



## Rejuvenation Instructions Power Cables IA (Injection Adaptor) Installation – Splices

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- Ultrinium<sup>™</sup> sustained pressure injection method (patent pending)
- Ultrinium<sup>™</sup> formulation optimization injection method (patent pending)
- Injection Adaptor (U.S. Patent 7,195,504 and pending)
- Perfectium<sup>™</sup> single switch injection (U.S. Patent 7,353,601)
- Formulation of Ultrinium<sup>™</sup> & Perficio<sup>™</sup> components (patents pending)
- N-Rex<sup>™</sup> radial exclusion process for treating long cables (patent pending)

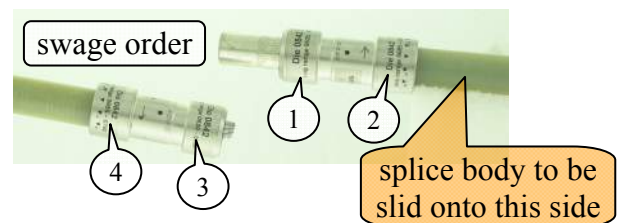
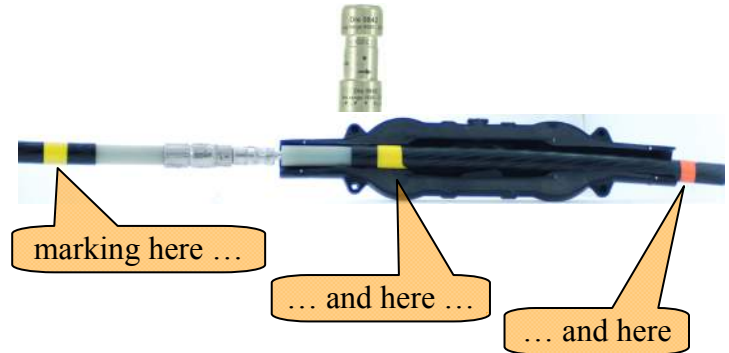
Version 20090315

## Installing IAs in Splices



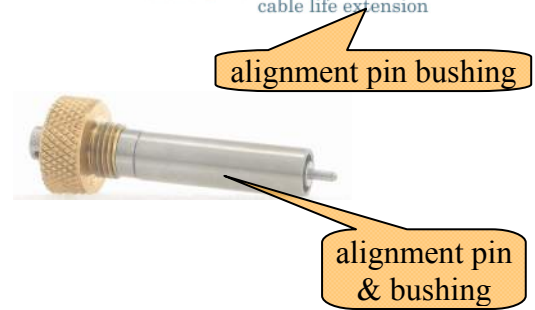
**Caution: Working around energized high-voltage systems may cause serious injury or death. Installation should be performed by personnel familiar with good safety practice in handling high-voltage electrical equipment. De-energize, test and ground all electrical systems before installing Injection Adaptors.**

1. Perform the instructions in NRI 30 “IA Installation – Connector Replacement & Strand Preparation”.
2. Apply permanent marks to both cables on the insulation shield as indicated on the Novinium component template. For molded splices apply a third mark (the orange tape in the illustration) one splice-body-length from the insulation cutback on the cable which will hold the splice body during the swaging and crimping operation.
3. If the component includes cable adaptors, slide them into place before installing the IAs.
4. Insert the insulation end of each IA over the insulation until the insulation seats on the internal IA shoulder. There must be no interference between the insulation and the IA inner diameter. If there is any interference the next larger size of IA is required, or the cable may be out-of-round and may need to be replaced. The positioning line drawn in a previous step should be flush with the end of the IA.
5. Install the first compression connector on the cable end which will hold the splice body during compression connector installation. Swage the compression connector first and the insulation second.
6. **Begin Swage 1.** Loosely position the tool stop (NPN: O-LT-TLSTP) with the rounded shoulder facing away from

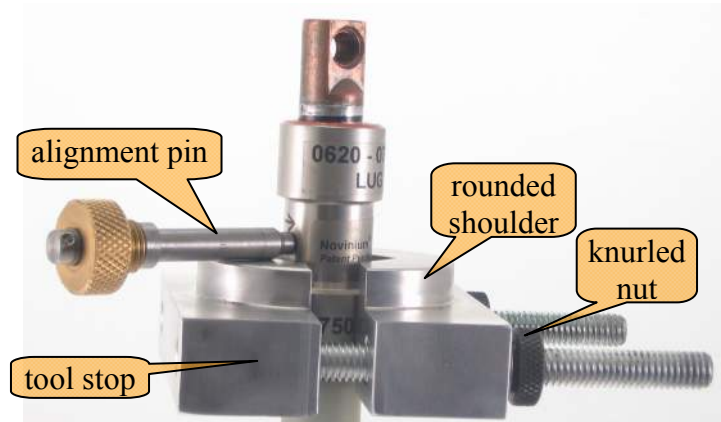


the cable insulation over the insulation compression portion of the IA.

- a. Except for IAs with part numbers which end with an “L”, slide the alignment pin bushing (NPN: 2-LT-ALBUSH) over the alignment pin (NPN: 2-IT-ITOOL/PIN) for accurate positioning in 25b.



- b. Insert the alignment pin into the injection port hole. Snug the rounded shoulder of the tool stop against the swage alignment pin and tighten the knurled nuts. Remove the alignment pin.



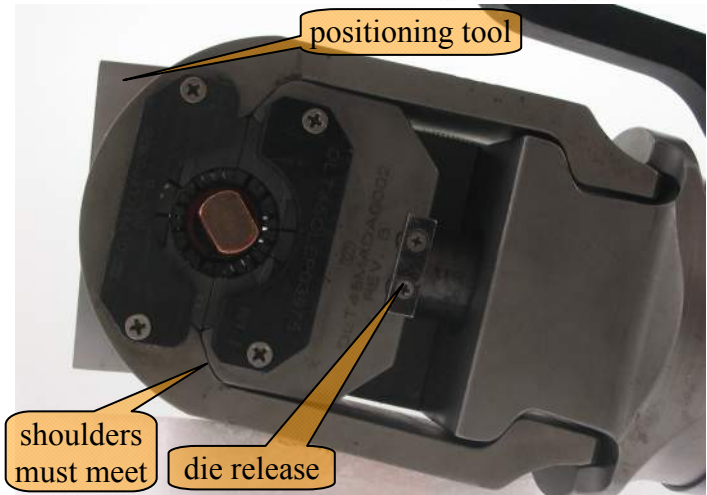
7. Install the 4-digit die in the swaging tool that matches the 4-digit number on the connector side of the IA. This 4-digit number is the nominal outside diameter of the IA after it is swaged in mils. A mil is 1/1000<sup>th</sup> of an inch. In the example, die 0842 will swage to a nominal OD of 0.842”.



8. Swage the IA and compression connector ...
  - a. With the die release facing away from the positioning tool, hold the swaging tool head snugly against the positioning tool and swage the IA, compression connector (lug) and strands until the shoulders of the tool head meet.



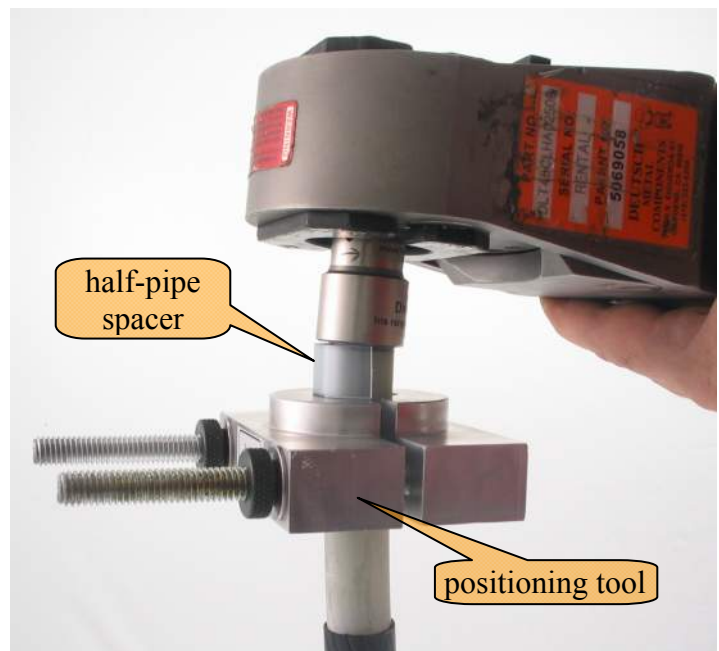
**Keep fingers away from the closing portion of die and tool head.**



- b. If the NRI 30 IA application table requires a double swage to obtain the optimum compression ratio, apply the second swage over the first swage with the second and smaller die indicated on the IA label.



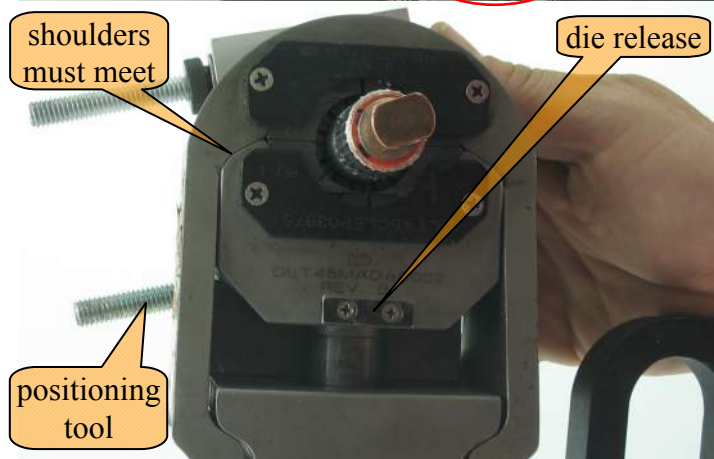
9. Loosen the positioning tool knurled knobs and slide the tool onto the insulation. Place the required half-pipe spacer (NPN: 0-LT-HALF-PIPE) on the insulation adjacent to the IA. Use the half-pipe spacer marked with an "L" for IAs with part numbers ending in an "L". Snug the positioning tool against the half-pipe spacer and tighten the positioning tool knobs. Remove the half-pipe spacer.



10. **Begin Swage 2.** Install the 4-digit die in the swaging tool which matches the 4-digit number on the insulation side of the IA. This 4-digit number is the nominal outside diameter of the IA after it is swaged in mils. A mil is 1/1000<sup>th</sup> of an inch. In the example, die 0842 will swage to a nominal OD of 0.842”.



11. With the die release facing away from the positioning tool, hold the swaging tool head snugly against the positioning tool and swage the IA and insulation until the shoulders of the tool meet.



**Keep fingers away from closing portion of die and tool head.**

12. Place the splice body over the swaged IA or crimped compression connector until it is out of the way of swages 3 and 4 or crimps to follow. For molded splices the surfaces must be clean between all marking tapes and the splice body may not be pushed past the third marking tape (orange tape on right in image). Avoid applying torque to the IA.



13. Repeat steps 6-11 for the other end of the compression connector. If a compression sleeve is required for swage 3 by the NRI 30 IA application table, park the sleeve on the non-crimped portion of the compression sleeve before beginning swage 3.

14. Remove tool stop and swage head.

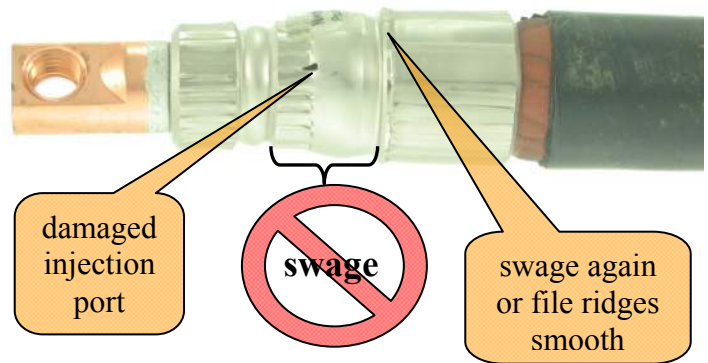


15. Rub a 3M<sup>®</sup> Scotch-brite™ pad around the circumference of the swages to remove any burrs.

16. For applications where some unswaged barrel length remains, additional swages or conventional crimps should be applied on the compression barrel before all IA swages are complete.

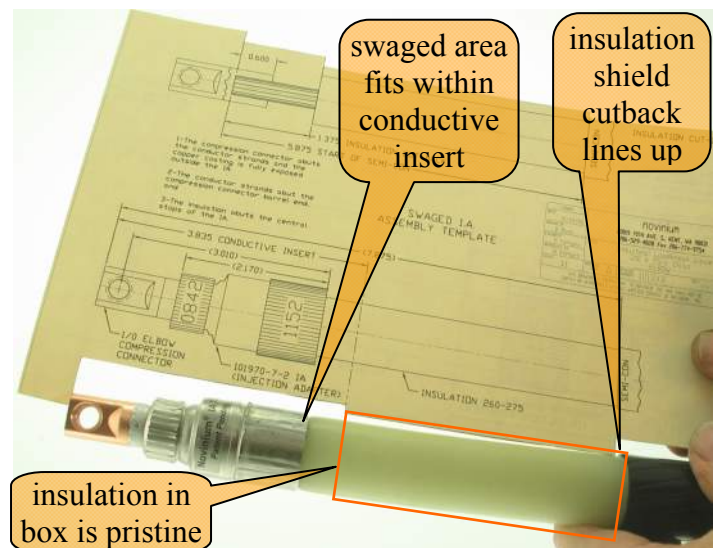


17. IA quality check: There should be no marks on the central injection portion of the IA and the entire swage length will be compressed with no ridges at the end margins. Stray swages on the central portion of the IA may interfere with subsequent operation of the injection port. Any rough external edges may be filed or swaged again.

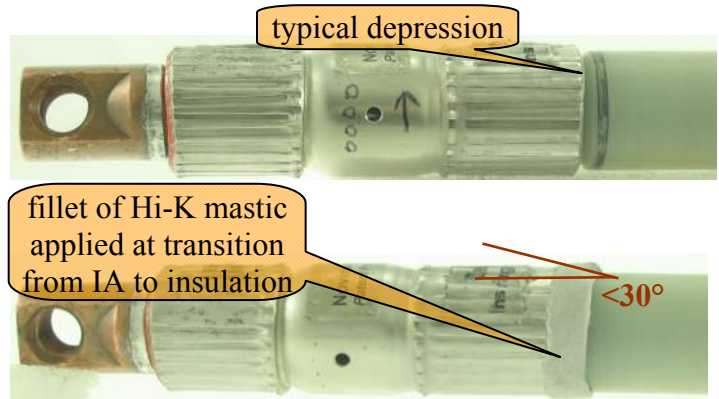


18. Component preparations quality check: Lay the post-swaged portion of the template next to the swaged assembly. Confirm:

- Insulation shield cutback falls within the required range. Adjust to requirement without the use of semi-conducting tape.
- The swaged assembly including any circumferential depressions in the insulation immediately adjacent to the connector is within the conductive insert.
- Insulation outside of conductive insert is scratch-free.



d. If there are depressions which are near the end of the conductive insert, fill the depressions or shoulders with 3M<sup>®</sup> Hi-K mastic (NPN: 1-3M-HiK) to create a smooth transition. The slope of the fillet (relative to the insulation surface) should be 30° or less and the mastic OD should be less than or equal to the diameter of swaged IA.



19. When injection is complete and the plug pin is inserted flush with the IA exterior as described in NRI 40, "IT Installation & Removal" the component may be installed. Avoid applying torque to the IA.



20. The body of the splice should be centered between the edges of the two marks and within 1/4" (6 mm) of the inner edges of both marks. **Do not remove marking tape.**



21. Install the splice as per the more stringent of the manufacturer's installation instructions or the circuit owner's standards. **Under no circumstances may there be any bend in a splice.** Silicone grease supplied in the splice kit may be applied to the IA exterior to facilitate the installation of molded components.

