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OFFER



PSA N2 plant with
10 Nm³/Hr @99 %

By

By Amp tech

TECHNICAL SPECIFICATIONS

Model	CIG 1099N2
Mounting	Skid Mounted – Pre Commissioned
Capacity of Plant	10 Nm³/Hr
Oxygen in outlet gas	1% (10000 PPM)
No Of Modules	ONE
Operation	Automatic With PLC – Non Stop 24 Hrs
Turn Down Ratio	zero to 100%
Operating temperature	40 Deg C Max
CMS QUANTITY	60 Kgs
Compressed Air requirement	60 Nm³/Hr @ 7 BarG
Power consumption	7.5 kw
Discharge pressure Ex PSA	5.5 Bar g
Atmospheric Dew Point	Minus 40 degree C
Surge Tank Volume	500 ltrs
Storage Tank Volume	5 M3
Oxygen Gas Analyzer(Online)	Provided with Two Alarms
Oxygen Level - Purity Check	Continuous – Online

Size of the skid in Meters	3 X 2.5 X 3 [L x W x Ht]
Design Code	As per ASME Sec VIII DIV -1
Area Classification	Non Hazardous – Safe Area
Air Receiver	700 ltrs
Cooling Water Required	1.0 M3

FEED AIR COMPRESSOR

Type Of Compressor	Lubricated Screw Compressor
Duty	Continuous
Make	As per Client Need
Quantity	1 No.
Delivered flow of Each Compressor	60 Nm³/Hr Nm³/hr
Power Consumption	7.5 kw
Discharge Pressure	7 Bar G
Cooling	Air Cooled
Area Classification	Safe – Non Hazardous

NITROGEN STORAGE TANK

Capacity of Nitrogen receiver	5 M3
Storage Pressure	5.5 BarG
Working Pressure	5.5 BarG Max
Design Pressure	10.5 BarG
Test Pressure	10 BarG
Design Code	ASME Sec VIII DIV I
Design Temperature	75 DegC
Accessories	safety Valve / Drain valve/ nozzles/ manhole

AIR RECEIEVER

Capacity of Air RECIEVER – Dry AIR	750 Ltr
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QTY	ONE No.
MOC	SA 516 Gr 70
Design / Fabrication Code	As per ASME Sec VIII
Hydrotest Pressure	15 Barg
Accessories in Air Receiver	
Safety valves.	
Temp. & pressure gauges.	
Drain valve and Pressure Switches.	

Process Description of PSA Nitrogen Plant

Basic Principle: Atmospheric Air Contains 78% of Nitrogen and 21% of Oxygen. Nitrogen in PSA method is generated by Physical separation of Oxygen from Atmospheric air and let the Nitrogen be collected for use. This is done by using a special Molecular sieve which has selective adsorption affinity for adsorption of Oxygen Molecule and let the Nitrogen go out. This phenomenon of adsorption of oxygen gas molecules on the adsorbent is under pressure and is known as **Pressure Swing Adsorption i.e. P. S. A.**

Basic Process Steps (Please refer The Schematic Drawing of the PSA Plant)

1. First the air compressor sucks the air from atmosphere and compresses it to a pressure of 100 minimum to 150 Maximum PSIG.
2. The Air Compressor has after-coolers (Water or Air Cooled – Depending on the type and choice of Compressor) and after-coolers cool the hot compressed air where it gets cooled and physical moisture is condensed. The physical moisture thus condensed is separated out in the moisture separator where it is thrown out to atmosphere by auto drain valve.
3. Next the Cool compressed air is allowed to pass through filter where the complete dust and oil-contamination is removed.
4. The filtered air now is allowed to pass through an air dryer where all the moisture is removed – The air dryer can be desiccant or refrigeration based depending on The site Condition , Application and some times the customary Choice
5. This clean Dry Air is now allowed to pass through the PSA module. (The Basic PSA Nitrogen Generator Module). In PSA module the dry air enters one of Adsorption tower where the compressed air is allowed to pass over the Adsorbent (Carbon molecular sieve), This adsorption continues for a minute, After a minute the tower get saturated with oxygen and thus the tower is switched automatically to other tower for oxygen adsorption and nitrogen generation. The previous tower which is saturated with oxygen is thus allowed to vent out the oxygen to atmosphere.
6. This process is cyclic and you get a regular supply of nitrogen from either of the tower which is collected in the surge vessel.

7. The nitrogen is analyzed for its impurity of oxygen (& Moisture also if opted for as dew-point measurement is optional) by an online oxygen analyzer (& online dew-point Meter which is optional) In case the nitrogen is of desired quality it is then allowed to go to storage tank.
8. The system is provided with vent valves which do-not allow the nitrogen of unwanted quality to go for storage and thus use. It let the impure nitrogen vent out till the desired purity is achieved.
9. The nitrogen from storage tank can be taken for use. Storage tank is provided with pressure switches which stop the plant if the pressure is high and restarts the plant if the pressure goes below the set level.

Safety Features And Audio Visual Alarms

The Nitrogen Gas Generator is Skid Mounted and Pre- commissioned at Our Works. It is fully automatic and virtually requires no attention of the Operator. Once started it can be left- unattended. All operations take place automatically and Nitrogen Purity remains very consistent. In case of any abnormality the gas Generator would trip automatically with Audio Visual Alarms for Necessary action.

In Case of Storage Tank Getting Filled the Gas Generator **Goes to Sleep** and **restarts** once the pressure in storage Tank is Reduces to set Limit.

The System Starts With Only Four Switches

- Control On – To Energize the Control Panel
- System On - To Start The System or gas Generator
- Nitrogen On – To Start To Nitrogen feeding to Your System

Following **Audio – Visual alarms** are provided In Our Standard System

- Low Feed Air Pressure
- Inlet Air Temp, High
- High & Very High Oxygen Content (two Set Limits)
- High Storage Tank Pressure

Safety Valves are provided at all Pressure Vessels

DESIGN CODES & MATERIAL SPECIFICATIONS

- Operating Pressure : 8.0 – 10 BarG.
- Material of Construction : SA 516 Gr70 For Vessels
: SA106 Schedule 40 seamless for pipes
: SA 105 Drilled (ASA 150/300) Flanges
- ASME Section VIII Division 1 Specification for Pressure Vessels,

- ASME Section IX Specification for Welding Qualification
- American Institute of Steel Construction (AISC)
- AISC Specification for Structural Steel
- American National Standard Institute (ANSI)
- ANSI B16.5 Specification for Steel Pipe Flanges and Flanged Fittings
- ANSI B31.3 Specification for Petroleum Refinery Piping
- International Electrotechnical Commission (IEC).
- National Electrical Manufacturers Association (NEMA)
- NEMA specifies instrumentation, electrical, Control and Sensing Devices.

Make Of Components and Major Bought Out Items

Feed Air Compressor	ELGI / CP / IR
Pre / After / Fine filter	Fabricated Housing By Chaalak Industries
Activated Alumina	Elegant
Changeover Valves	Ryder
Flow meter(Glass Tube)	IEPL / Eureka / Krone Marshal
Back Press Controller	Nirmal / VKE
Safety valves	Sebim / Fainger laser
Solenoid valves	Rotex
Pressure gauge	WIKA / Waree
Electrical Switchgear items	Siemens
Sequential Programmer	PLC Base Allen Bradley , GE Fanuc or Siemens
Oxygen Sensor	Made In USA Analytical / Teledyne make sensor
Auto Drain	PLC controlled actuated valve
Manual Valve	Audco / Valve India / Aira

Special Feature of System Offered

- The Nitrogen Generator will be Pressure Swing Adsorption (PSA) technology; it is based on the selective adsorption phenomena of gas molecules under pressure on the surface of highly porous and efficient adsorbent.
- All operations will be taken place automatically
- Nitrogen Purity will remain very consistent.
- In case of any abnormality the gas Generator will trip automatically with Audio Visual Alarms for Necessary action.
- In case of storage tank getting filled, the gas generator will go to sleep and restarts once the pressure in storage tank is reduce to set limit.
- For continuous generation of nitrogen two Adsorption towers are provided which are interconnected with Auto change over valves controlled by PLC in the control panel.
- The system includes vertical carbon steel pressure vessel, the vessel are designed, fabricated, and tested in accordance with ASME standard.
- The generator offered is capable for non-stop 24 hours operation.
- Welding on parts subject to process pressure, welders and welding procedure is qualified in accordance with Section IX of ASME Code.
- Skid Base frame and Plate is provided and All components are mounted on it
- The Skid frame will be provided with two earthing bosses located diagonally to each other.
- Anchor bolt details and Material will be submitted along with the drawing for approval.
- The Nitrogen Generator is skid mounted Pre-commissioned ready to use units.
- The generator is fully automatic unit, and have continuous Purity Check
- System is totally automatic and All operations take place automatically
- Nitrogen Purity will remain very consistent.
- In case of any abnormality the gas Generator will trip automatically with Audio Visual

Alarms for Necessary action. In case of storage tank getting filled, the gas generator shall go to sleep and restarts once the pressure in storage tank is reduce to set limit.

- The Nitrogen generator system includes
 - External inlet process air filter for removal of particles, oil vapor and condensate.
 - Waste gas silencers – Purge silencer
 - Auto matic electro-pneumatic valves
 - Safety valves set at appropriate pressure level.
 - All pneumatic pipe, valves and instrumentation mounted in a cabinet
- Hazardous Area Classification is not applicable as installation is in safe area

Scope of supply and List of Equipments

✚ Following is the list of Equipment's in **PSA Nitrogen plant**

- **Feed Air Compressor System (ELGI or Eqv. Make) consists**
 - Feed Air Compressor with all Standard accessories like suction filter, drive arrangement with motor, discharge pressure switch and safety valve.
 - Electric Motor for air compressor.
 - Water Cooled After Cooler Shell and Tube type
 - Moisture Separator and Auto Drain valve
- **Air Receiver with Pressure Gauge, Safety Valve and Pressure Switch**
- **PSA Nitrogen Plant Consisting OF**
 - Dust and Oil Removal Filter and Pre filter
 - Twin Tower PSA Module with Automatic Change over valves
 - Surge Vessel with drain valve and instruments
 - CMS (Carbon Molecular Sieves) & Activated Alumina One Charge filled in PSA Towers
 - Nitrogen 3 Way Vent Valve, Back Pressure Controller, Set of pressure switches, Pressure gauges, Safety valve.
 - Interconnecting Piping within the skid
 - Metal Tube Flow meters for nitrogen with flow control valve
 - Centralized control panel with sequence programmer
 - Online Oxygen Analyzer
- **Nitrogen Storage Tank of 5 M3 with Pressure Gauge, Safety Valve and Pressure Switch**

Exclusion for Our Scope of Supply (Purchasers Scope)



Customer Is Always Right

- All civil work like foundation, cables trenches, building shed etc.
- All Electrical and Instrument/power cabling outside the battery limit of our skid
- Piping out side the skids and Our battery Limits of our skid
- All skilled and unskilled labor required at the time of supervision of erection and commissioning of plants at site.
- Any tools and tackles including lifting and shifting equipment required at the time of supervision of erection and commissioning.
- Any type of services required after expiry one year from the date of commissioning. However if services is required after one year same can be provided at extra cost.
- Anything not specifically mentioned in our offer.
- Lodging and boarding arrangement for our team of one or two engineers during supervision of erection and commissioning along with local conveyance have to be arranged by you.

AMP Computer Services
Opp Indian Oil Petrol Pump ,Wakad ,Pune -411057
M: 9373305074, 7774045550 , Mail id : amphardsoft@gmail.com,pune@amptech.co.in,
www.amptech.co.in