# Powerpole® & Multipole

## Connectors | 10A up to 550A

- *Battery Charging* • *Material Handling* • *E-Mobility*
- *Telecommunications* • *Industrial* • *Commercial Applications*



APP®
Anderson Power Products®

An IDEAL Company

# SBE® 80 / SBO® 60 Connectors

## Up to 80 Amps



SBE® and SBO® connectors build on the capability of the two pole SB® connectors by offering up to 8 auxiliary power / signal contacts along with an IEC 60950 touch safe housing. The center of the main connector features a connector holder for either: two PP15/45, two PPMX, or APP's innovative 1x4 auxiliary connector.

- **Touch Safe Interface**
  *Minimizes potential contact with live circuits per IEC 60950*
- **Up to 8 Last Mate / First Break Auxiliaries**
  *Enables intelligent power switching, CAN and interlock loop circuitry, as well as power up to 20 amps per pole*
- **Silver Plated Wire Contacts up to 4 (25 mm²)**
  *Allows UL rated currents up to 80 amps per pole*



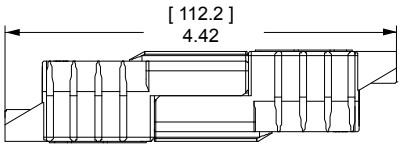
## SBE® 80 / SBO® 60 ORDERING INFORMATION

### SBE® 80 / SBO® 60 Housings

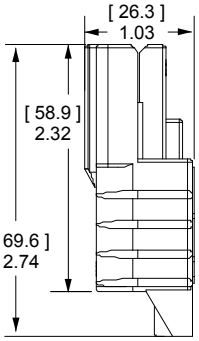
The smallest size of SBE®, X, O style housing. SBE® 80 and SBO® 60 housings of the same Voltage Color-Code can be mated but is not recommended as it invalidates UL approvals for SBO® 60. SBO® 60 housings do not meet EN1175-1 requirements for industrial trucks.

| Description | SBE® 80 Part Numbers | | SBO® 60 Part Numbers | |
|---|---|---|---|---|
| Minimum Quantity | 400 | 25 | 400 | 25 |
| Yellow | SBE80YEL-BK | SBE80YEL | SBO60YEL-BK | SBO60YEL |
| Orange | SBE80ORN-BK | SBE80ORN | SBO60ORN-BK | SBO60ORN |
| Red | SBE80RED-BK | SBE80RED | SBO60RED-BK | SBO60RED |
| Gray | SBE80GRA-BK | SBE80GRA | N/A | N/A |
| White | N/A | N/A | SBO60WHT-BK | SBO60WHT |

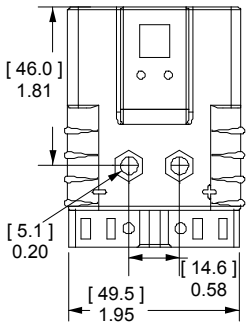
Mated Length




Side View




Top View

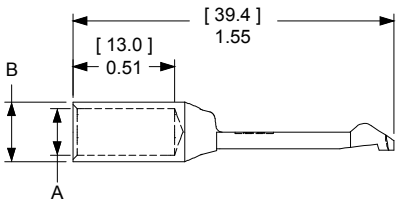


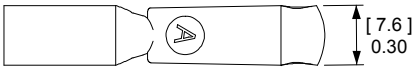

### SBE® 80 / SBO® 60 Silver Plated Primary Power Wire Contacts

Use two silver plated contacts per housing for the best electrical performance and durability up to 10,000 mating cycles. See reducing bushings in accessory section for smaller wire size.

| AWG | mm² | Mating Force | Loose Piece Part Numbers | | Dimensions - A - inches | A mm | - B - inches | B mm |
|---|---|---|---|---|---|---|---|---|
| Minimum Quantity | | | 1,000 | 100 | | | | |
| 4 | 25 | Low | 1339G4-BK | 1339G4 * | 0.28 | 7.11 | 0.35 | 9.0 |
| 6 | 16 | High | 1339G1-BK | 1339G1 * | 0.22 | 5.59 | 0.29 | 7.3 |

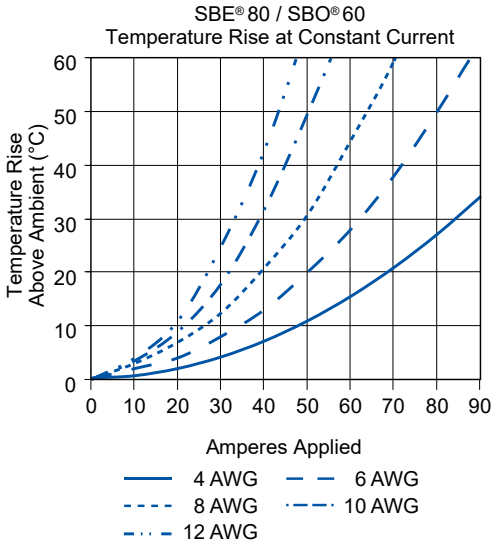
* Sold as pairs. 2 parts shipped for every 1 part ordered.

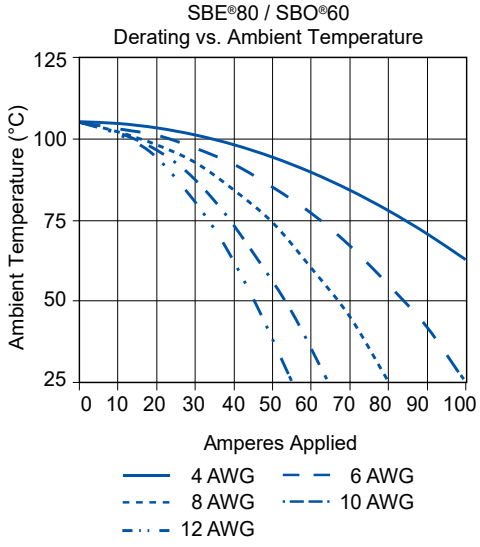


# SBE® 80 / SBO® 60 CONNECTOR TEMPERATURE CHARTS - Temperature rise charts are based on a 25°C ambient temperature.

Current - Temperature Derating per IEC 60512-5-2 Test 5B




# SBE® 80 / SBO® 60 CONNECTOR SPECIFICATIONS

| ELECTRICAL | | |
|---|---|---|
| **Current Rating Amperes [1]** | **SBO® 60** | **SBE® 80** |
| Primary Power (6 AWG) | 70 | 80 |
| Powerpole® Auxiliary (12 AWG) | 20 | 20 |
| 1x4 Auxiliary (12 AWG) | 20 | 20 |
| PPMX Auxiliary (20 AWG) | 7 UL | 5 CSA |
| **Voltage Rating AC/DC** | **UL 1977** | **EN1175-1** |
| Primary Power | 600 | 150 [4] |
| Powerpole® Auxiliary | 600 | 150 [4] |
| 1x4 Auxiliary | 200 | |
| PPMX Auxiliary | 300 | |
| **Dielectric Withstanding Voltage Primary Power** | | |
| Volts AC | 2,200 | |
| ***Avg. Mated Contact Resistance Milliohms [1]*** | | |
| 1 1/4" of 6 AWG wire | 0.200 | |
| **Hot Plug Current Rating Amperes - 250 Cycles at 120V DC** | | |
| Power | 60A | |
| Powerpole® Auxiliary | 30A | |
| 1x4 Auxiliary | 5A | |

*Specifications continued on next page*

## MATERIALS

| | |
|---|---|
| **Housing** | |
| SBE® / SBO® & 1x4 Auxiliary Housing | Polycarbonate / PBT blend |
| Powerpole® Plastic Resin | Polycarbonate |
| Contact Retention Spring | Stainless Steel |
| **Housing Flammability Rating** | |
| UL94 | V-0 |
| Glow Wire - SBE® 80 Only | 960°C (GWFI) / 800°C (GWIT) |
| **Power & Powerpole® Contact** | Silver Plated Copper Alloy |
| **1x4 Auxiliary Contacts** | |
| Pin | Copper alloy, Au over Ni |
| Socket | BeCu, Au over Ni |
| Socket Body | Copper Alloy, Sn Bright Over Ni |
| Retention Clip | Stainless Steel |
| **PPMX Contacts** | Gold Plated Copper Alloy |
| **Contact Termination Methods** | |
| Crimp [3] | |
| Hand Solder | |

c UL us File No. E26226 RoHS COMPLIANT APP © CSA Certified File No. LR25154 REACH COMPLIANCE APP

*NOTE 1: See IEC 60664-1 for working voltage.*
*NOTE 2: Amp ratings are stated per position and based on all positions being fully loaded.*
*1 - Based on: 105°C rated or better cable of the largest size. Properly calibrated APP® recommended tooling, and a 25°C ambient temperature. UL rating not to exceed the maximum operating temperature. CSA rating below a 30°C temperature rise. Only SBO® 60 has UL recognition.*
*2 - Limited by the thermal properties of the connector plastic housing.*
*3 - Use APP® recommended tooling only. Alternate tools may adversely affect the performance of our connectors along with UL and CSA recognition.*
*4 - Voltage capability of SBE® housings is identical to SBO®, but derated to meet EN1175-1 requirements.*

## MECHANICAL

| **Wire Size Range** | **AWG** | **mm²** |
|---|---|---|
| Power Contacts | 6 to 4 | 16 to 25 |
| Auxiliary Contacts | 24 to 10 | 0.25 to 5.3 |
| **Max. Wire Insulation Diameter** | **in.** | **mm** |
| Power Contacts | 0.440 | 11.200 |
| Powerpole® Auxiliary | 0.175 | 4.450 |
| 1x4 Auxiliary | 0.140 | 3.600 |
| **Operating Temperature [2]** | **°F** | **°C** |
| SBO® and SBE® Housings | -4° to 221° | -20° to 105° |
| **Mating Cycles No Load by Plating** | **Silver (Ag)** | **Gold (Au)** |
| Power Contacts | 10,000 | |
| Powerpole® Auxiliary | 10,000 | |
| 1x4 Auxiliary | | 10,000 |
| PPMX Auxiliary | | 5,000 |
| **Avg. Mating / Unmating Force** | **Lbf.** | **N** |
| Main Connector Housing | 16 | 70 |
| Per Powerpole® Connector | 5 | 22 |
| Per Contact in 1x4 Auxiliary | 0.7 | 3.0 |
| Per PPMX Housing | 4.50 | 20.00 |
| **Min. Contact / Spring Retention Force** | **Lbf.** | **N** |
| Power Standard Housing | 50 | 222 |
| Powerpole® Housing | 25 | 111 |
| 1x4 Auxiliary Housing | 10 | 44.5 |
| PPMX Housing | 12 | 53 |

# IEC INFORMATION

| Connector Series | Configurations | Creepage / Clearance per IEC 60950-1 | Material Group |
|---|---|---|---|
| **SBE® 80** | Unmated | 4.23 mm | IIIa |
| | Mated | 7.9 mm | |

## PROTECTION

**Touch Safety Main Connector Housing**

| | |
|---|---|
| IEC 60950 | Pass |
| IEC 60529 | IP20 |

TÜV Rheinland BAUART GEPRÜFT TYPE APPROVED

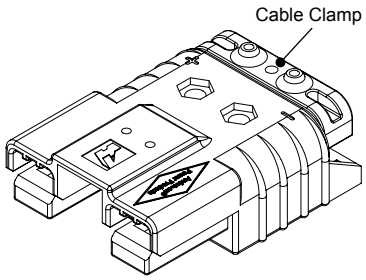


All Data Subject To Change Without Notice

# SBE® 80 / SBO® 60 ACCESSORIES

## Cable Clamps

Clamps are made out the same chemical resistant PBT material that is used in the SBE® housings. Clamp holds the cable between the clamp piece and the connector housing. Screws must be ordered separately for part numbers starting with “113”.

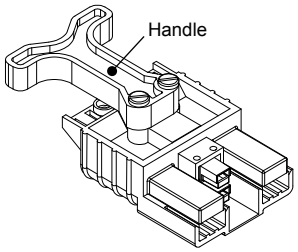



| Description | Part Numbers | |
|---|---|---|
| Minimum Quantity | 100 | 25 |
| Red Clamp and Hardware Kit | - | SBE80CLPRED or SBO60CLPRED |
| Red Clamp Only | 113953P1 | - |
| Screws (2 per clamp) | H1120P42 (Individual) | - |

## “T” Handle *

Handles are made out the same chemical resistant PBT material that is used in the SBE® housings. (2) screws and (2) nuts are required to attach each handle.

| Description | Part Numbers | | |
|---|---|---|---|
| Minimum Quantity | 500 | 100 | 25 |
| Red Handle and Hardware Kit | - | - | SBE80HDLRED or SBO60HDLRED |
| Red Handle Only | 113952P1 | - | - |
| Hardware Bag | - | - | 105G13 |
| M5 x 35mm Screws | - | 113715P4 | - |
| M5 Nut | - | 113716P3 | - |

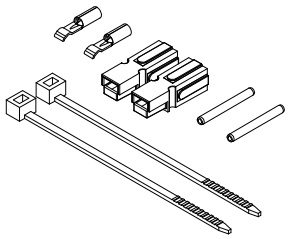



* Torque value 12 (in - lbs) / 1.4 (Nm)

*NOTE: For assembly of clamp to housing only*

## Powerpole® Auxiliary

Powerpole® auxiliary connectors are rated up to 30 amps 600 volts and can be used for auxiliary power, control or sensing. The auxiliary kit includes (1) each black and red Standard Powerpole® housing, (2) contacts, (2) zip cable straps, and (2) retaining pins.

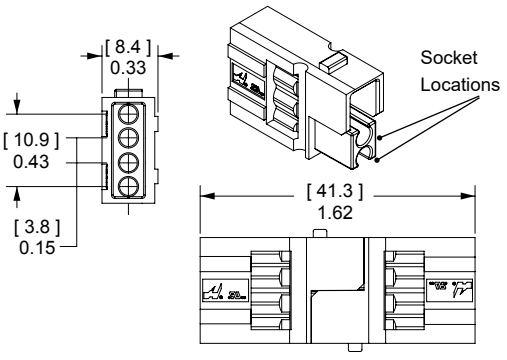


| Description | Part Numbers | |
|---|---|---|
| Minimum Quantity | 200 | 25 |
| Powerpole® Auxiliary Kit | - | 6344 |
| Black Powerpole® Housing | 1327G6 | - |
| Red Powerpole® Housing | 1327 | - |
| 16 to 12 Contact | 1331 | - |
| Retaining Pin | - | - |

*NOTE: Finger proof PP15/45 housings should not be used for auxiliary contacts.*

## 1x4 Auxiliary Connector

The unique 1x4 auxiliary connector allows up to 4 auxiliary circuits up to 20 amps 200 volts each in SBE®, SBO®, & SBX® housings. The genderless design holds two each of the gold plated pin & socket contacts. This innovation allows the very durable and cost effective design of SBE®, O, X connectors to substitute for DIN 43589-1 applications where 4 auxiliary contacts are required. Multiple pin lengths allow the further benefit of sequencing between circuits. (2) Retaining pins are required to hold the auxiliary housing in place. Auxiliary Kits include (1) Auxiliary Housing, (2) Standard Length Pin Contacts, and (2) Socket Contacts, (2) Retaining Pins and (1) Retaining Clip.

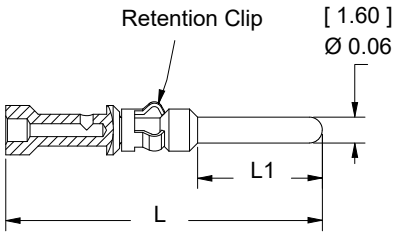



| Description | AWG | mm² | Part Numbers | | |
|---|---|---|---|---|---|
| Minimum Quantity | | | 1,000 | 250 | 25 |
| 1x4 Auxiliary Kit | 12 | 4 | - | - | 441G3 |
| 1x4 Auxiliary Kit | 16 to 14 | 1.5 to 2.5 | - | - | 441G1 |
| 1x4 Auxiliary Kit | 20 to 16 | 0.75 to 1.5 | - | - | 441G2 |
| 1x4 Auxiliary Housing | Contacts Sold Separately | | 3-5956P1 | 444G1 | - |

## Pin Contacts for 1x4 Auxiliary Connector

Gold plated contacts are available in 4 lengths to allow sequencing of circuits.

| Description | AWG | mm² | Part Numbers | |
|---|---|---|---|---|
| Minimum Quantity | | | 500 | 50 |
| Standard Length 7.7 mm | 12 | 2.5 | PM16P12S30 | PM16P12S30-50 |
| | 16 to 14 | 1.0 to 1.5 | PM16P1416S30 | PM16P1416S30-50 |
| | 20 to 16 | 0.75 to 1.0 | PM16P1620S30 | PM16P1620S30-50 |
| | 24 to 20 | 0.50 to 0.75 | PM16P2024S30 | PM16P2024S30-50 |
| Pre-Mate 9.3 mm | 12 | 2.5 | PM16P12A30 | - |
| | 16 to 14 | 1.0 to 1.5 | PM16P1416A30 | - |
| | 20 to 16 | 0.75 to 1.0 | PM16P1620A30 | - |
| | 24 to 20 | 0.50 to 0.75 | PM16P2024A30 | - |
| Post-Mate 6.4 mm | 12 | 2.5 | PM16P12C30 | - |
| | 16 to 14 | 1.0 to 1.5 | PM16P1416C30 | - |
| | 20 to 16 | 0.75 to 1.0 | PM16P1620C30 | - |
| | 24 to 20 | 0.50 to 0.75 | PM16P2024C30 | - |

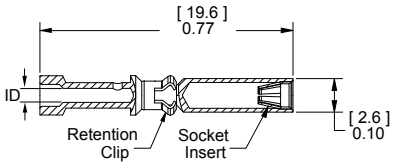



| Auxiliary Pin Contact Lengths | - L - | | - L1 - | |
|---|---|---|---|---|
| | in. | mm | in. | mm |
| **Standard Length 7.7 mm** | 0.77 | 19.6 | 0.30 | 7.7 |
| **Pre-Mate 9.3 mm** | 0.83 | 21.2 | 0.37 | 9.3 |
| **Post-Mate 6.4 mm** | 0.72 | 18.3 | 0.25 | 6.4 |

## Socket Contacts for 1x4 Auxiliary Connector

Selectively gold plated contacts offer low resistance and durability up to 10,000 mating cycles.

| Description | AWG | mm² | Part Numbers | |
|---|---|---|---|---|
| Minimum Quantity | | | 500 | 50 |
| Socket Contact | 12 | 2.5 | PM16S12S32 | PM16S12S32-50 |
| | 16 to 14 | 1.0 to 1.5 | PM16S1416S32 | PM16S1416S32-50 |
| | 20 to 16 | 0.75 to 1.0 | PM16S1620S32 | PM16S1620S32-50 |
| | 24 to 20 | 0.50 to 0.75 | PM16S2024S32 | PM16S2024S32-50 |




| Auxiliary Socket Contacts Crimp Barrel ID | | |
|---|---|---|
| **Wire Gauge** | **in.** | **mm.** |
| 24 to 20 | 0.04 | 1.1 |
| 20 to 16 | 0.07 | 1.7 |
| 16 to 14 | 0.08 | 2.1 |
| 12 | 0.10 | 2.6 |

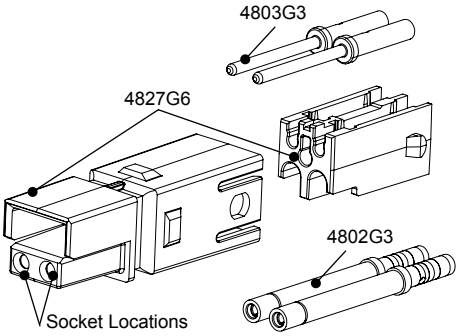
## PPMX Auxiliary Connector

The PPMX auxiliary connector allows up to 8 auxiliary circuits to be used in the SBE®, SBO®, & SBX® housings. There are 4 auxiliary circuits per PPMX connector and two PPMX housings fit into the auxiliary port in the main connector housing. Rated up to 7 amps 300 volts per contact, the genderless design holds two each gold plated pin & socket contacts. This innovation allows the very durable and cost effective equipment design of SBE®, O, X connectors to be used for applications requiring up to 8 battery monitoring or vehicle communication circuits. (2) Retaining pins or (1) Retaining clip is required to hold the auxiliary housing in place.

Auxiliary Kits include (1) Auxiliary Housing, (2) Pin Contacts, and (2) Socket Contacts.

| Description | AWG | mm² | Part Numbers | | |
|---|---|---|---|---|---|
| Minimum Quantity | | | 1,000 | 100 | 25 |
| PPMX Auxiliary Kit | 24 to 20 | 0.50 to 0.25 | - | 4850G6 | - |
| 1x4 Auxiliary Housing | Contacts Sold Separately | | 4827G6-BK | - | 4827G6 |

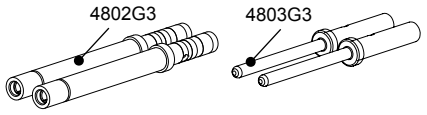
* No extraction tool required for contact removal.



## Pin & Socket Contacts for PPMX Auxiliary Connector

Gold plated contacts are ideal for signal or low power use with durability up to 5,000 mating cycles.

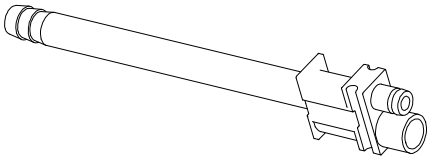
| Description | AWG | mm² | Part Numbers | |
|---|---|---|---|---|
| Minimum Quantity | | | 2,000 | 50 |
| Pin Contacts | 24 to 20 | 0.50 to 0.25 | 4803G3-BK | 4803G3 |
| Socket Contacts | 24 to 20 | 0.50 to 0.25 | 4802G3-BK | 4802G3 |




*NOTE: Contacts sold individually, not sold as a set of two.*

## SBE® Air Tubes

Air tubes fit into SBE® housings to allow electrolyte circulation while charging the battery. Genderless tube design allows the same part to be used on both sides. (2) Retaining pins are required to hold the air tube in place. Retaining pins are included in Air Tube Kit.

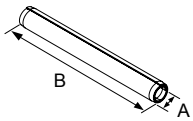


| Description | Part Numbers | |
|---|---|---|
| Minimum Quantity | 500 | 25 |
| Air Tube Kit, Black | - | 6396G1 |
| Air Tube Only | 3-5798P1 | - |

## Retaining Pins

Retaining pins are used to hold accessories in the auxiliary port in SBE®, SBO®, & SBX® housings. Dimension “B” is +/- 0.015 in or 0.38 mm.

| Description | Part Numbers | | Dimensions - A - inches | Dimensions - A - mm | Dimensions - B - inches | Dimensions - B - mm |
|---|---|---|---|---|---|---|
| Minimum Quantity | 1,000 | 100 | | | | |
| For SBE® 80 & SB0® 60 | 110G9-BK | 110G9 | 0.093 / 0.099 | 2.36 / 2.51 | 0.85 | 21.59 |

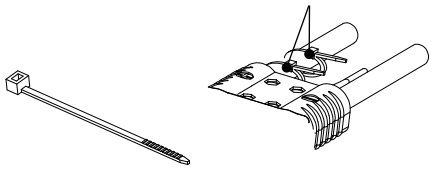



## Zip Cable Straps

Zip cable straps are used to secure auxiliary wires to the side of the main power cables.

| Description | Part Number |
|---|---|
| Minimum Quantity | 1,000 |
| White | H1835P3 |

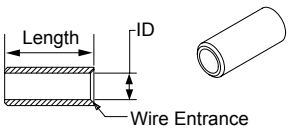
Use cable ties to secure auxiliary contact leads to one of the main cables.



## Reducing Bushings

Use with contact part number 1339G1 to allow a smaller wire to be used with the connector. Electrical capability is derated with smaller wire.

| Contact Barrel Size AWG | Contact Barrel Size mm² | Wire Size AWG | Wire Size mm² | Part Numbers | | | Dimensions - ID - inches | Dimensions - ID - mm | Dimensions - Length - Inches | Dimensions - Length - mm |
|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Quantity | | | | 3,000 | 1,000 | 100 | | | | |
| 6 | 13.3 | 8 | 8.4 mm² | - | 5912-BK | 5912 | 0.18 | 4.57 | 0.45 | 11.43 |
| 6 | 13.3 | 12 to 10 | 3.3 to 5.3 | 5910-BK | - | 5910 | 0.14 | 3.56 | 0.47 | 11.94 |
| 6 | 13.3 | 16 to 14 | 1.3 to 2.1 | 5913-BK | - | 5913 | 0.09 | 2.29 | 0.47 | 11.94 |



# SBE® 160 / SBX® 175 Connectors

## Up to 175 Amps




SBX® and SBE® connectors can integrate up to 8 auxiliary power / signal contacts along with the two primary power circuits. SBE® connectors feature an IEC 60950 touch safe housing molded from a chemical resistant PBT / PC blend resin. SBX® are molded from a rugged PC resin and are rated IP20 per IEC 60529.

- **Touch Safe Interface**
  *Minimizes potential contact with live circuits per IEC 60950 & IEC 60529*
- **Up to 8 Last Mate / First Break Auxiliaries**
  *Enables intelligent power switching, CAN and interlock loop circuitry, as well as power up to 20 amps per pole*
- **Color-coded Mechanical Voltage Keys**
  *Like all Multipole connectors, the SBE® and SBX® offer an easy way to identify circuits and protect against cross mating*



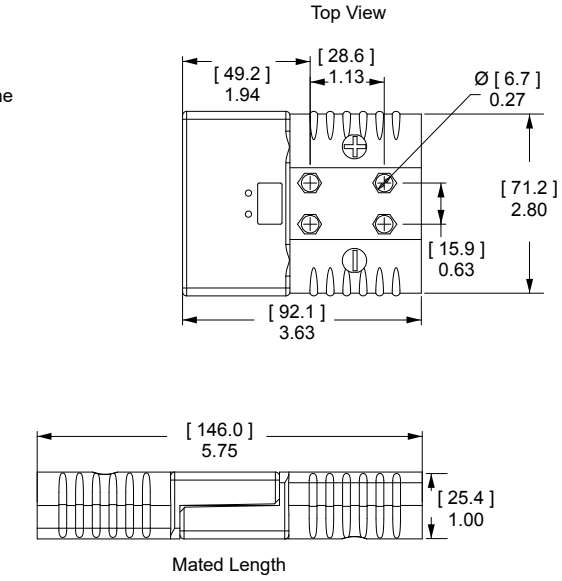
## SBE® 160 / SBX® 175 ORDERING INFORMATION

### SBE® 160 / SBX® 175 Housings

The middle size of SBE®, X, O style housing. SBE® housings are molded from a chemical resistant PBT. SBX® housings are molded from PC. SBE® 160 and SBX® 175 housings of the same Voltage Color-Code can be mated (except yellow) but is not recommended as it invalidates UL approvals. SBX® 175 housings do not meet EN1175-1 requirements for industrial trucks.

| Description | SBE® 160 Part Numbers | | SBX® 175 Part Numbers | |
|---|---|---|---|---|
| Minimum Quantity | 100 | 25 | 100 | 25 |
| Yellow | 2-8170G4 | E6383G1 | 2-7251G4 | 6383G1 |
| Orange | 2-8170G3 | E6382G1 | 2-7251G3 | 6382G1 |
| Red | 2-8170G5 | E6385G1 | 2-7251G5 | 6385G1 |
| Gray | 2-8170G1 | E6380G1 | 2-7251G1 | 6380G1 |
| Blue | 2-8170G2 | E6381G1 | 2-7251G2 | 6381G1 |
| Green | 2-8170G7 | E6390G1 | 2-7251G7 | 6390G1 |
| Black | 2-8170G14 | E6392G1 | N/A | N/A |

* Yellow SBE® 160 and SBX® 175 housings are NOT intermateable.

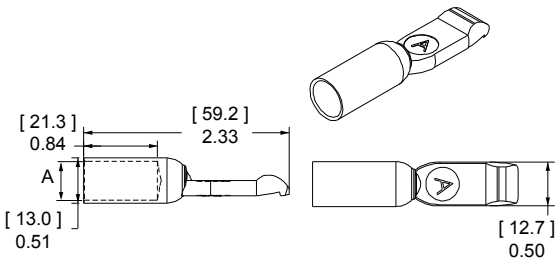



### SBE® 160 / SBX® 175 Silver Plated Primary Power Wire Contacts

Use two silver plated contacts per housing for the best electrical performance and durability up to 10,000 mating cycles. See reducing bushings in accessory section for smaller wires.

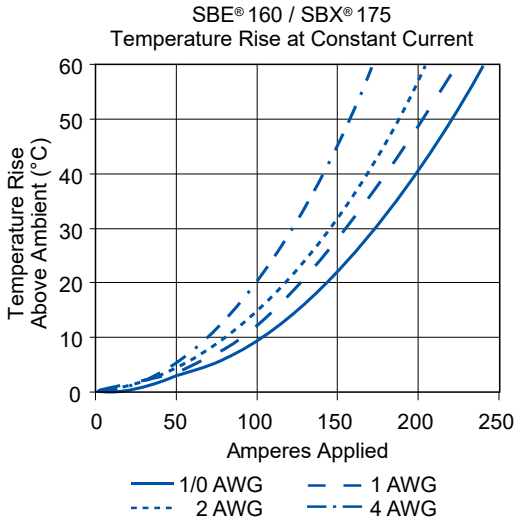
| AWG | mm² | Loose Piece Part Numbers | | Dimensions - A - inches | mm |
|---|---|---|---|---|---|
| Minimum Quantity | | 500 | 50 | | |
| 1/0 | 50 | 6384G1-BK | 6384G1 * | 0.44 | 11.1 |
| 2 | 35 | 6384G2-BK | 6384G2 * | 0.38 | 9.7 |

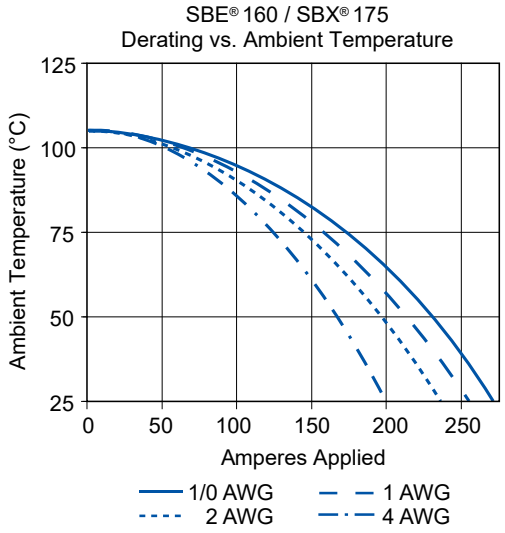
* Sold as pairs. 2 parts shipped for every 1 part ordered.



# SBE® 160 / SBX® 175 CONNECTOR TEMPERATURE CHARTS - Temperature rise charts are based on a 25°C ambient temperature.

Current - Temperature Derating per IEC 60512-5-2 Test 5B




# SBE® 160 / SBX® 175 CONNECTOR SPECIFICATIONS

| ELECTRICAL<br>SBE® 160 / SBX® 175 Connectors - Up to 280A | | | |
|---|---|---|---|
| **Electrical** | **SBE® / SBX®** | | **SBE® Only** |
| Current Rating Amperes [1] | UL | CSA | EN1175-1 |
| Primary Power (1/0) | 280 | 175 | 160 |
| Powerpole® Auxiliary | 20 | 20 | N/A |
| 1x4 Auxiliary (12 AWG) | 20 | 20 | N/A |
| PPMX Auxiliary (20 AWG) | 7 | 5 | N/A |
| **Voltage Ratings** | | | |
| Powerpole® Auxiliary | 600 | 600 | 150 [4] |
| 1x4 Auxiliary ( 12 AWG) | 600 | 600 | N/A |
| **Dielectric Withstanding Voltage** | | | |
| Volts AC | 2,200 | 2,000 | 2,000 |
| **Avg. Mated Contact Resistance [1]** | | | |
| 6" of 1/0 AWG Wire | 0.1 | 0.1 | |
| **UL Hot Plug Current Rating Amperes - 250 Cycles at 120V DC** | | | |
| Power | 100 | 100 | |
| Powerpole® Auxiliary | 30 | 30 | |
| 1x4 Auxiliary | 5A | 5A | |

| MECHANICAL | | |
|---|---|---|
| **Wire Size Range** | **AWG** | **mm²** |
| Power Contacts | 10 to 1/0 | 5.3 to 53.5 |
| Auxiliary Contacts | 24 to 10 | 0.25 to 5.3 |
| **Max. Wire Insulation Diameter** | **in.** | **mm** |
| Power Contacts | 0.600 | 15.200 |
| Powerpole® Auxiliary | 0.175 | 4.450 |
| 1x4 Auxiliary | 0.140 | 3.600 |
| **Operating Temperature [2]** | **°F** | **°C** |
| SBX® and SBE® Housings | -4° to 221° | -20° to 105° |
| **Mating Cycles No Load by Plating** | **Silver (Ag)** | **Gold (Au)** |
| Power Contacts | 10,000 | |
| Powerpole® Auxiliary | 10,000 | |
| 1x4 Auxiliary | | 10,000 |
| PPMX Auxiliary | | 5,000 |
| **Avg. Mating / Unmating Force** | **Lbf.** | **N** |
| Main Connector Housing | 30 | 134 |
| Per Powerpole® Connector | 5.00 | 22.00 |
| Per Contact in 1x4 Auxiliary | 0.70 | 3.00 |
| Per PPMX Housing | 4.50 | 20.00 |
| **Min. Contact / Spring Retention Force** | **Lbf.** | **N** |
| Power Standard Housing | 120 | 533.7 |
| Powerpole® Housing | 25 | 111 |
| 1x4 Auxiliary Housing | 10 | 44.5 |
| PPMX Housing | 12 | 53 |

*Specifications continued on next page*

| MATERIALS | |
|---|---|
| **Housing** | |
| SBX® and Powerpole® Plastic Resin | Polycarbonate |
| SBE® and 1x4 Auxiliary Housing | Polycarbonate / PBT Blend |
| Contact Retention Spring | Stainless Steel |
| **Housing Flammability Rating** | |
| UL94 | V-0 |
| Glow Wire- SBE® 160 Only | 960°C (GWFI) / 850°C (GWIT) |
| Power & Powerpole® Contact | Silver Plated Copper Alloy |
| **1x4 Auxiliary Contacts** | |
| Pin | Copper Alloy, Au Over Ni |
| Socket | BeCu, Au Over Ni |
| Socket Body | Copper Alloy, Sn Bright Over Ni |
| Retention Clip | Stainless Steel |
| **PPMX Contacts** | Gold Plated Copper Alloy |
| **Contact Termination Methods** | |
| Crimp [3] | |
| Hand Solder | |

c UL US File No. E26226 © CSA Certified File No. LR25154

*NOTE 1: See IEC 60664-1 for working voltage.*
*NOTE 2: Amp ratings are stated per position and based on all positions being fully loaded.*
*1 - Based on: 105°C rated or better cable of the largest size. Properly calibrated APP® recommended tooling, and a 25°C ambient temperature. UL rating not to exceed the maximum operating temperature. CSA Rating below a 30°C temperature rise.*
*2 - Limited by the thermal properties of the connector plastic housing.*
*3 - Use APP® recommended tooling only. Alternate tools may adversely affect the performance of our connectors along with UL and CSA recognition.*
*4 - Voltage capability of SBE® housing is identical to SBX®, but derated to meet EN1175-1 requirements.*

# IEC INFORMATION

| Connector Series | Configurations | Creepage / Clearance per IEC 60950-1 | Material Group |
|---|---|---|---|
| **SBE® 160** | Unmated | 6.1 mm | IIIa |
| | Mated | 11.6 mm | |

| PROTECTION | | |
|---|---|---|
| **Touch Safety Main Connector Housing** | | |
| IEC 60950 | SBE® 160 Only | Pass |
| IEC 60529 | SBX® 175 Only | IP20 unmated |

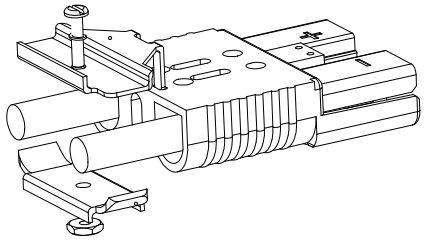
| ATTRIBUTES | SBE® 160 |
|---|---|
| **AMP Rating AC/DC** | 160 Amp |
| **Voltage Rating AC/DC (Steady State)** | 600 V AC/DC (Operational) |
| **Breaking Capacity - AMP Rating / Cycles** | 160 Amp / 10 Cycles |
| **Voltage Rating (Breaking Capacity)** | 220 VDC |
| **FINGER Safety - Mated / Unmated** | IEC 60529 - IP20 |
| **Wire Size Tested** | 50 mm² |
| **Contact Series Tested** | 6384G1 |
| **Climatic Testing (Cold, Heat & MFG)** | IEC 60512 Test -11j, 11i & 11g |
| **Cycle Life** | IEC 60512 Test 9a - 5,000 Cycles |
| **Mechanical Strength Impact** | IEC 60512-5 @ 29.5 Inches-dropped 8 times |
| **Temperature Range** | -20 °C to 105 °C<br>-4 °F to 221 °F |


All Data Subject To Change Without Notice

# SBE® 160 / SBX® 175 ACCESSORIES

## Cable Clamps *

Durable metal clamps adapt to a wide range of cable sizes.



| Description | Cable Size Min / Max Inches O.D. | Cable Size Min / Max mm O.D. | Part Number |
|---|---|---|---|
| Minimum Quantity | | | 25 |
| Cable Clamp Kit | 0.62 to 0.22 | 15.7 to 5.6 | 945G2 |

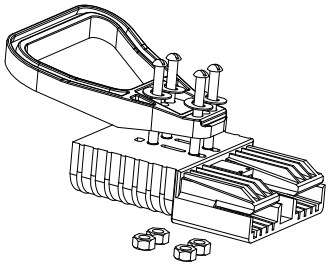
* Torque value 30 (in - lbs) / 3.4 (Nm)

*NOTE: For assembly of clamp to housing only*

The given wire O.D. information is an estimate. Cable clamps should be evaluated for performance with the actual wire to be used.

## Handles *

Handles are made out of durable PC plastic. Hardware to attach to connector body included in kits.



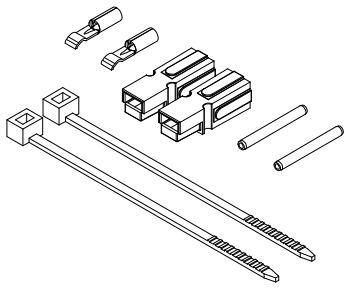
| Description | Part Numbers | |
|---|---|---|
| Minimum Quantity | 100 | 25 |
| Gray Handle Kit | 995G1-APP | 995G1 |
| Red Handle Kit | 995G3-APP | 995G3 |
| Handle Only, Gray | 3-5074P1 | - |
| Handle Only, Red | 3-5074P3 | - |
| Handle Only, Black | 3-5074P5 | - |
| Hardware Bag | - | 105G8 |

* Torque value 30 (in - lbs) / 3.4 (Nm)

*NOTE: For assembly of clamp to housing only*

## Powerpole® Auxiliary

Powerpole® auxiliary connectors are rated up to 30 amps 600 volts and can be used for auxiliary power, control or sensing. The auxiliary kit includes (1) each black and red Standard Powerpole® housing, (2) contacts, (2) zip cable straps, and (2) retaining pins. (1) Retaining clip can be Substituted for (2) retaining pins.

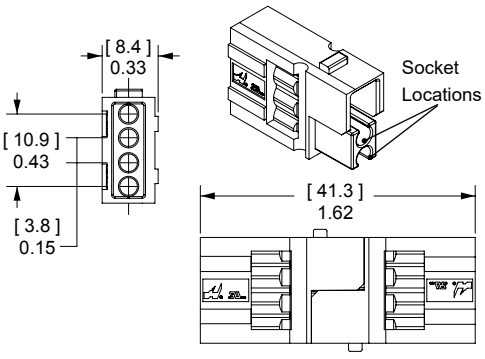


| Description | Part Numbers | |
|---|---|---|
| Minimum Quantity | 200 | 25 |
| Powerpole® Auxiliary Kit | - | 6344 |
| Black Powerpole® Housing | 1327G6 | - |
| Red Powerpole® Housing | 1327 | - |
| 16 to 12 AWG Contact | 1331 | - |

*NOTE: Finger proof PP15/45 housings should not be used for auxiliary contacts.*

## 1x4 Auxiliary Connector

The unique 1x4 auxiliary connector allows up to 4 auxiliary circuits up to 20 amps 150 volts each in SBE®, SBO®, & SBX® housings. The genderless design holds two each of the gold plated pin & socket contacts. This innovation allows the very durable and cost effective design of SBE®, O, X connectors to substitute for DIN 43589-1 applications where 4 auxiliary contacts are required. Multiple pin lengths allow the further benefit of sequencing between circuits. (2) Retaining pins or (1) Retaining clip is required to hold the auxiliary housing in place. Auxiliary Kits include (1) Auxiliary Housing, (2) Standard Length Pin Contacts, (2) Socket Contacts, (2) Retaining Pins and (1) Retaining Clip.



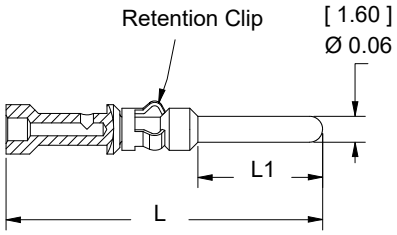

| Description | AWG | mm² | Part Numbers | | |
|---|---|---|---|---|---|
| Minimum Quantity | | | 1,000 | 250 | 25 |
| 1x4 Auxiliary Kit | 12 | 4 | - | - | 441G3 |
| 1x4 Auxiliary Kit | 16 to 14 | 1.5 to 2.5 | - | - | 441G1 |
| 1x4 Auxiliary Kit | 20 to 16 | 0.75 to 1.5 | - | - | 441G2 |
| 1x4 Auxiliary Housing | Contacts Sold Separately | | 3-5956P1 | 444G1 | - |

## Pin Contacts for 1x4 Auxiliary Connector

Gold plated contacts are available in 4 lengths to allow sequencing of circuits.

| Description | AWG | mm² | Part Numbers | |
|---|---|---|---|---|
| Minimum Quantity | | | 500 | 50 |
| Standard Length 7.7 mm | 12 | 2.5 | PM16P12S30 | PM16P12S30-50 |
| | 16 to 14 | 1.0 to 1.5 | PM16P1416S30 | PM16P1416S30-50 |
| | 20 to 16 | 0.75 to 1.0 | PM16P1620S30 | PM16P1620S30-50 |
| | 24 to 20 | 0.50 to 0.75 | PM16P2024S30 | PM16P2024S30-50 |
| Pre-Mate 9.3 mm | 12 | 2.5 | PM16P12A30 | - |
| | 16 to 14 | 1.0 to 1.5 | PM16P1416A30 | - |
| | 20 to 16 | 0.75 to 1.0 | PM16P1620A30 | - |
| | 24 to 20 | 0.50 to 0.75 | PM16P2024A30 | - |
| Post-Mate 6.4 mm | 12 | 2.5 | PM16P12C30 | - |
| | 16 to 14 | 1.0 to 1.5 | PM16P1416C30 | - |
| | 20 to 16 | 0.75 to 1.0 | PM16P1620C30 | - |
| | 24 to 20 | 0.50 to 0.75 | PM16P2024C30 | - |

| Auxiliary Pin Contact Lengths | - L - | | - L1 - | |
|---|---|---|---|---|
| | in. | mm | in. | mm |
| **Standard Length 7.7 mm** | 0.77 | 19.6 | 0.30 | 7.7 |
| **Pre-Mate 9.3 mm** | 0.83 | 21.2 | 0.37 | 9.3 |
| **Post-Mate 6.4 mm** | 0.72 | 18.3 | 0.25 | 6.4 |

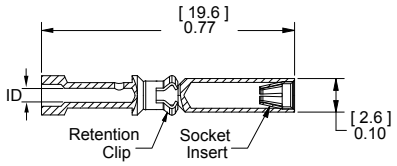



## Socket Contacts for 1x4 Auxiliary Connector

Selectively gold plated contacts offer low resistance and durability up to 10,000 mating cycles.

| Description | AWG | mm² | Part Numbers | |
|---|---|---|---|---|
| Minimum Quantity | | | 500 | 50 |
| Socket Contact | 12 | 2.5 | PM16S12S32 | PM16S12S32-50 |
| | 16 to 14 | 1.0 to 1.5 | PM16S1416S32 | PM16S1416S32-50 |
| | 20 to 16 | 0.75 to 1.0 | PM16S1620S32 | PM16S1620S32-50 |
| | 24 to 20 | 0.50 to 0.75 | PM16S2024S32 | PM16S2024S32-50 |

| Auxiliary Socket Contacts Crimp Barrel ID | | |
|---|---|---|
| **Wire Gauge** | **in.** | **mm.** |
| 24 to 20 | 0.04 | 1.1 |
| 20 to 16 | 0.07 | 1.7 |
| 16 to 14 | 0.08 | 2.1 |
| 12 | 0.10 | 2.6 |



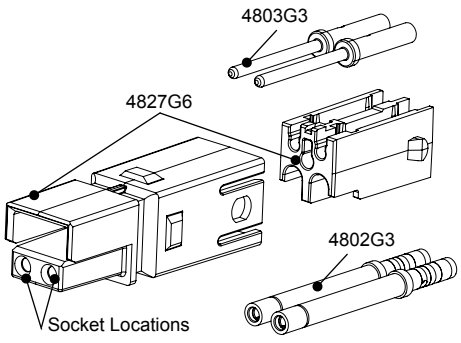

## PPMX Auxiliary Connector

The PPMX auxiliary connector allows up to 8 auxiliary circuits to be used in the SBE®, SBO®, & SBX® housings. There are 4 auxiliary circuits per PPMX connector and two PPMX housings fit into the auxiliary port in the main connector housing. Rated up to 7 amps 300 volts per contact, the genderless design holds two each gold plated pin & Socket contacts. This innovation allows the very durable and cost effective design of SBE®, O, X connectors to be used for applications requiring up to 8 battery monitoring or equipment vehicle communication circuits. (2) Retaining pins or (1) Retaining clip is required to hold the auxiliary housing in place.

Auxiliary Kits includes: (1) Auxiliary Housing, (2) Pin Contacts, and (2) Socket Contacts.

| Description | AWG | mm² | Part Numbers | | |
|---|---|---|---|---|---|
| Minimum Quantity | | | 1,000 | 100 | 25 |
| PPMX Auxiliary Kit | 24 to 20 | 0.50 to 0.25 | - | 4850G6 | - |
| 1x4 Auxiliary Housing | Contacts Sold Separately | | 4827G6-BK | - | 4827G6 |

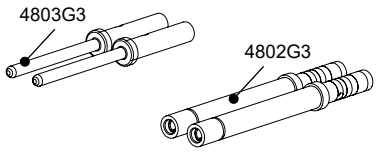
* No extraction tool required for contact removal.



## Pin & Socket Contacts for PPMX Auxiliary Connector

Gold plated contacts are ideal for signal or low power use with durability up to 5,000 mating cycles.

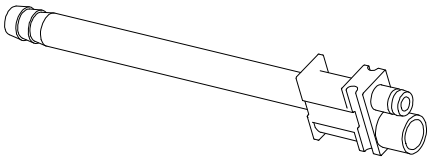
| Description | AWG | mm² | Part Numbers | |
|---|---|---|---|---|
| Minimum Quantity | | | 2,000 | 50 |
| Pin Contacts | 24 to 20 | 0.50 to 0.25 | 4803G3-BK | 4803G3 |
| Socket Contacts | 24 to 20 | 0.50 to 0.25 | 4802G3-BK | 4802G3 |




## SBE® Air Tubes

Air tubes fit into SBE® housings to allow electrolyte circulation while charging the battery. Genderless tube design allows the same part to be used on both sides. (2) Retaining pins or (1) Retaining clip is required to hold the air tube in place. Retaining pins are included in Air Tube Kit.

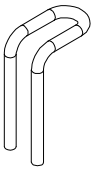
| Description | Part Numbers | |
|---|---|---|
| Minimum Quantity | 500 | 25 |
| Air Tube Kit, Black | - | 6396G1 |
| Air Tube Only | 3-5798P1 | - |



## Retaining Clip

Retaining clips can be used in place of two retaining pins to hold auxiliary connectors or air tubes. Allows easier removal of auxiliary modules.

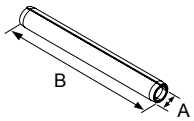
| Description | Part Number |
|---|---|
| Minimum Quantity | 100 |
| For SBE® 160 & SBX® 175 | 2-8675P2 |



## Retaining Pins

Retaining pins are used to hold accessories in the auxiliary port in SBE®, SBO®, & SBX® housings. Dimension “B” is +/- 0.015 in or 0.38 mm.

| | | | Dimensions | | | |
|---|---|---|---|---|---|---|
| | | | - A - | | - B - | |
| Description | Part Numbers | | inches | mm | inches | mm |
| Minimum Quantity | 1,000 | 100 | | | | |
| For SBE® 160 & SBX® 175 | 110G9-BK | 110G9 | 0.093 / 0.099 | 2.36 / 2.51 | 0.85 | 21.59 |

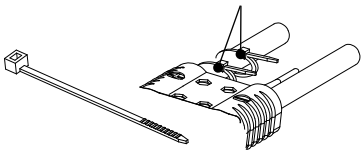



## Zip Cable Straps

Zip cable straps are used to secure auxiliary wires to the side of the main power cables.

| Description | Part Number |
|---|---|
| Minimum Quantity | 1,000 |
| White | H1835P3 |

Use cable ties to secure auxiliary contact leads to one of the main cables.



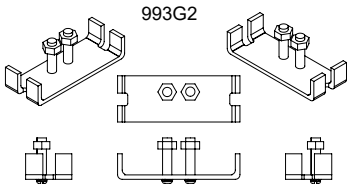
## Manual Release - Battery Side *

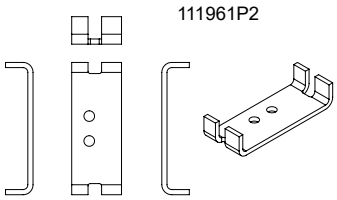
Works with the Charger / Truck side to ease mating and unmating connectors.

| Description | Part Numbers | |
|---|---|---|
| Minimum Quantity | 88 | 25 |
| Bracket and Hardware Kit | - | 993G2 |
| Battery Bracket Only | 111961P2 | - |
| Hardware Bag | - | 105G1 |

* Torque value 30 (in - lbs) / 3.4 (Nm)

**NOTE: For assembly of bracket to housing only*



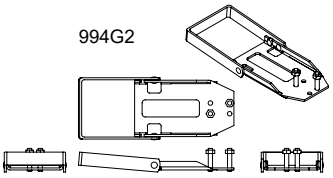

## Manual Release - Charger / Truck Side *

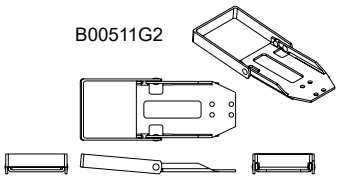
Works with the Battery side to ease mating and unmating connectors.

| Description | Part Numbers | |
|---|---|---|
| Minimum Quantity | 60 | 25 |
| Bracket and Hardware Kit | - | 994G2 |
| Bracket / Lever Only | B00511G2 | - |
| Hardware Bag | - | 105G1 |

* Torque value 30 (in - lbs) / 3.4 (Nm)

**NOTE: For assembly of bracket to housing only*

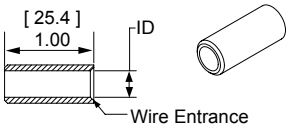



## Reducing Bushings: for Use with Contact Part Number 6384G1

Use with contact part number 6384G1-BK to allow a smaller wire to be used with the connector. Electrical capability is derated with smaller wire.

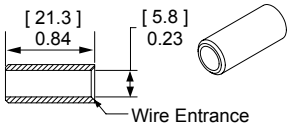
| Contacts Barrel Size | | Wire Size | | Part Numbers | | | | Dimensions - ID - | |
|---|---|---|---|---|---|---|---|---|---|
| AWG | mm² | AWG | mm² | 1,500 | 1,000 | 500 | 100 | inches | mm |
| Minimum Quantity | | | | | | | | | |
| 1/0 | 53.5 | 1 | 42.4 | - | - | 5687-BK | 5687 | 0.39 | 9.91 |
| 1/0 | 53.5 | 2 | 33.6 | 5690-BK | - | - | 5690 | 0.34 | 8.64 |
| 1/0 | 53.5 | 4 | 21.2 | - | 5693-BK | - | 5693 | 0.27 | 6.86 |
| 1/0 | 53.5 | 6 | 13.3 | - | 5663-BK | - | 5663 | 0.22 | 5.59 |
| 1/0 | 53.5 | 10 to 8 | 5.3 - 8.4 | 5648-BK | - | - | 5648 | 0.19 | 4.83 |




## Reducing Bushings: for Use with Contact Part Number 6384G2

Use with contact part number 6384G2-BK to allow a smaller wire to be used with the connector. Electrical capability is derated with smaller wire.

| Contact Barrel Size | Wire Size | Part Numbers | |
|---|---|---|---|
| Minimum Quantity | | 1,000 | 100 |
| 35 mm² | 16 mm² | 5920-BK | 5920 |



# SBE® 320 / SBX® 350 Connectors

## Up to 550 Amps



SBE® and SBX® connectors can integrate up to 8 auxiliary power / signal contacts along with the two primary power circuits. Sequencing within auxiliary positions is possible using the 4 pin lengths available in the 1x4 auxiliary connector. SBE® and SBX® offer touch safe housings.

- **Silver Plated Wire Contacts up to 350 mcm (185 mm²)**
  *Allows low resistance UL rated currents up to 550 amps per pole*
- **Up to 8 Auxiliaries**
  *Enables intelligent power switching, CAN and interlock loop circuitry, as well as power up to 20 amps per pole. Auxiliaries are all Last-mate/ First-break relative to power contacts.*

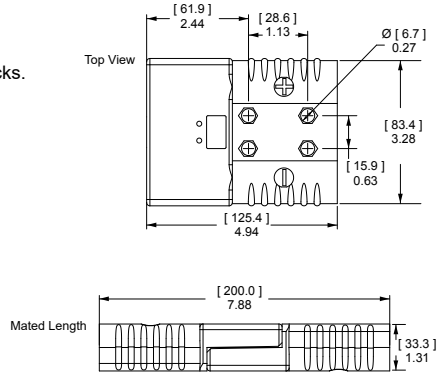


## SBE® 320 / SBX® 350 ORDERING INFORMATION

### SBE® 320 / SBX® 350 Housings

The largest size of SBE®, X, O style housing. SBE® housings are molded from a chemical resistant PBT. SBX® housings are molded from PC. SBE® 320 and SBX® 350 housings of the same Voltage Color-Code cannot be mated. SBX® 350 housings do not meet EN1175-1 requirements for industrial trucks.

| Description | SBE® 320 Part Numbers | | SBX® 350 Part Numbers | |
|---|---|---|---|---|
| Minimum Quantity | 100 | 25 | 100 | 25 |
| Yellow | 2-8171G6 | E6362 | 2-7249G6 | 6362 |
| Orange | 2-8171G7 | E6339 | 2-7249G7 | 6339 |
| Red | 2-8171G3 | E6352 | 2-7249G3 | 6352 |
| Gray | 2-8171G1 | E6350 | 2-7249G1 | 6350 |
| Blue | 2-8171G2 | E6351 | 2-7249G2 | 6351 |
| Green | 2-8171G4 | E6353 | 2-7249G4 | 6353 |
| Black | 2-8171G5 | E6361 | 2-7249G5 | 6361 |
| Brown | 2-8171G8 | E6336 | N/A | N/A |
| Purple | 2-8171G9 | E6349 | N/A | N/A |

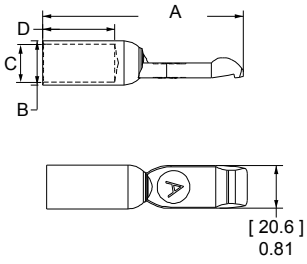



### SBE® 320 / SBX® 350 Silver Plated Primary Power Wire Contacts

Silver plated contacts offer superior electrical performance and durability up to 10,000 mating cycles. See reducing bushings in accessory section for smaller wires.

| AWG | mm² | Loose Piece Part Numbers | | | Dimensions - A - inches | mm | - B - inches | mm | - C - inches | mm | - D - inches | mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Quantity | | 200 | 150 | 50 | | | | | | | | |
| 300/350 mcm | 150 | - | 6358-BK | 6358 * | 3.03 | 76.96 | 0.88 | 22.20 | 0.75 | 19.05 | 1.25 | 31.80 |
| 4/0 | 120 | 6356-BK | - | 6356 * | 3.10 | 78.74 | 0.75 | 19.05 | 0.64 | 16.26 | 1.25 | 31.80 |
| 3/0 | 95 | 6355-BK | - | 6355 * | 3.10 | 78.74 | 0.70 | 17.78 | 0.58 | 14.73 | 1.25 | 31.80 |
| 2/0 | 70 | 6354-BK | - | 6354 * | 3.10 | 78.74 | 0.64 | 16.26 | 0.49 | 12.45 | 1.25 | 31.80 |
| 2 | 35 | 6394-BK | - | 6394 * | 3.10 | 78.74 | 0.51 | 12.95 | 0.38 | 9.50 | 1.25 | 31.80 |

* Sold as pairs. 2 parts shipped for every 1 part ordered.

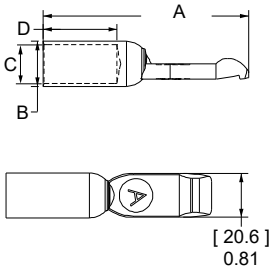



### SBE® 320 DIN Standard Silver Plated Primary Power Wire Contacts

Crimp barrel O.D. are compliant with DIN standard tooling. Will also fit into SBX® 350 housings. Not recommended for cross mating with above typical contacts for SBE® & SBX®.

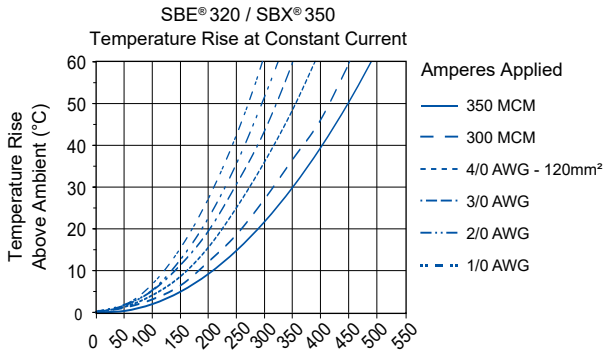
| AWG | mm² | Loose Piece Part Numbers | | Dimensions - A - inches | mm | - B - inches | mm | - C - inches | mm | - D - inches | mm |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Quantity | | 200 | 50 | | | | | | | | |
| 3/0 | 95 | 1341G3-BK | 1341G3 * | 2.89 | 73.41 | 0.78 | 19.81 | 0.59 | 14.99 | 0.94 | 23.88 |
| 2/0 | 70 | 1341G2-BK | 1341G2 * | 2.74 | 69.60 | 0.68 | 17.27 | 0.51 | 12.95 | 0.79 | 20.07 |
| 1/0 | 50 | 1341G1-BK | 1341G1 * | 2.65 | 67.31 | 0.57 | 14.48 | 0.43 | 10.92 | 0.79 | 20.07 |

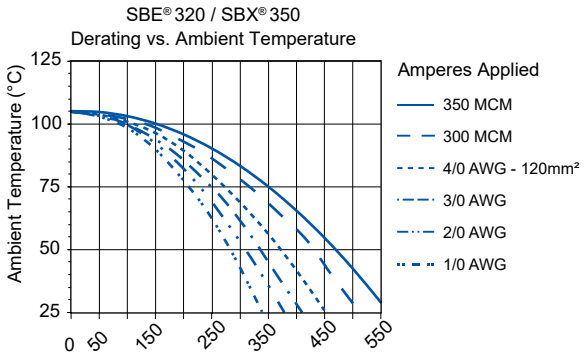
* Sold as pairs. 2 parts shipped for every 1 part ordered.



# SBE® 320 / SBX® 350 CONNECTOR TEMPERATURE CHARTS - Temperature rise charts are based on a 25°C ambient temperature.

Current - Temperature Derating per IEC 60512-5-2 Test 5B






# SBE® 320 / SBX® 350 CONNECTOR SPECIFICATIONS

| ELECTRICAL | SBX® & SBE® | | SBE® Only |
|---|---|---|---|
| **Current Rating Amperes** [1] | **UL** | **CSA** | **EN1175-1** |
| Primary Power (350 MCM) | 550 | 350 | 320 |
| Powerpole® Auxiliary (12 AWG) | 20 | 20 | N/A |
| 1x4 Auxiliary (12 AWG) | 20 | 20 | N/A |
| PPMX (20 AWG) | 5 | 5 | N/A |
| **Voltage Rating AC/DC** | | | |
| Primary Power (350 MCM) | 600 | | 150 [4] |
| Powerpole® Auxiliary (12 AWG) | 600 | | 150 [4] |
| 1x4 Auxiliary (12 AWG) | 600 | | N/A |
| PPMX (20 AWG) | 600 | | N/A |
| **Dielectric Withstanding Voltage** | | | |
| Volts AC | 2,200 | | |
| * Average Mated Contact Resistance milliohms | | | |
| 2 1/2 " 350 MCM | 0.05 | | |

| MATERIALS | | |
|---|---|---|
| **Housings** | | |
| SBX® and Powerpole® Auxiliary Housings | Polycarbonate | |
| SBE®, PPMX and 1x4 Auxiliary Housings | Polycarbonate / PBT blend | |
| **Housing Flammability Rating** | **UL** | **IEC (SBE® Only)** |
| SBX® / SBE® | 94 V-0 | 960°C (GWFI)<br>850°C (GWIT) |
| **Contact Materials** | | |
| Power Contacts | Au Plated Copper | |
| Powerpole® Auxiliary | Au or Sn - Copper Alloy | |
| **1x4 Auxiliary Contacts** | | |
| Pin | Au Over NI - Copper Allow | |
| Socket | Au Over NI - BeCu | |
| Socket Body | Sn Over Ni, Copper Alloy | |
| Retention Clip | Stainless Steel | |
| PPMX Contacts | Gold Plated Copper Alloy | |

* Not UL rated

Contact Terminations [3]- Crimp or Hand Solder

| MECHANICAL | | |
|---|---|---|
| **Wire Size Range** | **AWG** | **mm²** |
| Power Contacts | 1/0 to 350 MCM | 53.5 to 185 |
| Auxiliary Contacts | 24 to 10 AWG | 0.25 to 5.3 |
| **Max Wire Insulation Diameter** | **in** | **mm** |
| Power Contact | 0.82 * | 20.8 * |
| Powerpole® Auxiliary | 0.175 | 4.45 |
| 1x4 Auxiliary | 0.14 | 3.6 |
| PPMX Auxiliary | 0.09 | 2.29 |
| **Operating Temperature [2]** | **°F** | **°C** |
| SBX® Housing with all Auxiliary | -4 to 221 | -20 to -105 |
| SBE® Housing | -40 to 221 | -40 to 105 |
| SBX® Housing with Powerpole® Auxiliary Housings | -4 to 221 | -20 to -105 |
| SBE® Housing with 1x4 and PPMX Auxiliaries | -40 to 221 | -40 to 105 |
| **Mating Cycles** | **Silver / Tin** | **Gold** |
| Power Contacts | 10,000 | N/A |
| Powerpole® Auxiliary | 10,000 / 1500 | N/A |
| 1x4 Auxiliary | N/A | 10,000 |
| PPMX Auxiliary | N/A | 5,000 |
| **Average Mating** | **LBF** | **N** |
| Main Connector Housing | 37 | 165 |
| Per Powerpole® Connector | 5 | 22 |
| Per 1x4 Auxiliary Housing | 0.7 | 3 |
| Per PPMX Housing | 4.5 | 20 |
| Min Contact / Spring Retention Force | 150 | 667 |
| Powerpole® Housing | 25 | 111 |
| 1x4 Auxiliary Housing | 10 | 44.5 |
| PPMX Housing | 12 | 53 |
| Min Contact / Spring Retention Force | 150 | 667 |
| Powerpole® Housing | 25 | 111 |
| 1x4 Auxiliary Housing | 10 | 44.5 |
| PPMX Housing | 12 | 53 |
| Min Contact / Spring Retention Force | 150 | 667 |
| Powerpole® Housing | 25 | 111 |
| 1x4 Auxiliary Housing | 10 | 44.5 |
| PPMX Housing | 12 | 53 |

# IEC INFORMATION

| Connector Series | Configurations | Creepage / Clearance per IEC 60950-1 | Material Group |
|---|---|---|---|
| **SBE® 320** | Unmated | 5.6 mm | IIIa |
| | Mated | 24.7 mm | |

| ATTRIBUTES | SBE® 320 |
|---|---|
| **AMP Rating AC/DC** | 320 Amp |
| **Voltage Rating AC/DC (Steady State)** | 600 V AC/DC (Operational) |
| **Breaking Capacity - AMP Rating / Cycles** | 275 Amp / 10 Cycles |
| **Voltage Rating (Breaking Capacity)** | 220 VDC |
| **FINGER Safety - Mated / Unmated** | IEC 60529 - IP20 |
| **Wire Size Tested** | 120 mm² |
| **Contact Series Tested** | 6356 |
| **Climatic Testing (Cold, Heat & MFG)** | IEC 60512 Test -11j, 11i & 11g |
| **Cycle Life** | IEC 60512 Test 9a - 5,000 Cycles |
| **Mechanical Strength Impact** | IEC 60512-5 @ 29.5 Inches Dropped 8 Times |
| **Temperature Range** | -20°C to 105°C<br>-4°F to 221°F |

| PROTECTION | |
|---|---|
| **Touch Safety Main Connector Housing** | |
| IEC 60950 SBE® 320 Only | Pass |
| IEC 60529 SBE® 320 & SBX® 350 | IP20 |



*Note 1: See IEC60664-1 for working voltage*
*Note 2: Amp ratings are stated per position and based on all positions being fully loaded*
*1 - Based on 195°C rated or better cable of the largest size. Properly calibrated APP® recommended tooling and 25°C ambient temperature*
*2 - limited by thermal properties of the connector plastic housing*
*3 - USE APP® recommended tooling only. Alternate tools may adversely affect performance of our connectors along with UL and CSA recognition*
*4 - Voltage capability of SBE® housings is identical to SBX® but derated to meet EN1175-1 requirements*
** Refer to assembly instructions for using 300 MCM and 350 MCM wire*

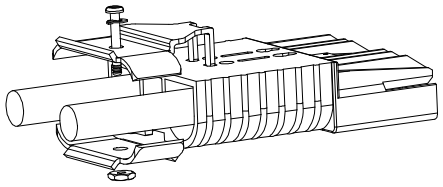
# SBE® 320 / SBX® 350 ACCESSORIES

## Cable Clamps

Durable metal clamps adapt to a wide range of cable sizes. Cable clamp kit includes clamp top and bottom as well as the hardware bag.

| Description | Cable Size Min / Max Inches O.D. | Cable Size Min / Max mm O.D. | Part Number |
|---|---|---|---|
| Minimum Quantity | | | 25 |
| Cable Clamp Kit | 0.85 to 0.67 | 21.6 to 17.1 | 911G2 |

The given wire O.D. information is an estimate. Cable clamps should be evaluated for performance with the actual wire to be used.



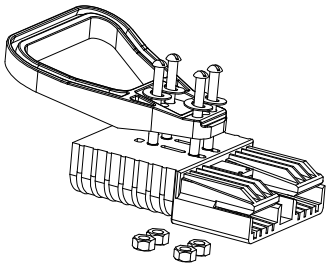
## Handles *

Handles are made out of durable PC plastic. Hardware to attach to connector body included in kits.

| Description | Part Numbers | |
|---|---|---|
| Minimum Quantity | 100 | 25 |
| Gray Handle Kit | 995G2-APP | 995G2 |
| Red Handle Kit | 995G4-APP | 995G4 |
| Handle Only, Gray | 3-5074P1 | - |
| Handle Only, Red | 3-5074P3 | - |
| Handle Only, Black | 3-5074P5 | - |
| Hardware Bag | - | 106G7 |

* Torque value 50 (in - lbs) / 5.6 (Nm)

*NOTE: For assembly of clamps to housing only*

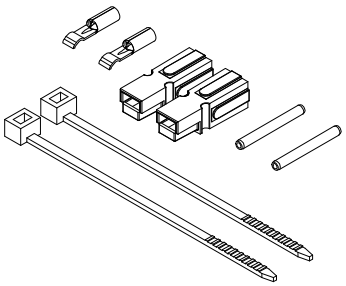


## Powerpole® Auxiliary

Powerpole® auxiliary connectors are rated up to 30 amps 600 volts and can be used for auxiliary power, control or sensing. The auxiliary kit includes (1) each black and red standard Powerpole® housing, (2) Contacts, (2) Zip Cable Straps, and (2) Retaining Pins. (1) Retaining Clip can be substituted for (2) Retaining Pins.

| Description | Part Numbers | |
|---|---|---|
| Minimum Quantity | 200 | 25 |
| Powerpole® Auxiliary Kit 16 to 12 AWG Contact | - | 6305G1 |
| Powerpole® Auxiliary Kit 20 to 16 AWG Contact | - | 6310G1 |
| Black Powerpole® Housing | 1327G6 | - |
| Red Powerpole® Housing | 1327 | - |
| 16 to 12 AWG Contact | 1331 | - |
| 20 to 16 AWG Contact | 1332 | - |

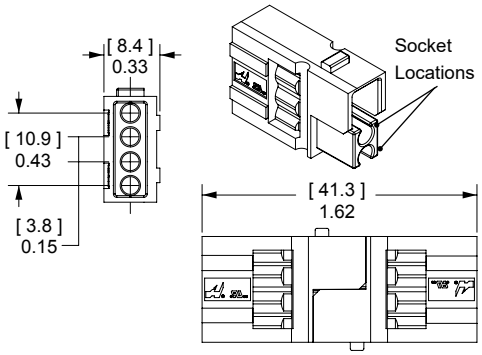
*NOTE: Finger proof PP15/45 housings should not be used for auxiliary contacts.*



## 1x4 Auxiliary Connector

The unique 1x4 auxiliary connector allows up to 4 auxiliary circuits up to 20 amps 150 volts each in SBE®, SBO®, & SBX® housings. The genderless design holds two each of the gold plated pin & socket contacts. This innovation allows the very durable and cost effective design of SBE®,O, X connectors to substitute for DIN 43589-1 applications where 4 auxiliary contacts are required. Multiple pin lengths allow the further benefit of sequencing between circuits. (2) Retaining Pins or (1) Retaining Clip is required to hold the auxiliary housing in place. Auxiliary Kits include (1) Auxiliary Housing, (2) Standard Length Pin Contacts, (2) Socket Contacts, (2) Retaining Pins and (1) Retaining Clip.

| Description | AWG | mm² | Part Numbers | | |
|---|---|---|---|---|---|
| Minimum Quantity | | | 1,000 | 250 | 25 |
| 1x4 Auxiliary Kit | 12 | 4 | - | - | 440G3 |
| 1x4 Auxiliary Kit | 16 to 14 | 1.5 to 2.5 | - | - | 440G1 |
| 1x4 Auxiliary Kit | 20 to 16 | 0.75 to 1.5 | - | - | 440G2 |
| 1x4 Auxiliary Housing | Contacts Sold Separately | | 3-5956P1 | 444G1 | - |

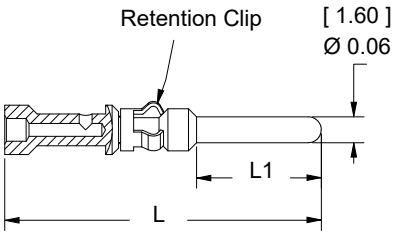


## Pin Contacts for 1x4 Auxiliary Connector

Gold plated contacts are available in 4 lengths to allow sequencing of circuits.

| Description | AWG | mm² | Part Numbers | |
|---|---|---|---|---|
| Minimum Quantity | | | 500 | 50 |
| Standard Length 7.7 mm | 12 | 2.5 | PM16P12S30 | PM16P12S30-50 |
| | 16 to 14 | 1.0 to 1.5 | PM16P1416S30 | PM16P1416S30-50 |
| | 20 to 16 | 0.75 to 1.0 | PM16P1620S30 | PM16P1620S30-50 |
| | 24 to 20 | 0.50 to 0.75 | PM16P2024S30 | PM16P2024S30-50 |
| Pre-Mate 9.3 mm | 12 | 2.5 | PM16P12A30 | PM16P12A30-50 |
| | 16 to 14 | 1.0 to 1.5 | PM16P1416A30 | PM16P1416A30-50 |
| | 20 to 16 | 0.75 to 1.0 | PM16P1620A30 | PM16P1620A30-50 |
| | 24 to 20 | 0.50 to 0.75 | PM16P2024A30 | PM16P2024A30-50 |
| Post-Mate 6.4 mm | 12 | 2.5 | PM16P12C30 | PM16P12C30-50 |
| | 16 to 14 | 1.0 to 1.5 | PM16P1416C30 | PM16P1416C30-50 |
| | 20 to 16 | 0.75 to 1.0 | PM16P1620C30 | PM16P1620C30-50 |
| | 24 to 20 | 0.50 to 0.75 | PM16P2024C30 | PM16P2024C30-50 |

| Auxiliary Pin Contact Lengths | - L - | | - L1 - | |
|---|---|---|---|---|
| | in. | mm | in. | mm |
| **Standard Length 7.7 mm** | 0.77 | 19.6 | 0.30 | 7.7 |
| **Pre-Mate 9.3 mm** | 0.83 | 21.2 | 0.37 | 9.3 |
| **Post-Mate 6.4 mm** | 0.72 | 18.3 | 0.25 | 6.4 |

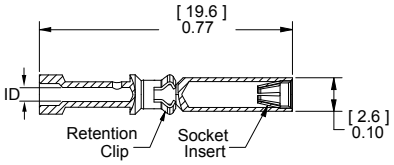



## Socket Contacts for 1x4 Auxiliary Connector

Selectively gold plated contacts offer low resistance and durability up to 10,000 mating cycles.

| Description | AWG | mm² | Part Numbers | |
|---|---|---|---|---|
| Minimum Quantity | | | 500 | 50 |
| Socket Contact | 12 | 2.5 | PM16S12S32 | PM16S12S32-50 |
| | 16 to 14 | 1.0 to 1.5 | PM16S1416S32 | PM16S1416S32-50 |
| | 20 to 16 | 0.75 to 1.0 | PM16S1620S32 | PM16S1620S32-50 |
| | 24 to 20 | 0.50 to 0.75 | PM16S2024S32 | PM16S2024S32-50 |

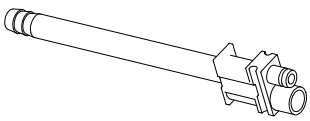
| Auxiliary Socket Contacts Crimp Barrel ID | | |
|---|---|---|
| **Wire Gauge** | **in.** | **mm.** |
| 24 to 20 | 0.04 | 1.1 |
| 20 to 16 | 0.07 | 1.7 |
| 16 to 14 | 0.08 | 2.1 |
| 12 | 0.10 | 2.6 |




## SBE® Air Tubes

Air tubes fit into SBE® housings to allow electrolyte circulation while charging the battery. Genderless tube design allows the same part to be used on both sides. (2) Retaining Pins or (1) Retaining Clip is required to hold the air tube in place. Retaining Pins are included in Air Tube Kit.

| Description | Part Numbers | |
|---|---|---|
| Minimum Quantity | 500 | 25 |
| Air Tube Kit, Black | - | 6396G1 |
| Air Tube Only | 3-5798P1 | - |



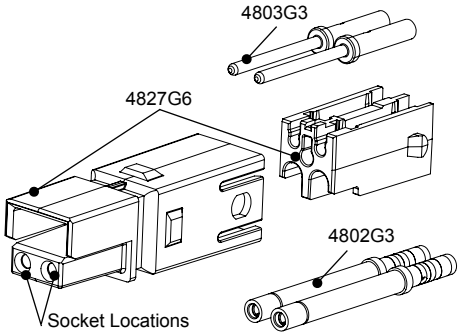
## PPMX Auxiliary Connector

The PPMX auxiliary connector allows up to 8 auxiliary circuits to be used in the SBE®, SBO®, & SBX® housings. There are 4 auxiliary circuits per PPMX connector and two PPMX housings fit into the auxiliary port in the main connector housing. Rated up to 7 amps 300 volts per contact, the genderless design holds two each gold plated pin & socket contacts. This innovation allows the very durable and cost effective design of SBE®, O, X connectors to be used for applications requiring up to 8 battery monitoring or equipment vehicle communication circuits. (2) Retaining Pins or (1) Retaining Clip is required to hold the auxiliary housing in place.

Auxiliary Kits includes: (1) Auxiliary Housing, (2) Pin Contacts, and (2) Socket Contacts.

| Description | AWG | mm² | Part Numbers | | |
|---|---|---|---|---|---|
| Minimum Quantity | | | 1,000 | 100 | 25 |
| PPMX Auxiliary Kit | 24 to 20 | 0.50 to 0.25 | - | 4850G6 | - |
| 1x4 Auxiliary Housing | Contacts Sold Separately | | 4827G6-BK | - | 4827G6 |

* No extraction tool required for contact removal.




## Pin & Socket Contacts for PPMX Auxiliary Connector

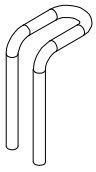
Gold plated contacts are ideal for signal or low power use with durability up to 5,000 mating cycles.

| Description | AWG | mm² | Part Numbers | |
|---|---|---|---|---|
| Minimum Quantity | | | 2,000 | 50 |
| Pin Contacts | 24 to 20 | 0.50 to 0.25 | 4803G3-BK | 4803G3 |
| Socket Contacts | 24 to 20 | 0.50 to 0.25 | 4802G3-BK | 4802G3 |

## Retaining Clip

Retaining clips can be used in place of two retaining pins to hold auxiliary connectors or air tubes. Allows easier removal of auxiliary modules.

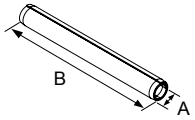
| Description | Part Number |
|---|---|
| Minimum Quantity | 100 |
| For SBE® 320 & SBX® 350 | 2-8675P1 |



## Retaining Pins

Retaining pins are used to hold accessories in the auxiliary port in SBE®, SBO®, & SBX® housings. Dimension “B” is +/- 0.015 in or 0.38 mm.

| | | Dimensions | | | |
|---|---|---|---|---|---|
| | | - A - | | - B - | |
| Description | Part Number | inches | mm | inches | mm |
| Minimum Quantity | 1,000 | | | | |
| For SBE® 320 & SBX® 350 | 110G59-BK | 0.093 / 0.103 | 2.36 / 2.62 | 1.000 | 25.40 |

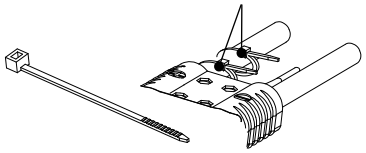


## Zip Cable Straps

Zip cable straps are used to secure auxiliary wires to the side of the main power cables.

| Description | Part Number |
|---|---|
| Minimum Quantity | 1,000 |
| White | H1835P3 |

Use cable ties to secure auxiliary contact leads to one of the main cables.



## Manual Release - Battery Side *

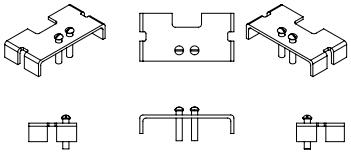
Works with the Charger / Truck side to ease mating and unmating connectors.

| Description | Part Numbers | |
|---|---|---|
| Minimum Quantity | 72 | 25 |
| Bracket and Hardware Kit | - | 993G1 |
| Battery Bracket Only | 111961P1 | - |
| Hardware Bag | - | 106G6 |

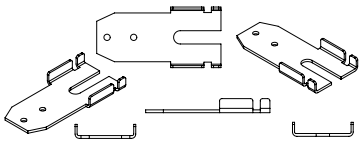
* Torque value 50 (in - lbs) / 5.6 (Nm)

*NOTE: For assembly of bracket to housing only*

993G1



111961P1



## Manual Release - Charger/ Truck Side *

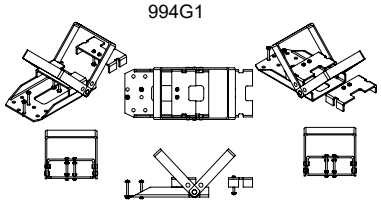
Works with the Battery side to ease mating and unmating connectors.

| Description | Part Numbers |
|---|---|
| Minimum Quantity | 25 |
| Bracket and Hardware Kit | 994G1 |
| Bracket / Lever Only | B00511G4 |
| Hardware Bag | 106G6 |

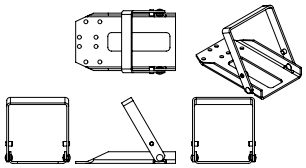
* Torque value 50 (in lbs) / 5.6 (Nm)

*NOTE: For assembly of bracket to housing only*

994G1



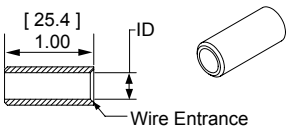
B00511G4



## Reducing Bushings: for Use with Contact Part Number 6354 and Bushing Part Number 5918

Use with contact part number 6354-BK and bushing part number 5918-BK to allow a smaller wire to be used with the connector. Electrical capability is derated with smaller wire.

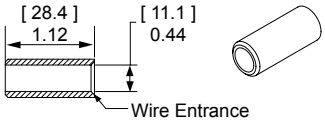
| Bushing Part Number 5918 Barrel Size | | Wire Size | | Part Numbers | | | | Dimensions - ID - | |
|---|---|---|---|---|---|---|---|---|---|
| AWG | mm² | AWG | mm² | | | | | inches | mm |
| Minimum Quantity | | | | 1,500 | 1,000 | 500 | 100 | | |
| 1/0 | 53.5 | 1 | 42.4 | - | - | 5687-BK | 5687 | 0.39 | 9.91 |
| 1/0 | 53.5 | 2 | 33.6 | 5690-BK | - | - | 5690 | 0.34 | 8.64 |
| 1/0 | 53.5 | 4 | 21.2 | - | 5693-BK | - | 5693 | 0.27 | 6.86 |
| 1/0 | 53.5 | 6 | 13.3 | - | 5663-BK | - | 5663 | 0.22 | 5.59 |
| 1/0 | 53.5 | 10 to 8 | 5.3 to 8.4 | 5648-BK | - | - | 5648 | 0.19 | 4.83 |




## Reducing Bushings: for Use with Contact Part Number 6354

Use with contact part number 6354-BK to allow a smaller wire to be used with the connector. Electrical capability is derated with smaller wire.

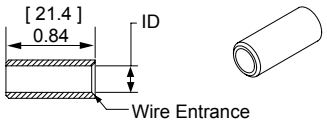
| Contact Barrel Size / Wire Size | | Part Number | |
|---|---|---|---|
| Minimum Quantity | | 500 | 100 |
| 2/0 AWG (67.4 mm²) | 1/0 AWG (53.5 mm²) | 5918-BK | 5918 |




## Reducing Bushings: for Use with Contact Part Number 6394

Use with contact part number 6394-BK to allow a smaller wire to be used with the connector. Electrical capability is derated with smaller wire.

| Contact Barrel Size / Wire Size | | Part Numbers | | Dimensions - ID - | |
|---|---|---|---|---|---|
| | | | | inches | mm |
| Minimum Quantity | | 1,000 | 100 | | |
| 35 mm² | 16 mm² | 5920-BK | 5920 | 0.23 | 5.8 |



# SBO® / SBE® / SBX® - Tooling Information

| Wire Size | | Loose Piece Part Number | Loose Piece Contact Crimp Tools | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| AWG | mm² | Contacts | Pneumatic Bench Tool | + | Die | + | Locator | Number of Crimps | + | Hand Tools |
| **SBE® 320 / SBX® 350** | | | | | | | | | | |
| 300 MCM | 152 | 6358 | N/A | | N/A | | N/A | N/A | | 1368 Series |
| 4/0 AWG | 107.2 | 6356 | 1387G2 | | 1303G12 | | 1303G28 | Double | | |
| 3/0 AWG | 85 | 6355 | | | | | | | | |
| 2/0 AWG | 67.4 | 6354 | | | | | | | | |
| 2 | N/A | 6394 | | | 1303G2 | | 1304G28 | | | |
| N/A | 95 mm² | 1341G3 | | | 1303G17 | | 1304G35 | | | |
| N/A | 70 mm² | 1341G2 | | | 1303G12 | | 1304G34 | | | |
| N/A | 50 mm² | 1341G1 | | | 1303G8 | | 1304G36 | | | |
| **SBE® 160 / SBX® 175** | | | | | | | | | | |
| 1/0 AWG | 53.5 | 6384G1 | 1387G2 | | 1303G13 | | 1304G32 | Double | | 1368 series |
| 2 | 25 mm² | 6384G2 | 1387G2 | | 1303G13 | | 1304G32 | Double | | |
| 1/0 & #2 | 53.5 to 5mm² | 6384G1 & 6384G2 | 1387G1 | | 1388G3 | | 1389G3 | Single | | |
| **SBO® 60 / SBE® 80** | | | | | | | | | | |
| 4 | 25 | 1339G4 | 1387G1 | | 1388G7 | | 1389G9 | Single | | N/A |
| 6 | 16 | 1339G1 | | | 1388G6 | | | | | 1309G4 |
| **Powerpole® 15/45 Auxiliary Contacts **** | | | | | | | | | | |
| 16 to 20 | 1.3 to .52 | 1332 | N/A | | N/A | | N/A | Single | | 1309G2 or 1309G8 |
| 12 to 16 | 3.3 to 1.3 | 1331 | | | | | | | | |
| **PowerMod® 1x4 Auxiliary Contacts** | | | | | | | | | | |
| 12 to 24 | 2.5 to 0.25 | All Crimp Pins | TP0001* | | N/A | | TL0001 | Single | | TM0001* |
| | | All Crimp Sockets | | | | | TL0002 | | | PM1000G1 |
| **PPMX Auxiliary Contacts** | | | | | | | | | | |
| 20 to 24 | 0.50 to 0.25 | 4803G3 | TP0001* | | N/A | | TL0005 | Single | | TM0001* or |
| | | 4802G3 | | | | | | | | PM1000G1 |

| Tools |
|---|
| **PM1002G1** - 1 x 4 Auxiliary Contact Insertion Tool - For use with PM contacts and 1x4 auxiliary housing (444G1 housings and 441G kits) |
| **PM1003G1** - 1 x 4 Auxiliary Contact Insertion Tool - For use with PM contacts and 1x4 auxiliary housing (444G1 housings and 441G kits) |
| **PM1003GX** - 1x4 Auxiliary contacts Inspection Tool - For use with PM contacts and 1x4 auxiliary housing (444G1 housings and 441G kits) |
| **969P1** - SBE® 160 / SBX® 175 Power Contact Extraction Tool |
| **970P1** - SBE® 320 / SBX® 350 Power Contact Extraction Tool |

** TP0001 and TM0001 tools require locators to properly position contacts.*

*** See Powerpole® family tooling chart for other Powerpole® contacts*

*The auxiliary contacts used with wire sizes 16 to 24 AWG cannot be properly inserted without the insertion tool. Properly installed auxiliary contact of all wire gauges cannot be removed from the housing without the extraction tool.*