





MICRO/I™

Hardware Manual

MICRO/I HG2J-7U, HG5G/4G/3G/2G-V,
HG4G/3G, HG2G-5F/-5T, HG1G/1P

SAFETY PRECAUTIONS

- Be certain to read this manual carefully before performing installation, wiring, or maintenance work, or operating the MICRO/I HG2J-7U, HG5G/4G/3G/2G-V, HG4G/3G, HG2G-5F/-5T, HG1G/1P (Hereinafter referred to as "MICRO/I"). If the MICRO/I is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- The MICRO/I has been manufactured with careful regard to quality. However, if you intend to use this product in applications where failure of this equipment may result in damage to property or injury, ensure that it used in conjunction with appropriate fail-safe backup equipment.
- Precautionary measure should be taken to avoid unauthorized access from the outside network to the MICRO/I. Please note that the Company shall not be liable for any loss, damage or other expenses incurred directly or indirectly by unauthorized access, etc.
- In this manual, safety precautions are categorized depending on the severity as Warning or Caution:

 WARNING	Warning notices are used to emphasize that improper operation may cause severe personal injury or death.
 CAUTION	Caution notices are used where inattention might cause personal injury or damage to equipment.

WARNING

MICRO/I (Common to all models):

- This product is not designed for use in applications requiring a high degree of reliability and safety, such as applications for medical devices, nuclear power, railroads, aerospace, and automotive devices. This product should not be used for such applications.
- Turn off the power of this product before installation, removal, wiring, maintenance, and inspection of this product. Failure to turn power off may cause electrical shock or fire hazard.
- Special expertise is required to install, wire, configure, and operate this product. Person without such expertise must not use this product.
- This product uses an LCD (liquid crystal display) as a display device. The liquid inside the LCD is harmful to the skin. If the LCD is broken and the liquid attaches to your skin or clothing, wash the liquid off using soap, and consult a doctor immediately.
- An emergency circuit that uses emergency stop switch must be configured outside of this product.
- Do not use touch switches, the function keys and selector switches for an emergency circuit or an interlocking circuit. If this product fails, equipment connected to this product will no longer be protected, and serious injury to operators and equipment damage may be caused.
- In case this product is accidentally dropped or exposed to significant shock, stop using this product, check this product for damage, and confirm that its various functions work safely and correctly.
- Connect MICRO/I's FG wire to grounding resistance of 100 Ω or less. Otherwise, there is a risk of electric shock or malfunction.
- The screen will not be visible if the backlight of this product burns out. However, the touch panel and the function keys will remain functional. Thus, Erroneous touch panel operation or function key operation may occur while controlling the touch panel. Because such erroneous operations could result in damage, the touch panel and the function key should not be used once the backlight is burned out.

HG5G/4G/3G/2G-V, HG4G/3G, HG2G-5F/-5T, HG1G/1P:

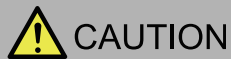
- When more than one panel spot is pressed at the same time, due to the detection mechanism of the analog type touch panel used in this product, the unit assumes that only the center of the pressed spots is sensed and the unit assumes that only one button is pressed. Therefore, do not operate this product by pressing more than one button simultaneously.

 **WARNING**
HG1P:

- For the emergency stop switch and the enabling switch on this product, note the following points:
 - Connect the emergency stop switch to function as either a category 0 or category 1 stop in accordance with EN 60204-1.
 - Perform regular checks to confirm that the emergency stop switch and enabling switch work properly. It is extremely dangerous if the enabling switch no longer returns to position 1 due to a foreign object getting stuck in the switch.
 - Do not, under any circumstances, hold the enabling switch in position 2 with tape, string, or deform the rubber cover. The function of the enabling switch will be lost, and the enabling switch may not work in an emergency.
 - Place your finger firmly on the enabling switch.
- The emergency stop function is disabled when main unit is removed from the machine. To eliminate the possibility of accidents caused by operating the disabled emergency stop switch, place this product, removed from the machine, in a location that is not visible to the operator. Install at least one emergency stop switch on the machine near the location where the HG1P is connected.

 **CAUTION**
MICRO/I (Common to all models):

- Prevent this product from falling while moving or transporting, otherwise it may cause damage or malfunction to this product as a result.
- Use the product within the environmental limits given in the catalog and this manual. Use of the product in high-temperature or high-humidity environments, or in locations where it is exposed to condensation, corrosive gas, or large shock loads can create the risk of electrocution and fire.
- This product is designed for use in pollution degree 2. Use this product in environments of pollution degree 2. (based on the IEC 60664-1 rating)
- Install this product according to this manual. Improper installation will result in falling, failure, electrical shock, fire hazard, or malfunction of this product.
- Prevent metal fragments or wire chips from dropping inside this product housing. Ingress of such fragments and chips may cause fire hazard, damage, and malfunction.
- Use a power supply of the rated value. Using a wrong power supply may cause fire hazard.
- When exporting this product to Europe, use an EN 60127 (IEC 60127) approved fuse on the power line outside this product.
- When exporting this product to Europe, use an EU-approved circuit protector.
- Make sure of safety before starting and stopping this product. Incorrect operation of this product may cause mechanical damage or accidents.
- This product cannot be directly connected to the communication lines (including public wireless LAN) of telecommunication carriers (mobile communication companies, fixed-line communication companies, Internet providers, etc.). When connecting this product to the Internet, be sure to connect via a device, such as a router.
- The touch panel of this product is made of glass, and will break if exposed to excessive shock. Take due care when handling it.
- The protective film attached to the display of this product is to protect the product from scratches during transportation. Please remove the protective film before use. If the display is used with protective film, the film may become cloudy and stick to the display depending on the usage environment and may become unremovable.
- Do not push hard or scratch the touch panel and protection sheet with a hard object like hand tool. Touch panel and protection sheet can be easily damaged.
- Do not install this product in areas subjected to strong ultraviolet rays, since ultraviolet rays may impair the quality of the LCD.
- Do not attempt to disassemble, repair or modify this product. This can create the risk of fire or electrocution.
- When disposing of this product, do so as an industrial waste.
- When using this product in a system that requires clock accuracy, set the time regularly.
- Do not switch off the power or pull out the SD Memory Card or the USB flash drive while it is being accessed, as this may result in destruction of the stored data. If the data on the SD Memory Card or the USB flash drive is corrupted, format the SD Memory Card or the USB flash drive.
- Turn off the power supply of this product before connecting or disconnecting USB devices other than USB memory.

**HG2J-7U:**

- This product uses "PS2" as DC power supply. (based on the IEC/EN 61131 rating)
- Use wire of a proper size to meet the voltage and current requirements.

HG5G/4G/3G/2G-V, HG4G/3G, HG2G-5F/-5T, HG1G:

- This product "PS2" as DC power supply. (based on the IEC/EN 61131 rating)
- Use wire of a proper size to meet the voltage and current requirements, and tighten the terminal screws of this product to the specified tightening torque.

HG5G/4G/3G/2G-V, HG4G/3G, HG2G-5F:

- Be sure to confirm that the SD Memory Card Access lamp is not lit prior to turning the power off to this product or pulling out the SD memory card. Refer to this manual for details.

HG1P:

- Use the HG1P optional cable for proper wiring.
- The D-sub connector on the end of the HG1P optional cable is not water- or dust-proof. If protection against water and dust is required, the user must replace the D-sub connector with a water-proof connector.

Revision history

September 2023: First Edition

Caution

- All rights in this manual belong to IDEC Corporation. It may not be reproduced, reprinted, sold, transferred or rented without our permission.
- The contents of this manual are subject to change without notice.
- Please contact your vendor or IDEC Corporation with any problems regarding the operation of this product.

Trademarks

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All other company names and product names used in this manual are trademarks of their respective owners.

Preface

Thank you for purchasing the MICRO/I manufactured by IDEC Corporation.

This manual describes the specifications of MICRO/I HG2J-7U, HG5G/4G/3G/2G-V, HG4G/3G, HG2G-5F/-5T, HG1G/1P, how to install it, and various functions.

Read this manual to ensure the correct understanding of the entire functions of this product.

IDEC Corporation makes the latest product manual PDFs available on our website at no additional cost. Please download the latest product manual PDFs from our website.

Read the following materials as necessary for your particular application.

References	Content
MICRO/I Hardware Manual (This document)	Describes the product specifications, installation and wiring methods, maintenance and inspection of the HG2J-7U, HG5G/4G/3G/2G-V, HG4G/3G, HG2G-5F/-5T and HG1G/1P.
WindO/I-NV4 User's Manual (PDF)	Describes the basic operations of the HG2J-7U, HG5G/4G/3G/2G-V, HG4G/3G, HG2G-5F/-5T and HG1G/1P, how to create the project necessary for operation, and the various drawings and parts that make up the project.
WindO/I-NV4 External Device Setup Manual (PDF)	Describes the connection procedures and available device addresses for various communication including the Device Link Communication, O/I Link communication, and DM Link communication.

Symbols Used in this Manual

This manual uses the following symbols to facilitate explanation.

Symbols



..... Information that requires special attention. Failure to operate the product in accordance with the information provided can lead to serious injury or damage.



..... Information relating to requests or material to reference in the use of a function



..... Useful information relating to a function

OK

..... Screen buttons are indicated by **bold** text or by using the actual graphic icon.

..... Controls are indicated by bold text.

Abbreviations, Generic Terms, and Terminology Used in this Manual

Item	Description
HG2J-7U	The name is short for MICRO/I HG2J-7UT22TF-B.
HG5G-V	The name is short for MICRO/I HG5G-VFXT22MF-B.
HG4G-V	The name is short for MICRO/I HG4G-VCXT22MF-B.
HG4G	The name is short for MICRO/I HG4G-CJT22*F-B.
HG3G-V	The name is short for MICRO/I HG3G-V*XT22MF-*
HG3G	The name is short for MICRO/I HG3G-*JT22*F-*
HG2G-V	The name is short for MICRO/I HG2G-V5FT22TF-*
HG2G-5F	The name is short for MICRO/I HG2G-5FT22TF-*
HG2G-5T	The name is short for MICRO/I HG2G-5T*22TF-*
HG1G	The name is short for MICRO/I HG1G-4VT22TF-*
HG1P	The name is short for MICRO/I HG1P-ST32*.
HG5G/4G/3G/2G-V	The format used to refer to HG5G-V, HG4G-V, HG3G-V and HG2G-V.
HG5G/4G/3G-V	The format used to refer to HG5G-V, HG4G-V and HG3G-V.
HG4G/3G	The format used to refer to HG4G and HG3G. HG4G-V and HG3G-V is not included.
HG2G-5F/-5T	The format used to refer to HG2G-5F and HG2G-5T.
HG1G/1P	The format used to refer to HG1G and HG1P.
MICRO/I	Generic term used to refer to the HG2J-7U, HG5G/4G/3G/2G-V, HG4G/3G, HG2G-5F/-5T, HG1G/1P.
External Device	Generic term used to refer to a PLC or micro computer that is connected to and communicates with the main unit.
Device Address	Memory that is capable of storing values in unit of bits or words loaded on the main unit and external device.
User Communication	A communication method which performs communication with external devices such as barcode readers and inverters.
WindO/I-NV4	Integrated configuration software application for creating projects of the main unit.
Operating System	Software used to manage and control system software. Only HG2J-7U supports the update.
System Software	Software that performs basic control and management of the main unit.
Project	Data including image data required for operating the main unit, which is created with WindO/I-NV4.
Setup	Generic term used to refer to the common settings in the project.
Script	A function that can describe complex calculations and operations in text.
Internal Device	The generic term for internal device addressing on the main unit such as internal relays, registers, etc.
Parts	Define as functional content (i.e. button, pilot lamp, commands, etc.)

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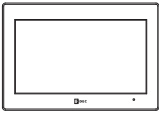
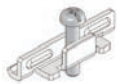
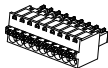
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1 HG2J-7U

1.1 Packing Content

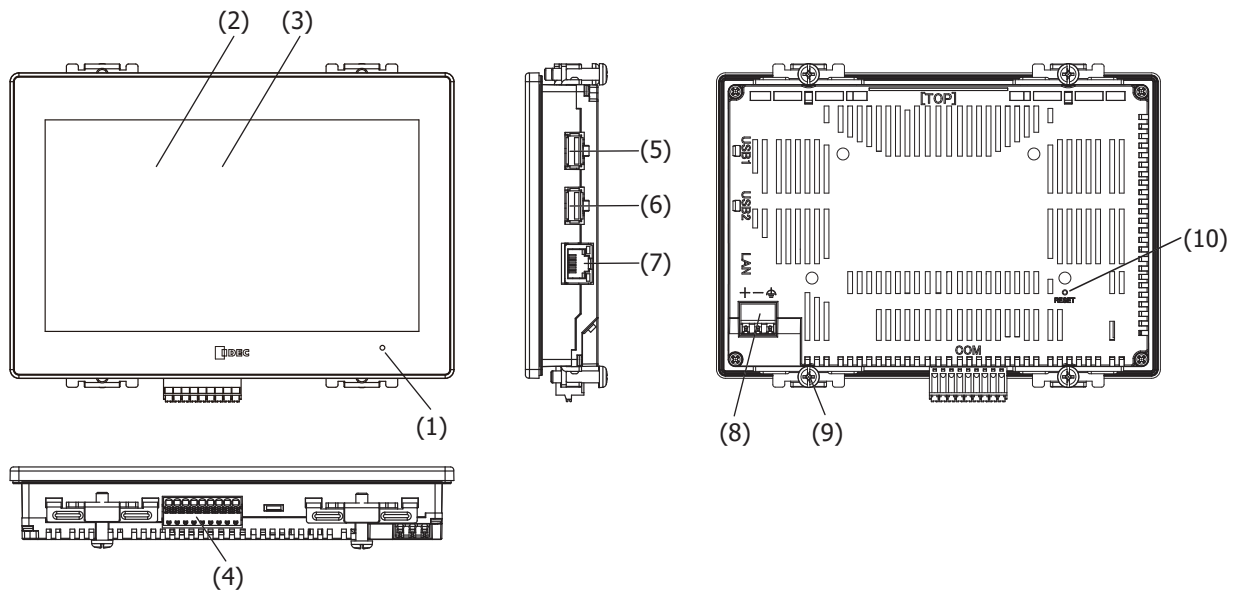
Before installing the HG2J-7U, make sure that the model you have received is what you actually ordered, and no parts are damaged to accidents during shipping.

Product Name & Appearance	Quantity	Description
HG2J-7U 	1	Main unit
Mounting clip 	4	-
Serial interface connector 	1	Removable terminal block 9-pin

1.2 Type Number


LCD	Bezel Color	Type Number
7.0 inch wide TFT Color	Black	HG2J-7UT22TF-B

1.3 Part Names



No.	Name	Description
(1)	POWER LED	Green (lit): Normal Operation Green (flash): Operating system is booting. (Normal Operation) Orange (lit): Operating system is booting. (Boot mode) Orange (flash): Preparing to boot the operating system, running in boot mode. Red (lit): Main unit is damaged. Not lit : Power is off.
(2)	Display	TFT color LCD
(3)	Touch Panel	PCAP touchscreen (Projected capacitive)
(4)	Serial Interface (COM)	RS232C, RS422/485 Connector: Terminal Block 9-pin (Push-in type) Maximum cable length: 15m (RS232C), 1200m (RS422/485)
(5)	USB Interface (USB1)	USB2.0 (Host) Connector: Type-A Output current: 5V 500mA
(6)	USB Interface (USB2)	USB2.0 (Host) Connector: Type-A Output current: 5V 500mA
(7)	Ethernet Interface (LAN)	IEEE802.3u 10BASE-T/100BASE-TX Connector: RJ-45(With Auto MDI/MDI-X function) Maximum cable length: 100m
(8)	Power Supply Terminal	Connector: Terminal Block 3-pin (Push-in type)
(9)	Mounting Clip Position	4 places
(10)	RESET Switch	-

1.4 External Interfaces

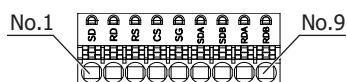
 **CAUTION**

- Make sure to turn off the power to the HG2J-7U before wiring each interface.
- The serial interface (COM) can be used as the RS232C and RS422/485 interfaces at same time.
- Use the SELV (Safety Extra-Low Voltage) circuit to connect each interface.

● Serial Interface (COM)

Use applicable cables for wiring and recommended ferrules (made by IDEC, Phoenix Contact or Weidmüller) as follows.

Interface Specification	RS232C, RS422/485		
Connector	Detachable Terminal Block 9-pin		
Applicable cable	AWG16 to 28		
Conductor Type	Solid wire or Stranded wire		
Wire Strip Length *1	8 to 9 mm		
Recommended ferrule	ST3L-H025-12WJ S3TL-H034-12WT S3TL-H05-14WA S3TL-H075-14WW (IDEC)	AI 0,25-8YE AI 0,34-8TQ AI 0,5-8WH AI 0,75-8GY (Phoenix Contact)	H0,25/12 HBL H0,34/12 TK H0,5/14 OR H0,75/14 W (Weidmüller)



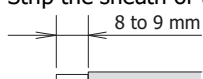
No.	Name	I/O	Function	Communication type	
1	SD	OUT	Send Data	RS232C	/
2	RD	IN	Receive Data		
3	RS	OUT	Request to Send		
4	CS	IN	Clear to Send		
5	SG	—	Signal Ground		
6	SDA	OUT	Send Data (+)	RS422/485	/
7	SDB	OUT	Send Data (-)		
8	RDA	IN	Receive Data (+)		
9	RDB	IN	Receive Data (-)		



Only one ferrule can be inserted into a terminal hole.

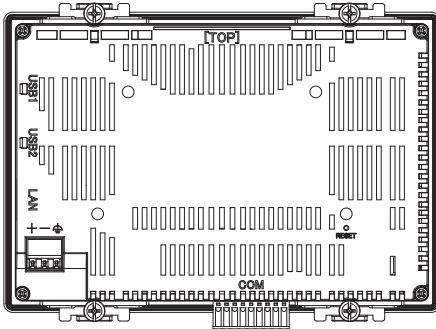
Please set another terminal block in the vicinity of the main unit and connect SG when using RS232C and RS422/485 requiring crossover wiring at the same time. And separate the communication cables so that they do not affect each communication waveform when using RS232C and RS422/485 at the same time.

*1 Strip the sheath of the wire 8 to 9 mm from the end.



Using RS422/485 interface

HG2J-7U is not equipped with terminating resistor. Insert a terminating resistor of an appropriate value (about 100 to 120 Ohm, 1/2 W minimum) between terminal number 8 (RDA) and terminal number 9 (RDB), if necessary.



Terminal Number 8 (RDA) Terminal Number 9 (RDB)

For details about inserting and removing wires, refer to "1.8 Wiring" on page 1-12.

1.5 Specifications

■ Applicable Standards

Safety Standards	UL61010-1, UL61010-2-201, UL121201 CSA C22.2 No.61010-1-12 (c-UL), CSA C22.2 No.61010-2-201 (c-UL), CSA C22.2 No.213 (c-UL)
EMC Standards	IEC/EN 61131-2

■ Environmental Specifications

Ambient Operating Temperature	-20 to +60°C* ¹ (no freezing)
Ambient Operating Humidity	10 to 90% RH (no condensation)
Ambient Storage Temperature	-20 to +70°C (no freezing)
Ambient Storage Humidity	10 to 90% RH (no condensation)
Altitude	0 to 2000m
Pollution Degree	2
Corrosion Immunity	Free from corrosive gases

■ Electrical Specifications

Rated Voltage	12V/24V DC
Power Consumption	13W maximum
Not using USB Interface (USB1, USB2)	5W maximum
Backlight OFF	3W maximum
Power Voltage Range	10.2 to 28.8V DC
Allowable Momentary Power Interruption	10 ms maximum (Power supply: 20.4 to 28.8V DC) 1 ms maximum (Power supply: 10.2 to 20.4V DC)
Inrush Current	40A maximum
Dielectric Withstand Voltage	AC500V, 10mA, 1 minute (between power and earth terminals)

■ Construction Specifications

Vibration Resistance	5 to 8.4Hz amplitude 3.5mm, 8.4 to 150Hz acceleration 9.8m/s ² 10 times on each of three mutually perpendicular axes (IEC 61131-2)
Shock Resistance	147m/s ² , 11ms (3 shocks on each of three mutually perpendicular axes) (IEC 61131-2)

*1 For details about the output current limitation of the USB interface due to the ambient operating temperature, refer to "Restrictions due to mounting orientation" on page 1-11.

■ Performance Specifications

Display	LCD Type ^{*1}	TFT color LCD (TN Type)
	Display Colors	65,536 Colors
	Effective Display Area	154.08 (W) × 85.92 (H) mm
	Display Resolution	800 (W) × 480 (H) dots
	Dot pitch	0.1926 (W) × 0.179 (H) mm
	View angle	Left/Right/Top: 80°, Bottom: 60°
	Brightness of LCD only	500 cd/m ²
	Brightness Adjustment	48 levels
	Backlight	LED (white)
	Backlight Life ^{*2}	Approx. 50,000 hours (The time until brightness becomes 50% of the initial value)
Touch Panel	Switch Type	Projected Capacitive
	Multiple Operations	Possible (2-point touch)
User Memory		Approx. 24 MB
Backup time of the real-time clock (Ambient Operating Temperature at 25°C)		Min. 20 days ^{*4}
Backup Data		Calendar, Log Data, HMI Keep Relays, HMI Keep Registers
Buzzer output		Single tone (tone length is adjustable)
Degree of Protection ^{*3}		Panel thickness is 1 mm or more and less than 1.6 mm: IP65F IEC 60529) Panel thickness is 1.6 mm or more and 5 mm or less: IP66F, IP67F (IEC 60529), TYPE 4X (indoor use only), TYPE 13
Weight (approx.)		500g

*1 Please be aware that small black and bright dots might show up on LCD Screen: it is not a failure or malfunction.

*2 The life of the LCD itself at an ambient temperature of 25°C. This is not a guaranteed value. The actual life depends on the environment and conditions of use.

*3 It is a protection structure for the operating surface of HMI, which is attached to a panel. Although protection structure suffices every test conditions, it does not guarantee to operate under all of the environmental condition. As for IP65F/IP66F/IP67F oilproof structure, it suffices oilproof test conditions. Conditions are listed in the document that comes with Japanese Industrial Standard JIS C 0920. Protection structure do not guarantee usage under long exposure to oil or usage of oil that is not prescribed in the document. Please test/check beforehand to avoid trouble. IP ratings are not applicable to UL certification.

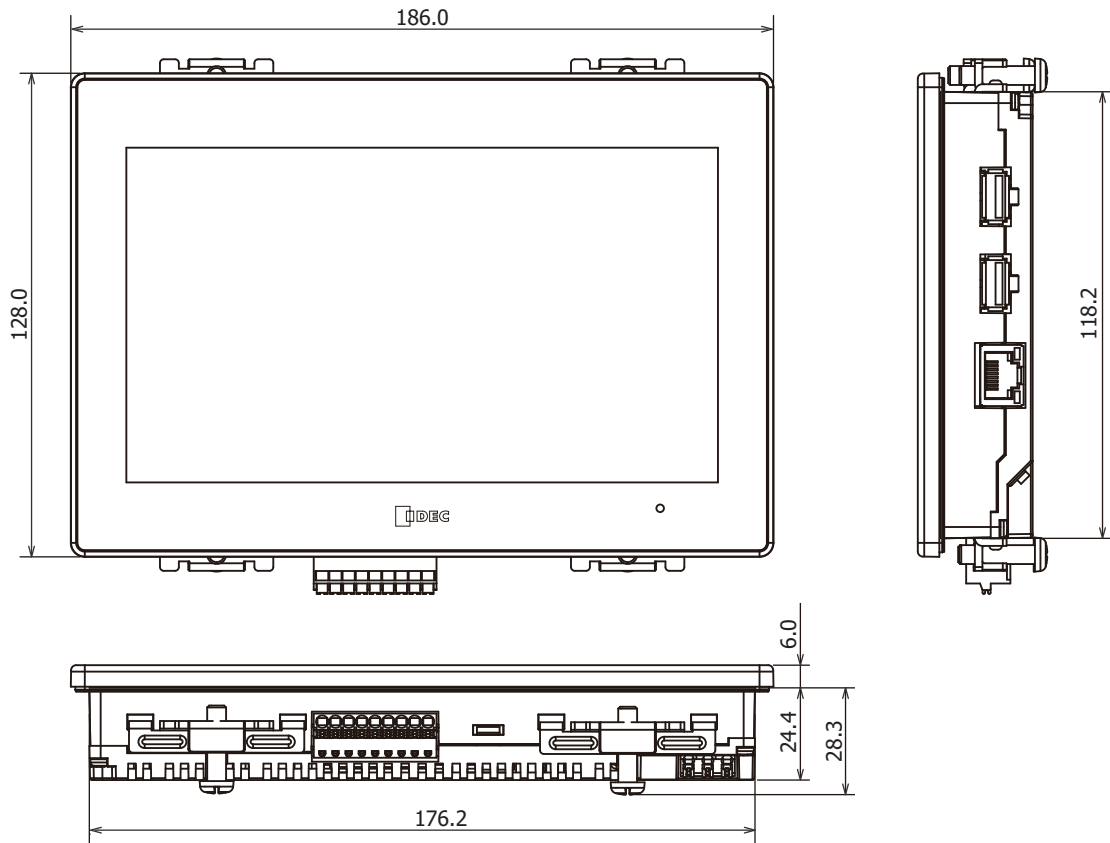
*4 If the power interruption period exceeds the Backup time of the real-time clock, the error message "Initialize clock data" will be displayed when the power is turned on, and the clock data will be initialized to 00:00:00 on January 1, 2000.

■ EMC Specifications

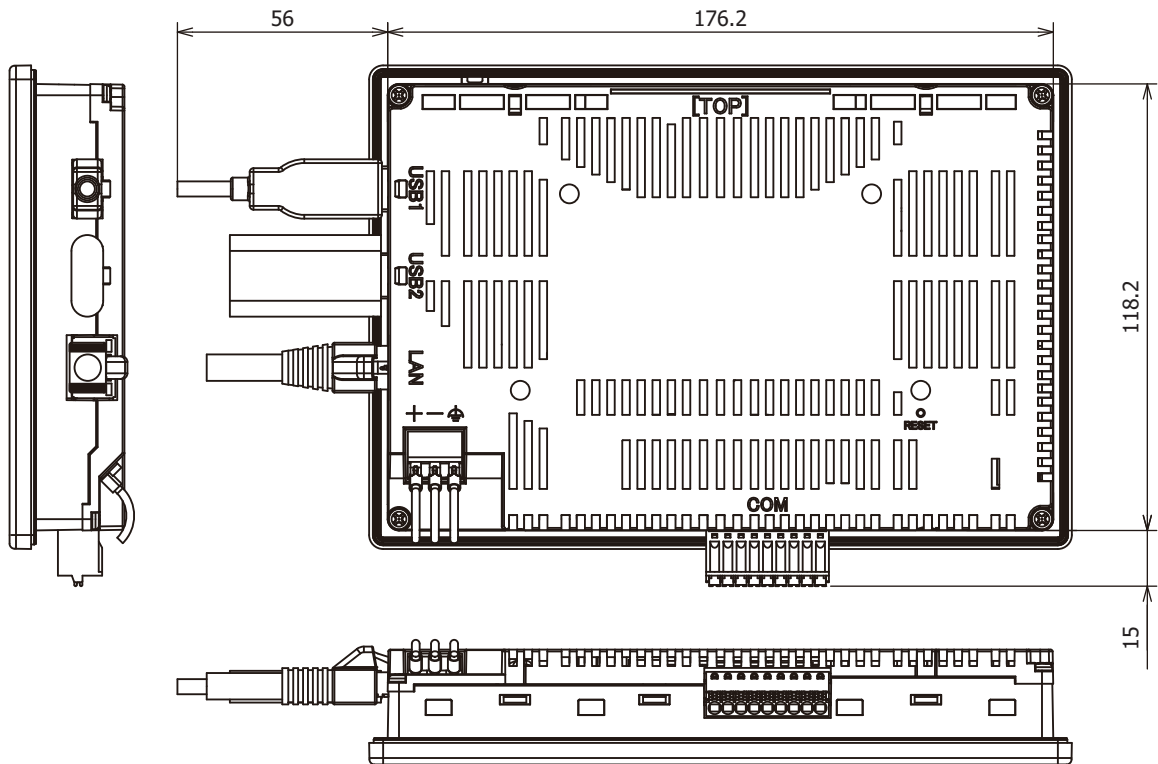
Radiated Emission	Class A: 10m 40dB μ V/m quasi-peak (30M to 230MHz) 47dB μ V/m quasi-peak (230M to 1GHz) Class A: 3m 76dB μ V/m (Peak), 56dB μ V/m (AVG) (1G to 3GHz) 80dB μ V/m (Peak), 60dB μ V/m (AVG) (3G to 6GHz)
Electrostatic Discharge	Contact: \pm 6kV Air: \pm 8kV
Electromagnetic Field	10V/m (80M to 1000MHz) 3V/m (1.4G to 2.0GHz) 3V/m (2.0G to 2.7GHz) 3V/m (2.7G to 6.0GHz) 80% AM (1kHz)
Fast Transient/Burst	Power: \pm 2kV Communication cable: \pm 1kV
Surge Immunity	\pm 500V (between +24V and 0V) \pm 500V (between +24V and FE, 0 and FE)
Conducted Radio Frequency Immunity	3V (Power, Communication cable) (150k to 80MHz) 80% AM (1kHz)

1.6 Dimensions

Unit: mm



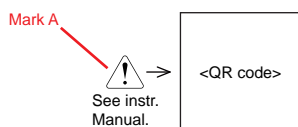
<Cable Attached Dimensions>



Depending on the type of connection cable used the dimensions shown above will change. The dimensions given here are representative values and are intended for reference only.

● About the printed contents of the main unit

"Mark A" indicates that you can refer to the instruction sheet using the QR code. For details, refer to "1.8 Wiring" on page 1-12.



1.7 Installation

● Operating Environment

For designed performance and safety of the HG2J-7U, do not install the HG2J-7U in the following environments:

- Where dust, briny air, or iron powder exist.
- Where oil or chemical splashes for a long time.
- Where space is filled with oil mist.
- Where direct sunlight falls on the main unit.
- Where strong ultraviolet rays fall on the main unit.
- Where corrosive or combustible gasses exist.
- Where shocks or vibrations are transmitted.
- Where condensation occurs due to rapid temperature change.
- Where high-voltage or arc-generating equipment (electromagnetic contactors or circuit protectors) exists in close proximity.

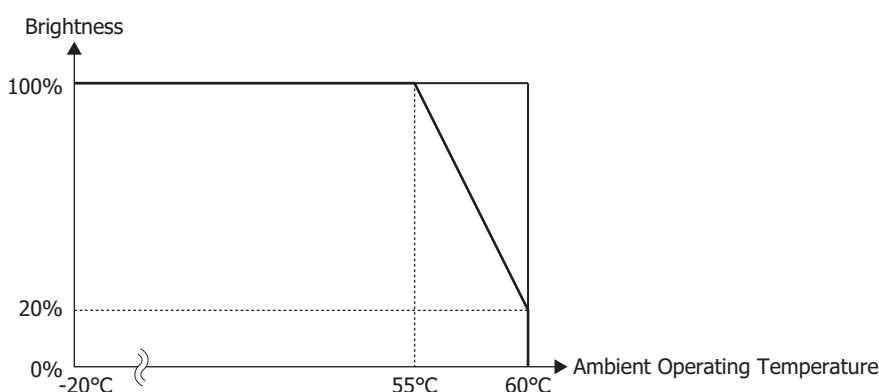
● Ambient Temperature

- Allow sufficient space for ventilation, and install the equipment away from heat sources.
- Allow at least 100mm between the HG2J-7U and walls or other equipment.
- Do not install the HG2J-7U where the ambient temperature exceeds the rated operating ambient temperature range. When mounting the HG2J-7U in such locations, provide a forced air-cooling fan or air-conditioner to keep the ambient temperature within the rated temperature range.
- The HG2J-7U is designed to install on a vertical plane so that natural air-cooling is provided. If you install it using any other orientation, use forced-air cooling, or lower the ambient operating temperature.

● About Derating

HG2J-7U suppresses the temperature rise inside the product by reducing the backlight brightness when the ambient operating temperature becomes high.

The relationship between ambient operating temperature and brightness when the USB interfaces (USB1 and USB2) are not used is as follows.

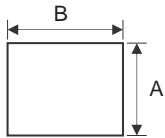


Brightness reduction occurs depending on the output current value of the USB interface.

Depending on each product the values shown above will change. The values given here are representative values are intended for reference only.

● Installation

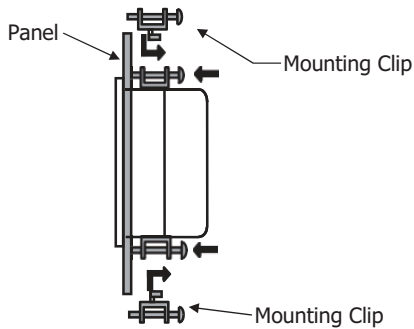
- Make a panel cut-out on the panel with the dimensions shown below.



Unit: mm

A		B		Panel Thickness
118.6	+1.0 0	176.6	+1.0 0	1.0 to 5.0

- Use the attached mounting clips to tighten the screws evenly to mount panel: screws must be applied on total of four places with the specified torque 0.5 to 0.6N·m.

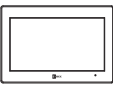

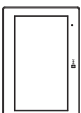
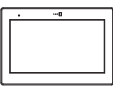



CAUTION

- Mount the main unit on a rigid panel.
- Do not tighten with excessive force, otherwise the main unit may warp the display, or impair the waterproof characteristics.
- If the mounting clips are tightened obliquely to the panel, the main unit may fall off the panel.
- When installing the main unit into a panel cut-out, make sure that the gasket is not twisted. Especially when re-installing, take special care because any twists in the gasket will impair the waterproof characteristics. Also, if the gasket comes off the main unit, align the convex part of the gasket with the concave part of the front case, and then insert the gasket fully into the gasket mounting groove without twisting it.

● Restrictions due to mounting orientation

The HG2J-7U is designed to install on a vertical landscape. The ambient operating temperature and the output current of the USB interface (total of USB1 and USB2) are limited depending on the mounting orientation as shown in the table below.

Orientation		Ambient Operating Temperature: Output current limitation of USB
Vertical	 Landscape	-20 to +45 °C : 1000mA +45 to +55 °C : 500mA +55 to +60 °C : 150mA
	 Portrait (Clockwise)	-20 to +40 °C : 1000mA +40 to +55 °C : 500mA +55 to +60 °C : 150mA
	 Portrait (Counter Clockwise)	-20 to +40 °C : 1000mA +40 to +55 °C : 500mA +55 to +60 °C : 150mA
	 Landscape (Rotate 180°)	-20 to +55 °C : 500mA +55 to +60 °C : 150mA
 Horizontal		-20 to +40 °C : 1000mA +40 to +55 °C : 500mA +55 to +60 °C : 150mA



- When installing the HG2J-7U in a diagonal, the limitations are same as a horizontal.
- Confirm the visibility of the display in a final installation.

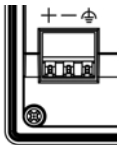
1.8 Wiring

⚠ CAUTION

- Turn off the power supply before wiring.
- Make the wiring as short as possible and run all wires as far away as possible from high-voltage and large-current cables. Follow all the procedures and precautions when wiring the HG2J-7U.
- Separate the HG2J-7U power supply wiring from the power lines of I/O devices and motor equipment.
- Ground the functional earth terminal to make sure of correct operation.
- Use the SELV (Safety Extra-Low Voltage) circuit and LIM (Limited Energy) circuit for power supply.
- Use Copper Conductors Only.

● Power Supply Terminal

- Pin assignment is shown in the following table.



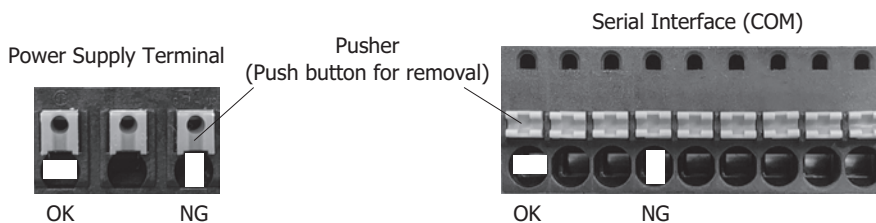
+	Power supply 12V/24V DC
-	Power supply 0V (0V)
⏏	Functional Earth (FE)

- Use applicable cables for wiring and recommended ferrules (made by IDEC, Phoenix Contact or Weidmüller) as follows.

Applicable cable	AWG14 to 28		
Conductor Type	Solid wire or Stranded wire		
Wire Strip Length*1	7 to 9 mm		
Recommended ferrule	ST3L-H025-12WJ S3TL-H034-12WT S3TL-H05-14WA S3TL-H075-14WW (IDEC)	AI 0,25-8YE AI 0,34-8TQ AI 0,5-8WH AI 0,75-8GY (Phoenix Contact)	H0,25/12 HBL H0,34/12 TK H0,5/14 OR H0,75/14 W (Weidmüller)

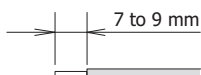
● Caution when inserting and removing wires

- When connecting a wire that has not been treated with a tip, such as a stranded wire, you can connect it by inserting the wire all the way in while pressing the pusher, and then releasing the pusher.
- When connecting wires with ferrules, connect the ferrules to the terminal block so that the long side is horizontal. (See the figure below.)



- Do not pull out the wire without pressing the pusher. When pulling out the wire, use a flat blade screwdriver, etc., and pull the wire straight out while pressing the pusher with about 20 N of force.
- Be careful not to damage the push-in terminals. When pressing the pusher, do not apply more than 40N of force.

*1 Strip the sheath of the wire 7 to 9 mm from the end.



- Cautions for using the HG2J-7U connected to a personal computer

When connecting the HG2J-7U to a personal computer via the USB Interfaces, the HG2J-7U or the personal computer may break down depending on the conditions of the personal computer. Make sure of the following cautions, in order to prevent an accident.

- If the personal computer has a 3-pin power plug or power plug with a ground lead type, make sure to use a plug socket including a ground input electrode or ground the earth lead, respectively.
- If the personal computer has a 2-pin power plug without ground lead, follow the procedure below when connect the HG2J-7U to the personal computer.
 - (1) Pull out the power plug of the personal computer from the AC outlet.
 - (2) Connect the HG2J-7U to the personal computer.
 - (3) Insert the power plug of the personal computer into the AC outlet.

- Recommended Tools

Tool Name		Model Number (Order Number)	Manufacturer
Flat blade screwdriver	Normal type	SDS 0.4×2.5×75 (9009030000)	Weidmüller
	With insulated cover	S3TL-D04-25-75	IDEC
		SDIS 0.4×2.5×75 (9008370000)	Weidmüller
Crimping tool		S3TL-CR06D	IDEC
		PZ6/5 (90011460000)	Weidmüller
Stripping tool		S3TL-ST06	IDEC
		STRIPAX(9005000000)	Weidmüller

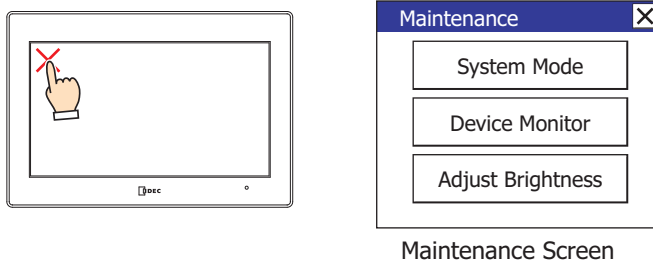
1.9 Maintenance and Inspection

Maintain and inspect the HG2J-7U periodically to ensure the best performance. Do not disassemble, repair, or modify the HG2J-7U during inspection.

Maintenance and Inspection Parts	Description
Display	Wipe any stain of the display using a soft cloth slightly dampened with neutral detergent or alcoholic solvent. Do not use solvents such as thinner, ammonia, strong acid, and strong alkaline.
Terminals, Connectors	Check the terminals and connectors to make sure of no loose screws, incomplete insertion, or disconnected lines.
Mounting Clips	Make sure that all mounting clips and screws are tightened sufficiently. If the mounting clips are loose, tighten the screw to the specified torque.
Backlight	The HG2J-7U's backlight cannot be replaced by the customer. When the backlight needs to be replaced. Contact your vendor or IDEC Corporation.

● Maintenance Screen

Turn on the power to the HG2J-7U, then press and hold the touch panel on the upper-left corner of the screen for three seconds or longer. The Maintenance Screen appears on the screen.

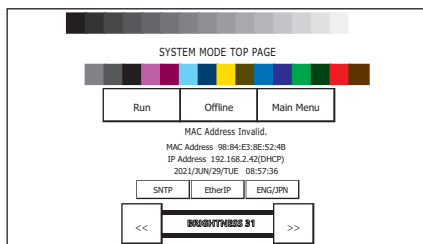


Maintenance Screen

- Permission to show the Maintenance Screen can be set using the WindO/I-NV4. For details, refer to Chapter 4 "3.1 System Tab" in the WindO/I-NV4 User's Manual.
- The Maintenance Screen is not displayed in the System Mode.

● System Mode

Press the **System Mode** at the top of the Maintenance Screen. The Top Page Screen appears.

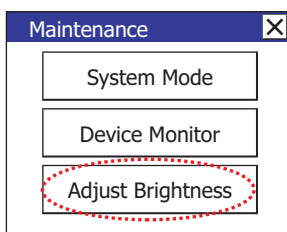


Initial Setting, Self Diagnosis and Initialization of the data, etc can be executed in the System Mode.

● Adjusting the Brightness

The brightness of the HG2J-7U display can be adjusted on the Adjust Brightness Screen.

- 1 Press the **Adjust Brightness** at the bottom of the Maintenance Screen. The Adjust Brightness Screen appears.



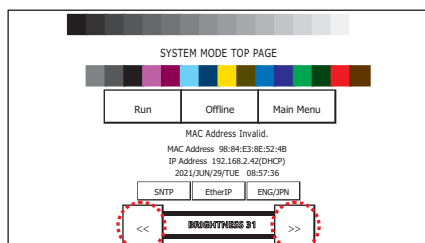
- 2 Press the << and >> at the bottom the Adjust Brightness Screen to adjust the contrast to the optimal setting.



- 3 Press the **X** at the top-right to close the Adjust Brightness Screen.



To adjust the brightness in the System Mode, use the << and >> buttons located at the bottom of the Top Page.



1.10 Software License Information


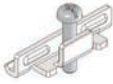



This product contains various open source software in addition to the software owned by IDEC Corporation. Information about open source software can be obtained from the QR code printed on the back of the HG2J-7U.

2 HG5G/4G/3G/2G-V



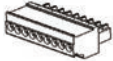


2.1 Packing Content

Before installing the HG5G/4G/3G/2G-V, make sure that the model you have received is what you actually ordered, and no parts are damaged to accidents during shipping.

■ HG5G/4G/3G-V

Product Name & Appearance	Quantity	Description
HG5G/4G/3G-V 	1	Main unit
Instruction Sheet	1	Japanese
Mounting clip 	HG5G-V: 6 HG4G/3G-V: 4	-
Communication plug for external devices 	1	Removable terminal block 9-pin
USB Cable Lock Pin 	1	-
USB Clamp Band 	1	-

■ HG2G-V

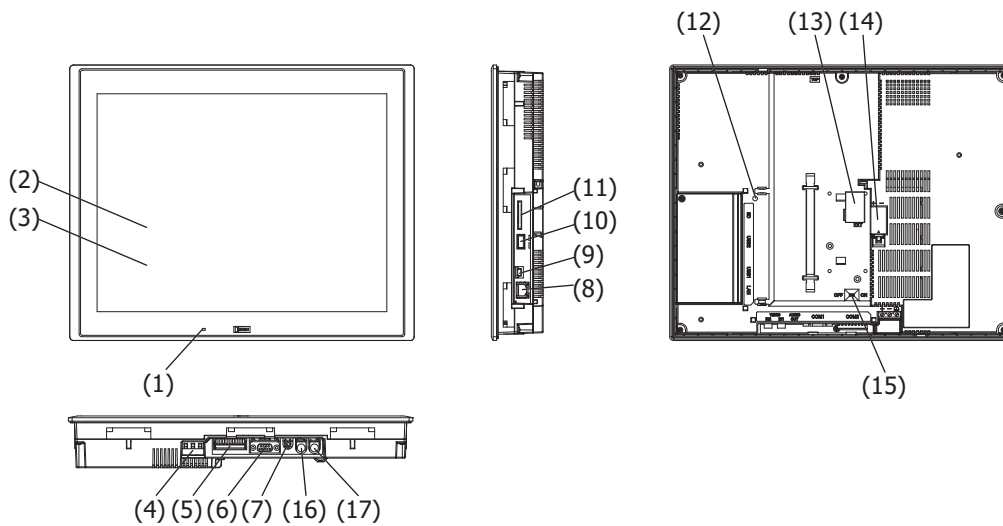
Product Name & Appearance	Quantity	Description
HG2G-V 	1	Main unit
Instruction Sheet	1	Japanese
Mounting clip 	4	-
Serial interface connector 	1	Removable terminal block 9-pin
USB Cable Lock Pin 	1	-
USB Clamp Band 	1	-

2.2 Type Number

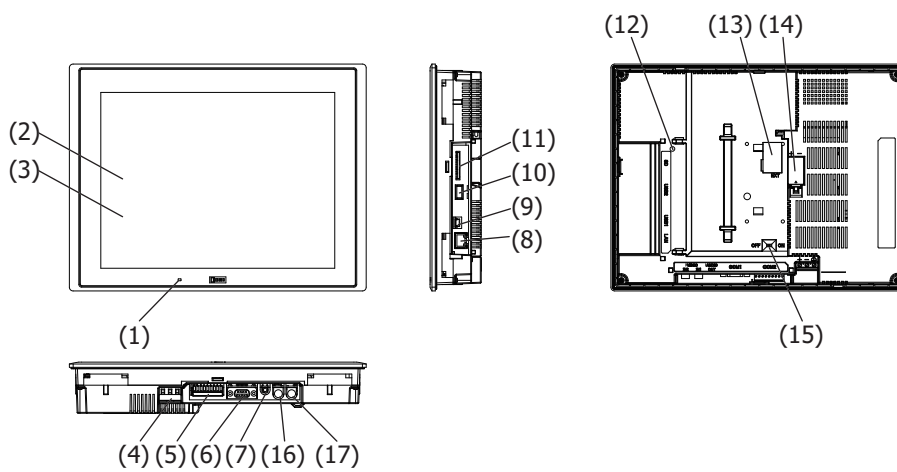
LCD	AUDIO IN/VIDEO IN	Bezel Color	Type Number
15.0 inch	With	Black	HG5G-VFXT22MF-B
12.1 inch	With	Black	HG4G-VCXT22MF-B
10.4 inch	With	Light gray	HG3G-VAXT22MF-W
		Black	HG3G-VAXT22MF-B
8.4 inch	With	Light gray	HG3G-V8XT22MF-W
		Black	HG3G-V8XT22MF-B
5.7 inch	Without	Light gray	HG2G-V5FT22TF-W
		Black	HG2G-V5FT22TF-B

2.3 Part Names

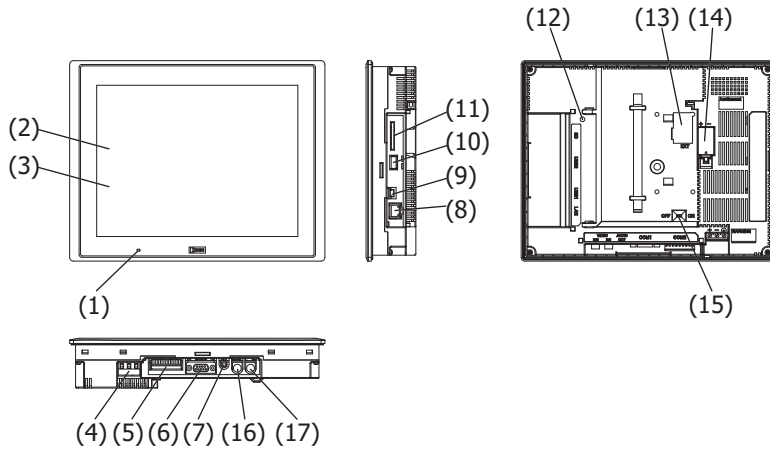
■ HG5G-V (15.0 inch)



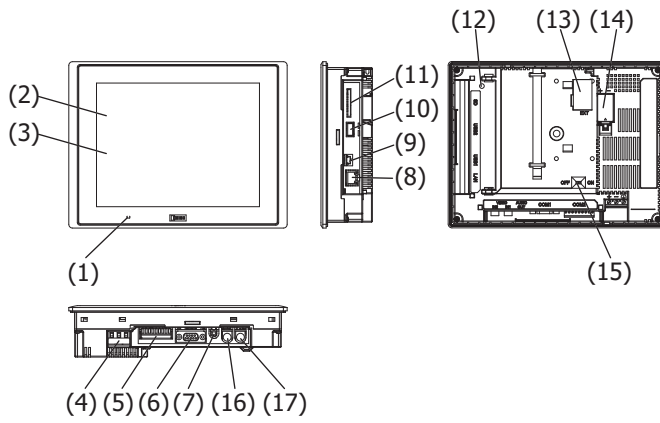
■ HG4G-V (12.1 inch)



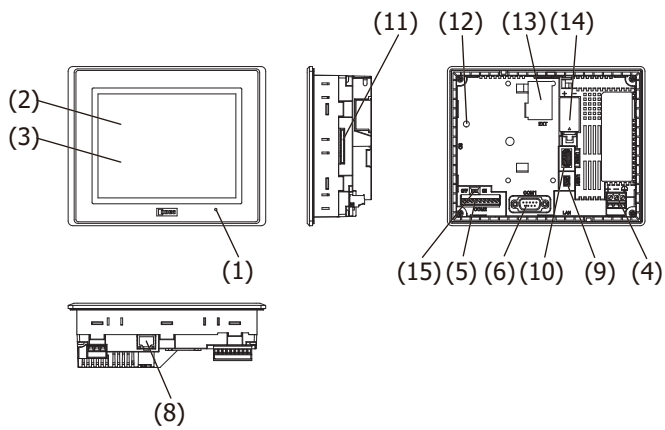
■ HG3G-VA (10.4 inch)



■ HG3G-V8 (8.4 inch)



■ HG2G-V (5.7 inch)



No.	Name	Description
(1)	POWER LED	Green (lit): Normal Operation (Power is ON.) Not lit: Power is off.
(2)	Display	TFT color LCD
(3)	Touch Panel	Analog resistive membrane type
(4)	Power Supply Terminal	Connector: Terminal Block 3-pin (Screw fastened type)
(5)	Serial Interface (COM2)	RS232C, RS422/485 Connector: Terminal Block 9-pin (Screw fastened type) Maximum cable length: 15m (RS232C), 1200m (RS422/RS485)
(6)	Serial Interface (COM1)	RS232C, RS422/485 Connector: D-sub 9-pin Maximum cable length: 15m (RS232C), 1200m (RS422/RS485)
(7)	Audio Interface (AUDIO OUT)	LINE OUT (Stereo) Recommended minimum load: 10kΩ Connector: Mini Jack (φ3.5mm) ^{*1}
(8)	Ethernet Interface (LAN)	IEEE802.3u 10BASE-T/100BASE-TX Connector: RJ-45 (With Auto MDI/MDI-X function) Maximum cable length: 100m
(9)	USB Interface (USB1)	USB2.0 (Device) Connector: Mini-B
(10)	USB Interface (USB2)	USB2.0 (Host) Connector: Type-A Output current: 5V 500mA
(11)	Memory Card Interface (SD)	For SD memory card
(12)	SD Memory Card Access Lamp	-
(13)	Expansion Module Interface (EXT)	For IDEC MICROSmart Expansion Modules
(14)	Battery Cover	-
(15)	Terminating Resistor Selector Switch	For COM2 RS422/485 interface
(16)	Video Interface (VIDEO IN1)	NTSC/PAL Connector: Pin Jack ^{*1}
(17)	Video Interface (VIDEO IN2)	NTSC/PAL Connector: Pin Jack ^{*1}

*1 HG5G/4G/3G-V only

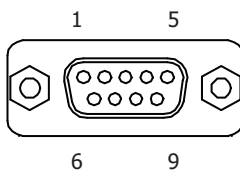
2.4 External Interfaces

! CAUTION

- Make sure to turn off the power to the HG5G/4G/3G/2G-V before wiring each interface or switching the terminating resistor selector switch.
- The serial interface (COM 1) is used only for the interface of RS232C or RS422/485. Wiring both interfaces will result in failure of the HG5G/4G/3G/2G-V. Wire only the interface used.
- The serial interface (COM2) can be used as the RS232C and RS422/485 interfaces at same time.

● Serial Interface (COM1)

Interface Specification	RS232C, RS422/485
Connector	D-sub 9-pin (Plug)
Screw lock bracket	Inch Screw Thread #4-40 UNC



No.	Name	I/O	Function	Communication type
1	RDA	IN	Receive Data (+)	RS422/485
2	RD	IN	Receive Data	RS232C
3	SD	OUT	Send Data	RS232C
4	SDA	OUT	Send Data (+)	RS422/485
5	SG	-	Signal Ground	-
6	RDB	IN	Receive Data (-)	RS422/485
7	RS	OUT	Request to Send	RS232C
8	CS	IN	Clear to Send	RS232C
9	SDB	OUT	Send Data (-)	RS422/485

● Serial Interface (COM2)

Use applicable cables for wiring and recommended ferrules (made by Phoenix Contact or Weidmüller) as follows.

Interface Specification	RS232C, RS422/485	
Connector	Detachable Terminal Block 9-pin	
Applicable cable	AWG20 to 22	
Recommended ferrule	AI 0,34-8 TQ AI 0,5-8 WH AI-TWIN 2 x 0,5-8 WH (Phoenix Contact)	H0,34/12 TK H0,5/14 OR H0,5/14 ZH OR (Weidmüller)
Tightening Torque	0.22 to 0.25 N·m	



No.	Name	I/O	Function	Communication type	
1	SD	OUT	Send Data	RS232C	/
2	RD	IN	Receive Data		
3	RS	OUT	Request to Send		
4	CS	IN	Clear to Send		
5	SG	—	Signal Ground	RS422/485	/
6	SDA	OUT	Send Data (+)		
7	SDB	OUT	Send Data (-)		
8	RDA	IN	Receive Data (+)		
9	RDB	IN	Receive Data (-)		

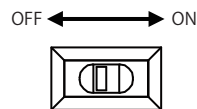


Only one ferrule can be inserted into a terminal hole.

Please set another terminal block in the vicinity of the main unit and connect SG when using RS232C and RS422/485 requiring crossover wiring at the same time. And separate the communication cables so that they do not affect each communication waveform when using RS232C and RS422/485 at the same time.

Using RS422/485 interface

When using RS422/485 interface, set the Terminating Resistor Selector Switch to the ON side. This will connect the internal terminating resistor (120Ω) between RDA and RDB.



Terminating Resistor Selector Switch (for RS422/485 interface)

● Expansion Module Interface (EXT)

IDEC MICROSmart expansion modules can be connected to the HG5G/4G/3G/2G-V.

Refer to Chapter 2 "1.2 Applicable Expansion Modules" on page 2-2 for the number, the types and the combination of the expansion modules that can be installed.

2.5 Specifications

■ Applicable Standards

Safety Standards	UL61010-1, UL61010-2-201, UL121201 CSA C22.2 No.61010-1-12 (c-UL), CSA C22.2 No.61010-2-201 (c-UL) CSA C22.2 No.213 (c-UL)
EMC Standards	IEC/EN 61131-2
Marine Standards	LR, DNV·GL, ABS, ClassNK

■ Environmental Specifications

Ambient Operating Temperature	-20 to +60°C (no freezing)
Ambient Operating Humidity	10 to 90% RH (no condensation)
Ambient Storage Temperature	-20 to +70°C (no freezing)
Ambient Storage Humidity	10 to 90% RH (no condensation)
Altitude	0 to 2000m
Pollution Degree	2
Corrosion Immunity	Free from corrosive gases

■ Electrical Specifications

Type Number	HG5G-V	HG4G-V	HG3G-VA	HG3G-V8	HG2G-V
Rated Voltage	24V DC				
Power Consumption	27W maximum	25W maximum		22W maximum	18W maximum
Not using USB Interface (USB2) and Expansion Module Interface (EXT)	20W maximum	15W maximum		12W maximum	8W maximum
Backlight OFF	7W maximum			4W maximum	
Power Voltage Range	20.4 to 28.8V DC				
Allowable Momentary Power Interruption	10 ms maximum				
Inrush Current	30A maximum				
Dielectric Withstand Voltage	AC1000V, 10mA, 1 minute (between power and earth terminals)				

■ Construction Specifications

Vibration Resistance	5 to 8.4Hz amplitude 3.5mm, 8.4 to 150Hz acceleration 9.8m/s ² 10 times on each of three mutually perpendicular axes (IEC 61131-2)
Shock Resistance	147m/s ² , 11ms (3 shocks on each of three mutually perpendicular axes) (IEC 61131-2)

■ Performance Specifications

Type Number	HG5G-V	HG4G-V	HG3G-VA	HG3G-V8	HG2G-V	
Display	LCD Type*1	TFT color LCD (TN Type)	TFT color LCD (IPS Type)			TFT color LCD (TN Type)
	Display Colors	65,536 Colors				
	Effective Display Area	304.1 (W) × 228.1 (H) mm	245.76 (W) × 184.32 (H) mm	210.4 (W) × 157.8 (H) mm	170.496 (W) × 127.872 (H) mm	115.2 (W) × 86.4 (H) mm
	Display Resolution	1024 (W) × 768 (H) dots				640 (W) × 480 (H) dots
	View angle	Left/Right/Bottom: 80°, Top: 60°	Left/Right/Top/Bottom: 85°			Left/Right/Top/Bottom: 80°
	Brightness of LCD only	650 cd/m ²	600 cd/m ²	700 cd/m ²	800 cd/m ²	800 cd/m ²
	Brightness Adjustment	48 levels				
	Backlight	LED (white)				
	Backlight Life*2	Approx. 100,000 hours (The time until brightness becomes 50% of the initial value)				
Touch Panel	Switch Type	Analog Resistive Film				
	Operating Force	3N maximum				
	Multiple Operations	Impossible				
	Life	1,000,000 operations				
User Memory	Approx. 58 MB					
Backup Battery	Coin type lithium manganese dioxide battery CR2032W Guarantee Period: 1 Year (Ambient Operating Temperature at 25°C) Recommended Replacement Span: Every 5 Years (Ambient Operating Temperature at 25°C)					
Backup Data	Calendar, Log Data, HMI Keep Relays, HMI Keep Registers					
Buzzer output	Single tone (tone length is adjustable)					
Degree of Protection*3	IP66F, IP67F (IEC 60529) TYPE 4X (indoor use only) TYPE 13					
Weight (approx.)	3.2kg	2.1kg	1.65 kg	1.25 kg	0.65 kg	

*1 Please be aware that small black and bright dots might show up on LCD Screen: it is not a failure or malfunction.

*2 The life of the LCD itself at an ambient temperature of 25°C. This is not a guaranteed value. The actual life depends on the environment and conditions of use.

*3 It is a protection structure for the operating surface of HMI, which is attached to a panel. Although protection structure suffices every test conditions, it does not guarantee to operate under all of the environmental condition. As for IP66F/IP67F oilproof structure, it suffices oilproof test conditions. Conditions are listed in the document that comes with Japanese Industrial Standard JIS C 0920. Protection structure do not guarantee usage under long exposure to oil or usage of oil that is not prescribed in the document. Please test/check beforehand to avoid trouble.

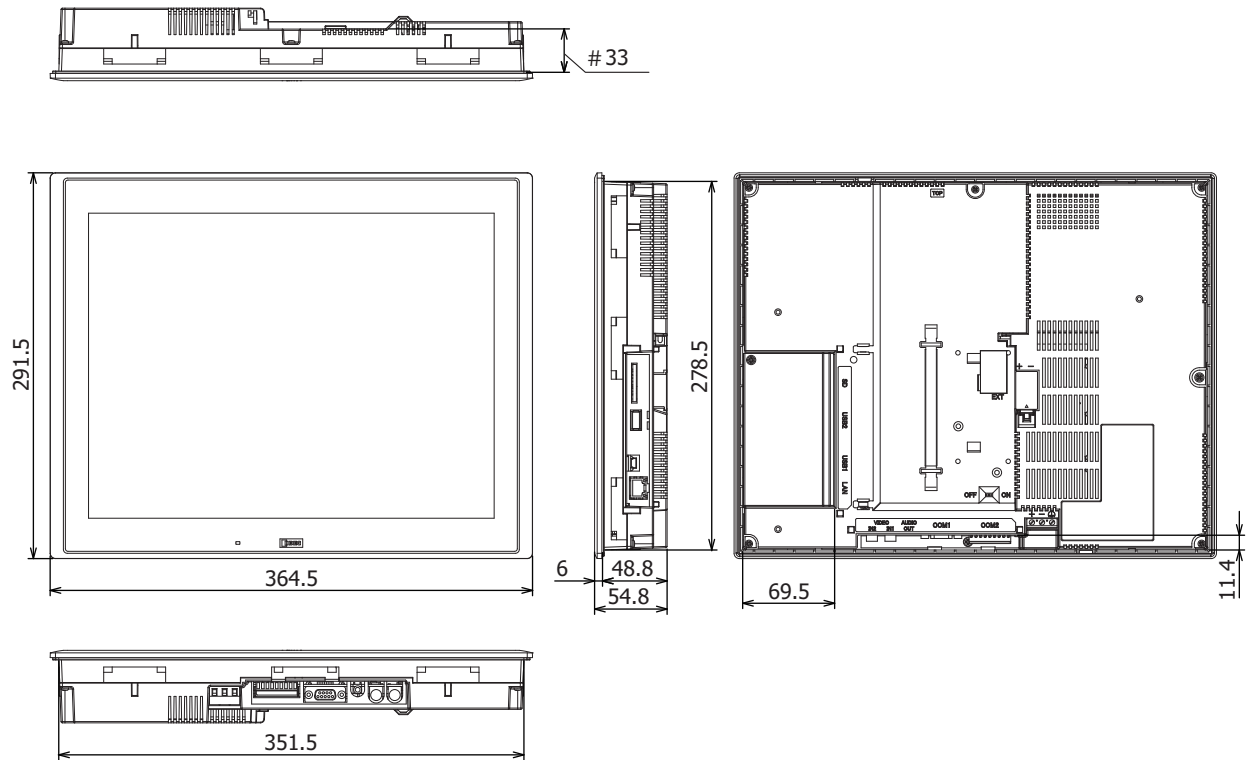
■ EMC Specifications

Radiated Emission	Class A: 10m 40dB μ V/m quasi-peak (30M to 230MHz) 47dB μ V/m quasi-peak (230M to 1GHz)
Electrostatic Discharge	Contact: \pm 6kV Air: \pm 8kV
Electromagnetic Field	10V/m (80M to 1000MHz) 3V/m (1.4G to 2.0GHz) 1V/m (2.0G to 2.7GHz) 80% AM (1kHz)
Fast Transient/Burst	Power: \pm 2kV Communication cable: \pm 1kV
Surge Immunity	\pm 500V (between +24V and 0V) \pm 1kV (between +24V and FE, 0 and FE)
Conducted Radio Frequency Immunity	3V (Power, Communication cable) (150k to 80MHz) 80% AM (1kHz)

2.6 Dimensions

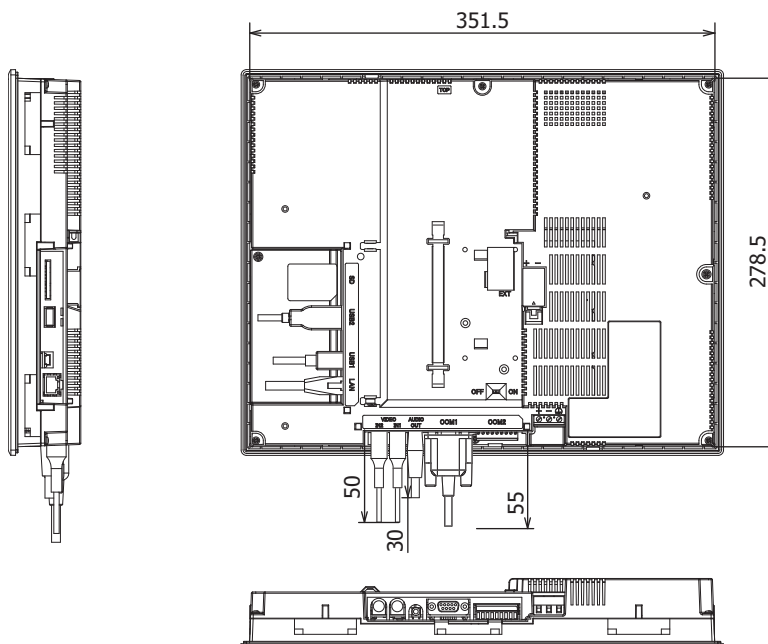
■ HG5G-V (15.0 inch)

Unit: mm



The size to the expansion module installation side

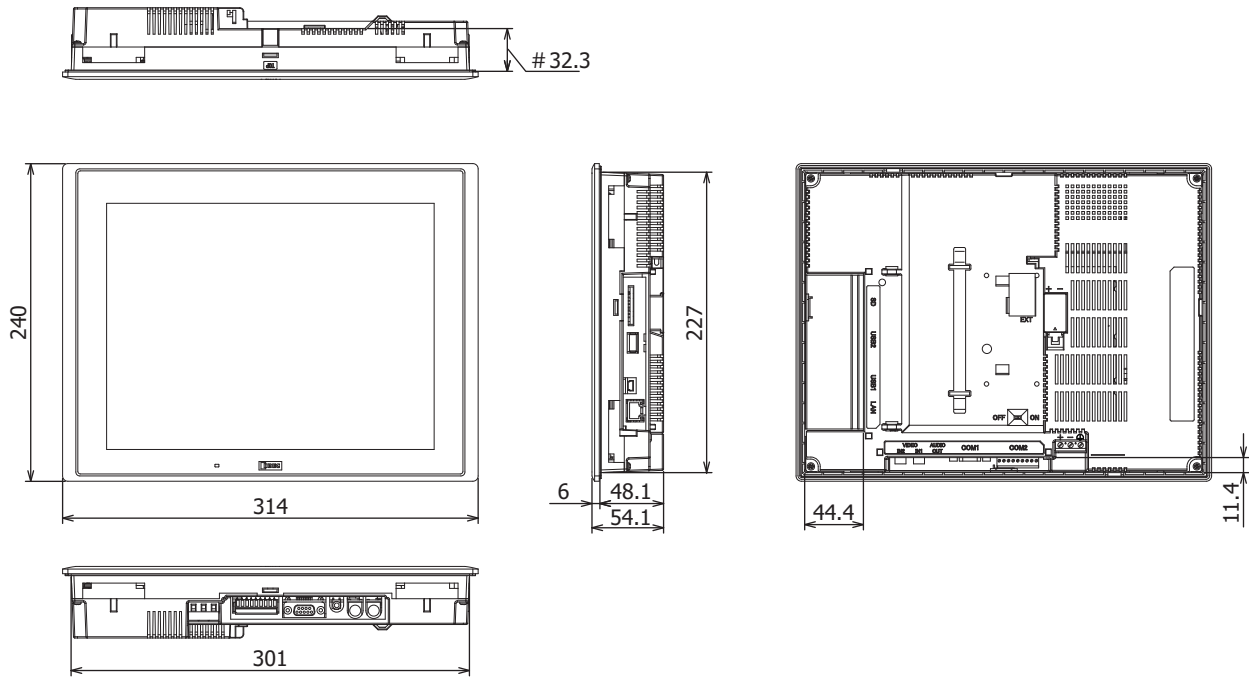
<Cable Attached Dimensions>



Depending on the type of connection cable used the dimensions shown above will change. The dimensions given here are representative values and are intended for reference only.

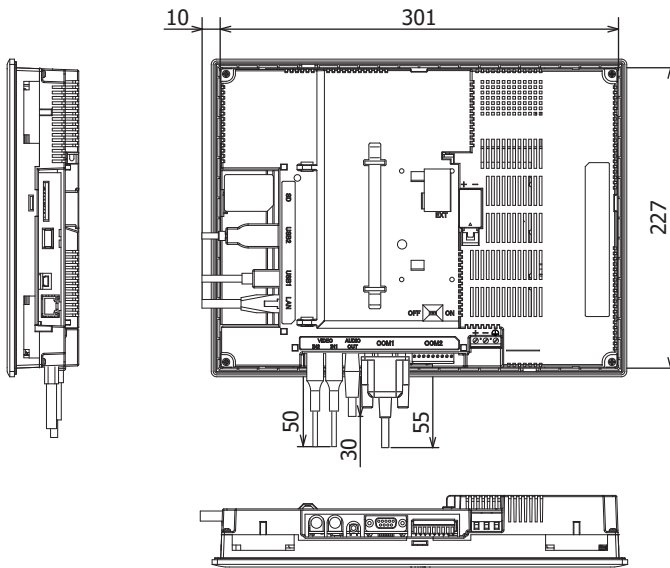
■ HG4G-V (12.1 inch)

Unit: mm



The size to the expansion module installation side

<Cable Attached Dimensions>



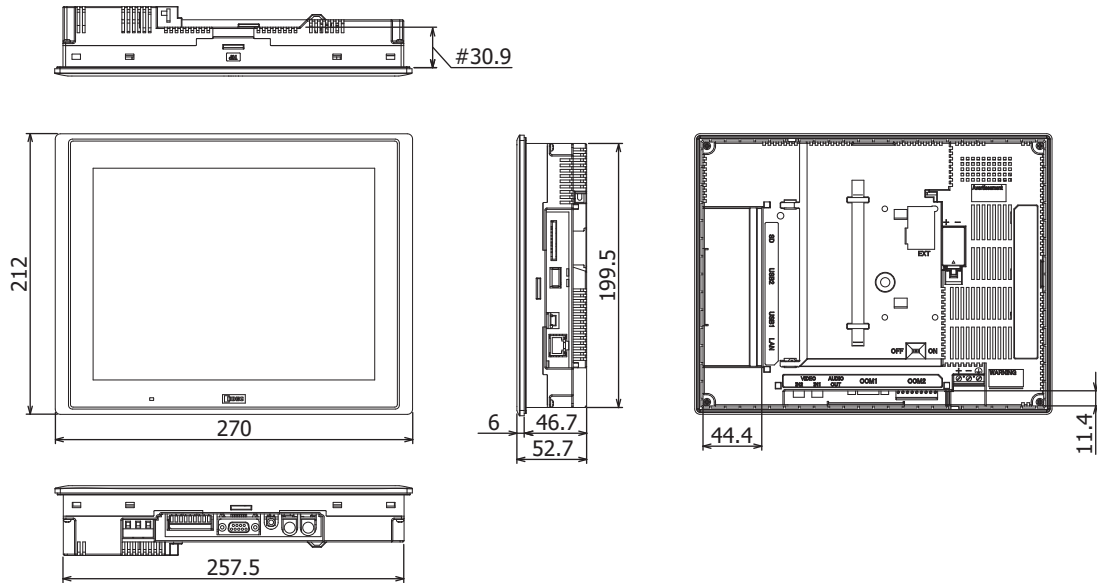
Depending on the type of connection cable used the dimensions shown above will change. The dimensions given here are representative values and are intended for reference only.

■ HG3G-VA (10.4 inch)

Unit: mm

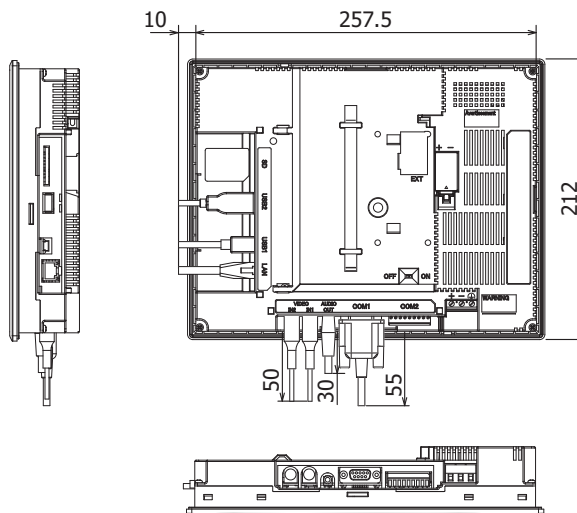
1

Main Unit Specifications



The size to the expansion module installation side

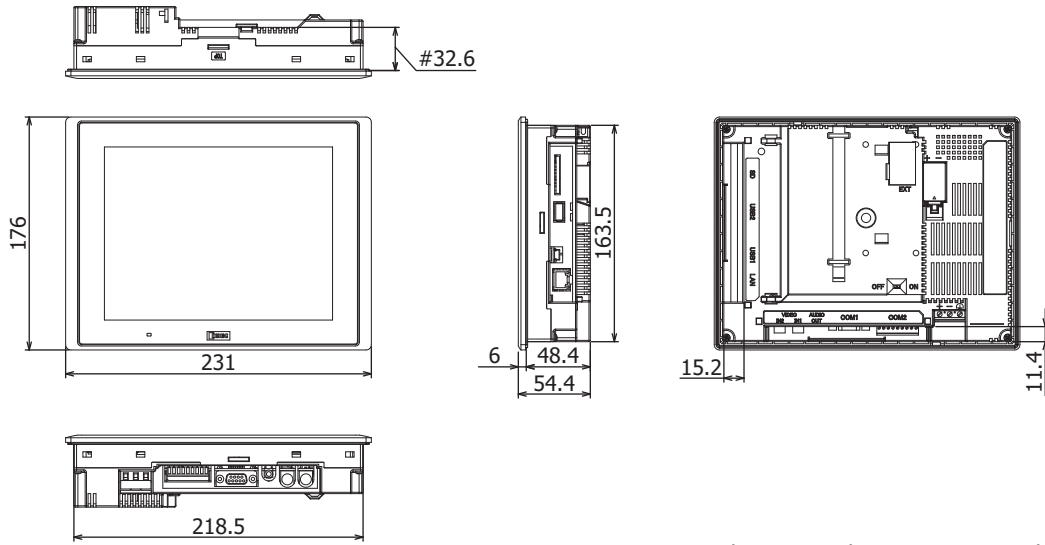
<Cable Attached Dimensions>



Depending on the type of connection cable used the dimensions shown above will change. The dimensions given here are representative values and are intended for reference only.

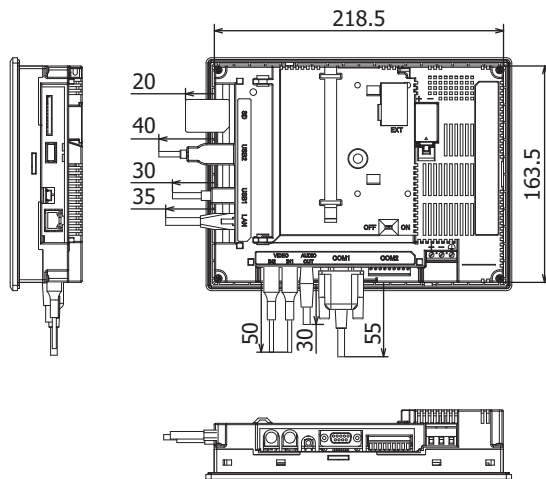
■ HG3G-V8 (8.4 inch)

Unit: mm



The size to the expansion module installation side

<Cable Attached Dimensions>

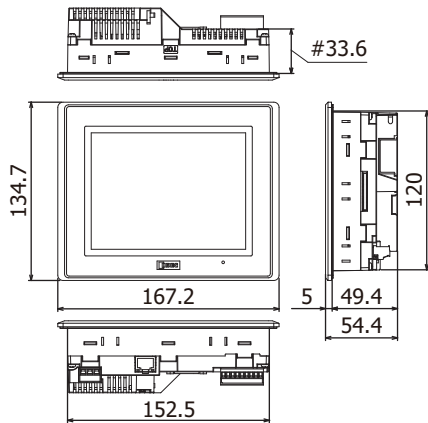


Depending on the type of connection cable used the dimensions shown above will change. The dimensions given here are representative values and are intended for reference only.

■ HG2G-V (5.7 inch)

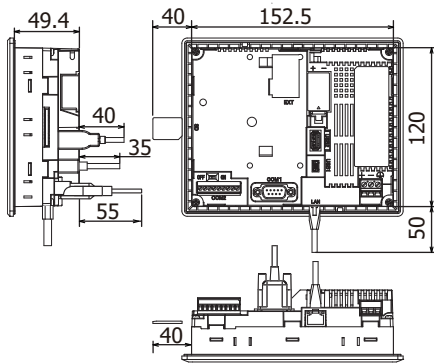
Unit: mm

1



The size to the expansion module installation side

<Cable Attached Dimensions>



Depending on the type of connection cable used the dimensions shown above will change. The dimensions given here are representative values and are intended for reference only.

2.7 Installation

● Operating Environment

For designed performance and safety of the HG5G/4G/3G/2G-V, do not install the HG5G/4G/3G/2G-V in the following environments:

- Where dust, briny air, or iron powder exist.
- Where oil or chemical splashes for a long time.
- Where space is filled with oil mist.
- Where direct sunlight falls on the main unit.
- Where strong ultraviolet rays fall on the main unit.
- Where corrosive or combustible gasses exist.
- Where shocks or vibrations are transmitted.
- Where condensation occurs due to rapid temperature change.
- Where high-voltage or arc-generating equipment (electromagnetic contactors or circuit protectors) exists in close proximity.

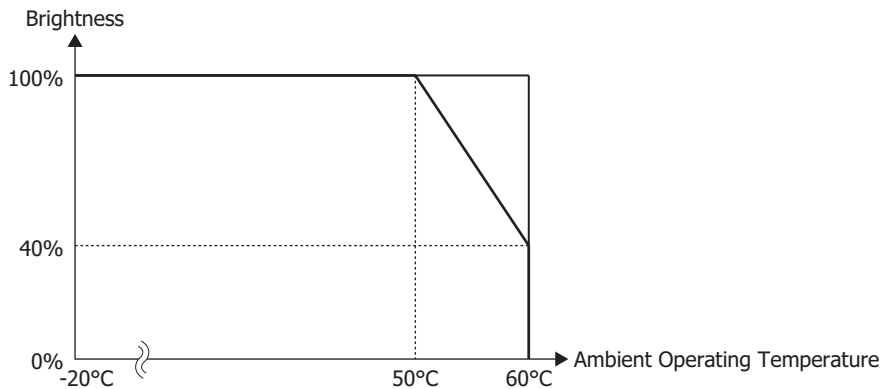
● Ambient Temperature

- Allow sufficient space for ventilation, and install the equipment away from heat sources.
- Allow at least 100mm between the HG5G/4G/3G/2G-V and walls or other equipment.
- Do not install the HG5G/4G/3G/2G-V where the ambient temperature exceeds the rated operating ambient temperature range. When mounting the HG5G/4G/3G/2G-V in such locations, provide a forced air-cooling fan or air-conditioner to keep the ambient temperature within the rated temperature range.
- The HG5G/4G/3G/2G-V is designed to install on a vertical plane so that natural air-cooling is provided. If you install it using any other orientation, use forced-air cooling, or lower the ambient operating temperature.

● About Derating

HG5G/4G/3G/2G-V suppresses the temperature rise inside the product by reducing the backlight brightness when the ambient operating temperature becomes high.

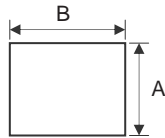
Relationship between the ambient operating temperature and brightness is as follows.



Depending on each product the values shown above will change. The values given here are representative values are intended for reference only.

● Installation

- Make a panel cut-out on the panel with the dimensions shown below.



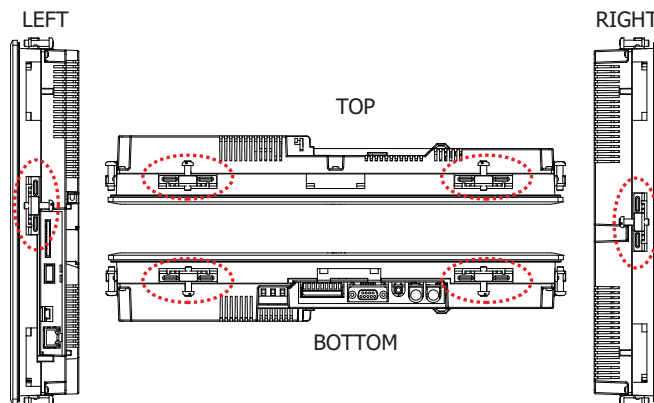
Unit: mm

Model	A		B		Panel Thickness
HG5G-V	279.0	+2.0 0	352.0	+2.0 0	2.0 to 5.0
HG4G-V	227.5	+2.0 0	301.5	+2.0 0	2.0 to 5.0
HG3G-VA	200.0	+2.0 0	258.0	+2.0 0	2.0 to 5.0
HG3G-V8	164.0	+2.0 0	219.0	+2.0 0	2.0 to 5.0
HG2G-V	121.0	+2.0 0	153.0	+2.0 0	1.6 to 5.0

- Install the HG5G/4G/3G/2G-V in a panel cut per the chart above. As it is the following figure, fasten the mounting clips on the top, bottom, and sides of the unit to secure to the panel. If mounting clips are attached in the part besides the following figure, there is a risk of not satisfying product specifications such as waterproof performance, shock resistance, and vibration resistance performance.

Mounting Clip Position

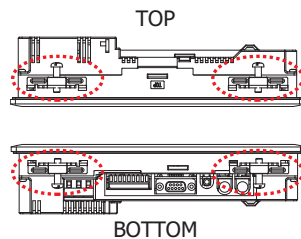
HG5G-V



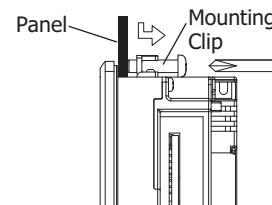
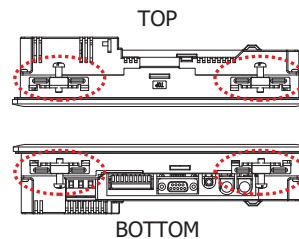
Unit : N·m

Model	Specified Torque
HG5G-V	0.5 to 0.6
HG4G-V	0.5 to 0.6
HG3G-VA	0.5 to 0.6
HG3G-V8	0.5 to 0.6
HG2G-V	0.2 to 0.3

HG4G/3G-V



HG2G-V







⚠ CAUTION

- Do not tighten with excessive force, otherwise the main unit may warp and cause wrinkle on the display, or impair the waterproof characteristics.
- If the mounting clips are tightened obliquely to the panel, the main unit may fall off the panel.
- When installing the main unit into a panel cut-out, make sure that the gasket is not twisted. Especially when reinstalling, take special care because any twists in the gasket will impair the waterproof characteristics. Also, if the gasket comes off the main unit, align the convex part of the gasket with the concave part of the front case, and then insert the gasket fully into the gasket mounting groove without twisting it.

● Restrictions due to mounting orientation

The HG5G/4G/3G/2G-V is designed to install on a vertical landscape. The ambient operating temperature and the use of expansion modules are limited depending on the mounting orientation as shown in the table below.

Orientation			Ambient Operating Temperature	
			w/o expansion modules	w/ expansion modules
Vertical	 Landscape	HG5G-V	-20 to 60°C	-10 to 50°C
		HG4G-V		
		HG3G-V		
		HG2G-V		
	 Portrait (Clockwise)	HG5G-V	-20 to 60°C	unavailable
		HG4G-V		
		HG3G-V		
		HG2G-V		
	 Portrait (Counter Clockwise)	HG5G-V	-20 to 60°C	unavailable
		HG4G-V		
		HG3G-V		
		HG2G-V		
 Horizontal	HG5G-V	-20 to 60°C	unavailable	
	HG4G-V			
	HG3G-V			
	HG2G-V			



- When installing the HG5G/4G/3G/2G-V in a diagonal, the limitations are same as a horizontal.
- Confirm the visibility of the display in a final installation.

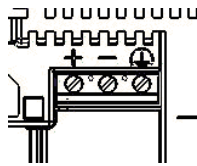
2.8 Wiring

! CAUTION

- Turn off the power supply before wiring.
- Make the wiring as short as possible and run all wires as far away as possible from high-voltage and large-current cables. Follow all the procedures and precautions when wiring the HG5G/4G/3G/2G-V.
- Separate the HG5G/4G/3G/2G-V power supply wiring from the power lines of I/O devices and motor equipment.
- Ground the functional earth terminal to make sure of correct operation.

● Power Supply Terminal

- Pin assignment is shown in the following table.



+	Power supply 24V DC (+24V)
-	Power supply 0V (0V)
	Functional Earth (FE)

- Use applicable cables for wiring and recommended ferrules (made by Phoenix Contact or Weidmüller) as follows.

Type Number	HG5G/4G/3G-V		HG2G-V	
Applicable cable	AWG18 to 22		AWG14 to 22	
Recommended ferrule	AI 0,34-8 TQ AI 0,5-8 WH AI 0,75-8 GY AI 1-8 RD AI-TWIN 2 x 0,5-8 WH AI-TWIN 2 x 0,75-8 GY AI-TWIN 2 x 1-8 RD (Phoenix Contact)	H0,34/12 TK H0,5/14 OR H0,75/14 W H1,0/14 GE H0,5/14 ZH OR H0,75/14 ZH W H1,0/15 ZH GE (Weidmüller)	AI 0,34-12 TQ AI 0,5-12 WH AI 0,75-12 GY AI 1-12 RD AI 1,5-12 BK AI 2,5-12 BU AI-TWIN 2 x 1,5-12 BK (Phoenix Contact)	H0,5/18 OR H0,75/18 W H1,0/18 GE H1,5/18D SW H2,5/19D BL H1,5/20 ZH R (Weidmüller)
Tightening Torque	0.5 to 0.6 N·m		0.5 to 0.6 N·m	

● Grounding Cautions

If you decide to use a single power supply for the HG5G/4G/3G/2G-V with more than one external device, take extra precautions. Some external devices may produce electrical noise and short circuit the entire system setup, therefore, damaging the communication circuit of the HG5G/4G/3G/2G-V and non-isolated Communication Device (i.e. PLC).

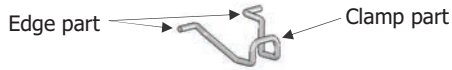
To prevent such damage, choose a proper solution depending on your system setup.

- Use a separate earth ground from the external noise source device.
- The wire for grounding should be thick and short in order to direct the noise from the noise source device to the earth ground.
- Use a separate power supply from the external noise source device.
- Insert an isolator on the communication line of the HG5G/4G/3G/2G-V and the non-isolated communication device (i.e. PLC) to prevent damage.

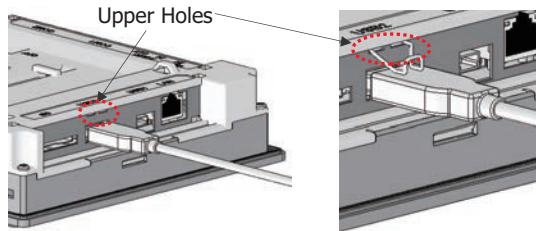
2.9 USB Cable Lock Pin Attachment

When using the USB device, attach the USB Cable Lock Pin to prevent disconnecting the USB cable from the HG5G/4G/3G/2G-V.

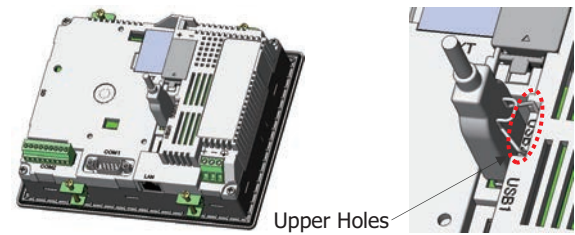
- 1 Insert the USB cable into the USB2 port.
- 2 Strain the "Edge part" of the USB Cable Lock Pin, and insert the "Edge part" to the 2 holes upper the USB2 port.



HG5G/4G/3G-V

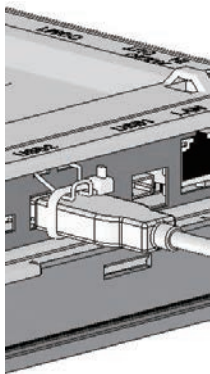


HG2G-V

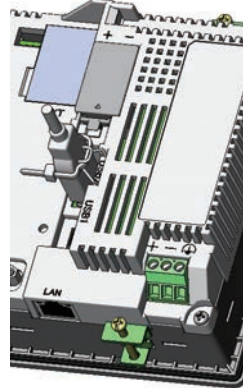


- 3 Fasten the USB Clamp Band around the USB cable and the "Clamp part", secure them tightly.

HG5G/4G/3G-V

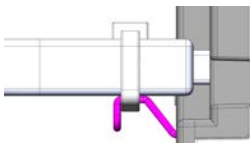


HG2G-V

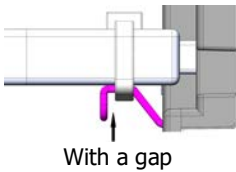


Fasten the USB Clamp Band without the space between the "Clamp part" and it, and the inclination.

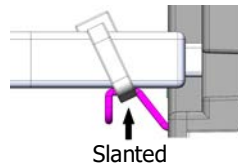
YES



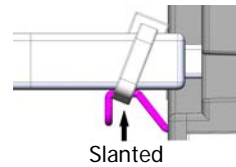
NO



NO



NO



2.10 Maintenance and Inspection

Maintain and inspect the HG5G/4G/3G/2G-V periodically to ensure the best performance. Do not disassemble, repair, or modify the HG5G/4G/3G/2G-V during inspection.

Maintenance and Inspection Parts	Description
Display	Wipe any stain of the display using a soft cloth slightly dampened with neutral detergent or alcoholic solvent. Do not use solvents such as thinner, ammonia, strong acid, and strong alkaline.
Terminals, Connectors	Check the terminals and connectors to make sure of no loose screws, incomplete insertion, or disconnected lines.
Mounting Clips	Make sure that all mounting clips and screws are tightened sufficiently. If the mounting clips are loose, tighten the screw to the specified torque.
Backlight	The HG5G/4G/3G/2G-V's backlight cannot be replaced by the customer. When the backlight needs to be replaced, contact your vendor or IDEC Corporation.
Backup Battery	The operating life of the internal battery is approximately five years. It is recommended to replace the battery every five years even before the reminder message for battery replacement is displayed.
Touch Panel	A gap may be caused in the operation accuracy of the touch panel by the secular distortion, etc. Readjust the touch panel in the System Mode according to the following procedure when there is a gap in the operation of the touch panel. Refer to "Adjusting the Touch Panel" on page 1-38 for details.

● Replacing the Backup Battery

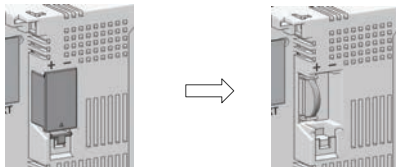
A backup battery is built into the HG5G/4G/3G/2G-V to retain the internal backup data (log data, keep resistor, and keep relay) and clock data.

When the "Replace the battery" message is displayed, replace the backup battery by following the procedure below.

When the "Battery level LOW" message is displayed, replace the battery immediately; otherwise, the backup data and clock data may be lost.

Whether or not to display the reminder message for battery replacement can be specified with the configuration software. For details, refer to Chapter 4 "3.1 System Tab" in the WindO/I-NV4 User's Manual.

1 Remove the battery holder cover.



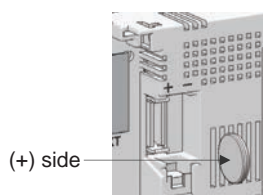
2 Turn on the power to the HG5G/4G/3G/2G-V, wait for approximately one minute, and then turn off the power again.



After turning off the power to the HG5G/4G/3G/2G-V in step 2, complete the steps through 4 within 30 seconds to replace the battery without losing the backup data and clock data. However, it is recommended that the backup data be transferred to flash memory as a precautionary measure. For the procedure to transfer the data to flash memory, refer to Chapter 35 "Internal Devices" in the WindO/I-NV4 User's Manual. If it is not necessary to save the data, step 2 can be skipped.

3 Remove the battery from the battery holder.

4 Install a replacement battery into the battery holder. Ensure that the orientation of the battery is correct.



- 5 With the new batter installed correctly, reverse the instruction the procedure described in item #1 above to secure the cover.
- The operating life of the internal battery is approximately five years. It is recommended to replace the battery every five years even before the reminder message for battery replacement is displayed.
 - IDEC provides replacement service for the battery (at customer's expense). Contact your vendor or IDEC Corporation.

! WARNING

The battery may be regulated by national or local regulation. Observe the instructions of proper regulation. As electric capacity is left in a discarded battery and it comes into contact with other metals, it could lead to distortion, leakage, overheating, or explosion, so make sure to cover the (+) and (-) terminals with insulating tape before disposal.

! CAUTION

When replacing the battery, use the specified battery only. Note that any problems and failures arising from or in connection with the use of a battery other than the specified battery is not guaranteed.

Handling of Batteries and Devices with Built-in Batteries in EU Member States

Note: The following symbol mark is for EU countries only and is according to the directive 2006/66/EC Article 20 information for end-users and Annex II.



This symbol mark means that batteries and accumulators, at their end-of life, should be disposed of separately from your household waste.

If a chemical symbol is printed beneath the symbol shown above, this chemical symbol means that the battery or accumulator contains a heavy metal at a certain concentration. This will be indicated as follows :

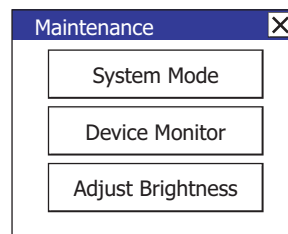
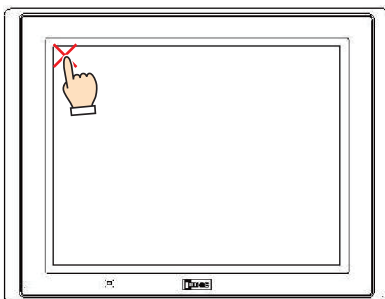
Hg : mercury (0.0005%), Cd : cadmium (0.002%), Pd : lead (0.004%)

In the European Union there are separate collection systems for used batteries and accumulators.

Please dispose of batteries and accumulators correctly in accordance with each country or local regulation.

● Maintenance Screen

Turn on the power to the HG5G/4G/3G/2G-V, then press and hold the touch panel on the upper-left corner of the screen for three seconds or longer. The Maintenance Screen appears on the screen.

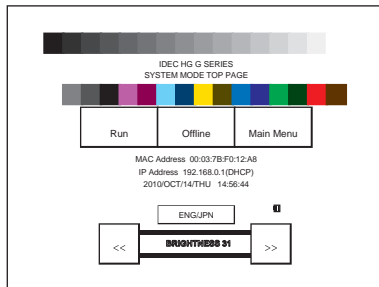


Maintenance Screen

- Permission to show the Maintenance Screen can be set using the WindO/I-NV4. For details, refer to Chapter 4 "3.1 System Tab" in the WindO/I-NV4 User's Manual.
- The Maintenance Screen is not displayed in the System Mode.

● System Mode

Press the **System Mode** at the top of the Maintenance Screen. The Top Page Screen appears.

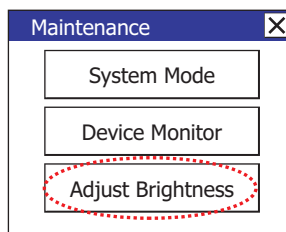


Initial Setting, Self Diagnosis and Initialization of the data, etc can be executed in the System Mode.

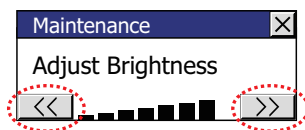
● Adjusting the Brightness

The brightness of the HG5G/4G/3G/2G-V display can be adjusted on the Adjust Brightness Screen.

- 1 Press the **Adjust Brightness** at the bottom of the Maintenance Screen. The Adjust Brightness Screen appears.



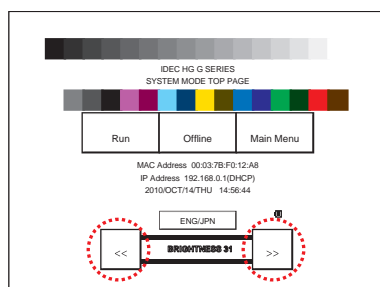
- 2 Press the << and >> at the bottom the Adjust Brightness Screen to adjust the contrast to the optimal setting.



- 3 Press the **X** at the top-right to close the Adjust Brightness Screen.



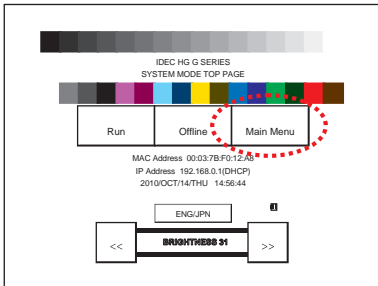
To adjust the brightness in the System Mode, use the << and >> buttons located at the bottom of the Top Page.



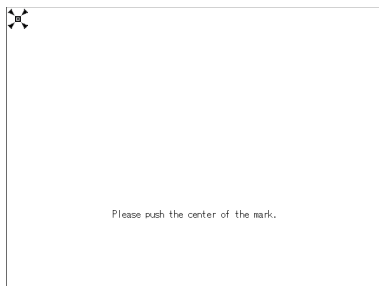
● Adjusting the Touch Panel

A gap may be caused in the operation accuracy of the touch panel by the secular distortion, etc. Adjust the touch panel according to the following procedure when there is a gap in the operation of the touch panel.

- 1 Press the **Main Menu** on the Top Page in System Mode. The Main Menu Screen appears.



- 2 Press in order of **Initial Setting, Initialize, Touch Panel Adjust**. The confirmation screen appears and asks "Adjust Touch Panel setting?". Press **Yes**, then the Touch Panel Adjust screen appears.
- 3 Press the center of the X mark, then the position of the mark changes one after another. Press five marks sequentially.



Press the center of the X mark.

This will ensure the accuracy of the touch panel operation.

- 4 When normally recognized, the confirmation screen of 2 is restored.


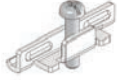




At procedure 3, when pressing a point away from the center of the X mark, a recognition error will result. Then the X mark returns to the initial position, then repeat the procedure of 3 again.

3 HG4G/3G, HG2G-5F







3.1 Packing Content

Before installing the HG4G/3G, HG2G-5F, make sure that the model you have received is what you actually ordered, and no parts are damaged to accidents during shipping.

■ HG4G/3G

Product Name & Appearance	Quantity	Description
HG4G/3G 	1	Main unit
Instruction Sheet	1	Japanese
Mounting clip 	4	-
Serial interface connector 	1	Removable terminal block 9-pin
USB Cable Lock Pin 	1	-
USB Clamp Band 	1	-
Screw lock bracket 	2	Metric Screw Thread M2.6 x 0.45

■ HG2G-5F

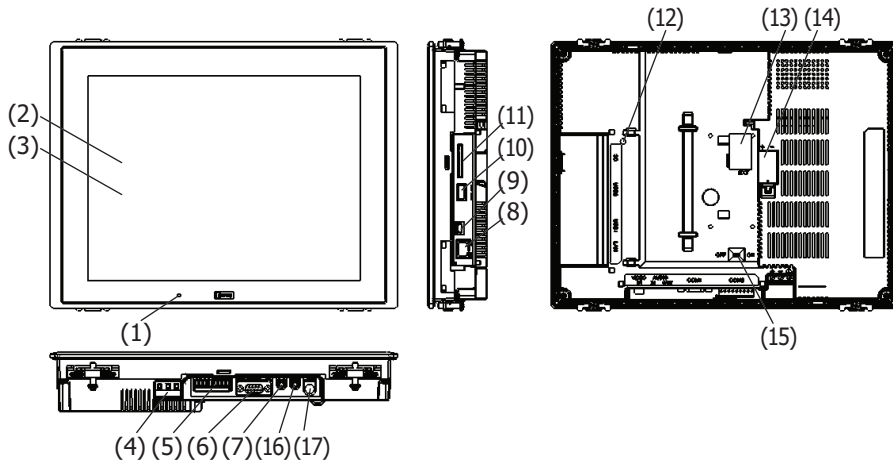
Product Name & Appearance	Quantity	Description
HG2G-5F 	1	Main unit
Instruction Sheet	1	Japanese
Mounting clip 	4	-
Serial interface connector 	1	Removable terminal block 9-pin
USB Cable Lock Pin 	1	-
USB Clamp Band 	1	-
Screw lock bracket 	2	Metric Screw Thread M2.6 x 0.45

3.2 Type Number

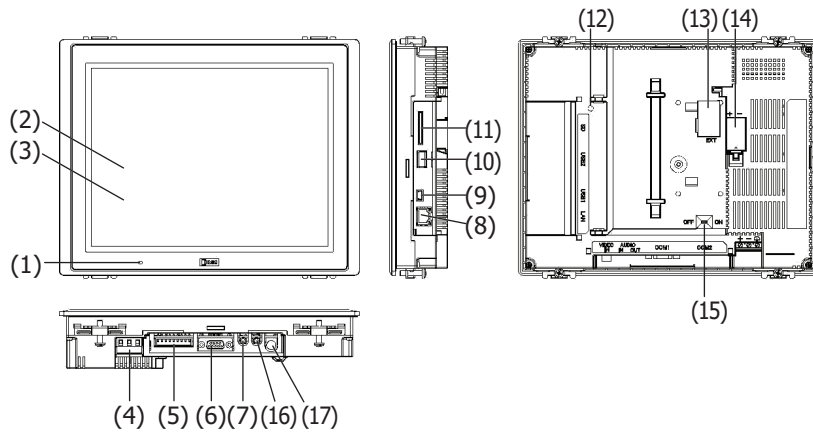
LCD	AUDIO IN/VIDEO IN	Bezel Color	Type Number
12.1 inch	Without	Dark gray	HG4G-CJT22TF-B
	With	Dark gray	HG4G-CJT22MF-B
10.4 inch	Without	Light gray	HG3G-AJT22TF-W
		Dark gray	HG3G-AJT22TF-B
	With	Light gray	HG3G-AJT22MF-W
		Dark gray	HG3G-AJT22MF-B
8.4 inch	Without	Light gray	HG3G-8JT22TF-W
		Dark gray	HG3G-8JT22TF-B
	With	Light gray	HG3G-8JT22MF-W
		Dark gray	HG3G-8JT22MF-B
5.7 inch	Without	Light gray	HG2G-5FT22TF-W
		Dark gray	HG2G-5FT22TF-B
		Silver	HG2G-5FT22TF-S

3.3 Part Names

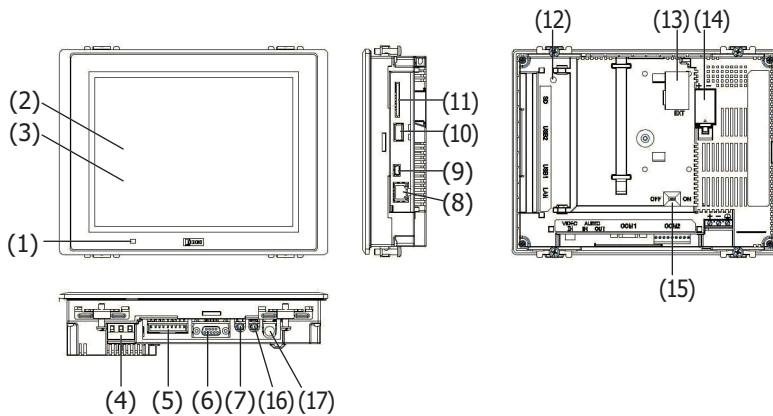
■ HG4G (12.1 inch)



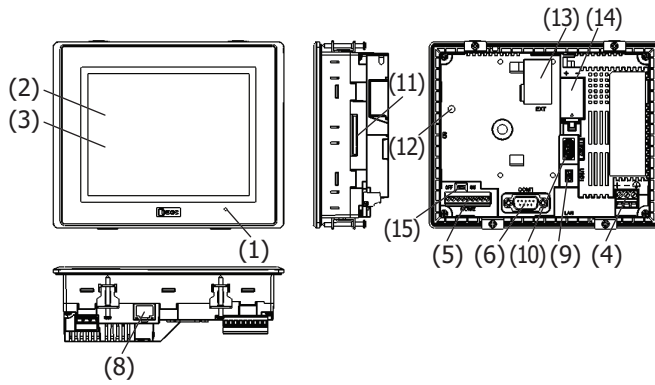
■ HG3G-A (10.4 inch)



■ HG3G-8 (8.4 inch)



■ HG2G-5F (5.7 inch)



No.	Name	Description
(1)	POWER LED	Green (lit): Normal Operation (Power is ON.) Not lit: Power is off.
(2)	Display	TFT color LCD
(3)	Touch Panel	Analog resistive membrane type
(4)	Power Supply Terminal	Connector: Terminal Block 3-pin (Screw fastened type)
(5)	Serial Interface (COM2)	RS232C, RS422/485 Connector: Terminal Block 9-pin (Screw fastened type) Maximum cable length: 15m (RS232C), 1200m (RS422/RS485)
(6)	Serial Interface (COM1)	RS232C, RS422/485 Connector: D-sub 9-pin Maximum cable length: 15m (RS232C), 1200m (RS422/RS485)
(7)	Audio Interface (AUDIO OUT)* ¹	LINE OUT (Stereo), Recommended minimum load: 10kΩ Connector: Mini Jack (φ3.5mm)
(8)	Ethernet Interface (LAN)	IEEE802.3u 10BASE-T/100BASE-TX Connector: RJ-45 (With Auto MDI/MDI-X function) Maximum cable length: 100m
(9)	USB Interface (USB1)	USB2.0 (Device) Connector: Mini-B
(10)	USB Interface (USB2)	USB2.0 (Host) Connector: Type-A Output current: 5V 500mA
(11)	Memory Card Interface (SD)	For SD memory card
(12)	SD Memory Card Access Lamp	-
(13)	Expansion Module Interface (EXT)	For IDEC MICROSmart Expansion Modules
(14)	Battery Cover	-
(15)	Terminating Resistor Selector Switch	For COM2 RS422/485 interface
(16)	Audio Interface (AUDIO IN)* ¹	LINE IN terminal (Stereo) Input impedance : 60kΩ Connector: Mini Jack (φ3.5mm)
(17)	Video Interface (VIDEO IN)* ¹	NTSC/PAL Connector: Pin Jack

*1 This is applicable for HG4G/3G with a video interface only.

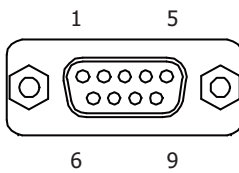
3.4 External Interfaces

⚠ CAUTION

- Make sure to turn off the power to the HG4G/3G, HG2G-5F before wiring each interface or switching the terminating resistor selector switch.
- Note that only one of the RS232C or RS422/485 interfaces can be used at same time. Wiring both interfaces will result in failure of the HG4G/3G, HG2G-5F. Wire only the interface used.

● Serial Interface (COM1)

Interface Specification	RS232C, RS422/485
Connector	D-sub 9-pin (Plug)
Screw lock bracket	Inch Screw Thread #4-40 UNC



No.	Name	I/O	Function	Communication type
1	4W-RDA/2W-A	IN/INOUT	Receive Data (+) [4W]/ Send and Receive Data (+) [2W]	RS422/485
2	RD	IN	Receive Data	RS232C
3	SD	OUT	Send Data	RS232C
4	4W-SDA	OUT	Send Data (+) [4W]	RS422/485
5	SG	-	Signal Ground	-
6	4W-RDB/2W-B	IN/INOUT	Receive Data (-) [4W]/ Send and Receive Data (-) [2W]	RS422/485
7	RS	OUT	Request to Send	RS232C
8	CS	IN	Clear to Send	RS232C
9	4W-SDB	OUT	Send Data (-) [4W]	RS422/485

● Serial Interface (COM2)

Use applicable cables for wiring and recommended ferrules (made by Phoenix Contact or Weidmüller) as follows.

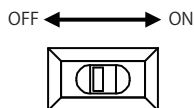
Interface Specification	RS232C, RS422/485	
Connector	Detachable Terminal Block 9-pin	
Applicable cable	AWG20 to 22	
Recommended ferrule	AI 0,34-8 TQ AI 0,5-8 WH AI-TWIN 2 x 0,5-8 WH (Phoenix Contact)	H0,34/12 TK H0,5/14 OR H0,5/14 ZH OR (Weidmüller)
Tightening Torque	0.22 to 0.25 N·m	



No.	Name	I/O	Function	Communication type	
1	SD	OUT	Send Data	RS232C	/
2	RD	IN	Receive Data		
3	RS	OUT	Request to Send		
4	CS	IN	Clear to Send		
5	SG	—	Signal Ground	/	RS422/485
6	4W-SDA	OUT	Send Data (+) [4W]		
7	4W-SDB	OUT	Send Data (-) [4W]		
8	4W-RDA/2W-A	IN/INOUT	Receive Data (+) [4W]/ Send and Receive Data (+) [2W]		
9	4W-RDB/2W-B	IN/INOUT	Receive Data (-) [4W]/ Send and Receive Data (-) [2W]		

Using RS422/485 interface

When using RS422/485 interface, set the Terminating Resistor Selector Switch to the ON side. This will connect the internal terminating resistor (120Ω) between RDA and RDB.



Terminating Resistor Selector Switch (for RS422/485 interface)

● Expansion Module Interface (EXT)

IDEC MICROSmart expansion modules can be connected to the HG4G/3G, HG2G-5F.

Refer to Chapter 2 "1.2 Applicable Expansion Modules" on page 2-2 for the number, the types and the combination of the expansion modules that can be installed.

3.5 Specifications

■ Applicable Standards

Safety Standard	UL508, ANSI/ISA-12.12.01 CSA C22.2 No.142 (c-UL), CSA C22.2 No.213 (c-UL)
EMC Standard*1	IEC/EN 61131-2
Ship Classification Standard *1	ABS, DNV, LR, NK

■ Environmental Specifications

Ambient Operating Temperature	0 to +50°C (no freezing)
Ambient Operating Humidity	10 to 90% RH (no condensation)
Ambient Storage Temperature	-20 to +60°C (no freezing)
Ambient Storage Humidity	10 to 90% RH (no condensation)
Altitude	0 to 2000m
Pollution Degree	2
Corrosion Immunity	Free from corrosive gases

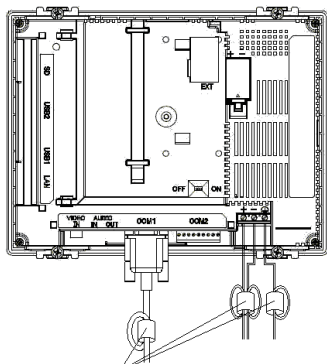
■ Electrical Specifications

Type Number	HG4G	HG3G-A	HG3G-8	HG2G-5F
Rated Voltage	24V DC			
Power Consumption	27W maximum	25W maximum	19W maximum	
Not using USB Interface (USB2) and Expansion Module Interface (EXT)	18W maximum	15W maximum	10W maximum	
Power Voltage Range	20.4 to 28.8V DC			
Allowable Momentary Power Interruption	10 ms maximum			
Inrush Current	30A maximum			
Dielectric Withstand Voltage	AC1000V, 10mA, 1 minute (between power and earth terminals)			

■ Construction Specifications

Vibration Resistance	5 to 8.4Hz amplitude 3.5mm, 8.4 to 150Hz acceleration 9.8m/s ² 10 times on each of three mutually perpendicular axes (IEC 61131-2)
Shock Resistance	147m/s ² , 11ms (3 shocks on each of three mutually perpendicular axes) (IEC 61131-2)

*1 When using the HG4G/3G, HG2G-5F as the EMC Standard Approved Products, or when using the HG4G/3G, HG2G-5F as the Ship Classification Standard Approved Products, attach a ferrite core (ZCAT3035-1330 manufactured by TDK Corporation) to the power cables and the communication cables.



Ferrite Core : ZCAT3035-1330 (TDK)

■ Performance Specifications

Type Number	HG4G	HG3G-A	HG3G-8	HG2G-5F	
Display	LCD Type* ¹				TFT color LCD (TN Type)
	Display Colors				65,536 Colors
	Effective Display Area				246.0 (W) × 184.5 (H) mm 211.2 (W) × 158.4 (H) mm 170.4 (W) × 127.8 (H) mm 115.2 (W) × 86.4 (H) mm
	Display Resolution				800 (W) × 600 (H) dots 640 (W) × 480 (H) dots
	View angle				Left/Right: 80°, Top: 80°, Bottom: 60° Left/Right/Top/Bottom: 80°
	Brightness of LCD only				550 cd/m ² 700 cd/m ² 600 cd/m ² 800 cd/m ²
	Brightness Adjustment				48 levels
	Backlight				LED
	Backlight Life* ²				Approx. 100,000 hours (The time until brightness becomes 50% of the initial value) Approx. 50,000 hours (The time until brightness becomes 50% of the initial value)
Touch Panel	Switch Type				Analog Resistive Film
	Operating Force				3N maximum 0.55 to 2.3 N 3N maximum
	Multiple Operations				Impossible
	Life				1,000,000 operations
User Memory				Approx. 12 MB	
Backup Battery				Coin type lithium manganese dioxide battery CR2032 Guarantee Period: 1 Year (Ambient Operating Temperature at 25°C) Recommended Replacement Span: Every 5 Years Ambient Operating Temperature at 25°C)	
Backup Data				Calendar, Log Data, HMI Keep Relays, HMI Keep Registers	
Buzzer output				Single tone (tone length is adjustable)	
Degree of Protection* ³				IP66 (IEC 60529) TYPE 4X TYPE 13	
Weight (approx.)				2.1kg 1.65 kg 1.25 kg 0.65 kg	

■ EMC Specifications

Radiated Emission	Class A: 10m 40dB μ V/m quasi-peak (30M to 230MHz) 47dB μ V/m quasi-peak (230M to 1GHz)
Electrostatic Discharge	Contact: \pm 6kV Air: \pm 8kV
Electromagnetic Field	10V/m (80M to 1000MHz) 3V/m (1.4G to 2.0GHz) 1V/m (2.0G to 2.7GHz) 80% AM (1kHz)
Fast Transient/Burst	Power: \pm 2kV Communication cable: \pm 1kV
Surge Immunity	\pm 500V (between +24V and 0V) \pm 1kV (between +24V and FE, 0 and FE)
Conducted Radio Frequency Immunity	3V (Power, Communication cable) (150k to 80MHz) 80% AM (1kHz)

*1 Please be aware that small black and bright dots might show up on LCD Screen: it is not a failure or malfunction.

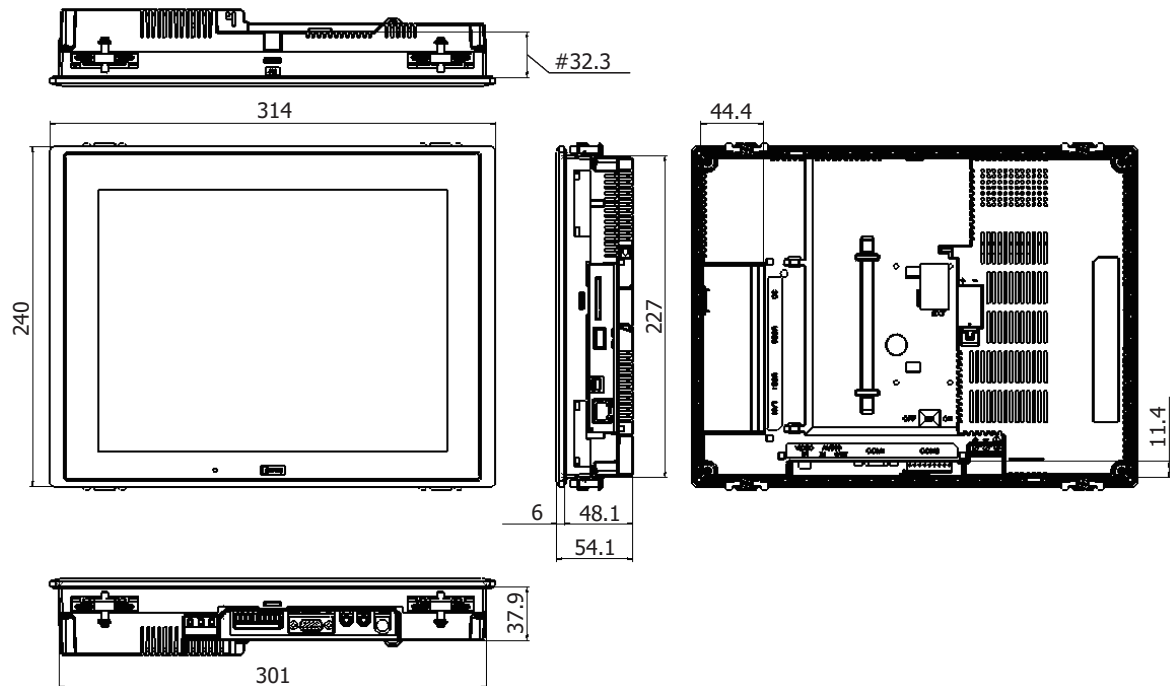
*2 The life of the LCD itself at an ambient temperature of 25°C. This is not a guaranteed value. The actual life depends on the environment and conditions of use.

*3 It is a protection structure for the operating surface of HMI, which is attached to a panel. Although protection structure suffices every test conditions, it does not guarantee to operate under all of the environmental condition. Protection structure do not guarantee usage under long exposure to oil or usage of oil that is not prescribed in the document. Please test/check beforehand to avoid trouble.

3.6 Dimensions

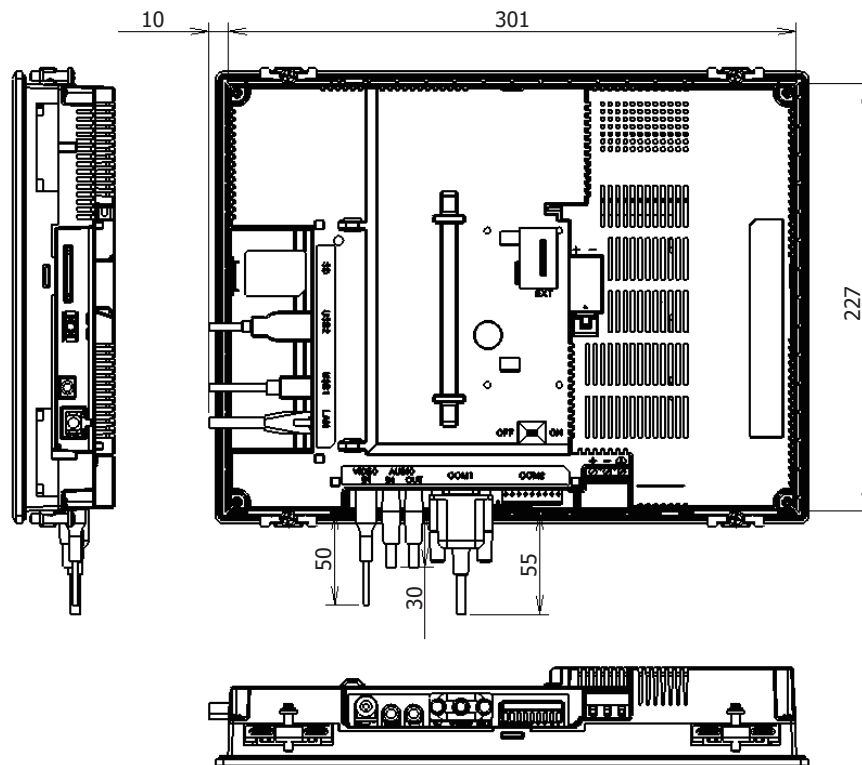
■ HG4G (12.1 inch)

Unit: mm



The size to the expansion module installation side

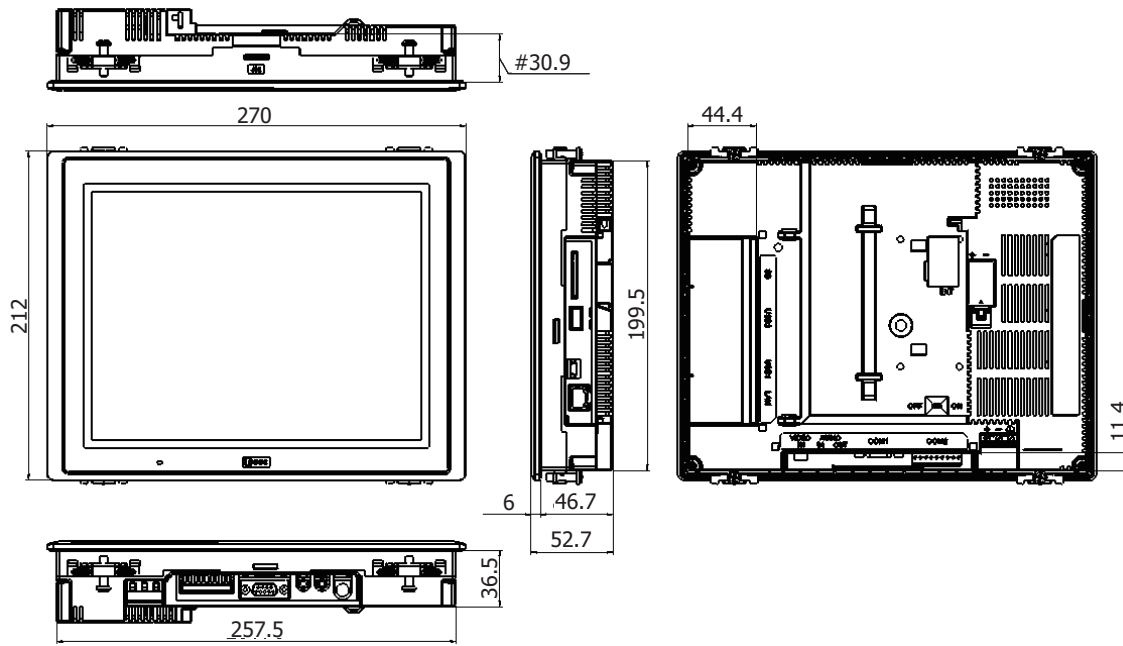
<Cable Attached Dimensions>



Depending on the type of connection cable used the dimensions shown above will change. The dimensions given here are representative values and are intended for reference only.

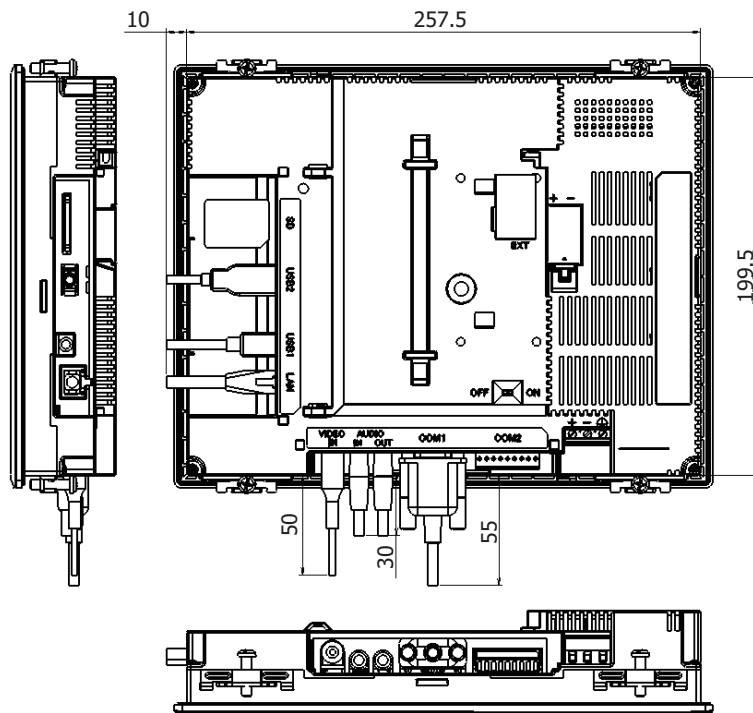
■ HG3G-A (10.4 inch)

Unit: mm



The size to the expansion module installation side

<Cable Attached Dimensions>

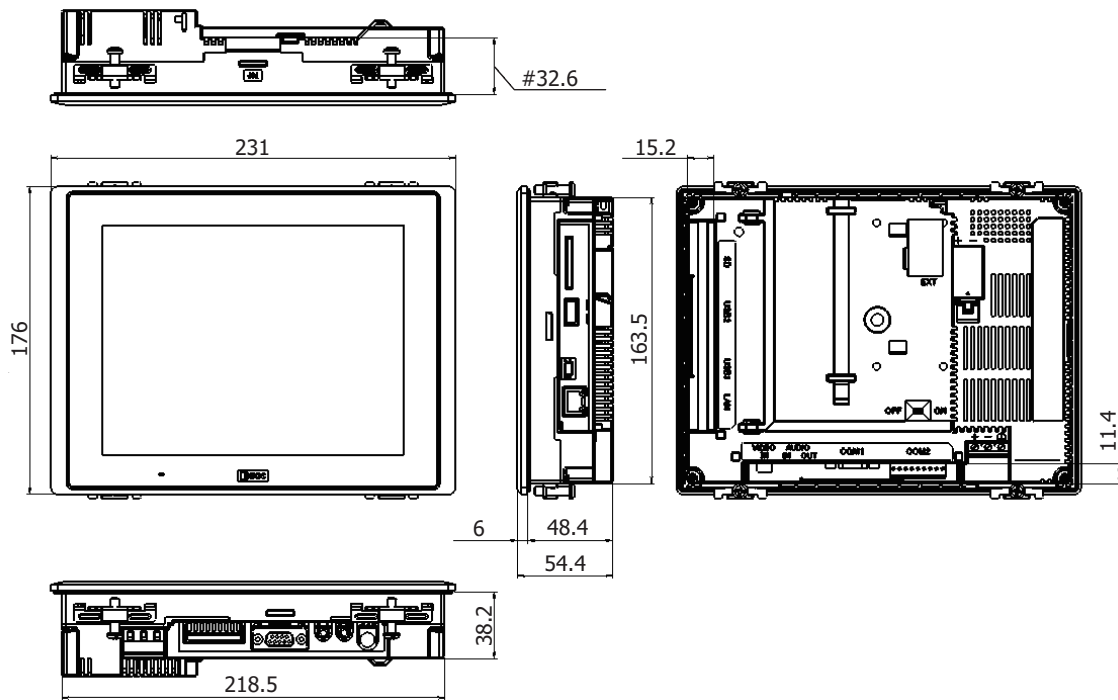


Depending on the type of connection cable used the dimensions shown above will change. The dimensions given here are representative values and are intended for reference only.

■ HG3G-8 (8.4 inch)

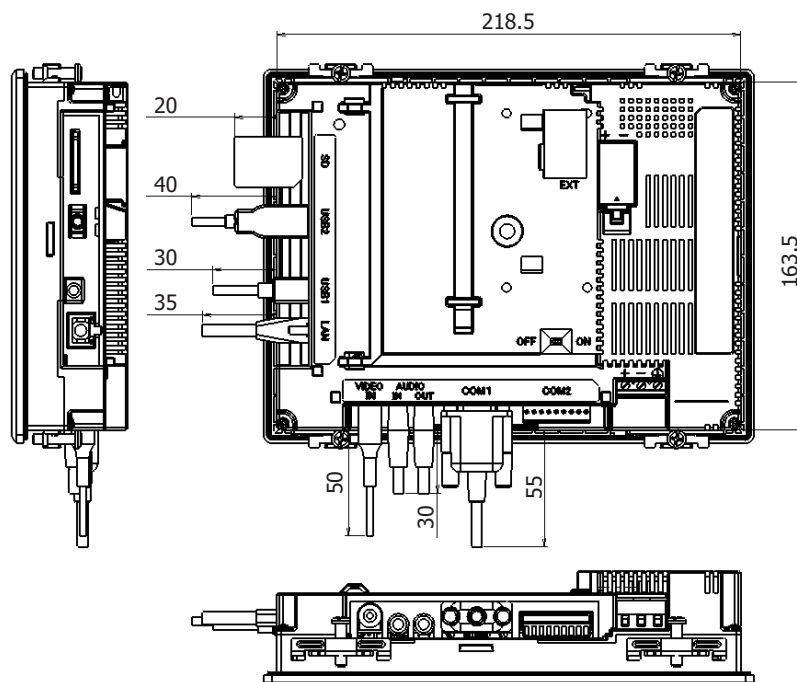
Unit: mm

1



The size to the expansion module installation side

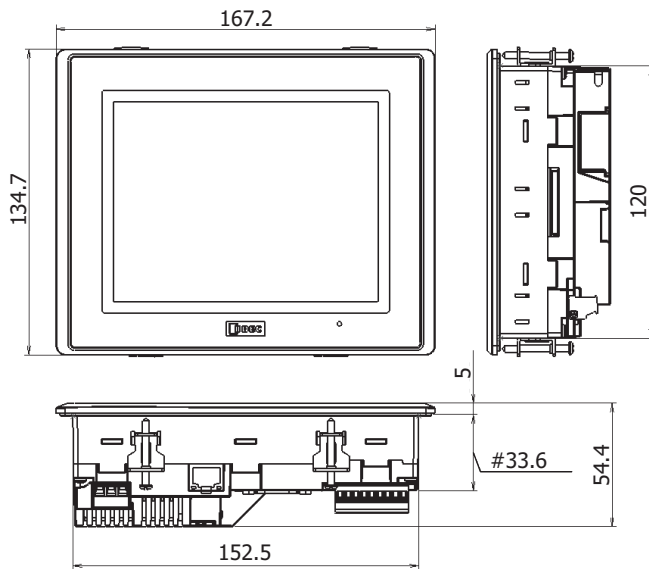
<Cable Attached Dimensions>



Depending on the type of connection cable used the dimensions shown above will change. The dimensions given here are representative values and are intended for reference only.

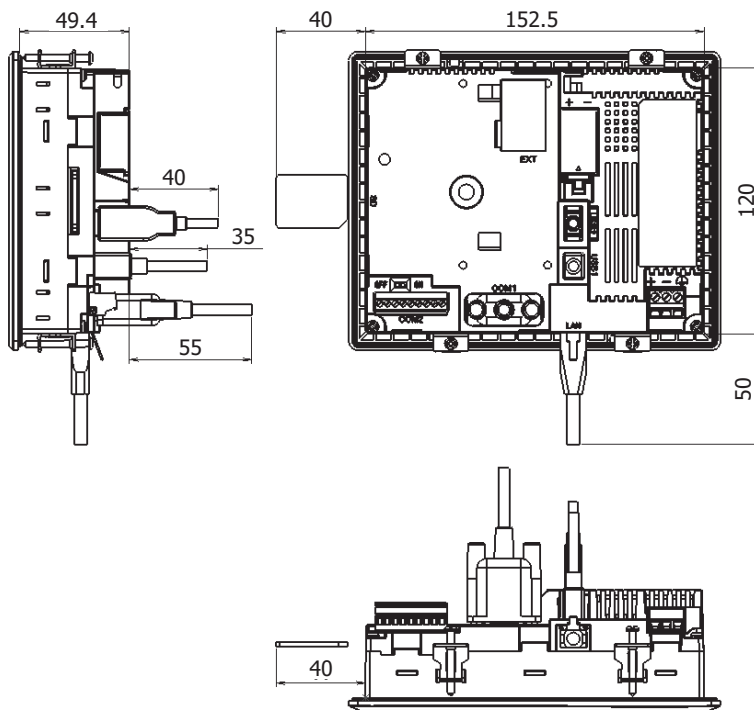
■ HG2G-5F (5.7 inch)

Unit: mm



The size to the expansion module installation side

<Cable Attached Dimensions>



Depending on the type of connection cable used the dimensions shown above will change. The dimensions given here are representative values and are intended for reference only.

3.7 Installation

● Operating Environment

For designed performance and safety of the HG4G/3G, HG2G-5F, do not install the HG4G/3G, HG2G-5F in the following environments:

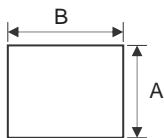
- Where dust, briny air, or iron powder exist.
- Where oil or chemical splashes for a long time.
- Where space is filled with oil mist.
- Where direct sunlight falls on the main unit.
- Where strong ultraviolet rays fall on the main unit.
- Where corrosive or combustible gasses exist.
- Where shocks or vibrations are transmitted.
- Where condensation occurs due to rapid temperature change.
- Where high-voltage or arc-generating equipment (electromagnetic contactors or circuit protectors) exists in close proximity.

● Ambient Temperature

- Allow sufficient space for ventilation, and install the equipment away from heat sources.
- Allow at least 100mm between the HG4G/3G, HG2G-5F and walls or other equipment.
- Do not install the HG4G/3G, HG2G-5F where the ambient temperature exceeds the rated operating ambient temperature range. When mounting the HG4G/3G, HG2G-5F in such locations, provide a forced air-cooling fan or air-conditioner to keep the ambient temperature within the rated temperature range.
- The HG4G/3G, HG2G-5F is designed to install on a vertical plane so that natural air-cooling is provided. If you install it using any other orientation, use forced-air cooling, or lower the ambient operating temperature.

● Installation

- Make a panel cut-out on the panel with the dimensions shown below.



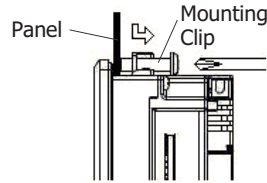
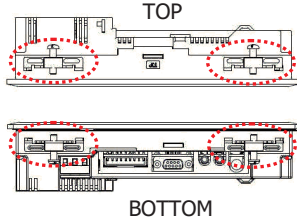
Unit: mm

Model	A		B		Panel Thickness
HG4G	227.5	+2.0 0	301.5	+2.0 0	2.0 to 5.0
HG3G-A	200.0	+2.0 0	258.0	+2.0 0	2.0 to 5.0
HG3G-8	164.0	+2.0 0	219.0	+2.0 0	2.0 to 5.0
HG2G-5F	121.0	+2.0 0	153.0	+2.0 0	1.6 to 5.0

- Use the attached mounting clips to tighten the screws evenly to mount panel: screws must be applied on total of four places on top and bottom with the specified torque. If mounting clips are attached in the part besides the following figure, there is a risk of not satisfying product specifications such as waterproof performance, shock resistance, and vibration resistance performance.

Mounting Clip Position

Example: HG3G-8 (8.4 inch)



Unit : N·m





Model	Specified Torque
HG4G	0.5 to 0.6
HG3G-A	0.5 to 0.6
HG3G-8	0.5 to 0.6
HG2G-5F	0.2 to 0.3

CAUTION

- Do not tighten with excessive force, otherwise the main unit may warp and cause wrinkle on the display, or impair the waterproof characteristics.
- If the mounting clips are tightened obliquely to the panel, the main unit may fall off the panel.
- When installing the main unit into a panel cut-out, make sure that the gasket is not twisted. Especially when re-installing, take special care because any twists in the gasket will impair the waterproof characteristics. Also, if the gasket comes off the main unit, align the convex part of the gasket with the concave part of the front case, and then insert the gasket fully into the gasket mounting groove without twisting it.

● Restrictions due to mounting orientation

The HG4G/3G, HG2G-5F is designed to install on a vertical landscape. The ambient operating temperature and the use of expansion modules are limited depending on the mounting orientation as shown in the table below.

Orientation			Ambient Operating Temperature	
			w/o expansion modules	w/ expansion modules
Vertical	 Landscape	HG4G	0 to +50°C	0 to +50°C
		HG3G		0 to +45°C
		HG2G-5F		0 to +40°C* ¹
	 Portrait (Clockwise)	HG4G	0 to +50°C	unavailable
		HG3G		
		HG2G-5F		
	 Portrait (Counter Clockwise)	HG4G	0 to +50°C	0 to +45°C
		HG3G	0 to +45°C	0 to +40°C* ¹
		HG2G-5F		0 to +35°C
 Horizontal	HG4G	0 to +50°C	unavailable	
	HG3G	0 to +45°C		
	HG2G-5F			



- When installing the HG4G/3G, HG2G-5F in a diagonal, the limitations are the same as a horizontal.
- Confirm the visibility of the display in a final installation.

*1 When I/O Simultaneous ON Ratio is 50% or less, the Ambient Temperature is 0 to 45°C.

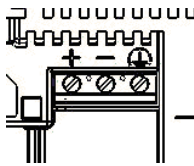
3.8 Wiring

! CAUTION

- Turn off the power supply before wiring.
- Make the wiring as short as possible and run all wires as far away as possible from high-voltage and large-current cables. Follow all the procedures and precautions when wiring the HG4G/3G, HG2G-5F.
- Separate the HG4G/3G, HG2G-5F power supply wiring from the power lines of I/O devices and motor equipment.
- Ground the functional earth terminal to make sure of correct operation.

● Power Supply Terminal

- Pin assignment is shown in the following table.



+	Power supply 24V DC (+24V)
-	Power supply 0V (0V)
⏏	Functional Earth (FE)

- Use applicable cables for wiring and recommended ferrules (made by Phoenix Contact or Weidmüller) as follows.

Type Number	HG4G/3G		HG2G-5F	
Applicable cable	AWG18 to 22		AWG14 to 22	
Recommended ferrule	AI 0,34-8 TQ AI 0,5-8 WH AI 0,75-8 GY AI 1-8 RD AI-TWIN 2 x 0,5-8 WH AI-TWIN 2 x 0,75-8 GY AI-TWIN 2 x 1-8 RD (Phoenix Contact)	H0,34/12 TK H0,5/14 OR H0,75/14 W H1,0/14 GE H0,5/14 ZH OR H0,75/14 ZH W H1,0/15 ZH GE (Weidmüller)	AI 0,34-12 TQ AI 0,5-12 WH AI 0,75-12 GY AI 1-12 RD AI 1,5-12 BK AI 2,5-12 BU AI-TWIN 2 x 1,5-12 BK (Phoenix Contact)	H0,5/18 OR H0,75/18 W H1,0/18 GE H1,5/18D SW H2,5/19D BL H1,5/20 ZH R (Weidmüller)
Tightening Torque	0.5 to 0.6 N·m		0.5 to 0.6 N·m	

● Grounding Cautions

If you decide to use a single power supply for the HG4G/3G, HG2G-5F with more than one external device, take extra precautions. Some external devices may produce electrical noise and short circuit the entire system setup, therefore, damaging the communication circuit of the HG4G/3G, HG2G-5F and non-isolated Communication Device (i.e. PLC).

To prevent such damage, choose a proper solution depending on your system setup.

- Use a separate earth ground from the external noise source device.
- The wire for grounding should be thick and short in order to direct the noise from the noise source device to the earth ground.
- Use a separate power supply from the external noise source device.
- Insert an isolator on the communication line of the HG4G/3G, HG2G-5F and the non-isolated communication device (i.e. PLC) to prevent damage.

● Cautions for using the HG4G/3G, HG2G-5F connected to a personal computer

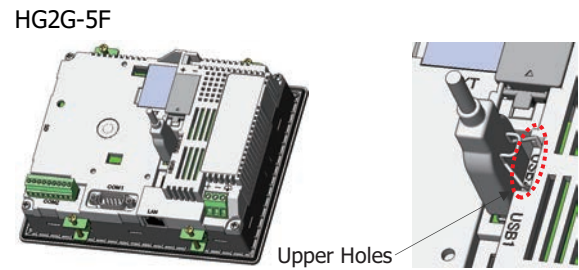
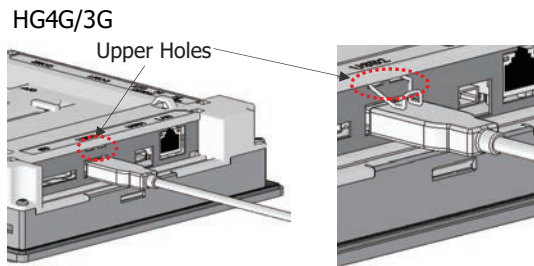
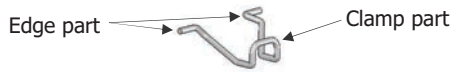
When connecting the HG4G/3G, HG2G-5F to a personal computer via the Serial Interface (COM1) or USB Interface, the HG4G/3G, HG2G-5F or the personal computer may break down depending on the conditions of the personal computer. Make sure of the following cautions, in order to prevent an accident.

- If the personal computer has a 3-pin power plug or power plug with a ground lead type. make sure to use a plug socket including a ground input electrode or ground the earth lead, respectively.
- If the personal computer has a 2-pin power plug without ground lead, follow the procedure below when connect the HG4G/3G, HG2G-5F to the personal computer.
 - (1) Pull out the power plug of the personal computer from the AC outlet.
 - (2) Connect the HG4G/3G, HG2G-5F to the personal computer.
 - (3) Insert the power plug of the personal computer into the AC outlet.

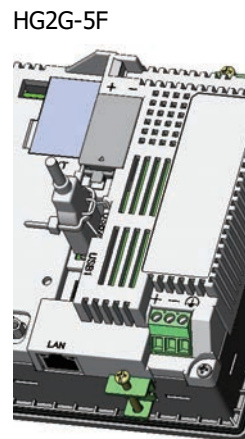
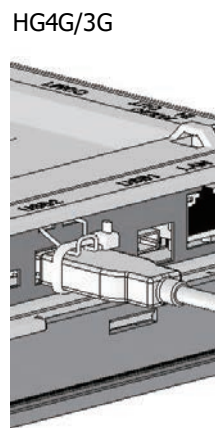
3.9 USB Cable Lock Pin Attachment

When using the USB device, attach the USB Cable Lock Pin to prevent disconnecting the USB cable from the HG4G/3G, HG2G-5F.

- 1 Insert the USB cable into the USB2 port.
- 2 Strain the "Edge part" of the USB Cable Lock Pin, and insert the "Edge part" to the 2 holes upper the USB2 port.

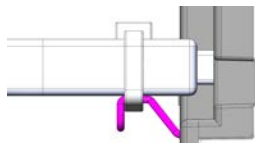


- 3 Fasten the USB Clamp Band around the USB cable and the "Clamp part", secure them tightly.

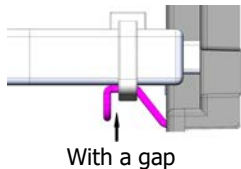


Fasten the USB Clamp Band without the space between the "Clamp part" and it, and the inclination.

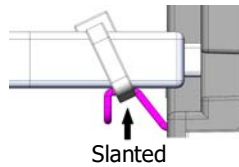
YES



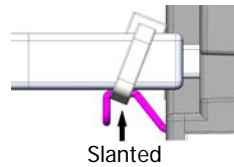
NO



NO



NO



3.10 Maintenance and Inspection

Maintain and inspect the HG4G/3G, HG2G-5F periodically to ensure the best performance. Do not disassemble, repair, or modify the HG4G/3G, HG2G-5F during inspection.

Maintenance and Inspection Parts	Description
Display	Wipe any stain of the display using a soft cloth slightly dampened with neutral detergent or alcoholic solvent. Do not use solvents such as thinner, ammonia, strong acid, and strong alkaline.
Terminals, Connectors	Check the terminals and connectors to make sure of no loose screws, incomplete insertion, or disconnected lines.
Mounting Clips	Make sure that all mounting clips and screws are tightened sufficiently. If the mounting clips are loose, tighten the screw to the specified torque.
Backlight	The HG4G/3G, HG2G-5F's backlight cannot be replaced by the customer. When the backlight needs to be replaced. Contact your vendor or IDEC Corporation.
Backup Battery	The operating life of the internal battery is approximately five years. It is recommended to replace the battery every five years even before the reminder message for battery replacement is displayed.
Touch Panel	A gap may be caused in the operation accuracy of the touch panel by the secular distortion, etc. Readjust the touch panel in the System Mode according to the following procedure when there is a gap in the operation of the touch panel. Refer to "Adjusting the Touch Panel" on page 1-59 for details.

● Replacing the Backup Battery

A backup battery is built into the HG4G/3G, HG2G-5F to retain the internal backup data (log data, keep resistor, and keep relay) and clock data.

When the "Replace the battery" message is displayed, replace the backup battery by following the procedure below.

When the "Battery level LOW" message is displayed, replace the battery immediately; otherwise, the backup data and clock data may be lost.

Whether or not to display the reminder message for battery replacement can be specified with the WindO/I-NV4. For details, refer to Chapter 4 "3.1 System Tab" in the WindO/I-NV4 User's Manual.

1 Remove the battery holder cover.



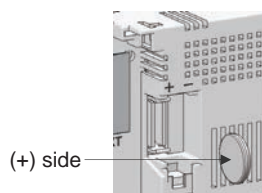
2 Turn on the power to the HG4G/3G, HG2G-5F, wait for approximately one minute, and then turn off the power again.



After turning off the power to the HG4G/3G, HG2G-5F in step 2, complete the steps through 4 within 30 seconds to replace the battery without losing the backup data and clock data. However, it is recommended that the backup data be transferred to flash memory as a precautionary measure. For the procedure to transfer the data to flash memory, refer to Chapter 35 "Internal Devices" in the WindO/I-NV4 User's Manual. If it is not necessary to save the data, step 2 can be skipped.

3 Remove the battery from the battery holder.

4 Install a replacement battery into the battery holder. Ensure that the orientation of the battery is correct.



- 5 With the new batter installed correctly, reverse the instruction the procedure described in item #1 above to secure the cover.
- The operating life of the internal battery is approximately five years. It is recommended to replace the battery every five years even before the reminder message for battery replacement is displayed.
 - IDEC provides replacement service for the battery (at customer's expense). Contact your vendor or IDEC Corporation.

WARNING

The battery may be regulated by national or local regulation. Observe the instructions of proper regulation. As electric capacity is left in a discarded battery and it comes into contact with other metals, it could lead to distortion, leakage, overheating, or explosion, so make sure to cover the (+) and (-) terminals with insulating tape before disposal.

CAUTION

When replacing the battery, use the specified battery only. Note that any problems and failures arising from or in connection with the use of a battery other than the specified battery is not guaranteed.

Handling of Batteries and Devices with Built-in Batteries in EU Member States

Note: The following symbol mark is for EU countries only and is according to the directive 2006/66/EC Article 20 information for end-users and Annex II.



This symbol mark means that batteries and accumulators, at their end-of life, should be disposed of separately from your household waste.

If a chemical symbol is printed beneath the symbol shown above, this chemical symbol means that the battery or accumulator contains a heavy metal at a certain concentration. This will be indicated as follows :

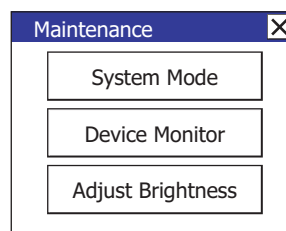
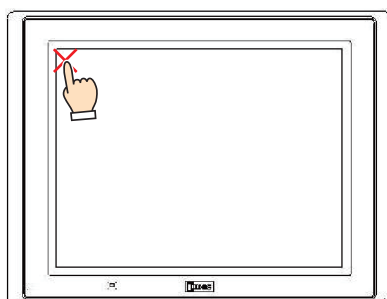
Hg : mercury (0.0005%), Cd : cadmium (0.002%), Pd : lead (0.004%)

In the European Union there are separate collection systems for used batteries and accumulators.

Please dispose of batteries and accumulators correctly in accordance with each country or local regulation.

● Maintenance Screen

Turn on the power to the HG4G/3G, HG2G-5F, then press and hold the touch panel on the upper-left corner of the screen for three seconds or longer. The Maintenance Screen appears on the screen.

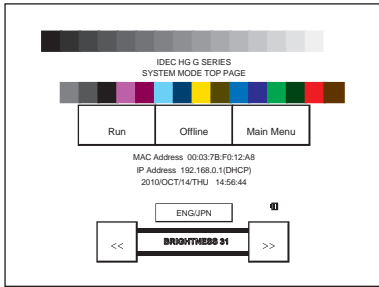


Maintenance Screen

- Permission to show the Maintenance Screen can be set using the WindO/I-NV4. For details, refer to Chapter 4 "3.1 System Tab" in the WindO/I-NV4 User's Manual.
- The Maintenance Screen is not displayed in the System Mode.

● **System Mode**

Press the **System Mode** at the top of the Maintenance Screen. The Top Page Screen appears.

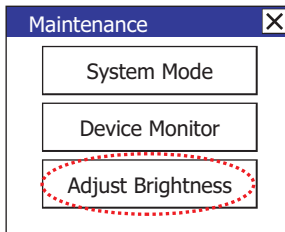


Initial Setting, Self Diagnosis and Initialization of the data, etc can be executed in the System Mode.

● **Adjusting the Brightness**

The brightness of the HG4G/3G, HG2G-5F display can be adjusted on the Adjust Brightness Screen.

- 1 Press the **Adjust Brightness** at the bottom of the Maintenance Screen. The Adjust Brightness Screen appears.



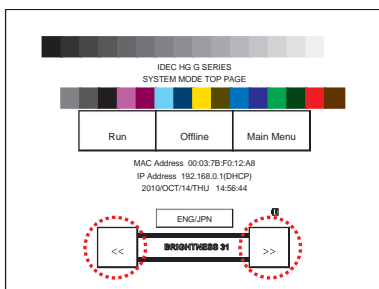
- 2 Press the << and >> at the bottom the Adjust Brightness Screen to adjust the contrast to the optimal setting.



- 3 Press the **X** at the top-right to close the Adjust Brightness Screen.



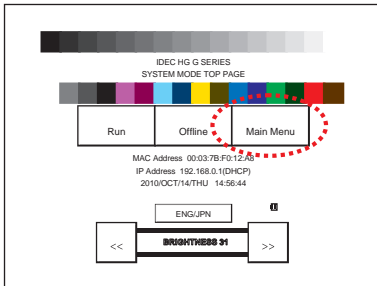
To adjust the brightness in the System Mode, use the << and >> buttons located at the bottom of the Top Page.



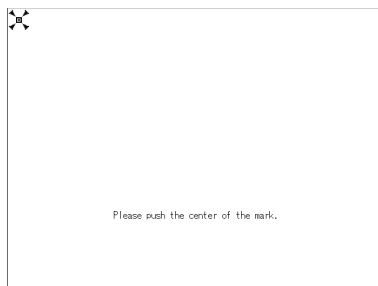
● Adjusting the Touch Panel

A gap may be caused in the operation accuracy of the touch panel by the secular distortion, etc. Adjust the touch panel according to the following procedure when there is a gap in the operation of the touch panel.

- 1 Press the **Main Menu** on the Top Page in System Mode. The Main Menu Screen appears.



- 2 Press in order of **Initial Setting, Initialize, Touch Panel Adjust**. The confirmation screen appears and asks "Adjust Touch Panel setting?". Press **Yes**, then the Touch Panel Adjust screen appears.
- 3 Press the center of the X mark, then the position of the mark changes one after another. Press five marks sequentially.



Press the center of the X mark.

This will ensure the accuracy of the touch panel operation.






- 4 When normally recognized, the confirmation screen of 2 is restored.
At procedure 3, when pressing a point away from the center of the X mark, a recognition error will result. Then the X mark returns to the initial position, then repeat the procedure of 3 again.

4 HG2G-5T, HG1G



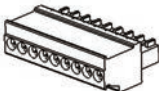


4.1 Packing Content

Before installing the HG2G-5T, HG1G, make sure that the model you have received is what you actually ordered, and no parts are damaged to accidents during shipping.

■ HG2G-5T

Product Name & Appearance	Quantity	Description
HG2G-5T 	1	Main unit
Instruction Sheet	1	Japanese, English, Chinese
Mounting clip 	4	-
Serial interface connector 	1	Removable terminal block 9-pin
USB Cable Lock Pin 	1	-
USB Clamp Band 	1	-

■ HG1G

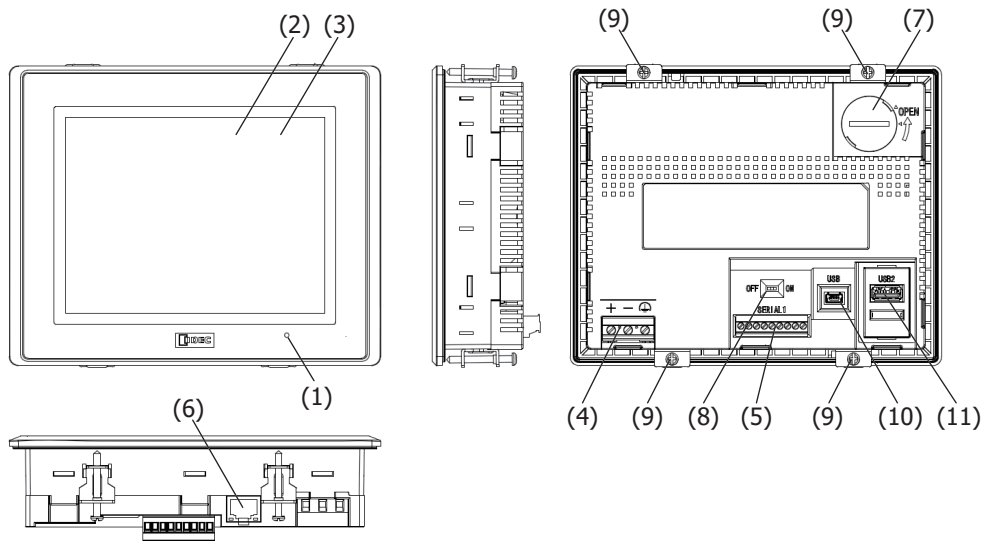
Product Name & Appearance	Quantity	Description
HG1G 	1	Main unit
Instruction Sheet	1	Japanese, English, Chinese
Mounting clip 	2	-
Serial interface connector 	1	Removable terminal block 9-pin
USB Cable Lock Pin 	2	-
USB Clamp Band 	2	-

4.2 Type Number

LCD	Bezel Color	Type Number
5.7 inch TFT Monochrome	Light gray	HG2G-5TN22TF-W
	Dark gray	HG2G-5TN22TF-B
	Silver	HG2G-5TN22TF-S
5.7 inch TFT Color	Light gray	HG2G-5TT22TF-W
	Dark gray	HG2G-5TT22TF-B
	Silver	HG2G-5TT22TF-S
4.3 inch TFT Color	Black	HG1G-4VT22TF-B
	Silver	HG1G-4VT22TF-S

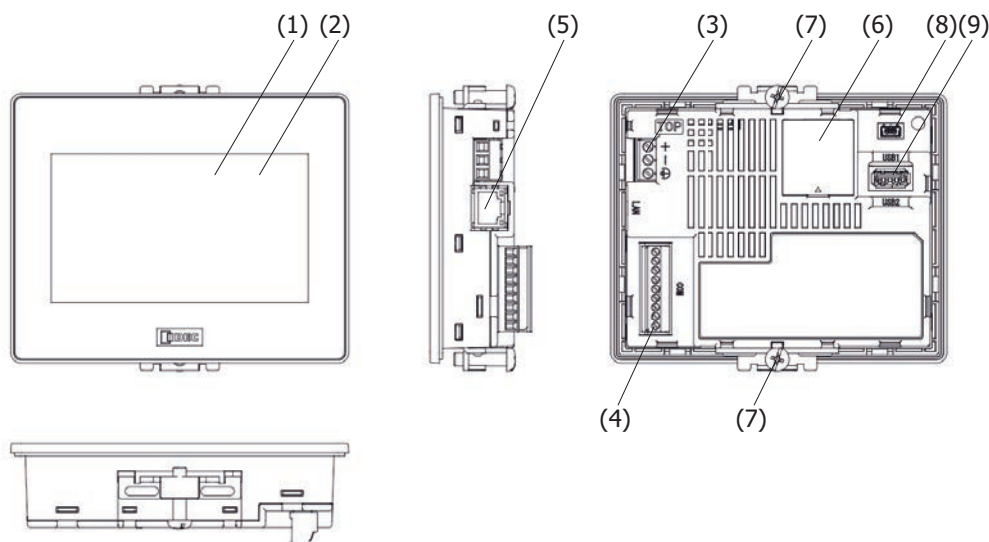
4.3 Part Names

■ HG2G-5T



No.	Name	Description
(1)	POWER LED	Green (lit): Normal Operation (Power is ON.) Not lit: Power is off.
(2)	Display	TFT monochrome LCD/TFT color LCD
(3)	Touch Panel	Analog resistive membrane type
(4)	Power Supply Terminal	Connector: Terminal Block 3-pin (Screw fastened type)
(5)	Serial Interface (SERIAL1)	RS232C, RS422/485 Connector: Terminal Block 9-pin (Screw fastened type) Maximum cable length: 15m (RS232C), 1200m (RS422/RS485)
(6)	Ethernet Interface (LAN)	IEEE802.3u 10BASE-T/100BASE-TX Connector: RJ-45 (With Auto MDI/MDI-X function) Maximum cable length: 100m
(7)	Battery Cover	-
(8)	Terminating Resistor Selector Switch	For RS422/485 interface
(9)	Mounting Clip Position	4 places
(10)	USB Interface (USB)	USB2.0 (Device) Connector: Mini-B
(11)	USB Interface (USB2)	USB2.0 (Host) Connector: Type-A Output current: 5V 500mA

■ HG1G



No.	Name	Description
(1)	Display	TFT color LCD
(2)	Touch Panel	Analog resistive membrane type
(3)	Power Supply Terminal	Connector: Terminal Block 3-pin (Screw fastened type)
(4)	Serial Interface (COM)	RS232C, RS422/485 Connector: Terminal Block 9-pin (Screw fastened type) Maximum cable length: 15m (RS232C), 1200m (RS422/RS485)
(5)	Ethernet Interface (LAN)	IEEE802.3u 10BASE-T/100BASE-TX Connector: RJ-45 (With Auto MDI/MDI-X function) Maximum cable length: 100m
(6)	Battery Cover	-
(7)	Mounting Clip Position	2 places
(8)	USB Interface (USB1)	USB2.0 (Device) Connector: Mini-B
(9)	USB Interface (USB2)	USB2.0 (Host) Connector: Type-A Output current: 5V 500mA ^{*1}

*1 The ambient operating temperature range will be -20 to +50 °C if USB interface is used with 151 mA or more.

4.4 External Interfaces

⚠ CAUTION

- Make sure to turn off the power to the HG2G-5T, HG1G before wiring each interface or switching the terminating resistor selector switch.
- The serial interface can be used as the RS232C and RS422/485 interfaces at same time.

● Serial Interface

Use applicable cables for wiring and recommended ferrules (made by Phoenix Contact or Weidmüller) as follows.

Interface Specification	RS232C, RS422/485	
Connector	Detachable Terminal Block 9-pin	
Applicable cable	AWG20 to 22	
Recommended ferrule	AI 0,34-8 TQ AI 0,5-8 WH AI-TWIN 2 x 0,5-8 WH (Phoenix Contact)	H0,34/12 TK H0,5/14 OR H0,5/14 ZH OR (Weidmüller)
Tightening Torque	0.22 to 0.25 N·m	



No.	Name	I/O	Function	Communication type	
1	SD	OUT	Send Data	RS232C	/
2	RD	IN	Receive Data		
3	RS	OUT	Request to Send		
4	CS	IN	Clear to Send		
5	SG	-	Signal Ground		
6	SDA	OUT	Send Data (+)	/	RS422/485
7	SDB	OUT	Send Data (-)		
8	RDA	IN	Receive Data (+)		
9	RDB	IN	Receive Data (-)		



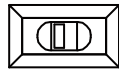
Only one ferrule can be inserted into a terminal hole.

Please set another terminal block in the vicinity of the main unit and connect SG when using RS232C and RS422/485 requiring crossover wiring at the same time. And separate the communication cables so that they do not affect each communication waveform when using RS232C and RS422/485 at the same time.

Using RS422/485 interface

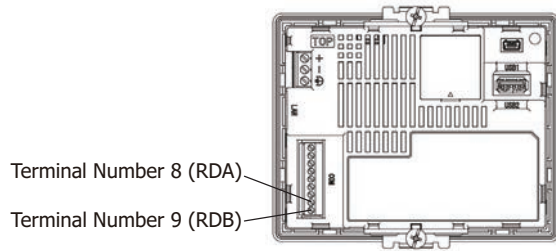
- For HG2G-5T, if you set the Terminating Resistor Selector Switch to the ON side, this will connect the internal terminating resistor (100Ω) between RDA and RDB.

OFF ←→ ON



Terminating Resistor Selector Switch (for RS422/485 interface)

- HG1G is not equipped with terminating resistor. Insert a terminating resistor of an appropriate value (about 100 to 120 Ohm, 1/2 W minimum) between terminal number 8 (RDA) and terminal number 9 (RDB), if necessary.



4.5 Specifications

■ Applicable Standards

Safety Standard	UL508, ANSI/ISA 12.12.01, CSA C22.2 No.142 (c-UL), CSA C22.2 No.213 (c-UL)
EMC Standard*1	IEC/EN 61131-2

■ Environmental Specifications

Type Number	HG2G-5T	HG1G
Ambient Operating Temperature	-20 to +60°C (no freezing)	-20 to +55°C*2 (no freezing)
Ambient Operating Humidity	10 to 90% RH (no condensation)	
Ambient Storage Temperature	-20 to +70°C (no freezing)	
Ambient Storage Humidity	10 to 90% RH (no condensation)	
Altitude	0 to 2000m	
Pollution Degree	2	
Corrosion Immunity	Free from corrosive gases	

■ Electrical Specifications

Rated Voltage	12V/24V DC
Power Consumption	8W maximum
Not using USB Interface (USB2)	4W maximum
Power Voltage Range	10.2 to 28.8V DC
Allowable Momentary Power Interruption	10 ms maximum (Power supply: 20.4 to 28.8V DC) 1 ms maximum (Power supply: 10.2 to 20.4V DC)
Inrush Current	40A maximum
Dielectric Withstand Voltage	1000V AC, 10mA, 1 minute (between power and earth terminals)

■ Construction Specifications

Vibration Resistance	5 to 8.4Hz amplitude 3.5mm, 8.4 to 150Hz acceleration 9.8m/s ² 10 times on each of three mutually perpendicular axes (IEC 61131-2)
Shock Resistance	147m/s ² , 11ms (3 shocks on each of three mutually perpendicular axes) (IEC 61131-2)

*1 When using the HG2G-5T, HG1G as the EMC Standard Approved Products, refer to the precautions on the emission.

*2 When using a USB interface(USB2) by 151mA or more, operating temperature will be -20 to +50°C.

■ Performance Specifications

Type Number	HG2G-5TN	HG2G-5TT	HG1G	
Display	LCD Type*1	TFT Monochrome LCD (TN Type)	TFT Color LCD (TN Type)	
	Display Colors	2 Colors (16 tones)	65,536 Colors	
	Effective Display Area	115.2 (W) × 86.4 (H) mm		95.04 (W) × 53.856 (H) mm
	Display Resolution	320 (W) × 240 (H) dots		480 (W) × 272 (H) dots
	View angle	Left/Right: 65°, Top: 80°, Bottom: 60°	Left/Right: 80°, Top: 80°, Bottom: 80°	Left/Right: 70°, Top: 60°, Bottom: 65°
	Brightness of LCD only	1100 cd/m ²	500 cd/m ²	800 cd/m ²
	Brightness Adjustment	32 levels		
	Backlight	LED (white)		
	Backlight Life*2	Approx. 100,000 hours (The time until brightness becomes 50% of the initial value)		Approx. 70,000 hours (The time until brightness becomes 50% of the initial value)
Touch Panel	Switch Type	Analog Resistive Film		
	Operating Force	3N maximum		
	Multiple Operations	Impossible		
	Life	1,000,000 operations		
User Memory	Approx. 5 MB		Approx. 12 MB	
Backup Battery	Coin type lithium manganese dioxide battery CR2032 Guarantee Period: 1 Year (Ambient Operating Temperature at 25°C) Recommended Replacement Span: Every 5 Years (Ambient Operating Temperature at 25°C)			
Backup Data	Calendar, Log Data, HMI Keep Relays, HMI Keep Registers			
Buzzer output	Single tone (tone length is adjustable)			
Degree of Protection*3	When panel thickness is 1 to 1.5 mm: IP65F (IEC 60529) When panel thickness is 1.5 to 5 mm: IP66F (IEC 60529), TYPE 4X, TYPE 13		When panel thickness is 1 to 1.5 mm: IP65F, IP67F (IEC 60529) When panel thickness is 1.5 to 5 mm: IP66F, IP67F (IEC 60529), TYPE 4X, TYPE 13	
Weight (approx.)	500g		300g	

*1 Please be aware that small black and bright dots might show up on LCD Screen: it is not a failure or malfunction.

*2 The life of the LCD itself at an ambient temperature of 25°C. This is not a guaranteed value. The actual life depends on the environment and conditions of use.

*3 It is a protection structure for the operating surface of HMI, which is attached to a panel. Although protection structure suffices every test conditions, it does not guarantee to operate under all of the environmental condition. As for IP65F/IP66F/IP67F oilproof structure, it suffices oilproof test conditions. Conditions are listed in the document that comes with Japanese Industrial Standard JIS C 0920. Protection structure do not guarantee usage under long exposure to oil or usage of oil that is not prescribed in the document. Please test/check beforehand to avoid trouble.

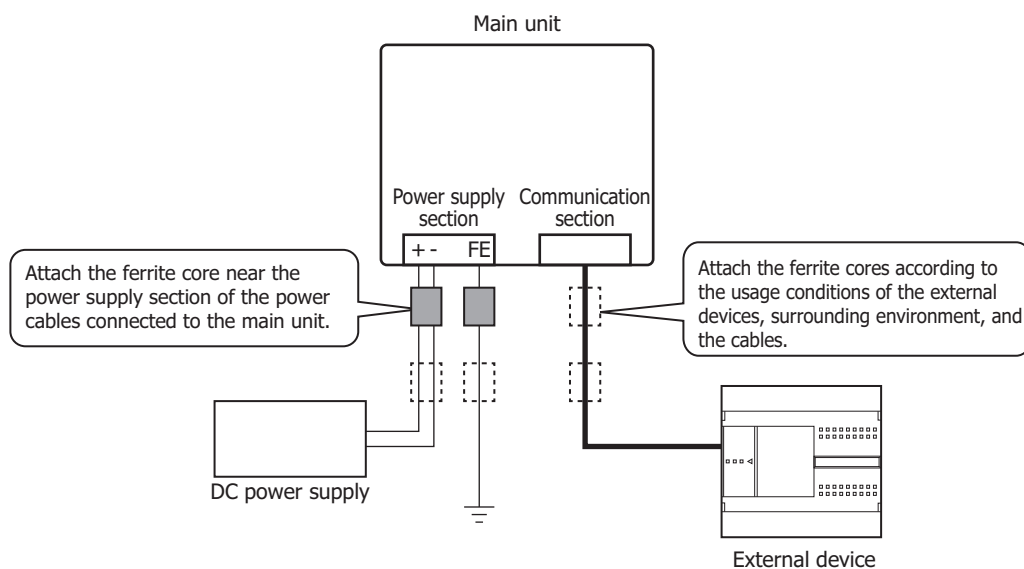
■ EMC Specifications

Radiated Emission	Class A: 10m 40dB μ V/m quasi-peak (30M to 230MHz) 47dB μ V/m quasi-peak (230M to 1GHz)
Electrostatic Discharge	Contact: \pm 6kV Air: \pm 8kV
Electromagnetic Field	10V/m (80M to 1000MHz) 3V/m (1.4G to 2.0GHz) 1V/m (2.0G to 2.7GHz) 80% AM (1kHz)
Fast Transient/Burst	Power: \pm 2kV Communication cable: \pm 1kV
Surge Immunity	\pm 500V (between +24V and 0V) \pm 1kV (between +24V and FE, 0V and FE)
Conducted Radio Frequency Immunity	3V (Power, Communication cable) (150k to 80MHz) 80% AM (1kHz)

Notes related to emissions

In order to meet the emission specifications for the HG2G-5T, HG1G, attach a ferrite core to the power cables and communication cables.

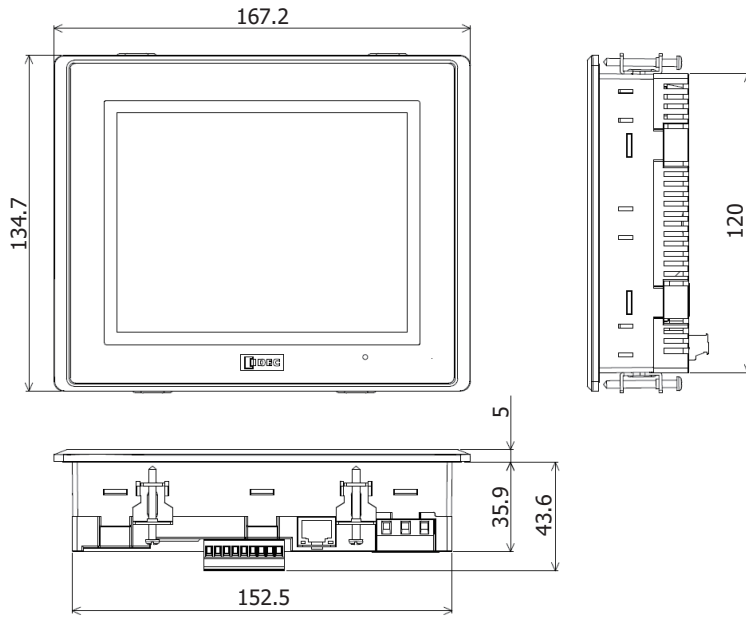
Recommended ferrite core: ZCAT3035-1330 manufactured by TDK Corporation



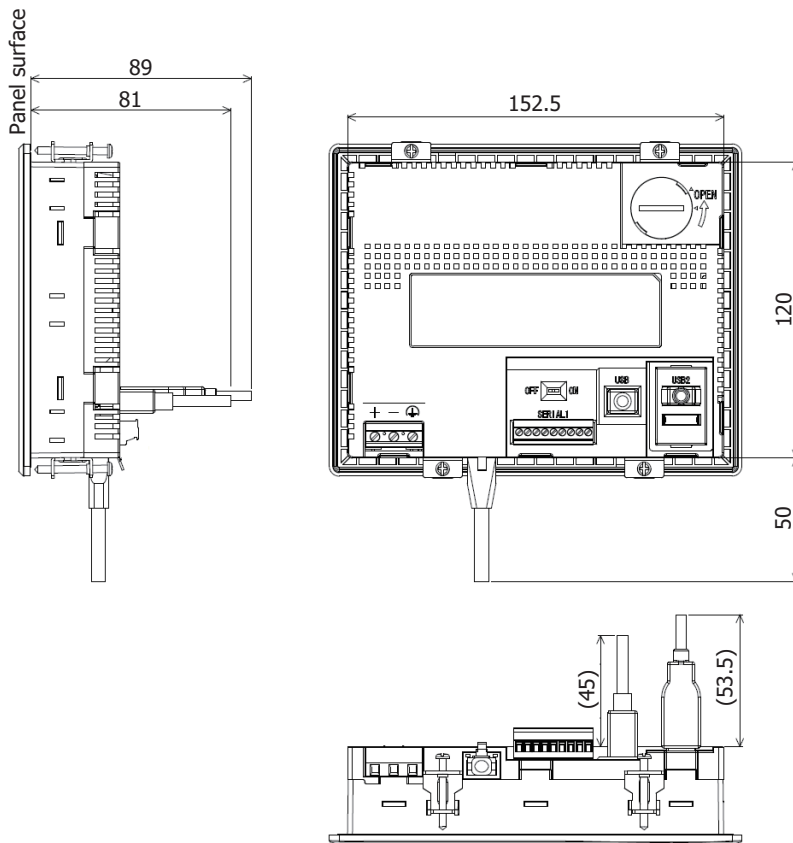
4.6 Dimensions

■ HG2G-5T (5.7 inch)

Unit: mm



<Cable Attached Dimensions>

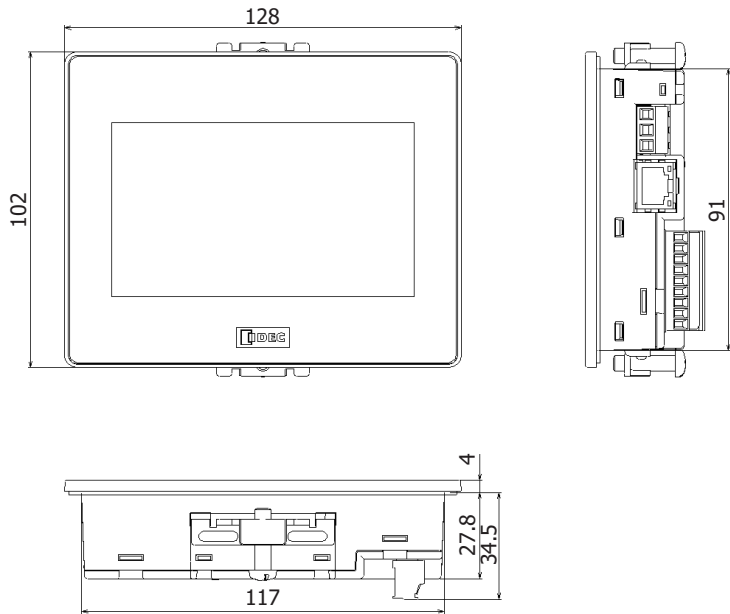


Depending on the type of connection cable used the dimensions shown above will change. The dimensions given here are representative values and are intended for reference only.

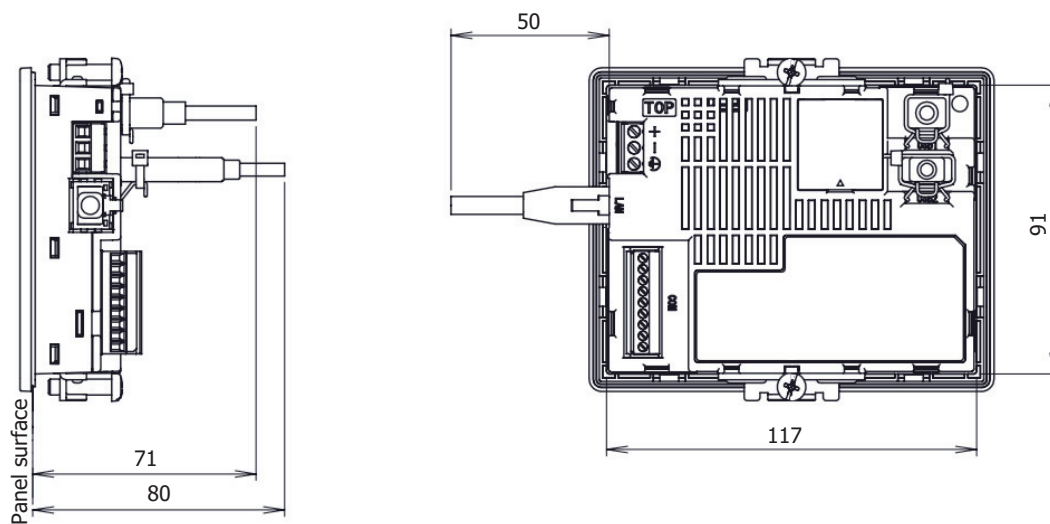
■ HG1G (4.3 inch)

Unit: mm

1



<Cable Attached Dimensions>



Depending on the type of connection cable used the dimensions shown above will change. The dimensions given here are representative values and are intended for reference only.

4.7 Installation

● Operating Environment

For designed performance and safety of the HG2G-5T, HG1G, do not install the HG2G-5T, HG1G in the following environments:

- Where dust, briny air, or iron powder exist.
- Where oil or chemical splashes for a long time.
- Where space is filled with oil mist.
- Where direct sunlight falls on the main unit.
- Where strong ultraviolet rays fall on the main unit.
- Where corrosive or combustible gasses exist.
- Where shocks or vibrations are transmitted.
- Where condensation occurs due to rapid temperature change.
- Where high-voltage or arc-generating equipment (electromagnetic contactors or circuit protectors) exists in close proximity.

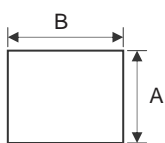
● Ambient Temperature

- Allow sufficient space for ventilation, and install the equipment away from heat sources.
- Allow at least 100mm between the HG2G-5T, HG1G and walls or other equipment.
- Do not install the HG2G-5T, HG1G where the ambient temperature exceeds the rated operating ambient temperature range. When mounting the HG2G-5T, HG1G in such locations, provide a forced air-cooling fan or air-conditioner to keep the ambient temperature within the rated temperature range.
- The HG2G-5T and HG1G are designed to install on a vertical plane so that natural air-cooling is provided. If you install it using any other orientation, use forced-air cooling, or lower the ambient operating temperature.

● Installation

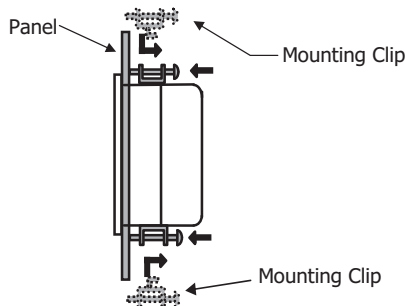
- Make a panel cut-out on the panel with the dimensions shown below.

Unit: mm



Model	A		B		Panel Thickness
HG2G-5T	121.0	+2.0 0	153.0	+2.0 0	1.0 to 5.0
HG1G	92.0	+1.0 0	118.0	+1.0 0	

- Use the attached mounting clips to tighten the screws evenly to mount panel: screws must be applied on total of four places for HG2G-5T and on total two places for HG1G with the specified torque. Mounting clips can be attached to the left and right sides of HG2G-5T. However, if they are attached in such way, there is a risk of not satisfying product specifications such as waterproof performance, shock resistance, and vibration resistance performance.



Unit : N·m

Model	Specified Torque
HG2G-5T	0.2 to 0.3
HG1G	0.3 to 0.35

CAUTION

- Do not tighten with excessive force, otherwise the main unit may warp and cause wrinkle on the display, or impair the waterproof characteristics.
- If the mounting clips are tightened obliquely to the panel, the main unit may fall off the panel.
- When installing the main unit into a panel cut-out, make sure that the gasket is not twisted. Especially when re-installing, take special care because any twists in the gasket will impair the waterproof characteristics. Also, if the gasket comes off the main unit, align the convex part of the gasket with the concave part of the front case, and then insert the gasket fully into the gasket mounting groove without twisting it.

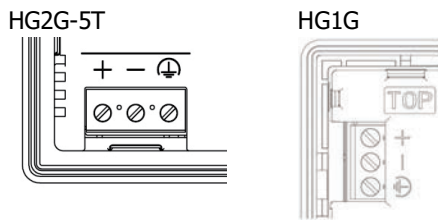
4.8 Wiring

⚠ CAUTION

- Turn off the power supply before wiring.
- Make the wiring as short as possible and run all wires as far away as possible from high-voltage and large-current cables. Follow all the procedures and precautions when wiring the HG2G-5T, HG1G.
- Separate the HG2G-5T, HG1G power supply wiring from the power lines of I/O devices and motor equipment.
- Ground the functional earth terminal to make sure of correct operation.

● Power Supply Terminal

- Pin assignment is shown in the following table.



+	Power supply 12V/24V DC
-	Power supply 0V
⏚	Functional Earth (FE)

- Use applicable cables for wiring and recommended ferrules (made by Phoenix Contact or Weidmüller) as follows.

Applicable cable	AWG18 to 22	
Recommended ferrule	AI 0,34-8 TQ AI 0,5-8 WH AI 0,75-8 GY AI 1-8 RD AI-TWIN 2 x 0,5-8 WH AI-TWIN 2 x 0,75-8 GY AI-TWIN 2 x 1-8 RD ^{*1} (Phoenix Contact)	H0,34/12 TK H0,5/14 OR H0,75/14 W H1,0/14 GE H0,5/14 ZH OR H0,75/14 ZH W H1,0/15 ZH GE ^{*1} (Weidmüller)
Tightening Torque	0.5 to 0.6 N·m	

● Cautions for using the HG2G-5T, HG1G connected to a personal computer

When connecting the HG2G-5T, HG1G to a personal computer via the USB Interfaces, the HG2G-5T, HG1G or the personal computer may break down depending on the conditions of the personal computer. Make sure of the following cautions, in order to prevent an accident.

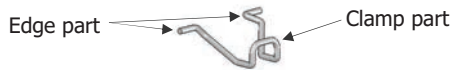
- If the personal computer has a 3-pin power plug or power plug with a ground lead type, make sure to use a plug socket including a ground input electrode or ground the earth lead, respectively.
- If the personal computer has a 2-pin power plug without ground lead, follow the procedure below when connect the HG2G-5T, HG1G to the personal computer.
 - (1) Pull out the power plug of the personal computer from the AC outlet.
 - (2) Connect the HG2G-5T, HG1G to the personal computer.
 - (3) Insert the power plug of the personal computer into the AC outlet.

*1 HG2G-5T only

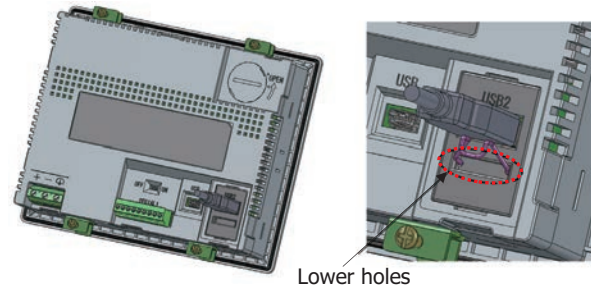
4.9 USB Cable Lock Pin Attachment

When using the USB device, attach the USB Cable Lock Pin to prevent disconnecting the USB cable from the HG2G-5T*1, HG1G.

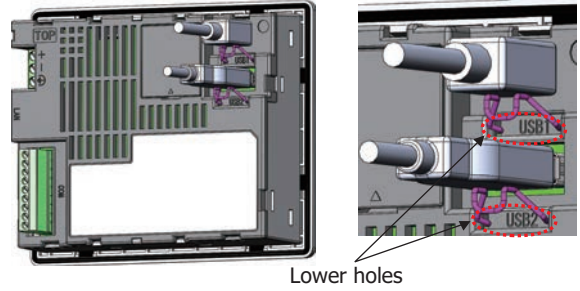
- 1 Insert the USB cable into the USB2 port.
- 2 Strain the "Edge part" of the USB Cable Lock Pin, and insert the "Edge part" to the 2 holes lower the USB2 port.



HG2G-5T

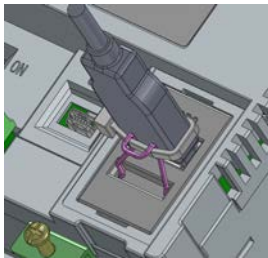


HG1G

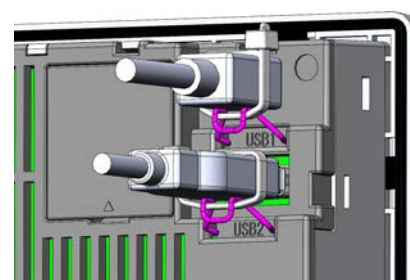


- 3 Fasten the USB Clamp Band around the USB cable and the "Clamp part", secure them tightly.

HG2G-5T

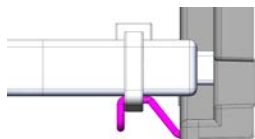


HG1G

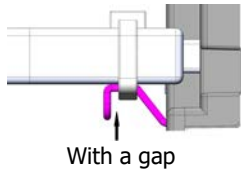


Fasten the USB Clamp Band without the space between the "Clamp part" and it, and the inclination.

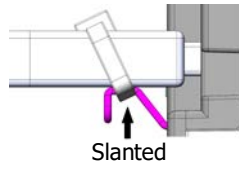
YES



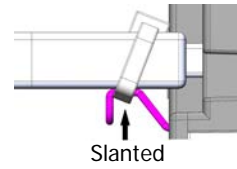
NO



NO



NO



*1 Only USB2 for HG2G-5T

4.10 Maintenance and Inspection

Maintain and inspect the HG2G-5T, HG1G periodically to ensure the best performance. Do not disassemble, repair, or modify the HG2G-5T, HG1G during inspection.

Maintenance and Inspection Parts	Description
Display	Wipe any stain of the display using a soft cloth slightly dampened with neutral detergent or alcoholic solvent. Do not use solvents such as thinner, ammonia, strong acid, and strong alkaline.
Terminals, Connectors	Check the terminals and connectors to make sure of no loose screws, incomplete insertion, or disconnected lines.
Mounting Clips	Make sure that all mounting clips and screws are tightened sufficiently. If the mounting clips are loose, tighten the screw to the specified torque.
Backlight	The HG2G-5T, HG1G's backlight cannot be replaced by the customer. When the backlight needs to be replaced. Contact your vendor or IDEC Corporation.
Backup Battery	The operating life of the internal battery is approximately five years. It is recommended to replace the battery every five years even before the reminder message for battery replacement is displayed.
Touch Panel	A gap may be caused in the operation accuracy of the touch panel by the secular distortion, etc. Readjust the touch panel in the System Mode according to the following procedure when there is a gap in the operation of the touch panel. Refer to "Adjusting the Touch Panel" on page 1-78 for details.

● Replacing the Backup Battery

A backup battery is built into the HG2G-5T, HG1G to retain the internal backup data (log data, keep resister, and keep relay) and clock data.

When the "Replace the battery" message is displayed, replace the backup battery by following the procedure below.

When the "Battery level LOW" message is displayed, replace the battery immediately; otherwise, the backup data and clock data may be lost.

Whether or not to display the reminder message for battery replacement can be specified with the WindO/I-NV4. For details, refer to Chapter 4 "3.1 System Tab" in the WindO/I-NV4 User's Manual.

- 1 Follow the procedure below to remove the battery holder cover.

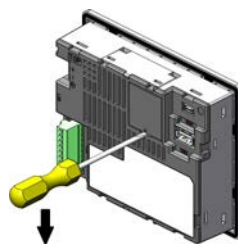
HG2G-5T

Turn the cover counterclockwise using a coin.



HG1G

Use a flat head screwdriver.



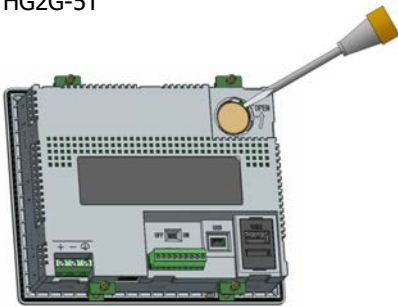
- 2 Turn on the power to the HG2G-5T, HG1G, wait for approximately one minute, and then turn off the power again.



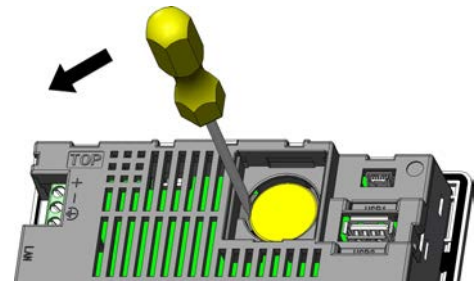
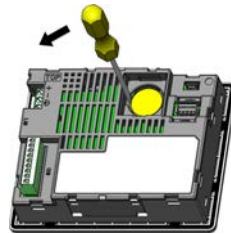
After turning off the power to the HG2G-5T, HG1G in step 2, complete the steps through 4 within 30 seconds to replace the battery without losing the backup data and clock data. However, it is recommended that the backup data be transferred to flash memory as a precautionary measure. For the procedure to transfer the data to flash memory, refer to Chapter 35 "Internal Devices" in the WindO/I-NV4 User's Manual. If it is not necessary to save the data, step 2 can be skipped.

- 3 Insert a flat head screwdriver into the battery holder, as shown in the figure below, and remove the battery. The battery may pop out from the battery holder.

HG2G-5T



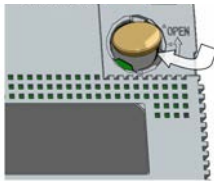
HG1G



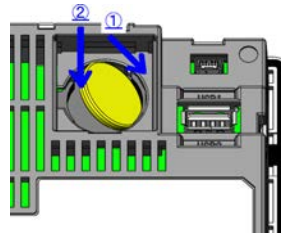
Enlarged view

- 4 Install a replacement battery into the battery holder. Ensure that the orientation of the battery is correct.

HG2G-5T



HG1G



- 5 With the new battery installed correctly, reverse the instruction the procedure described in item #1 above to secure the cover.

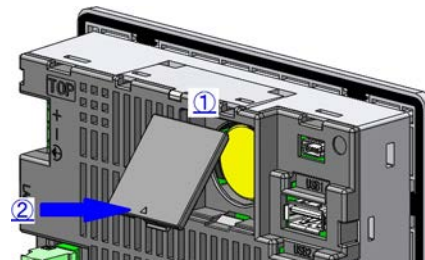
HG2G-5T

Set the battery holder cover to the original position, and turn it clockwise using a coin.



HG1G

Set the battery holder cover, as shown in the figure below.



- The operating life of the internal battery is approximately five years. It is recommended to replace the battery every five years even before the reminder message for battery replacement is displayed.
- IDEC provides replacement service for the battery (at customer's expense). Contact your vendor or IDEC Corporation.

⚠ WARNING

The battery may be regulated by national or local regulation. Observe the instructions of proper regulation. As electric capacity is left in a discarded battery and it comes into contact with other metals, it could lead to distortion, leakage, overheating, or explosion, so make sure to cover the (+) and (-) terminals with insulating tape before disposal.

⚠ CAUTION

When replacing the battery, use the specified battery only. Note that any problems and failures arising from or in connection with the use of a battery other than the specified battery is not guaranteed.

Handling of Batteries and Devices with Built-in Batteries in EU Member States

Note: The following symbol mark is for EU countries only and is according to the directive 2006/66/EC Article 20 information for end-users and Annex II.



This symbol mark means that batteries and accumulators, at their end-of life, should be disposed of separately from your household waste.

If a chemical symbol is printed beneath the symbol shown above, this chemical symbol means that the battery or accumulator contains a heavy metal at a certain concentration. This will be indicated as follows :

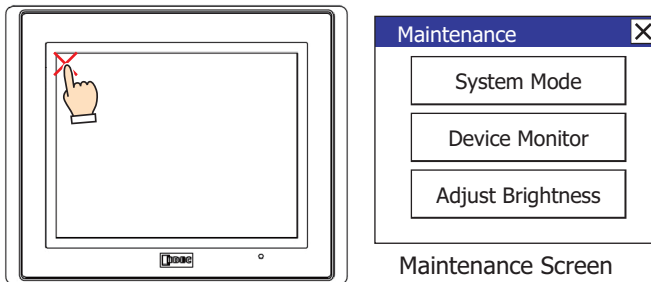
Hg : mercury (0.0005%), Cd : cadmium (0.002%), Pb : lead (0.004%)

In the European Union there are separate collection systems for used batteries and accumulators.

Please dispose of batteries and accumulators correctly in accordance with each country or local regulation.

● Maintenance Screen

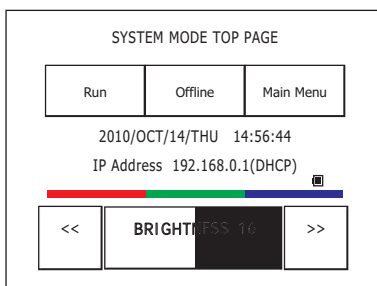
Turn on the power to the HG2G-5T, HG1G, then press and hold the touch panel on the upper-left corner of the screen for three seconds or longer. The Maintenance Screen appears on the screen.



- Permission to show the Maintenance Screen can be set using the WindO/I-NV4. For details, refer to Chapter 4 "3.1 System Tab" in the WindO/I-NV4 User's Manual.
- The Maintenance Screen is not displayed in the System Mode.

● System Mode

Press the **System Mode** at the top of the Maintenance Screen. The Top Page Screen appears.

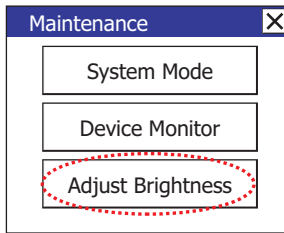


Initial Setting, Self Diagnosis and Initialization of the data, etc can be executed in the System Mode.

● Adjusting the Brightness

The brightness of the HG2G-5T, HG1G display can be adjusted on the Adjust Brightness Screen.

- 1 Press the **Adjust Brightness** at the bottom of the Maintenance Screen. The Adjust Brightness Screen appears.



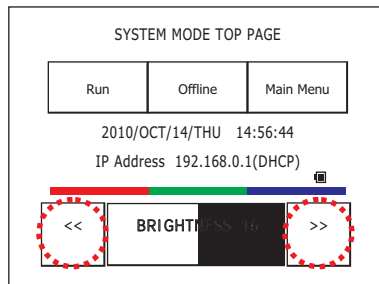
- 2 Press the << and >> at the bottom of the Adjust Brightness Screen to adjust the brightness to the optimal setting.



- 3 Press the **X** at the top-right to close the Adjust Brightness Screen.



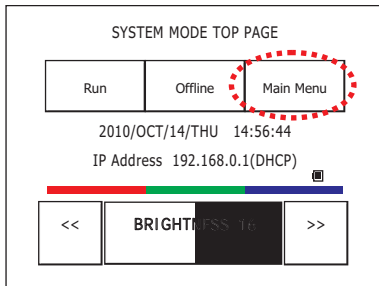
To adjust the brightness in the System Mode, use the << and >> buttons located at the bottom of the Top Page.



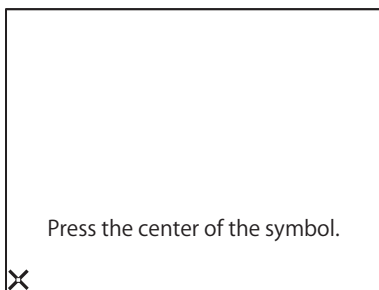
● Adjusting the Touch Panel

A gap may be caused in the operation accuracy of the touch panel by the secular distortion, etc. Adjust the touch panel according to the following procedure when there is a gap in the operation of the touch panel.

- 1 Press the **Main Menu** on the Top Page in System Mode. The Main Menu Screen appears.



- 2 Press in order of **Initial Setting, Initialize, TP Adjust**. The confirmation screen appears and asks "Adjust Touch Panel setting?". Press **Yes**, then the Touch Panel Adjust screen appears.
- 3 Press the center of the X mark, then the position of the mark changes one after another. Press five marks sequentially.



Press the center of the X mark.

This will ensure the accuracy of the touch panel operation.


- 4 When normally recognized, the confirmation screen of 2 is restored.

At procedure 3, when pressing a point away from the center of the X mark, a recognition error will result. Then the X mark returns to the initial position, then repeat the procedure of 3 again.

5 HG1P

5.1 Packing Content

Before installing the HG1P, make sure that the model you have received is what you actually ordered, and no parts are damaged to accidents during shipping.

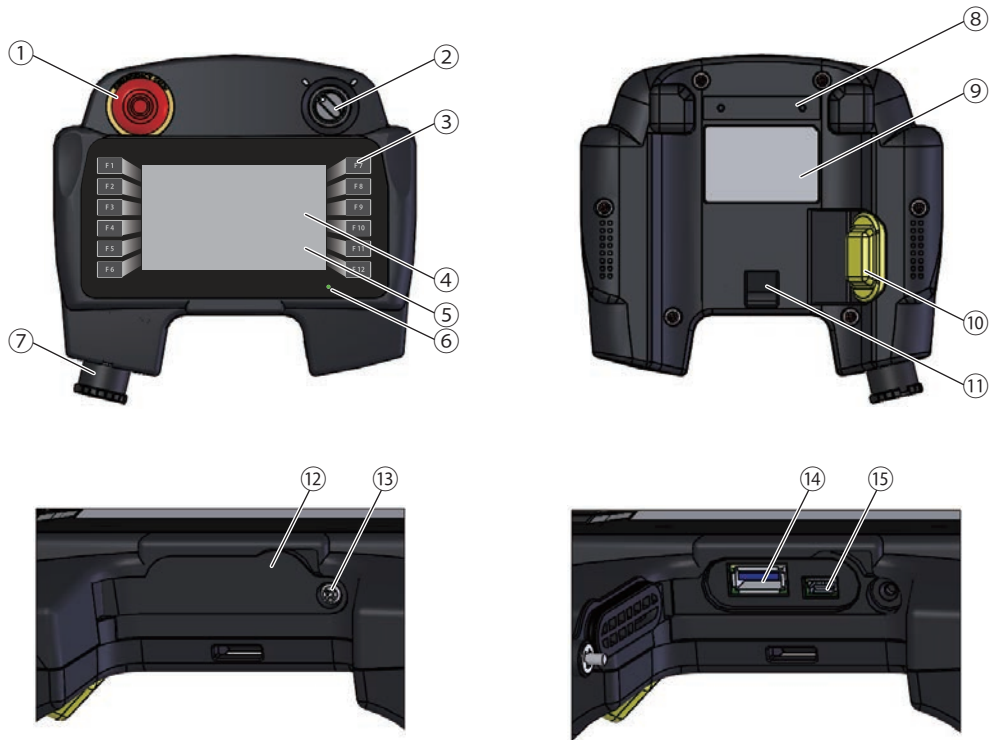
Product Name & Appearance	Quantity	Description
HG1P 	1	Main unit
Instruction Sheet	1	Japanese, English
Instruction Sheet	1	Chinese

5.2 Type Number

Communication Interface	Bezel Color	Part No.
Serial Interface (RS422/485)	Dark gray	HG1P-ST32YBFH-B0
Ethernet Interface		HG1P-ST32ZBFH-B0

5.3 Part Names

■ HG1P



No.	Name	Description
(1)	Mechanical Switch 1 (Emergency Stop Switch)	1 (external wiring) Type No.: AB6E-3BV02PRM (IDEC) Contact Rating: 1A/DC30V
(2)	Mechanical Switch 2 (Selector Switch)	1 (external wiring) Type No.: LB6S-2T1 (IDEC) Contact Rating: 0.1A/DC30V (resistance load)
(3)	Function Key	12 (internal wiring)
(4)	Display	TFT color LCD
(5)	Touch Panel	Analog resistive membrane type
(6)	POWER LED	Green (lit): Normal Operation (Power is on.) Not lit: Power is off.
(7)	Connector	Removable 19-pin Female Connector
(8)	Mounting Hole For Wall-Mounted Hook	Wall-mounted hook screw mounting part (2)
(9)	Nameplate	Label printed with Part number, Serial Number and Consumption Current
(10)	Enabling Switch	1 (external wiring) Type No.: HE6B-M200Y (IDEC) Contact Rating: 1A/DC30V (resistive), 0.7A/DC30V (pilot duty)
(11)	Hand Strap Mounting Part	-
(12)	USB Port Cover	-
(13)	USB Port Cover Mounting Part	USB port cover screw mounting part (1)
(14)	USB Interface (USB2) *1	USB2.0 (Host) Connector: Type-A
(15)	USB Interface (USB1)	USB2.0 (Device) Connector: Mini-B

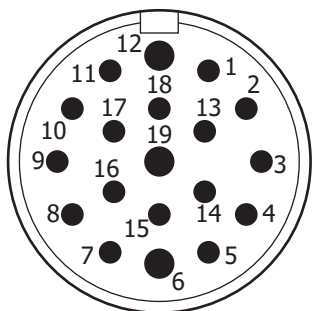
*1 USB flash drive only

5.4 External Interfaces

⚠ CAUTION

- Make sure to turn off the power to the HG1P before inserting or pulling the cable into or out of the connector.
- Communication interface specifications vary based on the model number.

Communication Interface Specifications	HG1P-ST32YBFH-B0: Serial Interface (RS422/485) HG1P-ST32ZBFH-B0: Ethernet Interface
Connector	Removable 19-pin Female Connector
Part Number (Manufacturer)	CA-19P1N126Y00 (PHOENIX CONTACT)



View of mating surface of the removable connector

No.	Name	Function
1	C_NC1	Selector Switch Contact 1 (NC)
2	C_NO1	Selector Switch Contact 1 (NO)
3	B_C1	Enabling Switch Contact 1 (COM)
4	B_C2	Enabling Switch Contact 2 (COM)
5	B_NO2	Enabling Switch Contact 2 (NO)
6	FG	Frame Ground
7	RDA+/TP1+	Receive Data (+)
8	RDB-/TP1-	Receive Data (-)
9	SDB-/TP0-	Send Data (-)
10	A_NC21	Emergency Stop Switch Contact 2 (NC)
11	A_NC22	Emergency Stop Switch Contact 2 (NC)
12	DC24V-	HG1P 24V DC Power Supply (-)
13	C_C1	Selector Switch Contact 1 (COM)
14	B_NO1	Enabling Switch Contact 1 (NO)
15	SG	Communication Signal Ground
16	SDA+/TP0+	Send Data (+)
17	A_NC11	Emergency Stop Switch Contact 1 (NC)
18	A_NC12	Emergency Stop Switch Contact 1 (NC)
19	DC24V+	HG1P 24V DC Power Supply (+)

5.5 Specifications

! CAUTION

The following specifications are when the HG1P optional cable, specified by IDEC, is attached.

■ Applicable Standards

Safety Standards	UL61010-, UL61010-2-201 CSA C22.2 No.61010-1 (c-UL), CSA C22.2 No.61010-2-201 (c-UL)
EMC Standards*1	IEC/EN 61131-2 FCC

■ Environmental Specifications

Ambient Operating Temperature	0 to +45°C (no freezing)
Ambient Operating Humidity	10 to 90% RH (no condensation)
Ambient Storage Temperature	-10 to +60°C (no freezing)
Ambient Storage Humidity	10 to 90% RH (no condensation)
Altitude	Up to 2000m (RUN) 750 to 1060hPa
Pollution Degree	2
Corrosion Immunity	Free from corrosive gases

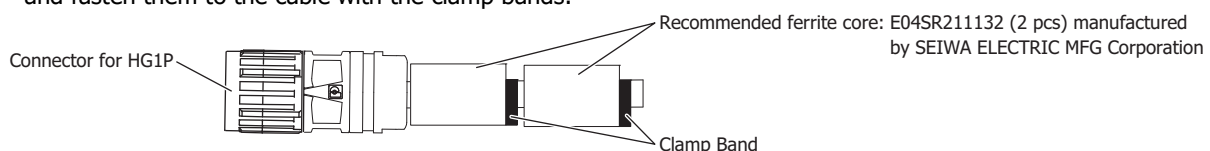
■ Electrical Specifications

Rated Voltage	24V DC
Power Consumption	3W maximum
Not using USB Interface (USB2)	2W maximum
Power Voltage Range	20.4 to 28.8V DC
Allowable Momentary Power Interruption	10 ms maximum
Inrush Current	20A maximum
Dielectric Withstand Voltage	AC500V, 10mA, 1 minute (between power and ground terminals)

■ Construction Specifications

Vibration Resistance	5 to 8.4Hz amplitude 3.5mm, 8.4 to 150Hz acceleration 9.8m/s ² 1 octave 10 minutes 10 times on each of three mutually perpendicular axes (100 minutes) (IEC 61131-2)
Shock Resistance	147m/s ² , 11ms (5 shocks on each of three mutually perpendicular axes) (IEC 61131-2)
Dropping	1.5 m, 6 directions, 1 time
Connector Insertion Life	HG1P Optional Cable: 100 times USB1: 5000 times USB2: 1500 times

*1 When using the HG1P-ST32ZBFH-B0 with **Connect Speed of 10/100 Mbps** as the EMC Standard Approved Products, attach the recommended ferrite cores (2 pieces) near the connector for HG1P of the HG1P optional cable, and fasten them to the cable with the clamp bands.



■ Performance Specifications

Display	LCD Type ^{*1}	TFT color LCD
	Display Colors	65,536 Colors
	Effective Display Area	95.04 (W) × 53.856 (H) mm
	Display Resolution	480 (W) × 272 (H) dots
	View angle	Left/Right: 80°, Top: 65°, Bottom: 55°
	Brightness of LCD only	400 cd/m ²
	Brightness Adjustment	32 levels
	Backlight	LED (white)
	Backlight Life ^{*2}	Approx. 30,000 hours (The time until brightness becomes 50% of the initial value)
Touch Panel	Switch Type	Analog Resistive Film
	Operating Force	3N maximum
	Multiple Operations	Impossible
	Life	1,000,000 operations
User Memory	Approx. 12 MB	
Clock Function ^{*3}	Year, Month, Day, Hour, Minute, Second, Day-of-week ±90 seconds per month	
Buzzer output	Single tone (tone length is adjustable)	
Degree of Protection	IP54 (When HG1P optional cable is attached ^{*4})	
Weight	Approx. 500g (without HG1P optional cable)	

■ Communication Specifications

Serial Interface (RS422/485)	Communication Speed	187500, 115200, 57600, 38400, 19200, 9600, 4800, 2400, 1200 bps
	Communication Distance	20m maximum
	Synchronization	Asynchronous
Ethernet Interface	Interface Specification	IEEE802.3i, IEEE802.3u
	Connect Speed	10Mbps, 10/100Mbps

*1 Please be aware that small black and bright dots might show up on LCD Screen: it is not a failure or malfunction

*2 The life of the LCD itself at an ambient temperature of 25°C. This is not a guaranteed value. The actual life depends on the environment and conditions of use.

*3 The HG1P has no backup battery, therefore, time data is deleted when the HG1P is turned off.

*4 The connector for the external device is not guaranteed.

■ EMC Specifications

Radiated Emission	<p>Class A: 10m</p> <ul style="list-style-type: none"> •IEC 61000-6-4 Class A 40dBμV/m quasi-peak (30M to 230MHz) 47dBμV/m quasi-peak (230M to 1GHz) •FCC Class A 39dBμV/m quasi-peak (30M to 88MHz) 43.5dBμV/m quasi-peak (88M to 216MHz) 46.4dBμV/m quasi-peak (216M to 960MHz) 49.5dBμV/m quasi-peak (960M to 1GHz)
Electrostatic Discharge	<p>Contact: \pm4kV</p> <p>Air: \pm8kV</p>
Electromagnetic Field	<p>10V/m (80M to 1000MH)</p> <p>3V/m (1.4G to 2.0GHz)</p> <p>1V/m (2.0G to 2.7GHz)</p> <p>80% AM (1kHz)</p>
Fast Transient/Burst	<p>Power: \pm2kV</p> <p>Communication cable: \pm1kV</p>
Surge Immunity	<p>\pm500V (+24V and 0V)</p> <p>\pm1kV (+24V and FE, 0V and FE)</p>
Conducted Radio Frequency Immunity	<p>3V (Power, Communication cable) (150k to 80MHz)</p> <p>80% AM (1kHz)</p>

Switch Specifications

Function Keys

Model		Tactile Switch
Number Equipped		12
Contact		Normally open contact
Internal Devices	Device Name	HMI Expansion Input (Bit)
	Symbol	LI
	R/W	R



R/W is an abbreviation of Read/Write. R/W indicate that both reading and writing are possible, while R indicates that only reading is possible.



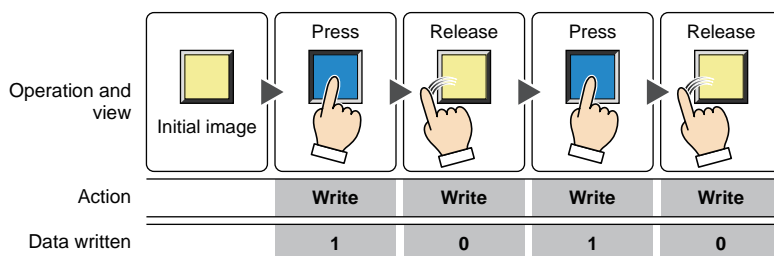
No.	Name	HMI Expansion Input (Bit) Assignment
1	F1	LI0
2	F2	LI1
3	F3	LI2
4	F4	LI3
5	F5	LI4
6	F6	LI5
7	F7	LI6
8	F8	LI7
9	F9	LI8
10	F10	LI9
11	F11	LIA
12	F12	LIB

The function keys are written to HMI Expansion Inputs (LI) as momentary switches with normally open contacts.

- Momentary

Pressing the button writes a 1 to the HMI Expansion Input (LI).

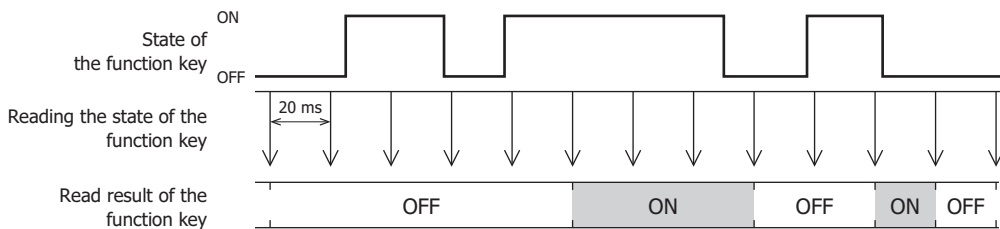
Pressing the button writes a 0 to the HMI Expansion Input (LI).



• Reading the State of Function Keys

The HG1P reads the state of the function keys once approximately every 20 ms, and those states are applied to the HMI Expansion Inputs (LI).

When the state of a function key is ON two consecutive times, the HG1P recognizes that the key has been pressed, and it processes the read result and makes an ON judgment. When the state of a function key is OFF even once, the HG1P recognizes that the key has been released, and it processes the read result and makes an OFF judgment.



Time to judge the state of the function key

The time from reading the state of the function key to when the result is judged is as follows.

	OFF→ON	ON→OFF
Maximum	41 ms	20 ms



While executing transmitting and receiving processing for user communications, the time required for the HG1P to process the read result and make an ON judgment will increase because the read processing for function keys is executed after communication processing has completed.

Time to apply the read results to HMI Expansion Inputs (LI)

For function key inputs, the latest read results when the scan for the screen ends are applied to HMI Expansion Inputs (LI) at that time.

When there is a change in the state of a function key, the time until the read result is applied to the HMI Expansion Input (LI) is as follows.

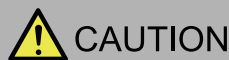
Minimum: 21 ms

Maximum: 39 ms + Scan time (HMI Special Data Register LSD4)



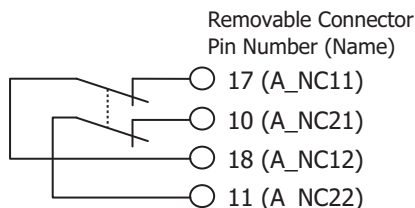
The longer it takes for display processing and part processing, the longer it will take to apply the read results to the HMI Expansion Inputs (LI).

Emergency Stop Switch



- Use the emergency stop switch through the HG1P optional cable as a control signal for external devices.
- Consider counter-measures for switch bouncing because bouncing will occur during reset operation.
- Be careful with the switch. If the switch is subjected to excessive shocks or vibrations, it may deform or become damaged, chattering may occur, operation may fail, or performance may become degraded.

Part Number (Manufacturer)	AB6E-3BV02PRM (IDEC)
Number Mounted	1
Contact	2NC (external wiring)
Contact Rating	1A/DC30V
Damage Limits	Mechanical: 100,000 operations minimum Electrical: 100,000 operations minimum
Reset Operation	Pull or Turn reset

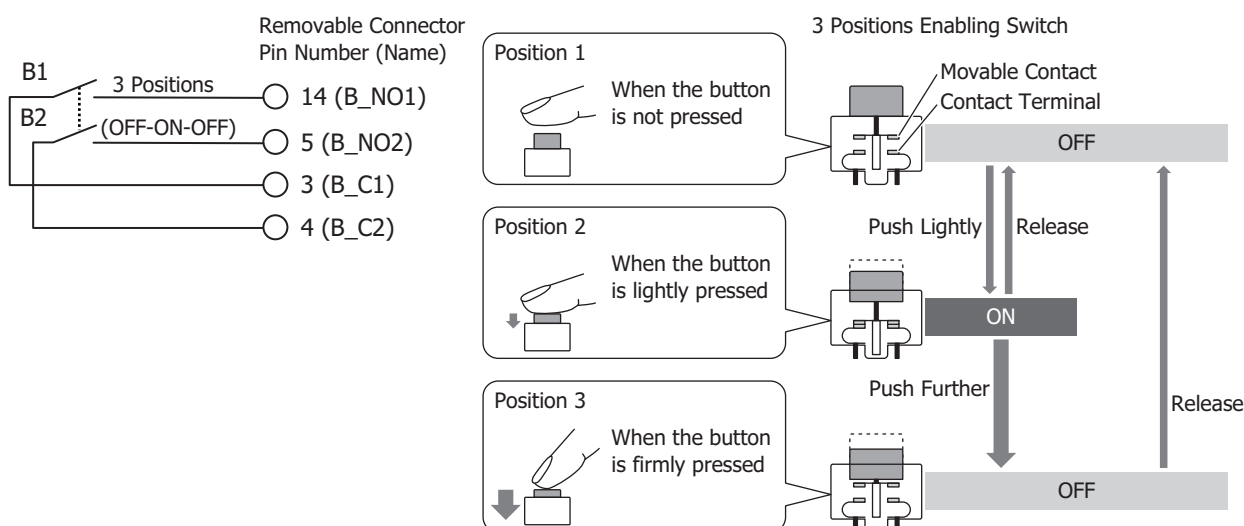


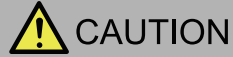
Enabling Switch

 CAUTION

- Use the enabling switch through the HG1P optional cable as a control signal for external devices.
- Build the system so that the machine operates only in position 2.
- Use the two contacts of the enabling switch as inputs for a mismatch detection circuit (safety relay module, etc.).
- The two contacts have been constructed to work independently of each other. For this reason, a time lag may occur in the operation of the two contacts when the button is pressed to the edge. When wiring the contacts to two inputs so that they are monitored mutually, design the sequence control to take into consideration this time difference.

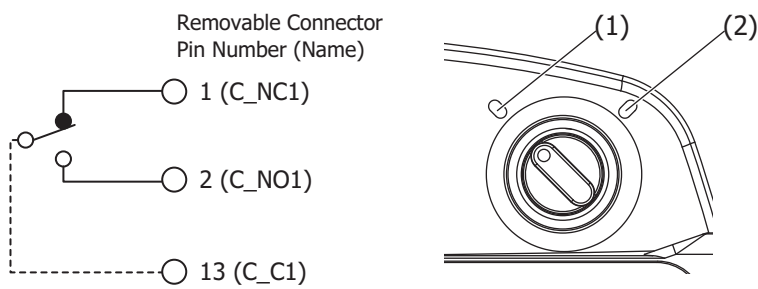
Part Number (Manufacturer)	HE6B-M200Y (IDEC)
Number Mounted	1
Contact	2 contacts (external wiring)
Contact Rating	1A/DC30V (resistive) 0.7A/DC30V (pilot duty)
Monitoring Contact	None
Damage Limits	Mechanical: Position 1→2→1: 1,000,000 operations minimum Position 1→2→3→1: 100,000 operations minimum Electrical: 100,000 operations minimum



Selector Switch (φ16 or Non-Illuminated model)

Use the selector switch through the HG1P optional cable as a control signal for external devices.

Part Number (Manufacturer)	LB6S-2T1 (IDEC)
Number Mounted	1
Contact	SPDT (external wiring)
Contact Rating	0.1A/DC30V (resistance load)
LED	Non-Illuminated
Damage Limits	Mechanical: 250,000 operations minimum Electrical: 100,000 operations minimum
Switching detent	90° - 2-positions
Specification	Stops at all positions (manual)

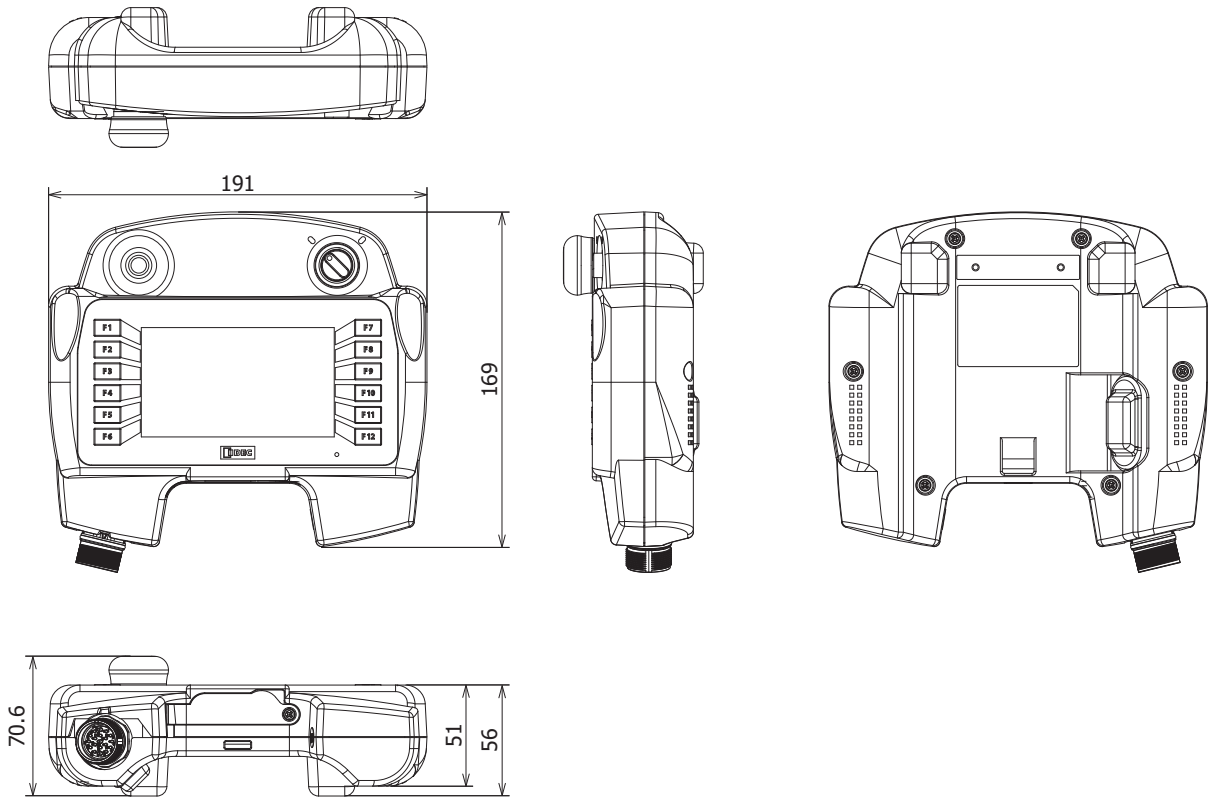


When at position (1), pin 1 (C_NC1) and pin 13 (C_C1) are connected.

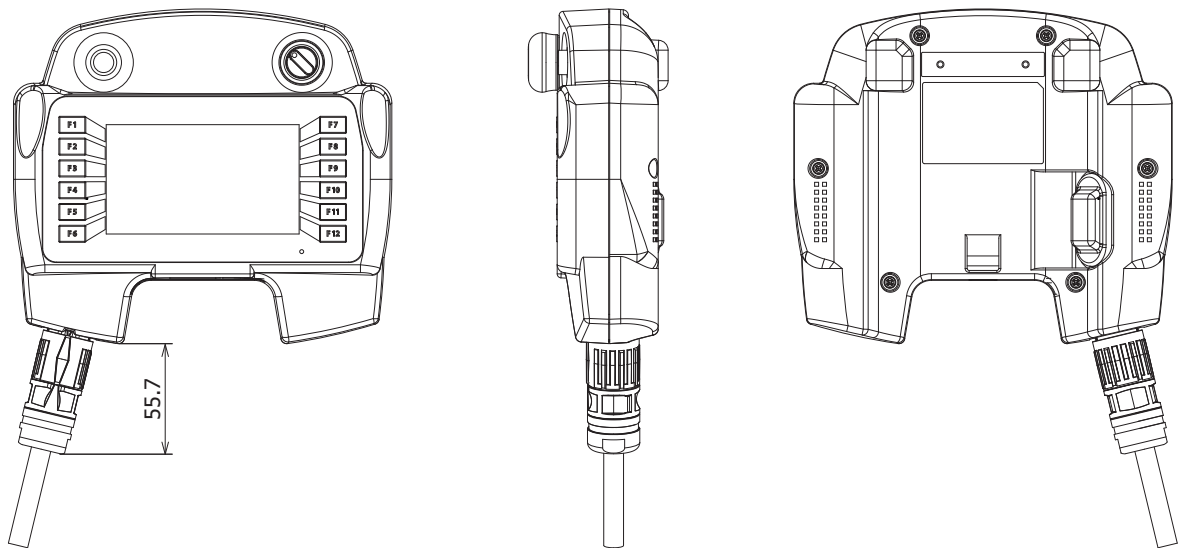
When at position (2), pin 2 (C_NO1) and pin 13 (C_C1) are connected.

5.6 Dimensions

Unit: mm



<Cable Dimensions>



5.7 Installation

● Operating Environment

- For designed performance and safety of the HG1P, do not install the HG1P in the following environments:
 - Where dust, briny air, or iron powder exist.
 - Where oil or chemical splashes for a long time.
 - Where space is filled with oil mist.
 - Where direct sunlight falls on the main unit.
 - Where strong ultraviolet rays fall on the main unit.
 - Where corrosive or combustible gasses exist.
 - Where shocks or vibrations are transmitted.
 - Where condensation occurs due to rapid temperature change.
 - Where high-voltage or arc-generating equipment (electromagnetic contactors or circuit protectors) exists in close proximity.
 - Near devices that generate a lot of heat. Such as a boiler.
- Use the wall-mounted hook (optional item) for wall mounting.

● Installation

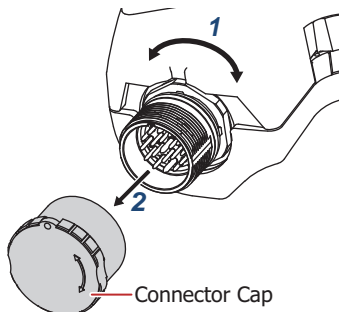
Attaching the Optional Cable (HG9Z-XCP13/-XCP15/-XCP17) to the HG1P

⚠ CAUTION

- Make sure to turn off the HG1P's power before inserting or pulling the cable into or out of the connector.
- After locking the connector, gently tug on the cable to make sure that the connector does not come off.
- Do not apply an excessive tensile load to the cable, otherwise damage of the connector will result.

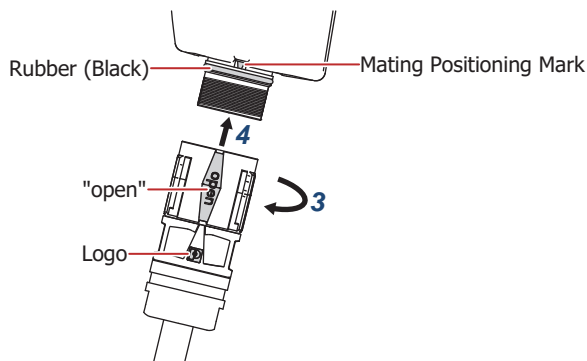
1 Turn the connector cap.

2 Pull off the connector cap.

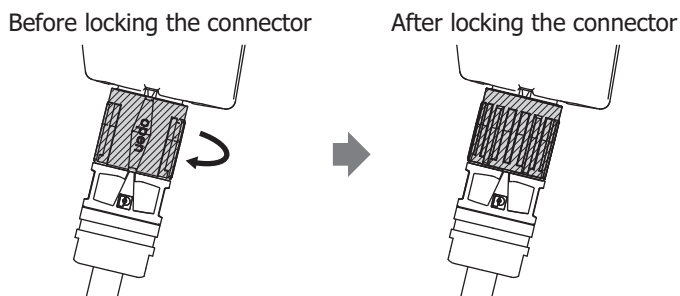


3 Turn the connector at the end of the HG1P optional cable to align the "open" text with the logo.

4 Align the connector at the end of the HG1P optional cable with the mating positioning mark, and then push it straight on until the rubber (black) is completely covered.



- 5 Turn the shaded portion of the connector clockwise 90°.



The connector will stop turning at 90°. Do not try to turn it past 90°.

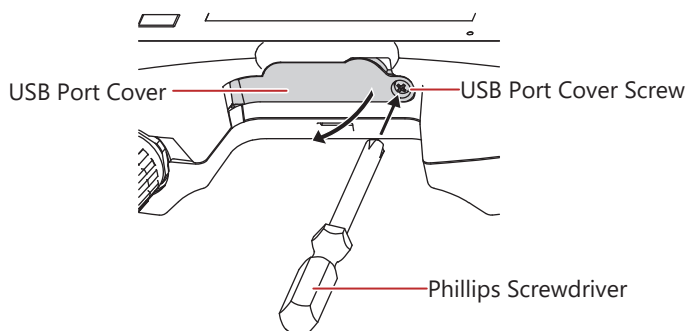
Removing and Installing the USB Port Cover

CAUTION

- When attaching the cover, tighten the screw to the recommended tightening torque (0.6 N·m).
- When installing the HG1P, make sure that the gasket is not twisted. Because any twisting in the gasket will impair the waterproof characteristics.

■ Removing the USB Port Cover

Unscrew the USB port cover screw with a Phillips screwdriver, and then pull the USB port cover outward to open it.



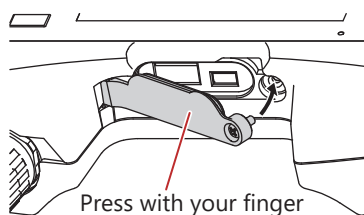
Only one side of the USB port cover opens.

Be careful when opening the USB port cover because the part that opens may be damaged if excessive force is used.

Do not remove the USB port cover screw from the USB port cover.

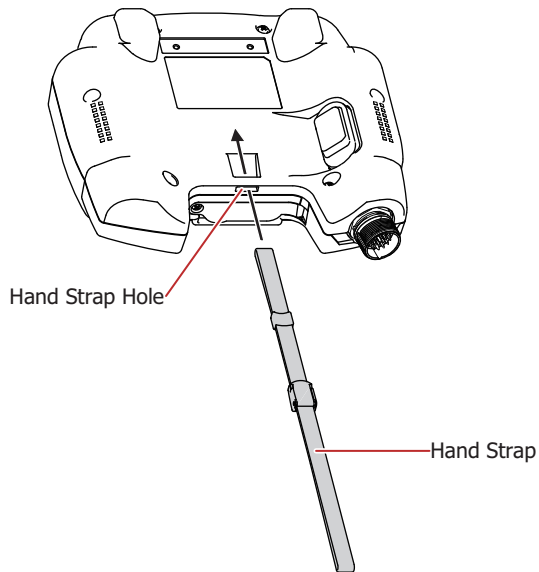
■ Installing the USB Port Cover

Close the USB port cover while pressing it with your finger, and tighten the USB port cover screw to recommend tightening torque while keeping it from lifting up from the main unit.

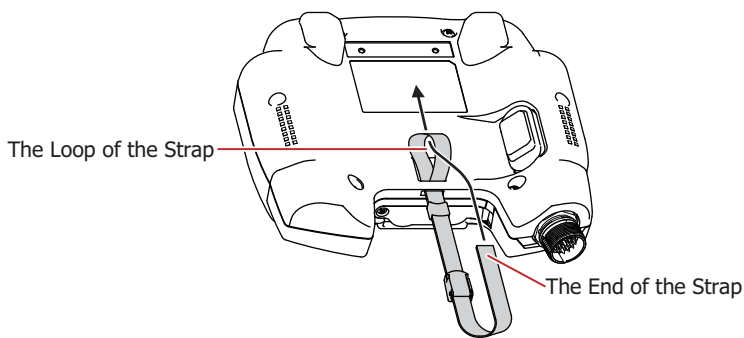


Installing the Hand Strap (HG9Z-PS4)

- 1 Pass the hand strap through the hand strap mounting part.



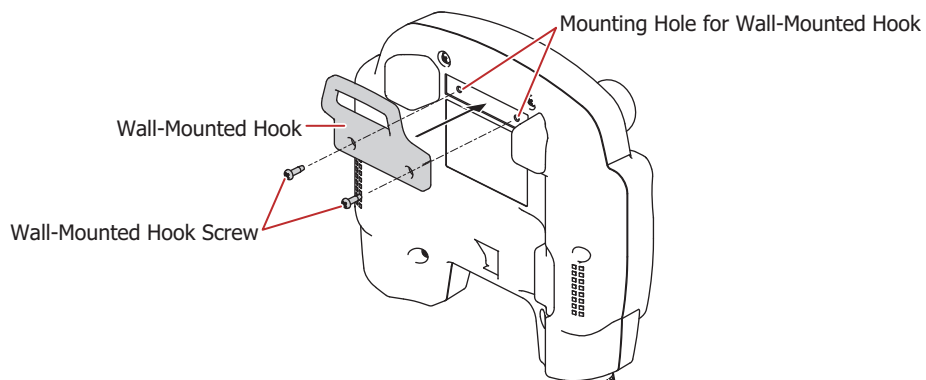
- 2 Pass the end of the strap through the loop, keep holding the end, and pull it tight.



Be careful when pulling the strap tight because the strap may be damaged if excessive force is used.

Installing the Wall-Mounting Hook (HG9Z-PK3)

- 1 Fit the indented surface of the wall-mounted hook into the HG1P.
- 2 Use the wall-mounted hook screws (M3×10), and tighten in two locations to the recommended tightening torque (0.6 N·m).



5.8 Wiring

⚠ CAUTION

- Turn off the power supply before wiring.
- Make the wiring as short as possible and run all wires as far away as possible from high-voltage and large-current cables. Follow all the procedures and precautions when wiring the HG1P.
- Separate the HG1P power supply wiring from the power lines of I/O devices and motor equipment.
- Ground the functional earth terminal to make sure of correct operation.

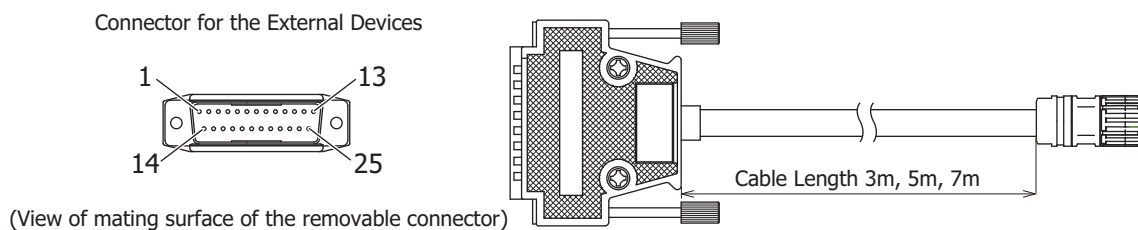
● HG1P Optional Cable (HG9Z-XCP13/-XCP15/-XCP17)

This cable connects the HG1P and external devices.

■ Specifications

Communication Interface	Serial Interface (RS422/485) or Ethernet Interface
Connector for the External Devices	D-sub 25-pin Male Connector (Jackscrew M2.6)
Length	3m, 5m, 7m

■ Outline Drawing



■ Connector Wiring Table

No.	Name	Function
1	FG	Frame Ground
2	RDB-/TP1-	Receive Data (-)
3	RDA+/TP1+	Receive Data (+)
4	SDB-/TP0-	Send Data (-)
5	SDA+/TP0+	Send Data (+)
6	SG	Communication Signal Ground
7	NC	-
8	NC	-
9	B_NO1	Enabling Switch Contact 1 (NO)
10	B_C1	Enabling Switch Contact 1 (COM)
11	A_NC11	Emergency Stop Switch Contact 1 (NC)
12	A_NC12	Emergency Stop Switch Contact 1 (NC)
13	DC24V-	Main unit 24V DC Power Supply (-)

No.	Name	Function
14	NC	-
15	NC	-
16	NC	-
17	NC	-
18	C_NC1	Selector Switch Contact 1 (NC)
19	C_NO1	Selector Switch Contact 1 (NO)
20	C_C1	Selector Switch Contact 1 (COM)
21	B_NO2	Enabling Switch Contact 2 (NO)
22	B_C2	Enabling Switch Contact 2 (COM)
23	A_NC21	Emergency Stop Switch Contact 2 (NC)
24	A_NC22	Emergency Stop Switch Contact 2 (NC)
25	DC24V+	Main unit 24V DC Power Supply (+)

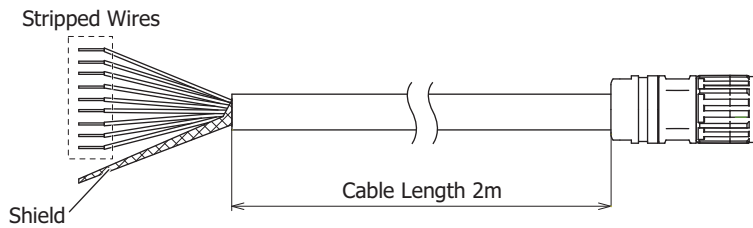
● HG1P Debug Cable (HG9Z-PX12)

This cable is the debug cable. Use this cable only for debugging.

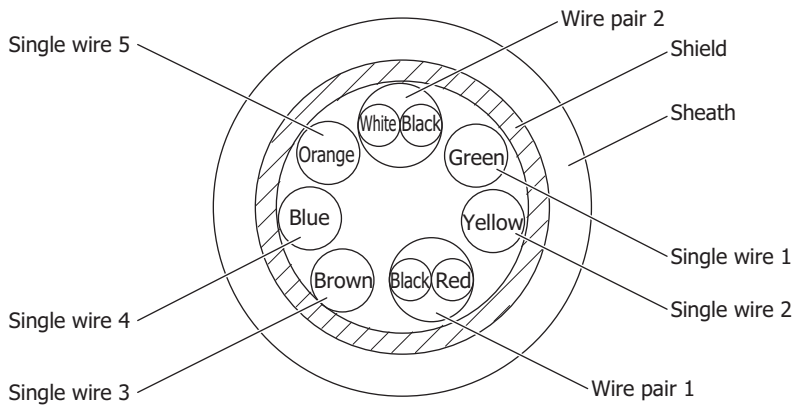
■ Cable Specification

Structure		Double shield cable
Configuration		AWG25 x 2 Pair AWG23 x 5 Cores
Conductor	Configuration	40N/0.08mm(Pair), 60N/0.08mm(Cores)
Insulator	Material	PVC
	Thickness	0.16mm(Pair), 0.145mm(Cores)
	Outer Diameter	0.9mm(Pair), 1.0mm(Cores)
Sheath	Outer Diameter	7.0 mm

■ Outline Drawing



■ Sectional View



■ Wiring Table

No.	Name	Function	Cable Color
1	RDA+/TP1+	Receive Data (+)	Wire pair 1 : Black
2	RDB-/TP1-	Receive Data (-)	Wire pair 1 : Red
3	SDA+/TP0+	Send Data (+)	Wire pair 2 : Black
4	SDB-/TP0-	Send Data (-)	Wire pair 2 : White
5	FG	Frame Ground	Single wire 1 : Green
6	SG	Communication Signal Ground	Single wire 2 : Yellow
7	DC24V+	Main unit 24V DC Power Supply (+)	Single wire 3 : Brown
8	NC	-	Single wire 4 : Blue
9	DC24V-	Main unit 24V DC Power Supply (-)	Single wire 5 : Orange

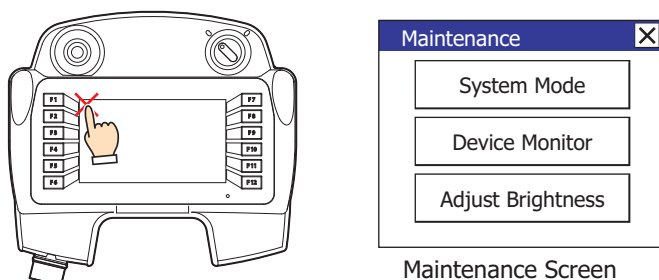
5.9 Maintenance and Inspection

Maintain and inspect the HG1P periodically to ensure the best performance. Do not disassemble, repair, or modify the HG1P during inspection.

Maintenance and Inspection Parts	Description
Display	Wipe any stain of the display using a soft cloth slightly dampened with neutral detergent or alcoholic solvent. Do not use solvents such as thinner, ammonia, strong acid, and strong alkaline.
Removable Connector	Check the terminals and connectors to make sure of incomplete insertion or disconnected lines.
USB Port Cover	Make sure of no loose screws, or no twisted gasket.
Wall-Mounted Hook	Make sure of no loose screws.
Backlight	The HG1P's backlight cannot be replaced.
Touch Panel	A gap may be caused in the operation accuracy of the touch panel by the secular distortion, etc. Readjust the touch panel in the System Mode according to the following procedure when there is a gap in the operation of the touch panel. Refer to "Adjusting the Touch Panel" on page 1-97 for details.

● Maintenance Screen

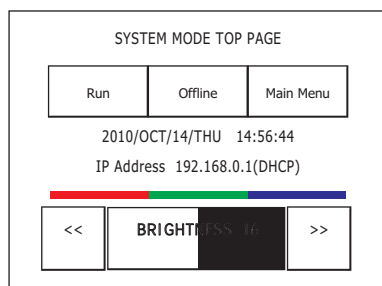
Turn on the power to the HG1P, then press and hold the touch panel on the upper-left corner of the screen for three seconds or longer. The Maintenance Screen appears on the screen.



- Permission to show the Maintenance Screen can be set using the WindO/I-NV4. For details, refer to Chapter 4 "3.1 System Tab" in the WindO/I-NV4 User's Manual.
- The Maintenance Screen is not displayed in the System Mode.

● System Mode

Press the **System Mode** at the top of the Maintenance Screen. The Top page Screen appears.

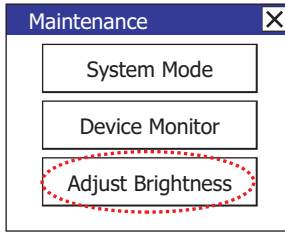


Initial Setting, Self Diagnosis and Initialization of the data, etc can be executed in the System mode.

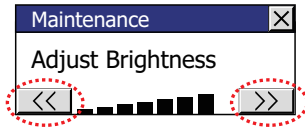
● Adjusting the Brightness

The brightness of the HG1P display can be adjusted on the Adjust Brightness Screen.

- 1 Press the **Adjust Brightness** at the bottom of the Maintenance Screen. The Adjust Brightness Screen appears.



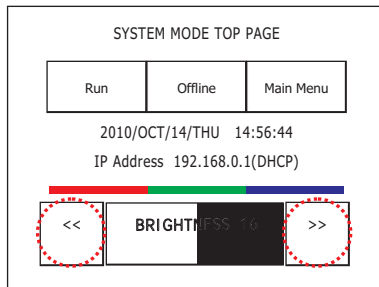
- 2 Press the << and >> at the bottom the Adjust Brightness Screen to adjust the brightness to the optimal setting.



- 3 Press the **X** at the top-right to close the Adjust Brightness Screen.



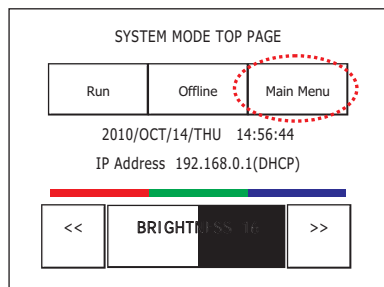
To adjust the brightness in the System Mode, use the << and >> buttons located at the bottom of the Top Page.



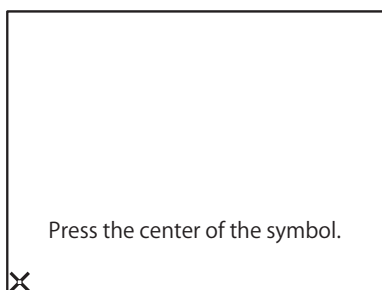
● Adjusting the Touch Panel

A gap may be caused in the operation accuracy of the touch panel by the secular distortion, etc. Adjust the touch panel according to the following procedure when there is a gap in the operation of the touch panel.

- 1 Press the **Main Menu** on the Top Page in System Mode. The Main Menu Screen appears.



- 2 Press in order of **Initial Setting, Initialize, TP Adjust**. The confirmation screen appears and asks "Adjust Touch Panel setting?". Press **Yes**, then the Touch Panel Adjust screen appears.
- 3 Press the center of the X mark, then the position of the mark changes one after another. Press five marks sequentially.



Press the center of the X mark.

This will ensure the accuracy of the touch panel operation.

- 4 When normally recognized, the confirmation screen of 2 is restored.

At procedure 3, when pressing a point away from the center of the X mark, a recognition error will result. Then the X mark returns to the initial position, then repeat the procedure of 3 again.

Chapter 2 Expansion Modules

This chapter describes how to use or operate the expansion modules, how to write a Cyclic Script and the basic operations of the Module Configuration dialog box.

2

Expansion Modules

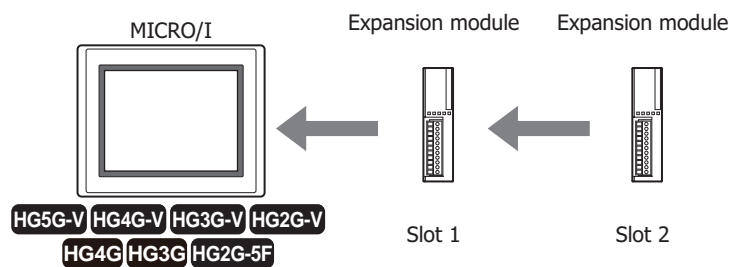
1 Overview

HG2J-7U HG5G-V HG4G-V HG4G HG3G-V HG3G HG2G-V HG2G-5F HG2G-5T HG1G HG1P

1.1 Overview of Expansion Modules

The MICRO/I has an expansion interface which allows you to add input and output functionality by adding expansion modules.

For the HG5G/4G/3G-V, HG4G/3G, up to four IDEC MICROSmart PLC expansion I/O modules may be installed. For the HG2G-V, HG2G-5F, up to two IDEC MICROSmart PLC expansion I/O modules may be installed.



Expansion I/O modules can be used to configure a display and I/O control system for small equipment with only a few I/O, or for applications with simple I/O control requirements.



Attached expansion modules are referred to as Slot 1 and Slot 2 in order from the module closest to the MICRO/I.

1.2 Applicable Expansion Modules

● Analog I/O Module

HG2J-7U HG5G-V HG4G-V HG4G HG3G-V HG3G HG2G-V HG2G-5F HG2G-5T HG1G HG1P

IDEC MicroSmart PLC Analog I/O modules that can be attached as expansion modules are shown below.

■ Analog Input Module

Type	Model No.	Input Type				
		Voltage	Current	Thermocouple	Resistance Thermometer	Thermistor
2 points Input	FC6A-J2C1 FC6A-J2C4	0 to 10 V/ -10 to +10 V	0 to 20 mA/ 4 to 20 mA	—	—	—
4 points Input	FC6A-J4A1 FC6A-J4A4	0 to 10 V/ -10 to +10 V	0 to 20 mA/ 4 to 20 mA	—	—	—
8 points Input	FC6A-J8A1 FC6A-J8A4	0 to 10 V/ -10 to +10 V	0 to 20 mA/ 4 to 20 mA	—	—	—
4 points Input	FC6A-J4CN1 FC6A-J4CN4	0 to 10 V/ -10 to +10 V	0 to 20 mA/ 4 to 20 mA	K/ J/ R/ S/ B/ E/ T/ N/ C	Pt100/Pt1000/ Ni100/Ni1000	—
4 points Input	FC6A-J4CH1Y FC6A-J4CH4Y	—	—	K/ J/ R/ S/ B/ E/ T/ N/ C	—	—
8 points Input	FC6A-J8CU1 FC6A-J8CU4	—	—	K/ J/ R/ S/ B/ E/ T/ N/ C	—	NTC/PTC

■ Analog Output Module

Type	Model No.	Output Type	
		Voltage	Current
2 points Output	FC6A-K2A1 FC6A-K2A4	0 to 10V/-10 to +10V	0 to 20mA/4 to 20mA
4 points Output	FC6A-K4A1 FC6A-K4A4	0 to 10 V/-10 to +10 V	0 to 20 mA/4 to 20 mA

■ Mixed Analog I/O Module

Type	Model No.	Input Type				Output Type	
		Voltage	Current	Thermocouple	Resistance Thermometer	Voltage	Current
4 points Input, 2 points Output	FC6A-L06A1 FC6A-L06A4	0 to 10 V/ -10 to +10 V	0 to 20 mA/ 4 to 20 mA	—	—	—	—
		—	—	—	—	0 to 10 V/ -10 to +10 V	0 to 20 mA/ 4 to 20 mA
2 points Input, 1 points Output	FC6A-L03CN1 FC6A-L03CN4	0 to 10 V/ -10 to +10 V	0 to 20 mA/ 4 to 20 mA	K/ J/ R/ S/ B/ E/ T/ N/ C	Pt100/Pt1000/ Ni100/Ni1000	—	—
		—	—	—	—	0 to 10 V/ -10 to +10 V	0 to 20 mA/ 4 to 20 mA

Checking the Hardware Version Number

The analog I/O module hardware version number is printed on the side of the analog I/O module. The performance and functionality of the analog I/O module will differ by its version, so check the version number before use.

S/N:XXXXX-XXXXX
IDEC CORPORATION



● Digital I/O Module

HG2J-7U HG5G-V HG4G-V HG4G HG3G-V HG3G HG2G-V HG2G-5F HG2G-5T HG1G HG1P

IDECC MicroSmart PLC Digital I/O module that can be attached as expansion modules are shown below.

■ Digital Input Modules

YES: Supported, NO: Not supported

Type	Model No.	Terminal	Dimensions (L x W x H (mm))	Consumption Current (mA)		HG5G/ 4G/3G/ 2G-V	HG4G/ 3G	HG2G- 5F
				5 V	24 V			
8 points/AC Input	FC4A-N08A11	Removable Screw terminal block	90.0×23.5×70.0	25	0	NO	YES	YES
8 points/DC Input	FC4A-N08B1		90.0×23.5×70.0	25	0	NO	YES	YES
16 points/DC Input	FC4A-N16B1		90.0×23.5×70.0	40	0	NO	YES	YES
16 points/DC Input	FC4A-N16B3	MIL Connector	90.0×17.6×70.0	35	0	NO	YES	YES
32 points/DC Input	FC4A-N32B3		90.0×29.7×70.0	65	0	NO	YES	YES
8 points/AC Input	FC6A-N08A11	Removable Screw terminal block	90.0×23.6×73.0	40	0	YES	YES	YES
8 points/DC Input	FC6A-N08B1		90.0×23.6×73.0	30	0	YES	YES	YES
16 points/DC Input	FC6A-N16B1		90.0×23.6×73.0	40	0	YES	YES	YES
16 points/DC Input	FC6A-N16B3	MIL Connector	90.0×17.6×73.0	40	0	YES	YES	YES
32 points/DC Input	FC6A-N32B3		90.0×30.2×73.0	65	0	YES	YES	YES
8 points/AC Input	FC6A-N08A14	Removable Push-in terminal block	90.0×30.2×73.0	40	0	YES	YES	YES
8 points/DC Input	FC4A-N08B4		90.0×30.2×73.0	30	0	YES	YES	YES
16 points/DC Input	FC4A-N16B4		90.0×30.2×73.0	40	0	YES	YES	YES

■ Digital Output Modules

YES: Supported, NO: Not supported

Type	Model No.	Terminal	Dimensions (L x W x H (mm))	Consumption Current (mA)		HG5G -V	HG4G /3G/ 2G-V	HG4G /3G	HG2G -5F
				5 V	24 V				
8 points/Relay Output	FC4A-R081	Removable Screw terminal block	90.0×23.5×70.0	30	40	NO	NO	YES	YES
16 points/Relay Output	FC4A-R161		90.0×23.5×70.0	45	75	NO	NO	YES	YES
8 points/Transistor Sink Output	FC4A-T08K1		90.0×23.5×70.0	10	20	NO	NO	YES	YES
8 points/Transistor Source Output	FC4A-T08S1		90.0×23.5×70.0	10	20	NO	NO	YES	YES
16 points/Transistor Sink Output	FC4A-T16K3	MIL Connector	90.0×17.6×70.0	10	40	NO	NO	YES	YES
16 points/Transistor Source Output	FC4A-T16S3		90.0×17.6×70.0	10	40	NO	NO	YES	YES
32 points/Transistor Sink Output	FC4A-T32K3		90.0×29.7×70.0	20	70	NO	NO	YES	YES
32 points/Transistor Source Output	FC4A-T32S3		90.0×29.7×70.0	20	70	NO	NO	YES	YES
8 points/Relay Output	FC6A-R081	Removable Screw terminal block	90.0×23.6×73.0	35	50	YES	YES	YES	YES
16 points/Relay Output	FC6A-R161		90.0×23.6×73.0	50	100	NO	YES	YES	YES
8 points/Transistor Sink Output	FC6A-T08K1		90.0×23.6×73.0	25	15	YES	YES	YES	YES
8 points/Transistor Source Output	FC6A-T08S1		90.0×23.6×73.0	25	15	YES	YES	YES	YES
16 points/Transistor Sink Output	FC6A-T16K1		90.0×23.6×73.0	30	25	YES	YES	YES	YES
16 points/Transistor Source Output	FC6A-P16K1		90.0×23.6×73.0	30	25	YES	YES	YES	YES
16 points/Transistor Sink Output	FC6A-T16K3	MIL Connector	90.0×17.6×73.0	30	25	YES	YES	YES	YES
16 points/Transistor Source Output	FC6A-P16S3		90.0×17.6×73.0	30	25	YES	YES	YES	YES
32 points/Transistor Sink Output	FC6A-T32K3		90.0×30.2×73.0	45	50	YES	YES	YES	YES
32 points/Transistor Source Output	FC6A-P32S3		90.0×30.2×73.0	45	50	YES	YES	YES	YES
8 points/Relay Output	FC6A-R084	Removable Push-in terminal block	90.0×23.6×73.0	35	50	YES	YES	YES	YES
16 points/Relay Output	FC6A-R164		90.0×23.6×73.0	50	100	NO	YES	YES	YES
8 points/Transistor Sink Output	FC6A-T08K4		90.0×23.6×73.0	25	15	YES	YES	YES	YES
8 points/Transistor Source Output	FC6A-T08P4		90.0×23.6×73.0	25	15	YES	YES	YES	YES
16 points/Transistor Sink Output	FC6A-T16K4		90.0×23.6×73.0	30	25	YES	YES	YES	YES
16 points/Transistor Source Output	FC6A-T16P4		90.0×23.6×73.0	30	25	YES	YES	YES	YES

■ Digital Combination I/O Modules

YES: Supported, NO: Not supported

Type	Model No.	Terminal	Dimensions (L x W x H (mm))	Consumption Current (mA)		HG5G/4G/3G/2G-V	HG4G/3G	HG2G-5F
				5 V	24 V			
4 points/DC Input, 4 points/Relay Output	FC4A-M08BR1	Removable Screw terminal block	90.0×23.5×70.0	25	20	NO	YES	YES
16 points/DC Input, 8 points/Relay Output	FC4A-M24BR2	Non-removable Terminal Block	90.0×39.1×70.0	65	45	NO	YES	YES
4 points/DC Input, 4 points/Relay Output	FC6A-M08BR1	Removable Screw terminal block	90.0×23.6×73.0	30	25	YES	YES	YES
16 points/DC Input, 8 points/Relay Output	FC6A-M24BR1		90.0×39.2×73.0	55	50	YES	YES	YES
4 points/DC Input, 4 points/Relay Output	FC6A-M08BR4	Removable Push-in terminal block	90.0×23.6×73.0	30	25	YES	YES	YES
16 points/DC Input, 8 points/Relay Output	FC6A-M24BR4		90.0×39.2×73.0	55	50	YES	YES	YES

● Restrictions when connecting the expansion modules

HG2J-7U HG5G-V HG4G-V HG4G HG3G-V HG3G HG2G-V HG2G-5F HG2G-5T HG1G HG1P

- The expansion module for FC6A and the expansion module for FC4A cannot be used together.
- Always turn the MICRO/I and the expansion module off before attaching or detaching an expansion module.
- Use the expansion module clamp (sold separately) when using expansion modules.
Order the module clamp by referring to the width of the module shown in the dimensions of each module.
- When connecting more than 2 expansion modules, note the limits shown below.

Model	Quantity of Applicable Expansion Modules	Total width when connecting more than 2 expansion modules	Current flow rate at 5V	Current flow rate at 24V
HG5G-V	4	93.0 mm max.	130 mA max.	50 mA max.
HG4G/3G-V, HG4G/3G	4	93.0 mm max.	130 mA max.	150 mA max.
HG2G-V, HG2G-5F	2	70.0 mm max.	130 mA max.	150 mA max.

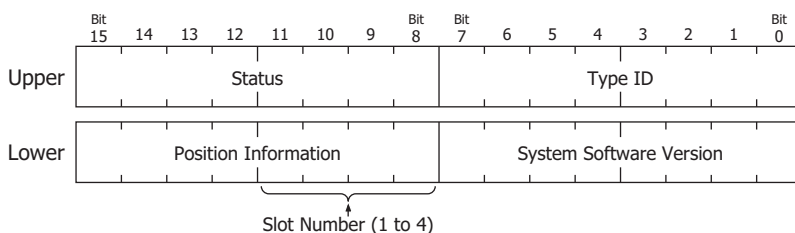
● Expansion Module Slot Information

HG2J-7U HG5G-V HG4G-V HG4G HG3G-V HG3G HG2G-V HG2G-5F HG2G-5T HG1G HG1P



The type number, type, and system software version of the expansion modules installed in MICRO/I can be checked on the WindO/I-NV4. For details, refer to Chapter 29 "Expansion Module Information Dialog Box" in the WindO/I-NV4 User's Manual.

Expansion module type information is written to HMI Special Data Registers (LSD270 to 277). The details are shown below.



Upper	Lower	Description
LSD270	LSD271	Expansion Module Slot 1 Information
LSD272	LSD273	Expansion Module Slot 2 Information
LSD274	LSD275	Expansion Module Slot 3 Information
LSD276	LSD277	Expansion Module Slot 4 Information

■ Status

Status		Description
Hexadecimal	Binary	
0x00	0000 0000	Normal
0x81	1000 0001	Communication error (An error has occurred in the communication between MICRO/I and an expansion module.)
0x82	1000 0010	Unknown device detected
0x83	1000 0011	Device setting error (No device is connected or the connected device is different from the setting of the project.)
0x84	1000 0100	Device writing error (Failed to set the operation of the device.)

■ Type ID

Type ID		Type No.
Hexadecimal	Binary	
0x00	0000 0000	FC6A-N16B1, FC6A-N16B4, FC6A-N16B3
0x01	0000 0001	FC6A-R161, FC6A-R164, FC6A-T16K1, FC6A-T16K4, FC6A-T16P1, FC6A-T16P4, FC6A-T16K3, FC6A-T16P3
0x02	0000 0010	FC6A-N32B3
0x03	0000 0011	FC6A-T32K3, FC6A-T32P3
0x04	0000 0100	FC6A-N08B1, FC6A-N08B4, FC6A-N08A11, FC6A-N08A14
0x05	0000 0101	FC6A-R081, FC6A-R084, FC6A-T08K1, FC6A-T08K4, FC6A-T08P1, FC6A-T08P4
0x06	0000 0110	FC6A-M08BR1, FC6A-M08BR4
0x07	0000 0111	FC6A-M24BR1, FC6A-M24BR4
0x20	0010 0000	FC6A-J2C1, FC6A-J2C4
0x21	0010 0001	FC6A-J4A1, FC6A-J4A4
0x22	0010 0010	FC6A-J8A1, FC6A-J8A4
0x23	0010 0011	FC6A-K2A1, FC6A-K2A4
0x24	0010 0100	FC6A-K4A1, FC6A-K4A4
0x25	0010 0101	FC6A-L06A1, FC6A-L06A4
0x26	0010 0110	FC6A-L03CN1, FC6A-L03CN4
0x27	0010 0111	FC6A-J4CN1, FC6A-J4CN4
0x28	0010 1000	FC6A-J8CU1, FC6A-J8CU4
0x2B	0010 1011	FC6A-J4CH1Y, FC6A-J4CH4Y
0xFF	1111 1111	Disconnect

■ System Software Version

Displays the version of the system software written to the device.

1.3 The Expansion Module Operation

The Expansion modules can be controlled by switch parts, command parts and scripts. Processing priority should be determined based on the application.



When the MICRO/I is switched from operation mode to another mode, the state of the output terminal of the expansion module is as follows.

Digital I/O Module: Output OFF

Analog I/O Module: High impedance

■ Priority to display processing

In this mode, priority is given to the display and parts processing.

This mode can be used for applications where the priority is on the processing speed of screen parts operation and screen switching.

Read and write to the Input (#I, #D and LEX) and Output (#Q, #D and LEY) using the parts and the functions except the Cyclic Script such as switch parts, command parts, and scripts.

Users should understand that the processing time for drawing objects and communicating (the scan time of the screen) affects the control timing of the expansion module.

This means a time-consuming display process will slow the control time down and result in delayed input response.

■ Priority on control processing

This mode places priority on control processing speed.

It can be used for screens where parts operation is minimal but have many data processing parts.

Use the Cyclic Script to read and write to the Input (#I, #D and LEX) and Output (#Q, #D and LEY).

For details about setting cyclic script, refer to Chapter 4 "Expansion Module Tab" in the WindO/I-NV4 User's Manual.

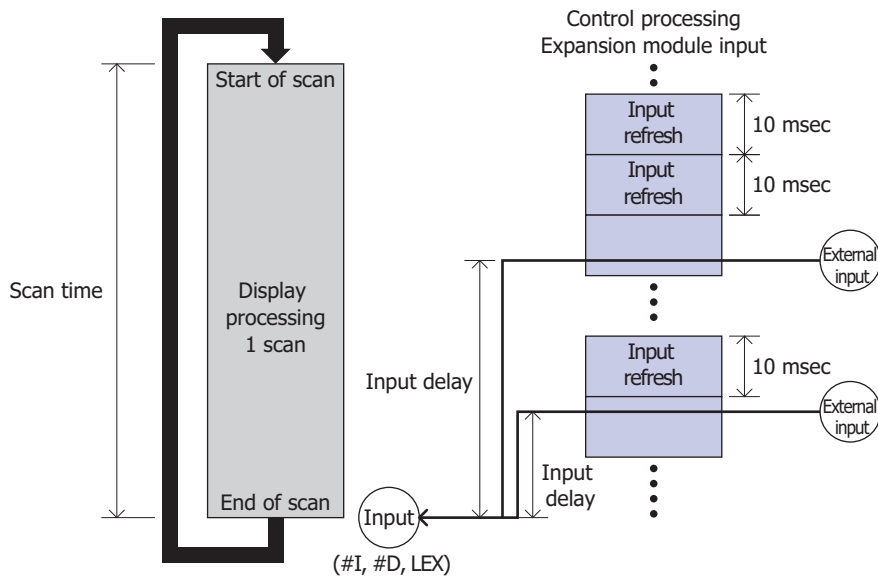
Use the Cyclic Script, which executes in conjunction with the expansion module, to provide I/O control at fixed intervals independent of the scan time of the screen.



Input and output processing set in the periodic script captures input at fixed intervals, and inputs other than fixed-period scripts take inputs at the end of scan. If the same device address is used, take input at each timing and update the output.

● Operation with priority on display processing

When there are external inputs



■ **Display processing**

Parts placed on the screen are processed in order from top to bottom. This process is done in a single scan. When processing reaches the end, it returns to the beginning and starts the next scan. The time for one scan depends on the number and type of parts used, as well as how they are configured.

■ **Input refresh**

Inputs are refreshed every 10 milliseconds independent of the screen scan. However, inputs from the expansion module are not reflected in the Input (#I, #D and LEX) until the screens scan ends.

■ **Input delay**

When there is an external input to the expansion module, the delay time until that input is reflected to the Input (#I, #D and LEX) is as follows.

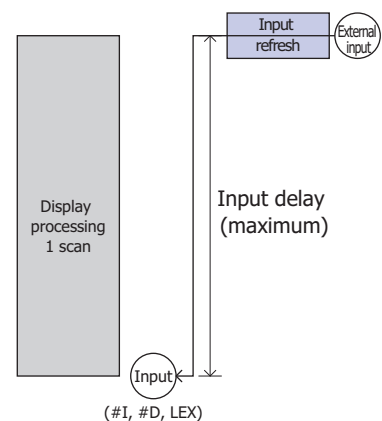
Minimum: 5 milliseconds

Maximum: 15 milliseconds + the scan time (HMI Special Data Register LSD4)

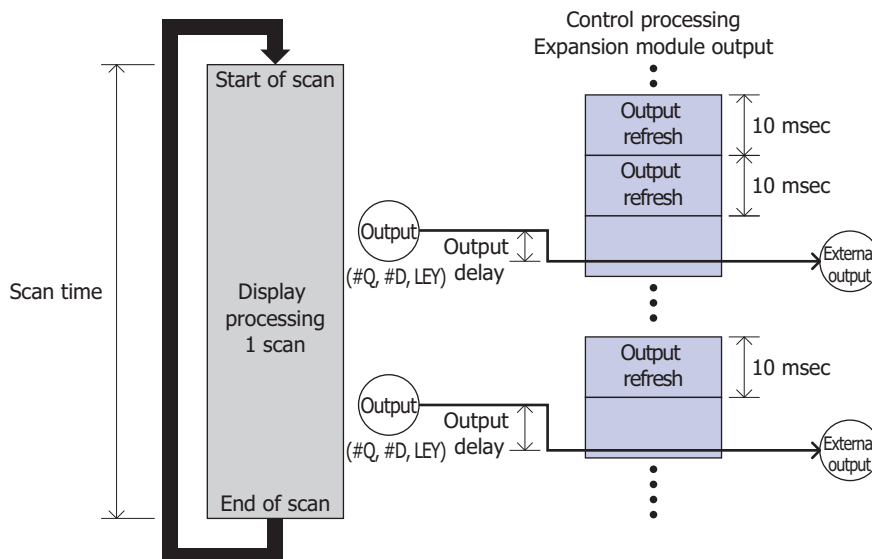
The longer display processing takes, the longer the delay.



When the input refresh is executed immediately after starting the scan, the input of the expansion module is reflected at the end of the scan of the screen. This will result in a wait time of about 1 scan and the input delay is maximized.



Writing to the external outputs



■ **Output refresh**

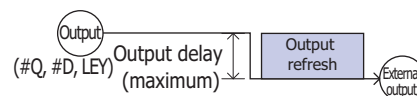
Outputs are refreshed every 10 milliseconds independent of the screen scan.
 The Output (#Q, #D and LEY) are reflected in the expansion module.

■ **Output delay**

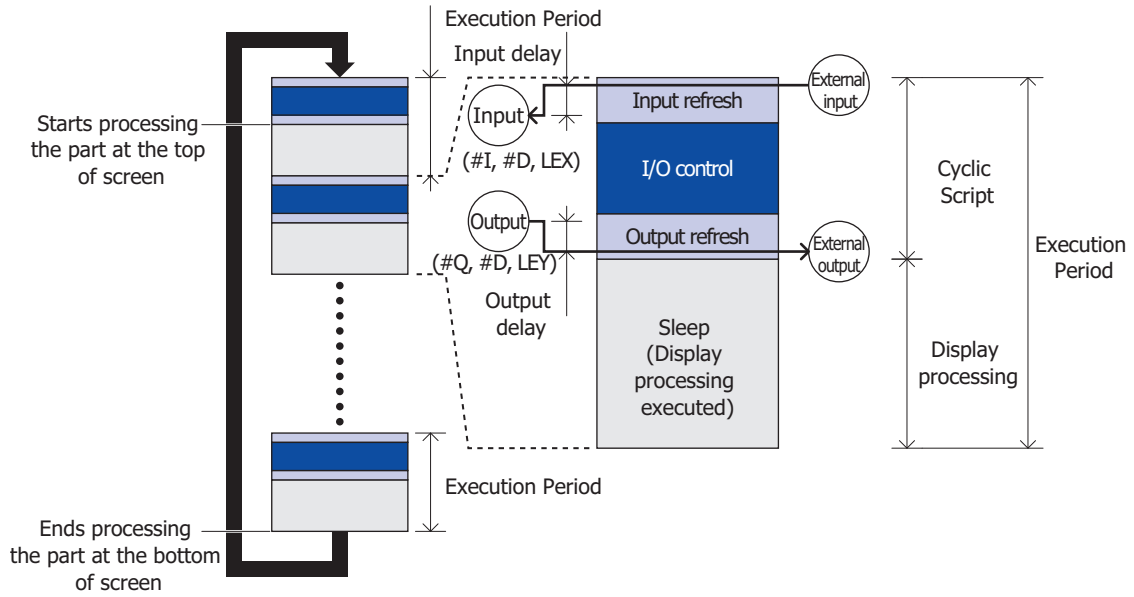
The delay time from output (# Q, # D, LEY) to output from the expansion module is as follows.
 Minimum: 1 millisecond
 Maximum: 11 milliseconds
 This does not affect the display processing



The maximum output delay is 11 milliseconds, which is the operating time of the output refresh.



● Operation of priority on control processing



■ **Input refresh**

Inputs on the expansion module are reflected in the Input (#I, #D and LEX).



The HG5G/4G/3G/2G-V also performs output refresh when input refreshing.

■ **Input delay**

There is a delay for reflecting the expansion module input to the Input (#I, #D and LEX).

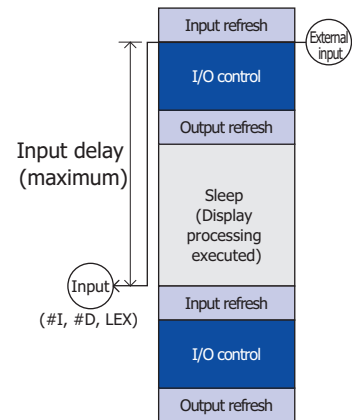
The delay time is as follows.

Minimum: 5 milliseconds

Maximum: 5 milliseconds + the execution period



There will be maximum input delay if input is made to the expansion module immediately after the input refresh ends. The processor waits for the input refresh in the next scan before reflecting the input to the Input (#I, #D and LEX).



■ **I/O control**

Executes the script that is set to Cyclic Script.

■ **Output refresh**

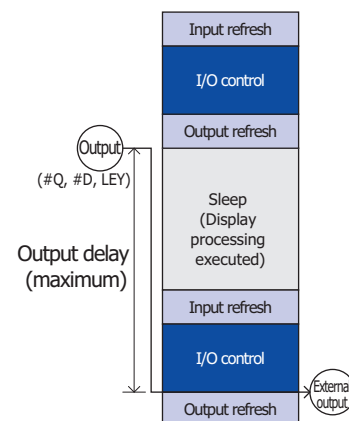
The Outputs (#Q, #D and LEY) are outputted to the expansion module.

■ Output delay

The min-to-max delay time for the Output (#Q, #D and LEY) to fire from the expansion module is 1 millisecond to 1 millisecond + the Execution Period.



There will be maximum output delay if output is made to the expansion module immediately after the output refresh ends. The processor waits for the output refresh in the next scan before reflecting the output to the Output (#Q, #D and LEY).



■ Cyclic Script

A Cyclic Script refers to three processes: input refresh, I/O control (the specified script), and output refresh. For details about setting cyclic script, refer to Chapter 4 "Expansion Module Tab" in the WindO/I-NV4 User's Manual.



- Only internal devices can be used in the Cyclic Script.
- The actual execution time of the Cyclic Script is stored in HMI Special Data Register LSD38 (current value x msec), LSD39 (max value x msec), and LSD40 (min value x msec).
- LINE function, RECTANGLE function, and CIRCLE function cannot be used in the Cyclic Script.

■ Sleep

Sleep refers to the time used by the Cyclic Script subtracted from the Execution Period. This is when the processor executes display processing.

■ Execution Period

The Execution Period refers to one scan of the Cyclic Script (input refresh + I/O control + output refresh) and display processing time (sleep).

The Cyclic Script is executed once every specified execution interval.



- If execution of the Cyclic Script takes more than half of the time specified for the Execution Period, the processor automatically extends the Execution Period so that the Cyclic Script completes within 1/2 of the Execution Period. In this instance, error number 7 will be stored in HMI Special Data Register LSD53.
- If the execution time of the Cyclic Script exceeds 3,000 milliseconds, it pauses to allow the output refresh to be executed. Thereafter, the script goes to sleep and the Cyclic Script executes on the next scan. In this instance, error number 6 will be stored in HMI Special Data Register LSD53.



There is a delay in the I/O control. Please take this delay time into consideration when specifying the Execution Period. For instance, if it is necessary to take in external inputs within 100 milliseconds, set the Execution Period to 80 milliseconds.

■ Display processing

Parts laid out on the screen are processed from top to bottom only when the Cyclic Script is in sleep mode.

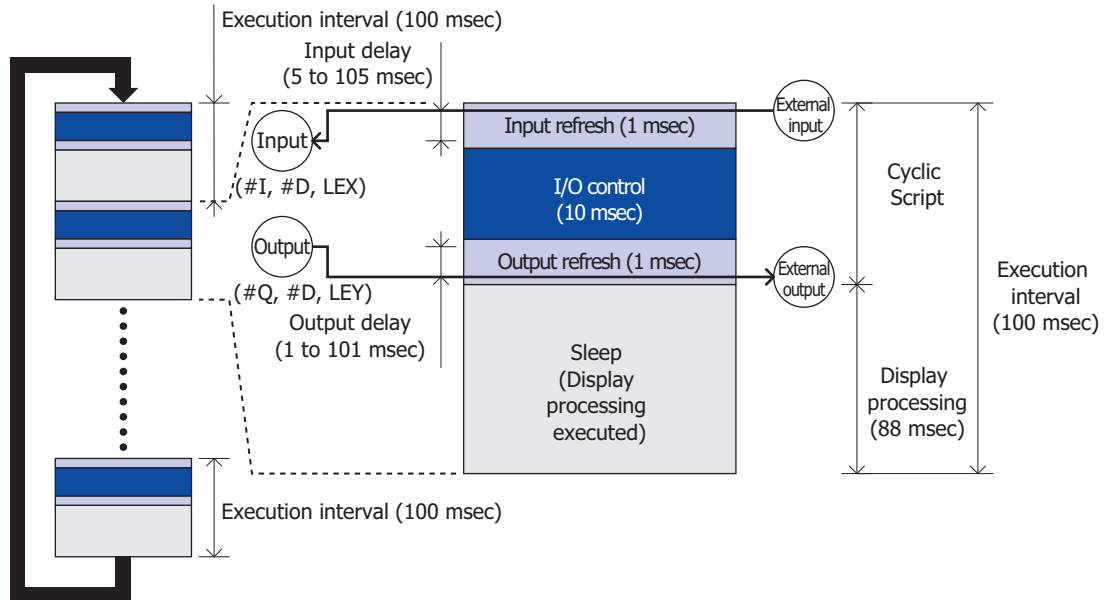
Display processing is paused when execution of the next Cyclic Script begins, and resumes when the script goes to sleep again.

When processing reaches the bottom of the screen, processing returns to the top of the screen.

Operation Example

Where,

- Execution interval: 100 milliseconds
- Input refresh: 1 millisecond
- I/O control: 10 milliseconds
- Output refresh: 1 millisecond



The execution time of the Cyclic Script is $1 + 10 + 1 = 12$ milliseconds, so the script executes normally.

The input delay can be from 5 to 105 milliseconds, and the output delay can be from 1 to 101 milliseconds.

Since the sleep time is $100 - 12 = 88$ milliseconds, display processing is executed every 88 milliseconds for each scan.

2 Analog I/O Modules

HG2J-7U HG5G-V HG4G-V HG4G HG3G-V HG3G HG2G-V HG2G-5F HG2G-5T HG1G HG1P

2

2.1 Using Analog I/O Modules

Analog I/O modules are available that allow the MICRO/I to directly handle analog data such as voltage, current, and temperature. There are ten types of analog I/O modules that differ by the number of analog inputs and outputs and the operation mode. These analog I/O modules can be used by connecting them to the back of the MICRO/I.

Analog I/O module inputs support voltage, current, thermocouples, resistance thermometers, and thermistors. Analog I/O module outputs support voltage and current.

To use Analog I/O modules, configure the settings on the **Module Configuration** dialog box. For details on configuration methods, refer to Chapter 4 "Module Configuration Dialog Box" in the WindO/I-NV4 User's Manual. For details on the analog I/O module parameter settings, refer to "2.2 Analog I/O Module Parameter Settings" on page 2-13.

2.2 Analog I/O Module Parameter Settings

Analog I/O Module Parameter Settings are configured for each channel. The parameters to configure differ according to the analog I/O module type and I/O type. Please configure the parameter settings according to the application in the **Analog Module Configuration** dialog box.

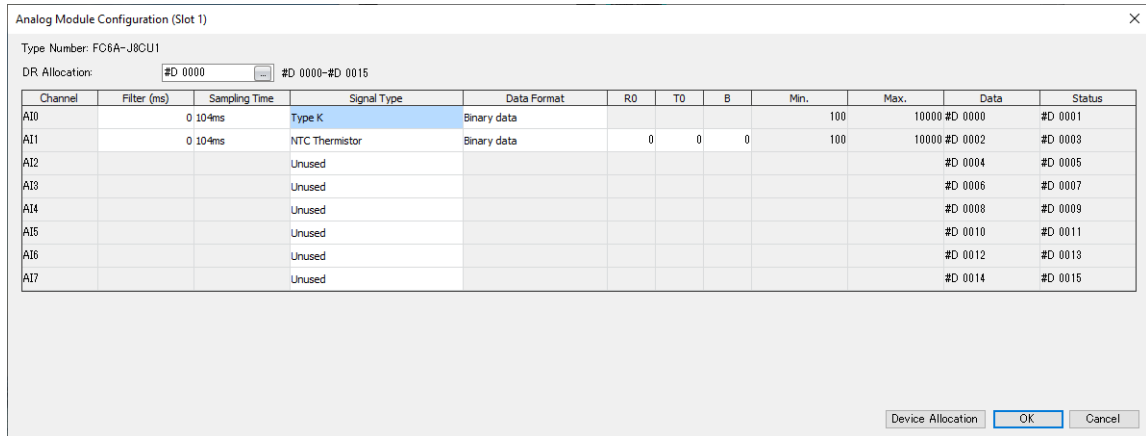
For details on configuration methods, refer to Chapter 4 "Module Configuration Dialog Box" in the WindO/I-NV4 User's Manual.

● Analog Input Type

The following parameters are for configuring the analog inputs on the analog input modules and the mixed analog I/O modules.

YES: Supported, NO: Not supported

Parameter	FC6A-J2C1	FC6A-J4A1	FC6A-J8A1	FC6A-J4CN1	FC6A-J4CH1Y	FC6A-J8CU1	FC6A-L06A1	FC6A-L03CN1
	FC6A-J2C4	FC6A-J4A4	FC6A-J8A4	FC6A-J4CN4	FC6A-J4CH4Y	FC6A-J8CU4	FC6A-L06A4	FC6A-L03CN4
Signal Type	YES	YES	YES	YES	YES	YES	YES	YES
Data Format	YES	YES	YES	YES	YES	YES	YES	YES
Min., Max.	YES	YES	YES	YES	YES	YES	YES	YES
Filter	YES	YES	YES	YES	YES	YES	YES	YES
Sampling Time	YES	YES	YES	YES	YES	YES	YES	YES
Thermistor Settings	NO	NO	NO	NO	NO	YES	NO	NO
Data	YES	YES	YES	YES	YES	YES	YES	YES
Status	YES	YES	YES	YES	YES	YES	YES	YES



■ Signal Type

The signal type that can be set differs according to the analog I/O module model. Select the analog I/O module that corresponds to the user application and set the signal type. The signal type is the type of analog input to measure. There are 24 signal types for the analog inputs, which are detailed as follows.

YES: Supported, NO: Not supported

Signal Type	FC6A-J2C1 FC6A-J2C4	FC6A-J4A1 FC6A-J4A4	FC6A-J8A1 FC6A-J8A4	FC6A-J4CN1 FC6A-J4CN4	FC6A-J4CH1Y FC6A-J4CH4Y	FC6A-J8CU1 FC6A-J8CU4	FC6A-L06A1 FC6A-L06A4	FC6A-L03CN1 FC6A-L03CN4
Unused*1	YES	YES	YES	YES	YES	YES	YES	YES
0 to 10V DC	YES	YES	YES	YES	NO	NO	YES	YES
-10 to +10V DC	YES	YES	YES	YES	NO	NO	YES	YES
0 to 20mA DC	YES	YES	YES	YES	NO	NO	YES	YES
4 to 20mA DC	YES	YES	YES	YES	NO	NO	YES	YES
Type K thermocouple	NO	NO	NO	YES	YES	YES	NO	YES
Type J thermocouple	NO	NO	NO	YES	YES	YES	NO	YES
Type R thermocouple	NO	NO	NO	YES	YES	YES	NO	YES
Type S thermocouple	NO	NO	NO	YES	YES	YES	NO	YES
Type B thermocouple	NO	NO	NO	YES	YES	YES	NO	YES
Type E thermocouple	NO	NO	NO	YES	YES	YES	NO	YES
Type T thermocouple	NO	NO	NO	YES	YES	YES	NO	YES
Type N thermocouple	NO	NO	NO	YES	YES	YES	NO	YES
Type C thermocouple	NO	NO	NO	YES	YES	YES	NO	YES
Pt100	NO	NO	NO	YES	NO	NO	NO	YES
Pt1000	NO	NO	NO	YES	NO	NO	NO	YES
Ni100	NO	NO	NO	YES	NO	NO	NO	YES
Ni1000	NO	NO	NO	YES	NO	NO	NO	YES
NTC Thermistor	NO	NO	NO	NO	NO	YES	NO	NO
PTC Thermistor	NO	NO	NO	NO	NO	YES	NO	NO
PTC Thermistor (threshold)*2	NO	NO	NO	NO	NO	YES	NO	NO
Ohm meter	NO	NO	NO	NO	NO	YES	NO	NO
Expansion 0 to 20mA DC	NO	NO	YES	NO	NO	NO	NO	NO
Expansion 4 to 20mA DC	NO	NO	YES	NO	NO	NO	NO	NO

*1 Channels that are set to unused are not scanned.

The circuit is setup the same as when **0 to 10V DC** is selected as **Signal Type**.

0 is always stored in the analog data storage data registers for channels that are set to unused.

*2 For details, refer to " PTC Thermistor (Threshold)" on page 2-22.

■ **Data Format**

The analog input value can be handled as the set data format. There are seven data formats for the analog inputs.

YES: Supported, NO: Not supported

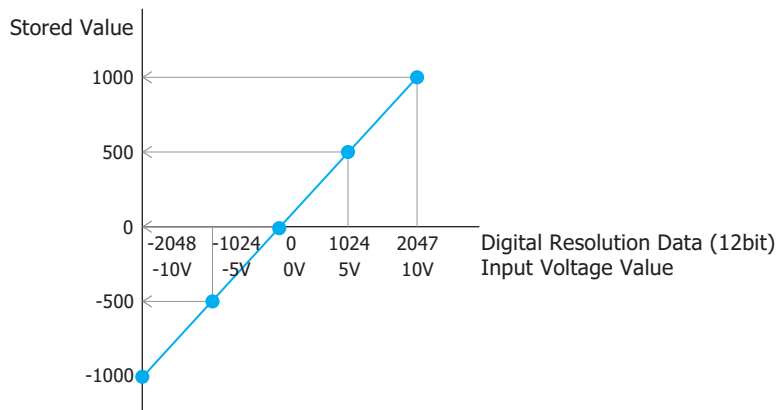
Data Format	FC6A-J2C1	FC6A-J4A1	FC6A-J8A1	FC6A-J4CN1	FC6A-J4CH1Y	FC6A-J8CU1	FC6A-L06A1	FC6A-L03CN1
	FC6A-J2C4	FC6A-J4A4	FC6A-J8A4	FC6A-J4CN4	FC6A-J4CH4Y	FC6A-J8CU4	FC6A-L06A4	FC6A-L03CN4
Binary data*1	YES	YES	YES	YES	YES	YES	YES	YES
Optional range*1	YES	YES	YES	YES	YES	YES	YES	YES
Celsius (°C)*2	NO	NO	NO	YES	YES	YES	NO	YES
Fahrenheit (°F)*2	NO	NO	NO	YES	YES	YES	NO	YES
Resistance (Ω)*3	NO	NO	NO	NO	NO	YES	NO	NO
Binary data (16bit)	NO	NO	YES*4	NO	NO	NO	NO	NO
Optional range (16bit)	NO	NO	YES*4	NO	NO	NO	NO	NO

Optional range

Scales the analog input value to a digital value with 12-bit or 16-bit resolution in the specified minimum and maximum value range (-32,768 to 32,767) and stores it in the data register.

However, when **PTC Thermistor (threshold)** is selected as **Signal Type**, the range of the minimum and maximum value is 100 to 10,000.

Example: The digital resolution data is 12bit, the range of the input voltage value is -10 to +10V DC, the minimum is -1000 and the maximum is 1000.



*1 **Binary data (12bit)** and **Optional range (12bit)** are displayed only for FC6A-J8A1 and FC6A-J8A4.

*2 Can only be set when **Signal Type** is thermocouples, resistance thermometers or **NTC Thermistor**.

*3 Resistance when using the FC6A-J8CU1 or FC6A-J8CU4 and **Signal Type** is set to **PTC Thermistor** or **Ohm meter**.

*4 **Binary data (16bit)** and **Optional range (16bit)** can be used with the following versions.

FC6A-J8A1, FC6A-J8A4: Hardware version 200 or later (Refer to "Checking the Hardware Version Number" on page 2-2.)

If an FC6A-J8A1 or FC6A-J8A4 that does not correspond to the above version numbers is set to **Binary data (16bit)** or **Optional range (16bit)**, an error will occur and the module will operate as **Binary data (12bit)**.

■ Minimum and maximum values

The values of **Min.** and **Max.** are determined by the set **Signal Type** and **Data Format**. The value is stored in the **Data** according to values of **Min.** and **Max.**.

The minimum and maximum values that correspond to the signal type and data formats are as follows.

Signal Type	Data Format						
	Binary data *1	Optional range *1*2	Celsius (°C)	Fahrenheit (°F)	Resistance (Ω)	Binary data (16bit)	Optional range (16bit)
0 to 10V DC	0 to 65,535	-32,768 to 32,767	—	—	—	0 to 65,535	-32,768 to 32,767
-10 to +10V DC	-32,768 to 32,767	-32,768 to 32,767	—	—	—	-32,768 to 32,767	-32,768 to 32,767
0 to 20mA DC	0 to 65,535	-32,768 to 32,767	—	—	—	0 to 65,535	-32,768 to 32,767
4 to 20mA DC	0 to 65,535	-32,768 to 32,767	—	—	—	0 to 65,535	-32,768 to 32,767
Type K thermocouple	0 to 65,535	-32,768 to 32,767	-2,000 to 13,000	-3,280 to 23,720	—	—	—
Type J thermocouple	0 to 65,535	-32,768 to 32,767	-2,000 to 10,000	-3,280 to 18,320	—	—	—
Type R thermocouple	0 to 65,535	-32,768 to 32,767	0 to 17,600	320 to 32,000	—	—	—
Type S thermocouple	0 to 65,535	-32,768 to 32,767	0 to 17,600	320 to 32,000	—	—	—
Type B thermocouple	0 to 65,535	-32,768 to 32,767	0 to 18,200	320 to 33,080	—	—	—
Type E thermocouple	0 to 65,535	-32,768 to 32,767	-2,000 to 8,000	-3,280 to 14,720	—	—	—
Type T thermocouple	0 to 65,535	-32,768 to 32,767	-2,000 to 4,000	-3,280 to 7,520	—	—	—
Type N thermocouple	0 to 65,535	-32,768 to 32,767	-2,000 to 13,000	-3,280 to 23,720	—	—	—
Type C thermocouple	0 to 65,535	-32,768 to 32,767	0 to 23,150	320 to 41,990	—	—	—
Pt100	0 to 65,535	-32,768 to 32,767	-2,000 to 8,500	-3,280 to 15,620	—	—	—
Pt1000	0 to 65,535	-32,768 to 32,767	-2,000 to 6,000	-3,280 to 11,120	—	—	—
Ni100	0 to 65,535	-32,768 to 32,767	-600 to 1,800	-760 to 3,560	—	—	—
Ni1000	0 to 65,535	-32,768 to 32,767	-600 to 1,800	-760 to 3,560	—	—	—
NTC Thermistor	0 to 65,535	-32,768 to 32,767	-900 to 1,500	-1,300 to 3,020	—	—	—
PTC Thermistor	0 to 65,535	-32,768 to 32,767	—	—	100 to 10,000	—	—
PTC Thermistor (threshold)*3	1/2/4	—	—	—	—	—	—
Ohm meter	0 to 65,535	-32,768 to 32,767	—	—	100 to 32,000	—	—
Expansion 0 to 20mA DC	0 to 4,095	-32,768 to 32,767	—	—	—	0 to 65,535	-32,768 to 32,767
Expansion 4 to 20mA DC	0 to 4,095	-32,768 to 32,767	—	—	—	0 to 65,535	-32,768 to 32,767

*1 **Binary data (12bit)** and **Optional range (12bit)** are displayed only for FC6A-J8A1 and FC6A-J8A4.

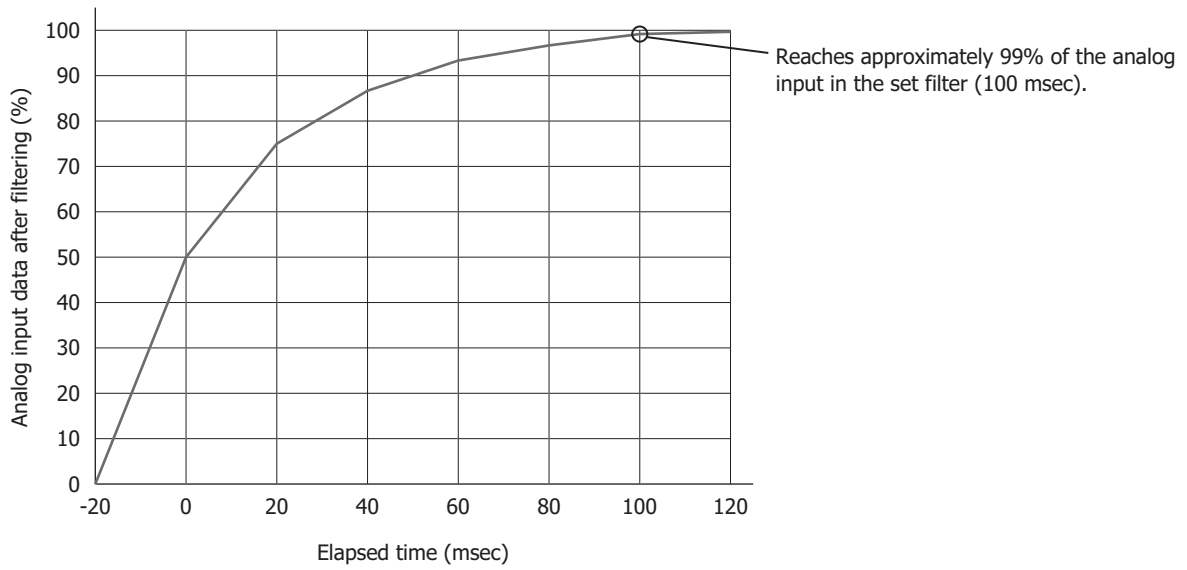
*2 **Min.** and **Max.** can be configured in the range of -32,768 to 32,767 only when **Optional range** is configured to **Data Format**. However, when **PTC Thermistor (threshold)** is configured to **Signal Type**, the range of **Min.** and **Max.** is 100 to 10,000. For Optional range, refer to "Optional range" on page 2-16.

*3 For details, refer to "PTC Thermistor (Threshold)" on page 2-22.

■ **Filter**

The analog input is filtered so it reaches approximately 99% of the analog input in the set time. Rapid fluctuations in the analog input can be reduced by setting the filter, but increasing the filter slows down the tracking of fluctuations in the analog input. The filter must be set for each channel.

Input filter example



Filter	Description
0 msec	The value is not filtered.
50 to 50,000 msec	The analog input filter can be set in 50 milliseconds increments. The analog input is filtered so that approximately 99% of the analog input is reached in the specified filter.

■ Sampling Time

Analog values are converted to digital values at the interval of the sampling time. Depending on the analog I/O module, you may be able to change the sampling time setting.

Type	Signal Type	Sample Time
FC6A-J2C1 FC6A-J2C4	0 to 10V DC	1 msec
	-10 to +10V DC	1 msec
	0 to 20mA DC	1 msec
	4 to 20mA DC	1 msec
FC6A-J4A1 FC6A-J4A4	0 to 10V DC	1 msec or 10 msec
	-10 to +10V DC	1 msec or 10 msec
	0 to 20mA DC	1 msec or 10 msec
	4 to 20mA DC	1 msec or 10 msec
FC6A-J8A1 FC6A-J8A4	0 to 10V DC	1 msec or 10 msec
	-10 to +10V DC	1 msec or 10 msec
	0 to 20mA DC	1 msec or 10 msec
	4 to 20mA DC	1 msec or 10 msec
	Expansion 0 to 20mA DC	1 msec or 10 msec
	Expansion 4 to 20mA DC	1 msec or 10 msec
FC6A-J4CN1 FC6A-J4CN4	0 to 10V DC	100 msec or 10 msec
	-10 to +10V DC	100 msec or 10 msec
	0 to 20mA DC	100 msec or 10 msec
	4 to 20mA DC	100 msec or 10 msec
	Thermocouple	104 msec
	Resistance thermometer	104 msec
FC6A-J4CH1Y FC6A-J4CH4Y	Thermocouple	120 msec or 30 msec* ¹
FC6A-J8CU1 FC6A-J8CU4	Thermocouple	104 msec
	NTC Thermistor, PTC Thermistor	104 msec
	PTC Thermistor (threshold)	104 msec
	Ohm meter	104 msec
FC6A-L06A1 FC6A-L06A4	0 to 10V DC	1 msec or 10 msec
	-10 to +10V DC	1 msec or 10 msec
	0 to 20mA DC	1 msec or 10 msec
	4 to 20mA DC	1 msec or 10 msec
FC6A-L03CN1 FC6A-L03CN4	0 to 10V DC	100 msec or 10 msec
	-10 to +10V DC	100 msec or 10 msec
	0 to 20mA DC	100 msec or 10 msec
	4 to 20mA DC	100 msec or 10 msec
	Thermocouple	104 msec
	Resistance thermometer	104 msec

*1 When the **Sampling Time** is set to 30 milliseconds, the modules may be more easily affected by commercial power supply noise (50/60 Hz noise) and fluctuations in input values may become larger. If there are large fluctuations in input values, change the **Sampling Time** to 120 milliseconds.

■ Thermistor settings

When **NTC Thermistor** is selected as **Signal Type** for the FC6A-J8CU1 or FC6A-J8CU4, the following parameters must be set.

Parameter	Description	Range
R0	The thermistor resistance in "T0" °C (Ω)* ¹	0 to 65,535
T0	Temperature (°C)* ¹	-32,768 to 32,767
B	Thermistor B constant* ²	-32,768 to 32,767

The characteristic of NTC Thermistor is the resistance decreases as the temperature rises. The analog modules measure the resistance of the thermistor and calculate the temperature based on above three parameters.

The measurable range of the resistance of NTC Thermistor is 100 Ω to 200,000 Ω . The range of temperature that can be calculated is -90°C to 150°C. Select NTC Thermistor that functions within those ranges.

■ Data

Data refers to the input analog values converted to digital values at the interval of the sampling time.

The data is not guaranteed when the **Satus** is a value other than "0". For details on when **PTC Thermistor** (threshold) is selected as **Signal Type**, refer to " PTC Thermistor (Threshold)" on page 2-22.

■ Status

The status of the analog input **Data** is stored in data registers.

Status	Description
0	Operating normally
1	Converting data
2	Initializing
3	Parameter setting error
4	Hardware fault (external power supply error)
5	Wiring fault (out of maximum range error)
6	Wiring fault (out of minimum range error)
7	Reserved
8	When the analog input value is greater than 20 mA and less than the upper limit value* ²
9	When the analog input value is greater than the lower limit value and less than 4 mA* ³
10 to 65,535	Reserved

*1 Information are described in the instruction sheet for the thermistor to use.

*2 **Signal Type** is only **Expansion 0 to 20mA DC** or **Expansion 4 to 20mA DC**.

*3 **Signal Type** is **Expansion 4 to 20mA DC** only.

Out of range error for Analog Input Value (Status: 5, 6)

When the analog input value reaches or exceeds the following upper limit, the out of maximum range error occurs.

When the analog input value falls below the following lower limit, the out of minimum range error occurs.

Signal Type	Lower Limit Value	Upper Limit Value
0 to 10V DC	-0.2 V	10.2 V
-10 to +10V DC	-10.4 V	10.4 V
0 to 20mA DC	-0.4 mA	20.4 mA
4 to 20mA DC	3.68 mA	20.32 mA
Type K thermocouple	-200.0°C	1,300.0°C
Type J thermocouple	-200.0°C	1,000.0°C
Type R thermocouple	0.0°C	1,760.0°C
Type S thermocouple	0.0°C	1,760.0°C
Type B thermocouple	0.0°C	1,820.0°C
Type E thermocouple	-200.0°C	800.0°C
Type T thermocouple	-200.0°C	400.0°C
Type N thermocouple	-200.0°C	1,300.0°C
Type C thermocouple	0.0°C	2,315.0°C
Pt100	-200.0°C	850.0°C
Pt1000	-200.0°C	600.0°C
Ni100	-60.0°C	180.0°C
Ni1000	-60.0°C	180.0°C
NTC Thermistor	-90.0°C or 200 kΩ ^{*1}	150.0°C or 100 Ω ^{*2}
PTC Thermistor	100 Ω	10 kΩ
PTC Thermistor (threshold)	100 Ω	10 kΩ
Ohm meter	100 Ω	32 kΩ
Expansion 0 to 20mA DC	-0.4 mA	23.54 mA
Expansion 4 to 20mA DC	1.20 mA	23.17 mA

*1 Out of minimum range error occurs when a resistance of 200 kΩ or higher is connected.

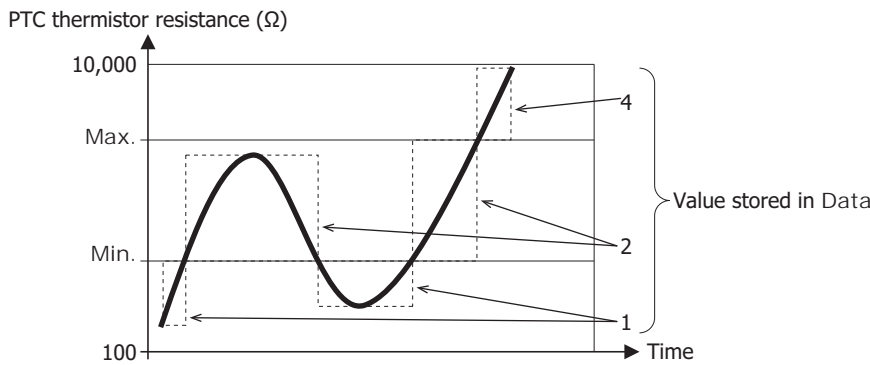
*2 Out of maximum range error occurs when a resistance of 100 Ω or lower is connected.

PTC Thermistor (Threshold)

This section describes details on PTC thermistor (threshold).

The value is stored in **Data** according to the resistance of the PTC thermistor and the values of **Min.** and **Max.**

The relationship between the resistance of the PTC thermistor, the values of **Min.** and **Max.**, and **Data** is as follows.

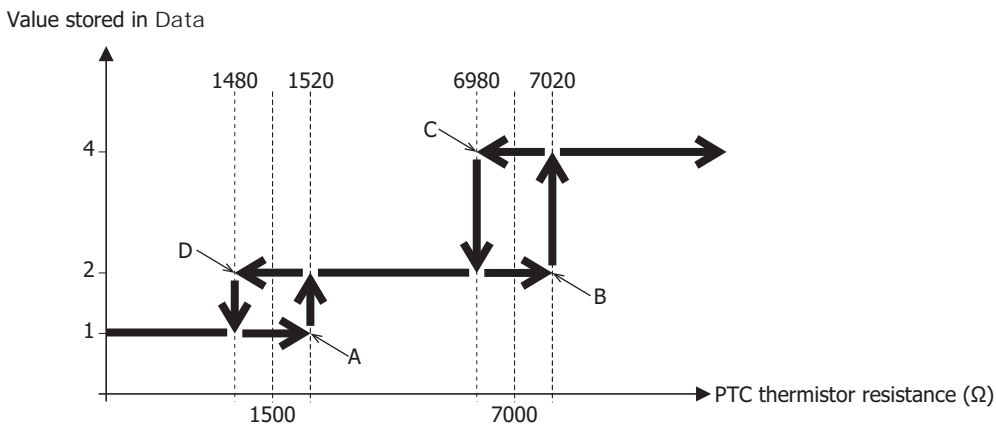


- Value stored in **Data** : 1 **Min.** > PTC thermistor resistance
- Value stored in **Data** : 2 **Min.** ≤ PTC thermistor resistance **Max.**
- Value stored in **Data** : 4 **Max.** < PTC thermistor resistance

For the operation when the resistance of the PTC thermistor matches the value of **Min.** or **Max.**, see "Hysteresis" below.

Hysteresis

The system has a hysteresis of ±20 Ω for Min. and Max. that are set. For example, if Min. is set to 1,500 and Max. is set to 7,000, the operation is shown as follows.



- A : The value of **Data** changes from 1 to 2 when the resistance of the PTC thermistor is greater than or equal to 1,520Ω.
- B : The value of **Data** changes from 2 to 4 when the resistance of the PTC thermistor exceeds 7,020Ω.
- C : The value of **Data** changes from 4 to 2 when the resistance of the PTC thermistor is less than or equal to 6,980Ω.
- D : The value of **Data** changes from 2 to 1 when the resistance of the PTC thermistor is less than 1,480Ω.



When setting **Min.** and **Max.**, ensure that the difference between the two values is 41 or greater. If the difference between the **Min.** and **Max.** is less than or equal to 40, Status 3 (Parameter setting error) is stored in **Status**.

Behavior of the Status

If the resistance of the PTC thermistor is out of range, the following values are stored in Status.

If the resistance of the PTC thermistor is less than 100 Ω, status 6 (Wiring fault (out of minimum range error)) is stored in Status.

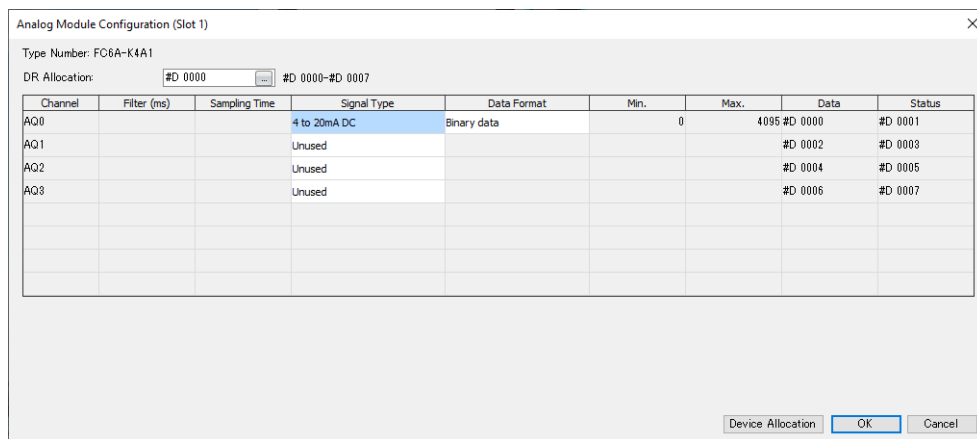
If the resistance of the PTC thermistor is greater than 10,000 Ω, status 5 (Wiring fault (out of maximum range error)) is stored in Status.

● Analog Output Type

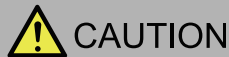
The following parameters are for configuring the analog outputs on the analog output modules and the mixed analog I/O modules.

YES: Supported, NO: Not supported

Parameter	FC6A-K2A1 FC6A-K2A4	FC6A-K4A1 FC6A-K4A4	FC6A-L06A1 FC6A-L06A4	FC6A-L03CN1 FC6A-L03CN4
Signal Type	YES	YES	YES	YES
Data Format	YES	YES	YES	YES
Min., Max.	YES	YES	YES	YES
Data	YES	YES	YES	YES
Status	YES	YES	YES	YES



■ Signal Type



CAUTION

The device connected to the analog I/O module may be damaged if the analog output signal type is mistakenly set and used. Please use caution when setting the analog output signal type.

The signal type that can be set differs according to the analog I/O module model. Select the analog I/O module that corresponds to the user application and set the signal type. There are five types of signal types for the analog outputs, which are detailed as follows.

YES: Supported, NO: Not supported

Signal Type	FC6A-K2A1 FC6A-K2A4	FC6A-K4A1 FC6A-K4A4	FC6A-L06A1 FC6A-L06A4	FC6A-L03CN1 FC6A-L03CN4
Unused*1	YES	YES	YES	YES
0 to 10V DC	YES	YES	YES	YES
-10 to +10V DC	YES	YES	YES	YES
0 to 20mA DC	YES	YES	YES	YES
4 to 20mA DC	YES	YES	YES	YES

*1 Channels that are set to **Unused** are not scanned. A channel set to unused always outputs 0 V. The circuit is setup the same as when **0 to 10V DC** is selected as **Signal Type**.

■ Data Format

The analog output value can be handled as the set data format. There are two data formats for the analog outputs.

YES: Supported, NO: Not supported

Data Format	FC6A-K2A1 FC6A-K2A4	FC6A-K4A1 FC6A-K4A4	FC6A-L06A1 FC6A-L06A4	FC6A-L03CN1 FC6A-L03CN4
Binary data	YES	YES	YES	YES
Optional range	YES	YES	YES	YES

■ Min., Max.

The value written to the data register is output from the analog output. The values of **Min.** and **Max.** that can be written are determined by the set **Signal Type** and **Data Format**. A parameter setting error occurs when a value is set that exceeds the value of **Min.** or **Max.** .

The minimum and maximum values that correspond to the signal types and data formats are as follows.

Signal Type	Data Format	
	Binary data	Optional range* ¹
0 to 10V DC	0 to 4,095	-32,768 to 32,767
-10 to +10V DC	-2,048 to 2,047	-32,768 to 32,767
0 to 20mA DC	0 to 4,095	-32,768 to 32,767
4 to 20mA DC	0 to 4,095	-32,768 to 32,767

■ Data

The analog output data for the analog output set with the **Signal Type**, the **Data Format**, the **Min.** and the **Max.** is stored in the data registers in the END progressing of each scan. The actual analog output data is not guaranteed when the analog output **Status** is a value other than "0". However, 0V is output when **Signal Type** is set to **-10 to +10V DC**.

■ Status

The status of the analog output **Data** is stored in data registers.

Status	Description
0	Operating normally
1	Reserved
2	Initializing
3	Parameter setting error
4	Hardware fault (external power supply error)
5 to 65,535	Reserved

*1 **Min.** and **Max.** can be set only when **Data Format** is set to **Optional range**. Set the values of **Min.** and **Max.** between -32,768 and 32,767.

● Control Registers

For the **DR Allocation**, configures the data register as the device to which each parameter of the analog I/O module is written.

Analog Module Configuration (Slot 1)

Type Number: FC6A-J8CU1

DR Allocation: #D 0000 #D 0000-#D 0015

Channel	Filter (ms)	Sampling Time	Signal Type	Data Format	R0	T0	B	Min.	Max.	Data	Status
AI0	0 104ms		Type K	Binary data				100	10000	#D 0000	#D 0001
AI1	0 104ms		NTC Thermistor	Binary data	0	0	0	100	10000	#D 0002	#D 0003
AI2			Unused							#D 0004	#D 0005
AI3			Unused							#D 0006	#D 0007
AI4			Unused							#D 0008	#D 0009
AI5			Unused							#D 0010	#D 0011
AI6			Unused							#D 0012	#D 0013
AI7			Unused							#D 0014	#D 0015

Device Allocation

Multiple words are used starting from the configured data register. The number of words of data registers that are used varies based on the analog I/O module model.

Used Data Registers (words)					
FC6A-J2C1 FC6A-J2C4	FC6A-J4A1 FC6A-J4A4	FC6A-J8A1 FC6A-J8A4	FC6A-J4CN1 FC6A-J4CN4	FC6A-J4CH1Y FC6A-J4CH4Y	FC6A-J8CU1 FC6A-J8CU4
4	8	16	8	8	16

Used Data Registers (words)			
FC6A-K2A1 FC6A-K2A4	FC6A-K4A1 FC6A-K4A4	FC6A-L06A1 FC6A-L06A4	FC6A-L03CN1 FC6A-L03CN4
4	8	12	6

2.3 Device Allocation

● Analog Input Module

Allocation of device address for the analog input module is shown below.

For details about the parameter setting values, refer to "Analog Input Parameter Setting Values" on page 2-27.

Channel	Parameter	R/W	FC6A-J2C1	FC6A-J4A1	FC6A-J8A1	FC6A-J4CN1	FC6A-J4CH1Y	FC6A-J8CU1
			FC6A-J2C4	FC6A-J4A4	FC6A-J8A4	FC6A-J4CN4	FC6A-J4CH4Y	FC6A-J8CU4
No.			Address Number	Address Number	Address Number	Address Number	Address Number	Address Number
CH0	Analog input data	R	+0	+0	+0	+0	+0	+0
	Analog input status	R	+1	+1	+1	+1	+1	+1
CH1	Analog input data	R	+2	+2	+2	+2	+2	+2
	Analog input status	R	+3	+3	+3	+3	+3	+3
CH2	Analog input data	R	—	+4	+4	+4	+4	+4
	Analog input status	R	—	+5	+5	+5	+5	+5
CH3	Analog input data	R	—	+6	+6	+6	+6	+6
	Analog input status	R	—	+7	+7	+7	+7	+7
CH4	Analog input data	R	—	—	+8	—	—	+8
	Analog input status	R	—	—	+9	—	—	+9
CH5	Analog input data	R	—	—	+10	—	—	+10
	Analog input status	R	—	—	+11	—	—	+11
CH6	Analog input data	R	—	—	+12	—	—	+12
	Analog input status	R	—	—	+13	—	—	+13
CH7	Analog input data	R	—	—	+14	—	—	+14
	Analog input status	R	—	—	+15	—	—	+15



R/W is the abbreviation for read/write. When R/W, it can be read and written. When R, it can only be read. When W, it can only be written.

Analog Input Parameter Setting Values

The parameter setting values are as follows.

■ Signal Type

Setting Value	Signal Type
0	Unused
1	0 to 10V DC
2	-10 to +10V DC
3	0 to 20mA DC
4	4 to 20mA DC
5	Type K thermocouple
6	Type J thermocouple
7	Type R thermocouple
8	Type S thermocouple
9	Type B thermocouple
10	Type E thermocouple
11	Type T thermocouple
12	Type N thermocouple
13	Type C thermocouple
14	Pt100
15	Pt1000
16	Ni100
17	Ni1000
18	NTC Thermistor
19	PTC Thermistor
20	PTC Thermistor (threshold)
21	Ohm meter
22	Expansion 0 to 20mA DC
23	Expansion 4 to 20mA DC

If the setting value is outside the range, a parameter setting error will occur.

■ Data Format

Setting Value	Data Format
0	Binary data, Binary data (12bit)
1	Optional range, Optional range (12bit)
2	Celsius (°C), Resistance (Ω), Binary data (16bit)
3	Fahrenheit (°F), Optional range (16bit)

If the setting value is 4 to 65,535, a parameter setting error will occur.

■ Min., Max.

The values of **Min.** and **Max.** can be set only when **Data Format** is set to **Optional range**. Set the minimum and maximum values between -32,768 and 32,767. However, when **Signal Type** is set to **PTC Thermistor (threshold)**, set the values of **Min.** and **Max.** between 100 and 10,000.

■ Filter

Setting Value	Filter
0	0 msec
50	50 msec
100	100 msec
150	150 msec
...	...
50,000	50,000 msec

The setting value is rounded by 50.

When 50,001 to 65,535 is stored for the setting value, the filter operates as the maximum value of 50,000 milliseconds.

■ Thermistor constant

Range	Thermistor Constant
0 to 65,535	R0
-32,768 to 32,767	T0
-32,768 to 32,767	B

● Analog Output Module

Allocation of device address for the analog output module is shown below.

For details on the parameter setting values, refer to "Analog Output Parameter Setting Values" on page 2-29.

Channel No.	Parameter	R/W	FC6A-K2A1 FC6A-K2A4	FC6A-K4A1 FC6A-K4A4
			Address Number	Address Number
CH0	Analog output data	R	+0	+0
	Analog output status	R	+1	+1
CH1	Analog output data	R	+2	+2
	Analog output status	R	+3	+3
CH2	Analog output data	R	—	+4
	Analog output status	R	—	+5
CH3	Analog output data	R	—	+6
	Analog output status	R	—	+7



R/W is the abbreviation for read/write. When R/W, it can be read and written. When R, it can only be read. When W, it can only be written.

Analog Output Parameter Setting Values

The parameter setting values are as follows.

■ Signal Type

Setting Value	Signal Type
0	Unused
1	0 to 10V DC
2	-10 to +10V DC
3	0 to 20mA DC
4	4 to 20mA DC

If the setting value is outside the range, a parameter setting error will occur.

■ Data Format

Setting Value	Data Format
0	Binary data
1	Optional range

If the setting value is 2 to 65,535, a parameter setting error will occur.

■ Min., Max.

The minimum and maximum values can be set only when **Optional range** is selected as **Data Format**. Set the minimum and maximum values between -32,768 and 32,767.

● Mixed Analog I/O Module

Allocation of device address for the mixed analog I/O module is shown below.

For details on the parameter setting values for analog inputs, refer to "Analog Input Parameter Setting Values" on page 2-27. For analog outputs, refer to "Analog Output Parameter Setting Values" on page 2-29.

Channel No.	Parameter	R/W	FC6A-L06A1 FC6A-L06A4		FC6A-L03CN1 FC6A-L03CN4	
			I/O	Address Number	I/O	Address Number
CH0	Analog data	R	Input	+0	Input	+0
	Analog status	R		+1		+1
CH1	Analog data	R		+2		+2
	Analog status	R		+3	+3	
CH2	Analog data	R		+4	Output	+4
	Analog status	R		+5		+5
CH3	Analog data	R		+6	—	—
	Analog status	R	+7	—	—	
CH4	Analog data	R	Output	+8	—	—
	Analog status	R		+9	—	—
CH5	Analog data	R		+10	—	—
	Analog status	R		+11	—	—



R/W is the abbreviation for read/write. When R/W, it can be read and written. When R, it can only be read. When W, it can only be written.

3 Digital I/O Modules

HG2J-7U HG5G-V HG4G-V HG4G HG3G-V HG3G HG2G-V HG2G-5F HG2G-5T HG1G HG1P

3.1 Using Digital I/O Modules

The inputs and outputs on the digital I/O modules are mapped to following device address locations within the MICRO/I. The device name and symbol vary based on the model.

Type No.	Device Name	Symbol
HG5G/4G/3G/2G-V	Expansion Inputs	#I
	Expansion Outputs	#Q
HG4G/3G, HG2G-5F	Digital Input	LEX
	Digital Output	LEY

To monitor the inputs and control the outputs, the Expansion Inputs(#I), Expansion Outputs(#Q), Digital Input(LEX) and Digital Output (LEY) are used.



When entering the control device, enter "#" before the symbol (device type). In addition, on the Device Monitor a "#" is displayed before the symbol.

Example: Setting I100 as a control device

#I100

The Expansion Inputs(#I), Expansion Outputs(#Q), Digital Input(LEX) and Digital Output(LEY) are octal-based, meaning that only numbers 0 to 7 are used in their addresses.

Address numbers are assigned in ascending order from Slot 1. However, if a unit has four input/output ports, address numbers 0 to 3 are assigned to each, and address numbers 4 to 7 cannot be used.



Inputs and outputs of Digital I/O modules can also be controlled and monitored using the word devices #WI, #WQ, WLEX and WLEY. #WI, #WQ, WLEX and WLEY are useful for batch control of inputs and outputs. For details about allocation of address number, refer to Chapter 35 "Internal Devices" in the WindO/I-NV4 User's Manual.

1 Optional items

1.1 HG2J-7U

Name	Type No.	Description
USB Panel-Mount Extension Cable	HG9Z-XCE11	Extension cable for attaching to USB interface (Type-A) Length: 1m
PLC Connection Cable	FC2A-KP1C	Connection cable for Serial interface (COM) (Compatible models: IDEC FC5A/4A MICROSmart) Length: 2.4m <Connector> Main unit: Parted Wire External device: Mini DIN 8-pin
	HG9Z-XC275	Connection cable for Serial interface (COM) (Compatible models: IDEC FC5A/4A MICROSmart) Length: 5m <Connector> Main unit: Parted Wire External device: Mini DIN 8-pin
	FC6A-KC1C	Connection cable for Serial interface (COM) (Compatible models: IDEC FC6A MICROSmart FC6A-C*****E only) Length: 5m <Connector> Main unit: Parted Wire External device: RJ45
Protective Film ^{*1}	HG9Z-2D7PN05	5 pcs/pack

*1 No UV resistant.

1.2 HG5G/4G/3G/2G-V

YES: Supported, NO: Not supported

Name	Type No.	Description	HG5G-V	HG4G-V	HG3G-V	HG2G-V
Maintenance Cable	HG9Z-XCM42	USB cable to connect to a computer Length: 2m <Connector> Main unit: USB Mini-B Computer: USB Type-A	YES	YES	YES	YES
USB Panel-Mount Extension Cable	HG9Z-XCE11	Extension cable for attaching to USB interface (Type-A) Length: 1m	YES	YES	YES	YES
	HG9Z-XCE21	Extension cable for attaching to USB interface (Mini-B) Length: 1m	YES	YES	YES	YES
PLC Connection Cable	FC2A-KP1C	Connection cable for Serial interface (COM) (Compatible models: IDEC FC5A/4A MICROSmart) Length: 2.4m <Connector> Main unit: Parted Wire External device: Mini DIN 8-pin	YES	YES	YES	YES
	HG9Z-XC275	Connection cable for Serial interface (COM) (Compatible models: IDEC FC5A/4A MICROSmart) Length: 5m <Connector> Main unit: Parted Wire External device: Mini DIN 8-pin	YES	YES	YES	YES
	HG9Z-XC295	Connection cable for Serial interface (COM) (Compatible models: IDEC FC5A/4A MICROSmart) Communication Mode: RS232C Length: 5m <Connector> Main unit: D-sub 9-pin External device: Mini DIN 8-pin	YES	YES	YES	YES
	FC6A-KC1C	Connection cable for Serial interface (COM) (Compatible models: IDEC FC6A MICROSmart FC6A-C*****E only) Length: 5m <Connector> Main unit: Parted Wire External device: RJ45	YES	YES	YES	YES
	FC6A-KC2C	Connection cable for Serial interface (COM) (Compatible models: IDEC FC6A MICROSmart FC6A-C*****E only) Communication Mode: RS232C Length: 5m <Connector> Main unit: D-sub 9-pin External device: RJ45	YES	YES	YES	YES
	HG9Z-XC305	For Mitsubishi FX series direct connection Communication Mode: RS422 Length: 5m <Connector> Main unit: D-sub 9-pin External device: Mini DIN 8-pin	YES	YES	YES	YES
	HG9Z-XC315	For Mitsubishi Q series direct connection Communication Mode: RS232C Length: 5m <Connector> Main unit: D-sub 9-pin External device: Mini DIN 6-pin	YES	YES	YES	YES

YES: Supported, NO: Not supported

Name	Type No.	Description	HG5G-V	HG4G-V	HG3G-V	HG2G-V
Protective Sheet *1	HG9Z-5DFPN01	For HG5G-V 1 pce/pack	YES	NO	NO	NO
	HG9Z-4DCPN02	For HG4G-V 2 pcs/pack	NO	YES	NO	NO
	HG9Z-3DA2PN02	For HG3G-VA 2 pcs/pack	NO	NO	YES	NO
	HG9Z-3D8PN02	For HG3G-V8 2 pcs/pack	NO	NO	YES	NO
	HG9Z-2D5PN05	For HG2G-V 5 pcs/pack	NO	NO	NO	YES
Protective Cover	HG9Z-2E2PN03	For HG2G-V To Cover the front of the main unit 3 pcs/pack	NO	NO	NO	YES
Expansion Module Clamp	HG9Z-XJ3PN05	For installing the expansion modules on the back of the main unit (Short). 5 pcs/pack For total width 17.6 to 41.1 mm.	YES	YES	YES	YES
	HG9Z-XJ4PN05	For installing the expansion modules on the back of the main unit (Long). 5 pcs/pack For total width 47.0 to 69.4 mm.	YES	YES	YES	YES
	HG9Z-XJ5PN05	For installing the expansion modules on the back of the main unit (Extra-Long). 5 pcs/pack For total width 70.5 to 93.0 mm.	YES	YES	YES	NO

*1 The protective sheet is UV resistant, however, resistance against direct sunlight in outdoor usage is not guaranteed.

1.3 HG4G/3G, HG2G-5F

YES: Supported, NO: Not supported

Name	Type No.	Description	HG4G	HG3G	HG2G-5F
Maintenance Cable	HG9Z-XCM42	USB cable to connect to a computer Length: 2m <Connector> Main unit: USB Mini-B Computer: USB Type-A	YES	YES	YES
USB Panel-Mount Extension Cable	HG9Z-XCE11	Extension cable for attaching to USB interface (Type-A) Length: 1m	YES	YES	YES
	HG9Z-XCE21	Extension cable for attaching to USB interface (Mini-B) Length: 1m	YES	YES	YES
PLC Connection Cable	FC2A-KP1C	Connection cable for Serial interface (COM) (Compatible models: IDEC FC5A/4A MICROSmart) Length: 2.4m <Connector> Main unit: Parted Wire External device: Mini DIN 8-pin	YES	YES	YES
	HG9Z-XC275	Connection cable for Serial interface (COM) (Compatible models: IDEC FC5A/4A MICROSmart) Length: 5m <Connector> Main unit: Parted Wire External device: Mini DIN 8-pin	YES	YES	YES
	HG9Z-XC295	Connection cable for Serial interface (COM) (Compatible models: IDEC FC5A/4A MICROSmart) Length: 5m <Connector> Main unit: D-sub 9-pin External device: Mini DIN 8-pin	YES	YES	YES
	FC6A-KC1C	Connection cable for Serial interface (COM) (Compatible models: IDEC FC6A MICROSmart FC6A-C*****E only) Length: 5m <Connector> Main unit: Parted Wire External device: RJ45	YES	YES	YES
	FC6A-KC2C	Connection cable for Serial interface (COM) (Compatible models: IDEC FC6A MICROSmart FC6A-C*****E only) Communication Mode: RS232C Length: 5m <Connector> Main unit: D-sub 9-pin External device: RJ45	YES	YES	YES
	HG9Z-XC305	For Mitsubishi FX series direct connection Communication Mode: RS422 Length: 5m <Connector> Main unit: D-sub 9-pin External device: Mini DIN 8-pin	YES	YES	YES
	HG9Z-XC315	For Mitsubishi Q series direct connection Communication Mode: RS232C Length: 5m <Connector> Main unit: D-sub 9-pin External device: Mini DIN 6-pin	YES	YES	YES

YES: Supported, NO: Not supported

Name	Type No.	Description	HG4G	HG3G	HG2G-5F
Connector Conversion Cable	HG9Z-XCT11	To convert from D-sub 25-pin to 9-pin (used when replacing from HG4F/3F/2F to HG4G/3G, HG2G-5F) Length: 16cm	YES	YES	YES
Protective Sheet *1	HG9Z-4DCPN02	For HG4G 2 pcs/pack	YES	NO	NO
	HG9Z-3DA2PN02	For HG3G-A 2 pcs/pack	NO	YES	NO
	HG9Z-3D8PN02	For HG3G-8 2 pcs/pack	NO	YES	NO
	HG9Z-2D5PN05	For HG2G-5F/-5T 5 pcs/pack	NO	NO	YES
Protective Cover	HG9Z-2E2PN03	For HG2G-5F/-5T To Cover the front of the main unit 3 pcs/pack	NO	NO	YES
Memory Card	HG9Z-XMS2	SD memory card (2GB, Class6)	YES	YES	YES
Expansion Module Clamp	HG9Z-XJ3PN05	For installing the expansion modules on the back of the main unit (Short). 5 pcs/pack For total width 17.6 to 41.1 mm.	YES	YES	YES
	HG9Z-XJ4PN05	For installing the expansion modules on the back of the main unit (Long). 5 pcs/pack For total width 47.0 to 69.4 mm.	YES	YES	YES
	HG9Z-XJ5PN05	For installing the expansion modules on the back of the main unit (Extra-Long). 5 pcs/pack For total width 70.5 to 93.0 mm.	YES	YES	NO
L-shaped Terminal Block Connector for I/O Module	HG9Z-PMT10LPN02	For MicroSmart I/O Module (10-pole) 2 pcs/pack	YES	YES	YES
	HG9Z-PMT11LPN02	For MicroSmart I/O Module (11-pole) 2 pcs/pack	YES	YES	YES

*1 The protective sheet is UV resistant, however, resistance against direct sunlight in outdoor usage is not guaranteed.

1.4 HG2G-5T, HG1G

YES: Supported, NO: Not supported

Name	Type No.	Description	HG2G-5T	HG1G
Maintenance Cable	HG9Z-XCM42	USB cable to connect to a computer Length: 2m <Connector> Main unit: USB Mini-B Computer: USB Type-A	YES	YES
USB Panel-Mount Extension Cable	HG9Z-XCE11	Extension cable for attaching to USB interface (Type-A) Length: 1m	YES	YES
	HG9Z-XCE21	Extension cable for attaching to USB interface (Mini-B) Length: 1m	YES	YES
PLC Connection Cable	FC2A-KP1C	Connection cable for Serial interface (COM) (Compatible models: IDEC FC5A/4A MICROSmart) Length: 2.4m <Connector> Main unit: Parted Wire External device: Mini DIN 8-pin	YES	YES
	HG9Z-XC275	Connection cable for Serial interface (COM) (Compatible models: IDEC FC5A/4A MICROSmart) Length: 5m <Connector> Main unit: Parted Wire External device: Mini DIN 8-pin	YES	YES
	FC6A-KC1C	Connection cable for Serial interface (COM) (Compatible models: IDEC FC6A MICROSmart FC6A-C****E only) Length: 5m <Connector> Main unit: Parted Wire External device: RJ45	YES	YES
Protective Sheet *1	HG9Z-2D5PN05	For HG2G-5F/-5T 5 pcs/pack	YES	NO
	HG9Z-1D4PN05	For HG1G 5 pcs/pack	NO	YES
Protective Cover	HG9Z-2E2PN03	For HG2G-5F/-5T To Cover the front of the main unit 3 pcs/pack	YES	NO

*1 The protective sheet is UV resistant, however, resistance against direct sunlight in outdoor usage is not guaranteed.

1.5 HG1P

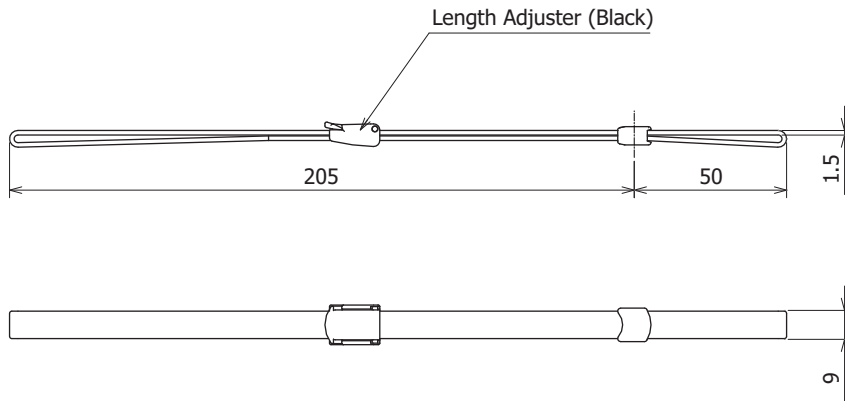
Name	Type No.	Description
Maintenance Cable	HG9Z-XCM42	USB cable to connect to a computer Length: 2m <Connector> Main unit: USB Mini-B Computer: USB Type-A
HG1P Optional Cable	HG9Z-XCP13	Communication Mode: RS422/485 or Ethernet Length: 3m <Connector> Main unit: CA-19S1N128007S External device: D-sub 25-pin Male Connector
	HG9Z-XCP15	Communication Mode: RS422/485 or Ethernet Length: 5m <Connector> Main unit: CA-19S1N128007S External device: D-sub 25-pin Male Connector
	HG9Z-XCP17	Communication Mode: RS422/485 or Ethernet Length: 7m <Connector> Main unit: CA-19S1N128007S External device: D-sub 25-pin Male Connector
HG1P Debug Cable	HG9Z-PX12	Length: 2m <Connector> Main unit: CA-19S1N128007S External device: Twisted Wire
Hand Strap	HG9Z-PS4	Wrist strap 1 pce/pack
Wall-Mounted Hook	HG9Z-PK3	Hook attached to the back of the main unit 1 pce/pack Includes two installation screws

*1 The protective sheet is UV resistant, however, resistance against direct sunlight in outdoor usage is not guaranteed.

External Dimensions

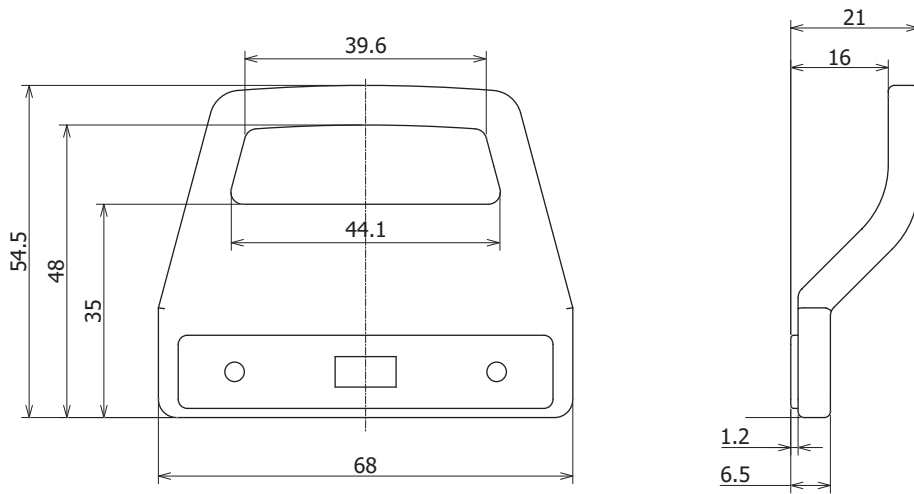
■ **Hand Strap (HG9Z-PS4)**

Unit: mm



■ **Wall-Mounted Hook (HG9Z-PK3)**

Unit: mm



2 Replacement Parts

2.1 HG2J-7U

Name	Type No.	Qty.	Description
Mounting Clip	HG9Z-4K2PN04	4	For HG2J-7U
Serial interface connector	HG9Z-XT09P	1	Removable terminal block 9-pin (Vertical type, Push-in type)

2.2 HG5G/4G/3G/2G-V

YES: Supported, NO: Not supported

Name	Type No.	Qty.	Description	HG5G-V	HG4G-V	HG3G-V	HG2G-V
Mounting Clip	HG9Z-4K2PN06	6	For HG5G-V	YES	NO	NO	NO
	HG9Z-4K2PN04	4	For HG4G/3G-V	NO	YES	YES	NO
	SLD-K02PN10	10	For HG2G-V	NO	NO	NO	YES
Replacement Battery	HG9Z-XR1	1	Coin type lithium manganese dioxide battery CR2032W	YES	YES	YES	YES
Serial interface connector	HG9Z-XT09	1	Right angle type	YES	YES	YES	NO
	HG9Z-XT09V	1	Vertical type	NO	NO	NO	YES
USB Cable Lock Pin	HG9Z-XU1PN05	5	For USB2 (Type-A) port	YES	YES	YES	YES

2.3 HG4G/3G, HG2G-5F

YES: Supported, NO: Not supported

Name	Type No.	Qty.	Description	HG4G	HG3G	HG2G-5F
Mounting Clip	HG9Z-4KPN04	4	For HG4G/3G	YES	YES	NO
	SLD-K02PN10	10	For HG2G-5F	NO	NO	YES
Replacement Battery	HG9Z-XR1	1	Coin type lithium manganese dioxide battery CR2032	YES	YES	YES
Serial interface connector	HG9Z-XT09	1	Right angle type	YES	YES	NO
	HG9Z-XT09V	1	Vertical type	NO	NO	YES
USB Cable Lock Pin	HG9Z-XU1PN05	5	For USB2 (Type-A) port	YES	YES	YES

2.4 HG2G-5T, HG1G

YES: Supported, NO: Not supported

Name	Type No.	Qty.	Description	HG2G-5T	HG1G
Mounting Clip	HG9Z-4KPN04	4	For HG1G	NO	YES
	SLD-K02PN10	10	For HG2G-5T	YES	NO
Replacement Battery	HG9Z-XR1	1	Coin type lithium manganese dioxide battery CR2032	YES	YES
Serial interface connector	HG9Z-XT09V	1	Vertical type	YES	YES
USB Cable Lock Pin	HG9Z-XU1PN05	5	For USB2 (Type-A) ^{*1} port	YES	YES

2.5 HG1P

There are no replacement parts.

*1 USB1(Mini-B) can be used for HG1G only.

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1 Warranty Period

The Products are warranted for 3 years from the date of purchase, or from the date of delivery completion.

2 Extent of warranty

IDEC CORPORATION is responsible for failures or defects of the Products during the above warranty period, either a replacement part will be provided or the defective parts of the Products will be repaired free of charge. If such failure or defects should occur, please offer them to the distributor, dealer or IDEC CORPORATION with the materials in which the date of purchase is specified.

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 - 3) The Products are improved, modified or altered by the party other than IDEC; or
 - 4) The failure or defects and damages of the Products arise from the usage of the Product in the way that is not intended; or
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- 1) Instruction for installment and visiting for test operation, including, but not limited to creating application software and operation tests; and
- 2) Maintenance and inspection, arrangement and repair; and
- 3) Technical assistance and technical education; and
- 4) Product test and inspection based on you request.

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