

Programmable Logic Controllers

# MICRO-EHV+

**HITACHI**  
Inspire the Next

Full compliance with  
the IEC61131-3 International Standard



Preprocessing file for export





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**ISO 14001**  
JQA-EM5428



**ISO 9001**  
JQA-1000

The MICRO-EHV+ PLCs are produced at the factory registered under the ISO 14001 standard for environmental management system and the ISO 9001 standard for quality management system.

Programmable Logic Controllers

**MICRO-EHV+**

Full compliance with  
the IEC61131-3 International Standard

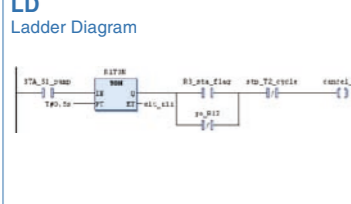
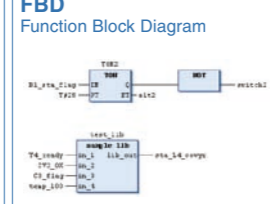
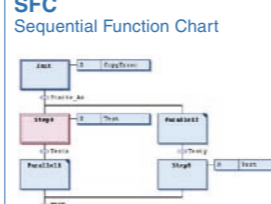


# Hitachi new compact PLC MICRO-EHV+

“MICRO-EHV+” is an all-in-one type compact PLC packed with powerful functions.

## Full IEC compliant 3S CODESYS V3.5 platform

Standardized programming style with 5 programming languages (LD, FBD, IL, ST, SFC)

<p><b>LD</b> Ladder Diagram</p> 	<p><b>FBD</b> Function Block Diagram</p> 	<p><b>IL</b> Instruction List</p> <pre>LD I0.0 AND I0.1 OR I0.2 AND NOT I0.3 LD I0.4 AND I0.5 ST Q0.0</pre>	<p><b>ST</b> Structured Text</p> <pre>Q := I + A + I; C1 := FALSE; PT := T300; END_FUNCTION IF VALUE &lt; T300 WHILE value &lt; 0 DO END_WHILE; END_FUNCTION;</pre>	<p><b>SFC</b> Sequential Function Chart</p> 
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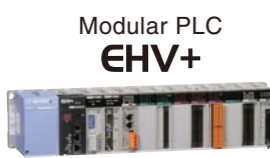
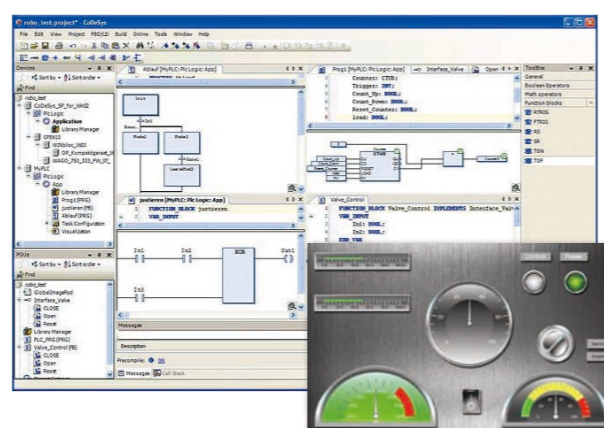
- No proprietary programming languages
- Easy start-up for users with:
  - no PLC experience or
  - experience of other manufacturer's programming language or
  - experience of high level programming languages
- Variable names for PLC, HMI, SCADA, and other I/O devices can be consolidated.
- Features Offline simulation function

## Powerful communication performance in one CPU

All models have Ethernet, serial, USB (host & device) communication ports as standard. Additional communication ports can be realized by option boards.

## Wide range of expansion units are available\*

\*Expansion units, terminal block and dimensions are compatible with previous compact series MICRO-EH

<p><b>MICRO-EHV+</b></p>  <p>Modular PLC <b>EHV+</b></p>	<p><b>EHV-CODESYS</b></p> <p>Hitachi version of CODESYS by 3S-Smart Software Solutions GmbH</p> 
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Functions ↑

Compact PLC  
**MICRO-EHV+**

I/O numbers →

## MICRO-EHV+ Basic unit

User program memory 1,024kB  
Data memory (non-retain) 640kB  
Data memory (retain) 256kB

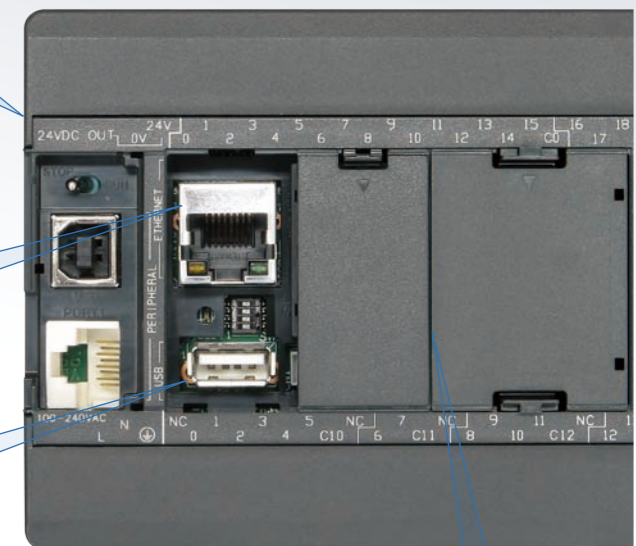
**3 communication ports**

- Ethernet port (10BASE-T/100BASE-T)
- USB port (Ver.2.0 FullSpeed 12Mbps)
- Serial port (RS-232C)

**USB host function**

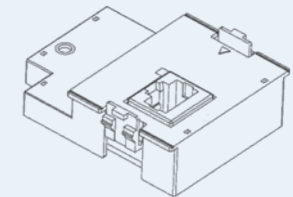
- Memory storage can be used for data logging, program upload/download.

**User program is stored in non-volatile FLASH memory**  
(Data is stored in volatile RAM memory Retained by battery.)



**Option board**

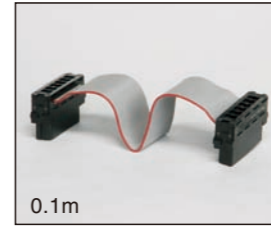

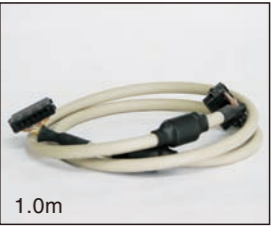
- RS-485 port can be added as option



## No. of I/O Is Max. 320 (using 64 pts expansion unit)

Basic unit

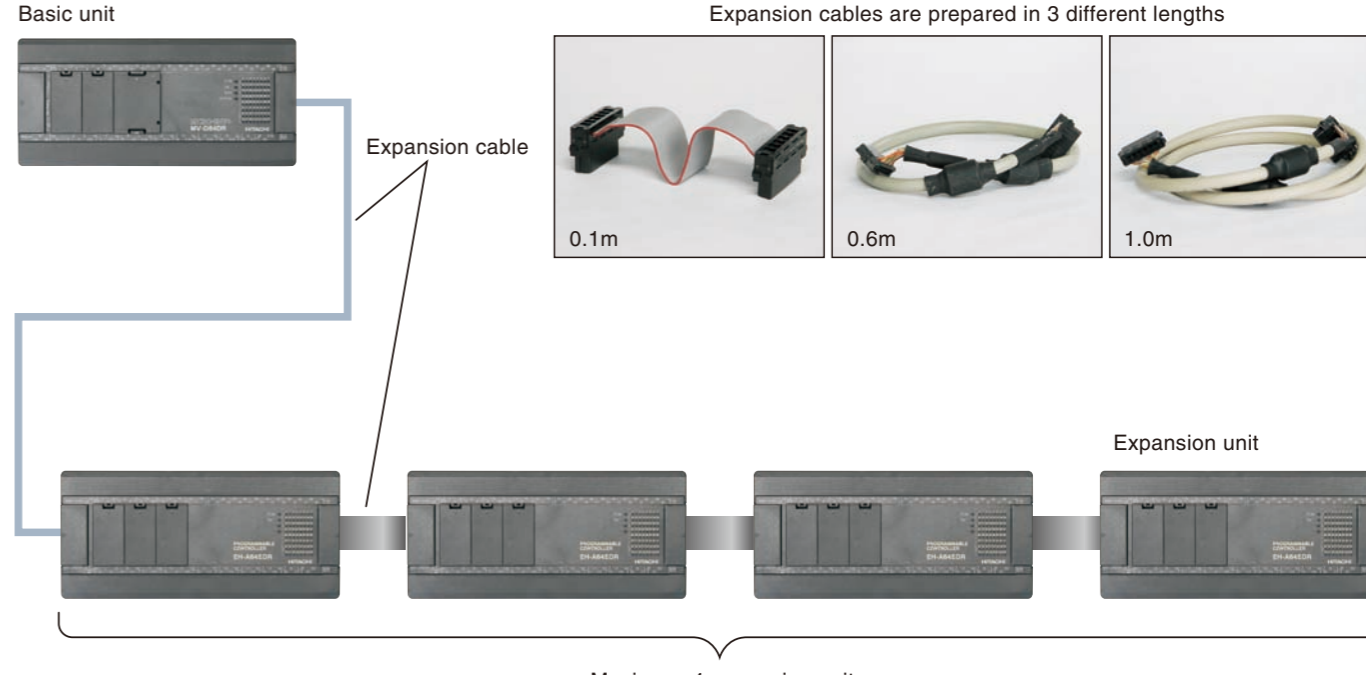
Expansion cables are prepared in 3 different lengths

		
0.1m	0.6m	1.0m

Expansion cable

Expansion unit

Maximum 4 expansion units



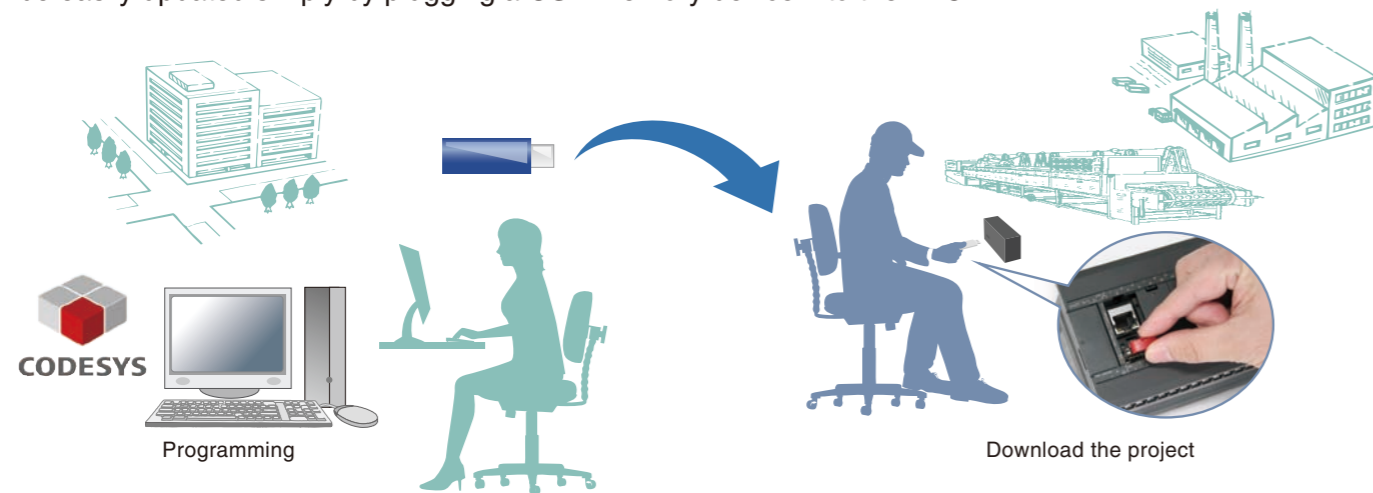
# Advantage in your application

## USB storage



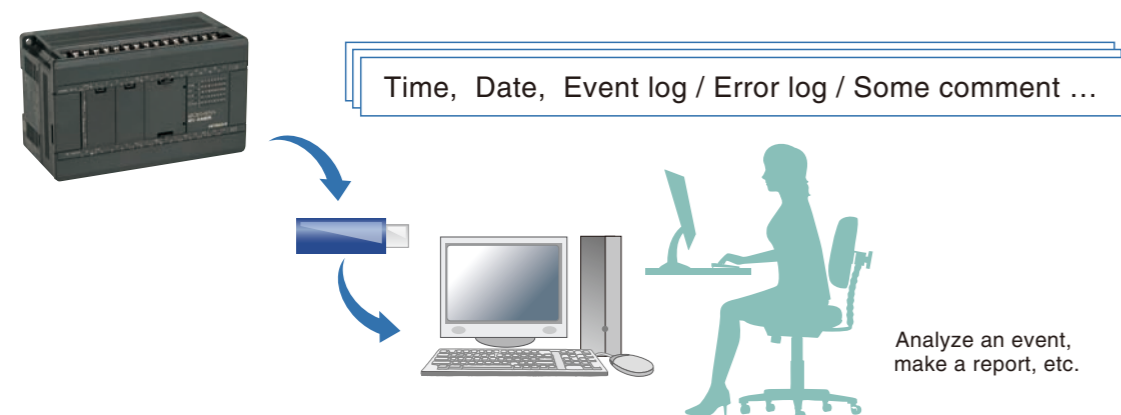
### Program Download/Upload without a PC connection

If end users don't have EHV-CODESYS or are not familiar with PLC programming, the user-program can be easily updated simply by plugging a USB memory device into the PLC.



### Data logging to USB storage

Logging data can be stored on to a USB memory device using a specific library. Logging data can then be analyzed or edited remotely.

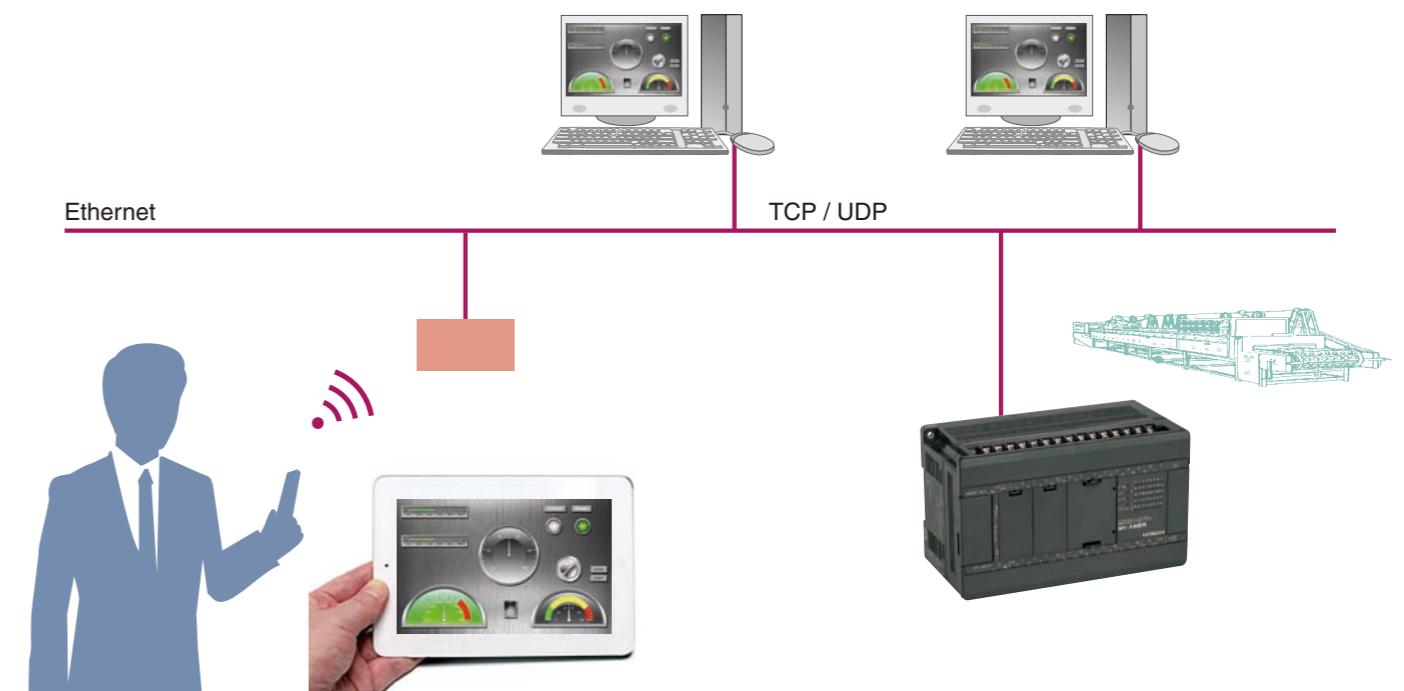


Note : Using USB memory does not mean to expand MICRO-EHV+ CPU memory .

## Web visualization



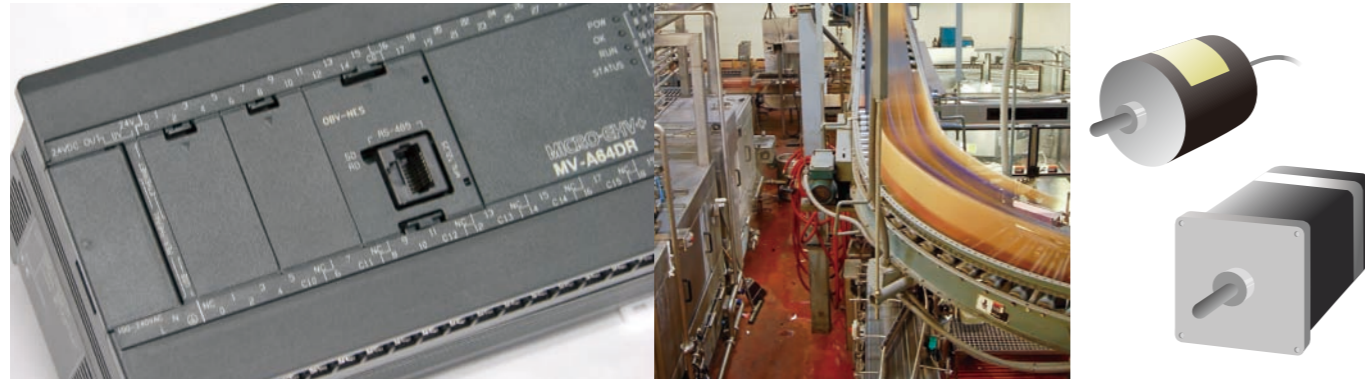
Worldwide access to MICRO-EHV+ via an internet browser. I/O data can be monitored like HMI via a PC, Smartphone or Tablet.



- Functionality**
- Visualization over Internet / Intranet
  - WebServer is adopted as standard
  - JavaScript Execution

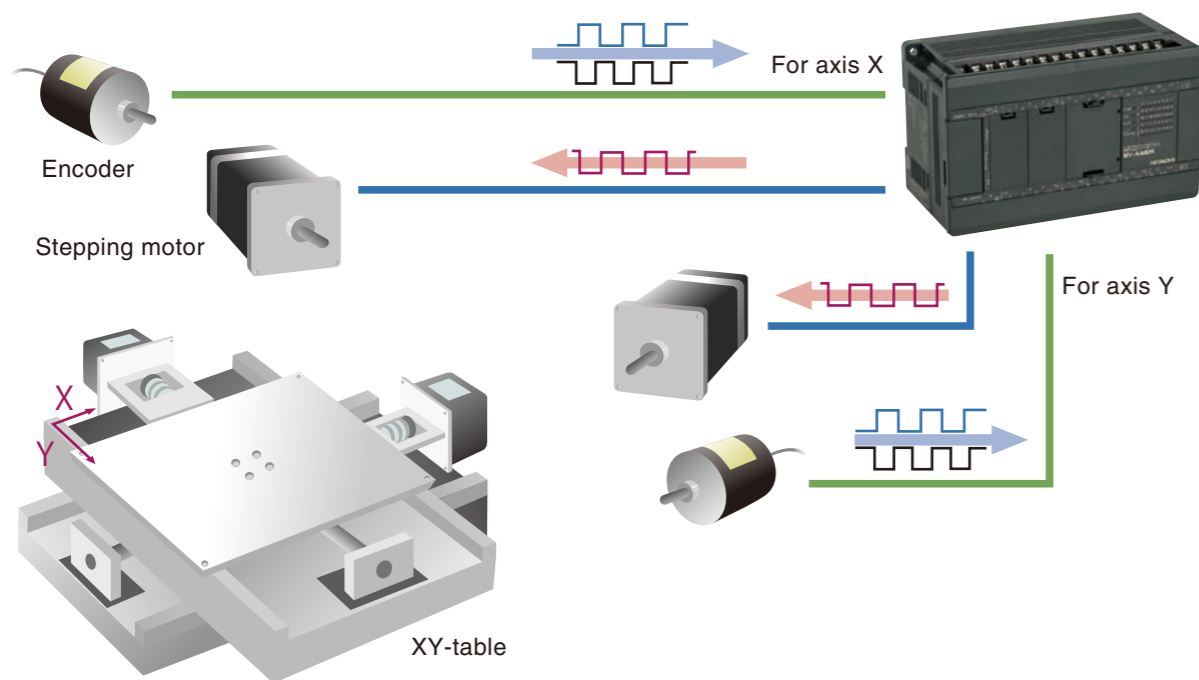
- Purpose**
- Remote maintenance
  - Diagnostics
  - Remote control

**Simple automation system**



**Application Example – Position control**

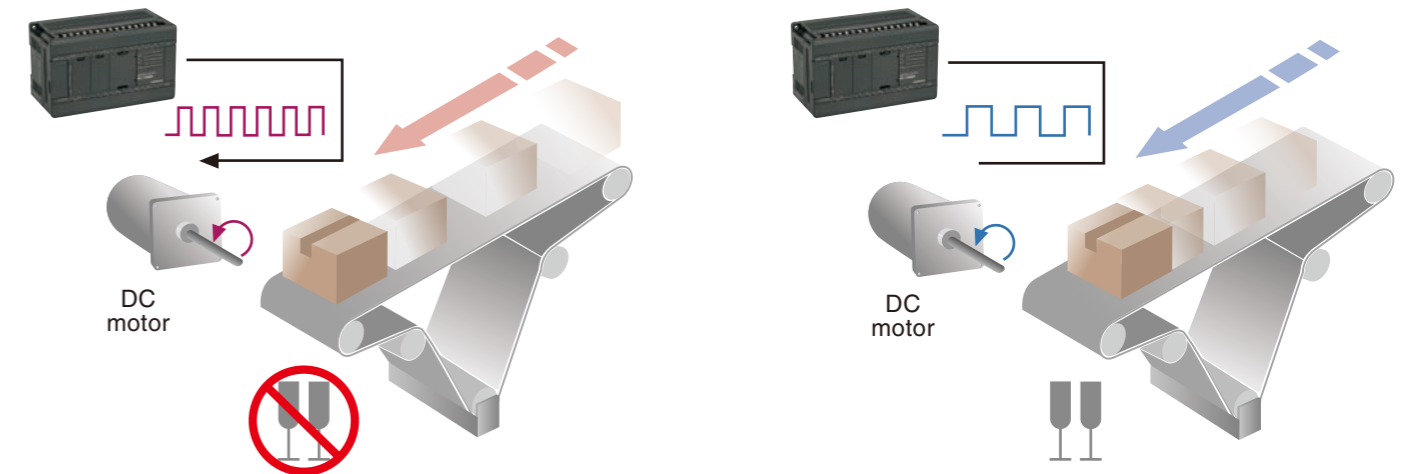
Using the built in High-speed counter and pulse train output a simple position control system can be achieved without the need for a dedicated motion controller.



- High-speed counter Single counter / Max. 5ch, 100kHz, 32bits  
2 phase counter / Max. 2ch, 60kHz, 32bits
- Pulse train output Max. 3ch, 65kHz, Specific libraries will be prepared

**Application Example – Speed control using PWM output**

Speed control can be achieved without a dedicated speed control unit.

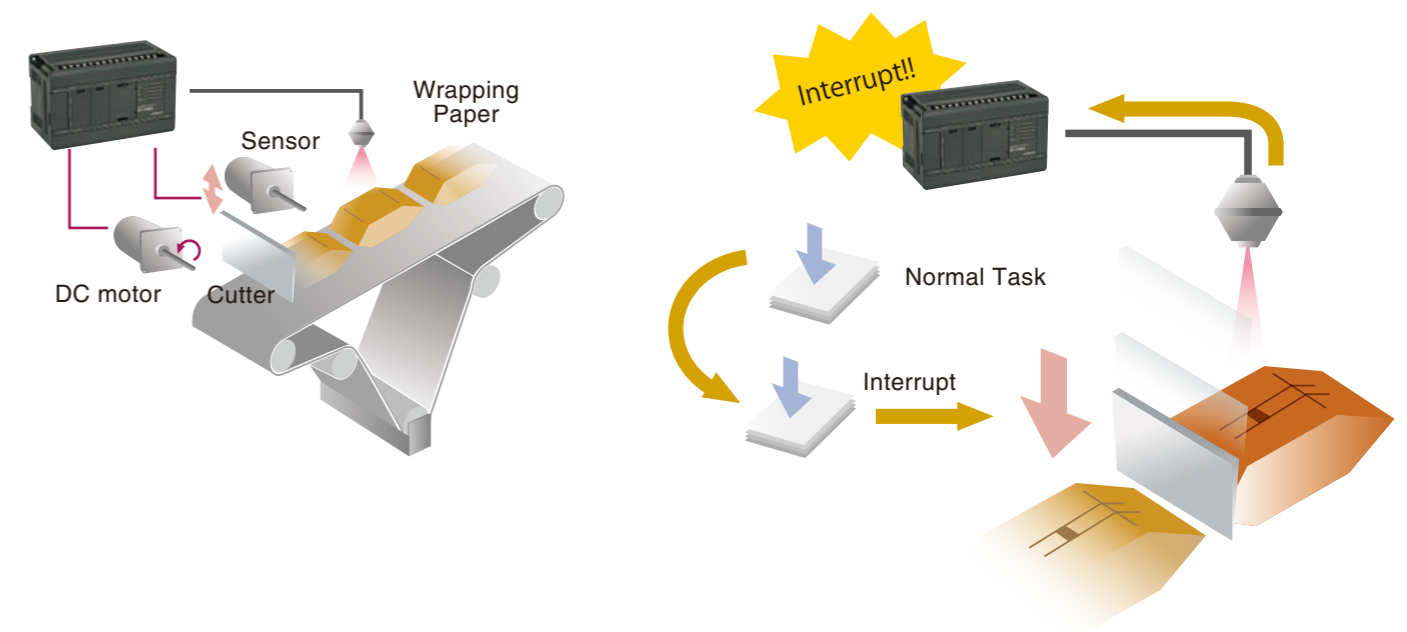


Conveyor speed can be changed depending on the contents of packages.

- PWM output Max. 3ch, 65kHz, Specific libraries will be prepared

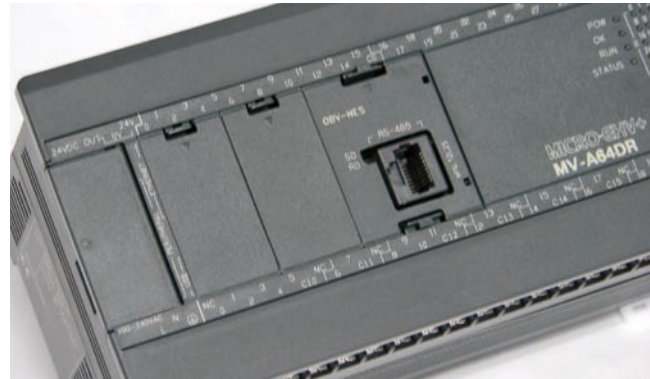
**Application Example – Interrupt input**

Specific processing can be executed without jitter.



- Interrupt input Max. 5ch

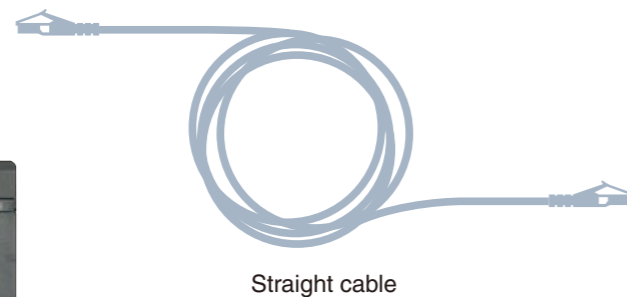
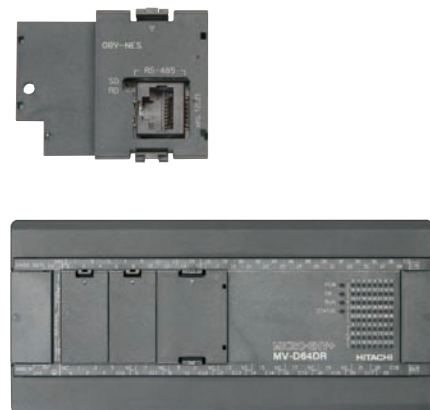
### Easy communication with Hitachi Inverter



Economical Inverter  
**NE-S1**

MICRO-EHV+ can be used as a controller for multiple Hitachi inverters. The new option board OBV-NES can turn the MICRO-EHV+ into the ideal controller for the Hitachi NE-S1 series inverter. Communication is achieved using a standard Cat. 5 LAN cable.

OBV-NES



Straight cable



**NE-S1**

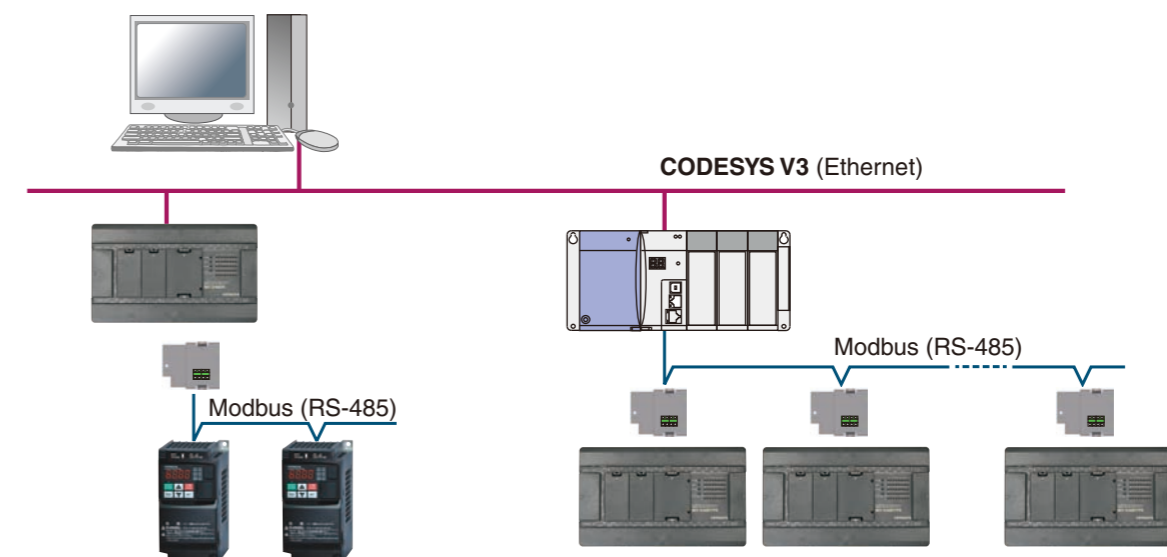
By using RJ-45 splitter, multi-drop connection will be achieved easily.



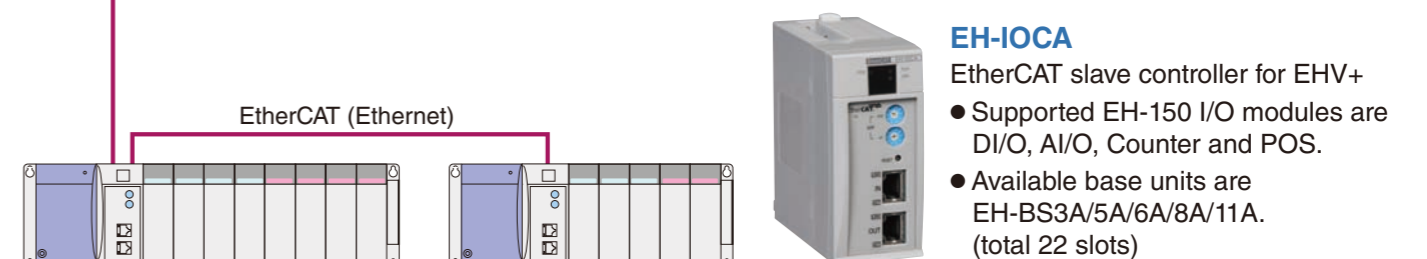
### Compliance with Fieldbus Standards



MICRO-EHV+ supports Modbus / TCP, Modbus / RTU and EtherCAT. (EtherCAT under preparation).



I/O extension using Hitachi EH-150 series I/O modules in combination with the EH-IOCA EtherCAT slave module.



#### EH-IOCA

EtherCAT slave controller for EHV+

- Supported EH-150 I/O modules are DI/O, AI/O, Counter and POS.
- Available base units are EH-BS3A/5A/6A/8A/11A. (total 22 slots)

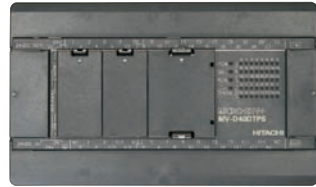
# Overview of products lineup

## Basic units

### 40 points type

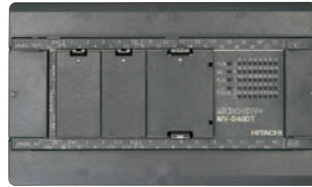
DC power supply (24V),  
DC input 24pts,  
TR output 16pts (source)  
with short circuit protection

#### MV-D40DTPS



DC power supply (24V),  
DC input 24pts,  
TR output 16pts (sink)

#### MV-D40DT



DC power supply (24V),  
DC input 24pts,  
RY output 16pts

#### MV-D40DR



AC power supply (100/200V),  
DC input 24pts,  
RY output 16pts

#### MV-A40DR



### 64 points type

DC power supply (24V),  
DC24V input 40pts,  
TR output 24pts (source)  
with short circuit protection

#### MV-D64DTPS



DC power supply (24V),  
DC24V input 40pts,  
TR output 24pts (sink)

#### MV-D64DT



DC power supply (24V),  
DC24V input 40pts,  
RY output 24pts

#### MV-D64DR



AC power supply (100/200V),  
DC24V input 40pts,  
RY output 24pts

#### MV-A64DR



## Expansion units (Digital I/O)

### 8 points type



- EH-D8ED** : DC power supply (24V), DC input 8pts
- EH-D8ER** : DC power supply (24V), RY output 8pts
- EH-D8ETPS** : DC power supply (24V),  
TR output 8pts (source) with short circuit protection
- EH-D8ET** : DC power supply (24V), TR output 8pts (sink)
- EH-D8EDR** : DC power supply (24V), DC input 4pts, RY output 4pts
- EH-D8EDTPS** : DC power supply (24V), DC input 4pts,  
TR output 4pts (source) with short circuit protection
- EH-D8EDT** : DC power supply (24V), DC input 4pts, TR output 4pts (sink)

### 14 points type



- EH-D14EDT** : DC power supply (24V), DC input 8pts, TR output 6pts (sink)
- EH-D14EDTP** : DC power supply (24V), DC input 8pts, TR output 6pts (source)
- EH-D14EDTSPS** : DC power supply (24V), DC input 8pts,  
TR output 6pts (source) with short circuit protection
- EH-D14EDR** : DC power supply (24V), DC input 8pts, RY output 6pts
- EH-A14EDR** : AC power supply (100/200V), DC input 8pts, RY output 6pts

### 16 points type



- EH-D16ED** : DC power supply (24V), DC input 16pts
- EH-D16ER** : DC power supply (24V), RY output 16pts
- EH-D16ETPS** : DC power supply (24V),  
TR output 16pts (source) with short circuit protection
- EH-D16ET** : DC power supply (24V), TR output 16pts (sink)

### 28 points type



- EH-D28EDT** : DC power supply (24V), DC input 16pts,  
TR output 12pts (sink)
- EH-D28EDTP** : DC power supply (24V), DC input 16pts,  
TR output 12pts (source)
- EH-D28EDTSPS** : DC power supply (24V), DC input 16pts,  
TR output 12pts (source) with short circuit protection
- EH-D28EDR** : DC power supply (24V), DC input 16pts,  
RY output 12pts
- EH-A28EDR** : AC power supply (100/200V), DC input 16pts,  
RY output 12pts

### 64 points type



- EH-D64EDT** : DC power supply (24V), DC input 40pts,  
TR output 24pts (sink)
- EH-D64EDTSPS** : DC power supply (24V), DC input 40pts,  
TR output 24pts (source) with short circuit protection
- EH-D64EDR** : DC power supply (24V), DC input 40pts,  
RY output 24pts
- EH-A64EDR** : AC power supply (100/200V), DC input 40pts,  
RY output 24pts

# Programming software “EHV-CODESYS”

## Expansion units (Analog I/O)

### Analog



**EH-D6EAN** : DC power supply (24V), Analog input 4pts, Analog output 2pts  
**EH-A6EAN** : AC power supply (100/200V), Analog input 4pts, Analog output 2pts

### RTD



**EH-D6ERTD** : DC power supply (24V), RTD input 4pts, Analog output 2pts  
**EH-D4ERTD** : DC power supply (24V), RTD input 4pts  
**EH-A6ERTD** : AC power supply (100/200V), RTD input 4pts, Analog output 2pts  
**EH-A4ERTD** : AC power supply (100/200V), RTD input 4pts

### Thermocouple

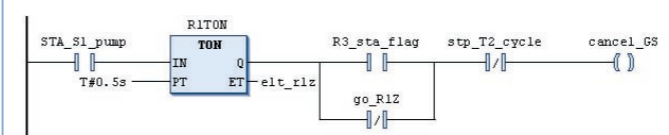


**EH-D6ETC** : DC power supply (24V), Thermocouple input 4pts, Analog output 2pts  
**EH-D4ETC** : DC power supply (24V), Thermocouple input 4pts

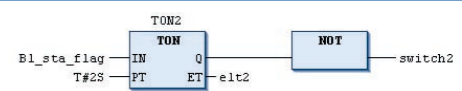
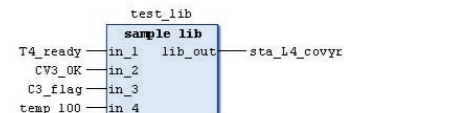
## ● Five programming language editors

The user can freely select among the 5 programming languages of the IEC61131-3 standard according to the intended purpose and the programmer's skills and experience.

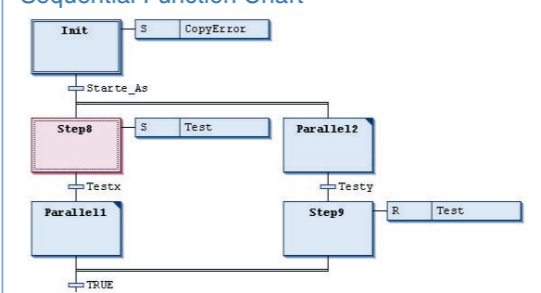
#### LD Ladder Diagram



#### FBD Function Block Diagram

#### SFC Sequential Function Chart



#### IL Instruction List

```
LD      bVar
ST      inst1.IN
JMPC    m1
CAL     inst1(
        PT:=t1,
        ET:=>tout1)
LD      inst1.Q
ST      inst2.IN
```

#### ST Structured Text

```
1  a := a + 1;
2  t1(IN:=FALSE, PT:= T#5S);
3  t1(IN:=TRUE);
4  FOR i := 0 TO count DO
5  test_l_int();
6  END_FOR
7  IF value < 7 THEN
8  WHILE value < 8 DO
9  value:=value+1;
10 END_WHILE;
11 END_IF;
```

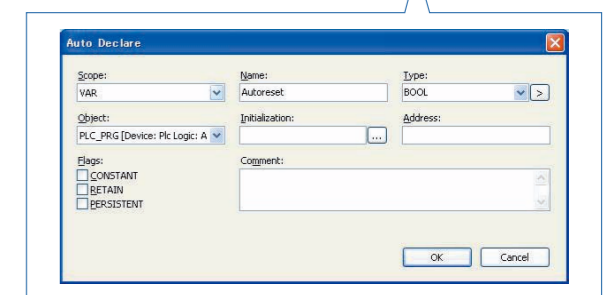
## ● Easy and efficient programming

### Structured Programming

Task configuration and structured-based editors on POU (Program Organization Unit) enable flexible programming.

### Programming with variable names

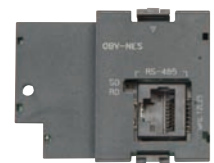
Programming with variable name enables you to be free from I/O addressing of PLC.



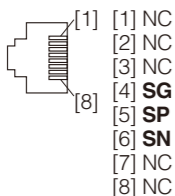
## Options

### Communication board

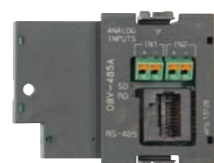
#### OBV-NES



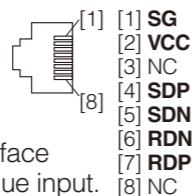
RS-485 2-wires interface option.



#### OBV-485A



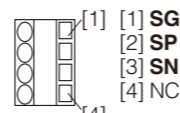
RS-485 4-wires interface option with 2-analogue input. compatible with EH-OB485.



#### OBV-485T



RS-485 2-wires interface option. Terminal connection. (Under planning)



### Battery



#### MV-BAT

For data memory retention. 1750mAh.



## ● Debugging and commissioning features

Many of user-friendly debugging and commissioning features are supported.

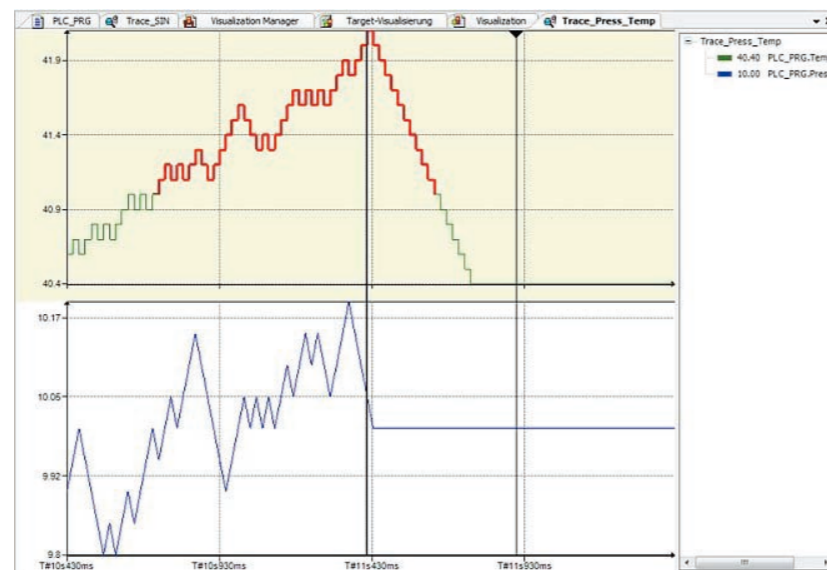
- Monitoring
- Forcing of variables
- Break points
- Single step execution
- Single cycle execution
- Flow control
- Online change
- Incremental compile
- Incremental download
- Sampling trace
- Simulation
- and much more.

Expression	Type	Value	Prepared value
Startime	TIME	T#0ms	
S3	GEN		
MODE	GEN_MODE	GEN_MODE.SAWTOO...	
BASE	BOOL	FALSE	TRUE
PERIOD	TIME	T#1s	
CYCLES	INT	100	45
AMPLITUDE	INT	1000	
RESET	BOOL	FALSE	
OUT	INT	-280	

```

13 D(IN:=INT_TO_REAL(S6.Out 440) , TM:=10 , RESET:=FALSE );
14 B(ENABLE:=TRUE, TIMELOW:=t#4s , TIMEHIGH:=t#8s);
15 ispecialsinus -833 := S12.Out 639 - S11.OUT 1472 ;
16 RETURN
    
```

Forcing of variables



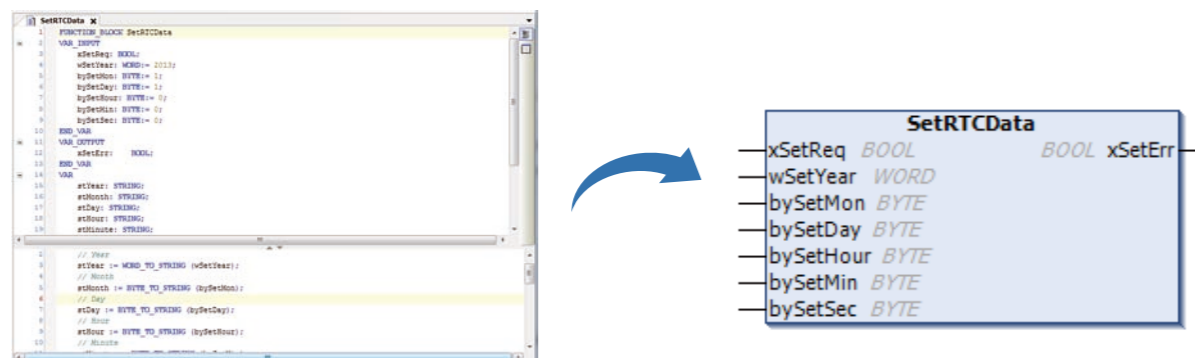
Sampling trace

## ● Library

For efficient programming, libraries are a convenient tool. Through the use of libraries, overall programming time can be shortened.

EHV-CODESYS already contains many built-in libraries for various purposes.

The user can create their own library from a collection of commonly used sub-routines. Re-use of such objects can save time in programming and testing.



## Specifications

### Basic units

40 points type



64 points type



I/O external connection : Removable type screw terminal block (M3)

### [CPU specification]

Item	40 points type	60 points type
Platform	CODESYS Runtime V3.5 SP3 Patch4	
Boolean execution speed	0.54µs/instruction	
User Program memory	1MB	
Source file memory	1MB	
Data memory (non retain)	640KB	
Data memory (retain)	256KB	
Programming languages	IEC61131-3 compliant 5 languages (LD, FBD, SFC, IL, ST)	
No. of expansion unit	4	
No. of I/O (using 64pts exp. units)	296 ( In 184 / Out 112 )	320 ( In 200 / Out 120 )
Special I/O	Single phase counter	Max. 5ch, 100kHz
	2 phase counter	Max. 2ch, 60kHz
	Pulse train output	Max. 3ch, 65kHz
	PWM output	Max. 3ch, 65kHz
	Interrupt	Max. 5 ch
I/O updating cycle	Refresh processing (depends on each task cycle)	
USB	Device function	For programming. Built-in USB 2.0 Full speed
	Host function	USB stick can be used for a copy of project and data logging (under preparation)
Ethernet*	UDP/IP, TCP/IP	Programming, General purpose, Modbus/TCP server, EtherCAT master (under preparation)
	RS-232C (Built-in)	General purpose, Modbus/RTU master and slave
Serial	RS-485 (Option)	General purpose, Modbus/RTU master and slave
	Web visualization function	(under preparation)
RTC	Built-in	
Battery	Optional	

### [I/O specification]

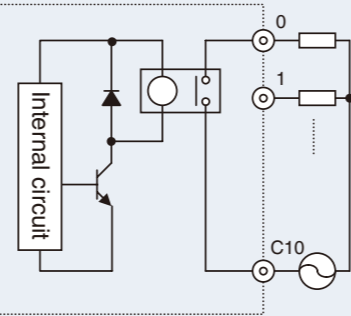
#### DC input

MV-A64DR / MV-D64DR : 24 pts, MV-A40DR / MV-D40DR : 16 pts

Item	Specification		Circuit diagram
	bit 0, 2, 4, 6, 8	The other inputs	
Input voltage	24 V DC		
Allowable input voltage range	0 to 30 V DC		
Input impedance	Approx. 2.7kΩ	Approx. 4.7 kΩ	
Input current	Approx. 8 mA	Approx. 4.8 mA	
Operating voltage	On voltage	15 V DC (min.) / 4.5 mA (max.)	
	OFF voltage	5 V DC (min.) / 1.8 mA (max.)	
Input lag	OFF → ON	0.5 to 20ms (configurable)	
	ON → OFF	0.5 to 20ms (configurable)	
Polarity	None		
Insulation system	Photocoupler insulation		
Input display	LED (green)		
External connection	Removable type screw terminal block (M3)		

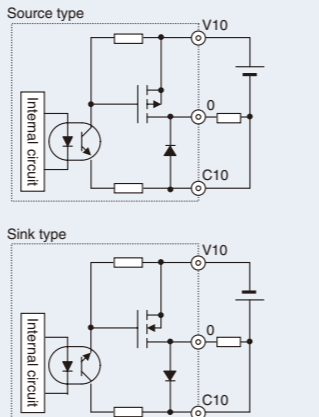
### Relay output

MV-A64DR / MV-D64DR : 24 pts, MV-A40DR / MV-D40DR : 16 pts

Item	Specification	Circuit diagram
Rated load voltage	5 – 250 V AC, 5 – 30V DC	
Minimum switching current	10 mA (5V DC)	
Maximum load current	1 circuit: 2A (24V DC, 20V AC) 1 common: 5A	
Output response time	OFF → ON: 15 ms (max.) ON → OFF: 15 ms (max.)	
Surge removal circuit	None	
Fuse	None	
Insulation system	Relay insulation	
Output display	LED (green)	
Externally supplied power (for driving relays)	Not need	
Contact life	20,000,000 times (mechanical) 200,000 times (electrical : 1.5 A)	
Insulation	1,500V or more (external – internal) 500V or more (external – external)	

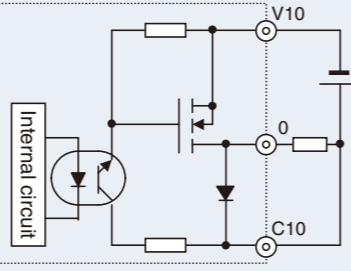
### DC Transistor output

MV-D64DT, MV-D40DT : bit 0-2 (3 pts) , MV-D64DTPS, MV-D40DTPS : bit 0-3 (4 pts)

Item	Specification	Circuit diagram
Rated load voltage	24/12 V DC ( +10 % , -15 % )	
Minimum switching current	10 mA	
Leak current	0.1 mA	
Maximum load current	1 circuit: 0.5 A / 24V DC, 0.3 A / 12V DC 1 common: 2A	
Output response time	OFF → ON: bit 0-2: 5µs (max.) / 24V DC 0.2A bit 3: 0.5ms (max.) / 24V DC ON → OFF: bit 0-2: 5µs (max.) / 24V DC 0.2A bit 3: 0.5ms (max.) / 24V DC	
Surge removal circuit	None	
Fuse	None	
Insulation system	Photocoupler insulation	
Output display	LED (green)	
Externally supplied power	12 to 30 V DC	
Insulation	1,500V or more (external – internal) 500V or more (external – external)	
Output voltage	0.3 V DC (max.)	

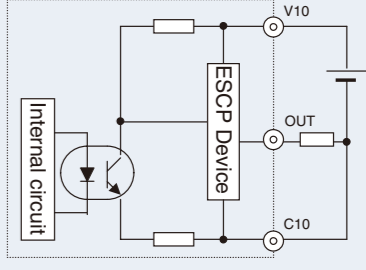
### DC Transistor output

MV-D64DT : 21 pts from bit 3, MV-D40DT : 13 pts from bit 3

Item	Specification	Circuit diagram
Rated load voltage	24/12 V DC ( +10 % , -15 % )	
Minimum switching current	10 mA	
Leak current	0.1mA	
Maximum load current	1 circuit: 0.5A 1 common: 2A	
Output response time	OFF → ON: 0.1 ms (max.) / 24V DC ON → OFF: 0.1 ms (max.) / 24V DC	
Surge removal circuit	None	
Fuse	None	
Insulation system	Photocoupler insulation	
Output display	LED (green)	
Externally supplied power	12 to 30 V DC	
Insulation	1,500V or more (external – internal) 500V or more (external – external)	
Output voltage	0.3 V DC (max.)	

### DC Transistor output (ESCP type)

MV-D64DTPS : 20 pts from bit 4, MV-D40DTPS : 12 pts from bit 4

Item	Specification	Circuit diagram
Rated load voltage	24/12 V DC ( +10 % , -15 % )	
Minimum switching current	10 mA	
Leak current	0.1mA	
Maximum load current	1 circuit: 0.7A 1 common: 2A	
Output response time	OFF → ON: 0.5 ms (max.) / 24V DC ON → OFF: 0.5 ms (max.) / 24V DC	
Surge removal circuit	None	
Fuse	None	
Insulation system	Photocoupler insulation	
Output display	LED (green)	
Externally supplied power	12 to 30 V DC	
Insulation	1,500V or more (external – internal) 500V or more (external – external)	
Output voltage	0.3 V DC (max.)	

### High-speed counter

Item	Single phase	2-phase
Available input	bit 0, 2, 4, 6, 8	bit 0/2/3, bit 4/6/7
Input voltage	ON: 18V OFF: 5V	
Count pulse width	10 µs	17 µs
Maximum count frequency	100 kHz at each channel	60 kHz at each channel
Counter register		
Coincidence output		32 bits
ON/OFF-preset		Allowed
Upper/lower limit setting		Not Allowed

### PWM output / Pulse Train Output

Item	Specification
Available output	Bit 0-2
Load voltage	12 / 24 V
Minimum load current	1 mA
PWM max. output frequency	65,535 Hz at each channel
Pulse train max. output frequency	65,535 Hz at each channel

### Interrupt input

Item	Specification
Input that can be used	bit 1, 3, 5, 7, 9
Input voltage	ON: 18 V OFF: 5 V

**Expansion units**



I/O external connection : Removable type screw terminal block (M3)

**DC input ( 14 / 28 points expansion unit)**

EH-D14EDT / EH-D14EDTP / EH-D14EDTPS / EH-D14EDR / EH-A14EDR : 8 pts  
EH-D28EDT / EH-D28EDTP / EH-D28EDTPS / EH-D28EDR / EH-A28EDR : 16 pts

Item	Specification	Circuit diagram	
Input voltage	24 V DC		
Allowable input voltage range	0 to 30 V DC		
Input impedance	Approx. 2.8 kΩ		
Input current	Approx. 7.5 mA		
Operating voltage	On voltage		15 V DC (min.) / 4.5 mA (max.)
	OFF voltage		5 V DC (min.) / 1.5 mA (max.)
Input lag	OFF → ON		0.5 ms or less
	ON → OFF		0.5 ms or less
Polarity	None		
Insulation system	Photocopler insulation		
Input display	LED (green)		

**DC input ( 8 / 16 points expansion unit)**

EH-D8ED : 8 pts , EH-D8EDR / EH-D8EDTPS / EH-D8EDT : 4 pts, EH-D16ED : 16 pts

Item	Specification		Circuit diagram
	EH-D8EDR EH-D8EDTPS EH-D8EDT	EH-D8ED EH-D16ED	
Input voltage	24 V DC		
Allowable input voltage range	0 to 30 V DC		
Input impedance	Approx. 2.8 kΩ	Approx. 4.8 kΩ	
Input current	Approx. 7.5 mA	Approx. 4.8 mA	
Operating voltage	On voltage	15 V DC (min.) / 4.5 mA (max.)	
	OFF voltage	5 V DC (min.) / 1.5 mA (max.)	
Input lag	OFF → ON	4 ms (TYP)	
	ON → OFF	2 ms (TYP)	
Polarity	None		
Insulation system	Photocopler insulation		
Input display	LED (green)		

**DC input ( 64 points expansion unit)**

EH-A64EDR / EH-D64EDR / EH-D64EDT / EH-D64EDTPS : 40 pts

Item	Specification		Circuit diagram
	bit 0, 2, 4, 6	The other inputs	
Input voltage	24 V DC		
Allowable input voltage range	0 to 30 V DC		
Input impedance	Approx. 2.7 kΩ	Approx. 4.7 kΩ	
Input current	Approx. 8 mA	Approx. 4.8 mA	
Operating voltage	On voltage	18 V DC (min.) / 4.5 mA (max.)	
	OFF voltage	5 V DC (min.) / 1.8 mA (max.)	
Input lag	OFF → ON	2 ms or less	
	ON → OFF	2 ms or less	
Polarity	None		
Insulation system	Photocopler insulation		
Input display	LED (green)		

**Relay output (14 points / 28 points expansion unit)**

EH-D14EDR / EH-A14EDR : 6 pts , EH-D28EDR / EH-A28EDR : 12 pts

Item	Specification	Circuit diagram
Rated load voltage	5 – 250 V AC, 5 – 30V DC	
Maximum load current	1 circuit 1 common 5A	
Output response time	OFF → ON ON → OFF 15 ms (max.) 15 ms (max.)	
Surge removal circuit	None	
Fuse	None	
Insulation system	Relay insulation	
Output display	LED (green)	
Externally supplied power (for driving relays)	Not necessary	
Contact life	20,000,000 times (mechanical) 200,000 times (electrical : 2 A)	
Insulation	1,500V or more (external – internal) 500V or more (external – external)	

**Relay output (8 points / 16 points expansion unit)**

EH-D8ER : 8 pts , EH-D8EDR : 4 pts, EH-D16ER : 16 pts

Item	Specification	Circuit diagram
Rated load voltage	5 – 250 V AC, 5 – 30V DC	
Maximum load current	1 circuit 1 common 5A	
Output response time	OFF → ON ON → OFF 15 ms (max.) 15 ms (max.)	
Surge removal circuit	None	
Fuse	None	
Insulation system	Relay insulation	
Output display	LED (green)	
Externally supplied power (for driving relays)	Not necessary	
Contact life	20,000,000 times (mechanical) 200,000 times (electrical : 2 A)	
Insulation	1,500V or more (external – internal) 500V or more (external – external)	

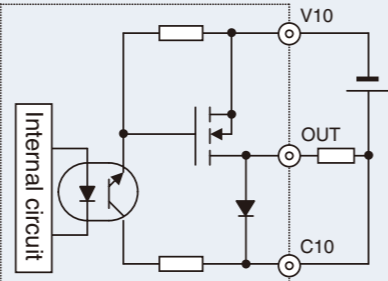
**Relay output (64 points expansion unit)**

EH-A64EDR / EH-D64EDR : 24 pts

Item	Specification	Circuit diagram
Rated load voltage	5 – 250 V AC, 5 – 30V DC	
Maximum load current	1 circuit 1 common -	
Output response time	OFF → ON ON → OFF 15 ms (max.) 15 ms (max.)	
Surge removal circuit	None	
Fuse	None	
Insulation system	Relay insulation	
Output display	LED (green)	
Externally supplied power (for driving relays)	Not necessary	
Contact life	20,000,000 times (mechanical) 200,000 times (electrical : 2 A)	
Insulation	1,500V or more (external – internal) 500V or more (external – external)	

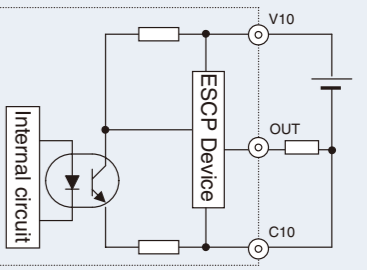
**DC Transistor output : LCDC-Low Current (8 / 16 points expansion unit)**

EH-D8ET : 8 pts, EH-D16ET : 16 pts

Item	Specification	Circuit diagram
Output specification	Sink output	
Rated load voltage	24 V DC	
Minimum switching current	1 mA	
Leak current	0.1 mA (max.)	
Maximum load current	1 circuit: 0.5A 1 common: 3A	
Output response time	OFF → ON: 0.5 ms (max.) 24 V DC 0.2A ON → OFF: 0.5 ms (max.) 24 V DC 0.2A	
Surge removal circuit	None	
Fuse	None	
Insulation system	Photocoupler insulation	
Output display	LED (green)	
Externally supplied power	12 to 30 V DC	
Insulation	1,500V or more (external – internal) 500V or more (external – external)	
Output voltage drop	0.3 V DC (max.)	

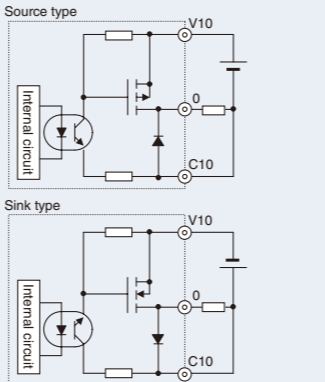
**DC Transistor output (ESCP type) LCDC-Low Current (8 / 14 / 16 / 28 points expansion unit)**

EH-D8ETPS : 8 pts, EH-D8EDTPS : 2 pts, EH-D14EDTPS : 4 pts, EH-D16EDTPS : 16 pts, EH-D28EDTPS : 8 pts

Item	Specification	Circuit diagram
Rated load voltage	24/12 V DC (+10 %, -15%)	
Minimum switching current	10 mA	
Leak current	0.1 mA (max.)	
Maximum load current	1 circuit: 0.7A / 24V DC 1 common: 3A	
Output response time	OFF → ON: 0.5 ms (max.) 24 V DC 0.2A ON → OFF: 0.5 ms (max.) 24 V DC 0.2A	
Surge removal circuit	None	
Fuse	None	
Insulation system	Photocoupler insulation	
Output display	LED (green)	
Externally supplied power	12 to 30 V DC	
Insulation	1,500V or more (external – internal) 500V or more (external – external)	
Output voltage drop	0.3 V DC (max.)	

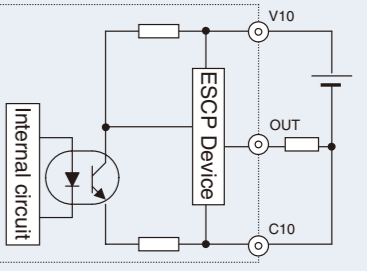
**DC Transistor output : LCDC-Low Current (8 / 14 / 28 points expansion unit)**

EH-D8EDT : 2 pts, EH-D14EDT / EH-D14EDTPS : 4 pts, EH-D28EDT / EH-D28EDTPS : 8 pts

Item	Specification	Circuit diagram
Rated load voltage	24/12 V DC (+10 %, -15%)	
Minimum switching current	1 mA	
Leak current	0.1 mA (max.)	
Maximum load current	1 circuit: 0.75A / 24V DC, 0.5A / 12V DC 1 common: 3A	
Output response time	OFF → ON: 0.1 ms (max.) 24 V DC 0.2A ON → OFF: 0.1 ms (max.) 24 V DC 0.2A	
Surge removal circuit	None	
Fuse	None	
Insulation system	Photocoupler insulation	
Output display	LED (green)	
Externally supplied power	12 to 30 V DC	
Insulation	1,500V or more (external – internal) 500V or more (external – external)	
Output voltage drop	0.3 V DC (max.)	

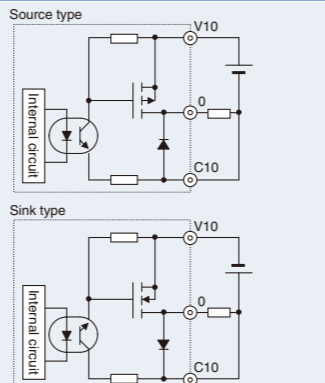
**DC Transistor output (ESCP type) HCDC-High Current (8 / 14 / 28 points expansion unit)**

EH-D8EDTPS : 2 pts, EH-D14EDTPS : 2 pts, EH-D28EDTPS : 4 pts

Item	Specification	Circuit diagram
Rated load voltage	24/12 V DC (+10 %, -15%)	
Minimum switching current	10 mA	
Leak current	0.1 mA (max.)	
Maximum load current	1 circuit: 1A 1 common: 3A	
Output response time	OFF → ON: 0.05 ms (max.) 24 V DC ON → OFF: 0.05 ms (max.) 24 V DC	
Surge removal circuit	None	
Fuse	None	
Insulation system	Photocoupler insulation	
Output display	LED (green)	
Externally supplied power	12 to 30 V DC	
Insulation	1,500V or more (external – internal) 500V or more (external – external)	
Output voltage drop	0.3 V DC (max.)	

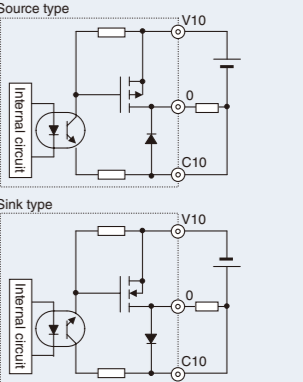
**DC Transistor output : HCDC-High Current (8 / 14 / 28 points expansion unit)**

EH-D8EDT : 2 pts, EH-D14EDT / EH-D14EDTPS : 2 pts, EH-D28EDT / EH-D28EDTPS : 4 pts

Item	Specification	Circuit diagram
Rated load voltage	24/12 V DC (+10 %, -15%)	
Minimum switching current	1 mA	
Leak current	0.1 mA (max.)	
Maximum load current	1 circuit: 1A / 24V DC 1 common: 3A	
Output response time	OFF → ON: 0.1 ms (max.) 24 V DC 0.2A ON → OFF: 0.1 ms (max.) 24 V DC 0.2A	
Surge removal circuit	None	
Fuse	None	
Insulation system	Photocoupler insulation	
Output display	LED (green)	
Externally supplied power	12 to 30 V DC	
Insulation	1,500V or more (external – internal) 500V or more (external – external)	
Output voltage drop	0.3 V DC (max.)	

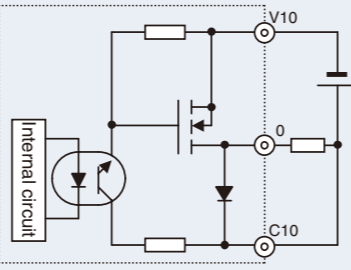
**DC Transistor output (64 points expansion unit)**

EH-D64EDT / EH-D64EDTPS : bit 0-3 (4 pts)

Item	Specification	Circuit diagram
Rated load voltage	24/12 V DC (+10 %, -15%)	
Minimum switching current	10 mA	
Leak current	0.1 mA (max.)	
Maximum load current	1 circuit: 0.5A 24V DC, 0.3A 12V DC 1 common: 2.0A	
Output response time	OFF → ON: 5μs (max.) 24 V DC ON → OFF: 5μs(max.) 24 V DC	
Surge removal circuit	None	
Fuse	None	
Insulation system	Photocoupler insulation	
Output display	LED (green)	
Externally supplied power	12 to 30 V DC	
Insulation	1,500V or more (external – internal) 500V or more (external – external)	
Output voltage drop	0.3 V DC (max.)	

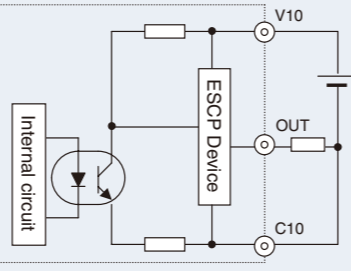
### DC Transistor output (64 points expansion unit)

EH-D64EDT : bit 4-23 (20 pts)

Item	Specification	Circuit diagram
Rated load voltage	24/12 V DC (+10 %, -15%)	
Minimum switching current	10 mA	
Leak current	0.1 mA (max.)	
Maximum load current	1 circuit: 0.5A 1 common: 64 pts : 3A, 40 pts : 5A	
Output response time	OFF → ON: 0.1ms (max.) 24 V DC ON → OFF: 0.1ms (max.) 24 V DC	
Surge removal circuit	None	
Fuse	None	
Insulation system	Photocoupler insulation	
Output display	LED (green)	
Externally supplied power	12 to 30 V DC	
Insulation	1,500V or more (external - internal) 500V or more (external - external)	
Output voltage drop	0.3 V DC (max.)	

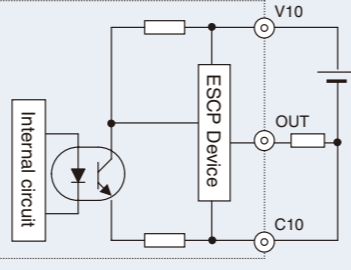
### DC Transistor output (ESCP type) LCD-Current (64 points expansion unit)

EH-D64EDTPS : bit 4-19 (16 pts)

Item	Specification	Circuit diagram
Rated load voltage	24/12 V DC (+10 %, -15%)	
Minimum switching current	10 mA	
Leak current	0.1 mA (max.)	
Maximum load current	1 circuit: 0.7A 1 common: 64 pts : 3A, 40 pts : 5A	
Output response time	OFF → ON: 0.5 ms (max.) 24 V DC ON → OFF: 0.5 ms (max.) 24 V DC	
Surge removal circuit	None	
Fuse	None	
Insulation system	Photocoupler insulation	
Output display	LED (green)	
Externally supplied power	12 to 30 V DC	
Insulation	1,500V or more (external - internal) 500V or more (external - external)	
Output voltage drop	0.3 V DC (max.)	

### DC Transistor output (ESCP type) HCDC-High Current (64 points expansion unit)

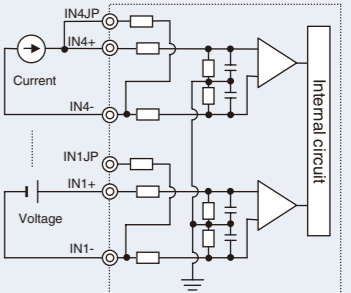
EH-D64EDTPS : bit 20 - 23 (4 pts)

Item	Specification	Circuit diagram
Rated load voltage	24/12 V DC (+10 %, -15%)	
Minimum switching current	10 mA	
Leak current	0.1 mA (max.)	
Maximum load current	1 circuit: 1.0A 1 common: 3.0A	
Output response time	OFF → ON: 0.5 ms (max.) 24 V DC ON → OFF: 0.5 ms (max.) 24 V DC	
Surge removal circuit	None	
Fuse	None	
Insulation system	Photocoupler insulation	
Output display	LED (green)	
Externally supplied power	12 to 30 V DC	
Insulation	1,500V or more (external - internal) 500V or more (external - external)	
Output voltage drop	0.3 V DC (max.)	

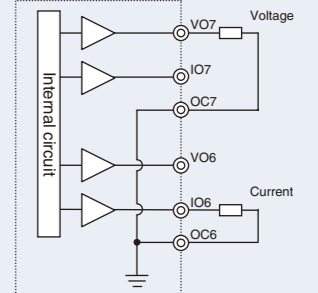
### Analog expansion unit

EH-D6EAN / EH-A6EAN

Input specification : All models

Item	Specification	Circuit diagram
No. of input channel	4	
Input range	0-10V (10.24V max.) -10 to +10V (+/- 10.24V max.) 0-20mA (20.48mA max.) 4-20mA (20.38mA max.)	
Resolution	12 bits	
Accuracy	+/- 1 % of full scale	
Linearity	Max. +/- 3 digits	
Current input impedance	Approx. 249 Ω	
Voltage input impedance	Approx. 200 kΩ	
Input delay time	20 ms	
Channel to internal circuit insulation	Insulated	
Channel-to-channel insulation	Not insulated	

Output specification : All models

Item	Specification	Circuit diagram
No. of output channel	2	
Output range	0-10V (10.24V max.) 0-20mA (20.48mA max.) 4-20mA (20.38mA max.)	
Resolution	12 bits	
Accuracy	+/- 1 % of full scale	
Current output	Allowable load: 10 - 500 Ω Output allowable capacity: Max. 2,000 pF Output allowable inductance: Max. 1H	
Voltage output	Allowable load: Min. 10 k Ω Output allowable impedance: Max. 1μF	
Channel to internal circuit insulation	Insulated	
Channel-to-channel insulation	Not insulated	

### RTD Expansion Unit

EH-A6ERTD / EH-A4ERTD / EH-D6ERTD / EH-D4ERTD

Input specification : All models

Item	Specification
No. of input channel	4
RTD type supported	Pt100 ( 2 or 3 wire)
Input resolution	0.1 °C / 0.1 °F
Input ranges	-100.0 °C to +600.0 °C -148.0 °F to +1112.0 °F
Accuracy	+/- 0.5% of full scale over temp. range
Response time	141 / 563ms
Error detection	Data H7FFF and LED blinking at below -100°C (-166 °F) or beyond +610 °C (+1130 °F) (Included wire breaking or cable disconnection)
Cable length ( shielded)	100 m (Max.)

Output specification : EH-D6ERTD / EH-A6ERTD

Item	Specification	
No. of analog output channels	2	
Output ranges	0-10V (10.24V Max.) / 4-20mA (20.38mA max.)*	
Resolution	12 bits	
Accuracy	+/- 1% of full scale over temp. range	
Response time	8.8 ms	
Current outputs	Max. voltage at 20mA	10 V
	User load range	10 to 500 Ω
	Output load capacitance	2000 pF Max.
Voltage outputs	Output inductance	1 Henry Max.
	Output load range	10 kΩ Minimum at 10 V
	Output load inductance	1 μF Max.

\*: Value in brackets is in case of mode 4000.

# Components list

## Thermocouple Expansion Unit

EH-D6ETC / EH-D4ETC

Input specification : All models

Item		Specification			
No. of channels		4 channels			
Supported thermocouple		Type K, J, E, S, T, B, N			
Each type of specification (Ambient temp. 0 to 55°C)	Type	Accuracy guaranteed range	Accuracy (*1)	Resolution	Input range
	K	-200 to 1200°C -328 to 2192°F	0.4%(FS)	0.1 °C 0.2°F	-270 to 1370°C -454 to 2498°F
	J	-40~750°C -40 to 1382°F	0.3%(FS)	0.1 °C 0.2°F	-210 to 1200°C -346 to 2192°F
	E	-200~900°C -328 to 1652°F	0.3%(FS)	0.1 °C 0.2°F	-270 to 1000°C -454 to 1832°F
	S	0~600°C 32 to 2912°F	1.0%(FS)	1.0 °C 1.0°F	-50 to 1760°C -58 to 3200°F
	T	-200~350°C -328 to 662°F	0.8%(FS)	0.1 °C 0.2°F	-270 to 400°C -454 to 752°F
	B	600~1700°C 1112 to 3092°F	1.0%(FS)	1.0 °C 1.0°F	0 to 1820°C 32 to 3308°F
	N	-200~1200°C -328 to 2192°F	0.4%(FS)	0.1 °C 0.2°F	-270 to 1300°C -454 to 2372°F
	50mV	-50 to 50mV	0.5%(FS)	0.01 mV	-50 to 50mV
	100mV	-100 to 100mV	0.5%(FS)	0.02 mV	-100 to 100mV
Conversion data		15 bits + sign ( 0.1 °C / 0.1 °F / 0.01 mV)			
Isolation	Between channels	Not isolated			
	Between channel and internal circuit	Isolated by photocoupler			
Cold junction temperature input range		-20 to 80 °C			
Cold junction temperature compensation		+/- 2 °C or less ( ambient temp. 0 to 55 °C)			
Diagnostic error (Overflow or breaking wire)		Input data : H7FFF ( LED blinks at error channel)			
Conversion time ( 4 channels all)		563 ms ( thermocouple ) / 141 ms ( mV )			
External wiring length *1		Max. 100 m			

\*1: Overall error is sum of accuracy for each sensor and accuracy of cold junction compensation. Error of thermocouple is not included in the above accuracy. Above accuracy is guaranteed under the condition of 10 minutes after power ON.

\*2: Note : The max. cable length is 100m, however it depends on noisy environment or other conditions.

Output specification : EH-D6ETC

Item		Specification	
No. of analog output		2 channels, single output	
Output ranges		0-10V (10.24V max.) / 0-20mA (20.48mA max.)	
Resolution		12 bits	
Accuracy		+/- 1% of full scale over temp. range	
Response		8.8 ms	
Current outputs	Output load range and max. voltage	10 to 500 Ω , 10V	
	Output capacitance and inductance	2000 pF max. 1 Henry max.	
Voltage outputs	Output loading	10kΩ Minimum at 10V	
	Output load inductance	1 μF Max.	

[Basic units]

40 points type



64 points type



No.	Class	Model Name	Specification				Mass (g)	Power consumption (A)			Certifications		
			Power	Input	Output	Remarks		100V AC	264V AC	24V DC	CE	UL	C-Tick
1	40 points	MV-D40DTPS	24V DC	DC24V x 24	Transistor x 16 (short circuit protection)	Source	460	-	-	0.4	○	-	-
2		MV-D40DT	24V DC	DC24V x 24	Transistor x 16	Sink	460	-	-	0.4	○	-	-
3		MV-D40DR	24V DC	DC24V x 24	Relay x 16		500	-	-	0.4	○	-	-
4		MV-A40DR	100/200V AC	DC24V x 24	Relay x 16		570	0.2	0.1	-	○	-	-
5	64 points	MV-D64DTPS	24V DC	DC24V x 40	Transistor x 24 (short circuit protection)	Source	600	-	-	0.5	○	-	-
6		MV-D64DT	24V DC	DC24V x 40	Transistor x 24	Sink	600	-	-	0.5	○	-	-
7		MV-D64DR	24V DC	DC24V x 40	Relay x 24		655	-	-	0.5	○	-	-
8		MV-A64DR	100/200V AC	DC24V x 40	Relay x 24		710	0.2	0.1	-	○	-	-

[Expansion units]

Expansion units



No.	Class	Model Name	Specification				Mass (g)	Power consumption (A)			Certifications		
			Power	Input	Output	Remarks		100V AC	264V AC	24V DC	CE	UL	C-Tick
1	8 points	EH-D8ED	24V DC	24VDC x 8	-		260	-	-	0.16	○	○	○
2		EH-D8ER	24V DC	-	Relay x 8		280	-	-	0.16	○	○	○
3		EH-D8ETPS	24V DC	-	Transistor x 8 (short circuit protection)	Source	260	-	-	0.16	○	○	○
4		EH-D8ET	24V DC	-	Transistor x 8	Sink	260	-	-	0.16	○	○	○
5		EH-D8EDTPS	24V DC	24VDC x 4	Transistor x 4 (short circuit protection)	Source	260	-	-	0.16	○	○	○
6		EH-D8EDT	24V DC	24VDC x 4	Transistor x 4	Sink	260	-	-	0.16	○	○	○
7		EH-D8EDR	24V DC	24VDC x 4	Relay x 4		300	-	-	0.16	○	○	○
8		EH-D14EDTPS	24V DC	24VDC x 8	Transistor x 6 (short circuit protection)	Source	300	-	-	0.16	○	○	○
9	14 points	EH-D14EDTP	24V DC	24VDC x 8	Transistor x 6	Source	300	-	-	0.16	○	○	○
10		EH-D14EDT	24V DC	24VDC x 8	Transistor x 6	Sink	300	-	-	0.16	○	○	○
11		EH-D14EDR	24V DC	24VDC x 8	Relay x 6		400	-	-	0.16	○	○	○
12		EH-A14EDR	100/200V AC	24VDC x 8	Relay x 6		400	0.2	0.06	-	○	○	○

**[Expansion units]**

No.	Class	Model Name	Specification				Mass (g)	Power consumption (A)			Certifications		
			Power	Input	Output	Remarks		100V AC	264V AC	24V DC	CE	UL	C-Tick
13	16 Points	EH-D16ED	24V DC	24VDC x 16	-		260	-	-	0.13	○	○	○
14		EH-D16ER	24V DC	-	Relay x 16		300	-	-	0.11	○	○	○
15		EH-D16ETPS	24V DC	-	Transistor x 16 (short circuit protection)	Source	260	-	-	0.04	○	○	○
16		EH-D16ET	24V DC	-	Transistor x 16	Sink	260	-	-	0.03	○	○	○
17	28 Points	EH-D28EDTPS	24V DC	24VDC x 16	Transistor x 12 (short circuit protection)	Source	500	-	-	0.2	○	○	○
18		EH-D28EDTP	24V DC	24VDC x 16	Transistor x 12	Source	500	-	-	0.2	○	○	○
19		EH-D28EDT	24V DC	24VDC x 16	Transistor x 12	Sink	500	-	-	0.2	○	○	○
20		EH-D28EDR	24V DC	24VDC x 16	Relay x 12		500	-	-	0.3	○	○	○
21		EH-A28EDR	100/200 V AC	24VDC x 16	Relay x 12		600	0.2	0.06	-	○	○	○
22	64 Points	EH-D64EDTPS	24V DC	24VDC x 40	Transistor x 24 (short circuit protection)	Source	640	-	-	0.4	○	○	○
23		EH-D64EDT	24V DC	24VDC x 40	Transistor x 24	Sink	640	-	-	0.4	○	○	○
24		EH-D64EDR	24V DC	24VDC x 40	Relay x 24		640	-	-	0.5	○	○	○
25		EH-A64EDR	100/200 V AC	24VDC x 40	Relay x 24		720	0.4	0.2	-	○	○	○
26	Analog	EH-D6EAN	24V DC	Analog x 4	Analog x 2		300	-	-	0.16	○	○	○
27		EH-A6EAN	100/200 V AC	Analog x 4	Analog x 2		400	0.1	0.06	-	○	○	○
28	RTD	EH-D6ERTD	24V DC	RTD x 4	Analog x 2		300	-	-	0.16	○	○	○
29		EH-D4ERTD	24V DC	RTD x 4	-		300	-	-	0.16	○	○	○
30		EH-A6ERTD	100/200 V AC	RTD x 4	Analog x 2		400	0.1	0.06	-	○	○	○
31		EH-A4ERTD	100/200 V AC	RTD x 4	-		400	0.1	0.06	-	○	○	○
32	TC	EH-D6ETC	24V DC	Thermocouple x 4	Analog x 2		300	-	-	0.16	○	○	○
33		EH-D4ETC	24V DC	Thermocouple x 4	-		300	-	-	0.16	○	○	○
34	Expansion cable	EH-MCB10	1.0 m										n/a
35		EH-MCB05	0.5 m										n/a
36		EH-MCB01	0.1 m										n/a
37	Option board	OBV-NES	RS-485 serial com. Port (RJ-45)										n/a
38	board	OBV-485A	RS-485 serial com. ,4-wire,Port (RJ-45), 10-bit analog input (0-10V) 2ch										n/a
39	Battery	MV-BAT	For data memory back-up. 3.0V / 1,750mAh										n/a

**[Programming software]**

No.	Item	Descriptions	
1	Model name	EHV-CODESYS	
2	Version	V3.5 SP3 Patch 6 or higher	
3	System requirements	RAM	1GB
4		Operating system	Windows XP / Windows Vista / Windows 7 (32-bit / 64-bit)
5		CPU	1GHz Pentium
6		Hard disk	1GB
7	Screen resolution	1024 x 768	
8	Communication cables	USB	Standard USB cable (type-B connector)
9		Ethernet	UTP or STP cable (vat 5E)

\*Windows is a registered trademark of Microsoft Corp. in the U.S. and other countries.

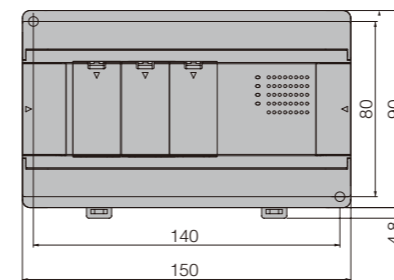
**[General specifications]**

Item	Specification
Power supply type	AC DC
Power voltage	100/110/120 V AC (50/60 Hz), 200/220/240 V AC (50/60 Hz) 24 V DC
Power voltage fluctuation	85 to 264 V AC wide range 19.2 to 30 V DC
Operating ambient temp.	0 to 55 °C
Storage ambient humidity	5 to 95% RH ( no condensation)
Vibration resistance	Conforming to IEC(EN) 62231-2 (147m/s <sup>2</sup> , 3 times in each 3 directions X, Y, Z)
Noise resistance	○Noise voltage 1,500 Vpp, Noise pulse width 100ns, 1μs (Noise input by a noise simulator across input terminal of a power module according to measuring method of Hitachi-IES.) ○Based on IEC 61131-2 ( not applied for input modules) ○Static noise: 3,000V at electrode part
Certifications	Conforms with UL, CE marking
Insulation resistance	20MΩ minimum between AC terminal and frame ground (FE) terminal (based on 500V DC megger)
Dielectric withstand voltage	1,500V AC for 1 minute between AC input terminal and frame ground (FE) terminal
Ground	Class D grounding ( grounding with the power supply module)
Usage environment	No corrosive gases, no excessive dust
Structure	Attached on an open wall
Cooling	Natural air cooling

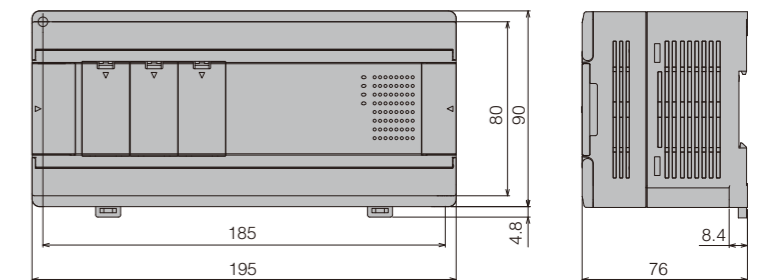
**[Dimensions]**

[Unit : mm]

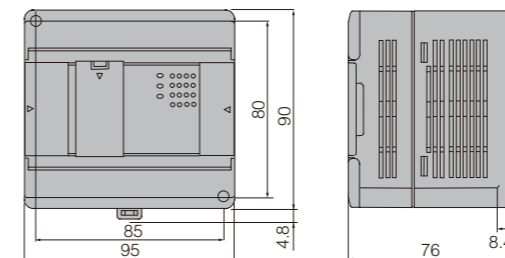
40 points type basic unit



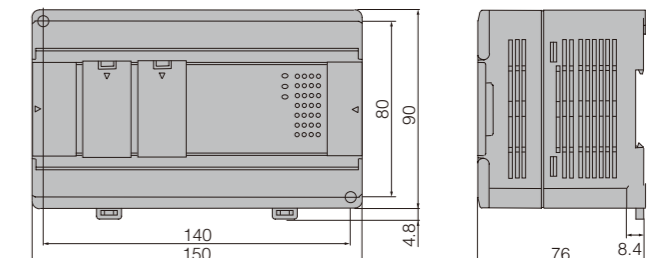
64 points type basic/expansion unit



8/14/16/analog/RTD/TC expansion unit



28 points expansion unit





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ISO 14001  
JQA-EMS428



ISO 9001  
JQA-1000

The MICRO-EHV- PLCs are produced at the factory registered under the ISO 14001 standard for environmental management system and the ISO 9001 standard for quality management system.