



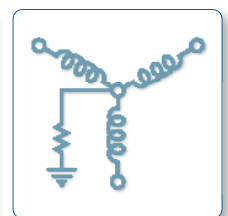
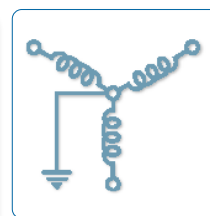
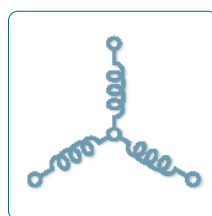
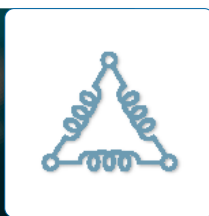
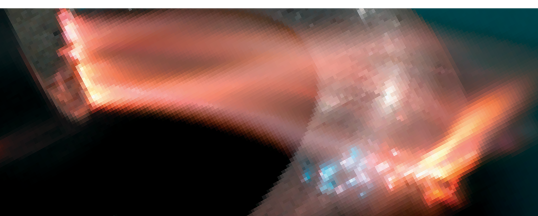
*Unparalleled Protection*



**VIA**

## VOLTAGE ALARM INDICATOR - GROUND FAULT INDICATOR

### Installation & Operation Manual



C-418EM Instruction Manual, Nov. 2024

## ABOUT I-GARD

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I-Gard's commitment to electrical safety provides both industrial and commercial customers with the products needed to protect their electrical equipment and the people that operate them.

As the only electrical-safety focused company whose product portfolio includes neutral grounding resistors, high-resistance grounding systems and optical arc mitigation, we take pride in our technologies that reduce the frequency and impact of electrical hazards, such as arc flash and ground faults.

For those customers who have purchased from us over the last 30 years, you know us for the quality and robustness of our products, our focus on customer service and technical leadership. We build on this foundation by investing in developing new products in electrical safety education by actively participating in the IEEE community programs on technical and electrical safety standard, and working with local universities at discovering new technologies. We remain unrelenting in our goal of improving electrical safety in the workplace.

Our commitment to excellence is validated by long-standing relationships with industry leaders in fields as diverse as petroleum and gas, hospitals, automotive, data centers, food processing, aerospace, water and waste water plants, and telecommunications. We provide our customers with the product and application support required to ensure that their electrical distribution system is safe and reliable.

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## 1. FEATURES

- POWERED DIRECTLY FROM 3 PHASES
- BRIGHT LED LAMP TECHNOLOGY USED FOR INDICATION
- ALL PHASES FUSED INTERNALLY
- CONTAINS 2 AUXILIARY RELAYS FOR EXTERNAL INDICATION
- PLASTIC ENCLOSURE WITH KNOCKOUTS FOR CONVENIENT MOUNTING
- ISOLATED FLUSH MOUNT EXTERNAL DISPLAYS ARE OPTIONAL

## 2. INTRODUCTION

The I-Gard VIA is a 3-phase ground fault indicator unit and is designed specifically for ground fault indication on wye or delta-connected, three-phase, three-wire, resistance grounded or ungrounded power systems. It may be used on systems between 120 V and 600 V (up to 690 V without CSA approval) line-to-line or up to any voltage with the use of 120 V or 240 V potential transformers (PT's).

One or more optional flush mounted external displays can be mounted on panel doors or other locations. Up to four displays can be connected using an RJ-45 (networking) cable in a daisy-chain configuration. Isolation inside the VIA protects the external display from high voltages. Up to several kilometers of cable can be used between the VIA and VIA-R display. Refer to table 2.0 for part numbers.

The VIA is designed to provide an alarm when a single ground fault occurs, and to indicate on which phase the fault occurred. Each phase is fused inside the VIA enclosure; therefore it does not require any external hardware.

When a second fault, on another phase, occurs in the distribution system, the only limitation on the amount of ground fault current is the impedances of the faults, the impedance of the source (transformer windings feeding the faults) and the ground circuit between them. Under this condition, extensive damage can occur, making it necessary to clear the first fault as soon as possible. The prime advantage, then, of using the VIA ground alarm indicator unit, is that the user is given early warning of ground faults allowing time to locate and clear the fault to ensure maximum service continuity.

| PART NUMBER | DESCRIPTION                    |
|-------------|--------------------------------|
| VIA         | VIA (Voltage Indication Alarm) |
| VIA-R       | Remote VIA                     |

Table 2.0 Part Numbers

## 3. OPERATION

The VIA measures the fault level as shown in Figure 3.0 below. The fault is expressed as a percentage of the total neutral voltage displacement at the time of a ground fault. A bolted fault (short) to ground is considered to be a 100% fault. A RED LED indicates a fault on which the neutral voltage displacement from ground is greater than or equal to 50%, YELLOW indicates a neutral to ground voltage greater than or equal to 20% and less than 50%, and GREEN means a neutral to ground voltage displacement of less than 20%.

Two auxiliary, form C relays can also be used for external indication. The 20% relay changes state when the system has a 20% or greater fault level (when any of the LED's change to YELLOW). The 50% relay changes state when the system has a fault level that is greater than or equal to 50% (when any of the LED's change to RED). In addition, the 20% relay will change state in the event of a phase loss.

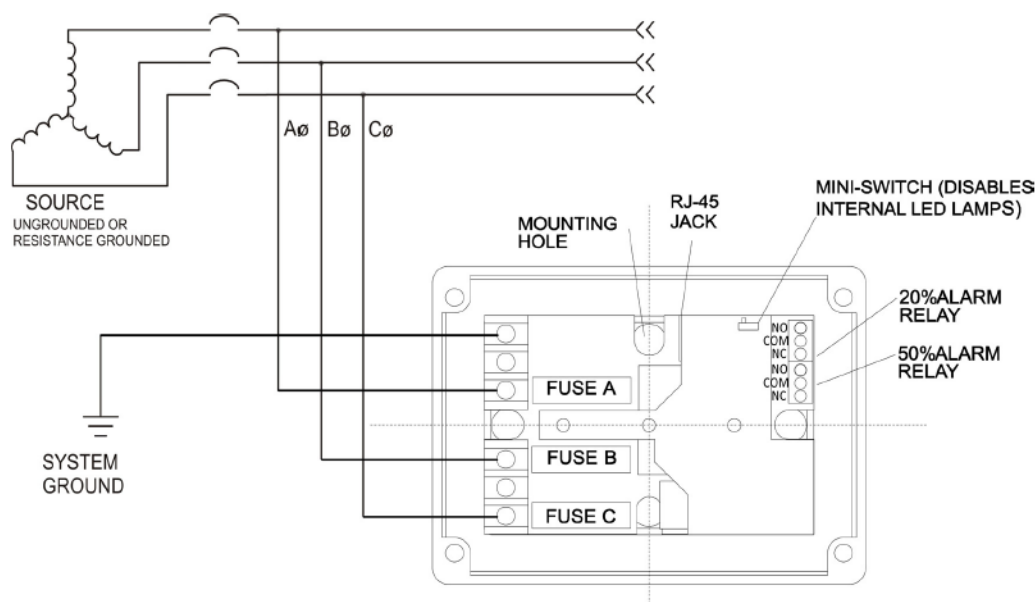


Figure 3.0 VIA Internal Operation Diagram

## 4. INDICATION

The status of each phase is represented by a LED lamp on the front of the unit. The LED's are labelled A, B, C, corresponding to the connections within the VIA. Table 4.0 shows all possible conditions that can be displayed using the LED lamps.

| CONDITION                                           | REASON                                                                      |
|-----------------------------------------------------|-----------------------------------------------------------------------------|
| All phase LED's are GREEN                           | No fault or ground fault level is less than 20%                             |
| One phase LED is YELLOW                             | Fault level is greater than or equal to 20%, but less than 50%              |
| One phase LED is RED                                | Fault level is greater than or equal to 50%                                 |
| One phase LED is GREEN and BLINKING                 | Phase is lost or fuse is blown                                              |
| One phase LED is OFF                                | Unit may be defective (LED may have burned out)                             |
| All phase LED's are OFF                             | More than 1 phase is lost, more than one fuse is blown or unit is defective |
| All phase LED's are RED and BLINKING (single flash) | DC fault from positive (+) to ground                                        |
| All phase LED's are RED and BLINKING (double flash) | DC fault from negative (-) to ground                                        |

Table 4.0 VIA Indication Summary

The VIA Indicator has a tolerance of +/- 15% of the neutral voltage displacement during a ground fault.

### DC Fault Indication

The VIA indicator also has the capability to indicate when a DC fault has occurred. If a bolted fault (100%) occurs from the positive DC side of a rectifier, the VIA LED's will all turn RED and flash. If the fault is resistive (less than 100%) the LED's will turn YELLOW and flash. Likewise if the fault is from the negative side of the DC rectifier, the LED's will change color (depending on the fault intensity) and double flash (indicating a negative DC fault).

**Important:** The VIA shall be placed on the line side (AC line side) of the rectifier to be able to detect a DC fault (on the load side) and rectifier needs to read Line-to-Ground voltages at the input. Under this scenario, the VIA will indicate fault condition as described above.

Most rectifier configurations are 6-pulse, meaning only the Line-to-Line of the input is used to create the DC output, which would not vary during a Ground Fault condition on an ungrounded system, therefore the VIA will not be able to indicate a Ground Fault.

When indicating DC faults the VIA does not apply the 20% and 50% level thresholds.

The fault indication is not a latched function; once the fault is cleared, the VIA will reset to the normal state.

However, it does distinguish between bolted DC faults (RED) and resistive faults (YELLOW). In addition to visual indication, the VIA is equipped with two optional auxiliary relays. Table 4.1 below describes the operation of these relays.

| CONDITION                                                     | STATE OF 20% RELAY | STATE OF 50% RELAY |
|---------------------------------------------------------------|--------------------|--------------------|
| No fault or fault is less than 20%                            | De-energized       | De-energized       |
| Fault level is greater than or equal to 20% but less than 50% | Energized          | De-energized       |
| Fault level is greater than or equal to 50%                   | Energized          | Energized          |
| Phase is lost or fuse blown                                   | Energized          | De-energized       |
| Negative or Positive DC Fault (low level)                     | Energized          | De-energized       |
| Negative or Positive DC Fault (high level)                    | Energized          | Energized          |

Table 4.1 Auxiliary Relay Operation Summary

If using an external display the VIA's internal LED lamps can be disabled. This is done by toggling the mini switch on the VIA's top printed circuit board shown in Figure 5.0. The VIA's internal LED lamps can be either on or off depending on customer preference.

## 5. INSTALLATION INSTRUCTIONS

| DANGER                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hazard of Electrical Shock, Burn or Explosion                                                                                                                                                                                                                                                                             |
| All installation, servicing and testing referred to in this manual must be performed by qualified personnel. All power should be disconnected prior to removing covers or enclosures and where live conductors may otherwise be exposed.                                                                                  |
| Failure to observe these precautions may result in death or severe personal injury and damage to equipment. Before placing an intentional ground fault on the power system, check that a fault does not already exist. Any test ground fault equipment must be rated for full system voltage and be fused for protection. |

Prior to mounting, select one of the 10 knockout locations for wiring. (Refer to Figure 8.0 for dimensions and knockout locations) Gently tap with a hammer to snap out the plastic. A cable grommet (25 mm or 32 mm) can be used to seal the knockout and provide entry for the cables.

Each enclosure can be mounted directly to a panel or wall. In order to properly mount the VIA, remove the cover by unscrewing the 4 corner screws. The unit has four screw mounting locations as shown in Figure 5.0. Prior to mounting on the wall, four holes need to be drilled out to accommodate the mounting screws. Use the appropriate drill bit depending on the selected screws. Once the drill holes are ready, proceed to mount the back and then to reattach and tighten the top cover.

Note: The VIA interior is permanently fixed in place, do not attempt to remove it.

Each VIA comes with mounting hardware listed in Table 5.0.

| DESCRIPTION                                     | QUANTITY |
|-------------------------------------------------|----------|
| 8-18 Round head, Slotted, Stainless Steel Screw | 4        |
| #8 Flat Washer                                  | 4        |
| 25 mm Cable Grommet                             | 2        |

Table 5.0 Mounting Hardware Included with VIA

All required connections are made inside the VIA enclosure. Please ensure that all power is disconnected before and during setup and installation. All three phases must be connected to their corresponding terminal. Should the phase connections be inverted, the VIA ground fault indication will also be inverted. A good ground connection is essential for proper bonding and voltage indication; to complete the ground connection, connect a wire from the VIA ground terminal to a reliable system ground.

If using an optional external flush mount display, connect the RJ-45 cable to the RJ-45 jack inside the VIA as shown in Figure 5.0. Route the cable clear of any exposed high voltage components such as fuses or phase connection terminal blocks. The connections to the alarm relays must also be made during the installation process.

When using remote VIA indicators, it may be desired to toggle the mini-switch to disable the internal LED lamps. This is not required; in fact, the internal LED lamps can remain active even if using more than one external display. However, the internal LED's may not be visible as a result of the mounting location, and therefore will not be useful. The mini-switch then can be used to disable the indicating lights on the main VIA.

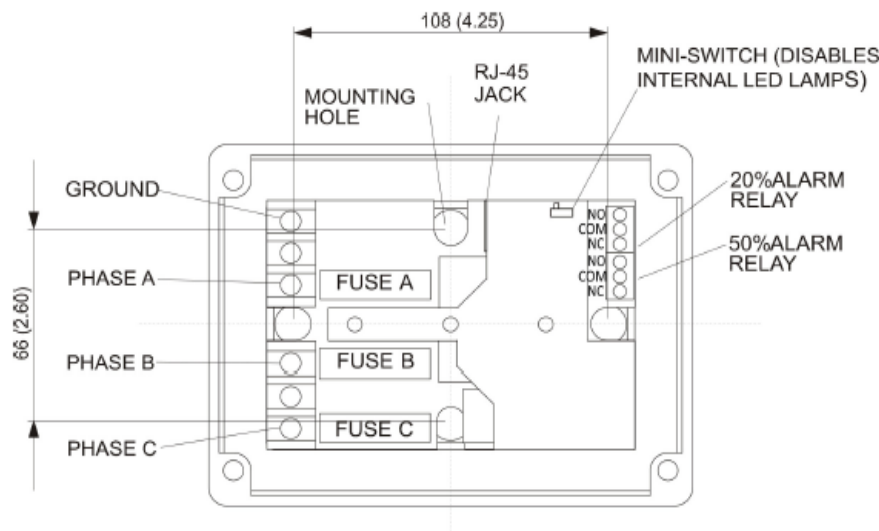


Figure 5.0 Connections and Mounting - mm (inches)

The external VIA-R (remote indicator) may be mounted with the base or flush mounted directly on a panel door or wall. For flush mounting, remove and discard the base. Remove the screws and replace with the machine screws provided (see Table 5.1 for a list of hardware provided with the VIA-R remote display). Figure 5.1 shows the recommended cut-out pattern for flush mounting the display on a door. Once attached, connect the RJ-45 cable into either of the two modular jacks. If using more than one VIA-R (remote indicator), daisy chain the units by connecting a cable from the remaining jack to the next VIA-R in the chain. In this manner, up to four VIA-R units may be connected to a single VIA main unit.

| DESCRIPTION                                        | QUANTITY |
|----------------------------------------------------|----------|
| 6-32, " Round head, Slotted, Stainless Steel Screw | 4        |
| #6 Flat Washer                                     | 4        |
| 5 meter, Straight Through, RJ-45 cable             | 1        |

Table 5.1 Mounting hardware included with VIA-R

The VIA base and the VIA-R remote display are connected using a CAT6 cable. The unit includes a 5-meter cable, but you can replace it with any length up to a maximum of 85 meters. Please ensure that the cable is not cross-wired; it must be a straight-through cable with 8 conductors and an RJ-45 modular plug at both ends.

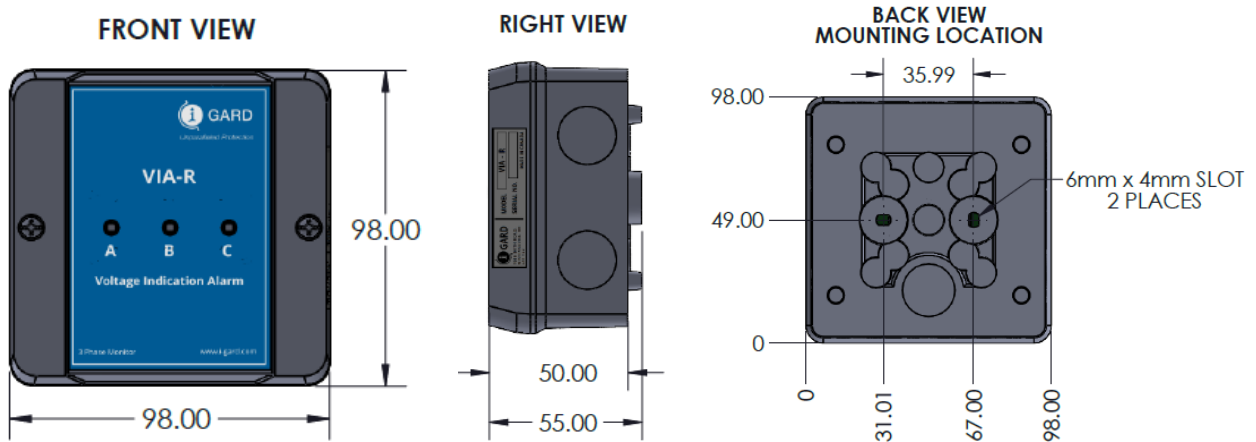


Figure 5.1 VIA-R dimensions for flush mounting - mm

The VIA can be used on higher system voltages with the use of potential transformers. Appropriately sized (see section 6 for power requirements) PT's with output voltages that fall within the VIA operating range must be used. Connections are shown in Figure 5.2. The VIA voltage range is between 120 and 600 VAC line-to-line +/- 10%.

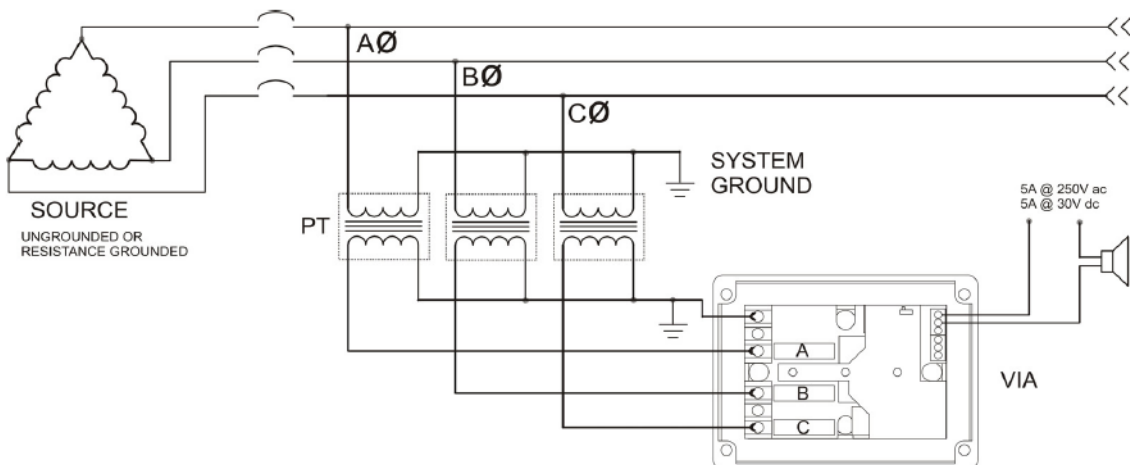


Figure 5.2 VIA connected to system through potential transformers (PT's)

## 6. SERVICE

For assistance in installation, set-up or testing please contact I-Gard at [support@i-gard.com](mailto:support@i-gard.com)

| DANGER                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hazard of Electrical Shock, Burn or Explosion                                                                                                                                                                                                                                                                                                           |
| All installation, servicing and testing referred to in this manual must be performed by qualified personnel. All power should be disconnected prior to removing covers or enclosures and where live conductors may otherwise be exposed.                                                                                                                |
| Failure to observe these precautions may result in death or severe personal injury and damage to equipment.<br>Before placing an intentional ground fault on the power system, check that a fault does not already exist. Any test ground fault equipment must be rated for full system voltage and interrupting capacity, and be fused for protection. |

The VIA contains three fuses that protect each phase input. The fuses are 1.6 A fast-acting type (part number: 0ADBC1600-BE by Bel Fuse). Approved equivalent fuses can also be used. There are no other recommended, user-serviceable parts in the VIA.

To replace a fuse, isolate the VIA and remove the top cover by unscrewing the 4 corner screws. Remove the burned fuse out of the fuse holder and replace it with a new one. Reattach the cover and tighten the screws.

All service other than direct replacement of entire modules to I-Gard should be referred to qualified factory representatives. Please visit the I-Gard website for information regarding field service representatives in your area.

Note: Please ensure that proper authorisation is obtained from I-Gard before returning any material.

## 7. TECHNICAL SPECIFICATIONS

### Control Power and Burden:

120-690 VAC line-to-line, +/- 10%, 50/60 Hz (CSA and UL approved up to 600 VAC)  
4 VA @ 120 VAC  
12 VA @ 208 VAC  
15 VA @ 240 VAC  
45 VA @ 415 VAC  
60 VA @ 480 VAC  
100 VA @ 600 VAC  
125 VA @ 690 VAC

### Temperature Range (Celsius):

Operating Temperature: -40°C to +65°C  
Storage Temperature: -40°C to +85°C

### Isolation Voltage for External Display:

AC Voltage (60 seconds): 3000 V  
Peak Voltage (1 second): 6000 V

#### Ground Fault:

Pickup Settings (as a percentage of displacement from ground):

GREEN 0% - 19%



YELLOW 20% - 49%



RED 50% - 100%



#### Pickup Tolerance:

+/- 15%

(YELLOW: 17% - 23%)

(RED: 42.5% - 57.5%)

#### Output Contacts:

Type: Form C (Normally Open, Common, Normally Closed)

Rating: 10 A @ 277 VAC (resistive)

5 A @ 30 VDC (resistive)

Replacement Fuse: 0ADBC1600-BE by Bel Fuse

#### Physical:

Weight: 0.40 kg (0.88 Lbs)

Dimensions: 6.57" (L) x 4.92" (W) x 3.22" (H) (See Fig. 8.0)

Standards: CSA Standard C22 No.14 - Industrial Control Equipment

CAN/CSA-C22.2 No. 144 - Ground Fault Circuit Interrupters

Certificate Number: 2007286 (LR 65287)

UL 1053 - UL Standard for Safety Ground-Fault Sensing and Relaying Equipment

Certificate Number: 20130216-E107725

I-GARD RESERVES THE RIGHT TO CHANGE SPECIFICATIONS OF ITS PRODUCTS WITHOUT NOTICE.

## 8. DIMENSIONAL DRAWINGS

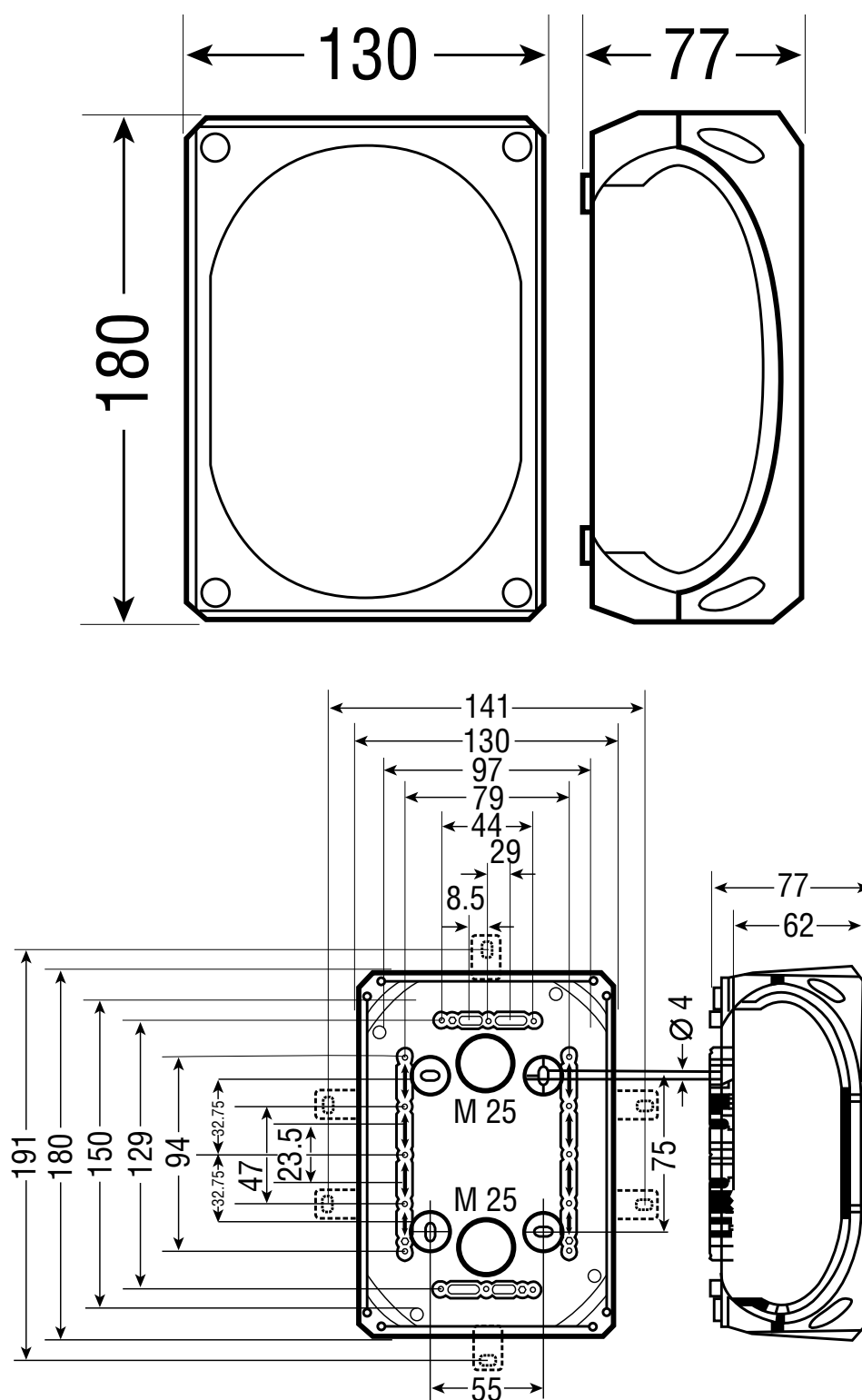


Figure 8.0 VIA Dimensions – mm



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