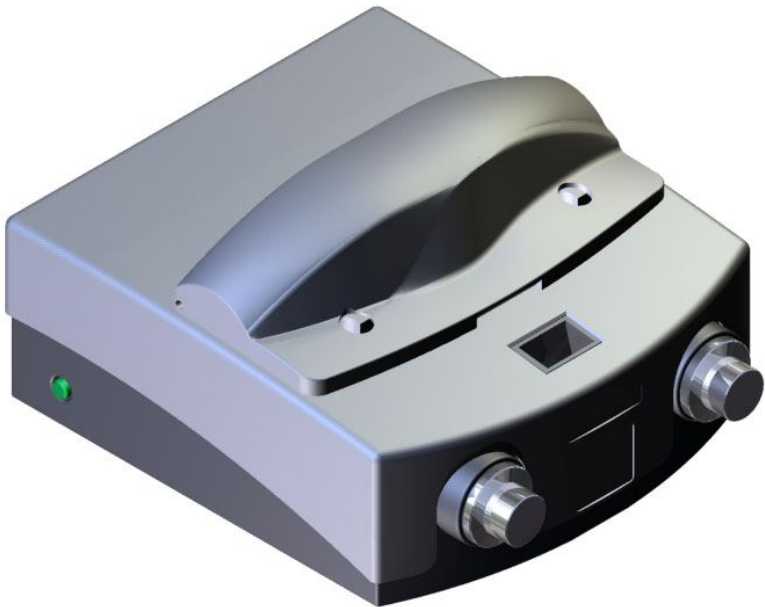




Lovibond[®]

Comparator 3000 Series

OPERATORS INSTRUCTION MANUAL



Contents

Introduction	1
Information	
Permanent Colour Glass Standards	2
Special Disc Service	2
Colorimetric Chemical Analytical Methods	3
Technical Specifications	3
Parts Diagram	4
Operating Instructions Comparator 3000 Series	5
Operating Instructions for measuring ASTM Color scale on the Comparator 3000 Series	7
Reading the ASTM Discs	9
Maintenance	
Replacing the Lamp	10
Cleaning the Glass Standards	10
Cleaning the Optical Cells	10
Accessories / Spare Parts	
High Quality Optical Cells	11
Optional Extras	12
Sales Offices	13

Comparator 3000 Series

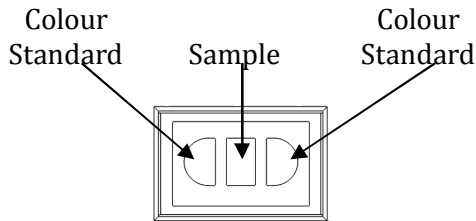
Introduction

The Lovibond® Comparator 3000 Series instruments are single scale 3-field instruments used for visual grading to determine the colour of a sample, achieved by direct comparison of Lovibond® Glass Standards and the liquid sample.

To achieve rapid colour grading within pre-determined colour limits, the glass standards are mounted in two discs so that it is easy to check that the sample is within tolerance.

The two discs containing the relevant colour scale are brought together by a prism and viewed simultaneously alongside the sample making it easier to achieve an optimum match.

When seen through the prism, the sample is viewed in the centre. The colour standards are viewed either side of the sample, as in the following diagram:



The human eye perceives colour differently according to the lighting conditions, so constant lighting conditions are essential for consistent colour comparison. The Comparator 3000 Series uses a tungsten halogen lamp which is colour corrected to CIE standard Illuminant C to produce a consistent light source.

The Comparator 3000 Series are available to measure the following colour scales.:

Comparator 3000 Series	Order Code
ASTM Color	34 50 30
EBC Colour	34 50 00
FAC Colour	34 50 20
Gardner Color	34 50 10

Information

Permanent Colour Glass Standards

The colour standards for use with the Comparator 3000 Series consist of flat chemically produced glass. Unlike plastics, Lovibond® permanently coloured glass standards are guaranteed not to fade with continuous exposure to daylight and will give reliable accurate results every time. The standards are mounted into a disc which is easily positioned in the Comparator 3000 Series.

Special Disc Service

The Tintometer Ltd. is able to produced customised glass standards to suit your requirements, for special chemical and colorimetric analysis. The Company has great experience in the development of such standards, and they are manufactured in accordance with the procedures required by The Tintometer Ltd's ISO 9001 certification.

The standards are mounted in a disc for use with the Lovibond® Comparator 3000 Series.

“Colorimetric Chemical Analytical Methods” – CCAM

This CD, now in its 9th edition, is a comprehensive reference for the chemical methods used for the range of Lovibond® discs.

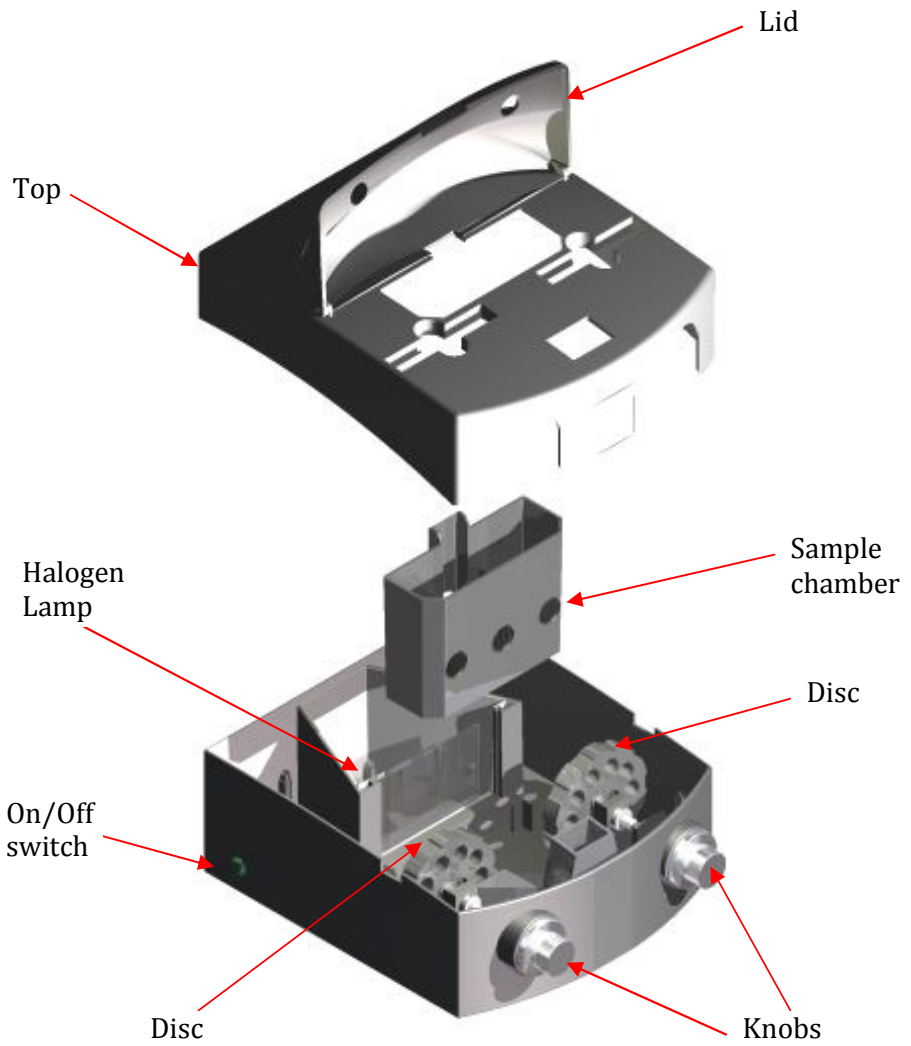
The Individual methods and techniques are clearly laid out, enabling the reader to see the principles of the various chemical methods as well as the actual techniques for carrying out the tests.

The order code for this CD is 17 02 00.

Technical Specifications

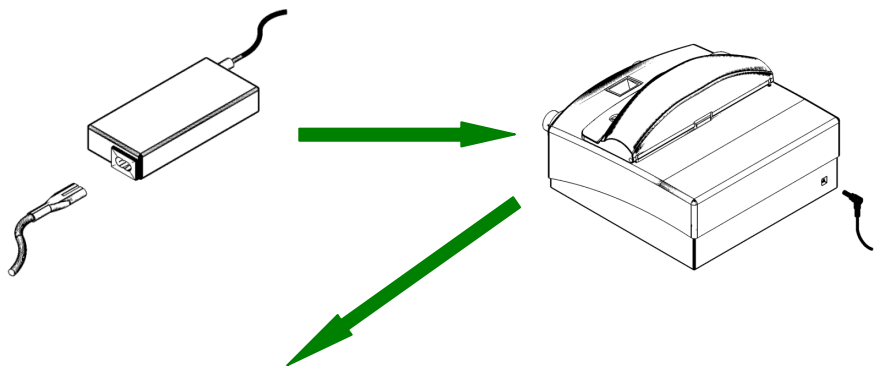
Specification	Description
Light Source	12V 20 Watt Tungsten Halogen
Optical System	Fully Prismatic
Sample Requirements	Sample, Glass Cells and Lovibond® Glass Colour Standards
Instrument Housing	Moulded Fire Retardant ABS
Power Pack: Input Voltage Output voltage	100-240V 12V DC
Power Consumption	2 amps 20 Watts (Max).
Operating Temperature Range	-10°C to +70°C
Dimensions:	231w x 273l x 142h
Weight:	1.5 Kg
Technical Assistance	Technical Services Department The Tintometer Ltd Lovibond House Solar Way Solstice Park Amesbury. SP4 7SZ Tel: +44 (0) 1980 446800 Fax: +44 (0) 1980 625412 E-mail: sales@tintometer.com

Parts Diagram

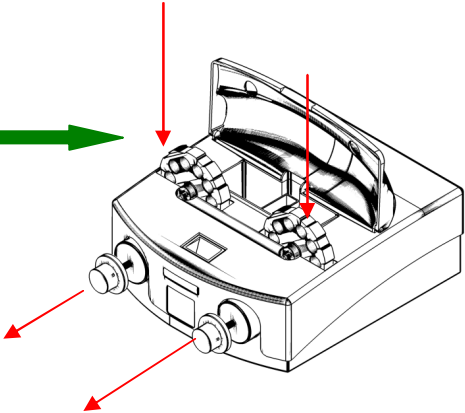
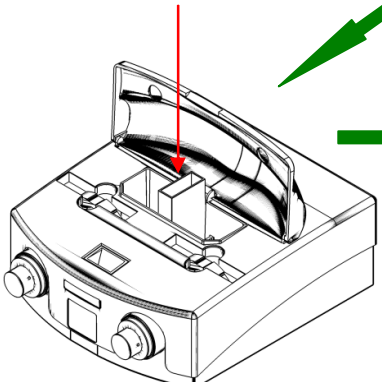
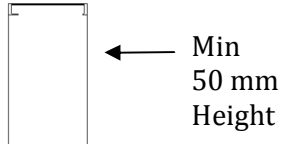


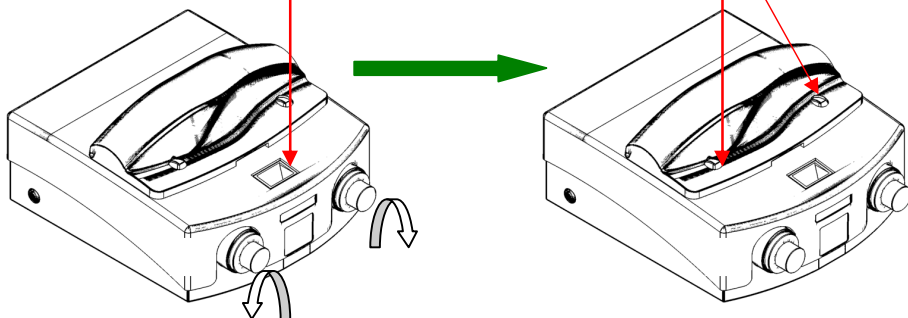
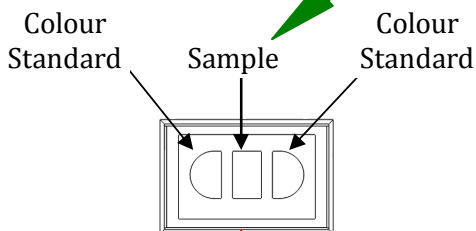
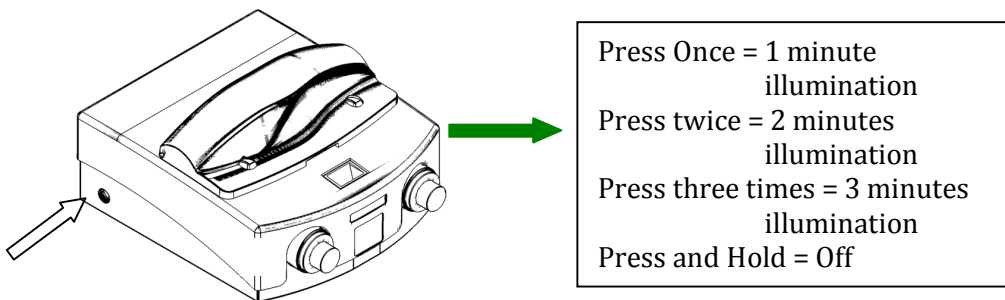
Operating Instructions for the Comparator 3000 Series

All scales except ASTM color



See test method or sample preparation for instructions on sample liquid.



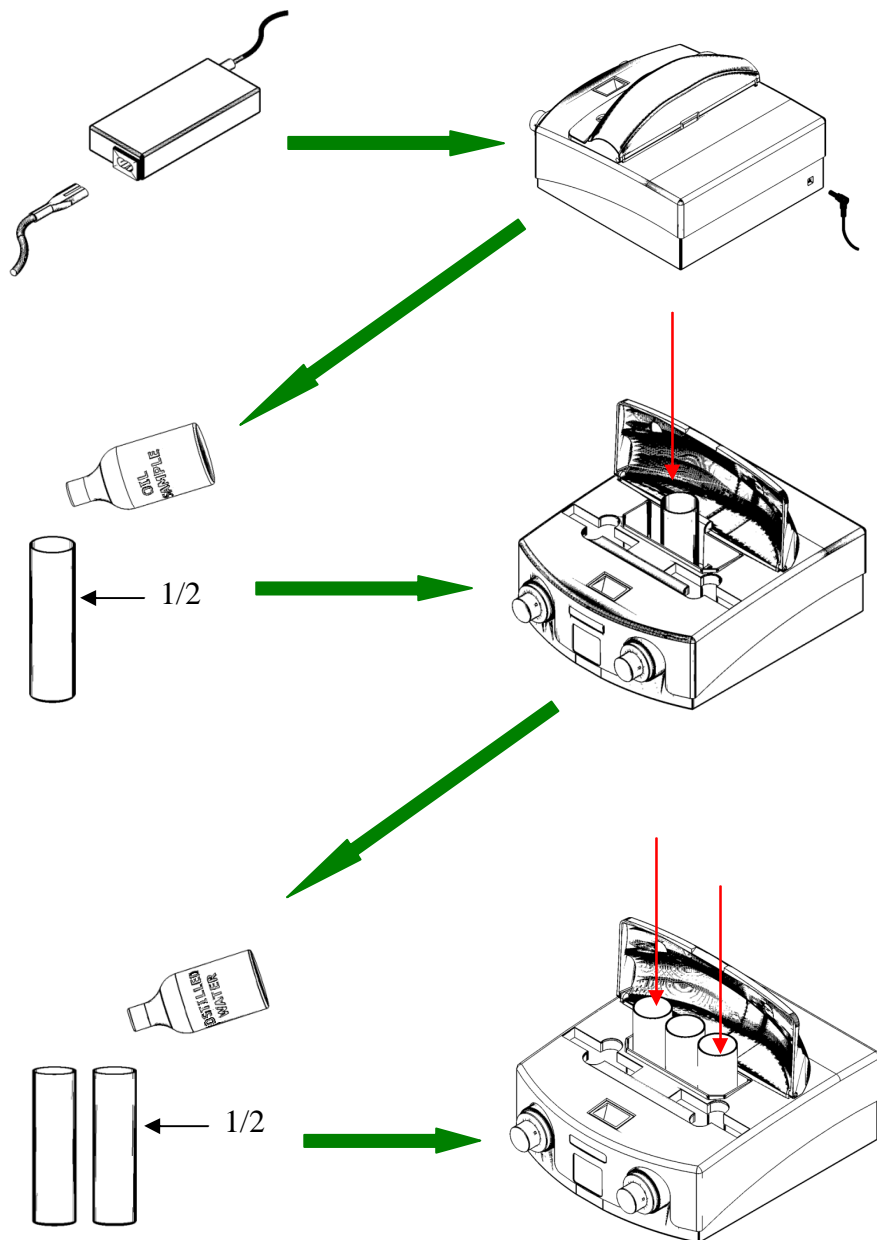


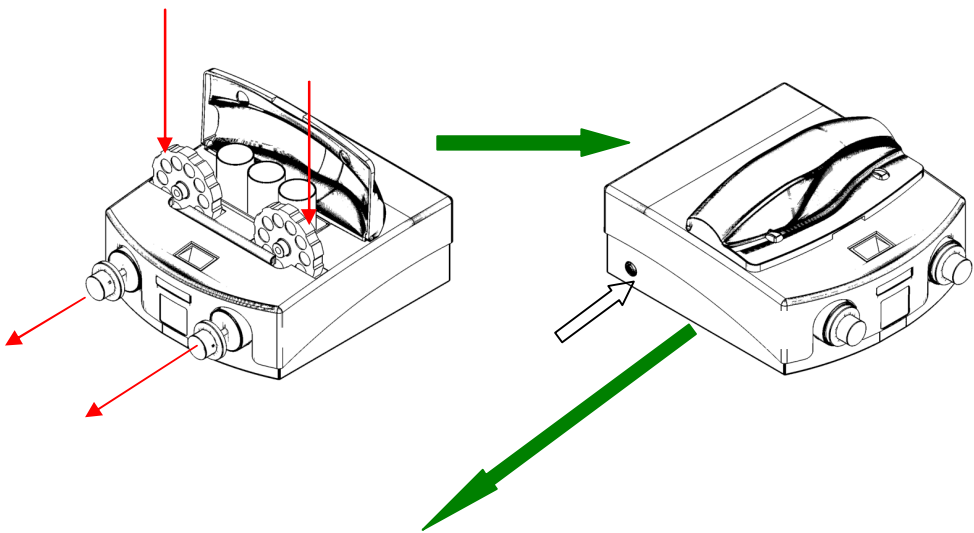
Note: The best colour match is obtained by viewing with one eye closed

Rotate the discs by turning the knobs on the front of the instrument until the oil sample matches or falls between two Colour Standards. A reading can then be taken from the disc.

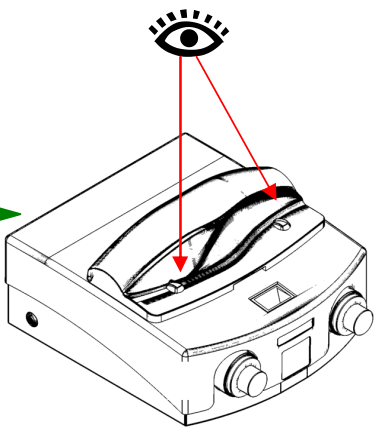
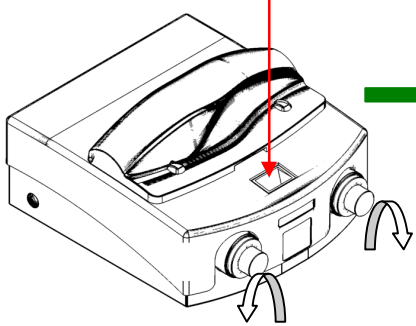
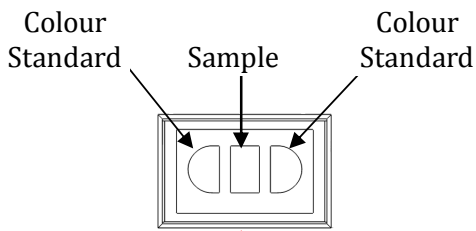
FAC / EBC:- To change the disc pair: open the lid, pull the knobs and lift out the discs. To insert the discs: pull the knobs, insert the discs and rotate the knobs until they engage in the discs.

Operating Instructions for measuring ASTM colour scale on the Comparator 3000 Series





Press Once = 1 minute illumination
 Press twice = 2 minutes illumination
 Press three times = 3 minutes illumination
 Press and Hold = Off



Reading the Petroleum Oil - ASTM Discs

NOTE: The best colour match is obtained by viewing with one eye closed.

Rotate the discs by turning the knobs on the front of the instrument until the oil sample matches or falls between two Colour Standard. A reading can then be taken from the disc.

If the sample is not clear, heat to 6°C above its cloud point and measure the colour at that temperature. Petroleum waxes including Petrolatum, should be heated to 11°C to 17°C above the congealing point. If the sample is darker than 8 ASTM color, mix 15 volumes of sample with 85 volumes of solvent kerosene.

- Report to one colour standard e.g. 7.5 ASTM Color
- If the colour falls between two standards report to the colour darker than the sample and precede it by LIGHTER THAN or "L" e.g. LIGHTER THAN 7.5 ASTM Color or L7.5 ASTM Color.
- If diluted add "DIL" after the colour e.g L7.5 DIL ASTM Color

Maintenance

Replacing the lamp

- Always disconnect the Comparator 3000 Series from the main power supply before removing the cover
- Undo the four screws on the case using a suitable screwdriver
- Lift the top clear of the unit. The lamp housing is located on the base.
- Remove the old lamp and replace with the new in the same position, using the protective sleeve.

NOTE: always avoid touching the lamp as this can significantly reduce the life of the lamp.

- Replace the cover.

To maintain the performance of the Comparator 3000 Series instrument, spillages on the instrument and in the sample chamber should be cleaned up immediately.

Should a spillage occur in the sample chamber, simply remove the cell or glass tubes, remove the sample chamber and clean.

Cleaning the Glass Standards

To clean the glass standards simply remove from the unit by lifting the lid, pulling the knob and lifting out the disc containing the glass standards. The standards can be cleaned with a lens tissue and polished with a soft lint free cloth or brush.

Cleaning the Optical Cells and Tubes

The optical cells and Tubes should be emptied and rinsed with a suitable solvent, washed in laboratory detergent, rinsed in distilled water and allowed to dry. Avoid vigorous scrubbing which may scratch the glass and impair the luminance.

Accessories / spare parts

Lovibond® High Quality Optical Cells

Precision fused glass cells and moulded glass tubes are made to the highest quality standards. The cells perform an important dual function in the Comparator System. Not only do they serve to contain the sample being analysed, but the intensity of the colour sample is directly proportional to the optical path length of the cell. For this reason it is important to use cells with a path length matched to the colour standards and the disk.

Description	Order Code
Gardner / FAC Test Tube AF228T	35 22 80
AF763 Reference Tube (ASTM D1500)	35 76 30
W680 2.5 mm fused glass cell	60 67 80
W680 5 mm	60 67 90
W680 10 mm	60 68 10
W680 15 mm	60 68 40
W680 20 mm	60 68 50
W680 25 mm	60 68 60
W680 33 mm	60 68 80
W680 40 mm	60 68 90

Optional Extras

Description	Order Code
Tungsten Halogen Lamp 12V 20W	12 23 40
4/30-1 Gardner Comparator 3000 disc	24 00 10
4/30-2 Gardner Comparator 3000 disc	24 00 20
4/32A FAC/A Comparator 3000 disc	24 02 10
4/32B FAC/B Comparator 3000 disc	24 02 20
4/32C FAC/C Comparator 3000 disc	24 02 30
4/32D FAC/D Comparator 3000 disc	24 02 40
EBC/1 Comparator 3000 disc	24 04 50
EBC/2 Comparator 3000 disc	24 04 60
EBC/3 Comparator 3000 disc	24 04 70
EBC/4 Comparator 3000 disc	24 04 80
ASTM D1500 Comparator 3000 disc 0.5 - 7.5	24 02 80
ASTM D1500 Comparator 3000 disc 1.0 – 8.0	24 02 90
Certificate of Conformity for new discs (order with discs)	QA1
Conformance Filter Recertification (Certificate of Conformity)	QD2
Colour Disc Calibration (ISO 9001 Calibration Certificate)	CAL2