

# Medical Oxygen Plant



## Medical Oxygen Plant

Fully contained design for quick installation.

Built-in with safety automatic change over to backup system

ISO 13485-2016 Certified



PSA Technology delivers uninterrupted oxygen supply

Meets ISO 7396 standards for use in hospitals

Easy to use and digital display at all critical parameter



## ABOUT US

- Established in the the year 1988 - more than three decades of service to the industry.
  - First to develop Auto drain valves in india.
  - One of the leading Manufacturers of Compressed Air treatment products like:
    - Auto drain valves      ○ Refrigeration / Desiccant Air dryer
    - Micro filters            ○ Medical Breathing Air dryer
    - Nitrogen Generator    ○ Oxygen Generator
  - ISO 9001.2015 Certified company. ISO 9005, ASME, CE, UL & EN Standards are endorsements of our commitment to quality.
  - Strong presence in the country with wide network of more than 100 dealers / associates for Customer support.
  - Best practices like lean method, six sigma are followed in manufacturing.
  - Supported by strong R&D team with qualified engineers.
  - ISO 13485
- 
- Trident recently developed oxygen plant in technology collaboration with DRDO.
  - Proud to be a part of PM Cares Initiatives for oxygen plant installations across the Country.



## Medical Grade Oxygen Quality



93+3%



< 300 ppm



< 5 ppm

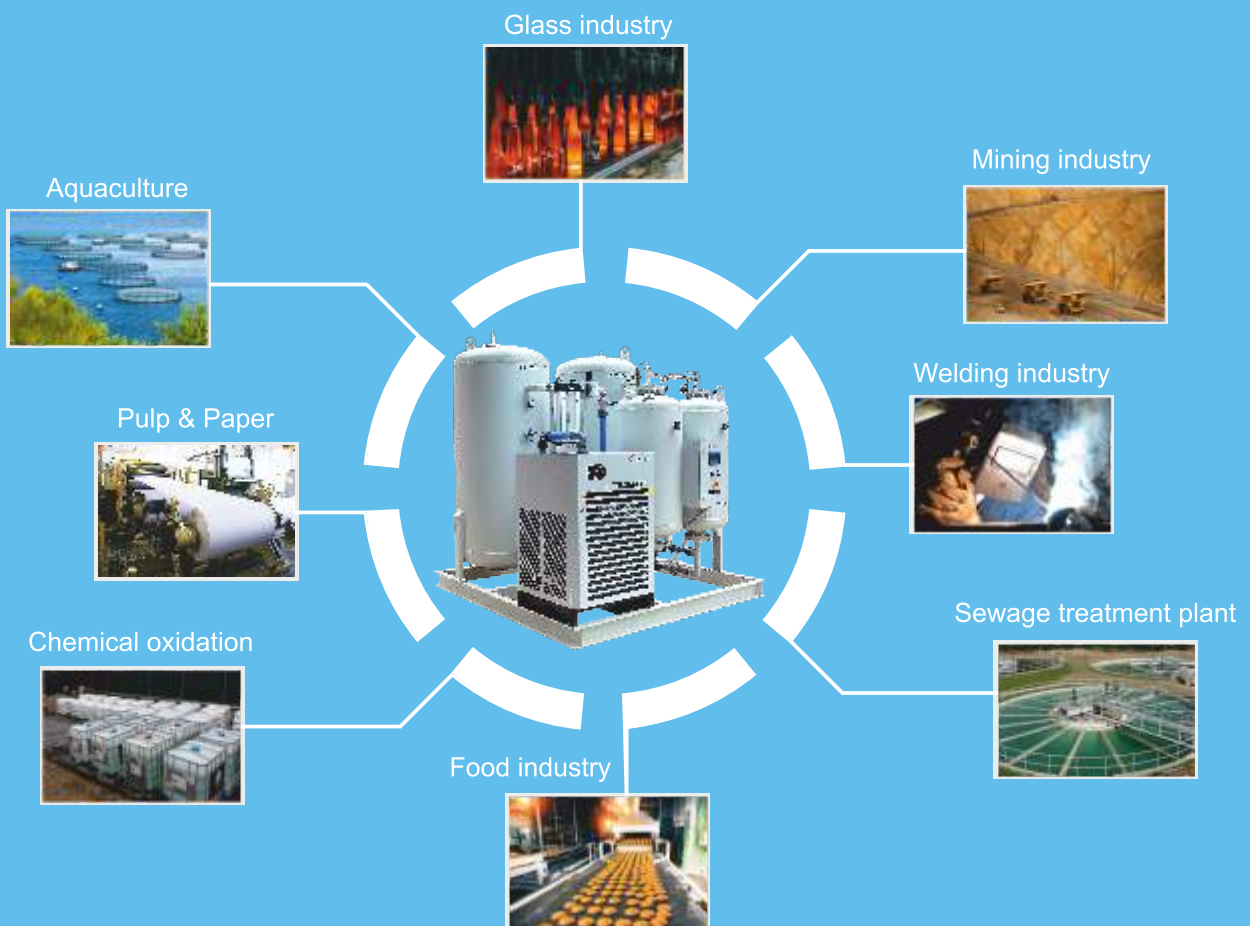


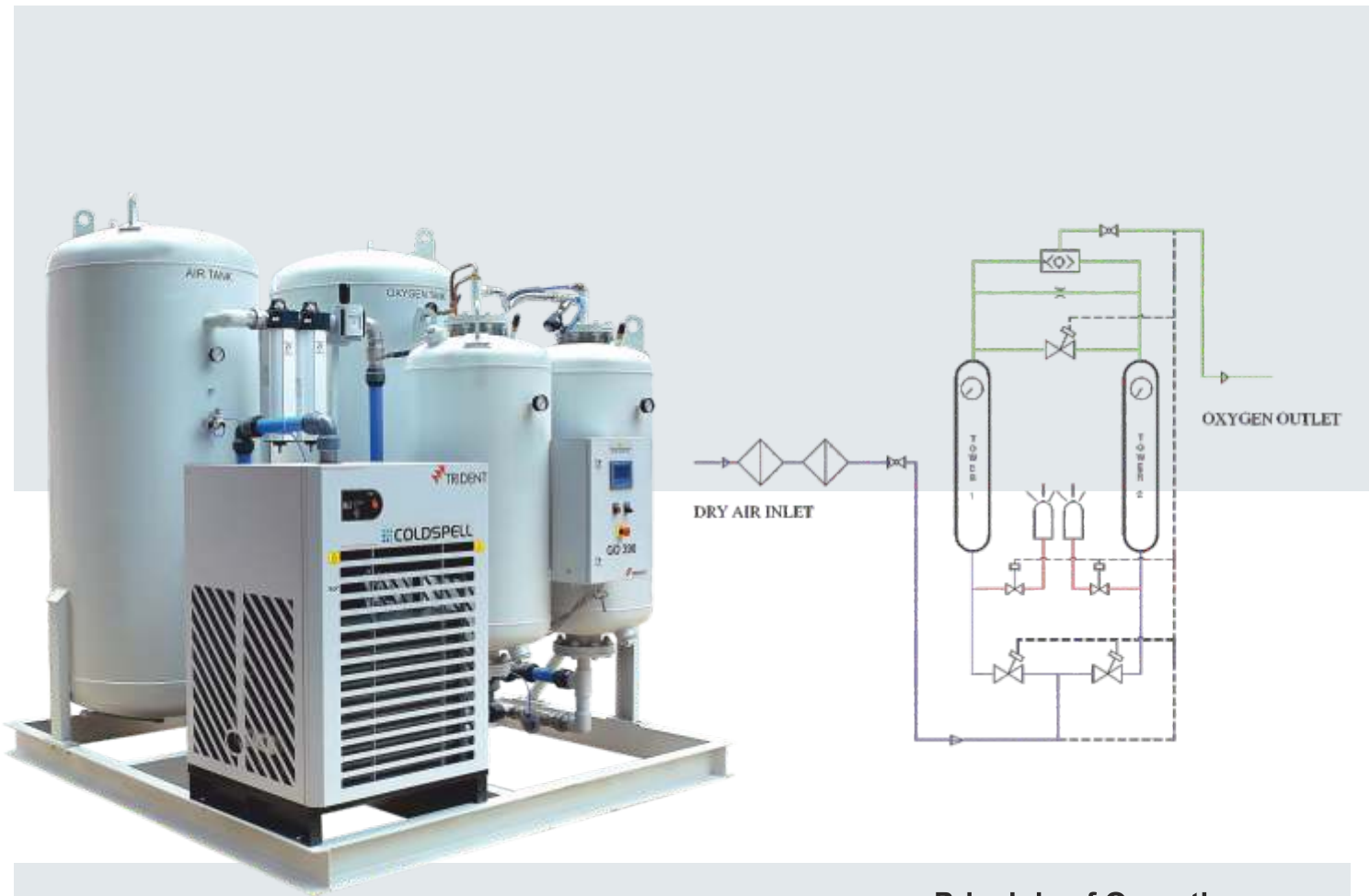
< 0.1 mg/m<sup>3</sup>



< 67 ppm (-50° C)

## Other Applications :





### Principle of Operation :

Oxygen plant works on the Pressure Swing Adsorption (PSA) technology. The moisture free air enters into the zeolite towers where the nitrogen and other gases are adsorbed and thus only oxygen at the desired purity level is delivered at the outlet.

**Generation Cycle:** Purified (Moisture and oil free) air from the compressed air system, passes through one of the tower filled with molecular sieves (Zeolite type). The sieves selectively adsorb nitrogen, allowing oxygen to pass through at the desired purity level.

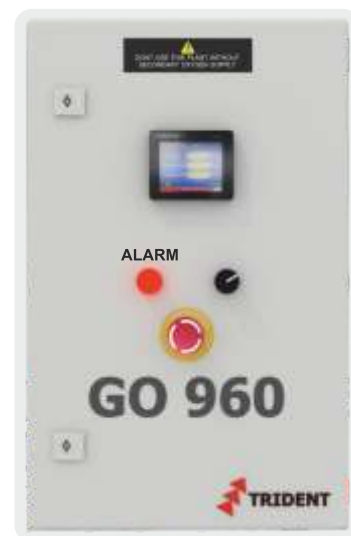
**Regeneration Cycle:** During regeneration cycle, the sudden depressurization brings out nitrogen molecules trapped in the sieves pores to the surface of the beads. Small portion of the oxygen from the drying tower is passed over the sieves through the regeneration orifice. This results in complete regeneration of molecular sieves and the trapped gases are completely exhausted.

The automatic cycling of the adsorption and desorption between the two beds enables the continuous production of oxygen.



PLC BASED CONTROLLER WITH DIGITAL DISPLAY

- ◉ Gas Purity
- ◉ Pressure
- ◉ Flow
- ◉ Operation hours
- ◉ Provides indication of plant maintenance schedule



**Automatic Alarm in case of :**

- ◉ Low pressure (less than 4 bar)
- ◉ Low purity (less than 85 %)
- ◉ Low pressure and Low purity
- ◉ Power failure

**Benefits:**

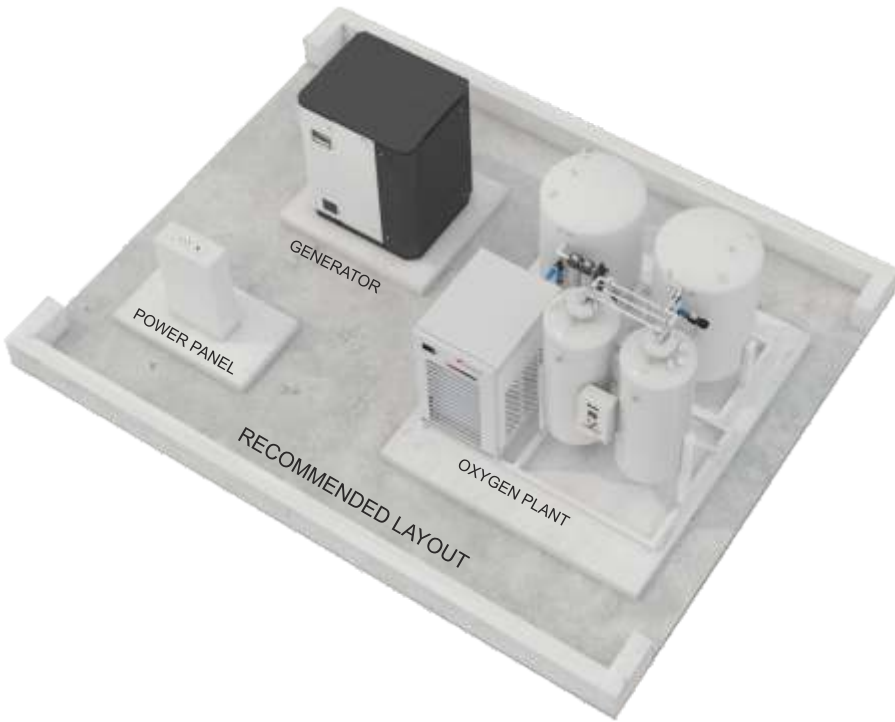
- Produce as per demand
- Faster payback period
- No safety risks associated with handling high pressure cylinders
- Concentration up to 93±3%.
- Avoid oxygen cylinder availability, logistics and management problem
- Can be used as mobile application also
- Low operating cost
- Easy to install and maintain



ISO 7396-1

**Oxygen Plant Consisting of**





Model	Room Layout (in mtrs)		
	L	B	H
GO x			
GO 85	5.3	4.7	4.3
GO 180	5.9	5.0	4.3
GO 260	6.7	5.1	4.6
GO 390	7.3	5.6	4.5
GO 470	7.3	5.6	4.5
GO 570	7.3	5.6	4.6
GO 960	8.5	6.4	4.7

Model	capacity		Equivalent		Air requirements (comp.power)			Dimensions (in meters)			Air/ oxygen Receiver Liters
	LPM	cu.m/hr	Liquid oxygen liters/day	No. of Cylinders /day	cfm	Pressure in kg/cm <sup>2</sup>	Power in kw	L	B	H	
GO 85	85	5.1	153	15-18	44	7	7.5	1.3	1.7	2.5	300
GO 180	180	10.8	324	35-80	100	7	15	1.8	1.9	2.5	500
GO 260	260	15.6	468	50-60	144	7	22	2.1	2.1	2.8	1000
GO 390	390	23.4	702	70-86	205	7	30	2.5	2.6	2.7	1500
GO 470	470	28.2	846	90-105	250	7	37	2.5	2.6	2.8	1500
GO 570	570	34.2	1026	110-126	310	7	45	3.9	3.4	2.8	1500
GO 950	950	57	1728	170-220	525	7	75	3.9	3.4	2.9	2000

**Suggested Guidelines for Selection :**

For higher model, contact factory

Capacity =(1 x No. of beds + No. of beds in ICU x 10 + No. of beds in operation theater x 10) (lpm)

**Specification:**

- Oxygen purity..... 93±3%
- Oxygen pressure..... 4-5 bar (g)
- Air Pressure ..... 7 bar g
- Air inlet temperature.....45 deg C max
- Ambient temperature.....45 deg C max
- Air Quality.....ISO 8573 - 2010 class 1-4-1

Trident's Medical Oxygen Plant are designed in such way, it will work at site 24 x7 without any trouble. All the components used in product are highly reliable and tested as per the Industrial standards. All the safety precautions have been addressed (stand by gas supply mode automatically in case of any failure mode like purity, power failure etc.) to give uninterrupted gas supply.

Trained service team are available across the country to attend the service calls for breakdown as well as preventive maintenance.

Necessary documents and training will be provided to users to handle minor breakdowns.

- 45 service outlets in India.
- Centralized service log system.
- Onsite training for the users.
- Genuine spares available at the nearest point.
- Competitive and effective annual maintenance contracts available at the end of warranty period.

## Comparison

Factor	On-site oxygen production using PSA processes	Liquid oxygen supply systems	High-Pressure cylinder
Capital costs	Investments Required by; but pay-back period(compared with high-pressure cylinders)less than 15 months	Investment required	Investment not required
Recurring costs	Electricity	Cost of liquid oxygen and rent	Cost of oxygen
Space requirements	Medium	High	Least; but depends on number of cylinders
Administration	Easy	Difficult	Difficult
Safety	Safe	Risk of uncontrolled release of oxygen	Risk of explosion
Logistic management	One-time-installation of the plant	Issues might arise when a tanker needs access to bulk-storage tank to refill liquid oxygen	Issues might arise with the transport, storage and accessing of the cylinders.
Evaporation loss	None	Up to 20%	3% unusable

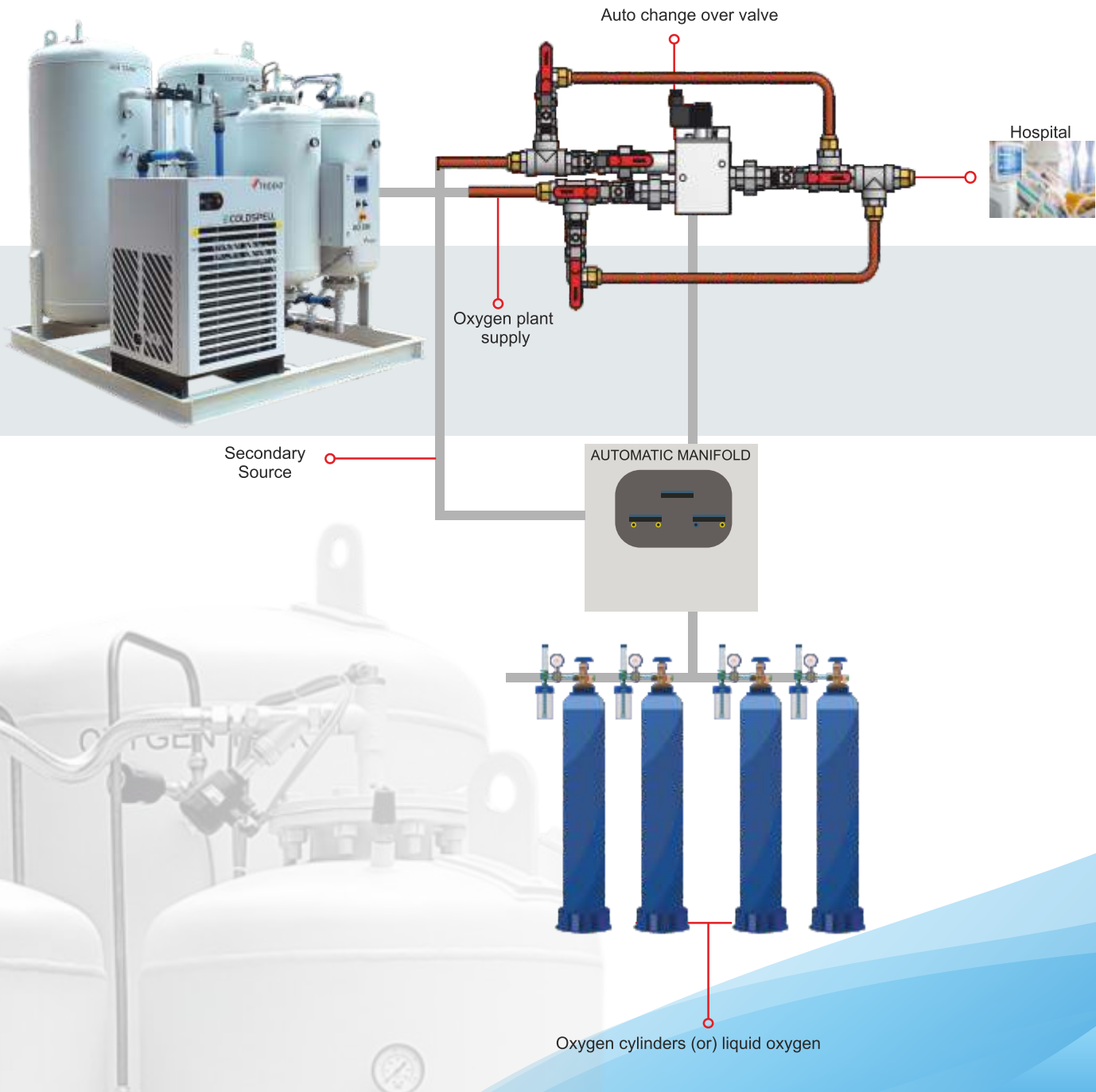
## Recovery of investments

	High-pressure Cylinders	On-site oxygen plant (Model : GO 180 Flow : 180 LPM)
Basis of estimates	Usage: 40 cylinders per day Cost of one cylinder: ₹ 200	Investment: 25,00,000 + taxes power requirement: 15 Kw
Total expenses per month (₹)	40 cylinders per day x 30 days x 200 per cylinders = 2,40,000	Monthly power bill: 15Kw x 75 % loading time x 24 hours x 30 days x ₹ 8 per Kw hour = 64,800
Savings per month (₹)	—	2,40,000 - 64,800 = ₹ 1,75,200
Payback Period	—	25,00,000/1,75,200 = 14.26 months

Note: Plant price, Cylinder cost, Power cost mentioned above is tentative.

## RECOMMENDED OXYGEN SUPPLY CONNECTIONS

- ⦿ Auto change over valve ensures the oxygen supply from the secondary source is triggered and continued incase of output set back from the oxygen plant.
- ⦿ Installation of auto change over valve with secondary source connected is compulsory.





THE HINDU

APRIL 28, 2021

### DRDO to set up 500 medical oxygen plants under PM CARES Fund

In addition, 120 plants of 500 litres per minute capacity will be produced by industries working with Indian Institute of Petroleum, Dehradun, belonging to the Council of Scientific and Industrial Research (CSIR), the DRDO said.

Transfer of Technology has already been done to Tata Advanced Systems Limited and **Trident Pneumatics Pvt. Ltd.**, which will be producing the plants for installation across various hospitals in the country.



hindustantimes

APRIL 23, 2021

### DRDO's 900-bed Covid facility to be inaugurated in Ahmedabad today

DRDO has transferred oxygen generation technology to the industry, which has now started providing oxygen plants to state governments and hospitals

The Uttar Pradesh government has ordered five such plants from Coimbatore based **Trident Pneumatics**.



THE TIMES OF INDIA

MAY 4, 2021

### Delhi: DRDO begins installing oxygen plants at AIIMS, RML hospital

The five MOPs are part of the overall plan to establish 500 such plants at hospitals in different parts of the country within the next three months from the allocations made by the **PM Cares Fund**, as was announced by defence minister Rajnath Singh earlier. The equipment for the two plants at AIIMS and RML, which has been supplied by the Coimbatore-based **Trident Pneumatics Pvt Ltd**, reached the Capital on Tuesday.



THE HINDU

APRIL 30, 2021

### Coimbatore firms step in to meet oxygen needs

With the Government sanctioning procurement of portable oxygen concentrators and setting up of medical oxygen plants, with a technology developed by the Defence Research and Development Organisation, some of the companies in Coimbatore are expected to cater to these orders.

**Trident Pneumatics**, which is the one of the companies to which DRDO has transferred the medical oxygen plant technology, will make 48 plants to be installed across the country. According to its managing Director K.S. Natarajan, the company already received the technology and had installed 70 machines. it will now instal 48 plants."There are a lot of challenges, but it will be done he said.

- Over 400 Installation across the country
- Proud to be a part of installation under



## Few of our Customers



Shree Pragati Foundation's  
Hira Mongi Navneet Hospital



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Supply through **Govt. Organisations** like :



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