

**PAPERLESS RECORDER**

(5.7 inch LCD, touch panel, 16 points DC voltage input, 2 points dry contact, 2 points photo MOSFET relay output)

**MODEL VR144E-G16****BEFORE USE ....**

Thank you for choosing us. Before use, please check contents of the package you received as outlined below.

If you have any problems or questions with the product, please contact our sales office or representatives.

This product is for use in general industrial environments, therefore may not be suitable for applications which require higher level of safety (e.g. safety or accident prevention systems) or of reliability (e.g. vehicle control or combustion control systems).

For safety, installation and maintenance of this product must be conducted by qualified personnel.

**■ PACKAGE INCLUDES:**

- Paperless recorder  
(body + mounting bracket × 2 pcs.\*1+ watertight packing)...(1)

When power input is MR2 or BR2:

- AC adapter .....(1)
- AC code .....(1)
- Ferrite core (ZCAT 2132-1130 TDK) .....(1)
- Ferrite core (ZCAT 1325-0530A TDK) .....(1)

Note 1: Not included for desktop type.

**■ MODEL NO.**

Confirm Model No. marking on the product to be exactly what you ordered.

**■ INSTRUCTION MANUAL**

This manual describes necessary points of caution when you use this product, including installation, connection and basic maintenance procedures.

For more details, refer to the operating manual (EM-7063-B) downloadable at our web site.

**■ SD CARD**

To record the data, prepare the following model number:  
Available for purchase from us. Consult us.

- Manufacturer: Hagiwara Solutions  
Model: MSDB-016GS(V01SLS)  
Capacity: 16 GB

**POINTS OF CAUTION****■ CONFORMITY WITH EU DIRECTIVES**

- The included AC adapter is suitable for Pollution Degree 2 and Installation Category II (transient voltage 2500V). Use the included AC adapter for safety.
- Altitude up to 2000 meters.
- The equipment must be mounted inside a panel. (excluding desktop type)

- The actual installation environments such as panel configurations, connected devices, connected wires, may affect the protection level of this device when it is integrated in a panel system. The user may have to review the CE requirements in regard to the whole system and employ additional protective measures\* to ensure the CE conformity.

\* For example, installation of noise filters and clamp filters for the power source, input and output connected to the device, etc.

**■ POWER INPUT RATING & OPERATIONAL RANGE**

- Locate the power input rating marked on the product and confirm its operational range as indicated below:

100V AC rating: 100V ±10%, ≤ 15 VA  
100 – 240V AC rating: 85 – 264V, 47 – 66Hz,  
≤ 15 VA at 100 V  
≤ 20 VA at 200 V  
≤ 22 VA at 240 V

24V DC rating: 24V ±10%, ≤ 240 mA

- Supplying any level of power other than specified above can damage the device or the power source.
- Power supply start-up characteristics must reach within 5 seconds to the operational voltage range of the device.
- Power cables and signal I/O cables for the device must be located separately.
- Power cables, signal I/O cables and communication cables for the device should not be bundled together.
- To increase noise resistance of the power input wires, twist the strands before connecting.

**■ AC ADAPTER**

- The use of AC adapter other than the included one may cause malfunctions.

**■ GENERAL PRECAUTIONS**

- Before you remove the device or mount it, turn off the power supply and I/O signals for safety.
- Before you remove the terminal block or mount it, turn off the power supply and input signal for safety.
- Do not disassemble or modify the device in any way. Doing so may result in a fire or an electrical shock.
- Do not block the device's ventilation openings or use it in areas where heat accumulates.  
Additionally, do not store or use it under high-temperature conditions.
- Do not use this device in an environment where flammable/corrosive gases are present.
- Do not store or use this device in locations subject to direct sunlight, or where excessive dust, dirt or metal particles are present.
- This device is a precision instrument. Do not store or use it where large shocks or excessive vibration can occur.
- Do not store or use this device in environments subject to chemical evaporation (such as that of organic solvents), or where there are chemicals and/or acids present in the environment.
- Do not use paint thinner or organic solvents to clean this device.
- Observe the environmental conditions when using this device.

- Wait at least 15 seconds before turning on the power supply after it was turned off.

#### ■ ENVIRONMENT

- Indoor use.
- This device is designed to be mounted on a vertical panel. It is not suitable for a slanted or a horizontal panel surface.
- When heavy dust or metal particles are present in the air, install the device inside proper housing with sufficient ventilation.
- Do not install the device where it is subjected to continuous vibration. Do not subject the device to physical impact.
- Environmental temperature must be within -10 to +55°C (14 to 131°F) with relative humidity within 10 to 90% RH in order to ensure adequate life span and operation.

#### ■ GROUNDING

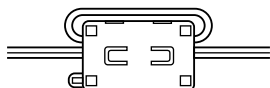
- Be sure to determine in advance the most stable grounding point in the environment and earth the device's FE terminal and that of connected devices to it in order to protect the devices from dielectric breakdown.
- Grounding is also effective to eliminate noise that could cause errors in the device's operation.

#### ■ WIRING

- Wrong connection may damage the device.
- Do not connect cables to moving parts or pull them tightly.
- Noise entering through the analog signal cables may cause irregular measurement values, degradation of overall accuracy, and malfunction of the product. We recommend that you would conduct wiring to the device with the following points of caution.
- Do not install cables close to noise sources (relay drive cable, high frequency line, etc.).
- Do not bind these cables together with those in which noises are present. Do not install them in the same duct.

#### ■ FERRITE CORE

- Twist the power cables 1 turn around the ferrite core at near the device as shown below.



#### ■ SD CARD

- Do not turn off the power supply to the device or reset it during data recording or history recording. The SD card may be destroyed.
- Observe the described procedure when you need to replace the SD card during recording.
- Confirm the sides and the connector position of the SD card when inserting one to the card slot.
- Do not touch the metal terminal with your hands or metallic tools.
- SD cards have a life span. Back up your important data.

#### ■ LCD PANEL

- The LCD panel's liquid contains an irritant. If the panel is damaged and the liquid contacts your skin, rinse immediately the contact area with running water for at least 15 minutes. If the liquid gets in your eyes, rinse immediately your eyes with running water for at least 15 minutes and consult a doctor.
- The following phenomena are LCD characteristics, and NOT a product defect:
  - LCD screen may show uneven brightness depending upon displayed images or contrast settings.
  - The LCD screen pixels may contain minute black-and-white-colored spots.
  - The color displayed on the LCD screen may appear different when seen from outside the specified viewing angle.
  - When the same image is displayed on the screen for a long time period, an afterimage may appear when the image is changed. If this happens, turn off the device and wait for a while before restarting it.
- To prevent an afterimage:
  - Set the screensaver when you plan to display the same image for a long time period.
  - Plan to change the screen image periodically so that the same image does not remain for the long time period.
- The LCD surface is covered with a protective film at the factory shipment. Remove it once the device is installed.

#### ■ DO NOT APPLY OVERRANGE INPUT

- Do not apply voltages beyond the maximum input range to prevent failure.

#### ■ INTERNAL CLOCK

- The internal clock data is stored in memory powered by a backup battery while the device is without external power supply.
- The data will be reset to its default status when the battery is used up while the device is left without power supply for a long time period. The clock adjustment will be necessary once the power is restored.
- Once the power is restored, the device starts recharging the battery. It will be full in approximately in 36 to 48 hours.
- Battery backup: approx. 2 months

#### ■ AND ....

- We recommend use of an UPS to supply power backups.
- The device is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.

### USER REGISTRATION (FREE)

Register your user information in order to receive information about firmware update.

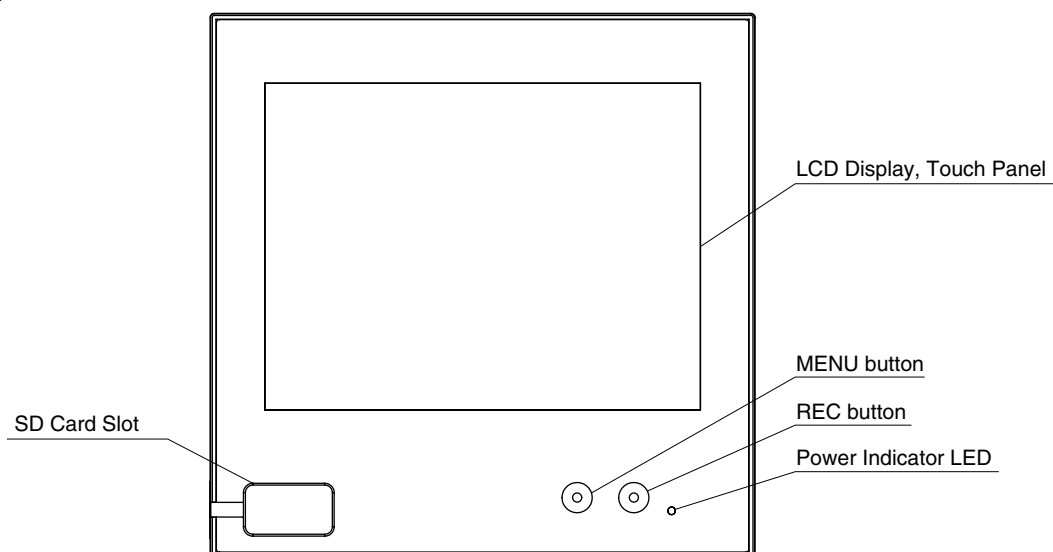
Complete the user registration by clicking 'User Registration' on our website.

### LIGHTNING SURGE PROTECTION

We offer a series of lightning surge protector for protection against induced lightning surges. Please contact us to choose appropriate models.

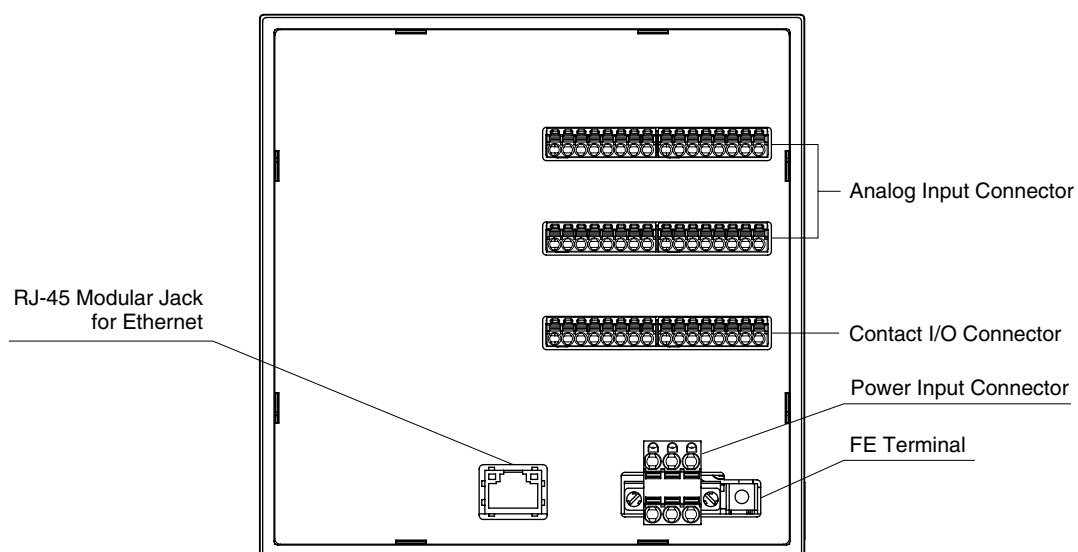
## COMPONENT IDENTIFICATION

### ■ FRONT VIEW

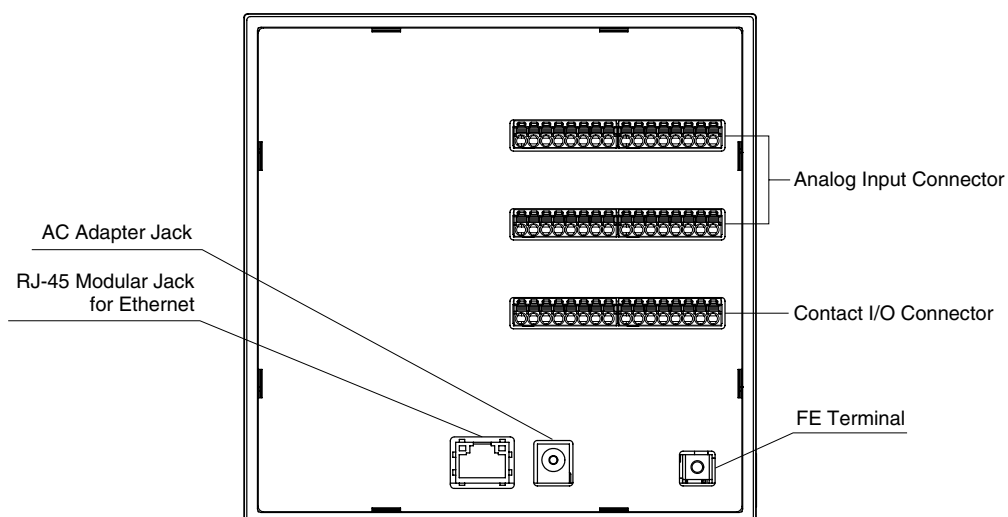


### ■ REAR VIEW

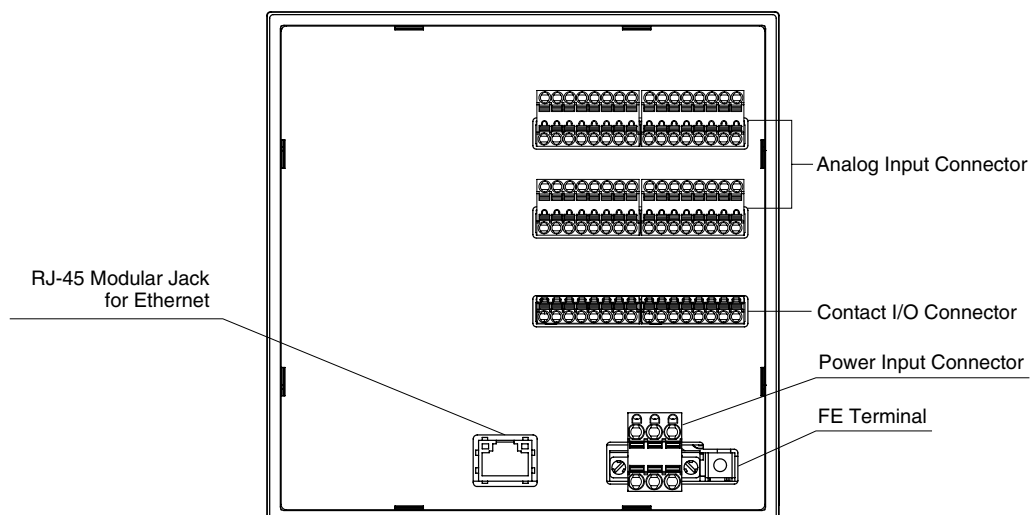
- Voltage input connector  
Power input code is R



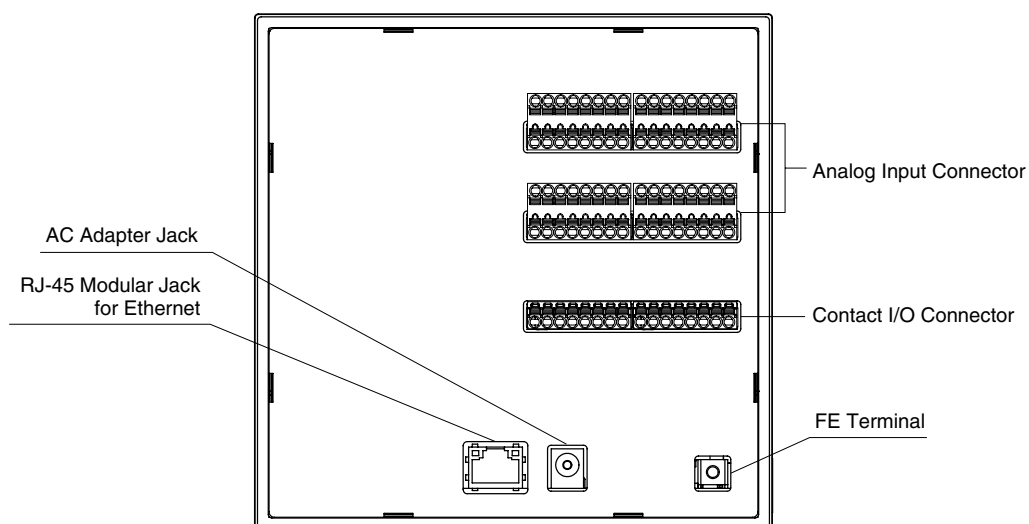
Power input code is MR2 or BR2



• Current input connector  
Power input code is R



Power input code is MR2 or BR2



### ■ LCD DISPLAY, TOUCH PANEL

TFT Color Display. Data display such as trend screen and setting view appear.

Various settings are configured by touching the screen.

### ■ CONTROL BUTTONS

Various settings are configured.

### ■ SD CARD SLOT

Remove the watertight cap and insert the SD card.

The SD card should be inserted with the terminal end facing up.

After inserting the SD card, be sure to attach the watertight cap.

### ■ STATUS INDICATOR LED

| LED | COLOR  | STATUS   | ACTION                    |
|-----|--------|----------|---------------------------|
| PWR | Green  | ON       | Internal power is normal. |
|     |        | OFF      | Power is turned off.      |
| LNK | Yellow | ON       | Link is established       |
|     |        | OFF      | No link                   |
| ACT | Green  | Blinking | Sending/receiving data    |
|     |        | OFF      | No sending/receiving data |

### ■ POWER SUPPLY TERMINAL ASSIGNMENT (Power input code is R)

**Device side connector:** MSTB2,5/3-GF-5,08 (Phoenix contact)

**Cable side connector:** FKCN2,5/3-STF-5,08 (Phoenix contact) included in the package

**Applicable wire size:** 0.2-2.5 mm<sup>2</sup>

**Stripped length:** 10 mm

**Recommended solderless terminal:**

AI0,25-10YE 0.25mm<sup>2</sup> (Phoenix contact)

AI0,34-10TQ 0.34mm<sup>2</sup> (Phoenix contact)

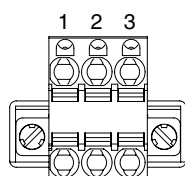
AI0,5-10WH 0.5mm<sup>2</sup> (Phoenix contact)

AI0,75-10GY 0.75mm<sup>2</sup> (Phoenix contact)

AI1-10RD 1.0mm<sup>2</sup> (Phoenix contact)

AI1,5-10BK 1.5mm<sup>2</sup> (Phoenix contact)

AI2,5-10BU 2.5mm<sup>2</sup> (Phoenix contact)



| PIN NO. | ID  | FUNCTION              |
|---------|-----|-----------------------|
| 1       | 24V | Power supply (24V DC) |
| 2       | 0V  | Power supply (0V)     |
| 3       | NC  | No Connection         |

## ■ ANALOG INPUT TERMINAL, CONTACT INPUT/OUTPUT TERMINAL ASSIGNMENT

**Device side connector:** MC1,5/8-GF-3,5 (Phoenix contact)

**Cable side connector:** Included in the package

· Voltage input connector: FMC1,5/8-STF-3,5 (Phoenix contact)

· Current input connector: TFMC1,5/8-STF-3,5 (Phoenix contact)

**Applicable wire size:** 0.2–1.5 mm<sup>2</sup>

**Stripped length:** 10 mm

**Recommended solderless terminal:**

AI0,25-10YE 0.25mm<sup>2</sup> (Phoenix contact)

AI0,34-10TQ 0.34mm<sup>2</sup> (Phoenix contact)

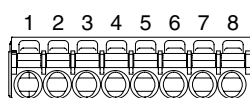
AI0,5-10WH 0.5mm<sup>2</sup> (Phoenix contact)

AI0,75-10GY 0.75mm<sup>2</sup> (Phoenix contact)

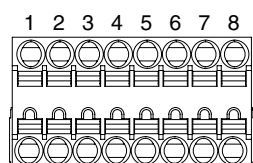
A1-10 1.0mm<sup>2</sup> (Phoenix contact)

A1,5-10 1.5mm<sup>2</sup> (Phoenix contact)

Voltage input connector



Current input connector



### • Analog input

| PIN NO. | ID   | FUNCTION |
|---------|------|----------|
| 1       | AI1+ | Input 1+ |
| 2       | AI1- | Input 1- |
| 3       | AI2+ | Input 2+ |
| 4       | AI2- | Input 2- |
| 5       | AI3+ | Input 3+ |
| 6       | AI3- | Input 3- |
| 7       | AI4+ | Input 4+ |
| 8       | AI4- | Input 4- |
| 9       | AI5+ | Input 5+ |
| 10      | AI5- | Input 5- |
| 11      | AI6+ | Input 6+ |
| 12      | AI6- | Input 6- |
| 13      | AI7+ | Input 7+ |
| 14      | AI7- | Input 7- |
| 15      | AI8+ | Input 8+ |
| 16      | AI8- | Input 8- |

| PIN NO. | ID    | FUNCTION  |
|---------|-------|-----------|
| 1       | AI9+  | Input 9+  |
| 2       | AI9-  | Input 9-  |
| 3       | AI10+ | Input 10+ |
| 4       | AI10- | Input 10- |
| 5       | AI11+ | Input 11+ |
| 6       | AI11- | Input 11- |
| 7       | AI12+ | Input 12+ |
| 8       | AI12- | Input 12- |
| 9       | AI13+ | Input 13+ |
| 10      | AI13- | Input 13- |
| 11      | AI14+ | Input 14+ |
| 12      | AI14- | Input 14- |
| 13      | AI15+ | Input 15+ |
| 14      | AI15- | Input 15- |
| 15      | AI16+ | Input 16+ |
| 16      | AI16- | Input 16- |

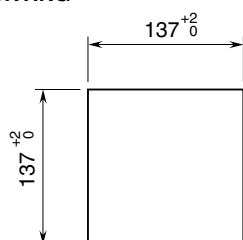
### • Contact input/output

| PIN NO. | ID  | FUNCTION              |
|---------|-----|-----------------------|
| 1       | DI1 | Contact Input 1       |
| 2       | COM | Common                |
| 3       | DI2 | Contact Input 2       |
| 4       | COM | Common                |
| 5       | NC  | No Connection         |
| 6       | NC  | No Connection         |
| 7       | NC  | No Connection         |
| 8       | NC  | No Connection         |
| 9       | DO1 | Photo MOSFET Output 1 |
| 10      | DO1 | Photo MOSFET Output 1 |
| 11      | DO2 | Photo MOSFET Output 2 |
| 12      | DO2 | Photo MOSFET Output 2 |
| 13      | NC  | No Connection         |
| 14      | NC  | No Connection         |
| 15      | NC  | No Connection         |
| 16      | NC  | No Connection         |

## INSTALLATION

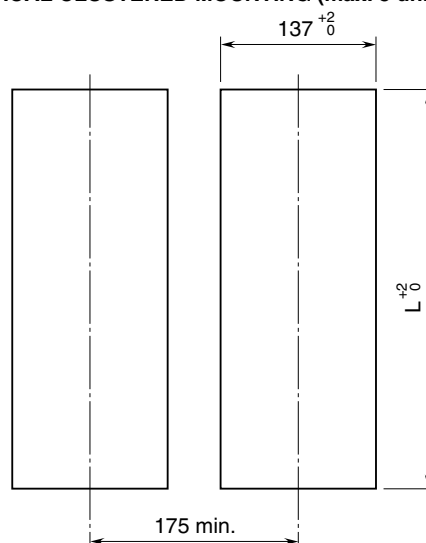
Usable panel thickness: 2 – 26 mm [0.08" – 1.02"]

### ■ SINGLE MOUNTING

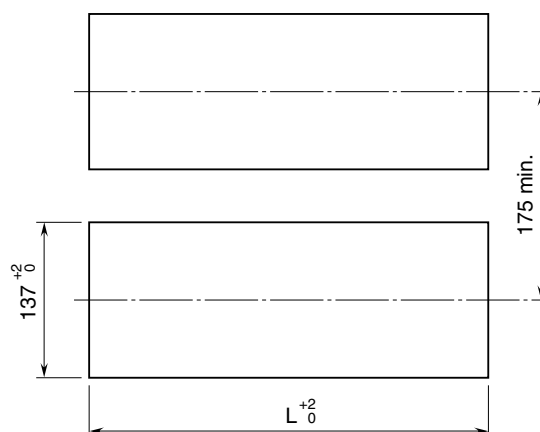


| Number | $L^{+2}_0$ (mm)      |
|--------|----------------------|
| 2      | 282                  |
| 3      | 426                  |
| 4      | 570                  |
| 5      | 714                  |
| 6      | 858                  |
| 7      | 1002                 |
| 8      | 1146                 |
| 9      | 1290                 |
| 10     | 1434                 |
| n      | $(114 \times n) - 6$ |

### ■ VERTICAL CLUSTERED MOUNTING (max. 3 units)



### ■ HORIZONTAL CLUSTERED MOUNTING



Note: Desktop type cannot be mounted on a panel surface.

### ■ CAUTION

- Degree of protection, IP55 is applicable to the front panel of the device with single mounting according to the specified panel cutout. Not applicable in case of re-mounting. After installation ensure waterproof of the mounting.
- Install the device to vertical panel so that its function buttons are at the bottom side. Installing by other direction will cause degradation of life span or performance due to rise of the internal temperature.
- Ensure that there is sufficient space for ventilation inside a panel. Do not install above the devices that generate high heat such as heaters, transformers or resistors. Observe at the minimum of 30 mm (1.2") in all directions for maintenance purpose.

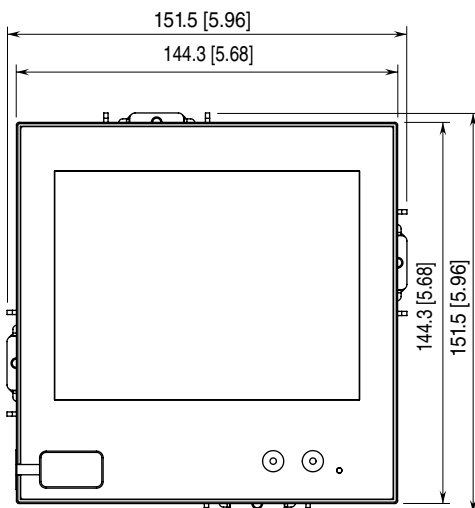
## TERMINAL CONNECTIONS

Connect the device as in the diagram below or refer to the connection diagram.

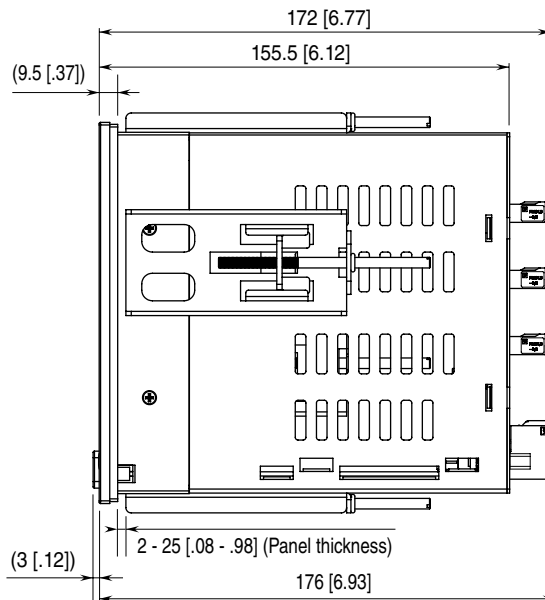
### EXTERNAL DIMENSIONS unit: mm [inch]

#### PANEL FLUSH MOUNTING

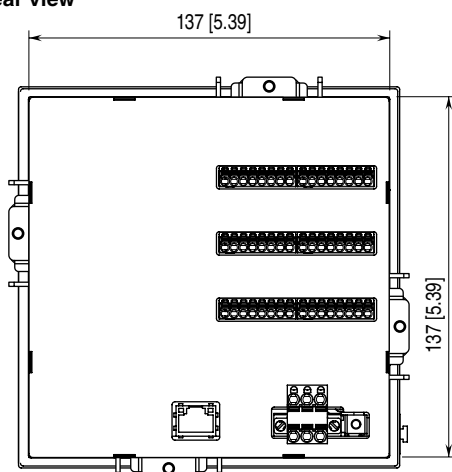
##### • Front view



##### • Side view



##### • Rear view



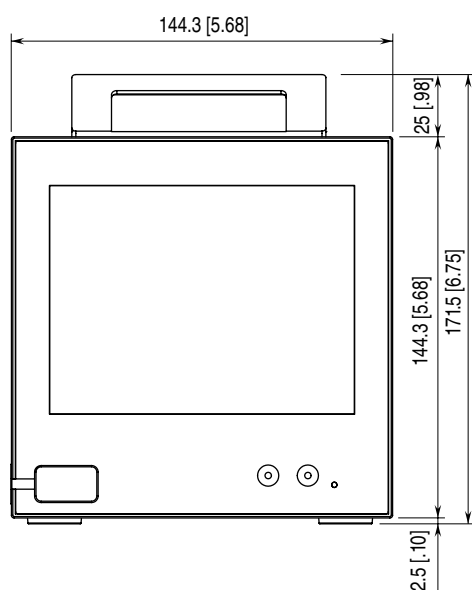
Note 1: The shape of rear connectors and other components differs according to the code number.

Note 2: The mounting brackets can be installed either vertically or horizontally.

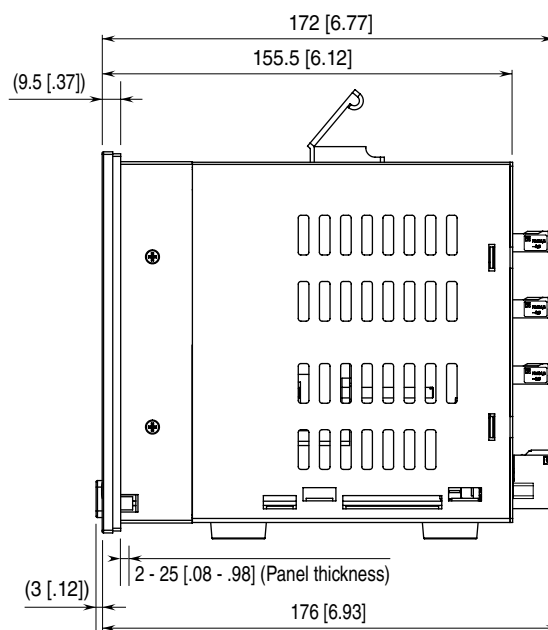


# ■ DESKTOP TYPE

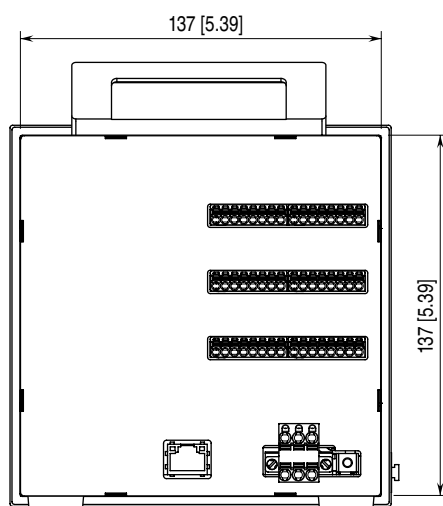
## • Front view



## • Side view



## • Rear view

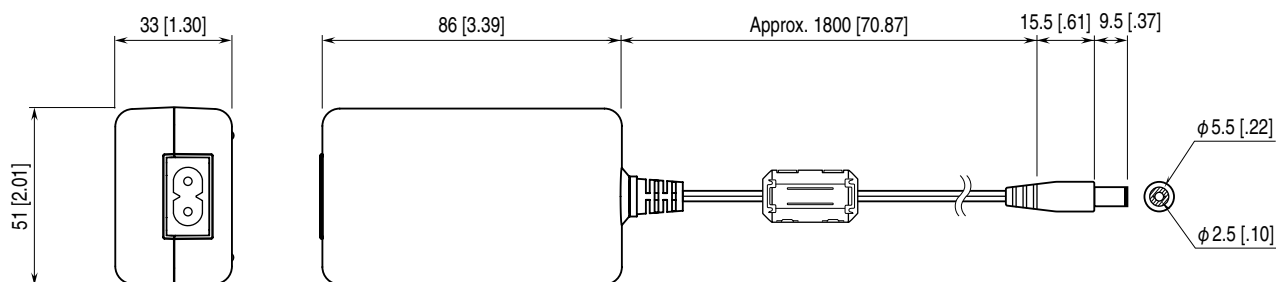


Note 1: The shape of rear connectors and other components differs according to the code number.

Note 2: The mounting brackets can be installed either vertically or horizontally.

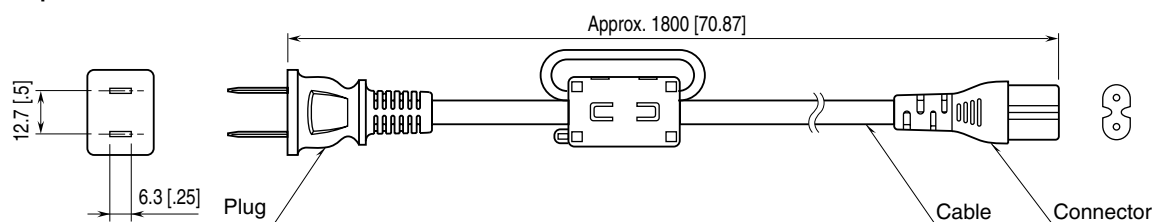
■ AC adapter

• Device

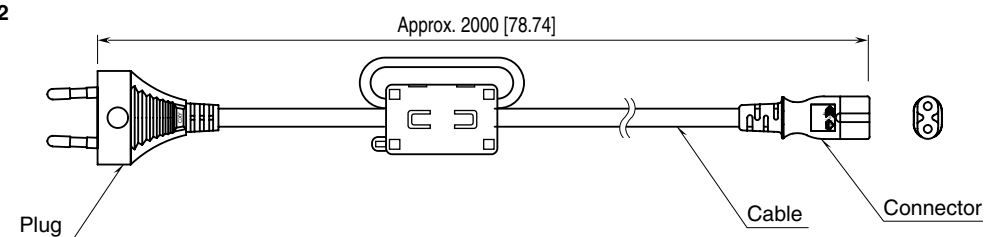


• Cable

Power input code is BR2



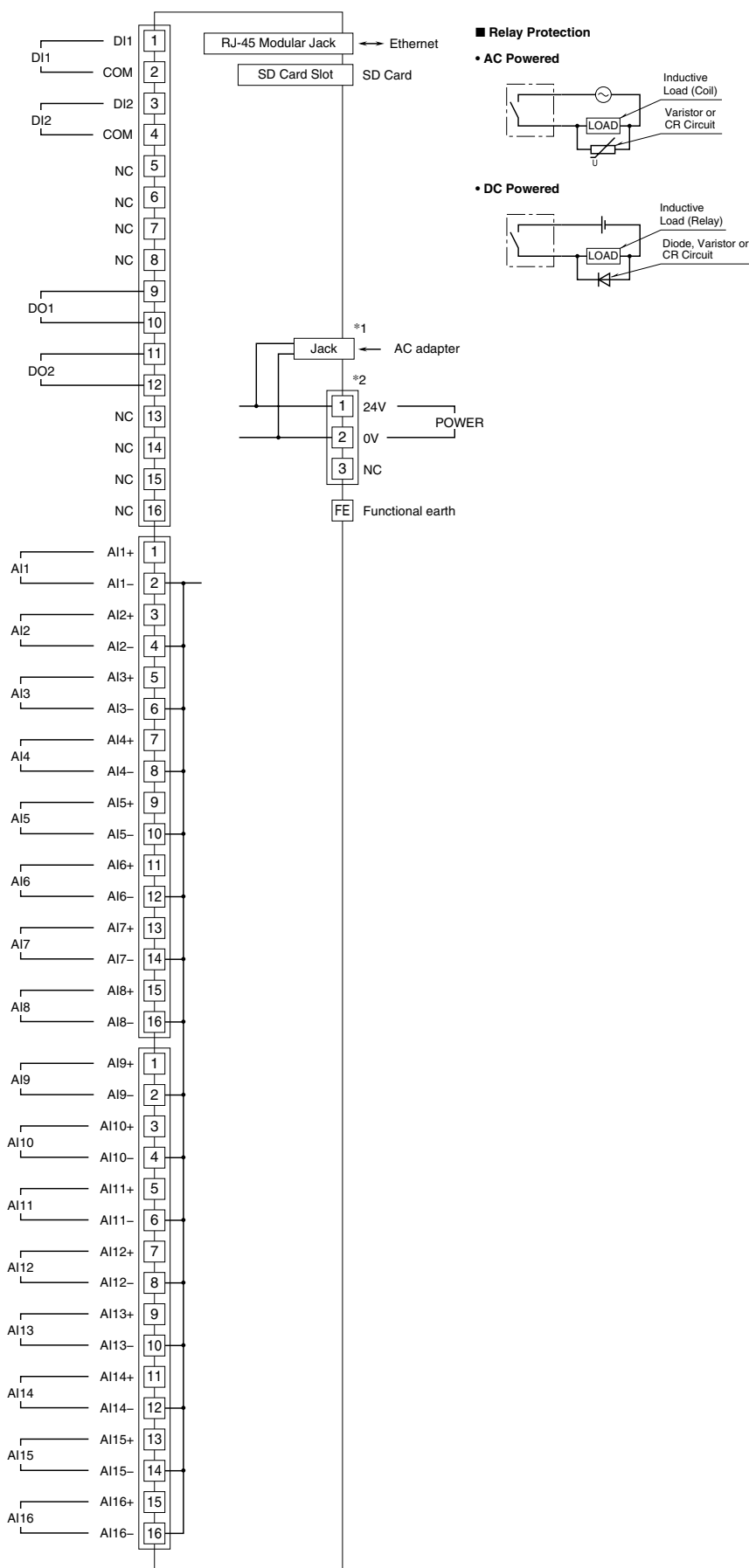
Power input code is MR2



## ■ CONNECTION DIAGRAM

Note: In order to improve EMC performance, bond the FE terminal to ground.

Caution: FE terminal is NOT a protective conductor terminal.



Note 1: Not included when the power input code is R.

Note 2: Not included when the power input code is MR2 or BR2.