INTRODUCING
THE V-LIM®
ELECTRICAL LINE INTEGRITY
MONITORING MODULE
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. With its precise and accurate measurements of Insulation Resistance, Capacitance and other advanced electrical parameters, V-LIM not only provides a better picture of the health of the system over time, but also provides opportunities to identify problems before they arise. This allows proactive and more cost effective intervention to be undertaken based on risk and asset condition assessments rather than relying on reaction to failures after they have occurred.

The V-LIM unit employs Digital Signal Processing techniques which facilitate trending and characterisation of the system condition with reliable fault disclosure over a wide measurement range. V-LIM is fully compatible with power transmission, communications as well as combined communications on powerline systems and is easily integrated into existing or new infrastructure via its convenient panel mounting arrangement.

V-LIM has two independently adjustable alarms and relay contacts set to predefined user-configurable thresholds. When the V-LIM detects that the IR has fallen below the thresholds, the alarms activate, and the relays operate. V-LIM offers an overall system condition as a standalone unit which can be interrogated using the module’s touch LCD panel, or downloaded easily via USB A or B.

Additionally, V-LIM is V-LIFE ready - an exclusive feature for subsea applications which can be activated to increase the system IR and availability without the need for costly intervention or risk of introducing new faults.

V-LIM forms part of Viper Innovation’s V-IR product line offers a granular view of the subsea electrical network, it’s component and cable condition, as well as fault identification and location. V-IR uses the V-LIM along with subsea deployed V-SLIM modules to display the subsea network integrity on an interactive graphical user interface, reducing the reliance on vessel-based fault finding operations with divers or ROVs and supporting a move to condition and risk-based maintenance.

Key Features
- Two separately configurable alarms with associated relay contacts to take desired action
- Timestamped measurement data is logged to internal memory
- Touchscreen LCD and web interface displays
- Ethernet, RS485 Modbus and 4-20mA interfaces
- Upload firmware and configuration settings from front panel USB interfaces via memory stick or service PC
- Download data log to memory stick or service PC
- Compatible with temporary application of external IR test unit without physical disconnection of V-LIM
- Multiple user security levels supported for secure access
- Built-in self-test

Additional functions include
- V-LIFE cable remediation technology
- V-SLIM integration for V-IR network condition monitoring
- V-NET communications integrated for data recovery from V-SLIM modules

Insulation Monitoring Standards
IEC 61557-1: 2007
IEC 61557-8: 2014

Product Marks

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.
## V-LIM

### PRODUCT SPECIFICATION

#### Electrical

- **Supply Voltage:**
  - 110V to 240V AC
  - 140V to 335V DC
  - ± 10% tolerance

- **Supply Frequency:**
  - DC, 50/60Hz
  - ± 6% tolerance

- **Power Consumption:**
  - 5W typical
  - 14W maximum

- **Line Voltage:**
  - Up to 1000V DC/AC 47-400Hz

- **Line Capacitance (operating):**
  - Up to 500µF

#### 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)
  - Storage Temperature Range:
    - -40°C to +85°C (-40°F to 185°F)
  - Relative Humidity:
    - Up to 85% 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
  - Additional Testing:
    - BS EN 60068-2-1:2007 Test Ae
    - BS EN 60068-2-2:2007 Test Be
    - BS EN 60068-2-78:2013 Test Cab

- **Packaging:**
  - Dimensions: See diagram below (in millimetres [inches])
  - Weight: 0.8kg

- **Design Life**
  - Minimum 15 years operation

### Mounting Arrangement

- Total width with clamps 151
- Clamps fitted after installation

---

Diagram of the V-LIM unit showing dimensions.
**V-LIM**

**PRODUCT SPECIFICATION**

**Measurement**

**Insulation Resistance:**
1kΩ to 1GΩ @ see graphs below

![Insulation Resistance Graph](image)

**Note:**
Measurement accuracies are specified in the form ±XX% ±Y, where XX is the tolerance expressed as a percentage of measured value and Y is an offset error. When V-LIFE is enabled, the maximum IR measured is 500MΩ

**Response Value (Alarms)¹:**
1kΩ to 10MΩ

**Insulation Capacitance:**
0.1µF to 150µF @ ±25% ± 0.05µF

**Line Voltage (True RMS):**
50 to 1000V AC/DC @ ±3% ± 5V

**Line Frequency:**
DC, AC 47 – 410Hz @ ±1% ± 0.5Hz

¹ Based on IEC61557-8 reference conditions

**Enhanced Measurements:**
(Requires external coil)
- Line Current (True RMS)
- Line Power (True RMS)
- Line Power Factor

**Interfaces**

**Connection:**
- Pluggable screw terminal connectors
- RJ45 Ethernet
- RJ50 Remote Sensor [option for enhanced measurements]

**Alarms:**
- 2 x Single pole volt-free changeover contacts 240V AC, 2A
- 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:**
- 9600, 19200, 38400, 57600, 115200 bps
- Modbus RTU
- 120Ω termination resistor may be connected via rear panel switches

**Current Loop:**
- 12V to 24V DC input voltage required.
- Multiple configurable Linear IR Ranges:
  - 0Ω (4mA) - 1GΩ (20mA)
  - 0Ω (4mA) - 500MΩ (20mA)
  - 0Ω (4mA) - 100MΩ (20mA)
  - 0Ω (4mA) - 10MΩ (20mA)
  - 0Ω (20mA) - 10MΩ (4mA) Inverted
  - 0Ω (4mA) - 1MΩ (20mA)
  - 0Ω (20mA) - 1MΩ (4mA) Inverted
  - 0Ω (4mA) - 100kΩ (20mA)
- Two configurable non-linear IR ranges for Legacy systems.

**LCD:**
- 640 x 480 touch screen

**USB:**
- USB 2.0 Type-A data download and configuration update via memory stick
- Mini USB Type-B laptop service port access.

**Order Code:**
VA-223619 V-LIM (V-LIFE capable)
STANDARD LINE CONNECTION

Connection Method 1: Single Phase Connection

Description:
The V-LIM is connected to each line conductor (L1 and L2) and associated ground.

Measurements available:
- Insulation Resistance
- Insulation Capacitance
- Line Voltage
- Line Frequency

ENHANCED LINE CONNECTION

Connection Method 2: Enhanced Single Phase Connection [requires accessory]

Description:
The V-LIM is connected to each line conductor (L1 and L2) and associated ground.

Measurement of additional parameters can be achieved through installation of a remote sensor.

Measurements available:
- Line Current
- Power Factor
- Real RMS Power

Connection Method 3: Enhanced Single Phase Connection [requires accessories]

Description:
The V-LIM is connected to each line conductor (L1 and L2) and associated ground.

Measurement of additional parameters can be achieved through installation of remote sensors

Measurements available:
- Directional Insulation Resistance (Upstream or Downstream)
- Directional Insulation Capacitance (Upstream or Downstream)
INTERFACES

Front Panel

Rear Panel

Relay 1 & 2

Current Loop
Please contact Viper Innovations for further information on V-LIM.

PORTISHEAD OFFICE
Viper Innovations Ltd
Unit 3, Marine View Office Park
45 Martingale Way
Portishead
Bristol
BS20 7AW
United Kingdom
Tel: +44 (0) 1275 787878

ABERDEEN OFFICE
Viper Innovations Ltd
Unit A, Kettock Lodge, Campus 2
Aberdeen Innovation Park
Balgownie Drive,
Bridge of Don
Aberdeen
AB22 8GU
Tel: +44 (0) 1224 519944

E-mail: enquiries@viperinnovations.com