CFP-15M Cylinder Filling Plant

Installation, Operation and Maintenance Manual

Oxygen Generating Systems Intl. (*OGSI*)
Division of Audubon Machinery Corporation
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Part # 9000000.003 **US $25.00**

Effective 11/2010

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Password to Access Touch Screen

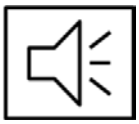
647401

Please take appropriate measures to keep this password secure and prevent unauthorized access.

Using the Manual

This manual is intended as a guide for operators of ***OGSI*** Oxygen Generators and Oxygen Generating Systems. It includes information on our warranty policy, features, functions, applications, proper set-up and installation, operation and maintenance of our products.

The following symbols are used throughout the manual:

	**Information** (Do not use product before reading the manual)		**Electrical Hazard**
	**Sound**		**Fire Hazard**
	**No Smoking**		**Warning**
	**No Open Flames**		**Power ON/OFF**
	**Flow Meter**		**Timer**
	**No Oil**		**Not Connected to Outlet**

Initial Inspection

The crate should be opened and inspected immediately upon delivery. Unpack the unit at once and perform a visual inspection to determine if it is dented, bent or scratched. Also check to make sure the power cord is attached and that the control panel has not been damaged in any way during shipment.

If for any reason the unit should need to be returned in the future, this crate is the best way to ship it back to the manufacturer. Claims of damage due to freight handling can only be filed by you, the consignee, as ***OGSI*** shipping terms are Free On Board (FOB), North Tonawanda, NY USA. This means that once the equipment leaves our dock you are the owner of it. ***OGSI*** has no legal claim to make against any shipping company for damage.

At ***OGSI***, we are committed to using shipping companies with good reputations for taking care in the handling of freight and providing service in the event of damage.

Warranty

Oxygen Generating Systems Intl., being a division of Audubon Machinery Corporation (hereinafter ***OGSI***), provides a warranty on its products (the "Products") against defects in material and workmanship, under normal use and operation, to the extent set forth in this Warranty.

THIS WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY OF ***OGSI*** WITH RESPECT TO THE PRODUCTS AND IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED ALL OF WHICH ARE HEREBY DISCLAIMED TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW. WITHOUT LIMITING THE GENERALITY OF THE FOREGOING DISCLAIMER AND EXCEPT AS OTHERWISE SET FORTH IN THIS WARRANTY, ***OGSI*** DISCLAIMS ALL WARRANTIES OF MERCHANTABILITY WITH RESPECT TO THE PRODUCTS AND ALL WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE. THE WARRANTY OF ***OGSI*** AS SET FORTH HEREIN IS FOR THE BENEFIT OF THE ORIGINAL USER OF THE PRODUCTS AND IS NOT TRANSFERABLE WITHOUT THE PRIOR EXPRESS WRITTEN CONSENT OF ***OGSI***.

The ***OGSI*** Warranty provides the following:

1) ***OGSI*** shall repair or replace the Products free of charge to the original user where defects in the material and/or workmanship are evident at the time of delivery. Such replacement of the Products does not include damages incurred in shipping the Products. If shipping damage is evident, the original user should contact the shipper immediately. ***OGSI*** will pay for shipping the Products to the original user as well as returning damaged/defective Products to ***OGSI***. Once the Products are repaired, ***OGSI*** will ship the Products back to the original user and cover all costs incurred in shipping.

2) ***OGSI*** shall repair or replace the Products (excluding filter elements and sieve material) free of charge to the original user where defects in material and/or workmanship become evident between the time of delivery to the original user and one (1) year from the date of delivery to the original user. ***OGSI*** will pay for shipping the Products to the original user as well as returning damaged/defective Products to ***OGSI***. Once the Products are repaired, ***OGSI*** will ship the Products back to the original user and cover all costs incurred in shipping. In no event shall ***OGSI*** have any responsibility or liability for the cost of labor for the removal of component parts or equipment that constitute part of the Products, packaging of the component parts or equipment that constitute part of the Products or the re-installation or replacement of the component parts or equipment that constitute part of the Products.

3) The warranty provided by ***OGSI*** to the original user covers parts and equipment specifically manufactured by ***OGSI*** and used as components or equipment that constitute part of the Products. The warranty on parts or equipment manufactured by third parties and included as part of the Products *(e.g., air dryers, air compressors, oxygen compressors, instrumentation, etc.)* is limited to the respective original warranties of such third parties.

Note: A *Return Authorization Number* must be obtained from ***OGSI*** prior to the return shipment of the Product or any component parts or equipment of the Products. The *Return*

Authorization Number must be visibly written on the outside of the package of the returned Products, component parts or equipment as applicable or ***OGSI*** will not accept the return. **Note:** A *Credit Certificate* will be created for all Warranty Exchange transactions. ***OGSI*** will provide the *Credit Certificate* with an invoice at the time of shipment to the original user. The *Credit Certificate* must be included in the package to ***OGSI*** with the returned products within 30 days of the date of the invoice. Failure to return Warranty Exchange Products to ***OGSI*** within 30 days will make the Warranty Exchange process void and payment for Products will be billed and due on receipt.

Note: The warranties of ***OGSI*** as set forth herein shall also become null, void and not binding on ***OGSI*** if a defect or malfunction occurs in the Products or any part of the Products as a result of:

a) A failure to provide the *Required Operating Conditions* for the Products (*See Page 28)*

b) Repair, attempted repair, adjustment or servicing of the Products, or any component parts or equipment that constitutes part of the Products by anyone other than an authorized representative of ***OGSI***. The authorized service representative must obtain prior approval from ***OGSI***'s Service Manager before performing any warranty work.

c) External Causes (e.g. flood, hurricane, tornado, fire, any natural disaster, or any event deemed an act of God).

Molecular Sieve Replacement:

The breakdown of the molecular sieve inside the generator (dusting of the sieve) only occurs if excess water/oil is entrained in the feed air stream. Under no circumstances is the molecular sieve covered under any warranty by ***OGSI***. If sieve dusting occurs on your machine, check the air compressor, air dryer and filter elements.

Other Matters:

OGSI is not liable for any special, indirect, punitive, economic, incidental or consequential losses or damages including without limitation, loss of use, malfunction of ***OGSI*** products, replacement oxygen charges, delays or lost savings related to the Products or otherwise even if ***OGSI*** shall have been advised of the possibility of such potential losses or damages.

Limits of Liability

OGSI Oxygen Generator products shall not be used for breathable or medical oxygen applications, unless they are assembled with the appropriate support equipment, tested, and operated in compliance with either American, Canadian or ISO norms for hospital oxygen systems.

Safety Guidelines

Handling of Compressed Gas Cylinders

Many of the following procedures for the handling, storage, and utilization of compressed gas in cylinders are taken from material furnished by the Compressed Gas Association, which complies with **OSHA** standards.

Always ensure that compressed gas cylinders are securely strapped or chained in place to prevent tipping or falling. Do not store near elevators, stairs, or passageways.

Do not place cylinders in a position where they might become part of an electric circuit. When electric welding is taking place, precautions should be taken to prevent accidental grounding of cylinders, permitting them to be burned by electric welding arc.

If visual inspection indicates obvious damage, the cylinder should be returned to the supplier without any attempt at using the machine.

If cylinder leaks, other than normal venting, and the leak cannot be corrected by tightening a valve gland or packing nut, the valve should be closed and a tag attached stating that the cylinder is not serviceable. Remove the cylinder outdoors to a well-ventilated or open area, notify the supplier, and follow the supplier's instructions for the return of the cylinder.

Keep the cylinder valve closed at all times except when in active use. When removable caps are provided for valve protection, they should not be removed except for active use. Remember to replace removable caps when not in use.

Cylinders should not be dropped or permitted to strike each other or any other surface. Do not drag or slide cylinders; use a suitable hand truck, fork truck, roll platform or similar device, firmly securing the cylinders for transporting.

Do not store oxygen cylinders with flammable gas cylinders. Stored oxygen and fuel gas cylinders should be at least 20 ft apart; preferably separated by a fire resistant partition.

For additional information refer to the CGA publications that can be found at ***http://www.cganet.com***

See also ISO publication 10083that can be found online at ***http://www.iso.org***

Operating

OGSI cylinder filling plants are self-contained systems for the production of high concentration oxygen. Although oxygen itself is not combustible, it can be very dangerous. It greatly accelerates the burning of combustible materials.

Precautions should be taken to avoid a fire in the area of the generator.

Smoking should not be permitted in the area where the generator is located.

All oxygen connections and hoses should be kept clean and free of grease, oil and other combustible materials.

Valves controlling oxygen flow should be opened and closed slowly to avoid the possibility of fires or explosions that can result from adiabatic compression.

Do not attempt to modify or enhance the performance of a **CFP-15M** unit in any way.

When bleeding a tank or line, stand clear and do not allow oxygen to embed itself within clothing. A spark could ignite the clothing violently.

Product Information

Features and Applications

The ***OGSI*** Model **CFP-15M** is a self-contained oxygen cylinder filling plant that uses Pressure Swing Adsorption (PSA) technology. It allows users to generate medical-grade oxygen (conforming to United States Pharmacopeia (USP) XXII oxygen 93% Monograph). It concentrates oxygen up to **93% (± 3%)** purity.

Features

Easy to Use

- Just connect to an electrical outlet.
- A digital color touch screen display shows all the information required to monitor the manufacturing process of oxygen

Dependable

- The unit has an internal air compressor, two sieve beds, small storage tank, oxygen compressor and automated PLC and other connections which are all enclosed within the unit. The unit can be operated continuously for up to **18** hours a day. The recommended duty cycle is **75%** per day.

Durable

- The unit is built in a self contained plastic cover and operates quietly.

Portable

- The **CFP-15M** unit is made up of two cases placed on top of one another and strapped in a cart that can be moved around easily.

Safe

- The unit performs a continuous series of self-diagnostic tests as it runs. It shuts down automatically if there is a drop in oxygen purity and displays a visual alarm on the screen.

Economical

- The **CFP-15M** unit saves at least **20%** of oxygen expenses. It eliminates the costs involved in transportation, maintenance, hazmat fees, cylinder rental fees and wasted supply of oxygen. Conserve and control your oxygen supply.

Applications

The **CFP-15M** can be used in various applications. A few examples are given below.

Military Medical Services

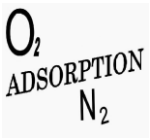
EMS (Emergency Medical Services)

Fire Departments

Hospitals

Scuba Applications

Nursing Homes

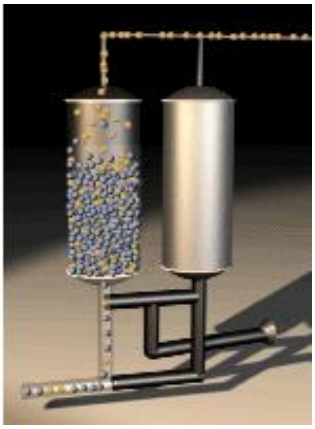


Pressure Swing Adsorption (PSA) Technology

An ***OGSI*** Oxygen Generator is an on-site oxygen generating machine capable of producing oxygen on demand in accordance with your requirements. In effect, it separates the oxygen (21%) from the air it is provided and returns the nitrogen (78%) to the atmosphere through a waste gas muffler. The separation process employs a technology called **Pressure Swing Adsorption (PSA)**. At the heart of this technology is a material called Molecular Sieve (Zeolite). This sieve is an inert, ceramic-like material that is designed to adsorb nitrogen more readily than oxygen. Each of the two beds that make up the generator contains this sieve. The process is described below.

Stage 1

Compressed air is fed into the first molecular sieve bed. Nitrogen is trapped, while oxygen is allowed to flow through.

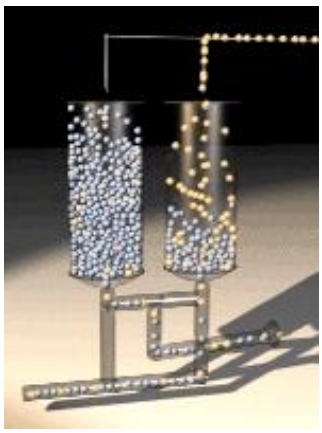


Stage 2

When the sieve in the first bed becomes full of nitrogen, the airflow is then directed into the second bed.

Stage 3

As the second bed separates the oxygen from the nitrogen, the first bed vents its nitrogen into the atmosphere.

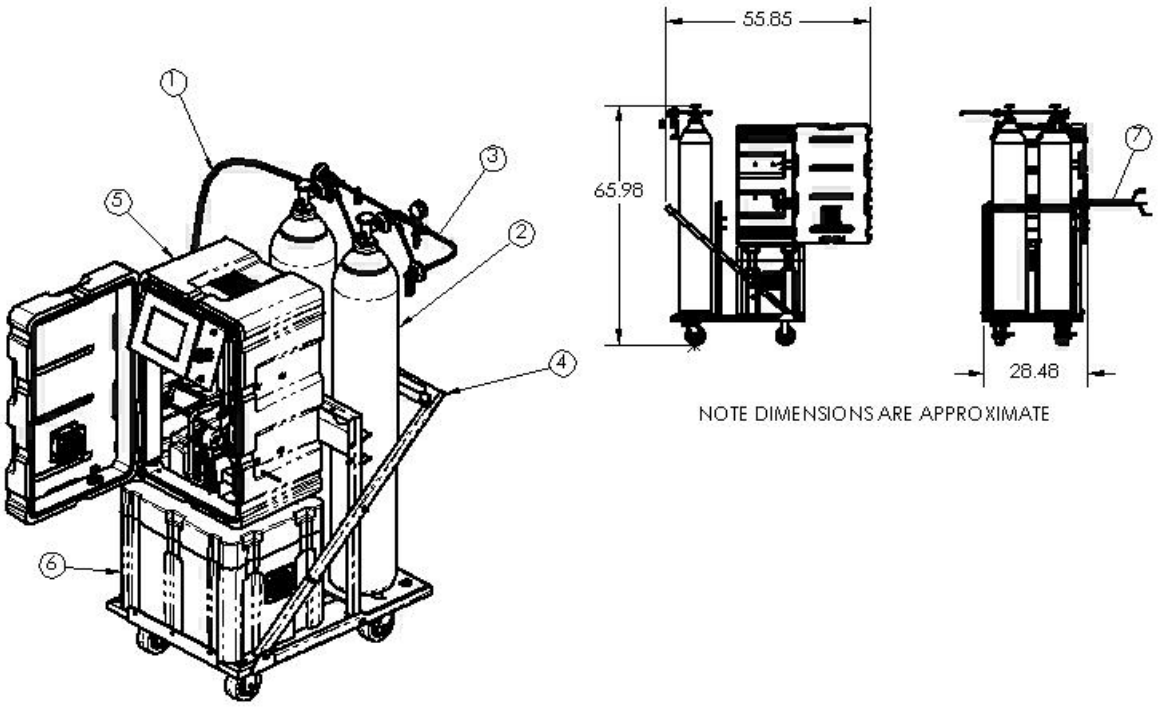


Stage 4

Compressed air is once again fed into the first bed and the process is repeated continuously. A constant flow of oxygen is produced.

This air separation process is reliable and virtually maintenance-free. The molecular sieve will last indefinitely, as long as it does not become contaminated with water or oil vapors. This is why regular filter element replacement is crucial to trouble-free operation. The filter elements are very inexpensive and require semi-annual maintenance.

External Components



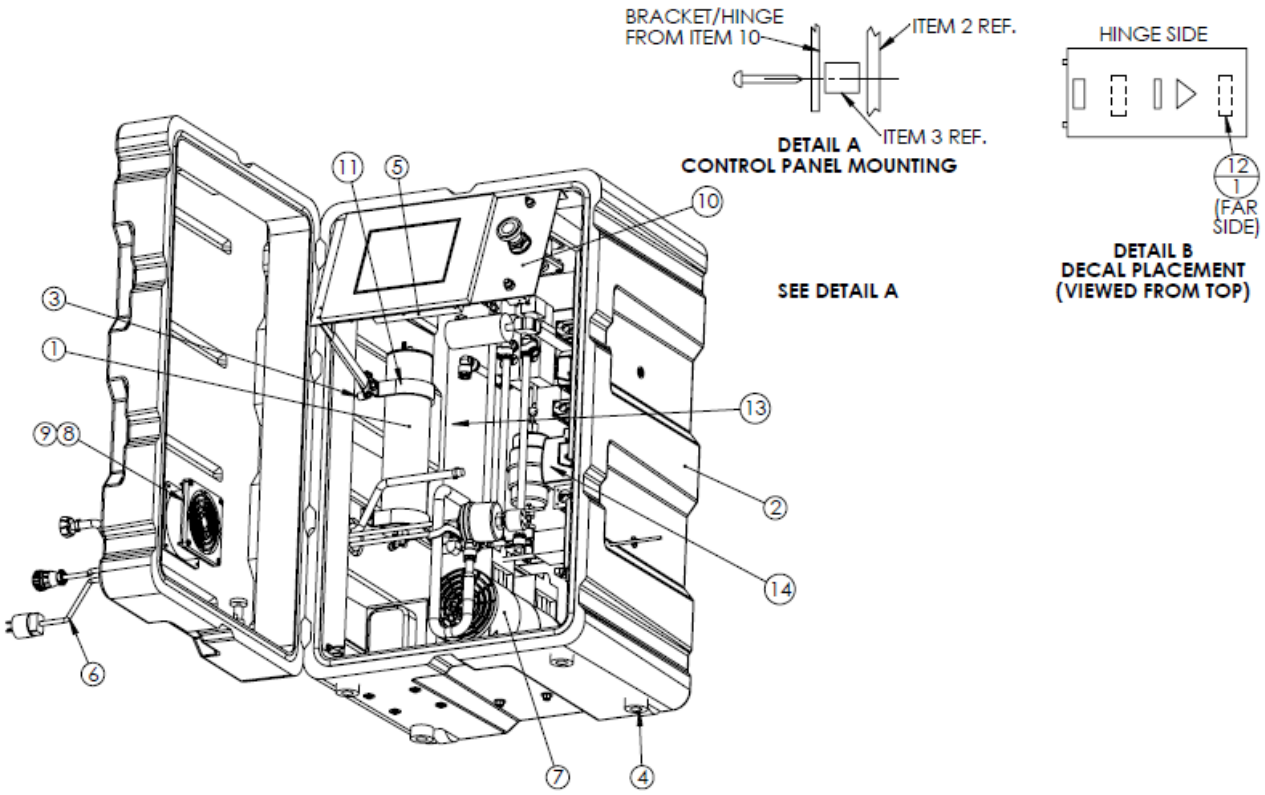
1. **72” HP Oxygen Hose**
2. **K-size Tanks**
3. **Manifold**
4. **Cart**
5. **Upper OGS Case**
6. **Lower OCS Case**
7. **Umbilical Cord with Outlets**

External Components Description

High Pressure Oxygen Hose	This hose connects to the **OCS** outlet fitting.
K-size Tanks	These tanks are oxygen safe and are used to store high pressure oxygen.
Manifold	This is a stainless steel braided hose used to transport oxygen to the bottles.
Cart	This cart allows the **OGS** and the **OCS** units to be easily moved around with up to two K-sized cylinders.
Upper OGS Case	This case contains the oxygen generator system.
Lower OCS Case	This case contains the oxygen compressor system.
Umbilical Cord with Outlets	When the two ports are connected by the umbilical cord, low pressure oxygen, electrical power and relay signals can be transferred between the **OGS** unit and the **OCS** unit.

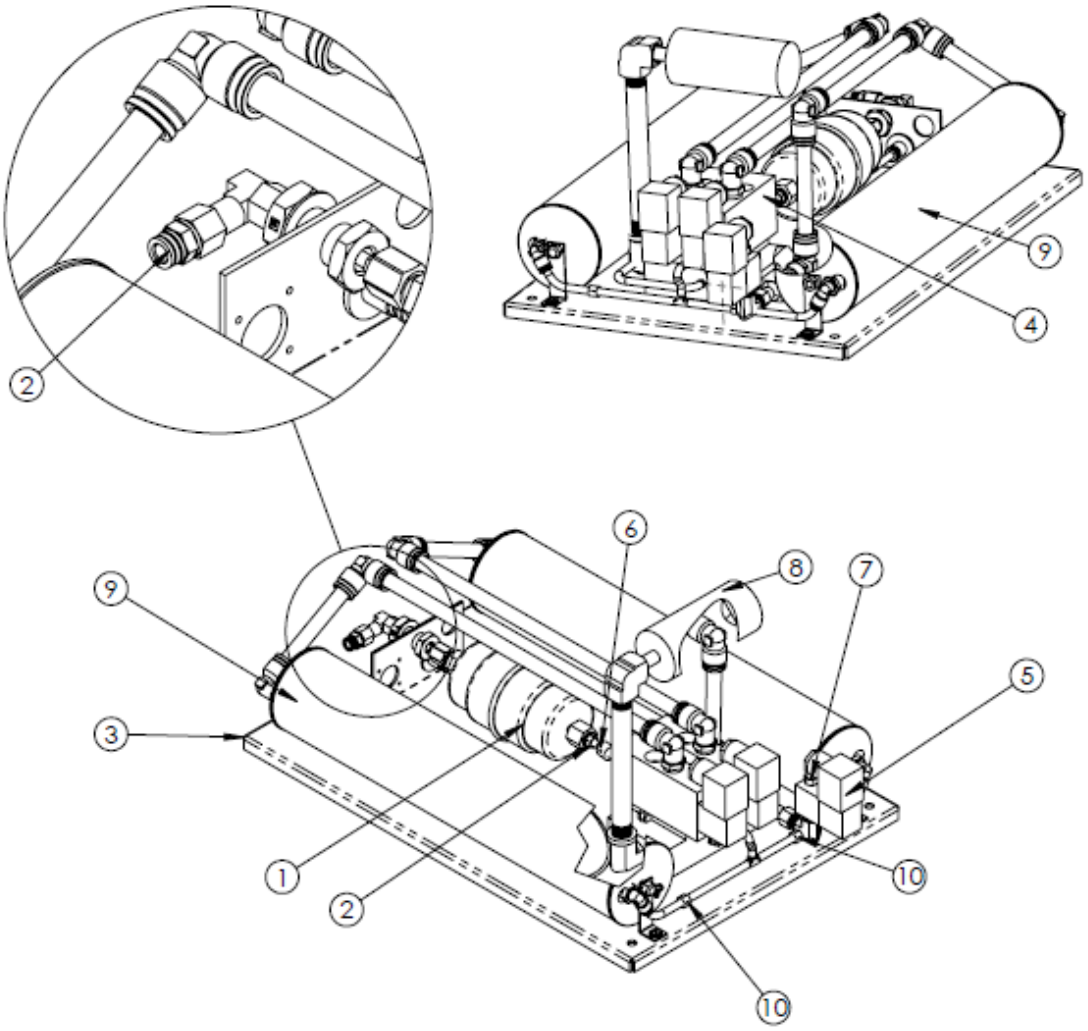
Internal Components

Upper OGS Case



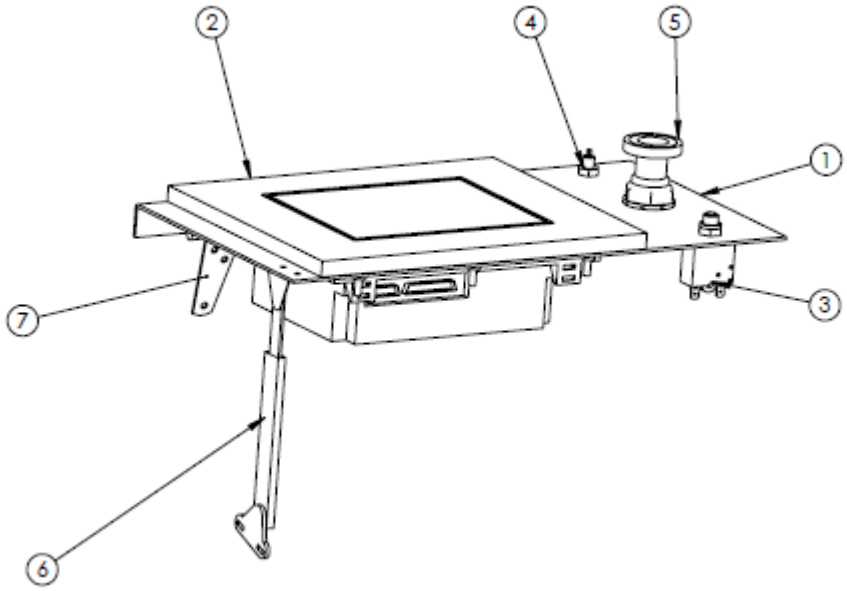
1. **Storage Tank**
2. **Hardigg Case**
3. **$^1/_2$" Nylon Spacers**
4. **Rubber Foot with $^1/_4$" Hole**
5. **Touch Screen RS232 Cable**
6. **Power Cord**
7. **Compressor Assembly**
8. **Cooling Fans (115 VAC)**
9. **Fan Filter ASM**
10. **Control Panel Assembly**
11. **2 $^1/_2$" Pipe Strap**
12. **Serial Number Tag**
13. **OEM Panel Assembly**
14. **Electrical Assembly**

OEM Panel Assembly



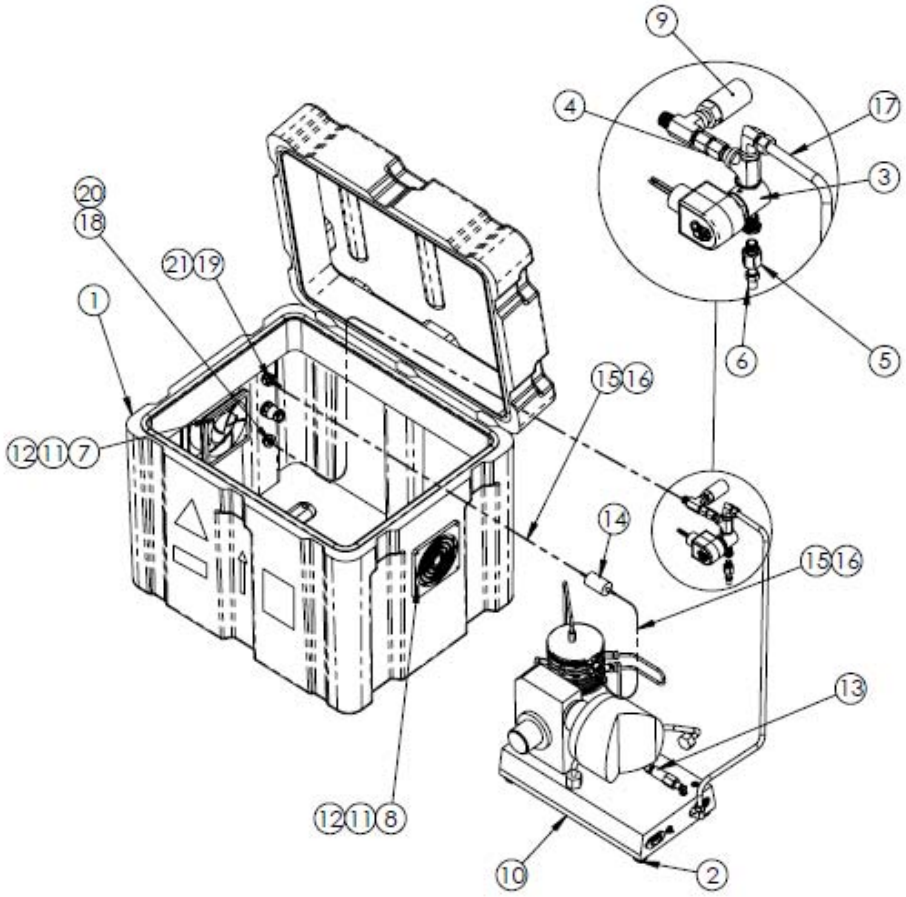
1. **Mixing Tank**
2. **$^1/_4$" PTC x $^1/_8$" NPT Adapter**
3. **OEM Base Plate**
4. **Valve Manifold**
5. **Solenoid Valve**
6. **Check Valve**
7. **Bronze Muffler**
8. **Exhaust Muffler**
9. **Sieve Beds**
10. **Purge Orifice**

Monitor Board



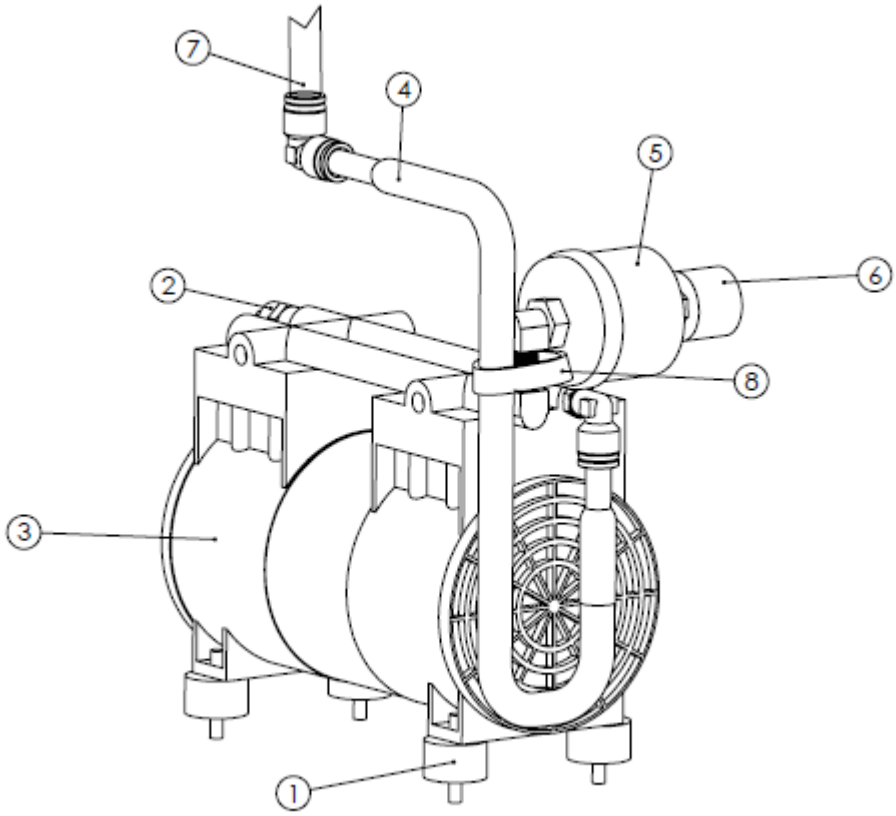
1. **Control Panel Base Plate**
2. **8” Touch Screen Panel**
3. **7 A Breaker**
4. **Breaker (Supplied with P/N 21200MB.110)**
5. **Emergency Stop Switch**
6. **Hinged Support Bracket**
7. **Hinge**

Lower OCS Case



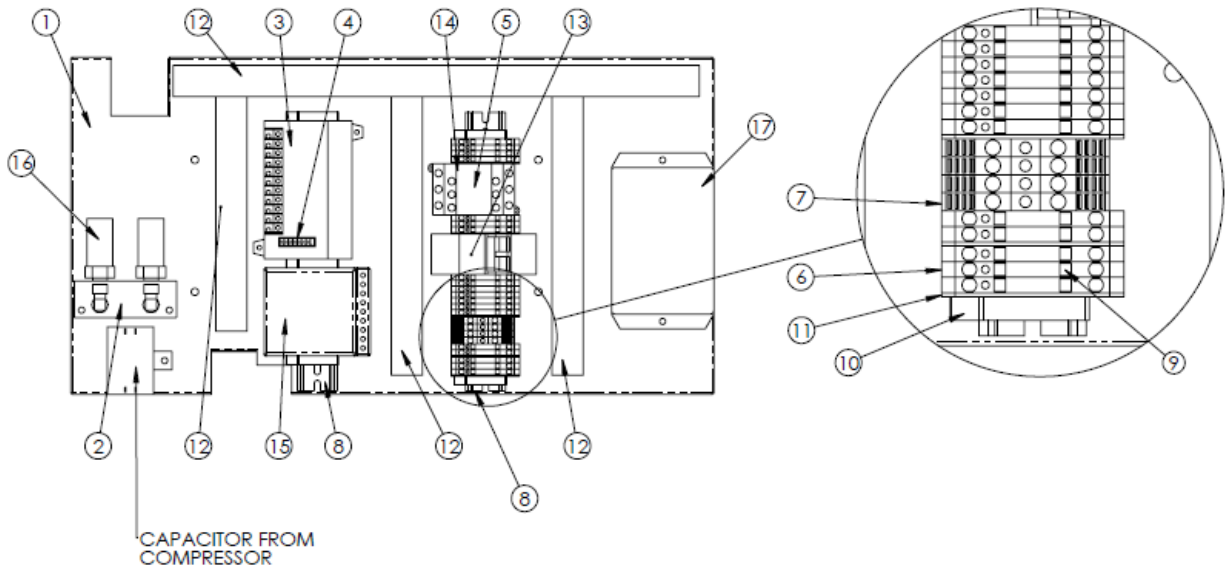
1. Hardigg Case
2. Rubber Mounts
3. Solenoid Valve HP
4. Check Valve SS HP
5. $^{1}/_{8}$" NPT Orifice
6. Sintered Muffler
7. Fan Cord 24"
8. Fan Cord 48"
9. $^{1}/_{4}$" NPT 0-3000 psi Transducer
10. RIX Micro-boost O_2 Compressor (115 VAC)
11. Cooling Fans (115 VAC)
12. Fan Filter Assembly
13. Inline Filter $^{1}/_{4}$" Swagelok
14. HEPA Inline Filter
15. $^{1}/_{4}$" Clear Hose
16. Nylon Tube Clamps
17. 24" HP Hose
18. OCS Outlet to Manifold
19. OCS Inlet from OGS
20. CGA540 Cap and Chain
21. Dust Cap

Compressor Assembly



1. $^{1}/_{4}$" Rubber Stud Bumpers
2. Relief Valve
3. $^{1}/_{3}$ HP Compressor (115 VAC)
4. Heat Exchanger
5. Inlet Filter
6. Inlet Pre-filter
7. $^{1}/_{2}$" Green Oxygen Hose
8. Worm Clamp

Electrical Sub-Assembly



1. **Electrical Base Plate**
2. **Two-port Junction Manifold**
3. **PLC DL05AR**
4. **Four-channel Analog Input PLC Card**
5. **Motor Contactor (115 VAC, 25 A)**
6. **Terminal Block Section**
7. **Ground Terminal Block Section**
8. **Din Rail**
9. **Terminal Block Pole Jumper**
10. **Terminal Block End Stop**
11. **Terminal Block End Plate**
12. **1” Panduit Wire Duct**
13. **Circuit Breaker (15 A)**
14. **Low Pass Filter for Motor Contactor**
15. **Power Supply (24 VDC)**
16. **$^1/_4$” NPT 0-50 psi Pressure Transducer**
17. **O_2 Monitor (± 1 %) 24 V, 4-20 mA**

Umbilical Cord

PIN #	COLOR	START CONNECTION	END CONNECTION	PURPOSE
1	BLACK W/ # 1	RIX O/L BREAKER	RIX HARNESS	RIX POWER
2	BLACK W/ # 2	C6	RIX HARNESS	RIX NEUTRAL
3	BLACK W/ # 3	Y3	RIX CONTACTOR A2	RIX TRIGGER
4	BLACK W/ # 4	A3	FAN3	FAN 3 POWER
5	BLACK W/ # 5	C11	FAN3	FAN 3 NEUTRAL
6	BLACK W/ # 6	A6	FAN4	FAN 4 POWER
7	BLACK W/ # 7	C12	FAN4	FAN 4 NEUTRAL
8	BLACK W/ # 8	Y4	HP RELIEF VALVE	HP VALVE POWER
9	BLACK W/ # 9	C7	HP RELIEF VALVE	HP VALVE NEUTRAL
10	BLACK W/ # 10	F5	HP TRANSDUCER	HP TRANSDUCER +24V
11	BLACK W/ # 11	CH3 +	HP TRANSDUCER	HP TRANSDUCER SIGNAL
12	GREEN W/YELLOW	D6	RIX HARNESS	RIX GROUND

- **Items 2 and 6 form the power cord**
- **Items 13 and 14 connect to the OCS inlet from the OGS**
- **Item 3 connects to OCS electrical inlet**

1. **Pull Handle**
2. **5-15 Plug End**
3. **18 AWG Pin for Male Connector**
4. **16 Pin Connector (Male)**
5. **$^{3}/_{4}$" Polyester Sleeve Black**
6. **12 AWG 3 Wire Power Cord**
7. **18 AWG 12 Wire Control Cable**
8. **$^{1}/_{4}$" ID Green Oxygen Hose**
9. **Green Shrink Tubing**
10. **3 into 1 Heat Shrink Boot**
11. **$^{9}/_{16}$" Oetiker Clamp**
12. **Strain Relief for 16 Pin Connector**
13. **$^{1}/_{4}$" Hose Bard Diss Nipple**
14. **Hand tight Diss Nut**

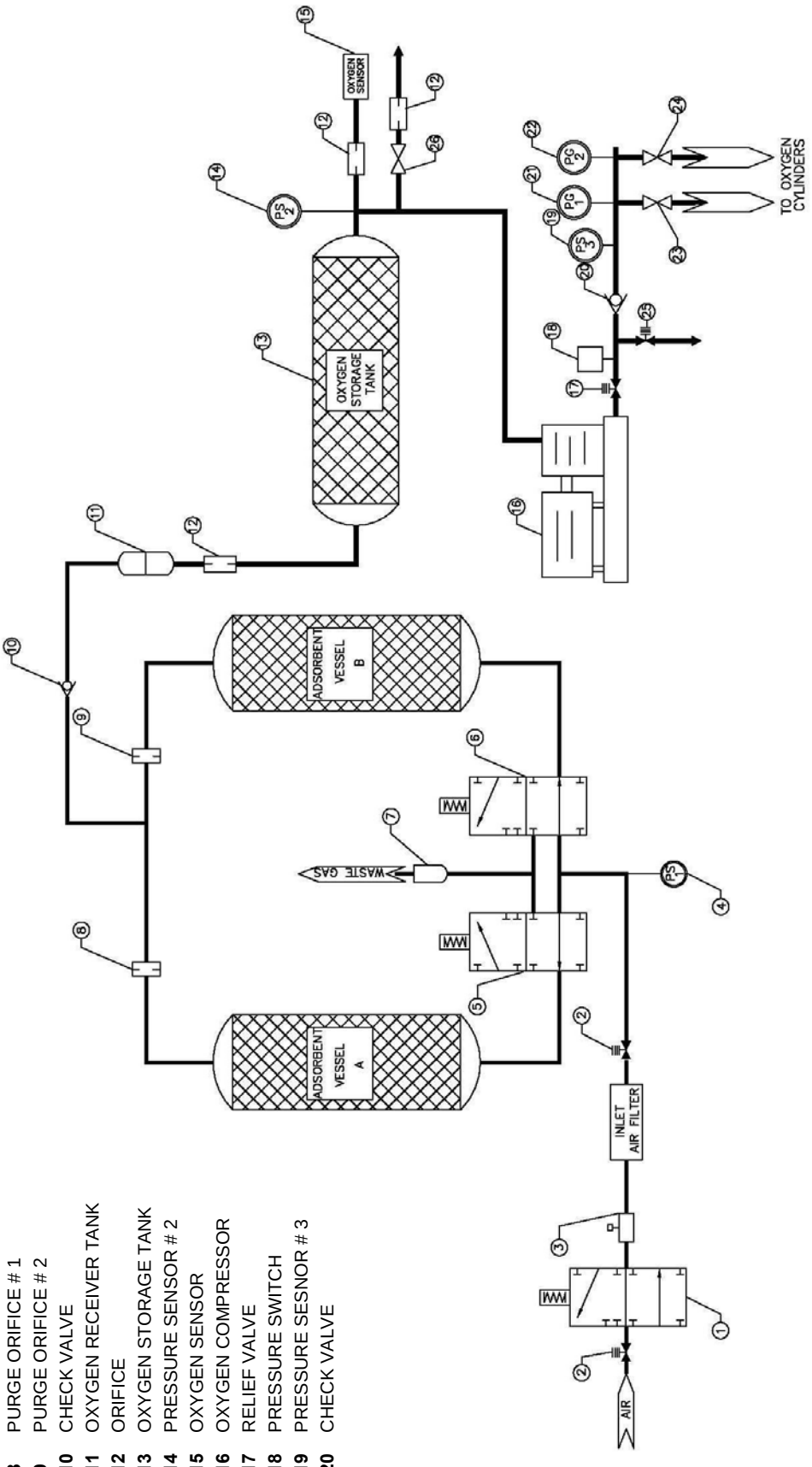
Internal Components Description

Storage Tank	The storage tank serves as a reservoir for the oxygen, prior to entering the oxygen compressor.
Touch Screen	This is the main user interface with the machine. All controls are programmed within the touch screen.
Power Cord	The standard power cord is designed for use on **115 VAC/60 Hz** electrical systems and comes with a three-pronged ground fault protected plug. For **230 VAC (**optional**)**, a plug of local configuration will need to be installed by the end-user.
Cooling Fans	The fans maintain air flow through the enclosure to prevent excessive high temperature. The cooling fans are used to draw air into the unit and to remove heat from inside the enclosure. In addition, they remove the nitrogen that is being exhausted from the muffler. The fans operate when the unit runs.
Mixing Tank	The oxygen mixing tank is used as a small reservoir for oxygen storage before the product gas flows through the oxygen pressure regulator.
Valve Manifold	The valve block holds the main valves that control the direction of airflow in the machine. These are the feed and waste valves for each bed. They direct feed air to each bed during oxygen production and waste nitrogen through the muffler to regenerate the sieve. The cycle continues while the unit operates.
Check Valves	The check valves allow oxygen to flow through them in one direction only.
Exhaust Muffler	The exhaust muffler is used to silence the exhaust noise that occurs as a result of the sieve beds rapidly depressurizing to atmospheric pressure, releasing nitrogen. For installations where a lower noise level is required, ***OGSI*** offers an optional alternative muffler system that can decrease the emitted noise even further.
Sieve Beds	These beds contain the molecular sieve that performs the air separation process. Exposing the internal sieve material to the atmosphere causes contamination. If the sieve becomes contaminated the beds can be easily replaced.

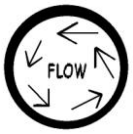
Purge Orifice	The purge orifice allows for a small amount of produced oxygen to vent into the opposite sieve bed, forcing nitrogen out and preparing the sieve for another cycle.
Circuit Breaker	The circuit breaker will trip to prevent excess current from passing into the system which could damage the equipment. It allows the air compressor to be reset in the event of a thermal overload fault.
Transducer Manifold	The transducer manifold distributes pressure, supplies connections to tubing and provides a mounting surface for the transducers.
Oxygen Compressor	The **RIX** oxygen compressor boosts the low pressure oxygen from the typical **5 psi (0.3 bar)** up to **2200 psi (152 bar)**. It is a three-stage compressor with a self-contained motor start capacitor.
OCS Outlet	This is the oxygen outlet that gets connected from the manifold to the **OCS (Oxygen Compressing System)**.
OCS Inlet	This is the oxygen inlet that gets connected from the **OGS** case to the **OCS** case. This is low pressure oxygen.
Safety Relief Valve	The relief valve vents excessive pressure to the atmosphere.
Air Compressor	The air compressor supplies the feed air to the sieve beds. It is held in place by four bolted rubber feet and can be easily replaced when necessary. It should work as designed for a minimum of 10,000 hours and will last 20,000 hours in many cases.
Heat Exchanger Tube	The heat exchanger tube runs in front of the cooling fan and delivers the feed air from the air compressor to the valve block. The tube has been designed to allow significant air temperature reduction before the air enters the sieve beds, improving performance.
Inlet Air Filter	The air filter keeps dust and dirt from entering the compressor and needs to be changed twice a year in normal environments to maintain the unit's performance. It should be changed more often in dirty, oily areas. Four times a year is recommended.
Motor Contactor	The relay supplies power to the oxygen compressor and starts the fans and air compressor when a signal is received from the PLC.

24 VDC Power Supply	The power supply converts **115 VAC** signal into 24 VDC, which is used by transducers, oxygen sensor and touch screen.
Motor Start Capacitor	The motor starting capacitor is connected directly to the motor of the air compressor. It is used to reduce the starting electrical current surge into the motor.
Thermal Overload	The thermal switches prevent damage to the motor due to excess current draw. If a thermal overload switch trips, it may be reset by pressing the exposed button.
Timed Shutdown Relief Valve	This valve vents the air compressor head pressure for thirty seconds upon shut-down.
Oxygen Sensor	The oxygen sensor gives a variable output current to the PLC at different levels of oxygen purity. The PLC then communicates this signal to a virtual gauge in the touch screen. This shows the purity of the oxygen being made by the oxygen generator.
Oxygen Flow Control Orifice	This orifice controls the amount of oxygen to the oxygen compressor.
Oxygen Compressor Thermal Reset Switch	This switch allows the oxygen compressor to be reset in the event of a thermal overload fault.
PLC	The PLC (Programmable Logic Controller) processes inputs and outputs to and from the system components and communicates with the touch screen.
Transducers	The transducers give a variable output current to the PLC at different pressures. The PLC then communicates this signal to a virtual gauge in the touch screen.

Process Flow Schematic



1 AIR INLET VALVE
2 RELIEF VALVE
3 HEAT EXCHANGER
4 PRESSURE SENSOR # 1
5 VALVE # 1
6 VALVE # 2
7 MUFFLER
8 PURGE ORIFICE # 1
9 PURGE ORIFICE # 2
10 CHECK VALVE
11 OXYGEN RECEIVER TANK
12 ORIFICE
13 OXYGEN STORAGE TANK
14 PRESSURE SENSOR # 2
15 OXYGEN SENSOR
16 OXYGEN COMPRESSOR
17 RELIEF VALVE
18 PRESSURE SWITCH
19 PRESSURE SESNOR # 3
20 CHECK VALVE
21 MANIFOLD PRESSURE GAUGE # 1
22 MANIFOLD PRESSURE GAUGE # 2
23 MANIFOLD VALVE # 1
24 MANIFOLD VALVE # 2
25 HIGH PRESSURE UNOADING VALVE
26 PURGE VALVE



Process Flow Description

The normal flow of air through the **CFP-15M** unit is shown on the previous page in the Process Flow Schematic. As you can see once the incoming air is filtered and compressed in the **CFP-15M** unit, it is directed into one of the two sieve beds. As the air enters the bed, the nitrogen is adsorbed by the sieve and the oxygen passes through as product gas to the mixing tank. Each bed produces oxygen until the sieve in that bed is saturated with nitrogen. When this occurs, the feed airflow is directed to the other bed, which continues the production process. While the second bed is producing oxygen, the first bed is releasing into the atmosphere the nitrogen it adsorbed, under very low pressure through a waste gas muffler.

From the mixing tank, the oxygen product gas passes through a flow control orifice and into a storage tank. This storage tank serves as a reservoir for the oxygen prior to entering the oxygen compressor. The oxygen product gas is then delivered to the oxygen compressor where it is compressed into cylinders up to **2200 psi (152 bar)**. The system will automatically de-energize when this pressure is reached.

Unit Specifications

Performance

Oxygen Volume	0 - 15 SCFH or 0.4 Nm^3/h 0 – 7 LPM
Oxygen Pressure	Up to 2200 psi (152 bar)
Oxygen Purity	United States Pharmacopeia (USP) XXII oxygen 93% Monograph
▪ *Oxygen Concentration* ▪ *CO_2 Output* ▪ *CO Output*	93% (± 3%) ≤ 300 ppm ≤ 10 ppm
Oxygen Dew Point	- 60° F (-51° C)
Response Time	Approximately **5** minutes to attain maximum purity after initial start-up or extended shut-down

Physical

Oxygen Outlet Fitting	*CGA540* Adapter
Air Inlet Filtration Level	0.3 Micron
Sound Levels ▪ *Door Opened* ▪ *Door Closed*	 72 dBA @ 1 m 65 dBA @ 1 m
Dimensions ▪ *OGS Unit (Top)*	 21 x 20 x 33 in (W x D x H) 53 x 50 x 84 cm (W x D x H)
▪ *OCS Unit (Bottom)*	19 x 20 x 23 in (W x D x H) 47 x 51 x 58 cm (W x D x H)
▪ *Cart*	27 x 36 x 39 in (W x D x H) 68 x 92 x 100 cm (W x D x H)
▪ *K Size Cylinder*	9 x 54 in (W x H) 23 x 137 cm (W x H)

Continued

Continued from Page 24

Weight	
▪ *OGS Unit (Top)*	88 lb (40 kg)
▪ *OCS Unit (Bottom)*	118 lb (54 kg)
▪ *Cart*	96 lb (44 kg)
▪ *K Size Cylinder*	120 lb (54 kg)

Power Requirement

Standard (Domestic)	115 VAC, 60 Hz, Single Phase 11 A

Safety Precautions

It is very important that you read the precautions below and make yourself aware of the hazards of oxygen in general. While it can be handled and used very safely, it can also be mishandled or applied incorrectly causing dangerous situations.

Oxygen is a fire hazard. It can be very dangerous as it vigorously accelerates the burning of combustible materials. To avoid fire and/or the possibilities of an explosion, oil, grease or any other easily combustible materials must not be used on or near the **CFP-15M** unit. **DO NOT SMOKE NEAR THE UNIT**. The unit should be kept away from heat and flames. Individuals who have experience handling oxygen systems should become the designated operators of the **CFP-15M** unit within your facility**.**

In critical applications, it is important to have a backup supply of oxygen since the generator does not come with any reserve storage tank and requires electrical power to operate. ***Therefore, during power outages oxygen will not be produced.***

Do not use extension cords to bring power to the generator. It is also important to use only a properly grounded outlet**.**

High pressure oxygen may present a hazard. Always follow proper operating procedures, and ***open valves slowly***. Rapid pressurization may result in personal injury. Safety glasses and hearing protection are required when venting oxygen under high pressure.

Ensure that the oxygen outlet stream is not directed toward anyone's clothing.
Oxygen will embed itself in the material and one spark or hot ash from a cigarette could violently ignite the clothing.

Pre-Installation

Before installing the ***OGSI* CFP-15M** unit, it is necessary to consider the location, space available and power supply for the machine.

1) Locating the **CFP-15M :**

- The machine should be located in an area that is indoors and remains between **40°F** (**5°C**) and **100°F** (**38°C**). There should also be a distance of at least **8 in** (**20 cm**) between the machine and any side wall in the room that it will be located in. This is to ensure that airflow into the machine through the cooling fans is not restricted.

2) Space Available for the **CFP-15M:**

- If the machine is going to be set up in a room that is small, (less than **1000 ft^3**or **28.3 m^3**), that room should be well ventilated (at least **5** air changes in the room per hour). The generator will be discharging nitrogen into the atmosphere of the room and a nitrogen build up could be dangerous to people entering the room. If the generator is placed in a small closet, the air in that closet will become enriched with nitrogen. As the generator continues to run, it would become more and more difficult for it to separate the oxygen from the air because oxygen will make up a smaller and smaller fraction of the air that is fed into the generator. This will stop the machine from functioning correctly and purity of the oxygen produced will decrease.

3) Power Supply for the **CFP-15M:**

- The machine should be positioned within **8 ft** (**2.2 m**) of the electrical outlet that will power it. The reason for this is that the motor draws a large current during the first few seconds of startup. **It is also very important for this reason NOT to use any extension cord rated for less than 20 A services with the machine.** They could overheat and melt, possibly causing a fire.

Required Operating Conditions

Location of Machine:

The **CFP-15M** unit is intended for use in mobile applications. The enclosure meets **NEMA 12** protection guidelines, which provides a degree of protection against dust, falling dirt and non-corrosive liquids.

Feed Air/Ambient Air Quality:

The life of any PSA **CFP-15M** unit is directly related to the air quality that is fed into it. Hot, humid, dirty, oily air deteriorates and degrades the performance of the molecular sieve. In order to preserve the effectiveness and extend the life of the generator, precautions must be taken to ensure that the air provided is cool, dry, clean and oil-free.

Ambient Air Temperature:

The machine is designed for use over a temperature range of **40°F** to **100°F** (**5°C** to **38°C**). Since hot air has the ability to hold more water in the form of humidity than cool air, operating the units in hot areas will reduce the effective life of the molecular sieve.

Note: Operation outside of this temperature range will not be warranted by ***OGSI***.

Electrical Power:

On U.S. models, the power for the control circuitry of the **CFP-15M** unit is a single-phase electrical supply of **115 VAC** and about **20 A** at a frequency of **60 Hz**. This equates to approximately **2.3 kW** of power. It is required that a **20 A** circuit be dedicated to each **CFP-15M** unit. Additionally, the unit must be plugged into this circuit using only the supplied power cord, and without additional extension cords.

Feed Air Requirements:

4 SCFM (6 Nm^3/h) at **30-35 psi (2.1-2.4 bar)** incoming pressure is required for proper functioning of this machine. The air should be cool and clean, filtered to remove any contaminants such as dust particles and moisture. It is recommended that it meet the requirements of ***ISO8573.1Class 4***.

Positioning:

The unit must be operated in an upright position only, with no obstruction blocking airflow around the unit. The rear of the unit should be positioned at a minimum of **12 – 18"** off the wall behind it with clear access on the other three sides.

Set-up & Installation

Although every **CFP-15M** unit is thoroughly tested and checked before it is shipped from our facility, the following checks are necessary to ensure that none of the internal components have been damaged in shipment. This check should take less than five minutes to perform. *(Refer to '**Initial Inspection'** on Page 2 before reading the instructions below)*

Make a visual inspection of the machine and make sure all parts are properly connected. (*Refer to 'Components' section*)

Open the upper **OGS** case and feed box interconnectors (power cords) through the round opening.

Screw the low pressure oxygen hose on to the lower **OCS** case until it is hand-tight. Line up control connector and plug into the lower **OCS** case. Push in lightly and turn control connection latch ring until it locks into place.

Attach H/K bottle manifold onto both bottle until it is hand tight. Attach high pressure hose to side of the lower **OCS** case and to the end of the manifold and screw it until hand-tight.

Connect the upper **OGS** case to the lower **OCS** case with the umbilical cable and the oxygen hose. Connect the power cord to the **OGS** unit.

Ensure the plug is removed from the top of the oxygen compressor located in the **OCS** case prior to operation of the system. Please do not discard this plug as it will need to be re-installed prior to movement of system to another location. This will prevent oil leakage and damage to oxygen compressor upon restart.

Connect the unit to an electrical outlet. A receptacle plug of local configuration will need to be attached first if the machine has been shipped outside North America.

Ensure the touch screen is powered and a display is visible. Consult the troubleshooting guide in this manual (*See Page 32*) for any problems you may encounter.

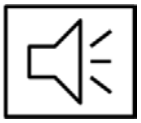
After entering a password and selecting a language, start the machine by pressing both the **OPERATING MODE** (**AUTOMATIC**), and then the **ON/OFF** buttons on the touch screen. (Ensure that the pressure **ON/OFF** set points located on the **SETTINGS** screen is set to **1900 psi (131 bar)** and **2200 psi (152 bar)** respectively or the machine will not start when the **ON/OFF** button is in the **ON** mode.

Operating Instructions

Start-up

Once the system has been installed in accordance with the setup and installation instructions, it may be energized and cylinder filling may begin. It is highly recommended that the user read the „**Touch Screen Overview**' section (*Pages 34-47*) prior to operating the system.

Choose between **AUTOMATIC** and **MANAUAL** modes of operation. For a detailed explanation of modes and all other touch screen functions, see the „**Touch Screen Overview**' section (*Pages 34-47*). If selected, the **AUTOMATIC** mode will initialize the system when pre-programmed conditions are satisfied and the **ON/OFF** button is in the **ON** position. **AUTOMATIC** mode (recommended) will turn **ON** and **OFF** automatically to fill H/K storage bottles when needed. The **MANUAL** mode requires the user to press an additional **START** button to initialize the system. This is intended to prevent an inadvertent system initialization. **MANUAL** mode will complete one filling cycle and shut-down.



Listen for the sound of the compressor and four cooling fans to start running, if you do not hear them within a few seconds, shut the machine down immediately by pressing the **ON/OFF** button and call ***OGSI*** for assistance.

Once the machine is running, press the **MAIN MENU** button and then press the **GAUGE** screen button. Both the regulated air and low oxygen pressure gauge needle indicators should be operating within the highlighted green area. The oxygen purity gauge should steadily increase to above **90%**.

When the purity reaches **90%** or higher for **4** minutes, the high pressure oxygen compressor will be energized. You should be able to feel oxygen being discharged from the lower right oxygen outlet port. Look at the touch screen to see if the high pressure reading increases. If these things do not occur, check to make sure that none of the hose connections have come loose. Call the ***OGSI Technical Service Department*** at ***(800) 414-6474*** (toll free number in USA and Canada) or ***(716) 564-5165*** if no loose connections are found and trouble persists.

Ensure that an approved oxygen cylinder is properly connected (*See the manifold operating procedures on Pages 48-50*). The system should not normally be operated without a cylinder properly attached and ready to be filled.

Operating status of the system is consistently monitored by the touch screen. The system will take a few minutes to reach an acceptable purity level and begin filling the H/K storage bottles. The oxygen countdown times (located in the **CONTROLS** screen) will show the number of seconds it will take until the oxygen compressor starts.

If the machine purity drops below the acceptable purity level, the touch screen will provide you with a visual alarm. Select the **ALARM s**creen from the **MAIN MENU** to see a description of the issue at hand for assistance in correcting the performance issue or resetting the alarm.

Shut-down

The system is designed to shutdown in a few different ways. The first method is for it to shut down automatically, which should occur during normal operation. The second method is through intentional user interruption by stopping it using the touch screen **STOP** button and the third method is using the **Emergency-Stop** function.

The **CFP-15M** unit has been programmed to automatically de-energize when cylinder pressure reaches the set point (normally **2200 psi** i.e. **152 bar**); indicating that cylinder filling is complete. This pressure can be adjusted up to **2200 psi (152 bar)** by the user.

The machine may be manually de-energized by pressing the „**Power**' button on the **CONTROLS** screen to **OFF** at any time.

The machine can also be de-energized at any time by pressing the red **Emergency-Stop** button on the front control panel. Keep in mind that this will only break the electrical power to the machine. There may still be oxygen stored at high pressure inside the system which could represent a hazard in an emergency situation.

Troubleshooting Guide

Problem	Sign	Cause	Solution
No Power	Blank touch screen display	• **Emergency-Stop** button has been pushed in • Loose wires	• Ensure that power is available from **115 VAC** supply. • Check the **Emergency-Stop** button. If this button is pressed, it secures all power to the system. • Visually inspect the electrical wiring. Reconnect any loose wires to the labeled location.
System not Running	No sound	• System is in **MANUAL** mode • Bottle full to set pressure • Active alarm	• Press the additional **START** button if system is in manual mode. • Check the **GAUGE** screen and ensure that the current **High Oxygen Pressure** is not greater than the set **low-point**. The default setting is **1950 psi (134 bar)**. • Check that bottle valve is open. • Check the **ALARM** screen for any faults. A „**WARNING ACTIVE'** sign will appear at the bottom of each screen if a fault has occurred.
System Shuts Down Inadvertently	„**WARNING ACTIVE**' indication	• Bottle full to set pressure • Active alarm	• Check that bottle valve is open. • Check the **ALARM** screen. If a warning is active, follow the instructions. • Check the high oxygen pressure gauge. If the reading is equal to the set point, the machine has been programmed to shut down.
Oxygen Purity is Low		• Leaks in the system • Extreme high temperature or humidity.	▪ Check the system for leaks, using a leak testing solution. ▪ Ensure that the operating environment is conducive to oxygen generation.

Valves Sticking	Pressure levels too high	Dusting of sieve or machine filled with dirt and dust due to filters not being replaced	Remove valve block from machine and clean valves and spools completely.
Low Pressure Compressor not Running	No regulated air pressure	Circuit breaker has tripped	Push in the thermal overload button and restart the machine.

Warning Signs

Thermal switch warning	The appropriate thermal overload switch must be reset (by pressing it) and the „**CLEAR WARNING**' button must be pressed. Normal operation can then be resumed.
Low oxygen pressure	This may be a result of a leak in the system. Use a leak testing solution to locate and repair any leaks.
The machine has run for 30 minutes and purity has not yet been reached	This may be a result of a leak in the system. Use a leak testing solution to locate and repair any leaks.
Oxygen purity has fallen below acceptable limits	This may be an indication of a leak within the system. Use a leak testing solution to locate and repair any leaks.

Touch Screen Overview

The touch screen is the main interface between the operator and machine, and incorporates all controlling mechanisms within its display.

Listed below are the Main Operator Features incorporated within the touch screen:

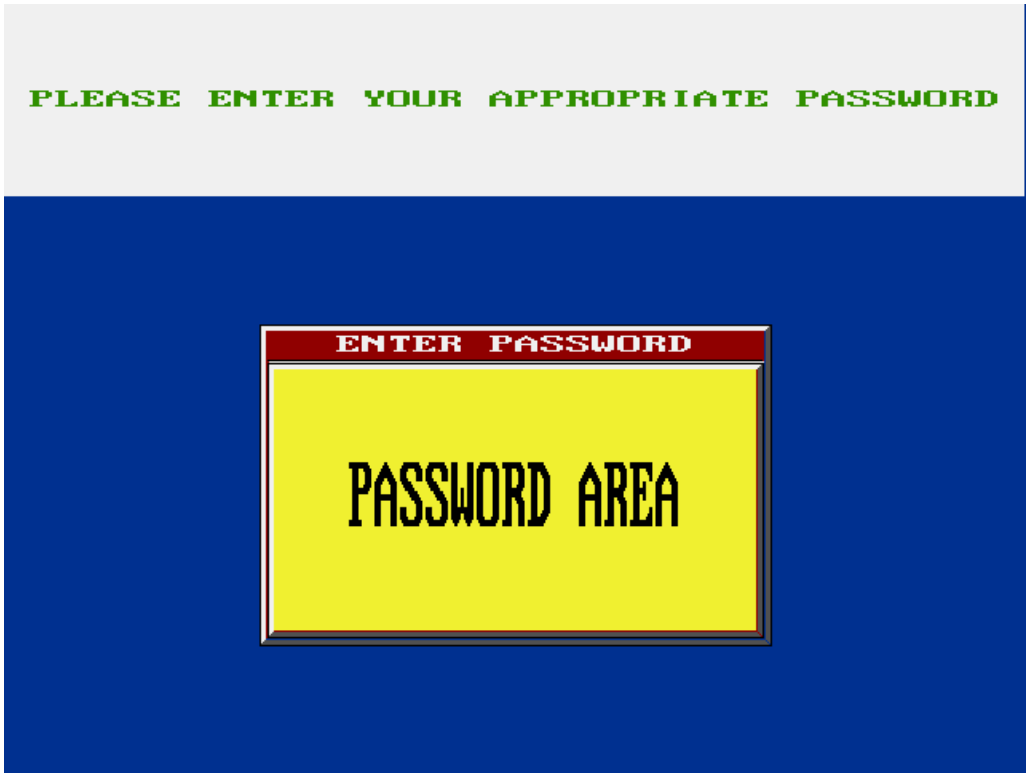
- Language selection
- Password protection
- Energize/de-energize the machine
- Monitor the operating condition of valves and compressors
- Monitor all system pressures and oxygen purity
- Set the pressure for cylinder filling at **ON/OFF** set points
- Hours meter and real time clock to monitor service intervals
- Line graphs meter readings showing performance (for up to the previous 24 hours)
- Self-diagnostic alarm panel

The following pages give a detailed description of the 8 individual screens.

Language Screen

The language screen enables the user to choose the language – English, French or Spanish. After choosing a language, select **MAIN MENU**.

Password Screen



This screen prompts the user to enter the password supplied by the manufacturer.

- Select **PASSWORD AREA**
- Enter the password using the numeric keypad displayed on the screen.
- Select **ENTER**

The password will be verified and the screen will change to the **MAIN MENU** screen when the password is accepted.

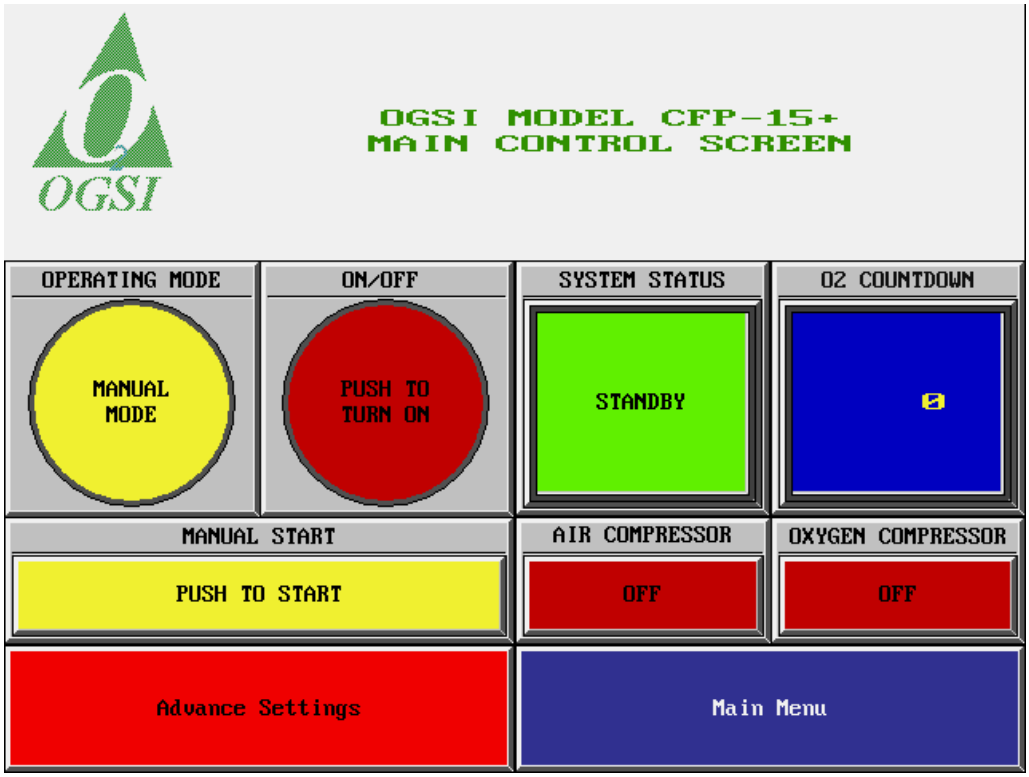
Note: The user will not be allowed to change their default password so please keep it secure.

Main Menu Screen

This screen allows the user to navigate through the program from screen to screen. This screen will get you where you need to go inside the program.

(**Note**: A notification will appear at the top of the screen only if the machine has the timer set and is turned **ON**.)

Control Screen



- **Operating Mode**

  This feature allows the selection of either **MANUAL** or **AUTOMATIC** modes. The **AUTOMATIC** mode will initiate machine operation when the **ON/OFF** button is in the **ON** position and all other conditions are satisfied. To use the **MANUAL** mode, the user needs to press an additional **START** button. **MANUAL** mode can be used to prevent inadvertent machine operation.

- **Power**

  In **AUTOMATIC** mode, the machine will start operating when the button is in the **ON** position. In **MANUAL** mode, the machine will start only when this button is in the **ON** position and the additional **START** button is pressed. The button will stop the machine in either mode of operation when it is in the **OFF** position.

- **System Status**

  This feature monitors the current status of the system. It will display **STANDBY** when the system is deactivated and **CYCLING** when the system is activated.

- **Manual Start**

  This button is used in conjunction with the **MANUAL** mode of operation, and must be pressed each time the system is restarted.

- **Air Compressor**

  This feature monitors the operational condition of the air compressors. When the air compressors are de-energized, it will display **STANDBY** and will toggle to **RUNNING** when they are energized.

- **Oxygen Compressor**

  This feature monitors the operational condition of the oxygen compressor. When the oxygen compressor is de-energized, the feature will display **STANDBY**. When the oxygen compressor is energized, it displays **RUNNING**.

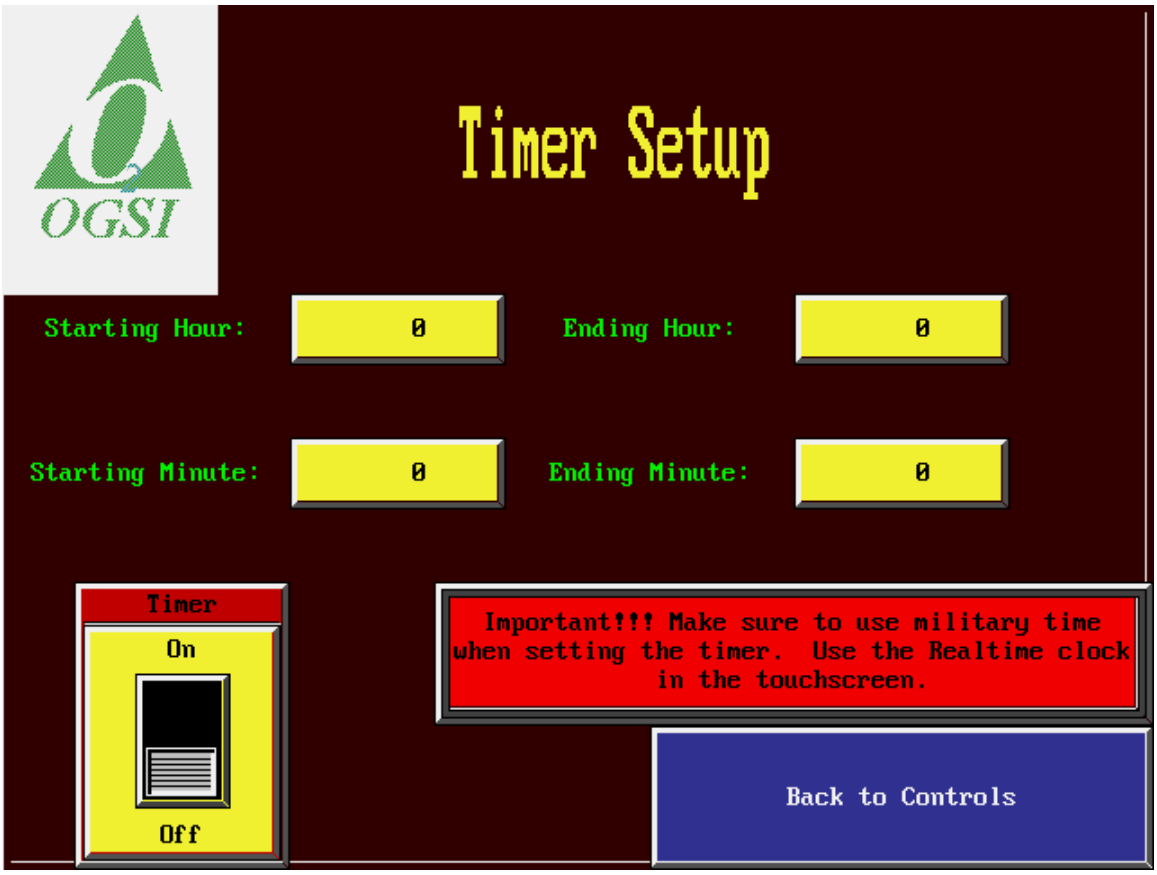
- **Oxygen Countdown**

  This indicator monitors and lets the user know when the oxygen compressor will be turning **ON/OFF**. This indicator resets frequently due to the duty cycle of the oxygen compressor.

- **Advance Settings**

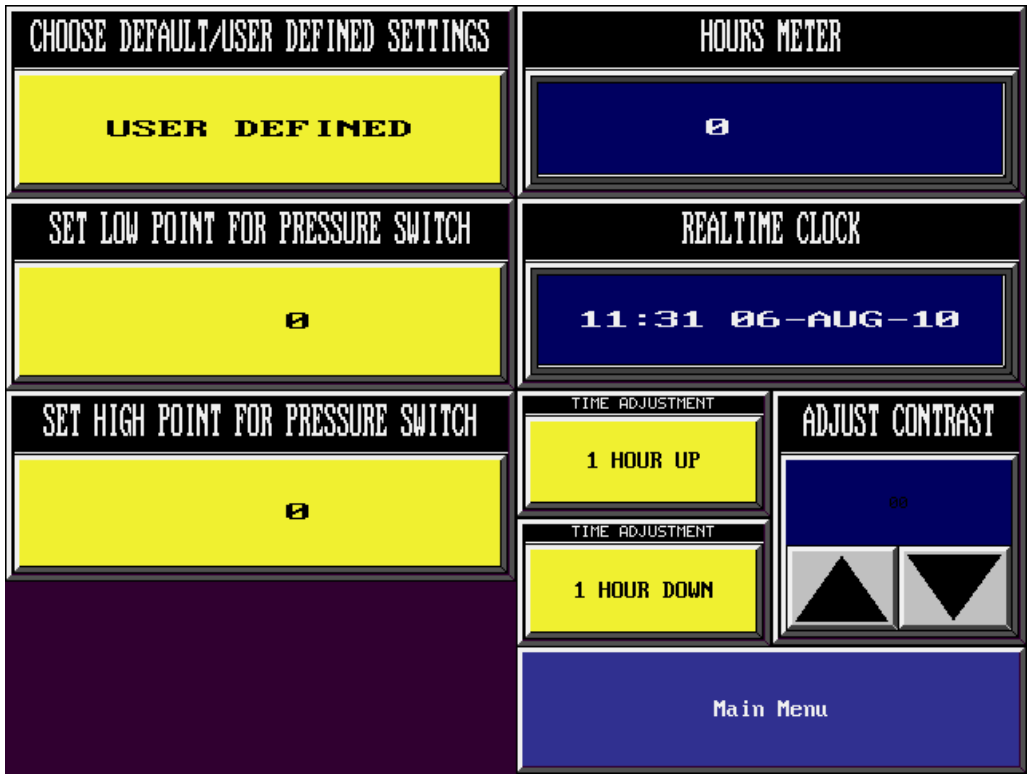
  This button allows the user to move the timer screen which lets the user set the machine to turn **ON/OFF** at specific times.

Advanced Settings



This feature allows the user to modify timer settings. If there are particular hours of the day you want the machine to run, you can enter the hour and minutes (military time) you want into the starting and ending time inputs.

Settings Screen



- **<u>Choose Default/User-defined Settings</u>**

  This password protected feature allows the user to operate the machine using either the manufacturer's settings or customized settings. The manufacturer's settings are set at **1950 psi (135 bar)** and **2200 psi (152 bar)**. When the high point of this setting is reached, the machine will de-energize and the cylinder filling will cease.

  To customize the settings, enter the low and high pressures using the displayed numeric keypads. When the cylinder pressure drops to the low point, the machine re-energizes and cylinders can be filled once again to the high point.

- **<u>Set Low Point for Pressure Switch</u>**

  This is a password protected feature that allows the user to customize the low-pressure setting. Valid entries are between **0-2050 psi (0-141 bar)**. A warning will be displayed if the low-pressure entry is higher than the high-pressure entry and the system will not operate.

- **Set High Point for Pressure Switch**

  This is a password protected feature that allows the user to customize the high- pressure setting. Valid entries are between **0-2200 psi (0-152 bar)**. A warning will be displayed if the high-pressure entry is lower than the low-pressure entry and the system will not operate.

- **Hours Meter**

  This meter displays the accumulated operating time of the system. This meter will increment only while the system status is **CYCLING** and will reset to zero after 10,000 hours. Most maintenance will be related to the number of hours the machine has been operating.

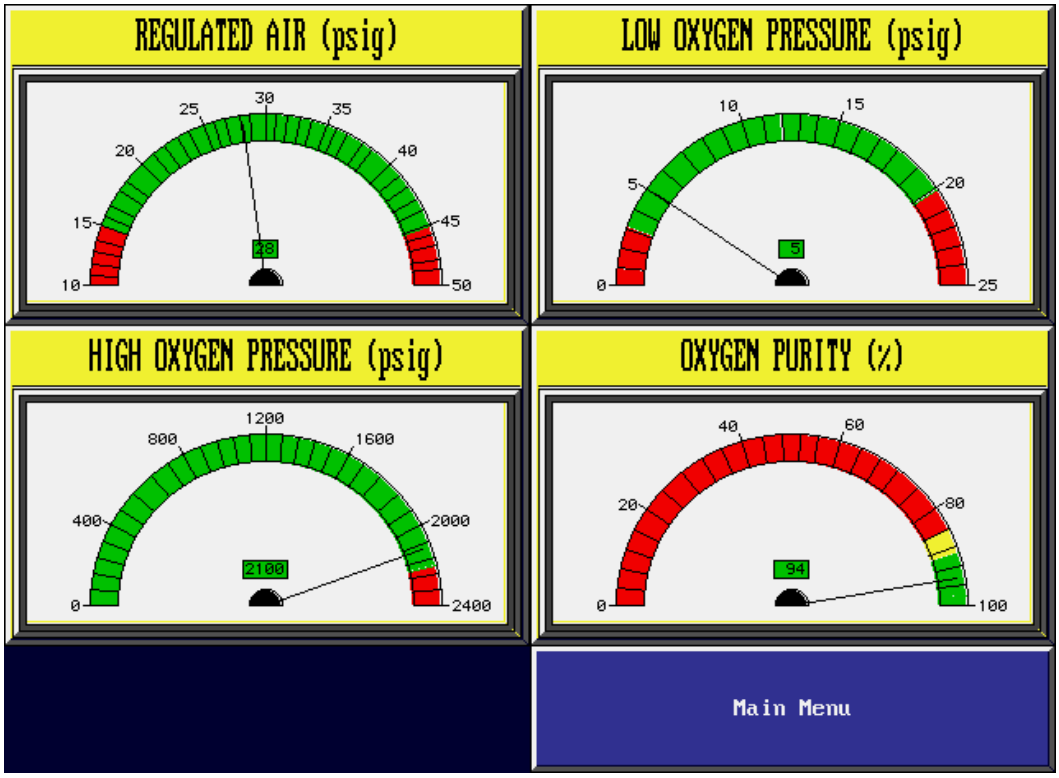
- **Real-time Clock**

  This is a password-protected feature that allows the user to synchronize the system's clock according to the current time-zone.

- **Adjust Contrast**

  This button allows the user to adjust the screen brightness according to his/her eyes' sensitivity.

Gauge Screen



- **<u>Regulated Air</u>**

  This feature displays the pressure associated with the air compressor. This pressure is typically between **15 psi (1 bar)** and **35 psi (2.4 bar)**.

- **<u>Low Oxygen Pressure</u>**

  This feature displays the oxygen pressure prior to entering the high-pressure oxygen compressor. This pressure is typically around **5 psi (0.3 bar)**.

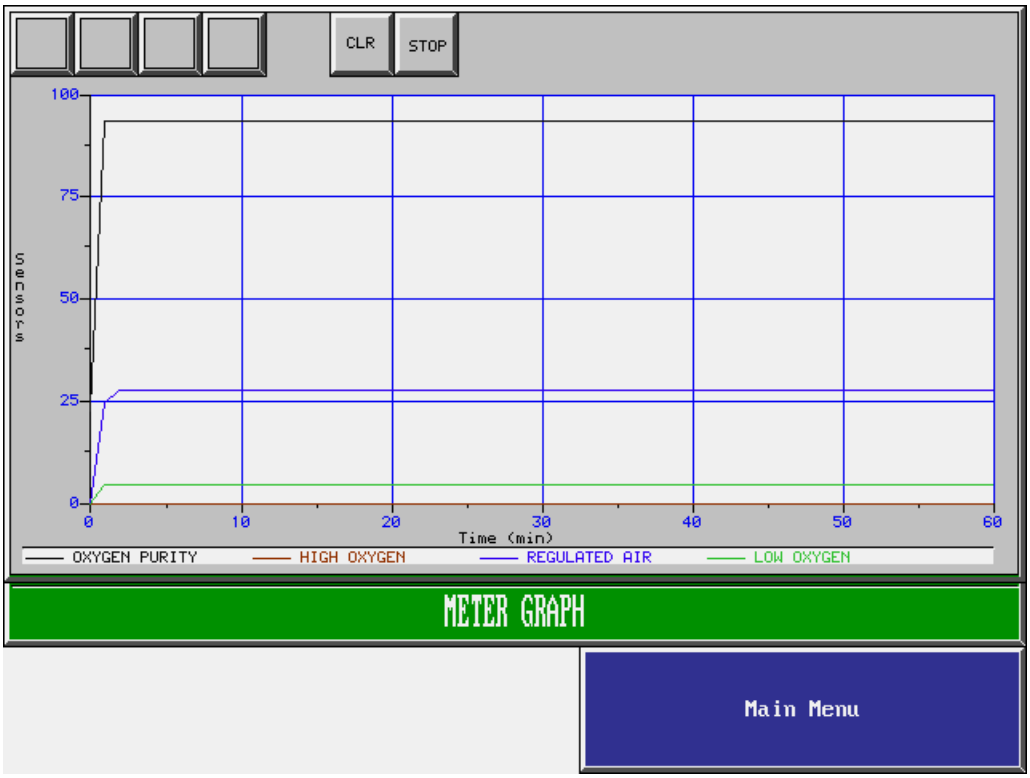
- **<u>High Oxygen Pressure</u>**

  This feature displays the oxygen pressure exiting the high-pressure oxygen compressor (entering the cylinders). This pressure is typically between **0 psi** and **2200 psi (152 bar)**.

- **<u>Oxygen Purity</u>**

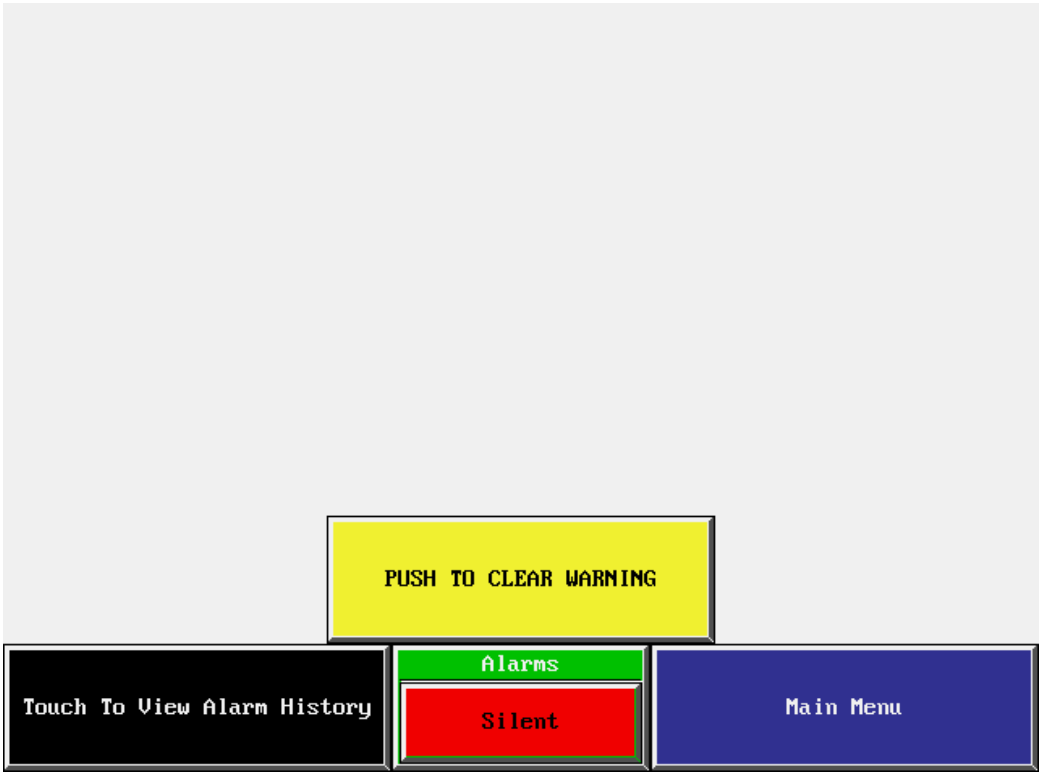
  This feature displays the percentage of oxygen present which is typically **93% (±3%)**.

Pressure-Line Graph Screen



This screen shows the graph based on the readings on the **GAUGE** screen. Note that the high-pressure oxygen display has been scaled down by a factor of 100. **60** minutes are displayed at a time and 24 hours of chart readings are stored in memory. If power to the machine is lost (**Emergency-Stop** button is pushed in, machine is unplugged, etc.), the chart memory will be lost.

Alarm Screen

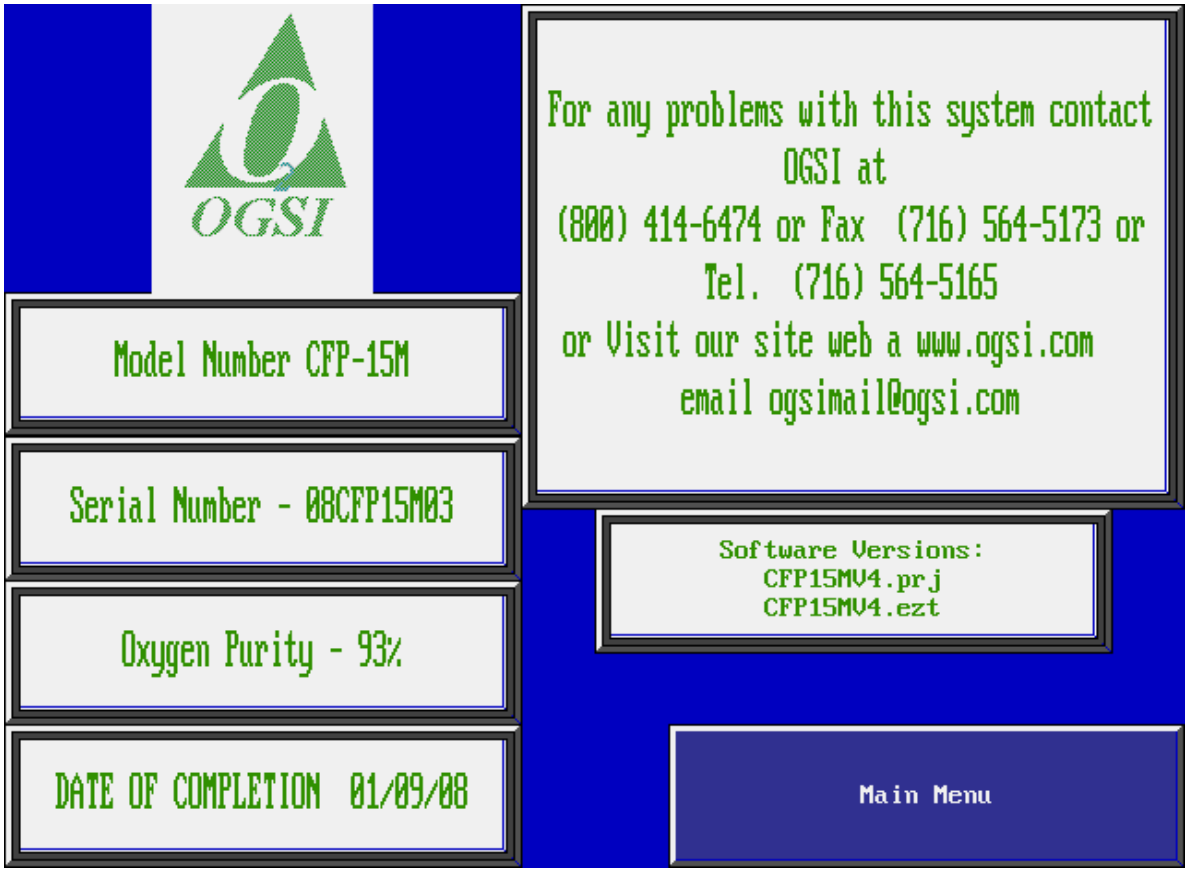


This feature displays warnings when any of the following faults occur:

- Oxygen pressure has fallen below acceptable limits. (This fault does not de-energize the machine.)
- Oxygen purity has fallen below acceptable limits.
- Oxygen compressor pressure switch has tripped.
- Air compressor thermal switch has tripped.
- Oxygen compressor thermal switch has tripped.
- Air compressor has been running one hour, and the purity has not yet reached an acceptable level.

Instructions will be displayed on the screen to clear any warnings. For certain alarms, the machine will not operate until the „**CLEAR WARNING**' button has been pressed.

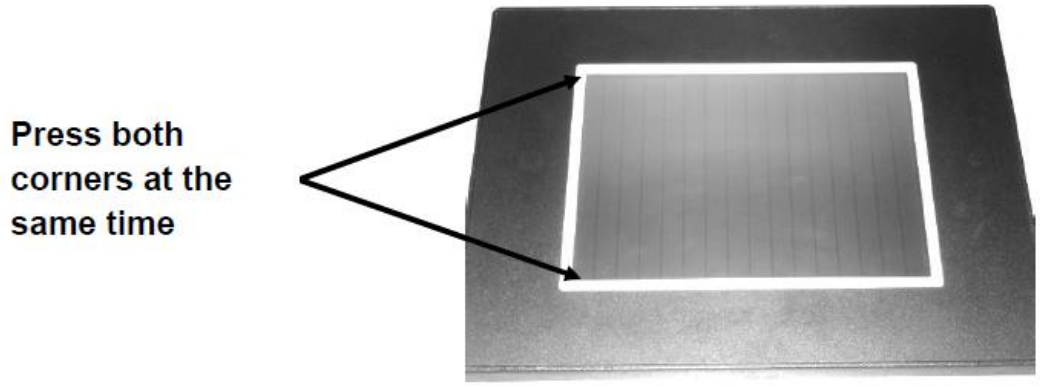
Final Screen



This screen displays information pertinent to the system, and manufacturer contact information. The Model Number of the Machine and its Serial Number are displayed along with the Date of Completion. The software versions for both the Programmable Controller and Touch Screen are also shown. During the course of normal maintenance, the company may offer to upgrade the software packages on the machine as improvements and modifications to it become available.

Correcting Missing or Irregular Touch Screen Color Scheme

- Ensure that the machine is not in **CYCLING** mode and leave the power button in the **ON** position.
- Touch both the top left corner and the bottom left corner of the touch screen at the same time.



- Select the appropriate language – English or Spanish.
- Select **CONTRAST** and use the up and down arrows to change the contrast settings to get the clearest picture. Select **EXIT** when done to return to the main menu.
- Select **DISPLAY TEST**. The screen will display all the colors continuously, allowing the user to see if a color is not displayed correctly. Select **EXIT** at any time to go back to the previous screen.
- Select **TOUCHPAD TEST**. The screen will display a grid. The user can select each square in the grid to ensure that all sections of the screen are responding. Select **EXIT** to return to the main menu.
- Select **EXIT** when done to return to the screen displayed before the two corners were pressed.

Manifold Design & Installation

Design

The **CFP-15M** cylinder filling manifold serves two purposes:

- To connect the **CFP-15M** to each bottle for filling
- To connect the bottles to one another for equalizing during trans-filling (filling smaller bottles from larger ones)

A shutoff valve is located at the end of the manifold, downstream of the K-type storage cylinders. This valve stops the flow of oxygen when a small cylinder is not attached in the filling station and also allows the user to fill the storage cylinders. Every oxygen cylinder is equipped with its own shutoff valve, so any additional valves in the system are unnecessary. It is recommended that the filling manifold be as simple as possible with few valves and fittings in order to keep the number of potential leak points to a minimum.

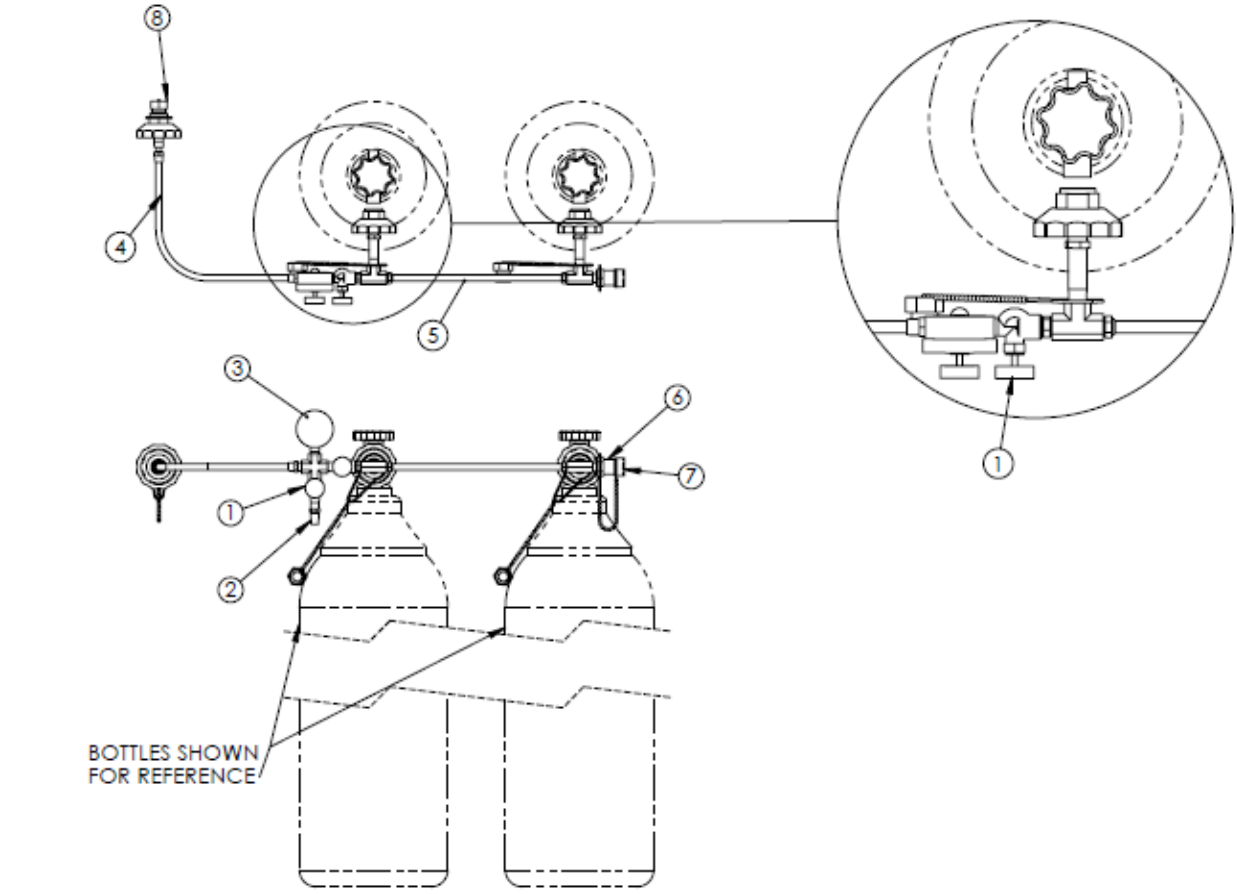
Preferred materials for use in high pressure oxygen generation include, but are not limited to:

- Stainless Steel
- Brass
- Bronze

Installation

When building and installing a cylinder filling manifold, it is necessary to ensure that the threads on all NPT connections and all stainless steel on stainless steel connections are lubricated by Teflon tape or a similar pipe dope (such as Krytox grease). It is equally important to ensure that the threads on all compression fittings, such as the *CGA 540* connections on K-type cylinders, are clean unless the threads are stainless steel on stainless steel. All fittings should be tightened with a wrench (much tighter than hand tight). Once the manifold is built and installed, it needs to be checked for leaks with oxygen at **2200 psi (152 bar)**. This can be done by shutting the valves on all bottles and using the **CFP-15M** to fill the manifold to **2200 psi (152 bar)**. Each joint should then be checked for leaks by applying soapy water to the joint using a spray bottle or a small paintbrush. If bubbles are formed, it means that there is a leak. If a leak is found, the joint should be tightened further with a wrench. If this does not work, the joint should be disassembled and cleaned, then reassembled and tested. If this does not work, the leaking fittings need to be replaced

Manifold Drawing



1. ALL FITTINGS ARE TO BE SUBJECTED TO OXYGEN CLEANING PROCESS BEFORE ASSEMBLING

1. **$^1/_4$" NPT M x F Valve HP**
2. **$^1/_4$" Sintered Bronze Muffler**
3. **$^1/_4$" NPT 0-4000 psi O_2 Gauge**
4. **$^1/_4$" FNPT x 72" SS Braided Hose**
5. **$^1/_4$" NPT x 12" SS Braided Hose**
6. **$^1/_4$" NPT x CGA540 Adapter**
7. **CGA540 Female Cap and Chain**
8. **CGA540 Male Cap and Chain**

Manifold Operating Procedures

Warning:

High pressure oxygen may present a hazard. Always follow proper operating procedures, and open valves slowly. Rapid pressurization may result in personal injury. Safety glasses and hearing protection are required when venting oxygen under high pressure. The intended use of the **CFP-15M** is to fill large K-type cylinders. The smaller M-type cylinder can then be trans-filled from the K-type cylinder.

Attaching and filling a K-type cylinder:

With all valves initially closed, connect the steel whip between a manifold valve and a cylinder valve and tighten both connections using **$1^1/_8$"** wrench. Slowly open the cylinder valve first and then the manifold valve. Fully open both valves, backing off **¼"** turn to prevent the valve from sticking in the open position and appearing closed. At this point, the gauge on the top of the manifold will read the pressure contained within the cylinder. Now, cylinder filling can be initiated by starting the machine, *(See Start-up Procedures on Page 30).*

Detaching a K-type cylinder:

With the machine turned off, close each of the appropriate manifold and cylinder valves.

Warning: Oxygen under high-pressure is present. The use of safety glasses and hearing protection is required.

Slowly disconnect the steel whip from the cylinder valve, using **$1^1/_8$"** wrench.
Be aware of the venting of oxygen under high pressure. If difficulty is encountered while attempting to remove the steel whip, open the appropriate manifold valve and then slowly open the bleed valve to vent the pressure. This will allow easier removal of the steel whip. Ensure that both manifold and bleed valves are closed after venting pressure.

Attaching and filling an M-type cylinder:

It is intended that M-type cylinders be filled from K-type cylinders. With all valves closed, attach the steel whip between the M and K type valves (see „**Attaching and filling a K-type cylinder'** above). Slowly open the K-type cylinder valve, followed by the M-type cylinder valve. Allow pressure to vent from the K-type into the M-type. When the desired pressure is reached in the M-type cylinder, close both valves.

Warning: Oxygen under high-pressure is present. The use of safety glasses and hearing protection is required. Disconnect the steel whip following the procedure outlined in „**Detaching a K-type cylinder'** above.

Preventive Maintenance

Air Filter Element Replacement:

The air filter element provided with the **CFP-15M** must be replaced every **six (6)** months on an average. This element helps to maintain the quality of the feed air supply and preserve the molecular sieve inside the oxygen generators.

Failure to replace the filter element on schedule will result in the warranty becoming invalid.

Oxygen Sensor:

The oxygen sensor should be calibrated on a monthly basis. Contact ***OGSI*** or see **Service Manual** for proper procedure.

Cabinet & Power Cord:

The cabinet and power cord should be occasionally washed down with a sponge or clean rag and some soapy water. Avoid the use of ammonia or other strong chemical based cleaning solvents. This prevents dust and dirt from building up on the machine.

Air Compressor:

The air compressor should last **five (5) or six (6) years** or longer under normal operating conditions. Eventually, however, it will need to be re-built or replaced. Oxygen purity and flow rate along with feed air pressure delivered to the sieve beds will all be indicators that the air compressor has expended its life. Replacement in the field is possible, but returning the unit to ***OGSI*** or an authorized service center is recommended.

Valve Replacements:

The best method to address this issue is to return the unit to ***OGSI*** or to an authorized service center for repair, the same procedure as compressor repairs.

Technical Service Assistance

It is our intention to provide complete customer satisfaction. This manual is one way in which we hope to provide you with technical assistance.

If you do not find what you need in this manual or you have other questions about this equipment, please feel free to contact us directly. We look forward to serving your oxygen needs and invite your inquiries. We will respond to you as promptly as possible.

You can reach ***OGSI*** through the following means:

- **By Telephone (Within the United States and Canada)**:

  (800) 414-6474 - Our toll free number (Within USA and Canada only)
  (716) 564-5165 - Our direct number

- **By Telephone (Outside the United States)**:

  Your local International Access Code (usually **0** or **00**), followed by
  The Country Code for the U.S. which is (**1**), followed by
  Our Area Code and Number (**716**) **564-5165**

- **By Automated Voicemail:**

  (716) 564-5165

- **By Fax (Within or outside the United States)**:

  (716) 564-5173

- **By E-Mail or Website:**

  ogsimail@ogsi.com
  http://www.ogsi.com

- **By Mail**:

  OGSI
  814 Wurlitzer Drive
  North Tonawanda, New York 14120 USA

- **By UPS, FedEx or Common Carrier:** *(Address to return shipments)*

  OGSI
  814 Wurlitzer Drive
  North Tonawanda, New York 14120 USA

*Technical service personnel are available from **8:00 AM** to **5:00 PM** **EST** (GMT - 5).*
We also have a list of Distributors and Authorized Service Agents available upon request.

Customer Satisfaction Survey

Help us serve you better. Please take our Customer Satisfaction Survey at www.ogsi.com

Appendix

Spare Parts List

PART NAME	PART NUMBER	QUANTITY
OEM Subassembly	7010003.002	1
Sieve Bed Assembly 2/set	7060001.002	1
OEM Receiver Tank Assembly	7050002.001	1
1/8" 2-way Solenoid Valve ASCO	1510009.B01	1
1/8" Sintered Bronze Muffler	1700002.B01	1
OEM 115 VAC Valve Block Assembly	7020003.002	1
RIX Oxygen Compressor Assembly	7030003.001	1
¼" Direct Acting Solenoid Valve 2200 psi	1510009.CD2	1
7 Micron Filter Element	2180001.001	1
HEPA Inline Filter	2160001.C04	1
Relief Valve Kit #X204-MB-3	21260MB.003	1
115 VAC 60 Hz Air Compressor	2110002.001	1
Delta Twist Aluminum Coil	2140020.001	1
PHD-02 Micron Inlet Filter	2150001.C01	1
1/4" Black Intake Filter	2160001.C02	1
Electric Panel Assembly	7100001.001	1
DL-05-AR PLC	1810002.001	1
25 A Motor Contractor	1810107.002	1
DIN Rail Mounted 15 A Circuit Breaker	1830003.D15	1
24 VDC Power Supply	1860200.001	1
0-50 psi Pressure Transducer	1910001.050	1
Oxyalert Oxygen Sensor	3110003.008	1
Touch Screen Panel	1810001.S8C	1
Potter & Brumfield Power Reset Breaker	1830002.001	1
Emergency Stop Button	1840052.001	1
0-3000 psi Pressure Transducer	1910003.000	1
Fan 115VAC 115 CFM/49 dBA	2140001.001	1
Manual – Available Free on Website	9000000.003	1

Oxygen Cleaning Procedure

Scope

This procedure sets forth the cleaning requirements for parts that are used in the construction of ***OGSI*** oxygen systems and are in the gaseous oxygen product stream including but not limited to valves, tubing, fittings, manifolds and pipes.

Objective

The objective of this procedure is to provide personnel with clear directions and an understanding of how parts are to be cleaned and why that is important. This document is based on guidelines provided in publication ***CGA G-4.1-2009*** which is produced by the Compressed Gas Association (CGA) and is intended to ensure that our internal procedure is compliant with that publication.

Safety

Harmful contamination such as grease, dirt, oil, dust, solvents, weld slag, sand, rust and previously applied thread sealants on parts that come into contact with oxygen can cause a combustion reaction resulting in system degradation or failure or worse, a hazard to nearby personnel. Care needs to be taken in the cleaning and handling of components used in oxygen service to prevent any contamination related failure.

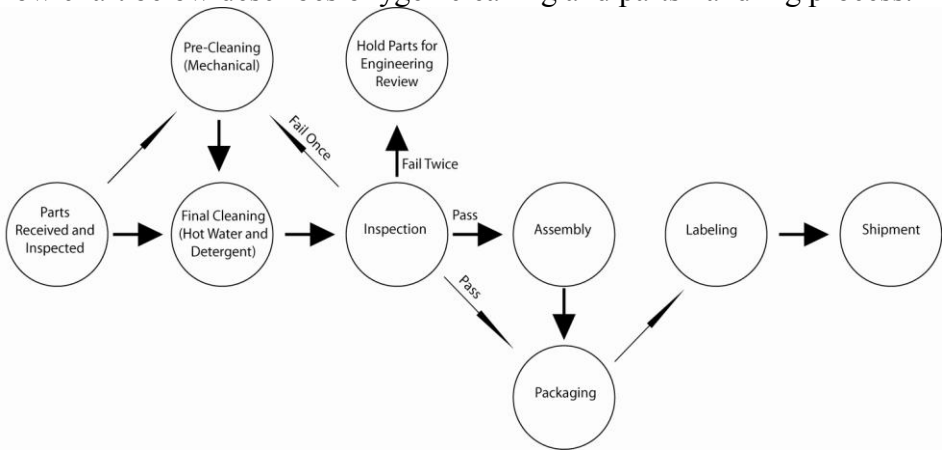
While the ***CGA G-4.1-2009*** standard makes allowance for cleaning parts using caustic agents, acids or solvents, the ***OGSI*** procedure will use only mechanical (soaking, wire brushing or grinding) means for pre-cleaning and hot water cleaning with aqueous detergents for final cleaning. This is done to reduce any chemical exposure risk to personnel and to eliminate the additional steps needed to remove these cleaning agents from the parts themselves.

Training

Personnel involved in the cleaning and preparation of parts used in oxygen service should be trained in these cleaning procedures and be familiar with this document.

Process Flow Chart

The flow chart below describes oxygen cleaning and parts handling process.



Parts Received and Initial Inspection

Upon determining which parts need to be cleaned, the technician needs to perform an initial visual inspection (under white light). Check for the presence of visible residue on the parts including but not limited to oil, grease, dirt, dust, rust, weld slag or pre-existing thread sealant

among others. For parts that have an internal cavity that is not directly observable by the naked eye, a lint free cloth that is first soaked in water can be inserted into the part and withdrawn for evidence of contamination. No part failing inspection shall be used in any assembly.

Pre-Cleaning

Pre-cleaning methods include soaking parts in a water based solution with an aqueous detergent, using a wire brush or thread pick, holding it under a wire brush grinding wheel or simply wiping it down with a clean rag. Upon completion of pre-cleaning, the part should be clear of any visible contamination and ready for final cleaning.

Final Cleaning

Final cleaning involves placing the parts in the parts washing machine, adding an appropriate amount of detergent and running them through the cleaning cycle. Consideration shall be given to the size, shape and number of parts to be cleaned at one time to ensure that the system is not overloaded or its function impaired. The cleaning temperature inside the washer shall be **120°F (49°C)** to **140°F (60°C)** and the detergent to be used shall be Cascade™. This detergent has a flash point above **105°F (41°C)** but it does not sustain combustion and there are no exposure controls for it. Parts can be removed from the washer once the drying cycle is complete.

Inspection

Upon completion of the final cleaning cycle, all parts should be removed from the parts washing machine and inspected for any residual contamination. The item shall be observed to confirm the absence of any contaminants including any oil, grease, detergent, moisture, lint, or other foreign materials. If any material remains on the part after the final cleaning cycle, the part shall be returned for a second round of pre-cleaning and final cleaning.

Packaging

Once a part or assembly has been cleaned for oxygen service, it should be protected to prevent recontamination if it will be put into storage. Small to medium sized parts should be packaged in plastic bags. Larger assemblies should be bubble-wrapped or wrapped in foam material and then moved on to final packaging in boxes and/or crates.

Labeling

Once a part or an assembly has been cleaned and packaged for oxygen service, it should be labeled per the customer's instructions, but at a minimum;

- contain the statement "**Cleaned for Oxygen Service**"
- contain the date of cleaning or packaging

References

The following publications were referenced in the creation of this document.

- CGA G-4.1-2009, ***Cleaning Equipment for Oxygen Service***, Compressed Gas Association, Inc., 4221 Walney Road, 5th Floor, Chantilly, VA 20151. www.cganet.com
- ***Oxygen Cleaning Procedure*** Rev. L (8/05), RIX Industries, Inc., 4900 Industrial Way, Benicia, CA 94510. www.rixindustries.com

Oxygen Sensor Calibration Procedure

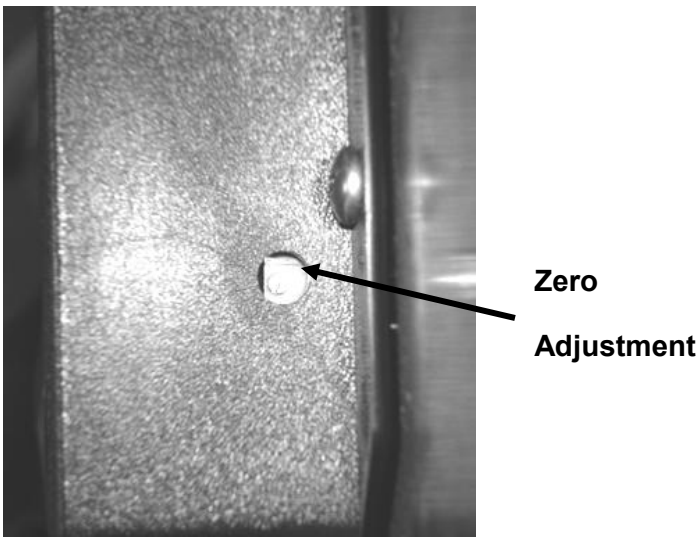
Oxyalert 2-Gas Sensor ±1% accuracy

15 LPM max flow

Manufacturer: Douglas Scientific (Compass Controls)

Contact: *Don Stinnett*

Phone: *(913) 438-5988*



Notes:

The Zero potentiometer is used calibrate the sensor to zero with pure nitrogen.

The Span potentiometer is used to calibrate the sensor to a known purity of oxygen.

It may be necessary to temporarily remove the oxygen sensor from the electrical module to gain access to the calibration potentiometers.

100% oxygen will give a 90% reading due to the lack of 5% argon in the gas.

It is recommended that calibration be performed with a gas 93% pure, as this is the normal output purity of the **CFP-15M.**

Procedure:

Apply a known purity of oxygen to the sensor and verify the sensor reading matches the purity of the oxygen used.

Air Changes by Room Size/Machine Size

Air Changes Required in a Room Per Hour for All Models											
Model Number	**Room Volume in Cubic Feet (ft^3)**										
	1000	**2000**	**3000**	**4000**	**5000**	**6000**	**7000**	**8000**	**9000**	**10000**	**12500**
OG-15	5	2.5	2	1.5	1	1	1	1	1	1	1
OG-20	8	4	2.5	2	2	1.5	1	1	1	1	1
OGS-20	8	4	2.5	2	2	1.5	1	1	1	1	1
OG-25	10	5	4	2.5	2.5	2	1.5	1	1	1	1
OG-50	20	10	7.5	5	5	4	3	2.5	2	2	1.5
OG-100	NR	20	15	10	9	8	7	5	4	4	3
OG-175	NR	25	18	12.5	11	10	8	6	5	5	4
OG-250	NR	30	22.5	15	13	11	9	7.5	7	6	5
OG-375	NR	NR	30	27	22.5	18	15	13	11	8	7
OG-500	NR	NR	NR	30	27	22.5	18	15	13	11	8
OG-650	NR	NR	NR	NR	30	27	22.5	18	15	13	11
OG-750	NR	NR	NR	NR	NR	30	27	22.5	18	16	13
OG-1000	NR	NR	NR	NR	NR	NR	NR	30	26	22	17
OG-1250	NR	NR	NR	NR	NR	NR	NR	NR	NR	30	24
OG-1500	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	30
CFP-15+/15M	5	2.5	2	1.5	1	1	1	1	1	1	1
MOGS-100	NR	20	15	10	9	8	7	5	4	4	3

Notes:

1. **NR** *means that the models indicated are not recommended for rooms of this size.*
2. *For air changes requirements for models* ***OG-2000*** *and above, please contact* ***OGSI****.*

Units of Measurement

lb	U.S. Pound
hp	Horsepower
psi	Pound-force per Square Inch
kW	Kilowatt
kWh	Kilowatt hour
ft^3	Cubic Feet
VAC	Volts Alternating Current
Hz	Hertz
SCFH	Standard Cubic Foot per Hour
SCFM	Standard Cubic Foot per Minute
LPM	Liter Per Minute
1 bar	1.45×10^1 psi
dBA	Decibel (A scale)
A	Ampere
W	Watt
°C	Degree Celsius/Centigrade
°F	Degree Fahrenheit

Maintenance Log

Date	Part	Reason for Maintenance	Authorized Service Technician Signature