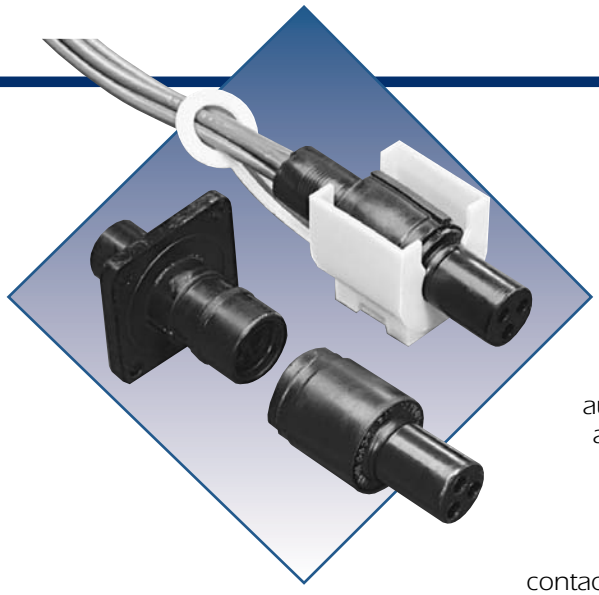
Sure-Seal®



Low cost, high reliability

A one-piece resilient body and rugged multiple moisture seals make Sure-Seal® connectors a natural for applications where outside contaminants must be excluded. Sure-Seal® is reliable and uncomplicated. Only two parts are required to complete a connector: the connector body, and the contacts. Sure-Seal® was developed to address Department of Transportation safety regulations for connectors used in automobiles. Since then, Sure-Seal® has been successfully used in a broad range of environmental applications where a small, low cost connector is needed. These sealed connectors meet or exceed DOT requirements for shock, vibration, temperature cycling, salt water spray and immersion, petroleum derivatives, industrial gas, all the while insuring low milli-volt drop and low contact resistance. Existing applications include motorcycles, automobiles, boats, and a wide range of demanding off-road vehicle uses. Sure-Seal® will operate in temperatures from -40˚F to +221˚F under conditions of high humidity, severe vibration, ice and mud. Sealing integrity is maintained with exposure to brake fluid, gasoline, diesel fuel, anti-freeze, ultraviolet, ozone, and steam.

Applications

Wet, humid, or dirty environments requiring a low cost, small and reliable sealed connector

- Automotive
- Marine
- Appliances
- Trucks and Buses
- Off-road Vehicles
- Industrial Machinery

Features

Low Installed Cost
One piece molded bodies and crimp contacts provide a low cost solution. In addition, these connectors can be easily terminated by the user.

Water Submersible
Not just splash-proof, but truly submersible for short periods of time. Sure-Seal® will seal to the requirements of IP67 and DIN 400 50.

Resistant to Automotive/Industrial Environments
Sure-Seal® will operate in temperatures from -40˚F to +221˚F under conditions of high humidity, severe vibration, ice and mud. Sealing integrity is maintained with exposure to brake fluid, gasoline, diesel fuel, anti-freeze, ultraviolet, ozone, and steam.

Wide Range of Wire Gauges and Current Carrying Capability
Up to 85 amps with wire gauges from size 20 up to size 4 AWG wire.

One-Piece Connector
Sure-Seal® has a simple one-piece molded body. No other parts (other than contacts) are required. Bodies mate using multiple resilient seals and will remain mated even under severe vibration and shock.

Field Serviceable
The use of removable crimp contacts allows Sure-Seal® connections to be changed or modified in the field if necessary.

Polarized Against Mis-mates
Connector halves use both pin and socket contacts. The plug and receptacle must be properly oriented for the connectors to mate. Raised indexing ribs in conjunction with a stepped plane allow blind mating of the connector halves even in dark or cramped spaces.

Three Sure-Seal® Versions
Sure-Seal® is available in three versions. The basic Sure-Seal® line is the broadest and ideal for most applications. Mini-Sure-Seal® provides a slightly smaller connector in a limited range of configurations. Power Sure-Seal® is for single circuit, high power applications.

SURE SEAL CONNECTIONS
Manufacturer of high quality environmental connectors & accessories

NEW! **Visit us at: www.suresealconnections.com**

Technical Specifications

(Complete test data available on page SS 16.)

MATERIALS & FINISHES

Body	Elastomeric material (PVC Nitrile standard. Also available in silicone & EPDM)
Contacts	Copper alloy
Plating	Tin-lead standard; gold plating optional

ELECTRICAL DATA

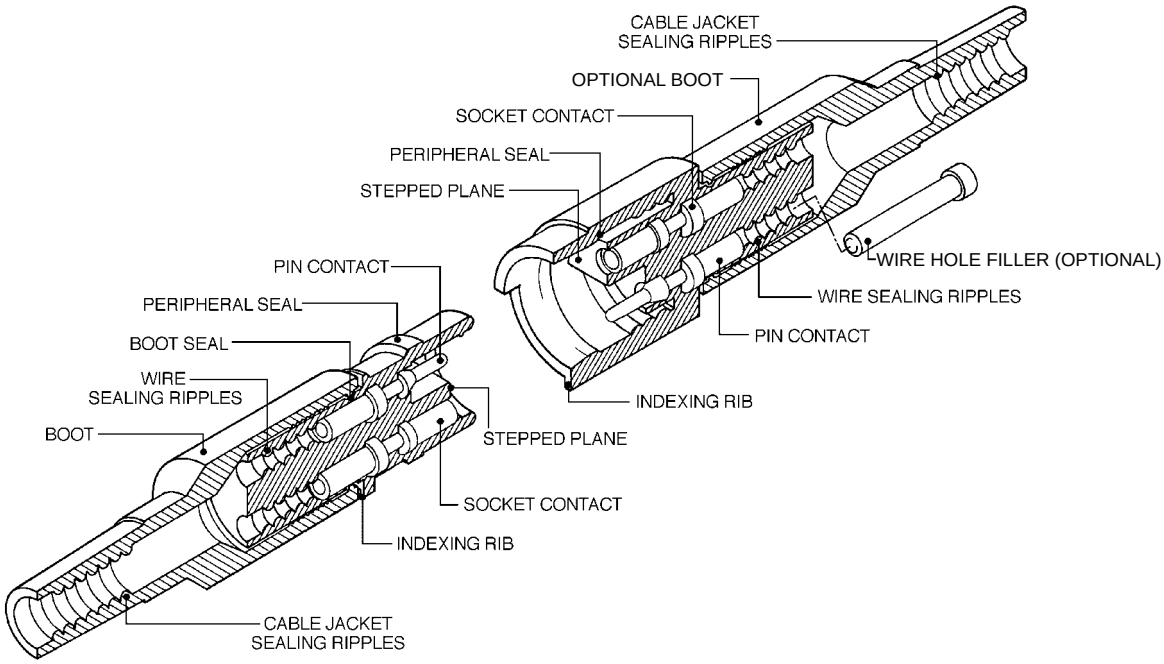
Operating Voltage	400 Vac maximum
Dielectric Withstanding Voltage	1,200 Vac at sea level
Current rating	15 Amps (Sure-Seal®) 8 Amps (Mini Sure-Seal®) 85 Amps (Power Sure-Seal®)
Wire Range Sizes	14 - 18 AWG (Sure-Seal®) 18 - 20 AWG (Mini Sure-Seal®) 4 - 10 AWG (Power Sure-Seal®)
Contact Resistance	10 Milliohms maximum
Insulation Resistance	100 Megohms (minimum)

MECHANICAL

Operating Temperature	-40˚F to +221˚F (-40˚C to +105˚C)
Sealing	≈IP67, DIN 400 50, 3 foot depth in 5% salt solution 24 hours min. ≈ NEMA 6 p
Wire Sealing Range	See column 8 on contact chart, page SS 7.
Insulation Strip Lengths	See column 7 on contact chart, page SS 6.
Mating Life	50 cycles minimum
Salt Spray	To MIL-STD-202D Method 101D
Heat	+221˚F (+105˚C) for 1000 hours (See test data page SS 16.)
Weather, Ozone, & Ultraviolet	In accordance with ASM D-1149 (100pphm) & ASTM D-1171 (outdoor exposure)
Vibration	5 to 55 Hz .06" DA 1 hour; radial & longitudinal axes
Shock	50g 11ms, 30 cycles; radial & longitudinal axes
Contact Type	Crimp: using hand or semi-automatic tooling
Number of Circuits	1 to 10
Contact Insertion	From rear with simple hand tool or simultaneous insertion of multiple contacts with semi-automatic insertion machine. Removable, 5 cycles minimum.
Contact Retention	7.5 lbs. (35N) minimum
Polarization	Stepped plane positive polarization, indexing ribs, and visual polarization all permanently molded into body.
Agency Listings	UL (E176866) & CSA (LR109871-1)
Color	Black (alternate colors optional)

SURE SEAL CONNECTIONS
Manufacturer of high quality environmental connectors & accessories

Sure Seal Cross Section



How to Select Sure-Seal® Connectors & Accessories

1. Choose series:
   (Sure-Seal®, Mini Sure-Seal®, or Power Sure-Seal®).
2. Determine number of circuits required per connector:
   - 1 to 10 in Sure-Seal®
   - 2 to 4 in MINI Sure-Seal®
   - 1 in POWER Sure-Seal®
3. Select connector with appropriate number of circuits.
4. Select Sure-Seal® body style (straight or flanged plug and receptacle).
5. Select connector accessories:
   (Boots, Mounting Ring, Mounting Plates, Mounting Clip, Wire Hole Filler, Holding Blocks).

How to Select Sure-Seal® Contacts & Tooling

1. Determine current carrying and wire gauge requirements for application.
2. Select appropriate contacts from contact selection chart on page SS 6.
3. Choose appropriate crimp, insertion, and extraction tooling on page SS 7.

Layouts

Connectors

Notice that all multi-pin Sure-Seal® connectors use a combination of pin and socket contacts in each connector.

View from mating face of receptacle

● pin ❍ socket

Number of Circuits	AWG Wire Sizes	Plug	Flanged Plug	Receptacle
SURE-SEAL®				
1	14-18 AWG	120-1832-000	- **	120-1833-000
2	14-18 AWG	120-1807-000	120-8552-200	120-1804-000
3	14-18 AWG	120-1808-000	120-8552-201	120-1805-000
4	14-18 AWG	120-1809-000	120-8552-202	120-1806-000
5	14-18 AWG	120-1841-000	- **	120-1839-000
6	14-18 AWG	120-1842-000	- **	120-1840-000
7 *	14-18 AWG	120-1873-000	- **	120-1874-000
8	14-18 AWG	120-1865-000	120-8552-305	120-1866-000
9	14-18 AWG	120-1867-000	120-8552-306	120-1868-000
10	14-18 AWG	120-1869-000	120-8552-307	120-1870-000
MINI SURE-SEAL®				
2	18-20 AWG	120-8552-100	-	120-8551-100
3	18-20 AWG	120-8552-101	-	120-8551-101
4	18-20 AWG	120-8552-102	-	120-8551-102
POWER SURE-SEAL®				
1	4-6 AWG	120-1905-000	-	120-1903-000
1	8-10 AWG	120-1906-000	-	120-1904-000

* See page SS 12 for special rectangular version

** Use Mounting Rings (2) Page SS 10.

(1) Boot

Fits over the rear of the connector and seals the jacket of the cable. It also provides additional strain relief and abrasion resistance. See dimensions on page SS 10 for choosing 3 or 4 circuit boot.

(2) Mounting Ring

A Mounting Ring snaps into an appropriate sized hole in a panel or bracket and allows a non-flanged plug or receptacle to be panel mounted.

(3) Mounting Plate

Metal mounting plates reinforce the molded flanges when attaching flanged connectors to a panel.

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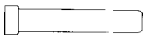
Manufacturer of high quality environmental connectors & accessories

Accessories

 Boot(1)	 Mounting Ring(2)	 Mounting Plate(3)	 Posi-Lok Mounting Clip(4)	 Wire Hole Filler(5)	 Holding Block(6)
-	-	-	026-0452-000	225-0093-000	317-1408-002
317-1398-000	351-1640-000	066-8516-000	029-0263-000	225-0093-000	317-1408-001
317-1397-000* 317-1399-000*	351-1641-000	066-8516-000	029-0262-000	225-0093-000	317-1408-000
317-1397-000* 317-1399-000*	351-1641-000	066-8516-000	029-0262-000	225-0093-000	317-1408-000
317-8657-000	351-1633-000	-	026-0450-000	225-0093-000	317-1408-003
317-8657-000	351-1633-000	-	026-0450-000	225-0093-000	317-1408-003
317-8657-000	351-1633-000	-	026-0450-000	225-0093-000	317-1408-003
317-8657-002	351-1634-000	066-8516-002	026-0451-000	225-0093-000	317-1408-004
317-8657-002	351-1634-000	066-8516-002	026-0451-000	225-0093-000	317-1408-004
317-8657-002	351-1634-000	066-8516-002	026-0451-000	225-0093-000	317-1408-004
-	-	-	026-0452-000	225-1012-000	195-8508-013 plug 195-8508-014 receptacles
-	-	-	026-0452-000	225-1012-000	195-8508-015 plug 195-8508-016 receptacles
-	-	-	026-0452-000	225-1012-000	195-8508-017 plug 195-8508-018 receptacles
-	-	-	-†	-	-
-	-	-	-†	-	-

*See page SS 10 for Cable O.D. accommodations.

† Please call for availability

(4) Mounting Clip

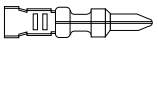
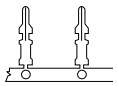
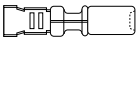
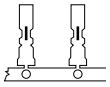
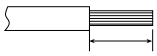
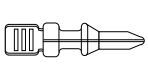
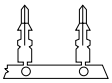
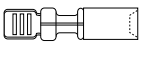
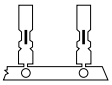
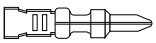
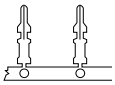
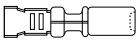
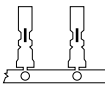
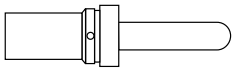
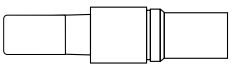
Mounting clips can be used free-hanging as a positive lock to provide a secondary means of securing the connector halves. Mated connector pairs can be snapped into the clip for fixed mounting using a screw or cable tie. The wires of one of the connectors can be passed through an integral retention ring which captivates one of the connector halves to the clip.

(5) Wire Hole Fillers

Wire Hole fillers are inserted into unused cavities in place of a contact. Hole fillers are required to retain the watertight sealing if less than a full compliment of contacts are to be used.

(6) Holding Block

A holding block makes insertion of contacts into the molded body faster and avoids personal injury or damage to the connector. It is highly recommended that the appropriate block be used when inserting contacts. (See Assembly Instructions, page SS 15).

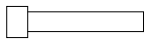
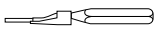
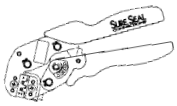
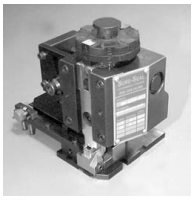
Index	Contacts(1)					Wire
COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7
Contact Style	A.W.G. Wire Size	Loose Pins	5K Reel Pins(1)	Loose Sockets	5K Reel Sockets(1)	Strip Length Inches (MM)
Sure-Seal® Insulation Support						
						
Tin Plated (Standard)†	14-18	030-2196-001	110238-0195	031-1267-001	110238-0194	.155 - .185
Gold Plated*†	14-18	030-2196-006	110238-0409	031-1267-005	110238-0408	(3.94 - 4.70)
Sure-Seal® Non-Insulation Support						
						
Tin Plated (Standard)	14-18	030-2196-000	110238-0040	031-1267-000	110238-0085	.185 - .220
Gold Plated*	14-18	030-2196-008	110238-0440	031-1267-007	110238-0442	(4.70 - 5.59)
Mini Sure-Seal® Insulation Support						
						.118 - .130
	18-20	330-8672-100	121348-0100	031-8703-100	121347-0100	(3.00 - 3.30)
Power Sure-Seal® (VE)**						
						.460 - .480 (11.7 - 12.2)
	4	030-2245-002	-	031-1295-001	-	**Note:** 6 AWG & 10 AWG socket contacts have unique strip lengths .515 - .535 (13.1 - 13.6)
	6	030-2245-001	-	031-1294-001	-	
	8	030-2244-001	-	031-1299-001	-	
	10	030-2244-002	-	031-1298-001	-	

* Silver available 50K minimum, please call.
** VE can be used with ITT CANNON VE connectors and Deutsch HD connectors.
NOTE: Sure-Seal® and Mini Sure-Seal® contacts are available in machined contact versions. Call for information.
Power Sure-Seal® contacts are machined contacts.
† See page SS 12 for special low force contacts.

(1) Loose Piece or 5K Reel
Contacts are available loose piece or on continuous reels of 5,000 pieces for use with semi-automated crimping systems.

(2) Wire Hole Fillers
These fillers are inserted into unused cavities in place of a contact. Wire hole fillers are required to retain the watertight sealing if less than a full compliment of contacts are to be used.

(3) Insertion Tool
An insertion tool is required to insert contacts into the connector. These tools are heavy duty production hand tools. A holding block should also be used during the insertion process. An extraction tool is not required. See assembly instructions. A semi-automatic insertion tool is available. See page SS 15.

Range	Tooling				
COLUMN 8	COLUMN 9	COLUMN 10	COLUMN 11	COLUMN 12	COLUMN 13
Wire Insulation Diameter	Wire Hole Fillers(2)	Insertion Tool (3)	Hand Crimp Tool(4)	Extraction Tool	Power/Automatic Tools(5)
		 Replacement Tip* 317-1153-017			Mini Applicator (See below and pages SS 13-14 for more details) 
 .100 - .147 (2.54 - 3.73)	225-0093-000	070306-0000	SSI-CS10	DRK 152	
	225-0093-000	070306-0000	SSI-CS10	DRK 152	 CBIT-SS-150 (see page SS 15 for more detail)
		Replacement Tip 317-1153-015			
.100 - .147 (2.54 - 3.73)	225-0093-000	070235-0001	SS-CS10	DRK 152	
	225-0093-000	070235-0001	SS-CS10	DRK 152	
		Replacement Tip MSS 2000 TIP			M6000 Heavy Duty Press (see page SS 14 for more detail) 
.055 - .071 (1.40 - 1.80)	225-1012-000	MSS 2000	MSS-CS10	DRK32	
					Crimp Tool / Crimp Kit
					 
.274 - .380 (6.96 - 9.65)	-	CIT-VE4-6	-	—	400BHD / Kit contains: Crimp die, Locator(s), and Go No-Go Gauge. Provide sample of wire when ordering. (Call for more information.)
	-	CIT-VE4-6	-		
.159 - .245 (4.04 - 6.22)	-	CIT-VE8-10	-		
	-	CIT-VE8-10	-		

▪ Use holding block on page SS 5.

Power insertion tool available, see page SS 15.

(4) Hand Crimp Tools

These are heavy duty tools with a ratchet mechanism that will only release the contact when the crimp is completed. These tools produce consistent, high quality crimps. They are the only hand crimping tools recommended for Sure-Seal® contacts.

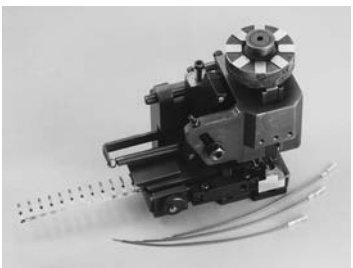
(5) Semi-Automatic Crimp Tools

For high volume applications, several types of semi-automatic crimping tools are available for all Sure-Seal® contacts. See pages SS 13 and SS 14.

Mini Applicator

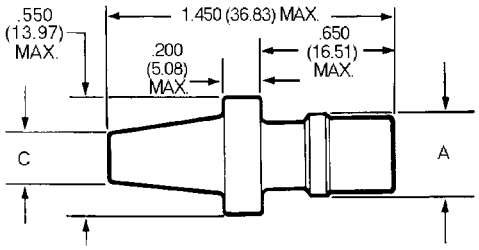
For Sure-Seal® stamped contacts

Mini applicator modules are used in industry standard crimp presses. This allows for fast changeover for crimping different contacts and by using the same crimp press, saves valuable factory floor space versus having to use multiple presses.

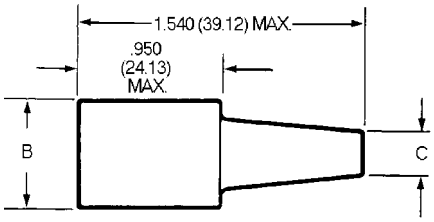


Sure Seal Plugs & Receptacles

1 Circuit

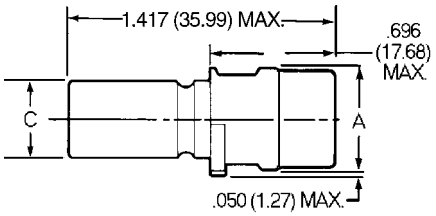


Plug P/N 120-1832-000

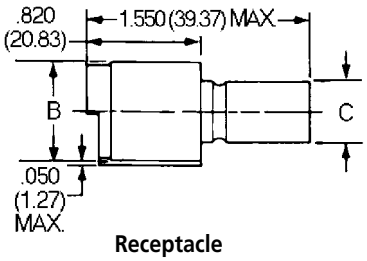


Receptacle P/N 120-1833-000

2 – 4 Circuit



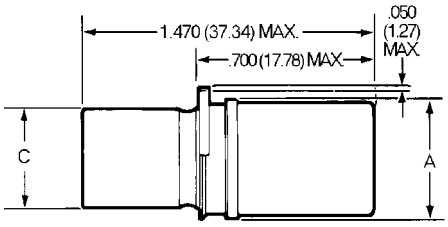
Plug



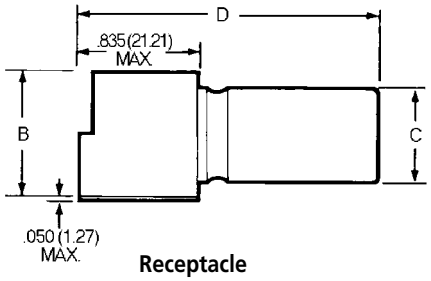
Receptacle

Body Identifier	Plug Number (P)	Receptacle No. (R)	A Dia. Max.	B Dia. Max.	C. Max.
SS-1 P/R	120-1832-000	120-1833-000	.380 (9.65)	.550 (13.97)	.230 (5.84)
SS-2 P/R	120-1807-000	120-1804-000	.550 (13.97)	.710 (18.03)	.430 (10.92)
SS-3 P/R	120-1808-000	120-1805-000	.600 (15.24)	.760 (19.30)	.500 (12.70)
SS-4 P/R	120-1809-000	120-1806-000	.600 (15.24)	.760 (19.30)	.500 (12.70)

5 – 10 Circuit



Plug

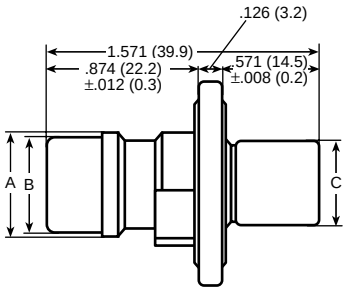


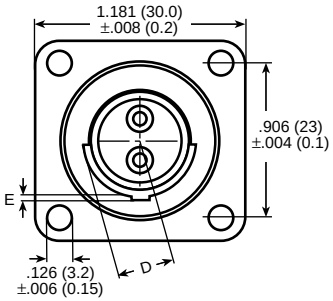
Receptacle

Body Identifier	Plug Number	Receptacle No.	A Dia. Max.	B Dia. Max.	C Max.	D Max.
SS-5 P/R	120-1841-000	120-1839-000	1.010 (25.65)	1.160 (29.46)	.810 (20.57)	1.610 (40.89)
SS-6 P/R	120-1842-000	120-1840-000	1.010 (25.65)	1.160 (29.46)	.810 (20.57)	1.610 (40.89)
SS-7 P/R	120-1873-000	120-1874-000	1.010 (25.65)	1.160 (29.46)	.810 (20.57)	1.610 (40.89)
SS-8 P/R	120-1865-000	120-1866-000	1.135 (28.83)	1.285 (32.64)	.935 (23.75)	1.610 (40.89)
SS-9 P/R	120-1867-000	120-1868-000	1.135 (28.83)	1.285 (32.64)	.935 (23.75)	1.610 (40.89)
SS-10 P/R	120-1869-000	120-1870-000	1.135 (28.83)	1.285 (32.64)	.935 (23.75)	1.610 (40.89)

Sure Seal Flanged Plugs

2 – 4 Circuit

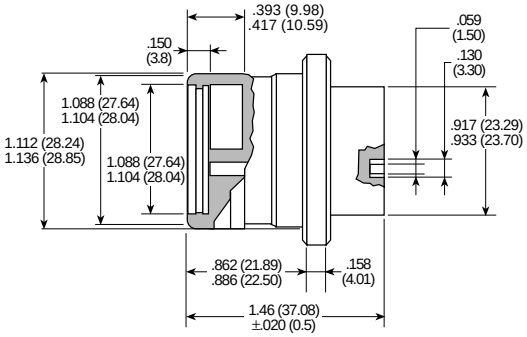


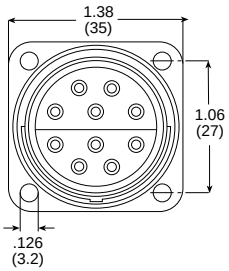


Use with Mounting Plate #066-8516-000

Body Identifier	Part Number	A Dia. +.12 (0.3)	B Dia. +.008 (0.2)	C Dia. +.012 (0.3)	D Dia. +.012 (0.3)	E +.008 (0.2)
SSF-2P	120-8552-200	.547 (13.9)	.524 (13.3)	.425 (10.8)	.307 (7.8)	.039 (1.0)
SSF-3P	120-8552-201	.598 (15.2)	.583 (14.8)	.484 (12.3)	.315 (8.0)	.020 (0.5)
SSF-4P	120-8552-202	.598 (15.2)	.583 (14.8)	.484 (12.3)	.354 (9.0)	.039 (1.0)

8 – 10 Circuit



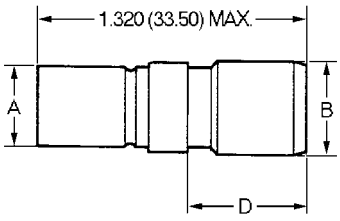


Use with Mounting Plate #066-8516-002 or #066-8516-003

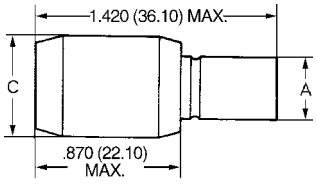
Body Identifier	Plug Number
SSF-8P	120-8552-305
SSF-9P	120-8552-306
SSF-10P	120-8552-307

Mini-Sure-Seal Plugs & Receptacles

2 – 4 Circuit



Plug



Receptacle

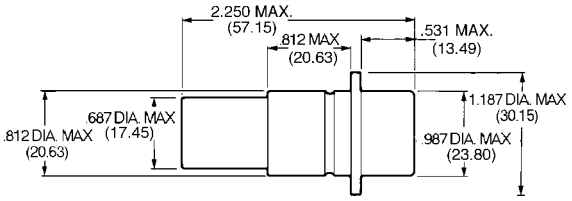
Body Identifier	Plug (P) Part Number	Receptacle (R) Part Number	A Dia. Max.	B Dia. Max.	C Dia. Max.	D Max.
MSS-2 P/R	120-8552-100	120-8551-100	.340 (8.64)	.390 (9.91)	.540 (13.72)	.550 (13.97)
MSS-3 P/R	120-8552-101	120-8551-101	.360 (9.15)	.420 (10.67)	.580 (14.74)	.550 (13.97)
MSS-4 P/R	120-8552-102	120-8551-102	.360 (9.15)	.450 (11.43)	.610 (15.50)	.550 (13.97)

Dimensions

Power Sure-Seal®

Plug

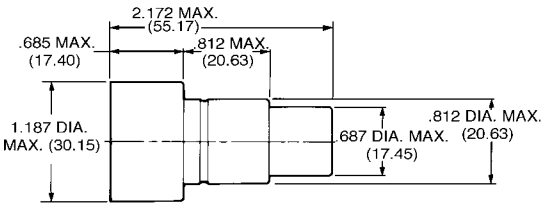
Body Identifier	Part Number	AWG Size
SS-1P-4	120-1905-000	#4 or #6
SS-1P-8	120-1906-000	#8 or #10



Plug

Receptacle

Body Identifier	Part Number	AWG Size
SS-1R-4	120-1903-000	#4 or #6
SS-1R-8	120-1904-000	#8 or #10



Receptacle

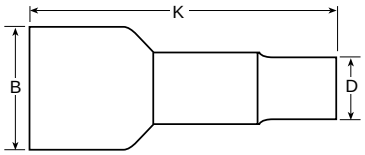
Accessories

Boot

NEW!

Heat Shrink Boots are also available. Please call 888-308-SURE with cable O.D.

Fits over the rear of the connector and seals the jacket of a multi-conductor cable. Also provides additional strain relief and abrasion resistance.



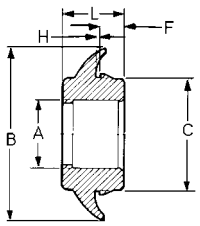
Body Identifier	Part Number	B Dia. Max.	Cable O.D.	K Ref.	D Dia. Max.
SS-2 Boot	317-1398-000	.435 (11.05)	.208-.228 (5.28-5.79)	2.050 (52.07)	.380 (9.65)
SS-3 Boot	317-1397-000	.504 (12.80)	.220-.240 (5.59-6.10)	2.050 (52.07)	.380 (9.65)
SS-4 Boot	317-1399-000	.504 (12.80)	.345-.380 (8.76-9.65)	2.050 (52.07)	.500 (12.70)
SS-5–7 Boot	317-8657-000	1.063 (27.00)	.283-.331 (7.20-8.40)	2.441 (62.00)	.492 (12.50)
SS-8–10 Boot	317-8657-002	1.220 (31.00)	.394-.488 (10.00-12.40)	2.480 (63.00)	.732 (18.60)

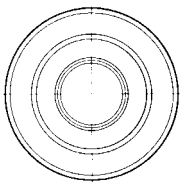
Note: In addition to boot, remember to use 225-0093-000 Wire Hole Fillers to fill any unused contact cavities.

See page SS 4 for matching plugs and receptacles chart.

Mounting Ring

A Mounting Ring snaps into an appropriate sized hole in a panel or bracket and allows a non-flanged plug or receptacle to be panel mounted.



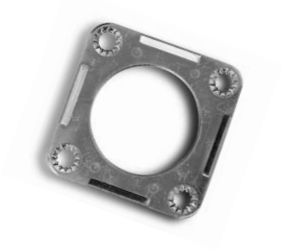


Part Number	A Dia. Max.	B Dia. Max.	C Dia. Max.	F Max.	H Ref.	L Max.	Hole Diameter	Panel Thickness
351-1640-000	.410 (10.41)	1.275 (32.39)	.790 (20.07)	.230 (5.84)	.055 (1.40)	.690 (17.53)	.781 (19.84)	.060 (1.52)
351-1641-000	.470 (12.06)	1.275 (32.39)	.790 (20.07)	.230 (5.84)	.055 (1.40)	.690 (17.53)		
351-1633-000	.755 (19.05)	2.200 (56.64)	1.445 (36.70)	.330 (8.38)	.065 (1.65)	.830 (21.08)	1.50 (38.12)	
351-1634-000	.875 (22.23)	2.200 (56.64)	1.445 (36.70)	.330 (8.38)	.065 (1.65)	.830 (21.08)		

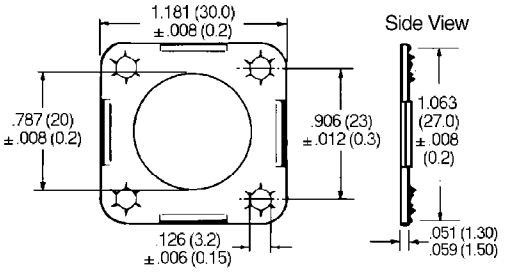
See page SS 4 for matching plugs and receptacles chart.

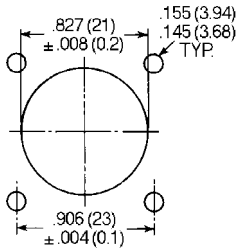
Mounting Plate

For 2 – 4 Circuit Plug



066-8516-000 for use with
120-8552-200
120-8552-201
120-8552-202



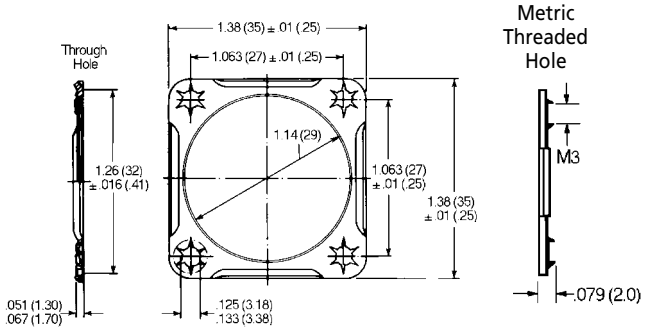


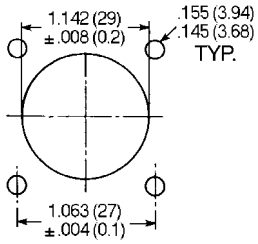
Mounting Dimensions

NEW! Use Nutplate part number M85528/2-14A .
Use Sealing Screws for mounting, see Accessories page SS 12.

For 8 – 10 Circuit Plug

066-8516-002 (Through-Hole) for use with
120-8552-305
120-8552-306
120-8552-307

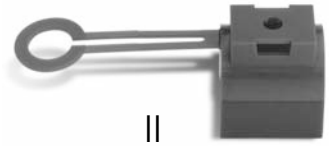


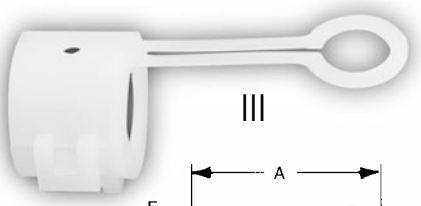


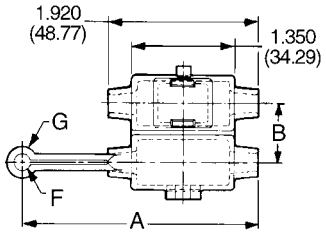
Mounting Dimensions

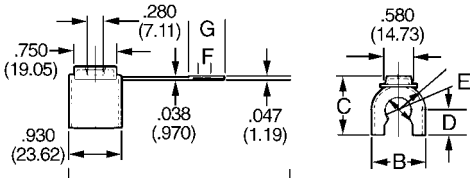
NEW! Use Nutplate part number M85528/2-18A .
Use Sealing Screws for mounting, see Accessories on page SS 12.

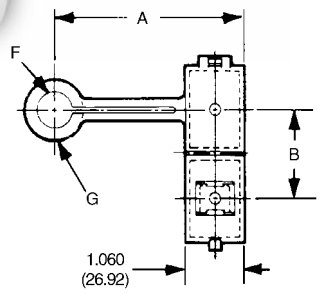
Mounting Clip (Sure-Seal® only)









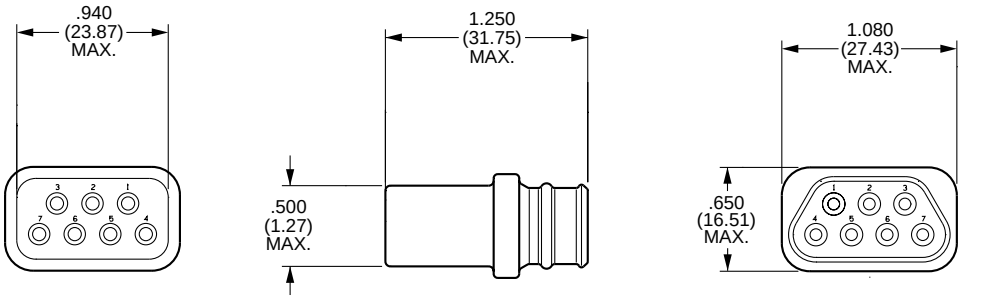


Style	Body Identifier	Part Number	Colors	A Max.	B +/-.01	C	D	E	F Max.	G Max.
I	SS-1C	026-0452-000	Black	2.225 (56.52)	.740 (18.80)	–	–	–	.210 (5.33)	.390 (9.91)
II	SS-2C	029-0263-000	Red	2.443 (62.04)	.886 (22.50)	1.000 (25.40)	.420 (10.67)	.420 (10.67)	.400 (10.16)	.650 (16.51)
II	SS-3-4C	029-0262-000	Yellow	2.443 (62.04)	.926 (23.52)	1.053 (26.74)	.450 (11.43)	.480 (12.19)	.400 (10.16)	.650 (16.51)
III	SS-5-7C	026-0450-000	Natural	3.045 (77.34)	1.395 (35.43)	–	–	–	.610 (15.49)	.910 (23.11)
III	SS-8-10C	026-0451-000	Black	3.045 (77.34)	1.520 (38.61)	–	–	–	.660 (16.76)	.960 (24.38)

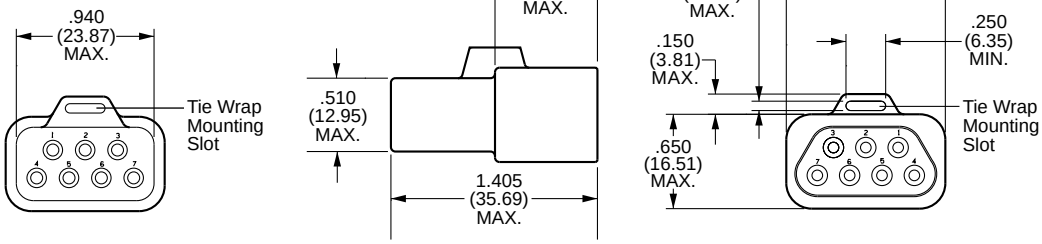
Special Products

Rectangular Sure-Seal® Connector

Part Number
120-1873-007



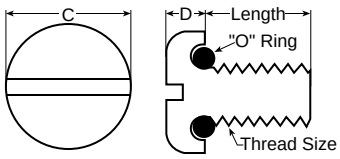
Part Number
120-1874-007



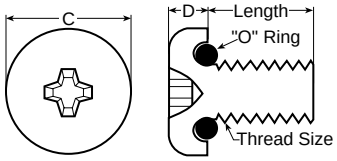
Accessories

Sealing Screws

Sealing screws are designed with a groove underneath the head to incorporate an O-ring. When tightened, the O-ring is compressed against the connector flange to form an air, water, and gas-tight seal. Sealing screws are used in conjunction with the nutplates below.



(S) Slotted Pan Head



(R) Phillips Pan Head

Part Number	Thread	Length	C Max	D Max	Clear Hole Min	Clear Hole Max
S-440-1/2	4-40NC-2A	1/2"	.220"	.069"	.125"	.129"
R-440-1/2	4-40NC-2A	1/2"	.238"	.080"	.125"	.129"

Nut Plates

Nutplates should be used in conjunction with mounting plates. Nutplates eliminate the need for loose nuts which are often difficult to negotiate in confined areas. As well, they effectively distribute the screw tension across the back of the panel. The bracket is aluminum alloy with Alodine plating, and the nuts are steel alloy plated cadmium. Nutplates mate with above sealing screws.

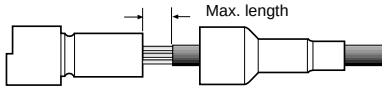
Nut Plate P/N (uses 4-40 screws)	For Sure Seal P/Ns
M85528/2-14A	120-8552-200 120-8552-201 120-8552-202
M85528/2-18A	120-8552-305 120-8552-306 120-8552-307

Alcohol Pen

Isopropyl alcohol is the only lubricant recommended by Sure Seal Connections to ease insertion of contacts into the Sure Seal connector cavity. This pen is small and easy to manipulate, dispensing as much or as little alcohol as needed directly onto the contact or into the cavity. Perfect for tool kits, shirt pockets, or anywhere a larger container might be inconvenient.

Part Number
1610N

Wire and Jacketed Cable Preparation



Strip wires to appropriate length (See contact chart on page SS 6 for strip lengths). If using a boot, strip jacket so no more than listed dimension is exposed when contact is full inserted.

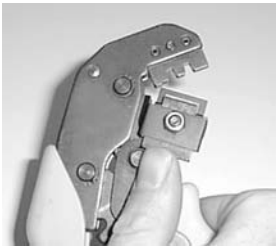
Note: Try stripping back jacket approximately **1.25 inches (32mm)** because strip lengths will vary depending on cable being used.

# Circuits	Max. exposed length Inches (mm)
2, 3, 4	.87 (22)
5, 6, 7	1.02 (26)
8, 9, 10	1.02 (26)

Sure Seal Hand Crimp Tool Operation Instructions

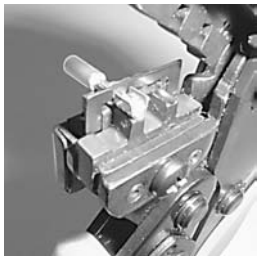
1. Squeeze handles until tool has gone through a complete cycle and opens easily.

2. Select the proper cavity for the wire size to be crimped.



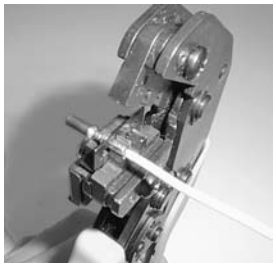
3. Using your thumb or forefinger, raise the spring-loaded locator on the back of the lower jaw by pushing up.

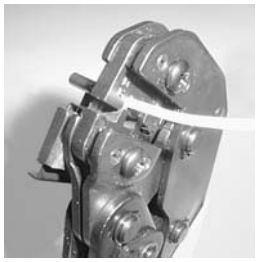
4. While the locator is in the up position, place the contact into the front of the tool (crimp side up) in the proper crimp cavity (18-16 AWG or 14 AWG).



5. Release the locator. The locator should rest comfortably in the indent in the contact just above the crimp area.

6. Insert the stripped wire into the crimp area until it bottoms.





7. Firmly squeeze the handle until the crimp jaw ratchet releases.

8. Using your thumb or forefinger, raise the spring loaded locator and remove the crimped contact and wire. See page SS 14 for crimp inspection

Power Sure-Seal® Machined Contact Crimp Tool

400BHD

The SS400BHD is a pneumatically power heavy duty crimp tool designed for contacts that are too large to be crimped by hand tools. The SS400BHD comes with a power unit and bench mounting bracket. The SS400BHD is actuated with either the standard handle actuating switch or optional Pneumatic Foot Pedal (PFP). Crimp Die Kits are ordered separately (see page SS 7). It is highly recommended that you provide a sample of your wire when ordering these Crimp Die Kits. Your wire sample will be crimped and tested for proper crimp tensile strength.

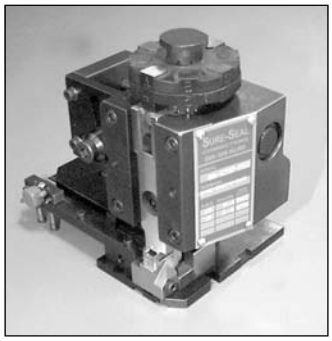
Power Requirements: 90-125 PSI 1-2 CFM of dry, oil free, air

Operating Instructions: (Call for operating instructions)

Assembly Instructions

Semi/Automatic Crimp Tooling

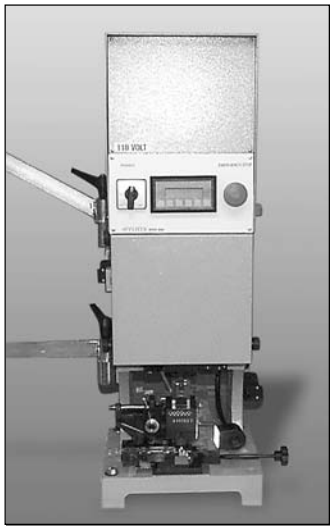
Mini Applicator



The Sure-Seal mini-applicator is designed for use in most common crimping presses and automatic wire processing systems. It utilizes a quick change mounting system, which allows the applicator to be installed or removed in two quick steps. This makes the change over from one applicator to another for crimping a variety of contacts utilizing the same press fast and easy. We offer this side-feed applicator for our most popular stamped and formed terminals (see below).

Applicator	Terminal
SSMA-SSI	110238-0195 & 110238-0194
SSMA-SS	110238-0040 & 110238-0085
MSSMA-SSI	121348-0100 & 121347-0100

M6000 Heavy Duty Press



The M6000 3-ton, heavy duty press is compatible with most side-feed mini-applicators for automated terminal crimping. It has a greater capacity than most presses available, which translates to increased capability. Our M6000 will crimp up to 8AWG (most presses are 2.5 tons and crimp up to 12AWG only). Other features include: solid state electronic control, split cycle and jog cycle modes, 1.5 hp motor/ 1400 RPM. Power supply 110V.

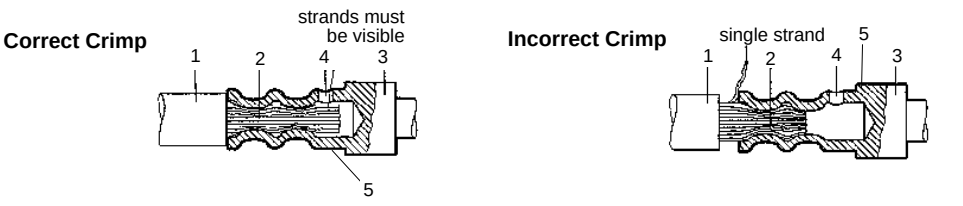
Crimp monitors and counters are also available. Call for more information.

Crimp Inspection

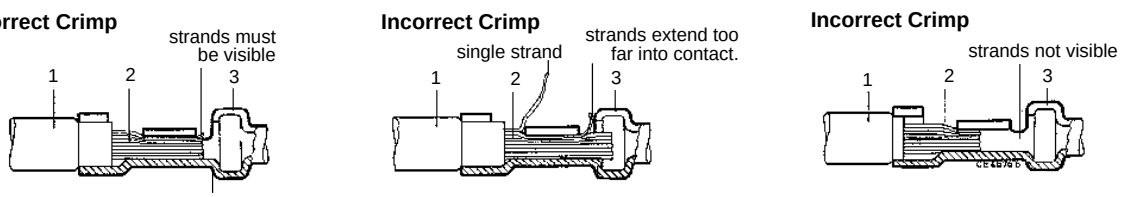
Micro sections: Enlargement of micro section allows for final judgment of crimp quality. This test is recommended whenever new tools or new types of wire are used.
NOTE: For accurate pull test results when crimping insulation support contacts (030-2196-001 & 031-1267-001), strip wire back .3" so that the insulation support tine does not crimp onto insulation.

1 insulation
2 strands
3 contact
4 wire inspection hole
5 shoulder

For machined power contacts



For stamped contacts

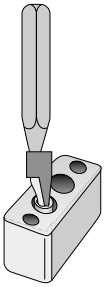


Manual Insertion of Contacts

1. Affix proper connector holding block to stable surface (i.e. vice or table). See Connector Selection table, page SS 5, for proper holding block.

2. If a jacket wire sealing boot is to be used, it must be slid up the cable (isopropyl alcohol will help in doing this).
3. Dip connector in isopropyl alcohol and place in holding block with the back end up (wire side).

4. Using proper contact insertion tool, (see Contact Selection table for proper tool):
   A. place contact in groove of tool
   B. make sure that end of the tool is up against the shoulder of the contact.



5. Insert contact into proper cavity of the connector body by applying constant pressure until contact snaps into place. Isopropyl alcohol will help in doing this. (Warning: Do not tilt the tool during the insertion).
6. Insert all remaining contacts. To insure environmental sealing of the connector any empty contact cavities must be filled with wire hole fillers (see Contact Selection table, page SS 5, for proper wire hole filler).

7. Check mating side of the connector to be sure that all contacts are on the same plane (fully inserted).
8. If you are using jacket sealing boot, slide the boot down the cable and onto the connector.
9. Remove connector and wire assembly from holding block.

Pneumatic Automatic Insertion Tool (Leased)

CBIT-SS-150

The CBIT-SS-150 Sure-Seal® insertion machine is pneumatically powered, and microprocessor controlled. It is designed to insert pre-crimped wires into the standard Sure-Seal® plug and receptacle housings for moderate to high volume applications. This machine is used for SS2P/R through SS10P/R including the 120-1873-007 and 120-1874-007 rectangular style Sure-Seal® connectors.

The benefits of using this insertion machine are:

▪Ease of operation	Short operator training time
	Reduces operator fatigue and insertion errors
	Quick change over for different connectors sizes
▪Low cycle time	Much faster than manual insertion
▪High connector integrity	Lower chance of damaging the wire sealing ripples

Power Requirements: Electrical = 115 Vac, 60 Hz
Pneumatic = 80 PSI, 10 CFM dry oil free filtered air

Extraction of Contacts

1. Slide up any rear accessories (i.e. jacket cable sealing boots). Using isopropyl alcohol will help you slide these up your cable.
2. Grasp individual wire firmly and gently pull the contact out of the connector.

* Extraction tool available DRK152, please call.

Sure-Seal® Circular Connectors

Typical: Power Sure-Seal®, Flange Sure-Seal®, and Mini Sure-Seal® are essentially the same except for mechanical and amperage capacity differences. Sure-Seal® products are designed to meet specification CS-155. Items of most general interest to users and designers are listed below. With its current capability and large size, Power Sure-Seal® contacts and currents are covered in CS-169.

Test Description	Reference Paragraph	Requirements
Environmental Sealing	3.5.1	Sure-Seal® connectors when mated shall form an environmental seal against water, moisture, aqueous solutions, oils and certain chemicals as well as dust and dirt. Tests include immersion in 3 feet depth in water solution containing 5% salt.
Contact Tensile Strength–Crimp	3.6.12	The minimum tensile load required to separate the wire from the contact, either by pulling the wire out of the crimp joint or breaking the wire within the crimp joint, shall not be less than the applicable limits as specified. Wire breakage, or contact damage not due to crimping, at less than tensile loads shall not constitute failure.

Crimp Tensile Strength, Pounds Minimum

Wire Size AWG	Without Insulation Support Contacts	With Insulation Support Contacts	Wire Size AWG	Without Insulation Support Contacts	With Insulation Support Contacts	Wire Size AWG	Without Insulation Support Contacts	With Insulation Support Contacts
4	140	—	10	80	—	18	25	25
6	100	—	14	35	35	20	—	20
8	90	—	16	35	35			

Insulation Resistance	4.4.1	Properly assembled and mated connectors shall be tested in accordance with MIL-STD-202, Method 302, except a potential of 500 ± 15 volt DC shall be used. The resistance shall be measured between adjacent parts of contacts (or contacts to ground for SS-1) and shall not be less than 100 MΩ. If the specimen has been immersed in fluid in the preceding test, it shall be placed wet on a conducting surface and insulation resistance measured within 5 minutes between each contact and also between each contact and the conducting surface (except for SS-1 to be measured contact to ground while immersed).
Dielectric Withstanding Voltage	4.4.2	Assembled and mated connectors shall show no evidence of breakdown between adjacent contacts (or contact to ground for SS-1) when tested in accordance with MIL-STD-202, Method 301, and a test voltage of 1200 ± 15 volts A.C.
Contact Resistance	4.4.3	The contact resistance of mated contacts shall be such that the resistance measured across the contacts and 5/8" behind the crimp junction shall not exceed 10 mΩ. Test current to be 1 amp, and MIL-STD-202, Method 307.
Shock	4.4.4	Mated connectors properly mounted shall be subjected to the shock test in accordance with MIL-STD-202, Method 213B, CONDITION B. The shock test shall be repeated three (3) times in each of X, Y & Z axis. Suitable means shall be employed to monitor the current flow. Current discontinuity of 1 microsecond or more, disengagement of the mated connectors, evidence of cracking, breaking or loosening of parts shall be cause for rejection.
Vibration	4.4.5	Properly assembled and mated connectors shall be mounted to the vibration table, with the wire leads strapped to a vibrating member approximately 3 inches from each end of the connector body and vibrated with a peak-to-peak amplitude of .25 inch across a frequency range of 5 to 39Hz, and a ±20g acceleration across 39 to 55 Hz, swept up in one minute and down in another minute. The vibration shall be swept up and down for a total of 36 hours under the following conditions: Six (6) hours at 180°F (82°C) along the longitudinal axis Six (6) hours at 180°F (82°C) along a perpendicular axis Six (6) hours at room temperature along the longitudinal axis Six (6) hours at room temperature along a perpendicular axis Six (6) hours at -40°F (-40°C) along the longitudinal axis Six (6) hours at -40°F (-40°C) along a perpendicular axis The connectors shall be connected in a series circuit with a minimum of 0.1 ampere flowing through the contacts. Electrical continuity shall be continually monitored. Breaks in continuity longer than one microsecond shall be cause for rejection.
Durability	4.4.6	The connectors shall be subjected to 25 cycles of mating and unmating at -10°C and another 25 cycles at 50°C. There shall be no evidence of damage to the contacts, the contact plating, the insulators or sealing rings, which would be detrimental to connector function.
Contact Retention	4.4.7	With the connector plug or receptacle held firmly, an axial dead weight of 7.5 lbs. shall be imposed on each wire for one minute without the contacts being dislodged from the connector. Plugs and receptacles to be tested separately.
Maintenance Aging	4.4.8	Each wired receptacle and plug shall be subjected to 5 cycles of contact insertion and extraction in the same cavity using the approved tools. Plug and receptacle are to be tested separately. After the 5 cycles of insertion and extraction, each plug and receptacle in turn will be subjected to the contact retention test of 6 lbs. per paragraph 4.4.7.
Connector Separating Force	4.4.11	Using an assembled and mated connector with the receptacle held firmly by the wires, a load shall be applied to the wires of the plug until the connector is completely separated. The rate of loading shall be one inch per minute. The sample shall fall within the limits specified as follows:

Connector Size	Unmating Forces (lbs.) max.	min.	Connector Size	Unmating Forces (lbs.) max.	min.
SS-1	12	6	SS-4	20	9
SS-2	15	6	SS-5/7	30	10
SS-3	18	8	SS-8/10	55	10

Solvent Resistance			Wired and mated connectors shall be subjected to the applicable fluids for the length of time specified. Following the test the connectors shall be immersed to a depth of 3 feet in salt water for 24 hours at room temperature. At the completion of the salt water immersion test and while still immersed insulation resistance shall be measured. Failure to meet the insulation resistance requirements shall be cause for rejection.
	4.4.13	Gasoline Splash	1 second dip - 3 minute air dry for 80 cycles at room ambient temperature.
	4.4.14	Diesel Fuel Splash	1 second dip - 3 minute air dry for 80 cycles at room ambient temperature.
	4.4.15	Automotive Lubricating Oil	Immersed in S.A.E. 30 weight lubricating oil for 1 hour.
	4.4.16	Antifreeze	Immersed at 120°F (49°C) for 48 hours.
	4.4.17	Brake Fluid	Immersed at room ambient temperature for 24 hours.
	4.4.18	Automatic Transmission Fluid	Immersed at 120°F (49°C) for 48 hours.
	4.4.19	Gasoline Vapor	Immersed in a gasoline vapor atmosphere at room temperature for 48 hours.
Weather and Ozone Resistance	4.4.20		Wired and properly mated connectors shall be subjected to ozone test per ASTMD-1149 except that 100 ppm of ozones shall be used. The duration of the test shall be 7 days. Outdoor exposure to be conducted per ASTM D-1171. The connector shall show no cracking or other degradation which would result in loss of sealing integrity.
High Temperature Long-Term	4.4.23		Wired mated connectors shall be tested in accordance with MIL-STD-202 Method 108A, Test Condition D at 105°C for 1000 hours. Following the test, they shall be subjected to 3 feet salt water immersion for 24 hours. While immersed, insulation resistance shall be determined. Failure to meet the insulation resistance requirements shall be cause for rejection.
UV	-		Sure Seal Connections has recently completed testing of the Sure Seal PVC Nitrile material (SM 3400-06) for UV resistance. The material was tested in accordance with ASTM G-26 (Xenon Arc), 720 hours exposure with no loss in tensile strength and greater than 75% retention of elongation.

Caution: "Sure-Seal® connectors are rated for use between temperatures of -40 to + 105 degrees Celsius. However, if a Sure-Seal® connector is exposed for long periods of time to temperatures exceeding 85 degrees Celsius and is unmated, it may lose its environmental sealing integrity upon remating. Thus, we recommend that both the plug and receptacle be replaced if environmental sealing is required after remating."

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USA Sales Offices

Corporate Headquarters

2180 Hornig Road
Philadelphia, PA 19116-4289
1-800-523-0727
215-673-0400
FAX: 215-552-8022

800 Hart Road, Suite 260
Barrington, IL 60010-2630
1-877-539-5364
847-382-9300
FAX: 847-382-9768

1915 N. Bendix Drive
South Bend, IN 46628-1603
1-800-348-2996
219-287-2911
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7168 Waldemar Drive
Building #116
Indianapolis, IN 46268-2183
1-800-428-5081
317-328-7700
FAX: 317-328-7717

354 McDonnell Street
Suite Six
Lewisville, TX 75057-4832
1-800-780-8463

3951 South Plaza Drive
Suite 240
Santa Ana, CA 92704-6954
1-800-692-2186
714-428-1188
FAX: 714-428-1194

45 Stiles Road, Suite 206
Salem, NH 03079-4808
1-877-751-1168
603-898-3444
FAX: 603-898-7872

27322 23 Mile Road, Suite 2
Chesterfield, MI 48051
1-866-280-4734
810-948-4734
FAX: 810-948-4211

International Sales Offices

PEI-Genesis UK LTD

Unit 23, Headley Park 10
Woodley, Reading,
Berkshire RG5 4SW
0118 969 3444
FAX: 0118 969 4777

International Sales Office

9 Dexter Street
Selden, NY 11784-2273, USA
631-696-8140
FAX: 631-696-0299

Canada

316 Colborne Street West
Whitby, Ontario L1N 1X3, CANADA
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