

# 3M™ Mechanical Shearbolt Connectors, QCI Series

Data Sheet

November 2011

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**Description** 3M™ Mechanical Shearbolt Connectors, QCI Series are designed to cover a wide range of conductor sizes from 2 AWG to 1250 kcmil. This shearbolt connector design provides excellent performance and features not found in many other shearbolt connectors. No dies are needed for installation: following cable preparation, simply slide the connector over the conductor and tighten the bolts until they shear. The QCI connectors are designed to connect either aluminum and/or copper conductors. The connectors are tin plated to resist corrosion. Individual sizes cover ranges from 2 AWG–250 kcmil, 1/0 AWG– 350 kcmil, 4/0 AWG–600 kcmil, 350–750 kcmil, 500–1000 kcmil and 1000-1250 kcmil.

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**Connector Contents** Each connector includes the following materials:

- Connector w/centering rings, if needed (no centering rings included with 1000-1250 kcmil connector)
- Foil tape pad
- Instruction sheet

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**Features**

- Greater contact force versus standard shearbolt connectors
- Contact disk (friction plate) on the bolt end prevents damage to the conductor, providing increased contact force and will not damage fine strand conductors
- Bolts are continuous shearing, thus no filing is needed; bolts shear below the connector surface
- No specialty tools needed
- Meets, or exceeds, the requirements of ANSI C119.4
- Sized for American wire gauge conductors
- Tapered ends allow for smooth splice body transition from the connector to the cable
- Centering rings are provided for smaller conductors (not included with 1000-1250 kcmil connector)
- Designed to fit 3M™ Cold Shrink Splices QS-III

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**Applications**

- To connect aluminum and/or copper conductors from 2 AWG through 1250 kcmil (MCM)
- For low and medium voltage up to 46 kV (Contact 3M for 69 kV and higher voltage applications. We offer splice kits that utilize shearbolt connectors specifically designed for these voltage classes.)

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# 3M™ Mechanical Shearbolt Connectors, QCI Series

**QCI Connector Selection Table**

QCI	Conductor Size Range AWG/kcmil	Connector O.D. Inches (mm)	Connector Length, with centering rings Inches (mm)	Connector I.D. Inches (mm)
QCI 2-250	2-250	1.10 (27,9)	4.41 (112,0)	0.64 (16,3)
QCI 1/0-350	1/0-350	1.30 (33,0)	5.12 (130,0)	0.78 (19,8)
QCI 4/0-600	4/0-600	1.50 (38,1)	5.75 (146,1)	0.94 (23,9)
QCI 350-750	350-750	1.65 (41,9)	6.93 (176,0)	1.02 (25,9)
QCI 500-1000	500-1000	2.05 (52,1)	7.83 (198,8)	1.22 (31,0)
QCI 1000-1250	1000-1250	2.10 (53,3)	8.25 (209,5)	1.34 (34,0)

**Note:** These connectors are designed to be used with 3M™ Cold Shrink Splice Kits QS-III. For non-3M splices, contact the splice manufacturer before installing the connector to determine proper sizing.

QCI	QS-III-IJ Integrated Splice Kit**	QS-III Standard Splice Kit**
QCI 2-250	5415A-IJ, 5456A-IJ	5415A, 5456A, 5513A, 5524A
QCI 1/0-350	5467A-IJ	5467A, 5535A
QCI 4/0-600	5416A-IJ, 5457A-IJ	5416A, 5457A, 5514A, 5525A
QCI 350-750	5417A-IJ, *5468A-IJ	5417A, *5468A, 5515A, *5536A
QCI 500-1000	5418A-IJ, 5458A-IJ, *5468A-IJ	5418A, 5458A, *5468A, 5516A, 5526A, *5536A

\*The 5468A and 5536A splices are sized to cover 35 kV 350 kcmil to 1000 kcmil. Therefore, 2 shearbolt connectors are required to cover the range.

\*\*Installer should verify that both cables are within the Insulation O.D. Range of the splice kit before using any given QCI connector.

## Typical Properties

Not for specifications. Values are typical, not to be considered minimum or maximum. Properties measured at room temperature 73°F (23°C) unless otherwise stated.

The 3M™ Mechanical Shearbolt Connectors, QCI Series aluminum /copper connectors can be used on cables with an operating temperature of 221°F (105°C) and an emergency overload rating of 284°F (140°C). The QCI connectors pass the requirements of ANSI C119.4-2004. The current rating of these connectors meets or exceeds the current rating of the conductor size for which it is intended.

Electrical Property Test Method - ANSI C119.4-2004	Requirement	Results
Current Cycle Test - Class A @ 284°F (140°C) Conductor	Thermal Stability Resistance Stability	Pass Pass
Mechanical Pullout Test - Class 2 Partial Tension	40% pull out force	Pass

## Tool/Installation Information

The installer can use a ratchet (long handle, if available) with the correct hex socket (5, 6, or 8 mm) or an electric impact wrench, 18 volts, or greater, to tighten and shear the bolts. Depending on the battery condition and the torque available (160ft. lbs. (217 Nm) or greater), some electric wrenches may not be able to complete bolt shear. In these cases, a ratchet should be used to complete bolt shearing.

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**Shelf Life & Storage** The 3M™ Mechanical Shearbolt Connectors, QCI Series have a 5-year shelf life from date of manufacture when stored in a humidity controlled storage (10°C/50°F to 27°C/80°F and <75% relative humidity). Components of the QCI connectors are not impaired by freezing or overheating due to ambient temperatures found in typical storage or shipping. Normal stock rotation procedures are recommended.

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**Availability** Please contact your local distributor; available from [3M.com/electrical](http://3M.com/electrical) [Where to Buy] or call 1.800.245.3573.

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# 3M™ Shearbolt Connectors QCI Series

## Instructions

### ⚠ CAUTION

Working around energized systems may cause serious injury or death. Installation should be performed by personnel familiar with good safety practice in handling electrical equipment. De-energize and ground all electrical systems before installing product.

Connector	Outside Diameter	Typical Length w/Centering Rings
QCI 2-250	1.10" (28 mm)	4.41" (112 mm)
QCI 1/0-350	1.30" (33 mm)	5.12" (130 mm)
QCI 4/0-600	1.50" (38 mm)	5.75" (146 mm)
QCI 350-750	1.65" (42 mm)	6.93" (176 mm)
QCI 500-1000	2.05" (52 mm)	7.83" (199 mm)
QCI 1000-1250	2.10" (53 mm)	8.25" (210 mm)*

\* No centering rings used with this connector.

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### Kit Contents

- 1 3M™ Shearbolt Connectors QCI (includes centering rings as appropriate)
- 1 3M™ Foil Tape Connector Wrap 1115B
- 1 Installation Instructions

### 1.0 Notes

- 1.1 Unless the 3M™ Shearbolt Connector is supplied with a cable accessory kit, always check with the cable accessory manufacturer to make certain that the shearbolt connector will work properly with the accessory before installing the connector.
- 1.2 Do not remove bolts from the connector.
- 1.3 These shearbolt connectors can be used with both copper and aluminum conductors.
- 1.4 These shearbolt connectors can be used to join conductors of equal size or different sizes, provided that both conductors are within the range of the connector.
- 1.5 The connector is pre-greased. Do not remove the connector grease.
- 1.6 These connectors are designed to be used in 3M™ Cold Shrink Splices QS-III. Check with other manufacturers before using with their splice kits.

### 2.0 Insulation Cutback Dimensions

- 2.1 Prepare the cable cutbacks per the accessory manufacturers instructions. The ends of the conductors must be square cut. Using your QCI connector number, remove the cable insulation length shown in the following table.

Connector	Insulation Cutback
QCI 2-250	2.25" (57 mm)
QCI 1/0-350	2.75" (70 mm)
QCI 4/0-600	3.0" (76 mm)
QCI 350-750	3.50" (89 mm)
QCI 500-1000	3.875" (98 mm)
QCI 1000-1250	4.125" (105 mm)

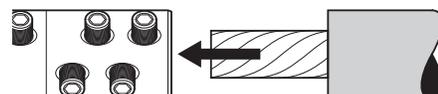
- 2.2 Use the following table and your conductor size to determine the appropriate connector centering ring. Install the centering ring, unless conductor size indicates "No ring," by screwing the ring clockwise into the connector end. For size transitions, use the ring appropriate to each conductor size.

Connector	Conductor Size (AWG, kcmil)	Connector Centering Ring Color
QCI 2-250	2-1/0	Grey
	2/0-3/0	Black
	4/0-250	No ring
QCI 1/0-350	1/0-2/0	Blue
	3/0-4/0	Black
	250	White
	350	No ring
QCI 4/0-600	4/0	Blue
	250	Black
	350	White
	500-600	No ring
QCI 350-750	350	White
	500-750	No ring
QCI 500-1000	500	White
	750-1000	No ring
QCI 1000-1250	1000-1250	No ring

\* If conductor does not fit in the centering ring, use the next larger size ring or no ring if there's no larger ring.

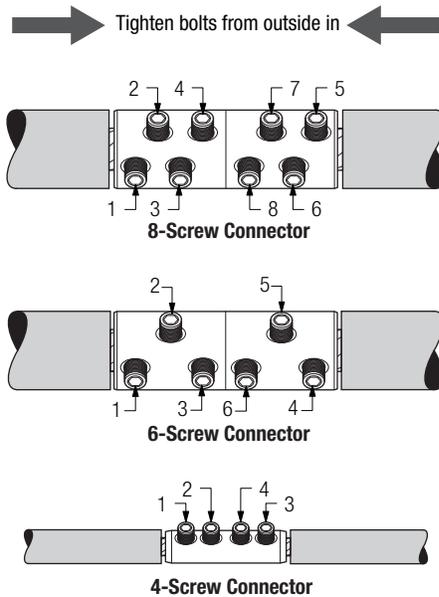
### 3.0 Installation Steps

- 3.1 Aluminum conductors must be wire brushed shortly before installing the connector. The conductor must be clean and dry before installing the connector.
- 3.2 Check that screws are not protruding into the connector bore. Unscrew the bolts, as needed, to clear the bore. Do not remove the bolts from the connector. Feed the stripped cable ends into the connector until conductor contacts the connector center stop. Hand tighten all of the bolts to the conductor.

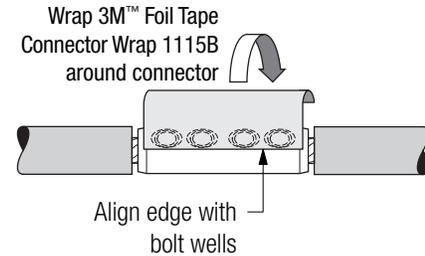


3.3 Shear the bolts, by using the correct hex key/socket and following the sequence appropriate for the number of connector bolts (see illustration below). The installer can use a ratchet with the correct hex key/socket and/or an electric impact wrench to tighten and shear the bolts. If using an electric impact wrench, the wrench must be 18 volts or greater and have a torque of 160 ft.-lbs. (217 N•m) or greater.

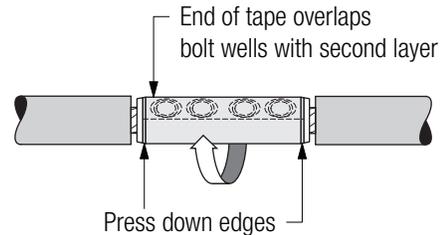
3M™ Shearbolt Connector	Hex Key/Socket Size
QCI 2-250	5 mm
QCI 1/0-350	6 mm
QCI 4/0-600	8 mm
QCI 350-750	8 mm
QCI 500-1000	8 mm
QCI 1000-1250	8 mm



- 3.4 Discard the sheared bolt tops. They can be recycled.
- 3.5 Clean the surface of the connector to remove any debris or grease.
- 3.6 Apply the included 3M™ Foil Tape Connector Wrap 1115B. Start by checking the foil tape width, before removing the liner. The tape must extend from connector taper to connector taper (it may extend down the tapers a small amount). The longer length will wrap around the connector.
- 3.7 Remove the liner from the foil tape. Align the foil edge with the recessed bolt wells in a direction that covers the sheared bolts.



- 3.8 Once foil tape is properly aligned, continue wrapping the foil tape around the connector until it covers the bolt wells with a second layer. Press down the ends of the tape at the final edge and near the connector tapers.



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