

Pump Protection, SuperPro™

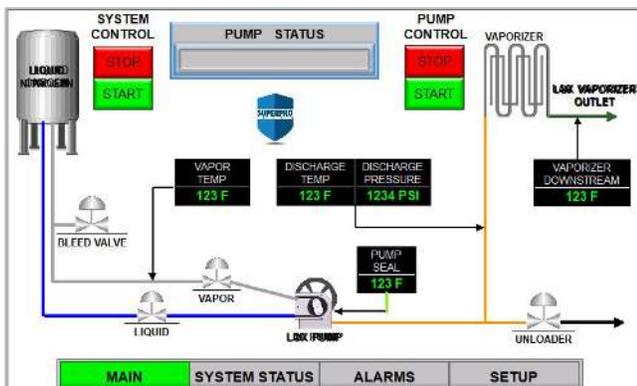
Spec Sheet

Let the CryoVation SuperPro™ Automatic Cryogenic Pump Protection System keep an eye on your pump. The PLC driven SuperPro can look for and monitor for any potential pump problems and alert you before any damage is done. These features are housed in a NEMA-4 enclosure that includes an over-pressure switch, hour meter & **touchscreen**.

The monitoring system also allows the operator to **remotely cool down, start and stop a pump as well as monitor the pump for a proper prime**, to ensure effective performance and help reduce unnecessary wear and maintenance. The goal is to try to double the life of the pump between repairs, saving both money and time.



1. **Pump Prime Protection (Cavitation)**, to monitor pump discharge temperature. This assures proper prime, if proper prime is not achieved and held for 60 seconds, an interrupt happens and the pump will be shut off. Pump operation will also be shut down if the discharge temperature rises above the temperature set point.
 - a. Digital temperature controller with adjustable set point
 - b. Thermocouple probe and fittings to tee into discharge line
2. **Liquid Saver**, automatically controls liquid flow to the cryogenic pump. Liquid Saver will automatically shut off liquid to the pump after a preset time duration of non-use, reducing the potential for pressure building in the liquid vessel and excessive frosting of the pump.
 - a. Liquid Supply Air Actuated Ball Valve
 - b. Shuts off liquid supply after 45 minutes of non-use
 - c. Status indicator lights “Pump cool-down” and ready
3. **Pump Packing Blow-By Protection (Seal Leak)**, preventing drive end freezing up from cold gas or liquid leaking past the pushrod gas seals.
 - a. Thermocouple
 - b. Temperature Controller
4. **Pump Unloader Kit**, to automatically unload excessive high-pressure present in the discharge line of the pump prior to start-up, thereby reducing undue wear and stress on the pump.
 - a. Air- actuated unloader valve
 - b. Control components
 - c. Interconnecting fittings
5. **VFD, Variable Frequency Drive**, available component to speed up and slow down the pump for fine accuracy of filling large and small cylinders by varying the frequency supplied to the electric motor of the pump.



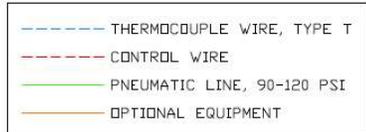
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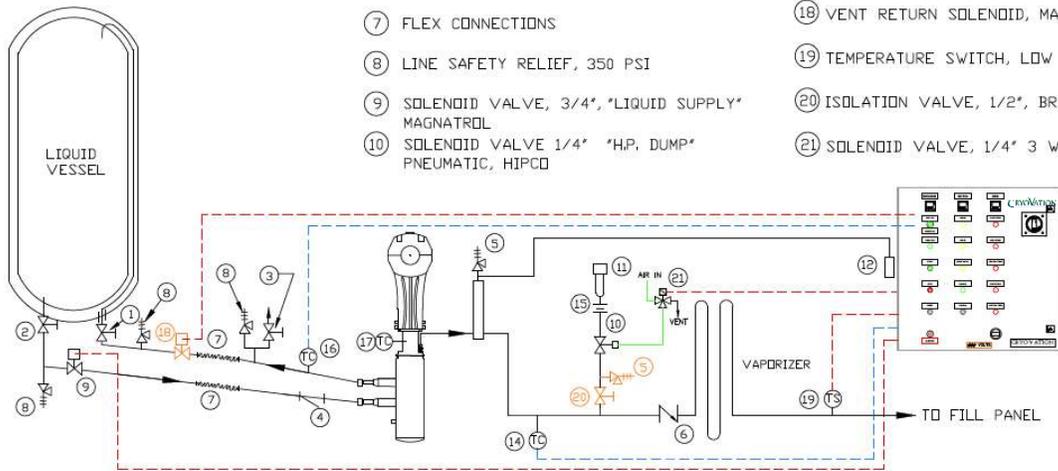
Other Features:

- Automatic Auto-Reversing of the motor
- Thermocouple Burnout Protection, notifying the user to which is bad
- Outdoor Shade Aide, to preserve the life of the touchscreen
- Integrate with CryoVation Fill-Free Filling System and most others

Typical P&ID:



- | | |
|---|---|
| ① MANUAL EXTENDED STEM VALVE, 1/2", "VENT RETURN" (NOT INCL.) | ⑪ VENT SILENCER, 3/4", SS |
| ② MANUAL EXTENDED STEM VALVE, 3/4", "LIQUID SUPPLY" (NOT INCL.) | ⑫ OVER-PRESSURE SWITCH, PER SPECIFICATION |
| ③ MANUAL VALVE, 1/2", REGD "L.P. BLEED" | ⑭ THERMOCOUPLE - CAVITATION SENSING |
| ④ STRAINER, 3/4" | ⑮ CRITICAL ORIFICE, .125, SS |
| ⑤ H.P. RELIEF VALVE, SET PER SPECIFICATION | ⑯ THERMOCOUPLE, VAPOR RETURN |
| ⑥ H.P. CHECK VALVE, METAL SEAT, HASKEL | ⑰ THERMOCOUPLE, SEAL LEAK |
| ⑦ FLEX CONNECTIONS | ⑱ VENT RETURN SOLENOID, MAGNATROL |
| ⑧ LINE SAFETY RELIEF, 350 PSI | ⑲ TEMPERATURE SWITCH, LOW GAS TEMP, -40°F |
| ⑨ SOLENOID VALVE, 3/4", "LIQUID SUPPLY" MAGNATROL | ⑳ ISOLATION VALVE, 1/2", BRASS |
| ⑩ SOLENOID VALVE 1/4" "H.P. DUMP" PNEUMATIC, HIPCO | ㉑ SOLENOID VALVE, 1/4" 3 WAY, ASCO |



SCHEMATIC REPRESENTS A GENERIC INSTALLATION INCLUDING OPTIONAL EQUIPMENT.

Timers:

- **Liquid Saver:** 45 min. Holds liquid feed valve open 45 minutes from initializing cooldown or until pump is started
- **Blowdown:** 10 sec. Opens the blowdown valve for 10 second dwell after pump start is requested, prior to engaging pump starter
- **Vapor Return:** 45 sec.
- **Cavitation:** 60 sec. AFTER the alarm is enabled
 - The pump runs for 45 seconds prior to the cavitation alarm circuit being energized, so that on initial startup - the cavitation delay will be 105 seconds. Once the initial start up time has passed, if the discharge temp rises above setpoint it's a 60 second delay
- **Seal Leak:** 10 sec. Delay after temp drops below setpoint to reduce false trips
- **High Pressure:** 2 sec. Reduces the likelihood of incidental trip from contact bounce of the mechanical switch



SuperPro™ Installed on a CV22



SuperPro™ Installed on a CV22 7 Cooled Down