PowerCost Monitor ™

Installation Guide

Welcome

Congratulations on your purchase of the **PowerCost Monitor**™, a new electricity-monitoring device that informs you in real time of the amount of electricity your household is consuming. This Guide explains how to get your system ready for use. Please follow the instructions in the order shown without skipping any steps.

Important Safety Precautions

Install your PowerCost Monitor Sensor Unit on a dry day and take all necessary safety precautions, particularly if you need to use a ladder for installing the Sensor Unit. In addition, please read and apply the safety instructions below at all times.

➢ Do not immerse either PowerCost Monitor unit in any liquid.
➢ Do not drop or cause any sudden impact to either PowerCost Monitor unit.
➢ If disposing of the PowerCost Monitor, do so in accordance with your local waste disposal regulations.
➢ Take precautions when handling batteries. They can cause injuries, burns, and/or property damage as a result of contact with metal objects, heat, and corrosive materials.
➢ A damaged LCD display may leak fluids that can be harmful to your health. If any fluid leaks from the Display Unit after you drop it accidentally, immediately wash it off with soap and water.
➢ Read all the instructions carefully before using your PowerCost Monitor.

1 Verify the Contents of the Box

Verify that your box contains all these components. If any item is missing, please contact your PowerCost Monitor reseller.
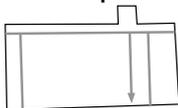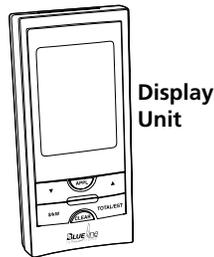

Rubber Shim

Clear Alignment Template
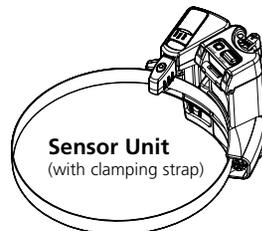
Installation Guide and User Guide

Display Unit

Sensor Unit (with clamping strap)

Alkaline "AA" Batteries
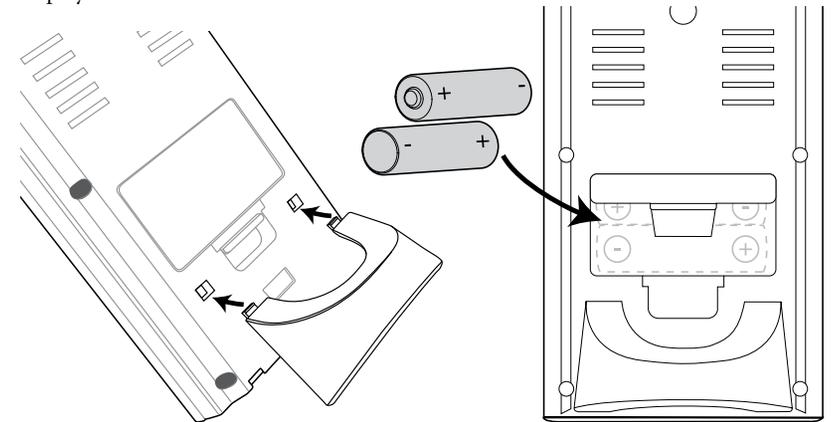
2 Install the Batteries in the Display Unit

Remove the battery compartment cover on the back of the Display Unit, insert two AA batteries in the proper orientation, and replace the battery compartment cover.

You can also install the stand by clicking it into its position on the back of the Display Unit as shown below. Note that, with the stand removed, you can mount the Display Unit on a wall.

3 Install the Batteries in the Sensor Unit

Turn the screw counter-clockwise to open the Sensor Unit battery compartment cover, insert two AA batteries in the orientation indicated by the + and – signs printed on the circuit board, then close and lock the battery compartment by turning the screw clockwise. Do not overtighten. The red STATUS indicator should light up without flashing within 10 seconds.

NOTE: The STATUS indicator stays lit until you install it on the meter, at which time it starts flashing. If your Sensor Unit has not detected the signal from a meter within 20 minutes, the STATUS indicator starts blinking very rapidly. This behaviour is normal.
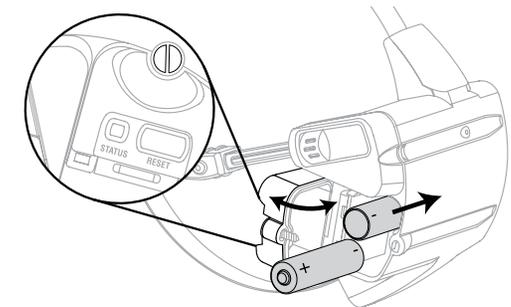
4 Determine Your Meter Type and Power Factor

In some cases, it may be necessary to adjust your Sensor Unit to fit your particular meter. Therefore, it is extremely important to determine exactly what kind of meter is installed on your premises.

INSTRUCTIONS: To determine your meter type, study the illustrations and descriptions below as well as in any other meter-specific installation guide that may be included in your box. For more information on meter types, see the *Troubleshooting* section in the *User Guide*.

1. Locate your electricity meter.

2. Determine which of the following illustrations most closely matches your meter. Remember your meter type.

3. Find your meter's power factor and write it down in the box labeled "Power Factor" next to the illustration below which matches your meter. Your meter's power factor is indicated on the face of the meter, most often next to the letters Kh (less often the letters Ks or Kt). In most cases, your meter's power factor is 7.2 if it has dials and a spinning disk, or 1.0 if it has a digital readout.

4. When you are done, go to *Step 5 - Determine your Billing Mode*.

Type 1 Meter: *Electromechanical*

This type of meter has dials and a spinning disk.

The Sensor Unit reads the revolutions of the disk and transmits that information to the Display Unit.

Power Factor
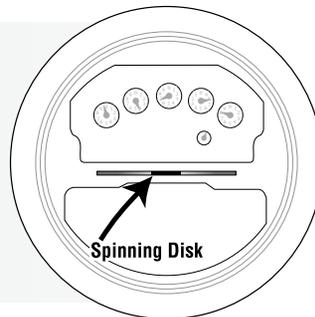
Spinning Disk

Type 2 Meter: *Electronic with optical port on the face, 1.5 inches or more from the outer rim*

On this type of meter, the optical port is located at least 1.5 inches (37 mm) from the meter's outer rim.

If in doubt, measure the distance using the ruler below.

Power Factor

At least 1.5 inches

Optical Port   Outer Rim
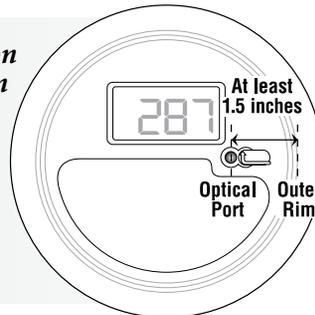
Type 3 Meter: *Electronic with optical port on the face, less than 1.5 inches from the outer rim*
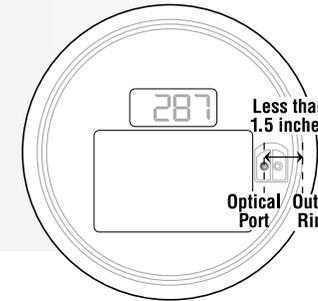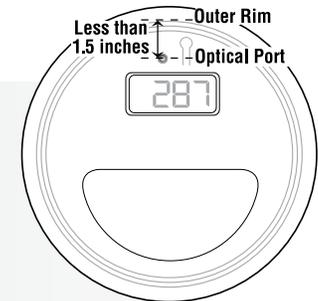
On these electronic meters, the optical port is on the face, located less than 1.5 inches (37 mm) from the meter's outer rim.

If in doubt, measure the distance using the ruler below.

This type of meter requires that you mount the supplied rubber shims on the underside of the Sensor Unit.

NOTE: If your meter seems to have two ports, the one closest to the center of the meter is the optical port.

Power Factor

Less than 1.5 inches   Outer Rim   Optical Port

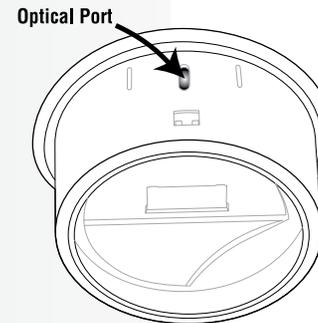Less than 1.5 inches   Optical Port   Outer Rim

Type 4 Meter: *Electronic with optical port on the top*

On this type of meter, the optical port is located on the top portion of the meter.

This kind of meter requires you to reconfigure the Sensor Unit and install the Clear Alignment template.

Power Factor

Optical Port

ruler

0   .5   1   1.5   Inches

2

5 Determine Your Billing Mode

Find a recent electricity bill and determine which of the following two billing modes your electricity supplier is applying to your account. Then, write the appropriate value(s) in the box(es) provided as a quick reference that you can use when you are ready to perform *Step 7 - Set Your Billing Rates*.

If you have trouble determining your electricity rate(s), please contact your electricity supplier directly!

Time-based

Your bill shows two or three rates associated with various times of day and days of the week. Study the example below carefully, and determine:

a) whether you are being charged on a two-rate basis, meaning that you are charged normal (OFF PEAK) and peak (ON PEAK) rates, or on a three-rate basis, where you also pay an intermediate rate (MID PEAK).
b) what your rates are;
c) at what time(s) of the day the rates change; and
d) whether your company charges you any other rate than OFF PEAK during weekends.

EXAMPLE:

➤ **OFF PEAK**   342 kWh @ $0.063/kWh

➤ **MID PEAK***   399 kWh @ $0.069/kWh

➤ **ON PEAK****   988 kWh @ $0.075 /kWh

MID/ON PEAK applies Mon to Fri.

* *MID PEAK Periods: 9:30 AM to 4:20 PM and 7:00 PM to 11:00 PM*

** *ON PEAK Periods: 6:10 AM to 9:30 AM and 4:20 PM to 7:00 PM*

The information from this example is illustrated in the table below, indicating that from Monday through Friday only, you pay:

1) 7.5 ¢/kWh from 6:10 AM to 9:30 AM;
2) 6.9 ¢/kWh from 9:30 AM to 4:20 PM;
3) 7.5 ¢/kWh again from 4:20 PM to 7:00 PM;
4) 6.9 ¢/kWh again from 7:00 PM to 11:00 PM; and finally
5) 6.3 ¢/kWh from 11:00 PM until 6:10 AM the next day.

	TIME SLOT	START TIME		RATE TYPE	
OFF PEAK rate **6.3** ¢/kWh	1	6:10	✓AM / PM	✓ON PEAK / MID PEAK	OFF PEAK
MID PEAK rate **6.9** ¢/kWh	2	9:30	✓AM / PM	ON PEAK / ✓MID PEAK	OFF PEAK
ON PEAK rate **7.5** ¢/kWh	3	4:20	AM / ✓PM	✓ON PEAK / MID PEAK	OFF PEAK
MID/ON PEAK rates apply on weekends?	4	7:00	AM / ✓PM	ON PEAK / ✓MID PEAK	OFF PEAK
Yes ☐	5	11:00	AM / ✓PM	ON PEAK / MID PEAK	✓OFF PEAK
No ✓	6	:	AM / PM	ON PEAK / MID PEAK	OFF PEAK

Single (Flat) Rate and Tiered Rates

Your bill shows a single *value in cents per kilowatt-hour (¢/kWh) or more than one value in ¢/kWh* for increasingly higher consumption thresholds.

EXAMPLES:

➤ **SINGLE (FLAT) RATE**
$0.063/kWh

You are paying 6.3 ¢/kWh at all times.

	RATE		THRESHOLD	
1	6.3	¢/kWh		kWh

➤ **TIERED RATE**
1200 kWh @ $0.063/kWh and
1369 kWh @ $0.075/kWh

You consumed 2,569 kWh in total, paying the first 1,200 kWh at the rate of 6.3 ¢/kWh and the following 1,369 kWh at the higher rate of 7.5 ¢/kWh.

	RATE		THRESHOLD	
1	6.3	¢/kWh	1200	kWh
2	7.5	¢/kWh		kWh

Instructions:
In the table to the right, enter the rate(s) and threshold(s) that are reported on your electricity bill.

NOTE: The PowerCost Monitor system allows for up to six different rates. If you pay a single rate, simply write it down in the RATE 1 box for reference purposes and ignore the rest of the table.

	RATE		THRESHOLD	
1		¢/kWh		kWh
2		¢/kWh		kWh
3		¢/kWh		kWh
4		¢/kWh		kWh
5		¢/kWh		kWh
6		¢/kWh		kWh

Instructions: Looking at your electricity bill, and following the example to the left, fill out the table below with the rates and times of the day that apply to your situation.

|	TIME SLOT	START TIME		RATE TYPE	
OFF PEAK rate ¢/kWh	1	:	AM / PM	ON PEAK / MID PEAK	OFF PEAK
MID PEAK rate ¢/kWh	2	:	AM / PM	ON PEAK / MID PEAK	OFF PEAK
ON PEAK rate ¢/kWh	3	:	AM / PM	ON PEAK / MID PEAK	OFF PEAK
MID/ON PEAK rates apply on weekends?	4	:	AM / PM	ON PEAK / MID PEAK	OFF PEAK
Yes ☐	5	:	AM / PM	ON PEAK / MID PEAK	OFF PEAK
No ☐	6	:	AM / PM	ON PEAK / MID PEAK	OFF PEAK

6 Configure Your Display Unit

You will now configure your Display Unit so it will be ready to provide you with real time information as soon as you install your Sensor Unit.

Important: Your Display Unit has three buttons you will use during configuration: the ▲ and ▼ buttons on the front of the unit, and the PROG/SYNC button on top. In the configuration instructions that follow, "Enter" means pressing the ▲ and ▼ buttons to select the appropriate value, then pressing PROG/SYNC to record the value in memory. The next parameter will then automatically start flashing.

The Display Unit automatically exits Configuration Mode after one minute of inactivity, saving whatever values you set up to that point. If you are interrupted before you have finished entering all your values, return to Configuration Mode and press PROG/SYNC successively until you get to the value(s) you need to modify.

PROG/SYNC

TOP

APPL

S/kW   CLEAR   TOTAL/EST
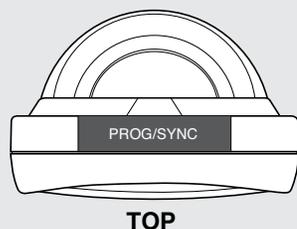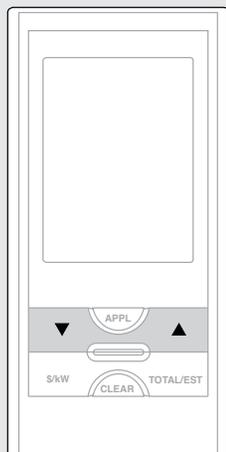
Set your billing mode, the internal clock and the meter's Power Factor

NOTE: If your Display Unit displays SLEEP, briefly press any button before proceeding with the steps below.

1. Press PROG/SYNC until the Display Unit beeps once (about 3 seconds) and enters Configuration mode. The hours start flashing.
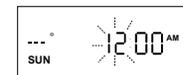
2. Enter the current hour of the day.

   12:00 AM   SUN

3. Enter the current minutes of the day.

   9:00 AM   SUN

4. Enter the clock format you wish to use. Pressing ▲ or▼ toggles between 12 hour and 24 hour time display format.

   12 Hr   SUN

5. Enter the current day of the week.

   9:30 AM   SUN

6. Enter the temperature format you wish to use. Pressing ▲ or▼ toggles between degrees Celsius and Fahrenheit.

   °F   9:30 AM   SUN

7. Enter the Power Factor you wrote down in *Step 4*. If you have a meter with dials and a spinning disk, this value is most likely 7.2. If you have a meter with a digital readout, it is most likely 1.0.

   1.0   9:30 AM   SUN
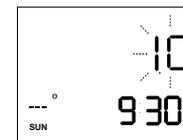
8. The TIER billing mode indicator (Flat/Tiered rate) is now flashing. Pressing ▲ or ▼ alternates between TIER, 2-PEAK (time-based, two rates) and 3-PEAK(time-based, 3 rates). Enter the indicator that corresponds to your billing mode

TIER
2-PEAK
3-PEAK
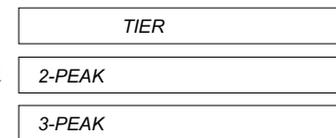
9. You will now enter your billing details. While still in Configuration Mode, and referring to the numbers you wrote down in *Step 5*, set up your Display Unit for your billing mode by following the instructions in the appropriate table under *Step 7 - Set Your Billing Rates*.

7 Set Your Billing Rates

NOTE: If you need to reconfigure your Display Unit after your energy supplier has changed your rates, perform a Factory (Hard) Reset as described in your User Guide and start from *Step 6 - Configure Your Display Unit*.

REMEMBER: To "Enter" a value, press ▲ or ▼ until the correct value is displayed, then press PROG/SYNC.

Single Flat Rate

1. The RATE and TIER 1 indicators are displayed and the default rate is flashing. Enter your electricity rate.

   TIER 1 / RATE / 10.2 ¢/kWh

2. The THRESHOLD and TIER 1 indicators are now displayed and the default threshold value is flashing. Press ▼ until a series of dashes is displayed.

   TIER 1 / THRESHOLD / 1000 kWh

3. Press PROG/SYNC. Your Display Unit exits Configuration Mode.

   TIER 1 / THRESHOLD / ---- kWh

4. ***Go to Step 8 - Prepare your Sensor Unit***.
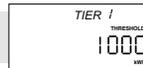
NOTE: The next time you change your rates, the TIER 1 indicator is not displayed. It will only reappear if your enter a value to change the threshold.

Tiered Rates

1. The RATE and TIER 1 indicators are displayed and the default rate is flashing. Enter your first electricity rate.

   TIER 1 / RATE / 10.2 ¢/kWh

2. The THRESHOLD and TIER 1 indicators are now displayed and the default threshold value is flashing. Enter your (first) threshold

   TIER 1 / THRESHOLD / 1000 kWh

3. The RATE and TIER 2 indicators are now displayed. Enter your second rate.

   TIER 2 / RATE / 11.1 ¢/kWh

4. The THRESHOLD and TIER 2 indicators are displayed and the default value for the second threshold is flashing. Do one of the following:

   TIER 2 / THRESHOLD / 1800 kWh

   - If you have no more rates to enter, press ▼ until a series of dashes is displayed.

     TIER 2 / THRESHOLD / ---- ¢/kWh

   - Enter your second threshold and repeat steps 1 and 2 until you have entered all your rates and thresholds. After your have entered your last rate, press ▼ until a series of dashes is displayed.

5. Press PROG/SYNC. Your Display Unit exits Configuration Mode.

NOTE: The Display Unit automatically exits Configuration Mode as soon as you enter a 6th rate.

6. ***Go to Step 8 - Prepare your Sensor Unit***.
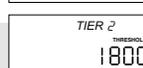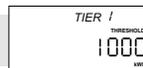
Time-based (2 and 3 rates)

1. All the day of the week segments are displayed, with the SAT and SUN segments flashing. This means that in the current setting, higher rates are not applied on weekends. If you do not pay higher rates on weekends, go to step 2 below. If you do pay higher rates on weekends, press either ▲ or ▼ to make the SAT and SUN display solid like the other day segments, then press PROG/SYNC.

   3-PEAK / SUN MON TUE WED THU FRI SAT

2. Enter your OFF PEAK RATE.

   OFF-PEAK / 78 ¢/kWh / 2:00 PM

3. If required, enter your MID PEAK RATE.

   MID-PEAK / 83 ¢/kWh / 2:00 PM

4. Enter your ON PEAK RATE.

   ON-PEAK / 141 ¢/kWh / 2:00 PM

5. Number "1" is displayed above the clock, indicating the 1st time slot. Enter the HOURS when your 1st time slot starts. Next, enter the MINUTES when your 1st time slot starts.

   3-PEAK / 1 / 7:00 AM

   3-PEAK / 1 / 7:00 AM

6. Enter the RATE TYPE of your 1st time slot.

   OFF-PEAK / 1 / 7:00 AM

7. Number "2" is now displayed above the clock, indicating the 2nd time slot. Repeat steps 5 and 6 for all your time slots.

   3-PEAK / 2 / 8:00 AM

   When you are done, press PROG/SYNC for 3 seconds to exit Configuration mode. Also, note that the Display Unit exits Configuration mode automatically as soon as you finish entering the 6th time slot.

8 Prepare Your Sensor Unit
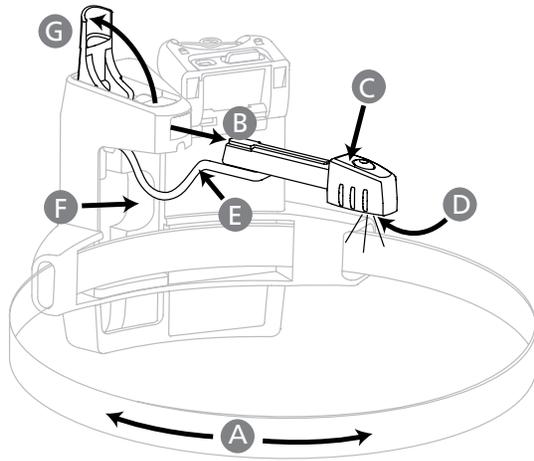
A Clamp

B Sensor Arm (pulled out)

C Sensor Head

D Sensor LEDs (dark red and white)

E Wire

F Wire Cavity

G Sensor Arm Latch

Instructions: Perform the operations in the block that corresponds to your meter type. When you are done, go to *Step 9 - Install your Sensor Unit.*

Type 1 Meter: *Electromechanical*

① Open the Sensor Arm latch G by pulling upward.

② Extend the Sensor Arm B to its full length by pulling on it firmly, but gently. If you accidentally pull it out completely, push it back into the casing.

③ Close the latch G.
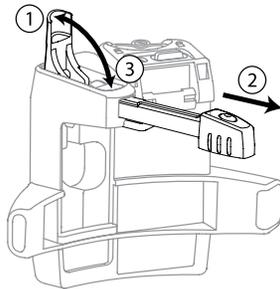
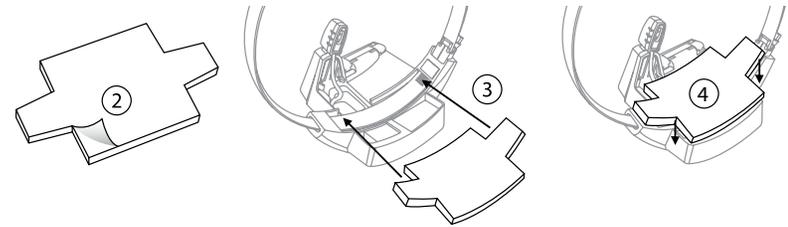## Type 2 Meter: *Electronic with optical port on the face, 1.5 inches or more from the outer rim*

① Open the Sensor Arm latch G by pulling upward.

② Ensure that the Sensor Arm B is pushed in as far as it will go into the body of the Sensor Unit.

③ Close the latch G.
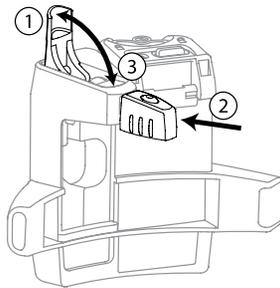
## Type 3 Meter: *Electronic with optical port on the face, 1.5 inches maximum from the outer rim*

① Verify that the Sensor Arm B is fully pushed in as described for Type 2 meters.

② Peel off the adhesive backing from the shim.

③ Position the shim on the underside of the Sensor Unit casing with the adhesive side down.

④ Press the shim in place onto the underside of the Sensor Unit casing.

Type 4 Meter: *Electronic - optical port on top*

① Open the Sensor Arm latch G by pulling upward.

② Gently pull the Sensor Arm B completely out of the Sensor Body.

③ Turn over the Sensor Arm B.

④ Push the thin end of the Sensor Arm B upwards through the latch opening and press the Sensor Arm firmly into the cavity.

⑤ Firmly push the Sensor Head C behind the strap, and as far down as it will go into the bottom cavity of the body. The dark red Sensor Head LED D must be clearly visible below the clamp. If necessary, use a dull pointed object, such as a ballpoint pen to push the head C downwards.

⑥ Tuck the wire E into the side cavity F.

⑦ Close the latch G.
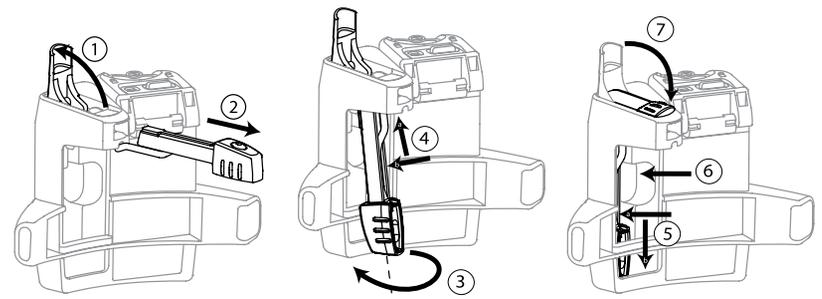
9 Install Your Sensor Unit

START – Read SAFETY PRECAUTIONS first

IMPORTANT: Turn on a high energy-consuming appliance in your house, such as your electric stove or dryer. This will temporarily increase your electricity consumption and enable the Sensor Unit to begin reading your meter's output in less time.

1. Go to your meter, taking the following items with you:

   - ➢ This Guide
   - ➢ Sensor Unit
   - ➢ Display Unit
   - ➢ A clean damp cloth
   - ➢ 1 large Flat Head screwdriver
   - ➢ Clear Alignment Template (if you have a Type 4 meter)
   - ➢ Stepping stool or ladder if your utility meter is located higher than eye level

2. Perform the installation steps for your type of meter (which you determined in *Step 4*).
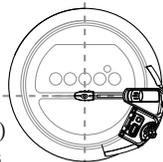
Type 1, 2 & 3 Meters:

1. After carefully wiping the meter dome clean with the damp cloth, fit the Sensor Unit over your utility meter as shown, so that the Sensor Head **C** sits as close as possible to the front of the glass dome.

2. With your screwdriver, tighten the hose clamp **A** until the Sensor Unit is snug, but can move just enough to allow for slight adjustments.
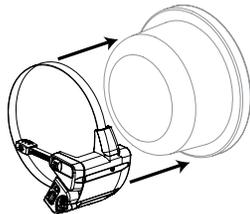
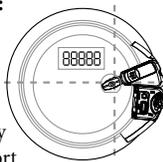3. Position the Sensor Head **C**:

TYPE 1 Meters:
Position the Sensor Arm **B** so that it is inline with the spinning disk (use the line on the Sensor Arm as a reference) and the Sensor Head **C** is on or near the center of the meter.

TYPES 2, 3 Meters:
Position the Sensor Arm **B** so that the dark red LED **D** in the Sensor Head **C** is located exactly above the optical port.

4. Press the RESET button and wait 10 seconds. The red STATUS indicator turns on solid.

5. If you positioned the Sensor Head **C** correctly, the STATUS indicator starts flashing as indicated below. If it does not, correct the positioning slightly.
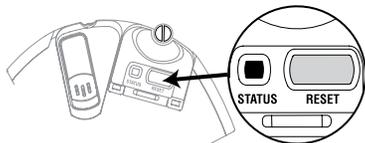
TYPE 1 - After 15 seconds, the red STATUS indicator turns off and within two minutes, it starts flashing once per disk revolution. This is an indication that your Sensor Unit is correctly reading the meter.

TYPES 2 and 3 - After about 15 seconds, the red STATUS indicator starts flashing regularly, indicating that the Sensor Unit has detected the signal from your meter. Within 1 minute, in addition to the regular flashing, you should see an extra flash every now and then, depending on your rate of electricity consumption. These extra flashes are normal, and indicate that the Sensor Unit is reading the meter's output correctly.

Note 1: The STATUS indicator stops flashing after 2 minutes, in order to maximize battery life.

Note 2: If the STATUS indicator does not flash at all and stays lit solid, please read the *Troubleshooting* section in your *User Guide*.

Type 4 Meters:

1. Stand directly in front of your meter, at a height where you can see the optical port. The optical port itself looks like a small protruding pipe in the center of the top portion of the meter. Carefully wipe the meter dome clean with the damp cloth.

2. Hold the template with the protruding tab facing you and the white arrow pointing away from you. Peel off the adhesive backing.

3. Position the template on the meter so that the horizontal white line on the template follows the front edge of the meter dome, and the white arrow points straight to the optical port.

4. Carefully stick the template to the dome, pressing it in place on top first, then on the protruding tab down the front of the dome.
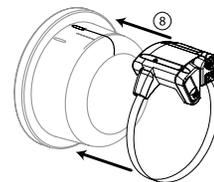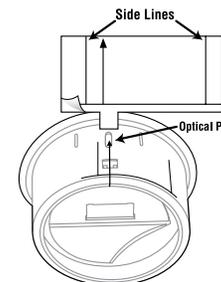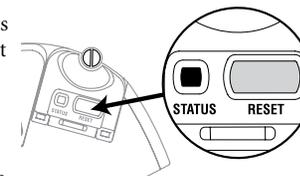
5. Slide the Sensor Unit over the glass dome and align the edges of the Sensor Unit body with the white side lines.

6. Tighten the hose clamp **A** until the Sensor Unit is snug, but can move just enough to allow for adjustments.

7. Open the Sensor Arm latch **G** and sight down the opening. You see a vertical plastic tab painted white on the inside of the Sensor body.

8. Sighting through the opening, position the Sensor Unit so that the white plastic tab on the body is aligned with the arrow on the template.

9. Press the RESET button and wait 10 seconds. The red STATUS indicator turns on solid.
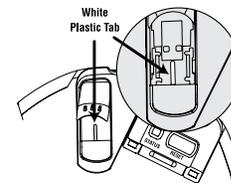
10. Keeping the white lines on the body and template aligned, slowly and gently push or pull on the Sensor Unit until the red STATUS indicator starts flashing regularly, indicating that the Sensor Unit has detected the signal from your meter. Within 1 minute, in addition to the regular flashing, you should see an extra flash every now and then, depending on your rate of electricity consumption. These extra flashes are normal, and indicate that the Sensor Unit is reading the meter's output correctly.
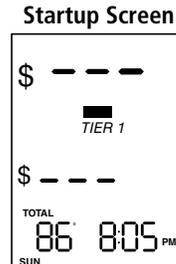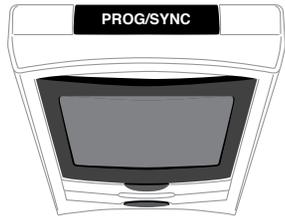
Note 1: The STATUS indicator stops flashing after 2 minutes, in order to maximize battery life. If you have not seen at least one extra flash by then, please read the *Troubleshooting* section in your *User Guide*.

Note 2: If the STATUS indicator doesn't flash at all and stays lit solid, please read the *Troubleshooting* section in your *User Guide*.

10 Synchronize Your Sensor and Display Units

ID Screen	Startup Screen

PROG/SYNC

ID Screen display:
```
  id
TIER 1
$003
TOTAL
86  8:05 PM
SUN
```

Startup Screen display:
```
$ ---
TIER 1
$ ---
TOTAL
86  8:05 PM
SUN
```

1. Press and hold the PROG/SYNC button until the Display Unit beeps twice (about 5 seconds) and displays the ID screen.

2. Press and release the RESET button on the battery cover of the Sensor Unit. The Display Unit now displays the Startup screen.

   Your Display Unit should start displaying real-time information within a few minutes.

11 Finalize the Installation

1. Tighten the hose clamp Ⓐ just enough so that the Sensor Unit cannot move.

2. Turn off the appliance you turned on when you started.

   Your Sensor Unit should now be correctly installed and communicating with your Display Unit.

   If there is a problem, please read the *Troubleshooting* section in the *User Guide.*

Technical Specifications

Power

Display Unit	2 AA Alkaline Batteries (LR6 or equivalent)
Sensor Unit	2 AA Alkaline Batteries (LR6 or equivalent)
	2 AA Lithium Batteries for temperatures consistently below -20 ºC

Wireless Communications

Frequency	433.92MHz
Update Rate	Approximately every 30 seconds
Range	Up to 30m (100ft.) line-of-sight (Subtract 5m or 15 feet for each wall between Display and Sensor Units)

Operating Temperature Range

Display Unit	10°C to 40°C (50°F to 104°F). For indoor use only
Sensor Unit	-40°C to 60°C (-40°F to 140°F)

Altitude

Display Unit	2,000 meters maximum

Relative Humidity

Display Unit	80% for temperatures up to 31°C decreasing linearly to 50% at 40°C

Pollution

Display Unit	Pollution Degree 2

FCC INFORMATION

FCC Class B Part 15

This device complies with part 15 of the FCC Rules.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

· Reorient or relocate the receiving antenna.
· Increase the separation between the equipment and receiver.
· Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
· Consult the dealer or an experienced radio/TV technician for help.

Industry Canada Certification

Operation is subject to the following two conditions:
· This device may not cause harmful interference, and
· This device must accept any interference received, including interference that may cause undesired operation.

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