

Thermo Scientific Multipurpose Vacuum Oven

Operating Manual and Parts List 056-988-00 Rev. 0



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Models covered in this manual		
Catalog number	Model number	Voltage
3606	6255	120V
3606-1CE	6256	240V

MANUAL NUMBER 056-988-00 (7006255)

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REV	ECR/ECN	DATE	DESCRIPTION	By



Important Read this instruction manual. Failure to read, understand and follow the instructions in this manual may result in damage to the unit, injury to operating personnel, and poor equipment performance. ▲

Caution All internal adjustments and maintenance must be performed by qualified service personnel. ▲

Material in this manual is for information purposes only. The contents and the product it describes are subject to change without notice. Thermo Fisher Scientific makes no representations or warranties with respect to this manual. In no event shall Thermo be held liable for any damages, direct or incidental, arising out of or related to the use of this manual.

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Important operating and/or maintenance instructions. Read the accompanying text carefully.



Potential electrical hazards. Only qualified persons should perform procedures associated with this symbol.



Equipment being maintained or serviced must be turned off and locked off to prevent possible injury.



Hot surface(s) present which may cause burns to unprotected skin, or to materials which may be damaged by elevated temperatures.



Marking of electrical and electronic equipment, which applies to electrical and electronic equipment falling under the Directive 2002/96/EC (WEEE) and the equipment that has been put on the market after 13 August 2005.



This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. It is marked with the WEEE symbol. Thermo Fisher Scientific has contracted with one or more recycling/disposal companies in each EU Member State European Country, and this product should be disposed of or recycled through them. Further information on Thermo's compliance with this directive, the recyclers in your country and information on Thermo products will be available at www.thermofisher.com.

- ✓ Always use the proper protective equipment (clothing, gloves, goggles, etc.)
- ✓ Always dissipate extreme cold or heat and wear protective clothing.
- ✓ Always follow good hygiene practices.
- ✓ Each individual is responsible for his or her own safety.

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Our **Sales Support** staff can provide information on pricing and give you quotations. We can take your order and provide delivery information on major equipment items or make arrangements to have your local sales representative contact you. Our products are listed on the Internet and we can be contacted through our Internet home page.

Our **Service Support** staff can supply technical information about proper setup, operation or troubleshooting of your equipment. We can fill your needs for spare or replacement parts or provide you with on-site service. We can also provide you with a quotation on our Extended Warranty for your Thermo Scientific products.

Whatever Thermo Scientific products you need or use, we will be happy to discuss your applications. If you are experiencing technical problems, working together, we will help you locate the problem and, chances are, correct it yourself...over the telephone without a service call.

When more extensive service is necessary, we will assist you with direct factory trained technicians or a qualified service organization for on-the-spot repair. If your service need is covered by the warranty, we will arrange for the unit to be repaired at our expense and to your satisfaction.

Regardless of your needs, our professional telephone technicians are available to assist you Monday through Friday from 8:00 a.m. to 6:00 p.m. Eastern Time. Please contact us by telephone or fax. If you wish to write, our mailing address is:

Thermo Fisher Scientific
401 Millcreek Road, Box 649
Marietta, OH 45750

International customers, please contact your local Thermo Scientific distributor.

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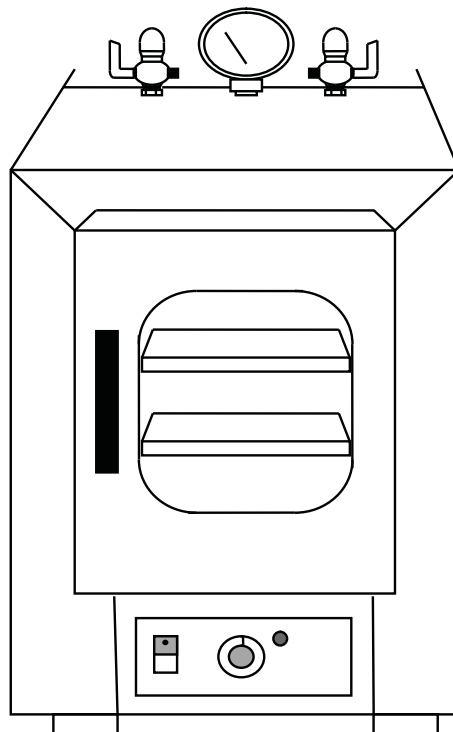
Section 1 Description

The vacuum ovens covered in this manual are designed for drying applications under controlled conditions at either normal atmosphere or a vacuum of up to 30-inches of mercury. The ovens have use in desiccating, vacuum embedding, plating and electronic component processing applications. Nitrogen, CO₂ and other noncorrosive, nonflammable gases can be used in the oven.

Control panels include a lighted power switch, temperature control dial and heat-indicating light.

The vacuum control and release valves are on top of the oven. Vacuum levels are precisely controlled between 0 and 30-inches of mercury, with the door gasket assuring a tight seal at all vacuum levels. The inner window is high-strength tempered glass and the outer door incorporates a safety shield of shatter-proof polycarbonate.

Radiant, warm-wall heat surrounds the chamber for uniform heating. Two solid aluminum shelves provide heat conduction to the load. Three inches of glass-wool insulation assure optimum temperature control.



Section 2 **Safety**

Your Thermo Scientific Vacuum Oven has been designed with function, reliability, and safety in mind. It is your responsibility to install it in conformance with local electrical codes. It is most important that the user follow installation instructions exactly as written. Failure to do so is likely to lead to improper operation, erroneous calibrations and possible damage to the equipment. Use in the manner specified by the manufacturer. If not, the protection provided by the equipment may be impaired. Do not attempt operation without this information.

Section 3 Specifications

Electrical Requirements

3606 (6255): 120VAC, 50/60 Hz, 5.0 Amps, 600 Watts

3606-1CE (6256): 240VAC, 50/60 Hz, 2.5 Amps, 600 Watts

Temperature Range

All Models: Slightly above ambient to 220°C

Thermometer Type

Bimetallic, dial type; range from 0°C to 300°C in 5°C increments

Dimensions

Interior: 8" W x 12" D x 8" H (20 x 30 x 20 cm)

Exterior: 17" W x 16" D x 17-3/8" H (43 x 41 x 44 cm)

Volume

0.44 cubic feet (12.5 liters)

Net Weight

57 lbs. (26 kg)

Environmental 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: $\pm 10\%$ of normal rated line

Temperature: 15°C to 40°C

Indoor use only

Declaration of Conformity (for CE models only)

We hereby declare under our sole responsibility that this product conforms with the technical requirements of the following standards:

EMC:

EN 61000-3-2 Limits for harmonic current emissions

EN 61000-3-3 Limits for voltage fluctuations and flicker

EN 61326-1 Electrical equipment for measurement, control, and laboratory use; Part I: General Requirements

Safety:

EN 61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use; Part I: General Requirements

EN 61010-2-010 Part II: Particular requirements for laboratory equipment for the heating of materials per the provisions of the Electromagnetic Compatibility Directive 89/336/EEC, as amended by 92/31/EEC and 93/68/EEC, and per the provisions of the Low Voltage Directive 73/23/EEC, as amended by 93/68/EEC.

Copies of the Declaration of Conformity are available upon request.

Section 4 Unpacking and Installation

The shipping carton 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 oven near an electrical outlet meeting the requirements stated on the name plate and in a location away from drafts and free from wide temperature variations.

Allow enough space around the oven for the free circulation of air. Heat escaping through the oven walls and top must be carried off by normal convection. Do not place oven near an open window, radiator or ventilator. It must not be placed on a combustible surface or be stacked directly on top or under another oven. If a vacuum pump or inert gas source will be used, allow room for the equipment.

Vacuum Pump Connections

To operate the unit as a vacuum oven, connect 1/4-inch ID tubing to valve on either side. Connect the other end of the tubing to your vacuum pump.

Shelving

Install the two shelves. While the door is open, apply a high-quality vacuum grease to the door gasket.

Thermometer Placement

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.

Note It is important to place the sensing element of the thermometer in direct contact with the shelf or sample that is being heated, in order to obtain a precise reading of the temperature under vacuum conditions. Make sure that the dial is clearly visible through the glass door. ▲

Electrical Power

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.

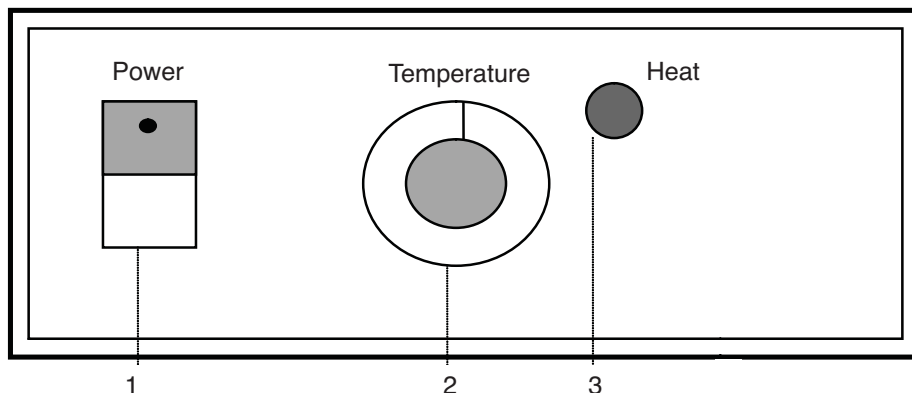
If a plug must be installed, use only the 3-prong grounded type, rated for the unit load requirements and matching the power outlet. Make sure the green ground wire is secured to the plug ground post.

Turn the power switch to the OFF position and insert plug into an outlet meeting the electrical requirements of the unit's nameplate.

Note Disconnect unit from power source when not in use. ▲

Caution Disconnect plug from electrical outlet before attempting any maintenance or repair on this unit. ▲

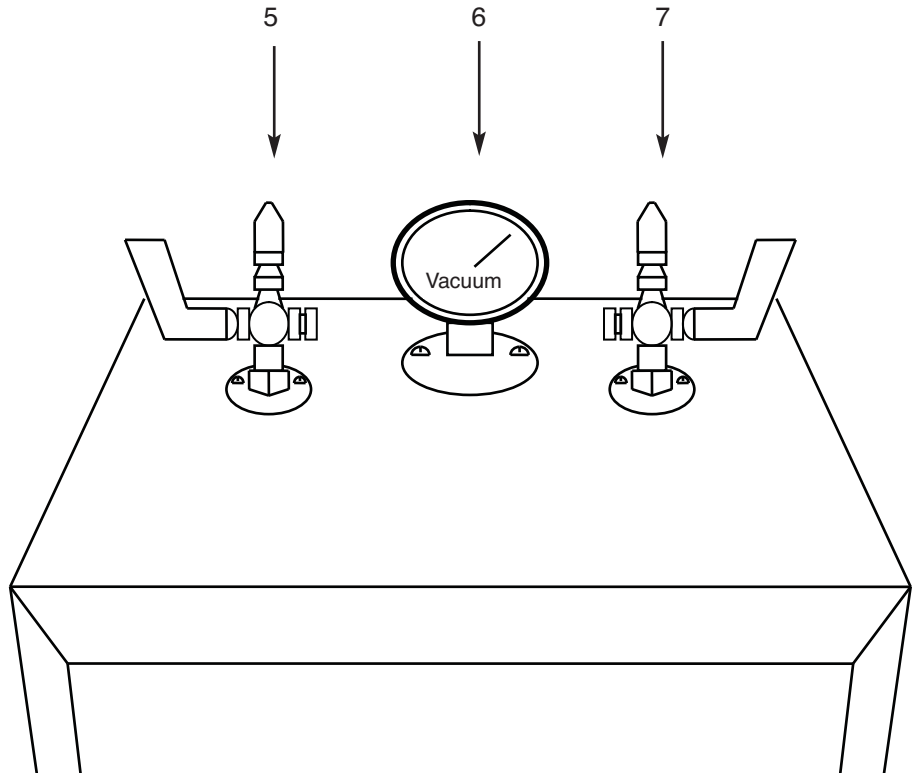
Section 5 Features



Control Panel

1. **POWER SWITCH:** An illuminated, rocker-type switch controls electric power to the entire unit. The switch lights when the top half is depressed and indicates that power is on.
2. **TEMPERATURE CONTROL DIAL:** This thermostat controls the temperature of the oven. While the dial scale of 0 to 10 does not indicate the actual temperature settings and is for **REFERENCE ONLY**, it does allow the user to repeat a temperature setting after experience is gained in its use.
3. **HEAT INDICATOR STATUS LAMP:** This lamp lights whenever heat is being applied to the chamber.

Topside of Oven



5. **VACUUM PORT:** Located on the left side of the top of the chamber, this is an outlet to the vacuum pump (not supplied). Connect 1/4-inch ID tubing between this port and your vacuum pump; adjust the pet cock to control the vacuum draw.
6. **VACUUM GAUGE:** A large-dial indicator located between the two topside ports, this gauge is scaled down from 0 to 30-inches of mercury. It indicates the level of vacuum in the chamber.
7. **VACUUM RELEASE PORT:** Located on the right side of the top of the chamber, this is an inlet that allows air into the chamber through the vacuum release valve, a pet cock near the port. Also used as a purge inlet (connect 1/4-inch ID tubing from the inert gas source to purge the chamber).

Section 6 Operation

Caution 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. ▲

Caution Do not heat any substance above a temperature which will cause it to emit toxic fumes - death or severe injury may result. ▲

Caution Do not operate the oven at temperatures above the upper limit (220°C) stated in this manual; doing so will void the warranty. ▲

Caution When the oven is operating at high temperatures, do not touch the surfaces of the oven; they become quite warm. ▲

Temperature Control

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

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

Loading the Oven

The dial thermometer can be removed and put back after loading, if it is more convenient. For precise measurement, be sure thermometer sensing element directly contacts a shelf or sample.

Distribute the load evenly in the chamber, at least 1-inch away from chamber walls and resting directly on the shelves or best results.

Vacuum Control

The following are directions for operating the oven in a vacuum mode:

1. Apply a high-quality vacuum grease to the door gasket, load the oven, and close the door.
2. Close the vacuum release valve (on the topside, right) and open the vacuum valve (topside left).
3. Turn the vacuum pump on and note the vacuum gauge dial (graduated in inches of mercury). Just as the gauge needle reaches the desired setting, close the vacuum control valve completely and turn off pump.
4. If there is greater vacuum than desired in the chamber, open the vacuum release valve slightly until the correct reading is obtained, then close it.
5. After a period of several hours, the vacuum level is likely to decrease an inch or so. Re-establish the original level by repeating Steps 2 and 3.

Purging the Chamber with Inert Gas

Some applications call for replacing the vacuum with an inert gas while the bake continues. Use only noncorrosive, nonflammable gases, such as nitrogen and CO₂ for purging.

1. Connect 1/4-inch ID tubing to the vacuum release port (right side). Connect the other end of the tubing to the regulator on a gas cylinder or bottle.
2. Start the gas flowing at no more than 5 psi. Open the vacuum release valve and observe the vacuum gauge. The vacuum level will fall as the chamber approaches atmospheric pressure.
3. Turn off the gas when vacuum gauge reads zero. Turn vacuum release valve to the CLOSED position. Disconnect hose from barbed fitting.

Caution Do not pressurize the oven chamber to a level higher than atmospheric pressure. When the vacuum gauge reads zero, turn off the gas. The oven is designed to retain a vacuum, not to withstand any positive internal pressure. Any positive internal pressure may damage component parts and/or result in injury. The oven does not require very much gas to fill the chamber - approximately 0.4 cubic feet. ▲

Section 7 Maintenance

Caution Make no attempt to service or repair a Thermo Scientific product under warranty before consulting your distributor. 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 Technical Services department. No merchandise, however should be returned without prior approval.

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.

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.

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 exterior safety shield with a solution of mild soap and water using soft lint-free cloth. Do not use abrasive cleaners or other strong solutions. They will harm surface of the safety shield and reduce clarity.

Door Gasket Lubrication

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

Fusible Link Replacement

Disconnect power and remove the back panel (edge screws) and back insulation. Locate the bimetallic limit thermostat on the back of the oven chamber.

1. Disconnect the fusible link from the bimetallic thermostat and control thermostat/terminal block as connected. This is the wire assembly with the high temperature sleeving on it.
2. Connect the new fusible link to the bimetallic thermostat and control thermostat/terminal block.
3. Replace the insulation and back panel, then power up and test the oven.

Heater Replacement

Disconnect power and remove the back panel (edge screws), insulation from the back and the oven housing. The oven housing is held by screws around the bottom edges. Lift it off and remove the rest of the insulation.

- Unscrew the heater brace nuts 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 indicates a faulty heater.
- 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 wiring schematic at the end of this manual). Tighten mounting nuts securely, using a nickel-based anti-seize on the threads.
- Repack side as well as back insulation, and replace the back panel.

Section 8 Replacement Parts

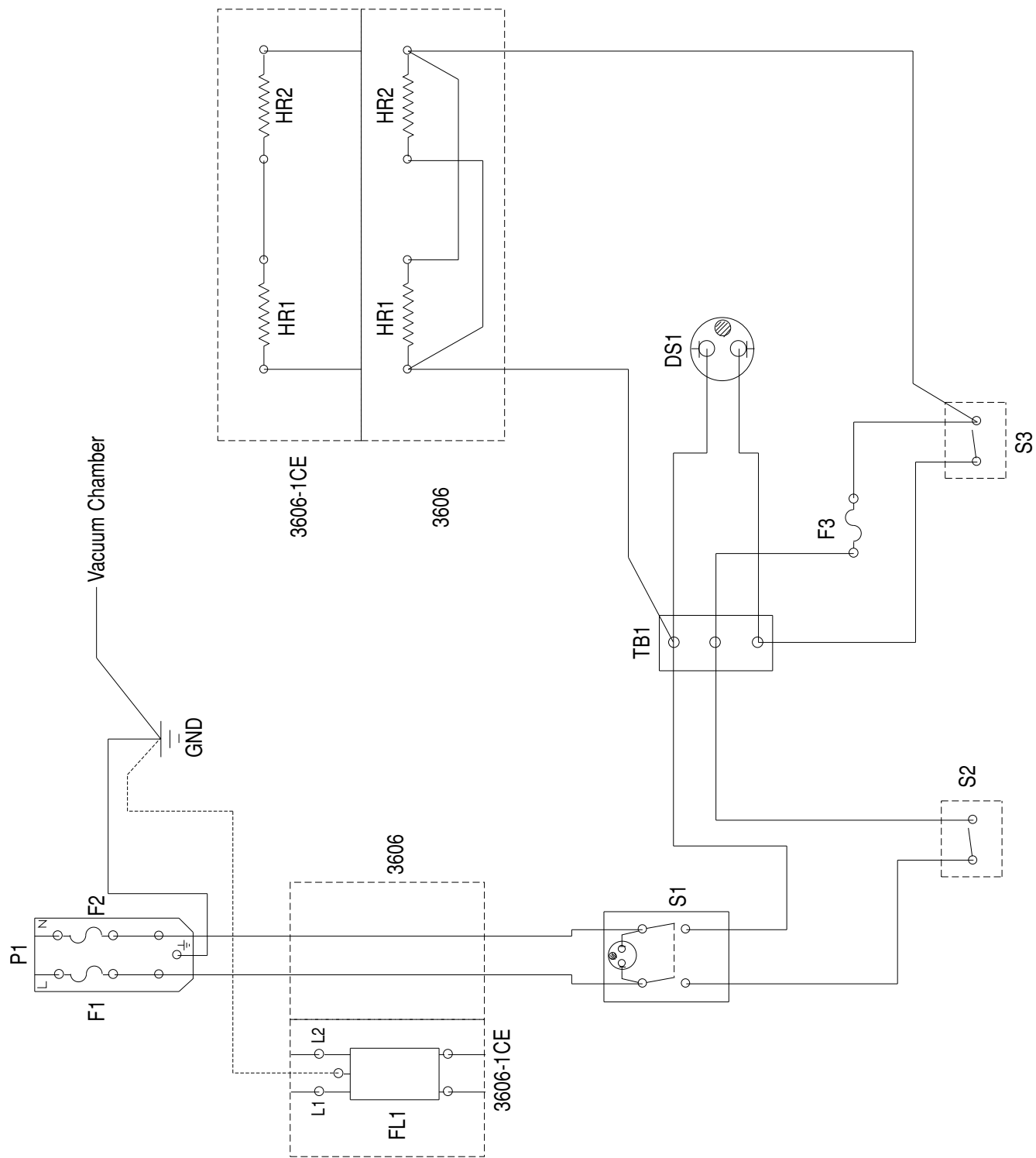
Description	Part Number
Cordset	CRX72 (3606), CRX70 (3606-1CE)
Door Glass (Interior Pane)	540-201-00
Feet, Rubber (4)	790-225-00
Fuse (2) - F1, F2	264306 (3606), 710-0022 (3606-1CE)
Gasket, Front Door	530-194-00
Heaters, 300 Watts (2) - HR1, HR2	340-331-00
Power Switch, Lighted - S1	440-359-00
Safety Shield (Exterior Panel)	720-466-00
Shelf, Upper/Lower (2)	810-387-00
Status Lamp Base - DS1	PL1483X1
Status Lamp, Heat Indicator (Amber) - F3	360-235-00
Temperature Control Knob	560-223-00
Thermometer, Dial	910-017-00
Thermostat, Hydraulic - S2	920-223-00
Thermostat, Bi-metal - S3	920-283-00
Vacuum Gauge	660-102-00
Vacuum/Purge Valve (2)	950-003-01 (3606-1CE)
Line Filter - FL1	330-346-00(3606-1CE)
Power Entry Module - P1	710-0019
Terminal Block - TB1	TRX178

Ordering Procedures

Please refer to the Specification Plate for the complete model number, serial number, and series number when requesting service, replacement parts or in any correspondence concerning this unit.

All parts listed herein may be ordered from the Thermo Scientific dealer from whom you purchased this unit or can be obtained promptly from the factory. When service or replacement parts are needed, check first with your dealer. If the dealer cannot process your request, then contact our Technical Services Department.

Prior to returning any materials, please contact our Technical Services Department for a “Return Materials Authorization” number (RMA). Material returned without an RMA number will be refused.



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