



K3016X NACE RUST PREVENTING CHARACTERISTICS BATH

OPERATION AND INSTRUCTION MANUAL

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PETROLEUM TESTING & ANALYSIS INSTRUMENTATION • CUSTOM DESIGN & MANUFACTURING

CERTIFICATE OF CONFORMANCE

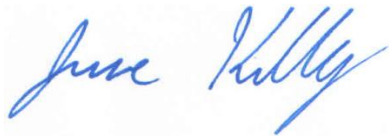
Rust Preventing Characteristics K3016XNACE

This certificate verifies that part number K3016XNACE, Rust Preventing Characteristics, was manufactured in conformance with the applicable standards set forth in this certification.

Specifications:

- NACE TM-01-72
- ASTM D665
- ASTM D3603
- ASTM D6158
- IP 135
- ISO 7120
- DIN 51585
- FTM 791-4011
- NF T 60-151

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

Table of Contents

1	Introduction	7
1.1	<i>Koehler's Commitment to Our Customers</i>	7
1.2	<i>Recommended Publications</i>	7
1.3	<i>Electrical Requirements</i>	7
2	Safety Information and Warnings	7
3	Getting Started	8
3.1	<i>Packing List</i>	8
3.2	<i>Unpacking</i>	8
4	Descriptions	9
4.1	<i>Temperature Controller Operation</i>	9
5	Operation	9
6	Safety Features	11
6.1	<i>Over-Temperature Protection</i>	11
6.2	<i>Over-Power Protection</i>	11
7	Maintenance Procedure	11
7.1	<i>Routine Maintenance</i>	11
7.2	<i>Bath Cleaning</i>	11
7.3	<i>Idler Pulley Maintenance</i>	12
8	Motor Specifications	12
9	Replacement Parts	12
10	Service	13
11	Storage	13
12	Warranty	13
13	Returned Goods Policy	13
14	Assembly and Wiring Diagrams	14
	Notes	21

1 Introduction

Koehler Model K30160NACE, K30165NACE, and K30166NACE Rust Preventing Characteristics Oil Bath is used to control corrosion in product pipelines caused by moisture condensed from gasoline and distillate fuels. Antirust properties are determined by immersing a polished steel test specimen in a stirred mixture of the sample and distilled water held at constant temperature.

This manual provides operating instructions for the K30160NACE, K30165NACE, and K30166NACE Rust Preventing Characteristics Oil Bath, and should be used in conjunction with applicable standard test methods. The following sources are recommended:

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
Fax: +1 631 589 3815

Email: info@koehlerinstrument.com
<http://www.koehlerinstrument.com>

1.2 Recommended Publications

1. National Association of Corrosion Engineers (NACE)
PO Box 218340
Houston, TX 77218
Tel: +1 713 492 0535

NACE Publication:

- NACE TM0172-86: Antirust Properties of Cargoes in Petroleum Product Pipelines

1.3 Electrical Requirements

Model No	Voltage	Frequency	Amps
K30160NACE	115V	60 Hz	13.0 A
K30165NACE	220-240V	50 Hz	6.8 A
K30166NACE	220-240V	60 Hz	6.8 A

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.

Over Temperature Protection. This unit is equipped with Over Temperature Protection (OTP) circuitry to prevent overheating. The unit will automatically interrupt power whether equipment malfunction or operator error causes the temperature to exceed either 20 °C above the set point or the maximum recommended temperature range. The power can only then be restored by identifying and correcting the problem, allowing the unit to return to normal operating temperatures, and resetting the power to the unit.

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>.

Gasoline and other volatile petroleum products



WARNING: Extremely Flammable. Vapors or spray mist harmful if inhaled.

- Vapors may cause flash fire.
- Keep away from heat, sparks, open flames, or any other ignition sources.
- Keep container closed. Beware of static discharges.
- Prevent build-up of vapors by opening all windows and doors to achieve cross-ventilation. Also, use under a hood.
- Avoid contact with eyes, skin, and clothing.
- Turn off all stoves, heaters, motors, and pilot lights during use and until all vapors are gone.

3 Getting Started

3.1 Packing List

Component Check List:

- K30160NACE, K30165NACE, or K30166NACE Rust Preventing Characteristics Oil Bath
- K30100 Steel Test Specimens with Type 2 Plastic Specimen Holders (6)
- K30120 Plastic Beaker Covers (6)

Accessories (purchased separately)

- 332-002-006 Test Beaker, 400mL (6)
- 250-000-09F ASTM 9F Thermometer
Range: 20 to 230°F
- 250-000-09C ASTM 9C Thermometer
Range: -5 to +110°C
- K30130 Chuck for Polishing Test Specimens
- 380-150-002 Aluminum Oxide Cloth, 150-grit, pack of 50
- 380-240-002 Aluminum Oxide Cloth, 240-grit, pack of 50
- K30140 Auxiliary Stirrer Blade

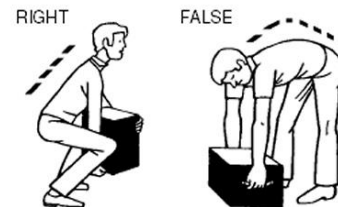
- K30110 Steel Test Specimen without holder

3.2 Unpacking

1. This unit comes packed in a crate with the rust test specimens packed in a separate carton inside the main crate.
2. 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.



3. Lift instrument from cart and place on bench.
4. Unpack the rust test specimens from the separate carton and place in a safe location.
5. 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.

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

4 Descriptions

4.1 Temperature Controller Operation

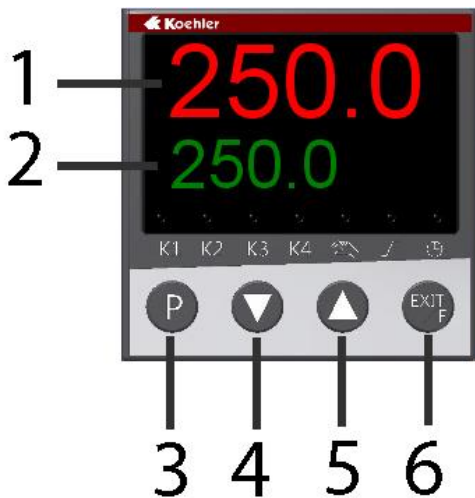


Figure 4. Temperature Controller

1. **Process Temperature Display.** The upper red LED display shows the process temperature as read from the RTD probe.

2. **Set Point Temperature Display.** The lower green LED display shows the set point temperature of the controller.
3. **Programming Key.** Permits scrolling through controller menu parameters. One Level Forward
4. **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

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 this manual before operating this instrument.
2. Flip the Line Switch to the ON position.
3. Observe the display panel of the digital temperature control. Upon power initialization all LED's will momentarily be illuminated. After five seconds, the control will reset and display the current bath temperature on top as PV or

process (or actual) value. The bottom display is the setpoint value or SV

4. To raise the apparatus temperature, push the ascending arrow until the desired temperature is displayed in the setpoint value display. To lower the setpoint value, push the descending arrow until the desired temperature is displayed in the setpoint value display.

The maximum setpoint temperature limit is programmed at 150°F.



WARNING: Do not set a temperature higher than 150°F. The software overtemperature protection is set at 200°F. If an overtemperature situation occurs, power to the heaters is interrupted until the operator shuts off the bath or the bath cools down.



WARNING: There are exposed hot surfaces on the bath. Avoid contact with exposed skin by the use of protective equipment as required or serious injury could occur.

5. Test Sample Setup Instructions

Fill the beaker with an oil sample up to the graduation mark. Place beaker into the chamber. Place the plastic beaker cover on top. Push up on the upper stirrer shafts (already assembled). Insert a lower stirrer shaft into the slot provided on the beaker cover. Connect the lower stirrer shaft to the upper stirrer shaft by slipping it into the slotted coupling and twisting to the left or to the right as required. Install the test specimen into the beaker. Insert the ASTM grade thermometer with a cork into the plastic beaker cover.

Adjust the stirrer height as per the instructions outlined on the lower left side of the stirrer Arrangement Assembly diagram,. A vernier caliper may be used to measure the correct stirrer height.

Turn ON the stirrer motor by flipping the Stirrer Motor Switch up.

6. Proceed to test in accordance with any of the following standard test methods: NACE TM0172-86 ASTM D665, IP 134, ISO 7120,

DIN 51355, DIN 51585, FTM 791-4011, FTM 791-5313

6 Safety Features

The Koehler Rust Prevention Bath is equipped with several safety and protection features, which are described in the following sections.

6.1 Over-Temperature Protection

The Koehler Rust Prevention Bath is equipped with Over-temperature Protection (OTP) circuitry, which prevents the unit from exceeding unsafe operating temperatures. If the unit cannot maintain the set point temperature and begins to decline, the OTP circuitry may have been activated. Please follow these steps.

1. Turn off the unit power switch and disconnect the line cord.
2. Determine the source of the problem and correct the situation.
3. Restart the unit. Monitor the operations to ensure that the unit is operating properly. If you are still experiencing trouble, please contact Koehler technical service for assistance.

6.2 Over-Power Protection

The Koehler Rust Prevention Bath is equipped with Over-power Protection circuitry, which prevents the unit from unsafe electrical conditions. If power to the unit is lost, then turn off the main power and turn it back on again. The main power switch also functions as a circuit breaker.

7 Maintenance Procedure



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.

7.1 Routine Maintenance

The Rust Preventing Characteristics Bath 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).

7.2 Bath Cleaning

- To clean the instrument's exterior, which includes all painted surfaces and glass, either a solution of soap and water or laboratory grade detergent may be used.
- Apply cleaner to clean wipe or cloth, not to the instrument directly. Wipe surface clean.
- **Do Not** clean bath exterior with organic chemicals such as Acetone, Toluene, Hexane, etc.
- For more difficult cleaning of finished surfaces, a dilute solution or isopropanol in water may be used.
- It is not recommended that more aggressive solvents be used on painted surfaces since paint color will tarnish or be stripped from the instrument.
- Glass surfaces may be cleaned using a more aggressive solvent such as acetone, if necessary.



SHOCK AND BURN HAZARD: Only clean inside the bath when equipment is de-energized and unplugged from the mains power supply. Allow adequate time for heating coils to completely cool before cleaning.

7.3 Idler Pulley Maintenance

Occasionally oil the Idler Pulley (see the Idler Assembly Diagram)

To Replace the Idler Assembly Belt:

1. Remove the spindle guard.
2. Remove the ¼-20 x ¾ long bolt on the right rear of the cross brace (as outlined on the Stirrer Arrangement Diagram)
3. Install the idler assembly K301-0-16A using the longer ¼-20 x 1" bolt supplied.
4. Loosen the ¼-20 bolt holding the cam (K301-0-15)
5. Install the new belt (301-005-001) to the spindle pulleys and sheave as shown in the Stirrer Arrangement diagram
6. Adjust the tension on the belt using the cam. The belt should have a slight deflection of approximately ¼-3/8 of an inch.
7. Tighten the cam by locking and mounting the bolt. Run the spindles and check that the belt is running correctly.
8. Replace the stirrer guard and secure tightly

8 Motor Specifications

K301X6NACE Rust Preventing Characteristics baths are supplied with an Explosion-Proof Motor (288-115-061). **The Explosion Proof Motor is UL, and CSA approved for Class I, Group D, Class II, Group F & G, and T3C.** See Wiring Diagram in Section 13 of this Manual.

Technical Specifications	
Speed:	1725 rpm
Output:	.33 hp
Phase:	1
Power-Factor:	60
Rating:	40C AMB-CONT
Voltage:	115/208-230
FL Amps:	6/3.2-3
208V Amps:	3.2
FL Efficiency:	60
Frame:	48
Hertz:	60
Insulation Class:	B

9 Replacement Parts

Part Number	Replacement Part
K299-0-16	Bearing Housing (#1)
289-001-012	Ball Bearing (#2)
K301A-0-6	Crossbar (#3)
326-102-004	½ ID Steel CAD/PL Collar (#4)
K301-0-5	Stirrer Collar (#5)
K301-0-7	Stirrer Housing Assembly (#7)
K301-0-16A	Idler Pulley Assembly (#16A)
K301-0-8L	L.H. Upper Stirrer Assembly
K301-0-8R	R.H. Upper Stirrer Assembly
K301-0-9	Lower Stirrer Shaft
K301-0-10	Stirrer Pulley, 50/60 Hz
K301-0-11	Stirrer Rod
288-115-061	Motor, 115V 60 Hz
K30165NA-03005	Motor Pulley, 50 Hz
K30160-03000	Motor Pulley, 60 Hz
K301A-0-5	Heater, 1500W 115V
K301A-1-0-5	Heater, 1500W 230V
265-600-001	RTD Temperature Probe
275-103-044	Electronic Temperature Control
301-005-001	Endless Woven Polyester Belt
271-010-024	Circuit Breaker for K30165NACE and K30166NACE
271-017-004	Circuit Breaker for K30160NACE

*(#--) numbers refer to parts indicated on assembly drawings

10 Service

Under normal operating conditions and with routine maintenance, the Rust Preventing Characteristics 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: _____

11 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.

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.

13 Returned Goods Policy

To return products for credit or replacement, please contact Koehler Customer Service with your purchase order number, our packing

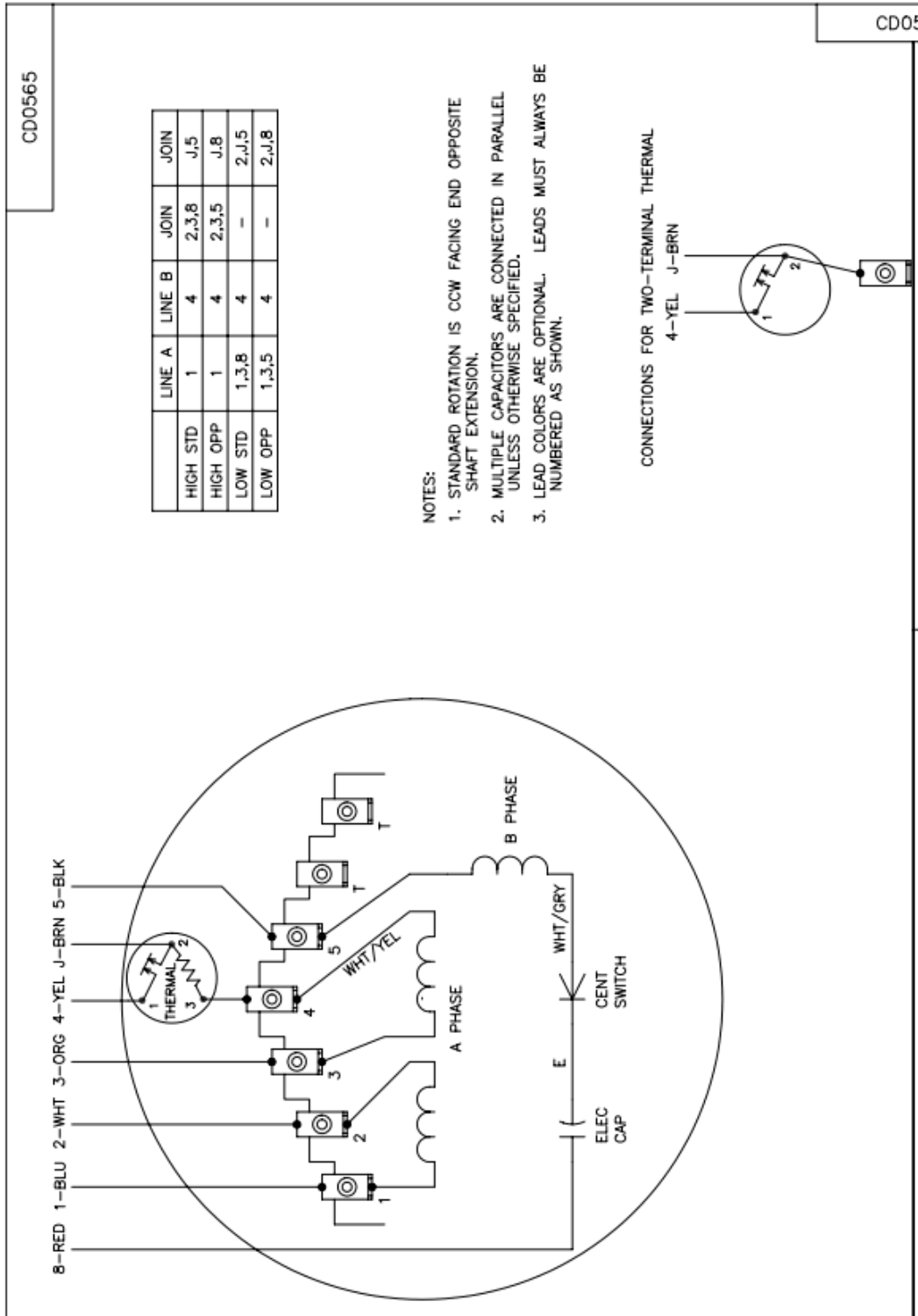
This equipment was shipped from the factory in a corrugated cardboard container. If long term storage is anticipated, re-packing the instrument in a water-resistant container is recommended to ensure equipment safety and longevity.

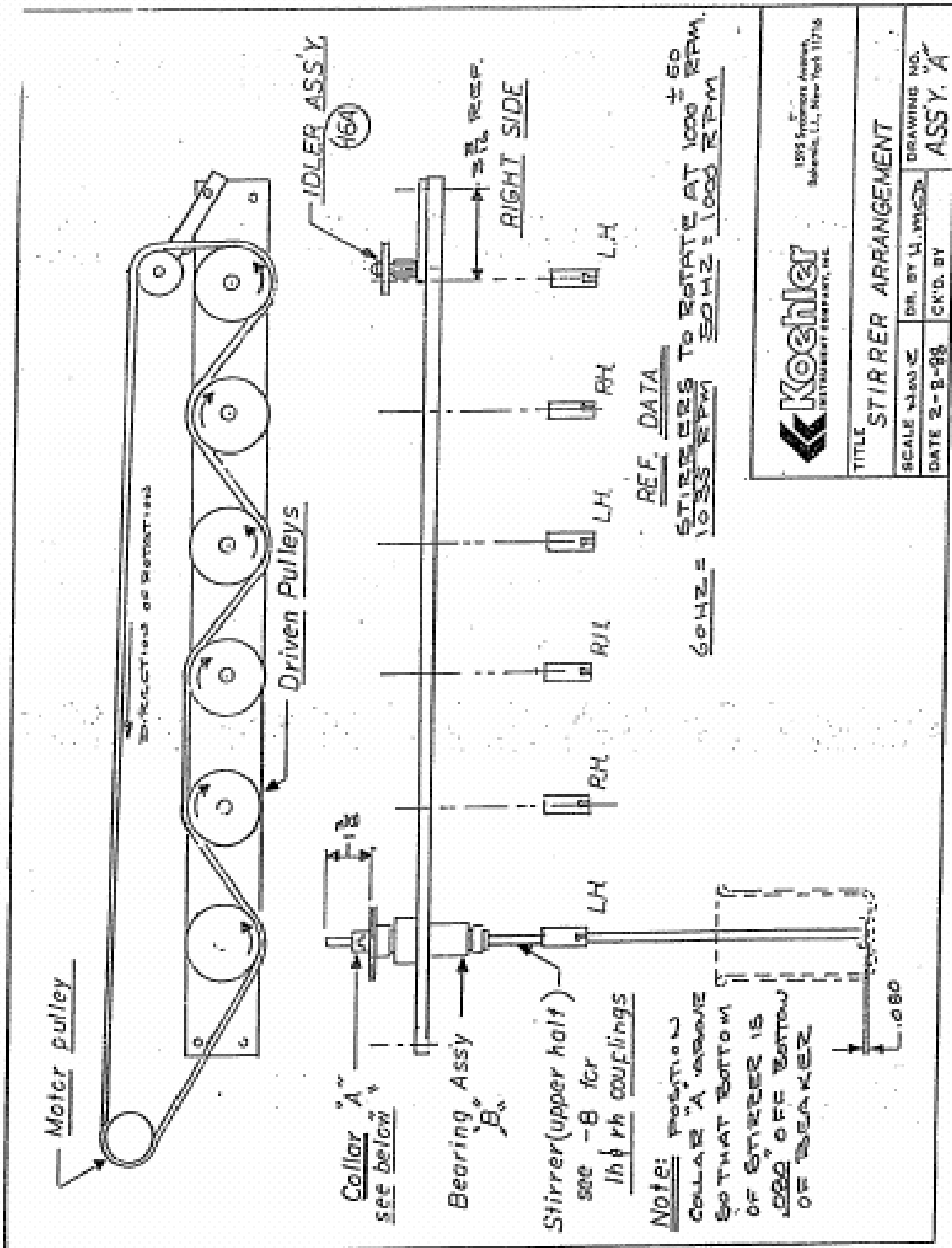
12 Warranty

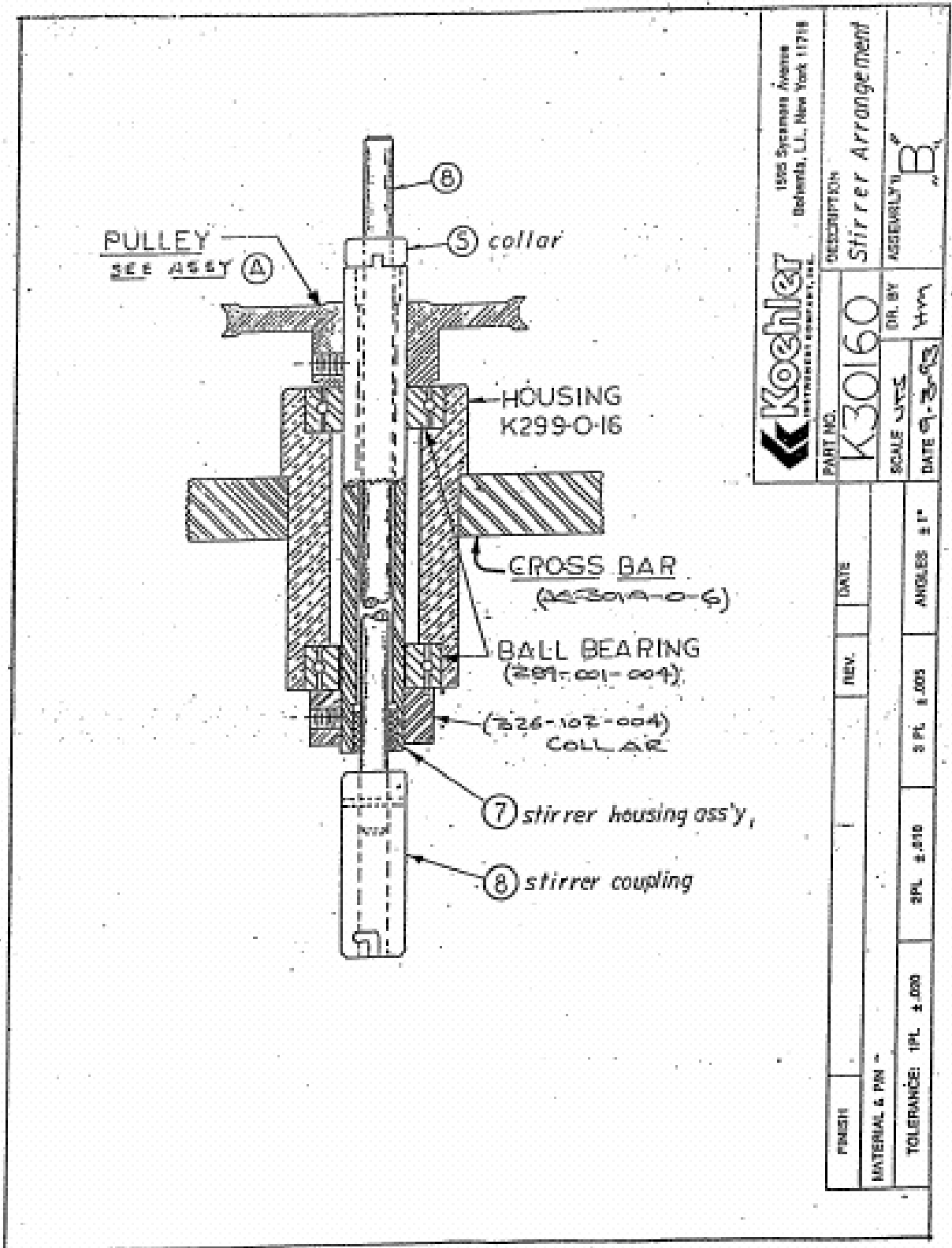
We, at Koehler, would like to thank you for your equipment purchase, which is protected by the following warranty. If within one (1) year from the date of receipt, but no longer than fifteen (15) months from the date of shipment, Koehler equipment fails to perform properly because of defects in materials 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

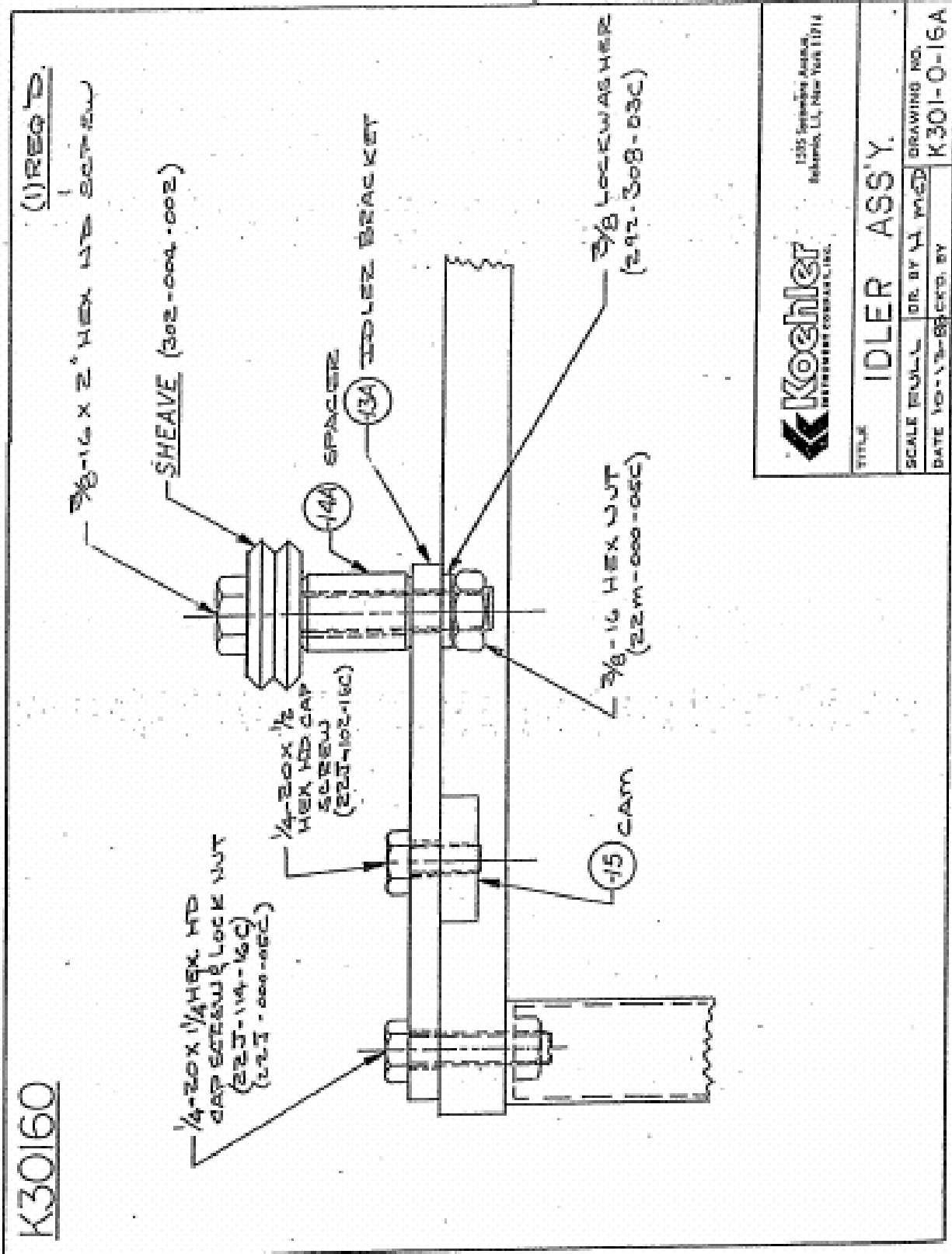
list/invoice number, the item(s) to be returned and the reason for the return. You will be issued a Returned Authorization (RA) number, which must be prominently displayed on the shipping container when you return the material to our plant. Shipping containers without an RA number prominently displayed 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.

14 Assembly and Wiring Diagrams









1235 Sepponen Avenue,
Baltimore, LI, New York 11714

TITLE		IDLER ASS'Y.	
SCALE	FULL	DR. BY	H. M. G.
DATE	10-13-68	CHKD. BY	K301-0-16A
DRAWING NO.		K301-0-16A	

