

SHAPING THE FUTURE WITH "TSUNAGU" TECHNOLOGY.

FUJIKURA NEWS

R&D

Release of Rare-earth-based High-temperature Superconducting Wire Rod with Artificial Pinning Center

Rare-earth-based superconducting wire rods are known for excellent in-field critical current characteristics, which are improved in a low temperature range by adding impurities generally called artificial pin to the rods. Fujikura has worked on the research and development of superconducting wire rods with artificial pinning centers to further improve the critical current characteristics of our conventional product, rare-earth-based high-temperature superconducting wire rods. The sales and supply of artificial-pin-doped superconducting wire rods were launched in fiscal 2019 since we had completed the development and had the prospect of volume production. Our superconducting wire rods with artificial pinning centers showed a lower critical current (I_c) in a conduction test in typical liquid nitrogen (77 K/-196°C, 0 T*) compared to an existing product. However, our new product possesses critical current characteristics improved by 40% or higher at 20 K (-253°C), 5 T,

which are intended to present a temperature and magnetic field in actual industrial application of high-temperature superconductive wire rods. Rare-earth-based high-temperature superconducting wire rods can be used in wide temperature and magnetic field environments and are expected to find various applications to industrial devices including those in the fields of power, medicine, and analysis. Rare-earth-based high-temperature superconducting wire rods with artificial pinning centers can meet specifically growing demands for application in high magnetic fields or for higher current density. In addition, our unique production method will enable stable manufacturing of not only long wire rods but also those with excellent characteristics. We expect our superconducting wire rods including existing products to play a role in promoting practical use of high-temperature superconducting applied equipment. Fujikura will further be committed to improving the

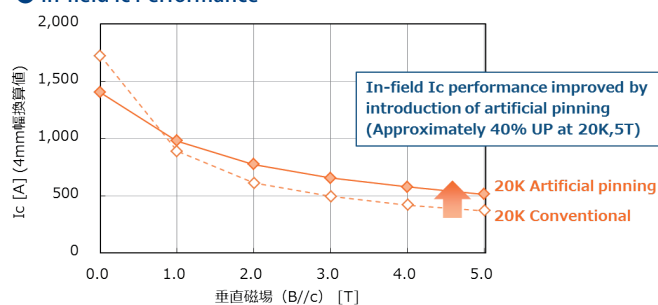
quality and reliability of rare-earth-based high-temperature superconducting wire rods, propose specifications and supply products as per customer demands.

* 1 tesla (T) = 10,000 gauss

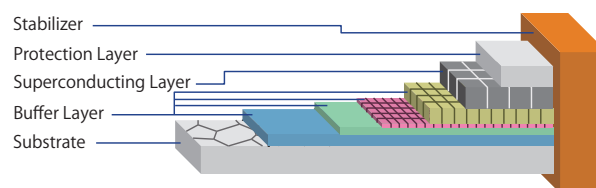
Product Line Up

Product	Width (mm)	Thickness (mm)	Substrate (μm)	Stabilizer (μm)	Critical Current [A]		Notes
					77K, 0T	20K, 5T	
FYSC-SCH04	4	0.13	75	20	165	368	Conventional
FESC-SCH04	4	0.11	50	20	85	514	Artificial pinning

In-field I_c Performance



Schematic of Superconducting Wire





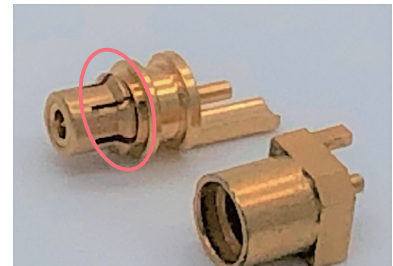
The MMCXG Series of Connectors for Detachable Earphone Cable

Recently, an increasing number of earphones with detachable cables (photo 1) have been brought in the high-end earphone market, where sound quality is focused. If the cable is broken, the users can just replace it with new one and thus save money. Furthermore, they can enjoy the change of sound by connecting a different cable.

Fujikura released the MMCXF series as cable-detachable connectors, which have been well received in the market. We also have just commercialized the MMCXG series (photo 2), the sound quality of which has been further improved. The new series have a structure without discontinuity by the integration of fitting parts of the connector (outer conductor). This has improved the contact reliability and mechanical strength and reduced the occurrence of sound discontinuity due to instantaneous interruption. We will continue to develop products that satisfy customer needs.



● Photo 1: Cable-detachable earphones (connector in gold color)



● Photo 2: MMCXG Connector (new product) integration of outer conductors in red circle

✉ Connector Product Development Department ddk.contact@jp.fujikura.com



Development of Small-diameter LCX for 920 MHz Bandwidth

In these years, while IoT has been drawing much attention, radio communication such as RFID and LPWA*1, which use 920 MHz bandwidth, grow in demand. Against such a background, Fujikura Dia Cable Ltd. has developed an LCX*2, ZLCX-1.5D, with a small external diameter of about 3 mm. This LCX is a cable-type radio antenna and its reduced diameter allows the features of space saving, easy to bend, and lightweight, which conventional LCXs do not possess. These features enable the product to be wired in a limited space such as in a shelf. They also enable real-time inventory control through communication with RFID tags and data collection from different ambient sensors in environments with many radio wave obstacles and a small space for wiring. This will expand the application area of RFID and LPWA.

In addition, the new LCX is designed with higher antenna gain than existing LCXs and thus can be used in passive RFID and other application.

The new product is expected to find applications in various settings because of its performance and ease of handling while IoT is spreading in society from now on.

*1 LPWA: low power wide area (telecommunication network fulfilling two features of long-distance data communication and low power consumption)

*2 LCX: leaky coaxial cable



Appearance of cable

✉ Fujikura Dia Cable <https://www.fujikura-dia.co.jp/contact/>

EX
Exhibition

JECA FAIR 2019 (the 67 Electrical Construction Equipment and Materials Fair)

Dates

May 22 (Wed), 2019 10:30-17:30
May 23 (Thu) 10:00-17:00 May 24 (Fri) 10:00-16:30

Venue

West Halls 1 and 2, Tokyo Big Sight
(Fujikura Dia Cable booth 1-19)

JECA FAIR 2019, where manufacturers of electrical construction equipment, materials, and tools and the distributors meet together under one roof, is Japan's largest exhibition in the electrical construction industry. This year's theme for the exhibition is "A new step! Power to step forward! Electrical construction changes the future!"

Fujikura Dia Cable's booth shows a live wire sheath fault locator, foam-insulation leaky coaxial cable (LCX) and connector, and RFID tags and LCXs combined for product control under the slogan, "power saving and higher efficiency, safety and security, and proposals for future." We sincerely look forward to seeing you at our booth.

Examples of exhibits

Safety and security

live wire sheath fault locator

Capable of precisely measuring insulation resistance of high-voltage cable sheath in live state.



● Main body of LILIA-150T

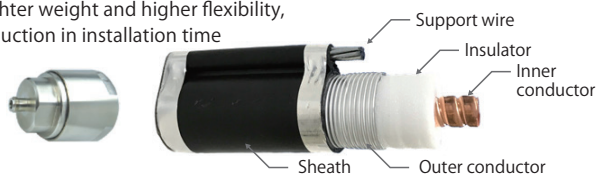


● Terminal box of LISSA-101

Saving labor in construction

Foam-insulation LCX and connector

Lighter weight and higher flexibility, reduction in installation time



Proposal for future

Product control by RFID tag and LCX combination

Saving labor by locating things through radio communication



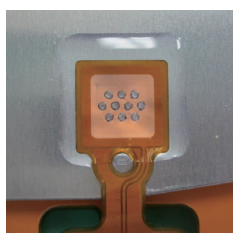
Fujikura Dia Cable

<https://www.fujikura-dia.co.jp/contact/>

EL
Electronics

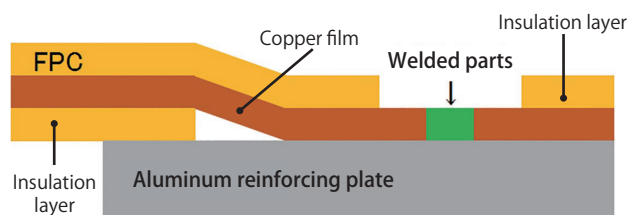
Development of FPC Welding Technology

Fujikura has developed a technology to directly weld copper film and aluminum material together. It is generally said that welding copper to aluminum is difficult because fragile intermetallic compounds are formed at the welding seam and reduce the bonding strength. The use of Fujikura's fiber laser and proprietary welding technique has enabled welding in which the formulation of intermetallic compounds is reduced. We will aim at applying this technique to large-current application that uses



● exterior of welded parts

an aluminum reinforcing plate that supports FPCs as a current path.



● Cross-sectional view of welded metals

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Electronics The CE05M Series of Waterproof Circle Connectors for Servo Motor

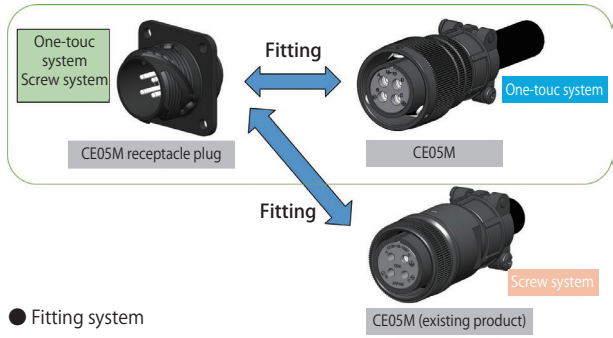
Fujikura has successfully sold the CE05 series of waterproof circular connectors for servomotors. It has just added to the product line the new products, the CE05M series, in which a one-touch locking and fitting system was employed instead of the conventional screw system.

Major features

- One-touch locking and fitting releases users from screwing and torque management.
- The receptacle is adaptable to both screwing to fit and one-touch locking to fit. Thus it can be connected to an existing plug cable.
- The new product has improved vibration resistance compared to the old model.



● CE05M (from left: receptacle, straight-type plug, right-angle-type plug)



● Fitting system

✉ Connector Product Development Department ddk.contact@jp.fujikura.com

Information Consecutive Wining of Corporate Innovation Award @ Batch 2.2019

Fujikura has received Corporate Innovation Award from Plug and Play Japan, with which we have entered into partnership, for our support of corporate innovation. Companies that specifically promote open innovation during half-year program are granted the awards. We won the award for a second year in a row following last September. We understand that our continuous promotion of open innovation and the results of the verification tests were recognized. We will accelerate our activities in cooperation with all of you.



✉ Bridge Web for inquiries www.fujikura/contact/02/index.php



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