

ControlEdge HC900 Controller Specifications

51-52-03-31, January 2023



Overview

The Honeywell ControlEdge HC900 Controller is an advanced loop and logic controller offering a modular design sized to satisfy the control and data management needs of a wide range of process equipment. When combined with the optional 900 Control Station operator Interface that is highly integrated with the controller's database, configuration and setup time is minimized. This powerful combination together with Honeywell's performance proven control technology provides users an ideal solution for process control. Open Ethernet connectivity with Modbus TCP Protocol also allows network access using a variety of HMI/SCADA software. Program execution environment is protected using an independent watchdog timer.

Easy-to-use Windows-based Designer software, operable over Ethernet or RS485 port (isolated) simplifies controller configuration. The software is available in English, Chinese, Russian, and German language version. It provides advanced monitoring functions for debug, allows run-mode process configuration changes while maintaining process control, uploads the complete, annotated graphic controller configuration, plus supplies an array of reports for enhanced documentation. The ControlEdge HC900 Controller provides superior PID loop control and more robust analog processing than most logic controllers without compromising logic performance. A separate, fast scan cycle executes a rich assortment of logic and calculation function blocks. Logic blocks may also execute in the same scan with analog function blocks for time critical events. These function blocks may be fully integrated into a combined analog and logic control strategy for uncompromising control performance.

For more information see specification sheets:

- ControlEdge 900 Platform Modules
Specs 51-52-03-41
- Designer Software Specs 51-52-03-43



Applications

Mining & Metals	Furnaces, Kilns, Boilers
Chemicals,	Extruders Autoclaves
Pharmaceuticals	Sterilizers, Dryers
Rail/ Infrastructure	Burner Management,
HVAC/ DataCenters	Combustion Control
Pulp & Paper	Emergency Shutdown
Cement & Glass	Pipeline Monitoring,
Power	Spill Prevention

Features Summary

- Supports Split Rack Redundancy
- Supports Honeywell FDM (Field Device Manager) using HART IP
- Supports HART function blocks (Command 3 and 48)
Note: UIO Module is required for HART support
- Non-redundant and Redundant Architectures
- Sequence of events support (SOE)
Note: Supported only in non-redundant UIO configuration.
- Redundant and Non-redundant Safety Universal IO
- PID Control with advanced Accutune III auto-tuning
- Safety peer communication between ControlEdge HC900 controllers
- External watchdog timer with independent clocks that detect spurious CPU lockups
- Adjustable recipe pool memory lets you allocate memory for recipes, SP Profiles, sequences and schedules to meet your needs
- Up to 4608 points with remote I/O
- Boolean Logic programming. Robust assortment of over 100 algorithms

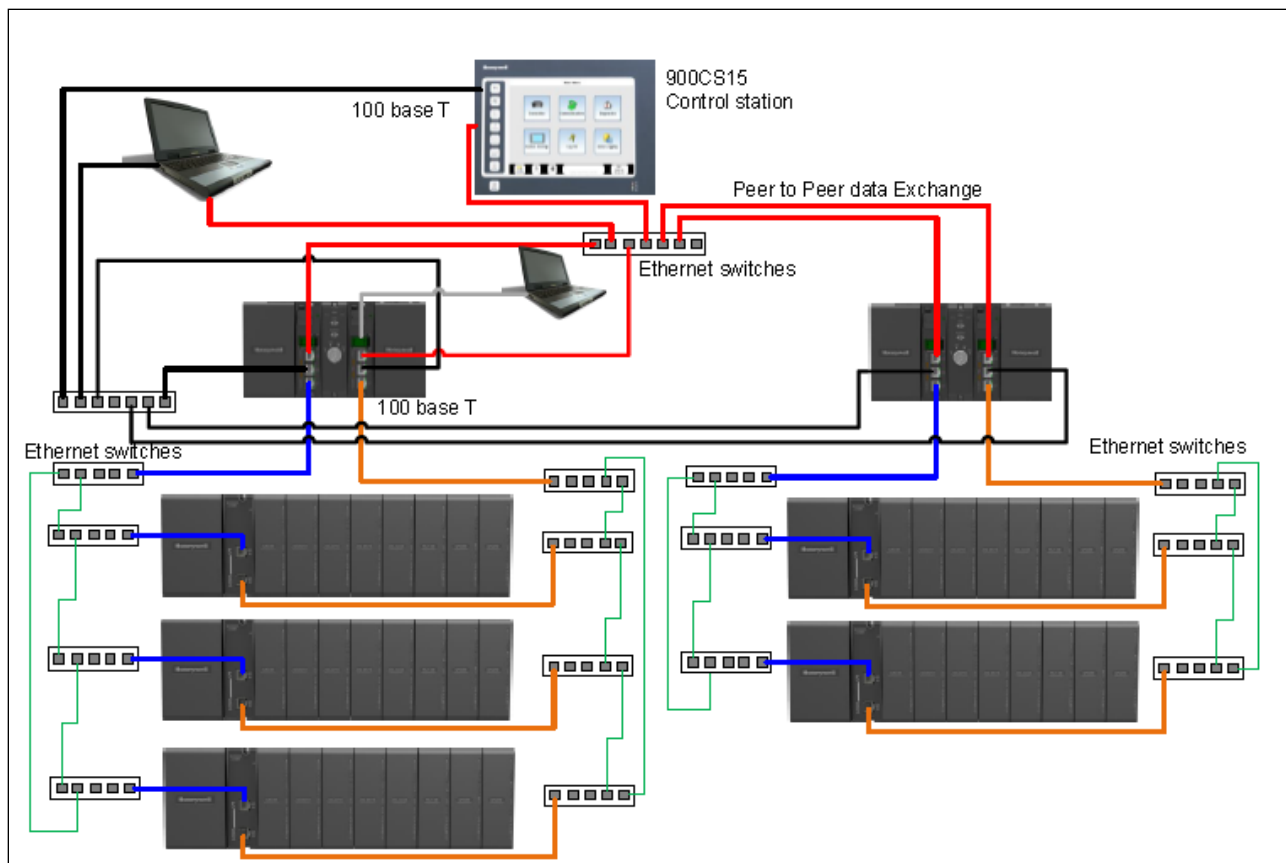


Figure 6 MULTIPLE PROCESS/MULTIPLE RACKS - RED NETWORKS (RING TOPOLOGY)

ControlEdge HC900 Controller

- The rack based ControlEdge HC900 Controller is available in 4 rack sizes with 1, 4, 8 or 12 I/O slots each to support a wide range of requirements.
- Redundant C75 controllers use a separate controller rack for CPUs without local I/O. Two power supplies provide separate CPU power. A redundant controller switch module provides status and performs mode changes.

CPU Modules

- The CPU options available for the ControlEdge HC900 Controller include:
 - C30 and C50 for non-redundant applications.
 - C70 for dual networking.
 - C75 for redundant CPU applications and dual networking.

- All ControlEdge HC900 CPU modules are based on the e300 32 Bit RISC based PowerPC Architecture. The controller operates out of a battery-backed DDR2 64MB memory for C30 and C50 modules, 128MB for C70 and C75 modules. DDR2 memory on all modules is supported with ECC circuitry to enhance reliability and error detection. Program execution environment is protected using an independent watchdog timer.
- All ControlEdge HC900 CPU modules offer open Ethernet communications for access by a variety of HMI and SCADA software applications and peer to peer communications for control data exchanges between controllers. The C70 and C75 provide dual Ethernet ports for high network availability installations.
- ControlEdge HC900 CPU modules use a dual scan method to handle fast digital scanning and normal analog input scanning in the same integrated control environment. Both scans support a wide range of computational function block algorithms and a user adjustable execution sequence order.

Remote Terminal Panels - Optional DIN rail mounted Remote Terminal Panels (RTPs) are available for use with pre-wired cables to reduce installation time and labor expense. RTP types available: analog input, relay output, discrete input, discrete output, analog output.

Three cable lengths are also available to match hardware to installation variations. See Module Specification sheet 51-52-03-41 for more details.

Redundant Power - A second (backup) power module may be added to each ControlEdge HC900 controller rack. An extended rack is available that expands the standard 8 and 12 I/O rack to accommodate a second (redundant) power supply and power status module.

Table 1 CPU Capacities

Function	Point per Module	Max. for C30 CPU	Max. for C50 CPU	Max. for C70/C75 CPU
Analog In	Universal: 8 High level: 16 UIO: 16	Universal: 96 High level: 192 UIO: 192	Universal: 1152 High level: 2304 UIO: 1920*	Universal: 1152 High level: 2304 UIO: 1920* (< R710)
Analog Out	4, 8, 16	40	480	480
Analog Out (External power)	8, 16 UIO: 8	192 UIO: 192	2304 UIO: 416*	2304 UIO: 416*
Digital In	8, 16 or 32 UIO: 16	384 UIO: 192	4608 UIO: 1920*	4608 UIO: 2340* (=> R710)
Digital Out	8 AC or 16 DC, 32 DC UIO: 16	384 UIO: 192	4608 UIO: 1920*	4608 RUIO: 1008* (=> R710)
Function Blocks	n/a	400	2000	15000 (5000 for version below 6.6)

* Check "System Planning Tool" to find out the maximum configurable UIO channels.

Specifications

Features				
	C30/C30S	C50/C50S	C70/C70S	C75/C75S
Controller Design	Modular design with metal rack enclosure, power supply, controller CPU and user selectable I/O module types.			
Rack Mounting and Installation	Surface mounting with 4 screws in the back of the rack. Installation Category II, Pollution Degree 2, IEC 664, UL840 Installation coordination			
Controller I/O support	4, 8, or 12 I/O slots per Rack			None (requires remote I/O racks)
Remote I/O racks	None	1 w/o switch, using Ethernet direct cable. Up to 11 (12 for Redundant) with recommended Honeywell switches (part no. 50008930-001, copper to copper)		
		1 w/o switch, using Ethernet direct cable. Up to 11 (12 for Redundant) with recommended Honeywell switches (Moxa EDS-308 series/EDS-316/EDS-4008-2SSC-LV-T/EDS-4008-2SSC-LV/EDS-4009-3SSC-LV-T, or ORing IES-1080A) for Star topology. Note: See "Table 3" for the list of Qualified Ethernet switches.		
		1 w/o switch, using Ethernet direct cable. Up to 11 (12 for Redundant) with recommended Honeywell switches (Moxa EDS-505A/EDS-508A/EDS-4008-2SSC-LV-T/EDS-4008-2SSC-LV/EDS-4009-3SSC-LV-T, or ORing IES-1080A, or RSB20-XX or equivalent, copper to fiber) in Remote IO for Ring topology. Note: See "Table 3" for the list of Qualified Ethernet Switches.		
Remote I/O interface type	None	Separate Ethernet 100Base-T port on CPU, RJ-45 connection, and dedicated communications link.		
Remote I/O Distance	None	100 m (328 ft.) – Ethernet cable, controller to remote rack or controller to switch. Up to two switches per connection, 300m (984 ft.), maximum distance. 40km – Single mode fiber optic cable 5km – Multi mode fiber optic cable.		
	Fiber Optics Equipment Recommendations			
	Ethernet Switch	Choose a model which has fiber optic port (single/multi-mode) from the above switch series.		
	Converter	Moxa Media Converter model IMC-101-M-SC/ IMC-101-S-SC with (1) 10/100BaseT(X) to 100BaseFX single/multi-mode fiber port with SC connectors (require 24VDC power)		
	Fiber Cable	Multi-mode, Duplex, 50/125 with SC connectors on both ends Single mode, duplex, 9/125 with SC connector on both ends		
	Copper Ethernet Cable	Shielded Cat5 Ethernet		
I/O Capacity				
Combined Analog and Digital	384	4608		
Analog Inputs	192	2304		

Features				
	C30/C30S	C50/C50S	C70/C70S	C75/C75S
Analog Outputs	40 48 with heat de-rating 192 with external power source	480 576 with heat de-rating 2304 with external power source		

	C30	C50	C70	C75
Rack Size				
4 I/O slot chassis	5.4" (137mm) H" x 10.5" (266.7mm) W x 6.0" * (151.7 mm) D (rear mounting plate extends height to 6.9" (175.3mm)			
8 I/O slot chassis	5.4" (137mm) H x 16.5" (419.1mm) W x 6.0" * (151.7mm) D (rear mounting plate extends height to 6.9" (175.3mm)			
8 I/O slot chassis with redundant power support	5.4" (137mm) H x 20.9" (530.9.1mm) W x 6.0" * (151.7mm) D (rear mounting plate extends height to 6.9" (175.3mm)			
12 I/O slot chassis	5.4" (137mm) H x 22.5" (571.5mm) W x 6.0" * (151.7mm) D (rear mounting plate extends height to 6.9" (175.3mm)			
12 I/O slot chassis with redundant power support	5.4" (137mm) H x 26.9" (683.3mm) W x 6.0" * (151.7mm) D (rear mounting plate extends height to 6.9" (175.3mm)			
Redundant CPU rack	N/A * 6.4 (162.6) for 32 DI/DO and 16 AI Modules			5.4" (137mm) H x 10.3" (261.6mm) W x 6.0" * (151.7mm) D (rear mounting plate extends height to 6.9" (175.3mm)
I/O Wiring				
Type	Removable terminal blocks			
Terminal Block Styles	20 screw: Barrier or Euro-style, tin-plated or gold-plated (for DC connections) 36 screw: Euro style gold plated (Required with certain higher capacity modules)			
Gauge wires	20 screw: Barrier style - #14 to 26 AWG, solid or stranded Euro-style - #14 to 26 AWG, solid or stranded 36-screw: Euro-style - #12 to 26 AWG, solid or stranded			
Shield terminals	Optional brackets mounted top/bottom of rack			
Power (P01)				
Voltage	Universal power, 90 to 264VAC, 47 to 63 Hz			
In Rush Current	40 Amps peak-to-peak for 120 ms at 240VAC			
Input rating	130 VA			
Output rating	60W			
Fuse	Internal non-replaceable fuse. User installed external fuse.			

	C30	C50	C70	C75
Power (P24) Voltage	21 to 29VDC			
In Rush Current	30A for 3ms @29VDC			
Input rating	72.5W			
Output rating	60W			
Fuse	Internal non-replaceable fuse. User installed external fuse.			
Power Supply Hold up time	20milliseconds @115VAC, 60HZ maximum Load			
Normal Scan Time	100ms. Each analog input card has its own A/D converter providing parallel processing.			
Fast Scan Time	25ms for up to ~250 fast logic blocks 35ms for up to ~315 fast logic blocks 50ms for up to ~400 fast logic blocks	10ms for up to ~250 fast logic blocks 25ms for up to ~500 fast logic blocks 35ms for up to ~780 fast logic blocks 50ms for up to ~1040 fast logic blocks 60ms for up to ~1300 fast logic blocks	10ms for up to ~330 fast logic blocks 25ms for up to ~660 fast logic blocks 35ms for up to ~1040 fast logic blocks 50ms for up to ~1380 fast logic blocks 60ms for up to ~1700 fast logic blocks 130ms for up to ~3300 fast logic blocks	25ms for up to ~500 fast logic blocks 35ms for up to ~780 fast logic blocks 50ms for up to ~1040 fast logic blocks 60ms for up to ~1300 fast logic blocks 130ms for up to ~2500 fast logic blocks
System latency - terminal to terminal	Typical 3x scan			
Switchover	0-100ms			
Bumpless Failover	Internal parameters, variables and outputs are maintained during transition.			
Run-Mode Edit Transfer Time	3 normal scan times for all configuration edits not including I/O changes			
Operating Modes	Run (No configuration download in this position). No writes/forces for safety critical configurations. Run/Program (Download allowed) Program (Outputs Off, initialization on download). Offline mode is available via software selection (for AI calibration).			
Maximum user-configurable Function Blocks	400	2000	15000 (5000 for version below 6.6)	
Maximum Control Loops	Quantity based on available memory			
System Blocks (Not user configurable)	100 (not part of configurable blocks), for Alarm Group blocks, System block, Rack Monitor blocks, Communications			
Loop Outputs	Current, time proportional, position proportional, 3-position step (motor positioning), dual output [heat/cool])			

	C30	C50	C70	C75
Control Loop Types	PID A, PID B, Duplex A, Duplex B, Ratio, Cascade, % Carbon, Dewpoint, Relative Humidity, On-Off, Auto/Manual-Bias			
Auto-tuning	Accutune III, fuzzy logic overshoot suppression, applicable to all control loops			
Setpoint Programmers	Ramp Types: Ramp Rate or Ramp Time Time Units: Hours or Minutes Segment Time: 0-99,999.999 hours or minutes Program Cycles: Up to 100 or infinite, configurable segment range			
Programmer Events	Assignable to DO or internal status			
Setpoint Profiles	50 segments per profile. Number of stored profiles is user-configurable.			
Setpoint Scheduler	Ramp type: Ramp time Time units: Hours or minutes Segment time: 0.001 to 9999.999 hours or minutes Cycles: Per segment to 999 or infinite			
Auxiliary Scheduler Setpoints	Up to 8 setpoints, soak only			
Schedule events	Up to 16, assignable to DO or internal status			
Setpoint Scheduler Schedules	50 segments per schedule. Number of stored schedules is configurable.			
Sequencers	States: 50 State text: 12 characters Steps: 64 Time Units: Minutes or Seconds Digital Outputs: 16 Analog Output: 1, configurable value/step Step Execution: On Time, Event 1, Event2, or via Advance Next Step: Any step			
Sequences	Number of stored Sequences is user-configurable			
Recipes (Variables)	Number of stored Recipes (Variables) is user-configurable			
Recipe Parameters	Up to 50 analog or digital Variables — (may include profile numbers)			
Signal Tags (Read only)	Up to 65,535			
Tag Identification	16-character tagname, 16-character descriptor, 6-character units of measure (analog only), 6 character on/off state (digital only). Non-Safety Critical enable.			
Variables (Read/Write)	Up to 6144			
Variable Identification	16-character tagname, 16-character descriptor, 6-character units of measure (analog only), 6 character on/off state (digital only)			
Controller Data Storage	- Data types: Signals, Alarms, Events - Storage size: 1.5MB for C30/C50 3MB for C70/C75 - Maximum signals tags: 250 - Maximum points per group: 50 - Selectable storage rates: 3 - Storage rate resolution, 10 sec. to 24hr - Data Access - via HC Historian PC software, manual upload using Ethernet or Serial communications.			

Specifications

Communications				
	C30	C50	C70	C75
Network Communications Ports				
Number of Ethernet 10/100Base-T connections	1	1	2	2
Ethernet 10/100Base-T, RJ-45 connection	Supports Modbus/TCP Protocol to PC supervisory and data acquisition software packages, OPC server, Modbus/TCP Initiator, Peer to Peer, and Designer configuration software		Supports dual Modbus/TCP ports to PC supervisory and data acquisition software packages, OPC server, Modbus/TCP Initiator (non-redundant), Peer to Peer, and Designer configuration software	
Max. number of concurrent Ethernet host connections	Up to 5 (peer data exchange does not consume a host connection)	Up to 10 shared between two ports (peer data exchange does not consume a host connection).		
	Note: Subnet must be: 255.255.255.0 Note: C70/ C75 IP Addresses must be on different Subnet.			
USB-RS485 Converter	50089787 -501			
RS-485 Ports				
Ports per controller	Two, isolated RS-485 (connector supplied), Honeywell or Modbus RTU protocol.			
Cable type	2-wire plus shield, Belden 9271 or equivalent			
Distance from controller	2000 ft. (600 m.)			
Modbus Device addresses	1 to 247			
Parity (user selectable)	Odd, even, none			
Stop bits (user selectable)	1 or 2			
Speed (user selectable)	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200			
Double Register Format for Modbus RTU Device and Host data (User selectable)	Selectable byte order			
RS-485 Modbus, Device Operation				
Number of ports per controller	Up to two			
Modbus Hosts per port	One			
Principal Function Block Address Range	User selectable starting address range for registers assigned to each principal block type.			

RS-485 Modbus Host Operation	
Number of ports per controller	One (isolated RS485)
Function Block Types	Modbus Device – 4 read and 4 write data points Read (Modbus Device extension block) up to 16 parameters Write (Modbus Device extension) up to 8 parameters (No limit on the number of Read and Write extension blocks per Modbus Device block up to the maximum 1024 parameters per controller.)
Modbus Device devices per controller	Up to 32
Number of read/write Modbus Parameters	Up to 1024 max. per controller
Double Register Format	Selectable per device
Speed	1 second fastest – load dependent
Modbus Host Advanced Application Speed	Recommended for use with gateway devices As fast as 500ms
Ethernet Modbus/TCP Initiator Operation	
Number of ports per controller	One (Models C30 and C50) - Two (Models C70 and C75) isolated RS485
Function Block Types	Modbus Device – 4 read and 4 write data points Read (Modbus Device extension block) up to 16 parameters Write (Modbus Device extension) up to 8 parameters (No limit on the number of Read and Write extension blocks per Modbus Device block up to the maximum 1024 parameters per controller.)
Modbus Device devices per controller	Up to 32
Number of read/write Modbus Parameters	Up to 1024 max. per controller
Double Register Format	Selectable per device
Speed	1 second fastest – load dependent
Peer-to-peer 10/100Base-T via Network port	Supports UDP protocol and Peer Data Exchange function blocks for peer data exchange. Safety peer data exchange is supported from release 6.300 and above
	No. of Peers/Controller 32
	Update rate @Normal cycle for safety peer and 500ms to 5 sec., selectable
	Peer Data Digital and Analog Signal Tags, Variables - up to 2240 (max 44 peer writes per modbus device) parameters
Ethernet	
Ethernet Network Connection	10/100 Base-T, RJ-45
Host Network Protocol	Modbus/TCP
HART	
Protocol Version	5, 6 and 7
Discovery	5 Seconds Discovery Time. Supported device address range is 0 to 15.
HART IP	HART-IP Protocol, Version 7, based on TCP/IP Configurable TCP port number Support single Honeywell Field Device Manager connection.