

**System cables
& harnesses
for robots and
automation systems**

System cables & harnesses

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Axon' Cable designs and manufactures custom designed composite cables and cable assemblies for robotics and automation systems. The design of these cables takes account of the most demanding operational constraints of automation systems:

- Good flex life,
- Small bend radius,
- Flexibility,
- Resistance to chemical products, oil and solvents,
- Abrasion resistance,
- High temperature,
- Miniaturization : small dimensions for arm compactness,
- High speed,
- Precision,
- High quality trajectory,
- EMI protection,
- Uninterrupted signal transmission,
- Production stability.

Testing capabilities

Axon' uses a wide variety of in-house equipment to ensure that cables and cable assemblies meet our customer requirements:

- Mechanical tests : combined flex/torsion, folding, winding, unwinding.
- Vibration:
Vibration equipment (using frequency of the system, 10 Hz to 3 000 Hz) : acceleration up to 100 G. Combined vibration/climatic tests.

- Differential Calorimeter Analysis (DSC): measurement of heat flux under temperature variations (fusion point, crystallization).
- Electronic scanning microscope.
- Benches to test shielding efficiency.
- Meniscograph (IEC 68-2-69) to check solderability of cables and components.

Expertise in Research and Process: Axon' Cable offers not only custom designed cables but is also able to design equipment to test cable's flex life and test benches in partnership with customers.

From conductor to cable assembly

Conductor

Expertise in silver plating, tin plating, drawing and assembling

The diameter and the composition of the basic strand have a determining role when choosing the right conductor to ensure signal transmission. The nature, the drawing and the assembling of the strands will also play a determining role upon flex life and torsion of the final cable.

- Single-stranded or multi-stranded conductors,
- Bare copper, silver plated copper, tin plated copper, nickel plated copper and special copper alloys.

Primary Insulation and Jacketing

Expertise in thermoplastic extrusion, PTFE extrusion and taping

The insulating materials are chosen to resist oil, solvents, chemical products and high temperature. Miniaturization constraints have an effect upon the choice of the insulation.

- Fluorinated materials (PTFE, FEP, ETFE, PFA), PEEK, polyimide,
- Polyurethane,
- Thermoplastic polyester,
- Special Axon' compounds.

Shielding and electromagnetic protection

In order to protect electronic systems and links against electromagnetic interference while maintaining good flexlife of the final cable, Axon' Cable offers different solutions:

- Shielding with a braid or overbraiding for the cables,
- Helicoidal shielding is specially designed for a good flex life,
- Shield termination to achieve the perfect continuity of cable assemblies,
- Shield termination bands,
- Dedicated test benches to control the shielding efficiency of the cables or complex harnesses.

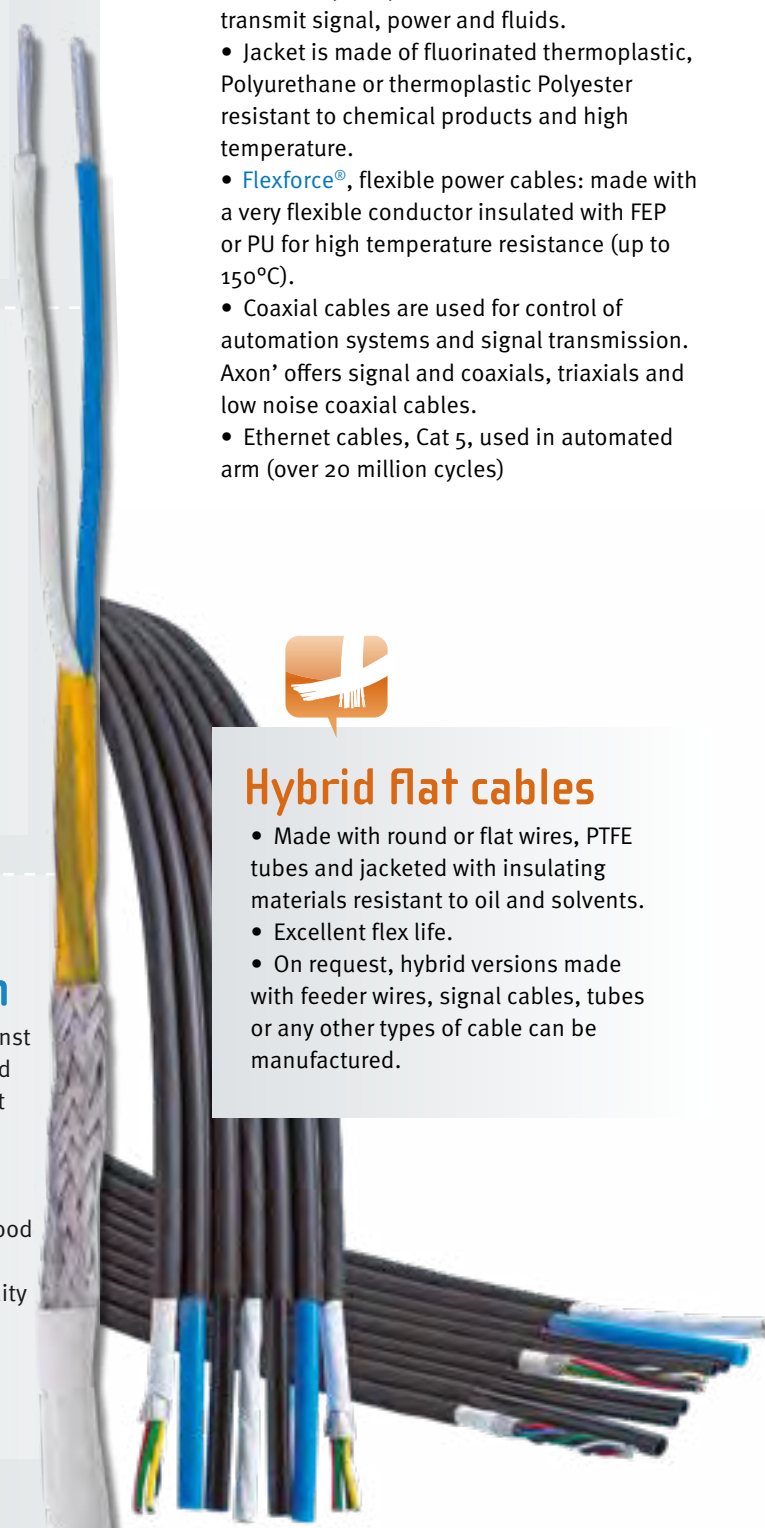
Assembly of hybrid

Composite cables & hybrid round cables

- Different configurations of cables made with twisted pairs, shielded versions, flexible wires, power cables, coaxial cables, microwave cables, Ethernet cables, PTFE tubes.
- Assembly of hydro electrical cables able to transmit signal, power and fluids.
- Jacket is made of fluorinated thermoplastic, Polyurethane or thermoplastic Polyester resistant to chemical products and high temperature.
- **Flexforce®**, flexible power cables: made with a very flexible conductor insulated with FEP or PU for high temperature resistance (up to 150°C).
- Coaxial cables are used for control of automation systems and signal transmission. Axon' offers signal and coaxials, triaxials and low noise coaxial cables.
- Ethernet cables, Cat 5, used in automated arm (over 20 million cycles)

Hybrid flat cables

- Made with round or flat wires, PTFE tubes and jacketed with insulating materials resistant to oil and solvents.
- Excellent flex life.
- On request, hybrid versions made with feeder wires, signal cables, tubes or any other types of cable can be manufactured.





Axon' also offers a range of bulk flat flexible Cables, **Flexlink®**, supplied on the reel for any application where space reduction and flexibility are the most important criteria.

- Available in 1.25, 1.27 mm and 2.54 mm pitches,
- Compatible with the most commonly used crimp contacts.



Axojump™ Flat Flexible Cables

Designed for board-to-board interconnections, **Axojump™** Flat Flexible Cables are made with bare, tin plated or gold plated copper flat conductors. They are insulated with polyester or polyimide tapes.

The termination of FFC is made:

- Either with ZIF/LIF connectors,
- Or by soldering,
- or with crimped contacts.

To meet the different requirements of flex life in dynamic applications, Axon' offers FFC's able to withstand an increasing number of flex cycles (over 70 000 000 of cycles with a bend radius of 10 mm for the ultra-flexible version).



Flextrack® High flex flat cables

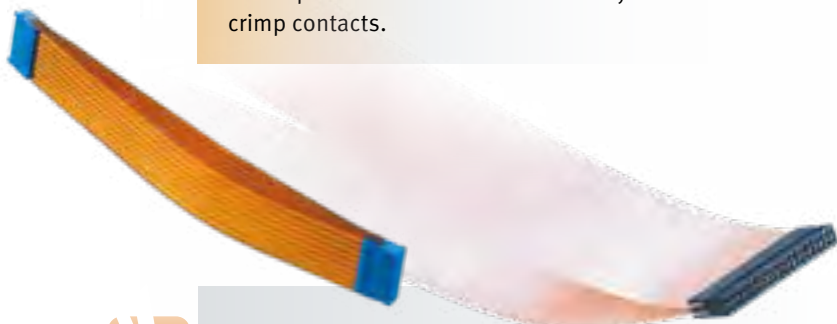
Flextrack® flat cables are composite cables made with wires, PTFE or polyurethane tubing.

Flextrack® flat cables are insulated with a **Celloflon®** film (expanded PTFE) patented by Axon' Cable. The **Celloflon®** has the following advantages:

- High flexible and lightweight cables.
- Low insertion losses.
- No molecular contaminations, no particles, low outgassing, chemical resistance : **Flextrack®** flat cables suit for clean rooms and vacuum environments.
- Temperature range : from -50°C to + 150°C dependent on the insulation.

The flat configuration of the cable allows for:

- Better heat dissipation over round cables when the cable is put onto an equipment which can heat the cable.
- Better flex life performance : over tens of millions of flex cycles.
- Low bend radius (>25mm) : it allows for space saving inside the equipment (depending on the cable thickness).
- Maximum width of the cable: 76 mm.



Manufacture of cable assemblies and harnesses



Expertise in interconnect

Axon' Cable has gained considerable experience in the design and manufacture of cable assemblies and complex harnesses integrating several branches and terminated with different types of terminals and connectors:

- D-Sub connectors,
- Crimped or soldered connectors,
- Miniature connectors (Micro-D, nano-D),
- Circular connectors,
- Special backshells,
- Coaxial connectors,
- Mechanical sub-systems, etc.



Expertise in overmoulding

- Long experience in mould design,
- Robust and tailor-made mechanical protection,
- Strain relief,
- Overmoulding with the following characteristics: absorption of repeated flexes, chemical resistance, shaping, airtightness, provision of fixing points.



Axospiral™ Spiral cables and cords

Axospiral™ spiral cables and cords are mostly used for dynamic automation systems where flexibility and a good extension coefficient are essential.

Their main characteristics are as follows:

- Custom design.
- Jacket made of fluorinated thermoplastic, polyurethane, thermoplastic polyester or special AXON' compounds.
- High or low memory / high or low extension coefficient depending on the application.
- Supplied fully terminated to connectors.



Axowave™ Low loss microwave coaxial cable assemblies

Axon' microwave coaxial assemblies are mainly used as measurement and equipment assemblies. They are mainly used for antennae, surveillance systems and radars.

The high flex microwave assemblies of the [Extraflex](#) series have been specially designed for high repetitive bending as required for dynamic applications (for example, 3 million of cycles for a 30 mm bend radius for a 5 mm diameter coax assembly).



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