



PNEUMATIC PRODUCTS

Hydrogen Coolant Purifier

DESCRIPTION

The Hydrogen Coolant Purifier is a self-contained purification system for generator coolant gas incorporating a coalescing prefilter, carbon bed adsorber, automatic, dual-chamber desiccant dryer, particulate afterfilter, and positive displacement blower.

The Hydrogen Coolant Purifier provides clean, dry hydrogen:

- During highest contamination loading
- During idle time with less natural circulation boost
- While automatically eliminating operator attention
- By positively purging contaminants from the hydrogen system

APPLICATIONS

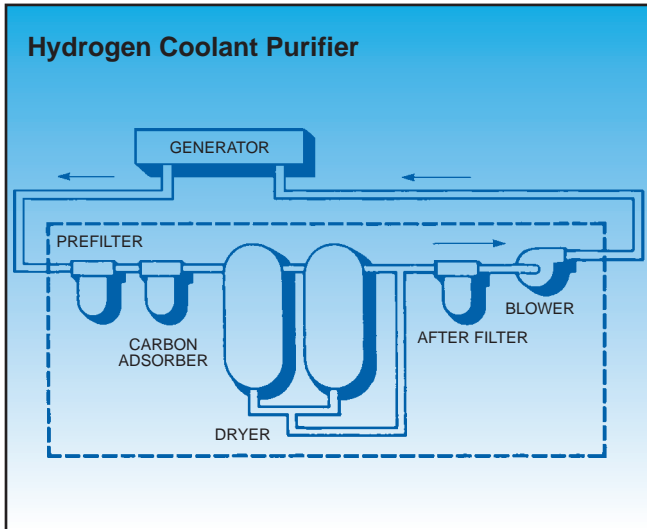
The Hydrogen Coolant Purifier (HCP) is used in electrical power generating plants to dry and purify the hydrogen used as a coolant for generators. Water, oil and other contaminants cause corrosion in retaining and zone rings, lead carbonate formation, increased windage, and other potentially catastrophic consequences. Single tower dryers require constant attention because of manual operation. Upgraded models include automatic operation but neglect improvements in reliability and the purification consequences of “turning gear” operation (increased contamination load and decreased hydrogen circulation boost). The HCP was specifically designed to remove each contaminant and provide a continuous flow of clean, dry hydrogen throughout all phases of generator operation.

FEATURES AND BENEFITS

- Switching valves and gas-tight blower are vented to prevent formation of dangerous air-hydrogen mixtures.
- Welded stainless steel piping minimizes threaded connections, reducing potential leak points.
- Standard NEMA 4 enclosure provides weather-tight protection for controls.
- Complete instrumentation monitors the system for operation outside of specifications.
- Potted conduit seals isolate electrical controls from hydrogen.
- Equipment is built to applicable ASME, ANSI, and NEC standards.
- High temperature heater shutdown prevents excessive operating temperature.
- Chamber relief valves prevent overpressure.
- Direct Connected Heater Wires — Eliminates potential for arcing across the terminal blocks in presence of moisture.
- Purge Exhaust Drip Leg — Insures optimum regeneration; minimizes purge condensate back pressure.
- Vent Rotameter — Detects and measures any gross hydrogen leakage through system vent lines.



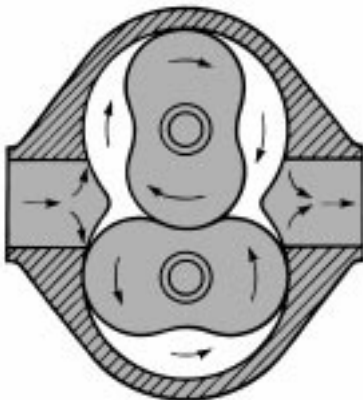
SUPERIOR PERFORMANCE



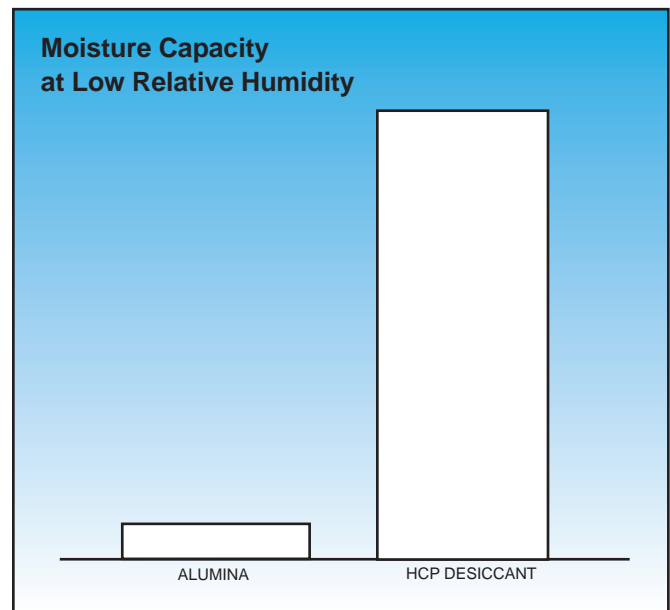
- Maximum contaminant removal is provided by a completely packaged system incorporating a coalescing pre-filter to remove liquids, a carbon adsorber to remove hydrocarbons, a desiccant dryer to remove water vapor, and an afterfilter to remove particulates.
- Positive displacement, gas-tight blower ensures maximum circulation of hydrogen through the generator and purifier during peak load as well as turning gear operation.
- Specially selected desiccant provides maximum moisture removal capacity for low relative humidity gases... 15 times the capacity of activated alumina.
- Open-loop regeneration ensures removal of extracted contaminants from the system, unlike closed loop dryers which actually concentrate contaminants within the hydrogen system.
- The non-lubricated, two-way poppet valves were developed by Pneumatic Products Corporation, specifically for desiccant dryer service. They provide fast action, positive sealing, minimal pressure drop, and prevent crossport leakage.



Inlet and Exhaust valves



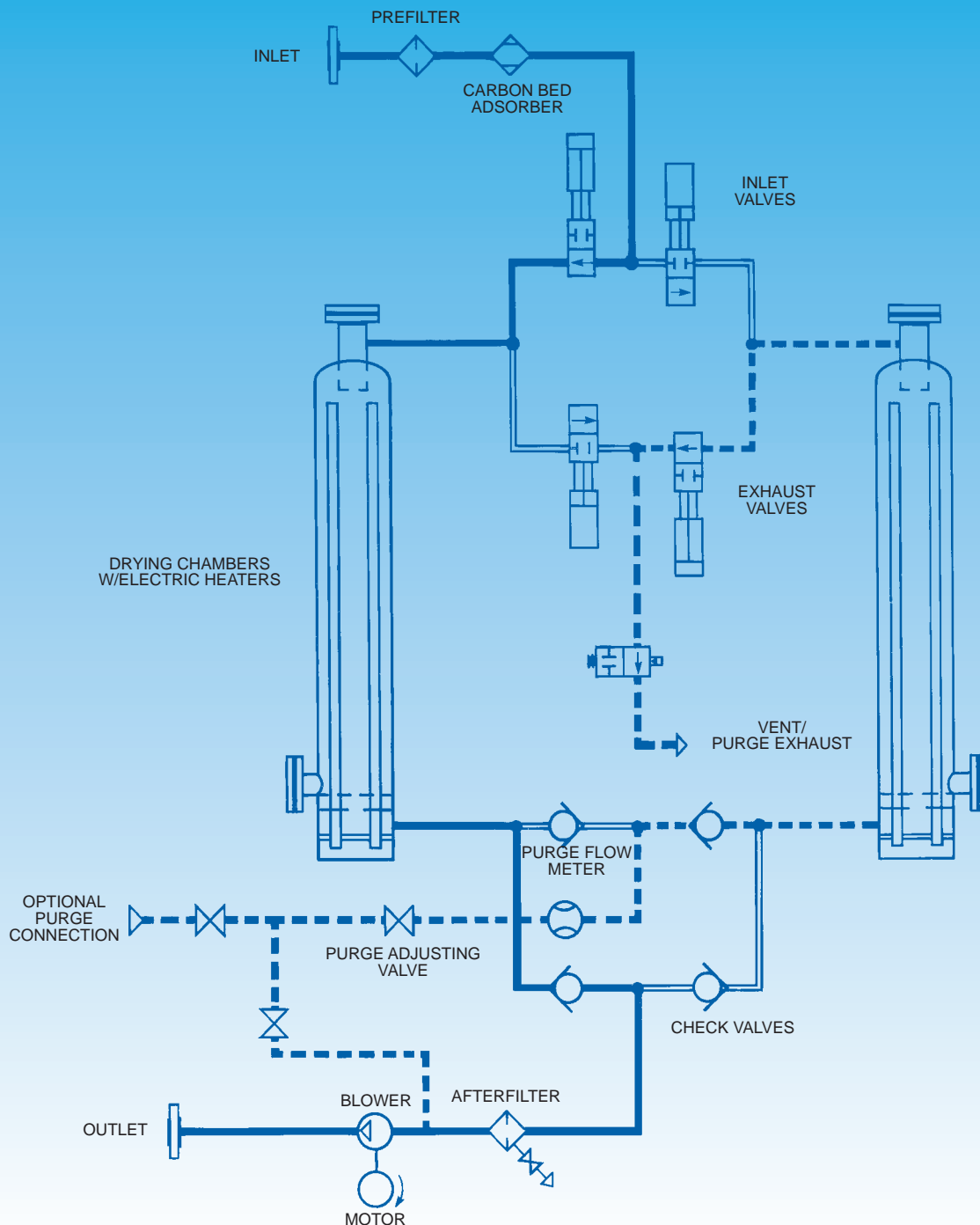
Positive Displacement Blower



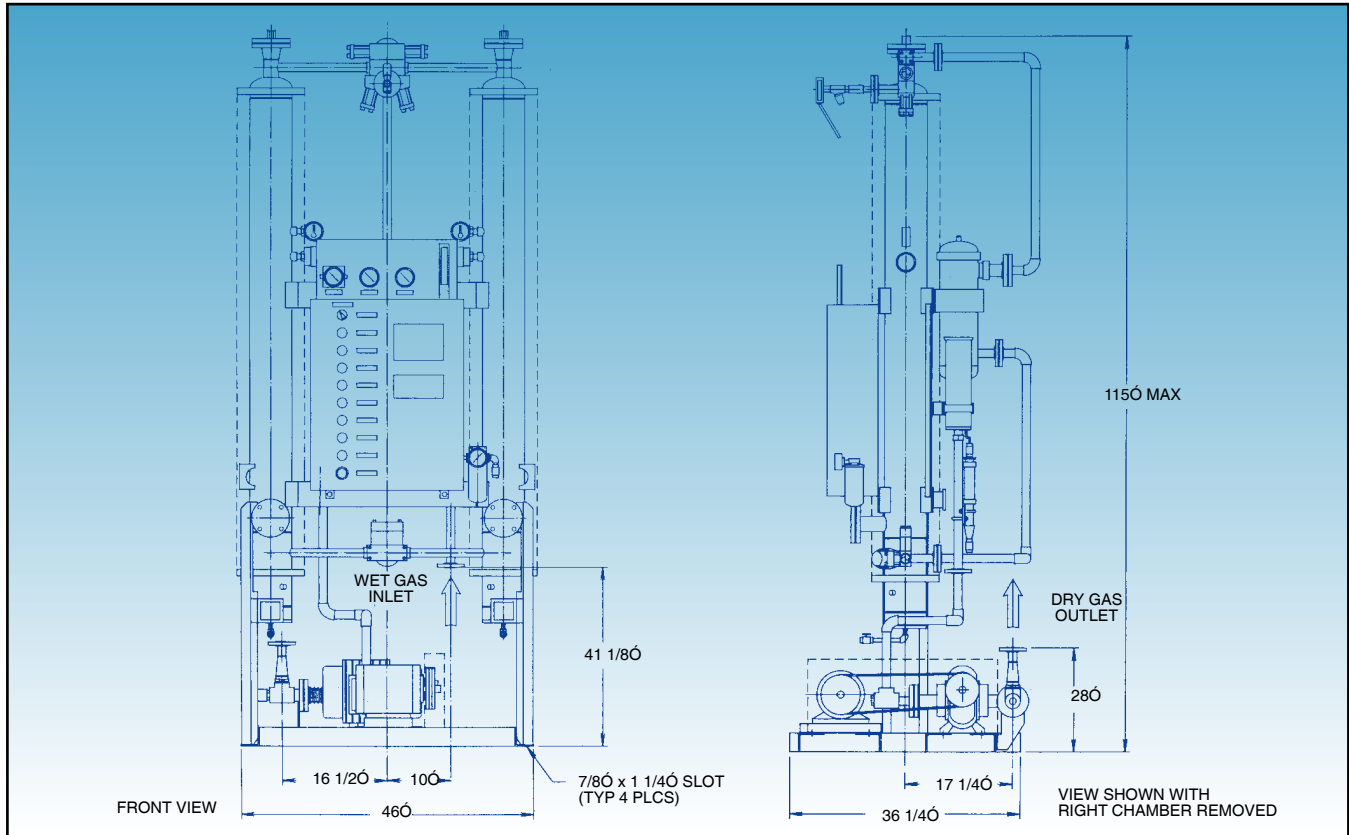
RELIABILITY

- Complete regeneration of the desiccant is accomplished by multiple low-watt density heaters. The heaters are housed in stainless steel tubes to optimize desiccant life.
- Pilot operated switching valves incorporate stainless steel internals for reliable, trouble-free operation.
- Dryer chambers are epoxy painted and have 1/16" corrosion allowance for long service life.
- Pilot air filter protects valves, instruments and controls.
- Desiccant quality and life is enhanced by open loop regeneration and downflow drying.

Simplified Schematic



DIMENSIONS



Design Operating Conditions

Fluid: _____ Hydrogen Gas
 System Flow Rate (ACFM): _____ 8-12
 Operating Pressure Min/Max (psig): _____ 10/75
 Inlet Temperature Max (F): _____ 120
 Outlet Moisture Content ($^{\circ}$ FD.P. @ pressure): _____ -40

Detail Specifications

Complete NEMA Design Cycle (hrs): _____ 50, 92 or 196
 Adsorbent - (lbs/chamber): _____ 52
 Activated Carbon (lbs): _____ 10
 Heat Cycle Purge Flow (scfm): _____ 2
 Purge Source: _____ Dryer Outlet or Separate Source
 System Conn. Size, 150 lb RF flange (in.): _____ 1
 Prefilter Cartridge: _____ POC1001SU
 Afterfilter Cartridge/Rating (μ m): _____ PCC1001HT/.9
 Pilot Air Filter Cartridge/Rating (μ m): _____ PCC060AF/.9
 Vessel Corrosion Allowance (in.): _____ .0625

Ordering Information

The Hydrogen Coolant Purifier is offered in one size suitable for use with any hydrogen cooled generator.

Utilities

Electrical Classification: _____ NEMA 4
 Electrical Service (V/Hz/Ph): _____ 460/60/3
 Heater Size (KW/chamber): _____ 1.8
 Motor Size (HP): _____ 5
 Pilot Air, separate source (Min. psig) _____ 60

Instrumentation

¥(2) Chamber Pressure Gauges
 ¥(2) Chamber Temperature Gauges
 ¥Blower Differential Pressure Gauge
 ¥Blower Outlet Temperature Gauge
 ¥Purge Flow Rotometer
 ¥(3) Sequence Lights
 ¥Switching Failure Light
 ¥Blower Overtemperature Light
 ¥Low Pilot Air Pressure Light
 ¥Heater Trouble Light
 ¥On/Off Switch
 ¥Cycle Time Selection Switch
 ¥Vent Rotameter
 ¥Locking Purge Valve
 ¥Push-to-Test Lights

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