APPLICATIONS
The MPH atmosphere mixing panel is available only with a new L&L Special Furnace Co., Inc., furnace. It 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 lower explosive limit (LEL) 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 burnoff is needed for this gas mixture. It may be used at any temperature; however, L&L also includes a low temperature alarm that prevents the introduction of hydrogen below 1,400°F (760°C). It is important to adequately ventilate a furnace with this system.

FEATURES
NITROGEN OR ARGON FLOW CONTROL
The nitrogen or argon gas line includes manual shutoff ball valve, pressure regulator, pressure relief valve, pressure gauge, flowmeter with regulating valve, and check valve.

HYDROGEN FLOW CONTROL
Hydrogen flow control includes manual shutoff valve, pressure regulator, pressure gauge, normally closed solenoid for automatic shutoff, flowmeter with regulating valve, and flame arrestor. The flame arrester 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 SHUTOFF 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 that is set at 1,400°F (760°C), below which hydrogen can’t flow. This can be programmed 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 LEL.

HYDROGEN HIGH FLOW ALARM/SHUTOFF
A high flow switch on the hydrogen line automatically shuts off hydrogen.

DOOR INTERLOCK ALARM
Typically, there is a door interlock switch that prevents hydrogen from flowing unless the door is closed.

FLOW CONTROL PANEL
A floor standing flow control panel contains all of 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
The piping is normally copper throughout the flow panel. The 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 the 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 startup and shutdown procedures. A complete flow schematic of the atmosphere system is provided.

WARRANTY
The furnace is warranted for one year except for elements and thermocouples, which are warranted for six months.

OPTIONS
- **STAINLESS-STEEL PIPING FOR HYDROGEN**: All flow components in the 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.
- **DELTA F OXYGEN ANALYZER**: Model DF-13/E-P5 with local analog display, 0-10 VDC analog output, integral rotometer with flow control adjustment and NEMA 1 enclosure. An alarm condition preventing hydrogen from flowing and initiating a nitrogen purge at any time if oxygen level rises above 1% is optional. 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**: A Sierra Monitors detector is 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 case of low ventilation flow. Ventilation hoods can be provided by L&L.
- **FLAME CURTAIN**: An automatically controlled flame curtain reduces oxygen inrush. It requires 1 PSI natural gas pressure. (Can be specified for propane, as well.) Includes natural gas fed pilot light with its own regulator to prevent pressure feedback from flame curtain. Gas turns off automatically if the 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 that includes a check valve, properly sized flowmeter and regulating valve, solenoid shutoff 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 that 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.
- **STARTUP SERVICE**: An L&L factory technician will review and check out the customer's installation, start up the burn-in furnace, and train the operators.