3M Science. Applied to Life.™

Your Trusted Connection

3M Medium Voltage Separable Connectors

Plug In Selection Guide

2021

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General Product Description

3M Separable Connector or so-called Plug-In is a separable cable termination, that means it can be plugged in and out. It is designed for Dead Break System, which is only able to be plugged-in or un-plugged when the circuit is de-energized (Voltage & Current can't be present).

A Separable Connector and a conventional Termination (such as QT II and QT III) perform the same function, by means: to terminate a power cable, either at a piece of equipment or at a junction of the power cable to the overhead system. The applications can be split into:

- ***Underground cable connected to the overhead system: these connections use Live Front Terminations, like 3M's QT-II or QT-III, which are not fully insulated and shielded like Separable Connectors.***

- ***Cable connected to equipment (transformers, switchgears, motors...): choice of either using a Separable Connector or a Live Front Termination depends on the connection type on the equipment. A Separable Connector will connect to a bushing, while a Live Front Termination connects to a bus bar connection pad or a station post insulator.***

3M Separable Connector with thick EPDM insulation & shielded layer makes it having wide range of operation temperature -40° to 65°C and suitable for compact connection, short distance phase-phase, increase safety & maintenance free. Therefore, 3M Separable Connector meets the increasing demand of compact SF6 MV Switchgear Compact substation nowadays.

Each kit consists of a complete package to make one Separable Connector including the compatible connecting devices: a copper or bi-metallic or a shear-bolt cable lug, probe contact + hex key or a screw contact. A bail assembly, as extra fixing tool to hook the Separable Connector to the equipment, is also included in the kit for probe plug-in system. Besides, a cold shrink or heat shrink breakout boot is also needed for 3C cable system.

24kV Deadbreak 250A - Elbow Connector
93-EE-800L-24-250-ELBOW

Application

The 3M Deadbreak Elbow connector is a fully shielded and insulated termination for connecting underground cable to transformers, switch gear and other apparatus equipped with deadbreak bushings, junctions, or other deadbreak connectors.

The 3M Deadbreak Elbow meets all the requirements of HD 629-1 & IEC 60502-4, and complies with bushing type A 250A which follows EN-50180 & 50181, inside RMU Switchgear & on Transformer.

3M Deadbreak Elbow Connectors are molded using high precision molding technique–cured insulating and semi-conducting EPDM rubber. All insulating rubber is compounded in house, using 3M - developed proprietary formulations. 3M Deadbreak Elbow Connecter has a copper probe combined with the bimetallic or copper compression lug, which will ensure a reliable operating connection.

Production Tests

Tests conducted in accordance with HD 629.1

- Minimum Corona Voltage Level – 22 kV < 3 pC
- AC 1 Minute Withstand – 60 kV
- Test Point Voltage Test

Tests conducted in accordance with 3M manufacturing process requirements:

- Physical Inspection
- Periodic Dissection
- Periodic X-Ray analysis

Product Ratings

Maximum Voltage Class (Um)	24 kV
AC 5 Minute Withstand	57 kV
Minimum Corona Voltage Level	22kV < 3pC
Impulse Voltage Withstand	125 kV

Continuous Current	250 A
Overload Current (8 hour maximum)	300 A

Detailed composition of the Deadbreak Elbow Connector

PULLING EYE

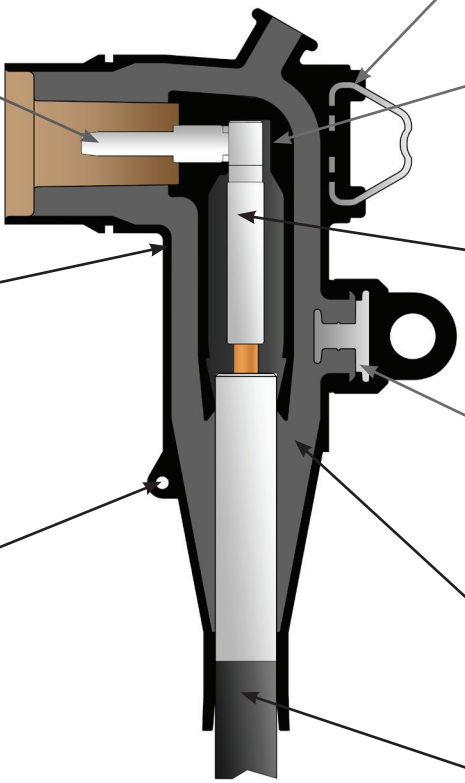
Stainless steel pulling eye for hotstick operations.

PROBE

Tin plated copper probe ensures reliable electrical connection.

INNER ELECTRODE

Controls the electrical stress around connecting components.



COMPRESSION CONNECTOR

Compression connector is sized to ensure a cool running connection with maximum current tranfer.

OUTER SHIELD

Semiconducting outer shield provides ground shield continuity.

VOLTAGE TEST POINT

Capacitive test point with a snap-on shielded cap to detect voltage inside cable for a safe plug-out operation.

DRAIN WIRE TAB

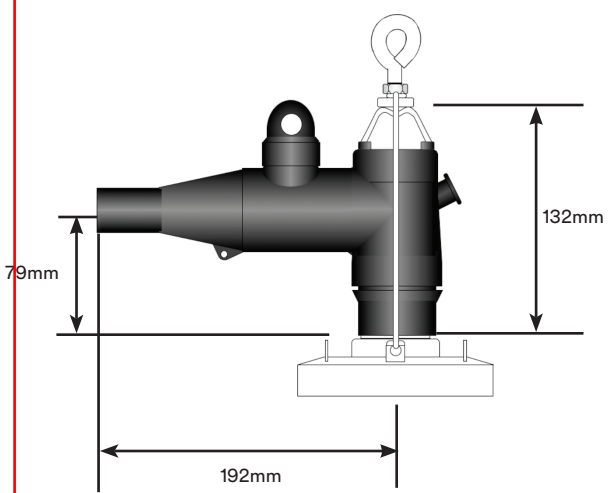
To connect drain wire to ensure grounding of the outer shield.

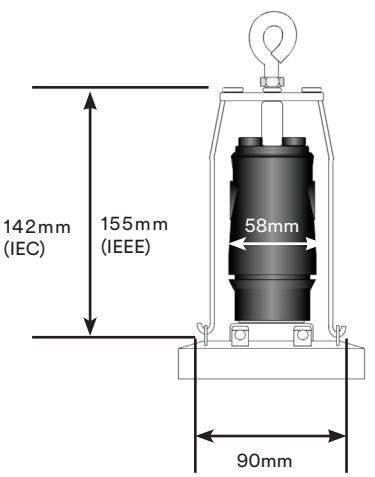
INSULATION LAYER

High quality cured EPDM insulation.

CABLE ENTRANCE

The sized cable entrance provides an interference fit to maintain a watertight seal.





24kV Deadbreak 250A - Straight Connector
93-EE-800I-24-250-STRAIGHT

Application

The 3M Deadbreak Straight Connector is a fully shielded and insulated termination for connecting underground cable to transformers, switch gear and other apparatus equipped with deadbreak bushings, junctions, or other deadbreak connectors.

The 3M Deadbreak Straight meets all the requirements of HD 629-1 & IEC 60502-4, and complies with bushing type A 250A which follows EN-50180 & 50181 inside RMU Switchgear & on Transformer.

3M Deadbreak Straight Connectors are molded using high precision molding technique–cured insulating and semi-conducting EPDM rubber. All insulating rubber is compounded in house, using 3M - developed proprietary formulations. 3M Deadbreak Straight Connector contains a copper or bimetallic probe connector, this ensures a reliable operating connection.

Production Tests

Tests conducted in accordance with HD 629.1

- Minimum Corona Voltage Level – 22 kV < 3 pC
- AC 1 Minute Withstand – 60 kV
- Test Point Voltage Test

Tests conducted in accordance with 3M manufacturing process requirements:

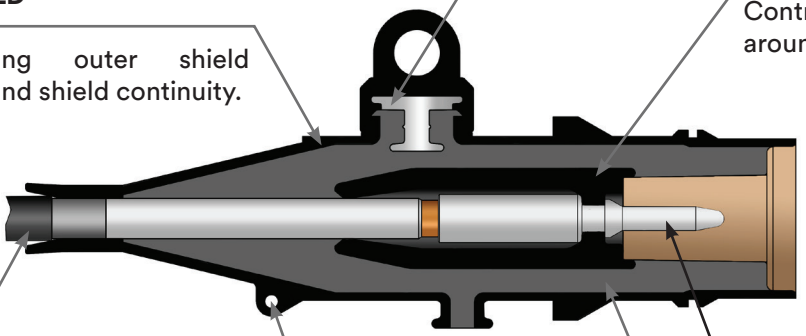
- Physical Inspection
- Periodic Dissection
- Periodic X-Ray analysis

Product Ratings

Maximum Voltage Class (Um)	24 kV
AC 5 Minute Withstand	57 kV
Minimum Corona Voltage Level	22kV < 3pC
Impulse Voltage Withstand	125 kV

Continuous Current	250 A
Overload Current (8 hour maximum)	300 A

Detailed composition of the 3M Deadbreak Straight Connector



VOLTAGE TEST POINT

Capacitive test point with a snap-on shielded cap to detect voltage inside cable for a safe plug-out operation.

INNER ELECTRODE

Controls the electrical stress around connecting connector.

OUTER SHIELD

Semiconducting outer shield provides ground shield continuity.

CABLE ENTRANCE

The sized cable entrance provides an interference fit to maintain a watertight seal.

DRAIN WIRE TAB

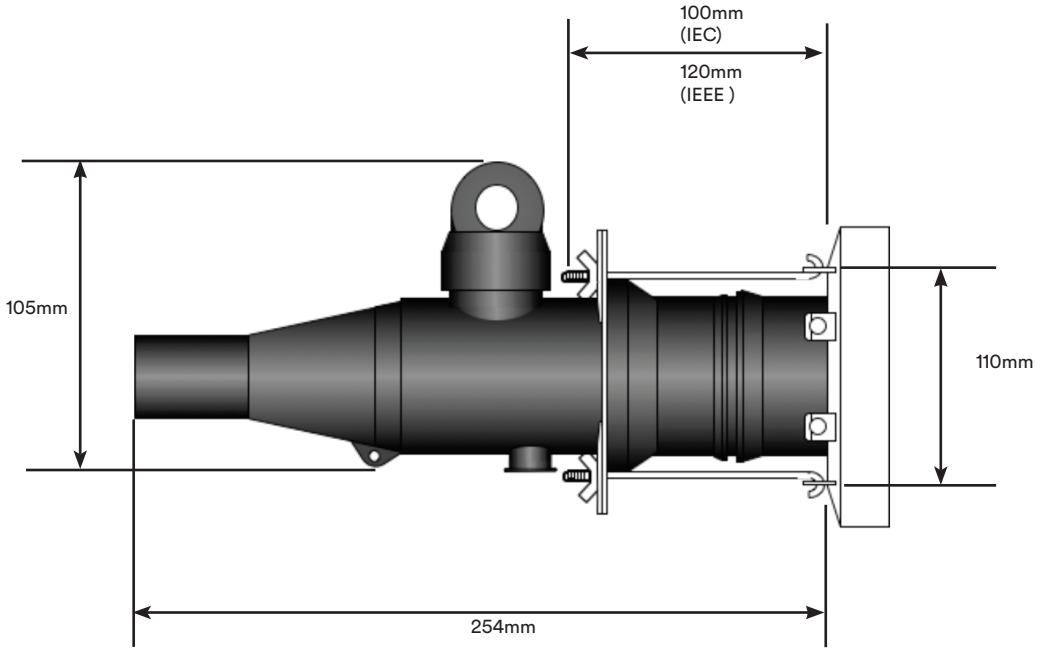
To connect drain wire to ensure grounding of the outer shield.

INSULATION LAYER

High quality cured EPDM insulation.

PROBE CONNECTOR

Tin plated copper connector ensures reliable electrical connection.



Separable Connectors 24 kV, 630A
Front Tplug / Sub (Rear) Tplug Connector
93-EE-900-24-630-TPLUG & SUB TPLUG /
93-EE-900-24-630-LARGE TPLUG & SUB LARGE TPLUG

Application

These 3M Tplug connectors are used to terminate polymeric cable to dead front apparatus such as transformers, switchgear, and other equipment with voltage range from 12kV to 24kV. They can be used for indoor or outdoor applications and for all polymeric cable types (XLPE, EPR, etc.) with copper or aluminum conductors.

These 3M Tplug & Sub Tplug connectors meet all requirements of HD 629.1 & IEC 60502-4, and comply with bushing type C 630A which follows EN-50180 & 50181 inside MV Switchgear, and come with Compression copper lug or Bimetallic Al-Cu lug or Mechanical shearbolt lug.

Key Features

- Provides a fully shielded and submersible connection when mated with the proper bushing or plug.
- Type “C” 630A Interface.
- Mounting can be vertical, horizontal, or any angle in between.
- No minimum phase clearance requirements.
- 100% electrical tested at factory.

Product Ratings

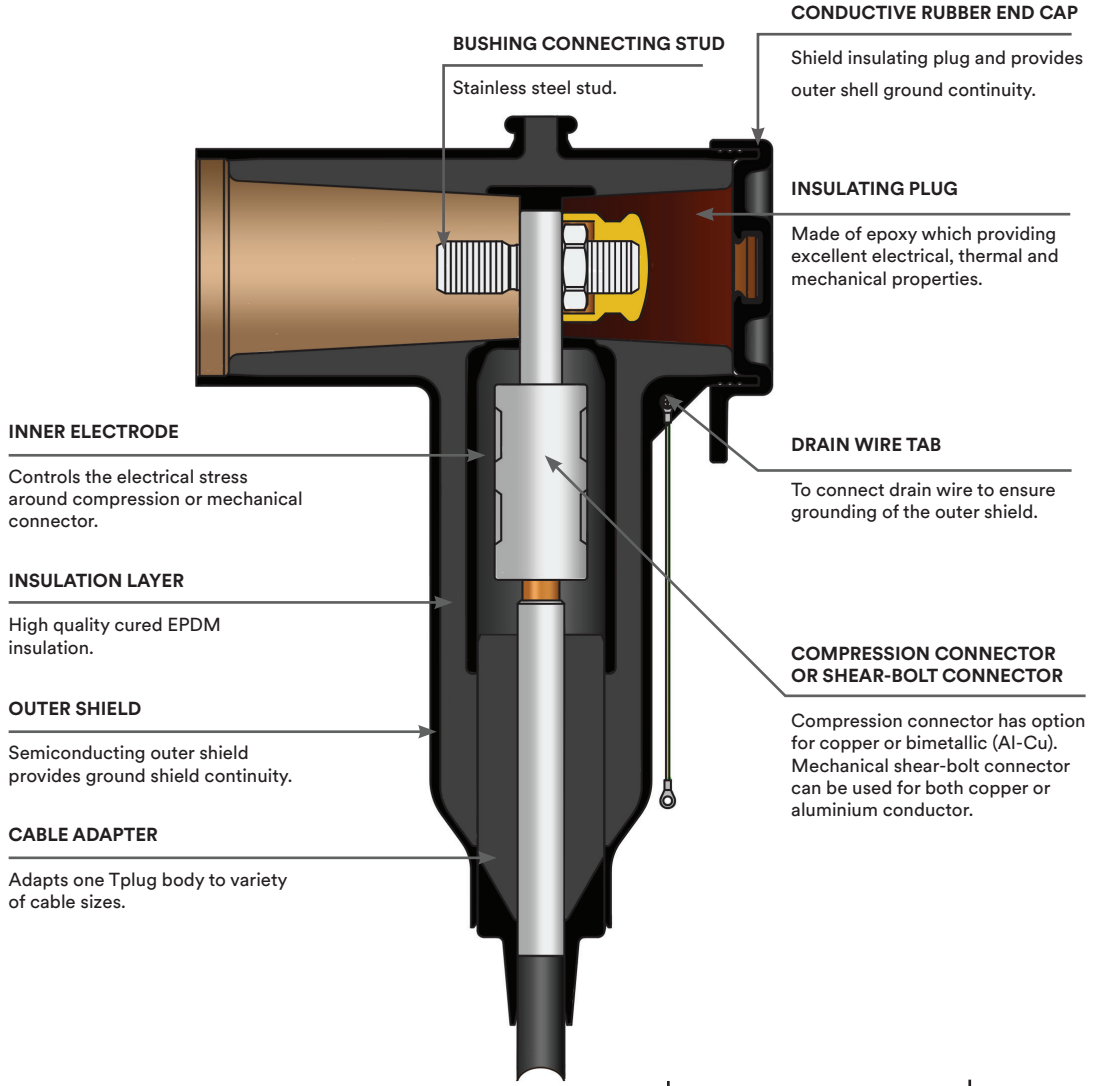
Maximum Voltage Class (Um):	24kV
AC 5 Minute Voltage Withstand:	57kV
AC 1 Minute Voltage Withstand:	65kV
DC 15 Minute Voltage Withstand:	76kV
PD test level:	22kV < 10pC
Impluse voltage test:	150kV
Thermal Short Circuit (Conductor, 2sec.)	23 kA/2s
Dynamic Short Circuit (Conductor, 10 ms.)	82 kA/10ms
Continuous Current	630 A
Overload Current	900 A

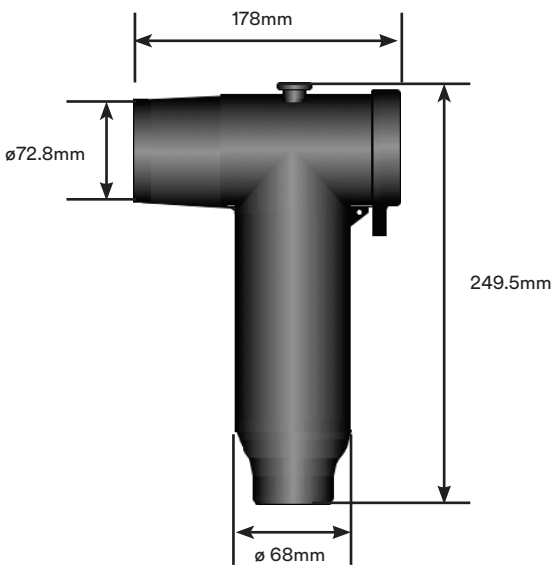
Production Tests

Tests conducted in accordance with IEC 60502-4
- Minimum Corona Voltage Level – 20 kV<3pC
- AC 5 Minute Withstand – 54 kV

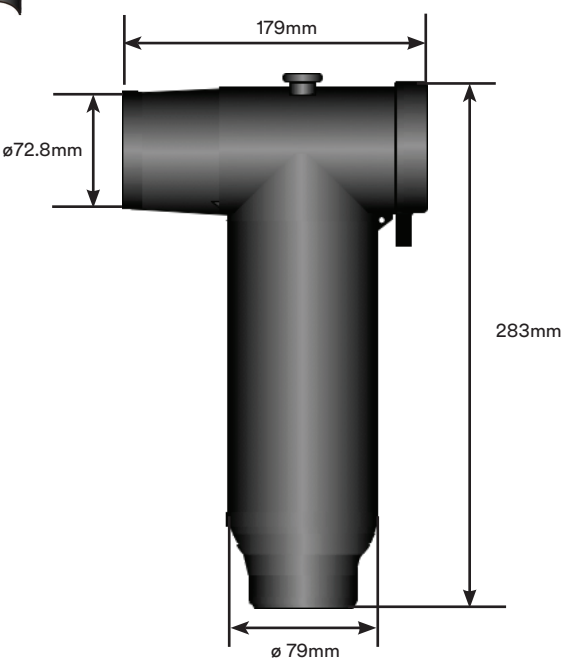
Tests conducted in accordance with 3M manufacturing process requirements:
- Physical Inspection
- Periodic Dissection
- Periodic X-Ray analysis

Detailed composition of 24 kV – 630A Front Tplug Connector





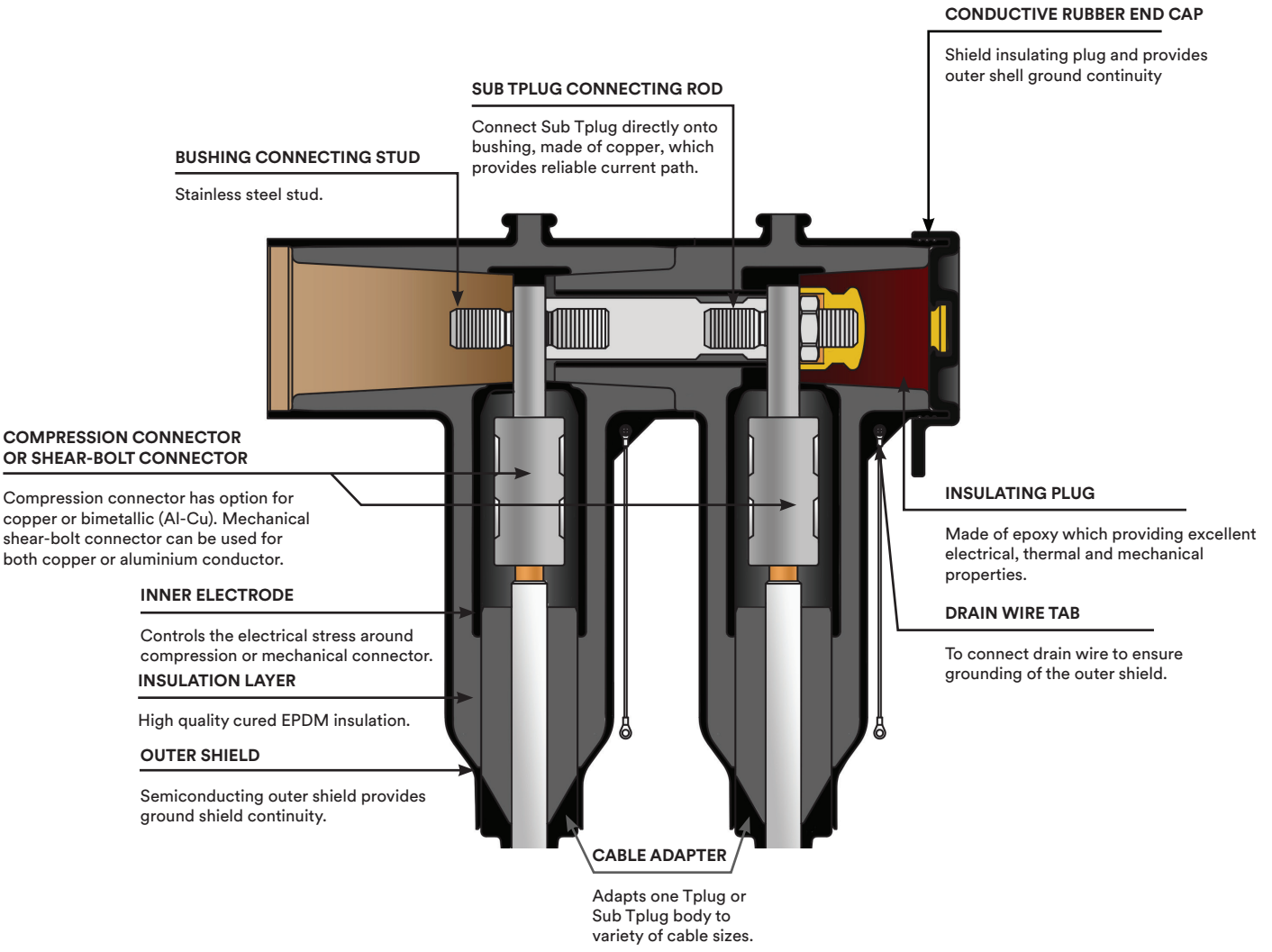
NORMAL TYPE

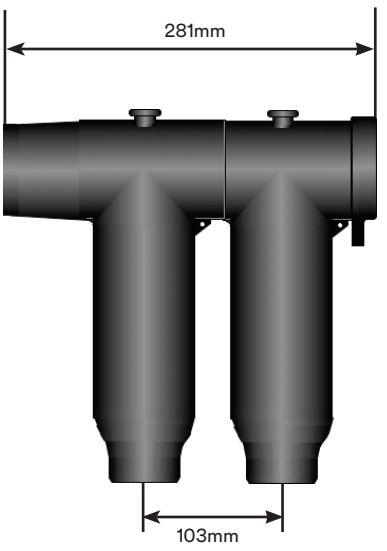


LARGE TYPE

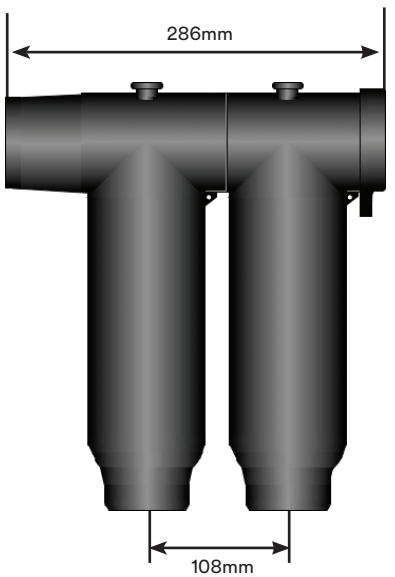
Note: Normal type is for short compression connectors up to 400mm2, and for shear-bolt connector up to 240mm2.
Large type is for normal compression connectors up to 500mm2, and for shear-bolt connector up to 400mm2.

Detailed composition of 24 kV - 630A Sub (Rear) Tplug Connector





NORMAL TYPE



LARGE TYPE

Note: Normal Sub (Rear) Tplug could be installed at the back of Large Front Tplug and vice versa.

Separable Connectors 36kV - 400A
Tplug Connector
94-EE-900-36-400-TPLUG

Application

This 3M Tplug connector is used to terminate polymeric cable to dead front apparatus such as transformers, switchgear, and other equipment. It can be used for 36kV 400A application at MV/LV end user site. This Tplug connector is suitable for indoor or outdoor applications, and is able to be used for all polymeric cable types (XLPE, EPR, etc.) with copper or aluminum conductors. Its design is especially suited for the harsh off-shore or wind farm environment, where long runs and large cable sizes are needed.

This 3M Tplug connector meets all requirements of HD 629.1 & IEC 60502-4, and complies with bushing type B 400A which follows EN-50180 & 50181 inside MV Switchgear or on Transformer, and comes with a probe connector and Compression copper or Bimetallic Al-Cu or Mechanical shearbolt thread hole cable lug.

Key Features

- Provides a fully shielded and submersible connection when mated with the proper bushing or plug.
- Type “B” 400A interface.
- Mounting can be vertical, horizontal, or any angle in between.
- No minimum phase clearance requirements.
- 100% electrical tested in production.

Product Ratings

Maximum Voltage Class (Um):	36kV
AC 5 Minute Voltage Withstand:	90kV
DC 15 Minute Voltage Withstand:	80kV
Minimum Corona Voltage Level:	35kV < 10pC
BIL and Full Wave Crest (Impluse):	170kV
Thermal Short Circuit (Conductor, 2sec.)	23 kA
Dynamic Short Circuit	82 kA
Continuous Current	400 A

Production Tests

Tests conducted in accordance with IEC 60502-4
- Minimum Corona Voltage Level – 30 kV 3pC
- AC 5 Minute Withstand – 81 kV

Tests conducted in accordance with 3M manufacturing process requirements:
- Physical Inspection & Periodic Dissection
- Periodic X-Ray analysis

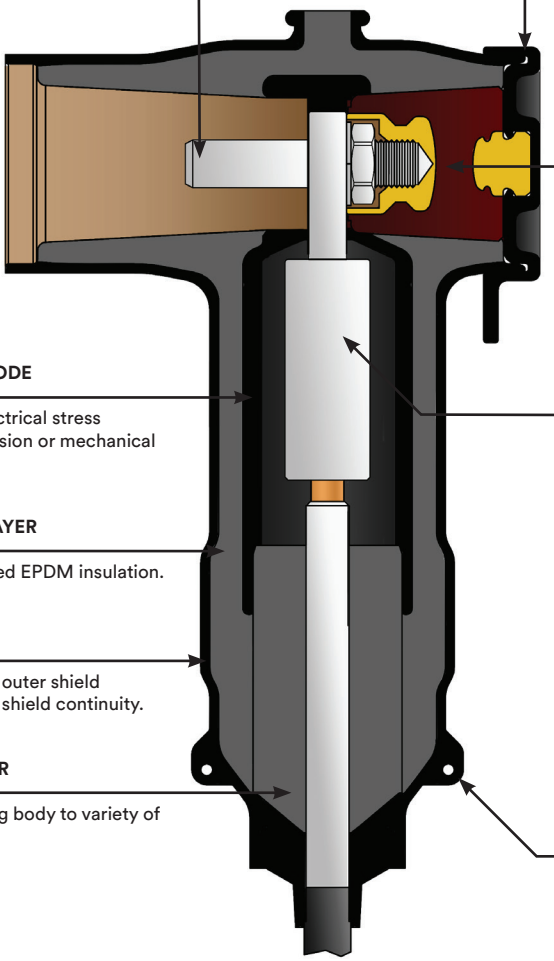
Detailed composition of 36 kV – 400A Tplug Connector

CONDUCTIVE RUBBER END CAP

Shield insulating plug and provides outer shell ground continuity.

PROBE

Tin plated copper probe ensures reliable electrical connection.



INSULATING PLUG

Made of epoxy which providing excellent electrical, thermal and mechanical properties.

INNER ELECTRODE

Controls the electrical stress around compression or mechanical connector.

COMPRESSION CONNECTOR OR SHEAR-BOLT CONNECTOR

Compression connector has option for copper or bimetallic (Al-Cu). Mechanical shear-bolt connector can be used for both copper or aluminium conductor.

INSULATION LAYER

High quality cured EPDM insulation.

OUTER SHIELD

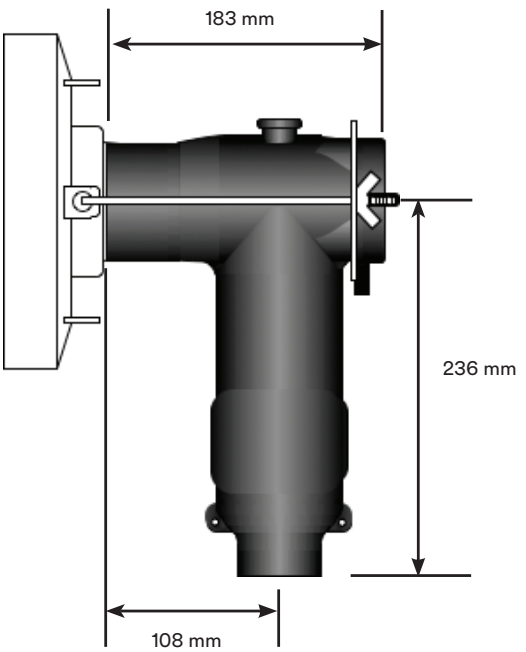
Semiconducting outer shield provides ground shield continuity.

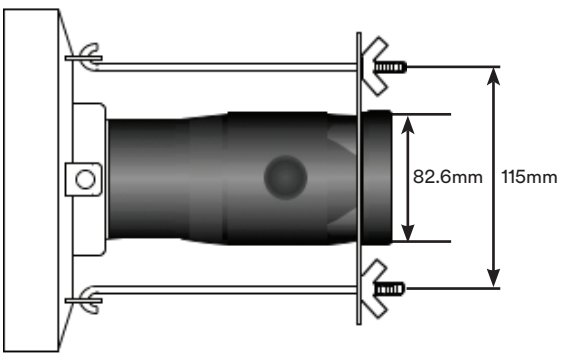
CABLE ADAPTER

Adapts one Tplug body to variety of cable sizes.

DRAIN WIRE TAB

To connect drain wire to ensure grounding of the outer shield.





Separable Connectors 36kV - 630A & 42kV - 630A Front Tplug / Sub (Rear) Tplug Connector
94-EE-900-36-630-TPLUG & SUB TPLUG / 94-EE-900-42-630-TPLUG & SUB TPLUG

Application

These 3M Tplug connectors are used to terminate polymeric cable to dead front apparatus such as transformers, switchgear, and other equipment. They can be used for 36kV application with 36kV-630A Tplug at MV/LV end user site and 40.5kV application with 42kV-630A Tplug. These Tplug & Sub Tplug connectors are suitable for indoor or outdoor applications, and are able to be used for all polymeric cable types (XLPE, EPR, etc.) with copper or aluminum conductors. Their designs are especially suited for the harsh off-shore or wind farm environment, where long runs and large cable sizes are needed.

These 3M Tplug & Sub Tplug connectors meet all requirements of HD 629.1 & IEC 60502-4, and comply with bushing type C 630A which follows EN-50180 & 50181 inside MV Switchgear, and come with Compression copper lug or Bimetallic Al-Cu lug or Mechanical shearbolt lug.

Key Features

- Provides a fully shielded and submersible connection when mated with the proper bushing or plug.
- Type “C” 630A interface.
- Mounting can be vertical, horizontal, or any angle in between.
- No minimum phase clearance requirements.
- 100% electrical tested in production.

Product Ratings

	36kV 630A Tplug	42kV 630A Tplug
Maximum Voltage Class (Um):	36kV	42kV
AC 5 Minute Voltage Withstand:	90kV	99kV
DC 15 Minute Voltage Withstand:	80kV	88kV
Minimum Corona Voltage Level:	35kV < 10pC	38kV < 10pC
BIL and Full Wave Crest (Impluse):	170kV	185kV
Thermal Short Circuit (Conductor, 2sec.)	23 kA	24 kA
Dynamic Short Circuit	82 kA	85 kA
Continuous Current	630 A	630 A

Production Tests

Tests conducted in accordance with IEC 60502-4	**36kV 630A**	**42kV 630A**
• Minimum Corona Voltage Level	30kV ≤ 3pC	45kV ≤ 3pC
• AC 5 Minute Withstand	81kV	117kV

Tests conducted in accordance with 3M manufacturing process requirements:
- Physical Inspection & Periodic Dissection
- Periodic X-Ray analysis

Detailed composition of 36kV / 42kV – 630A Front Tplug Connector

CONDUCTIVE RUBBER END CAP

Shield insulating plug and provides outer shell ground continuity.

BUSHING CONNECTING STUD

Stainless steel stud.

INSULATING PLUG

Made of epoxy which providing excellent electrical, thermal and mechanical properties.

INNER ELECTRODE

Controls the electrical stress around compression or mechanical connector.

INSULATION LAYER

High quality cured EPDM insulation. 42kV version uses higher dielectric EPDM material.

COMPRESSION CONNECTOR OR SHEAR-BOLT CONNECTOR

Compression connector has option for copper or bimetallic (Al-Cu). Mechanical shear-bolt connector can be used for both copper or aluminium conductor.

OUTER SHIELD

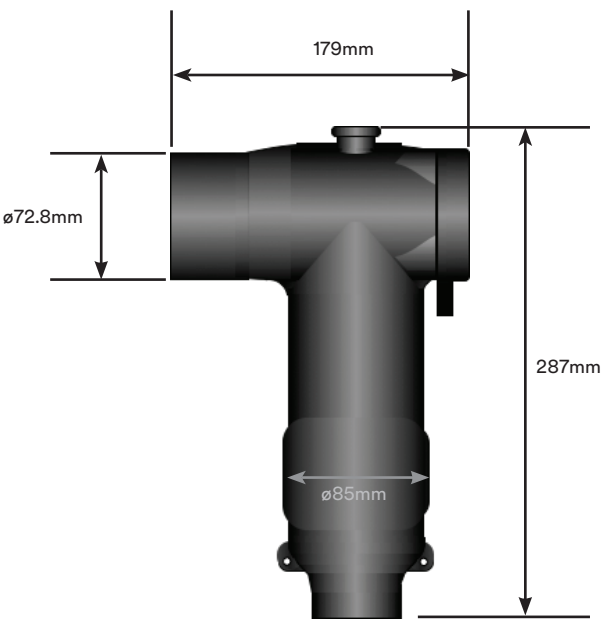
Semiconducting outer shield provides ground shield continuity.

CABLE ADAPTER

Adapts one Tplug body to variety of cable sizes. 36kV and 42kV Tplug use different types of adapter.

DRAIN WIRE TAB

To connect drain wire to ensure grounding of the outer shield.



Note: Even having similar application range and dimension, 42kV 630A Tplug adapter has higher dielectric value than 36kV 630A Tplug adapter. Thus, they are not interchangeable.

Detailed composition of 36kV/42kV - 630A Sub (Rear) Tplug Connector

CONDUCTIVE RUBBER END CAP

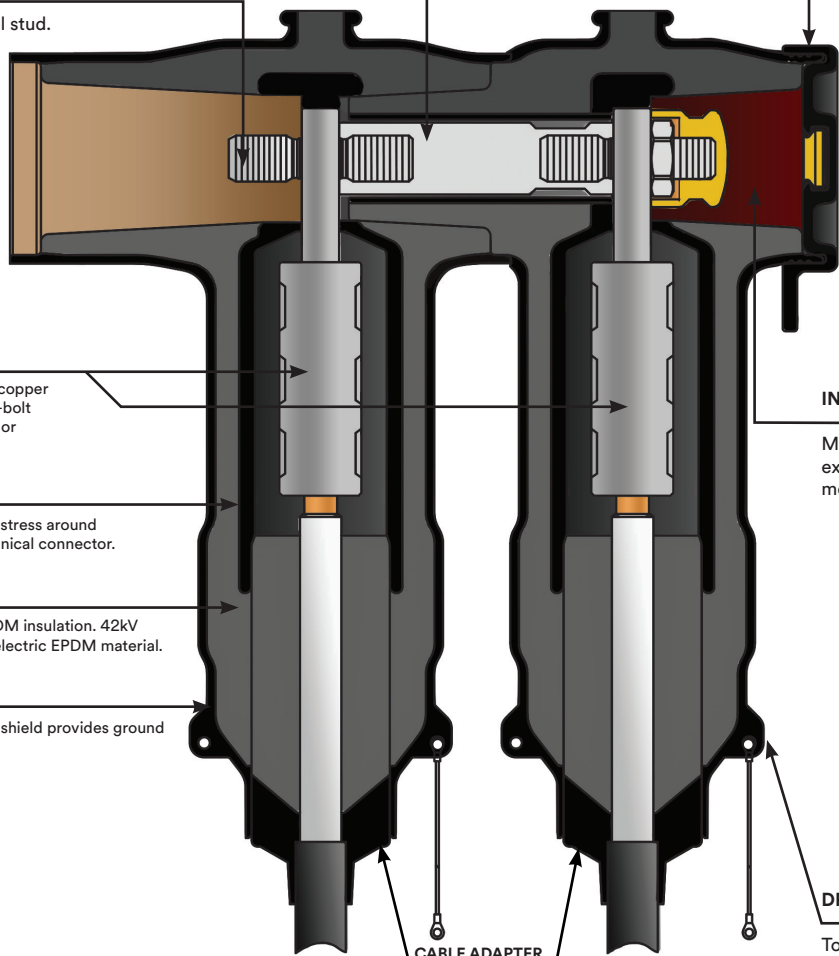
Shield insulating plug and provides outer shell ground continuity.

SUB TPLUG CONNECTING ROD

Connect Sub Tplug directly onto bushing, made of copper, which provides reliable current path.

BUSHING CONNECTING STUD

Stainless steel stud.



COMPRESSION CONNECTOR OR SHEAR-BOLT CONNECTOR

Compression connector has option for copper or bimetallic (Al-Cu). Mechanical shear-bolt connector can be used for both copper or aluminium conductor.

INSULATING PLUG

Made of epoxy which providing excellent electrical, thermal and mechanical properties.

INNER ELECTRODE

Controls the electrical stress around compression or mechanical connector.

INSULATION LAYER

High quality cured EPDM insulation. 42kV version uses higher dielectric EPDM material.

OUTER SHIELD

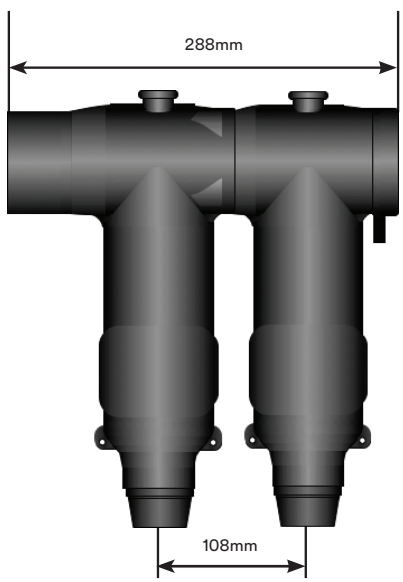
Semiconducting outer shield provides ground shield continuity.

DRAIN WIRE TAB

To connect drain wire to ensure grounding of the outer shield.

CABLE ADAPTER

Adapts one Tplug body to variety of cable sizes. 36kV and 42kV Tplug use different types of adapter.



Separable Connectors 12kV to 42kV - 1250A
Front Tplug / Sub (Rear) Tplug Connector
93-EE-900-24-1250-TPLUG & SUB TPLUG /
94-EE-900-42-1250-TPLUG & SUB TPLUG

Application

These 3M Tplug connectors are used to terminate polymeric cable to dead front apparatus such as transformers, switchgear, and other equipment. They can be used for 1250A applications under wide range of voltage: from 12kV up to 42kV with suitable adapter. These Tplug & Sub Tplug connectors are suitable for indoor or outdoor applications, and are able to be used for all polymeric cable types (XLPE, EPR, etc.) with copper or aluminum conductors. Their designs are especially suited for the harsh off-shore or wind farm environment, where long runs and large cable sizes are needed.

These 3M Tplug & Sub Tplug connectors meet all requirements of HD 629.1 & IEC 60502-4, and comply with bushing type C 1250A which follows EN-50180 & 50181 inside MV Switchgear, and come with Compression copper lug or Bimetallic Al-Cu lug or Mechanical shearbolt lug.

Key Features

- Provides a fully shielded and submersible connection when mated with the proper bushing or plug.
- Type “C” 1250A interface.
- Mounting can be vertical, horizontal, or any angle in between.
- No minimum phase clearance requirements.
- 100% electrical tested in production.

Product Ratings

Maximum Voltage Class (Um):	42kV
AC 5 Minute Voltage Withstand:	117kV
DC 15 Minute Voltage Withstand:	125kV
Minimum Corona Voltage Level:	45kV < 10pC
BIL and Full Wave Crest (Impluse):	200kV
Thermal Short Circuit (Conductor, 2sec.)	45 kA
Dynamic Short Circuit	100 kA
Continuous Current	1250 A

Production Tests

Tests conducted in accordance with IEC 60502-4
- Minimum Corona Voltage Level – 45 kV ≤ 10pC
- AC 5 Minute Withstand –117 kV

Tests conducted in accordance with 3M manufacturing process requirements:
- Physical Inspection Periodic Dissection
- Periodic X-Ray analysis

Detailed composition of 42 kV – 1250A Front Tplug Connector

BUSHING CONNECTING STUD

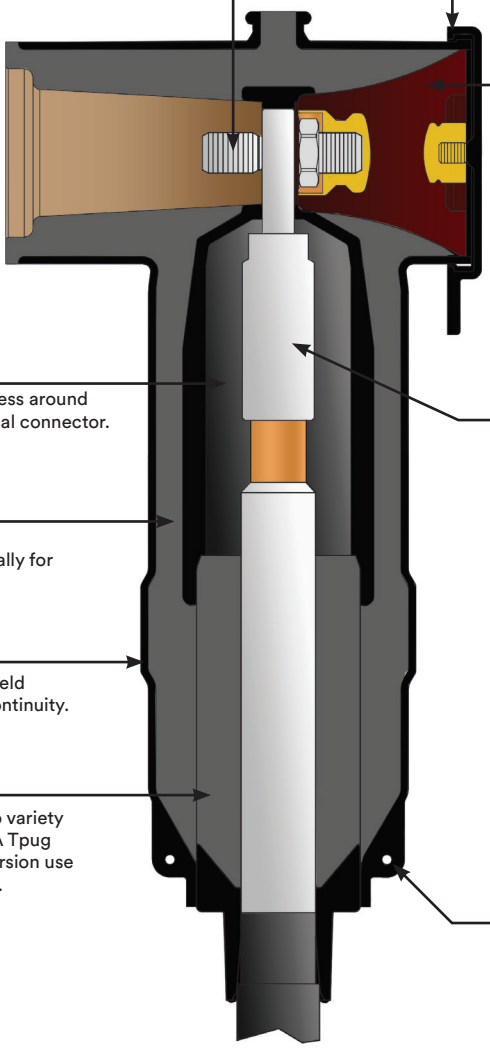
Stainless steel stud.

CONDUCTIVE RUBBER END CAP

Shield insulating plug and provides outer shell ground continuity.

INSULATING PLUG

Made of epoxy which providing excellent electrical, thermal and mechanical properties.



INNER ELECTRODE

Controls the electrical stress around compression or mechanical connector.

COMPRESSION CONNECTOR OR SHEAR-BOLT CONNECTOR

Compression connector has option for copper or bimetallic (Al-Cu). Mechanical shear-bolt connector can be used for both copper or aluminium conductor.

INSULATION LAYER

High quality cured EPDM insulation designed specially for 42kV.

OUTER SHIELD

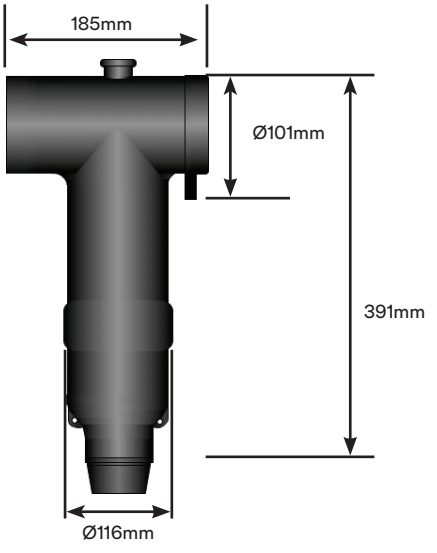
Semiconducting outer shield provides ground shield continuity.

CABLE ADAPTER

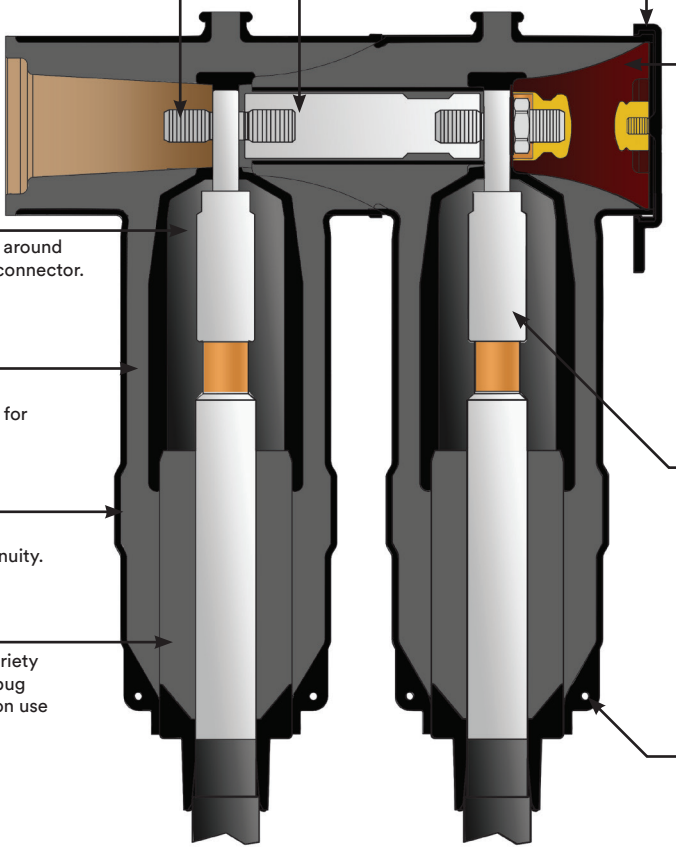
Adapts one Tplug body to variety of cable sizes. 42kV 630A Tpug version & 1250A Tplug version use different types of adapter.

DRAIN WIRE TAB

To connect drain wire to ensure grounding of the outer shield.



Detailed composition of 42 kV – 1250A Sub (Rear) Tplug Connector



BUSHING CONNECTING STUD

Stainless steel stud.

SUB TPLUG CONNECTING ROD

Connect Sub Tplug directly onto bushing, made of copper, which provides reliable current path.

CONDUCTIVE RUBBER END CAP

Shield insulating plug and provides outer shell ground continuity.

INSULATING PLUG

Made of epoxy which providing excellent electrical, thermal and mechanical properties.

INNER ELECTRODE

Controls the electrical stress around compression or mechanical connector.

INSULATION LAYER

High quality cured EPDM insulation designed specially for 42kV.

OUTER SHIELD

Semiconducting outer shield provides ground shield continuity.

CABLE ADAPTER

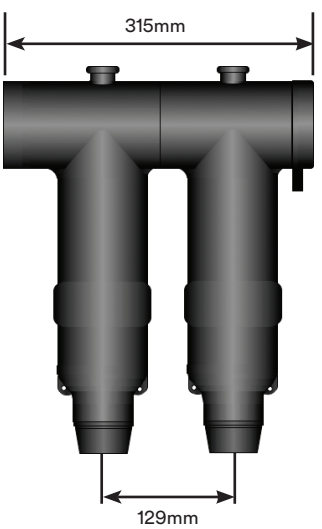
Adapts one Tplug body to variety of cable sizes. 42kV 630A Tpug version & 1250A Tplug version use different types of adapter.

COMPRESSION CONNECTOR OR SHEAR-BOLT CONNECTOR

Compression connector has option for copper or bimetallic (Al-Cu). Mechanical shear-bolt connector can be used for both copper or aluminium conductor.

DRAIN WIRE TAB

To connect drain wire to ensure grounding of the outer shield.



Note: 630A Rear Tplug body could not be installed with 1250A Tplug body and vice versa.

Separable Connector 26kV/72kV, 34kV/95kV and 51kV/134kV Surge Arrester 93-EE-900-SURGE ARRESTER / 94-EE-900-SURGE ARRESTER

Application

The 3M Separable Connector Surge Arrester is an arrester combined within a Sub (Rear) Tplug interface. It is designed to protect apparatus, including transformers, switchgear, and other equipment from high voltage surges due to lightning or switching.

Key Features

- Provides fully shielded deadfront arrester protection.
- Metal (zinc) Oxide Varistor (MOV) gapless design.
- EPDM insulation rubber molded around MOV module.
- Mounting can be vertical, horizontal, or any angle in between.
- No minimum phase clearance requirements.
- 100% electrical tested at factory.

Product Ratings

Rated Voltage Class (Um):	26kV	34kV	51kV
Nominal Discharge Current of Arrester:	10kA	10kA	10kA
Residual Voltage of Nominal Discharge Current:	≤ 72 kV	≤ 95 kV	≤ 134kV
Maximum Continuous Operating Voltage:	20.8kV	27.2kV	40.8kV
Voltage of DC 1mA Current:	≥ 37 kV	≥ 48 kV	≥ 73kV

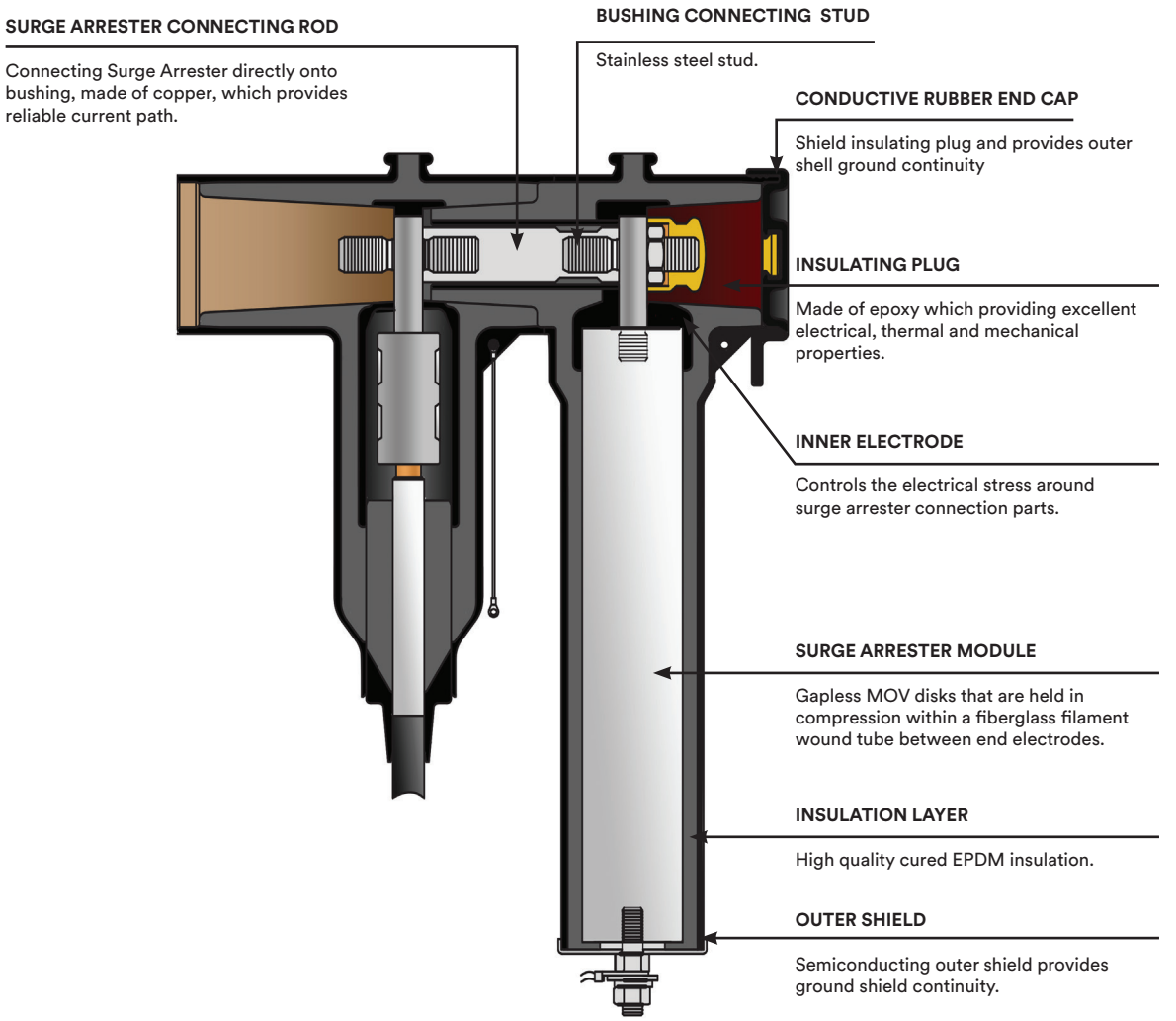
Production Tests

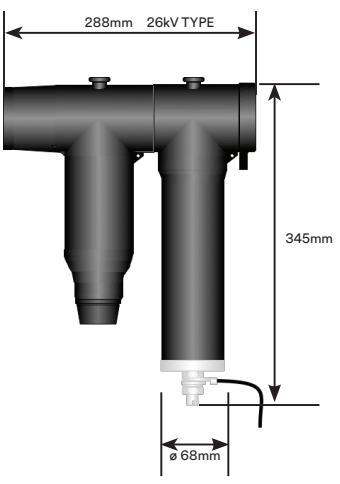
Tests conducted in accordance with IEC 60099-4	**26kV**	**34kV**	**51kV**
• Minimum Corona Voltage Level	29kV < 3pC	29kV < 3pC	43kV < 3pC
• Voltage of DC 1mA Current	≥ 37kV	≥ 48kV	≥ 73kV

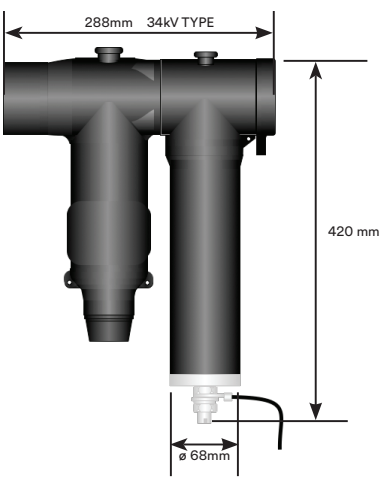
Tests conducted in accordance with 3M manufacturing process requirements:

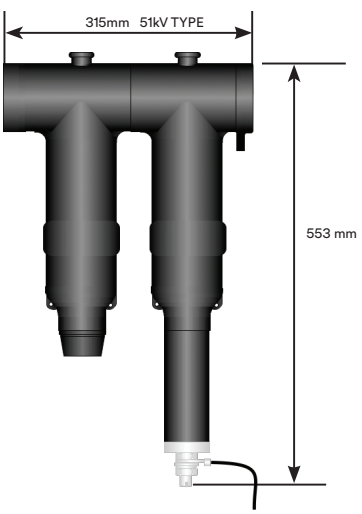
- Physical Inspection
- Periodic Dissection
- Periodic X-Ray analysis

Detailed composition of the 3M Separable Connector Surge Arrester



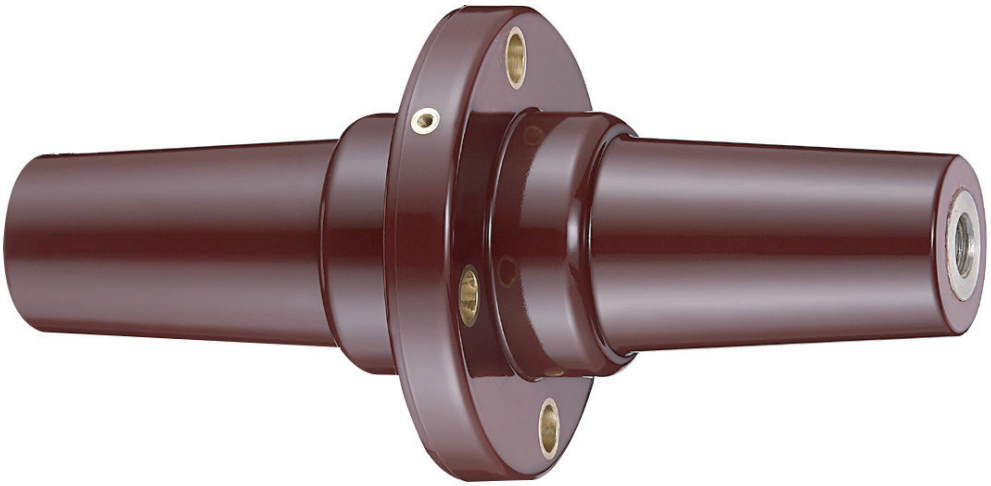






Note: 26kV Surge Arrester module could only be installed with 24kV 630A Tplug
34kV Surge Arrester module could only be installed with 36kV 630A Tplug
51kV Surge Arrester module could only be installed with 42kV 1250A Tplug

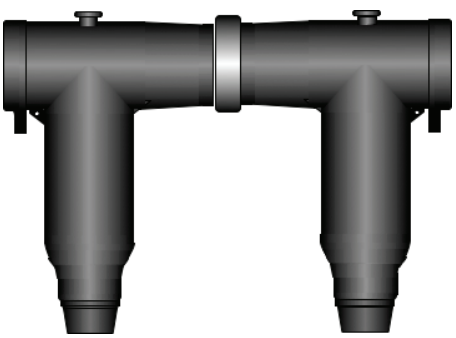
3M Double sides Bushing C
For Tplug Splice & Branch Splice



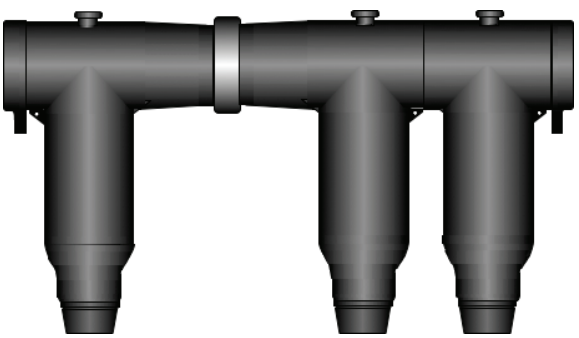
Application

The 3M Bushing is molded from high quality insulating epoxy material. It meets all the requirements of the DIN47636 standard. The interface is Type C, per the specifications of standard EN50181.

The 3M Bushing can be installed in switchgear, or other equipment, and used in conjunction with Tplug connectors and arresters to make Tplug Splice and Branch Splice. The connection is fully shield and insulated, designed to be fully functional in submersible applications.

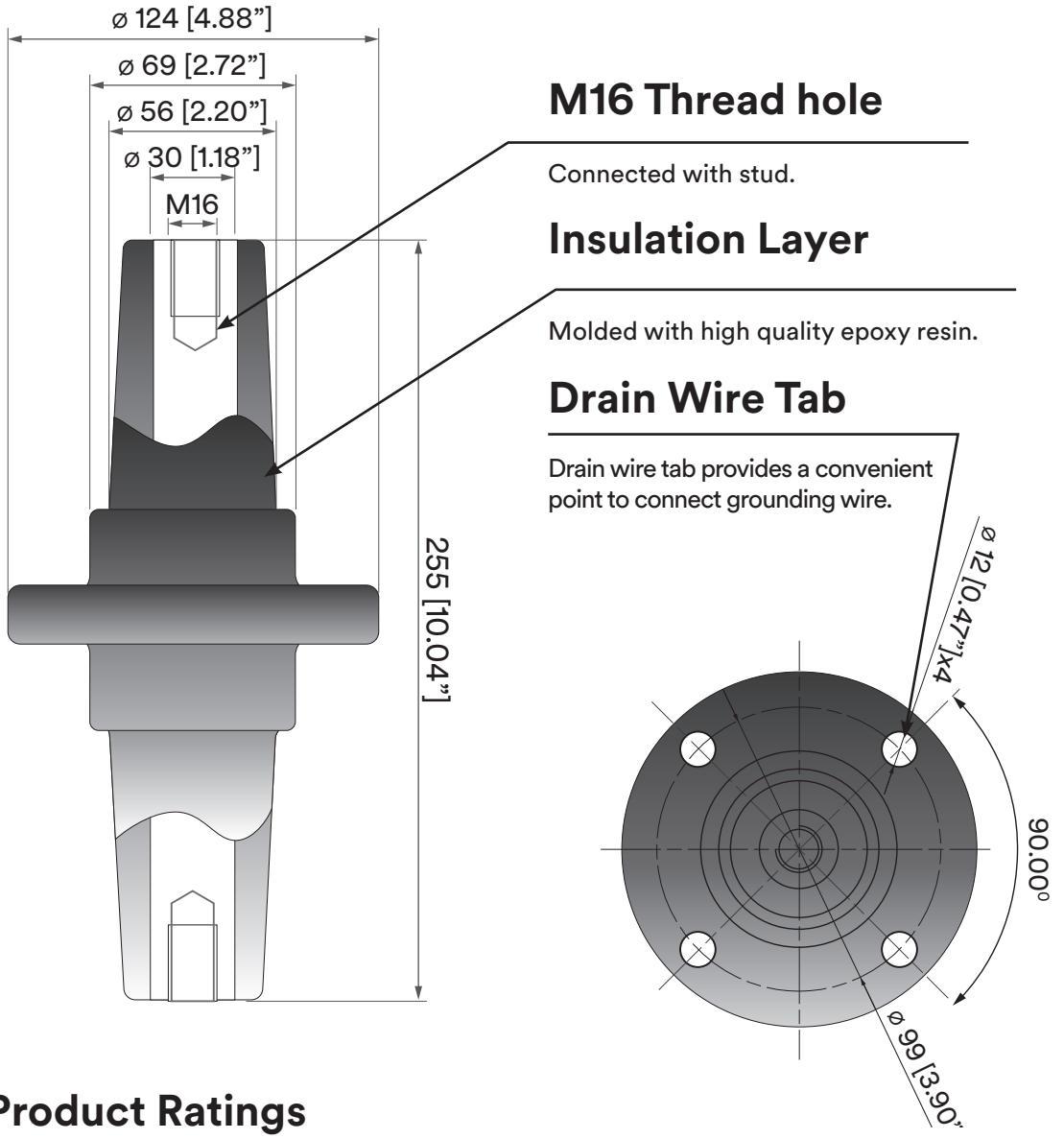


TPLUG SPLICE



BRANCH SPLICE

Detailed composition of Double sides Bushing C



Product Ratings

3M Double sides bushing C follows IEC 60502-4 Connection Interface C follows EN50180 & 50181			
Electrical Ratings	24kV Type C 630A	36kV Type C 630A	42kV Type C 1250A
Maximum System Voltage (Um) AC Withstand (5 min) Partial Discharge Impulse Current rating	24 kV 57 kV 20kV ≤ 10pC 125 kV 630A	36 kV 81 kV 30kV ≤ 10pC 170 kV 630A	42 kV 117 kV 45kV ≤ 10pC 200 kV 1250A
Order code	24-DSBC-630	36-DSBC-630	42-DSBC-1250

Kit Content and Packaging Information

The 3M kits consist – for 12kV up to 42kV, applications – all specific parts such as connector, pin and screws to install one complete phase of Dead Break Separable Connector.
Note: For 1C armor cable having copper tape shield, jointer needs to supply additional Constant Force Spring to connect tinned copper braid to cable armor.

250 A Elbow Series	250 A Straight Series	400A & 630 A & 1250A Tee Series
1 x Elbow Connector c/w grounding wire 1 x Copper or Bi-metallic cable lug 1 x Pin Contact + Hex Key 1 x Bail Assembly 1 x Test Point Cap 1 x Silicone Lubricant	1 x Straight Connector c/w grounding wire 1 x Copper or Bi-metallic cable lug 1 x Bail Assembly 1 x Test Point Cap 1 x Silicone Lubricant	1 x Tee Plug Connector c/w grounding wire 1 x Cable Adapter 1 x Copper or Bi-metallic compression lug or Shear-bolt connector 1 x Thread Stud for 630A & 1250A or PIN contact for 400A 1 x Washer + Hex Nut 1 x Mechanical Wrench + handle 1 x Bail Assembly for 400A 1 x Insulating Plug + Covering Cap 1 x Silicone Lubricant
2 x Mastic Strips 1 x PVC Temflex Tape 1 x Tinned Copper Braid 1 x Constant Force Spring 1 x Rubber Tape Strip 1 x Cable Cleaning kit Drawing Instructions	2 x Mastic Strips 1 x PVC Temflex Tape 1 x Tinned Copper Braid 1 x Constant Force Spring 1 x Rubber Tape Strip 1 x Cable Cleaning kit Drawing Instructions	2 x Mastic Strips 1 x PVC Temflex Tape 1 x Tinned Copper Braid 1 x Constant Force Spring 1 x Rubber Tape Strip 1 x Cable Cleaning kit Drawing Instructions

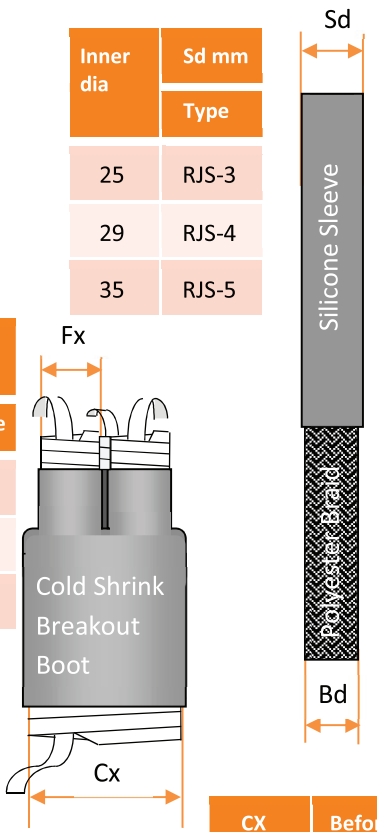
For 3 core cable, we have Cold Shrink & also Heat Shrink option for cable breakout:

Cold Shrink Breakout Boot	Heat Shrink Breakout Boot
1 x Cold Shrink Breakout Boot	1 x Heat Shrink Breakout Boot
1 x Silicone Sleeve 1500mm	3 x Heat Shrink tubes 500mm
1 x Polyester Braid 1800mm	
1 x Constant Force Spring	1 x Constant Force Spring
1 x Comfort Grip Gloves	1 x Comfort Grip Gloves
1 x colour coding PVC tape RYB set	1 x colour coding PVC tape RYB set
Drawing Instruction	Drawing Instruction

Technical parameters of breakout boot parts

COLD SHRINK TYPE

Inner dia	Sd mm Type
25	RJS-3
29	RJS-4
35	RJS-5



Shrink max	Before pulling inner core	FX mm Type
15.5	36	8563
18	50	8564
18	56	8565

Bd mm Type	Inner dia
BRAID 0.75	19
BRAID 1.25	32

CX mm Type	Before pulling inner core	Shrink max
8563	85	35.6
8564	118	45.7
8565	128	45.7

HEAT SHRINK TYPE

Hd mm Type	Expand-ed	Shrink max
MDT-V	40	12
MDT-V	60	20

HFd mm Type	Expand-ed	Shrink max
BB-375	40	16
BB-385	55	20

HCd mm Type	Expand-ed	Shrink max
BB-375	110	33
BB-385	125	47

Detailed cable application range for breakout boot parts

Cable phase core diameter	Cable 12.7/22/24kV	DSTA Outer cable sheath
21.9mm	24kV 3Cx35mm2	52mm
23.0mm	24kV 3Cx50mm2	55mm
24.8mm	24kV 3Cx70mm2	59mm
26.4mm	24kV 3Cx95mm2	63mm
27.8mm	24kV 3Cx120mm2	66mm
29.2mm	24kV 3Cx150mm2	70mm
30.8mm	24kV 3Cx185mm2	74mm
33.1mm	24kV 3Cx240mm2	81mm
35.4mm	24kV 3Cx300mm2	86mm
38.2mm	24kV 3Cx400mm2	93mm

8563 (36-15.5)
RJS-3+B0.75 (25-19)
8564 (50-18)
RJS-4+B1.25 (29-32)
8565 (56-18)
RJS-5+B1.25 (35-32)
BB-375 (40-16)
MDT-V (40-12)
MDT-V (60-20)
BB-385 (55-20)
8563 (85-35.6)
8564 (118-45.7)
8565 (128-45.7)
BB-375 (110-33)
BB-385 (125-47)

Cable phase core diameter	Cable 20/35/40.5kV	DSTA Outer cable sheath
29.6mm	40.5kV 3Cx50mm2	71mm
31.4mm	40.5kV 3Cx70mm2	75mm
33.0mm	40.5kV 3Cx95mm2	80mm
34.4mm	40.5kV 3Cx120mm2	84mm
35.8mm	40.5kV 3Cx150mm2	87mm
37.4mm	40.5kV 3Cx185mm2	91mm
39.7mm	40.5kV 3Cx240mm2	96mm
42.0mm	40.5kV 3Cx300mm2	102mm
44.8mm	40.5kV 3Cx400mm2	106mm

8564 (50-18)
RJS-4+B1.25 (29-32)
8565 (56-18)
RJS-5+B1.25 (35-32)
BB-385 (55-20)
MDT-V (60-20)
8564 (118-45.7)
8565 (128-45.7)
BB-385 (125-47)

Product Stocknumbers and Application Range

Note: These are some common SKUs. For others range and voltage, please contact with 3M.

24 kV Voltage Class

250A – 24KV Elbow configuration for Cu conductor with Copper Compression Lug:

Order code	Kit Reference	Cross Section (mm²)	Diameter over Primary Insulation (mm)
XA010915594	93-EE-800L-24-250-ELBOW-3×1Cx25	25	12.9 – 17.4
XA010914092	93-EE-800L-24-250-ELBOW-3×1Cx50	50	16.3 – 20.5
XA010914456	93-EE-800L-24-250-ELBOW-3×1Cx70	70	19.5 – 24.0
XA010914084	93-EE-800L-24-250-ELBOW-3×1Cx95	95	19.5 – 24.0
XA010914464	93-EE-800L-24-250-ELBOW-3×1Cx120	120	19.5 – 24.0

250A – 24KV Elbow configuration for Al conductor with Bimetallic Compression Lug:

Order code	Kit Reference	Cross Section (mm²)	Diameter over Primary Insulation (mm)
XA010914449	93-EE-800L-24-250-ELBOW-3×1Cx50 bi	50	16.3 – 20.5
XA010914472	93-EE-800L-24-250-ELBOW-3×1Cx70 bi	70	19.5 – 24.0
XA010914266	93-EE-800L-24-250-ELBOW-3×1Cx95 bi	95	19.5 – 24.0
XA010914274	93-EE-800L-24-250-ELBOW-3×1Cx120 bi	120	19.5 – 24.0

250A – 24KV Straight configuration for Cu conductor with Copper Compression Lug:

Order code	Kit Reference	Cross Section (mm²)	Diameter over Primary Insulation (mm)
XA010914480	93-EE-800I-24-250-STRAIGHT-3×1Cx50	50	16.3 – 20.5
XA010914498	93-EE-800I-24-250-STRAIGHT-3×1Cx70	70	19.5 – 24.0
XA010914506		95	19.5 – 24.0
XA010914514	93-EE-800I-24-250-STRAIGHT-3×1Cx120	120	19.5 – 24.0

250A – 24KV Straight configuration for Al conductor with Bimetallic Compression Lug:

Order code	Kit Reference	Cross Section (mm²)	Diameter over Primary Insulation (mm)
XA010914522	93-EE-800I-24-250-STRAIGHT-3×1Cx50 bi	50	16.3 – 20.5
XA010914530	93-EE-800I-24-250-STRAIGHT-3×1Cx70 bi	70	19.5 – 24.0
XA010914548	93-EE-800I-24-250-STRAIGHT-3×1Cx95 bi	95	19.5 – 24.0
XA010914548	93-EE-800I-24-250-STRAIGHT-3×1Cx120 bi	120	19.5 – 24.0

630A – 24KV Tee Plug configuration for Cu conductor with Copper Compression Lug:

Order code	Kit Reference	Cross Section (mm²)	Diameter over Primary Insulation (mm)
XA010913805	93-EE-900-24-630-TPLUG-3×1Cx50	50	18.0 – 23.0
XA010913847	93-EE-900-24-630-TPLUG-3×1Cx70	70	18.0 – 23.0
XA010913813	93-EE-900-24-630-TPLUG-3×1Cx95	95	18.0 – 23.0
XA010913854	93-EE-900-24-630-TPLUG-3×1Cx120	120	22.0 – 27.0
XA010913821	93-EE-900-24-630-TPLUG-3×1Cx150	150	22.0 – 27.0
XA010913862	93-EE-900-24-630-TPLUG-3×1Cx185	185	22.0 – 27.0
XA010913839	93-EE-900-24-630-TPLUG-3×1Cx240	240	26.0 – 32.0
XA010913870	93-EE-900-24-630 -TPLUG-3×1Cx300	300	26.0 – 32.0
XA010916170	93-EE-900-24-630-TPLUG-3×1Cx400S	400	31.0 – 37.0
XA010916162	93-EE-900-24-630-LARGE TPLUG-3×1Cx500	500	36.0 - 39.0

630A - 24kV Sub (Rear) Tplug configuration for Cu conductor with Copper Compression Lug:

Order code	Kit Reference	Cross Section (mm²)	Diameter over Primary Insulation (mm)
XA010913920	93-EE-900-24-630-SUB TPLUG-3×1Cx50	50	18.0 – 23.0
XA010913953	93-EE-900-24-630-SUB TPLUG-3×1Cx70	70	18.0 – 23.0
TBA	93-EE-900-24-630-SUB TPLUG-3×1Cx95	95	18.0 – 23.0
...	...	...	...
XA010913979	93-EE-900-24-630-SUB TPLUG-3×1Cx240	240	26.0 – 32.0
XA010913987	93-EE-900-24-630-SUB TPLUG-3×1Cx300	300	26.0 – 32.0
TBA	93-EE-900-24-630-SUB TPLUG-3×1Cx400S	400	31.0 – 37.0
TBA	93-EE-900-24-630-LARGE SUB TPLUG-3 x1Cx500	300	36.0 – 39.0

630A - 24kV Tee Plug configuration for Al conductor with Bimetallic Compression Lug:

Order code	Kit Reference	Cross Section (mm²)	Diameter over Primary Insulation (mm)
TBA	93-EE-900-24-630-TPLUG-3×1Cx50 bi	50	18.0 – 23.0
TBA	93-EE-900-24-630-TPLUG-3×1Cx70 bi	70	18.0 – 23.0
TBA	93-EE-900-24-630-TPLUG-3×1Cx95 bi	95	22.0 – 27.0
TBA	93-EE-900-24-630-TPLUG-3×1Cx120 bi	120	22.0 – 27.0
TBA	93-EE-900-24-630-TPLUG-3×1Cx150 bi	150	26.0 – 32.0
TBA	93-EE-900-24-630-TPLUG-3×1Cx185 bi	185	31.0 - 34.0
XA010913193	93-EE-900-24-630-TPLUG-3×1Cx240 bi	240	33.0 – 37.0
TBA	93-EE-900-24-630-TPLUG-3×1Cx300 bi	300	34.4 – 38.6
TBA	93-EE-900-24-630-TPLUG-3×1Cx400 bi	400	40.0 – 42.8

630A - 24kV Sub (Rear) Tee Plug configuration for Al conductor with Bimetallic Compression Lug:

Order code	Kit Reference	Cross Section (mm²)	Diameter over Primary Insulation (mm)
TBA	93-EE-900-24-630-SUB TPLUG-3×1Cx50 bi	50	18.0 – 23.0
TBA	93-EE-900-24-630- SUB TPLUG-3×1Cx70 bi	70	18.0 – 23.0
TBA	93-EE-900-24-630- SUB TPLUG-3×1Cx95 bi	95	22.0 – 27.0
TBA	93-EE-900-24-630- SUB TPLUG-3×1Cx120 bi	120	22.0 – 27.0
TBA	93-EE-900-24-630- SUB TPLUG-3×1Cx150 bi	150	26.0 – 32.0
TBA	93-EE-900-24-630- SUB TPLUG-3×1Cx185 bi	185	31.0 - 34.0
TBA	93-EE-900-24-630- SUB TPLUG-3×1Cx240 bi	240	33.0 – 37.0
TBA	93-EE-900-24-630- SUB TPLUG-3×1Cx300 bi	300	34.4 – 38.6
TBA	93-EE-900-24-630- SUB TPLUG-3×1Cx400 bi	400	40.0 – 42.8

630A /1250A – 24KV Tee Plug configuration for both Al and Cu conductor with Mechanical Shearbolt Lug:

Order code	Kit Reference	Cross Section (mm²)	No. of Bolts	Diameter over Primary Insulation (mm)
TBA	93-EE-900-24-630-TPLUG-3×1Cx25..35 Cu-Al	25-35	1	15.5 – 19.0
XA010914357	93-EE-900-24-630-TPLUG-3×1Cx50 Cu-Al	50	1	18.0 – 23.0
XA010914365	93-EE-900-24-630-TPLUG-3×1Cx70..95 Cu-Al	70-95	1	18.0 – 23.0
XA010914373	93-EE-900-24-630-TPLUG-3×1Cx95..120 Cu-Al	95-120	2	22.0 – 27.0
XA010914381	93-EE-900-24-630-TPLUG-3×1Cx150..185 Cu-Al	150-185	2	22.0 – 27.0
XA010914399	93-EE-900-24-630-TPLUG-3×1Cx240 Cu-Al	240	2	26.0 – 32.0
XA010914118	93-EE-900-24-630- LARGE TPLUG-3×1Cx300 Cu-Al	300	3	31.0 - 34.0
XA010914126	93-EE-900-24-630- LARGE TPLUG-3×1Cx400 Cu-Al	400	3	33.0 – 37.0
XA010914407	93-EE-900-24-1250-TPLUG-3×1Cx500 Cu-Al	500	3	34.4 – 38.6
XA010914415	93-EE-900-24-1250-TPLUG-3×1Cx630 Cu-Al	630	3	40.0 – 42.8

630A – 24KV Sub (Rear) Tee Plug configuration for both Al and Cu conductor with Mechanical Shearbolt Lug:

Order code	Kit Reference	Cross Section (mm²)	No. of Bolts	Diameter over Primary Insulation (mm)
XA010914423	93-EE-900-24-630-SUB TPLUG-3×1Cx50 Cu-Al	50	1	18.0 – 23.0
XA010914019	93-EE-900-24-630-SUB TPLUG-3×1Cx70..95 Cu-Al	70-95	1	18.0 – 23.0
XA010914134	93-EE-900-24-630-SUB TPLUG-3×1Cx95..120 Cu-Al	95-120	2	22.0 – 27.0
XA010914431	93-EE-900-24-630-SUB TPLUG-3×1Cx150..185 Cu-Al	150-185	2	22.0 – 27.0
XA010914142	93-EE-900-24-630-SUB TPLUG-3×1Cx240 Cu-Al	240	2	26.0 – 32.0
XA010914159	93-EE-900-24-630-SUB LARGE TPLUG-3×1Cx300 Cu-Al	300	2	31.0 - 34.0

1250A - 24kV Tee Plug and Sub (Rear) Tee Plug configuration for Al conductor with Compression Bimetallic Lug or Cu conductor with Compression Copper Lug would be available upon request.
Note: Other types and sizes at 24kV would be avaiable upon request.

36 kV Voltage Class

630A – 36KV Tee Plug configuration for both Al and Cu conductor with Mechanical Shearbolt Lug:

Order code	Kit Reference	Cross Section (mm²)	No. of Bolts	Diameter over Primary Insulation (mm)
XA010914027	94-EE-900-36-630-TPLUG-3×1Cx50 Cu-Al	50	1	24.0 - 27.0
XA010914167	94-EE-900-36-630-TPLUG-3×1Cx70 Cu-Al	70	1	26.0 - 29.0
XA010914035	94-EE-900-36-630-TPLUG-3×1Cx95 Cu-Al	95	2	26.0 – 29.0
XA010914043	94-EE-900-36-630-TPLUG-3×1Cx120 Cu-Al	120	2	28.0 – 32.0
XA010914050	94-EE-900-36-630-TPLUG-3×1Cx150 Cu-Al	150	2	28.0 – 32.0
XA010914068	94-EE-900-36-630-TPLUG-3×1Cx185 Cu-Al	185	2	31.0 – 34.0
XA010914076	94-EE-900-36-630-TPLUG-3×1Cx240 Cu-Al	240	2	33.0 – 37.0
XA010914175	94-EE-900-36-630-TPLUG-3×1Cx300 Cu-Al	300	3	36.0 – 39.0
XA010914183	94-EE-900-36-630-TPLUG-3×1Cx400 Cu-Al	400	3	38.0 – 42.0

630A - 36kV Tee Plug configuration for Cu conductor with Compression Copper Lug:

Order code	Kit Reference	Cross Section (mm²)	Diameter over Primary Insulation (mm)
XA010916261	94-EE-900-36-630-TPLUG-3×1Cx50	50	24.0 - 27.0
XA010916279	94-EE-900-36-630-TPLUG-3×1Cx70	70	26.0 - 29.0
XA010916287	94-EE-900-36-630-TPLUG-3×1Cx95	95	26.0 – 29.0
XA010916295	94-EE-900-36-630-TPLUG-3×1Cx120	120	28.0 – 32.0
XA010916303	94-EE-900-36-630-TPLUG-3×1Cx150	150	28.0 – 32.0
XA010916311	94-EE-900-36-630-TPLUG-3×1Cx185	185	31.0 – 34.0
XA010916329	94-EE-900-36-630-TPLUG-3×1Cx240	240	33.0 – 37.0
XA010916337	94-EE-900-36-630-TPLUG-3×1Cx300	300	36.0 – 39.0
XA010916345	94-EE-900-36-630-TPLUG-3×1Cx400	400	38.0 – 42.0

630A - 36kV Tee Plug configuration for Al conductor with Compression Bimetallic Lug:

Order code	Kit Reference	Cross Section (mm²)	Diameter over Primary Insulation (mm)
TBA	94-EE-900-36-630-TPLUG-3×1Cx50 bi	50	24.0 - 27.0
TBA	94-EE-900-36-630-TPLUG-3×1Cx70 bi	70	26.0 - 29.0
TBA	94-EE-900-36-630-TPLUG-3×1Cx95 bi	95	26.0 – 29.0
TBA	94-EE-900-36-630-TPLUG-3×1Cx120 bi	120	28.0 – 32.0
TBA	94-EE-900-36-630-TPLUG-3×1Cx150 bi	150	28.0 – 32.0
TBA	94-EE-900-36-630-TPLUG-3×1Cx185 bi	185	31.0 – 34.0
TBA	94-EE-900-36-630-TPLUG-3×1Cx240 bi	240	33.0 – 37.0
TBA	94-EE-900-36-630-TPLUG-3×1Cx300 bi	300	36.0 – 39.0
TBA	94-EE-900-36-630-TPLUG-3×1Cx400 bi	400	38.0 – 42.0

630A - 36kV Sub (Rear) Tplug configuration for Cu conductor with Compression Copper Lug:

Order code	Kit Reference	Cross Section (mm^2)	Diameter over Primary Insulation (mm)
TBA	94-EE-900-36-630-SUB TPLUG-3×1Cx50	50	24.0 - 27.0
TBA	94-EE-900-36-630-SUB TPLUG-3×1Cx70	70	26.0 - 29.0
TBA	94-EE-900-36-630-SUB TPLUG-3×1Cx95	95	26.0 - 29.0
TBA	94-EE-900-36-630-SUB TPLUG-3×1Cx120	120	28.0 - 32.0
TBA	94-EE-900-36-630-SUB TPLUG-3×1Cx150	150	28.0 - 32.0
TBA	94-EE-900-36-630-SUB TPLUG-3×1Cx185	185	31.0 - 34.0
TBA	94-EE-900-36-630-SUB TPLUG-3×1Cx240	240	33.0 - 37.0
TBA	94-EE-900-36-630-SUB TPLUG-3×1Cx300	300	36.0 - 39.0

400A – 36KV Tee Plug configuration for both Al and Cu conductor with Threaded Mechanical Shearbolt Lug:

Order code	Kit Reference	Cross Section (mm^2)	No. of Bolts	Diameter over Primary Insulation (mm)
XA010914563	94-EE-900-36-400-TPLUG-3×1Cx50 Cu-Al	50	1	24.0 - 27.0
XA010914324	94-EE-900-36-400-TPLUG-3×1Cx70 Cu-Al	70	1	26.0 - 29.0
XA010914332	94-EE-900-36-630-TPLUG-3×1Cx95 Cu-Al	95	1	26.0 – 29.0
XA010914340	94-EE-900-36-400-TPLUG-3×1Cx95..120 Cu-Al	95 - 120	2	28.0 – 32.0

Note: Other types and sizes at 36kV would be available upon request.

42 kV Voltage Class

630A/1250A – 42KV Tee Plug configuration for 40.5kV Cu conductor cable with Compression Copper Lug:

Order code	Kit Reference	Cross Section (mm^2)	Diameter over Primary Insulation (mm)
TBA	94-EE-900-42-630-TPLUG-3×1Cx50	50	24.0 - 27.0
TBA	94-EE-900-42-630-TPLUG-3×1Cx70	70	26.0 - 29.0
TBA	94-EE-900-42-630-TPLUG-3×1Cx95	95	28.0 - 32.0
TBA	94-EE-900-42-630-TPLUG-3×1Cx120	120	28.0 - 32.0
TBA	94-EE-900-42-630-TPLUG-3×1Cx150	150	31.0 - 34.0
TBA	94-EE-900-42-630-TPLUG-3×1Cx185	185	33.0 - 37.0
TBA	94-EE-900-42-630-TPLUG-3×1Cx240	240	33.0 - 37.0
TBA	94-EE-900-42-630-TPLUG-3×1Cx300	300	36.0 - 39.0
TBA	94-EE-900-42-630-TPLUG-3×1Cx400	400	38.0 - 42.0
TBA	94-EE-900-42-1250-TPLUG-3×1Cx500	500	42.3 – 45.3
TBA	94-EE-900-42-1250-TPLUG-3×1Cx630	630	46.9 – 49.9

630A/1250A - 42kV Sub (Rear) Tplug configuration for 40.5kV Cu conductor with Compression Copper Lug:

Order code	Kit Reference	Cross Section (mm²)	Diameter over Primary Insulation (mm)
TBA	94-EE-900-42-630-SUB TPLUG-3×1Cx50	50	24.0 - 27.0
...	...	...	...
TBA	94-EE-900-42-630-SUB TPLUG-3×1Cx150	150	31.0 - 34.0
TBA	94-EE-900-42-630-SUB TPLUG-3×1Cx185	185	33.0 - 37.0
TBA	94-EE-900-42-630-SUB TPLUG-3×1Cx240	240	33.0 - 37.0
...	...	...	...
TBA	94-EE-900-42-1250-SUB TPLUG-3×1Cx630	630	46.9 – 49.9

630A - 42kV Tee Plug configuration for 40.5kV Al conductor with Compression Bimetallic Lug:

Order code	Kit Reference	Cross Section (mm²)	Diameter over Primary Insulation (mm)
TBA	94-EE-900-42-630-TPLUG-3×1Cx50 bi	50	24.0 - 27.0
...	...	...	...
TBA	94-EE-900-42-630-TPLUG-3×1Cx185 bi	185	33.0 - 37.0
TBA	94-EE-900-42-630-TPLUG-3×1Cx240 bi	240	33.0 - 37.0
TBA	94-EE-900-42-630-TPLUG-3×1Cx300 bi	300	36.0 - 39.0

Note: Other types and sizes at 42kV would be available upon request.

Breakout Boot

Order code	Kit Reference	For Cross Section (mm²)
XA010913417	36kV /40.5kV Cold Shrink Breakout Boot, 1.5m Silicone Sleeve for 3Cx50-95	50-95
XA010913425	36kV /40.5kV Cold Shrink Breakout Boot, 1.5m Silicone Sleeve for 3Cx120-300	120-300
XA010913441	24kV Cold Shrink Breakout Boot, 1.5m Silicone Sleeve for 3Cx35-95	35-95
XA010913458	24kV Cold Shrink Breakout Boot, 1.5m Silicone Sleeve for 3Cx120-185	120-185
XA010913185	24kV Cold Shrink Breakout Boot, 1.5m Silicone Sleeve for 3Cx240-400	240-400
XA010913433	36kV /40.5kV Heat Shrink Breakout Boot, 0.5m HS tube per phase for 3Cx50-400	50-400
XA010913797	24kV Heat Shrink Breakout Boot, 0.5m HS tube per phase for 3Cx35-300	35-300

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3M Vietnam Ltd.

20F, Maplee Business Centre Building
1060 Nguyen Van Linh Street, Tan Phong Ward
District 7, Ho Chi Minh City, Vietnam
Tel: (84.28) 5416 0429 | Fax: (84) 28 5416 0430

Ha Noi Office

15F, Gelex Tower
52 Le Dai Hanh Street, Hai Ba Trung Ward, Ha Noi
Tel: (84. 24) 3933 3780 | Fax: (84) 24 3933 3775