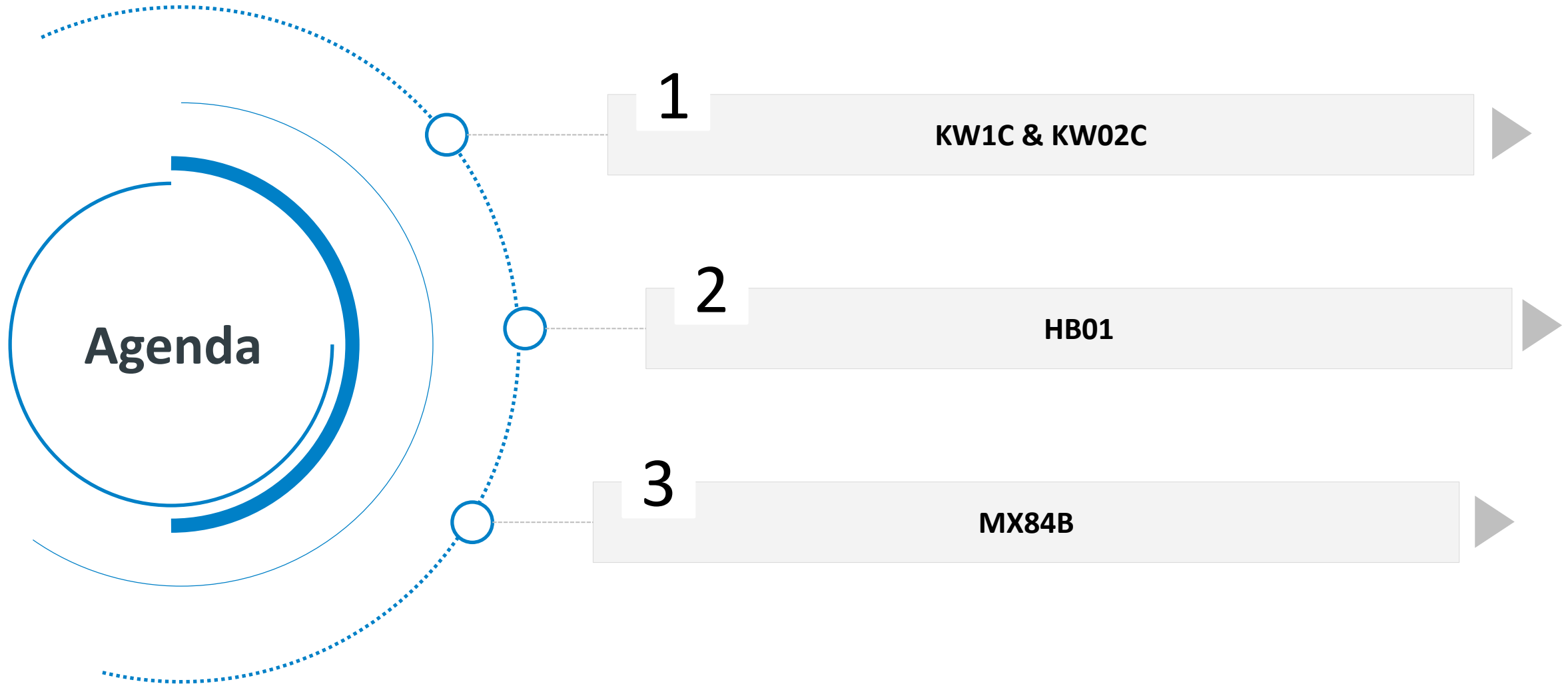


# TECHTALK ENERGY & POWER

*Rutronik*

Erik Tröger, Head of Connector Sales, Distribution  
Dr. Levon Altunyan, Product and Marketing Manager  
26.04.2022

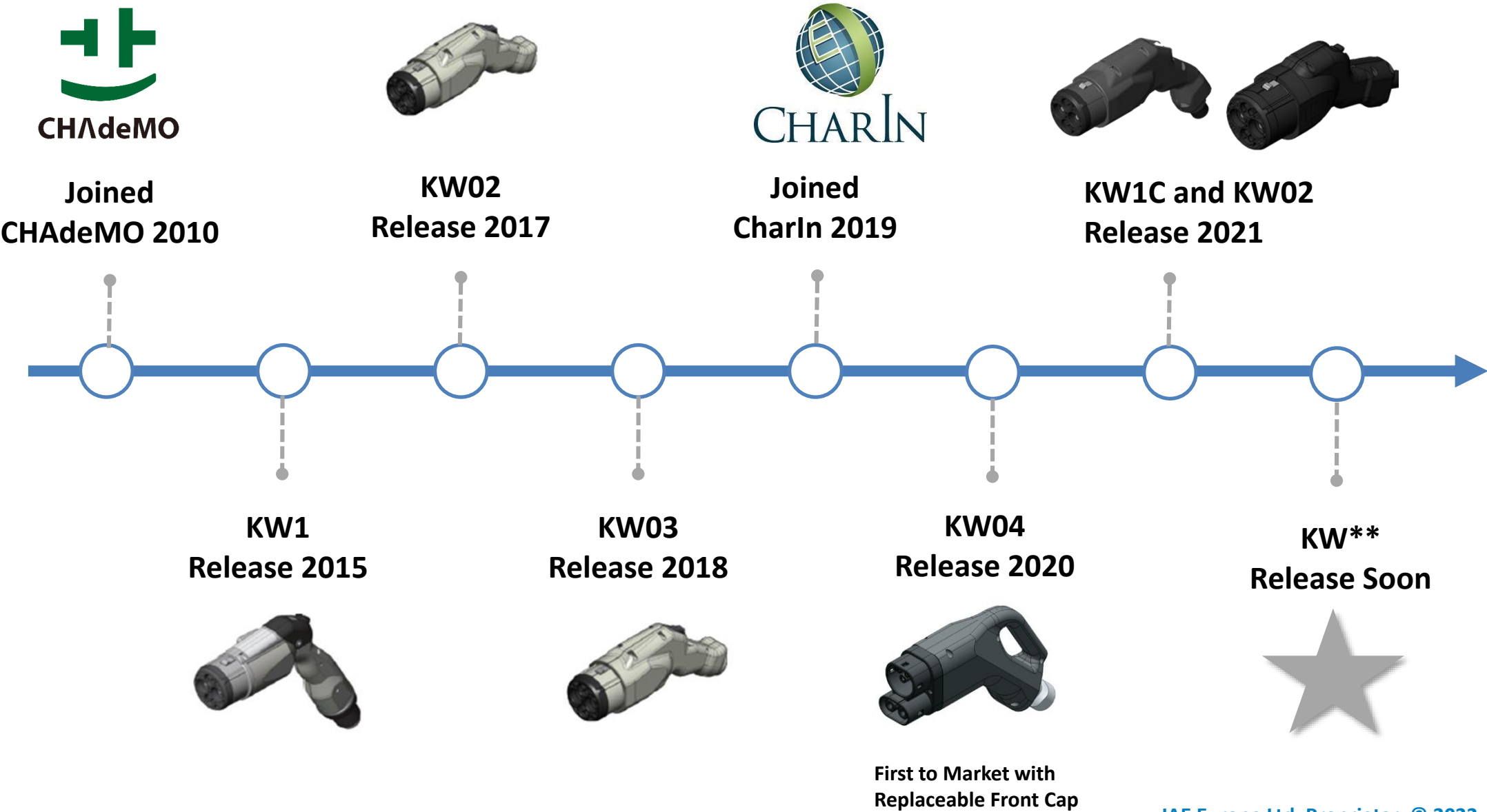


# KW1C & KW02C

*EV Charging*



# KW SERIES DEVELOPMENT TIMELINE



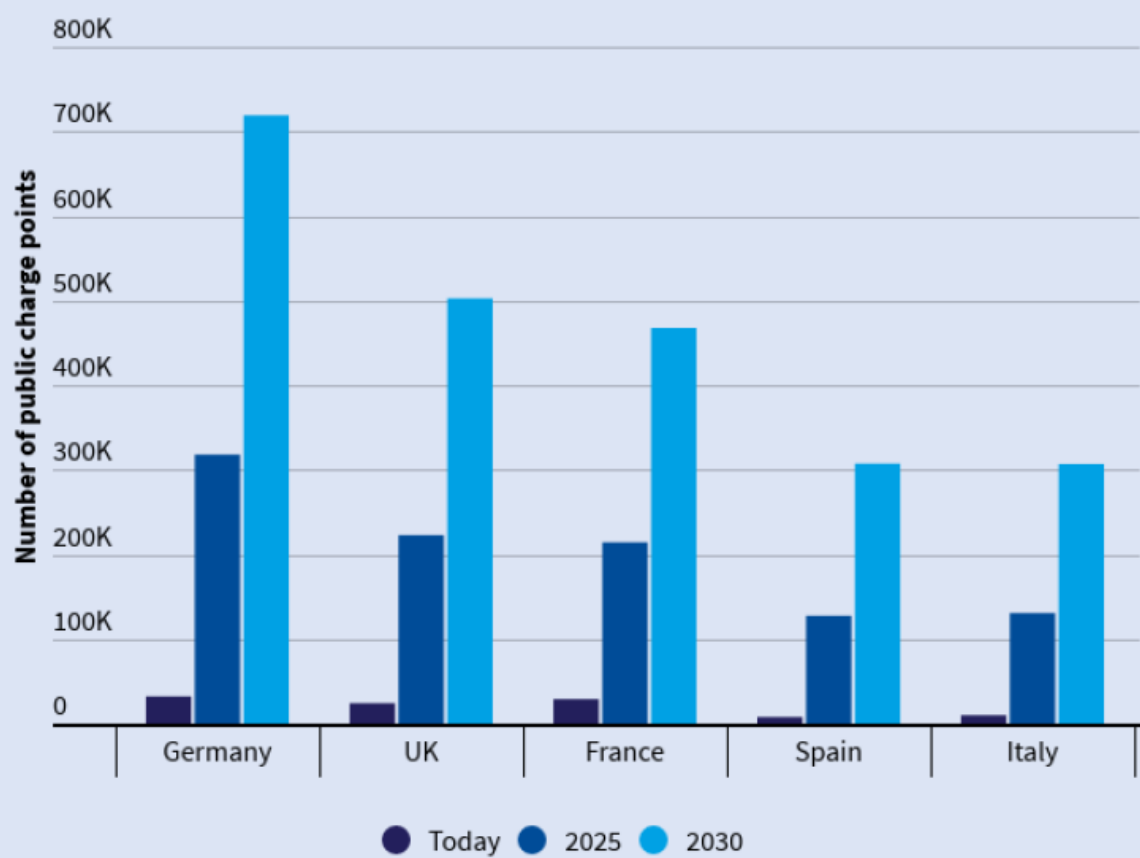


# OUR MARKET POSITION

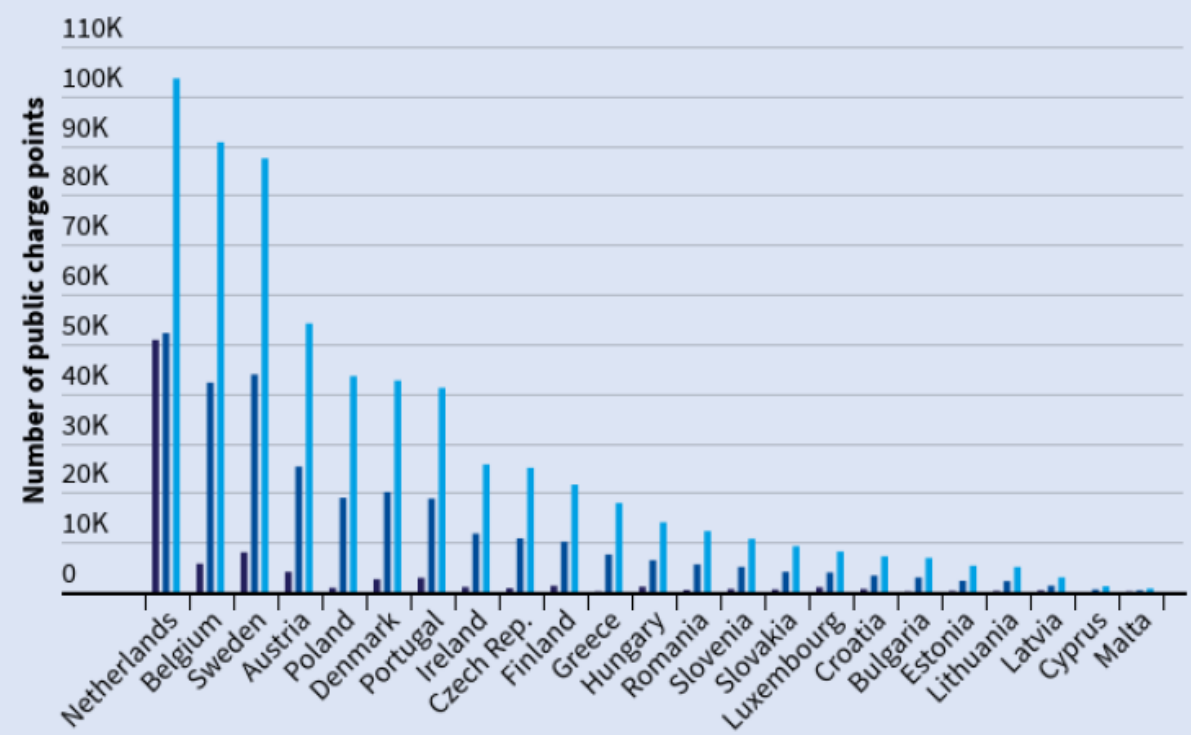
*The market looks for **innovative solutions** that drive continuous **cost improvements**.*

*We, at JAE offer **right solutions** with **quality products** that keep your **maintenance cost low**.*

**1.3 million public chargers in 2025 and 2.9 million in 2030** (Road2Zero scenario)



Source: T&E Infrastructure Report 2020



Road2Zero scenario is compliant with the EU's climate ambitions for carbone neutrality by 2050  
About 78% of the EU's public charge points will be needed in the five biggest EU markets  
**Source:** T&E Charging Infrastructure Supply and Cost model



Figure 3. Inspection of a connector producing smoke during a charge session [6].



Figure 4. Exploded connector, Daegu, South Korea, 2018. The explosion was allegedly caused by a short-circuit [7].



Figure 2. Common mechanical failures of connectors, including damage to the housing (left [3]), damage to the mating interface (right [4])

# CHARGING CONNECTOR SOLUTIONS

GEU22-037

8



| Product                          |                                                                                     | Standard                                                            | Rated Current      | Rated Voltage | Certification | Operating Temp                     | Charging Type               |
|----------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------|--------------------|---------------|---------------|------------------------------------|-----------------------------|
| <b>KW1(CE)</b><br><b>KW1(UL)</b> |    | <b>CHAdeMO 1.2</b><br><b>IEC62196-3</b>                             | 125 A              | 500 VDC       | UL /CE        | CE: -30°C~+50°C<br>UL: -30°C~+40°C | Fast Charge                 |
| <b>KW1C</b>                      |    | <b>CHAdeMO 2.0</b><br><b>IEC62196-3</b>                             | MAX150 A<br>* Note | 500 VDC       | CE            | CE: -30°C~+50°C                    | Fast Charge<br>(w/V2G)      |
| <b>KW02</b>                      |    | <b>CHAdeMO 1.2</b><br><b>V2H Guideline 2.1</b><br><b>IEC62196-3</b> | 25 A               | 450 VDC       | CE            | CE: -30°C~+50°C                    | Slow Charge<br>(w/V2H, V2G) |
| <b>KW02C</b>                     |    | <b>CHAdeMO 2.0</b><br><b>V2H Guideline 2.1</b><br><b>IEC62196-3</b> | MAX37 A<br>* Note  | 500 VDC       | CE            | CE: -30°C~+50°C                    | Slow Charge<br>(w/V2H, V2G) |
| <b>KW03</b>                      |  | <b>CHAdeMO 1.2</b><br><b>V2H Guideline 2.1</b><br><b>IEC62196-3</b> | 80 A               | 500 VDC       | UL /CE        | CE: -30°C~+50°C<br>UL: -30°C~+50°C | Mid-Charge<br>(w/V2H, V2G)  |
| <b>KW04</b>                      |  | <b>CCS Type-2</b><br><b>IEC62196-3</b>                              | 150 A<br>200 A     | 1000 VDC      | CE            | CE: -30°C~+50°C                    | Fast Charge                 |

## Product Feature

- ▶ **Light, compact plastic body with enough robustness**
- ▶ **User Friendly**
  - Just Plug in w/o any button operation
  - One button action for unlocking
  - Ergonomic Grip design
- ▶ **High reliability**
  - Stainless steel used in Latch
  - High weather resistance in Resin part
  - Block foreign material around release button
  - Inside parts switch LED are water/dust proof (KW1, KW1C)
- ▶ **Emergency release/removal and recovery are possible**
- ▶ **Alcohol-resistant for antibacterial cleaning**



Latch  
(Stainless steel)



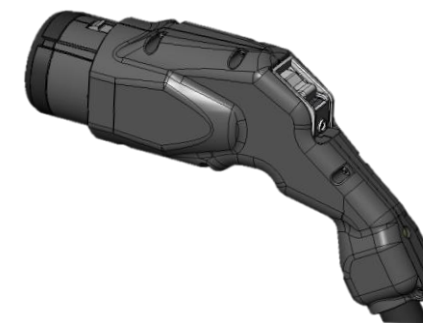
Plastic body  
(High Weather  
resistance)



Lock-release button - No rubber Cover  
Transparent Window to block foreign  
material



**KW02-C**



**KW1-C**

Inside parts have water/dust proof

- Live Contacts
- Electromagnetic lock mechanism
- Unlock detection switch



Mate face is easily broken when charging connector is dropped.

Mating face

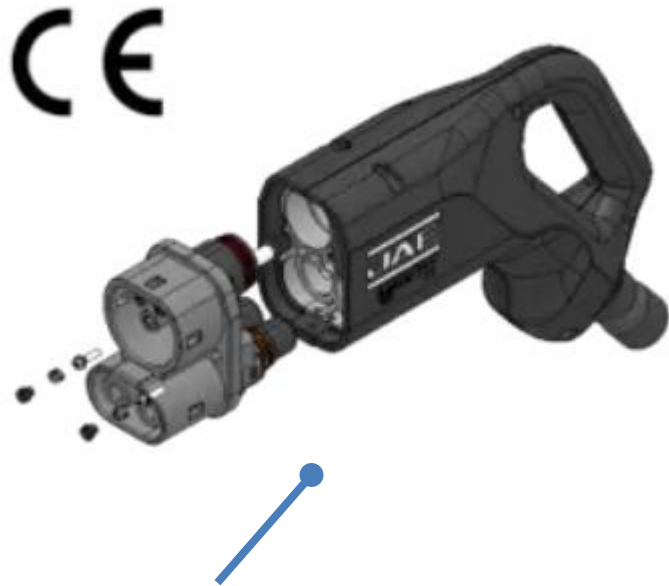


## Advantages

Cost reduction of EV connector full assembly replacement

- Remove the mating face and replace the new one
- Replace only the outer part to reduce costs

**Reduce Replacement Costs**



## Interchangeable Mating

Mating section can be easily replaced with contacts



## Double Insulation Structure

The live components are protected by the internal housing

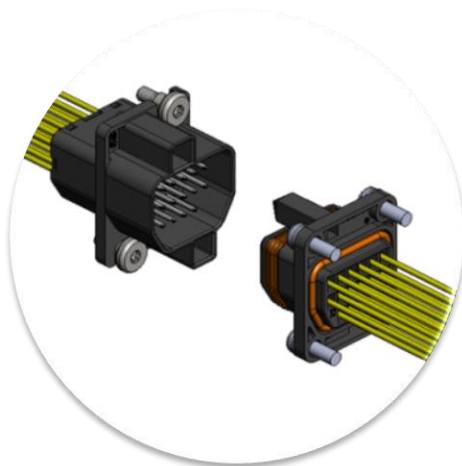
# CURRENT EV CHARGING PRODUCTS (KW-SERIES)

| System                     | Output | CHAdeMO                                                                                  |                                                                                      |                 | CCS                                                                                 |            | ChaoJi      |
|----------------------------|--------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------|------------|-------------|
|                            |        | CE                                                                                       | JCS                                                                                  | UL              | CE                                                                                  | UL         | CCC         |
| HPC<br>(High Power Charge) | >1000A |                                                                                          | ★<br>ChaoJi                                                                          |                 |                                                                                     | ★<br>MCS   | ★           |
|                            | 600A   |                                                                                          |                                                                                      |                 |                                                                                     |            | ★<br>ChaoJi |
|                            | 400A   |                                                                                          |                                                                                      |                 | KW04<br>CCS-2                                                                       |            |             |
| Fast Charge                | 200A   | KW1C<br>CHAdeMO                                                                          | KW1<br>CHAdeMO                                                                       |                 |                                                                                     | ★          | ★           |
|                            | 125A   |         |    |                 |  | ★<br>CCS-1 | ★<br>ChaoJi |
|                            | 80A    | New                                                                                      |  | KW03<br>CHAdeMO |                                                                                     |            |             |
| V2G<br>V2H                 | 37A    | New  | KW02C<br>CHAdeMO                                                                     |                 | ★<br>CCS-2                                                                          |            | ★           |
|                            | 25A    |      | KW02<br>CHAdeMO                                                                      |                 |                                                                                     |            |             |

★ : Under Consideration

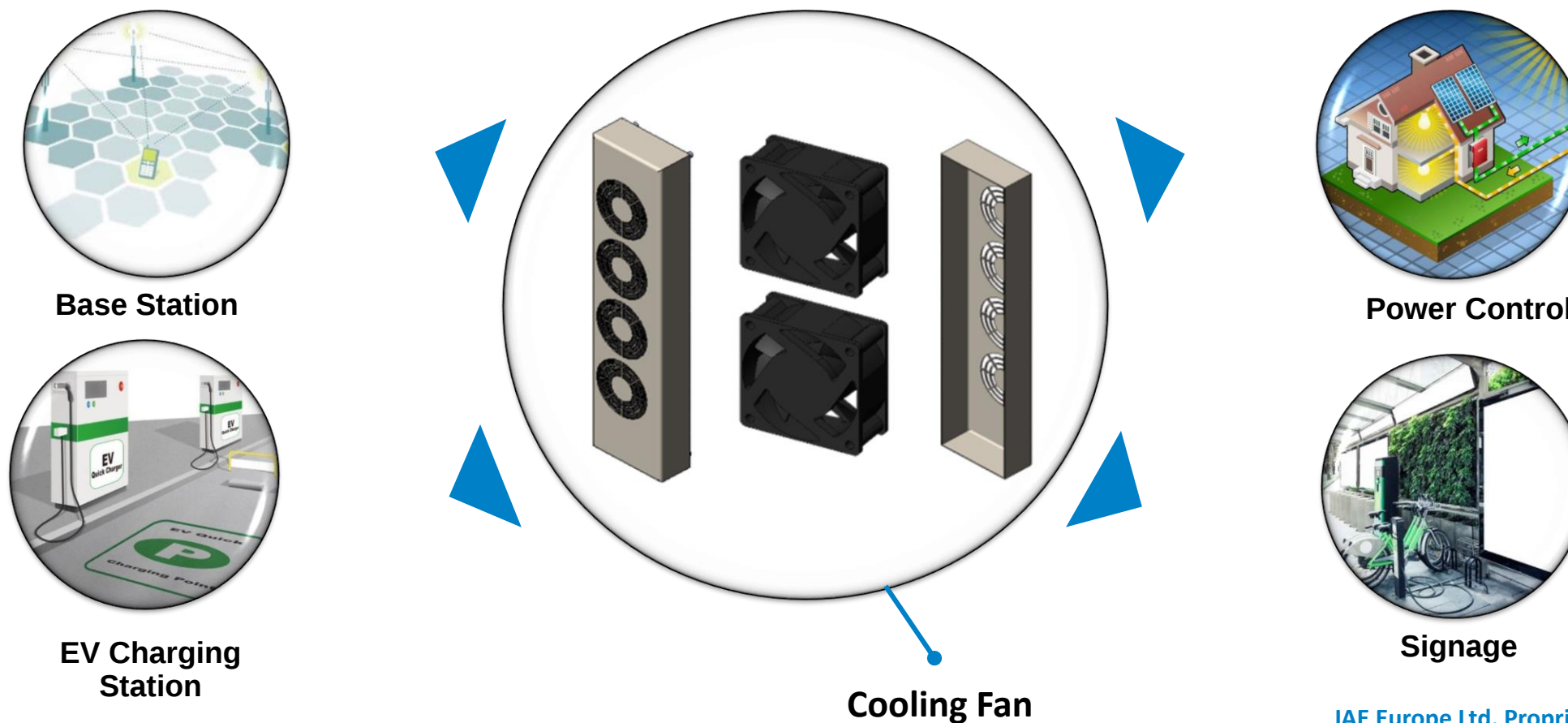
# WATER PROOF DOCKING CONNECTOR FOR COOLING FAN

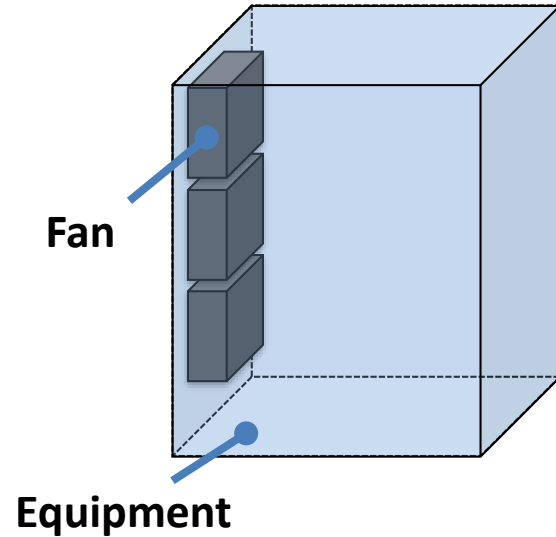
*HB01*



The demand of having fan have been increased for outdoor applications.

- ▶ Cooling fans are needed to lower the temperature in addition to natural cooling.
- ▶ Waterproof is required for outdoor applications.





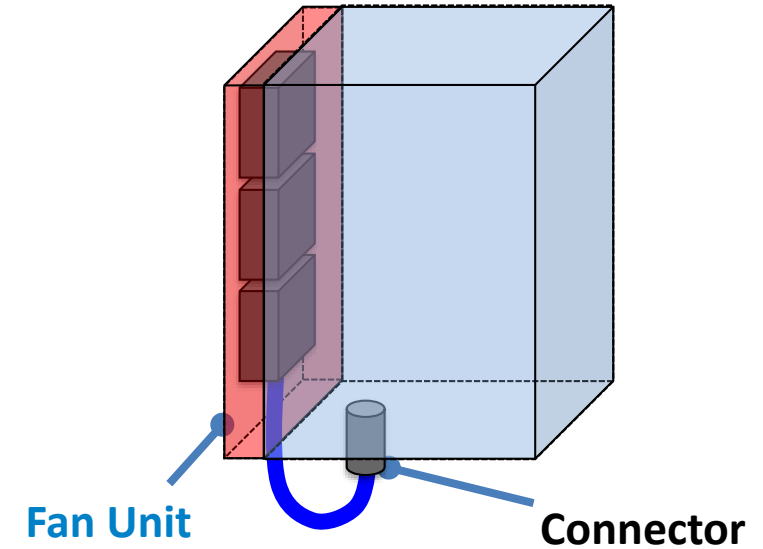
Requirement  
Exchange workability  
(Reduce maintenance cost)  
(Increase machine availability)

## Advantage

- Flexibility in setting the fan

## Challenges

- Complicated for wiring
- Complicated for maintenance



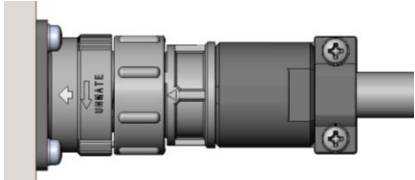
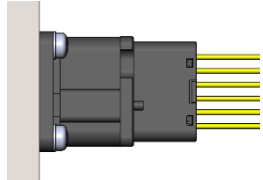
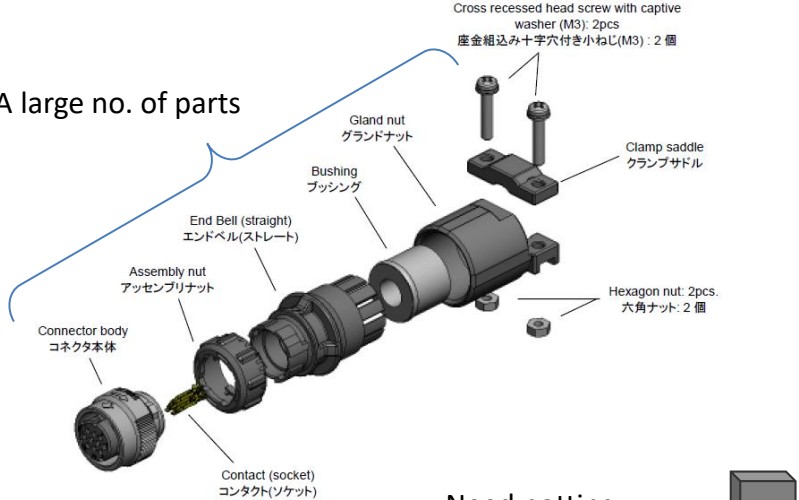
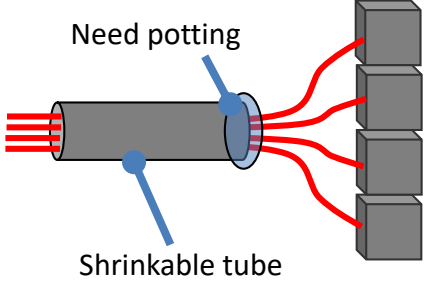
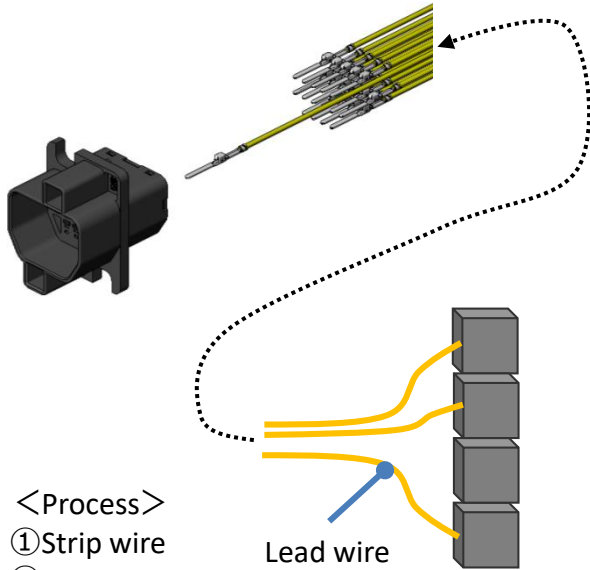
## Advantage

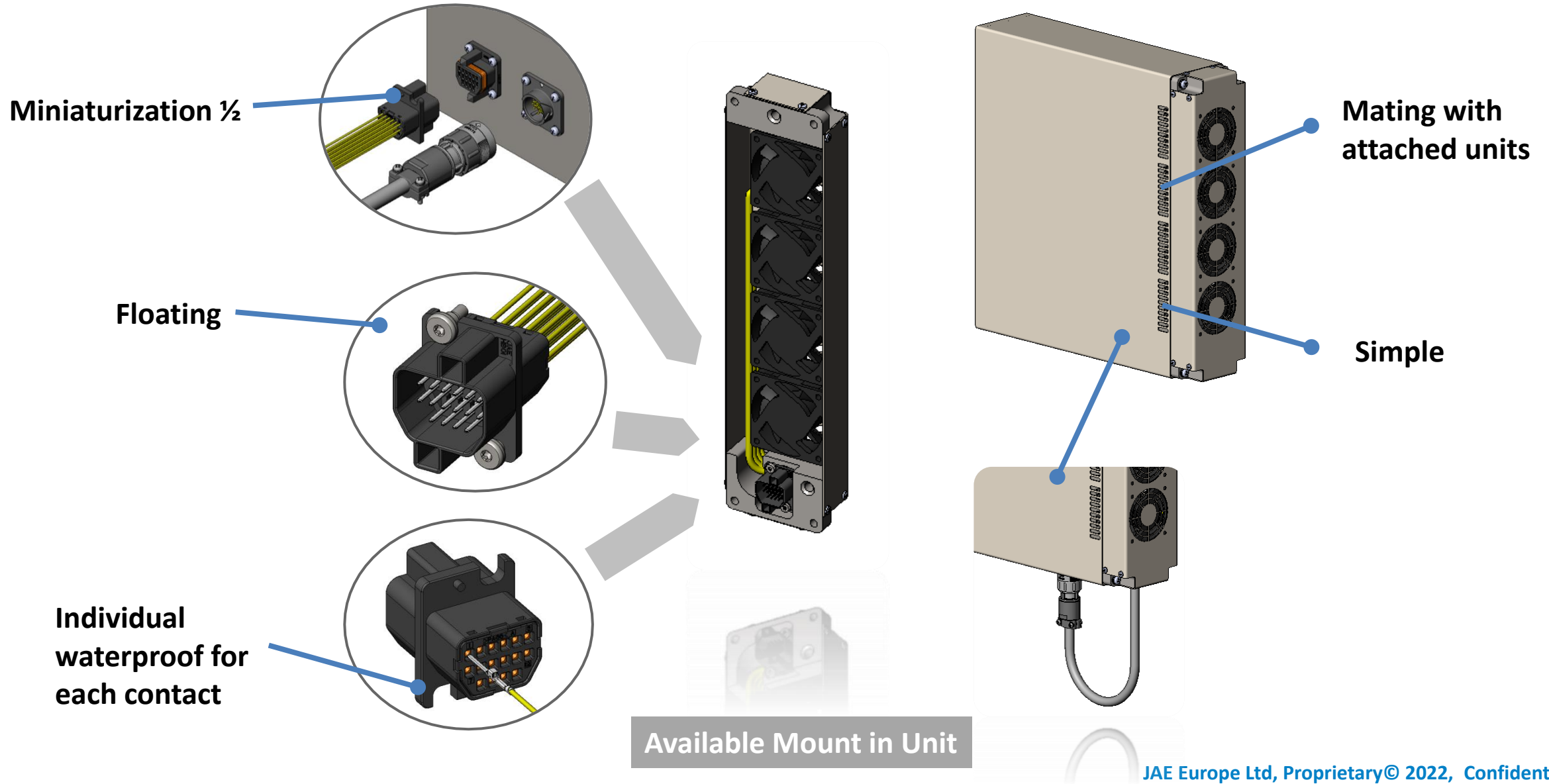
- Reduce maintenance cost
- Reduce cost by standardizing units

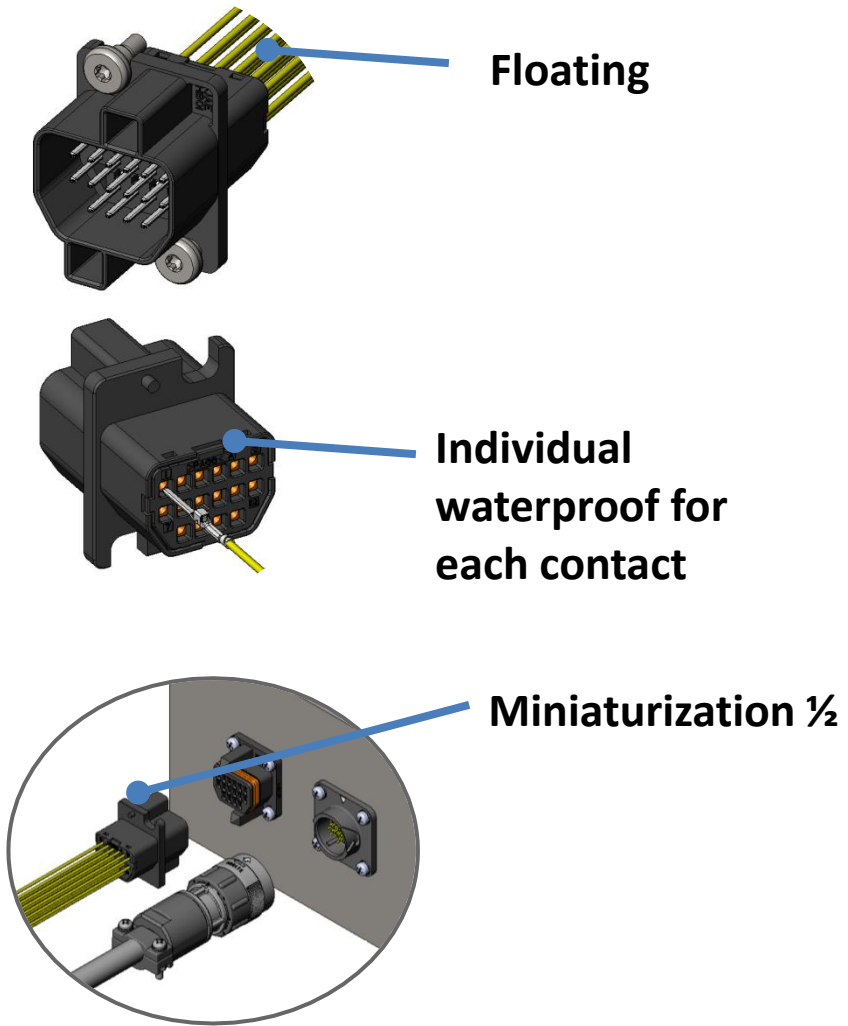
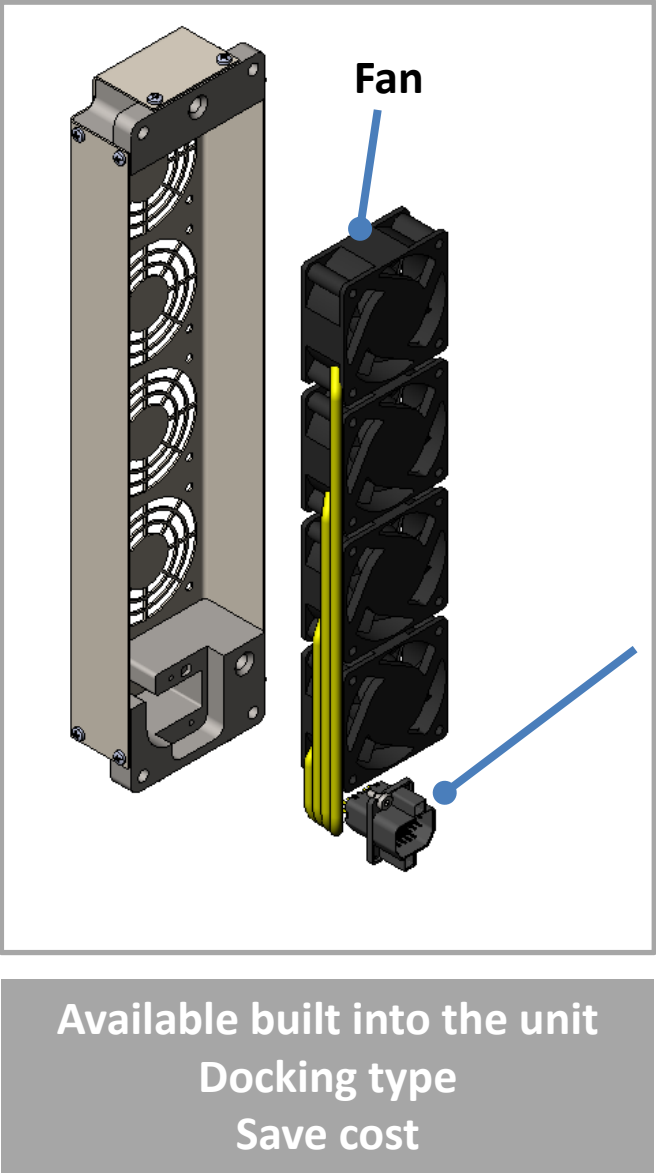
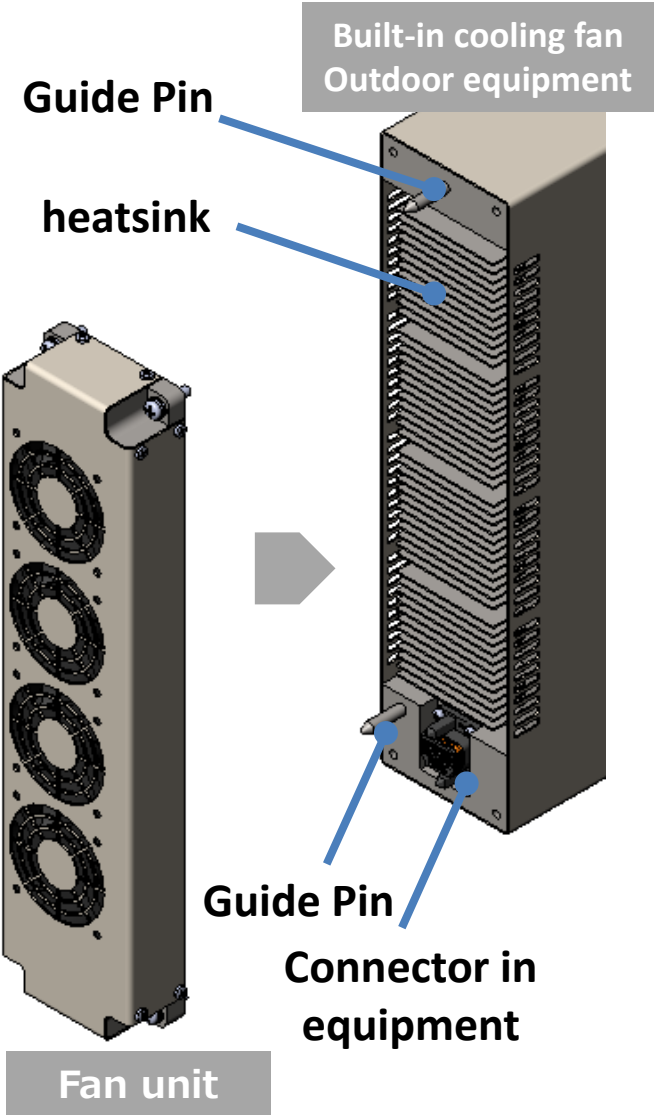
## Challenges

- Need I/O connector to supply power

# COMPARISON BETWEEN CURRENT AND NEW

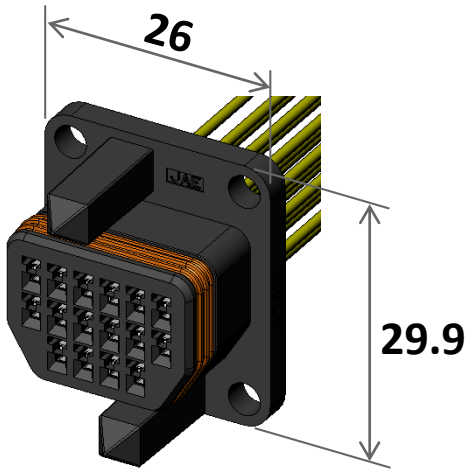
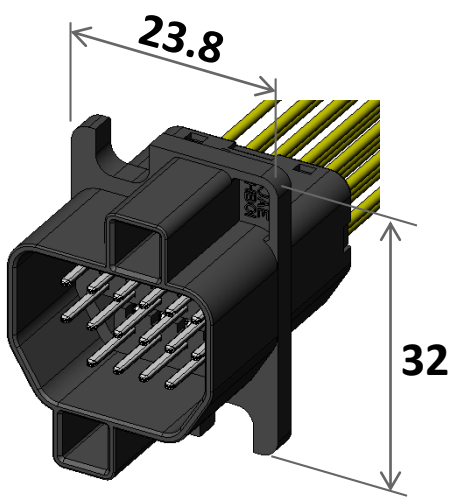
|      | Power supply I/O                                                                                                                                                                                                                                                                                                                                                                                | HB01                                                                                                                                                                                                                                                                                                               |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Size |  70mm                                                                                                                                                                                                                                                                                                          |  35mm                                                                                                                                                                                                                           |
| Cost | <p>A large no. of parts</p>  <p>&lt;Process&gt;<br/>① Attach shrinkable tube<br/>② Waterproof processing<br/>③ Assembly parts<br/>④ Strip wire<br/>⋮<br/>⑨ Tightening clamp saddle</p> <p>Multiple processes required</p>  | <p>Price <math>\frac{1}{2} \sim \frac{2}{3}</math> (set price)<br/>Harness process <math>\frac{1}{2}</math> (Fan side harness)</p>  <p>&lt;Process&gt;<br/>① Strip wire<br/>② Crimp<br/>③ Insert Contacts</p> <p>Lead wire</p> |





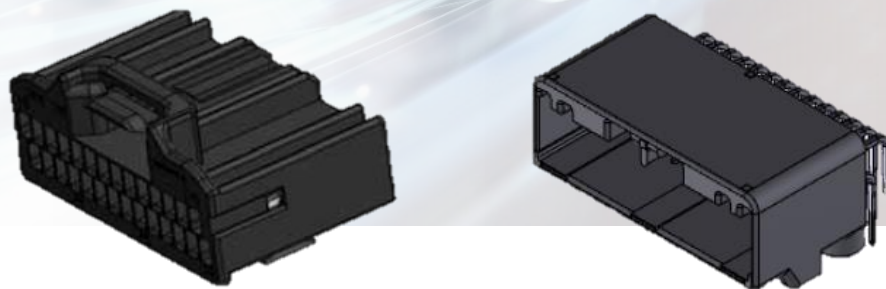
Comparison with round I / O connector

|       |           |                      |                                                  |
|-------|-----------|----------------------|--------------------------------------------------|
| Mount | Material  | Voltage              | AC/DC50V                                         |
|       |           | Current              | 1A/Pin                                           |
|       |           | Applicable Wire Size | AWG#22 ~ 24    Φ0.9 ~ 1.5                        |
|       |           | Pin Count            | 16 pin count (12 pin count)                      |
|       |           | IP Rating            | IP67(when mated)                                 |
|       |           | Tolerance mis-mating | ±1mm(X,Y,Z axis)                                 |
|       | Connector | Contact              | Copper alloy<br>Contact area Au<br>Crimp area Sn |
|       |           | Insulator            | 15%GF    6-6Ny                                   |
|       |           | Seal                 | Silicon rubber                                   |
|       |           | Pin Connector        | Shoulder bolt ×2EA<br>(M3・Hexalobular)           |
|       | Mount     | Socket Connector     | M3 Screw × 4EA                                   |

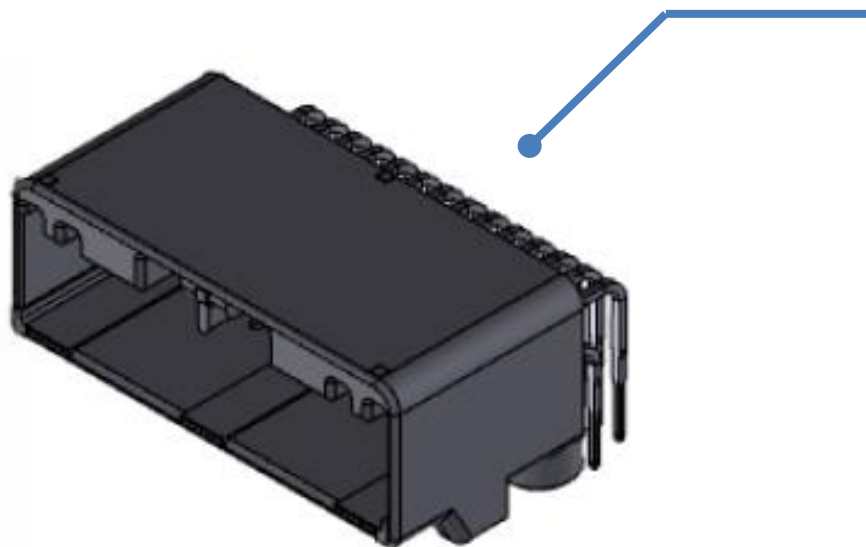


# MX84B SERIES

*UL94 V-0 Compatible Model of  
MX34 Series*



JAE developed MX84B series in response to safety requirement.



► Design based on MX34

► Change material to comply with UL94 V-0

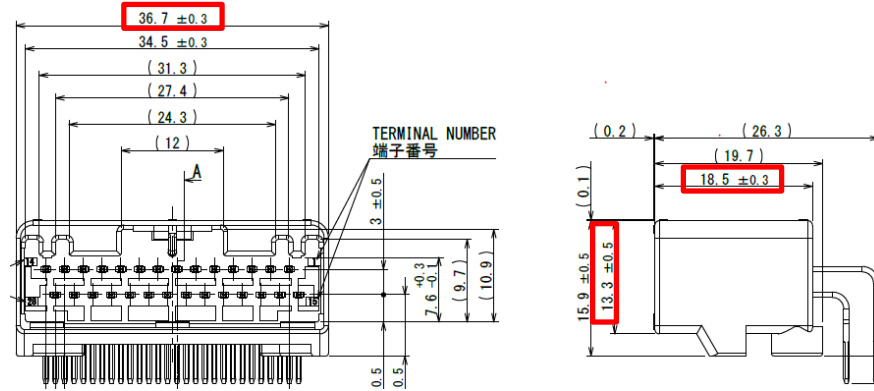
Material

► Pin-header: SPS

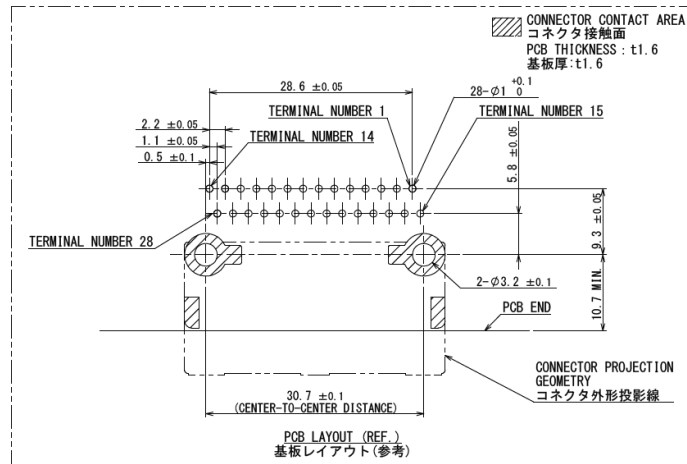
► Socket/In-line: PBT

## MX84

## Size

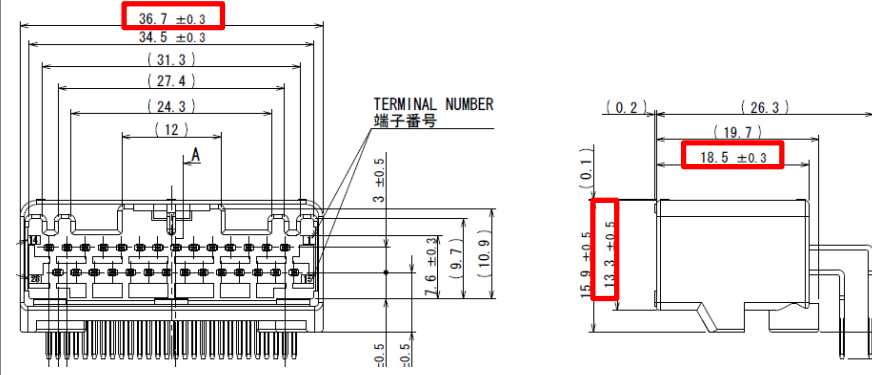


## Foot Pattern

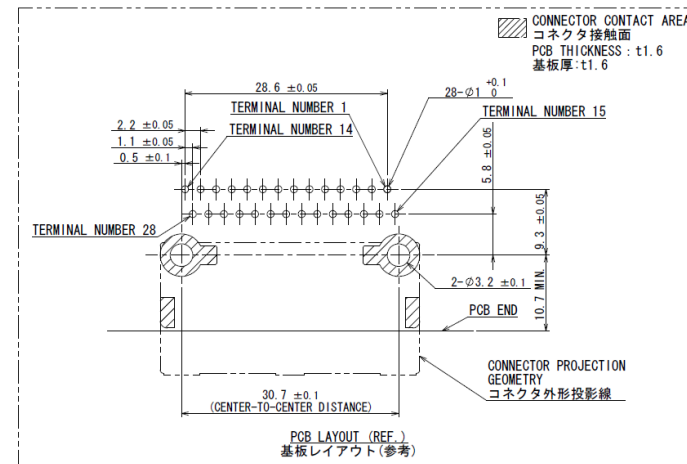


# MX34

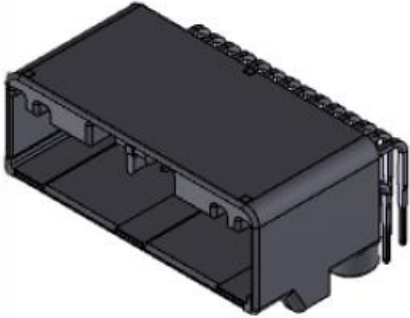
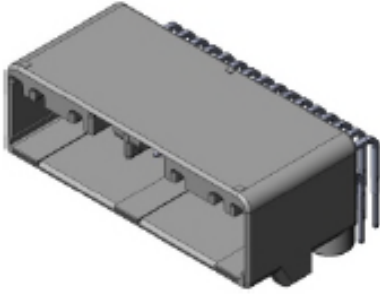
## Size



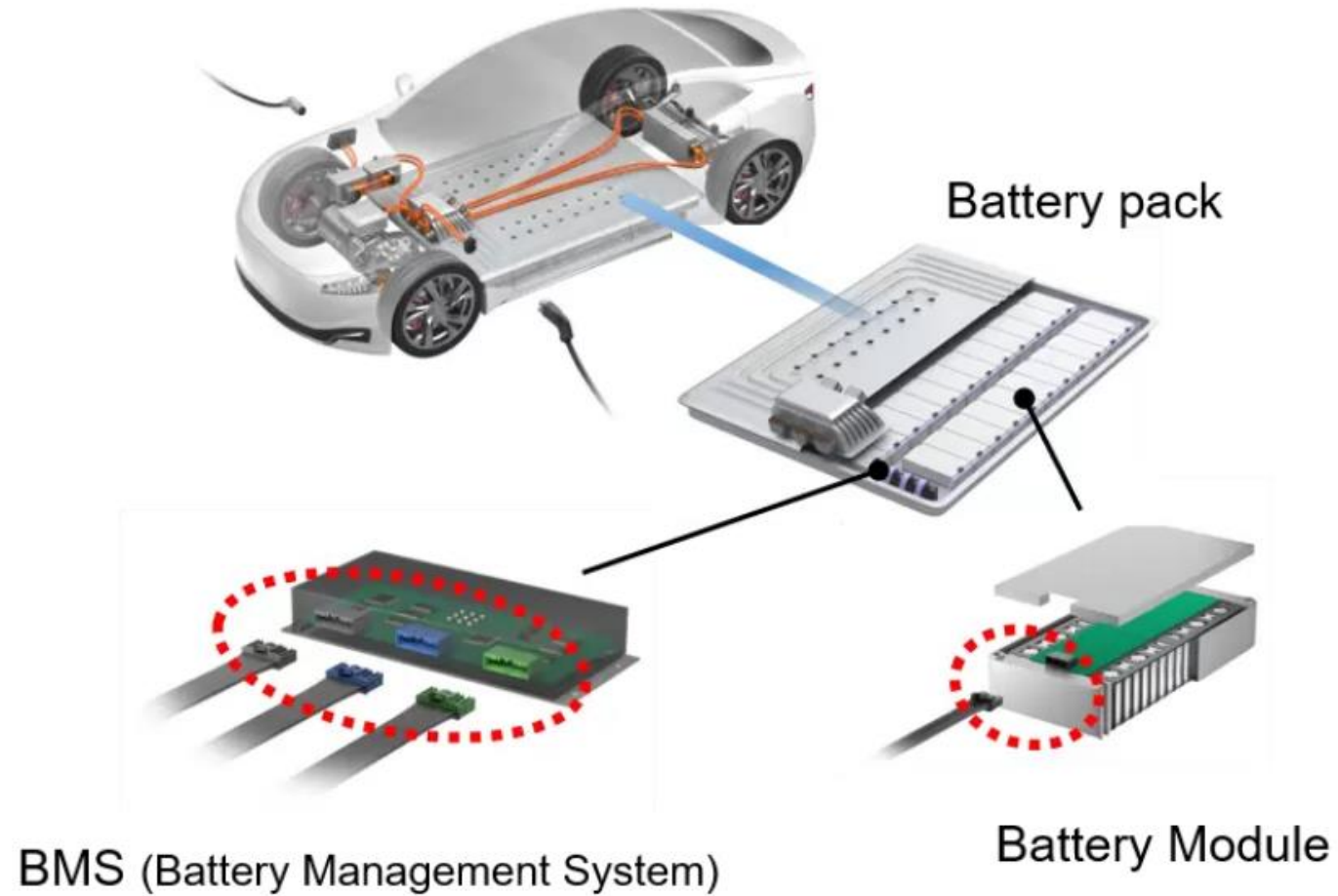
## Foot Pattern



## Size and foot pattern are compatible to each other

|                                                                     | MX84                                                                                | MX34                                                                                |
|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Appearance                                                          |  |  |
| Current Rating                                                      | 3A                                                                                  | 3A                                                                                  |
| Operating Temp.<br><small>(incl. temp. increase by current)</small> | -40 to +130°C                                                                       | -40 to +130°C                                                                       |
| Connector Insertion Force                                           | 147.1N max.                                                                         | 147.1N max.                                                                         |
| Connector Retention Force                                           | 58.8N min.                                                                          | 58.8N min.                                                                          |
| Terminal Plating                                                    | Post-plating                                                                        | Pre/Post-plating                                                                    |

Similar Specification to MX34





***Thank you!***