



Rain Bird IC System™

Tips for a Successful Installation



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Several documents are available to assist with the successful installation of your Rain Bird IC System. Reviewing all of these documents prior to beginning the design or installation of a system will help to ensure the system is successfully installed. These documents include:

- IC System Design Guide,
- IC System Installation Manual,
- ICI Installation Manual,
- IC System Operation and Troubleshooting Guide,
- IC System Design Details

These documents are available on the Rain Bird Golf Web Site or from your Rain Bird Distributor.

The comments contained within in this publication reflect “lessons learned” from recent IC System installations worldwide. They may prove useful during the installation process. This document is not designed to replace the support materials listed above but includes tips provided by installers and users based on field experience. This guide is intended to simplify the installation process by preventing common mistakes as well as ensure the successful start up of the IC System. Comments are separated into the following categories:

- Setting up the IC Interface
- Field Installation and Wiring
- Grounding and Bonding
- Rain Bird Software and the IC System
- Initial Operation and Troubleshooting
- Typical Central Control Installation Notes

This document will be updated periodically so check the Rain Bird Golf Web Site or contact your Rain Bird distributor for the latest version. Have you learned something new about the IC system you would like to share? Let the team at Rain Bird Global Service Plan (GSP) know at 1-866-GSP-XPRT, or 1-866-477-9778.

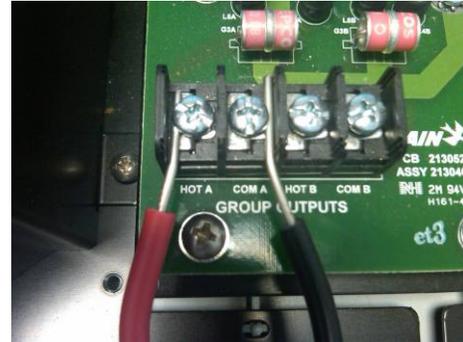
Setting up the IC Interface:

Please see the IC Interface Installation Manual for basic installation guidelines.

CONNECTING WIRE PATHS TO THE INTERFACE:

An interface has a maximum of two driver boards. Each driver board has two wire group outputs – labeled “A” and “B” on the board.

When identifying wire paths in the computer software, the left driver board is considered wire paths 1 and 2, though they are labeled A and B respectively. The right driver board (if installed) has wire paths 3 and 4.



Both conductors from a MAXI™ cable pair must be on the same output group, A or B. Do not cross wires among outputs A and B or between driver boards.

The red conductor of the MAXI cable should be connected to the “Hot” terminal and the black conductor should be connected to the “COM” terminal as shown in the photo.

Output voltage for a wire path should be between 25 and 28 VAC. With the wire path switch “ON” use a volt meter (and set for Volts AC) to measure across the HOT and COM wire paths on A.

LED LIGHTS ON DRIVER BOARDS:

There are 2 LED lights on each wire path of the Driver board. LED status can be used to indicate system operation on the wire path as follows:

	<u>LED CONDITION</u>	<u>EXPLANATION</u>
Data LED (top of Driver Board)	Flickering	Normal condition. When flickering, is communicating with the field.
	Solid “on”	Indicates a direct short on the wire path (i.e. wires crossed in the field.)
	Off	No communication with central software or CPU board in Interface.
Wire Path LED (lower LED on board, below on/off switch)	Solid “on”	Normal operation to communicate to the field. The on/off switch has to be “on” to illuminate the LED.
	Flickering	If the top Data LED is solid, indicates a dead short on the wire path.
	Off	No power to the field. On/off switch could be turned off, or could be a bad Driver board.

Field Installation and Wiring:

POWER TO THE WIRE PATH SHOULD BE “OFF” BEFORE MAKING WIRE

CONNECTIONS IN THE FIELD: Use the On/Off switch on the Driver Board to control power supply to a wire path, as shown in the photo at right. Off is down. The power supply to the field should be off before attempting any field wiring. Do not attempt to “hot wire” ICM’s or ICSD’s to the wire path.

COLORED MAXI CABLE: Different colors of Maxi™ cable should be used for each wire path to reduce the potential of cross-connecting wire paths and for easy wire path identification in the field.

RED TO RED, BLACK TO BLACK: The IC System has polarity on the wire path. Red conductors of the MAXI™ cable are connected to red conductors and black conductors are connected to black conductors.

LOCATING MAXI CABLE IN THE TRENCH: When installing the Maxi™ cable in the trench, locate it below and to the side of the irrigation pipe to protect the cable from shovel strikes. It may be beneficial to locate all MAXI cables on the same side of the trench i.e. always right side of the trench as facing the next green. This makes it easier to locate cables for system expansion or testing. Damage to the cable can cause undesirable operation and a short to ground.

KING SAFETY STRIPPERS: To ensure integrity of the Maxi cable, during installation use the approved King Safety Stripper tool as shown at right. These wire strippers reduce cuts, nicks, or cracks in the outer jacket. Avoid using a utility knife to strip the outer jacket of the Maxi cable.



ELIMINATE NICKS: Eliminate nicks or exposed copper conductors from the wire path if observed during installation. Over time, exposure may cause corrosion and lead to cable faults. Do not use utility or pocket knives to make cable splices.

OPEN WIRE ENDS: All open wire ends, whether stripped or not, should be covered with a UL-listed splice kit rated for direct bury (UL 486D).

BARE COPPER: When completing wire connections, ensure that bare copper conductors are well inside the silicone of the wire connector. Exposed bare copper may degrade over time.

CROSSING WIRE PATHS: Never cross-connect two different wire paths. Each wire path should be independent of any other wire path. Cross-connection can lead to damage of the interface due to back feeding of power.

INCLUDE ICM ADDRESSES ON THE RECORD DRAWING: A detailed record drawing showing ICM address labels by location can help to quickly troubleshoot and identify the

location of field issues. The record drawing should also include locations of ICSD surge devices, in line switches or fuses and wire splices not at an ICM or ICSD. Having a record drawing in electronic format, complete with ICM addresses, may be useful for future reference.

ICM ADDRESSES: Take care when recording addresses from ICM modules. A tear-off label is attached to each ICM so that it can be removed and posted in a notebook or on a record drawing. Hand written addresses can be misread, causing errors when entered into the software database.

LEAVE ENOUGH SPARE WIRE: At all wire connections, leave enough slack Maxi cable to lift the splice to at least 24" above grade.

COIL EXTRA CABLE BELOW THE ICM: For wire connections at ICM rotors, coil the cable and place it below the ICM before back filling. Do not coil the cable around the rotor or tape spare cable to the rotor or swing joint. This can make it more difficult to access the cable in future.

TESTING THE INTEGRITY OF THE IC WIRE PATH: The IC System is capable of measuring voltage directly at the ICM at each sprinkler or valve. This is a powerful diagnostic tool for installers and specifiers, enabling the verification of the quality of the wire path immediately upon installation. This is an electrical check that can be done after the wire path is established and even before there is water in the system. Using the diagnostics in the central control software, the voltage at each Module should be measured. Changes in voltage along a wire path can indicate poor wire splices or nicks in the cable. Consider this diagnostic similar to a "pressure test" of the hydraulic system that is used to determine how many leaks exist in the pipe network. Using the voltage diagnostics, these weak points can be identified quickly and easily, reducing the likelihood of future wire path issues. Voltage losses should be minimal along the wire path on a typical golf hole. Significant voltage drops (greater than 0.5v) between ICM's on a wire path indicates a possible weak point on the wire path.

Grounding and Bonding:

A 10 gauge bare copper bonding/shielding wire may be optionally specified, depending upon the irrigation designer's specifications. If specified, please consider the following tips:

LOCATE BOND WIRE DIRECTLY ABOVE MAXI CABLE: The bond wire should be located directly above the Maxi™ cable, approximately four inches above the top of the pipe and 12-18 inches below the soil surface. If the MAXI cable is located to the side of the trench, the bond wire should be located to the same side, above the cable.

CHECK RESISTANCE OF ROD BEFORE CONNECTING BOND WIRE: If using a bonding/shielding wire to connect ground rods or plates, check the resistance of the individual rods or plates before connecting the bond wire with a three point or "fall of potential" meter. Clamp on meters are not accurate when testing single ground sites. A bond wire will usually lower the resistance, but the rod or plate also needs a good resistance reading independent of the bond wire to ensure that there is low impedance (a good path) to ground.

ICSD GROUNDING: The ground rod or plate at ICSD locations should be installed so that resistance of the individual rod or plate is 45 ohms or less. The earth ground test should be measured at a minimum of 15 different locations across the site to provide a reasonable sampling of the grounding on the wire path and ensure good grounding exists along the length of the wire path. If the resistance is above 45 ohms, an extra ground rod may be required to improve the earth ground resistance and achieve the desired resistance. Two methods may be employed to install additional rods or plates, depending upon soil conditions. If soil conditions permit driving a ground rod deeper in the ground, couple a second rod to the initial rod and drive both rods deeper. Alternately, a second rod or plate can be added, separated by 16 feet and connected with bare copper wire to the first rod. Either method has proven successful in reducing the resistance to ground. Following the addition of rods or plates, the resistance test should be repeated to determine whether the desired reading has been achieved. The process should be repeated until desired grounding is accomplished.

VERIFY ALL BONDING CONNECTIONS ARE COMPLETED: The bonding/shielding wire is much more effective if all connections are completed. Double-check to ensure that all bond wires are properly connected and that all ground rods and plates are connected to the bond wire. A missing, incomplete or disconnected section of bond wire will greatly diminish the effectiveness of the bonding effect.

CADWELD® CONNECTIONS WITH BOND WIRES: Cadweld® One Shot exothermic connections are designed for use with 6 gauge or larger wire. If using a 10 gauge bonding wire in the system, the Cadweld may "burn through" the 10 gauge wire, causing the wire connection to be loose. This may not provide a secure bonding connection to the rod.

One suggested solution to prevent a Cadweld from “burning through” is to tightly twist 2 or 3 short (1 foot long) pieces of 10 gauge wire together with the bond wire where a Cadweld is to be used. This helps increase the effective diameter of the bond wire at this location. If this method is used, be sure to pull on the bond wire after Cadweld is used to make sure the connection is secure. Loose connections should be re-done. (Paige Electric has produced a Tech Tip to provide assistance on the proper use Cadweld One Shots with 10 gauge bond wire.)

Use of an UL-listed Acorn Clamp is an accepted alternate to Cadweld connections to ground rods.

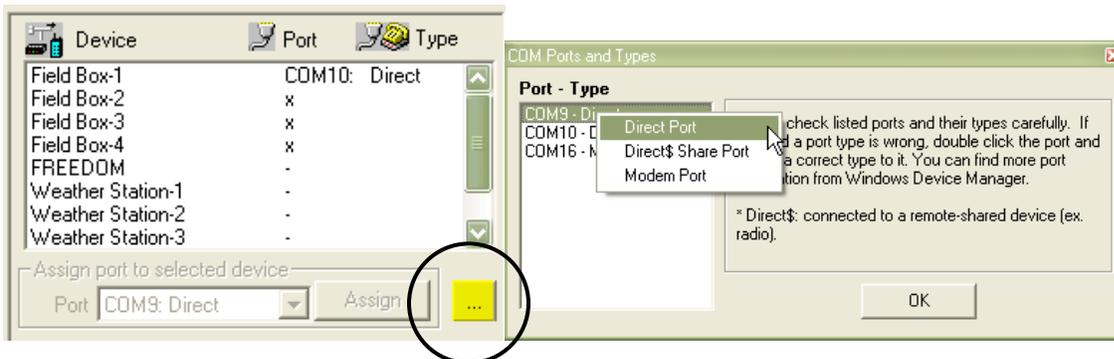
KEEP THE BOND WIRE STRAIGHT: Bond wire should be kept as straight as possible during the installation process with no sharp turns, elbows or bends. All bends should be smooth radius curves. Kinks and sharp bends can increase the impedance of the wire path and reduce the effectiveness of the bond wire.

BEST PRACTICES – ICSD’S: If an electrical surge damages ICM’s on a wire path, it is a recommended “best practice” to replace the field surge devices (ICSD’s) on either side of any damaged ICM units on the wire path. The ICSD surge devices are designed to withstand many electrical surges and will usually reset after shunting an electrical surge to ground. However it is recommended to replace ICSD’s in the affected area to ensure proper grounding in that area.

Rain Bird Software and the IC System:

There are five (5) levels of Rain Bird Central Control software that work with the IC System. In the following notes, when referring to “Rain Bird software” it applies for any of the five levels of Rain Bird central control software.

COM PORT SETTINGS: The IC Interface connects to the computer through a USB port. When connected, a “virtual COM port” setting is created in the computer. When the Rain Bird software is opened, the proper COM port must be selected to communicate with the Interface, similar to other devices. Ensure that the “virtual com port” is chosen, matching the COM port established in the computer. It should automatically appear as an option in the hardware settings area of the Rain Bird software. Occasionally the Rain Bird software does not identify the USB connection as a direct port and will show as “Unknown” in the software. This will be indicated by a yellow “Change Port Types” button. To correct this simply click on the yellow button, then double click on the port number listed as unknown and change it to Direct Port. If uncertain how to verify the COM port, contact Rain Bird GSP.



ENTERING ICM ADDRESSES INTO SOFTWARE:

One of the unique features of the IC System is that the central computer continuously communicates with all of the IC Modules in the field, monitoring proper communication and operation. During the installation process, this “live” communication can create short-term complications if addresses have been entered in the Rain Bird software, but the ICM’s have not yet been installed in the field. Slower than usual communication with the field may be the result. Two important guidelines follow:

Ideally ICM addresses are entered into the “Station Detail” screen in the software after an ICM is installed and connected to the wire path and the wire path has been connected to the Interface.

In the event that ICM addresses are entered into the software database before the ICMs are physically wired and connected to the system, please complete the following step to ensure proper short-term communication with the field during installation:

In the “Station Detail” screen of the software and for each address that is entered in the database but not physically connected to the system, change the dropdown setting in the “Fast Connect” column from “Not Connected” to “Suspend.” Changing the setting to “Suspend” tells the Rain Bird software that the ICM is not physically connected to the system and the software will not look for that address.

{Failing to change an address to “Suspend”, if entered in the database but not connected to the wire path, may cause the software to keep searching for the module on the wire path. This may cause slower system operation as the software continues to search for the “missing” address. This is a short-term issue that may be observed during the installation process.}

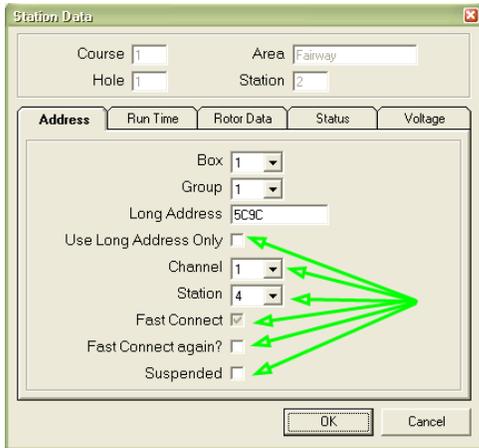
ENTER ICM ADDRESSES ON PROPER WIRE PATH: Take care to enter addresses in the proper station location (1F1, 1F2 etc) and on the proper wire path in the software database. An address entered in the software database with an incorrect wire path will not communicate with the central. In the software “Station Detail” screen, the station will remain as “not connected” and will report as an “empty” box in the Status Poll diagnostics. The ICM may be wired correctly in the field, but if identified in the software database on the wrong wire path, the ICM will not communicate with the central.

LEADING “00” on ADDRESS LABEL: If the ICM has leading zeros (“00”) on the address label, the initial 0’s do not have to be entered into the software. *{As an example, the ICM address “003B4A” can be entered into the database as “3B4A” without the two leading zeros. If the leading zeros are entered, the software will automatically remove the leading zeros. Imported address from an ICM Scanner database will keep the leading zeros in place.}*

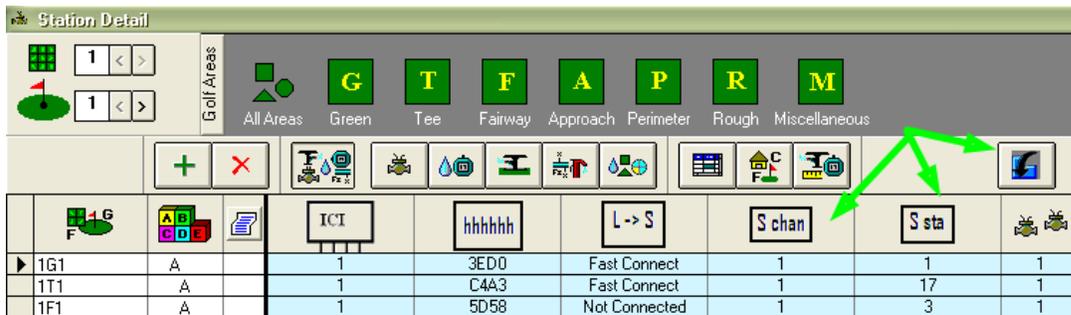
CAPTURE VOLTAGE READINGS: As each phase of the installation is completed, take and save a “Print Screen” (or print) the initial voltage readings from each ICM using the ICM Diagnostics menu. Capturing this information during initial setup is valuable if troubleshooting voltage issues in the future. Following is a simple way to capture diagnostic information electronically for future reference.

PRINTING TO A PDF FILE: Rather than printing a document on paper, to save a document or database electronically on the computer hard drive, it can be saved as a PDF file. Free PDF writing software is available for download on the internet. One example is **CutePDF™ Writer**, available for free download at <http://www.cutepdf.com/products/cutepdf/writer.asp>. This software allows you to create PDF files from documents instead of printing on a printer. Use CutePDF Writer to save diagnostic databases to PDF files for future reference and to track field devices names and other system information. *{To use the CutePDF Writer software, download and install the software on the computer. In the “Printers and Faxes” window under Start/Settings, select the “CutePDF Writer” icon, right-click and select as the “default” printer setting. Then when printing in the Rain Bird software, the file will automatically print to a PDF file, and will prompt you to provide a filename to save the file.}*

DIAGNOSTIC TROUBLESHOOTING TOOLS: The advanced diagnostic options in Course Monitor/DMA and Station Detail are password-protected. To unlock these options, follow these steps in the Rain Bird software: Navigate to Tab 3 on the top toolbar. Choose the “Password” icon. Enter “4321” (with no quotes) to unlock these options. Return to Tab 1. Choose “Monitor/Log and Course Data Views” Icon. Look for “Course Monitor/DMA” from the dropdown menu, right click on an individual station box, choose properties, and added features are now available.



Also look at “Station Detail”, and note the 2 new columns labeled “Fast Connect Channel” and “Fast Connect Station”. There will also be a new button called “Reprogram Short Address Group” used to reprogram “Fast Connect” addresses.



Initial Operation and Troubleshooting:

IF ROTOR WILL NOT ACTIVATE ELECTRICALLY: If an IC rotor won't turn ON electrically (either from the Central, Freedom or MI) during initial installation, use the software diagnostics to ensure the ICM is communicating to the central. If the ICM is passing all diagnostic tests at the Central Control, check the rotor for debris that may have entered hydraulic tubes or solenoid plunger during construction. Check operation of the rotor manually to ensure you have proper operation and pressure. Note: make sure base pressure is less than 150 PSI.

KEEP EXPOSED ICM AREA CLEAN: When unscrewing an ICM from the rotor, it is important to ensure that dirt or debris does not enter the solenoid plunger or hydraulic tube area. It's helpful to keep a squirt bottle of water on hand to spray the area and clear foreign materials from the rotor during inspection. Keeping the work area clean can help reduce issues associated with debris.

The "IC System Operation and Troubleshooting Guide" contains specific details about operating your system and how you can take advantage of the advanced diagnostic features of the IC System during the start up process. Consult this tool so you can take full advantage of the IC System capabilities using your Central Control software.

Typical Central Control Installation Notes:

Following are some notes and “best practices” related to the installation and set up of a central control system computer and interface:

WINDOWS XP OPERATING SOFTWARE: Rain Bird software is designed to operate with Windows XP, Service Pack 3. XP is a stable operating system and Rain Bird software has been extensively tested with XP.

POWER SUPPLY: The IC Interface and the central control computer should be plugged into the same 120/240v power supply and not “switched” separately. This will ensure that both the computer and Interface have power at the same time.

DEDICATED IRRIGATION COMPUTER: To minimize potential issues, the central control computer should be dedicated to the irrigation system. Ideally it would not be used for internet “surfing.” Use other computers for these tasks and maintain system integrity for the irrigation control system.

INTERNET ACCESS: When planning the location of the Central Control computer, it is valuable to have internet access. This enables the user to remotely access the central software and also allows Rain Bird GSP technicians to remotely access the central control system (with your approval) should technical support or troubleshooting be needed.

INSTALL THE GROUNDING ASSEMBLY AT THE CENTRAL FIRST: The grounding assembly at the central location should be completed and operational for each wire path before connecting the wire path to the Interface.

VERIFY EARTH GROUND RESISTANCE: Test the Central Control Grounding Assembly earth ground resistance to ensure earth ground resistance is 5 ohms or less. Grounding should be tested early in the installation process and repeated later on, then annually thereafter, to ensure that the grounding assembly meets specifications.

If uncertain how to proceed with any of these tips or if you experience any other installation obstacle, please contact Rain Bird Global Service Plan (GSP) at 1-866-GSP-XPRT, or 1-866-477-9778. Our goal is to ensure the successful operation of your new IC system in support of Rain Bird Golf Division's Professional Customer Satisfaction Policy.