APPLICATION & INSTALLATION GUIDELINES

Rayvoss®
Stand-Alone Surge Protection Devices Featuring

Strikesorb®
Surge Suppression Modules
Application & Installation Guidelines
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Preface

This document provides technical information on Raycap’s Strikesorb Surge Suppression Modules and Rayvoss stand-alone Surge Protective Devices (SPDs). An introduction to the principle of operation of Strikesorb’s patented technology is briefly presented. The technical characteristics of available types, the interconnection options, and the selection of the appropriate Strikesorb type for many power system configurations, as well as the methodology for integrating Strikesorb modules into the cabinets of large systems, is described in detail.

Strikesorb modules are the basic elements of Rayvoss SPD systems. The internal configuration of a Rayvoss system, which depends on the power system configuration, the required level of protection, and the desired additional features, is different for every Rayvoss type. The unique design of Rayvoss SPDs does not include or require any type of dedicated thermal disconnect mechanism (fuses, breakers, etc.), allowing the Rayvoss to be connected directly on the power wires. This provides for two possible installation options for Rayvoss SPD systems:

- **Direct Connection on the power lines**
  Rayvoss is the only SPD device that can be safely installed in-line directly on the power lines.

- **T-Connection**
  This is the conventional method of connecting a SPD in a branch via an appropriate circuit breaker or fuse.

A Product Selection Guide for Rayvoss systems is shown on page 13. Detailed installation instructions for the Direct or T-Connection of Rayvoss system are also provided.

Updated product information can be found on the Raycap website: www.raycapsurgeprotection.com. The site provides detailed information of the following:

- Rayvoss Brochure,Datasheets, Application Notes, White Papers
- Comprehensive presentation of Strikesorb’s principles of operation
- Features and benefits of Strikesorb/Rayvoss unique technology
Strikesorb® Surge Suppression Modules

Introduction

The Strikesorb surge suppression module is used either as a stand-alone protection element in integrated solutions or within a Rayvoss SPD system. It incorporates a single, heavy duty, distribution grade metal oxide varistor (MOV) disk, assembled under pressure in an environmentally sealed aluminum casing.

Strikesorb’s unique design provides very low internal contact resistance and uniform distribution of the surge current over the total area of the protection element resulting in low current density which guarantees the lowest let-through voltages. Furthermore, the excellent thermal management of the MOV due to its aluminum housing provides extremely high energy handling capability. Strikesorb’s patented design minimizes the effects of aging and completely eliminates the risk of catastrophic failure, explosion or fire.

Strikesorb incorporates state of the art developments in metal oxide technology providing superior protection characteristics, which remain unchanged throughout its long service life. The modules have been designed to withstand repeated surges providing cost-effective and maintenance free operation in harsh environments. Strikesorb is the only UL 1449 3rd Edition recognized surge protection module in the industry rated for safe operation without the use of additional internal fuses. This unique feature, combined with its capability to be connected directly on the power lines (feed-through connection), makes it the most reliable surge protection device known and ensures that critical electronic equipment will remain protected at all times. Strikesorb 40mm and 80mm modules are certified as Class I surge protection devices per the IEC 61643-11:2011.
Strikesorb Surge Suppression Modules

Strikesorb Options

Strikesorb (AC) Types Available

- **Strikesorb-40**
  This module includes a single MOV disc of 40 mm diameter, provides protection from surges up to 140 kA (8/20 µs), and can be used in all applications.

- **Strikesorb-80**
  This module includes a single MOV disc of 80 mm diameter and provides protection from surges up to 200 kA (8/20 µs). It is recommended for use in locations where the risk of direct lightning strikes is high, or at locations with a history of frequent surge-related equipment failures.

There are multiple Strikesorb surge protection modules available, some of the more commonly used for Rayvoss are shown in the table below:

<table>
<thead>
<tr>
<th>Product ID</th>
<th>Nominal Operating Voltage</th>
<th>Maximum Continuous Operating Voltage (MCOV)</th>
<th>Maximum Surge Current Rating (8/20 µs)</th>
<th>SPD Class I per IEC 61643-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strikesorb 40-A</td>
<td>120 V</td>
<td>150 V</td>
<td>140 kA</td>
<td>12.5 kA 10/350 µs</td>
</tr>
<tr>
<td>Strikesorb 40-B</td>
<td>240 V</td>
<td>300 V</td>
<td>140 kA</td>
<td>12.5 kA 10/350 µs</td>
</tr>
<tr>
<td>Strikesorb 40-C</td>
<td>277 V</td>
<td>350 V</td>
<td>140 kA</td>
<td>12.5 kA 10/350 µs</td>
</tr>
<tr>
<td>Strikesorb 40-D</td>
<td>400 V</td>
<td>480 V</td>
<td>140 kA</td>
<td>12.5 kA 10/350 µs</td>
</tr>
<tr>
<td>Strikesorb 40-E</td>
<td>480 V</td>
<td>600 V</td>
<td>140 kA</td>
<td>12.5 kA 10/350 µs</td>
</tr>
<tr>
<td>Strikesorb 40-F</td>
<td>600 V</td>
<td>750 V</td>
<td>140 kA</td>
<td>12.5 kA 10/350 µs</td>
</tr>
<tr>
<td>Strikesorb 40-G</td>
<td>1000 V</td>
<td>1200 V</td>
<td>140 kA</td>
<td>12.5 kA 10/350 µs</td>
</tr>
<tr>
<td>Strikesorb 80-A</td>
<td>120 V</td>
<td>150 V</td>
<td>200 kA</td>
<td>25 kA 10/350 µs</td>
</tr>
<tr>
<td>Strikesorb 80-B</td>
<td>240 V</td>
<td>300 V</td>
<td>200 kA</td>
<td>25 kA 10/350 µs</td>
</tr>
<tr>
<td>Strikesorb 80-C</td>
<td>277 V</td>
<td>350 V</td>
<td>200 kA</td>
<td>25 kA 10/350 µs</td>
</tr>
<tr>
<td>Strikesorb 80-D</td>
<td>400 V</td>
<td>480 V</td>
<td>200 kA</td>
<td>25 kA 10/350 µs</td>
</tr>
<tr>
<td>Strikesorb 80-E</td>
<td>480 V</td>
<td>600 V</td>
<td>200 kA</td>
<td>25 kA 10/350 µs</td>
</tr>
<tr>
<td>Strikesorb 80-F</td>
<td>600 V</td>
<td>750 V</td>
<td>200 kA</td>
<td>25 kA 10/350 µs</td>
</tr>
</tbody>
</table>
Strikesorb Interconnection Options

Modes of Protection
The way that Strikesorb is connected to the power system determines the mode of protection that Strikesorb will provide. There are four possible interconnection options described in the following table:

<table>
<thead>
<tr>
<th>Connector A</th>
<th>Mode of Protection</th>
<th>System</th>
</tr>
</thead>
<tbody>
<tr>
<td>L G</td>
<td>Line-to-Ground (L-G)</td>
<td>Single-phase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Split-phase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Three-phase</td>
</tr>
<tr>
<td>L N</td>
<td>Line-to-Neutral (L-N)</td>
<td>Single-phase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Split-phase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Three-phase (with neutral wire)</td>
</tr>
<tr>
<td>N G</td>
<td>Neutral-to-Ground (N-G)</td>
<td>Single-phase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Split-phase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Three-phase (with neutral wire)</td>
</tr>
<tr>
<td>L L</td>
<td>Line-to-Line (L-L)</td>
<td>Single-phase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Split-phase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Three-phase</td>
</tr>
</tbody>
</table>

Selecting Module Type
The Strikesorb module selection is based on the following two criteria:

- **Nominal Operating Voltage**: This is the rms voltage measured between the two points (A and B) that Strikesorb module will be connected to.
- **Surge Current Withstand Capability**: In critical applications where severe lightning strikes are expected, Strikesorb 80 should be considered.
Product Selection Example

Requirements:

- **Power System**: Three-phase with neutral
- **System Voltage**: 480 V rms Line-to-Line (L-L)
- **Required Mode of Protection**: Line-to-Ground (L-G)
- **Application**: Protection Variable Frequency Drives (VFD) from lightning and power surges

In this application three Strikesorb modules are required to be installed between each line conductor and the ground. The protection modules should be able to withstand the thermal energy generated by periodic transients produced by the inverter circuit in addition to utility-generated surges, therefore Strikesorb 80-C or 40-C is recommended.

Mechanical Properties

The table below shows the primary mechanical properties of Strikesorb 40 and 80 modules.

<table>
<thead>
<tr>
<th>Mechanical Properties</th>
<th>Strikesorb 40</th>
<th>Strikesorb 80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter inch [cm]</td>
<td>2.5” - 2.76” [6.35 - 7.0 cm]</td>
<td>4.25” [10.79 cm]</td>
</tr>
<tr>
<td>Height inch [cm]</td>
<td>3.73” - 4.24” [9.46 - 10.78 cm]</td>
<td>3.72” [9.45 cm]</td>
</tr>
<tr>
<td>Weight lbs [kg]</td>
<td>1.33 - 1.76 lbs [6.04 - 8.0 kg]</td>
<td>3.31 - 3.41 lbs [1.5 - 1.55 kg]</td>
</tr>
</tbody>
</table>

The mechanical drawings of the Strikesorb 40 and Strikesorb 80 modules are shown below.
Torque Recommendations

The following illustration provides the recommended torque values for secure mounting of Strikesorb modules on ground bars and busbars. In addition, it provides the recommended torque values for attaching the wires into the mechanical connector, for different wire sizes.

Torque Recommendations for Strikesorb Module Assembly

Example:

60 in-lbs = 60 \times 0.113 = 6.8 \text{ Newton Meters (Nm)}

Unit Conversion:

1 \text{ in-lb} = 0.113 \text{ Newton Meter}

AWG=American Wire Gauge
Strikesorb Integrated Applications

Strikesorb surge suppression modules are the basic elements of the Rayvoss SPD systems which are described in the following sections. They can also be used as stand-alone SPDs integrated into large systems. Integrating Strikesorb modules into the equipment provides the highest level of protection due to the elimination of the interconnecting cables. Strikesorb modules can be directly connected inside the cabinet after the main circuit breaker. Due to the absence of lead wires and internal disconnect mechanisms, this installation method provides the lowest let-through voltage to the equipment.

Typical applications of the integrated solutions include:

- Variable Frequency Drives (VFDs)
- Telecommunication Equipment: Base Stations, Exchange Nodes, Street Cabinets, Optical Node Units (ONU), etc.
- Uninterruptible Power Supplies (UPS)
- Electrical Submersible Pump (ESP)

Strikesorb modules can be integrated into any cabinet provided that there is sufficient space inside the cabinet to install the modules.

A general interconnection diagram showing the direct connection of Strikesorb modules on busbars is illustrated below:
Rayvoss® Stand-Alone Surge Protection Devices

Introduction

General
Rayvoss SPD systems deploy Strikesorb suppression modules in a variety of configurations and operating voltages:

- **Single Phase / Split Phase**: 120 V to 240 V
- **Three Phase Wye**: 120/208 V, 220/380 V to 240/415 V, 277/480 V, 347/600 V
- **Three Phase Delta**: 240 V, 480 V, 600 V

Rayvoss SPD products provide continuous protection from lightning, temporary voltage and other transient voltage activity on a stand-alone basis at the building entrance and distribution panels where critical equipment is connected.

Rayvoss System with Four Strikesorb Modules
Rayvoss Product Selection Guide

The Rayvoss Product Selection Guide is a helpful tool when determining the right Rayvoss for an application based on operating voltage, distribution type, enclosure size, and other variables.

The information in this guide is intended to aid in the selection of a Rayvoss SPD suitable for your installation. For further assistance please contact Raycap Sales at info@raycap.com or your area representative.

### Operating Voltage
- 120
- 240
- 277
- 380
- 480
- 600

*This is the SPD operating Voltage. For single phase or three phase wye (Y) distributions, this is the voltage between Line and Neutral. For Delta (∆) type distribution, this is the Line to Line Voltage.*

### Distribution Type
- **1P** 1 Phase
- **2S** 2 Phase – Split Type
- **3Y** 3 Phase – Wye
- **3D** 3 Phase – Delta ∆
- **3H** 3 Phase – Delta ∆ High Leg

### Enclosure Size

<table>
<thead>
<tr>
<th>Enclosure Size</th>
<th>NEMA 4 Metal Stainless steel upon request</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>19.75 x 19.75 x 10.5</td>
</tr>
<tr>
<td>N</td>
<td>19.75 x 14.75 x 8.5</td>
</tr>
<tr>
<td>M</td>
<td>12 x 12 x 8.5</td>
</tr>
<tr>
<td>S</td>
<td>10 x 8 x 6.5</td>
</tr>
</tbody>
</table>

### Strikesorb Capacity
- 40
- 80

### Type of Strikesorb
- 1 Strikesorb 80
- 3 Strikesorb 40

### Part Number Example
**120 - 2S - M3 - 3 - 06 - A - H***

<table>
<thead>
<tr>
<th>Number of Strikesorbs</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>7</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Internal Plate Connection</th>
<th>0</th>
<th>Connected to Ground</th>
<th>N</th>
<th>Connected to Neutral</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Optional Features</th>
<th>No electronics</th>
<th>Surge Counter, phase indication LEDs and Remote Relays <em>(Not available for “S” enclosure)</em></th>
<th>Phase indication LEDs and remote relay</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*For a stainless steel enclosure specify “-SS” in place of the “-H” indication which is for the standard painted NEMA 4 enclosure.*
Typical Product Configurations

Rayvoss is available in a variety of configurations to match local electrical system requirements. The following table lists the most common configurations. Rayvoss can also be customized to fit special applications.

<table>
<thead>
<tr>
<th>Electrical System Configuration</th>
<th>General Interconnection Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Voltage:</strong> 120V or 220V</td>
<td><img src="image" alt="General Interconnection Diagram" /></td>
</tr>
<tr>
<td><strong>Single Phase</strong></td>
<td><img src="image" alt="General Interconnection Diagram" /></td>
</tr>
<tr>
<td><strong>Circuit Type:</strong> 2W + G</td>
<td><img src="image" alt="General Interconnection Diagram" /></td>
</tr>
<tr>
<td><strong>Protection Mode:</strong> L-G, N-G</td>
<td><img src="image" alt="General Interconnection Diagram" /></td>
</tr>
</tbody>
</table>

**Rayvoss Configuration**

<table>
<thead>
<tr>
<th>N</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td><img src="image" alt="Rayvoss Configuration" /></td>
</tr>
</tbody>
</table>

**Notes**

2 module system suitable for most applications

**Rayvoss Models**

- 120-1P-M1-2-0x-A-H
- 120-1P-S3-2-0x-A-H
- 240-1P-M1-2-0x-B-H
- 240-1P-S3-2-0x-B-H

---

**Electrical System Configuration**

<table>
<thead>
<tr>
<th>System Voltage: 120V/240V</th>
<th>General Interconnection Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Split Phase</strong></td>
<td><img src="image" alt="General Interconnection Diagram" /></td>
</tr>
<tr>
<td><strong>Circuit Type:</strong> 2φ, 3W + G</td>
<td><img src="image" alt="General Interconnection Diagram" /></td>
</tr>
<tr>
<td><strong>Protection Mode:</strong> L-G, N-G</td>
<td><img src="image" alt="General Interconnection Diagram" /></td>
</tr>
</tbody>
</table>

**Rayvoss Configuration**

<table>
<thead>
<tr>
<th>N</th>
<th>L1</th>
<th>L2</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td><img src="image" alt="Rayvoss Configuration" /></td>
<td></td>
</tr>
</tbody>
</table>

**Notes**

3 module system suitable for most applications

**Rayvoss Models**

- 120-2S-N1-3-0x-A-H
- 120-2S-M1-3-0x-A-H
- 120-2S-M3-3-0x-A-H

---

Legend: ![Legend](image)
### Electrical System Configuration

**System Voltage:** 120V/208V  
**Three Phase**  
**Circuit Type:** 3φ, Wye, 4 W + G  
**Protection Mode:** L-G, N-G

### General Interconnection Diagram

![Diagram](image)

### Rayvoss Configuration

<table>
<thead>
<tr>
<th>Rayvoss Models</th>
<th>Notes</th>
<th>Rayvoss Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>120-3Y-A1-4-0x-A-H</td>
<td>4 module system suitable for most applications</td>
<td>120-3Y-N3-4-0x-A-H</td>
</tr>
<tr>
<td>120-3Y-M3-4-0x-A-H</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Electrical System Configuration

**System Voltage:** 120V/208V  
**Three Phase**  
**Circuit Type:** 3φ, Wye, 4 W + G  
**Protection Mode:** L-G, L-N, N-G

### General Interconnection Diagram

![Diagram](image)

### Rayvoss Configuration

<table>
<thead>
<tr>
<th>Rayvoss Models</th>
<th>Notes</th>
<th>Rayvoss Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>120-3Y-A1-7-0x-A-H</td>
<td>7 module system for applications with sensitive electronic equipment</td>
<td>120-3Y-N3-7-0x-A-H</td>
</tr>
</tbody>
</table>

### Rayvoss Configuration Notes

- Rayvoss Models
- System Voltage: 120V/208V
- Three Phase
- Circuit Type: 3φ, Wye, 4 W + G
- Protection Mode: L-G, N-G
- Suitable for most applications
- Figures and symbols represent electrical connections.
**Electrical System Configuration**

System Voltage: 220V/380V
Three Phase
Circuit Type: 3φ, Wye, 4W + G
Protection Mode: L-G, N-G

**Rayvoss Configuration Notes**

Rayvoss Models

- 4 module system suitable for most applications
- 240-3Y-A1-4-0x-B-H
- 240-3Y-N3-4-0x-B-H
- 240-3Y-M3-4-0x-B-H

**Rayvoss Configuration**

- N
- L1
- L2
- L3
- G

**General Interconnection Diagram**

**Electrical System Configuration**

System Voltage: 220V/380V
Three Phase
Circuit Type: 3φ, Wye, 4W + G
Protection Mode: L-G, L-N, N-G

**Rayvoss Configuration Notes**

- 7 module system for applications with sensitive electronic equipment
- 240-3Y-A1-7-0x-B-H
- 240-3Y-N3-7-0x-B-H

**Rayvoss Configuration**

- N
- L1
- L2
- L3
- G

**Legend:**
- Load
- Strikesor®
Electrical System Configuration
System Voltage: 277V/480V
Three Phase
Circuit Type: 3φ, Wye, 4W + G
Protection Mode: L-G, N-G

Rayvoss Configuration Notes Rayvoss Models
N L1 L2 L3
4 module system suitable for most applications
277-3Y-A1-4-0x-C-H
277-3Y-N3-4-0x-C-H
277-3Y-M3-4-0x-C-H

Electrical System Configuration
System Voltage: 277V/480V
Three Phase
Circuit Type: 3φ, Wye, 4W + G
Protection Mode: L-G, L-N, N-G

Rayvoss Configuration Notes Rayvoss Models
N L1 L2 L3
7 module system for applications with sensitive electronic equipment
277-3Y-A1-7-0x-C-H
277-3Y-N3-7-0x-C-H
**Electrical System Configuration**

System Voltage: 347V/600V  
Three Phase  
Circuit Type: 3φ, Wye, 4W + G  
Protection Mode: L-G, N-G

**General Interconnection Diagram**

![Diagram](image)

**Rayvoss Configuration**

<table>
<thead>
<tr>
<th>N</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes**

- 4 module system suitable for most applications
- 7 module system for applications with sensitive electronic equipment

**Rayvoss Models**

- 347-3Y-A1-4-0x-D-H
- 347-3Y-N3-4-0x-D-H
- 347-3Y-M3-4-0x-D-H

**Legend**

- Load
- Strikesorb®
Electrical System Configuration
System Voltage: 240V High-Leg Delta
Circuit Type: 3φ, Delta, 4 W + G
Protection Mode: L-G, CT-G

General Interconnection Diagram

Rayvoss Configuration Notes Rayvoss Models
N A C HL
G

4 module system suitable for most applications
240-3H-A1-4-0x-B-H
240-3H-N3-4-0x-B-H
240-3H-M3-4-0x-B-H

Electrical System Configuration
System Voltage: 240V Three Phase Delta
Circuit Type: 3φ, Delta, 3 W + G
Protection Mode: L-G

General Interconnection Diagram

Rayvoss Configuration Notes Rayvoss Models
L1 L2 L3
G

3 module system suitable for most applications
240-3D-N1-3-0x-B-H
240-3D-N3-3-0x-B-H
240-3D-M3-3-0x-B-H
### Electrical System Configuration

- **System Voltage:** 480 V Three Phase Delta
- **Circuit Type:** 3φ, Delta, 3W+G
- **Protection Mode:** L-G

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### General Interconnection Diagram

![General Interconnection Diagram](image)

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### Rayvoss Configuration

- **L1**
- **L2**
- **L3**

### Notes

- 3 module system suitable for most applications

### Rayvoss Models

- 480-3D-N1-3-0x-D-H
- 480-3D-N3-3-0x-D-H
- 480-3D-M3-3-0x-D-H

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**Legend:**
- Load
- Strikesorb®
Optional Features

OPTION 06: Phase Indication LEDs and Remote Relays
Normal operation is indicated by the illumination of green LEDs. In the event of a fault or loss of power, the respective LEDs will go OFF. There are also dry contacts available which can be connected to a remote alarm system.

OPTION 03: Surge Counter, Phase Indication LEDs and Remote Relays
Normal operation is indicated by the illumination of green LEDs. In the event of a fault or loss of power, the respective LEDs will go OFF. There are also dry contacts available which can be connected to a remote alarm system. The 03 Option also includes a surge counter.

Optional Enclosure Features

Rayvoss standard metal enclosure is NEMA 4 rated and available in four standard sizes which can be equipped with multiple features and options.
Stainless steel enclosures are also NEMA 4X rated and available with the same standard options and features.*

*For a stainless steel enclosure specify "-SS" in place of the "-H" indication which is for the standard painted NEMA 4 enclosure.
Rayvoss Installation Guidelines

There are two ways to install Rayvoss systems:

- **Direct Connection** – the ability to provide true continuous protection to downstream equipment. This is the preferred method for Rayvoss installation. It provides the lowest possible let-through voltage. In addition, it never leaves the equipment unprotected.

- **T-Connection** – traditional method of connection to the electrical system through a branch fuse or circuit breaker.

Direct Connection

![Direct Connection Diagram]
Key Advantages of the Direct Connection

- **Zero Lead Length** – The modules are directly connected to the electrical system offering the lowest possible let-through voltage. The input wires (line and neutral wires) are inserted into the Rayvoss enclosure and are directly connected to one of the two Strikesorb connector ports. The second port of each connector is used to connect the corresponding wire that feeds the equipment, as shown in the diagram on the opposing page. Therefore, no additional lead wires, which can increase the voltage seen by the equipment, are used.

- **Load is Always Protected** – Should a continuous overvoltage event exceed the energy handling capability of Rayvoss, the Strikesorb module goes short and the upstream overcurrent protection device operates. In this way the equipment is taken off-line, protecting it from subsequent exposure to damaging conditions.
T-Connection

T-Connection is used in the following situations where direct connection is not possible:

- Line wire size is greater than #4/0 AWG

Because Rayvoss systems can use larger size lead wires, they can be connected using bigger fuses compared to those used in conventional SPD systems even when connected in T-configurations. This allows for continuous protection at higher surge currents, and maximum use of Strikesorb's superior capabilities.
Direct and T-Connection Installation Notes

Rayvoss installations are driven by the size of the enclosure, as indicated in the table below and must comply with the national codes:

<table>
<thead>
<tr>
<th>Enclosure Type</th>
<th>Enclosure Size</th>
<th>Upstream Protection (Class J Fuse or Circuit Breaker)</th>
<th>Maximum Conductor Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>10” × 8” × 6.5”</td>
<td>50 A</td>
<td>#6 AWG [10 mm²]</td>
</tr>
<tr>
<td></td>
<td>[254.0 × 203.2 × 165.1 mm]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>12” × 12” × 8.5”</td>
<td>100 A</td>
<td>#2 AWG [35 mm²]</td>
</tr>
<tr>
<td></td>
<td>[304.8 × 304.8 × 215.9 mm]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>19.75” × 14.75” × 8.5”</td>
<td>225 A</td>
<td>#4/0 AWG [95 mm²]</td>
</tr>
<tr>
<td></td>
<td>[501.65 × 355.6 × 215.9 mm]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>19.75” × 19.75” × 10.5”</td>
<td>225 A</td>
<td>#4/0 AWG [95 mm²]</td>
</tr>
<tr>
<td></td>
<td>[501.65 × 501.65 × 266.7 mm]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

AWG=American Wire Gauge
Installation Instructions

Cautions & Warnings
1. Always select the appropriate Rayvoss type for your electrical system.
2. Rayvoss systems should be installed by qualified electricians.
3. Installation and wiring should conform to the National Electrical Code and applicable local codes.
4. The environmental rating and type of this product will be adversely affected if the incorrect type and rating of conduit fitting or cable gland is installed.
5. Disconnect from energized circuits before installing or servicing.

Mounting
The Rayvoss system needs to be mounted to a solid, flat surface capable of supporting appropriate weight as determined by the size of the enclosure per the table below. It is convenient to install the lower mounting studs/bolts first as the Rayvoss has slotted lower mounting lugs. Once the lower studs/bolts are installed, the Rayvoss may be lowered onto them and the correct location for the upper mounting stud bolts can be marked through the holes in the upper mounting lugs.

<table>
<thead>
<tr>
<th>Enclosure Type</th>
<th>Enclosure Size</th>
<th>Approximate Support Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>North American Specifications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>10” × 8” × 6.5” [254.0 × 203.2 × 165.1 mm]</td>
<td>11 lbs [4.99 kg]</td>
</tr>
<tr>
<td>M</td>
<td>12” × 12” × 8.5” [304.8 × 304.8 × 215.9 mm]</td>
<td>22 lbs [9.98 kg]</td>
</tr>
<tr>
<td>N</td>
<td>19.75” × 14.75” × 8.5” [501.65 × 355.6 × 215.9 mm]</td>
<td>47 lbs [21.32 kg]</td>
</tr>
<tr>
<td>A</td>
<td>19.75” × 19.75” × 10.5” [501.65 × 501.65 × 266.7 mm]</td>
<td>62 lbs [28.12 kg]</td>
</tr>
<tr>
<td>European Specifications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>7.87” × 13.15” × 6.44” [199.90 × 334.01 × 163.58 mm]</td>
<td>11 lbs [4.99 kg]</td>
</tr>
<tr>
<td>M</td>
<td>11.81” × 15.12” × 8.41” [299.97 × 384.05 × 213.61 mm]</td>
<td>22 lbs [9.98 kg]</td>
</tr>
<tr>
<td>N</td>
<td>15.75” × 21.73” × 8.41” [400.05 × 551.94 × 213.61 mm]</td>
<td>47 lbs [21.32 kg]</td>
</tr>
<tr>
<td>A</td>
<td>19.69” × 22.99” × 10.37” [500.13 × 583.95 × 263.40 mm]</td>
<td>62 lbs [28.12 kg]</td>
</tr>
</tbody>
</table>
Grounding

Ground connection is made to the ground terminal mounted on the inside of the Rayvoss enclosure. A short and straight cable should make the connection to the power ground or to the main ground bar at the installation location.
Raycap Worldwide Locations

**Offices**
- Parkring 11, 85748 Garching, Munich Germany
- Telou & Petroutsou 14, 15124 Maroussi Athens, Greece
- 806 South Clearwater Loop Post Falls, ID 83854, United States of America
- 800 Freeport Parkway Suite 150 Coppell, TX 75019, United States of America

**Manufacturing**
- Parkring 11, 85748 Garching, Munich Germany
- 806 South Clearwater Loop Post Falls, ID 83854, United States of America
- 800 Freeport Parkway Suite 150 Coppell, TX 75019, United States of America
- Industrial Area of Drama 66100 Drama, Greece
- Soseauna de Centura 27-28 077040 Chiajna Ilfov, Romania