

# INSTRUCTION SHEET

## Operator Interface

# MICRO/I™ HG1F Series

Confirm that the delivered product is what you have ordered. Read this instruction sheet to make sure of correct operation. Make sure that the instruction sheet is kept by the end user.

### SAFETY PRECAUTIONS

In this operation instruction sheet, safety precautions are categorized in order of importance to Warning and 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

- This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D or Non-Hazardous locations only.
- Explosion Hazard - Substitution of components may impair suitability for Class I, Division 2
- Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be Non-Hazardous.
- The HG1F is not intended to be used for applications which require high reliability and safety, such as medical equipment, nuclear equipment, railways, aircraft, and vehicles. The HG1F cannot be used for these applications.
- For other applications which require high reliability in function and precision, provide a failsafe design and redundant design for the entire system including the HG1F.
- Turn off the power to the HG1F before starting installation, removal, wiring, maintenance, and inspection of the HG1F. Failure to turn power off may cause electrical shock for fire hazard.
- Special expertise is required to install, wire, configure, and operate the HG1F. People without such expertise must not use the HG1F.
- The HG1F 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 clothes, wash the liquid off using soap, and consult a doctor immediately.
- Emergency and interlocking circuits must be configured outside the HG1F.
- Replace battery with Hitachi Maxell battery, model CR2032 only. Use of another battery may present a risk of fire or explosion. See instruction sheet for safety instructions.

#### CAUTION

- Install the HG1F according to the instructions in the Instruction Manual. Improper installation will result in falling, failure, electrical shock, fire hazard, or malfunction of the HG1F.
- The HG1F is designed for use in pollution degree 2. Use the HG1F in environments of pollution degree 2.
- The HG1F uses "PS2 of EN61131" as DC power supply.
- Prevent the HG1F from falling while moving or transporting it, otherwise damage or malfunction of the HG1F will result.
- Prevent metal fragments or wire chips from dropping inside the HG1F 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.
- Use wire of a proper size to meet the voltage and current requirements.
- Use fuses or circuit protectors on the power line outside the HG1F.
- When exporting the HG1F to Europe, use an EN60127 (IEC60127) approved fuse or an EU-approved circuit protector.
- Do not push hard or scratch the touch switch and protection sheet with a hard object such as a tool, because they are damaged easily.
- Make sure of safety before starting and stopping the HG1F. Incorrect operation of the HG1F may cause mechanical damage or accidents.
- When disposing of the HG1F, do so as an industrial waste.
- Battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.

### 1 Package Content

Before installing the HG1F, make sure that the specifications of the product conform to your requirements, and that no parts are missing or damaged due to accidents during transportation.

#### Main Unit

Display Device	Interface	Model No.
4.6-inch STN monochrome LCD	RS232C	HG1F-SB22BF-△
	RS485/422	HG1F-SB22YF-△

△ indicates the body color.

#### Accessories

Product Name	Model No./Specifications	Quantity
Mounting Clip	SLD-K02	4
Instruction Sheet (Japanese/English) [This manual]	B-953, B-954	1 each
Screw lock bracket (RS232C type only)	Screw lock bracket for replacing serial interface 1: 1/4 inch screw thread type	2

### 2 Type

HG1F-SB22□F-□

Body color B: Dark gray W: Light gray  
S: Silver (Unapproved by UL)

Interface B: RS-232C Y: RS-485/422

### 3 Specifications

Safety Standards	UL508, UL1604, CSA C22.2 No.213
	IEC/EN61131-2
EMC-Standards	IEC/EN61000-6-4
	IEC/EN61131-2

Electrical Specifications	Rated Operating Voltage	24V DC
	Power Voltage Range	85% to 120% of the rated voltage (including ripple)
	Power Consumption	10W maximum
	Allowable Momentary Power Interruption	10ms maximum, Level: PS-2 (IEC/EN61131)
	Inrush Current	20A maximum
	Dielectric Strength	1000V AC, 10mA, 1 minute (between power terminals and FG)
Environmental Specifications	Insulation Resistance	50MΩ minimum (500V DC mega) (between power terminals and FG)
	Battery for backup	Built-in CR2032 lithium primary battery Standard replacement cycle: 4 years Guaranteed term: 1 year(at 25°C)
	Operating Ambient Temperature	0 to 50°C (no freezing)
	Operating Relative Humidity	10 to 90% RH (no condensation)
	Storage Ambient Temperature	-20 to 60°C (no freezing)
	Storage Relative Humidity	10 to 90% RH (no condensation)
Construction Specifications	Altitude	0 to 2000m (operation) 0 to 3000m (transportation) (IEC61131-2)
	Vibration Resistance	10 to 20 Hz, amplitude 0.625mm 20 to 55 Hz, 9.8 m/s <sup>2</sup> (2 hours each in 3 axes) (IEC60068-2-6)
	Shock Resistance	147 m/s <sup>2</sup> , 11 ms (5 shocks each in 3 axes) (IEC60062-2-27)
	Pollution Degree	Pollution degree 2 (IEC60664-1)
	Corrosion Immunity	Free from corrosive gases
	Degree of Protection	IP65 NEMA TYPE 13 (In the front of panel attachment.)
Noise Specifications	Terminal	Power supply terminal: M3 3P Tightening torque 0.5 to 0.6 N·m
	Dimensions	147 (W) × 76 (H) × 39.3 (D)/mm
	Weight (Approx.)	280g
	Electrostatic Discharge	ESD-3 (RH-1) : Level 3 Contact ±6kV / Air ± 8kV (IEC/EN61000-4-2)
	Electromagnetic Field	10V/m AM80% 80M to 1000MHz 1400M to 2000MHz (IEC/EN61000-4-3)
	Fast Transient Burst Withstandability	Common mode: Level 3 Power supply: ±2kV Communication line: ±1kV (IEC/EN61000-4-4)
Noise Specifications	Damped Oscillatory Wave	Serial mode Power supply: ±1kV (IEC/EN61000-4-12)
	Surge Immunity turning on electricity	500V between L-N, 1kV between L-FG (IEC/EN61000-4-5)
	Radiated Emission	IEC/EN61000-6-4

### 4 Mounting

#### Operating Environment

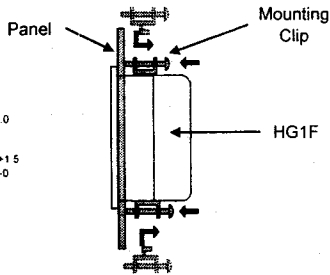
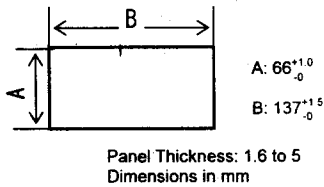
For designed performance and safety the HG1F, do not install the HG1F in the following environments:

- Where dust, briny air, or iron particles exist.
- Where oil or chemical splashes exist.
- Where direct sunlight falls on the HG1F.
- Where corrosive or combustible gasses exist.
- Where the HG1F is subjected to shocks or vibrations.
- Where condensation occurs due to rapid temperature change.
- Where high-voltage or arc-generating equipment, (electromagnetic contactors or circuit protectors) exists in the vicinity.

● Ambient Temperature

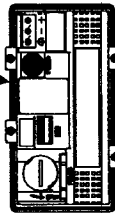
- The HG1F<sub>i</sub> is designed to install on a vertical plane so that natural air-cooling is provided. Keep as much space as possible around the HG1F. Allow 100mm minimum clearance above and below the HG1F.
- Do not install the HG1F where the ambient temperature exceeds the rated operating ambient temperature range. When mounting the HG1F in such locations, provide a forced air-cooling fan or air-conditioner to keep the ambient temperature within the rated temperature range.

● Panel Cut-out Dimensions



Place the HG1F in a panel cut-out and fasten with the attached mounting clips at four places to a torque of 0.12 to 0.15 N·m uniformly. Do not tighten excessively, otherwise the HG1F may be deformed or damaged. When installing the HG1F vertically, make sure that the power input terminal is on the upper side.

Make sure that the power terminal is on the upper side.



! CAUTION

- If the mounting clips are tightened obliquely to the panel, the HG1F may fall off the panel.
- Please attach this product to press down a panel in the portion of the mountain of gasket. Once removing especially, in the attaching again, be careful. There is a possibility that it may become impossible to maintain waterproof ability.

5 Notes for Operation

- The screen becomes blank when the backlight is burnt out; however, the touch panel remains enabled. Incorrect touch panel operation will occur when operating the touch panel when the backlight appears to be turned off but is actually burnt out. Please note that this erroneous operation may result in damage.
- At temperatures over the rated operating temperature, the clock accuracy is affected. Adjust the clock before use.
- For applications which require clock accuracy, adjust the clock periodically.
- When more than one button is pressed at the same time, due to the detection characteristics of an analogue type touch panel, only the gravity center of the pressed area is sensed and the unit assumes that only one button is pressed. Thus, when more than one button is pressed simultaneously, the resulting operation is not guaranteed.

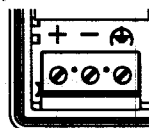
6 Wiring

- 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 HG1F.

● Power Supply Terminals

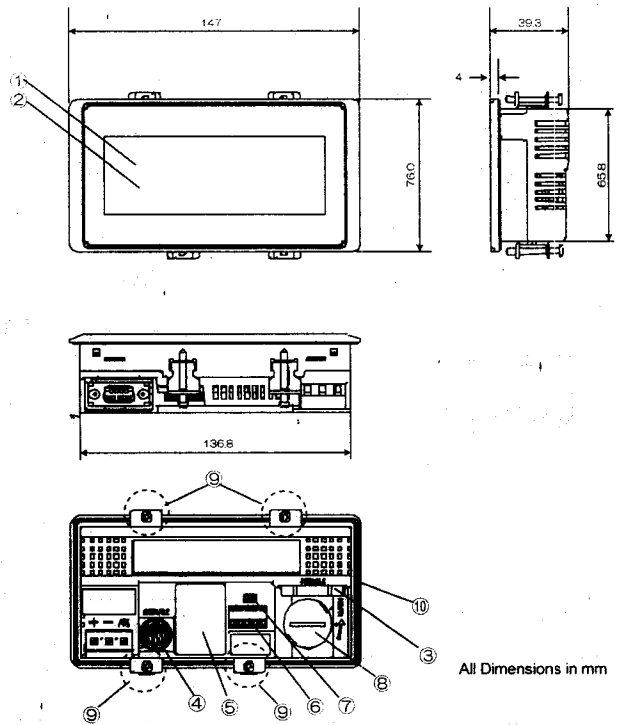
Pin assignment is shown in the following table.

Terminal	Name	Function
+	24V DC+	Power supply +24V DC
-	24V DC-	Power supply -24V DC
	FG	Function ground



- Use applicable cables for wiring and recommended ferrules, (made by Phoenix Contact) as follows:  
 Applicable cable ----- Ferrules  
 UL1007 AWG18 ----- AI 1-8 RD (AI-TWIN 2 × 1-8 RD)  
 UL1015 AWG20 ----- AI 0.5-8 WH (AI-TWIN 2 × 0.5-8 WH)
- Tighten the screws to a torque of 0.5 N·m to 0.6 N·m.
- For power supply wiring, twist the wires as close as possible and make the power supply wiring as short as possible.
- Separate the HG1F power supply wiring from the power lines of I/O devices and motor equipment.
- Ground the functional ground terminal to make sure of correct operation.

7 Dimensions



All Dimensions in mm

No.	Name	Description
①	Display	4.6 Inch STN LCD
②	Touch Switch	Resistance membrane method
③	Serial Interface 1	Connects the host PLC
④	Serial Interface 2	Connects the maintenance PC
⑤	O/I Link Interface	Connects the O/I link unit
⑥	Communication Terminal Block (RS485/422 type only)	Communication terminal block for RS485/422
⑦	Terminating Resistance Selector SW (RS485/422 type only)	Switches between presence/absence of terminating resistance.
⑧	Battery Holder Cover	Open here when replacing the internal battery.
⑨	Mounting Clip Position	Attaches the Mounting Clips
⑩	Gasket	Ensures waterproof characteristic when the panel is mounted.

! CAUTION

- Make sure to turn off the power to the HG1F before attaching the O/I link unit or replacing the internal battery or the backlight. Do not touch the printed circuit board in the HG1F and other devices. Otherwise, failure of the HG1F and other devices may be caused.
- Hold the connector when disconnecting the maintenance cable from serial interface 2. Do not pull the maintenance cable.

8 Interface

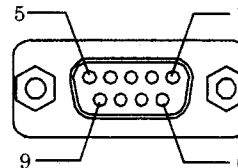
! CAUTION

- Make sure to turn off the power to the HG1F before wiring each interface or switching the terminating resistance selector SW.

● Serial interface 1

Serial interface 1 is used for host communication (RS-232C, RS-485 and RS-422). Use the following recommended connectors for wiring.

Recommended connector: JEZ-9P-90 <JST>  
 Recommended cover: J-C9-2C <JST>



D-sub connector: 9-pin socket

Screw lock bracket type  
 Metric screw thread (M2.6×0.45p)

● RS232C Type (Model No.: HG1F-SB22BF-△)

No.	Name	Function
1	FG	Frame Ground
2	SD	Send Data
3	RD	Receive Data
4	NC	No Connection
5	NC	No Connection
6	DR	Data Set Ready
7	SG	Signal Ground
8	NC	No Connection
9	ER	Data Terminal Ready

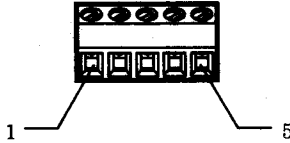
Screw lock brackets of inch screw thread type (#4-40UNC) are provided with the RS232C type. Use them as required.

• RS485/422 Type (Model No.:HG1F-SB22YF-Δ)

No.	Name	Function
1	SD+	Send Data (+)
2	RD+	Receive Data (+)
3	RS+	Request to Send (+)
4	CS+	Clear to Send (+)
5	SG	Signal Ground
6	SD-	Send Data (-)
7	RD-	Receive Data (-)
8	RS-	Request to Send (-)
9	ICS-	Clear to Send (-)

Note that this D-sub connector cannot be used simultaneously with the terminal block.

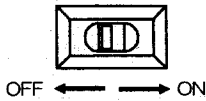
• Communication Terminal Block (RS485/422 type: Model No.:HG1F-SB22YF-Δ only)



No.	Name	Function
1	SDA	Send Data A
2	SDB	Send Data B
3	RDA	Receive Data A
4	RDB	Receive Data B
5	SG	Signal Ground

Note that this terminal block cannot be used simultaneously with the D-sub connector.

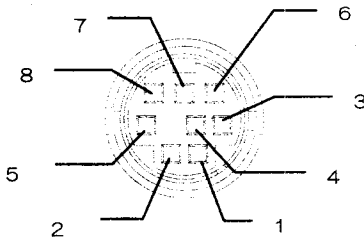
• Terminating Resistance Selector SW (RS485/422 type: Model No.:HG1F-SB22YF-Δ only)



Setting the Terminating Resistance Selector SW to the ON side will insert and connect the terminating resistance (330Ω) between RDA and RDB.

● Serial interface 2

Serial interface 2 is used for maintenance communication(RS-232C).



No.	Name	Function
1	RS	Request to Send
2	ER	Data Terminal Ready
3	SD	Send Data
4	RD	Receive Data
5	DR	Data Set Ready
6	EN	(Request to Enable)
7	SG	Signal Ground
8	NC	No Connection

Connect pin 6(EN) and pin 2(ER) unless performing maintenance communications for downloading project data.

Connecting the maintenance communications cable to Serial interface 2 will stop the O/I Link communications.

● O/I Link interface (Option)

Method	Dedicated Interface to O/I Link Unit
Connector	Dedicated connector

The HG1F Operator Interface can be connected to an O/I Link Unit for 1:N communication with a PLC. This allows high-speed communication with the PLC host.

Connecting the maintenance cable to Serial interface 2 will stop the O/I Link communications.

## 9 Replacing the Backlight

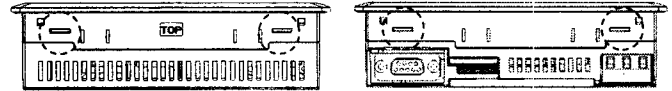
### WARNING

Make sure to turn off the power to the HG1F before replacing the backlight; otherwise, product breakdown, electric shock, or fire may occur.

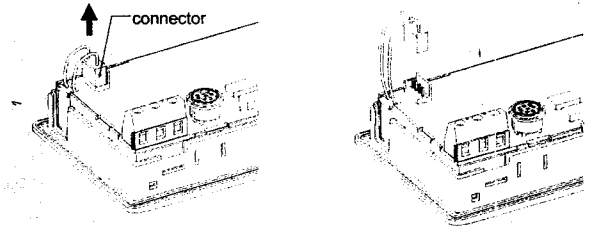
The backlight may be hot. Make sure to wear gloves when performing the replacement work.

Follow the procedures below to replace the backlight.

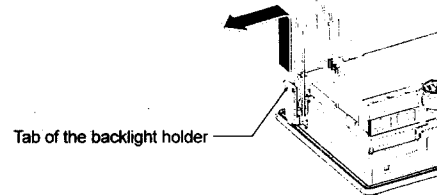
- 1 Turn off the power to the HG1F, disconnect the cable, and remove the main unit from the panel.
- 2 Unlock the tabs (4) securing the rear case, and remove the rear case.



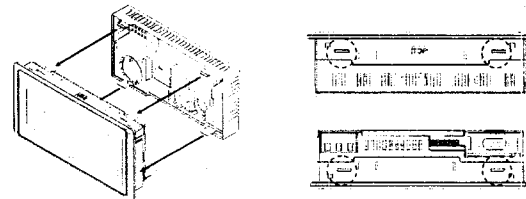
- 3 Remove the connector that is connected to the PWB.



- 4 Pull out the backlight while lifting the tab of the backlight holder.



- 5 Attach the new replacement backlight by following step 4 in reverse.
- 6 Connect the connector for the replacement backlight.
- 7 Align the tabs (4) of the rear case in place, and close the rear case.



IDEC provides replacement service for the backlight (for a fee). Please contact our offices, sales branches, or local offices for details.

## 10 Replacing the Backup Battery

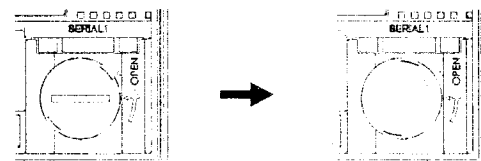
A backup battery is built into the HG1F to retain the internal backup data (log data, keep register, and keep relay) and clock data.

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

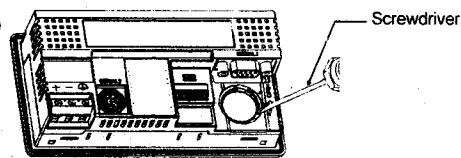
When the "Battery level LOW" message is displayed, replace the battery immediately; otherwise, the backup data and clock data may be lost.

Whether or not to display the reminder message for battery replacement can be specified with the configuration software. Refer to the Instruction Manual for details.

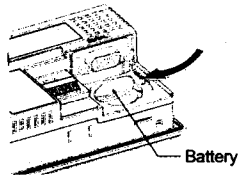
- 1 Turn off the power to the HG1F and disconnect the cable.
- 2 Remove the battery holder cover.



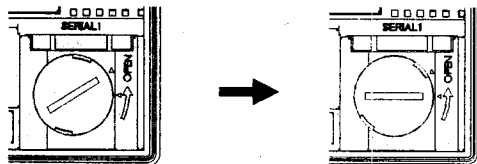
- 3 Turn on the power to the HG1F, wait for approximately one minute, and then turn off the power again.
- 4 Insert a flathead screwdriver into the battery holder as shown in the figure, and remove the battery. Please be careful because the battery may pop out from the battery holder.



- ⑤ Attach a new replacement battery to the battery holder.



- ⑥ Replace the battery holder cover into the original position. Replace the battery holder cover on the HG1F, and turn it clockwise to lock the cover.



- After turning off the power to the HG1F in step ③, complete the steps through ⑤ within 30 seconds in order 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 how to transfer the data to flash memory, refer to the Instruction Manual. If it is not necessary to save the data, step ③ can be skipped.
- The operating life of the internal battery is approximately four years. It is recommended to replace the battery every four years even before the reminder message for battery replacement is displayed.

IDEC provides replacement service for the battery (for a fee). Please contact our offices, sales branches, or local offices for details.

#### WARNING

The battery may be regulated by national or local regulation. Please follow 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 friction tape or some other insulator before disposal.

#### CAUTION

When replacing the battery, use the specified battery. Please be forewarned that any problems and failures arising from or in connection with the use of a battery other than the specified battery shall not be guaranteed.

### 11 Replacing the Screw Locking Bracket (RS232C Type)

Locking brackets for metric screw thread are attached to the connector of Serial interface 1. The brackets can be replaced with the locking brackets for inch screw thread. Follow the procedure below and replace the brackets as needed.

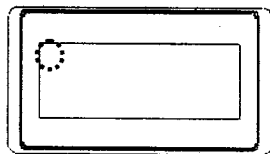
1. Turn off the power to the HG1F and disconnect the cable.
2. Use a box wrench to turn the locking brackets on both sides of the connector in a counterclockwise direction, and remove the brackets.
3. Attach the provided locking bracket for inch screw thread by following step ② in reverse. The tightening torque is 0.45 to 0.49N·m.

IDEC provides replacement service for the screw lock bracket (for a fee). Please contact our offices, sales branches, or local offices for details.

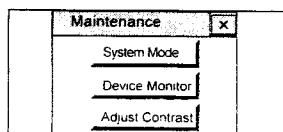
### 12 Adjusting the Contrast

The contrast of the HG1F display can be adjusted on the Adjust Contrast Screen. Adjust the contrast to the best condition as required. To ensure the best contrast, adjust the contrast approximately 10 minutes after turning on the power.

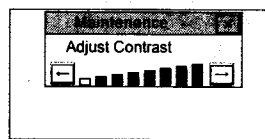
1. Turn on the power to the HG1F, then press and hold the touch switch on the upper-left corner of the screen for three seconds or longer. The Maintenance Screen appears on the screen.



2. Press the **Adjust Contrast** button at the bottom of the Maintenance Screen. The Adjust Contrast Screen appears.



3. Press the **Left** or **Right** button at the bottom the Adjust Contrast Screen to adjust the contrast to the optimal setting.



4. Press the **X** button to close the Adjust Contrast Screen.

## 13 Maintenance and Inspection

Maintain and inspect the HG1F periodically to ensure the best performance. Do not disassemble, repair, or modify the HG1F during inspection.

- Wipe any stain off 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.
- Check the terminals and connectors to make sure of no loose screws, incomplete insertion, or disconnected lines.
- Make sure that all mounting clips and screws are tightened sufficiently.

## 14 Option

The following products are available as options for the HG1F. Please request the items as required.

Name	Description	Type No.
Software (WinO/I-NV2)	Japanese Manual	HG9Y-B595
	English Manual	HG9Y-B596
	CD-ROM	HG9Y-ZSS2W
PLC Connecting Cable	RS-232C For programming port (Port 1) of IDEC MICROSmart (Length: 5 m)	FC4A-KC1C
	RS-232C For SIF2 of IDEC FA-3S (Length: 5 m)	HG9Z-XC115
	RS-232C (D-sub 25-pin) for Mitsubishi computer link unit (Length: 5 m)	HG9Z-XC145
	RS-232C (D-sub 25-pin) for Omron Host link unit (Length: 5 m)	HG9Z-XC155
	RS-232C For IDEC Micro <sup>3</sup> C, OpenNet Controller, MICROSmart Port2 (Length: 3 m)	HG9Z-XC183
	RS-232C (D-sub 9-pin) for Mitsubishi computer link unit (Length: 3 m)	HG9Z-XC203
	RS-232C (D-sub 9-pin) for RS-232C I/F of Omron CPU unit (Except for C20H/28H/40H) (Length: 3 m)	HG9Z-XC213
	RS-485(422) For direct connection with the Mitsubishi FX series (Length: 5 m)	HG9Z-XC245
	RS-485(422) For direct connection with the Mitsubishi A/QnA series (Length: 5 m)	HG9Z-XC255
	RS-232C For direct connection with the Mitsubishi Q series (Length: 5 m)	HG9Z-XC265
Maintenance Cable	D-sub 9-pin (socket) for DOS/V	HG9Z-XCM22
O/I Link Unit	Dedicated communication unit	HG9Z-2G1
Mounting Clip	10 pieces per package	SLD-K02PN10
Replacement Backlight	Backlight	HG9Z-1FB
Protective Sheet	5-sheets per package	HG9Z-1DPN05
Replacement Battery	Coin-type lithium primary battery CR2032	HG9Z-XR1