



K253XX

COPPER / SILVER STRIP CORROSION BATH

OPERATION AND INSTRUCTION MANUAL

REV B

Koehler Instrument Company, Inc.

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Petroleum Testing & Analysis Instrumentation • Custom Design & Manufacturing

CERTIFICATE OF CONFORMANCE


Copper and Silver Strip Corrosion Bath K2531X, K2532X

This certificate verifies that part number K2531X, and K2532X Copper and Silver Strip Corrosion Bath, was manufactured in conformance with the applicable standards set forth in this certification.

Specifications:

- ASTM D130
- IP 154
- FSPT DT-28-65
- ISO 2160
- DIN 51759
- FTM 791-5325
- NF M 07-015

This unit is tested before it leaves the factory, to ensure total functionality and compliance to the above specifications and ASTM standards. Test and inspection records are on file for verification.



Jesse Kelly
Application Engineer
Koehler Instrument Company



EC Declaration of conformity

Koehler Instrument Company, Inc.
of 1595 Sycamore Av., Bohemia, New York USA

We declare that the product listed below meets all basic requirements in accordance with the following Directive(s) by design, type, and version placed upon the market by us.

2004/108/EC The Electromagnetic Compatibility Directive
2006/42/EC The Machinery Directive by way of the Low-Voltage directive 2006/95/EC

And hereby declare that:

Equipment: **Metal Strip Corrosion Test Tube Bath**
Model Number(s): **K25319**

Qualifications:

This product may only be used in a professional laboratory setting by authorized personnel following the instruction handbook.

and

This product declaration is valid for unmodified equipment when installed and operated by authorized personnel following the instruction handbook.

Conforms to the following standards (as applicable):

Safety	Low-Voltage directive 2006/95/EC
EN 61010-1:2010	Safety Requirements for electrical equipment for measurement, control and laboratory use; by engineering design and risk review and by meeting the requirements of Hi-Pot Test (1500 VAC, 60 sec. per table 5) as detailed in the product's technical documentation.
EMC	Meets the essential requirements of EMC Directive 2004/108/EC by engineering design review and by meeting the requirements of Conducted Emissions Test for Group 1 Class A as detailed in the product's technical documentation.
EN 55011:2007	

James R. Ball
Dir. Research & Development

1595 Sycamore Av.
Bohemia, NY 11716
United States of America
November 20, 2013

WEEE Directive Compliance Statement

Background

The goal of the WEEE Directive is to encourage design of environment-friendly products that increase reuse, recycling and other forms of recovery to reduce waste streams and applies to listed Electronic and Electrical Equipment (EEE) and Koehler's equipment falls broadly into Appendix 1A; Section 9 Monitoring and Control Equipment: Measuring, weighing or adjusting appliances for household or as laboratory equipment.

Any associated non-embedded equipment such as Lighting (Saybolt Color) and PCs/Printers also fall under WEEE. If provided with an order these ancillary items must be WEEE compliant. For these and other reasons (printer cartridges are regionalized) the equipment must be supplied through a third party supplier in Europe.

The WEEE Directive applies to electrical and electronic equipment falling under the categories set out in Annex IA provided that the equipment concerned is not part of another type of equipment that does not fall within the scope of this Directive. Annex IB contains a list of products which fall under the categories set out in Annex IA.

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:037:0024:0038:en:PDF>

We do not qualify for any of the 10 exemption categories.
<http://www.dpa-system.dk/en/WEEE/Products/Exemptions>

Professional use

For equipment defined for 'professional use' local authorities have no role to play. Producers and importers are basically responsible for collection of WEEE recyclables from the professional user and for subsequent management. A separate statement is given cataloging the items that require separation from the equipment along with basic information on subsequent processing or recycling prior to disposal of the equipment.
<http://www.dpa-system.dk/en/WEEE/Products/Private-or-professional-use>

Responsibility for Registration and Annual Reporting:

Koehler will not sell directly to end users in the EU and so has no responsibility to register within each EU state and to make annual reports. Koehler declares that this responsibility is born by the importer who is the first level of the distribution chain and is subject to producer responsibility. We will communicate this in writing to our distributor/importers in the EU stating they are responsible to satisfy WEEE registration and reporting requirements in the EU states where they conduct sales activities.

It is illegal to market electrical and electronic equipment covered by producer responsibility without being registered.

<http://www.dpa-system.dk/en/WEEE/Producers/Whoissubjecttoproducerresponsibility>

Product Design

Koehler's designs allow for complete disassembly to a modular level which usually allows for standard recycling. A qualified refrigeration system technician must be consulted when disassembling and de-commissioning any equipment with refrigeration systems.

Koehler's scientific testing equipment is robustly designed to function over a long service life and are typically repaired many times over the course of years rather than being replaced. We believe that re-use and refurbishment is the very best form of re-cycling.

All batteries must be readily removable not soldered in place.

Recycling instructions

In the event that replacement becomes necessary, we will include instructions, particularized to each instrument that informs the customer of their recycling responsibilities and giving them guidance in doing this. All Koehler equipment has been placed on the market since 13th August 2005 and so Koehler is defined as a "new WEEE producer". As such we must provide information on refurbishment, treatment, and re-use.

Our instrument manual will include this compliance statement and indicate that any collection of materials will be handled by their authorized distributor. In the event that the distributor is unreachable or is no longer a

distributor for Koehler Instrument, Co., other arrangements may be made including accepting the materials directly.

Recycling is free of charge. Shipping is the responsibility of the end users. Whether shipping to a distributor or to Koehler directly, safe, properly declared, and labeled packaging and shipping expenses are the sole responsibility of the end user.

WEEE Marking



Since Koehler products are subject to the WEEE Directive we must display the WEEE symbol shown above in accordance with European Standard EN 50419 on the equipment. It must be indelible, at least 5mm in height, and clearly legible. If the equipment is too small the mark must be in the product literature, guarantee certificate, or on the packaging. Rules on marking are established in section 49 of the WEEE Order.

Koehler Instrument Company, Inc.
c/o RECYCLING
1595 Sycamore, Ave.
Bohemia, NY 11716

As a minimum the following substances, preparations and components have to be removed from any separately collected WEEE:

- Mercury containing components, such as switches or backlighting lamps (compact fluorescent lamps, CFL),
- Batteries
- Printed circuit boards if the surface of the printed circuit board is greater than 10 square centimeters (about 4 sq in.),
- Toner cartridges, liquid and pasty, as well as color toner,
- Chlorofluorocarbons (CFC), hydrochlorofluorocarbons (HCFC) or hydrofluorocarbons (HFC), hydrocarbons (HC)
- Liquid crystal displays (together with their casing where appropriate) of a surface greater than 100 square centimeters and all those back-lighted with gas discharge lamps,
- External electric cables
- Components containing refractory ceramic fibers as described in Commission Directive 97/69/EC of 5 December 1997 adapting to technical progress Council Directive 67/548/EEC relating to the classification, packaging and labeling of dangerous substances (2),
- Electrolyte capacitors containing substances of concern (height > 25 mm, diameter > 25 mm or proportionately similar volume)

2. The following components of WEEE that is separately collected have to be treated as indicated:

- Equipment containing gases that are ozone depleting or have a global warming potential (GWP) above 15, such as those contained in foams and refrigeration circuits: the gases must be properly extracted and properly treated. Ozone-depleting gases must be treated in accordance with Regulation (EC) No 2037/2000 of the European Parliament and of the Council of 29 June 2000 on substances that deplete the ozone layer (4).

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1 Introduction

The K253XX corrosion baths test the corrosiveness of petroleum products to both copper and silver by immersion of a polished test strip in the sample inside a test cylinder at elevated temperature. The K253XX is available as a 4 unit (K2531X) and an 8 unit (K2532X) model. The more versatile 4 unit model (K2531X) can be further adapted to conform to test method IP227, silver corrosion, with the addition of an available Bath Conversion Kit.

This manual provides important information regarding safety, technical reference, installation requirements, operating condition specifications, user facility resource requirements, and operating instructions for the corrosion bath. This manual should also be used in conjunction with applicable published laboratory procedures. Information on these procedures is given in section 1.2.

1.1 Koehler's Commitment to our Customers

Providing quality testing instrumentation and technical support services for research and testing laboratories has been our specialty for more than 50 years. At Koehler, the primary focus of our business is providing you with the full support of your laboratory testing needs. Our products are backed by our staff of technically knowledgeable, trained specialists who are experienced in both petroleum products testing and instrument service to better understand your requirements and provide you with the best solutions. You can depend on Koehler for a full range of accurate and reliable instrumentation as well as support for your laboratory testing programs. Please do not hesitate to contact us at any time with your inquiries about equipment, tests, or technical support.

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Tel: +1 631 589 3800
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Email: info@koehlerinstrument.com
<http://www.koehlerinstrument.com>

1.2 Recommended Publications

1. American Society for Testing and Materials (ASTM)
100 Barr Harbor Drive
West Conshohocken, Pennsylvania 19428-2959, USA
Tel: +1 610 832 9500

Fax: +1 610 832 9555
<http://www.astm.org>
email: service@astm.org

ASTM Publication:

- ASTM D130: Standard Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test
- D4814: Standard Specification for Automotive Spark-Ignition Engine Fuel
- D6074: Characterizing Hydrocarbon Lubricant Base Oils
- D6158: Specification for Mineral Hydraulic Oils

2. International Organization for Standardization (ISO)
1, rue de Varembé
Case postale 56
CH-1211 Geneva 20, Switzerland
Tel: 41 22 749 01 11
Fax: 41 22 733 34 30
<http://www.iso.org>

ISO Publication:

- ISO 2160: Petroleum products – Corrosiveness to Copper – Copper Strip Test

3. Energy Institute (IP)
61 New Cavendish Street
London, WIM 8AR, United Kingdom
Tel: 44 (0)20 7467 7100 • Fax: 44 (0)20 7255 1472
<http://www.energyinstpubs.org.uk/>

IP Publication:

- IP 154: Petroleum products – Corrosiveness to Copper – Copper Strip Test
- IP 227: Determination of corrosiveness to silver of aviation turbine fuels – Silver strip method

4. Deutsche International Norm (DIN)
<http://www.din.de>

DIN Publication:

- DIN 51759

5. Federal Test Method (FTM)

FTM Publication:

- FTM 791-5325

6. Association Francaise de Normalisation (AFNOR)

AFNOR Publication:

- NF M 07-015

7. FSPT DT-28-65

1.3 Instrument Specifications

Models: K25310
K25319
K25320
K25329

Electrical Requirements: 115V 60Hz
220-240V 50/60Hz

Capacity: Four (4) – Eight (8) Test Vessels

Maximum Temperature: 221°F (105°C)

Temperature Control Stability: ±1°F (±0.5°C)

Heater Range: 0-750W

Bath Capacity: 5 gal (18.9 L)

Dimensions (l x w x h): K2531X:
12 x 10 x 24 in
(30 x 25 x 61) cm
K2532X:
16 x 11 x 24 in
(30 x 25 x 61) cm

Net Weight: K2531X: 19 lbs (8.6 kg)
K2532X: 24 lbs (10.9kg)

2 Safety Information and Warnings

Safety Considerations. The use of this equipment may involve *hazardous* materials and operations. This manual does not purport to address all of the safety problems associated with the use of this equipment. It is the responsibility of any user of this equipment to investigate, research, and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

Equipment Modifications and Replacement Parts. Any modification or alteration of this equipment from that of factory specifications is not recommended voids the manufacturer warranty, product safety, performance specifications, and/or certifications whether specified or implied, and may result in personal injury and/or property loss. Replacement parts must be O.E.M. exact replacement equipment.

Unit Design. This equipment is specifically designed for use in accordance with the applicable standard test methods listed in section 1.2 of this manual. The use of this equipment in accordance with any other test procedures, or for any other purpose, is not recommended and may be extremely hazardous.

Chemical Reagents Information. Chemicals and reagents used in performing the test may exhibit potential hazards. Any user must be familiarized with the possible dangers before use. We also recommend consulting the Material Data and Safety Sheet (MSDS) on each chemical reagent for additional information. MSDS information can be easily located on the internet at <http://siri.uvm.edu> or <http://www.sigma-aldrich.com>.

3 Getting Started

The instructions for preparing the equipment assume that the user is aware of the contents of this document, which lists the warranty conditions and important precautions.

3.1 Packing List

- K253XX Copper Strip Corrosion Bath
- Rubber Stopper (4)
- K253XX Copper Strip Corrosion Bath Operation and Instruction Manual

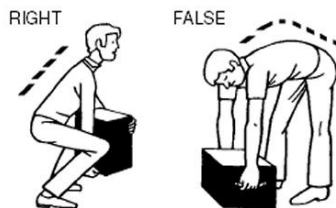
3.2 Unpacking

1. Check Shock Watch Label on Cardboard Box for indication of rough handling and possible damage.
2. Check labeling for correct orientation of instrument. (e.g. This Side Up)
3. Carefully open top of box with box cutter and remove packing foam.

4. Make two additional vertical cuts, using box cutter, along length of two sides of the box and remove packing foam.
5. Extract instrument and place on suitable cart for transportation to work area / lab bench.
6. Remove the Styrofoam from around the constant water level device and unpack the cover plates and Soxhlet condenser from separate carton.



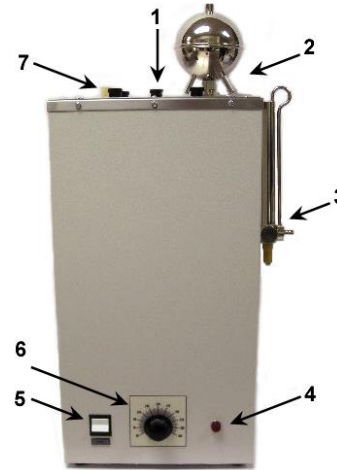
WARNING: Be sure two or more individuals are available for extracting and lifting instrument from box to cart and from cart to bench. Individuals must lift in accordance to proper technique. See Figure below.



7. Lift instrument from cart and place on bench.

Ensure that all parts listed on the packing list are present. Inspect the unit and all accessories for damage. If any damage is found, keep all packing materials and immediately report the damage to the carrier. We will assist you with your claim, if requested. When submitting a claim for shipping damage, request that the carrier inspect the shipping container and equipment. Do not return goods to Koehler without written authorization..

3.3 Instrument Descriptions



1. **Pressure Vessel Ports:** Four (4) Pressure Vessel Ports with rubber caps are located at the top of the bath.
2. **Soxhlet Reflux Condenser:** Maintains water level and temperature when operating at temperatures around (100°C) 212°F.
3. **Constant Water Level Device:** Maintains water level in the bath with inlet and outlet valves.
4. **Heater Indicator Light:** Light illuminates red when the heater on.
5. **Line Switch:** This switch controls power to the entire unit.
6. **Temperature Control Dial:** Controls power to the heater
7. **Thermometer Port:** Place ASTM certified thermometers through this port to monitor temperature within the bath.

3.4 Setup

Equipment Placement: Place the instrument on a firm, level table in an area with adequate ventilation or in a hood. The unit may be leveled by making minor turning adjustments to the feet located at the base of the unit. Please note that Koehler does not supply a level with this equipment.

Environmental Conditions: The instrument environment must comply with the following conditions for proper setup:

- No / Low Dust
- No direct sunlight
- Not near heating or AC ventilation ducts
- No Vibrations
- Clearance from other instruments
- Temperature Range: 5 to 40°C
- Elevation to 2000 meters
- Relative Humidity: < 80%

Ventilation: A fume hood or exhaust system is required when operating the unit. Flammable vapors and/or steam are generated during operation and must not be permitted to accumulate. A canopy-style hood may be used if the height from the top of the unit to the canopy is 5 feet or less. The exhaust blower should have a rating of 1000 C.F.M. or greater.

Power: Connect the line cords to properly fused and grounded receptacles with the correct voltage as indicated in section 1.3 or on the back of the unit.



WARNING: For safety, disconnect the power when performing any maintenance and/or cleaning. Do **NOT** turn the power on unless the bath is filled with the proper medium; otherwise, damage will occur.

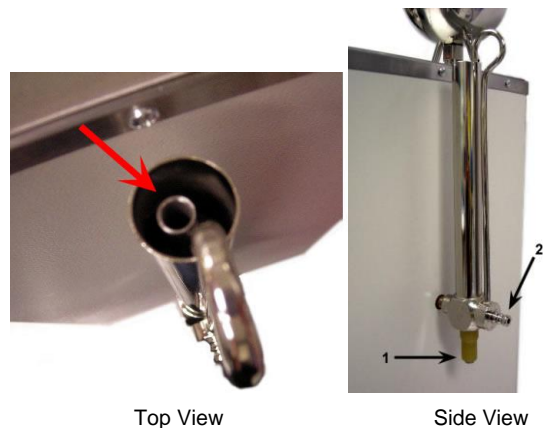
Bath: Fill the bath with water through one of the port openings.

Thermometer: Insert an ASTM certified thermometer through the thermometer port to monitor temperature within the bath.

Soxhlet Reflux Condenser: Install the condenser to the bath and secure with the fitting on the tube. If the test is to be run at 212°F, connect a cooling

water line to one the small tubes on the bottom of the condenser and a drain line to the other.

Constant Water Level Device: Control of the water level is controlled by adjusting the level on the inner tube of the device, indicated by the white arrow below. Push down on the inner tube to lower the water level or up from the bottom to raise the water level. Connect the outlet drain **(1)** to a draining receptacle in the case of overflow. Connect the inlet drain **(2)** to a gravity filled tank to fill the bath if the water level decreases.



3.5 Accessories for Test

K25200 Copper Strip Pressure Vessel

Koehler offers Test Pressure Vessels for use with the K253XX Copper Strip Corrosion Test Apparatus.

Koehler also offers a full selection of accessories to run ASTM D130, IP 227 and related specifications, which are ordered separately from the K253XX instrument. Koehler also offers thermometers for testing. All accessories with their part numbers are listed on the next page.

Accessories for D130

Part Number	Description
K25080	Copper Strips 12.5 x 1.5-3.0mm x 75mm to ASTM specifications
332-004-004	Test Tube 25 x 150mm

332-004-002	Viewing Test Tube Protects copper strip during inspection or storage
K25100	ASTM Copper Strip Corrosion Standards Colored reproductions of tarnished strips encased in a plastic plaque
380 220-001	Silicone Carbide Paper, 220-grit, FEPA Grade. Pack of 50 sheets. For polishing of copper strips prior to testing.
380-150-003	Silicone Carbide Grain, 150-grit, FEPA Grade. 1 lb package. For final polishing of copper strips prior to testing.
K25000	Polishing Vise Holds copper strip firmly in place without marring the edges. Stainless steel, mounted on a composition base.
K25090	Multi-Strip Polishing Vise Similar to k25000 but capable of holding four strips at a time.
250-000-12F	ASTM 12F Thermometer. Range: -5 to +215°F
250-000-12C	ASTM 12C Thermometer. Range: -20 to +102°C
K25330-4B-8T	Optional rack to hold 4 test bombs and 8 test tubes
K25330-6B-6T	Optional rack to hold 6 test bombs and 6 test tubes

380-150-000	Silicone Carbide Grain, 150-grit For final polishing of copper strips prior to testing. 1 lb package.
K25000	Polishing Vise Holds copper strip firmly in place without marring the edges. Stainless steel, mounted on a composition base.
K25090	Multi-Strip Polishing Vise Similar to K25000 but capable of holding four strips at a time.
250-000-12C	ASTM 12C Thermometer. Range: -20 to +102°C

4 Operation

1. Flip the line switch up to the ON position
2. Turn the graduated dial clockwise to the desired set temperature of the bath
3. When the bath has reached the desired test temperature, the red pilot light will shut OFF. This means that the bath has stabilized.
4. After the temperature has stabilized, insert the corrosion pressure vessels or glassware assemblies (method dependent), into the bath rack and cover with the rubber stoppers.

Accessories for IP 227

Part Number	Description
K25370	Bath Conversion Kit for IP 227 Inserts in K253XX bath to hold sixteen IP 227 Glassware Sets (K25360)
K25360	Glassware Set for IP 227 Includes cold-finger condenser, glass cradle and 350mL test tube
K25280	Silver Test Strip
K25282	ASTM D3241 - IP 323 Color Standard
380-150-001	Silicone Carbide Paper, 150-grit For polishing of copper strips prior to testing. Pack of 50 sheets.
380 240-001	Silicone Carbide Paper, 240-grit For polishing of copper strips prior to testing. Pack of 50 sheets.



NOTE: For further detail on the preparation and test method procedure instructions, refer to ASTM D130 or IP 227.

5 Maintenance



WARNING: Disconnect power to the unit before servicing to avoid exposure to high voltages and/or temperatures which may result in personal injury or death. If you have any questions about maintaining your equipment, then please do not hesitate to contact the Koehler technical service department.

5.1 Routine Maintenance

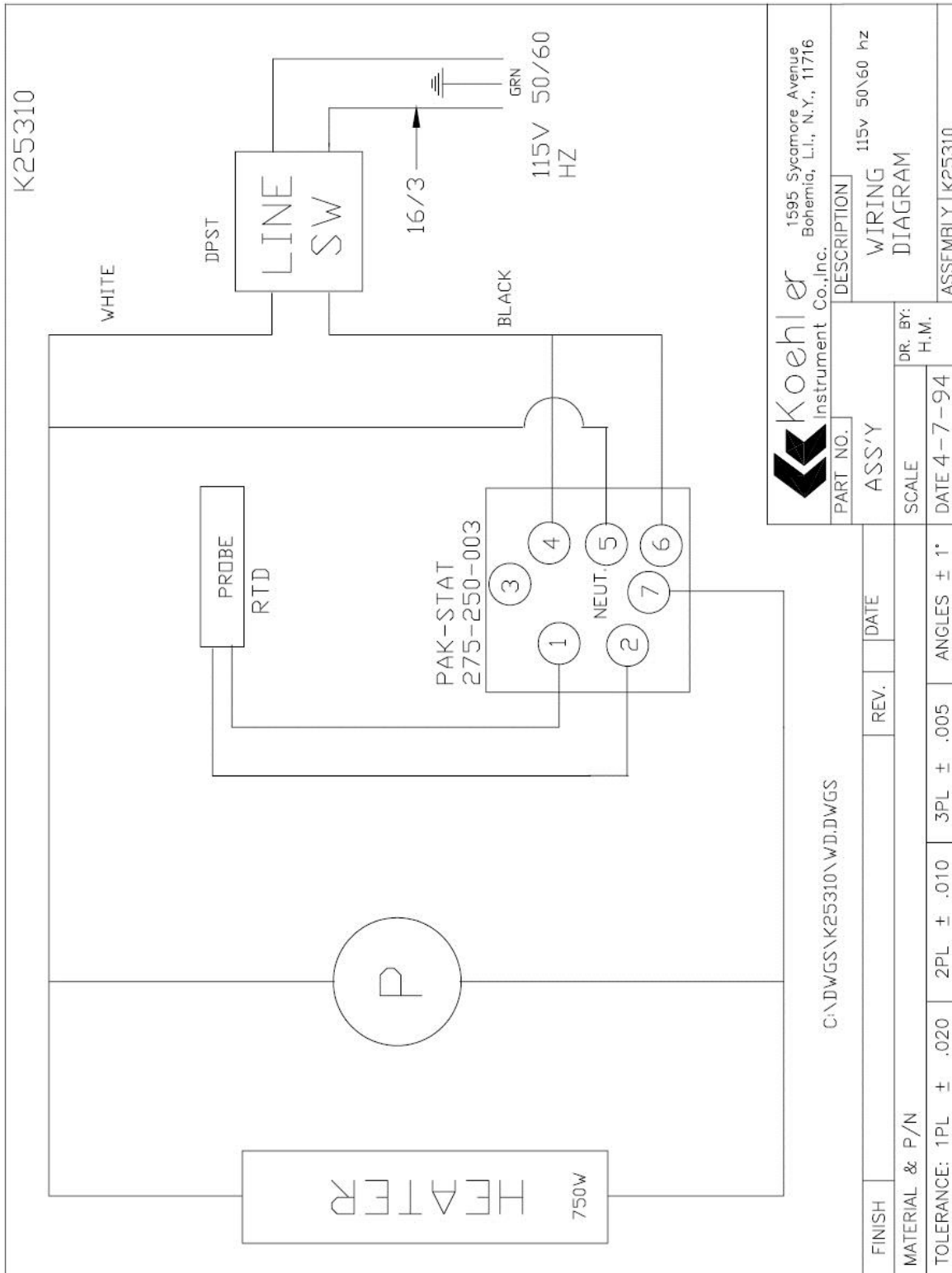
The K253XX requires little routine maintenance to provide many years of continuous service. However, over the course of time, some instrument parts may need to be replaced. When ordering replacement part(s), please provide the model number, serial number, and product shipment date of your equipment so that we can ensure you will receive the proper replacement part(s).

5.2 Replacement Parts

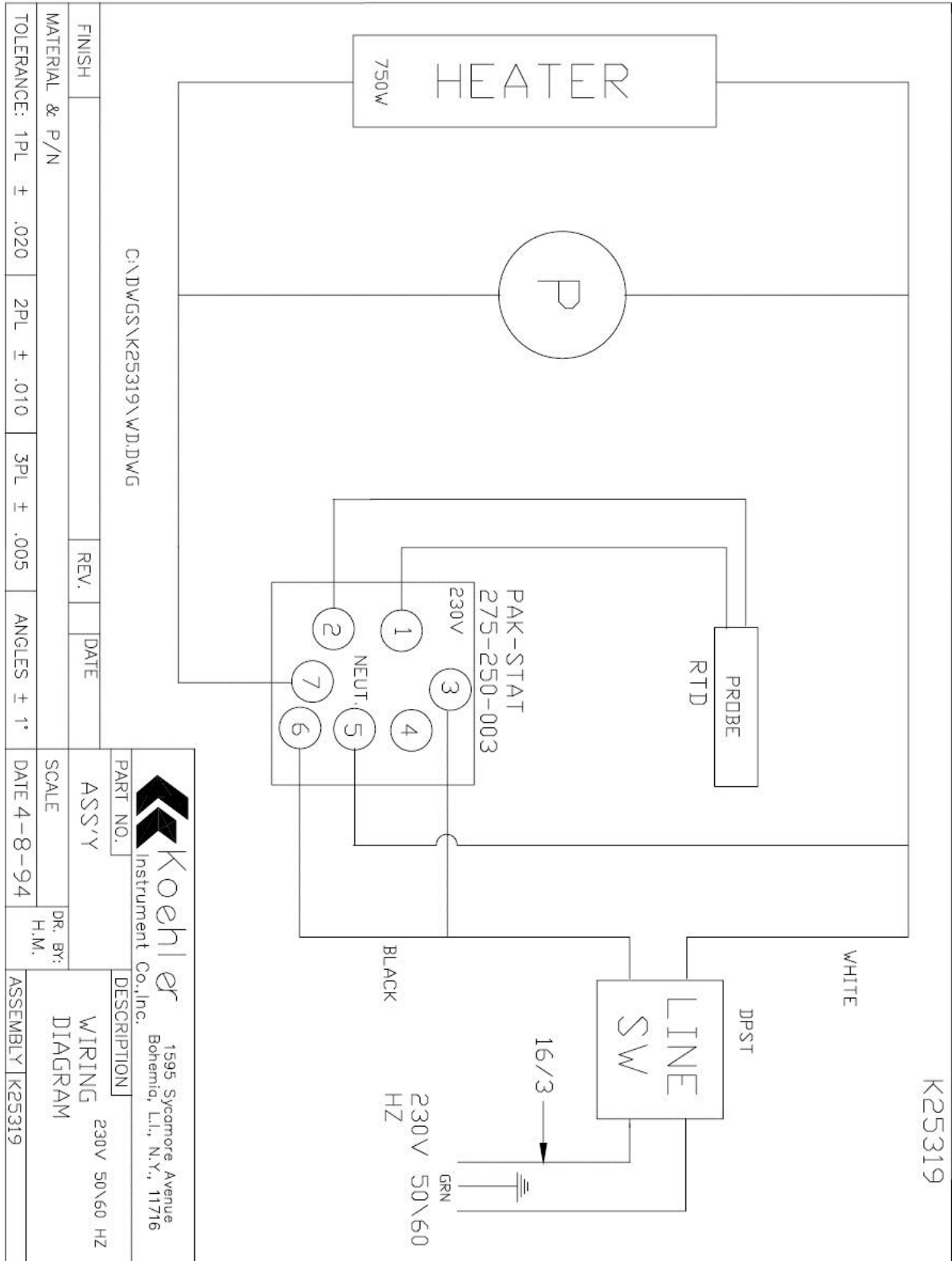
Part Number	Description
045-115-001	Red Pilot Light, 115V [†]
045-230-001	Red Pilot Light, 230V [‡]
050-002-001	Switch
167	Thermometer/Probe Holder
285-000-006	Cork Stopper
191	RTD Probe
275-250-003	Temperature Controller
281-200-002	Knob
K253-1-0-8	Heater 750W/ 115V [†]
K253-1A-0-8	Heater 750W/230V [‡]
169	Soxhlet Condenser Holder
K33100	Soxhlet Condenser
K399-5	Cover Plate
AS568-218	O-Ring for LPG Cylinder

6 Wiring Diagrams

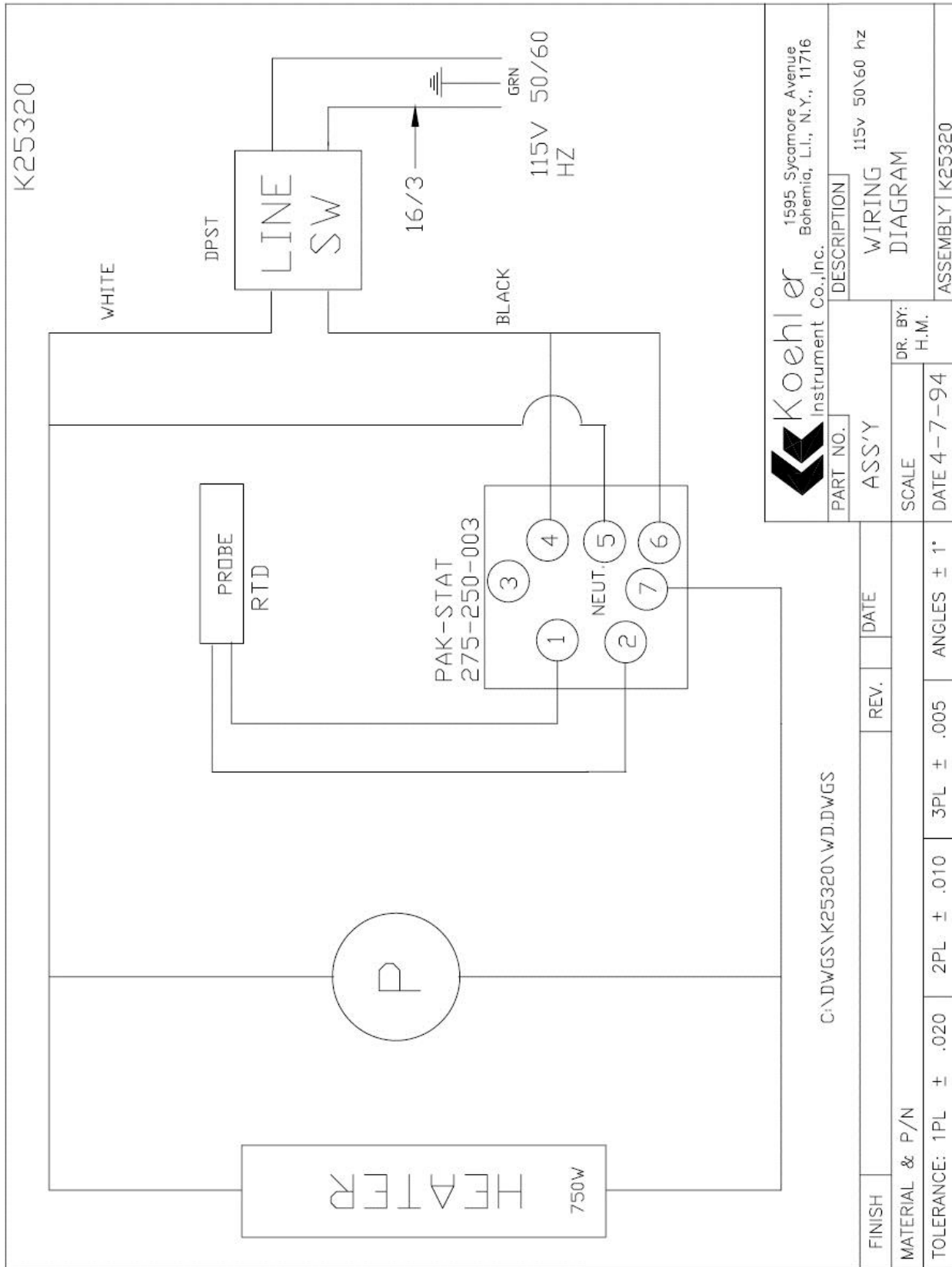
6.1 K25310 (115V 60Hz)



6.2 K25319 (230V 50/60Hz)



6.3 K25320 (115V 60Hz)

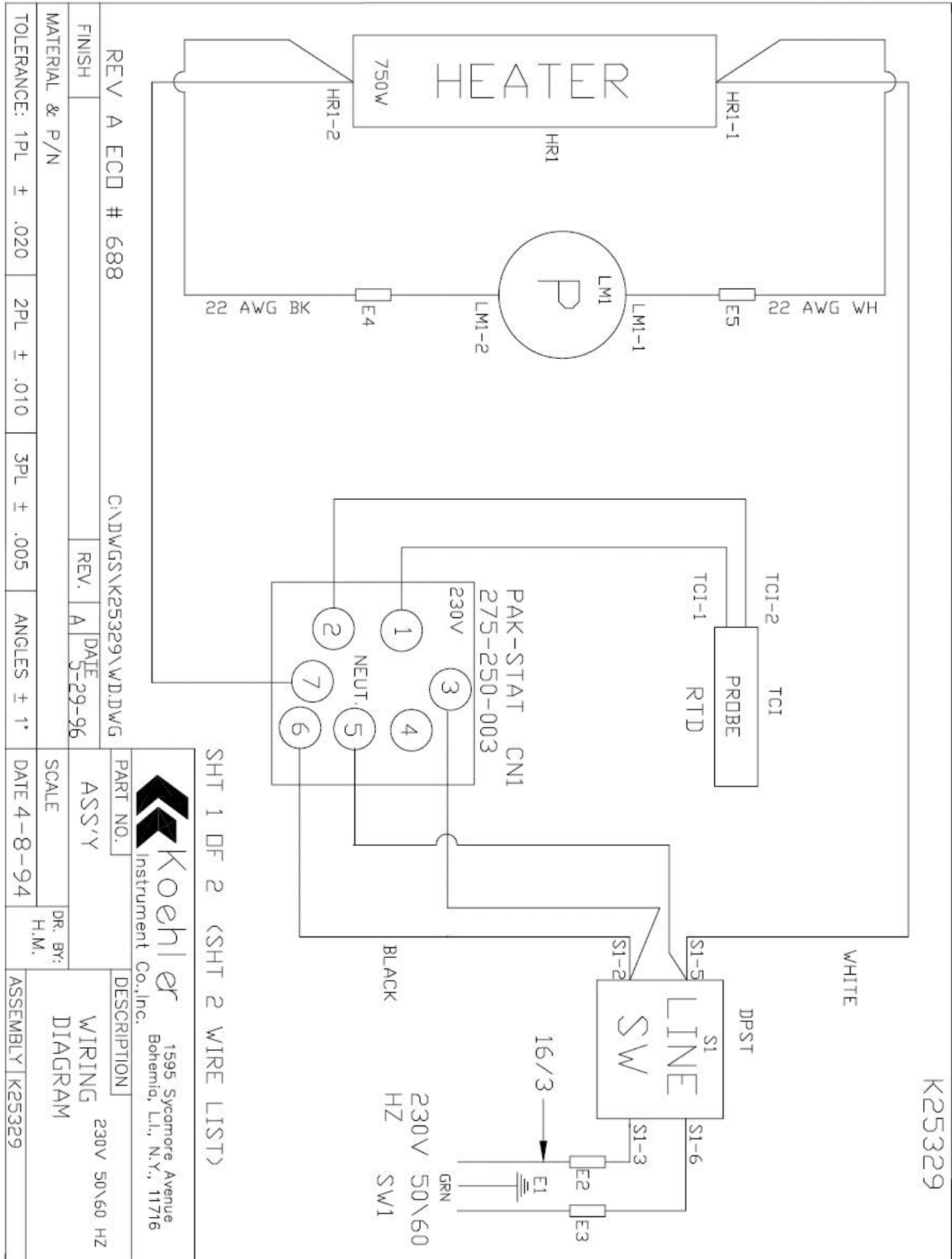


 1595 Sycamore Avenue Bohemia, L.I., N.Y., 11716	
PART NO.	DESCRIPTION
ASS'Y	WIRING DIAGRAM
SCALE	115v 50\60 hz
DATE 4-7-94	DR. BY: H.M.
ANGLES ± 1°	ASSEMBLY K25320

C:\DWGS\K25320\WD.DWGS

FINISH	REV.	DATE
MATERIAL & P/N	3PL ± .005	2PL ± .010
TOLERANCE: 1PL ± .020	ANGLES ± 1°	

6.4 K25329 (230V 50/60Hz)



7 Service

Under normal operating conditions and with routine maintenance, the K253XX Copper Strip Corrosion Test apparatus should not require service. Any service problem can be quickly resolved by contacting Koehler's technical service department either by letter, phone, fax, or email. In order to assure the fastest possible service, please provide us with the following information.

Model Number: _____

Serial Number: _____

Date of Shipment: _____

8 Storage

This laboratory test instrument is equipped with electrical components. Storage facilities should be consistent with an indoor laboratory environment. This testing equipment should not be subjected to extremes of temperature and/or moisture.

This equipment was shipped from the factory in a corrugated cardboard container. If long term storage is anticipated, re-packing the instrument in a water-resistant container is recommended to ensure equipment safety and longevity.

9 Warranty

We, at Koehler, would like to thank you for your equipment purchase, which is protected by the following warranty. If within one (1) year from the date of receipt, but no longer than fifteen (15) months from the date of shipment, Koehler equipment fails to perform properly because of defects in materials or workmanship, Koehler Instrument Company, Inc. will repair or, at its sole discretion, replace the equipment without charge F.O.B. its plant, provided the equipment has been properly installed, operated, and maintained. Koehler Instrument Company must be advised in writing of the malfunction and authorize the return of the product to the factory. The sole responsibility of Koehler Instrument Company and the purchaser's exclusive remedy for any claim arising out of the purchase of any product is the repair or replacement of the product. In no event shall the cost of the purchaser's remedy exceed the purchase price, nor shall Koehler Instrument Company be liable for any special, indirect, incidental, consequential, or exemplary damages. KOEHLER INSTRUMENT COMPANY, INC.

DISCLAIMS ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE. Please save the shipping carton in the event the equipment needs to be returned to the factory for warranty repair. If the carton is discarded, it will be the purchaser's responsibility to provide an appropriate shipping carton.

10 Returned Goods Policy

To return products for credit or replacement, please contact Koehler Customer Service with your purchase order number, our packing list/invoice number, the item(s) to be returned and the reason for the return. You will be issued a Returned Authorization (RA) number, which must be prominently displayed on the shipping container when you return the material to our plant. Shipping containers without an RA number prominently displayed will be returned to the sender. Goods must be returned freight prepaid. Returns will be subject to a restocking charge, the application of which will depend upon the circumstances necessitating the return. Some returns cannot be authorized, including certain products purchased from outside vendors for the convenience of the customer, products manufactured on special order, products shipped from the factory past ninety (90) days, and products which have been used or modified in such a way that they cannot be returned to stock for future sale.

