

AERO₂

PCS[®] 60

Operator Manual



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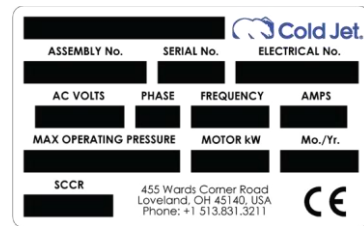
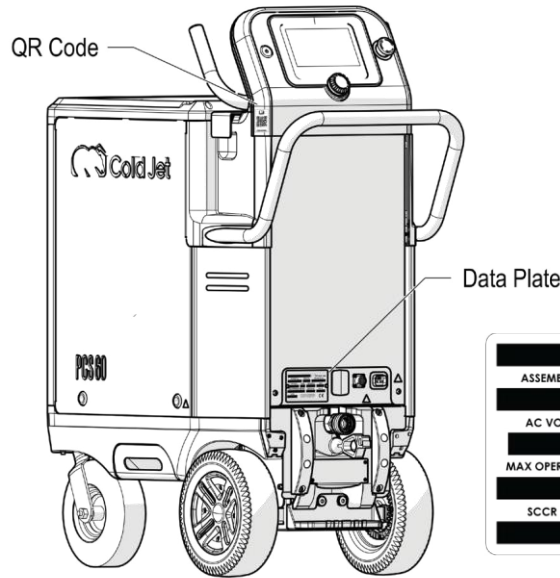
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System Identification

Locate the data plate for this machine and record the information provided in the spaces below. To view documentation for your machine, scan the QR code:



ASSEMBLY No. _____

SERIAL No. _____

ELECTRICAL No. _____

AC VOLTS _____

PHASE _____

FREQUENCY _____

AMPS _____

MAX OPERATION PRESSURE _____

MOTOR KW _____

Mo./Yr. _____

SCCC _____

Supplier Responsible for the Equipment:

Cold Jet, LLC
455 Wards Corner Road
Loveland, Ohio 45140 USA

Phone: 1-800-777-9101
Website: www.coldjet.com



Introduction

About This Manual

This manual should be kept with the machine and be readily accessible to machine operators and maintenance personnel.

This manual contains information on the safety, transportation, operation, and maintenance of this machine.

The graphics used in this manual may show machine details that may be different than the actual machine. Components of the machine may have been removed for illustrative purposes or the continuing improvement of the machine's design may cause changes that are not included in this publication.

The owner of this machine is responsible for verifying the operator of this machine is trained and understands the contents of this manual.

About The PCS 60

This machine combines patented technology in a lightweight and compact design that gives the operator unparalleled control for dry ice cleaning and surface preparation.

The Advanced Air-Flow System reduces pressure loss as the air flows straight through the system which also decreases sublimation and loss of the dry ice particles.

The Blast Pressure Control System can be regulated digitally from the 7" HMI color screen on the control panel or certain applicators.

The Sure Flow System with Dynamic Agitation is designed to keep warm air, moisture, and debris out of the hopper while keeping the dry ice flowing. The level of dry ice in the hopper can be monitored from the HMI screen of the control panel or certain applicators.

The Advanced Direct Drive Feeding System is a two-stage feeding system that improves feed rate consistency and maximizes dry ice particle integrity.

This machine includes a Particle Control System™ brand blast media resizer that allows the operator to control the size of dry ice particles being blasted from 0.3 mm micro-particles to 3.0 mm pellets.

Environmental Impact

Dry ice is a safe, clean, and non-toxic medium approved by the EPA, USDA, and FDA. The dry ice used in this machine is made from reclaimed CO₂ generated from other industrial processes.



Safety

General Safety Guidelines

This machine is designed to comply with international design standards and the European Machinery Directives. Therefore, using the machine does not pose a risk to the operator when the instructions in this manual are followed. However, certain precautions must be followed during its use. To understand all the necessary precautions, the machine operator must read the entire manual before operating or performing maintenance on the machine.

Operation should only be performed by trained personnel. Below are some basic safety guidelines:

- a. Follow local governing codes to ensure a minimum standard of safety.
- b. Wear protective gloves, eye protection, and hearing protection.
- c. Operate the machine in a well-ventilated work area.
- d. Follow the prescribed Inspection schedule (see "Inspection" on page 57).
- e. Start up and shut down the machine according to the instructions in this manual.
- f. Do not operate a machine that is damaged or in disrepair.
- g. Do not store objects on top of machine.

CO₂ Safety



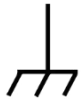
WARNING Ensure adequate ventilation when operating this equipment to prevent the build-up of carbon dioxide gas. If used indoors or other confined space, a CO₂ detector should be used to monitor for excessive unsafe levels of CO₂ gas and provide a suitable warning. The legal exposure limit by OSHA is a 0.5% average over an 8-hour workday.

This machine uses dry ice (CO₂ in solid form). The temperature of dry ice is -109°F (-78.9°C). Avoid coming into direct contact with dry ice as it may cause severe tissue damage. Study the material safety data sheet (MSDS) of dry ice (CO₂) supplied with the delivery of dry ice and follow all the recommendations and guidelines listed therein.

Operate the blaster in a well-ventilated work area with continuous CO₂ -level monitoring. The effects of CO₂ are entirely independent of the effects of oxygen deficiency. Therefore, CO₂ concentrations at 3-5% causes headaches, fast breathing, and discomfort while higher concentrations may cause unconsciousness, suffocation, or respiratory arrest. The legal exposure limit set by OSHA is a 0.5% average over an 8-hour workday and the acute (15 minute) exposure limit is 3.0%.

Always use a CO₂ monitoring/alarm system when working with machinery that emits CO₂ in a confined room/space.

Electrostatic Discharge



WARNING Dry ice blasting may create electrostatic discharges which may harm personnel. Ensure that the surfaces being cleaned are properly grounded with the supplied grounding cable. This machine is fitted with effective electrostatic dischargers to prevent injury or damage. It is recommended to avoid operating the machine near explosive or flammable material. Also, use a polymer shovel when handling dry ice to eliminate any electrostatic discharge.

Electrical Grounding



WARNING To prevent electrical shock, the machine must be properly grounded using outlets and power cords that have a ground lug. The machine must be plugged into a properly grounded outlet. If there is no ground connection, DO NOT USE.

Safety Labels

The symbols used on the machine were developed by the International Organization for Standardization (ISO) and are defined below. These symbols may include yellow warning triangles, blue mandatory action circles, or red prohibited action circles. ****Replace any safety labels or warning signs if they become damaged, missing, or illegible.*

Symbol	Definition
	Attention
	Cold Temperature Warning
	Pressurized Material Ejection Hazards
	Electrical Hazard
	Asphyxiation Warning
	Wear protective gloves
	Wear hearing protection
	Wear eye protection
	Read operator and maintenance manual
	Do not operate without Safeguard Grate/guard in place
	No foreign objects allowed inside machine
	CO ₂ is in use

Safety Labels cont.



Protective Earth/Ground



Frame/Chassis Ground Terminal

Cautions and Warnings

Please review the following cautions and warnings before operating or performing maintenance on the machine.

CAUTION Read the instructions before using the machine. Only qualified personnel should operate the PCS 60.

WARNING Ensure adequate ventilation when operating this equipment to prevent the build-up of carbon dioxide gas. If used indoors or other confined space, a CO2 detector should be used to monitor for excessive unsafe levels of CO2 gas and provide a suitable warning. The legal exposure limit by OSHA is a 0.5% average over an 8-hour workday and the acute (15 minute) exposure limit is 3.0%.

WARNING Ensure that expended dry ice pellet emissions are not in the vicinity of air ducts that could allow CO2 to enter another space.

WARNING Due to the nature of dry ice, and atmospheric conditions, use caution when operating, storing, and cleaning the machine as condensate can build up and leave moisture on the ground near the machine and blast hose. It is recommended to wear appropriate non-slip work shoes and it is necessary to wipe up and dry any condensate from the work area that could cause a slip hazard.

WARNING This machine has been designed for use with 3mm dry ice pellets recommended by Cold Jet. The use of other cleaning agents or chemicals may adversely affect the safety of the machine.

WARNING High pressure blast streams can be dangerous if subject to misuse. The blast stream must never be directed at persons, live electrical equipment, or the machine itself.

WARNING Do not use the machine within range of persons unless they wear the required personal protective equipment (PPE).

WARNING Do not direct the blast stream of air or air and dry ice against yourself or others.

WARNING High pressure cleaners shall not be used by children or untrained personnel.

WARNING High pressure hoses, fittings and couplings are important for the safety of the machine. Use only hoses, fittings, and couplings supplied by Cold Jet.

WARNING To ensure machine safety, use only original and replacement parts from Cold Jet.

WARNING The applicator and applicator hose contain electrical connections. Do not immerse in water.

WARNING Only use Cold Jet applicators, nozzles, and hoses.

WARNING Do not use the machine if an electrical supply cord or important parts of the machine are damaged or missing, e.g., safety devices, side panels, guards, high pressure hoses, applicator, hardware, nuts and bolts, or screws.

WARNING Inadequate extension cords can be dangerous. If an extension cord is used, it shall be suitable for the environment in which it is used. If used outdoors the connection must be kept dry and off the ground. It is recommended that this is accomplished by means of a cord reel which keeps the socket at least 2.4 inches (60 mm) above the ground. Ensure that the extension cord is properly sized for the machine electrical requirements.

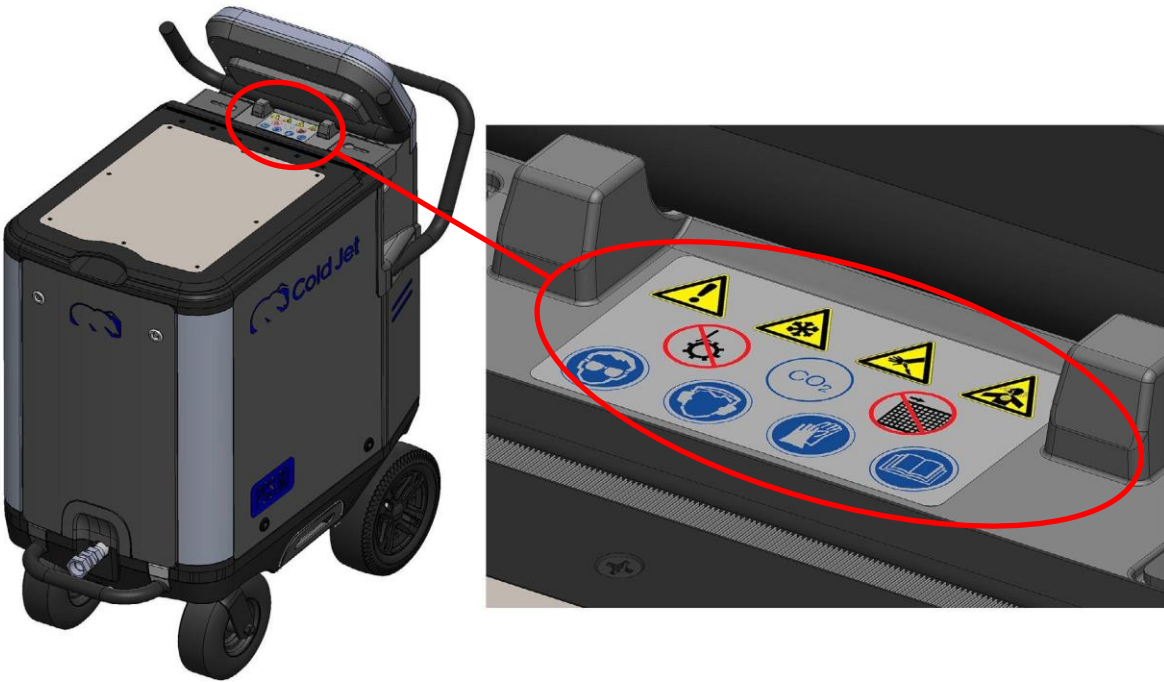
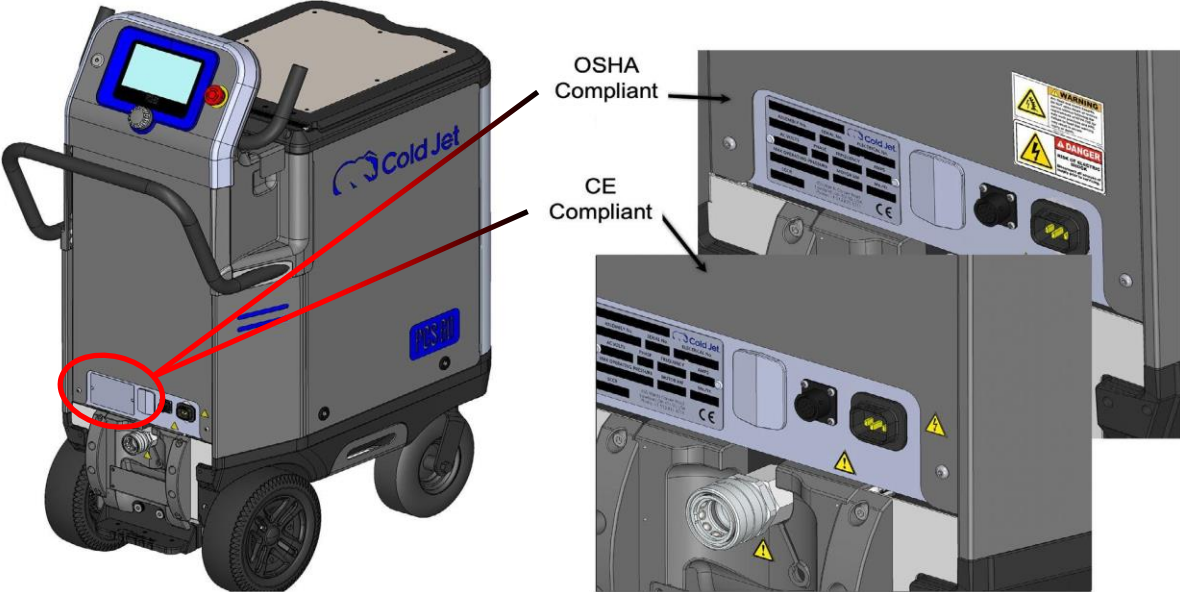
WARNING Always switch off the main disconnecting switch, or unplug the blaster power cord, bleed any pressure, and disconnect the air supply when leaving the machine unattended or shutting down. Reel the cord up to the machine and place a locking device over the plug of the unit when Lock Out Tag Out is necessary.

WARNING Ensure all safety grates and machine covers are in place before operating the PCS 60.

WARNING Never insert a foreign object into the hopper of the machine for any reason without the machine in Lock Out Tag Out (completely de-energized).

WARNING Dry ice blasting may create electrostatic discharges which may harm personnel. Ensure that the surfaces being cleaned are properly grounded with the supplied grounding cable.

Safety Label Locations



Steps for conducting a Lockout Tagout or “LO/TO”

Throughout this manual, “Lockout Tagout” (LO/TO) will be referred to in instances when power must be removed from the machine. There are (6) universally accepted basics to this procedure. They are listed below but may not be limited to these (6) steps; each individual entity owning and/or operating a PCS 60 may have their own LO/TO procedures. Please refer to those procedures and decide which procedure will provide the safest working conditions and environment.

Preparation: The first step to completing a proper lockout tagout is preparing the equipment to be powered off:

Note: There are (2) energy sources that supply the PCS60: an electrical supply and a compressed air supply. Both energy sources must be removed.

1. **Shut Down:** The machine’s power button is to be turned off.
2. **Isolation:** The electrical power supplying the machine must be turned off. The power cord must be unplugged from the supply source. Leave power cord within visual distance of the machine. The compressed air supplying the machine must be turned off and disconnected from the machine.
3. **Check for Stored Energy:** At the applicator, press the “Air-Only” once, pull the trigger. No activity should be present at the machine.
4. **Isolation Verification:** Does the machine have electric power or compressed air present? The power button should have no luminescence presence; it should be off. The HMI display should have no images present. At the applicator, press the “Air-Only” once, pull the trigger. No activity should be present at the machine.
5. **Verify the reason for using the LO/TO procedure has been solved.** For example, if the reason for initiating the LO/TO procedure was a screwdriver that fell into the hopper causing the doser to stop, verify that the screwdriver has been removed. Once verified that the problem is solved, in this case that the screwdriver has been removed, follow the instructions to “Setting Up the PCS 60 System” on Page 41.

Emergency Stop

The Emergency Stop button is used if the PCS 60 must be shut down immediately. If any event occurs that could cause harm to personnel or equipment, then use the Emergency Stop to shut down the PCS 60. The Emergency Stop button is a push button. Once pushed, the button becomes locked in the down position. The button must be rotated clockwise to reset. Once rotated, the button will pop outward to its ready state. The display on the machine now turns to a “Reset Screen.”

Note: When the PCS 60 is in idle, such as between cleaning cycles, the machine has full power to all functions and motors.

Note: When the Emergency Stop has been activated, there is only power going to the control board and safety relay. Nothing on the machine will operate until the emergency stop has been reset.



CAUTION

Do not use the emergency stop button to shut down the PCS 60 for anything other than an emergency.

Reset Screen

The reset screen appears if the *Emergency Stop Button has been depressed (activated)* or if the *safety grate has been opened*.

If an emergency has occurred in which the Emergency Stop button has been depressed (activated), correct any issues that initially caused the emergency. When the issue(s) have been corrected, reset the Emergency Stop button by following the instructions on Page 14.

If the Safety Grate has been opened, close it. Then, reset the Emergency Stop button by following the instructions on Page 14.

Once the Emergency Stop Button has been reset or the Safety Grate has been properly closed, press the rotary encoder dial as on the reset screen as shown below. This will cause the machine to go through a calibration sequence that lasts about (15) seconds. It will then return to its last mode of operation prior to shut down.



Reset Screen

PCS 60 System Description

The PCS 60 may be supplied with the Performance Kit or the Precision Kit or both depending on what was ordered with the purchase of the machine. An optional Advanced Applicator is available for purchase upon request.

The standard applicator kits are as follows:

Performance Kit

- 3/4 in or 1in Performance Applicator
- Performance nozzle
- Control cable
- Nozzle handle
- 1in air supply hose 25 ft (7.62 meters)
- 3/4 in or 1in hybrid-flex blast hose 20 ft (6.09 meters)
- Hose carrier
- Hose wrap

Precision Kit

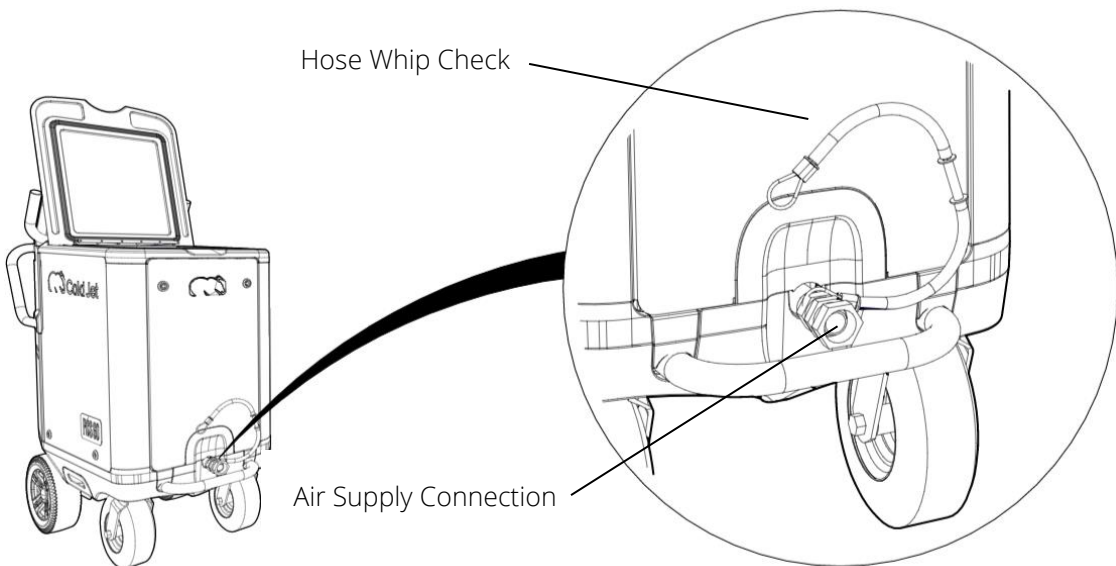
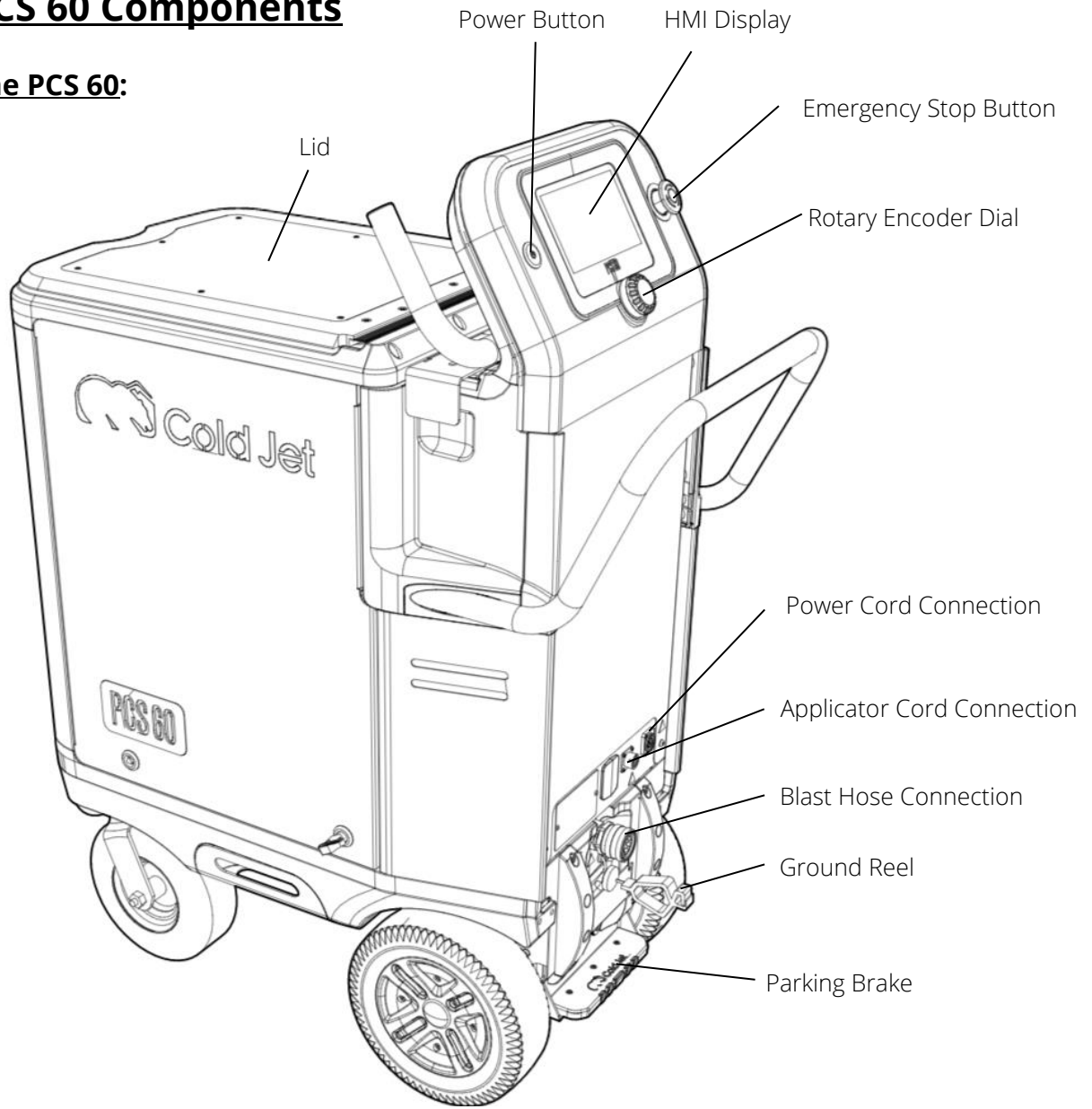
- 1/2 in Precision Applicator
- 2 Precision nozzles
- Control cable
- 1in air supply hose 25 ft (7.62 meters)
- 1/2 in hybrid-flex blast hose 12 ft (3.66 meters)
- Hose carrier
- Hose wrap

PCS 60 Data

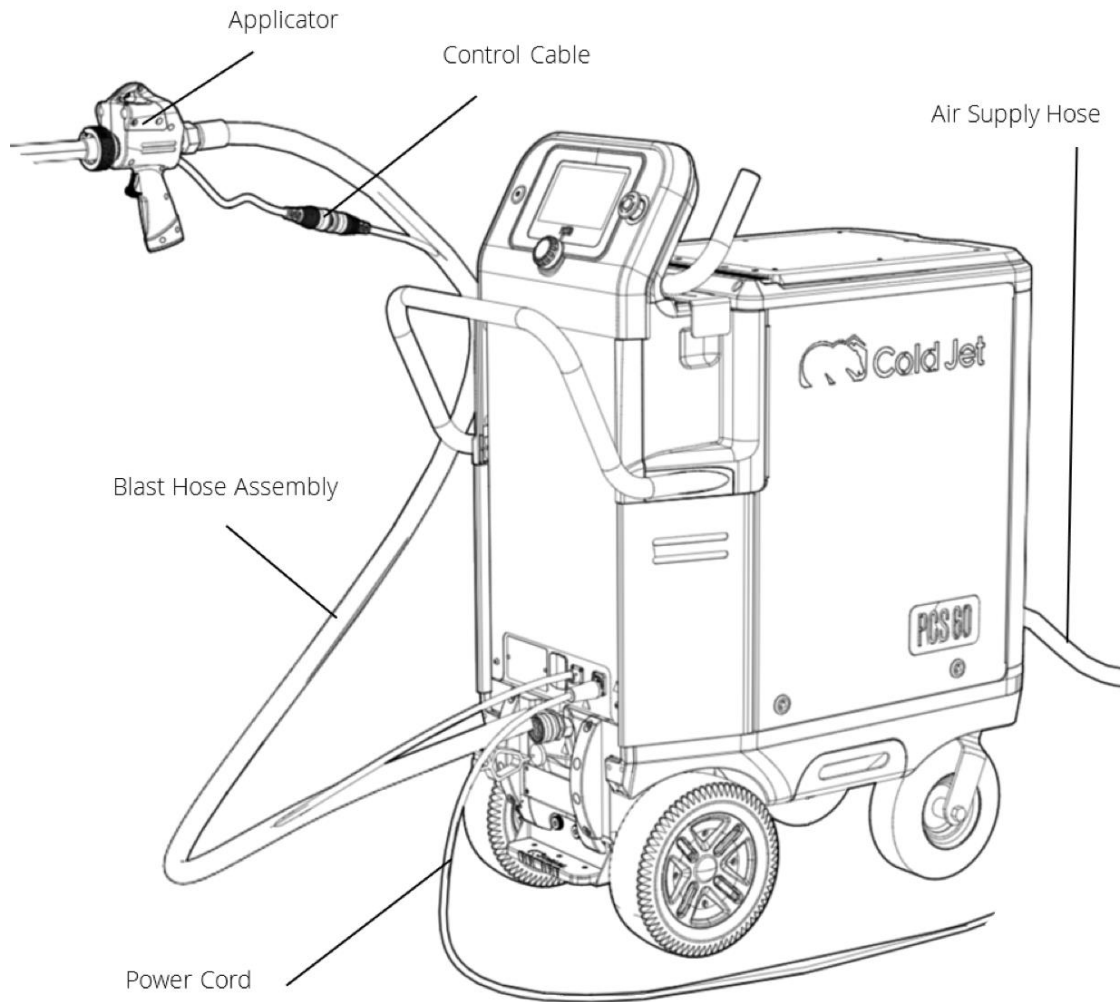
Dimensions	38.75 x 18.98 x 45.03 in (984.33 x 482.21 x 1143.82 mm)
Weight	269 lb. (122 kg)
Blast Medium	3 mm dry ice pellets
Hopper Capacity	60 lb. (27 kg)
Power Requirement	110/220 VAC (50/60 Hz) = AMPS 4.5
Short Circuit Current Rating (SCCR)	10Ka
Air Supply Pressure	40- 145 psi (2.8-10 bar)
Air Flow	12-100 cfm at 80 psi (0.33-2.83 m ³ /min at 5.5 bar)
Air Flow Line	¾ in (19 mm) straight-through
Blast Pressure	20- 145 psi (1.4 - 10 bar)
Variable Feed Rate	0-4 lb/min (0 - 1.8 kg/min)
Blast Particle Size	3.0 mm to 0.3 mm (Variable Particle Size Controls)
Air Hose	1 in (25.4 mm) Air Supply Hose
Blast Hose	<ul style="list-style-type: none"> - ½ in (12.7 mm) Advanced combination material flex hose (low flow) - ¾ in (19 mm) Advanced combination material flex hose (medium flow) - 1 in (25.4 mm) Advanced combination material flex hose (standard)
Applicators	<ul style="list-style-type: none"> - ½ in (12.7 mm) Precision Applicator with on/off; air only; light control - ¾ in (19 mm) Performance Applicator with on/off; air only; light control - ¾ in (19 mm) Advanced Applicator with LED light control; mode air only or blast; feed rate; air pressure; particle size - 1 in (25.4 mm) Performance Applicator with on/off; air only; light control - 1 in (25.4 mm) Advanced Applicator with LED light control; air only or blast; feed rate; air pressure; particle size - 1 in (25.4 mm) Heavy Duty Applicator with on/off; air only; light control; blasting pressure, and dry ice feed rate
Control/Display	7 in (17.7 cm) LCD screen with rotary encoder dial
Integration	Automation/Integration capable with PLC Controlled system (Integration upgrade is optional)
Communication	IoT connectivity via a cellular service and Cold Jet Connect®
Noise Level	Noise level 50 dB(A) up to 137 dB(A) (See Maximum Sound Pressure Levels on page 70)
Integration	Guard interlock functions conform to EN ISO 13849-1:2015 Category 1 PLC Emergency stop functions conform to EN ISO 13849-1:2015 Category 1 PLC Safety Relay functions conform to EN ISO 13849-1:2015 Category 1 PLC

PCS 60 Components

The PCS 60:

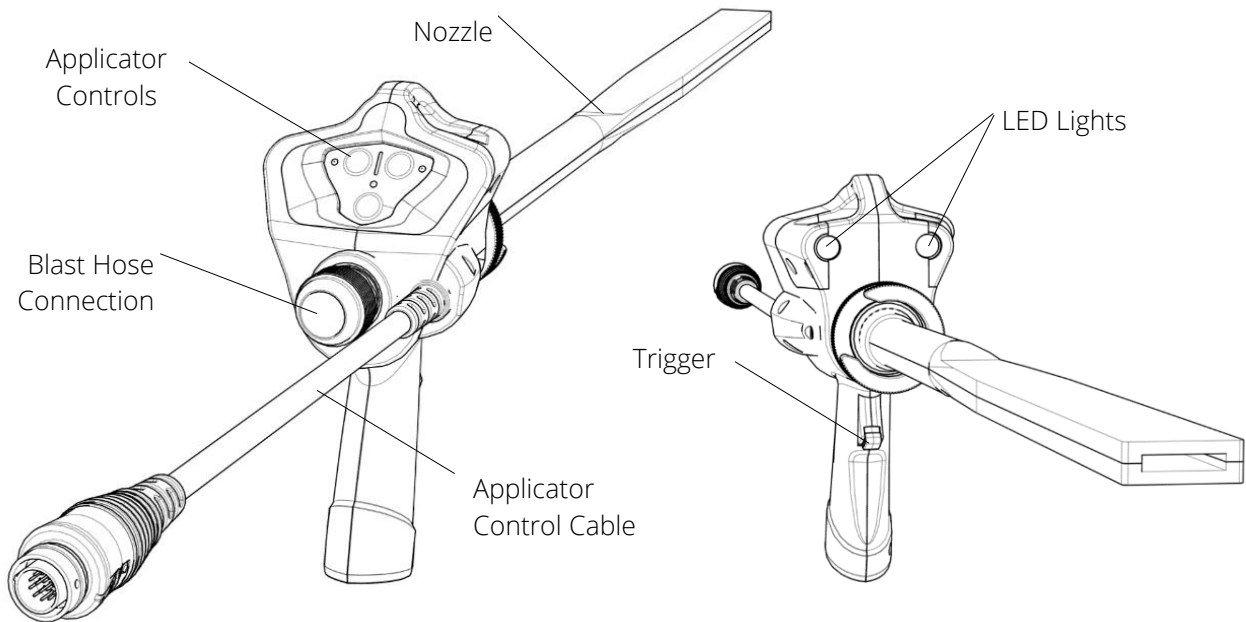


PCS 60 Machine in its typical Set-Up format

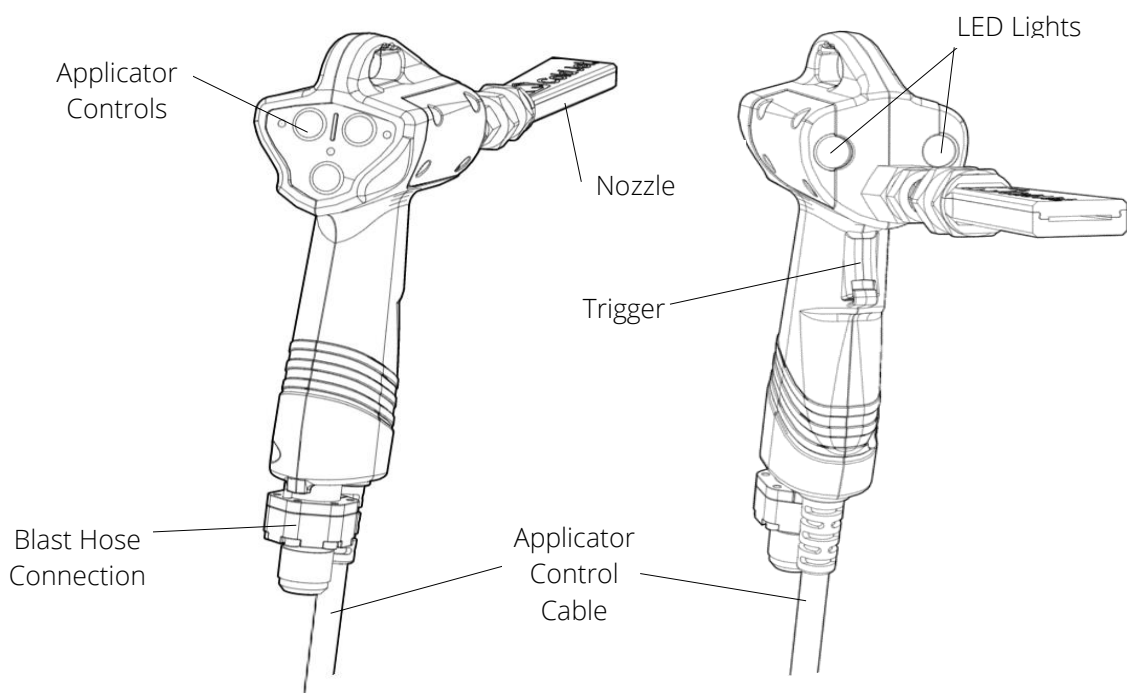


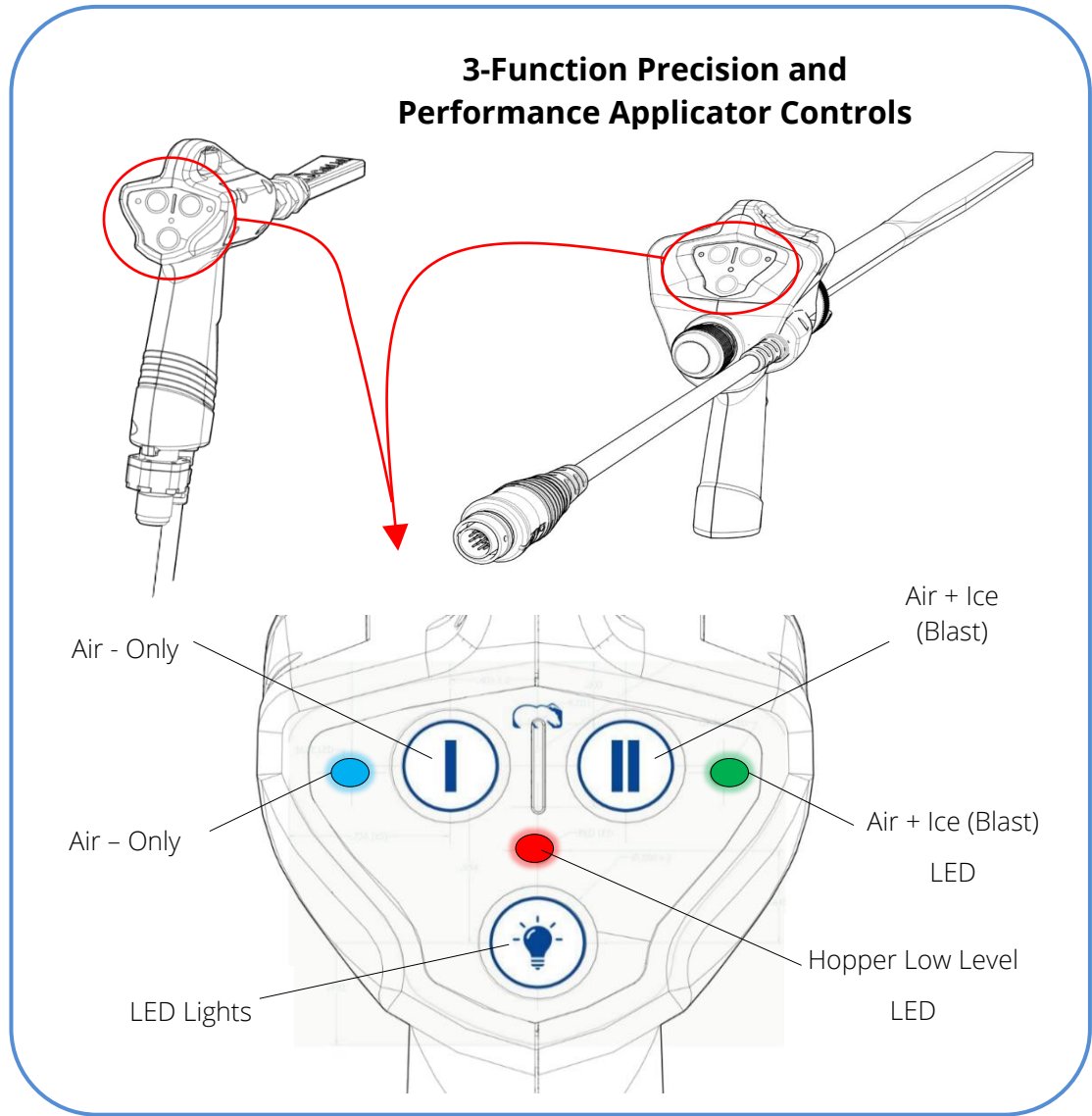
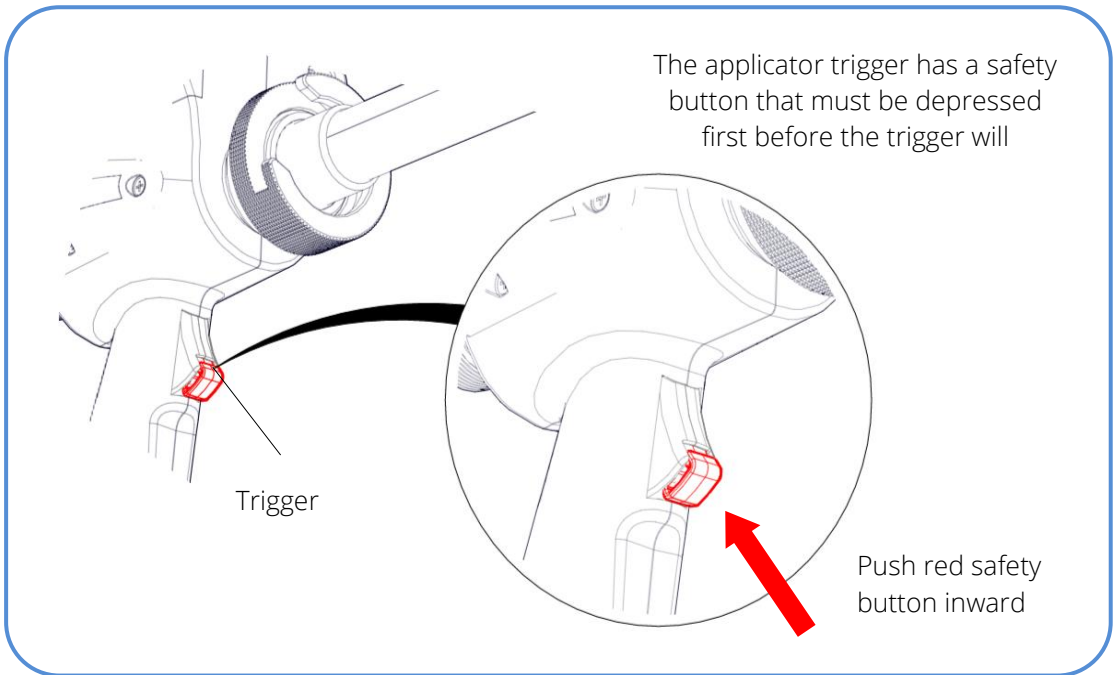
Applicators:

The Performance Applicator



Precision Applicator Components





Performance Applicator Nozzles

There are several unique styles of nozzles, depending on the application the PCS 60 was ordered for. The table below can be used to help with initial settings as you set up the PCS 60 for operation.

Low and Standard Flow Nozzles

These straight nozzles have standard air consumption rate of 100 cfm or less at 80 psi.



Nozzle	Part #	Air Consumption	Blast Swath	Feed rate	Length	Material	Comfort Handle
106S.6	5E0421	50cfm @ 80psi (1.4m ³ /min @ 5.5 bar)	0.6 in (1.5 cm)	1-3 lbs/min (0.5-1.4 kg/min)	6 in (15.2 cm)	Anodized Aluminum	n/a
110S.6	5E0180	50cfm @ 80psi (1.4m ³ /min @ 5.5 bar)	0.6 in (1.5 cm)	1-3 lbs/min (0.5-1.4 kg/min)	10 in (25.4 cm)	Anodized Aluminum	2E0209 *2E1180
123S.7	5E0179	50cfm @ 80psi (1.4m ³ /min @ 5.5 bar)	0.7 in (1.8 cm)	1-3 lbs/min (0.5-1.4 kg/min)	23 in (58.4 cm)	Anodized Aluminum	2E0209 *2E1180
310S.5	5E0233	100cfm @ 80psi (2.8m ³ /min @ 5.5 bar)	0.45 in (1.1 cm)	2-4 lbs/min (0.9-1.8 kg/min)	10 in (25.4 cm)	Aluminum	2E0275 *2E1209
312S1	5E0156	100cfm @ 80psi (2.8m ³ /min @ 5.5 bar)	1 in (2.5 cm)	2-4 lbs/min (0.9-1.8 kg/min)	12 in (30.5 cm)	Aluminum	2E0289 *2E1182
323S1	5E0175	100cfm @ 80psi (2.8m ³ /min @ 5.5 bar)	1 in (2.5 cm)	2-4 lbs/min (0.9-1.8 kg/min)	23 in (58.4 cm)	Aluminum	2E0209 *2E1180
312S2	5E0159	100cfm @ 80psi (2.8m ³ /min @ 5.5 bar)	1.8 in (4.6 cm)	2-4 lbs/min (0.9-1.8 kg/min)	12 in (30.5 cm)	Aluminum	2E0289 *2E1182
308S.4	5E1174 (8")	60cfm @ 80psi (1.7m ³ /min @ 5.5 bar)	0.4 in (1.0 cm)	1-3 lbs/min (0.5-1.4 kg/min)	8 in (20.3 cm)	Aluminum	2E0209

Specialty Nozzles

These nozzles have various configurations for special applications and operation.



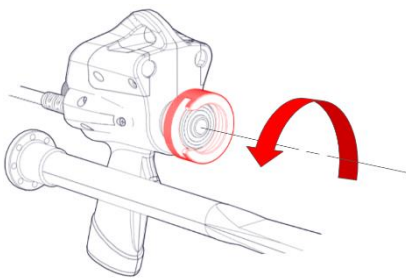
Nozzle & Angle	Part #	Air Consumption	Blast Swath	Swath Orientation	Feed rate	Length	Material
112HK 160°	2E0361	70cfm @ 80psi (2.0m ³ /min @ 5.5 bar)	0.25 in (0.6 cm)	n/a	1-3 lbs./min (0.5-1.4 kg/min)	12 x 2 in (30.5 x 5.1 cm)	Polymer Coated SST
114P.5 straight	5E0183	70cfm @ 80psi (2.0m ³ /min @ 5.5 bar)	0.25 in (0.6 cm)	n/a	1-3 lbs./min (0.5-1.4 kg/min)	10.3 in (26.2 cm)	Polymer
307A135V.8 135°	2E0328	100cfm @ 80psi (2.8m ³ /min @ 5.5 bar)	0.75 in (1.9 cm)	Vertical	2-4 lbs./min (0.9-1.8 kg/min)	7.3 X 6.3 in (18.6 x 16 cm)	Polymer Coated SST
307A45H1 45°	2E0349	100cfm @ 80psi (2.8m ³ /min @ 5.5 bar)	1 in (2.5 cm)	Horizontal	2-4 lbs./min (0.9-1.8 kg/min)	7.3 x 5 in (18.6 x 12.7 cm)	
307A90H.8 90°	2E0326	100cfm @ 80psi (2.8m ³ /min @ 5.5 bar)	0.75 in (1.9 cm)	Horizontal	2-4 lbs./min (0.9-1.8 kg/min)	7 x 5.3 in (17.8 x 13.5 cm)	
307A90V1 90°	2E0329	100cfm @ 80psi (2.8m ³ /min @ 5.5 bar)	1 in (2.5 cm)	Vertical	2-4 lbs./min (0.9-1.8 kg/min)	7.3 x 7 in (18.6 x 17.8 cm)	
308A45H.8 45°	2E0324	100cfm @ 80psi (2.8m ³ /min @ 5.5 bar)	0.75 in (1.9 cm)	Horizontal	2-4 lbs./min (0.9-1.8 kg/min)	7.7 x 3.5 in (19.6 x 8.9 cm)	
308A45V.8 45°	2E0325	100cfm @ 80psi (2.8m ³ /min @ 5.5 bar)	0.75 in (1.9 cm)	Vertical	2-4 lbs./min (0.9-1.8 kg/min)	7.8 x 3.5 in (19.8 x 8.9 cm)	
309A45H.8 45°	5E0094	120cfm @ 80psi (3.4m ³ /min @ 5.5 bar)	0.75 in (1.9 cm)	Horizontal	3-5 lbs./min (1.4-2.3 kg/min)	8.9 x 4 in (22.6 x 10.2 cm)	
317A90H1 90°	2E0327	100cfm @ 80psi (2.8m ³ /min @ 5.5 bar)	1 in (2.5 cm)	Horizontal	2-4 lbs./min (0.9-1.8 kg/min)	16.6 x 3.4 in (42.2 x 8.6 cm)	Polymer Coated SST
509C 22° cone	2E0411	150cfm @ 80psi (4.3m ³ /min @ 5.5 bar)	n/a	n/a	3-5 lbs./min (1.4-2.3 kg/min)	9 in (22.9 cm)	Multi

Precision Applicator Nozzles

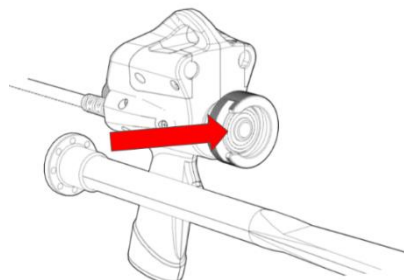


Nozzle	Part #	Air Consumption	Blast Swath	Feed Rate	Length	Material
MC13 (Yellow)	13865-126	12cfm @80 psi (0.3 m ³ /min 5.5 bar)	0.13 in (.3 cm)	0.1-0.4 lbs/min .05-0.2 kg/min	6 in (15.2 cm)	Polymer
MC19 (White)	5E0478	30cfm @80 psi (0.8 m ³ /min 5.5 bar)	0.19 in (.5 cm)	0.2-1.0 lbs/min 0.1-0.5 kg/min	6 in (15.2 cm)	Polymer
MC31 (Blue)	13865-506	50cfm @80 psi (1.5 m ³ /min 5.5 bar)	0.31 in (.8 cm)	0.5-1.2 lbs/min 0.2-0.6 kg/min	6 in (15.2 cm)	Polymer
Fan Nozzles						
MC47	5E0220	25cfm @80 psi (0.7 m ³ /min 5.5 bar) Fan	0.47 in (1.2 cm)	0.2-1 lbs/min 0.1-0.5 kg/min	6 in (15.2 cm)	Polymer & Aluminum
MC28	5E0218	25cfm @80 psi (0.7 m ³ /min 5.5 bar) Fan	.28 in (.7 cm)	.2-1 lbs/min 0.1-0.5 kg/min	6 in (15.2 cm)	Polymer & Aluminum
MC35	5E0219	25cfm @80 psi (0.7 m ³ /min 5.5 bar) Fan	0.35 in (.9 cm)	0.2-1 lbs/min 0.1-0.5 kg/min	6 in (15.2 cm)	Polymer & Aluminum
MC88F	5E0254	25cfm @80 psi (0.7 m ³ /min 5.5 bar) Fragmenting Fan	0.88 in (2.2) cm)	0.2-1 lbs/min 0.1-0.5 kg/min	5 in (12.7 cm)	Polymer & Aluminum

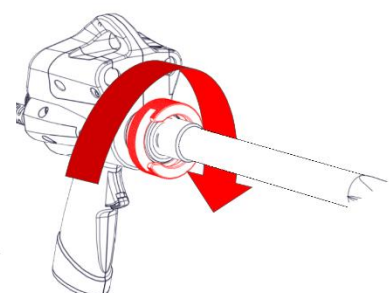
Attaching Nozzles



Loosen the Nozzle Retainer



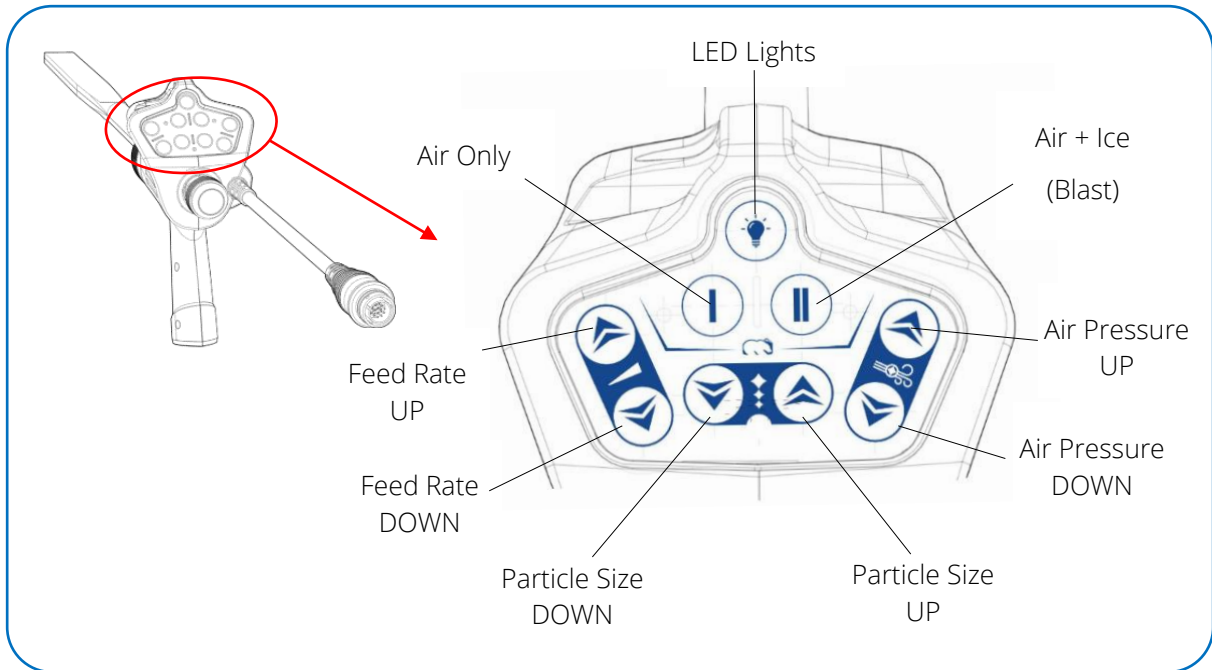
Insert Nozzle into opening



Hand tighten Nozzle Retainer

Optional, Advanced Applicator Components

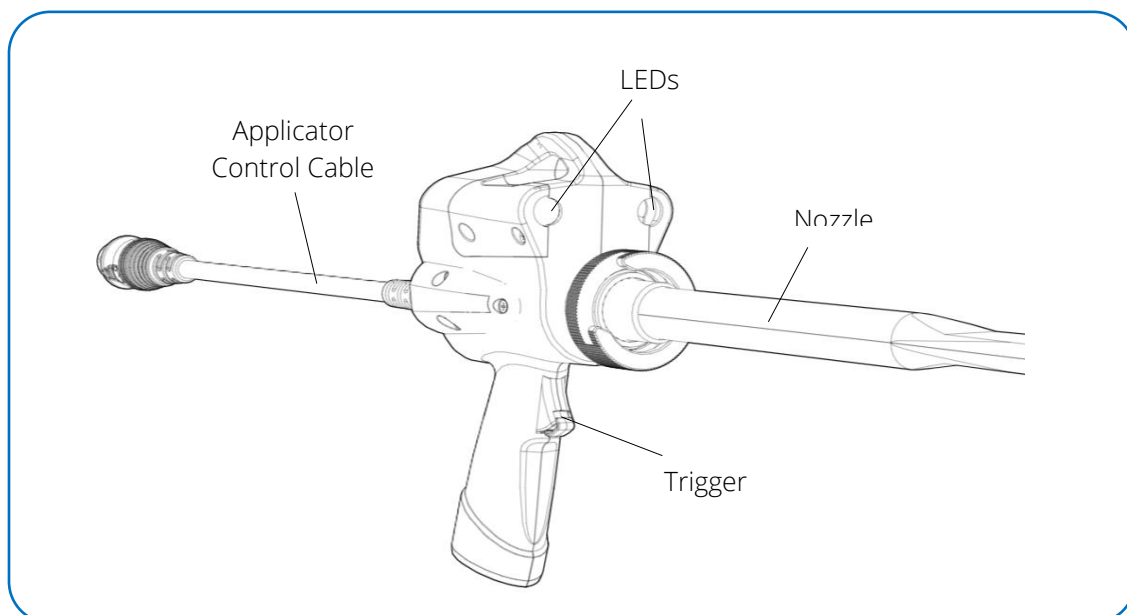
Note: uses the same nozzle selection as the Performance Applicator



The following details are about the onboard functions of the Advanced Applicator's feed rate, blast pressure, and particle size:

- Increase/decrease feed rate: This adjusts in increments of 0.2 lbs. (0.1kg) with each button click
- Increase/decrease blast pressure: This adjusts in increments of 10 psi or 1 bar with each button click
- Particle size: This adjusts in increments of 0.1 mm

**Feed rates, blast pressure, and particle size can also be adjusted at the rotary encoder dial located on the machine console*

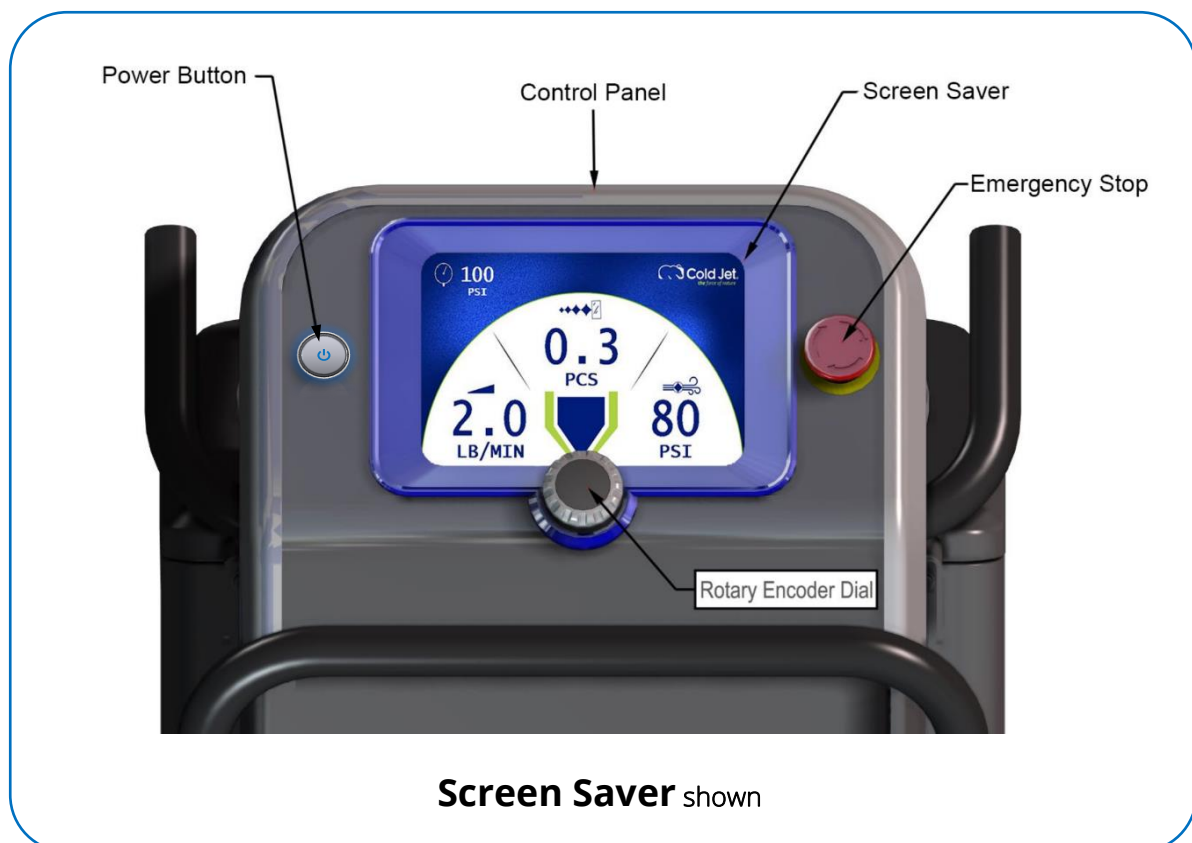


Control Panel and HMI Screens

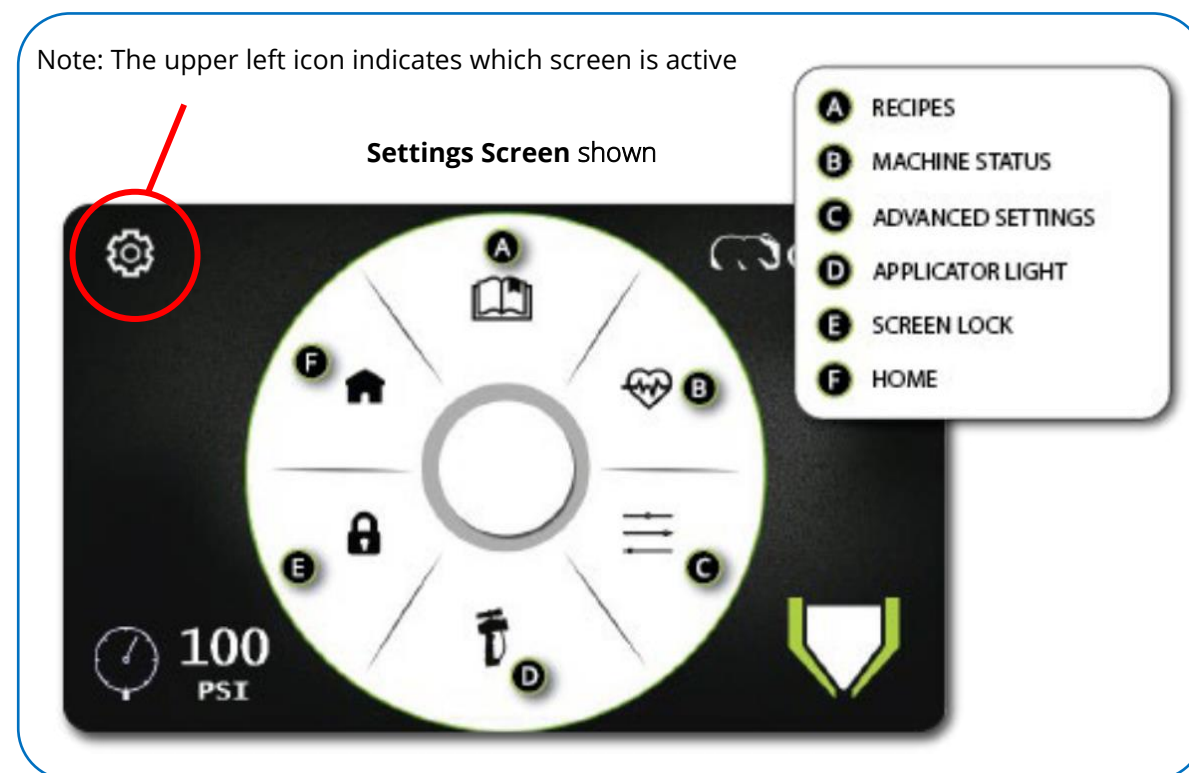
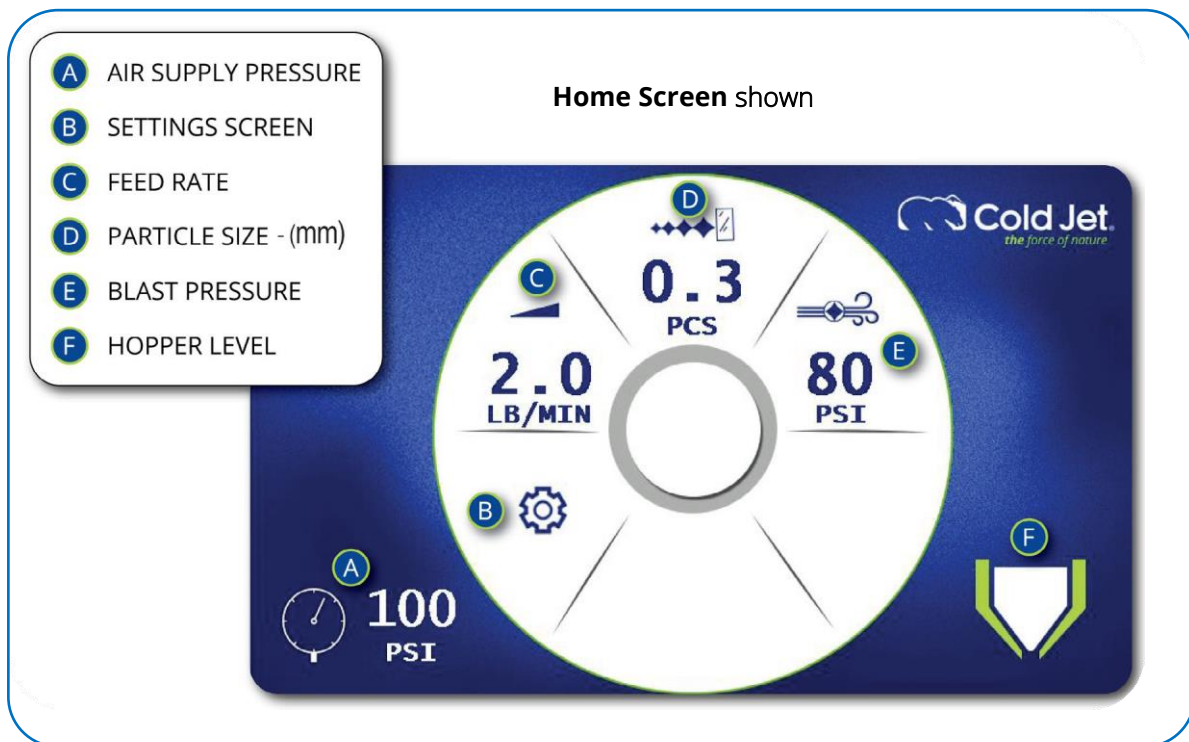
This PCS 60 uses a rotary encoder dial that allows the operator to navigate, select and adjust settings on the control panel screen. You must first press the rotary encoder to activate navigation. Navigate between options by turning the rotary encoder dial left or right; this will highlight the option in blue. Once the desired option is highlighted, simply press the dial to select it; this will highlight the option in green. With the option selected (green), turn the rotary encoder dial left or right to adjust the setting then press again to accept.

Some options can be adjusted directly from the home screen while other options can be found on other screens. To access these other screens using the rotary encoder dial, navigate to the settings screen and press to select. Continue to navigate through the screens (i.e. recipe, status, applicator, advanced, reset, settings) and adjust the settings as needed by turning and pressing the rotary encoder dial.

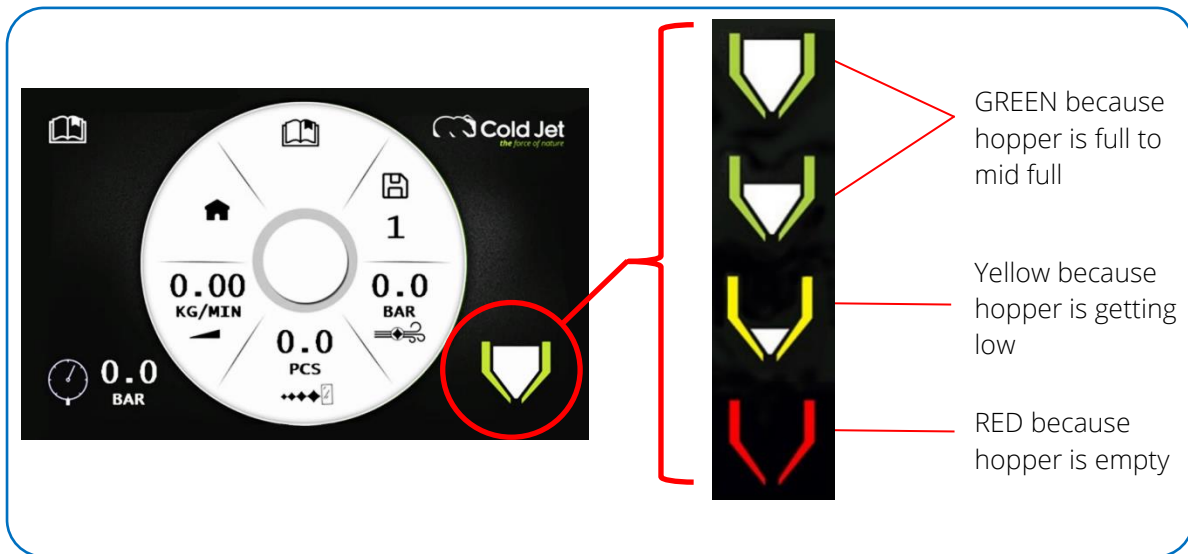
Once the settings are completed and after approximately (30) seconds, the screen on the control panel will change to a screen saver with incoming air pressure, feed rate, particle size, set blasting pressure and hopper level.



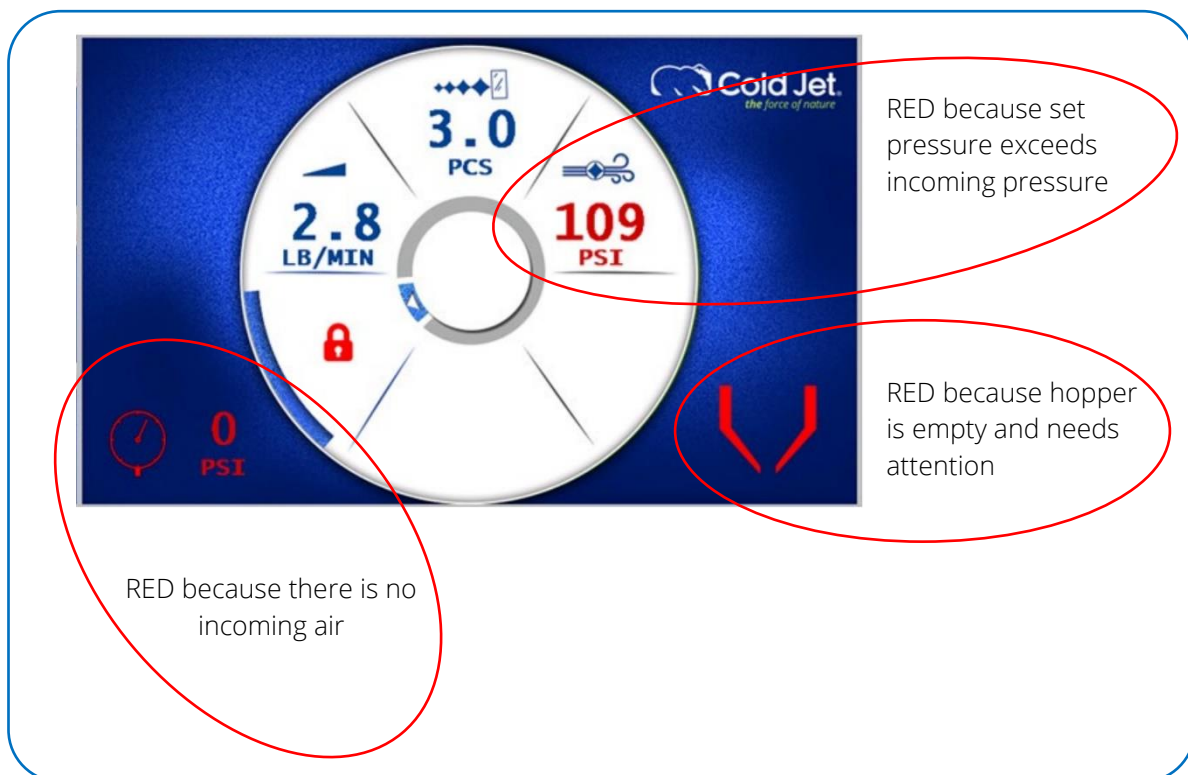
There are two screen states for the PCS 60. A blue screen (such as the Home screen) which indicates system operating screens. A black screen indicates that the PCS 60 is in the Advanced Settings screens. Changes can be made in each screen.



During operation, some display items on the screen will change color. Green is normal, yellow (or orange) is a warning and red is critical that needs attention. For example, the illustration below indicates the possible different levels of dry ice in the hopper and how they may change.



Numbers also change colors much like the hopper levels. White is normal, orange is warning, and red is critical. In the illustration below, there are items being displayed in red:






Operation

Unpacking the PCS 60 System

This machine has been assembled and tested as one unit prior to shipment. Follow the steps below to inspect and unpack the machine from the shipping container.

1. Examine the shipping container for any damages that may have occurred during transport.
2. Remove the machine and the box(es) that contain accessories. The accessory boxes and the outer box are recyclable.
3. Examine the machine for any external damage that may have occurred during transport. Refer to the packing slip for a list of the components shipped with the machine. Contact Cold Jet if any damage has occurred to the shipping container or the machine (see "Contact Information" on page 69).

The following sections describe the unpacking, moving, transporting, and operations of the PCS 60. Read and follow all instructions prior to using the PCS 60.

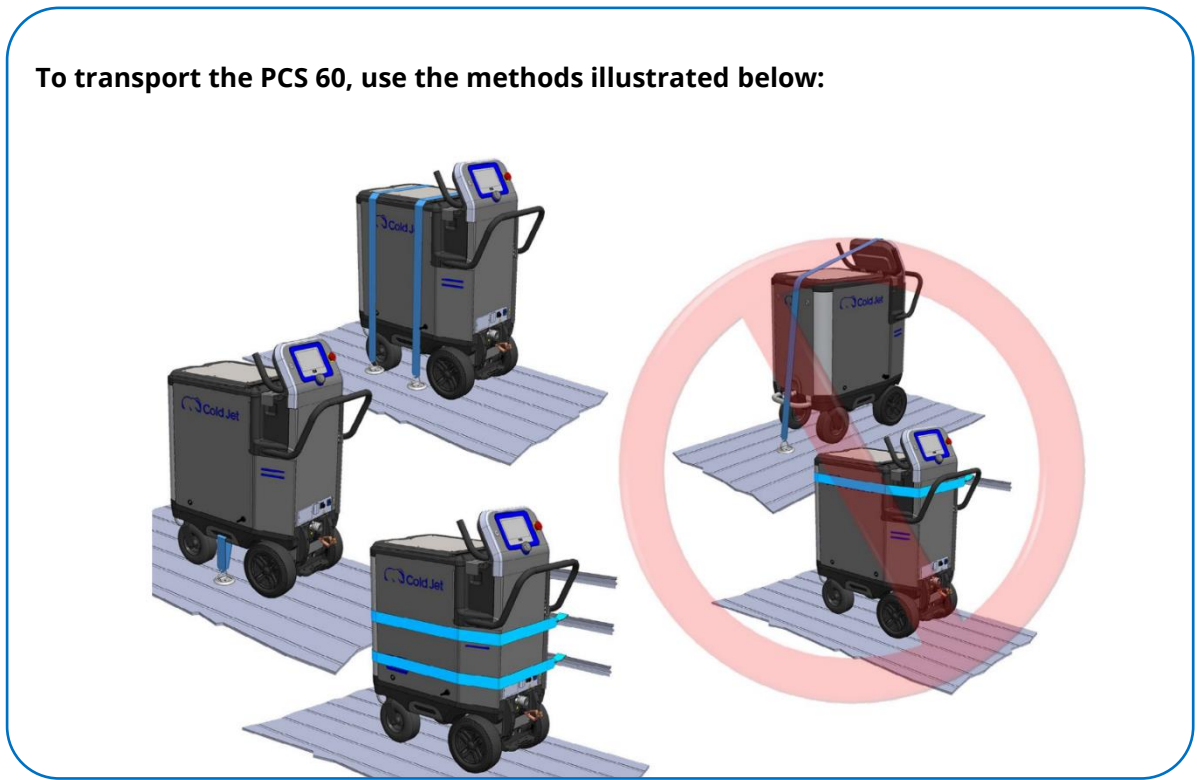
 **WARNING** Only trained and or certified personnel should operate or rig the PCS 60 for shipment or movement.

Transport, Storage and Disposal

The following instructions are for proper transport of the PCS 60. Follow all instructions as illustrated to avoid damaging the PCS 60. It is recommended that only trained and qualified personnel use and move the PCS 60. Contact Cold Jet Customer Service (page 73) for proper disposal instructions at the end of the machine's life.



To transport the PCS 60, use the methods illustrated below:



Do not strap over the console or above the front handlebar as this could damage the screen and/or components for operating the PCS 60. See above illustration to correctly strap the PCS 60 to a wall, floor, or pallet. Strapping the PCS 60 for extended periods of time is not advised. Always remove any straps or rigging prior to operating the machine.

To transport short distances using a forklift, use the method illustrated below. Secure the PCS 60 before lifting or moving on a forklift to prevent it from sliding or falling off. Lift the tires about 3-5 inches (8.5-12.5 cm) off the ground to move the machine.



⚠ WARNING Do not lift the PCS 60 using the front handlebar, upper handlebar, or the lower bumper as there will be no stability which could cause damage to equipment or harm to personnel.



- To store the PCS 60, see section “Shutting Down the PCS 60” on Page 46.

Personal Protective Equipment (PPE)

⚠ WARNING Only trained personnel should operate the PCS 60.

⚠ WARNING Do not operate the PCS 60 without proper PPE.

Prior to operating the PCS 60, or loading dry ice into the hopper, proper PPE must be used. It is recommended that each operator is trained on the proper use of PPE.



Wear Protective Gloves



Wear Hearing Protection





Wear Eye Protection



Read Operator's Manual

Setting Up the PCS 60


 **WARNING** Improper installation of hoses and adapters to the PCS 60 can cause damage to the machine or the applicators.

 **WARNING** Follow LO/TO procedures and shut off the air pressure while attaching or disconnecting hoses or fitting to the machine. Prior to disconnecting the air supply hose, ensure that the supply air pressure has been shut off and pressure bled from the hose. The air hose is normally pressurized while the machine is in idle or in operation.

As illustrated below, do not use one wrench when tightening or replacing fittings on the PCS 60 machine:



Always use two wrenches to install and remove hoses and accessories on the PCS 60 or the applicators as illustrated below:

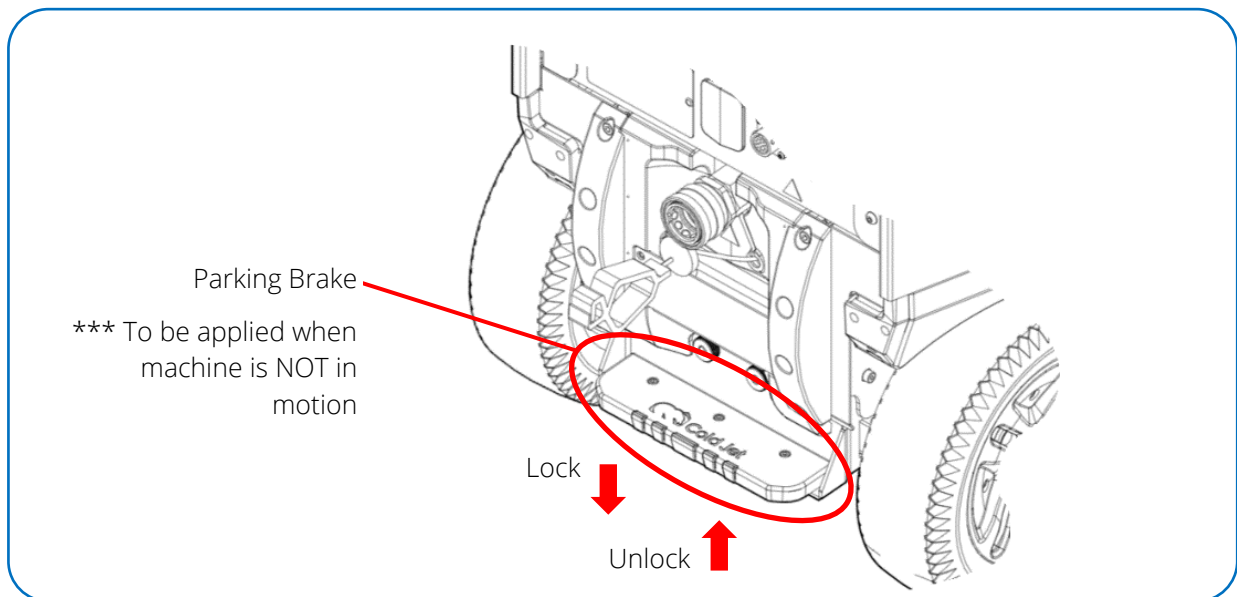
 **CAUTION** When attaching the air supply hose, make sure to use (2) wrenches at the connection point on the machine.



Follow the instructions below to set up the PCS 60:

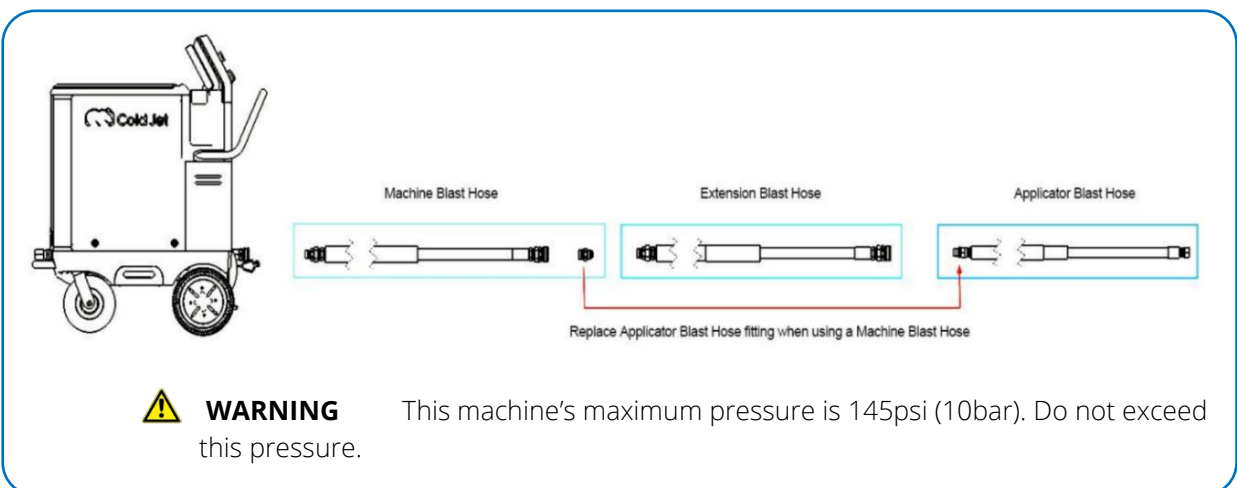
1. Set the parking brake by pressing down on the center of the brake pad. Lift to release.

Note: The machine should not be in motion when the parking brake is applied.



⚠ WARNING Always set the parking brake when the machine is still and not in motion. Do not allow the PCS 60 to move while pressurized, in standby, or in operation. Disconnect power and air supply prior to moving the machine.

2. Attach the blast hose and control cable to the PCS 60.

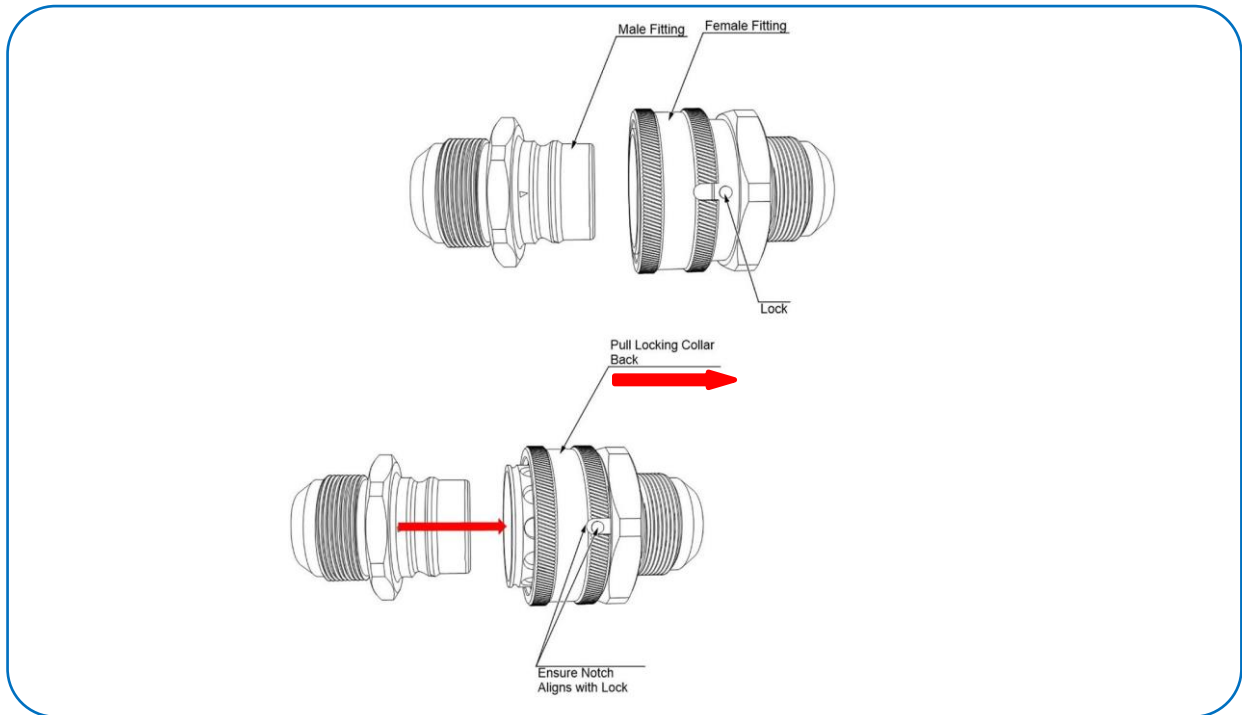


⚠ WARNING This machine's maximum pressure is 145psi (10bar). Do not exceed this pressure.

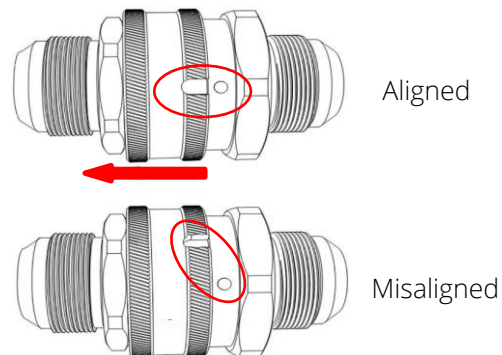
Note: Each machine is shipped with (1) 20' "Applicator Blast Hose". If additional hose length is needed, a "Machine Blast Hose" must be used. If further lengths are required, "Extension Blast Hoses" must be used. By default, the "Applicator Blast Hose" includes a male QDC that connects to the machine's female QDC (located on the blast tube outlet). An Applicator Blast Hose will not connect to a "Machine Blast Hose" until the Applicator Blast Hose male QDC fitting is removed and reinstalled to the "Machine Blast Hose."

Attaching the hoses using the Quick Disconnect Fittings (QDC)

- a. Align the quick disconnect male end with the female end.
- b. Ensure the notch in the locking collar aligns with the lock and pull the spring-loaded collar back so that the male end of the QDC can be inserted into the female fitting.



- c. Insert the male fitting and release the collar.



- d. Rotate the collar clockwise or counterclockwise to purposefully misalign the notch from the lock. This prevents the collar from unlocking.

3. Attach an applicator to the blast hose and control cable using the two supplied wrenches.


⚠ WARNING Do not use the applicator body or handle for leverage when tightening the applicator blast hose to the applicator. Always use two wrenches to prevent damaging the applicator and fittings



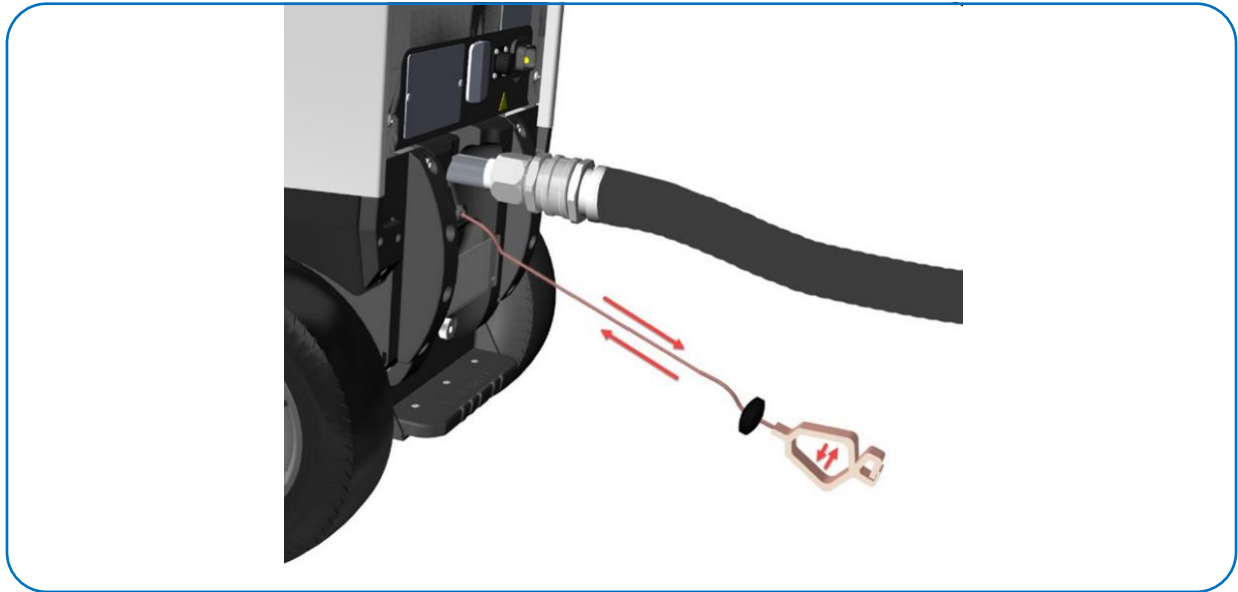
⚠ WARNING Do not tape, tie, or bind the applicator blast hose and the control cable. The applicator blast hose and control cable are designed to prevent cracking and damage. Constraining the design flexibility will void the control cable and blast hose warranty.






4. Attach a nozzle to the applicator.

 **CAUTION** Ensure that both the nozzle and Applicator Blast Hose are tight and secured to the applicator prior to operating the machine.

5. Attach the ground reel to the article that is being cleaned.
 - a. Pull out the ground reel to the distance needed to attach to the material being blasted. Relax the ground cable and it will lock into position.
 - b. To retract the ground cable, quickly pull the ground cable to unlock and allow the cable to spool back in without locking. Do not let go of the ground cable, feed it slowly back into the spool until the line is completely reeled in.

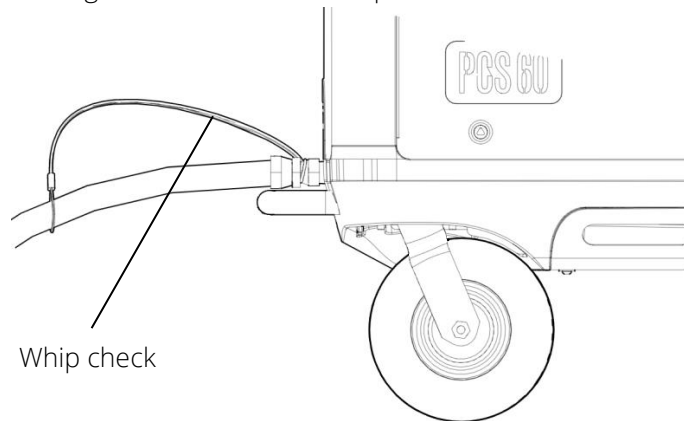


 **CAUTION**   Static electricity can build up on the article being cleaned and create a static shock during operation and afterward. Ensure that the static reel bonding clamp is tight and will not slip off while blasting. The static reel clamp must be attached to the article being cleaned.

6. Attach the power cord to the PCS 60 and then to an appropriate electrical outlet (see “PCS 60 Data” on Page 17). The machine will go into a calibration mode which will take 20-30 seconds.
7. Loop the whip-check around the air supply hose as illustrated and attach the supply hose to the front of the PCS 60.

**CAUTION**

When connecting the air supply hose to the blaster, always run the hose through the choker of the whip check in case of accidental disconnect.



8. Turn the air supply on and allow the air hose to pressurize.

Maximum air supply pressure should not exceed 145 psi (10 bar)

9. Once the PCS 60 is set up, go to "Starting the PCS 60" on Page 41.

The Compressed Air Supply

Although Cold Jet dry ice equipment is designed and engineered to work under the most demanding environments and conditions, the incoming air supply must be as free of oil, dirt/foreign particles, and water/moisture as possible. For example, oil-laden air will contaminate the entire system including any articles being dry ice blast cleaned. Other contaminants such as dirt/foreign particles will score or even clog interior mechanical parts resulting in poor machine function. Dirt/foreign particles in the compressed air can also strike the article causing damage to the surfaces being dry ice blast cleaned.

Particular attention must be paid to water. Water or moisture laden air can be especially troublesome once it is introduced to dry ice. (In this case, "moisture" is referred to as water in vapor form.) For example, dry ice is -109F (-78C), water/moisture will immediately freeze and may cause problems. The results of frozen water and/or moisture can be: 1.) "Water-ice". It is a very good adhesive; internal parts may freeze together and seize the machine, 2.) Loose water-ice pieces could build up and cause clogs in the hose, particle control assembly, feeder and/or nozzle, 3.) Water-ice is harder than dry ice and may cause damage to the article being dry ice cleaned, 4.) When water-ice melts, water is left behind. (Note that dry ice sublimates, meaning it turns to a gas.) Water can be a hazard and may increase the speed at which corrosion may occur.

The incoming air quality must meet the standards in the chart provided on the next page. In addition, it is recommended that the incoming supply air and any associated filters and water separators that may be used are continuously monitored to ensure the PCS 60 receives the air required for proper machine function. If these air quality specifications are not met, yet are continued to be used with Cold Jet, LLC equipment, the warranty will be nullified.

Required Air Quality

ISO 8573-1:2010 Compressed Air Contaminants and Purity Classes								
Class	Particles				Water		Oil	
	By Particle Size (maximum number of particles per m ³) See Note 2			By Mass mg/m ³	Vapor Pressure Dewpoint		Liquid	Liquid, Aerosol, & Vapor See Note 1
	0.10 – 0.5 microns	0.5 – 1.0 microns	1.0 – 5.0 microns		°C	°F	g/m ³	mg/m ³
0	As specified by the equipment user or supplier and more stringent than class 1							
1	≤ 20,000	≤ 400	≤ 10	-	≤ -70	≤ -94	-	≤ 0.01
2	≤ 400,000	≤ 6,000	≤ 100	-	≤ -40	≤ -40	-	≤ 0.1
3	-	≤ 90,000	≤ 1,000	-	≤ -20	≤ -4	-	≤ 1
4	-	-	≤ 10,000	-	≤ +3	≤ +37	-	≤ 5
5	-	-	≤ 100,000	-	≤ +7	≤ +45	-	-
6	-	-	-	0 – 5	≤ +10	≤ +50	-	-
7	-	-	-	5 – 10	-	-	≤ 0.5	-
8	-	-	-	-	-	-	≤ 5	-
9	-	-	-	-	-	-	≤ 10	-
X	-	-	-	> 10	-	-	> 10	> 5
Microbiological Contaminants				Other Gaseous Contaminants				
No purity classes are identified				No purity classes are identified Gases mentioned are: CO, CO ₂ , SO ₂ , NO _x , Hydrocarbons in the range of C ₁ to C ₅				

- One micron = .00003in. or .001mm • Symbol: μ • Example: Human hair = 70 μ
- For **manual** blasting with start/stop - intermittent operation and using 0.12-inch (3mm) pellets (any density) - Class 4 or lower.
- For **manual** blasting with start/stop - intermittent operation and using 0.04-inch (1mm) micro pellets or smaller particles (Particle Control System) - Class 2 or lower.
- For **automated** blasting or continuous blasting of 1 hour or more, with 0.12-inch (3mm) pellets (any density) - Class 2 or lower.
- For **automated** blasting, continuous blasting for any amount of time, with 0.04-inch (1mm) micro pellets or smaller particles (Particle Control System) - Class 1

The air-purity classification given in this part of the manual, ISO 8573.1:2010, is intended to provide a guide to the air-purity expected in the compressed air system. Achieving any given air-purity specification can be challenging but it is possible with the combination of proper equipment. Cold Jet, LLC offers equipment to help separate water from compressed air. A Coalescent Air Filter, or CAF, (2M0039) is a good entry level tool to help separate water from compressed air. Cold Jet's aftercooler (P/Ns 2M0023-G1 / 2M0036) is the next best tool in separating water by *cooling the compressed air*. This causes moisture in gas or vapor forms to change state to physical water. The aftercooler's onboard CAF will then separate the water from the compressed air. Air dryers are also available. These come in many forms. A machine cover is also helpful in reducing dust, dirt and other undesirable particles from entering the interior of the machine. (P/N 2J1113). The purchase and use of these types of air treatment equipment is not a guarantee that the required air quality is met. Nor is it a substitute for precise testing of the air quality to ensure the requirements are met. Please contact your local/regional Cold Jet representative for additional needs.

Understanding the effects of the surrounding environment

Although Cold Jet dry ice equipment is designed and engineered to work under the most demanding environments and conditions, temperature, humidity, dust, and other contaminants present in the surrounding air can have an adverse effect on dry ice blasting equipment.

Temperature and humidity: You may be familiar with a hot, sticky mid-summer day. These days have high temperatures and high humidity. How does this affect dry ice blasting equipment? Understanding "Dew Point" will answer this question.

What is "Dew Point"? *The temperature the air needs to be cooled to (at constant pressure) in order to achieve a relative humidity of 100%. At this point the air cannot hold more moisture in the gas form and water droplets form.*

Air compressors generally draw air from its surrounding environment. Once the air passes through the compressor, it is warmed even further due to the mechanical friction of the compressor's internal mechanisms. As the compressed air travels through pipes or hoses towards its destination it starts to cool down. As it is cooled, moisture in vapor form turns to physical water. This is the dew point. The specific dew point will vary based on temperature and humidity, but it is certain that this natural phenomenon will occur as warm, moist air cools. And, if it is possible to cool the air even further such as using a Cold Jet aftercooler, more moisture is turned to water that can be separated from the compressed air. The result is even less moisture, in any form, to negatively affect the dry ice blasting equipment.



Signs of water/moisture in the compressed air stream.

- Water coming from the nozzle while blasting Air-Only and/or with dry ice.
- Water running out of any of the hose connections or the hoses themselves
- Water-ice building up on the tip of the nozzle and getting longer as blasting continues
- Periodic stopping of dry ice flow/blasting
- "Sputtering" of ice coming from the nozzle
- Complete feeder blockage

Humidity in the surrounding air: The higher the humidity, the higher the moisture content in the surrounding air. This not only affects the compressed air quality on the internal surface of the equipment as already discussed but on the dry ice itself. Humidity (moisture in the air) that seeps into the hopper will settle on the dry ice. The result is that the moisture freezes on the dry ice pellets causing them to stick together. A sign of this is dry ice that is not free flowing but rather presents itself as one or more large masses. Ultimately, the flow of dry ice from the hopper into the blast stream is stopped. (Note – if this is the case, do not use a foreign object such as a stick or metal rod to break up the ice.) It is important to keep the hopper lid closed as much as possible. Leaving it open on a regular basis allows the humidity to settle on the dry ice. The PCS 60 has features to help reduce this problem. Later in this manual, there are instructions to keep the dry ice free flowing by using the Advance Settings that control the Cold Jet SureFlow® system.

Starting the PCS 60

With power cord, air supply hose, blast hose, applicator control cord properly connected, and safety precautions understood, it is now time to start blasting.

-  **WARNING** Never blast the display screen area of the PCS 60 with dry ice as this will cause permanent damage to the screen.
-  **WARNING** Use caution when handling the applicator to prevent accidental discharge.

Follow these instructions to start blasting:

1. Ensure the power cord is plugged in to an appropriate grounded, wall socket. The screen below will be shown. Note the progress bar at the bottom of the screen. It is showing the calibration progress.

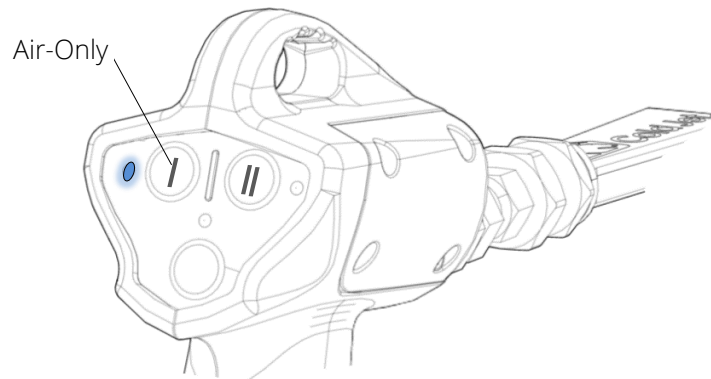


2. Once the calibration has completed, the Screen Saver will be displayed:



3. Purge the system from any standing water in the system using the applicator:
 - a. Press the Air-Only button (I) once. The blue LED indicator light will come on.
 - b. Pull the trigger for (2) minutes to purge the system.

Purging the system: Press "I" (air-only) button once. This will initiate the system for air only. On the applicator, the blue LED indicator light will come on.



- c. Push the Air-Only button once to deactivate the applicator.

Always purge the system with compressed air during start-up, after breaks, and before loading dry ice. This will remove any accumulated moisture, water, and ice in the system.

Now, load dry ice into the hopper:

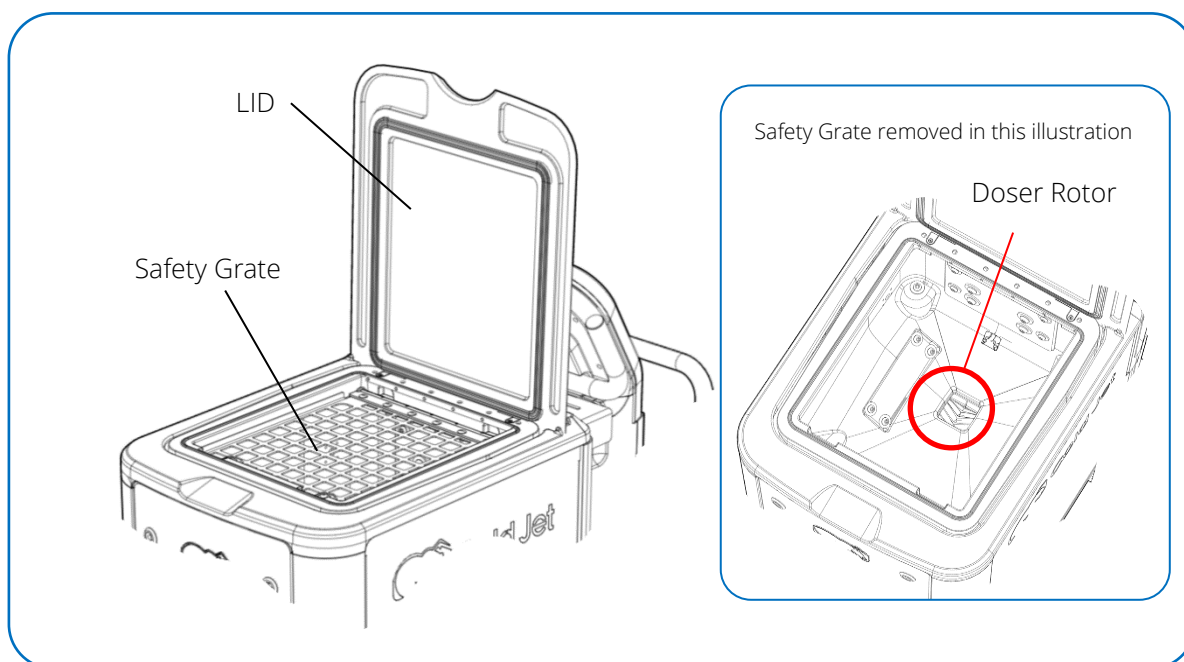
4. At the PCS 60, open the hopper lid leaving the safety grate in place.
5. Check the hopper for the presence of any foreign material or condensate and clean or remove, as necessary. Should it be necessary to remove objects or clean the hopper, follow proper LO/TO procedures on Page 14. Open the safety grate. Remove objects if needed. Condensate should be wiped dry using a towel being careful not to come into contact with the doser rotor.
6. Load the hopper with 3 mm dry ice pellets to the bottom of the closed grate. Do not over fill the hopper; any ice above the closed grate is considered over-filling.

⚠ CAUTION Use only 3mm dry ice pellets for blast media. The use of any other media will lead to loss of warranty coverage.

⚠ WARNING Do not use any type of item to break up ice in the hopper by jamming through the safety grate.

⚠ WARNING Never defeat the safety grate safety interlock. The safety interlock must be tested daily prior to operating the machine.

7. Close the lid.



Opening the safety grate will cause the PCS 60 to shut down automatically. The grate is a safeguard to prevent the operator and undesirable objects from coming into contact with the doser rotor at the bottom of the hopper.

The PCS 60 is designed to keep the dry ice flowing with the help of an insulated hopper. Keep the lid closed when there is ice in the hopper. When the machine is plugged in, the default settings for vibration will be used: (5) second -- vibration ON and (30) seconds -- vibration OFF. The machine will default to these settings each time the machine is unplugged and then plugged in again. The settings for the vibrator may be changed by the operator in the Advanced Settings menu to adjust the time between vibration cycles and the length of the vibration cycle.

The PCS 60 safety grate is equipped with a magnetic interlock switch for safety. Should the safety grate be opened while the PCS 60 is operating, it will go into Emergency Shut Down until it is closed. Once closed, the rotary encoder must be pushed to reset the machine at which time normal operations may begin.

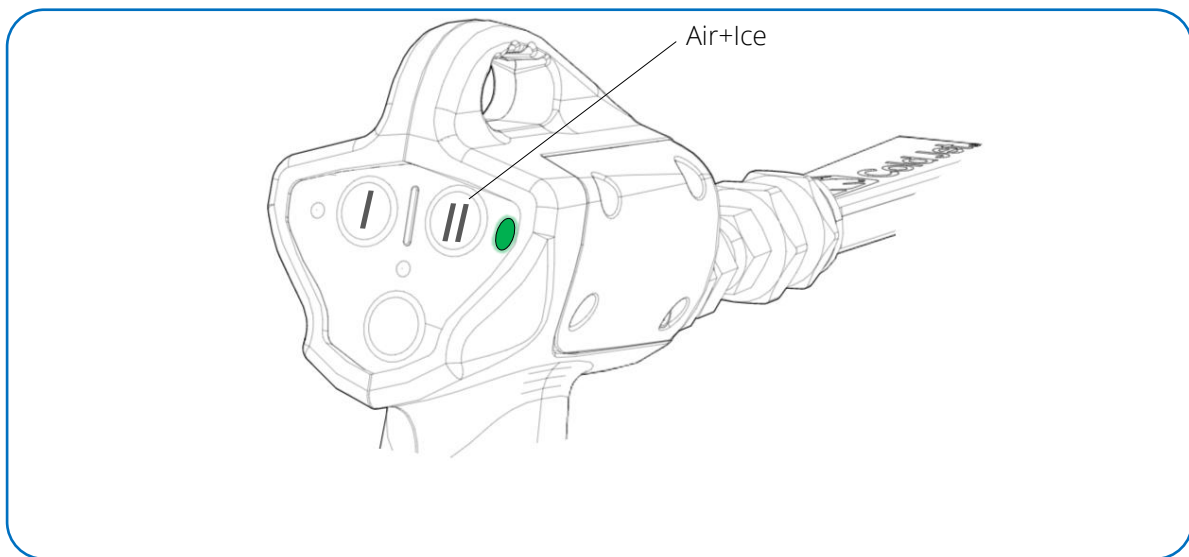
1. While the machine is at the Home Screen, use the rotary encoder dial on the machine console, navigate to the feed rate indicator on the home screen and adjust it to the minimum setting.

Note: There are limitations to how much ice can be fed through the system. The maximum feed rates in the PCS 60 change on the HMI depending on what sized particle is selected. Max dry ice feed rates per particle size are:

Dry Ice Particle Size	Max feed Rate
• 0.3 mm	2.5 lbs./min (1.13 kg/min)
• 0.4 mm	2.6 lbs./min (1.18 kg/min)
• 0.5 mm	2.7 lbs./min (1.22 kg/min)
• 0.6 mm	2.8 lbs./min (1.27 kg/min)
• 0.7 mm	2.9 lbs./min (1.31 kg/min)
• 0.8 to 2.9 mm	3.0 lbs./min (1.36 kg/min)
• 3.0 mm	4.0 lbs./min (1.81 kg/min)

Note: If ice has recently been loaded into the hopper but a break or delay in blast periods has occurred, then press the air-only button (I), the blue LED will come on, and pull the trigger for 2 minutes.

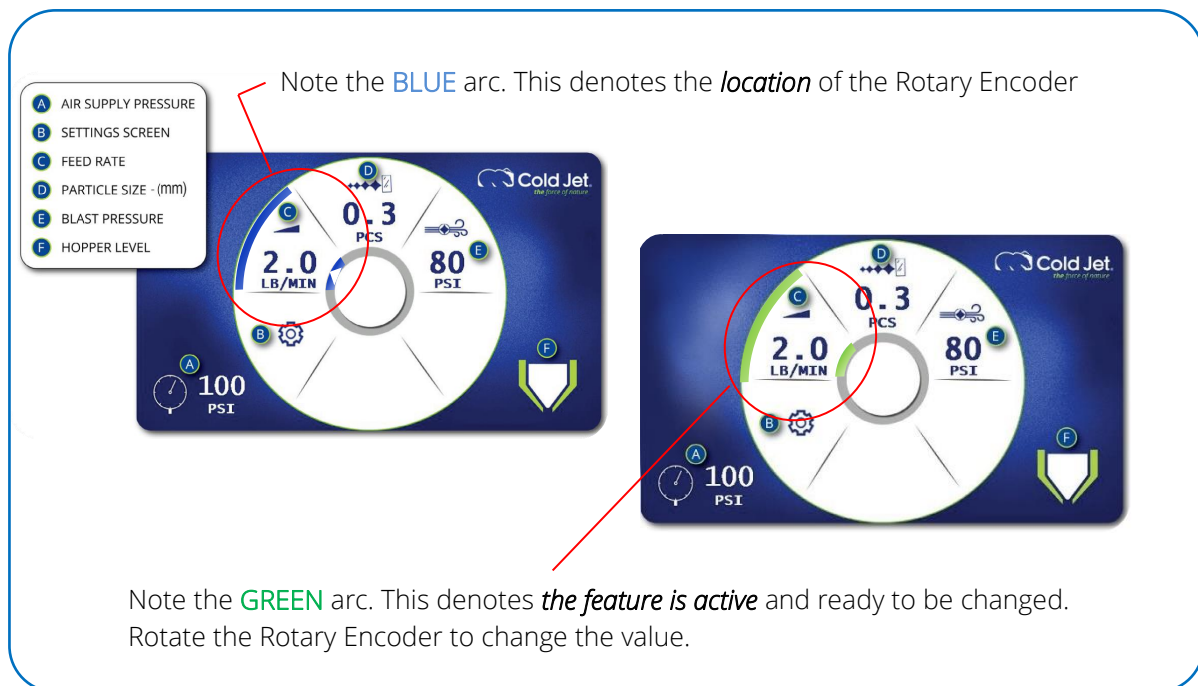
2. On the applicator, press the Air+Ice button (II) once. The green LED indicator light is ON. This will activate the applicator.



Blasting Dry Ice Particles

For optimum performance:

- Position the PCS 60 and blast hose to prevent kinking and allow for maximum maneuverability.
 - Hold the nozzle perpendicular to and about 2 – 6 inches (5 cm to 15 cm) from the article being cleaned.
 - To find the optimum feed rate: start at 0 and gradually increase until the desired cleaning result and/or cleaning performance is achieved.
 - Use a lower feed rate when the air pressure is below 50 psi (3.4 bar).
1. It is recommended to start blasting next to the target (but in a safe place) and move onto the target.
 2. Move the nozzle back and forth keeping it perpendicular to the surface being cleaned.
 3. Monitor the hopper level and reload dry ice pellets as needed:
 - On the Performance Applicator, the status light will be solid red when the hopper is full and start flashing when the hopper level is low to empty.
 - On the control panel, the hopper level is indicated by the color of the hopper icon. Green is full, yellow is half-full, and red is empty.
 4. To adjust settings:
 - From the Screen Saver, press the rotary encoder dial. The screen will change from the Screen Saver to the Home Page. Here, the feed rate, blast pressure and particle size can be adjusted. The features are identified below.

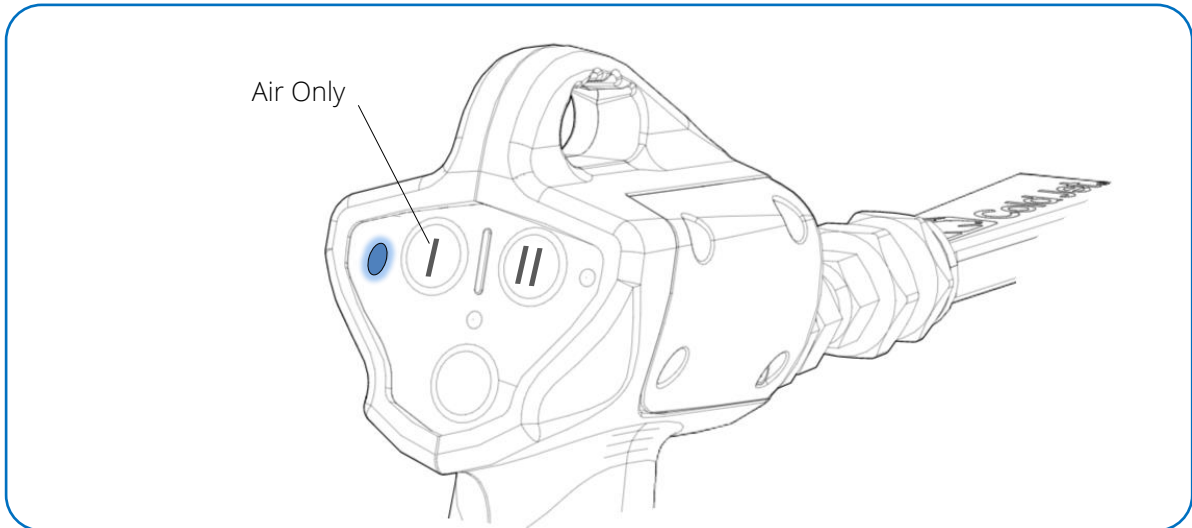


Note: During normal operation, the machine will bleed air for 1.5 seconds for every 30 minutes of accumulated blast or air only time. This is to purge moisture from the pneumatic control circuit.

Shutting Down the PCS 60

Follow the instructions below to shut down the PCS 60:

1. On the applicator: Press the air-only button (I) to activate (blue light on):





2. Pull the trigger to blast for 10 seconds.
3. After blasting air only, press the air-only button (I) again to deactivate (blue light off). This should also deactivate applicator.
4. On the control panel, press the power button to turn off the PCS 60.
5. Refer to the LO/TO instructions on Page 14

Always remove any remaining dry ice from the hopper if shutting down the PCS 60 for more than 15 minutes to prevent the internal mechanics from freezing.

6. Using a polymer scoop, remove any unused ice from the hopper then close the lid.

⚠ CAUTION Be careful to avoid coming into contact with the doser at the bottom of the hopper.

7. Remove nozzle from applicator.

⚠ CAUTION   Do not touch nozzle with bare hands during or immediately after use. Always wear protective gloves.

8. Turn off the compressed air supply. The PCS 60 will automatically bleed any remaining pressure.

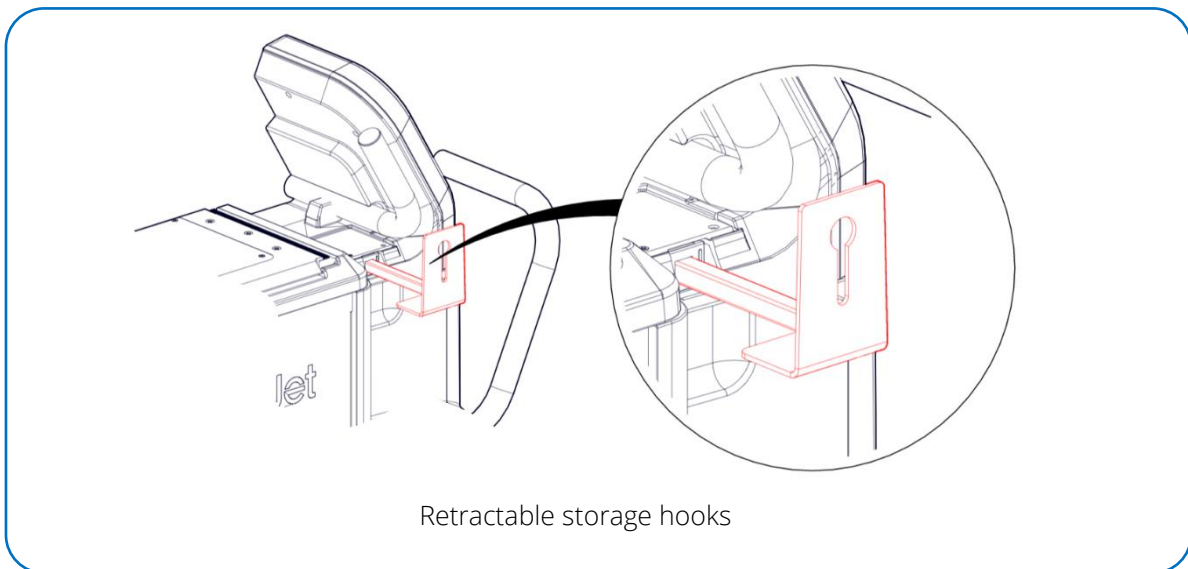
****Each air supply is unique to the user. Turning off the air supply may require closing air-lines, shut-off valves, disconnection of power through an electrical switch(es) and/or shutting down mobile gasoline/diesel compressors. This process should follow any recommended procedures of the compressed air supplier including any LO/TO procedures.*

9. After all the air pressure is bled off, disconnect the air supply hose from the PCS 60.

10. Unplug the power cord from the PCS 60, roll up all cords and hoses and properly stow.

11. If transporting the PCS 60 to a different location, disconnect all cables and hoses from the PCS 60 first and stow them on the machine's onboard retractable hooks.

12. If storing the PCS 60, disconnect all cables and hoses and stow them on the retractable hooks. Store the PCS 60 in a dry space, free of dirt and debris. Keep out of direct sunlight.

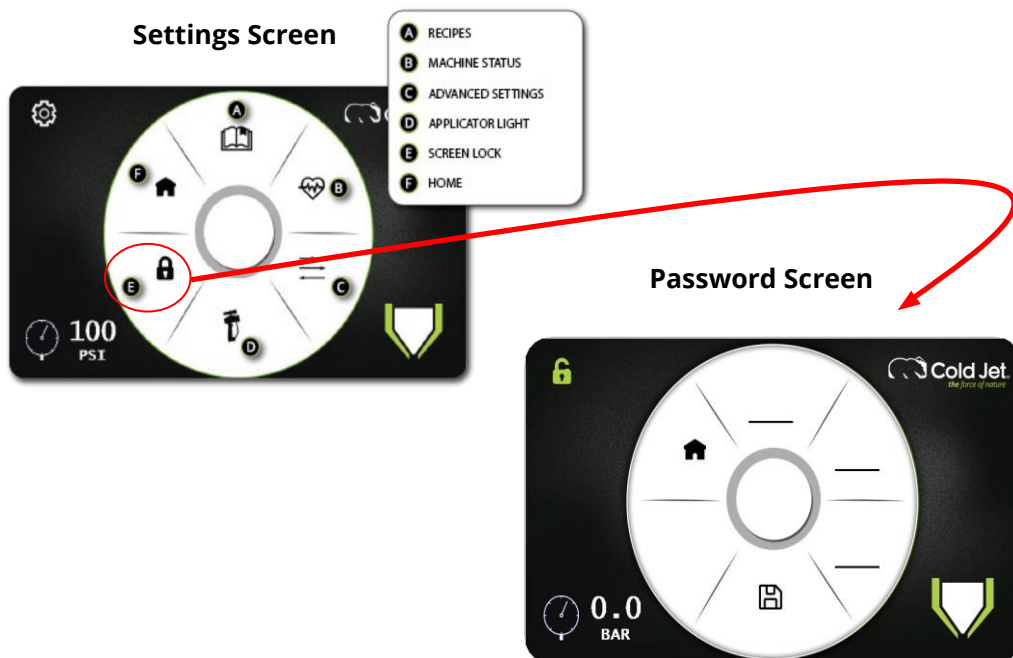



Additional PCS 60 features:

Password (optional)

A three-digit code can be entered to lock the screen so that the blaster settings cannot be changed.

1. From the Home screen, use the rotary encoder dial to navigate to the Settings screen.
2. From the Settings screen, using the rotary encoder dial to and select "E". The Password Screen is now active.



3. The password contains three numbers. Using the rotary encoder dial, select the blank line at the "12 o'clock" position and press the dial once. This enables access to the first number of the code.
 - Rotate to select a number and press the encoder dial to enter it.
4. Next, rotate clockwise to the next line and press the encoder dial. This accesses the second number of the code.
 - Rotate to select a number and press the encoder dial to enter it.
5. Next, rotate clockwise to the next line and press the encoder dial. This accesses the third number of the code.
 - Rotate to select a number and press the dial to enter it.
6. Rotate to the "Save" icon --  -- and press to save.
7. Write the number down and keep it in a safe place. If the password is lost, a call must be made to Cold Jet Customer Service.
8. The green "lock icon" in the upper left corner will change to red.
9. If the screen has been locked, repeat steps 1-5 entering the existing password and the screen will unlock.

Recipes (Optional)

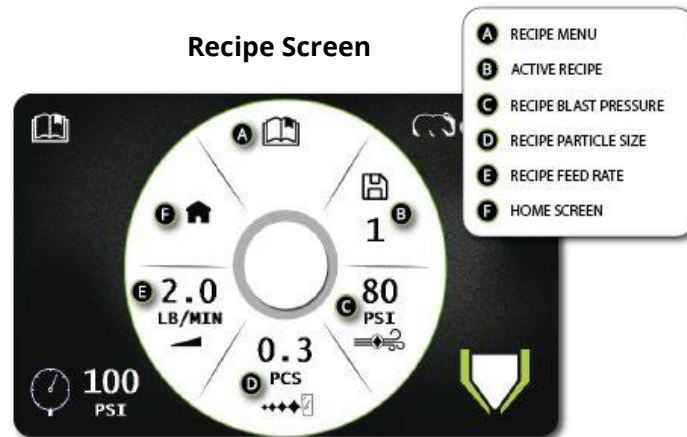
The following steps describe the recipe functions for the PCS 60. Recipes are useful for saving optimal settings for the machine for diverse types of surfaces. This saves time when switching from one type of surface to another. Below describes how to save recipes and how to recall for use.

To access the Recipe screen:

From the Home screen, use the rotary encoder dial to navigate to the Settings screen.

To select a recipe:

- a. Using the rotary encoder dial, navigate to the Recipe icon (A). Press to activate.



- b. Again, using the rotary encoder dial, navigate to the Recipe icon (A). Press to activate.
- c. The button is now green and active. Rotate the dial left and right to select a number between 1 – 9.
- d. Press the dial to select the desired existing recipe number.

To create a recipe:

- a. Using the rotary encoder dial, navigate to the Recipe icon (A) above. Press to select.
- b. Rotate and select Blast Pressure (C) above. Press to activate.
- c. The button is now green and active. Rotate the dial left and right to select a blast pressure. Press to select.
- d. Repeat step C to change the Particle size (D) and Feed Rate (E).
- e. Once all settings are adjusted as desired, navigate to (B) and press to activate.
- f. The button is now green and active. Rotate the rotary encoder dial to select a desired recipe number. Press to select.

Using the rotary encoder dial, navigate to the home icon (F) and press to return to the home screen.

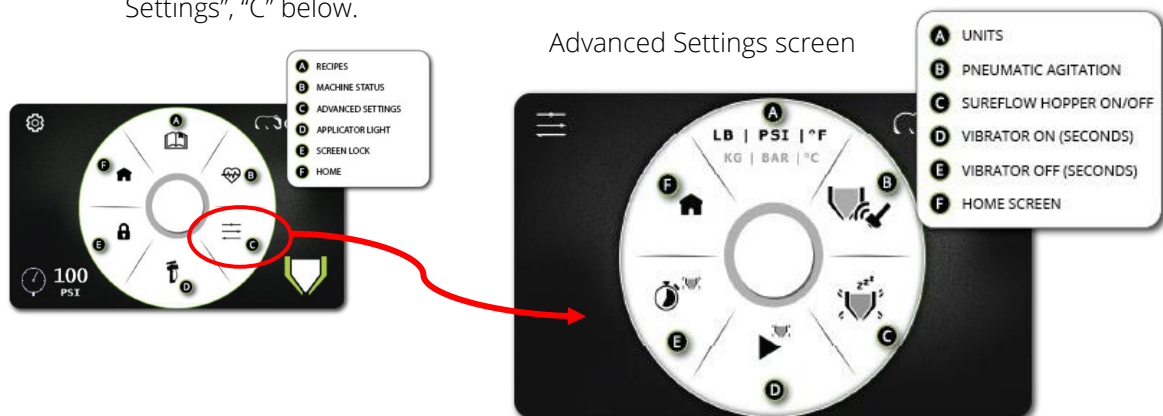
Advanced Settings

Note: The PCS 60 has a patented agitation system called “SureFlow”. It is comprised of vibration, thumping and a pair of ram-rods. When the machine is plugged in, SureFlow’s “Sleep Mode” is automatically enabled; however, the vibration and thumper/ramrods are NOT active:

- “Enabled” -- agitation is set and ready to be on
- “Active” -- agitation is in operation; meaning the machine’s vibrator is running, the thumper and ramrods are actuating.

SureFlow Sleep Mode and other preferences can be accessed through the Advanced Settings screen. For example, if it is notice that the dry ice is clumping or sticking to itself, the frequency of the thumper/ram-rod action can be increased to help break up the ice. Separately, the intervals between vibration cycles can be adjusted as well as how long the vibration cycle is on. Note: the vibration can be turned off; however, the thumper/ramrods cannot be turned off. All adjustments are in seconds: See the following steps to access the Advanced Settings.

1. To access the Advanced Settings screen:
 - a. From the Home screen, use the rotary encoder dial to select “Settings” then “Advanced Settings”, “C” below.



2. To change the units of measurement:
 - a. Using the rotary encoder dial, navigate to units (A) and press to select. This will toggle between US standard (LB | PSI | °F) or metric (KG | BAR | °C).
3. To change the thumper and ramrod settings:

Note: The default SureFlow agitation settings are 30 seconds off, 5 seconds on for the vibration and 7 seconds between thumper/ramrod activations. Each time the PCS 60 is unplugged and then plugged in; the vibration default settings will be used but the thumper/ramrod will remain as set by the operator.

- a. For thumper and ramrod activation cycles: using the rotary encoder dial, navigate to (B) and push the dial. The button is now green and active. Rotate the rotary encoder dial to change the time (in seconds) between each activation.

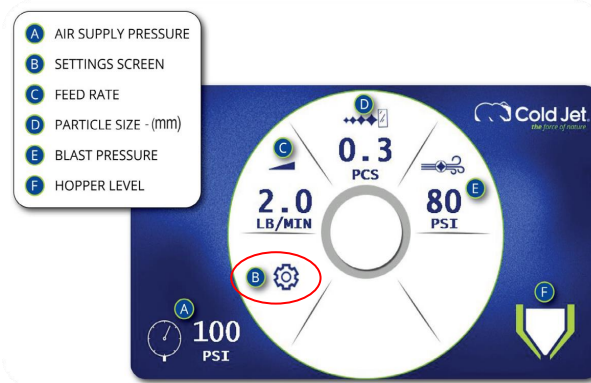
4. The hopper vibration on/off (C) operates based on the hopper temperature values when dry ice is detected in the hopper. The adjustments below can only be made when "C" is on.
 - a. (D) adjusts the number of seconds, in increments of 5, that the vibrator will activate (a cycle).
 - b. (E) adjusts the number of seconds, in increments of 5, in between vibration cycles.

Note: When the applicator trigger is pulled, vibration, thumping and the ramrods will activate regardless of the settings. This will occur whether there is ice in the hopper or not. Every time the trigger is pulled, vibration activates.

Status Screen

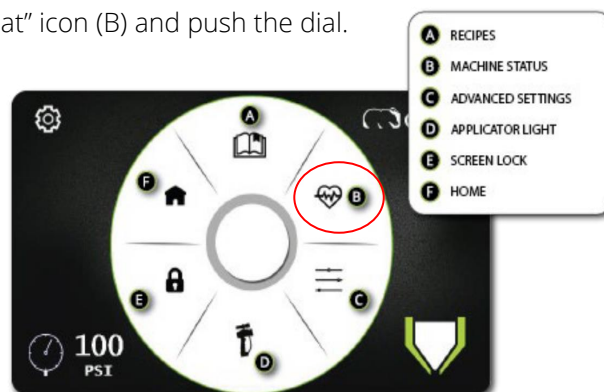
To access the Status Screen:

1. Using the rotary encoder dial, navigate such that you can select the Settings icon (B). Press the rotary encoder dial.



Note that the background color has changed to black as shown below. You are now in the Advanced Settings screen.

2. Rotate to the "heartbeat" icon (B) and push the dial.



You are now on the Status Screen. Here you can find various information about the machine such as serial number, software version, hours of operation, pressure values, hopper temperature values, RPM and amp draw values of each of the (5) motors.



In the illustration above, the (6) red triangles are present only to indicate where error codes would be displayed

Status Screen Legend:

1. Current Screen Indication
2. Serial Number
3. Hour Meter
4. Hopper Temperature Indicators
5. Motor Status identification:
 - i. "1" = Doser motor
 - ii. "2" = Clockwise Cutter motor
 - iii. "3" = Counterclockwise Cutter motor
 - iv. "4" = Positioner motor
 - v. "5" = Feeder motor
6. Error Codes: *Note In the illustration above, the (6) red triangles are present to indicate where error codes would be displayed.*
7. IoT Diagnostic Mode (for Cold Jet Field Service) *
8. Cellular Signal (if there are no signal bars the machine will not be able to connect) *
9. Firmware Version
10. Incoming/Outgoing Pressure

* As described in the following section, the Aero2 series machines automatically connect to cellular service if the service is available and not obstructed. Once connected, the machine is directed to the Cold Jet CONNECT® platform where you can view the machine's operating conditions. In addition, through the machine's control panel you can initiate Diagnostic Mode (7) when working with Cold Jet's technical service personnel. This will send a sustained burst of more detailed operating data for help in evaluating technical issues. To initiate the diagnostic mode, hold the rotary encoder button down for (8) seconds. The Cold Jet CONNECT® icon (7) will turn white, indicating that the diagnostic mode has been activated. The diagnostic mode will time-out after 5 minutes of inactivity with the machine (for example, no motors have run). Note that the icon will turn black indicating that the diagnostic mode is no longer active.

**Cold Jet blasters continuously monitor internal systems. These systems may cause error codes to display periodically. These error codes are transmitted to Cold Jet to help improve blaster efficiency and performance. This feature is called "Cold Jet Connect."*

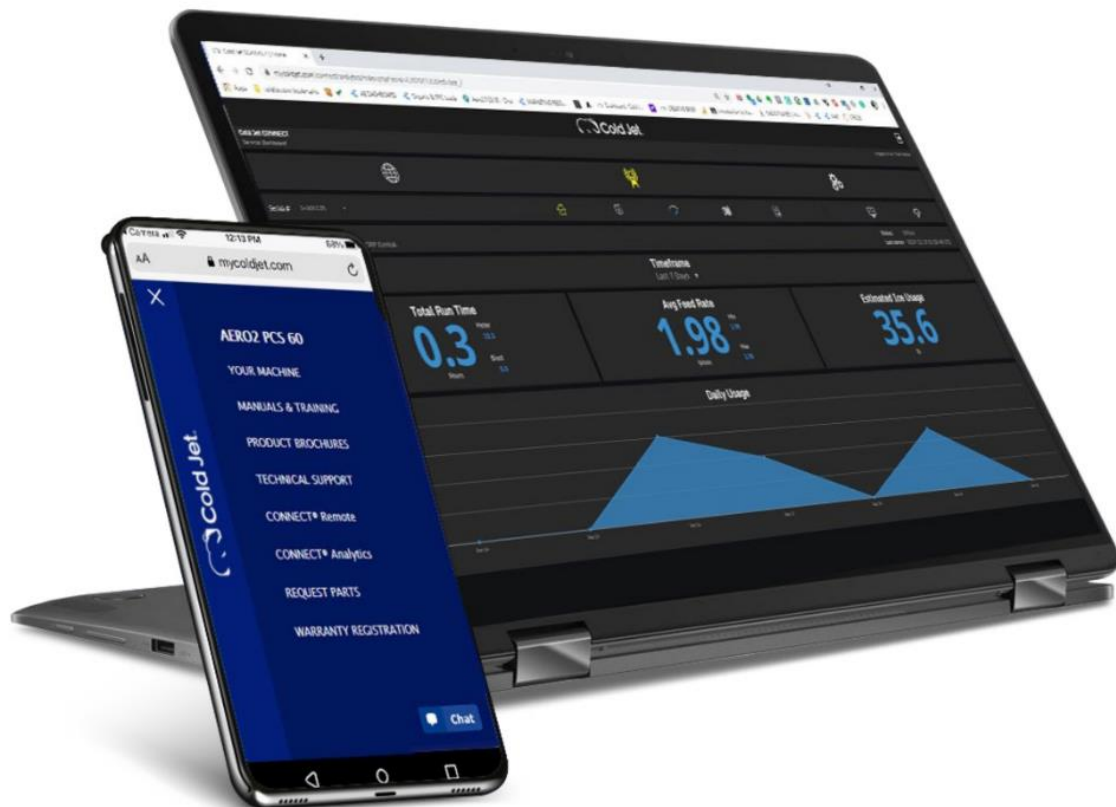
Cold Jet CONNECT®

In the increasingly smart connected world, technology makes it easier to support and maintain your Cold Jet equipment. As part of our commitment in the support of your dry ice blasting machine, it comes with its own personal support site through coldjetconnect.com.

To access your machine's personal support page, scan any of the QR code labels on the machine or attached inside this operator manual on Page 4. This will take you to a support site unique to this machine, providing on-line manual(s), training, warranty information, technical service contacts, service parts ordering and more.

Additionally, with one of Cold Jet CONNECT's tiered subscription plans, you can access detailed insights into your machine's operation, and gain direct access to Cold Jet's technical support staff when needed.

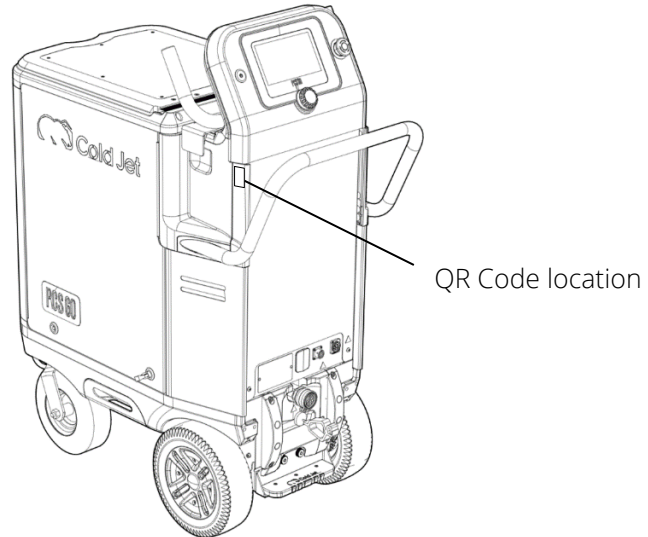
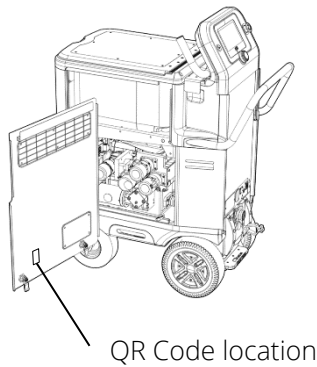
Cold Jet offers Professional and Enterprise level subscriptions for access to advanced CONNECT features, analytics, and priority customer service. Please contact your Technical Support Representative for more information on available Cold Jet CONNECT® subscription plans. See Page 58.



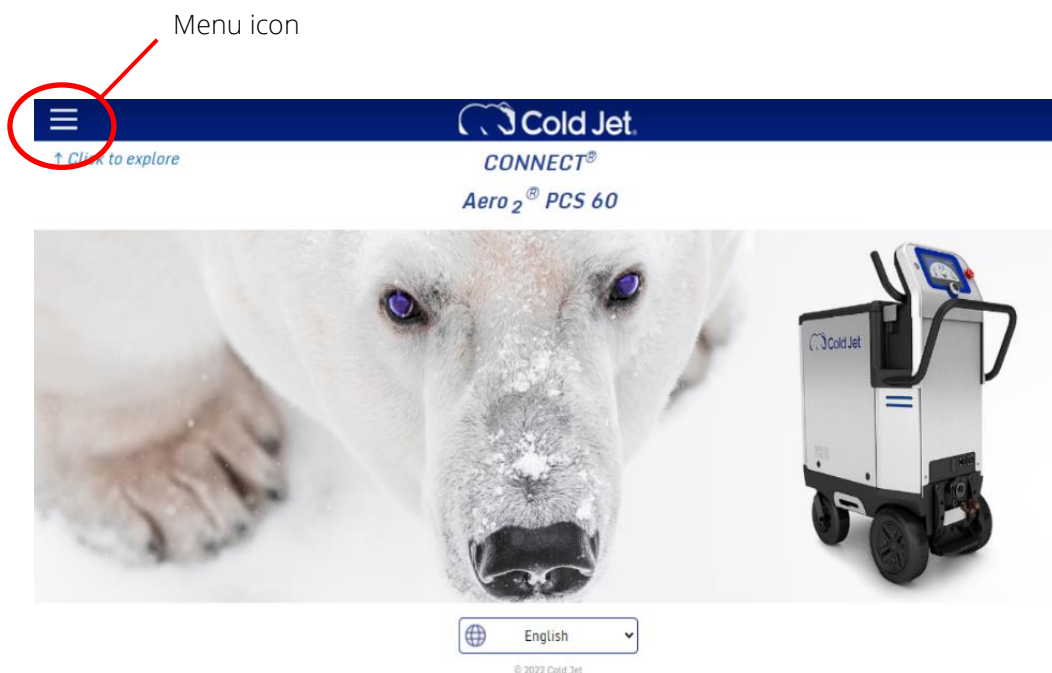
How to Access Cold Jet CONNECT®

To access your machine's unique personal support page, scan one of the QR codes located on your machine as shown. *Accessing the QR Code behind the side panel is to be done only if the other QR Codes are unscannable. If this panel is to be removed, LO/TO procedures should be followed.

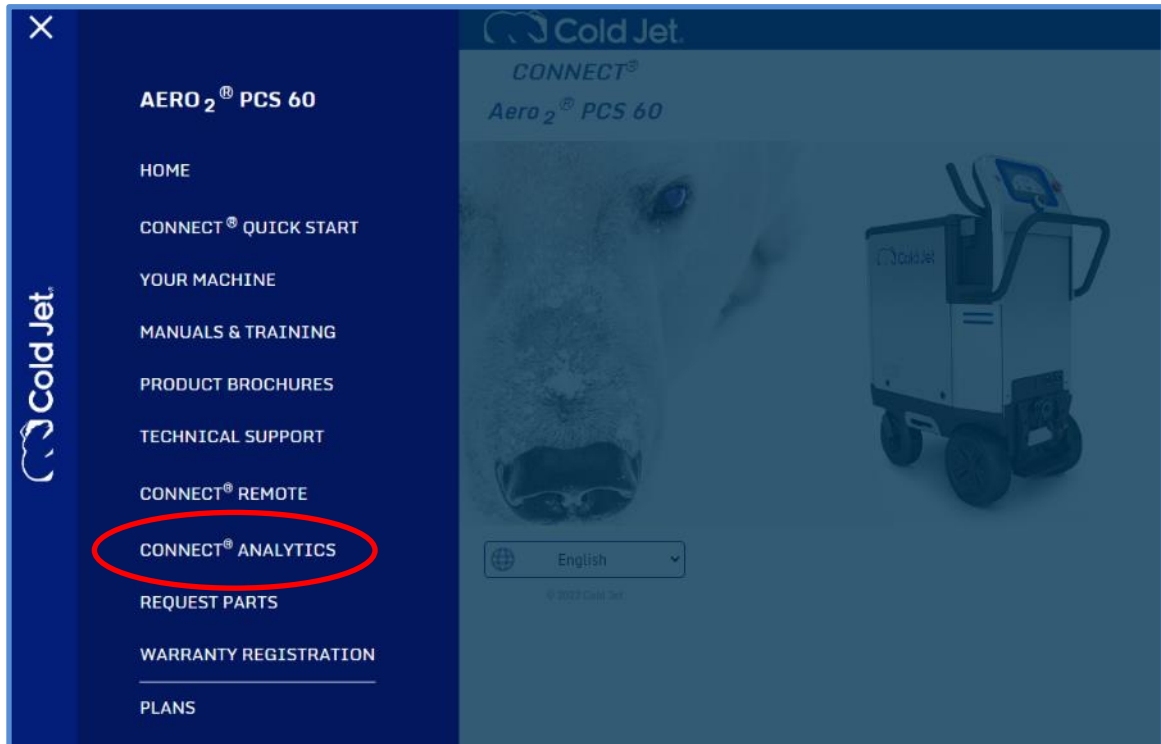
Example QR Code:



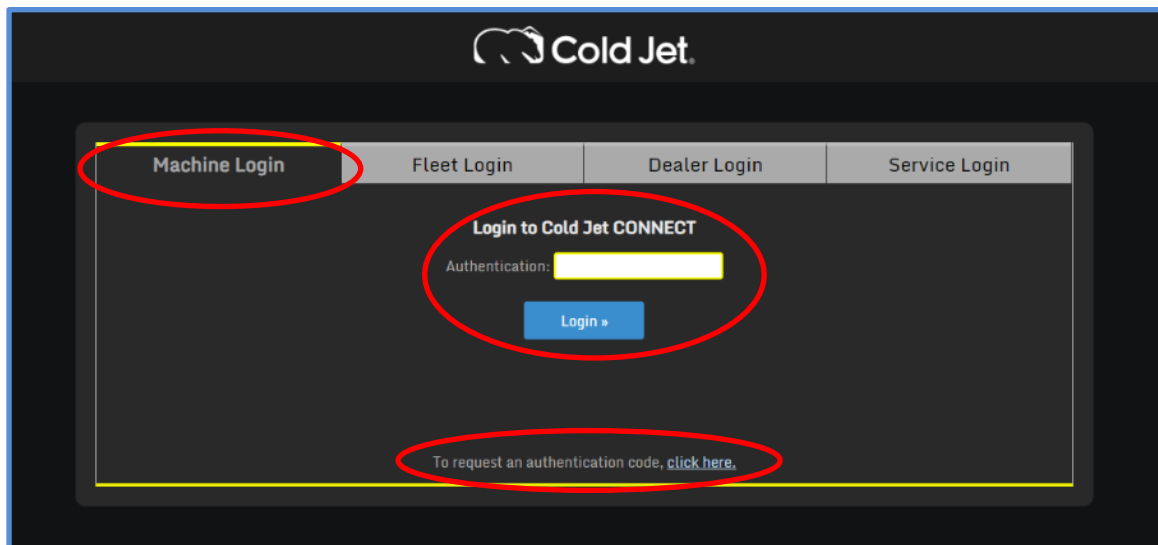
The image below shows the Cold Jet CONNECT® Home Page. Clicking the menu icon in the upper left-hand corner will allow you to access items such as on-line manuals, warranty information, and technical service contacts. In addition, you can order parts and link to your specific machine's Cold Jet CONNECT® operational view.



Once the Menu Button is selected, the menu appears on the left-hand side of the screen as shown below. Now, select the "CONNECT® Analytics" button.



Clicking on "CONNECT® Analytics" button will bring you to the following page. Click the "Machine Login" button and enter your "Authentication Code" in the field and then select the "Login" button.



Note: If you don't know your "Authentication" code, you can request it by clicking the "click here" link located at the bottom of the page. A form as seen on the following page, must be filled out and once completed, an authentication code will be emailed to you. For more information, visit www.coldjetconnect.com.

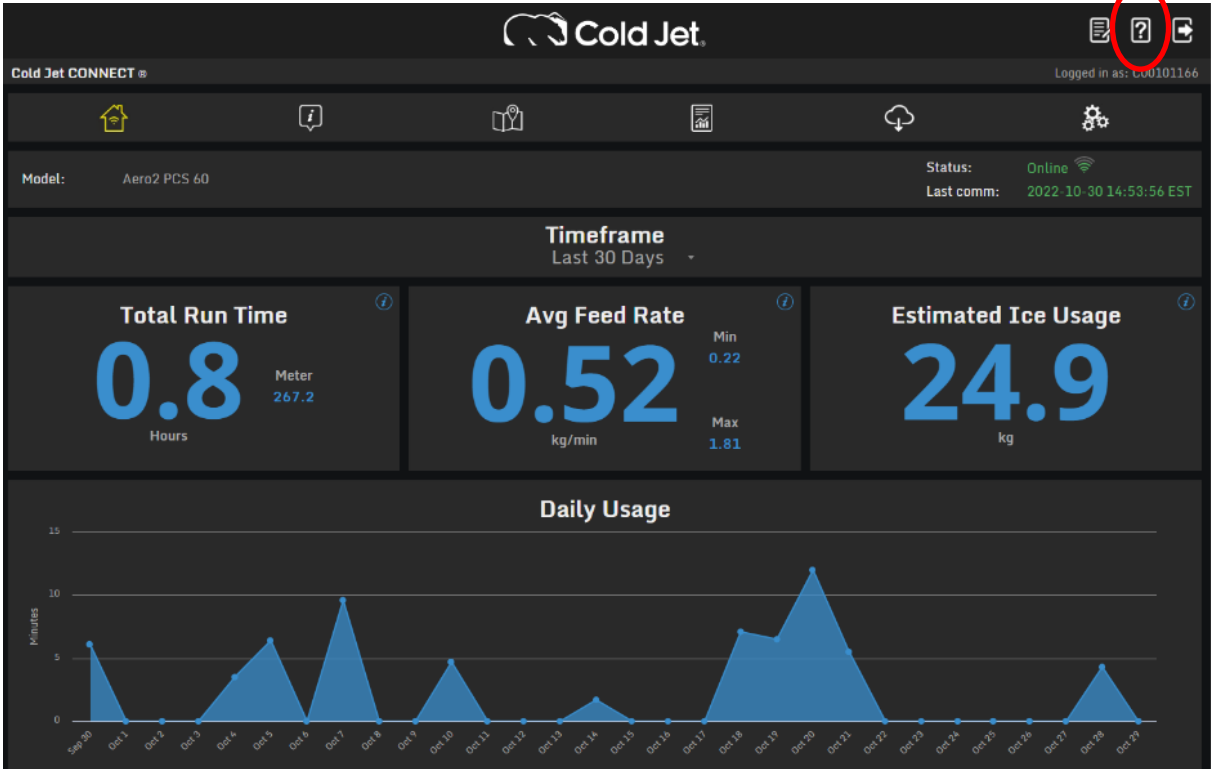
Cold Jet. *CONNECT*

Identity Verification


This information is used only to verify your ownership of the machine and is not stored.

SUBMIT

Once successfully logged in, the following page is shown. To learn more about each of the analytics shown, access the user guide by clicking the “Help” icon in the top right-hand corner of the screen.



Inspection

 **WARNING** Prior to any maintenance or inspection procedures, ensure that the PCS 60 is turned off and the power source is disconnected. Follow all LO/TO procedures. Ensure that the air supply is closed, bled off, and the air supply hose is disconnected from the PCS 60

Daily

- Inspect the hopper area for any dirt or debris.
- Inspect the air and blast hoses for damage such as cuts or kinks and replace, as necessary.
- Inspect power cords for cuts, worn surfaces and proper ground. Repair or replace, as necessary.
- Inspect fittings on the applicator for loose or improper connections and correct, as necessary.
- Inspect applicator blast cable for wear or improper connections and correct, as necessary.
- Inspect the applicator for any damage or loose parts and correct, as necessary.
- After the machine has power and has completed the startup process, test the safety interlock on the safety grate by opening the safety grate and ensuring the machine will not operate without the grate in place.

Weekly

- Inspect the inside of the hopper for dirt and inspect rotors for cracks, gouges, or broken surfaces.
- Verify the nozzle airflow exit end is not deformed or burred.

Optional Service Agreements:

Cold Jet. **CONNECT.** Service Agreements

CONNECT BASIC * Included with ALL Cold Jet Equipment



MACHINE DOCUMENTATION AT YOUR FINGERTIPS

- + Operator Manuals
- + Parts & Accessory Catalog



MACHINE & APPLICATION TRAINING

- + Videos On-Demand



SERVICE & SUPPORT ANYWHERE

- + Standard 1 Year Warranty

CONNECT ANALYTICS * Smart (IoT Enabled) Blasters ONLY



IoT DATA & REMOTE SUPPORT

- + Machine Utilization & Dry Ice Usage / Feed Rates
- + Historical Service Records & Maintenance Notifications
- + Pre-Configured & Custom Job Reporting
- + Remote Support Capabilities



CONNECT CARE * BOTH Smart & Standard Blasters



CARE ASSURANCE

- + Additional Year of Standard Manufacturer Warranty (Renew for up to 3 Years Total)



ONSITE PREVENTATIVE MAINTENANCE

- + Performed by Certified Cold Jet Technician
- + One Annual Onsite Service Call



REMOTE ASSISTANCE PLATFORM

- + Certified Cold Jet Technicians on call
- + Mobile App with Augmented Reality (AR) for Instant Performance & Technical Support



CONNECT ENTERPRISE * Smart (IoT Enabled) Blasters ONLY

Get the most out of your smart dry ice blasting equipment by combining both **CONNECT ANALYTICS** and **CONNECT CARE**.



- + Data. Information. Insights.
- + Comprehensive Customer Care

CONNECT CUSTOM

- + Custom Service Agreements Available Upon Request

- + Tailored Solutions To Meet Your Needs

Warranty Policy

Cold Jet, LLC® (“CJ”) warrants its products (“Equipment”) provided under this Agreement to be free from defects in materials and workmanship for a period of 12 months (90 days for used equipment), under normal use, maintenance and service as stipulated in the Operator’s Manual, Commissioning, and Operator Training. At the discretion of CJ, failure to complete Installation, Commissioning, and Operator Training shall result in forfeit of warranty rights. CJ warrants that the equipment will be in good working order on the Date of Shipment and will conform to CJ’s official published specifications.

The warranty period is 12 months (90 days for used equipment) for CJ manufactured Equipment. Original Equipment Manufacturers’ warranties provided by CJ on equipment purchased under this Agreement not manufactured by CJ will be passed through to the Buyer. The warranty period commences on the Date of Shipment of the Equipment.

CJ’s liability is limited to repairing or replacing, at its option, any covered part of its Equipment which CJ has determined to be defective. Said repair or replacement will be made by CJ or its authorized representative (“Authorized Personnel”) free of charge to the Buyer during the warranty period. Any replaced part will become the property of CJ. If, after repeated efforts, CJ is unable to restore its Equipment to good working order, or to replace the defective parts, all as warranted, CJ may replace the Equipment in its entirety at its discretion. Any claim must be made in writing to CJ within 30 days after the defect is discovered and any claim not made within that period shall be deemed waived or released and denied.

Warranty service provided under this Agreement does not assume uninterrupted operation of the Equipment. The suitability of the equipment for the purpose intended is not included in the warranty.

This warranty shall not apply and CJ shall not be responsible nor liable for:

- a) Consequential, collateral, or special losses or damages.
- b) Equipment conditions caused by abnormal conditions of use, accident, neglect or misuse of Equipment, improper storage or handling, or damages resulting during shipment as determined by CJ.
- c) The replacement of normal wear items, including but not limited to air, blast and whip end hoses.
- d) Deviation from the Equipment’s prescribed maintenance programs, replacement parts, operating instructions, specifications, or other terms of sale.
- e) Improper application of the product.

In order to comply with the terms of this Warranty Policy, and for safety reasons, repairs other than those stated above require special equipment and therefore must be made by Authorized Personnel. The liability of CJ under the terms of the UL, CSA, CE, or other applicable regulatory standards governing product performance and safety may become invalid if Buyer or persons other than Authorized Personnel make repairs with spare parts not identical to the parts for the Original Equipment, if repairs are carried out by persons other than Authorized Personnel, or if repairs are unsatisfactory due to lack of special equipment. In such cases, CJ’s liability will be solely confined to manufacturing defects or errors made prior to the Equipment being delivered to Buyer and before such unauthorized repairs or replacements were made. In no event shall CJ be liable for claims, whether arising from breach of contract or warranty of claims of negligence or negligent manufacture, in excess of the purchase price.

THIS WARRANTY IS THE SOLE WARRANTY OF CJ AND ANY OTHER WARRANTIES, INCLUDING ANY WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR USE, WHETHER EXPRESS OR IMPLIED BY LAW, FACT, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE, OR OTHERWISE, ARE HEREBY SPECIFICALLY EXCLUDED.



EU Declaration of Conformity

Original [EN]

We as the manufacturer:

Cold Jet, LLC
455 Wards Corner Road
Loveland, OH 45140 USA

Hereby declares that the following product:

Product Designation: Aero2 PCS 60

Type/Serial no.:

Is in compliance with the following European directives:

Directive 2006/42/EC [Machinery Directive]

Harmonized standards applied:

EN ISO 12100:2010

EN ISO 4414:2010

EN ISO 13857:2008

EN ISO 14120:2016-03

EN ISO 13732-3:2008

EN ISO 13849-1:2015

Person in the European Community authorized to compile the technical documentation:

Cold Jet Sp.zo.o, Slawomir Kucharski, Lukowska 12, Oborniki 64-600, Poland

Place and Date of Issue: Loveland, US on September 24, 2019

Signed for and on behalf of Cold Jet, LLC

Arvid Nielsen
Director Technology & Engineering, Sr. VP



Technical Schematics

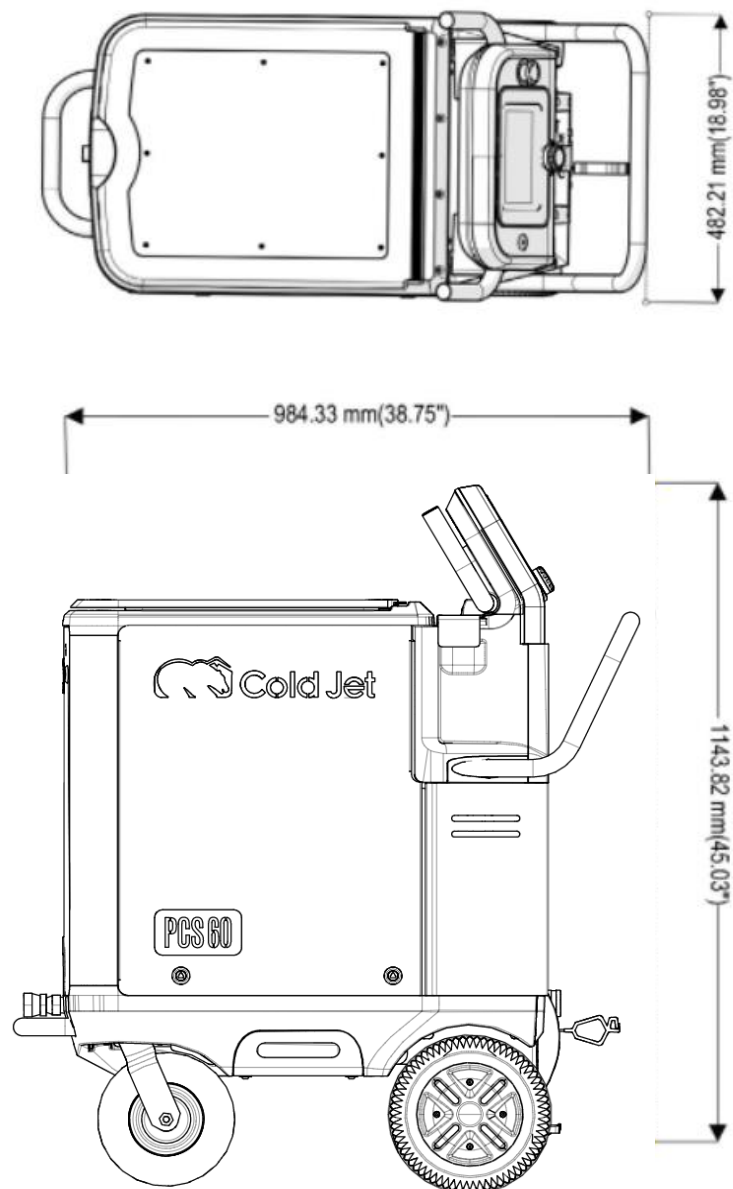
Dimensional Drawing with Pneumatic Schematics [2A0338]

62-64

Electrical Schematics

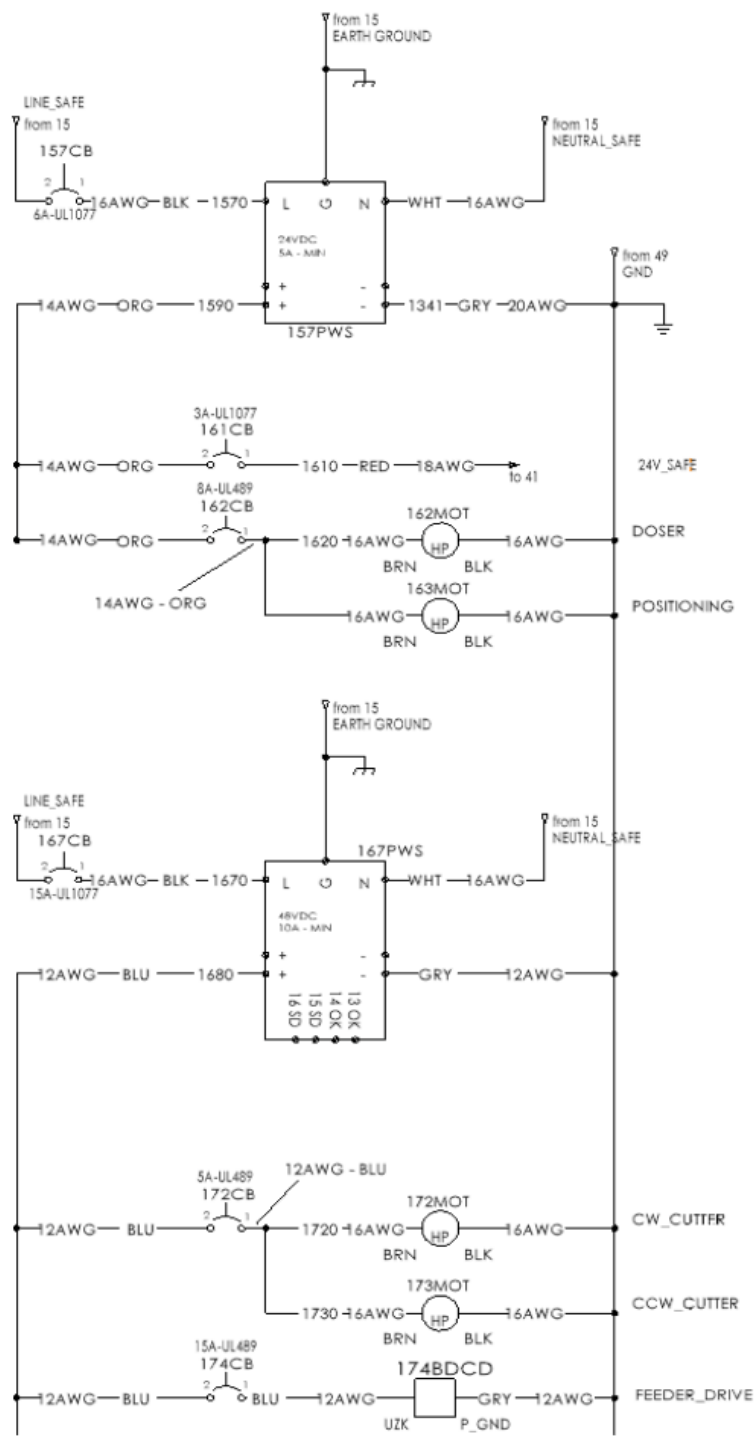
65-70

PCS 60 Dimensional Drawing

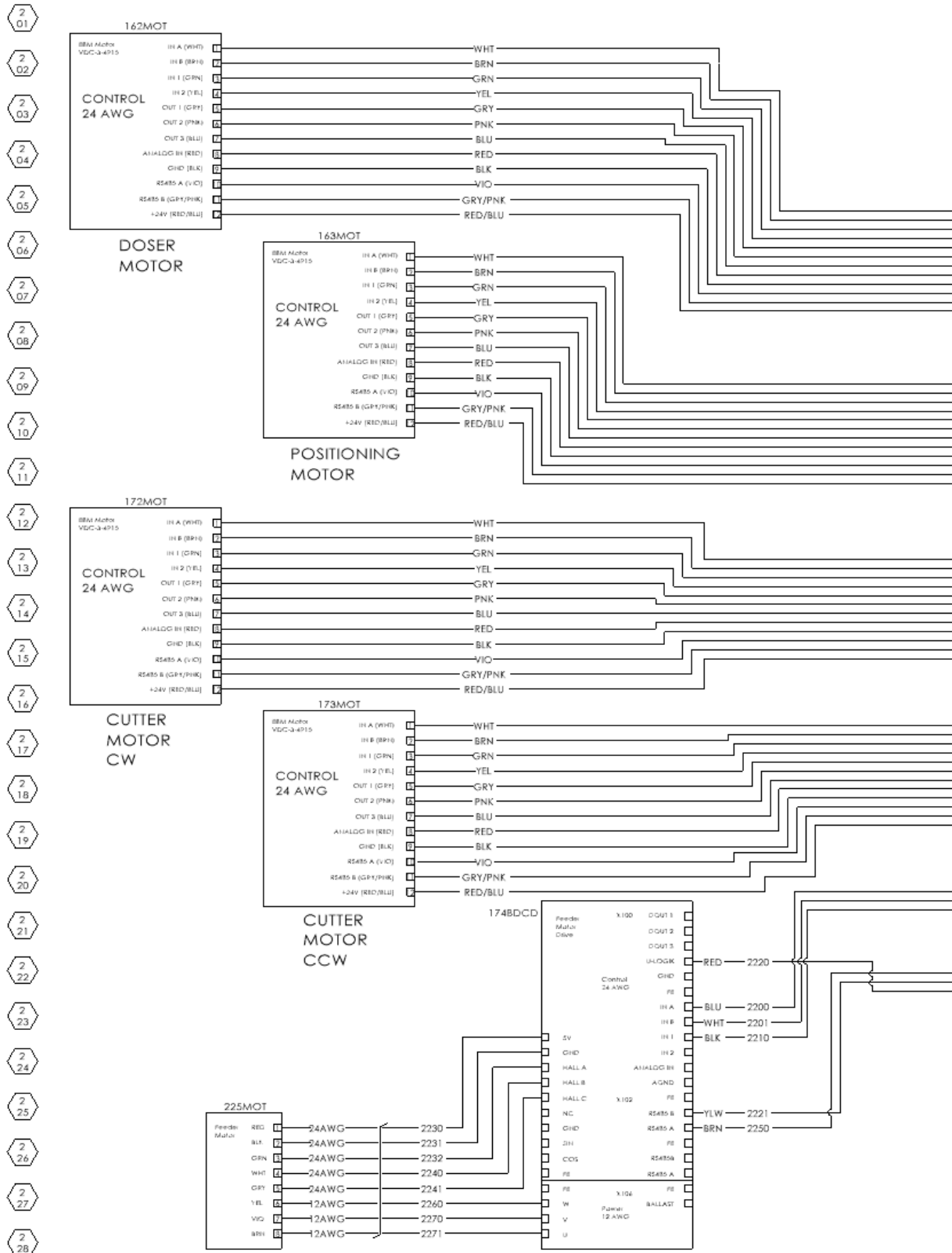


Electrical Schematic cont.

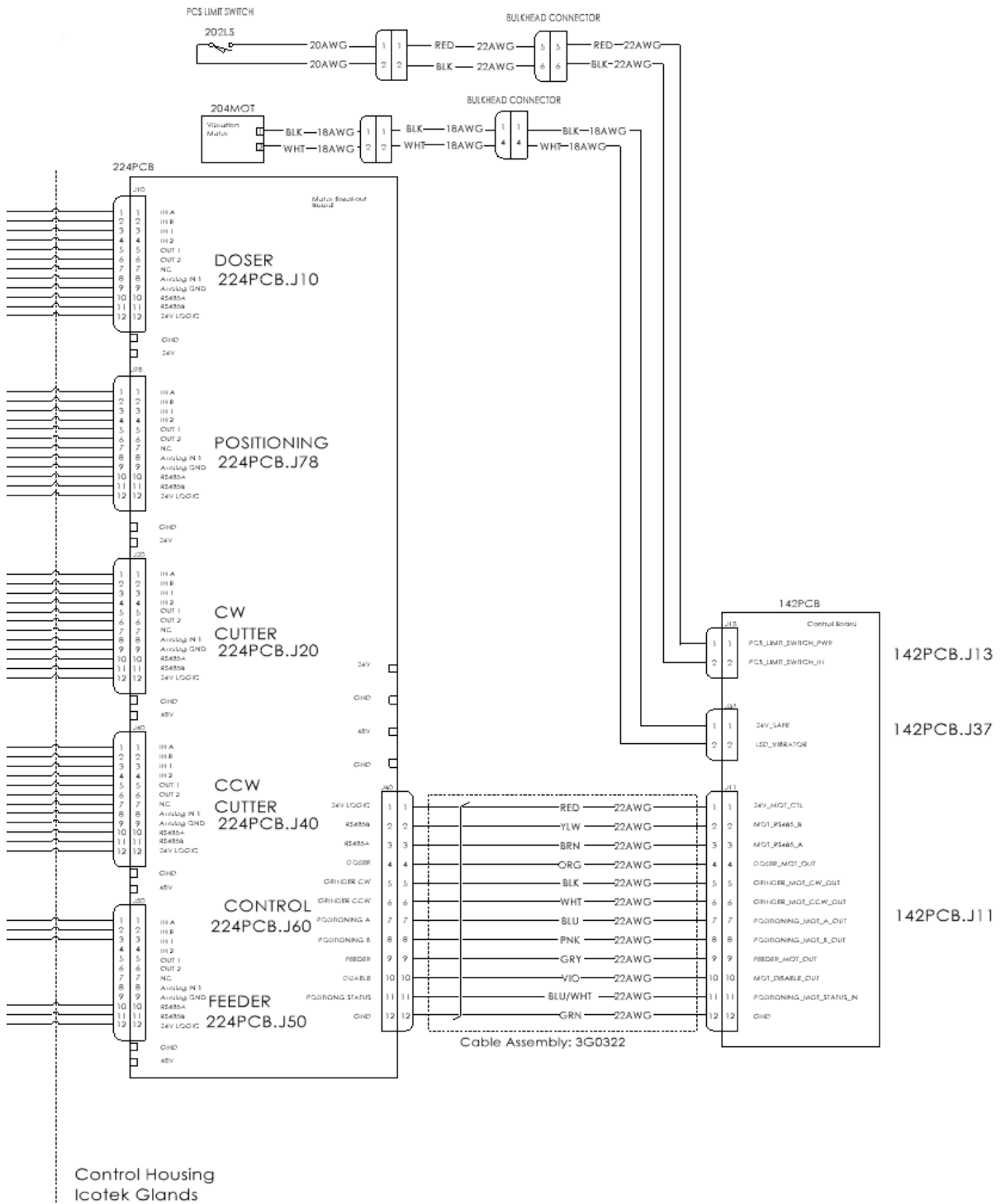
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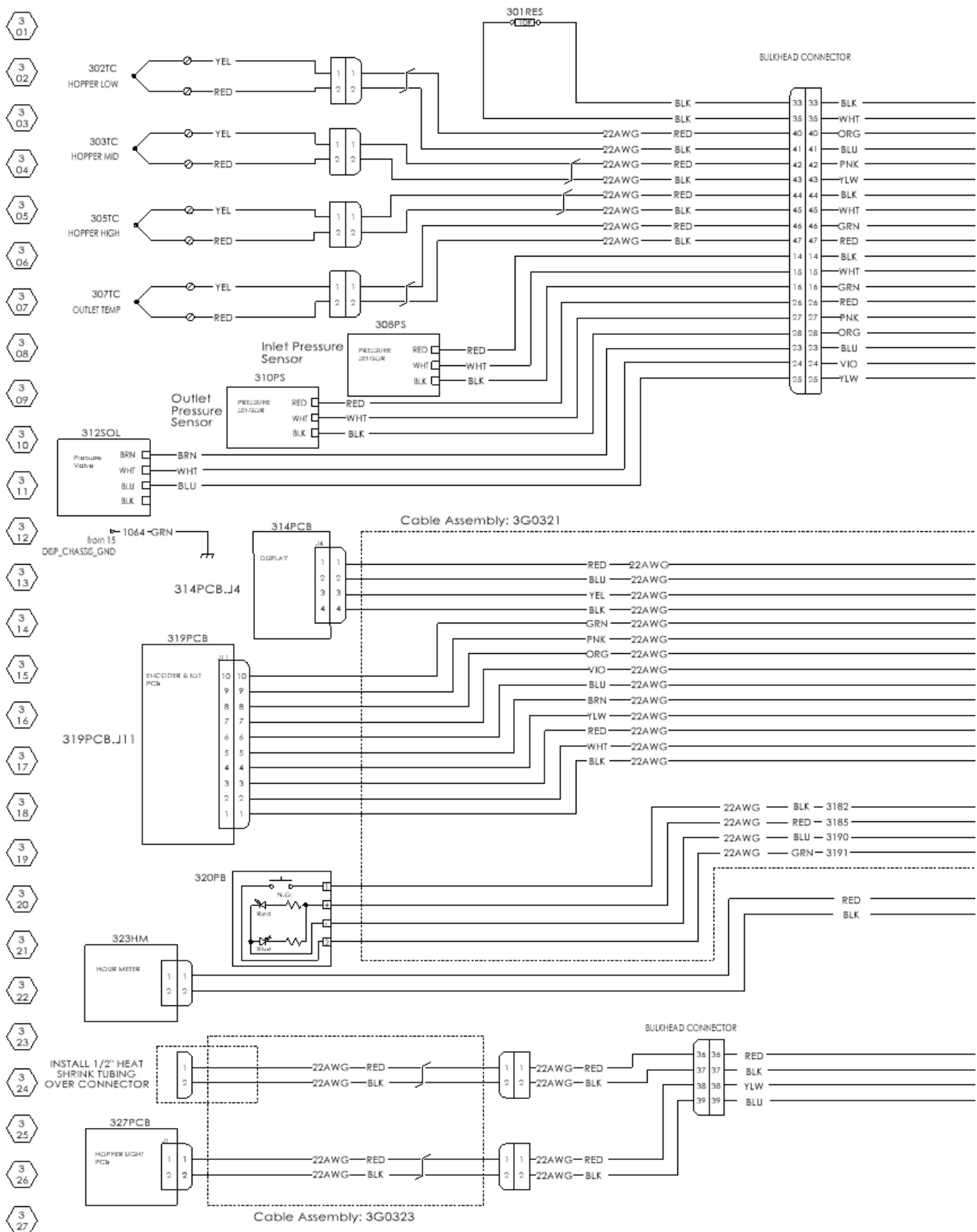
Electrical Schematic cont.



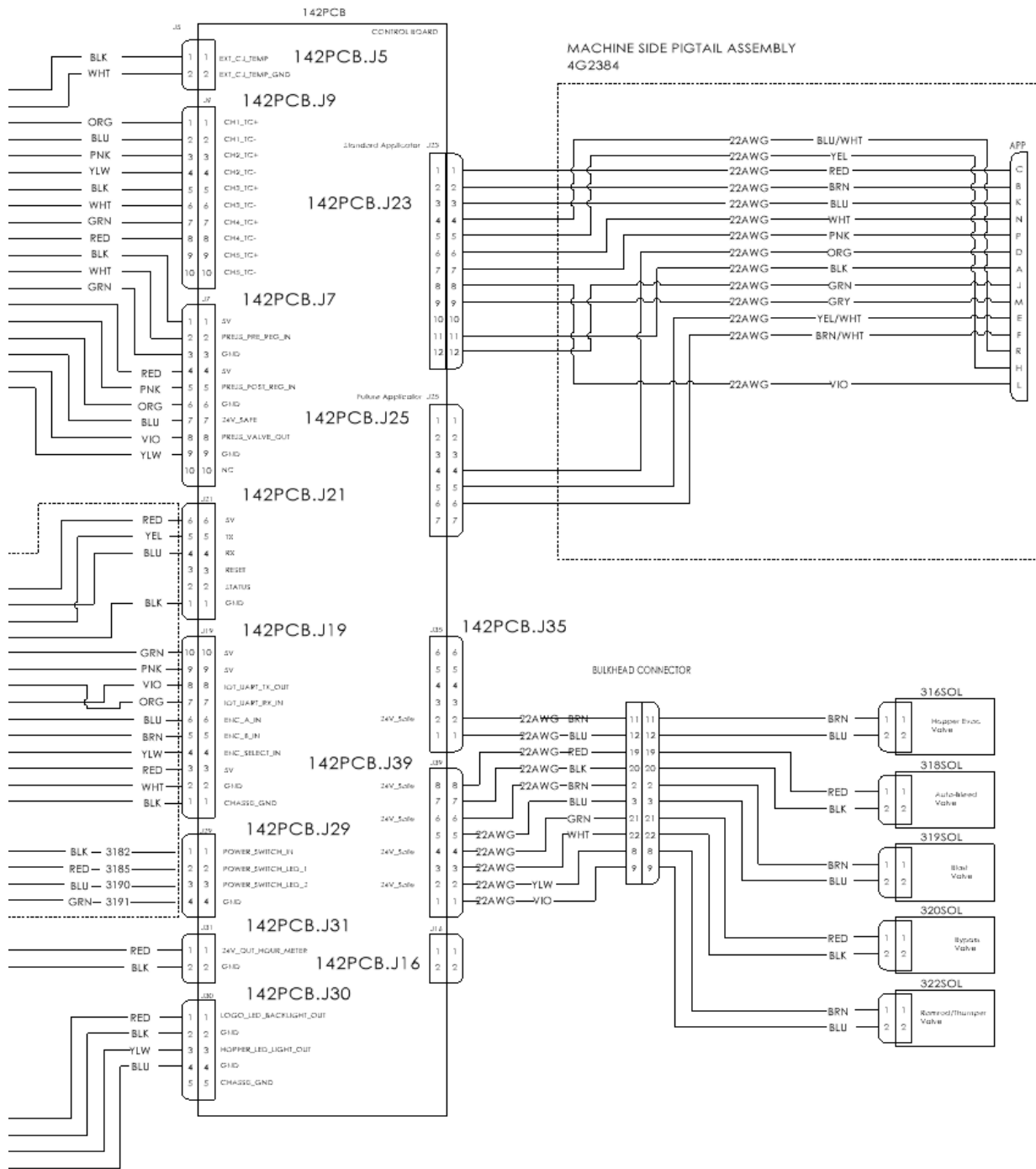
Electrical Schematic cont.



Electrical Schematic cont.

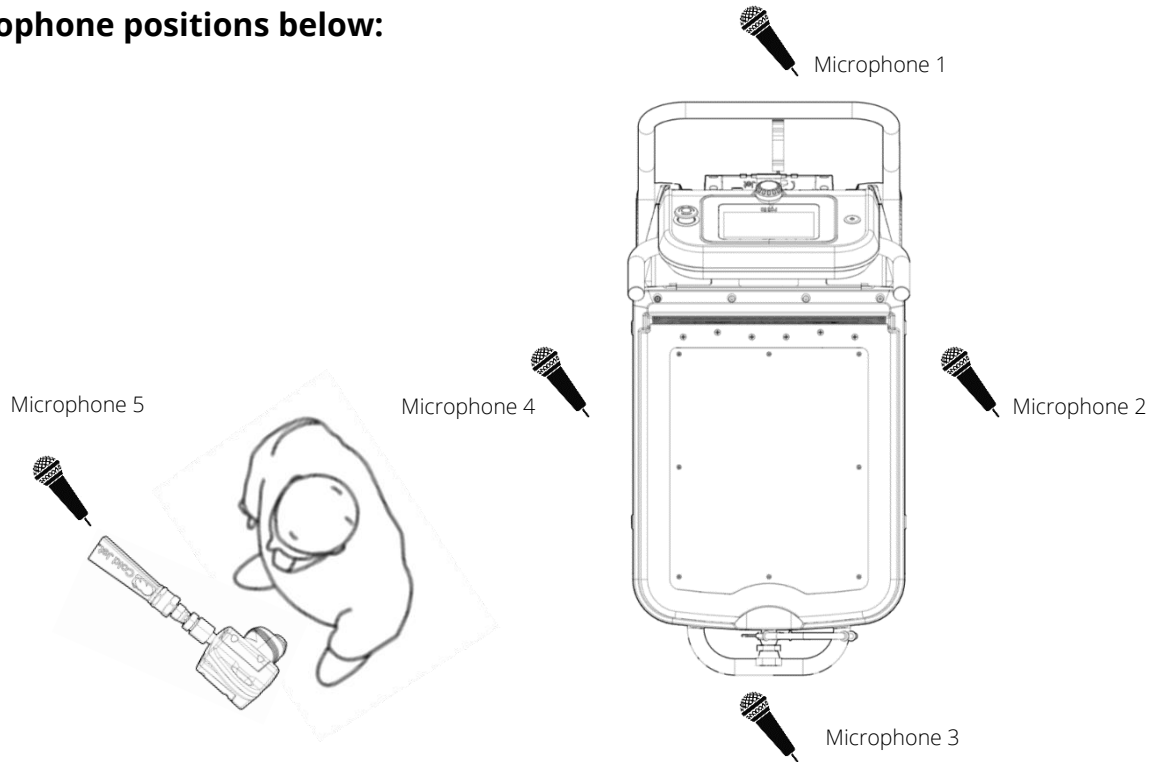


Electrical Schematic cont.



PCS 60 Maximum Acoustic Emissions

Microphone positions below:



Readings used maximum air pressure and the highest flow nozzle.

Correction Factors

MICROPHONE POSITION	BACKGROUND NOISE K1 (dB)	ENVIRONMENTAL INDICATOR K2 (dB)	LOCAL ENVIRONMENT K3 (dB)
M1	0.0	0.7	1.1
M2	0.0		
M3	0.0		
M4	0.0		
M5	0.0		

Corrected Emissions

LEQ (A-Weighted SPL)	AMBIENT dB(A)	EMISSION dB(A)	LIMIT dB(A)
M1	54.0	113.0	70 dB(A)
M2	54.6	106.1	
M3	56.7	110.1	
M4	55.6	113.4	
M5	54.5	117.4	
CPK (C-Weighted Instantaneous)	AMBIENT (dB)	EMISSION (dB)	LIMIT (dB)
M1	74.7	129.7	130 dB (20µPa)
M2	81.8	124.4	
M3	77.2	126.3	
M4	76.9	132.1	
M5	78.0	133.0	
SEL (A-Weighted Sound PNR Level)	AMBIENT dB(A)	EMISSION dB(A)	LIMIT dB(A)
M1	73.6	132.6	80 dB (A)
M2	74.2	125.7	
M3	76.3	129.7	
M4	75.2	133.0	
M5	74.1	137.0	

Emission Levels C-Weighted and Corrected A-Weighted Levels minus Correction Factors in Table 1.

NOTES:

Contact Information

Cold Jet – World Headquarters

Address:

455 Wards Corner Road
Loveland, Ohio 45140, USA

Phone: [+1 513-831-3211](tel:+15138313211)

Fax: +1 513-831-1209

Customer Service: +1-800-777-9101

After Hours: +1-513-832-3211

Cold Jet Canada

Address:

1727 Industrial Road, Unit 1
Cambridge, Ontario, N3H 5G7, Canada

Phone: [+1 800-337-9423](tel:+18003379423)

Fax: +1 513-831-1209

Belgium - Europe Headquarters

Cold Jet BVBA

Address:

Zone 1 Researchpark 330, B-1731
Zellik, Belgium

Phone: [+32 13 53 95 47](tel:+3213539547)

Fax: +32 13 53 95 49

Germany - Cold Jet GmbH

Address:

Obere Industrie Strasse 1
54595 Weinsheim, Germany

Phone: [+49 6551 9606-0](tel:+49655196060)

Fax: +49 6551 9606-26

Customer Service: +49 65519606-14

Spain (Iberian Peninsula)

Cold Jet S.L.

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Pol.Ind. Europolis

28232 Las Rozas de Madrid, Madrid, Spain

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Japan - Asia Headquarters

Cold Jet Japan

Address:

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Tokyo 130-0011

Phone: [+81 3 6869 2665](tel:+81368692665)

Fax: +81 3 6869 2666

China (Shanghai)

Cold Jet Dry Ice Equipment (Shanghai)
Co., Ltd.

Address:

Room 111, Building 1

Jindu Road No. 1199

Minhang District, Shanghai, 201108

Phone: [+86 21 5296 7161](tel:+862152967161)