Dry Ice Hub

10 ft container unit with PR350H or PR120H pelletizer

USER MANUAL

Original Instructions [English]

December 2024
Rev 3

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CONTENT


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FOREWORD

The purpose of this user manual is to provide the operator, the technical staff, and the people responsible with the most important technical and safety information about the machine.

Please read the gas supplier's safety instructions thoroughly before using the system. Read the user manual as well as the supplementary user manual provided by the manufacturers of purchased parts.

This manual is supplementary to the training: training provided by the manufacturer of distributor is essential for all persons who will be in direct or indirect contact with the cabinet (operation / cleaning / maintaining). Only well-trained personnel are allowed to operate the system. Consequently, this training is also necessary for the personnel responsible for cleaning and maintaining the system.

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Concept

Working principle of the dry ice production hub

The Dry Ice Production Hub integrates the PR120H PR350H pelletizers with a 10 ft High Cube ISO Transportable Container, divided into a machine and filling room capable of producing up to 120 kg/265 lb. or 350 kg/772 lb of dry ice pellets or nuggets per hour.

The system utilizes both liquid CO_2 and gaseous CO_2, which are supplied directly to the pelletizer from CO_2 Tank located outside the container. The pelletizer then produces solid CO_2 (dry ice). The container itself is equipped with an integrated exhaust system featuring a ventilator and a CO_2 safety alarm system.

Cold Jet's dry ice production equipment has been engineered to extrude the highest density dry ice available. The process creates dry ice pellets with a longer shelf life, better transportability, and offers better blasting performance. The pelletizer can be equipped with different die plate options to manufacture various sizes of dry ice, from pellets to nuggets.

The PR120H / PR350H Pelletizer is a compact dry ice extruder designed to make dry ice pellets and nuggets with minimal space requirements. Dry ice pellets and nuggets are produced by injecting liquid CO_2 into the pelletizer extrusion cylinder, where the solid CO_2 is formed. There are several applications for dry ice pellets and nuggets, including the preservation of perishable items and dry ice cleaning.

If installed, maintained and used properly according to the purpose it has been designed for, the machine shall meet the safety and health requirements of the guidelines currently in effect.

Important addresses

If you have any questions or if you are perhaps dealing with a technical malfunction that cannot be immediately resolved by your Technical Department, you may submit a request for intervention to Cold Jet office.

Manufacturer

Cold Jet Aps
Industrivej 68
DK-6740 Bramming
Denmark

SAFETY PRECAUTIONS

Producers obligate each operator/technician/responsible personnel to take thorough cognizance of all mechanical and electrical characteristics of the cabinet. Start by reading this chapter and the gas supplier's safety information sheet.

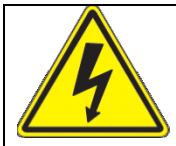
Safety guidelines and warnings are printed red.

Training is required. This is provided by the manufacturer of the cabinet or by the gas company.

Description of the pictograms

The PR120H / PR350H Pelletizer uses ISO safety symbols. The symbols come in three categories:

- A yellow warning triangle/black graphical symbol indicates what the hazard is;
- A blue mandatory action circle/white graphical symbol indicates an action to take to avoid the hazard;
- A red prohibited action circle-with-slash/black graphical symbol indicates an action to avoid.

	**WARNING SYMBOL** Arc flash (electrical)		**MANDATORY ACTION** Read manual before operating
	**WARNING SYMBOL** General warning		**MANDATORY ACTION** Read manual before servicing
	**WARNING SYMBOL** Explosion (electrical)		**MANDATORY ACTION** Lock out/tag out before servicing
	**WARNING SYMBOL** Flying debris and loud noise		**MANDATORY ACTION** Wear hearing protection
	**WARNING SYMBOL** Pressurized device		**MANDATORY ACTION** Wear safety glasses
	**WARNING SYMBOL** Cold surface		**MANDATORY ACTION** Wear gloves
	**WARNING SYMBOL** Finger crush hazard		**PROHIBITED ACTION** Do not operate without guards
	**WARNING SYMBOL** Carbon dioxide present		**PROHIBITED ACTION** Do not stand here
			**PROHIBITED ACTION** ESD area, pacemaker wearer avoided.

General recommendations on cryogenic gases

CO_2 is an asphyxiate gas which displaces oxygen in the air. Carbon dioxide is colorless. At low concentrations, the gas is odorless. At higher concentrations it has a sharp, acidic odor. When the carbon dioxide levels are not monitored, there is a risk of exposure to high concentrations of CO_2. Exposure to high concentrations of carbon dioxide can result in shortness of breath, headaches, dizziness, increased heart rate, impaired hearing, nausea, loss of consciousness, or, in extreme cases, death. Always use a CO_2 monitoring device when operating the PR120H / PR350H Pelletizer.

Solid CO_2 is extremely cold (-109°F / -78°C). This presents a risk to the operator, as direct contact with skin or eyes quickly causes tissue damage. Always protect skin from direct contact with CO_2 pellets, nuggets or slices.

Asphyxiation hazard

High concentrations of CO_2 could potentially cause asphyxiation hazards for people. However, CO_2 is not a toxic gas, in high concentrations can cause a (too) low concentration of oxygen in the air. Cold CO_2 vapor is heavier than air and tends to accumulate on the ground. In the absence of proper ventilation and a correct adjustment/operation of the exhaust system, CO_2 will gradually accumulate from the floor upwards and cause asphyxiation.

The use of cryogenic gases is only permitted in adequately ventilated areas where a system perpetually detects and alerts for high concentration of CO_2 in the area.

An exhaust system only is no guarantee for a safe workplace with sufficient oxygen (>19%). A properly functioning co2 monitoring system should be in operation before the machine may be taken into operation.

Freeze burns

The device was especially designed to screen off and/or insulate cold surfaces as much as possible. Coincidental damage (e.g. the supply line) may cause liquid or gaseous CO_2 (vapor or smoke of CO_2 gas) to leak from the system. Contact with liquid CO_2, with cold gas vapors or solid CO_2 will cause serious burns. The surface of the product leaving the device can be extremely cold. Touch the product only if adequate protection is used. The same applies to the internal and external surfaces of the device. The risk of freeze burning is inherent to working with very cold products. The use of protective gloves and clothing during production is therefore mandatory.

Contact with the gases can cause serious burns. The components coming in contact with the gases will gradually become extremely cold as well. Contact with the device's inside and outside surfaces can cause serious burns.

High-pressure jets

Injury caused by high-pressure jets: exposure to liquid CO_2 or gas jets may cause serious injuries (kinetic energy, noise and freezing). Make sure that liquid CO_2 does not remain entrapped in the pipes. When heated, the CO_2 will vaporize, strongly increasing pressure in the pipe. Unless the gas can flow back (as liquid) to the storage tank or otherwise escape through a safety valve, the pipe will burst.

Pay special attention to pipes for co2 as you would to those for steam pipes. Provide pressure relief safety devices and make sure that the pressure is evacuated from them.

Ejected Material

When the PR120H / PR350H Pelletizer is beginning production, there is the possibility of ejected material exiting the discharge chute in an explosive manner. Always remain alert during start-up of the machine and inform others in the vicinity of this process. If a pellet box is not in front of the chute exit, keep the area within 3 ft (1 m) of the chute clear.

Noise Emissions

When the proper safety precautions are not followed, prolonged exposure to the noise emitted by the PR120H / PR350H Pelletizer can cause damage. Long-term exposure to loud noises can result in loss of hearing or tinnitus. Always wear ear protection when operating the PR120H / PR350H Pelletizer.

Heavy parts

Due to the nature of the machine, several of the parts are extremely heavy. This poses a risk to a technician performing maintenance or troubleshooting procedures. Use caution when handling parts.

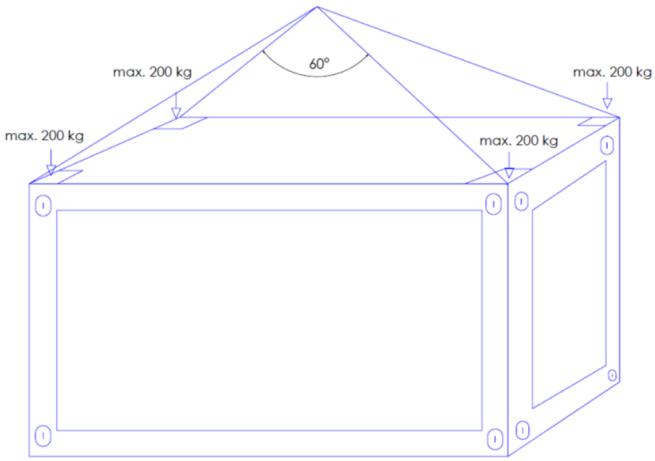
Crush hazard

When the machine has just started or is in the process of switching from chill-down mode to production mode, a mild crush hazard is present if an operator inserts his/her hand into the discharge chute opening. Do not insert any extremities into the machine when energized.

PREPARATION

Transport

The dry ice production unit is transported with the lorry suited for the transport of a 10 ft HC-Container unit. Before shipping the entire unit must be prepared for transport. Including but not limited to coverage/sealing of open vents grid and the AC-Unit.



Use a crane with lifting straps of adequate strength to lift and unload the machine.

Do not push or pull the device when it is standing on the ground without any support.

Any damage (dents, scratches, piercings) resulting from improper handling of the machine is excluded from the warranty. Damaging the outer surface of the machine can void the insulation capacities of the walls and bottom.

Unloading the Container Unit

The dry ice hub machine should be unloaded by specialized personnel. They have the necessary experience and all the required materials to safely unload the machine. Make sure that the lifting straps do not press directly on the sides, electrical pipes, or electrical box of the machine. This can cause substantial damage, dent or break the equipment.

Use long cables to minimize horizontal stress on the machine's lifting points. The roof of the machine is equipped with lifting eyes. Never use less than 4 lifting points.

Weights and Dimensions	DIPH with a PR120H	DIPH with a PR350H
Shipping Weight Transport	3686 kg (8126 lbs.)	4410 kg (9722 lbs.)
Container weight (without pelletizer)	3000 kg (6614 lbs.)	
Machine Weight (Includes Hydraulic Oil)	3705 kg (8168 lbs.)	4515 kg (9954 lbs.)
Machine Dimensions (L x W x H)	2991 mm x 2438 mm x 2891 mm (117.8 in x 96.0 x 113.8 in)	

Inspection after delivery

When the equipment arrives it should be inspected for damage that may have occurred during shipment or storage. Inspect for signs of being hit or jammed. See whether any parts are missing. If any shortcomings are found, contact Cold Jet immediately.

CONNECTING THE CONTAINER UNIT

Connecting the CO_2 supply

The unit's primary utility supply is liquid CO_2 and CO_2 Gas (instrument process air) and is drawn from a vacuum insulated CO_2 storage tank. Insulate all pipes for liquid CO_2 up to the joint with the container to guarantee efficient and safe operation.

Ensure that there can be no thermal stress on the pipe work because of the shrinkage or the expansion of the pipe work. Purge the supply line before connecting it to the machine to assure free of moisture and any other contaminants. Slowly open the main cock on the storage tank. Purge the pipe according to the chapter 5.2.

Liquid CO_2

Liquid CO_2 Quality	For optimum production performance and quality, Cold Jet recommends the use of industrial grade liquid CO_2 (CO_2 purity> 99,9% and with moisture content levels of 1 – 10 ppmv). The water content should not exceed 35 ppm and should not be less than 5 ppm – or equivalent to a dew point temperature of -66°C to -51°C (-86.8°F to -59.8°F).
Insulation	For optimum performance the liquid CO_2 supply at entry pelletizer must be free of CO_2 gas phase. Recommended supply piping dimension is insulated 3/4" pipe connecting to the 3/4" BSP connection at the pelletizer. At supply distance longer than 15 m contact the CO_2 gas supplier for optimum piping design.
Supply line	3/4" BSP

Vapor CO_2

Supply line	½" BSP
Recovery line (if applicable)	2" (50 mm) copper tube with ball style check valve

Exhaust Venting

Exhaust pipe	*0 – 30 ft. (0 – 9 m)

*Pipe can be PVC, flexible hose, copper, stainless steel, or sheet metal ducting.

Storage tank PBY System Setting / Supply Pressure Specification

Refrigeration	Recommended turn on at 295 psig (20.3 bar) and turn off at 285 psig (19.7 bar)
Vaporizer	Recommended turn on at 270 psig (18.6 bar) and turn off at 280 psig (19.3 bar)

Procedure for cleaning contaminated pipes

Objective

Instructions are provided for cleaning a pipe (and or pipe components) prior to first operation or when the pipe is contaminated by particles or foreign gases. At no time is there a guarantee that the pipe is totally clean of contamination. Check carefully and repeat the procedure, if necessary. To eliminate any doubts, you may have about the further application of the pipe, implement a gas analysis.

Removing solid particles

Solid particles can be removed by a high flow rate of an inert gas, to the pipe's outlet.

1. Connect an inert gas to the inlet of the pipe that needs to be cleaned. If a connection is provided, use it. Otherwise, use of the pipe must be interrupted to provide a connection.

2. Dismounting the pipe the components that can cause accumulation of particle aggregates.

3. Check whether the pipe's entry and exit points are safe for purging the inert gas and contamination.

4. Check whether the area is well ventilated. If such is not the case, the pipe must be extended to an area provided with proper ventilation.

5. Start flushing inert gas at high flow rate (depending on the pipe diameter).

6. During flushing, you may change the flow rate to loosen all particulate matter.

7. Repeat steps 1-6 for each part of the pipe that needs to be cleaned.

Post-cleaning visual inspection

Carry out the following tests to check whether large amounts of contaminants are still present after the pipe has been flushed:

1. Mount on each outlet of the pipe a semi-permeable cloth such as linen, cotton or permeable filter paper. Choose a cloth color that is dissimilar to the color of the contaminant.

2. The amount of gas that should be allowed to flow through must at least match the amount of gas that is present in the pipe.

3. Remove the cloth and check for visual contamination. In the absence of residues on the cloth, you may assume that the largest quantities of particles have been removed from the pipes. If residues can still be seen on the cloth, the flushing procedure will need to be repeated.

Safety and key focal points

- Solid CO_2
- CO_2 can displace the oxygen from any breathing environment rapidly. Only operate the PR120H / PR350H Pelletizer with a proper ventilation system that maintains the concentration levels of the governing codes of your local/national body.
- Always review and observe all safety guidelines when using materials that displace oxygen.
- All operators and supervisors should familiarize themselves with the literature on the physiological characteristics of CO_2 before using the PR120H / PR350H Pelletizer. The information can be obtained from the local CO_2 supplier or governing codes of your local/national body.
- Always use a CO_2 monitoring device when using the PR120H / PR350H Pelletizer in a confined space.
- Regularly inspect all CO_2 storage tanks for moisture or petroleum contamination.

Installing the exhaust system and fan

Any structure housing a pelletizer must have an appropriate air circulation system in place. The production of dry ice generates a considerable amount of CO_2 gas, which must be piped away to the building's exterior or a vapor recovery system, if available.

If a CO_2 vapor recovery system is utilized, a copper or stainless-steel manifold with ball style check valves must be used.

It is recommended that the recovery system backpressure be limited to 8 psig (0.55 bar) or less. Be aware that any backpressure on the exhaust system may reduce the production performance of your pelletizer. The pelletizer's exhaust connection(s) should be routed to the exterior of the building using a passive or powered vapor exhaust arrangement.

The exterior outlet fitting(s) of the exhaust should be pointed in a downward orientation. A 1/16" (1.5 mm) hole should be drilled into the lowest point of the exhaust system to provide a moisture drain for water that will accumulate in the piping following normal dry ice production. This is not required for machines connected to vapor recovery systems.

The dry ice container should be connected to a dedicated exhaust ducting.

Even a properly functioning exhaust system cannot guarantee that sufficient fresh air will be supplied. Always use the exhaust system in combination with a ventilation system and a properly functioning CO_2 measuring system.

Ensure that a sufficient amount of fresh air, sufficiently rich in oxygen concentration, is provided to the production area. This fresh air supply allows the proper functioning of the exhaust system and avoids creating a vacuum pressure in the production area. Manual or automatic closing of the exhaust ducting is forbidden.

Active exhaust (two fans installed)

System is equipped with two powerful turbine type exhaust fans:

Capacity	2x1100 m^3
Power capacity	2x145 W
Rated voltage	230V
Frequency	50 Hz
Ambient temperature	-15°C, + 40°C
Fan blades	Diameter: 250mm

CO_2 monitoring system

The detection system should be provided with a CE certificate and an alarm. The alarm starts operating when the CO_2 concentration in the atmosphere levels in the atmosphere:

a) First level – 1%

b) Second level – 2%

c) Third level – 3%

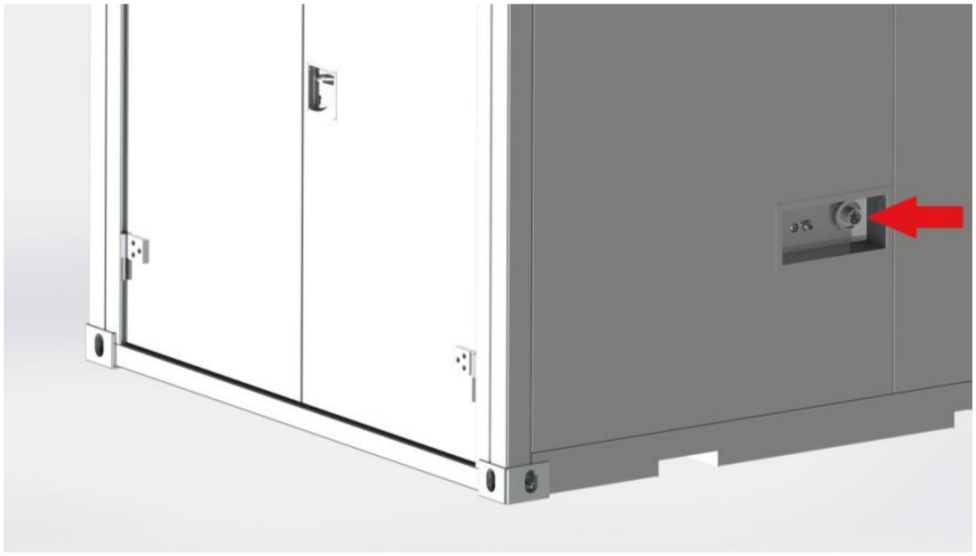
When the concertation is exceeded, the machine DOES NOT STOP. The alarm system only informs and warn about such situation and the responsible operators' standard procedures must apply.

The user always must make sure that a safe working environment is guaranteed and that all personnel is informed of the potential dangers attached to using CO_2 in the vicinity of the device.

The interruption of co_2 supply does not guarantee a recovery of the oxygen content or safe working environment. A sufficient fresh air must be supplied at all times. An exhaust system, air grate or fan cannot serve as replacement for a co2 monitoring system.

Electrical preparations

- The Dry Ice Production Hub System is ready to operate just after it is connected to the power source.
- The Dry Ice Production Hub System has a maximum power consumption 11 kW.
- The power supply cable must be adequately protected by a 35 A fuse.
- There is 3-phase main electrical connection placed on the right side of the container, type: 3 x 400 VAC + N + PE, AC 50 Hz. 32 AMP 5 PIN CE INDUSTRIAL PLUG.



- We recommend using a system to detect power leaks and earthing problems.
- The container is equipped with an earth cable, we recommend to use is and attach one of its\ end to the ground – shown by red arrow below:

OPERATING ENVIRONMENT

- Any structure housing a pelletizer must have an air circulation system, and must route the vapour CO_2 to an exhaust system or outside source;
- The pelletizer must be installed indoors (ambient temperature 36°F – 140°F (4°C - 43°C) on a level floor with adequate load bearing to support it.
- Maximum static pressure of exhaust piping during operation is 2 – 3 psi (0,14 – 0,20 bar);
- If a pressurized exhaust recovery system is used, a ball style check valve must be provided between the customer's system and the Cold Jet equipment;
- Allow a minimum of 40" (1 m) of space in front of the pelletizer for pellet boxes;
- A safety pressure relief valve must exist between the supply line and the pelletizer shut off valves;
- The liquid and vapour CO_2 shut off valves and electrical disconnect should be near the pelletizer, within easy reach of the operator and conform to local regulations.

THE USE OF THE DRY ICE HUB MACHINE

This chapter describes the most important aspects essential for the safe and proper use of the Container Unit.

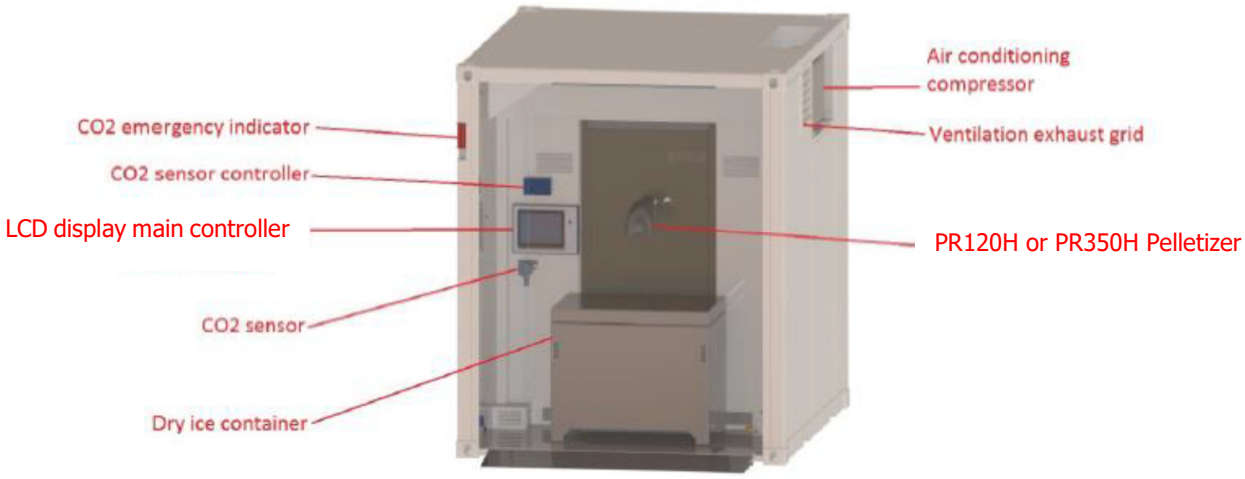
The dry ice hub machine forms one freezing system together with the peripheral devices like the LCO_2 storage tank, the supply line, the exhaust fan, the ventilation system and the CO_2 sensing device. Damage or defects to one or more peripheral devices can cause dangerous situations.

General safety requirements

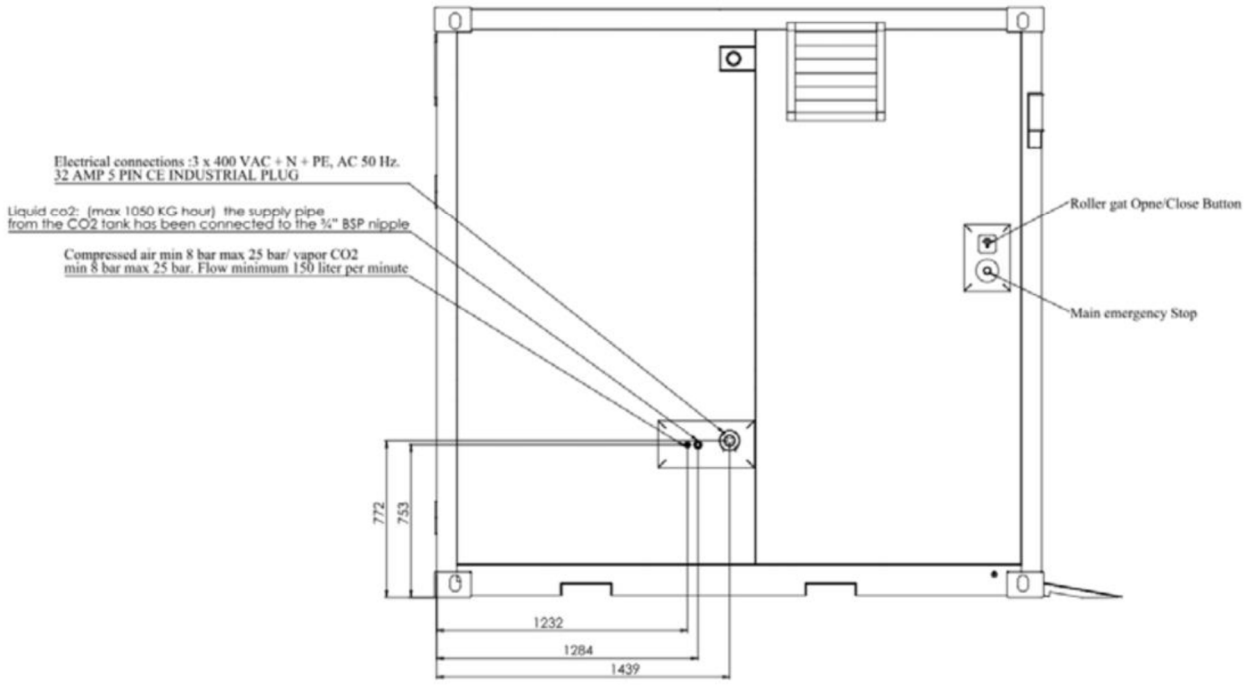
Persons directly or indirectly involved with the use of the freezing device should be qualified:

- Always follow the guidelines of the governing codes of your local/national body as a minimum standard for ensuring safety.
- Always wear thermal gloves, eye and ear protection (safety glasses and ear plugs).
- Never expose bare skin to CO_2 pellets or liquid.
- Never operate a damaged pelletizer.
- Only Cold Jet trained service technicians are certified to work on mechanical and electrical components.
- Do not operate equipment with mechanical or electrical parts exposed, jumpered or rendered inoperable.
- Never operate in a confined space without an approved ventilation system (OSHA maximum CO_2 concentration levels, 5000 ppm).
- Turn on ventilation before operating the pelletizer.
- Always ensure that hoses are securely attached, and tighten hose fittings with a wrench.
- Never tighten or loosen a hose that is pressurized.
- Never use hoses above their recommended working pressure.
- Keep area around pelletizer clean of debris.
- Check hoses for nicks and gouges.
- Always turn off the main power if the pelletizer will remain unused for an extended period of time.
- Periodically check the CO_2 supply pressure and the hourly production rate of the pelletizer.
- Check whether the exhaust system is working properly before injecting liquid CO_2.
- Check whether ventilation system is working properly and supplies sufficient fresh air before injecting liquid CO_2.
- Check whether CO_2 detection system is working properly.
- Check the pressure in the liquid gas storage tank.
- Check the level in the liquid gas storage tank.
- Never touch cold parts of the freezing system with bare hands. This could cause skin burn and frostbite. Keep in mind that the product in the freezing device may be extremely cold as well.

Overview of the dry ice hub machine



External connections / operation buttons overview:



Machine set – up.

Electrical service requirements

- It is strongly recommended that the electrical service/check is done by a qualified electrician installs power to the pelletizer.
- A hard or flexible conduit connection is required (review local codes), as well as four wire, 3-phase power wiring to the main power disconnect switch in the control enclosure. Use an appropriately sized disconnects enclosure with breakers or fuses at the correct amperage and voltage rating.

CO_2 supply requirements

- Cold Jet pelletizers require both liquid and vapor CO_2 supply lines. CO_2 providers can assist with specific requirements.
- The liquid CO_2 supply pressure (Min-Max):
    - 13-18 bar with -30°C to -20°C (189-261 psi with -22°F to -4°F)
    - Optimum performance range 15-16 bar with -24°C to -26° C (218-232 psi with -11°F to -15°F)
- The vapor CO_2 supply pressure range must be 150 – 300 psi (10,3 – 20,7 bar).
- The CO_2 inlet fittings on the machine are standard male JIC type connections.
- Both the liquid and vapor CO_2 lines should have a manual shut off valve near the machine connection that is easily accessible for an operator or technician.
- If possible, the CO_2 supply connections should be hard piped to the machine. Alternatively, hard piping can be run to a point near the machine and the final connecting segment can be a length of flexible hose suitable for the application.
- The pelletizer should be located as near to the CO_2 supply tank as possible. The liquid piping should run with the fewest possible restrictions, such as elbows.
- If the liquid tank is more than 100' (30 m) away from the pelletizer, a "loop" system (auxiliary liquid CO_2 pump and vapor-to-tank return line) should be installed. Ask the CO_2 supplier for details.

Relocation instructions

- When choosing a new location, ensure that all machine set – up requirements (chapter 5.1) can be met.
- Contact Cold Jet if any problems occur during or after relocation of the machine.
- Turn off the main power. Turn off and lock out local power source.
- Disconnect the power supply. Turn all breakers inside the control panel to the off position.
- Turn off the CO_2 liquid and vapor supply lines and bleed down line pressures.
- Disconnect the CO_2 liquid and vapor lines. Disconnect the CO_2 vapor exhaust.
- The pelletizer should be moved to the new installation location using an industrial forklift with the appropriate weight capacity rating.
- Level the base using the four adjustable feet.
- After the machine has been moved, properly connect the power supply, CO_2 supply and CO_2 vapor exhaust.
- Perform the pre – startup checklist before running the machine.

Pre-startup checklist

- Ensure that the machine has no broken parts. Ensure that there is not excessive oil on the outside surface of the machine.
- Make sure there are no loose electrical lines and no exposed wires.
- Make sure liquid and vapor CO_2 lines are connected.
- Make sure exhaust pipes are attached to the machine and venting to an outside source.
- Ensure that the specified supply voltage on the data plate matches the power supplied by the facility.
- Ensure that the 3-phase power lines have been properly installed.
- Turn on the power at the local power source. On the pelletizer, turn on the main power.
- Turn on the liquid and vapor CO_2 lines. Ensure that the vapor purge cycle begins during initial startup.

PELLETIZER

For a proper usage of either the PR120H or the PR350H Pelletizer installed in the Dry Ice Production Hub System please read the "User manual" for the pelletizer type. The manual can be found on Cold Jet CONNECT.

STARTING THE DRY ICE PRODUCTION HUB / PELLETIZER

1) Inspect the machine room for production ready.

2) Check list according to chapter Pre-startup checklist on page 22.

3) Start the AC unit if the environment temperature required heating or cooling.

4) Start the ventilation system.

5) Check the function of the CO_2 alarm system.

6) Open the main valve for CO_2 supply to the unit.

7) Prepare and place an empty and clean dry ice container under the chute and open the lid ready for production.

8) Start the pelletizer (ref. the user instruction PR120H / PR350H) and control the startup sequence until steady state production is reached after approximately 10 minutes.

9) Close the container unit and inspect the production frequently and make the necessary exchange of a filled container with a new empty prepared container.

INSPECTION AND MAINTENANCE

Careful and regular maintenance largely provides the proper and safe functioning of the dry ice hub machine and makes for a longer technical life span. This chapter describes the instructions for periodic inspections and preventive maintenance of the system in general.

You may need to remove the protective covers in some places. These should be put back after the activities. Also check whether all connections (electrical, mechanical, nitrogen, etc.) are properly installed, closed and pipes are not jammed.

Competence and safety measures

Maintenance works carried out by the user must be limited to assembly and disassembly works and may only be carried out by trained and authorized personnel. Activities on the electrical part of the dry ice hub machine may only be executed by professional employees and they must have:

- Knowledge and experience with the dry ice hub machine's control devices;
- Knowledge of cryogenic process technology;
- Knowledge of the dry ice hub machine 's mechanical properties;
- Knowledge and certification for electricity (3 x 400 V) and low voltage.

Maintenance works, replacement of worn/spare parts should always take place when emergency stop is operated. Where possible, disengage all energy supply sources. Activities carried out on the electrical part of the dry ice production hub may only take place if the voltage across the entire machine has been switched off by all main switches.

Daily inspection list - in advance

Before starting the dry ice hub machine, check all items on the checklist below. The handful of minutes needed for running through this checklist can prevent unexpected standstills or damage to the machine which may occur as a result of carelessness. Regard this list as a guideline. The operating circumstances may vary and necessitate more frequent or more comprehensive inspection.

- Check whether all parts are fully defrosted.
- Check whether inside of the dry ice production hub is clean.
- Check whether the machine and workplace are dry.
- Check whether all emergency stops are in proper working condition.
- Check whether exhaust system is working properly before injecting CO_2.
- Check whether CO_2 monitoring system is in proper working condition.
- Check storage tank level.
- Check whether tank pressure is correct and falls within specifications.
- Check whether all protective coverings are back in place and fixed.

Weekly inspection list

- Check hydraulic oil level at the oil temperature and level gauge.
- Check for leaking and worn hoses.
- Check for oil leaks.
- Check gauges on control panel for cracks and proper functioning.
- Check for proper operation of the chamber pressure display.
- Run machine and check for CO_2 leaks.
- While making ice, ensure that the piston advance time is 7 seconds.
- Ensure that the dry ice does not easily crumble.
- Ensure that the cooling fan turns on when the oil temperature reaches 38°C.

Inspection list after 1000 hours for hydraulic unit

- Change the hydraulic filter.
- Check hydraulic oil level at the oil temperature and level gauge.
- Clean the hydraulic cooling fan fins and filter.
- Check the advance and retract coil resistance, which should be between 33 – 35 ohms.
- Check maximum hydraulic pressure setting by dead heading the unit [should not exceed 3000 psig (206,8 bar)].
- Check hoses for leaks and wear.
- Check for oil leaks.
- Check tightness of valve and hose connections.

Inspection list after 1000 hours for liquid and vapor system

- Check tightness of valves and hose connections.
- Apply vapor pressure to the unit and check for leaks.
- Check the hydraulic pressure gauge for leaks and operation.

Inspection list after 1000 hours for pelletizer

- Check the condition of the die back – up block or die block.
- Check the condition of the die back – up blocks bolts.
- Check condition of the die (if applicable).
- Check, clean, and (if necessary) replace exhaust collector screens.
- Replace the wear ring and the o – rings.
- Check the condition of the piston.
- Replace the belleville washers and the piston bolt.
- Every 6000 hours only, replace the top injector valve.

Inspection list after 1000 hours for electrical parts

- Check for loose connections.
- Check the incoming voltage.
- Check for loose terminals.
- Check the lights on the system run switch.
- 10.8. Inspection list after 1000 hours (operational check)
- Run the machine and check for CO_2 and oil leaks.
- Check the settings on the shift point of the pump.
- Check the extrusion rate of ice from the rear proximity switch to the front proximity switch.
- Check the quality of the ice.
- Check that the cooling fan turns on at approximately 38°C.