

Amphenol® RF


AUTOMATE®

MINI-FAKRA

NEXT-GENERATION
AUTOMOTIVE CONNECTOR SERIES



ABOUT AMPHENOL RF

Amphenol RF, a division of Amphenol Corporation, is the largest manufacturer of radio frequency connectors, coaxial adapters and RF cable assemblies in the world.

With a global team of experienced engineers, Amphenol RF is able to offer the broadest portfolio of standard RF products on the market today.

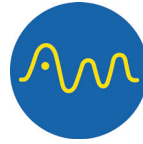
As a leader in design and manufacturing of RF interconnect products, our dedicated team of engineers specialize in custom product development to meet the challenges of design-specific constraints.

GLOBAL PRESENCE



With a global presence, Amphenol RF has experienced engineers and production capabilities in multiple regions across the globe. Our experienced cross-functional teams oversee the entire process from the initial design through delivery, and beyond.

Amphenol RF has a global footprint of operations in North America, Europe and Asia.



AUTOMOTIVE MARKET OVERVIEW

The automotive industry has been revolutionized with the increased adoption of telematics in vehicles including GPS, Cellular, Bluetooth Wi-Fi and Satellite Radio. No longer are satellite navigation systems and sophisticated in-vehicle entertainment confined solely to the luxury end of the market. As advancements in telematics become more reliable, available and inexpensive, vehicles are transforming into intelligent platforms for enabling mobile life. With the evolution in communications technology, RF components have also become integral in enabling sensors to efficiently send and receive data for increased passenger protection.

As this technology continues to evolve, we are seeing an increased crossover between automotive and industrial applications. Amphenol RF is proud to support the content that drives innovation and safety in vehicles.

TECHNOLOGIES & APPLICATIONS:

- Autonomous Vehicles
- Advanced Driver Assistance Systems (ADAS)
- 360° Surround View Cameras
- GPS Navigation
- 3D Instrument Cluster
- High Bandwidth Infotainment
- Remote Start and Vehicle Control
- Antenna Connections
- V2X Communication
- Robotics
- Last Mile Delivery
- Drones

AUTOMATE® CONNECTOR SERIES

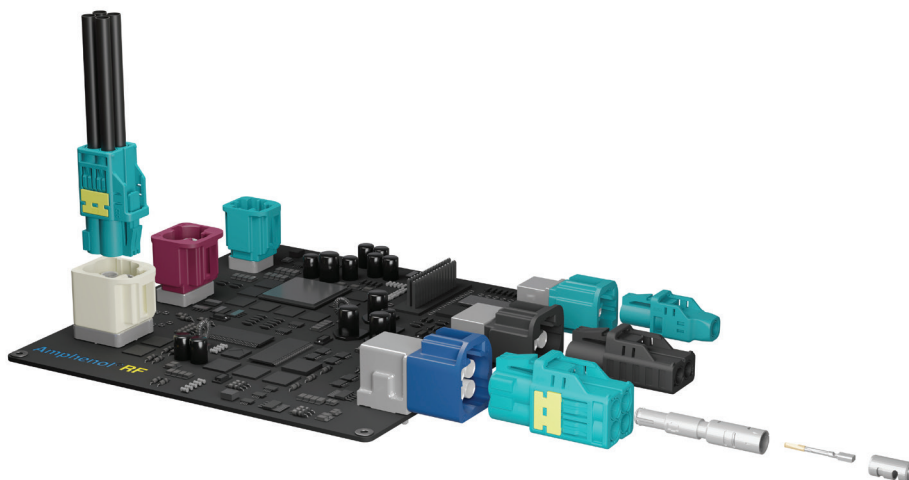
OVERVIEW

The AUTOMATE® connector series, the latest in automotive interconnect technology, is a space-conscious, high-performance interface central to the next generation of vehicle applications. Supporting up to 20 Gbps data transmission rates, these connectors are able to reduce installation space requirements by up to 80% compared with previous FAKRA products.

The AUTOMATE® series is able to adapt to evolving trends in the automotive industry with single, dual and quad port configurations. Color-coded housings provide visual guidance during the assembly process and mechanical keying options prevent mismatching of connectors. Foolproof installation is aided by industry leading mating forces.

This series is available in two distinct design types – Type A is compatible with the Rosenberger HFM® series and Type B is compatible with TE's Connectivity's MATE-AX series. Both of these designs are manufactured with ruggedized, impact-resistant bodies that allow them to be used in applications that experience constant movement.

Various RF connectors and cable assembly configurations are available in both design types.



Straight and right-angle versions available in single, dual and quad-port configurations for PCB and cable-mount designs.

FEATURES & BENEFITS



Reduced package size
reduces installation space
requirements by up to 80%

Supports high-bandwidth
applications with data
rates up to 20 Gbps



Closed entry interface limits
the size of mating parts to
prevent damage when mating

- Low 45 N mating force ideal for high-density, multi-port applications
- Rugged, impact resistant housing
- Mechanically and visually keyed to eliminate installation errors and prevent mis-mating
- Modular multi-port design with single, dual and quad port PCB and cable mount options
- One piece terminal outer contact eliminates process induced performance variation.
- Connector Position Assurance (CPA) designed to prevent accidental disengagement
- Terminal Position Assurance (TPA) offers a secondary locking feature
- Supports popular coaxial cable types such as industry-standard TFC-302LL and equivalent
- Cost-conscious design for high-volume production

AUTOMATE MINI-FAKRA ORDERING INFORMATION

F M 4 - N X S J - C 3 0 W 0

Series

FM = AUTOMATE®
Mini-FAKRA Product Series

Port Configuration & Compatibility

1- = Single Port Type A (HFM® Compatible)
2- = Dual Port Type A (HFM® Compatible)
4- = Quad Port Type A (HFM® Compatible)
B1 = Single Port Type B (Mate-Ax Compatible)
B2 = Dual Port Type B (Mate-Ax Compatible)
B4 = Quad Port Type B (Mate-Ax Compatible)

Tab Location

N = North S = South
E = East W = West

Key Code: See Key Code Chart

Style

S = Straight R = Right-Angle

Gender

J = Jack P = Plug

Termination

Cable Mount Connectors
-C01 = Compatible with RG-174, RG-316, DACAR 462
-C30 = Compatible with TFC302, RTK031, DACAR 302

-PCB = Printed Circuit Board

Options

W0 = No clip provision (Jack only)
W1 = No clip provision (Plug only)
W6 = With clip provision

Note: All AUTOMATE Mini-FAKRA connectors have TPAs

Suffix may vary for PCB part products, please consult factory.

Please contact Amphenol RF for custom configurations.

TYPE A

TECHNICAL SPECIFICATIONS

Electrical

Impedance		50 Ω Nominal
Frequency Range		DC - 15 GHz (20 Gb/s Data Throughput)
Return Loss		≤ 25 dB, DC - 3 GHz
		≤ 20 dB, 3 - 6 GHz
		≤ 15 dB, 6 - 12 GHz
		≤ 12 dB, 12 - 15 GHz
Test Voltage		800 VRMS
Working Voltage		60 VDC
Current Rating ≤ 1 A DC	Center Contact Resistance	< 15 mΩ
	Outer Contact Resistance	< 5 mΩ

Mechanical

Mating Cycles	25 Cycles Min.
Engagement Force	≤ 45N
Disengagement Force	> 2N

Environmental

Temperature Range	-40°C to +105°C
RoHS	Compliant

Material

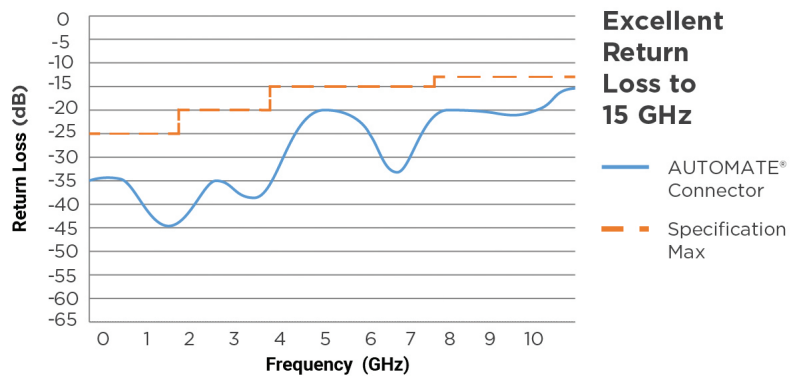
	PCB	Cable
Body	Zinc Alloy, Matte Tin Finish	N/A
Outer Contact	Brass, Matte Tin Finish	Copper -Nickel Alloy, Matte Tin Finish
Center Contact	Copper-Nickel Alloy, Gold Finish	Copper-Nickel Alloy, Gold Finish
Housing	Nylon	PBT
Insulator	LCP	PPE+PS

Note: Technical specifications are typical and may vary by specific part number and design. See component drawing for additional details.

SUPPORTED 50 OHM COAXIAL CABLES

Amphenol Cable Group	Amphenol Cable Type	Alternative Cables	Temp Range	Jacket OD (mm)	Center Cond. OD (mm)
C01	TFC-1-5	JIS 1 5D S-QFB (TA)	-40°C to +105°C	3.00	0.61 (Stranded)
C01	RG-174LL 105C Flex	Dacar 462	-40°C to +105°C	2.74	0.50 (Stranded)
C01	RG-174LL 105C High Flex	Dacar 464-2, 464-6	-40°C to +125°C	2.79	0.50 (Stranded)
C30	TFC-302LL	Dacar 302, RTK 031	-40°C to +105°C	3.30	0.81 (Stranded)
C36	TFC RTK 044	RTK 044	-40°C to +105°C	3.60	0.86 (Solid)

AUTOMATE® TYPE A
RETURN LOSS
RF PERFORMANCE



The AUTOMATE® Type A Mini-FAKRA series is compatible with the Rosenberger HFM® series.

TYPE B

TECHNICAL SPECIFICATIONS

Electrical

Impedance	50 Ω Nominal
Frequency Range	DC - 15 GHz (20 Gb/s Data Throughput)
Return Loss	≥ 20 dB, DC - 6 GHz
	≥ 15 dB, 6 - 9 GHz
Test Voltage	750 VRMS
Working Voltage	60 VDC
Current Rating	≤ 3 A DC
Center Contact Resistance	< 15 m Ω
Outer Contact Resistance	< 7.5 m Ω

Mechanical

Mating Cycles	25 Cycles Min.
Engagement Force	≤ 75 N
Disengagement Force	≥ 5 N

Environmental

Temperature Range	-40°C to +105°C
RoHS	Compliant

Material

	PCB	Cable
Body	Zinc Alloy, Matte Tin Finish	N/A
Outer Contact	Brass, Matte Tin Finish	Phosphor Bronze, Matte Tin Finish
Center Contact	Brass, Gold Finish	Copper-Nickel Alloy, Gold Finish
Housing	Nylon	PBT
Insulator	LCP	PTFE

Note: Technical specifications are typical and may vary by specific part number and design. See component drawing for additional details.

SUPPORTED 50 OHM COAXIAL CABLES

Amphenol Cable Group	Amphenol Cable Type	Alternative Cables	Temp Range	Jacket OD (mm)	Center Cond. OD (mm)
C01	TFC1-5	JIS 1 5D S-QFB (TA)	-40°C to +105°C	3.00	0.61 (Stranded)
C01	RG-174LL 105C Flex	Dacar 462	-40°C to +105°C	2.74	0.50 (Stranded)
C01	RG-174LL 105C High Flex	Dacar 464-2, 464-6	-40°C to +125°C	2.79	0.50 (Stranded)
C30	TFC-302LL	Dacar 302, RTK 031	-40°C to +105°C	3.30	0.81 (Stranded)
C36	TFC RTK 044	RTK 044	-40°C to +105°C	3.60	0.86 (Solid)

AUTOMOTIVE CAPABILITIES

Amphenol RF excels in providing traditional automotive interconnect products as well as the design and manufacturing of innovative, custom RF solutions. In addition to the AUTOMATE® series, our portfolio includes a wide variety of options to meet customer specific requirements and satisfy existing in-vehicle protocols.

CAMERA MODULE INTERCONNECT

Our global team of engineers leverages their expertise in sealed interconnects, high-float blindmate interfaces and overmolding of custom configurations in order to provide fully integrated and clean solutions for automotive camera connectivity.



SMART ANTENNA INTERCONNECT

Communication can be streamlined both inside and outside a vehicle by consolidating all radio functions into a single module that utilizes custom RF products to enable the mounting of these modules directly to external vehicle antennas, often referred to as “smart antennas.”



COMPUTE MODULE INTERCONNECT

Compute modules are critical to the future of autonomous technology across markets and are supported by high-quality, high-speed RF connector solutions.



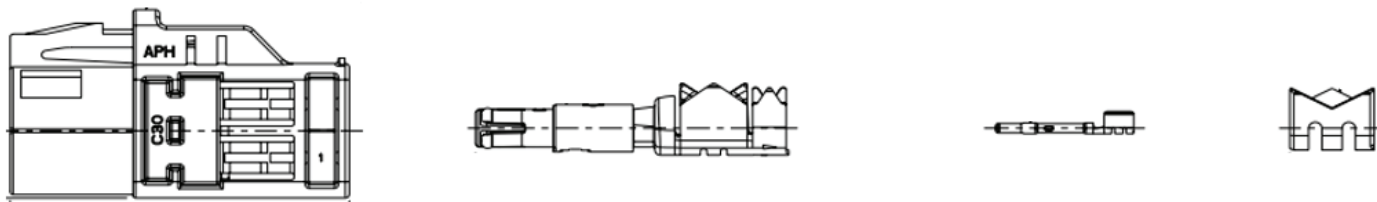
GENERATION 4.0 FAKRA CONNECTOR SERIES

Amphenol RF's generation 4.0 FAKRA series uses automated tooling with stamped and formed components in order to provide cost-effective manufacturing of FAKRA connectors for high volumes.



AUTOMATE® TYPE A MINI-FAKRA CABLE CONNECTORS

AUTOMATE® Type A cable connectors consist of (4) components purchased separately; a housing with TPA clip(s), a contact body sub-assembly, contact pin and crimping sleeve. Components vary by cable type.



CABLE GROUPS

Amphenol RF's AUTOMATE® Type A Mini-FAKRA series connectors support industry standard 50 ohm automotive cable types:

C01 – RG-174LL, DACAR462

C30 – TFC-302LL, DACAR 302, RTK031

C36 – RTK044

AUTOMATE Type A Mini-FAKRA Straight Jack Connectors

Quad-Port Jacks

Item	Description	Cable Group	Image
FM4-NxSJ-C01W0	Quad-Port Jack	C01	
FM4-NxSJ-C30W0	Quad-Port Jack	C30	
FM4-NxSJ-C36W0	Quad-Port Jack	C36	

Dual-Port Jacks

Item	Description	Cable Group	Image
FM2-NxSJ-C01W0	Dual-Port Jack	C01	
FM2-NxSJ-C30W0	Dual-Port Jack	C30	
FM2-NxSJ-C36W0	Dual-Port Jack	C36	

Single Port Jacks

Item	Description	Cable Group	Image
FM1-NxSJ-C01W0	Single-Port Jack	C01	
FM1-NxSJ-C30W0	Single-Port Jack	C30	
FM1-NxSJ-C36W0	Single-Port Jack	C36	

*see customer drawing for contact body sub-assembly, contact pin, and crimping sleeve

AUTOMATE Type A Mini-FAKRA Straight Plug Connectors

Quad-Port Plugs

Item	Description	Cable Group	Image
FM4-NxSP-C01W1	Quad-Port Plug	C01	
FM4-NxSP-C30W1	Quad-Port Plug	C30	
FM4-NxSP-C36W1	Quad-Port Plug	C36	

Dual-Port Plugs

Item	Description	Cable Group	Image
FM2-NxSP-C01W1	Dual-Port Plug	C01	
FM2-NxSP-C30W1	Dual-Port Plug	C30	
FM2-NxSP-C36W1	Dual-Port Plug	C36	

Single-Port Plugs

Item	Description	Cable Group	Image
FM1-NxSP-C01W1	Single-Port Plug	C01	
FM1-NxSP-C30W1	Single-Port Plug	C30	
FM1-NxSP-C36W1	Single-Port Plug	C36	

Note: Consult customer drawing for contact body sub-assembly, contact pin and crimping sleeve

AUTOMATE® Type A Mini-FAKRA PCB Connectors

Right Angle Plugs

Item	Description	Image
FM4-NxRP-PCB-1	Quad-Port Plug Right Angle	
FM2-NxRP-PCB-1	Dual-Port Plug Right Angle	
FM1-NxRP-PCB-1	Single-Port Plug Right Angle	

Vertical Plugs

Item	Description	Image
FM4-NxSP-PCB-1	Quad-Port Plug Vertical	
FM2-NxSP-PCB-1	Dual-Port Plug Vertical	
FM1-NxSP-PCB-1	Single-Port Plug Vertical	

Note: x denotes mechanical key code. See component drawing for available keys.

AUTOMATE® Type A Mini-FAKRA Cable Assemblies

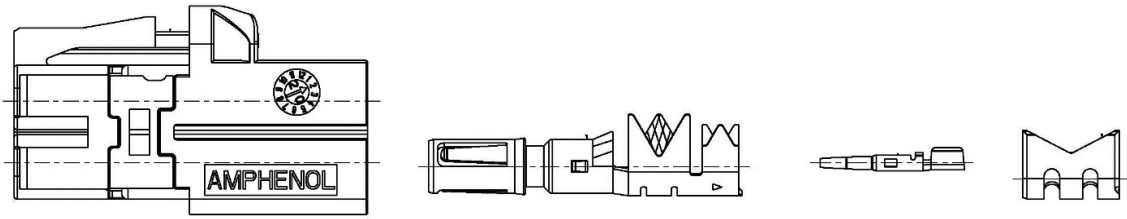
Quad Port Type A Cable Assemblies

Item	Description	Image
095-820-182XXXX	Quad-Port Jack to Quad-Port Jack, TFC-302LL	
095-820-175XXXX	Quad-Port Jack to SMA Plugs, TFC-302LL	
095-820-176XXXX	Quad-Port Jack to SMA Jacks, TFC-302LL	
095-820-157XXXX	Quad-Port Jack to FAKRA Jacks IP67, RG-174 LL	
095-820-199XXXX	Quad Port Jack to FAKRA Jacks IP67, TFC-302LL	

Note: XXXX denotes length code. See component drawing for available lengths.

AUTOMATE® TYPE B MINI-FAKRA CABLE CONNECTORS

AUTOMATE® Type B cable connectors consist of (4) components purchased separately; a housing with TPA clip(s), a contact body sub-assembly, contact pin and crimping sleeve. Components vary by cable type.



CABLE GROUPS

Amphenol RF's AUTOMATE® Type B Mini-FAKRA series connectors support industry standard 50 ohm automotive cable types:

C01 – RG-174LL, DACAR462

AUTOMATE Type B Mini-FAKRA Straight Jack Connector

Quad-Port Jack

Item	Description	Cable Group	Image
FMB4NxRP-PCB-1	Quad-Port Jack	C01	

AUTOMATE® Type B Mini-FAKRA PCB Connectors

Right Angle Plug

Item	Description	Image
FMB4NxRP-PCB-1	Quad-Port Right-Angle Plug	

Note: x denotes mechanical key code. See component drawing for available keys.

AUTOMATE® Mini-FAKRA Mechanical Coding

Type A Version

Type A Single-Port Key Codes

Coding	Plug	Color	
A		Jet Black	
B		Cream	
C		Signal Blue	
D		Claret violet	
E		Leaf Green	
F		Nut Brown	
G		Gray	
H		Light Pink	
J		Beige	
K		Curry	
N		Pastel Green	
Z		Water Blue	

AUTOMATE® Mini-FAKRA Mechanical Coding

Type A Version

Type A Dual-Port Key Codes

Coding	Plug	Color
A		Jet Black 
B		Cream 
C		Signal Blue 
D		Claret violet 
E		Leaf Green 
F		Nut Brown 
G		Gray 
H		Light Pink 
J		Beige 
K		Curry 
Z		Water Blue 

AUTOMATE® Mini-FAKRA Mechanical Coding

Type A Version

Type A Quad-Port Key Codes

Coding	Plug	Color
A		Jet Black 
B		Cream 
C		Signal Blue 
D		Claret violet 
E		Leaf Green 
F		Nut Brown 
Z (universal)		Water Blue 

AUTOMATE® Mini-FAKRA Mechanical Coding

Type B Version

Type B Single-Port Key Codes

Coding	Plug	Color
A		Jet Black 
B		Cream 
C		Signal Blue 
D		Claret violet 
E		Leaf Green 
F		Nut Brown 
G		Gray 
H		Light Pink 
J		Beige 
K		Curry 
L		Carmine Red 
M		Pastel Orange 

AUTOMATE® Mini-FAKRA Mechanical Coding

Type B Version

Type B Dual-Port Key Codes

Coding	Plug	Color	
A		Jet Black	
B		Cream	
C		Signal Blue	
D		Claret violet	
E		Leaf Green	
F		Nut Brown	

Type B Quad-Port Key Codes

Coding	Plug	Color	
A		Jet Black	
B		Cream	
C		Signal Blue	
D		Claret violet	
E		Leaf Green	
F		Nut Brown	

NOTES

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about the AUTOMATE
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