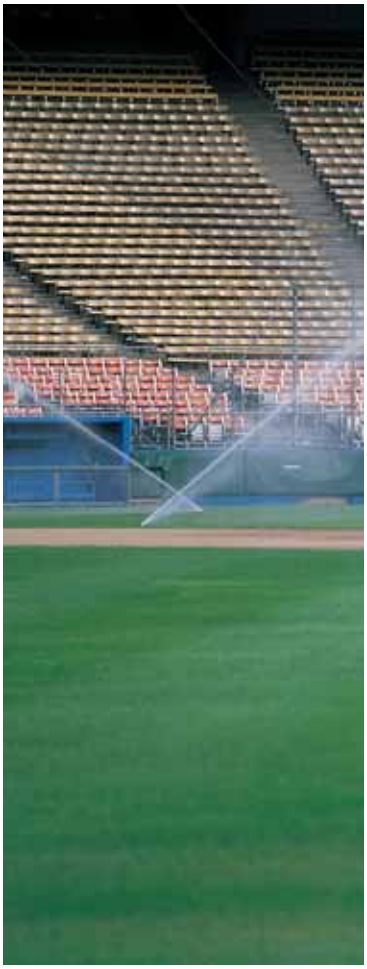


courtesy of Hunter Industries Inc.

courtesy of Rain Bird® Corporation

courtesy of Hunter Industries Inc.

The Paige® wiring guide

irrigation

Canadian Edition

Why Paige?

Because you need an irrigation wire and cable pro….

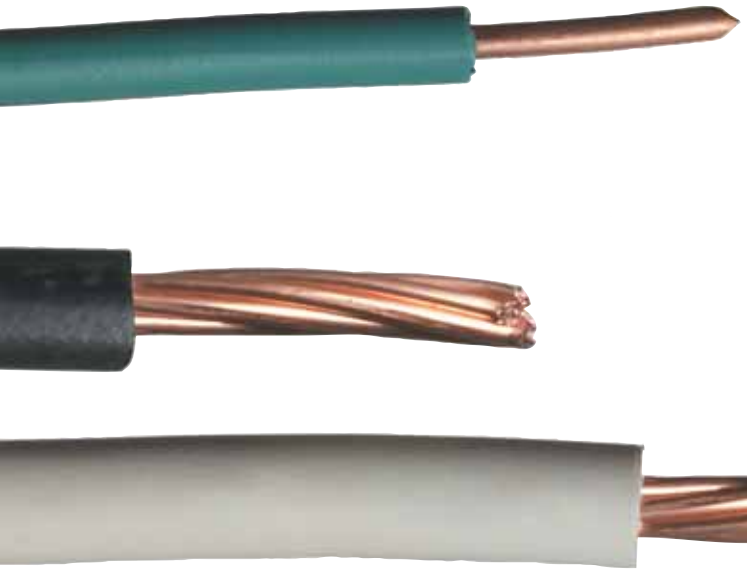
Who understands where you're coming from
Who covers the total spectrum of your cable and accessory needs
Who can talk-the-talk with your people
Who from coast-to-coast maintains the industry's largest, most comprehensive stock so your customers' needs are met promptly

Because you need one-to-one service…

From someone who answers the phone when you call.
Who's obsessed with personal, immediate response, and service.
Someone who delivers the hard-to-find items.
Someone who will develop new wires & cables to meet your needs.
Someone who will stock a cable, when others won't.
Someone with fast, same-day shipping.

Who's easy to do business with – your Paige irrigation ally.

Who takes your business personally.



Paige® grounding systems

LoVo Landscape lighting

Tuf-hide® Communication Cables

The Paige® irrigation wiring guide

CERTIFICATION
- *Wires*
- *Cables*
- *Splicing*
- *Lightning and Surge Protection (Grounding, Bonding, Shielding)*

POWER WIRES
- *Single Conductors, Type TWU*
- *Single Conductors, Type TWN*
- *Type NMWU Cable*

CONTROL WIRES
- *Single Conductors, Type TW*
- *Single Conductors, Type PE*
- *18-Multi*

COMMUNICATION CABLES
- *Toro Systems*
- *Rain Bird Systems*
- Hunter Systems
- *Weather Stations, Sensors, Telephone Lines, Etc.*

DECODER CABLES
- *Toro Systems*
- *Rain Bird Systems*
- *Hunter Systems*
- *Tucor Systems*

WIRE & CABLE INSTALLATION
- *Splices*

LIGHTNING AND SURGE PROTECTION
- *Grounding*
- *Bonding*
- *Shielding*
- *Components*

Paige®
irrigation CERTIFICATION

Generally speaking, irrigation professionals are much more knowledgeable about the hydraulic aspects of an irrigation system than they are about the electrical details. And oftentimes, contractor personnel are untrained, resulting in installations with less than satisfactory workmanship.

There are many certification programs available from the Irrigation Association, equipment manufacturers, etc. that focus on product knowledge and troubleshooting. The Paige Electric Electrical Certification Program focuses on electrical theory, best recommended practices as defined by the IEEE (The Institute of Electrical and Electronics Engineers), the laws of physics, electrical code requirements, and, generally speaking, doing things right the first time. The Paige Electric program offers many benefits to irrigation consultants, contractors, distributors, and end users as follows:

1. Consultants can require that the contractor personnel that are involved in the installation and wiring of electrical products be certified by Paige Electric to ensure some minimal level of competency. They can also require that a distributor's sales and service staff be certified as they need to be familiar with product and their application in order to properly advise their customers. A copy of the Paige Electric Certificate of Completion can be required before commencement of work on a specific project.
2. Contractors could greatly benefit from this program by having their personnel better trained to install the electrical equipment to the requirements of the consultant/designer specifications and in accordance with local and national electrical codes. The contractor's cost is greatly reduced if the installation is done right the first time. The training should also improve the contractor's safety record.
3. Distributor sales and service staffs would be better equipped to help their customers
4. Higher quality projects would result which will better the reputation of the irrigation industry, which will enhance its growth.

PROPRIETARY SPECIFICATIONS

Professional consultants and designers write specifications that include products that they know to have a good reputation. These products are usually made by reliable manufacturers who provide excellent service. The professionals also provide detail drawings to help the installer with proper methods. And some even specify certain minimum requirements for the bidding contractors such as minimum number of years of experience, certain certifications from the Irrigation Association, etc. Oftentimes the specifications are “value engineered” by others in order to reduce cost. And sometimes, those who attempt to do this are not qualified to do so.

The specifier/consultant/designer has the right to write a specification that he/she feels is in the best interest of his/her client.

Here is a typical paragraph that can be included in a specification to require certain certifications:

TYPICAL WORDING FOR CERTIFICATION SPECIFICATION

In order to provide a minimum level of workmanship, all installation personnel who are expected to work on the electrical circuits of the irrigation system shall be certified by Paige Electric Co., LP. The certification shall cover irrigation wires, cables, proper installation and splicing methods, and protecting electronic equipment from lightning and power surges. It is the responsibility of the contractor/installer to obtain such certification and to provide a copy of the "Certificate of Completion" for each person installing electrical products on the project to the irrigation consultant prior to commencement of work. It is recommended that the contractor contact Paige Electric well in advance of commencement of work to schedule his/her attending of an already scheduled seminar or to make an appointment for a new one. See list of contacts in last page of this publication.

CERTIFICATION COURSE SUMMARY

Irrigation Wires/Cables and proper splicing methods

Various types of products used in our industry are presented along with an explanation of the pros and cons of each. This is a hands-on seminar where the student works with a small group and each person actually makes connections using the products. The handout includes charts showing various products that can be used to make specific splices for any kind of wire or cable connection. Ohm’s law is also discussed in this course.

Protecting Equipment from Lightning and Power Surges

This seminar covers the requirements of the Canadian Electrical Code® (CEC)®, the laws of physics governing this subject, and best-recommended practices as prescribed by the Institute of Electrical & Electronics Engineers (IEEE.) It sounds too technical, but we present it in a practical manner such that the average folk can understand it.

The holder of the Certificate of Completion attends a training seminar and is tested on wires, cables, proper installation and splicing methods, and protecting electronic equipment from lightning and power surges. Two exams are administered at the end of each of the above courses. In order for the student to receive this certificate, he/she must pass both exams with a minimum grade of 70%. Paige Electric does not make any claim as to the actual competency of the individual nor accepts any liability with regard to his/her actions in the course of his/her providing information, products, services, etc.

Paige®
irrigation WIRES & CABLES

POWER WIRES for 120 VAC or 240 VAC Single Phase power sources to irrigation controllers (choose one of the following):

SINGLE CONDUCTORS, TYPE TWU – This type of wire is a general purpose, direct burial, product that is widely used on all kinds of irrigation systems. Available from 14 AWG up to 1/0 AWG. See specification number P7001D for available colors and stripes. Detailed color code requirements are available from the American Society of Irrigation Consultants, ASIC Guideline 102-2004 (www.asic.org, "Design Guides".)

All branch circuit wires shall be type TWU and sized according to the irrigation system plans. They are to be CSA® approved or c(UL)® listed for direct burial, and rated at 600 volts. The copper conductors shall be insulated with PVC and colored as follows:

120-volt system	
Hot	Black
Neutral	White
Equipment ground	Green

240-volt system	
Hot (Line 1)	Black
Hot (Line 2)	Red
Equipment ground	Green

Paige Electric Co., LP specification number P7001D (http://www.paigewire.com/specs/P7001D.htm)

MULTI-CONDUCTOR, TYPE TWU (120 VAC SYSTEMS ONLY) – This type of cable is a general purpose, direct burial product made-up of three TWU wires. Available from 14 AWG/3 conductors up to 4 AWG/2 conductors with ground. The "with ground" refers to the "equipment ground" (green wire), which is sized in accordance with the requirements of the Canadian Electrical Code®, as shown in table:

Wire sizes and colors					
Black	White	Green	Black	White	Green
14	14	14	8	8	10
12	12	12	6	6	10
10	10	10	4	4	8

Since this product does not need an overall outer jacket, it is easier to strip and splice thereby yielding a lower cost than type NMWU cable. See specification number P7001D. Detailed color code requirements are available form the American Society of Irrigation Consultants, ASIC Guideline 102-2004 (www.asic.org, "Design Guides".)

All branch circuit cables are to be constructed of three type TWU wires, taped together with nylon reinforced tape, and sized according to the irrigation system plans. They are to be c(UL)® listed or CSA® approved for direct burial, and rated at 600 volts. The copper conductors shall be insulated with PVC and colored as follows:

120-volt system	
Hot	Black
Neutral	White
Equipment ground	Green

SINGLE CONDUCTORS, TYPE TWN – This type of wire is used in applications where the end user requires a high degree of safety and it must be installed in conduit. Available from 14 AWG up to 1000MCM AWG. See specification number P7316 for available colors. Detailed color code requirements are available form the American Society of Irrigation Consultants, ASIC Guideline 102-2004 (www.asic.org, “Design Guides”.)

All branch circuit wires shall be type TWN and sized according to the irrigation system plans. These wires must be installed in conduit. The wires shall not occupy more than 40% of the cross-sectional area of the inner diameter of the conduit. They are to be CSA® approved or c(UL)® listed for in-conduit installations in wet applications, and rated at 600 volts. The copper conductors shall be insulated with PVC/Nylon and colored as follows:

120-volt system	
Hot	Black
Neutral	White
Equipment ground	Green

240-volt system	
Hot (Line 1)	Black
Hot (Line 2)	Red
Equipment ground	Green

Paige Electric Co., LP specification number P7316 (http://www.paigewire.com/specs/P7316.htm)

TYPE NMWU CABLE (120 VAC SYSTEMS ONLY) – Not available from Paige Electric.

CONTROL VALVE WIRES for 24 VAC (nominal) circuits (choose one of the following):

SINGLE CONDUCTORS, TYPE TWU – This type of wire is a general purpose, direct burial, product that is widely used on all kinds of irrigation systems. Available from 14 AWG up to 1/0 AWG. See specification number P7001D for available colors and stripes.

Wires connecting the remote control valves to the irrigation controller shall be single conductors, type TWU. Its construction incorporates a solid copper conductor and PVC insulation. The wires shall be CSA® approved or c(UL)® listed for direct burial in irrigation systems and be rated at a minimum of 30 VAC. Wire sizes and colors are defined in the irrigation plans and other specifications.

Paige Electric Co., LP specification number P7001D (http://www.paigewire.com/specs/P7001D.htm)

Note: White wires (or white with different color stripes) should be used only as the "common". Green wire should not be used since this color is strictly reserved for the "equipment ground" of the power source. All other colors can be used as common or hot.

SINGLE CONDUCTORS, TYPE PE – This type of wire was specifically designed for the harsh conditions of landscape projects where chemicals such as fertilizers, herbicides, pesticides, and fungicides are frequently applied. This product is excellent for these applications. See specification number P7079D for available colors and stripes.

Wires connecting the remote control valves to the irrigation controller shall be single conductors, type PE. Its construction incorporates a solid copper conductor and polyethylene (PE) insulation. The wires shall be CSA® approved or c(UL)® listed for direct burial in irrigation systems and be rated at a minimum of 30 VAC. Wire sizes and colors are defined in the irrigation plans and other specifications.

Paige Electric Co., LP specification number P7079D (http://www.paigewire.com/specs/P7079D.htm)

Note: White wires (or white with different color stripes) should be used only as the "common". Green wire should not be used since this color is strictly reserved for the "equipment ground" of the power source. All other colors can be used as common or hot.

"18-MULTI" – This is a cable with varying numbers of 18 AWG conductors, ranging from 2 to 25. It is used primarily in residential and small commercial irrigation projects.

The irrigation cable shall incorporate enough wires to accommodate all the valves it is designed to control, plus some spares for future expansion. For example, if the cable will activate 6 valves, then the number of wires needed is: 6 hot + 1 common + 2 spares = 9 wires. This cable would be called out as 18 AWG/9c. The construction shall include insulated solid copper conductors and an overall PE jacket. For direct burial.

Paige Electric Co., LP specification number P7183D
(http://www.paigewire.com/specs/P7183D.htm)

COMMUNICATION CABLES (choose one of the following):

Toro SYSTEMS – Typically uses a 16 AWG/1-pair cable. It is available as shielded or shielded/armored. The latter is rodent and lightning resistant. (Chose one of the following):

SHIELDED – The communication cable shall be 16 AWG/1-pair. The construction shall include tin coated copper conductors, an aluminum shield to prevent cross-talk, a drain wire for grounding the cable, and an overall PE jacket. For direct burial.

Paige Electric Co., LP specification number P7162D (http://www.paigewire.com/specs/P7162D.htm)

SHIELDED AND ARMORED - The communication cable shall be 16 AWG/1-pair. The construction shall include tin coated copper conductors, an aluminum shield to prevent cross-talk, a drain wire for grounding the cable, a stainless steel tape (also to be grounded) helically wrapped around the pair of wires, and an overall PVC jacket. For direct burial.

Paige Electric Co., LP specification number P7162D-A (http://www.paigewire.com/specs/P7162D-A.htm)

RAIN BIRD SYSTEMS – Typically uses a 14 AWG/2c or 12 AWG/2c "Maxi" cable, or 19 AWG/multi-pair cable for "Maxicom" systems. Rain Bird allows Maxicon cable to be any of the following types: PE-39, PE-54, or PE-89. See specification number P7072D for available outer jacket colors of Maxi cable.

MAXI CABLE - The communication cable shall be 14 AWG/2c or 12 AWG/2c "Maxi" cable as shown on the irrigation plans and specifications. The cable shall include two PVC insulated wires with a PE outer jacket. The colors of the outer jacket shall be as called-for in the irrigation plans and specifications. For direct burial.

Paige Electric Co., LP specification number P7072D (http://www.paigewire.com/specs/P7072D.htm)

MAXICOM CABLE - The communication cable shall be 19 AWG with a minimum of 3-pairs (or 6-pairs or 12-pairs, etc.) The cable construction shall be type PE-39 or PE-54 or PE-89. For direct burial.
Paige Electric Co., LP specification number P7073D (for PE-89) or P7315D (for PE-39 & PE-54)
(http://www.paigewire.com/specs/P7073D.htm and http://www.paigewire.com/specs/P7315D.htm)

HUNTER SYSTEMS, WEATHER STATIONS, SENSORS, TELEPHONE LINES, ETC – Typically use an 18 AWG/2-pair cable. It is available as shielded or shielded/armored. The latter is rodent and lightning resistant. (Choose one of the following):

SHIELDED – The communication cable shall be 18 AWG/2-pair. The construction shall include tin coated copper conductors, an aluminum shield to prevent cross-talk, a drain wire for grounding the cable, and an overall PE jacket. For direct burial.

Paige Electric Co., LP specification number P7171D (http://www.paigewire.com/specs/P7171D.htm)

SHIELDED AND ARMORED - The communication cable shall be 18 AWG/2-pair. The construction shall include tin coated copper conductors, an aluminum shield to prevent cross-talk, a drain wire for grounding the cable, a stainless steel tape (also to be grounded) helically wrapped around the pairs of wires, and an overall PVC jacket. For direct burial.

Paige Electric Co., LP specification number P7171D-A (http://www.paigewire.com/specs/P7171D-A.htm

DECODER CABLES – Custom cables have been designed by Paige Electric for various manufacturers of decoder systems, each somewhat different. (choose one of the following):

Toro SYSTEMS – This is a cable with 3 twisted wires, so that they stay together during the installation process and offer some opposition to electrical flow during lightning strikes. This cable is specifically designed for the harsh conditions of landscape projects where chemicals such as fertilizers, herbicides, pesticides, and fungicides are frequently applied. Available in 14 AWG/14 AWG/14 AWG, 12 AWG/12 AWG/14 AWG, and 10 AWG/10 AWG/14 AWG.

The decoder cable shall consist of 3 wires, twisted together. Its construction incorporates solid copper conductors with an extra-thick PE insulation with a minimum wall thickness of 0.060". The wires are designed for direct burial in irrigation systems. Wire sizes are defined in the irrigation plans and other specifications.

Paige Electric Co., LP specification number P7318 (http://www.paigewire.com/specs/P7318.htm)

RAIN BIRD SYSTEMS – These decoder systems utilize 14 AWG/2c or 12 AWG/2c "Maxi" cable. See specification number P7072D for available outer jacket colors of Maxi cable.

The decoder cable shall be 14 AWG/2c or 12 AWG/2c "Maxi" cable as shown on the irrigation plans and specifications. The cable shall include two PVC insulated wires with a PE outer jacket. The colors of the outer jacket shall be as called-for in the irrigation plans and specifications. For direct burial.

Paige Electric Co., LP specification number P7072D (http://www.paigewire.com/specs/P7072D.htm)

HUNTER SYSTEMS – This is a cable with 2 twisted wires, so that they stay together during the installation process and offer some opposition to electrical flow during lightning strikes. This cable is specifically designed for the harsh conditions of landscape projects where chemicals such as fertilizers, herbicides, pesticides, and fungicides are frequently applied. Available in 14 AWG/2c and 12AWG/2c.

The decoder cable shall consist of 2 wires, twisted together. Its construction incorporates solid copper conductors with an extra-thick PE insulation with a minimum wall thickness of 0.060". The wires are designed for direct burial in irrigation systems. Wire sizes are defined in the irrigation plans and other specifications.

Paige Electric Co., LP specification number P7313 (http://www.paigewire.com/specs/P7313.htm)

TUCOR SYSTEMS – These decoder systems utilize 18 AWG/2c or 16 AWG/2c or 14 AWG/2c cable, with a green outer jacket.

The decoder cable shall be 18 AWG/2c or 16 AWG/2c or14 AWG/2c cable as shown on the irrigation plans and specifications. The cable shall include two PVC insulated wires with a green PE outer jacket.

Paige Electric Co., LP specification number P7296D (http://www.paigewire.com/specs/P7296D.htm)

Paige® irrigation

WIRE & CABLE INSTALLATION

Wire and cable burial depth is dictated by Table 53 of the 2002 Canadian Electrical Code®. Temperature changes cause wires and cables to expand and contract as much as 1% of the length. And high voltage power lines create large electro-magnetic fields that cause interference and corrupt signals in communication lines. It is therefore necessary to take certain precautions when installing these products.

The contractor shall install all wires and cables carrying up to 750 volts at a minimum burial depth of 600 mm, as required by Table 53 of the 2002 Canadian Electrical Code®. When installing wires and cables in a trench, they must be "snaked" so that some slack is created. At points in the trench where there are sharp bends, a loop of 30 to 60 cm of wire shall be created to allow for shrinkage. When communication cables are in the same trench as power wires, there shall be a minimum separation between them of 30 cm.

WIRE & CABLE SPLICES

All electrical connections shall incorporate:
1. A solid mechanical connection of the copper conductors
2. Electrical insulation of the mechanical connection
3. A means to waterproof the insulated connection
4. "Strain relief" to prevent the connection from coming apart when wires/cables are pulled-upon.

Approved products are as follows:

Connectors for power wires and cables shall be rated at 600 volts and shall be as follows:

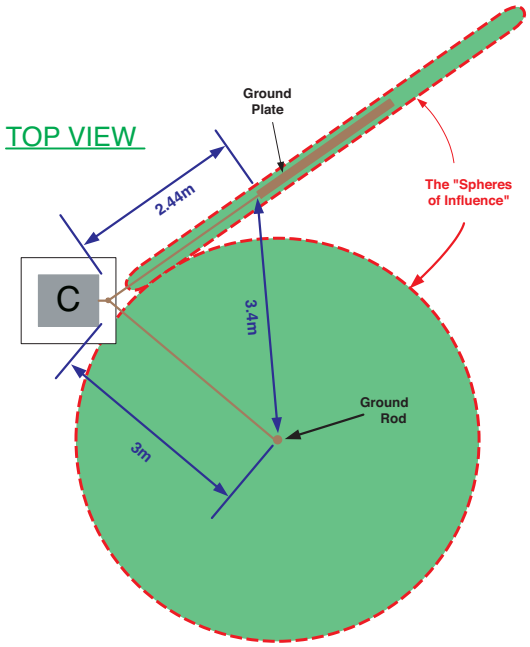
<table>
<tr><th>Product</th><th>Mechanical Connector</th><th>Insulation</th><th>Waterproofing Material</th><th>Strain relief</th></tr>
<tr><td>(For installation in valve boxes)
3M #3570G (600 volts)</td><td colspan="2">3M Connector (Wire nut with steel spring)</td><td rowspan="2">Two-part resin</td><td rowspan="2">3M weather resistant cable ties (black.)</td></tr>
<tr><td>(For installation in valve boxes)
3M #4 Series (600 volts)</td><td rowspan="2">  Paige Electric brass split bolts</td><td rowspan="2">3M #33+ Electrical Tape, or 3M #23 Rubber Tape, or 3M 130C Rubber Tape</td></tr>
<tr><td>(For installation in valve boxes)
3M #82-A Series (600 volts)</td><td>Two-part resin & plastic housing, included</td><td>Built into product design</td></tr>
<tr><td>(For direct burial)
3M #DBY-6 (600 volts)
3M #DBR-6 (600 volts)</td><td colspan="2">Wire nut with steel spring, included</td><td>Gel-filled plastic tube, included</td><td>Incorporated into lid of plastic tube</td></tr>
</table>

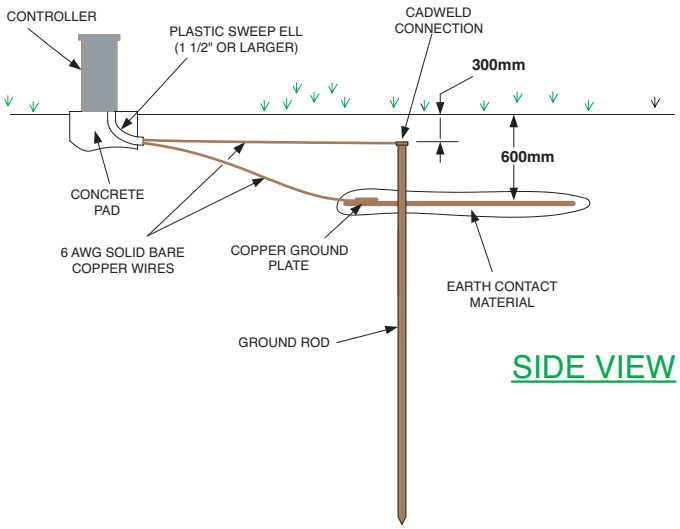
Connectors for solenoid valve and valve-in-head sprinkler wire splices shall be rated at a minimum of 30 volts and shall be as follows:

<table>
<tr><td>(For installation in valve boxes)
3M #DBY (30 volts)
3M #DBR (30 volts)</td><td rowspan="2">Wire nut with steel spring, included</td><td rowspan="2">Gel-filled plastic tube, included</td><td rowspan="2">Incorporated into lid of plastic tube</td></tr>
<tr><td>(For direct burial, as in "valve-in-head sprinkler" splices)
3M #DBY-6 (600 volts)
3M #DBR-6 (600 volts)</td></tr>
</table>

grounding systems EARTH GROUNDING

It is the responsibility of the installer to connect all electronic irrigation equipment for which he is responsible to earth ground in accordance with the requirements of the Canadian Electrical Code® (CEC®.) At the very minimum, the grounding circuit will include a copper clad steel ground rod, a solid copper ground plate and 100 pounds of PowerSet® earth contact material, as defined below and per the following detail. This detail is the minimum requirement for supplementary grounding of any electronic equipment. Other details, for a multitude of field situations, are available from the American Society of Irrigation Consultants, ASIC Guideline 100-2002 (www.asic.org, “Design Guides”.)



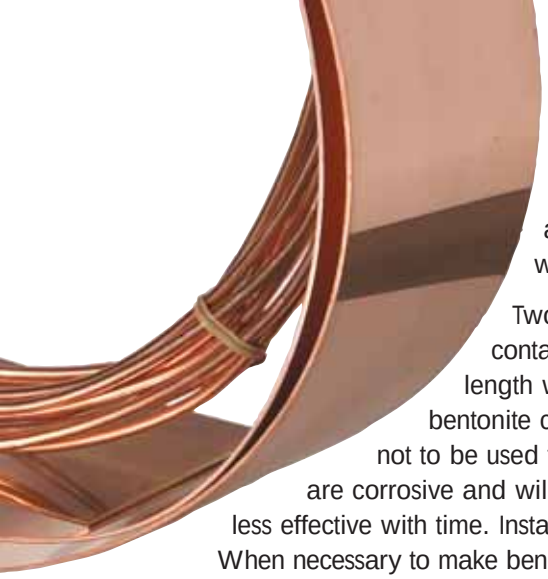


The ground grid components must be installed with the dimensional relationships shown in the detail above. WIRES, CABLES, AND ELECTRONIC EQUIPMENT MUST BE INSTALLED OUTSIDE “THE SPHERE OF INFLUENCE” OF THE GROUNDING ELECTRODES.

Ground rods are to have a minimum diameter of 5/8” (16 mm) and a minimum length of 10 feet (3.05 m.) These are to be driven into the ground in a vertical position 10 feet (3.05 m) from the electronic equipment [Paige Electric part number 182007.]

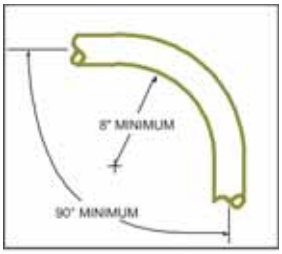
A 6 AWG solid bare copper wire, about 12 feet (3.66 m) long shall be connected to the ground rod by the installer using a Cadweld GR1161G ”One-Shot” welding kit [Paige Electric part number 1820037.] This wire shall be connected to the electronic equipment ground lug.

The copper grounding plate assemblies [Paige Electric part number 182199L] must meet the minimum requirements of the CEC®. They are to be made of a copper alloy intended for grounding applications and will have minimum dimensions of 4” x 8’ x 0.0625” (101.6 mm x 2.44 m x 1.6 mm.) A 25-foot (7.62 m) continuous length (no splices allowed unless using exothermic welding process) of 6 AWG solid bare copper wire is to be attached to the plate by the manufacturer using an approved welding process. This wire is to be connected to the electronic equipment ground lug. The ground plate is to be installed to a minimum depth of 23.62” (600 mm), or below the frost line if it is lower than 600 mm, at



a location 8 feet (2.44 m) from the electronic equipment and underground wires and cables.

Two 50-pound bags of PowerSet® [Paige Electric part number 1820058] earth contact material must be spread so that it surrounds the copper plate evenly along its length within a 6" (152 mm) wide trench. Salts, fertilizers, bentonite clay, cement, coke, carbon, and other chemicals are not to be used to improve soil conductivity because these materials are corrosive and will cause the copper electrodes to erode and become less effective with time. Install all grounding circuit components in straight lines. When necessary to make bends, make sweeping turns. When connecting bare copper wire to the ground lug of electronic equipment, feed it through a dedicated 1.5" (38.1 mm) plastic sweep ell. "Sweep bends" must follow the guidelines shown here.

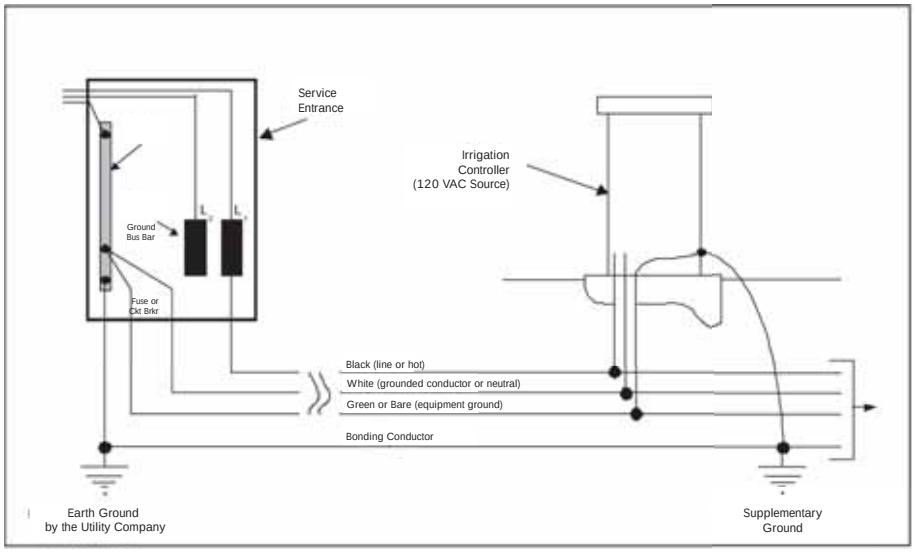


The earth-to-ground resistance of this circuit is to be measured using a Megger®, or other similar instrument, and the reading is to be no more than 10 ohms. If the resistance is more than 10 ohms, additional ground plates and PowerSet® are to be installed using ASIC Guidelines 100-2002 (www.asic.org, "Design Guides".) It is required that the soil surrounding copper electrodes within the sphere of influence be kept at a minimum moisture level of 15% at all times.

All underground circuit connections are to be made using an exothermic welding process by utilizing products such as the Cadweld "One-Shot" kits. Solder shall not be allowed to make connections. In order to ensure proper ignition of the "One-Shot", the Cadweld T-320 igniter must be utilized [Paige Electric part number 1820040.] The 6 AWG bare copper wires are to be installed in as straight a line as possible, and if it is necessary to make a turn or a bend it shall be done in a sweeping curve with a minimum radius of 8" (203.2 mm) and a minimum included angle of 90°. Mechanical clamps shall be permitted temporarily during the resistance test process, but are to be replaced with Cadweld "One-Shot" kits immediately thereafter.

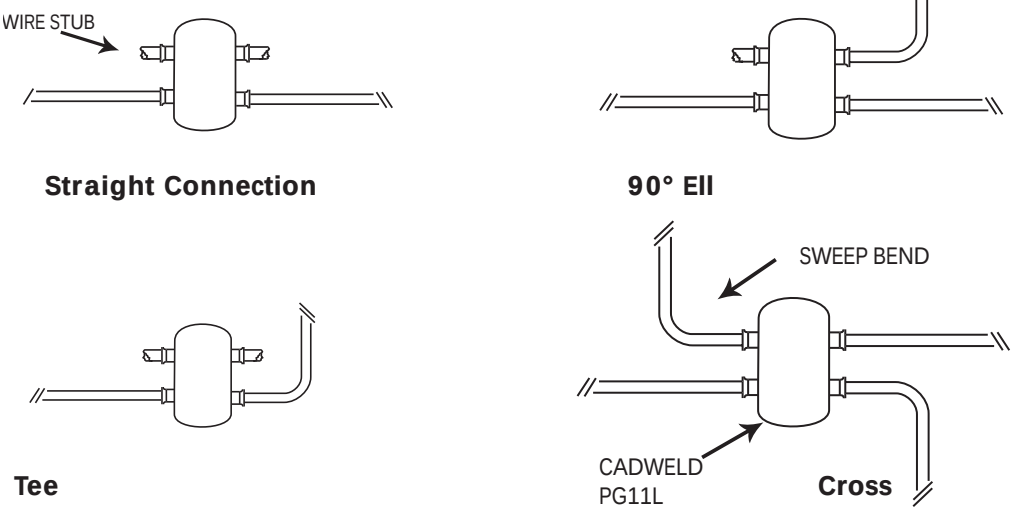
ALL GROUNDING COMPONENTS MUST BE CONNECTED TO THE EQUIPMENT BEFORE ANY OTHER CONNECTION IS MADE.

BONDING

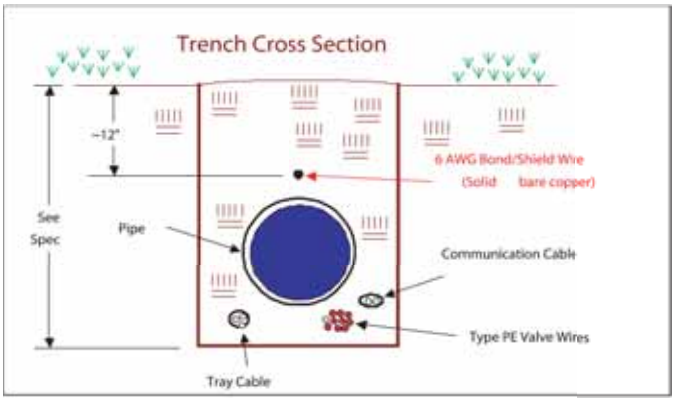


The above grounding circuit is referred-to as "supplementary grounding" in the CEC®. And for safety reasons, the CEC® requires that all supplementary grounds be "bonded" to each other and to the service entrance ground (power source) as shown here. This is also "recommended practice" of IEEE Standard 1100-1999. Note that this is in addition to the equipment ground, which is commonly referred-to as "the green wire." The Black, White and Green wires must always be kept together in a trench/conduit/tray/etc. The bonding conductors are to be 6 AWG solid bare copper unless the system power conductors are larger than 1/0 AWG, in which case they are to be 4 AWG solid bare copper. All splices to the bonding conductors shall be made using a Cadweld "One-Shot" kit as shown in the details below. [Paige Electric part number 1820074.]

When joining bare copper wires, do so using an ERICO PG11L "One-Shot" kit as shown in the details below. [Paige Electric part number 1820074.]



SHIELDING



The bonding conductors are to be installed in such a way so that they also act as shielding conductors. This becomes a network of solid bare copper wire over all the main bundles of other wires and cables as shown in the detail. The bare copper wire is to be installed as close to the surface as possible, yet being sufficiently below the ground level as to prevent damage from maintenance equipment such as aerifiers. And it must be placed above all other valve, power, and communication wires and cables, and installed in all trenches as shown on the electrical plan drawings. It is not necessary to install this conductor over short wire runs (less than 150 feet) away from the main wire bundles. The conductor is laid in as straight a line as possible, and when necessary to make bends, do so in a sweeping motion as defined above. The shield network is to be connected to the service entrance earth ground, to all electronic equipment ground lugs, and all equipment supplementary grounding electrodes. One such network is necessary for each power source. Do not interconnect the equipment ground wires from different power sources.

When joining bare copper wires, do so using an ERICO PG11L "One-Shot" kit as shown in the details above [Paige Electric part number 1820074.]

Paige®
grounding systems
COMPONENTS

GROUND RODS
& CLAMPS

COPPER GROUND PLATES

LIGHTNING ARRESTERS

CADWELD BONDING
CONNECTORS

INSTALLATION TOOLS

EARTH CONTACT
BACKFILL

FOR ASSISTANCE, PLEASE CONTACT PAIGE ELECTRIC AT THE LOCATIONS BELOW, OR ONE OF ITS DISTRIBUTORS.

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Please note that this document and the details within are available from Paige Electric's website at www.paigewire.com. The text is in .doc format and the details are in .dwg format.

5/1/05