ANDERSON POWER™

JPCPT

Technical Application Guide

Material Handling Solutions

DIN, SB®, SBX®, SBE®

Anderson Power Products® (APP®) offers a wide array of products ideally suited for Material Handling applications. Products are offered from 25A up to 550A at 600 volts and provide either power or combinations of power and signal. There are products that meet UL / CSA as well as European safety standards (DIN43589-1, EN1175-1, etc.).

Why Anderson Power Products®

Anderson Power Products® has established a reputation as being the leader for high quality products, on-time deliveries and excellent customer service. As a result of modern manufacturing techniques, rigorous quality control measures, best practice training and extensive testing we assure our customers receive the quality products and service they deserve.

Anderson Power products® is a leader in designing high quality connectors ideal for the Material Handling market and beyond:

Electric Forklifts

Electric Lifts

Battery Chargers

Reach Lifts

Our patented contact technology provides a low resistance connection with large conducting surface and a high normal force verses a typical pin and socket design ensuring a more stable connection. Designed to handle over 10,000 mating cycles, the sacrificial tip confines damage to the non–conducting area when mating or breaking under load. Our Din style Connectors (A and E series) utilize Pin and Socket contacts that meet or exceed Din 43589-1 mating cycle requirements (min 5,000 cycles) and provide low mating and un-mating forces during operation.

SBS® 75X Series

SBE® / SBX® Series

SB® Series

DIN (A & E Series)

Bringing Power and Signaling to Your Application

Anderson™ connectors are designed to work within your applications to bring power or power and signaling to and from the following equipment:

Battery to Equipment

Forklift Truck

Battery Charger

Battery Connection

Design Consideration

Application Needs	Anderson™ Value
High Power with auxiliary contacts for requirements such as temperature sensing, power on / off, signage, etc.	DIN 80, 160, and 320 have two power contacts DIN 320 UL rated up to 350A and four auxiliary contacts. SBE® / SBX® / SBS® offer 4 to 8 auxiliary contacts with the SB® 320 / SBX® 350 UL power rating up to 550 Amps
High Mating Cycles	SB® / SBE® / SBX® / SBS® exceed 10,000 mating cycles. DIN A and E Series exceed the DIN standard that requires minimum 5,000 mating cycles. Most competitors do not.
Battery Acid Resistant	APP® E Series DIN and the SBE® products meet the battery acid resistance requirements of EN1175-1.
Voltage / Application Keys	DIN A & E Series offer Gray (Wet), Green (Dry) and Yellow (Universal) keys with 6 voltage options up to 96V. SB® / SBE® / SBX® / SBS® offer both mechanical and color coding for voltages up to 120V.
Complete Stable of Accessories	Handles, latches, air tubes (SBE® / SBX® / DIN only), and manual release brackets available for all sizes.

Design- Why Customers Choose Flat Wiping or DIN

The Material Handling Market is driven and divided by regional standards from North America and Europe. There is a mix of products used globally due to the spread of American and European manufacturing locations / distribution . The major design drivers are:

North America — UL / CSA / Anderson™ Connector Designs

The UL / CSA requirements are primarily normal standards that specify electrical and mechanical performance. This is accomplished by specifying uniform testing requirements to assure "apples to apples" performance between products. These standards do not specify connector design but rather how they perform. A typical standard is the CSA heat-rise requirement that specifies a maximum amperage rating is achieved when the connector being tested reaches +30°C above an ambient temperature of +25°C. As far as connector design, APP® Multipole designs became de facto standards in North America based on the innovative and robust designs (APP® designed and patented the SB® Connector in the 1950's) and to this day the APP® voltage / color coding chart is used in the Material Handling industry and has expanded into other markets.

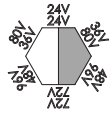
Europe—DIN 43589-1 and EN1175-1

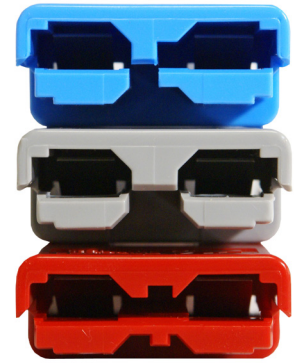
As opposed to UL / CSA, the DIN standards are formative and control certain external dimensions and contact locations amongst others. This assures that any manufacturers' product that meets this standard will be cross-mateable with another. However, internal dimensions are allowed to vary and components from one manufacturer will not be interchangeable with another's connectors even though both connectors comply with the standard. EN1175-1 is more a normative standard like UL / CSA controlling performance requirements including aspects such as ability to withstand heat, chemical resistance , and electrical performance based on wire size. APP® changed the materials on the SBX® to meet EN1175-1 and that was the creation of the SBE®—E for Europe.

Since the creation of the original designs there have been a myriad of international standards (UL60950 / IEC60950 as an example) created to harmonize some of the global performance requirements of these connectors but to this day the APP® original flat wiping designs and the DIN standards rule the majority of the battery / equipment / charger connector designs.

Voltage Keying Systems for Material Handling

DIN Keying

Keying Plug	Identification	Assembled In
	Used for Wet Cell Battery / Charger **– Color Grey**	Battery Receptacle and Charging Plug
	Used for Dry Cell Battery / Charger **– Color Green**	Battery Receptacle and Charging Plug
	Used for Vehicle Only **- Yellow (Universal)**	Vehicle Plug Only - used when vehicle may use wet or dry cell batteries



12 Volts
18 Volts
24 Volts
36 Volts
48 Volts
72 Volts
80 Volts
96 Volts
120 Volts

Technical Specifications

	DIN A & E Series	SB®	SBS®	SBE® / SBX®
Current Rating (Amperes)				
Power Contacts	80 to 320 Nominal (E) 55 to 350 Maximum (A)	Up to 450	Up to 110	Up to 550
Auxiliary Contacts (UL) [1]	20 [5]		up to 20	up to 20
Voltage Rating (AC/DC)	150 IEC (E) / 600 (A)	600 UL	600 UL	600 UL
Contact Barrel Wire Size				
(AWG) - Power Contacts	8 to 4/0	16 to 300 mcm	20 to 6	6 to 350 mcm
- Auxiliary/Signal Contacts	18 to 10		24 to 12	24 to 10
(mm^2) - Power Contacts	10 to 95	1.5 to 150	0.75 to 10	16 to 150
- Auxiliary/Signal Contacts	1 to 4		0.5 to 2.5	0.25 to 5.3
Dielectric Withstanding Voltage (AC)	2,200 UL	2,200 UL	2,200 UL	2,200 UL
Mating Cycles				
Power Signal	5,000	10,000	10,000	10,000
Operating Temperature				
(°C) [2]	-25° to 75° E	-20° to 105°	-20° to 105°	-20° to 105°
	-45° to 105° (A)	-40° to 105° (CR) [3]	-40° to 105° (CR) [3]	
	-13° to 167° (E)	-4° to 221°	-4° to 221°	-4° to 221°
(°F)	-13° to 221° (A)	-40° to 221° (CR) [3]	-40° to 221° (CR) [3]	
Touch Safety	IP20 Female	IP20	IEC 60950	IEC 60950

NOTES
1 - UL rated for largest wire or cable size up to the maximum operating temperature
2 - Contact factory for higher temperature rated connectors
3 - On CR (Chemical Resistant) versions where available

Certifications

Anderson™ connectors strictly follow applicable standards and certifications. The product complies with UL, CSA, IEC and RoHS.

c UL us File No. E26226 © CSA Certified File No. LR25154 RoHS-II COMPLIANT APP

Application Notes

- Modifications to the product will void all warranties. For warranty information, please visit www.andersonpower.com.
- Users and installers are required to read and understand the supplied installation guides and warnings.

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