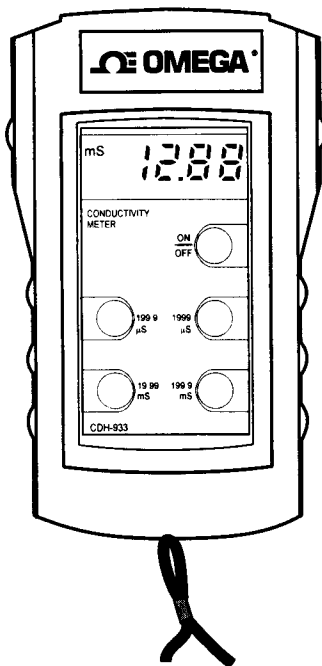


CDH-933

Portable Conductivity Meter



Preliminary Examination	51
General Description	51
Functional Description & Specifications	52
Operational Guide	53
Calibration	55
Temperature Compensation	57
Battery Replacement	58
Accessories	59

PRELIMINARY EXAMINATION

Remove the instrument from the packing material and examine it carefully to make sure that no damage has occurred during shipment. If noticeable damage is found, contact your Omega's Customer Service.

Each meter is supplied with:

- Conductivity probe with 1m (3.3') cable
- 9V battery
- Screwdriver
- Soft carrying case

Note: Save all packing materials until you are sure that the instrument functions correctly. All defective items must be returned in its original packaging together with the supplied accessories.

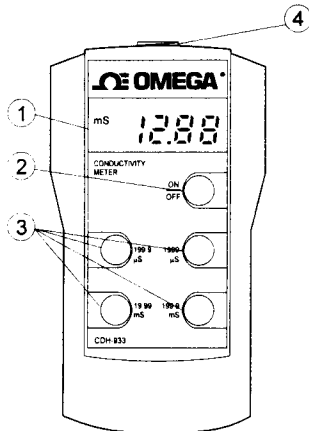
GENERAL DESCRIPTION

CDH-933 is the most complete and versatile portable conductivity meter ever manufactured. Designed with utmost precision and simplicity of use, the meters provide for up to 4 measurement ranges. The conductivity of a solution depends on the temperature and for this reason measurements are carried out with reference to a standard temperature of 25°C. If the solution measured has a different temperature than 25°C, compensation must be performed.

CDH-933, with a built-in NTC circuitry, automatically compensate for temperature changes.

The temperature coefficient is fixed at 2%.

FUNCTIONAL DESCRIPTION & SPECIFICATIONS CDH-933



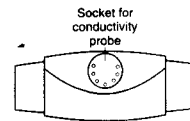
1. 3½-digit liquid-crystal display
2. ON/OFF key
3. Measurement range selection keys
4. Probe connector.

SPECIFICATIONS	CDH-933
Range	μS/cm 0.0 to 199.9 μS/cm 0 to 1999 mS/cm 0.00 to 19.99 mS/cm 0.0 to 199.9
Resolution	0.1 μS/cm, 1 μS/cm, 0.01 mS/cm, 0.1 mS/cm
Accuracy (@ 20°C / 68°F)	1% Full Scale excluding probe error
Typical EMC Deviation	±2% Full Scale
Calibration	Manual single set point through trimmer in the battery compartment
Temperature Compensation	Automatic with a β of 2% per degree °C
Probe (included)	CDE-35 ATC w/1m screened cable
Environment	0 to 50°C (32 to 122°F); 95% RH
Battery	9 Volt (alkaline type) 100 hrs of continuous use
Dimensions	143 x 80 x 38 mm (5.6 x 3.2 x 1.5")
Weight	360 g (13 oz.)

OPERATIONAL GUIDE

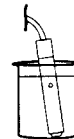
- Each meter is supplied complete with a 9V battery. Slide off the battery compartment cover on the back of the meter (see page 58), install the battery.

- Connect the probe to the meter securely by aligning the pins with the socket and pushing the plug in. Then tighten the threaded ring.



- Make sure that the meter has been calibrated before taking any measurements (see page 10 for calibration procedure).
- Immerse the conductivity probe into the sample, with the holes on the shaft completely submerged.

If possible, use plastic beakers or containers to minimize any EMC interference.



- Tap the probe lightly on the bottom of the recipient to remove any air bubbles which may have been trapped inside the PVC sleeve.
- Turn the instrument on by pressing the ON/OFF key.



Wait for approximately 3 to 4 minutes for the temperature sensor to reach thermal equilibrium with the sample before taking measurements.

When the sample's temperature is lower than 20°C or higher than 30°C, allow a longer time for the thermal equilibrium of the system to be achieved.

- After the measurement has been completed, the instrument should be switched off and the probe should be cleaned and dried up (see "Probe Maintenance" section at page 61).

CALIBRATION

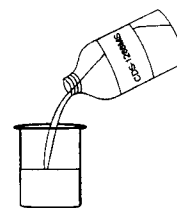
Accessories needed:

- Use as calibration solution:
CDS-1288MS, 12880 $\mu\text{S}/\text{cm}$ (=12.88 mS/cm) conductivity solution
- a calibration screwdriver.

Procedure:

- Pour a small quantity of CDS-1288MS buffer solution into a beaker.

If possible, use plastic beakers to minimize any EMC interference.



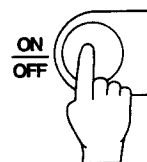
- Immerse the conductivity probe (with the holes completely submerged) into the solution.



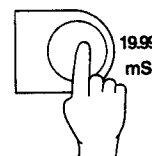
Wait for 2 or 3 minutes until thermal equilibrium has been reached.

Tap the probe on the bottom, then shake it while rotating to make sure no air bubbles remain trapped in the sleeve.

- Switch the instrument on by pressing the ON/OFF key.

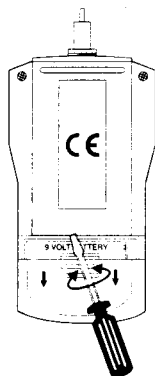


- Select 19.99 mS/cm range by pressing the appropriate range key.



- Adjust the calibration trimmer in the battery compartment with a screwdriver until display shows "12.88 mS" i.e. the conductivity reading @ 25°C.

mS 12.88



- All subsequent measurements will be compensated to 25°C (77°F). If you prefer to standardize temperature to 20°C (68°F) rather than 25°C (77°F), using CDH-1288MS, adjust the trimmer to read "11.67 mS" (see the conductivity vs. temperature chart at page 62). All subsequent measurements will be compensated to 20°C.
- The calibration is now complete and the instrument is ready for use.

The instrument should be re-calibrated monthly and every time the probe has been changed.

Note: For more accurate results, it is advisable to use a calibration solution very close to the range to be measured. For a wide selection of conductivity solutions see the accessories section at page 59.

TEMPERATURE COMPENSATION

The conductivity of an aqueous solution is the measure of its ability to carry an electrical current by means of ionic motion.

Conductivity increases with increasing of the temperature. It is affected by the type and number of ions in the solution as well as the viscosity of water, which is temperature dependent.

The dependency of conductivity on temperature is expressed as a relative change per degree Celsius at a particular temperature, commonly as percent/°C at 25°C. For common ionic solution, this value is about 2%/°C. Acids, alkalis and concentrated salt solutions have somewhat lower value, typically 1.5%/°C.

Since a small difference in temperature causes a large change in conductivity, it is necessary to compensate for the conductivity readings particularly at high and low temperature. The readings are usually normalized at 25°C.

CDH-933 automatically compensate for temperature differences with a built-in NTC sensor circuitry. With this compensation, the display shows conductivity readings at 25°C (77°F) or 20°C (68°F) depending on the reference temperature set during calibration.

CDH-933 has a fixed temperature coefficient at 2%.

BATTERY REPLACEMENT

When the battery becomes weak the meters will display "V".

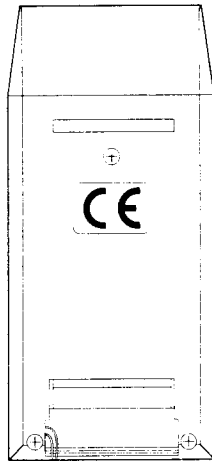
12.00

v 12.00

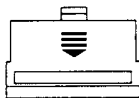
When the low battery indicator appears, the battery only has few hours of life left. A low battery will result in unreliable measurements. It is recommended that the battery be replaced.

Battery replacement must only take place in a non hazardous area using the appropriate battery type.

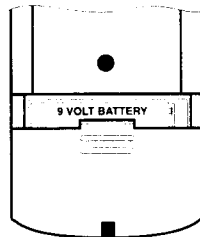
Slide off the battery compartment cover at the rear of the meter and replace the 9V battery with a new one. Make sure the battery contact is tight before replacing the cover back.



BATTERY



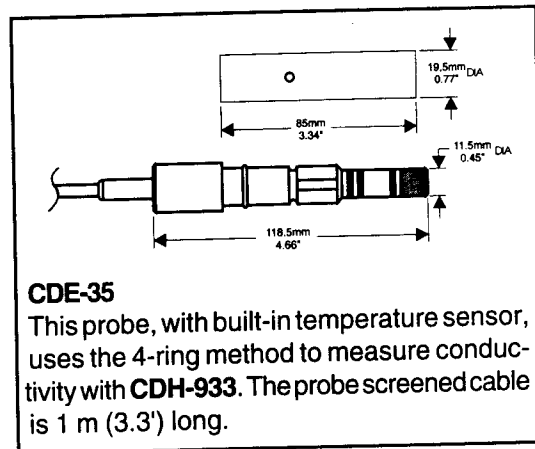
SLIDE OFF



SLIDE OFF

ACCESSORIES

CDS-1288MS	12,800 $\mu\text{S/cm}$ (umho /cm)
CDS-1413	1,413 $\mu\text{S/cm}$ (umho /cm)
CDS-84	84 $\mu\text{S/cm}$ (umho./cm)
CDS-80MS	80,000 $\mu\text{S/cm}$ (umho /cm)



CDE-35

This probe, with built-in temperature sensor, uses the 4-ring method to measure conductivity with **CDH-933**. The probe screened cable is 1 m (3.3') long.