

NELSON TURF

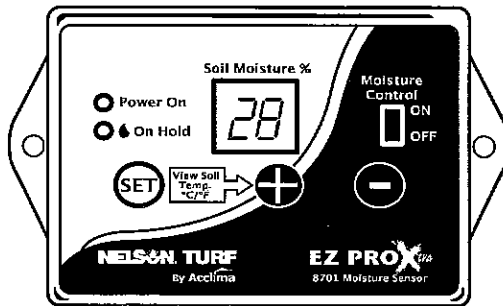
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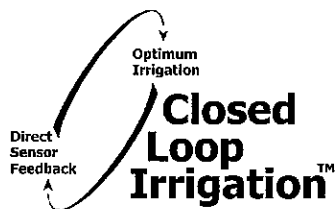
EZ PRO^{tra}

Soil Moisture Controller

Precision Irrigation System
Timer Upgrade Kit



Installation Guide and
User's Manual



Congratulations on your recent purchase of the Nelson EZ PRO™ XTRA, the finest soil moisture sensor irrigation controller on the market. Thank you for joining those interested in conserving water – earth's most important resource.

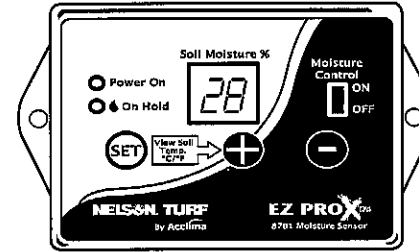
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1 Before You Begin

1.1 Kit Contents

- A. EZ PRO™ XTRA Soil Moisture Controller
- B. Digital TDT™ Soil Moisture Sensor
- C. Grease Caps (DBY Connectors) x3
- D. Yellow 14 Gauge Wire Connectors x3
- E. Blue 16 Gauge Wire Connectors x2
- F. Installation Guide and User's Manual
- G. Wiring Schematic



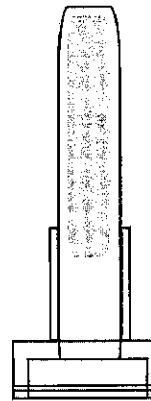
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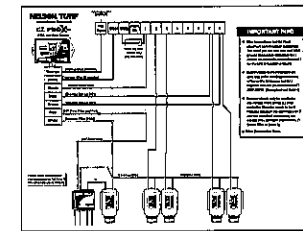
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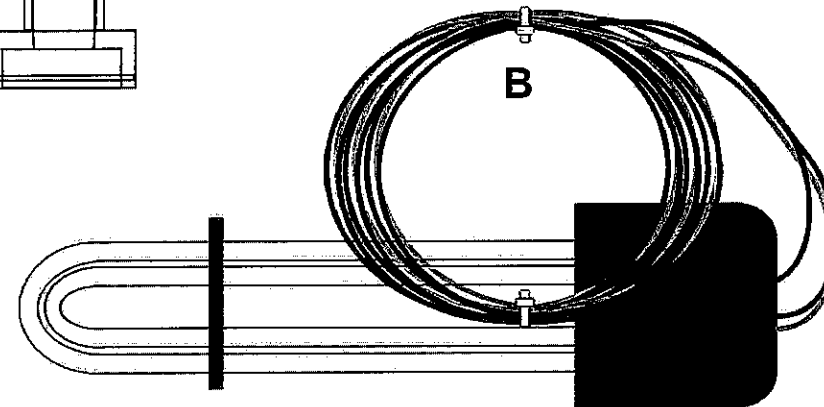
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1.2 About the Nelson EZ PRO™ XTRA

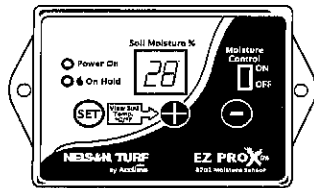
The Nelson EZ PRO™ XTRA is a water conserving system that works with your existing sprinkler controller (timer).

There are two modules:

1. A precise Digital TDT™ Moisture Sensor



2. A wall-mounted EZ PRO™ XTRA controller



The soil moisture sensor accurately measures the volumetric moisture percentage of the soil. You will use the controller to set a **turn-on moisture threshold**. When the moisture level in the soil is above the threshold, the controller disables your timer. As the moisture level in the ground falls below the threshold, your timer will be permitted to operate.

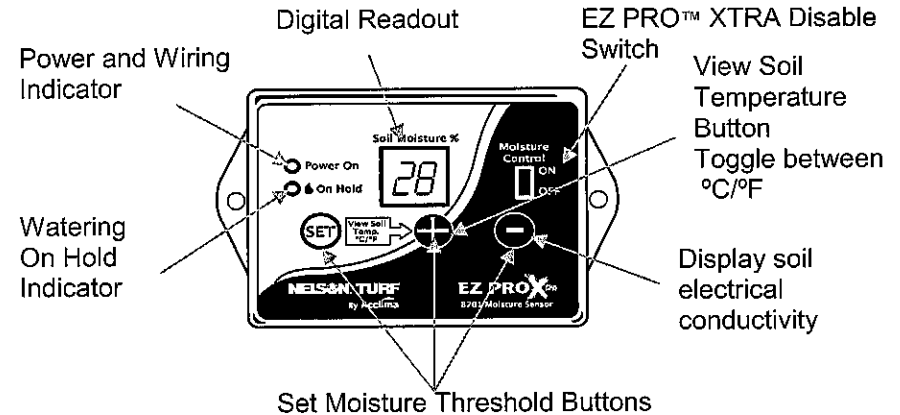
1.3 How the Nelson EZ PRO™ XTRA works

In setting up the EZ PRO™ XTRA System, you will select a location in your lawn to bury the moisture sensor. The sensor will then be connected to the valve that waters that location (sensor zone). This spot will represent the moisture level for your entire yard.

Each zone can have different watering needs based on microclimate variations on your property. For example, your "sensor zone" may be completely exposed to the sun throughout the entire day. Another zone may have a shade tree which casts a shadow in different areas throughout the day. Another zone may get only a few hours of direct sunlight due to fences, buildings, tall shrubbery, trees, or all of the above. Each of these varying zones will have different watering requirements.

You will make adjustments to the watering duration for each zone based on your observations of which zones become too wet and which zones are too dry. These adjustments in watering duration will be made to your existing sprinkler clock. Once you have determined that all zones seem to be getting the proper amount of water, then your sprinkler system should begin saving water and require minimal intervention.

2 EZ PRO™ XTRA Operation



2.1 Digital Moisture Readout

The display indicates the absolute volumetric water content of the soil where the sensor is installed. It will also display the soil temperature when the button is depressed. *The display indicates nothing while the controller is taking a moisture reading. The EZ PRO™ XTRA automatically takes a reading every 10 minutes.*

2.2 Moisture Setting Buttons

When the button is pressed, the display shows the current moisture threshold setting; when it is released it will prompt a moisture reading. When the actual soil moisture level near the sensor drops below this threshold the EZ PRO™ XTRA will allow watering during the next cycle programmed into your timer. To increase the threshold, hold the button in and press the button (increase). To decrease the threshold hold the button in and press the button (decrease).

2.3 Soil Temperature Button

If you press the button without simultaneously pressing the button, the display will show the soil temperature in degrees Celsius or Fahrenheit. To toggle the soil temperature display to Fahrenheit or Celsius press and hold the button and press the button.

2.4 Power and Wiring Indicator

Power On This lamp illuminates when the COM (Common) and AC power wires from the EZ PRO™ XTRA are properly connected into your timer and the timer is properly connected to the AC power supply.


2.5 Moisture Control Switch



When the Moisture Control Switch is in the OFF position your timer will operate as if the EZ PRO™ XTRA were not present. The EZ PRO™ XTRA will continue to take moisture readings but will not inhibit watering if the moisture is above the threshold setting. This feature allows you to check and maintain your timer and sprinkler heads. **Be sure to return the switch to the ON position after maintenance checks to avoid wasting water.**

2.6 Watering 'On Hold' indicator

On Hold Whenever the soil moisture reading exceeds the threshold setting this lamp will illuminate indicating water will not be applied during the timer's next scheduled watering cycle.

Hold the  button to display soil electrical conductivity in cS/m.

3 Sensor Installation

3.1 Selecting the Sensor Location

One of your sprinkler zones will be used to control water application throughout your sprinkler system. This zone is called the **sensor zone**. The sensor zone should be carefully chosen to represent all of the zones in your system.

Characteristics for the **sensor zone**:

- Full sun for most of the day
- South or west exposure is best
- Represent the predominant soil type of your property
- Should not receive water from car washing, wading pools, running hoses, etc

After selecting the **sensor zone**, carefully select a location in that zone where the sensor will be installed. Considerations for that location are:

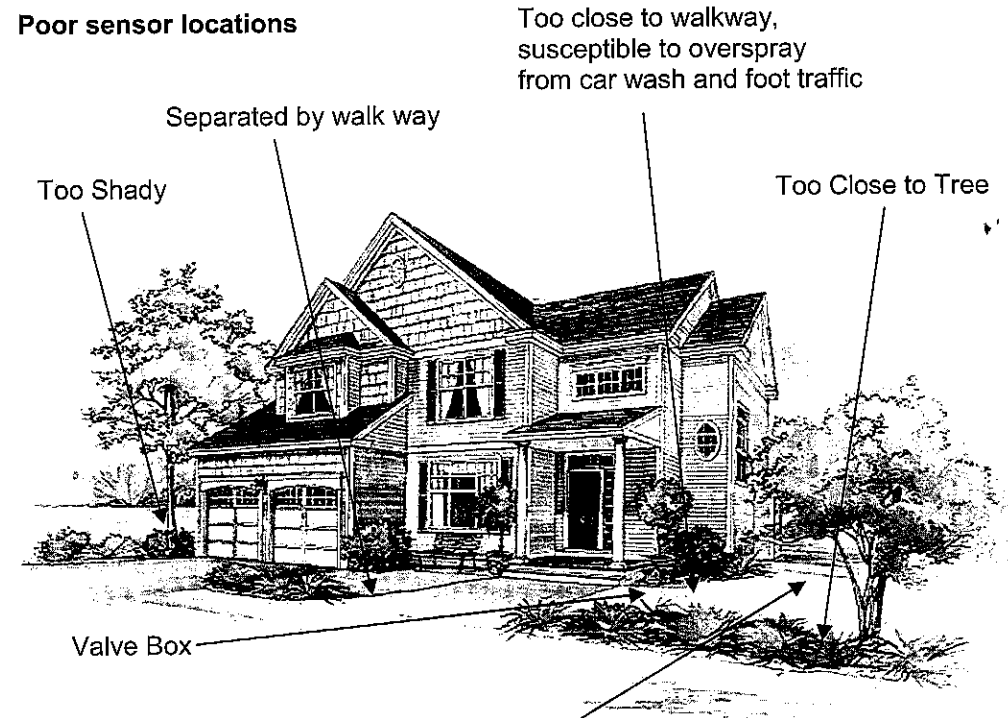
- Well drained—avoid low spots
- Within 25 feet of a valve box with no side walks in between

If 25 feet of wire is insufficient to reach the valve box from the sensor location additional wire may be added. See *Adding additional sensor wire 6.2*

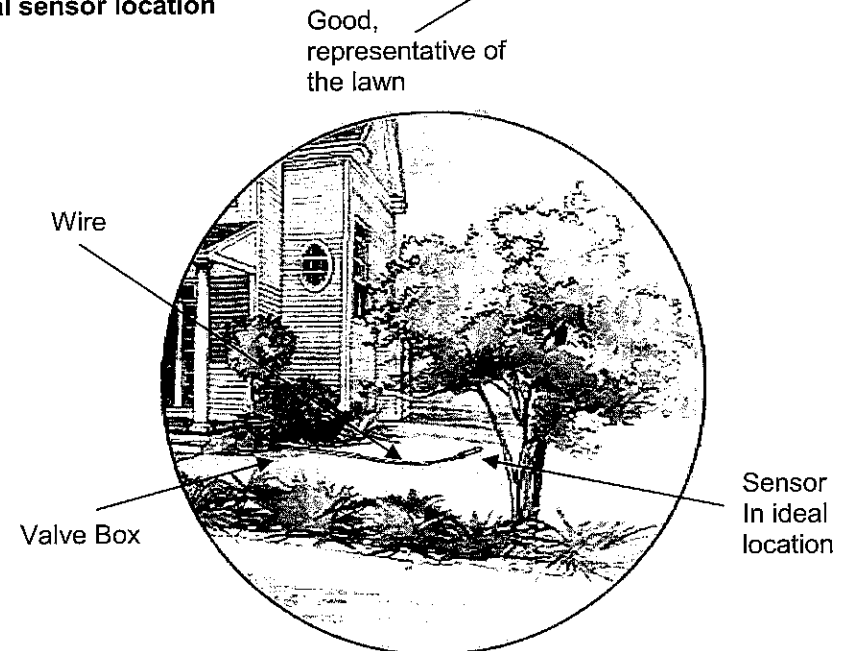
- Receives the same hours of sun as the remainder of the zone
- Not watered by over-spray from adjacent zones
- At least 4 feet away from sprinkler heads
- Avoid areas at or near the bottom of a hill where it is exposed to runoff
- Avoid areas where the lawn is thin and unhealthy
- Avoid areas of heavy foot traffic
- If your water distribution is uneven, ensure that the spot receives average or little below average water coverage for the zone

Examples of sensor installation locations

Poor sensor locations



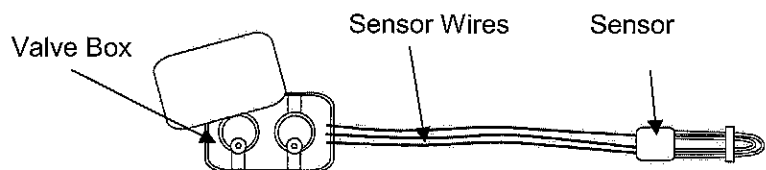
Ideal sensor location



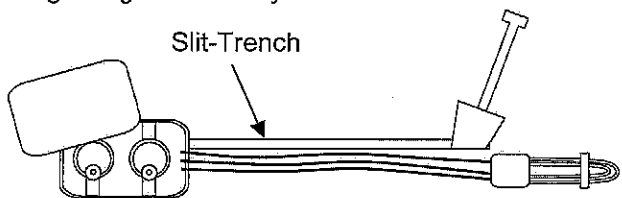
3.2 Installing the Sensor

IMPORTANT: As you dig be careful not to cut any shallow wiring, cables or sprinkler pipes. Most sprinkler systems have wiring and pipes buried deeper than 8 inches, but not always. It is up to you to know the layout and depth of your plumbing and wiring. In some areas you may be required to notify a local agency before you dig.

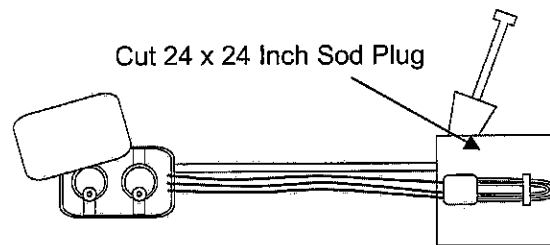
Step 1) Remove the sensor from the shipping package, cut the plastic retainers around the sensor wires and unwind the wires. Place the sensor in the pre-selected sensor location and run the wires back to the valve box containing the valve controlling the irrigation in the sensor zone to make sure there is enough wire to connect the sensor wires to the correct valve in the box.



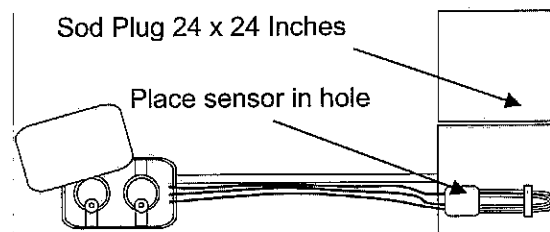
Step 2) Cut a slit-trench in your lawn from the sensor location to the sensor zone valve box using a flat-blade spade (a rounded shovel will work, but is not recommended). Beginning at the sensor location, penetrate the soil deep enough so sensor wires at the bottom of the cut will be protected from aerators (4 to 6 inches). Rock the spade back and forth to open the cut large enough to allow your fingers to the bottom of the cut. Remove the spade and repeat the process, continuing along a line until you reach the valve box.



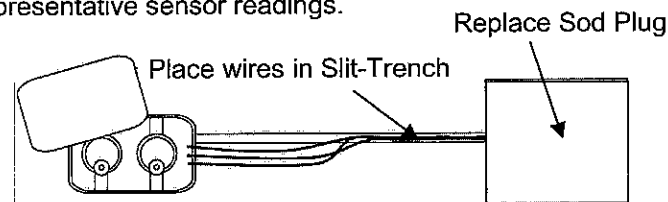
Step 3) Using your spade, cut a rectangular sod plug measuring 24 by 24 inches, penetrating down three to four inches. With your spade at an angle, work the spade to cut the grass roots under the sod to free the plug from the soil beneath. Carefully lay back the sod, exposing the soil beneath. It is important to produce a large piece of sod with no tear in it to allow good "sealing" of the sod over the installed sensor and insure that irrigation water does not run directly from the lawn surface to the sensor rods, forming a pool of water around the sensor and producing unreliable readings while the sod "heals."



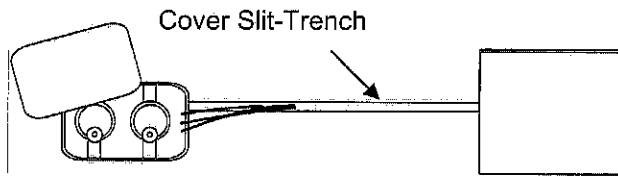
Step 4) Remove all loose rocks, sticks and other debris from the bottom of the excavation. Loosen the soil in the bottom of the excavation to create about an inch of "bedding" soil to pack around the sensor. Place the sensor horizontally in the center of the loosened exposed soil, as level as possible, embedding the sensor firmly in the soil and running the sensor wires out of the excavation through the slit-trench. Lay the wires on the surface of the lawn to be dealt with later. Loosen about an inch of soil from the removed sod plug and spread it evenly over the sensor, about an inch thick, packing the soil around the sensor with your fingers between the sensor rods and over the sensor body. Compress the soil around the sensor to approximately the same density as the undisturbed side walls of the excavation. Ensure there are no air pockets around the sensor rods. Try to achieve the same soil compaction density around the sensor as in the surrounding root zone soil.



Step 5) Smooth the soil in the bottom of the excavation and on the bottom of the sod plug. Replace the sod plug in the excavation, using your feet to tramp the sod back in place, level and firm. Work around the edge of the sod plug with the heel of your foot or with your fist to seal the cut in the soil made by the spade and prevent irrigation water from draining into and filling the sensor excavation, causing unrepresentative sensor readings.



Step 6) Insert the sensor wires into the bottom of the slit-trench, beginning at the sensor. Make sure the wires stack in the bottom of the trench. Close the trench over the wires by tramping both sides of the slit trench, sealing the cut. Continue this process from the sensor to the valve box.



3.3 Connecting the sensor wires

Before connecting the sensor to the system, identify the sensor zone valve wire coming from your sprinkler timer to the valve box. This wire will be used for communication between the EZ PRO™ XTRA controller and the sensor. To identify this valve wire, open the valve box and observe the wiring inside. Typically, there is a bundle of wires with multiple colors. There should be one white wire that is connected to all of the valves. This is the common or COM wire. Each station valve should also have another wire connected to it, called the "hot wire."

Identify the station valve controlling the sensor zone. **Note and write down the color of the "hot wire" on the valve controlling the sensor zone.** You will identify the sensor zone "hot wire" at your timer by referring to the sensor zone "hot wire" color.

Now go to your sprinkler timer. Open it up so you can see the screw terminals where the "hot wires" attach. Note the zone number of the "hot wire" having the same color as the sensor zone "hot wire." There may be several wires of the same color as the sensor zone "hot wire." Using your sprinkler timer, turn on the zone number where the "hot wire" is connected and make sure that the sensor zone valve opens and water sprays. If the first same color wire does not work, try all of them in succession until you find the one that turns on the sensor zone valve. Once you have identified the "hot wire" controlling the sensor zone at the timer, disconnect the power to your sprinkler timer, being sure to write down the existing start times and duration as a backup. Now you are ready to connect the sensor to the system.

Step 1) The **white wire** from the sensor is the common wire and should be connected to the common wire on your value network in the valve box.

Make sure you know which wire is the common wire in your valve box. It is usually white and will be connected to each valve in the box; whereas the "hot wires" from the valves will be individually connected to each valve.

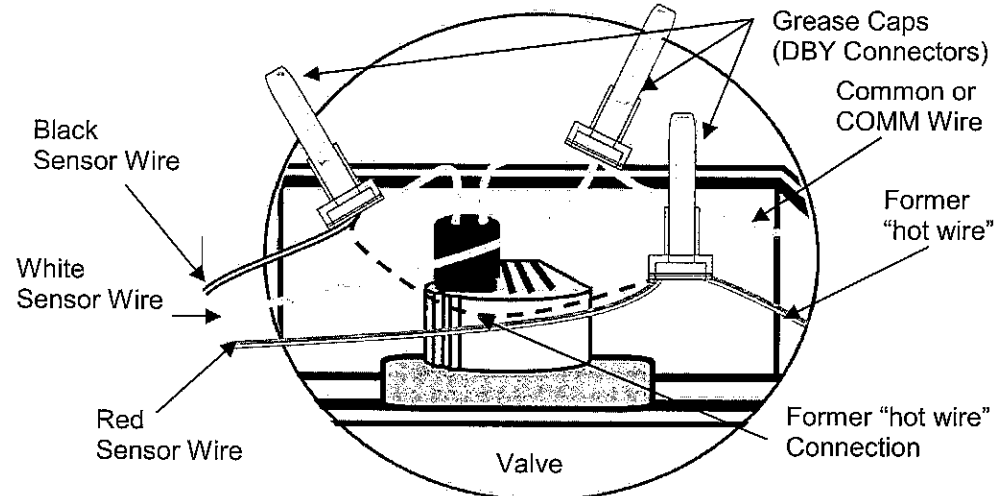
Remove one of the wire nut connections on this common wire and connect the white wire from the sensor to that same point.

IMPORTANT: When connecting burial-grade wire, be sure to use the supplied yellow wire nuts and grease caps (DBY connectors) when connecting the wiring in valve boxes or trenches. Strip each wire back $\frac{3}{4}$ of an inch and twist the two wires together clockwise, then screw on the yellow wire nut clockwise. Finally, open a grease cap and shove the wire nut to the bottom of the grease cap, arrange the wires protruding from the cap so the lid can easily be snapped shut.

Step 2) Disconnect the "hot" wire from the valve controlling the sensor zone and write down the color of the wire. This is the wire that you will eventually connect to the red wire from the EZ PRO™ XTRA controller.

Step 3) Connect the "hot" wire disconnected in step 2 to the **red wire** on the sensor.

Step 4) Connect the **black wire** from the sensor to the loose sensor zone valve wire (the one the sensor zone "hot wire" was connected to). *Use the supplied yellow wire nuts and grease caps for each connection.*

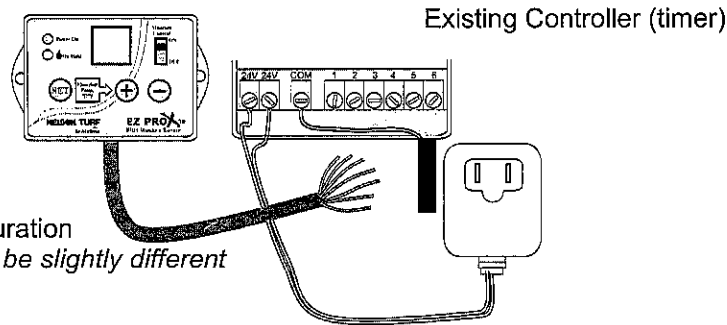


4 Installing the EZ PRO™ XTRA

4.1 Connecting the EZ PRO™ XTRA Controller

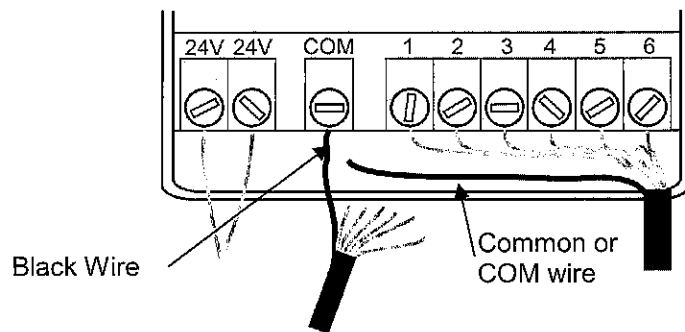
Mount the EZ PRO™ XTRA controller next to your existing sprinkler timer.

The EZ PRO™ XTRA controller must be mounted indoors. If your sprinkler timer is mounted outdoors you should obtain a weatherproof cabinet for the EZ PRO™ XTRA



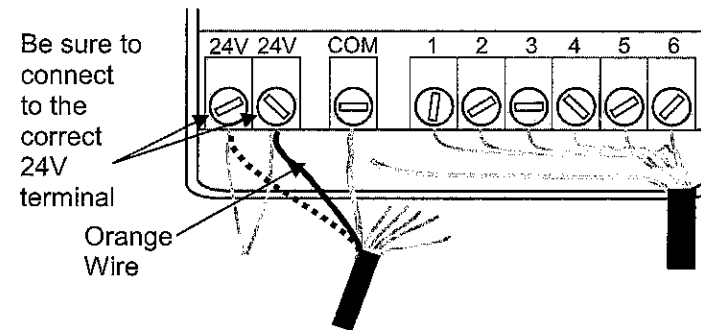
The cable from the EZ PRO™ XTRA controller has 7 color-coded wires. Five of these wires connect to your timer and the other two connect to the sprinkler wiring.

Step 1) Disconnect the wire or wires that are connected to the COM (or Common) terminal on your timer. Connect the **black** wire from the EZ PRO™ XTRA controller to the COM terminal of your sprinkler system.



Step 2) Connect the **orange** wire from the EZ PRO XTRA to one of the 24 VAC terminals on your timer.

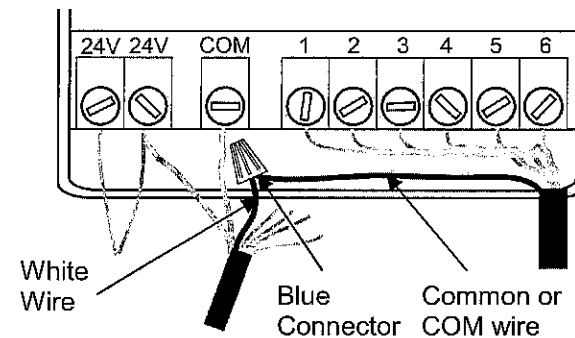
In order to determine which of the 24V terminals to connect the orange wire to touch the **orange** wire to each of them with the timer power on (AC adapter plugged in). The terminal that causes the EZ PRO™ XTRA 'Power On' light to illuminate is the correct one. Be sure to unplug the power once you determined the correct 24V terminal.



Do not disturb the power supply wires connected to these terminals. Leave them connected as they are.

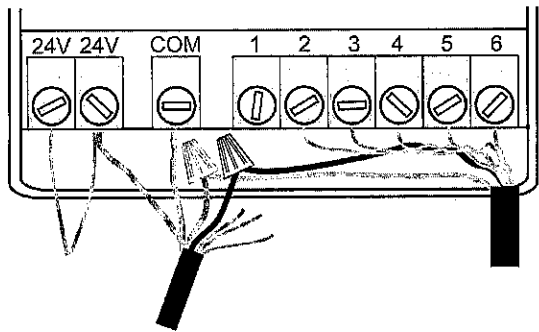
Unplug the AC power supply and secure the **orange** wire in that terminal along with the existing wire. (Some timers have a terminal marked 'TEST' or 'HOT SPOT' that can be used to connect the orange wire.)

Step 3) Connect the wire or wires you disconnected from the 'COM' terminal to the **white** wire from the EZ PRO™ XTRA cable using a supplied blue wire nut.

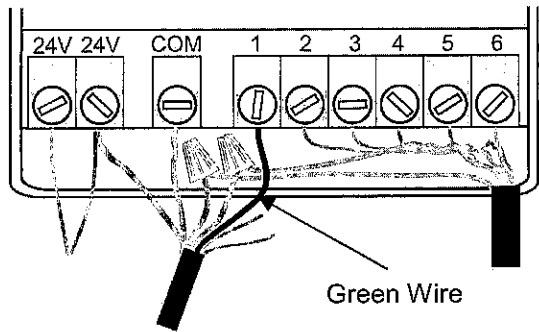


Note: Some timers do not provide internal access to the AC power terminals. In this case a 24 volt AC adapter is available at your local sprinkler supply store. You will need to connect one of the AC adapter wires to the common terminal (which will also have the black wire from the EZ PRO™ XTRA attached) and the other adapter wire connects to the orange wire coming from the EZ PRO™ XTRA.

Step 4) Disconnect the sensor zone "hot wire" identified in step 2 of Connecting the Sensor from its terminal in your sprinkler timer. Connect it to the **red** wire of the EZ PRO™ XTRA controller with a blue wire nut.



Step 5) Connect the **green** wire from the EZ PRO™ XTRA controller to your sensor zone terminal, where the “hot wire” was formerly connected.

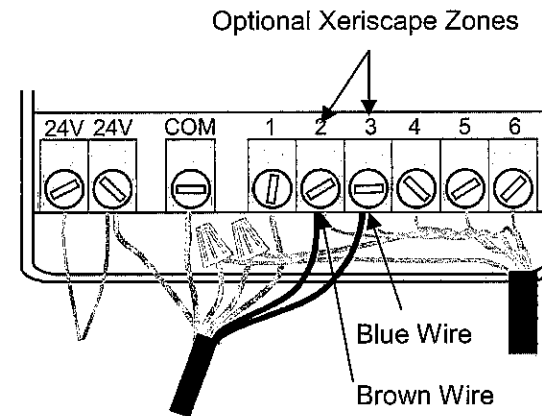


4.2 Optional wiring for Xeriscape or Flower Bed Zones

You may have zones you wish to water regardless of the moisture sensor, for example a flower bed or a desert landscaping zone. The EZ PRO™ XTRA can accommodate up to two such zones.

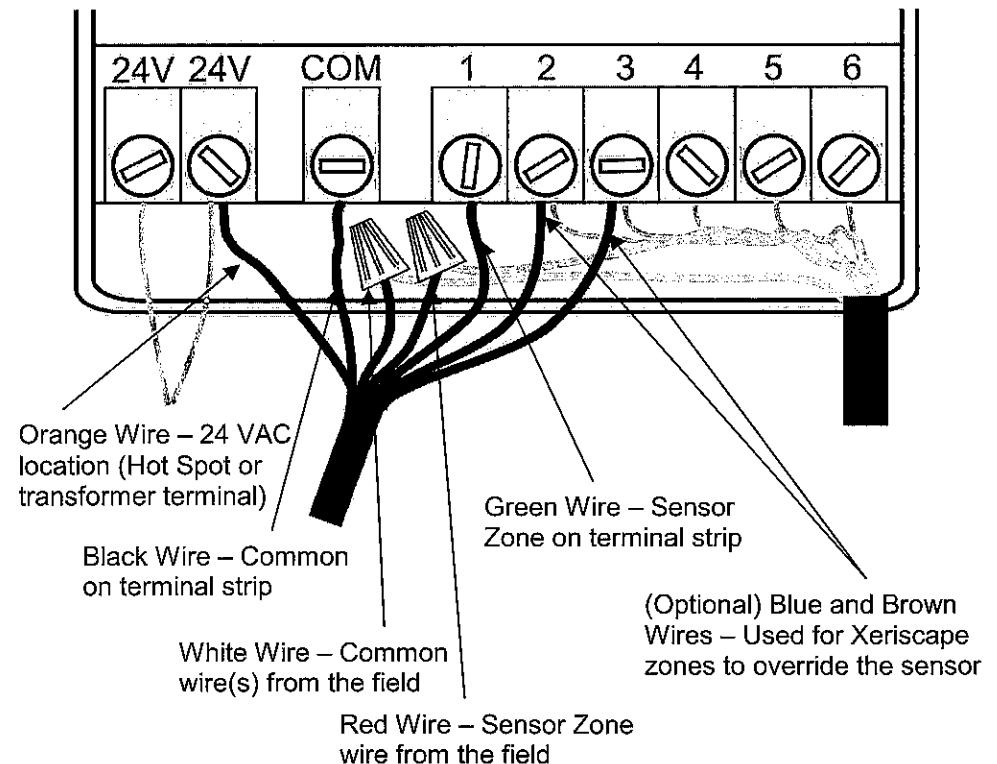
How to connect them

- Identify the zone(s) that fit into this category. Note which terminal(s) they are connected to on your sprinkler system.
- Loosen the screw that connects each such zone wire to your sprinkler timer.
- Connect the **blue** wire from the EZ PRO™ XTRA controller to the same terminal as the zone wire. There will now be two wires connected to this terminal, one going to the EZ PRO™ XTRA controller and one going to the valve.
- If you have a second zone to run independently of the moisture sensor, connect the **brown** wire from the EZ PRO™ XTRA Controller to the second terminal



Now these two zones will run independently of the output of the moisture sensor. You may notice that there is up to a 60 second delay from the start times of these zones and when the sprinklers begin delivering water. This is perfectly normal.

4.3 Wiring Diagram



Orange Wire – 24 VAC location (Hot Spot or transformer terminal)

Black Wire – Common on terminal strip

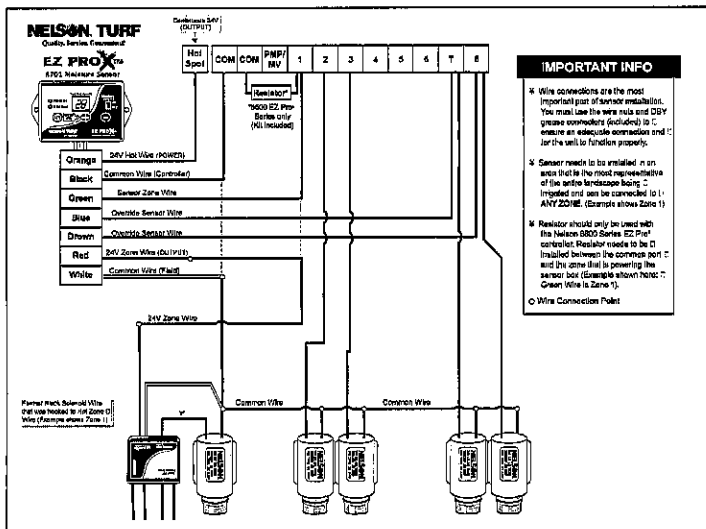
White Wire – Common wire(s) from the field

Green Wire – Sensor Zone on terminal strip

(Optional) Blue and Brown Wires – Used for Xeriscape zones to override the sensor

Red Wire – Sensor Zone wire from the field

Wiring Schematic



5 Programming the System

5.1 Setting your timer

Set your sprinkler timer to water only on times and days for which your location is authorized to water according to local ordinances. If there are no restrictions in your area, bear in mind that it is usually more efficient to water at night. Once the 'days of the week' and 'times of the day' for watering are set up in the sprinkler timer, the next step is to set the optimal amount of time for each zone (station) to irrigate. The timer should be programmed to apply 1/2 inch of water during each cycle. The time required to apply 1/2 inch of water will vary; a water audit is recommended. *You should set your timer to water as frequently (everyday) as possible. Once the EZ PRO™ XTRA system is installed correctly if the soil has sufficient moisture the system will not water.*

The timer can be set to use multiple programs if your timer has that functionality built into it. Each program should fall within the time parameters of local ordinances.

Set up your programs and watering times so that all of your zones water as a block with no long inactivity periods during the watering cycle. The EZ PRO™ XTRA senses the watering activity and assumes that a **30 minute gap** or longer signals the end of your full watering cycle. It assumes that any subsequent activity after a 30 minute gap is a full new watering cycle for your whole yard. Therefore, if the program gap exceeds 30 minutes and if the moisture level is above your selected threshold, the EZ PRO™ XTRA will not allow the continued program after the gap exceeding 30 minutes.

If the lawn in your sensor zone shows some stress after the system has been installed for a week or so you can correct it by increasing the moisture threshold on the EZ PRO™ XTRA controller. If it appears to be getting plenty of water you can reduce the watering by lowering the EZ PRO™ XTRA threshold. The other zones can be adjusted by increasing or decreasing their watering times in your timer program.

5.2 Setting the EZ PRO™ XTRA Controller

When the **SET** button is pressed the display shows the current moisture threshold setting. When the **SET** button is released, a moisture reading is taken. When the soil moisture level drops below the threshold the EZ PRO™ XTRA will allow watering during the next set cycle programmed into your timer. To increase the threshold, hold the **SET** button in and press the **+** button (increase). To decrease the threshold hold the **SET** button in and press the **-** button (decrease).

Because the EZ PRO™ XTRA is a suspended cycle product, the greatest water efficiency will be achieved when the timer is set to water daily.

5.3 Determining your soil moisture setting (threshold)

Because each lawn is different it is important to match your soil type with your moisture setting. There are several ways to determine your ideal moisture setting (threshold).

Watering Method

Put the EZ PRO™ XTRA in disable (OFF) mode until about 6 to 12 hours after your lawn has received one complete watering cycle. At that time check the moisture reading of the sensor by looking at the EZ PRO™ XTRA display. Next, set the moisture threshold to 3 percentage points below the currently displayed reading.

Watch the condition of the sensor zone for a couple of weeks and make weekly adjustments of not more than 2 percentage points at a time until the lawn in your sensor zone appears as you want it. Take care of the other zones by adjusting the watering time in your timer.

The Field Capacity Method

Near sundown soak the soil above the sensor with a bucket of water. It is important that the area is very wet so that the water is standing on the surface. This can be accomplished with a 5 gallon bucket of water or a garden hose. Turn off hose and let the soil soak overnight.

The next morning before the sun reaches the sensor location take a moisture reading by pressing the **SET** button. This reading is your soil's field capacity. The threshold setting should be about 3/4 of field capacity.

Use the table below to determine your moisture setting (threshold).

Field Capacity	10%	15%	20%	25%	30%	35%	40%	45%
Moisture Setting (Threshold)	8%	11%	15%	19%	23%	26%	30%	34%

6 Troubleshooting and Warranty

6.1 Trouble Shooting

Reminders and Suggestions:

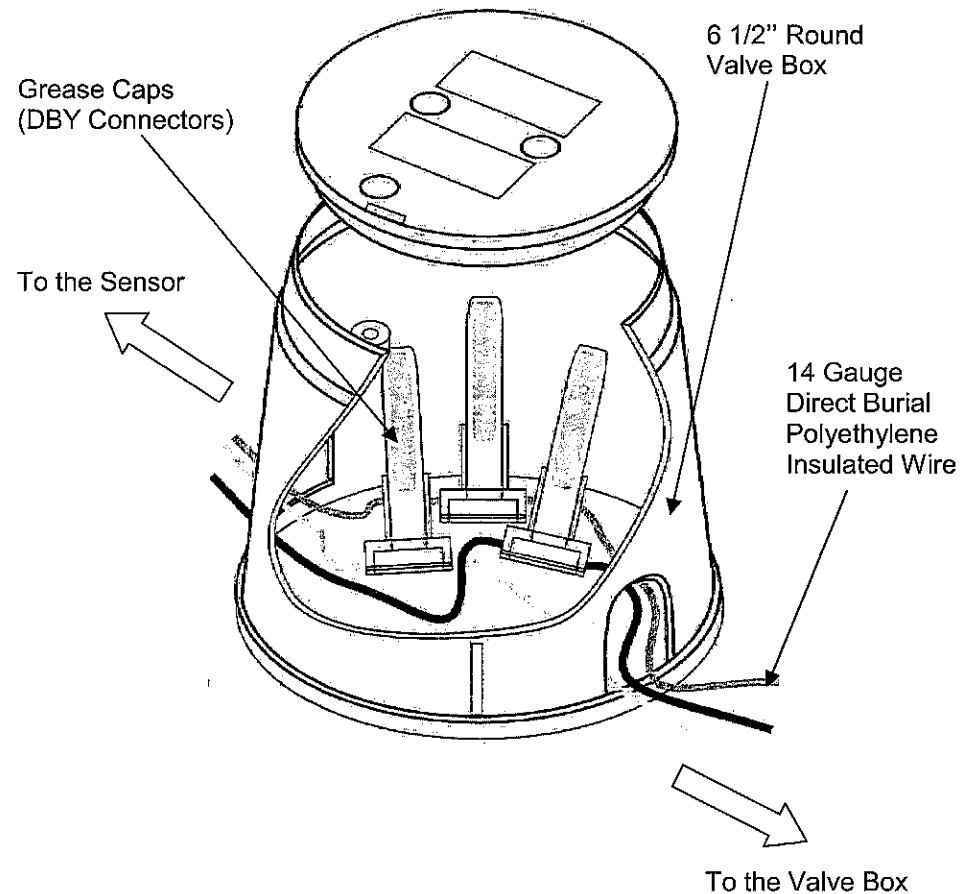
- Be sure the sensor is connected to the valve that controls water for the sensor zone.
- Make sure the green wire on the EZ PRO™ XTRA controller is connected to the sensor zone terminal on the controller (timer).
- Be sure your system is set to water 1/2 inch of water during each cycle.

Trouble Shooting

SYMPTOM	POSSIBLE CAUSE	CORRECTION
The display is blank	The power is not connected	Re-establish power to the EZ PRO™ XTRA by connecting the orange wire to the correct 24 V terminal on your controller. Check fuse on timer.
	The controller is not plugged it	Plug in the power cord on your controller.
The display shows "00"	The sensor is disconnected	Review the SENSOR INSTALLATION section. Check all connections to the sensor and from the EZ PRO™ XTRA to your controller
The system is not watering	Your controller is not set	Be sure your controller is set
	The soil is not be below the threshold	Take a soil moisture reading. If above the threshold the system should not be watering due to sufficient soil moisture. If above the threshold check the "On Hold" indicator.
There is no change in the system's watering	The COMM wire is disconnected	Check the COMM wire connection
	The EZ PRO XTRA is not connected to the right zone	Check that the Green Wire is connected to the sensor zone terminal of your controller.

6.2 Adding additional sensor wire

Additional wire may be added to the sensor increasing the 25 feet of supplied wire up to 4000 feet. For a weather proof connection a 6 1/2 inch round valve box and Grease Caps (DBY Connectors) are recommended. Use 14 gauge direct burial polyethylene insulated wire. These materials are not included but can be purchased locally.



6.3 Warranty and Service

LIMITED PRODUCT WARRANTY

Congratulations on your recent purchase of the Nelson EZ PRO™ XTRA, the finest soil moisture sensor irrigation controller on the market. Thank you for joining those interested in conserving water – earth's most important resource.

Your controller is warranted for two years from date of purchase to be free of defective materials and workmanship provided it is used within the working specifications for which the product was designed and under normal use and service. Unless installed by an authorized Nelson trained technician, Nelson assumes no responsibility for installation. Nelson also assumes no responsibility for removal or unauthorized repair. Nelson's liability under this warranty is limited solely to replacement or repair of defective parts, and Nelson will not be liable for any crop or other consequential damages resulting from any defects in design or breach of warranty. **THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSES** and of all other obligations or liabilities of manufacturer. No agent, employee or representative of the manufacturer has authority to waive, alter or add to the provisions of warranty, nor to make representations or warranty not contained herein.

Should you have any claim under this warranty, please contact Nelson's warranty desk by calling 1-888-NELSON-8 (888-635-7668) for prompt assistance.

L.R. Nelson Corporation
One Sprinkler Lane
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