



**A Hybrid Solution
for Process and Logic Control**



Process control made easy

The HC900 reduces hardware, software, training and support requirements, making it an ideal control solution for diverse needs ranging from thermal control in boilers, furnaces, kilns, and dryers, to unit processing in pharmaceutical, chemical, bio-fuel, pilot-plant, and many other applications.

The Honeywell HC900 Hybrid Controller is an advanced process and logic controller offering a modular, scalable design that is sized to meet the automation needs of a wide range of process equipment. A touch screen operator interface provides user-friendly pre-built or custom displays, along with trending, data archiving and a host of other capabilities. A selection of controller CPU modules, multiple I/O rack sizes and multiple local or remote I/O racks per system provides a flexible architecture that can accommodate the most demanding application.

Modularity, built-in redundancy, versatile I/O configuration and connectivity, plus the ability to configure complete process solutions and archive their program parameters for easy retrieval and implementation, permits customized pinpoint control.

The Hybrid Control Designer software used for controller configuration is a Windows-based application that uses graphic objects to represent function blocks, greatly simplifying control strategy development and improving configuration recordkeeping.

The Station Designer software used for configuration of the operator interface is conjoined with Hybrid Control Designer software through database import functions that greatly simplify user interface display development.





HC900 Controller (4 and 12 slot I/O racks) with 900 Control Station and Hybrid Control Designer software

Easy to own

- Purchase only what you need initially, then expand as desired, thanks to modular/scalable platform design.
- Take advantage of hybrid control design to cut hardware and software costs and reduce training and support requirements.
- Reduce spares requirements, with universal analog inputs (TC, RTD, V, mV, mA) on the same I/O card.
- Use a graphic operator interface for extensive controller status views and integrating database contents with the controller.
- Maximize run times and reduce support costs, with built-in alarm e-mails.

Easy to engineer and start up

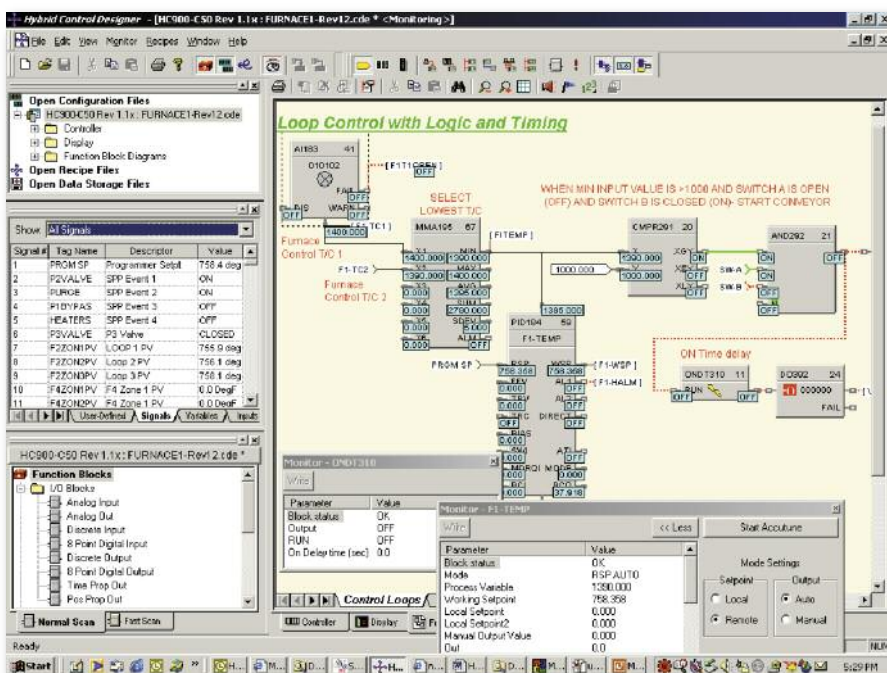
- Integrate a total solution with process control logic and sequences, communications, archived settings, and process recipes.
- Reduce startup time with run-mode configuration monitoring and edits.
- Simplify record keeping and eliminate filing errors with configuration back-build.
- Ensure confidence and compatibility with a customized user friendly dedicated operator interface.
- Shorten design cycles and enhance design flexibility with conjoined controller and interface configuration tools.

Easy to operate

- Streamline intuitive operation, eliminate errors, speed data access, and improve process supervision with a touch screen interface featuring custom graphic displays.
- Upgrade throughput, while reducing energy and scrap costs, thanks to tighter process control.
- Monitor process performance, and enhance data security with local data archiving.
- Facilitate fast, accurate process changes with recipe selections chosen from secure controller storage.

Easy to maintain

- Manage and access historical process data quickly and easily, through electronic records and logs.
- Eliminate PC or network dependency, reduce downtime, and enable portable configurations with a controller-centric database.
- Avoid process shutdowns with hot-swappable I/O removal/insertion while system is powered.
- Simplify version management and minimize software maintenance with a backward-compatible configuration tool.
- Eliminate compiled databases and uncertainty, reduce service support requirements, with back-built configuration.



Standard display for the Hybrid Control Designer.

Modular design creates broad application versatility

The modular, scalable HC900 Controller is available in three rack sizes and three CPU performance levels to handle a wide range of automation requirements. Analog and digital modules support up to 1,920 I/O points. Universal analog inputs that accept both direct and indirect inputs from sensors minimize the number of input cards and spare parts required.

Function blocks simplify execution of complex control strategies.

Hybrid control systems are configurable from a menu of more than 125 different types of software function blocks, each representing a unique algorithm for a specific control function. Signal conditioning, logic, function generators, powerful mathematical calculations, sequencing, and signal selection are just some types of the function blocks available to implement control strategies ranging from simple to sophisticated. Available CPU options support up to 400, 2,000, or 5,000 function blocks. Function block types are not limited.

HC900 control loops provide tighter, more accurate process control to increase throughput, reduce scrap, and minimize energy costs. They include applications ranging from single loop control to interactive cascade, ratio, duplex, feed forward, three-position-step, or custom control strategies. The quantity of loops per controller is not limited. Accutune III auto tuning is standard on every control loop to reduce startup time and ensure on-spec product.

Integrated logic capability can execute all logic functions approximately every 27 milliseconds and/or be synchronized with analog processing at 500 milliseconds. Logic instructions include two-, four-, and eight-input logic gates, plus traditional instructions such as timers, flip flops, and counters. Free-format logic capability

optimizes design by combining multiple logic functions into one, simplifying operation and troubleshooting. Both logic control and process control are configured from the same Hybrid Control Designer PC based software tool.

Sequencers control the output states of multiple digital parameters to control the sequence of process operation based on time or process events. Each sequencer supports up to 16 digital outputs and may have up to 50 process states. Multiple sequences stored in the HC900 controller can be selected on demand from the operator interface or as part of a recipe.

Setpoint programmers automatically manipulate a setpoint value for use by PID loops to create a time/value profile for process batch control. Multiple setpoint programmers, with profiles of up to 50 segments each, may be configured and stored in the HC900. Any programmer may run any profile separately or simultaneously. Each also has an auxiliary soak output and up to 16 event outputs for integration with sequence control functions.

A setpoint scheduler provides up to eight ramp/soak setpoints along with eight soak only setpoints that operate on a common time base. The scheduler also supports up to 16 event digital outputs. Multiple independent setpoint schedulers are available in a configuration.

Implementation options support diverse configuration and I/O needs.

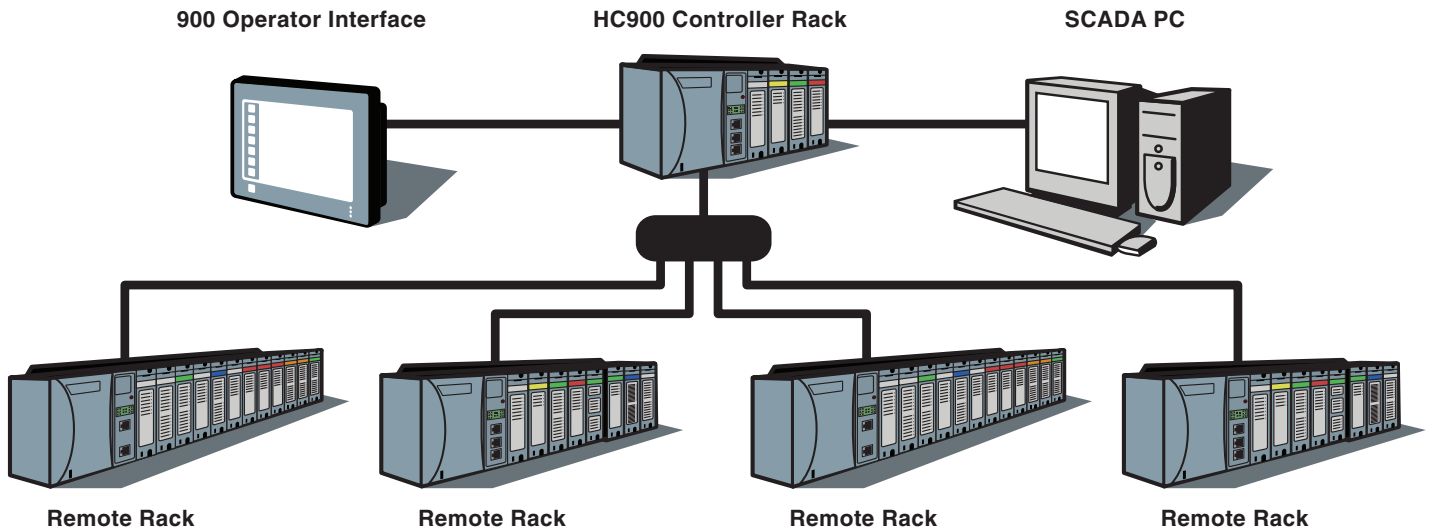
Recipes stored in the controller memory make it easy to ensure error-free product/process changeovers. These recipes include variables, setpoint profiles, setpoint schedules, and/or logic sequences that can be loaded by operator action or included as an integral part of the HC900 controller configuration for automatic loading.

Redundancy features maximize process availability by providing backup controllers, power supplies and communications for seamless failover under fault conditions. A Redundant Switch Module (RSM) is located in the rack between two CPUs and visually indicates which CPU is the lead and which is the reserve. A key switch on the RSM allows the user to change the operating mode of the lead and reserve CPUs.

Ethernet network ports are continuously active on the lead controller, each on a different subnet. Transfer of communications from one port to another port on the same CPU is handled by the host application. A secondary power supply can also be added to each HC900 I/O rack for standby redundancy.

Remote I/O capabilities maximize installation flexibility and reduce wiring and installation costs, with up to four remote I/O racks able to connect to a single controller. Honeywell Ethernet switches accommodate connections up to 300 meters. Fiber-optic cable with Honeywell recommended hardware satisfies connections up to 1,500 meters.

Remote Terminal Panels (RTPs) connect to HC900 I/O modules using pre-wired cables to simplify wiring configurations and costs.



Flexible connectivity suits your process environment.

Diverse HC900 connectivity and communications options adapt to existing process-line infrastructure, satisfy specific control requirements, and accommodate specialty applications.

Open Ethernet connectivity enables HC900 controllers to communicate with their host interfaces and each other. The open Modbus/TCP protocol allows interfacing to most popular HMI, data acquisition and OPC software. Up to 10 device connections are supported on the host Ethernet port. An HC900 network of controllers and operator interfaces are partitioned into segments on the network to maximize communication performance.

Serial Modbus connectivity, using selectable Modbus RTU capability, allows RS232 and/or RS485 ports to be configured as Modbus slaves, while one of the ports is selected as a Modbus master. A wide variety of devices (touch panel operator interfaces, I/O devices, etc.) can be connected to the controller to provide greater flexibility in system design.

Peer-to-peer communications allows any HC900 to interface with up to 32 other units for process equipment applications that require sharing data between controllers. Up to 2,040 parameters per controller may be exchanged. A standard Ethernet communication port supports concurrent peer-to-peer communications and connectivity to supervisory systems.

Wireless connectivity, using dedicated communication function blocks in the HC900 Hybrid Controller, simplifies setup and operation of the controller with Honeywell wireless transmitters, via an RS485 network to multiple base stations. Connectivity to the OneWireless™ LAN is via an Ethernet connection to a wireless gateway.

E-mailed alarm/event reporting communicates process upsets over a plant LAN or via the Internet using the HC900's e-mail capability. Alarms and events may be programmed to send messages to up three different e-mail addresses.

Building-block configuration simplifies control implementation.

Hybrid Control Designer software enables HC900 system configuration with a Windows NT, 2000, XP or Vista based PC. It uses drag-and-drop placement techniques for graphic icons and soft-wiring connections between function blocks to create

application-specific control strategies, automatically calculating memory usage and processor scan time as the function blocks are configured. The user-friendly graphic development allows partitioning of the control strategy into multiple worksheets for ease of recordkeeping, faster access to functional areas during programming and better support for user-specified process function identifications.

Run-mode configuration editing is a standard feature that can significantly reduce startup time and avoid costly process shutdowns. Configuration debug tools simplify troubleshooting with features such as online monitoring of multiple function blocks on a single display, on/off identification of digital signal flow connections, and output forcing capability for most block outputs. Selectable user-defined Watch Windows and Signal Trace-back provide a clear view of the configuration operation and quick identification of potential errors.

A variety of printable presentation formats simplify configuration documentation. These include a summary of controller I/O, the graphic configuration diagram, function block properties, recipe groups, setpoint profile groups, operator display and point selections, and more.

System configuration and operation adapt to your needs

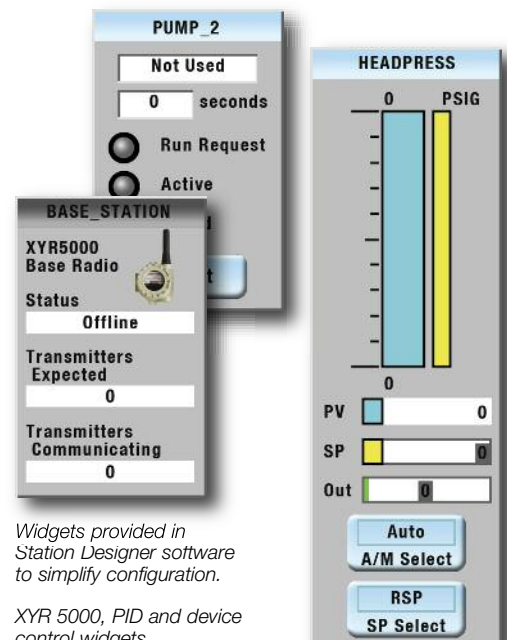
The new 900 Control Station operator interface provides a large assortment of standard preformatted displays for controller monitoring and servicing. Their use shortens design time, reduces engineering costs, and facilitates standardization of operator interaction with the process—all while enhancing the ability to customize easy-to-understand graphic displays that look like the process the operator is monitoring.

An extensive array of standard operator displays and pre-built display “widgets” are provided to complement robust control function blocks such as PID, setpoint programmers and setpoint schedulers, and sequencers for the HC900 controller. Display widgets are intelligent graphic objects that bind display parameters to the parameters of HC900 controller function blocks through a single reference, eliminating the time-consuming process of uniquely identifying the data source for each display parameter. There is no need to look up register addresses or cryptic index locations to identify sources.

The HC900 control station provides trending objects that can be integrated into displays to provide a recent history of process performance. Data logging to an internal compact flash card is also supported, allowing access via a network connection and web server, or a USB memory module. Logs may be continuous or batch, and can be stored at specified frequencies using single or multiple file partitions.

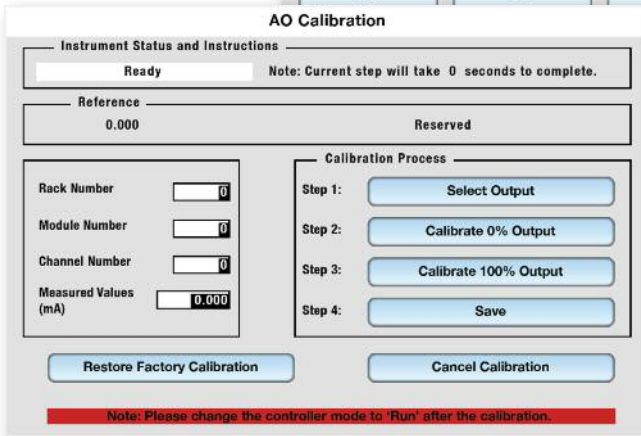
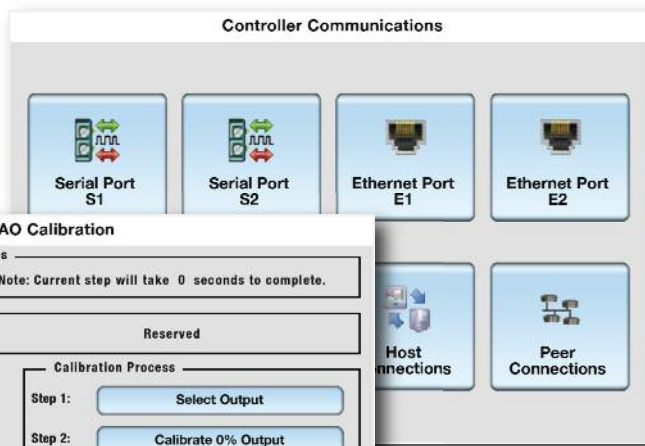
Station Designer software is a robust yet user-friendly PC tool that integrates with the HC900 Controller’s Hybrid Control Designer software to streamline the task of configuring a custom operator interface. It is an intuitive development environment that offers more than 4,000 pre-built process graphic symbols (for pumps, valves, tanks, buttons, switches), widgets, animation, hide object, if-then-else scripting, and more.

A master overlay is incorporated into every user display to provide annunciation of alarms and events, indicate controller communication/mode status, time and date, and to provide access to the background data log function. The overlay is linked to the controller database and provides structure for items of common interest to operators. A database import feature allows the software to extract information – including tags, names, descriptions, units and more – from the configuration file of Hybrid Control Designer software, simplifying object referencing to controller parameters.



Widgets provided in Station Designer software to simplify configuration.

XVR 5000, PID and device control widgets.



Standard displays provided in 900 Control Station:

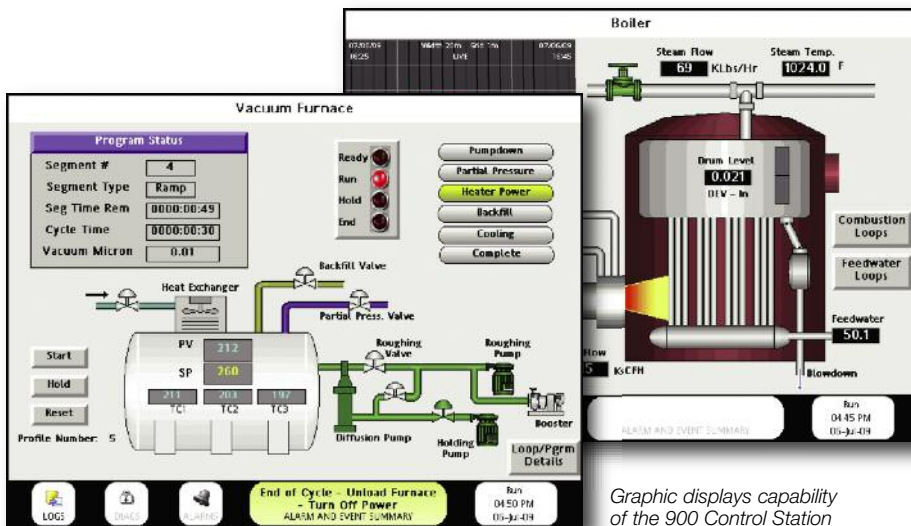
Top screen: controller maintenance display

Left screen: accessing controller analog calibration

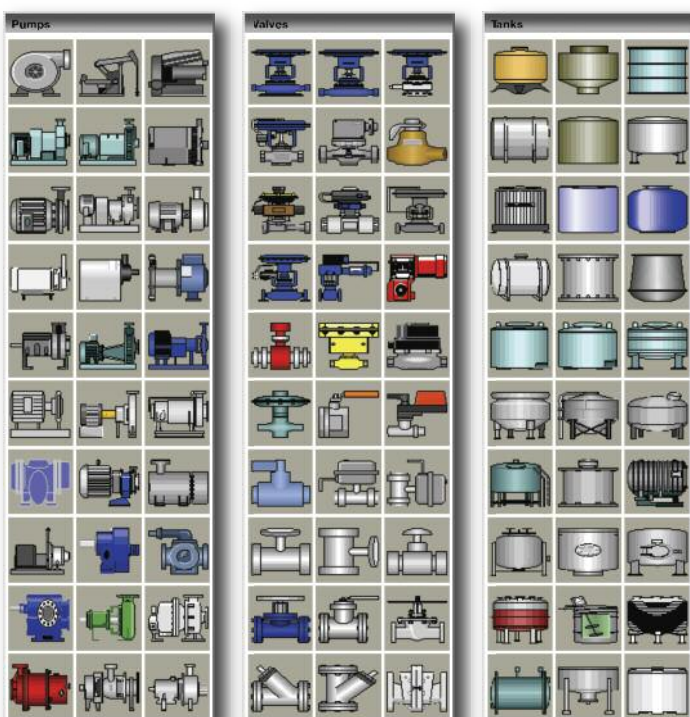


Operator Interface Features

- NEMA Type 4X operator interface screen withstands harsh operating environments.
- Easy-to-operate 10"-display includes both a touch screen and dedicated buttons.
- Standard and custom graphic elements can be assembled into specific displays, for fast and easy startup.
- Custom graphics tools let you select from 4,000+ pre-built objects for animation support, math, formulas, scripting.
- Function block widgets accelerate configuration development.
- Controller status displays verify system integrity, with no configuration required.
- Recipe selection makes product/process changeovers simple and accurate.
- Trending and data logging is provided via non-volatile flash card storage, with USB memory support and no artificial limits.
- Multi-level log-on security feature prevents unauthorized access.
- Alarm/event logging with e-mail notification of impending problems tracks process upsets and validates performance.
- Ethernet or serial connectivity enhances installation flexibility, includes Modbus and Modbus/TCP protocol support.
- Embedded web server feature allows access to your application from anywhere.
- Multiple interfaces on each controller enable process management from up to three locations.



Graphic displays capability of the 900 Control Station



Graphic symbols provided in Station Designer software to simplify configuration.

Hundreds of icons available including pumps, valves, and tanks icons shown.

Controller

Function Blocks: C70, C70R CPU–5000, C50 CPU–2000, C30 CPU–400

Analog Inputs: Up to 480 universal analog inputs, 960 high level

Accuracy: 0.1% of span (field calibration to $\pm 0.05\%$ of span)

Analog Outputs: Up to 200 with internal power, 960 with external power 0 to 20 mA maximum, 12 bits, 0.1% accuracy

Digital Inputs/Outputs: Up to 1920, contact DI, 24Vdc DI/DO, 120Vac DI/DO, 240Vac DI/DO

Total I/O: Up to 1920

I/O Racks per System: One controller and up to four remote I/O racks

Control Loops: PID, on/off, cascade, ratio, %C, three-position step

Control Output Types: Current, time-proportioning, position-proportioning, three-position steps

Setpoint Programmers: 50 segments each, 16 event outputs, multiple stored profiles

Setpoint Scheduler: 50 segments, 8 ramp/soak outputs, eight auxiliary outputs, 16 events, multiple schedules

Comm: Ethernet 10/100/base T, Modbus/TCP protocol, up to 10 Ethernet hosts on C50, C70, C70R up to 32 peer-to-peer controllers, Serial Modbus RTU, RS485 or RS232, slave or master operation (up to 32 slaves)

Operating Temp: Rated 0° to 140°F (0° to 60°C)

Humidity: Rated 10% RH to 90% RH, non-condensing

Control Station Operator Interface

Display: 10.4in (264mm), TFT active matrix color LCD

Touch Screen: Resistive analog

Distance from Controller: Ethernet—328ft (100m), RS485—2000ft (600m)

Power Supply: 24Vdc, 1.4A

Size (WxHxD): 12.83in x 9.5in x 2.2in (325.8m x 241.3m x 55m)

Operating Temperature: 32° to 122°F, (0° to 50°C)

Humidity: Rated 10 to 90%, non-condensing

Panel Rating: Type 4X

Memory: 16MB onboard non-volatile flash, optional memory card (compact flash 2GB)

Comm. Ports: Ethernet 10/100 base T, 1xRS-485, 2xRS232 Serial

USB Ports: 2 x USB specification 2.0 host port, type A, 1 x USB specification 2.0 device port type B

900 Station Designer Software

Configuration: 900 control station CS interface – offline

Operating Environment: Windows 2000, XP, Vista

PC: Pentium class processor and RAM as required by the chosen operating system plus 50MB for software installation. 800 by 600 pixels minimum, 256 or more colors. RS-232 or USB port

Cable: USB Host, RS232 Serial, Ethernet 10/100 base T

Hybrid Control Designer Software

Configuration: HC900 Controller – offline with run-mode editing

Operating Environment: Windows NT, 2000, XP, Vista

PC: Pentium, 2GHz with 256 MB RAM minimum, SVGA or greater screen resolution

Cable: RS232 – three-wire, Ethernet 10/100 base T

Modem Support: Monitor, upload, download configuration

For more information, contact Honeywell Field Solutions in your country/region:

Baltics: 358 (0) 20 752 2753	Oman: 968 24589200
Belgium: 32 2 728 24 07	Pacific: 61 3 9420 5588
Canada: 800 343 0228	Romania: 40 21 231 64 37
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Netherlands: 31 152 701 100	United States: 800 343 0228

Automation & Control Solutions

Honeywell
2500 West Union Hills Dr.
Phoenix, AZ 85027
Tel: 1-800-343-0228
www.honeywell.com

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