HC900 Hybrid Controllers

PROCESS CONTROL
MADE EASY

Honeywell Solutions for Hybrid Control

Honeywell

Easy to Engineer & Start-Up

Integrated Control Solution
- Process Control
- Logic and sequences
- Operator Interface
- Recipes
- Communications

Run-Mode configuration edit reduces startup time

Floppy disk configuration loading
- Simplifies updates
- Provides program security

On-Line monitoring reduces startup time

Configuration Back-build
- Simplifies record keeping and eliminates errors

Preformatted Operator Displays
- Shortens design time
- Operator friendly

Easy to Own

Modular/Scalable Platform
- Purchase only what you need
- Expands as needed

Universal Analog Inputs
- TC, RTD, V, mV, ma on the same I/O card
- Reduces spares required

Single Integrated Configuration Tool for:
- Configuration
- Monitoring
- Operator Interface Setup
- Documentation

Hybrid Design
- Reduces hardware needed
- Reduces software needed
- Reduces training and support

The Honeywell HC900 Hybrid Controller is an advanced process and logic controller with data acquisition offering a modular, scalable design that is sized to meet the automation needs of a wide range of process equipment. A large screen, factory floor, Operator Interface provides **user-friendly** displays along with local trending and data archiving capabilities. The operator interface is fully integrated with the controller database to **minimize configuration** and setup time. The Hybrid Control Designer is a Windows® based software tool that uses graphic objects to represent function blocks, greatly simplifying control strategy development and improving configuration record keeping.

Hybrid design reduces the hardware and software needed, reduces training and support requirements and makes the HC900 an **ideal** control solution for boilers, furnaces, environmental chambers, reactors, autoclaves, dryers, extruders, and other process equipment.

HC900 Controller

The rack-based HC900 is a modular, scalable platform available in 3 rack sizes (4, 8 and 12 I/O slots) and two CPU performance choices (C50, C30) to handle a wide range of automation requirements. To maximize installation flexibility, up to 4 remote I/O racks may be connected to a single controller to reduce wiring and installation costs. A variety of analog and digital modules are available to support up to a total of 1920 I/O points. Universal analog inputs minimize the number of input cards and spare parts required.

Function Block Algorithms

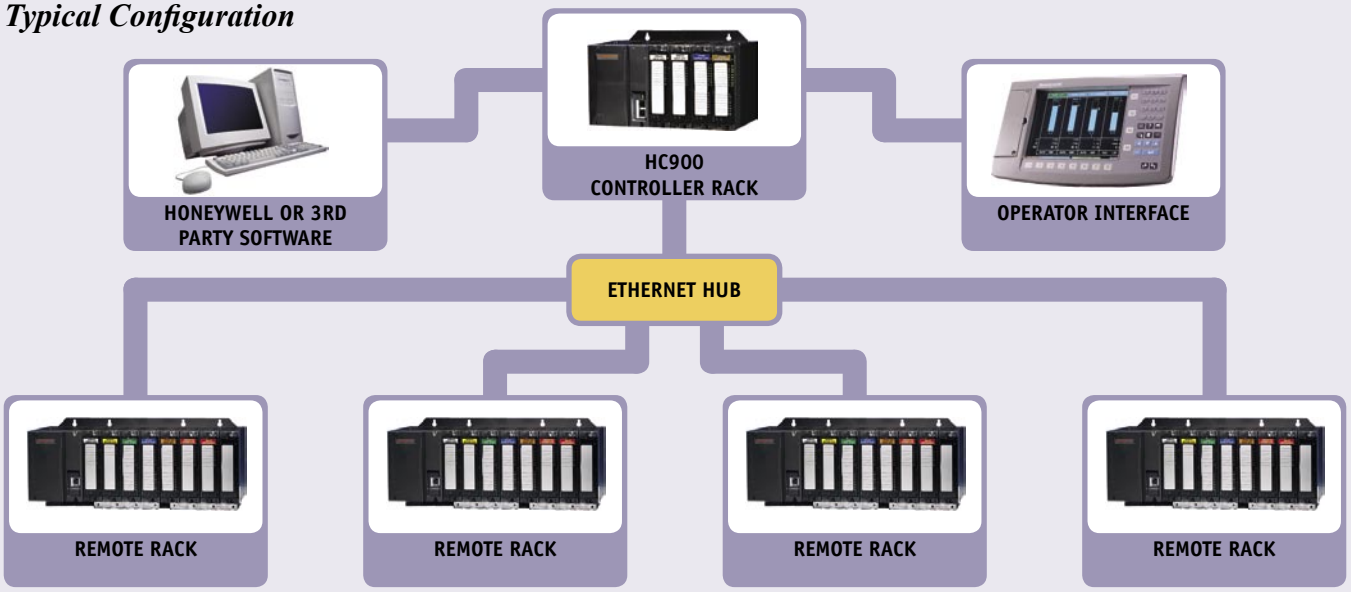
The HC900 is configured from a large, powerful assortment of function block algorithms. Use function blocks by selecting from a menu of over 100 different types to configure simple to very sophisticated control strategies. Signal conditioning, logic, function generators, powerful math, sequencing, and signal selection are just some of the types of function blocks available. CPUs are available that provide 400, 2000 or 5000 function blocks. Function block types are not limited. A user can configure 60 or more PID blocks if controller memory is available and scan times are adequate. The HC900 configuration software automatically calculates memory usage and processor scan time as function blocks are configured.

Control Loops

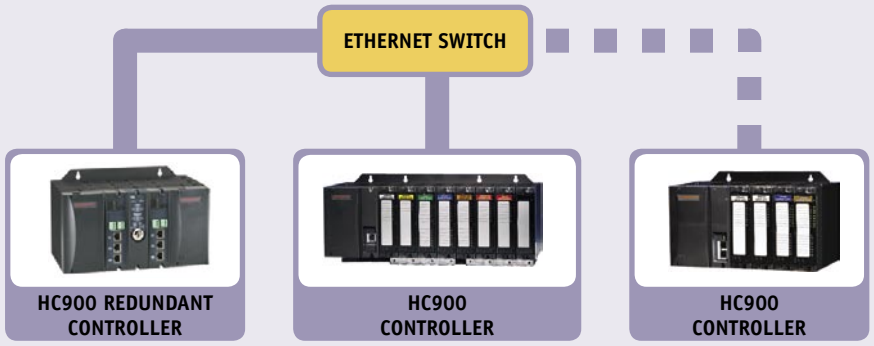
The HC900 supports applications

Open Modbus/TCP Protocol interfaces to Honeywell or 3rd party software.

Typical Configuration



Up to 32 Peers per Controller



from simple loop control to interactive cascade, ratio, duplex, feed forward, three position step or custom control strategies. Auto tuning is standard on every control loop using Honeywell's proven "AccutuneIII" tuning algorithm to reduce startup time and ensure on-spec product.

"Fuzzy logic" suppresses unwanted process overshoot, reducing cycle time and product losses. The HC900 provides tighter, more accurate process control, increasing throughput and reducing scrap and energy costs.

Remote I/O

Up to 4 I/O racks may be remotely connected to the HC900 controller to support a process using distributed I/O. The maximum distance supported using Honeywell switches is 300 meters. Up to 750 meters additional distance is supported useing Honeywell recommended hardware. Racks can support up to 192 analog inputs as part of the 480 total, or 1920 total I/O per HC900 controller.

Peer-to-Peer Capability

Peer-to-peer communications allow any HC900 to share data with up to 32 other HC900 controllers for process equipment applications that require sharing information between controllers. A standard Ethernet communication port supports concurrent peer-to-peer communications between controllers and connectivity to supervisory systems.

Easy to Operate

Lower Support Cost with on-line e-mail of:

- Alarm
- Events

Tighter Process Control

- Higher throughput
- Reduced energy and scrap

Local Data Archiving

- Track process performance
- Enhance data security

Recipe Selection

- Fast, accurate product changes

Fuzzy Logic Overshoot

- Eliminates process overshoots

Ethernet Open Connectivity

HC900 controllers communicate with their host interfaces and each other over an Ethernet 10/100baseT communication network. The open Modbus/TCP protocol allows interfacing to most popular HMI, data acquisition and OPC server software. A HC900 network of controllers and Operator Interfaces are partitioned into segments to maximize control performance.

Easy to Maintain

Modular Product
- Scalable
- Expandable

Low Cost Data Acquisition
- No pens or paper

I/O Remove/Insert Powered
- No process shutdown

Backward Compatible Configuration Tool
- Only 1 tool required
- Simplifies version mgmt.

"Controller Centric" Database
- Fast operator interface replacement
- Reduced downtime

Configuration backbuild
- No compiled databases
- Reduced service support
- PC/Modem upload

Sequencers
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. Sequences with up to 64 steps with selected states may be configured to advance based on time or event. Multiple sequences can be stored in the HC900 controller. Sequences can be selected on demand from the Operator Interface or as part of a recipe. Hold, jog to a step or sequence advance can also be selected from the Operator Interface. Multiple sequencers can be supplied in a control strategy.

Integrated Logic
Logic capability can execute all logic functions approximately every 27 milliseconds and/or be synchronized with analog processing at 500 milliseconds. Logic instructions include 2, 4, and 8 input logic gates plus traditional instructions such as timers, flip flops and counters. A 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 tool.

E-mailed Alarms/Events
Process upsets can be communicated over a plant LAN or via the Internet using the HC900's e-mail capability. Alarms and events may be programmed to send an e-mail message to up to 3 different E-mail addresses upon occurrence.

Recipes
Error free product changeover is greatly simplified using recipes. Recipes in the HC900 controller include variables, setpoint profiles, setpoint schedules, and logic sequences. The user can allocate controller memory to store recipes as needed to support batch operation. Recipes may be loaded by operator action or may be included as an integral part of the HC900 controller configuration for automatic loading.

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

Setpoint Scheduler
The setpoint scheduler provides up to 8 ramp/soak setpoints along with 8 soak only setpoints that operate on a common time base. The scheduler also supports up to 16 event digital outputs. Guaranteed soak, jog to a segment and nested looping are standard features of the setpoint scheduler. Multiple independent setpoint schedulers are available in a configuration.

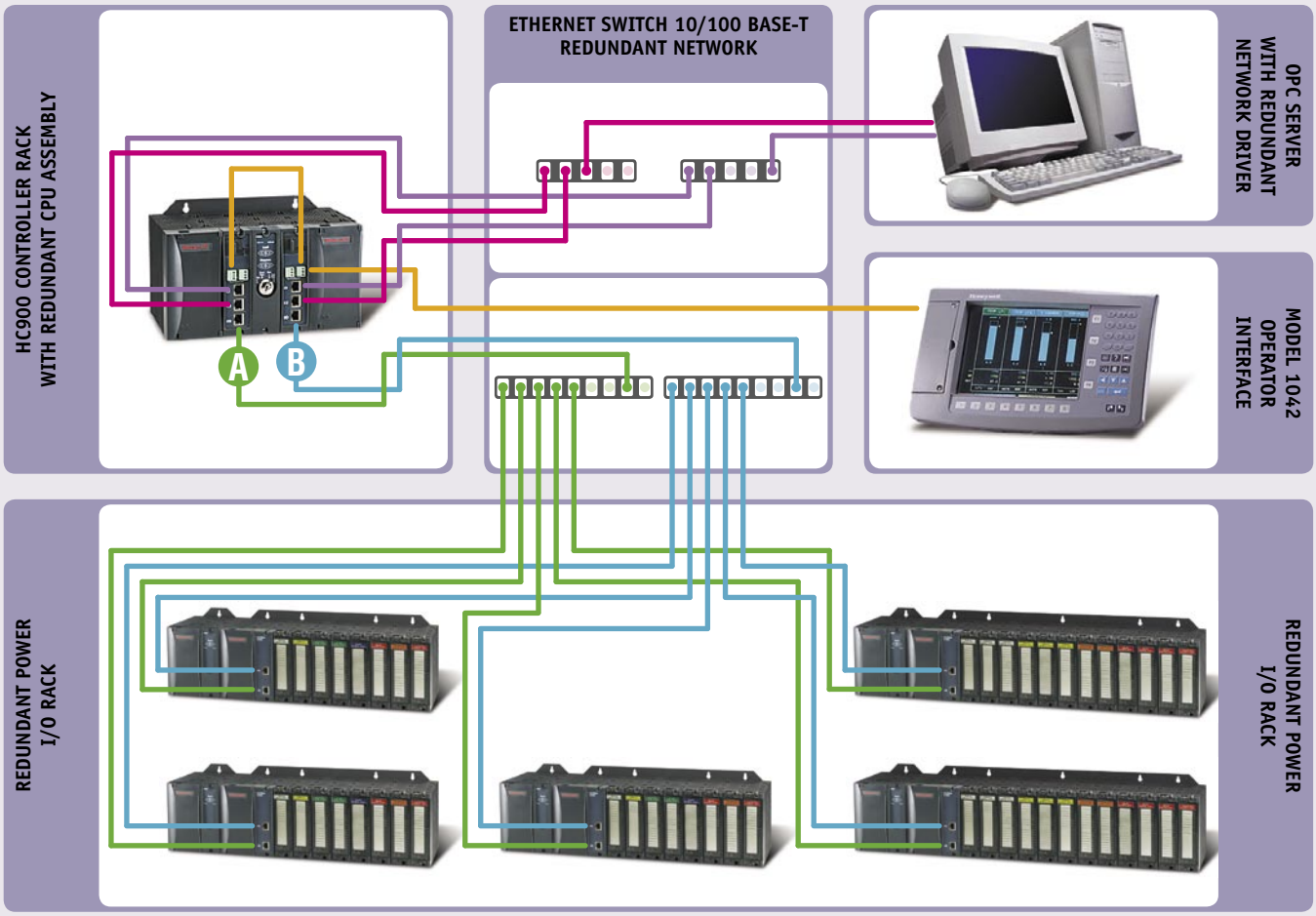
Remote Terminal Panels
Three types of remote terminal panels (RTPs) can be connected to the HC900 I/O modules. Prewired cables are used between the I/O modules and the RTPs to lower wiring costs.

- 3 cable lengths (1M, 2.5M, 5M)
- DIN rail mounting
- Switchable 250 ohm resistors
- Field power disconnect for remove/insert under power
- Fused 24 Vdc transmitter power
- Fused relay outputs

A cable assembly is available in 1 meter and 2.5 meter lengths to connect two 16 point RTPs to 32 channel DI/DO or 16 channel AI modules.

HC900 Hybrid Controller Redundancy

Redundant HC900 Controller with Five I/O Racks



Redundancy

The HC900 redundancy feature maximizes process availability by providing redundant controllers, power supplies and communications for seamless failover under fault conditions. Two redundant C70R CPUs operate in a separately mounted controller rack, each with an independent power supply. A Redundant Switch Module (RSM) is located in the rack between the 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. In operation all control functions, I/O communications and host communication exchanges are handled by the Lead CPU, including control configuration. The Lead CPU updates the Reserve CPU with all the information needed for the Reserve to assume control in the event of a fault of the Lead CPU.

Both network ports are continuously active on the Lead controller. The network ports on the Reserve CPU are not available for external communications. The HWIOPC server provides redundant Ethernet communications and automatic communications transfer.

A second (redundant) power supply can be added to each HC900 I/O rack. A Power status Module (PSM) provides visual indication of power supply status.

Redundancy

Effective:

- Redundant CPUs
- Redundant Networks
- Redundant Power

Easy to Implement:

- No Complex Configuration
- Automatic Reserve Controller Configuration

Secure Operation:

- Key Lock Mode Changes
- Configure Only Lead Controller
- Communicate to Only Lead Controller

Performance:

- Ethernet 100 baseT Communications
- 5000 Function Blocks

Highlights include:

- **Single & multiloop displays**
  Simplify operation while providing a full view of the process
- **Bar graphs**
  Evaluate interaction between groups of process measurements
- **Push-button displays**
  Reduce the need for dedicated panel buttons & indicator lights
- **Data archiving**
  Stores process data on floppy disk or zip drive for easy analysis using TrendManager Software Suite
- **Overviews**
  Show grouping of similar or related analog or digital points for quick review and data entry as required
- **Trend displays**
  Analog points may be grouped to emulate the action of a traditional strip chart recorder to locally track process performance
- **Recipe selection**
  Product changeover is simple and accurate
- **Hardened operator interface**
  Type 4X front panel allows mounting in harsh environments
- **Tight Controller integration**
  Replace operator interface with no re-configuration

Operator Interface

The Model 1042 and Model 559 Operator Interfaces provide a wide selection of over 100 operator friendly preformatted displays and use direct access display keys. The use of preformatted displays both shortens design time, reducing engineering costs, and facilitates easy operator interaction with the process. Both analog data and digital status information are viewed in multiple formats on an LCD display for clear process monitoring. Displays are available for viewing and changing control loops, setpoint programs, recipes, alarm groups, trends and other analog and digital functions. A standard floppy disk drive or optional zip drive stores process data, stores and retrieves configuration information, recipes, setpoint profiles or schedules.

Users can configure Models 1042 and 559 Operator Interfaces by selecting display formats using the same Hybrid Control Designer tool that configures the HC900 controller. This eliminates register mapping, which can greatly reduce troubleshooting and startup time. The OI configuration is stored in the HC900 controller. If a new OI needs to be installed it will automatically be restarted from the HC900 controller. This greatly simplifies maintenance and eliminates any concern about incompatible software revisions between the controller and OI.

Serial Modbus Connectivity

Selectable Modbus RTU capability allows both the RS232 and RS485 ports to be configured as Modbus slaves and one of the ports may be selected as a Modbus master. This enables the HC900 controller to communicate via Modbus RTU with Honeywell controllers, recorders, actuators in addition to Models 559/1042 Operator Interfaces. Also, a wide variety of 3rd party devices (touch panel operator interfaces, I/O devices, etc.) can be digitally connected to the HC900 controller to provide wide flexibility in system design.

Hybrid Control Designer creates application specific control strategies

Hybrid Control Designer

The Hybrid Control Designer software provides system configuration using a Windows® NT, 2000 or XP based PC. Hybrid Control Designer uses drag-and-drop placement techniques for graphic icons and soft-wiring connections between function blocks to create application specific control strategies. The user-friendly graphic development allows partitioning of the control strategy into multiple worksheets for ease of record keeping, faster access to functional areas during programming and better support for user specified process function identifications.

Run-mode Configuration Editing and Monitoring

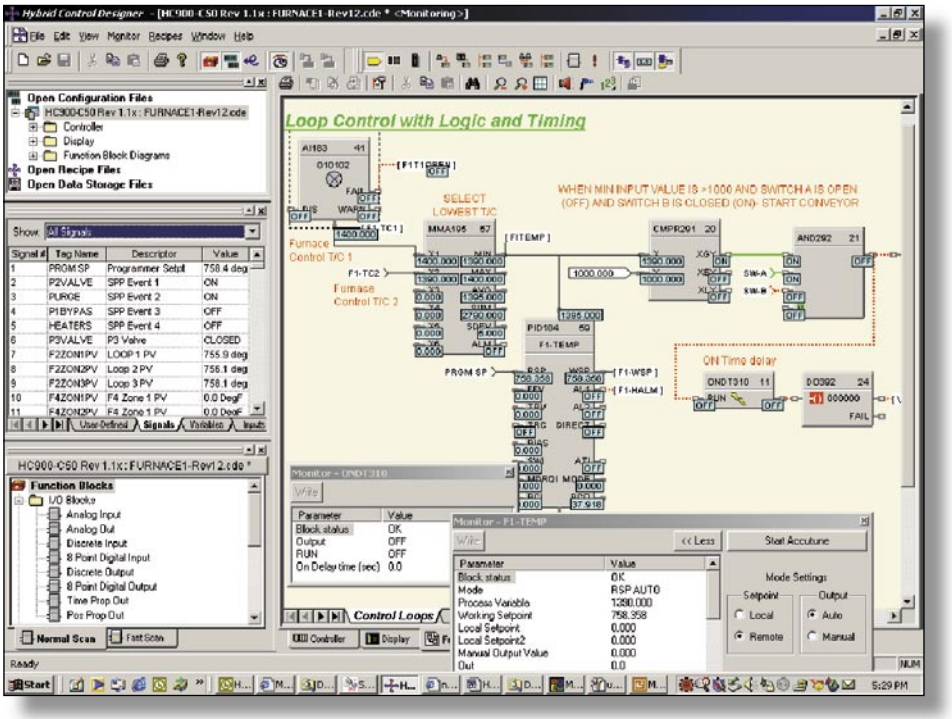
Run-mode configuration editing is a standard feature that can significantly reduce startup time and avoids costly process shutdowns. Configuration debug tools simplify troubleshooting with features such as on-line monitoring of multiple function blocks on a single display, on/off identification of digital 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.

Documentation

Configuration documentation is supported through a variety of printable presentation formats. A few of these include a summary of the controller I/O, the graphic configuration diagram, function block properties, recipe groups, setpoint profile groups, operator display and point selections, etc.

File Export

When interfacing the HC900 controller to PC software programs or 3rd party operator interfaces, a time saving service is provided to export tag and variable definitions in CSV or tab delimited formats. Additionally, the Modbus addresses of each configured data parameter may also be exported to a file.



Vista 400 Supervisory Control System

Vista 400 is a modular, flexible, supervisory control system that incorporates leading edge, open-system technologies. Vista 400 provides comprehensive facilities in an economical and easy-to-use package that integrates with a wide range of Honeywell and Third Party devices.

- Open client/server architecture
- Standard displays, HTML graphics, trending, batch reporting (option)
- Universal Modbus driver supports Honeywell devices using:
  - Uses familiar “acronyms” for database build, e.g., Tag1, Loop1 PV
- Standard SP Programmer/Recipe Interface for HC900
  - Support for Programmers 1 to 4
  - display & edit
  - Storage and selection for 1000 recipes, profiles
  - SP Programmer trend display with SP profile pre-plot

SpecView 32 Centralized PC Software

SpecView 32 is a low cost, easy-to-use, centralized PC software that provides supervisory control, data acquisition, recipe management and batch reporting. SpecView 32 operates in all current Windows operating systems environments – 98, Me, NT, XP, and 2000. The optional OPC client capability allows easy linkage to other OPC server products. SpecView’s auto-detection capability minimizes database creation for easy configuration.

HC900 Product Overview

Controller

Function Blocks	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 ±0.05% of span)
Analog Outputs	Up to 200; user-specified span from 0 to 20 mA maximum, 12 bits, 0.1% Accuracy
Digital Inputs/ Outputs	Up to 1920,contact DI, 24 Vdc DI/DO, 120 Vac DI/DO, 240 Vac DI/DO, relay DO
Total I/O	Up to 1920 combined analog and digital
I/O Racks per System	One controller and up to 4 remote I/O racks
Control Loops	PID, On/Off; cascade, ratio, %C, RH, dew point, three position step
Control Output Types	Current, time-proportioning, position proportioning, three-position step
Setpoint Programmers	50 segments each, 16 event outputs, multiple stored profiles.
Setpoint Scheduler	50 segments, 8 ramp/soak outputs, 8 auxiliary outputs, 16 events, multiple schedules
Recipes	50 variables each
Comm.	Ethernet 10/100/baseT; Modbus/TCP protocol; up to 5 Ethernet hosts; 10 sockets on C70, C70R, up to 32 peer to peer controllers; Serial Modbus RTU, RS485 or RS232, slave or master operation (up to 32 slaves)
Power Supply	120 to 240 VAC and 24 Vdc
Operating Temp.	Rated: 0° to 140°F (0° to 60°C)
Humidity	Rated: 10% RH to 90% RH, non-condensing

Rack Size (W)	4 Slot	8 Slot	12 Slot
Inches:	10.5	16.5	22.5
Millimeters:	266.7	419.1	571.5

Operator Interface

Display		
Model 1042:	10.4 in. (264 mm); TFT Active Matrix Color LCD	
Model 559:	5.5 in. (140 mm); Color LCD	
Distance from Controller	Up to 2000 ft. (600 m)	
Disk Drive or Zip Drive (1042)	Data archiving and configuration, setpoint profile, recipe file transfer	
Power Supply	24 VDC	
Size (WxHxD)	**559**	**1042**
Inches:	9.40 x 6.15 x 5.40	15.80 x 9.80 x 7.20
Millimeters:	240 x 159 x 136	400 x 248 x 183
Operating Temperature	32° to 122°F (0° to 50°C)	32° to 113°F (0° to 45°C)
Humidity (Non-condensing)		
Rated:	10 to 90%	20 to 80%
Extreme:	5 to 95%	5 to 90%
Panel Rating:	Type 12 or 4X	Type 4X

Hybrid Control Designer Software

Configuration	Off-line, with run mode editing
Operating Environment	Windows, NT, 2000 or XP
PC	Pentium, 2gHz with 256 MB RAM minimum SVGA or greater screen resolution
Cable	9-pin RS232 null modem cable to configuration port or Ethernet 10/Base T
Modem Support	Monitor, upload, download configuration

Honeywell offers a complete portfolio of products and solutions for process and machine control applications, including controllers, recorders, transmitters, actuators, smart sensors, and analytical instruments. To learn more about these offerings and how they can help your organization achieve breakthrough results, contact your local Honeywell representative, or contact us at the following phone numbers:

USA: 1-800-343-0228
Canada: 1-800-461-0013
UK: 44 1344 655251
Germany: 49 69 8064-336
Latin America: 1-305-805-8188
France: 33 1 60 19 80 75
Italy: 39 02 9214 6503
Spain: 34 91313.61.00
Asia/Pacific: 65 6355 2828

Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective.

The foregoing is Buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.

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