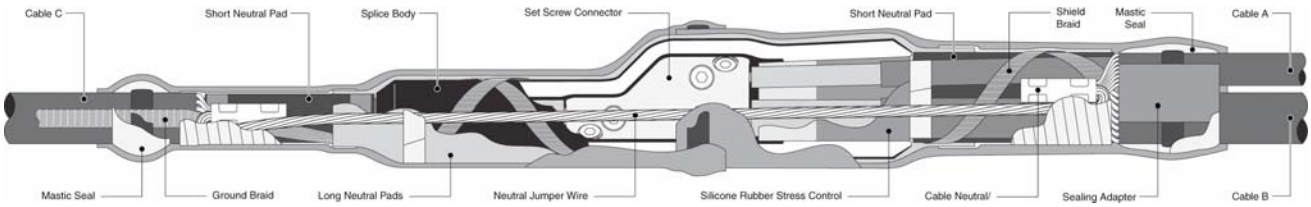
Branch Splice
QS-2001B

Data Sheet



1. Product Description

The 3M™ Branch Splice QS-2001B molded rubber splice kits are designed to connect extruded dielectric power cables rated 15 kV. The basic kits handle the main and branch cable range from 350 kcmil to 500 kcmil (for cable between 1/0 – 250 use the adapter).

These kits use the cold shrink technology that 3M invented. The kits consist of a multi-layer silicone rubber splice and stress control (SC) adapter body, each expanded on a removable, supporting polymeric core. The splice and the SC adapter body provide the stress relief and the re-insulation in one piece.

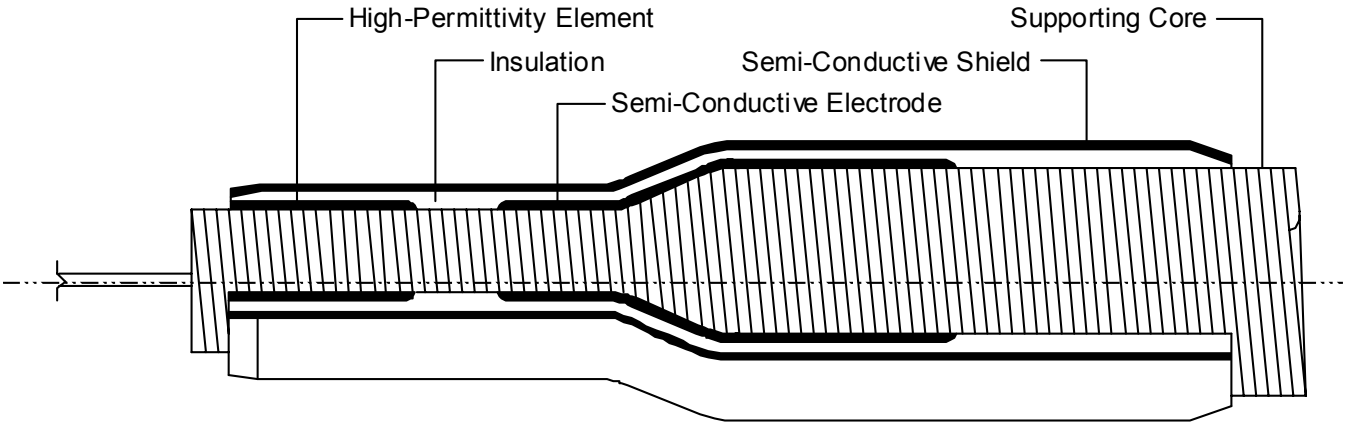


Figure 1
Construction of Splice Body

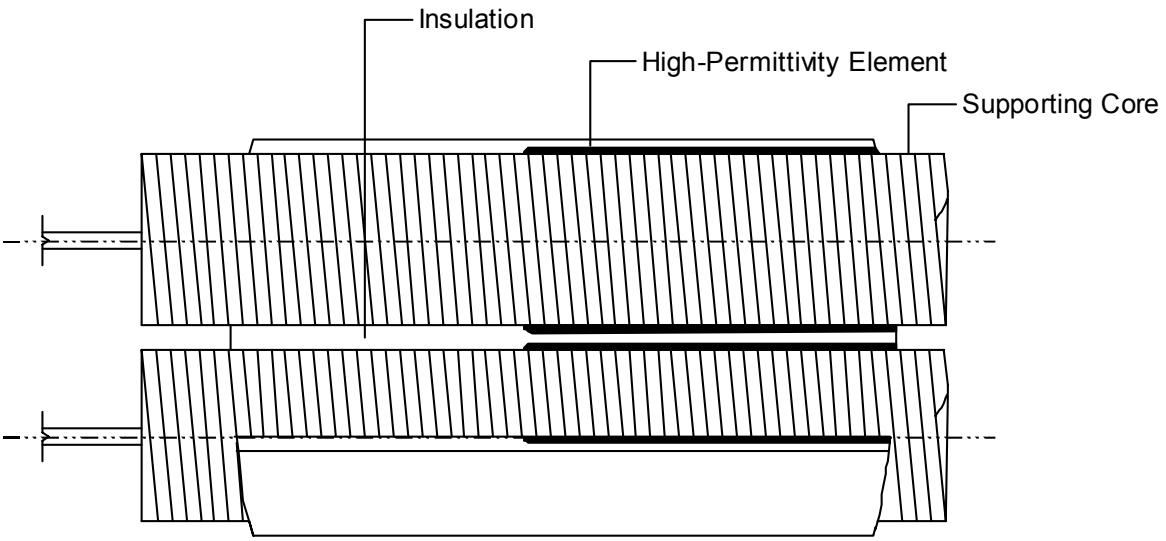


Figure 2
Construction of SC Adapter

The Splice Body

- The stress control element provides the electric stress control at the cable semi-con step.
- The semi-conductive electrode electrically surrounds the high-voltage connector creating a Faraday Cage virtually eliminating the use of tapes or additional molded and metallic electrodes
- The splice insulation is designed to effectively replace and continue the performance characteristics of the cable insulation across the entire splice.
- The outer semi-conductive layer of the splice adapts to the geometry of the insulation and re-establishes the electro-magnetic screen.

The SC Adapter Body

- Two inner stress control elements provide electric stress control at both cable semi-icons.
- The adapter insulation effectively continues the extruded dielectric between the main and branch cable.

Additional Kit Components

- Constant force springs and metallic shielding sleeve replace the metallic shielding of cable. This helps enable a solderless grounding system. The primary purpose of the metallic components is to provide a low resistance path to ground for essential fault current protection.
- The sealing adapter and pads of rubber mastic provide additional moisture protection, specifically when the splice has to be grounded.
- The cable jacket replacement for single-conductor cables can be made by utilizing a pre-stretched cold shrink tube. The addition of heavy-walled protection tubes help prevent corrosive liquids and moisture from compromising the grounding system.

2. Product Features

- Versatile design of prefabricated one-piece splice and adapter kit allows installation on a wide range of 15 kV cable sizes and types, from #2 AWG through 500 kcmil.
- Designed to fit screw-type branch connectors.
- Symmetrical cut-back dimensions.
- Minimized interface zones for reliable performance.
- 100% factory tested.
- Compact size allows installation in narrow areas.
- 3M proprietary technology provides safe and tool-free installation.

3. Product Application

The 3M™ Branch Splice QS-2001B kits are designed to connect medium-voltage cables with extruded dielectric insulation: i.e. cross-linked polyethylene (XLPE) and ethylene propylene rubber (EPR); metallic wire, tape shield or JCN and plastic jacket. The QS-2001B series kits can be used as aerial splice, on cable trays or in direct burial applications.

3M™ Branch Splice QS-2001B – Selection Table
Voltage Class 15 kV

Kit Number	Cable Insulation Inches (mm)	Conductor Size Range
QS-2001B	1.00" to 1.35" (25,4 mm to 34,3 mm)	350 – 500 kcmil (185 – 240 mm^2)
QS-2001BA	0.64" to 1.00" (16,3 mm to 25,4 mm)	2 AWG – 250 kcmil (35 – 150 mm^2)

For #2 AWG through 250 kcmil cable, the adapter kit must be ordered and used in conjunction with the 3M™ Branch Splice QS-2001B, so the cable insulation O.D. can be increased so the cable will work with the splice body.

4. Characteristics and Test Data

The specially formulated silicone material is designed to provide high elasticity, easy installation at low temperatures and superior electrical performance over a wide range of operating temperatures.

A) Typical Physical And Electrical Properties

Typical Materials Data for Silicone Rubber					
Property	Units	Numerical Value			
		Insulation	Semi-Conductive Electrode	High-Permittivity Element	Semi-Conductive Shield
Hardness	Shore A	30	40	40	40
Tensile Strength	Mpa	7.5	6.0	5.5	6.0
Ultimate Elongation	%	750	600	400	600
Tear Resistance	N/mm	25	20	15	20
Compression Set	%	20	20	15	20
Volume Resistivity	Wcm	10^{15}	<100	10^{11}	<100
Dielectric Strength	KV/mm	25	-	-	-
Relative Permittivity ER		2.8	-	20	-
Dielectric Loss Factor Tan δ		0.003	-	0.1	-
Service Temperature Range	ºC	-50 bis + 180	-		

Electric Field Control

The QS-2001B Branch Splice is designed to control its electric field distribution. Lines of electric flux are regulated to equalize the electrical stresses along the entire splice area. Figure 3 shows a computerized plot of the equipotential lines of the branch splice on a 350-kcmil 15 kV cable.

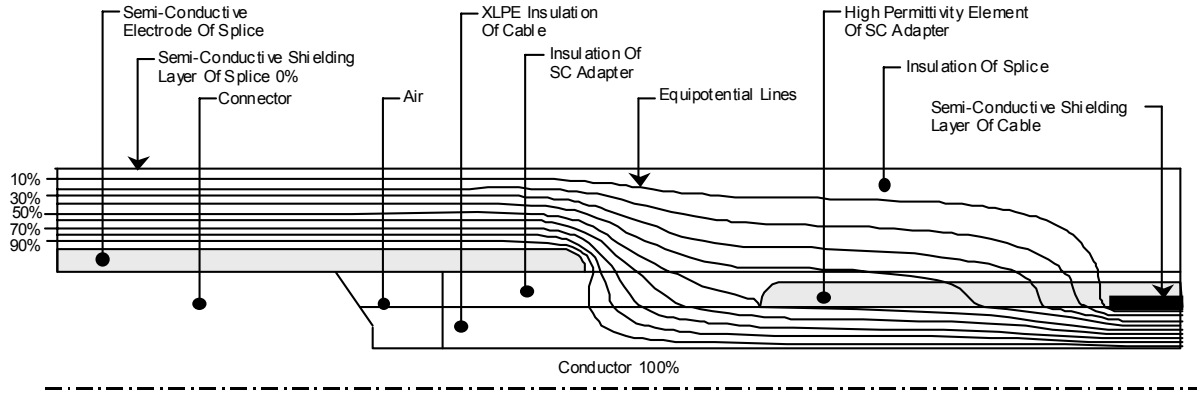


Figure 3
Equipotential Line Plot for Splice

5. Performance Tests And Data

A) Performance Data

The 3M™ Branch Splices QS-2001B meet the requirements as specified in the IEEE–404 Standard. The current rating of each kit is determined by the maximum conductor size, normal operation at 90ºC and of the emergency overload at operations 130ºC.

B) Quality Assurance

The factory tests includes 100% electrical tests of the prefabricated QS-2001B splice body.

1. AC Voltage Withstand Test 55 kV, 50 Hz. 5 minute.
2. Corona Discharge Test (pC) at 24 kV.

6. Installation Techniques

A) Prepare cable as per instructions.
B) Install adapters on two cables together.
C) Install connector.
D) Install splice body.
E) Connect ground system over splice.
F) Jacket and seal.

Exact instructions for constructing QS-2001B Branch Splice are available in each kit.

7. Specification

Product Specification

The Cold Shrink wye splice shall meet the requirements of ANSI/IEEE Standard 404 for a 15 kV rating. The splice shall be rated by the manufacturer for use on 15 kV class corrugated jacketed concentric neutral, concentric neutral, tape shield or longitudinal corrugated shielded power cable systems. The splice must be rated for continuous operation at 90ºC, with an emergency overload temperature rating of 130ºC. The splice shall be capable of splicing cables with copper or aluminum conductors sized from 2 AWG to 500 kcmil. The splice shall accommodate all splices within that range, but the 2 AWG to 250 kcmil cables will use an adapter kit so that any transitions can be accommodated. The splice must be a molded silicone rubber splice body that installs using cold shrink method. The splice jacketing shall be of a cold shrink tubing made of EPDM rubber. The color of splice body and outer jacket shall be black.

Engineering/Architectural
(Closed Specification)

WYE splicing of all 15 kV rated jacketed concentric neutral, concentric neutral, tape shield and longitudinal corrugated shielded power cables, sized from 2 AWG to 500 kcmil copper or aluminum conductor, shall be performed in accordance with the instructions provided with the QS-2001B splice kit and QS-2000BA adapter kit.

8. Availability And Kit Contents

3M™ Branch Splice QS-2001B kit is available in one size. It is packaged one kit per carton.

The kit contains sufficient of the following components to make one single-conductor splice.

Item Number	Quantity	Description
1.	One	Cold Shrink Branch Splice Body
2.	One	Cold Shrink SC Adapter
3.	Two	Cold Shrink Outer Cover
4.	Two	Constant Force Spring
5.	One	Metallic Shield Sock
6.	Three	Roll Scotch® Rubber Mastic 2228 (Pad Available)
7.	One	Roll Scotch Electrical Semi-Conductive Tape 13
8.	One	Roll 3M™ Temflex™ Vinyl Electrical Tape 1800
9.	Two	Tube Of Lubricant P55/R
10.	Two	Sealing Adapter
11.	One	Screw Type Branch Connector GPH 95-240 SDAV
12.	One	Plastic Glove
13	One	Instructions (Multi-Language)
14	One	Material List

9. Maintenance

Components of the QS-2001B Branch Splice kit and QS-2001BA adapter kit are stable under normal storage conditions. Normal stock rotation procedures are recommended. As provided, in the expanded state, cold shrink components of the kit, including the splice body, have an on-shelf life of three years from the date of manufacture. The installed splices can be field tested using standard field cable test procedures.

3M

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