TORO Count on it.

Lynx® SmartHub with LSM
Installation and User Guide

Table of Contents

Toro's Commitment to Excellence

Toro is committed to developing and producing the highest quality, best performing, most dependable products on the market. Because your satisfaction is our first priority, we have provided the Toro Helpline to assist you with any questions or problems that may arise. If for some reason you are not satisfied with your purchase or have questions, please contact us toll free at **1-877-345-8676**.

Introduction

Congratulations on purchasing Toro's Lynx SmartHub. The SmartHub combines modular flexibility, ease of use and increased programmability in a single controller.

The Lynx SmartHub user interface is easy to use and includes a backlight for improved visibility in low-light conditions, yet it is completely viewable in direct sunlight. The faceplate's combination of menu buttons, navigation arrows and input dial allows for easy and quick menu navigation.

The Lynx SmartHub comes in eight versions:

- DEC-RS-1000-DR (digital radio and modem)
- DEC-RS-1000-M (modem only)
- DEC-RSP-1000-DR
- DEC-RSP-1000-M
- DAC-RS-1000-DR
- DAC-RS-1000-M
- DAC-RSP-1000-DR
- DAC-RSP-1000-M

The Lynx SmartHub satellite controller pedestal is designed for installation on a substantial concrete foundation with imbedded conduit of various diameters to enable power, field, ground and communication wiring to be routed into the pedestal for connection. A mounting bolt positioner and basic mounting hardware components are included with each controller. Additional materials required to complete the installation must be obtained separately. A material list can be compiled by reading through the instructions completely prior to starting the installation.

 **CAUTION**: For your protection and the safety of the product user, comply with all Caution and Warning statements within this document. All installation practices must comply with all applicable national and/or local electrical and construction codes.

Cabinet Installation

Wallmount

Selecting the proper installation site for the Lynx SmartHub is essential to safe and reliable operation. The SmartHub features a weather resistant cabinet designed for indoor or outdoor installation.

Install the Lynx SmartHub:

- on a vertical wall or other sturdy structure
- so that the display is at or below eye level
- near a grounded power source
- so that it is in shade during the hottest hours of the day
- with as much protection from direct sunlight, rain, wind and snow as possible

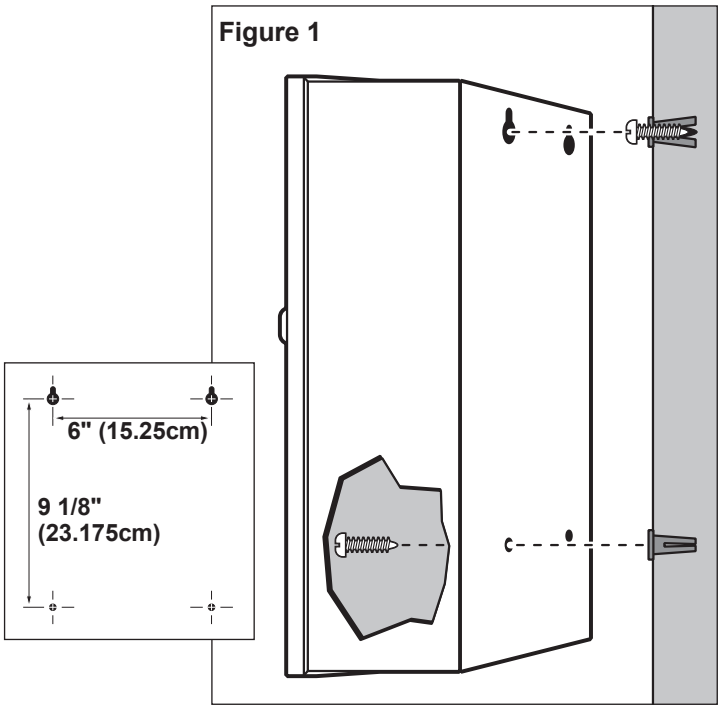
IMPORTANT! Do not mount the controller where it is exposed to direct spray from the irrigation system.

Steps:

1. Drill two pilot holes 6” (15.25cm) apart for the top keyholes of the controller cabinet.
2. Install the top screws leaving approximately 1/4” (5–6mm) of exposed screw to accommodate the cabinet.

   If mounting the cabinet on dry wall or masonry, install the appropriate type of screw anchors or fasteners to ensure secure installation.
3. Hang the cabinet using the top keyhole slots. See **Figure 1**.
4. Open the cabinet door and install the two bottom screws to secure the cabinet.

Figure 1



Earth Ground

IMPORTANT! The SmartHub's surge protection components cannot properly function unless an efficient pathway to earth ground is provided. The ground path must be as direct as possible, without sharp bends and must not exceed 10 Ohm resistance (when measured with an earth ground resistance device). All electrical components throughout the irrigation system should be grounded similarly to provide the same ground potential.

The following instructions depict one of several acceptable earth grounding methods. Due to variables in soil composition and terrain, the method shown may not be suitable for your installation site. Contact your local Toro distributor for assistance and availability of the required earth ground resistance test instrument.

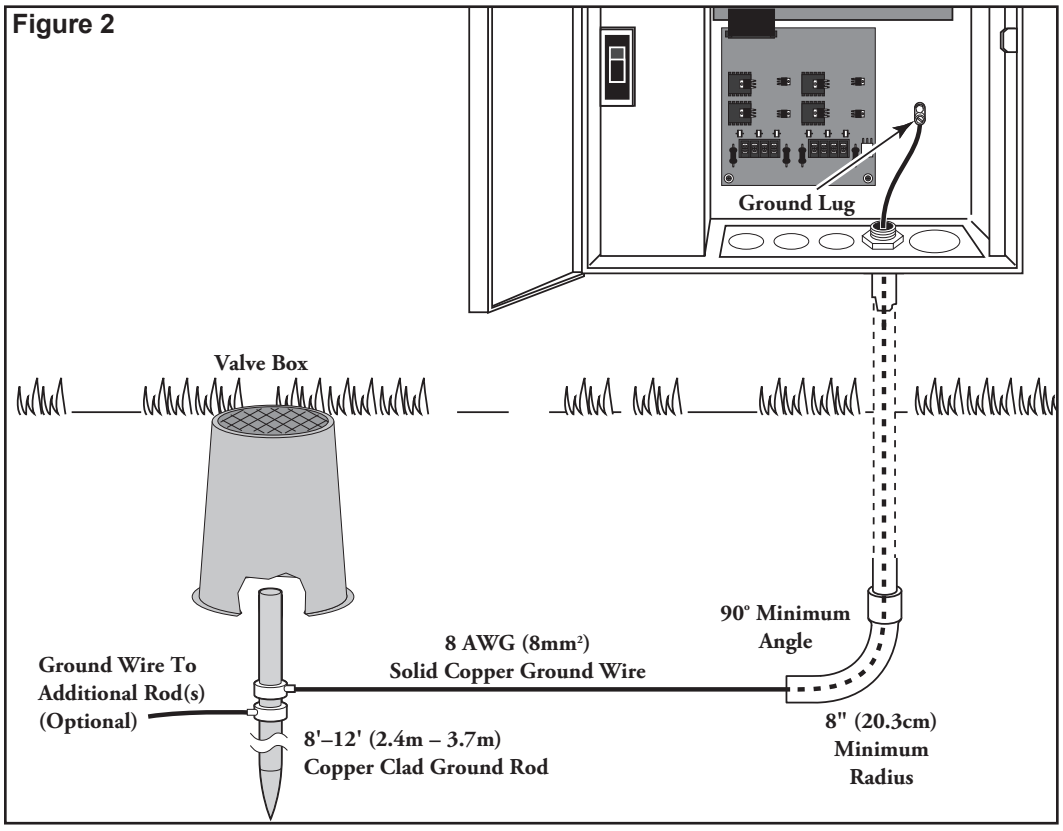
Steps:

1. Drive a 5/8" x 8' (17mm x 2.5m) copper-clad steel rod into well moistened soil not less than 8' (2.5m) or not more than 12' (3.7m) from the controller cabinet. The top of the ground rod should be flush with or below ground level, and should be protected from damage using a valve box. See Figure 2.
2. Using a 5/8" (17mm) clamp or "Cad weld" fastener, attach an 8 AWG (8mm^2) solid copper wire near the top of the ground rod. Avoiding wire bends of less than 8" (20.3cm) radius and more than 90º, route the wire through conduit and into the cabinet. Secure the wire to the copper ground lug.

   Make sure the soil surrounding the ground rod(s) remains well moistened at all times. The addition of some form of irrigation may be required if the cabinet is installed in a non-irrigated location.
3. Measure the ground resistance per the instructions provided with the ground test instrument. A reading of 0.0 Ohm is optimum, up to 10 Ohm is acceptable in most cases. If the resistance exceeds the acceptable limit, additional ground rod(s) can be installed at a distance equal to twice the buried depth of the first rod; i.e., 16' (4.9m). Interconnect the ground rods using 8 AWG (8mm^2) solid copper wire and test again. If the measured ground resistance continues to read above the acceptable limit, contact your local Toro distributor for further assistance and recommendations.

   Installing a round valve box over the ground rod enables the ground rod to be easily located as well as providing access to the ground wire connection(s).

Figure 2



Power Source

WARNING! AC POWER WIRING MUST BE INSTALLED AND CONNECTED BY QUALIFIED PERSONNEL ONLY.

ALL ELECTRICAL COMPONENTS AND INSTALLATION PROCEDURES MUST COMPLY WITH ALL APPLICABLE LOCAL AND NATIONAL ELECTRICAL CODES. SOME CODES MAY REQUIRE A MEANS OF DISCONNECTION FROM THE AC POWER SOURCE, INSTALLED IN THE FIXED WIRING, HAVING A CONTACT SEPARATION OF AT LEAST 3mm IN THE LINE AND NEUTRAL POLES.

ENSURE THE AC POWER SOURCE IS OFF PRIOR TO SERVICING. FAILURE TO COMPLY MAY RESULT IN SERIOUS INJURY DUE TO ELECTRICAL SHOCK HAZARD.

Steps:

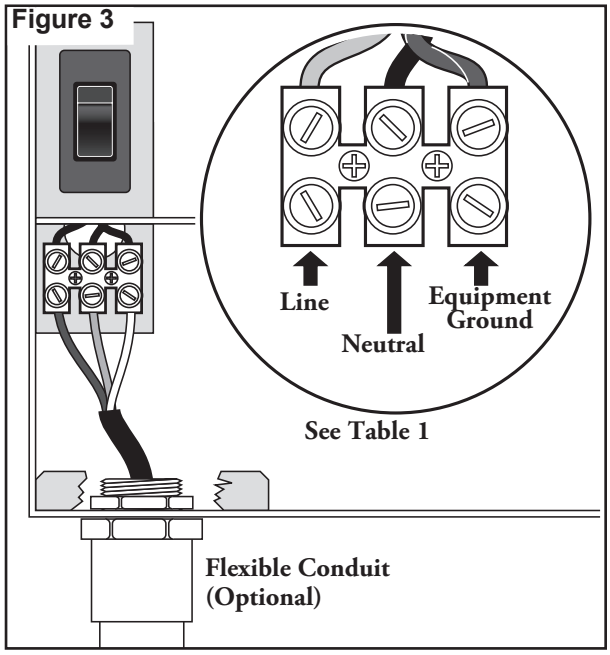
1. Turn off the power at the power source location and place the controller's power switch to OFF. Connect and route the appropriate size 3-conductor cable (14 AWG [2.5mm^2] maximum) from the power source to the controller cabinet.

   The provided power cable access hole can accommodate a 1" (25mm) conduit fitting. If conduit is required, install a section of flexible 1" (25mm) electrical conduit from the power source conduit box to the cabinet's access hole.
2. Open the cabinet door and remove the two retaining screws from the power supply cover.
3. Strip the power cables and secure them to the terminal block (**Figure 3**). Reference **Table 1** for the appropriate type of power connection.
4. Reinstall the power supply cover.
5. Apply power to the controller.

Table 1

AC Service Type	Line	Neutral	Equipment Ground
100 – 120 VAC (Domestic)	Hot (Black)	Neutral (White)	Green
220 – 240 VAC (International)	Hot (Brown)	Neutral (Blue)	Green / Yellow

Figure 3



Pedestal Installation

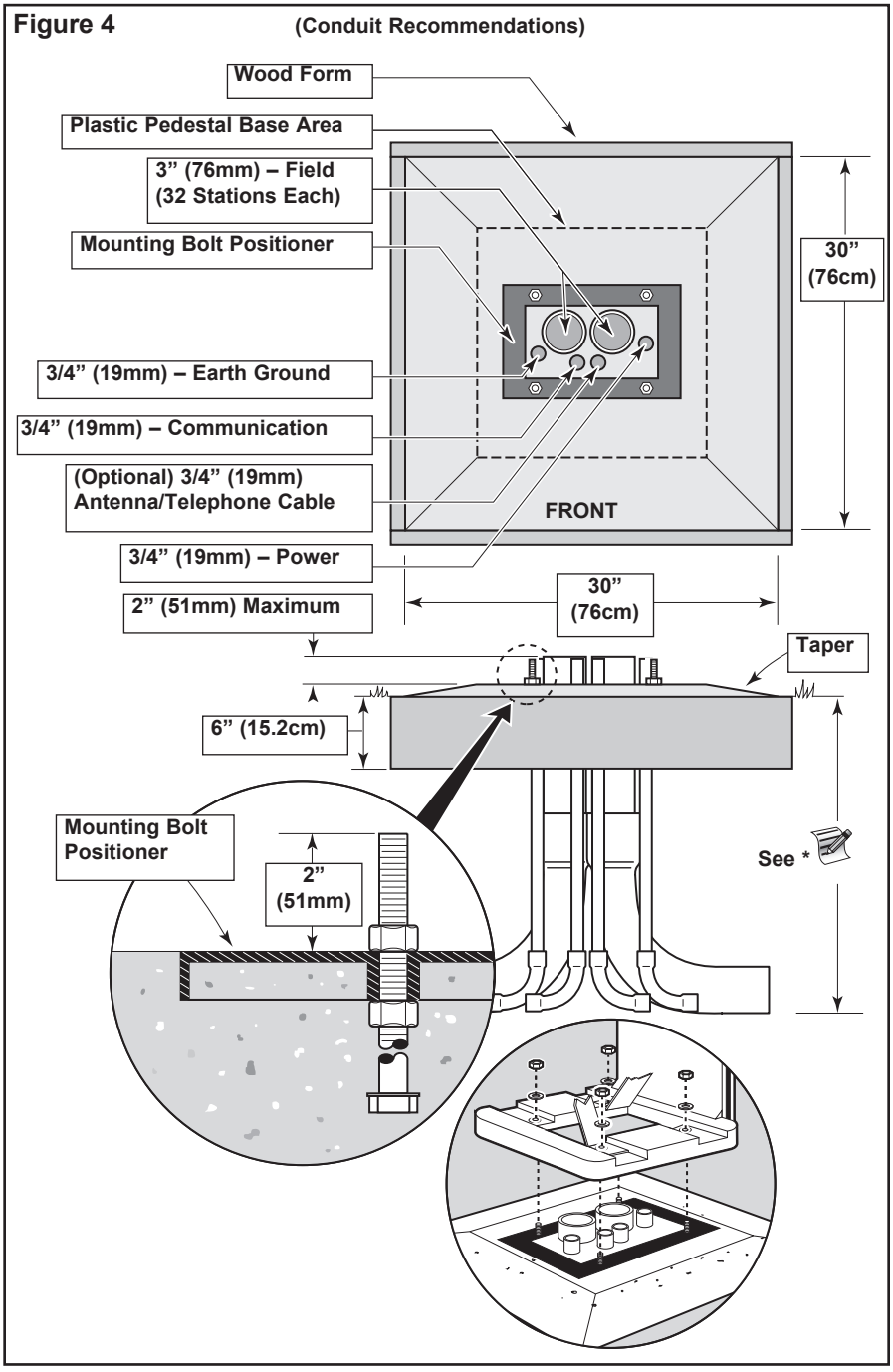
Foundation Construction

1. Prepare a hole for the foundation and wiring conduit using the minimum recommended dimensions shown in **Figure 4**.

*Refer to local electrical codes for required depth of buried wiring .

2. Trench to the foundation site as required for each wiring run.
3. Position straight and sweep elbow conduit sections in foundation hole as shown. Tape the conduit ends to seal out dirt. Backfill soil to form a 6" (15.2cm) foundation depth. Conduit should not extend more than 2" above the finished top surface of the foundation.
4. Prepare the sides of the foundation hole with wood forms.
5. Prepare the mounting bolt positioner with the 5/16 x 4-1/2" bolts and nuts (provided) as shown in Figure 3. The threads should extend 2" (51mm) from the top surface of the bolt positioner.
6. Pour concrete into the formed foundation hole. Press the mounting bolt positioner into the concrete until it is flush and level with the foundation surface and aligned with the conduit.
7. Finish the concrete with a level flat area for the pedestal base (13" x 13" [33cm x 33cm] for the metal pedestal or 16" x 16" [41cm x 41cm] for the plastic pedestal). To prevent pooling at the base of the pedestal, add a slight taper away from the pedestal base contact area. Allow concrete to sufficiently harden before continuing.
8. Remove the hex nuts from the mounting studs. Carefully position the controller onto the studs. Install a flat washer and a hex nut on each stud and tighten securely.

Figure 4 (Conduit Recommendations)



Earth Ground

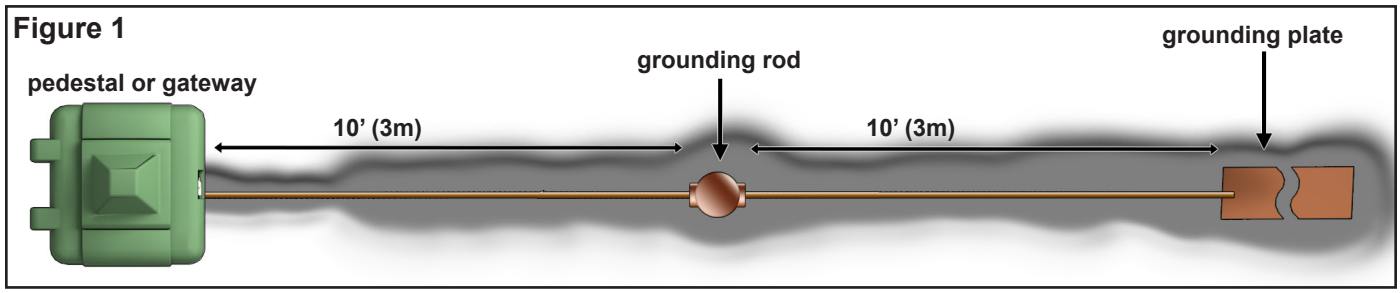
IMPORTANT! The Lynx SmartHub surge protection components cannot properly function unless an efficient pathway to earth ground is provided. The ground path must be as direct as possible, without sharp bends and must not exceed 10 Ohm resistance (when measured with an earth ground resistance device). All electrical components throughout the irrigation system should be grounded similarly to provide the same ground potential.

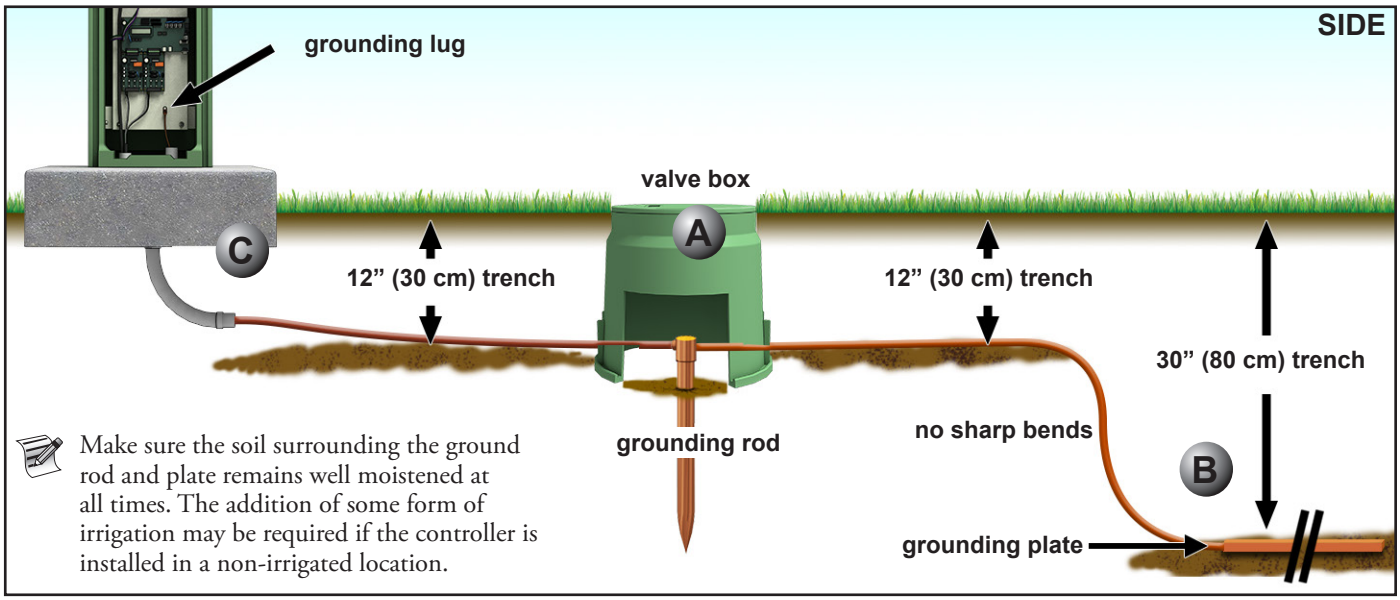
The following instructions depict one of several acceptable earth grounding methods. Due to variables in soil composition and terrain, the method shown may not be suitable for your installation site. Contact your local Toro distributor for assistance and availability of the required earth ground resistance test instrument. Recommended ground testers are: AEMC Instruments, model 3710 clamp-on tester, or Biddle Megger, model 250260 (or equivalent).

Procedure

1. Drive a 5/8" by 8' (17mm x 2.5m) copper clad steel rod (Paige part # 182000) into well moistened soil not less than 8' (2.5m) or not more than 12' (3.7m) from the controller cabinet (**Figure 1**). For 2-Wire systems, install the ground rod adjacent to the communication cable (**Figure 2**). The top of the ground rod should be flush with or below ground level, and should be protected from damage using a valve box (A).
2. Install a 4" by 96" (10cm x 2.5m) copper ground plate (Paige part # 182199IC). The plate should be at least .06" thick (1.5mm) and should have a 6 AWG x 12' (10mm² x 4m) solid copper, insulated wire welded to the plate. The plate should go into a trench that is at least 30" (80cm) deep (B). Use ground enhancement material (GEM) per the manufacturer's directions.
3. Using a 5/8" (17mm) clamp or exothermic-weld fastener (Paige part # 1820039P), attach an 8 AWG (10mm²) solid copper wire (Paige part # 160629) near the top of the ground rod.
4. Route the wire through conduit and into the controller cabinet, avoiding wire bends of less than 8" (20cm) radius and more than 90° (C). Secure the wire to the copper ground lug in the controller.
5. Measure the ground resistance per the instructions provided with the ground test instrument. A reading of 10 ohms or less is recommended.

Figure 1





Make sure the soil surrounding the ground rod and plate remains well moistened at all times. The addition of some form of irrigation may be required if the controller is installed in a non-irrigated location.

Power Source

WARNING!
AC POWER WIRING MUST BE INSTALLED AND CONNECTED BY QUALIFIED PERSONNEL ONLY.

ALL ELECTRICAL COMPONENTS AND INSTALLATION PROCEDURES MUST COMPLY WITH ALL APPLICABLE LOCAL AND NATIONAL ELECTRICAL CODES. SOME CODES MAY REQUIRE A MEANS OF DISCONNECTION FROM THE AC POWER SOURCE, INSTALLED IN THE FIXED WIRING, HAVING A CONTACT SEPARATION OF AT LEAST 3mm IN THE LINE AND NEUTRAL POLES.

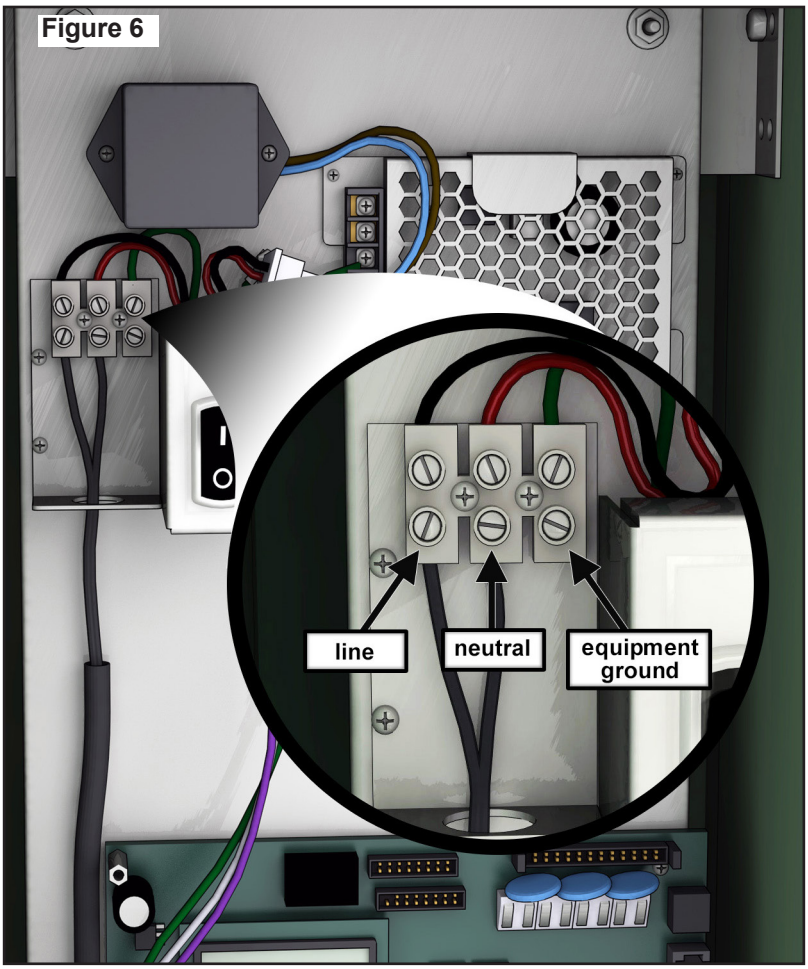
ENSURE THE AC POWER SOURCE IS OFF PRIOR TO SERVICING. FAILURE TO COMPLY MAY RESULT IN SERIOUS INJURY DUE TO ELECTRICAL SHOCK HAZARD.

1. Turn off the power at the power source location and place the controller's power switch to OFF. Connect and route the appropriate size 3-conductor cable (14 AWG [2.5mm2] maximum) from the power source to the controller pedestal.
   The provided power cable access hole can accommodate a 1" (25mm) conduit fitting. If conduit is required, install a section of flexible 1" (25mm) electrical conduit from the power source conduit box to the pedestal's access hole.
2. Strip the power cables and secure them to the terminal block. Reference **Table 1** and **Figure 6** for the appropriate type of power connection.
3. Reinstall the power supply cover.
4. Apply power to the controller.

Table 1

AC Service Type	Line	Neutral	Equipment Ground
100 – 120 VAC (Domestic)	Hot (Black)	Neutral (White)	Green
220 – 240 VAC (International)	Hot (Brown)	Neutral (Blue)	Green / Yellow

Figure 6



Lynx Smart Module

New System or New Communication Cable

Lynx Smart Modules are available in 1-station configurations.

The SmartHub pedestal and cabinet can handle up to 1000 modules or 1000 stations each. Each SmartHub has a daughterboard with two output circuits. Each cable path can handle up to 250 modules and 250 stations. The modules can be connected in parallel anywhere on the two-wire communication line connected to the station terminals. Each station can activate up to two solenoids.

It is recommended that the modules are installed in an approved valve box to provide easy access to the wiring. Use 3M DBR/Y to waterproof all connectors.

Recommended Controller-to-Module cable: 14 AWG (2.1 mm2), solid copper, jacketed 2-conductor, direct burial. The preferred wire make and model is the Paige Irrigation Wire, Spec P7350D, P7389D, P7072D, or equivalent.

Recommended Module-to-Solenoid cable: 14 AWG (2.1 mm2), solid copper, 2-conductor, direct burial. The preferred wire make and model is the Paige Irrigation Wire, Spec P7351D.

Burial Depth

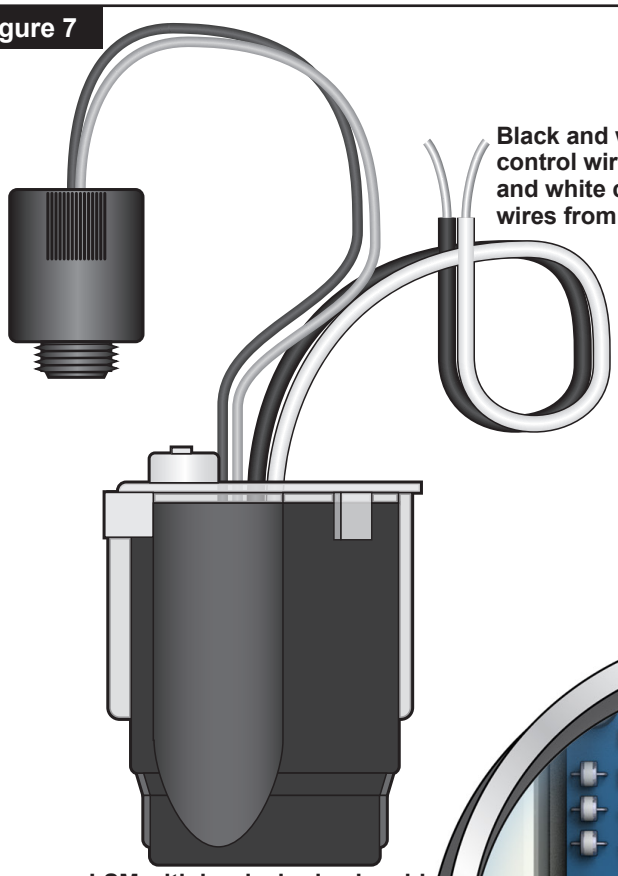
Toro recommends that the Controller-to-Module and Module-to-Solenoid cables should have a minimum cover of 6" (150mm). The irrigation plan may specify additional depth to be consistent with the depth of mainline or lateral pipe work and/or soil conditioning procedures such as aeration. Installation procedures must comply with all applicable local and national electrical codes.

- Use only wire approved for direct burial if installing the wires underground without conduit.
- All field wiring splices must be accessible to facilitate troubleshooting and/or service.

Steps:

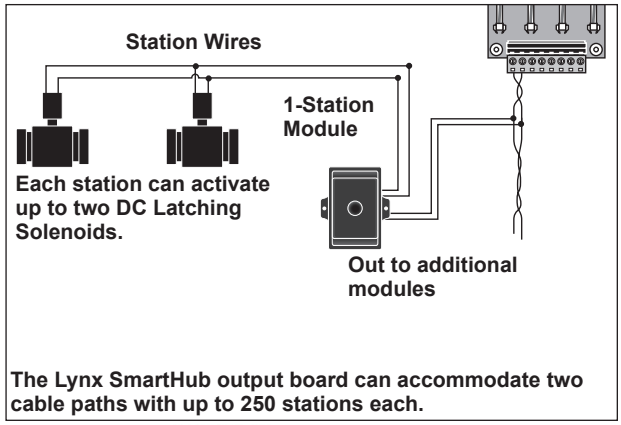
1. Route communication cable from the controller to the station module installation location.
   The maximum wire length between the controller and the module is 15,000' (4500 m).
2. Secure the communication wires to terminal 1 of the SmartHub output board. White wire onto the 1st terminal and black wire onto the second terminal. See **Figure 7**.
3. Install the module in a valve box. Record the module's address number found on the side label. This address number identifies the station(s) that the module control.
4. Secure the communication wires to the module's black and white wires.
   Connect the black communication wire to the black module wire.
   Connect the remaining communication wire (red or white) to the white module wire.
   Use 3M DBR/Y to properly water-proof all wire connections.
5. Route output wires from the module to the solenoid.
   The maximum wire length between the module and the solenoid is 410' (125m) for 14 AWG (2.5mm²) wire.
6. Connect the solenoid wires to the module's station wires. The station wires are color coded for easy identification.
   Connect the solid red colored station wire to the red/white solenoid wire.
   Connect the similar color station wire with black stripe to the black solenoid wire.
   Use 3M DBR/Y to properly water-proof all wire connections.
7. Connect an additional solenoid to the station wire as necessary.
   Each station has a maximum load of two solenoids.
8. Repeat Steps 3–8 for additional modules.

Figure 7

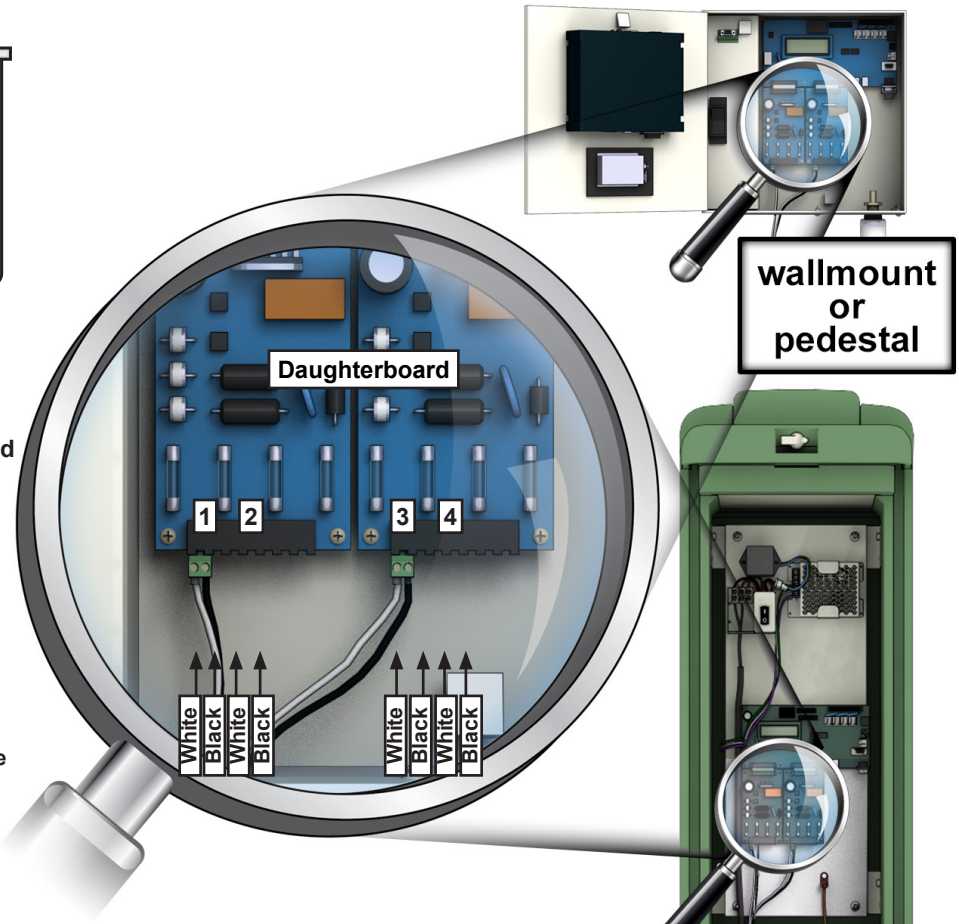


Black and white control wires to black and white control wires from controller.

LSM with hard-wired solenoid



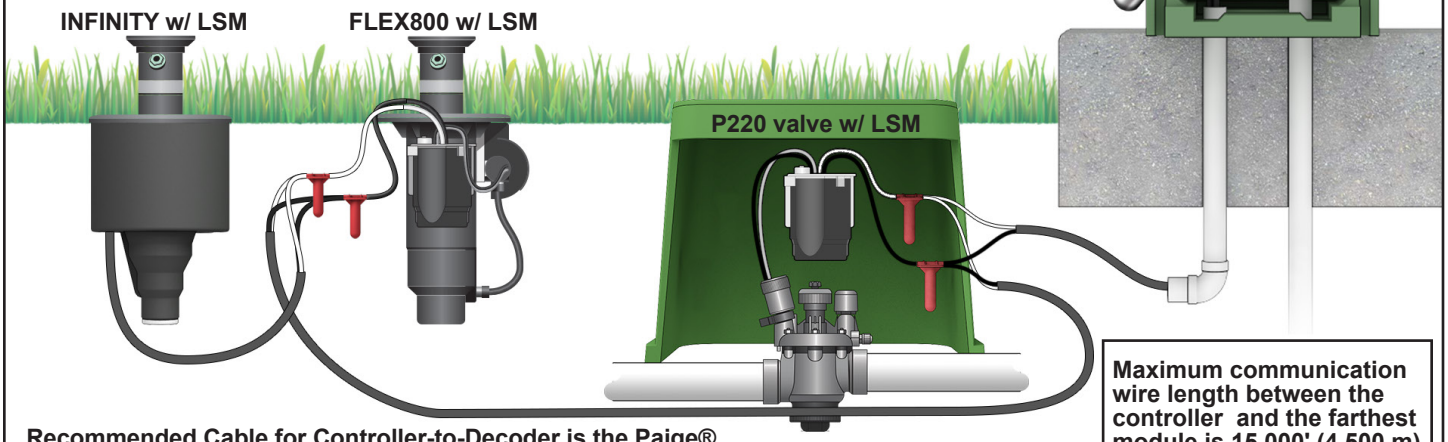
The Lynx SmartHub output board can accommodate two cable paths with up to 250 stations each.



The maximum communication wire length between the module and the solenoid is 410' (125m).

Recommended Cable for Module-to-Solenoid: Paige® P7351D, 14 AWG, Solid Copper, 2-Conductor, Direct Burial cable.

To easily identify stations for troubleshooting, install wires with the same color code as the station wires.



Recommended Cable for Controller-to-Decoder is the Paige® P7350D, P7389D, P7072D, 14 AWG, Solid Copper, Jacketed 2-Conductor, Direct Burial cable, or equivalent.

Maximum communication wire length between the controller and the farthest module is 15,000' (4,500 m).

GAC Decoder Installation

New System or New Communication Cable

AC station decoder modules are available in 1-station, 2-station, 4-station configuration or a Toro golf sprinkler with an integrated 1-station decoder.

The SmartHub pedestal and cabinet can handle up to 250 decoders or 500 stations each. Each SmartHub has a daughterboard with two output circuits. Each output circuit can handle up to 125 decoder modules and 500 stations. The decoder modules can be connected in parallel anywhere on the two-wire communication line connected to the station terminals. Each station can activate up to two solenoids.

It is recommended that the decoder modules are installed in an approved valve box to provide easy access to the wiring. Use 3M DBR/Y to waterproof all connectors.

Recommended Controller-to-Decoder cable: 14 AWG (2.5mm^2), solid copper, jacketed 2-conductor, direct burial. The preferred wire make and model is the Paige Irrigation Wire, Spec P7350D.

Burial Depth

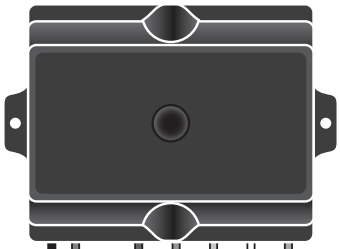
Toro recommends that the Controller-to-Decoder and Decoder-to-Solenoid cables should have a minimum cover of 6" (150mm). The irrigation plan may specify additional depth to be consistent with the depth of mainline or lateral pipe work and/or soil conditioning procedures such as aeration. Installation procedures must comply with all applicable local and national electrical codes.

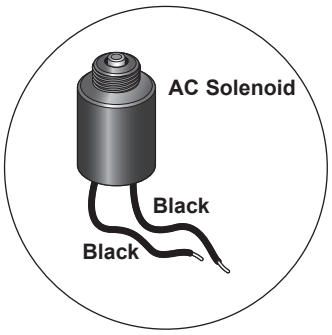
- Use only wire approved for direct burial if installing the wires underground without conduit.
- All field wiring splices must be accessible to facilitate troubleshooting and/or service.

Steps:

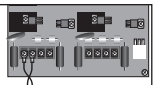
1. Route communication cable from the controller to the station decoder module installation location.
   The maximum wire length between the controller and the decoder module is 6,800' (2072 m).
2. Secure the communication wires to terminal 1 of the SmartHub output board. Black wire onto the 1st terminal and Red wire onto the second terminal. See **Figure 8**.
3. Install the decoder module in a valve box. Record the decoder module's address number found on the side label. This address number identifies the station(s) that the decoder module controls.
4. Secure the communication wires to the decoder module's black and red wires. Connect the black communication wire to the black decoder module wire. Connect the remaining communication wire (red) to the red decoder module wire. Use 3M DBR/Y or similar products to properly water-proof all wire connections.
5. Route output wires from the decoder module to the solenoid.
   The maximum wire length between the decoder module and the solenoid are 400' (122m) for 18 AWG wire and 575' (175m) for 16 AWG wire.
6. Connect the solenoid wires to the decoder module's station wires. The station wires are color coded for easy identification (Station 1 = Violet, Station 2 = Yellow, Station 3 = White, Station 4 = Orange and Common Wire = Brown). Connect the solid colored (violet, yellow, white or orange) station wire to one of the solenoid wire. Connect the similar color station wire with black stripe to the remaining solenoid wire. Use 3M DBR/Y or similar products to properly water-proof all wire connections.
7. Connect an additional solenoid to the station wire as necessary.
   Each station has a maximum load of up to two solenoids.
8. Repeat Steps 3–8 for additional decoder modules.

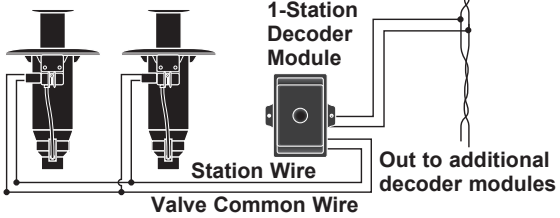
Figure 8





Each station can activate up to 2 solenoids.
(See valve compatibility for details.)





Each output circuit can accommodate up to
125 Decoder Modules.

Station 4
Orange Wire: Connect to one of Station 4's solenoid wires.

Station 3
White Wire: Connect to one of Station 3's solenoid wires.

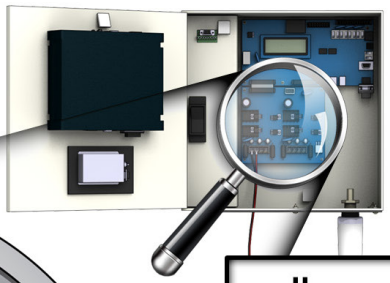
Station 2
Yellow Wire: Connect to one of Station 2's solenoid wires.

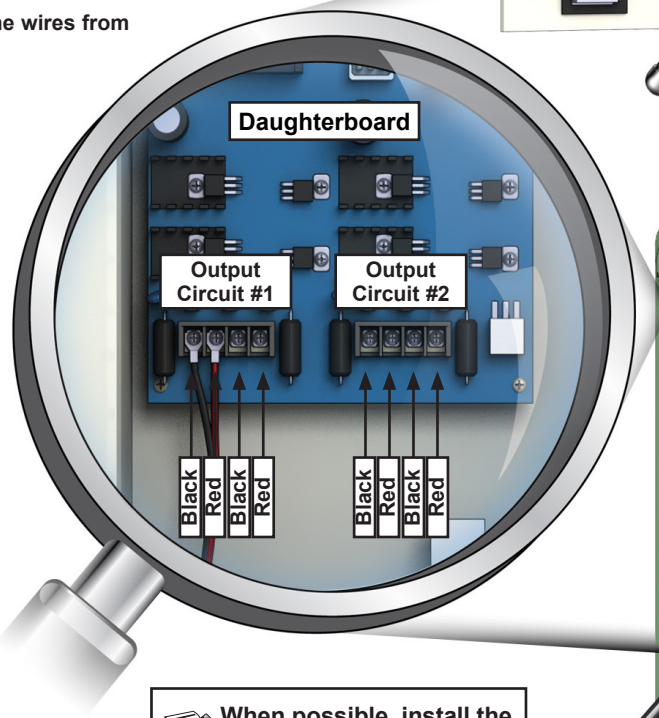
Station 1
Violet Wire: Connect to one of Station 1's solenoid wires.

Valve Common
Brown Wire: Connect to one of the wires from each of the four solenoids.

Red Power/Communication Wire

Black Power/Communication Wire





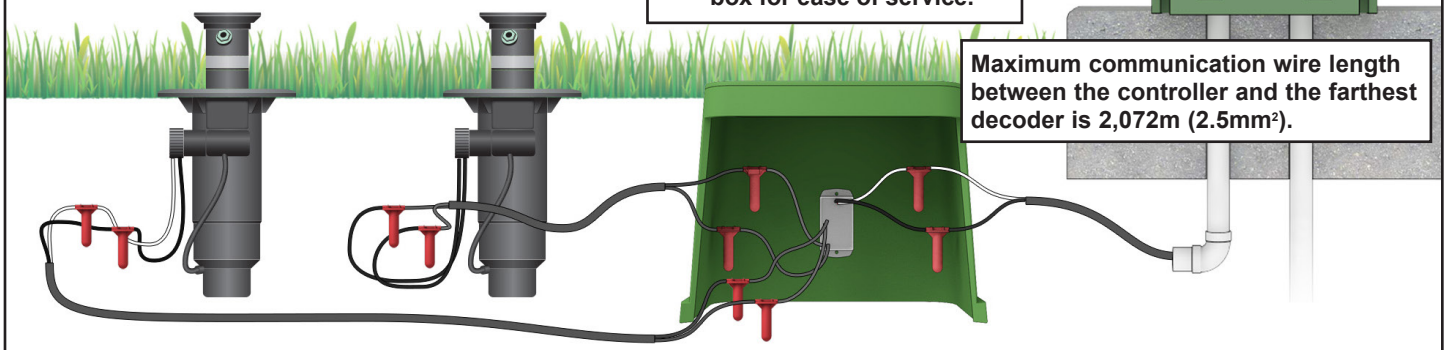
wallmount or pedestal

The maximum communication wire length between the decoder module and the solenoid is 575' (175m).

Recommended Cable for Decoder-to-Solenoid is a Solid Copper, 2-Conductor, Direct Burial cable.

To easily identify stations for troubleshooting, install wires with the same color code as the station wires.

When possible, install the decoder module in a valve box for ease of service.



Maximum communication wire length between the controller and the farthest decoder is 2,072m (2.5mm²).

Recommended Cable for Controller-to-Decoder is the Paige® P7350D, 14 AWG, Solid Copper, Jacketed 2-Conductor, Direct Burial cable.

Upgrade of Existing System, Using Existing Wiring

Communication Cable Type
Should be 2 or 3 copper conductors, solid or stranded, with PE pr PVC insulation, rated for at least 600V. For 3-conductor cables, the third conductor will not be used and any exposed ends must be capped and sealed with a DBR/Y splice.

Communication Cable Length
The maximum wire run from the SmartHub to the farthest decoder is 6800' (2072 meters) for 14 AWG (2.5mm^2) cable. The total amount of wire path is 14,000' (4267 meters) for 14 AWG (2.5mm^2) cable.

Resistance
The maximum resistance of the wire path with the end shorted can be 37.7 Ohms. The minimum resistance of the wire path with the end open should be 1000 Ohms.

Noise
For the wire path to be tested, disconnect from the DIU (or other controller), connect an oscilloscope across the wire path, and power up the pump and any other equipment that would be running when watering. Measure the voltage across the open wire path. It should be less than 1 V p-p.

Short Circuits
After the DAC decoders are installed, measure the resistance across the two open wire path wires to insure that it is still greater than 1000 Ohms to insure that no shorts were introduced during the installation process.

Communication Cable to Power Cable Spacing
This recommendation applies to GDC communication installation. This minimum spacing to any power cable should be maintained to minimize the possibility of electrical interference which could affect the integrity of the GDC communication to decoders. If there are power cables already installed running next to the communication cables that do not meet the minimum spacing, remdiation will be required to meet the minimum spacing listed in **Table 2** below.

Table 2

Power Cable Circuit Rating (Minimum KVA*)	Recommended Minimum Spacing**
0-5	12 inches (30 cm)
5-10	24 inches (61 cm)
10-20	48 inches (122 cm)
>20	10 feet (3 m)

*Maximum voltage x current rating of circuit

**These are minimum spacking recommendations to minimize noise coupling. There may be greater separation required by safety agencies or local codes.

Decoder to Sprinkler Wires
Wire Type - Should be copper conductors, solid core, with PE or PVC insulation, rated for at least 600V

Wire Length
For 16 AWG or 1.5mm2 – Maximum length is 575 feet (175m)

For 18 AWG or 0.9mm2 – Maximum length is 400 feet (122m)

Decoder Module Installation
Remove an old decoder by cutting out the old splices. Make sure to cut the communication wires and station wires back to remove any green or corroded copper. Strip the wires and connect a new decoder module per Figure 4. All splices must be made with 3M DBR/Y splice kits.

Valve Compatibility

Toro	Golf VIH (Solenoid 89-1905 or 118-0248) at 150 PSI 400ft (122m) Max Solid Core, 18 AWG or 0.9mm2 Cable 2.3 Ohms/Conductor (400ft), 1 per Output 575ft (175m) Max Solid Core, 16 AWG or 1.5mm2 Cable 2.3 Ohms/Conductor (575ft), 2 per Output
Toro	252 Valve (Solenoid 102-1905 or 118-0248) at 150 PSI at AC Decoder, 1 per Output
Toro	220 Valve (Solenoid 102-0927) up to 220 PSI (passing is 150 PSI) at AC Decoder,1 per Output
Toro	216 Brass Valve (Solenoid 89-1673), Up to 220 PSI (passing is 150 PSI) at AC Decoder, 1 per Output
Rain Bird	Green Golf VIH Solenoid at 150 PSI 200ft Max Solid Core, 18 AWG or 0.9mm2 Cable 1.2 Ohms/Conductor, 1 per Output 328ft Max Solid Core, 16 AWG or 1.5mm2 Cable 1.2 Ohms/Conductor, 2 per Output
Rain Bird	DV Solenoid (Black Wires) at 150 PSI at AC Decoder, 1 per Output
Rain Bird	PGA/PESB Solenoid (White Wires) at 150 PSI at Decoder, 1 per Output

Grounding the Communication Cable

(for both AC and DC decoders)

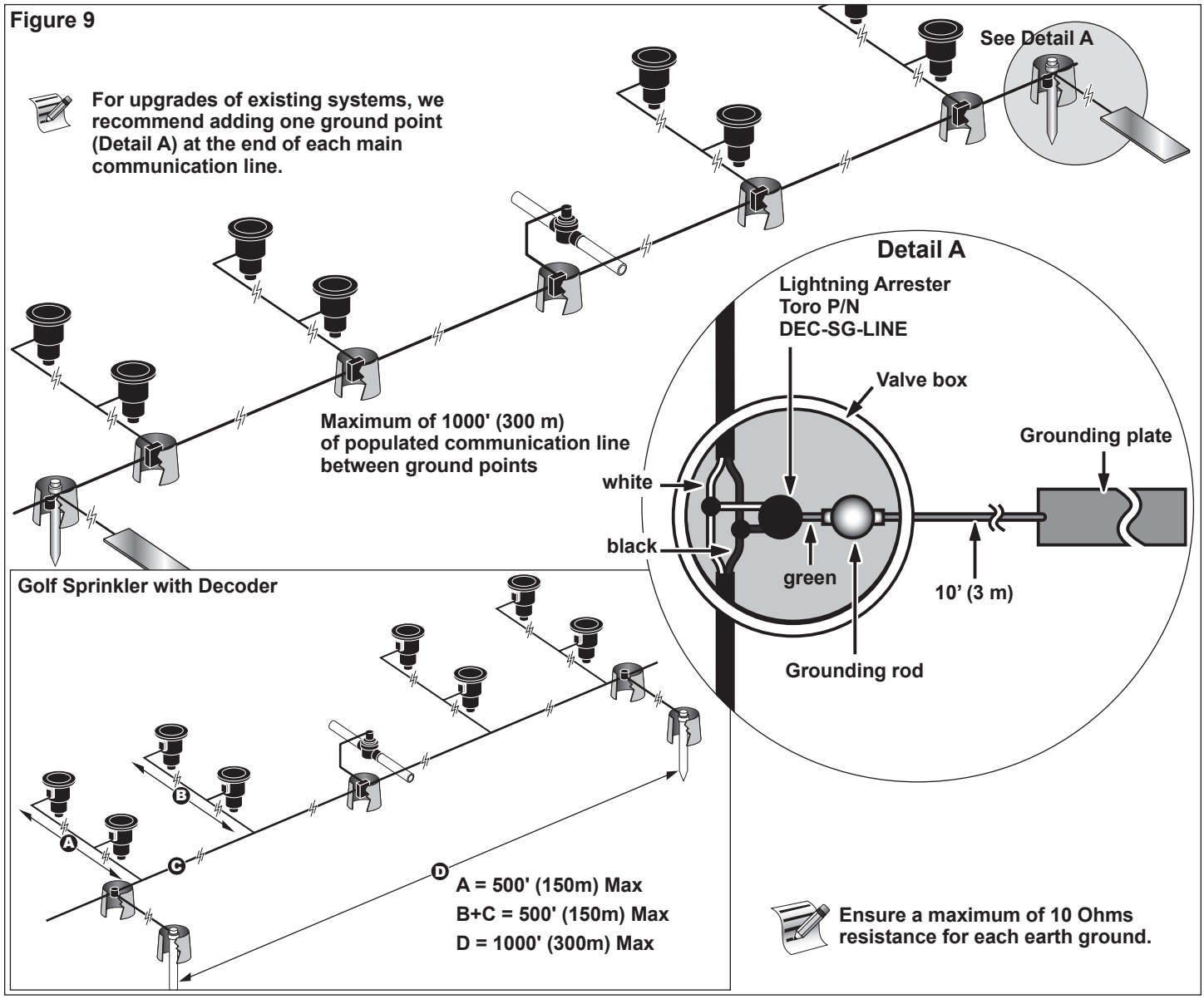
The lightning arrester (Toro P/N DEC-SG-LINE) is required to protect the decoder module from lightning. Without lightning arresters, decoders are vulnerable to lightning damage. In order for these arresters to discharge lightning energy efficiently, they must be properly grounded. To be effective, a resistance of 10 Ohms or less must be achieved at each earth ground point. **Figure 6** illustrates the proper grounding and wiring of the arrester.

1. Locate decoder's power/communication wires (black and white wires).
2. Strip the insulation from lightning arrester's white wire and connect it to the white wires from the decoder and controller-to-decoder cable. Use 3M DBR/Y to properly water-proof all wire connections. (See **Figure 6**.)
3. Strip the insulation from lightning arrester's black wire and connect it to the black wires from the decoder and controller-to-decoder cable. Use 3M DBR/Y to properly water-proof all wire connections. (See **Figure 6**.)
4. Connect the lightning arrester's ground wire to the ground rod or plate's wire. If the ground rod or plate is not pre-wired, use a 10 AWG bare copper wire. (See **Figure 9**.)

IMPORTANT! If using a ground rod, verify that the straight line distance between the lightning arrester/decoders and the ground rod is 8' (2.5m) +/– 10%. If using a 3' (1m) ground plate, the straight line distance should be 3' (1m) +/– 10%.

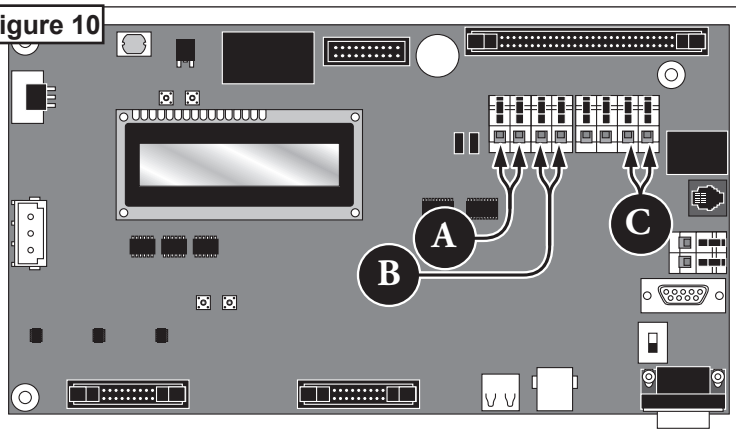
5. If necessary, use ground enhancement material (GEM) to attain a resistance of 10 Ohms or less.
6. Check the system for proper operation.

Figure 9



Motherboard Connections

Figure 10

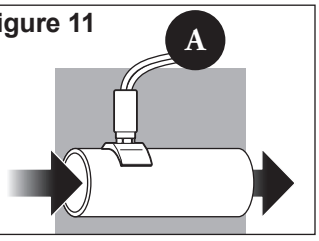


Pressure Sensor

The Lynx SmartHub controller is designed to accept both normally-open and normally-closed pressure sensor. Set the pressure sensor model in Lynx SmartHub controller preference menu.

1. Place the controller's power switch to OFF.
2. Route the pressure sensor's cable into the controller.
3. Connect the cable wires to the Pressure Sensor Terminals labeled **A** in **Figure 10**.
4. Place the controller's switch to ON.

Figure 11

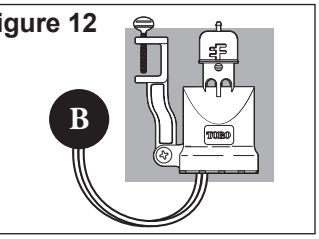


Rain Sensor

The Lynx SmartHub controller is designed to accept both normally-open and normally-closed rain switch. Set the rain switch model in Lynx SmartHub controller preference menu.

1. Place the controller's power switch to OFF.
2. Route the rain sensor's cable into the controller.
3. Connect the cable wires to the Rain Sensor Terminals labeled **B** in **Figure 10**.
4. Place the controller's switch to ON.

Figure 12

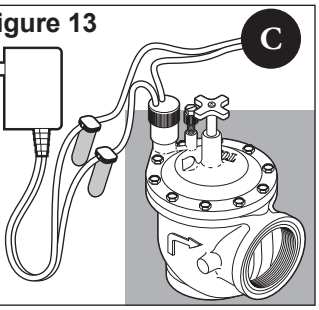


Master Valve / Pump Relay

Lynx SmartHub provide switch terminals to control a master valve or a pump relay if the system requires it.

1. Place the controller's power switch to OFF.
2. Connect the Positive/Hot wire of the power source that controls the master valve or the pump relay to the Master valve/Pump relay switch terminal. See **Figure 10, C**.
3. Route another wire from the Master Valve / Pump terminal and connect it to the master valve solenoid or pump relay.
4. Connect the Negative/Equipment ground wire of the power source to the master valve solenoid or pump relay.
5. Place the controller's switch to ON.

Figure 13



Communication Cable

Please note the following communication cable installation requirements and suggestions:

- The remote SmartHub is designed for use with shielded, twisted-pair, communication cable. Toro recommends Paige P7162D or equivalent.
- More than one cable run can be connected to the Surge Protection Unit (SPU, part #35-7353).
- A remote SmartHub communication cable can emanate from another remote SmartHub connection.
- If additional communication cable runs are installed for future system expansion, each cable wire pair must be terminated with a 600 ohm resistor (**Figure 15**).
- If the communication cable is routed in the same trench as main power wires, or the SmartHub to decoder module cables, a minimum of 12" (30.5cm) separation is recommended to prevent voltage induction on the communication cable. Check local codes for actual requirements.
- Refer to the installation instructions provided with the central control system for communication cable testing procedures.
- If in-ground cable splices or repairs are required, the connection must be properly insulated with a waterproof splicing device. Using an appropriate splicing kit, such as Scotchcast 82-A1 (or equivalent), is recommended. Placing the cable splice in a small valve box for protection and accessibility is a good installation practice.

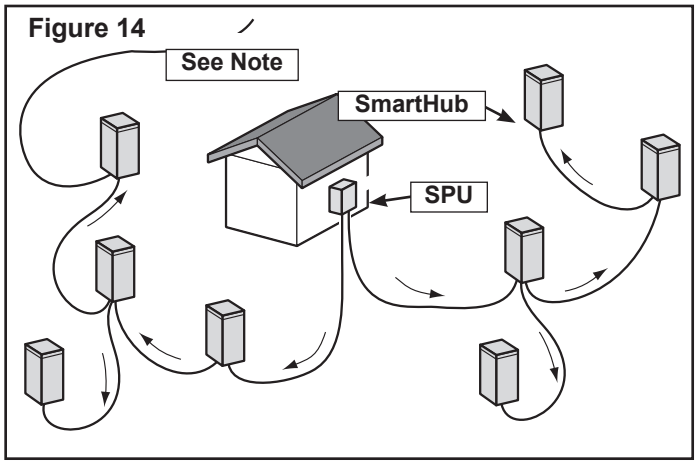
Steps:

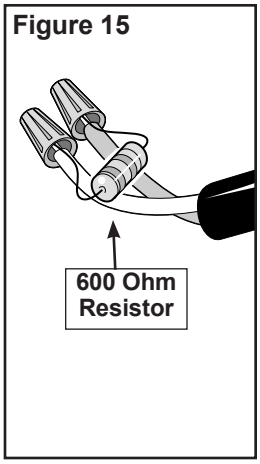
1. Starting at the Surge Protection Unit (SPU, part #35-7353), route the communication (comm) cable to each SmartHub leaving enough cable at each location to enable connection. See **Figure 14**.

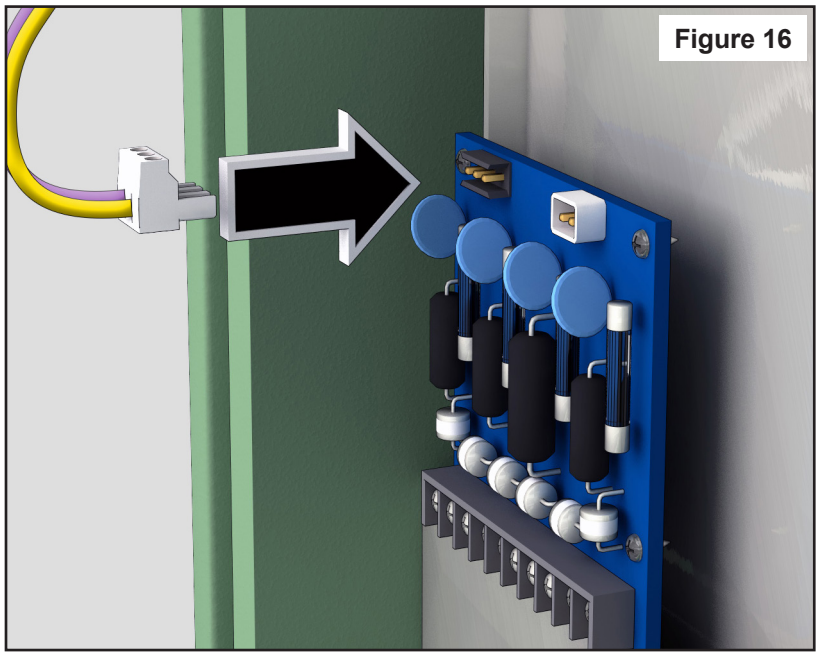
   If additional communication cable is installed for future system expansion, connect a 600 ohm resistor across the wire pair at the end of the cable as shown in **Figure 15**.

2. At the SmartHub, cut the cable and pull both ends into the SmartHub through the 3/4" (16mm) sweep conduit.
3. At the cable ends, strip the outer jacket and inner insulation to expose the comm wires.
   - **SmartHub connection**: Attach a Phoenix 3-hole connector.
   - **SPU connection**: Attach a Phoenix 3-hole connector.
   - **FIU connection**: Attach a RJ-11 connector.
4. For the SmartHub, plug comm line into the modem port (**Figure 16**).

   Remove the modem wire connector(s) until the comm cable has been tested. Refer to the installation instructions provided with the Central controller for testing procedures.







Communicating with the Lynx SmartHub

A personal computer running Toro's "Lynx" software is necessary to communicate with the Lynx SmartHub. The SmartHub allows Lynx software to control over 9,000 sprinkler heads with individual precision.

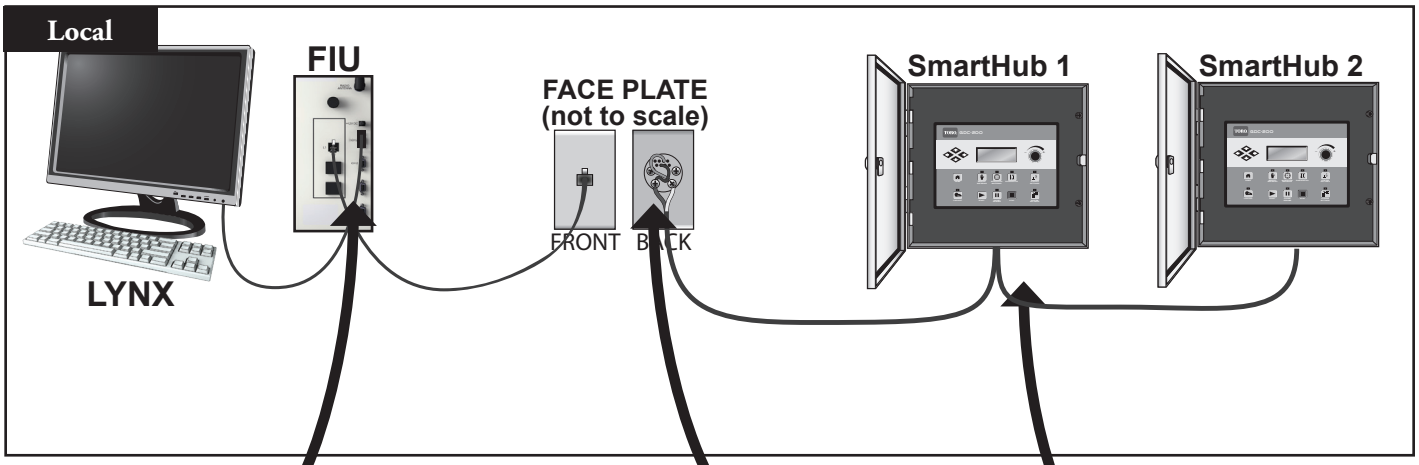
The Lynx computer is attached to a Field Interface Unit (FIU) which sends commands to the SmartHubs throughout the golf course.

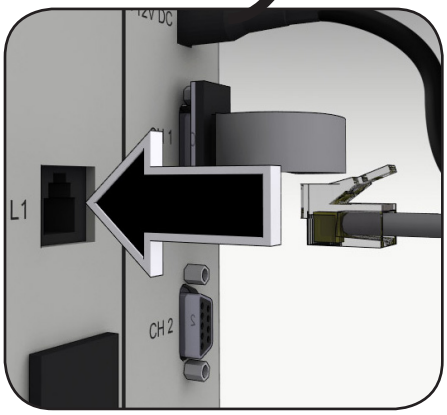
There are two ways for the FIU to communicate with SmartHubs: by Wireline or by radio. This document shows **three typical layouts** making use of one or both methods.

For the purposes of the layouts, the pedestal and cabinet Smart Hubs are interchangeable with each other.

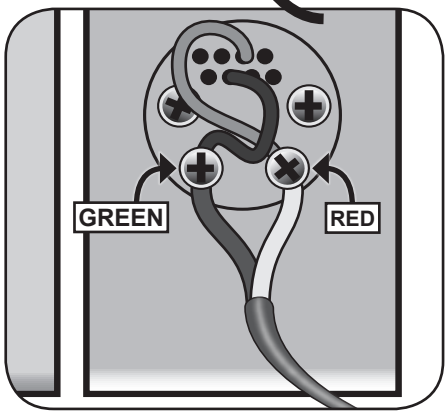
Layout 1 - Local

The SmartHub is attached to the Field Interface Unit by a Wireline. The SmartHub typically resides in the office with the Lynx computer and FIU.

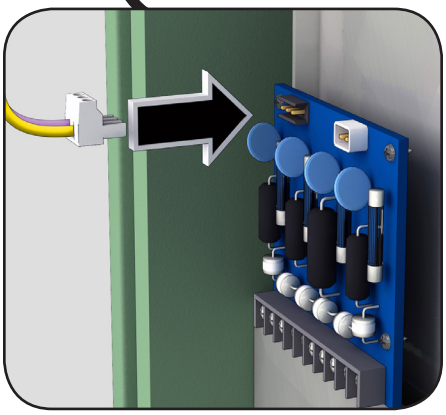




Connect RJ11 cable to L1 of the FIU and face plate.



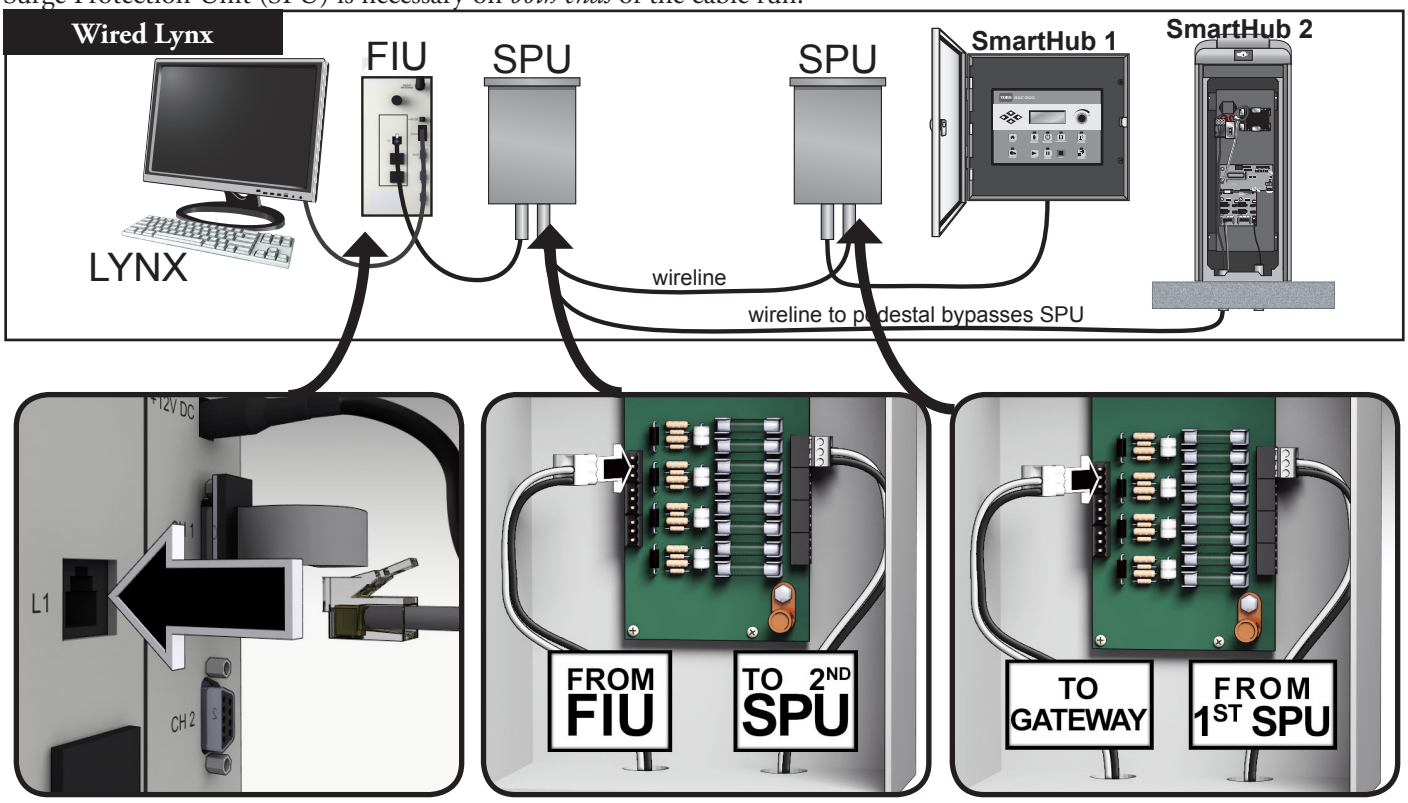
Gray wire to green terminal. Yellow wire to red terminal.



Plug wireline into modem port on back of the Lynx SmartHub.

Layout 2 - Wired Lynx

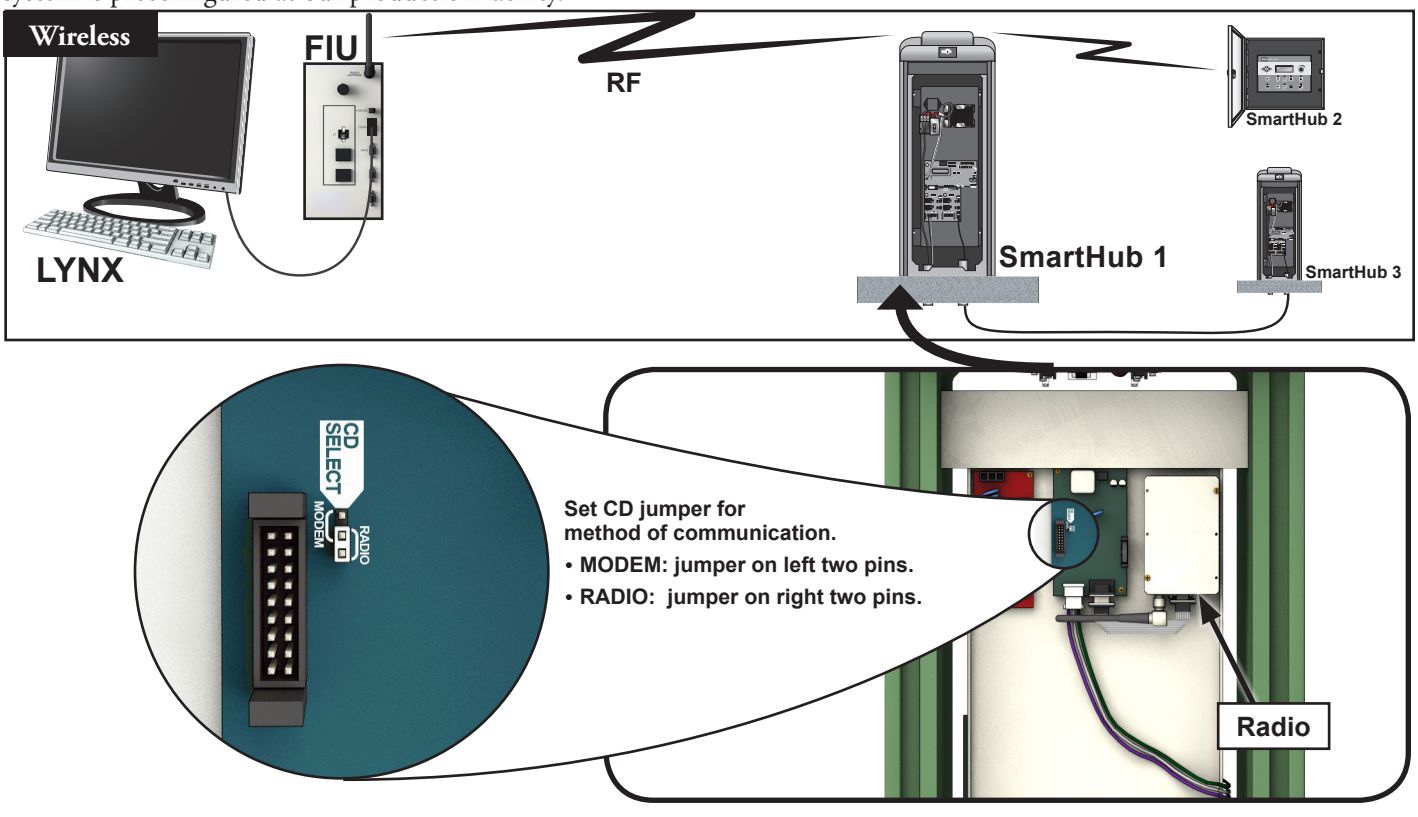
The Field Interface Unit is attached to the SmartHub which is out in the field. Due to this distance (see note below), a Surge Protection Unit (SPU) is necessary on *both ends* of the cable run.



The Wireline connection is limited to about 9 miles.

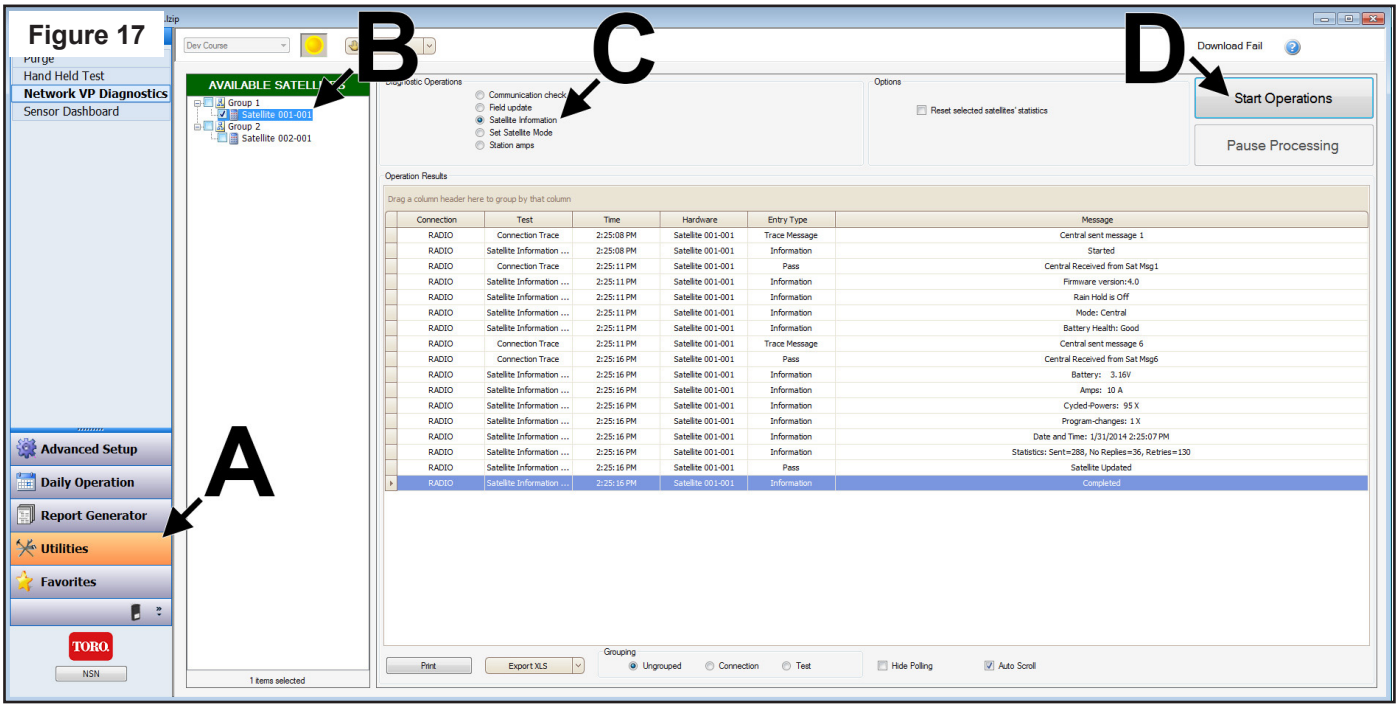
Layout 3 - Wireless

The Lynx SmartHub DEC-RS-1000-DR (digital radio and modem) communicates with the Lynx computer via radio. The system is preconfigured at our production facility.

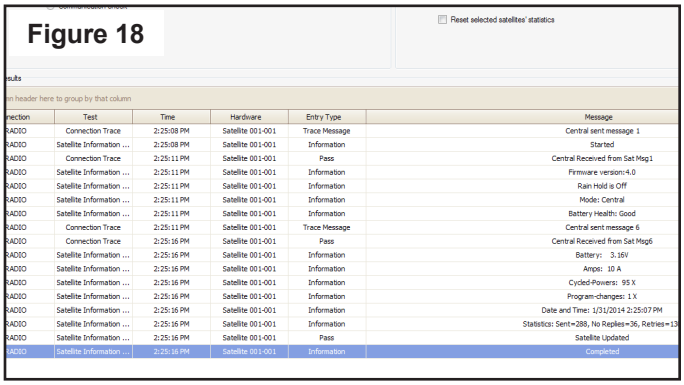


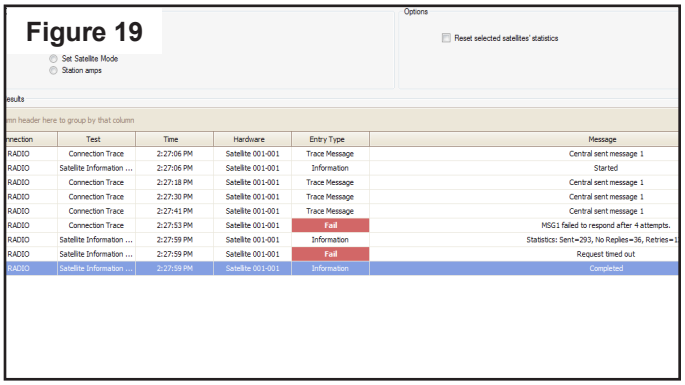
To Test Radio Communication Between the FIU and the Lynx SmartHub

1. Launch Lynx. See **Figure 17**.



2. Click the Utilities bar (**Figure 17, A**).
3. Select the desired satelite from the list (**Figure 17, B**).
4. Select **SmartHub Information** radio button (**Figure 17, C**).
5. Click **Start Operations** button (**Figure 17, D**). Certain SmartHub information should be displayed on the screen (**Figure 18**). If communication fails, the software will display a "fail" message (**Figure 19**).





Radio range can vary. Under normal conditions, a range of two miles should be feasible. To boost radio range, mount radio antennas on masts.

If radio interference is a problem, please see the section below, "Changing the Frequency of the Radio".

Changing the Frequency of the Radio

At the time of installation, your authorized Toro installer should configure the radio to work properly. In the future, if it becomes necessary to change the radio frequency, you will need:

- Radio Manager software from Raveon
- USB to Serial (DB9) cable with included drivers
- 12V Phoenix power connector (from authorized Toro distributor)
- 12V power supply for radio (from authorized Toro distributor)

1. Disconnect all power to the FIU. Remove the radio. Place it next to the Lynx computer on a static-free surface.
2. At the computer running Lynx, install the drivers for the USB to Serial (DB9) cable. Reboot computer.
3. Plug USB cable into a USB port and Serial port on radio (**Figure 20**).
4. Connect Phoenix power cable into 12V power supply. Plug other end into DC IN port on radio (**Figure 21**).
5. Plug in 12V power supply.
6. Launch Radio Manager. See **Figure 22**.
7. Select appropriate COM port (**Figure 22, A**).
8. Change the baud rate to 1200 (**Figure 22, B**)
9. Press 'Discover Radio' button (**Figure 22, C**). The computer should discover the radio (**Figure 23**).
10. To see current radio frequency, enter **ATFX** into the command line (**Figure 24**).
11. To change the frequency, simply add an appropriate frequency number to that command. Example: **ATFX 460.5**

UHF frequency range is from 450 to 470 MHz. Frequency number specified must be between those numbers.

12. Software will confirm the change (**Figure 25**). It is possible to manually confirm the change by simply typing in **ATFX** again.
13. Power down power supply and disconnect power line and serial cable.
14. Install radio back into FIU.
15. The UHF frequencies of the two radios involved (one in the FIU, one in the Lynx SmartHub) must match. Follow the above procedure with the radio from the Lynx SmartHub to specify a matching frequency.

Figure 20

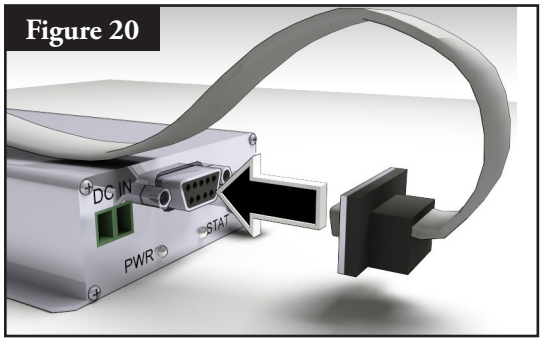


Figure 21

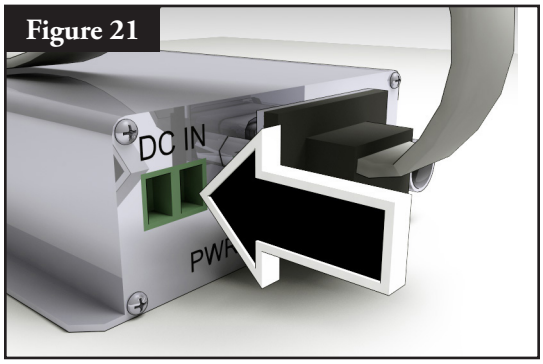


Figure 22

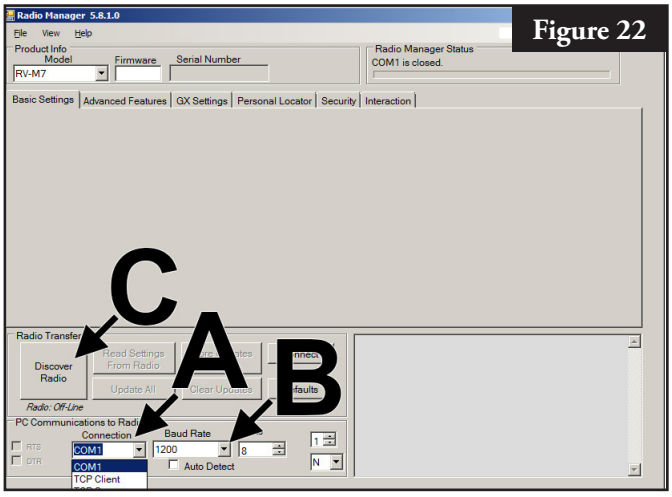


Figure 23

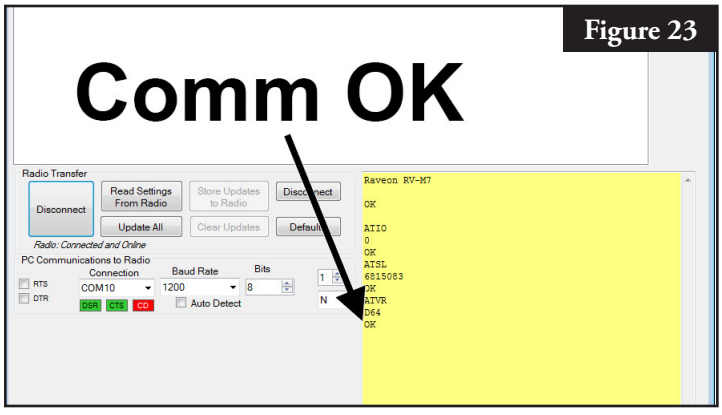


Figure 24

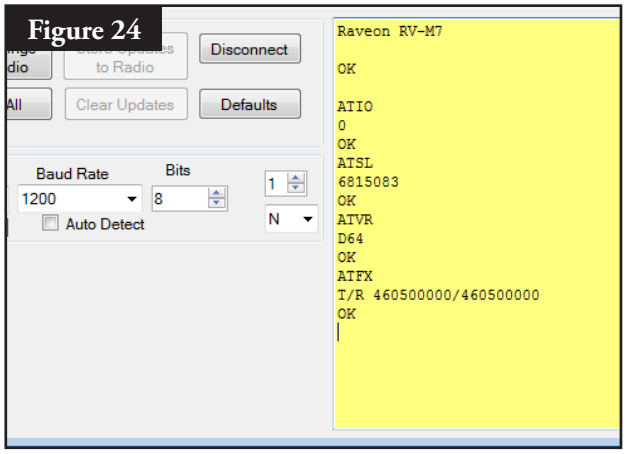
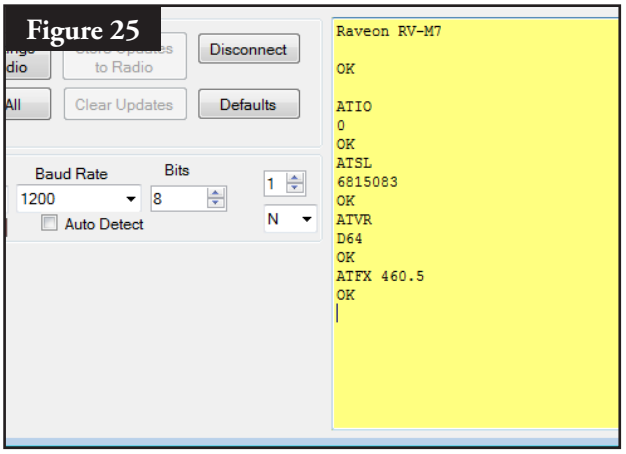


Figure 25



An FCC license is required to operate on any given UHF frequency. Frequency coordination (selection) is handled through the Personal Communications Industry Association (PCIA) (800-759-0300) and an application must be submitted to the FCC. There is a PCIA fee and FCC license fee that must be paid as well.

Operation

Modes of Operation

The Lynx SmartHub can be placed in three operating modes: Central mode, Local mode and Off mode. In all three modes, the SmartHub will accept communications from Lynx®. Select the mode of operation by pressing **Satellite Settings** and selecting **Comm Mode**. Select from the three modes using the Input Dial.

Central Mode - When placed in Central Mode, the SmartHub will allow Lynx to download irrigation programs, edit time and date and modify the SmartHub's operation mode. If communication between central and SmartHub is interrupted for more than one hour, the Central Mode LED indicator will start flashing until communication is reestablished.

Local Mode - When placed in Local mode, the SmartHub will execute previously downloaded or locally configured irrigation programs. In this mode, the SmartHub will allow the central to edit time, date and operation mode but will not allow modification of settings affecting irrigation programs.

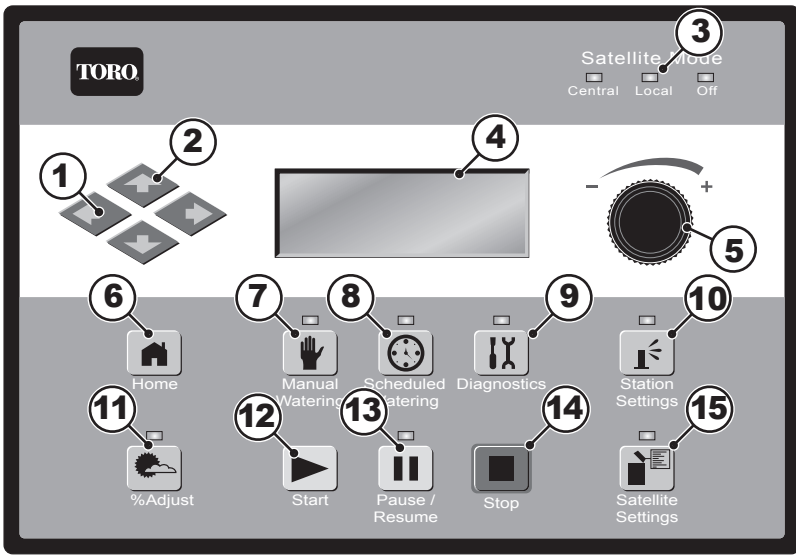
Off Mode - When placed in Off mode, the SmartHub will not execute any watering operation whether it is program or manually initiated. Any watering operation will terminate once the SmartHub is placed in Off mode. Watering operations will resume once the SmartHub is placed back to Central or Local mode. In this mode, the SmartHub will allow the central to edit time, date and operation mode but will not allow modification of settings affecting irrigation programs.

General Editing

Pressing a menu key on the Lynx SmartHub will display menu items. Items with fields containing values that can be edited are called Entry Fields. Use the Arrow Keys to navigate through the menus and entry fields. Modify any selected value by scrolling through the selection using the Input Dial. Values will be saved automatically when you exit an entry field or press another menu key. Pressing the HOME button will also save any modification and revert back to Home display.

Additionally, if no keypad activity is detected within five minutes, the SmartHub will automatically save any modifications and revert back to Home display.

Timing Mechanism Components



1. **Left and Right Arrows** allow you to select the next entry field within the same menu line. Any changes will be saved after you exit that entry field.

2. **Up and Down Arrows** allow you to scroll up and down through the menu items.

3. **Operation Mode LED Display** will indicate the current gateway operation mode.

4. **LCD Panel** is the display screen.

5. **Input Dial** allows you to scroll through the value selection within the selected entry field.

6. **Home** button allows you to exit from any function menu and return the gateway to normal operation. After pressing the Home Key, all modifications to the settings will be saved.

7. **Manual Watering** button allows you to activate station(s) or program(s) manually.

8. **Scheduled Watering** button allows you to view the Station Based Flow (SBF) list, which is the automatic watering schedule.

9. **Diagnostics** button allows you to view the gateway's firmware version as well as other diagnostic information.

10. **Station Settings** button allows you to modify station parameters. Within this setting, you can disable the station from any activity, hold station watering for a specific number of days, set the station type to a switch and create or edit the station description/name.

11. **Percent Adjust** is not used at this time.

12. **Start** button will execute selected manual operation.

13. **Pause** will cancel a currently running station.

14. **Stop** button will cancel currently running program(s) or station(s).

15. **Satellite Settings** button allows the user to modify the gateway parameters. Users can specify the gateway communication mode, hold duration for gateway's activity, the language, clock settings, date, day change, CSG address, gateway address, station delay, maximum number of stations to run simultaneously, units and display contrast. Within this menu, the user can also reset all programs, reset the station parameters and reset all disables.

Power-Up Diagnostics

Upon power-up, the SmartHub will display:

```
SmartHub TM Booting
```

The SmartHub TM will initiate a diagnostic test automatically during power-up. This function will take approximately ten seconds and it can not be bypassed. If a problem is detected during the diagnostic test, it will be indicated on the display. These status information cannot be edited. The information is as follows:

Line 1: SmartHub Firmware Version and Revision Date
Line 2: Last Power Downtime Date and Time

Example:

```
Rev: 4.00  09/15/10

PD - 09/16/10
```

The default Home display will follow after the diagnostic display has timed-out.

Home display example:

```
Sun 04/02/06    02:31 pm
GW# 001-001    Sec: 57
Day Change:     12:00am
```

Home Button

Pressing the Home button will revert to the default display. When editing irrigation programs, Station or SmartHub settings, pressing the Home buton will save any setting modifications and return the user to the Home display.

Home display examples:

```
Sun 04/02/06     02:31 pm
GW# 001-001     Sec: 57
Next start:      03:00am
```

(typical Home display with no active scheduled program)

```
Sun 04/02/06     02:31 pm
GW# 001-001     Sec: 57
Running 02 programs
P01  Sta01       00:09:46
P05  Sta25       00:19:51
```

(Home display with two active scheduled programs)

The Day Change line will display the next program start time (Next Start: HH:MM) if the current day is an active watering day. If the SmartHub is running a program, the Day Change line will display `Running XX programs` to indicate the number of active programs.

Currently, the SmartHub only displays the next automatic start for SmartHub A only. SmartHub B's next automatic start is *not* displayed.

If the SmartHub has an active running program, the display will read:

```
Sun 04/02/06      02:31 pm
GW# 001-001      Sec: 57
Running 04  prg+ Man
```
(Running Multi-Manual)

```
P01   Sta01      %00:05:00
P01   Sta02      00:05:00
P01   Sta03D     00:05:00
P02   Sta10P     00:05:00
Man   Sta21      00:10:00
Man   Sta22S     00:10:00
```

(The "%" symbol before the runtime indicates that station 01 is percent adjusted.)
(P01 indicates Program 01 is currently active)
(The "D" symbol after the station number indicates that station 03 is disabled.)
(The "P" symbol after the station number indicates that program 02 is paused.)
("Man" indicates Manual Watering is currently active)
(The "S" symbol after the station number indicates that program 02 is stacked.)

Start Button

Use the Start button to execute a manual function.

Pressing the Start button while the controller is idle will prompt the Manual Watering menu.

Multi-Manual Start Display

```
    Multi-Manual
      Starting
         03
   STOP to cancel
```

Press the Stop button to cancel.

Pause Button

The Pause button can be used to cancel a currently running station. Those stations will not be resumed.

Stop Button

Use the Stop function to cancel program or manual irrigation. If the Lynx SmartHub has no current activity, pressing the Stop button will have no effect. The Stop function causes a system cancel including power-down / power-up sequence for BOTH daughterboards regardless of station activity.

SmartHub Settings

Satellite Settings allows you to set SmartHub parameters such as Time, Date and Language.

- Use the Up or Down Arrows to navigate through the menus.
- Use the Left and Right Arrow to advance to the next entry field on the same menu line.
- Use the Input Dial to select values when editing.

Command	Function
Comm Mode:	Use this menu item to select the SmartHub mode of operation between Central, Local or Off mode.
Hold All:	Use this menu item to suspend satellite operation and choose the suspension duration from **Today**, **02-30** days, **Permanent** or **None**. This does not affect manual starts from the front panel.
Hold Rain:	Use this option to suspend satellite operation and choose the suspension duration from **Today**, **02-30** days, **Permanent** or **None**. When activated, Hold Rain will cancel any current watering, along with suspending operation. This does not affect manual starts from the front panel.
Reset Sta's:	Use this menu item to reset all station settings by selecting Yes. After selecting Yes, press the Up or Down Arrows to activate. There is countdown before the command executes. The following will display: Reset All Stations to defaults 05 STOP to escape All station settings will be erased after a successful reset.
Reset Unit:	Use this menu item to reset the SmartHub settings by selecting Yes. Select Yes using the Input Dial and press the Up or Down Arrows to activate.There is countdown before the SmartHub reboots. The following will display: Reset All Defaults 10 STOP to escape Resetting the unit will erase all user-defined program data and configuration values in the SmartHub's memory.
Power Mode:	Shows the power mode as "Switched" or "Continuous".
Enable Sta's:	Use this menu item to reset all disabled stations with one execution. Select Yes All using the Input Dial and press the Up or Down Arrows to activate. Select No to cancel. Individual stations can be enabled/disabled by using the Disable function within the Station Settings menu.
Language:	Default language is English. Future option: Spanish.
Clock Set:	Use this menu item to set the current time. Use the Left and Right Arrow Keys to select the Hours and Minutes parameters then use the Input Dial to modify the values.
Clock Mode:	Use this menu item to select the clock mode between Am/Pm (12-Hour) and 24-Hour mode.
Date Mode:	Use this menu item to select the date mode: MMDDYY or DDMMYY.
Date:	Use this menu item to set the current date. Use the Left and Right Arrow Keys to select the Month, Date and Year parameters then use the Input Dial to modify the values.
Day Change:	Use this menu item to set the "day change" time. The "day change" is the specified time that the SmartHub will advance the date. The default day change is 12:00 am. Adjusting the day change time will allow programs to start throughout the night on the same active day schedule. Programs with runtimes beyond the day change time are allowed to finish.

CSG Address: Use this menu item to set the CSG (Central SmartHub Group) address. Lynx uses this address to identify different SmartHub groups.

Identify all SmartHubs that can be grouped together and assign them with the same CSG address. When Lynx sends out a command to that CSG address, all the SmartHubs within that group will receive and execute the command.

SAT Address: Use this menu item to set the SmartHub address. Each SmartHub must be given a unique SmartHub address. Lynx uses this address to identify individual SmartHubs when sending SmartHub specific commands.

Max Sim Sta: Use this menu item to set the maximum number of simultaneously operating stations. This threshold will be applied to all programs and manual irrigation functions. Each program can then be set with a lower limitation if necessary. This setting is set in Lynx and downloaded to the SmartHub.

Meas Units: Use this menu item to set the SmartHub's unit system between English (U.S. Standard) and Metric units.

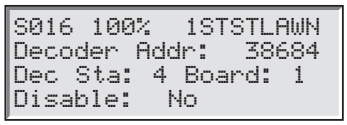
Display Adj: Use this menu item to adjust the contrast of the LCD screen. Use the Input Dial  to darken or lighten the text display.

Station Settings

Station Settings allows you to set parameters specific to each station.

- Use the Up or Down Arrows to navigate through the menus.
- Use the Left and Right Arrow Keys to advance to the next entry field on the same menu line.
- Use the Input Dial to select values when editing.

Command	Function
DB1 or **2**	Select the daughterboard.
S01	Select the station you want to edit in this field. Choose from Station 01 through the SmartHub maximum station count of 500 (per daughterboard).
Sched Today:	Total scheduled station runtime for the current irrigation day.
Water Today:	Total station runtime that has occurred for the current irrigation day.
Water Yestr:	Total station runtime that occurred for the previous irrigation day.
Disable:	Disable station operation by selecting **Yes**. Resume station operation by selecting **No**.
Hold:	Use this menu item to delay operation for this station. Select the hold duration from **01–30 days**, **Permanent** or **None**. This option is useful when a specific station needs to be deactivated without affecting any of the programs. This does not affect manual starts from the front panel.
Capacitor Voltage	Must be set to 15V only.
Dec Addrss:	Shows the 5-character address of the decoder module, is downloaded from Lynx.
Dec Offset:	Shows the ouput number (1,2,3, or 4), is downloaded from Lynx.



Scheduled Watering

The Lynx SmartHub shows the Station Based Flow Management list, the automatic program downloaded from the Central computer Lynx software.

Station Based Flow Management:

The SBF (Station Based Flow) screen can be accessed from the Scheduled Watering menu.
Follow the steps to access.

1. Press the Scheduled Watering Key . The cursor is initially located at the program selection field. Use the Input Dial to select **SBF List** which is located between GMM and P01.

   The SBF List is only available after a successful download from the Central computer.
2. Use the Right arrow to navigate to the event number.
3. Use the Input Dial to select the event number you want to review.

   SBF (Station Based Flow) Sample Screen:

`SBF List Event  001`	(1st line will indicate the Event Number)
`Start  12:00am  S22`	(2nd line will indicate the Start Time followed by the Station Number)
`Run  00:10:00  P26`	(3rd line will indicate the Runtime [Hrs:Min:Sec] followed by the Program Number)
`Program Start  (80)`	(4th line indicate Miscellaneous Functional Code)

Editing the SBF List is not allowed at the SmartHub level. SBF modifications must be made at the Central computer and downloaded to the SmartHub to implement changes.

Manual Watering

The Manual Watering functions are used for additional watering if the irrigation program is not sufficient. They can also be used to troubleshoot each station for proper operation. Pressing the Manual Watering Key accesses the Multi-Manual function.

M-Manual - Select M-Manual to activate a station or group of stations with a specified runtime.

Multi-Manual Station Activation Directions

Manual station activation example: Activate stations 1–12 with a runtime of 5 minutes each and limit watering to 3 stations simultaneously.

The Multi-Manual function is limited to the maximum simultaneous station settings of the SmartHub. In cases where a program is running and a multi-manual activated, the SmartHub will activate all stations specified in the multi-manual in addition to the currently activated stations. Thus, the multi-manual will allow the SmartHub to exceed the maximum simultaneous station settings.

1. Press the Manual Watering Key .
2. The cursor should be located in the Manual field, use the Input Dial to select M-Manual.
3. Press the Down Arrow to advance the cursor to the Sta#: field. Use the Input Dial to select the correct value of the first station being irrigated. For this example, select station 01.
4. Press the Right Arrow to advance the cursor to the next value. This value will indicate the last station of the range. If irrigating only one station, this value should be the same as the first value. For this example, select station 12.
5. Press the Right Arrow to advance the cursor to the next entry field. This entry field will indicate the runtime in hours, minutes and seconds (HH:MM:SS). Use the Input Dial and the Right Arrow Key to select the appropriate runtime value. For this example, set the value to 00:05:00.
6. Press the Down Arrow to advance the cursor to the next entry field. Notice that a new Station: line was created. Fill this line only if irrigating multiple ranges of stations, otherwise, leave this line blank.
7. Press the Down Arrow to advance the cursor to the Simult: field. Use the Input Dial to select the maximum simultaneous irrigating stations. For this example, set the value to 03.
8. Once finished, press the Start Key to activate or press the Home Key to cancel and revert back to the default display.

   Pressing the Home Key will save the entered values.

   The SmartHub containing the desired station to be started can be selected by highlighting 'x' in the "BDx" field.

   When finished, the display should read:

```
Manual: M-Manual
Sta#: 01-12  00:05
Sta#: -----  --:--
Simult: 03
```

```
Press START to water
```

   When reviewing the Multi-Manual program by pressing the Manual Watering button, the display will deduct the stations that watered or currently watering to the list.

   Modifying the Multi-manual will append the added stations to the currently running manual. Currently running stations will not be affected. The SmartHub will run the stations in sequential order disregarding the order it was entered.

% (Percent) Adjust

The Percent Adjust feature is not used at this time.

Diagnostics

The Diagnostics function of the remote SmartHub allows for easy system troubleshooting. Within this function, the user can monitor the SmartHub's internal voltages as well as check the firmware version.

Use the Input Dial – + to navigate through the menus while in the **Menu:** field.

Menu: Link Monitor	This menu item allows you to monitor communication network traffic.
Menu: System Monitor	This menu item allows you to monitor all the SmartHubs in the system.
Menu: Revision	This menu item will display the SmartHub firmware version and creation date.
Menu: Power-Up Detect	This menu item will display the number of detected stations, number of detected sensors. It will also display the date and time of the last power-down (PD) and last power-up (PU). Press the Down arrow to scroll down the informations.
Menu: VA Monitor	This menu item allows you to monitor the SmartHub's amperage, voltages and temperature in real-time. This allows you to troubleshoot the SmartHub's internal circuit voltages.
Menu: Event Codes	This menu item will display the SmartHub's Event Code log. You can clear the log from this option. Navigate to the Clear field using the Down arrow, select Yes using the Input Dial – + and press the Down arrow to activate.
Menu: Link Settings	Use this menu item to view the SmartHub's communication settings. Parameters can not be edited here.

Motherboard Diagnostic Display

The SmartHub motherboard features a 2-line, 16 character LCD display for quickly viewing for system diagnostic information (see **Figure 6**, **page 9**). Use the left button below the LCD to scroll through the display lines and if needed, use the right button the scroll through the available options.

```
   Rev 2.02
   03/28/2011
```

After power up, the screen will display board's firmware version.

```
D1 A=1.500
D2 = OFF
```

After the initial Revision screen, the display will show the real time current for both daughterboards.

```
D1L1=0.123 A
D1L2=0.121 A
```

```
D2L1=0.224 A
D2L2=0.223 A
```

The display will also show the load currents by individual wires of a two-wire communication line.

```
Rain sw  =open
Pump pres=closed
```

The display will show the Rain and Pump Pressure sensor state and will be updated in real time.

```
D1 DEC 32396
10 min Send...
```

The display will show the information contained in the message during transmission execution. The information will only be displayed while the transmission is being executed. The display will refresh if a different command is transmitted.

```
Display Contrast
Psh Opt to Adj
```

Scroll to this menu to adjust the display contrast. Press the right button below the LCD to adjust.

```
00:00:06:23:05
```

This is the time counter in Month:Days:Hours:Minutes:Seconds which starts upon power up.

```
Flow=0.00 Hz
```

The display will show the real time pulse frequency of the flow sensor input.

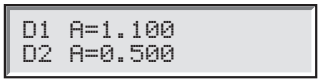
Alarm Conditions

All of the Alarm Conditions, when active, toggle back and forth between the two message states below.

Thermal Alarm

- Shuts off and disables daughterboard indefinitely.
- Motherboard LCD toggles alarm and instruction on how to re-enable the daughterboard.
- Affected daughterboard's alarm LED blinks on and off.

High Current Alarm



- Triggered when individual daughterboard's load current is above 1.0 Amps for a minimum 10 seconds.
- 10 second timer is reset when below 1.0Amps.
- Does NOT shut off or disable daughterboard.
- Motherboard LCD toggles alarm message and load current.
- Affected daughterboard's alarm LED blinks on and off.

Phase Current Imbalance Alarm

- Triggered when load current of one wire is 2x higher than the opposite wire for a minimum 20 seconds.
- 20 second timer is reset when load current of one wire is no longer 2x higher.
- Does NOT shut off or disable daughterboard.
- Motherboard LCD toggles alarm message and load current.
- Affected daughterboard's alarm LED blinks on and off.

The display difference between the **High Current Alarm** and **Phase Current Imbalance Alarm** is subtle: Notice the two-character difference in the display on the first line:
"D1" (High Current Alarm) vs. "D1L1" (Phase Imbalance).

Clear Alarms

To clear an alarm condition, simply hold down the Option button on the motherboard for three seconds.

Specifications

Radio

Equipment Type – Data radio, Raveon RV-M7-UC
Frequency Band – UHF
RF Output Power – 2.0 watt
Current Consumption:
Standby (Muted) – < 65 mA
Transmit 2 watts RF power – < 1.0A
FCC License: FCC ID# SRS-RV-M7-UC

Fuse and Circuit Breaker

Power Supply:
1.5A On/Off Switch/Circuit Breaker – Main Power Input
3.2A Fuse (Slow-Blow) – Field Output

Output Board: 3.2A Fuse

Lynx SmartHub

- **Cabinet**: Non-corrosive, lockable wall mount, indoor/outdoor installation
- **Pedestal**: Non-corrosive, lockable pedestal, indoor/outdoor installation
- Six 1" (25.4mm) conduit openings and one 1 1/2" (38mm) conduit opening
- Controls up to 1000 stations
- **Rated Input Voltage**: 100-240 VAC, 50/60 Hz
- **Rated Input Current**: 1.6A
- **Rated Output Current**: 1.8A max.
- **SmartHub output voltage**: 40 VAC
- **SmartHub output power**: 75W max.
- **Automatic Action**: Type 1.C product
  Impulse Voltage: 2500V
- **Operating Temperature**: 0°C to +60°C (32°F to 140°F)
- **Storage Temperature**: -30°C to +60°C (-22°F to 140°F)
- **Ball Pressure Test Temperature**: 257°F (125°C)
  Glow Wire Test Temperature: 1,562°F (850°C)

Warranty and FCC Notice

Warranty

The Toro Company and its affiliate, Toro Warranty Company, pursuant to an agreement between them, jointly warrants to the owner each new piece of irrigation equipment (featured in the current catalog at date of installation) against defects in material and workmanship for a period described below, provided they are used for irrigation purposes under manufacturer's recommended specifications.

During the warranty period, we will repair or replace, at our option, any part found to be defective. Your remedy is limited solely to the replacement or repair of defective parts.

This warranty does not apply (i) to Acts of God (e.g., lightning, flooding, etc.); or (ii) to products not manufactured by Toro when used in conjunction with Toro products, or (iii) where equipment is used, or installation is performed in any manner contrary to Toro's specifications and instructions, nor where equipment is altered or modified.

Return the defective part to your irrigation contractor or installer, or your local Golf Irrigation Distributor, or contact The Toro Company, 5825 Jasmine St., Riverside, California, 92504, (800) 664-4740, for the location of your nearest Toro distributor, or outside the United States, call (951) 688-9221.

Neither Toro nor Toro Warranty Company is liable for indirect, incidental or consequential damages in connection with the use of equipment, including but not limited to vegetation loss, the cost of substitute equipment or services required during periods of malfunction, or resulting non-use, property damage or personal injury resulting from installer's actions, whether negligent or otherwise. Some states do not allow the exclusion of incidental or consequential damages, so the above exclusion may not apply to you.

All implied warranties, including those of merchantability and fitness for use, are limited to the duration of this express warranty.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. This warranty gives you specific legal rights and you may have other rights which vary from state-to-state.

All Toro golf control systems (central controls, field satellite controllers, GDC, CDS and Turf Guard), unless covered by a Toro NSN Support Plan, are covered by this warranty for one year from date of installation.

Radio complies with FCC Part 22 and Part 90 of the FCC Rules

Domestic: This equipment has been tested and found to comply with the limits for a FCC Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. The equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to the radio communications. Operation in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

International: This is a CISPR 22 Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.Each stations can activate up to two solenoids.

This product, utilizing a Class 2 transformer tested to UL1585, satisfies the requirements of a Class 2 Power Source as defined in the NFPA 70 (NEC), Article 725.121(A)(3).

Notes

Count on it.

