



K461XX CLOUD AND POUR POINT 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

Cloud and Pour Point Chamber K461XX

This certificate verifies that part number K461XX, Cloud and Pour Point Bath, was manufactured in conformance with the applicable standards set forth in this certification.

Specifications:

ASTM D97
ASTM D2500
ASTM D5853
ASTM D6074
ASTM D6158
IP 15
IP 219
ISO 3015
ISO 3016
DIN 51597
FTM 791-201
NF T 60-105

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

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1 Introduction

The Cloud and Pour Point Bath is a bench model unit used for determining cloud and pour point of fuels and lubricants. This unit is configured with three test chambers which have been factory preset at 0, -18, and -33°C. Each test chamber can hold four test samples.

To reduce the frost formation and accumulation of water in the baths, each bath is equipped with a cover. Included in each test position is a copper test jacket, thermometer holder, gasket (O-ring), cork disk, and a lead weight (to hold down the metal jacket).

This manual provides important information regarding safety, technical reference, installation requirements, operating condition specifications, user facility resource requirements, and operating instructions for the Cloud and Pour Point 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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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 D97: Test Method for Pour Point of Petroleum Oils
- ASTM D2500: Test Method for Cloud Point of Petroleum 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 3015
- ISO 3016

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 15: Pour Point of Petroleum Oils
- IP 219: Cloud Point of Petroleum Oils

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

DIN Publication:

- DIN 51597

Federal Test Method (FTM)

FTM Publication:

- FTM 791-201

1.3 Instrument Specifications

Model Number	Voltage	Frequency
K46100	115V	60Hz
K46195	220-240V	50Hz
K46196	220-240V	60Hz

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.

This unit is NOT explosion-proof and proper precautionary measures should be taken during operation. Avoid using this unit in an environment with flammable or explosive vapors.

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

- K463XX Cloud and Pour Point Bath
- K46100-03030 Copper Jacket (12)
- AS568-131 Copper Jacket Gasket (12)
- AS568-219 Test Jar Gasket (12)
- K460-0-8 Thermometer Holder for test jar (12)
- K46120 Cork Disk (12)
- K461XX-Manual Cloud and Pour Point Bath Operation and Instruction Manual

Accessories (To be purchased separately)

- 332-004-001 Test Jar
- 250-000-05F ASTM 5F Thermometer
- 250-000-05C ASTM 5C Thermometer
- 250-000-06F ASTM 6F Thermometer
- 250-000-06C ASTM 6C Thermometer
- K46100-SFW Cloud and Pour Point Software

3.2 Unpacking

This unit comes packed in a crate. Remove the bath from the crate and place on a bench top with approximately 12" of space between the back of the bath and the wall for airflow. **Blocking the airflow will cause a malfunction to occur.**

Unwrap the unit and wipe the shell with a soft cloth to remove smudges caused by wrapping material.

Very high ambient temperatures would also affect the efficiency of the unit. It is advisable to maintain the environment of the machine below 25°C.

Connect the line cord to a properly fused and grounded receptacle with the correct voltage as indicated in section 1.3.

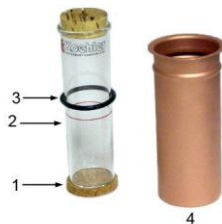
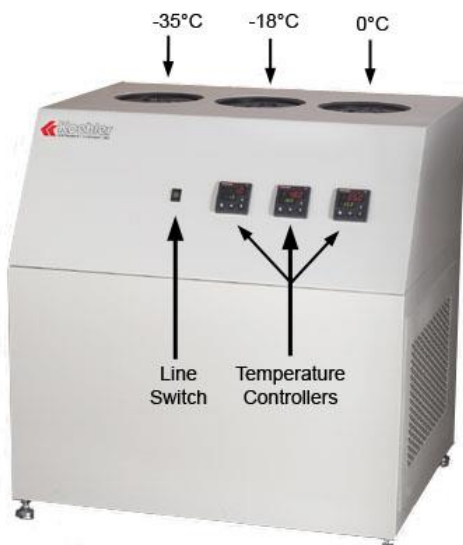
WARNING: For safety, disconnect the power when performing any maintenance and/or cleaning. Do **NOT** turn the power on unless the bath is filled with the proper medium; otherwise, damage may occur to the unit and the warranty will be void.

It is strongly suggested that a voltage stabilizer be used to prevent voltage variability. The unstable voltage may cause damage to the unit.

Carefully unpack and place the instrument and accessories in a secure location. 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.

4 Descriptions

4.1 Instrument Controls



- | | |
|-----------------------|--------------|
| 1 Cork Disk | K46120 |
| 2 Test Jar* | 332-004-001 |
| 3 Gasket for Test Jar | AS568-131 |
| 4 Copper Test Jacket | K46100-03030 |

*sold separately

4.2 Additional Accessories

ASTM Thermometers

- | | |
|-------------|--|
| 250-000-05F | ASTM 5F
Range: -36 to +120°F |
| 250-000-05C | ASTM 5C
Range: -38 to +50°C |
| 250-000-06F | ASTM 6F
Range: -112 to +70°F |
| 250-000-06C | ASTM 6C
Range: -80 to +20°C |

4.3 Temperature Controller Operation

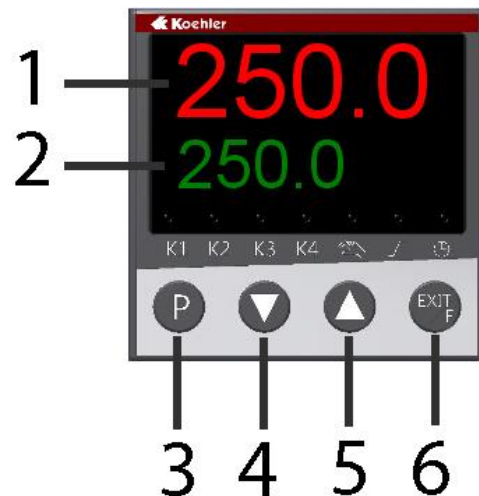


Figure 4. Temperature Controller

- Process Temperature Display.** The upper red LED display shows the process temperature as read from the RTD probe.
- Set Point Temperature Display.** The lower green LED display shows the set point temperature of the controller.
- Programming Key.** Permits scrolling through controller menu parameters. One Level Forward
- Down Key.** Used to decrease the set point temperature and to decrease or change parameter values when programming the temperature controller.

5. **Up Key.** Used to increase the set point temperature and to increase or change parameter values when programming the temperature controller.
6. **Exit / Function Key.** This key is used to exit or leave a level. One level backward

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 Set Point LED display and the actual temperature will be displayed in the upper red Process LED display. Please allow the instrument to fully equilibrate before proceeding with any testing.

Temperature Calibration. This routine allows the digital temperature controller to be calibrated to a certified thermometer.

- a. Use a certified calibrated measuring device to acquire the temperature. Calculate the difference between the measuring device and the Process value displayed on the controller.
- b. Press the program key two times until **Pct** is displayed in the lower green LED display. Press the DOWN key. CAL will display on the lower green 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. Press the Program Key. The lower green display will flash. Use the up or down keys to adjust to the new calibration offset value on the upper red display calculated in the previous step. When the value has been entered, the controller will automatically store the value. The lower green display will stop flashing. If further adjustments are

necessary, press the Program Key again. Resume regular operations by pressing the Exit / Function key two times. Verify if the new calibration is correct by observing the upper red display and comparing the value with the calibrated reference device.

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, after replacing or changing the bath medium type, 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 up and down arrow buttons simultaneously for about 5 seconds. When Auto Tune is active, the lower green LED display will blink **TUNE**. Auto Tune will automatically toggle off when the set point temperature is reached. Auto tune can be terminated by pressing the up & down buttons simultaneously again.

5 Operation

Be sure to read the safety and hazard warnings, the installation procedure and any of the standard test methods mentioned in the Introduction of this manual before operating this unit.

5.1 Bath

Fill each bath chamber with the appropriate bath medium. This can be done by removing one of the copper jackets in each chamber. Allowance must be given for the liquid displacement that would occur when the copper jacket is returned to its position. When all jackets are in position, the liquid medium level should be no more than 25 mm from the top. The level can be checked by means of a dipstick through the thermometer hole.

The manufacturer is unable to make any specific recommendation on the choice of a bath medium. Safety, toxicity, flammability and other factors must be taken into account while

selecting a bath medium. However, during tests at the factory, 200 proof (water free) denatured ethanol was used with satisfactory results. Other users have reported methanol to also be an adequate bath medium as well.

Glycol water mixtures are not a very suitable bath medium since partial freezing around the refrigeration coils and high fluid viscosity will reduce cooling efficiency with the resultant increase in bath temperature. Furthermore, in extreme cases, damage to the bath may also occur which will void the warranty.

5.2 Power

Turn on the main power switch to the unit using the line switch.

WARNING: 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 would be void.

5.3 Temperature Control

1. As seen from the front of the unit, the lowest temperature chamber is on the left, with successively higher temperatures proceeding from left to right. The controls are set at -33, -18, and 0°C (see Section 4.1). The temperature controller for each chamber has been factory preset for operation at set points as per ASTM D97 standard test method. Each chamber will automatically come to equilibrium at its set temperature.
2. Place the calibrated thermometer into the center of each of the **three** chambers to the proper immersion depth. Each chamber is controlled by the digital temperature controller positioned in line with it.
3. Wait for the temperature to stabilize before using the bath. If readjustment of the chamber temperatures becomes necessary, use the **UP** or **DOWN** arrows on the controller until the desired setpoint is achieved. Allow time for the bath to stabilize after each adjustment.

CAUTION: Disconnect all electrical power before removing the protective back to prevent injury.

CAUTION: For personal safety, do not operate the bath with the cover removed,

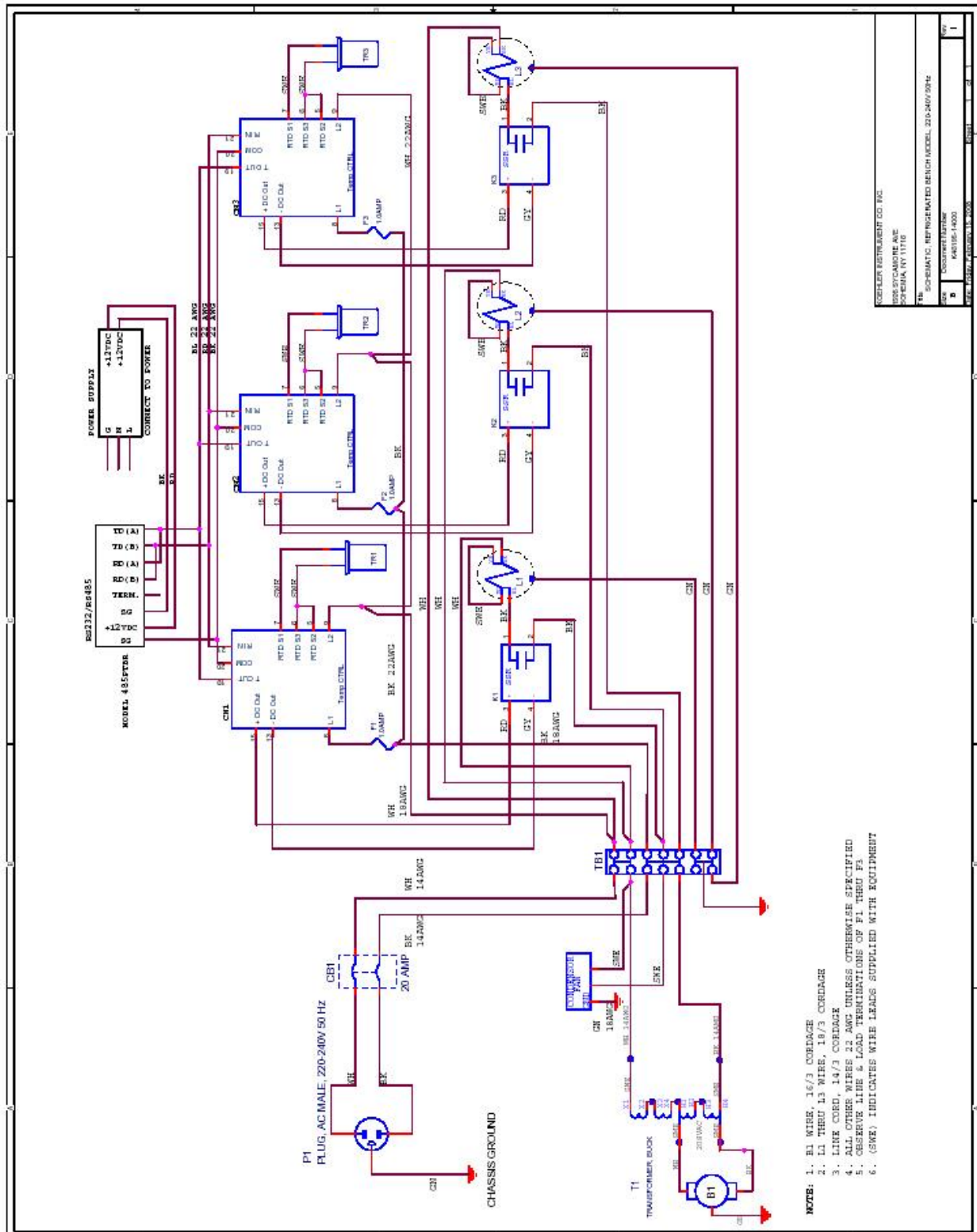
because there is a possibility of electrical shock.

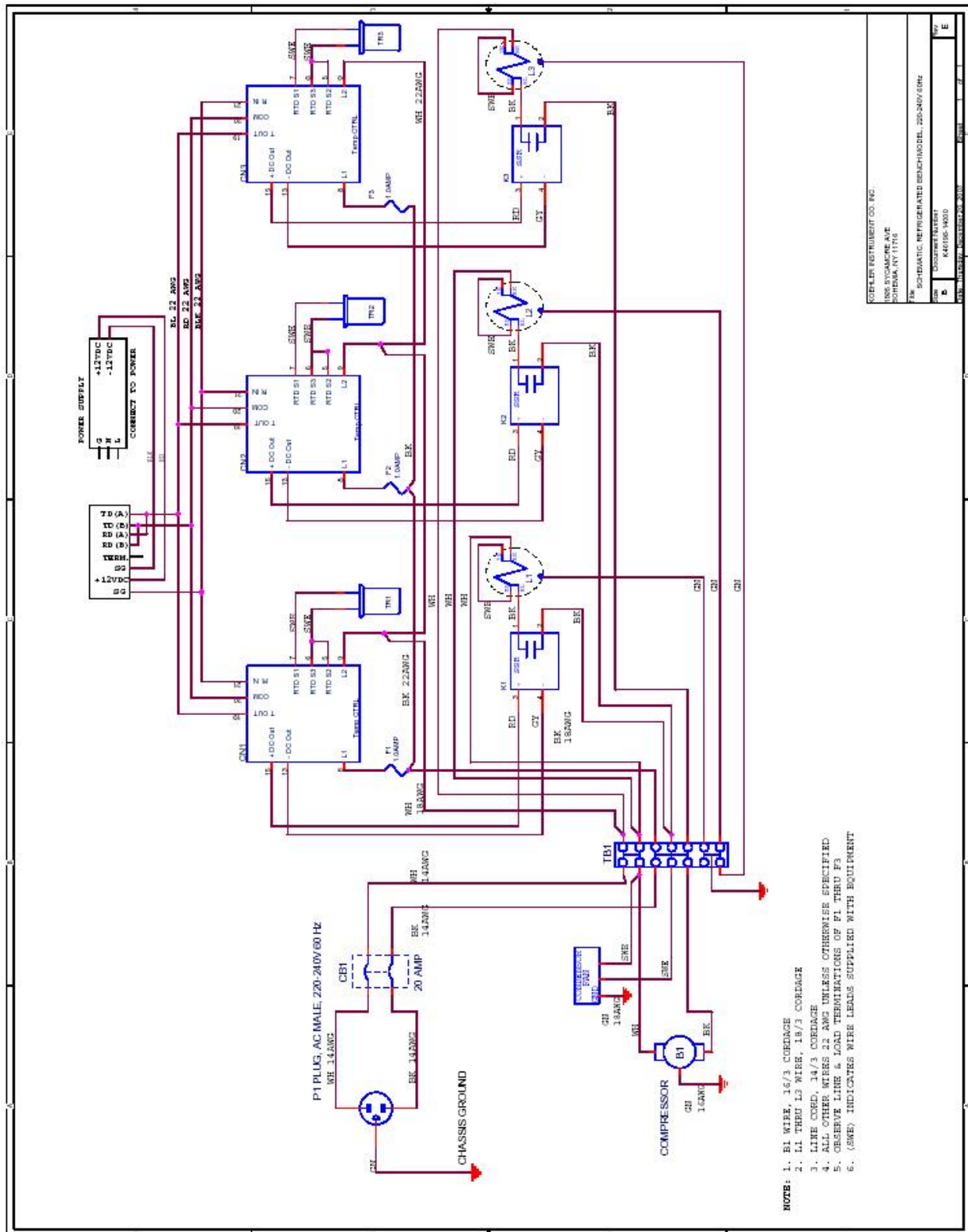
4. Proceed to test in accordance with published test methods (see Section 1.3)

6 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.

- For maximum refrigeration efficiency, periodically remove the cover and clean the refrigeration condensers using a pressurized air blast or vacuum cleaner with a brush.
- With time, particularly in a humid environment, the test bath fluid will accumulate water. The resultant increase in viscosity and or freezing on the refrigeration coil reduces the efficiency of the refrigeration.
- Check each chamber weekly, examining the liquid level and the extent of water contamination in the bath medium. The chambers should be emptied, wiped dry, and filled with fresh, dry bath medium.
- Failure to attain or maintain temperature is usually due to water saturation of the bath medium, excessive dust collecting on the refrigeration condensers, a defective condenser fan, poor electrical connection at the power plug or a refrigeration leak.
- In case of a temperature failure, check each of the above. In case of a leak, have a qualified serviceman contact the factory service department. We will advise how to charge the suspected system with the proper refrigerant. When a leak is suspected, check with a halide or electronic detector. Repair, evacuate and recharge with the proper refrigerant





8 Replacement Parts

Part Number	Description
K46100-03002	Sponge Disk
K46100-0303	Copper Test Jacket
K46120	Cork Disk
A5568-131	Gasket (O-ring)
K460-0-8	Thermometer Holder

9 Service

Under normal operating conditions and with routine maintenance, the K461XX Cloud and Pour Point Bath 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: _____

10 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.

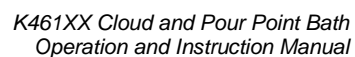
11 Warranty

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.

12 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 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.

[illegible]

