

Model 021 Liquid Nitrogen Transfer System Operating Instructions



The LN₂ Transfer system is intended for use with liquid nitrogen. You may also use liquid argon, but **NEVER** use liquid oxygen. Always wear a safety face shield or goggles when handling liquid nitrogen to prevent the possibility of splashing into the eyes.

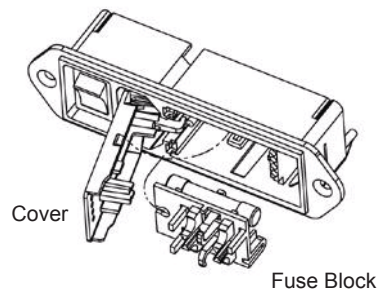
Voltage Selection

All instruments leave the factory set for 120 VAC and with the line fuse removed. The correct setting of the universal power entrance must be checked and the appropriate fuse installed before the pump can be operated. The pump is designed to operate with either 100, 120, 230, or 240 VAC at 50 or 60 Hz.

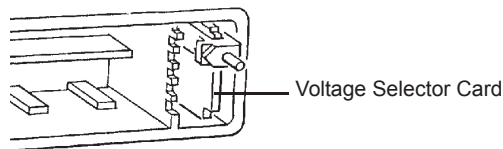


The power cord should be disconnected from the LN₂ Transfer system before opening the cover on the input power connector. Failure to disconnect the power cord could result in electrical shock.

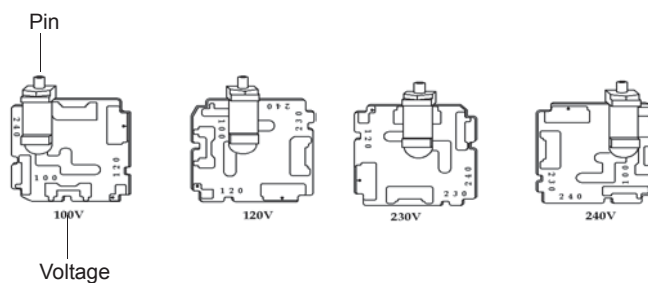
1. Using a pointed object, pop the cover open. The cover is hinged and cannot be removed; grasp the right side with your fingers and swing it to the left.
2. Remove the fuse block; you may have to use needle-nosed pliers to grasp the fuse block.



3. Using needle-nosed pliers, pull the voltage selector card straight out of the power connector housing.

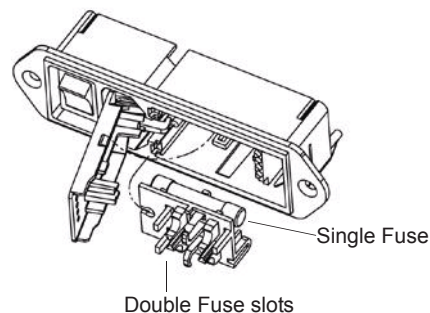


4. Orient the voltage selector card so that the desired voltage is indicated at the bottom. Orient the indicator pin so that it points upward.
5. Reinsert the card into the power connector housing. Orient the card so that the printed side is facing the power connector.



6. Fuse the input power according to local safety practices. The input power connector can be used with either a single-or double-fuse arrangement.

| Power Source | Fuse |
|--------------|--------------------------------------|
| 100-120 VAC | 1.0 Amp, 3AG, Slow Blow |
| 230-240 VAC | 0.5 Amp, 5 x 20 mm Slow Blow, Type T |



The fuse used in the LN₂ pump must be identical in type and rating to that specified. Use of other fuses could result in electrical shock and/or damage to the pump.

7. Snap the fuse block into place and close the cover.



When using the double-fuse arrangement, the fuse block will not snap into place. Simply position the fuse block properly. When you close the cover, the fuse block will seat properly.

Operation



The LN₂ pump must be dry before installing in the Dewar. Remove condensation by blowing dry air or nitrogen through the delivery hose.

Insert the transfer unit, intake end first, into the mouth of the Dewar; it rests on the Dewar flange. Initial insertion into the LN₂-filled Dewar results in a considerable escape of boiled-off nitrogen until the mass of the unit cools to the liquid temperature. Gradual insertion over a minute or so is recommended to avoid a vigorous boil-off.

Once installed, plug the power cord into a power outlet. Leave power applied to the transfer unit at all times whether or not the drawing of LN₂ is frequent or infrequent. The presence of power permits a very low input of heat at the intake end. This very small input of energy ensures a small, constant outflow of evaporated nitrogen through the discharge line and prevents the counter diffusion of moisture-laden, ambient air which can lead to internal deposition of ice and eventual freeze-up of the discharge line.

If the output line becomes clogged with ice despite the system described above, remove the transfer unit from the storage Dewar and allow it to warm to room temperature. Then blow the line dry using a compressed air source.

An output of LN₂ as great as 3.5 L/min can be achieved when the Dewar is full and the pump is operated at maximum speed. This is excessive for filling most laboratory Dewars. Turn the flow control knob fully counterclockwise initially and then turn it clockwise until the desired rate is achieved. When the Dewar is nearly empty, a high called-for discharge rate may result in cavitation and consequent diminished output. Cavitation will be recognized by excessive motor noise; if this happens, turn the flow control knob counterclockwise until a steady output is again attained.