



K1891X CONSTANT TEMPERATURE AIR CABINET

OPERATION AND INSTRUCTION MANUAL

REV A

Koehler Instrument Company, Inc.

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Petroleum Testing & Analysis Instrumentation • Custom Design & Manufacturing



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: *Constant Temperature Air Cabinet*
Model Number(s): *K18919*

Qualifications:

This product may only to 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.
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United States of America
August 26, 2014

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
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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 K1891X Constant Temperature Air Cabinet is designed to provide a constant temperature environment and regulated air pressure.

This manual provides important information regarding safety, technical reference, installation requirements, operating condition specifications, user facility resource requirements, and operating instructions for the water spray apparatus. 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.

Toll Free: 1-800-878-9070 (US only)
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1.2 Recommended Resources and 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 D1742: Standard Test Method for Oil Separation from Lubricating Grease during Storage

1.3 Instrument Specifications

Model: K18910
K18919

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

Test Temperature: 25°C

Temperature Control

Stability: ± 1°F (±0.5°C)

Capacity: Four Samples

Interior Dimensions: 19 3/4 x 19 3/4 x 21 1/2
(l x w x d, in.(cm)) (50x50x4.55)

Overall Dimensions: 47 x 23 3/4 x 31 1/4
(l x w x d, in.(cm)) (119x60x4.79)

Net Weight: 121 lbs (54.9kg)

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 and 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

3.1 Packing List

- K1891X Constant Temperature Air Cabinet
- 371-000-001 Manometer
- K189-1-0-19 Gas Washing Bottle, 125mL

Accessories (Purchased Separately)

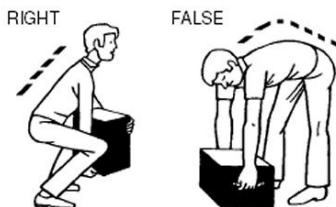
- K18900 Pressure Bleeding Test Cell
- 332-002-009 Test Beaker, 20mL
- 250-000-57C ASTM 57C Thermometer
- K1891X-Manual K1891X Constant Temperature Air Cabinet Operation and Instruction Manual

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.



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.



6. Lift instrument from cart and place on bench.
7. 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 Set up

Equipment Placement: Make sure the instrument is placed on a firm, level table in an area with adequate ventilation or in a hood.

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%

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 may occur to the unit and the warranty will be void.

Pressure System Assembly:

1. On the right side of the cabinet, install the piping assembly and the 5 pound (lb.) pressure gauge.
2. Connect the manometer and gas washing bottle to the hose nipples with Tygon Tubing. See General Arrangement Drawing in Section 6 of this document.
3. Fill the gas washing bottle with about 3.5 inches of water and the manometer to the lower 10 inch mark with water.
4. Connect the cooling coil hose nipples to a cold water supply. The inlet and outlet are located on the right rear section of the cabinet.

5. Connect the air inlet to a clean and regulated air source.
6. Connect the outlet to the process to be regulated (the solenoid side is in the air inlet). The barb fitting on the tee is the outlet which should be connected to the inlet on the air cabinet.
7. Turn on the air pressure
8. Introduce air into the pressure controller using a regulator. This pressure controller is rated for a maximum pressure of 10 psi. Exceeding this pressure will result in damage to the unit. For controlling pressures of 0.25 psi, an inlet pressure of 1 to 2 psi is recommended. Higher inlet pressure may be the cause of poor sensitivity. Pressure setpoint is varied by turning the slotted adjustment screw clockwise to increase or counterclockwise to reduce the pressure. The unit has been set to control at 0.25 psi. Pressure adjustment may be necessary.
9. Adjust the pressure with all the test cell valves on the cabinet closed.
10. Measure the pressure using the manometer.

1 psi is equivalent to 27.67 inches of water
0.25 psi is equivalent to 6.92 inches of water

4 Instrument Descriptions

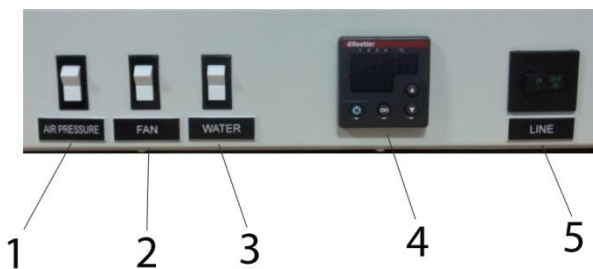


Figure 1. Instrument Description_Front Panel

1. **Air Pressure.** Opens the air solenoid and allows pressure to be applied to the test cell through the pipes.
2. **Fan.** Turns the fan motor on and off to allow the air circulating within the cabinet to be uniform
3. **Water.** Opens the water solenoid to allow coolant to flow through cooling coil

4. **Digital Temperature Controller.** The temperature controller regulates the air temperature inside the cabinet. Refer to Section 3.4 for full operational details.
5. **Line Switch.** For powering On and Off the apparatus. Controls power for all the components in the cabinet.

3.4 Temperature Controller Operation

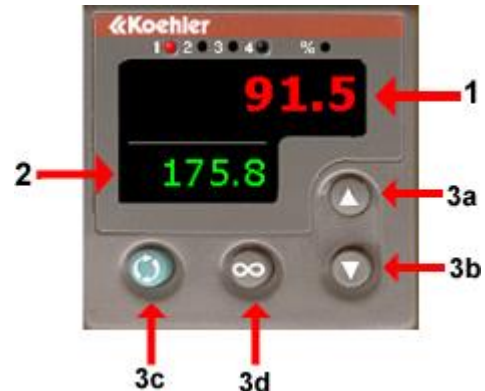


Figure 2. Temperature Controller

Actual Temperature Display. The upper red LED display shows the actual temperature as read from the RTD probe.

Set Point Temperature Display. The lower green LED display shows the set point temperature of the controller.

Control Buttons.

- a. **Up Key.** Used to increase the set point temperature and to increase or change parameters when programming temperature controller.
- b. **Down Key.** Used to decrease the set point temperature and to decrease or change parameters when programming temperature controller.
- c. **Advance Key.** Permits scrolling through controller menu parameters.
- d. **Infinity (Home) Key.** This key is used to return the temperature controller to the home page when scrolling through menu parameters. **IMPORTANT NOTE:** The digital temperature controller for the unit comes pre-programmed from the Koehler factory. Please do NOT attempt to re-program the digital temperature controller

as this will void the product warranty. If assistance is required, please do not hesitate to contact the Koehler technical service department.

Setting the Temperature. Set the desired operating temperature by adjusting the set point with the up and down keys. The set point will be displayed in the lower green LED display and the actual temperature will be displayed in the upper red LED display. Please allow the unit to fully equilibrate before proceeding with the test.

Temperature Calibration. This routine allows the digital temperature controller to be calibrated to a certified thermometer. In calibration mode, the display will automatically show two decimal places.

- a. Use a certified calibrated thermometer or thermocouple to acquire the true temperature. Determine the difference between the thermometer or thermocouple and the value displayed on the controller for the actual temperature.
- b. Press the advance key four times until **CAL1** is displayed in the lower green LED display. If there is a value observed in the upper red LED display, add it to the calculated difference obtained in the previous step. This is the offset value.
- c. Use the up or down keys to adjust to the new calibration offset value calculated in the previous step. Resume regular operations by pressing the infinity key and verify if the new calibration is correct.

Toggle Between °C and °F. This routine allows the digital temperature controller to be toggled between showing temperature readings in Celsius or Fahrenheit.

- a. Press and hold the up and down keys simultaneously for 8 seconds until **INP1** is displayed in the upper red LED display and **SET** is displayed in the lower green LED display.
- b. Press the up key until the global menu appears which is displayed as **GLBL** in the upper red LED display.
- c. Press the advance key twice until **C-F** appears in the lower green LED display. The upper red LED display will show the current

setting of either °C or °F. Press the up key to toggle setting. Resume regular operations by pressing the infinity key.

Auto Tune. This routine allows the digital temperature control to learn the heating parameters needed for any particular set point temperature. This operation should be done when installing a new unit or utilizing a different temperature set point 20% different from the previously used set point temperature.

- a. Set the operating temperature to the desired setting.
- b. Press the advance key until lower green LED display shows **AUT**. The upper red LED display will read **OFF**. Use the up key to toggle **ON/OFF** the auto tune feature. When Auto Tune is active, the upper red LED display will blink **TUNE**. Auto Tune will automatically toggle off when the set point temperature is reached.
- c. Resume regular operations by pressing the infinity key.

5 Operation

1. Be sure to read the safety and hazard warnings, the installation procedure and any of the standard test methods mentioned in the introduction of the manual before operating this instrument.
2. Install the test cell to the air line inside the cabinet and open the inside line valves as per the method and close the door.
3. Flip the Line, Fan, and Water switches to the ON position.
4. Press the Up/Down Keys on the Digital Temperature Control Panel to set your desired test temperature
5. Set the proper air pressure by using the low differential located on the left side of the cabinet. Set and record the proper readings.
6. Proceed to test in accordance with any of the following standard test methods:

- **ASTM D1742**

- **FTM 791-322**

6 Maintenance



WARNING: Disconnect power to the unit before servicing and accessing any internal portion of the instrument 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.

6.1 Routine Maintenance

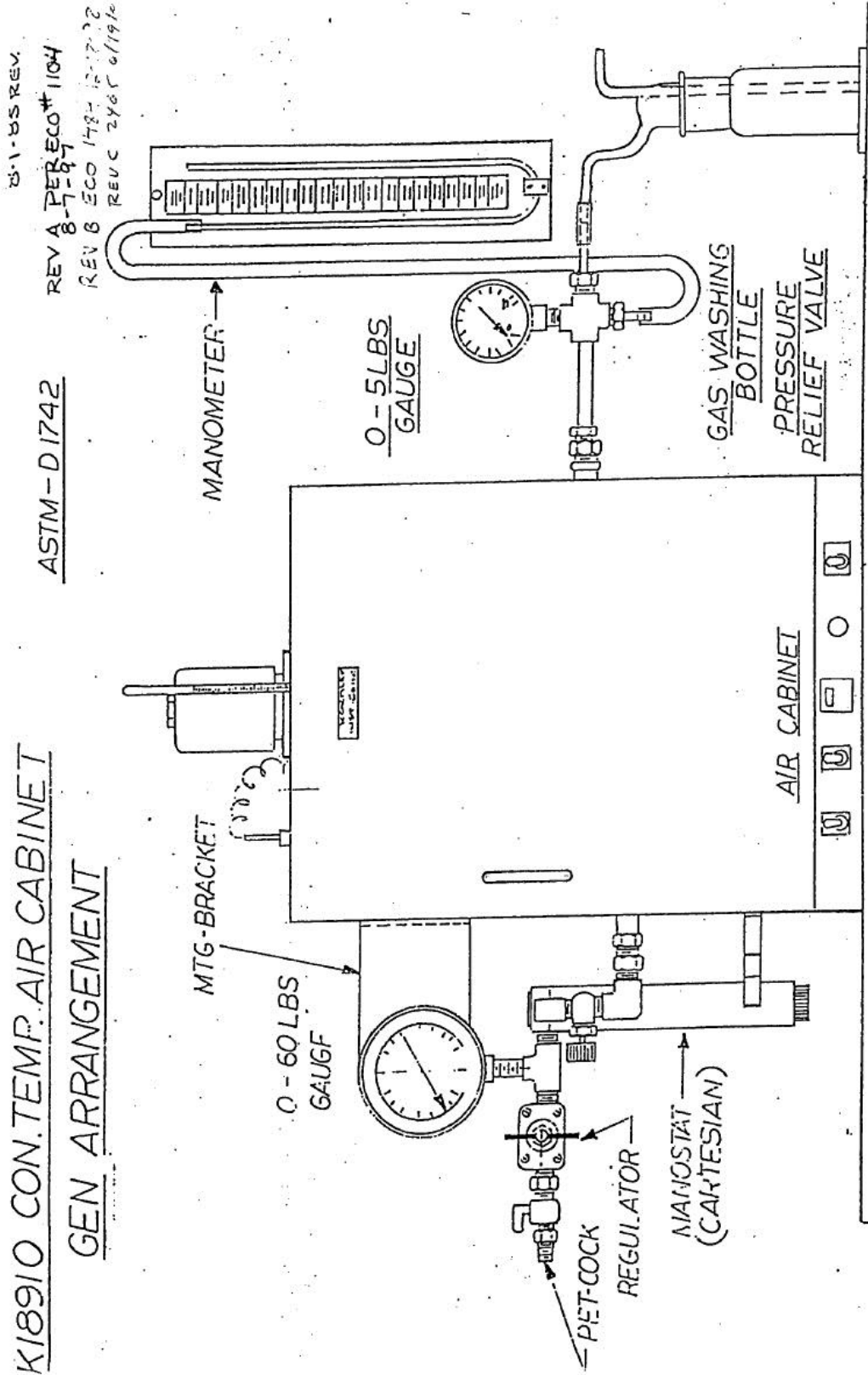
The K1891X Constant Temperature Air Cabinet requires little routine maintenance to provide many years of continuous service. However, over the course of time, some instrument parts may need to be replaced. When ordering replacement part(s), please provide the model number, serial number, and product shipment date of your equipment so that we can ensure you will receive the proper replacement part(s).

6.2 Replacement Parts

Part Number	Description
288-115-002	Motor, 115V
288-230-002	Motor, 230V
K189-1-0-17	Heater, 115V
K189-1A-0-17	Heater, 230V
442-001-001	Low Differential Pressure Switch
335-000-004	Fan Blade
283-120-002	Solenoid Valve, 115V
283-240-001	Solenoid Valve, 230V
290-050-001	Pressure Regulator
371-00-001	Manometer
045-115-001	Pilot Light, 115V
045-230-001	Pilot Light, 230V
K189-1-0-19	Gas Washing Bottle
311-005-001	Pressure Gauge, 0 to 5 psi
311-060-001	Pressure Gauge, 0. to 60 psi
010-115-002	Controller
275-103-010	Temperature Controller
010-500-001	Probe

7 Diagrams

7.1 General Arrangement



8 Service

Under normal operating conditions and with routine maintenance, the K1891X Constant Temperature Air Cabinet 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: _____

9 Storage

This laboratory test instrument consists of Electrical & Mechanical Components. Storage facilities should not be subject to extremes of high and low temperatures or extremes of high and low moisture conditions. Storage facilities should be consistent with indoor laboratory environment.

NOTE: Unit is shipped in corrugated cartons and if long term storage is anticipated, repacking with water resistant packing is recommended to insure a safe condition for the equipment.

10 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.

11 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 with 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.

