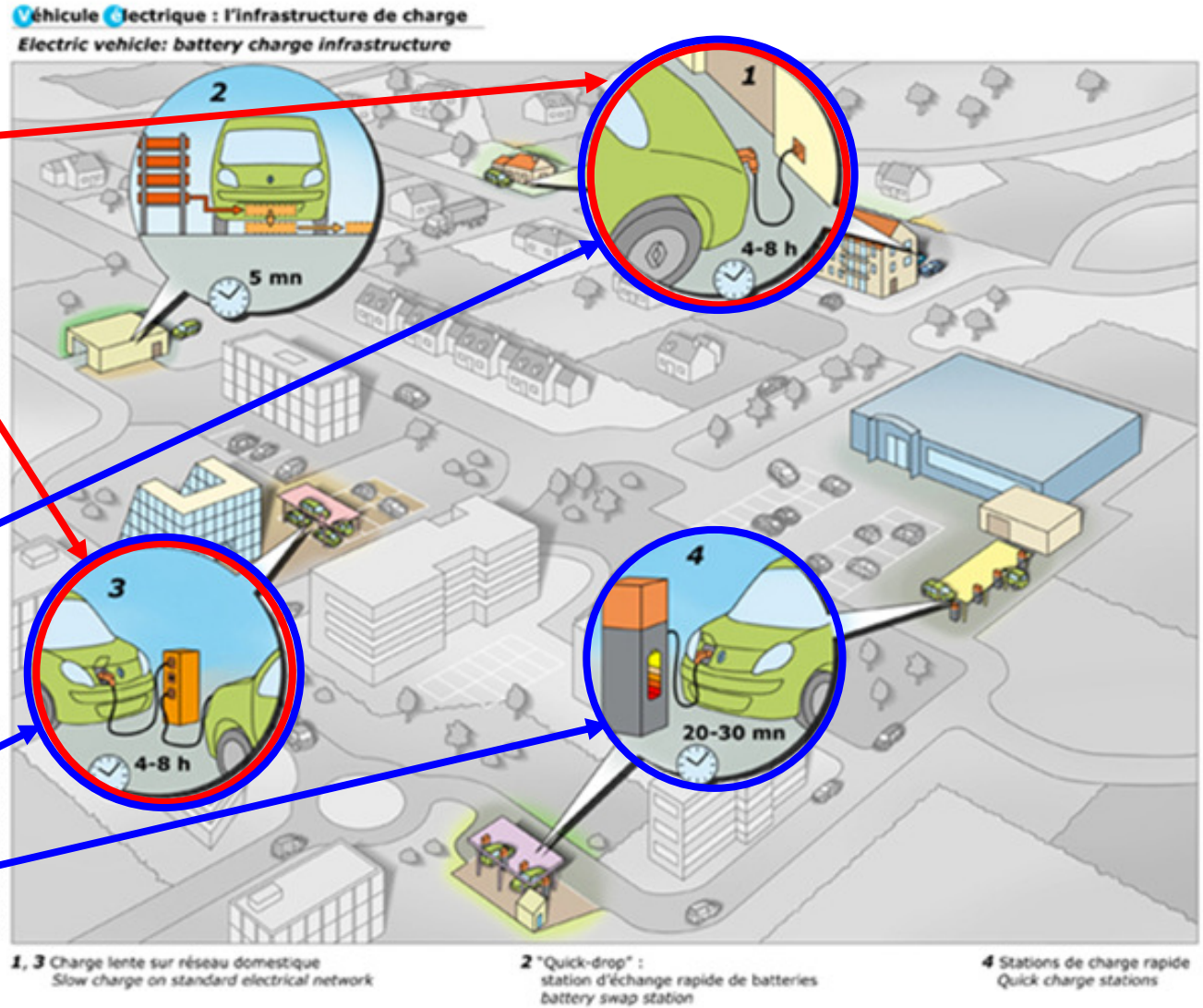
POWER.S3

16/32A Charge plug SAE J1772

Charge plug applications

SAE J1772 – 16/32A

IEC 62196-2-2–16/32/63A



Renault ©

SAE J1772 charge plug configurations

Charging stations

16A and 32A :

Domestic charging

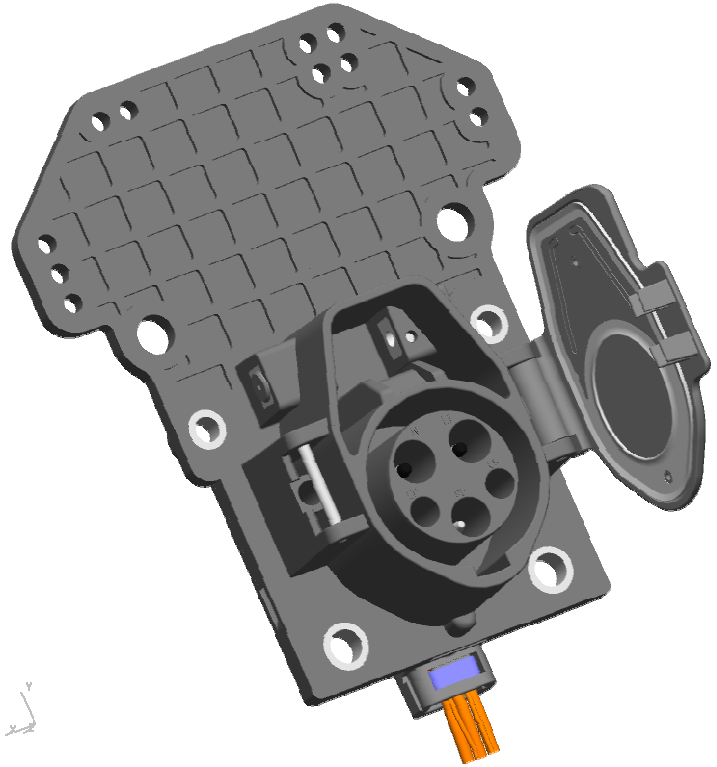
16A : (mode 2)

32A : (mode 3)

+ **Wall Electric management box**

General view

Inlet



Plug

- Fully compatible with SAE J1772 and IEC62196_2_1

FCI – REMA partnership for EV

- A collaboration between FCI and REMA
- Rema company profile:
  - Established in Germany.
  - Supplier for 35 years of plugs and sockets in electrical powered forklifts market worldwide.
  - Development and manufacturing of different connector-systems for special industrial solutions (Telecommunication, Railway, ...)
- Roles and responsibilities
  - Product design & tooling : co-design and co-ownership
  - Manufacturing : Rema
  - Interface to customer : FCI is the unique window party for automotive and other motorized vehicle market segments.

Main technical characteristics

- Electrical
  - 16 or 32 Amp
  - 250 V single phase
  - maximum charge performance of 7.4 KW
  - High voltage insulation protection
  - Power cable 2,5 mm² (16A) or 4 mm² (32A)
  - Signal cable 0,75 mm²
- Mechanical
  - Mating and un-mating force 40N at initial
  - >10,000 mating cycles
    - Mating and un-mating force 80N after 10,000 cycles
  - Plug/socket pull out force 200N mini
- Environmental
  - Ambient temperature – 40°c + 85°c
  - IP67 sealing for the plug/socket connection and socket flap protection
  - Freezing protection
  - Drain system for fluids and dust egress
  - Salt spray protection

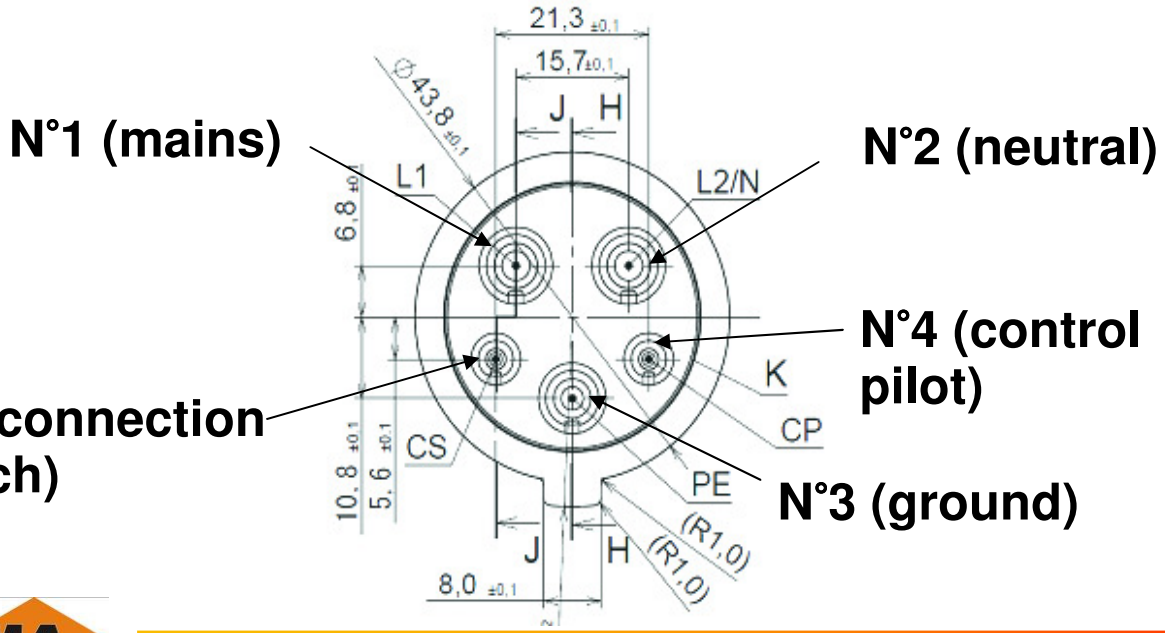
Norm IEC62196_2_1 WD_REV 090810

Table 102 – Overview of the basic vehicle interface

Position n°	a.c.	Functions [a]
1	250 V 32 A [b]	L1 (mains 1)
2	250 V 32 A	L2 (mains 2)/N(neutral)
3	Rated for fault	PE (ground/earth)
4	30 V 2 A	CP (Control pilot)
5	30 V 2 A	CS (Connection switch)

[a] For contacts 4 and 5, environmental conditions may demand larger conductor cross-sections.

[b] In the following countries, the branch circuit overcurrent protection is based upon 125 % of the device rating: USA.



N°1 (mains)

N°2 (neutral)

N°4 (control pilot)

N°5 (connection switch)

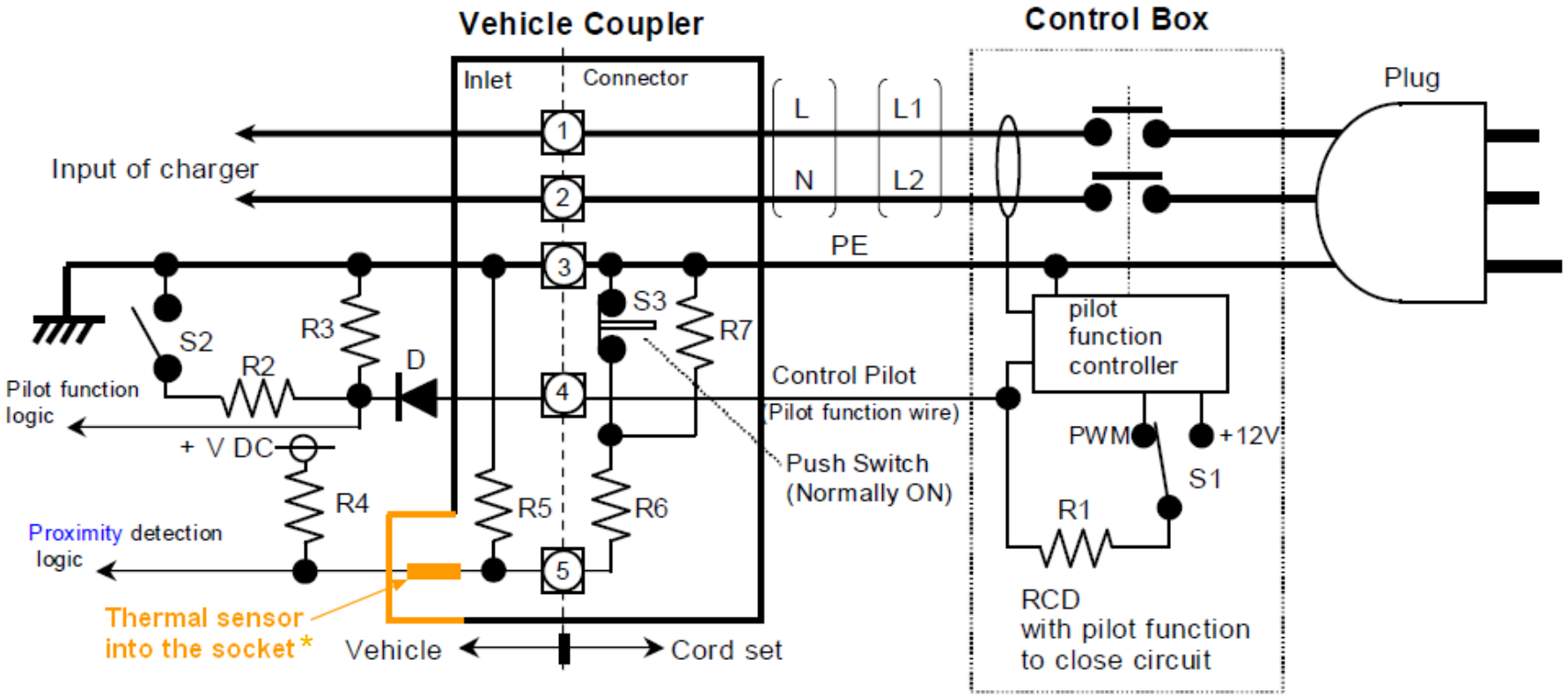
N°3 (ground)

Front view PLUG

Or

Rear view INLET

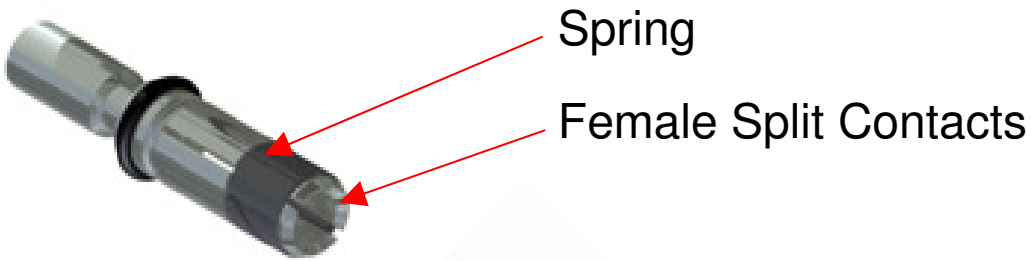
SAE J1772 Electrical configuration 1 mode 2



* Thermal sensor is not part of the standard (FCI option)

Terminal system

- Female multi-beam terminals with calibrated spring device to precisely control mating/unmating forces

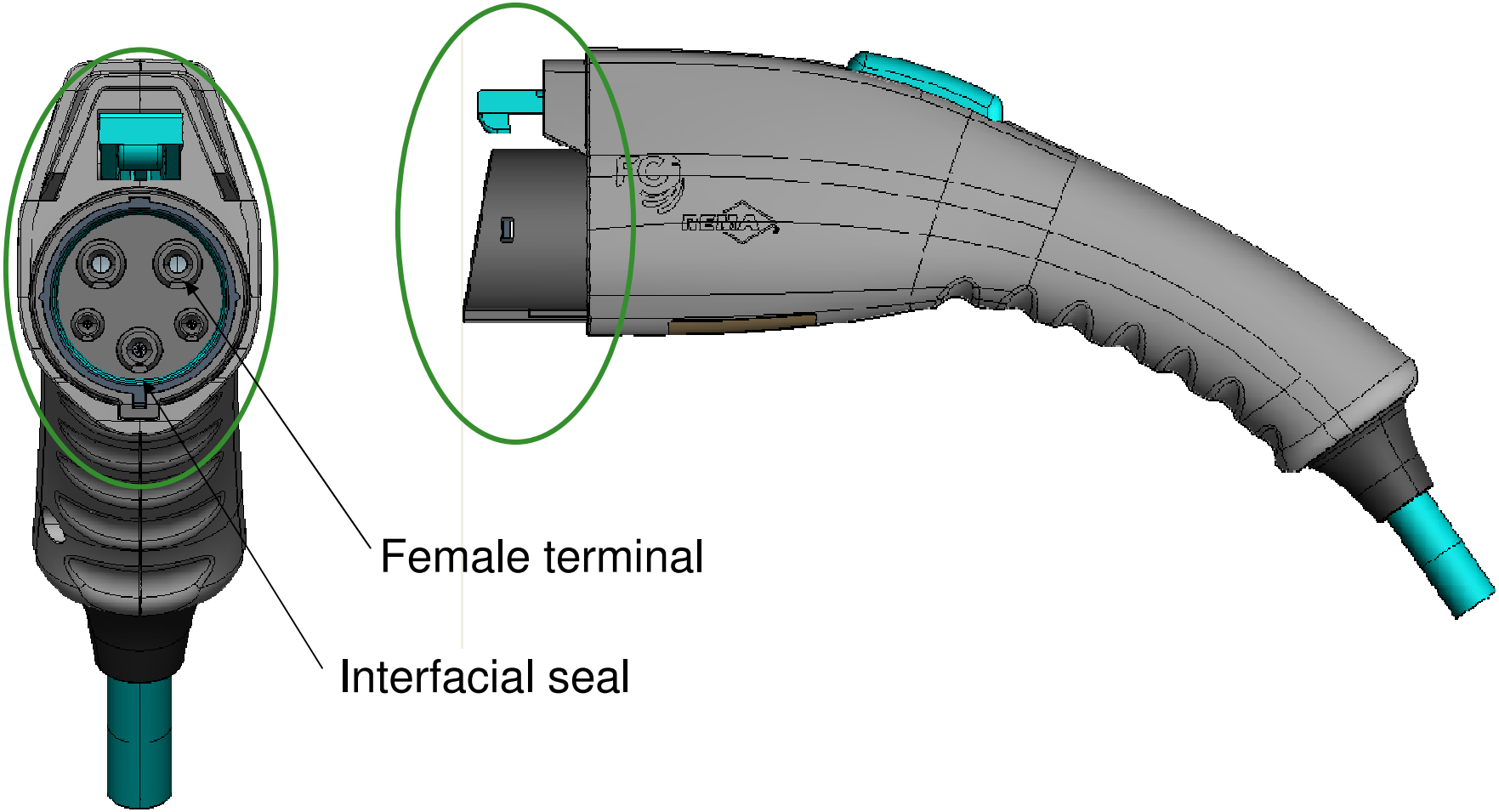


- Male terminal with front plastic protection

- Terminal material : copper (excellent conductivity and crimp performance)
- Terminal plating : nickel (excellent wear resistance, good conductivity)
- Terminal diameters :
  - 1.5 mm for connection switch and pilot control lines
  - 2.8 mm for ground line
  - 3.6 mm for main, neutral and ground lines
- Cable crimping : hexagonal

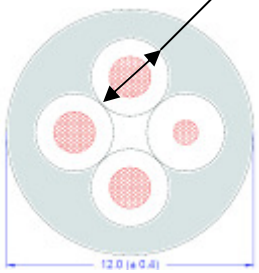
Plug

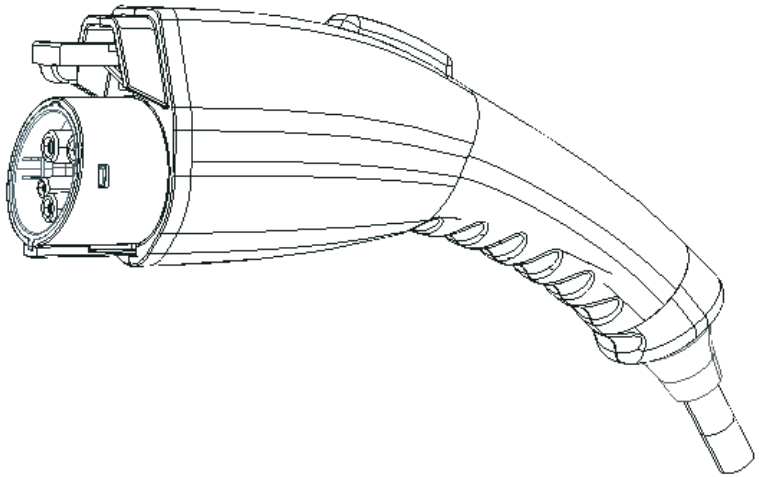
- Interface conform to J1772 standard



Plug 16A cable definition for domestic charging

CABLE DEFINITION
3 Power 2,5 mm² + 1 Signal 0,75 mm²
L = 6,5 m

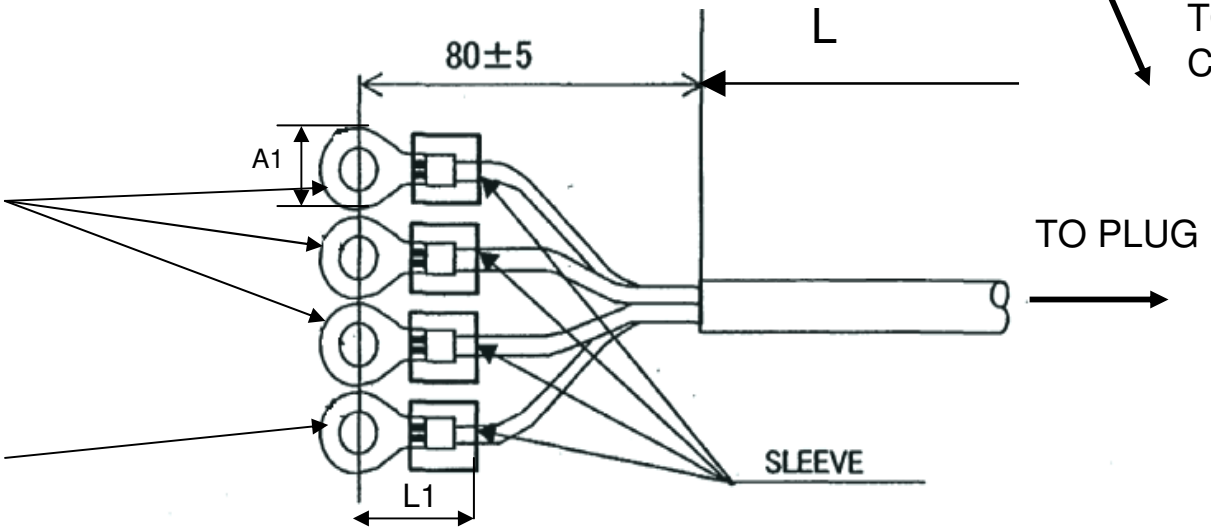




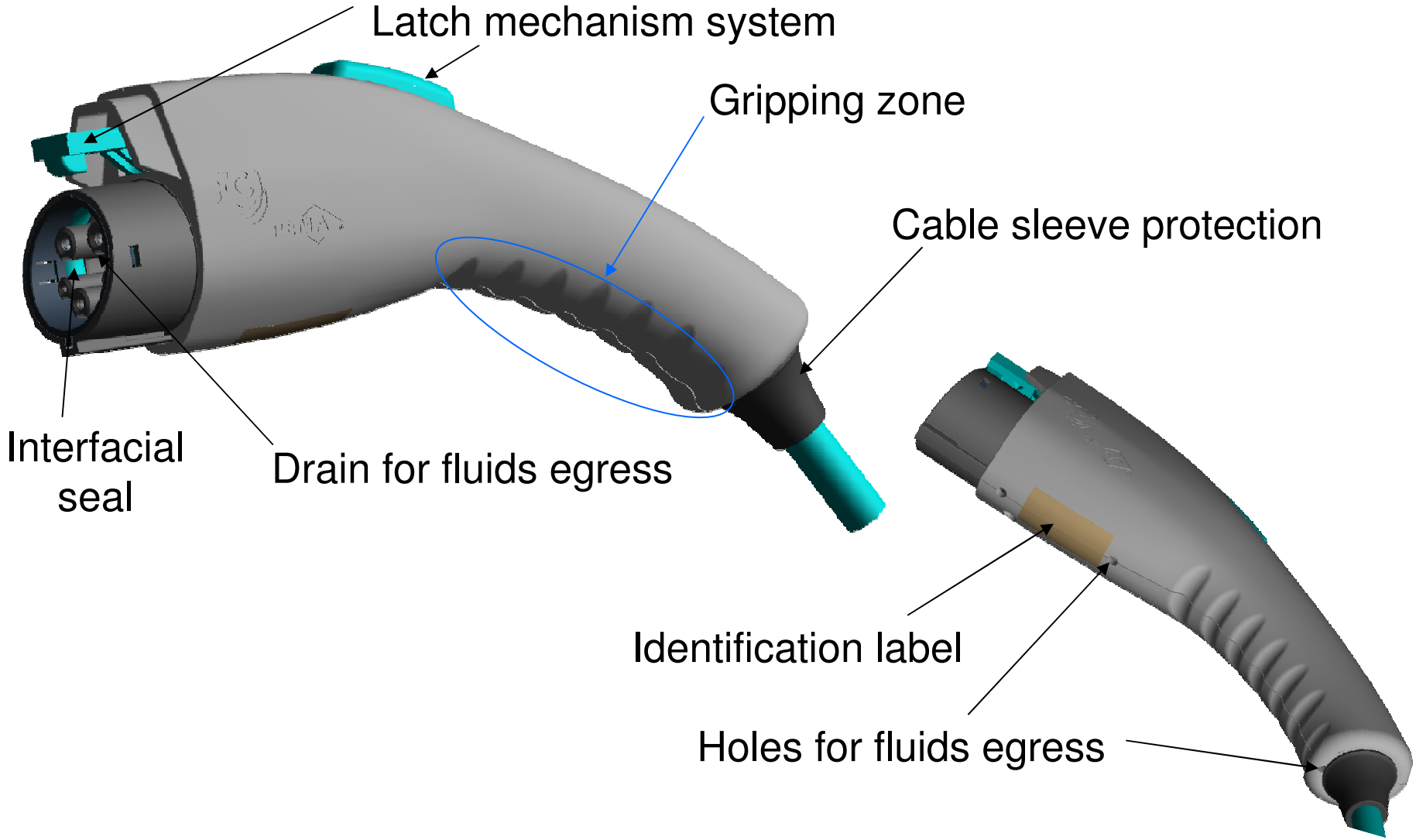
END CABLE EXAMPLE

RING TONGUE TERMINAL (x3)
STUD DIAM = 4 mm
WIRES 2,5 mm²
L1 = 18 MAX
A1 = 8 MAX
SLEEVE COLOR = BLUE

RING TONGUE TERMINAL (x1)
STUD DIAM = 4 mm
WIRE 0,75 mm²
L1 = 17 MAX
A1 = 8 MAX
SLEEVE COLOR = RED

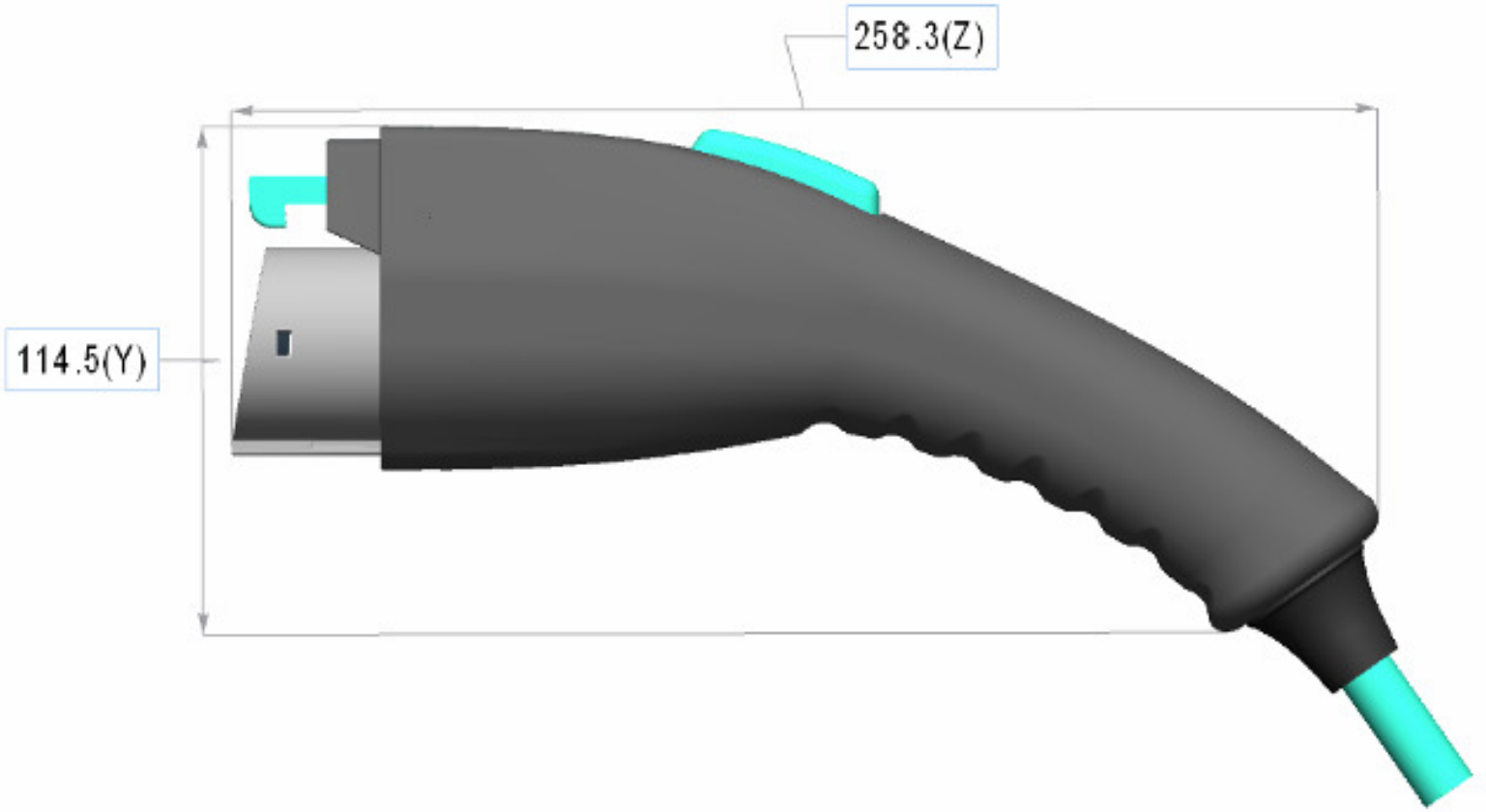


Plug – external design



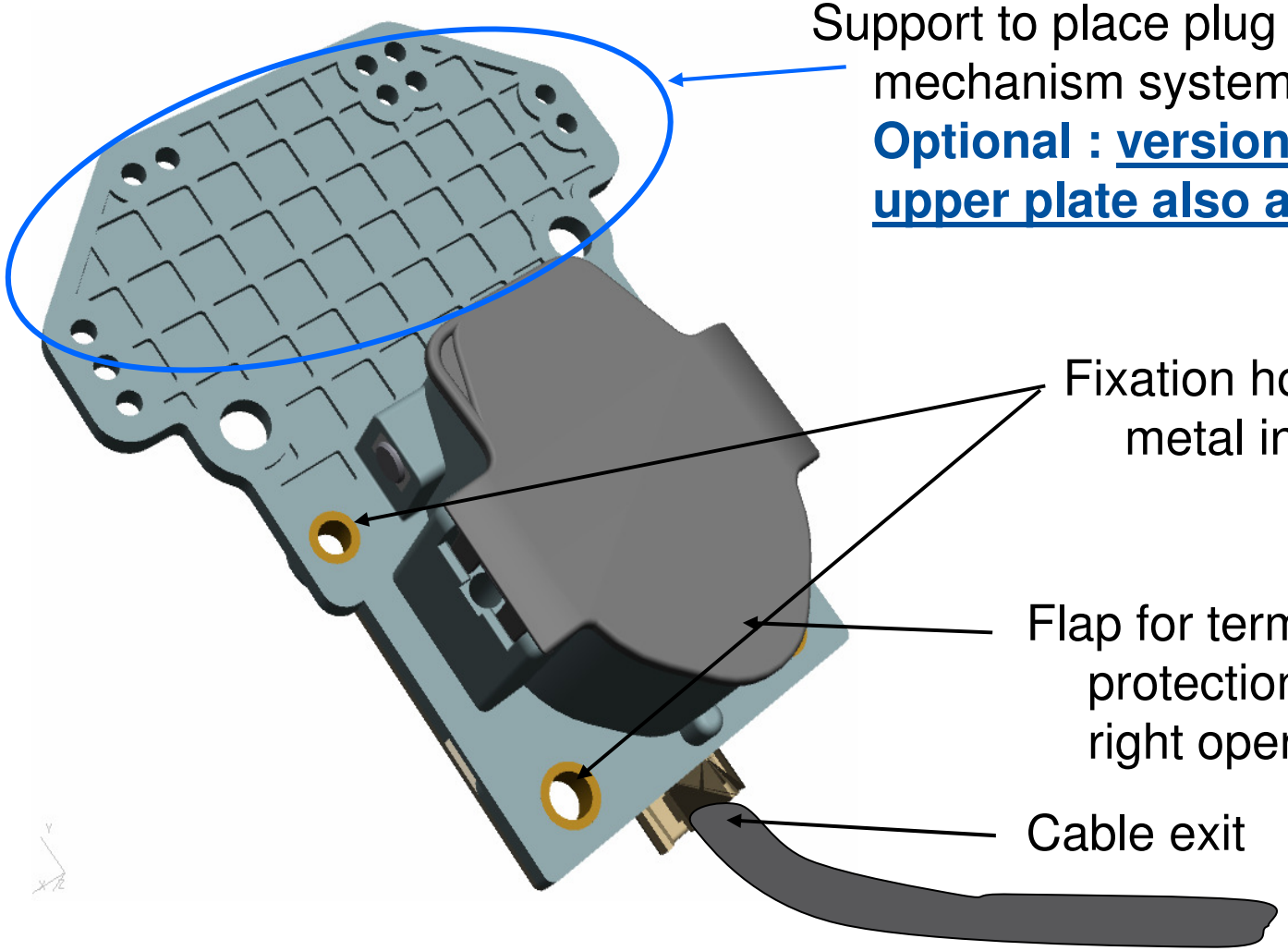
Plug – main dimensions

- Main dimensions



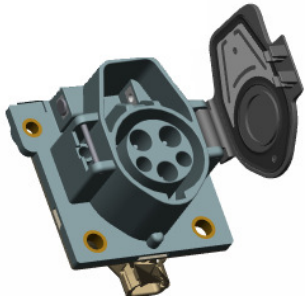
Inlet

- Front view



Support to place plug locking mechanism system

Optional : version without upper plate also available



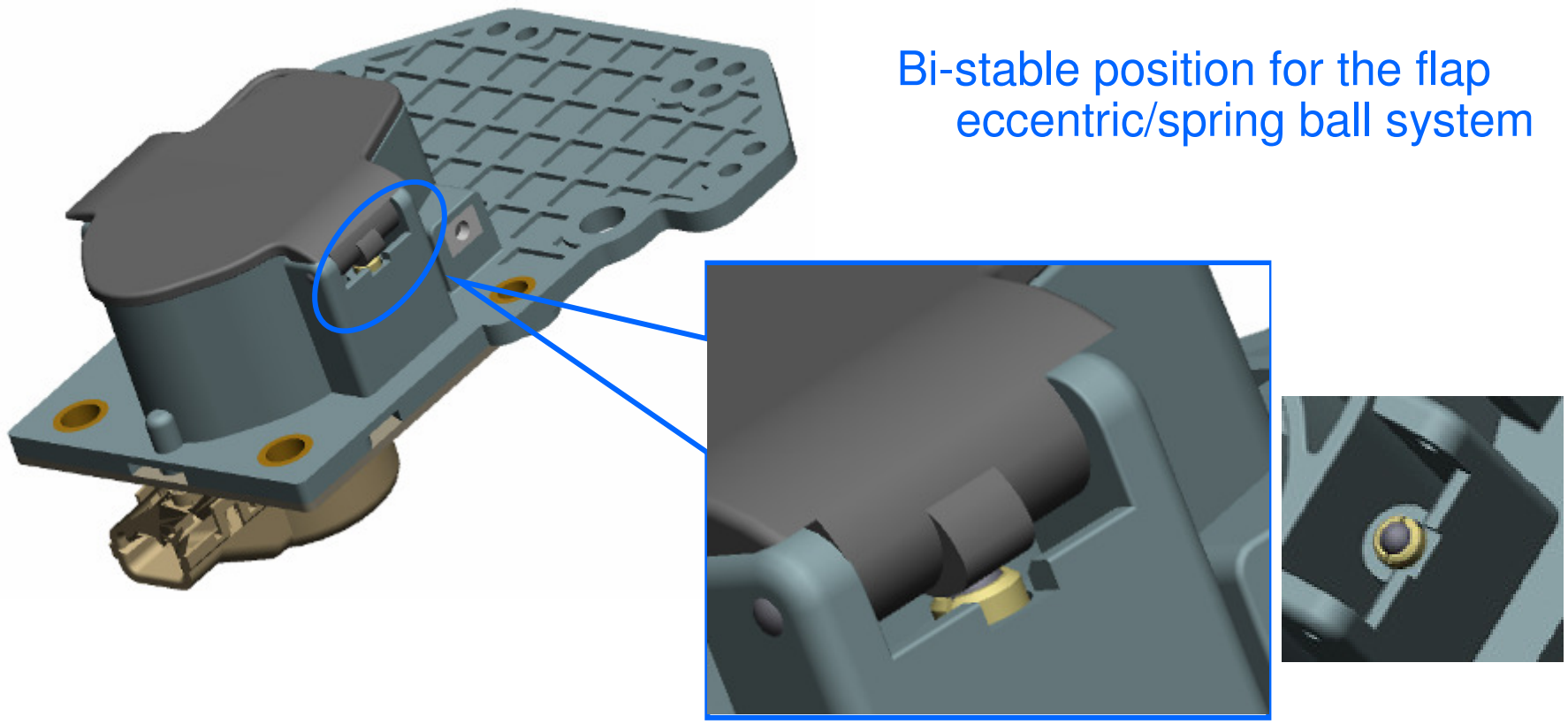
Fixation holes with metal inserts

Flap for terminal protection left or right opening

Cable exit

Inlet

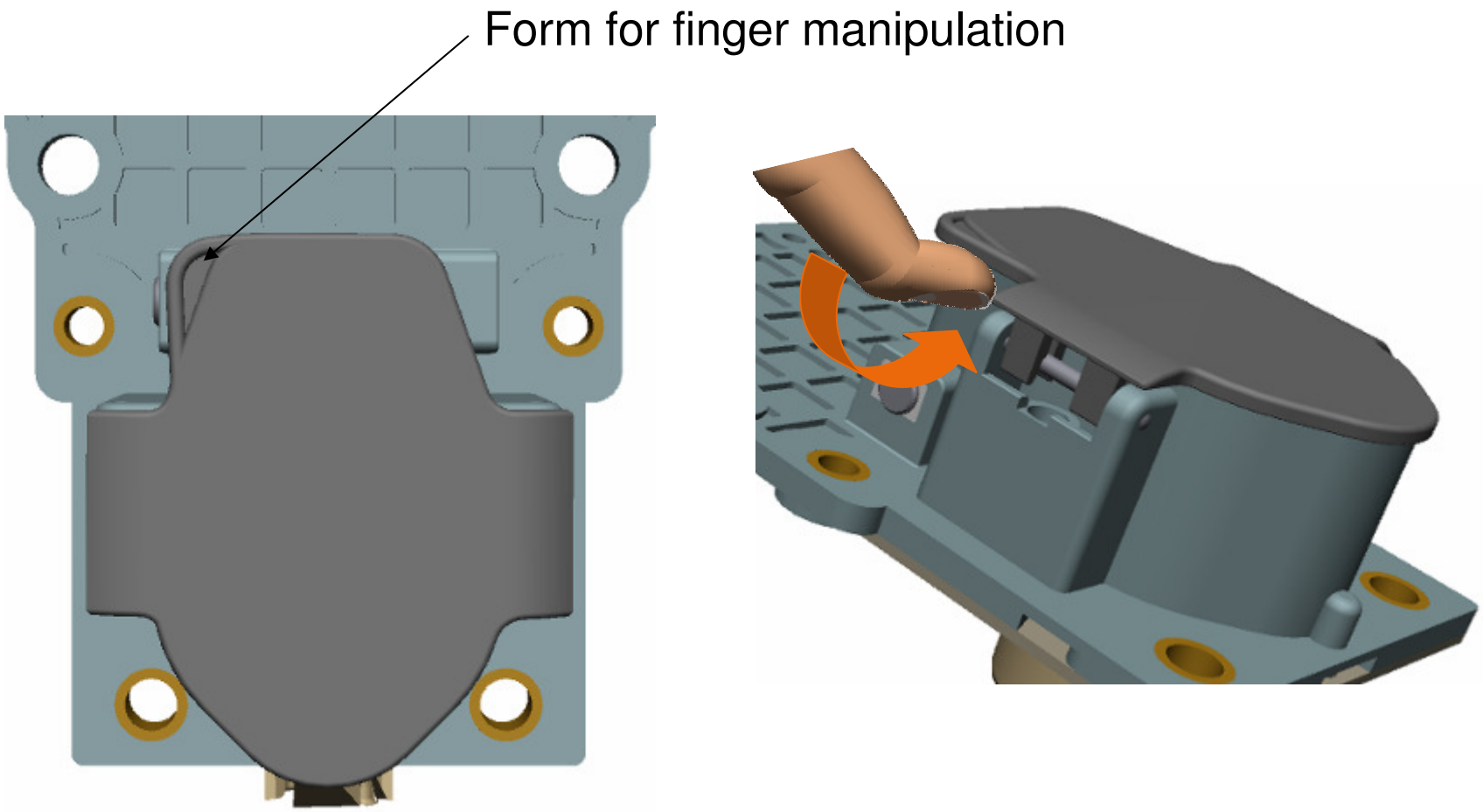
- Flap bi-stable position



Bi-stable position for the flap
eccentric/spring ball system

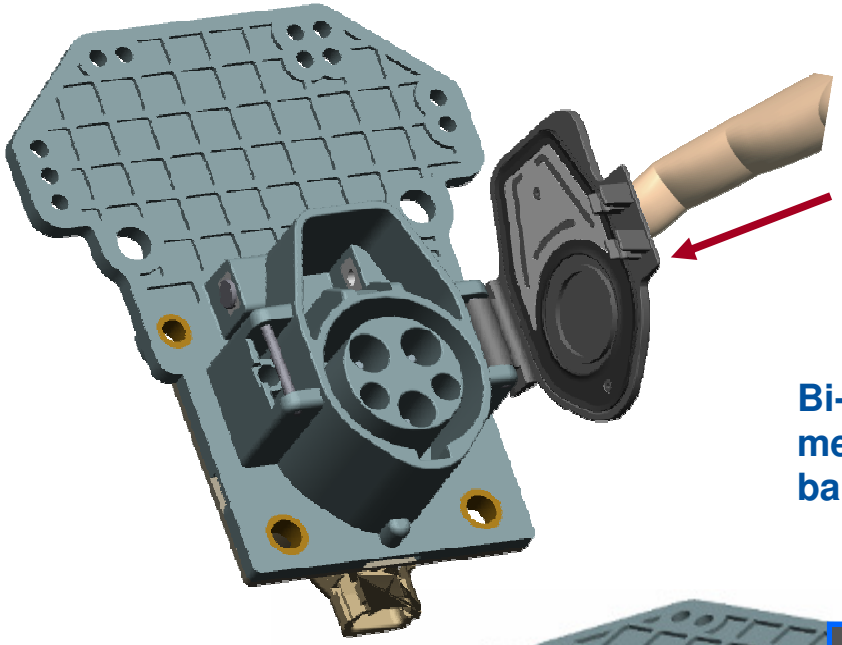
Inlet - Opening

- Flap opening



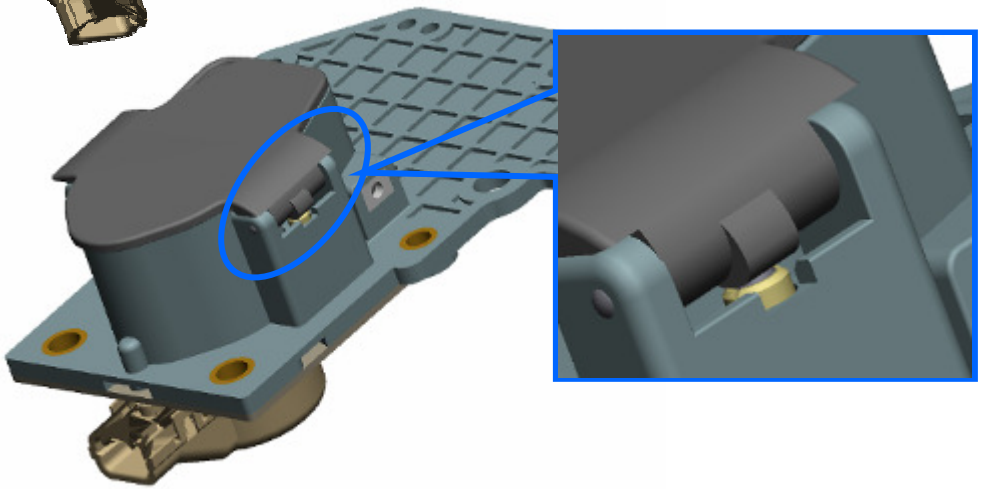
Inlet – Closing

- Flap bi-stable position

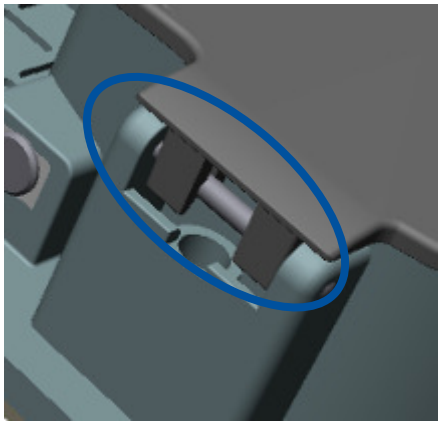


Apply a force in the direction for closing until the bi-stable position. The flap will be closed automatically

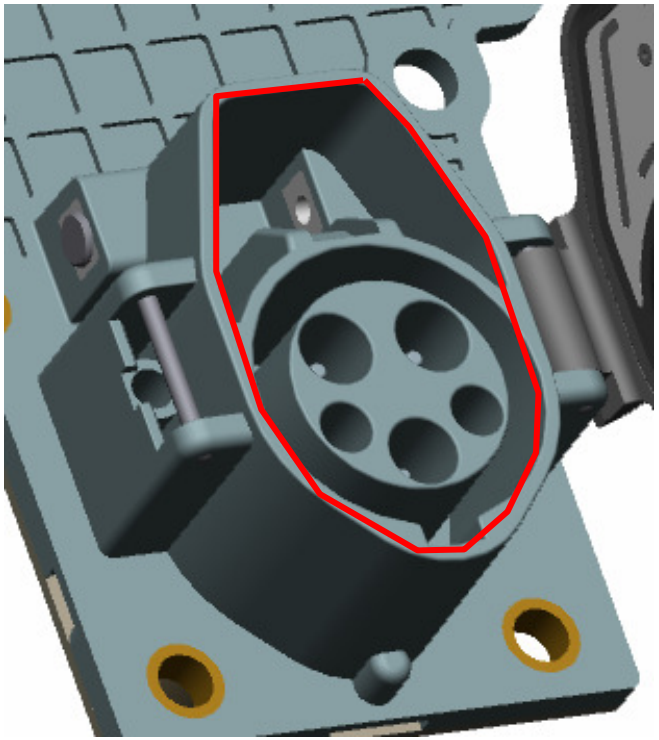
Bi-stable position by means of eccentric/spring ball system



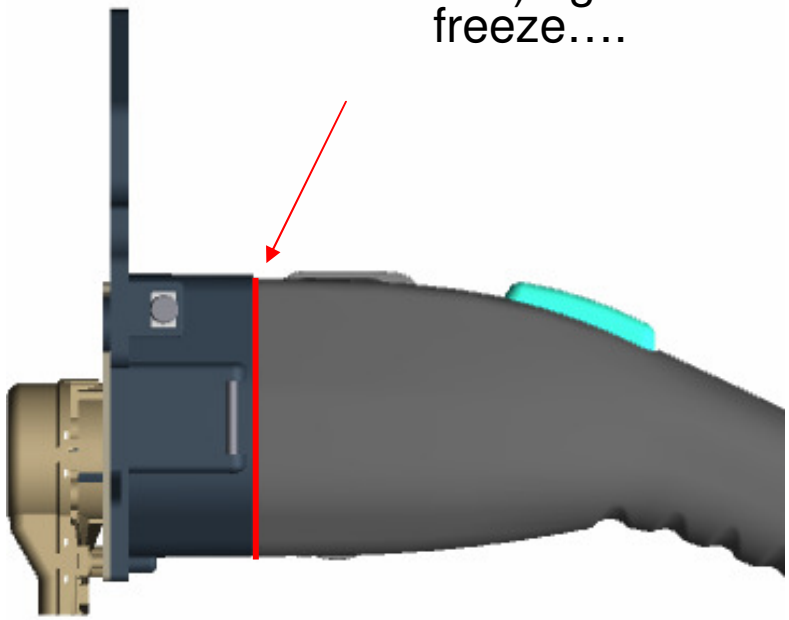
Locking of flap is insured when closing it from it stable position



Inlet - Anti freezing design



Overall protection (locking device and terminals) against snow, freeze….

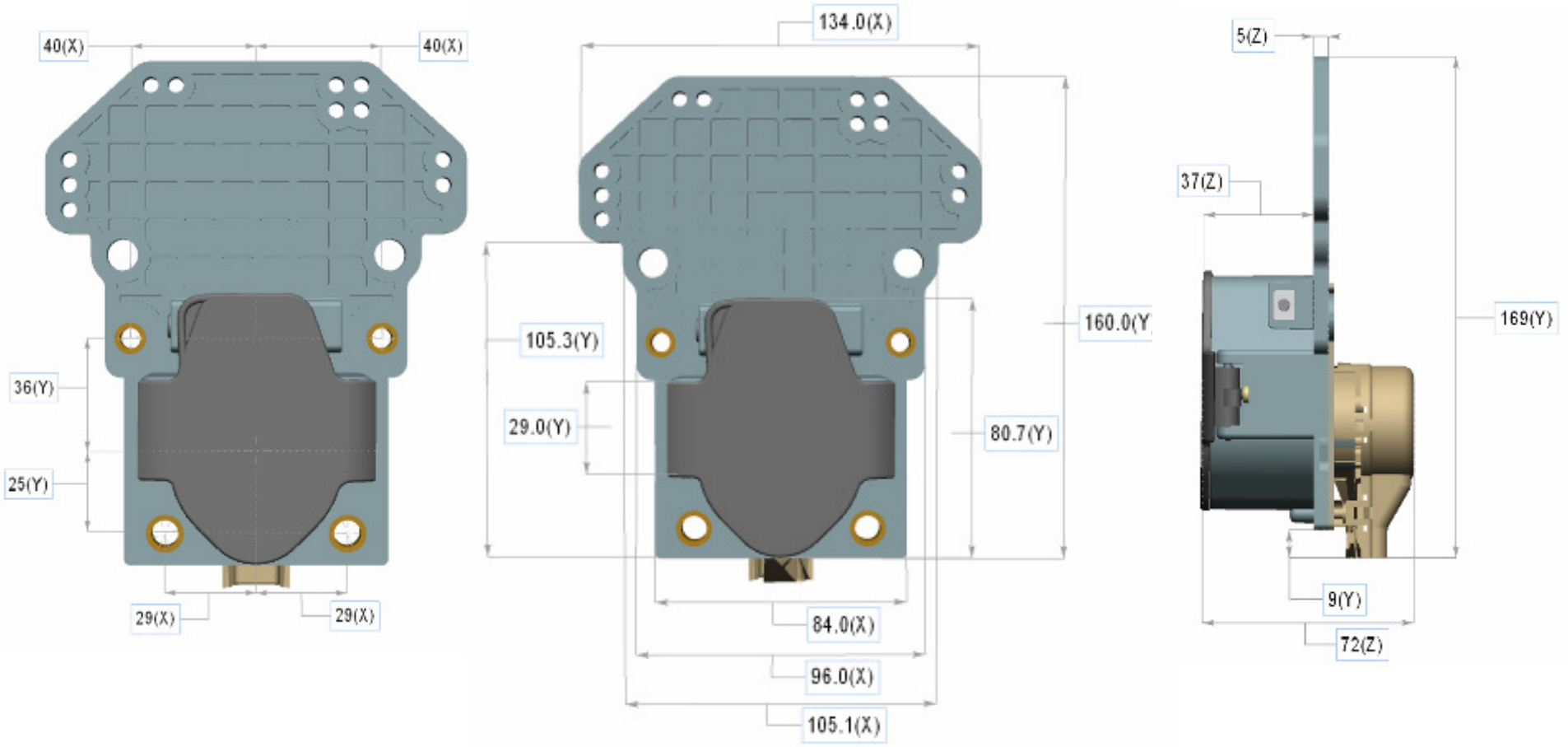


Products are sprayed with water and placed at – 30°c

No blocking situation

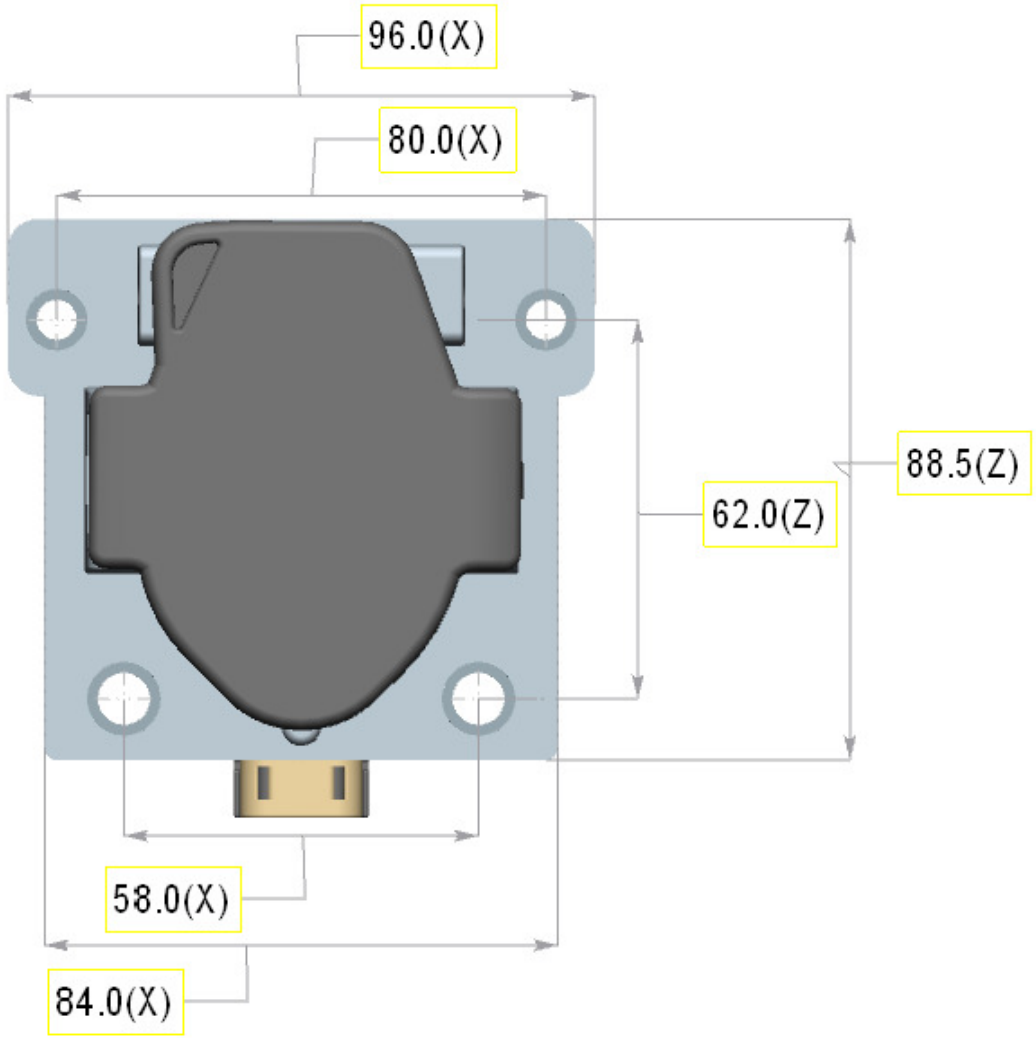
Inlet – With upper plate

- Main dimensions

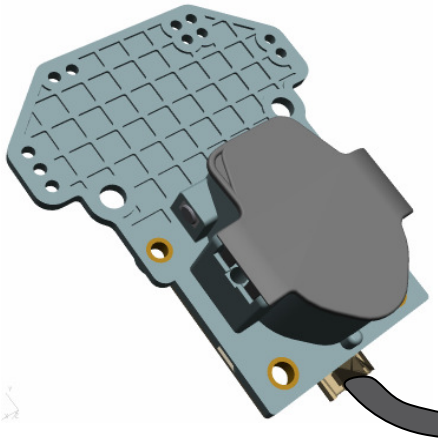


Inlet – Without upper plate

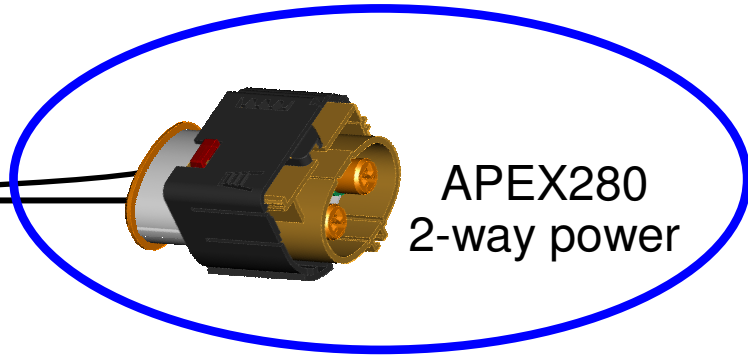
- Main dimensions



FCI inside car connector solutions

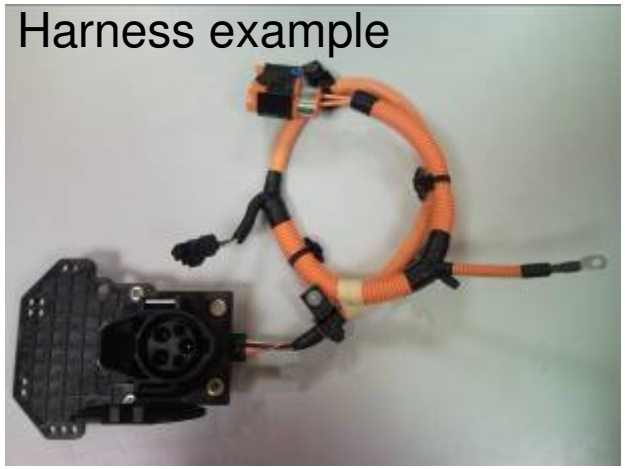


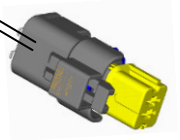
Ground



APEX280
2-way power

Harness example

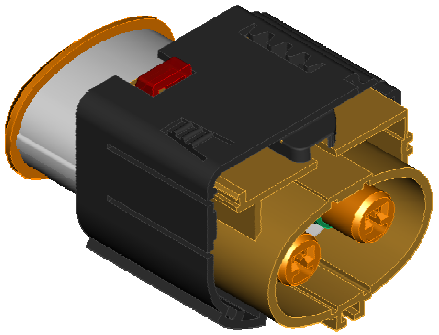


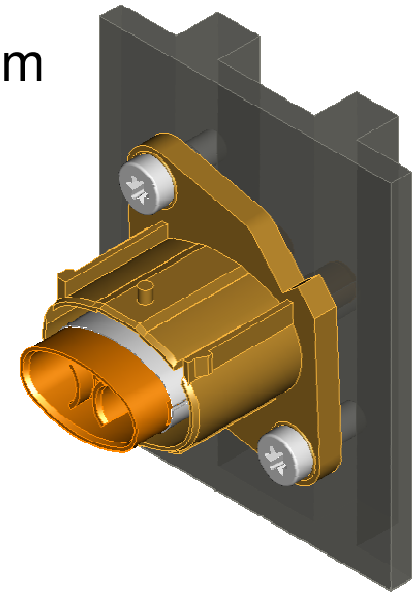


2-way signal

FCI Power.S^3 : APEX-280 Housing concept

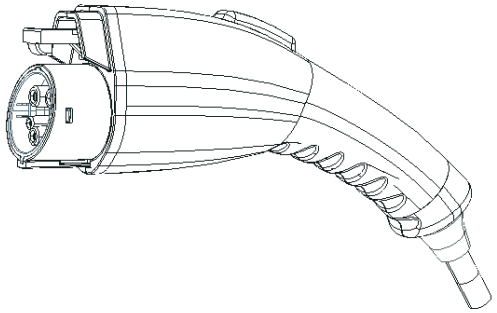
- Apex-280 housings offers the same features and benefits as the RCS-800 housings
  - High voltage 400 / 600V
  - Ergomate system with two-step disconnection system
  - Dual sealing feature
  - Shielding : 60 db
  - Integrated Interlock system
- Current rating: 35A @ 70°C





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

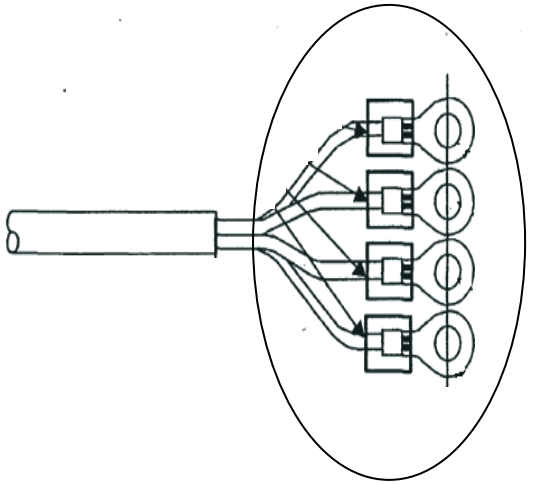
PRODUCT DELIVERY CONDITIONS

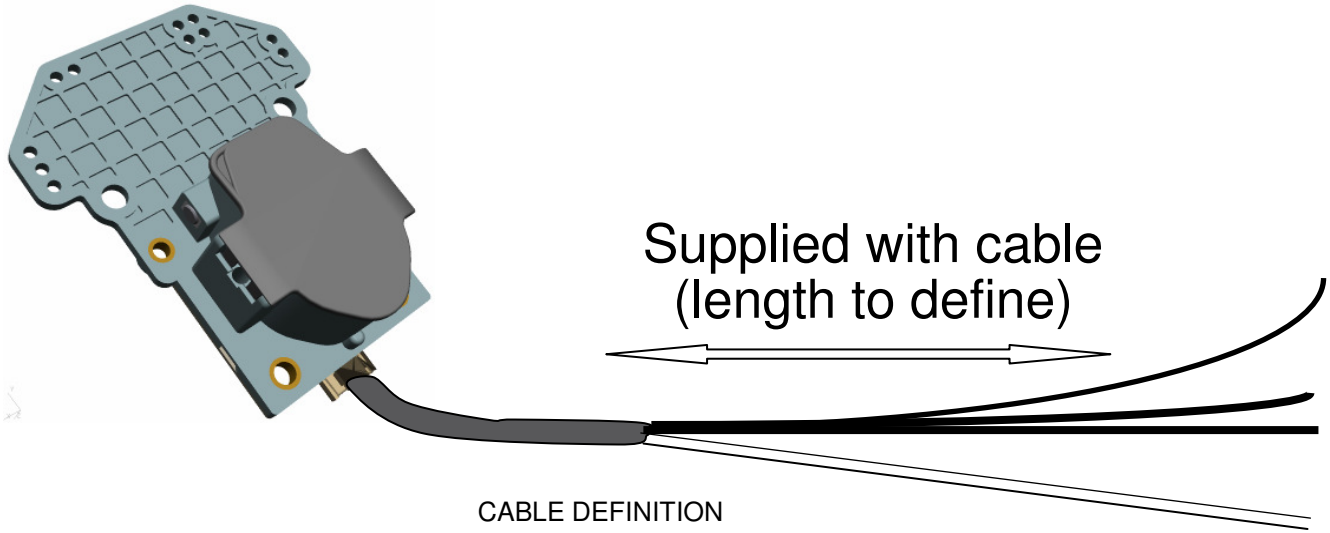


Supplied with cable
(length to define)

CABLE DEFINITION
16 A : 3 Power 2,5 mm² + 1 Signal 0,75 mm²
32 A : 3 Power 4,0 mm² + 1 Signal 0,75 mm²

Possible termination





Supplied with cable
(length to define)

CABLE DEFINITION
16 A: 2 Power 4,0 mm² + 1 Ground 2.5 mm² + 2 Signal 0,5 mm²
32 A : To be confirmed

EV plug 16/32 A - Features & Benefits

- Features
  - Design according to SAE-J1772 and IEC62192-2
  - Round male terminals on car socket connector, female terminals on charge plug
  - Electrical :
    - 16 and 32A / 110 or 250 V, single phase with High voltage insulation protection
  - Mechanical :
    - Mating and un-mating force 40N at initial
    - >10,000 mating cycles (Mating and un-mating force < 80N after 10,000 cycles)
  - Environmental
    - Ambient temperature – 40°c + 85°c
    - IP67 sealing for the plug/socket connection and socket flap protection
    - Salt spray protection, UL certification and Arizona dust test.

- Benefits – Unique to FCI/Rema
  - High mating/unmating cycle performance thanks to unique female terminal design : female beam technology with calibrated spring system.
  - Freezing protection
  - Drain system for fluids and dust egress
  - Inlet thermal protection thanks to integrated thermal circuit breaker