



SPECIAL FURNACE CO INC

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MPH SERIES

APPLICATIONS

The MPH atmosphere mixing panel is designed to mix nitrogen or argon with small percentages of hydrogen (up to 4%). The resulting gas mixture is known as “forming gas.” The small percentage of hydrogen will act as a “getter” gas to help neutralize trace oxygen in a furnace or retort. This will often result in cleaner work than could be accomplished with just inert gas. The 4% hydrogen mix is below the LEL (lower explosive limit) of hydrogen in air. This is accomplished with an inert gas low flow switch, high flow switch for the hydrogen and safety limit valve for the hydrogen. No burn off is needed for this gas mixture. It may be used at any temperature; however, L&L also includes a low temperature alarm which prevents the introduction of hydrogen below 1400°F (760°C). It is important to operate a furnace with this system with adequate ventilation.

FEATURES

NITROGEN OR ARGON FLOW CONTROL

Nitrogen or argon gas line includes manual shut off ball valve, pressure regulator, pressure relief valve, pressure gauge, flowmeter with regulating valve, and check valve.

HYDROGEN FLOW CONTROL

Hydrogen flow control includes manual shut off valve, pressure regulator, pressure gauge, normally closed solenoid for automatic shut off, flowmeter with regulating valve, and flame arrestor. The flame arrestor prevents any potential flashback of hydrogen into the hydrogen supply.

LIMITING VALVE FOR HYDROGEN

A high flow limit valve on the hydrogen line limits the amount of combustible gas that can flow.

ELECTRIC SHUT OFF OF GASES

The hydrogen and inert gas can be shut off from the main electrical control panel with a push button control switch.

LOW TEMPERATURE ALARM

The control has a temperature based alarm which is set at 1400°F (760°C) below which hydrogen can't flow. This can be set lower if necessary.

INERT GAS LOW FLOW ALARM

Nitrogen or argon line has a low flow switch to shut off hydrogen if inert gas flow is not sufficient to dilute the hydrogen to below the Lower Explosive Limit.

HYDROGEN HIGH FLOW ALARM/SHUT OFF

A high flow switch on the hydrogen line automatically shuts off hydrogen.

DOOR INTERLOCK ALARM

There is typically a door interlock switch which prevents hydrogen from flowing unless the door is closed.

FLOW CONTROL PANEL

A floor standing flow control panel contains all the flow train components. This panel is constructed of 10 gauge steel from the floor to the top of the panel. The panel has an open back for easy maintenance and 12" deep side panels for protection of the components and neat appearance.

FITTINGS AND PIPING

Pipe is normally copper throughout the flow panel. Fittings are brass flare type NPT fittings where possible. These are easy to disassemble for maintenance work and are extremely tight.

IRI OR FM APPROVAL

L&L will provide all necessary information to customer's insurance carrier for approval purposes.

ATMOSPHERE INSTRUCTIONS

A very complete instruction manual, specifically written for the atmosphere system is included. This includes theory of operation of all major systems and subsystems, full maintenance instructions and schedules, component lists, component instructions and data sheets, emergency procedures, cautions, and start up and shut down procedures. A complete flow schematic of the atmosphere system is provided.

ATMOSPHERE MIXING PANEL FOR FORMING GAS USING ARGON OR NITROGEN WITH HYDROGEN

OPTIONS

- **STAINLESS STEEL PIPING FOR HYDROGEN:** All flow components in hydrogen line and all piping and fittings are made of stainless steel. All welded connections can be used.
- **MASS FLOWMETERS:** One or more of the atmosphere lines can have a mass flowmeter to control the flow rates very precisely. Can be recorded.
- **OXYGEN ANALYZER:** Delta F Oxygen analyzer. Model PA 31525 A-Plus with 0-1/5/25% ranges, five year sensor warranty, local analog display, 0-10 VDC analog output, integral rotometer with flow control adjustment and NEMA 1 enclosure. Instrument is mounted in the control panel and a relay output creates this alarm condition. An optional pump is required when used with non-retort or muffle furnaces.
- **DEW POINT ANALYZER:** A Panametrics or Eastern Instruments dew point analyzer can indicate furnace or muffle dew point.
- **HYDROGEN LEAK MONITOR:** Sierra Monitors detector shall be calibrated for 1/4 of the LEL (1% hydrogen). An alarm output from this sensor shuts off hydrogen, initiates purge, and rings an alarm buzzer. The sensor is located at the top of the atmosphere control panel in the back.
- **LOSS OF EXHAUST VENTILATION:** L&L can provide specific alarm contacts and differential pressure switch to be installed into the ventilation system. This initiates inert purge in the case of low ventilation flow. Ventilation hoods can be provided by L&L.
- **FLAME CURTAIN:** Automatically controlled flame curtain to reduce oxygen inrush. Requires 1 PSI natural gas pressure. (Can be specified for propane also.) Includes natural gas fed pilot light with its own regulator to prevent pressure feedback from flame curtain. Gas turns off automatically if pilot goes off. Includes manual safety override to light the flame curtain. The flame curtain is activated when the door opens. Uses compressed air for combustion air.
- **DOOR PURGE TIMER:** It is an advantage to be able to automatically fast purge the furnace whenever the door is opened. To do this L&L offers an optional door purge which includes a check valve, properly sized flowmeter and regulating valve, solenoid shut off valve and delay timer. Every time the door switch is opened, the purge valve opens. When the door is closed again, a delay timer is triggered which keeps the purge gas flowing for a preset period of time. (0-15 minutes is typical).
- **ATMOSPHERE SAMPLE PORT:** An alloy sample port is provided. There is a ball valve to close this off when not in use. This is used to sample the atmosphere for dew point content.

START UP SERVICE

L&L will provide a service technician to do the following:

- **Go over the installation carefully to make sure everything is reconnected properly.**
- **Properly set all alarms, flow switches, etc.**
- **Leak test entire atmosphere system.**
- **Review electrical installation and reconnections.**
- **Go over furnace itself and make any necessary adjustments and minor repairs.**
- **Start up furnace and run bake out cycle.**
- **Review operation, adjustment and maintenance procedures for the controls, atmosphere system, and furnace with customer's operation and maintenance personnel.**

Customer is responsible for initial reassembly of furnace, electrical hook up, atmosphere supplies and hook up to MPH flow panel. Any process testing is responsibility of customer. Price for above service can be quoted as a fixed price or on a per diem charge plus expenses.