

High Voltage Components for Electric Vehicle

High Voltage Components for Electric Vehicle



Product Image



Technical Data

Mechanical

- Connection Type
 - Wire To Unit
 - Wire To Wire
- Terminal Size
 - HV : 2.8mm Terminal
 - Interlock : 0.63mm Terminal
- Cable
 - 1.25SQ/3.0SQ/4.0SQ Single Core Wire
 - Shield & Non-Shield Wire Required
- Finger Protection : IP2XB
 - Under Unmated Condition
- HVIL
- CPA
 - Release Type1 : By Finger
 - Release Type2 : By Tool
- Shield Type
- 2 Step Disconnection For Safe Unmating
- Multiple Key Code
 - LB/LT/RB/RT (4 Types)
 - * Refer To 36,37 Page

Electrical

- Voltage : Up To 600V
- Current : 20A

Environmental

- Waterproof : IP67/IP69K
 - Under Mated Condition
- Operating Temp. Range : -40°C~125°C

Application

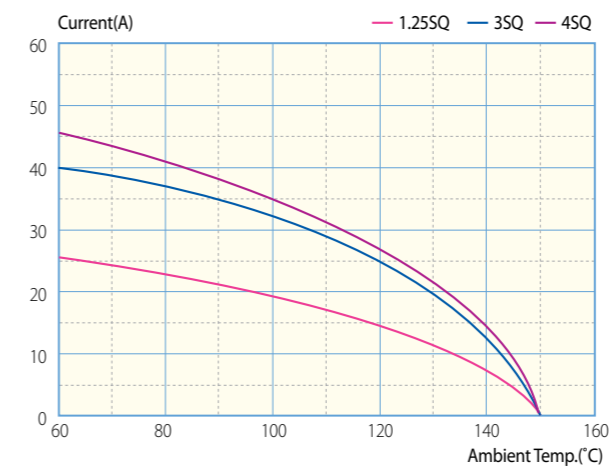
- High Voltage AC/DC Connections For PTC, A/C Comp, OBC, Battery Pack And Others

Standard

- Satisfied With USCAR 2/USCAR 37/USCAR 21

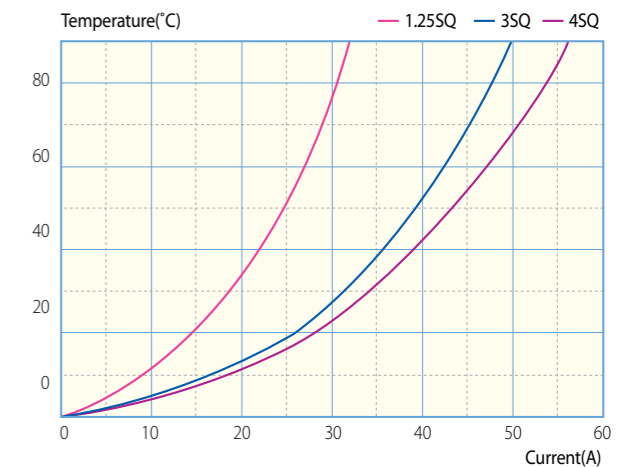
Derating Curve

IEC 60512-5-2



Temperature Rising

SAE J 1772



Connector Size

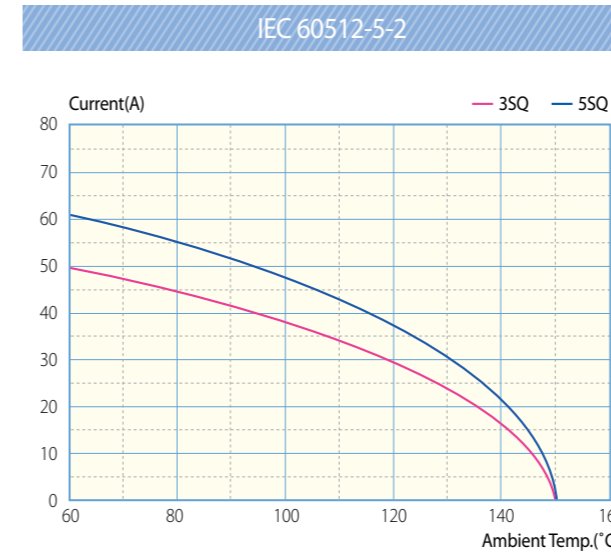
		Wire To Unit		Wire To Wire	
Connector Assembly					
	Female Connector				
Male Connector	Type A				
	Type B				

* Band Clip Type : Slot/Key Shape (2types)

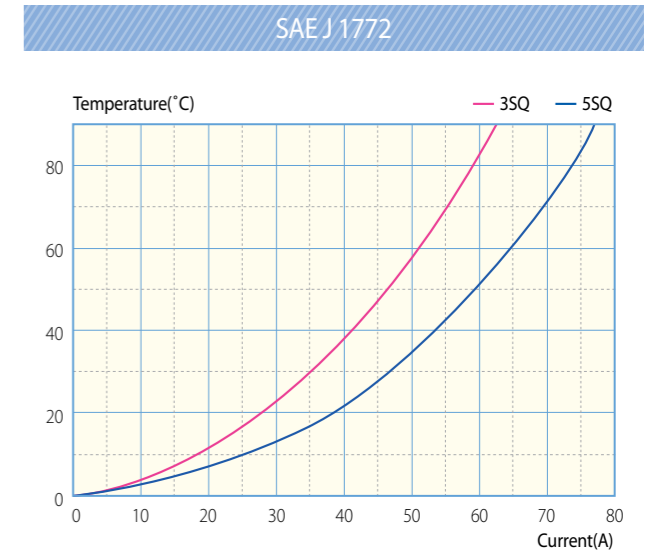
Product Image



Derating Curve



Temperature Rising



Technical Data

Mechanical

- Connection Type
 - Wire To Unit
- Terminal Size
 - HV : 4.8mm Terminal
 - Interlock : 1.0mm Terminal
- Cable
 - 35Q/55Q Single Core Wire
 - Shield & Non-Shield Wire Required
- Finger Protection : IP2XB
 - Under Unmated Condition
- HVIL
- CPA
 - Release Type : By Finger
- Shield Type
- 2 Step Disconnection For Safe Unmating
- Multiple Key Code
 - L/C/R (3 Types)
 - * Refer To 38 Page

Electrical

- Voltage : Up To 600V
- Current : 40A

Environmental

- Waterproof : IP67/IP69K
 - Under Mated Condition
- Operating Temp. Range : -40°C~125°C

Application

- High Voltage AC/DC Connections For PTC, A/C Comp, OBC, Battery Pack And Others

Standard

- Satisfied With SAE J1742

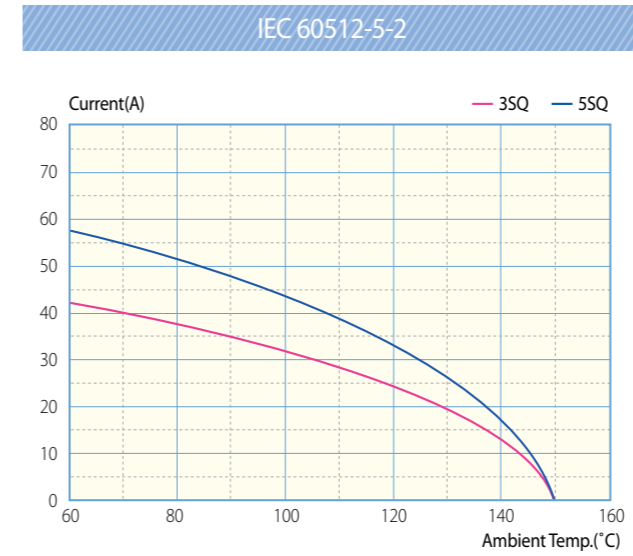
Connector Size

	Wire To Unit	
Connector Assembly		
Female Connector		
Male Connector		

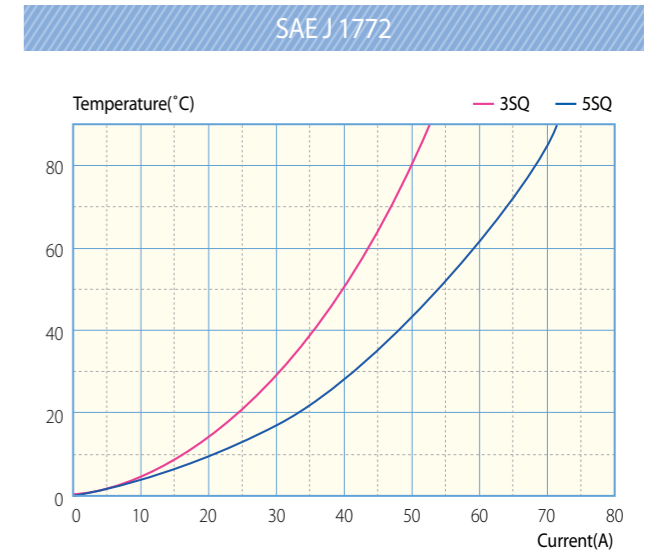
Product Image



Derating Curve



Temperature Rising



Technical Data

Mechanical

- Connection Type
 - Wire To Unit
- Terminal Size
 - HV : 6.3mm Terminal
 - Interlock : 1.2mm Terminal
- Cable
 - 3.0SQ/5.0SQ Single Core Wire
 - Shield & Non-Shield Wire Required
- Finger Protection : IP2XB
 - Under Unmated Condition
- HVIL
- CPA
 - Release Type : By Finger
- Shield Type
- 2 Step Disconnection For Safe Unmating
- Multiple Key Code
 - LB/LT/RB/RT (4 Types)
 - * Refer To 38 Page

Electrical

- Voltage : Up To 600V
- Current : 40A

Environmental

- Waterproof : IP67/IP69K
 - Under Mated Condition
- Operating Temp. Range : -40°C~125°C

Application

- High Voltage AC/DC Connections For PTC, A/C Comp, OBC, Battery Pack And Others

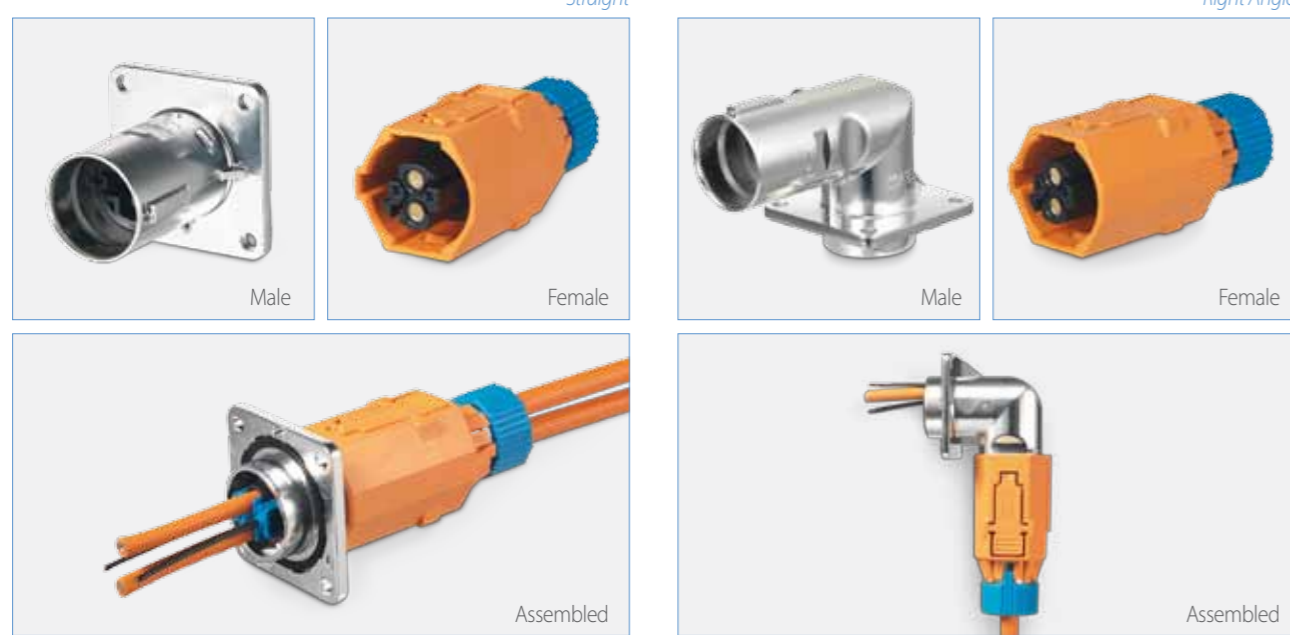
Standard

- Satisfied With USCAR 2/USCAR 37/USCAR 21

Connector Size

	Wire To Unit	
Connector Assembly		
Female Connector		
Male Connector		

Product Image



Technical Data

Mechanical

- Connection Type
 - Wire To Unit
 - 1) Degree Type1 : Straight (180°)
 - 2) Degree Type2 : Right Angle (90°)
- Terminal Size
 - HV : ϕ 4mm Terminal
 - Interlock : 0.63mm Terminal
- Cable
 - 3.0SQ/5.0SQ Single Core Wire
 - Shield & Non-Shield Wire Required
- Finger Protection : IP2XB
 - Under Unmated Condition
- HVIL
- Shield Type
- Multiple Key Code
 - L/C/R (3 Types)
 - * Refer To 39 Page

Electrical

- Voltage : Up To 600V
- Current : 50A

Environmental

- Waterproof : IP67/IP69K
 - Under Mated Condition
- Operating Temp. Range : -40°C~125°C

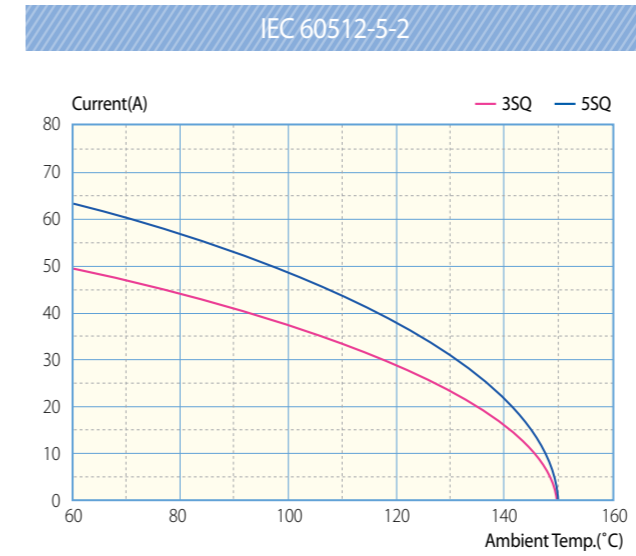
Application

- High Voltage AC/DC Connections For PTC, A/C Comp, OBC, Battery Pack And Others

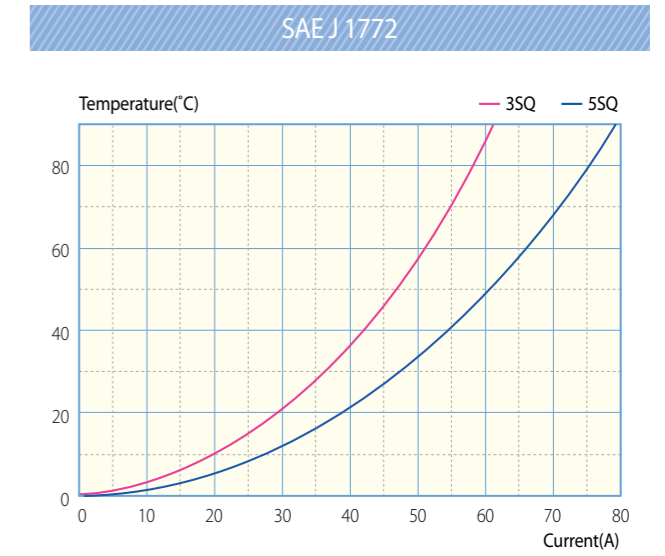
Standard

- Satisfied With USCAR 2/USCAR 37/USCAR 21

Derating Curve



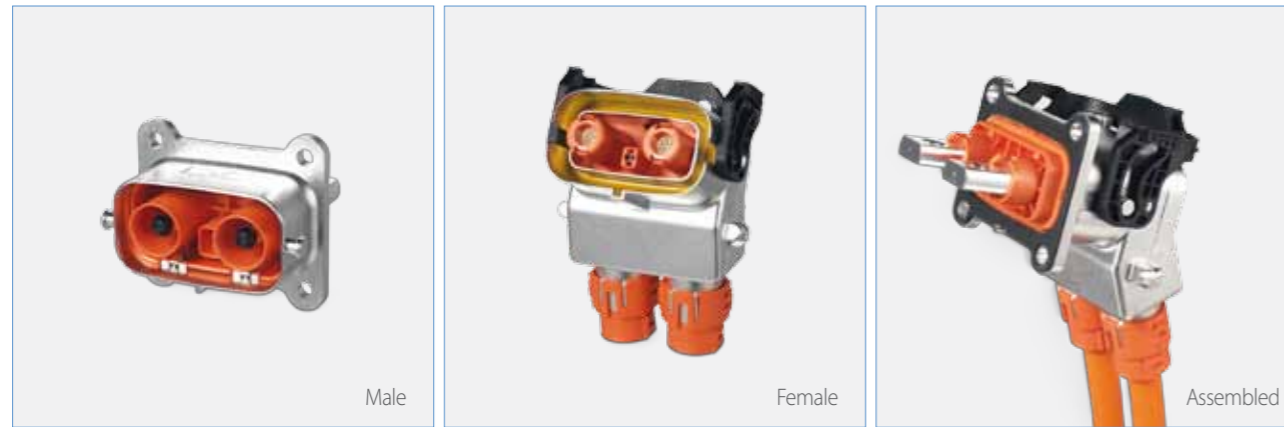
Temperature Rising



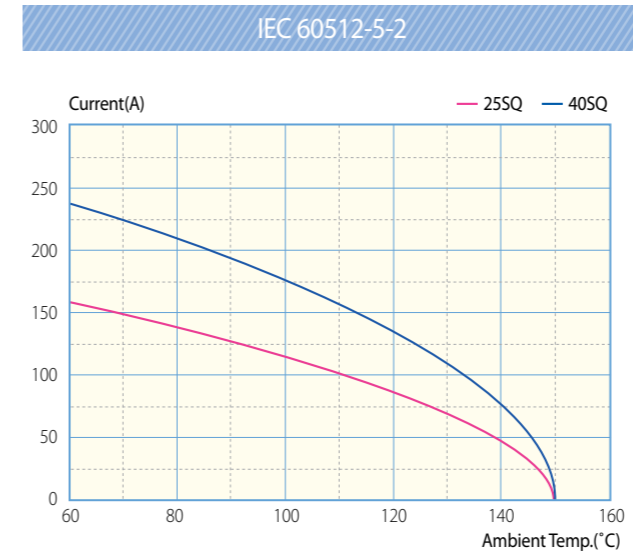
Connector Size

		Wire To Unit		Wire To Unit	
Connector Assembly	Degree Type1 Straight (180°)		82.8		43
	Degree Type2 Right Angle (90°)		104.6		51.1
Male Connector	Degree Type1 Straight (180°)		43		50.4
	Degree Type2 Right Angle (90°)		72.2		54.6
Female Connector			64.3		31.1

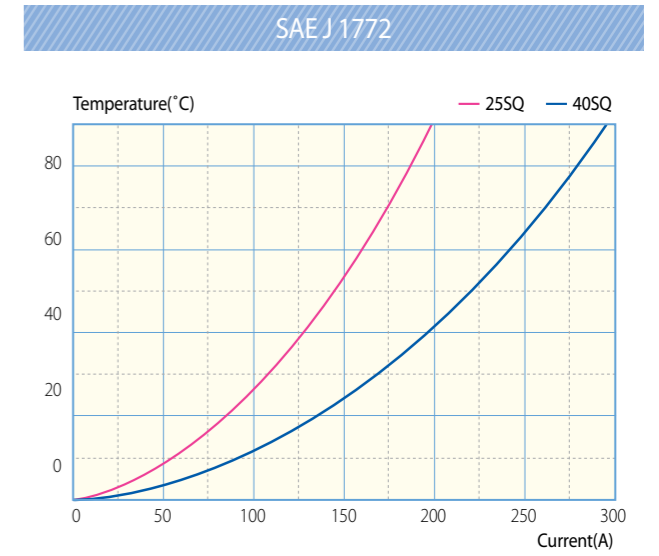
Product Image



Derating Curve



Temperature Rising



Technical Data

Mechanical

- Connection Type
 - Wire To Unit
 - 1) Degree Type : 120°
- Terminal Size
 - HV : ø9mm Terminal
 - Interlock : 1mm Terminal
- Cable
 - 25~40SQ Single Core Wire
 - Shield Wire Required
- Finger Protection : IP2XB
 - Under Unmated Condition
- HVIL
- CPA
 - Release Type : By Finger
- Shield Type

Electrical

- Voltage : Up To 600V
- Current : 200A

Environmental

- Waterproof : IP67/IP69K
 - Under Mated Condition
- Operating Temp. Range : -40°C~125°C

Application

- High Voltage AC/DC Connections For Batteries, Junction Box, Inverter And Others

Standard

- Satisfied With USCAR 2/USCAR 37/USCAR 21

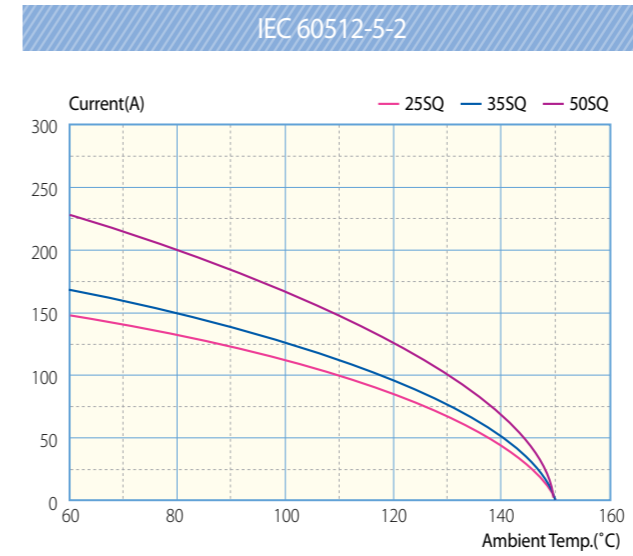
Connector Size

		Wire To Unit	
Connector Assembly			
Female Connector	Degree Type 120°		
Male Connector			

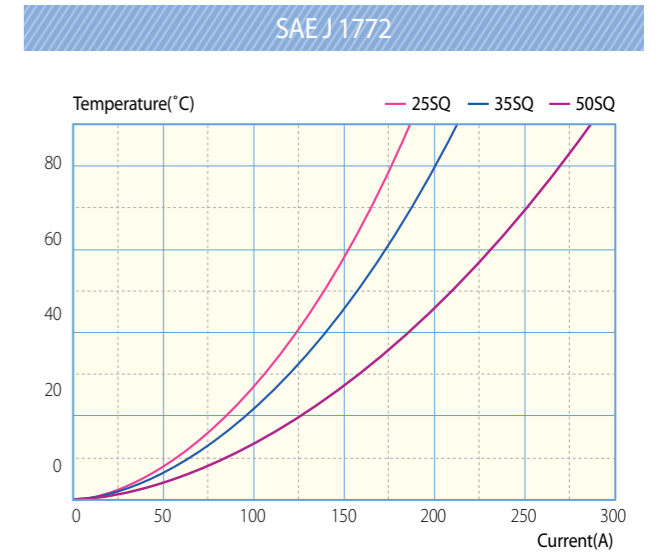
Product Image



Derating Curve



Temperature Rising



Technical Data

Mechanical

- Connection Type
 - Wire To Unit
- Terminal Size
 - HV : ø8mm Terminal
 - Interlock : 1.5mm Terminal
- Cable
 - 25~50SQ Single Core Wire
 - Shield Wire Required
- Finger Protection : IP2XB
 - Under Unmated Condition
- HVIL
- Shield Type

Electrical

- Voltage : Up To 600V
- Current : 200A

Environmental

- Waterproof : IP67/IP69K
 - Under Mated Condition
- Operating Temp. Range : -40°C~125°C

Application

- High Voltage AC/DC Connections For Batteries, Junction Box, Inverter And Others

Standard

- Satisfied With USCAR 2/USCAR 37/USCAR 21

Connector Size

	Wire To Unit	
Connector Assembly		
Female Connector		
Male Connector		

Product Image



Technical Data

Mechanical

- Connection Type
 - Wire To Unit
 - 1) Degree Type1 : Straight (180°)
 - 2) Degree Type2 : Right Angle (90°)
- Terminal Size
 - HV : \varnothing 8mm Terminal
 - Interlock : 1.5mm Terminal
- Cable
 - 25~50SQ Single Core Wire
 - Shield Wire Required
- Finger Protection : IP2XB
 - Under Unmated Condition
- HVIL
- CPA
 - Release Type : By Finger
- Shield Type

Electrical

- Voltage : Up To 600V
- Current : 200A

Environmental

- Waterproof : IP67/IP69K
 - Under Mated Condition
- Operating Temp. Range : -40°C~125°C

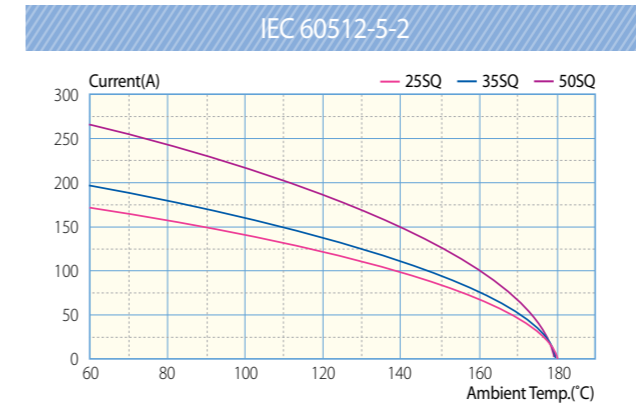
Application

- High Voltage AC/DC Connections For Batteries, Junction Box, Inverter And Others

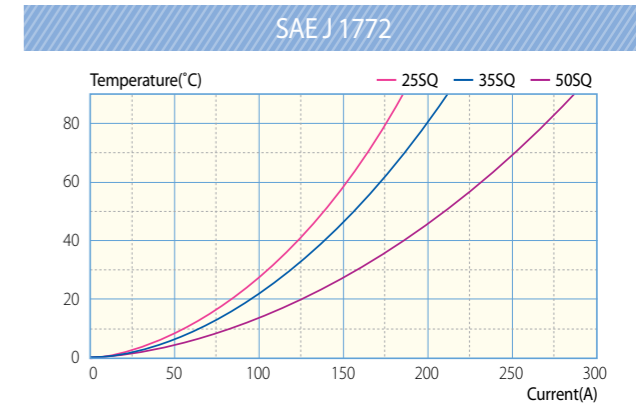
Standard

- Satisfied With USCAR 2/USCAR 37/USCAR 21

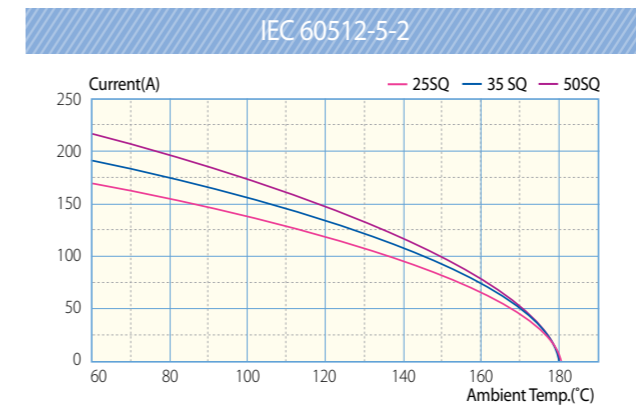
Derating Curve (Straight)



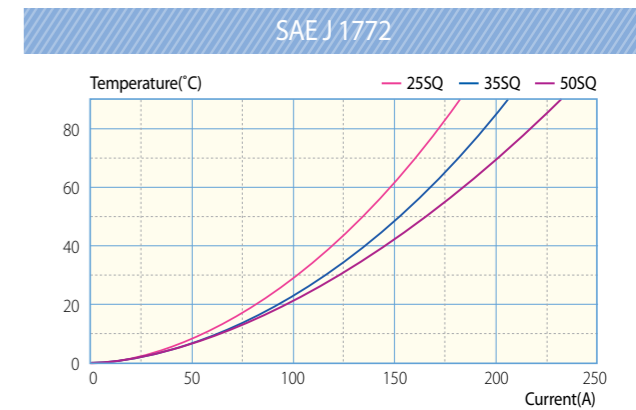
Temperature Rising (Straight)



Derating Curve (Right Angle)



Temperature Rising (Right Angle)



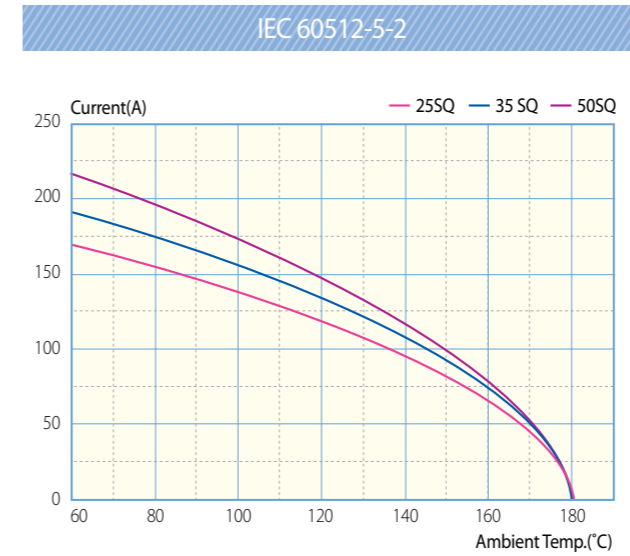
Connector Size

		Wire To Unit		Wire To Unit	
Connector Assembly	Degree Type1 Straight (180°)		124.5		78
	Degree Type2 Right Angle (90°)		93.5		80.5
Female Connector	Degree Type1 Straight (180°)		78		85.7
	Degree Type2 Right Angle (90°)		80.5		54.5
Male Connector			73		69.2

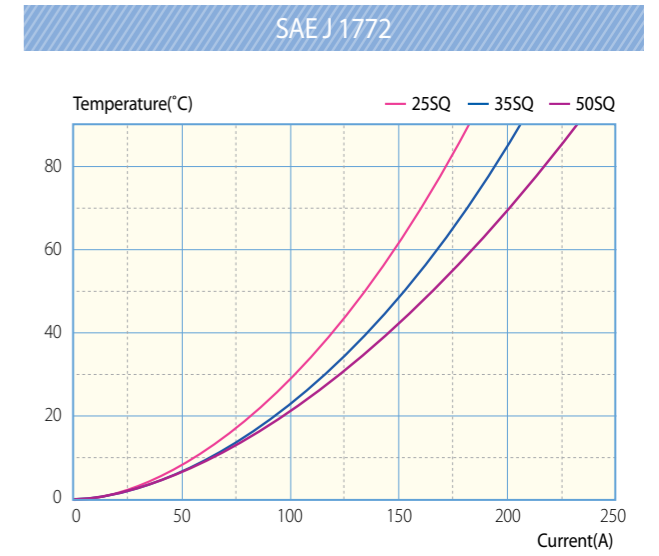
Product Image



Derating Curve



Temperature Rising



Technical Data

Mechanical	Electrical
<ul style="list-style-type: none"> • Connection Type <ul style="list-style-type: none"> - Wire To Unit <ul style="list-style-type: none"> 1) Degree Type <ul style="list-style-type: none"> : Right Angle (90°) • Terminal Size <ul style="list-style-type: none"> - HV : ø8mm Terminal - Interlock : 1.5mm Terminal • Cable <ul style="list-style-type: none"> - 25~50SQ Single Core Wire - Shield Wire Required • Finger Protection : IP2XB <ul style="list-style-type: none"> - Under Unmated Condition • HVIL • CPA <ul style="list-style-type: none"> - Release Type : By Finger • Shield Type • Multiple Key Code <ul style="list-style-type: none"> - L/R/CL/CR (4 Types) * Refer To 40 Page 	<ul style="list-style-type: none"> • Voltage : Up To 600V • Current : 200A
Environmental	Application
<ul style="list-style-type: none"> • Waterproof : IP67/IP69K <ul style="list-style-type: none"> - Under Mated Condition • Operating Temp. Range : -40°C~125°C 	<ul style="list-style-type: none"> • High Voltage AC/DC Connections For Batteries, Junction Box, Inverter And Others
Standard	<ul style="list-style-type: none"> • Satisfied With USCAR 2/USCAR 37/USCAR 21

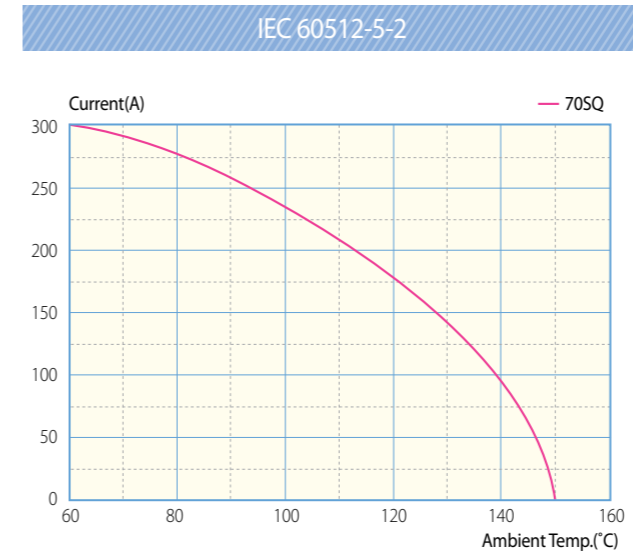
Connector Size

	Wire To Unit	
Connector Assembly		
Female Connector		
Male Connector		

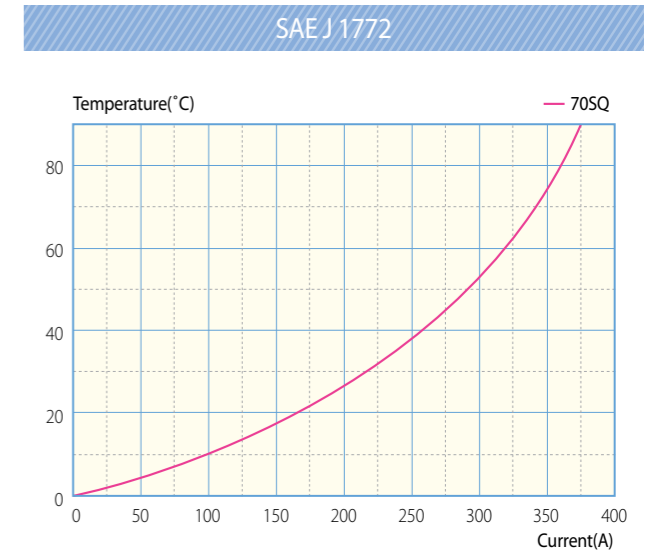
Product Image



Derating Curve



Temperature Rising



Technical Data

Mechanical

- Connection Type
 - Wire To Unit
 - 1) Degree Type
 - : Right Angle (90°)
- Terminal Size
 - HV : ϕ 12mm Terminal
 - Interlock : 1.5mm Terminal
- Cable
 - 50~95SQ Single Core Wire
 - Shield Wire Required
- Finger Protection : IP2XB
 - Under Unmated Condition
- HVIL
- CPA
 - Release Type : By Finger(Normal)
- Shield Type
- 2 Step Disconnection For Safe Unmating

Electrical

- Voltage : Up To 1,000V
- Current : 300A

Environmental

- Waterproof : IP67/IP69K
 - Under Mated Condition
- Operating Temp. Range : -40°C~125°C

Application

- High Voltage AC/DC Connections For Batteries, Junction Box, Inverter And Others

Standard

- Satisfied With USCAR 2/USCAR 37/USCAR 38 /USCAR 21

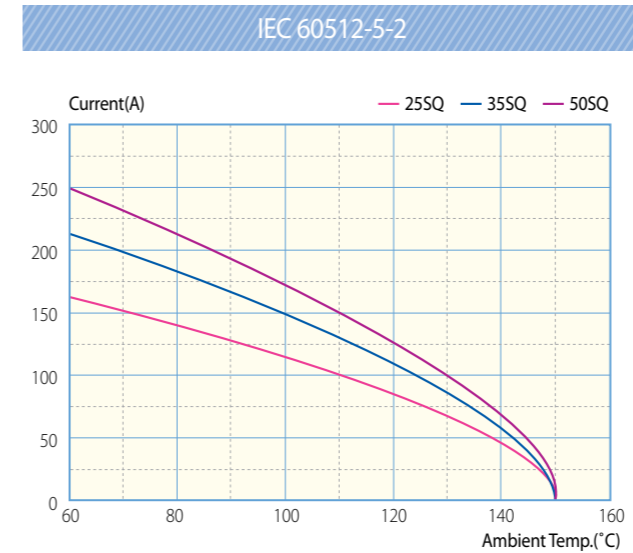
Connector Size

	Wire To Unit	
Connector Assembly		
Female Connector		
Male Connector		

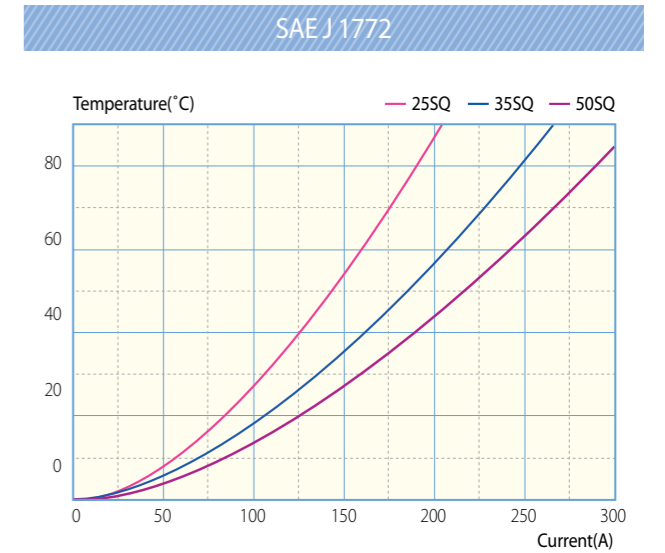
Product Image



Derating Curve



Temperature Rising



Technical Data

Mechanical

- Connection Type
 - Pass Through (Eyelet Connector)
- Cable
 - 25/35/50SQ Single Core Wire
 - Shield Wire Required
- Shield Type
- Multiple Key Code
 - L/R/CL (3 Types)
 - * Refer To 41 Page

Electrical

- Voltage : Up To 600V
- Current : 125A

Environmental

- Waterproof : IP67/IP69K
 - Under Fastened Condition
- Operating Temp. Range : -40°C~125°C

Application

- High Voltage AC/DC Connections For Batteries, Junction Box, Inverter And Others

Connector Size

		Wire To Unit	
Connector Assembly	1P		
	2P		
	3P(A)		
	3P(B)		

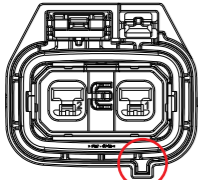
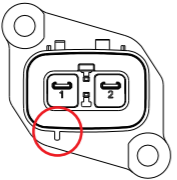
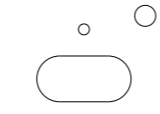
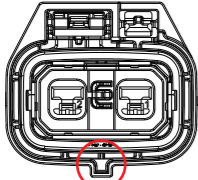
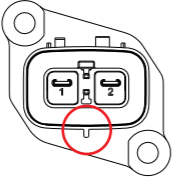
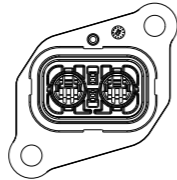
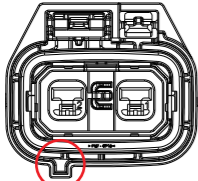
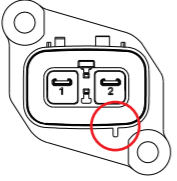
020A 2P / Wire To Unit

Key Code	Female	Male (Type A)		
		Front View	Rear View	Panel Shape
LB				
LT				
RB				
RT				
Key Code	Female	Male (Type B)		
		Front View	Rear View	Panel Shape
LB				
LT				
RB				
RT				

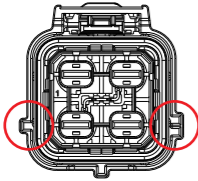
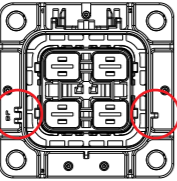
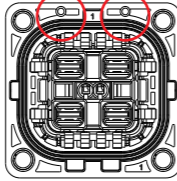
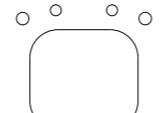
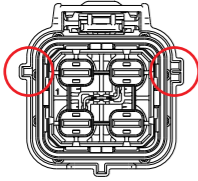
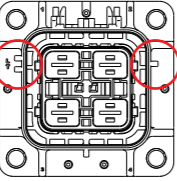
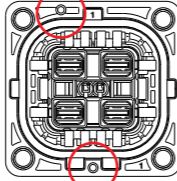
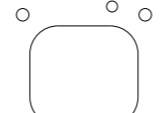
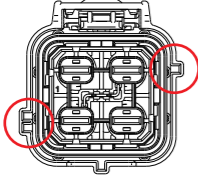
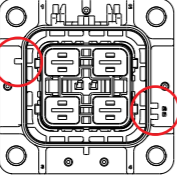
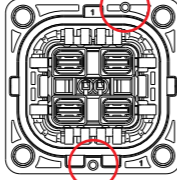
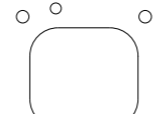
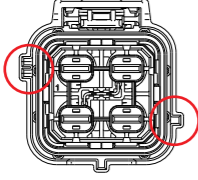
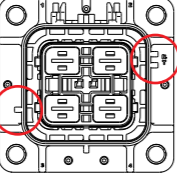
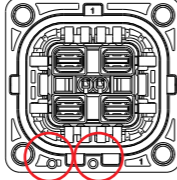

020A 2P / Wire To Wire

Key Code	Female	Male
LB		
LT		
RB		
RT		

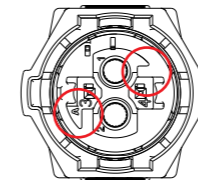
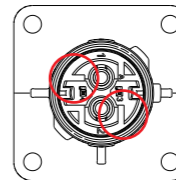
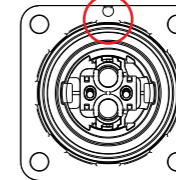
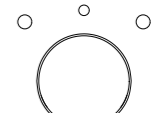
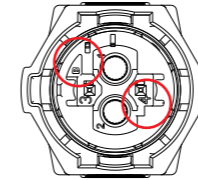
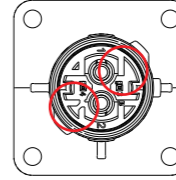
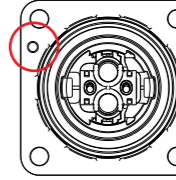
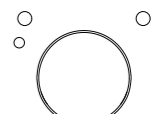
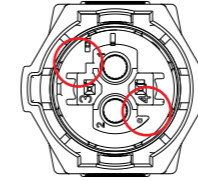
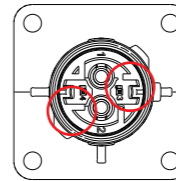
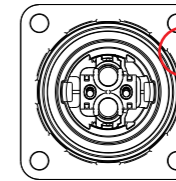
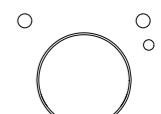
040D 2P

Key Code	Female	Male		Panel Shape
		Front View	Rear View	
L				
C				
R				

040E 4P

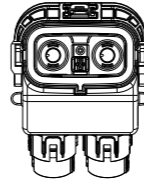
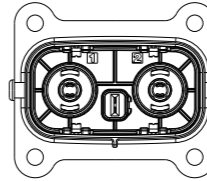
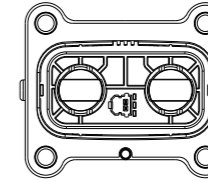
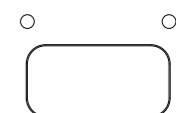
Key Code	Female	Male		Panel Shape
		Front View	Rear View	
LB				
LT				
RB				
RT				

050A 2P

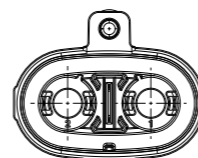
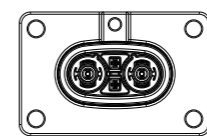
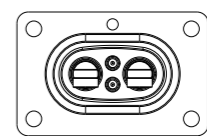

Key Code	Female	Male		Panel Shape
		Front View	Rear View	
L				
C				
R				

* Key code of male(Degree Type2) is compatible with male of degree type1

200B 2P

Key Code	Female	Male		Panel Shape
		Front View	Rear View	
C				

200D 2P

Key Code	Female	Male		Panel Shape
		Front View	Rear View	
C				

Connector KeyCode

200A/300A/Pass Through Series

200E 2P

Key Code	Female	Male		
		Front View	Rear View	Panel Shape
L				
R				
CL				
CR				

*Key code of female(Degree Type2) is compatible with female of degree type1

200E 3P

Key Code	Female	Male		
		Front View	Rear View	Panel Shape
L				
R				
CL				
CR				

*Key code of female(Degree Type2) is compatible with female of degree type1

300B 1P

Key Code	Female	Male		
		Front View	Rear View	Panel Shape
C				

UE125A

Key Code	Pass Through (1P)	
	Front View	Panel Shape
L		
R		
CL		

*There is one key code to the 2P/3P Pass Through

Busbar Solution

- Types of Busbar
- CAE Simulation and Analysis
- Flexible Busbar
- Flat Wire Busbar



Flexible Busbar



Flat Wire Busbar



Rigid Busbar



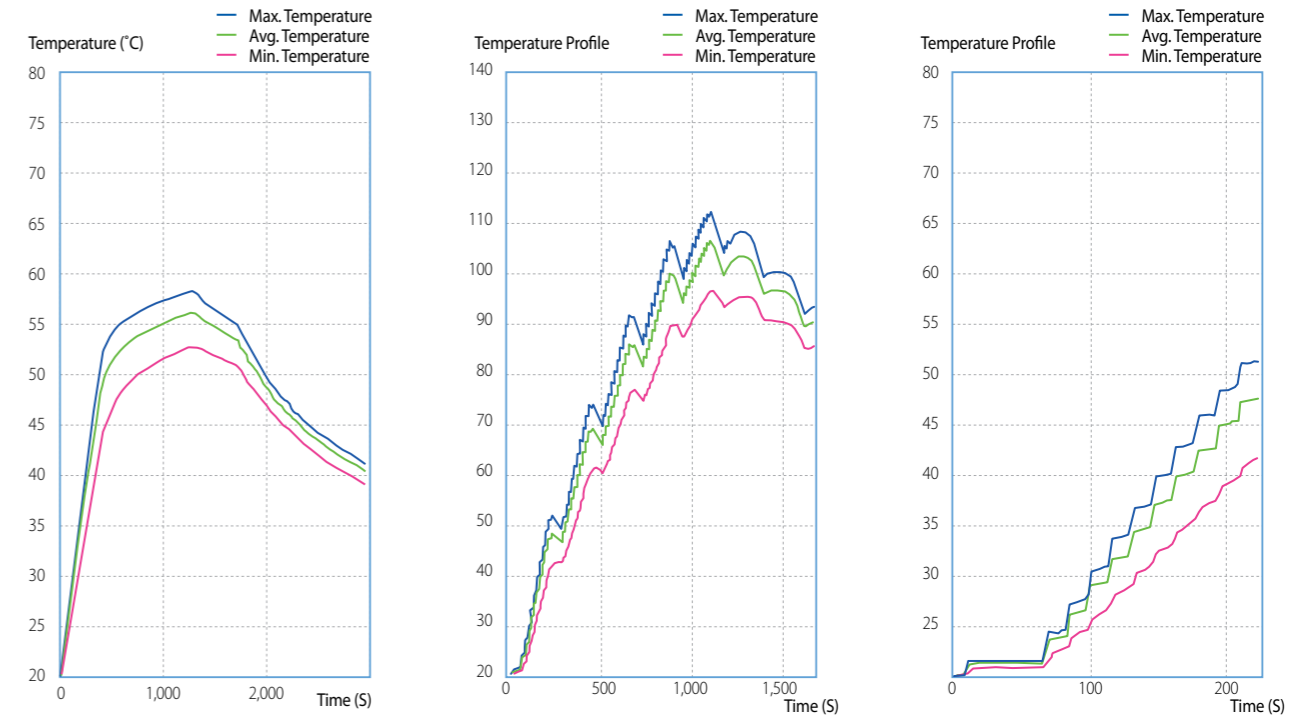
Aluminum Busbar



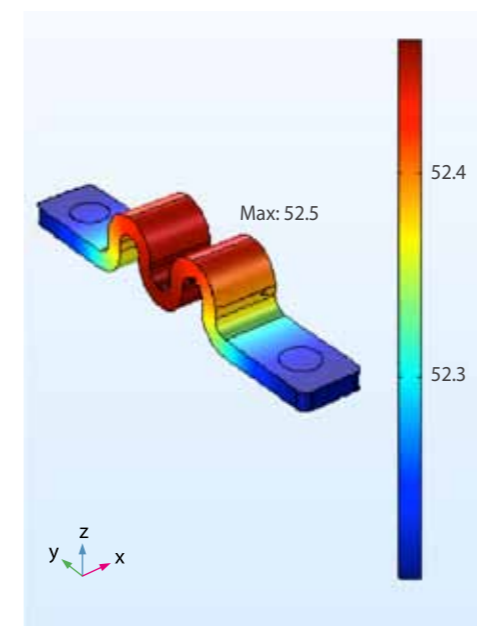
Types of Busbar

	Flexible Busbar	Rigid Busbar	Flat Wire Busbar
Shape			
Process	Manual	Stamping Process (Progressive)	Semi-automation (Extrusion)
Insulation	TPE (Thermal Plastic Elastomer)	Epoxy Powder Coating, Insert Mold, Overmold, Laminated	PA12 (Nylon)
Material	Tin-Plated Copper	Copper	Copper
Plating Option	Tin	Silver Nickel Tin	TBD
Difference	No Tooling Cost High Tolerance High Flexibility of Design Manual Labor Process	Requires Tooling Cost Standard Stamping Process Limited Design Flexibility Machined Process	No Tooling Cost Automated Bending Process High Flexibility of Design Machined Process

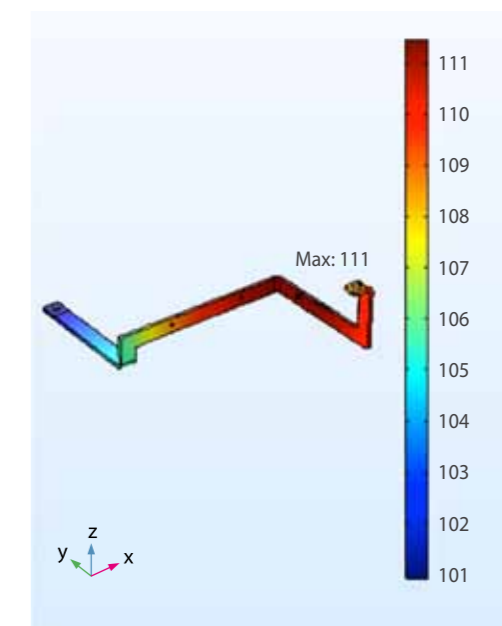
CAE Simulation and Analysis



Time=1080s Surface : Temperature (degC)
Max/Min Volume : Temperature (degC)



Time=1102s Surface : Temperature (degC)
Max/Min Volume : Temperature (degC)



*The above simulation and analysis data is not relevant to any project but a sample representation of a Busbar analysis.

Flexible Busbar

Product Image



Available



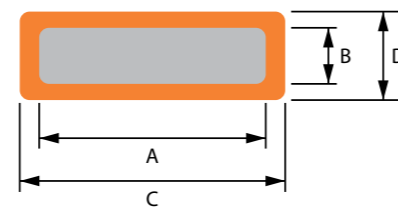
Straight Bending

Twist Bending

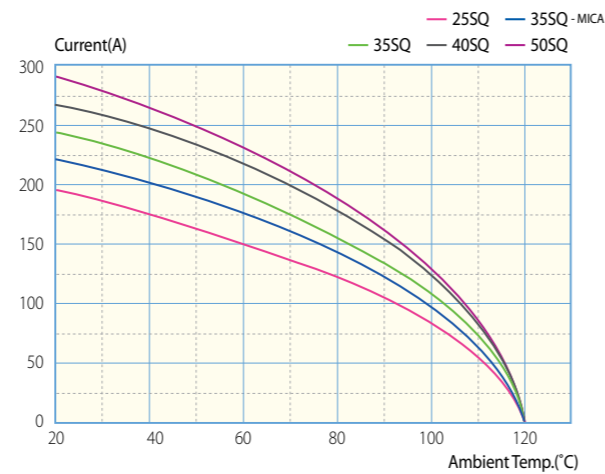
Features

- High Flexibility & High Operating Efficiency For Connection
- Various Selection Of Conductor Dimension On Required Current
- Optimized Design Application For Battery Pack Structure
- No Need Tool Cost

Dimension



Derating Curve



* Customization is possible for Wire Square

Flat Wire Busbar

Product Image



Available



Thickness Bending

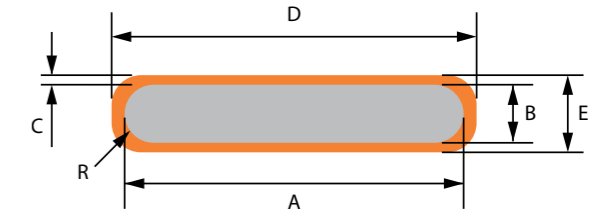
Twist Bending

Width Bending

Features

- Integrated Insulation Tube With Conductor
- Various Selection Of Conductor Dimension On Required Current
- Less Space And Weight Than Cable
- Semi-Automation Process

Dimension

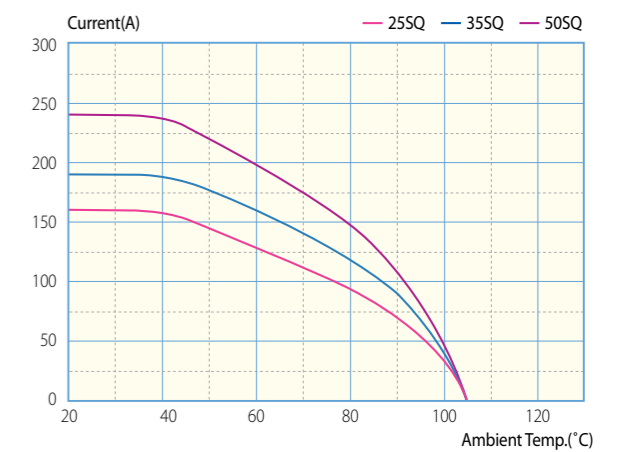


SQ	Dimension (mm)					
	Conductor			Insulation	D	E
	A±0.1	B±0.05	R±0.15	C+0.3/0.1		
25	12	2.2	1	0.5	13	3.5
35	12	3	1	0.5	13	4
35	15.5	2.5	1.25	0.5	16.5	3.5
50	15.5	3.5	1.75	0.5	16.5	4.5
60	18	3.5	1.75	0.6	19.2	4.7
70	18	4	2	0.6	19.2	5.2
80	20	4	2	0.6	21.2	5.2
100	20	5	2.5	0.8	21.6	6.6
125	25	5	2.5	0.8	26.6	6.6

* Cross section can be customized up to 150SQ.

* Tin plating and non-insulation are optional.

Derating Curve



Charging Application

- AC Coupler
- Inlet



Product Image



AC Connector



AC Inlet

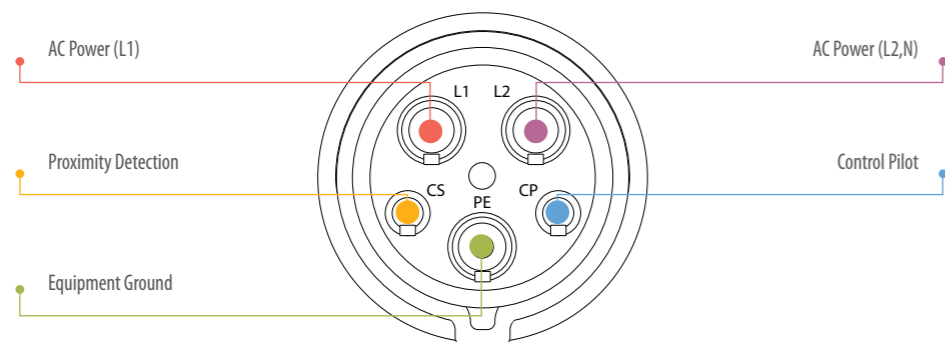
Features

- Interface Compliant To SAE J1772 And IEC 62196-2 Type1 Standards
- Engagement/Disengagement Performance Exceeding 10,000 Cycles
- Pushbutton-Controlled Flashlight
- Ambient Temperature -40°C~60°C
- Degree of Protection IP67 (Under Mating Condition)

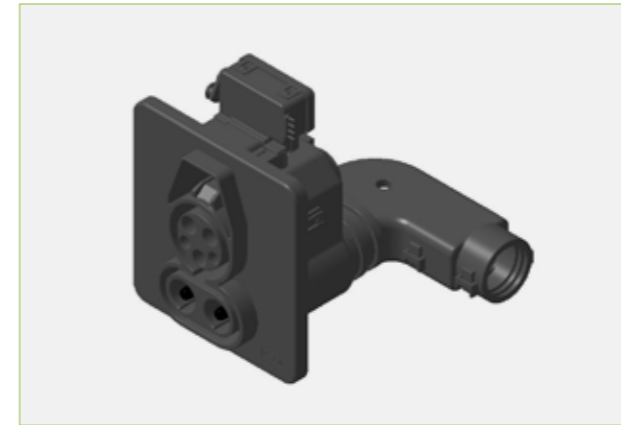
Technical Data

- Certification Standard
 - UL2251 / IEC62196-1 / K9900(Korea)
- Voltage : Up To 250V
- Current
 - Option1 : 16A
 - Option2 : 32A
- Number Of Poles : 5
 - Power 2 / Ground 1 / Signal 2
- Insulation Resistance
 - : Over 5MΩ(DC 500V)
- Dielectric Withstand Voltage
 - : AC 2,000V 1Minute

Pin Map



Product Image



CCS1



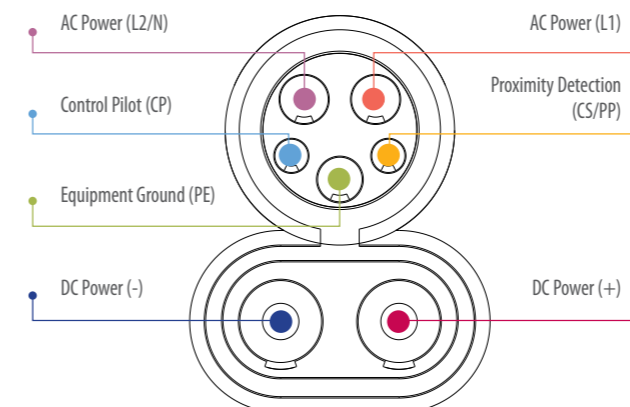
CCS2

Features

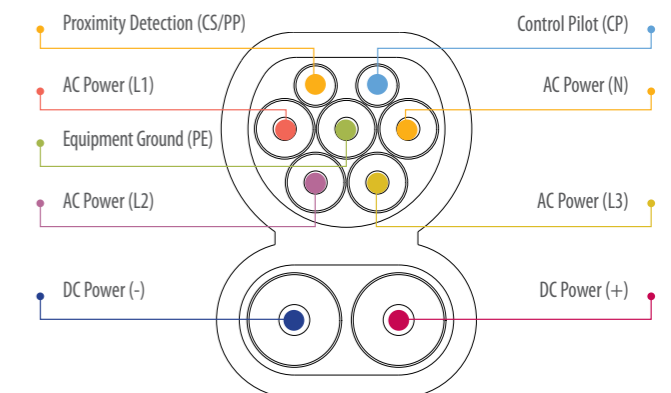
- Interface Compliant To SAE J1772 And IEC 62196-3 Standards
- Ambient Temperature (Operation) : -40°C ~ 60°C
- Degree Of Protection IP55 (With Protective Cap)
- Temperature Monitoring Pt1,000 x 2
- Engagement/Disengagement Performance Exceeding 10,000 Cycles

- Insertion Force < 100 N
- Withdrawal Force < 100 N
- Locking Mechanism By Actuator
 - Emergency Release Function Applied
- Vehicle Inlet/Connector Customizing Available

Vehicle Inlet CCS 1



Vehicle Inlet CCS 2





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