Operation Manual and Parts List

Lab-Line

Vacuum Ovens

Model: 3608, 3608-1, 3608-1ACE, 3608-1CE, 3608-1CCE, 3608-1C/PCE, 3608-5, 3608-5X, 3608X, 3608-6, 3608-6CE, 3608-6CCE, 3618, 3618FEP, 3618-1, 3618-1CE, 3618-1CCE, 3618-5, 3618-6, 3618-6CE

Literature: 9-056-602-00

1/98

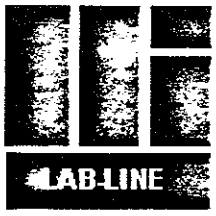
OPERATION MANUAL

MANUAL NO. 9-056-602-00
REV. NO. E

LAB-LINE® VACUUM OVENS

MODEL NOs.

3608	3608-6
3608-1	3608-6CE
3608-1ACE	3608-6CCE
3608-1CE	3618
3608-1CCE	3618FEP
3608-1C/PCE	3618-1
3608-5	3618-1CE
3608-5X	3618-1CCE
3608X	3618-5
	3618-6,
	3618-6CE



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CE

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SECTION 1

INTRODUCTION

THANK YOU

for selecting Lab-Line Instruments for your equipment needs. For maximum value and ease of start-up,

PLEASE PROCEED AS FOLLOWS:

- Inspect the carton and contents for shipping damage. Notify the carrier immediately if damage is found.
- Use the Accessory Checklist when unpacking to verify that the complete unit has been received. Do not discard packing materials until all is accounted for.
- Read this Operation Manual thoroughly *before* deciding upon an appropriate location for the unit: you will want to consider the availability of power, water, hook-ups, drains and other unit requirements, as well as user convenience.
- Insist that every operator of this unit becomes familiar with the Operation Section of this manual.
- Be sure to fill out the Warranty Registration Card and mail it in to Lab-Line Instruments within seven (7) days after receiving the unit.

IF

after reading this manual you should have any difficulties with the installation or operation instructions, please call:

Lab-Line Customer Relations Department
708/450-2600 (in Illinois)
1-800/LAB-LINE (elsewhere)

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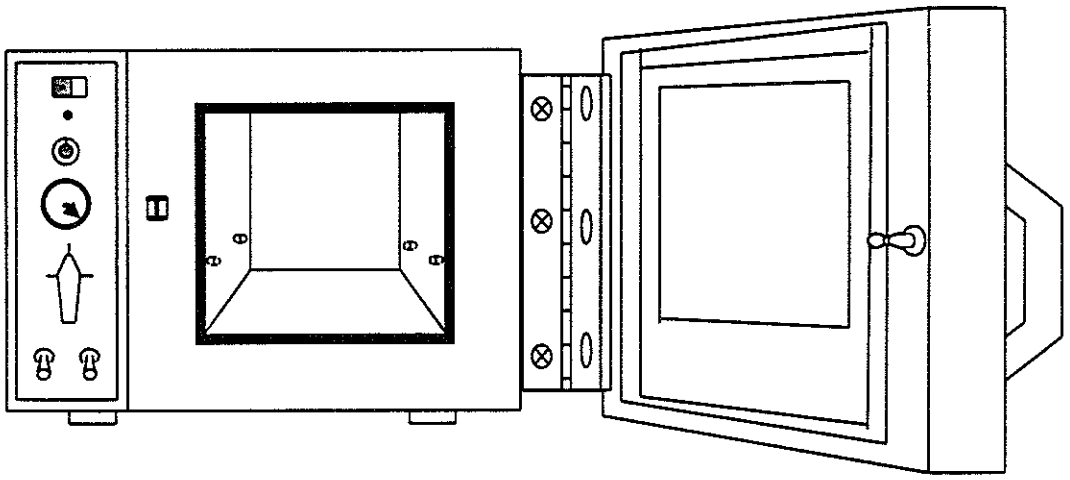
SECTION 2

DESCRIPTION



Lab-Line's Vacuum Ovens are designed for drying media under carefully controlled conditions—in a normal atmosphere, a vacuum of up to 30 inches Hg, or an inert gas atmosphere.

The oven is primarily used for desiccating, vacuum embedding, plating and electronic component processing. Non-corrosive, nonflammable gases such as nitrogen and carbon dioxide can be used in the oven.

All controls and connections (except electrical power) are located on the front vertical panel—these include lighted power switch, vacuum gauge, temperature control, vacuum control valve and nickel-plated hose connectors.

Uniform radiant wall heat, with no internally exposed heaters, optimizes chamber space. 3-inches (76 mm) of glass wool insulation throughout helps maintain temperature uniformity effectiveness. Temperature is controlled by a hydraulic thermostat and can be read on a dial thermometer or an LED display.

The chamber of the unit is not designed for exposure to concentrated solvents, oils, concentrated acids or dilute sodium hydroxide.

Vacuum levels are precisely held between 0 and 30-inches of mercury.

The silicone door gasket assures a tight seal at all vacuum levels. A high-strength tempered glass window allows full view of oven contents. Two aluminum shelves provide good heat conduction to samples. The shelf assembly removes for easy cleaning.

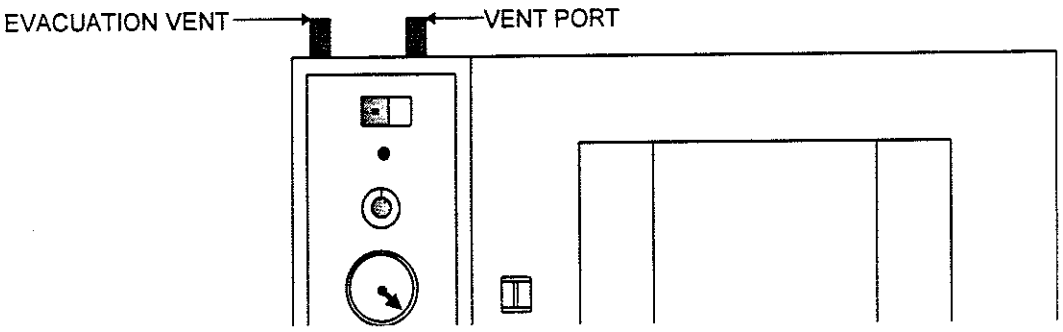
IMPORTANT NOTE: WHEN OPERATING IN A VACUUM, THERE IS NO TRANSFER OF HEAT FROM THE EVACUATED CHAMBER INTERIOR TO OBJECTS WITHIN THE CHAMBER UNLESS THEY ARE RESTING DIRECTLY UPON ONE OF THE SHELVES—DO NOT PUT INSULATING MATERIAL BETWEEN A SHELF AND A VESSEL BEING HEATED. ALSO, BE SURE THAT A THERMOMETER'S SENSOR ELEMENT IS IN DIRECT CONTACT WITH THE SURFACE OF THE CENTER SHELF WHEN TAKING A READING.

DESCRIPTION: (Con't)

MODEL DESIGNATIONS AND THEIR FEATURES:

3608, 3608-1, 3618 and 3618-1: Models with dial thermometer
3608-5, 3608-6, 3618-5 and 3618-6: Models with LED temperature display.

3608-5X **ONLY**: DETAIL OF TOPSIDE PORTS



SECTION 3

SPECIFICATIONS

POWER REQUIREMENTS:	
3608, 3608-5:	120 VAC, 50/60 Hz, 5.0 Amps, 600 Watts
3608-1, 3608-6:	240 VAC, 50/60 Hz, 2.5 Amps, 600 Watts
3618, 3618-5:	120 VAC, 50/60 Hz, 13.3 Amps, 1600 Watts
3618-1, 3618-6:	240 VAC, 50/60 HZ, 6.7 Amps, 1600 Watts
3618FEP:	(Same as Model 3618 except interior of unit is Teflon® coated)
TEMPERATURE RANGE:	All Models: From slightly above ambient to 220°C
THERMOMETER TYPE:	
3608, 3608-1, 3618, 3618-1:	Bimetallic, dial type; range from 0°C to 300°C in 5°C increments
3608-5, 3608-6, 3618-5, 3618-6:	LED Display; range from 0°C to 300°C in 1°C increments
CHAMBER DIMENSIONS:	
3608, 3608-1, 3608-5, 3608-6:	10"W x 12"D x 10"H (25 x 30 x 25 cm)
3618, 3618-1, 3618-5, 3618-6:	14"W x 20"D x 14"H (36 x 51 x 36 cm)
OVERALL DIMENSIONS:	
3608, 3608-1, 3608-5, 3608-6:	19-7/8"W x 16"D x 16¼"H (50 x 40 x 41 cm)
3618, 3618-1, 3618-5, 3618-6:	25"W x 25"D x 22"H (64 x 64 x 56 cm)
VOLUME:	
3608, 3608-1, 3608-5, 3608-6	0.7 cubic feet (19.8 liters)
318, 3618-1, 3618-5, 3618-6	2.3 cubic feet (65.1 liters)
NET WEIGHT:	
3608, 3608-1, 3608-5, 3608-6:	83 lbs. (38 kg)
3618, 3618-1, 3618-5, 3618-6:	150 lbs. (68 kg)

UNIT'S ENVIRONMENTAL OPERATING CONDITIONS:

POLLUTION DEGREE:	2
INSTALLATION CATEGORY:	II
ALTITUDE:	2000 Meters MSL (Mean Sea Level)
HUMIDITY:	80% maximum, non-condensing
ELECTRICAL SUPPLY:	120VAC or 240VAC
VOLTAGE TOLERANCE:	±10% of normal rated line
TEMPERATURE:	15°C to 40°C
PRODUCT USAGE:	This product is intended for use indoors **only**

SECTION 4

INSTALLATION

√SHIPPING CARTON:

This should be inspected upon delivery. When received, carefully examine for any shipping damage before unpacking. If damage is discovered, the delivering carrier should both specify and sign for the damage on your copy of the delivery receipt.

Open the carton carefully making certain that all parts are accounted for before packaging materials are discarded—after unpacking, if damage is found promptly report it to the carrier and request a damage inspection promptly.

IMPORTANT: Failure to request an inspection of damage within a few days after receipt of shipment absolves the carrier from any liability for damage: you must call for a damage inspection promptly.

LOCATION:

Place the unit where it will be operated, away from drafts and wide variations in ambient temperature. It should be near a power source that matches the unit nameplate requirements. Allow clearance around the unit for free air convection, hose/accessory attachment and user access. DO NOT put the oven on top of or underneath another oven, or on a combustible surface.

HOSE CONNECTIONS:

Connect a ¼-inch ID vacuum hose to the left hose connector on the control panel which is marked "EVACUATE". Connect the other end of the hose to a vacuum pump.

If operation will include replacing the vacuum in the chamber with an inert gas such as carbon dioxide or nitrogen, connect a ¼-inch ID flexible hose to the right hose connector which is marked "VENT" and to the regulator for the gas supply. DO NOT use combustible, flammable or corrosive gases.

ELECTRICAL CONNECTION:

The unit is supplied with a 3-wire line cord. It should be plugged into an outlet supplying the correct voltage for the unit and designed for 3-prong plugs.

For an outlet designed to accept 2-prong (ungrounded) plugs, the best recommendation is to have a qualified electrician replace it with a new grounded outlet.

If a plug must be installed, use only the 3-prong grounded type, rated for the unit load requirements and matching the power outlet. Make sure the green ground wire is secured to the plug ground post—refer to the upcoming wiring schematics if necessary.

Turn the power switch **OFF** and insert the plug into the outlet.

FOR MODEL 3618 UNITS **ONLY**: Turn the power switch to the **OFF** position. For the 120V unit, plug the power cord into a grounded 20 amp outlet; for the 240V unit, attach proper power plug to match the power outlet.

INSTALLATION: (Con't)

THERMOMETER:

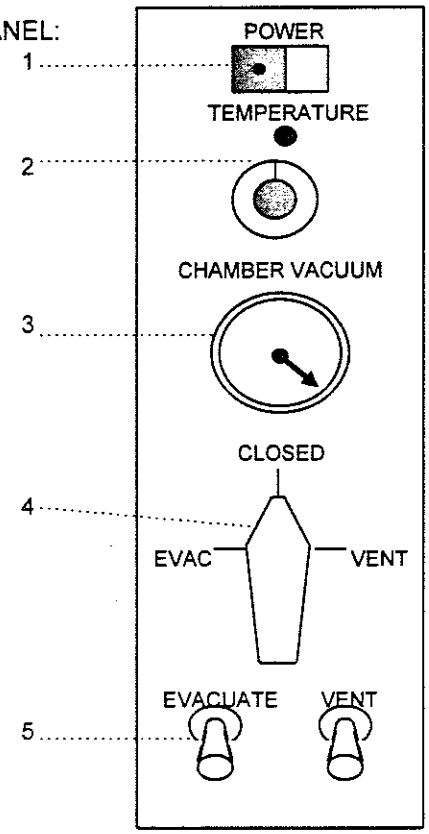
For models using the dial thermometer—3608, 3608-1, 3618 and 3618-1—place the thermometer so that the sensing element is in direct contact with the top shelf. The dial should be easily visible through the glass door.

Models with the LED display of temperature—3608-5, 3608-6, 3618-5 and 3618-6—are easily identifiable with the LED positioned just below the power switch.

SECTION 5

FEATURES

CONTROL PANEL:



MODELS WITH DIAL THERMOMETER:

1. POWER SWITCH: Power is on to the unit when this switch lamp is lit. (To reset the circuit breaker press this switch to off, then on.)
   #440-359-00 (120V), #440-292-00 (240V)*

2. CONTROL THERMOSTAT & STATUS LAMP: Adjust manually to control oven temperature. A permanently-set bimetallic thermostat (not on the panel) limits oven temperature at 250°C should the control thermostat fail.)
   #920-283-00 (BIMETALLIC THERMOSTAT), #560-223-00 (KNOB) ; #360-235-00 (LAMP LENS)*

3. VACUUM GAUGE: Displays chamber level to 30-inches of mercury.
   #660-103-00 (3608,-1, 3618, -1) *

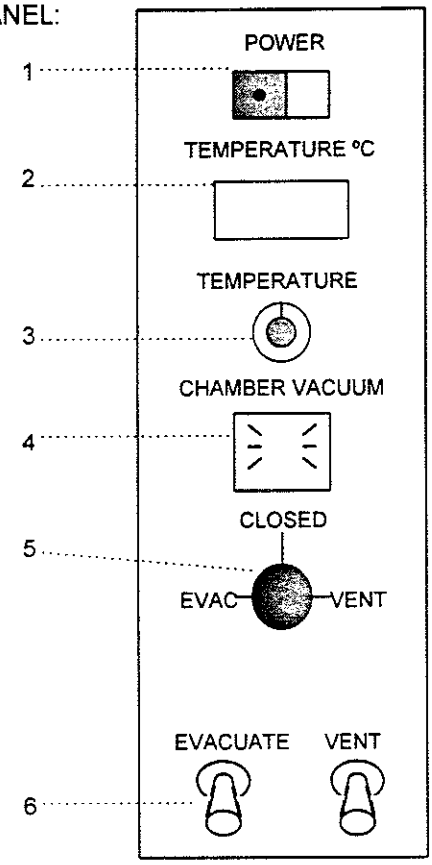
4. VACUUM/VENT VALVE: 3-way valve draws, holds or releases a vacuum.
   #950-125-00*

5. HOSE CONNECTORS: Marked "EVACUATE" and "VENT" for ¼" flexible tubing to connect to a gas source or vacuum pump.

*AS LISTED ON UPCOMING REPLACEMENT PARTS LIST

FEATURES: (Con't)

CONTROL PANEL:



MODELS WITH LED READOUT:

1. POWER SWITCH: Power is on to the unit when this switch lamp is lit. (To reset the circuit breaker press this switch to off, then on.)
   #440-359-00 (120V), #440-292-00 (240V)*

2. LED TEMPERATURE DISPLAY: Readout of temperature.

3. CONTROL THERMOSTAT & STATUS LAMP. Adjust manually to control oven temperature. A permanently-set bimetallic thermostat (not on the panel) limits oven temperature at 250°C should the control thermostat fail.)
   #920-283-00 (BIMETALLIC THERMOSTAT), #560-223-00 (KNOB) ; #360-235-00 (LAMP LENS)*

4. VACUUM GAUGE: Displays chamber level to 30-inches of mercury.
   #660-097-00 (3608-5,-6) OR $660-097-00 (3618-5, -6)*

5. VACUUM/VENT VALVE: 3-way valve draws, holds or releases a vacuum.
   #950-125-00*

6. HOSE CONNECTORS: Marked "EVACUATE" and "VENT" for ¼" flexible tubing to connect to a gas source or vacuum pump.

*AS LISTED ON UPCOMING REPLACEMENT PARTS LIST

SECTION 6

OPERATION

DANGER: DO NOT USE IN THE PRESENCE OF FLAMMABLE OR COMBUSTIBLE MATERIALS OR EXPLOSIVE GASES. DO NOT USE IN THE PRESENCE OF PRESSURIZED OR SEALED CONTAINERS—FIRE OR EXPLOSION MAY RESULT, CAUSING DEATH OR SEVERE INJURY.

WARNING: DO NOT HEAT ANY SUBSTANCE ABOVE A TEMPERATURE WHICH WILL CAUSE IT TO EMIT TOXIC FUMES—DEATH OR SEVERE INJURY MAY RESULT.

TEMPERATURE CONTROL:

If it is necessary to set temperature before loading oven, push the power switch **ON** and note that the power switch light is lit. Rotate the thermostat knob to approximate the desired setting. The heater status lamp will be steadily lit until the chamber temperature approaches the thermostat setting. Wait several heat cycles until the temperature has stabilized.

Check the thermometer—dial or LED display—and rotate the thermostat knob clockwise to raise the setpoint or counterclockwise to lower it. After oven temperature has stabilized, check the temperature again and make further thermostat adjustments until the thermometer consistently shows the desired operating temperature. Push the power switch **OFF** and allow the oven to cool down, or, if a batch is ready, the oven can be loaded immediately.

LOADING THE OVEN:

For units which utilize a dial thermometer, the thermometer can be removed and put back after loading if that is more convenient. Note that the thermometer sensing element must be in direct contact with a shelf for an accurate reading.

For best results, distribute the load evenly in the chamber, at least 1-inch away from chamber walls and resting directly on the shelves. DO NOT PLACE FLAMMABLE SOLVENTS OR VAPORS in the oven and avoid spilling acids. Be careful not to heat substances above their auto-ignition temperatures.

While the oven door is open, apply a high-quality vacuum grease to the door gasket. Close the door and push the power switch **ON**. If oven temperature was not previously set, review above at "TEMPERATURE CONTROL" to set the desired operating temperature.

MAINTAINING PROPER VACUUM LEVEL:

The vacuum level will decrease slightly over a period of time. To bring it back up, rotate the vacuum/vent valve to "EVACUATE" and start the vacuum pump.

When the vacuum gauge again shows the desired level, rotate the vacuum/vent valve to the setting marked "CLOSED" and shut off the vacuum pump.

OPERATION: (Con't)

RELEASING THE VACUUM:

If the vacuum is to be replaced by ambient air, disconnect any tubing attached to the hose connector marked "VENT" and rotate the vacuum/vent valve to its "VENT" setting.

PURGING THE CHAMBER WITH INERT GAS:

Use only a non-combustible, nonflammable, non-corrosive gas—such as nitrogen or carbon dioxide—if application requires replacing the vacuum with an inert gas.

Connect ¼-inch ID tubing to the hose connector marked "VENT" and connect the other end of the tubing to the regulator at the inert gas source.

Start the gas flowing at no more than 5 psi. Rotate the vacuum/vent valve to the "VENT" position and shut off the regulator when the vacuum gauge reads zero (normal atmospheric pressure).

WARNING: DO NOT PRESSURIZE THE CHAMBER ABOVE ATMOSPHERIC PRESSURE—THE OVEN WILL NOT WITHSTAND A POSITIVE INTERNAL PRESSURE. **WHEN THE VACUUM GAUGE READS ZERO, SHUT THE GAS OFF**.

The oven does not require very much gas to fill the chamber:

3608, 3608-1, 3608-5, 3608-6: Interior volume is 0.75 cubic feet
3618, 3618-1, 3618-5, 3618-6: Interior volume is 2.30 cubic feet

UNLOADING THE OVEN:

When the bake is completed and the vacuum has been released or replaced as described above and on the previous page, push the power switch to **OFF**. Open the oven door and remove the dial thermometer. Take the contents from the chamber and re-insert the thermometer with the sensing element in direct contact with the center shelf.

SECTION 7

MAINTENANCE

BE ADVISED:

NOTE: MAKE NO ATTEMPT TO SERVICE OR REPAIR A LAB-LINE PRODUCT UNDER WARRANTY BEFORE CONSULTING YOUR LAB-LINE DEALER. AFTER THE WARRANTY PERIOD, SUCH CONSULTATION IS STILL ADVISED, ESPECIALLY WHEN THE REPAIR MAY BE TECHNICALLY SOPHISTICATED OR DIFFICULT.

IF ASSISTANCE IS NEEDED BEYOND WHAT THE DISTRIBUTOR CAN PROVIDE, PLEASE CALL THE LAB-LINE CUSTOMER RELATIONS DEPARTMENT AT 708/450-2600 (IN ILLINOIS) OR 1-800/LAB-LINE (ELSEWHERE).

NO MERCHANDISE, HOWEVER, SHOULD BE RETURNED DIRECTLY TO LAB-LINE WITHOUT PRIOR APPROVAL FROM LAB-LINE.

CAUTION: DISCONNECT PLUG FROM ELECTRICAL OUTLET BEFORE ATTEMPTING ANY MAINTENANCE OR REPAIR OF THIS UNIT.

ROUTINE CLEANING:

Wash the cabinet with a solution of water and mild soap or detergent to clean off surface dirt, marks or smudges.

Keep the vents clear of dust for free air circulation. This will add to the service life of components.

The aluminum shelf assembly should be washed with a mild soap and water. Do not use abrasive or halogen-based cleaners—they will damage the finish. Rinse thoroughly and dry completely.

Wipe interior glass with an ammonia-based glass cleaner and a soft, lint-free cloth.

Clean up spills inside the chamber as soon as possible to prevent them from being baked on. When the oven is cool, use hot soapy water and a soft cloth to clean the #304 stainless steel chamber. Do not use scouring pads with metallic content, chlorine bleach or halogen-based cleaners. (Special order units may come with stainless steel shelves, in addition to the stainless steel interior.)

CARE AND CLEANING OF STAINLESS STEEL:

CAUTION: DISCONNECT UNIT FROM POWER SOURCE PRIOR TO CLEANING. WE RECOMMEND ALL SERVICE BE PERFORMED BY QUALIFIED SERVICE PERSONNEL.

WARNING: ELECTROLYSIS CAN DAMAGE STAINLESS STEEL. THIS OCCURS WHEN AN OBJECT IS ALLOWED TO REST DIRECTLY ON THE SURFACE OF STAINLESS STEEL, TRAPPING MOISTURE THAT BECOMES OXYGEN-STARVED, BUT IS SURROUNDED BY WATER-CONTAINING OXYGEN.

MAINTENANCE: (Con't)

THE ALLOY CALLED STAINLESS:

Stainless steel is an alloy of steel with chromium and nickel which increase the metal's resistance to rust and corrosion. Yet, if not properly cared for, stainless steel can rust and corrode.

Exposure to air provides the passivation, or oxide layer coating, for clean stainless by producing a thin, durable chromium-oxide film that forms rapidly on the alloy surface to give stainless its characteristic "stainless" quality. Also exposure of the surface to other oxidizing environments can produce a passivating film or coating.

However, if free oxygen is not available due to scale or contamination buildup the metal surface may become vulnerable to rusting and corrosion as well as pitting. But by maintaining neutral pH and conducting frequent cleanings with detergent and water, years of trouble-free service from stainless steel products can be obtained.

SOME STAINLESS GUIDELINES TO CONSIDER:

Distilled water is recommended. Please note: if this water is very pure it may be corrosive to stainless. When filling a bath or incubator, ALWAYS ADD 2 to 40 PPM (20 TO 40 MG/LITER) DISODIUM PHOSPHATE OR SODIUM BICARBONATE, ADJUSTING DOSAGE TO PROVIDE A pH VALUE OF 7 TO 9.

If not available, use clean, aerated soft tap water provided the total solids concentration is < 500 PPM.

WE DO NOT RECOMMEND USING 18 MEG OHM DEIONIZED WATER. If this is the only source of treated water available—mix with regular tap water at a 50/50 ratio.

THE pH FACTOR:

Check pH regularly. If pH is <6.0, add disodium phosphate to increase pH to a 7 to 9 value. Sodium carbonate or sodium bicarbonate may be used but they tend to form scale which must be rinsed out regularly. If pH is >10.0, add sodium bisulfate to decrease pH to a 7 to 9 value. Avoid adding harsh alkalines or acids since these may cause localized corrosion and result in unstable pH.

SPECIAL CONSIDERATIONS:

WARNING: IF IT IS NECESSARY TO USE THE FOLLOWING CHEMICALS, LIMIT EXPOSURE TIME TO A MAXIMUM OF 3 HOURS—ALWAYS CLEAN SURFACES IMMEDIATELY AFTER USE.

Chemicals which should be limited to a 3 hour maximum exposure time to stainless steel are:

Aluminum chloride	E.D.T.A.	Potassium permanganate
Barium chloride	Ferrous chloride	Potassium thiocyanate
Calcium chloride	Lysol	Sodium hypochlorite
Chlorinated Lime	Mercury salts	Stannous chloride
Citric acid (boiling)	Phenol	Tartaric acid
Dakin's solution		

MAINTENANCE: (Con't)

BE ADVISED: NEVER USE THE FOLLOWING ON STAINLESS STEEL:

Aqua regia
Ferric chloride
Iodine
Sodium acid
Sodium azide

Chemical spills, especially those agents listed here, should be removed as soon as possible and the stainless steel surface cleaned with mild soapy water followed by a clean water rinse.

CLEANSING AGENTS:

Anti-fungal and anti-bacterial additives are permissible to use as long as the pH of the aqueous solution is kept within the range of 7 to 9. These are available through laboratory distributors—but be sure to CONFIRM that they are not harmful to stainless steel.

CLEANING METHODS:

Do not use any metallic pads. Instead, for stubborn stains, use a plastic light-duty cleansing pad and rub GENTLY in the direction of the metal grain.

If stains continue to persist, use one of the following chemicals and methods.

CAUTION: EXTREME CARE MUST BE TAKEN WHEN HANDLING THESE MATERIALS. ALWAYS WORK IN AN AREA WITH ADEQUATE VENTILATION. USE THE PRECAUTIONS AS OUTLINED IN THE *MATERIAL SAFETY DATA SHEET* (MSDS) AND THE MANUFACTURER'S INSTRUCTIONS FOR THE PRODUCT BEING UTILIZED. ALSO, FOLLOW THE PERSONAL PROTECTION INDEX FOUND IN THE *HAZARDOUS MATERIALS INFORMATION SYSTEM* (HMIS) SECTION OF THE *MSDS*.

NOTE: THE USE AND DISPOSAL OF THESE CHEMICALS MAY BE REGULATED BY YOUR LOCAL CITY CODES; CONSULT THOSE REGULATIONS BEFORE OF DISPOSING OF THESE MATERIALS.

- Any of a variety of "scale removers" available at local supermarkets or hardware stores used for the cleaning of coffee marks, humidifiers or vaporizers.
- A 15% to 35% phosphoric acid solution available from laboratory supply distributors for scale and rust removal. Allow solution to soak the surface affected until rust and scale is loosened. Immediately follow with a clean water rise.
- Citric acid based cleaners.
- Bathroom tub and tile cleaners.

MAINTENANCE: (Con't)

CLEANING METHODS: (Con't)

- A mixture of 20% nitric acid and 1.5% hydrofluoric acid (or hyrochloric acid). Swab solution on surface allowing it to remain until rust is loosened. Immediately follow with a clean water rise. (This method should ONLY be used if SEVERE rust and scale stains are present.)

- Oxalic acid 2% to 5% in warm water. Swab solution on surface allowing it to remain until rust is loosened. Immediately follow with a clean water rise. (This method should ONLY be used if SEVERE rust and scale stains are present.)

Regardless of the approach utilized, ALWAYS follow the manufacturer's directions and allow the chemicals to do the cleaning with MINIMAL scrubbing. Always follow cleanings with a clean water rinse. Air dry.

MATERIALS EFFECTIVE IN DISINFECTING:

- Glutaraldehyde
- Alcohol

BE ADVISED: THIS INFORMATION IS INTENDED AS **GUIDELINES ONLY** AND LAB-LINE INSTRUMENTS, INC. MAKES NO CLAIM AS TO THE SUITABILITY TO ANY PARTICULAR SITUATION. CONSULT YOUR STAFF CHEMIST TO DETERMINE WHAT WOULD BE BEST FOR YOUR STAINLESS STEEL PRODUCT AND LABORATORY.

DOOR GASKET LUBRICATION:

Apply a high-quality vacuum grease to the door gasket frequently, especially before initiating a vacuum. Also apply vacuum grease to the gasket after shutdown, if the oven will not be used in the near future.

SECTION 8

TROUBLESHOOTING

There are few oven parts that will require repair. In case of a malfunction, the control thermostat, limit thermostat, heater status lamp, heaters, power switch, vacuum/vent valve and vacuum gauge are fairly easy to replace.

Use this troubleshooting guide to find a possible source of any problem, then test and/or make replacement as described.

NOTE: BEFORE ATTEMPTING ANY REPAIR, DISCONNECT POWER CORD FROM OUTLET.

SYMPTOM	POSSIBLE CAUSES OF PROBLEM
Excessive vacuum leaks:	Check door gasket and door alignment. Check for loose connections/fittings.* Check the vacuum/vent valve—order a replacement if it is leaking.*
Won't vent or evacuate:	Check for open fittings, large leaks.* Check vacuum/vent valve; replace if bad.* Check tubing & fittings for obstruction.* Apply high quality vacuum grease to door gasket.
Vacuum gauge not at zero when oven door is open:	Replace the vacuum gauge.*
Power switch does not light:	Check power cord and outlet for power. Re-set the circuit breaker by pushing the power switch on and off. Replace the power switch if necessary.

***NOTE**: ALL PIPE THREADS ARE WRAPPED WITH THREAD SEALING TAPE FOR A LEAKPROOF FIT—USE NEW TAPE IF ANY CONNECTION IS OPENED.

TROUBLESHOOTING: (Con't)

SYMPTOM	POSSIBLE CAUSES OF PROBLEM
Heater status lamp is out when cold oven is heating up:	Replace the heater status lamp.
The thermostat is set at maximum and thermometer does not register or only registers partial heating:	Move thermometer in contact with shelf. Check both thermostats—replace if bad. Make ohmmeter check of heater resistance and replace faulty heater(s).

SECTION 9

SERVICE GUIDES

CAUTION: PUSH THE POWER SWITCH **OFF** AND **UNPLUG** THE OVEN BEFORE ATTEMPTING ANY SERVICE OR REPAIRS ON THE UNIT.

CONTROL PANEL REMOVAL & INSTALLATION:

- Tilt the oven back to remove screws under the control panel. Carefully pull the bottom forward until the top is free. Pull it 3-inches (at most) from the oven to reach behind and remove internal copper tubing from the vacuum gauge.
- To replace the panel, first attach copper tubing securely to the vacuum gauge, then guide the panel top edge onto mounting studs. Fasten the bottom edge screws and power up to test components.

POWER SWITCH REPLACEMENT:

Disconnect power, remove the control panel, then locate the power switch and associated wiring.

- Compress 4 tabs to push the switch out the front of the panel.
- Remove the leads from the old switch one at a time and attach them to the new switch—refer to the wiring schematic if needed.
- Push the new switch into place on the control panel and replace the control panel on the oven body.

CONTROL THERMOSTAT REPLACEMENT:

Disconnect power and remove the control panel, back panel (edge screws) and insulation.

- Locate the thermostat bulb from the back of the oven attached to the right-side heater on the vacuum chamber. Slide the bulb from its bracket.
- Remove the thermostat knob by loosening the setscrew and take the old thermostat from the control panel. Move the 3 leads to new thermostat, referring to the wiring schematic if necessary.
- Install the new thermostat on the control panel and tighten the knob onto it. Uncurl enough sensor tubing to slide the new bulb into its bracket with several inches of slack. Route the sensor tubing to prevent electrical shorts to other components.
- Replace the insulation and the back panel. Replace the control panel, power up and test run the oven.

SERVICE GUIDES: (Con't)

HEATER STATUS LAMP REPLACEMENT:

Disconnect power and remove the control panel—refer to the upcoming wiring schematic before continuing.

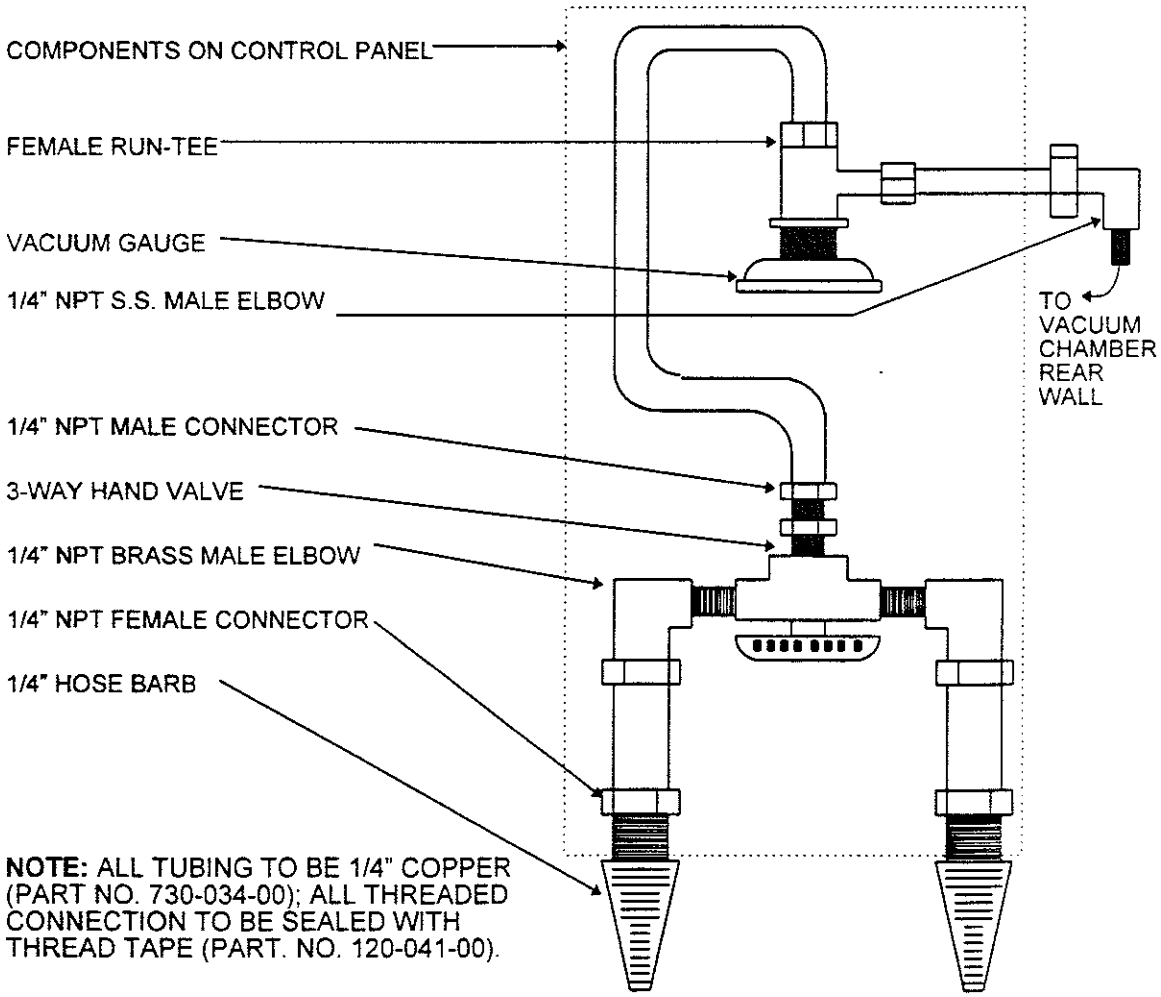
- Remove the status lamp lead at the thermostat and cut the other lead close to the heater status lamp.
- Pry the retaining clip from the old lamp and pull it from the control panel. Push the new lamp in place and install the same retaining clip on it. Attach the new lamp leads to the thermostat and to the cut wire, referring to the wiring schematic.
- Replace the control panel, power up and test the new status lamp.

SERVICE GUIDES: (Con't)

VACUUM/VENT VALVE REPLACEMENT:

Disconnect power and remove the control panel. Referring to the upcoming piping diagram below, loosen the copper tubing from 3 compression fittings on the vacuum/vent valve on the control panel. Then remove the 2 elbows and the straight connector from the valve body.

- Remove the control panel valve knob by loosening the hex setscrew. Then unscrew the valve retaining nut on front of the panel and take the old valve from the back of the panel.
- Install the new valve in the panel and tighten the retaining nut. Replace the valve knob and tighten the setscrew.
- Clean the old thread tape from elbow and connector threads. Wrap these threads with new thread tape, then install the elbows and connector on the new valve body. Connect this assembly to the vacuum gauge with the copper tubing and compression fittings.
- Replace the control panel, draw a vacuum and check for leaks.



NOTE: ALL TUBING TO BE 1/4" COPPER (PART NO. 730-034-00); ALL THREADED CONNECTION TO BE SEALED WITH THREAD TAPE (PART. NO. 120-041-00).

SERVICE GUIDES: (Con't)

VACUUM GAUGE REPLACEMENT:

After disconnecting power and removing the control panel, remove copper tubing from both compression fittings on the vacuum gauge—refer to the piping diagram on previous page if necessary.

- Remove the T-fitting from the back of the gauge and take off the gauge retaining bracket by removing the two thumbnuts. Pull the old gauge out from the front of the control panel.
- Install the new gauge in the panel and replace the retaining bracket with thumbnuts.
- Clean old thread tape from all male threads and wrap them with new tape. Install the T-fitting on the back of the new gauge and attach copper tubing with compression fittings to the gauge.
- Replace the control panel, draw a vacuum and check for leaks.

BACK PANEL COMPONENTS:

HI-LIMIT THERMOSTAT REPLACEMENT: Disconnect power and remove the back panel (edge screws) and insulation from around components. Locate the bimetallic limit thermostat on the back of the oven chamber.

- Remove the nut holding the thermostat in place. Disconnect the 2 leads from it and attach them to the new thermostat.
- Secure the new thermostat onto the back of the oven chamber. Replace insulation and the back panel, then power up and test run the oven.

HEATER REPLACEMENT: Disconnect power and remove the back panel (edge screws) and insulation from the back and sides. Note that oven Models 3608 and 3608-1 have 2 heaters, one located on each side of the chamber; Models 3618 and 3618-1 have 4 heaters, 2 located on each side.

- For Models 3618 and 3618-1, the control panel and the oven housing must also be removed. The oven housing is held by screws around the bottom edges. Lift it off and remove the rest of the insulation.
- For all models, unscrew the ¼-inch heater brace bolts to remove heater braces. Pull the leads from heater terminals and test each heater for shorts or low resistance at the heating element sheath. An ohmmeter resistance reading that differs greatly from 48 ohms for Models 3608, 3608-1, or 36 ohms for Model 3618, indicates a faulty heater.

SERVICE GUIDES: (Con't)

HEATER REPLACEMENT: (Con't)

- Install a new or original heater with terminals facing down, using a new heater brace if a new heater is installed. Attach leads to the heater, so that wires do not touch any heated surfaces (see the upcoming wiring schematic). Tighten mounting bolts securely.

- Replace the oven housing and control panel and repack side as well as back insulation, and replace the back panel.

DOOR AND GASKET REPAIRS:

DOOR GASKET REPLACEMENT: After pulling the old gasket from its groove, remove all dirt and foreign matter from the groove and from the mating surface on the oven.

NOTE: DO NOT LET PETROLEUM, SILICONE OIL OR GREASE CONTACT THE GASKET OR MOUNTING GROOVE.

- Press the new gasket onto the mounting surface in the middle of the top section. Press top corners into place, then the sides. Next, fit the bottom corners, then the bottom section into place. Press and spread the gasket to set it solidly in the door groove.

- Close the door to help seat the gasket. Open the door and apply a high-quality vacuum grease to the gasket. Evacuate the oven while pressing on the door to seat the gasket firmly.

DOOR ALIGNMENT: Inspect the door-to-gasket seal to find where the door is out of alignment. Note that there are 2 (inner and outer) sets of hinge bolts.

- Adjust vertical door position by loosening inner hinge-to-oven bolts. Tighten them securely when the door is straight.

- Adjust gasket compression tolerance (in/out movement) by the outer hinge-to-door bolts, then tighten them securely.

- After adjustment is made, check it by opening and closing the door several times. Regrease the gasket and test the seal by evacuating the oven. (Make further adjustments if necessary.)

SECTION 10

REPLACEMENT PARTS

DESCRIPTION	MODELS 3608,-1,-5,-6	MODELS 3618,-1,-5,-6
Circuit Breaker	330-119-00	330-128-00 (3618,-5,-6)
Circuit Breaker		330-118-00 (3618-1)
Cordset	470-105-00	470-122-00
Door Gasket	530-158-00	530-159-00
Glass Door	540-181-00	540-182-01
Heater	340-331-00	340-171-00
Heater Braces	014-247-00	583-657-00
Rubber Feet	790-225-00	790-078-00
Shelf Assembly	014-255-00	014-314-00
Status Lamp Base	360-233-01	360-233-01
Status Lamp Lens[1]	360-235-00	360-235-00
Switch, Power (120V)[2]	440-359-00 (3608,-5)	440-359-00 (3618,-5)
Switch, Power (240V)[3]	440-292-00 (3608-1,-6)	440-292-00 (3618-1,-6)
Thermometer, Dial	910-017-00 (3608,-1)	910-017-00 (3618,-1)
Thermometer, LED	910-126-00 (3608-5,-6)	910-126-00 (3618-5,-6)
Thermostat, Bimetallic[4]	920-283-00	920-283-00
Thermostat, Hydraulic	920-223-00	920-223-00
Thermostat, Knob	560-223-00	560-223-00
Transformer	460-266-00 (3608-5,-6)	460-266-00 (3618-1,-6)
Vacuum Gauge[5]	660-103-00 (3608,-1)	660-103-00 (3618,-1)
Vacuum Gauge[6]	660-097-00 (3608-5,-6)	660-097-00 (3618-5,-6)
Vacuum/Vent Valve[7]	950-125-00	950-125-00
S. S. Vacuum Gauge	660-103-01 (3608X)	
Wiring Schematics	227-659-00 (3608)	227-667-00 (3618)
	227-663-00 (3608-1)	227-668-00 (3618-1)
	228-693-00 (3608-1CE)	228-710-00 (3618-1CE)
	228-239-00 (3608-5)	228-429-00 (3618-5)
	228-276-00 (3608-6)	228-609-00 (3618-6)
	228-703-00 (3608-6CE)	228-694-00 (3618-6CE)

NEED A PART? CALL THE LAB-LINE PARTS HOTLINE.
CALL: 1-800/522-5463; FAX: 1-800/450-4522.

LAB-LINE RESERVES THE RIGHT TO CHANGE SPECIFICATIONS WITHOUT PRIOR NOTICE.

Door Latch Components:

11 Spring Catch 500-320-00

Strike Catch 500-319-00

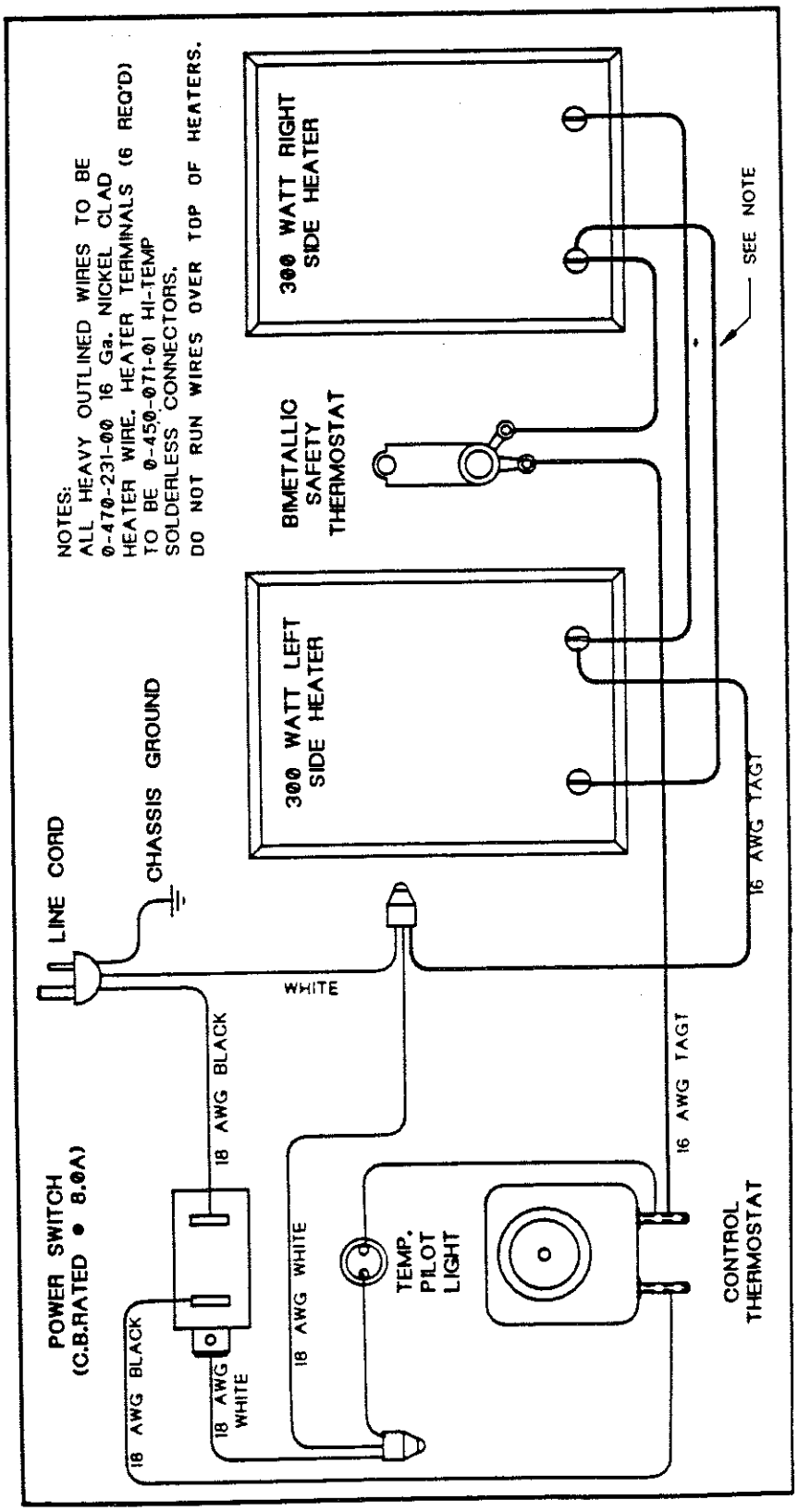
Door Handle 560-165-00

[1] AS ILLUSTRATED
[2] AS ILLUSTRATED
[3] AS ILLUSTRATED
[4] AS ILLUSTRATED
[5] AS ILLUSTRATED
[6] AS ILLUSTRATED
[7] AS ILLUSTRATED

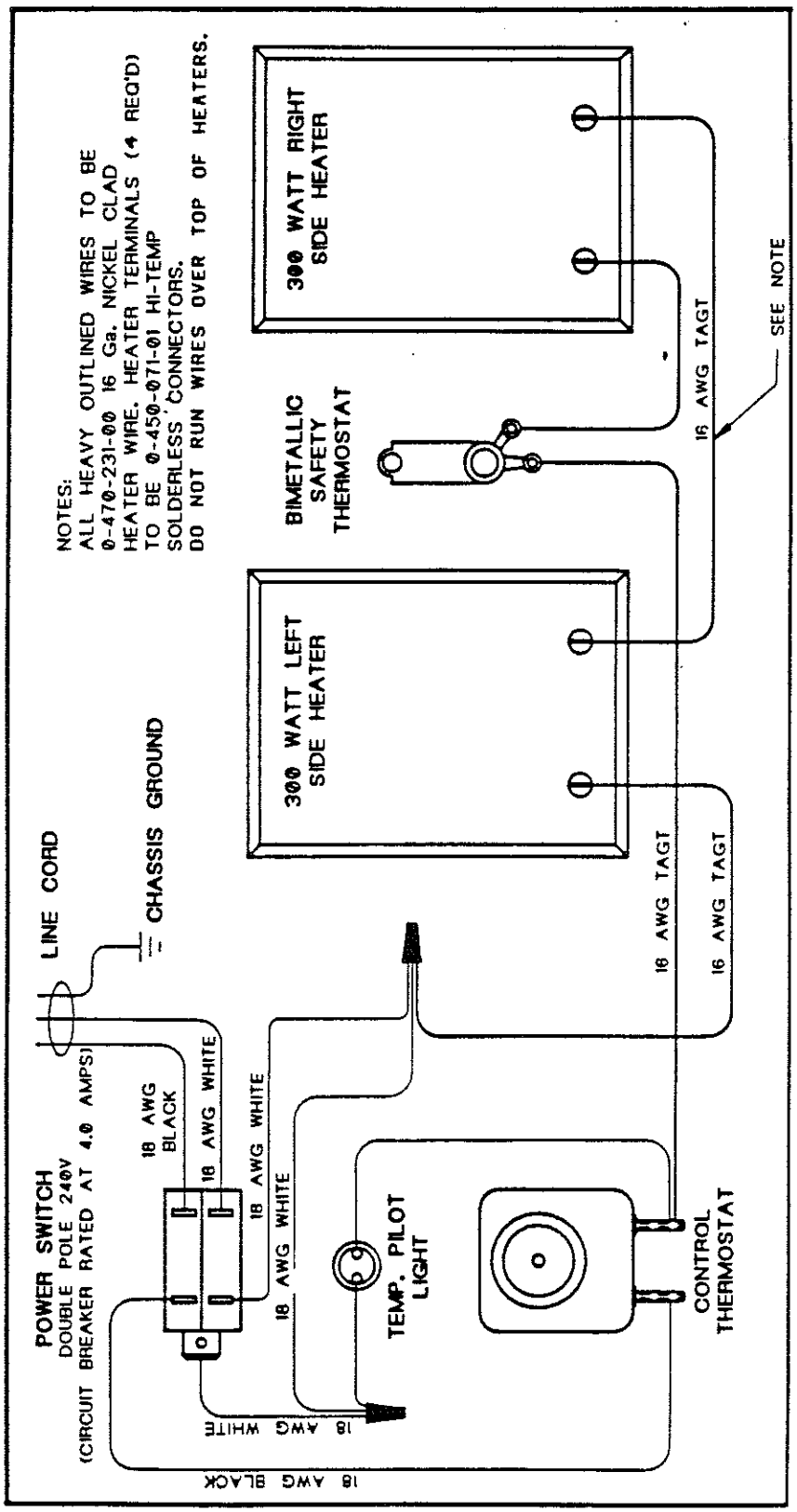
SECTION 11

WIRING SCHEMATICS

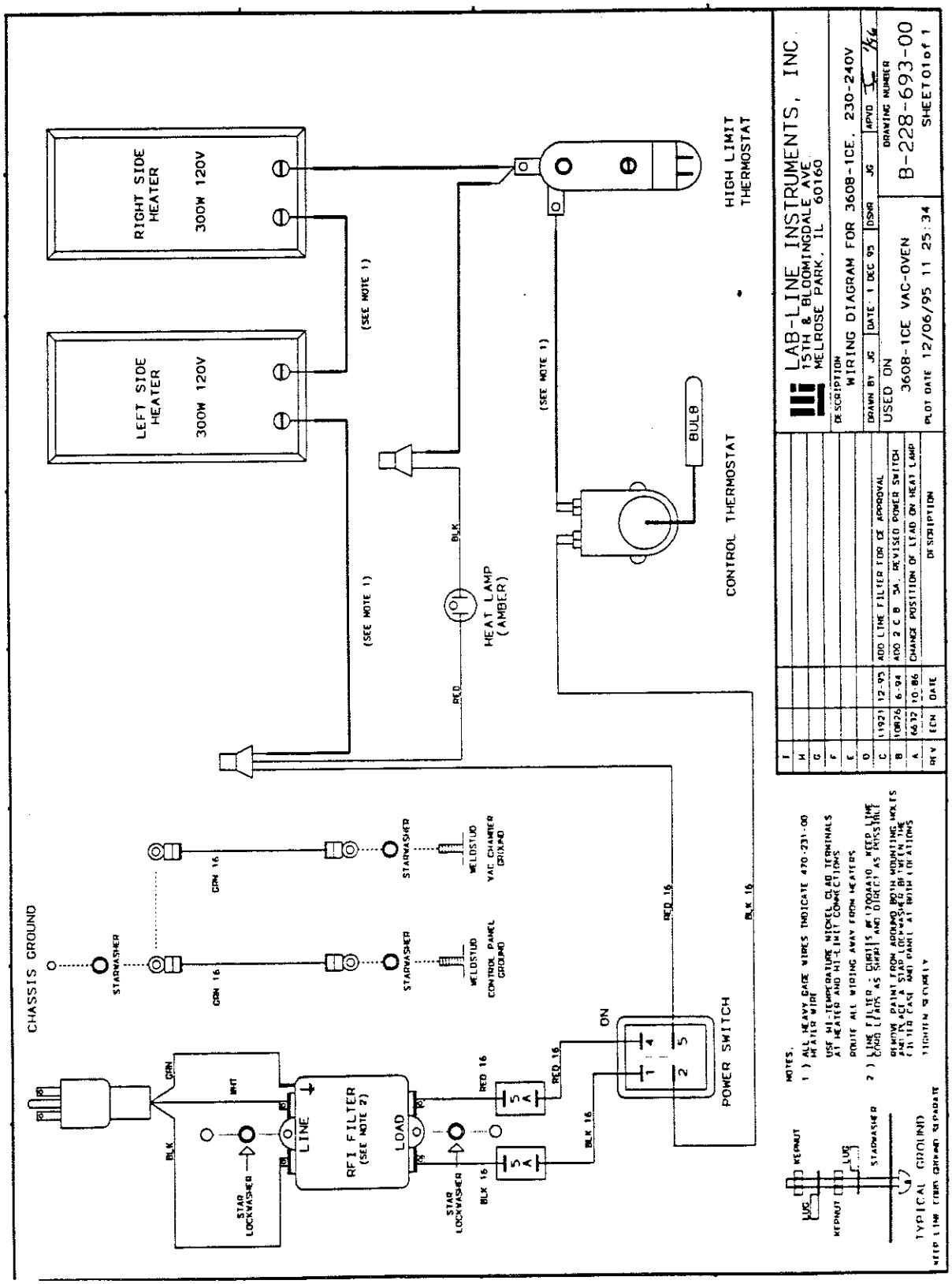
Wiring Schematic: #227-659-00 (3608)



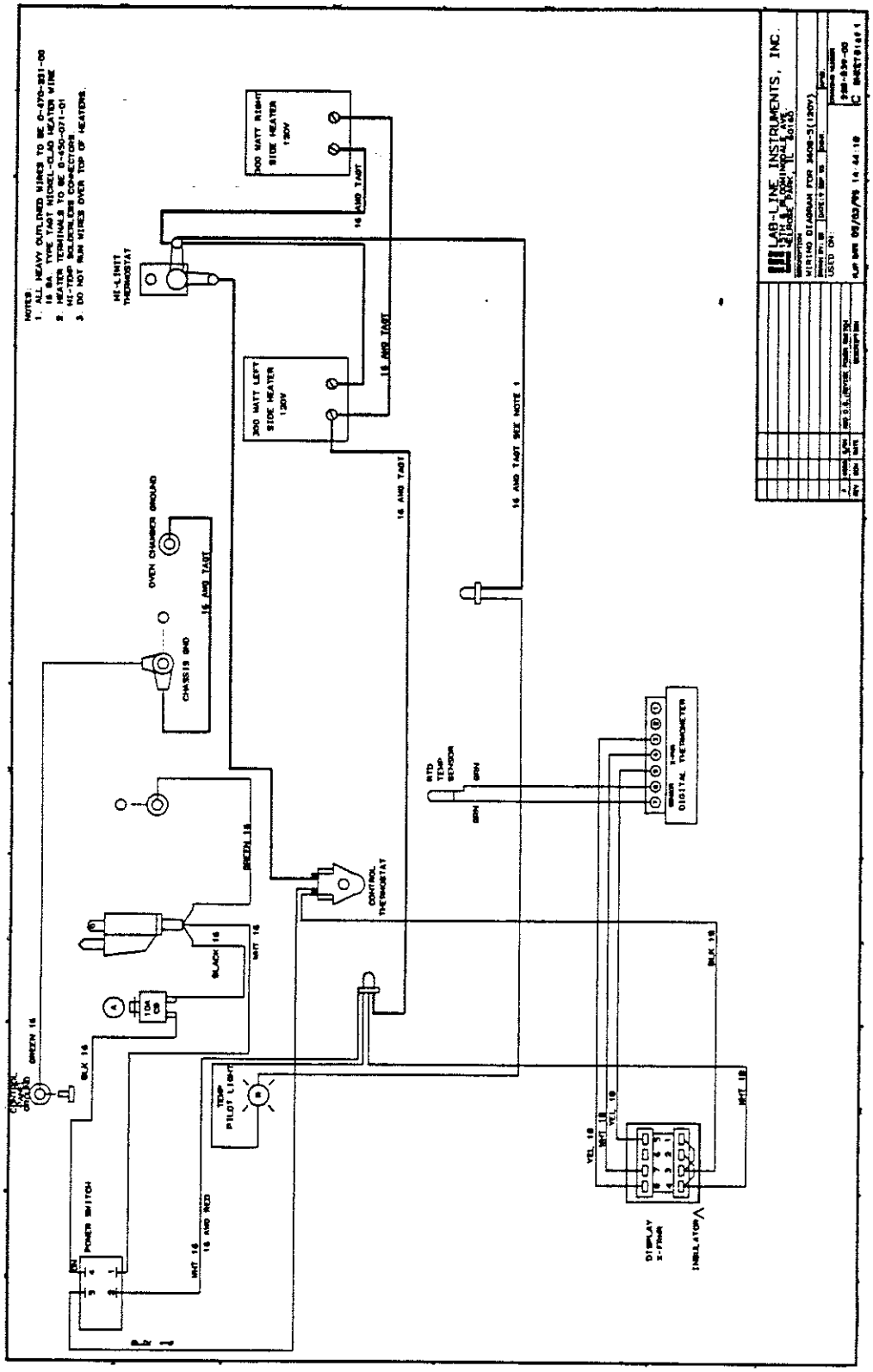
Wiring Schematic: #227-663-00 (3608-1)



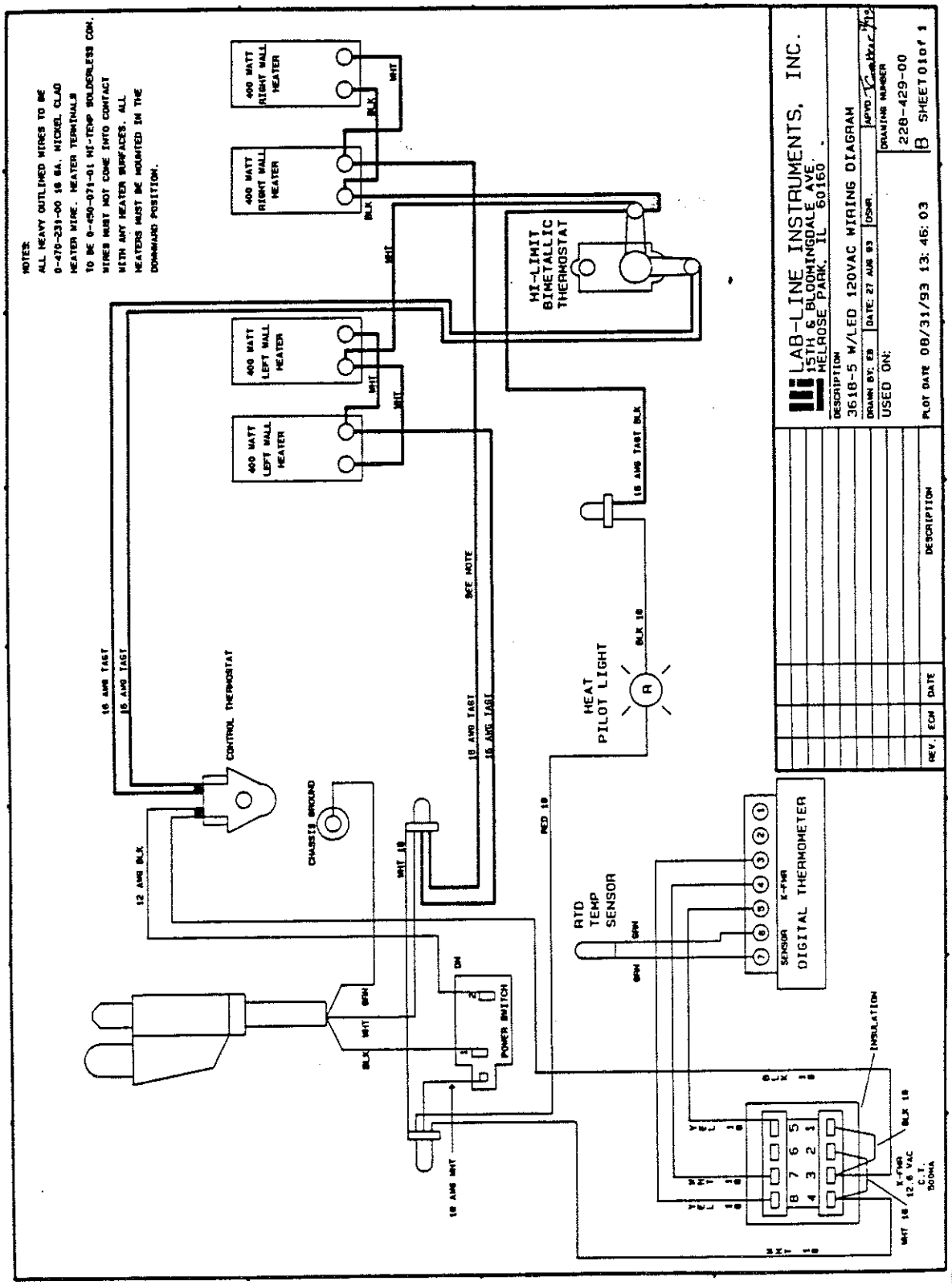
Wiring Schematic: #228-693-00 (3608-1CE)



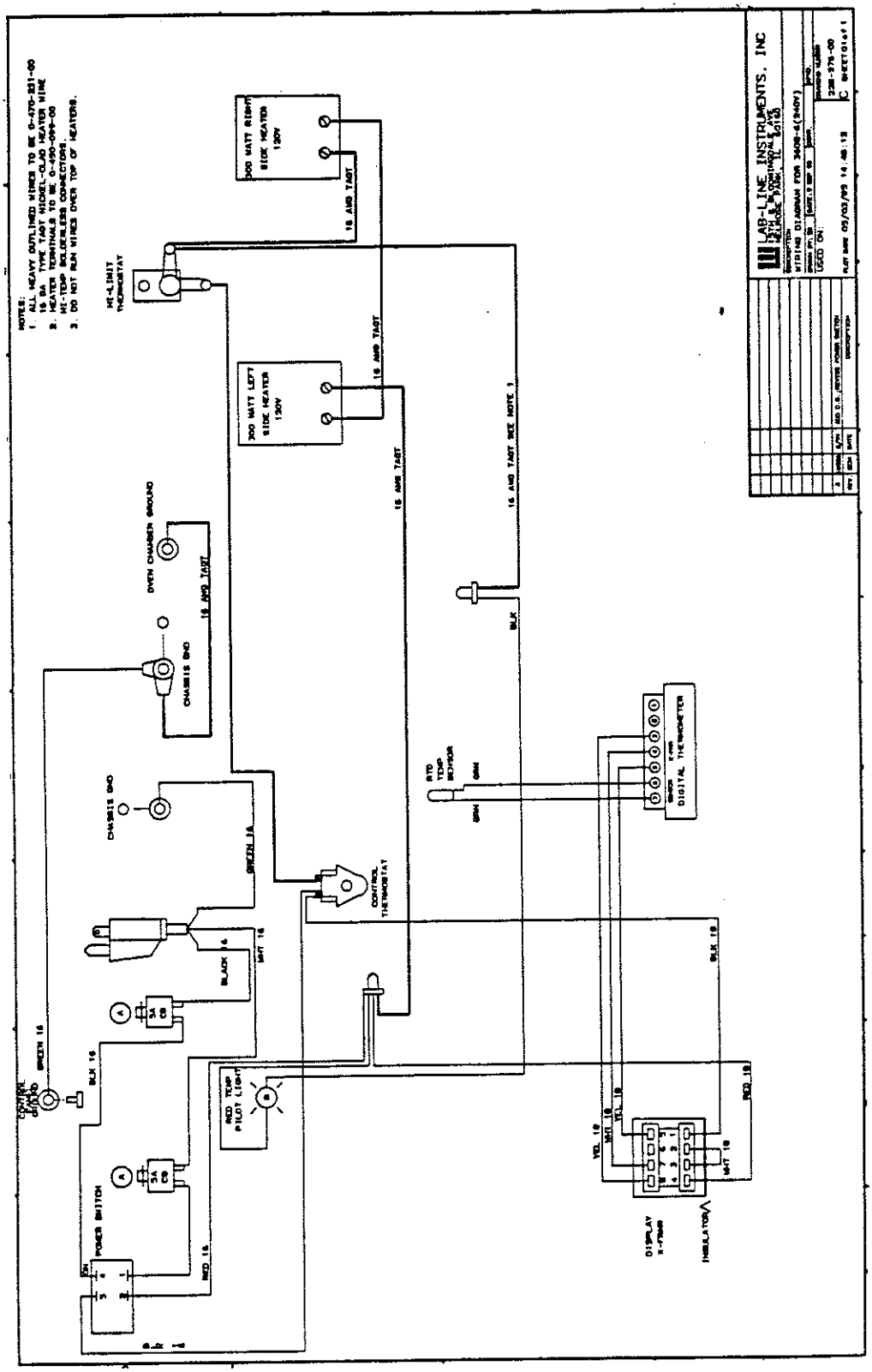
Wiring Schematic: #228-239-00 (3608-5)



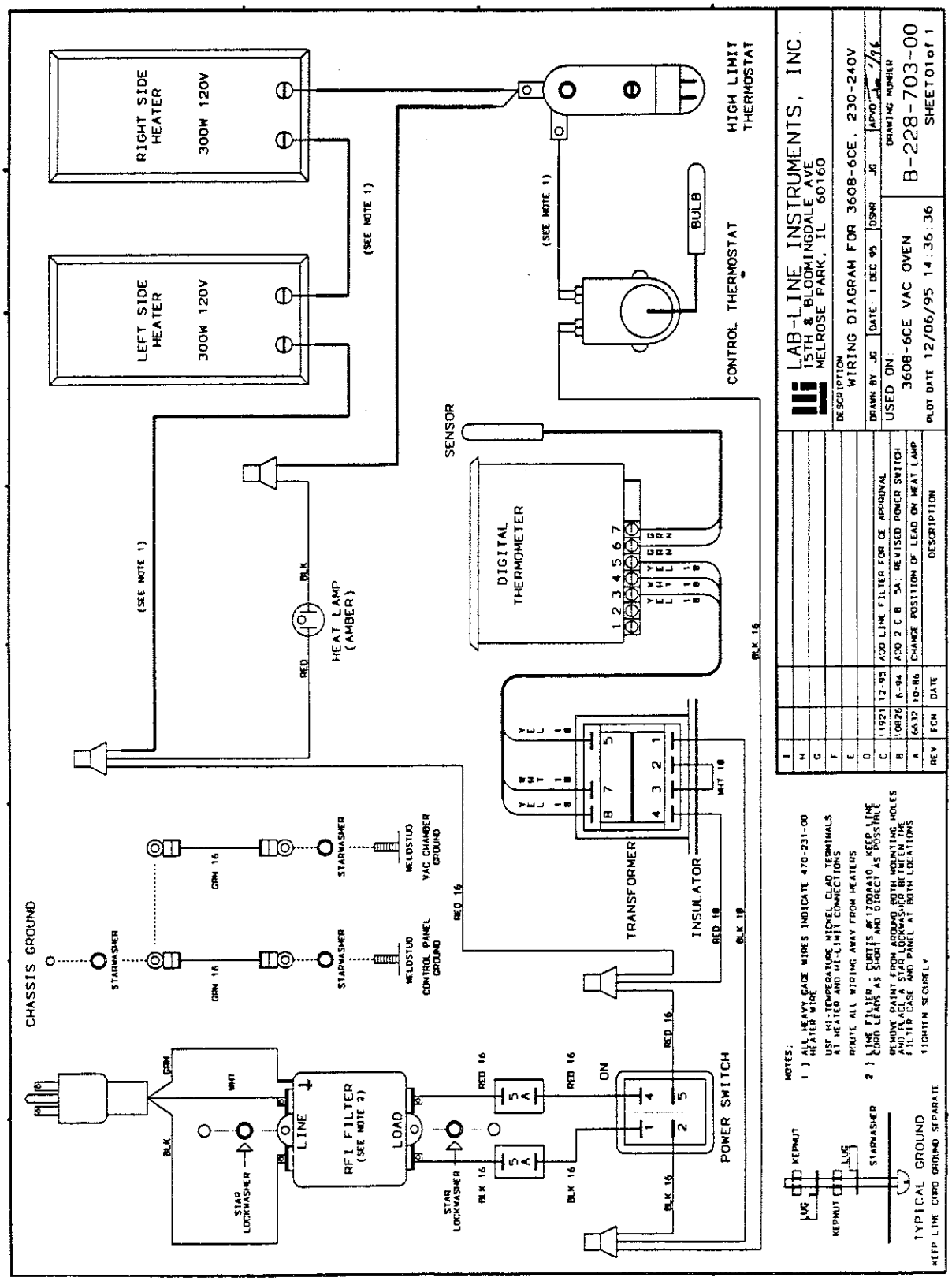
Wiring Schematic: #228-429-00 (3618-5)



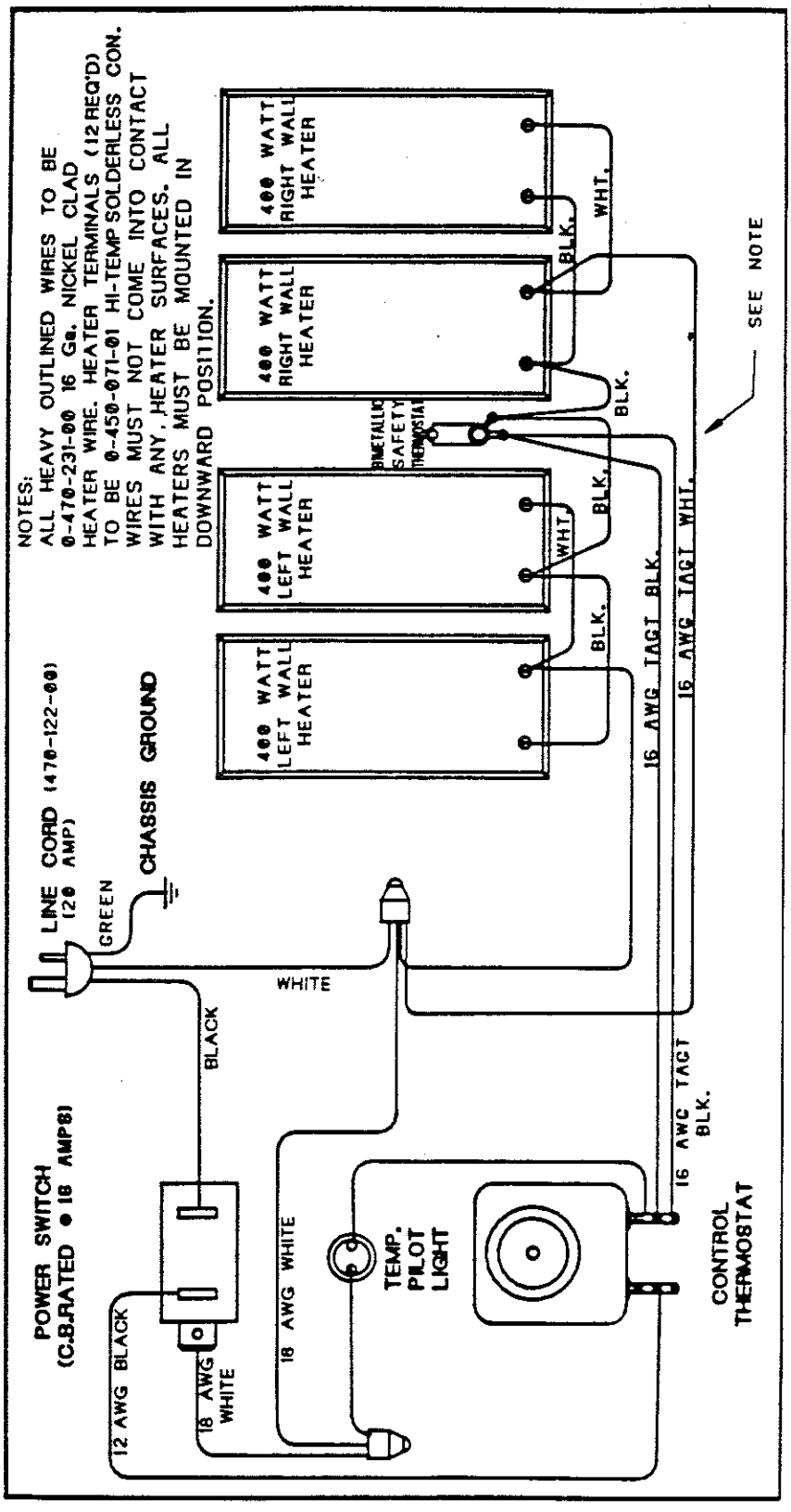
Wiring Schematic: #228-276-00 (3608-6)



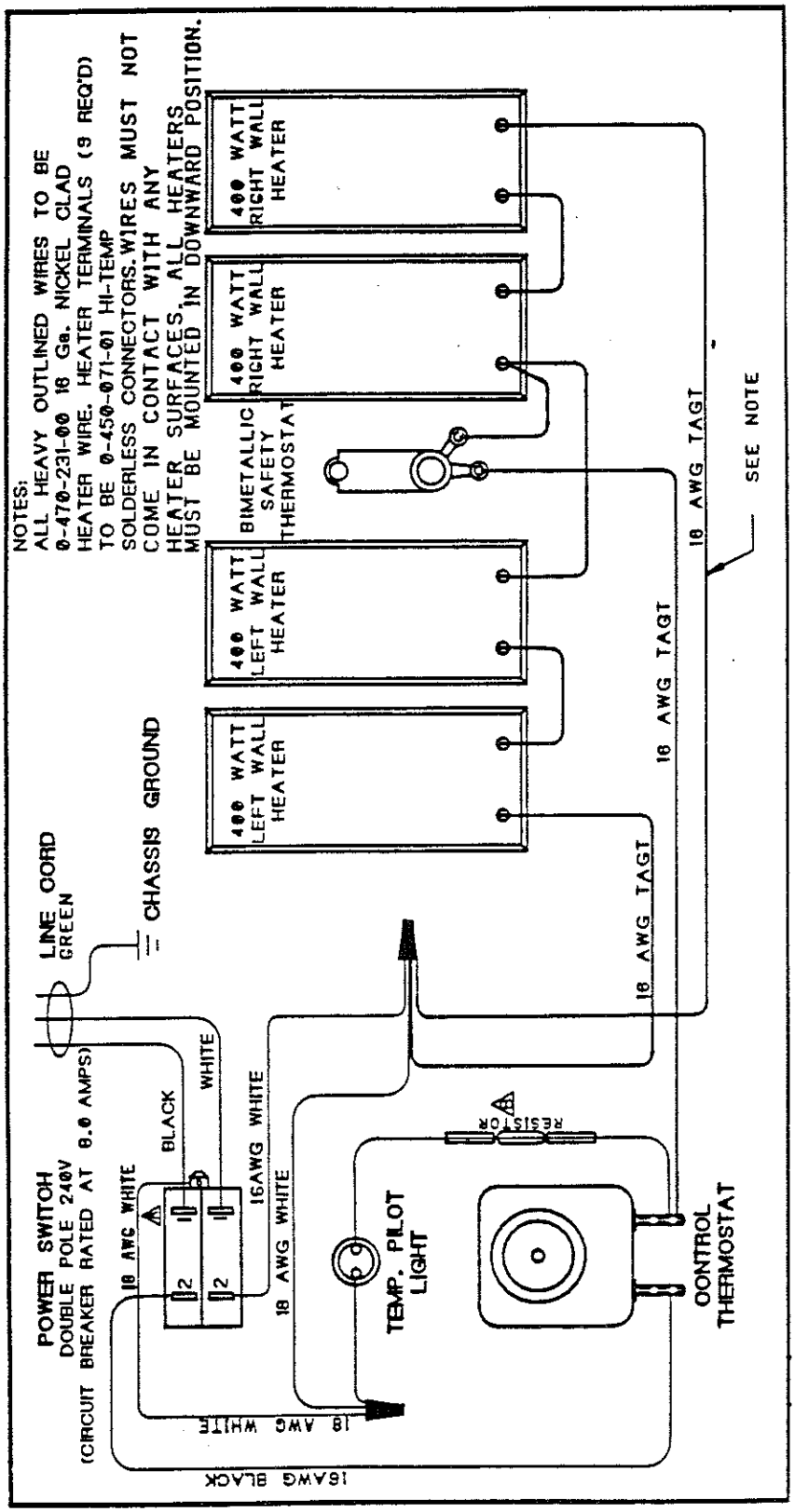
Wiring Schematic: #228-703-00 (3608-6CE)



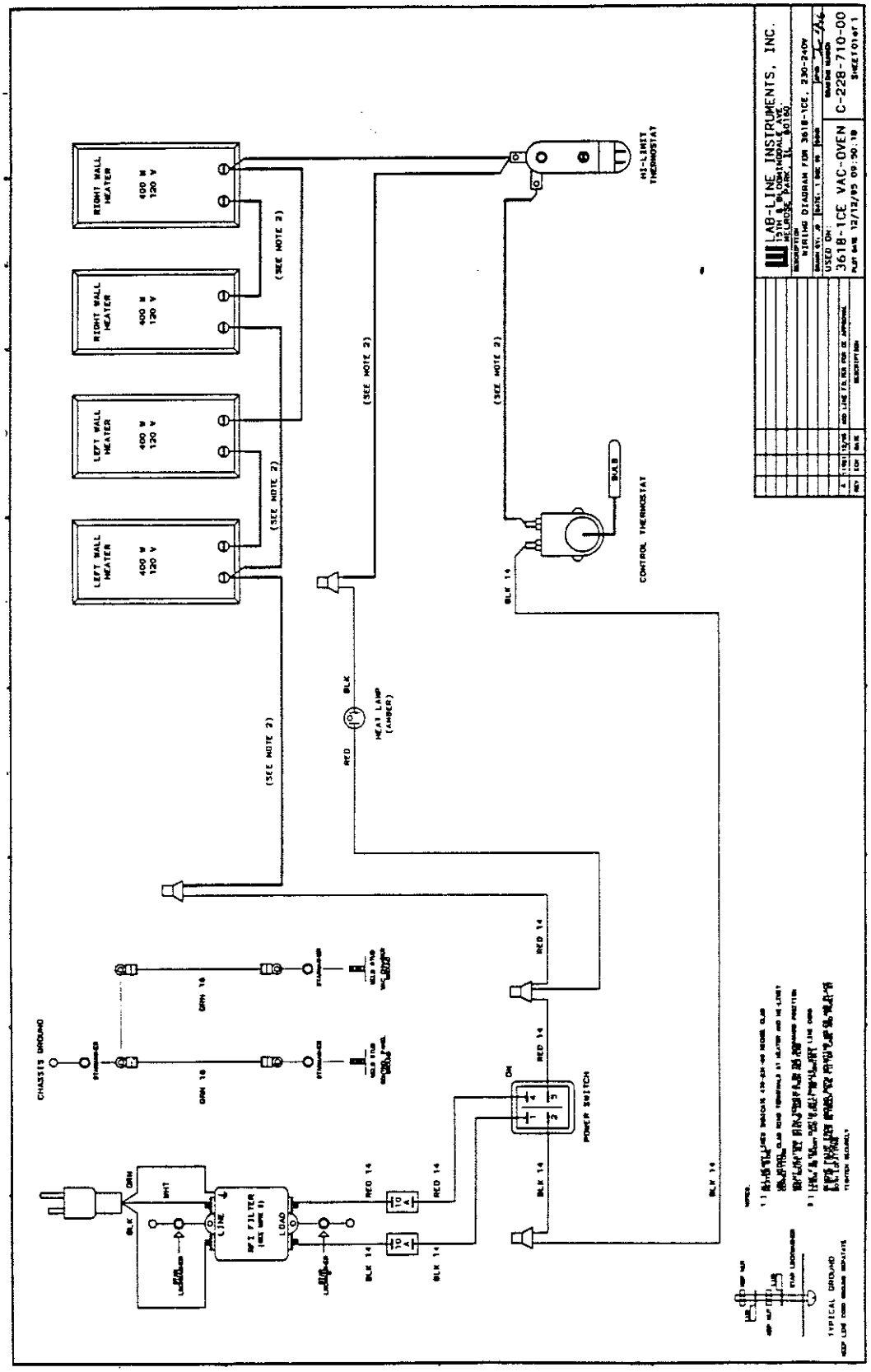
Wiring Schematic: #227-667-00 (3618)



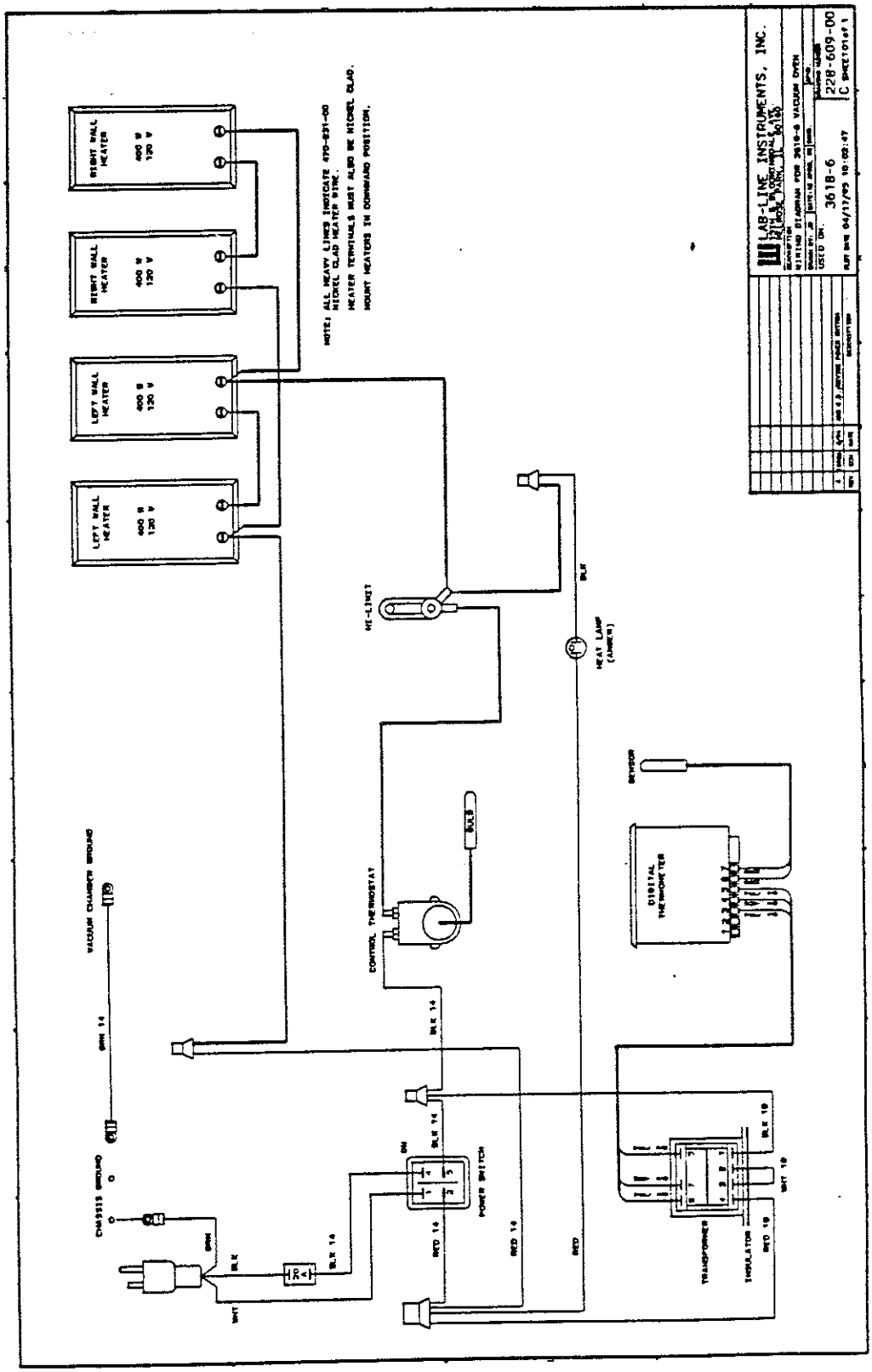
Wiring Schematic: #227-668-00 (3618-1)



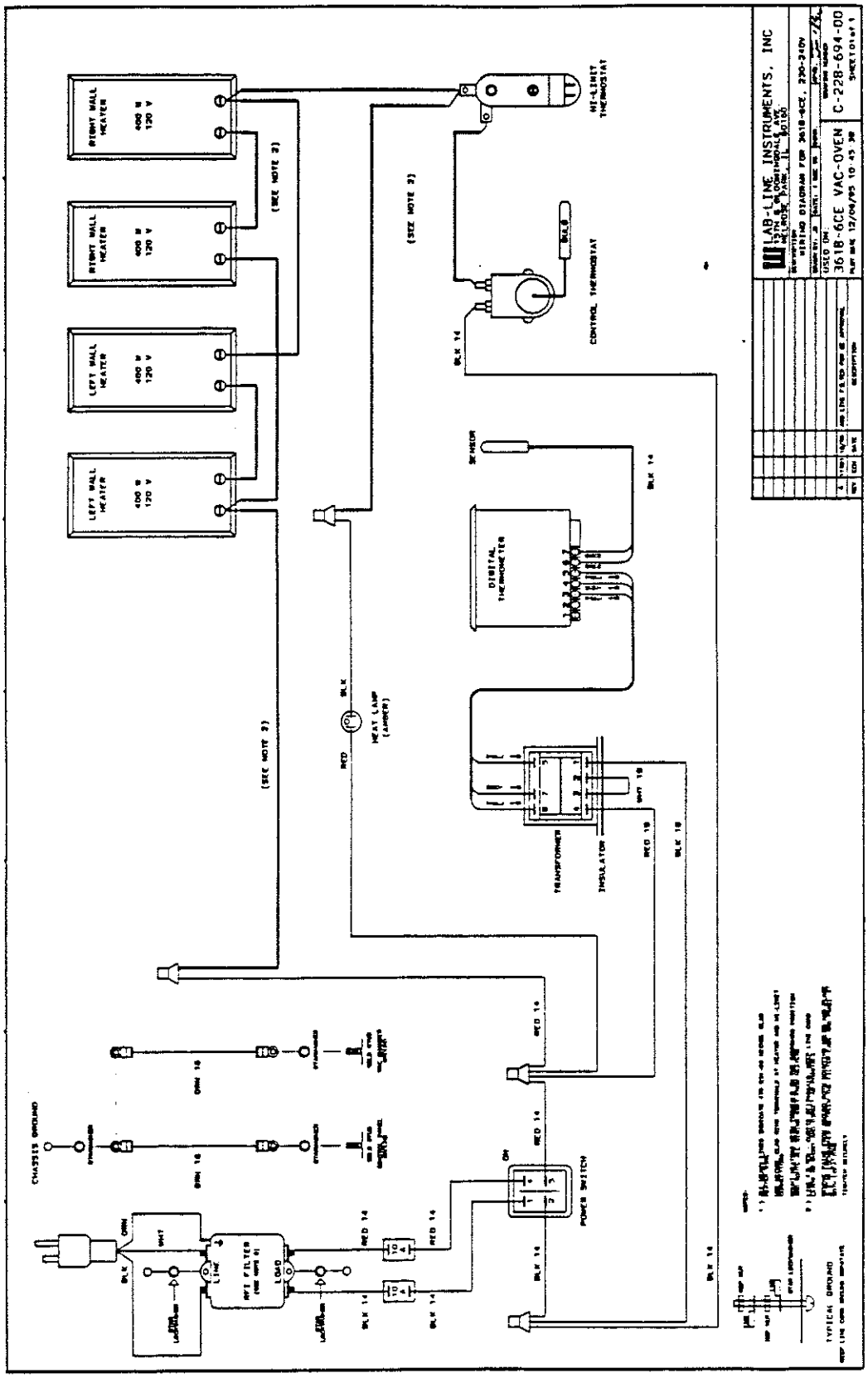
Wiring Schematic: #228-710-00 (3618-1CE)



Wiring Schematic: #228-609-00 (3618-6)

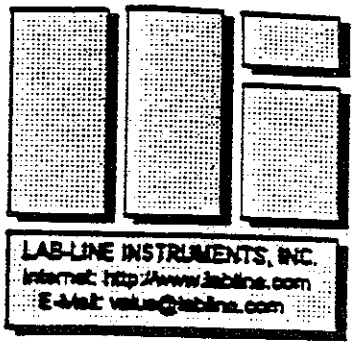


Wiring Schematic: #228-694-00 (3618-6CE)



LAB-LINE ORDER FORM

ORDER TODAY BY PHONE, FAX OR MAIL



SHIP TO:
(Please print clearly)

NOTE: P.O. BOXES ARE NOT ACCEPTED FOR SHIPPING ADDRESS WITHIN THE USA AND CANADA

Mr Mrs Ms
Name _____
Company _____
Address _____
City _____ State Zip _____
Country _____
Department _____ Phone Number _____

BILL TO:
(If different from shipping address)

Purchase Order No

Mr Mrs Ms
Name _____
Company _____
Address _____
City _____ State Zip _____
Country _____
Department _____ Phone Number _____

PHONE

1-(800)-LAB-LINE (USA/CANADA)
(708)-450-2600
Monday-Thursday 7:30 a.m.- 6:00 p.m.
Friday 7:30 a.m.-3:30 p.m. (CST)

FAX

1-(800)-450-4LAB (USA/CANADA)
(708)-450-5830 (INTERNATIONAL)
Complete form and fax to
the above number

MAIL

LAB-LINE INSTRUMENTS, INC.
15th and Bloomingdale Avenues
Melrose Park, IL USA 60160-1491

ITEM DESCRIPTION	MODEL #	QUANTITY	PRICE EACH	TOTAL

Add the following UPS charge to your order:
Orders under $100-add $10.00 for UPS
Orders over $100-add $15.00 for UPS

Please contact our International Dept. for freight charges outside the USA and Canada

Subtotal: _____
UPS (Prepaid): _____
Sales Tax (Residents in CA, IL, MI): _____
TOTAL: _____

✓ METHOD OF PAYMENT: (Please check one)

☐ MasterCard® ☐ VISA®

Card # _____ Daytime Phone Number _____

Expiration Date _____ Cardholder Signature _____ Date _____

WARRANTY

LAB-LINE INSTRUMENTS, INC., for itself and all of its subsidiaries ("Lab-Line"), does hereby offer a warranty for products from the date of receipt by the user, under normal and proper usage, against defects in workmanship and material, and will repair or replace any defective part(s) without charge when same is shipped prepaid to the authorized Lab-Line distributor from which the product was originally purchased.

Should the nature of any defect require that the product, or any constituent portion thereof, be returned to Lab-Line's factory in Melrose Park, Illinois, prepaid, for service, a condition precedent to any return shall be the procurement of written authorization from Lab-Line assigning a Return Goods Number to the product or part requiring service.

Parts and accessories manufactured by others are warranted only to the extent of the regular warranty of the manufacturer or supplier of such materials and only insofar as Lab-Line is able to transfer the benefits of warranty coverage, if any, to the user. Any adequately warranted defective part or accessory manufactured or supplied by others may be exchanged through an authorized Lab-Line dealer for a replacement part, and no charge, in respect thereof, shall be assessed if the defective part is shipped prepaid and received at Lab-Line's factory within 30 days from the date any replacement part is obtained by the user.

This warranty supersedes and is given in lieu of all implied warranties, and is void if the user does not provide the unit with continuous ample electric power at constant voltage, consistent with the specifications of the product.

TO OBTAIN BENEFITS CONFERRED BY THIS WARRANTY, USER MUST RETURN THE PRODUCT REGISTRATION CARD TO LAB-LINE WITH SEVEN (7) BUSINESS DAYS AFTER RECEIPT OF THE PRODUCT.

LAB-LINE INSTRUMENTS, INC.
(and all of its subsidiaries)
15th & Bloomingdale Avenues
Melrose Park, IL 60160-1491 USA
708/450-2600

MODEL NUMBER: _____

SERIAL NUMBER: _____

DATE OF PURCHASE: _____

See reverse side for warranty coverage

WARRANTY: (Con't)

12 MONTH PARTS WARRANTY:

- All E.C. Chambers, Furnaces
- Cold Rooms (5 yrs. parts warranty on compressor only)
- Low Temperature B.O.D. Incubators
- Animal Study Chamber and Aviary
- Controlled Environment Centers
- Biological Work Station
- Refrigerators, Freezers
- Chromatography Refrigerators (5 yrs. parts warranty on compressor only)
- Large Capacity Refrigerators and Freezers (5 yrs. parts warranty on compressor only)
- Circulators, Chillers

24 MONTH PARTS WARRANTY:

- Frame Clamps, Frame Sets, Lab Jacks
- Saybolt Viscosimeter
- Timers, Samplers, Flasks
- Saf-T-Shield, Safety Tongs
- All Incubators & Ovens
- Dual Action Open Air Shaker
- Reciprocating Shakers (open air and water bath)
- Rockers and Rotators
- Low Cost Shakers
- Environ Blok Shaker
- Titer Plate Shaker
- Multi Wrist Shaker
- Water Baths (excluding Aquabaths)
- Slide Warmers, Ultrasonic Cleaners
- Mixers, Stirrers, Hotplates
- Thermal Cyclers
- Frigid Blok
- Blok Heaters

LIFETIME PARTS WARRANTY:

- Aquabaths
- All **ORBITAL** Shakers (not carrying a 24 month parts warranty) offer a lifetime parts warranty on the drive mechanism and 5 yrs. warranty on all other parts
- Refrigerated Orbital Shakers carry a lifetime warranty on the drive mechanism, 1 yr. parts warranty on the compressor, and 5 yrs. Warranty on all other parts

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ACCESSORY CHECKLIST

The following loose parts and accessories are packed with this unit. Before discarding any packing materials, please be sure that nothing has been overlooked.

MODEL NO. S: 3608, 3608-1, 3608-1CE, 3608-1CCE, 3608-1ACE, 3608-1C/PCE
3608-5, 3608-5X, 3608-6, 3608-6CE, 3608-6CCE, 3618, 3618FEP,
3618-1, 3618-1CE, 3618-1CCE, 3618-5, 3618-6, 3618-6CE, 3608X

CHECKED BY: _____

DATE _____

PACKED BY _____

CHECKED	ITEM	PART NUMBER	QUANTITY
_____	Operation Manual	9-056-602-00	1
_____	Thermometer (All models except those with a -5, or -6 designation)	910-017-00	1
_____	Shelf Assembly: 3608, 3608-1	810-439-00	1
_____	Shelf Assembly: 3618, 3618-1	810-440-00	1
_____	Warranty Card	—	1