

14 SERIES SINGLE PIN HIGH VOLTAGE CONNECTOR

The 14-Series is a single-pin, no-shell high-voltage connector family designed for DC systems requiring controlled electric field geometry, stable insulation performance, and repeatable termination integrity in the 10–60 kV operating range. The connector architecture uses a molded silicone insulation system to manage field stress at the pin interface and termination region, supporting reliable operation in electrically and mechanically demanding environments.



Electrical Performance – Voltage Classes

Voltage Class	Max Operating Voltage (DC)	Dielectric Withstand Test (DC)	Corona Performance
10 KV	10 kVDC	15 kVDC	Program dependent
30 KV	30 kVDC	40 kVDC	Program dependent
45 KV	45 kVDC	60 kVDC	Program dependent
50 KV	50 kVDC	60 kVDC	Program dependent

Electrical Performance – Voltage Classes

Voltage Class Rating	Standard Contact	Standard Wire	Continuous Current
10 KV	½ Hard Brass Per QQ-B-626, Gold Plated Per MIL-G-45204, Type II, Class I	20 AWG (19/32) TC, Silicone Rubber Insulation	4 AMPS MAX
30 KV	½ Hard Brass Per QQ-B-626, Gold Plated Per MIL-G-45204, Type II, Class I	18 AWG (16/30) TC, Silicone Rubber Insulation	6.5 AMPS MAX
45 KV	½ Hard Brass Per QQ-B-626, Gold Plated Per MIL-G-45204, Type II, Class I	16 AWG (19/29) AWG S.P.C., Silicone Rubber Insulation	10 AMPS MAX
50 KV	½ Hard Brass Per ASTM B16, Gold Plated Per MIL-G-45204, Type II, Class I	12 AWG (19/.0185) S.P.C., Semiconductive Silicone Layer, Silicone Rubber Insulation Layer Bonded to Semiconductive	26 AMPS MAX

Insulation System

Element	Description
Primary Insulation (Connector Body)	Silicone Rubber Per A-A-59588
Shielding	Not Available on 14 Series
Field Grading	Combination of molded geometry and tapered conical interface that controls electric field stress and eliminates air gaps at the mating interface
Termination Insulation	Overmolded silicone structure forming the termination insulation system
Interface Control	Tapered mating geometry designed to displace air and create a continuous dielectric path between plug and receptacle

Note on Field Grading-

Electric field stress is managed using molded insulation geometry, stress control materials, and a tapered conical mating interface. When mated, the conical interface displaces air and forms a continuous solid dielectric path between the plug and receptacle, eliminating air gaps that could otherwise support corona inception or partial discharge.

Mechanical Construction

Parameter	Description
Termination Method	Solder
Strain Relief	Molded insulation geometry
Shield Termination	Not Available
Minimum Bend Radius	Wire dependent
Assembly Lengths	Standard: 6", 12", 18", 24", 36", 48", 96"

Environmental Limits

Parameter	Rating
Operating Temperature	-55C to +125C
Humidity	Program dependent
IP Rating	Not Specified
Altitude / Pressure	Rated values maintained to 70,000 Feet
Chemical Exposure on insulation system	Program dependent – material compatibility based

Handling & Installation Considerations

Aspect	Requirement / Guidance
Insulation Surfaces	Must be kept free of contamination and mechanical damage
Termination Areas	Sensitive to debris that can influence performance
Handling	Avoid abrasion, compression, and distortion of molded geometry. Do not apply grease to interface.
Installation / Mounting	Voltage class specific, contact engineering for mounting specifications.
Mechanical Loading	Avoid excessive strain at termination interfaces

The 16-Series is a multi-pin, high-voltage connector family designed for DC systems requiring controlled electric field geometry between adjacent conductors, stable dielectric performance, and positive mechanical retention. The series supports applications where multiple high-voltage circuits must be integrated into a compact interface while maintaining pin-to-pin insulation integrity. Molded silicone insulation, controlled insert geometry, and a tapered conical mating interface are used to displace air during engagement and form continuous dielectric paths, supporting operation from 5 kV through 50 kV DC.



Electrical Performance – Current Capability

Voltage Class	Maximum Operating Voltage (DC)	Dielectric Withstand Test (DC)	Corona Performance
5 kV Class	5 kV	7.5 kV	Available – Program dependent
10 kV Class	10 kV	15 kV	Available – Program dependent
15 kV Class	15 kV	20-22 kV	Available – Program dependent
20 kV Class	20 kV	30 kV	Available – Program dependent
25 kV Class	25 kV	30-37 kV	Available – Program dependent
30 kV Class	30 kV	45 kV	Available – Program dependent
50 kV Class	50 kV	60 kV	Available – Program dependent

Note: Corona testing is performed using partial discharge measurement techniques consistent with IEC 60270 methodology. Acceptance criteria are program dependent and may include thresholds such as ≤ 5 pC for corona-free applications.

Electrical Performance – Current Capability

Wire Gauge	Typical Voltage Class	Maximum Continuous Current
20 AWG	5 kV	4 A
18 AWG	10 kV	6.5 A
16-18 AWG	15 kV	6.5 A
14-16 AWG	20 kV	6.5-16.5 A
14-16 AWG	25 kV	6.5-16.5 A
12-16 AWG	30 kV	10-26 A
16 AWG	50 kV	10 A

Note: Current capability is configuration dependent and must be confirmed based on contact design, conductor size, duty cycle, and thermal environment.

Mating / Interface Definition

Element	Description
Connector Type	Multi-pin, screw or bayonet coupled connector
Mating Interface	Tapered conical interface forming continuous dielectric path
Air Displacement	Air displaced during mating to eliminate trapped air gaps
Contact Engagement	Pin / Socket style
Hardware	Aluminum or Stainless Steel
Plating	Nickel, Clear Cadmium, Olive Drab
Receptacle Styles	Feedthrough, inline, or flying lead

Mechanical Construction

Parameter	Description
Insert Type	Molded silicone insert
Termination Method	Vacuum-applied RTV silicone potting into insert
Strain Relief	Molded insert geometry and potting interface
Shield Termination	Optional, configuration dependent
Cable Construction	Shielded or unshielded, jacketed optional

Insulation System

Element	Description
Conductor Interface	Semi-conductive layer applied over each conductor to control electric field stress at the conductor surface and create a uniform field transition into the primary insulation
Primary Insulation	Silicone insulation on each individual conductor providing the main dielectric barrier along the cable length
Insert Insulation	Molded silicone insert forming the primary pin-to-pin dielectric structure and controlling electric field interaction between adjacent contacts
Termination Insulation	Vacuum-applied RTV silicone potting forming the termination dielectric system and eliminating internal air voids at the conductor-to-insert interface
Shielding	Conductive shield referenced to ground when specified, defining the outer electric field boundary and stabilizing field distribution
Field Grading	Combination of insert geometry, insulation thickness distribution, molded termination geometry, and RTV-filled interfaces to control voltage gradients and suppress localized field concentration
Interface Control	Tapered conical mating geometry that displaces air during engagement and forms a continuous solid dielectric path between plug and receptacle

Note on Field Grading: Electric field stress is managed using molded insulation geometry, stress control materials, and a tapered conical mating interface. When mated, the conical interface displaces air and forms a continuous solid dielectric path between the plug and receptacle, eliminating air gaps that could otherwise support corona inception or partial discharge.

Environmental Limits

Parameter	Rating
Operating Temperature	-55C to +125C
Humidity	Program dependent
IP Rating	Not Specified unless required by program
Altitude / Pressure	Rated values maintained to 70,000 Feet
Chemical Exposure	Program dependent – material compatibility based on insulation system

Note: Molded silicone components meet A-A-59588, Class 2B

Electrical Performance – Voltage Capability

Voltage Classv (kVDC)	Max Current (A)	Pin Count	Insert No.	Shell Size
5	4	5	12S-5	12S
5	4	13	18-13	18
5	4	19	20-19	20
7	6.5 / 85	6	32-6	32
10	6.5	1	12S-1	12S
15	6.5	3	16S-3	16S
15	6.5	4	18M-4	18
15	6.5	7	16-7	16
15	6.5	8	24-8	24
20	16.5	1	16-1	16
20	6.5	2	16S-2	16S
20	10	6	24-6	24
25	16.5	5	28-5	28
25	10	7	24-7	24
30	10	1	18-1	18
30	16.5	2	24-2	24
30	26	2	32-2	32
30	26	5	36-5	36
50	10	1	22-1	22

Electrical Performance – Current Capability

Wire Gauge	Typical Voltage Class	Maximum Continuous Current
Inline Plug	Cable-to-cable connection using mated plug and receptacle assemblies	Harness interconnects, removable cable assemblies
Feedthrough Receptacle	Panel-mounted receptacle providing electrical isolation across a bulkhead	Enclosures, power supplies, sealed housings
Inline Receptacle	In-line receptacle for cable-to-cable mating without panel mounting	Modular harness systems
Flying Lead Receptacle	Receptacle with integral leads for direct wiring into system	Internal system wiring, compact assemblies
Right-Angle Plug	Plug with 90° cable exit geometry	Tight packaging environments

17 SERIES SINGLE PIN HIGH VOLTAGE CONNECTOR

The 17-Series is a single-pin, screw-coupled high-voltage connector family designed for DC systems requiring controlled electric field geometry, positive mechanical retention, and flexible shielding and mounting configurations. The series uses an overmolded silicone insulation system and a tapered conical mating interface that displaces air during engagement, forming a continuous dielectric path and supporting stable operation from 10 kV through 60 kV.



Electrical Performance – Voltage Classes

Voltage Class	Max Operating Voltage (DC)	Dielectric Withstand Test (DC)	Corona Performance
10 KV	10 kVDC	15 kVDC	Program dependent
15 KV	15 kVDC	20 kVDC	Program dependent
25 KV	25 kVDC	38 kVDC	Program dependent
40 KV	40 kVDC	50 kVDC	Program dependent
60 KV	60 kVDC	75 kVDC*	Program dependent

Electrical Performance – Current

Voltage Class	Standard Contact	Unshielded Wire	Shielded Wire	Continuous Current Rating
10 KV	Gold plate per MIL-G-45204, Type II, Class I	18 AWG TC, Semicon, Silicone Rubber Insulation	N/A	6.5 AMPS MAX
15 KV	Gold plate per MIL-G-45204, Type II, Class I	18 AWG TC, Semicon, Silicone Rubber Insulation	18 AWG (19/30) TC, Silicone Dielectric, TC Braid, Black Silicone Jacket, Semicon layers bonded to dielectric	6.5 AMPS MAX
25 KV	Gold plate per MIL-G-45204, Type II, Class I	18 AWG TC, Semicon, Silicone Rubber Insulation	8 AWG (19/30) TC, Silicone Dielectric, TC Braid, Black Silicone Jacket, Semicon layers bonded to dielectric	10 AMPS MAX
40 KV	Gold plate per MIL-G-45204, Type II, Class I	16AWG, Semicon, Silicone Rubber Dielectric	16 AWG (19/29) SPC, Silicone Dielectric, TC Braid, Black Silicone Jacket, Semicon layers bonded to dielectric	10 AMPS MAX
60 KV	Gold plate per MIL-G-45204, Type II, Class I	12 AWG (19/25), Silver Plated, Semicon, Silicone Dielectric	12 AWG SPC, Silicone Insulation and Jacket, TC braid, Semicon layer bonded to dielectric	26 AMPS MAX

Insulation System

Element	Description
Primary Insulation (Connector Body)	Silicone Rubber Per A-A-59588
Shielding	TC Braided Shield
Field Grading	Combination of molded geometry and tapered conical interface that controls electric field stress and eliminates air gaps at the mating interface
Termination Insulation	Overmolded silicone structure forming the termination insulation system
Interface Control	Tapered mating geometry designed to displace air and create a continuous dielectric path between plug and receptacle

Note on Field Grading-

Electric field stress is managed using molded insulation geometry, stress control materials, and a tapered conical mating interface. When mated, the conical interface displaces air and forms a continuous solid dielectric path between the plug and receptacle, eliminating air gaps that could otherwise support corona inception or partial discharge.

Mating / Interface Definition

Parameter	Description
Connector Type	Single-pin high-voltage connector
Mating Interface	Tapered conical interface forming continuous dielectric path
Air Displacement	Conical interface displaces air during mating to eliminate trapped air gaps
Contact Engagement	Pin / Socket style
Mating Cycles	Program dependent
Assembly Configurations	Single Ended Plug Double Ended Plug Receptacle (in oil) Receptacle (in air w/ flying lead)

Mechanical Construction

Parameter	Description
Termination Method	Solder
Strain Relief	Molded insulation geometry
Minimum Bend Radius	Wire dependent
Assembly Lengths	Standard: 24", 36", 48", 96"

Environmental Limits

Element	Rating
Operating Temperature	-55C to +125C
Humidity & Shock	Per MIL-STD-202
Vibration	Per MIL-STD-167-1
Altitude / Pressure	Rated values maintained to 70,000 Feet
Chemical Exposure	Program dependent – material compatibility based on insulation system
Leakage (Receptacle)	Less than 1×10^{-6} cc/SEC of helium at 30 PSIG

Handling & Installation Considerations

Aspect	Requirement / Guidance
Insulation Surfaces	Must be kept free of contamination and mechanical damage
Termination Areas	Sensitive to debris that can influence performance
Handling	Avoid abrasion, compression, and distortion of molded geometry. Do not apply grease to interface.
Installation / Mounting	Voltage class specific, contact engineering for mounting specifications.
Mechanical Loading	Avoid excessive strain at termination interfaces

19 SERIES SINGLE PIN HIGH VOLTAGE CONNECTOR

The 19-Series is a single-pin, high-voltage connector family designed for systems operating at higher voltage levels where increased electrical spacing, insulation control, and electric field management are required. The connector architecture uses a molded silicone insulation system to manage field stress at the pin interface and termination region, supporting reliable operation in electrically and mechanically demanding environments.



Electrical Performance – Operating Voltage

Voltage	Dielectric Withstand Test (DC)	Corona Performance
60 KV / 20KV RMS	75 kVDC	Corona free

Electrical Performance – Plug Assembly

Standard Contact	Standard Wire	Continuous Current Rating
Beryllium Copper per ASTM-B196, Gold plated per MIL-C-26074, Class 2	12 AWG TC, Silicone Rubber Insulation, Semicon layers over and under dielectric, TC braided shield, black silicone jacket	25 AMPS MAX

Electrical Performance – Connector Receptacle

Center Electrode	Insulator	Continuous Current Rating
Beryllium Copper per ASTM-B194, B196, or B197, Tin plated per MIL-T-10727, Type I	Diallyl Phthalate Per MIL-M-14, Type SDG-F	25 AMPS MAX

Insulation System

Element	Description
Primary Insulation (Connector Body)	Silicone Rubber Per A-A-59588
Shielding	TC Braided Shield
Field Grading	Combination of molded geometry and tapered conical interface that controls electric field stress and eliminates air gaps at the mating interface
Termination Insulation	Overmolded silicone structure forming the termination insulation system
Interface Control	Tapered mating geometry designed to displace air and create a continuous dielectric path between plug and receptacle

Note on Field Grading-

Electric field stress is managed using molded insulation geometry, stress control materials, and a tapered conical mating interface. When mated, the conical interface displaces air and forms a continuous solid dielectric path between the plug and receptacle, eliminating air gaps that could otherwise support corona inception or partial discharge.

Mating / Interface Definition

Parameter	Description
Connector Type	Single-pin high-voltage connector
Mating Interface	Tapered conical interface forming continuous dielectric path
Air Displacement	Conical interface displaces air during mating to eliminate trapped air gaps
Contact Engagement	Pin / Socket style
Mating Cycles	Program dependent
Assembly Configurations	Single Ended Plug Double Ended Plug Receptacle (in oil) Receptacle (in air w/ flying lead)

Mechanical Construction

Parameter	Description
Termination Method	Solder
Strain Relief	Molded insulation geometry
Minimum Bend Radius	Wire dependent
Assembly Lengths	Standard: 24", 36", 48", 96"

Environmental Limits

Element	Rating
Operating Temperature	-55C to +125C
Humidity & Shock	Per MIL-STD-202
Vibration	Per MIL-STD-167-1
Altitude / Pressure	Rated values maintained to 70,000 Feet
Chemical Exposure	Program dependent – material compatibility based on insulation system
Leakage (Receptacle)	Less than 1×10^{-6} cc/SEC of helium at 30 PSIG

Handling & Installation Considerations

Aspect	Requirement / Guidance
Insulation Surfaces	Must be kept free of contamination and mechanical damage
Termination Areas	Sensitive to debris that can influence performance
Handling	Avoid abrasion, compression, and distortion of molded geometry. Do not apply grease to interface.
Installation / Mounting	Voltage class specific, contact engineering for mounting specifications.
Mechanical Loading	Avoid excessive strain at termination interfaces

UL Style 3239 High Voltage Silicone Wire

These designs have earned the U L approval only after successfully meeting stringent performance and manufacturing acceptance criteria. The silicone dielectric maintains excellent flexibility over an extreme temperature range and is resistant against radiation, moisture, and weathering. Being compatible with most silicone encapsulation material (RTV) makes this wire an excellent choice for most high or low voltage terminations.



Part Number	Operating Voltage (kVdc)	AWG	Stranding (TC)	Dimension Inches (mm)	O.D. in[mm]	lbs./1000' apx. net
33163	15	20	19/32	0.040[1.02]	0.134[3.42]	10.5
36225	25	16	19/28	0.058[1.47]	0.181[4.60]	21.2
36226	40	16	19/28	0.058[1.47]	0.331[8.41]	29.9
36220	25	14	41/30	0.078[1.98]	0.201 [5.11]	28.3
36219	50	12	65/30	0.101 [2.57]	0.307[7.80]	56.8

NOTE:

1. Standard dielectric color is white. Custom colors are available. Please contact Caton for details.
2. Operating temperature range is -55 to +150 C

Dual Extruded High Voltage Silicone Wire

When applications require extremely low loss of power and low electrical noise, i.e. partial discharge, a layer of semi-conductive silicone is extruded around the stranded center conductor thereby bringing air inside the stranding to zero electrical stress.



Part Number	Operating Voltage			Conductor			Semiconductive Layer		lbs./1000' apex. net
	kVac	kVdc	AWG	Stranding	Plating	Dimensions	in [mm]	in [mm]	
005639	10	30	22	19/34	Silver	0.032[0.81]	0.067[1.70]	0.180[4.57]	12.4
0A2841	15	40	18	19/30	Silver	0.051 [1.30]	0.086[2.18]	0.236[5.99]	27.6
002841	18	50	14	19/27	Silver	0.071 [1.80]	0.100[2.54]	0.300[7.62]	47.1
005640	20	60	12	19/25	Silver	0.092[2.34]	0.134[3.4]	0.360[9.14]	68.3
CC40415	15	40	10	105/30	Silver	0.126[3.20]	0.163[4.14]	0.415[10.54]	96.0
005641	30	80	8	133/29	Silver	0.150[3.81]	0.240[6.10]	0.650[16.51]	209.5

NOTE:

1. Standard dielectric color is white. Custom colors are available. Please contact Caton for details.
2. Operating temperature range is -55 to +150 C