

INSTRUCTIONS FOR USING LN2 ON A SCIENTEMP FREEZER WITH A BUILT-IN SYSTEM

The Scientemp Liquid Nitrogen System, if your freezer is so equipped, is built-in and always ready to use at a moments notice. It only requires a pressure nitrogen supply and connecting tube to hook-up. Our built-in liquid nitrogen system will not interfere with the normal function of the low temperature equipment or deform the lid gaskets. It permits the normal use of the sub lids, which are important to good temperature control.

SAFETY PRECAUTIONS: Good safety precautions should always be used with liquid nitrogen. Nitrogen is an inert, colorless, odorless and tasteless gas which makes up four-fifths of the air you breathe. Liquid nitrogen is obtained by cooling air until it becomes a liquid and then removing the oxygen which makes up the other fifth of the air. Liquid nitrogen reaches a temperature of -320 deg F under normal atmospheric pressure.

EXTREME COLD - COVER EYES AND SKIN: Scientemp's liquid nitrogen system is designed to shield and divert the liquid nitrogen away from the normal position in which you would stand. Nevertheless, always use the utmost safety precautions when it is connected and in use. **ACCIDENTAL CONTACT OF LIQUID NITROGEN OR COLD ISSUING GAS WITH SKIN AND EYES MAY CAUSE A FREEZING INJURY SIMILAR TO A BURN. PROTECT YOUR EYES AND COVER THE SKIN WHERE THE POSSIBILITY OF CONTACT WITH THE LIQUID, COLD PIPES, COLD EQUIPMENT OR COLD GAS EXISTS.** SAFETY GOGGLES OR A FACE SHIELD SHOULD BE WORN IF LIQUID EJECTION MAY OCCUR. Clean, insulated gloves that can be easily and quickly removed and long sleeves are recommended for arm protection. Since about 1990, we have installed a switch in the lid to prevent the liquid nitrogen from shooting into the freezer when the lid is up, but the best safety program is to close the liquid nitrogen valve when reaching into the cabinet, then open the valve when the lid is closed.

KEEP EQUIPMENT AREA WELL VENTILATED. Although nitrogen is non-toxic and non-flammable, IT CAN CAUSE ASPHYXIATION IN A CONFINED AREA WITHOUT ADEQUATE VENTILATION. ANY ATMOSPHERE WHICH DOES NOT CONTAIN ENOUGH OXYGEN FOR BREATHING CAN CAUSE DIZZINESS, UNCONSCIOUSNESS, OR EVEN DEATH. Nitrogen cannot be detected by the human senses and will be inhaled normally as if it were air. Without adequate ventilation, the expanding nitrogen will displace the normal air without warning that a non-life-supporting atmosphere is present. Store liquid containers outdoors or in other well-ventilated areas.

The Lock Hasp on a Scientemp Cabinet equipped with a liquid nitrogen system is purposely loose to permit venting when the liquid nitrogen system operates. When the liquid nitrogen stops flowing, the magnetic gaskets on the cabinet lid will automatically reseal. This provides for maximum efficiency in using the liquid nitrogen.

When using Liquid Nitrogen, it is necessary that the freezer be equipped with a cryogenic high pressure solenoid valve. Be sure to use high pressure hose from the LN2 bottle to the valve. Provide an LN2 cylinder with a drop pipe for liquid nitrogen or invert the cylinder if there is not a drop pipe. Connect the high pressure hose from the LN2 bottle to the solenoid valve on the rear of the freezer using a 1/8" NPT to 1/4" flare stainless steel fitting.

In the event of electrical failure or mechanical failure, the stand-by system should be energized when the cabinet temperature raises to the point set on the liquid CO2 controller.

INSTALLATION AND MAINTENANCE INSTRUCTIONS

PROCESS START UP

The LN2 control is located in the front of the freezer. This is a mechanical dial control. The temperature of the LN2 system should be set 15 degrees warmer than the set point temperature on the CAL9500 digital controller. This prevents the LN2 system from coming on during normal operation. The ON/OFF switch for both the alarm and LN2 system should be turned on once the freezer has reached the desired set point temperature.

***LN2 cylinders should be weighed frequently to determine the amount of LN2 that remains in the cylinder.

Note: LN2 and CO2 systems operate on a 12V rechargeable battery. A charger is installed on the freezer to insure a full charge to the battery in an event of a power failure.

TROUBLE SHOOTING GUIDE

<u>TROUBLE</u>	<u>COMMON CAUSE</u>
No supply pressure	Closed supply valve. Source pressure exhausted.
Low supply pressure	Nitrogen exhausted (Liquid).
Process temperature shift up	Thermal assembly failure. Liquid nitrogen exhausted. Solenoid valve not opening. Supply valve closed.
Valve not operating	Low battery charge. Charger not operating. Open electric circuit. Solenoid valve failure.