IDEC

Think Automation and beyond...

AGV AND AUTOMATIC
WAREHOUSE Industry Solutions

APEM
an IDEC company

AGV AND AUTOMATIC WAREHOUSE INDUSTRY

With trends such as the advance of e-commerce continuing to push ahead automated warehouses and AGVs, material handling technologies that boost efficiency and automation in the flow of goods must provide the added value of uninterrupted systems and visual control. As seen with the formulation of ISO3691-4 as the new AGV safety standard, balancing safety and peace of mind with efficiency could also become an even greater issue in AGVs and automated warehouses. IDEC has a strong history of supplying the industry with safety, HMI, control panel, and automation products, as well as a wide range of standard-compliant products. We will continue to offer solutions using the latest technology to contribute to AGV and automated warehouse automation and efficiency.

AGV / Automated Warehouse Industry and IDEC

BOOSTING PERFORMANCE

IDEC helps boost the performance of customers' AVGs and automated warehouses with a vast array of product lines, including switches for triggering the operation of equipment and facilities, operator interface for visual control, barcode scanners for product identification, push-in terminal blocks that reduce the installation space and wiring time required for the control portion of equipment and facilities, and the safety laser scanners, interlock switches, bumper switches, and enabling switches that ensure operator safety and peace of mind.

PREVENTING DOWNTIME

Preventing downtime in AVGs and automated warehouses hinges on not just reliability but also ease of use. When it comes to quality, IDEC places utmost priority on both reliability and ease of use and has been constantly working to improve these, which is why our products are used by so many customers in so many areas of the AGV and automated warehouse industry. IDEC will continue to develop and supply products with a focus on reliability and ease of use, helping to realize AGVs and automated warehouses with no downtime.

LOOKING AHEAD

As AGVs become increasingly multifunctional and automated warehouses even more efficient, environments where there is a physical separation between AVG and equipment operation areas and human work areas will give way to collaborative environments where people work in collaboration with machinery in the same space. The new AGV standard ISO3691-4 formulated in February 2020 will also be revised in the years ahead, making safety standards even clearer. IDEC will pursue product development and supply geared to collaborative work environments to add peace of mind to safety, while at the same time continuing to provide solutions geared to market changes, so that we can help to realize the future of AGVs and automated warehouses.

Safe and efficient solutions for the logistics industry

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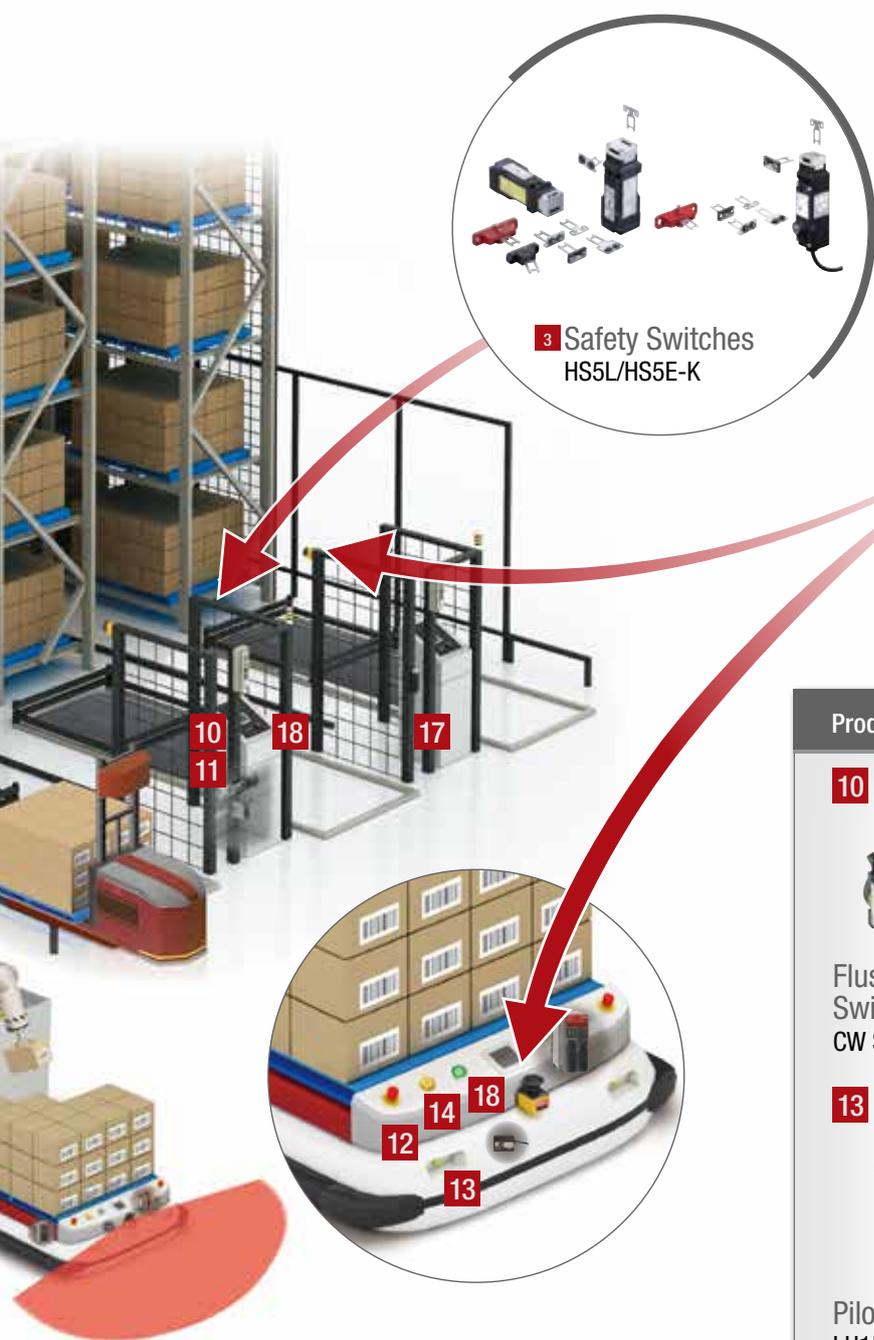
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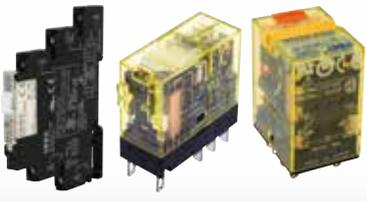
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New Products

Coming Soon

Safety Commander™

Tablet Mount Safety Device

Safety functions (emergency stop switch / enabling switch) added to commercially available tablets for use as a remote controller or teaching pendants

■ The device can be attached to **8** to **11**-inch tablets for flexible mounting depending on the required display size.

■ Ergonomic grip design ideal for long and **fatigue-free** operation.

■ Rotating mechanism allows the tablet to be used **vertically** or **horizontally**, to display a variety of contents including drawings, tables, and graphs.

■ **Dedicated accessories** enable wall mount for installation in limited spaces when the device is not used.

Emergency Stop Switch

Enabling Switch

*) The above image shows the device mounted on a commercially available tablet.
*) The tablet must be purchased by the user.

Series	Operating Temperature	Operating Humidity	Degree of Protection	Supported Tablet Sizes	Supported Tablet Thickness	Switches
Safety Commander	-20 to +55°C (-20 to +30°C (*1))	45 to 85% RH	IP54	8 to 11 inches	9 to 24 mm	Emergency stop switch: XA1E-LV302Q4R Enabling switch: HE5B-M2PY

*1) USB power supply

Ensuring safety when using a tablet as a remote controller for AGVs / automated warehouse

BEFORE

Safety issues occur when tablets are used.

AFTER

Easy and safe operation can be achieved
Satisfies ISO3691-4 requirements

Emergency stop switches and enabling switches can be operated while holding the tablet with one hand.

Control using a tablet

New

KW2D Smart RFID Reader

RFID to smartly manage access to devices and facilities, such as entering and exiting automated warehouses

▌ **ø22** panel cut-out enables standardization with switches of the same cut-out and allows easily installation.

▌ Device equipped with **verification function**. Easy tag registration using a software.

▌ Ethernet communication (Modbus TCP, EtherNet/IP) allows **easy communication** with existing devices such as touch panels and PLCs.

Coming Soon

HR6S Safety Relay Modules

Full range of diagnostic functions reduce downtime at automated warehouses

▌ **Diagnostic** results are **coded** and output as a pulse signal for easy and detailed monitoring of systems.

▌ **Dial switching** allows connection to various input devices and selection of numerous start modes, eliminating the need use a different module with a different function.

▌ IDEC safety relay modules, including HR5S category 2 relay modules, covers all safety requirements from **categories 1 to 4**. Can be used for various safety applications.

Coming Soon

SE4D-C Safety Light Curtains

Compact, lightweight, and high performance. Ideal for detecting access to restricted areas at robot systems

▌ Compact size fits on an **aluminum frame** used as safety fences around restricted areas to avoid collision with detected objects.

▌ Although compact in size, **various functions** such as a muting function, fixed blanking, and floating blanking, are available for conveyor lines.

▌ **Large operation indicators** indicate the presence of the light curtain and prevents downtime due to inadvertent shading in automated warehouses.

* SE4D is shown as image.

SE2L
Safety Laser Scanner

## Compact safety laser scanner for easy integration in AGVs

SE9Z-* connection box

▌ Compact size suitable for integration in devices (85 × 85 × 95 mm)

▌ Safety can be maintained throughout a range of 270 degrees at a distance of 5 m with a single unit, ideal for equipment using robots such as palletizing robots and long conveyor lines

▌ A combination of up to 4 master and slave units can be connected. This makes it possible to integrate input and output of multiple units for 360-degree detection of AGVs, as though they are a single unit

▌ A maximum of 128 area patterns can be configured/switched according to the mobile application such as AGV, ensuring the optimum protection in various applications

▌ By sending out distance measurement data through the Ethernet port on an AGV, data of obstacles in surrounding areas can be acquired and used as AGV location information

▌ SE9Z-* connection box equipped with a safety relay reduces maintenance time and wiring (*1)

*1 Coming Soon

▌ Distance 5m, sensing angle 270°(*1)

7 steps or more (*1)

5m
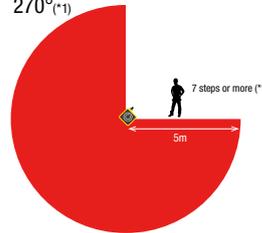
▌ Safety ensured with maximum of 128 (*2) area patterns

*1) average stride length (70 cm) of a 170 cm tall person

*2) Maximum 32 sets of area can be configured by parallel input when switching the area by encoder input.

▌ Master slave connection achieves 4 times the sensing area of a single unit
Up to 4 units can be connected using RS-485, increasing the sensing area to 4 times.

Area switching

K1
K2

M

RS-485

Area Switching

Slave →
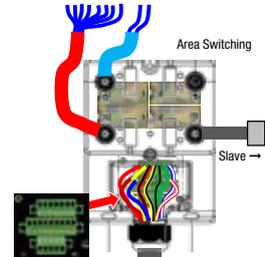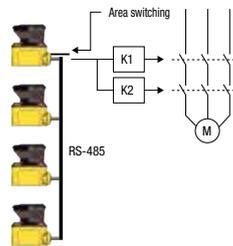
Series	Performance Level	SIL	Response Speed	Power Supply Voltage	Power Consumption	International Standards			
						UL	CSA	TÜV	CE
SE2L	PL=d	SIL 2	ON → OFF: 60 to 510ms OFF → ON: 270 to510ms	24V DC ± 10%: When using converter power supply 24V DC -30%/+20%: When using battery	Without Output Load: 6W Maximum (without output load): 50W	●	●	●	●

Application: Detection and collision protection of humans entering AGV and AMR routes

Compact size suitable for limited installation spaces on AGV / AMR

HS5L/HS5E-K

Interlock Switches

Compact interlock switches suitable for safety doors in automated warehouses

▌ Compact size mounts comfortably on an aluminum frame without impeding. **2-contact** models suitable for category 2 is also available (*1)

▌ Locking/unlocking is achieved using a key. By using the same key as HW switches, **hostage control** is possible (*2)

▌ **Head removal** detection function prevents accidents that are caused by a door opening unexpectedly when the head is removed (*2) (*3)

▌ Complete with 2 types: a **spring lock** type and a **solenoid lock** type for applications where locking is not required for safety (*1).

▌ Rear unlock button models available, for **unlocking** doors in case a person is left behind in a dangerous area.

*1) HS5L *2) HS5E-K *3) HS5L spring lock type

Series	Contact Ratings		Mechanical Durability	Electrical Durability	Solenoid	Locking Strength	International Standards				
	Rated Insulated Voltage	Rated Current					UL	CSA	TÜV	CCC	CE
HS5L	250V	2.5A	2,000,000 times min. (*4)(*5)	100,000 times min. (Operating Frequency: 900 operations/h) 2 million operations min. (24V AC/DC, 100mA)	Rated voltage: 24V DC Rated xurrent: 200mA	1400N min.	●	●	●	●	●
HS5E-K	250V	2.5A max. (*1) 1.5A max. (*2) 1.0Amax. (*3)	1,000,000 times min. (*4)(*5)	100,000 operations min. (AC-12, 250V, 1A) 1 million operations min. (24V AC/DC, 100 mA) (Operating frequency: 900 operations/h)	–	1400N min.	●	●	●		●

*1) Operating temperature: −25°C to 60°C *2) Operating temperature: 60° to 65°C *3) Operating temperature: 65°C to 70°C:
*4) Operating Frequency: 900 operations/h, actuator insert/remove, solenoid operation *5) 100,000 times min. when HS9Z-SH5/EH5L/DH5 (actuator insert/remove)

Application: Interlock for safety fences/doors in automated warehouses

Hostage control can be acheived by reduced installation space and key operation

HG1P

Operator Interface Hand-Held Model

Lightweight, robust, user-friendly teaching pendant for AGVs and various equipment in automated warehouses

▌ Lightweight and compact, weighs only 500g, yet robust and drop resistant to a height of **1.5** m, to prevent damage if it is dropped

▌ Ergonomic design ideal for long and fatigue-free operation. **1.5** seconds start up reduces wait time

▌ **High-resolution 4.3-inch TFT color LCD** display. Clear and informative display enables intuitive operation

▌ **Removable cable** enables cables to be detached easily when damaged. Saves downtime and cost

▌ Easy maintenance with a USB memory achieve a **simple and easy** work environment

▌ High resolution and clear display makes robot teaching simple

Series	Rated Voltage	Power Consumption	Electrostatic Discharge	Display	Color/ Shade	Display Resolution	Brightness	View Angle	Backlight Life	User Memory Capacity	International Standards		
											UL	CSA	CE
HG1P	24V DC	3W max. (2W max. when not using USB interface (USB2))	Air: 8 kV Contact: 4 kV	TFT Color LCD	65,536 colors	480 (W) × 272 (H) pixels	400 cd/m2	Left / right: 80°, top: 65°, bottom: 55°	30,000 hours minimum	12MB	●	●	●

Application: Various teaching and monitoring applications for AGV, AMR, and equipment in automated warehouses

Safe IDEC Products: Easy for Anyone to Use, and Meet the Requirements of the New ISO3691-4 AGV Standard

HE*B
Enabling Switch

3-position switch suitable for avoiding danger in emergency situations and hold-to-run operation

▌ Ergonomic **3**-position operation OFF➔ON➔OFF to avoid danger

▌ Structure that does not turn ON between pushed-in OFF (position 3) state to released OFF (position 1) state.
(IEC60204-1, Section 9.2.5.8; IEC60947-5-8, Section 7.1.9)

▌ Wide variety of models available, from a single to a maximum of **6 contacts**

▌ 2 contacts are built in for circuit **redundancy**, and for complies with requirement PI=C item 24 in table 1 of the new ISO3691-4 AGV standard

▌ Compact size with a **monitor contact** (*1).

*1) HE6B

▌ Ergonomic 3-position operation
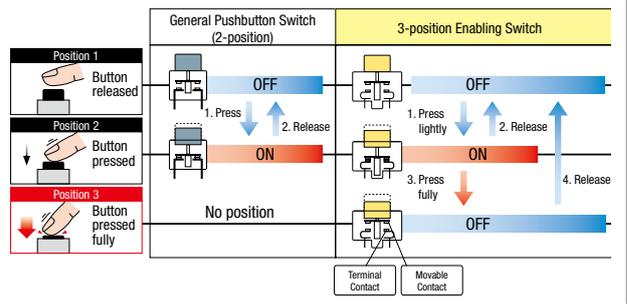
Series	Contact Rating		Mechanical Durability	Electrical Durability	Weight	International Standards				
	Rated Insulation Voltage	Rated Current				UL	CSA	TÜV	CCC	CE
HE2B	250V	3A	Position 1 ➔ 2 ➔ 1: 1 million operations min. Position 1 ➔ 2 ➔ 3 ➔ 1: 100,000 operations min.	100,000 operations min.	26g (without rubber boot), 30g (with rubber boot)	●	●	●	●	●
HE3B	125V	3A	Position 1 ➔ 2 ➔ 1: 1 million operations min. Position 1 ➔ 2 ➔ 3 ➔ 1: 100,000 operations min.	100,000 operations min.	14g (without rubber boot), 18g (with rubber boot)	●	●	●	●	●
HE5B	125V	3A	Position 1 ➔ 2 ➔ 1: 1 million operations min. Position 1 ➔ 2 ➔ 3 ➔ 1: 100,000 operations min.	100,000 operations min.	8g (without rubber boot), 9g (with rubber boot)	●	●	●	●	●
HE6B	125V	3A	Position 1 ➔ 2 ➔ 1: 1 million operations min. Position 1 ➔ 2 ➔ 3 ➔ 1: 100,000 operations min.	100,000 operations min. (rated load), 1,000,000 operations min. (24V AC/DC 100 mA)	14g (without rubber boot), 17g (with rubber boot)	●	●	●	●	●

Application: Hold-to-run operation and danger avoidance with teaching pendant and remote control

Compact, lightweight, and highly reliable, and suitable for pendants and remote controls

LD6A
LED SignaLight Towers

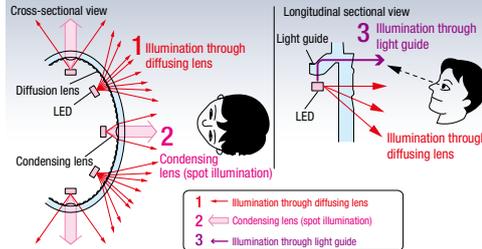## Stylish design fits installation on AGVs and various equipment in automated warehouses

▮ Universal design with oval shape and striped design enhances **visibility**

▮ Variety of mounting patterns, easily replaceble LED units, and **plug-in** terminals. Color combinations can be changed on-site, **reducing** maintenance time

▮ Steady / flashing (flashing cycle compliant with **IEC** standards / alarm types available

▮ Unique powerful design with 360-degree sound field. Two alarm sound patterns available.

▮ Unique lens offers high visibility

Three different illumination methods and a unique lens shape enable high visibility from all directions.

■Characteristics of the lenses and light

Cross-sectional view

Longitudinal sectional view

1 Illumination through diffusing lens

Diffusion lens

LED

Condensing lens

2 Condensing lens (spot illumination)

Light guide

3 Illumination through light guide

LED

Illumination through diffusing lens

1	← Illumination through diffusing lens
2	⇐ Condensing lens (spot illumination)
3	← Illumination through light guide

2 Condensing lens area (spot illumination)
3 Light guide
1 Diffusion lens

Light OFF

Light ON

Clear lens type

By combining a diffusing lens, which diffuses the light broadly, with a condensing lens, a super bright area is created enabling high visibility. Also, the illumination through the light guide enhances the visibility when the SignaLight is viewed from below.

| Series | Rated Voltage | Power Consumption (LED) | Power Consumption (Buzzer) | Flashing Cycle (IEC60073) | LED Life | Alarm Volume | International Standards | | |
							UL	CSA	CE
LD6A	24V AC/DC	LED: 0.6W (R,Y) 0.75W (S, G) 0.5W (W)	110mA max.	Approx. 105 flashes per minute (1.75 Hz)	Approx. 30,000 hours	70 to 90 dB, at 1m (volume adjustable)	●	●	●

Application: Alarm when abnormality occurs in a device

Stylish Design for Devices
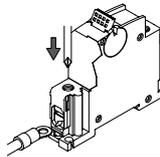
Panel Solutions

NC1V
Circuit Protectors

Circuit protector for usability and safety

▍ The flat handle fits in the main body to **prevent misoperation** due to contact

▍ Safe trip-free mechanism ensures that the circuit is cut off even if the handle is operated immediately after an accident, in order to avoid an **sudden restart**

▍ Integrated terminal covers achieve **IP20** finger protection and prevent electric shock

▍ AC / DC common models help reduce **stock**
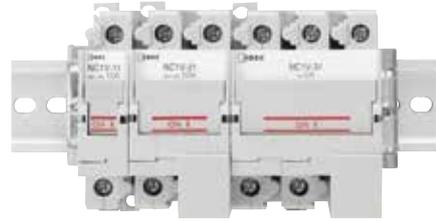
▍ Finger-safe, spring-up terminal reduces wiring time.
Ring terminal tabs can be installed easily, and screws are held captive.

▍ Padlock Attachment
Locks the retractable actuator in the off position to prevent NC1V from being switched on inadvertently.

▍ Main circuit terminals are fingersafe (IP20)
Spring-up, fingersafe structure requires no terminal cover.

▍ Auxiliary/Alarm contact terminals are equipped with a terminal cover
Voltage coil terminals on the relay trip version are also equipped with a terminal cover as standard.

Series	Rated Voltage (AC, DC) (*1)	Rated Short-circuit Capacity	Series Trip Trip Characteristics	Dimensions (width)	International Standards				
					UL	CSA	TÜV	CCC	CE
NC1V	1-pole: 250V AC 50/60Hz, 65V DC 2-pole: 250V AC 50/60Hz, 125V DC 3-pole: 250V AC, 50/60Hzz	2,500A	Curve M (slow) Curve A (medium) Curve S (instantaneous)	1-pole: 17.5mm 2-pole: 35.0mm 3-pole: 52.5mm	●	●	●	●	●

*1) 3-pole type is for AC voltage only.

Application: Protection from damage due to overload and short circuit in devices and circuits inside the equipment
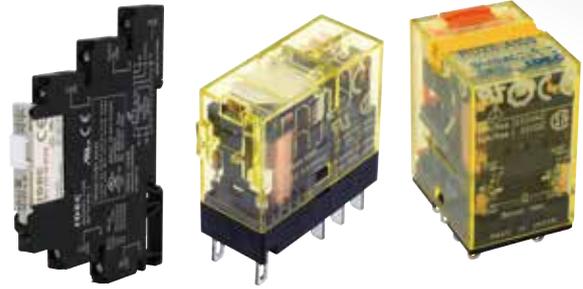
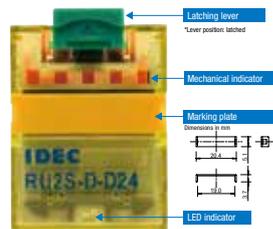Reduce wiring work and eliminate lost screws achieving cost reduction

RU/RJ/RV8
Slim Relays / Universal Relays

Slim, compact relays save installation space for parts mounting

▌**Compact** size with excellent durability and high contact allowable current.

▌Circuit check can be checked without energizing the coil, enabling check up **before applying power** to the relay (RU)

▌The release lever easily holds and removes the relay and push-in terminals reduce **wiring time** (RU, RJ).

▌Space-saving **6** mm ideal for high density mounting (RV8).

▌Only **70** mm from the DIN rail. Suitable for slim control panels and low-profile AGVs (RV8).

Time Saving & Efficient

Latching lever
*Lever position: latched

Mechanical indicator

Marking plate
Dimensions in mm

LED indicator

▌Large Switching Capacity

Highly conductive materials ensure stable electric conduction of current.

High Capacity (maximum allowable switching current)

12A | 10A | 8A | 5A
RJ1 | Competitor products | RJ2 | Competitor products

Note) Values compared with specifications in competitor's datasheet

▌Save up to 55% in wiring time

Wiring time reduced greatly compared with conventional screw terminals. (Compared with IDEC products)

Push-in SJ Series

Conventional screw terminal

Approx 55% reduced

Based on IDEC research
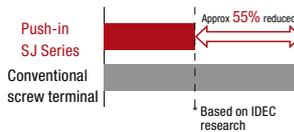
▌Reduce maintenance work

Push-in terminals eliminate the need for torque maintenance such as tightening of screws because screws are not used.

No retightening

| Series	Rated Thermal Current	Contact Material	Electrical Life	Mechanical Life	International Standards			
					UL	CSA	TÜV	CE
RJ	1-pole: 12A 2-pole: 8A 2-pole (bifurcated contacts): 1A	AgNi (*1) AgNi (Au clad) (*2)	•AC: 200,000 operations min. DC: 100,000 operations min. Operation frequency 1800 operations/ h (*1) •AC: 100,000 operations min. DC: 200,000 operations min. Operation frequency 1800 operations/ h (*2)	•AC : 30,000,000 operations min. DC: 50,000,000 operations min. Operation frequency 18,000 operations/h (*1) •AC : 10,000,000 operations min. DC: 20,000,000 operations min. Operation frequency 18,000 operations/h (*2)	●	●	● (VDE)	●
RU	2-pole (RU2): 10A 4-pole (RU4): 6A 4-pole (RU42 bifurcated contacts): 3A	2-pole (RU2): Ag alloy 4-pole (RU4): Ag (Au-clad) 4-pole (RU42 bifurcated contacts): Ag-Ni (Au-clad)	2-pole (RU2): 100,000 operations min. (250V AC,10A/resistive load) 500,000 operations min. (250V AC, 5A/resistive load) 4-pole (RU4): 50,000 operations min. (250V AC, 6A/resistive load) 4-pole (RU42 bifurcated contacts): 100,000 operations min. (250V AC,3A/resistive load)	2-pole (RU2) / 4-pole (RU4): AC: 50,000,000 operations min. DC: 100,000,000 operations min. 4-pole (RU42 bifurcated contacts): 50,000,000 operations min.	●	●	●	●
RV8	6A	AgNi+Au plated	30,000 operations min. (NO contact) 10,000 operations min. (NC contact) (*3)	10,000,000 operations min. (Operation frequency 18,000 operations/h)	●	●	● (VDE) (*4)	●

*1) 1-pole, 2-pole *2) 2-pole (bifurcated contacts)   *3) 250V / DC30V AC, 6A resistive load, operation frequency 1800 operations/h)   *4) RV1H only

Application: Building control circuit for equipment

Compact Size with high-capacity contacts reduces installation space
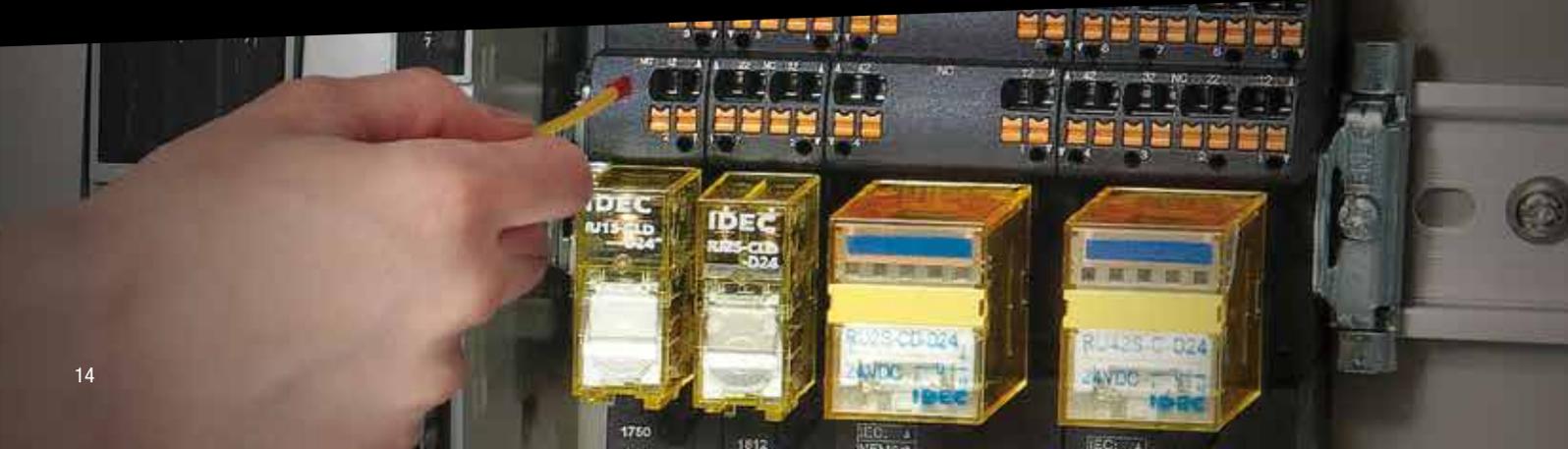
XA/X6/XW/XN Series
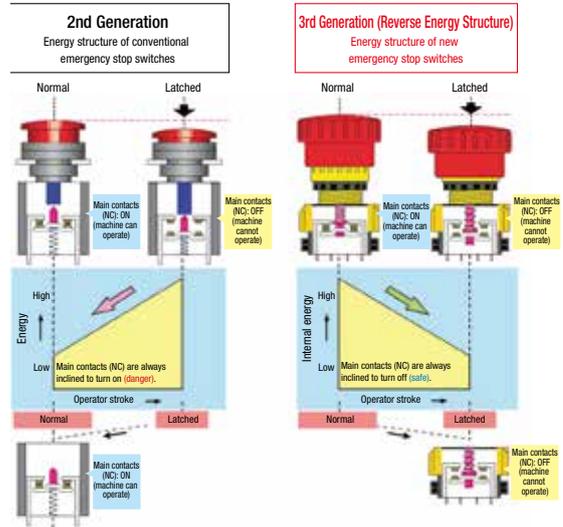
Emergency Stop Switches

Ergonomic emergency stop switches for staying one step ahead to ensure safety

▌ IDEC's safe break action and reverse energy structure (XA/XW Series) satisfies the requirements of **international safety standards**.

▌ E-stops can be reset either by pulling or turning, suitable for various regions where different reset methods are used.

▌ Compact with unibody structure (X6) ideal for mounting on limited spaces.

▌ Compliant with various safety standards. Ensures safe performance for devices and equipments for use **overseas**

▌ Reverse Energy Structure

With X series, the potential energy level of the latched status is lower than that of normal status. In the event the switch is damaged due to excessive shocks, the NC contacts will turn off, thus stopping the machine (patented design)

2nd Generation
Energy structure of conventional emergency stop switches

3rd Generation (Reverse Energy Structure)
Energy structure of new emergency stop switches

▌ Safe Break Action

When the contact block is detached from the operator, the NC contact opens (OFF).

When the contact block is detached from the operator, the cam directly opens the NC main contacts (contacts are off). (Patented)

Series	Hole Size (mm)	Head Size (mm)	Contact Ratings	International Standards				
				UL	CSA	TÜV	CCC	CE
XA (unibody)	ø16.2	ø29, ø40	Gold Plated Silver Contacts: 5A (30V DC / 125V AC / 250V AC)	●	●	●	●	●
XA (removable contacts)	ø16.2	ø30, ø40	Gold Plated Silver Contacts: 5A (30V DC / 125V AC / 250V AC)	●	●	●	●	●
X6	ø16.2	ø30, ø40	Gold Plated Silver Contacts: 5A (30V DC / 125V AC / 250V AC)	●	●	●	●	●
XW	ø22.3	ø40, ø60	Gold Plated Silver Contacts: 5A (30V DC / 125V AC / 250V AC) (connector type: 2.5A)	●	●	●	●	●
XW (indicator type)	ø22.3	ø38	Gold Plated Silver Contacts: 5A (30V DC / 125V AC / 250V AC)	●	●	●	●	●
XN	ø30.5	ø40, ø60	Gold Plated Silver Contacts: 5A (30V DC / 125V AC / 250V AC)	●	●	●	●	●

Application: Emergency stop when abnormality occurs in a device

Ensuring safety with high reliability that surpasses the requirements in standards

CW Series

Flush Silhouette Switches

Smart switches with sleek design & Push-in technology

▌ Flush design with **2.5** mm thick bezel prevents particles and contaminants from accumulating. Also suitable for preventing inadvertent operation.

▌ **Push-in** terminals and **screw** terminal styles available.

▌ Screw terminal models have a **short body** in depth behind the panel, reducing installation space.

▌ A single LED supports 6 colors. When sudden color changes are required, only the lens need to be replaced. Eliminates the need to stock replacement LEDs in variety of colors.

▌ Approximately **55**% less work time and improved efficiency compared to conventional screw terminals. Reduces downtime during manufacturing and maintenance in AGVs and automated warehouses.

*1 Based on IDEC research

▌ Six different colors with a single LED

Previously, 5 different color LEDs were required but with the new illuminated unit, only a single LED is used.
Only the lens needs to be replaced to change the illumination color.
The new LED reduces maintenance time, makes stock control easier, and is enviromentally friendly.

| R Red | G Green | Y Yellow | A Amber | S Blue | PW Pure White |

Six different color lenses

One LED
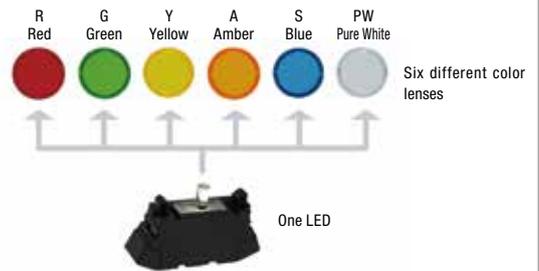
Series	Applicable Wires	Applicable Wire Size	Mechanical Durability	Electrical Durability	Contact Ratings	International Standards				
						UL	CSA	TÜV	CCC	CE
CW	UL1007 H05V,H07V JIS 3307(IV) JIS 3316(KIV)	0.25 to 1.5mm2 (AWG16 to 24)	Pushbuttons, illuminated pushbuttons Momentary: 2 million operations min. (when single contact block is used) Maintained: 250,000 operations min. (when single contact block is used) Selector switches: 250,000 operations min. (when single contact block is used) Key selector switches: 250,000 operations min. (when single contact block is used)	50,000 operations min. or 100,000 operations min. (*1) (*2)	Rated insulated voltage: 300V Rated continuous current: 10A	●	●	●	●	●

*1) Depends on rated operating current   *2) Operating frequency 1800 operations/h momentary, operating frequency 900 operations/h maintained

Application: Operation panel for devices

Flush silhouette switches enhance usability and push-in terminals increase maintenance efficiency
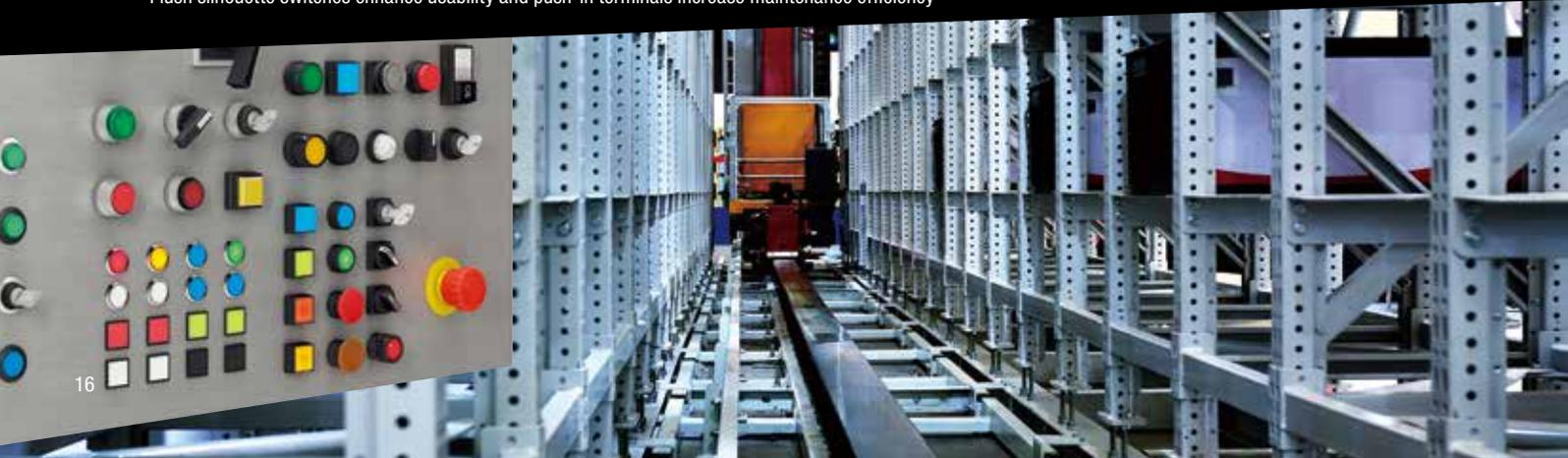
YW Series

Push-in Switches & Pilot Lights

S³ CONNECT

Push-in terminals allow easy connection and compact contact blocks acheive downsizing of equipment

▌ **Push-in** terminals reduce wiring and maintenance time.

▌ **10 mm-wide** contact blocks. Up to 3 contact blocks mounts on a single tier, and up to 2 contacts can be mounted on an illuminated unit, saving installation space .

▌ By mounting 3 double contact blocks, a maximum of **6 contacts** are available (*1).

*1 Except for emergency stop switches

Time saving and efficient

▌ Reduce wiring time

Connecting

Push the wire straight in as far as it will go.

Connection is completed. Pull lightly to make sure it is firmly in place.

Wiring process

Push-in connections are made simple by inserting the wire, reducing wiring time by approximately 55% compared to conventional screw terminals.

Push-in YW series
Conventional screw terminals
Approx.55% reduced
* Based on IDEC research

▌ The contact block design reduces the depth behind the panel.

CB:Contact block
FA:Full-voltage adapter

Series	Aplicable Wires	Applicable Wire Size	Mechanical Durability	Electrical Durability	Contact Ratings	International Standards				
						UL	CSA	TÜV	CCC	CE
YW	UL1007 H05V,H07V JIS 3307(IV) JIS 3316(KIV)	0.25 to 1.5mm² (AWG16 to 24)	Pushbuttons Momentary: 5 million operations miin. (*1) Maintained: 250,000 operations min. (*1) Selector switches: 250,000 operations min. (*2) Key selector switches: 250,000 operations (*2) Emergency stop switches: 250,000 operations (*2)	100,000 operations min.	Rated insulation voltage: 600V Rated continuous voltage: 10A	●	●	●	●	●

*1) Switching frequency 1800 operations/h, duty ratio 40% *2) Switching frequency 900 operations/h, duty ratio 40%

Application: Operation panel for devices

ø22 panel cut-out and reduced wiring time

HW1Z

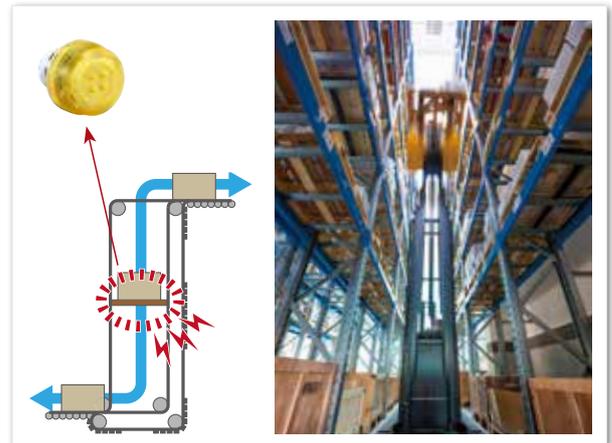## Illuminated / Non-illuminated Buzzer

Notifies the approach of AGVs and shuttles by light and sound.
Two functions integrated into one (*1)

*1) Illuminated buzzer only

▌ **Push-in** terminals and short body with a panel depth of **19.7** mm save wiring and space, making the buzzers suitable for installation in tight spaces such as on small and low-profile AGVs

▌ Reduced installation space is achieved by integrating the functions of a buzzer and lamp into one unit (illuminated buzzer only)

▌ Ensures **IP65** protection at front of panel. By using a waterproof terminal cover, **IP54** protection is achieved without using an enclosure

Series	Rated Voltage Current	Buzzer Sound	IP Rating	Boot Specification	International Standards	
					UL	CE
HW1Z	12 to 24V DC	Illuminated type: Steady Non-illuminated: Steady / Intermittent	Panel front: IP65 Panel back IP40, IP54 (with terminal rubber boot)	Terminal rubber boot: Nitryl rubber	●	●

Application: Indicators and alarms for AGVs, AMRs, and automated warehouses

Reduces installation space with a 2 in 1 short-body

LH1D/Q Series

Indicators

Indicator lights suitable as AGV direction indicators, achieving both improved visibility from various angles and space saving

▌ Indicator lights can be **installed on the surfaces** of AGVs, shuttles, palletizing robots (mounts directly on equipments). (LH1D)

▌ Availalbe in a wide selection of variations, such as flat, dome, **ø66** dome, 2-color switching, and **3**-color switching. (LH1D)

▌ Safety is ensured by **preventing electric shock** with finger protection on terminals.

▌ Ultra-bright LED pilot lights achieve **excellent visibility** under strong daylight. (Q)

▌ A wide range of sizes available, from **ø6** mm to **ø22** mm (Q)
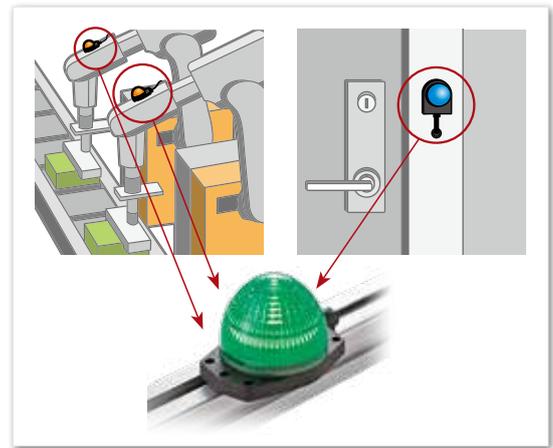
Series	Operating Voltage	Consumption Current	Illumination Color	Life	International Standards			
					UL	CSA	TÜV	CE
LH1D	Cable type: 24V AC / DC M12 connector type: 24V DC	17mA	1-color 2-color alternate 3-color alternate (*1)	Approx. 50,000 hours (When used on complete DC at 25°C, brightness reduces to 50% of the initial intensity.)	●	●	●	●
Q	24, 28, 220V AC / DC 2V, 12V DC	20mA	3 to 6 colors	50,000 hours (25°C)				

*1) Dome only

Application: Indicators and alarms in AGVs, AMRs, and automated warehouses

High visibility and various mounting styles achieves flexible mounting

LB/LBW/AV/I/ES Series
Pushbuttons

Wide variety of switches with stylish design and functions such as flush silhouette switches

▌ Stylish design with bezel heights of **2 to 2.2** mm.
(LB, LBW, (except AV22PNA))

▌ Removal contacts, single board mounting (LB, LBW)

▌ Robust and **metal** switches with stylish design (AV, ES), **IP69K** (ES) suitable for use in warehouses of food companies, and near conveyors requiring washdowns

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▌ **Removable Contact Block /Single Board Mounting**   Removable contacts enable easy wiring / Single board mounting for space-saving installation.

Detachable
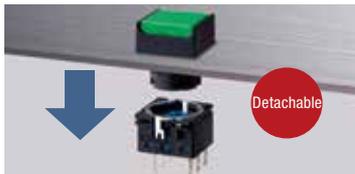
UP Series

UP series has the same depth as LB/LBW series. Mounts on the same panel. (Flush bezel: 34.9mm, standard bezel: 27.9mm)

Series	Bezel Size	Mechanical Durability	Electrical Durability	Contact Ratings	International Standards				
					UL	CSA	TÜV	CCC	CE
LB	ø22 / ø22mm	Momentary: 2,000,000 operations min. Maintained : 250,000 operations min. Selector/key selector sw: 250,000 operations min.	50,000 or 100,000 operations min. (*1) (*2)	Rated Insulation Voltage: 250V Rated Operating Current: 5A (silver contact) 3A (gold contact)	●	●	●	●	●
LBW	ø26 / ø26mm	Momentary: 2,000,000 operations min. Maintained : 250,000 operations min. Selector/key selector sw: 250,000 operations min.	50,000 or 100,000 operations min. (*1) (*2)	Rated Insulation Voltage: 250V Rated Operating Voltage: 5A (silver contact) 3A (gold contact)	●	●	●	●	●
AV	ø16 / 19 / 22	1,000,000 operations min.		Rated Operating Voltage: 24V/30V/48V DC, 250V AC Rated Operating Current: 50mA, 1A, 2A, 3A, 5A	●				
I	ø13.6	1,000,000 operations min.		Rated Operating Voltage: 4.5V/12V/24V/28V/48V DC, AC250V Rated Operating Current: 1.25mA, 50mA, 100mA, 2A, 3A, 4A, 5A	●				
ES	ø22 / 28	100,000 operations min.	6050 operations min.	Rated Operating Voltage: DC24V Rated Operating Current: 1A					

*1) Depends on rated operating current *2) Switching frequency - 1800 operations/h: momentary 1200 operations/h: maintained including selector switches and key selector switches

Application: Operation switches for AGVs and AMRs

Flush design and metal body prevemts build up of foreign objects. Acheives high impact resistance

TS/NV Series

APEM

Miniature Joysticks

Thumb-operated controllers with contactless hall effect technology. Ideal for installation on remote controls to enhance operability.

▌ By using non-contact hall elements, equipment maintenance work is reduced, achieving longer life and downsizing.

▌ Ergonomic design and operator-friendly structure suitable for long, repetitive, and fatigue-free operation.

▌ Protection degree: IP67, 69K

▌ Supports CAN communication, analog output, and USB output, and can be used with a controller for various IoT purposes.

*) Above information applies to TS series

Series	Supply Voltage Range	Consumption Current	Operating Force	Durability	Weight
TS	5.00V±0.01 VDC	11mA max.	3.1N ±0.5N (*1)	1,000,000 times	18.25g±5.0g
NV		50mA max.	Directions : 4 N ± 1 N Pushbutton: 11 N ± 2 N	1,000,000 times	

*1) Force applied to the top of the castle cap.

Application: Indicating direction and adjusting positioning with teaching pendants and remote controllers

Non-contact thumb controllers for durability and downsizing

PC Series

APEM

Hand-Held Pendants

Ergonomic game style pendant controller

▌ **USB** and **analog** output options

▌ **Lightweight**, one hand operation

▌ Excellent **proportional control** for smooth vertical movement of lifts

▌ Configured to order

▌ Readily available in TS series thumbstick and IM series pushbutton configuration

Lifter

Tape switch
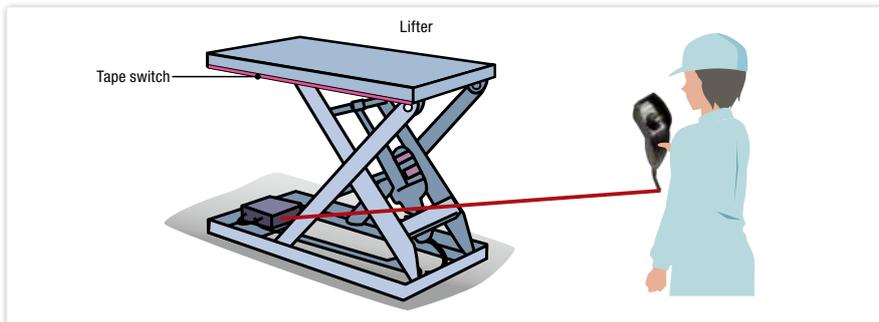
Series	Supply Voltage Range	Consumption Current	Operating Force	Life	Weight
PC	5.00V±0.250 DC	100mA	3 N ± 0.5 N (TS); 6 N ± 2N (IP)	1 million operations	226.8 g

Application: For remote control of AGVs, Lifts, and AMRs

Durable and compact lightweight pendant controllers

FC6A Series

Programmable Controller

S3 CONNECT

PLC suitable for the IoT era

▌ WEB server function allows easy construction of a remote monitoring system

▌ Data inside operator interfaces can be sent by CSV file or screen shot using the email function allowing tracing of devices, factor analysis, and sending early alerts to operators

▌ Remote maintenance can be performed by using the FTP server and client function to transfer project data and read history data

▌ Supports standard communication protocols for the industrial industry on CPU modules, communication modules, and communication cartridges. The communication monitoring function reduces debugging time and allows smooth communication with peripheral devices

Series	Program Size	M ax. I/O Points
FC6A	FC6A All-in-one: 640KB maximum (80,000 steps) FC6A Plus: 800KB maximum (100,000 steps)	FC6A All-in-one: 520 points maximim FC6A Plus: 2060 points maximum (including 511 analog points)

Application: Automated warehouse control, remote operation/monitoring

Compact PLC achieves on-site control and remote operation

HG Series
Operator Interface

Excellent visibility and usability equipped with basic performance required for operators

▌ With the web server function, location of AGVs and status of automated warehouses can be checked, and remote monitoring and operation of device is possible using a PC, tablet, or smartphone

▌ Data inside operator interfaces can be sent by CSV file or screen shot using the email function allowing tracing of devices, factor analysis, and sending early alerts to operators

▌ Remote maintenance is possible by using the FTP server and client function to transfer project data and read history data

▌ Maintenance time can be reduced with a long-life, high-performance LED backlight, enabling reduction of running costs

▌ Stress-free 1.5-second startup, allows quick access to devices

Log data

Image data
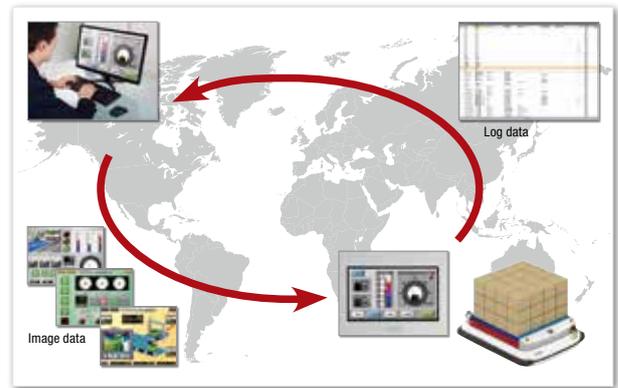
Series	Display Size	Display	Color/Shade	Display Resolution	Brightness	Rated Voltage	Power Consumption	International Standards		
								UL	CSA	CE
HG1G	4.3 inch	TFT color LCD	65,536	480 (W)×272 (H) pixels	800cd/m^2	12 / 24V DC	8W max.	●	●	●
HG2G-V HG2G-5T	5.7 inch	TFT color LCD	65,536	640 (W)×480 (H) pixels 320 (W)×240 (H) pixels	800cd/m^2 (V) 500cd/m^2 (5T)	12 / 24V DC	18W max. (V) 8W max. (5T)	●	●	●
HG3G-VA / V8	10.4 / 8.4 inch	TFT color LCD	65,536	1024 (W)×768 (H) pixels	700cd/m^2 (VA) 800cd/m^2 (V8)	24V DC	25W max. (VA) 22W max. (V8)	●	●	●
HG4G-V	12.1 inch	TFT color LCD	65,536	1024 (W)×768 (H) pixels	600cd/m^2	24V DC	25W max.	●	●	●
HG5G-V	15 inch	TFT color LCD	65,536	1024 (W)×768 (H) pixels	650cd/m^2	24V DC	27W max.	●	●	●

Application: Operation and monitoring of AGVs, AMRs, and automated warehouses

Fast, visible, and easy. Enhances usability and productivity with abundant communication functions

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