



## **K132XX PETROLEUM COMPARATOR**

### ***OPERATION AND INSTRUCTION MANUAL***

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**Koehler Instrument Company, Inc.**

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Petroleum Testing & Analysis Instrumentation • Custom Design & Manufacturing



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# CERTIFICATE OF CONFORMANCE

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## Petroleum Colorimeter K13200, K13290

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This certificate verifies that part numbers K13200, K13290, Petroleum Colorimeter, were manufactured in conformance with the applicable standards set forth in this certification.

**Specifications:**

ASTM D1500  
ASTM D6074  
IP 196  
ISO 2049  
FTM 791-102

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 Koehler K132XX Petroleum Oils Comparator is designed for the visual determination of the color of lubrication oils, heating oils, diesel fuel oils, and petroleum waxes.

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

**Read all instructions pertaining to safety, set-up and operation. Proper operation is the user's responsibility.**

### 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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**<http://www.koehlerinstrument.com>**

### 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](mailto:service@astm.org)

#### ASTM Publication:

- D1500: Standard Test Method for ASTM Color of Petroleum Products (ASTM Color Scale)
- D6074: Characterizing Hydrocarbon Lubricant Base Oils

2. International Organization for Standardization (ISO)  
1, rue de Varembe  
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 2049: Petroleum products – Determination of Colour (ASTM Scale)

3. Energy Institute (IP)  
61 New Cavendish Street  
London, W1M 8AR, United Kingdom  
Tel: 44 (0)20 7467 7100 • Fax: 44 (0)20 7255 1472  
<http://www.energyinstpubs.org.uk/>

#### IP Publication:

- IP 196: Petroleum products – Determination of Colour (ASTM Scale)

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

#### DIN Publication:

- DIN 515-78

5. Federal Test Method (FTM)

#### FTM Publication:

- FTM 791-102

6. Association Francaise de Normalisation (AFNOR)

#### AFNOR Publication:

- NF 60-104

### 1.3 Instrument Specifications

<i>Models:</i>	K13200, K13290
<i>Electrical Requirements:</i>	115V 50/60Hz 220-240V 50/60Hz
<i>Light Source</i>	12V 20 Watt tungsten halogen lamps
<i>Optical System</i>	Fully Prismatic
<i>Sample Requirements</i>	Sample and reference glass containers
<i>Instrument Housing</i>	Fabricated Steel with durable textured 'Trimite' paint finish
<i>Power Pack</i>	Input Voltage: 110/220V AC Switchable Output Voltage: 12V AC
<i>Instrument Input Voltage</i>	12V AC
<i>Input Frequency</i>	50-60 Hz
<i>Power Consumption</i>	2 amps 20 Watts (max)
<i>Temperature Range</i>	-10°C to +70°C
<i>Dimensions</i>	Width: 235 mm Depth: 245 mm Height: 90 mm
<i>Instrument Weight</i>	12.2 lbs (5.5 kg)

## 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

- K132XX Petroleum Oils Comparator
- K132XX-Manual Operation and Technical Manual
- Light Shield
- Sample Container (3)
- Calibration Certificate

### 3.2 Unpacking

Carefully unpack and place the instrument and accessories in a secure location. Lift the unit from the carton and remove all packing from the top and bottom. 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 Setup

**Equipment Placement.** Place the instrument on a firm, level table in an area with adequate ventilation or in a hood.

**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.** The Petroleum Oils Comparator comes complete with a purpose built external power supply unit. Before using the instrument, check that the correct voltage setting has been selected for the local supply voltage. The voltage selector switch is located on the power supply unit and can be adjusted, if necessary, with a suitable screwdriver.

The Instrument is supplied with a power lead fitted with a molded plug which should conform to local requirements. If however the plug is not the correct type, a replacement should be obtained. Please note when replacing plugs or leads that this unit must be grounded.

**WARNING:** Before connecting the instrument to the mains supply, please read the instructions above. Always disconnect from mains before removing the cover.

## 4 Operation

**NOTE:** Please refer to the table below and Figures 1, 3, and 4 for items designated by numbers in parenthesis.

Item Number	Description
1	Oil Sample
2	Flashed Opal Screen
3	Glass Sample and Reference Container Tubes
4	N/A
5	Color Standard Disc 1
6	Color Standard Disc 2
7	Power Switch
8	Center Sample Compartment

9	Left Water Compartment
10	Right Water Compartment
11	Sample Container
12	Prism
13	Right Control Knob
14	Left Control Knob
15	N/A
16	Cover
17	Chassis
18	Casing Screws
19	Lamp
20	Lamp Holder
21	Center Bulkhead
22	Shaft
23	Coupling
24	Felt Washer
25	Polyethylene Washer
26	PTFE Bushes (Center Bulkhead)
27	PTFE Bushes (inside of front panel chassis)
28	Prism Stand
29	N/A
30	Lighting Chamber
31	12V input Socket

### 4.1 Preliminary Overview

Permanently colored glass standards fitted into two discs are located on either side of the oil (1) sample being tested, so that the oil may be viewed in the center of any two glass standards. This facilitates more accurate grading and is also ideal for viewing the sample between two predetermined limit colors.

The comparator has a color corrected halogen light source closely corresponding to Illuminant C of the CIE system, guaranteeing an even field of view. The light source is also filtered through a flashed opal screen (2), housed within the lighting chamber (30).



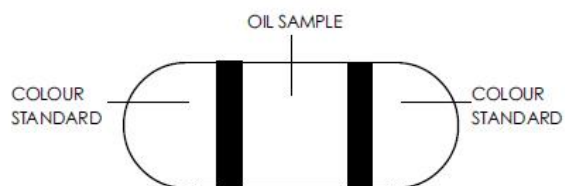
Disc 1: 0.5, 1.5, 2.5, 3.5, 4.5, 5.5, 6.5, 7.5. (5)  
Disc 2: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0. (6)

## 4.2 Method of Operation

- 
- This exploded perspective view shows the device 1000, which includes a base 12, a front panel 13, and a top cover 11. The front panel 13 features two control knobs 14 and 15. The top cover 11 is shown in an open position, revealing a display screen 3 and a control panel 16. The device is supported by four legs 18.

**Figure 1. Instrument Description (Portrait)**

6. The sample may be viewed through the prism (12) from either a sitting or standing position. The best results are achieved with one eye closed. The field of view should appear as in Figure 2 below.



**Figure 2. Prism field of view**

7. The two discs containing the color standards are rotated by turning the control knobs (13) and (14) on the front of the comparator, until the sample color falls between or matches the master disc colors. A direct reading may be taken from the scales on the control knobs.
8. If the sample is not clear, heat to 6°C above its cloud point and measure the color at that temperature. Petroleum waxes, including the petrolatum, should be heated 11°C to 17°C above the congealing point. If the sample is darker than 8, mix 15 volumes of solvent Kerosene.
9. Report the figure as an exact match to one standard, e.g., "7.5 ASTM COLOR", or if the color of the sample is intermediate between two glass standards, record the number of the exact darker standard with the addition of "LIGHTER THAN", e.g., "LIGHTER THAN 7.5 ASTM COLOR". If the sample has been diluted, add the abbreviation "DIL", e.g., "7.5DIL ASTM COLOR".

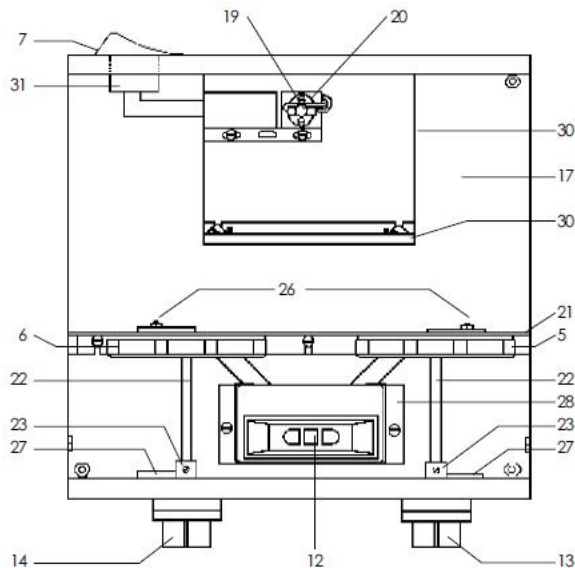


Figure 3. Petroleum Oil Comparator (Top View)

## 5 Maintenance

**WARNING:** Before connecting the instrument to the mains supply, please read the instructions below. Always disconnect from mains before removing the cover.

**NOTE:** To maintain the performance of the K132XX Petroleum Oils Comparator, spillages on the instrument or in the sample chamber should be cleaned immediately.

**NOTE:** Please refer to Figures 1, 3, and 4 for items designated by numbers in parenthesis.

### 5.1 Replacing the Lamp

**WARNING:** Avoid touching the lamps directly with fingers as this will significantly reduce the life of the lamps.

To change the lamp (19), remove the two casing screws (18) and lift the cover (16) clear of the instrument. Grip the lamp firmly and pull vertically from its holder (20). The replacement lamp should be put into the holder using clean tissue to prevent any contact between the lamp and the fingers.

### 5.2 Glass Standard Cleaning

**NOTE:** The Glass Standards are lifetime guaranteed not to fade, even under tropical and other extreme conditions

To clean the glass standards loosen the screws on the center bulkhead (21) and slide to the back of the chassis (17). Loosen the control knob screws and remove the discs (5) and (6) complete with shafts (22), couplings (23), and felt washers (24). The standards should be cleaned using a soft tissue. The white PTFE bushes (26) on the centre bulkhead, and (27) on the inside of the chassis front panel are aligned before the instrument leaves the factory and should never be unlocked unless realignment is necessary.

### 5.3 Reassembly of Apparatus

On reassembly, ensure that the polyethylene washers (25) are replaced between the control knobs (13 and 14) and the instrument front panel. Make certain that the disc with the half values (5), disc 1, and its control knob (13) are positioned on the right. To recalibrate the discs with the control knobs, rotate the discs by hand until the two lightest standards are central in the viewing fields, then rotate the control knobs until the lowest values on the scales are vertical. Finally tighten the control knob screws. The prism (12) can be removed by unfastening the two screws at the base of the prism stand (28). After cleaning, replace and realign the prism by moving the stand left or right until the field of view is correct, then tighten the screws.

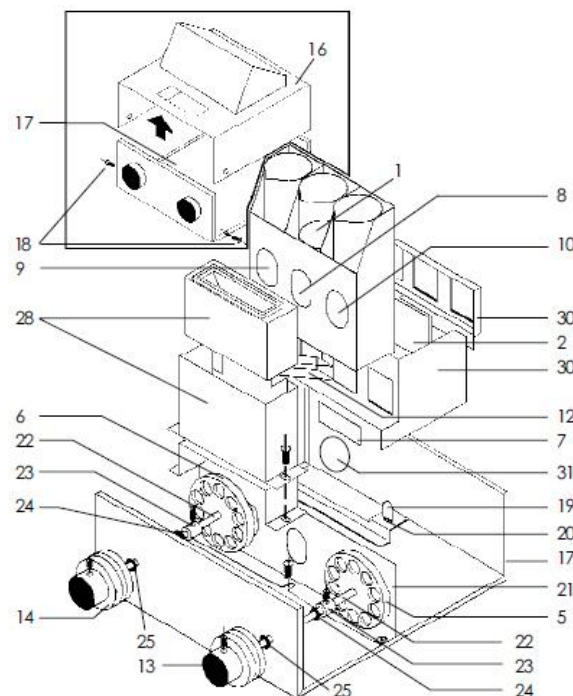
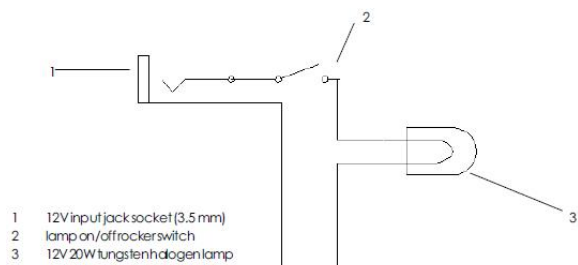


Figure 4. Petroleum Oil Comparator (disassembled view)

## 5.4 Replacement Parts

Part Number	Description
K13222	Tungsten Halogen Lamp, 12 V, 20 W
K13210	Sample and Reference Glass Container

## 5.5 Wiring Diagram



## 6 Service

Under normal operating conditions and with routine maintenance, the K132XX Petroleum Oils Comparator 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: \_\_\_\_\_

## 7 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.

## 8 Warranty

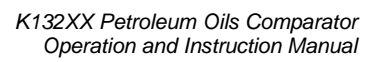
We, at Koehler, would like to thank you for your equipment purchase, which is protected by the following warranty. If within one (1) year from the date of receipt, but no longer than fifteen (15) months from the date of shipment, Koehler equipment fails to perform properly because of defects in materials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

## 9 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]



## This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.