

## INSULATED BY-PASS JUMPERS

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ASTM F2321--Standard Specification for Flexible Insulated Temporary By-Pass Jumper--defines a By-Pass Jumper as a device designed and used to keep electrical circuits effectively continuous (*electrically bridged*) for short periods of time at work locations when conductors are to be opened.



By-Pass Jumpers are constructed with insulated cable, jumper clamps, and cable ferrules. They are designed to insulate the worker from brush or accidental contact and carry the current in the circuit while the conductor is opened. It should be noted ... not all portions of a By-Pass Jumper are insulated, such as the exposed metal portion of the insulated jumper clamp or ground clamps used on the By-Pass Jumpers. These areas or objects should be covered with an appropriate insulating product such as a rubber blanket.

Voltage rating, maximum use voltage (*nominal*), proof test values, and current ratings for By-Pass Jumper Cable are shown below in Table 4 from ASTM F2321.

**TABLE 4 Bypass Jumper Cable Design and Ratings**

Conductor Size (AWG)	Stranding, (min)	Current Rating A, rms, 60 Hz	Insulation, min. (mils)			Jacketing, min (mils)
			15 kV	25 kV	35 kV	
#2	133	200	175	<sup>A</sup>	<sup>A</sup>	65
1/0	259	250	175	260	345	65
2/0	259	300	175	260	345	65
4/0	359	400	175	260	345	65

<sup>A</sup> Conductor size #2 unavailable for the 25 kV and 35 kV ratings.

For more information  
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**It is the user's responsibility to insure the following:**

- The correct voltage/current components make up the By-Pass Jumper.
- The circuit current is within the rating of the By-Pass Jumper.
- Jumper is in good working condition.

As with all equipment issued to field personnel, it should be inspected for good working condition prior to each use.

**Inspecting By-Pass Jumpers**

1. Check the cable for cuts, gouges, holes, snags, and chemical contamination (*softening of the jacket*).
2. Check clamps for cracks, smooth operation, oxidation, and dirt, oil, grease or other contamination. All contamination should be removed prior to use. If ground clamps are used, check the tightness of eye bolt and threaded terminals.
3. Check the cable-to-ferrule connection by unscrewing the handle off the current carrying head and look for broken strands, loose crimps, and oxidized or black conductor strands. With clear jumper handles this inspection is possible by viewing connection between the cable and the ferrule through the clamp.
4. Wire brush the current carrying portion of the jumper head (*upper jaw*).

**Installing the By-Pass Jumper**

1. Check the voltage rating and continuous current rating of the By-Pass Jumper and clamps to insure they are sufficient for the job at hand.
2. Take a current reading on all phases in the circuit to insure the amperage is within the rating of the jumper to be used.
3. Wire brush the conductor where the By-Pass Jumper is to be installed.
4. After installing the jumper and before opening the circuit, take a current reading on all jumpers. It is recommended about 30% of the total current be flowing through the By-Pass Jumper prior to cutting the conductor.
5. **If the By-Pass Jumper is to be left overnight, it should be checked for tightness at the end of the work day and rechecked first thing when work resumes the next day. (Use of the Salisbury "Sure Lock™" rubber glove jumper clamp can prevent loosening due to conductor vibration.)**

The enemy of a By-Pass Jumper is excessive resistance within the assembly that can lead to heating of the components. This increases resistance of complete assembly and—if left unchecked for extended period of time—**could lead to failure!**

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While by-pass cable can be in-serviced tested for dielectric strength of the cable jacket, there is very little current applied to the jumper assembly. For example, a 35kV dielectric test only circulates milliamps of current through the cable. This test does not confirm the current-carrying capability of the jumper.

Combining pre use inspection and in-service dielectric/continuous current tests, you can insure your By-Pass Jumpers are in good working condition.

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