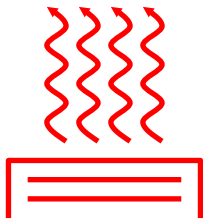
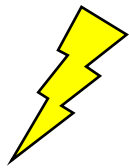


2.1 General Precautions



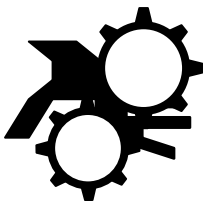
In general, the operation of any furnace may expose operators or maintenance technicians to the risk of burns. After being processed in a FurnacePros furnace, customer product may still be dangerous to handle. Each owner is responsible for providing a safe work environment and proper training in the handling of material being processed in a furnace.



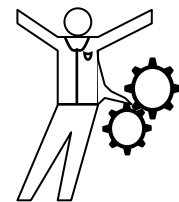
Electrical shock hazards exist for those technicians who service the furnace. High voltages are required to operate the furnace and precautions must be taken to reduce the exposure to these elements. Again, it is the responsibility of the furnace owner to assure that only properly trained service technicians, familiar with high voltage operations be allowed to service the equipment



Explosive dangers may exist in the high temperature process environment of the furnace. If the furnace operates with process gas containing hydrogen, measures must be taken to avoid the dangers of explosion. Furthermore, improper gas flow balance may draw oxygen rich air into the furnace, mixing with effluent gases and material from products, also creating a hazardous environment.



Roller dangers exist when working around the conveyor belt of the furnace. Care should be taken not to place hands on or near the belt drive mechanisms when the conveyor system is operating as roller crush may occur. Operators should avoid walking near the open ends of the conveyor belt. Those who must be near the moving parts should wear close fitting clothing.



2.2 EMO Buttons



Every FurnacePros Furnace is fitted with at least two Emergency Machine Off buttons (EMO's) Locate and insure proper function prior to regular furnace operation.

Each Emergency Machine Off button (**EMO**) is attached directly to a switch that will automatically shut down all electrical systems inside the furnace. In many cases, non-combustible gas flow will remain on after power is shut off. The following are special notes describing events associated with various furnace options.

2.2.1 UPS (Option)

An uninterruptable power supply may be added as an option to the furnace. In the event that the EMO is tripped, the computer and conveyor belt will remain on with this option installed. The possibility of data loss is reduced. The interface PC is also less likely to experience failure under this condition. See the description in Section 0, p.24.

2.2.2 H2 Controlled Atmosphere (Option)

Many events occur when an EMO is tripped in a H2 process gas environment. The solenoid valve allowing H2 gas to enter the chamber is closed with the loss of power. The solenoid valve holding back the N2 gas supplied for rapid purge is released with the loss of power. These two events ensure that no additional H2 gas is allowed into the furnace and that the remaining H2 is diluted and removed as quickly as possible.

2.2.3 Panel Interlock Switches

Removable interlock switches are installed to prevent the operation of the furnace with high voltage panel covers out of place.

Override this switch to allow furnace operation with the panels removed. Simply grasp the protruding switch and pull it out (See Figure 2-1) to activate the override switch setting.



Figure 2-1: Panel Switches Showing Normal Operation Position

Setting the panel switches in override mode is useful when performing a SCR calibration.



Figure 2-2: Panel Switch Installed (Override Mode Position)



DANGER: The activation of panel switches in the override mode, increases maintenance personnel exposure to electrical hazards. The user must ensure that any panel switches that are placed in override mode are returned to normal operation following any inspection or adjustment.

2.3 H₂ Operation Safety Overview (Option)

The addition of Hydrogen (H₂) to the heating chamber requires several safety considerations.

1. Special warm up and cool down procedures must be followed.
2. Gas flow balance is critical to the safety of all personnel working near an FurnacePros Furnace operating with H₂ as a process gas. Escaping hydrogen gas, or the admission of oxygenated gas into the process section is extremely hazardous.
3. Furnace installation ensuring proper ventilation and safe source gasses is the responsibility of the furnace owner.