HITACHI
Inspire the Next

PAC System
HX Series

Integrating Core Control and Communications of Automated Machines
and Production Facilities into One

Next-generation Industrial Controllers   for IoT and Global Rollout

In the manufacturing industry, following the globalization of the supply chain, there has been a demand for a revolution in production and services using IoT*. With that backdrop, we are working on the automation of systems, focusing mainly on Programmable Logic Controllers (PLC), which control various plant facility devices, and IPCs (industrial PCs), which are responsible for gathering data from plant facility devices and communicating with servers and other higher level information systems. We provide an environment not only for controlling plant facility devices using advanced control functions, but also for seamlessly transmitting plant facility device information to the cloud.

* IoT: Internet of Things

Open Technologies

The new controllers make it easy to secure programming engineers throughout the world by adopting a programming language that conforms to IEC61131-3international standards and support the construction of global production systems. Furthermore, the adoption of the open industrial network EtherCAT® enables connections with many EtherCAT® supported facility devices that have rapidly gained popularity in recent years. Compliance with OPC-UA, Industry 4.0 recommended communications standards, makes it possible to provide an environment where data can be transmitted seamlessly to the cloud.

High Performance

By leveraging CPU performance characterized by its increasingly rapid processing speeds in recent years and incorporating CODESYS, a software PLC, sequence controls (controls implemented according to a previously determined order) and advanced motion controls synchronized with sensors can be simultaneously executed with only a single CPU in the controller.

Simple Configuration

These next-generation industrial controllers were developed as PAC (programmable automation controllers) with both PLC and IPC functions. Compared to existing systems, these controllers contribute to reductions in TCO, including the costs of introduction, development, and maintenance, as well as to space saving.
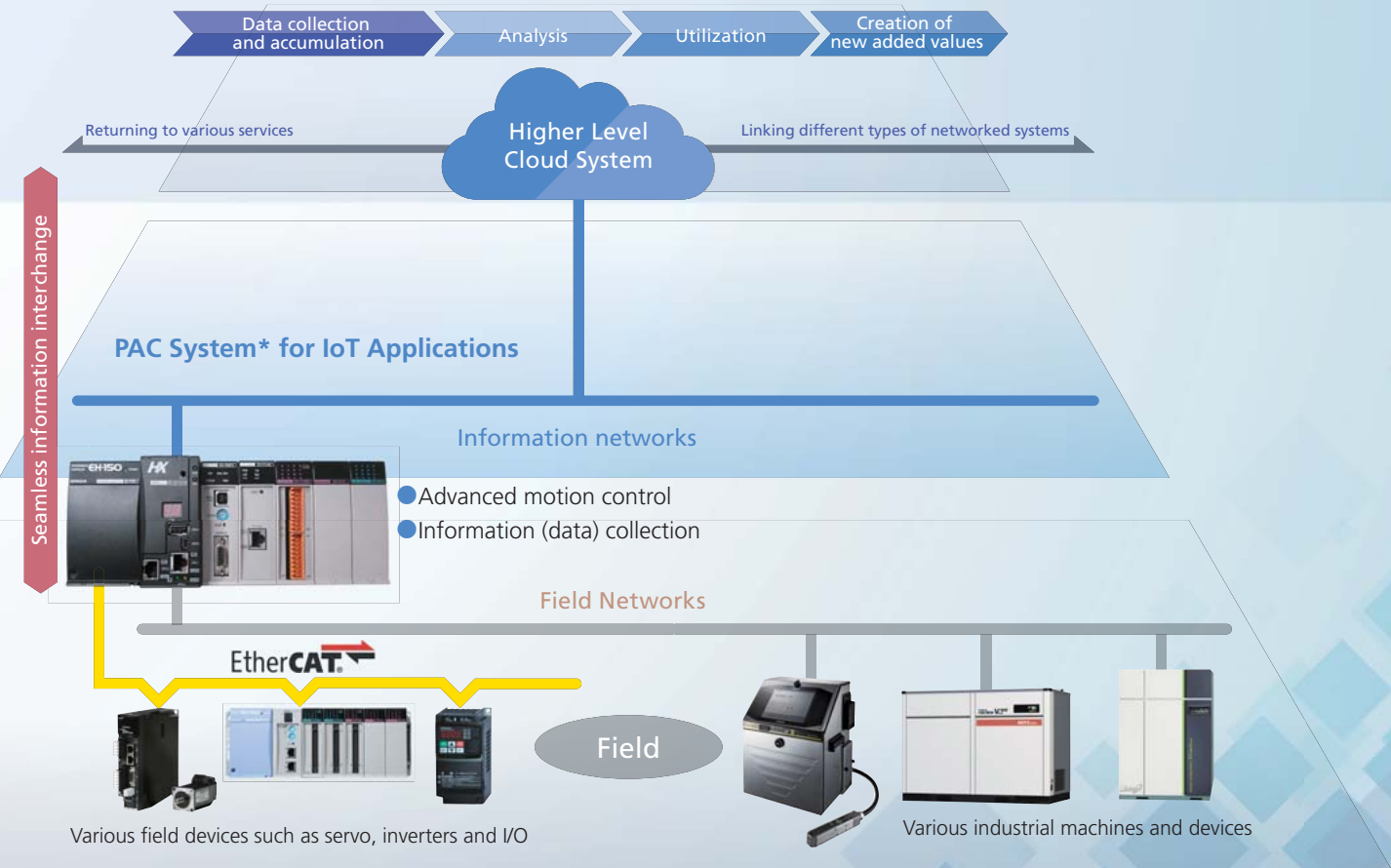
PLC Based PAC System for IoT Applications

HX Series

Integrating Core Control and Communications of Automated Machines and Production Facilities

Communication Control

Motion Control

Sequence Control

EtherCAT. Motion Control

● Controls multiple axes and I/O using EtherCAT®

(Various EtherCAT® slave devices such as Hitachi AC Servo ADV series)

● Supports function blocks for PLC open compliant motion control

Supports programming languages compatible with IEC61131-3 international standards

Supports data login using SD memory

Sensor and actuator control
(Various sensors and actuators including Hitachi inverters)

OPC-UA for communication with higher level information systems
ERP linkage, MES connection, SCADA system connection, etc.

Supports information communications
Ethernet (TCP/IP), IP communications, web support, etc.

Connection with various control equipment and HMI

Field network support
(Partially combined use with dedicated master modules)

Data collection and accumulation → Analysis → Utilization → Creation of new added values

Returning to various services

Higher Level Cloud System

Linking different types of networked systems

Seamless information interchange

PAC System* for IoT Applications

Information networks

● Advanced motion control
● Information (data) collection

Field Networks

EtherCAT.

Field

Various field devices such as servo, inverters and I/O

Various industrial machines and devices

* PAC (Programmable Automation Controller) system:
A new type of controller system with functions that respond to a variety of needs, in addition to typical PLC functions; for example, advanced controls, multifunction networks, and human machine interfaces (HMI).
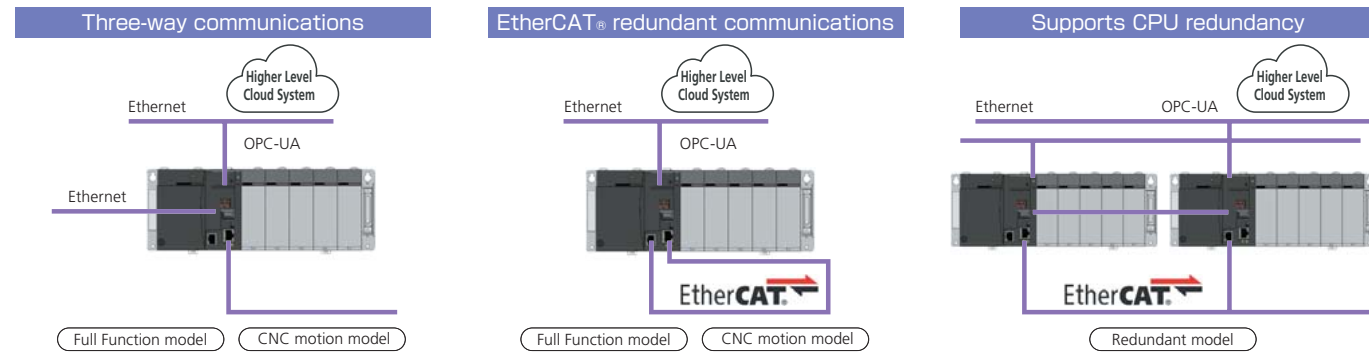
Next Generation Industrial Controllers that Respond to IoT Trends in Industrial Fields
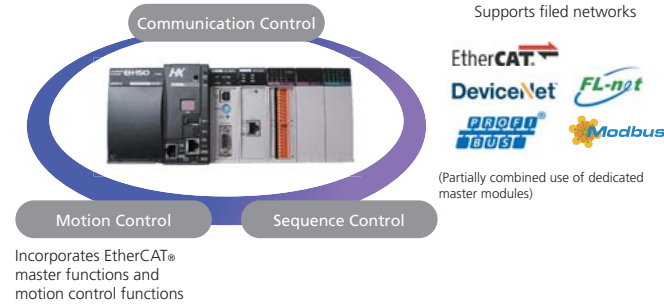
☑ Supports OPC-UA, an interface for connecting information with industries

☑ Supports information communications (Ethernet) and control communications (EtherCAT®)

☑ Supports data login for sites using SD memory

☑ Integrates sequence control with motion control, achieving high performance

3 Ethernet ports are standard (Full Function model, CNC motion model, Redundant model)

This enables independent communication with higher level information systems, between controllers, and with lower level equipment. A variety of communications can be made using different methods.

Three-way communications	EtherCAT® redundant communications	Supports CPU redundancy

Ethernet — Higher Level Cloud System
OPC-UA
Ethernet

Ethernet — Higher Level Cloud System
OPC-UA
EtherCAT

Ethernet — OPC-UA — Higher Level Cloud System
EtherCAT

Full Function model / CNC motion model

Full Function model / CNC motion model

Redundant model

Integrates core control and communications of automated machines and production facilities

Communication Control

Motion Control

Sequence Control

Incorporates EtherCAT® master functions and motion control functions

Supports filed networks

EtherCAT
DeviceNet
FL-net
PROFIBUS
Modbus

(Partially combined use of dedicated master modules)

OPC-UA has soft interface standards between industrial equipment and the OPC-UA server function is standard (for all models)
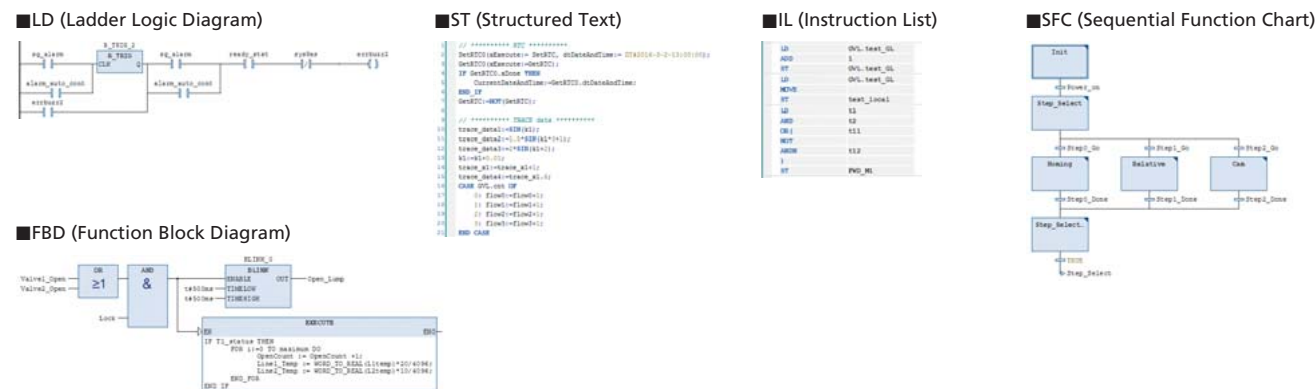
OPC-UA has Industry 4.0 recommended communication standards and these products incorporate the OPC-UA* server. They can be used as an interface for exchanging new information with higher level systems.

PC
OPC-UA client

OPC UA

Ethernet

(OPC-UA server)
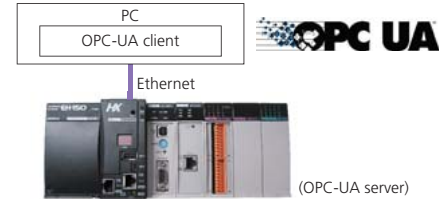
* OLE for Process Control Unified Architecture

Supporting programming languages compatible with IEC61131-3international standards (for all models)

These controllers support your global rollout.

■LD (Ladder Logic Diagram)

■ST (Structured Text)

■IL (Instruction List)

■SFC (Sequential Function Chart)

■FBD (Function Block Diagram)

CPU modules that can be selected to cater to your applications

	Hardware Specifications	Functional Specifications
Standard model	Program data memory 8MB / Ethernet port 2 / USB Host-device	EtherCAT master
Full Function model	Program data memory 16MB / Ethernet port 3 / USB Host-device / SD / Serial communications RS-485	EtherCAT master / Web Visualization
Motion model	Program data memory 8MB / Ethernet port 2 / USB Host-device	EtherCAT master / Soft motion
CNC motion model	Program data memory 16MB / Ethernet port 3 / USB Host-device / SD / Serial communications RS-485	EtherCAT master / Web Visualization / Soft motion / CNC (G codes)
Redundant model	Program data memory 16MB / Ethernet port 3* / USB Host-device / SD / Serial communications RS-485	EtherCAT master / Web Visualization / CPU redundancy

* One port exclusively used for tracking between CPUs

SD memory for large capacity data logging
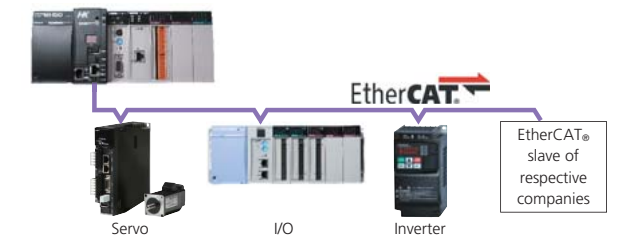(Full Function model, CNC motion model, Redundant model)

SD memory can be mounted on the CPU model, which makes it possible to easily log the data generated on the site (Function blocks for file access are available.)
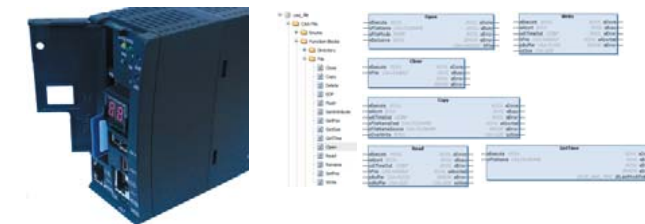
EtherCAT® master & soft motion
(EtherCAT® master function is incorporated into all models; soft motion function is incorporated into the Motion model, CNC motion model.)

EtherCAT® master function and motion control function are incorporated into the LAN port of the CPU module. A combined use of an EtherCAT® slave beside servo is possible (inverters, IO terminals, and so on.)

EtherCAT

Servo / I/O / Inverter

EtherCAT® slave of respective companies

Supporting function blocks for PLC open compliant motion control
(Motion model, CNC motion model)

From PTP positioning with a single axis and interpolation control and synchronization control of electronic cam to speed control and torque control, various functions are possible through the combined use of FBs.

Motion control in conformance with PLC open standards
● Single axis Part I and Part II
● Master axis/Slave axis (For example: MC_CamIn, MC_GearIn, MC_Phasing, etc.)

PLCopen motion control

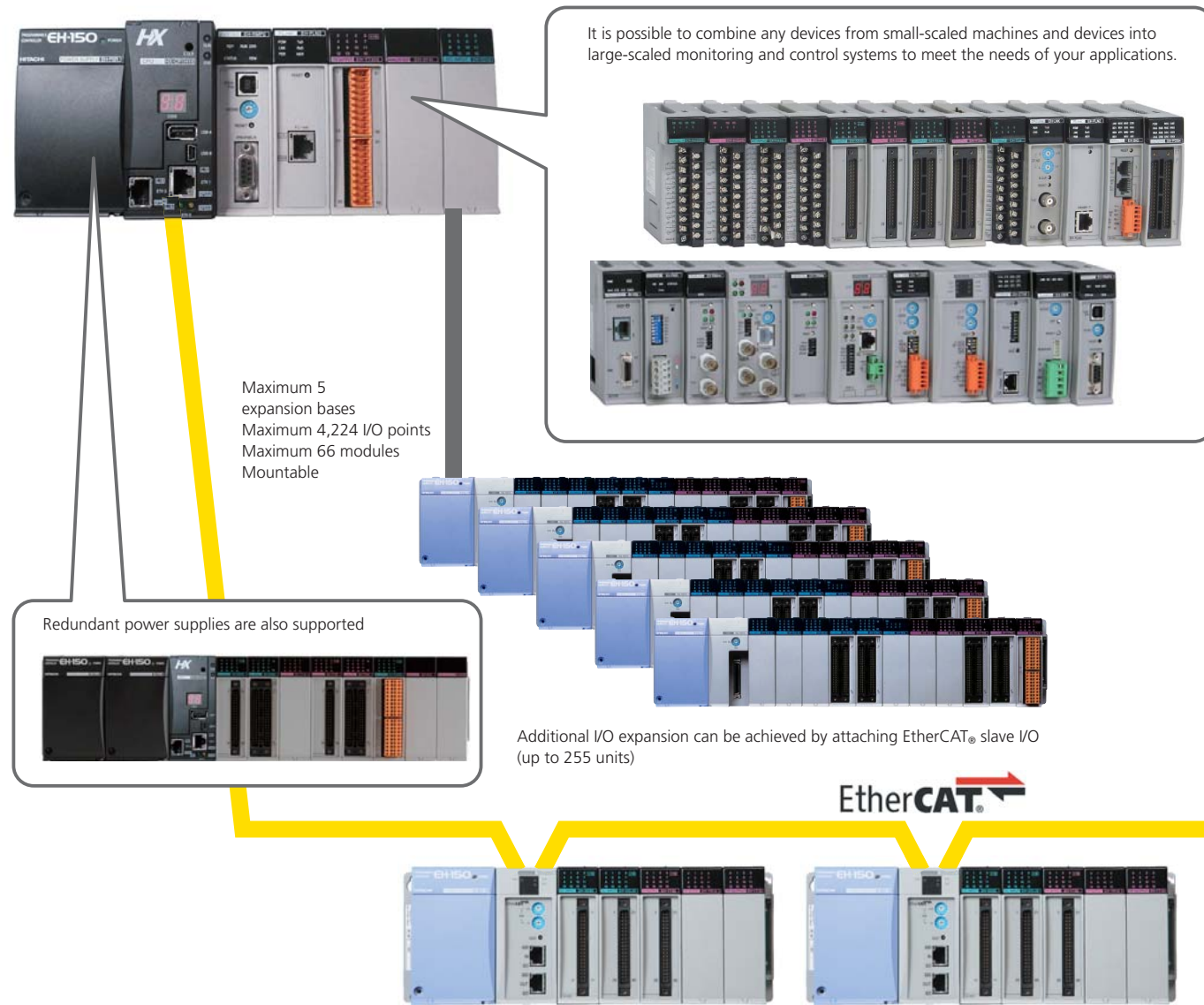### Enabling connecting with EH-TP500 series HMI

It is possible to connect with 4.3"-15" High performance touch screen EH-TP500 series.

Reduction in maintenance costs (all models)

No fan	The mechanical mechanism for consumables is not adopted for CPU modules.
No battery	Nonvolatile memory is adopted for program memory and data memory. Machine production records are stored without batteries. Even if power is turned off due to the unexpected outage, important programs and data will be protected. Note: To maintain calendar and clock data, batteries are required.

Flexibly extendable structure by adopting plug-in type modules

Functions can be extended using various modules from the reliable and proven EH-150/EHV/EHV+ series (digital input and output, analog input and output, and various function modules.)

It is possible to combine any devices from small-scaled machines and devices into large-scaled monitoring and control systems to meet the needs of your applications.

Maximum 5 expansion bases
Maximum 4,224 I/O points
Maximum 66 modules Mountable

Redundant power supplies are also supported

Additional I/O expansion can be achieved by attaching EtherCAT® slave I/O (up to 255 units)

EtherCAT

Protecting machine production and information

Unauthorized access will be prevented and your machine information will be protected when a connection is made to networks.
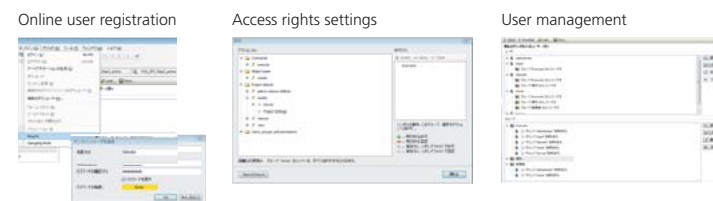
Prevention of unauthorized external access

- Prevention and detection of unauthorized external packets
- Prevention of unauthorized remote log-ins
- Prevention of the provision of information and functions to attackers

Access user control

Login authentication, user and group management, access right settings

Creating a library for dedicated functions (non-display)

Online user registration   Access rights settings   User management

Functional Specifications

Items	Model	Specifications				
		Standard model	Full Function model	Motion model	CNC motion model	Redundant model
		HX-CP1S08	HX-CP1H16	HX-CP1S08M	HX-CP1H16M	HX-CP1H16R
Program capacity		8 MB	16 MB	8 MB	16 MB	
Data memory (non-retaining)		8 MB	16 MB	8 MB	16 MB	
Data memory (retain when outage occurs)		0.5 MB				
Number of extension stages		5				
Extended cable		0.5 m, 1 m, 2 m				
Extension distance		Maximum 2 m between bases, maximum 8 m in total expansion				
Number of base mounted modules		Maximum 11 units (excluding power supply modules and CPU modules)				
I/O points (when using a 64-point unit)		4,224 points				
Command processing speed	Bit operations	1.0 ns				
	Double-precision real-number arithmetic operations	6.6 ns				
Programming language		Five languages in conformance with IEC61131-3 standards (LD/FBD/SFC/IL/ST) + CFC (Continuous Function Chart)				
I/O processing method		Refresh processing				
Supported functions	OPC-UA	✓	✓	✓	✓	✓
	WebVisualization	–	✓	–	✓	✓
	NTP (Network Time Protocol)	✓	✓	✓	✓	✓
	FTP (server client)	✓	✓	✓	✓	✓
	EtherCAT® master	✓	✓	✓	✓	✓
	(EtherCAT® communication cycle)	minimum 1 ms				
	Modbus-TCP client	✓	✓	✓	✓	✓
	Modbus-TCP server	✓	✓	✓	✓	✓
	Modbus-RTU master	–	✓	–	✓	✓
	Modbus-RTU slave	–	✓	–	✓	✓
	SoftMotion (PLCopen compliant + Cam editor)	–	–	✓	✓	–
	CNC function (G codes)	–	–	–	✓	–
	CPU redundancy	–	–	–	–	✓
Standard input and output interface	Ethernet port	✓ (2 ports)	✓ (3 ports)	✓ (2 ports)	✓ (3 ports)	✓ (3 ports)
	SD memory card slot	–	✓	–	✓	✓
	RS-485 serial	–	✓	–	✓	✓
	USB host (USB memory)	✓	✓	✓	✓	✓
	USB device (PC connection)	✓	✓	✓	✓	✓
Calendar clock		Built-in RTC (deviation ±60 sec / month at 25°C)				
Battery (sold separately)*		HX-BAT (for RTC)				
Maintenance function		Self diagnosis (CPU error, Watch-dog timer error, Memory / Battery error, etc.)				

*: Batteries are required to retain calendar clock data. In the case of synchronization with NTP server time, and in order to retain user programs and data memory with outage retaining attributes, batteries are not required.

Monitoring via web browser (Web Visualization)

It is possible to have access to the web server of the controller with a generic web browser without preparing the dedicated HMI and a monitor. This reduces dedicated terminals for monitoring and creates burdens on the workers.

- Comes standard in the web server
- No need for dedicated HMI
- Monitoring with a generic web browser
- Remote maintenance, diagnosis, and control

Ethernet

Wi-Fi router
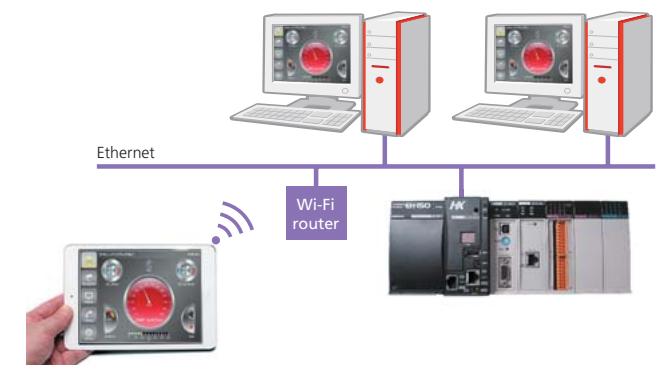
Functional Specifications

Items		Specifications
Ethernet port specifications	Physical layer	10BASE-T, 100BASE-TX
	Transmission mode	AUTO, 100 Mbps full duplex, 100 Mbps half duplex, 10 Mbps full duplex, 10 Mbps half duplex
	Modulation method	Base band
	Topology	Star type
	Transmission media	Twist pair cable with shields (STP), category 5/5e or higher
	Transmission distance	100 m
	Supports function	EtherCAT® master, Modbus-TCP client, Modbus-TCP server, CODESYS Gateway*[1], network variables, TCP/IP, UDP/IP, NTP, FTP client, FTP server, http*[2]
USB host	Standard	USB 2.0 High Speed (480 Mbps)
	Connector	A type
	File system	FAT32
	Maximum capacity	32 GB
	Maximum capacity per file	2 GB
	Bus power source capacity	500 mA
	Transmission distance	5 m
	Supported function	Program transfer, file system
USB device	Standard	USB 2.0 High Speed (480 Mbps)
	Connector	mini-B type
	Transmission distance	5 m
	Supports function	CODESYS gateway (exclusively for integrated development environment HX-CODESYS connection)
Serial*[3]	Standard	RS-485
	Transmission speed	4,800 / 9,600 /19.2k / 38.4k / 57.6k / 115.2k / 230k bps
	Communication method	2-wire type, half duplex
	Synchronous method	Start-stop synchronous communication
	Maximum message length	256 bytes (Modbus-RTU)
	Connector	Phoenix (5 pin) MC1, 5/5-G-3, 5-RN (AU)
	Terminal resistor	120 Ω (Attached)
	Transmission distance	1,200 m
	Error check	Vertical parity check, overrun check, framing check
	Supports function	Modbus-RTU mater, Modbus-RTU slave, generic communications
SD memory card*[3]	Standard	SD (Maximum 2 GB), SDHC (2 to 32 GB)
	Bus interface	Normal speed, high speed
	Bus speed	Maximum 25 MB/s
	Specification version	2.00
	File system	FAT32
	Maximum capacity	32 GB
	Maximum capacity per file	4 GB
	Supports function	File system

*1: Gateway is a communication function with the integrated development environment (CODESYS).
*2: HX-CP1S08, CP1S08M does not support the http function.
*3: Serial ports, SD memory are not available for HX-CP1S08, CP1S08M.

EtherCAT® Master Specifications

Items	Specifications
Communication protocol	EtherCAT® dedicated protocol (CoE)
Support service	CoE (process data, SDO communications)
Synchronous communications (DC)	Supported
Physical layer	100BASE-TX
Modulation method	Base band
Transmission speed	100M bit/s (100BASE-TX)
Duplex mode	Full duplex/Auto (automatic)
Topology	Daisy chain, branch wires
Transmission media	Twist pair cable with shields, category 5 or higher
Transmission distance	Within 100 m in distance between nodes (IEEE802.3)
Maximum number of slaves	255
Maximum process data size	Input 5,736 bytes/Output 5,736 bytes
Maximum size per slave	Input 1,434 bytes/Output 1,434 bytes
Maximum message size	2,048 bytes
Communication cycle*[1]	About 1 ms (motion control 1 ms/4 axes, 2 ms/8 axes, 4 ms/16 axes)
Process data communications	• PDO mapping with CoE • Fall back operations when a slave abnormality occurs • Suspension of operations when a slave abnormality occurs
SDO communications	CoE • Emergency message server (receiving from slave) • SDO request/response
Configuration	• Node address setting by HX-CODESYS network scanning • Network information display
RAS function	• Slave configuration check when the networks starts • Error information read • Troubleshooting information
Slave information	• Slave activation/deactivation • Slave withdrawal/re-entry (slave option)
Mail box	• CoE (CANopen/CAN application layer over EtherCAT®)

* Ethernet ports should not be used for purposes other than the EtherCAT® master function when using the EtherCAT® master function.
*1: The communication cycle must be increased depending on the number of slave devices to be connected.

IEC61131-3 international standards compliant
Integrated Development Environment
CODESYS
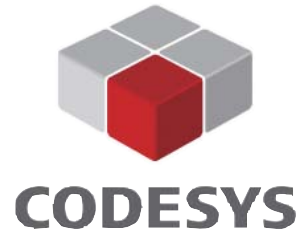
CODESYS is an integrated development environment that is in conformance with IEC61131-3, international standards. It is a cutting-edge PLC application development tool that has been used by more than 350 controller manufacturers and over tens of thousands of end users in various industries around the world.
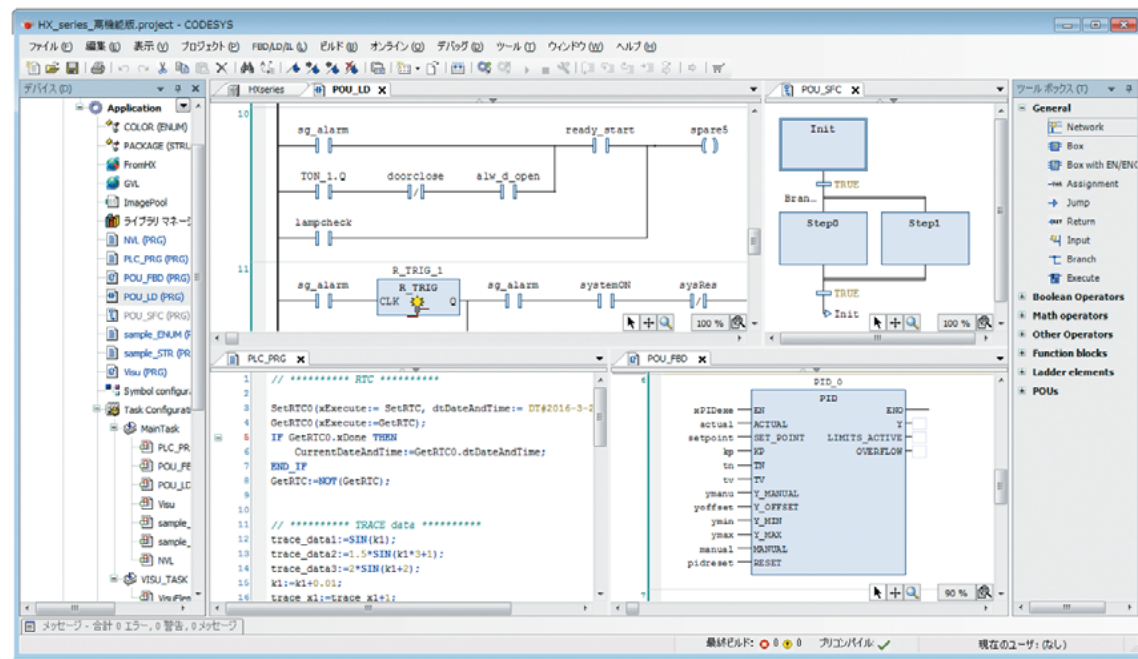

☑ Executes collective control of devices, tasks, and programs for applications in the project tree structure

☑ Incorporates the EtherCAT®/Modbus configuration that makes it possible to execute unified controls of I/O for slave devices by using tag names

☑ Supports five programming languages in conformance with IEC61131-3, international standards + CFC (Continuous Function Chart)

☑ Supports the eight total languages for tool display; in addition to Japanese and English, German, French, Italian, Spanish, Russian, and Chinese

☑ Enables object-oriented programming in conformance with IEC61131-3 (3rd edition)

☑ Incorporates a dedicated compiler for each platform that makes it possible to create efficient, powerful machine codes

☑ Enhances development efficiency using diverse functions such as input assist, grammar check, debugging function, and simulation

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Enabling you to select from five languages in conformance with IEC61131-3, according to the intended purpose and the programmer's skills
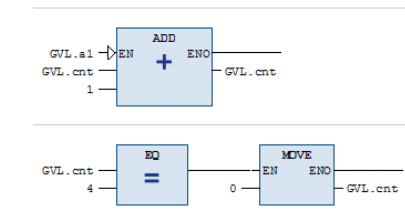
■LD (Ladder Logic Diagram)

A graphic language based on relay circuits. It is suitable for bit operations, such as interlock processing.
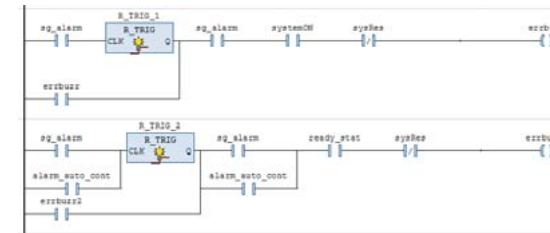
■FBD (Function Block Diagram)

A graphic language that makes it easy to see data and signal flows.

■ST (Structured Text)

A text language based on PASCAL. It is perfect for uses that are not handled well by LD, such as branching, repeating, and numerical operations.

```
1   count_M3:=count_M3+1;
2   L2_wait_time (IN:=FALSE, PT:=T#3.6S);
3   L2_wait_time (IN:=TRUE);
4   FOR i:=0 TO count_T DO
5       K1_temp[i]:=B1_init; //Reset B1
6   END_FOR
7   IF count_Nmax <24 THEN
8       WHILE vxcount<10 DO
9           T1max:=125;  //Max.=125 digC
10      END_WHILE
11  END_IF
12  B100status:=FALSE;  //B100 complete
```

■IL (Instruction List)

An imperative (mnemonic) text language for conventional PLCs. It is suitable for high-speed operations and short programs.

```
LD        sg_alarm
OR (      TON_1.Q
ANDN      doorclose
AND       alw_d_open
)
AND       ready_start
OR        lampcheck
ST        spare5
CAL       R_TRIG_1(
          CLK:= sg_alarm)
LD        R_TRIG_1.Q
OR        errbuzr
AND       sg_alarm
AND       systemON
ANDN      sysRes
ST        errbuzr
```

■SFC (Sequential Function Chart)

A graphic language that can express status transition. It is suitable for processing progress. Programs at each step are described in LD, FBD, ST, and IL.
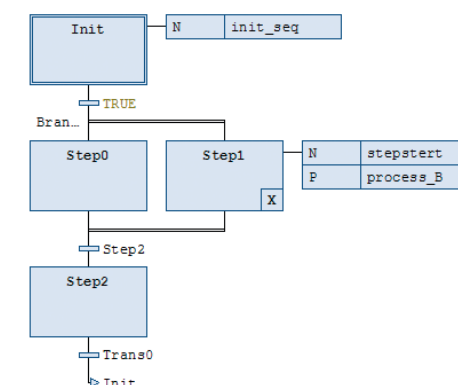
■CFC (Continuous Function Chart)

A graphic FBD editor with no restrictions on POU layout and connection. It is possible to give feedback from output to input (non IEC61131-3 language).

Reduces software development costs

Local variables and global variables

It is possible to define local variables, which are only effective for each program, and global variables, which are common to all programs. Properly using local variables and global variables makes it possible to create application programs with high rates of reusability.

Structured programming

It is possible to create a hierarchy of programs and function blocks. This enhances the readability of application programs, and improves the stability, and as a result enhances efficiency in application development.

Creating a library
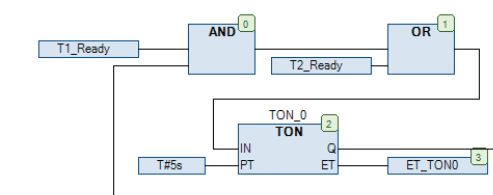
Since function blocks of commonly used process can be registered in the library, frequently used process can be easily reused in other application programs. Process contents of these function blocks can be also set as hidden, therefore can be distributed to end users without disclosing technical information to outside.

System design → Programming → Debugging → Commissioning

Compressing
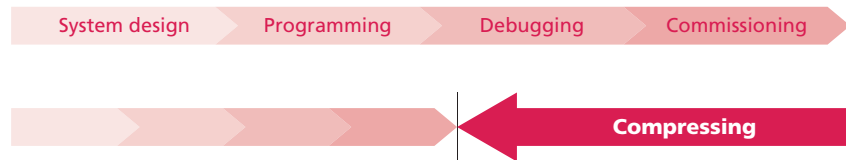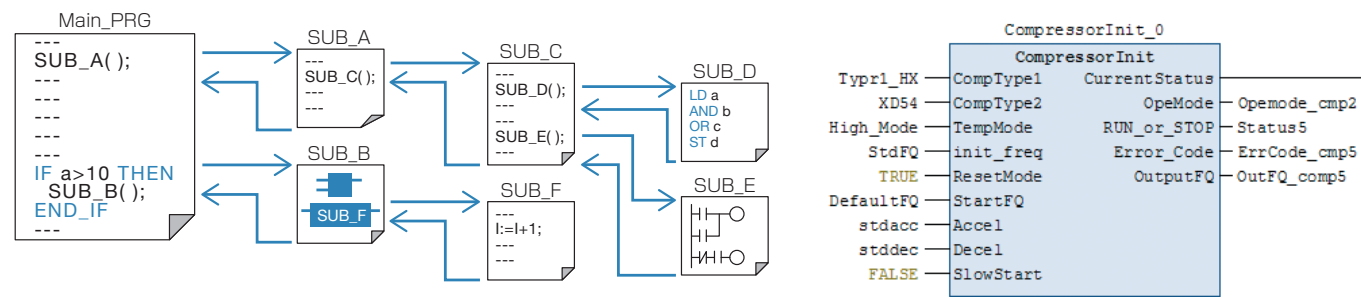
Full library

Convenient and usable commands are incorporated into the standard library; for example, in addition to standard commands in conformance with IEC61131-3, PID and various conversion commands.

- PID control
- Slew rate output
- ASCII conversion/BCD conversion
- Gray code conversion
- Character string operations
- Analog hysteresis
- Minimum/Maximum/Average/Dispersion
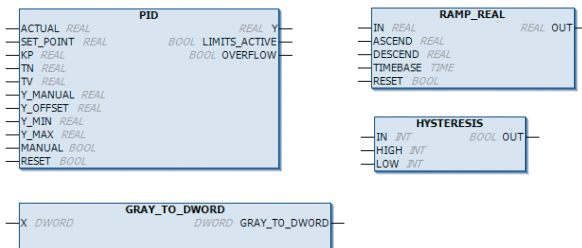
Convenient functions

Convenient functions enhance the efficiency of programming and debugging.

- The automatic input complement function and the input assistant function prevent compilation errors due to input mistakes
- Color changes automatically for imperative language and the corresponding parentheses are highlighted
- ST language can be used together with LD and FBD editors
- Any circuit can be commented out by right-clicking
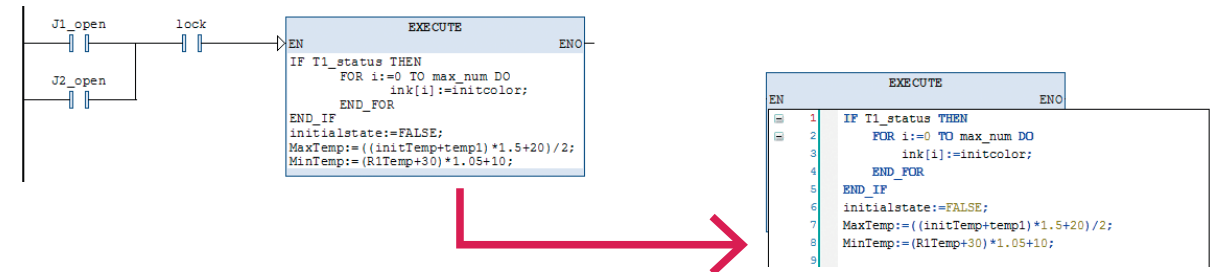
The powerful debugging function reduces launch costs

- Online monitor
- Offline simulation
- Break points
- Force
- Single step execution
- Single cycle scan
- Flow control
- Changes while running
- Trace
- Visualization
- Web visualization
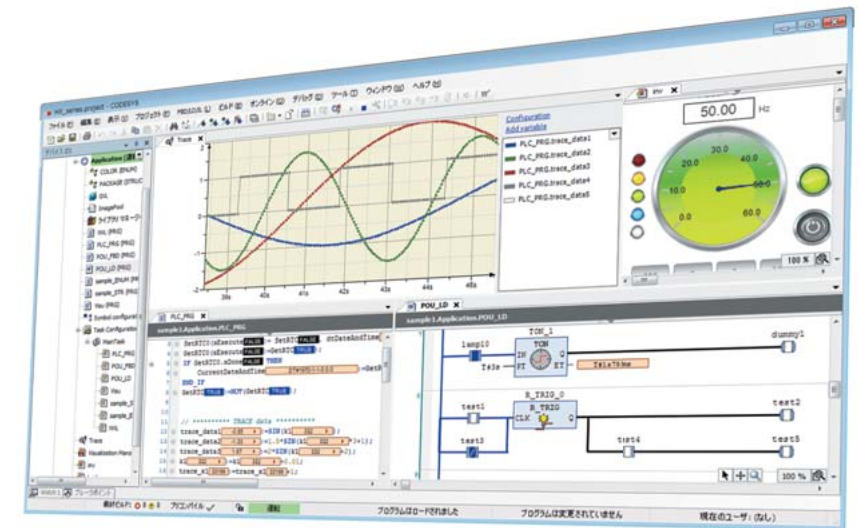
EtherCAT® Slave Controller & I/O Module

☑ **1408 points for maximum input and output (analog input and output 176ch)**
Users can create any configurations because of the coupler type. It can be also applied to the large-scale control system.

☑ **Passing down the I/O module assets of the EH-150/EHV/EHV+ series**
Power supplies, bases, and I/O modules (some are excluded) of the EH-150/EHV/EHV+ series can be used.

☑ **High-speed response and high reliability**
At the fastest pace, the communication cycle is 200 μs. When communication abnormalities occur, the output data can be retained.

EtherCAT® Slave Controller Specifications

Items	Model	Specifications
		EH-IOCA
Communication specifications	Communication protocol	EtherCAT® dedicated protocol
	Modulation method	Base band
	Transmission speed	100 Mbps
	Physical layer	100BASE-TX (IEEE802.3)
	Connector	RJ45 (IN, OUT)
	Topology	Daisy chain
	Communication cable	Category 5 or higher STP cable
	Communication distance	Within 100 m in distance between nodes (slaves)
	Communication cycle	200 μs or higher*[1]
	Node address range	1 to 99: Setting by the node address switch
		1 to 65535: Setting by EtherCAT® master
	Process data	Fixed PDO mapping
	Mail box	Support
	Synchronous mode	Free Run mode (asynchronous)
	Output hold function	Support (set by master)
Functional specifications	Usable base	EH-BS3A/5A/6A/8A/11A/8R
	Number of mounted modules	Maximum 22 units per slave device
	Input and output points	1408 points for digital input and output, 176 ch for analog input and output
	Number of extendable stages	1 stage
	Refresh time	500 μs fixed
	Self-diagnostics	WDT check
	Error display	LED
	Consumption current	350 mA

*1: The communication cycle depends on EtherCAT® master specifications.

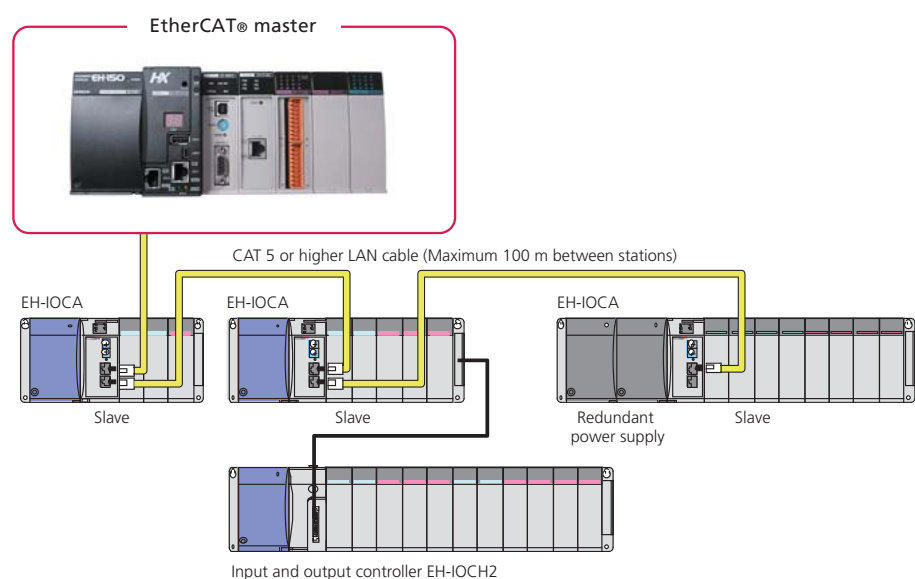**[Configuration Example]**   **EtherCAT® master**

CAT 5 or higher LAN cable (Maximum 100 m between stations)

EH-IOCA   EH-IOCA   EH-IOCA

Slave   Slave   Redundant   Slave
                              power supply

Input and output controller EH-IOCH2

EtherCAT® Slave Mountable Modules

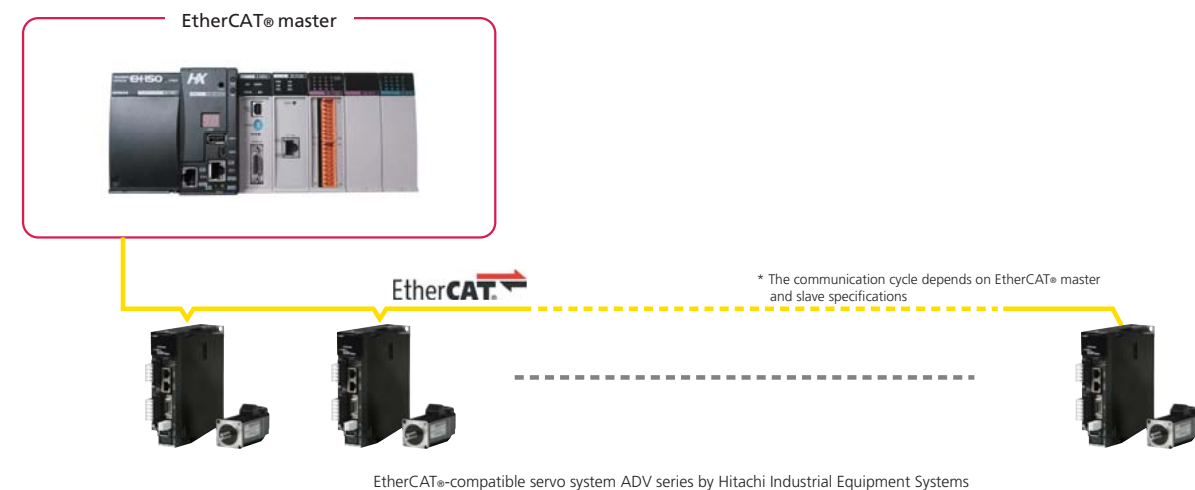| Product	Model	Specifications
Input module	EH-XD8	8 points, 24 V DC input
	EH-XD16	16 points, 24 V DC input
	EH-XDL16	16 points, 24 V DC input, filter reinforced version
	EH-XDS16	16 points, 24 V DC input, high-speed input
	EH-XD32	32 points, 24 V DC input
	EH-XDL32	32 points, 24 V DC input, filter reinforced version
	EH-XDS32	32 points, 24 V DC input, high-speed input
	EH-XD32E	32 points, 24 V DC input, European terminal block
	EH-XDL32E	32 points, 24 V DC input, European terminal block, filter reinforced version
	EH-XD32H	32 points, 24 V DC input, EM/H-200 compatible connector
	EX-XD64	64 points, 24 V DC input
	EH-XA16	16 points, 100 to 120 V AC input
	EH-XAH16	16 points, 200 to 240 V AC input
Output module	EH-YR8B	8 points, independent contact relay output, 100/240 V AC, 24 V DC
	EH-YR12	12 points, relay output, 100/240 V AC, 24 V DC
	EH-YR16	16 points, relay output, 100/240 V AC, 24 V DC, 16 points/1 common
	EH-YR16D	16 points, relay output, 100/240 V AC, 24 V DC, 8 points/1 common
	EH-YT8	8 points, transistor output, 12/24 V DC, Sink Type
	EH-YTP8	8 points, transistor output, 12/24 V DC, Source Type
	EH-YT16	16 points, transistor output, 12/24 V DC, Sink Type
	EH-YTP16	16 points, transistor output, 12/24 V DC, Source Type
	EH-YTP16S	16 points, transistor output, 12/24 V DC, Source Type, with a short circuit protection function
	EH-YT32	32 points, transistor output, 12/24 V DC, Sink Type
	EH-YTP32	32 points, transistor output, 12/24 V DC, Source Type
	EH-YT32E	32 points, transistor output, 12/24 V DC, Sink Type, European terminal block
	EH-YTP32E	32 points, transistor output, 12/24 V DC, Source Type, European terminal block
	EH-YT32H	32 points, transistor output, 5 to 24 V DC, Sink Type, EM/H-200 compatible connector
	EH-YT64	64 points, transistor output, 12/24 V DC, Sink Type
	EH-YTP64	64 points, transistor output, 12/24 V DC, Source Type
	EH-YS16	16 points, triac output, 100/240 V AC
Input and output mixed module	EH-MTT32	16 points TTL input, 4 to 27 V DC, 16 points TTL output, 4 to 27 V DC
Analog input module	EH-AX44	12 bit analog input, 4 to 20 mA, 0 to 10 V, 4 ch each
	EH-AX8V	12 bit analog input 8 ch, voltage 0 to +10 V
	EH-AX8H	12 bit analog input 8 ch, voltage −10 to +10 V
	EH-AX8I	12 bit analog input 8 ch, current 4 to 22 mA
	EH-AX8IO	12 bit analog input 8 ch, current 0 to 22 mA
	EH-AXH8M	14 bit analog input 8 ch, 0 to 22 mA, 4 to 22 mA, −10 to +10 V, 0 to 10 V
	EH-AXG5M	Insulation between channels, 16 bit analog input 5 ch, 0 to 22 mA, 4 to 22 mA, −10 to +10 V, 0 to 10 V
Analog output module	EH-AY22	12 bit analog output, 4 to 20 mA, 0 to 10 V, 2 ch each
	EH-AY2H	12 bit analog output 2 ch, voltage −10 to +10 V
	EH-AY4V	12 bit analog output 4 ch, voltage 0 to +10 V
	EH-AY4H	12 bit analog output 4 ch, voltage −10 to +10 V
	EH-AY4I	12 bit analog output 4 ch, current 4 to 20 mA
	EH-AYH8M	14 bit analog output 8 ch, 0 to 22 mA, 4 to 22 mA, 0 to 10 V
	EH-AYG4M	Insulation between channels, 16 bit analog output 4 ch, 0 to 22 mA, 4 to 22 mA, −10 to +10 V, 0 to 10 V
Resistance thermometer sensor module	EH-PT4	4 ch resistance thermometer sensor (Pt 100/Pt 1000) input, signed 15 bit
	EH-PTD8	6/8 ch resistance thermometer sensor (Pt 100/Pt 1000) input, signed 15 bit
Thermocouple input module	EH-TC8	8 ch thermocouple (K, E, J, T, B, R, S, N) input, signed 15 bit
Counter module	EH-CU	2 channel high speed counter input, maximum frequency 100 kHz, single phase/2 phase changeover, 4 point open collector output
	EH-CUE	1 channel high speed counter input, maximum frequency 100 kHz, single phase/2 phase changeover, 2 point open collector output
Dummy module	EH-DUM	Module for empty slots

Supporting function blocks for PLCopen compliant motion control

Incorporating the Motion Control Function* (SoftMotion)

*Motion model, CNC motion model

☑ Supports function blocks for PLCopen Motion Control

☑ Enables motion control by connecting servo with EtherCAT®

☑ Enables use of multiple axes coordination operations for CNC and robots by using the SoftMotion CNC package

☑ Enables execution of not only simple single axis control, but also synchronous control of multiple axes by using the electronic cam function, and to freely program the position, speed, acceleration with the graphical editor

☑ Enables simulation of operations without connecting to a real drive by using the functions of virtual axes

☑ Enables diverse control from I/O control to robot control with a single unit through combined use of PLC functions (sequence control function)

Motion Function Specifications

Items			Specifications
Control mode			Position control, speed control and torque control
By axis type			Drive axis, virtual axis, encoder axis
Single axis	Position control	Absolute value positioning	Specifies the target position in the absolute position coordinates (MC_MoveAbsolute)
		Relative value positioning	Specifies the target position in the relative position by setting the current position as the start point (MC_MoveRelative)
		Target position change	Adds relative distance to the last position command (MC_MoveAdditive)
		Superimposed positioning	Superimposes relative distance and speed on the last position command (MC_MoveSuperimposed)
		Position profile moving	Operates according to the specified time-position profile (MC_ProsionProfile)
	Speed control	Speed control	Specifies the target speed (MC_MoveVelocity)
		Speed profile moving	Operates according to the specified time-speed profile (MC_VelocityProfile)
	Torque control		Specifies the torque (SMC_SetTorque)
	Others	Stop	Ends operations (MC_Halt)
		Compulsory stop	Ends operations. Other commands cannot cut in while this command is being executed (MC_Stop)
		Acceleration profile moving	Operates according to the specified time-acceleration profile (MC_AccelerationProfile)
Multiple axes	Cam operation		The subordinate axis operates by maintaining the position relations with the master axis (real axis or virtual axis)
			The position relations are defined in the user-created cam table, using a graph or numerals (MC_CamIn, MC_CamOut, MC_CamTableSelect)
	Gear operation		Operates at the speed ratio specified by the master axis (real axis or virtual axis) and the subordinate axis (MC_GearIn, MC_GearOut, MC_GearInPos)
	Tappet		Controls digital output according to the position of the main axis
			The relationships between the position and digital output are user-defined in a tappet table (MC_CamTappetAction)
	Relative value main axis phase correction		Corrects the phase difference of the main axis and the slave axis (MC_Phasing)
	CNC (locus control)		Operates according to the locus specified by graphics or G codes in the CNC editor

EtherCAT® master

EtherCAT

* The communication cycle depends on EtherCAT® master and slave specifications

EtherCAT®-compatible servo system ADV series by Hitachi Industrial Equipment Systems

SoftMotion (Motion model)

● Diverse motion function blocks make it possible to respond to a wide range of controls, from PTP control with a single axis to synchronous control with multiple axes

● It is possible to execute programming for the electronic cam with the graphical cam editor, which makes it easy to intuitively visualize the movement
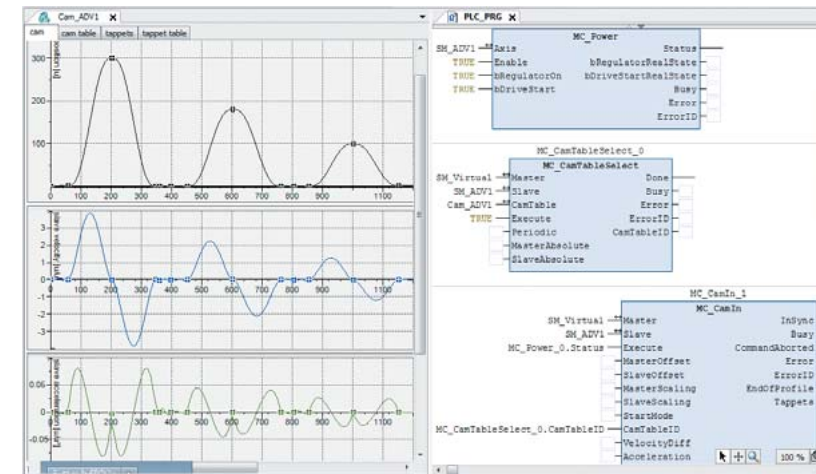
SoftMotion + CNC (G codes) (CNC motion model)

● Enable locus control programming with coordinate input in the graphical 3D display or the table format, or G codes

● Achieve intuitive visualization of movement, for example, automatic locus display from the input coordinates, and visual display of the acceleration and slowdown band of the locus

● Enable coordinate reading from the DXF file, and conversion to G codes

● Support coordinate-type conversion functions, such as conversion from rectangular coordinates to polar coordinates

● Support different speed profiles, such as trapezoid acceleration and deceleration, S shaped acceleration and deceleration, jerk-limited acceleration and deceleration (air supplement control)

● Achieve movements needed for processing machines and others, such as tool diameter compensation, edge smoothing, and setting the continuous operations according to accuracy
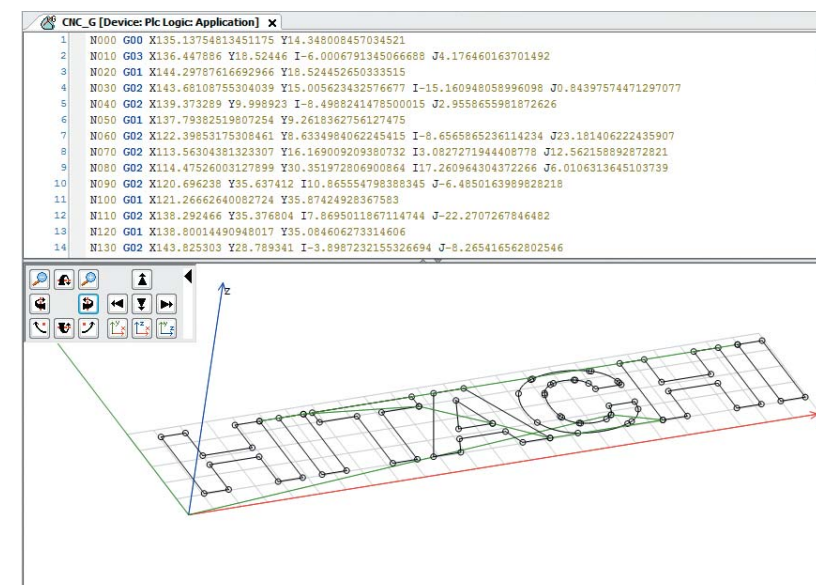
A Range of Functional Modules Common in the Reliable and Proven EH-150/EHV Series

⬤ Power Supply Module

Items		Model EH-PSA	EH-PSR	EH-PSD
Input	Related voltage	85 to 264 V AC		24 V DC
	Current	1 A maximum		1.25 A maximum
	Inrush current	50 A maximum (25°C), 100 A maximum (55°C)		
Output Current	5 V DC	3.8 A	5.6 A (to 45°C) / 5.0 A (45°C over)	3.8 A
	24 V DC	0.4 A	–	–
Redundant Power Supply		×	○	×

⬤ Base

Items	Model EH-BS3A	EH-BS5A	EH-BS6A	EH-PS8A	EH-BS11A	EH-BS8R
Number of mountable input and output modules	3	5	6	8	11	8
Number of mountable network modules	3	5	6	8	8*[1]	8
Redundant Power Supply	×					○
Internal current consumption (5 V DC)	200 mA					

*1: Slot 0 to 7

⬤ Input and output controller (One unit required per extended base)

Items	Model EH-IOCH2
Number of mountable input and output modules	11 (When EH-BS11A is used)
Maximum number of expansion	5
Internal current consumption (5 V DC)	80 mA

⬤ Cable for Expansion Base

Items	Model EH-CB05A	EH-CB10A	EH-CB20A
Cable length	0.5 m	1.0 m	2.0 m

Input and Output Modules

⬤ DC Input Module

Items	Model	EH-XD8	EH-XD16	EH-XDL16	EH-XDS16
Input specification		8	16		
Input voltage		19.2 to 30 V DC			
Input current		Approximately 6.9 mA	Approximately 4 mA		
Polarity		None			
Input impedance		Approximately 3.5 kΩ	Approximately 5.9 kΩ		
Operating voltage	ON voltage	15 V minimum			
	OFF voltage	5 V maximum			
Input lag	ON	5 ms maximum		16 ms maximum	1 ms maximum
	OFF	5 ms maximum		16 ms maximum	1 ms maximum
External connection		Removable screw terminal block (M3)			
Number of input points/Common		8 points/1 common	16 points/1 common		
Internal current consumption (5 V DC)		Approximately 30 mA	Approximately 50 mA		

Items	Model	EH-XD32	EH-XDL32	EH-XDS32	EH-XD32E	EH-XDL32E	EH-XD32H	EH-XD64
Input specification		32						64
Input voltage		19.2 to 30 V DC			20.4 to 28.8 V DC		21.6 to 26 V DC	20.4 to 28.8 V DC
Input current		Approximately 4.3 mA					Approximately 4.1 mA	Approximately 4.3 mA
Polarity		None					(+) common	None
Input impedance		Approximately 5.6 kΩ						
Operating voltage	ON voltage	15 V minimum					19 V minimum	15 V minimum
	OFF voltage	5 V maximum					7 V maximum	5 V maximum
Input lag	ON	5 ms maximum	16 ms maximum	1 ms maximum		16 ms maximum	4 ms maximum	1 ms maximum
	OFF	5 ms maximum	16 ms maximum	1 ms maximum		16 ms maximum	4 ms maximum	1 ms maximum
External connection		Connector (40 pin)*[1]			Screw clamp type removable terminal block		Connector (50 pin)*[2]	Connector (40 pin)*[1]
Number of input points/Common		32 points/1 common			8 points/1 common		32 points/1 common	
Internal current consumption (5 V DC)		Approximately 60 mA					Approximately 60 mA	Approximately 80 mA

*1: 40 pin square shaped connector (Connection cable model: EH-CBM***) in conformance with the relay terminal block for 32-/64- point input and output modules (Model: HPX7DS-40V6)
*2: 50-pin connector compatible with the 32-point input module for the EM and H-200 series (Model: PIM-DM, PIH-DM)

⬤ AC Input Module

Items	Model	EH-XA16	EH-XA16
Input specification		16	
Input voltage		85 to 132 V AC	170 to 264 V AC
Input current		Approximately 4.8 to 7.6 mA (200 V AC/50 Hz)	Approximately 4.3 to 8.0 mA (200 V AC/50 Hz)
Input impedance		16 kΩ (50 Hz), 13 kΩ (60 Hz)	32 kΩ (50 Hz), 27 kΩ (60 Hz)
Operating voltage	ON voltage	79 V AC	164 V AC
	OFF voltage	20 V AC	40 V AC
Input lag	ON	15 ms maximum	
	OFF	25 ms maximum	
Insulation method		Photocoupler insulation	
Input display		LED display	
External connection		Removable screw terminal block (M3)	
Number of input points/Common		16 points/1 common	
Number of common terminals		2 (Internal connection)	
Internal current consumption		Approximately 50 mA	

Circuit Diagram

DC Input (8, 16, 32, and 64 points)

Model: EH-XD8, EH-XD16,
EH-XDL16, EH-XD32,
EH-XD64, EH-XDL32,
EH-XD32E, EH-XDL32E

AC Input (16 points)

Model: EH-XA16, EH-XAH16

Transistor Output Module (Sink Type)

Items / Model	EH-YT8	EH-YT16	EH-YT32	EH-YT32E	EH-YT32H	EH-YT64
Number of output points	8	16	Approx. 90 mA			64
Rated load voltage	12/24 V DC				5 V to 27 V DC	12/24 V DC
Transistor output polarity	Sink					
Minimum switching current	1 mA					
Leak current	0.1 mA max.				0.05 mA max.	0.1 mA max.
Maximum load current — One point	0.5 A		0.2 A		0.1 A	0.1 A
Maximum load current — One common	2.4 A	4.0 A	6.4 A	1.0 A	0.8 A	3.2 A
Number of outputs/common	8 points/common	16 points/common	32 points/common	8 points/common		32 points/common
Number of common terminals	1		4 (Internal connection)	4		8*[3]
Output response time — ON	0.3 ms max.				1 ms max.	0.3 ms max.
Output response time — OFF	1 ms max.					
Surge removal circuit	Diode					
Fuse (per common)	4 A	8 A	10 A	2 A		5 A
External connection	Removable screw terminal block (M3)		Connector (40 pin)*[1]	Connector (50 pin)*[2]		Connector (40 pin)*[1]
Internal current consumption (5 V DC)	App. 30 mA	App. 50 mA	App. 90 mA			App. 120 mA
External power supply*[4] (For supplying power to the S terminal)	12/24 V DC max. 30 mA			5 V to 27 V DC max. 160 mA		12/24 V DC max. 100 mA

Transistor Output Module (Source Type)

Items / Model	EH-YTP8	EH-YTP16	EH-YTP16S	EH-YTP32	EH-YTP32E	EH-YTP64
Number of outputs points	8	16		32		64
Rated load voltage	12/24 V DC					
Transistor output polarity	Source					
Minimum switching current	1 mA					
Leak current	0.1 mA					
Maximum load current — One point	0.5 A		0.8 A	0.2 A	0.2 A	0.1 A
Maximum load current — One common	2.4 A	4 A	5 A	6.4 A	1.0 A	3.2 A
Number of outputs/common	8 points/common	16 points/common		32 points/common	8 points/common	32 points/common
Number of common terminals	1			4 (Internal connection)	4	8*[2]
Output response time — ON	0.3 ms max.					
Output response time — OFF	1 ms max.					
Short-circuit protection	None		Yes			
Surge removal circuit	Diode		Built-in	Diode		
Fuse	4 A	8 A	None	10 A/common		5 A/common
External connection	Removable screw terminal block (M3)			Connector (40 pin)*[1]		
Internal current consumption (5 V DC)	App. 30 mA	App. 50 mA		App. 90 mA		App. 120 mA
External power supply*[3] (For supplying power to the S terminal)	12/24 V DC max. 30 mA					12/24 V DC max.100 mA

Relay Output/Triac Output Module

Items / Model	EH-YR12	EH-YR16	EH-YR16D	EH-YR8B	EH-YS16
Output specifications	Relay output	Relay output	Relay output	Independent relay output	Triac output
Points/module	12 points	16 points	16 points	8 points	16 points
Number of common	1*[1]	1*[1]	2 (8 points/common)	8 (Independent for each point)	1
Insulation method	Photocoupler insulation	Relay insulation			Photo-triac insulation
Rated load voltage	100/240 V AC, 24 V DC				100/240 V AC
Minimum switching current	1 mA (DC 5 V)*[2]				100 mA
Leak current	None				2 mA max.
Maximum load current — One point	2 A	2 A	2 A	2 A	0.3 A
Maximum load current — One common	5 A	8 A	4 A	2 A (independent contact)	4.0 A*[3]
Output response time — OFF→ON	10 ms max.	10 ms max.	10 ms max.	10 ms max.	1 ms max.
Output response time — ON→OFF	10 ms max.	10 ms max.	10 ms max.	10 ms max.	1 ms + 1/2 cycles max.
External connection	Removable screw terminal block (M3)				
Surge removal circuit	None				Varistor
Fuse	None				6.3 A/1 common*[4]
External power supply (To be set up by customer)	24 V DC (+10%, −15%) (App. 70 mA)	Not used			
Internal current consumption (5 V DC)	App. 40 mA	App. 430 mA	App. 430 mA	App. 220 mA	App. 250 mA

*1: There are two common terminals that are connected internally.
*2: Excludes a case after switching large currents.
*3: Refer to the following derating diagram.
*4: Install an external fuse at each load.

Circuit Diagram

Relay Output (12 points, 16 points)

Model: EH-YR8B   Model: EH-YR12   Model: EH-YR16   Model: EH-YR16D

Triac Output (16 points)

Model: EH-YS16

Circuit Diagram

Transistor Output Module (8, 16, 32, and 64 points) Sink Type

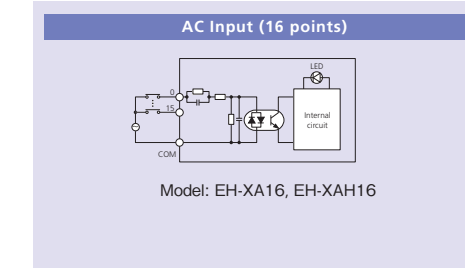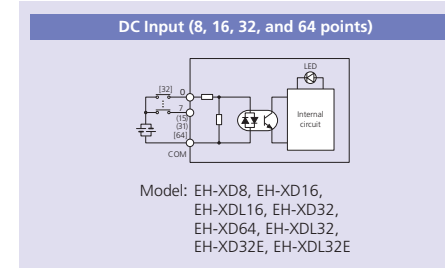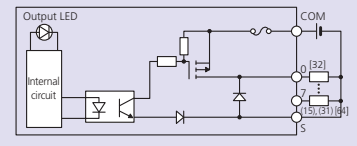Mode: EH-YT8, EH-YT16, EH-YT32, EH-YT64, EH-YT32E

*1: 40-pin square shaped connector (Connection cable model: EH-CBM***) in conformance with the relay terminal block for 32-/64-point input and output modules (Model: HPX7DS-40V6)
*2: 50-pin connector compatible with the 32-point input module for the EM, H-200 series (Model: PIM-DM, PIH-DM)
*3: Four common terminals are internally connected by 32 points. Common terminals for 32 points designed independently.
*4: Power needs to be externally supplied to the S terminal.

Circuit Diagram

Transistor Output Module (8, 16, 32, and 64 points) Source Type

Model: EH-YTP8, EH-YTP16, EH-YTP32, EH-YTP64, EH-YTP32E
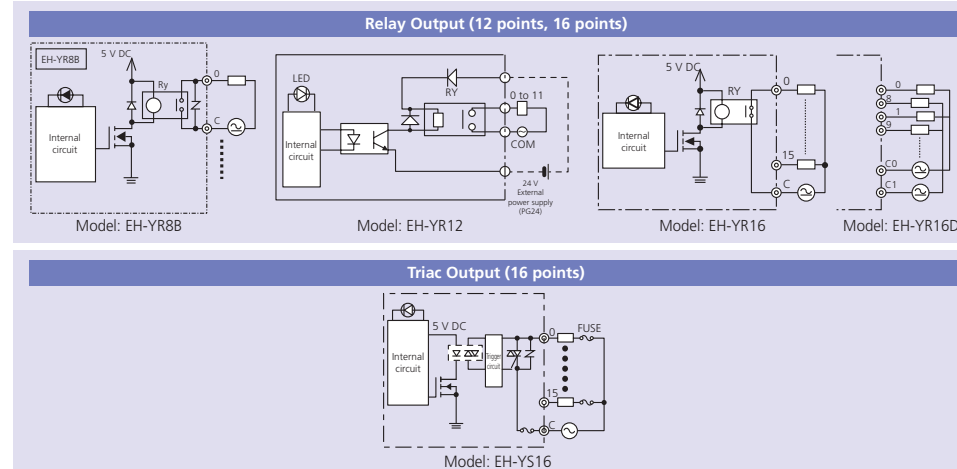
*1: 40-pin square connector (Connection cable model: EH-CBM***) in conformance with the relay terminal block for 32-/64-point input and output modules (Model: HPX7DS-40V6)
*2: Four common terminals are internally connected by 32 points. Common terminals for 32 points designed independently.
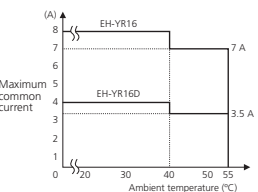*3: Power needs to be externally supplied to the S terminal.

EH-YR16/YR16D Derating diagram

EH-YS16 Derating diagram
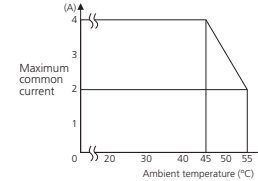
Input and Output Mixed Module

Items / Model	EH-MTT32 TTL input	EH-MTT32 TTL output
Number of Input and output points	16	16
Input and output voltage	4 to 27 V DC	
Input current	Approximately 6 mA (5 V DC)	–
Operation voltage — ON voltage	3.5 V minimum (5 V DC)	–
Operation voltage — OFF voltage	1.5 V maximum (5 V DC)	–
Maximum load current	–	20 mA/point
Maximum leak current	–	50 µA
Input and output response time — ON	1 ms maximum	
Input and output response time — OFF	1 ms maximum	
Polarity	(–) common	
Fuse	0.63 A	1.6 A
External connection	Connector	
Input points/common	16 points/common	8 points/common
External power supply — For supplying power to the input S termina	4 to 27 V DC, maximum 200 mA	–
External power supply — For supplying power to the output S terminal	–	4 to 27 V DC, maximum 200 mA
Internal current consumption (5 V DC)	Approximately 140 mA	

Options for Input and Output Modules

Terminal Block for 32-/64-point Connector Type Input and Output Modules

Items / Model	HPX7DS-40V6
Number of terminals	40
Terminal screw, terminal pitch	M3 × 6L, 7.62 mm pitch
Compliant electrical wires	Maximum 1.25 mm²
Tightening torque	0.075 to 0.5 N·m
Rated voltage and current	125 V 1 A

Terminal Block Connection Cable for 32-/64-point Connector Type Input and Output Module

Connector in both ends		Connector and open ends	
Model	Cable length	Model	Cable length
EH-CBM01W	1 m	EH-CBM01	1 m
EH-CBM03W	3 m	EH-CBM03	3 m
EH-CBM05W	5 m	EH-CBM05	5 m
EH-CBM10W	10 m	EH-CBM10	10 m

Half Terminal Block Cover for 8-/16-point Terminal Block Type Input and Output Modules
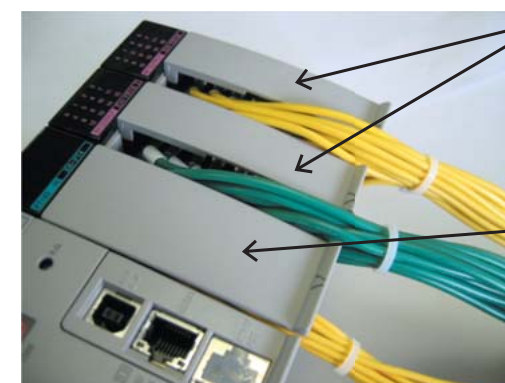
Half-size cover (Sold separately: EH-TMCV)

Wiring area
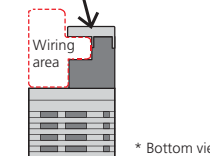
* Bottom view

Full size cover (Standard)

Wiring area
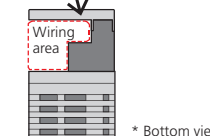
* Bottom view

Model	EH-TMCV
Overview	Even in the case of using input and output wires with thick diameter of approximately 3 mm maximum, it is possible to protect the screw terminal (prevent fingers and other body parts from contact).

Analog Input Module

Items	Model	EH-AX44	EH-AX8V	EH-AX8H	EH-AX8I	EH-AX8IO
Voltage and current		4 to 20 mA (0 to 3ch.) 0 to 10 V DC (4 to 7ch.)*¹	0 to 10 V DC	−10 to 10 V DC	4 to 20 mA	0 to 22 mA
Resolution		12 bits				
Conversion time		5 ms maximum				
Overall accuracy		±1% or less (of the full-scale value)				
Input impedance	Current input	Approximately 100 Ω	–	–		Approximately 100 Ω
	Voltage input		Approximately 100 kΩ			–
Insulation method	Channel, Internal circuit	Photocoupler insulation				
	Between channels	No insulation				
Number of channels	Current input	4 ch./module (0 to 3 Ch.)*¹	–	–		8 ch./module
	Voltage input	4 ch./module (4 to 7ch.)*¹	8 ch./module			–
External connection		Removable screw terminal block (M3)				
Internal current consumption (5 V DC)		Approximately 100 mA				
External power supply		24 V DC (+20%, −15%) Approximately 0.15 A (Approximately 0.4 A (when the power is turned on))				
External wiring		2-core shield wire (20 m maximum)				

*1: It is possible to use 8 points simultaneously.

Circuit Diagram

Analog Input

Model: EH-AX44, EH-AX8I, EH-AX8IO, EH-AX8V, EH-AX8H

* EH-AX44 is a current and voltage mixed type. *1: Current *2: Voltage

Analog Output Module

Items	Model	EH-AY22	EH-AY4V	EH-AY2H	EH-AY4H	EH-AY4I
Voltage and current		4 to 20 mA (2 to 3ch.) 0 to 10 V DC (0 to 1ch.)*¹	0 to 10 V DC	−10 to 10 V DC		4 to 20 mA
Resolution		12 bits				
Conversion time		5 ms maximum				
Overall accuracy		±1% or less (of the full-scale value)				
External load resistor	Current output	0 to 500 Ω	–			0 to 350 Ω
	Voltage output		Approximately 10 kΩ minimum			–
Insulation method	Channel, Internal circuit	Photocoupler insulation				
	Between channels	No insulation				
Number of channels	Current output	2 ch./module (2, 3ch.)*¹	–	–	–	4 ch./module
	Voltage output	2 ch./module (0, 1ch.)*¹	4 ch./module	2 ch./module	4 ch./module	–
External connection		Removable screw terminal block (M3)				
Internal current consumption (5 V DC)		Approximately 100 mA				Approximately 130 mA
External power supply		24 V DC (+20%, −15%) Approximately 0.15 A (Approximately 0.5 A (when the power is turned on))				
External wiring		2-core shield wire (20 m maximum)				

*1: It is possible to use 4 points simultaneously.

Circuit Diagram

Analog Input
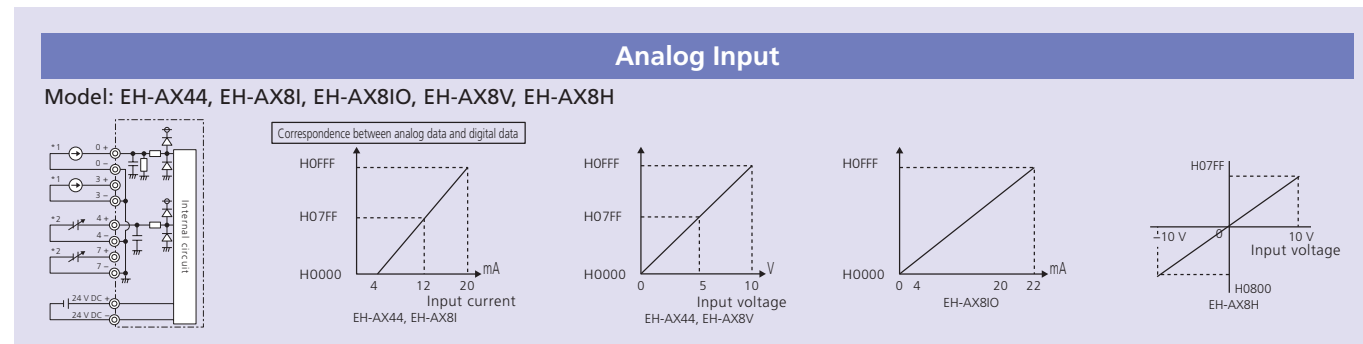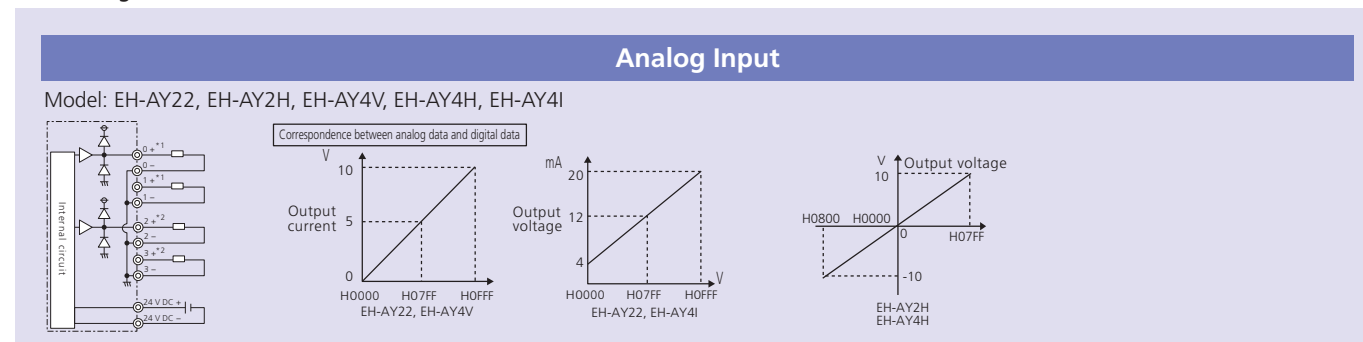
Model: EH-AY22, EH-AY2H, EH-AY4V, EH-AY4H, EH-AY4I

* EH-AX44 is a current and voltage mixed type. *1: Current *2: Voltage
*2 of EH-AY2H is NC.

14-bit Analog Input Module

Items	Model	EH-AXH8M
Input range (Selected by the switch)		Voltage 0 to 10 V/−10 to 10 V DC
		Current 0 to 22 mA/4 to 22 mA
Resolution (Selected by the switch)		Voltage 1 mV or 1/16,384 (14 bits)
		Current 0.002 mA or 1/16,384 (14 bits)
Conversion time		8.9 ms/8 ch.
Overall accuracy		Voltage ±0.5% or less (of the full-scale value)
		Current ±0.8% or less (of the full-scale value)
Linearity		±0.1% or less (of the full-scale value)
Input filter (Selected by the switch)	Enable	Approximately 90 ms (to reach 90% after step input)
	Disable	18 ms maximum (to reach 90% after step input)
Input impedance	Voltage input	Differential 200 kΩ
	Current input	249 Ω
Insulation method	Channel, Internal circuit	Photocoupler insulation
	Between channels	No insulation
Number of channels		Differential voltage input 8 ch. or Current 8 ch. (selected per 4 ch.)
External connection		Removable screw terminal block (M3)
Internal current consumption		Maximum 70 mA
External power supply (5 V DC)		24 V DC (+20%, −15%) approximately 0.04 A (approximately 0.3 A (when the power is turned on))
External wiring		2-core shield wire (20 m maximum)

Circuit Diagram
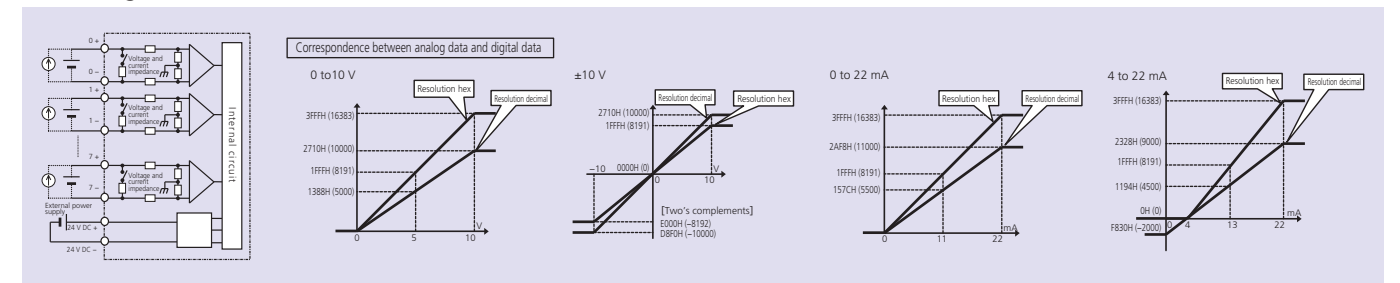
14-bit Analog Output Module

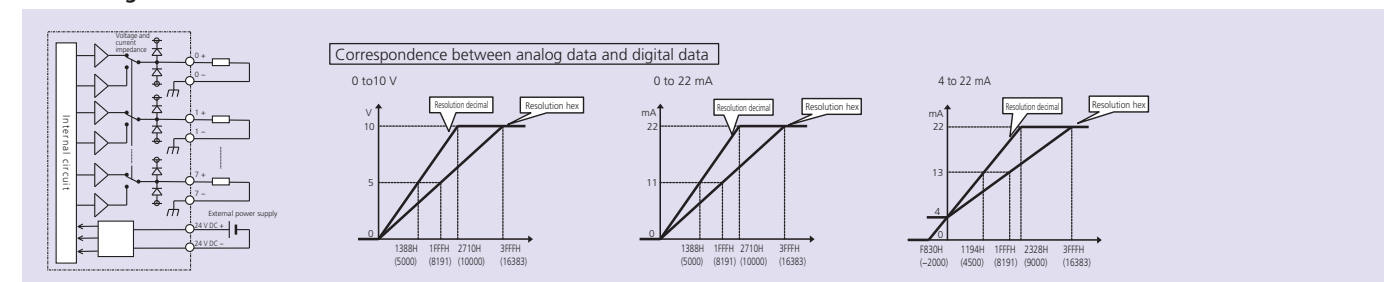| Items	Model	EH-AYH8M
Output range (Selected by the switch)		Voltage 0 to 10 V DC
		Current 0 to 22 mA/4 to 22 mA
Resolution (Selected by the switch)		Voltage 1 mV or 1/16,384 (14 bits)
		Current 0.002 mA or 1/16,384 (14 bits)
Conversion time		8.9 ms/ 8 ch.
Overall accuracy		Voltage/current ± 0.8% or less (of the full-scale value)
Linearity		±0.2% or less (of the full-scale value) (0 to 10 V DC, 0.05 to 22 mA)
Output filter (Selected by the switch)	Enable	Approximately 200 ms minimum (to reach 90% after step output)
	Disable	18 ms maximum (to reach 90% after step output)
External load resistor	Voltage output	10 kΩ minimum
	Current output	400 Ω maximum
Insulation method	Channel, Internal circuit	Photocoupler insulation
	Between channels	No insulation
Number of channels		Voltage 8 ch. or Current 8 ch. (selected per 4 ch.)
External connection		Removable screw terminal block (M3)
Internal current consumption		Maximum 70 mA
External power supply		24 V DC (+20%, −15%) approximately 0.15 (approximately 0.4 A (when the power is turned on))
External wiring		2-core shield wire (20 m maximum)

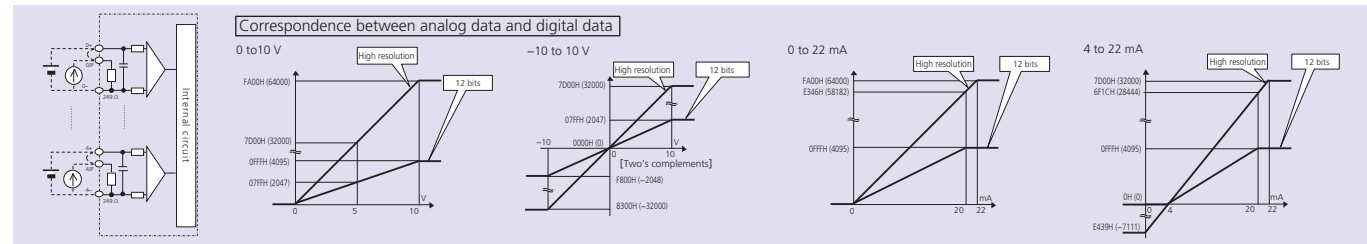### Circuit Diagram

Analog Input Module with Insulation between Channels

Items		Model	EH-AXG5M	
Number of input channel			Differential voltage input or current input 5 ch.	
Input range (Select via dip switch settings)	Voltage input		0 to 10 V DC	
			−10 to 10 V DC	
	Current input		0 to 22 mA	
			4 to 22 mA	
			High resolution mode	12-bit mode
Resolution (Select via dip switch settings)	0 to 10 V		0 to 64000 [0.15625 mV]	0 to 4095 [2.442 mV]
	−10 to 10 V		−32000 to 32000 [0.3125 mV]	−2048 to 2047 [4.884 mV]
	0 to 22 mA		0 to 64000 [0.34375 µA]	0 to 4095 (20 mA) [4.884 µA]
	4 to 22 mA		−7111 to 32000 [0.5625 µA]	0 to 4095 (20 mA) [3.907 µA]
Conversion time			High accuracy mode	High speed mode
			8 ms/5 ch.	0.25 ms/5 ch.
Accuracy (of full-scale value)*[1]	Standard accuracy (25°C)		±0.05%	
	Temperature coefficient		±80 ppm/°C (0.008%/°C)	
Input filter			1 kHz	
Input impedance	Voltage input		Differential 200 kΩ	
	Current input		249 Ω	
Power on			15 minutes	
Maximum rated values			Voltage input: ±15 V Current input: 30 mA*[2]	
Insulation method	Between channel and Internal circuit		Insulation resistance 1000 V AC for 1 minute	
	Between channels		Insulation resistance 1000 V AC for 1 minute	
External connection			Removable screw terminal block (M3)	
Internal current consumption (5 V DC)			Maximum 300 mA	
External power supply			None	
External wiring			2-core shield wire (20 m maximum)	

*1: For example, accuracy at 40°C is as follows:
0.05% (Standard accuracy) + 0.008%/°C (Temperature coefficient) × 15°C (Difference in change from 25°C) = ±0.17%
*2: Temporary current value over a short period that will not break the resistor inside the module.

Circuit Diagram

Correspondence between analog data and digital data

Analog Output Module with Insulation between Channels

Items		Model	EH-AYG4M	
Number of output channel (ch.)			Differential voltage output or current output 4 ch.	
Output range (Select via dip switch settings)	Voltage output		0 to 10 V DC	
			−10 to 10 V DC	
	Current output		0 to 22 mA	
			4 to 22 mA	
			High accuracy mode	12-bit mode
Resolution (Select via dip switch settings)	0 to 10 V		0 to 64000 [0.15625 mV]	0 to 4095 [2.442 mV]
	−10 to 10 V		−32000 to 32000 [0.3125 mV]	−2048 to 2047 [4.884 mV]
	0 to 22 mA		0 to 64000 [0.34375 µA]	0 to 4095 (20 mA) [4.884 µA]
	4 to 22 mA		−7111 to 32000 [0.5625 µA]	0 to 4095 (20 mA) [3.907 µA]
Conversion time			0.25 ms/4 ch.	
Accuracy (of full-scale value)*[1]	Standard accuracy (25°C)		±0.1%	
	Temperature coefficient		±80 ppm/°C (0.008%/°C)	
Output impedance	Voltage output		1 kΩ minimum	
	Current output		600 Ω maximum	
Power on			15 minutes	
Maximum rated values			Voltage output: ±15 V Current output: 24 mA*[2]	
Insulation method	Between channel and Internal circuit		Insulation resistance 1000 V AC for 1 minute	
	Between channels		Insulation resistance 1000 V AC for 1 minute	
External connection			Removable screw terminal block (M3)	
Internal current consumption (5 V DC)*[2]			Maximum 300 mA	
External power supply			None	
External wiring			2-core shield wire (20 m maximum)	

*1: For example, accuracy at 40°C is as follows:
0.1% (Standard accuracy) + 0.008%/°C (Temperature coefficient) × 15°C (Difference in change from 25°C) = ±0.22%
*2: 480 mA (when voltage 10 V is output in all channels, impedance is 10 kΩ), 600 mA (when voltage 10 V is output in all channels, impedance is 1 kΩ), 600 mA (when current 11 mA is output in all channels),
730 mA (when current 22 mA is output in all channels)
*3: Please note that rated current of the power supply module cannot be exceeded, Please take other options into account, such as power supply module EH-PSR with a large capacity of 5 V DC (5.6 A)

Circuit Diagram

Correspondence between analog data and digital data
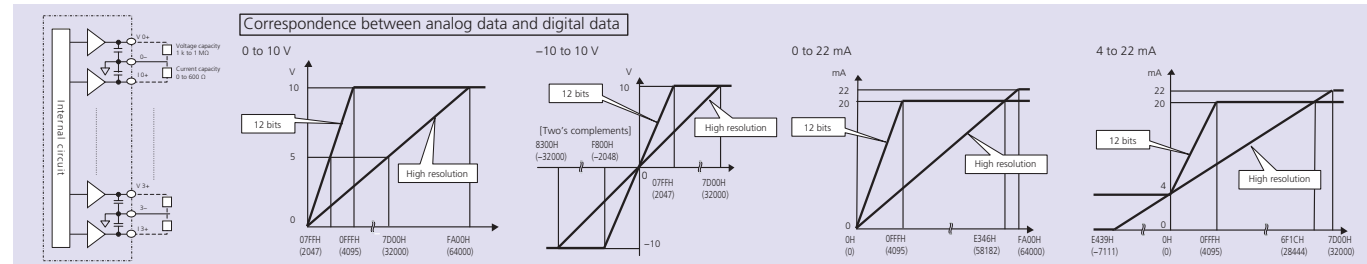
Resistance Temperature Detector Module for Temperature Input

Items		Model	EH-RTD8		
Applicable resistance temperature detector*[1]			Platinum resistance temperature detector Pt 100/Pt 1000 (3 wire or 2 wire type)		
Number of input channels*[1]			6 ch. input (3 wire type) or 8 ch. input (2 wire type)		
Temperature range*[1]			−200 to 850°C/−40 to 60°C		
Resolution*[1]			Temperature conversion	Temperature conversion in °F	PT4 compatible
			−200 to 850°C: 0.1°C	−328 to 1562°F: 0.1°F	−60 to 410°C: 15 bits
			−40 to 60°C: 0.02°C	–	−25 to 45°C: 15 bits
Conversion time*[1]			1.6 s/all channels or 0.5 s/all channels		
Accuracy*[2]	Standard accuracy (25°C)		±0.5°C maximum (under 380°C in measured temperature) ±0.8°C maximum (380°C in measured temperature or higher)		
	Temperature coefficient		±0.01%/°C (FS)*[3] maximum (±0.1°C/°C maximum)		
Current			0.18 mA		
Error detection (Wire disconnection detection)	LED		Corresponding LED blinks		
	Conversion value		Temperature conversion data for one of the four values is H7FFF		
Input filter*[1]			None/16 times (moving average)		
Power on*[4]			1 minute		
Insulation	Between channel and Internal circuit		Photocoupler insulation		
	Between channels		No insulation		
External connection			Removable screw terminal block (M3)		
Internal current consumption (5 V DC)			Maximum 300 mA*[5]		
External power supply			None		
External wiring			Wiring resistance 5 Ω or less for shield wires, 3 wire type (equivalent to 100 m with AWG22)		

*1: Select via dip switch settings.
*2: For example, accuracy for measuring under 380°C in a 35°C environment is as follows (other than the noise environment)
0.5°C (Standard accuracy) +0.1°C/°C (Temperature coefficient) × 10°C (Difference in change from 25°C) = ±1.5°C
*3: Accuracy for measuring at −200 to 850°C
*4: Time from start of electrification to the time of stabilization
*5: Unlike the existing analog modules, this does not use an external power supply (24 V DC).
However, the current consumption of internal 5 V DC is high. Please note that rated current of the power supply module cannot be exceeded. Please take other options into account, such as the power supply module EH-PSR with a large capacity of 5 V DC (5.6 A)

Thermocouple Input Module

Items		Model	EH-TC8	
Applicable thermocouple*[1]			JIS C 1602-1995 compliant product Type K, E, J, T, B, R, S, N	
Temperature conversion data			Signed 15-bit	
Range and Accuracy*[1] *[2]	Type		Accuracy guarantee range	Input range
	K		−200 to 1200°C 0.4% (FS)	−270 to 1370°C
	E		−200 to 900°C 0.3% (FS)	−270 to 1000°C
	J		−40 to 750°C 0.3% (FS)	−270 to 1200°C
	T		−200 to 350°C 0.8% (FS)	−270 to 400°C
	B		600 to 1700°C 1.0% (FS)	0 to 1820°C
	R		0 to 1600°C 1.0% (FS)	−50 to 1760°C
	S		0 to 1600°C 1.0% (FS)	−50 to 1760°C
	N		−200 to 1200°C 0.4% (FS)	−270 to 1300°C
Allowable tolerance of cold contact temperature*[3]			±2°C or less (ambient temperature 15 to 35°C) ± 3°C or less (ambient temperature 0 to 55°C)	
Resolution*[1]	K, E, J, T, N		0.1°C/0.1°F	
	B, R, S		1.0°C/1.0°F	
Number of input points			8 ch.	
Data update time*[1]			108/860 ms	
Insulation	Between channels		No insulation	
	Internal circuit		Photocoupler insulation	
External connection			Removable screw terminal block (M3)	
Internal current consumption (5 V DC)			Maximum 70 mA	
External power supply			24 V DC ±10% maximum 100 mA	
External wiring*[4]			Maximum 100 m (shield wire)	
Error detection	Input upper limit excess/ wire disconnection detection		Input data: H7FFF (LED corresponding to the channel which detects the error blinks)	
	Input lower limit excess		Input data: H8000	

*1: Select via dip switch settings.
*2: Adding accuracy per sensor to the allowable tolerance of the cold contact temperature will improve overall accuracy. The thermocouple itself also has allowable tolerance. Please check it in advance.
*3: Allowable tolerance means the value 10 minutes after electrification starts. The allowable tolerance may be a bit larger immediately after electrification or depends upon the sudden change in ambient temperature, and the operating environment.
*4: Maximum length of 100 m can be used for external wiring. Please note that it may change depending on the usage environment.

Counter Modules

● Counter Module

EH-CU/EH-CUE

■Counter specifications

Items　　　　　　　　Model		EH-CU	EH-CUE
Capacity		32 bits (0 to 4,294,967,295)	
Highest frequency/channels		100 kHz/2 ch.	100 kHz/1 ch.
Pulse output method		2 phase count mode (standard, multiplication by 4), 1 phase count	
Differential input current		4 mA minimum	
Input voltage		12 to 24 V DC	
Input operational voltage	Minimum ON voltage	10 V	
	Maximum OFF voltage	4 V	
Insulation method		Photocoupler	
Input points	A: A	Each channel, phase difference (A-B)	
	B: B	When it increases: +45 to +125	
	M: Marker	When it decreases: −45 to −125	
Minimum count pulse width		on: 4 μs, off: 4 μs	
Minimum marker pulse		10 μs	
Cable for external wiring		Model EH-CUC** (** represents cable length, sold separately)	
External wiring		Wired with twisted pair wires and batch shielded wires	

■Output Specifications

Items　　　　　　　　Model		EH-CU	EH-CUE
Output voltage		10 to 30 V	
Load current		20 mA/point 80 mA/common	
Output method		Open collector output	
Minimum load current		1 mA	
Output delay time	ON→OFF	Within 1 ms	
	OFF→ON	Within 1 ms	
Voltage drop when ON		Maximum 1.5 V	
Number of external output points		4 points/module	2 points/module
Output specification		Current value = Set value 1 or Current value > Set value 1	
		Current value = Set value 2 (Ring counter)	
Leak current		Maximum 0.5 mA	
Polarity		(−) common in the module	
External power supply		10 to 30 V	
Insulation method		Photocoupler	

Communication Function Modules

○ Serial Communication Interface Module*

* This will be supported soon.

Items　　　　　　　　Model	EH-SIO
Interface	RS-232C × 1
	RS-232C/422/485 × 1
Communication method	Half duplex
Transmission speed (bps)	300/600/1,200/2,400/4,800/9,600/19,200/38,400/57,600
Maximum communication data	Maximum 1,024 byte
Communication protocol	Non-procedure
	Modbus RTU

Field Network Modules

● PROFIBUS®-DP Master Module/Slave Module

Items　　　　　　　　Model	Master module: EH-RMP2, slave controller EH-IOCP2		
Number of installed units	2 units/CPU, communication slot only*[1]		
Number of supported slave units	124 units (of which maximum 22 units are EH-IOCP2)		
Supported I/O list	CPU link		
Output data	4096 points/256 words		
Input data	4096 points/256 words		
Communication protocol	PROFIBUS®-DP V0		
Communication distance, transmission speed (bps)	9.6 kbps: 1,200 m	187.5 kbps: 1,000 m	3 Mbps: 100 m
	19.2 kbps: 1,200 m	500 kbps: 400 m	6 Mbps: 100 m
	93.75 kbps: 1,200 m	1500 kbps: 200 m	12 Mbps: 100 m

*1: Base 0 to 7 slots
*2: Please prepare the configuration software (Hilscher SYCON.net) for set-up.

● External Dimensions

(Unit: mm)
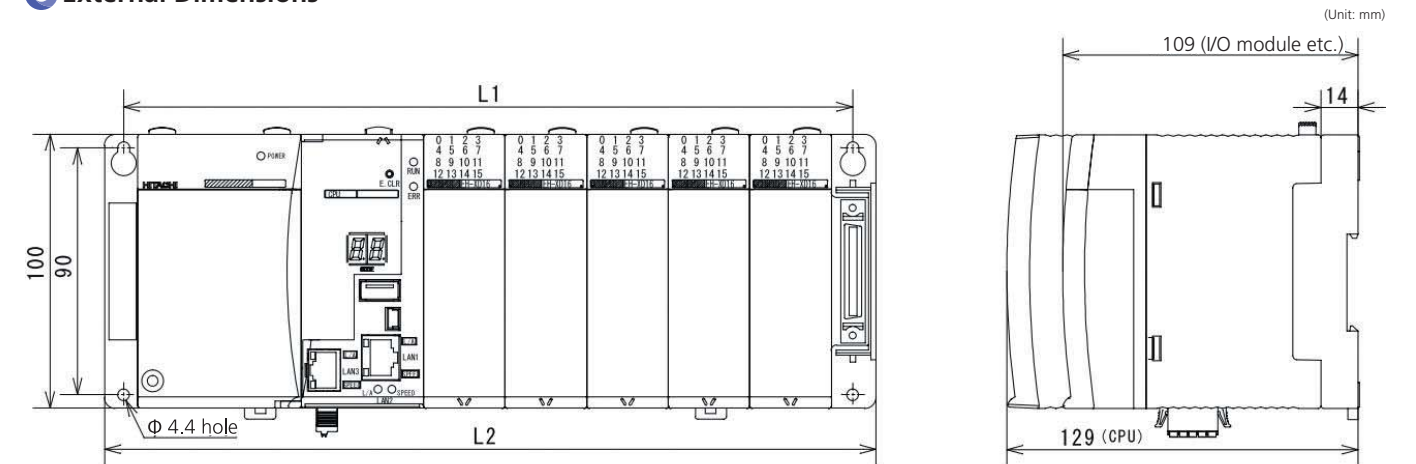
Base model	EH-BS11A	EH-BS8A	EH-BS6A	EH-BS5A	EH-BS3A	EH-BS8R
Number of I/O module slots	11	8	6	5	3	8
L1	447	357	297	267	207	417
L2	462.5	372.5	312.5	282.5	222.5	432.5

General Specifications

Model/Type	Specifications				
	Standard	Full Function	Motion	CNC motion	Redundant
Items	HX-CP1S08	HX-CP1H16	HX-CP1S08M	HX-CP1H16M	HX-CP1H16R
Operating ambient temperature	0 to 55℃				
Storage ambient temperature	±10 to 75℃				
Operating ambient humidity	5 to 95% RH (No condensation)				
Storage ambient humidity	5 to 95% RH (No condensation)				
Vibration resistance	IEC60068-2-6 compliant				
Noise resistance	○ Noise voltage 1,500 Vpp, Noise pulse width 100 ns, 1 μs (Noise created by the noise simulator is applied across the power supply module's input terminals. This is determined by this company's measuring methods.) ○ IEC61131-2 compliant ○ Static noise: 3,000 V at metal exposed area				
Insulation resistance	20 MΩ or more between the AC external terminal and case ground (FE) terminal (based on 500 V DC mega)				
Dielectric withstand voltage	1,500 V AC for 1 minute between the AC external terminal and case ground (FE) terminal				
Grounding	Class D grounding (ground with power supply module)				
Usage environment	No corrosive gases, no excessive dust				
Structure	Open, wall-mount type				
Cooling	Natural air cooling				
Dimensions	45 mm (W) × 100 mm (H) × 115 mm (D)				
Weight	190 g	240 g	190 g	240 g	
Current consumption	5 V DC 1,000 mA	5 V DC 1,200 mA	5 V DC 1,000 mA	5 V DC 1,200 mA	

Components List

* Please check the usable units, restrictions, and other matters in the product manual before selecting components.

Items	Model	Specifications	I/O type	Basic base (*1)	Expansion base (*2)	Slave (*3)	Current consumption (mA) (*4)	Remarks
CPU module	HX-CP1S08	Standard model, program capacity 8 MB	–	○	–	–	1,000	
	HX-CP1H16	Full Function model, program capacity 16 MB	–	○	–	–	1,200	
	HX-CP1S08	Motion model (supports Soft Motion), program capacity 8 MB	–	○	–	–	1,000	
	HX-CP1H16M	CNC motion model (supports Soft Motion, CNC (G code)), program capacity 16 MB	–	○	–	–	1,200	
	HX-CP1H16R	Redundant model (supports CPU redundancy), program capacity 16 MB	–	○	–	–	1,200	
Power supply module	EH-PSA	Input 100 to 240 V AC, output 5 V DC 3.8 A, 24 V DC 0.4 A	–	○	○	○	–	
	EH-PSD	Input 24 V DC, output 5 V DC 3.8 A	–	○	○	○	–	
	EH-PSR	Input 100 to 240 V AC, output 5 V DC 5.6 A (45℃ maximum ambient temperature)	○	○	○	○	–	
I/O controller	EH-IOCH2	Input and output control module, mounting one unit per extended base	–	–	○	–	80	*4
Base unit	EH-BS3A	3 input and output modules installed	–	○	○	○	200	
	EH-BS5A	5 input and output modules installed	–	○	○	○	200	
	EH-BS6A	6 input and output modules installed	–	○	○	○	200	
	EH-BS8A	8 input and output modules installed	–	○	○	○	200	
	EH-BS11A	11 input and output modules installed	–	○	○	○	200	
	EH-BS8R	8 input and output modules installed, power supply redundancy supported (2 units of EH-PSR mounted)	–	○	○	○	200	
Digital input module	EH-XD8	8 points, 24 V DC input, response time 5 ms	DI16	○	○	○	50	
	EH-XD16	16 points, 24 V DC input, response time 5 ms	DI16	○	○	○	50	
	EH-XDL16	16 points, 24 V DC input, response time 16 ms	DI16	○	○	○	50	
	EH-XDS16	16 points, 24 V DC input, response time 1 ms	DI16	○	○	○	50	
	EH-XD32	32 points, 24 V DC input, response time 5 ms	DI32	○	○	○	60	
	EH-XDL32	32 points, 24 V DC input, response time 16 ms	DI32	○	○	○	60	
	EH-XDS32	32 points, 24 V DC input, response time 1 ms	DI32	○	○	○	60	
	EH-XD32E	32 points, 24 V DC input, response time 1 ms, screw clamp type terminal block	DI32	○	○	○	60	
	EH-XDL32E	32 points, 24 V DC input, response time 16 ms, screw clamp type terminal block	DI32	○	○	○	60	
	EH-XD32H	32 points, 24 V DC input, response time 4 ms, sink type, 32-point compatible connector for EM/H-200	DI32	○	○	○	60	
	EH-XD64	64 points, 24 V DC input, response time 1 ms	DI64	○	○	○	80	
	EH-XA16	16 points, 100 to 120 V AC input, response time 15 ms	DI16	○	○	○	50	
	EH-XAH16	16 points, 200 to 240 V AC input, response time 15 ms	DI16	○	○	○	50	
	EH-YR8B	8 points, independent contact relay output, 100/240 V AC, 24 V DC	DO16	○	○	○	220	
	EH-YR12	12 points, relay output, 100/240 V AC, 24 V DC	DO16	○	○	○	40	
	EH-YR16	16 points, relay output, 100/240 V AC, 24 V DC	DO16	○	○	○	430	
	EH-YR16D	16 points, relay output, 2 common 100/240 V AC, 24 V DC	DO16	○	○	○	430	
	EH-YT8	8 points, transistor output, 12/24 V DC, sink type	DO16	○	○	○	30	
	EH-YTP8	8 points, transistor output, 12/24 V DC, source type	DO16	○	○	○	30	
	EH-YT16	16 points, transistor output, 12/24 V DC, sink type	DO16	○	○	○	50	
	EH-YTP16	16 points, transistor output, 12/24 V DC, source type	DO16	○	○	○	50	
	EH-YTP16S	16 points, transistor output, 12/24 V DC, source type (with a short circuit)	DO16	○	○	○	50	
	EH-YT32	32 points, transistor output, 12/24 V DC, sink type	DO32	○	○	○	90	
	EH-YTP32	32 points, transistor output, 12/24 V DC, source type (with a short circuit)	DO32	○	○	○	90	
	EH-YT32E	32 points, transistor output, 12/24 V DC, sink type, removable screw clamp type terminal block	DO32	○	○	○	90	
	EH-YTP32E	32 points, transistor output, 12/24 V DC, source type, removable screw clamp type terminal block (with a short circuit)	DO32	○	○	○	90	

*1: ○ means mountable on the Basic base.
*2: ○ means mountable on the Expansion base.
*3: ○ means mountable on the EtherCAT® and PROFIBUS®-DP slave base.
*4: Mounts to the right of the power supply module of each expansion base (CPU mounting position of the Basic base. Fixed mounting position.)

◎Note◎
Maximum 11 modules can be mounted per base in this system. However, the mountable module configuration depends on the maximum output current of the power supply module. Please use it within the allowable range of the maximum output current of the power supply module.

* Please check the usable units, restrictions, and other matters in the product manual before selecting components.

Items	Model	Specifications	I/O type	Basic base (*1)	Expansion base (*2)	Slave (*3)	Current consumption (mA) (*4)	Remarks
Digital input module	EH-YT32H	32 points, transistor output, 5/12/24 V DC, sink type, 32-point compatible connector for EM/H-200	DO32	○	○	○	90	
	EH-YT64	64 points, transistor output, 12/24 V DC, sink type	DO64	○	○	○	120	
	EH-YTP64	64 points, transistor output, 12/24 V DC, source type (with a short circuit)	DO64	○	○	○	120	
	EH-YS16	16 points, triac output, 100/240 V AC	DO16	○	○	○	250	
Input and output mixed module	EH-MTT32	16-point TTL input, sink type, 16-point TTL output, sink type	DIO32	○	○	○	140	
Analog input module	EH-AX44	12 bits analog input, 4 to 20 mA, 0 to 10 V 4 ch. each	AI8	○	○	○	100	
	EH-AX8V	12 bits analog input 8 ch., voltage 0 to +10 V	AI8	○	○	○	100	
	EH-AX8H	12 bits analog input 8 ch., voltage −10 to +10 V	AI8	○	○	○	100	
	EH-AX8I	12 bits analog input 8 ch., current 4 to 20 mA	AI8	○	○	○	100	
	EH-AX8IO	12 bits analog input 8 ch., current 0 to 22 mA	AI8	○	○	○	130	
	EH-AXH8M	14 bits analog input 8 ch., 0 to 22 mA, 4 to 22 mA, −10 to +10 V, 0 to 10 V	AI8	○	○	○	70	
	EH-AXG5M	16 bits analog output module with insulation 5 ch., 0 to 22 mA, 4 to 22 mA, −10 to +10 V, 0 to 10 V	AI8	○	○	○	300	
	EH-AY22	12 bits analog output, 4 to 20 mA, 0 to 10 V 2 ch. each	AO8	○	○	○	100	
	EH-AY2H	12 bits analog output 2 ch., voltage −10 to +10 V	AO8	○	○	○	100	
	EH-AY4V	12 bits analog output 4 ch., voltage 0 to +10 V	AO8	○	○	○	100	
	EH-AY4H	12 bits analog output 4 ch., voltage −10 to +10 V	AO8	○	○	○	100	
	EH-AY4I	12 bits analog output 4 ch., current 4 to 20 mA	AO8	○	○	○	130	
	EH-AYH8M	14 bits analog output 8 ch., 0 to 22 mA, 4 to 22 mA, 0 to 10 V	AO8	○	○	○	70	
	EH-AYG4M	16 bits analog output module with insulation 4 ch., 0 to 22 mA, 4 to 22 mA, 0 to 10 V	AO8	○	○	○	730	
Resistance temperature detector input module	EH-PT4	4 ch. resistance temperature detector (Pt 100/Pt 1000) input, Signed 15 bits	AI4	○	○	○	160	
	EH-RTD8	6/8 ch. resistance temperature detector (Pt 100/Pt 1000) input, Signed 15 bits	AI4/AI8	○	○	○	300	
Thermocouple input module	EH-TC8	8 ch. thermocouple (K, E, J, T, B, R, S, N) input, signed 15 bits	AI8	○	○	○	70	
Counter input module	EH-CU	2 ch. high speed counter input, maximum frequency 100 kHz	EH-CU/E	○	○	○	310	
	EH-CUE	1 ch. high speed counter input, maximum frequency 100 kHz	EH-CU/E	○	○	○	310	
Serial communications module	EH-SIO	Serial communications module RS-232C/422/485, multipurpose, Modbus master	EH-SIO	○	○	○	250	*8
Field Network Modules	EH-RMP2	PROFIBUS®-DP Master Module 256 words input/256 words output	EH-LNK	○	—	—	100	*6
	EH-IOCP2	PROFIBUS®-DP Slave Controller 256 words input/256 words output	—	—	—	○	100	*7
	EH-IOCA	EtherCAT® Slave Controller Input and output maximum 1,408 points	—	—	—	○	350	*7

*1: ○ means mountable on the Basic base.
*2: ○ means mountable on the Expansion base.
*3: ○ means mountable on the EtherCAT® and PROFIBUS®-DP slave base.
*4: Mounts to the right of the power supply module of each Expansion base (CPU mounting position of the Basic base. Fixed mounting position.)
*5: It is possible to use a maximum of 2 units. Mountable slots are 0 to 7 for the Basic base only.
*6: It is possible to use a maximum of 8 units. Mountable slots are 0 to 7 for the Basic base only.
*7: Mounts to the right of the power supply module of each slave base (CPU mounting position of the Basic base. Fixed mounting position.)
*8: This will be supported soon.

* Please check the usable units, restrictions, and other matters in the product manual before selecting components.

Items	Model	Specifications	Remarks
Others	EH-DUM	Module for empty slots	
	EH-TMCV	Half-size terminal block cover (Lot 10 configuration)	
	HX-BAT	Clock data is stored in memory retained by battery.	*1
Extension cable	EH-CB05A	Length: 0.5 m, common for Base to Extension, Extension to Extension	
	EH-CB10A	Length: 1.0 m, common for Base to Extension, Extension to Extension	
	EH-CB20A	Length: 2.0 m, common for Base to Extension, Extension to Extension	
Terminal block	HPX7DS-40V6	Terminal block for 32-/64-point modules	
External connection cable for 32-/64-point input and output modules	EH-CBM01W	Length 1 m (Connector in both ends)	
	EH-CBM03W	Length 3 m (Connector in both ends)	
	EH-CBM05W	Length 5 m (Connector in both ends)	
	EH-CBM10W	Length 10 m (Connector in both ends)	
	EH-CBM01	Length 1 m (Connector and open ends)	
	EH-CBM03	Length 3 m (Connector and open ends)	
	EH-CBM05	Length 5 m (Connector and open ends)	
	EH-CBM10	Length 10 m (Connector and open ends)	
External connection cable for EM/H-200 compatible 32-point input and output modules	CBM-02	Length 2 m (Connector and open ends)	
	CBM-05	Length 5 m (Connector and open ends)	
	CBM-10	Length 10 m (Connector and open ends)	
Cable for counter modules	EH-CUC01	Length 1 m (Connector and open ends)	
	EH-CUC02	Length 2 m (Connector and open ends)	
	EH-CUC03	Length 3 m (Connector and open ends)	
	EH-CUC04	Length 4 m (Connector and open ends)	
	EH-CUC05	Length 5 m (Connector and open ends)	

Item	Model	Specifications	Remarks
Integrated development environment HX-CODESYS	HX-CDS	Integrated development environment in conformance with IEC61131-3	*2

*1: Batteries are required to retain calendar clock data only.
    Batteries are not required in the case of synchronization with the calendar clock of the NTP server and in order to retain user programs and data memory with outage retaining attributes.
*2: A cable for connecting the PC to the CPU (A-mini B type USB cable or LAN cable) must be obtained by the customer.

Cautions for Selecting Products

This document explains the representative features of the products. It does not cover all information, such as restrictions in usage and the combined use of units. Be sure to read the manual of the product before selecting it.

We are not responsible for any damage caused by reasons which are not attributable to our company, damage to machinery at the customer's site caused by the malfunctioning of our products, loss of profits, damage caused by special circumstances, regardless of it was foreseeable by our company, secondary damage, compensation for accidents, damage to things other than our products, and other agreements with your business.

⚠️ Cautions Regarding Safety

● Please read all manuals and instructions carefully before use to ensure safety and proper use of the product.
● The operating environment shall be within the range specified in the catalog, the manuals, and the instructions. Do not use the products in the following environments: high temperatures, high humidity, dust, corrosive gas, many vibrations, and shocks. This may cause fires, malfunctioning, electrical shocks, and erroneous operations.
● Follow the manuals and the instructions while the installing the products and wiring to ensure safety. The set up should be conducted by qualified people with special skills in electrical work and wiring. Please be sure to prevent contamination from foreign articles.
● Some of the products in this catalog have restrictions on usage and usage location and require routine inspection. Please inquire with the retail store where you purchased them or our company.
● These products are manufactured under strict quality control. However, if they are intended for use at important facilities where human lives may be lost if a malfunction occurs, or at facilities where significant loss can be predicted, install safety devices to prevent major accidents.

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ISO 14001
JQA-EM5428

ISO 9001
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The HX series controllers are produced at the
factory registered under the ISO 14001 standard for
environmental management system and the ISO
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