POWER.S^3

Power Supply Safe Solutions

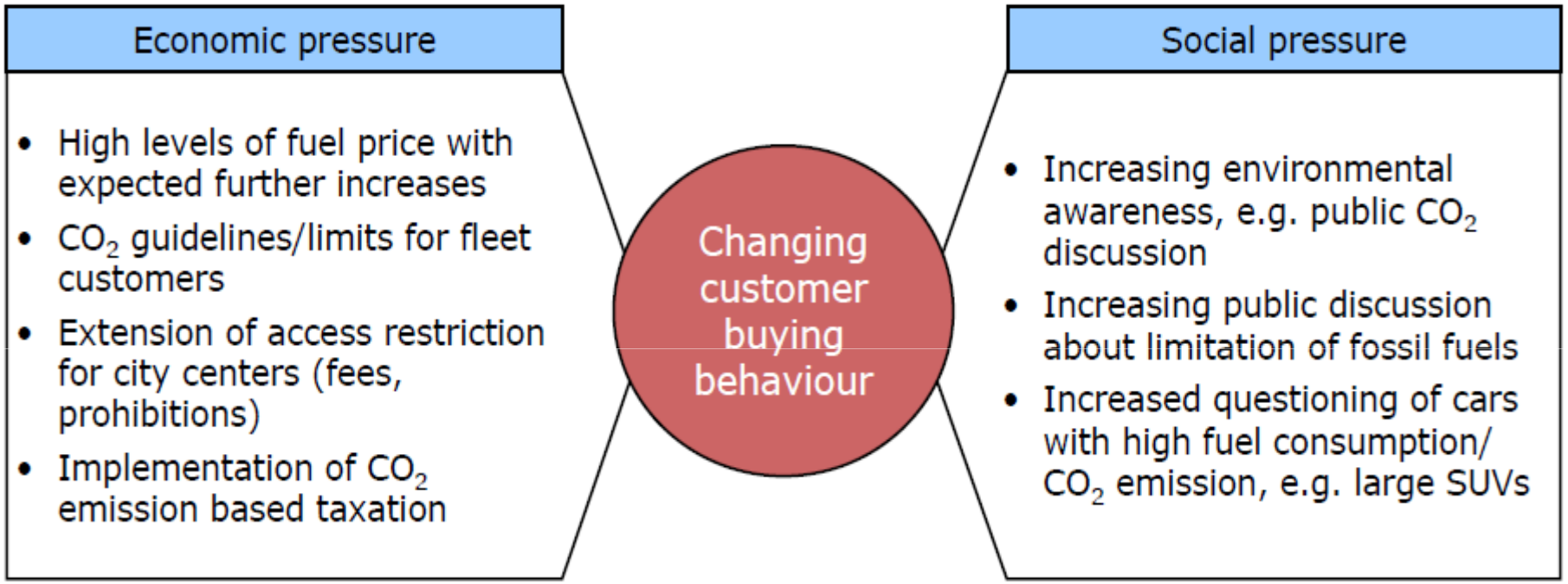
INTERCONNECT PRODUCTS

2012

FCI MVL Division

FCI COPYRIGHT

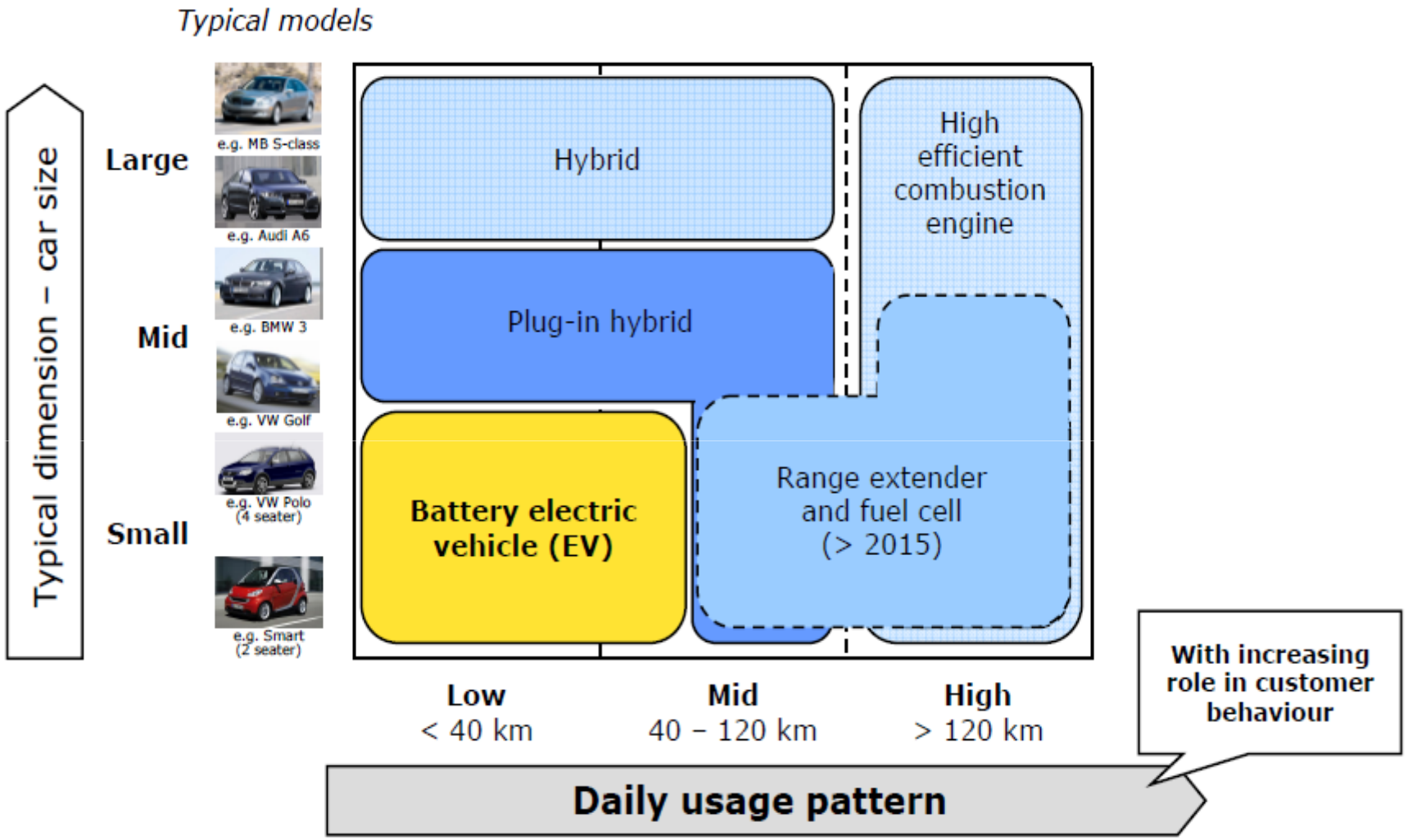
A changing automotive market environment



Source : Bain & Co

FCI COPYRIGHT

Battery electrical solutions for metropolitan mobility

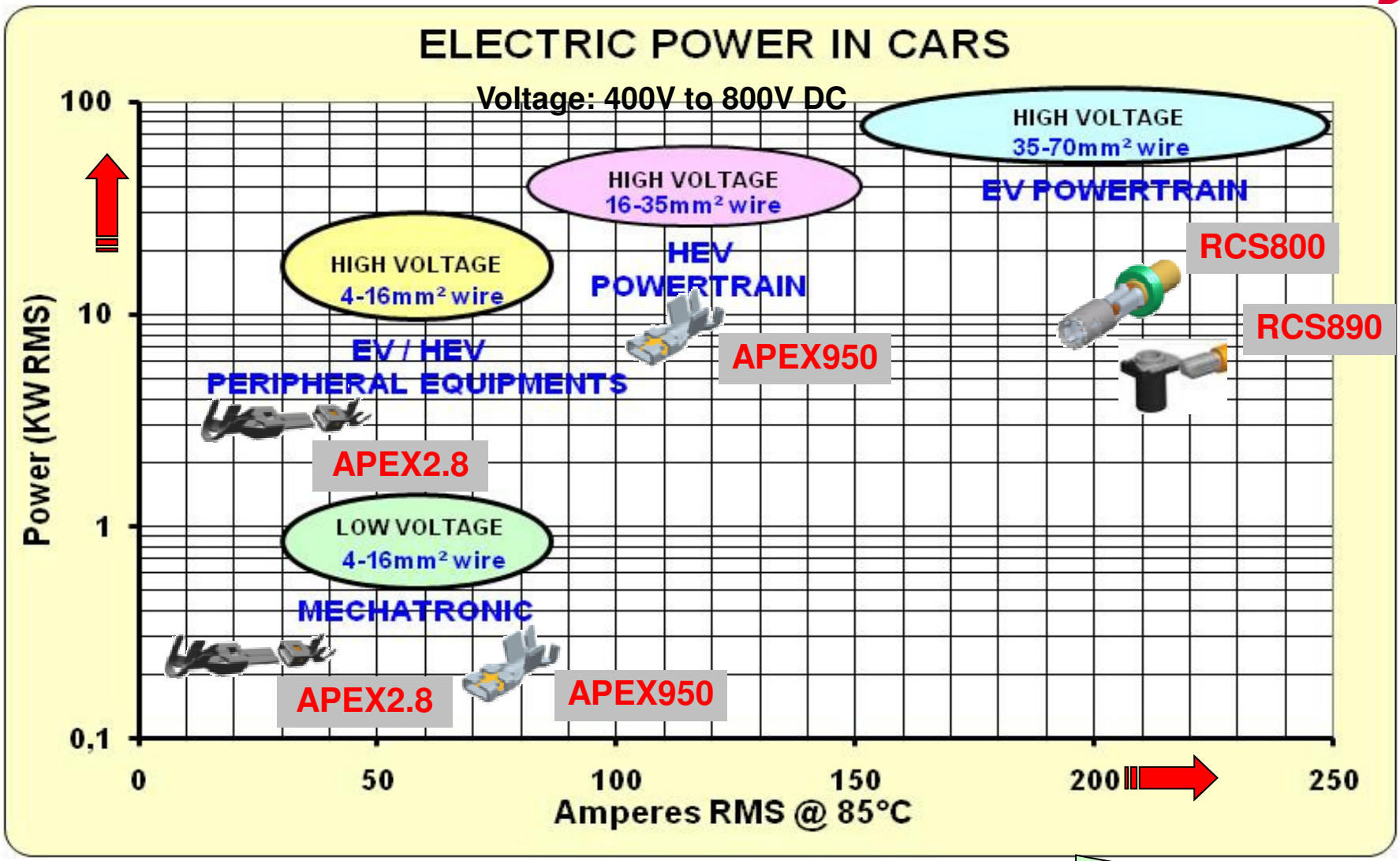


Note: 70% of the European population drive less than 40 km per day; 80% of U.S. population drive less than 50 miles per day

Source : Bain & Co

FCI COPYRIGHT

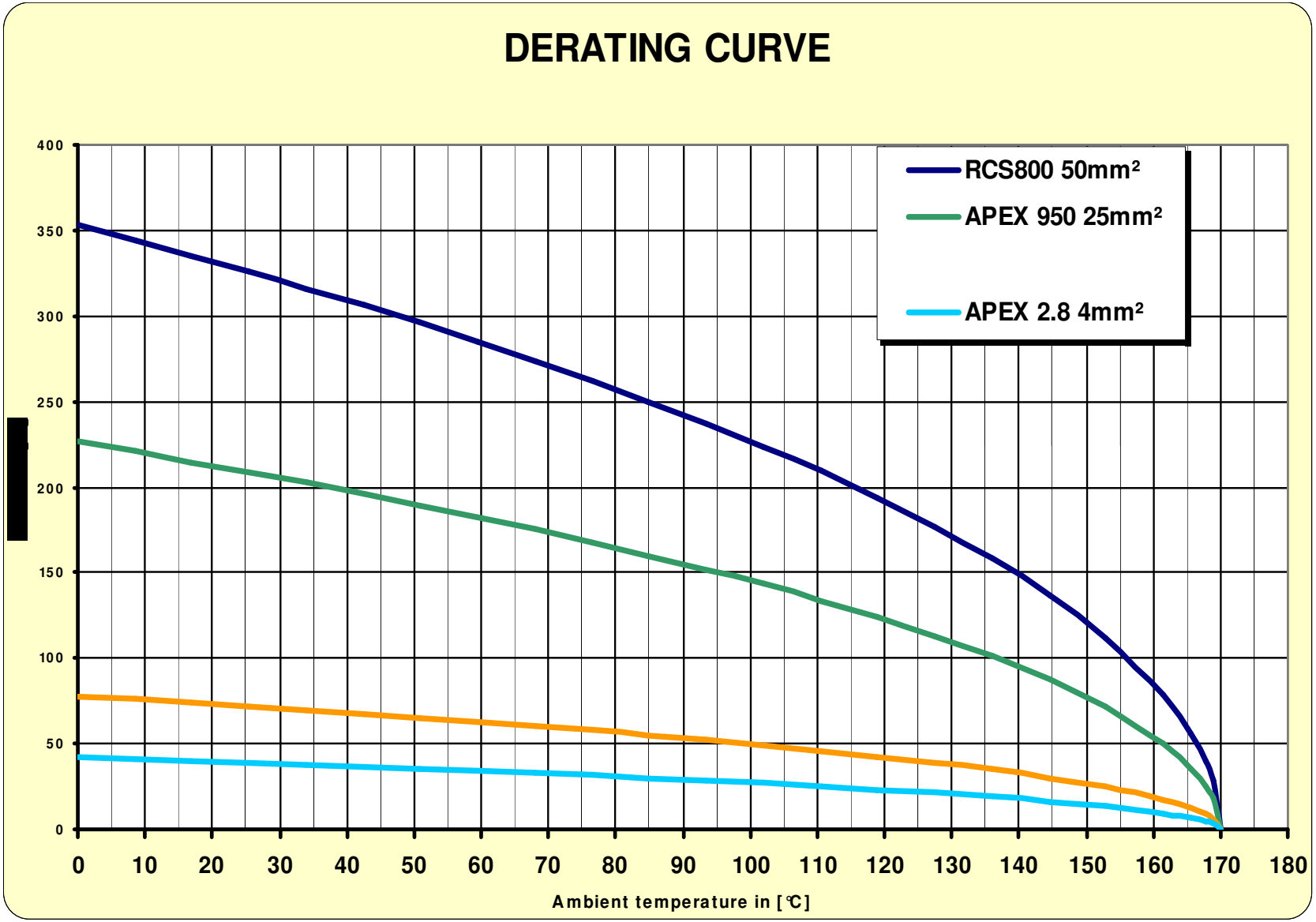
What does High Power means in Automotive?



FCI's complete range of terminals to cover all applications

FCI COPYRIGHT

Current carrying capacity - terminals derating curves*



* For RCS800, performance based on high quality cables.

FCI COPYRIGHT

We equip serial cars …

Example of Renault Fluence and Nissan Leaf EV

- *high power system interconnection*

Apex280 2-way
RCS800 2-way

EV-PLUG IEC Type-1

EV-Plug IEC Type-2

FCI COPYRIGHT

Renault L38 electric car (Fluence)

FCI COPYRIGHT

POWER.S^3 - High power interconnect products

HOUSINGS

HIGH POWER TERMINALS

"Peripherals"

Air conditioning
Heating
In-car charger

APEX280 2-WAY

PERIPHERAL SHIELDING

APEX-2.8mm
[2.8mm rectangular pin]
35A @ 70° C
(4mm² cable)

"Peripherals"

In-car charger

APEX950 4+1-WAY

UNSHIELDED

(serial Q3 2012)

APEX-950
[for 9.5mm rectangular pin]
70A @ 70° C
(16mm² cable)

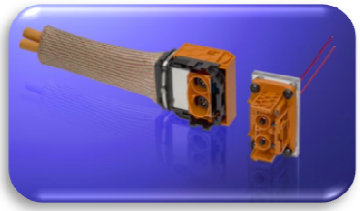
"Powertrain"

Battery
Junction box
Inverter
e-motor

RCS800 2-WAY

PERIPHERAL SHIELDING

RCS-800 *[straight]*
[for 8mm round pin]
230A @ 70°C
(50mm² cable)



RCS890 2-WAY

PERIPHERAL SHIELDING

(serial Q2 2012)

RCS-890 *[90° angle]*
[for 8mm round pin]
210A @ 70°C
(50mm² cable)

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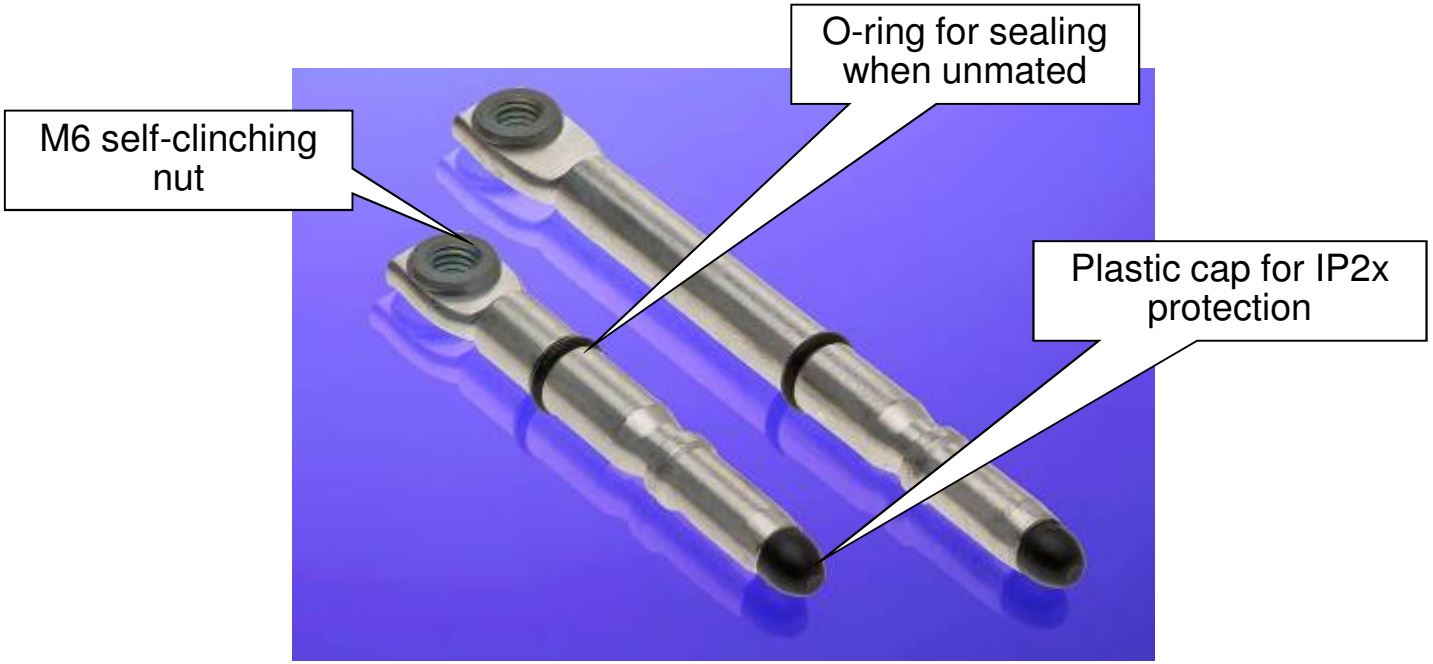
RCS800 – 400/800V, 250A

FCI COPYRIGHT

Power.S³ - RCS-800 male terminal

- ✓ Ø8mm screw machined pin
- ✓ 50 mm² section
- ✓ Plastic cap for IP2x protection
- ✓ To be screwed to busbar (M6)
- ✓ Several terminal lengths for flexible busbar configurations (straight, 90°…)



FCI COPYRIGHT

FCI Power.S³ - RCS-800 female terminal

- ✓ Round shape for optimized dimensions
  → rectangular terminal would require 15x2 mm male terminal
- ✓ Robust bend strength
- ✓ 8 contact points
- ✓ Mate with Ø8mm pin
- ✓ Protective metal cage

✓ Body material	K75, Cu CR Ti Si, 1.20mm
✓ Box material	stainless steel 0,4mm
✓ Crimping range	35 to 50 mm²
✓ Current capacity	230A at 70°C
✓ Contact resistance	< 0.1mΩ
✓ Operating temp.	-40°C / 170°C
✓ Plating	Silver (Ag)

FCI COPYRIGHT

FCI Power.S³ - RCS-890 female terminal

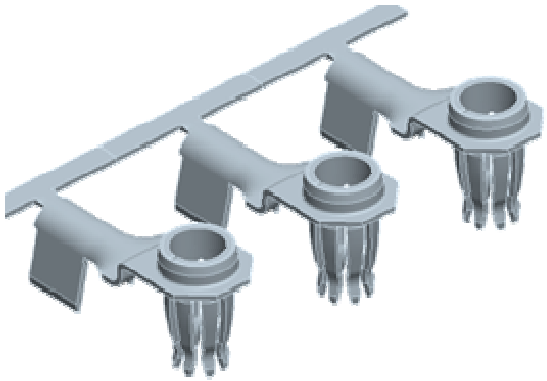
- Same performances as RCS800

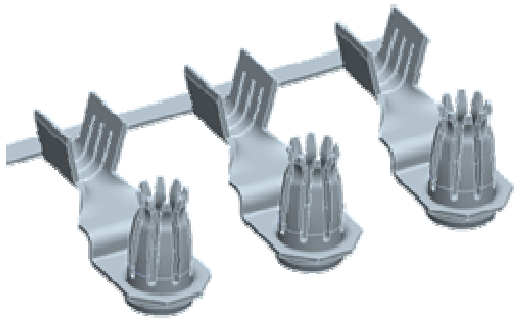
- 2 copper alloy parts and 1 isolating part

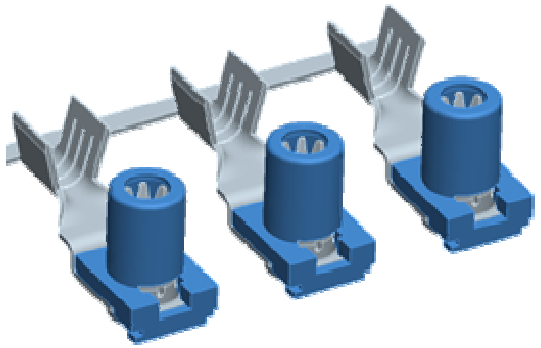
The active part is stamped and rolled

↳ It is then inserted in force into a crimping part

↳ Finally, an isolating body is added to ensure mechanical protection.







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FCI Power.S³ - RCS800 connector

- Features & benefits
  - High voltage : 400 / 800 V
  - Current rating: 230A @ 70°C
  - Ergomate system with two-step disconnection system
  - Dual sealing feature
  - Shielding : 60 db
  - Integrated Interlock system

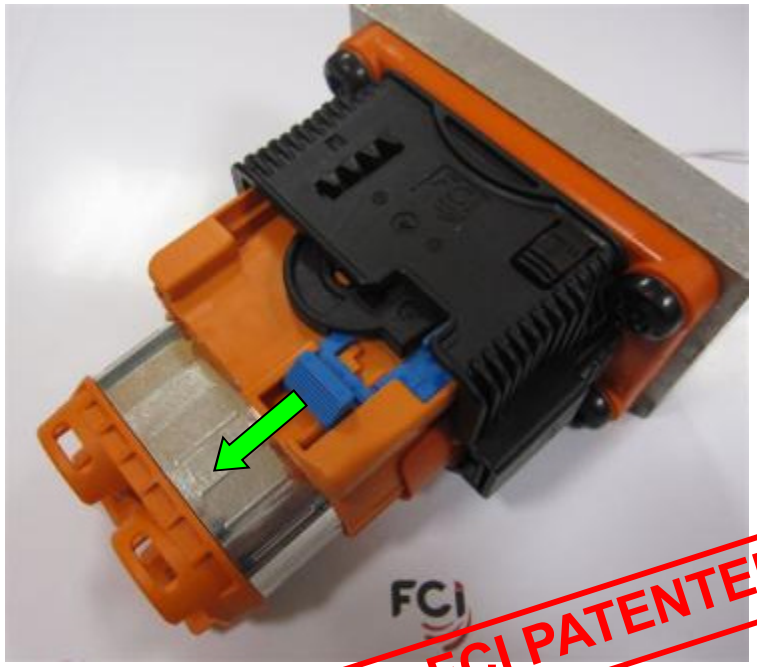
- Main applications : High current, high voltage DC connections for
  - Battery
  - Junction box
  - Inverter

FCI COPYRIGHT

FCI Power.S³ : RCS-800 housings

Two step unmating

1st step



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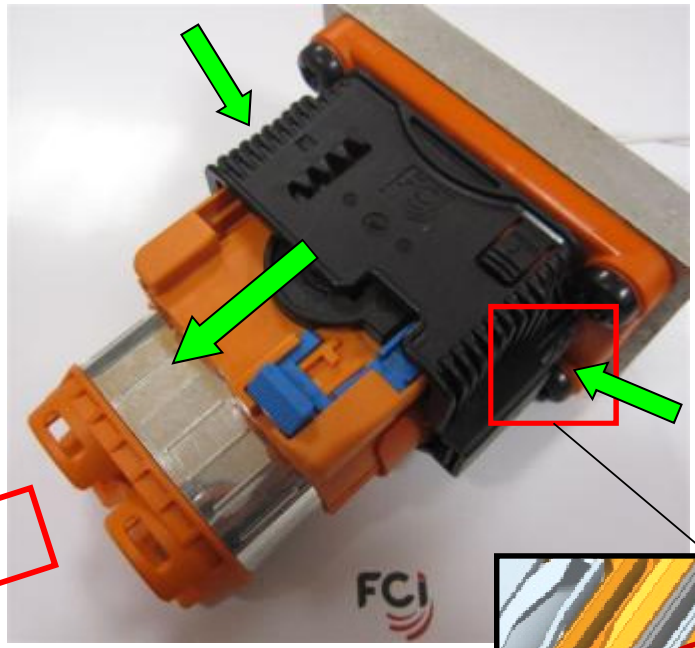

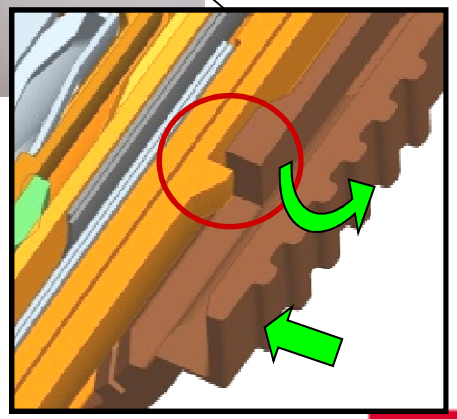

1 PULL THE CPA TO ITS 'OPEN' POSITION

2 PRESS THE SIDE LATCH TO UNMATE THE PLUG CONNECTOR THEN PULL IT

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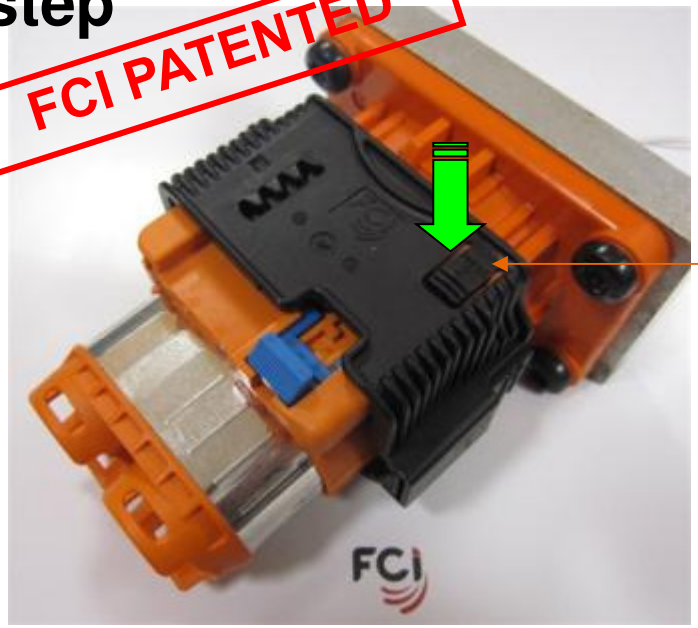
FCI Power.S³ : RCS-800 housings

Two step unmating

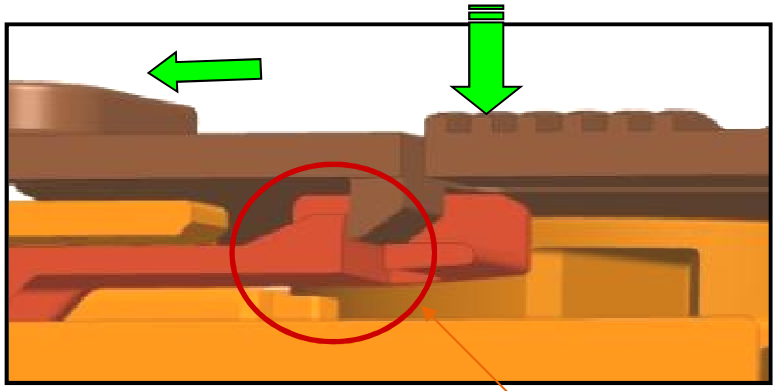
Similar concept on Apex 280 and RCS890 housing

2nd step

FCI PATENTED



1 **CHANGE HAND'S POSITION AND PRESS TOP LATCH TO RELEASE THE SLIDER**



THE SLIDER IS STOPPED ON THE CPA UNTIL TOP LATCH IS PRESSED

2 **PULL THE SLIDER TO FINISH THE UNMATING**

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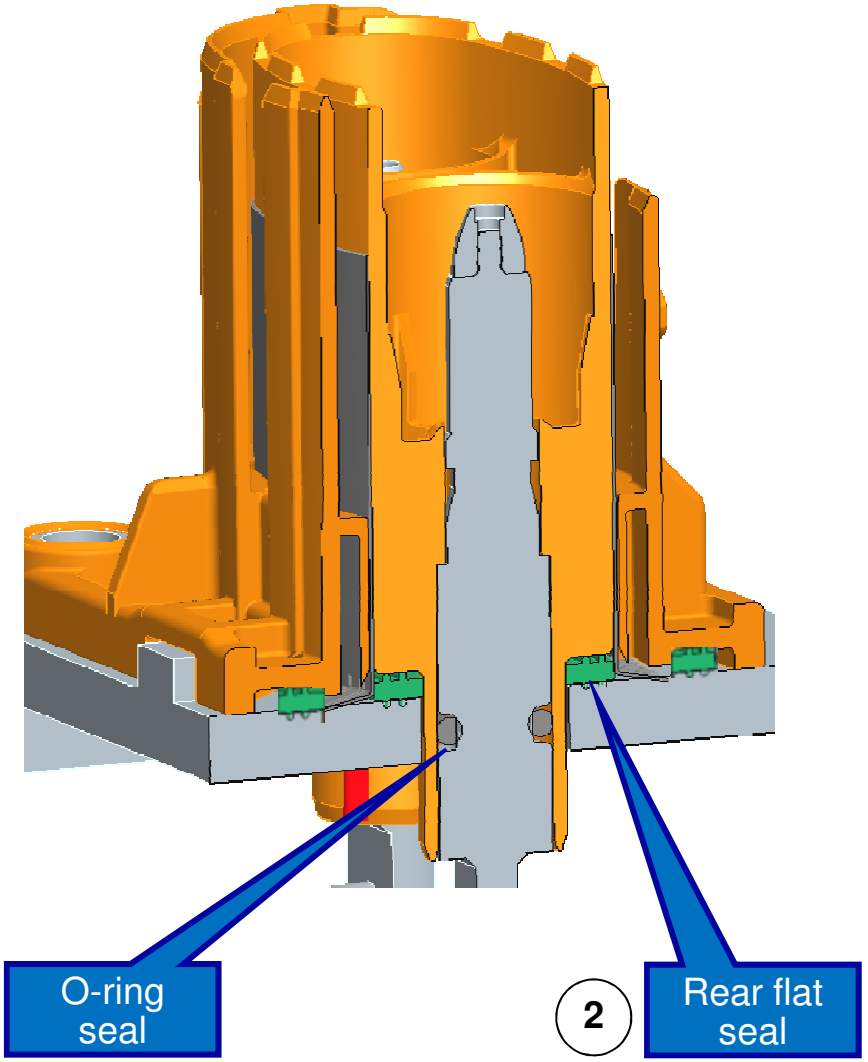
FCI Power.S³ : RCS-800 housings

Dual sealing feature - header

Header unmated sealed. Water can't go inside the box

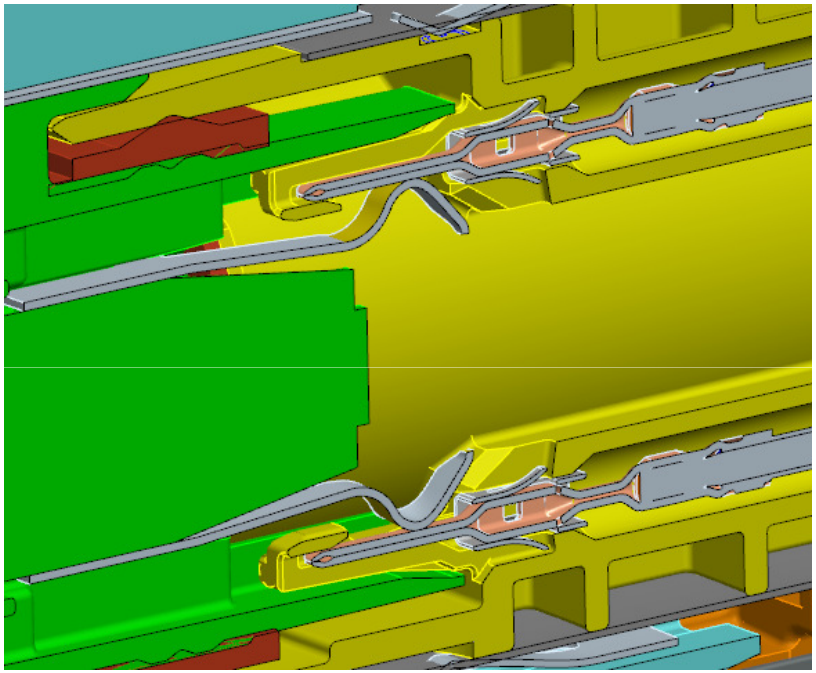


Peripheral seal for corrosion protection between connector shielded and metalic system.

Same concept for the Apex 280 housing

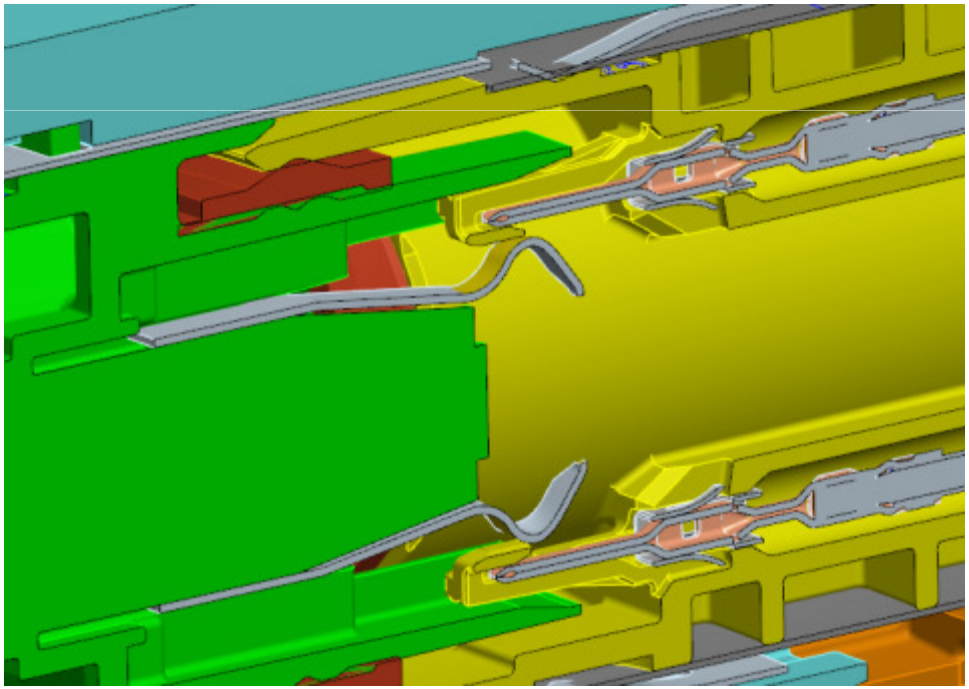
FCI COPYRIGHT

FCI Power.S³ : RCS-800 housings
Integrated interlock function



Mated position

Unmated intermediate position



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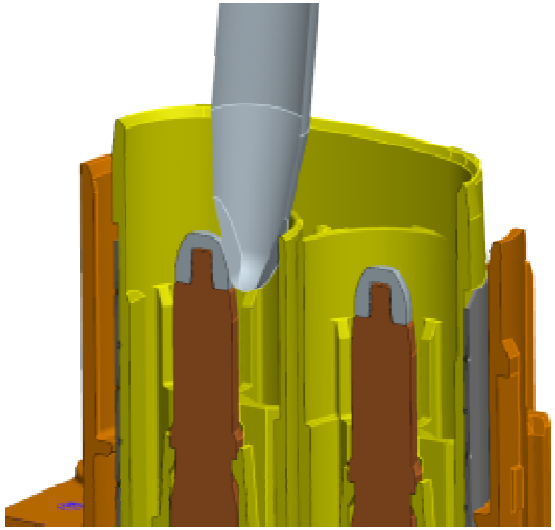
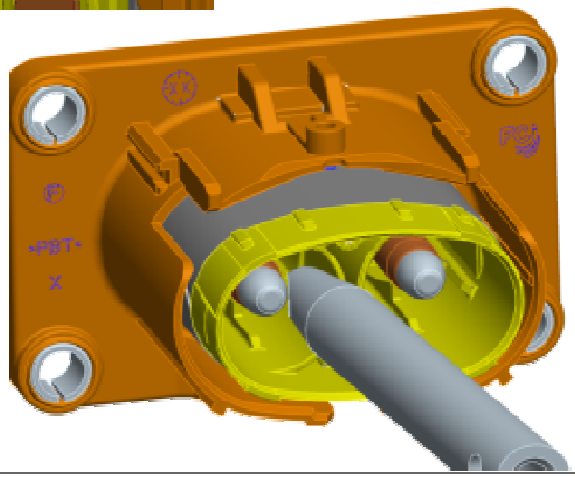
FCI Power.S³ : RCS-800 housings

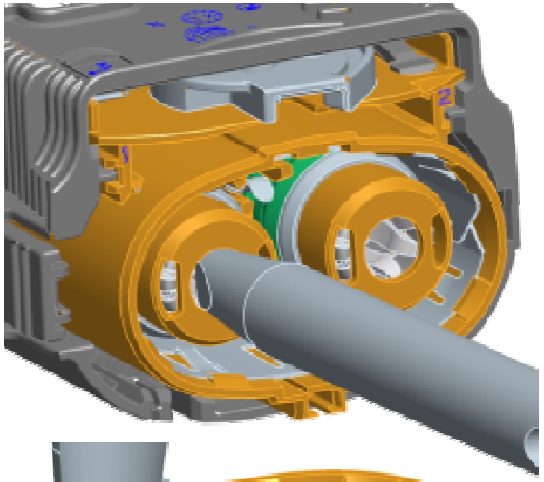
IP2XB electrical shock protection

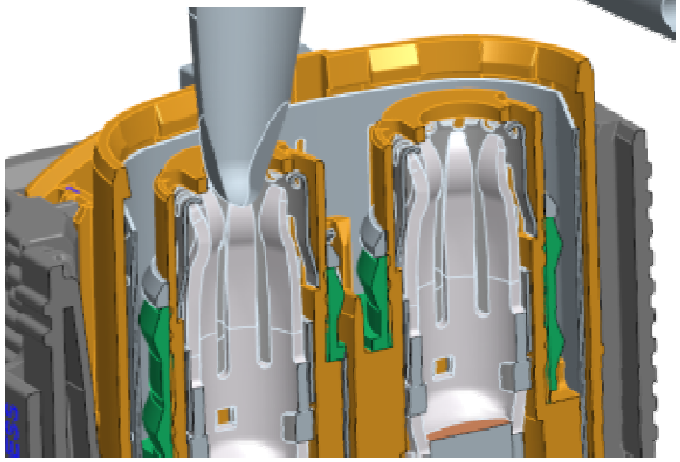
Protection of the connector active/conductive parts against electric shock

(i.e preventing access by operator's finger)









Same concept for APEX-280 housing

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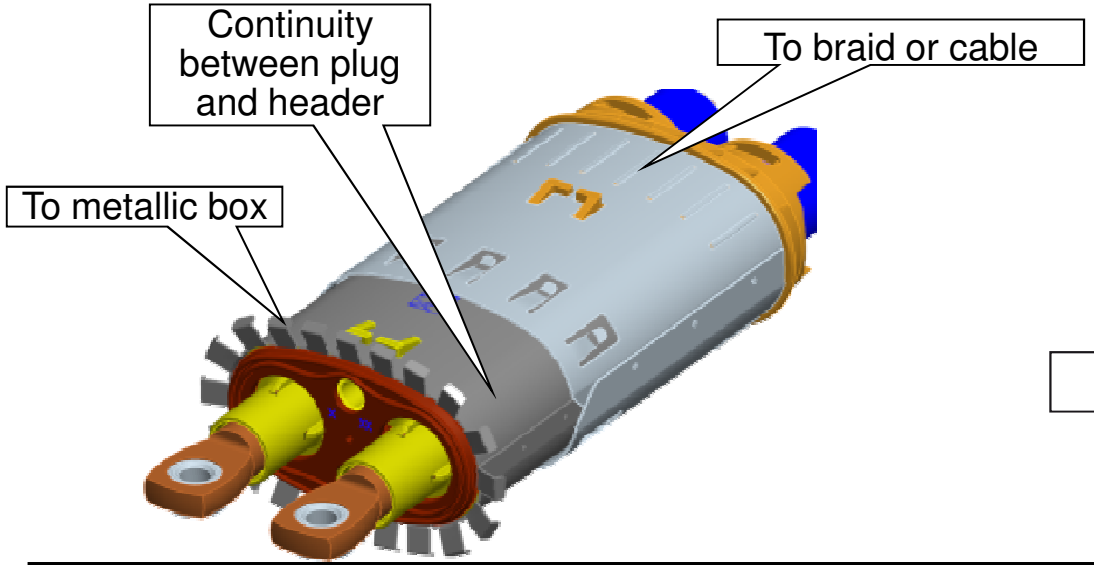
FCI Power.S³ : RCS-800 housings

Peripheral shielding concept



Same concept for APEX-280 housing

Shielding efficiency:
60dB according EN 50289-1-6 clause N°8 and IEC61196-1-12.6 triaxial method (Zt≤100mΩ from 10 Hz to 100 MHz)

Shielding continuity:
R≤100mΩ

MAIN ADVANTAGES :

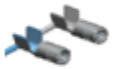
- ✓Fast and simple process to attach the metal braid on the female connector.
- ✓Usage of shielded cables is unnecessary

→ **EFFECTIVE TOTAL APPLIED COST**

Shielded braid choice is essential to make sure to keep shielding efficiency performance after ageing. Please refer to our FCI user manual to select recommended braids.

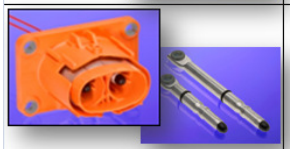
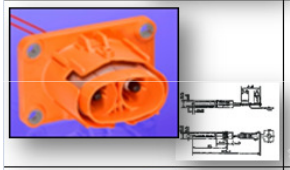
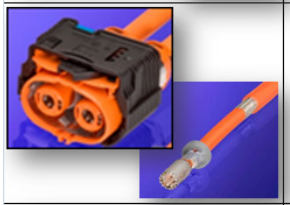
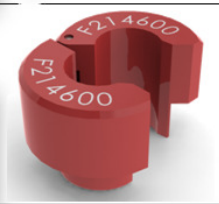
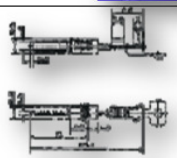
FCI COPYRIGHT

Power.S³ : RCS-800 Part numbers

Description	Bill of material BOM	New version P/N	Product image
RCS-800 2WAY PLUG CODE 1 BLACK	1	F673110	
RCS-800 2WAY PLUG CODE 2 BROWN	1	F773110	
RCS-800 FEMALE TERMINAL silver version 35 to 50 MM²	2	F385400	
RCS-800 FEMALE RETAINER (PLUG)	2	F527600	
RCS-800 FEMALE SWS 50 MM² (PLUG)	2	F327600	
RCS-800 FEMALE SWS 35-40 MM² (PLUG)	2	F427600	
RCS-800 HEADER CODE 1 BLACK	1	F473110	
RCS-800 HEADER CODE 2 BROWN	1	F573110	
RCS-800 MALE Bus Bar TERMINAL Round 8 Silver version - standard length 49.7 mm	2	F076600	
RCS-800 MALE Bus Bar TERMINAL Round 8 Silver version - V1 71.7 mm	optional	F176600	
RCS-800 MALE Bus Bar TERMINAL Round 8 Silver version - V2 95.7 mm	optional	F276600	
DCS2 1.5 gold-plated MALE TERMINAL 0,5-1,00 mm²	2	60100734	
DCS 1.5 MALE RED SWS 0,22 - 0,5 mm²	2	60993913	

FCI COPYRIGHT

Power.S³ : RCS-800 tooling (1)

RCS 800			
Related product Pictures	**Tool Pictures**	**Description**	**Part-number**
		RCS800 removing tool for female terminal	F 226010
		RCS800 removing tool for male terminal	**F218500**
		DCS2 1,5 removing tool for male terminal	**F418500**
		Press and positioning of the SWS 50² & 35² on the connector	**F214600**
		Insert help tool for the SWS (Optional tool : to be used if the SWS is positionned on the cable after terminal	**F979500**
		DCS2 1,5 hand crimp tool (0,50 / 0.75 / 1.00 mm²)	**6 520 04 14-M**

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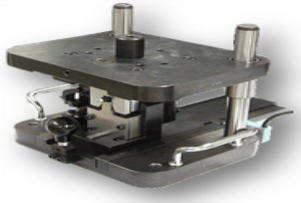
Power.S³ : RCS-800 tooling (2)

RCS 800



RCS800 crimp tool

RCS800 crimp tool

CRIMPING HEIGHT	272mm (10,7")
STROKE	50 mm (1,968")
TERMINAL PITCH	Loose
TERMINAL THICKNESS	> 1,5mm
WIRE SECTION	oltre 75mm²
FEEDING SYSTEM	Manual
WEIGHT	20,4 (44,85)
DIMENSION mm	W250xH270xD197
DIMENSION (")	W9,84xH10,6xD7,75

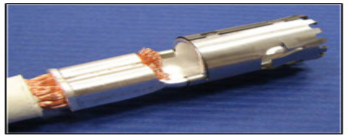
RCS -800 TOLL 03.2010 (Model MECAL)
Other Tool Typ please ask FCI Nürnberg

RCS800 crimp tool

CRIMP PRESS

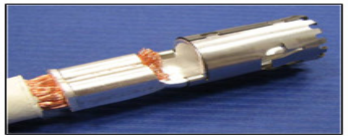
POWER	5,5Kw (7,5 HP)
FORCE	15000 Kg (33000 lb)
STROKE	40/50mm (1,57/1,96")
CRIMPING HEIGHT	190mm (7,48")
WEIGHT	1200Kg (2640 lb)
DIMENSION (mm)	W900xH2100xD1200
DIMENSION (")	W35,43"xH82,6"xD47,2"
CONFIGURATION	manual
POWER SUPPLY	to see versions
VOLTAGE	to see versions
SURFACE FINISHING	Light grey RAL7038

CRIMPPRESS P150
for max. Cable:
100 mm².



HAND CRIMPPRESS FCI C10 for max. Cable: 100 mm².

FCI C10



CRIMP SPARE PARTS SET for HAND CRIMP TOOL FCI C10

CR10 (10mm²)
CR16 (16mm²)
CR25 (25 mm²)
CR35 (35-40mm²)
CR50 (50 mm²)

FCI COPYRIGHT

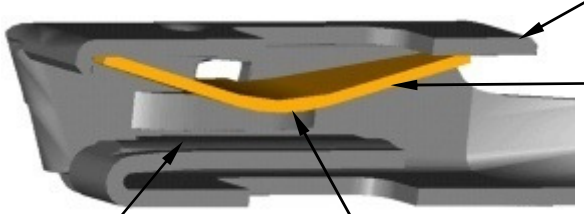
POWER.S3

APEX-280 – 400/800V, 35A

FCI COPYRIGHT

Power.S³ - APEX-2.8 terminal design

- Features

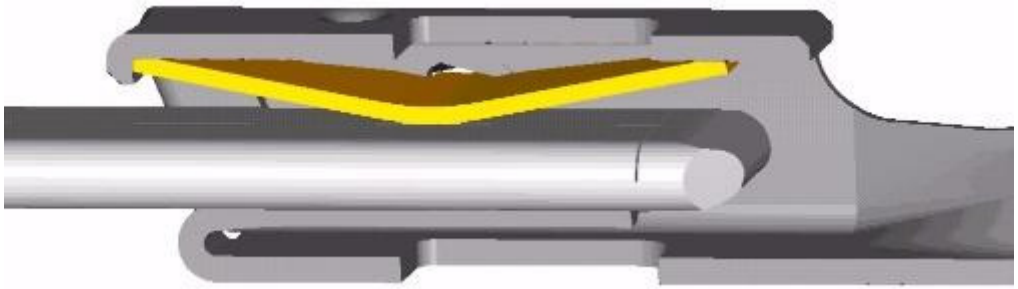


Box terminal material is a highly conductive copper.

Spring material is a beryllium copper.

Raised rib contact surface
minimum 2 points of contact
wiping action

Pre-loaded spring
extra point of contact
low insertion force
repeatable normal force



FCI COPYRIGHT

Power.S^3 - APEX-280 housing

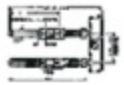
- Apex-280 housings offers same features and benefits as RCS-800 housings
  - High voltage 400 / 800V
  - Ergomate system with two-step disconnection system
  - Dual sealing feature
  - Shielding : 60 db @ 100MHz
  - Integrated Interlock system

- Current rating: 35A @ 70°C

- Main applications : Medium current, high voltage DC connections for:
  - Heating device
  - Air conditioning
  - In-car charge plug interconnection

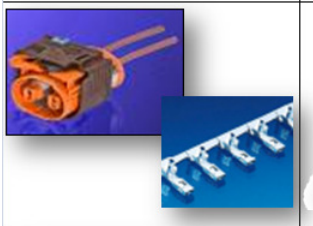
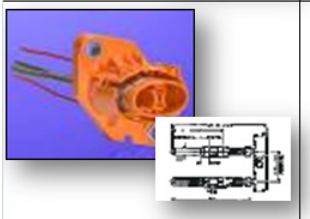
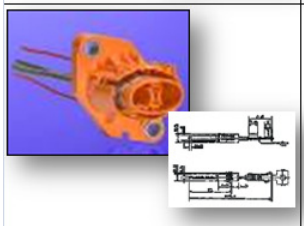
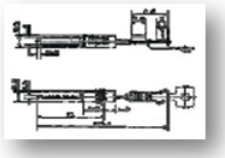
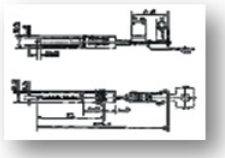
FCI COPYRIGHT

FCI Power.S^3 : **Apex-280** Part numbers

Description	Bill of material	New version P/N	Product image
APEX-280 PLUG CODE 1 BLACK	1	F083110	
APEX-280 PLUG CODE 2 BROWN	1	F183110	
APEX-2.8 FEMALE TERMINAL 4 mm²	2	54001202	
APEX-2.8 MALE & FEMALE SWS Red 4 mm²	2	C302400	
APEX-280 HEADER CODE 1 BLACK	1	F873110	
APEX-280 HEADER CODE 2 BROWN	1	F973110	
APEX-2.8 MALE TERMINAL 4 mm²	2	54001027	
APEX-2.8 MALE & FEMALE SWS Red 4 mm²	2	C302400	
DCS2 1.5 gold-plated MALE TERMINAL 0,5-1,00 mm²	2	60100734	
DCS 1.5 MALE RED SWS 0,22 - 0,5 mm²	2	60993913	

FCI COPYRIGHT

FCI Power.S³ : **Apex-280** Tooling

APEX280			
Related product Pictures	**Tool Pictures**	**Désignation**	**Part-number**
		Apex 280 removing tool for female terminal	**F911110**
		Apex 280 removing tool for male terminal	**F689500**
		DCS2 1,5 removing tool for male terminal	**F858400**
		DCS2 1,5 hand crimp tool (0,50 / 0.75 / 1.00 mm²)	**6 520 04 14-M**
		Apex 2.8 hand crimp tool (4.0 mm² with SWS)	**6 520 10 99 -M**

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THANK YOU !

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