



## BUILDING YOUR SOLUTION WITH APD CONNECTORS



### Customization for your critical harsh environment applications.

Connectors are critical for heavy and offroad vehicles, and they are ubiquitous in multiple applications, including engines, gearboxes, cabin-to-chassis interfaces, control boxes, sensors, batteries, selective catalytic reduction, and more. These connectors must be incredibly rugged to endure some of the most demanding environments. However, heavy and off-road vehicle applications sometimes have requirements that can not be met with standard off-the-shelf connector solutions. In these cases, you need something different - something customized.

## HARSH ENVIRONMENTS AND OPERATING CONDITIONS

Heavy and off-road vehicles, such as those shown in Figure 1, require rugged, reliable connector solutions that meet stringent requirements to ensure the integrity of the critical power, signal, and data connectivity. To start with, they must provide reliable sealing against gasoline, diesel, hydraulic fluid, transmission fluid, brake fluid, and lubricants. This requires seal and o-ring materials such as rubbers and silicones that can ensure tightness and function throughout the lifetime of the connector.

Some connectors need to withstand pressure washing which requires IP69K-rated sealing, while others may need to maintain a seal against oil pressure on one side (such as what you might see inside an engine).

Heavy and off-road vehicle connectors must resist the effects of extreme vibration and intense, unpredictable impact loadings. They must also be able to perform when high temperatures, extreme temperature variations, and high pressures are present. Additional considerations may include space constraints, wire harness complexity, and access to connectors for maintenance. Fortunately, there are fully proven connector solutions available that address all of these issues.

### ITT CANNON APD SERIES

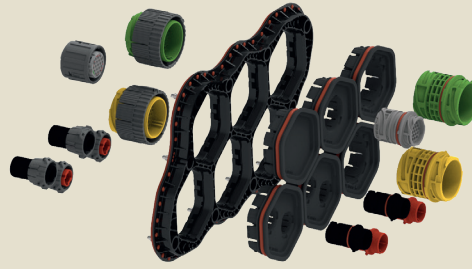
The ITT Cannon APD series meets all the challenges just outlined. They are full plastic, harsh environment connector solutions derived from ISO 15170 and engineered for applications with up to 48V / 500V voltage and up to 240A power. Available solutions range from 1- & 2-way high power to VDE-certified 4-way high voltage solutions to 51-way high-density connectors.



#### Key features of the APD connector series include the following:

- Bayonet coupling with a quick 120° turn
- Reliable sealing up to IP67 / IP69K
- Operating temp: -40°C to +125°C / -40°F to +257°F
- Wire range from AWG 22 to AWG 0
- Available in high power and high voltage variants
- Compact, lightweight, easy to assemble, and ultra-reliable
- Multiple variants: 1, 2, 4, 6/7, 19, 37 and 51-way

Additionally, ITT Cannon offers a highly flexible APD Modular Interface (shown above in Figure 3) that helps manage APD and other connectors. It is ideal for use with heavy and off-road vehicles. This flexible, space-saving design solution helps reduce assembly and installation time while simplifying mating/unmating and reconfiguration processing.



The APD Modular Interface can be figured in a variety of ways.

## CUSTOMIZED SOLUTIONS

Even with the wide variety of connector solutions on the market, off-road and heavy vehicle applications may come with non-standard requirements that cannot be met by off-the-shelf catalog solutions. This is where ITT Cannon can help with deep application knowledge and engineering expertise to develop bespoke solutions for customers across the globe.

### CONNECTOR SOLUTION FOR USE WITHIN DIESEL ENGINES

A German engine manufacturing company came to ITT Cannon requiring a custom receptacle for large diesel engines such as those found in ships and trains. These connectors were used within the engine, so they had to provide excellent sealing against engine oils while maintaining the integrity of the contact in the presence of extreme vibration.

To address the needs of this design, APD 7-way connectors from the standard APD series served as a starting point. They included customizations such as an additional o-ring to improve tightness, vibration resistance, and pressure resistance and a stainless steel spring clip to hold the connector in place. In addition, due to severe space limitations, the overall connector footprint was reduced to ½ the size of the standard connector solution.

### CONNECTOR SOLUTION FOR DOUBLE-CLUTCH GEARBOX

A major agricultural and construction equipment manufacturer required a custom solution for a double-clutch gearbox for tractor transmissions. This gearbox required six different connections: two larger 6-way power connectors based on the APD 19-way interface and 4 smaller APD 4-way-based connectors for signal transmission.

Several customizations were required to meet design specifications. A radical change in the form and shape of the connectors was necessary for them to fit within the unique shape of the gearbox. Two connectors would be highly exposed to gear oil, and all had vibration resistance requirements that were met by two bespoke purple o-rings.

### CONNECTORS FOR A DIESEL PUMP HOUSING

A global Tier 1 supplier for commercial vehicle manufacturers required connectors that would be exposed to diesel exhaust fluid (AdBlue) within a Selective Catalytic Reduction (SCR) pump and contacted ITT Cannon for a custom solution. With APD 37-way as a starting point, as requested by the customer who was familiar with this product, key customization included substantial amendments to the receptacle form factor and size so that the connectors would fit within the customer pump housing and a stainless steel bracket to hold the connector securely in place. The application required 7 of the available 37 contact positions and the unused contact cavities were closed in the production process, ensuring the customer didn't need to seal cavities. ITT Cannon delivered a full cable assembly, incorporating the custom connector, to the customer facility to minimize integration time and complexity.

## CONCLUSION

Exposure to fuels and lubricants, extreme vibration, impact loadings, and similar issues can make it challenging to find the right connector solution for off-road and heavy equipment applications. However, ITT Cannon is a leader in harsh environment, heavy equipment connectors and has an excellent reputation for customizing its APD line of connectors to meet customer requirements. Contact ITT Cannon today and let them become your partner in solving even the most difficult connector challenges.

Connect with your ITT Cannon representative today or visit us at [ittcannon.com](http://ittcannon.com)

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