



Installation Guidelines

GEN2 Current and Voltage Sensor

15 kV p/n 9E65, 25k V p/n 9E66, & 35 kV p/n 9E67



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 the sensor is grounded AND the signal cable is connected to the sensor.** Failure to ground before energizing can result in serious injury or death.

DANGER

An energized conductor must be isolated from the sensor during installation per your company's work practices. Insufficient electric insulation or electrical clearance between an energized conductor and the sensor during installation 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.

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 No. Sequence	9E65x/...	9E66x/...	9E67x/...
Insulation Class	15 kV	25 kV	35 kV
Impulse (BIL)	110 kV	150 kV	200 kV
Leakage Distance (in./mm)	19.9/505	29.4/747	36.5/927
Dry Arc Distance (in./mm)	8.8/223	11.9/302	15.1/385
Overall Height (in./mm)	12.4/315	15.5/395	18.7/475
Withstand (60Hz, 1 min.)	34 kV	40 kV	50 kV
Corona (extinction)	11 kV	19 kV	26 kV
Operating Temperature	-40° C to +65° C		
Conductor Diameter	Two sided keeper accommodates 0.18" - 1.25" (4.6-32mm) diameter		
Construction	Hydrophobic cycloaliphatic epoxy		

Characteristics:

Lindsey GEN2 sensors provide highly accurate voltage and/or current sensing for 15 to 35kV systems and offer greatly simplified installation process compared to conventional PTs and CTs. Unlike other sensors, no calibration is required for line conductor diameter.

The sensor can be mounted vertically or horizontally to replace any standard insulator with the conductor held precisely by dual clamps. The deep groove design places the current path at the center of multiple sensing cores that are embedded inside the solid insulator. Overall symmetry of the internal sensing system ensures high accuracy when used with conductor diameters from 0.18 to 1.25 inches. The current output signal of the GEN2 sensor is presented as a voltage of 10V and less than 1mA at rated current for safe handling.

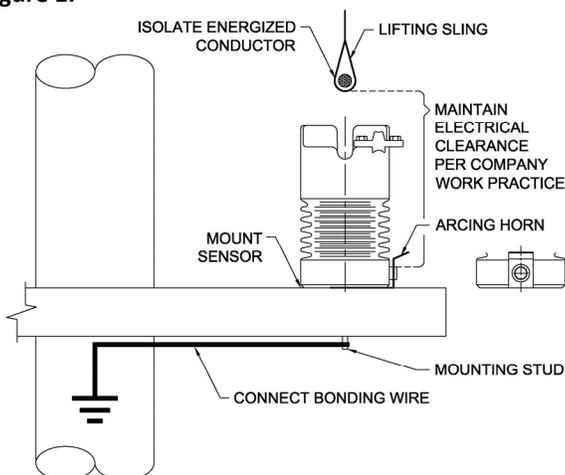


An energized conductor must be isolated from the sensor during installation per your company's work practices. Insufficient electric insulation or electrical clearance between an energized conductor and the sensor during installation can result in serious injury or death.

Installation:

Included with the GEN2 sensor is an arcing bracket (also known as an arcing horn), P/N 9E609 (See Figure 9) which will be installed under the sensor (See Figure 1). Mounting the sensor to the crossarm will require a mounting stud which is not included.

If a mounting stud is needed, it can be purchased from Lindsey (See Table 2 for ordering information).

Figure 1.**Installation (continued):**

The GEN2 Sensor is designed to be installed without de-energizing or cutting the main utility conductor.

- Using the sensor catalog number, use the Specifications table to ensure the sensor is being applied in accordance with its ratings.
- Per your company's work standards, either lift the conductor up away from the work area to ensure a proper and safe AC line work minimum approach distance (See Figure 1). See Table 1 for clearance recommendations. As an example, the conductor may be lifted using a sling (See Figure 1). The sling could be attached to a bucket truck, a lift, hotsticks, or other insulated arms typically used to change out a cross arm. As an alternative to lifting the conductor, apply sufficient external insulating blankets (See Figures 2 & 3) to ensure proper and safe electrical clearances.
- Installation requires an appropriate 3/4"-10 line post mounting stud which is not included but available from Lindsey. See Table 2 for ordering options. If replacing an existing insulator, remove the existing insulator using approved work methods. Place the provided arcing bracket (See Figures 1 & 9) underneath the GEN2 sensor and mount both on the crossarm. The connector socket on the GEN2 sensor must be aligned with the hole in the arcing bracket (See Figure 1). Install the Line Post Mounting Stud in the base of the sensor and install on the crossarm. Rotate the sensor to place "H1" towards the feeder source. "H1" is always on the right side of the sensor when looking at the sensor with the signal cable connector facing you. Note that "H1" is also printed on the nameplate on the "H1" side of the sensor. Further, "H1" is also molded into the body of the sensor adjacent to the conductor groove.
- Grounding procedure:**
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 nut. (See Figure 1).

Alternatively, the ground wire may be attached to the mounting stud by use of an appropriately sized parallel groove clamp.

Connect the grounding jumper to a low resistance (<5 Ohms) pole ground.

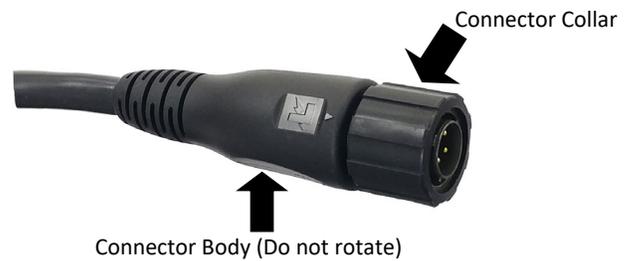


Figure 2. Example use of insulating blankets to shield live line from sensor connector area.



Figure 3. Example use of insulating blankets to shield sensor connector area from live line.

Figure 4. Control cable bayonet connector detail



5. Connect signal cable to the sensor while maintaining the safe and proper electrical clearances established during Step 2 (See Figures 5 & 6).

The cables used with the GEN2 sensors are fitted with bayonet-style connectors (See Figure 4). Gently rotate the connector collar of the cable connector until you feel the slots in the cable align with the pins on the female base which is molded into the sensor. Do not rotate the connector body once the connector is inserted into the sensor.

Push gently until the cable is seated against the sensor. Rotate the outer collar of the cable connector 1/4 turn clockwise until you feel a "click" as the connector halves seat into each other.

6. Secure the control cable with wood staples to crossarm or route inside conduit being careful not to crimp or damage the signal cable. Now, connect the cable to the controller.

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 following connector or cable diameters for proper pass through.

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)

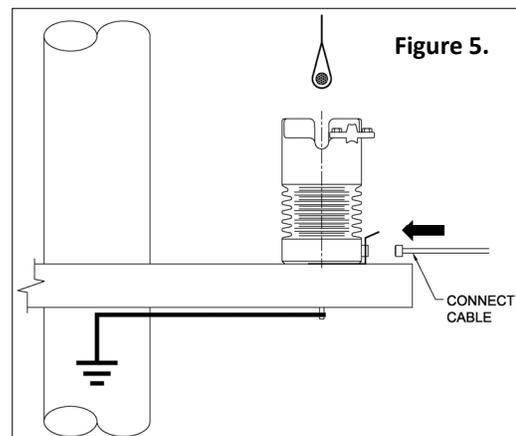


Figure 5.

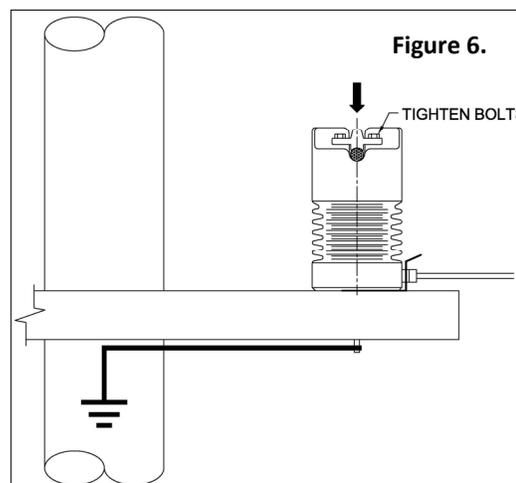


Figure 6.

Lindsey Installation Guidelines

GEN2 Current and Voltage Sensor

- Install the conductor keepers (See Figure 7). Note that the conductor keepers are reversible: one side accepts conductors ranging from 0.18 inch to 0.73 inch (4.6 - 18.5 mm) diameter; inverting the keeper will allow it to accept conductors from 0.73 to 1.25 inch (18.5 - 32 mm) diameter. If preferred, armor rod may be used without affecting accuracy.

Install one keeper pivot bolt through the keeper into the top of the sensor. Start a second bolt into the top of the sensor. Both bolts should be tightened only so far as to allow free movement of the keeper in the direction of the top groove.

Swing the keepers to the side clear of the top groove of the GEN2 sensor (See Figure 7).

- De-energized or Insulated Glove Installation Method:** Lower the conductor into the top groove of the sensor (See Figure 7). Tighten clamping bolts.
 - Hot Stick Installation Method:** Lower the conductor into the top groove of the sensor (See Figure 2).

Connect the shotgun/hot stick hook through the working hole on the keeper.

Swing the keeper over the conductor in the top groove until the slotted hole in the keeper makes contact with the second bolt in the top of the GEN2.

The GEN2 device is now energized (See Figure 8).

- Tighten both keeper bolts to 25 to 30 ft. lbs. with your organizations accepted practice/methods for live line work.

Repeat the same procedure to the keeper on the opposite side of the GEN2.

- Installation is complete.

Figure 7.

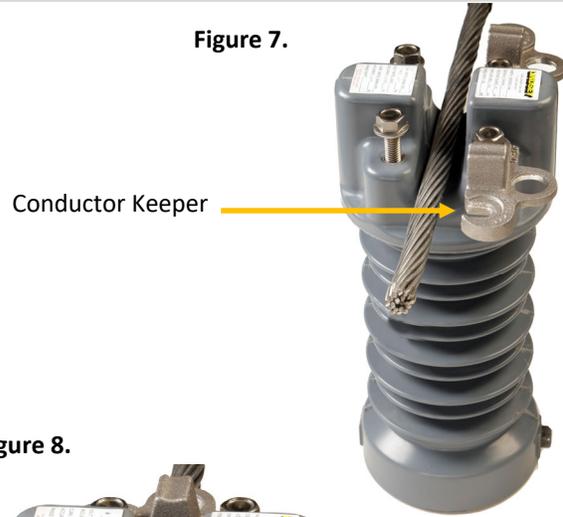


Figure 8.



Figure 9. Location detail for installation of arcing bracket

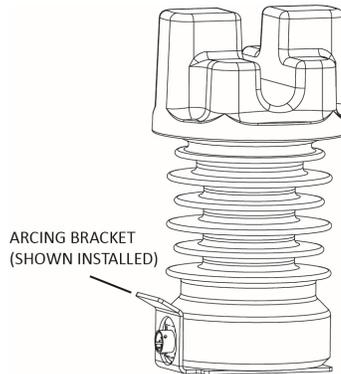


Table 1. Safe Working Distances*

Voltage Class KV phase-phase	Distance to Workman
15kV	26 inches (660 mm)
25kV	31 inches (790mm)
35kV	31 inches (790mm)

*National Electric Safety Code C2-2007, IEEE, 2007, Table 441-1, p. 266

Table 2. Accessories

Part #	Description	Note
2004	Horizontal mounting base	Optional
2040	3/4" x 2 3/16" mounting stud for metal cross-arms	Optional
2041	3/4" x 7" mounting stud for wood cross-arms	Optional
R-23741	Extra Hotstick keeper set (2 keepers and bolts)	Optional
9E609	Arcing Bracket (Horn) for GEN2 sensor	Included