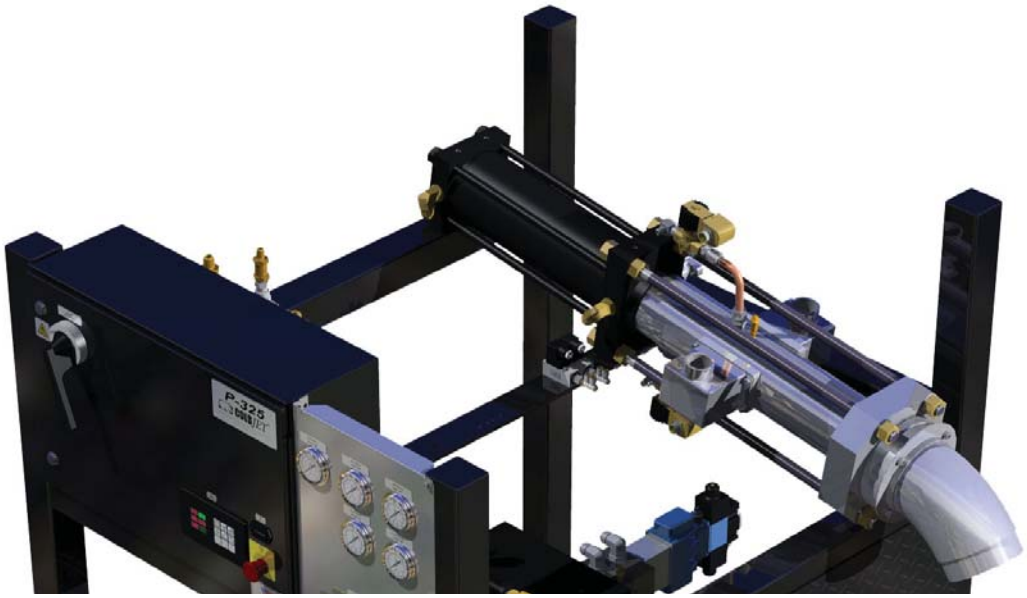
Pelletizer Series
P325





Operator Manual



Voltages: 200 - 480 Volts AC

Model No.: P325

Control No.: 2A0149

This manual illustrates the safety, operation, and maintenance features of the Cold Jet P325 Pelletizer.
The build revision level is located on the machine's data plate.
All Machine diagrams are located on the inside of the electrical enclosure door.

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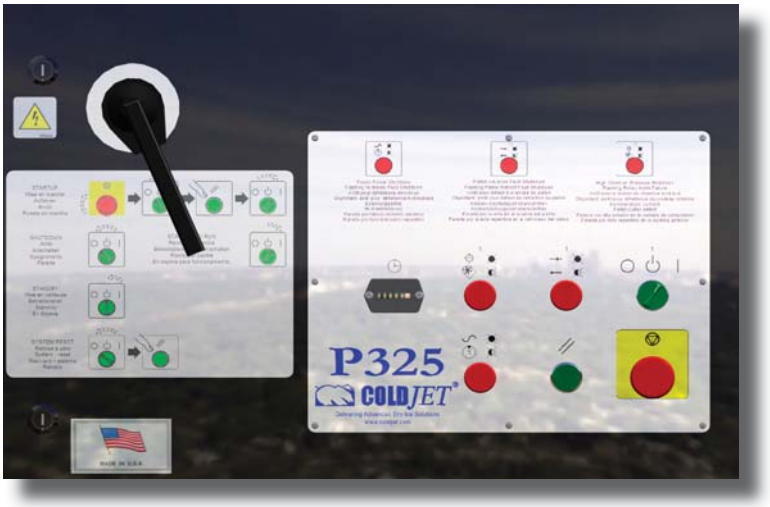
Quick Reference

Safety First



- DO NOT touch the dry ice with your bare hands!
- TURN ON ventilation before operating the pelletizer.
- BE SURE that the pelletizer exhaust is routed out of the building.
- FOLLOW written procedure for start-up and shutdown.
- ENSURE that all gauges are within their operating ranges.
- NEVER tighten or loosen a hose that is pressurized.

Start Up / Shut Down



Start Up

1 OPEN the liquid CO_2 supply and vapor CO_2 supply valves.

2 TURN ON the main power. 

3 CHECK that the E-stop is not depressed. 

4 CHECK that the system run switch is off (O). 

5 PUSH the reset button. 

6 TURN ON the system run switch (I). 

Shut Down

1 TURN OFF the system run switch (O). 

2 TURN OFF the main power. 

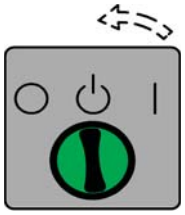
3 CLOSE the liquid CO_2 supply and vapor CO_2 supply valves.

Standby Mode

For Short Breaks

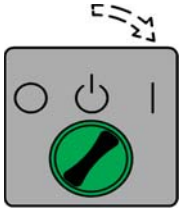


Going INTO Standby Mode:



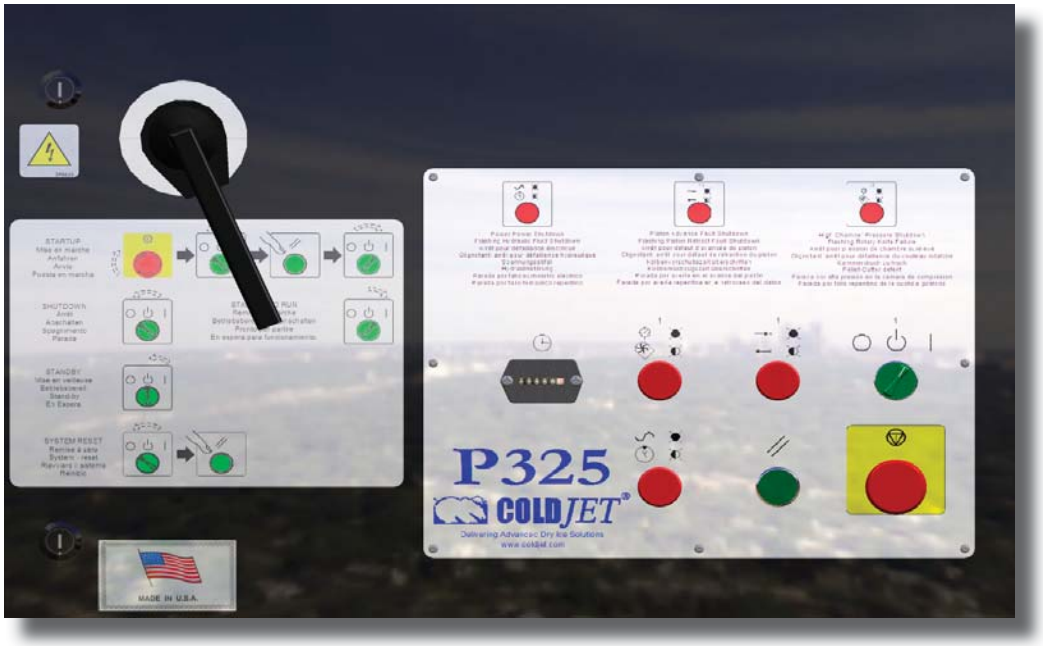
- TURN the system run switch to standby (the middle position).

Getting OUT OF Standby Mode:

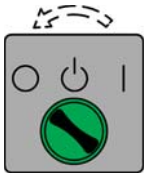


- TURN the system run switch back to ON (I).

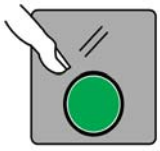
System Reset



1 TURN the system run switch to OFF (O).



2 PUSH the reset button.



Operation & Storage Tips



- ONLY put dry ice pellets in pellet boxes. Dry ice snow will reduce the quality of the pellets.
- CLOSE and seal the pellet box, when filling is complete, to prevent air circulation over the pellets.
- PERIODICALLY check the CO_2 supply pressure and the hourly production rate of the pelletizer.
- STORE pellet boxes out of direct sunlight.
- KEEP the pellet box lid CLOSED when not filling.
- DO NOT use pellet boxes that have holes or cracks. Make sure the interior of the box is clean and dry.

Cold Jet Services



- Equipment upgrades
- Maintenance services and training
- Parts and Customer Service
- 24-hour technical assistance (in the USA)

  +1-800-777-9101 or +1-513-831-3211
- For technical assistance during business hours you may call the branch locations
- 48-hour pellet delivery +1-800-736-3423 or +1-513-831-3211 ext. 343
- Contract cleaning services
- Engineered solutions

General Information

Introducing the Cold Jet P325

- The Cold Jet P325 is a compact dry ice extruder designed to make dry ice pellets and nuggets with minimal space requirements.
- The P325 produces pellets for dry ice blasting and nuggets for the preservation of perishable items and other applications.
- The P325 requires 3-phase AC power and a liquid CO_2 tank for operation. See the data plate on the machine for the voltage, current, and frequency specifications.
- The P325 can be fitted with a series of die plates to vary the diameter of the dry ice pellets and an ice cutting extension to cut the pellets to precise lengths.
- The P325 contains an innovative injection and extrusion system to produce the highest density and longest lasting pellets in the industry.
- The pellets are produced by injecting liquid CO_2 into the pelletizer extrusion cylinder where a solid CO_2 is formed.
- A ram presses the solid CO_2 through the die plate to form pellets or nuggets.
- The P325 is able to produce up to 300 lbs/hr (136.4 kg/hr) of dry ice pellets.
- The pellets must be stored in the proper containers to minimize sublimation (returning to a gaseous state).

Before you begin...

CO_2 Quality Requirements

- Standard “Food Quality” liquid CO_2 is required.
- Moisture content must be between 1 ppm and 10 ppm.
- Regularly inspect all tanks for moisture or petroleum contamination.

Pressure Requirements for the Liquid CO_2 Supply

- The liquid CO_2 supply must be selected and maintained at a constant pressure between 210 to 290 psig (14.48 to 19.99 bar) with a variance of +/-10 psig (+/-.69 bar).
- If the supply pressure varies by more than +/-10 psig (+/-.69 bar), Cold Jet will not be held responsible for lost production.

Liquid CO_2 Insulation Requirements

- CO_2 vaporization in the supply lines, caused by poor insulation, will reduce pelletizer output.
- 0-50 ft (0-15 m) - use Rubatex (or its equivalent) with minimum thickness of half the pipe's diameter.
- 50-100 ft (15-30 m) - use at least 6" (152 mm) urethane foam with a hard plastic outer shell (or its equivalent).
- Over 100 ft (30 m) - use a "Loop" system (auxiliary liquid CO_2 pump and vapor-to-tank return line).

Pelletizer Liquid CO_2 Connections for Vapor & Exhaust

- CO_2 liquid supply line: 3/4" (19 mm) JICM
- CO_2 vapor supply line: 1/2" (13 mm) JICM
- CO_2 vapor exhaust line: 1.5" (38 mm) PVC
- CO_2 vapor recovery line (when applicable): 1.5" (38 mm) copper tube

Exhaust Venting

- Any structure housing a pelletizer must have an air circulation system.
- Route the vapor CO_2 to an exhaust system or vent it to an outside source.
- The exhaust backpressure must be less than 1 psig (.07 bar).
- Use a 1.5" (38 mm) conduit when exhaust pipe is 30 ft (9 m) or less.
- Use a 3" (76 mm) conduit when exhaust pipe is more than 30 ft (9 m)
- The pipe can be PVC, flexible hose, copper pipe, stainless steel pipe, or sheet metal ducting.

Placement and Spacing

- The pelletizer needs to be installed on a level floor with adequate load bearing to support it.
- Allow a minimum of 40" (1 m) of space in front of the pelletizer for pellet boxes.

Supply Valve Locations

- A safety pressure relief valve must exist between the pelletizer and the supply line shut off valves.

- The liquid and Vapor CO_2 shut-off valves and electrical disconnect must be near the pelletizer within easy reach of the operator.

Electrical Power Connection

- Cold Jet requires a qualified electrician to install power to the pelletizer.
- The pelletizer has been pre-wired for your requested voltage and frequency.
- You must provide the correct hard conduit and four-wire, three-phase power wiring.

Liquid CO_2 Storage Tank Recommendations

- Use a tank large enough to accept a full truckload of CO_2.
- A refrigerator and vaporizer (heater) are needed to balance the CO_2 temperature and pressure. Ideal storage conditions are 290 psig (19.99 bar) at 0°F (-18°C).
- The refrigeration should turn on at 295 psig (20.3 bar) and turn off at 285 psig (19.7 bar).
- The vaporizer should turn on at 270 psig (18.62 bar) and turn off at 280 psig (19.3 bar).
- Facilities with large and/or multiple tanks (i.e. 220 tons) may only have over-pressure safety valves. In these situations, there are several factors to consider:
    1. Length and diameter of supply line.
    2. Type and quality of insulation on the supply line.
    3. Number of machines drawing liquid from the supply line.
    4. Is a liquid loop system being used?

Note: Large ice production facilities are generally considered on an individual basis.

Operating Modes

Purge

When starting the unit from main power off, it will enter a “purge cycle” using high-pressure vapor only to dry out the extrusion cylinder and the exhaust screens before allowing the CO_2 liquid to enter this area. This is done for ten strokes.

Chill Down

The next phase is the chill down for up to twenty strokes. The number of chill down strokes can be set on the HMI.

Production

The unit will automatically shift into full production at the preset end of chill down.

Safety

Carbon Dioxide



CAUTION

ALWAYS USE PROTECTIVE CLOTHING (THERMAL GLOVES) WHEN HANDLING CO_2 SOLIDS OR LIQUID.



Caution Must be Exercised!

- This unit uses carbon dioxide liquid and gas to create carbon dioxide pellets. CO_2 gas will be present if the room is not vented properly.
- Dry Ice is very cold (-110°F, -79°C) and may freeze skin instantly.
- Carbon Dioxide (CO_2) is a naturally occurring gas and a normal by-product of breathing.
- CO_2 is nontoxic, non-corrosive, non-conductive and is approved by the FDA and USDA. While exposure to CO_2 gas is not harmful in low concentrations, CAUTION must be exercised when using any material that can DISPLACE OXYGEN.
- Never run this unit without the exhaust duct connected and always operate in well ventilated areas.
- Never exceed the recommended CO_2 concentration levels mandated by regulatory agencies or local company safety polices while operating this unit.

Safety Precautions

The Cold Jet P325 is safe to operate. However, certain precautions must be taken during use:

- NEVER OPERATE the unit without first reading the Operator Manual.
- NEVER operate the unit unless trained or authorized to do so.
- NEVER EXPOSE bare skin to CO_2 pellets or liquid.
- NEVER OPERATE without proper ear and eye protection.
- NEVER operate in a confined space without a ventilation system that maintains OSHA CO_2 concentration levels (5,000 ppm).
- NEVER ATTEMPT to run the unit if it is damaged.
- ALWAYS disconnect the main power to the unit BEFORE performing maintenance services.
- ALWAYS check gauges, when starting the unit, to verify the unit is working properly.
- DO NOT change pressure flow rate settings once they have been set.
- ALWAYS turn off the main power to the pelletizer if it is to remain unused for an extended time.

Hose Safety Precautions

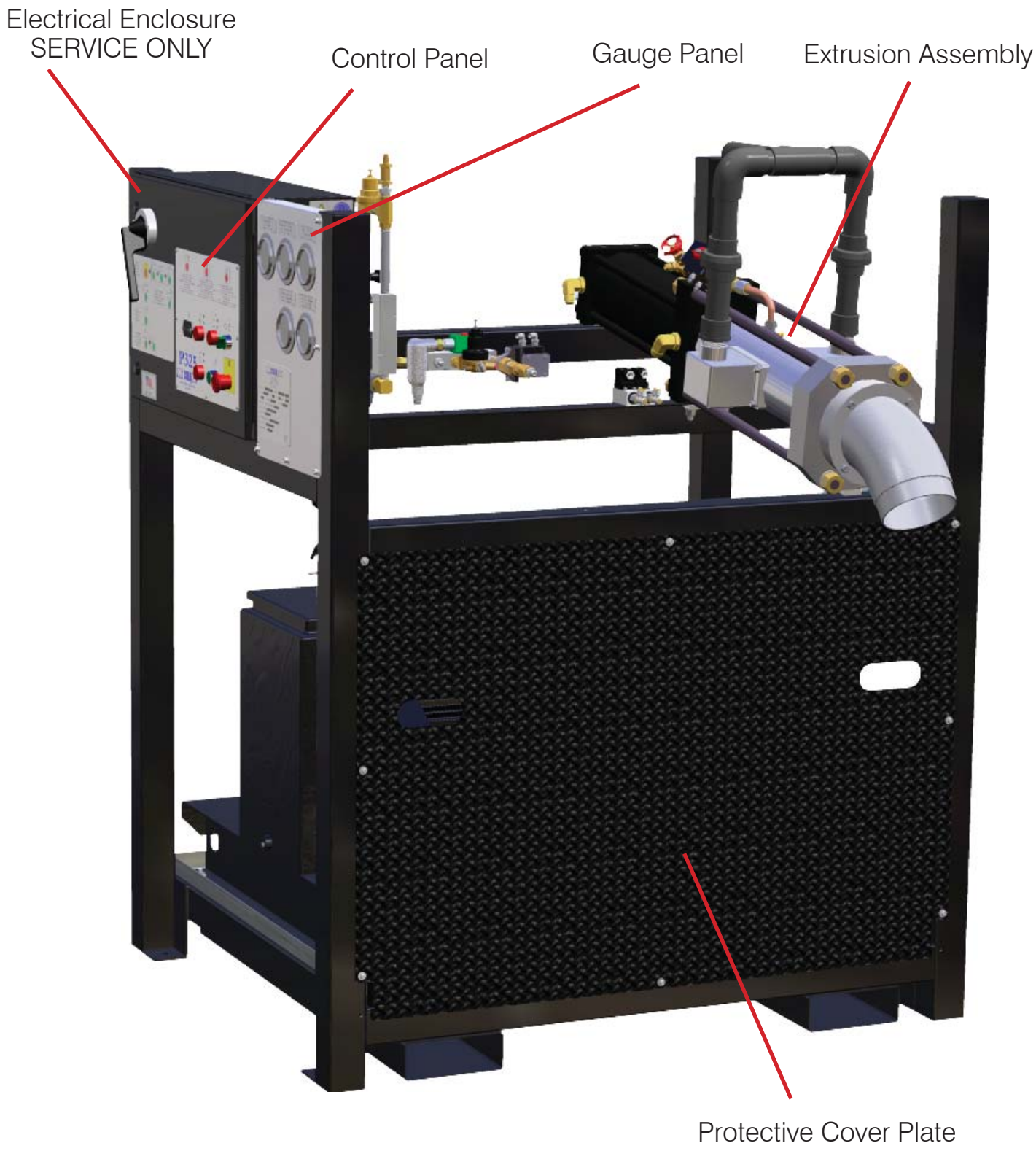
- ALWAYS tighten hose fittings with a wrench.
- NEVER OPERATE equipment if the fittings have only been hand tightened.
- NEVER USE hoses above the recommended working pressure.

Electrical Safety Precautions

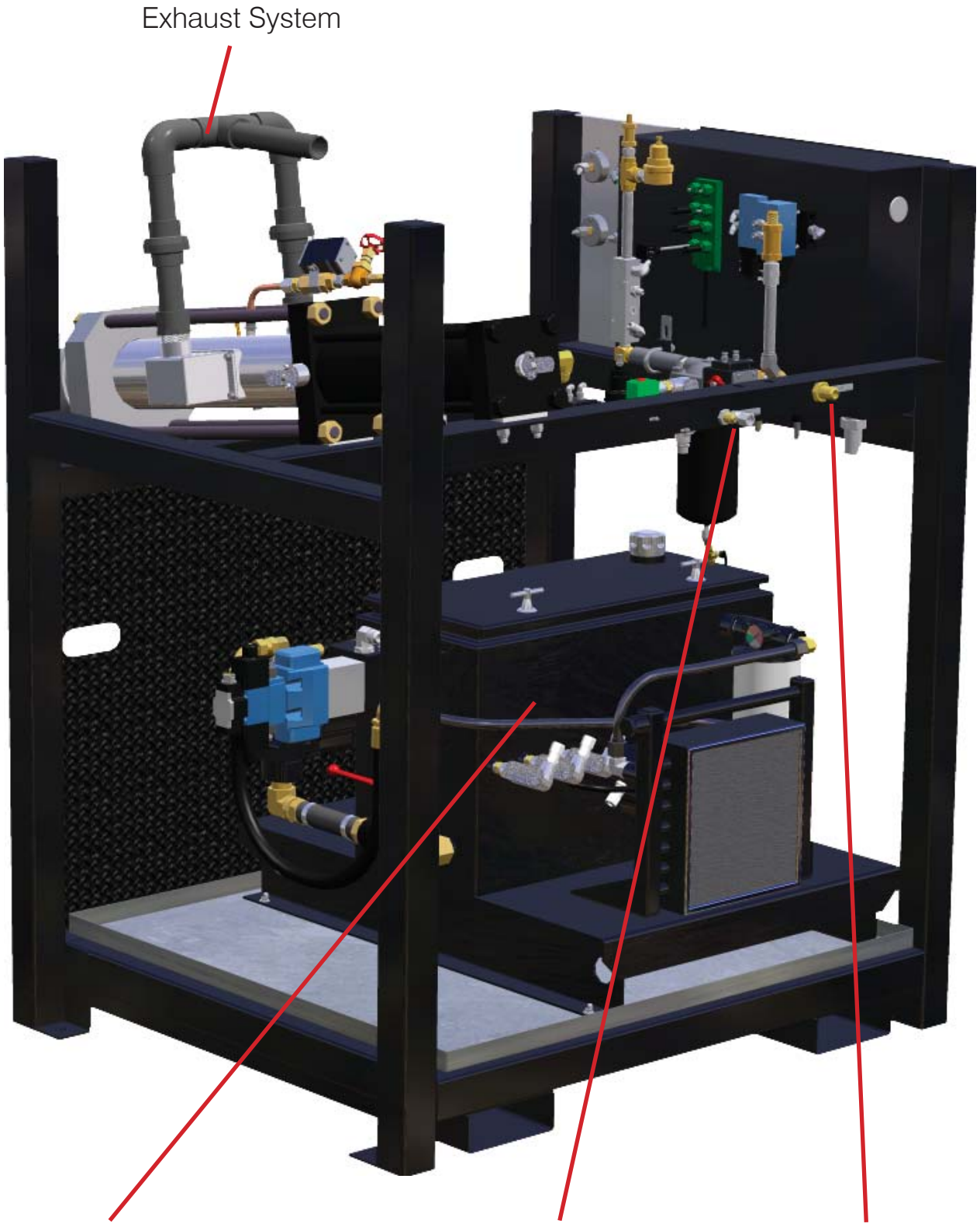
- UNLESS YOU ARE COLD JET TRAINED as a service technician, you should NEVER attempt to work on the unit's electrical components.
- Do not operate equipment with electrical parts exposed.
- Do not operate equipment that has had safety circuits “jumpered” or rendered inoperable.
- Follow the guidelines set forth in the governing codes of your local/national body as a minimum standard for ensuring safety.

Know Your Machine

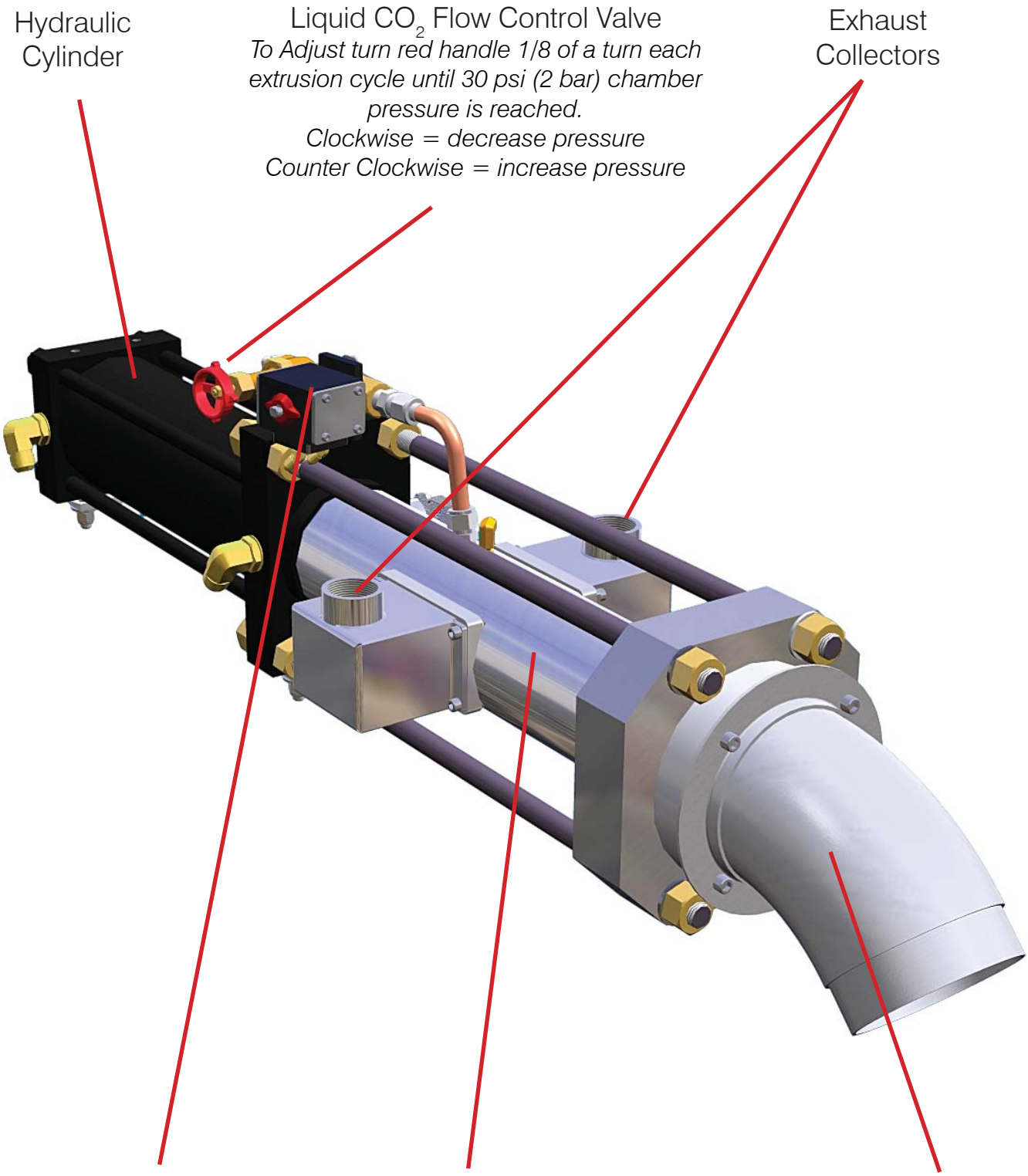
Front


Electrical Enclosure
SERVICE ONLY
Control Panel
Gauge Panel
Extrusion Assembly
Protective Cover Plate

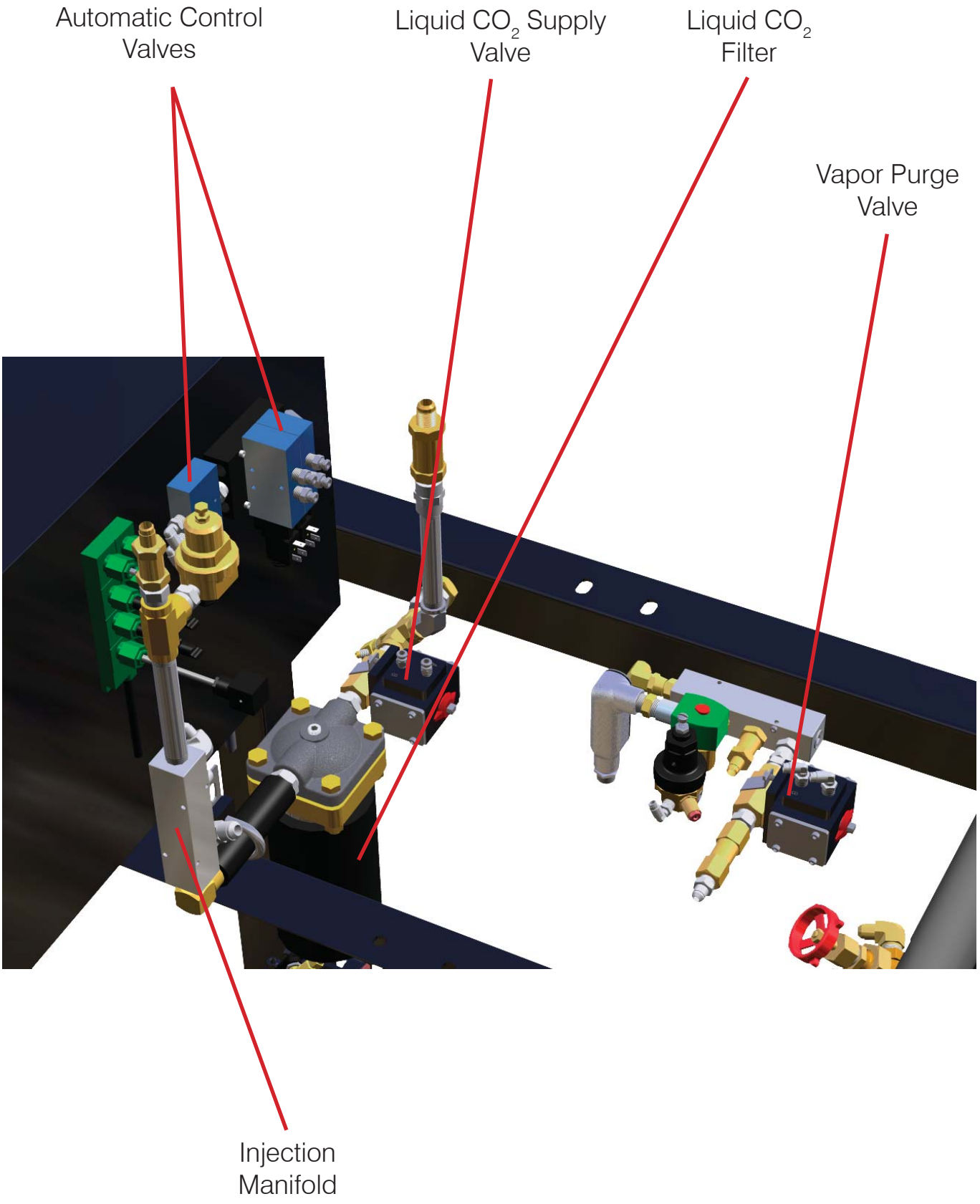
Back


Exhaust System
Hydraulic Power Unit
Vapor CO_2 Supply
Liquid CO_2 Supply

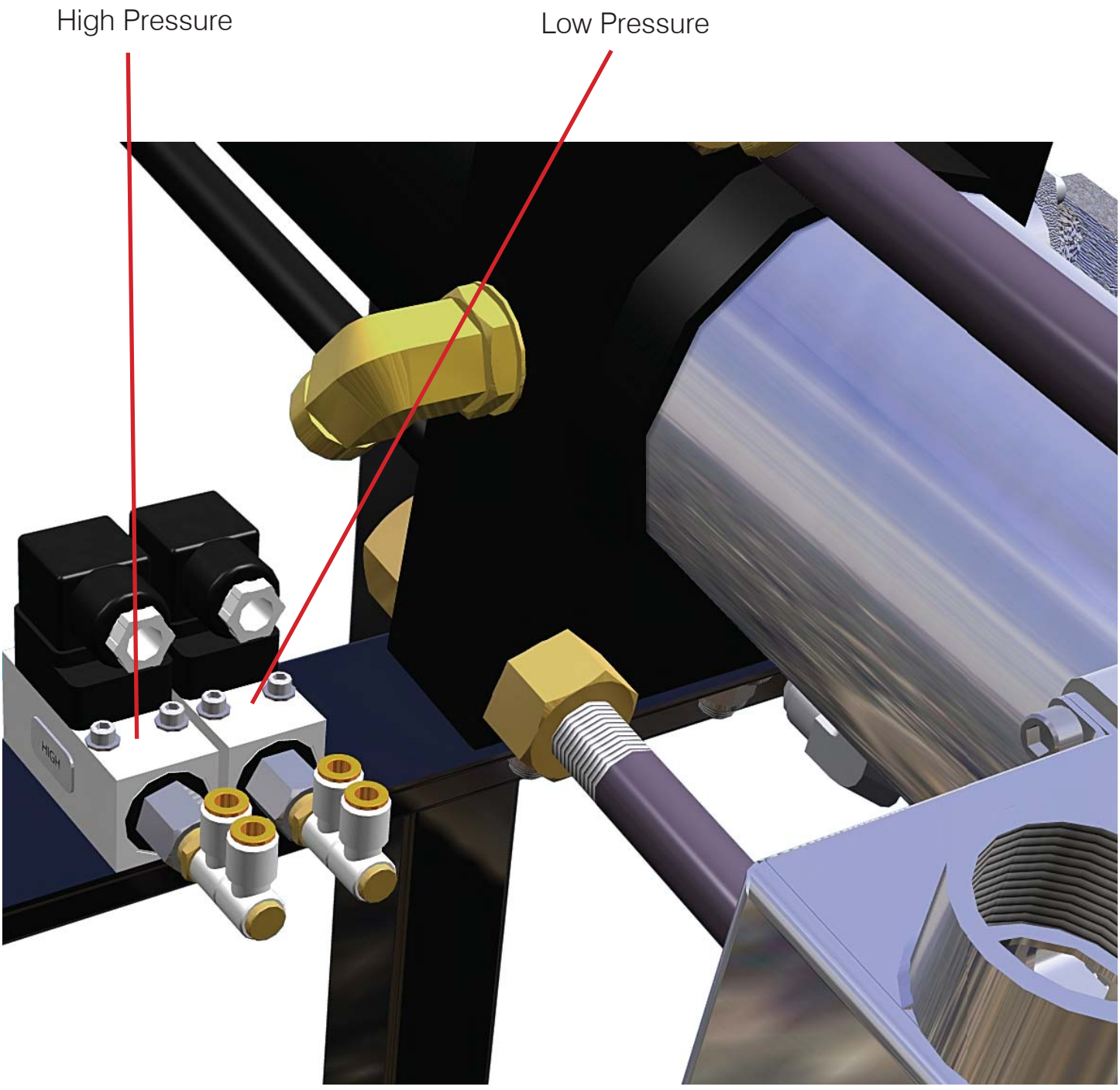
Extrusion Cylinder



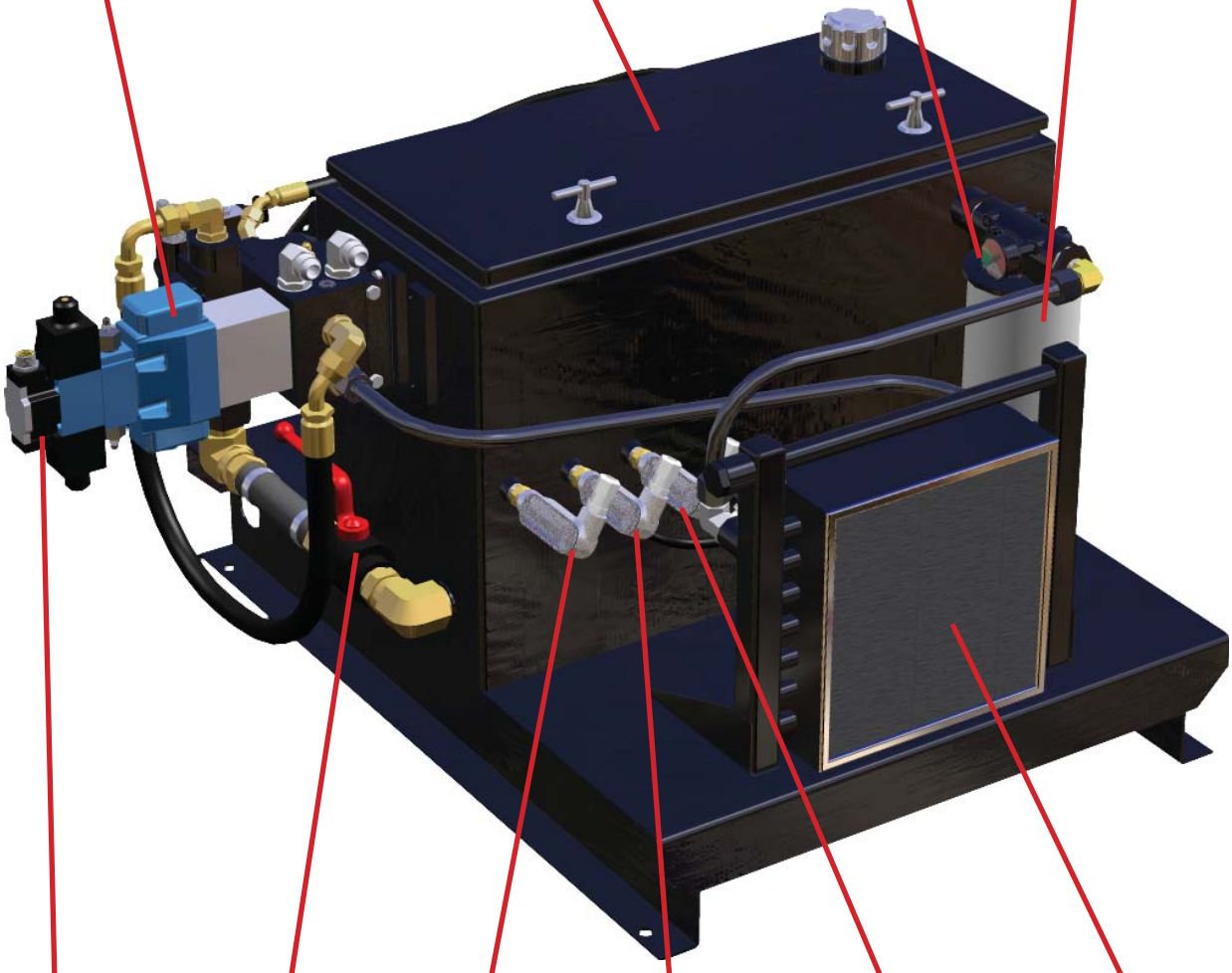
CO_2 Components



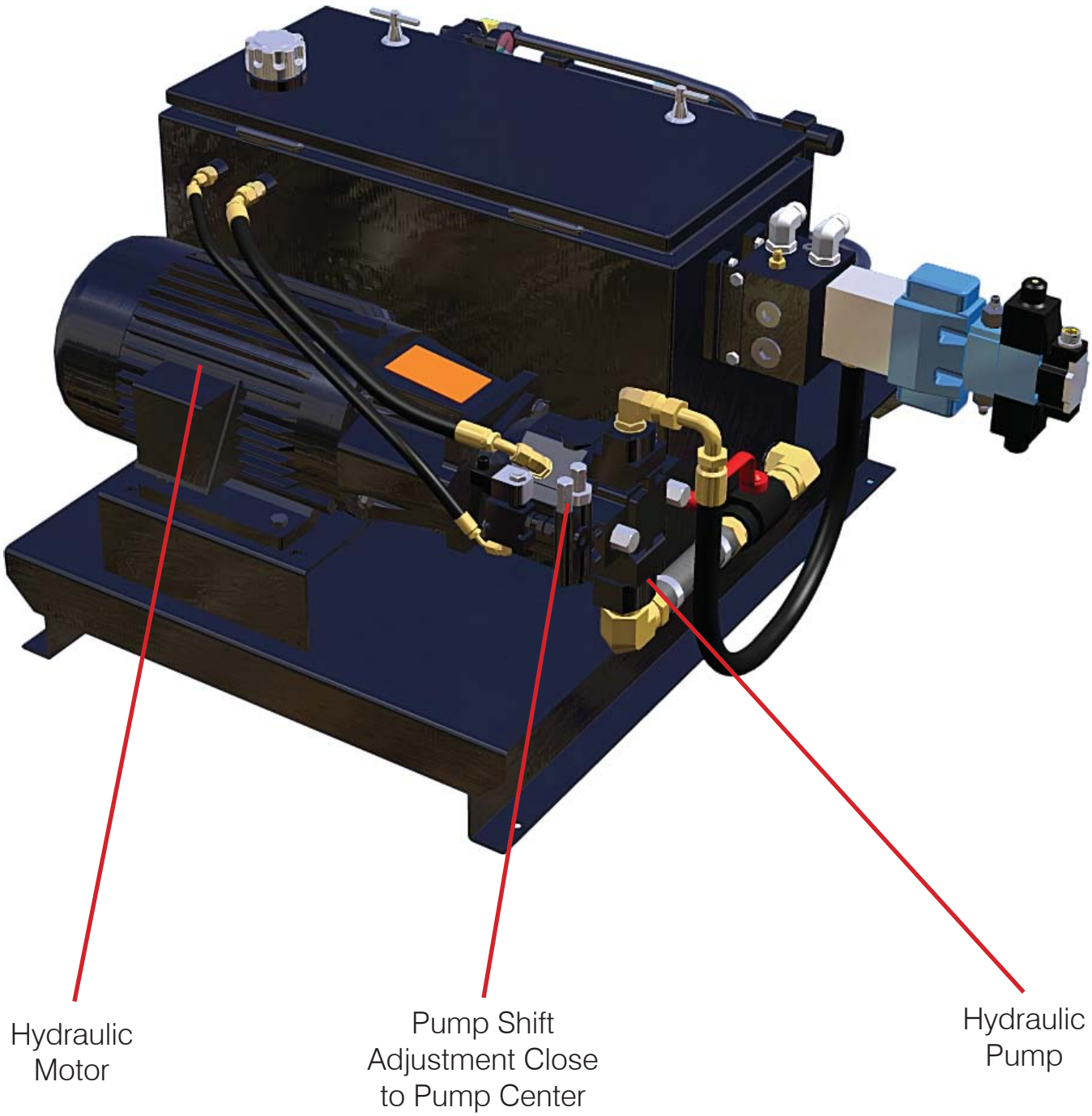
Chamber Pressure Switches



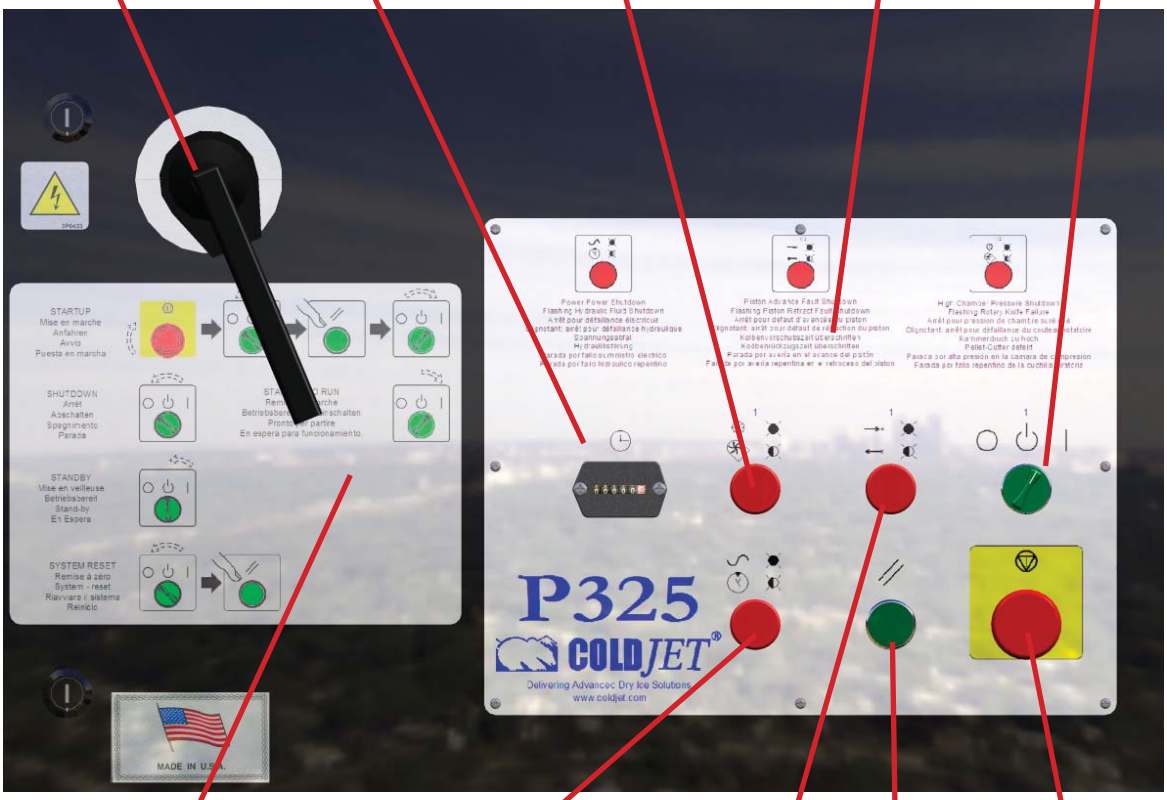
Hydraulic Unit - View 1



Hydraulic Unit - View 2



Control Panel



Error Descriptions

Chamber Pressure & Rotary Knife Fault Light

System Run Switch

Main Power

Hour Meter

Quick Start Instructions

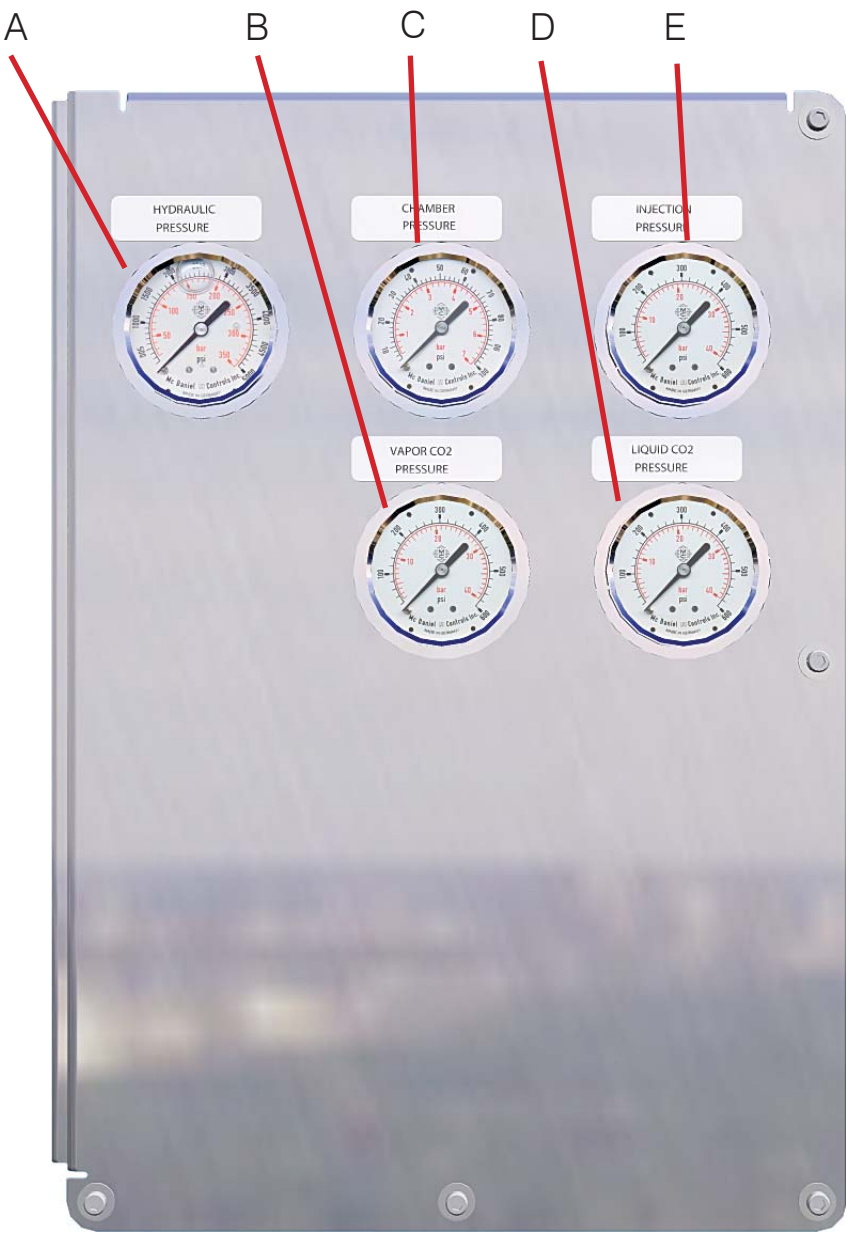
Hydraulic Electric Shutdown
Hydraulic Temp Shutdown
Hydraulic Oil Level Shutdown

Long Extrusion Time
Long Retract Time

Reset

E-Stop

Gauge Panel



A: Hydraulic Pressure

The hydraulic pressure should increase from 1000 psig (68.9 bar) to 2500 psig (172.3 bar) or 3000 psig (206.8 bar) during the extrusion cycle. The cycle should require no more than 12 to 13 sec. to complete. Timing is done from the rear proximity switch to the front proximity switch when the machine has run for 30 minutes

B: Vapor CO_2 Pressure

The vapor pressure gauge may range from 150 to 300 psig (10.3 to 20.7 bar) and it is not always the same as the liquid CO_2 pressure. The CO_2 vapor supply must maintain at least 150 psig (10.3 bar) during the purge and chill down portions of the machine operating cycle.

C: Chamber Pressure

The chamber pressure gauge should indicate a maximum of 30 psig (2.1 bar) at the end of the injection cycle. The pressure then drops rapidly to zero as the piston starts to advance.

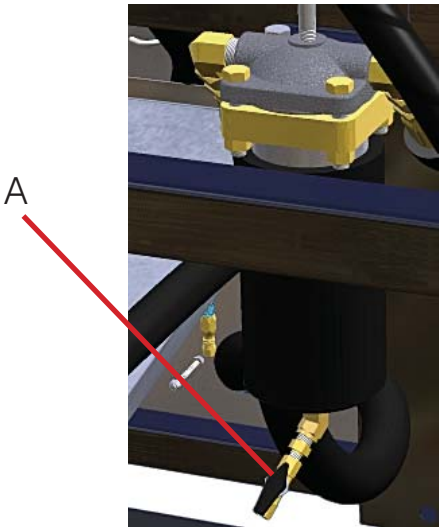
D: Liquid CO_2 Pressure

The liquid pressure gauge indicates the liquid CO_2 pressure supplied to the machine. This gauge, and the liquid injection pressure gauge, should read within 20 psig (1.4 bar) of each other during the injection cycle when liquid CO_2 is at full flow rate.

E: Injection Pressure

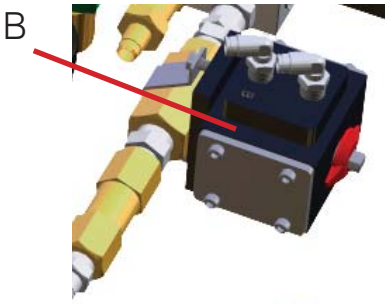
The injection pressure gauge indicates liquid CO_2 pressure in the line when the valves are open. It should not indicate any more than a 20 psig (1.4 bar) drop from normal during the injection cycle.

Valve Types



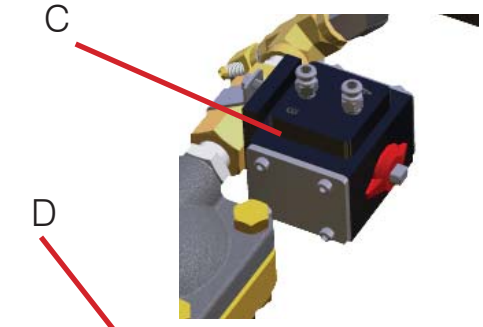
A: Liquid Bleed Valve

This valve is used to relieve pressure from the liquid side and the liquid filter. It can also be used to bleed excess vapor from the liquid supply lines before start up.



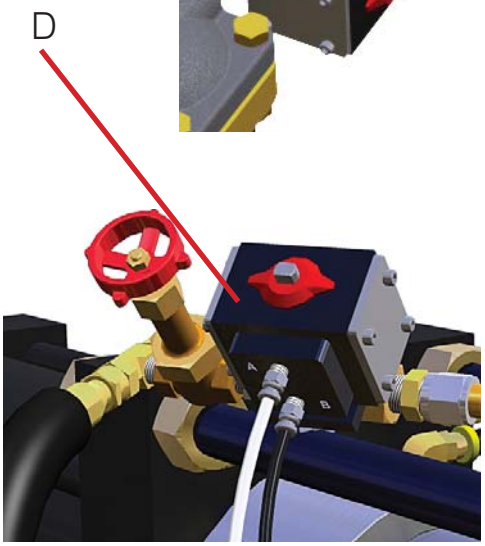
B: Vapor Purge Valve

This is a pneumatically actuated valve controlled by the pelletizer. It is actuated any time the machine is RESET from an E-stop condition or the main power is turned on. It's used to flush out debris from the extrusion cylinder during the purge cycle.



C: Liquid CO_2 Supply Valve

This is a pneumatically actuated valve controlled by the pelletizer. It releases liquid CO_2 into the system from the supply tank when the unit is turned on.



D: Injector Valve Assembly

This assembly consists of two parts: a manually set flow control valve (set at the time of installation) and the pneumatically actuated ball valve. The injector is activated for the purge and production cycles.

WARNING: THE FLOW CONTROL SHOULD ONLY BE ADJUSTED BY COLD JET TRAINED PERSONNEL.

Weekly Checklist

- Check hydraulic oil level at the oil temp 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 gauge.
- Check lights on the control panel by pushing the reset button.
- Run machine and check for CO_2 leaks.
- While making ice make sure the piston advance time is 12 sec.
- Check the ice quality to make sure it does not easily crumble.
- Check if the cooling fan turns on when the oil temperature reaches 100°F (38°C).



Incidental Malfunctions

General Malfunctions

Chamber Pressure

If the Chamber Pressure is below 30 psig (2.1 bar):

- Turn the flow control valve 1/8-turn counter clockwise, each injection cycle, until the chamber pressure reads a maximum of 30 psig (2.1 bar).
- The liquid supply line or the filter is plugged with CO_2 "snow". This can result from an improper start up procedure.

If the Chamber Pressure does not drop to zero at the end of an injection cycle:

- The ball valve is not providing a positive valve shutoff at the end of the cycle.
- The actuator may not be closing the ball valve completely or the ball valve may be faulty.
- If the flow control valve is open too far, it will cause high and/or erratic chamber pressure indications.

Liquid CO_2 Injection Pressure

If the pressure drop exceeds 20 psig (1.4 bar) during injection:

- The liquid filter is clogged.
- There is CO_2 snow somewhere in the liquid CO_2 lines.

Liquid CO_2 Supply Pressure

If the liquid CO_2 gauge indicates pressure and the liquid injection pressure is very low, while the liquid valve is open and the machine is not running, a CO_2 snow plug may exist in the internal plumbing of the Pelletizer.

- Snow plugs are typically the result of the liquid CO_2 valve being opened on an unpressurized machine when the supply pipe is cold and the liquid CO_2 is already at the machine inlet.
- The incoming liquid experiences an immediate pressure drop and "flashes to snow", forming a plug in the liquid CO_2 line.

CO_2 Vapor Pressure

The vapor pressure gauge may range from 150 to 300 psig (10.3 to 20.7 bar). It is not always the same as the liquid CO_2 pressure. The CO_2 vapor supply must maintain at least 150 psig (10.3 bar) during the purge and chill down cycles.

Hydraulic Pressure

The hydraulic pressure should increase from 1000 psig to 2500-3000 psig (69 bar to 172.4-206.8 bar) - this depends on the die plate size - during the extrusion portion of the production cycle. The high pressure portion of the cycle requires only 8 to 9 seconds to complete, or 12 to 13 seconds for the piston to advance from the rear proximity switch to the front one after operating for at least 30 minutes.

Oil Filter Pressure

The oil filter pressure will average 5 - 8 psig (0.4 - 0.6 bar) except on the return stroke when the gauge will indicate 10 psig (0.7 bar). When the pressure exceeds 20 psig (1.4 bar), the filter element needs to be replaced.

No Piston Movement

When the chamber power switch is off, press the reset button and turn the chamber power switch on. If the machine does not operate, check the following:

- Check fuse 3 for a possible OFF position.
- If rotary knife is installed, check fuse 5. If blown, an indicator light will be on the blown fuse. Piston movement will stop in the cylinder with the blown fuse. The damaged side is jammed with CO_2 "snow" or water ice. Remove the jammed elbow and clear the ice, then re-install it and resume production.
- With the pelletizer in "standby" mode the hydraulic pressure should be 400 psig (27.6 bar) or less.
    - Turn the hydraulic pump off.
    - Check the hydraulic cylinder proximity switch lights. All must be on to determine the piston position and switch power status. The rear switch light must be red (indicates the piston is at the home position).
    - Locate the hydraulic directional control valve solenoids. In the center of the solenoid is a manual override brass button. With the system switched OFF, and the hydraulic motor running, depress the manual override to retract the piston until the proximity switch light on the hydraulic cylinder illuminates red. Turn the system ON again. If the Pelletizer still does not run, repeat the procedure on the other solenoid. (All the proximity switches must have the indicator light illuminated or it will not operate).
- Disconnect the yellow cable from the hydraulic directional control valve solenoid and measure the solenoid resistance. It should be 33-35 ohms. If the solenoid is defective, the cylinder will not operate.
- If neither proximity switch is illuminated then it's cable may have failed. Disconnect the proximity switch cable and check for 115 VAC. If power is present the proximity switch has failed and must be replaced.

Pellet Quality

- Pellet quality is determined by extrusion speed and moisture content of the CO_2 supply.
- Dirty collector screens degrade pellet quality because the gas cannot rapidly escape. This results in reduced production and brittle pellets.
- If connected to a gas recovery system and the back pressure exceeds 20 psig (1.4 bar), then pellet quality diminishes.
- When brittle pellets are transported, they can break into “fines” or snow then form a solid CO_2 “snow cake” within a few hours.

To avoid these problems check the following:

- The extrusion cycle should be between 12 and 13 sec.
- The pump shift point, from high volume to low volume, should be between 1000 to 1500 psig (68.9 to 103.4 bar).
- Check the condition of the collector screens.

Low Pellet Output

Less than 300 lbs/hr (136.4 kg/h)

Low pellet production can be caused by several factors:

- Poor insulation of the liquid supply line.
- The size of the supply line compared to the distance and number of pelletizers being supplied.
- The capacity of the gas recovery system versus the back pressure.
- A reduction of more than 20 psig (1.4 bar) in the supply line, indicated at the CO_2 injection pressure gauge.
- Excessive gas in the liquid supply line (erratic chamber pressure gauge).

Within the machine itself, the following items can affect production:

- Dirty exhaust collector screens.
- Clogged liquid CO_2 filters.

CO_2 Snow Behind the Piston

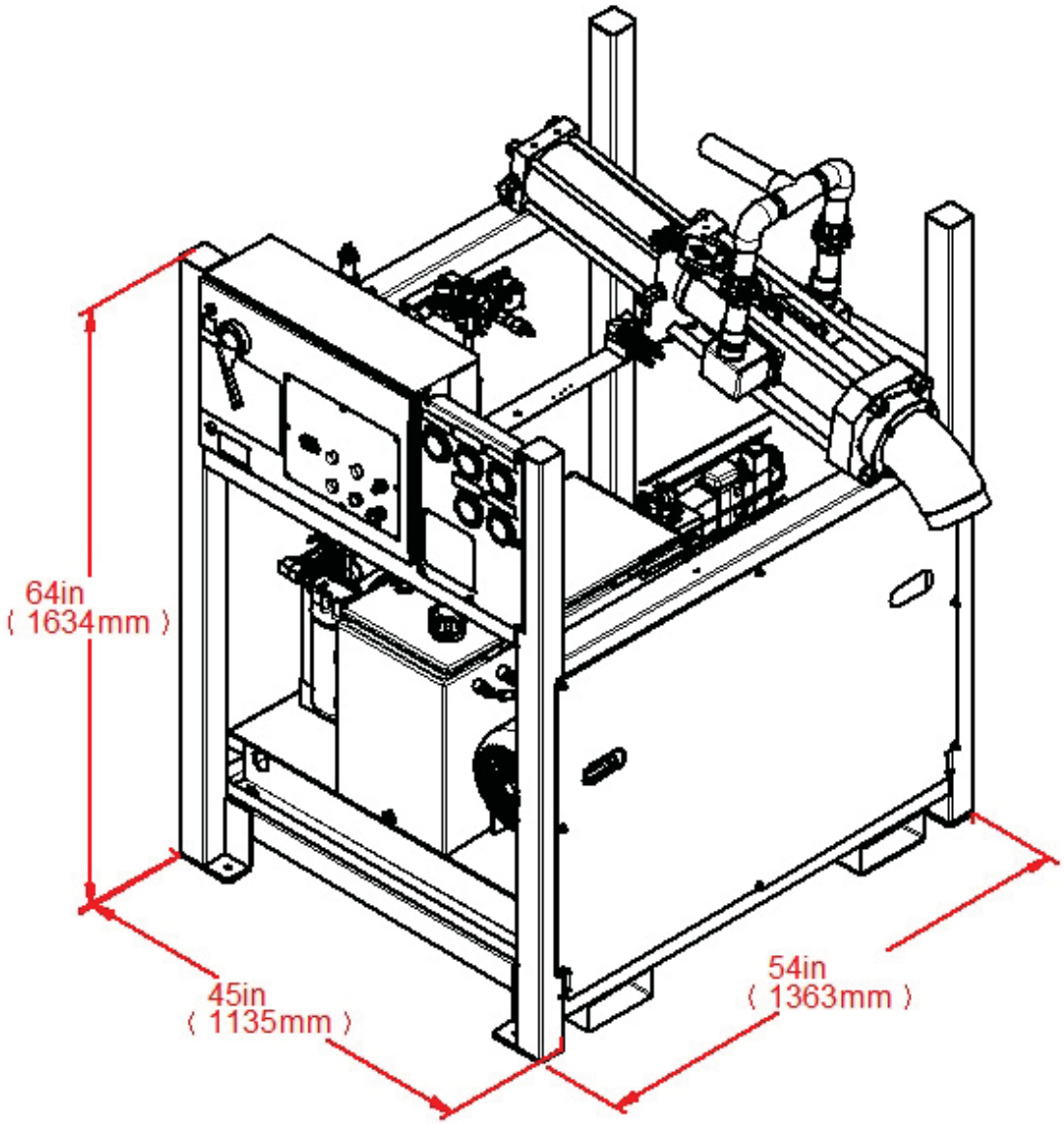
There are two reasons for snow accumulating behind the piston:

- The wear rings are worn and snow is being pushed past them during each cycle.
- The injector ball valve is not shutting off completely, allowing snow to build up behind the piston as it advances. The chamber pressure gauge will spike high and then drop to zero. Too much buildup will cause the unit to shut off the extrusion process and a *Long Retract Time* fault will display.

Specifications & Warranty

Specifications

Weight:	1,750 lbs (794 kg)
Pellet Capability:	300 lbs/hour (136.4 kg/hour)
Power Requirements:	200 - 480 Volt AC 3-Phase, 10HP, 8 Kw



Warranty

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 twelve months (90 days for used equipment), under normal use, maintenance and service as stipulated in the Operator's Manual. CJ warrants that the equipment will be in good working order on the Date of Shipment and that they will conform to CJ's official published specifications.

The warranty period is twelve 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 free of charge to the Buyer, except for any freight or travel expenses, 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.

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 damages resulting during shipment as determined by CJ;
c) The replacement of normal wear items, including but not limited to air and blast hoses;
d) Deviation from the Equipment's prescribed maintenance programs, replacement parts, operating instructions, specifications or other terms of sale;
d) Labor charges, loss or damage resulting from improper operation, maintenance or repairs made by person (s) other than CJ or CJ's authorized service representative;
f) Improper application of the product.

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, EXPRESS, IMPLIED IN LAW OR IMPLIED BY FACT, INCLUDING ANY WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR USE, ARE HEREBY SPECIFICALLY EXCLUDED.

Since 1986, Cold Jet has led the development of dry ice blasting and dry ice production technology, setting the standard for quality, performance and reliability. With thousands of installed customers worldwide, Cold Jet's success has been the result of its superior technology, dedication to customer service and its establishment of a global infrastructure for product support. Cold Jet is committed to developing dry ice solutions for the betterment of industry and the environment through a relentless pursuit of technology.



Ask us about our Dry Ice Blasting product line or visit us on the web at

www.coldjet.com