SitePro™ Central Decoder System Components
Installation Instructions

Introduction

The SitePro Central Decoder System (CDS) program works in conjunction with the SitePro Field Interface Unit (FIU) (model F-1000) and the Decoder Interface Unit (DIU). The following instructions cover installation of the FIU, Surge Protection Unit (SPU), wall jack assembly and communication cable. For DIU and decoder module installation details, refer to form number 368-0038.

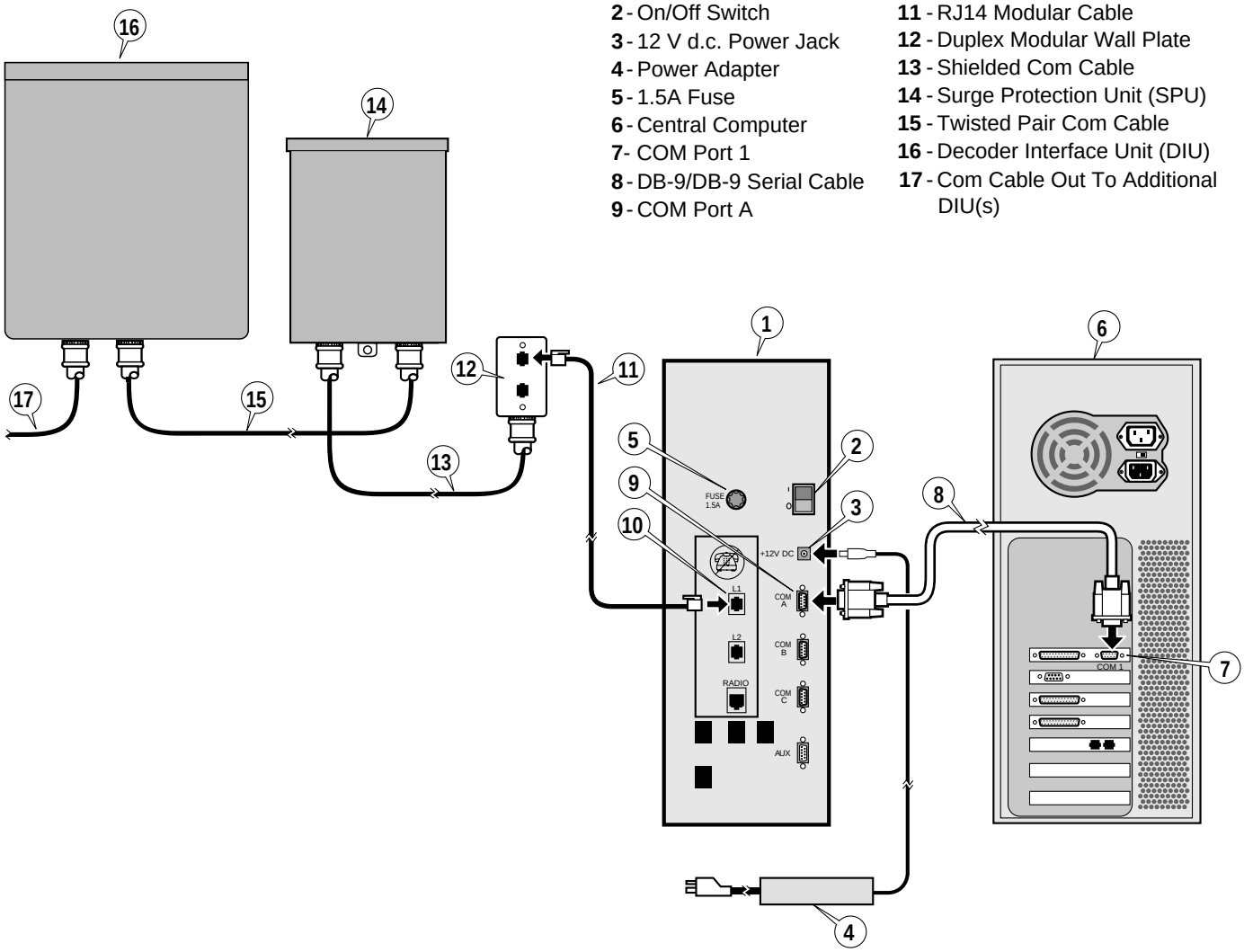
Please review the instructions completely first to determine the tools and any additional materials required to complete the installation process; then follow the step-by-step procedures in the order presented.

Important: The DIU must have the proper firmware EPROM installed to function properly with the SitePro operating system. If the DIU is date coded prior to H-97, use Kit A, P/N 89-9813. For date code H-97 and later, user Kit B, P/N 89-9814.

Caution: All applicable safety and electrical codes must be strictly followed when installing the following equipment.

Figure 1- Hardware Connection Overview

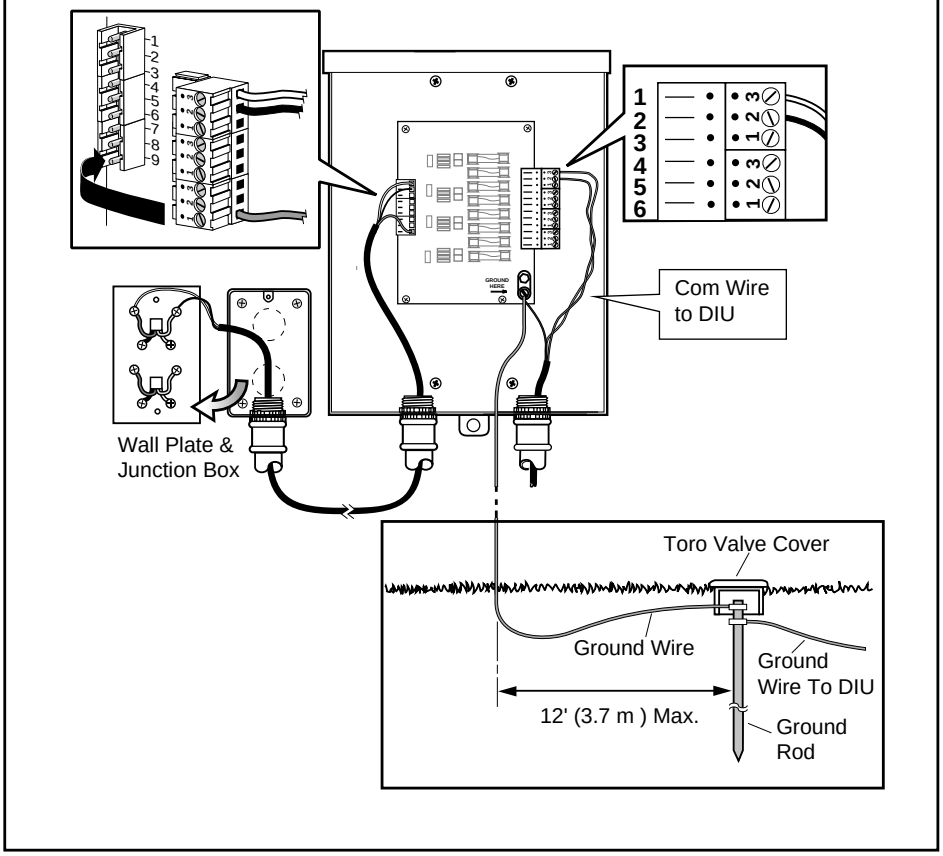
1 - Field Interface Unit (FIU)
2 - On/Off Switch
3 - 12 V d.c. Power Jack
4 - Power Adapter
5 - 1.5A Fuse
6 - Central Computer
7 - COM Port 1
8 - DB-9/DB-9 Serial Cable
9 - COM Port A
10 - COM Port Link 1 (L1)
11 - RJ14 Modular Cable
12 - Duplex Modular Wall Plate
13 - Shielded Com Cable
14 - Surge Protection Unit (SPU)
15 - Twisted Pair Com Cable
16 - Decoder Interface Unit (DIU)
17 - Com Cable Out To Additional DIU(s)



Surge Protection Unit Installation Procedure

1. Select an exterior wall installation site for the SPU within 25' (7.6m) of FIU and 12' (3.6m) or less of a suitable location for earth ground conductor installation.
2. Attach the SPU to the wall using the screws provided or the appropriate fasteners for type of wall construction material. Ensure SPU is securely mounted to the wall before continuing.

Figure 2



Wall Jack And Communication Wire Installation Procedure

1. Attach a standard duplex junction box to the interior wall within 5' (1.5m) of the FIU.
2. Install approved electrical conduit from junction box to the SPU.

   Note: Metal conduit is required to meet FCC class B requirements.
3. Pull a length of shielded, twisted-pair, communication cable through the conduit from the SPU to the junction box.
4. At the junction box, carefully remove the cable insulation to expose 6" (15cm) of wire. Cut off the drain wire flush with the insulation. Strip 3/8" (10 mm) of insulation from the wires
5. At the wall jack terminals, connect the white wire to the green wire terminal and the black wire to the red wire terminal.
6. Install the wall jack plate to the junction box.
7. Connect the FIU to the wall jack using the modular cable provided (reference item 11 in **Figure 1**).
8. At the SPU, carefully remove the cable insulation to expose approximately 6" (15cm) of wire leads. Remove 3/8" (10 mm) of insulation from the wire pair.
9. Secure black and white wires and drain wire to the SPU connector plug as shown in **Figure 2**.

   Note: The connector plug can be removed from the PCB receptacle to facilitate wire installation. When inserting the plug into receptacle after connection wires, ensure that the plug is inserted securely. **Improper insertion of the plug into the receptacle can cause faulty communication between the FIU and DIU**.

Earth Ground Installation

Note: The 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 should have 10 ohms or less resistance (when measured with an earth ground resistance test device). For optimum ground protection, all electrical components throughout the irrigation system should be grounded in a manner which provides the same ground potential.

The following instructions depict one of several recommended 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 alternate grounding methods 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).

A separate earth ground wire connection is required for the SPU and each DIU installed . A large copper ground lug is provided in each unit for this connection.

Procedure

1. Drive a 5/8" (16mm) by 8' (2.5m) copper-clad steel rod into well-moistened soil not more than 12' (3.7m) from the satellite. The top of the ground rod should be slightly below grade level. See **Figure 2**.
2. Using a 5/8" (16mm) clamp or “Cad weld” fastener, attach a length of 6 AWG (6mm^2) solid-core, bare copper wire near

the top of the ground rod. Avoiding sharp bends, route the wire into the SPU and secure to the ground lug.

3. Ensure the soil surrounding the ground rod remains well moistened at all times. Measure the ground resistance per the instructions provided with the ground test instrument. A reading of 0 ohms is optimum, up to 10 ohms is good and 11–30 ohms is acceptable in most cases. If the resistance exceeds the acceptable limit, an additional ground rod can be installed at a distance equal to twice the buried depth of the first rod (i.e., 16' [4.9m]). Connect the ground rods using 6 AWG (6mm^2) bare copper wire and test again. If the ground resistance remains high, contact your local Toro distributor for further assistance and recommendations.

   Optional: Install a Toro Valve Cover, P/N 850-00, over the ground rod to provide access to the ground wire connection(s).

In-Ground Communication Cable Installation Procedure

Note: In-ground communication cable installation from the SPU to the DIU requires the use of shielded, twisted pair cable . In-ground cable splices should be avoided. If splices or repairs are required, use an appropriate water-proof splicing device such as Scotchcast 82-A1 or equivalent.

1. Route a continuous length of communication cable from the SPU to the DIU installation site.

   Note: Cable installation depth is determined by local code requirements.

2. Dress approximately 18" (45.7cm) of cable into SPU and DIU. Leave a 24" (61 cm) service loop at each site.
3. At the SPU and DIU, remove insulation to expose 16" (40.6cm) of communication and drain wires. Strip off 3/8" (10 mm) insulation from the communication wires.
4. At the SPU, secure the communication wires to terminal connector plug as follows: white to #1 and black to #2 and drain wire to the ground lug. See **Figure 2**.
5. At the DIU, connect the communication wires to the plug terminals as follows: white wire to top and black to center. See **Figure 3**.
6. Connect a ground wire from the DIU ground lug to the SPU ground rod if within 12' (3.6m) or to another ground rod using the same grounding technique.

Figure 3

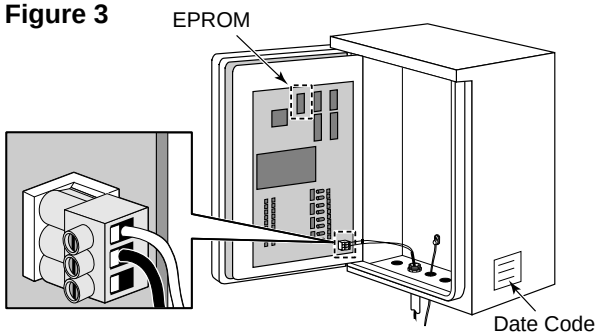
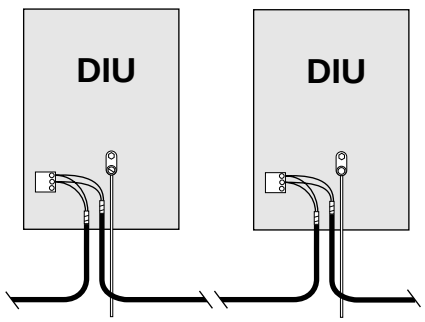


Figure 4



Note: To enable operation with the SitePro operating system, the DIU firmware EPROM indicated in **Figure 3** must be replaced. Use kit A, P/N 89-xxxx for date code prior to H-97; date code H-97 and later, use kit B, P/N9-xxxx.

Note: If installing more than one DIU, connect the communication cable in series as shown in **Figure 4.**

Testing Communication Cable

Note: Correct installation of the communication cable is essential for proper operation of the Central Decoder System. The communication cable must be tested for the presence of significant voltage, circuit continuity and excessive resistance. A digital multimeter and a 600 Ohm resistor are required to perform the following tests.

1. Remove communication wire connector plug at DIU location(s).
2. At SPU, remove communication wire connector plug.
3. Test for presence of voltage on com and drain wire as follows:

   Connect positive lead of voltmeter to either end of wire circuit and negative lead to an earth ground. If voltmeter indicates any significant voltage, connect a 600 Ohm resistor between open end of wire circuit and earth ground. Perform voltage test again. If voltage drops to less than one volt, the voltage is induced and will not impair operation of the communication circuit. If voltage does not drop, a direct connection to a power source exists which must be located and corrected. When all wire circuits have been tested successfully, continue to Step 4.

4. Test white, black and drain wire circuits for possible cross connection (white connected to black etc.). Perform test as follows:

   Connect one Ohmmeter lead to white wire and one lead to black wire; Ohmmeter should indicate an open circuit. If Ohmmeter indicates a complete circuit, check communication wire connector plug at each DIU location for possible crossed connection. When wire circuit has been corrected and/or tested successfully, continue to Step 5.

5.Test signal and drain wire circuit for continuity and total resistance. Perform test as follows:

At last DIU location, install a short jumper wire to connector plug across white and black wires. At SPU, connect Ohmmeter leads to ends of wire circuit. If circuit continuity is good, Ohmmeter will indicate resistance. Record resistance (ohms) reading for future reference. If circuit is open (no resistance), check communication wire connector plug at each DIU location for loose or improperly installed wires. When circuit has been tested successfully and resistance recorded, remove jumper from connector. Install DIU communication wire connector, and continue to Step 6.

6. Determine if measured resistance of signal wire circuit is less than or equal to maximum allowable resistance. Maximum allowable resistance of 16 gauge signal wire is 7 Ω (ohms) per 1000 feet (305 meters). Maximum allowable resistance of 18 gauge signal wire is 11 Ω per 1000 feet (305 meters). Calculate resistance as follows:
7. First, find maximum allowable resistance for actual length of communication wire circuit: Divide length of circuit by 1000 feet (305 meters); multiply quotient by 7 (for 16 gauge) or 11 (for 18 gauge). The product equals maximum allowable resistance of circuit.

Example – Total length of 16 AWG wire circuit is 3500 feet (1067 meters)

3500 ft. (1067 m) ÷ 1000 ft. (305 m) = 3.5

3.5 x 7 Ω = 24.5 Ω

8. Next, compare actual circuit resistance measured in Step 5 with calculated maximum allowable ohms. If actual resistance exceeds maximum, check communication wire for damage and/or possible break. Also check connector plug at each DIU location for loose or improperly installed wires. If actual resistance is less than or equal to maximum, circuit is properly installed.
9. When all wire circuits have been tested successfully, reconnect all signal cable connector plugs at all DIU locations and at SPU.

System Setup

1. Check all cable connections at the Field Interface Unit, central computer, Modular Wall Plate and SPU and DIU.
2. Switch on the Field Interface Unit.
3. From the SitePro program menu bar, select: Setup> Hardware.
4. From the “System” tab, select the Central Decoder System.
5. From the “Communications” tab, select the “Wire” subtab.
6. Using the scroll down list provided, select the computer com port associated with the FIU (Field Interface Unit) Com Port.
7. Click OK to exit the setup window. This completes the SitePro setup procedure.

Field Interface Unit Specifications

Enclosure Dimensions: 5" W x 6.5" D x 17" H (12.7cm W x 16.5cm D x 43.2cm H)
Input: 12 V d.c., 1.5A (max.)
Output: NEC Class 2
Fuse Protection: 1.5A (fast-blow)
Caution: For continued protection against risk of fire, replace only with the same type and rating of fuse.

AC Power Supply Specifications

Input: 100–250 V a.c., 50/60 Hz, 0.38A, ± 10%
Output: 12 V d.c., 1.5A

Electromagnetic Compatibility

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.

TORO

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