

Lynx Smart Module

Design Guide

TORO

Introduction

The Lynx Smart Module (LSM) provides industry leading, next generation control for Toro Lynx 2-Wire systems. Advanced Smart Guard™ lightning protection meets the highest IEC standards for irrigation controls. Installation and maintenance are simplified through use of the Toro barcode app for iOS and Android devices. Rapid two-way communication and enhanced diagnostics allow you to quickly confirm that your system is operational. The LSM is compatible with all INFINITY and Flex800 golf sprinklers and P220 and 220G golf valves as well as 100% backwards compatible with 2006-2017 GDC systems using GDC modules DEC-ISP-1, DEC-ISP-2 or DEC-ISP-4.

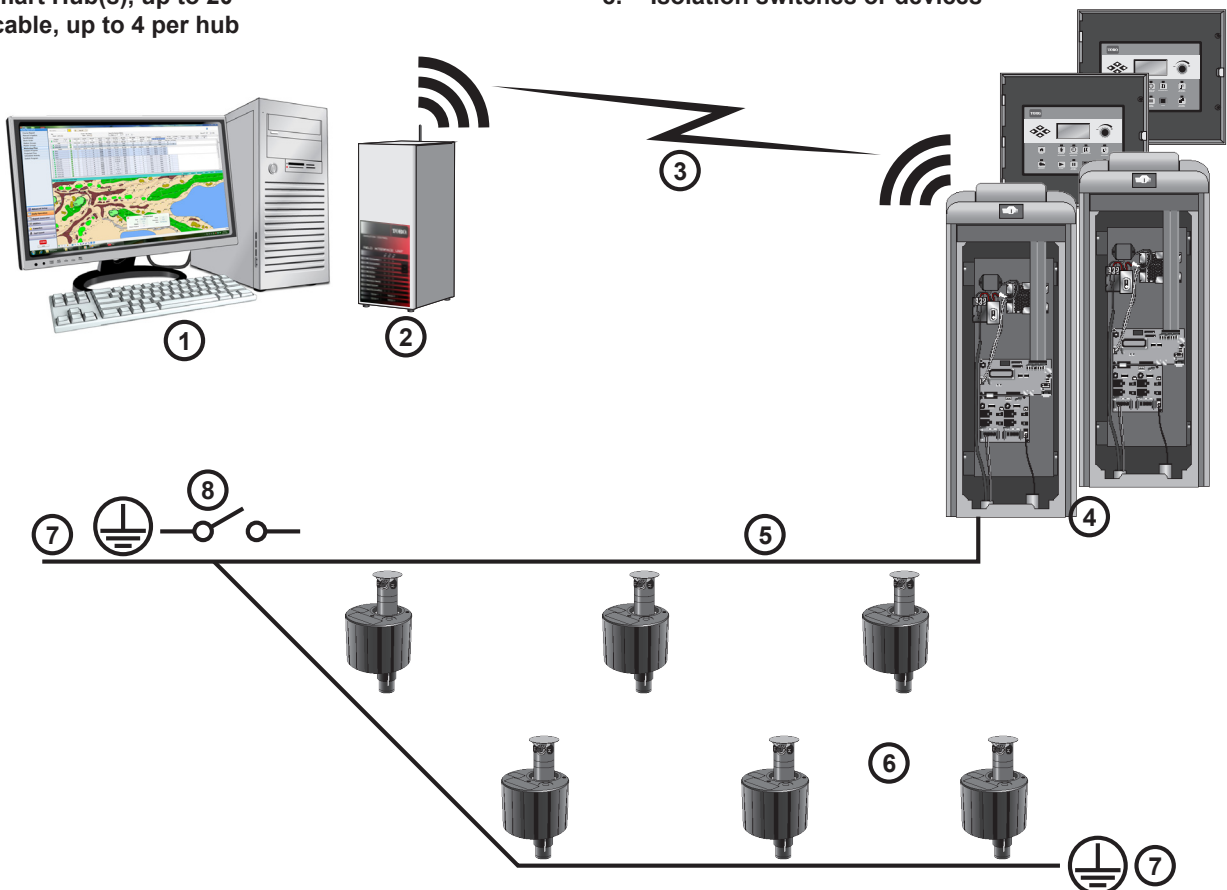


Specifications

Model Number	LSM-1 or LSM-1GB
Dimensions	4" x 3" x 1.5"
Weight	0.5 lb
Address	6 character, alpha-numeric
Input Voltage	40 VAC nominal
Input Current	0.00014 amps nominal
Surge Resistance	20KV, 10KA per IEC 61000-4-5
Solenoid Compatibility	Toro 102-2709 or DCLS-P
Input wiring	16 AWG, solid core
Approvals	FCC, cUL, CE, TUV, RCM

System Components

1. Central (Toro PC with Lynx Software)
2. Field Interface Unit (FIU)
3. Connection via wire or radio
4. Lynx Smart Hub(s), up to 20
5. 2-wire cable, up to 4 per hub
6. LSM equipped sprinkler or valve (Infinity, Flex 800, P220), up to 250 per cable
7. Ground points
8. Isolation switches or devices



The Details

Capacity

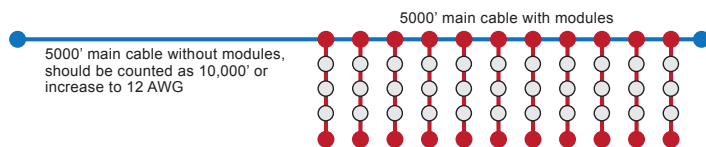
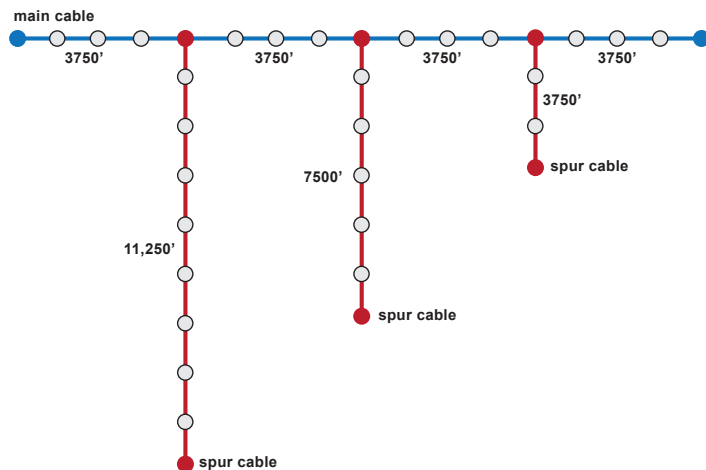
Lynx Smart Hubs per system	20
Modules per Lynx Smart Hub	1000
Daughter boards per Lynx Smart Hub	2
Wire paths per daughter board	2
Modules per wire path	250
Simultaneous solenoids per wire path	50

Wire Sizing

Sleep current	0.00014 amps
Active current	0.00070 amps
Average current	0.00025 amps
Maximum design voltage drop	3.0 volts

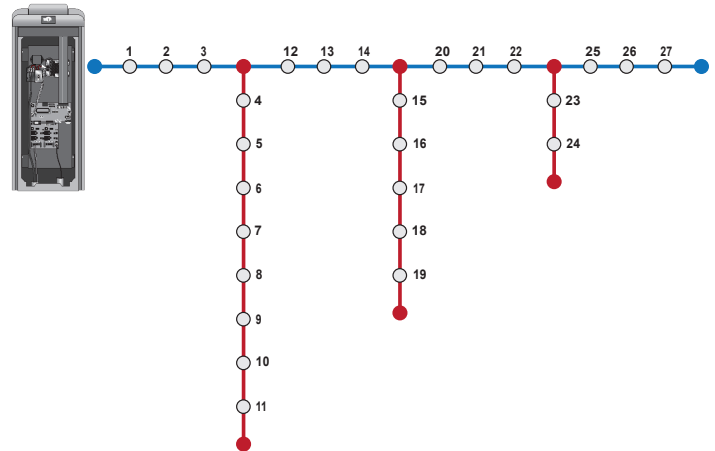
Total main cable length not to exceed 15,000 feet (14 AWG). Total spur cable amount is unlimited, as long as the furthest module is not further than 15,000 feet from the Lynx Smart Hub. A cable should never form a loop that is connected back to itself.

If there is a long section of cable with no modules attached, that length should be counted as double, or increase the size of that section from 14 AWG up to 12 AWG. For example, if there is a 5000 ft section with no modules, count it as 10,000 ft or use 5000 ft of 12 AWG for the section with no modules.



Station Numbering

To optimize the advanced diagnostic features, the station numbering should follow the wire, with the lowest station numbers closest to the Lynx Smart Hub and the highest station numbers at the end of the main cable path. Branches should be included in the numbering sequence as shown.



Surge Device

DEC-SG-LINE

Spacing of surge devices is 1000 ft (305m). Each LSM should be within 500ft (150m) of a surge device. Connect white wire to white communication wire, black wire to black communication wire, green wire to ground. Long sections of cable without LSM modules do not require surge devices.

Wire

14 AWG, two-conductor, insulated wire suitable for direct burial applications for operation up to 600 volts and conductor temperatures up to 60°C. Listed by UL, ETL or CSA. Soft drawn bare copper conductor meeting the requirements of ASTM specification B-3 or B-8. PE or PVC insulation, 1 or two layers, minimum thickness .075 inches. Paige P7389D, Paige P7350D, P7072D, or equivalent.

Splices

All splices should be made with either Toro Golf Red connector 363-6443 or 3M DBR/Y-6



Grounding

Toro surge protection devices require an acceptable ground to dissipate excess energy. In all cases a ground is required and the lower the resistance the more effectively those surge protection devices will operate.

Grounding for surge protection must be measured at the time of installation and Toro recommends a resistance reading of 10 ohms or less.

The installation of a ground rod, a ground plate, and enhancement material at each ground device should be used as a best practice. When these devices are installed per the manufacturer's instructions, this grounding strategy is considered effective; yet may not always achieve the 10-ohm or less recommendation.

As a best practice, Toro recommends that all ground and surge devices be checked annually and/or after a significant lightning event.

All other electrical equipment grounds must meet local electrical codes.

Toro advises against the use of a bonding/shielding wire to protect the Toro components of Toro control systems.

Grounding materials or equipment that is not specified in the Toro installation instructions must not be connected to the Toro communication/power wiring or the grounding for the communication/power wiring.

Fuse Devices

Fuse devices, like the Paige DCFD, work like isolation valves for the communication wiring. We allow using these devices (or equivalent) at significant cable junction points in order to facilitate isolation and troubleshooting without having to disconnect wires or waterproof splices. If DCFD devices are used, we recommend a 20-amp fuse, not a 5-amp fuse. In high lightning areas, we recommend the addition of one DEC-SG-LINE surge device on the input and all outputs of the DCFD and that they should be grounded per grounding recommendations listed above.

High Voltage Cables

Toro recommends that all communication cables be kept separate from mains power cabling. Power cables which have a higher voltage than communication/mains control cabling will induce a voltage into that communication line through transformer effect. This will be detrimental to the communication reliability. All cables must be separated from high voltage power lines by at least 30cm per these guidelines

Power Cable Circuit Rating (max KVA*)	Recommended Minimum Spacing**
0-5 KVA	30cm
5-10 KVA	60cm
10-20 KVA	120cm
>20 KVA	3m

* Maximum Voltage x Current ratings of circuit

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

The Components

Software

Lynx V7.0 or later

FIU

The FIU is used in all systems. It provides the communication link between the PC and the Lynx Smart Hub(s). Communication can be by wireline or radio.

FIU-2010	wireline only communication
FIU-2011DR	wireline and radio communication



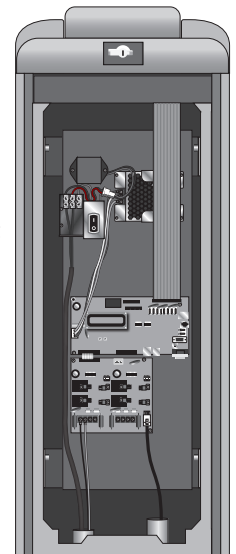
FIU

Lynx Smart Hub

The Lynx Smart Hub is the interface that converts the signals from the computer into the 2-way high speed data signal that goes out to all of the Lynx Smart Modules. All systems require at least one Hub. It can be installed in the office, next to the computer, or in a remote location on the golf course.

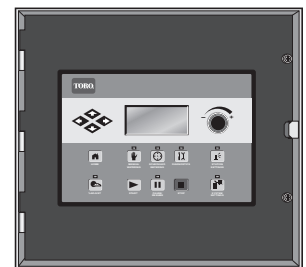
Features

- Plastic pedestal or metal wall-mount enclosure
- Local or Remote Mounting
- Wired or Radio Communication – up to two miles
- Faceplate stores a downloaded irrigation program, shows what is running, and allows manual watering.



pedestal

Each of the Lynx Smart Hubs (up to 20 per system), can have wire or radio communication. If you have two or more Lynx Smart Hubs co-located, and you are using radio communication, you only need one unit with radio and the other co-located Lynx Smart Hubs can communicate with the radio Lynx Smart Hub via wire.



wall-mount

Front Panel Controls

- The Lynx Smart Hub receives a list of up to 1000 stations that will run automatically, even if communication is interrupted
- Program list can be viewed under scheduled activity
- Features multi-manual program, with up to 500 stations and 50 simultaneous stations
- All currently running stations can be stopped at once
- Communication can be monitored between the Lynx Smart Hub and the central FIU.

Specifications

- Up to 1000 stations per Lynx Smart Hub
- Each Smart Hub has two daughter boards
- Each daughter board can have two wire paths with up to 250 decoder modules each
- Each system can have up to 20 Lynx Smart Hubs

Wired Communication

- Uses standard satellite type communication cable (Paige P7162D) to connect FIU to Lynx Smart Hubs
- Communication cable can be up to 50,000 feet

Wireless Communication

- Uses UHF data radio in the FIU and the Lynx Smart Hub
- RF output power – 2.0 watts
- Typical Range – up to two miles
- Frequency programmable from 450 to 480 MHz
- Plastic pedestal models include a 3dB antenna
- Metal cabinet models and FIU include a BNC connector for external antenna
- FCC ID# SRS-RV-M7-UC
- Requires a radio site survey and an operating license

Enclosures

- Plastic 17 in X 16 in X 40 in HDPE
- Wall Mount - 14 in X 13 in X 6 in, powder coated steel
- IP 44 rated
- Input 100-240 VAC, 50/60Hz, 75 VA
- Output 40 VAC, 75 W
- UL/cUL listed

Model Numbers

DEC-RS-1000-M
DEC-RS-1000-DR
DEC-RSP-1000-M
DEC-RSP-1000-DR
DEC-RST-1000-M
DEC-RST-1000-DR
DEC-RSB-1000-M
DEC-RSB-1000-DR

