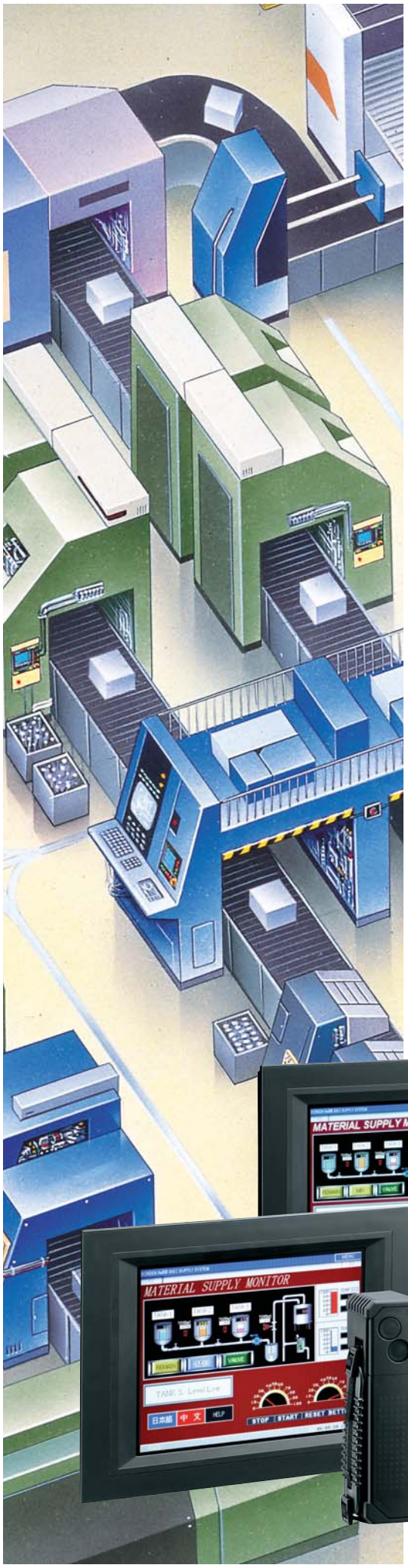


HG2F/HG3F/HG4F
Operator Interface
HG2S
CC Pendant

Design Tool
WindO/I-NV2

Super-bright, wide viewing-angle LCD screen
For convenient HMI environment

IDEC IZUMI CORPORATION

Clear legible display in three screen sizes
Teaching Pendant is also available with tactile switches.

HG4F
HG3F
HG2F
HG2S

Model	Large		Medium
Screen Size	12.1 inches	10.4 inches	5.7 inches
Type	HG4F	HG3F	HG2F
Appearance			
LCD	TFT	TFT	STN
Pixels	800 × 600	640 × 480	320 × 240
Display Color	256 colors	256 colors	256 colors / Monochrome
User Memory Size	6 MB	6 MB	2 MB
Memory Card (CF)	Yes	Yes	Yes
Ethernet Port	Yes	Yes	—
O/I Link	Yes	Yes	Yes
USB	—	—	Yes
RS232C	Yes	Yes	Yes
RS485/RS422	Yes	Yes	Yes
Design Tool	WindO/I-NV2		
See Page	10 to 19	10 to 19	10 to 19

Design tool for easy graphical screen editing by selecting from 5000 objects in “Symbol Library”

WindO/I-NV2

Medium	Small	CC Pendant	Small Teaching Pendant
5.7 inches	4 inches	5.7 inches	4 inches
HG2F w/CC switch	HG1B	HG2S	HG1T
			
STN	STN	STN	STN
320 × 240	192 × 64	320 × 240	192 × 64
256 colors / Monochrome	Monochrome	256 colors / Monochrome	Monochrome
2 MB	127 KB	2 MB	512 KB
Yes	—	—	—
—	—	—	—
Yes	—	Yes	—
Yes	—	—	—
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
WindO/I-NV2			WindE/T
10 to 19	—	20 to 27	Made upon order

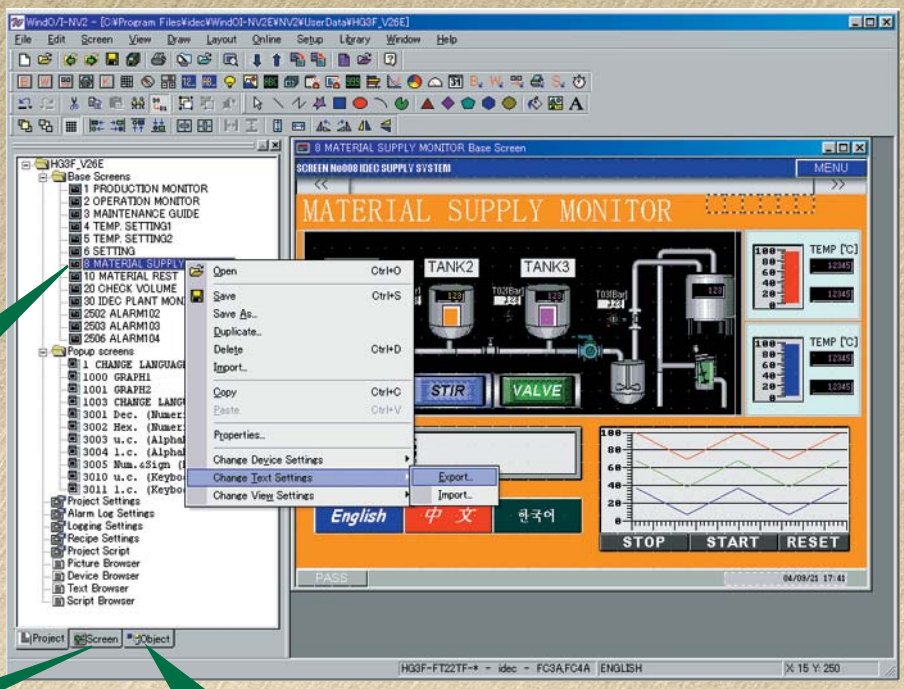
Software

WindO/I-NV2

Design tool WindO/I-NV2 assists you in programming your HG family O/Is.

Work Area

The project structure can be listed for easy viewing, and switched to the editing screen by one click.

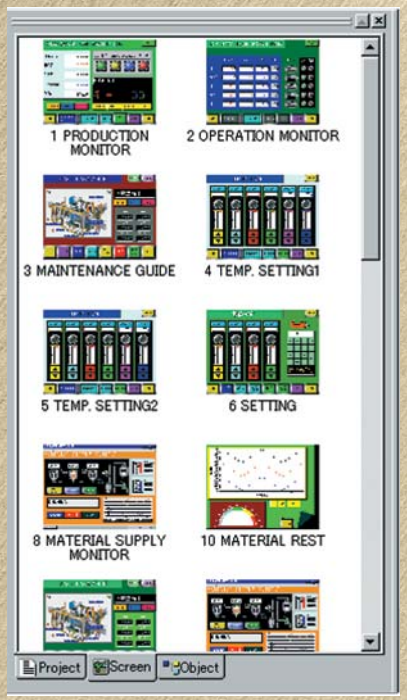


Screen List Project Settings List

Screens can be duplicated and property can be changed easily. Projects can also be edited effectively. Import and export functions make it possible to replace devices, text, and shapes all at once. Exported CSV files can be edited using Excel.

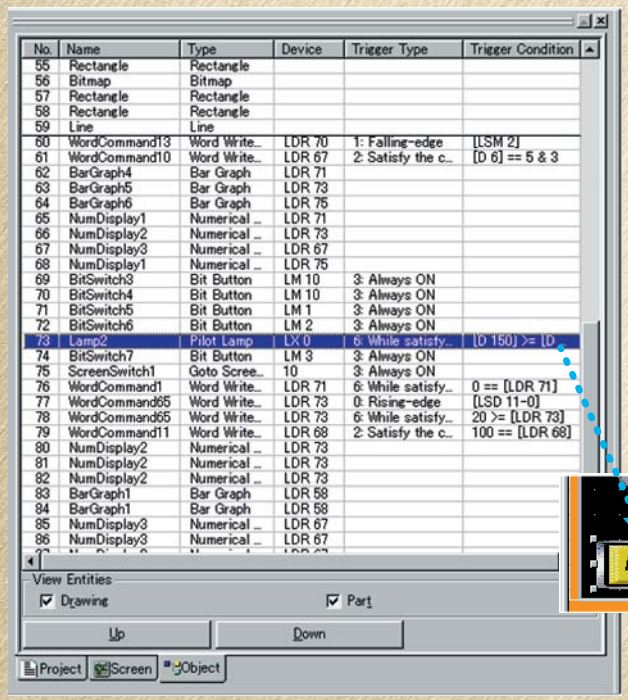
Screen Preview List

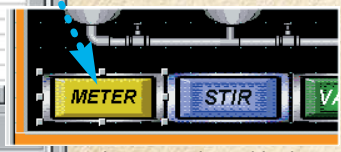
Screens can be selected from the preview images and opened quickly.



Object List

Information and figures of devices, condition types, and operation conditions arranged on the screen can be confirmed. Properties can also be changed using the list





The part selected in the object list is also reflected in the editing screen.

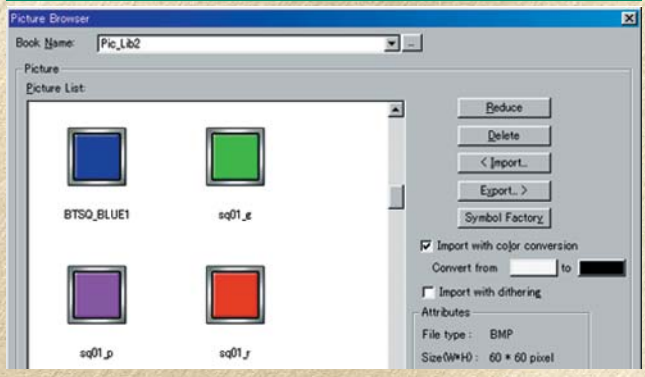
System Requirements

• OS	Windows 95 (OSR2 or later)/98/Me NT4.0/2000/XP	• RAM	64 MB minimum
		• Hard Disk Space	50 MB minimum
• Computer	PC-AT compatible	• Graphic	SVGA (800 × 600) or higher
• CPU	Pentium 133 MHz or higher	• Others	Mouse, CD-ROM drive

Flexible Screen Display for Efficient Editing

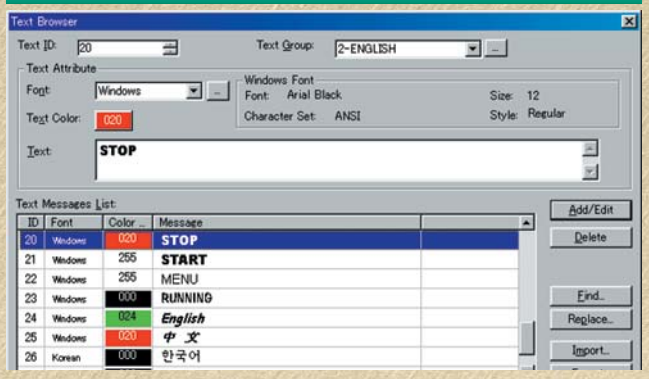
A maximum of 5 base screens can be overlapped, and sub screens can also be popped up, so screens can be arranged very effectively. Subscreens can be resized and made transparent to show the background using the superimpose function as required. In addition, subscreens can be designed to have a move or close button.

Possible to Reuse Data



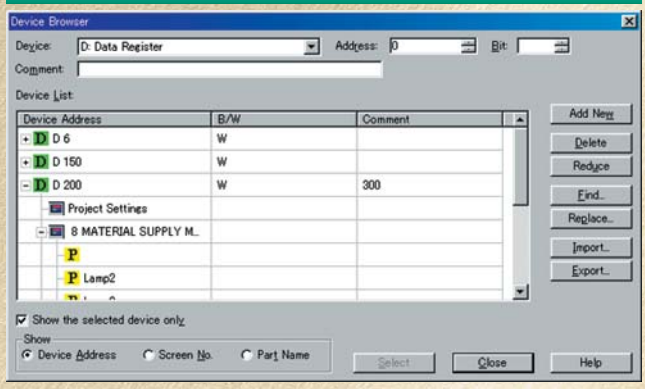
Screen data can be imported from another project. Figures and scripts stored in library can be reused, so accumulated software properties can be used effectively. Image data of BMP, JPG, DXF, WMF, and ICO files as well as CAD data can also be used.

Text Browser for Text Data Management



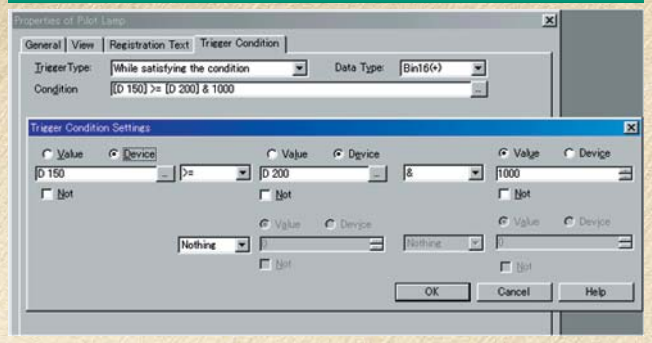
Legends for switches and lamps, and text massages used for the alarm function can be managed in the text browser. Text property settings (font, text, color, and size) can be exported to a CSV format file, which can then be edited on Excel and imported back to the text browser, resulting in effective screen editing.

Device Browser for Listing Used Devices



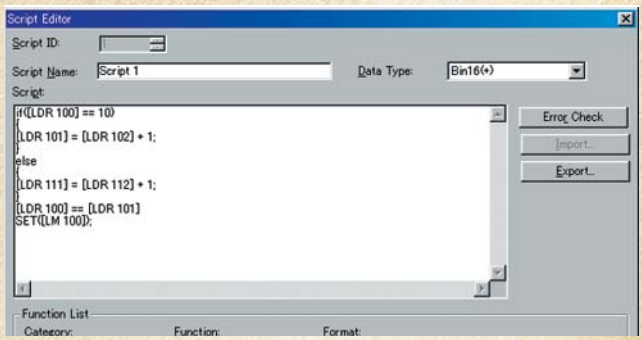
The device browser is used to list devices used in the project and also to replace used devices at once.

Easy Programming of Parts Operating Conditions



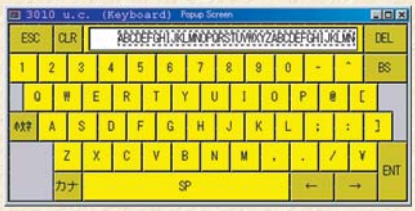
Operating conditions for switches and lamps, bit/word write, and screen switching can be programmed in the property settings for each part. Lamps can be easily set to turn on, turn off, and flash.

Script Function for Assisting the Host



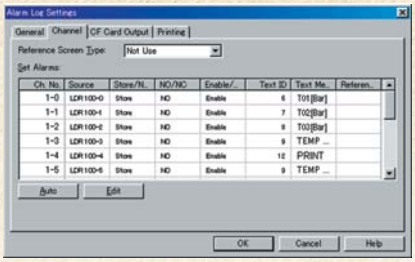
The HG can process various operations to reduce the task of the host. On the script editor, conditional equations and functions can be selected and inputted from the function list. Syntax error check function is also available.

Numeric Key Pad Settings



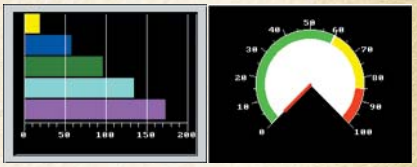
The standard key pad can be used for easy inputting of numerals and text. In the pop-up display mode, the keyboard can be moved to the best position automatically.

Alarm Functions



Alarm log data can be listed during operation. Details of each data item can also be confirmed easily.

Various Graph Functions



Bar graph, trend chart, pie chart, and meter can be displayed, and their colors, scales, and labels can be set easily. On the bar graph, the display color can be changed or flashed when an input overflow occurs.

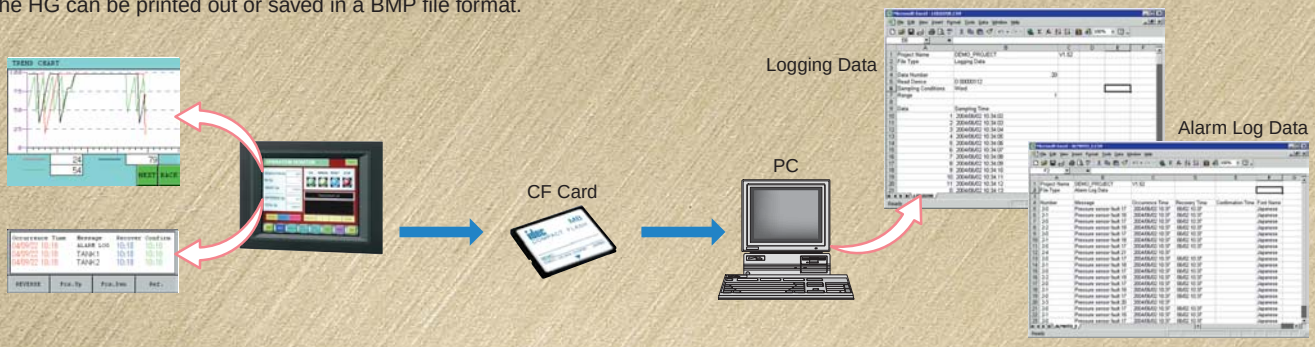
Features

The HG series is equipped with most demanded features and functions.

Powerful Functions for Production Data Logging and Management

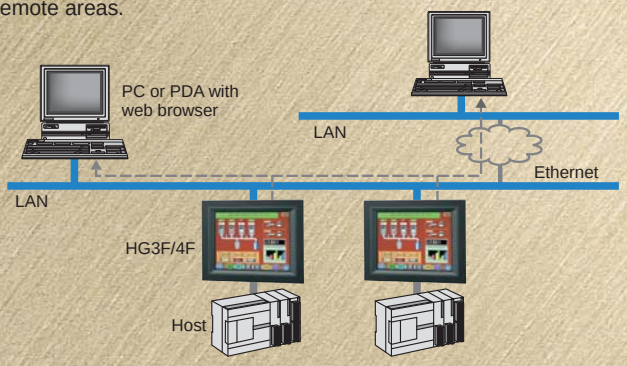
Alarm Logging and Data Logging

Alarm logging display, alarm list display, and data logging display functions make it easy to view the production information and perform data collection and management.
Alarm and data logging data can be saved on a CF card in a CSV file format, which can be edited on a PC. In addition, the current screen on the HG can be printed out or saved in a BMP file format.



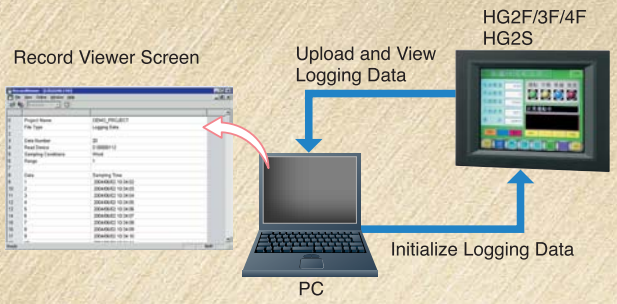
Monitor and Data Logging through Ethernet

Using the web browser on a PC or PDA, machine operating statuses can be monitored and CF card data can be collected to the PC through an Ethernet network. Data can be collected from remote areas.



View Logged Data on a PC

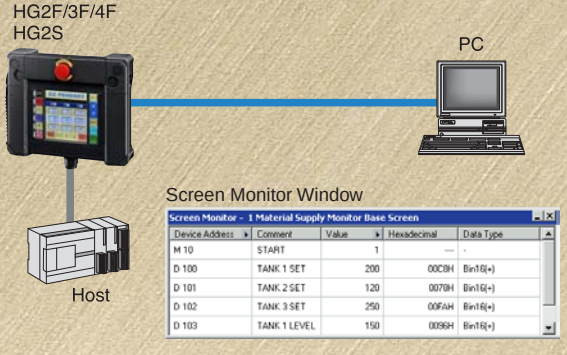
Record Viewer
Using utility software Record Viewer, alarm and log data stored in the HG can be uploaded through the maintenance communication and displayed on the PC.



Speeding Production System Start-up

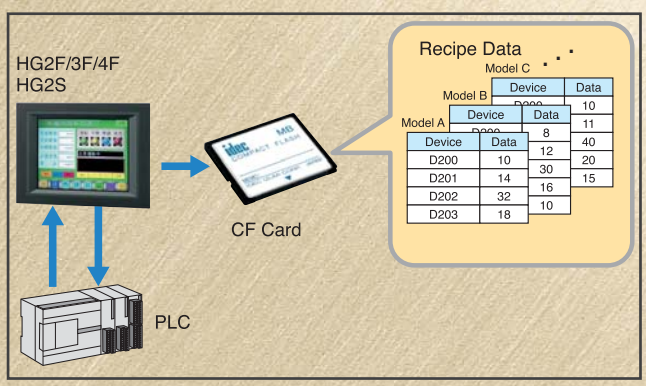
Debugging Function

After downloading a created project to the HG, actual operation can be confirmed while editing the data. Simulation mode makes it possible to debug the project while confirming the HG operation without the need for connection to the host.



Recipe Function

Preset values of the machine (positioning, work piece dimensions, etc.) can be stored on the internal memory of the HG. Using the stored preset values (recipe data), the machine can be initialized easily. The recipe data can be stored on the CF card and edited on a PC.
(Available on HG models with CF card slot; not available on HG2S)



Multilingual Capabilities for Global Applications

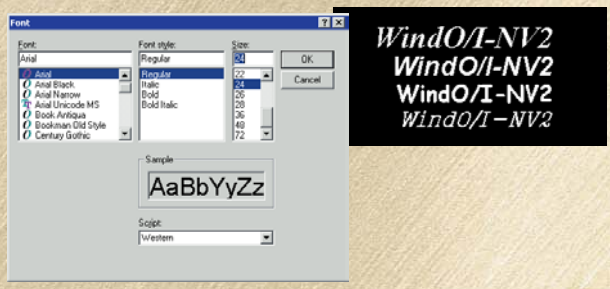
Easy Selection of Multiple Languages

The text group selection function enables to make a selection from a maximum of 16 languages by changing the assigned device value, even during operation.
Windows 2000 and XP makes it possible to input Japanese, Simplified Chinese, Traditional Chinese, and Korean languages.

Applicable Languages:
Western European languages (English, German, French, Italian, Spanish, Dutch, Norwegian, Danish, Finnish, Irish, etc.)
Central European languages (Czech, Hungarian, Romanian, Croatian, Slovene, Polish, and Slavic)

Compatible with Windows Fonts

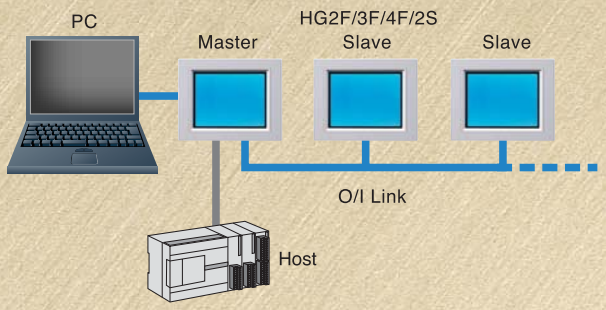
Fonts used in Windows can be displayed on the HG screens, making it possible to design the attractive screen layout.



Speeding Production System Start-up

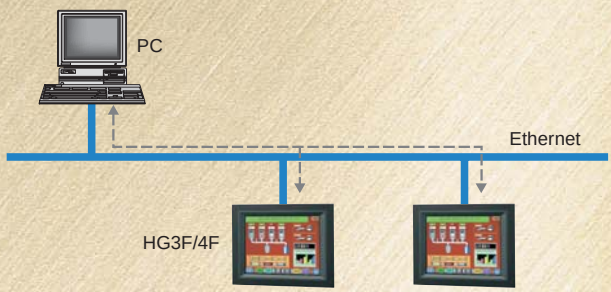
Simultaneous Download through O/I Link

In the O/I link communication network, the screen display data can be downloaded to multiple slaves at once.



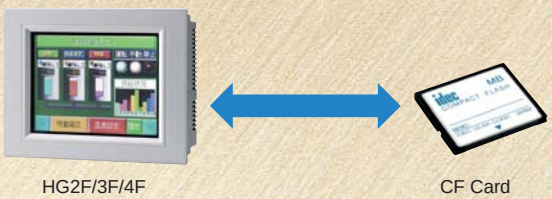
Maintenance through Ethernet

The HG models with the Ethernet capability can upload and downloaded the screen display data through the Ethernet.



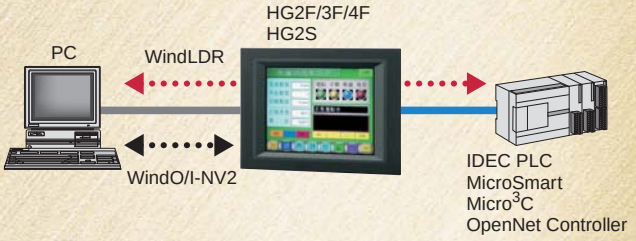
Download from CF Card

The screen display data can be downloaded and uploaded using the CD card without the need of a PC. The CF card can store multiple pieces of project data.



PLC Data Exchange through the HG Unit

In the network where the HG is connected to an IDEC PLC using the computer link communication system and the PC is connected to the HG using the maintenance cable, the PC can exchange data with the PLC using WindLDR.



USB Port on HG2F

The screen display data can be downloaded and uploaded through the USB port on a computer.

Download Service

Latest versions of WindO/I-NV2, host interface driver, and user's manual can be downloaded from the IDEC web site. Since the system program for the HG can also be downloaded from WindO/I-NV2, your HG series devices can be updated to use the latest functionality.

http://www.idec.com/Products/ENG/Software/SoftwareDownloads.html

After installing WindO/I-NV2, the download page can be opened from the Windows start menu.

Applicable PLCs

Maker	Series	Applicable System (CPU Module)	Link Unit	Host Interface Driver
IDEC	FA-3S	**PF3S-CP12**, PF3S-CP13	**PF3S-SIF2**, PF3S-SIF4, PF2-CLA	FA-3S (CP12/13)
		PF3S-CP11, PF3S-CP11T	**PF2-CLA**	FA-3S (CP11/11T) FA-2J
	FA-2J	PF2J-CPU1		
	Micro^3	FC2A-C10, FC2A-C16, FC2A-C24	Not used (connect to CPU module)	Micro^3/Micro^{3}C
	Micro^{3}C	FC2A-C16A, FC2A-C24A	Not used (connect to CPU module)	
	OpenNet Controller	FC3A-CP2	Not used (connect to CPU module)	FC3A/FC4A
	MicroSmart	FC4A-C10R2, FC4A-C10R2C	Not used (connect to CPU module)	
		FC4A-C16R2, FC4A-C16R2C, FC4A-C24R2, FC4A-C24R2C	Not used (connect to CPU module)	
			FC4A-PC1, FC4A-PC3	
		FC4A-D20K3, FC4A-D20S3, FC4A-D20RK1, FC4A-D20RS1, FC4A-D40K3, FC4A-D40S3	Not used (connect to CPU module)	
			FC4A-HPC1, FC4A-HPC3	
			FC4A-HPH1 + FC4A-PC1	
			FC4A-HPH1 + FC4A-PC3	
Mitsubishi	MELSEC-A	A1N, A2N, A3N	AJ71C24, AJ71C24-S3/-S6/-S8, AJ71UC24	MELSEC-AnN (Link)
		A1SH	**A1SJ71C24-R2**, A1SJ71UC24-R2 A1SJ71C24-R4, A1SJ71UC24-R4	
		A2CCPUC24	Not used (connect to CPU module)	
		A0J2, A0J2H	A0J2-C214-S1	
		A2A, A3A, A2U, A3U, A4U	AJ71C24-S6/-S8, AJ71UC24	MELSEC-AnA (Link)
		A2US, **A2USH**	A1SJ71C24-R2, **A1SJ71UC24-R2**, A1SJ71C24-R4, A1SJ71UC24-R4	
		A2N	Not used (connect to CPU module)	MELSEC-AnN (CPU)
		A1SJH, **A1SH**, A2SH, A2C, A0J2H	Not used (connect to CPU module)	MELSEC-A1S/A2C (CPU)
		A2A, A3A, A2US, A2USH	Not used (connect to CPU module)	MELSEC-AnA (CPU)
		A2U	Not used (connect to CPU module)	MELSEC-AnU (CPU)
	MELSEC-Q	**Q02CPU**	**QJ71C24**	MELSEC-Q/QnA (Link)
	MELSEC-FX	FX0, FX0N, **FX0S**, **FX1S**, FX1, FX2, FX2C	Not used (connect to CPU module)	MELSEC-FX (CPU)
		FX2N, FX2NC, **FX1N**, **FX1NC**	Not used (connect to CPU module)	MELSEC-FX2N (CPU)
		FX2N	FX2N-232-BD, FX2N-422-BD	
		FX1N	FX1N-232-BD, FX1N-422-BD, FX1N-485-BD	
OMRON	SYSMAC-C	C500, C500F, C1000H, C2000, C2000H	C120-LK201-V1, C120-LK202-V1	SYSMAC C series
			C500-LK201-V1, C500-LK203	
		C1000HF	C500-LK203	
		C200HS	C200H-LK201, C200H-LK202	
		C200HE, C200HG, C200HX	C200H-LK201, C200H-LK202	
			C200HW-COM02/COM04/COM05/COM06	
			C200HW-COM03	
		C120, C120F	C120-LK201-V1, C120-LK202-V1	
		C20H, C28H, C40H, C60H	Not used (connect to CPU module)	
		CQM1H, C200HS-CPU21/23/31/33	Not used (connect to CPU module)	
		C200HE-CPU42, C200HG-CPU43/63, C200HX-CPU44/64	Not used (connect to CPU module)	
		CPM1, CPM1A, CPM2A	CPM1-CIF01, CPM1-CIF11	
		CPM2A	Not used (connect to CPU module)	SYSMAC CS1 series
	CS1 series	**CS1G**, CS1H	Not used (connect to CPU module)	
		CS1G, CS1H	CS1W-SCB41 (Port 1) (Port 2)	
Toyoda Machine	TOYOPUC-PC3J	**PC3J**, PC3JD, PC3JG	Not used (connect to CPU module)	TOYOPUC-PC3J
Sharp	New Satellite JW	JW-21CU, JW-22CU, JW-31CUH/H1, JW-32CUH/H1, JW-33CUH/**H1**/H2/H3	JW-21CM	JW
		JW-50CU/CUH, JW-70CU/CUH, JW-100CU/CUH	JW-10CM	
		JW-22CU, JW-70CU/CUH, JW-100CU/CUH, JW-32CUH/H1, JW-33CUH/H1/H2/H3	Not used (connect to CPU module)	
Keyence	KV-700	**KV-700**	Not used (connect to CPU module)	KV-700
	KZ series	KZ-10, KZ-16, KZ-20, KZ-40, **KZ-80**	Not used (connect to CPU module)	KV/KZ
Hitachi	S10mini	**S10mini**	Not used (connect to CPU module)	S10mini
			Used	
Allen-Bradley	PLC-5	All PLC-5 models compatible with 1770-KF2	**1770-KF2**	PLC-5
		All **PLC-5** models	Not used (connect to CPU module)	
	SLC-500	**SLC5/03**, SLC5/04	Not used (connect to CPU module)	SLC500
	Micro Logix (Full Duplex)	Micro Logix 1000, Micro Logix 1200	Not used (connect to CPU module)	Micro Logix 1200
Siemens	S7-200	CPU212, CPU214, CPU215, **CPU216**, CPU221, CPU222, CPU224, CPU226, **CPU216XM**	Not used (connect to CPU module)	S7-200 (PPI)
	S7-300	**CPU313**, CPU314, CPU315, **CPU315-2DP**, CPU316, CPU318	**CP-340**, **CP-341**	S7-300 3694(R)/RK512
	S7-400	CPU412, CPU414, CPU416, **CPU416-F2**, CPU417	CP-440, **CP-441**	
Toshiba Machine	TC200	**TC3-13B1**	Not used (connect to CPU module)	TC200
GE Fanuc Automation	Series 90-30	**CPU331**, CPU341, CPU350, CPU351, CPU352, CPU360, CPU363, CPU364, CPU374	IC693CMM311	Series 90 (SNP-X)
		CPU311, CPU313, CPU323, **CPU331**, CPU341, CPU350, CPU351, CPU352, CPU360, CPU363, CPU364, CPU374	Not used (connect to CPU power module)	
	VersaMax	Nano, Micro (14 points), **Micro** (23, **28** points)	Not used (connect to CPU module)	
Schneider	Twido	TWDLCAA16DRF, **TWDLCAA24DRF**	**TWDNAC232D, TWDNAC485D, TWDNAC485T**	Modbus RTU
Matsushita Electric Works	FP series	FP0	**Not used (connect to CPU module)**	MEWNET
		FP1	Not used (connect to RS232C port)	
			Not used (connect to CPU module)	
		FPΣ	**Not used (connect to CPU module)**	
			Communication cassette AFP801	
			Communication cassette AFP802	
			Communication cassette AFP803	
Yaskawa	Machine Controller	**MP920**, MP930	**Not used (connect to CPU module)**	MP920-RTU
			Communication module 217IF	
Modicon	Momentum	171CCC96020	**Not used (processor Ethernet port)**	MODBUS/TCP
Koyo	KOSTAC SU	SU-5E, SU-6B	**Not used (CPU communication port)**	KOSTAC
		SU-5E, **SU-6B**, SU-5M, SU-6M, SU-6H	**U-01DM**	
	KOSTAC SZ	**SZ-4**	**Not used (CPU communication port)**	
FANUC	Power Mate	Power Mate-MODEL D	**Not used (connect to CPU module)**	Power Mate

Maker	Series	Applicable System (CPU Module)	Link Unit	Host Interface Driver
Yokogawa	FACTORY ACE	FA-M3 (F3SP05, F3SP20, **F3SP21**, F3SP25, F3SP30, F3SP35, F3SP38, F3SP53, F3SP58, F3SP36, F3BP20, F3BP30)	**F3LC11-1N** **F3LC11-2N**	FA-M3
		FA-M3 (F3SP05, **F3SP21**, F3SP25, F3SP28, F3SP35, F3SP38, F3SP53, F3SP58)	**Not used**	

Applicability has been verified on modules shown in bold face in the table above.
The host interface driver can be downloaded from IDEC's web site: http://www.idec.com/japan/

HG Available Functions

Category	Item	HG2F		HG3F	HG4F	HG2S	
		Touch Switch Type	CC Switch Type			Touch Switch Type	CC Switch Type
Communication	PLC link communication	x	x	x	x	x	x
	DM link communication	x	x	x	x	x	x
	O/I link communication	x	x	x	x	x (slave only)	x (slave only)
	Ethernet	—	—	x	x	—	—
	No host	x	x	x	x	x	x
User Memory		2 MB	2 MB	6 MB	6 MB	2 MB	2 MB
Interface	RS232C/RS485 (422)	x	x	x	x	x	x
	Ethernet	—	—	x ∗1	x ∗1	—	—
	USB	x ∗2	x ∗2	—	—	—	—
	CF card slot	x ∗3	x ∗3	x ∗3	x ∗3	—	—
	Parallel	—	—	x	x	—	—
Display Color	256 colors	x	x	x	x	x	x
	Monochrome	x	x	—	—	x	x
Resolution		320 × 240	320 × 240	640 × 480	800 × 600	320 × 240	320 × 240
Touch Switch		16 × 12	16 × 8	32 × 24	40 × 30	16 × 12	10 × 12
CC Switch		—	4 × 1 row (bottom)	—	—	—	6 × 2 columns
Expansion Unit	Digital I/O unit	x	x	x	x	—	—
	LONWORKS communication unit	x	x	—	—	—	—
Features	System program download	x	x	x	x	x	x
	Font download	x	x	x	x	x	x
	Download via Ethernet	—	—	x ∗1	x ∗1	—	—
	Download via O/I link	x	x	x	x	x	x
	Project transfer via CF card	x ∗3	x ∗3	x ∗3	x ∗3	—	—
	Printer output	x ∗4	x ∗4	x	x	x	x
	External input/output	—	—	—	—	x	x
	Backlight replacement	x	x	x	x	x ∗5	x ∗5
	Environment resistance	x	x	x	x	x	x
Functions	Simulation	x	x	x	x	x	x
	Pass through	x	x	x	x	x	x
	Device monitor	x	x	x	x	x	x
	Web server function	—	—	— ∗1	— ∗1	—	—
	Overlapped screens	x	x	x	x	x	x
	Sub-screen superimpose	x	x	x	x	x	x
	Text group switching	x	x	x	x	x	x
	Script	x	x	x	x	x	x
	Part operating condition setting	x	x	x	x	x	x
	Alarm log	x	x	x	x	x	x
	Logging	x	x	x	x	x	x
	Recipe	x	x	x	x	x	x
	Password setting	x	x	x	x	x	x
Parts	Bit button	x	x	x	x	x	x
	Word button	x	x	x	x	x	x
	Goto screen button	x	x	x	x	x	x
	Print button	x	x	x	x	x	x
	Key button	x	x	x	x	x	x
	Keypad	x	x	x	x	x	x
	Selector switch	x	x	x	x	x	x
	Potentiometer	x	x	x	x	x	x
	Numerical input	x	x	x	x	x	x
	Character input	x	x	x	x	x	x
	Pilot lamp	x	x	x	x	x	x
	Picture display	x	x	x	x	x	x
	Message display	x	x	x	x	x	x
	Message switching display	x	x	x	x	x	x
	Alarm list display	x	x	x	x	x	x
	Alarm log display	x	x	x	x	x	x
	Numerical display	x	x	x	x	x	x
	Bar graph	x	x	x	x	x	x
	Trend chart	x	x	x	x	x	x
	Pie chart	x	x	x	x	x	x
	Meter	x	x	x	x	x	x
	Calendar	x	x	x	x	x	x
	Bit write command	x	x	x	x	x	x
	Word write command	x	x	x	x	x	x
	Goto screen command	x	x	x	x	x	x
	Timer	x	x	x	x	x	x
	Print command	x	x	x	x	x	x
	Screen print command	x	x	x	x	x	x
WindO/I-NV2 Functions	Debugging	x	x	x	x	x	x
	Log data upload tool	x	x	x	x	x	x
	Graphic library tool	x	x	x	x	x	x
	Screen import	x	x	x	x	x	x
	Text browser	x	x	x	x	x	x
	Device browser	x	x	x	x	x	x
	Script browser	x	x	x	x	x	x
	Picture browser	x	x	x	x	x	x
	Basic/advanced mode	x	x	x	x	x	x
	Preview	x	x	x	x	x	x
	Windows font	x	x	x	x	x	x
	Library function	x	x	x	x	x	x
	Global replace	x	x	x	x	x	x
	Work space	x	x	x	x	x	x

∗1: Available on models with the Ethernet, ∗2: Available on models with the USB interface, ∗3: Available on models with the CF card slot, ∗4: Except for models with the USB interface, ∗5: Replaced at IDEC

Clear, bright display screen
Quick refresh by high-performance CPU

350 cd/m^2
(HG3F/4F)

250 cd/m^2
(HG2F)

HG2F/HG3F/HG4F

HG2F/HG3F/HG4F

Bright, Legible Display

The HG3F and HG4F feature bright LCD of 350 cd/m^2, and the HG2F has a LCD of 250 cd/m^2. Both LCDs ensure a wide viewing angle and an improved legibility in bright environments. (The brightness values are presented by the manufacturer.)

CF Card Slot

A compact flash card can be used to store project data and to copy project data from one operator interface to the other.

Alarm log, logging data, and recipe data can be written to the CF card, and screen images can also be stored in the BMP format.

Fast Processing Speed

The 32-bit RISC CPU on the HG3F and HG4F have a 200 MHz clock, and the HG2F has a 133 MHz clock. The increased speed of screen switching, parts operation, and communication frees the operator from the stress of slow operating speed.

Ethernet Port (HG3F/HG4F)

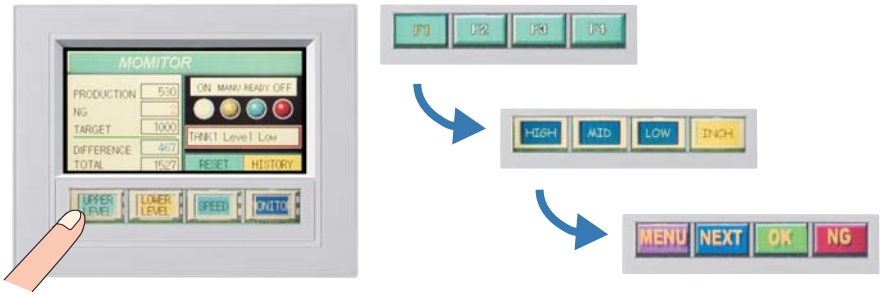
Since the HG3F and HG4F is available with a web server function, a PC or PDA having a web browser function (Internet Explorer or Netscape) can be used to monitor the HG operating status or to access the files on the CF card.

Operating statuses of machines can also be monitored easily. Screen display data can be uploaded and downloaded through the Ethernet.

Quick Display Response

Also Available with CC Switches (HG2F)

Tactile feedback from the CC switch assures positive operation and prevents unintended pressing on the button.



The CC switch has a pushbutton with a LCD indication, and the legend can be changed according to the program. When pressed, the button clicks to assure positive operation. CC switches can be used as function switches and other switches which require frequent operation.

Large Memory

The HG3F and HG4F have 6MB and the HG2F has 2MB of user memory to store screen display data.

USB Port (Option on the HG2F)

The HG2F is available with a USB2.0 OTG (On-The-Go) port having both host and peripheral functions. High-speed download of the screen display data to the HG is made possible.

Approvals

c UL us LISTED

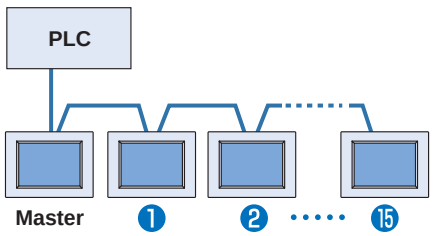
CE

Slim Body: 49.6 mm (behind the panel HG3F)

The HG4F is 52.1 mm and the HG2F is 50 mm deep behind the panel. The slim body allows for thin panel design.

High-speed O/I Link

Using optional O/I link unit HG9Z-2G1 on the HG2F/3F/4F, one PLC can be connected to a maximum of 16 HG units.



Interface Specifications

HG2F

HG2F Operator Interface

Photo shows the HG2F equipped with a CF card slot and USB port, and optional O/I link unit installed.

Power Terminals 24V DC

CF Card

CF Card Interface
CF card 32MB (optional)
HG9Z-MF32

Serial 2 **Serial Interface 2**
USB **RS232C**

Serial 1

Serial Interface 1
RS232C, RS485 (422)
RS232C and RS485 (422) can not be used simultaneously.

Expan-sion **Expansion Interface**

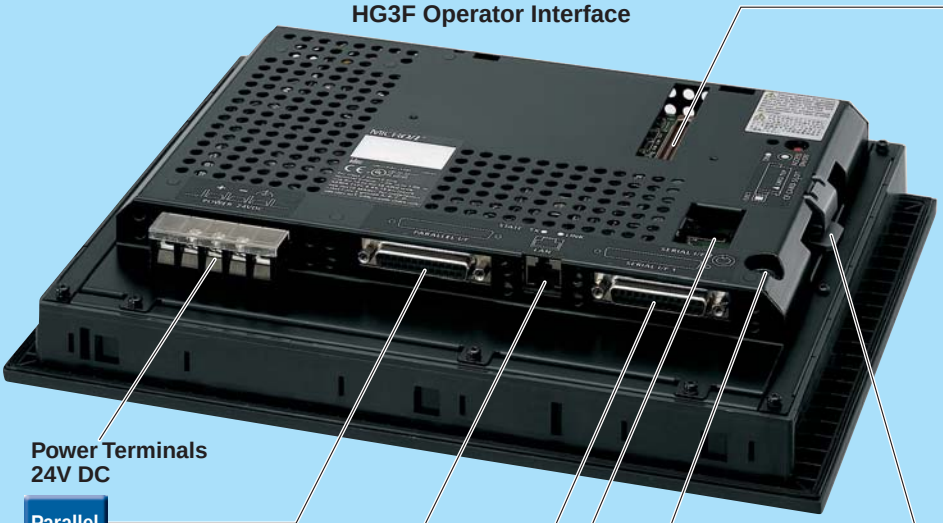
Digital I/O Unit
HG9Z-2P101
The optional digital I/O unit installed on the HG2F provides an expansion of 16 inputs and 16 outputs.

LONWORKS® Communication Unit
HG9Z-2PNL1
The optional LONWORKS communication unit installed on the HG2F provides an interface with the LONWORKS network.

O/I Link **O/I Link Interface**
O/I Link Unit (optional)
HG9Z-2G1

HG3F / HG4F

HG3F Operator Interface



Power Terminals 24V DC

Parallel

Parallel Interface
Centronics interface standard
For connecting a printer

Ethernet

Ethernet Interface 10Base-T

Serial 1

Serial Interface 1
RS232C, RS485 (422)
RS232C and RS485 (422) can not be used simultaneously.

Serial 2

Serial Interface 2
RS232C

Expan-sion **Expansion Interface**

Digital I/O Unit Connection

Digital I/O Unit
HG9Z-3P102
The optional digital I/O unit installed on the HG3F/4F provides an expansion of 16 inputs and 16 outputs.

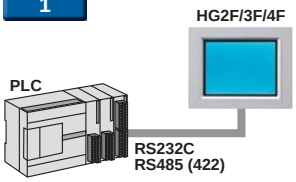
CF Card **CF Card Interface**
CF Card 32MB (optional)
HG9Z-MF32

O/I Link **O/I Link Interface**
O/I Link Unit (optional)
HG9Z-2G1

Photo shows the HG3F. The HG4F also has almost the same arrangement of interface ports.
The HG3F-FT22VF-B, HG3F-FT22VF-W, HG4F-JT22VF-B, and HG4F-JT22VF-W do not have the Ethernet and CF card interfaces.

Communication System

Serial 1 PLC Link Communication

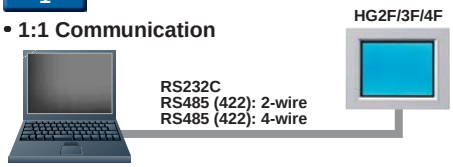


Data can be read from and written into PLC devices, such as relays and registers.

A PLC link unit, programming port on the CPU module, or another serial port is used for communication. The PLC does not require any special program for PLC link communication.

Serial 1 DM Link Communication

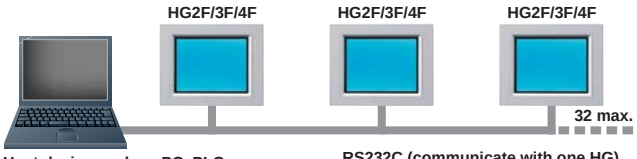
- 1:1 Communication



Data Memory

DM 0	1
DM 1	127
DM 2	0
DM 3	0
:	:
DM 8190	1234
DM 8191	5678

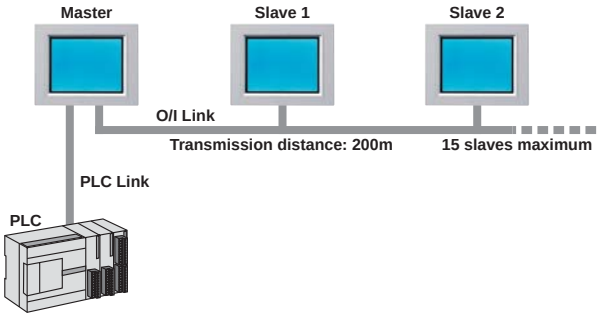
- 1:N Communication



The host, such as a PC, PLC, or microcomputer board, can access the DM link memory in the HG2F/3F/4F to read and write data.

In the 1:1 communication system, one host communicates with one HG unit. In the 1:N communication system, one host communicates with multiple HG units. Since special communication protocol for the HG2F/3F/4F is used, the host requires a special program for DM link communication.

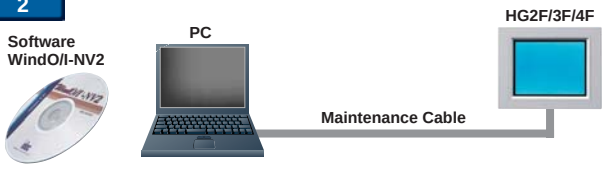
O/I Link O/I Link Communication



One PLC is connected to multiple HG2F/3F/4F units in the O/I link communication system. One O/I serves as a master for a maximum of 15 slaves. The master communicates with the PLC in the PLC link communication system.

The master can read data from the slaves, and the slaves can write to the PLC via the master. The master will read data directly from the specified PLC devices, and the slaves read through the master. The PLC does not require any special program for communication.

Serial 2 Maintenance Communication



WindO/I-NV2 is used to edit a project on the PC, download and upload the project to and from the O/I, initialize the O/I, and show the system program information on the PC.

Options

Maintenance Cable (2m)
HG9Z-XCM22

PLC Connection Cable (5m)
PF3S-KS1

PLC Connection Cable (5m)
HG9Z-3C115

PLC Connection Cable (5m)
HG9Z-3C125

PLC Connection Cable (5m)
HG9Z-3C135

PLC Connection Cable (5m)
HG9Z-3C145

PLC Connection Cable (5m)
HG9Z-3C155

PLC Connection Cable (5m)
HG9Z-3C165

Protective Sheet
HG9Z-2D2 (for HG2F) (5 pcs)
HG9Z-3DAPN02 (for HG3F) (2 pcs)
HG9Z-4DAPN02 (for HG4F) (2 pcs)

CF Card (32 MB)
HG9Z-MF32

Digital I/O Unit
HG9Z-2P101 (for HG2F)
HG9Z-3P102 (for HG3F/4F)
16 inputs, 16 outputs

LONWORKS Communication Unit
HG9Z-2PLN1 (for HG2F)

O/I Link Unit
HG9Z-2G1

WindO/I-NV2
HG9Y-ZSS2W
English/Japanese compatible.
PDF files of user's manuals are stored on the CD.

Hardware/Software Manual
HG9Y-B596

Spare Parts

Replacement Backlight
HG9Z-2B1 (for HG2F)

Replacement Backlight
HG9Z-3FB (for HG3F)

Replacement Backlight
HG9Z-4FB (for HG4F)

Mounting Clip (4 pcs)
HG9Z-2K1PN04 (for HG2F)

4 pieces are supplied with HG2F.

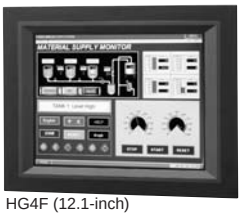
Mounting Clip (10 pcs)
HG9Z-4K1PN10 (for HG3F/4F)

4 pieces are supplied with HG3F/4F.

HG2F/3F/4F Operator Interfaces

Clear legible display: 350 cd/m^2 (HG3F/4F), 250 cd/m^2 (HG2F)
Quick screen refresh by high-speed CPU

- 256-color display
- Using the O/I link communication, one host PLC can connect to 16 HG2F/3F/4F units.
- Slim body style — behind-the-panel dimensions are 50 mm (HG2F), 49.6 mm (HG3F), 52.1 mm (HG4F)
- The HG2F is also available with CC-click switches on the LCD panel to provide tactile feedback for assurance when operating the switch.
- In addition to the RS232C/485 (422) serial interface port 1, the HG2F is available with USB or RS232C serial interface port 2.
- The HG3F and HG4F are available with or without a CF (compact flash) card slot and Ethernet port.
- UL, c-UL listed, EN compliant


HG4F (12.1-inch)


HG3F (10.4-inch)


HG2F (5.7-inch) Touch screen type


HG2F (5.7-inch) CC switch type

Types

• HG2F

Display Screen	Operation Type	CF Card Slot	Maintenance Port (Serial Interface 2)	Communication (Serial Interface 1)	Housing/ Bezel Color	Type No.
5.7-inch STN color LCD	Touch screen	With	USB	RS232C/485 (422)	Light gray	HG2F-SS22VDF
		With	RS232C			HG2F-SS22VCF
		Without				HG2F-SS22VF
	CC switch	With	USB			HG2F-SS52VDF
		With	RS232C			HG2F-SS52VCF
		Without				HG2F-SS52VF
5.7-inch STN monochrome LCD	Touch screen	With	USB			HG2F-SB22VDF
		With	RS232C			HG2F-SB22VCF
		Without				HG2F-SB22VF
	CC switch	With	USB			HG2F-SB52VDF
		With	RS232C			HG2F-SB52VCF
		Without				HG2F-SB52VF

The HG2F unit is supplied with four mounting clips HG9Z-2K1.

• HG3F/HG4F

Display Screen	CF Card Slot	Ethernet Port	Communication (Serial Interface 1)	Housing/Bezel Color	Type No.
10.4-inch TFT color LCD	With	With	RS232C/485 (422)	Dark gray	HG3F-FT22TF-B
				Light gray	HG3F-FT22TF-W
	Without	Without		Dark gray	HG3F-FT22VF-B
				Light gray	HG3F-FT22VF-W
12.1-inch TFT color LCD	With	With	RS232C/485 (422)	Dark gray	HG4F-JT22TF-B
				Light gray	HG4F-JT22TF-W
	Without	Without		Dark gray	HG4F-JT22VF-B
				Light gray	HG4F-JT22VF-W

The HG3F or HG4F unit is supplied with four mounting clips HG9Z-4K1.

• Spare Parts

Name	Type No.	Ordering Type No.	Description	Package Quantity
Replacement Backlight	HG9Z-2B1		For HG2F	1
	HG9Z-3FB		For HG3F	1
	HG9Z-4FB		For HG4F	1
Mounting Clip	HG9Z-2K1	HG9Z-2K1PN04	For HG2F (4 pieces are supplied with HG2F)	4
	HG9Z-4K1	HG9Z-4K1PN10	For HG3F/4F (4 pieces are supplied with HG3F/4F)	10

• Options

Name	Type No.	Ordering Type No.	Description	Package Quantity
Maintenance Cable	HG9Z-XCM22		D-sub 9-pin female connector to connect to computer (2m long) (Note)	1
PLC Connection Cable	PF3S-KS1		For IDEC's FA-3S SIF2 (5m long)	1
	HG9Z-3C115		For IDEC's Micro^{3}C direct connection (5m long)	1
	HG9Z-3C125		For IDEC's MicroSmart, OpenNet Controller, Micro^{3}C (5m long)	1
	HG9Z-3C135		RS232C, D-sub 25-pin, for Mitsubishi/OMRON link unit (5m long)	1
	HG9Z-3C145		RS232C, D-sub 9-pin, for Mitsubishi link unit (5m long)	1
	HG9Z-3C155		RS232C, D-sub 9-pin, for OMRON RS232C interface (5m long)	1
	HG9Z-3C165		For Mitsubishi FX/A series direct connection (5m long)	1
User Communication Cable 1C	FC2A-KP1C		For connecting the HG2F serial interface 2 port (RS232C) to a serial printer; not equipped with a connector for connecting the printer	1
Protective Sheet	HG9Z-2D2		For HG2F (5 pack)	5
	HG9Z-3DA	HG9Z-3DAPN02	For HG3F (2 pack)	2
	HG9Z-4DA	HG9Z-4DAPN02	For HG4F (2 pack)	2
Digital I/O Unit	HG9Z-2P101		For HG2F, 16 inputs / 16 outputs	1
	HG9Z-3P102		For HG3F/4F, 16 inputs / 16 outputs	1
LONWORKS Communication Unit	HG9Z-2PNL1		For HG2F	1
O/I Link Unit	HG9Z-2G1		Communication unit for O/I link	1
CF Card	HG9Z-MF32		Compact flash memory card, 32 MB	1
Design Tool	HG9Y-ZSS2W		WindO/I-NV2 on CD (English/Japanese compatible) w/o printed manual PDF files of English/Japanese manuals are stored on the CD.	1
Manual	HG9Y-B596		English hardware/software manual	1

Note: Computer link cable 4C (FC2A-KC4C) for IDEC's MicroSmart, OpenNet Controller, and Micro^{3}C is also applicable.

General Specifications

Type	HG2F	HG3F	HG4F
Rated Power Voltage	24V DC		
Power Voltage Range	20.4 to 28.8V DC	19.2 to 28.8V DC	
Power Consumption	10W maximum	25W maximum	
Power Inrush Current	20A maximum	15A maximum (cold start)	
Allowable Momentary Power Interruption	10 ms minimum		
Dielectric Strength	1,000V AC, 10 mA, 1 minute between power and FG terminals	1,500V AC, 10 mA, 1 minute between power and FG terminals	
Insulation Resistance	50 MΩ minimum between power and FG terminals (500V DC megger)	10 MΩ minimum between power and FG terminals (500V DC megger)	
Operating Temperature	0 to 50°C (no freezing)		0 to 45°C (no freezing)
Operating Humidity	10 to 95% RH (no condensation)	20 to 85% RH (no condensation)	
Storage Temperature	–20 to +60°C (no freezing)		
Storage Humidity	10 to 95% RH (no condensation)	20 to 85% RH (no condensation)	
Pollution Degree	2 (IEC 60664-1)		
Corrosion Immunity	Atmosphere free from corrosive gases		
Vibration Resistance (damage limits)	10 to 20 Hz amplitude 0.625 mm, 20 to 55 Hz acceleration 9.8 m/s^2 2 hours per axis on each of three mutually perpendicular axes		
Shock Resistance (damage limits)	147 m/s^2, 11 ms, 5 shocks on each of three mutually perpendicular axes		
Noise Immunity	Fast transient/burst test, common mode: Level 3, power terminals: ±2 kV, communication line: ±1 kV (IEC/EN 61000-4-4)		
Electrostatic Discharge	ESD-3 (RH-1), Level 3, (contact ±6 kV, aerial ±8 kV) (IEC/EN 61000-4-2)		
Mounting	Panel mounting		
Degree of Protection	IP65 NEMA TYPE 13 (operator)	IP66 NEMA TYPE 4.4X (operator)	
Dimensions (mm)	172W × 136H × 56D	324W × 240H × 55.8D	348W × 270H × 58.1D
Weight (approx.)	800g	2800g	3400g

Operation Specifications

Type	HG2F		HG3F	HG4F
	Touch Screen Type	CC Switch Type		
Switching Element	Resistive membrane			
Resolution	16 × 12	16 × 8	32 × 24	40 × 30
CC Switch Quantity	—	4 × 1 row (bottom only)	—	—
Operating Force	0.2 to 0.8N	2.5 to 5.0N	0.2 to 0.8N	0.2 to 0.8N
Mechanical Life	1,000,000 operations			
Acknowledge Sound	Electronic buzzer			
Multiple Operations	Possible to press two switching areas simultaneously (CC switch and touch screen cannot be pressed together)			

HG2F/3F/4F Operator Interfaces

Display Specifications

Type		HG2F		HG3F	HG4F
		Color	Monochrome	Color	Color
LCD		Color STN	Monochrome STN	Color TFT	
Effective Display Area (mm)		118.2W × 89.4H		211.2W × 158.4H	246W × 184.5H
Display Resolution		320W × 240H pixels		640W × 480H pixels	800W × 600H pixels
LCD Life		50,000 hours minimum		100,000 hours minimum	60,000 hours minimum
Contrast Adjustment		Possible in steps using the front touch screen			
Backlight		Cold-cathode tube		Cold-cathode tube (2 tubes)	
Backlight Life		40,000 hours nominal (Note)		50,000 hours nominal (Note)	
Backlight Control		Automatic OFF			
Backlight Replacement		Possible			
Display Character Size	1/4 size	8 × 8 pixels (Western European language: ISO 8859-1, Central European language: ANSI 1250, Japanese katakana and symbols: JIS 8-bit code)			
	1/2 size	8 × 16 pixels (Western European language ISO 8859-1, Central European language: ANSI 1250, Japanese katakana and symbols: JIS 8-bit code) 16 × 32 pixels, 24 × 48 pixels, 32 × 64 pixels (Western European language: ISO 8859-1)			
	Full size	16 × 16 pixels (Japanese JIS first and second level characters, simplified Chinese, traditional Chinese, Korean)			
	Double size	32 × 32 pixels (Japanese JIS first level characters, Mincho font)			
Quantity of Characters (CC Switch Type)	1/4 size	40 characters × 30 lines (40 × 20)		80 characters × 60 lines	100 characters × 75 lines
	1/2 size	40 characters × 15 lines (40 × 10)		80 characters × 30 lines	100 characters × 37 lines
	Full size	20 characters × 15 lines (20 × 10)		40 characters × 30 lines	50 characters × 37 lines
	Double size	10 characters × 7 lines (10 × 5)		20 characters × 15 lines	25 characters × 18 lines
Character Magnification		0.5, 1, 2, 3, 4, and 8 vertically and horizontally			
Character Attribute		Blink (1 or 0.5 sec period), reverse, bold, shadowed			
Graphics Type		Straight line, polyline, polygon, rectangle, circle, ellipse, arc, pie, equilateral polygons (3, 4, 5, 6, 8), paint, bitmap image			
Window Display		3 popup screens + 1 system screen			

Note: The backlight life refers to the time until the surface brightness reduces to a half after using continuously at room temperatures.

Operation Specifications

Type	HG2F	HG3F/4F
Screen Types	Base screen, popup screen, system screen	
No. of Screens	Base screen: 3000 max., popup screen: 3015 max.	
User Memory	2 MB	6 MB
Parts	Bit Button, Word Button, Goto Screen Button, Print Button, Key Button, Keypad, Selector Switch, Potentiometer, Numerical Input, Character Input, Pilot Lamp, Picture Display, Message Display, Message Switching Display, Alarm List Display, Alarm Log Display, Numerical Display, Bar Graph, Trend Chart, Pie Chart, Meter, Calendar, Bit Write Command, Word Write Command, Goto Screen Command, Timer, Print Command, Screen print	
Calendar	Year, Month, Day, Hour, Min., Sec., Day of Week ±30 sec per month (at 25°C)	
Print Function (support)	SII printer, DPU-414	ESC/P, PC-PR, PCL command; EPSON PX-V600/Stylus C84
Power Failure Backup	Backup data: Calendar, log data, keep internal relay, keep internal register Backup duration: 1 month (at 25°C) after full charging for two days	

CF Card Interface Specifications

Interface Specifications	Compact Flash Type I standard compliant
Connector	50-pin compact flash card connector

Parallel Interface Specifications (HG3F/4F)

Electrical Characteristics	Centronics interface compliant
Connector	D-sub 25-pin female connector

Ethernet Specifications (HG3F/4F)

Interface Specifications	IEEE 802.3 standard compliant, 10Base-T

USB Interface Specifications (HG2F)

Interface Specifications	USB 2.0 compliant
Connector	Mini AB connector

For connecting with a PC using a USB port, use a USB cable with a 5-in USB mini B male connector on the HG side.

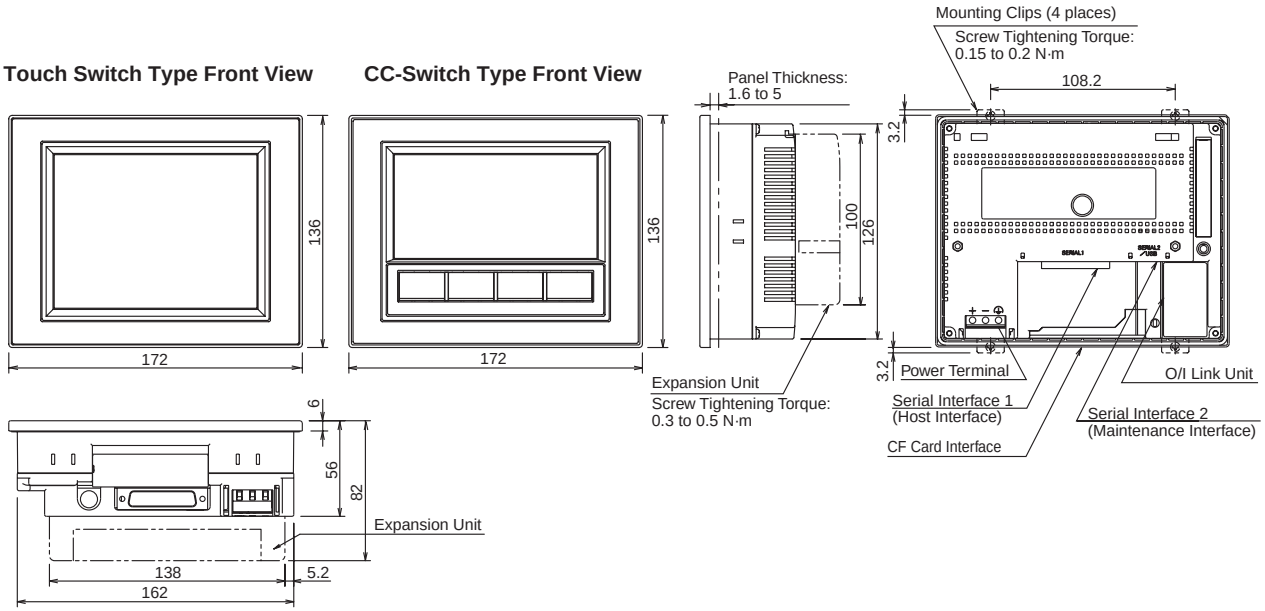
Interface Specifications

RS232C	Electrical Characteristics		EIA RS232C compliant
	Transmission Speed		1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
	Synchronization		Asynchronous
	Communication Method		Half or full duplex
	Control System		Hardware control or none
	Connector		D-sub 25-pin female connector
RS485 (422)	Electrical Characteristics		EIA RS485 (422) compliant
	Transmission Speed		1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
	Synchronization		Asynchronous
	Communication Method		Half or full duplex
	Control System		Hardware control or none
	Connector		D-sub 25-pin female connector
Expansion Unit (Digital I/O Unit)	Applicable Quantity		1
	Mounting Style		Mounted on the rear of the HG unit
	Input	Input Points	16
		Rated Voltage	12 to 24V DC (allowable range 10 to 28V DC)
		Isolation Method	Photocoupler
	Output	Output Points	16
		Load Voltage	12 to 24V DC (allowable range 10 to 28V DC)
		Isolation Method	Photocoupler
		Output Signal	NPN open collector
		Output ON Voltage	1.6V maximum
		Output Current	30 mA max. per point, 200 mA total
	Connector		24-pin connector (Fujitsu FCN-365P024-AG) 2 connectors for inputs and outputs
Maintenance Communication	Electrical Characteristics		EIA RS232C compliant
	Transmission Speed		9600, 19200, 38400, 57600, 115200 bps
	Synchronization		Asynchronous
	Communication Method		Half duplex, proprietary protocol
	Connector		Mini DIN 8-pin connector
O/I Link Communication	Electrical Characteristics		EIA RS485 compliant
	Transmission Speed		38400, 57600, 115200 bps
	Synchronization		Asynchronous
	Communication Method		Half duplex, proprietary protocol
	Connector		Special connector

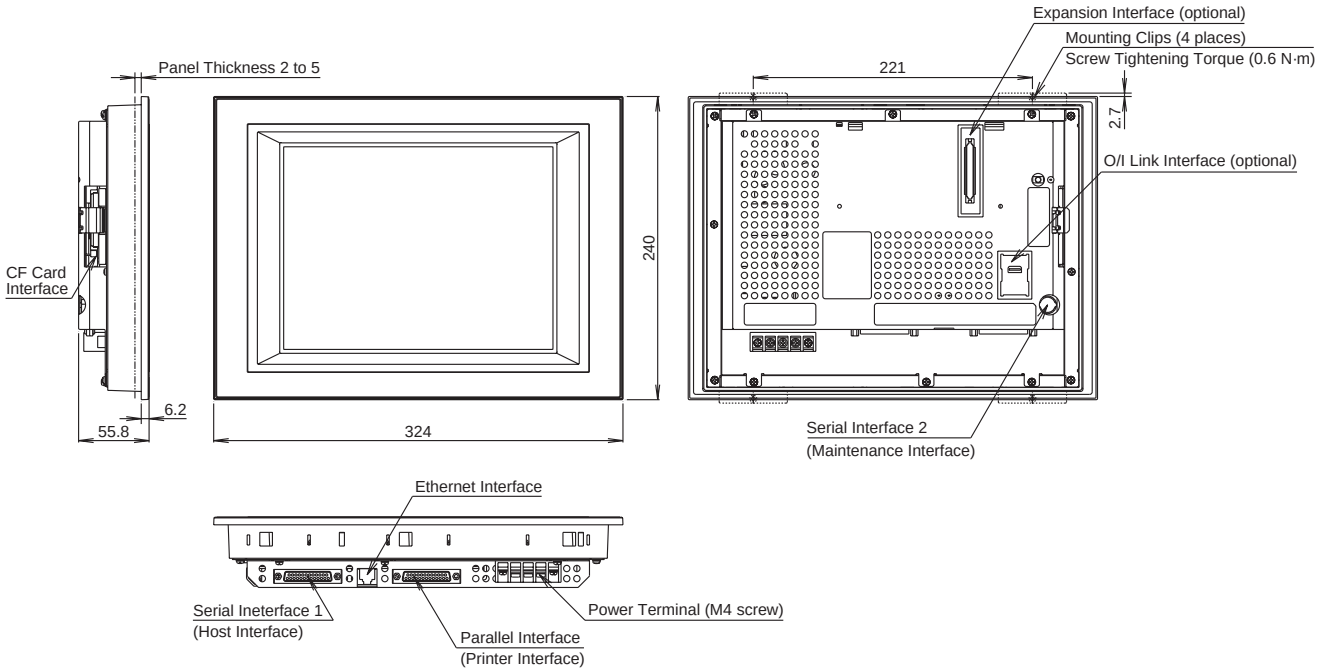
Dimensions

When installing the HG on a panel, keep a sufficient space to connect and disconnect cables and to install and remove the CF card as required.

• HG2F

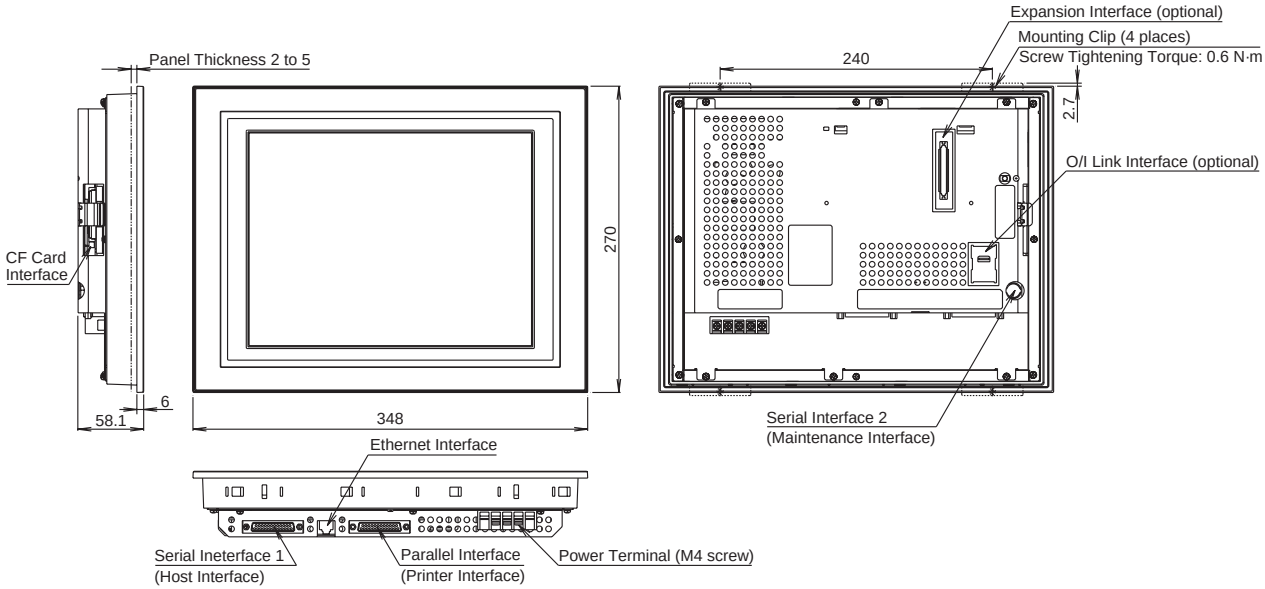


• HG3F



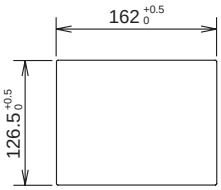
All dimensions in mm.

• **HG4F**

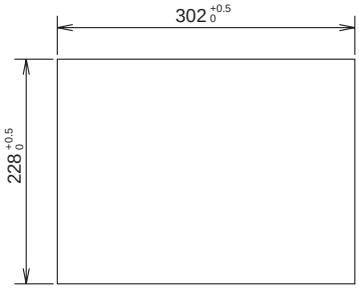


Panel Cutout

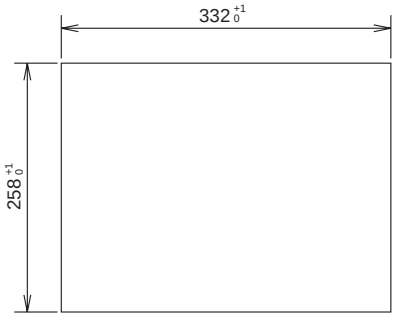
• **HG2F**
Panel thickness: 1.6 to 5 mm



• **HG3F**
Panel thickness: 2 to 5 mm



• **HG4F**
Panel thickness: 2 to 5 mm



All dimensions in mm.

⚠ Safety Precautions

- Turn off the power to the HG unit before starting installation, removal, wiring, maintenance, and inspection of the HG unit. Failure to turn power off may cause electrical shock or fire hazard.
- Special expertise is required to install, wire, configure, and operate the HG unit. People without such expertise must not use the HG unit.
- The HG unit 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 HG unit. If such a circuit is configured inside the HG unit, failure of the HG unit may cause a serious damage to the external devices.
- Read the following operating instructions to make sure of safety.

Operating Instructions

When installing and wiring the HG unit or when designing control panel including connection to the host device, observe the following instructions to make sure of safety of the personnel and performance of the HG unit.

1. Installation Location

In consideration of the safety and HG performance, avoid installing the HG unit in the following locations:

- Where dust, briny air, or iron particles exist in quantity
- Where oil or chemical splashes exist
- Where direct sunlight falls on the HG unit
- Where a corrosive gas or flammable gas exists
- Where the HG unit is subjected to vibrations or shocks
- Where dew condensation occurs due to rapid temperature change

2. Ambient Temperature

- Keep a minimum of 100 mm clearance around the HG unit for ventilation. Do not install the HG unit near heat-generating machines.
- When the ambient temperature exceeds the rated operating temperature of the HG unit, install a ventilating fan or air-conditioner.
- The HG unit is designed for installation on a vertical plane and natural air cooling. When installing the HG unit in other directions, provide forced air cooling or reduce the ambient temperature.

3. Noise

- Do not install the HG unit near high-voltage devices or arc-generating equipment, such as electromagnetic contactors and no-fuse breakers.
- Keep a minimum of 200 mm from motor lines.
- Make the power connection to the HG unit as short as possible.
- Separate the connection lines for motor devices from power lines for I/O devices connected to the HG unit.
- For connection with host devices, various cables are available for each HG unit. Select a correct cable for the HG unit and host device.
- When making a cable for connecting the HG unit to a host, use the recommended connector and applicable wire. When the maximum cable length is defined, observe the maximum cable length.

4. Operability and Maintenance

- In consideration of the viewing angle and switch operation, install the HG unit at a convenient height.
- The touch screen surface and CC switch lens are easily damaged. Do not scratch or press strongly on the surfaces using hard tools.
- To wipe off smears on the lens and screen surface, use a soft cloth dampened with the following solvents.

  Neutral detergent (squeeze the cloth tightly)

  Alcoholic solvents

  Do not use solvents such as thinner, ammonia, strong acid, and strong alkaline.

HG2S is a mobile teaching pendant consisting of mechanical switches (SUI), touch switches (GUI), and CC switches on the screen (SUI on GUI)

SUI
(Solid User Interface)

Mechanical Switch

Safety SUI

Stop Switch (Gray Button)
Emergency Stop Switch (Red Button)

IDEC's Original Safety Features

Safety Lock Mechanism
Contacts open only after the operator is locked.

Direct Opening Action
Contacts, when welded, are forced to open directly.

Emergency stop switch has a legend "EMERGENCY STOP."

▲ With mechanical switches

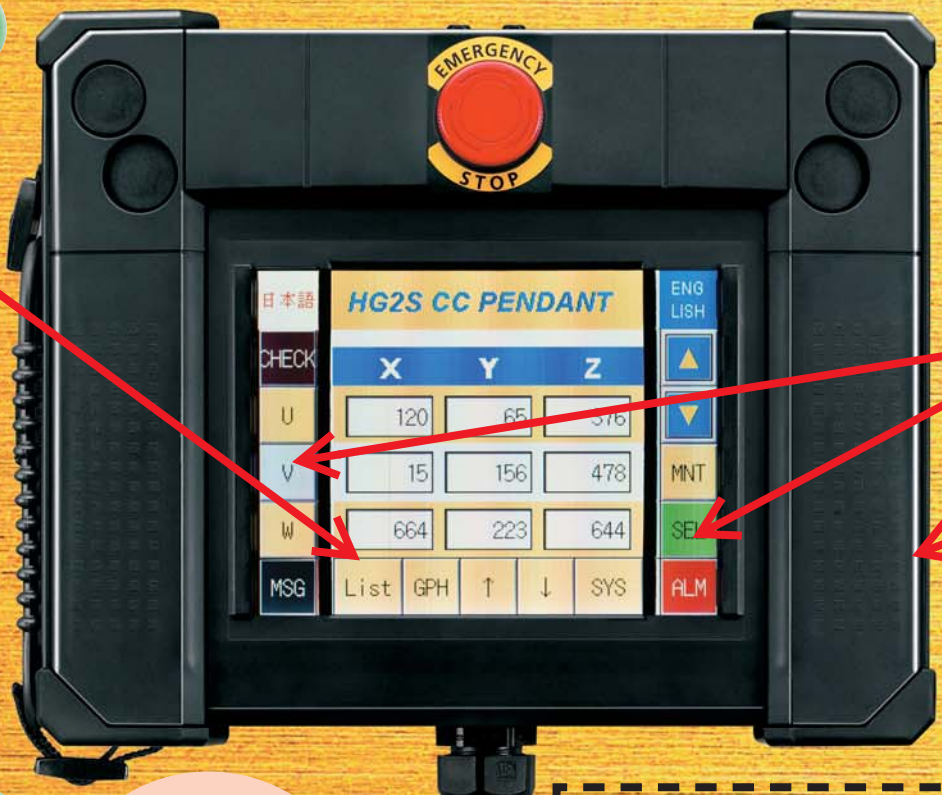
▼ Without mechanical switches

GUI
(Graphical User Interface)

Touch Switch
(12 rows × 10 columns)

SUI on GUI

CC Switch
(6 rows × 2 columns)



Safety SUI

GUI
Graphical User Interface

- A type of HMI which shows graphic objects on the display screen to operate virtual control units.
- Typical examples include a LCD screen with touch switches to operate the switches on the screen.

SUI
Solid User Interface

- A type of HMI which operates mechanical control units such as pushbuttons.
- Typical examples include LED indicators as well as mechanical switches.

SUI on GUI
(CC Switch)

- A new type of control display unit which consists of mechanical switch operators arranged on the LCD screen in consideration of ergonomics.
- The tactile feedback of the switch operator, when pressed, assures the operation of the switch.

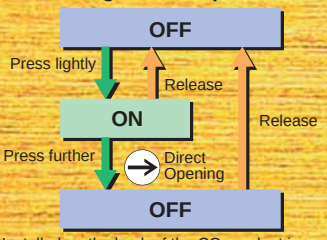
Safety SUI

- Among the SUI, such as pushbutton switches, intended to create the optimum environment for human and machinery, those directly related to safety are called Safety SUI.
- Typical examples include safety switches, emergency stop pushbuttons, stop switches, and enabling switches.

Enabling Switch

HG2S CC Pendant Rear View

Enabling Switch Operation



Installed on the back of the CC pendant is a 3-position enabling switch, which has been developed to enhance the safety for human and machinery based on ergonomics.

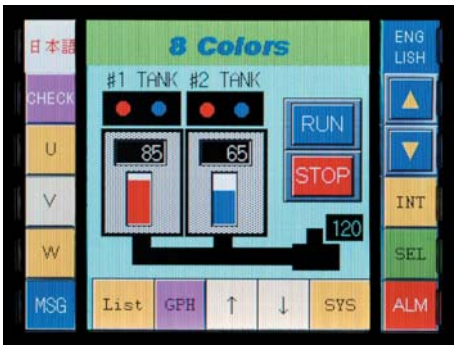
ANSI/RIA R15.06-1999 American National Standard for Industrial Robots and Robot Systems defines "4.7.3 Enabling device: The pendant or teaching device shall have an enabling device using a three position switch which, when continuously held in a detented position, permits motion."

HG2S

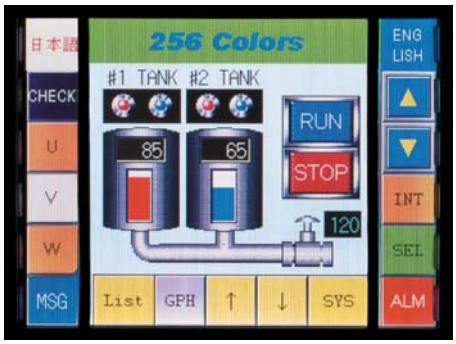
Brightness 250 cd/m^2, 256 colors ensure clear display

Brightness according to manufacturer.

8-color Display



256-color Display



High-speed CPU for fast processing and communication

The 32-bit RISC CPU/133MHz ensures fast switching of screens, fast processing of parts, and fast communication.

Safety concepts packed in the mobile control panel

Meets global standards

	Applicable Standards	Applicable Standards for Use
World	IEC60950, IEC60204-1 IEC61000-6-4 (EMC) IEC61131-2 (EMC)	ISO10218
North America	UL508 CSA C22.2 No.14 FCC Part15 (EMC)	ANSI RIA15.06 UL1740
Europe	EN60950, EN60204-1 EN61000-6-4 (EMC) EN61131-2 (EMC)	EN775
Japan	JIS C 6950 JIS B 9960-1	JIS B 8433

ISO20218 and IEC60204-1 require that a pendant shall have an emergency stop switch. Now it is under deliberation that a stop switch can also be used instead of an emergency stop switch depending on the application of the pendant.

IDEC's proven safety concepts

The HG2S CC pendant features a 3-position enabling switch that is required by the safety standards, and also a stop switch or emergency stop switch. All these switches are field-proven IDEC's control switches.

The HG2S is available with a stop switch (gray button) or an emergency stop switch (red button), which can be selected according to the risk assessment and assists in the inherently safe design of machinery based on ISO12100.

- When the CC pendant can be easily disconnected from the machine control circuit, a stop switch shall be used to indicate that the gray button does not function as an emergency stop switch when the CC pendant is disconnected from the machine.

- When the CC pendant is integrated with the machine control circuit, an emergency stop switch with a red button can be used since the emergency stop switch is always connected to the machine control circuit and the emergency stop function is always enabled.

HG2S Configuration Examples

Sample 1

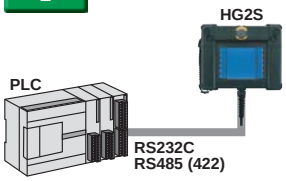
Sample 2

Square control units are also available with switch guards.

- The HG2S can mount ø16mm L6 series control switches, such as pushbuttons, illuminated pushbuttons, selector switches, and key selector switches.

Communication System

Serial 1 PLC Link Communication

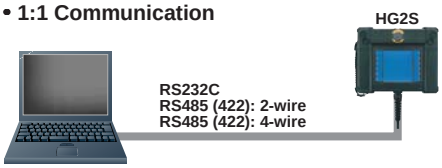


Data can be read from and written into PLC devices, such as relays and registers.

A PLC link unit, programming port on the CPU module, or another serial port is used for communication. The PLC does not require any special program for PLC link communication.

Serial 1 DM Link Communication

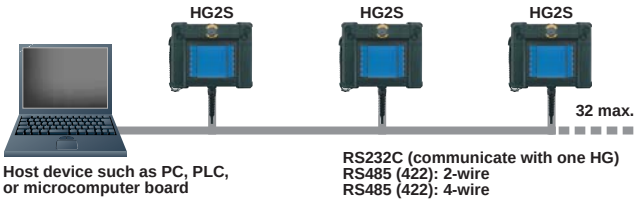
- **1:1 Communication**



Data Memory

DM 0	1
DM 1	127
DM 2	0
DM 3	0
:	:
DM 8190	1234
DM 8191	5678

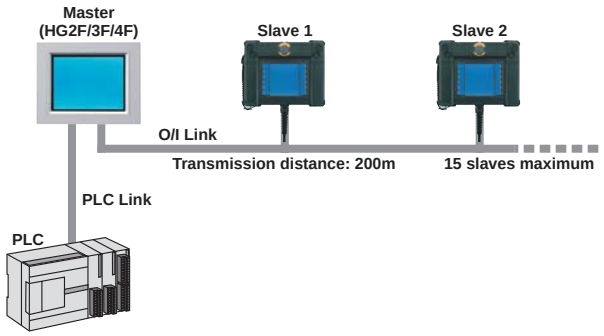
- **1:N Communication**



The host, such as a PC, PLC, or microcomputer board can access the DM link memory in the HG2S to read and write data.

In the 1:1 communication system, one host communicates with one HG unit. In the 1:N communication system, one host communicates with multiple HG units. Since special communication protocol for the HG2S is used, the host requires a special program for DM link communication.

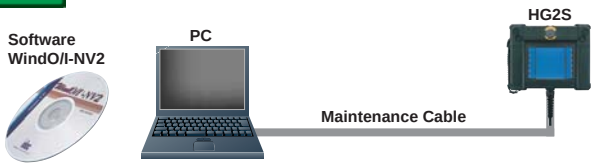
O/I Link O/I Link Communication



One PLC is connected to multiple HG2F/3F/4F/2S units in the O/I link communication system. HG2S units with RS485 port are used for O/I link communication. One O/I serves as a master for a maximum of 15 slaves. The master communicates with the PLC in the PLC link communication system.

The master can read data from the slaves, and the slaves can write to the PLC via the master. The master will read data directly from the specified PLC devices, and the slaves read through the master. The PLC does not require any special program for communication.

Serial 2 Maintenance Communication



WindO/I-NV2 is used to edit a project on the PC, download and upload the project to and from the O/I, initialize the O/I, and show the system program information on the PC.

Options

Maintenance Cable (2m)
HG9Z-XCM22

Protective Sheet
HG9Z-PE1

Wrist Strap
HG9Z-PS1

Hand Strap (supplied with the HG2S)
HG9Z-PS2

Neck Strap
HG9Z-PS3

WindO/I-NV2
HG9Y-ZSS2W
English/Japanese compatible.
PDF files of user's manuals are stored on the CD.

Hardware/Software Manual
HG9Y-B596

HG2S CC Pendant

Mobile teaching pendant designed with safety concepts
3-position enabling switch is a standard provision on the back.

- 256-color 5.7-inch LCD screen for touch switch and display
- CC switches and mechanical switches combined with touch switches on the LCD screen make up ideal HMI equipment.
- High-performance CPU ensures stress-free quick response.
- The grip is made of elastomer to prevent the CC pendant from slipping out of hand.
- IP65 water- and dust-proof structure
- The screen display and operation can be easily designed using WindO/I-NV2.
- UL (UL508), c-UL (CSA C22.2 No. 14) listed, IEC/EN 60950, IEC/EN 60204-1 compliant
- EMC (IEC/EN 61000-6-4, IEC/EN 61131-2) compliant

Types

• Without Mechanical Switch

CC Switch	LCD	Host I/F	Type No.
With CC Switch	Color	RS232C	HG2S-SS62BH-A3②
		RS485/422	HG2S-SS62YH-A3②
	Mono-chrome	RS232C	HG2S-SB62BH-A3②
		RS485/422	HG2S-SB62YH-A3②
Without CC Switch	Color	RS232C	HG2S-SS32BH-A3②
		RS485/422	HG2S-SS32YH-A3②
	Mono-chrome	RS232C	HG2S-SB32BH-A3②
		RS485/422	HG2S-SB32YH-A3②

- Above type numbers are for a 3m cable. When a 5m or 10m cable is required, replace “3” at the end with “5” or “10” respectively.
- In place of ②, specify a code for stop switch (gray button) or emergency stop switch (red button): N (gray), Blank (red)
- Each HG2S unit is supplied with one HG9Z-PS2 hand strap and one HG9Z-PK2 mounting bracket.

• With Mechanical Switch

CC Switch	LCD	Host I/F	Type No.
With CC Switch	Color	RS232C	HG2S-SS62BH-S①-②③
		RS485/422	HG2S-SS62YH-S①-②③
	Mono-chrome	RS232C	HG2S-SB62BH-S①-②③
		RS485/422	HG2S-SB62YH-S①-②③
Without CC Switch	Color	RS232C	HG2S-SS32BH-S①-②③
		RS485/422	HG2S-SS32YH-S①-②③
	Mono-chrome	RS232C	HG2S-SB32BH-S①-②③
		RS485/422	HG2S-SB32YH-S①-②③

- In place of ①, specify a cable length code: 3 (3m), 5 (5m), 10 (10m)
- In place of ②, specify a code for stop switch (gray button) or emergency stop switch (red button): N (gray), R (red)
- In place of ③, a file number controlled by IDEC enters to specify mechanical switches and their layout. For specifying mechanical switches, use the HG2S specification sheet on page???.
- Each HG2S unit is supplied with one HG9Z-PS2 hand strap and one HG9Z-PK2 mounting bracket.

• Options

Name	Type No.	Description	Package Quantity
Maintenance Cable	HG9Z-XCM22	D-sub 9-pin female connector to connect to computer (2m long) (Note)	1
User Communication Cable	FC2A-KP1C	For connecting the HG2S serial interface 2 port (RS232C) to a serial printer; not equipped with a connector for connecting the printer	1
Protective Sheet	HG9Z-PE1	Dustproof protective sheet for CC switches	1
Wrist Strap	HG9Z-PS1		1
Hand Strap	HG9Z-PS2	Supplied with the HG2S	1
Neck Strap	HG9Z-PS3		1
Mounting Bracket	HG9Z-PK2	Supplied with the HG2S	1
Design Tool	HG9Y-ZSS2W	WindO/I-NV2 on CD (English/Japanese compatible) w/o printed manual PDF files of English/Japanese manuals are stored on the CD.	1
Manual	HG9Y-B596	English hardware/software manual	1

Note: Computer link cable 4C (FC2A-KC4C) for IDEC’s MicroSmart, OpenNet Controller and Micro^{3}C is also applicable.

HG2S Configuration Examples

Various ø16mm L6 series control units can be mounted, such as pushbuttons, illuminated pushbuttons, selector switches, and key selector switches.

Example 1

CC Switches
6 × 2 columns (right/left)

Mechanical Switches
E-stop switch: 1
Round pushbutton: 2
Enabling switch: 1

Example 2

CC Switches
6 × 2 columns (right/left)

Mechanical Switches
E-stop switch: 1
Round pushbutton: 2
Square pushbutton: 5
Key switch: 1
Enabling switch: 1

Example 3

CC Switches
6 × 2 columns (right/left)

Mechanical Switches
E-stop switch: 1
Round pushbutton: 2
Illuminated pushbutton: 6
Enabling switch: 1

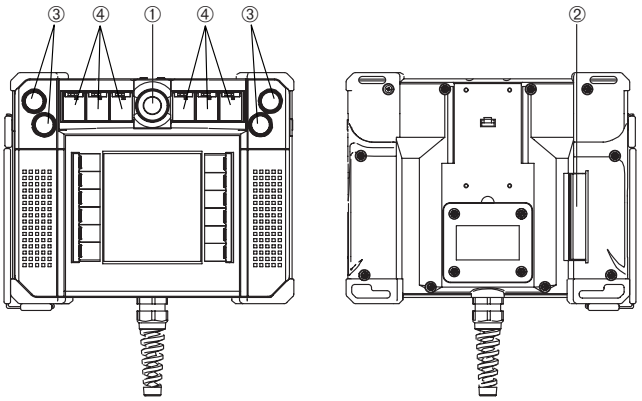
General Specifications

Rated Power Voltage	24V DC
Power Voltage Range	21.6 to 26.4V DC
Power Consumption	10W maximum
Power Inrush Current	30A maximum
Allowable Momentary Power Interruption	10 ms minimum
Dielectric Strength	500V AC, 10 mA, 1 minute between power and FG terminals
Insulation Resistance	10 MΩ minimum between power and FG terminals (500V DC megger)
Operating Temperature	0 to 40°C (no freezing)
Operating Humidity	20 to 85% RH (no condensation)
Storage Temperature	–20 to +60°C (no freezing)
Storage Humidity	20 to 85% RH (no condensation)
Vibration Resistance (damage limits)	10 to 55 Hz acceleration 9.8 m/s^2 2 hours per axis on each of three mutually perpendicular axes
Shock Resistance (damage limits)	98 m/s^2, 11 ms, 5 shocks on each of three mutually perpendicular axes
Noise Immunity	Fast transient/burst test, common mode: Level 3, power terminals: ±2 kV, communication line: ±1 kV (IEC/EN 61000-4-4)
Electrostatic Discharge	ESD-3 (RH-1), Level 3, (contact ±6 kV, aerial ±8 kV) (IEC/EN 61000-4-2)
Corrosion Immunity	Atmosphere free from corrosive gasses
Mounting	Hand-held or hang on hook with mounting bracket
Degree of Protection	IP65 (CC switch: IP20, except connector)
Cable Length	3m (standard), 10m maximum
Dimensions (mm)	228W × 186H × 57D
Weight (approx.)	1200g (except cable)

Operation Specifications

Switch Type	Touch Screen	CC Switch
Switching Element	Resistive membrane	Resistive membrane
Resolution	16 × 12 (CC switch type: 10 × 12)	6 × 2 columns (right/left)
Operating Force	0.2 to 0.8N	2.5 to 5N
Mechanical Life	1,000,000 operations	
Acknowledge Sound	Electronic buzzer	
Multiple Operations	Possible to press two switching areas simultaneously	
① Stop/E-stop Switch	HA1E type, 1 switch, 2NC contacts, Contact rating 24V DC, 1A	
② Enabling Switch	HE1B type, 2 switches, OFF-ON-OFF contact, Contact rating 24V DC, 50 mA	
③ Round Switch	L6 series round pushbuttons, 4 switches maximum 1NO or 2NO contacts, Contact rating 24V DC, 50 mA	
④ Square Switch	L6 series square pushbuttons or illuminated pushbuttons, 6 switches maximum 1NO or 2NO contacts, Contact rating 24V DC, 50 mA	

Mechanical Switch Layout



Display Specifications

Type		Color	Monochrome
LCD		5.7" color STN	5.7" monochrome STN
Display Color		256 colors	2 colors
Effective Display Area		118.2W × 89.4H mm	
Display Resolution		320W × 240H pixels	
Contrast Adjustment		Possible using the front touch screen	
Backlight		Cold-cathode tube (Note)	
Backlight Life		40,000 hours nominal	
Backlight Control		Automatic OFF	
Backlight Replacement		Replaceable at IDEC factory	
Display Character Size	1/4 size	8 × 8 pixels	JIS 8-bit code ISO 8859-1 (west European) ANSI 1251 (central European)
	1/2 size	8 × 16 pixels	
		16 × 32 pixels	ISO 8859-1 (west European)
		24 × 48 pixels	
		32 × 64 pixels	
	Full size	16 × 16 pixels	JIS 1st/2nd level, Simplified Chinese, Traditional Chinese, Korean
	Double size	32 × 32 pixels	JIS first level characters
Quantity of Characters (Touch screen on CC Switch Type)	1/4 size	40 characters × 30 lines (27 × 30)	
	1/2 size	40 characters × 15 lines (27 × 15)	
	Full size	20 characters × 15 lines (13 × 15)	
	Double size	10 characters × 7 lines (6 × 7)	
Character Magnification		0.5, 1, 2, 3, 4, and 8 vertically and horizontally	
Character Attribute		Blink (1 or 0.5 sec period), reverse, bold, shadowed	
Graphics Type		Straight line, polyline, polygon, rectangle, circle, ellipse, arc, pie, equilateral polygons (3, 4, 5, 6, 8), paint, bitmap image	
Window Display		3 popup screens + 1 system screen	

Note: The time until the surface brightness reduces to a half.

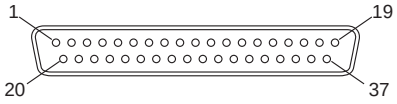
Interface Specifications

RS232C		Electrical Characteristics	EIA RS232C compliant
		Transmission Speed	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
		Synchronization	Asynchronous
		Communication Method	Half or full duplex
		Control System	Hardware control or none
		Connector	D-sub 37-pin connector (JAE's DC-37-PF-N)
RS485 (422)		Electrical Characteristics	EIA RS485 (422) compliant
		Transmission Speed	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
		Synchronization	Asynchronous
		Communication Method	Half or full duplex
		Control System	Hardware control or none
		Connector	D-sub 37-pin connector (JAE's DC-37-PF-N)
External I/O	Input	Input Points	4
		Rated Voltage	12 to 24V DC (allowable range 10 to 28V DC)
		Isolation Method	Photocoupler
		Input Resistance/Current	Approx. 3.9 kΩ / approx. 6 mA (input voltage 24V DC)
		Input Signal Level	ON voltage: 8V min., OFF voltage: 4V max.
	Output	Output Points	3 (including 1 point for RUN output)
		Load Voltage	12 to 24V DC (allowable range 10 to 28V DC)
		Isolation Method	Photocoupler
		Output Signal	NPN open collector
		Output ON Voltage	1.6V maximum
		Output Current	50 mA max. per point, 200 mA total
	Connector		D-sub 37-pin connector (JAE's DC-37-PF-N)
Maintenance Communication		Electrical Characteristics	EIA RS232C compliant
		Transmission Speed	9600, 19200, 38400, 57600, 115200 bps
		Synchronization	Asynchronous
		Comm. Method	Half duplex, proprietary protocol
		Connector	Mini DIN 8-pin connector
O/I Link Communication		Electrical Characteristics	EIA RS485 compliant
		Transmission Speed	38400, 57600, 115200 bps
		Synchronization	Asynchronous
		Comm. Method	Half duplex, proprietary protocol
		Connector	D-sub 37-pin connector (JAE's DC-37-PF-N)

Operation Specifications

Screen Types	Base screen, popup screen, system screen
No. of Screens	Base screen: 3000 max., popup screen: 3015 max.
User Memory	2 MB
Parts	Bit Button, Word Button, Goto Screen Button, Key Button, Print Button, Keypad, Selector Switch, Potentiometer, Numerical Input, Character Input, Pilot Lamp, Picture Display, Message Display, Message Switching Display, Alarm List Display, Alarm Log Display, Numerical Display, Bar Graph, Trend Chart, Pie Chart, Meter, Calendar, Bit Write Command, Word Write Command, Goto Screen Command, Timer, Print Command, Screen Print
Calendar	Year, Month, Day, Hour, Min., Sec., Day of Week ±30 sec per month (at 25°C)
Print Function (support)	SII printer, DPH-414
Power Failure Backup	Backup data: Calendar, log data, keep internal relay, keep internal register Backup duration: 1 month (at 25°C) after full charging for two days

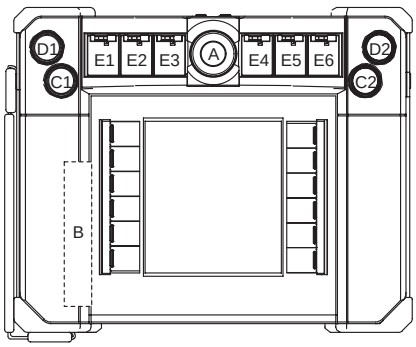
Connector Pin Assignment



• Power Supply and Mechanical Switch Contact

Pin No.	Name	Function
1	FG	Frame ground
2	(unused)	
3	A1	A1 stop/E-stop switch (NC contact)
4		
5	A2	A2 stop/E-stop switch (NC contact)
6		
7	24V DC +	Power supply 24V DC +
8	24V DC +	Power supply 24V DC +
9	24V DC –	Power supply 24V DC –
10	24V DC –	Power supply 24V DC –
20	B1	B1 enabling switch
21		
22	B2	B2 enabling switch
23		
24	D1 NO1	D1 contact 1
25	D2 NO1	D2 contact 1
26	C1 NO1	C1 contact 1
27	C2 NO1	C2 contact 1
28	SW COM	C1, C2, D1, D2 common

Switches E1 through E6 are expansion I/Os of the HG2S internal circuit and are not assigned to connector pins.



• RS232C

Pin No.	Name	Function
1	FG	Frame ground
29	SG	Signal ground
30	SD1	Send data
31	(reserved)	—
32	RD1	Receive data
33	(reserved)	—
34	RS	Request to send
35	NC	—
36	CS	Clear to send
37	NC	—

• RS485/RS422

Pin No.	RS485		RS422	
	Name	Function	Name	Function
1	FG	Frame ground	FG	Frame ground
29	SG	Signal ground	SG	Signal ground
30	SDA	Send data A	SD+	Send data +
31	SDB	Send data B	SD–	Send data –
32	RDA	Receive data A	RD+	Receive data +
33	RDB	Receive data B	RD–	Receive data –
34	—	—	RS+	Request to send +
35	—	—	RS–	Request to send –
36	—	—	CS+	Clear to send +
37	—	—	CS–	Clear to send –

When using RS422 communication on the RS485/422 type HG2S, open the rear lid and change the communication switch settings. O/I link communication uses RS485.

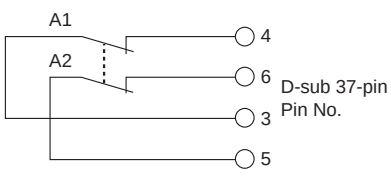
• I/O

Pin No.	Name	Function
11	I/O+	External I/O power +
12	I/O–	External I/O power –
13	Y0	External output 0
14	Y1	External output 1
15	O RUN	Run output
16	X0	External input 0
17	X1	External input 1
18	X2	External input 2
19	X3	External input 3

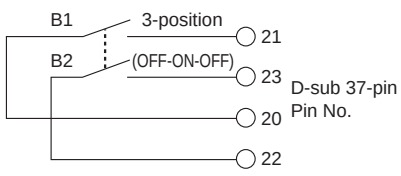
The run output remains on whether the HG2S is running or not, and turns off when a system error occurs in the HG2S.

Contact Configuration

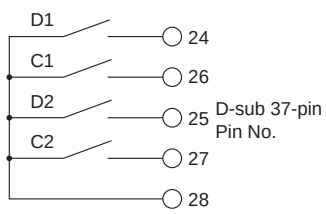
① Stop/E-stop Switch (A1, A2)



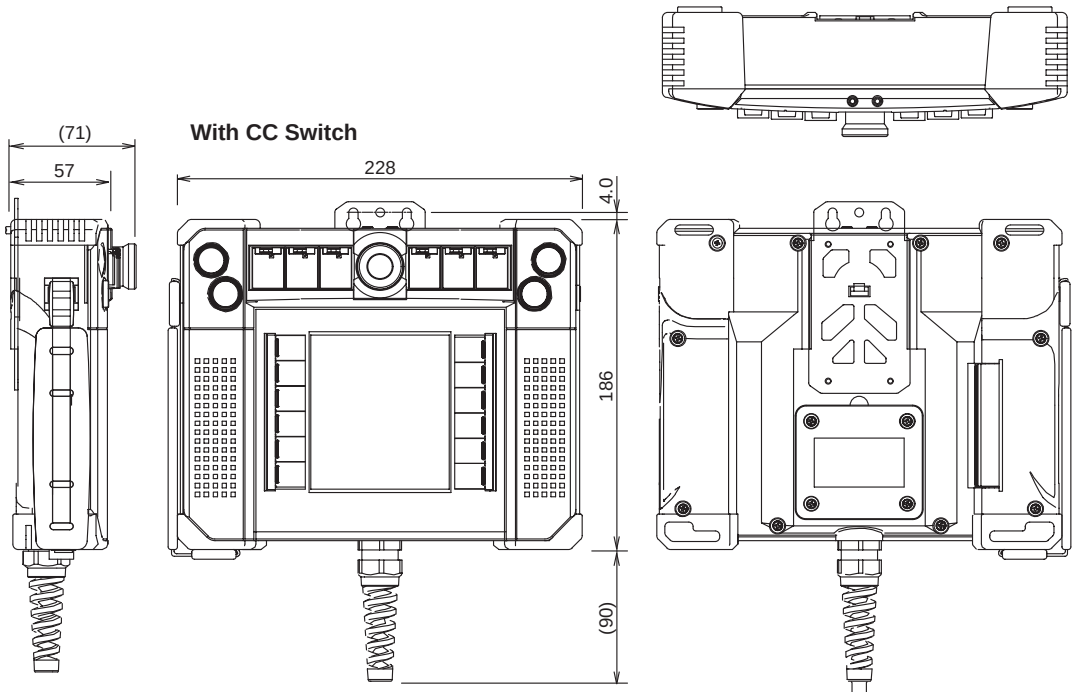
② Enabling Switch (B1, B2)

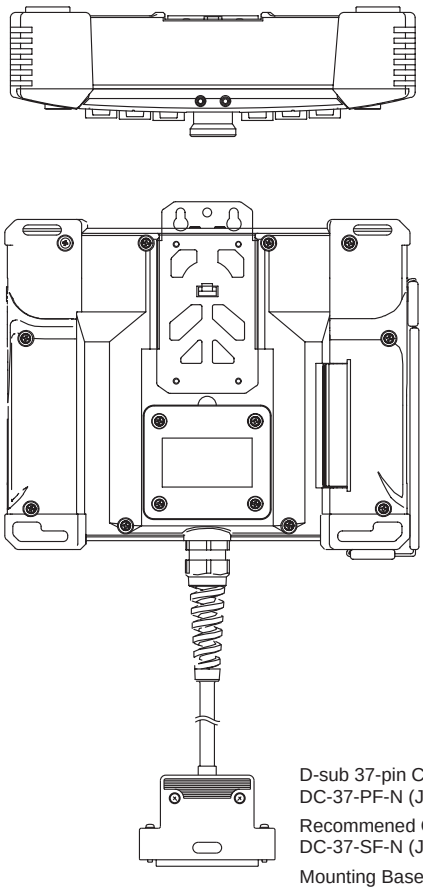


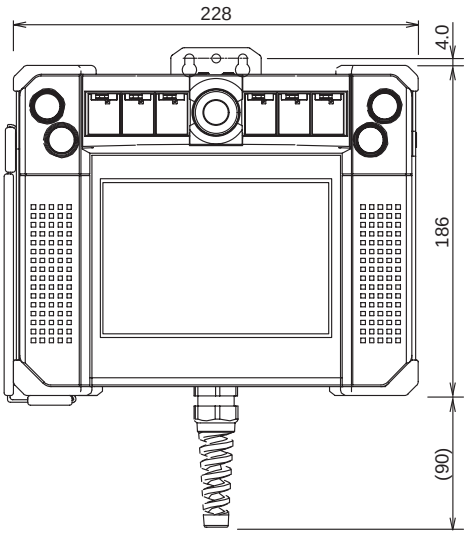
③ Round Switch (C1, C2, D1, D2)



Dimensions





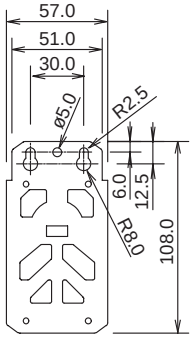


D-sub 37-pin Connector Plug:
DC-37-PF-N (Japan Aviation Electronics)

Recommened Connector Socket:
DC-37-SF-N (Japan Aviation Electronics)

Mounting Base: D20418-J3F (2 pcs)

Mounting Bracket (supplied)
HG9Z-PK2



All dimensions in mm.

⚠ Safety Precautions

- Turn off the power to the HG2S before starting installation, removal, wiring, maintenance, and inspection of the HG2S. Failure to turn power off may cause electrical shock or fire hazard.
- Special expertise is required to install, wire, configure, and operate the HG2S. People without such expertise must not use the HG2S.
- The HG2S 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.
- Connect the emergency stop switch (direct opening action type, red button) or the stop switch (direct opening action type, gray button) to an emergency stop circuit secured on a machine in accordance with ISO 13850 / EN 418. Do not configure an emergency stop circuit using the touch switches on the HG2S. If the HG2S internal circuit should fail, a serious injury or equipment damage may be caused.
- When using the HG2S with an emergency stop switch, secure the HS2S cable to the machine so that the cable cannot be disconnected easily.
- Connect the emergency stop switch or the stop switch and the enabling switch on the HG2S to function as either a category 0 or category 1 stop in accordance with IEC/EN 60204-1.
- When the HG2S cable can be easily disconnected from the machine, use the HG2S with a stop switch so that the operator can easily notice that the HG2S is not an emergency stop device which always functions.

HG2S SPECIFICATION SHEET

Date: _____

Use this sheet to specify detailed layout of optional switches and other provisions of the HG2S CC pendant.

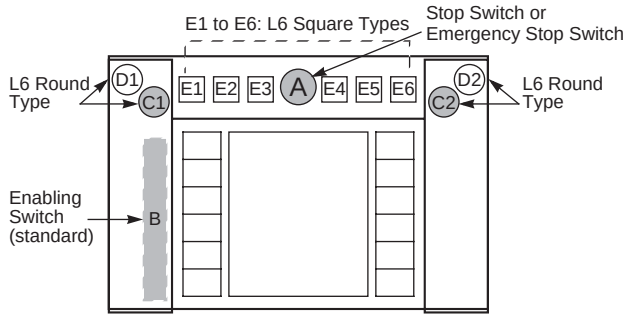
User Information

Company		Department	
Person in Charge		Email	
Address			
Phone No.		Remarks	

Product Information

Type No.	HG2S–S ① ② 2 ③ H–S ④ – ⑤ Specify codes in place of ①, ②, ③, ④, and ⑤. ① Screen color: S (color), B (monochrome) ② LCD: 6 (w/CC switch), 3 (w/o CC switch) ③ Host interface: B (RS232C), Y (RS485/422) ④ Cable length: 3 (3m), 5 (5m), 10 (10m) ⑤ Stop switch color: N (gray stop switch), R (red emergency stop switch)				
Application				Host	
Quantity		Delivery		Record No. (for Idec)	

Mechanical Switch Selection



• Select a switch type for position A.

Switch Position	Switch Type (button color)	
A	☐ Stop Switch (gray)	☐ Emergency Stop Switch (red)

• For switch positions C1, C2, D1, D2, and E1 to E6, specify type code, color code, and contact type.

C1, C2, D1, and D2 (L6 series, round switches)

Switch Position	Type	Color	Contact (1NO, 2NO) (Note 1)	
C1				The total of contacts C1 and D1 can be 2NO maximum.
D1				
C2				The total of contacts C2 and D2 can be 2NO maximum.
D2				

E1 to E6 (L6 series, square switches)

Switch Position	Type	Color	Switch Guard	Contact (1NO, 2NO) (Note 1)	
E1			☐ Yes ☐ No		While the total of contacts E1, E2, and E3 can be 4NO max., only one switch can use 2NO.
E2			☐ Yes ☐ No		
E3			☐ Yes ☐ No		
E4			☐ Yes ☐ No		While the total of contacts E4, E5, and E6 can be 4NO max., only one switch can use 2NO.
E5			☐ Yes ☐ No		
E6			☐ Yes ☐ No		

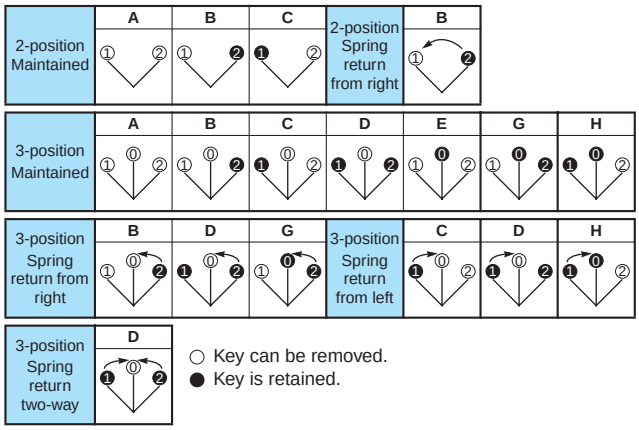
Note 1: Only NO contacts are used in selector and key selector switches.

• Type Code

L6 Control Unit (ø16) which can be used as mechanical switches			For positions C and D (round)	For position E (square)
Illuminated Pushbutton (LED, Gold Contact, 5V DC)		Momentary	—	S11
		Maintained	—	S12
Pushbutton (Gold Contact)		Momentary	R21 (L) (Note 2)	S21 (L) (Note 2)
		Maintained	R22 (L) (Note 2)	S22 (L) (Note 2)
Pilot Light (LED, 5V DC)			—	S31
Selector Switch (Gold Contact)	2-position	Maintained	R41	S41
		Spring return from right	R42	S42
	3-position	Maintained	R43	S43
		Spring return from right	R44	S44
		Spring return from left	R45	S45
		Spring return two-way	R46	S46
Key Selector Switch (Gold Contact)	2-position	Maintained	R51_ (Note 3)	S51_ (Note 3)
		Spring return from right	R52_ (Note 3)	S52_ (Note 3)
	3-position	Maintained	R53_ (Note 3)	S53_ (Note 3)
		Spring return from right	R54_ (Note 3)	S54_ (Note 3)
		Spring return from left	R55_ (Note 3)	S55_ (Note 3)
		Spring return two-way	R56_ (Note 3)	S56_ (Note 3)
Dummy Unit			R91	S91

Note 2: Specify "L" when illuminated type lens is required for pushbutton switch.

Note 3: When ordering key selector switches, specify the code of key removal positions (see below).



○ Key can be removed.
● Key is retained.

• Color Code

(Not necessary for selector and key selector switches)

- **Illuminated pushbutton and pilot light**
  A (amber), G (green), R (red), W (white), Y (yellow)
- **Non-illuminated pushbutton**
  B (black), G (green), R (red), S (blue), W (white), Y (yellow)

HG2S CC Pendant

Operating Instructions

When installing and wiring the HG2S or when designing a control panel including connection to the host device, observe the following instructions to make sure of safety of the personnel and performance of the HG2S.

1. Installation Location

In consideration of the safety and HG2S performance, avoid installing the HG2S in the following locations:

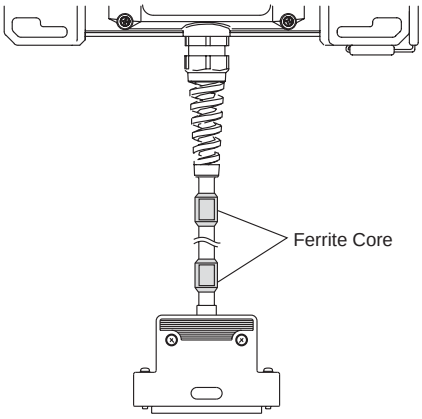
- Where dust, briny air, or iron particles exist in quantity
- Where oil or chemical splashes exist
- Where direct sunlight falls on the HG2S
- Where a corrosive gas or flammable gas exists
- Where the HG2S is subjected to vibrations or shocks
- Where dew condensation occurs due to rapid temperature change

2. Operating Environment

- Install the HG2S in such a way that it will not be exposed to the heat generated by other equipment.
- If there is no need to operate the HG2S, mount it onto a wall or a stand. Use the attached mounting bracket for wall mounting.
- Do not apply force to the D-sub connector directly.

3. Wiring

- Do not install the HG2S near high-voltage devices or arc-generating equipment, such as electromagnetic contactors and no-fuse breakers.
- Keep a minimum of 200 mm from motor lines.
- Make the power connection to the HG2S as short as possible.
- Separate the connection lines for motor devices from power lines for I/O devices connected to the HG2S.
- For connection with host devices, various cables are available for each HG unit. Select a correct cable for the HG2S and host device.
- When making a cable for connecting the HG2S to a host, use the recommended connector and applicable wire. When the maximum cable length is defined, observe the maximum cable length.
- For power connection to the HG2S, twist the wires together and make the connection between the power supply and the D-sub connector as short as possible.
- The stop switches and emergency stop switches consist of two NO contacts each. The enabling switches also consist of two poles of OFF-ON-OFF contacts. All these switches can be wired so that two input points can monitor each other. Since two poles of contacts are separated, note that there may be a slight time difference when the two poles operate. When wiring the enabling switches using two inputs to monitor the two poles of contacts with each other, design the sequence program in consideration of the time difference in contact operation of the two poles.
- When using the HG2S in environments where the HG2S is subjected to interference or noises, attach ferrite cores to both ends or to either end of the cable.



4. Operability and Maintenance

- Perform maintenance and inspection periodically to ensure the best performance.
- The touch screen surface and CC switch lens are easily damaged. Do not scratch or press strongly on the surfaces using hard tools.
- To wipe off smears on the lens and screen surfaces, use a soft cloth dampened with the following solvents.

  Neutral detergent (squeeze the cloth tightly)

  Alcoholic solvents

  Do not use solvents such as thinner, ammonia, strong acid, and strong alkaline.
- The HG2S housing is made of plastic. Do not drop or strike the HG2S against hard objects, otherwise the housing will be damaged.
- To prevent the HG2S from falling, hold the HG2S through the hand strap during operation. Or, use the optional wrist or neck strap.
- The touch screen is made of glass. Do not strike a hard object or exert an excessive force on the touch screen, otherwise the touch screen may be damaged.
- The D-sub connector on the cable end is not IP65 water/dustproof type. Take this into consideration when installing the HG2S.
- Do not exert an excessive force, twist or pull on the cable, otherwise the cable may be broken.
- Do not use the HG2S in the vicinity of fire or sparks of a welding machine.

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