How a Cleancab Pressurised Cabin Works

A simple guide for new technicians

The purpose of the pressuriser is to introduce clean, filtered air into the operator cabin and maintain the cabin at a controlled positive pressure. The technician's job is to make sure the system can supply filtered air, maintain pressure, allow suitable air exchange, and operate correctly with the cabin and HVAC system.

1. The basic idea

Think of the cabin as a controlled-air space. The pressuriser draws outside air through the filtration system, removes contaminants through the installed filters, and pushes the filtered air into the cabin. Because the pressuriser is supplying air continuously, the aim is to keep the pressure inside the cabin slightly higher than outside.

A simple way to picture it is:

Outside air	→	Prefilter / filtration	→	Pressuriser	→	Cabin
Contaminated air		Removes contaminations		Moves the air		Clean, positive-pressure space

2. Why the fresh-air intake is important

The pressuriser needs a controlled source of outside air. This air passes through the filtration system before being delivered to the cabin. The installation instructions recommend ducting pressurised air into the air-conditioning plenum so that it can mix with recirculated cabin air

Fresh air provides two important functions:

• **1. It provides the air that the pressuriser uses to create positive pressure.** Without a suitable filtered outside-air supply, the system cannot perform its intended pressurisation function.

• **2. It provides air exchange.** The cabin is occupied by the operator, so some outside/filtered air needs to enter the cabin while cabin air leaves through controlled leakage or other designed paths. This is important for managing CO2.

> Do not confuse the pressuriser fresh-air supply with simply opening a putting fresh air in the cabin. The incoming air must be filtered and the cabin must be sufficiently sealed so that the supplied air is controlled.

3. Why positive cabin pressure is important

Positive pressure means the air pressure inside the cabin is higher than the air pressure outside. When the cabin is reasonably sealed, air tends to move **out** through small gaps rather than contaminated outside air being drawn **in** through those gaps.

This is why cabin sealing is a major part of a successful installation. Door seals, window seals, penetrations, duct connections and other openings can all affect the ability of the pressuriser to maintain pressure.

> **Important technician point:** A pressuriser running does not automatically mean the cabin is protected. The system must be capable of maintaining the required pressure, and the cabin condition and sealing must be checked during commissioning.

4. Why CO2 levels are important

The operator is continually adding CO■ to the cabin by breathing. If the cabin is very tightly sealed and there is not enough air exchange, CO■ can build up. This is why a pressurised cabin needs both **pressure** and **air exchange**.

The Cleancab procedures use CO■ as an indicator that the cabin is receiving adequate air exchange. The verification procedure checks ambient CO■ first and then performs a 15-minute operator test. It states that CO■ should stabilise no more than about 400 ppm above ambient and should not exceed approximately 900–1000 ppm total.

The system also has a automatic CO■ control: when CO■ rises above 1200 ppm, the system can increase cabin pressure to 135 Pa; when CO■ falls below 1000 ppm, it returns to the preset pressure. forcing more air into the cabin can help reduce CO2 levels.

Technician takeaway: High CO■ does not necessarily mean the filtration system has failed. It can indicate that the cabin is too tightly sealed, the fan speed is too low, the HVAC/airflow arrangement is not providing sufficient exchange, or the CO■ sensor needs checking.

5. What happens if the cabin is not sealed enough?

If the cabin has excessive leakage, the pressuriser has to move a much larger volume of air just to maintain pressure. The fan may therefore need to run at a higher speed. A good sealed cabin should achieve 35 Pa at less than 60% fan speed, with 20% identified as a minimum operating fan speed to control CO2 levels.

Excessive leakage can also make the HVAC system work harder. Large amounts of outside air exiting through uncontrolled gaps can increase the heating or cooling load on the air-conditioning system. In hot conditions, this can mean the HVAC system has to cool more hot outside air; in cold conditions, it has to heat more outside air. Remember that the pressuriser adds load to the AC system and that sealing the cabin helps reduce heat load.

6. What happens if the cabin is sealed too well?

A cabin that is extremely well sealed can have the opposite problem: there may be insufficient air exchange for the operator. The supplied operating manual notes that a cabin that is too well sealed can allow CO■ to build up and that, where necessary, a bleed valve may be required.

The goal is therefore **not maximum sealing at any cost**. The goal is a controlled cabin: enough sealing to maintain positive pressure without excessive fan demand, while still providing sufficient filtered air exchange for the operator.

7. How the technician should think about the system

1	**Outside air**	The pressuriser needs a reliable source of outside air.
2	**Filtration**	The supplied air passes through the installed filtration stages before entering the cabin.
3	**Pressurisation**	The fan supplies filtered air faster than it can escape, creating positive pressure.
4	**Cabin sealing**	Good seals allow pressure to be maintained without excessive fan speed.
5	**Air exchange**	Some cabin air must leave so fresh filtered air can enter and CO■ does not build up.
6	**HVAC interaction**	The pressuriser and HVAC system work together excessive leakage can put strain on the system.
7	**Monitoring**	Pressure and CO■ measurements help the technician confirm system operation

8. What to check during commissioning

■ Confirm the pressuriser motor starts and operates correctly.

■ Confirm the monitor and sensor box are powered and functioning.

■ Check electrical and mechanical connectors and look for abnormal noise or vibration.

■ With the factory HVAC off, run the pressure test and record the maximum pressure.

■ The supplied installation instructions specify cabin pressure above 20 Pa, with 35–50 Pa recommended and a factory target of 35 Pa.

■ Test cabin pressure with the HVAC system on high speed to see if the system pressure is too high

■ If the target pressure cannot be achieved, investigate cabin sealing with a smoke test and inspect doors, windows, penetrations and duct connections.

■ For too high pressure with HHVAC on full speed check the cabin recirculation system for restriction

■ Check fan speed at target pressure. Excessive fan speed can be an indication of leakage or restriction.

■ Complete the CO■ verification with the HVAC set as specified in the Cleancab procedure and with an operator in the cabin for the 15-minute test.

■ Complete the commissioning record and provide the required filter and commissioning documentation.

9. Remember this simple rule

> **Pressure protects against uncontrolled outside-air entry. Fresh filtered air provides the supply. CO■ tells you whether the cabin is getting enough air exchange. Cabin sealing controls how efficiently the system can maintain pressure.**

A successful installation is a balance between these four things—not simply a pressuriser running at high fan speed.

Source basis

This guide is based on the supplied Cleancab Installation Instructions, Pressure & CO■ Monitoring System Installation & Operating Manual, CO■ Verification Procedure, Installation Checks and Annual Inspection Technician Checklist. Where the supplied documents contain differing fan-speed details, the installer should follow the current controlled product specification/firmware setting rather than assume a value.