

HSC Series

Two-Wire Controller

Submittal Specifications

The Hydro-Rain® HSC controller is an Internet-capable, irrigation water management device with the ability to manage up to 63 stations when used with a two-wire module, part number HSC-6300-MD. This module operates single-station decoders, part number HSC-FD1. Station Decoders are programmed with a Portable Programmer and Field Diagnostic module, part number HSC-DP.

Construction

The irrigation controller is housed in a NEMA 3R rated, key-lock entry, wall mount enclosure. The 16-gauge metal, powdered-coated enclosure has the following features.

- Pin-hinge, removable outer door,
- The outer-door incorporates a key-lock entry utilizing a CH751 key,
- The enclosure can be mounted to a vertical surface using a top, key-hole mounting bracket and lower horizontal mounting bracket,
- 1-1/2" thru-hole in the bottom of the enclosure for 2 (qty) separate two-wire communication paths.
- A second pair of knockouts for 3/4" conduit for flow sensor, master valve or pump start field wires.
- A third knockout for 1/2" conduit for a grounding wire.
- The top of the enclosure has 2 (qty) antenna's, one vertically oriented antenna for Bluetooth, Wi-Fi, or Radio communication and a second dome-type antenna for cellular communication.
- The enclosure houses a 3.3-amp step-down, dual-voltage transformer.
- The inside of the enclosure has vertically oriented and centered pins to secure 1 (qty), 63-station two-wire module. The module has 2 (qty) sets of Two-Wire terminals and a separate ground lug,
- A large ground lug is secured to the back of the enclosure that can accommodate a #6 bare copper conductor to be attached to a cold-water ground pipe, a ground rod or ground plate depending on site conditions.
- In the upper left-hand corner is a 2" x 1-1/2" full-color matrix display allowing a user to set time and date, manually operate stations and several other simple programming functions. The B-hyve Pro app is to be used for initial controller setup and station programming.

Electrical Specifications

The HSC controller incorporates a 3.3-amp step-down, dual-voltage transformer rated for input power of 120/208/240 VAC +/- 10% (60 Hz). The transformer contains a resettable fuse to avoid over-heating if current demand exceeds the transformer's rated output. The transformer can be wired to a 120-volt, or 220-volt power source as needed.

Output power of the transformer is 24 VAC, (60 Hz). Station outputs are (24 VAC) or 0.56 amps each. The pump start / master valve outputs are 24 VAC or 0.32 amps.

The individual Two-Wire station decoders have a rated current of a minimum operating voltage of 13 VAC with a maximum AC input voltage of 32 VAC. The operating ambient temperature range under full power is +5-+40⁰ C or (41⁰-104⁰ F).

Product Features

The HSC controller series offers a wide variety of programming features listed as follows:

- 4 Independent programs w/ 4 start times per program,
- Operate programs in a “stacked” mode or manage two separate programs with the same or overlapping start times,
- Maximum station runtime of 240 minutes (4 hours)
- Percent adjust of station runtimes by program,
- Diagnostic tools for field wire fault detection,
- Grow-in options for sod, hydroseed or shallow-rooted ground cover or annuals,
- Daily adjustment of station runtimes based on evapotranspiration rates (ET),
- Predictive watering using Hydro-Rain’s WaterSense® capabilities,
- Station runtime scheduling based on integrating Hydro-Rain’s Irrigation Auditing App
- Daily water management of water days based on local water conservation restrictions.
- Automatic firmware and software updates

Additionally, the HSC controller includes the following hardware features.

- 1 (qty) 63-station Two-Wire modules for a total capacity of 63 stations,
- 2 (qty) Flow sensor* inputs having compatibility with the following flow sensors.
 - Creative Sensor Technology,
 - Netafim (reed switch models only)
 - Badger Meter
- 2 (qty) master valve / pump start outputs* including the ability to select the type of master valve. The factory default is normally closed but this can be set to normally open as needed.
- 2 (qty) Rain Sensor ports
- 1 (qty) 24 VAC auxiliary output
- 1 (qty) Ethernet port
- 1 (qty) USB connection to charge a mobile phone or tablet
- 1 (qty) 2” x 1-1/2” color matrix display for Manual station operation and other simple functions. The display is used in conjunction with navigation buttons as part of this user interface.
- External antenna for 2.4 GHz Wi-Fi, 5 GHz Wi-Fi, or Bluetooth
- CAT-5 Ethernet connectivity
- Optional cellular connectivity available with a Hydro-Rain cellular module part number BHP-CELL-MD.

*The flow sensor and master valve/pump start wires are separate wire pairs from the Two-Wire path.

The HSC controller also contains a non-volatile memory for all station programming in the event of a power loss or brownout. The real-time clock is maintained via a replaceable and easily accessible coin-cell battery.

Installation

The HSC controller is intended to be wall mounted on a vertical surface with the display between 5 feet and 6 feet above surrounding grades.

Select a location for the controller near a power source as well as where a portion, if not all of the site, can be viewed from the controller location. Avoid locating the controller on a southern or western-facing wall where it could be difficult to discern the display in full sun.

Note: Avoid locating the enclosure in a basement or underground mechanical room where wireless reception can be compromised.

The HSC controller includes a power “On/Off” switch. Confirm the power button is in the “Off” position before connecting to a power source.

For ease-of-installation, it’s recommended to remove the outer door and set it aside where it won’t be damaged during enclosure installation.

The HSC enclosure includes a top-mounted “keyhole” mounting mechanism on which to hang the enclosure initially. Confirm the enclosure is level in two directions, then secure the bottom of the enclosure using the bottom mounting bracket located underneath the enclosure in two locations. Three (qty) mounting fasteners including plastic fastener inserts for drywall or masonry installation are included with the product.

The laser-cut knockout in the bottom of the enclosure can be removed as needed. Size electrical conductors and conduit to match available voltage. Follow all state and local electrical codes as part of this installation.

The HSC controller comes standard with a thru-hole located in the bottom of the enclosure for a 1-1/2” PVC conduit for one or two, Two-Wire communication paths.

There are two (qty) additional laser-cut knockouts available on either side of the field wire conduit thru-hole for flow sensor, master valve/pump start conduit. These are sized for ¾” PVC conduit.

Once the electrical connections are made, including grounding noted below, the power switch can be turned “On” to energize the HSC controller.

Controller Grounding

To ensure consistent product performance particularly in lightning prone areas, the HSC Two-Wire module should be grounded. The ground lug is located on the HSC controller enclosure.

Connect a bare, #6 copper conductor secured to the controller's ground lug to a cold-water ground pipe, a ground rod and/or ground plate depending on site and soil conditions. For additional information please see Article 250 of the National Electrical Code (NEC.), the American Society of Irrigation Consultant's grounding specifications, or the Hydro-Rain knowledge base.

Field Wiring

The HSC Two-Wire system can manage up to 63 individual remote-control valves or zones.

This Two-Wire system incorporates AC power down the Two-Wire path so standard, 14-gauge, 600-volt UF, direct burial wire can be used in lieu of twisted wire pairs and/or jacketed wire common to other Two-Wire systems. This also means that surge suppression decoders and ground rods or ground plates located at regular intervals and at the terminus of each Two-Wire com path is not required. However, the Two-wire Module located in the HSC controller must be grounded to ensure consistent product performance and longevity.

Strip approximately 3/8" of wire insulation to expose the underlying conductor and insert into the terminals on the Two-Wire module. Use a Philips-head screwdriver to tighten the fastener on the Two-Wire module terminal block. Pull backwards on the field wire once its tightened to confirm its secure.

Up to two separate wire paths can be terminated on the Two-Wire module.

Note: Separate wire pairs from the Two-Wire communication path for flow sensors, pump start/master valve inputs will be needed. Confirm if the flow sensor installed has wire polarity before terminating in the flow sensor inputs.

Two-Wire communication paths typically follow the irrigation mainline but can vary based on site conditions. Make all "T" splices of the Two-Wire path in valve boxes.

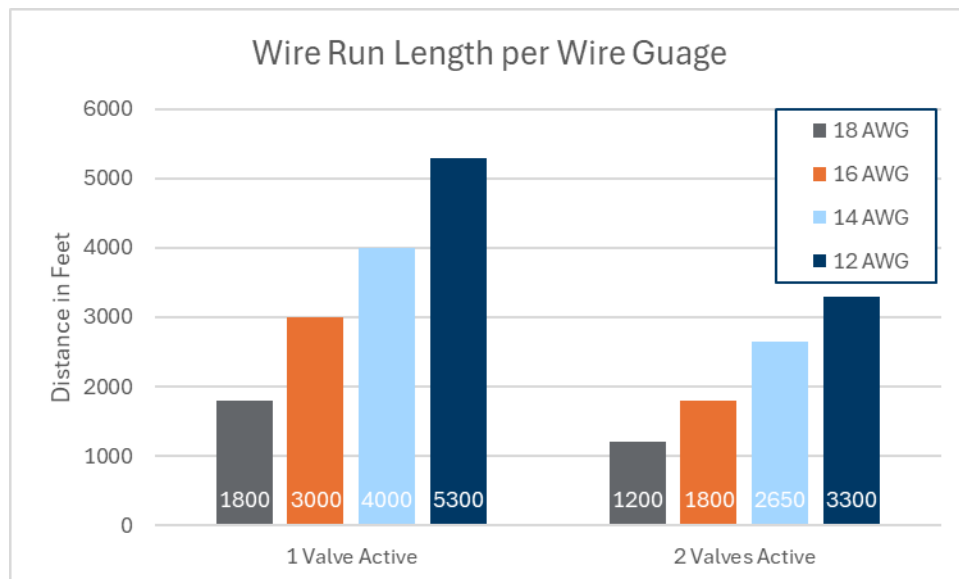
Note: Do not make Two-Wire field splices and then direct bury them without the installation of a valve box.

While "Looped" Two-Wire Com paths provide another level of security and longevity if the wire path is severed, it can prolong troubleshooting.

Maximum wire runs of the Two-Wire path are shown in the chart below. It's important to recognize that other variable listed below will determine wire sizing such as:

- Holding current of the remote-control valve solenoids being used,
- The number of stations to be operated at one time,

- The overall length of the Two-Wire com path.



Decoders

The HSC Two-Wire controller series utilizes single station decoders. Decoders are to be programmed prior to being installed in the field. Be sure and denote the corresponding station number on the Decoder case once programmed using a water-proof ink pen.

The decoder is encased in a modified ABS-PCN1 potted molded case that is IP68 rated for prolonged water submersion.

Each decoder includes 4 (qty), solid core, 16-gauge, color-coded wire leads representing the following attributes.

- 2 (qty) yellow wires for connection to any AC remote control valve solenoid,
- 1 (qty) black wire for connection to the Two-Wire path,
- 1 (qty) red wire for connection to the Two-Wire path,

Each decoder sold separately includes 4 (qty), 3M™ Direct Bury Splice Connectors model numbers DBO/B-6 and DBR/Y-6 to make all field wire connections. Connect field wires per the manufacturer's recommendations using a pair of solid wire strippers sized for the Two-wire path wire being installed.

The HSC Two-Wire controller can manage the following.

- 2 (qty) separate decoders addressed with the same station number or,
- 1 decoder tied to two separate valves if the maximum wire length between valves does not exceed 30" or,
- Can operate two decoders at the same time with overlapping start times from two separate programs.

Programming Decoders

Decoders are programmed with a hand-held, battery-powered Portable Programmer sold separately. The Portable Programmer allows a user to program or conduct field diagnostics when the decoder is disconnected from a valve solenoid and the Two-Wire path. Decoder addresses are programmed by using the “UP” and “DOWN” arrows on the Portable Programmer. Once selected, then press the “PROG” button to confirm. Pressing the “TEST” button will display a decoder’s station number or address. A Decoder can be programmed infinity to different addresses as needed.

Decoders are to be programmed prior to installation to the remote-control valve and a Two-Wire path. Mark the corresponding station number on the Decoder case using a supplied waterproof ink pen as soon as the station number is assigned.

HSC Controller Programming

Once all field wires have been installed, the HSC controller will be programmed from your mobile phone, tablet, or online using the B-hyve Pro Apps.

Agency Compliance

The HSC Controller series has the following agency certifications.

- FCC compliance with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation.
- UL compliance for a NEMA 3R rated enclosure and transformer,
- EPA Water Sense certification for water management.

Product Warranty

The HSC Controller Series has a 3-year, date-of-purchase warranty.

The HSC Controller series is made and distributed by Hydro-Rain, Salt Lake City, Utah.

End of Specification