HITACHI
Inspire the Next

Hitachi Programmable Controller
S10VE

⚠ Safety precautions

- To ensure the safe use of this product, read the following documents before using the product: the Read me, the Usage Guide, and the manual.
- Use this product in an environment that meets the requirements described in the catalog, the Usage Guide, and the manual. Do not use the product in an environment that is exposed to high temperature, high humidity, dust, corrosive gas, vibration, or shock. Failure to follow this instruction might result in fire, failure of the product, electric shock, or malfunction.
- For safety, the product must be installed and wired in accordance with the Usage Guide and the manual. Wiring must be performed by an expert in electrical work, electrical wiring, etc. Measures must be taken to ensure that foreign objects do not get into the product.
- Restrictions (such as those pertaining to the purpose and location of use) apply to the some of the products mentioned in this catalog, and some products might require periodic inspections. For details, contact us or a Hitachi sales representative.
- This product is manufactured under strict quality controls. However, safety mechanisms must be installed to prevent serious accidents if the product is to be used in important equipment where a product failure might result in death, or in equipment where a product failure might lead to significant loss.

Precautions for use

- This catalog gives an overview of the features of the product but does not include restrictions on the use of the product. Before using the product, read the Usage Guide and product manual to check the restrictions.
- Hitachi shall not be liable for any damages incurred for reasons that cannot be attributed to us; any damage to opportunity or loss of profits incurred by our customers due to the failure of this product; any damages arising out of special circumstances (foreseen or unforeseen); any secondary damages, accident warranties, damage to products other than our products, or warranties for any other work.
- Use S10VE only for purposes where there is no risk of a serious accident occurring even if S10VE fails or malfunctions. In addition, in the event of a failure or malfunction, establish backup and fail-safe operations separate from S10VE.
- S10VE is a general-purpose product intended for use in general industries. It is not intended for use for special purposes that require strict safety, high reliability, or especially high quality. Hitachi shall not assume any liability if the product is used for special purposes.
  Special purposes include the following:
  ■ Purposes that require strict safety
    Examples: Power-generation control equipment (such as that for nuclear, thermal, or hydroelectric power), combustion equipment, air and space equipment, railway equipment, elevators and escalators, recreational equipment, medical equipment, safety equipment, on-board equipment, ship equipment, traffic signal equipment, and other equipment that might pose a danger to human life or physical safety
  ■ Purposes that require high reliability
    Examples: Systems that supply gas, water, electricity, etc.; systems that operate continuously (24 hours a day); settlement systems; and other purposes related to the handling of rights and assets
  ■ Purposes that require use of the product in harsh conditions or environments
    Examples: Outdoor environments, and environments susceptible to chemical contamination, electromagnetic interference, or constant vibration and shock However, S10VE can be used even for the aforementioned purposes on the condition that the purpose of use is specifically limited, the customer assumes responsibility for ensuring redundancy, and especially high quality is not required. Please contact us for details.

- The specifications in this catalog may be changed without notice to improve the product. ● Due to printing conditions, the color of the product in this catalog might differ from that of the actual product.
- In some cases, the LED displays in the images in this catalog might differ from the actual displays.
- All images in this catalog were taken for the purpose of the catalog and might differ from actual usage.
- If you plan to export this product, please check all foreign export-related laws and regulations, such as Japan's Foreign Exchange and Foreign Trade Act and the U.S. Export Administration Regulations, and carry out all required procedures. If you have any questions, please contact a Hitachi sales representative.

For details and inquiries about products, refer to the following.

■ Product site and web inquiries
  https://www.hitachi.com/s10/

Industry & Distribution Business Unit, Hitachi, Ltd.

Continued compatibility with the S10 series, with improved reliability, maintainability, and computing performance:
A programmable controller that provides advanced support for manufacturing and social infrastructures

- Improved reliability by way of a built-in function (error correction code) that automatically corrects soft errors
- Includes a single CPU module that runs programs coded in ladder logic, HI-FLOW, and C
- Equipped with two standard Ethernet ports for enhanced connectivity with computers
- Eliminated the power retention battery for programs, thereby reducing the amount of required maintenance work
- Continued compatibility with S10V, enabling the migration of S10V program assets and ensuring network connectivity

● Features of S10VE

Soft-Error Automatic Correction Function

Soft errors can be caused by, among other things, the malfunction of memory chips due to cosmic rays. S10VE's program memory and internal registers include error correction code (ECC) that automatically corrects such errors, thereby allowing operations to continue. ＊The number of error bits that can be corrected depends on the memory area.

Ladder logic, HI-FLOW, and C programming languages

A single CPU module can concurrently process programs coded in ladder logic, HI-FLOW, and C. You can also run programs linked to other programs.

Two standard Ethernet ports

The CPU module is equipped with two Ethernet ports, allowing it to communicate with another computer or device in addition to the PADT. You can also add ET.NET modules to increase the total number of ports to up to six ports.

Elimination of the battery for programs

Non-volatile memory is now used to store programs, and the power retention battery (to protect against power outages) has been eliminated. (Note that, if the watch function is used, you will need to periodically replace the watch's battery.)

Migration of S10V program assets

S10V programs coded in ladder logic and HI-FLOW can be migrated to S10VE by using the PADT* converter function. (For details, see the guide on replacement.)

Connectivity with existing systems

S10VE can be connected to S10V via FL-net, optical double ring (OD.RING), or Ethernet. (For details, see the guide on replacement.)

Improved performance (by 1.6 times) and increased

With a memory size of 479K bits or 129 K words, S10VE boasts a ladder-bit calculation speed that is 1.6 times faster than that of S10V, and a ladder program capacity that is 5 times that of S10V.

Easy replacement of the communication module

The parameters set for the communication module are stored in the CPU, eliminating the need to reconfigure the parameters even if the communication module fails and needs to be replaced.
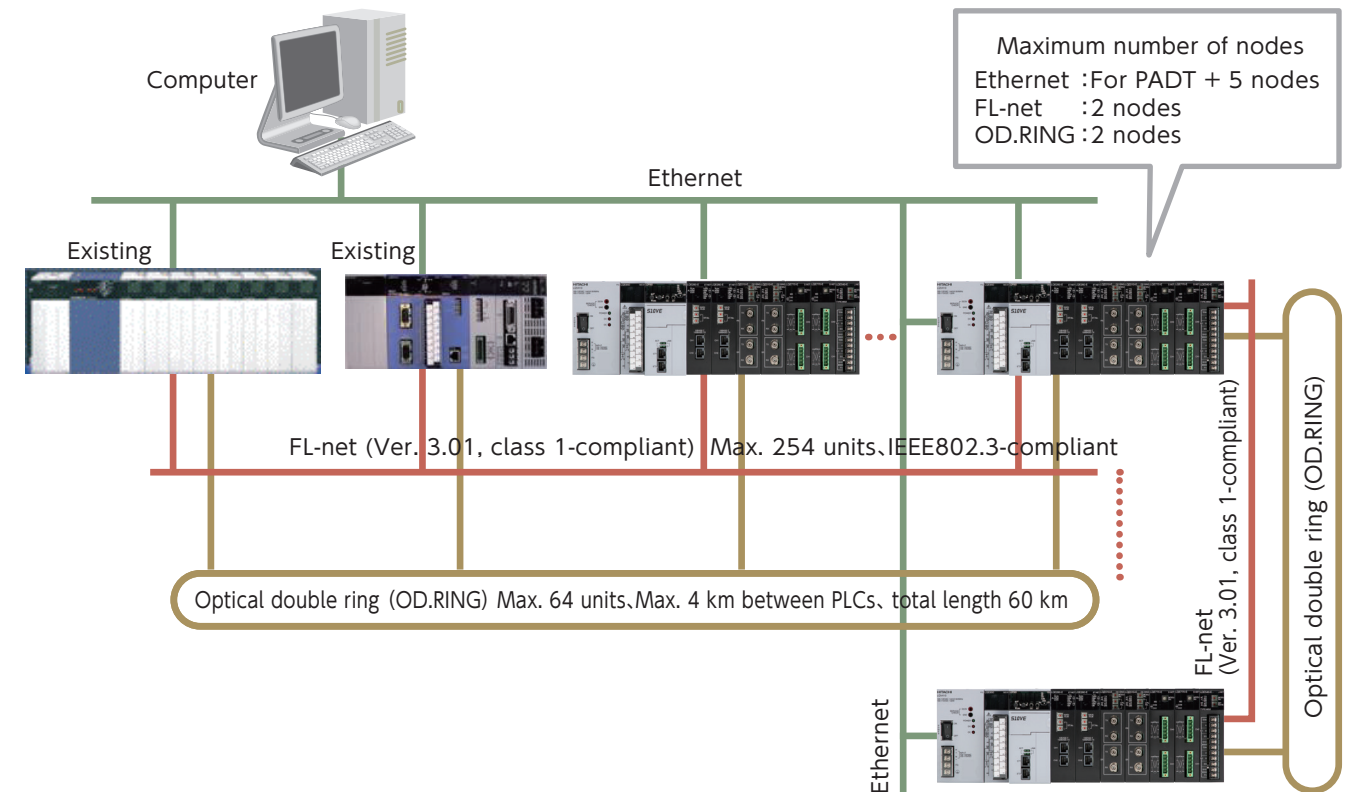
CPU indicator

An indicator on the CPU module displays the operating status. Even if you are not using the PADT, you can easily perform maintenance, guided by the errors and alarms displayed by the indicator.
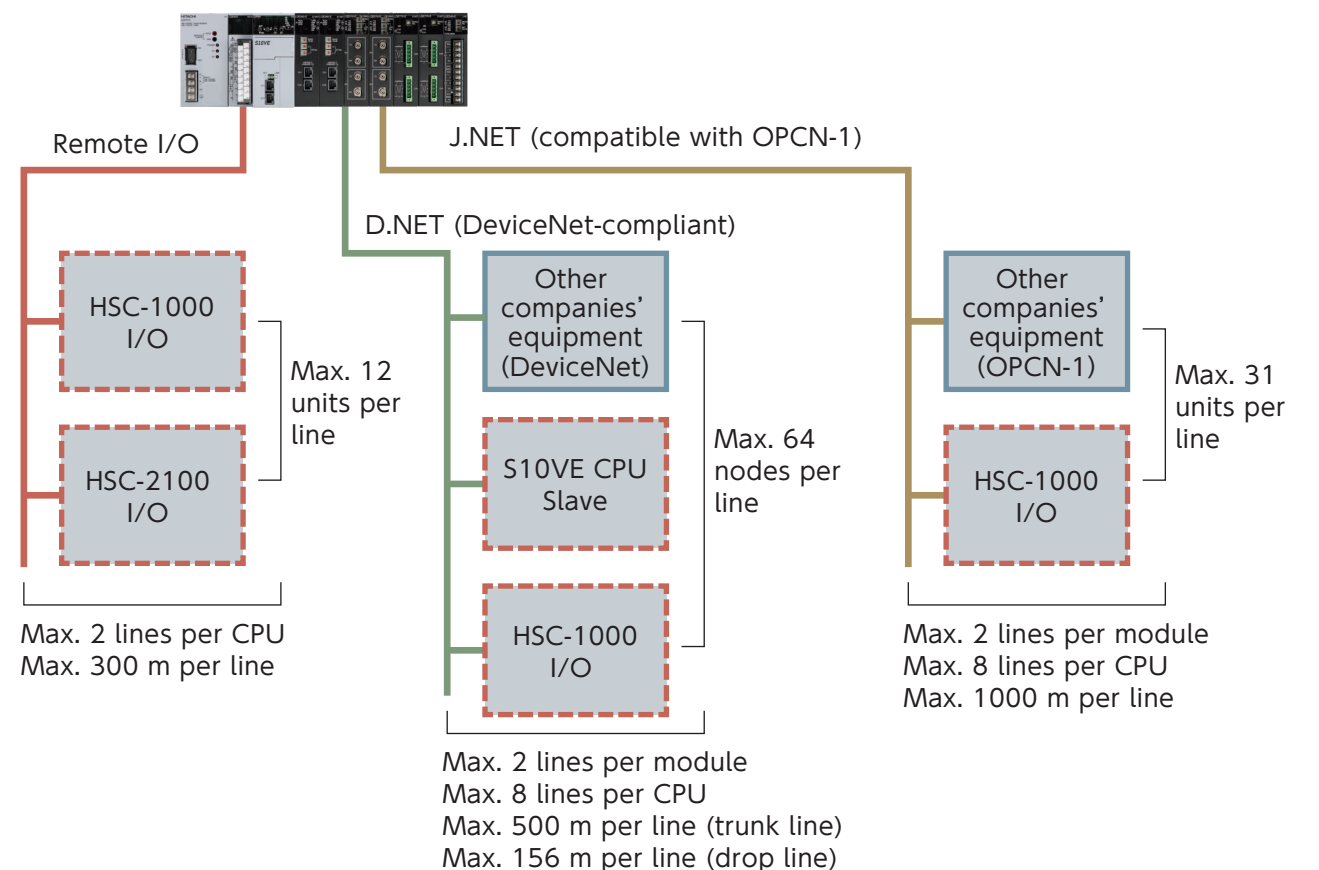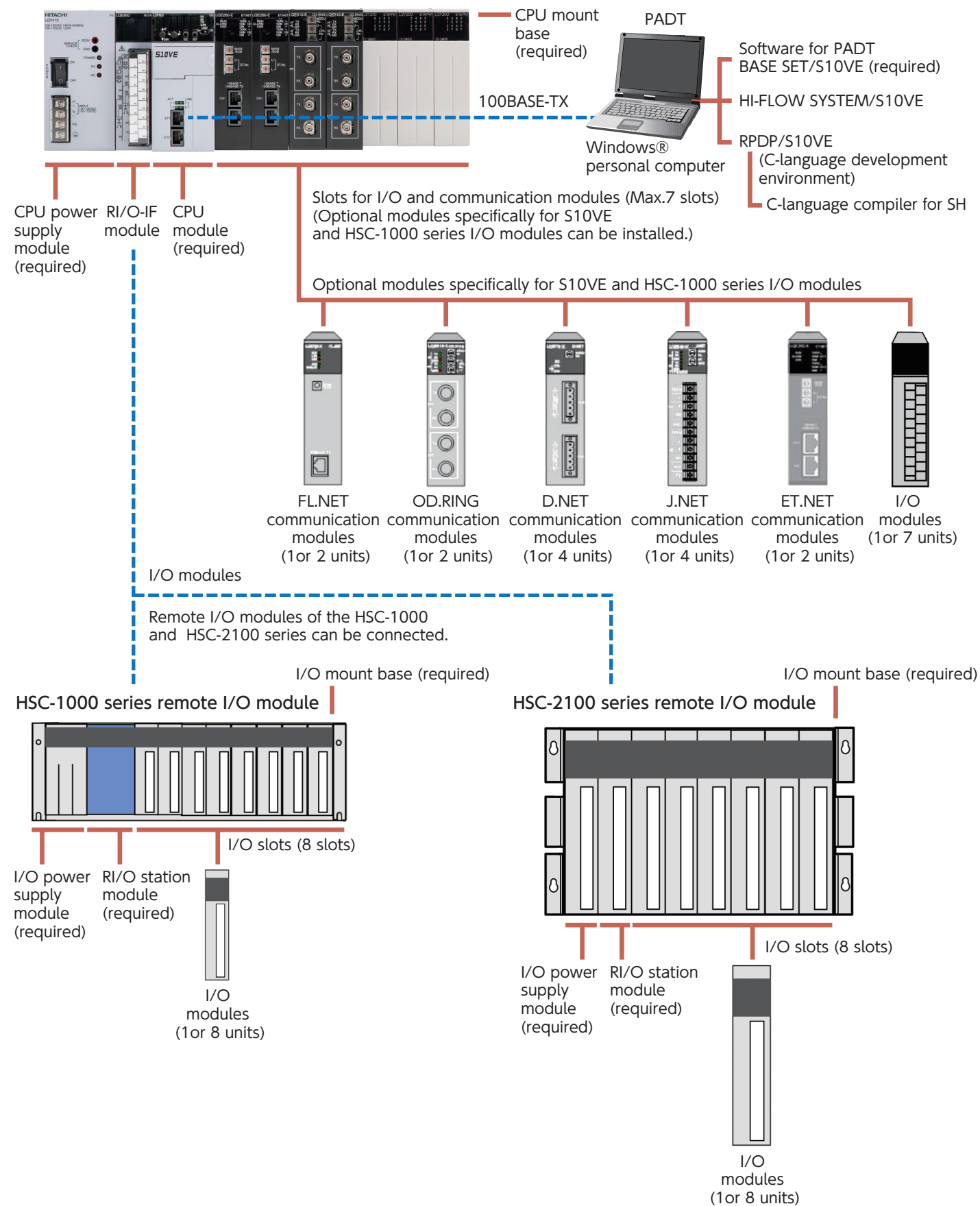

* PADT: Programming and Debugging Tool

Connectivity: Ethernet and Controller-Level Network

Maximum number of nodes
Ethernet : For PADT + 5 nodes
FL-net : 2 nodes
OD.RING : 2 nodes

Computer

Ethernet

Existing   Existing

FL-net (Ver. 3.01, class 1-compliant) Max. 254 units、IEEE802.3-compliant

Optical double ring (OD.RING) Max. 64 units、Max. 4 km between PLCs、total length 60 km

Ethernet

FL-net (Ver. 3.01, class 1-compliant)

Optical double ring (OD.RING)

Connectivity: Remote I/O and Device-Level Network

Remote I/O

J.NET (compatible with OPCN-1)

D.NET (DeviceNet-compliant)

HSC-1000 I/O

HSC-2100 I/O

Max. 12 units per line

Other companies' equipment (DeviceNet)

S10VE CPU Slave

HSC-1000 I/O

Max. 64 nodes per line

Other companies' equipment (OPCN-1)

HSC-1000 I/O

Max. 31 units per line

Max. 2 lines per CPU
Max. 300 m per line

Max. 2 lines per module
Max. 8 lines per CPU
Max. 500 m per line (trunk line)
Max. 156 m per line (drop line)

Max. 2 lines per module
Max. 8 lines per CPU
Max. 1000 m per line

Mounting Configuration Diagram

CPU mount base (required)

PADT

Software for PADT BASE SET/S10VE (required)

100BASE-TX

HI-FLOW SYSTEM/S10VE

RPDP/S10VE (C-language development environment)

Windows® personal computer

C-language compiler for SH

CPU power supply module (required)

RI/O-IF module

CPU module (required)

Slots for I/O and communication modules (Max.7 slots)
(Optional modules specifically for S10VE and HSC-1000 series I/O modules can be installed.)

Optional modules specifically for S10VE and HSC-1000 series I/O modules

FL.NET communication modules (1or 2 units)

OD.RING communication modules (1or 2 units)

D.NET communication modules (1or 4 units)

J.NET communication modules (1or 4 units)

ET.NET communication modules (1or 2 units)

I/O modules (1or 7 units)

I/O modules

Remote I/O modules of the HSC-1000 and HSC-2100 series can be connected.

I/O mount base (required)

I/O mount base (required)

HSC-1000 series remote I/O module

HSC-2100 series remote I/O module

I/O slots (8 slots)

I/O power supply module (required)

RI/O station module (required)

I/O modules (1or 8 units)

I/O power supply module (required)

RI/O station module (required)

I/O slots (8 slots)

I/O modules (1or 8 units)

( ): number of units that can be installed

Specifications

Programming language		Specifications
Programming capacity (with ECC function)	Ladder logic	512 k steps
	HI-FLOW	8 M bytes
	C	37 Mbytes (Number of tasks: Max. 224)
I/O points	When using remote I/O	Max. 2,048 points
	When using J.NET	Max. 8,192 points
Register capacity	Bit	479,357 points
	Word	129,720 words
Ladder logic processing speed	Basic order (AND)	9.4 ns per instruction
	Word operation (ADD)	18.75 ns per instruction
PADT interface		Ethernet
Function that rewrites programs while they run		Included (ladder logic and HI-FLOW)
Retention in the event of a power outage	Program memory	Non-volatile memory (battery-less)
	Register	Power retention register included
Operation in the event of a power outage	Clock	Operation continues by using the clock's batteries f power outages: 5 years (25°C)

Installation Environment Requirements

Item	Specifications
Ambient temperature during operation (during storage)	0 to 55°C (-20 to +75°C)
Humidity	10 to 90% RH (with no condensation)
Dust	Federal Standard 209D, class 1,000,000
Corrosive gas	JEITA IT-1004B, class B
Resistance to momentary power outages	Airbeilty to operate normally without detecting power outages of 10 ms or less I/O mount base (required)
Elevation during operation	1,000 m or less
Vibration resistance	Compliance with JIS C60028-2-6 Frequency: 10 to 150 Hz; acceleration: 10 m/s² in X, Y, and Z directions; sweep time: 8 minutes; number of sweep cycles: 20 cycles
Shock resistance	Compliance with to JIS C60068-2-27 Peak acceleration: 147 m/s² Half-sine pulse: 3 times in each of the X, Y, and Z directions

Model List: S10VE

Item		Product name	Model	Number of units that can be mounted	Specifications
CPU mount base		CPU mount base	HSC-1730	—	CPU power supply + CPU + RI/O-IF + 3 slots
			HSC-1770	—	CPU power supply + CPU + RI/O-IF + 7 slots
Module (required)	CPU power supply	CPU power supply (AC/DC)	LQV410	1	AC 100 V/120 V -15% to +10%, 144 VA, 50/60 Hz ± 5 Hz DC 100 V/110 V -15% to +30%, 132 W
	S10VE CPU	CPU	LQP600	1	Ladder program capacity: 512 K steps, basic instruction execution time: 9.4 ns, with two built-in Ethernet ports
Module (optional)	Remote I/O interface	RI/O-IF	LQE950	1	Remote I/O master station, number of RI/O ports: 2, CPU STOP/RUN contact input, RI/O STOP contact input, PCSOK contact output
	Ethernet	ET.NET	LQE260-E	1 to 2	100BASE-TX, TCP/IP + UDP/IP, 2 channels ∗1: It cannot be used for PADT connection or NX (Autonomous Decentralized System) use.
	Optical double ring	OD.RING	LQE510-E	1 to 2	Optical double ring method, maximum distance between stations: 4 km
	FL-net	FL.NET	LQE702-E	1 to 2	FL-net Ver. 3.01, class 1-compliant, 100BASE-TX
	OPCN-1	J.NET	LQE540-E	1 to 4	OPCN-1-compliant master station, 1 Mbps (240 m) to 125 kbps (1 km)
	DeviceNet	D.NET	LQE770-E	1 to 4	DeviceNet-compliant, choice of master, slave, peer, self-powered 125 kbps/250 kbps/500 kbps

Model List: HSC-1000

Item		Product name	Model	Number of units that can be mounted	Specifications
I/O mount base		I/O mount base (8 slots)	HSC-1081	—	Number of I/O slots: 8 slots
		I/O mount base (4 slots)	HSC-1041	—	Number of I/O slots: 4 slots
		I/O mount base (2 slots)	HSC-1021	—	Number of I/O slots: 2 slots
Module	I/O power supply	I/O power supply (AC)	LQV000	1	AC 100 V/120 V -15% to +10%, 80 VA, 50/60 Hz ± 5 Hz
		I/O power supply (AC/DC)	LQV100	1	AC 100 V/120 V -15% to +10%, 80 VA, 50/60 Hz ± 5 Hz DC 100 V/110 V -15% to +20%, 50 W
	Station	RI/O station	LQS010	1	Remote I/O slave station
		D.STATION	LQS070	1	DeviceNet-compliant slave station

Model List: HSC-2100

Item		Product name	Model	Number of units that can be mounted	Specifications
I/O mount base		I/O mount base (8 slots)	HSC-2108	—	Number of I/O slots: 8 slots
		I/O mount base (4 slots)	HSC-2104	—	Number of I/O slots: 4 slots
		I/O mount base (2 slots)	HSC-2102	—	Number of I/O slots: 2 slots
Module	I/O power supply	I/O power supply (AC/DC)	LWV461	1	AC100 V/120 V -15% to +10%, 135 VA 50/60 Hz ± 5 Hz DC100 V/110 V -20% to +30%, 65 W
	Station	RI/O station	LWS410	1	Remote I/O station

Model List: Parts to Be Periodically Replaced

Item	Product name	Model	Number of units that can be mounted	Specifications
CPU clock battery	BATTERY	HDC5200	1 per CPU	This battery is mounted on the CPU module and allows the clock to continue running even during a power outage. Standard replacement cycle: 5 years

Model List: HSC-1000 Series I/O Modules

TB20: 20-point terminal block, TB40: 40-point terminal block, CN40: 40P connector, CN34: 34P connector, Common: Common unit

Type	Rated input/output	Points	HSC-1000 series		
			Model	Terminal	Common
Digital input	AC 100 to 110 V	16 points (with latch)	LQX110	Terminal block	8 points
	AC 100 to 120 V	16 points	LQX130	Terminal block	8 points
	DC 12 to 24 V	16 points	LQX200	Terminal block	8 points
		16 points (for high speed)	LQX201	Terminal block	8 points
		16 points (with latch)	LQX210	Terminal block	8 points
		32 points	LQX300	CN40	32 points
		32 points	LQX310	CN34	32 points
		64 points	LQX350	CN40 × 2	32 points
	DC 48V	16 points	LQX220	Terminal block	8 points
	DC 100V	16 points	LQX240	Terminal block	8 points
		16 points (with latch)	LQX250	Terminal block	8 points
Digital output	Relay contact AC 100 to 220 V / DC 12 to 24 V / 48 V / DC 100 to 110V	16 points (a contact)	LQY100	Terminal block	8 points
		8 points (a contact)	LQY140	Terminal block	Each point independent
		6 points (a contact, b contact)	LQY160	Terminal block	
	Transistor (sink output) DC 12 to 24 V	16 points	LQY200	Terminal block	16 points
		32 points	LQY300	CN40	32 points
		32 points	LQY310	CN34	32 points
		64 points	LQY350	CN40 × 2	32 points
Mixed digital input/output	Input: DC 12 to 24 V Output: Transistor (sink output) DC 12 to 24 V	32 inputs and 32 outputs	LQZ300	CN40 × 2	32 points
Analog voltage/current input	DC ±5 V / ±10 V / +1 to 5 V	4 points	LQA000	Terminal block	Each point independent
	DC ±5 V / ±10 V / +1 to 5 V	8 points	LQA050	Terminal block	Common to all points
	DC ±5 V / ±10 V / +1 to 5 V	8 points	LQA055	Terminal block	Each point independent
	DC 4 to 20 mA	4 points	LQA100	Terminal block	
	DC 4 to 20 mA	8 points	LQA150	Terminal block	Common to all points
	DC 4 to 20 mA	8 points	LQA155	Terminal block	Each point independent
Analog resistance-thermometer input	-100 to 100°C / -200 to 350°C / -200 to 500°C	4 points	LQA200	Terminal block	Common to all points
	-50 to 150°C / -200 to 100°C / -100 to 300°C	4 points	LQA201	Terminal block	Common to all points
Analog voltage/current output	DC ±5 V / ±10 V / +1 to 5 V	4 points	LQA500	Terminal block	Common to all points
	DC 4 to 20 mA	4 points	LQA600	Terminal block	
Pulse-counter (UP & DOWN / UP)	Count: 0 to 16,383 / -8,192 to 8,191, Count input: DC 12 to 24 V Comparative output: DC 12 to 24 V	1 points	LQC000	Terminal block	Independent

Model List: HSC-2100 Series I/O Modules

TB20: 20-point terminal block, TB40: 40-point terminal block, CN40: 40P connector, CN34: 34P connector, Common: Common unit

Type	Rated input/output	Points	HSC-2100 series		
			Model	Terminal	Common
Digital input	AC 100 to 120 V	16 points	LWI650	TB20	8 points
		32 points	LWI600	TB40	8 points
	DC 12 to 24 V	16 points	LWI450	TB20	8 points
		32 points	LWI400	TB40	8 points
	DC 48 V	16 points	LWI460	TB20	8 points
	DC 100 V	16 points	LWI470	TB20	8 points
Digital output	Relay contact AC 100 to 220 V / DC 12 to 24 V	32 points (a contact)	LWO400	TB40	8 points
		16 points (a contact)	LWO450	TB20	8 points
		16 points (a contact)	LWO460	TB40	Each point independent
		8 points (c contact)	LWO090	TB40	Each point independent
	Transistor (sink output) DC 12 to 24 V	16 points	LWO650	TB20	16 points
		32 points	LWO600	TB40	16 points
	Transistor (source output) DC 12 to 24 V	32 points	LWO610	TB40	16 points
Analog voltage/ current input	DC ±5 V	4 points	LWA400	TB20	Each point independent
	DC ±5 V (for high speed)	4 points	LWA401	TB20	Each point independent
	DC ±10 V	4 points	LWA402	TB20	Each point independent
	DC ±10 V (for high speed)	4 points	LWA403	TB20	Each point independent
	DC ±10 V (for high speed)	2 points	LWA404	TB20	Each point independent
	DC ±5 V (12 bits)	4 points	LWA430	TB20	Each point independent
	DC ±5 V (14 bits)	4 points	LWA435	TB20	Each point independent
	DC ±10 V	8 points	LWA500	TB40	Common to all points
	DC ±5 V	8 points	LWA501	TB40	Common to all points
Analog resistance-thermometer input	-100 to 300°C	4 points	LWA421	TB20	Common to all points
	-50 to 150°C	4 points	LWA422	TB20	Common to all points
	-200 to 500°C	4 points	LWA423	TB20	Common to all points
Analog voltage/ current output	DC ±5 V	4 points	LWA450	TB20	Common to all points
	DC ±10 V	8 points	LWA550	TB40	Common to all points
	DC ±5 V	8 points	LWA551	TB40	Common to all points
	DC 4 to 20 mA	4 points	LWA460	TB20	Common to all points
	DC 4 to 20 mA	8 points	LWA560	TB40	Common to all points
Pulse-counter (UP & DOWN / UP)	Count: 0 to 16,383, Count input: DC 10 to 30 V, Comparative output: DC 24 V	1 points	LWC400	TB20	Independent
	Count: -8,192 to 8,191, Count input: DC 10 to 30 V Comparative output: DC 24 V (high-speed version)	1 points	LWC401	TB20	Independent
	Count: -8,192 to 8,191, Count input: DC 10 to 30 V, Comparative output: DC 24 V (low-speed version)	1 points	LWC402	TB20	Independent

Model List: Software for Windows® 7 (64-bit), Windows® 10 (64-bit)

Type	Product name	Model (*1)	Remark
Programming and parameter-setting software (required)	BASE SET/S10VE	S-7898-50	Set of ladder diagrams, base system, backup restore, and parameter-setting software BASE SET/S10VE is a set package containing the following. ·BASE SYSTEM/S10VE ·OD.RING SYSTEM/S10VE ·CPMS/S10VE ·FL.NET SYSTEM/S10VE ·LADDER DIAGRAM SYSTEM/S10VE ·D.NET SYSTEM/S10VE ·BACKUP RESTORE SYSTEM/S10VE ·RCTLNET/S10VE ·J.NET SYSTEM/S10VE
Programming software	HI-FLOW SYSTEM/S10VE	S-7898-03	HI-FLOW programming
	RPDP/S10VE	S-7898-10	C-language program development To use the C programming language, a separate C compiler is required.
NX (Autonomous Decentralized System)	NXACP/S10VE	S-7898-11	Remote data field, long packet support. (Use in combination with RPDP/S10VE (Model: S-7898-10)) To use the C programming language, a separate C compiler is required.
	NXTOOLS SYSTEM/S10VE	S-7898-13	Execution module for NX parameter setting (NXTools And set of NX/HOST)

Model List Recommended Software

Type	Product name	Type	APPLI
C compiler	SuperH RISC engine C/C++ compiler Ver.9	S-7350-22P	Used with the C-language compiler RPDP/S10VE for SH

Model List: Recommended cables

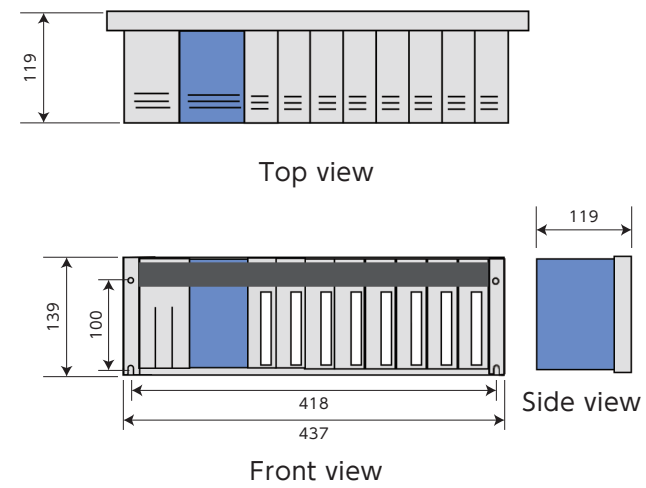| Item		Specification	Remark
Ethernet		NETSTAR-C5E	Manufactured by Hitachi Metals, Ltd.
Remote I/O	For long distances (300 m or less per line)	·CO-EV-SX-1P×0.75SQ ·CO-EV-SB-1P×0.3SQ	Manufactured by Hitachi Metals, Ltd.
	For intermediate distances (200 m or less per line)	CO-EV-SB-1P×0.18SQ	Manufactured by Hitachi Metals, Ltd.
	For short distances (100 m or less per line)	CO-SPEV-SB-1P 0.3mm²	Manufactured by Hitachi Metals, Ltd.
OD.RING		See "Recommended Cables" in the OD.RING documentation.	Manufactured by Hitachi Metals, Ltd.
J.NET		Shielded twisted pair cable (KPEV-SB 2P 0.5 mm²)	Manufactured by Hitachi Metals, Ltd.
D.NET		DeviceNet cables Thick cable: UL20276-PSX 1P × 18 AWG + 1P × 14 AWG Fine cable: UL20276-PSX 1P × 24 AWG + 1P × 22 AWG	Manufactured by Hitachi Metals, Ltd.
FL.NET		HUTP-CAT5E-4P XXX (XXX indicates the cable length)	Manufactured by Hitachi Metals, Ltd.

*1: When placing an order, add "J" or "E" to the end of the model number. Add "J" to receive the product along with documentation in Japanese, or "E" to receive the product along with documentation in English. Example: S-7898-50J, S-7898-50E
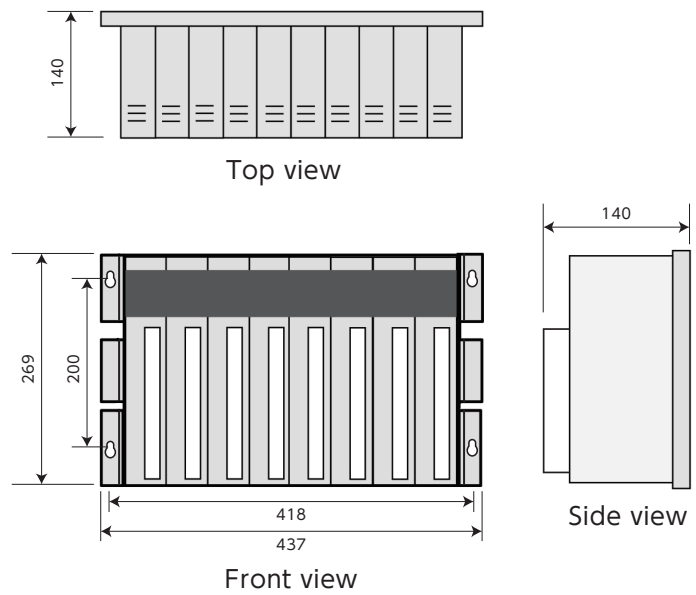
External Dimensions

External dimentions of the S10VE
7-slot CPU unit

(Unit: mm)

174

159

139 100

Top view

174

418
437

Side view

Front view
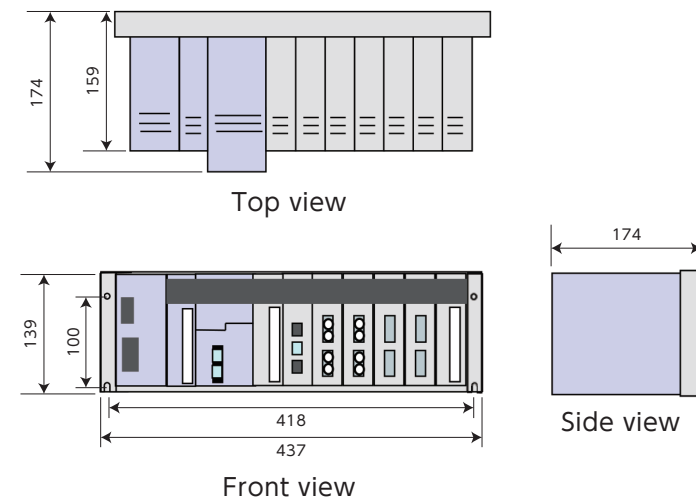
External dimensions of the HSC-1000
8-slot I/O unit

119

139 100

Top view

119

418
437

Side view

Front view

External dimensions of the HSC-2100
8-slot I/O unit

140

Top view

269 200

140

418
437

Side view

Front view

	S10VE CPU unit		HSC-1000 I/O unit (reference)S10V/S10 mini CPU mount base			HSC-2100 I/O unit		
	7 slots	3 slots	8 slots	4 slots	2 slots	8 slots	4 slots	2 slots
W	437	301	437	301	232	437	283	207
H	139	139	139	139	139	269	269	269
D	174	174	119	119	119	140	140	140