# V-LIM®2

## TECHNICAL DATA SHEET

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# ELECTRICAL LINE INTEGRITY MONITORING MODULE

V-LIM®2

A VIPER INNOVATION

V-LIM® 2 TECHNICAL SPECIFICATION

# A PRECISE AND ACCURATE ELECTRICAL CABLE INTEGRITY MONITOR FOR UNGROUNDED/ FLOATING ELECTRICAL SYSTEMS

## Long term operation and exposure to harsh environmental conditions causes insulation degradation in cables and other electrical equipment over time.

Building on over a decade of proven expertise with the original V-LIM unit, the V-LIM2 represents a significant advancement in system monitoring technology. Designed with insights gained from real-world applications, the V-LIM2 provides enhanced precision and accuracy in the measurement of insulation resistance, capacitance, and other advanced electrical parameters.

Thanks to its measurement capabilities, the V-LIM2 provides not only a detailed view of the system's health over time but also opportunities to prevent problems before they occur. This is achieved through **V-LIFE®** - an exclusive, patented feature for subsea applications that can be activated to increase system insulation resistance (IR), without the need for costly interventions or the risk of introducing new faults, reducing reliance on reactive measures following failures.

The V-LIM2 employs digital signal processing techniques to facilitate the trending and characterisation of system conditions, providing reliable fault detection across a wide measurement range. It is fully compatible with power transmission systems, communication systems, and combined communication-on-powerline systems. Integration into existing or new infrastructure is straightforward, thanks to its panel-mounting arrangement.

The V-LIM2 features two independently adjustable alarms and relay contacts, which can be set to predefined, user-configurable thresholds. When the insulation resistance falls below these thresholds, the alarms are triggered, and the relays operate. The V-LIM2 provides a comprehensive view of system condition as a standalone unit, which can be interrogated via its touch-enabled LCD panel or easily downloaded using its USB A or C ports.

Additionally, simultaneous measurement of cross-coupled channels is supported through the **V-NET® Sync** protocol. This protocol is specifically designed to mitigate interference between units caused by cross-coupling via inherent mutual capacitance and resistance in systems with multiple channels, where each channel is monitored by an individual unit.

The V-LIM2's integrated memory allows the storage of timestamped system health and line-characterising parameters. By uploading this data to Viper Innovations' advanced and intuitive online portal, **Platform Vi®**, users gain access to comprehensive insights, analytics, and personalised recommendations for the monitored system.

## Key features:

- **V-LIFE®** — Award-winning cable rejuvenation technology. V-LIM2 allows enabling of service on purchase of a runtime licence
- Two power supply input options, AC and DC, provided in a single variant
- Two separately configurable IR alarms with associated relay contacts to take desired action
- Timestamped measurement data is logged to internal memory
- High-resolution LCD touchscreen and web server user interfaces with full configuration capability
- Ethernet, RS485 and 4-20mA interfaces
- Firmware and configuration settings upload from front panel USB ports via memory stick or service PC
- Data log download to memory stick or service PC
- Facility to internally disconnect from the monitored line, allowing temporary application of external IR test without physical disconnection of V-LIM2
- Password-protected configuration access
- Cross-coupling immunity provided by **V-NET® Sync** feature, enabling multiple V-LIM2 units to take accurate simultaneous measurements on adjacent cables by eliminating effects of cross-coupled electrical noise
- Coupler Module connection capability for voltage >1kV
- Built-in self-test and facility to allow testing of IR indicating interfaces
- Rated power monitoring capability using split line CT Coil Accessory
- Fully compatible with existing V-LIM installations for seamless retrofitting

### Product Standards

BS EN / IEC 61557-1
BS EN / IEC 61557-8
BS EN IEC 61557-12
BS EN / IEC 61010-1
BS EN / IEC 61010-2-30
BS EN / IEC 61326-1
BS EN / IEC 61326-2-4
BS IEC 60533

### Industry Standards

API 17F 5th edition
ISO 13628-6

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# V-LIM2® TECHNICAL SPECIFICATION

## Insulation Measurement

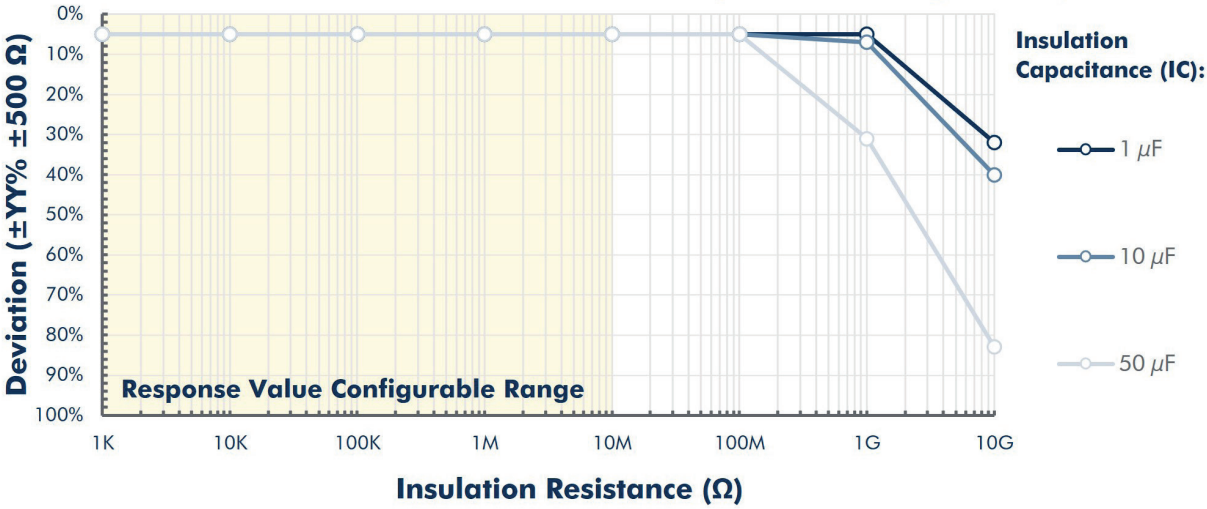
**Insulation Resistance (IR):**
1 kΩ to 10 GΩ[1]

**Insulation Capacitance (IC):**
0.1 µF to 150 µF[1]

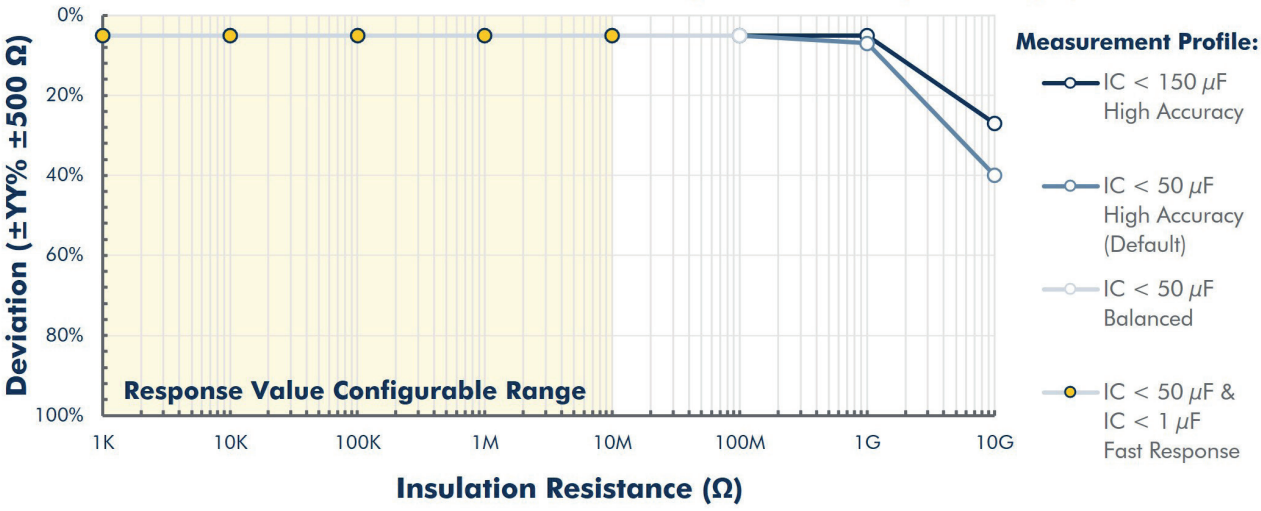
**Response Value ($R_{an}$):**
1 kΩ to 10 MΩ[2]

[1]*Maximum IR and recommended maximum system IC change depending on the measurement profile selected.*
[2]*Based on BS EN / IEC 61557-8 reference conditions*

### IR Measurement Deviation vs IC (Default Configuration)




### IR Measurement Deviation vs Configured Profile (IC = 10 µF)




*Measurement deviation is specified in the form of ±YY% ± 500 Ω, where YY is the relative measurement deviation expressed as a percentage of measured value from the graphs above on the Y axis.*
*The deviation values were obtained under controlled laboratory conditions corresponding to BS EN / IEC 61557-8 reference conditions with various IC values.*

## Power Monitoring

**V-LIM2** is classed as a PMD-x SD[3] with voltage and frequency measurement and external current measurement via the VA-232002 CT Coil accessory. Current and power measurement is only available on AC systems.

**Line Voltage (True RMS):**
50 V to 1000 V, Class[3]: 1

**Line Frequency:**
50 Hz to 100 Hz, Class[3]: 0.02
100 Hz to 400 Hz, for indication only

**Line Current[4]:**
0.8 A to 16 A, Class[3]: 2

**Active Power[4]:**
BS EN IEC 61557-12 rating pending

**Reactive Power[4]:**
BS EN IEC 61557-12 rating pending

**Apparent Power[4]:**
BS EN IEC 61557-12 rating pending

**Power Factor[4]:**
BS EN IEC 61557-12 rating pending

[3]*Performance class as per BS EN IEC 61557-12*
[4]*Requires VA-232002 CT Coil Accessory*

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# V-LIM2® TECHNICAL SPECIFICATION

## Electrical

**Supply Voltage:**

| Supply 1 | Supply 2 |
|---|---|
| 24 V DC | 110 V to 230 V AC |
| | 140 V to 300 V DC |
| ± 20% tolerance | ± 10% tolerance |

**Supply Frequency:**

| Supply 1 | Supply 2 |
|---|---|
| DC | DC, 50/60 Hz |
| | ± 6% tolerance |

**Power Consumption**

15 W maximum

**Line Voltage**

Up to 1000 V DC
Up to 1000 V single-phase AC
Up to 690 V 3-phase AC

**Line Capacitance (operating):**

Up to 500 µF

**Line Frequency (operating):**

50 Hz to 400 Hz single-phase AC
50 Hz to 60 Hz 3-phase AC

## Data Storage

Circular FIFO buffer
Typical two year data storage without overwrite @ one reading per minute.

## Mechanical

**Environmental**

| | |
|---|---|
| Operating Temperature Range: | -20° C to +60° C (-4° F to 140° F) |
| Relative Humidity: | Up to 93% non-condensing |
| Pollution Degree: | BS EN 61010-1:2010 Degree 2 |
| Overvoltage Category: | BS EN 61010-1:2010 CAT III |
| Measurement Category: | BS EN 61010-2-030:2010 CAT III |

**Packaging:**
Dimensions: See diagram below
Weight: 1.0kg

## Product Marks

UK CA CE

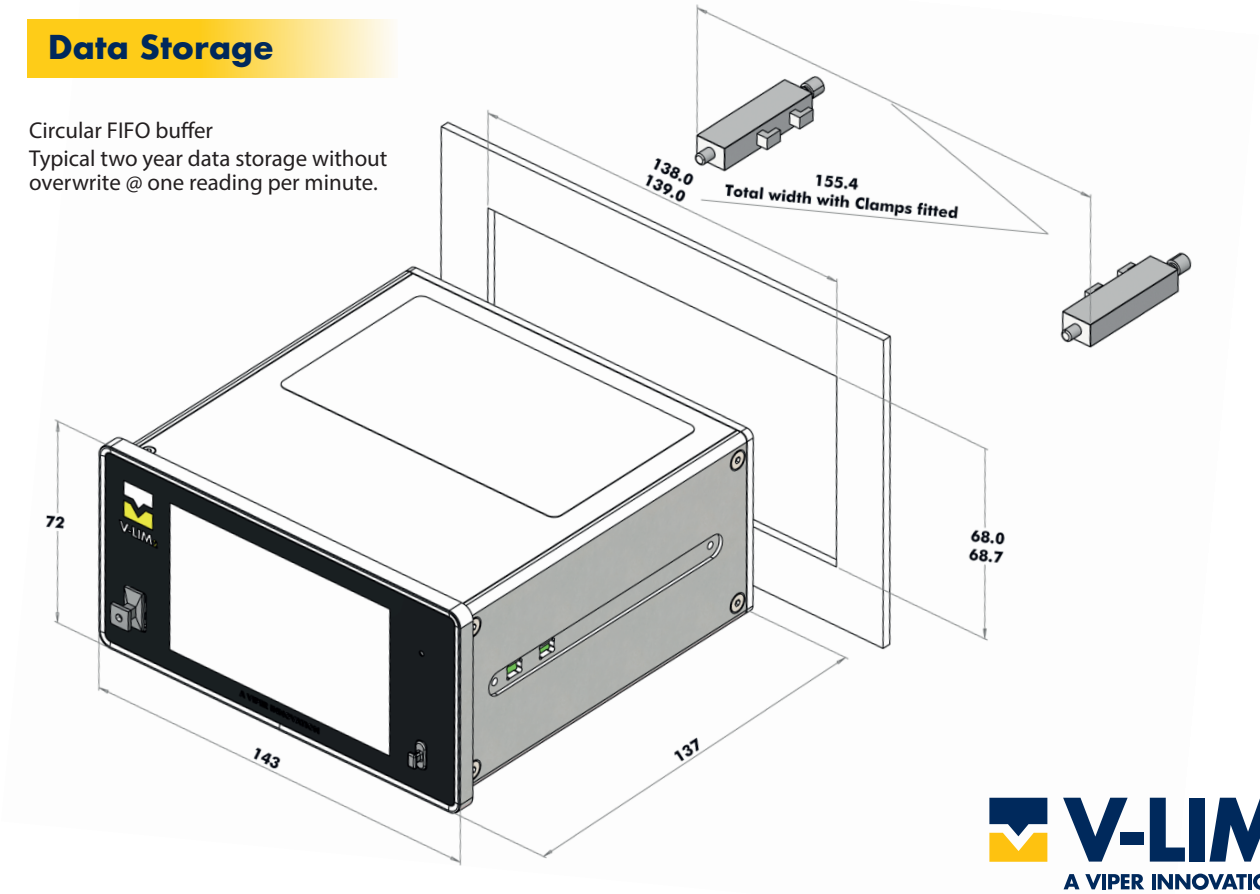
MET c us U: 61010-1 CSA C22.2 No. 61010-1 E114248

**Notice:** Product complies with Part 15 of the FCC rules, subject to the following two conditions:
1. The device may not cause harmful interference. 2. This device must accept any interference received, including interference that may cause undesired operation.

*MET Laboratories certification subject to formal qualification testing.*

## Mounting Arrangement

Dimensions in mm

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# V-LIM2® TECHNICAL SPECIFICATION

## Interfaces

**Connection**:

- Pluggable screw terminal connectors for alarm relays, line interface, and input supply 1
- Push-in connectors for 4-20mA interface, RS485, digital switches, and input supply 2
- RJ45 Ethernet
- Remote Sensor [option for power monitoring capability]

**Alarms**:

- 2 x Single pole volt-free changeover contacts compatible with signals up to 300V AC / DC, 2A, and 384 W maximum switching power
- User configurable non-failsafe (default) and failsafe modes

**Ethernet:**

- 10/100 Base-TX Auto negotiation
- DHCP / static (configurable) IP addressing
- Modbus TCP/IP, HTTP protocols supported

**RS485:**

- 1200 - 921600 bps
- Modbus RTU
- 120 Ω termination may be enabled via configuration
- Modbus map can be configured for backwards compatibility with the V-LIM

**USB:**

- USB 2.0 Type-A data download and configuration update via memory stick
- USB Type-C laptop service port access.

**Current Loop:**

- Powered either internally[5] or by a 12 V - 24 V DC external source
- Multiple configurable IR ranges between 10 MΩ and 10 GΩ
- Default current output of 4-20 mA and configurable legacy options

**Digital Switch Input:**

- 2 x volt-free digital switch inputs
- Configurable trigger modes (NO/NC) and 5 different functions

**LCD:**

- 800 x 480 touchscreen with full configuration capability

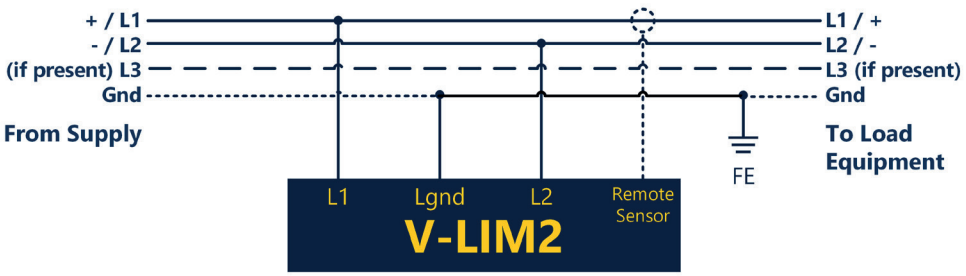
**Order Codes:**

- VA-231411 **V-LIM2** (**V-LIFE** capable)
- VA-232002 **CT Coil Accessory**

Full list of installation accessories is available upon request.

*[5]To satisfy the conducted emission limits of the BS IEC 60533 standard, the internal power supply of the current loop interface must remain switched off.*

## Standard Line Connection




**Description:**

The V-LIM2 is connected to each line conductor (L1 and L2) and associated functional earth (FE). Power monitoring capability can be enabled by installation of the CT Coil Accessory to the remote sensor port.

Refer to the V-LIM2 Installation and Operating Manual (6087-145852) for detailed information and installation instructions.

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For more information visit:
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