

# DATA CONNECTIVITY SOLUTIONS

FOR INDUSTRIAL & COMMERCIAL TRANSPORTATION

TERMINALS AND CONNECTORS





TE Connectivity (TE) Industrial & Commercial Transportation is a reliable provider of solutions for even the harshest environment. With a focus on employee expertise and durable products, we deliver the solutions and support our customers can count on.

		
<p><b>2,000+</b> EMPLOYEES</p>	<p><b>10,000+</b> CUSTOMERS</p>	<p><b>20,000+</b> DIFFERENT PARTS</p>

Years ago, tractors, construction equipment, trucks, and boats had simple electrical systems that might have included electrical starting and a basic lighting package. Today, ECUs, joysticks, fuel-efficient engines, LED lights, and applications using high speed data connections are standard equipment. The need to protect sensitive electrical systems from vibration, moisture, dust, dirt, salt, and airborne particles has never been greater. TE Industrial & Commercial Transportation is a leader in supporting today's increasingly complex and sophisticated equipment and applications.

Our comprehensive line of products includes an unparalleled portfolio of rugged sensors, terminals, connectors, relays, and hybrid electric mobility solutions. These solutions are designed to withstand the harshest environmental conditions and to help vehicles operate safer, cleaner, and smarter.

Our solutions adapt to virtually any **harsh environment application**, including:



Motors and Gearboxes



ABS/EBS Brake Units



Telematics Units



Sensors



Wire-To-Wire Coupling at the Chassis



Infotainment Applications

## MARKETS WE SERVE



ON-HIGHWAY



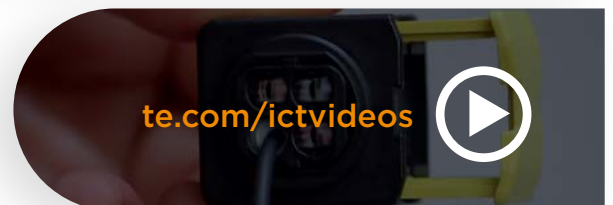
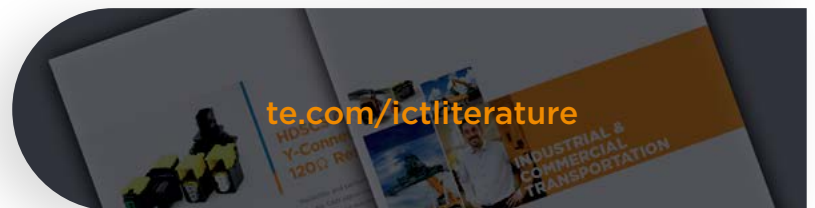
OFF-HIGHWAY



RECREATIONAL  
TRANSPORTATION

## ONLINE RESOURCES

To learn more about TE Connectivity Industrial & Commercial Transportation, its products, and their corresponding documents and videos, please check out the following pages on TE.com:



## PRODUCT INFORMATION CENTRE (PIC)

You can rely on TE Connectivity's PIC team to provide support for answers to your general information or technical questions in an efficient and effective manner.

Connect with our PIC staff at:

[te.com/support](https://te.com/support)

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TE Connectivity (TE) Industrial & Commercial Transportation is dedicated to providing reliable data connectivity products that will support the next generation of connected vehicles. We offer an extensive portfolio of fast, reliable, and responsive harsh environment connectivity solutions.



The industrial and commercial transportation (ICT) market is a diverse one, ranging from the commercial trucks and buses and last-mile delivery vans that populate urban and suburban landscapes to heavy equipment used in agriculture, construction and mining. Automation and Advanced Driver Assistance Systems (ADAS) are poised to unlock the potential of this industry by bringing greater reliability and accuracy to mission-critical work. Sophisticated core networks capture data from devices and systems and transmit it at high speeds with latency throughout the vehicle for processing in one or more on-board electronic control unit (ECUs). Cameras and Radar/Lidar provide 360-degree situational awareness that enhances safety and productivity, while displays provide vehicle dashboards that help drivers optimize operations.

Market participants, including designers and original equipment manufacturers (OEMs), are encountering the following requirements as they seek to enable the next level of automation and safety in ICT vehicles:

- A need for greater bandwidth and faster speeds
- The ability to maintain signal integrity in harsh environments, channel lengths and temperatures specific to the commercial transportation and heavy equipment markets
- A desire to simplify adoption by providing flexible, serviceable and future-proofed product designs

**To determine the best product for your application needs, the following graphs provide profile tradeoffs to aid with connector and cable assembly selection:**

	Devices	Primary ICT Benefit	Example Protocols
<b>enetSEAL+</b> Connector System	Backbone, Telemetry, Camera, Radar, Switches,	leverage existing harness maker speed gains, passthrough, sealed header	100BASE-T1
<b>HDSnet+</b> Connector System	Backbone, Telemetry, Camera, Radar, Switches, Displays	Familiar interface, Hybrid, passthroughs, sealed headers	100/1000BASE-T1, Type A
<b>AMPSEAL 16</b> Connector System	Cameras, Sensors, Antennas, Telemetry	Familiar interface, Speed gains, passthroughs, sealed headers	GMSL II/III, FPD-LINK III/IV
<b>DT High Speed</b> Connector System	Backbone, Telemetry, Camera, Radar, Switches, Displays	Lengths, future proof to multi-Gb, utilizing existing terminals and tools, serviceable	1000BASE-T1, Type A & B MULTIGIG <span style="background-color: #90EE90; padding: 2px;">FUTURE PRODUCT</span>
<b>MATEnet</b> Interconnection System	Backbone, Telemetry, Camera, Radar, Switches,	System Cost, speed gains vs CAN-Bus	100/1000BASE-T1 Type A
<b>MATE-AX</b> Interconnection System	Cameras, Sensors, Antennas, Telemetry	Miniaturization, future proof speed	GMSL II/III, FPD-LINK III/IV
<b>High Speed Data (HSD)</b> Connector System	Cameras, Controllers, Displays, Switches	Commoditized interface, large portfolio	LVDS protocols
<b>FAKRA</b> Connector System	Cameras, Sensors, Antennas, Telemetry	Commoditized interface, large portfolio, Cost	GMSL I/II, FPD-LINK, APIX

# THE VITAL LINK IN YOUR DATA CHAIN

Our comprehensive portfolio of rugged sensors, terminals, connectors, relays, and hybrid and electric mobility solutions are designed to withstand dirt, moisture, salt, and vibration.

	EEC	AMPSEAL 16	enetSEAL+	HDSnet+	M12	FAKRA	HSD	MATE-AX	MATenet	DT High Speed
<b>CHASSIS</b>										
Camera		X	X	X	X			X	X	X
Telemetry Unit	X	X	X						X	X
Antennas		X						X		
Radar/Lidar		X	X	X	X			X	X	X
GPS		X								
Displays		X	X		X					X
Gateway/Switch			X	X	X				X	X
Sealed Controller	X	X	X	X					X	X
Network Backbone 100/1000 Base-T1				X	X				X	X
Sensors	X			X					X	

<b>IN CABIN</b>										
ADAS Controller		X		X		X	X	X	X	
Network Backbone 10-T1 Base-T1			X	X			X		X	
Camera		X	X			X	X	X	X	
Displays		X	X			X	X	X	X	
Telemetry Unit	X	X	X			X	X	X	X	
Dedicating short range Communication (V2X)		X						X		
Antennas		X				X		X		
Radar/Lidar		X	X	X		X		X	X	
Gateway/Switch			X	X					X	
Multimedia/Infotainment		X				X	X	X	X	
Instrument Panel Cluster						X	X	X	X	
Service Port/Consumer Port							X		X	

■ Sealed and Robust Portfolio    ■ Unsealed Portfolio

## VEHICLE TYPE: TRUCKS

The use of intelligent transport systems in freight transport and logistics covers a broad range of applications. With our wide product range in the field of data connectivity we are the right partner.



### APPLICATION AREAS



1. Camera



2. Telemetry Unit



3. Antenna



4. Radar/Lidar



5. Sensors



6. Display



7. Switch/  
Gateway



8. Sealed  
Controller



9. Network  
Backbone



10. Instrument  
Cluster

## VEHICLE TYPE: CONSTRUCTION

Construction Equipment covers a wide range of use cases operating in extremely harsh conditions, all of which require increasing data functionality and speed. For these Data Connectivity challenges, TE is your best partner to support you with the knowledge and the robust product offerings to meet your needs in the now and the future.



### APPLICATION AREAS



1. Camera



2. Telemetry Unit



3. Antenna



4. Radar/Lidar



5. Sensors



6. Display



7. Switch/  
Gateway



8. Sealed  
Controller



9. Network  
Backbone



10. Instrument  
Cluster

## VEHICLE TYPE: AGRICULTURAL

Today, a tractor is more than just a motor-driven agricultural machine. With the help of robust, intelligent connectors from our product portfolio, it can become the hub of a farm's network and a farmer's workspace.



### APPLICATION AREAS



1. Camera



2. Telemetry Unit



3. Antenna



4. Radar/Lidar



5. Sensors



6. Display



7. Switch/  
Gateway



8. Sealed  
Controller



9. Network  
Backbone



10. Instrument  
Cluster



# SEALED AND ROBUST PORTFOLIO

Our specialized products all provide severe vibration and mechanical shock resistance, and some also allow for field maintenance in harsh environments such as those in which commercial vehicles operate. This includes situations involving dust, dirt, and moisture, and temperature ranges of -40°C to +125°C.

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EEC HEADER . . . . .	19
M12 . . . . .	22

# enetSEAL+ ETHERNET CONNECTORS



The new enetSEAL+ connector portfolio from TE Connectivity supports Single Pair 100Mbps Ethernet connections compliant with IEEE 802.3bw 100BASE-T1 communication protocol. This connector system enables the transmit and receive of 100-MB/s data over a single, unshielded twisted-pair (UTP) cable with up to four in-line connections over a 15 m channel length. This connector system provides for robust, wire-to-wire and wire-to-board connections in harsh conditions for infotainment modules, advanced driver assistance systems (ADAS), multifunction displays, telematics, telemetry units, and media access controllers.

The new enetSEAL+ products can be utilized to connect external cameras and sensing modules to improve operator awareness to enhance safety using Ethernet differential signal transmission communication protocols.

## PRODUCT BENEFITS

- Designed to support 100BASE-T1 (IEEE 802.3bw) 100Mb/s data rate over single pair ethernet for up to a 15m channel
- Leverages established MCON 1.2 terminal design with 8 points of contact. Terminal applicator tooling & harness capability is widely available
- Supports 18AWG - 22AWG jacketed UTP cable
- Wide portfolio of robust, sealed products, both wire-to-wire and wire-to-board connections for harsh conditions

## APPLICATIONS



Camera<sup>••</sup>



Displays<sup>••</sup>



Telemetry Unit<sup>••</sup>



Gateway/Switch<sup>••</sup>



Radar/Lidar<sup>••</sup>



Sealed Controller<sup>•</sup>



Network Backbone<sup>•</sup>

<sup>•</sup>Available in chassis <sup>••</sup>Available in cabin

## PRODUCTS

enetSEAL+ 2P Plug  
 enetSEAL+ 2P In-line  
 enetSEAL+ 2P Pass-Thru Adapter  
 180° Headers  
 90° Header

## SPECIFICATIONS

**Application Specification**  
 114-151045

**Product Specification**  
 108-151045

**Product Specification - Terminals**  
 108-18782

**Terminal Extraction Tool**  
 8-1579008-4

**Crimp Tooling**  
 2-1579016-1  
 1579001-6  
 539635-1

## enetSEAL+ CONNECTOR FEATURES



## enetSEAL+ CONNECTOR HOUSINGS

POSITIONS	DESCRIPTION	KEYING / COLOR	PLUG (F) HOUSING	IN-LINE (M) HOUSING	PANEL MOUNT PASS-THRU ADAPTER ASSEMBLED SEAL*
2	enetSEAL+ 100MB CABLE CONNECTOR HOUSINGS	CODE A	2292906-1	2292937-1	2325106-1
		CODE B	2292906-2	2292937-2	Contact TE

POSITIONS	DESCRIPTION	KEYING / COLOR	HEADER 180° ASSEMBLED SEAL*	HEADER 180° W/FLANGE, ASSEMBLED SEAL*	HEADER 180° DISPENSED SEALANT	HEADER 180° W/FLANGE, DISPENSED SEALANT	HEADER 90°
2	enetSEAL+ 100MB PCB SOLDER HEADERS	CODE A	2325102-1	2325102-7	2325103-1	2325103-7	2339032-1
		CODE B	Contact TE	Contact TE	Contact TE	Contact TE	Contact TE

\* Use with mounting clip for locking seal to panel/cover

## enetSEAL+ CONNECTORS ACCESSORIES & TERMINALS

DESCRIPTION	KEYING/COLOR	TE PN
enetSEAL+ 100MB Mounting Clip 4.5mm panel	BROWN	2325098-2
enetSEAL+ 100MB Mounting Clip 3.5mm panel	GREY	2325098-4
enetSEAL+ 100MB Mounting Clip 3.0mm panel	YELLOW	2325098-6
enetSEAL+ Mounting Clip 2.0mm panel	VIOLET	2325098-7
enetSEAL+ Mounting Clip 1.0mm panel	GREEN	2325098-8
WIRE DRESS BACKSHELL	STRAIGHT	2272168-1
2P BLIND PLUG ASSY	CODE A	2345284-1
2P BLIND PLUG ASSY	CODE B	2345284-2
2P BLIND CAP ASSY	UNIVERSAL	2376612-1

DESCRIPTION	WIRE OD	TERMINALS	
		FEMALE	MALE
MCON Terminal 1.2 (Clean Body) Plating: GOLD (Au)	20 AWG 0.5-0.75MM2	1670144-2	1718350-2
MCON 1.2 Terminal (Clean Body) Plating: SILVER (Ag)		1670144-3	1718350-3
MCON 1.2 Terminal (Clean Body) Plating: GOLD (Au)	22 AWG 0.25-0.35MM2	1534594-2	1718348-2
MCON 1.2 Terminal (Clean Body) Plating: SILVER (Ag)		1534594-3	1718348-3

Additional terminal sizes and platings available

# HDSCnet+ CONNECTOR SYSTEM



Today's vehicles utilize new functionalities that help increase productivity, while also driving down the total cost of ownership. Customers are demanding increases in driver assistance, advanced safety features, and automated driving functions. These new functionalities are changing technology and products, resulting in the need for more connectivity. For example Advanced Driver Assistance Systems (ADAS) are realized by a range of sensors (camera, Radar/Lidar). Some of these sensors will need to be positioned on the truck where they will be subject to harsh conditions. All sensors must be interconnected with a network that can transmit high data with low latency throughout the truck, which enables all information to be processed in one or more Electronic Control Units (ECU).

The HDSCnet+ connector system is a rugged, heavy-duty thermoplastic connector combining the established and well known HDSCS connector interface with TE Connectivity's MATEnet interconnection system. This wire-to-wire, wire-to-device, and wire-to-board connector program was designed to meet your reliability and quality needs; it's a modular system, offering flexibility as you can implement multiple hybrid interfaces and scalability by using unshielded or shielded twisted pair. It is made to perform in very tough and harsh environments at the best cost-benefit ratio for these requirements.

## PRODUCT BENEFITS

- Designed to support both 100BASE-T1 (IEEE 802.3bw) 100Mbps and 1000BASE-T1 (IEEE 802.3bp), 1Gb (based on cable selection) data rate over single pair ethernet for up to a 15m channel in both unshielded (UTP) and shielded (STP) twisted pair cable
- Hybrid signal/power connector provides design flexibility and extensive product offering enables scalability for future vehicle design needs
- Couples the performance of MATEnet terminal system with the proven performance in the harshest conditions of the HDSCS connector system
- Wire to wire, bulkhead mount and wire to board options

## APPLICATIONS



Camera\*



Radar/Lidar\*\*



Gateway/Switch\*\*



Sealed Controller\*



Network Backbone\*\*



Sensors\*



ADAS Controller\*



Multimedia/Infotainment\*

\* Available in chassis • Available in cabin

## PRODUCTS

### Receptacle Housing

1+6, 1+12, 2+6, 3+0

### Tab Housing

1+6, 1+12, 2+6, 3+0

### Tab Housing w/flange

2+6

## SPECIFICATIONS

### Application Specification

114-94625

### Product Specification

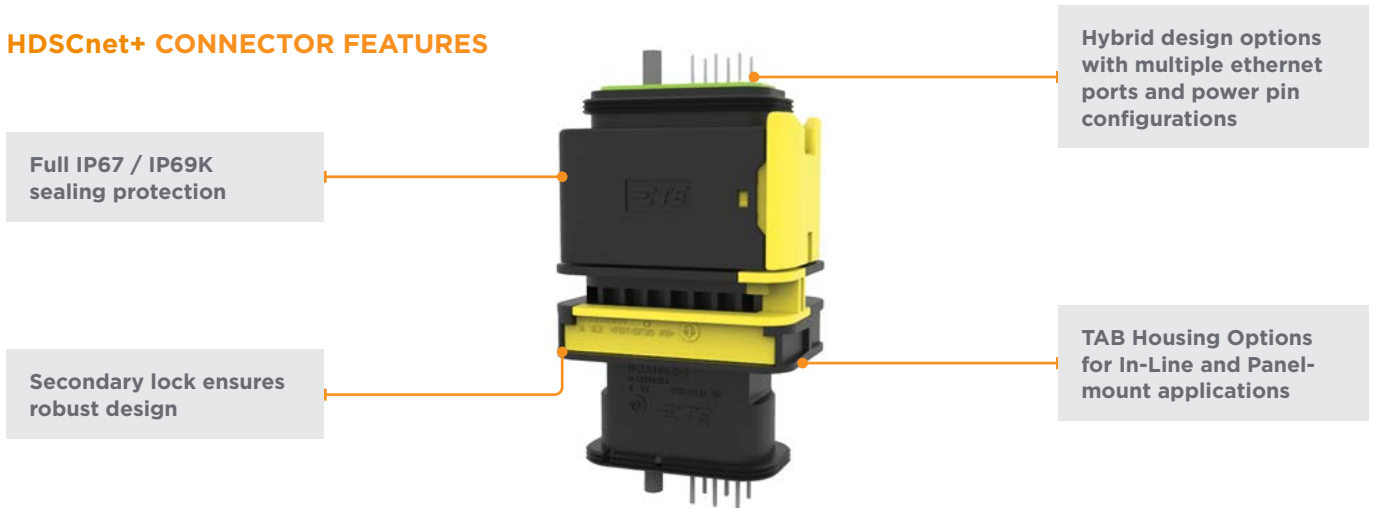
108-94725

### Product Specification

MATenet Connector System

108-94568

## HDSCnet+ CONNECTOR FEATURES



## GROUP D SIZE HDSCNET+ CONNECTOR HOUSINGS

POSITIONS	DESCRIPTION	KEYING / COLOR	RECEPTACLE (F) HOUSING	TAB (M) HOUSING W/O FLANGE
1+6	GRP D SIZED HDSCnet+ HOUSINGS (1x) MATenet ethernet connection (6x) 1.5 MCP terminal	CODE A / Black	9-2331355-1	9-2334935-1
		CODE B / Grey	9-2331355-2	9-2334935-2
		CODE C / Green	9-2331355-3	9-2334935-3
		CODE D / Blue	9-2331355-4	9-2334935-4

## GROUP D SIZE HDSCNET+ CONNECTOR ACCESSORIES

DESCRIPTION	KEYING/COLOR	SINGLE WIRE SEAL (SWS)	SWS COVER
Seal for Cable OD: 3.2-4.0mm	Green	9-2334941-1	-
Seal Cover Cable OD: 3.2mm	Black	-	9-2334942-1
Seal Cover Cable OD: 4.0mm	Blue	-	9-2334942-2

## GROUP E SIZE HDSCNET+ CONNECTOR HOUSINGS

POSITIONS	DESCRIPTION	KEYING / COLOR	RECEPTACLE (F) HOUSING	TAB HOUSINGS	
				W/FLANGE (PANEL MOUNT)	W/O FLANGE
1+12	(1x) MATenet ethernet connection (12x) 1.5MCP terminal	Black	9-2348795-1	Contact TE	9-2348792-1
		Grey	9-2348795-2		9-2348792-2
2+6	(2x) MATenet ethernet connection (6x) 1.5MCP terminal	Black	9-2348786-1	9-2348789-1	9-2348782-1
		Grey	9-2348786-2	9-2348789-2	9-2348782-2
3+0	(3x) MATenet ethernet connection	Black	9-2348776-1	Contact TE	9-2348772-1
		Grey	9-2348776-2		9-2348772-2

## GROUP E SIZE HDSCNET+ CONNECTOR ACCESSORIES

DESCRIPTION	KEYING/COLOR	SINGLE WIRE SEAL (SWS)	SWS COVER
Seal for Cable OD: 3.1-4.9mm	White	2348771-1	-
Seal for Cable OD: 5.0-6.2mm	Orange	2348771-2	-
Seal Cover Cable OD: 3.2mm	Black	-	2348770-1
Seal Cover Cable OD: 4.0mm	Black	-	2348770-2
Seal Cover Cable OD: 6.0mm	Black	-	2348770-3

Backshells, sealed connector covers, cavity plugs are available as standard HDSCS catalog items.

# AMPSEAL 16 CONNECTOR WITH COAXIAL TERMINALS



With the increasing demands on communication channels within a commercial vehicle, designers are starting to request also improved solutions for coax connections. Applications at the chassis of industrial and commercial vehicles have a higher demand for environmental sealing and a need for stronger resistance to vibrations.

TE Connectivity's new environmentally sealed AMPSEAL 16 connector with coaxial terminals is designed specifically for your coaxial connection needs in heavy-duty off-road and on-highway applications. This rugged four position coax connector features a locking latch for mating and utilizes TE's established AMPSEAL 16 connector style thermoplastic housing technology. The connector accepts TE's robust MATE-AX automotive coax terminals and delivers superior analog signal and digital data transmission performance. Using MATE-AX terminals for sealed and unsealed applications, allows for a one-time terminal validation to meet all application needs. The proven AMPSEAL 16 connector family seal design reduces the chance of seal damage during the terminal assembly process and eliminate the need of costly heat-shrink, tubing, making AMPSEAL 16 connectors with coax terminals a cost-efficient solution for sealed coax applications.

## PRODUCT BENEFITS

- Designed specifically for coaxial connection needs in heavy-duty off-road and on-highway applications
- Supports GMSL2 performance requirements up to 6GHz with MATE-AX miniaturized coax terminals and RTK031 or RG174 cable
- Full IP Protection IP67 / IP69K
- Sealed coaxial interface using historically proven AMPSEAL 16 connector system

## APPLICATIONS



Camera\*



Telemetry Unit\*\*



Antenna\*



Radar/Lidar\*\*



GPS\*



Displays\*\*



Sealed Controller\*



ADAS Controller\*



V2X\*



Multimedia/Infotainment\*

\*Available in chassis \*\*Available in cabin

## PRODUCTS

### 4P Female Plug Housing

See product table below

### 4P Male In-Line Housing

See product table below

### 4P Male Bulkhead Housing

See product table below

### 4P 180° Header

See product table below

### 1P Female Plug Housing

See product table below

### 1P 180° Header

See product table below

## SPECIFICATIONS

### Application Specification

114-94667

### Product Specification

108-94799

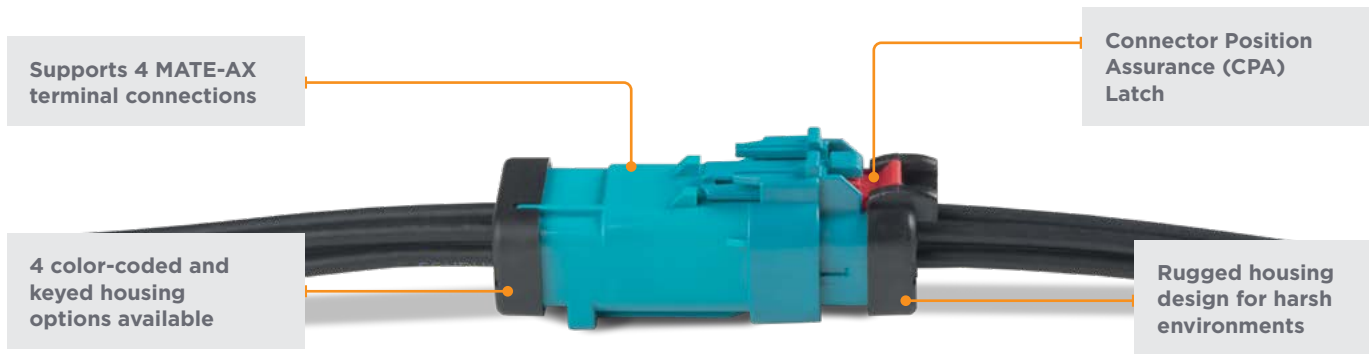
### Product Specification - Terminals

108-94515

### Terminal Extraction Tool

776441-1

## AMPSEAL 16 CONNECTOR FEATURES



## AMPSEAL 16 CONNECTOR HOUSINGS

TYPE		HOUSING			PCB MOUNT
POSITIONS	KEYING	PLUG (F)	IN-LINE (M)	IN-LINE (M) PANEL MOUNT	HEADER 180°
1	A	2355843-1	Contact TE*	-	2355844-1
4	A	2338212-1	2338211-1	Contact TE*	2356408-1

## AMPSEAL 16 CONNECTOR ACCESSORIES

POSITIONS	TE PN	DESCRIPTION
4	2292799-1	Backshell Kit - Smooth
	2292862-1	Backshell Kit - Smooth
	776363-1	SEALING PLUG (for unused cavities)



## EEC HEADER

Customers need an off-the-shelf enclosure which can be used to develop custom electronics and controllers. Existing solutions offer robust signal and power interfaces, but there is limited availability of offerings with coaxial interfaces. Adding a coax interface, likely would require precision milling, adding cost and processing challenges.

TE has developed a variant of its popular EEC enclosure to include TNC (Threaded Neill Concelman) and SMA (Sub-Miniature-A) interfaces. These interfaces are on a cable which can conveniently be connected to any part of the PCB to maximize PCB design layout and tracing of the coaxial signal.

## TNC / SMA

TE's vast RF coax portfolio has supported many applications across multiple industries for many years. TE's RF connectors and cable assemblies provide you with solutions for your RF connection requirements for legacy Coax solutions which have been used in a number of commercial vehicle applications for many years. While this section only highlights few TNC and SMA parts, TE's portfolio is much broader and can support your specific application needs.

### PRODUCT BENEFITS

- TE EEC solution reduces design time and investment for new projects by offering a fully sealed signal and power connector interface with a DEUTSCH sealed enclosure
- Enables custom telemetry functionality with sealed TNC/SMA coaxial interface option
- 12 position DEUTSCH PCB mount interface with 4 keying options available completes the sealed header interface

### APPLICATIONS



Telemetry Unit\*



Sensors\*



Sealed Controller\*

\*Available in chassis

## PRODUCTS

### TNC / DTM EEC Header

Part Number: 2333580-X

DEUTSCH Header Alias: DTM13-12X-R019

### SMA / DTM EEC Header

Part Number: 2333581-X

DEUTSCH Header Alias: DTM13-12X-R020

## SPECIFICATIONS

### Product Specifications

108-151090

### Coax Cable Specifications

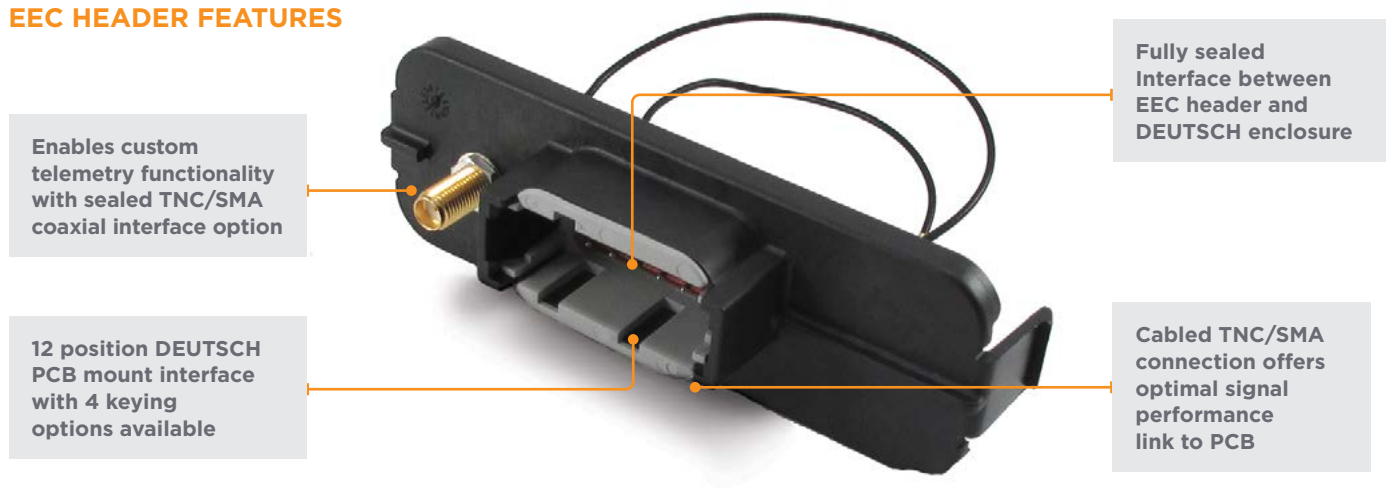
C2016456

### Box Drawing & Recommended

#### PCB Layout:

EEC-325X4A-EEC-325X4B

## EEC HEADER FEATURES



TE PART NUMBER	DEUTSCH REFERENCE PN	PART DESCRIPTION	MATES W/ DEUTSCH ENCLOSURES
2333580-X	DTM13-12PX-R019	EEC Header, with TNC coax interface, Key X	EEC-325X4A, EEC-325X4A-E016
2333581-X	DTM13-12PX-R020	EEC Header, with SMA coax interface, Key X	
EEC-325X4A		Enclosure with vent hole, black	
EEC-325X4A-E016		Enclosure with vent hole, clear	

\* xxx-1 Key A / xxx-2 Key B / xxx-3 Key C /xxx-4 Key D - further codings on request

## TNC AND SMA AVAILABLE PRODUCTS

- TNC & SMA interfaces
- Plug & panel bulkheads/passthroughs & board PCB
- Sealed & Unsealed
- Crimp style contacts

## PRODUCT BENEFITS

- Wide portfolio
- Standardized interfaces
- Historical reliability
- 50ohm & 75ohm versions
- TNC: Up to 7 GHz operating frequencies
- SMA: Up to 12.4 GHz operating frequencies
- Sealing options available

**NOTE: Contact your TE representative for more information on the TNC and SMA Products.**



## M12

The Commercial Vehicle and Industrial Equipment market is undergoing a transformation requiring more devices, data, information to be passed through networks and to users. These applications are enabling improvements in safety, productivity, vehicle networks, ADAS and infotainment.

These new requirements are bringing a new challenge to design engineers - who need to ensure that vehicles perform and stand the test of time in the harshest applications, and will future proof vehicle networks for the applications which we don't yet see today, but know are coming.

M12 Products provide robust connections for commonly used data protocols including several ethernet (100/1000/10G Base-Tx) and several CAN related protocols (NEMA 2K). It has historically been used in marine, agriculture and construction applications. TE's M12 products provide an excellent way to connect to those existing device and sensor interfaces. TE offers industrial ethernet patch cables with over molded M12 connectors. Customized cable assemblies offer a solution for your specific needs in different lengths, temperatures or flexibility.

### PRODUCT BENEFITS

- M12 Products provide robust connections for commonly used data protocols
- Connect existing device and sensor interfaces
- Customized cable assemblies offer a solution for your specific needs

### APPLICATIONS



Camera\*



Gateway/Switch\*



Radar/Lidar\*



Network Backbone\*



Displays\*

\*Available in chassis

## PRODUCTS

**A key:** for sensors & CAN-Bus applications

**D key:** for 2 twisted pair ethernet

**X key:** for 4 twisted pair ethernet

## SPECIFICATIONS

**Application Specifications  
Cable Assemblies and Components**

114-32127, 114-137008, 114-137144

**Product Specifications**

108-3631, 108-19483,  
108-106140, 108-137008

**Brochure**

1-1773701-8

## M12 FEATURES



## PLUGS AND HEADERS

CODE	DESCRIPTION	TYPE	NEW P/N	POLES
A	M12, male, A code, rear mount, PCB, R/A, unshielded	Header	T4144015051-000	5
	M12, male, A code, rear mount, PCB, R/A, shielded	Header	T4144035051-000	5
	M12, male, A code, rear mount, PCB, 180, shielded	Header	T4130012051-000	5
	M12, female, A code, rear mount, PCB, R/A, unshielded	Header	T4145015051-001	5
	M12, female, A code, rear mount, PCB, R/A, shielded	Header	T4145035051-001	5
	M12, female, A code, rear mount, PCB, 180, shielded	Header	T4131012051-000	5
	Screw, A code plug, unshielded, PG7, F	Plug, screw terminated	T4110001051-000	5
	Screw, A code plug, unshielded, PG9, F	Plug, screw terminated	T4110002051-000	5
	Screw, A code plug, shielded, PG7, F	Plug, screw terminated	T4110011051-000	5
	Screw, A code plug, shielded, PG9, F	Plug, screw terminated	T4110012051-000	5
	Screw, A code plug, unshielded, PG7, M	Plug, screw terminated	T4111001051-000	5
	Screw, A code plug, unshielded, PG9, M	Plug, screw terminated	T4111002051-000	5
	Screw, A code plug, shielded, PG7, M	Plug, screw terminated	T4111011051-000	5
	Screw, A code plug, shielded, PG9, M	Plug, screw terminated	T4111012051-000	5

## PLUGS AND HEADERS (CONTINUED)

CODE	DESCRIPTION	TYPE	NEW P/N	POLES
D	M12, male, D code, rear mount, PCB, R/A, unshielded	Header	T4144515041-000	4
	M12, male, D code, rear mount, PCB, R/A, shielded	Header	T4144535041-000	4
	M12, male, D code, rear mount, PCB, 180, shielded	Header	T4140512041-000	4
	M12, female, D code, rear mount, PCB, R/A, unshielded	Header	T4145515041-001	4
	M12, female, D code, rear mount, PCB, R/A, shielded	Header	T4145535041-001	4
	M12, female, D code, rear mount, PCB, 180, shielded	Header	T4141512041-000	4
	Crimp, D code plug, M	Plug, Crimp terminated	1-2823445-1	4
	Screw, D code plug, unshielded, PG7, F	Plug, screw terminated	T4110501041-000	4
	Screw, D code plug, unshielded, PG9, F	Plug, screw terminated	T4110502041-000	4
	Screw, D code plug, shielded, PG7, F	Plug, screw terminated	T4110511041-000	4
	Screw, D code plug, shielded, PG9, F	Plug, screw terminated	T4110512041-000	4
	Screw, D code plug, unshielded, PG7, M	Plug, screw terminated	T4111501041-000	4
	Screw, D code plug, unshielded, PG9, M	Plug, screw terminated	T4111502041-000	4
	Screw, D code plug, shielded, PG7, M	Plug, screw terminated	T4111511041-000	4
	Screw, D code plug, shielded, PG9, M	Plug, screw terminated	T4111512041-000	4
X	Crimp, X code plug, 8.1mm, 8.4mm, 8.8mm OD, M	Plug, Crimp terminated	1-2315714-x	8
	M12 X-CODE CAT6A	Plug, IDC terminated	2327989-1	8

## CABLE ASSEMBLIES

CODE	DESCRIPTION	LENGTH (PART SUFFIX)	NEW P/N	POLES
A	M12 FS 5P PUR CABLE **M	-001: 0.5m	T4151320005	5
	M12 FS 5P PUR CABLE **M SH	-002: 1.0m	T4161320005	5
	M12 MS 5P PUR CABLE **M	-003: 1.5m	T4151120005	5
	M12 MS 5P PUR CABLE **M SH	-004: 3.0m	T4161120005	5
	M12 FR 5P PUR CABLE **M	-005: 5.0m	T4151420005	5
	M12 FR 5P PUR CABLE **M SH	-006: 7.0m	T4161420005	5
D	M12D4-MS-PUR TYPE C GREEN-**M	-007: 10.0M	TAD14145101	4
	M12D4-MR-PUR TYPE C GREEN- **M		TAD14245101	4
X	X code, M12, 180, M/M, **m		X-2317142-X	8
	X code,		2241021-X	8



# UNSEALED PORTFOLIO

Our portfolio of unsealed connectors provides connectivity solutions for automotive infotainment modules, cameras, consumer connectors and display units according to your needs. The connector product portfolio can be used in combination with various protocols in sealed applications.

MATenet Interconnection System .....	25
MATE-AX Interconnection System .....	27
HSD Communication Connectors .....	29
FAKRA Connector System .....	31

# MATEnet INTERCONNECTION SYSTEM



TE Connectivity's (TE's) MATEnet modular and scalable connectors are designed for the harsh automotive environment and can transmit up to 1 Gbps according to IEEE 100BASE-T1 and 1000BASE-T1 Standards. TE Connectivity's MATEnet interconnection system contributes to modern E/E architectures and answers today's and tomorrow's requirements of vehicle connectivity. MATEnet interconnection system was specifically developed for IEEE Automotive Ethernet networks and set a standard for unshielded cabling. It relies on automotive-grade, miniaturized, robust and proven interconnection technology and has successfully passed severe testing and validation.

## PRODUCT BENEFITS

- Can transmit up to 1 Gbps according to Automotive Ethernet standards IEEE 100BASE-T1 and 1000BASE-T1
- Modular and scalable connectors for easy integration into existing and new connectivity interfaces
- Compatible with Unshielded Twisted Pair (UTP) and Shielded Twisted Pair (STP) cable
- Contributes to modern E/E architectures and answers today's and tomorrow's requirements of vehicle connectivity

## APPLICATIONS



Camera<sup>••</sup>



Sensors<sup>•</sup>



Telemetry Unit<sup>••</sup>



ADAS Controller<sup>•</sup>



Radar/Lidar<sup>••</sup>



Displays<sup>•</sup>



Gateway/Switch<sup>••</sup>



Multimedia/Infotainment<sup>•</sup>



Sealed Controller<sup>•</sup>



Instrument Cluster<sup>•</sup>



Network Backbone<sup>••</sup>



Service Port<sup>•</sup>

<sup>•</sup> Available in chassis <sup>••</sup> Available in cabin

## PRODUCTS

See product table below

## SPECIFICATIONS

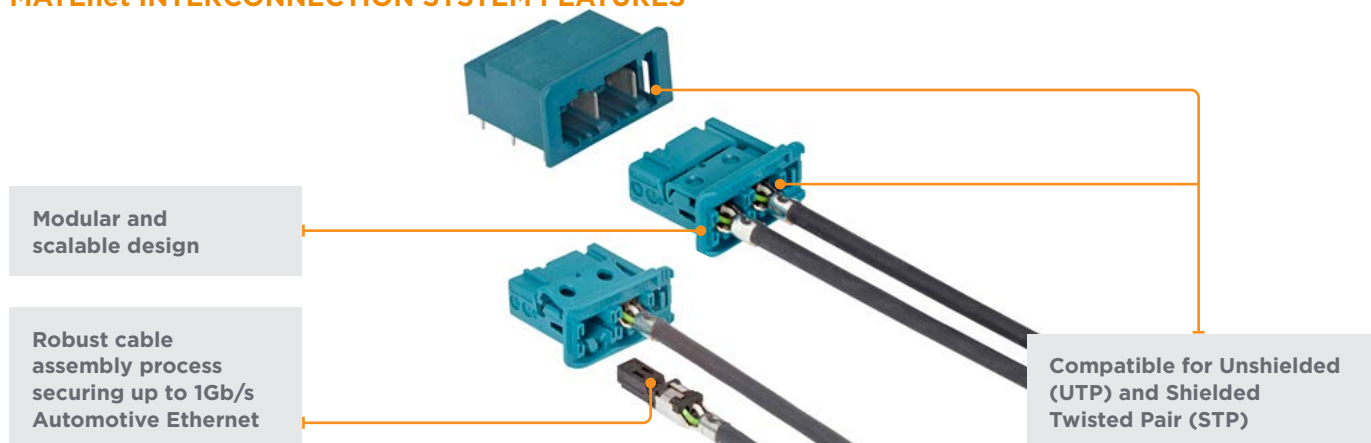
**Application Specifications Cable Assemblies and Components**  
114-94431

**Application Specification Header**  
114-94448

**Product Specification**  
108-94568

**Brochure**  
1-1773941-1

## MATenet INTERCONNECTION SYSTEM FEATURES



PART NUMBER	PART DESCRIPTION	SAMPLE AVAILABLE (YES/NO/PLANNED)
0-2304372-1/-2/-3*	1 port Header	Yes
0-2302461-1/-2/-3*	1 port Inline Coupler	Yes
0-2305987-1/-2/-3*	2 port Header	Yes
0-2305390-1/-2/-3*	5 port Header	Yes
0-1802162-1/-2/-3*	1 port sealed Header	Yes
0-2302454-1/-2/-3*	1 port Frame UTP	Yes
0-2302510-1/-2/-3*	1 port Frame STP	Yes
0-2305974-1/-2/-3*	2 port Frame UTP	Yes
0-2307961-1/-2/-3*	2 port Frame STP	Yes
0-2302455-1/-2/-3*	5 port Frame UTP	Yes
0-2302515-1/-2/-3*	5 port Frame STP	Yes
2317303-1	6 port Frame Dual Row UTP	Yes
0-1802105-1/-2/-3*	1 port sealed Frame UTP	Yes
0-1802113-1/-2/-3*	1 port sealed Frame STP	Yes

\* xxx-1 Code A / xxx-2 Code B / xxx-3 Code C - further codings on request

Custom lengths ordered by request. Please contact TE for cable assembly options.

# MATE-AX INTERCONNECTION SYSTEM



TE Connectivity's MATE-AX miniaturized terminals, housings and headers are designed for the harsh automotive environment and can transmit easily 9 GHz and even more (20 GHz) with optimized design. The MATE-AX interconnection system contributes to modern E/E architectures and answers today's and tomorrow's requirements of vehicle connectivity. MATE-AX interconnection system was specifically developed for the next generation of coax applications and set a standard for future coax system. The design is based on TE's automotive-grade experience on miniaturized, robustness interconnection technology.

## PRODUCT BENEFITS

- Higher frequency rate - applicable for 9 GHz and more with optimized designs
- Flexible integration into existing coax-architecture by supporting commercial vehicle graded cables similar to RTK-031 and RG174
- Huge space saving due to miniaturized design
- Cost efficient - design and process perfectly aligned for commercial vehicle coaxial needs

## APPLICATIONS



Camera<sup>••</sup>



Telemetry Unit<sup>•</sup>



Antenna<sup>••</sup>



V2X<sup>•</sup>



Radar/Lidar<sup>••</sup>



Multimedia/Infotainment<sup>•</sup>



ADAS Controller<sup>•</sup>



Instrument Cluster<sup>•</sup>



Displays<sup>•</sup>

<sup>•</sup>Available in chassis <sup>••</sup>Available in cabin

## PRODUCTS

See product table below

## SPECIFICATIONS

### Application Specifications

114-94443, 114-94571, 114-94572,  
114-94443, 114-94468 and 114-94413

### Brochure

1-1773981-7

### Product Specifications

108-94544, 108-94515 and 108-94709

## MATE-AX INTERCONNECTION SYSTEM FEATURES



PART NUMBER	PART DESCRIPTION	SAMPLE AVAILABLE (YES/NO/PLANNED)
0-/ 1-2310558-1/-2/-9*	1 pos. Header	Yes
0-/ 1-2306368-1/-2/-9*	2 pos. Header	Yes
0-/ 1-2304168-1/-2/-9*	4 pos. Header	Yes
0-/ 1-2310137-1/-2/-9*	1 pos. Plug	Yes
0-2306868-1/-2/-9*	2 pos. Plug	Yes
0-2298721-1/-2/-9*	4 pos. Plug	Yes
0-/ 1-2310138-1/-2/-9*	1 pos. Jack	Yes
0-2306498-1/-2/-9*	2 pos. Jack	Yes
0-2298724-1/-2/-9*	4 pos. Jack	Yes
0-2312193-1/-2/-9*	1 pos. Sealed Jack	
0-2312192-1/-2/-9*	1 pos. Sealed Plug	
0-2354440-1/-2/-9*	4 pos. Sealed Jack	
0-2354439-1/-2/-9*	4 pos. Sealed Plug	

\* xxx-1 Code A / xxx-2 Code B / xxx-9 Code Z. Refer C-Drawings for further codings

\* Housing and Headers: Serie: 0- or 1- / Pilot: 6- / 7- / 8- / 9-

\* Headers: Latch position available in 12h and 6h

\* CPA and clip slot variant on request

■ Available late 2020.

**Custom lengths ordered by request. Please contact TE for cable assembly options.**

# HIGH SPEED DATA COMMUNICATION CONNECTORS



TE Connectivity's High Speed Data (HSD) Communication Connector portfolio is designed for high speed data transmission to meet automotive requirements up to 3Gbps. This highly robust and fully shielded system is designed to provide high-speed connectivity solutions for applications such as in-vehicle infotainment modules, cameras, consumer ports and display units. TE's HSD Connectors are designed for differential data transmission that offers excellent Electromagnetic Interference (EMI) performance. EMI emissions are minimal from a differential pair, as compared to single ended systems, due to the positive and negative signals effectively canceling each other out. Similarly, incoming noise will effect both conductors equally, which can easily be removed by the receiver

## PRODUCT BENEFITS

- Full range of connectors for unsealed and sealed applications
- High level of process automation and global manufacturing footprint
- Compatible with the German AK HSD interface
- Impedance optimized HF Design supported by stamped signal pin profiles
- Fully automated diecast header production

## APPLICATIONS



ADAS Controller\*



Telemetry Unit\*



Network Backbone\*



Multimedia/Infotainment\*



Camera\*



Instrument Cluster\*



Displays\*



Service Port\*

\*Available in cabin

## PRODUCTS

See product table below

## SPECIFICATIONS

### Application Specifications

114-94381, 114-18867, 114-94117  
and 114-94058

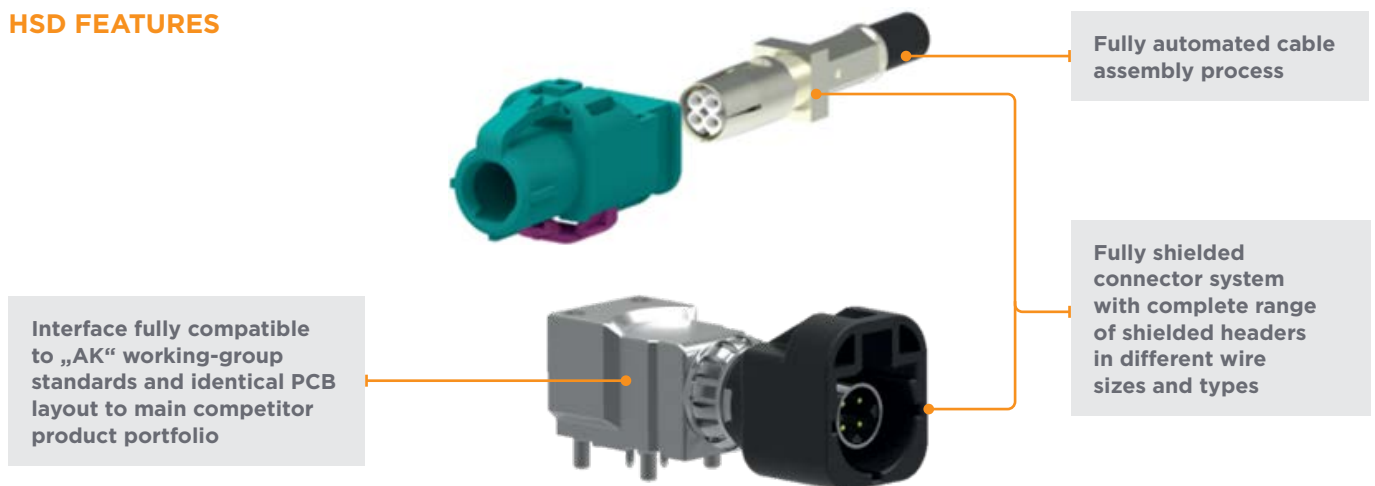
### Product Specifications

108-94479, 108-94331, 108-94433  
and 108-94434

### Brochure

1-1773982-3

## HSD FEATURES



PART NUMBER	PART DESCRIPTION	SAMPLE AVAILABLE (YES/NO/PLANNED)
X-1823898-X	Standard 180° Plug	Yes
X-1823905-X	Standard 180° Jack	Yes
X-2208145-X	Standard 90° Plug	Yes
X-1823853-X	Standard Sealed 180° Plug	Yes
X-1823857-X	Standard Sealed 180° Jack	Yes
X-2324148-X	Standard Sealed 90° Plug	Yes
X-2324148-X	Dual 180° Plug 12.7mm	Yes
X-2236891-X	Dual 180° Plug 8mm	Yes
X-2236888-X	Dual 90° Plug 12.7mm	Yes
X-2177694-X	Hybrid (HSD + MQS) 180° + 2 MQS Plug	Yes
X-2177954-X	Hybrid (HSD + MQS) 180° + 2 MQS Jack	Yes
X-2236326-X	Hybrid (HSD + MQS) 90° + 2 MQS Plug	Yes
X-2286546-X	Standard 90° Diecast Header	Yes
X-2286550-X	Hybrid (HSD + MQS) 90° + 2 MQS Header	Yes
X-2286797-X	Shielded 90° Diecast Header	Yes
2236886-X	Standard 180° Diecast Header	Yes

Custom lengths ordered by request. Please contact TE for cable assembly options.

# FAKRA CONNECTOR SYSTEM



The industrial and commercial transportation market is experiencing tremendous growth in telematics and multimedia applications that require high frequency transmission systems. Today's equipment features high-tech GPS, digital satellite radios, mobile phone connectivity, and mobile television systems. The FAKRA connector system meets the growing demand for infotainment applications using coaxial wiring products.

## PRODUCT BENEFITS

- Compliant with USCAR 18 Interface requirements
- Wide portfolio supporting all your design & application needs
- Supporting bandwidths to address all future application requirements up to 6 GHz (FAKRA Automated)
- Fakra Automated optimized for automated manufacturing

## APPLICATIONS



ADAS Controller\*



Antenna\*



Camera\*



Radar/Lidar\*



Displays\*



Multimedia/Infotainment\*



Telemetry Unit\*



Instrument Cluster\*

\*Available in cabin

## PRODUCTS

See product table below

## SPECIFICATIONS

### Full Line Catalog

1308073-3

### Brochure

2-1773982-4

### Product Specification

108-94089

### Product Specifications

#### Automated Header

108-18079, 108-132071 and 108-32058

#### Application Specification

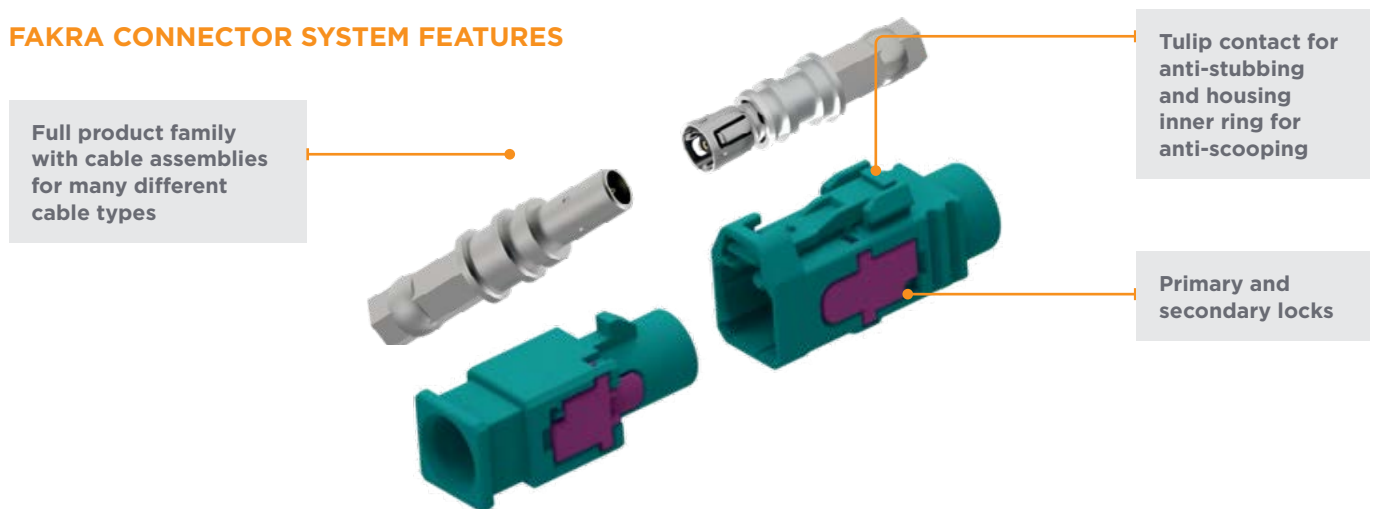
114-18623

#### Application Specifications

##### Automated Header

114-32108

## FAKRA CONNECTOR SYSTEM FEATURES



PART NUMBER	PART DESCRIPTION	SAMPLE AVAILABLE (YES/NO/PLANNED)
2098287-1	FAKRA Gen4 Male Plug Kit RTK031	Yes
2098288-1	FAKRA Gen4 Female Housing Kit RTK031	Yes
2035049-1	FAKRA Gen4 2 Pos	Yes
1719261-2	FAKRA II Right-Angle	Yes
1452584-1	FAKRA II Female Housing Kit	Yes
1452480-1	FAKRA II 2 Pos	Yes
2287903-1	FAKRA II Board Right-Angle	Yes
X-2203452-X	FAKRA Automated Header 1 pos 180°	Yes
X-2291392-X	FAKRA Automated Header 1 pos 90°	Yes
X-2209201-X	FAKRA Automated Header 1 pos 90° with shield	Yes
X-2287906-X	FAKRA Automated Header 1 pos 90° Edge mount	Yes
X-2272788-X	FAKRA Automated Header 2 pos 180°	Yes
X-2287923-X	FAKRA Automated Header 2 pos 180° edge mount	Yes

xxx-1 Code A / xxx-2 Code B / refer customer drawings for further codings

## CONTACT KIT PART NUMBERS FOR RTK 031 CABLES

DESCRIPTION	GEN4 P/N	FAKRA II P/N
180° male contact	1438890-7*	1488171-2*
180° female contact	1438896-2*	1488175-2*
90° female contact	1438896-2**	1719252-1

\* Representative part numbers, for other configurations and acceptable cable types, see full line catalog.

\*\* FAKRA Gen4 uses same contact part number for 180° and 90° housings.


















# CABLE ASSEMBLY FOR HARSH ENVIRONMENTS

As data transmission frequencies increase, cable assembly termination quality and process become more technical and critical. TE's cable assembly capabilities supports these critical processes for your prototyping, pre-production, and production needs.

Our specialized products provide severe vibration and mechanical shock resistance and allow field maintenance in harsh environments such as those in which commercial vehicles operate. This includes situations involving dust, dirt, and moisture, and temperature ranges of -40° C to +125° C.

**Info:** Contact your TE representative of custom length cable assemblies. Different housings like mentioned in the product sections above for each off-the-shelf cable assembly types can be ordered separately.

They can adapt to virtually any use, including:

- |   |  |  |
|---|--|--|
| <br><b>ADAS Controller</b>         | <br><b>Antenna</b>          | <br><b>Camera</b>             |
| <br><b>Displays</b>                | <br><b>GPS</b>              | <br><b>Instrument Cluster</b> |
| <br><b>Multimedia/Infotainment</b> | <br><b>Network Backbone</b> | <br><b>Radar/Lidar</b>        |
| <br><b>Sealed Controller</b>       | <br><b>Service Port</b>     | <br><b>Sensors</b>            |
| <br><b>Switch/Gateway</b>          | <br><b>Telemetry Unit</b>   | <br><b>V2X</b>                |

• Available in chassis • Available in cabin

## ASSEMBLY CHART

PRODUCT LINE	CABLE TYPE	TE PARENT PART NO.	DASH NO.	LENGTH (MM)	CONFIGURATION NAME	ALIAS PART NO.
MATEnet Interconnection System	Dacar 647 - STP (1Gb)	2362347	-1	500	MATEnet female insert to female insert	STPA-MNFI-MNFI-500
			-2	1000		STPA-MNFI-MNFI-1000
			-3	1500		STPA-MNFI-MNFI-1500
			-4	3000		STPA-MNFI-MNFI-3000
			-5	5000		STPA-MNFI-MNFI-5000
		2362348	-1	500	MATEnet male insert to female insert	STPA-MNMI-MNFI-500
			-2	1000		STPA-MNMI-MNFI-1000
			-3	1500		STPA-MNMI-MNFI-1500
			-4	3000		STPA-MNMI-MNFI-3000
			-5	5000		STPA-MNMI-MNFI-5000
		2362349	-1	500	MATEnet female 1-port to female 1-port	STPA-MNF1UA-MNF1UA-500
			-2	1000		STPA-MNF1UA-MNF1UA-1000
			-3	1500		STPA-MNF1UA-MNF1UA-1500
			-4	3000		STPA-MNF1UA-MNF1UA-3000
			-5	5000		STPA-MNF1UA-MNF1UA-5000
		2362350	-1	500	MATEnet male 1-port to female 1-port	STPA-MNMCUA-MNF1UA-500
			-2	1000		STPA-MNMCUA-MNF1UA-1000
			-3	1500		STPA-MNMCUA-MNF1UA-1500
			-4	3000		STPA-MNMCUA-MNF1UA-3000
			-5	5000		STPA-MNMCUA-MNF1UA-5000
		2362351	-1	500	MATEnet sealed female 1-port to sealed female 1-port	STPA-MNFISA-MNFISA-500
			-2	1000		STPA-MNFISA-MNFISA-1000
			-3	1500		STPA-MNFISA-MNFISA-1500
			-4	3000		STPA-MNFISA-MNFISA-3000
			-5	5000		STPA-MNFISA-MNFISA-5000
		2362352	-1	500	MATEnet sealed male 1-port to sealed female 1-port	STPA-MNMCSA-MNFISA-500
			-2	1000		STPA-MNMCSA-MNFISA-1000
			-3	1500		STPA-MNMCSA-MNFISA-1500
			-4	3000		STPA-MNMCSA-MNFISA-3000
			-5	5000		STPA-MNMCSA-MNFISA-5000

**ASSEMBLY CHART (CONTINUED)**

PRODUCT LINE	CABLE TYPE	TE PARENT PART NO.	DASH NO.	LENGTH (MM)	CONFIGURATION NAME	ALIAS PART NO.
MATEnet Interconnection System	Dacar 546 - UTP (100Mb)	2376737	-1	500	MATEnet female insert to female insert	UTPA-MNFI-MNFI-500
			-2	1000		UTPA-MNFI-MNFI-1000
			-3	1500		UTPA-MNFI-MNFI-1500
			-4	3000		UTPA-MNFI-MNFI-3000
			-5	5000		UTPA-MNFI-MNFI-5000
		2376738	-1	500	MATEnet male insert to female insert	UTPA-MNMI-MNFI-500
			-2	1000		UTPA-MNMI-MNFI-1000
			-3	1500		UTPA-MNMI-MNFI-1500
			-4	3000		UTPA-MNMI-MNFI-3000
			-5	5000		UTPA-MNMI-MNFI-5000
		2376739	-1	500	MATEnet female 1-port to female 1-port	UTPA-MNF1UA-MNF1UA-500
			-2	1000		UTPA-MNF1UA-MNF1UA-1000
			-3	1500		UTPA-MNF1UA-MNF1UA-1500
			-4	3000		UTPA-MNF1UA-MNF1UA-3000
			-5	5000		UTPA-MNF1UA-MNF1UA-5000
		2376740	-1	500	MATEnet male 1-port to female 1-port	UTPA-MNMCUA-MNF1UA-500
			-2	1000		UTPA-MNMCUA-MNF1UA-1000
			-3	1500		UTPA-MNMCUA-MNF1UA-1500
			-4	3000		UTPA-MNMCUA-MNF1UA-3000
			-5	5000		UTPA-MNMCUA-MNF1UA-5000
		2376741	-1	500	MATEnet sealed female 1-port to sealed female 1-port	UTPA-MNF1SA-MNF1SA-500
			-2	1000		UTPA-MNF1SA-MNF1SA-1000
			-3	1500		UTPA-MNF1SA-MNF1SA-1500
			-4	3000		UTPA-MNF1SA-MNF1SA-3000
			-5	5000		UTPA-MNF1SA-MNF1SA-5000
		2376742	-1	500	MATEnet sealed male 1-port to sealed female 1-port	UTPA-MNMCSA-MNF1SA-500
			-2	1000		UTPA-MNMCSA-MNF1SA-1000
			-3	1500		UTPA-MNMCSA-MNF1SA-1500
			-4	3000		UTPA-MNMCSA-MNF1SA-3000
			-5	5000		UTPA-MNMCSA-MNF1SA-5000

**ASSEMBLY CHART (CONTINUED)**

PRODUCT LINE:	CABLE TYPE	TE PARENT PART NO.	DASH NO.	LENGTH (MM)	CONFIGURATION NAME	ALIAS PART NO.
MATenet Interconnection System	Dacar 647 - UTP (1Gb)	2362764	-4	2000	Female insert - Female Insert, Dacar 647	
			-5	2500		
			-6	3000		
			-7	5000		
			-8	7500		
			-9	10000		
		2362767	-1	1200	Female insert - Male insert, Dacar 647	
			-2	2000		
			-3	2500		
			-4	3000		
			-5	7500		
2362768	-1	1000	Female Insert - Pigtail, Dacar 647			
enetSEAL+ Connector System	Champlain 20AWG	2362353	-1	500	enetSEAL+ female assy to female assy	UTPB-ESFSA-ESFSA-500
			-2	1000		UTPB-ESFSA-ESFSA-1000
			-3	1500		UTPB-ESFSA-ESFSA-1500
			-4	3000		UTPB-ESFSA-ESFSA-3000
			-5	5000		UTPB-ESFSA-ESFSA-5000
		2362354	-1	500	enetSEAL+ male assy to female assy	UTPB-ESMSA-ESFSA-500
			-2	1000		UTPB-ESMSA-ESFSA-1000
			-3	1500		UTPB-ESMSA-ESFSA-1500
			-4	3000		UTPB-ESMSA-ESFSA-3000
			-5	5000		UTPB-ESMSA-ESFSA-5000
enetSEAL+ Connector System	Dacar 546	2373781	-1	500	enetSEAL+ female assy to female assy	UTPB-ESFSA-ESFSA-500
			-2	1000		UTPB-ESFSA-ESFSA-1000
			-3	1500		UTPB-ESFSA-ESFSA-1500
			-4	3000		UTPB-ESFSA-ESFSA-3000
			-5	5000		UTPB-ESFSA-ESFSA-5000
		2373785	-1	500	enetSEAL+ male assy to female assy	UTPB-ESMSA-ESFSA-500
			-2	1000		UTPB-ESMSA-ESFSA-1000
			-3	1500		UTPB-ESMSA-ESFSA-1500
			-4	3000		UTPB-ESMSA-ESFSA-3000
			-5	5000		UTPB-ESMSA-ESFSA-5000

**ASSEMBLY CHART (CONTINUED)**

PRODUCT LINE	CABLE TYPE	TE PARENT PART NO.	DASH NO.	LENGTH (MM)	CONFIGURATION NAME	ALIAS PART NO.
AMPSEAL 16 Connector /MATE-AX Interconnection System	RTK031	2362355	-1	500	MATE-Ax 180° female terminal to 180° female terminal	CXA-MAF1UZ-MAF1UZ-500
			-2	1000		CXA-MAF1UZ-MAF1UZ-1000
			-3	1500		CXA-MAF1UZ-MAF1UZ-1500
			-4	3000		CXA-MAF1UZ-MAF1UZ-3000
			-5	5000		CXA-MAF1UZ-MAF1UZ-5000
		2362356	-1	500	MATE-Ax 180° male terminal to 180° female terminal	CXA-MAM1UZ-MAF1UZ-500
			-2	1000		CXA-MAM1UZ-MAF1UZ-1000
			-3	1500		CXA-MAM1UZ-MAF1UZ-1500
			-4	3000		CXA-MAM1UZ-MAF1UZ-3000
			-5	5000		CXA-MAM1UZ-MAF1UZ-5000
		2362357	-1	500	MATE-Ax 180° female terminal to Fakra 180° female terminal	CXA-MAM1UZ-FAF1UZ-500
			-2	1000		CXA-MAM1UZ-FAF1UZ-1000
			-3	1500		CXA-MAM1UZ-FAF1UZ-1500
			-4	3000		CXA-MAM1UZ-FAF1UZ-3000
			-5	5000		CXA-MAM1UZ-FAF1UZ-5000
AMPSEAL 16 Connector /MATE-AX Interconnection System	Dacar 462-6	2362358	-1	500	MATE-Ax 180° female terminal to 180° female terminal	CXB-MAF1UZ-MAF1UZ-500
			-2	1000		CXB-MAF1UZ-MAF1UZ-1000
			-3	1500		CXB-MAF1UZ-MAF1UZ-1500
			-4	3000		CXB-MAF1UZ-MAF1UZ-3000
			-5	5000		CXB-MAF1UZ-MAF1UZ-5000
		2362359	-1	500	MATE-Ax 180° male terminal to 180° female terminal	CXB-MAM1UZ-MAF1UZ-500
			-2	1000		CXB-MAM1UZ-MAF1UZ-1000
			-3	1500		CXB-MAM1UZ-MAF1UZ-1500
			-4	3000		CXB-MAM1UZ-MAF1UZ-3000
			-5	5000		CXB-MAM1UZ-MAF1UZ-5000
		2362360	-1	500	MATE-Ax 180° female terminal to Fakra 180° female terminal	CXB-MAM1UZ-FAF1UZ-500
			-2	1000		CXB-MAM1UZ-FAF1UZ-1000
			-3	1500		CXB-MAM1UZ-FAF1UZ-1500
			-4	3000		CXB-MAM1UZ-FAF1UZ-3000
			-5	5000		CXB-MAM1UZ-FAF1UZ-5000

## SMART PART NUMBER-ALIAS CONFIGURATOR

Side A

Side B



C	CABLE TYPE	ID
UTPA	Unshielded twisted pair	Dacar 547-D
UTPB		Champlain 20 AWG
UTPC		Dacar 647
UTPD		Dacar 546
STPA	Shielded twisted pair	Dacar 647-4
STPB		Champlain 23 AWG
CXA	Coaxial	RTK031
CXB		Dacar 462-6
CXC		RG-174
CXD		RG-58

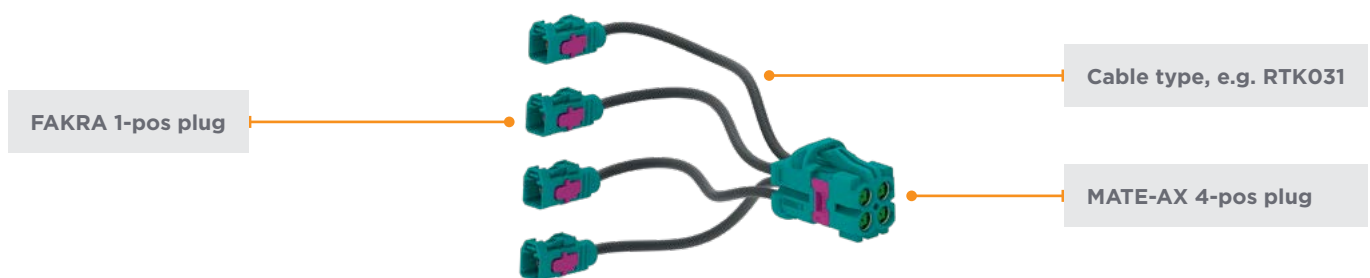
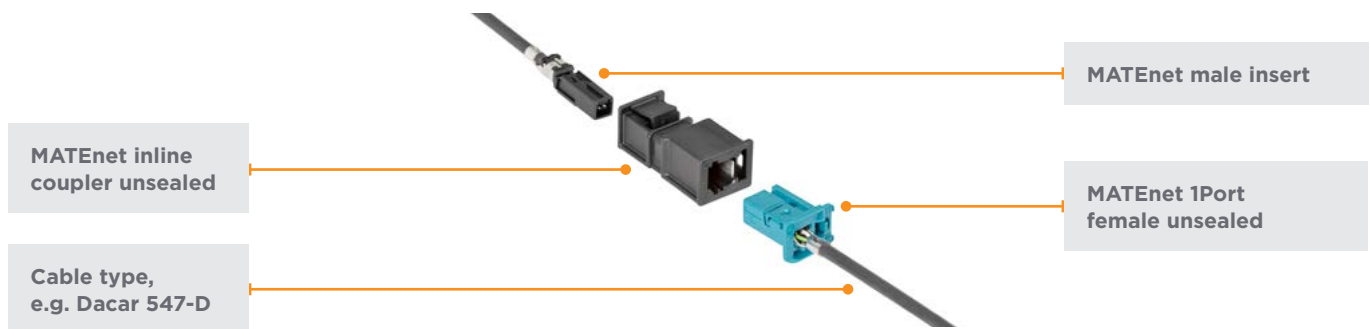
S	CONNECTOR SERIES
MN	MATenet interconnection System
MA	MATE-AX Interconnection System
FA	FAKRA II Connector System
F4	FAKRA IV Connector System
ES	enetSEAL+ Connector System

V	VARIANT
I	MATenet Insert
F1U	MATenet/MATE-AX/FAKRA 1Port Frame/1pos female unsealed
CU	MATenet inline coupler unsealed
F1S	MATenet 1Port Frame sealed
CS	MATenet Inliner Sealed
M1U	MATE-AX male 1pos unsealed
FS	Female Sealed, 2P
MS	Male Sealed, 2P

G	GENDER
M	Male
F	Female

K	KEY
A	Key A
Z	Key Z

L	LENGTH
500	500mm
1000	1000mm
1500	1500mm
3000	3000mm
5000	5000mm



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