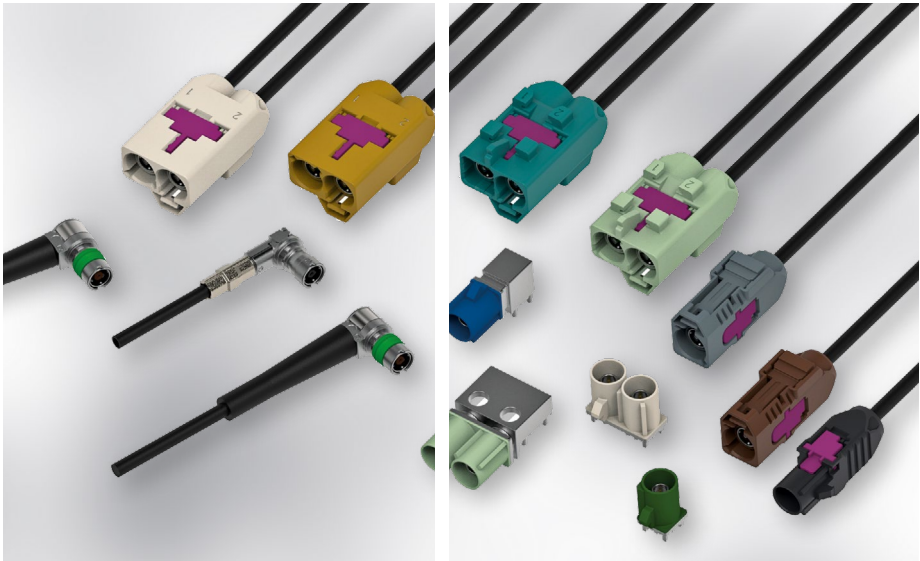
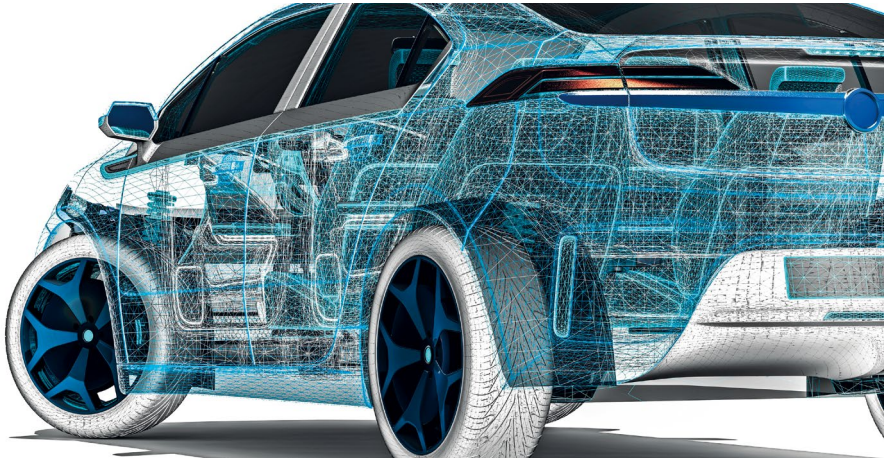


FAKRA RF CONNECTOR SYSTEM

FOR THE AUTOMOTIVE INDUSTRY



INNOVATIVE TECHNOLOGIES

TE Connectivity (TE) is a leader in automotive connectivity and sensor technology. Our engineers are always working to meet complex requirements. We connect nearly every electronic function in the vehicle – from alternative power systems to data connectivity and sensor technologies. Our technologies withstand harsh environments and tolerate high temperature, vibration, shock, pressure and long-life in electronic control systems.



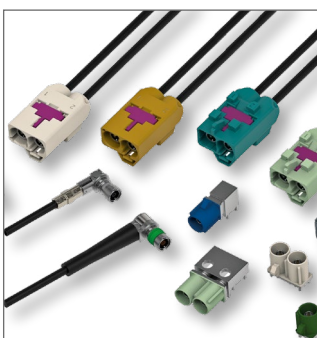
INTERCONNECTION SYSTEMS

Our electrical and electronic interconnection products and solutions are used to electrically and mechanically connect wires and cables, printed circuit boards, integrated circuit packages, batteries and more.



HYBRID & ELECTRIC MOBILITY SOLUTIONS

Our technologies leverage decades of innovation and experience with high-voltage transmission and distribution. Our hybrid and electric mobility solutions include a complete line of connectors, terminals, sensors, cable assemblies, contactors, and battery connection protection to help safeguard the flow of power in hybrid and electric vehicles.



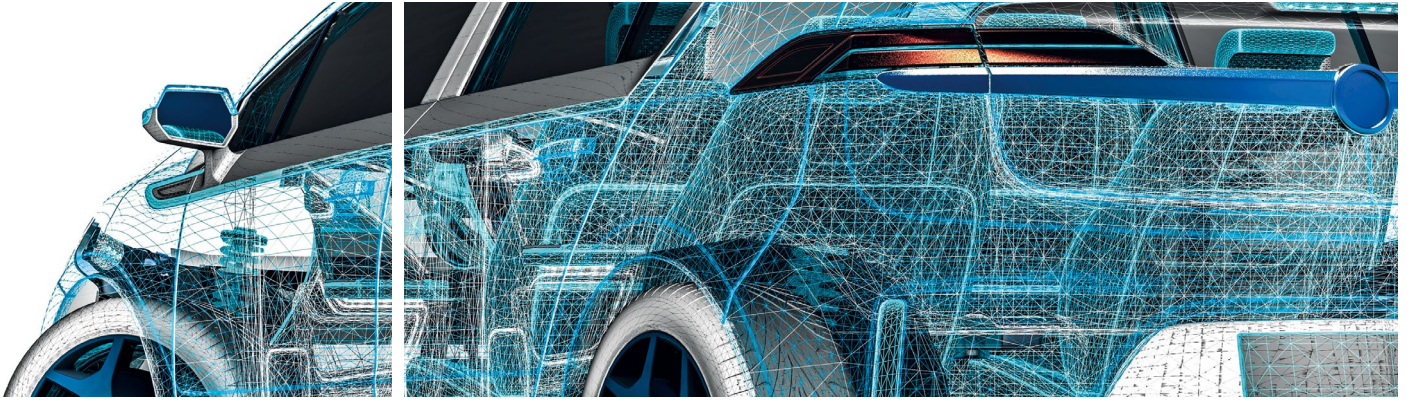
DATA CONNECTIVITY

Our wide range of data connectivity solutions are ideal for consumer port connections, high data rate applications, next-generation harness architecture, board-to-board connections and vehicle-to-vehicle communication.



WIRELESS

HIRSCHMANN MOBILITY wireless solutions enable high-performance signal reception and transmission for vehicles. We offer customized antenna systems as well as radio tuner systems for all common global standards. Together with the TE connectors solutions we provide one-stop-connectivity solutions with components along the signal chain that are optimized and compatible with each other to provide excellent signal quality and real-time data.



SENSOR SOLUTIONS

Customers rely on our sensor technology to provide data for control, adaptation and response of vehicle functions and features that increase safety, comfort, efficiency, and more. We collaborate to provide solutions for demanding and harsh applications such as automated transmissions, engines, chassis, clutch, brake and exhaust. Our products can be found in vehicles traveling the world's roads and highways.



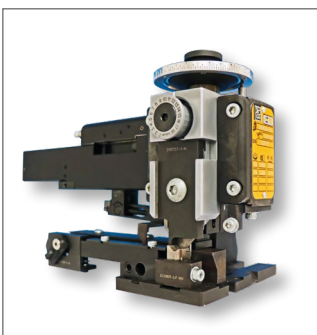
CABLE ASSEMBLY

TE is your partner for vehicle-specific cable assemblies. We offer research and development capabilities, prototypes and samples, as well as manufacturing facilities.



RELAYS

From passenger comfort and infotainment to higher DC voltages and power levels to harsh environments, our relays and contactors provide critical switching functions in multiple vehicle applications. With increased contact gaps and other key design features, our relays are ideal for harsh environments such as shock and vibration.



APPLICATION TOOLING

Ensuring a quality connection is essential to delivering high performance and reliability in extreme environments. From crimping a terminal onto a wire or pressing a connector onto a board, our equipment and services are designed to maximize production uptime, extend tooling life and minimize manufacturing waste.

FAKRA RF CONNECTOR SYSTEM

Page	Link
7	Introduction
8	Automotive Coaxial Portfolio
9	Available Keying Codes
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11	Technical Information for FAKRA Automated
12	1 HEADERS
12	Vertical
12	1 Position PCB
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22	Female Connector Kit
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25	1 Position, Female unsealed, 90 degree
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26	1 Position, Female sealed, 180 degree
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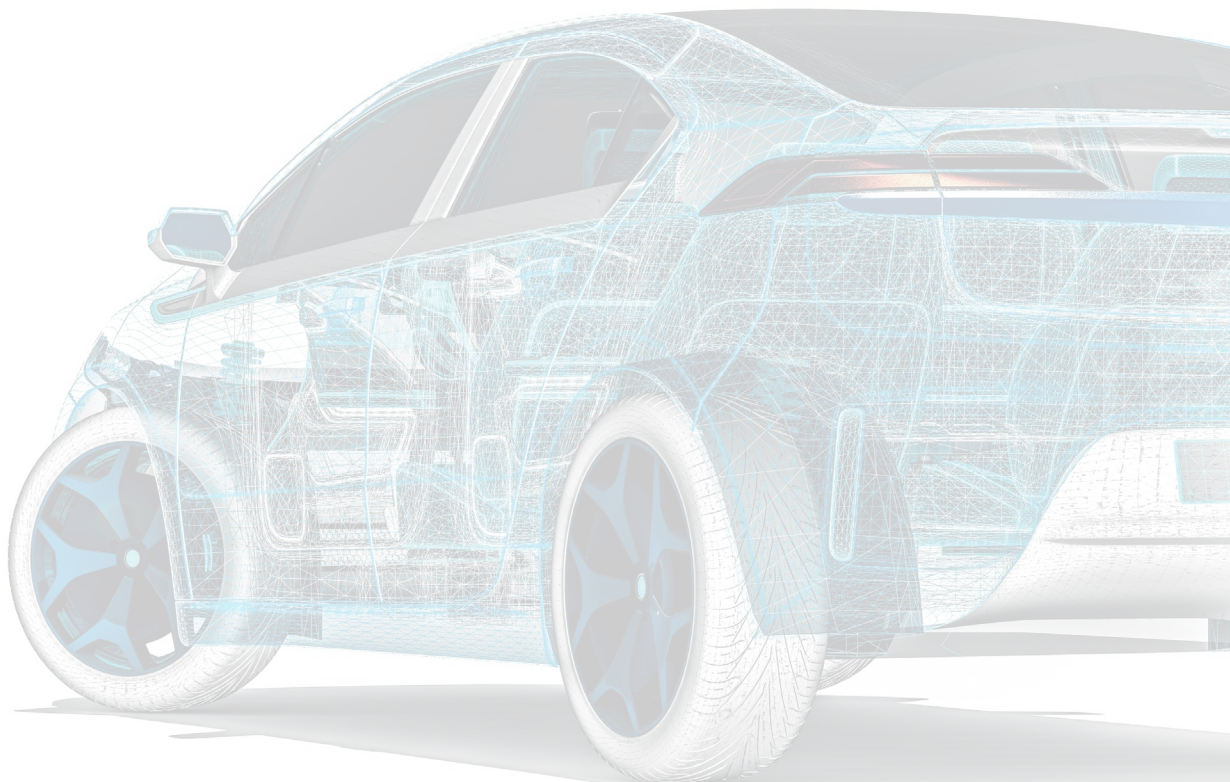
FAKRA RF CONNECTOR SYSTEMPage
Link**28 3 MALE CONNECTORS****28 Male Connector Kit****29 Unsealed**

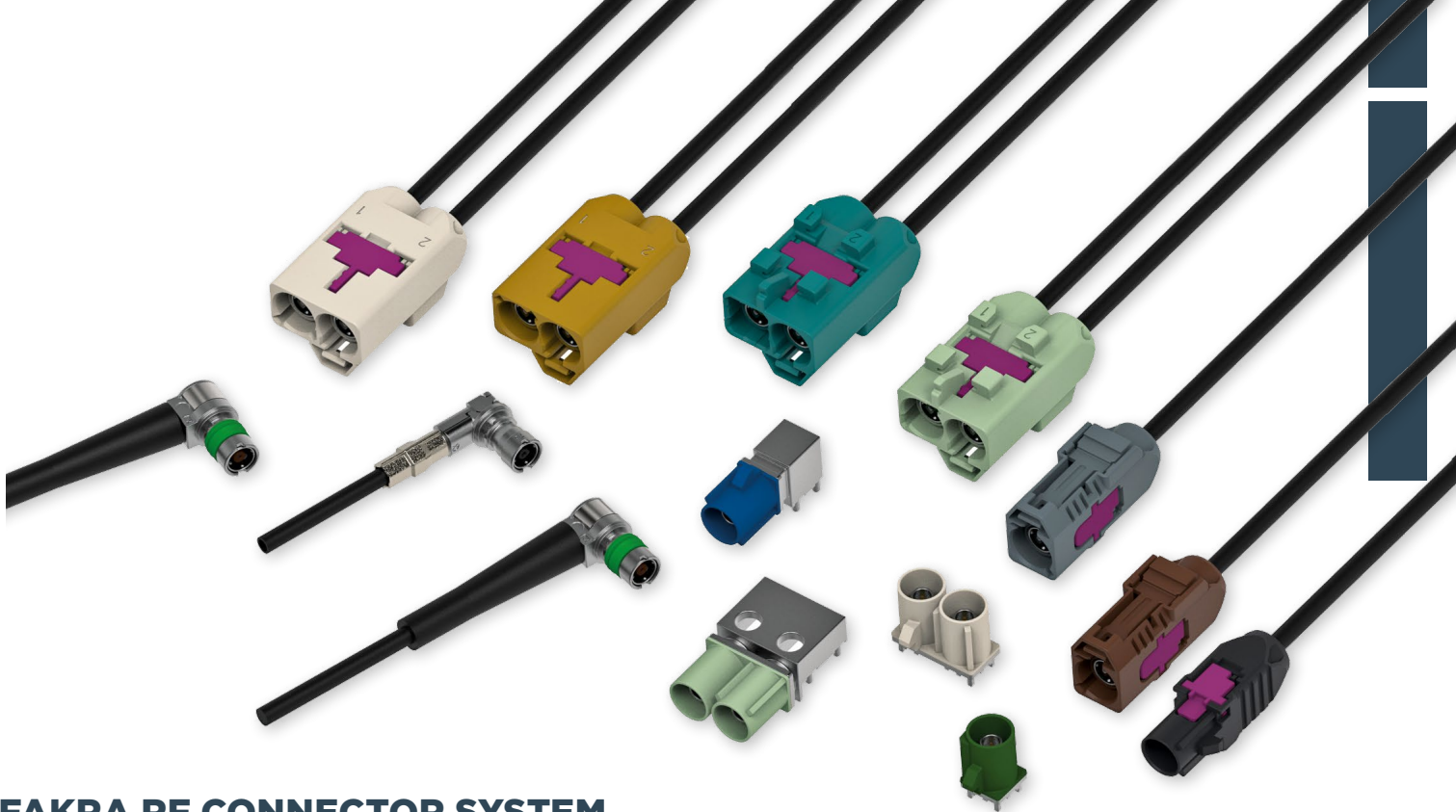
29 1 Position, Male unsealed, 180 degree

30 2 Position, Male unsealed, 180 degree

31 Sealed

31 1 Position, Male sealed, 180 degree

33 4 APPLICATION TOOLING34 **TE Connectivity online**35 **Global Contacts**35 **Imprint**



FAKRA RF CONNECTOR SYSTEM INTRODUCTION

FAKRA is an acronym developed in Germany for “Fachkreis Automobile”, which can be translated as “Working Group Automobile”. The FAKRA connector standard was developed by a sub-committee within the German Committee of Automobile Manufacturers. This standard covers the design of the connectors’ interface along with its mechanical and electrical characteristics. The standard is in a worldwide acceptance process by major car manufacturers and system suppliers for automotive communications and entertainment applications.

The TE Connectivity FAKRA connector system was designed to meet or exceed ISO20860-1 (50 Ohms Impedance Radio Frequency Connection System Interface), SAE/USCAR-17 (Performance Specification for Automotive RF Connector Systems), SAE/USCAR-18 (FAKRA SMB RF Connector Supplement) and SAE/USCAR-2 (Performance Specification for Automotive Electrical Connector Systems).

TE Connectivity (TE) offers a comprehensive portfolio of RF (Radio Frequency) cable assemblies, terminals and housings. These products are fully compatible and are designed according to the FAKRA RF requirements including recent extensions and improvements. The portfolio includes straight male and female terminals for different cable types, one and two position straight housings (pitch 8.0 mm and 12.7 mm) and different mechanical keys.

Features

- Fully compliant to USCAR requirements
- Optimized for automated manufacturing
- RF performance up to 6GHz
- Complete product family
- Primary and secondary locks
- Tulip contact / anti-stubbing
- Housing inner ring / anti-scooping
- Reduced number of components
- Global manufacturing

Benefits

- Supports broad road range of different cable types
- Components on reel with focus on fully automated C/A processing
- Design features to improve mating and short circuit protection
- Extensive FAKRA header portfolio
- Tape and reel, optional tray packaging
- Enables selective, wave and reflow soldering
- FAKRA interface terminal Au-plating 0,38µm or 0,8µm
- 14 available codings, A to N + Z
- Option to add EMI springs available (customized)
- Combined interfaces (hybrids) possible

USCAR is a trademark.

TE Connectivity’s automotive coaxial portfolio includes three generations of products, designed to fit, perform and deliver per unique customer requirements. Our products have RF capability ranging from 3GHz to 9GHz and the connector housings are designed with clip-slot variants, CPA (Connector Position Assurance) capability and anti-stubbing features.

FAKRA IV

Key Features

- 50 Ω system released to 3.0GHz
- Semi-automated assembly
- Qualified to SAE/USCAR-17, Rev 3 and 4
- CPA/sealed connectors not available
- Components
 - Center contact - stamped
 - Outer contact - diecast
 - Ferrule - drawn
- Product delivered to assembly as kit



FAKRA Automated

Key Features

- 50 Ω system released to 6.0GHz
- Capable of automated component and cable assembly
- Qualified to SAE/USCAR-17, Rev 5
- CPA/sealed connectors available
- Secondary lock
- Center contact, outer contact and ferrule - stamped
- Product delivered to assembly on strip
- Improved robustness of the system



MATE-AX (Miniaturized Coaxial Terminal)


















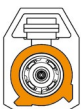

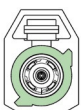


Key Features

- 50 Ω system released to 9.0GHz/
Potential up to 15GHz
- Closed contact for “anti-snagging” damage protection
- CPA/sealed connectors available
- Miniaturized size reduces packaging space
- 75% space savings when compared to 4x 1position FAKRA headers



For FAKRA IV part numbers, specification details and samples please contact our [Customer Service](#).

Coding Versions

Female	Male	Keying Code	Color	RAL No.	Single-way Application in	
					Europe	USCAR
		A	Jet Black	9005	Radio without phantom supply	
		B	Cream	9001	Radio with phantom supply	
		C	Signal Blue	5005	GPS telematics or navigation	GPS
		D	Claret Violet	4004	GSM	
		E	Leaf Green	6002	TV1	TV (UHF) /SDARS terrestrial (XM)
		F	Nut Brown	8011	TV2	TV (VHF) /SDARS terrestrial (Sirius)
		G	Blue Gray	7031	Remote Keyless Entry	SDARS terrestrial (interoperable)
		H	Heather Violet	4003	GPS telematics and navigation	
		I	Beige	1001	Remote	Bluetooth Controlled Parking Heating
		K	Curry	1027	Diversity radio	SDARS satellite
		L	Carmine Red	3002	Not defined	
		M	Pastel Orange	2003	Not defined	Keyless Entry Tire pressure Monitoring
		N	Pastel Green	6019	Not defined	
		Z	Water Blue	5021	Neutral (fits all)	

FAKRA Cable Availability

Cable Type	FAKRA Cable Availability			
	Unsealed		Sealed	
	180°	90°	180°	90°
RG 58	Available	Available	Available	Available
RG 58LL	Available	Available	Available	Available
RG 174	Available	Available	Available	Available
RG 174LL	Available	Available	Available	Available
RG 316	Available	Available	Available	Available
RTK 031	Available	Available	Available	Available
2DS	Available	Not available	Available	Not available
1.5DS	Available	Available	Available	Available
DACAR 462-5	Available	Available	Available	Available
DACAR 462-6	Available on request	Available on request	Available on request	Available on request
DACAR 037-6	Available on request	Available on request	Available on request	Available on request
RTK 044	Available on request	Available on request	Available on request	Available on request

- Available
- Not available
- Available on request

FAKRA Applications

INFOTAINMENT

- Instrument Cluster
- Touch-screen Center Stack
- Wireless Antennas
- Rear Seat Entertainment

SAFETY

- Driver Assistance
- Rear View/ Front View Camera
- Automated Emergency Braking
- Radar Cruise
- Zero, Conditional, High and Full Automation

IN-VEHICLE NETWORKS

- V2X
- Traffic Info
- Central Gateway
- Electronics Control Unit
- Video Processing
- Powertrain/ Brake Control

Voltage	Current	Temperature
800 VAC	1 amp maximum	Connector: -40 to 125°C Max temp is cable dependent

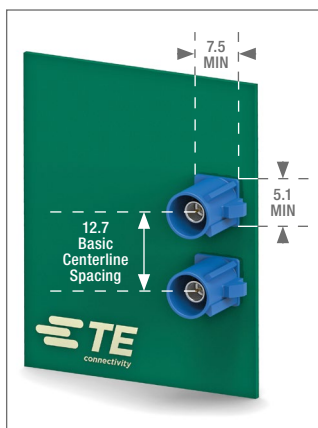
Electrical Parameters

Test Description	Requirement	Procedure
Contact Resistance	24mΩ maximum for signal contacts. 5mΩ initial maximum, 6mΩ maximum after environmental testing for ground contacts.	SAE/USCAR-17 Rev 5, 4.3.1.2
Circuit Continuity Monitoring	No loss of electrical continuity for > 1μs	SAE/USCAR-2 Rev 6, 5.1.9.3
Dielectric Withstanding Voltage	≥800 VAC	SAE/USCAR-17 Rev 5, 4.3.2.2
Voltage Standing Wave Ratio (VSWR)	SWR ≤ 1.4 0 to 2 GHz SWR ≤ 1.5 2 to 3 GHz SWR ≤ 1.6 3 to 6 GHz	SAE/USCAR-17 Rev 5, 4.4.2.2
Insertion Loss (IL)	IL ≤ 0.3 0 to 3 GHz IL ≤ 0.45 3 to 6 GHz	SAE/USCAR-17 Rev 5, 4.4.2.2
Insulation Resistance	>100MΩ	SAE/USCAR-17 Rev 5, 4.4.1.2
RF Leakage Leakage	≤ 45 dB 0 to 3 GHz Leakage ≤ 40 dB 3 to 6 GHz	SAE/USCAR-17 Rev 5, 4.4.3.2
Capacitance	<6.0 pF for in-line connectors	SAE/USCAR-17 Rev 5, 4.4.4.2

Mechanical Parameters

Test Description	Requirement	Procedure
Terminal Bend Resistance (Center Contacts)	No tear or crack at 3 N	SAE/USCAR-2 Rev 6, 5.2.2.3
Terminal to Connector Engage/Disengage	Disengage w Retainer ≥ 110 N Disengage w Retainer after conditioning ≥ 80 N Disengage w Retainer after vibration ≥ 70 N Disengage w Retainer after temp/humidity ≥ 70 N Disengage w Retainer after heat age ≥ 70 N	SAE/USCAR-2 Rev 6, 5.4.1
Connector to Connector Mating/Unmating	Mating Force ≤ 25 N (1 Position) Mating Force ≤ 45 N (2 Position) Connector Disengage with Lock ≥ 110 N Force to disengage lock ≥ 6N and ≤ 51 N Unmating Force with Lock disengaged ≤ 75 N	SAE/USCAR-2 Rev 6, 5.4.2
Mechanical Pull Force	≥ 110 N Axial force, 5 second hold IL and VSWR, before and after. See Electrical section	SAE/USCAR-17 Rev 4, 4.2.1.2

1 Position PCB



Technical Features

No. of Positions:

1

Operating Frequency:

6 GHz

PCB Mounting Style:

Through Hole

Operating Temperature:

-40°C to +105°C

Product Specification:

108-32058

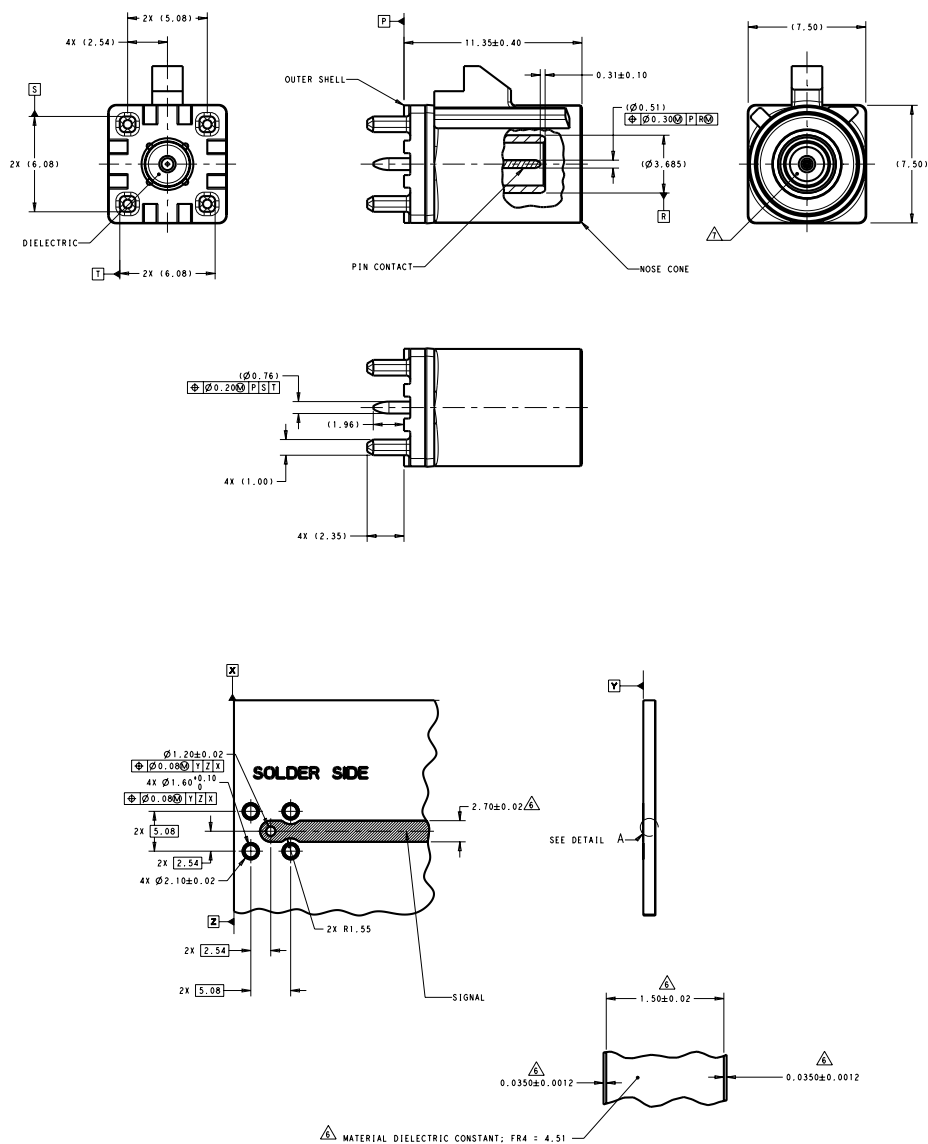
Application Specification:

114-32108

Mating Connector:

Housing part numbers on catalog pages 23, 25, 26 and 27 mate with this header type.

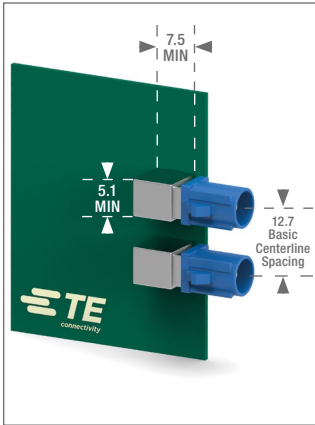
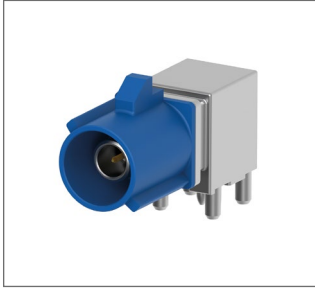
Drawing and recommended PCB layout



1 Position PCB

Keying Options	Nose Cone Color	Header PN (Tray)	Header PN (Tape & Reel)
A	Jet Black	2203452-1	5-2203452-1
B	Cream	2203452-2	5-2203452-2
C	Signal Blue	2203452-3	5-2203452-3
D	Claret Violet	2203452-4	5-2203452-4
E	Leaf Green	2203452-5	5-2203452-5
F	Nut Brown	2203452-6	5-2203452-6
G	Blue Gray	2203452-7	5-2203452-7
H	Heather Violet	2203452-8	5-2203452-8
I	Beige	2203452-9	5-2203452-9
K	Curry	1-2203452-0	6-2203452-0
L	Carmin Red	1-2203452-1	6-2203452-1
M	Pastel Orange	1-2203452-2	6-2203452-2
N	Pastel Green	1-2203452-3	6-2203452-3
Z	Water Blue	2-2203452-0	7-2203452-0

1 Position PCB



Technical Features

No. of Positions:

1

Operating Frequency:

6 GHz

PCB Mounting Style:

Through Hole

Operating Temperature:

-40°C to +105°C

Product Specification:

108-32058

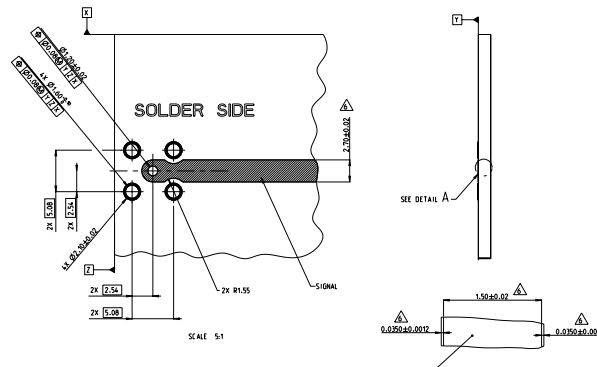
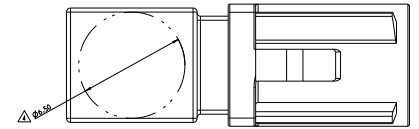
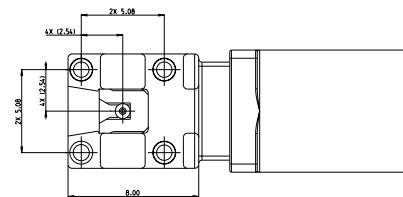
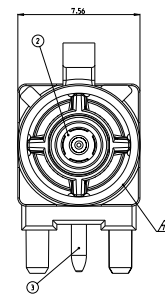
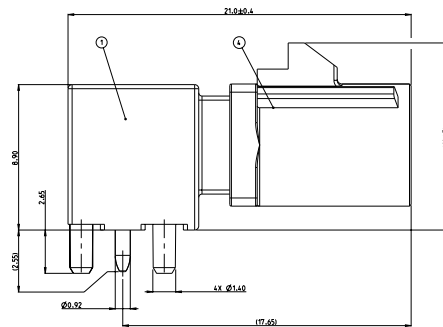
Application Specification:

114-32108

Mating Connector

Housing part numbers on catalog pages 23, 25, 26 and 27 mate with this header type.

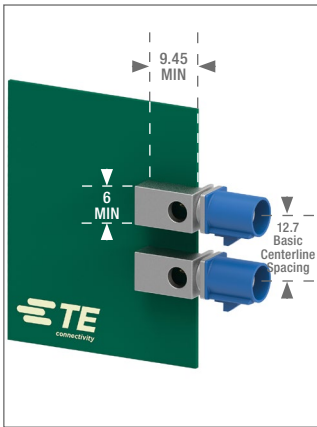
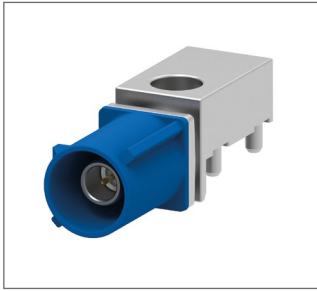
Drawing and recommended PCB layout



1 Position PCB

Keying Options	Nose Cone Color	Header PN (Tape & Reel)
A	Jet Black	2291392-1
B	Cream	2291392-2
C	Signal Blue	2291392-3
D	Claret Violet	2291392-4
E	Leaf Green	2291392-5
F	Nut Brown	2291392-6
G	Blue Gray	2291392-7
H	Heather Violet	2291392-8
I	Beige	2291392-9
K	Curry	1-2291392-0
L	Carmine Red	1-2291392-1
M	Pastel Orange	1-2291392-2
N	Pastel Green	1-2291392-3
Z	Water Blue	2-2291392-0

1 Position, 9 O’Clock PCB



Technical Features

No. of Positions:

1

Operating Frequency:
6 GHz

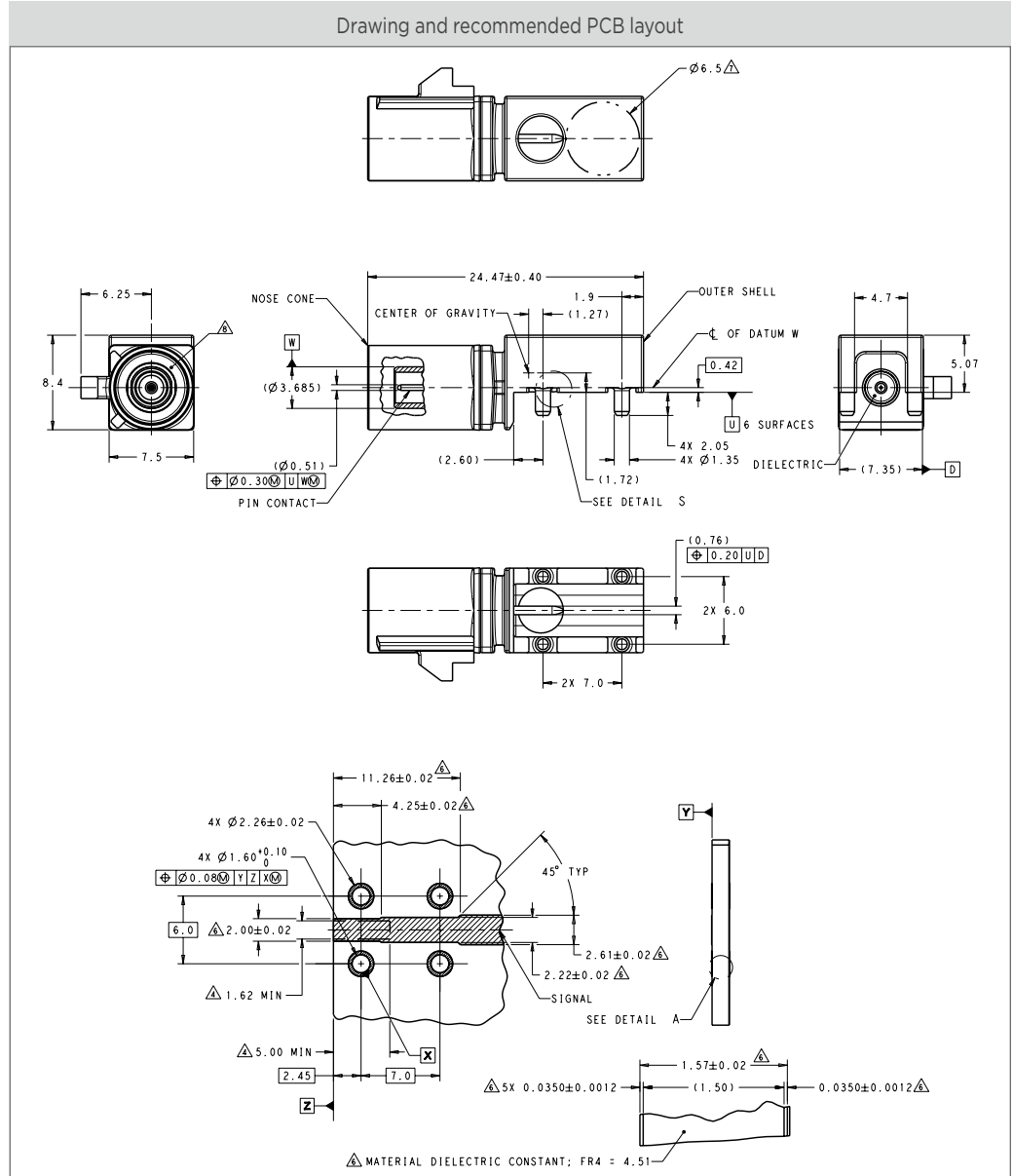
PCB Mounting Style:
Through Hole

Operating Temperature:
-40°C to +105°C

Product Specification:
108-32058

Application Specification:
114-32108

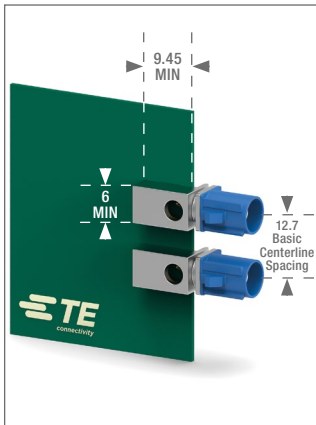
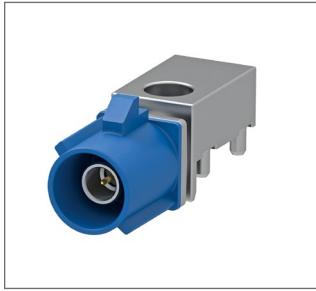
Mating Connector:
Housing part numbers on catalog pages 23, 25, 26 and 27 mate with this header type.



1 Position, 9 O’Clock PCB

Keying Options	Nose Cone Color	Header PN (Tray)	Header PN (Tape & Reel)
A	Jet Black	2287908-1	5-2287908-1
B	Cream	2287908-2	5-2287908-2
C	Signal Blue	2287908-3	5-2287908-3
D	Claret Violet	2287908-4	5-2287908-4
E	Leaf Green	2287908-5	5-2287908-5
F	Nut Brown	2287908-6	5-2287908-6
G	Blue Gray	2287908-7	5-2287908-7
H	Heather Violet	2287908-8	5-2287908-8
I	Beige	2287908-9	5-2287908-9
K	Curry	1-2287908-0	6-2287908-0
L	Carmine Red	1-2287908-1	6-2287908-1
M	Pastel Orange	1-2287908-2	6-2287908-2
N	Pastel Green	1-2287908-3	6-2287908-3
Z	Water Blue	2-2287908-0	7-2287908-0

1 Position, 12 O'Clock PCB



Technical Features

No. of Positions:

1

Operating Frequency:

6 GHz

PCB Mounting Style:

Through Hole

Operating Temperature

-40°C to +105°C

Product Specification:

108-32058

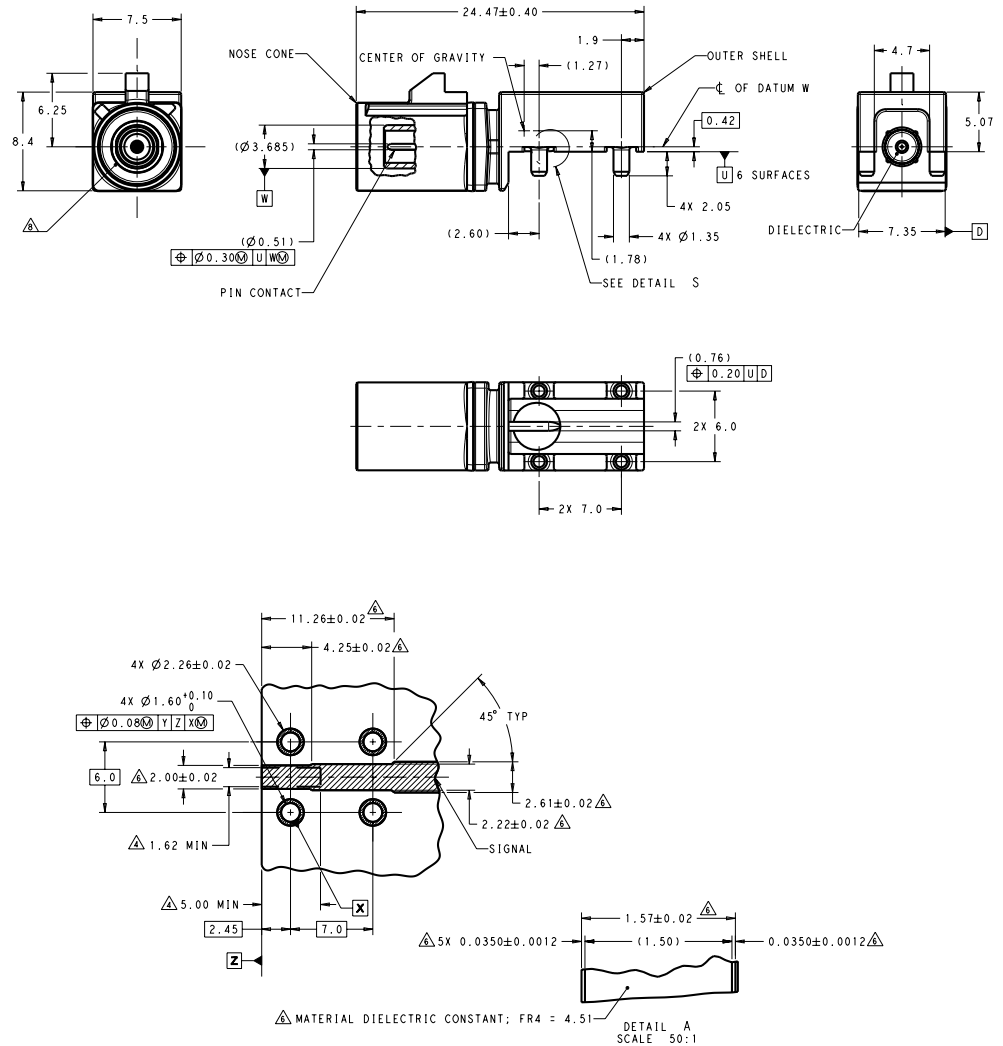
Application Specification:

114-32108

Mating Connector:

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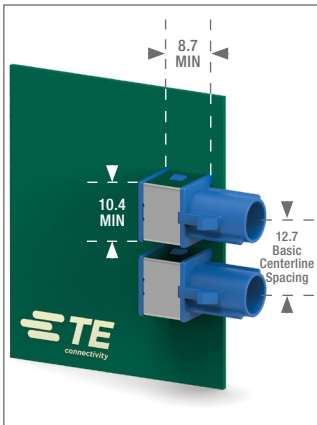
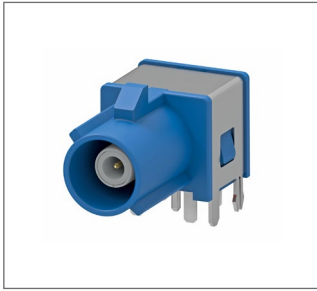
Drawing and recommended PCB layout



1 Position, 12 O'Clock PCB

Keying Options	Nose Cone Color	Header PN (Tray)	Header PN (Tape & Reel)
A	Jet Black	2287906-1	5-2287906-1
B	Cream	2287906-2	5-2287906-2
C	Signal Blue	2287906-3	5-2287906-3
D	Claret Violet	2287906-4	5-2287906-4
E	Leaf Green	2287906-5	5-2287906-5
F	Nut Brown	2287906-6	5-2287906-6
G	Blue Gray	2287906-7	5-2287906-7
H	Heather Violet	2287906-8	5-2287906-8
I	Beige	2287906-9	5-2287906-9
K	Curry	1-2287906-0	6-2287906-0
L	Carmine Red	1-2287906-1	6-2287906-1
M	Pastel Orange	1-2287906-2	6-2287906-2
N	Pastel Green	1-2287906-3	6-2287906-3
Z	Water Blue	2-2287906-0	7-2287906-0

1 Position, 90 degree, with Shield



Technical Features

No. of Positions:

1

Operating Frequency:

6 GHz

PCB Mounting Style:

Through Hole

Operating Temperature:

-40°C to +105°C

Product Specification:

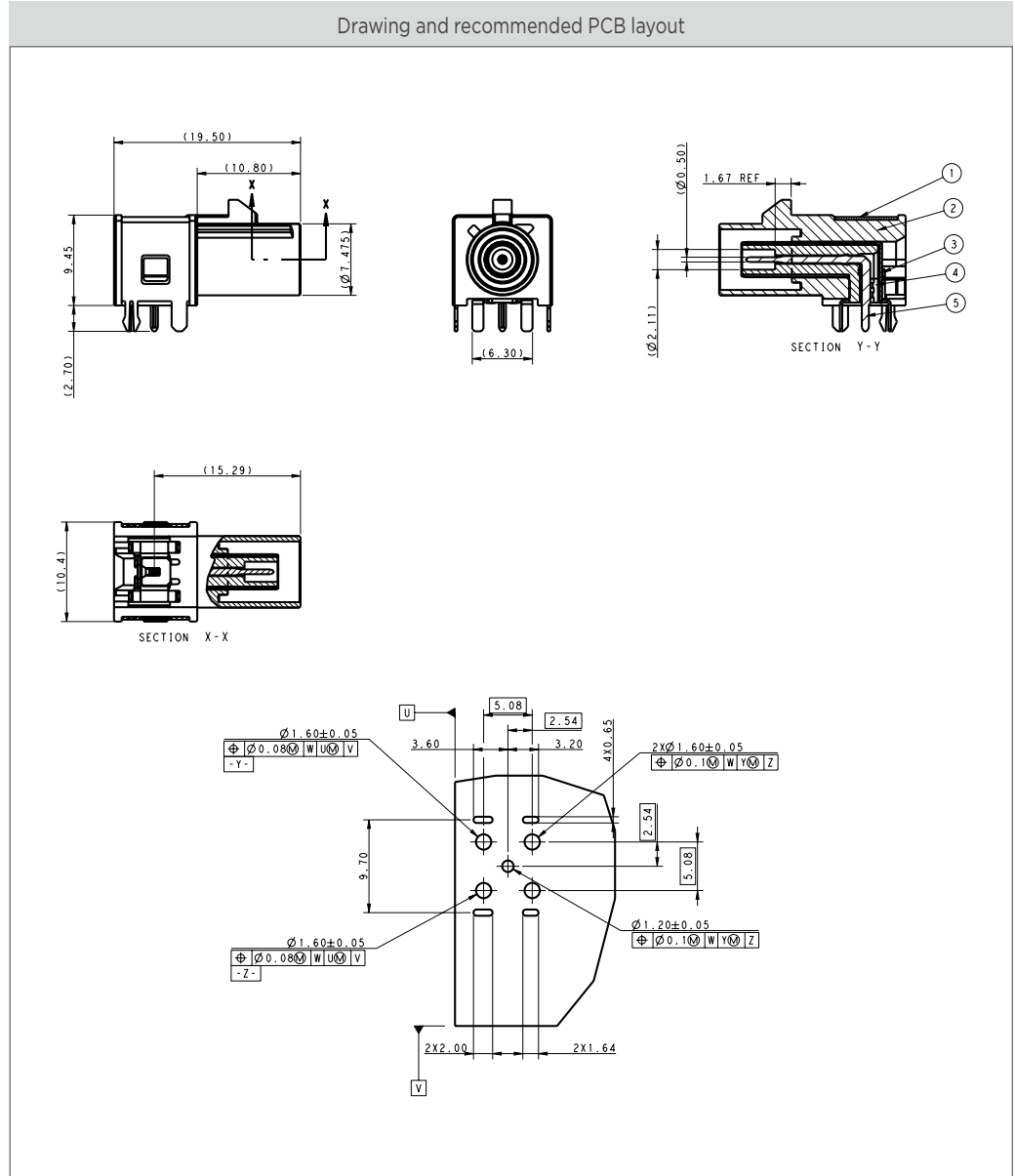
108-32058

Application Specification:

114-32108

Mating Connector:

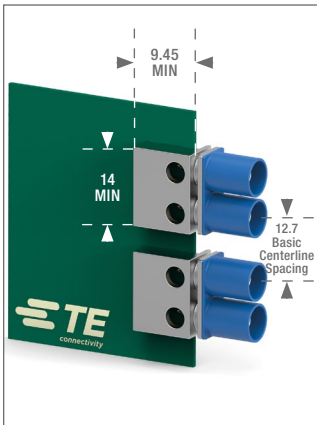
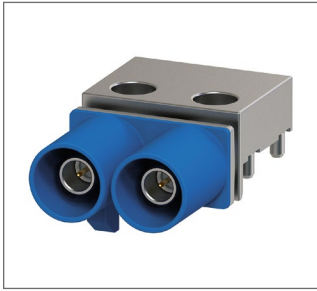
Housing part numbers on catalog pages 23, 25, 26 and 27 mate with this header type.



1 Position, 90 degree, with Shield

Keying Options	Nose Cone Color	Header PN
A	Jet Black	2209201-1
B	Cream	2209201-2
C	Signal Blue	2209201-3
D	Claret Violet	2209201-4
E	Leaf Green	2209201-5
F	Nut Brown	2209201-6
G	Blue Gray	2209201-7
H	Heather Violet	2209201-8
I	Beige	2209201-9
K	Curry	1-2209201-0
L	Carmine Red	1-2209201-1
M	Pastel Orange	1-2209201-2
N	Pastel Green	1-2209201-3
Z	Water Blue	2-2209201-0

2 Position, 6 O'Clock PCB



Technical Features

No. of Positions:

2

Operating Frequency:

6 GHz

PCB Mounting Style:

Through Hole

Operating Temperature:

-40°C to +105°C

Product Specification:

108-32058

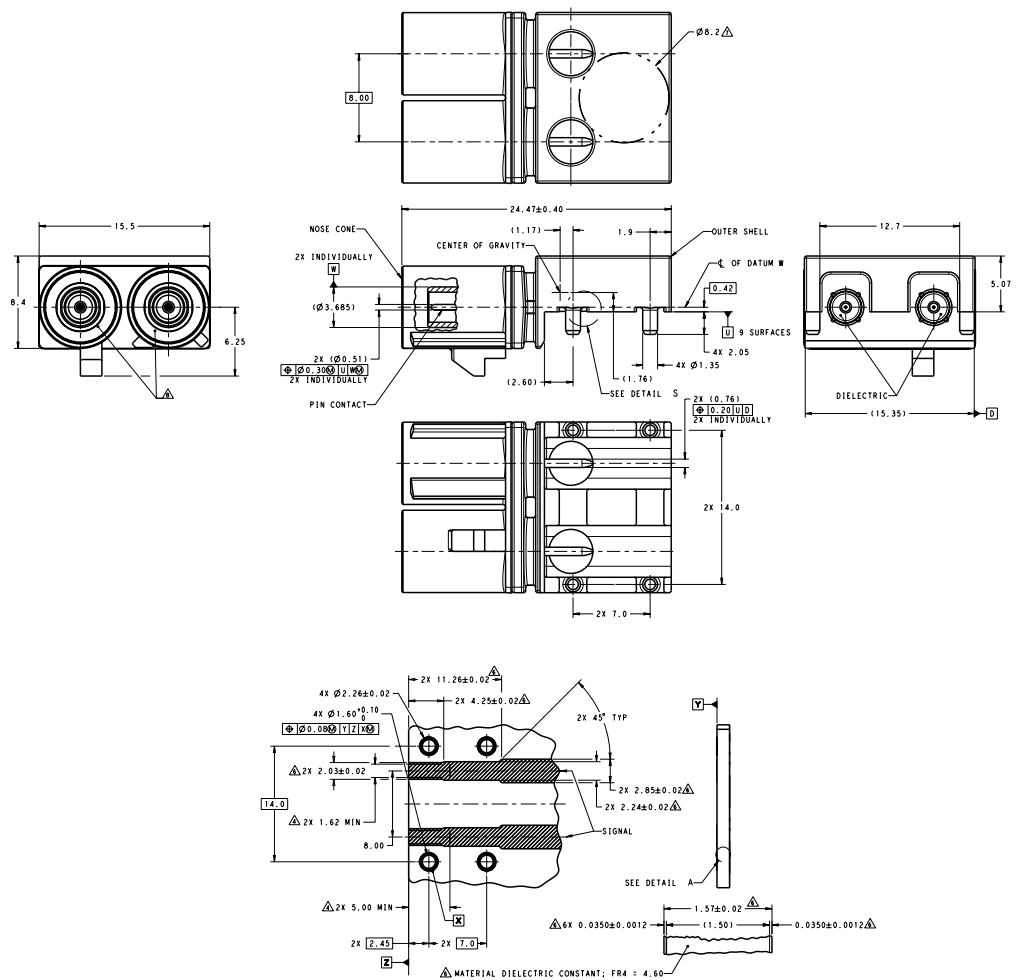
Application Specification:

114-32108

Mating Connector:

Housing part numbers on catalog page 24 mate with this header type.

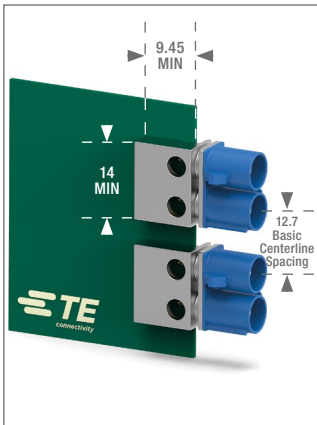
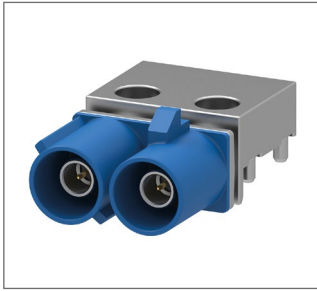
Drawing and recommended PCB layout



2 Position, 6 O'Clock PCB

Keying Options	Nose Cone Color	Header PN (Tray)	Header PN (Tape & Reel)
A	Jet Black	2287922-1	5-2287922-1
B	Cream	2287922-2	5-2287922-2
C	Signal Blue	2287922-3	5-2287922-3
D	Claret Violet	2287922-4	5-2287922-4
E	Leaf Green	2287922-5	5-2287922-5
F	Nut Brown	2287922-6	5-2287922-6
G	Blue Gray	2287922-7	5-2287922-7
H	Heather Violet	2287922-8	5-2287922-8
I	Beige	2287922-9	5-2287922-9
K	Curry	1-2287922-0	6-2287922-0
L	Carmine Red	1-2287922-1	6-2287922-1
M	Pastel Orange	1-2287922-2	6-2287922-2
N	Pastel Green	1-2287922-3	6-2287922-3
Z	Water Blue	2-2287922-0	7-2287922-0

2 Position, 12 O’Clock PCB



Technical Features

No. of Positions:
2

Operating Frequency:
6 GHz

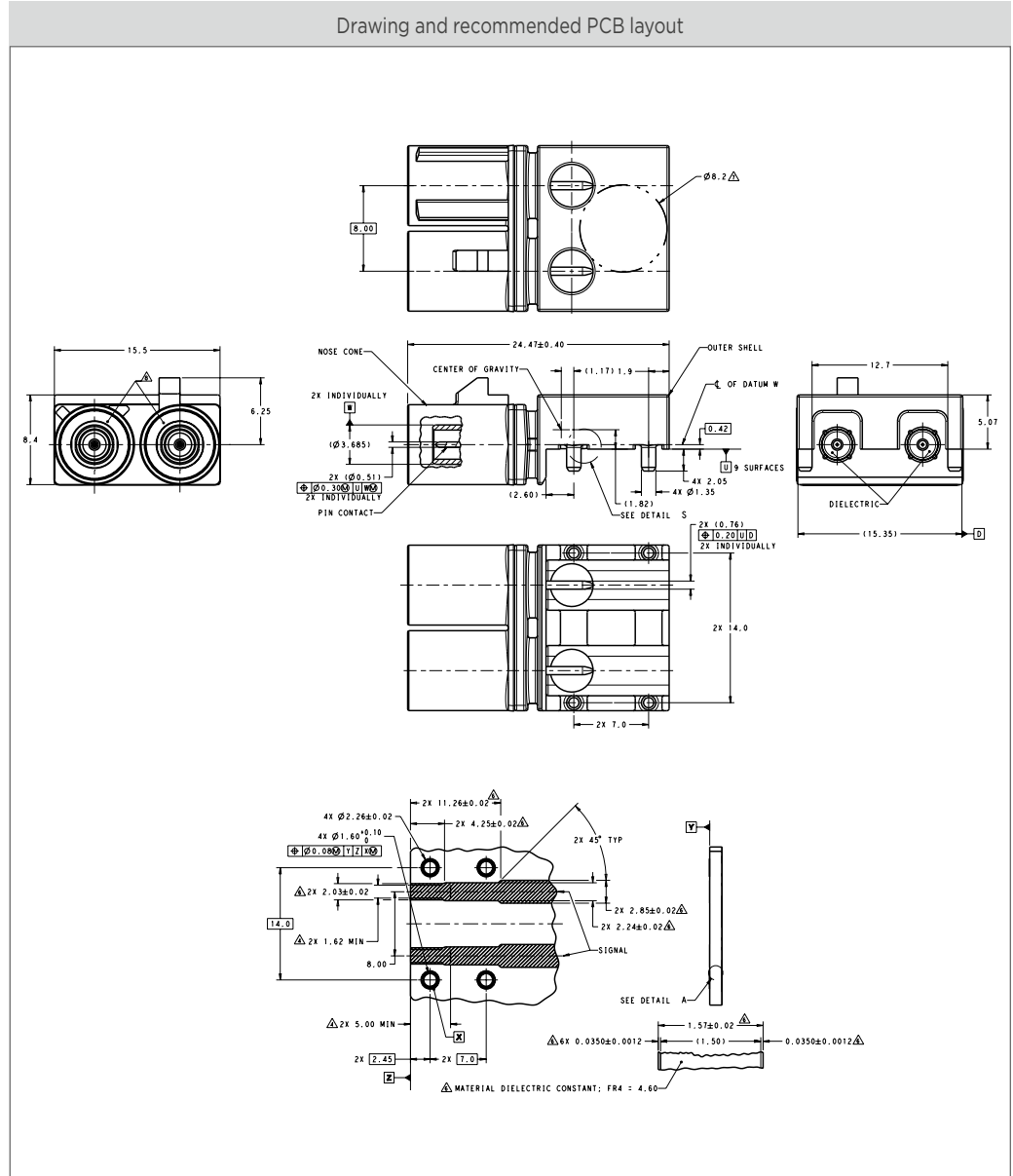
PCB Mounting Style:
Through Hole

Operating Temperature:
-40°C to +105°C

Product Specification:
108-18079

Application Specification:
114-32108

Mating Connector:
Housing part numbers on catalog page 24 mate with this header type.



2 Position, 12 O’Clock PCB

Keying Options	Nose Cone Color	Header PN (Tray)	Header PN (Tape & Reel)
A	Jet Black	2287923-1	5-2287923-1
B	Cream	2287923-2	5-2287923-2
C	Signal Blue	2287923-3	5-2287923-3
D	Claret Violet	2287923-4	5-2287923-4
E	Leaf Green	2287923-5	5-2287923-5
F	Nut Brown	2287923-6	5-2287923-6
G	Blue Gray	2287923-7	5-2287923-7
H	Heather Violet	2287923-8	5-2287923-8
I	Beige	2287923-9	5-2287923-9
K	Curry	1-2287923-0	6-2287923-0
L	Carmine Red	1-2287923-1	6-2287923-1
M	Pastel Orange	1-2287923-2	6-2287923-2
N	Pastel Green	1-2287923-3	6-2287923-3
Z	Water Blue	2-2287923-0	7-2287923-0

FEMALE CONNECTOR KIT

Kit part numbers are provided below to allow for evaluation of the entire connector system. These part numbers are for reference and are not available for sale. Components must be purchased separately.

Visit te.com for STEP files and datasheets.

Unsealed | Female | 180 degree

Housing

Description	Kit Part Number ^{*)}	Female Housing	Retainer / TPA
1 position			
No clip slot	2359319-x	2345653-x	2312641-1
No Clip OEM release	2289729-x	2289724-x	2312641-1
With Clip	2359321-x	2345654-x	2312641-1
Alt Clip	2360031-x	2360021-x	2312641-1
2 position			
No clip slot	2359323-x	2345657-x	2314551-1
No Clip OEM release	2-2289731-x	2289727-x	2314551-1
With Clip	2359325-x	2345658-x	2314551-1
Alt Clip	2360033-x	2360023-x	2314551-1

Terminal Applicable per Cable Type

Description	Kit Part Number ^{*)}	Center Contact	Cavity Insert Subassembly	Outer Ferrule
1.5DS, 462-1/2/5/6, RG-174, RG-174LL, RG 316	2203275-2	2203270-4	2203274-7	2203259-2
RTK-031	2344361-2	2203270-8	2203274-3	2338011-2
2DS-PPFW(TA)	2344361-4	2203270-8	2203274-3	2338011-1
RG- 58, RG-58 LL/, 037-6	2344361-1	1-2203270-9	2203274-1	2338011-1
RTK044	2344361-3	2203270-8	1-2203274-0	2338011-2

Unsealed | Female | 90 degree

Housing

Description	Kit Part Number ^{*)}	Female Housing	Retainer / TPA
1 position			
No clip slot	2291859-x	2291862-x	2291861-1

Terminal Applicable per Cable Type

Description	Kit Part Number ^{*)}	Center Contact	Front Shell Subassembly	Outer Ferrule	Rear Shell
1.5DS, RG-174LL, RG 316	2306475-1	2304634-4	2306474-1	1418993-1	2306472-1
RTK-031	2304626-1	2304634-8	2304628-1	1418993-1	2304631-1
RG- 58, RG-58 LL	2306490-1	1-2304634-0	2306489-1	1488499-3	2306487-1

Sealed Housing and Terminal Kit | Female

Clip Slot	Description	Kit Part Number ^{*)}	Female Housing	Inner Housing	Terminal Kit PN
No	1.5DS, 462, RG-174, RG-174 LL, RG-316	2304242-x	2307383-x	2307194-x	2272870-x
Yes	1.5DS, 462, RG-174, RG-174 LL, RG-316	2-2304242-x	2307361-x	2307194-x	2272870-x

^{*)} Kit part numbers not sealable

1 Position, Female unsealed, 180 degree

Technical Features

No. of Positions:

1

Operating Frequency:

0-6 GHz

Temperature Range:

-40°C to +125°C

Contact Finish:

Gold

Product Specification:

108-32137

Application Specification:

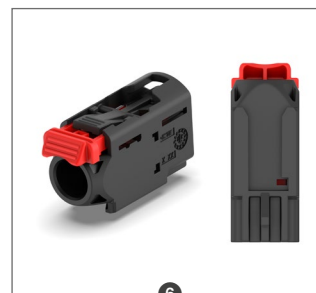
114-32145

Mating Male Connector:


Refer to catalog pages 29, 31

Mating Male Header:

Refer to catalog pages 12, 14, 15, 16, 17, 18, 19



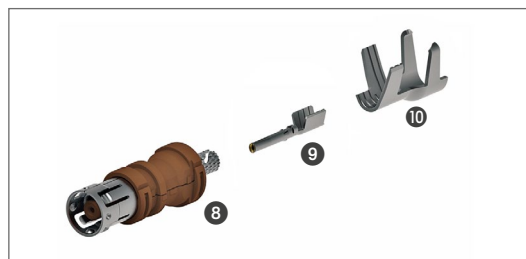
1 Position, Female unsealed, 180 degree

Keying Options	Color	Without CPA				With CPA Kit *)	
		No Clip	No Clip OEM Release Version	With Clip **)	With Alternative Clip ***)	No Clip	With Clip **)
		1	2	3	4	5	6
A	Jet Black	2345653-1	2289724-1	2345654-1	2360021-1	2289729-1	2289730-1
B	Cream	2345653-2	2289724-2	2345654-2	2360021-2	2289729-2	2289730-2
C	Signal Blue	2345653-3	2289724-3	2345654-3	2360021-3	2289729-3	2289730-3
D	Claret Violet	2345653-4	2289724-4	2345654-4	2360021-4	2289729-4	2289730-4
E	Leaf Green	2345653-5	2289724-5	2345654-5	2360021-5	2289729-5	2289730-5
F	Nut Brown	2345653-6	2289724-6	2345654-6	2360021-6	2289729-6	2289730-6
G	Blue Gray	2345653-7	2289724-7	2345654-7	2360021-7	2289729-7	2289730-7
H	Heather Violet	2345653-8	2289724-8	2345654-8	2360021-8	2289729-8	2289730-8
I	Beige	2345653-9	2289724-9	2345654-9	2360021-9	2289729-9	2289730-9
K	Curry	1-2345653-0	1-2289724-0	1-2345654-0	1-2360021-0	1-2289729-0	1-2289730-0
L	Carmine Red	1-2345653-1	1-2289724-1	1-2345654-1	1-2360021-1	1-2289729-1	1-2289730-1
M	Pastel Orange	1-2345653-2	1-2289724-2	1-2345654-2	1-2360021-2	1-2289729-2	1-2289730-2
N	Pastel Green	1-2345653-3	1-2289724-3	1-2345654-3	1-2360021-3	1-2289729-3	1-2289730-3
Z	Water Blue	2-2345653-0	2-2289724-0	2-2345654-0	2-2360021-0	2-2289729-0	2-2289730-0
	TPA/Retainer	2312641-1				Retainer included	

*) CPA Connector comes preloaded with the CPA

**) Clip Slot as per SAE/USCAR-18, EWCAP-005-7

***) Per Japanese OEM design



Cable Type	Cable Diameter	Cavity Insert Subassembly	Center Contact	Outer Ferrule
		8	9	10
1.5DS, 462-1/2/5/6, RG-174, RG-174LL, RG 316	2.67 mm to 2.86 mm	2203274-7	2203270-4	2203259-2
RTK-031	3.3 mm (0.13 in)	2203274-3	2203270-8	2338011-2
2DS-PPFW(TA), 2DS	4.20 mm (0.165 in)	2203274-3	2203270-8	2338011-1
RG- 58, RG-58 LL/037-6	4.95 mm (0.195 in)	2203274-1	1-2203270-9	2338011-1
RTK 044	3.55 mm	1-2203274-0	2203270-8	2338011-3

Female Interface per ISO-20860-1, ISO-20860-2, SAE/USCAR-17, SAE/USCAR-18. TPA/Retainer to be purchased separately. Housings and TPA packaged loose. All other components packaged on reel.

2 Position, Female unsealed, 180 degree, 0.8 mm centerline

Technical Features

No. of Positions:

1

Operating Frequency:

0-6 GHz

Temperature Range:

-40°C to +125°C

Contact Finish:

Gold

Housing:

Polyester PBT

Product Specification:

108-32137

Application Specification:

114-32145

Mating Male Connector:

Refer to catalog page 30

Mating Male Header:

Refer to catalog pages 13, 20, 21



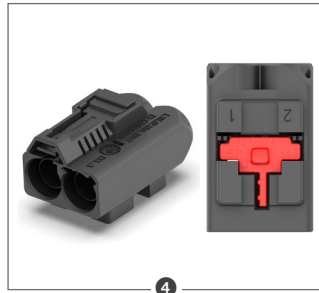
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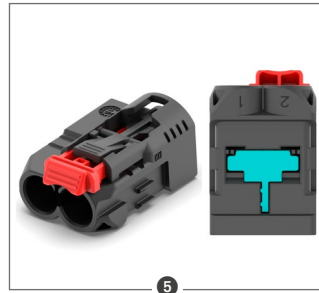
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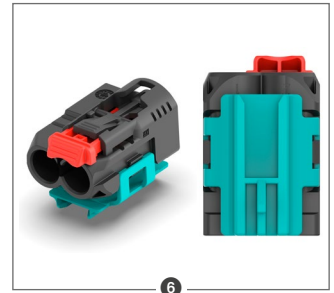
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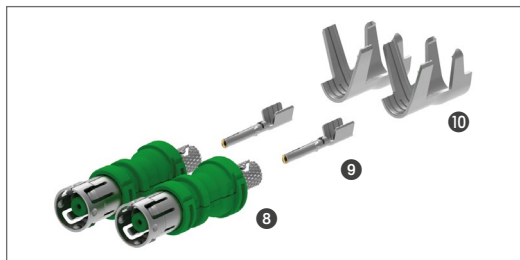
2 Position, Female unsealed, 180 degree, 0.8 mm centerline

Keying Options	Color	Without CPA				With CPA Kit *)	
		No Clip 1	No Clip OEM Release Version 2	With Clip **) 3	With Alternative Clip ***) 4	No Clip 5	With Clip **) 6
A	Jet Black	2345657-1	2289727-1	2345658-1	2360023-1	2289731-1	2289732-1
B	Cream	2345657-2	2289727-2	2345658-2	2360023-2	2289731-2	2289732-2
C	Signal Blue	2345657-3	2289727-3	2345658-3	2360023-3	2289731-3	2289732-3
D	Claret Violet	2345657-4	2289727-4	2345658-4	2360023-4	2289731-4	2289732-4
E	Leaf Green	2345657-5	2289727-5	2345658-5	2360023-5	2289731-5	2289732-5
F	Nut Brown	2345657-6	2289727-6	2345658-6	2360023-6	2289731-6	2289732-6
G	Blue Gray	2345657-7	2289727-7	2345658-7	2360023-7	2289731-7	2289732-7
H	Heather Violet	2345657-8	2289727-8	2345658-8	2360023-8	2289731-8	2289732-8
I	Beige	2345657-9	2289727-9	2345658-9	2360023-9	2289731-9	2289732-9
K	Curry	1-2345657-0	1-2289727-0	1-2345658-0	1-2360023-0	1-2289731-0	1-2289732-0
L	Carmine Red	1-2345657-1	1-2289727-1	1-2345658-1	1-2360023-1	1-2289731-1	1-2289732-1
M	Pastel Orange	1-2345657-2	1-2289727-2	1-2345658-2	1-2360023-2	1-2289731-2	1-2289732-2
N	Pastel Green	1-2345657-3	1-2289727-3	1-2345658-3	1-2360023-3	1-2289731-3	1-2289732-3
Z	Water Blue	2-2345657-0	2-2289727-0	2-2345658-0	2-2360023-0	2-2289731-0	2-2289732-0
	TPA/Retainer		2314551-1		2314551-1	Retainer included	

*) CPA Connector comes preloaded with the CPA

**) Clip Slot as per SAE/USCAR-18, EWCAP-005-7

***) Per Japanese OEM design



Female Interface per ISO-20860-1, ISO-20860-2, SAE/USCAR-17, SAE/USCAR-18.
TPA/Retainer to be purchased separately.
Housings and TPA packaged loose.
All other components packaged on reel.

Cable Type	Cable Diameter	Cavity Insert Subassembly 8	Center Contact 9	Outer Ferrule 10
.5DS, 462-1/2/5/6, RG-174, RG-174LL, RG 316	2.67 mm to 2.86 mm	2203274-7	2203270-4	2203259-2
RTK-031	3.3 mm (0.13 in)	2203274-3	2203270-8	2338011-2
2DS-PPFW(TA), 2DS	4.20 mm (0.165 in)	2203274-3	2203270-8	2338011-1
RG-58, RG-58 LL/037-6	4.95 mm (0.195 in)	2203274-1	1-2203270-9	2338011-1
RTK 044	3.55 mm	1-2203274-0	2203270-8	2338011-3

1 Position, Female unsealed, 90 degree

Technical Features

No. of Positions:
1

Operating Frequency:
0-6 GHz

Temperature Range:
-40°C to +125°C

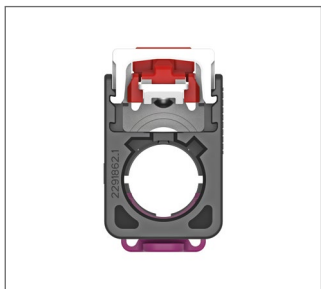
Contact Finish:
Gold

Product Specification:
108-162003

Application Specification:
114-32217

Mating Male Connector:
Refer to catalog pages 29, 31

Mating Male Header:
Refer to catalog pages 12, 14, 15, 16, 17, 18, 19



1 Position, Female unsealed, 90 degree

Keying Options	Color	With CPA *)	
		No Clip	
A	Jet Black	2291859-1	
B	Cream	2291859-2	
C	Signal Blue	2291859-3	
D	Claret Violet	2291859-4	
E	Leaf Green	2291859-5	
F	Nut Brown	2291859-6	
G	Blue Gray	2291859-7	
H	Heather Violet	2291859-8	
I	Beige	2291859-9	
K	Curry	1-2291859-0	
L	Carmine Red	1-2291859-1	
M	Pastel Orange	1-2291859-2	
N	Pastel Green	1-2291859-3	
Z	Water Blue	2-2291859-0	



Center contact packaged on reel.
 Ferrule, housing, front shell assembly and rear shell packaged loose.
 Female interface per ISO-20860-1, ISO-20860-2, SAE/USCAR-17, SAE/USCAR-18.

*) Housing comes preinstalled with retainer, ball bearing, CPA and TPA/Retainer.

Cable Type	Cable Diameter	Front Shell Subassembly ①	Female Center Contact ②	Rear Shell ③	Ferule ④
1.5DS, RG-174LL, RG 316	2.67 mm to 2.86 mm	2306474-1	2304634-4	2306472-1	1418993-1
RTK-031	3.3 mm (0.13 in)	2304628-1	2304634-8	2304631-1	1418993-1
RG-58, RG-58 LL	4.95 mm (0.195 in)	2306489-1	1-2304634-0	2306487-1	1488499-3

1 Position, Female sealed, 180 degree

Technical Features

No. of Positions:

1

Operating Frequency:

0-6 GHz

Temperature Range :

-40°C to +125°C

Contact Finish :

Gold

Product Specification:

108-94089

Application Specification:

114-32217

Mating Male Connector:

Refer to catalog pages 29, 31

Mating Male Header:

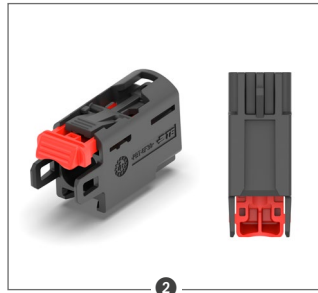
Refer to catalog pages 12, 14, 15, 16, 17, 18, 19



1



3



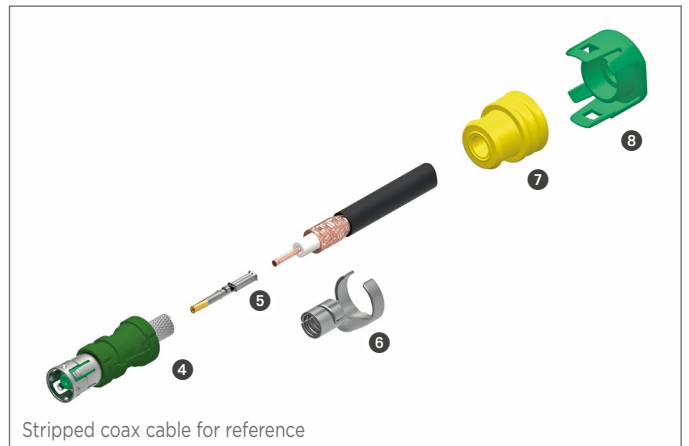
2



Exploded view connector

1 Position, Female sealed, 180 degree

Keying Options	Color	With CPA Kit	
		No Clip 1	With Clip **) 2
A	Jet Black	2307383-1	2307361-1
B	Cream	2307383-2	2307361-2
C	Signal Blue	2307383-3	2307361-3
D	Claret Violet	2307383-4	2307361-4
E	Leaf Green	2307383-5	2307361-5
F	Nut Brown	2307383-6	2307361-6
G	Blue Gray	2307383-7	2307361-7
H	Heather Violet	2307383-8	2307361-8
I	Beige	2307383-9	2307361-9
K	Curry	1-2307383-0	1-2307361-0
L	Carmin Red	1-2307383-1	1-2307361-1
M	Pastel Orange	1-2307383-2	1-2307361-2
N	Pastel Green	1-2307383-3	1-2307361-3
Z	Water Blue	2-2307383-0	2-2307361-0



Stripped coax cable for reference

Ferrule and center contact packaged on reel.
Housing, front shell assembly and rear shell packaged loose
Female interface per ISO-20860-1, ISO-20860-2, SAE/USCAR-17,
SAE/USCAR-18.

**) Clip Slot as per SAE/USCAR-18, EWCAP-005-7

Cable Type	Cable Diameter	Inner Housing	Cavity Insert Subassembly	Center Contact	Outer Ferrule	Wire Seal	Seal Cover
		3	4	5	6	7	8
.5DS, 462-1/2/5/6, RG-174, RG-174LL, RG 316	2.67 mm to 2.86 mm	2307194-2	2203274-7	2203270-4	2272633-2	963244-1	2289592-2
RTK-031	3.3 mm (0.13 in)		2203274-3	2203270-8	2272633-3	963245-1	2289592-3
2DS	4.20 mm (0.165 in)		2203274-3	2203270-8	2272633-5	967011-1	2289592-5
RG-58, RG-58 LL	4.95 mm (0.195 in)		2203274-1	1-2203270-9	2272633-4	968043-1	2289592-4
462-6	2.8 mm		2203274-7	2203270-4	2272633-2	963244-1	2289592-2
037-6	4.95 mm		2203274-1	1-2203270-9	2272633-4	968043-1	2289592-4
RTK044	3.55 mm		1-2203274-0	2203270-8	2272633-4	963245-1	2289592-3

1 Position, Female sealed, 90 degree

Technical Features

No. of Positions:
1

Operating Frequency:
0-6 GHz

Temperature Range:
-40°C to +125°C

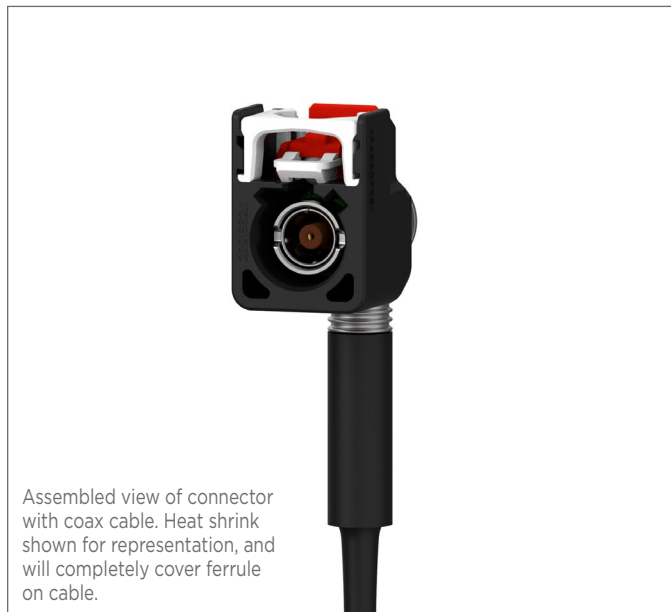
Contact Finish:
Gold

Product Specification:
108-162005

Application Specification:
114-162005 Rev B

Mating Male Connector:
Refer to catalog pages 29, 31

Mating Male Header:
Refer to catalog pages 12, 14, 15, 16, 17, 18, 19



1 Position, Female sealed, 90 degree

Keying Options	Color	With CPA Kit *)	
		No Clip	
A	Jet Black	2291859-1	
B	Cream	2291859-2	
C	Signal Blue	2291859-3	
D	Claret Violet	2291859-4	
E	Leaf Green	2291859-5	
F	Nut Brown	2291859-6	
G	Blue Gray	2291859-7	
H	Heather Violet	2291859-8	
I	Beige	2291859-9	
K	Curry	1-2291859-0	
L	Carmine Red	1-2291859-1	
M	Pastel Orange	1-2291859-2	
N	Pastel Green	1-2291859-3	
Z	Water Blue	2-2291859-0	



Center contact packaged on reel.
Ferrule, housing, front shell assembly and rear shell packaged loose.
Female interface per ISO-20860-1, ISO-20860-2, SAE/USCAR-17, SAE/USCAR-18.

*) Housing comes preinstalled with retainer, ball bearing, CPA and TPA/Retainer.

Cable Type	Cable Diameter	Terminal Kit Part Number **)
RG-174	2.67 mm to 2.86 mm	2301906-1
1.5DS	3.0 mm (0.118 in)	2299077-1
RTK-031	3.3 mm (0.13 in)	2301907-1
RG-58, RG-58 LL	4.95 mm (0.195 in)	2301908-1

**) Kit part numbers not sealable

Cable Type	Terminal Kit PN	Plug Sub-Assy	Male Contact	Ferrule	Heat Shrink
RG-174LL	2301906-1	2301903-1	1-2297252-2	1-413889-3	
RTK031	2301907-1	2301904-1	1-2297252-4	1418993-1	
RG-58LL	2301908-1	2301905-1	1-2297252-5	1488499-3	543633P062
1.5DS	2299077-1	2298742-1	1-2297252-2	1-413889-4	

MALE CONNECTOR KIT

Kit part numbers are provided below to allow for evaluation of the entire connector system. These part numbers are for reference and are not available for sale. Components must be purchased separately.

Visit te.com for STEP files and datasheets.

Unsealed | Male | 180 degree

Housing

Description	Kit Part Number ^{*)}	Male Housing	Retainer / TPA
1 position			
No clip slot	2359318-x	2203571-x	2312640-1
With clip	2359320-x	2345652-x	2312640-1
Alt clip	2360020-x	2360030-x	2312640-1
2 position			
No clip slot	2359322-x	2203575-x	2314550-1
With clip	2359324-x	2345656-x	2314550-1

Terminal Applicable per Cable Type

Description	Kit Part Number ^{*)}	Center Contact	Cavity Insert Subassembly	Outer Ferrule
1.5DS, 462-1/2/5/6, RG-174, RG-174LL, RG 316	2203265-2	2203260-4	2203264-7	2203259-2
RTK-031	2344360-2	2203260-8	2203264-8	2338011-2
2DS-PPFW(TA)	2344360-4	2203260-8	2203264-8	2338011-1
RG- 58, RG-58 LL/037-6	2344360-1	1-2203260-9	2203264-9	2338011-1
RTK044	2344360-3	2203260-8	1-2203264-0	2338011-2

Sealed | Male | 180 degree

Clip Slot	Description	Kit Part Number ^{*)}	Male Housing	Inner Housing	Cable Assembly Kit
No	1.5DS, 462, RG-174, RG-174 LL, RG-316	2304240-x	2307198-x	2307193-1	2272865-x
Yes		2-2304240-x	2307199-x	2307193-1	2272865-x

^{*)} Kit part numbers not sealable

1 Position, Male unsealed, 180 degree

Technical Features

No. of Positions:

1

Operating Frequency:

0-6 GHz

Temperature Range:

-40°C to +125°C

Contact Finish:

Gold

Product Specification:

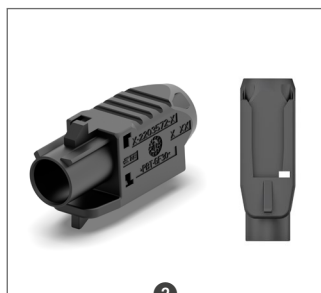
108-32137

Application Specification:

114-32145

Mating Female Connector:

Refer to catalog pages 23, 25, 26 and 27



1 Position, Male unsealed, 180 degree

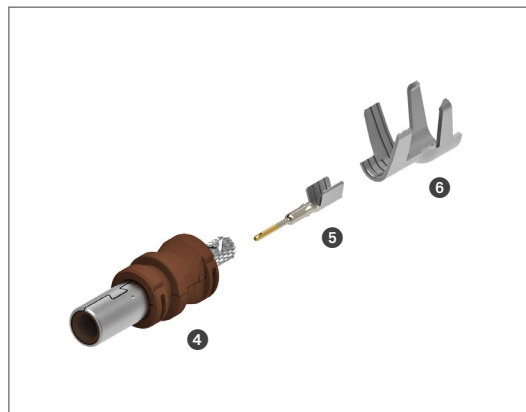
Keying Options	Color	No Clip	With Clip *)	With Alternative Clip **)
		1	2	3
A	Jet Black	2203571-1	2345652-1	2360030-1
B	Cream	2203571-2	2345652-2	2360030-2
C	Signal Blue	2203571-3	2345652-3	2360030-3
D	Claret Violet	2203571-4	2345652-4	2360030-4
E	Leaf Green	2203571-5	2345652-5	2360030-5
F	Nut Brown	2203571-6	2345652-6	2360030-6
G	Blue Gray	2203571-7	2345652-7	2360030-7
H	Heather Violet	2203571-8	2345652-8	2360030-8
I	Beige	2203571-9	2345652-9	2360030-9
K	Curry	1-2203571-0	1-2345652-0	1-2360030-0
L	Carmine Red	1-2203571-1	1-2345652-1	1-2360030-1
M	Pastel Orange	1-2203571-2	1-2345652-2	1-2360030-2
N	Pastel Green	1-2203571-3	1-2345652-3	1-2360030-3
Z	Water Blue	2-2203571-0	2-2345652-0	2-2360030-0
	TPA/Retainer **)		2312640-1	

Male Interface per ISO-20860-1, ISO-20860-2, SAE/USCAR-17, SAE/USCAR-18.
TPA/Retainer to be purchased separately. Housings and TPA packaged loose. All other components packaged on reel.

*) Clip Slot as per SAE/USCAR-18, EWCAP-005-7 **) Per Japanese OEM design

Terminal Applicable per Cable Type

Cable Type	Cable Diameter	Cavity Insert Subassembly	Center Contact	Outer Ferrule
		4	5	6
1.5DS, 462-1/2/5/6, RG-174, RG-174LL, RG 316	2.67 mm to 2.86 mm	2203264-7	2203260-4	2203259-2
RTK-031	3.3 mm (0.13 in)	2203264-8	2203260-8	2338011-2
2DS-PPFW (TA), 2DS	4.20 mm (0.165 in)	2203264-8	2203260-8	2338011-1
RG- 58, RG-58 LL, 037-6	4.95 mm (0.195 in)	2203264-9	1-2203260-9	2338011-1
RTK 044	3.55 mm	1-2203264-0	2203260-8	2338011-3



USCAR is a trademark

2 Position, Male unsealed, 180 degree

Technical Features

No. of Positions:
2

Operating Frequency:
0-6 GHz

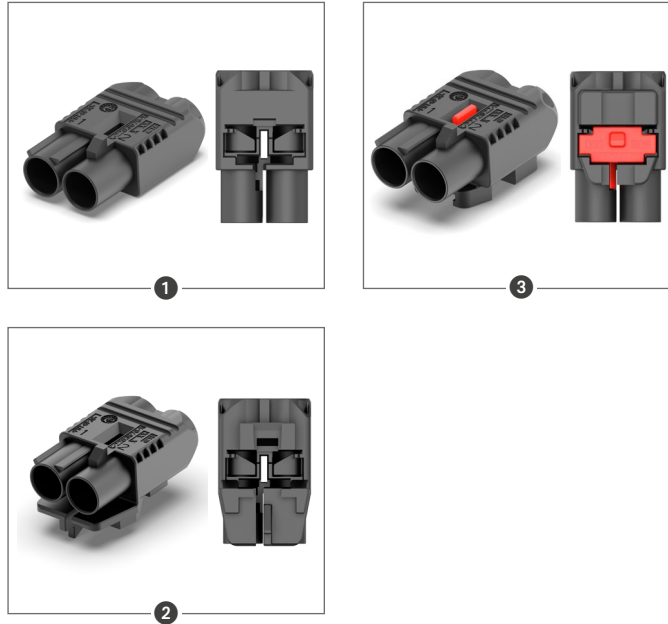
Temperature Range:
-40°C to +125°C

Contact Finish:
Gold


Product Specification:
108-32137

Application Specification:
114-32145

Mating Female Connector:
Refer to catalog page 24



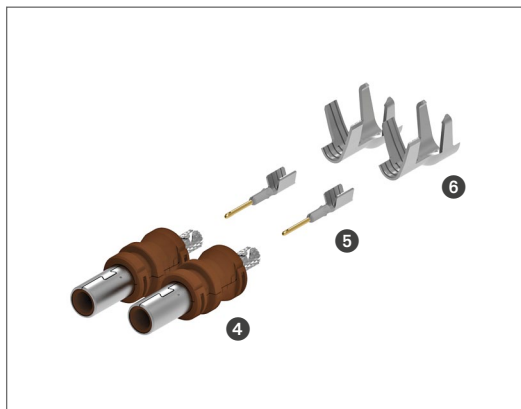
2 Position, Male unsealed, 180 degree

Keying Options	Color	No Clip	With Clip *)	With Alternative Clip **)
		1	2	3
A	Jet Black	2203575-1	2345656-1	2272922-1
B	Cream	2203575-2	2345656-2	2272922-2
C	Signal Blue	2203575-3	2345656-3	2272922-3
D	Claret Violet	2203575-4	2345656-4	2272922-4
E	Leaf Green	2203575-5	2345656-5	2272922-5
F	Nut Brown	2203575-6	2345656-6	2272922-6
G	Blue Gray	2203575-7	2345656-7	2272922-7
H	Heather Violet	2203575-8	2345656-8	2272922-8
I	Beige	2203575-9	2345656-9	2272922-9
K	Curry	1-2203575-0	1-2345656-0	1-2272922-0
L	Carmine Red	1-2203575-1	1-2345656-1	1-2272922-1
M	Pastel Orange	1-2203575-2	1-2345656-2	1-2272922-2
N	Pastel Green	1-2203575-3	1-2345656-3	1-2272922-3
Z	Water Blue	2-2203575-0	2-2345656-0	2-2272922-0
	TPA/Retainer **)	Changed		2272925-1

Male Interface per ISO-20860-1, ISO-20860-2, SAE/USCAR-17, SAE/USCAR-18.

TPA/Retainer to be purchased separately. Housings and TPA packaged loose. All other components packaged on reel.

*) Clip Slot as per SAE/USCAR-18, EWCAP-005-7 **) Per Japanese OEM design



Terminal Applicable per Cable Type

Cable Type	Cable Diameter	Cavity Insert Subassembly	Center Contact	Outer Ferrule
		4	5	6
1.5DS, 462-1/2/5/6, RG-174, RG-174LL, RG 316	2.67 mm to 2.86 mm	2203264-7	2203260-4	2203259-2
RTK-031	3.3 mm (0.13 in)	2203264-8	2203260-8	2338011-2
2DS-PPFW (TA), 2DS	4.20 mm (0.165 in)	2203264-8	2203260-8	2338011-1
RG- 58, RG-58 LL, 037-6*	4.95 mm (0.195 in)	2203264-9	1-2203260-9	2338011-1
RTK 044	3.55 mm	1-2203264-0	2203260-8	2338011-3

1 Position, Male sealed, 180 degree

Technical Features

No. of Positions:

1

Operating Frequency:

0-6 GHz

Temperature Range:

-40°C to +125°C

Contact Finish:

Gold

Housing:

Polyester PBT

Product Specification:

108-32137

Application Specification:

114-32145

Mating Female Connector:

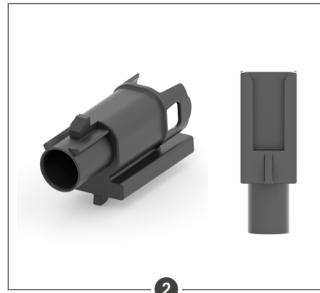
Refer to catalog pages 23, 25, 26 and 27



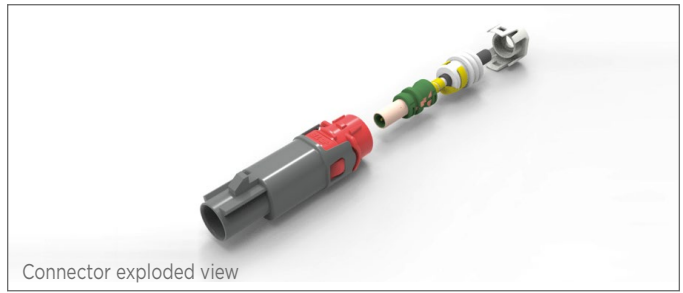
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3



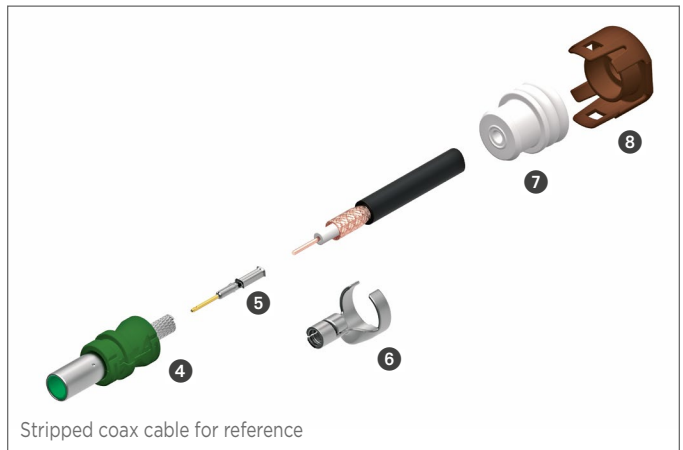
2



Connector exploded view

1 Position, Male sealed, 180 degree

Keying Options	Color	No Clip 1	With Clip 2
A	Jet Black	2307198-1	2307199-1
B	Cream	2307198-2	2307199-2
C	Signal Blue	2307198-3	2307199-3
D	Claret Violet	2307198-4	2307199-4
E	Leaf Green	2307198-5	2307199-5
F	Nut Brown	2307198-6	2307199-6
G	Blue Gray	2307198-7	2307199-7
H	Heather Violet	2307198-8	2307199-8
I	Beige	2307198-9	2307199-9
K	Curry	1-2307198-0	1-2307199-0
L	Carmine Red	1-2307198-1	1-2307199-1
M	Pastel Orange	1-2307198-2	1-2307199-2
N	Pastel Green	1-2307198-3	1-2307199-3
Z	Water Blue	2-2307198-0	2-2307199-0



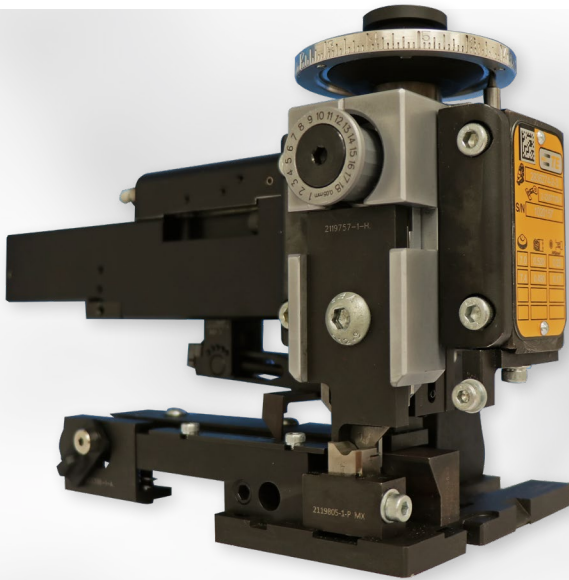
Stripped coax cable for reference

Housings packaged loose. All other components packaged on reel
 Male interface per ISO-20860-1, ISO-20860-2, SAE/USCAR-17, SAE/USCAR-18.

Terminal Applicable per Cable Type

Cable Type	Cable Diameter	Inner Housing Subassembly	Cavity Insert Subassembly	Center Contact	Outer Ferrule	Wire Seal	Seal Cover
		3	4	5	6	7	8
1.5DS, 462-5, RG-174, RG-174LL, RG 316	2.67 mm to 2.86 mm	2307193-1	2203264-7	2203260-4	2272633-2	963244-1	2289592-2
RTK-031	3.3 mm (0.13 in)		2203264-8	2203260-8	2272633-3	963245-1	2289592-3
2DS	4.20 mm (0.165 in)		2203264-8	2203260-8	2272633-5	967011-1	2289592-5
RG-58, RG-58 LL	4.95 mm (0.195 in)		2203264-9	1-2203260-9	2272633-4	968043-1	2289592-4
462-6	2.8 mm		2203264-7	2203260-4	2272633-2	963244-1	2289592-2
037-6	4.95 mm		2203264-9	1-2203260-0	2272633-4	968043-1	2289592-4
RTK 044	3.55 mm		1-2203264-0	2203260-8	2272633-4	963245-1	2289592-3

Images representative of tool type only.



APPLICATION TOOLING

TE Connectivity's business unit Application Tooling is dedicated to providing equipment with high quality, flexibility, reliability and productivity while meeting all levels of the product specification.

Our equipment range is vast and almost unmatched by others operating in the same industry segments, as is our global presence and support network in the form of field service engineers and product managers. We supply everything from simple hand tools to the most complex automated systems.

FAKRA Automated Assembly Process

The lead and harness industry of today is more price and quality competitive than ever before. The whole cable assembly process, as well as its crimping standards, continue to be raised to higher levels of quality and flexibility.

With the knowledge and experience of over a half century designing and manufacturing proven platforms of applicators and tooling, TE Connectivity has taken the modular concept to a new level by providing a dedicated system for FAKRA assembly lines.

Modules are programmed to provide additional quality control in each station, helping to avoid a defective crimp from going to the next stage of the process. This is ideal for customers who are looking for a high quality but affordable solution for low to medium volumes.

A modular system contains the following equipment:

- (4) GII Terminators with Crimp Quality Monitors (CQM II)
- (2) OCEAN 2.0 applicators (w/data connectivity) to crimp the center contact
- (2) OCEAN 2.0 applicators (w/data connectivity) or loose piece applicators (w/data connectivity) to crimp the ferrule
- (2) Center component assembly stations
- (1) Concentricity inspection tester
- (1) Cable electric tester and printer
- Powerful searches to find generic equipment options (Hand Tools / Applicators)
- Brochures and more detailed flyers for the specialized equipment.
- It's quick, easy and more importantly the latest and most up to date information is available online.

Regional Assistance

www.te.com/support-center

TE CONNECTIVITY ONLINE

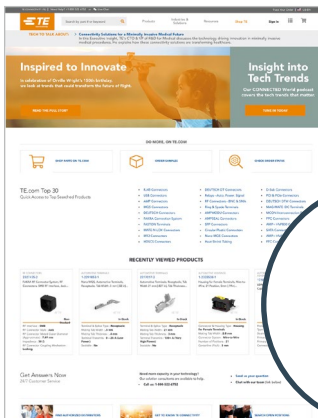
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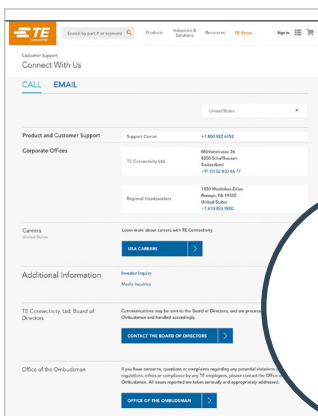
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