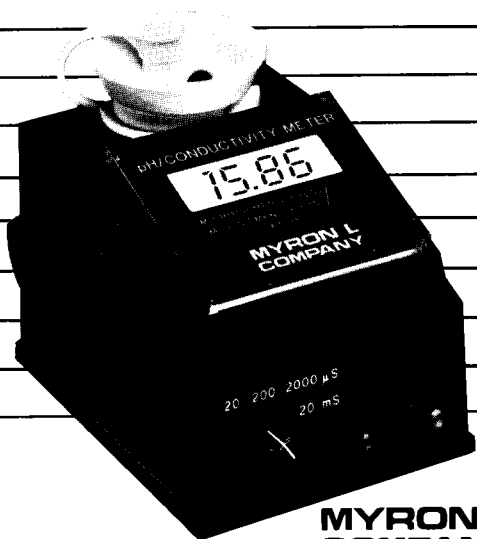


# 4 Range Digital Conductivity/pH Meters

User's Manual for Models DCH4  
DPH4



**MYRON L  
COMPANY**

# CALIBRATION/MAINTENANCE

## USING YOUR METER

### DESCRIPTION

This manual describes your Myron L Digital pDS meter, tells you how to use it, and how to keep it working accurately for many years.

Your model DCH4 or DPH4 Meter is a compact, lightweight, self-contained conductivity/pH instrument. It will quickly determine the pH and conductivity or ppm/Total Dissolved Solids (TDS) of almost any solution. Both models measure pH over the full range of 0-14 pH. Model DCH4 is also calibrated in microsiemens ( $\mu\text{S}$ ), which is the metric equivalent of micromhos ( $\mu\text{mhos}$ ). Model DPH4 also converts the conductivity directly into parts per million (ppm) of Total Dissolved Solids.

Both models are 3.4" x 4.5" x 4.0" (85 x 129 x 126mm) and weigh less than one pound (0.45 kg). Digital pDS Meters feature a built-in conductivity cell and replaceable pH sensor. Conductivity and pH measurements are automatically temperature compensated from 50° to 160°F (10° to 71°C). Power is supplied by a single 9 volt transistor battery good for at least 2000 tests, or one year shelf life.

MODEL	CONDUCTIVITY RANGES				pH RANGE	
DCH4	0-20	0-200	0-2,000	0-20,000 $\mu\text{S}$	0-14 pH	
DPH4	0-20	0-200	0-2,000	0-20,000 ppm	0-14 pH	

#### NOTE:

20,000  $\mu\text{S}$  is displayed as 20 mS (millisiemens). 1 mS = 1000  $\mu\text{S}$

20,000 ppm is displayed as 20 ppt (parts per thousand).

1 ppt = 1000 ppm

By using an RE-10 Range Extender (see ACCESSORIES), the maximum range of each meter may be increased ten times.

# ACCESSORIES

## CONDUCTIVITY TDS CALIBRATION

**ACCURACY:** (Both Models)

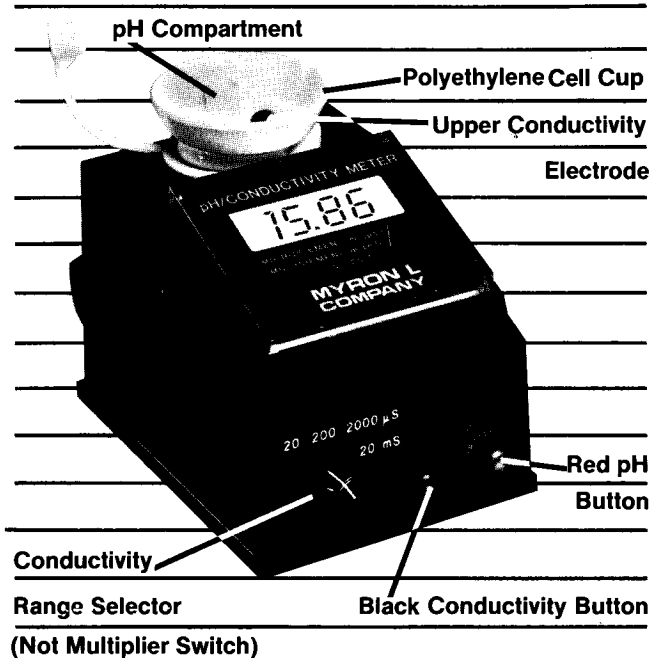
CONDUCTIVITY:  $\pm 1\%$  of full scale

pH:  $\pm 0.01$  pH ( $\pm 1$  Digit)

**REPEATABILITY:** (Both Models)  $\pm 1\%$

The pictures in this manual show the major operating parts of your Myron L pDS Meter. Handle the instrument and identify these parts to become familiar with it.

### Model DCH4 shown



**USING YOUR METER**

**CONDUCTIVITY/TDS MEASUREMENT**

1. Turn the Range Switch to the desired range. If you don't know which range to use, set it to 20 mS or ppt.
2. Rinse the cell cup three times with the sample you want to test. (For very hot or very cold samples see TEMPERATURE COMPENSATION at right.)

**NEVER FILL CELL BY DIPPING THE METER INTO WATER!**

3. Fill the cell with another sample to at least ¼" (6mm) above the upper electrode.
4. Press the black button.
5. Read the conductivity or TDS **directly** on the digital display.

**IMPORTANT:** Unlike other Myron L multi-range meters, the number displayed is NOT multiplied by the range switch value.

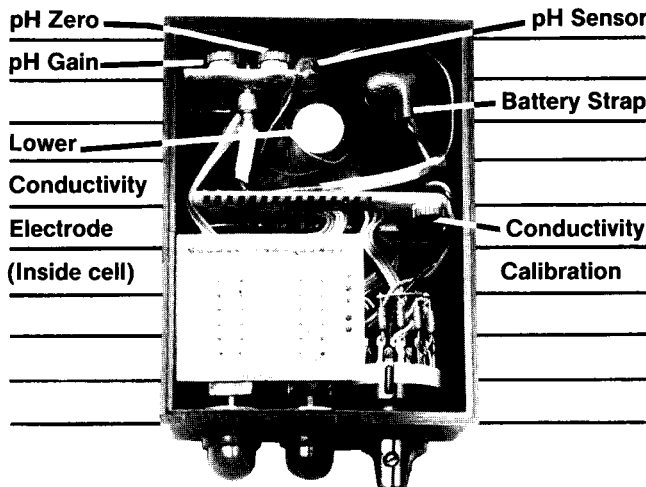
**RANGE SWITCH TOO HIGH:** If the reading is very low (less than 10% of the range switch setting), your Digital DS meter should be set to a lower range. Turn the Range Switch one position to the left.

**RANGE SWITCH TOO LOW:** If only a "1" is showing at the left side of the display, the Range Switch is set too low. Turn the Range Switch one position to the right. If the meter overranges on the top (20 mS or ppt) range, use an RE-10 Range Extender (see ACCESSORIES).

**NOTE:** When you are finished with the meter, RINSE THE CELL CUP with clean water, preferably distilled or deionized.

**pH MEASUREMENT**

1. Obtain sample to be tested; if necessary, heat or cool it to between 50° and 160°F (10°-71°C).
2. Remove the pH compartment cap and **sharply shake out** any liquid.
3. Pour or squirt the sample into the built-in cell cup, especially the small pH compartment. Shake out and repeat three times with the sample to be tested. These may be the same rinsings used to condition the cell for the conductivity measurement.
4. Press the red button. The display immediately indicates the pH of the sample. If the display drifts, wait approximately 30 seconds and press the button again to obtain a stable reading of pH. If drifting continues, the electrode may be coated with a film. Use a liquid cleaner such as Windex™ or Fantastic™ to clean the pH sensor bulb (see pH SENSOR).
5. Rinse both pH and conductivity parts of the cell with clean water. **LEAVE SOME LIQUID IN THE PH COMPARTMENT AND RECAP IT.**



**USING YOUR METER WITH CALIBRATION**

**TEMPERATURE COMPENSATION:** For very hot or very cold solutions let the three rinse samples each remain in the cell for several seconds, then immediately fill the cell with the sample you want to test (step 3 at lower left). This allows the automatic temperature compensation feature time to work properly.

**CAUTION:**

**ALWAYS** store your pH sensor wet and with the cap on. pH 4 buffer recommended.

**Always** rinse the cell cup with pure water immediately after use or cleaning. This will prevent the build-up of unwanted deposits and possible contamination of the sample.

**DO NOT** test solutions which could damage the pH sensor. See MAINTENANCE.

**DO NOT** use with samples hotter than 160°F (71°C). The readings WILL NOT be accurate.

**DO NOT** splash solvents such as lacquer thinner, acetone, benzene or chlorinated solvents on the plastic case.

**DO NOT** fix or modify the meter. That will void your warranty. See SERVICE for details or consult Myron L Company.

**DO NOT DIP THE INSTRUMENT INTO WATER.** If water does get inside the instrument, see MAINTENANCE for instructions on drying it.

**CONDUCTIVITY/TDS CALIBRATION**

**CONDUCTIVITY/TDS STANDARD SOLUTIONS:** A Standard Solution has a known conductivity and ppm/TDS. Your meter was calibrated at the factory using Standard Solutions. You can keep your meter accurate by recalibrating using these same Myron L Company Standard Solutions.

How often you calibrate your meter depends on how much you use it. For once a day use, recalibrate it every three months.

**NOTE:** The procedure below calibrates all 4 ranges at the same time using Myron L type 442-15,000 Standard Solution. For maximum accuracy you may use a Standard Solution value closest to the samples to be tested (see ACCESSORIES).

**CHECKING CONDUCTIVITY/TDS CALIBRATION**

1. Turn the Range Switch to 20 mS or ppt.
  2. Test a sample of 442-15,000 Standard Solution.
- CAUTION:** Throw the Standard Solution away as you use it. Don't put the used samples back in the bottle.
3. If the Digital pDS Meter does not display the same value as is on the Standard Solution bottle's label, first clean the cell. For directions on how to do this see CELL CUP inside. Rinse the cell thoroughly and test the Standard Solution again. If the meter still does not display the correct value, recalibrate it as described below.

**TO RECALIBRATE CONDUCTIVITY/TDS**

1. Remove the bottom cover using fingernails or a small screwdriver to loosen the front or rear edge. Identify the Calibration Control (see photo at left) so you can find it by touch while calibrating.
2. Test another sample of the Standard Solution (be careful to not splash solution inside the meter).
3. Adjust the Conductivity Calibration Control until the display indicates the value on the Standard Solution label.

# CALIBRATION/MAINTENANCE

## pH STANDARD BUFFER SOLUTIONS

All pH sensors "drift" and decrease in strength as they age. pDS meters have two Calibration Controls to compensate for those effects. ZERO adjust corrects for "drift" of the pH sensor's response to neutral pH solutions. GAIN adjust amplifies the signal from the pH sensor for accurate readings of other pH values.

Use pH standard buffer solutions to calibrate all pDS meters. The recommended values are 4, 7, and 10. For greatest accuracy, adjust with the buffer closest in pH to the samples to be tested before each use.

### pH ZERO ADJUST (Frequency: weekly)

Test by rinsing and refilling the cell with 7 buffer and pressing the red button. The display should indicate 7.00. If it is necessary to calibrate Zero, perform the following steps:

1. Remove the bottom cover using fingernails or a small screwdriver to loosen the front or rear edge.
2. Refill the cell with 7 buffer (see pH MEASUREMENT for proper procedure).
3. Press the red button and turn the pH Zero control until the display indicated 7.00.
4. Recap the pH compartment and replace the bottom cover

### pH GAIN (SLOPE) ADJUST (Frequency: bi-monthly)

The Gain should be calibrated approximately once every eight weeks. The Gain control is used with 4 and 10 buffers.

**NOTE:** Never adjust the Gain control without first adjusting Zero.

Test by rinsing and refilling the cell with 4 or 10 buffer and pressing the red button. The display should indicate the pH value of the buffer  $\pm 0.1$  pH. If it is necessary to calibrate the Gain, perform the following steps:

1. Remove the bottom cover.
2. Rinse and fill the pH compartment with 4 buffer and press the red button. Adjust the Gain control until the display indicates 4.00.
3. Rinse three times and test with 10 buffer. If adjustment is necessary, adjust to only one half the difference between the initial reading and 10. If, after this, the 4 and 10 buffer readings are not less than  $\pm 0.1$  pH from 4 and 10, the sensor is deteriorating and should be replaced. The sensor should also be replaced if the Gain control cannot make the display reach either 4 or 10.

## MAINTENANCE

### BATTERY CHECK/REPLACEMENT

1. Press the button. If the word "BAT" appears in the upper left corner of the display, replace the battery as described below.
2. Remove the bottom cover. Detach the battery connector. Pull on the plastic strap to remove the battery.
3. Replace with a fresh zinc carbon or alkaline 9 volt battery. Reinsert the plastic strap to secure battery.

**CELL CUP:** If very dirty samples—particularly scaling types—are allowed to dry in the cell cup, a film will build up. This film reduces accuracy. When there are visible films of oil, dirt, or scale in the cup or on the electrodes, scrub them lightly with a small brush and household cleanser. Rinse out the cleanser and the meter is ready for accurate measurements.

**pH SENSOR:** The unique pH electrode in your pDS meter is a non-refillable combination type which features a porous Teflon<sup>1</sup> liquid junction (covered by U.S. Patent #4128468). It should *never* be allowed to dry out (see pH MEASUREMENT). If it does, the sensor can sometimes be renewed by soaking in a saturated potassium chloride (KCl) solution for several days.

"Drifting" can be caused by a film on the sensor bulb. Use a liquid cleaner such as Windex™ or Fantastic™ to clean it. The sensor bulb is very thin and delicate. Excessive pressure on it during cleaning may break it.

Leaving high pH (alkaline) solutions in contact with the pH sensor for long periods of time can damage it. Rinsing such liquids from the pH compartment and moistening it with 4 buffer or tap water will extend its useful life.

Samples containing chlorine, sulphur, or ammonia can "poison" any pH electrode. If it is necessary to measure the pH of any such sample, thoroughly rinse the pH sensor with clean water immediately after taking the measurement. Any sample element which will reduce (add an electron to) silver, such as cyanide, will attack the reference electrode.

Replacement sensors are available only from the Myron L Company or our authorized distributors (see ACCESSORIES).

<sup>1</sup>™ DuPont Company

## WATER INSIDE THE METER

Your Myron L meter is a rugged instrument and will withstand water exposure around its cell, digital display, and switches. However, care should be taken to keep water from leaking in around the bottom cover. It is not sealed (to prevent condensation from forming).

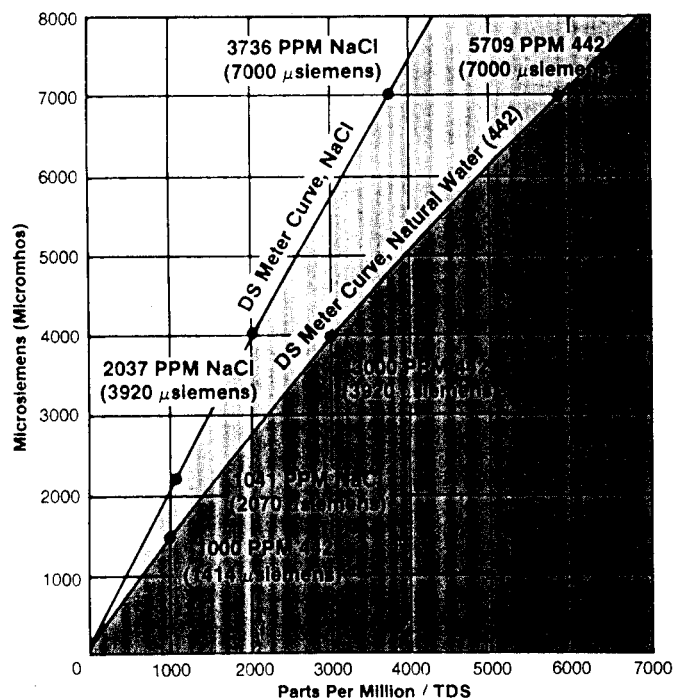
If the water is relatively clean (i.e., tap water or better), and there are only a few drops inside the meter, dry it as described below. Large amounts of water, or corrosive or very dirty solutions will almost certainly damage the display or electronics module. Such meters should be returned to the Myron L Company for repair.

### TO DRY YOUR METER

1. Shake excess water out of the inside of the meter.
2. Dab the exposed surfaces dry with an absorbent cloth or tissue. Avoid pushing any water into the Calibration Controls or switches.
3. Air dry the meter in a warm area with the bottom cover off. Allow several hours for thorough drying.

If the water entered through a leak in the case or cell, or if the instrument shows erratic readings or other unusual behavior, return it to the Myron L Company for servicing.

CONVERSION CHART



# ACCESSORIES

## STANDARD SOLUTIONS

### CONDUCTIVITY STANDARD SOLUTIONS

Your Digital pDS Meter has been factory calibrated with the appropriate Standard Solution. All Myron L conductivity Standard Solution bottle labels show three values: ppm **442**, ppm **sodium chloride**, and **conductivity** in microhos. See Conversion Chart lower left.

**442:** Unless otherwise specified, the calibration used for all Model DPH4 Meters is the "442" standard. The 442 Standard Solutions consist of the following salt ratios: 40% sodium sulfate, 40% sodium bicarbonate, and 20% sodium chloride. This salt ratio has conductivity characteristics approximating natural waters and was developed by the Myron L Company over two decades ago.

**Sodium Chloride:** For every ppm 442 Standard Solution, there is a ppm sodium chloride (NaCl) solution which will have the same conductivity. The parts per million of the equivalent NaCl solution is on each Standard Solution label. Model DPH4 cannot be calibrated to NaCl values.

**Conductivity:** All Myron L Company Standard Solutions are within 1.0% of Potassium Chloride reference solutions. The concentrations of the reference solutions are calculated from data in the International Critical Tables, Vol.6.

**pH STANDARD BUFFER SOLUTIONS:** Ready to use, Myron L Company pH buffer solutions are mold inhibited and accurate to within  $\pm 0.01$  pH units @25°C. They are traceable to NIST certified pH references and are color-coded for instant identification.

### RECOMMENDED STANDARD SOLUTIONS

#### MODEL/RANGE SOLUTION NUMBER

MODEL/RANGE	SOLUTION NUMBER
<b>DCH4</b>	
20 mS	442-15,000
2000 $\mu$ S	442-1000
200 $\mu$ S	KCl-70

pH ZERO	7 buffer
pH GAIN	4 buffer
	10 buffer

MODEL/RANGE	SOLUTION NUMBER
<b>DPH4</b>	
20 ppt	442-15,000
2000 ppm	442-1500
200 ppm	442-150
20 ppm	442-15

pH ZERO	7 buffer
pH GAIN	4 buffer
	10 buffer



Solution Number	Micromhos Microsiemens	PPM/442	PPM/NaCl
442-15	23.4	15 •	10.9
442-150	228	150	108
442-1000	1414	1000	702
442-1500	2070	1500	1041
442-15,000	16,655	15,000	9474
KCl-70	70	45	33

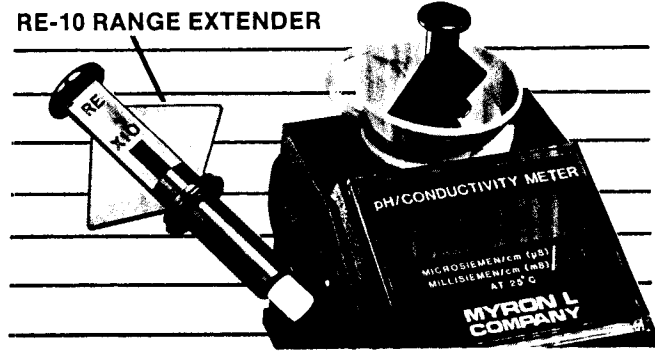
## RANGE EXTENDER

The RE-10 Range Extender is a useful accessory for testing high conductivity/ppm solutions beyond the normal range of your Digital pDS meter. Inserting the RE-10 into a sample-filled cell cup increases the maximum range ten times to 200 mS/ppt (200,000  $\mu$ S/ppm). Use the Range Extender whenever the reading in the 20 mS/ppt setting overranges (reads only "1" at the left of the display).

## USING THE RE-10

1. Fill the cell cup three times to rinse it, but each time insert the Range Extender to rinse it also.
2. Fill the cell cup with your sample. Push the Range Extender into the cell cup, seating the O-ring seal.
3. Use and read the Digital pDS Meter in the normal manner. Multiply the reading by 10.
4. For best accuracy, repeat the complete test with a fresh sample.
5. When you're done testing, remove the Range Extender. Thoroughly rinse the cell cup and Extender with clean water (preferably distilled or deionized) to eliminate dried salts build-up. This is extremely important when the instrument will be used to test high purity water.

## RE-10 RANGE EXTENDER



## CALIBRATING THE RE-10

1. Calibrate the 20 mS/ppt range (without RE-10) using 442-15,000 Standard Solution.
2. Turn the Range Switch to 2000  $\mu$ S/ppm. Again fill the cell cup with 442-15,000 Standard Solution.
3. Insert RE-10 and press the button. Multiply the reading by 10 and compare it with the value on the Standard Solution label. If they are not the same the RE-10 must be recalibrated.

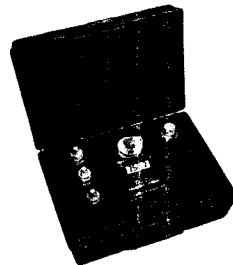
**NOTE: DO NOT** adjust the Calibration Control in your meter.

4. Adjust the white insert of the Extender as follows:  
If the reading is too high—push or tap inward.  
If reading is too low—twist or pull outward with pliers.

**NOTE:** Each Range Extender is calibrated to a particular meter. It should be recalibrated if it is to be used with another Myron L meter.

## PORTA KIT

Carrying Case for use with all Myron L portable meters is foam lined and molded of sturdy ABS plastic.



## REPLACEMENT pH SENSORS

Order **Model RPY** for either DCH4 or DPH4 meters. When ordering, be sure to include the serial number of your meter to ensure receiving the proper type. Complete installation instructions are provided with each replacement sensor.

## ORDERING

To order accessories contact your nearest stocking distributor, or the Myron L Company.

## WARRANTY & SERVICE

The Myron L DCH4 and DPH4 Digital pDS Meters have a one year warranty. **The pH sensor has a 6 month limited warranty.** Any service required other than battery or pH sensor replacement, cleaning, or calibration must be referred to the Myron L Company. If an instrument fails to operate properly, check the battery, calibration and cleanliness of the pH sensor bulb. If it still fails to properly function, return it prepaid to the Myron L Company.

If, in the opinion of the factory, failure was due to materials or workmanship, repair or replacement will be made without charge. A reasonable service charge will be made for diagnosis or repairs due to normal wear, abuse or tampering. This warranty is limited to the repair or replacement of the pDS meter only. The Myron L Company assumes no other responsibility or liability.

**MYRON L  
COMPANY**

*pH/Conductivity Instrumentation:  
Accuracy — Reliability — Simplicity*

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