Fujikura

FUJIKURA HISTORY

With rapid economic growth: Electric cables were in high demand, coinciding with the economic boom from 1958 and the income-doubling plan. The management of Fujikura was taken over by Kamon Hyodou from Goro Ishibashi, who had led the company's post-war growth. Fujikura won a contract to lay Japan-US trans-Pacific submarine cables in preparation for the Tokyo Olympics.

Shaping the future with "Tsunagu" Technology.

FUJIKURA NEWS 2019 No.452 3

IN Information formation

Our Efforts in Verification Tests with Omachi City (Nagano Prefecture)

New businesses increasingly tend to focus on experience (services) obtained from products but not performance or quality of products. Fujikura is also considering the feasibility of selling experience and is conducting verification jointly with a municipal government to provide new services in society.

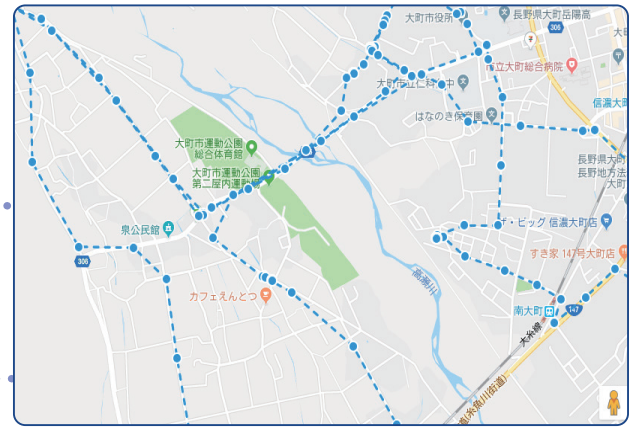
Conclusion of Cooperation Agreement with Omachi City

As part of the activity, Fujikura and Omachi City (Nagano Prefecture) entered into a cooperation agreement in October, 2018. With the aim of starting new services to help improve the service quality for citizens using ICT and IoT, we launched an effort to realize the idea in society while verifying the challenges in technology and administration through testing.

Solution of Challenges in Assessing Costs for Snow Removal Work

In January 2019, we began an effort to solve challenges in appropriately assessing costs for show removal work using a GPS terminal. We aim to provide services that create new value and deal with different challenges that the municipality, snowplowing contractors, and citizens face respectively. In addition, in terms of technology, Fujikura and one of the group companies, Fujikura Solutions Ltd., jointly prototyped a new GPS terminal. The terminal has solved challenges that commercially available GPS terminals have faced (positional accuracy, battery life, size) and has been already evaluated for performance. Furthermore, we use the technology of Cat. M1 (category M1), which is a carrier's LPWA (Low Power Wide Area) technology and considered to be a communication system of IoT terminals. Through widely cooperating (open innovation) with many players of new businesses that use positional information, we plan to start new businesses and expand our existing businesses.

•LTE-M compatible GPS terminal



•Indication of tracking record on map

Marketing Department fjk.market@jp.fujikura.com

Power & Telecom

Introduction to Field-connectable Optical Connector "Fast®"

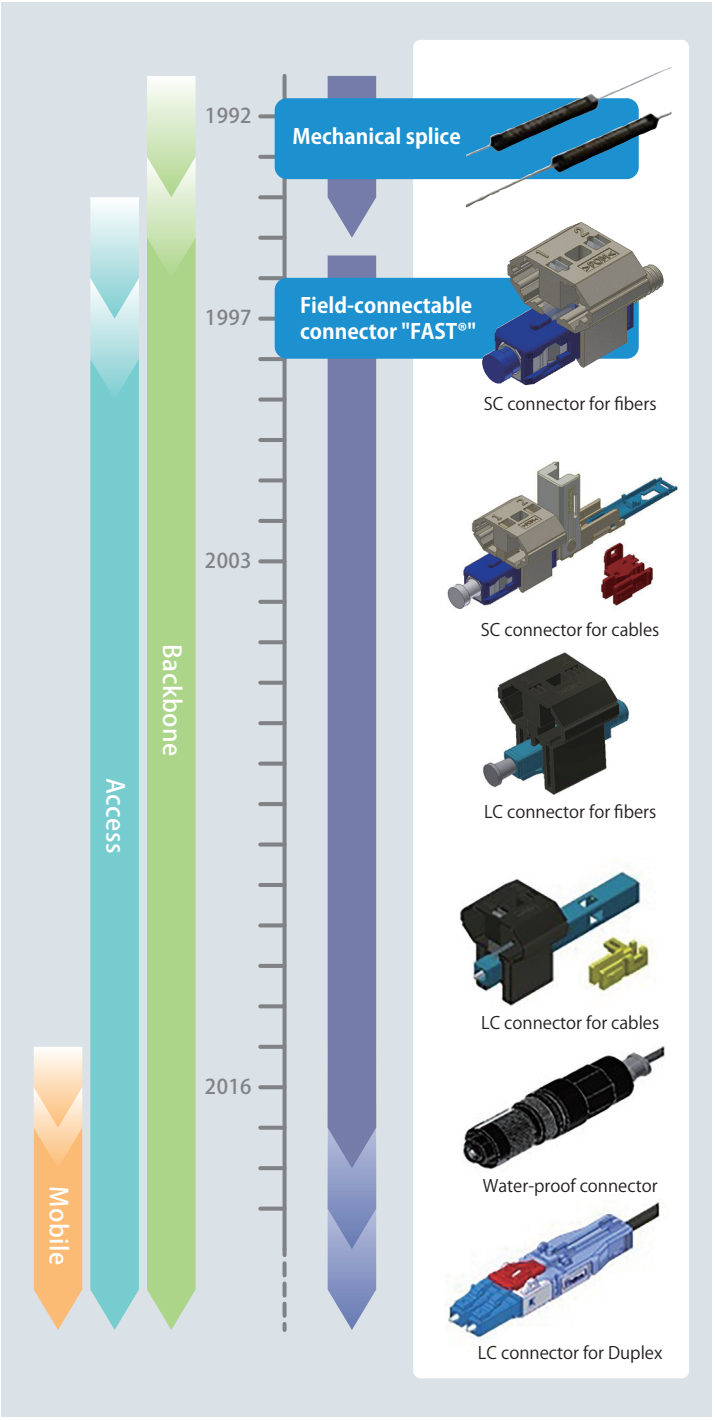
In the early 1990s, Fujikura explored a new technology to connect optical fibers quickly anywhere with inexpensive tools without a power supply and developed mechanical splices to align and fix optical fibers using a V-shaped ditch. Applying the technology, we also developed field connectable fiber-optic connectors that can be easily attached to the end of fibers at a cable installation site.

In 1995, the product was used to connect backbones in Japan. Since 2003, with the start of FTTH services, an increasing number of optical fibers have been installed nationwide. In line with this, the mechanical splices and the optical fiber connectors have been improved, becoming even cheaper and easier to connect at work sites. The products have become stored in different fiber-optic closures, termination boxes, sockets, and ONUs (optical network units). At that time, we named these connectors FAST® to have our field connectable fiber-optic connectors sound more familiar.

Since 2013, FTTH (Fiber to the Home) has become common also in foreign countries. However, there have been differences in each country's connection systems for cables and termination boxes, we have adjusted the field connection technique nurtured in Japan to theirs and improved the connector structure and connection method to expand our business overseas. While 5G, the next-generation mobile communication technology, has recently drawn attention, we have been working on the development of FAST® connectors that will be used in base stations of the antennas for the new system.

As mentioned above, our FAST® connectors have been improved according to usage environments and have an increased product lineup. We will continue to improve our products to meet customer needs.

● Transition of field-connectable connector



Optical Cable Systems Division telcon@jp.fujikura.com

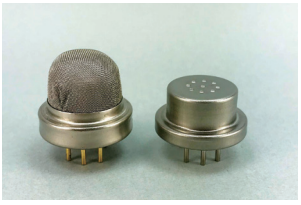
Electronics

Start of Mass-production of Small-size Oxygen Sensor FCX-UWL

Fujikura has developed a small-size oxygen sensor, FCX-UWL, and is going to launch the volume production in summer 2019. With the expansion of respiratory care using oxygen in the medical field, oxygen sensors are being used in medical devices such as oxygen concentrators to control the concentration of oxygen to provide to patients.

In recent years, medical device manufacturing companies have been hoping to reduce the size and weight of mobile medical devices, specifically, to increase patients' QOL (quality of life). This product has met the need with a lower profile and the ingenuity of structural component to minimize the installation space and maintain airtightness between the device and oxygen-supplying line with an O-ring attached to the side of the round body.

Furthermore, the oxygen sensor uses ion conducting ceramics. Although the sensing portion generates an intense heat during operation, the inner structure has been optimally designed so that the operation performance is not affected due to miniaturization. We will contribute to improving the health and QOL of many people through our product.



Left: conventional product
Right: new product

● Product specifications

型名	Conventional product FCX-UWC	New product FCX-UWL
Measurement range	0.1 ~ 95%O_2	0.1 ~ 95%O_2
Diameter	19.2 mm dia.	19.2 mm dia.
Height (excluding pin)	17 mm	10 mm
Weight	7 g	5.5 g

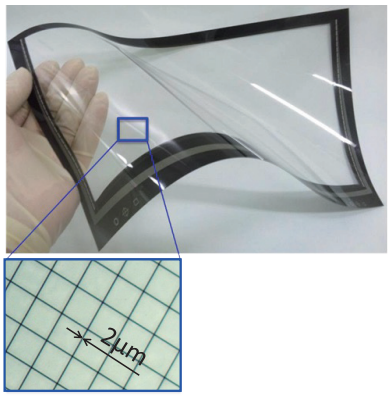
Sensor Business Unit sensor@jp.fujikura.com

R&D

Development of Transparent Electrode Film with 2-μm-wide Ultra-thin Silver Circuit by New Printing Method

Fujikura has developed transparent electrode film with 2-μm-wide ultra-thin silver circuit by a new printing method and will start trial production one by one from March 2019. Recent years, transparent electrode film using ITO (indium tin oxide) has been widely used in touch panels of smartphones and in-car navigation system. With increasing panel size, electrode materials of lower resistance, a higher degree of transparency are required.

We have succeeded in forming ultra-thin silver circuits by developing a new proprietary printing method and developed transparent electrode resin film, on which a mesh circuit has been created. When the line is reduced to as thin as 2 μm, it becomes invisible to the naked eye. This product has a low resistance and excellent flexibility and causes no rainbow(とう)-colored unevenness problem with PET base materials when polarizing glasses are used. The maximum film size is 460 x 460 mm, and a highly accurate alignment of ±5 μm is possible even when electrode layers are laminated. The applications of the products include not only touch panels but transparent antennas, anti-fog heaters, and electrodes for smart windows. We will further be committed to developing ultra-thin circuit solutions.



● Example of ultra-thin silver mesh transparent electrode film

Circuit material	Silver
Circuit Line/Pitch	2/90 μm
Circuit thickness	2.5 μm
Thickness of resin film base material	50-250 μm
Sheet resistance	10-20 Ω/□
Transmissivity	88%

Advanced Technology Laboratory fjk.ask-ELdept@jp.fujikura.com

FUJIKURA NEWS Apr.2018 - Mar.2019

Power and Telecommu-nication	Apr.	Release of "IoT Sensor Trial Kit" Incorporating Multi-hop Wireless EH Sensor System and IoT Cloud
		Introduction to MX Room-star (Indoor Cabling Unit)
	May.	Renewal of Adhesive Polyethylene Tape (FB-U Tape)
		Release of New Optical Fiber Tape Cleaver
	Jun.	"High-foamed Insulation LCX registered in the Ministry of Land,
		Infrastructure, Transport and Tourism's New Technology Information System"
		Release of Ultra-high Fiber Count Cable 3456F Wrapping Tube Cable™ with 200μm Fiber
	Jul.	Start of Delivery of 2000-Fiber SM Optical Fiber WBZ Cable to NTT
		TEC PANDA Fiber
		Cable Tech Show 2018
		6kV Portable Power Cable
	Aug.	Launch of Sales of New Single Fiber Fusion Splicer 41S
		Data Center Solutions
	Oct.	Released high flame retardant Wrapping Tube Cable(WTC)
		Development of High-power Pulse Fiber Laser, FLP-G11-100
	Nov.	Release of the World's Highest Density 6,912F WTC
		Showroom Opened in Fukui Plant
		Delivery of Light Guide for Ultrahigh Vacuum Environment
	Dec.	Release of Fiber Optic Splice Closure for Ultra-High Density Cable
	Jan.	Release of 432F Air Blown Optical Fiber Cable
		Release of Energy Harvesting LoRaWANTM Sensor Nodes
	Feb.	Release of Live Wire Sheath Fault Locator
		Release of Thin Dye-sensitized Solar Cell Module Panels as Energy-harvesting Power Sources
	Mar.	Our Efforts in Verification Tests with Omachi City (Nagano Prefecture)
		Introduction to Field-connectable Optical Connector "Fast®"
Electronics	Apr.	Digital Output Micro-pressure Sensor, AL4 series
	May.	Plug Harness BNC75 Series for 4K and 8K Broadcasting
	Jul.	Battery Connector BTK series for Smartphones
	Aug.	Harness with Low-profile Connector for Indoor Illumination
	Oct.	Temperature-compensated Absolute Pressure Sensor, AGF3F Series
	Nov.	Ultrathin Vapor Chamber
	Dec.	Temperature-compensated Differential Pressure Sensor AD2 Series
	Mar.	Start of Mass-production of Small-size Oxygen Sensor FCX-UWL
Automotive Products	May.	Market Trends in Seat Belt Reminder Sensor
	Nov.	Launch of Volume Production of Aluminum Harnesses for Electric Vehicles
	Nov.	Fujikura Sponsors Student Formula Japan
R & D	Jun.	Commercialization of Chip-stack WABE® Package
		Development of Wide-band Few Mode Fiber for Long-distance High-capacity Communications
	Oct.	60 GHz Beam-Forming Millimeter-Wave Device
	Dec.	Development of Four-core Three-mode Optical Fiber for Large Capacity Communications
	Feb.	Fujikura's Core Technology for Healthcare
	Mar.	Development of Transparent Electrode Film with 2-μm-wide Ultra-thin Silver Circuit by New Printing Method
Information Exhibition	Apr.	Showroom Opens at Kumagaya Plant
		10th Data Center Expo Spring
		2018 Japan International Welding Show
	May.	JECA FAIR 2018 (66th Electrical Construction Equipment and Material Fair)
		Fujikura's Optical Fiber Splicer Registered on Chiba's Industrial Technologies 100
	Jul.	Fujikura Receives Top 100 Global Technology Leader 2018 Award from Tomson Reuters
		Opening of Innovation Hub, BRIDGE
	Aug.	CEATEC JAPAN 2018
	Sep.	CEATEC JAPAN 2018 Information on Fujikura Exhibition
	Oct.	Health and Productivity Management: Contribution to Employees' Health Promotion Also at Canteen
		The 29th Japan International Machine Tool Fair, JIMTOF 2018
	Nov.	Fujikura Receives Corporate Innovation Award
	Dec.	Exhibition at IZB in Germany
		Publication of Fujikura Group CSR Integrated Report 2018
		Fujikura Volunteers in Disaster Relief in Minamisoma City, Fukushima Again in 2018
	Jan.	New Year's Greetings
		56th National Skills Competition
		Fujikura to Exhibit at 3rd Cloud Computing Expo Japan

Fujikura Fujikura Ltd.

"Tunagu" Technology New Product News No.452
1-5-1, Kiba, Koto-ku, Tokyo, Japan 135-8512
TEL. +81 (0) 3 5606 1112 FAX. +81 (0) 3 5606 1501
Issue : March 2019, No. 452 Editor in Chief : Tomoharu Morimoto
http://www.fujikura.co.jp

Market Research & Planning Department	+81(0)3 5606 1092
Kansai Office	+81(0)6 6364 0373
Chubu Office	+81(0)52 212 1880
Tohoku Office	+81(0)22 266 3344
Kyushu Office	+81(0)92 291 6126