

## OVRHSP/OVRHSR

### Surge protective devices

### Installation, operation and maintenance manual



## OVRHSP product features

- UL Listed 1449 4th Edition for Type 1 and Type 2 SPD applications.
- Fail-safe design with individually fused Metal Oxide Varistors (MOVs) eliminating single point failure, protecting against both overcurrent and overvoltage events.
- 200kAIC short circuit rating permits direct bus connection to most electrical services.
- Low let through voltage ensured by the lowest possible impedance path to ground and equal current sharing during surge events.
- All weather sealed, powder-coated NEMA 4/IP65 housing is designed for any orientation and indoor/outdoor applications.
- 5-year standard warranty.

## OVRHSR product features

- UL Listed 1449 4th Edition for Type 1 and Type 2 SPD applications.
- Compact design to allow the SPD to be recessed into the wall.
- Fail-safe design with individually fused Metal Oxide Varistors (MOVs) eliminating single point failure, protecting against both overcurrent and overvoltage events.
- 200kAIC short circuit rating permits direct bus connection to most electrical services.
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# Guide to installation and assistance

Thank you for choosing the ABB OVRHSP/OVRHSR series Surge Protective Device (SPD). We look forward to fulfilling your facilitywide surge protection needs.

This manual provides guidelines for the proper installation of the OVRHSP(SR) series of devices. Proper product selection and compliance with these guidelines will help your new suppression system provide years of reliable service. If installers are unsure about the facility electrical configuration or have other installation-related questions, it is recommended they consult with a qualified electrical professional.

When shortcuts are taken or installation procedures are not followed, the OVRHSP(SR) series may become damaged or may not provide adequate protection. It is extremely important to follow these installation procedures carefully.

## △ WARNING!:

THE OVRHSP(SR) SERIES WARRANTY IS VOIDED if the unit is damaged as a result of improper installation or the installer's failure to verify the following conditions prior to installation.

## △ WARNING!:

**HAZARDOUS VOLTAGES PRESENT:** Improper installation or misapplication may result in serious personal injury or damage to the electrical system. Read the complete installation instructions before proceeding with installation. Remove all power to the electrical panel before installing or servicing the SPD.

## △ WARNING!:

**IMPORTANT SAFETY INSTRUCTIONS:** All work must be performed by licensed and qualified personnel. Follow applicable electrical specifications for the country the unit is being used in.

## △ WARNING!:

Check to ensure that a proper bond is installed between neutral and ground at the transformer upstream from all 3-phase Wye, 3-phase High-Leg or 2-phase OVRHSP(SR) series device. If the transformer is not accessible, check the main service disconnect/panel for the NG bond. Lack of a proper bond will damage OVRHSP(SR) series and void the warranty.

## △ WARNING!:

Do not HIPOT the OVRHSP(SR) series units or the electrical system to which the OVRHSP(SR) series unit is connected without disconnecting the OVRHSP(SR) series units conductors including phases, neutral and ground.



### Warning!

Installation by person with electrotechnical expertise only.

### Warnung!

Installation nur durch elektrotechnische Fachkraft.

### Avertissement!

Installation uniquement par des personnes qualifiées électrotechnique.

### ¡Advertencia!

La instalación deberá ser realizada únicamente por electricistas especializados.



## Pre-installation checklist

- ☐ Confirm that the voltage(s) and service configuration shown on the OVRHSP(SR) series product label are consistent with the voltage and service configuration of the facility. A model number is on the right side of the OVRHSP(SR) series unit. Each model number corresponds to the configurations printed in Table 1:

Example of a SPD model number: OVRHSP(SR)1001201P1

Sample model number scheme

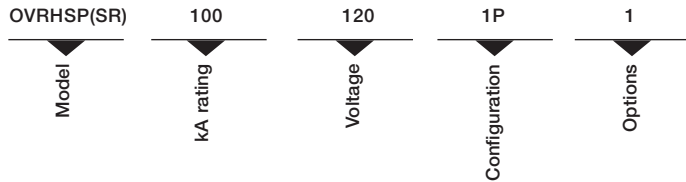


Table 1: Configuration table

| Model                           | Voltage  | L-N voltage range                               | L-L voltage | Configuration                           |
|---------------------------------|----------|---|-------------|---|
| OVRHSP(SR)xxx1201P <sup>1</sup> | 120V     | 108-132V  | N/A         | 1-phase, 2-wire + ground                |
| OVRHSP(SR)xxx2401P <sup>1</sup> | 240V     | 216-264V  | N/A         | 1-phase, 2-wire + ground                |
| OVRHSP(SR)xxx1202P <sup>1</sup> | 120/240V | 108-132V  | 216-264V    | 2-phase, 3-wire + ground                |
| OVRHSP(SR)xxx1203Y <sup>1</sup> | 120/208V | 108-132V  | 187-229V    | 3-phase Wye, 4-wire + ground            |
| OVRHSP(SR)xxx2203Y <sup>1</sup> | 220/380V | 198-242V  | 342-418V    | 3-phase Wye, 4-wire + ground            |
| OVRHSP(SR)xxx2403Y <sup>1</sup> | 240/415V | 216-264V  | 374-457V    | 3-phase Wye, 4-wire + ground            |
| OVRHSP(SR)xxx2773Y <sup>1</sup> | 277/480V | 249-305V  | 432-528V    | 3-phase Wye, 4-wire + ground            |
| OVRHSP(SR)xxx6003Y              | 347/600V | 312-382V  | 540-660V    | 3-phase Wye, 4-wire + ground            |
| OVRHSP(SR)xxx2403H <sup>1</sup> | 120/240V | 108-132V (Phases A and C)<br>187-229V (Phase B) | 216-264V    | 3-phase High-Leg Delta, 4-wire + ground |
| OVRHSP(SR)xxx2403D <sup>1</sup> | 240V     | N/A   | 216-264V    | 3-phase Delta, 3-wire + ground          |
| OVRHSP(SR)xxx3803D              | 380V     | N/A   | 342-418V    | 3-phase Delta, 3-wire + ground          |
| OVRHSP(SR)xxx4803D              | 480V     | N/A   | 432-528V    | 3-phase Delta, 3-wire + ground          |
| OVRHSP(SR)xxx6003D              | 600V     | N/A   | 540-660V    | 3-phase Delta, 3-wire + ground          |

### OVRHSP series options

|  |  |
|--|--|
| Advanced monitoring (available in 60–100kA units only)                                     | Add suffix 1 (Includes dry relay contacts, audible alarm, alarm silence button, fault light) |
| Surge counter (Not available on OVRHSP 60–100kA units or the OVRHSR series)                | Add suffix 2   |
| Transient filter (Meets UL 1283) (Not recommended when using telecommunication rectifiers) | Add suffix 3   |
| Stainless steel enclosure  | Add suffix 4   |
| Transient filter and advanced monitoring   | Add suffix A   |
| Transient filter and surge counter   | Add suffix B   |
| Transient filter and stainless steel enclosure   | Add suffix C   |
| Surge counter and stainless steel enclosure  | Add suffix D   |
| Stainless steel enclosure and advanced monitoring  | Add suffix M   |
| Stainless steel enclosure, transient filter and advanced monitoring                        | Add suffix N   |
| Transient filter, surge counter and stainless steel enclosure                              | Add suffix T   |

<sup>1</sup>These are the only voltages available on the 60, 80, and 100kA systems.

### NOTES:

- xxx denotes surge rating per phase (60, 80, 100, 120, 160, 200, 240, 300, 400)
- OVRHSR units are only available in 120 and 160kA.
- The power system operation frequency is between 47–63Hz.



Confirm that the environmental conditions are consistent with the following ranges:

- Ambient temperatures: Between -40° to 70°C (-40° to +158°F).
- Relative humidity: Between 5% and 95% non-condensing.
- Altitude: Less than 4000 m (13,000 feet).

# Service configurations

Figures 1–5 show the electrical relationship between OVRHSP(SR) series unit and these five basic service configurations: 1-phase, 2-wire; 2-phase, 3-wire; 3-phase Wye, 4-wire; 3-phase Delta, 3-wire and 3-phase High-Leg Delta, 4-wire.

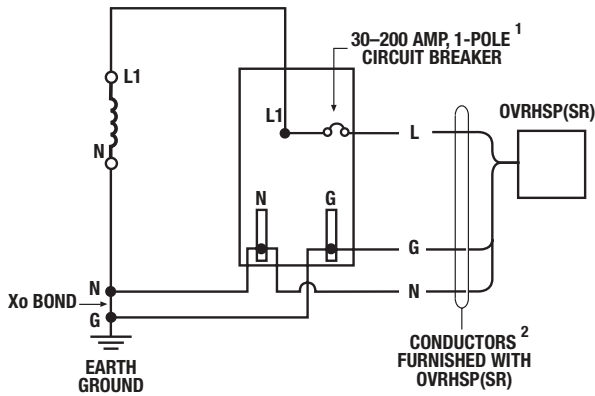


Figure 1: 1-phase, 2-wire

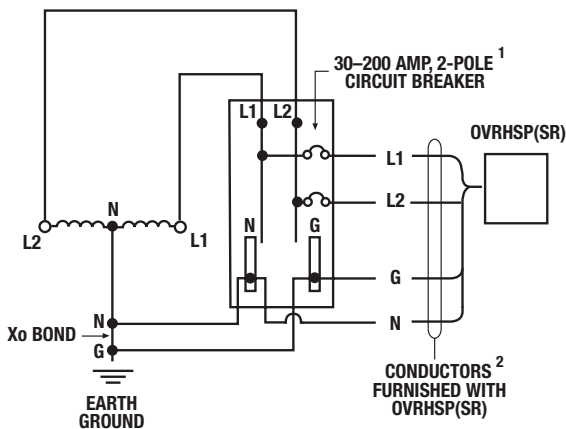


Figure 2: 2-phase, 3-wire

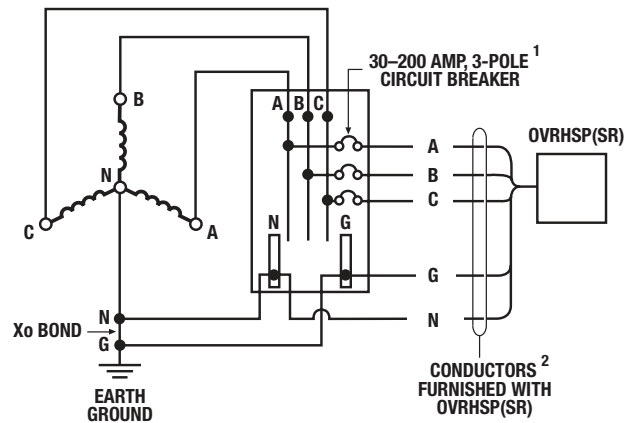


Figure 3: 3-phase Wye, 4-wire

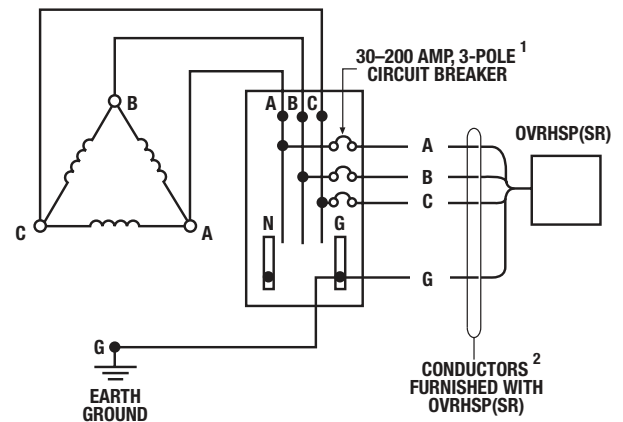


Figure 4: 3-phase Delta, 3-wire

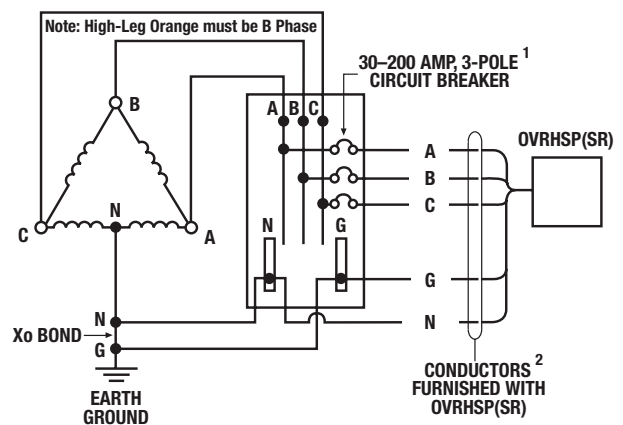


Figure 5: 3-phase High-Leg Delta, 4-wire

<sup>1</sup> All OVRHSP(SR) series units can be connected without an upstream breaker/fuse.

<sup>2</sup> OVRHSP 60 through 100kA and all OVRHSP units are furnished with #10 AWG leads.

# Conductor sizing and routing

## ⚠ CAUTION:

The OVRHSP(SR) series unit's performance will be limited severely if the conductors are (a) too long, (b) are of too small a wire gauge, (c) have too many bends or (d) have sharp bends. For optimum performance never exceed 3.048 meters (10 ft.) conductor lengths.

The factors listed above should be addressed during the design of an installation to reserve a suitable place for the OVRHSP(SR) series unit next to its point of connection to the electrical system. The selected mounting location should allow for the shortest possible conductor runs and a direct route with a minimum of bends. If bends are required, they should be sweeping bends. Do not make sharp 90° bends for appearance purposes because they will severely decrease the effectiveness of OVRHSP(SR) series unit.

Binding or twisting conductors together using tie-wraps or electrical tape increases the protection performance of the device.

The conductor length should be as short as possible to ensure the maximum level of protection. Wires are marked with (Phase A, B, C, Line 1, Line 2, Neutral or Ground) depending on the model.

# Upstream overcurrent protection device

The OVRHSP(SR) series unit is a Type 1 SPD which is suitable for use in both Type 1 and Type 2 SPD applications. The OVRHSP(SR) series unit is a one-port SPD and is to be connected in parallel with the electrical system. It may be connected via a circuit breaker, molded case switch, fused switch, or connected directly to the bus of the panelboard or switchboard it is protecting. If direct bus connection is used, ABB recommends installing the OVRHSP(SR) series unit behind a disconnect switch or other disconnecting means for ease of serviceability.

If the SPD is connected to a dedicated OCPD, a 60A breaker is recommended (30A minimum, 200A maximum).

## Conductor sizing and routing (OVRHSP)

ABB recommends installing the OVRHSP unit by following conductor size for phase, ground and neutral connections. The conductor length should be as short as possible to ensure the maximum level of protection.

Table 2: Maximum recommended conductor size

| OVRHSP models | Conductor size |
|---------------|----------------|
| OVRHSP120     | #6 AWG         |
| OVRHSP160     | #6 AWG         |
| OVRHSP200     | #4 AWG         |
| OVRHSP240     | #4 AWG         |
| OVRHSP300     | #4 AWG         |
| OVRHSP400     | #4 AWG         |

- 60 through 100kA units and all OVRHSR units are furnished with #10 AWG leads. Leads should be shortened during installation in order to minimize conductor length.
- 120 through 400kA units are shipped with compression box lugs. The set screws on the box lugs should be torqued to 2.3 Nm (20 in-lbs.).
- Terminals are identified with markers (Phase A, B, C, Line 1, Line 2, Neutral or Ground)

## Mounting (OVRHSP)

Mount the OVRHSP to the building structure using construction methods and hardware appropriate for your site. Install the conduit and pull the conductors as specified in Table 2.

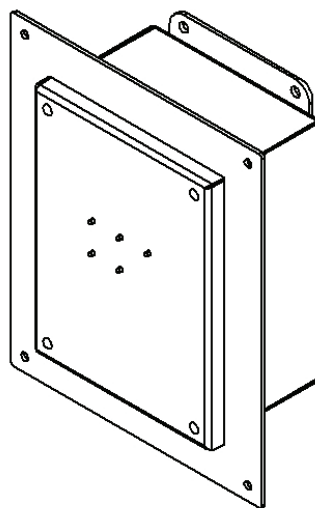
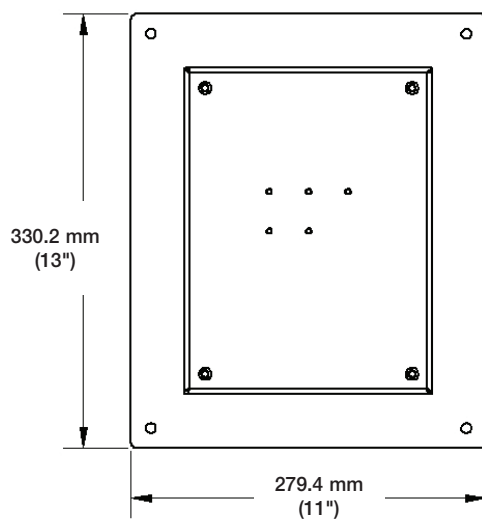
Stainless steel enclosures are suitable for corrosive environments as well. For direct sunlight applications, ABB suggests shading the monitoring components.

## Mounting (OVRHSR)

Mount the OVRHSR to the building structure using construction methods and hardware appropriate for your site.

Mount the OVRHSR into the wall. Electrician can mount to the back wall, if the back wall is made of structural material such as masonry or plywood. (Drywall is not a structural material). If back wall is not made of structural material, the electrician can create brackets to hold the SPD to the adjacent studs.

After the drywall has been installed, install Flush Mounting Plate (FMP) by first removing the OVRHSR enclosure lid. Place the FMP over enclosed body. Attach the FMP to the wall using the enclosed hardware kit. Screw the lid back on to the enclosure body.



**OVRHSR 120, 160**  
**Weight: 9 kg (20 lbs.)**

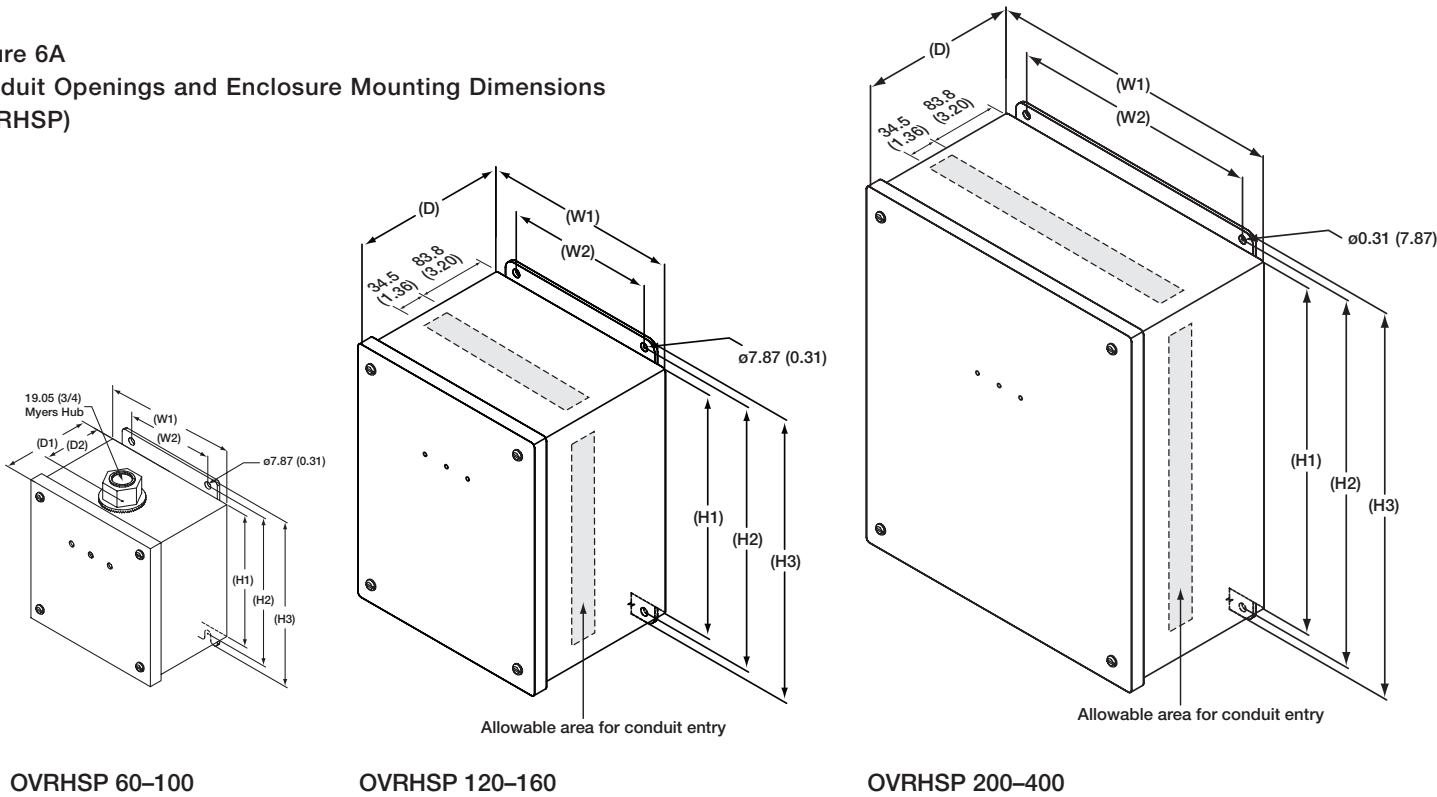
# Conduit openings (OVRHSP)

If desired, punch holes at this time for the conduit or nipple or wait until the OVRHSP unit is mounted to the building structure. Punch holes only in the designated areas as shown in the following illustration.

**⚠ CAUTION:**  
Careful consideration must be made when selecting an area for conduit entry. There are several components inside the enclosure that may interfere with the conduit entry path, therefore, ensure the path is clear of all objects before drilling. Damages caused by installation errors are not covered under the product warranty.

See Figures 6A and 6B for conduit openings and enclosure dimensions.

Figure 6A  
Conduit Openings and Enclosure Mounting Dimensions  
(OVRHSP)



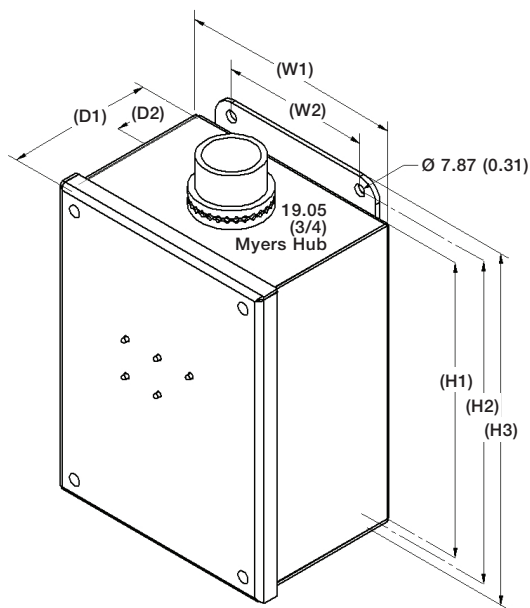
## Dimensional specifications

| Dim    | OVRHSP 60, 80, 100 | OVRHSP 120, 160 | OVRHSP 200, 240, 300, 400 |
|--------|--------------------|-----------------|---------------------------|
| H1     | 152.4 (6.00)       | 254.0 (10.00)   | 355.6 (14.00)             |
| H2     | 171.5 (6.75)       | 273.1 (10.75)   | 374.7 (14.75)             |
| H3     | 190.5 (7.50)       | 292.1 (11.50)   | 393.7 (15.50)             |
| W1     | 152.4 (6.00)       | 203.2 (8.00)    | 304.8 (12.00)             |
| W2     | 101.6 (4.00)       | 152.4 (6.00)    | 254.0 (10.00)             |
| D      | —                  | 157.5 (6.20)    | 157.5 (6.20)              |
| D1     | 105.7 (4.16)       | —               | —                         |
| D2     | 50.8 (2.00)        | —               | —                         |
| Weight | 4.5 kg (10 lbs.)   | 9 kg (20 lbs.)  | 18 kg (40 lbs.)           |

All measurements in millimeters (inches) and kg (pounds)



Figure 6B  
Enclosure mounting dimensions  
(OVRHSR)

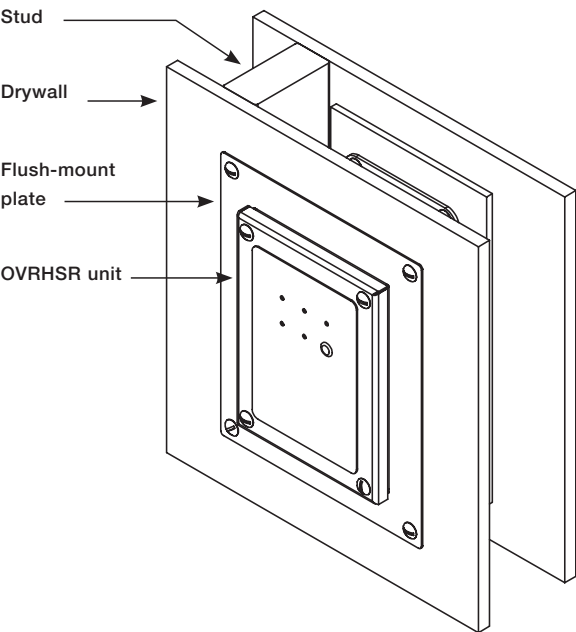


Dimensional specifications

| Dim    | Millimeters (Inches) |
|--------|----------------------|
| H1     | 254.0 (10.00)        |
| H2     | 273.1 (10.75)        |
| H3     | 292.1 (11.50)        |
| W1     | 203.2 (8.00)         |
| W2     | 152.4 (6.00)         |
| D1     | 106.9 (4.20)         |
| D2     | 50.8 (2.00)          |
| Weight | 9 (20)               |

All measurements in millimeters (inches) and kg (pounds)

The OVRHSR design allows for it to be recessed into the wall.



Electrical connections

**CAUTION:**  
Prior to installation ensure the system configuration and voltage is equivalent to the OVRHSP(SR) series unit being installed.

OVRHSP(SR) units come with 254 mm (36 in.) of #10 AWG conductors. Each phase conductor is labeled (Phase A, B or C). Ensure that the conductor lengths are kept as short and straight as possible. On all High-Leg systems, the High-Leg (208V LN) must be connected to the Phase B of the SPD. (Color coded orange according to NEC).

\*The 3-wire Delta + ground OVRHSP(SR) series units do not have a neutral conductor.

Connecting Form “C” dry contacts

Units that come with Form “C” dry relay contacts provide status of the surge protective device. These contacts are for connection to a user-provided remote alarm and monitoring circuit. The relay contacts are rated 65VDC/150VAC with maximum switching power of 30WDC/60VA AC. The Form “C” contacts come pre-wired with 254 mm (36 in.) of #20 AWG conductors on the OVRHSP 60 to 100kA models and on all OVRHSR models.

When input power is present on all phases, terminals “NO” (Normally Open) and “COM” (Common) are an open circuit and terminals “NC” (Normally Closed) and “COM” are a closed circuit. The contacts change state when the unit has encountered failure to one or more phases.

The installer must provide the appropriate raceway and wiring for the monitoring circuit, observing the restrictions and conduit openings illustrated in an earlier section of this manual.

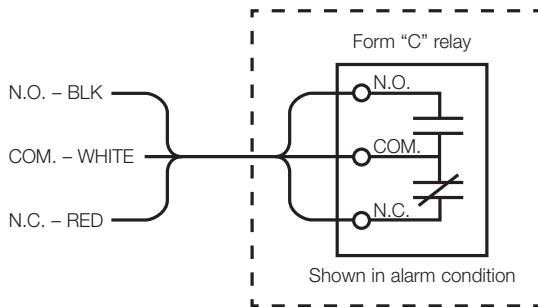
# Remote monitoring

## Models: OVRHSP-60kA–100kA with option 1 and OVRHSR series

For these models, the Form “C” contacts come pre-wired with 254 mm (36 in.) of #20 AWG conductors.

See Figure 7 for the Form “C” wiring and contact configuration.

Use butt splices within the panelboard to connect the Form “C” leads to the user’s monitoring circuits. Alternatively, install a junction box between the OVRHSP(SR) series and the panelboard to connect Form “C” leads to user’s monitoring circuits. If the Form “C” contacts are not used, user has the option of either cutting off the leads or coiling up the leads and saving them for potential future use. Consult applicable local codes to ensure proper installation.



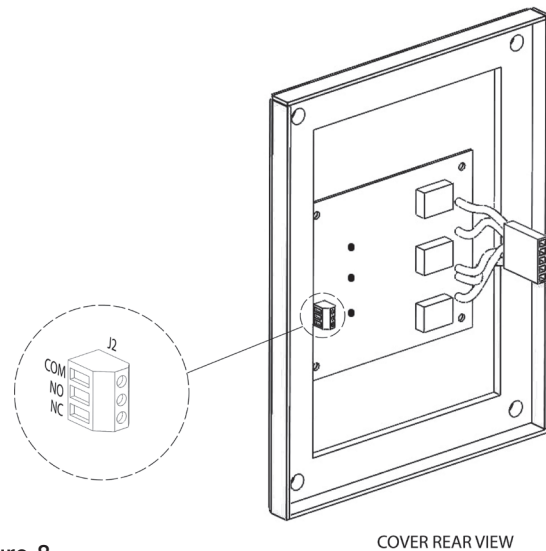
**Figure 7**  
**Wire connections**  
**Contacts shown in de-energized state**  
**(alarm condition).**

## Models: OVRHSP-120kA–400kA

For these models, the Form “C” contacts must be wired by the installer.

See Figure 8 for the Form “C” contact configuration and terminal location on the monitor board. The annotations on the diagram match the markings on the terminal block.

The installer must route the monitoring conductors to the terminal blocks on the main monitoring board. Tighten screws on terminals to 0.4 Nm (3.5 in-lbs.). This terminal block will accept wire sizes #28 AWG–#16 AWG. #18–#20 AWG is recommended.



**Figure 8**  
**Terminal block**  
**Contacts shown in energized normal state**  
**(no fault condition).**

## Verification and power up

### ⚠ WARNING!:

It is recommended that the cover of the OVRHSP(SR) series unit along with its associated cabling be installed prior to applying power. The monitoring harness, which exits the epoxy and connects to the input connector on the monitor board, contains line voltage when power is applied to the unit.

Apply power to the OVRHSP(SR) series unit by closing the overcurrent protection device or switch feeding the suppressor.

### For compact OVRHSP units (60–100kA)

Verify that all indicating lights are illuminated. The indicating lights extinguish only upon failure of one or more phases (indicating an alarm condition).

### For standard OVRHSP units (120–400kA) or advanced monitoring option (60–100kA) and OVRHSR units

Verify that all indicating lights are illuminated. The lights extinguish only upon failure of one or more phases (indicating an alarm condition).

Audible alarm should not operate under normal conditions. The audible alarm can be “muted” by pressing the “Alarm silence” button, which subsequently will illuminate the “Alarm silenced” light. Pressing the “Alarm silence” button again will enable the audible alarm.

### ⚠ CAUTION:

Pressing the “Alarm silence” button when the alarm has not triggered will prevent the audible alarm from sounding during a failure.

### For OVRHSP units with surge counter option (Not available on 60–100kA or OVRHSR units)

The number of surges detected by the SPD is displayed on an eight digit LCD display on the front of the OVRHSP door. The LCD counter is battery backed to maintain the number of surges even during a power loss. Press the reset button on the counter to reset the surge count.

Figure 9  
OVRHSP diagnostics

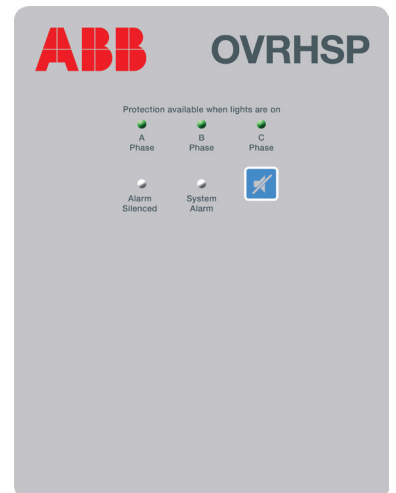
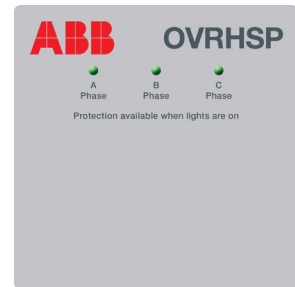


Figure 10  
OVRHSP with surge counter  
option diagnostics



Your OVRHSP(SR) series unit does not require scheduled maintenance. The unit's heavy duty construction is designed to provide years of uninterrupted service. The unit contains no serviceable parts.

### Indication

One or more phase protection status indicating lights are off, service required indicating light is on, or Form "C" alarm contacts have changed state.

### Procedure

Verify that the input power feeding the OVRHSP(SR) series unit is energized using a voltage tester.

The following standards and listings apply to the OVRHSP(SR) series product line:

- UL Listed 1449 4th Edition for Type 1 and Type 2 SPD applications, cUL, and UL 1283
- Meets Requirements for UL 96A
- Compliant to IEEE C62.41.1-2002, C62.41.2-2002 and C62.45-2002
- NFPA 70 [NEC], Article 285
- RoHS Compliant



## Warranty Period

**OVRHSP(SR) series (AC) – (All)**

5-years

For more information please contact:

**[www.abb.com](http://www.abb.com)**

We reserve the right to make technical changes to the product and to the information in this document without notice.

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