

TOTAL AUTOMATION AHEAD

Seamless Irrigation Integration for Large-Scale Automation Systems

Hunter®



INTEGRATE **IRRIGATION** WITH YOUR EXISTING **SMART CITY SYSTEMS**



Hunter commercial ACC2 and ICC2 Controllers provide scalable, state-of-the-art irrigation control, leak detection, and water management when synchronized with your building management system, smart city, or wide-area SCADA applications. Multi-protocol gateways and drivers seamlessly integrate into BACnet®, Modbus®, and more than 120 other automation protocols.

SYSTEM BENEFITS

- Connect with flexible LAN, Wi-Fi, or external wireless options.
- Integrate using our approved and certified pre-packaged command and query objects.
- Customize the functionality and user experience of your interface to your own specifications.

OVERVIEW

The need for cutting-edge innovation and support continues to rapidly expand as the market pivots to meet the complex needs of next-generation building management systems, smart city networks, and wide-area SCADA applications.

PROTOCOL TRANSLATOR

Hunter has created and refined communication protocols to operate our industry-leading irrigation controllers over wide areas. The automation interface uses field server gateways that convert commands and reports into standard protocols.

Hunter's field-proven commercial controllers are ideal for sophisticated control, monitoring, and reporting. Thanks to powerful and flexible built-in features, these controllers can be used as completely standalone logic and control centers. Adding simple communication modules and certified gateways links the controllers to the expansive world of industrial automation.

Hunter offers simple plug-in communication modules for LAN (Ethernet), Wi-Fi, and other external communication options. The modules connect inside the controller cabinet and are automatically powered by the controller facepack.

FIELD SERVER GATEWAYS

Installing one or more gateways in the automation system allows Hunter controllers to interact with third-party devices in the system via customized logic.

The gateway can expose settings and operational data to your site automation system. The system can then monitor faults and operational data and send commands to start, stop, pause, increase, or decrease irrigation. Site operators worldwide now see irrigation as an integral part of their automation systems. The site automation system seamlessly integrates landscape management devices into custom control interfaces.

Integrators can add as few or as many irrigation controller interactions as they wish. This "integrator enabling" approach allows fast, simple startup configurations, as well as the ability to add features and interactions as the system matures.

Through its powerful protocol conversion capability, the gateway allows system designers and managers to connect unique instrumentation and sensor devices onto common protocol systems and into the Ethernet backbone. Due to its internal poll-block caching, multiple protocol capability, and high port count, the gateway improves data and machine update time compared to conventional HMI packages using multiple drivers and port expanders.

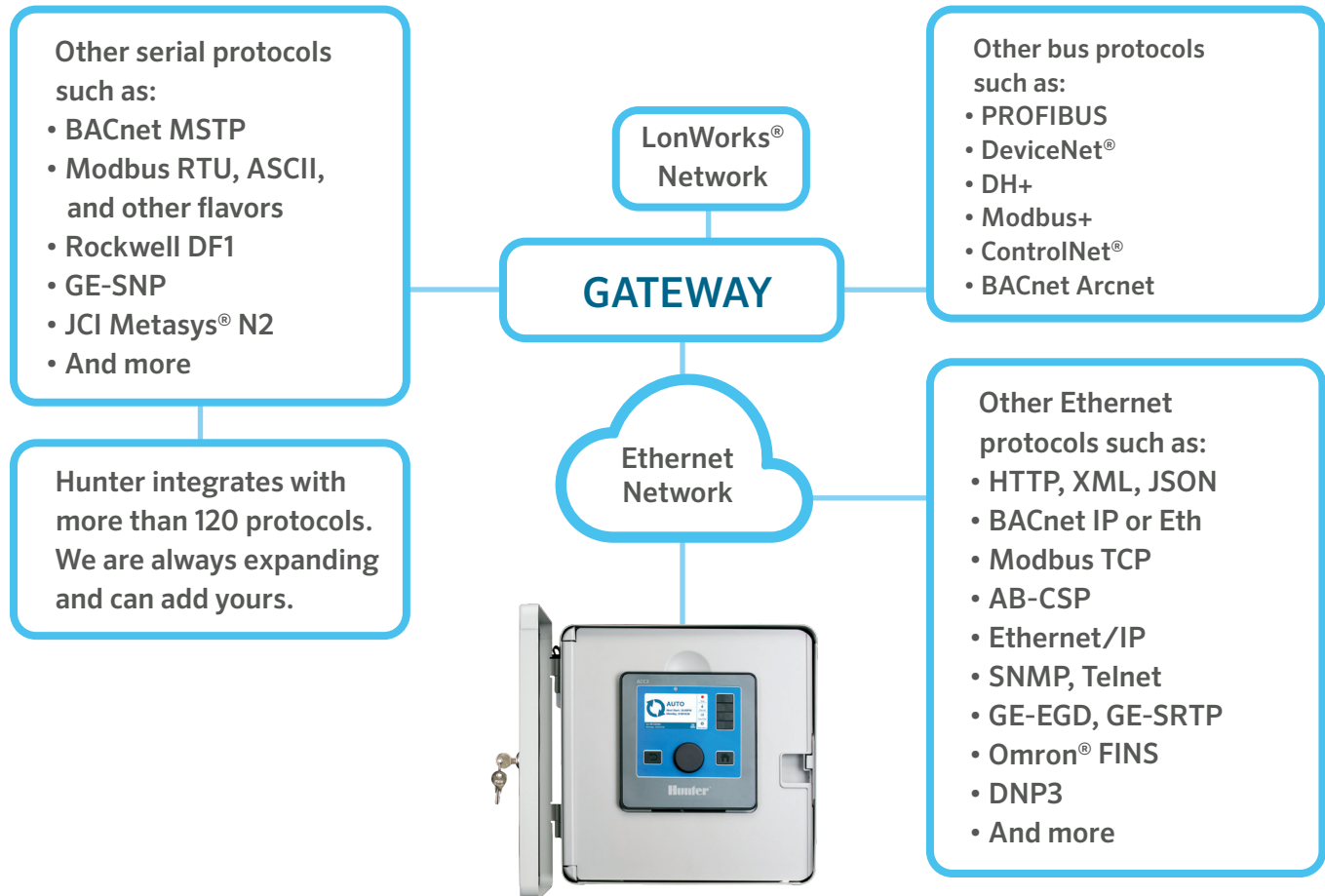
The gateway is designed to enable devices within a facility to communicate with SCADA networks, Ethernet, or other communication buses.

Hunter provides multi-protocol gateways and drivers that seamlessly integrate into BACnet, Modbus, and more than 120 other automation protocols.

Site operators worldwide now see irrigation as an integral part of their automation systems. The site automation system seamlessly integrates landscape management devices into custom control interfaces.

TYPICAL BLOCK DIAGRAM

Receive free BACnet test software with purchase. Discover devices and their objects. Test and document them. Arm yourself with a powerful field tool.



CLIENT SERVER MODEL AND DATA FLOW

Data flow is bidirectional. The central station can read and write parameters and issue commands.

The gateway will be an active client in communications with the Hunter controller. This means that the gateway will issue messages to read/write data. The ACC2 Controller will be a passive server, waiting silently for messages from the gateway to which it will respond. The data read will be cached for serving via BACnet or other automation protocols to the system dashboard.

This data is shared with another protocol (e.g., BACnet, Modbus, RESTful API, or DNP3). Any of the more than 120 protocols available in the gateway library can be linked. More than two protocols can be used in the same gateway. You can share the irrigation data with Modbus and BACnet if required.

The second protocol can be configured as a server, master, or both. Therefore, you can read flow data and write it to another device using a protocol like Modbus. You can also read the flow data and serve the data to a remote client using the second protocol.

Supported Services and Data – Most Commonly Used

The central station can execute the following services:

Service

- Change the programs with all the variables associated with them (1 to 32)
- Start/stop programs (1 to 32)
- Start/stop stations (1 to 225)
- Read the Daily Flow
- Read the Station Activity Log
- Read the Alarm Log
- Set the date and time

Hunter offers a wide variety of helpful resources and will work closely with you throughout the integration process.

Change Programs

The following program parameters may be read/changed:

Program Parameters

- 10 start times per program
- Irrigation days (e.g., days of the week, odd/even, day interval)
- Program stack/overlap
- Seasonal Adjust
- Run times
- And many others

Full documentation, including all data points, is provided with the gateways.

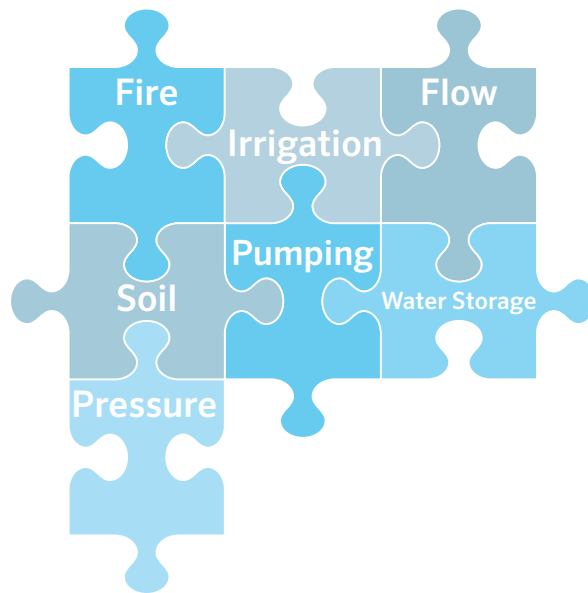
Support

Hunter is well-known for supporting customers long after sales have been closed. Local and factory technicians and engineers are available to assist with all facets of integration. We offer a wide variety of helpful resources and will work closely with you throughout the integration process.

Integration Examples

Here are a few examples of possible automation system applications to coordinate other devices with irrigation using the command protocol toolkit.

Scenario: *I want my irrigation system to work with third-party components.*

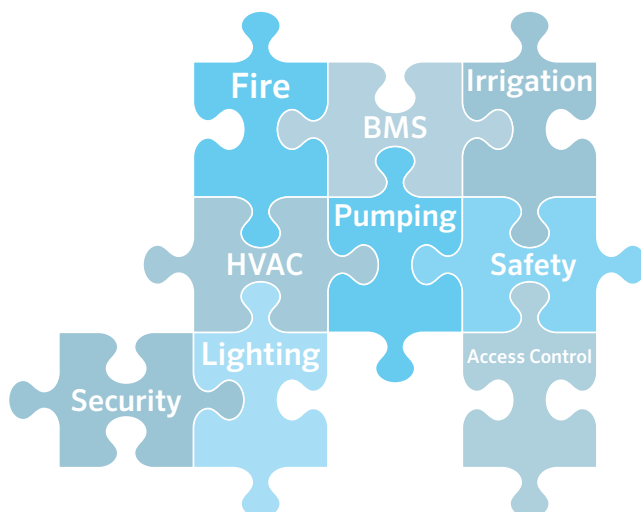


Connecting your irrigation system provides smooth, harmonious interaction with other connected devices, directly or indirectly. It can also extend the utility of your irrigation controller to additional commands from other devices (e.g., pressure sensors from pumping stations).

A protocol gateway can allow your irrigation controller to monitor, respond to, or control third-party devices. The gateway does so by exposing the third-party status and command data in a way the irrigation controller can understand.

For example, if your irrigation system is connected to a fire system, the irrigation controller can halt all irrigation activities when the fire system reports an alarm to conserve water for emergency needs.

Scenario: *I want my irrigation system to be part of my unified operations center.*



A protocol gateway can allow your irrigation controller to monitor, respond to, or control third-party devices.

Connecting your irrigation system to the automation system can have additional benefits related to system convenience, energy/water savings, fire safety, and more.

If you already have an automation system that is well integrated, you can add irrigation system control. A protocol gateway can expose the irrigation controller's status and commands to the network, which can be controlled and monitored directly through the automation interface.

For example, if your irrigation system is connected to the automation network, it can receive a message from the fire detection system to halt all irrigation activities to conserve water for emergency needs in the event of a fire.

IRRIGATION AUTOMATION INTEGRATION POSSIBILITIES

Weather

Automation network controllers are equipped with their own Solar Sync® Sensor inputs. These add-on sensors automatically adjust irrigation according to local weather conditions, using the Seasonal Adjust feature to set percentages of the base run time (100%) for each station.

Once integrated into an automation network, the controller will simply report the current level of adjustment, which is adequate for many applications. These sensors can also provide rain and freeze shutdowns to turn off irrigation locally, while reporting these statuses to the system.

With a fully integrated automation system, you can stop irrigation to conserve water in the event of a fire.

ALTERNATIVE WEATHER SOURCES

It is also possible to use a local weather station connected to the automation system to provide more advanced adjustments.

At a minimum, the weather source must provide:

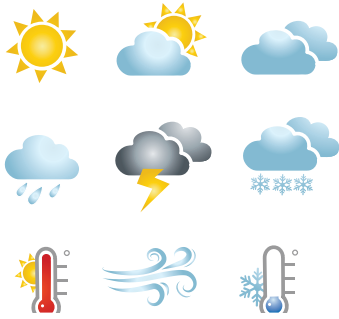
- Solar radiation
- Air temperature

Ideally, it would also provide:

- Relative humidity
- Wind speed
- Rainfall totals

All inputs should be compiled on an hourly, time-stamped basis.

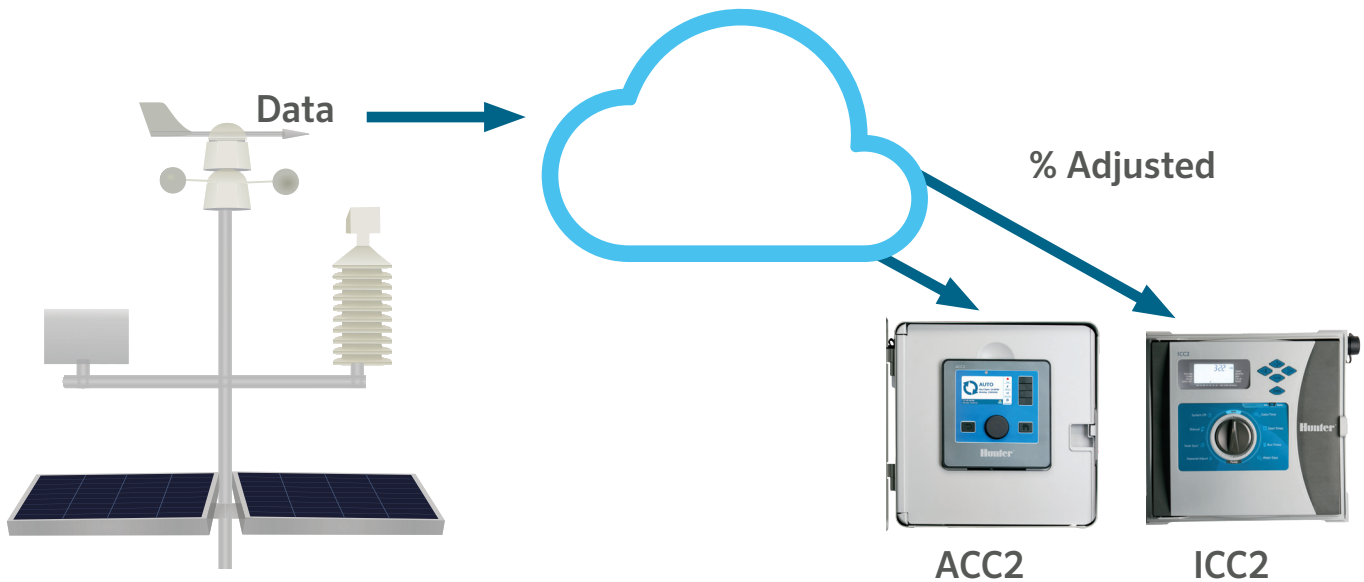
ALTERNATIVE WEATHER SOURCES (continued)



Irrigation Controller



Note: Most irrigation systems require immediate shutdown during rain events. A dedicated rain sensor (e.g., Hunter Rain-Clik® Sensor) is always recommended at each controller for this purpose.



The alternative weather source can be used to calculate a percentage adjustment similar to that performed by the Solar Sync Sensor. It's also capable of adjusting all controllers to a specific percentage using the Seasonal Adjust commands. This is a simple formula based on the modified Penman-Monteith equation for evapotranspiration.

Additionally, a contingency can be created to suspend irrigation for a set number of days based on locally measured rainfall amounts using the controller's Programmable Days Off command. This state may be overridden by a user with the Cancel Programmable Days Off command.

More detailed scenarios allowing for the modeling of root zone soil moisture levels for plants in each irrigation zone are possible.

Data from weather stations with Modbus, BACnet, or other supported network connections can be used to save water and improve plant health.

Slave Address: 255

*Functions Supported:
1, 2, 3, 4, 5, 6, 15, 16*

Modbus register map

Flow Sensors

ACC2 Controllers permit direct connection of up to six flow sensors. Economical ICC2 Controllers can report a single flow sensor via the network for flow recording, as well as high-flow shutdown settings.

In most irrigation scenarios, we recommend direct connection of the irrigation flow sensors to the controller, which is programmed to monitor and report flow on command.

- Controllers can learn the typical flow of each irrigation zone and allow adjustment to alarm limits and delay factors to prevent false alarms.
- The controllers can detect high- or low-flow conditions on their own and perform local diagnostics to identify and shut down malfunctioning devices.
- They will report alarm details to the system after the situation is diagnosed.

Alternative Flow Sources

By connecting the irrigation system to an automation network, it is possible to accept flow information from sensors connected separately via BACnet MSTP or Modbus RTU, and issue commands to the controllers based on those inputs.

These sensors function as a complete leakage detection system.

Higher-level functions, such as switching to another water source or cancelling irrigation when total flows have exceeded a user-defined limit, are certainly possible via automation connection to external flow sensors. The addition of real-time flow input results in a hydraulic balance throughout the pipe network.

Pump Stations

Many pump stations can be equipped with their own HMI and connection options for automation systems. In addition, most will automatically turn on or off based on their own sensors.

The SCADA can stop or reduce affected irrigation based on pressure drop, for example.

Higher-level pump monitoring (e.g., motor temperature or other alarm conditions) should be performed by the pump interface with the automation system. Any resulting actions for the controllers can be sent with the standard command set.

It is possible to accept flow information from sensors connected separately through the automation system and issue commands to the controllers based on those inputs.

Pressure Sensors

If pressure sensing is a system requirement, this should be supplied via the automation system with conditional programming to issue necessary commands to the controllers with the standard command set.

Pump stations often supply pressure data as part of their information. This is a potential source of pressure data if the pumps are integrated into the automation system.

Pressure differential can also be used to pause irrigation during filter backwash operations. Irrigation can be automatically resumed when the backwash is complete.

Water Tanks

Tank levels should be supplied to the automation system via sensors designed for that purpose. Conditional programming can then be created within the automation software to take specific controller actions with the standard command set, if necessary.

If a tank level is low, the system can, for example, suspend controller irrigation or switch to another tank or water source.

Fire Systems

When a fire system reports an alarm, it's a common requirement to halt all irrigation activities to conserve water for emergency needs.

This can be easily done with the standard command set via the automation system, where an active alarm monitored by the fire system will issue Programmable Off commands to all connected controllers.

The Programmable Off state can be cancelled with standard commands if the alarm is determined to be false.

Soil Sensors

Most command applications consist of using Klik Sensor inputs to inhibit irrigation when a connected soil sensor reads “wet” (open or closed input). The ACC2 Controller has three Klik inputs that may be adequate to prevent unnecessary irrigation on their own.

More detailed responses can be created via automation, with a network-connected sensor array reporting conditions from the field.

CONCLUSION

The need for cutting-edge innovation and support continues to rapidly expand as the market pivots to meet the complex needs of next-generation building management systems, smart city networks, and wide-area SCADA applications. Hunter solutions provide scalable, state-of-the-art irrigation control, leak detection, and water management when synchronized with a range of large-scale automation systems.

Hunter provides multi-protocol gateways and drivers that seamlessly integrate into BACnet, Modbus, and more than 120 other automation protocols to help landscapes thrive while conserving water and minimizing the use of energy and human resources.

To learn more, contact your Hunter representative.

BACnet is a trademark of ASHRAE. Modbus is a trademark of Schneider Electric. DeviceNet and ControlNet are trademarks owned by Odva, Inc.

Hunter®





Helping our customers succeed is what drives us. While our passion for innovation and engineering is built into everything we do, it is our commitment to exceptional support that we hope will keep you in the Hunter family of customers for years to come.

A handwritten signature in white ink, appearing to read "G. R. Hunter".

Gregory R. Hunter, CEO of Hunter Industries

A handwritten signature in white ink, appearing to read "Denise Mullikin".

Denise Mullikin, President, Landscape Irrigation and Outdoor Lighting

Website hunterindustries.com | **Customer Support** 1-800-383-4747