

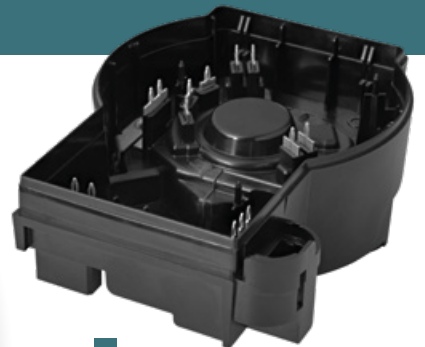
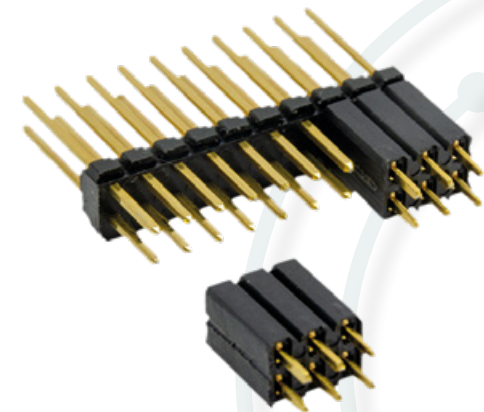


Industrial Connectors

CUSTOM DESIGN

axon'
mechatronics

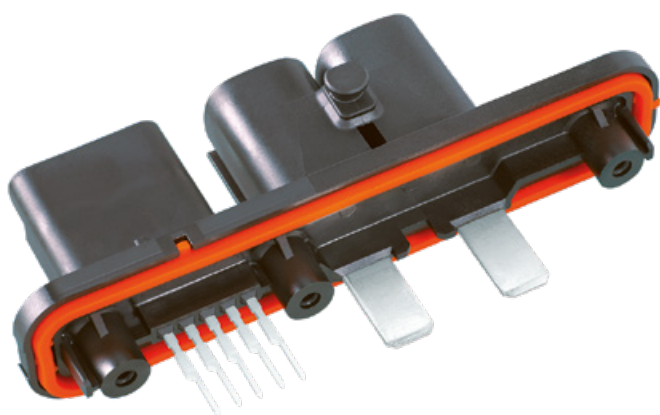
axon'



Industrial Connectors

CUSTOM DESIGN

Power & signal Industrial Connectors



Headquartered in France, the Axon Group has significant sales and manufacturing footprints in North America, Europe and Asia. The group has in-house expertise including plating, machining, lathing, electrostriction, assembling, moulding/overmolding, mechatronics and cabling.



Axon' Mechatronics, part of the Axon' group, is a renowned specialist in the development and manufacture of industrial connectors. The company offers a complete service including:

- co-engineering and co-design: connector development with dedicated engineers attentive to customer's specific requirements,
- creation of production tools (stamping tools, injection mold tools, assembly machines),
- production sites worldwide.



CONNECTORS ASSEMBLED
ON PCBA

PAGE 4

CONNECTORS ASSEMBLED
TO FLEXIBLE CIRCUIT

PAGE 9

CONNECTORS ASSEMBLED
ON FLEXIBLE CABLE

PAGE 11

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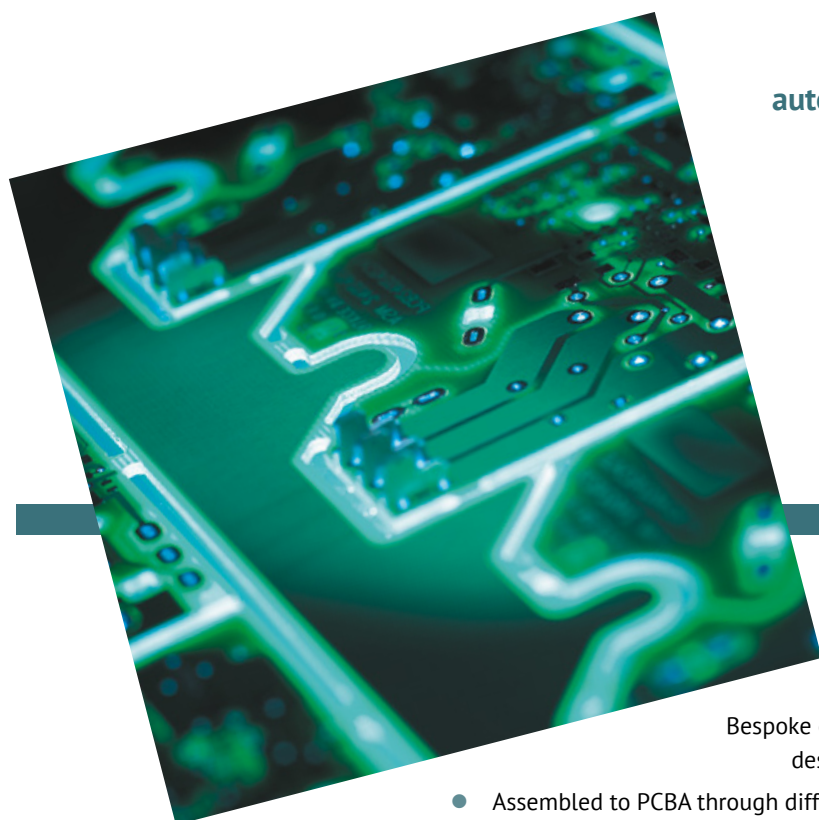
CONNECTORS

designed for
volume
markets

axon'
mechatronics



Automotive including systems
for driving assistance,
visibility, control, switch rotary
connectors, **electronics**.
Industrial equipment,
automation systems, machinery,
sensor systems.



CUSTOM DESIGN

Bespoke connectors by Axon' Mechatronics can be
designed for a variety of termination styles:

- Assembled to PCBA through different kinds of processes: wave soldering, reflow soldering or solderless solutions.
- Assembled to Flat Flexible Cables or Flexible Printed Circuits with different processes: soldering, crimping, locking.
- Terminated to wires by soldering or crimping.
- Terminated by electrical welding.

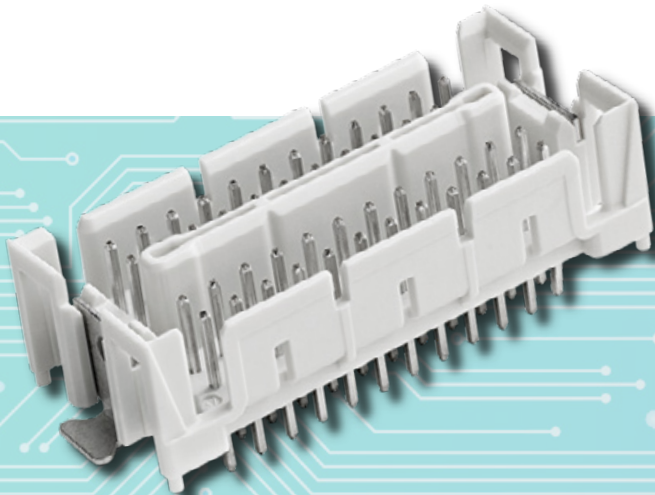
Mechatronics objects which integrate electromechanical and electronic components can be offered. **Watertight connectors** are also part of Axon's expertise.

CONNECTORS ASSEMBLED
WITH WIRES

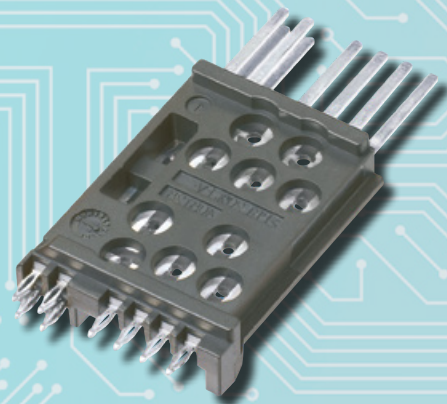
MECHATRONICS
CONNECTORS

WATERTIGHT
CONNECTORS

Connectors assembled to PCBA



THROUGH-HOLE TECHNOLOGY



PRESS-FIT TECHNOLOGY

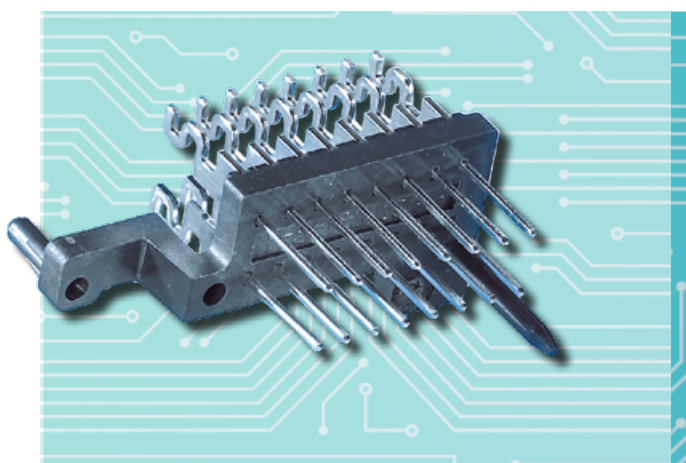
Axon' Mechatronics connectors for PCBA can be made with different kinds of electronic assembly processes.

- **Through-hole technology:** insertion of the tabs through the board and wave-soldering for robust environmental resilience.
- **Pin-in-Paste technology:** used for reflow soldering technology.
- **Surface Mount Technology:** direct mounting of the connectors onto the PCB used for reflow soldering.
- **Pressfit technology:** connectors to be inserted into the PCB. Avoids additional soldering processes to save cost and increase productivity.

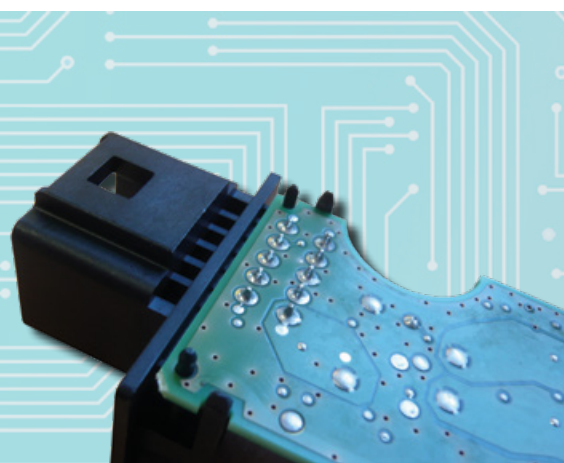


Connectors assembled to PCBA

Stitched connector terminals for easy assembly



CONNECTOR FOR REFLOW SOLDERING PROCESS



CONNECTOR FOR WAVE SOLDERING PROCESS

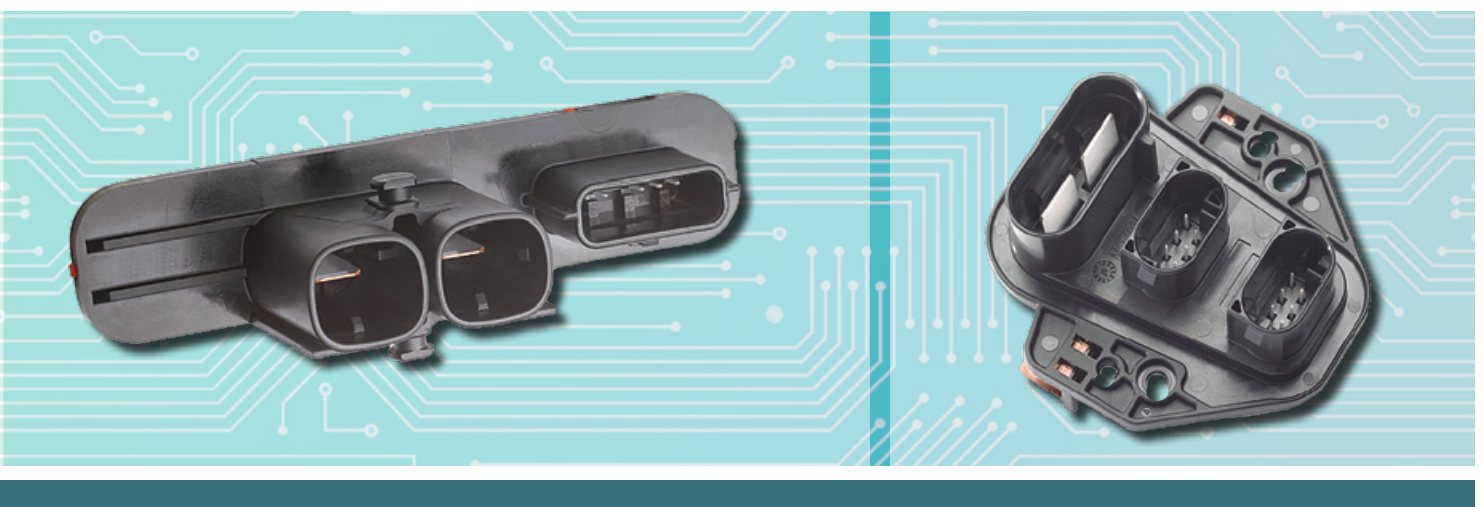
- A complete service from the choice of the material to the design and manufacture of customer's assembly process.
- **Custom-designed** solutions.
- Designed for different assembly processes:
 - wave soldering,
 - reflow soldering: connectors resistant up to 220°C (continuous temperature) and 250°C (peak temperature),
 - solderless assembly: connectors made with pressfit terminals.
- Easy assembly on **PCBA** with the locating pins: connector held in the correct position during soldering process.
- Plastic materials:
 - wave soldering process : PA or PBT with or without glass fiber, VO or HB,
 - reflow soldering process : PPS, SPS, PPA with or without glass fiber.
- Terminal retention force > 80 N.
- Possible combination of power & signal terminals in one single connector: space saving and cost-effective solution.
- Can be packaged in alveolar trays or packaging tubes and SMD carrier tapes: easy to handle for automated process.



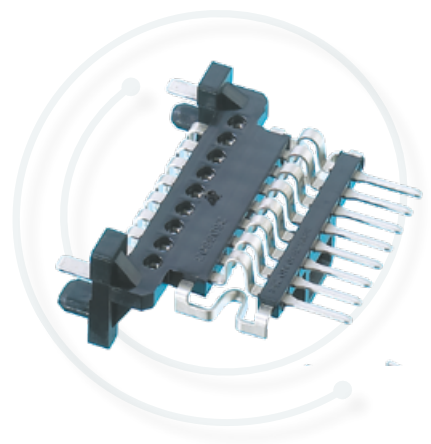
Connectors assembled to PCBA

Overmolded connectors

the right technology for complex or watertight shapes



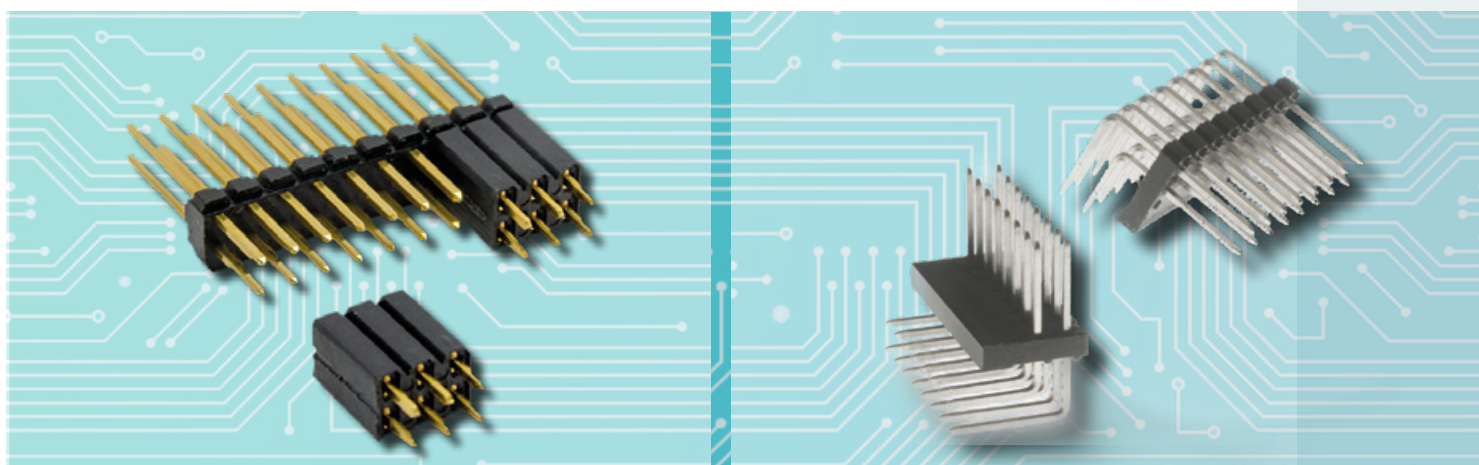
- A complete service from the choice of the material to the design and manufacture to customer's assembly process.
- Expertise in stamping and plastic injection.
- Design of complex and tailor-made overmolded connectors.
- Watertight connectors.
- Designed for different assembly processes:
 - wave soldering,
 - **reflow soldering**: connectors resistant up to 220°C (continuous temperature) and 250°C (peak temperature),
 - **Solderless assembly**: connectors made with **pressfit terminals**.
- Easy assembly on PCBA with possible locating pins: connector held in the correct position during soldering process.
- Plastic material: PPS, SPS and PPA with or without glass fiber.
- Very high terminal retention force: 200 N.
- Possible combination of **power & signal terminals** in one single connector: space saving and cost-effective solution.
- Can be packaged in alveolar trays, packaging tubes and SMD carrier tapes: easy to handle for automated process.



Overmolded connector with a damping area to compensate material deformation caused by the reflow soldering process.

Connectors assembled to PCBA

Through-hole Pin headers easy and smooth insertion



- Vertical integration of contact manufacturing and plastic material.
- Flexible process for small and large scale production volumes.
- Expertise in **electrostriction**: contacts made with smooth, spherical tips with none of the sharp edges that can cause damage on insertion.
- Cost-effective solution: no tooling required (depending on the application).
- Designed for **reflow soldering** and **wave-soldering processes**.
- Different shapes of pin headers adapted to the application: straight, angled.
- Pins can be round or square.
- Pitches : 2.54 or 5.08 mm.
- Single row, double row.
- Full or selective plating (tin, silver, gold, nickel).
- Terminals can also be used without plastic housing.
- Can be packaged in alveolar trays, packaging tubes and SMD carrier tapes: easy to handle for automated process.



Connectors assembled on PCBA

Connectors and housing with pressfit terminals solderless solution



Housings fitted with Eye of the Needle (EON) compliant pins, designed to be inserted directly into a PCB with no soldering.

BENEFITS:

- Avoids additional soldering processes to save cost and increase productivity.
- Avoids thermal stress of a second reflow phase.
- Allows the use of standard economic plastic resins in the case of overmolded or stitched connector terminals.
- Delivers robust mechanical retention and excellent electrical contact after insertion.
- Can be used in an industrial environment which does not necessarily require clean rooms.
- Axon' offers press-in machines to assemble PCBA inside connectors.

FEATURES:

- Components fully validated to IEC 60352-2.
- Materials :
 - CuSn6P -continuous temperature: 125°C,
 - CuNiSi -continuous temperature: 170°C,
 - thicknesses : 0.6, 0.8 and 1 mm,
 - can be packaged in alveolar trays, packaging tubes and SMD carrier tapes for connectors: easy to handle for automated process.

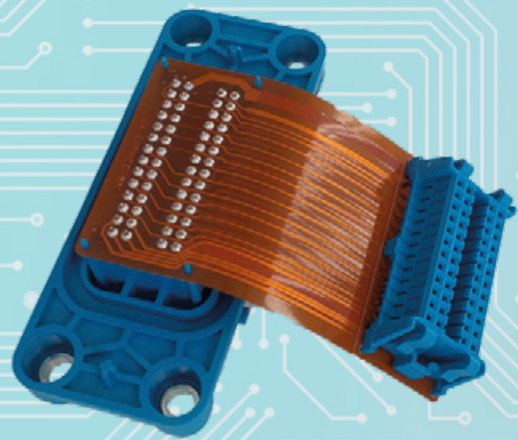
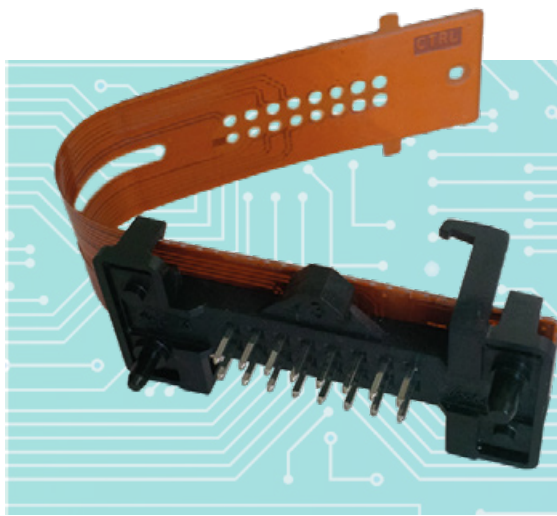


Pressfit terminals



Connectors assembled to flexible circuit

Soldered connector for an easy assembly

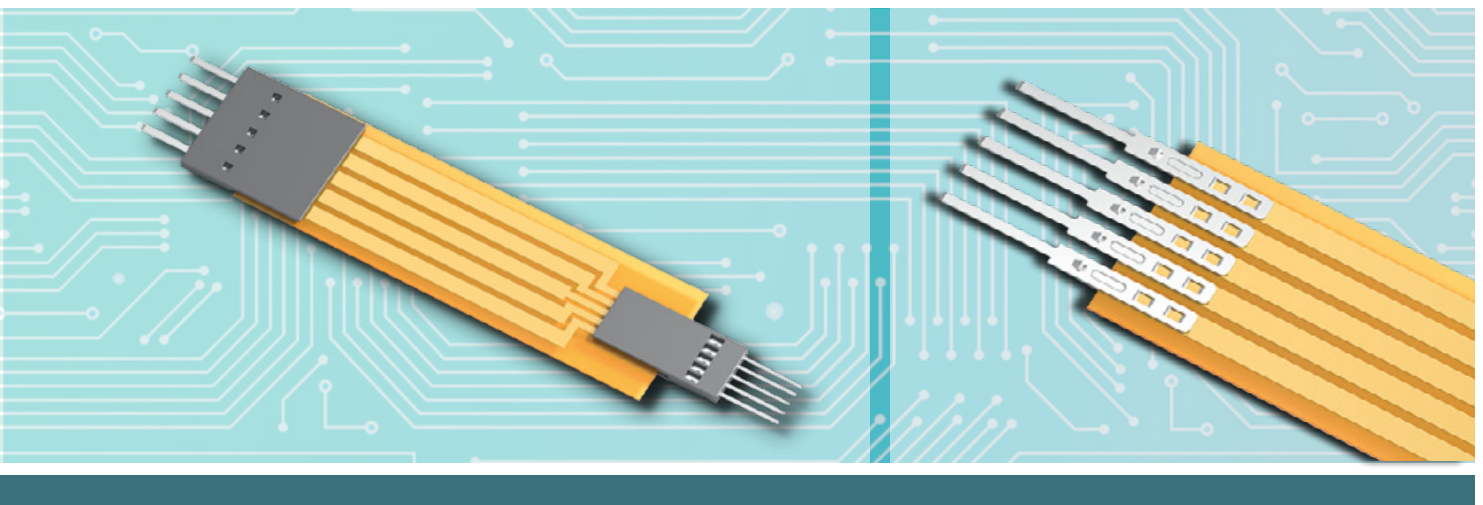


- Bespoke connectors designed around:
 - assembly processes,
 - customers' constraints including space requirements, mechanical or environmental requirements.
- Connectors made with **Through-Hole-Terminals (THT)** : stamped contacts or wire pins.
- Designed for:
 - wave soldering process,
 - reflow soldering: connectors resistant up to 220°C (continuous temperature) and 250°C (peak temperature).
- Easy assembly on PCBA with the locating pins and retention clip.
- Plastic materials:
 - **wave soldering process**: PA or PBT with or without glass fiber, VO or HB,
 - **reflow soldering process**: PPS, SPS, PPA with or without glass fiber.
- Terminal retention force > 80 N (for stitched connector terminals).
- Can be packaged in alveolar trays: easy to handle for automated process.



Connectors assembled to flexible circuit

Crimp connector flexible solution



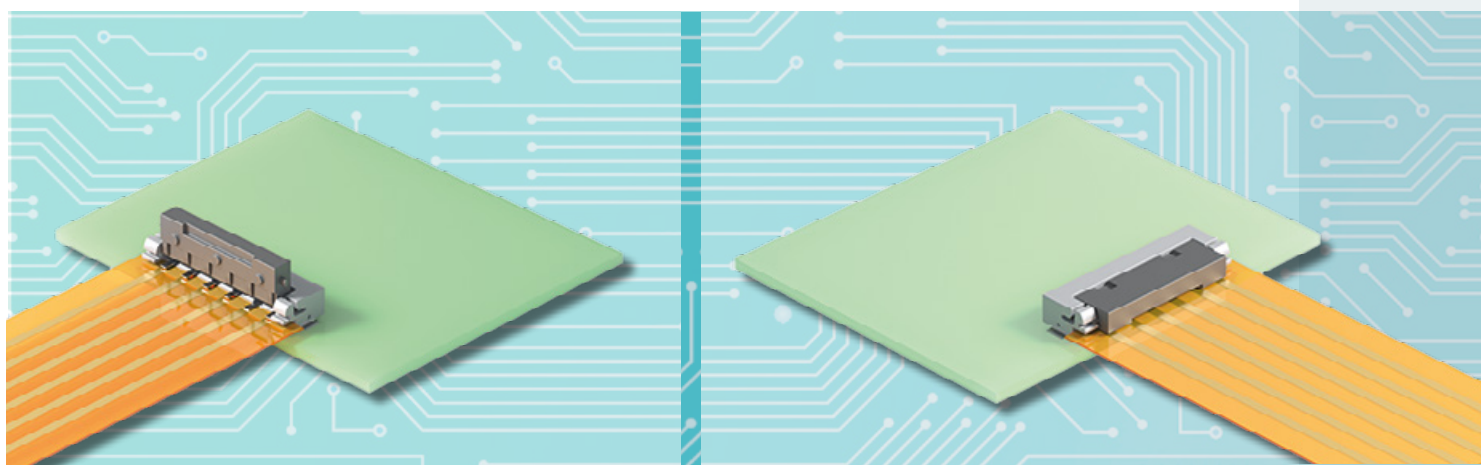
CUSTOM-DESIGNED CRIMP CONTACTS AND HOUSINGS FOR FLEXIBLE PRINTED CIRCUIT

- Flat and flexible configuration for space saving and easy mounting in plastic components which integrate more functions.
- Development of **custom-made connectors** for Flat Flexible Cables (FFC) and Flexible Printed Circuits (FPC):
 - made with crimp terminals,
 - designed to customers' requirements including number of terminals, thickness and dimensions of the FFC/FPC,
 - expertise in plastic injection.
- Cost-effective solution in terms of process: easy crimping to the cable with Axon' Mechatronics assembly machine.
 - all terminals are crimped at the same time.
- Various pitches possible.
- Terminals can be also used without plastic housing.



Connectors assembled on flexible cable

Locking connector for FFC or FPC board-to-cable connection



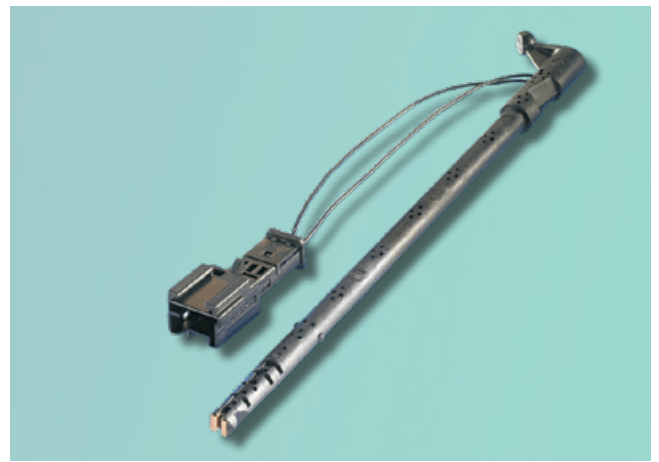
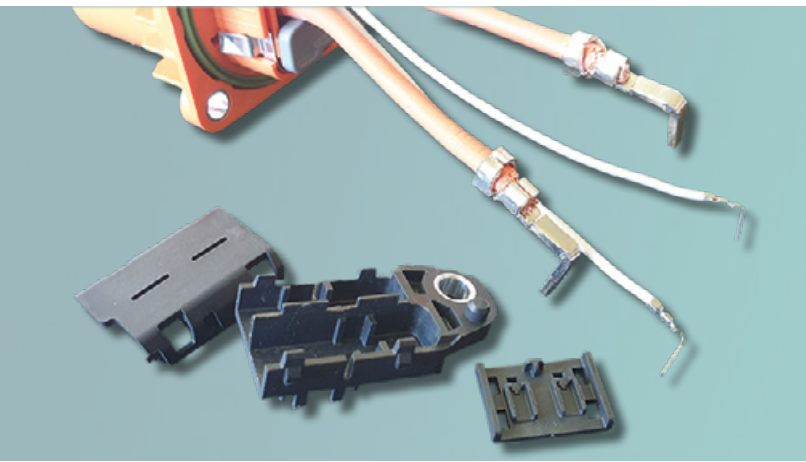
LOCKING PCB CONNECTORS FOR FFC AND FPC

- Custom-made connectors with a locking system.
 - designed to ensure reliable mechanical connection,
 - designed for **Flat Flexible Cables (FFC)** and **Flexible Printed Circuits (FPC)**,
 - designed to customers' requirements including number of ways, thickness and dimensions of the FFC/FPC: flexible solution.
- Easy and reliable connection: secure electrical contact and mounting.
- Space saving.
- Designed for **reflow soldering process**:
 - connectors resistant to 220°C (continuous temperature) and 250°C (peak temperature).
- Various pitches possible.



Connectors assembled with wires

Crimped wire terminations easy and fast



- Custom-designed connectors adapted to multi-stranded conductors.
- Connectors made with:
 - stamped terminals delivered in reel form for automated crimping process,
 - assembled plastic housing for easy handling and reliable connection.
- Long lifetime: the crimping process does not damage the conductor.



Connectors assembled with wires

Welded connections



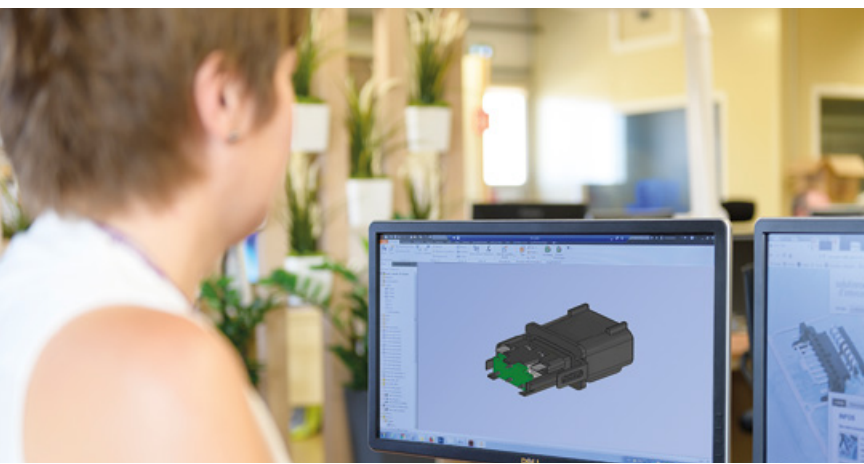
- Tailor-made solutions adapted for single or multi-stranded conductors.
- Resistance welding is suitable for the manufacture of overmolded, watertight connectors or stitched connector terminals.
- Expertise in stamping (terminals), overmolding and assembly.
- Expertise in the manufacture of machines designed to weld and test the cable/connector assembly.
- Manufacture of all-in-one pigtails.



Mechatronics connectors

Smart objects

combination of mechanical & electronic functions

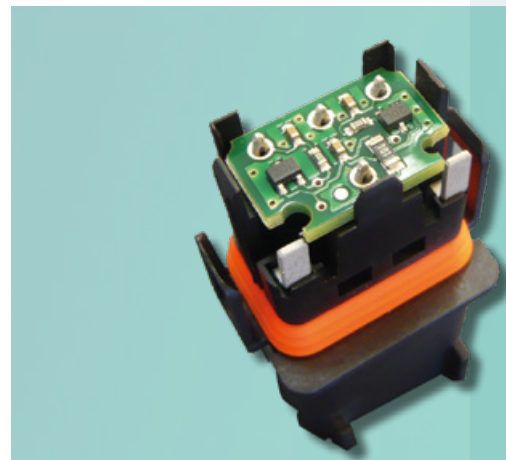
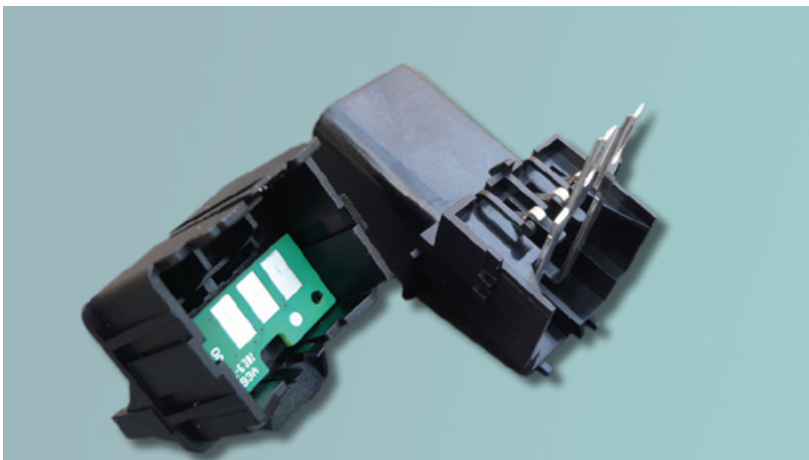


Axon' Mechatronics manufactures functional objects utilising the full expertise of the company in terms of contact design, overmolding and assembly techniques. To add a PCB or an electronic component to a connector, Axon' Mechatronics uses different techniques: press-fit terminals, electrical welding and soldering.



Mechatronics connectors

Mechatronics connectors with Press-fit terminals for PCB integration



When it comes to integrating a PCB into a connector, **Press-fit terminals** are the ideal solution. Based on Eye of the Needle (EON) compliant pin technology, **mechatronics connectors** made with pressfit terminals are designed to be easily inserted into a PCB.

This technology has many benefits

- Avoids additional soldering processes to save cost and increase productivity.
- Avoids thermal stress of a second reflow phase.
- Delivers high mechanical retention and excellent electrical contact after insertion.
- Provides the customer a connector solution with integrated PCB.

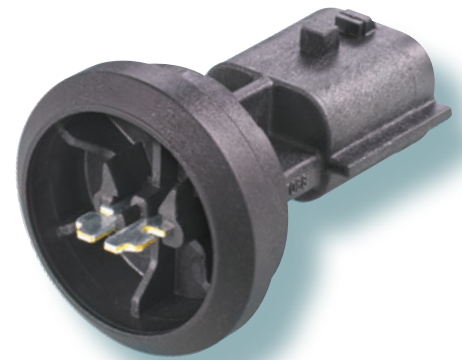
ADDING FUNCTIONS WITH ELECTRICAL WELDING OR SOLDERING

- **Electrical welding or soldering** are used to integrate the electronics part to the base component.
- Long-term expertise in component integration: the “legs” of the electronic component are preformed and bent to adapt to the design of the support. This provides optimised integration support for the electrical welding.
- Electronic components are assembled on an automated process.
- Process adapted to both low and high volume series.
- 100% functional acceptance testing.



Mechatronics objects

Watertight connectors overmolding expertise



Expertise in **overmolding** and **sealing techniques** to design and manufacture watertight connectors including.

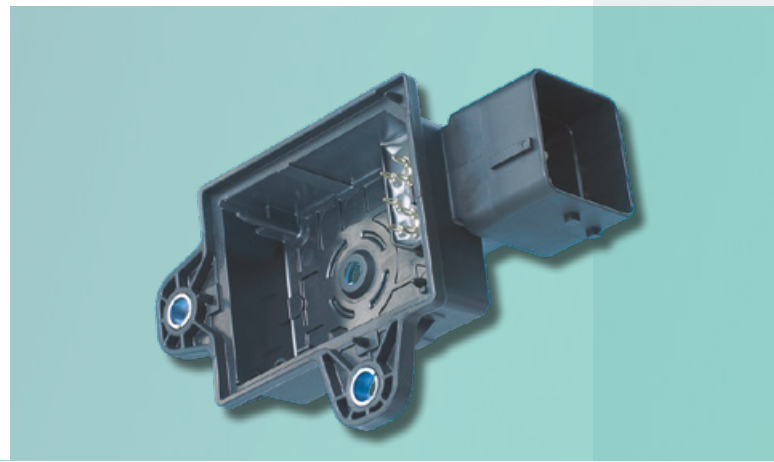
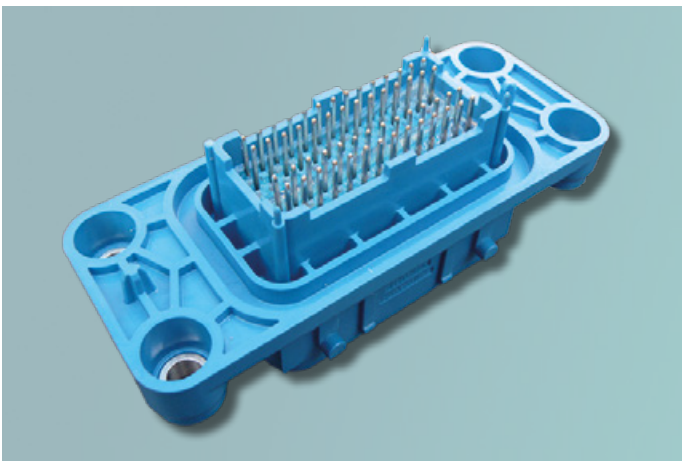
- IP67 products.
- Watertight products manufactured to meet specific requirements defined by the customer:
 - terminals and plastic housing optimized to reach a high level of watertightness,
 - example of performances:
 - 5 bars: leak < 0.6 cm³/min @ 3.5 seconds,
 - 10 bars: leak < 1.6 cm³/min @ 10 seconds,
 - if required, potting can be added for additional protection.

Ideal solution for electric vehicles (e-mobility).



Watertight connectors

Connectors with overmolded or stitched terminals
proven quality!



Contrary to overmolded connectors which have a certain level of protection against water, **stitched connector terminals** need potting to improve the sealing.

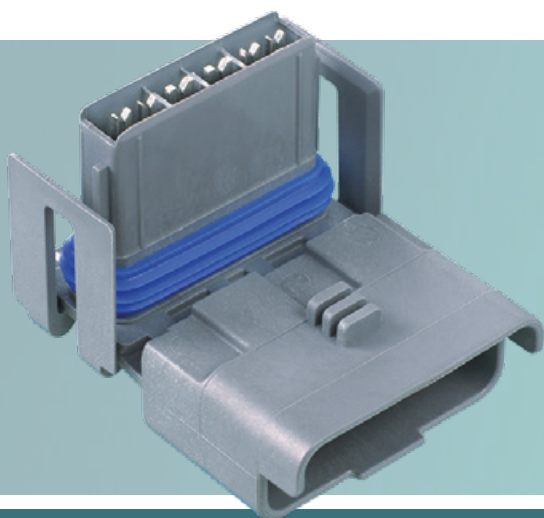
- Expertise in two potting solutions:
 - bi-component resin crosslinked in an oven,
 - UV Polymerizable resin:Fast process: just a few seconds are needed for the polymerization
- Automated process for both techniques.
- Connectors tested and approved through ageing tests defined by customers.



Watertight connectors

Watertight connectors

Seals and gaskets



- Some metal-plastic parts including stitched connector terminals or housing, require the addition of a seal to ensure the watertightness of the connector.
- The seal can be either overmolded directly, or inserted into the connector depending on the part configuration and/or application.
- The seal is fully developed by Axon Mechatronics to customer's requirements and environmental conditions such as sealing to air, dust, water and chemicals.
- Seal materials : elastomers (TPV, SEBS...) and silicone
- The color of the gasket can also be chosen to be detected by camera control.
- Expertise in the development of semi- or full-automatic machines to assemble connector gasket.



Connectors to your needs

For any industrial application

In addition to all the types of connectors presented in the previous pages, some examples of connectors designed for specific applications are highlighted hereafter:



- **Connector for sun visor**

This connector has been designed to allow for a high number of cycles (folding down/up) of the sun visor while having an electrical function.



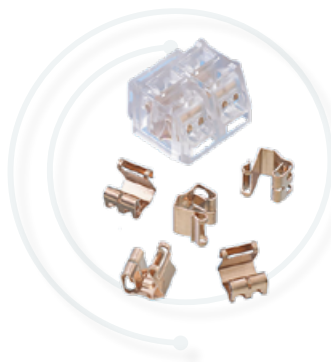
- **Fire sensor connectors for the building industry**

Assembled connectors made with stamped terminals. The cosmetic aspect was one of the major requirements of the customer.



- **Connectors for oil and gas application**

The connector has been designed to compensate for connector misalignment on all axes with a tolerance of ± 1 mm.



- **Fire sensor connectors for the building industry**

Quick connection and disconnection: no tools required.

Axon' Mechatronics is able to design bespoke connectors which meet electrical, environmental or cosmetic requirements defined by the customer. They also have to be compatible with the customer's assembly processes.

Finished connectors can be packaged in alveolar trays or SMD carrier tapes for an easier final assembly.

Axon' Mechatronics expertise in developing semi- or fully-automatic component assembly machines can be particularly beneficial for high volume production.



A worldwide presence

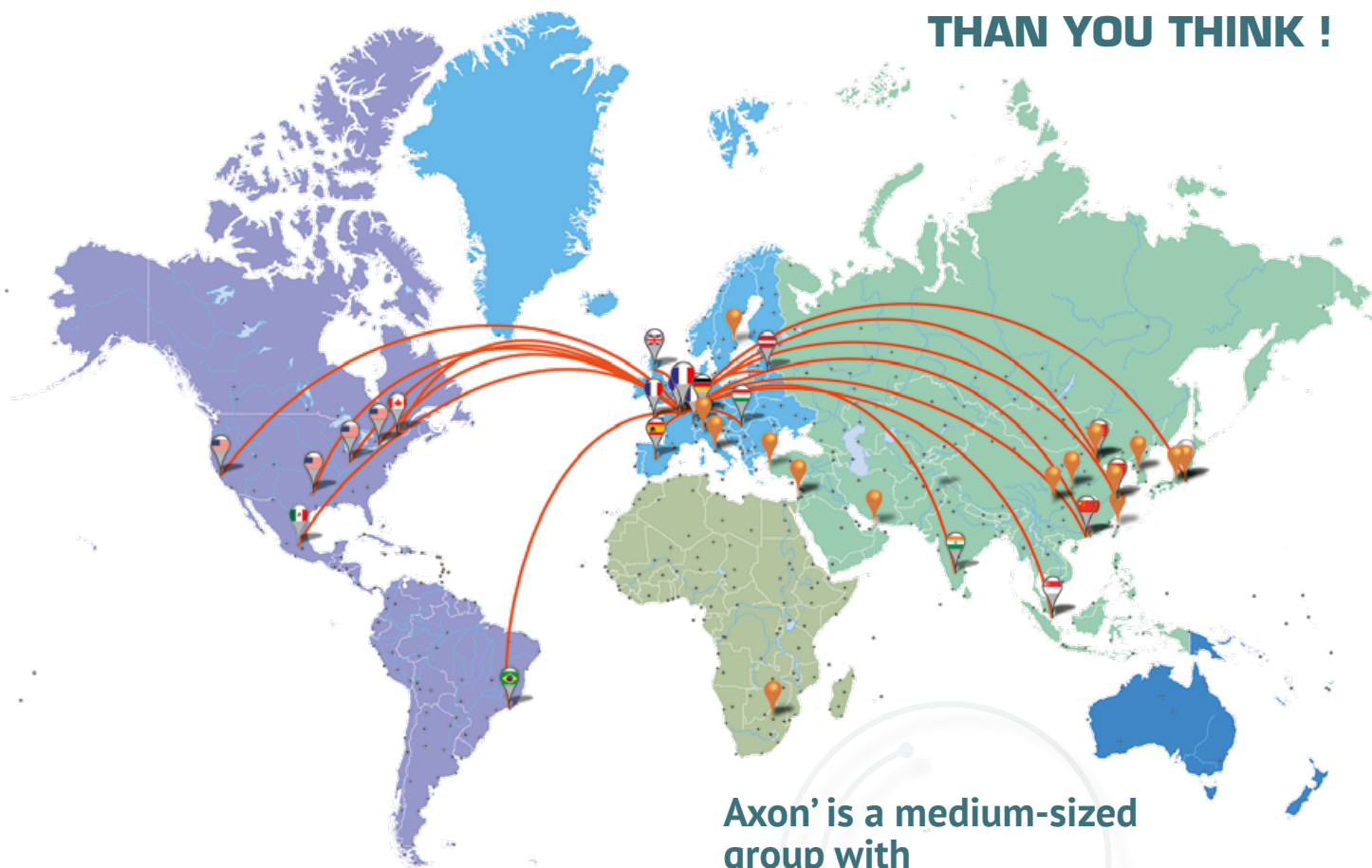
The Axon' Group:

**Over 50 years of
experience in cables
and interconnect.**

At the very beginning, Axon' Cable manufactured high temperature insulated wires. Since then, the group has greatly enlarged its areas of expertise to offer complete solutions to customers:

- design and manufacture of wires, cable assemblies, custom-designed connectors with Axon' Cable,
- design and manufacture of metal-plastic parts and components with Axon' Mechatronics and Axon' Nanotec,
- design and manufacture of elastomeric components with Addix.

**AXON' IS CLOSER
THAN YOU THINK !**



Axon' is a medium-sized
group with

20 subsidiaries
worldwide



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