



Operator manual
PureBlast Mini

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1. Your new machine

Prior to operating your new **PureBlast™** blaster you should check that no damage has occurred during transport. In the event that you do detect physical damage, please document this by taking photos and mail them to us. If transport has been arranged by us then we will take care of the compensation claim. If transport was arranged by you then we recommend that you contact your transport company as quickly as possible.

Please read through this manual carefully before operating the blaster.

It is the responsibility of the owner of the machine to make sure that the operator has been trained in the use of the equipment and health and safety aspects associated with performing dry ice blasting.

2. Safety and safety equipment

Fresh Air supply

Dry Ice is manufactured by expanding LCO_2 , which will form dry ice snow. The snow is then compressed and extruded by a pelletizer to create dry ice pellets.

The CO_2 released from the blasting process as the dry ice is turning into gas again increases the levels of CO_2 in the working area.

In most areas and with exterior cleaning this will not cause any problems. But if used indoor or in a confined space a CO_2 monitoring device (most regulations are defining that 5000 ppm is the highest concentration allowed over maximum 8 hours) and fresh air supply mask are needed. Please consult your local supplier of Personal Protection Equipment (PPE).

CO_2 is colorless, tasteless and has no smell. Symptoms of overexposure to CO_2 are:



It is under all circumstances required to have sufficient ventilation in the areas where you are working.

2.1. Gloves

 <p>Wear gloves</p>	<p>Dry ice is cold (-79°C) and can cause frost burns. Always wear gloves when handling dry ice.</p>
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2.2. Protective clothing

	<p>You should not get in contact with dry ice and mostly you will not. However, it is always recommended to wear protective clothing.</p>
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2.3. Ear Protection

	<p>Depending on the pressure and airflow being used during blasting the noise level will be between 75 dB (A) and 130 dB (A). It is therefore recommended to wear ear protectors at all times. Also do consider that others may be in the vicinity and they should also protect themselves.</p>
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2.4. Face Protection

	<p>There is a risk of being hit by dry ice pellets bouncing back from the surface you are cleaning. Also debris and other loose particles can get on to your skin and in your eyes. Always wear a fact shield when performing dry ice blasting.</p>
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3. Equipment assembly

3.1. Electrical cable

Connect the electrical cable to a power source as specified on the machine identification plate.

3.2. Blast hose and gun

The blast hose with the gun has got a threaded coupling which has to be fitted to the machine.

No tools are needed to connect the blast hose. A finger tight connection is sufficient. This also makes it easier to detach the blast hose again after use. However, it is required to regularly check to make sure the connections are securely attached.



Plug the male electrical connector on the blast hose into the female socket on the front of the blaster by inserting the plug and securing by twisting clockwise.



3.3. Compressed air hose

To maximize the cleaning performance and to avoid pressure drop, then use an air hose that has an inner diameter of 10-13 mm. The air hose should be able to deal with a pressure up to 12 bar. Never operate the machine at a higher pressure than 12 bar.

Attach the compressed air hose to the air inlet fitting



4. Equipment operation

4.1. Start-up

Follow the previously mentioned instructions on how to connect the electrical cable, compressed air hose and the blast hose. Make sure the emergency stop button is depressed, if it has been pressed in, slightly turn the button clockwise to depress.



Turn the on/off switch to the right to turn on the machine and left to switch off.

Before loading the hopper with dry ice, activate the blaster by pressing the handle on the blast gun. This will eliminate any moisture that could be in the hoses, hopper or airlock. You should always carry out this procedure before commencing blasting.

Only load the hopper with dry ice you when you are ready to start blasting and only use the amount you require for the operation. The dry ice hopper can hold 8 kgs and which will stay fresh for up to 20-30 minutes. If dry ice is left in the hopper for longer, there is a risk of humidity which in turn could make the dry ice become slushy which may block the flow of dry ice to the airlock.

We also recommend to always fully close the lid to avoid humidity affecting the dry ice and also to avoid dust and other ambient particles entering and mixing with the dry ice.

4.2. Dry Ice blasting techniques

When blasting always make sure that the blast hose rests over your shoulder. It minimizes the risk of tear and wear of the hose, but it also reduces any drop in pressure and the operator will incur less fatigue.

When blasting always aim for a 70-80 degree angle to the surface that is to be cleaned.

The distance to the object for normal blasting should be approximately 5 cm. When using micropellets where a softer cleaning is desired then a distance of up to 30 cm could be beneficial.

Move the nozzle slowly over the surface to allow maximum impact of the kinetic effect. Do not "wash/hose down" like normally seen with water blasting.

To avoid damage to the surface or object you are cleaning, start with low pressure and gradually adjust the pressure up to the point where you achieve the maximum speed of cleaning without damage to the surface/object. Start with 50% of the ice flow (15 kgs/hour) and try turning it down to the point where you see it has an effect on the cleaning speed. Dry ice is a consumable and correctly minimizing the consumption can increase your profit.

Dry ice blasting can be harmful. Be sure to never point the blast gun at other persons or creatures as damage caused by being "shot" with dry ice can be very dangerous.

Correct working procedures. When blasting there is a risk of cross contamination (particles/debris etc.) being projected from the place you clean to another area, to other machines or surfaces. To eliminate this risk we recommend that an enclosure is constructed around the part to be cleaned and at the same time apply the use of an extraction/filter system to capture the released particles/debris.

Covering flooring and other sensitive areas will reduce the after-cleaning time.

When blasting in closed areas or smaller rooms it is essential to have good ventilation or by using a fresh air supply as the levels of CO₂ can increase to dangerous levels. We always recommend the use of a CO₂ monitoring device to ensure the safety of the operative and to stay within required levels.

The operative should at all times be wearing facial protection, appropriate gloves and clothing to avoid dry ice or other particles that may rebound from the surface being cleaned.

4.3. Selection of the correct nozzle

It is not always necessary to have maximum cleaning power/speed. One of the most obvious benefits of dry ice is that it also can clean electronics and sensitive surfaces without damage. However, to obtain the fastest cleaning on surfaces where no damage is possible e.g. steel surfaces, then these factors need to be maximized.

4.3.1. Air pressure

The blaster and the hoses are built for pressures up to 12 bar. Higher pressures enable the removal of deposits that have a greater adherence to the surface.

4.3.2. Air volume

The machine has a 1/2 inch flow through the machine, which allows up to 15 m₃/min. However, if you can work with lower air flow then you save, not only in diesel/electricity consumption, but also in the investment in larger and more expensive compressors.

4.3.3. Supply hoses

It is however the compressor and air hoses to the blaster that gives limitations on air flow. Always choose a hose with large ID. Typically you will find hoses between 6 – 13 mm in factories. All hoses less than 10 mm will give significant pressure drop and reduced cleaning effect.

4.3.4. Wide nozzles

A wide orifice nozzle offers a far gentler clean whilst also cleaning a greater area.

4.3.5. Throat diameter.

If you were to work with a nozzle that had a full 1/2 inch opening the "expanding" air would cause the generated pressure and acceleration to dramatically drop.

In order to choose the right throat diameter you must first check what airflow your compressor can provide.

As a rule, the smaller the compressor the smaller the throat diameter of the nozzle. Having the right size throat diameter allows you to maintain a certain pressure

As standard the machine is supplied with 2 nozzles. One (3 mm) for use with compressors giving less than 1,5 m₃/min (only to be used with Micropellets) and a 5 mm that will deal with airflows up to 3 m₃/min.

4.4 Cleaning aggressiveness

Depending on what needs to be cleaned and how aggressive the cleaning should be, the angle of approach can be changed. Aggressive cleaning on hard deposits is usually carried out at an angle from 75-90 degrees. Softer cleaning can be achieved by lowering pressure, using a wide nozzle, using micro pellets, using 2-3 days old dry ice (depending on the insulation of the dry ice container) or by blasting at an angle of less than 75 degrees. Of course a combination of all the options will guide you to obtaining the best result in a given situation.

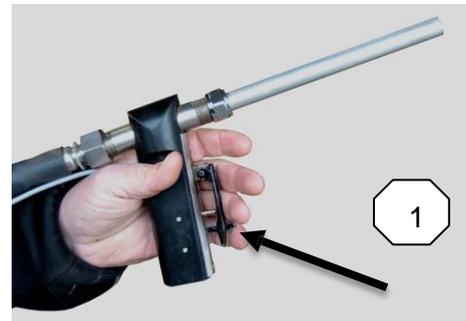
4.5 Dry ice particle size

Two things are important when understanding the importance of the size of a dry ice pellet. One is the weight (to create maximum force on impact) and the other is number of impacts per cm^2 . The industrial standard 3 mm pellet has a weight that will generate a strong impact. But when consuming between 10-30 kgs/hour it does not generate as many impacts per cm^2 as micropellets (1,7 mm) would do.

Number of impacts is a very important factor, especially when softer and a gentler cleaning is required. However, when it comes to aggressive cleaning then the micropellet simply is too light and the extra number of impacts cannot make up for the strength of a larger pellet. Finding the right size pellet for the right project is a challenge, but very important.

4.6 Using the dry ice gun

The lightweight blast gun has for safety been equipped with a safety pin (1) at the trigger. In order to activate blasting the lever must be pushed down, which in turn allows the trigger to be pressed.

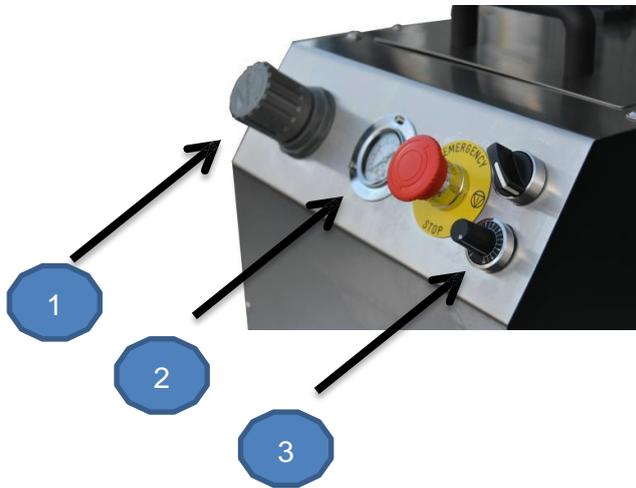


Nozzles can be changed by unfasten the nut that holds the nozzle. Replace the nozzle and fasten the nut again. Hand tight only. No need for tools



4.7 Regulating pressure and dry ice flow

The regulation of pressure and dry ice consumption is done at the front panel



1: Gently pull the regulator to active (it can for safety be locked by pushing it in). Regulate the pressure by turning the knob.

2: The pressure can be monitored at the pressure gauge

3: The dry ice flow can be regulated between 10-30 kgs/hour (depending on the dry ice particle size)

5 Avoiding humidity

There are 3 different possible sources for increased humidity when dry ice blasting that can therefore create a risk when cleaning sensitive parts.

Compressor:

Only dry ice blast when using compressors that have an after cooler and water separator. In some cases it may be necessary to have an electrical freeze dryer to make sure that water is not condensing on the surface to be cleaned.

Dry Ice:

Dry ice is cold and will attract humidity. That can happen at the production site or at the cleaning project site. Check before accepting delivery that the dry ice is fresh and has not been affected by long exposure to open air. Apart from when filling it is important to make sure that both the dry ice container and the lid on the blaster are both firmly closed at all times.

Condensation:

Condensation is another situation that happens when a substrate is being cooled down which then attracts water/condensation. If the condensation is not stemming from one of above and thus drawing water from the ambient air, then manual wiping or mechanical heating of the parts is the only solution to solve the condensation.

6 Handling the blast hose

The blast hose is a wear and tear part, but by handling it correct and protecting it during operation it will last for many years. It is a ½" PU hose that is rated for 20 bar with strong threaded connectors. All of this is to ensure a long life for the blast hose.

Most damage to the blast hose is not from the actual blast operation, but from improper transport and storage.

When blasting always try and have the hose as straight as possible. A 360 degree curve can reduce the cleaning effect by more than 10%.

Hold the blast hose over your shoulder when cleaning. Besides given a better working position it will also give a softer curve on the blast hose.

It is recommended to protect the hose with a disposal plastic liner. This will keep your blast hose clean at all times, which is important when you bring your machine on to a customer's site.

7 Changing nozzles

Nozzles and the inserts are easily changed without the use of tools. Simple turn of the nut, replace the nozzle and fasten the nut again. The nut should only be hand-tight and tools should never be used.

8 Equipment shut down and transportation

11.1. Depressurizing the machine

Whenever there is a long pause in the cleaning or if the equipment needs to be moved, then it is advised to depressurize the equipment. First shut off the air supply at the source, then depressurize the machine and hose by pulling the trigger on the gun.

Equipment maintenance

12.1 Daily

Check all external connections.

- Electrical plug
- Blast hose connections
- Connections at blast gun

Clean or replace if necessary

12.2 100 hours

Inspect all connections internally. Make sure all are well connected and that no leaks are damage are observed.

Inspect rotor plate and air plates for damage by following these steps.

IMPORTANT: (MAKE SURE THAT THE MACHINE HAS BEEN DEPRESSURIZED AND THAT THE ELECTRICAL POWER CORD HAS BEEN REMOVED FROM THE ELECTRICAL SUPPLY SOCKET)

Remove the side panels

Loosed the 4 bolts holding the hopper and lift it out gently.

Remove the 4 bolts holding the top airlock plate.

Inspect the air plate that is embedded in the top airlock plate. It is normally this inexpensive air plate that will absorb almost all wear and tear. It is a good idea to replace it on a regular basis to insure a long life of the machine.

Remove the rotor plate and inspect for damage (replace if needed). Please do not use screwdrivers or other tools to remove the rotorplate. It should slide up just by hand.

Inspect the air plate embedded in the lower airlock plate. Again replace if needed.

12.3 500 hours

Same as for the 100 hours service but it is recommended to have the blaster serviced and tested at a Cryo Pure Corp. service center.

13 Warranty

Cryo Pure Corp. provides a 2-year warranty on all none wear and tear parts if the machinery is used as intended under normal circumstances and only if stated service intervals have been observed. The cost of replacement is limited to the cost of the part only and does not cover labor, transport or any other cost. Replacement and repair on the machinery has to be performed by an appointed service technician or other approved and trained personnel. A warranty claim will first be accepted when the default part has been returned to Cryo Pure Corp. and evaluated as damaged from the factory.

Wear and tear parts are identified as; rotor plate, air plates, blast hose including couplings.

For more information or operational/technical questions please contact authorized distributor or

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