Installation Guidelines

Busbar Style Current and Voltage Sensor

Insulation Class	2-Hole Pad P/N	4-Hole Pad P/N
15kV	965x/Syz02	965x/Syz03
25kV	966x/Syz02	966x/Syz03
35kV	967x/Syz02	967x/Syz03
46kV	9680/Syz02	9680/Syz03

DANGER

The sensor is NOT designed for installation on energized power lines. The sensor must either be isolated from the high voltage power line or the power line must be de-energized before installing the sensor. Failure to ensure the high voltage connection is de-energized before installation can result in serious injury or death.

DANGER

The sensor must be solidly grounded to earth before it is energized. Connection to the phase conductor will energize the sensor and will result in high voltage across the output unless grounded. Failure to ground before energizing can result in serious injury or death.

DANGER

Sensor must be applied within its electrical and mechanical ratings. Application of sensor in excess of its ratings can result in immediate or delayed electrical or mechanical failure. Failure to apply the sensor within its ratings can result in serious injury or death, or in premature failure of the sensor.

DANGER

Do not drop. While extremely durable, the sensor is cast from a material that can fracture if dropped onto a hard surface. Fractures can result in either catastrophic failure of the sensor upon energization resulting in serious injury or death, or in premature failure of the sensor.

CAUTION

Sensor must remain in packaging during transportation to installation site. Transportation of the sensor without its protective packaging may result in chips, cracks, or fractures to the sensor body. Physical damage can result in premature failure of the sensor or reduced electrical ratings.

CAUTION

Both the sensor cable connectors and the cable connector located on the sensor must remain dry and protected from inclement weather. The connectors are weatherproof once joined, but may allow moisture in the cable when the male or female connectors are left exposed to the elements. Moisture in the cable will result in inaccurate measurement readings.

CAUTION

Sensors are not rated for any impact load. Ensure the loading on the sensor is less than the specified Cantilever strength (indicated in the Mechanical Ratings table of this document) or else severe damage and eventual failure of the sensor may result. Use **mechanical isolation braids** for electrical connections to stored energy switches or any other source of mechanical force to ensure the connection will not transfer any impact force to the sensor.

WARNING

The sensor must be installed with the supplied arcing bracket as directed in this document. Use of the arcing bracket will direct any external flashover current to ground. Failure to install the arcing bracket as directed may result in catastrophic failure of the sensor in the event of a flashover.

WARNING

DO NOT HIPOT. HIPOT (high potential) testing will thermally damage the resistor assemblies in the sensor causing permanent damage. HIPOT testing voids the sensor's warranty. If a HIPOT test is necessary, contact Lindsey for alternate product intended for HIPOT.

Specifications:

ELECTRICAL RATINGS				
Catalog Number Sequence	965x/S...	966x/S...	967x/S...	9680/S...
Insulation Class	15kV	25kV	35kV	46kV
Impulse (BIL)	110kV	150kV	200kV	250kV
Leakage Distance	15.0 in.	19.3 in.	28.1 in.	39.0 in
Dry Arc Distance	8.3 in.	10.4 in.	15.0 in.	17.1 in.
Overall Height	14.1 in.	16.2 in.	20.3 in.	22.5 in.
Withstand* (60Hz, 1 min.)	34kV	40kV	50kV	65kV
Corona (extinction)	11kV	19kV	26kV	33kV
*Current only sensors				

MECHANICAL RATINGS				
Insulation Class	15kV	25kV	35kV	46kV
Cantilever Strength	2,800 lbs.	2,800 lbs.	2,800 lbs.	2,800 lbs.
Weight	37 lbs.	45 lbs.	59 lbs.	52 lbs.
Shipping Weight	40 lbs.	48 lbs.	62 lbs.	61 lbs.

Table 1: Accessories for Busbar Style Sensor

PART #	DESCRIPTION
2004	Horizontal mounting base
2040	¾" x 2 3/16" mounting stud for metal cross-arms
2041	¾" x 7" mounting stud for wood cross-arms
9609-UNIV	Arcing bracket (horn) for busbar, clamp-top, and tube style sensors

Characteristics:

The Lindsey Busbar Style Current and Voltage Monitoring Insulator (CVMI) is designed to be installed on a de-energized line. The sensor is available with either 2-hole or 4-hole NEMA pads. Connection of the line to both sides of the sensor produces both current and/or voltage sensing. The CVMI can be installed in either a horizontal or vertical line post configuration, depending on the accessory hardware used. Following the instructions below will insure a safe and simple installation.

Installation:

Included with the sensor is an arcing bracket (also known as an arcing horn), P/N 9609-UNIV (See Figure 3) which will be installed under the sensor per Figure 1.

1. Using the sensor catalog number, use the Specifications tables to ensure the sensor is being applied in accordance with its ratings.
2. Ensure the high voltage line is de-energized. The sensor is not designed for installation on energized conductors.
3. Pre-assemble any required hardware accessories to the insulator. When used on a pole, this may include the bottom-mounting stud and/or the horizontal mounting base. See Table 1. The actual hardware will depend on the specific installation.
4. If the CVMI is replacing an existing insulator, raise the conductor away from the insulator using approved utility practices and remove the existing insulator.
5. Place the provided arcing bracket (see Figure 3) underneath the sensor and mount both on the crossarm or other mounting surface. The connector socket on the sensor must be aligned with the hole in the arcing bracket. See Figure 1.

   Rotate the sensor to place the "H1" marking on the sensor towards the feeder source or substation. Mount the sensor and attach using the central mounting stud or bolts using the 4-hole pattern on the bottom of the sensor. See Figure 2.

Installation (*continued*)

6. Grounding procedures:

   Preferred Method:

   This method establishes ground directly to the arcing bracket.

   Pass a No. 6 (typical) copper ground wire through the split bolt attached to the arcing bracket. (See Figures 1 & 3).

   NOTE: If preferred, before attaching the ground wire, the split bolt may be relocated to the alternate hole on the arcing bracket as shown in Figure 3.

   Alternate Methods

   The following alternate methods establish ground through the mounting stud.

   Alternate Method 1:

   Tighten the nut on the mounting stud nut against a square washer on the crossarm. Add two square washers, double coil lock washer, and square nut to stud and loop a No. 6 (typical) solid copper ground wire between washers and tighten the nut.

   NOTE: Mounting hardware is not supplied.

   Alternate Method 2:

   Attach a ground wire to the mounting stud using an appropriately sized parallel groove clamp (not supplied).

7. Ensure the ground resistance is < 5 Ohms before energizing.

8. Depending upon installation, either secure the signal cable with wood staples to the crossarm or route inside conduit, being careful not to crimp or damage the signal cable. Plug the signal cable into the connector at the base of the insulator.

   NOTE: When bringing the far end of the cable into a control cabinet, make sure the hole or cable gland in the cabinet can accept the connector or cable diameters as listed in Table 2 for proper pass through.

Table 2: Cable End Diameters

Cable End	Min. Hole or Gland Dia.
Pigtail	0.635 in. (16 mm)
Single Sensor Connector	1.46 in. (37 mm)
3-to-1 or 4-to-1 Sensor Connector	2.00 in. (51 mm)

9. Attach conductor to the two- or four-hole NEMA pads with suitable connectors for the type of conductor used (not included). Note that this type of connection works best in a dead end configuration. When installing the connectors, all of the normal procedures to minimize contact resistance, such as brushing the conductor and applying anti-corrosion grease, should be used.

10. Installation is complete.

Figure 1:
Busbar-style sensor showing proper orientation of arcing bracket

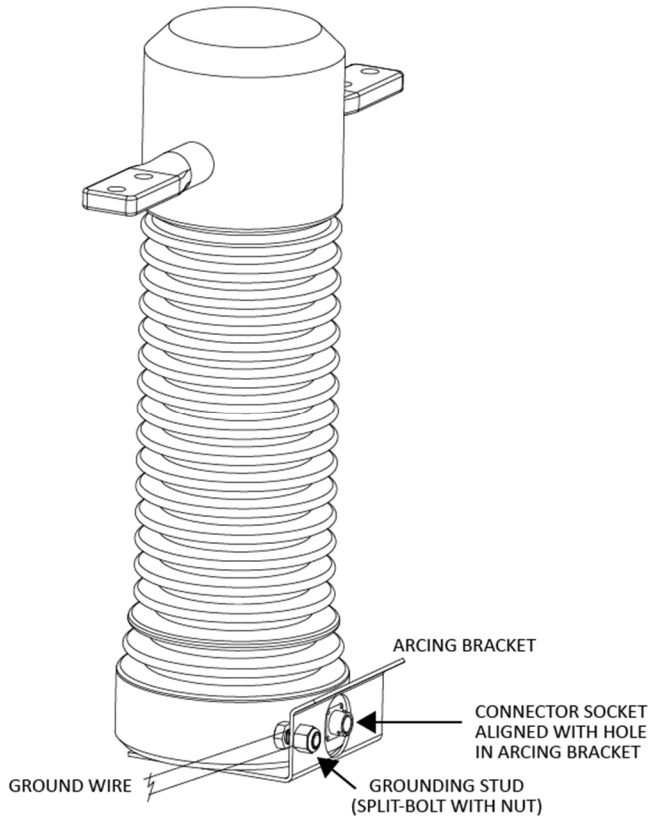


Figure 2: Sensor bottom mounting plate hole pattern

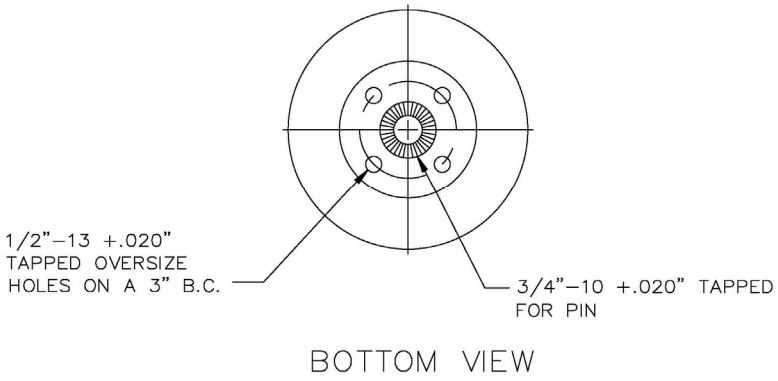
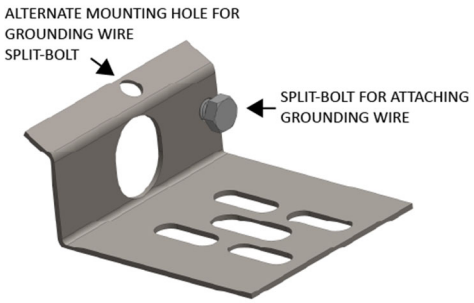


Figure 3: Arcing bracket (arcing horn) supplied with sensor



Lindsey Systems
760 N. Georgia Ave., Azusa, CA 91702 USA
+1 626-969-3471

www.lindsey-usa.com
Publication Number 09R-005 BUSBAR • January 2024