CUSTOMER CASE STUDY

Harnessflex® Specialist Conduit Systems protect critical cables and connectors on the toughest terrains For Munro 4x4 Electric Vehicles

Harnessflex
SPECIALIST CONDUIT SYSTEMS

Founded in 2019, Munro Vehicles is a rapidly growing manufacturer of commercial and industrial use 4x4 Electric Vehicles based in East Kilbride, Scotland.

Their vehicles have a robust body frame design and LFP battery architecture, meaning they are purpose-built to withstand the roughest terrains and harshest environments.

The Requirement

As fully electric vehicles, protecting electrical cables and connections on the **Munro** Vehicles in these tough conditions is crucial. This led to the electrical design engineers at Munro to work with and consult the **Harnessflex® Specialist Conduit Systems** team on their cable protection requirements.

Harnessflex® solutions have enabled Munro to equip the new Munro Series M with the most optimum and robust cable protection products.

Equipped with Harnessflex®
EVO™
Electric Vehicle Orange conduit systems.

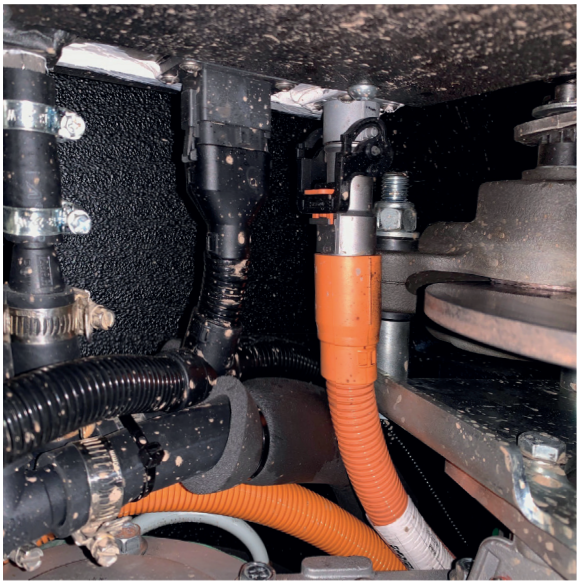
Munro manufacture utility electric vehicles designed for commercial and industrial use. The modular construction enables easy repairs and future upgrades.

Munro Vehicles chose to use Harnessflex® Specialist Conduit Systems throughout their vehicle as all Harnessflex solutions are designed and tested to withstand extreme environmental conditions.

Utilising the latest and most robust solutions in the **Harnessflex®** portfolio for the protection of their high voltage wiring harnesses has increased the reliability of **Munro**'s EVs, offering added strain relief as well as reducing risks from impact, ingress and vibration.

Each area of the vehicle presents its own unique risks and therefore requires its own unique solutions. **Harnessflex®** conduit systems have has a variety of solutions purpose-built for specific EV applications.

One of the key areas at risk is the vital link between cable and connector. Without robust backshell protection, cables running into connectors are often left exposed, leaving them open to intrusion, excessive strain and impact damage - all of which can lead to electrical faults and vehicle failure.

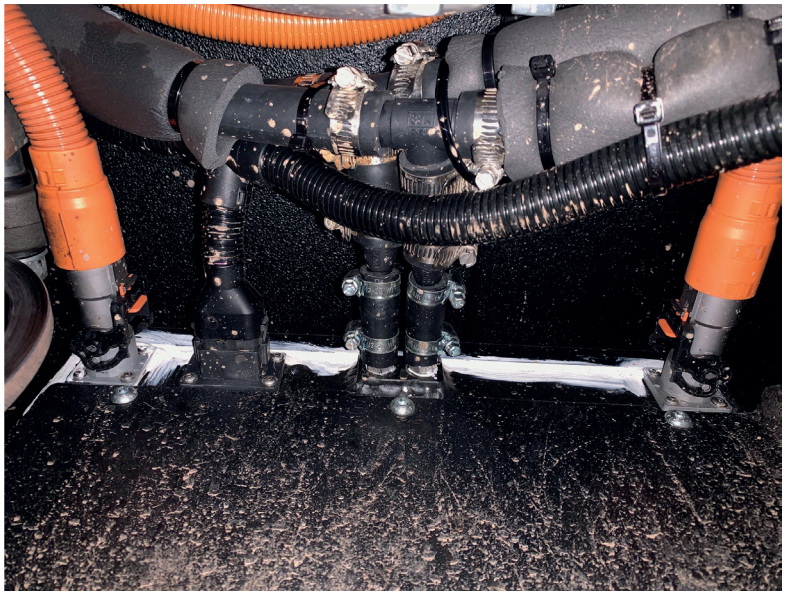


Fitted with Harnessflex®

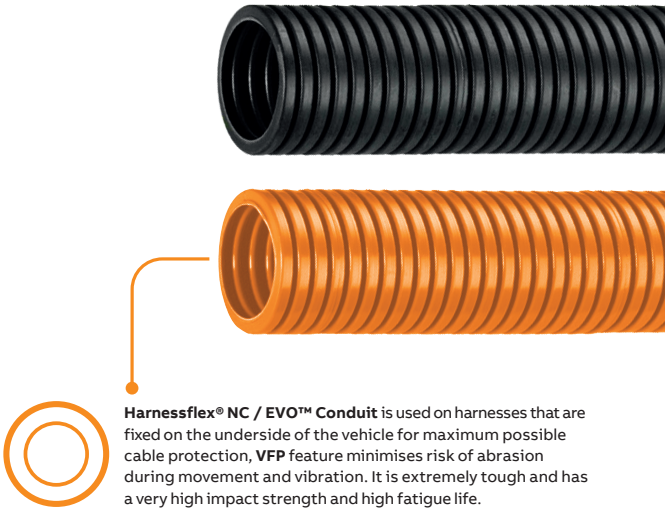
EVO™

Backshells

for safeguarding critical wiring on critical connectors.



ABB's Harnessflex® team has been working closely with the electrical design team at Munro, to consult on cable protection.



Harnessflex® NC / EVO™ Conduit is used on harnesses that are fixed on the underside of the vehicle for maximum possible cable protection, **VFP** feature minimises risk of abrasion during movement and vibration. It is extremely tough and has a very high impact strength and high fatigue life.

The Solution

To prevent this on the **Munro** Vehicles, the **Harnessflex®** team specified the world's first high voltage connector interfaces for **Amphenol Powerlok G2** connectors, which allow for an enhanced and elevated level of robustness and reliability, thanks to added strain relief and protection against impact and liquid ingress.

However, these aren't the only connector interfaces installed on the **Munro** Vehicles. As a must, **Munro** EVs are built to operate in freezing cold climates. To protect critical cabling even in these extreme conditions, **Harnessflex® X-Temp™** backshells are installed on the underside of the vehicle. This provides maximum protection against impact, abrasion and strain, and the PA46 material ensures this is still the case even down to low ambient temperatures.

Throughout the vehicle, there is also a mixture of standard voltage **Harnessflex® NC Conduit** and high voltage **Electric Vehicle Orange (EVO™) Conduit**. The orange conduit is specified to indicate which cables are carrying high voltage currents, while both the black and orange conduits come equipped with Harnessflex's unique **Vibration Friendly Profile (VFP).** This design minimises abrasion on the cable insulation, which can often be caused by extensive movement, flexing and vibration.

In the areas where the risk of ingress is higher, **Harnessflex® Fast-Fit™** Sealed Systems were specified for terminating wiring harnesses into panels and bulkheads. The unique twin-shot, one-piece design of the Fast-Fit sealed fittings offers ingress protection up to IP69K, even while exposed to constant vibration and flexing.

Harnessflex® EVO™ High Voltage Connector Interfaces provide superior mechanical protection. Robust backshell protection on high voltage connectors used in electric ancillaries, DC/DC converters, onboard chargers, high voltage battery packs, hybrid systems, hydrogen fuel cell vehicles, static power systems and more.

High Voltage (HV) cable protection for Amphenol Powerlok and TE HVA280-3 Connectors.

What's Next?

Munro Vehicles chose ABB's **Harnessflex®** solutions because they are proven to protect EV electrical systems in the most demanding environments. As a result, the cable protection systems now used on their electric vehicles are all designed to withstand increased EV running temperatures, abrasion, shock, vibration and potentially corrosive detergents, oils and grease.

Going forward, **Munro** Vehicles and the ABB **Harnessflex®** team continue to closely work together, coming up with new innovative solutions to solve complex applications as the **Munro** Vehicles continue to evolve into the next generation of EVs.

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