# DUAL® Irrigation Controller Product Specification

**Part 1 – General**

* 1. The controller shall be a full-featured, commercial-industrial product for the purpose of irrigation operation, management and monitoring of control valves and sensors. The controller shall be of a modular design that is provided with a standard base 6-station output module. The controller shall be expandable with 6-station conventional modules or one 48-station decoder output module.

**Part 2 – Controller Enclosures**

* 1. Controller shall be available in following the options:
1. Plastic wall-mount enclosure
2. The controller shall be Hunter Industries model IC-600-PL.
3. Pre-assembled controller shall have a height of 11" (28 cm), width of 13¼" (33.7 cm), and a depth of 6¼" (15.9 cm).
4. The controller shall be furnished in an outdoor, weather-resistant, wall-mount plastic enclosure, pre-wired for remote control, with a key lock.
5. The controller shall provide modular expansion up to 30 stations conventionally wired, or 48 stations via two-wire decoders.
6. All station outputs shall have MOV and copper induction coil surge suppression.
7. The enclosure shall be IP44 rated.
8. A 751CH key shall be mounted in the enclosure door for security.
	1. Two (2) keys shall be provided per each controller.
9. Plastic pedestal
10. The controller shall be Hunter Industries model IC-600-PP.
11. Pre-assembled controller shall have a height of 39" (99 cm), width of 24" (61 cm), and a depth of 17" (43 cm).
12. The controller shall be furnished in an outdoor, weather-resistant, pedestal-mount plastic enclosure, pre-wired for remote control, with a key lock.
13. The controller shall provide modular expansion up to 42 stations conventionally wired, or 48 stations via two-wire decoders.
14. All station outputs shall have MOV and copper induction coil surge suppression.
15. The enclosure shall be IP34, NEMA 3R rated.
16. A 751CH key shall be mounted in the enclosure door for security.
	1. Two (2) keys shall be provided per each controller.
17. Powder-coated metal wall-mount enclosure / Powder-coated metal pedestal
18. The controller shall be Hunter Industries model IC-600-M. The metal wall mount may also be mounted on a matching gray powder-coated metal pedestal. The pedestal shall be Hunter Industries model ACC-PED.
19. Pre-assembled wall-mount controller shall have a height of 12⅜" (31.4 cm), width of 15½" (39.4 cm), and depth of 6½" (16.5 cm).
20. Pre-assembled pedestal mount shall have a height of 36" (91.4 cm), width of 15½" (39.4 cm), and depth of 5" (12.7 cm).
21. The controller shall be furnished in an outdoor, weather-resistant, wall-mount or pedestal-mount gray metal enclosure, pre-wired for remote control, with a key lock.
22. The controller shall provide modular expansion up to 42 stations conventionally wired, or 48 stations via two-wire decoders.
23. All station outputs shall have MOV and copper induction coil surge suppression.
24. The enclosure shall be IP56 rated.
25. A 751CH key shall be mounted in the enclosure door for security.
	1. Two (2) keys shall be provided per each controller.
26. Stainless steel wall mount / Stainless steel pedestal
27. The controller shall be Hunter Industries model IC-600-SS. The stainless wall mount may also be mounted on a matching type 316 stainless steel pedestal. The pedestal shall be Hunter Industries model PED-SS.
28. Pre-assembled wall mount controller shall have a height of 12⅜" (31.4 cm), width of 15½" (39.4 cm), and depth of 6½" (16.5 cm).
29. Pre-assembled pedestal mount shall have a height of 36" (91.4 cm), width of 15½" (39.4 cm), and depth of 5" (12.7 cm).
30. The controller shall be furnished in an outdoor, weather-resistant, type 316 stainless steel wall-mount or pedestal-mount metal enclosure, pre-wired for remote control, with a key lock.
31. The controller shall provide modular expansion up to 42 stations conventionally wired, or 48 stations via two-wire decoders.
32. The enclosure shall be IP56 rated.
33. All station outputs shall have MOV and copper induction coil surge suppression.
34. A 751CH key shall be mounted in the enclosure door for security.
	1. Two (2) keys shall be provided per each controller.
	2. Warranty
35. The controller shall be installed in accordance with the manufacturer’s published instructions. The controller shall carry a conditional 5-year exchange warranty. The automatic controller(s) shall be the I-Core® series controller as manufactured for Hunter Industries Incorporated, San Marcos, California.

**Part 3 – Controller Hardware**

* 1. Control display
1. Display shall be 2¾" (7 cm) diagonal LCD, illuminated.
2. All programming shall be accomplished by use of a programming dial and selection buttons with user feedback provided by a backlit LCD display.
	1. Control panel
3. The front panel (facepack) shall be removeable to allow for programming without AC power, via a 9 VDC battery.
4. Front panel shall include a replaceable CR2032 battery for date/time backup during power outages.
	1. Controller power
5. Depending on requirements, transformer input shall be 120 VAC, 60 Hz or 230 VAC, 50 Hz.
6. Transformer output shall be 24 VAC, 1.4 A. Maximum output per station shall be 24 VAC, up to 0.56 A. Maximum output per P/MV terminal shall be 24 VAC, up to 0.28 A.
	1. Controller surge protection
		1. The controller transformer shall be equipped with an internal, self-resetting thermal circuit breaker to protect against overheating.
		2. The controller shall also be equipped with a ground lug for connecting to proper earth ground hardware.
	2. Station modules

A. Controller shall provide 5 (plastic enclosure) or 7 (metal and pedestal enclosures) separate station module slots.

1. Controller shall use 6-station conventional output modules, or one 48-station decoder output module.
2. Station modules shall be secured against field wiring tension by the power slide lock.
3. Using conventional wire only, the controller shall be expandable from 6 to 30 stations (plastic) and 8 to 42 stations (metal and pedestals).
4. Using conventional station modules in conjunction with one decoder output module (model: DUAL48M), all controller configurations (plastic, metal, pedestal) shall expand up to 48 stations.
5. Using only one decoder output module (model: DUAL48M) all controller configurations (plastic, metal, pedestal) shall expand up to 48 stations.
6. The controller shall have a base model capacity of 6 stations, consisting of one 6-station output module.
7. Each station output shall supply 24 VAC, up to 0.56 A current for solenoid activation.
8. The controller shall have self-diagnostic, electronic short-circuit protection that detects a faulty circuit, continues watering the remainder of the program, and reports the faulty station on the display. The diagnostic function shall also be capable of being initiated manually by the user.
9. Module hardware
10. The controller output modules shall have metal oxide varistors (MOVs) and copper induction coils on each station output circuit to help protect the micro-circuitry from power surges.
	1. DUAL48M output module
		1. The decoder output module shall include its own user interface dedicated to decoder programming and diagnostics, including a backlit LCD display and navigational buttons.
		2. The decoder output module shall include a programming port for field programming of decoder station address via the red and blue decoder station wires. Decoder programming shall not require the use of serial numbers.
		3. The decoder output module shall fit into three of the available station output slots that also accommodate conventional ICM-600 station modules.
		4. The decoder output module shall be able to co-exist with conventional station output modules, so that a hybrid system of conventional solenoid wiring and two-wire decoder wiring is possible within the same chassis.
		5. The decoder output module shall offer three separate two-wire paths to the field for up to 48 stations.
		6. The decoder output module shall display active stations by number and shall also be able to display current draw in milliamps on the two-wire paths at any time, without disruption to automatic irrigation.
		7. The decoder output module shall detect and display line-open and line-fault conditions on the two-wire path.
		8. The decoder output module shall use a current sensing logic to determine whether active stations are drawing sufficient current and shall provide alarm notification when either an undercurrent or overcurrent is detected.
		9. The decoder output module shall provide a solenoid finder feature, which chatters a solenoid loudly and aids in finding valve boxes in the field.
	2. DUAL decoders
		1. The decoders shall be completely waterproof, IP68 rated.
		2. Each decoder shall have a single red and single blue wire for connection to the color-coded two-wire path.
		3. Each decoder shall include two waterproof connectors, UL listed to 600 VAC direct burial, to ensure proper connection.
		4. The decoders shall be available in 1- and 2-station configurations. The individual station outputs shall also be color-coded to ensure proper connection.
		5. Each decoder station output shall be capable of activating a minimum of two typical 24 VAC irrigation solenoids.
		6. Decoders shall be installed within 100' (30 m) of the solenoids they intend to operate.
		7. The system shall accommodate up to 48 decoder stations in any combination of 1- or 2-station decoders.
		8. All decoders shall also be programmable once installed on the two-wire path via wireless electromagnetic induction with the use of Hunter model ICD-HP.
	3. Sensor inputs
		1. The controller shall be compatible with an external weather sensor that can change seasonal adjustment automatically, based on local weather conditions, for maximum water savings. The external weather sensor shall include rain and freeze shutoff functions.
11. The wireless external weather sensor shall be Hunter Industries model WSS-SEN.
12. The hardwired wired external weather sensor shall be Hunter Industries model SOLARSYNCSEN.
13. The sensor input shall also be compatible with any standard normally closed “Clik-type” sensors for automatic shutdown during rain, freeze, soil moisture, and/or wind events.
14. The controller shall be compatible with velocity-based, frequency-type flow sensors, such as Hunter model HFS and WFS, which require a specific K-factor and offset.
	1. P/MV outputs
15. The controller shall have one built-in P/MV (24 VAC) output with a capacity of up to 0.28 A.
16. The P/MV output shall be selectable as active or disabled per each individual station.
	1. Common wire
17. A common wire terminal is provided on the controller’s power module, and additional commons are provided on each station output module.
	1. SmartPort®

A. The controller shall be pre-wired with a SmartPort connector for easy connection of optional wireless remote controls.

B. For international or short-range uses, the wireless remote control shall be the Hunter model ROAM with a useful range of up to 1,000' (330 m).

C. For use in the United States or long-range uses, where permitted, the wireless remote shall be Hunter model ROAM-XL with a useful range of up to 2 mi. (3.2 km).

**Part 4 – Programming and Operational Software**

4.1 General

1. The control panel shall be available in an English-language display. The display shall include selectable settings for date, time, and units of measure.
2. The control panel shall also be available in 6 user-selectable languages: English, French, German, Italian, Portuguese, and Spanish.

4.2 Programming

1. The controller shall have 4 (A, B, C, D) independent programs with unique day schedules, start times, and station run times.
2. Each program shall offer up to 8 (A, B, C) or 16 (D) start times.
3. The controller shall be capable of running any two programs (+P/MV) simultaneously.
4. The controller programs shall have 4 weekly schedule options to choose from:
5. 7-day calendar
6. Up to 31-day interval calendar
7. Odd-day/even-day programming
8. It shall also have a 365-day calendar clock to accommodate true odd-even watering
9. Each station shall be programmable in minutes of run time, from 1 second to 12 hours.
10. The controller shall be equipped with programmable Non-Water Days to prevent watering on selected days of the week.
11. Each program may be assigned a programmable delay between stations, to allow for slow-closing valves or pressure recharging.
12. Delays between stations shall be programmable in 1-second increments from 0 to 60 seconds and in 1-minute increments from 60 seconds up to 9 hours.
13. The controller shall be equipped with a rain sensor bypass switch that allows the user to override a sensor that has suspended watering.
14. The controller shall allow the sensor input to be programmed by station, to exempt specified stations from sensor shutdowns.
15. Program backup shall be provided by a non-volatile memory circuit that will hold the program data indefinitely.
16. The controller shall also track time of day and date during power outages by means of a replaceable, commonly available CR2032 lithium battery.

4.3 Software

1. The controller shall have manual Seasonal Adjust settings from 0% to 300% in 1% increments.
2. The controller shall have automatic Seasonal Adjust settings when installed with a Solar Sync® weather sensor.
3. The controller shall also have manual Seasonal Adjust by Month settings from 0% to 300% in 1% increments, to allow for pre-set monthly run time adjustments.
4. The controller shall be capable of determining and displaying the total run time input for each program.
	* + 1. It shall have the capability to store a program in backup memory for easy retrieval, and shall also have a test program for quick system checks.
5. The controller shall allow Easy Retrieve® backup of all programming and configuration to preserve the original configuration, which may be restored at any time.

**Part 5 – Decoder Wiring and Installation**

* 1. Decoder wiring
1. Each two-wire path shall consist of approved decoder cable specific to Hunter DUAL systems. The wire shall consist of two twisted solid-core copper wires, color-coded red and blue, within a polyethylene jacket for added durability.
2. Each two-wire path shall consist of approved decoder cable specific to Hunter DUAL systems. The wire shall consist of two twisted solid-core copper wires, color-coded red and blue, within a polyethylene jacket for added durability.
3. Wire conductors shall be 14 AWG (2.5 mm2) for distances up to 5,000' (1,500 m) or 12 AWG (4 mm2) for distances up to 7,500' (2,300 m).
4. All splices made within the two-wire path shall be made using UL-listed waterproof connections rated to 600 VAC direct burial.
5. All splices in the wire path shall be made within valve boxes, leaving a minimum of 5' (1.5 m) slack in each valve box.
	1. Decoder grounding
6. Surge-suppression devices designed for use with the DUAL decoder system (Hunter model: DUAL-S) shall be installed at a minimum of every 1,000' (300 m) or every twelfth decoder, whichever comes first.
7. A surge-suppression device must also be installed at the very end of each two-wire path.
8. The surge-suppression device must be completely waterproof, and shall include two of each color-coded wire leads, for connection to the two-wire path.
9. Earth-ground hardware shall not be installed within the valve box.
	1. Each surge-suppression device shall have a single bare copper earth-ground lead, for connection to proper earth-grounding hardware.
	2. The bare copper lead shall be routed perpendicular to the two-wire path, at a minimum of 8' (2.5 m) away from the two-wire path.
	3. Proper earth ground hardware typically consists of an 8' (2.5 m) long copper-clad steel ground rod, or a copper plate of 4" (100 mm) width and 36" (1 m) length.
	4. Nominal resistance of this earth-ground connection shall be approximately 10 ohms or less.

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