HITACHI

HITACHI PROGRAMMABLE CONTROLLER

H series

Acceleration to the Apex of Pro with all Required Functions Inte the Next Generation.

H series

H-2002 H-2000

- Large capacity, high processing speed, high performance and high reliability.
- The performance is exhibited in large scale system control.
- Up to 2048 (with 32 point module) or 4096 (with 64 point module) inputs/outputs.
- Up to 48.5 k steps of program memory capacity when RAM-48H is used.

H-1002

- Up to 1344 (with 32 point module) or 2688 (with 64 point module) inputs/outputs.
- Up to 48.5 k steps of program memory capacity when RAM-48H is used.

H-702 H-700

- Best suited for medium scale system control.
- Processing speed and functions are equal to a higher class PC.
- A building block system copes flexibly with system needs.
- Up to 640 (with 32 point module) or 1280 (with 64 point module) inputs/outputs.
- Up to 15.7 k steps of program memory capacity when RAM-16H is used.

grammable Controller (PC)
grated for FA Trends of

H-302
H-300

- **Copes with small or medium scale system needs.**
- **Building block system.**
- **Up to 288 (with 32 point module) or 576 (with 64 point module) inputs/outputs.**
- **Up to 7.6 k steps of program memory capacity when RAM-08H is used.**

Enhance CPU type H-302/702/1002/2002 has specifications as follows.

Design concept of enhancement.

1) Improve performance and functions
   - Processing speed up: 15 to 20% up.
   - Faster CPU's start-up time: half of current time.
   - Faster program change time during RUN.
   - Additional commands: PID function.
     Trigonometrical function.
     ASCII code conversion.
     Function module supporting.
   - Additional Task codes: Monitor Task code for Time chart & Trace.
     Task code without occupation.
   - Additional functions: Clock function.
     Serial port I/F.
     Alternative RUN/ERR contact.
2) Basically, keep upward compatibility against current H-series.
   - Enhance CPU has upward compatibility of user's program.
   - Enhance CPU doesn't affect the other modules.

H-200

- **Cope with small scale system needs.**
- **FA system is built up economically, easily and freely.**
- **Programmers are the same as for H series.**
- **2 programming languages are available: command, ladder diagram.**
- **Up to 256 (with 16 point module) inputs/outputs.**
- **Up to 7.6 k steps of program memory capacity.**

Please see the H-200 Catalog (No. SI-E099Q)

All modules have been reviewed and innovated by using the latest technology.

Compact and lightweight

- 480 mm W x 210 mm H x 140 mm D with basic 9 modules

Functions selected by key switches

- CPU can be operated by peripherals at local station in remote mode

Mount base

- 6 different mount bases usable for any of H-2002 ~ H-300 to achieve optimum I/O combination. 3 mount bases for CPU having 9, 5 and 2 I/O slots and 3 mount bases for I/O expansion having 11, 7 and 4 I/O slots.

Power supply module

- For either 85 ~ 132 V AC or 170 ~ 264 V AC by changing over on the terminal block.
- Internal power supply of 24 V DC for relays is incorporated.

High function module

- A wide variety of system compositions is facilitated by 15 different high function modules coping with various needs.

Terminal block cover

- LED provided
- Removable
- Mountable on panel

Input/output module

- Abundant AC, DC and transistor input/output modules.
- Compact design with highly integrated components.
- I/O modules are easily distinguished by color.

Communicating function modules

(CPU linkage module)

- All CPUs on the linkage can be monitored at a single place.
- Link connection for up to 64 CPUs.

(Remote I/O module)

- Remote I/O connectable for any CPU on the linkage.
- 10 local stations per master station and up to 4 master stations per CPU, or a total of 40 stations.

(Intelligent serial port module)

- Connectable to peripheral, personal computer or host with interface of RS-232C or RS-422 port. 32 units of H series can be monitored by one personal computer.

CPU module

- High processing speed computation, thereby satisfying higher processing speed requirements.
- 6 models of the same dimensions facilitate upgrading the system.

(H-2002, H-1002, H-702 and H-302)

- PID function
- Clock function

Error code display

- The contents of error are displayed in a code of 2 digits. PC status can be judged easily.

Serial port I/F

(H-2002, H-1002, H-702 and H-302)

- Connectable to peripheral, personal computer or host with interface of RS-232C.

Memory cassette

- Battery backup memory

(H-2002/H-1002/H-702/H-302)

- ROM 48k step memory cassette

System Composition (H-300 ~ H-2002)

A Wide Variety of System Configurations through Full Utilization of the Merit of Series

CPU module	
	CPU-20Hα 2048 points CPU-07Hα 640 points CPU-03Hα 288 points
Enhance CPU	CPU2-20H input/output 2048 points CPU2-10H input/output 1344 points CPU2-07H input/output 640 points CPU2-03H input/output 288 points

Memory cassette	
	RAM-04H (3.5 k steps) RAM-08H (7.6 k steps) RAM-16H (15.7 k steps) RAM-48H (48.5 k steps) ROM-16H (15.7 k steps)
For Enhance CPU	<RAM> RAM2-04H (3.5 k steps) RAM2-08H (7.6 k steps) RAM2-16H (15.7 k steps) RAM2-48H (48.5 k steps) <RAM for fast program change during RUN> RAM3-08H (7.6 k steps) RAM3-16H (15.7 k steps) RAM3-48H (48.5 k steps) <ROM> ROM2-16H (15.7 k steps) ROM2-48H (48.5 k steps)

RS-232C
(HI-PROTOCOL)

RS-232C
[H-302 / 702 / 2002
(non-protocol)

Power supply module

AVRC-04H (output 5 V DC 4 A, 24 V DC 2 A)
AVRC-08H (output 5 V DC 9 A, 24 V DC 1 A)
AVR-04DH (input 24 V DC, output 5 V DC 4 A, 24 V DC 1.5 A)
AVR-08DH (input 24 V DC, output 5 V DC 9 A, 24 V DC 0.5 A)

Programmer

Character programmer
PGM-CHH

Handy graphic programmer
PGM-GPH

Programmer connection cable

PGCB02H (2 m)
PGCB05H (5 m)

Personal computer

Audio cassette

Option interface

PFMIF1H

Serial printer

EPROM memory

ROMIC-01H

Input/output controllers

IOC-01H for expansion of H-700 – H-2002

Note: The I/O controller most suited for a combination of H-702 and H-2002 is IOC-01H revision "F" onward.
Customers using revision "A" through "E" are asked to contact their nearest Hitachi representative.

Programming software

HL-AT3E

Ladder editor for IBM computer.

ACTSIP-H (ladder)/
ACTGRAPH+(grafcet):
by ACTRON AB
HPROG (ladder) by LOGITEK S.A.

Mount base

<Mount base for CPU>	<Mount base for I/O expansion>
BSU-09H (9 slots) BSU-05H (5 slots) BSU-02H (2 slots)	EXU-11H (11 slots) EXU-07H (7 slots) EXU-04H (4 slots) <For remote master station> BEU-04H (4 slots)

Expansion cable

<CPU — expansion>	<Expansion — expansion>
CBL-05H (0.5 m) CBL-10H (1 m) CBL-20H (2 m) CBL-40H (4 m)	CBE-05H (0.5 m) CBE-10H (1 m) CBE-20H (2 m) CBE-40H (4 m)

Input/output module

Input module		Output module	
AC input	XAC10AH (16 points, 100 V AC) XAC10BH (32 points, 100 V AC) XAC20AH (16 points, 200 V AC) XAC20BH (32 points, 200 V AC)	Contact output	YRY20AH (16 points, 240 V AC, 24 V DC) YRY20BH (32 points, 240 V AC, 24 V DC)
AC/DC input	XDC24AH (16 points, 12/24 V AC, DC) XDC24BH (32 points, 12/24 V AC, DC) XDC48AH (16 points, 48 V AC, DC) XDC48BH (32 points, 48 V AC, DC)	Isolated contact output	YDR20AH (16 points, 240 V AC, 24 V DC)
High speed DC input	XHS24BH (32 points, 12/24 V DC) XDC12DH (64 points, 12 V DC) XDC24D2H (64 points, 24 V DC)	Triac output	YSR20AH (16 points, 100 – 240 V AC) YSR20BH (32 points, 100 – 240 V AC)
TTL input	XTT05BH (32 points, 3 – 15 V DC)	Transistor output (sink load)	YTR48AH (16 points, 24/48 V DC) YTR48BH (32 points, 24/48 V DC) YTR24DH (64 points, 12/24 V DC)
Interrupt input	XINT0AH (16 points, 12/24 V DC)	Transistor output (source load)	YTS48AH (16 points, 24/48 V DC) YTS48BH (32 points, 24/48 V DC) YTS24DH (64 points, 12/24 V DC)
		TTL output	YTT05BH (32 points, 4 – 15 V)

Analog module

Analog input module	Analog output module
XAGV08H (0 – +10 V DC 8 bit, 8 channels) XAGC08H (4 – 20 mA 8 bit, 8 channels) XAGV12H (–10 – +10 V DC 12 bit, 8 channels) XAGC12H (4 – 20 mA 12 bit, 8 channels)	YAGV08H (0 – +10 V DC 8 bit, 4 channels) YAGC08H (4 – 20 mA 8 bit, 4 channels) YAGV12H (–10 – +10 V DC 12 bit, 4 channels) YAGC12H (4 – 20 mA 12 bit, 4 channels)
RTD module	
XRTD01H (–50 – 400°C, 8/4 channels)	

Communication function module

CPU linkage	LINK-H (coaxial cable) OLINK-H (optical fiber cable)	Remote I/O (local station)	REM-LOH (coaxial cable) REM-MMH (twisted pair cable)
Remote I/O (Master station)	REM-MAH (coaxial cable) REM-MMH (twisted pair cable)	COMM	COMM-H (RS-232C × 1, RS-422 × 1)
		GPIB	GPIB-H (GPIB × 1)

High function modules

Counter	XCU001H (high-speed counter) XCU232H (2-channel counter) CLOCK-H (real time clock)	BASIC	BASIC-H (RS-232C × 4)
		Serial I/O	SIO-H (RS-232C × 1, RS-422 × 1)
Positioning	POSIT-H (1-axis positioning) POSIT-2H (2-axis positioning) POSITA2H (2-axis analog positioning)	ASCII	ASCII-H (for CRT, printer)

Others

LIBAT-H (lithium battery)	DUMMY-H (PI/O dummy module)

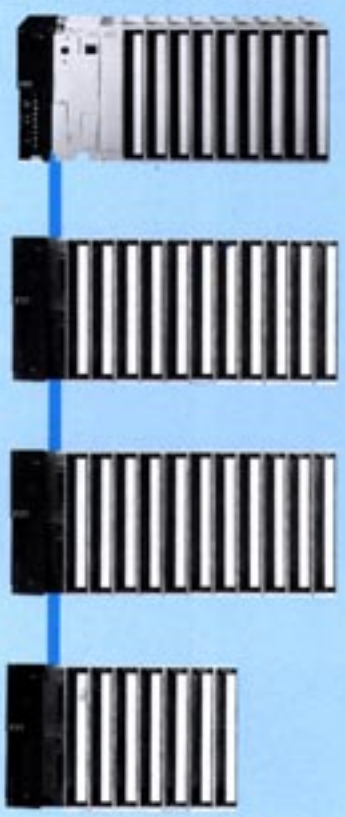
System configuration

- A system coping with single to multiple function machine control can be composed by a building block method.
- Possible to put in a minimum space in 19 inch rack . . . up to 9 modules can be mounted on the mount base for CPU or up to 11 modules on the mount base for the I/O expansion.
- A combination of different mount bases enables building up efficiently and compactly a system having as many inputs and outputs as required.

Unit configurations for different numbers of inputs/outputs

H-2002 H-2000

Input/output point:
Max. 2048 (4096)
〈Max. 64 I/O slots〉



1,216 (2,432) points

2,048 (4,096) points

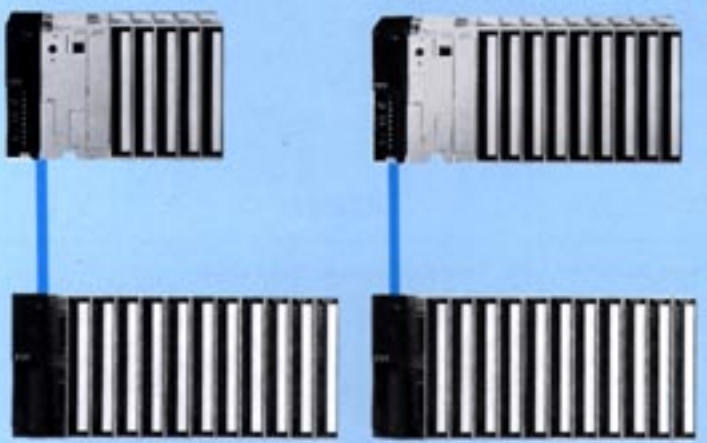
H-1002

Input/output point:
Max. 1344 (2688)
〈Max. 42 I/O slots〉

1,344 (2,688) points

H-702
H-700

Input/output point: Max. 640 (1280)
〈Max. 20 I/O slots〉



512 (1024) points

640 (1280) points

H-302
H-300

Input/output point: Max. 288 (576)
〈Max. 9 I/O slots〉

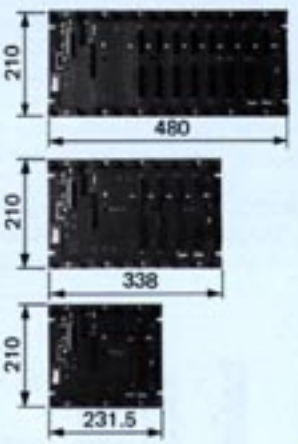
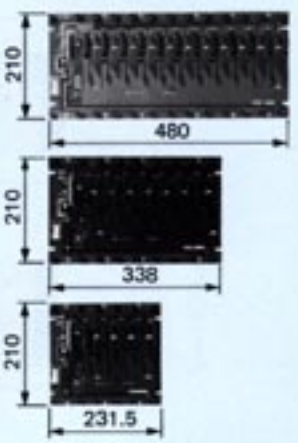
64 (128) points

160 (320) points

288 (576) points

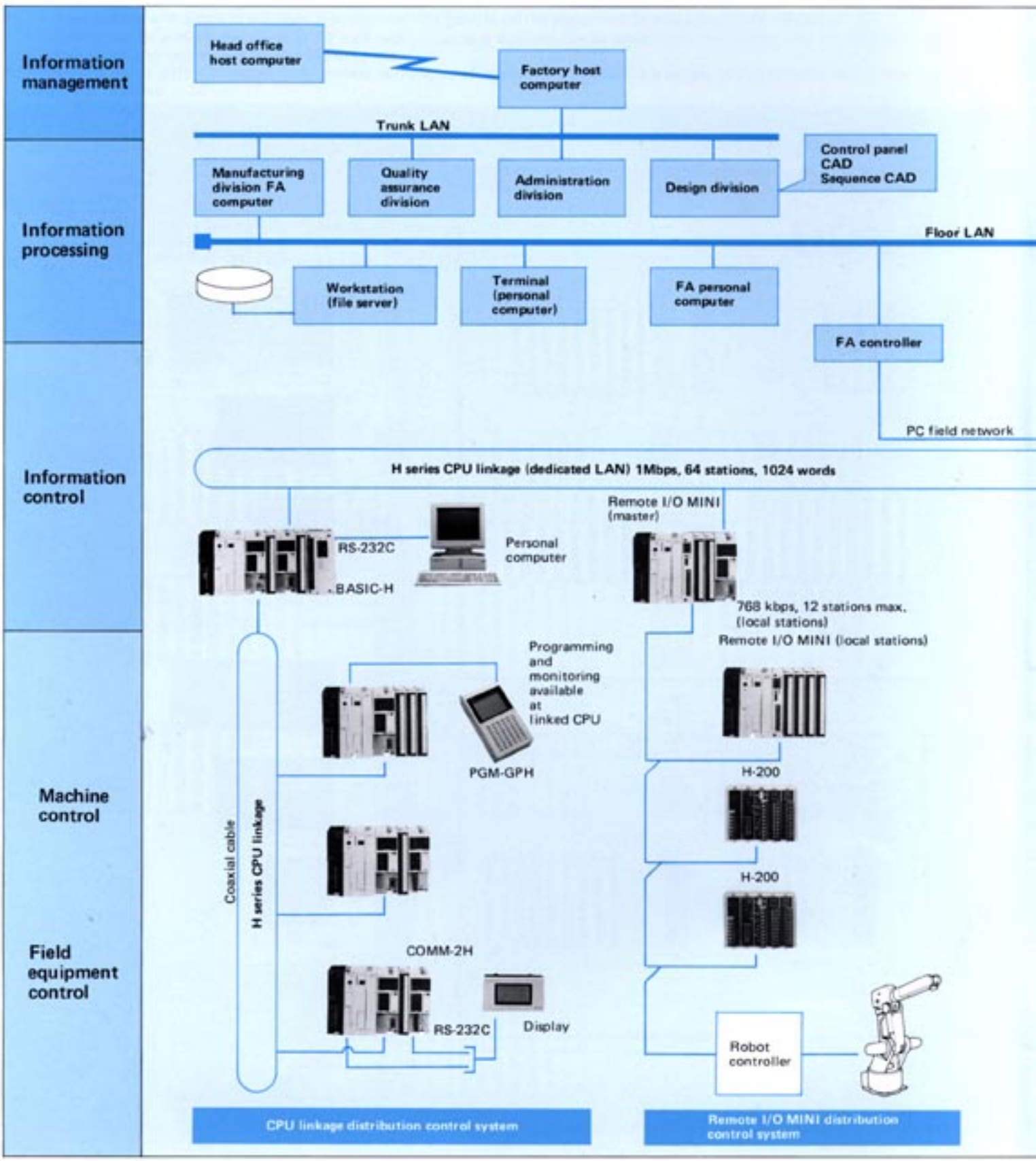
* Number in ( ) is for when 64 points module is used.

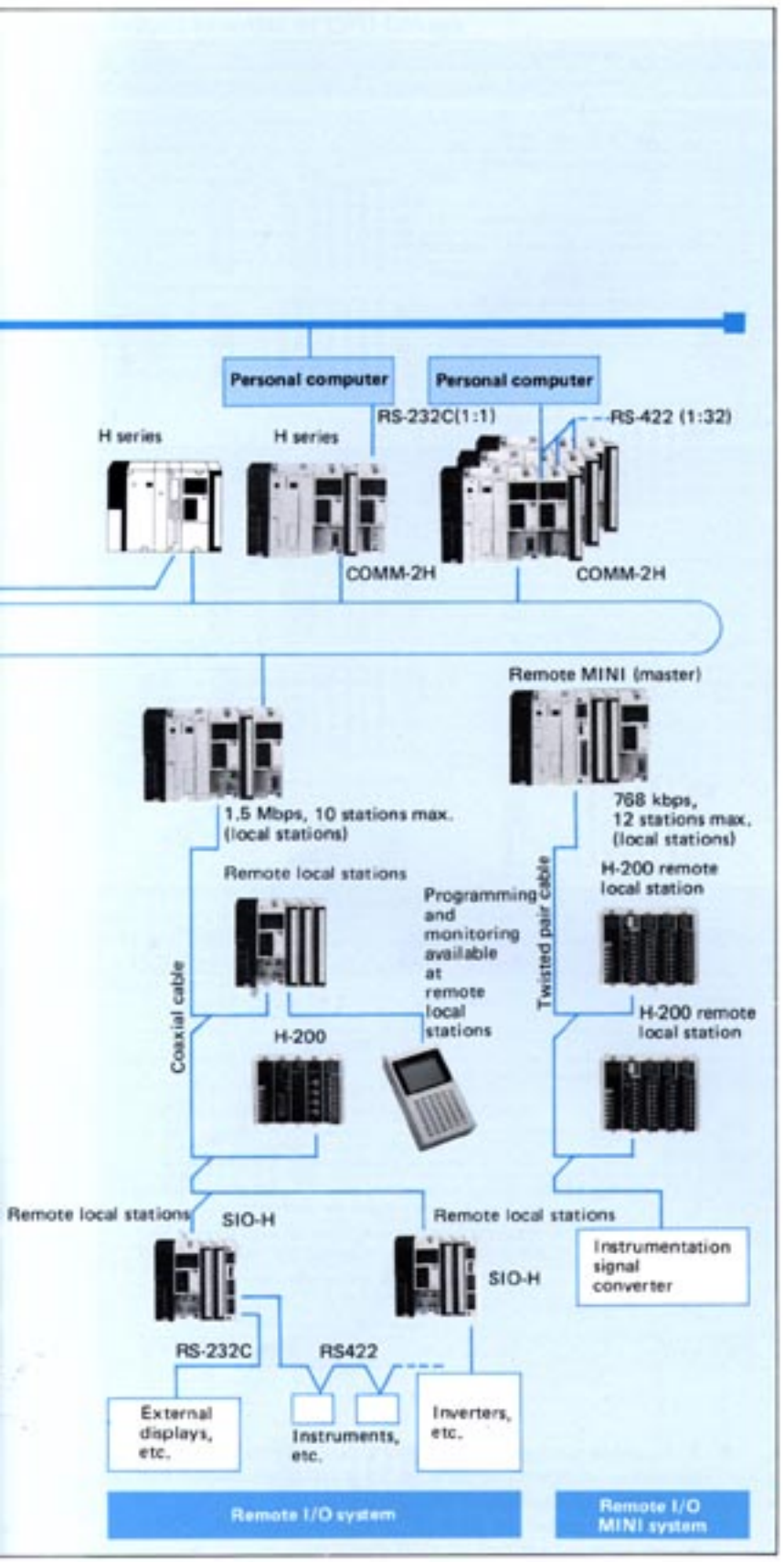
H-2002 ~ 300 mount base

Dimensions in (mm)	Number of input/output modules mounted
Mount base for CPU 	9 5 2
Mount base for I/O expansion 	11 7 4

Network Systems

Meeting the Need of Hierarchical and Distributed FA Systems with Flexible Networking





Features

1. Up to 64 CPU units can be connected in CPU linkage to compose a large scale system.

2. Coaxial remote I/O system is composed of one master station and up to 10 local stations connected in series. Up to 4 master stations are mountable for one CPU. System risk distribution and centralized control distribution for management are easily available without excessive wiring work.

3. Remote I/O MINI is composed of one master station and up to 12 local stations connected in series. Master station is mountable up to the number of available slots.Distribution and centralized control are easily realized by using low cost twisted pair cable.

4. Peripherals are connectable to all local stations of a remote I/O. Monitoring and programming are available on a remote station, whereby the maintainability and system startup capability are excellent.

5. Intelligent serial port (COMM-2H): RS-232C and RS-422 are provided. RS-422 permits connecting up to 32 Programmable Controllers.

Communicating function module

Specifications of CPU linkage module

Item	Description
	Coaxial linkage
Baud rate	1.0 Mbps
Transmission system	Half duplex bit serial
Synchronization system	Frame synchronization
Transmission path system	Loop system
Number of transmission points	32,768 points/2048 words
Number of connected CPU modules	Up to 64 modules/linkage, up to 2 links/CPU
Maximum cable length	0.5 km between modules, 1.0 km totally
Applicable cable	5D-2V shielded coaxial cable 50 Ω
Internal current consumption	5 V DC 0.8 A

Specifications of intelligent serial port (COMM-2H) module

Item	Description	
Baud rate	300/600/1200/2400/4800/9600/19,200/ bps (selectable by switch)	
Interface	RS-232C	RS-422
Synchronization system	Start-stop	
Maximum cable length	15 m	250 m
Connection aspect	1 : 1	1 : 32 max.
Transmission code	ASCII	
Protocol	Protocol for H series	
Applicable cable	12 pairs of twisted shielded wires	2 pairs of twisted shielded wires
Maximum message length	503 byte/message	
Occupying I/O points	32 (2 slots)	
Internal current consumption	5 V DC 0.8 A	

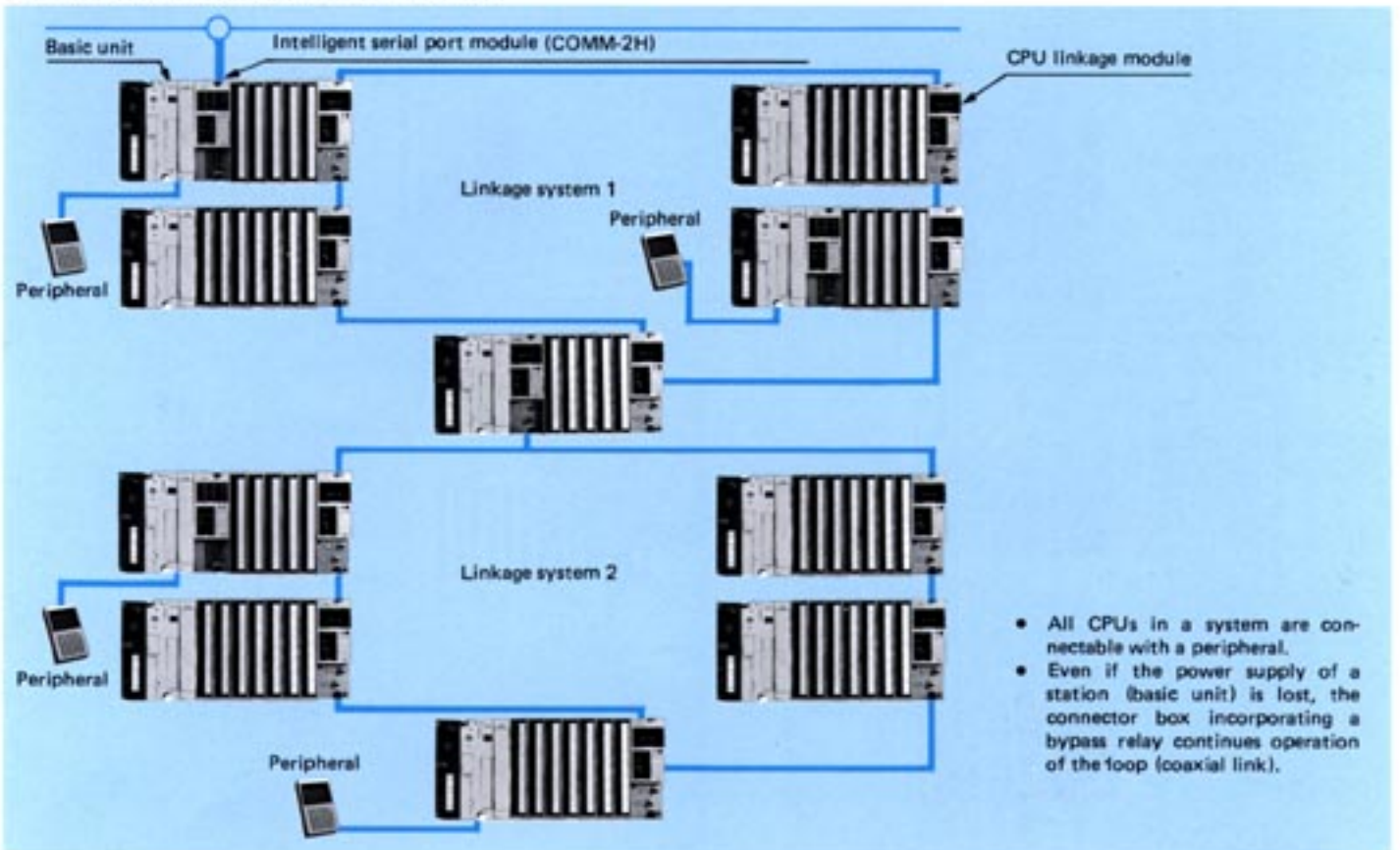
Remote I/O module

Item		Coaxial remote I/O		Remote I/O MINI	
		Master station	Local station	Master station	Local station
Applicable model		H-2002 ~ H-300		H-2002 ~ H-300	H-2002 ~ H-300
Type		REM-MAH	REM-LOH	REM-MMH	REM-LMH (H-2002 ~ H-300) REM-LH2 (H-200) RIOH-TL (H-200)
Baud rate		1.5 Mbps		768 kbps	
Transmission system		Half duplex serial transmission, polling system			
Number of transmission points	Indirect refresh method	–		Up to 1024 inputs/1024 outputs per master station	
	Direct refresh method	Up to 512 inputs/outputs per master station		Up to 64 inputs/64 outputs, 128 inputs or 128 outputs per master station	
Number of connectable local stations		Up to 4 master stations per basic unit (CPU). 10 local stations per master station.		Master station is mountable up to the number of available slots. 12 local stations per master station.	
Max. transmission distance		500 m between modules, total 500 m		150 m between modules, total 150 m (0.3 mm^2 cable) 300 m between modules, total 300 m (0.75 mm^2 cable)	
Applicable employed cable		5D-2V shielded coaxial cable		Shielded twisted pair cable (0.3 mm^2 or 0.75 mm^2)	
Occupying I/O points and slots		0 point/2 slots		Max. 128 points/1 slot	
Internal current consumption		5 V DC, 0.6 A	5 V DC, 1.6 A	5 V DC, 0.15 A	5 V DC, max. 0.15 A

- Because a bypass function (connector box incorporating bypass relay) is provided, even if the power supply of a local station on the line is lost, communication with another local station is available.
- A troubled point is easily found at a remote I/O master station . . . contents of an error of a troubled station can be monitored on the master station display.
- The total number of external inputs and outputs is that of master station plus that of local stations.

System example of CPU linkage

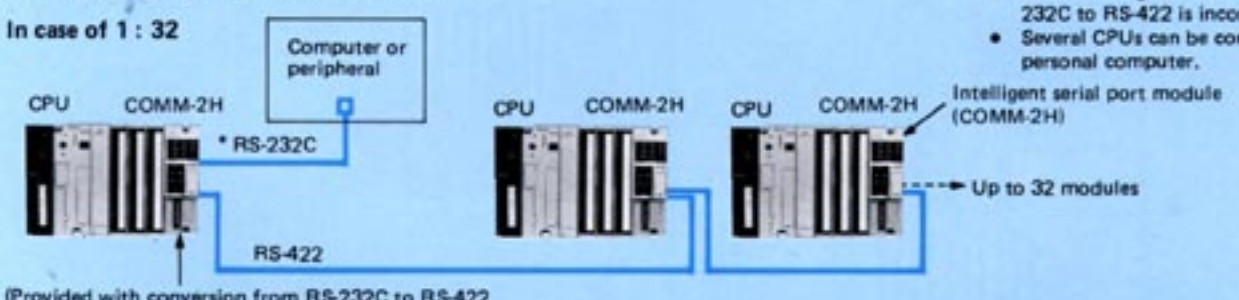
- Up to 2 CPU linkage modules per basic unit (CPU) are mountable.
- Up to 64 CPUs are connectable in one loop.



- All CPUs in a system are connectable with a peripheral.
- Even if the power supply of a station (basic unit) is lost, the connector box incorporating a bypass relay continues operation of the loop (coaxial link).

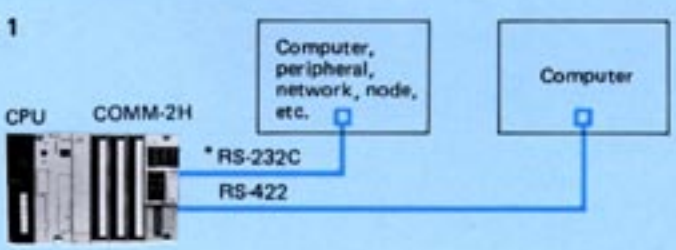
System example of COMM module

In case of 1 : 32



- A converting function from RS-232C to RS-422 is incorporated.
- Several CPUs can be connected by personal computer.

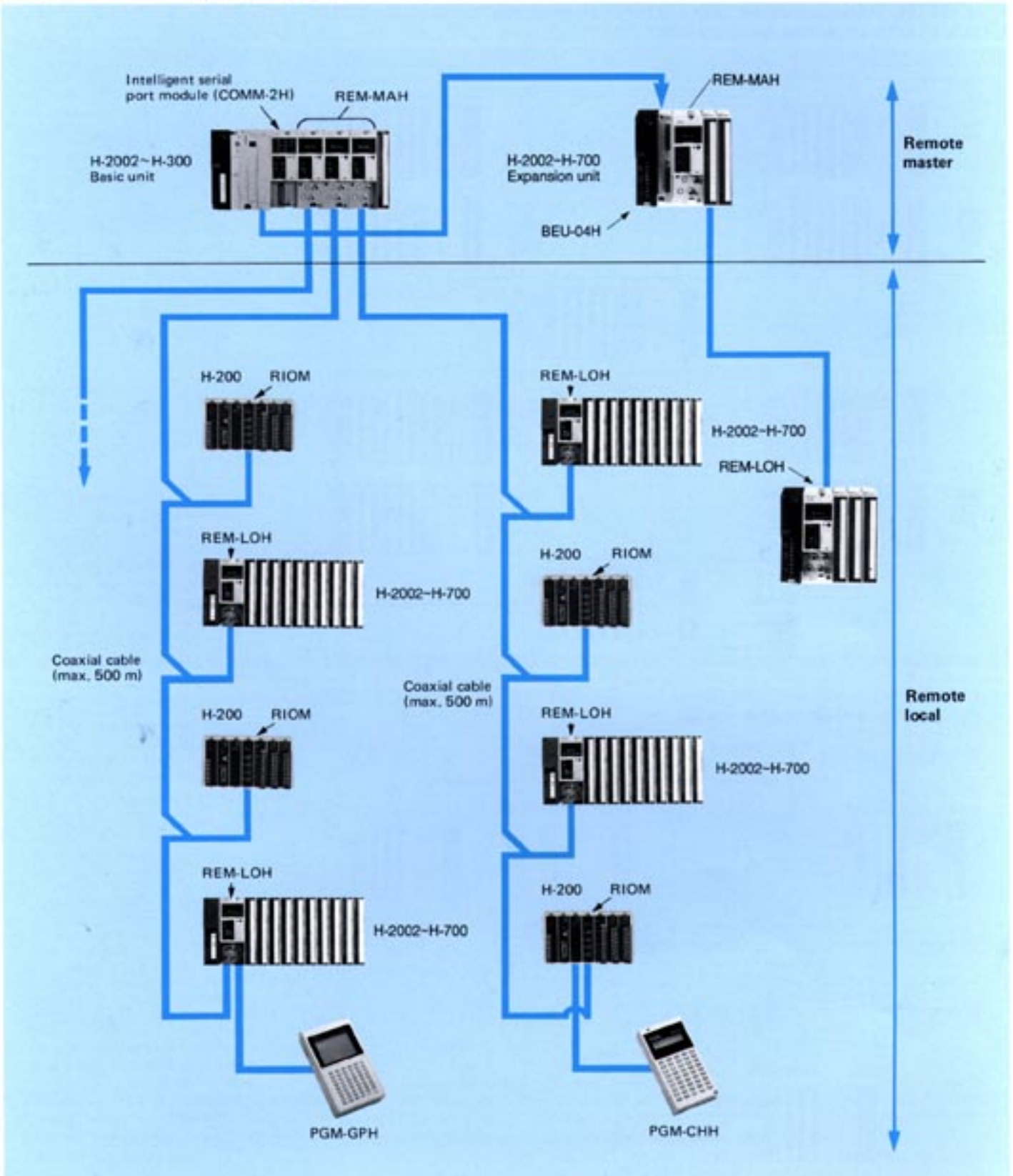
In case of 2 : 1



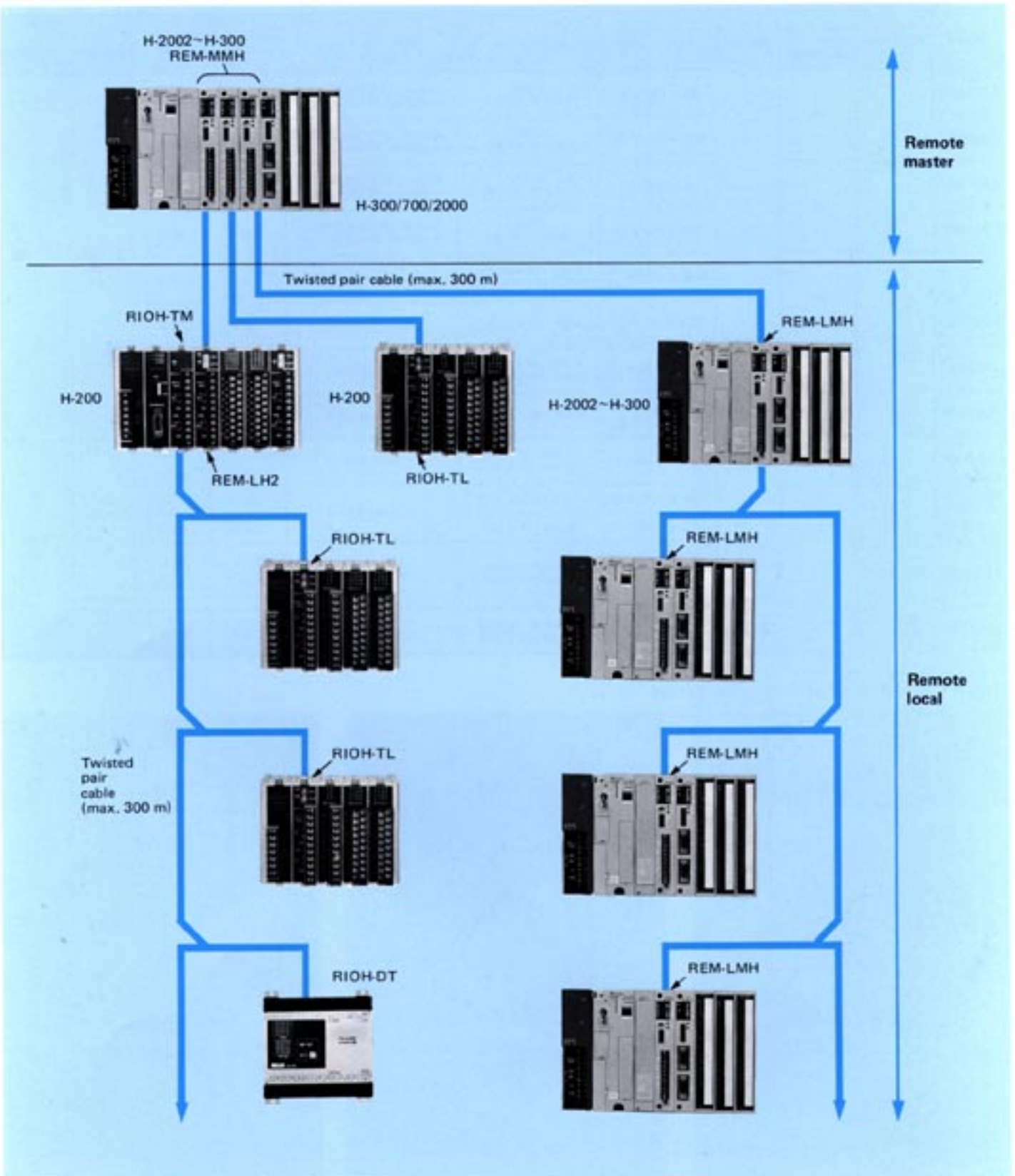
- Monitoring on 2 computers is available.
- Communication error monitor and display functions are substantiated, thereby improving the debug efficiency of personal computer software.

* Exclusive cable for the connection through RS-232C.

System example of coaxial remote I/O



System example of remote I/O MINI

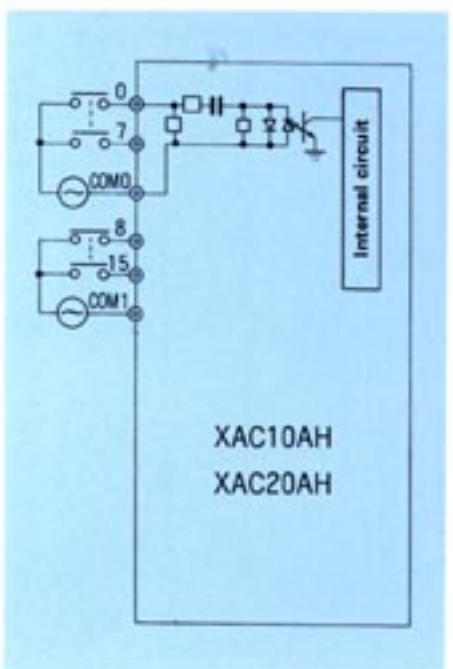


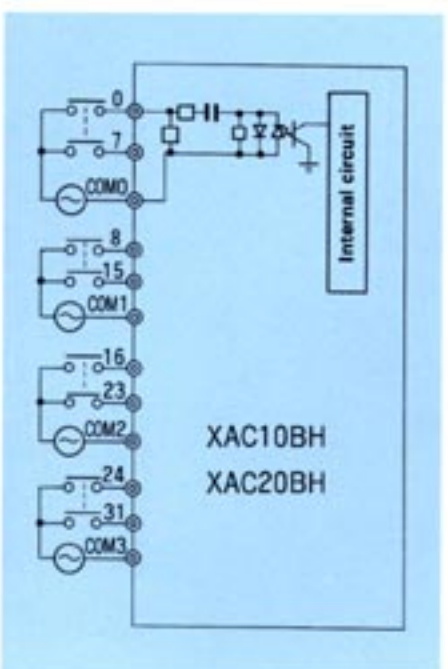
Input modules

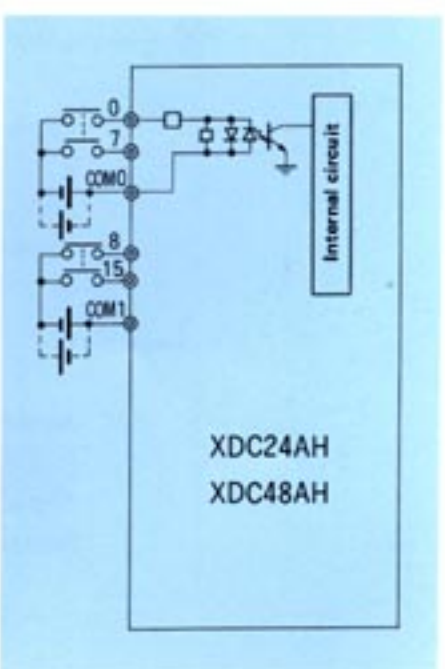
Specifications

Model	Input type	Number of points per module	Isolation	Input voltage	Input current	Input impedance	Operating voltage		Input response time	
							Minimum ON voltage	Maximum OFF voltage	ON → OFF	OFF → ON
XAC10AH	AC input	16	By photo-coupler	85 ~ 132 V AC	6 mA (100 V 50 Hz)	Approx. 17 kΩ at 50 Hz or approx. 15 kΩ at 60 Hz	75 V	30 V	16 ms max.	16 ms max.
XAC20AH				170 ~ 264 V AC	7 mA (200 V 50 Hz)	Approx. 31 kΩ at 50 Hz or approx. 26 kΩ at 60 Hz	150 V	60 V		
XAC10BH		32		85 ~ 132 V AC	6 mA (100 V 50 Hz)	Approx. 17 kΩ at 50 Hz or approx. 15 kΩ at 60 Hz	75 V	30 V		
XAC20BH				170 ~ 264 V AC	7 mA (200 V 50 Hz)	Approx. 31 kΩ at 50 Hz or approx. 26 kΩ at 60 Hz	150 V	60 V		
	AC/DC input	16		10.8 V ~ 30 V AC/DC	5 mA (12 V AC/DC) 10 mA (24 V AC/DC)	Approx. 2.2 kΩ	9 V	3.6 V		
XDC48AH				33 V ~ 60 V AC/DC	6 mA (48 V AC/DC)	Approx. 8.2 kΩ	28 V	9 V		
XDC24BH		32		10.8 V ~ 30 V AC/DC	5 mA (12 V AC/DC) 10 mA (24 V AC/DC)	Approx. 2.2 kΩ	9 V	3.6 V		
XDC48BH				33 V ~ 60 V AC/DC	6 mA (48 V AC/DC)	Approx. 8.2 kΩ	28 V	9 V		
XHS24BH	DC input			10.8 V ~ 30 V DC	5 mA (12 V DC) 10 mA (24 V DC)	Approx. 2.2 kΩ	9 V	3.6 V	1 ms max.	1 ms max.
XDC12DH		64		10.8 V ~ 15 V DC	3 mA (12 V DC)	Approx. 3.9 kΩ				
XDC24D2H				21.6 V ~ 30 V DC	6 mA (24 V DC)		18 V	7.2 V		
XTT08BH	TTL input			3 ~ 15 V DC	6 mA (5 V, input signal ON time)	Approx. 820 Ω	1.5 V (when 5 V is supplied externally)	3.5 V		
XINTOAH	Interrupt input	16		10 ~ 30 V DC	5 mA (12 V DC) 10 mA (24 V DC)	Approx. 2.2 kΩ	9 V	3.6 V		

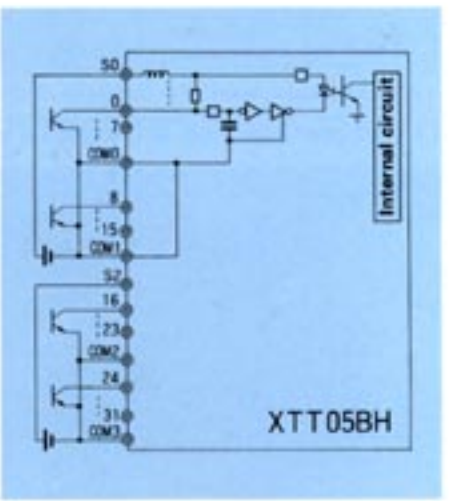
Circuit configuration and external wiring

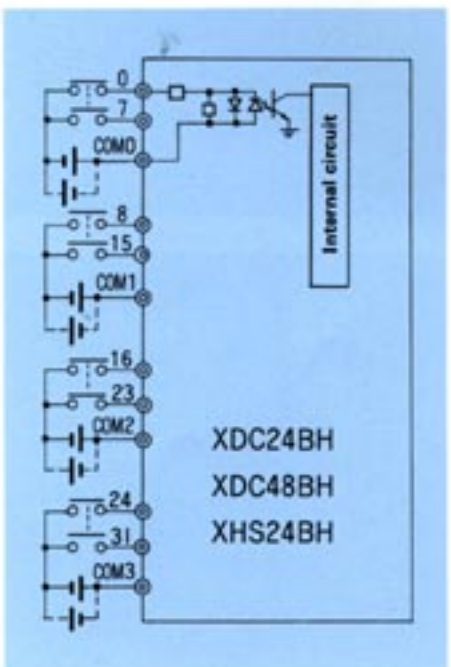


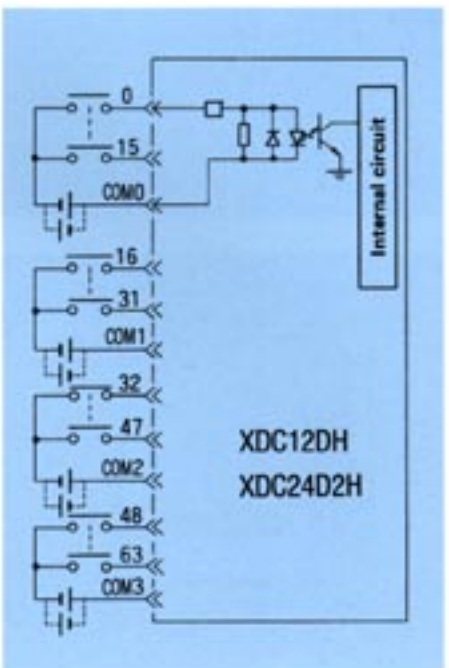


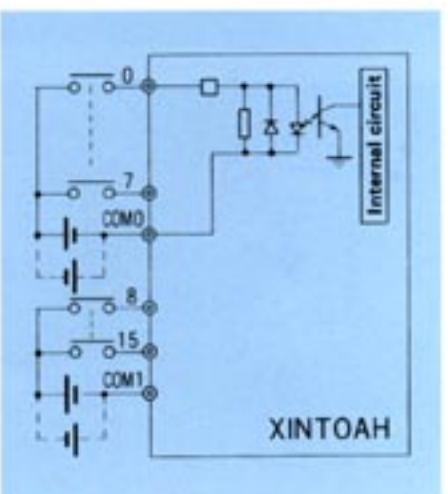


	Input display	External connection	Number of common connections	Polarity and logic	Internal current consumption	External power supply to be prepared by user.	Applicable to:
	by LED	Removable terminal block	2	Nonpolarity, positive	0.12 A	Not required	H-2002 H-2000 H- 702 H- 700 H- 302 H- 300
					0.12 A		
			4		0.15 A		
					0.15 A		
			2		0.12 A		
					0.12 A		
			4		0.15 A		
					0.15 A		
					0.15 A		
		40 pin connector × 2			0.3 A		
		Removable terminal block	4 (2) common internally	Negative common, negative logic	0.35 A (at 5 V DC)	4 ~ 16.5 V DC	
			2	Nonpolarity, positive	0.15 A	Not required	







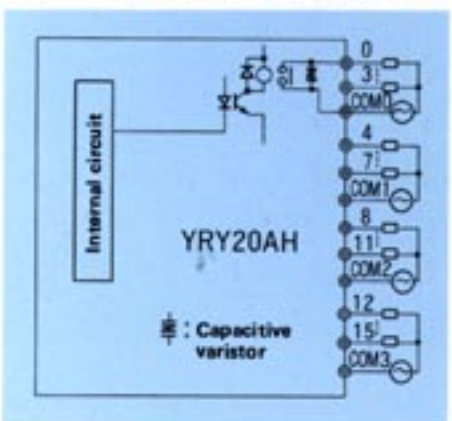


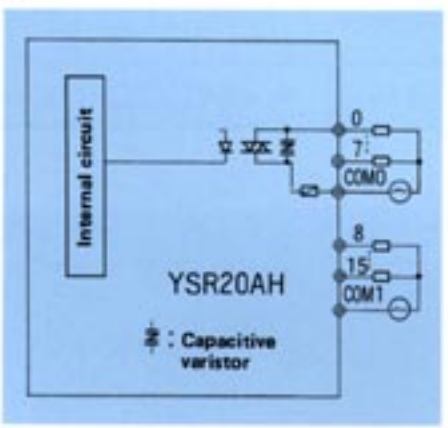
Output modules

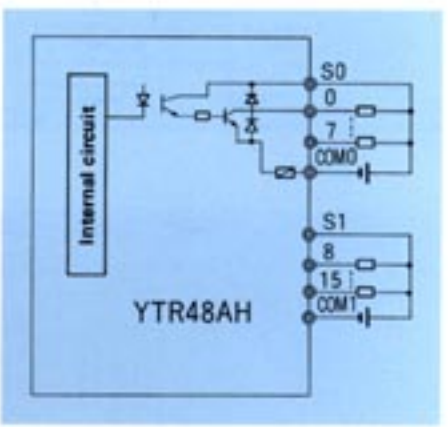
Specifications

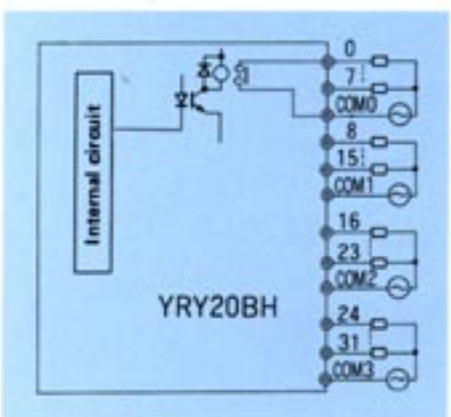
Model	Output type	Number of points per module	Isolation	Rated load voltage	Minimum ON/OFF voltage and current	Maximum load current	
						1 point	1 common
YRY20AH	Contact output	16	By photo coupler	240 V AC 24 V DC	5 V DC, 1 mA except after turning on or off large current	2 A (COSφ=1) 0.5 A (COSφ=0.4)	5 A (COSφ=1) 2A(COSφ=1) 0.5A(COSφ=0.4)
YRY20BH		32					
YDR20AH	Isolated contact output	16					
YSR20AH	Triac output	16		100 V ~ 240 V AC	3 mA (240 V AC)	1.7 A	3.2 A
YSR20BH		32				1.0 A	1.6 A
YTR48AH	Transistor output (sink load)	16		24/48 V DC	1 mA	2.0 A	5 A
YTR48BH		32				0.7 A	2 A
YTR24DH		64		12/24 V DC		0.1 A	0.4 A
YTS48AH	Transistor output (source load)	16		24/48 V DC		2.0 A	5.0 A
YTS48BH		32				0.7 A	2 A
YTS24DH		64		12/24 V DC		0.1 A	0.4 A
YTT05BH	TTL output (source load)	32		4 V ~ 15 V DC		20 mA	160 mA

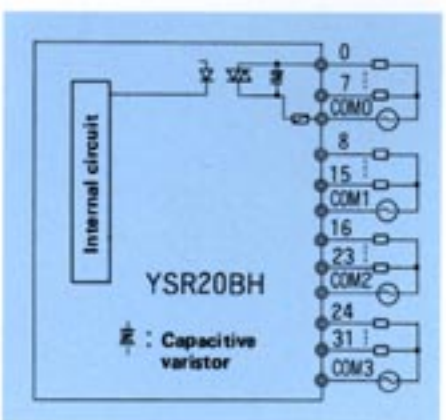
Circuit configuration and external wiring

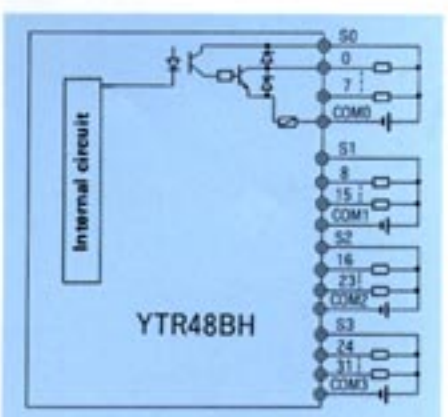






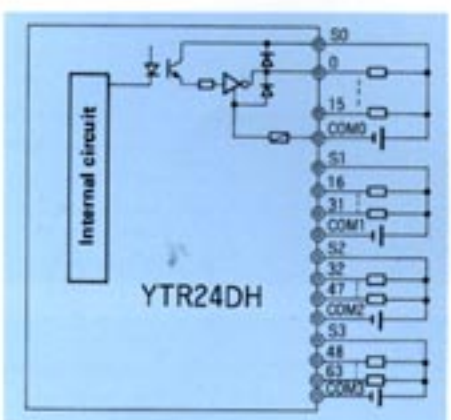


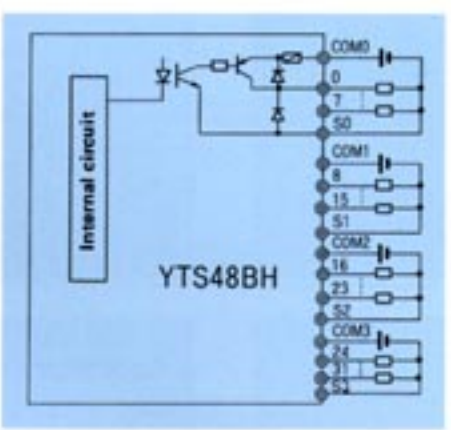


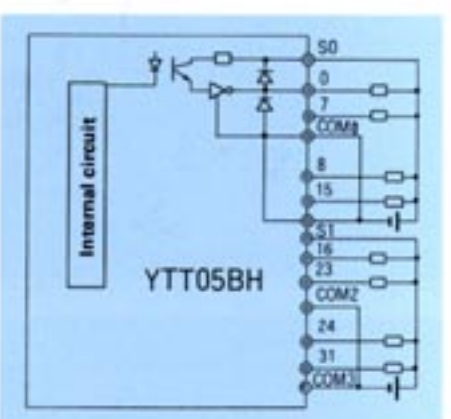


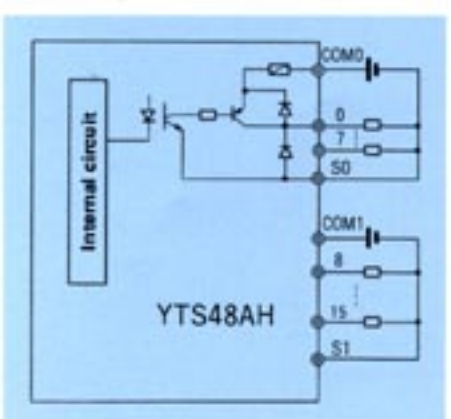
Output response time		Display output	External connection	Leakage current	Number of common points	Surge absorber	Fuse	Internal current consumption	(Note 1) External power supply (to be prepared by user)	Applicable to:
OFF→ON	ON→OFF									
7 ms max.	12 ms max.	by LED	Removable terminal block	1 mA (264 V AC, 60 Hz)	4	Varistor	No	0.12 A (5 V DC) 0.16 A (24 V DC)	Not required	H-2002 H-2000 H- 702 H- 700 H- 302 H- 300
				No		No		0.18 A (5 V DC) 0.27 A (24 V DC)		
					16			0.12 A (5 V DC) 0.16 A (24 V DC)		
1 ms max.	1/2 cycle + 1 ms max.			1 mA (264 V AC, 60 Hz)	2	Varistor	5 A	0.38 A (5 V DC)		
					4			0.57 A (5 V DC)		
0.3 ms max.	1 ms max.			1 mA	2	Diode	7.5 A	0.12 A (5 V DC)		
					4		5 A	0.18 A (5 V DC)		
1 ms max.	1 ms max.		40 pin connector x 2	0.5 mA			1 A	0.38 A (5 V DC)		
0.3 ms max.	1 ms max.		Removable terminal block	1 mA	2		7.5 A	0.12 A (5 V DC)		
					4		5 A	0.18 A (5 V DC)		
1 ms max.	1 ms max.		40 pin connector x 2	0.5 mA			1 A	0.38 A (5 V DC)		
			Removable terminal block	50 μA	4 (Note 2)		No	0.18 A (5 V DC)	———	

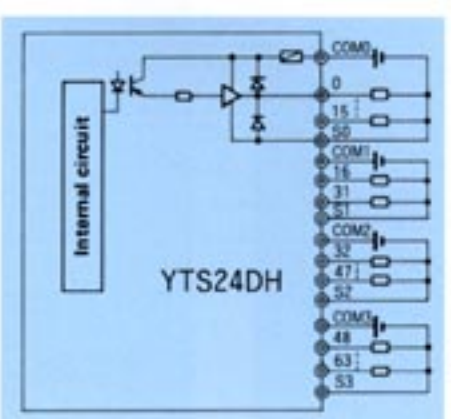
Note: 1. Prepare an output drive power supply separately.
Note: 2. 2 commons connected inside.

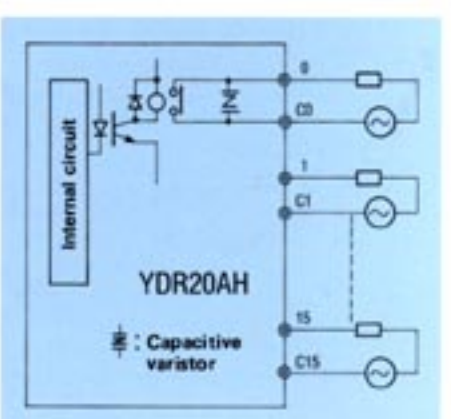












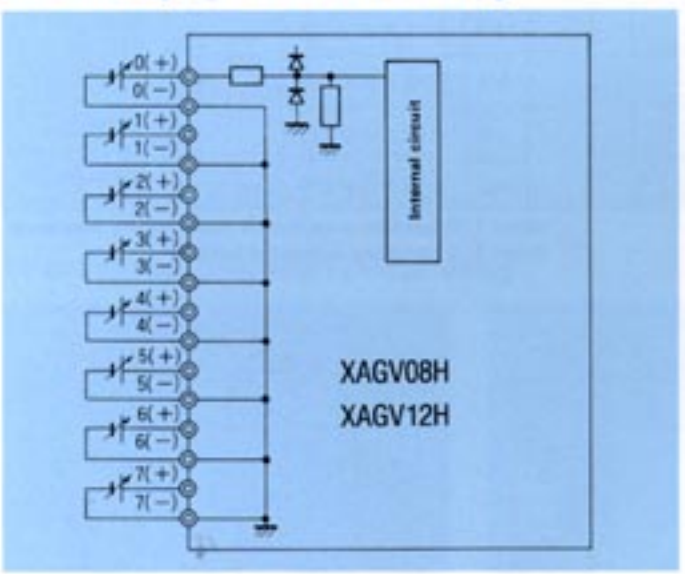
Analog input/output modules

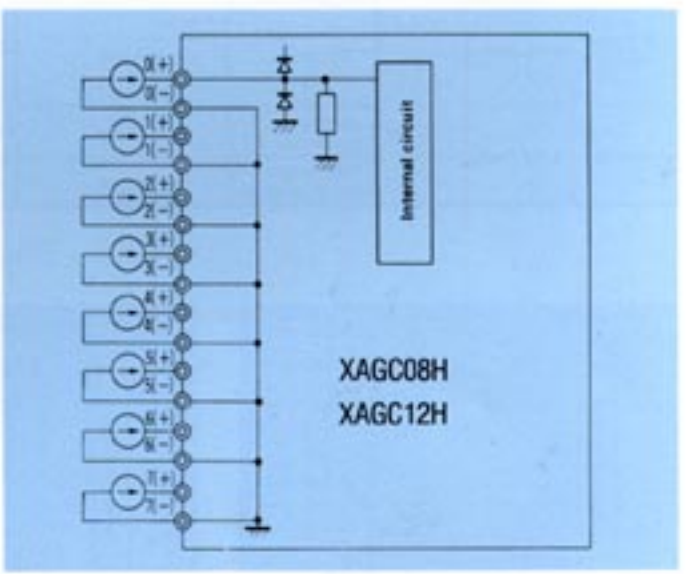
Data direct access (no special command is required).

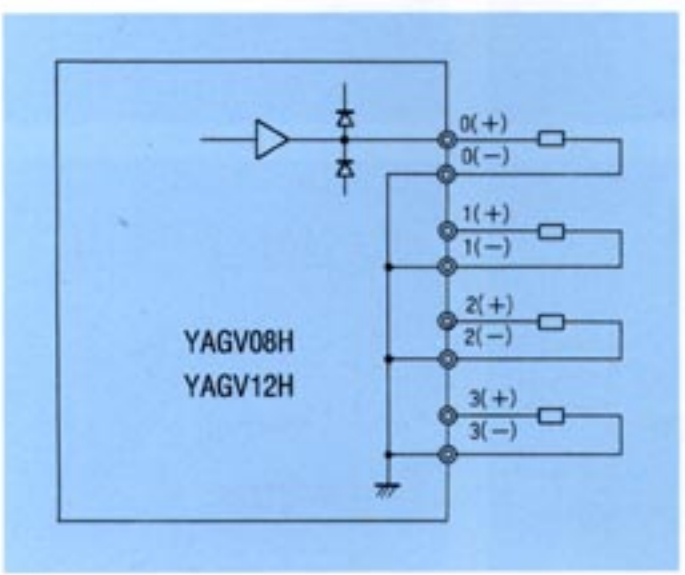
Specifications

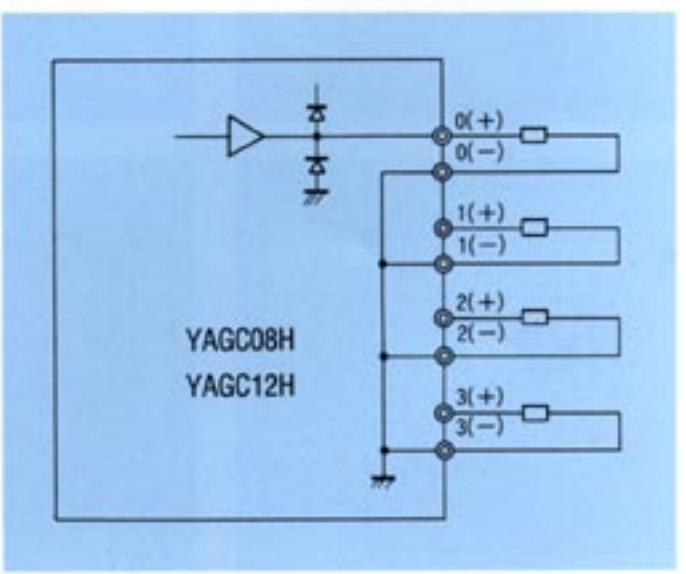
Model	Input/output type	Voltage or current range	Resolution	Conversion time	Overall accuracy	Number of input or output circuits	Isolation		Input impedance or external load resistance	Occupying I/O points	Applicable to:	Internal current consumption
							Between PC and channel	Between channels				
XAGV08H	Analog input	0 ~ 10 V DC	8 bit	5 ms	±1%	8 channels /module	By photo-coupler	No	100 kΩ	128	H-2002 H-2000 H- 702 H- 700 H- 302 H- 300	0.06 A (5 V DC) 0.07 A (24 V DC)
XAGC08H		4 ~ 20 mA							100 Ω			0.06 A (5 V DC) 0.07 A (24 V DC)
XAGV12H		−10 ~ +10 V DC	12 bit		±0.5%				100 kΩ			0.06 A (5 V DC) 0.17 A (24 V DC)
XAGC12H		4 ~ 20 mA							100 Ω			0.06 A (5 V DC) 0.19 A (24 V DC)
YAGV08H	Analog output	0 ~ 10 V DC	8 bit		±1%	4 channels /module			10 kΩ max.	64		0.07 A (5 V DC) 0.1 A (24 V DC)
YAGC08H		4 ~ 20 mA							0 ~ 500 Ω			0.07 A (5 V DC) 0.17 A (24 V DC)
YAGV12H		−10 ~ +10 V DC	12 bit		±0.5%				10 kΩ max.			0.06 A (5 V DC) 0.1 A (24 V DC)
YAGC12H		4 ~ 20 mA							0 ~ 500 Ω			0.06 A (5 V DC) 0.19 A (24 V DC)

Circuit configuration and external wiring









High function module

Specifications of positioning module

Item \ Model	POSIT-H	POSIT-2H	POSITA2H
Number of slots	1 slot	1 slot	2 slots
Number of controlled axes	1 axis	2 axes	
Interpolating function	Linear interpolating function available	Linear interpolating function available (2 axes simultaneously interpolable)	
Speed command	25 pulse/s ~ 100 kpulse/s	6.25 pulse/s ~ 200 kpulse/s (selectable by common parameters)	
Acceleration/deceleration	Same value for both acceleration and deceleration	Trapezoidal acceleration/deceleration (separately set for acceleration and deceleration in auto mode)	
Acceleration/deceleration rate	1250 pulse/s^2 ~ 20,480 pulse/s^2	19.53 pulse/s^2 ~ 2560 kpulse/s^2 (selectable by common parameters)	
Position command	±7,999,999 pulse or 0 ~ 9,999,999 pulse	±7,999,999 pulse	
Output system	Pulse sequence and clock ow direction signal	Pulse sequence and clock ow direction signal	Max. analog voltage output ±10 V
Resetting function	5 modes	4 modes	
Number of occupying I/O points	128 points	128 points	
Auto mode	1 mode	3 modes	
Internal current consumption	5 V DC, 0.2 A	5 V DC, 0.35 A	5 V DC, 0.55 A

Specifications of counter input module

Item \ Model	XCU001H	XCU232H
Number of channels	1	2
Number of counts	0 ~ 65,535 (16 bit)	0 ~ 4,294,967,795 (32 bit)
Max. count frequency	50 kHz	100 kHz
Count system	Two-phase pulse count system (up/down)	Single-phase pulse, counter pulse count system
Marker input	Negative logic	Positive/negative logic selectable
Number of output points	2 points	1 point/channel x 2
Number of occupying I/O points/ number of slots	128 points/1 slot	
Internal current consumption	5 V DC 0.3 A, 24 V DC 0.1 A	5 V DC 0.16 A

Specifications of real time clock module (CLOCK-H)

Item	Specifications
Data write/readout	Handshaking by sequence program
Calendar function	Last two digits of year, month, day, day of the week (with correction for a leap year)
Clock function	Hour (12/24 switchable), minute, second (with second adjust function)
Timer function	Up to 7 programmable timers, output as contact information
Backup	Battery backup (lithium battery)
Dimensions	35 (W) x 210 (H) x 130 (D) mm
Weight	Approx. 400 g
Current consumption	5 V DC, 0.3 A

Specifications of resistance temperature detective (RTD) input module (XRTD01H)

Item		Specifications
Temperature-sensing element		Platinum resistance temperature detective (Pt 100 Ω)
Measuring range		−50 ~ 400°C
Number of channels		8 channels/4 channels (switchover by pins on PCB)
Conversion time		Approx. 1 s/8 or 4 channels
Number of occupying I/O points/slot		128 points (8 channels), 64 points (4 channels)/slot
Isolation	Between channels	Non-isolated
	Between channel and PC	Photocoupler

Specifications of basic module (BASIC-H)

Item				Specifications
Basic specification	CPU			ND68HC000-8 (8 MHz) or equivalent
	Program execution system			Parallel processing by 17 tasks max. (priority switchover by task number)
	Memory	User program area		64 kbyte (battery backup)
		Symbol area		64 kbyte (battery backup)
	Programming unit			GPC-01H + HI-BASIC
Language specification	Programming language			HI-BASIC (dedicated real time multi-task FA BASIC)
	Instruction	Statement		48 kinds (PRINT, INPUT, START, STOP, TASK, CIRCLE, etc.)
		Command		11 kinds (AUTO, RUN, LIST, CHECK, RENUM, etc.)
		Function		36 kinds (SIN, COS, BCD, BIN, SQR, EXP, LEN, etc.)
	PC internal output variable			Optional internal outputs on PC side (R, WR, L, WL, M, WM) can be variable-specified directly.
Interface specification	General purpose port	Physical specification		RS-232C based, 3 ports (D-SUB 15-pin connector)
		Transmission specification		Start-stop synchronization, JIS code, half duplex, 300/600/1200/2400/4800/9600 (receiving only) bit/s.
		Communication sequence	Non-protocol	To be conformed to the protocol of host computer and local station personal computer on the other end of the line using a user's program.
			Terminal control (connectable terminal)	Color graphic terminal (CGT): connectable to F560J (Nippon Computer Industry Co.) or equivalent. Character display: connectable to VG620 (Victor Data Systems) or equivalent. Printer: connectable to SP80T (Epson) or equivalent.
General specification	Number of occupying I/O			0 point (3 slots)
	Current consumption			1.5 A (max.)
	Dimensions (mm)			106 (W) x 219.4 (H) x 135.4 (D)
	Weight			Approx. 7 kg

Specifications of serial I/O module (SIO-H)

Item	Specifications
Number of serial ports	1 port each for RS-232C and RS-422 (isolated by photocoupler)
Communication method	1 : 1 (RS-232C)/1 : n max. 32 (RS-422)
Transmission rate	2 ports from 300, 600, 1200, 2400, 4800, 9600 bps or 1 port from 300, 600, 1200, 2400, 4800, 9600, 19.2 bps
Communication data buffer	(512 words for receiving, 256 words for transmission) x 2 ports (without backup)
Communication protocol	Non-protocol (according to user's sequence program)
Data format	Start bit 1, data bits 7 or 8, parity bit (non, odd/even), stop bit 1 or 2. setting with DIP SW (shared by 2 ports)
Number of occupying I/O points and slots	128 points/1 slot
Cable length	15 m (RS-232C/500 m (RS-422)
Weight	Approx. 600 g
Current consumption	1.0 A (5 V DC)

Specifications of ASCII module (ASCII-1H)

Item			Specifications
Function specification	Display buffer memory		24 kbyte (battery backup available with litium battery LIBAT-H)
	Graphics		Available with dedicated graphic software (HIASC) using GPC-01H.
	Connectable equipment (example)		CRT display VG670 (Victor Data System's make), etc. Printer MP-80 (Epson's make), etc.
Communi-cation specification	Transmission character specification		JIS7 or JIS8 code
	Interface specification		Either RS-423 (RS-232C) or RS-422 to be selected, D-SUB25P connector
	Max. cable length	RS-423 (RS-232C)	15 m
		RS-422	250 m
	Transmission rate		300, 600, 1200, 2400, 4800, or 9600 bps to be selected.
Number of occupying I/O			128 points (2 slots)
Weight			Approx. 800 g
Current consumption			5 V DC, 1.0 A

Peripherals

Handy graphic programmer
(Ladder ↔ Command conversion is provided)

Easy-to-see liquid crystal display

- Liquid crystal display (80 x 57 mm)
- 19 characters x 2 lines
- Ladder diagram: 9 contacts, 1 coil, 7 lines

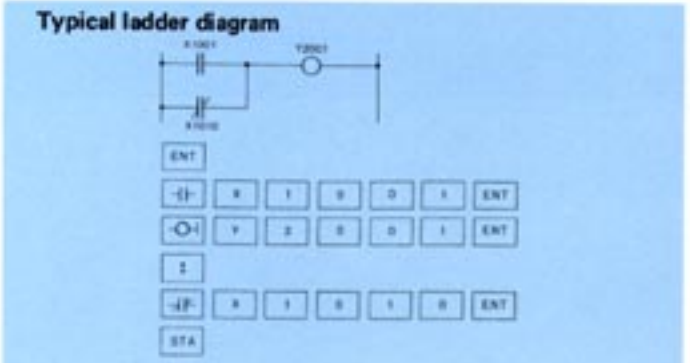
Buzzer settings of high and low sounds for office and shop

Dimensions : 120 x 207 x 47(mm)

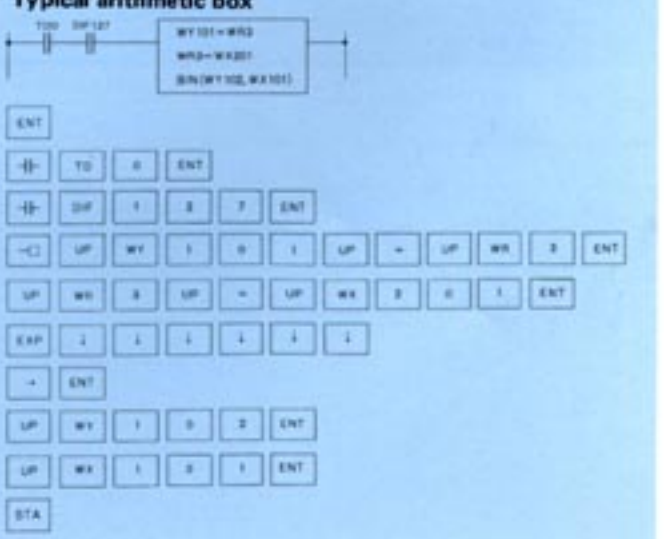
Features and functions

- 2 programming language: ladder and command.
- Monitoring available whether input with command or ladder.
- Liquid crystal display with EL backlight which permits use at a dark place.
- Audio cassette interface capable of high speed recording and playback. (3 min/8 k steps)
- Buzzer sound selectable distinctly for office and shop.
- Secrecy is ensured by password.
- Substantiated bebug function
- Remote run
- Programming and monitoring available on CPU linkage or remote station.
- Simulation
- Forced set or reset
- Force
- Program alteration while running
- Cross reference
- Double structure dust preventive keyboard
- Design support is ensured.
  Print-out (optional)
  [Ladder diagram is printed out as it is. Cross reference parameter, internal out etc. can be printed out.
- Either graphic print at low speed or character print at high speed is selectable according to purpose.
- ROM writing (optional)
- Checking is ensured by syntax check, double definition check (I/O, timer, master control) and CPU error check (message display).

Typical ladder diagram



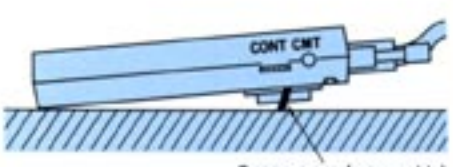
Typical arithmetic box



Character programmer:
Most advanced design with compactness

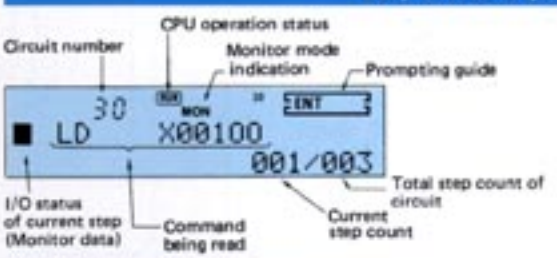
Features

- Weighing as little as 380 g, with compact dimensions of 85 x 160 x 35 mm.
- Back-lighted liquid-crystal display easy to read even in a dark environment.
- Menu selection and guide prompting friendly to the user.
- Tactile-click keyboard having dust-proof double-structure.
- High-speed recording and play back accomplishable through the audio-cassette interface (3 min/8 k steps).
- Monitoring and programming allowed at a remote or linked station.
- A wide repertoire of basic functions from I/O assignment to I/O number batch change.
- Equipped with a support peg for securing on the top of a desk.



Support peg (retractable)

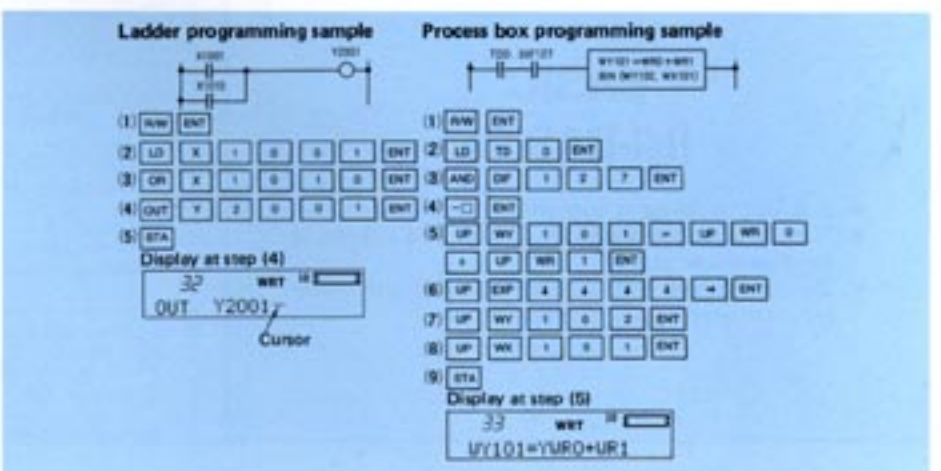
Easy-to-read display



The liquid-crystal display presents the user with guide message, CPU operation status and other device information not usually available in this class of instrument. With the back-lighted feature and contrast adjust function, it can display information clearly in any working environment.

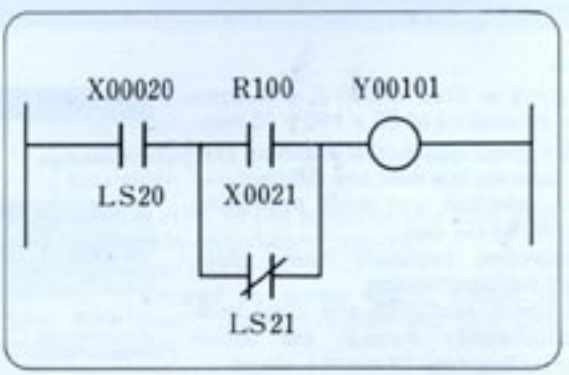
Examples of operation

Direct input and representation permitted for four-fundamental-arithmetic expressions. Outstandingly efficient in programming and debugging with easy-to-handle functionality.



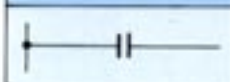
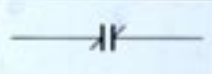
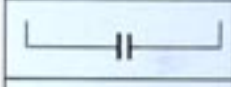
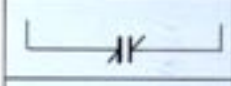
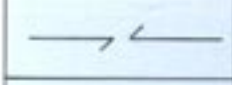
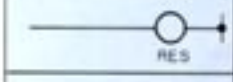
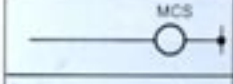
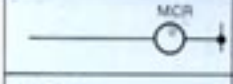
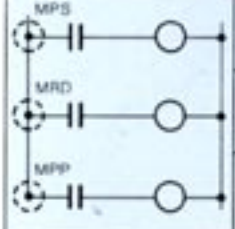
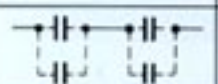
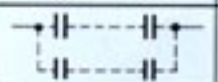
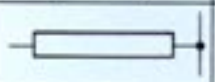
Programming language

- Input is available in a familiar programming language . . . (command language and ladder symbols are supported by the same CPU).
- Expression method which improves programming efficiency is adopted . . . arithmetic calculation expressed in formula, contact and circuit comment insertion, command ↔ ladder symbol conversion, etc. are available.

Language	Display example
Command [HI-COMMAND] • Standard instruction of sequence controller • Conversion to ladder diagram is available.	User No. 001 LD X00020 LS20 002 LD R100 003 ORI X00021 LS21 004 ANB 005 OUT Y00101
Ladder diagram [HI-LADDER] • A ladder diagram which you make can directly be input without translation. • User device name (up to 6 alphanumerics), I/O comment and circuit comment (up to 16 alphanumerics), etc. are usable, thereby improving the program creation, system startup and maintainability. • A conversion to a command is also available.	
BASIC [HI-BASIC] • A BASIC language is adopted. • Functions are expanded for control, and I/O No. is programmable as it is. • On-line system monitoring and daily/monthly report processing are possible.	10 TASK2 20 INPUT A, B 30 PRINT A×B 40 END

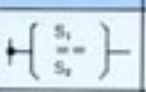
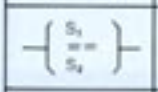
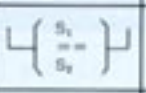
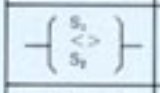
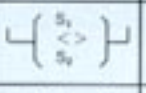
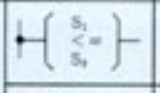
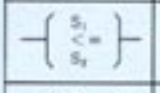
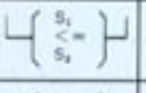
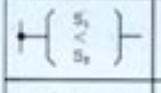
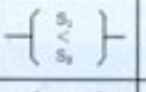
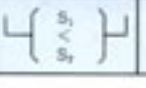
HI-COMMAND (command) and HI-LADDER (Ladder symbol)

Basic instruction

Ladder symbol	Instruction symbol	Processing contents
	LD	Logical computation start (NO contact computation start)
	LDI	Logical negation computation start (NC contact computation start)
	AND	Logical product (series connection of NO contacts)
	ANI	Negation of logical product (series connection of NC contacts)
	OR	Logical sum (parallel connection of NO contacts)
	ORI	Negation of logical sum (parallel connection of NC contacts)
	NOT	Logical negation
	OUT	Device output
	SET	Device set output
	RES	Device reset output
	MCS	Master control set
	MCR	Master control reset
	MPS	Store of calculated result
	MRD	Read of calculated result stored by MPS
	MPP	Read and reset of calculated result stored by MPS
	ANB	Logical product of logical blocks (series connection of blocks)
	ORB	Logical sum of logical blocks (parallel connection of blocks)
	[ ]	Processing box (see section on arithmetic and application instructions)
	[ ]	See section on compare box

12 others

Compare box

Compare contents	Ladder symbol	Command	Description of operation
=		LD ($S_1 = S_2$)	Continuity when S1 = S2. No continuity when S1 ≠ S2.
		AND ($S_1 = S_2$)	
		OR ($S_1 = S_2$)	
≠		LD ($S_1 <> S_2$)	Continuity when S1 ≠ S2. No continuity when S1 = S2.
		AND ($S_1 <> S_2$)	
		OR ($S_1 <> S_2$)	
≤		LD ($S_1 <= S_2$)	Continuity when S1 ≦ S2. No continuity when S1 > S2.
		AND ($S_1 <= S_2$)	
		OR ($S_1 <= S_2$)	
<		LD ($S_1 < S_2$)	Continuity when S1 < S2. No continuity when S1 ≧ S2.
		AND ($S_1 < S_2$)	
		OR ($S_1 < S_2$)	

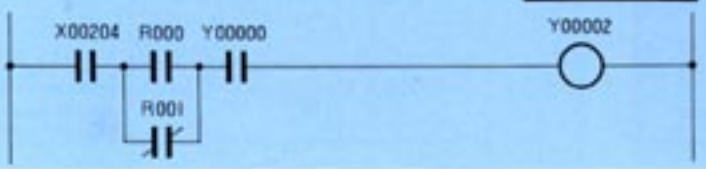
4 others

- Both program languages of familiar command and ladder symbols are supported by one CPU.
- The arithmetic calculation system is expressed in formulas, thereby ensuring programming efficiency.
- Application command facilitated by integration . . . sophisticated control is easily realized.

1. Typical basic command program

Series-parallel circuit

HI-LADDER



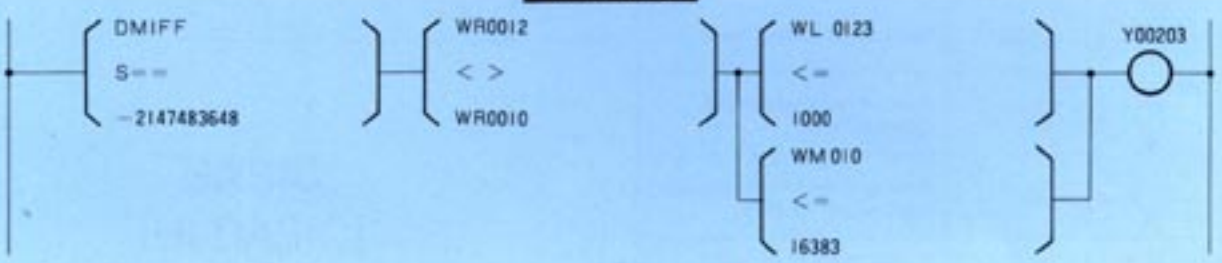
HI-COMMAND

```
LD    X00204
LD    R000
ORI   R001
ANB
AND   Y00000
OUT   Y00002
```

2. Typical compare box program

Compare box

HI-LADDER



HI-COMMAND

```
LD    (DMIFF    S==-2147483648)
AND   (WR0012   <>WR0010
LD    (WL0123   <=1000)
OR    (WM010    <=16383  )
ANB
OUT Y00203
```

Arithmetic calculation command

Classification	Command	Processing contents	
Substitute	d = s	Substitute d←s	
Elementary rules	$d = s_1 + s_2$	$d \leftarrow s_1 + s_2$	Binary addition
	$d = s_1$ B $+ s_2$		BCD addition
	$d = s_1 - s_2$	$d \leftarrow s_1 - s_2$	Binary subtraction
	$d = s_1$ B $- s_2$		BCD subtraction
	$d = s_1 * s_2$	$d \leftarrow s_1 \times s_2$	Binary multiply
	$d = s_1$ B $* s_2$		BCD multiply
	$d = s_1$ s $* s_2$		Signed multiply (double word only)
	$d = s_1 / s_2$	(1) Word size $d \leftarrow S_1 \div S_2$, WRF016←$S_1$ mod S_2	Binary division
	$d = s_1$ B$/s_2$		BCD division
	$d = s_1$ S$/s_2$	(2) Double word size $d \leftarrow S_1 \div S_2$, DRF016←$S_1$ mod S_2	Signed division (double word only)
Logical sum and product	$d = s_1$ OR s_2	$d \leftarrow s_1 + s_2$	Logical sum
	$d = s_1$ AND s_2	$d \leftarrow s_1 \cdot s_2$	Logical product
	$d = s_1$ XOR s_2	$d \leftarrow s_1 \oplus s_2$	Exclusive logical sum
Compare	$d = s_1 = s_2$	When $S_1 = S_2$, d←1. Otherwise, d←0.	= comparison expression
	$d = s_1 <> s_2$	When $S_1 \neq S_2$, d←1. Otherwise, d←0.	≠ comparison expression
	$d = s_1 <= s_2$	When $S_1 \leqq S_2$, d←1. Otherwise, d←0.	≦ comparison expression
	$d = s_1 < s_2$	When $S_1 < S_2$, d←1. Otherwise, d←0.	< comparison expression

4 others

Application command

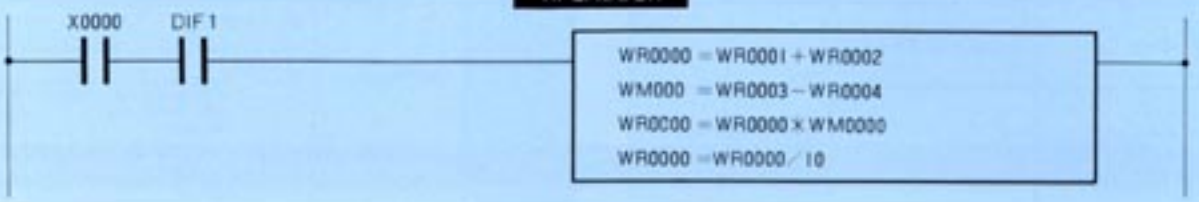
Classification	Command	Processing contents
Operational command	SHR(d,n)	Shift right SD → d → C n bit shift (n: 0 ~ 15 or 0 ~ 31) SD: shift-in data C: carry
	BSR(d,n)	BCD shift right n digit shift right in BCD d: word n: 0 to 3 d: word n: 0 to 7
	MOV(d,s,n)	Block transfer n : 0~255
	DECO(d,s,n)	Decode S: 0~FF d: 256 bit Decode Bit 2^n
	ENCO(d,s,n)	Encode S→1 Bit 2^n Encode n bit
	SEG(d,s)	7 segment decode 4 digits at 16 bit 4 digits at 32 bit
	FIFWR (p, s)	n read Make pointer + 1. Write data S in pointer designation. Error when pointer > n. When erroneous, "1" is set in DER.
	FIFRD(p,d)	Pointer Write contents designated by pointer in d. Make pointer - 1. Error when pointer is 0. When erroneous, "1" is set in DER.
	SQR(d,s)	Double word square root. $d<\sqrt{s}$. S is in BCD.
	BCU(d,s)	Bit count. Number of bits of "1". Number of bits of bit count
Arithmetic and control command	JMP n	Unconditional jump. Jumps to label of LBLn.
	C JMP n(s)	Conditional jump. Jumps to label of LBLn, when S = 1.
	CAL n	Subroutine call. Calls subroutine of SBn.
	RTS	Return from subroutine
	RTI	Return from interrupt processing
	FOR n(s)	FOR n … NEXT n: S: repetition. This range is repeated as many times as designated by S.
	NEXT n	

34 others (H-300/700/2000)
85 others (H-302/702/2002)

3. Typical arithmetic command program

WR0 = (WR1 + WR2) x (WR3 – WR4) ÷ 10

HI-LADDER



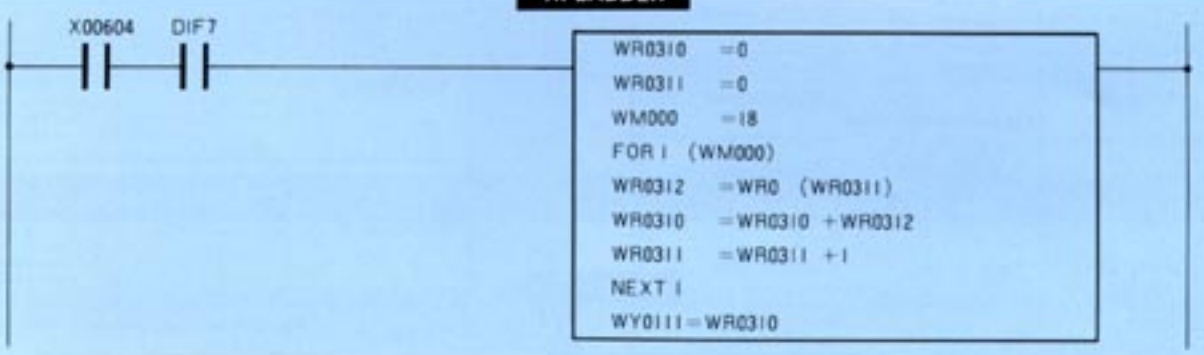
HI-COMMAND

```
LD    X0000
AND   DIF1
┌
    WR0000 = WR0001 + WR0002
    WM0000 = WR0003 – WR0004
    WR0000 = WR0000 x WM000
    WR0000 = WR0000 / 10
┘
```

4. Typical application command program

When X604 is ON, total sum of numbers is obtained and is output to WY111. WY011 = WR0 + WR1 + WR2 + · · · + WR17

HI-LADDER



HI-COMMAND

```
LD    X00604
AND   DIF7
┌
    WR0310  = 0
    WR0311  = 0
    WM000   = 18
    FOR I   (WM000)
    WR0312  = WR0000  (WR311)
    WR0310  = WR0310  + WR0312
    WR0311  = WR0311  + 1
    NEXT I
    WY0111  = WR0310
┘
```

Device configuration

Item	Name		Model	Remarks		H-2000 H-2002	H-1002	H-700 H-702	H-300 H-302
CPU	H-2000 CPU module		CPU-20Ha	2048 (4096) inputs/outputs, program memory capacity 48.5 k steps	Note: The number of inputs/outputs is for when each of H-2002 to H-300 uses a 32-point module. The numeral in ( ) indicates the number of inputs/outputs when a 64-point module is used.	H-2000			
	H-700 CPU module		CPU-07Ha	640 (1280) inputs/outputs, program memory capacity 15.7 k steps				H-700	
	H-300 CPU module		CPU-03Ha	288 (576) inputs/outputs, program memory capacity 7.6 k steps					H-300
Enhance CPU	H-2002 CPU module		CPU2-20H	2048 (4096) inputs/outputs, program memory capacity 48.5 k steps PID function, Serial port I/F		H-2002			
	H-1002 CPU module		CPU2-10H	1344 (2688) inputs/outputs, program memory capacity 48.5 k steps PID function, Serial port I/F			●		
	H-702 CPU module		CPU2-07H	640 (1280) inputs/outputs, program memory capacity 15.7 k steps PID function, Serial port I/F				H-702	
	H-302 CPU module		CPU2-03H	288 (576) inputs/outputs, program memory capacity 7.6 k steps PID function, Serial port I/F					H-302
Memory	RAM cassette		RAM-04H	Program memory capacity 3.6 k steps		H-2000		H-700	H-300
			RAM-08H	Program memory capacity 7.6 k steps		H-2000		H-700	H-300
			RAM-16H	Program memory capacity 15.7 k steps		H-2000		H-700	
			RAM-48H	Program memory capacity 48.5 k steps		H-2000			
	ROM cassette		ROM-16H	Program memory capacity 15.7 k steps		H-2000		H-700	*H-300
Memory for enhance CPU	RAM cassette		RAM2-04H	Program memory capacity 3.6 k steps		●	●	●	●
			RAM2-08H	Program memory capacity 7.6 k steps		●	●	●	●
			RAM2-16H	Program memory capacity 15.7 k steps		●	●	●	
			RAM2-48H	Program memory capacity 48.5 k steps		●	●		
			RAM3-08H	Program memory capacity 7.6 k steps	For fast program change during RUN	H-2002	●	H-702	H-302
			RAM3-16H	Program memory capacity 15.7 k steps	For fast program change during RUN	H-2002	●	H-702	
			RAM3-48H	Program memory capacity 48.5 k steps	For fast program change during RUN	H-2002	●		
	ROM cassette		ROM2-16H	Program memory capacity 15.7 k steps		H-2002	●	H-702	*H-302
			ROM2-48H	Program memory capacity 48.5 k steps		H-2002	●		
Input/ output controller	Module for H-2002 to 700 expansion		IOC-01H	Used for every mount base for I/O expansion		●	●	●	
Mount base	Mount base for CPU (CPU mounting unit for H-2000 to 300)		BSU-09H	9 input/output modules mountable, 24 V DC can be supplied externally		●	●	●	●
			BSU-05H	5 input/output modules mountable, 24 V DC can be supplied externally		●	●	●	●
			BSU-02H	2 input/output modules mountable, 24 V DC can be supplied externally		●	●	●	●
	Mount base for I/O expansion	Remote master is not mountable	EXU-11H	11 input/output modules mountable, 24 V DC can be supplied externally		●	●	●	
			EXU-07H	7 input/output modules mountable, 24 V DC can be supplied externally		●	●	●	
			EXU-04H	4 input/output modules mountable, 24 V DC can be supplied externally		●	●	●	
		Remote master is mountable	BEU-04H	4 input/output modules mountable, 24 V DC can be supplied externally		●	●	●	
Power source	Power supply module	For H-2002 to 300	AVRC-04H	Input 85 ~ 132, 170 ~ 264 V AC; output 5 V DC and 4 A, 24 V DC and 2.0 A	One power supply module is required for each mount base.	●	●	●	●
			AVRC-08H	Input 85 ~ 132, 170 ~ 264 V AC; output 5 V DC and 9 A, 24 V DC and 1.0 A		●	●	●	●
			AVR-04DH	Input 19.2 ~ 30 V DC; output 5 V DC and 4 A, 24 V DC and 1.5 A		●	●	●	●
			AVR-08DH	Input 19.2 ~ 30 V DC; output 5 V DC and 9 A, 24 V DC and 0.5 A		●	●	●	●
Cable	CPU – input/output controller connecting cable	For H-2002 to 300	CBL-05H	0.5 m		●	●	●	
			CBL-10H	1.0 m		●	●	●	
			CBL-20H	2.0 m		●	●	●	
			CBL-40H	4.0 m		●	●	●	
	Input/output expansion cable		CBE-05H	0.5 m	For expansion of H-2000 and H-2002. Use 1 cable per 1 expansion mount base.	●	●		
			CBE-10H	1.0 m		●	●		
			CBE-20H	2.0 m		●	●		
			CBE-40H	4.0 m		●	●		
	Cable interconnecting terminal cover (LED) and input/output module		CB-LED1H	4.0 m	For H-2002 to 300. Use for remote mounting of terminal block cover (LED).	●	●	●	●
Input module	AC input moduleb		XAC10AH	16 inputs of 85 ~ 132 V AC, isolated by photocoupler, LED display (Terminal block)		●	●	●	●
			XAC20AH	16 inputs of 170 ~ 264 V AC, isolated by photocoupler, LED display (Terminal block)		●	●	●	●
			XAC10BH	32 inputs of 85 ~ 132 V AC, isolated by photocoupler, LED display (Terminal block)		●	●	●	●
			XAC20BH	32 inputs of 170 ~ 264 V AC, isolated by photocoupler, LED display (Terminal block)		●	●	●	●
	AC/DC input module		XDC24AH	16 inputs of 12/24 V AC/DC, isolated by photocoupler, LED display (Terminal block)		●	●	●	●
			XDC48AH	16 inputs of 48 V AC/DC, isolated by photocoupler, LED display (Terminal block)		●	●	●	●
			XDC24BH	32 inputs of 12/24 V AC/DC, isolated by photocoupler, LED display (Terminal block)		●	●	●	●
			XDC48BH	32 inputs of 48 V AC/DC, isolated by photocoupler, LED display (Terminal block)		●	●	●	●
	High speed DC input module		XHS24BH	32 inputs of 12/24 V DC, isolated by photocoupler, LED display (Terminal block)		●	●	●	●
			XDC12DH	*64 inputs of 12 V DC, isolated by photocoupler, LED display (Terminal block)		●	●	●	●
			XDC24D2H	*64 inputs of 24 V DC, isolated by photocoupler, LED display (Terminal block)		●	●	●	●
	TTL level input module		XTT05BH	32 inputs of 3-15 V DC (Terminal block)		●	●	●	●

*When you use ROM-16H with CPU-03Ha or when you use ROM2-16H with CPU2-03H, you can use up to 7.6 k steps of memory.
**No external connector is furnished for 64 inputs module.

Item	Name	Model	Remarks	H-2000 H-2002	H-1002	H-700 H-702	H-300 H-302
Output module	Contact output module	YRY20AH	16 outputs of 240 V AC, 24 V DC, 2 A, isolated by photocoupler, LED display	●	●	●	●
		YRY20BH	32 outputs of 240 V AC, 24 V DC, 2 A, isolated by photocoupler, LED display	●	●	●	●
	Triac output module	YSR20AH	16 outputs of 100 ~ 240 V AC, 1.7 A, isolated by photocoupler, LED display	●	●	●	●
		YSR20BH	32 outputs of 100 ~ 240 V AC, 1 A, isolated by photocoupler, LED display	●	●	●	●
	Transistor output module (sink load)	YTR48AH	16 outputs of 24/48 V DC, 2 A, isolated by photocoupler, LED display	●	●	●	●
		YTR48BH	32 outputs of 24/48 V DC, 0.7 A, isolated by photocoupler, LED display	●	●	●	●
		YTR24DH	*64 outputs of 12/24 V DC, 0.1 A, isolated by photocoupler, LED display	●	●	●	●
	Transistor output module (source load)	YTS48AH	16 outputs of 24/48 V DC, 2 A, isolated by photocoupler, LED display	●	●	●	●
		YTS48BH	32 outputs of 24/48 V DC, 0.7 A, isolated by photocoupler, LED display	●	●	●	●
		YTS24DH	*64 outputs of 12/24 V DC, 0.1 A, isolated by photocoupler, LED display	●	●	●	●
	TTL output module (source load)	YTT05BH	32 outputs of 4 ~ 15 V DC, 20 mA, isolated by photocoupler, LED display	●	●	●	●
	Isolated contact output module	YDR20AH	16 outputs of 100 ~ 240 V AC, 24 V DC, 2 A, isolated by photocoupler, LED display	●	●	●	●

*No external connector is furnished for 64 input module.

Item	Name		Model	Remarks	H-2000 H-2002	H-1002	H-700 H-702	H-300 H-302
High function module	Analog module	Analog module	XAGV08H	0 ~ 10 V DC analog input, 8 bit, 8 channels	●	●	●	●
			XAGC08H	4 ~ 20 mA analog input, 8 bit, 8 channels	●	●	●	●
			XAGV12H	−10 ~ 10 V DC analog input, 12 bit, 8 channels	●	●	●	●
			XAGC12H	4 ~ 20 mA analog input, 12 bit, 8 channels	●	●	●	●
		Analog output module	YAGV08H	0 ~ 10 V DC analog output, 8 bit, 4 channels	●	●	●	●
			YAGC08H	4 ~ 20 mA analog output, 8 bit, 4 channels	●	●	●	●
			YAGV12H	−10 ~ 10 V DC analog output, 12 bit, 4 channels	●	●	●	●
			YAGC12H	4 ~ 20 mA analog output, 12 bit, 4 channels	●	●	●	●
	High speed counter input module		XCU001H	2 phase pulse, 50 kHz, 16 bit counter, 1 channel	●	●	●	●
			XCU232H	2 phase pulse, 100 kHz/50 kHz, 32 bit counter, 2 channels	●	●	●	●
	Positioning module		POSIT-A2H	2 axes positioning, analog output (occupy 2 slots)	●	●	●	●
			POSIT-2H	2 axes positioning, pulse output (occupy 2 slots)	●	●	●	●
			POSIT-H	1 axis positioning, pulse output (occupy 1 slot)	●	●	●	●
	ASCII module		ASCII-1H	ASCII code, connection with CRT or printer (occupy 2 slots)	●	●	●	●
	BASIC module		BASIC-H	BASIC function (occupy 3 slots)	●	●	●	●
	RTD module		XRTD01H	RTD input	●	●	●	●
	Serial I/O module		SIO-H	RS232C, RS422 port × 1 channel each	●	●	●	●
	Read time clock module		CLOCK-H	Real time clock	●	●	●	●
	Interrupt input module		XINTOAH	10 ~ 30 V DC, up to 16 factors, isolated by photocoupler	●	●	●	●
Communicating function module	Intelligent serial port module		COMM-2H	RS-422, RS-232C port × 1 channel each, occupy 2 slots	●	●	●	●
			Cable for RS-232C	Exclusive cable for the connection through RS-232C (Commercially available cable is usable for the connection through RS-422	●	●	●	●
	CPU linkage module		LINK-H	Up to 64 CPUs, up to 1024 words of link data*	●	●	●	●
	Remote input/output module	Coaxial cable	REM-MAH REM-LDH	Up to 512 input/output points per module (master station). Up to 4 modules master station per CPU. 1 master station: 10 local stations connected in series*.	●	●	●	●
		Twisted pair cable	REM-MMH REM-LMH	Up to 1024 inputs points and 1024 output points per module (master station). Master station is mountable up to the number of available slots. 1 master station: 12 local stations connected in series.	●	●	●	●
Peripheral	Command programmer		PGM-CHH	Display with LED backlight. Audio CMT I/F incorporated.	●	●	●	●
	Handy graphic programmer	Programmer	PGM-GPH	With EL backlight and 2 m cable between CPU and programmer. Audio CMT I/F incorporated.	●	●	●	●
		Option I/F	PGMIF1H	ROM write function, printer function	●	●	●	●
	Cable for peripheral		PGCB02H	2 m Between CPU and programmer	●	●	●	●
			PGCB05H	5 m Between CPU and programmer	●	●	●	●
	Programming software		HL-AT3E	LADDER EDITOR for IBM computer	●	●	●	●
Others	Lithium battery		LIBAT-H	Memory backup battery for H-2002 to 300	●	●	●	●
	Dummy module for P/O		DUMMY-H	For vacant slot of input/output module of H-2002 to 300	●	●	●	●

*No coaxial cable connector is furnished.

Functional specifications

Item \ Model			Description			
			H-2002, H-2000	H-1002	H-702, H-700	H-302, H-300
Number of inputs/outputs	32 I/O module		Up to 2048 points	Up to 1344 points	Up to 640 points	Up to 288 points
	64 I/O module		Up to 4096 points	Up to 2688 points	Up to 1280 points	Up to 576 points
	64 I/O module + remote I/O		Up to 5632 points	Up to 4224 points	Up to 2816 points	Up to 2112 points
Control specifications	Command and ladder diagram	Processing system	Stored program cyclic system			
		Processing speed	<H-2000> Logical operation: 0.5 ~ 4.9 μs/command Application command: 4.4 ~ 3,224 μs/command <H-2002> Logical operation: 0.4 ~ 4.1 μs/command Application command: 3.6 ~ 2690 μs/command	<H-700/H-300> Logical operation: 1.1 ~ 9.7 μs/command Application command: 8.6 ~ 4,737 μs/command <H-1002/H-702/H-302> Logical operation: 0.9 ~ 8.1 μs/command Application command: 6.9 ~ 3951 μs/command		
		User program memory	Up to 48.5 k steps for RAM, 15.7 k steps for EPROM		Up to 15.7 k steps for RAM, 15.7 k steps for EPROM	Up to 7.6 k steps for RAM, 7.6 k steps for EPROM
Arithmetic processing specifications	Command	Sequence command	LD, LDI, AND, ANI, OR, ORI, ANB, ORB, OUT, MPS, MRD, MPP			39 types
		Application command	Arithmetic (+, −, ×, ÷, =, etc.), high speed scan, jump, subroutine distribution extraction, etc.			<H-2000/700/300> 73 types <H-2002/702/302> 124 types
	Ladder diagram	Sequence command	⊣⊢, ⊣/⊢, ⊣↑⊢, ⊣↓⊢, ⊣/↑⊢, ⊣/↓⊢, ⊢⊣, ⊢○⊣ etc.			39 types
		Application command	Arithmetic (+, −, ×, ÷, =, etc.), high speed scan, jump, subroutine, distribution, extraction, etc.			<H-2000/700/300> 73 types <H-2002/702/302> 124 types

Reference: Current consumption by CPU (5 V DC)

CPU	CPU-03Ha	CPU-07Ha	CPU-20Ha	CPU2-03H	CPU2-07H	CPU2-10H	CPU2-20H
Current consumption	2.1 A	2.1 A	2.8 A	2.1 A	2.1 A	2.1 A	2.8 A

Item \ Model			Description			
			H-2002, H-2000	H-1002	H-702, H-700	H-302, H-300
Input/output processing specifications	External inputs/outputs	32 I/O module	Up to 2048 points	Up to 1344 points	Up to 640 points	Up to 288 points
		64 I/O module	Up to 4096 points	Up to 2688 points	Up to 1280 points	Up to 576 points
		Max. number of inputs/outputs	4096 points (256 words), direct processing			
		64 I/O module + remote I/O	Up to 5632 points	Up to 4224 points	Up to 2816 points	Up to 2112 points
	Internal output	Bit	1984 bit (R0 ~ R7FF, including special internal output)			
		Word	50 k words (WR0 ~ WRC3FF)		17 k words (WR0 ~ WR43FF)	1 k words (WR0 ~ WR3FF)
		CPU linkage	16,384 points/1024 words × 2 loops (L0 ~ L3FFF / WL0 ~ WL3FF, L10000 ~ L13FFF / WL1000 ~ WL13FF)			
		Remote input/output	512 points/32 words × 4 ports			
		Bit/word	16,384 points/1024 words (M0 ~ M3FFF / WM0 ~ WM3FF)			
	Timer, counter	Number of points	512 (TD + CU) (up to 256 for TD)			
		Timer setting	0 ~ 65,535 s, time base 0.01, 0.1, 1 s (up to 64 points for 0.01 s)			
		Counter setting	1 ~ 65,535 counts			
	Edge detection		512 points (DIF0 ~ DIF511: decimal) + 512 points (DFN0 ~ DFN511: decimal)			
Peripheral	Program system		Command, ladder diagram			
	Peripheral function		Command programmer (programming by command. Provided with audio cassette I/F). Handy graphic programmer (programming by ladder diagram or command. Provided with audio cassette I/F. ROM writer function, printer function (optional).)			
Maintenance function	Self-diagnosis		PC error (LED display + contact output): microprocessor error, watchdog timer error, memory error, program error, system ROM or RAM error, scan time supervision, battery voltage drop detection, protection from power failure, system reset, output kmodule fuse blow detection (except contact output)			
	External failure diagnosis		Watchdog timer instruction			

General specifications and external dimension diagrams

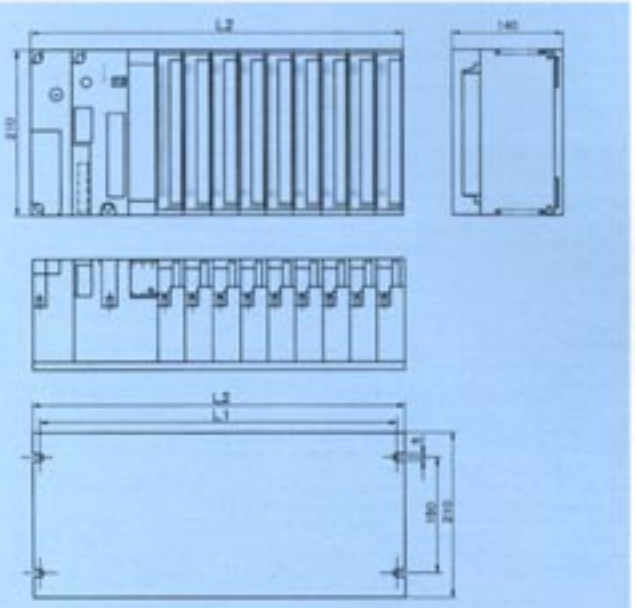
General specifications for programmable controller

Item	Description
Source voltage	100/110/120 V AC (50/60 Hz), 200/220/240 V AC (50/60 Hz)
Source voltage fluctuation range	85 ~ 132 V AC, 170 ~ 264 V AC
Ambient temperature	0 ~ 55°C (storage –10 to 75°C)
Ambient humidity	20 ~ 90% relative. Non-condensing. (Storage 10 ~ 90% relative. Non-condensing.)
Vibration resistance	Shall conform to JIS C0911
Noise resistance	• Noise voltage 1500 V p-p, noise pulse width 100 ns, 1 μs ..... by noise simulator • NEMA ICS 2-230-42 ~ 45 except 42.01 • Electrostatic noise 3000 V at metallic exposed part
Insulation resistance	20 MΩ min by 500 V DC megger between external AC terminal and frame ground
Dielectric strength	1500 V AC for 1 min between external AC terminal and frame ground
Ground	100Ω or less to earth
Atmosphere	No corrosive gases nor excessive dust
Structure	Uncovered wall mount type
Cooling	Natural air cooling

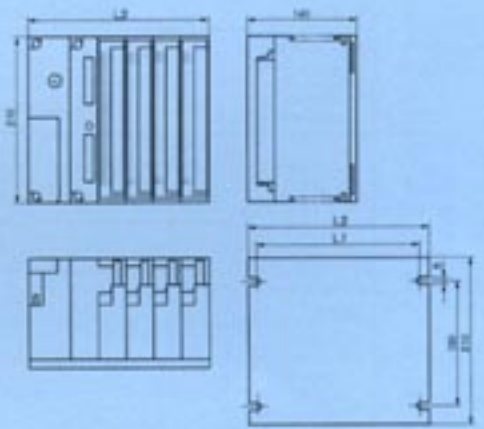
General specifications for character programmer and handy graphic programmer

Item	Specifications
Source voltage	5 V DC, ± 12 V DC (from CPU module)
Ambient temperature	0 to 45°C (storage –10 to 60°C)
Ambient humidity	20 to 90% relative. Non-condensing. (Storage 10 to 90% relative. Non-condensing.)
Vibration resistance	Shall conform to JIS C0911
Atmosphere	No corrosive gases nor excessive dust
Structure	Handy table-top calculator type
Cooling	Natural air cooling
Internal power consumption (5 V DC)	Character programmer (PGM-CHH) 0.5 A, Handy graphic programmer (PGM-GPH) 0.4 A, Option I/F (PGMIF1H) 0.15 A

External dimensions



Unit model	BSU-09H	BSU-05H	BSU-02H
Number of slots for input/output module	9	5	2
L1 (mm)	460	318	211.5
L2 (mm)	480	338	231.5



Unit model	EXU-11H	EXU-07H	EXU-04H, BEU-04H
Number of slots for input/output module	11	7	4
L1 (mm)	460	318	211.5
L2 (mm)	480	338	231.5

Specifications of programming device

No.	Function	Description		Graphic programming console	Handy graphic programmer	Character programmer
1	Edit	Circuit read	Display without device No.	●	●	●
			Display with device No.	●		
		Circuit insertion (multiple circuits can be inserted)		●	●	●
		Head circuit insertion		●	●	●
		Circuit alteration		●	●	●
		Circuit deletion		●	●	●
2	Monitor	Circuit monitor	Display without device No.	●	●	●
		I/O monitor		●	●	●
		Forced set or reset		●	●	●
		Forced output		●	●	●
3	FDD, CMT, ROM writer, memory cassette	Recording	Program	●(FDD, CMT)	●CMT ▲ROM writer	●CMT
		Playback	Program			
		Collation	Program			
4	Auxiliary function	Program error check	Syntax check of all circuits	●	●	●
			Master control error check	●	●	●
			Jump, subroutine instruction jump destination check	●	●	●
			DIF, DFN check	●	●	●
			Timer, counter check	●	●	●
		Program clear	All clear	●	●	●
			Partial clear	●	●	●
		Protection from power failure	Display	●	●	●
			Designation	●	●	●
		Force		●	●	●
		Program alteration (timer, counter setting alteration, I/O number alteration) during run		●	●	●
		Global alteration of I/O No.		●	●	●
		Printer	All circuit print	●	▲(Serial Printer only)	
			Block designation print	●	▲(Serial Printer only)	
			Cross reference	●	▲(Serial Printer only)	
5	Transfer	CPU → programming device (program, data memory)		●	●(By CMT)	●(By CMT)
		CPU ← programming device (program, data memory)		●	●(By CMT)	●(By CMT)
		CPU == programming device (program, data memory, verify)		●	●(By CMT)	●(By CMT)
6	System setting	CPU setting	I/O allocation list creation, reading, program name setting	●	●	●
		Console setting	Buzzer ON/OFF designation	●	●	●

●Standard function ▲Optional function

HITACHI

(Alteration reserved.)

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