# ACC2 Decoder (A2C) Irrigation Controller Product Specification

**Part 1 – General**

* + - 1. The controller shall be a full-featured commercial-industrial product for the purpose of irrigation management and monitoring of control valves, flow, and sensors, via tow-wire decoder connections

## Part 2 – Controller Enclosures

## 2.1 Controller Shall be available in the following options:

* + - * 1. Wall Mount Powder Coated or Stainless Steel Enclosure

Pre-assembled controller shall be: Height 15.7”/40 cm, Width 15.7”/40 cm, Depth 6.8”/18 cm

The enclosure shall be powder-coated 16 gauge (1.5mm) G90 galvanized or stainless steel, with approximately 5 mil coating.

Surge protection shall include a self-resetting thermal circuit breaker in the transformer, glass 250V fast blow fuse, positive temperature coefficient (PTC) breakers at key points, and gas-filled spark gap arresters where necessary.

Controller shall include copper-clad steel ground lug for connection to earth ground hardware.

A 751CH key lock shall be mounted in the enclosure door for security

Two (2) keys shall be provided per each controller

Enclosure shall have rounded corners to prevent injury to pedestrians.

Enclosure shall be furnished with a separate steel wall mounting bracket to ease installation, and a means of securing the controller to the wall internally once the enclosure is hung on the bracket.

Controller shall provide a conduit opening for AC power wiring, and 8 additional access holes for wiring ingress, including earth ground wire.

Controller shall feature a pre-wired external SmartPort connector for remote control, protected from the elements with a tethered rubber cap.

 B. Plastic Pedestal

Pre-assembled controller dimensions shall be: Height 39”/90 cm, Width 24”/61cm, Depth 17”/43 cm.

The enclosure shall be of double-walled roto-molded construction for durability and insulation.

Plastic pedestal shall be mounted on concrete slab with pre-installed PVC conduit sweeps for underground wire runs, including separate sweeps for AC power wiring, earth ground, and field wiring.

Surge protection shall include a self-resetting thermal circuit breaker in the transformer, glass 250V fast blow fuse, positive temperature coefficient (PTC) breakers at key points, and gas-filled spark gap arresters where necessary.

Controller shall include copper-clad steel ground lug for connection to earth ground hardware.

A 751CH key shall be mounted in the enclosure door for security

* 1. Two (2) keys shall be provided per each controller

The enclosure shall feature a pre-wired internal SmartPort connector for remote control.

2.2 Environmental Specifications

A. Controller shall be able to operate in all indoor and outdoor environments when installed according to specifications.

2.3 Warranty

A. Wall mount and pedestal enclosure and installed equipment shall carry a conditional 5 year warranty

## Controller Hardware

3.1 Control Display

1. Display shall be 4.125” diagonal (3.75” x 2.25”) full-color illuminated LCD suitable for outdoor viewing

3.2 Control Panel

A. Panel shall be reversible to allow for full access to programming, operations, and diagnostics when panel is open, exposing internal modules, components, and wiring

Control panel shall switch to diagnostics overview screen when reversed

Operator shall have full navigation and functional control of controller when reversed

Normal operations shall not be affected if panel is left reversed

1. Panel shall include ‘soft keys’ labeled for different functions in different screens to facilitate programming and navigation
2. Panel shall include an SD card reader for storage of backups and logs, as well as field updates of software

3.3 Controller Power

1. The controller shall accept either 120VAC or 230VAC primary power, 50/60Hz. The controller transformer shall include a safety ground wire connection.
2. The controller shall offer a constantly powered 24VAC terminal for sprinkler wire test purposes or specified auxiliary power functions

3.4 Controller Surge Protection

1. The controller transformer shall be equipped with an easily replaced standard 250V fast blow 5x20mm glass fuse, and shall be supplied with at least two spare fuses
2. The controller transformer shall include an internal, self-resetting thermal circuit breaker
3. Internal components shall include self-resetting PTC micro-breakers at critical paths
4. Power Supply Board shall include MOV and spark gap surge isolation

3.5 Decoder Modules

A. The controller shall have a base model capacity of 75 stations, consisting of a single 75-station decoder output module, and shall be expandable in 75-station increments up to 225 stations.

1. Controller be expandable to 225 stations
2. The controller must be able to operate at least 20 simultaneous solenoids per output module, up to a maximum of 30 simultaneous solenoids.
3. The controller shall operate waterproof decoders of 1, 2, 4, or 6 station capacity. Decoders shall have integrated surge suppression and two-way communications. Each decoder station output shall be monitored by the decoder, which will report solenoid malfunctions to the controller.
4. The field decoders shall be directly programmable with station numbers, and shall not require serial number assignments at the controller panel. The controllers shall also be addressable in the field with a wireless handheld programmer connection.
5. The decoder output module(s) shall be equipped with status LEDs, and shall be locked into place with a sliding lock. A warning LED shall flash when the slide is in the unlocked position. Operation of the slide lock shall also reboot the controller operating system. The control panel shall not require a dedicated “reset” button.
6. Each decoder output module shall include onboard surge protection, supplemented with common, replaceable 20A automotive fuses. The controller shall include spare fuses and a fuse pulling tool to facilitate field service. Each decoder output module shall display its version, the line current, and the status of each connected decoder in the diagnostic display.

3.6 Sensor Inputs

A. Controller shall have the following built-in sensor inputs:

1. 3 x ClikTM sensors: User-selectable, normally closed or normally open, dry contact switch closures for rain shutdown or switching purposes
2. 1 x Solar SyncTM weather sensor for automatic water savings with rain and freeze shutdown
3. 3 x Flow Inputs: Compatible with Hunter HFS Flow-SyncTM, and many other pulse type sensors
	1. A dedicated flow expansion module shall permit connection of up to 3 additional flow inputs, for a total of 6 per controller
	2. The flow expansion module shall have a dedicated slot, and shall not reduce the total number of stations available
4. A programmable rain delay shall allow the user to specify a number of days for the controller to remain shut down after restoration of a sensor alarm, such as a rain event.

3.7 Pump / Master Valve Outputs

1. The controller shall have 3 built-in P/MV outputs with a capacity of up to .800 mA each
	1. Each P/MV output shall have at least 12.5kV surge protection, supplemented by copper induction coils
2. The controller shall permit expansion to 6 P/MV outputs by allocating specified station outputs as “soft” P/MVs. The designated stations will then function exclusively as P/MV outputs 4, 5, and/or 6.
3. P/MV outputs may function as either normally-closed or normally-open
4. Basic P/MV activation is performed at the station level. Each station may have its own combination of P/MV activations
5. Additional P/MV activation shall be optionally programmable at the controller, water source, and flow zone level
6. The controller must be able to manage a normally-open P/MV at the water source level, upstream from and independently of one or more P/MVs at the flow zone level, as an example

3.8 Common Wire

1. The controller shall have a minimum of 3 common wire terminals to facilitate connection of a large number of stations.

3.9 Power Switch

A. Transformer assembly must include an integrated UL-listed power switch to provide safe operating conditions inside the wiring compartment.

**Part 4 – Programming and Operational Software**

4.1 General

1. Display shall be selectable in 12 languages
2. The display shall include selectable settings for date, time, units of measurement, and regional preferences.

4.2 Programming

1. The controller shall have 32 independent programs with unique day schedules, start times, and station run times
2. Each program shall allow Day of Week, Interval, or Odd/Even schedule types
3. Each program shall offer up to 10 start times
4. Each program may be allowed to overlap, stack, or SmartStackTM to a user specified maximum number of simultaneous programs
5. Each program may have programmable Non-Water Windows, during which automatic irrigation will not be allowed

1. Missed irrigation as a result of water window violations is logged and announced as an alarm

2. Manual irrigation for maintenance purposes shall not be inhibited by Non Water Windows

1. Each station shall be programmable in hours, minutes, and seconds of run time, from 1 second to 12 hours
2. The controller shall allow the creation of up to 64 “Blocks” of up to 8 stations each, used to facilitate programming and operation of larger systems

1. The blocks may be assigned a single run time within a program, and all stations will run together as a group

1. Each program may be assigned a programmable delay between stations, to allow for slow-closing valves or pressure recharging
2. Each station or block may be assigned Cycle and Soak settings to prevent runoff and waste by dividing run times into absorbable increments

4.3 Operating System

1. The controller display shall offer Copy and Paste functions for data entry tasks (such as run times, cycle and soak, program day schedules, Flow Zone and PMV assignments, etc.
2. A graphical display shall graph the start times and durations of each program over time, to allow the user to see the relationship between overlapping programs
3. The controller shall have Seasonal Adjust settings in 1% to 300% increments. Seasonal Adjust may be set by program in any of the following ways

1. Controller Level (adjusts all programs for ease of use)

2. Program Level (adjustment by individual program)

3. Monthly (pre-programmed adjustment for each month of the year)

4. Solar SyncTM (automatic daily adjustment from an external sensor)

1. The controller shall have true Calendar Date Off programming, allowing specific dates to be skipped at any time of year, by program. Off dates may be recurring, or one-time occurrences
2. The controller shall provide a User Management function to limit access to programming and other operations, with unique passwords for multiple users, permitting either full or partial access to controller functions

1. User logins and activities shall be tracked by user ID, if password security is enabled

2. The controller shall automatically log users out after a period of inactivity

1. The controller shall allow Easy RetrieveTM backup of all programming and configuration to preserve the original configuration, which may be restored at any time

1. The backup file shall also be stored to an SD card if desired

2. Multiple backups may be stored with unique file names on the SD card for different scenarios

1. The controller shall log all incidents and activity, organized into the following:

1. Alarm Logs shall include the last 250 alarm events with date/time stamp to the second

2. Controller Logs shall include the last 250 controller events

3. Station Logs shall include the last 1500 recorded irrigation events of all types

4. All logs shall appear in the selected language of the controller

1. Flow Operations

1. Controller shall feature independent flow management and flow monitoring in each of up to 6 flow zones.

2. Controller shall allow flow budgeting at flow zone and mainline levels to monitor total monthly water usage, and provide an alarm when the budgeted amount is exceeded

1. Flow management shall allow the controller to schedule simultaneous stations on within each flow zone, based on their flow characteristics, to reach a user programmable rate of flow for the duration of the water window

1. Station flows may be “learned” via flow sensor, or entered manually by the user.

2. Individual stations may be prioritized to insure they water earliest in flow management scenarios.

3. Flow zone assignments shall be by individual station, so that multiple programs may operate their stations in a flow managed state within a given flow zone

1. Flow monitoring uses a flow sensor to monitor actual flow, and intervene when high or low flow conditions are detected

1. Controller shall allow the station flows to be learned and entered automatically.

2. The station flow values shall be adjustable for high and low flow alarm limits

3. The station flow alarm settings shall have an adjustable delay factor to allow flow to stabilize

4. Each flow zone shall have an absolute high flow limit, independent of the station level flow monitoring

5. Each flow zone shall allow Unscheduled Flow allowances to permit manual watering within user programmable limits

6. Each flow zone shall include adjustable recovery settings for high level flow alarms, allowing irrigation to be automatically allowed after an elapsed period of time, or manually only, requiring a user to visit and clear the alarm

1. Flow operations shall also include the ability to assign a separate flow sensor and master valve to the mainline level, above the independent flow zones, to monitor and protect long runs of mainline pipe

1. Flow monitoring at the mainline level shall allow faster reaction to high or unexpected flow conditions, without the delay of station level diagnostics

2. Mainline protection may have its own monthly water budget, high flow and unscheduled flow limits, separately from lower level flow zone assignments

1. The controller shall permit the creation of Conditional Response statements, permitting sensor inputs or other conditions to trigger pre-programmed actions on the part of the controller

1. A Conditional Response may allow a sensor input to start a station, block, or program

2. The response shall be configured to either pause all other irrigation and execute the response immediately, or to execute the response together with other flow managed activities

3. A Conditional Response may be configured to activate an external Status Output Station to provide a visual notification that the controller is in an alarmed state

4. A Conditional Response may be configured to switch from one water source (P/MV) to another based on the status of an external sensor switch