LJV

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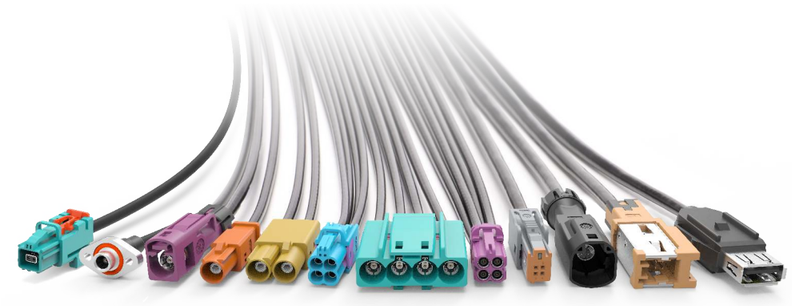
AUTOMOTIVE CONNECTOR

& CABLE ASSEMBLIES SOLUTIONS



FAKRA | X-FAKRA | HSD | HSL/USB | HSN

LJV COMMITS TO PROVIDE

ONE-STOP SHOP VERTICALLY INTEGRATED MANUFACTURING SOLUTIONS

FAKRA | X-FAKRA | HSD | HSL/USB | HSN

360° Surround View Camera / Advanced Driver Assistance System (ADAS) / In-Vehicle Infotainment System / Telematics / Wireless Communication Autonomous Driving System / Automotive Instrument Cluster / GPS Navigation / RF Bluetooth / Radio Antenna

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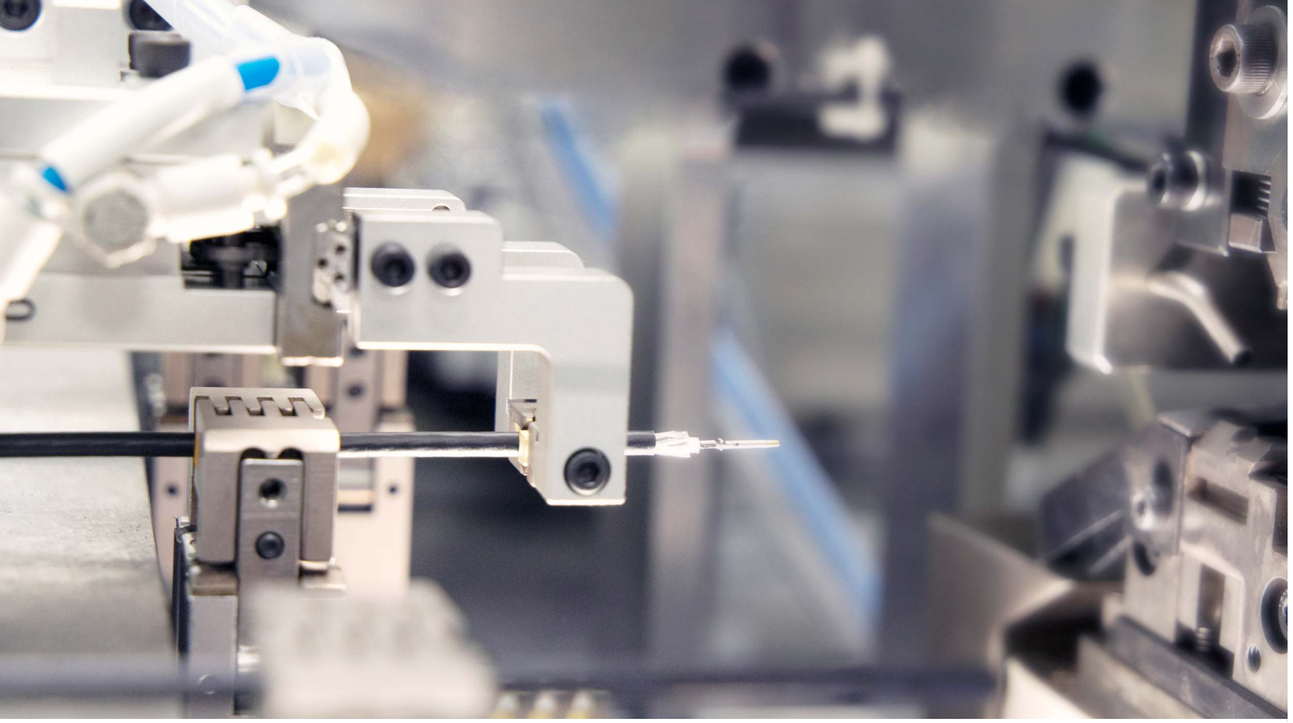


About Us

Certified as a High and New Technology Enterprise (HNTE) in China, headquartered in Dongguan, Guangdong Province, LJV specializes in design and manufacturing of telematic connectors and cable assemblies in a whole series, including FAKRA, X-FAKRA, HSD, HSL/USB and HSN. LJV also offers a comprehensive range of electronic products ranging from Encoder Smart Control Modules, Electric Car Seat Switch Modules, Encoders, Potentiometers, Switches as well as precision components containing Die-casting, Stamping and Injection Molding Parts. LJV's diversified product lines are widely utilized in the fields of automotive, smart home appliance, (5G) communication, optical camera module and transportation.

For decades, LJV insisted on product and manufacturing innovation in the industry. From precision components to finished products, LJV provides vertically integrated manufacturing solutions to ensure the most efficient turn-around service with both cost effective and high quality products to meet various demands in line with market expectations.

LJV leverages quality assurance system combined with automation and Manufacturing Execution System (MES) to ensure the expected quality is provided. LJV has built an effective and successful quality assurance foundation through optimizing of the entire production process with the MES best suitable for controlling workflows and procedures and automation best suited for improving productivity, safety and reliability.

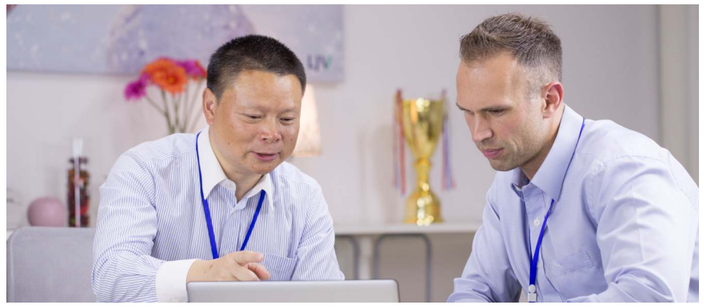
LJV Connectors and Cable Assemblies Business Unit

LJV Connectors and Cable Assemblies Business Unit provides RF connectivity solutions for automotive with series including FAKRA, X-FAKRA, HSD, HSL/USB, HSN.

LJV's telematic product series are designed for automotive applications, such as 360° surround view camera, blind spot monitoring, ADAS, in-vehicle Infotainment system, and telematics.

Supported by strong R&D capability with in-house component manufacturing, LJV has developed the whole manufacturing process of connectors and cable assemblies: design and development→mold processing→stamping→injection molding→die-casting→automated assembling→inspection and verification→wire harness processing. With serial products and solutions offering, LJV has successfully provided service to car manufacturers (OEMs) and Tier 1 suppliers.

Leveraging



Joint

Value

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Core Competitive Advantages

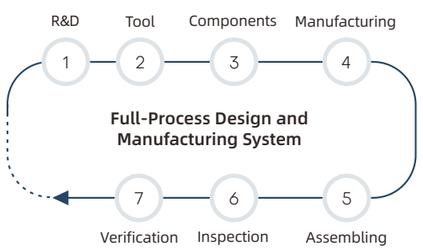
Research & Development Capability

Certified as a High and New Technology Enterprise (HNTE), LJV closely follows industry trends, consistently adheres to technological innovation, and continuously deepens its investment in R&D to promote innovation of connecting products. With years of product development, LJV has received multiple relevant national patents for invention, utility model and design. Additionally, focusing on customer requirements and technology upgrading, with considerable experience in independent R&D and vertically integrated manufacturing capabilities, LJV gradually became a complete supply chain of connectors and cable assemblies, as well as precision components for automotive telematics market.

Vertically Integrated Manufacturing Capability

LJV has established a full-process design and manufacturing system from R&D, tool fabrication, precision components, product assembling, inspection to verification. Efficient coordination among various business units, and in-house components manufacturing ensure internal control of production processes.

High flexibility and vertically integrated manufacturing capabilities enable LJV's quick response to customer needs and to provide customers with high-quality connectors and cable assemblies, precision parts and customized products and solutions.



Customer Focus & Customized Solutions

LJV closely follows the market and fulfills customer needs, continuously strengthens product development and technological innovation, and actively responds to customer needs. LJV provides industrialized and feasible professional solutions ranging from new product development, trial production, integrated manufacturing process to engineering. LJV is committed to providing customers with efficient and high-quality new generation electronic information technology product solutions and full-process services.

Manufacturing Execution System (MES)

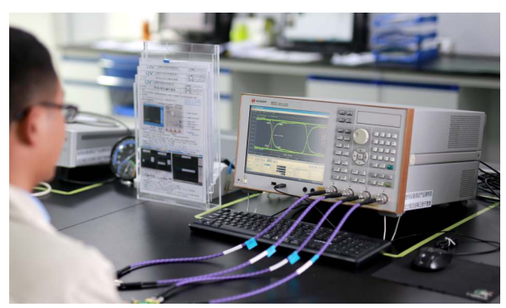
The introduction of the Manufacturing Execution System (MES) can effectively monitor and control manufacturing and operation through data flows, since MES helps achieve this goal by monitoring and collecting accurate, real-time data in the whole production process. Moreover, MES allows tracking of real-time data throughout the production lifecycle and on every piece of equipment involved in the production process. In this case, KPIs related to quality, delivery, and efficiency can be accurately measured, and KPIs information provides detailed insight for continuous improvement using PDCA improvement cycle.

In addition, aiming for producing products of high quality, MES ensures all procedures must be followed. MES will collect, combine and report manufacturing and testing data. Whenever a deviation occurs, MES will trigger proactive quality deviation alerts.

Inspection and Verification

LJV's in-house laboratory is well-equipped with professional test facilities, which provides testing and verification services for LJV's automotive connector and cable assemblies product series. These test facilities are used for electrical performance, mechanical performance, environmental and dimensional tests.

LJV satisfies customer specific requirements, while simultaneously implementing industry standard of ISO14001, ISO9001, IATF16949 and QC-080000, which provides reliable guarantee for integrated manufacturing and customized products. An independent in-house standardized laboratory effectively shortens the product development cycle, providing customers with high quality products.



Core Competitive Advantages-
Automation Focus

LJV set up its own automation engineering team based mainly on independent research and development to fulfill the increased requirements in volume production and high quality control of LJV's automotive products. Furthermore, combining with complete sets of automated equipment and fully automated production lines, LJV realized lean manufacturing by producing products with cost-efficiency, high performance and quality in large quantities.

Fully automated assembly lines for connector and cable assemblies consist of functional modular structure and several standalone workstations, which can support processes including wire stripping and cutting, automatic feeding, terminal crimping, body riveting, etc. This fully automated assembly line also supports a variety of inspection functions, including CCD test, air pressure test, wire electrical characteristic test, etc.

On that basis, LJV has been actively focused on intelligent manufacturing through continued investment in automation, optimizing automated equipment and manufacturing process, ultimately intended to ensure both quality and reliability of the products.

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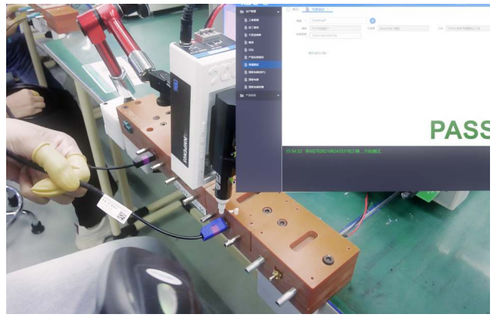
Core Competitive Advantages-
Manufacturing Execution System

With full introduction of MES, LJV successfully realized the digitalization in production, logistics and quality, with a view to establishing a solid information platform for agile service management. MES provides visibility, information throughout entire manufacturing process in real time, which enhances quality information traceability.

MES is organized by 3 major management systems:

- **MES** (Manufacturing Execution System)
- **WMS** (Warehouse Management System)
- **QIS** (Quality Information System)



Product Quality and Complete Traceability

All the information of raw materials, parts, and finished goods throughout manufacturing process can be quickly traced forward and backward. Specifically, a product barcode helps to keep an accurate track of information such as production batch, equipment, production line, mold, and inspection information of IQC/PQC/FQC/OQC, etc.

MES provides critical manufacturing process information such as results from product testing.

Data-Driven Operating

MES can contribute to overall productivity and efficiency by making the manufacturing process information driven. At present, each workshop is configured with a number of tasks and task alerts. Alert notification will be automatically released through mobile terminals to personnel that need to be involved. Alert notification accelerates issue response by reporting issue to a higher level management team until the issue gets closed.

Equipment Networking and Data Collection

MES is networked to be integrated with equipment for data collection, so it is capable of automatic data capture as the MES gathers data on processes and operations performed by machines. MES software also contains all the information related to the operation of the machinery. These incorporated functions can be used for monitoring of work in progress that seeks to acquire a complete and competitive solution to manage and optimize manufacturing processes.

Barcoding/QR Code and Logistics Management

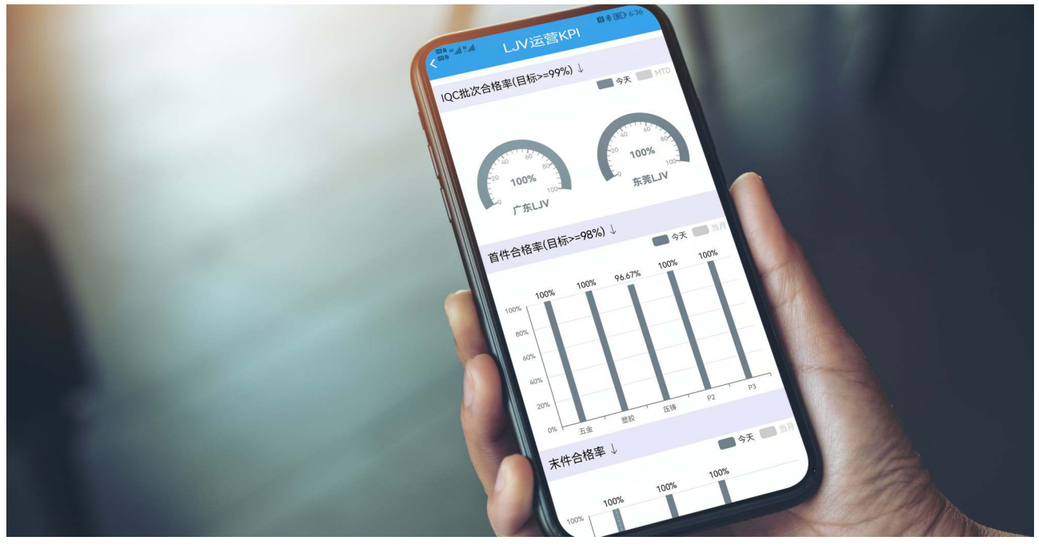
Data collection can be achieved through bar coding that conveys complete information about products in any production process. Barcoding/QR code and logistics management provide end-to-end visibility of raw materials, demand, consumption and WIP, thus inventory is tracked and traced during the conversion from raw materials to finished goods, which contributes to maximizing logistics efficiency.

Tool Systematic Management

MES for tool systematic management supports tool manufacturing process, using the tool information to manage and optimize the quality of the production process. MES builds a tool asset library with information about each tool, and then MES uses that information to manage and control the state of tools, to know whether they are good to use, and to track where and when tools are used.

Multidimensional Data Dashboard

MES data dashboard provides timely and accurate data for site management, which turns LJV into a digital workshop.The dashboard is a real-time visual representation of manufacturing process. It displays, typically in graphical or chart form, the key KPIs or metrics that indicates performance. Meanwhile, it presents data and insights from machines, planning, and production, which helps manufacturers monitor and optimize production quality and efficiency.



Digital Operation

MES provides a source of truth about all aspects of manufacturing by releasing daily/weekly/monthly report related to KPI or metrics that indicates performance to management team via mobile devices. On the basis of this, MES also provides a mechanism for LJV team involved to gain insights for continuous operation improvement, all of which translate into operational excellence.

LJV

—

DNA

Vision

Be the Most Valuable Strategic
Partner in the Global Electronics Industry.

Mission

Creating Values For All; Especially For Customers,
Business Partners And Our Employees.

Value

Complete Each Matter Attentively;
Treat Everyone With Sincerity.

Philosophy

Professional Focus; Harmonious Coexistence.

Culture

Sustainable Innovation; Passion to Win;
Team Collaboration.

LEVERAGING · JOINT · VALUE

Our Commitments

PRODCUT COMPETITIVENESS

We are committed to meeting our customers' requirements in terms of quality, service, price and cost.

FULL COMPLIANCE

We comply with related legal rules (both local government and national) and provide products and services based on the industry's best practices.

HEALTH AND SAFETY

We ensure our employees a safe and healthy workplace, which also demonstrates our responsibility for customer and end-users.

SOCIAL RESPONSIBILITY

We endeavour to make positive contributions to our society by creating equal and fair employment opportunities, actively participating in various public benefit activities and promoting employment of the disabled people, etc.

Customer Satisfaction

LJV executes through 3 core company values to assure customer satisfaction:

1 **Speedy Services**
Speedy turn around to all customer needs.
On-time delivery is one of our highest priorities.

2 **Lean Cost & QA**
Lean-manufacturing offers competitive products to meet with market and customer needs; High quality requirements with strict goals in QA, QC and QS.

3 **Vision & Flexibility**
Go extra steps to support strategic customers in super urgent demands as well as cost requirement. Market and customer oriented with flexible operation mode ensures customer satisfaction is met.

Quality System

Quality Policy

Quality First, Management by Scientific Approach

Act Real; Do Thorough; Make Solid; Be Strong

ISO 14001 ISO 9001 IATF 16949 IECQ QC 080000

Full Participation

Full participation is the foundation of successful implementation and continuous improvement of LJV quality management systems. With particular focus, involvement, support and supervision from the top management, management team at all levels take a leading responsibility to effectively execute all processes to achieve quality goals. We adhere to the requirement of our customer's highest expectation; the teams are motivated to offer any quality improvement plan and to participate in a constructive way to build a better quality management system for company development.

Performance-Orientation

LJV is driven by Key Performance Index (KPI) as a result from the quality system implementation and continuous improvement that reflects the overall result by the organization. The company adopts the "Turtle Diagram" method from the perspective of Man, Machine, Material, Method, Measure, Environment, namely 5M1E to analyze and determine processes optimization for overall quality performance.

Industry Specifications

The industry specifications are the standard and measure for another successful implementation of the quality system at LJV. We execute through ISO14001, IATF16949, ISO9001 and QC080000 standard terms and conditions as the main criteria and combine that with customer's specific requirements as well as company quality goals. These elements build up a rigid system manual for all levels to assure product quality expectations are met.

Quality Service

Quality is not merely reflected on the product itself, but also reflected on the service level. We execute through a comprehensive service chain as one of our core focuses with determination and confidence to assure the overall customer satisfaction.

◎ Product Selection Guide

Series	Type	Gender	Number of Ports	Configuration	Page
FAKRA	PCB Connector	Plug	1	Straight	18
				Right Angle	
			2	Right Angle	
	Cable Connector	Plug	1	Straight	20-22
			2	Straight	20
			4	Straight	
		Jack	1	Straight	21-22
				Right Angle	
			2	Straight	21
			4	Straight	
	Cable Assembly				24
X-FAKRA	PCB Connector	Plug	4	Right Angle	30
	Cable Connector	Plug	4	Straight	
		Jack	4	Straight	
	Cable Assembly				32
HSD	PCB Connector	Plug	1	Straight	38
				Right Angle	
			2	Straight	39
				Right Angle	
	Cable Connector	Plug	1	Straight	40
		Jack	1	Straight	40
				Right Angle	41
	Cable Assembly				42
HSL	Cable Assembly	Jack	1	Straight	48
	Cable Assembly				50
USB	Cable Connector	Jack	1	Straight	48
				Right Angle	
	Cable Assembly				50
HSN	PCB Connector	Plug	1	Right Angle	56
			2	Right Angle	
			4	Right Angle	
			6	Right Angle	
	Cable Connector	Plug	1	Straight	
		Jack	1	Straight	
			2	Straight	
			4	Straight	
			6	Straight	

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Standard

FAKRA SERIES

FAchKReis Automobil

Features & Benefits

- Fulfilling the rigorous performance standards of USCAR for automotive industry
- Color-coding provides quick visual indicators to prevent misuse
- Primary and secondary locking system ensures assembling security
- Flexible interlocking structure realizes efficient plug-in operation
- Supporting frequency up to 6 GHz
- Professional structure design and material selection make the product reliable and durable
- 2-port and 4-port housing designed for space saving and efficiency

Application Areas

360° Surround View Camera / Autonomous Driving System / Advanced Driver Assistance System (ADAS) / In-Vehicle Infotainment System / Telematics / GPS Navigation / RF Bluetooth / Radio Antenna / V2X Antenna / Wireless Communication / Automotive Instrument Cluster

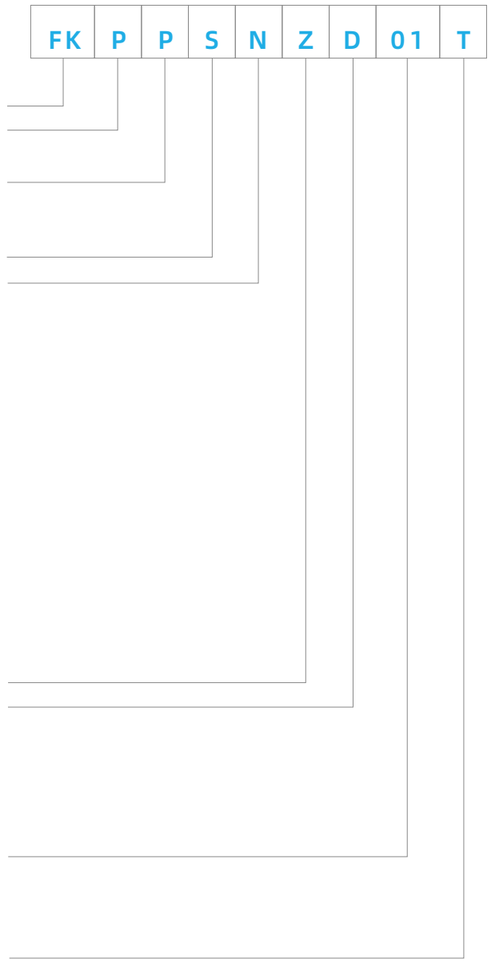
Numbering Reference Guide

E.G.

- FKPPSNZD01T

  FK(FAKRA); P(Plug); P(PCB); S(Straight); N(North); Z(Code); D(PCB_Wave soldering); 01(Serial number); T(Plastic tray packing)

Series	FK: FAKRA
Gender	P: Plug
	J : Jack
Type	P: PCB
	C: Cable
Configuration	R: Right Angle
	S: Straight
Direction	N: North
	S: South
	0: No Direction
Coding	A: Jet Black
	B: Cream White
	C: Signal Blue
	D: Claret Violet
	E: Leaf Green
	F: Nut Brown
	G: Blue Grey
	H: Heather Violet
	I : Beige
	K: Curry
	L : Carmine Red
	M: Paster Orange
	N: Pastel Green
	Z: Water Blue
Connection	D: PCB_Wave soldering
	S: PCB_Reflow soldering
Cable Group	3: Cable_RG58 or equivalent
	2: RG174/RG316/1.5DS or equivalent
	1: RTK031/DACAR 302-3 or equivalent
	0: Other custom cables
Serial Number	01 ~ 99 (Serial number are used to distinguish product with different accessories)
Packing	C: Carrier tape
	U: Tube
	T: Plastic tray



Color and Key Coding

Coding	Plug		Jack		Color/RAL No. (Similar)	Application
	Single	Double	Single	Double		
A					Jet Black /9005	Radio
B					Cream White /9001	Wireless audio
C					Signal Blue /5005	GPS navigation
D					Claret Violet /4004	Mobile communication
E					Leaf Green /6002	TV-1
F					Nut Brown /8011	TV-2
G					Blue Grey /7031	Remote control door lock
H					Heather Violet /4003	Navigation
I					Beige /1001	Wireless heating controls
K					Curry /1027	Medium frequency radio
L					Carmine Red /3002	Undefined
M					Paster Orange /2003	Undefined
N					Pastel Green /6019	Undefined
Z					Water Blue /5021	Neutral

Standard **FAKRA**

FAKRA
X-FAKRA
HSD
HSL/USB
NSH

Interface Dimensions

Unit: mm

Technical Data

Electrical Performance

Impedance	50 Ω
Frequency range	DC-6 GHz
Dielectric withstanding voltage	800 Vrms
Working current	1A DC Max (depending on cable type)
Center contact resistance	10 mΩ Max (initial)
Outer contact resistance	5 mΩ Max (initial)
Return loss	18 dB Min
Insertion loss	$\leq 0.1\times\sqrt{f_{GHz}}$ dB
Insulation resistance	1000 MΩ Min
RF leakage	-45 dB @ up to 3 Ghz; -40 dB @ up to 6 GHz

Mechanical Performance

Mating cycles	25 cycles Min
Retention force latch	110 N Min
Disengagement force	2 N Min
Engagement force (non waterproof)	25 N Max
Engagement force (waterproof)	45 N Max

Environmental Performance

Temperature range	-40°C to +105°C
Temperature & humidity	USCAR-2, Paragraph 5.6.2/ISO 20860-2 Clause 9.3
Vibration & mechanical shock	USCAR-2, Paragraph 5.4.6/ISO 20860-2 Clause 9.1
Thermal shock	USCAR-2, Paragraph 5.6.1/ISO 20860-2 Clause 9.2
RoHS	RoHS compliant

Materials

Housing	PA, PBT, PPE
Outer contact	Zn, CuZn, CuSn, Stainless Steel
Insulator	LCP, PA, PTFE
Center contact	CuBe, CuZn, CuSn
Cover	PA, PBT, PPE
Crimping ferrule	Cu
Terminal position assurance	PA, PBT, PPE

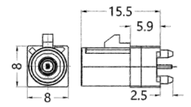
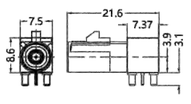
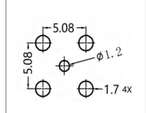
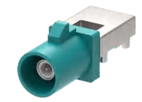
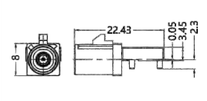
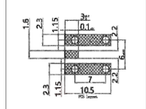
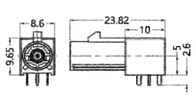
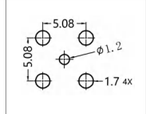
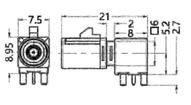
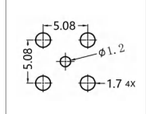
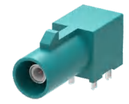
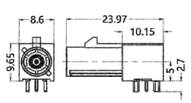
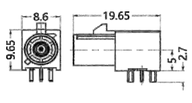
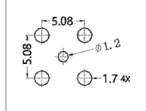
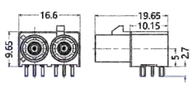
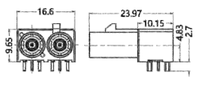
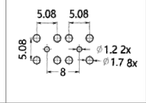
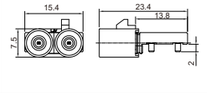
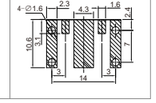
Platings

Outer contact	Au, Sn, Ni
Center contact	Au

Standard **FAKRA**

FAKRA
X-FAKRA
HSD
HSL/USB
HSN

PCB Connector

Part No.	Gender	Number of Ports	Configuration	Product	Outline Dimensions	PCB Layout
FKPPSNXD01X	Plug	1	Straight			
FKPPRNXD02X	Plug	1	Right Angle			
FKPPRNXS01X	Plug	1	Right Angle			
FKPPRNXD03X	Plug	1	Right Angle			
FKPPRNXD07X	Plug	1	Right Angle			
FKPPRNXD13X	Plug	1	Right Angle			
FKPPRNXD15X	Plug	1	Right Angle			
FKPPRNXD17X	Plug	2	Right Angle			
FKPPRNXD18X	Plug	2	Right Angle			
FKPPRNXD19X	Plug	2	Right Angle			

Coding: Please refer to **page 15** for Color and Key Coding; Specific coding is available upon request.
Packing: PCB connectors are packaged in plastic tray or carrier tapes;
Cable connectors and cable assemblies are packaged in bags;
Other specific packing is available upon request.

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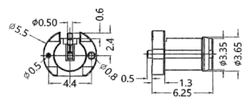
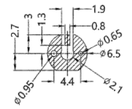
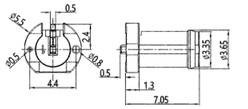
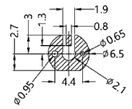
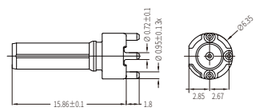
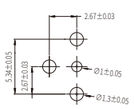
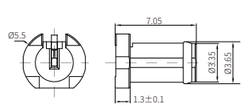
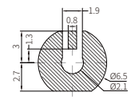
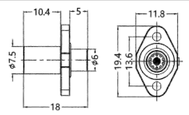
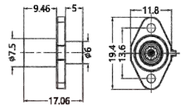
SMB Connector Accesories

Part No.	Gender	Configuration	Product	Outline Dimensions	PCB Layout
FKPPS0002C	Plug	Straight			
FKPPS0003C	Plug	Straight			
FKPPS00D27	Plug	Straight			
FKPPS0043C	Plug	Straight			
FKPPS0X014X	Plug	Straight			–
FKPPS0X009X	Plug	Straight			–

Standard **FAKRA**

FAKRA
X-FAKRA
HSD
HSL/USB
HSN

Cable Connector

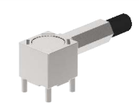
Part No.	Gender	Number of Ports	Configuration	Cable Group	Product
FKPCS0X103	Plug	1	Straight	RTK031/DACAR 302-3 or equivalent	
FKPCS0X201	Plug	1	Straight	RG174/RG316/1.5DS or equivalent	
FKPCS0X133	Plug	1	Straight	RTK031/DACAR 302-3 or equivalent	
FKPCS0X202	Plug	1	Straight	RG174/RG316/1.5DS or equivalent	
FKPCS0X115	Plug	1	Straight	RTK031/DACAR 302-3 or equivalent	
FKPCS0X215	Plug	1	Straight	RG174/RG316/1.5DS or equivalent	
FKPCS0X119	Plug	1	Straight	RTK031/DACAR 302-3 or equivalent	
FKPCS0X138	Plug	1	Straight	RG174/RG316/1.5DS or equivalent	
FKPCS0X167	Plug	1	Straight	RTK031/DACAR 302-3 or equivalent	
FKPCS0X267	Plug	1	Straight	RG174/RG316/1.5DS or equivalent	
FKPCS0X110	Plug	1	Straight	RTK031/DACAR 302-3 or equivalent	
FKPCS0X210	Plug	1	Straight	RG174/RG316/1.5DS or equivalent	
FKPCS0X160	Plug	1	Straight	RTK031/DACAR 302-3 or equivalent	
FKPCS0X260	Plug	1	Straight	RG174/RG316/1.5DS or equivalent	
FKPCS0X134	Plug	1	Straight	RTK031/DACAR 302-3 or equivalent	
FKPCS0X237	Plug	1	Straight	RG174/RG316/1.5DS or equivalent	
FKPCS0X133	Plug	2	Straight	RTK031/DACAR 302-3 or equivalent	
FKPCS0X205	Plug	2	Straight	RG174/RG316/1.5DS or equivalent	
FKPCS0X136	Plug	2	Straight	RTK031/DACAR 302-3 or equivalent	
FKPCS0X236	Plug	2	Straight	RG174/RG316/1.5DS or equivalent	
FKPCS0X159	Plug	4	Straight	RTK031/DACAR 302-3 or equivalent	
FKPCS0X259	Plug	4	Straight	RG174/RG316/1.5DS or equivalent	

Cable Connector

Part No.	Gender	Number of Ports	Configuration	Cable Group	Product
FKJCS0X173	Jack	4	Straight	RTK031/DACAR 302-3 or equivalent	
FKJCS0X248	Jack	4	Straight	RG174/RG316/1.5DS or equivalent	
FKJCS0X172	Jack	1	Straight	RTK031/DACAR 302-3 or equivalent	
FKJCS0X272	Jack	1	Straight	RG174/RG316/1.5DS or equivalent	
FKJCS0X104	Jack	1	Straight	RTK031/DACAR 302-3 or equivalent	
FKJCS0X204	Jack	1	Straight	RG174/RG316/1.5DS or equivalent	
FKJCS0X121	Jack	1	Straight	RTK031/DACAR 302-3 or equivalent	
FKJCS0X221	Jack	1	Straight	RG174/RG316/1.5DS or equivalent	
FKJCS0X144	Jack	1	Straight	RTK031/DACAR 302-3 or equivalent	
FKJCS0X126	Jack	1	Straight	RG174/RG316/1.5DS or equivalent	
FKJCS0X115	Jack	1	Straight	1.5DS or equivalent	
FKJCS0X122	Jack	1	Straight	RG174/RG316	
FKJCS0X107	Jack	1	Straight	RTK031/DACAR 302-3 or equivalent	
FKJCS0X207	Jack	1	Straight	RG174/RG316/1.5DS or equivalent	
FKJCS0X160	Jack	1	Straight	RTK031/DACAR 302-3 or equivalent	
FKJCS0X260	Jack	1	Straight	RG174/RG316/1.5DS or equivalent	
FKJCS0X105	Jack	2	Straight	RTK031/DACAR 302-3 or equivalent	
FKJCS0X205	Jack	2	Straight	RG174/RG316/1.5DS or equivalent	
FKJCS0X150	Jack	2	Straight	RTK031/DACAR 302-3 or equivalent	
FKJCS0X250	Jack	2	Straight	RG174/RG316/1.5DS or equivalent	
FKJCR0X251	Jack	1	Right Angle	RG174/RG316/1.5DS or equivalent	

Coding : Please refer to **page 15** for Color and Key Coding; Specific coding is available upon request.
Packing : Cable connectors and cable assemblies are packaged in bags; Other specific packing is available upon request.

Cable Connector

Part No.	Gender	Number of Ports	Configuration	Cable Group	Product
FKPCS0X118	Plug	1	Straight	RTK031/DACAR 302-3 or equivalent	
FKPCS0X130	Plug	1	Straight	RG174/RG316/1.5DS or equivalent	
FKPCS0X128	Plug	1	Straight	RG174/RG316/1.5DS or equivalent	
FKJCS0X255	Jack	1	Straight	1.5DS or equivalent	
FKJCS0X256	Jack	1	Straight	RG174/RG316 or equivalent	
FKJCS0X231	Jack	1	Straight	1.5DS or equivalent	
FKJCS0X112	Jack	1	Straight	1.5DS or equivalent	
FKJCS0X120	Jack	1	Straight	1.5DS or equivalent	
FKJCS0X137	Jack	1	Straight	1.5DS or equivalent	
FKJCR0X114	Jack	1	Right Angle	1.5DS or equivalent	
FKJCR0X116	Jack	1	Right Angle	1.5DS or equivalent	
FKJCR0X117	Jack	1	Right Angle	1.5DS or equivalent	
FKPCR0X129	Plug	–	Right Angle	RG174/RG316/1.5DS or equivalent	

Numbering Reference Guide
Cable: one to one

E.G.

- **C1–FJSZ–FPSZ–2150–001**

  C(Cable Assemblies); 1(Cable Group 1); FJSZ(Side A: FAKRA, Jack, Straight, Z Code); FPSZ(Side B: FAKRA, Plug, Straight, Z Code); 2150(Cable length); 001(Serial number)

C 1 - F J S Z - F P S Z - 2150 - 001

Cable Assemblies Marking	C: Cable Assemblies
Cable Group [Please see reference table *Cable Group (*)* for other cable specification]	1: DACAR 302/RTK031 or equivalent
	2: RG174/RG316/1.5DS or equivalent
	3: RG58 or equivalent
	4: DACAR 535 or equivalent
Series-Side A	F: FAKRA
	XF: X-FARKA
	D: HSD
	L: HSL
	U: USB
	N: HSN
Gender-Side A	P: Plug
	J: Jack
Configuration-Side A	R: Right Angle
	S: Straight
Coding-Side A (Please fill in required coding)	A: A code
	B: B code
	Z: Z code
Series-Side B	F: FAKRA
	XF: X-FARKA
	D: HSD
	L: HSL
	U: USB
	N: HSN
	E: No connector on Side B
Gender-Side B	P: Plug
	J: Jack
	0: No connector on Side B
Configuration-Side B	R: Right Angle
	S: Straight
	0: No connector on Side B
Coding-Side B	A: A code
	B: B code
	Z: Z code
	0: No connector on Side B
Cable Length	XXXX (Unit: mm)
Serial Number	YYY (Serial number are used to distinguish product with different accessories)

Standard **FAKRA**

FAKRA
X-FAKRA
HSD
HSL/USB
HSN

Cable Assembly

Part No.	Side A	Side B	Product
C*-FJSX-FJSX-XXXX-YYY	Jack Straight Stamping Die-casting	Jack Straight Stamping Die-casting	
C*-FPSX-FPSX-XXXX-YYY	Plug Straight Stamping Die-casting	Plug Straight Stamping Die-casting	
C*-FPSX-FJSX-XXXX-YYY	Plug Straight Stamping Die-casting	Jack Straight Stamping Die-casting	
C*-FJSX-FJSX-XXXX-YYY	Dual, Jack Straight Stamping Die-casting	Dual, Jack Straight Stamping Die-casting	
C*-FPSX-FPSX-XXXX-YYY	Dual, Plug Straight Stamping Die-casting	Dual, Plug Straight Stamping Die-casting	
C*-FPSX-FJSX-XXXX-YYY	Dual, Plug Straight Stamping Die-casting	Dual, Jack Straight Stamping Die-casting	

▶ Cable Group（C*）

Cable Group	Remark
Dacar 302/RTK031	Low loss coaxial cable
RG174/RG316/1.5DS/1.5C	Coaxial cable
RG58	Low loss coaxial cable
Dacar 535	HSD star quad cable
1P*20AWG+2C*26AWG-MYLAR+AL.Mylar+Braid 1P*24AWG+2C*24AWG-MYLAR+AL.Mylar+Braid	USB 2.0 cable
QFP12GD100-B-5G NX-Q22A0018 Dacar 647	1000M Ethernet cable
NOUL 22AWG 44/0.100D1.3mm(-40℃~105℃)	Bending-resistant wire

X-FAKRA SERIES

Four in One(X)-FAKRA

Features & Benefits

- Space saving and weight saving design
- Type A and Type B are designed to match with different types of X-FAKRA products in market
- Supporting frequency up to 15 GHz
- 4 in1 and dual modular housing designs with 5 types of key code enable more flexible wiring
- 2 regular cable options in available: RTK031 and RG174
- Supporting sealed and unsealed applications

Application Areas

Advanced Driver Assistance System (ADAS) / 4K Carmera System / In-Vehicle Infotainment System / Autonomous Driving / Automotive Instrument Cluster / GPS Navigation / Radio Antenna

Numbering Reference Guide

E.G.

- FKPPRNZD16T

  FK(X-FAKRA); P(Plug); P(PCB); R(Right angle); N(North); Z(Code); D(PCB_Wave soldering); 16(Serial number); T(Plastic tray packing)

FK	P	P	R	N	Z	D	16	T

Series	FK: X-FAKRA
Gender	P: Plug
	J: Jack
Type	P: PCB
	C: Cable
Configuration	R: Right Angle
	S: Straight
Direction	N: North
	S: South
	0: No Direction
Coding	A: Jet Black
	B: Cream
	C: Signal Blue
	D: Claret Violet
	E: Leaf Green
	F: Nut Brown
	Z: Water Blue
Connection	D: PCB_Wave soldering
	S: PCB_Reflow soldering
Cable Group	3: Cable_RG58 or equivalent
	2: RG174/RG316/1.5DS or equivalent
	1: RTK031/DACAR 302-3 or equivalent
	0: Other custom cables
Serial Number	01 ~ 99 (Serial number are used to distinguish product with different accessories)
Packing	C: Carrier tape
	U: Tube
	T: Plastic tray

Color and Key Coding

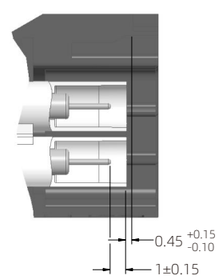
Type A

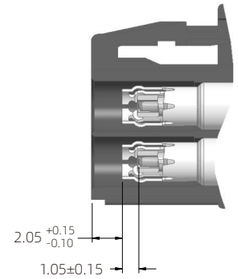
Coding	Plug	Jack	Color/RAL No. (Similar)
A			Jet Black/9005
B			Cream/9001
C			Signal Blue/5005
D			Claret Violet/4004
E			Leaf Green/6002
F			Nut Brown/8011
Z			Water Blue/5021

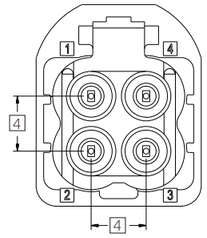
Type B

Coding	Plug	Jack	Color/RAL No. (Similar)
A			Jet Black/9005
B			Cream/9001
C			Signal Blue/5005
D			Claret Violet/4004
E			Leaf Green/6002
F			Nut Brown/8011
Z			Water Blue/5021

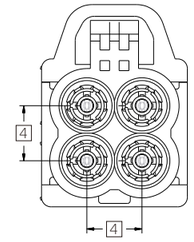
Interface Dimensions







Plug



Jack

Unit: mm

Technical Data

Electrical Performance

Impedance	50 Ω
Frequency range	DC-9 GHz
Dielectric withstanding voltage	800 Vrms
Working current	1 A DC Max (depending on cable type)
Center contact resistance	15 mΩ Max (initial)
Outer contact resistance	5 mΩ Max (initial)
Return loss	25 dB Min @ DC-3 GHz, 20 dB Min @ 3~6 GHz
Insertion loss	$\leq 0.1 \times \sqrt{f_{GHz}}$ dB
Insulation resistance	1000 MΩ Min
RF leakage	-45 dB @ up to 3 Ghz; -40 dB @ up to 6 GHz

Mechanical Performance

Mating cycles	25 cycles Min
Retention force latch	110 N Min
Disengagement force (4-port)	5 N Min
Engagement force (4-port/non waterproof)	60 N Max

Environmental Performance

Temperature range	-40°C to +105°C
Temperature & humidity	USCAR-2, Paragraph 5.6.2/ISO 20860-2 Clause 9.3
Vibration & mechanical shock	USCAR-2, Paragraph 5.4.6/ISO 20860-2 Clause 9.1
Thermal shock	USCAR-2, Paragraph 5.6.1/ISO 20860-2 Clause 9.2
RoHS	RoHS compliant

Materials

Housing	PA, PBT, PPE
Outer contact	Zn, CuZn, CuSn, Stainless Steel
Insulator	LCP, PA, PTFE
Center contact	CuBe, CuZn, CuSn
Cover	PA, PBT, PPE
Crimping ferrule	Cu
Terminal position assurance	PA, PBT, PPE

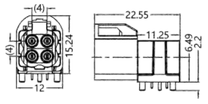
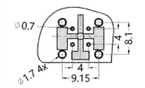
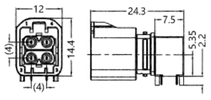
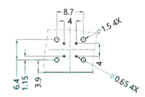
Platings

Outer contact	Au, Sn, Ni
Center contact	Au

X-FAKRA

FAKRA
X-FAKRA
HSD
HSL/USB
NSH

PCB Connector

Part No.	Gender	Number of Ports	Configuration	Product	Outline Dimensions	PCB Layout
FKPPRNXD16X	Plug	4	Right Angle			
FKPPRNXD06X	Plug	4	Right Angle			

Cable Connector

Part No.	Gender	Number of Ports	Configuration	Cable Group	Product
FKJCS0X148	Jack	4	Straight	RTK031/DACAR 302-3 or equivalent	
FKJCS0X261	Jack	4	Straight	RG174/RG316/1.5DS or equivalent	
FKJCS0X167	Jack	4	Straight	RTK031/DACAR 302-3 or equivalent	
FKJCS0X223	Jack	4	Straight	RG174/RG316/1.5DS or equivalent	
FKPCS0X164	Plug	4	Straight	RTK031/DACAR 302-3 or equivalent	
FKPCS0X264	Plug	4	Straight	RG174/RG316/1.5DS or equivalent	

Coding: Please refer to **page 27** for Color and Key Coding; Specific coding is available upon request.
Packing: PCB connectors are packaged in plastic tray or carrier tapes;
Cable connectors and cable assemblies are packaged in bags;
Other specific packing is available upon request.

EL.ITALIA SRL
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Numbering Reference Guide
Cable: one to many

E.G.

A B

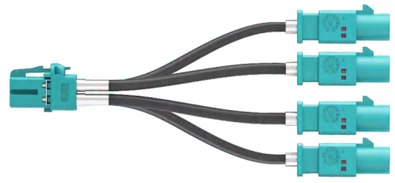
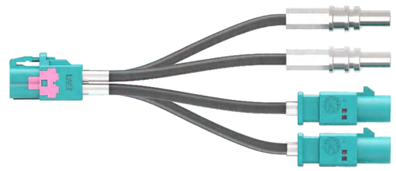
- **C1-XFJSA-FPSAB00-001**

  C(Cable Assemblies); 1(Cable Group 1); XFJSA(Side A: X-FAKRA, Jack, Straight, A Code); FPSAB00(Side B of 1st cable: FAKRA, Plug, Straight, A Code; Side B of 2nd cable: FAKRA, Plug, Straight, B Code; Side B of 3rd & 4th cable: FAKRA, Plug, Straight, No connector or code); 001(Serial number)

C 1 - XF J S A - F P S AB00 - 001

Cable Assemblies Marking	C: Cable Assemblies
Cable Group [Please see reference table *Cable Group (*)* for other cable specification]	1: DACAR 302/RTK031 or equivalent
	2: RG174/RG316/1.5DS or equivalent
Series-Side A	XF: X-FARKA(Multi-port)
	XN: HSN(Multi-port)
Gender-Side A	P: Plug
	J : Jack
Configuration-Side A	R: Right Angle
	S: Straight
Coding-Side A	A: A code
	B: B code
	.....
Series-Side B (Remark: Side B description of 1st cable)	F: FAKRA
	XF: X-FARKA
	D: HSD
	L : HSL
	U: USB
	N: HSN
	E: No connector on Side B
Gender-Side B	P: Plug
	J : Jack
	0: No connector on Side B
Configuration-Side B	R: Right Angle
	S: Straight
	0: No connector on Side B
Coding-Side B Please fill in each required coding according to cable sequences)	A: A code
	B: B code
	Z: Z code
	0: No connector on Side B
Serial Number	YYY (Serial number are used to distinguish product with different accessories)

Cable Assembly

Part No.	Side A	Side B	Product
C*-XFJSX-XFJSXXXXX-YYY	Four in one/Jack (Type A)	Four in one/Jack (Type A)	 A B
C*-XFJSX-XFJSXXXXX-YYY	Four in one/Jack (Type B)	Four in one/Jack (Type B)	 A B
C*-XFJSX-FPSXXXX-YYY	Four in one/Jack (Type B)	FAKRA/Plug	 A B
C*-XFJSX-FPSXX00-YYY	Four in one/Jack (Type A)	FAKRA/Plug	 A B

Cable Group（C*）

Cable Group	Remark
Dacar 302/RTK031	Low loss coaxial cable
RG174/RG316/1.5DS/1.5C	Coaxial cable
RG58	Low loss coaxial cable
Dacar 535	HSD star quad cable
1P*20AWG+2C*26AWG-MYLAR+AL.Mylar+Braid 1P*24AWG+2C*24AWG-MYLAR+AL.Mylar+Braid	USB 2.0 cable
QFP12GD100-B-5G NX-Q22A0018 Dacar 647	1000M Ethernet cable
NOUL 22AWG 44/0.100D1.3mm(-40℃~105℃)	Bending-resistant wire

HSD SERIES

High Speed Data

Features & Benefits

- Fulfilling the rigorous performance standards of USCAR for automotive industry
- Color-coding provides quick visual indicators to prevent misuse
- Primary and secondary locking system ensures assembling security
- Excellent shielding performance and signal stability
- Supporting data transfer rate up to 6 Gbps
- Full range of HSD connectors are designed to match with different types of HSD products in market
- Exceptional design with fully insulated center pins
- Supporting sealed and unsealed applications

Application Areas

360° Surround View Camera / In-Vehicle Infotainment System / Automotive Instrument Cluster / Touch Screens / HD Screen / Bluetooth / USB Connection / Dual-Band Wi-Fi

Numbering Reference Guide

E.G.

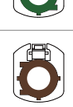
- HSPPSNZS01T

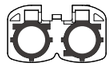
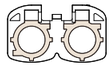
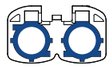
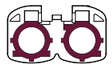
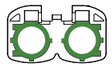
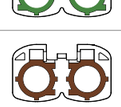
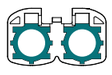
  HS(HSD); P(Plug); P(PCB); S(Straight); N(North); Z(Code); S(PCB_Reflow soldering); 01(Serial number); T(Plastic tray packing)

HS	P	P	S	N	Z	S	01	T

Series	HS: HSD
Gender	P: Plug
	J: Jack
Type	P: PCB
	C: Cable
Configuration	R: Right Angle
	S: Straight
Direction	N: North
	S: South
	W: West
	E: East
	0: No Direction
Coding	A: Jet Black
	B: Cream
	C: Signal Blue
	D: Claret Violet
	E: Leaf Green
	F: Nut Brown
	G: Blue Grey
	H: Heather Violet
	K: Curry
	M: Paster Orange
	N: Pastel Green
	Z: Water Blue
Connection	D: PCB_Wave soldering
	S: PCB_Reflow soldering
Cable Group	1: DACAR 535 or equivalent
	0: Other custom cables
Serial Number	01 ~ 99 (Serial number are used to distinguish product with different accessories)
Packing	C: Carrier tape
	U: Tube
	T: Plastic tray

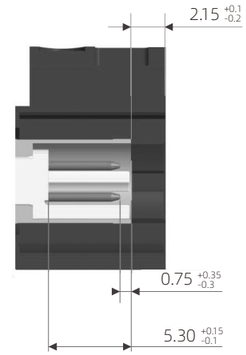
Color and Key Coding

Coding	Plug	Jack	Color/RAL No. (Similar)
A			Jet Black/9005
B			Cream/9001
C			Signal Blue/5005
D			Claret Violet/4004
E			Leaf Green/6002
F			Nut Brown/8011
G			Blue Grey/7031
H			Heather Violet/4003
I			Beige/1001
K			Curry/1027
L			Yellow Green/6018
M			Paster Orange/2003
O			Light Green/6027
Z			Water Blue/5021

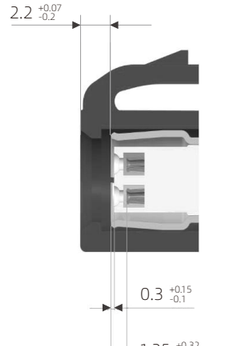
Coding	Plug	Color/RAL No. (Similar)
A（A+B）		Jet Black/9005
B（B+A）		Cream/9001
C（C+D）		Signal Blue/5005
D（D+C）		Claret Violet/4004
E（E+F）		May Green/6017
F（F+E）		Nut Brown/8011
Z（Z+Z）		Water Blue/5021

HSD

Interface Dimensions



Plug



Jack

Unit: mm

FAKRA
X-FAKRA
HSD
HSL/USB
HSN

EL.ITALIA SRL
+39 02.33611626 www.elitaliaweb.it
CONTACT US info@elitaliaweb.it

Technical Data

Electrical Performance

Impedance	100 Ω
Frequency range	DC-2 GHz
Dielectric withstanding voltage	250 Vrms
Working current	≤3 A DC @ 85°C ambient temperature
Center contact resistance	10 mΩ Max (initial)
Outer contact resistance	7.5 mΩ Max (initial)
Return loss	≥20 dB 1GHz
Insertion loss	≤0.1 dB, DC-2 GHz
Inter-pair skew	≤5 ps
Intra-pair skew	≤25 ps
Near-end crosstalk	≤30 dB 1GHz
Far-end crosstalk	≤35 dB 1GHz
Insulation resistance	1000 MΩ Min

Mechanical Performance

Connector durability	25 cycles Min
Coding efficiency	80 N Min
Retention force latch	110 N Min
Disengagement force	5 N Min
Engagement force	30 N Max
Engagement force (1-port/waterproof)	45 N Max

Environmental Performance

Temperature range	-40°C to +105°C
Temperature & humidity	USCAR-2, Paragraph 5.6.2
Vibration & mechanical shock	USCAR-2, Paragraph 5.4.6
Thermal shock	USCAR-2, Paragraph 5.6.1
RoHS	RoHS compliant

Materials

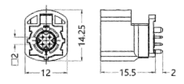
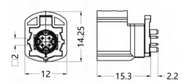
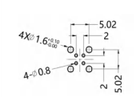
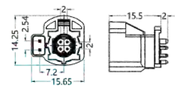
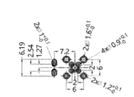
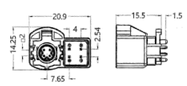
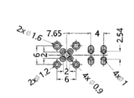
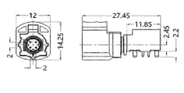
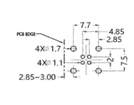
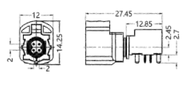
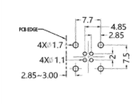
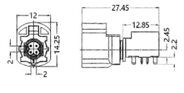
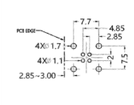
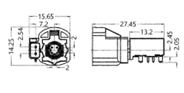
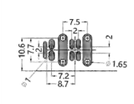
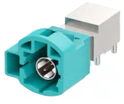
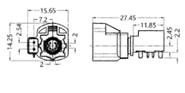
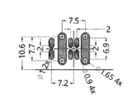
Housing	PA, PBT, PPE
Outer contact	Zn, CuZn, CuSn, Stainless Steel
Insulator	LCP, PA, PTFE
Center contact	CuBe, CuZn, CuSn
Cover	PA, PBT, PPE
Crimping ferrule	Cu
Terminal position assurance	PA, PBT, PPE

Platings

Outer contact	Au, Sn, Ni
Center contact	Au

HSD

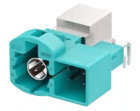
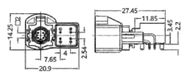
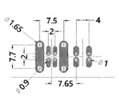
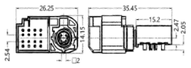
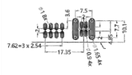
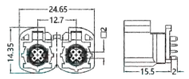
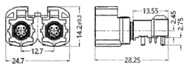
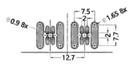
PCB Connector

Part No.	Gender	Number of Ports	Configuration	Number of Pins	Product	Outline Dimensions	PCB Layout
HSPPSNXS01X	Plug	1	Straight	4			
HSPPSNXS08X	Plug	1	Straight	4			
HSPPSNXS02X	Plug	1	Straight	4+2			
HSPPSNXS03X	Plug	1	Straight	4+4			
HSPPRNXS01X	Plug	1	Right Angle	4			
HSPPRNXS11X	Plug	1	Right Angle	4			
HSPPRNXS12X	Plug	1	Right Angle	4			
HSPPRNXS02X	Plug	1	Right Angle	4+2			
HSPPRNXS06X	Plug	1	Right Angle	4+2			

Coding: Please refer to **page 35** for Color and Key Coding; Specific coding is available upon request.
Packing: PCB connectors are packaged in plastic tray or carrier tapes;
Cable connectors and cable assemblies are packaged in bags;
Other specific packing is available upon request.

FAKRA
X-FAKRA
HSD
HSL/USB
HSN

PCB Connector

Part No.	Gender	Number of Ports	Configuration	Number of Pins	Product	Outline Dimensions	PCB Layout
HSPPRNXS07X	Plug	1	Right Angle	4+4			
HSPPRNXS05X	Plug	1	Right Angle	4+8			
HSPPSNXS04X	Plug	2	Straight	4			
HSPPRNXS04X	Plug	2	Right Angle	4			

Coding: Please refer to **page 35** for Color and Key Coding; Specific coding is available upon request.
Packing: PCB connectors are packaged in plastic tray or carrier tapes;
Cable connectors and cable assemblies are packaged in bags;
Other specific packing is available upon request.

Cable Connector

Part No.	Gender	Number of Ports	Configuration	Number of Pins	Cable Group	Product
HSPCSNXX01	Plug	1	Straight	4	DACAR 535 or equivalent	
HSPCSNXX03	Plug	1	Straight	4	DACAR 535 or equivalent	
HSPCSNXX06	Plug	1	Straight	4+2	DACAR 535 or equivalent	
HSPCSNXX04	Plug	1	Straight	4	DACAR 535 or equivalent	
HSPCSNXX05	Plug	1	Straight	4	DACAR 535 or equivalent	
HSPCSNXX02	Plug	1	Straight	4+2	DACAR 535 or equivalent	
HSJCSNXX05	Jack	1	Straight	4+4	DACAR 535 or equivalent	
HSJCSNXX03	Jack	1	Straight	4	DACAR 535 or equivalent	
HSJCSNXX04	Jack	1	Straight	4	DACAR 535 or equivalent	
HSJCSNXX01	Jack	1	Straight	4	DACAR 535 or equivalent	

Coding: Please refer to **page 35** for Color and Key Coding; Specific coding is available upon request.
Packing: PCB connectors are packaged in plastic tray or carrier tapes;
Cable connectors and cable assemblies are packaged in bags;
Other specific packing is available upon request.

Cable Connector

Part No.	Gender	Number of Ports	Configuration	Number of Pins	Cable Group	Product
HSJCRNXX01	Jack	1	Right Angle	4	DACAR 535 or equivalent	
HSJCRNXX05	Jack	1	Right Angle	4	DACAR 535 or equivalent	
HSJCRNXX02	Jack	1	Right Angle	4+2	DACAR 535 or equivalent	
HSJCRNXX04	Jack	1	Right Angle	4+2	DACAR 535 or equivalent	
HSJCRNXX03	Jack	1	Right Angle	4	DACAR 535 or equivalent	
HSJCSNXX02	Jack	1	Straight	4+2	DACAR 535 or equivalent	

HSD

Cable Assembly

Part No.	Side A	Side B	Product
C*-DJSX-DJRX-XXXX-YYY	Straight Jack	Right Angle Jack	
C*-DJRX-DJRX-XXXX-YYY	Right Angle Jack	Right Angle Jack	
C*-DPSX-DJSX-XXXX-YYY	Straight Plug	Straight Jack	
C*-DJSX-DJSX-XXXX-YYY	Straight Jack	Straight Jack	
C*-DJRX-DPSX-XXXX-YYY	Right Angle Jack	Straight Plug	
C*-DPSX-DPSX-XXXX-YYY	Straight Plug	Straight Plug	
C*-DPSX-DJRX-XXXX-YYY	Straight Plug+2 Pins	Right Angle Jack+2 Pins	

Cable Group（C*）

Cable Group	Remark
Dacar 302/RTK031	Low loss coaxial cable
RG174/RG316/1.5DS/1.5C	Coaxial cable
RG58	Low loss coaxial cable
Dacar 535	HSD star quad cable
1P*20AWG+2C*26AWG-MYLAR+AL.Mylar+Braid 1P*24AWG+2C*24AWG-MYLAR+AL.Mylar+Braid	USB 2.0 cable
QFP12GD100-B-5G NX-Q22A0018 Dacar 647	1000M Ethernet cable
NOUL 22AWG 44/0.100D1.3mm(-40℃~105℃)	Bending-resistant wire

FAKRA
X-FAKRA
HSD
HSL/USB
NSH

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HSL/USB SERIES

High Speed Link/Universal Serial Bus

Features & Benefits

- Fulfilling the rigorous performance standards of USCAR for automotive industry
- EMI shielding with metal housing design
- Compliant with the USB 2.0 protocol, LVDS protocol, GVIF protocol
- Type A, B and C are designed to match with different types of HSL products in market

Application Areas

Low-Voltage Differential Signaling (LVDS) / USB 2.0 / Rear Seat Entertainment System / Camera Connection System / Automotive Instrument Cluster / Automotive Display

Numbering Reference Guide

E.G.

- **UBJCSX1001**

  UB(HSL); J(Jack); P(PCB); S(Straight); X(Reserved Number); 1(Wire soldering); 001(Serial number)

UB	J	C	S	X	1	001

Series	UB: USB, HSL, Type C
Gender	P: Plug
	J : Jack
Type	P: PCB
	C: Cable
Configuration	R: Right Angle
	S: Straight
Reserved Number	
Connection	D: PCB_Wave soldering
	S: PCB_Reflow soldering
	1: Wire soldering
	2: Terminal crimping
Serial Number	001 ~ 999 (Serial number are used to distinguish product with different accessories)

Color and Key Coding

Type A

Coding		Color/RAL No. (Similar)
A		Jet Black/9005
B		Signal Blue/5005
C		Nut Brown/8011
D		Leaf Green/6002

Type B

Coding		Color/RAL No. (Similar)
A		Jet Black/9005
B		Blue Grey/7031
C		Pure White/9010
D		Nut Brown/8011
E		Signal Blue/5005
F		Leaf Green/6002

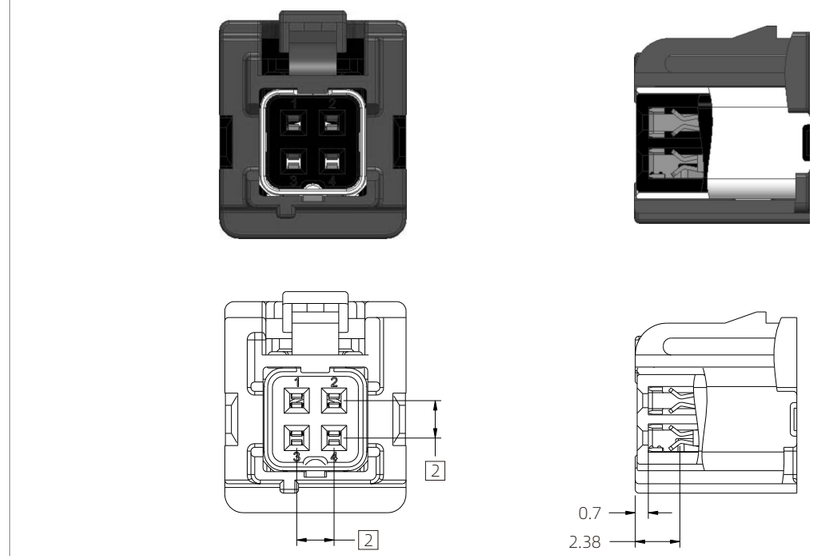
Type C

Coding		Color/RAL No. (Similar)
A		Nut Brown/8011
B		Leaf Green/6002
C		Signal Blue/5005
D		Jet Black/9005

HSL/USB

FAKRA
X-FAKRA
HSD
HSL/USB
NSH

Interface Dimensions



Cable Connector

Unit: mm

Technical Data

Electrical Performance

Impedance	90 Ω
Frequency range	480 MHz
Dielectric withstanding voltage	500 Vrms Min
Working current	≤2.5 A DC (depending on cable type)
Center contact resistance	30 mΩ Max
Outer contact resistance	30 mΩ Max
Insulation resistance	100 MΩ Min

Mechanical Performance

Connector durability	20 cycles Min
Coding efficiency	80 N Min
Retention force latch	98 N Min
Disengagement force	60 N Min
Engagement force	60 N Max

Environmental Performance

Temperature range	-40°C to +105°C
Temperature & humidity	USCAR-2, Paragraph 5.6.2
Vibration & mechanical shock	USCAR-2, Paragraph 5.4.6
Thermal shock	USCAR-2, Paragraph 5.6.1
RoHS	RoHS compliant

Materials

Housing	PA, PBT, PPE
Outer contact	Zn, CuZn, CuSn, Stainless Steel
Insulator	LCP, PA, PTFE
Center contact	CuBe, CuZn, CuSn
Cover	PA, PBT, PPE
Crimping ferrule	Cu
Terminal position assurance	PA, PBT, PPE

Platings

Outer contact	Au, Sn, Ni
Center contact	Au

HSL/USB

HSL Cable Connector

Part No.	Gender	Number of Ports	Configuration	Number of Pins	Cable Group	Product
UBJCSXX001(A)	Jack	1	Straight	4	USB 2.0 or equivalent	
UBJCSXX002(B)	Jack	1	Straight	4	USB 2.0 or equivalent	
UBJCSXX003(C)	Jack	1	Straight	4	USB 2.0 or equivalent	
UBPCSXX001(C)	Plug	1	Straight	4	USB 2.0 or equivalent	

USB Cable Connector

Part No.	Gender	Number of Ports	Configuration	Number of Pins	Cable Group	Product
UBJCSX1010	Jack	1	Straight	4	USB 2.0 or equivalent	
UBJCSX1009	Jack	1	Straight	4	USB 2.0 or equivalent	
UBJCS2A004	Jack	1	Straight	4	USB 2.0 or equivalent	
UBJCRX1015	Jack	1	Right Angle	4	USB 2.0 or equivalent	

Coding: Please refer to **page 45** for Color and Key Coding; Specific coding is available upon request.
Packing: PCB connectors are packaged in plastic tray or carrier tapes;
Cable connectors and cable assemblies are packaged in bags;
Other specific packing is available upon request.

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Numbering Reference Guide
Cable: one to one

E.G.

- **C4-LJSB-LJSB-2150-001**

  C(Cable Assemblies); 4(Cable Group 4); LJSB(Side A: HSL, Jack, Straight, B Code); LJSB(Side B: HSL, Jack, Straight, B Code); 2150(Cable length); 001(Serial number)

C 4 - L J S B - L J S B - 2150 - 001

Cable Assemblies Marking	CABLE
Cable Group [Please see reference table *Cable Group (*)* for other cable specification]	1: DACAR 302/RTK031 or equivalent
	2: RG174/RG316/1.5DS or equivalent
	3: RG58 or equivalent
	4: DACAR 535 or equivalent
Series-Side A	F: FAKRA
	XF: X-FARKA
	D: HSD
	L : HSL
	U: USB
	N: HSN
Gender-Side A	P: Plug
	J : Jack
Configuration-Side A	R: Right Angle
	S: Straight
Coding-Side A (Please fill in required coding)	A: A code
	B: B code
Series-Side B	F : FAKRA
	XF: X-FARKA
	D: HSD
	L : HSL
	U: USB
	N: HSN
	E : No connector on Side B
Gender-Side B	P: Plug
	J : Jack
	0: No connector on Side B
Configuration-Side B	R: Right Angle
	S: Straight
	0: No connector on Side B
Coding-Side B (Please fill in required coding)	A: A code
	B: B code
	0: No connector on Side B
Cable Length	XXXX (Unit: mm)
Serial Number	YYY (Serial number are used to distinguish product with different accessories)

HSL Cable Assembly

Part No.	Side A	Side B	Product
C*-LJSX-LJSX-XXXX-YYY	HSL Cable Connector Jack (Type A)	HSL Cable Connector Jack (Type A)	
C*-LJSX-LPSX-XXXX-YYY	HSL Cable Connector Jack (Type B)	HSL Cable Connector Plug (Type B)	
C*-LJSX-LJSX-XXXX-YYY	HSL Cable Connector Jack (Type C)	HSL Cable Connector Jack (Type B)	

USB Cable Assembly

Part No.	Side A	Side B	Product
C*-DJSX-UJSX-XXXX-YYY	HSD Cable Connector Jack	USB Cable Connector Jack	
C*-UJSX-UJSX-XXXX-YYY	USB Cable Connector Jack	USB Cable Connector Jack	
C*-LJSX-UPSX-XXXX-YYY	HSL Cable Connector Jack, (Type B)	USB Cable Connector Jack	

HSN SERIES

High Speed Connction for Automotive EtherNet

Features & Benefits

- Meeting high speed connection requirements of in-vehicle Ethernet application
- Differential connector system for high-speed data transmission
- Supporting data transfer rate up to 10 Ghz/25 Gbps
- Full 360° shielding and waterproof version designed for wiring requirements of large bandwidth and high speed in complicated and tough electromagnetic environment
- Modular and space saving design
- Supporting sealed and unsealed applications

Application Areas

Domain Controller Connection / Backbone Network Connection / Camera Connection System / Autonomous Driving / Advanced Driver Assistance System (ADAS) / Remote Information Processing System / High-Resolution Displays / Radar & Laser Radar

FULL 360° SHIELDING
CONNECTING SOLUTION

Numbering Reference Guide

E.G.

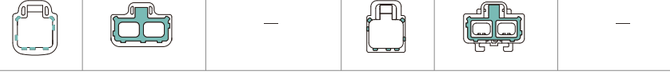
- HNPPRNZS01T

  HN(HSN); P(Plug); P(PCB); R(Right Angle); N(North); Z(Code); S(PCB_Reflow soldering); 01(Serial number); T(Plastic tray packing)

Series	HN: HSN
Gender	P: Plug
	J : Jack
Type	P: PCB
	C: Cable
Configuration	R: Right Angle
	S: Straight
Direction	N: North
	S: South
	W: West
	E: East
	0: No Direction
Coding	A: Jet Black
	B: Pure White
	C: Light Blue
	D: Claret Violet
	E: May Green
	F: Nut Brown
	G: Platinum Grey
	H: Light Pink
	I : Beige
	K: Curry
	L : Yellow Green
	M: Paster Orange
	O: Light Green
	Z: Water Blue
Connection	D: PCB_Wave soldering
	S: PCB_Reflow soldering
Cable Group	1: DACAR 647 or equivalent
	0: Other custom cables
Serial Number	01 ~ 99 (Serial number are used to distinguish product with different accessories)
Packing	C: Carrier tape
	U: Tube
	T: Plastic tray

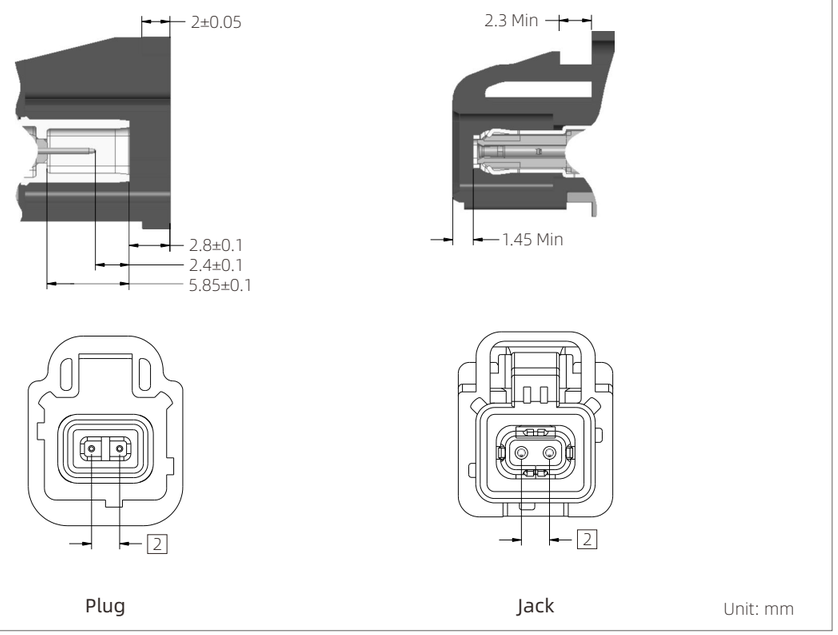
HN	P	P	R	N	Z	S	01	T

Color and Key Coding

Coding	Plug			Jack			Color/RAL No. (Similar)
	Single	Double	Quad	Single	Double	Quad	
A							Jet Black/9005
B							Pure White/9010
C							Light Blue/5012
D							Claret Violet/4004
E							May Green/6017
F			—			—	Nut Brown/8011
G			—			—	Platinum Grey/7036
H			—			—	Light Pink/3015
J			—			—	Beige/1001
K			—			—	Curry/1027
L			—			—	Yellow Green/6018
M			—			—	Paster Orange/2003
Z							Water Blue/5021
O			—			—	Light Green/6027

HSN

Interface Dimensions



FAKRA
X-FAKRA
HSD
HSL/USB
HSN

Technical Data

Electrical Performance

Impedance	100 Ω
Frequency range	DC-10 GHz
Dielectric withstanding voltage	200V AC
Working current	1 A DC Max (depending on cable type)
Center contact resistance	10 mΩ Max
Outer contact resistance	7.5 mΩ Max
Return loss	30 dB @ DC~190 Mhz; 20 dB @ 190~600 Mhz (TC9)
	14.4 dB @ 1000 Mhz; 11.4 dB @ 2000 Mhz; 7.5 dB @ 4000 Mhz 2.5GBASE-T1, 5GBASE-T1, 10GBASE-T1 (IEEE Std 802.3ch 149.8.2)
Insertion loss	$\leq 0.1\times\sqrt{fGHz}$ dB
Insulation resistance	500 MΩ Min (Connector) ,100 MΩ Min (Cable Assemblies)
Longitudinal Conversion Loss (Connector)	50 dB @ 10-50 MHz, 34 dB @ 50-600 MHz
Longitudinal Conversion Transfer Loss (Connector)	50 dB @ 10-50 MHz, 34 dB @ 50-600 MHz

Mechanical Performance

Connector durability	25 cycles Min
Retention force latch	110 N Min
Disengagement force (1-port/2-port)	5 N Min
Engagement force (1-port/2-port)	45 N Max
Engagement force (waterproof)	45 N Max

Environmental Performance

Temperature range	-40℃ to +105℃
Temperature & humidity	USCAR-2, Paragraph 5.6.2
Vibration & mechanical shock	USCAR-2, Paragraph 5.4.6
Thermal shock	USCAR-2, Paragraph 5.6.1
RoHS	RoHS compliant

Materials

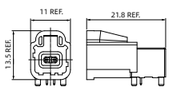
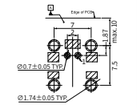
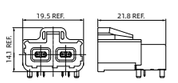
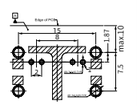
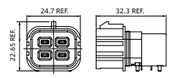
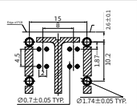
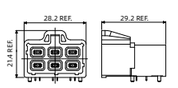
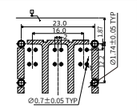
Housing	PA, PBT, PPE
Outer contact	Zn, CuZn, CuSn, Stainless Steel
Insulator	LCP, PA, PTFE
Center contact	CuBe, CuZn, CuSn
Cover	PA, PBT, PPE
Crimping ferrule	Cu
Terminal position assurance	PA, PBT, PPE

Platings

Outer contact	Au, Sn, Ni
Center contact	Au

HSN

PCB Connector

Part No.	Gender	Number of Ports	Configuration	Number of Pins	Product	Outline Dimensions	PCB Layout
HNPPRNZS01T	Plug	1	Right Angle	2			
HNPPRNZS02T	Plug	2	Right Angle	4			
HNPPRNZS04T-W	Plug	4	Right Angle	8			
HNPPRNZS06T	Plug	6	Right Angle	12			

Cable Connector

Part No.	Gender	Number of Ports	Configuration	Number of Pins	Cable Group	Product
HNPCSNZ101	Plug	1	Straight	2	QFP12GD100-B-5G NX-Q22A0018 DACAR 647	
HNJCSNZ101	Jack	1	Straight	2	QFP12GD100-B-5G NX-Q22A0018 DACAR 647	
HNJCSNZ102	Jack	2	Straight	4	QFP12GD100-B-5G NX-Q22A0018 DACAR 647	
HNJCSNZ104-W	Jack	4	Straight	8	QFP12GD100-B-5G NX-Q22A0018 DACAR 647	
HNJCSNZ106	Jack	6	Straight	12	QFP12GD100-B-5G NX-Q22A0018 DACAR 647	

Coding: Please refer to **page 53** for Color and Key Coding; Specific coding is available upon request.
Packing: PCB connectors are packaged in plastic tray or carrier tapes;
Cable connectors and cable assemblies are packaged in bags;
Other specific packing is available upon request.

Product Datasheet and Support

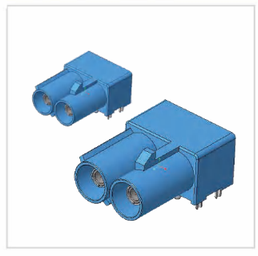
Product datasheet as well as supports are provided for better understanding of LJV products and solutions.
Please contact our sales representative for more information.

LJV

PRODUCT SPECIFICATION







Product Description: FAKRA Dual R/A PCB Connector

Product Part Number: FKPPRNXD18X

Specification Number: PS-FKPPRNXD18X-008

LJV P3 Connector and Cable Assemblies Business Unit

Product Specification

LJV

Specification Number	Product Description	Part Number	Date	Version
PS-FKPPRNXD18X-008	FAKRA Dual R/A PCB Connector	FKPPRNXD18X	XXXX-XX-XX	A.0

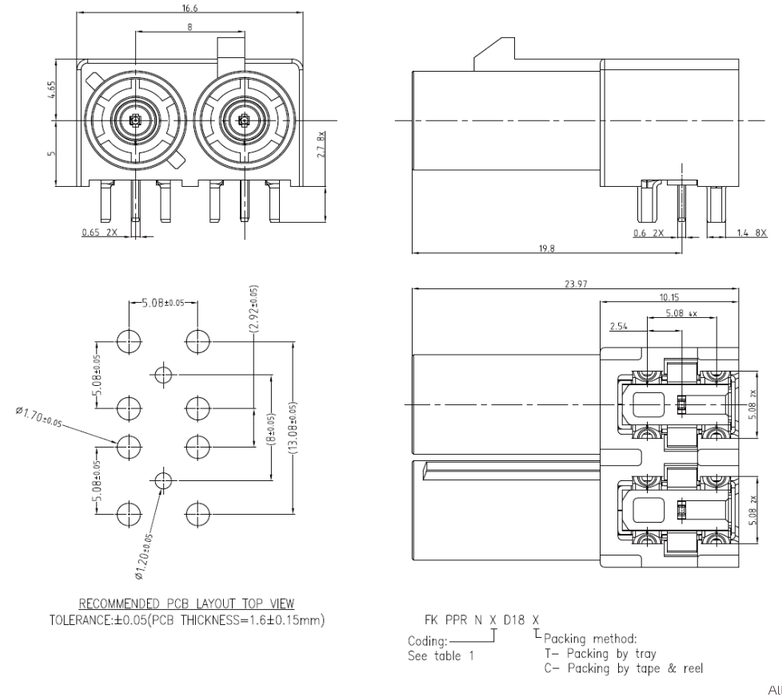
Revision History					
Rev.	ECN #	Rev.Date	Release and Revision Description	Prepared by	Approved by
A0	N/A	xxxx-xx-xx	The First Release	Kevin Fang	Harry He

1. Scope / Product Application

The FAKRA PCB connectors are applied for RF signal transmission under particular mechanical condition and environment in automotive industry. Designed to meet/exceed the performance specification and requirement of below industrial standards:
- SAE/USCAR-17
- SAE/USCAR-18
- DIN 72594-1

Applications:
- Automotive Antenna Communication
- Automotive ADAS

2. Outline & Application Dimension



All dimensions are in mm

3. Material and Finish

Item	Component Description	Material	Surface Finish
1	Plastic Housing	High Temp. Engineer Plastic	Color Per Coding defined
2	Body	Phosphor Bronze	Matte TIN
3	Insulator	LCP	Natural
4	Center Contact	Brass	Gold Plating

Specification Number	Product Description	Part Number	Date	Version
PS-FKPPRNXD18X-008	FAKRA Dual R/A PCB Connector	FKPPRNXD18X	XXXX-XX-XX	A.0

4. Technology Parameters

4.1 Electrical Performance

	Item		Spec Requirement	Test Condition
4.1.1	Impedance		50 Ω	
4.1.2	Frequency range		DC-6GHZ	
4.1.3	Insertion loss		IL≤0.1*$\sqrt{f}$ dB (f: GHz)	
4.1.4	Return loss		≥20.8dB @DC-200Mhz ≥15.5dB @200Mhz-2GHZ ≥13.9dB @2Ghz-3Ghz	Connector Only, depend on PCB design also
4.1.5	Operating voltage		335Volts rms	
4.1.6	Contact resistance	Center	10mΩ Max	Refer to USCAR-17 4.3.1
		Outer	5mΩ Max	Refer to USCAR-17 4.3.1
4.1.7	Withstanding voltage		800Volts rms	Refer to USCAR-17 4.3.2
4.1.8	Insulation resistance		≥1000 MΩ	Refer to USCAR-17 4.4.1

4.2 Mechanical Performance

	Item	Spec Requirement	Test Condition
4.2.1	Visual inspection	No surface broken, No Color changed	Refer to USCAR-2 5.1.8
4.2.2	Mating cycles	25 Cycles Min	Refer to USCAR-2 5.1.7
4.2.3	Mating force	45 N Max.	Refer to USCAR-2 5.4.2
4.2.4	Unmating force	2 N Min.	Refer to USCAR-2 5.4.2
4.2.5	Axial Retention force	110 N Min.	Refer to USCAR-2
4.2.6	Bland Mating force	40 N Min.	
4.2.7	Resistance to soldering heat	Connector can withstand Pb-free Reflow soldering Process; Peak Temperature can withstand 260°C, 5 seconds	Refer to JEDEC J-STD-020D

4.3 Environmental Performance

	Item	Spec Requirement	Test Condition
4.3.1	Operating temperature	-40°C to +105°C	
4.3.2	Humidity temperature cycling	1. Appearance: No abnormality ; 2. Contact Resistance: shall meet 4.1 ; 3. Insulation Resistance: shall meet 4.1 ;	Refer to USCAR-2 5.6.2
4.3.3	Thermal shock	1. Appearance: No abnormality ; 2. Contact Resistance: shall meet 4.1 ; 3. Insulation Resistance: shall meet 4.1 ;	Refer to USCAR-2 5.6.1
4.3.4	Vibration	1. Appearance: No abnormality ; 2. Electrical discontinuity less than 1us	Refer to USCAR-2 5.4.6
4.3.5	Shock	1. Appearance: No abnormality ; 2. Electrical discontinuity less than 1us	Refer to USCAR-2 5.4.6
4.3.6	Solder ability	At least 95% covered by a continuous new solder coating	Apply the following environment to the mating connector Temperature : 245±5°C Duration : 3~5 second Test sample should be observed by the magnification of 10times after the test.
4.3.7	RoHS compliant	RoHS 2.0	

Product Specification

Specification Number	Product Description	Part Number	Date	Version
PS-FKPPRNXD18X-008	FAKRA Dual R/A PCB Connector	FKPPRNXD18X	XXXX-XX-XX	A.0

5. Packaging & Stockpile Condition

5.1 Packaging

1) FKPPRNXD18T: Soft tray packing 50 pcs/tray, 28 layers, total 1400 pcs/carton

1) FKPPRNXD18C: Tape & Reel Packing 200 PCS/Reel

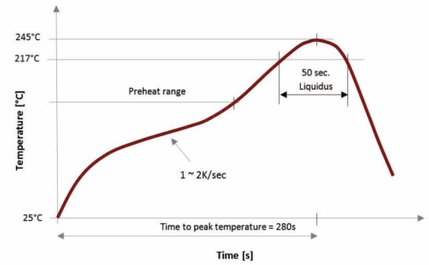
2) Weight: 4.19g/pc

5.2 Stockpile Condition

Use this product within 6 months after receipt
Condition : Temp: -10~+40℃ Humidity:15~85%

6. Recommended Reflow Soldering Condition/SMT

Due to large variations of existing processes, equipment and accessory and the different demands to the soldering process, it is not possible to define an ideal soldering proposal for all situations. This connector is designed for reflow soldering application. A recommended soldering processes is possible only in reference to the respective soldering standard (JEDEC). the Next Fig. shows the recommended reflow soldering process according JEDEC J-STD-020D.



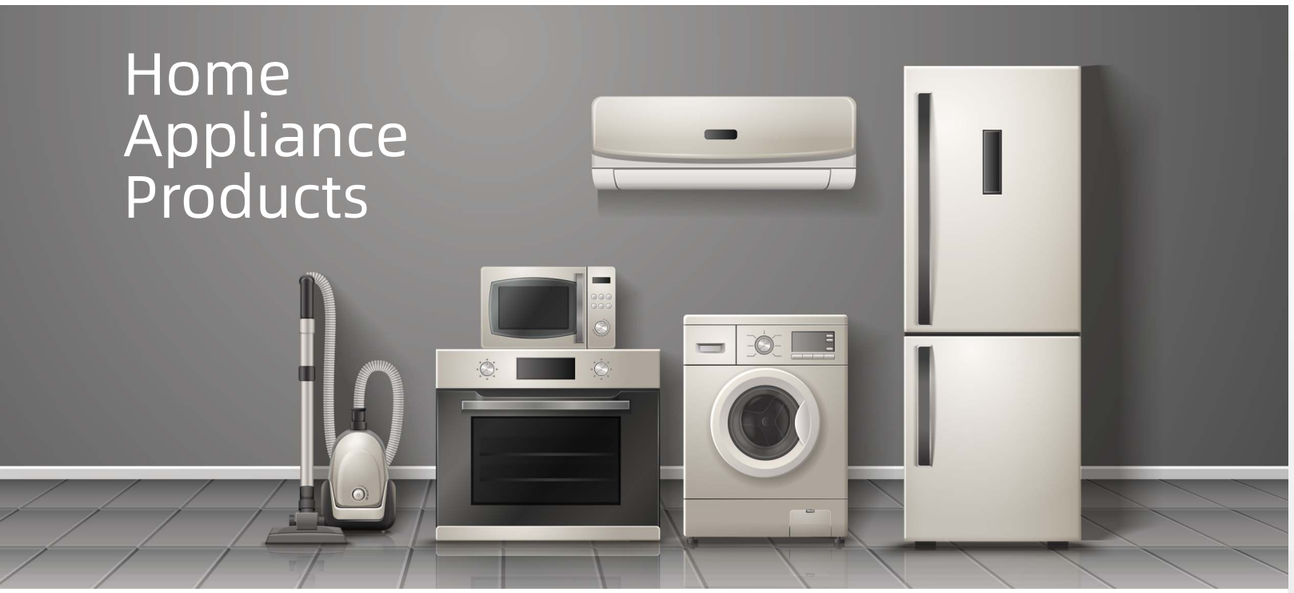
7. Coding

Jack	Coding	Color
	A	Jet Black
	B	Cream
	C	Signal Blue
	D	Claret Violet
	E	Leaf Green
	F	Nut Brown
	G	Blue Grey
	H	Heather Violet
	I	Beige
	K	Curry
	L	Carmine Red
	M	Paster Orange
	N	Pastel Green
	Z	Water Blue

Extensively Diversified Product Offering

LJV offers a complete range of products to fully meet the diversified demands and unique needs of customers.

- **Telematics Connectors and Cable Assemblies Series**: FAKRA, X-FAKRA, HSD, HSL/USB, HSN.
- **Electronics**: Encoder Smart Control Modules, Car Seat Switch Modules, Encoders, Potentiometers, and Switches.
- **Precision Components**: Precision Die-casted Parts (aluminum alloy/zinc alloy), Precision Stamped Parts, and Injection Molded Parts.
- **Customized Products.**



Smart Control Modules


ME7001


ME7002


MSE6800


ME9000


MSE4001

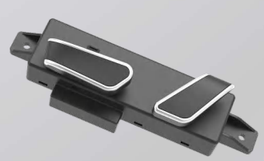

MSE3500


MSE2600


MSE5200

Encoders, Potentiometers and Switches

Car Seat Switch Modules


6-Way Seat Switch Module


10-Way Seat Switch Module


12-Way Seat Switch Module

Extensively Diversified Product Offering

Precision Components

Precision Die-casted Parts (aluminum alloy/zinc alloy), Precision Stamped Parts, and Injection Molded Parts; Customized Products.

Aluminum Alloy Die Casting

Automotive Parts

Telecommunication Parts

Security Accessories

Smart Device Accessories

Zinc Alloy Die Casting

Connector Parts

Optical Communication Parts

Consumer Electronics Parts

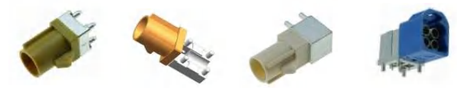
Automotive Parts

Injection Moulding

Plastic Injection Housings

Plastic Structural Parts

Over-molded Parts (Die-casting)



Over-molded Parts (Die-casting & Stamping)

Stamping

Contact Pins

Terminals

Compliant Pins

KOVAR Parts

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