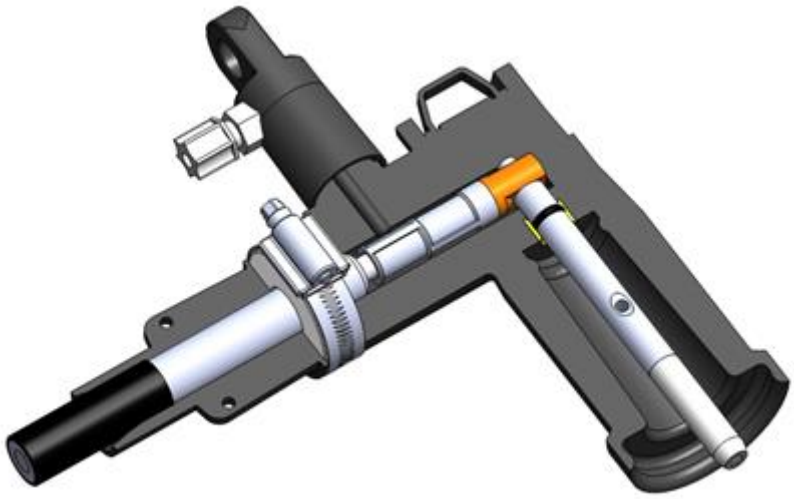
Rejuvenation Instructions

#521 – 200A Elbows – UPR



This NRI covers the following:

- How to prepare 200amp pre-molded elbows for injection.
- How to install and re-inforce an injection elbow.
- How to size an injection elbow to match the cable system.

Trademarks: http://www.novinium.com/trademarks/

Patents: http://www.novinium.com/patents/

WARNING: It is dangerous working around energized high-voltage systems, pressurized systems, and chemicals. Always work in accordance to the Novinium Field Operations Safety Handbook (FOSH) or other local governing safety standards.

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Introduction

1. Applications.

- 200amp load-break and dead-break dead-front elbow terminations.
- Three configurations (standard, extended, and repair length) injection elbows are available (Table 1).
- Extended length and repair length injection elbows can make up 8 ¾" of cable length.

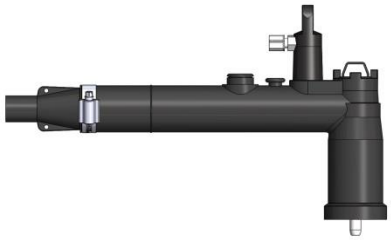
Configuration	Capacitive Test Point	Make-up Length
 **Standard Length**	No	--
 **Extended Length**	Yes	3¼"
 **Repair Length**	Yes	8¾"

Table 1: Injection elbow configurations.

2. Pressure rating.

- 30psi.

3. Limitations.

- Capacitive test points are available on the extended length and repair length injection elbows only.
- The injection port adds 2½" to the back of an elbow and may not fit in smaller enclosures.
- Injection caps are insulated and are not fully shielded with a semi-conductive layer.
- Accessories for injection elbows such as injection caps, permanent caps, and probes are not interchangeable between the two manufacturers (Cooper and Elastimold).

4. Required equipment.

- Injection elbow.
- Lug (for replacement).
- Injection cap (for injection).
- Probe kit (35kV Cooper elbows only).

Installing 200A Elbows

If you are installing an injection elbow on a cable that was not previously terminated with an elbow, follow the instructions supplied with the elbow to trim the insulation and install the compression connector.

If you are retrofitting an injection elbow on a cable that was previously terminated, follow the steps below and reference the manufacturer's instructions where directed.

a. Carefully remove and discard the old probe and elbow. Clean the cable and remove grease or corrosion inhibitor from around the conductor strands.

b. Measure the cable's insulation diameter and use the tables at the end of this NRI to determine the correct part number for the injection elbow.

c. Carefully inspect the existing craftwork including the insulation shield cutback, the insulation's surface, conductor strands, and the connector for damage. If the craftwork does not meet Novinium standards, take corrective actions.

   - **NOTE:** All lugs that are not bi-metal (copper top) must be replaced.

d. Compare the existing cable prep dimensions to the instruction sheet that is included with the injection elbow and make any necessary adjustments.

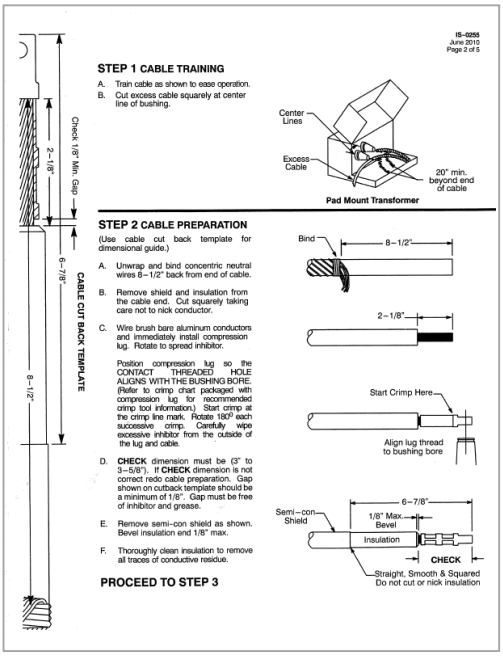


Figure 1: Instruction sheet example.

e. Adjust the insulation cutback as necessary to expose ¼" to ½" of conductor strands between the connector and insulation.

f. The conductor strands rotate around at a 15° angle. It is possible to create a suitable flow path into the cable by opening the conductor strands.

There are two methods to accomplish this goal:

1. Open the strands by rotating the connector the opposite direction of the strand lay by 15°.
   Remember, 15° is the strand lay angle.

OR

2. Tighten the strands by rotating the connector 15° in the strand lay's direction.
   Then, rotate the connector back 15° to its original position.

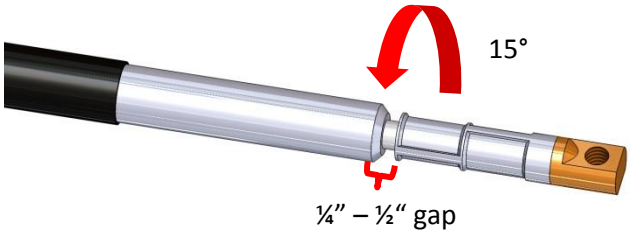


Figure 2: Check the gap and twist the connector to open the conductors.

g. Examine for any strands that broke during the rotation steps. Re-terminate if necessary.

1. Install the elbow.

a. Lightly lubricate the surface of the cable's insulation.
   - Do not apply lubrication to the inside of the elbow as the grease may accumulate around the conductor strands and block flow.

b. Push the elbow onto the cable.

c. Lightly lubricate the o-ring on the probe and carefully install the probe.
   - Do not rotate the probe during insertion until the threads are engaged.
   - Use the torque wrench supplied in the kit or other approved tool to tighten.

d. Position the hose clamp on the thick portion of the elbow and tighten until it just starts to deform the surface of the rubber.

e. Do not remove the yellow warning tags from the elbow or injection cap.

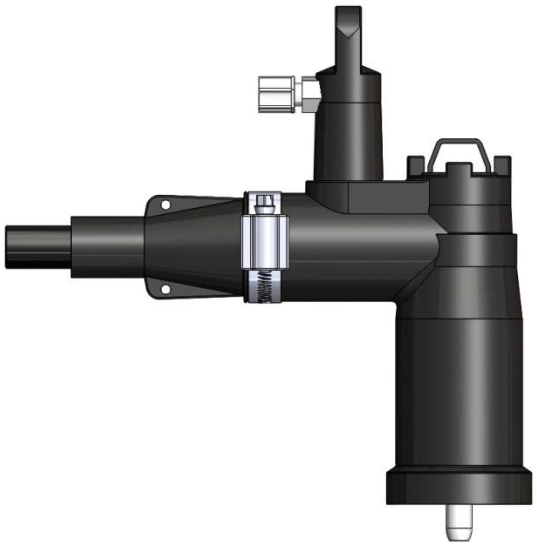


Figure 3: Position the hose clamp as shown.

2. Operations and maintenance.

- The flow test and pressure test should only be performed using the injection cap that will be used for injection in order to avoid contamination between cables.
- Injection caps are shipped in sealed polyethylene bags and should be opened just prior to installation.
- Re-using the injection cap and tubing is permitted.
  - The molded rubber should display no swelling, blisters or "belling", and the black plastic stem should be free of scratches.
  - Scratches on the stem can capture dirt and compromise its ability to function as a sealing surface and insulating interface.
  - Long-term exposure to injection fluid can cause swelling that may compromise the injection cap.
  - Injection caps that no longer look like "new" must be discarded.

- For storage between uses, the injection cap and tubing should be fully drained of fluid, and the outer surface of the tubing and the inner surface of the injection cap should be wiped clean.
  - The tubing should be neatly rolled and then stored along with the injection cap in a large re-sealable zip-lock bag.
  - Large re-sealable zip-lock bags are available through Supply Chain by part number 820122.
  - Prior to use, the injection cap should be examined and cleaned.

Figure 4: Re-sealable plastic bag for storing injection caps.

- Permanent caps must be stored in a polyethylene bag whenever they are not installed on an injection elbow.
  - The re-sealable bags may also be ordered separately by part number.

Figure 5: Re-sealable plastic bag for storing permanent caps.

Sizing Instructions

Injection elbows are sized according to the insulation diameter of the cable. Elbows can be further specified to match the system such as for load-break and dead-break configurations, single-phase and 3-phase applications, 15, 25, 35kV systems, and with or without capacitive test points.

Figure 6: Size elbows according to the insulation diameter.

1. Small-interface load-break elbows.

Voltage Rating	Elbow Type	Insulation Dia. DIM "A"	Elastimold P/N	P/N
15 kV	*Standard*	0.640" - 0.820"	168ALR-F	816119
		0.767" - 0.950"	168ALR-G	816120
		0.850" - 1.050"	168ALR-H	816121
		0.980" - 1.180"	168ALR-J	816407
	Extended w/ Test Port	0.665" - 0.895"	168AELR-6689	816419
		0.880" - 1.100"	168AELR-88110	818586
		0.980" - 1.180"	168AELR-J	819183
	Repair w/ Test Port	0.640" - 0.820"	168ARLR-F	819141
		0.767" - 0.950"	168ARLR-G	819142
25 kV	*Standard*	0.767" - 0.950"	274ALR-G	816122
		0.850" - 1.050"	274ALR-H	816123
	Extended w/ Test Port	0.880" - 1.100"	274AELR-88110	817299
		0.980" - 1.180"	274AELR-J	819076
28 kV	*Extended w/ Test Port*	0.880" - 1.100"	274AELR-88110-CS854	819437
		0.980" - 1.180"	274AELR-J-CS854	819815
35 kV	*Standard*	0.980" - 1.180"	376ALR-J-5240	816544

Table 2: Small-interface load-break elbows.

2. Large-interface load-break elbows.

Voltage Rating	Elbow Type	Insulation Dia. DIM "A"	Cooper P/N	P/N
35 kV	*Standard*	0.995" -1.180"	LEIN235D00	819065[1]

Table 3: Large-interface load-break elbows.

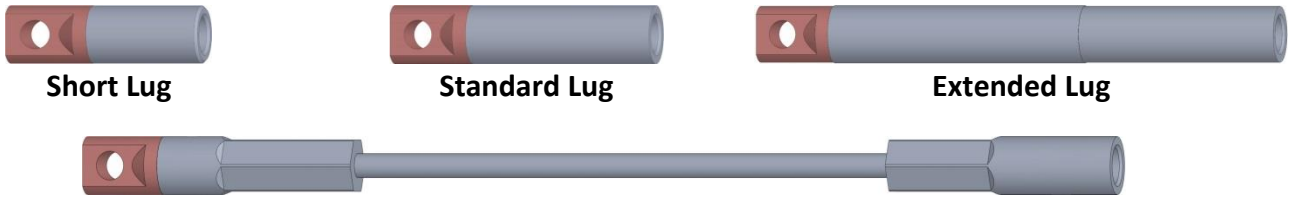
3. Dead-break elbows.

Voltage Rating	Elbow Type	Insulation Dia. DIM "A"	Elastimold P/N	P/N
15/25 kV	*Standard*	0.640" - 0.820"	156ALR-F-CS624	816418
		0.850" - 1.050"	156ALR-H-CS624	816124
	Extended w/ Test Port	0.665" - 0.895"	156AELR-6689-CS624	820058
		0.740" - 0.950"	156AELR-7495-CS624	820059
		0.880" - 1.100"	156AELR-88110-CS624	818422

Table 4: Dead-break injection elbows.

4. Lugs.

Determine the cable size and use Table 5 to select the appropriate part number for an injection elbow lug.



Short Lug **Standard Lug** **Extended Lug**

Repair Lug

Conductor Size	P/N			
	Cooper Elbows	Elastimold Elbows		
	Short Lugs	*Standard*	*Extended*	*Repair Lugs*
#4	-	816420	818746	-
#3	-	816421	-	-
#2	820025	816422	816525	819161
#1	820026	816423	816526	-
1/0	819146	816424	816527	819160
2/0	820027	816425	816528	-
3/0	-	816426	11556-1[1]	-
4/0	-	816427	11556-2[1]	-

Table 5: Injection elbow lugs.

5. Injection elbow accessories.

All available injection elbow caps, probes, and other accessories are provided in Table 6 below.

Description			P/N		
			Elastimold Elbows	Cooper Elbows	
				1-Phase	*3-Phase*
Caps	*Injection*		815629	819068	
	Permanent		815732	819069	
Probes	*Load Break*	*15 kV*	816333	-	
		25 kV	816334	-	
		35 kV	819431	819067[1]	819066
	Dead Break	*15/25 kV*	820057	-	
	Spare O-Ring		816335	-	
10-Pack[2]	*35 kV Kit*		-	11377-1	11377-3

Table 6: Injection elbow accessories.