

CVI-2R Voltage Detecting and Indicating System

User Manual



Version: 1.11

Revision: 2026.09

Read me

When you use CVI-2R Voltage Detecting and Indicating System, be sure to read this user manual carefully, and be able to fully understand the implications, the correct guidance of operations in accordance with user manual, which will help you make better use of CVI-2R Voltage Detecting and Indicating System and help to solve the various problems on the site.

1. Always keep safe distance between the high voltage part and the instrument, probe and operator.
2. Measurements must not be taken when thunderstorms are nearby.
3. Do not operate the instrument or accessories in explosive atmospheres.
4. After the battery alarm of the instrument, please turn off the power to charge.
5. Do not open the instrument without permission, this will affect the warranty of the product. The factory is not responsible for self-disassembly.
6. When the instrument is transported, it should avoid rain erosion and prevent collision and falling.
7. When storing and keeping the instrument, attention should be paid to the ambient temperature and humidity, and it should be protected from dust, moisture, shock, acid, and corrosive gas.



- **Please read this user manual carefully**
- **Please save this document**

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1.- SUMMARIZE

The CVI-2R voltage detecting and indicating system is designed for continuous indication of voltage on medium-voltage switchgear busbars. It provides continuous voltage presence indication and voltage absence verification in accordance with IEC 62271-213:2021. The device supports dual-stage voltage indication and overvoltage indication to improve operational safety during switching and maintenance procedures.

The front panel features two LED indicators and two dedicated pushbuttons for self-test and voltage presence verification. An integrated three-phase LRM measuring point supports phase comparison and phase sequence verification for safe commissioning and maintenance. An adjustable capacitance module is provided to optimize the capacitive voltage division ratio. Two relay outputs are available for alarm, interlock, and remote indication applications. With a compact 96× 48mm design and a wide auxiliary power supply range of 85–265 Vac/dc, the CVI-2R is suitable for various switchgear installations.

FEATURES

- Compact 96 × 48 mm panel design;
- High-definition three phase LCD display;
- 10-45%Un dual-stage voltage indication;
- >120%Un overvoltage indication function;
- Adjustable capacitance module;
- Wide auxiliary supply range 85–265Vac/dc;
- Compliant with IEC 62271-213:2021 standard;
- Two channels relay outputs for remote status monitoring;
- Self-test function ensures reliable operational verification;
- Integrated phase sequence detection;

APPLICATIONS

- Medium-voltage power distribution;
- Transmission and distribution systems;
- Power generation facilities applications;
- Industrial power distribution systems;
- Data center power infrastructure;
- Power system maintenance operations;

2.- TECHNICAL SPECIFICATION

Parameter	Value
Power supply	85-265Vac/dc
Rated voltage	1kV -35kV
Power consumption	Less than 2W
Voltage threshold	10% to 45%Un
Capacitance Module	200pF/ 125pF /80pF/ 45pF
Rated frequency	50-60Hz
Relay output	2 channel, passive, dry contact, normally open Load capacity: 10A @250Vac/5A@ 30Vdc
LED indicator	2* Ultra-high brightness LED operating voltage < 2.5Vdc, service life > 50,000 hours.
Insulation	Input, output, power supply to shell >5MΩ
Withstand voltage	2 kV AC RMS 1 minute, between power supply to ground/ between relay contact to ground.
Standards	Compliant with IEC 62271-213
Installation dimension	WxHxD: 96x48x66mm
Working environment	-25~70°C, Altitude ≤2000m, 0~95%RH, non-condensing, non-corrosive gas

Adaptation capacity parameter table:

Voltage Level (kV)	6	10	24	35
Adaptable Capacitance (pF)	200(±15)	125(±15)	80PF(±10)	45(±10)
Dimension (Height * Width)	140x95mm		210x110mm	320x145mm

3. - INSTALLATION AND START-UP



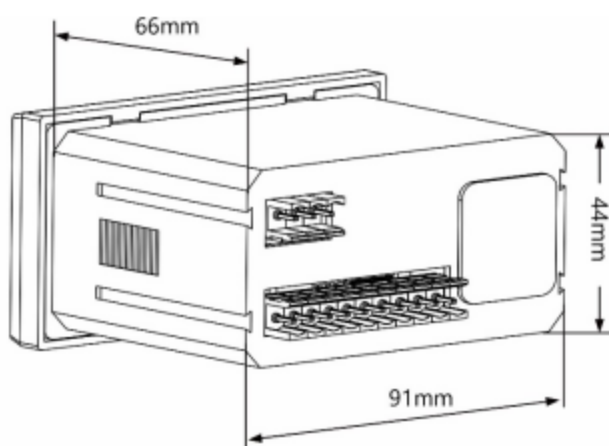
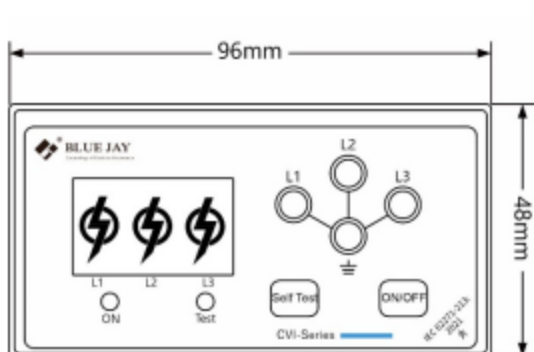
The manual you hold in your hand contains information and warnings that the user should respect in order to guarantee a proper operation of all the instrument functions and keep it in safety conditions. The instrument must not be powered on and used until its definitive assembly is on the cabinet's door.

If the instrument is not used as manufacturer's specifications, the protection of the instrument will be damaged.

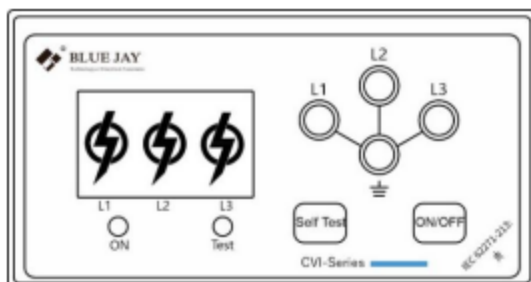
When any protection failure is suspected to exist (for example, it presents external visible damages), the instrument must be immediately powered off. In this case contact a qualified service representative.

3.1.- Installation

Dimension (WxHxD): 96x48x66mm

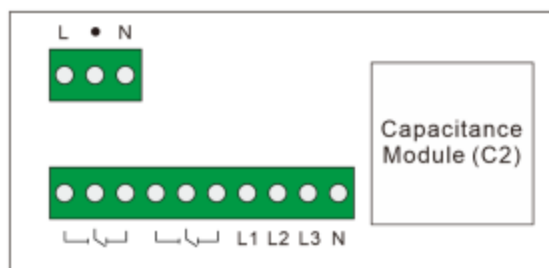


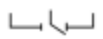
3.2.- Front Panel Introduction



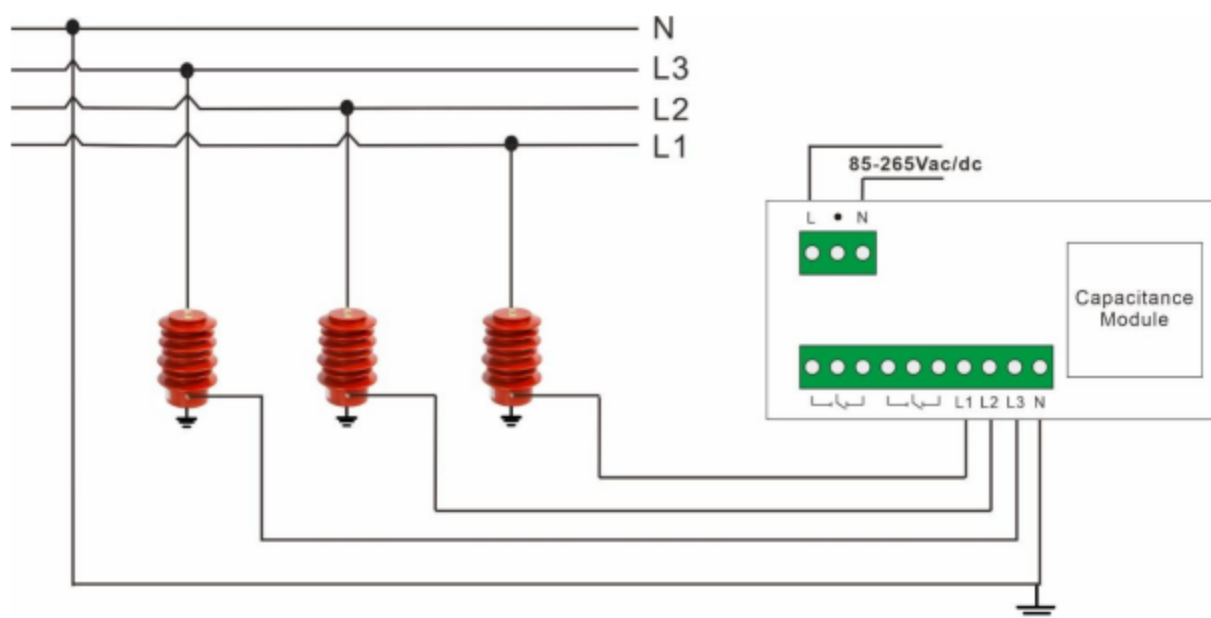
Component	Description
LCD Display	Displays the voltage presence status
ON LED	Lighting up in red indicates voltage monitoring function is enable.
Test LED	Lighting up in red indicates self-test function is enable.
Self-test button	Press and hold to start the device self-test function.
ON/OFF button	Press to enable or disable voltage preense monitoring.
L1/L2/L3 socket	Used for phase sequence detection.
Gound socket	Used for ground reference

3.3.- Rear Terminal definition



Marked	Notes
L, N	Auxiliary power supply: 85-265Vac/dc
	Digital output -1 NO: Normally open contact COM: Common contact NC: Normally closed contact
	Digital output - 2 NO: Normally open contact COM: Common contact NC: Normally closed contact
L1, L2, L3, N	Three phase voltage sensing input

3.4.- Wiring Diagram



Note:

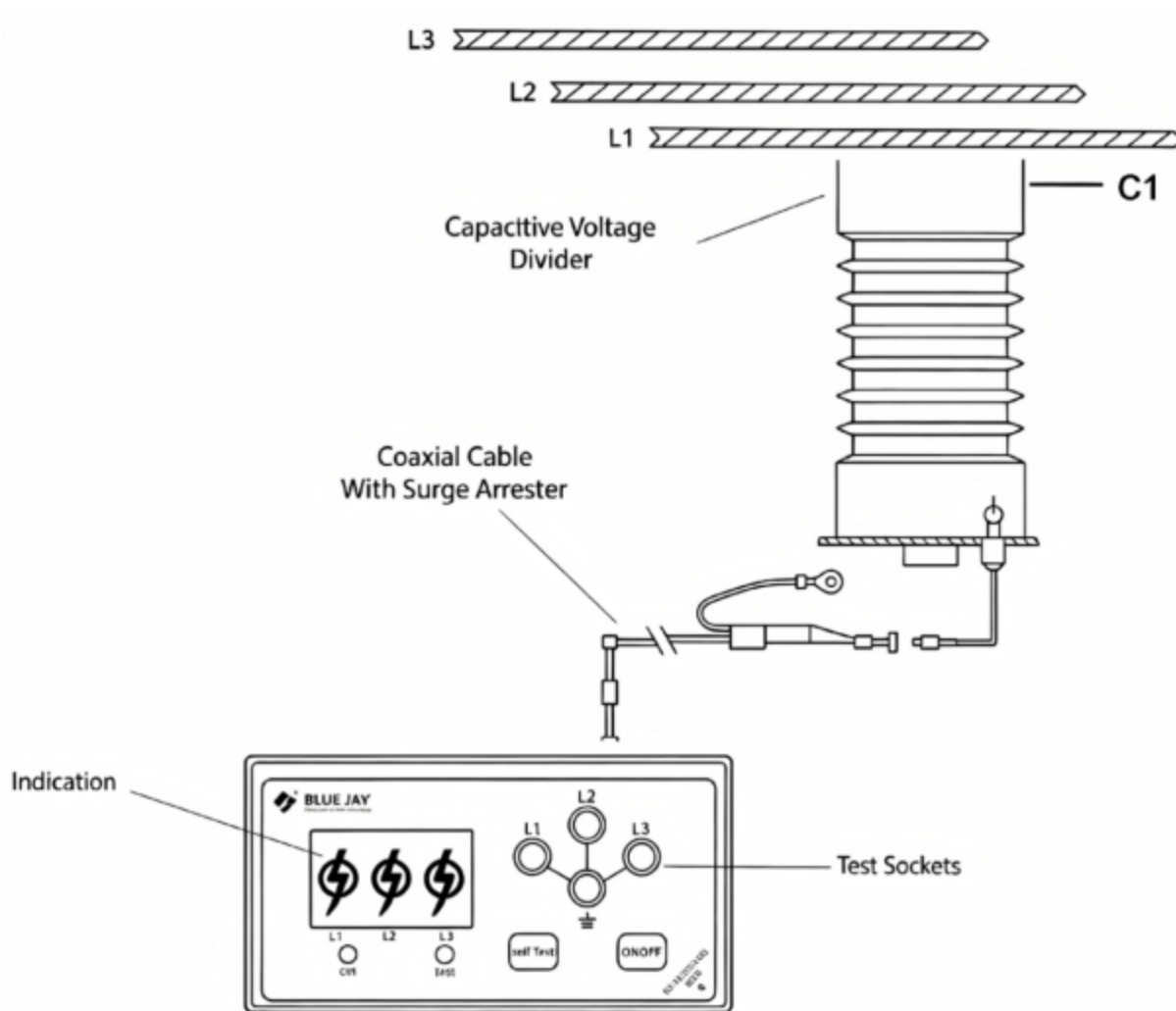
This connection drawing is for reference only; the actual connecting terminal, please refer to the label on the rear part.

4.- FUNCTION INTRODUCTION

4.1.- Capacitive voltage indicator working principle

The device is based on a capacitive voltage detection system (VDIS). The high-voltage phase conductors are connected to capacitive coupling elements (C1), which form a capacitive voltage divider with the high-voltage system. The coupling elements generate a low-energy voltage signal proportional to the primary voltage and transmit it through shielded coaxial cables to the indicator unit.

The CVI-2R indicator processes the detected voltage signals and determines the voltage status of each phase, providing reliable phase-by-phase voltage presence indication. Since the measurement circuit is electrically isolated from the high-voltage system, the device ensures safe operation through capacitive coupling technology without any direct galvanic connection to the primary circuit.



4.2.- Voltage presence indication function

After the device is powered on, press the front-panel **[ON/OFF]** button to enable the voltage monitoring function. When voltage monitoring is activated, the **[ON]** LED illuminates to indicate that the device is monitoring the system voltage.

The device continuously monitors the voltage status of the medium-voltage system and displays the result on the LCD. Based on the detected voltage level, it indicates four operating conditions: voltage not present ($U < 10\% U_n$), voltage present ($10\% U_n \leq U < 45\% U_n$), nominal voltage present ($U \geq 45\% U_n$), and overvoltage ($U > 120\% U_n$).

To ensure accurate voltage indication, the appropriate capacitor module must be selected according to the system's rated voltage.

Indication of LCD	Indication during normal operation		C2 module with nominal voltage	Indication with pressed test button
	Definition	Explanation		
	Overvoltage	$U \gg 120\% U_n$	C2 module < C2 min.	Test OK
	Nominal Voltage Present	$U > 45\% U_n$	C2 module correct	Error
	Voltage Present	$10\% U_n < U < 45\% U_n$	C2 module > C2 max.	Error
No Indication	Voltage not Present	$U < 10\% U_n$	C2 module $\gg$ C2 max.	Error

4.3.- Self-test function

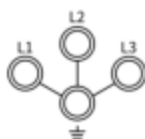
The integrated self-test function allows verification of the LCD display, indication LEDs, and output relays. The test is activated by pressing and holding the front-panel **[Self-test]** button.

During the test, all LCD segments are displayed, the LED indicators illuminate sequentially, and each output relay is energized once. Releasing the button terminates the self-test and restores normal operation.

If, after pressing the test button, the visual signaling functionality is not triggered, this means that the device is defective. Details see the image above.

4.4.- Phase Sequence Detection

The device features an integrated three-phase LRM measuring point for phase comparison (phase concordance testing) in medium-voltage switchgear systems. By utilizing the switchgear's capacitive voltage sensing outputs, it enables safe and reliable verification of phase relationships without direct high-voltage contact.



During phase comparison, insert the phase comparison probe into the corresponding L1, L2, and L3 sockets of the devices being tested. If the phase sequence is consistent, the corresponding L1, L2, and L3 phase icons on the LCD will illuminate, indicating correct phase concordance.

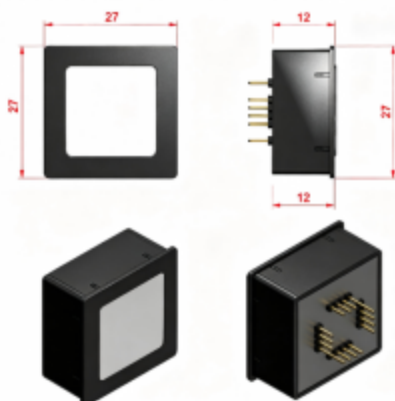
4.5.- Relay Output Functions

The device provides two built-in SPDT relay outputs for remote monitoring of voltage presence. Relay contacts activate when detected voltage exceeds 45 % U_n , and change status automatically according to the detected voltage condition, enabling reliable remote indication. Relays will also actuate during self-test routines for functional verification.

The relay outputs can be connected to external alarm, interlocking, or control systems, allowing seamless integration with switchgear monitoring and automation applications.

4.6.- Adjustable Capacitance Module

The CVI-2R is equipped with an interchangeable capacitance module offering four selectable capacitance values (200pF / 125pF / 80pF / 45pF). The module enables the device to match the capacitive voltage divider of different switchgear systems, ensuring accurate voltage indication and reliable voltage presence detection.



Note: Select the capacitance value specified by the switchgear and install the module before commissioning. An incorrect capacitance selection may affect voltage indication accuracy.

5.- SAFETY CONSIDERATIONS



All installation specification described at the previous chapters named:

INSTALLATION AND STARTUP, INSTALLATION MODES and SPECIFICATIONS.

Please note that with the instrument powered on, the terminals could be dangerous to touching and cover opening actions or elements removal may allow accessing dangerous parts. This instrument is factory-shipped at proper operation condition.

- ◆ The device must have a professional installation and maintenance.
- ◆ Any operation of the device, you must cut off the input signal and power.

For any inquiry about the instrument performance or any failure, contact to Blue Jay's technical service.

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