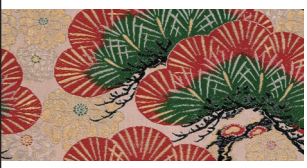
Fujikura

FUJIKURA HISTORY

Fukagawa Headquarters and New Factory: Although the Sendagaya plant was working well, Company President Tomekichi Matsumoto, decided to relocate it, considering the effect of the smoke blown toward sacred trees surrounding the Meiji Shrine, which was constructed at the time.

Shaping the future with "Tsunagu" Technology.

FUJIKURA NEWS 2018 No.438 1



President's 2018 New Year's Message

New Year's greetings to everyone.

President Masahiko Ito

Business projections for fiscal 2017

Looking at our performance in the first half of the 2017 fiscal year, Fujikura's in-house Power & Telecommunication Systems Company showed outstanding performance thanks to robust demand for optical fibers and related products in the global market, while the Electronics Business Company succeeded in establishing a strong business model focused on large clients. The Automotive Products Company saw a steep decline in profits due to rising costs associated with a labor dispute at its Eastern European production hub. Nevertheless, earnings from these companies more than supplemented the decline from the Automotive Products Company, pushing our profits higher than projected. In the April-September period, Fujikura logged \359 billion in sales, compared with a projected \340 billion, while taking in \17.5 billion in operating income, compared with a projected \16 billion. The ratio of operating income to net sales was 4.9 percent, compared with a projected 4.7 percent. Thus we were able to maintain or strengthen our earning power for the first half of the fiscal year.

For fiscal 2017 as a whole, we have projected an operating profit margin of 5.2 percent, the same as last fiscal year. In the second half of the business year, we plan to focus on prioritizing profitability over simply expanding the scale of our business operations, which we hope will serve as a launching pad for fiscal 2018, the midpoint of the current mid-term plan.

Progress made in 2020 Mid-Term Business Plan

The 2020 Mid-Term Business Plan, which was launched two years ago, includes four points. The first is the development of deeper ties with strategic customers. One example of our efforts concerns our strategic product, SWR/WTC optical fiber cable, created by analyzing customer needs and differentiating it with technology. The SWR/WTC technology has allowed us to drastically increase the number of optical fibers installed in a cable core. It will not be long before we can offer a multiple-core cable with 6,912 optical fibers. This product not only offers multiple cores, but also eases the burden associated with the installment of cables. These factors have helped deepen our clients' trust in us.

The second point is the creation of new businesses. Fujikura Dia Cable has discovered an area of demand in the cable business and has cultivated the market for "diagnostic services" that check on the state of cables installed in factories and buildings, while developing related products. The company is providing services – not selling diagnostic equipment per se – that allow it to generate business with high added value.

Open innovation is the third point. To create new value and accelerate our reinvention, we have sought partnerships and solutions from outside the company.

Fourth, I would like to talk about management reform and business structural reform. In June 2017, shareholders approved the transition of Fujikura into a company with an Audit and Supervisory Committee as stipulated by law to speed up management decision-making and strengthen monitoring and supervision.

Research and development

We have strengthened the three platforms that constitute Fujikura's technological foundation—wire & cable, optical and electronic components. By making the best use of the manufacturing technology the company has nurtured for optical fibers in telecommunications, we have elevated our high-output fiber lasers for processing equipment to among the best in the world. We also developed a 5 kW single-mode fiber laser that enables the kind of processing that is considered difficult with conventional lasers. We also developed a system that requires no electricity source or telecommunication functions by combining a dye-sensitized solar cell with a wireless sensor system. The system is designed to contribute to the expansion of Internet of things (IoT) infrastructure. Furthermore, we are focusing on research and development of millimeter-wave technology as a fourth platform.

We will inform you of the Fujikura Group's new products and technologies through Fujikura News again this year and look forward to your continued patronage.

New Year's Day 2018

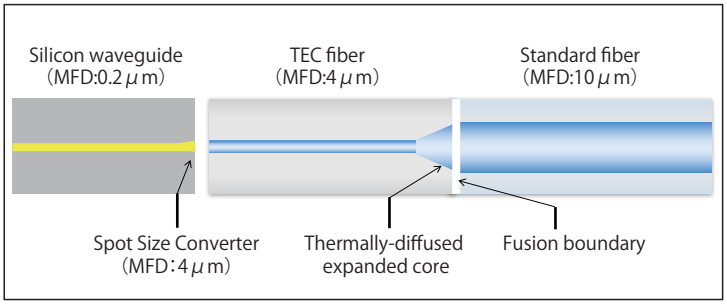
R & D

Optical Fiber for Low-loss Coupling to Silicon Photonics Device

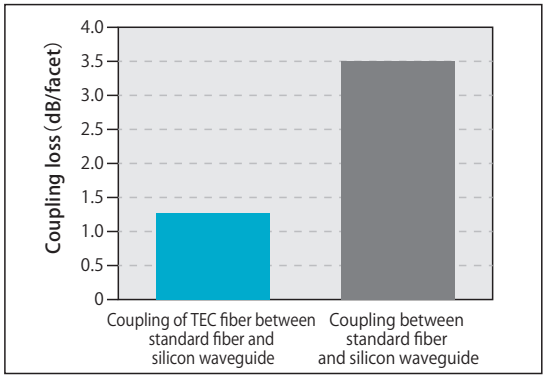
Fujikura has developed an optical fiber with a 4 μm mode field diameter (MFD) [1] by applying thermally-diffused expanded core (TEC) technology to enable low-loss coupling to silicon photo devices. TEC fibers can reduce splicing loss with their core to be expanded by discharges during fusion splicing while decreasing the loss caused by the mismatch of MFD between a silicon waveguide and a standard fiber. TEC fibers allow a decrease in the coupling loss that includes loss in fusion splicing to a silicon waveguide to 1.3 dB/facet from 3.5 dB/facet for traditional fibers. Our TEC fiber has been well received at an international conference, Optical Fiber Communication Conference and Exhibition, and other conferences held in and outside Japan. We will proceed with the development of polarization-maintaining optical fibers in cooperation with the operating department using TEC technology, expecting that the product will be used in optical transceivers and other devices.

[1] Acronym of mode field diameter. The MFD value in this article is the one when the wavelength is 1,550 nm.
[2] Acronym of Optical Fiber Communication Conference and Exhibition. One of the most prestigious international conferences in the field of information and telecommunications.

● Schematic diagram of coupling using TEC fiber



● Comparison of coupling loss with or without TEC fiber



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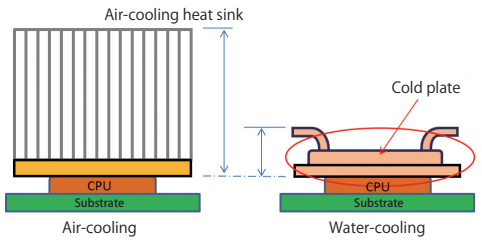
Electronics

Cold Plate for Cooling Supercomputer

Until now, air-cooling has been applied to cooling CPUs of supercomputers. Currently, however, water cooling is being used to support higher performance of CPUs, packaging density of boards and cooling efficiency. Fujikura offers cold plate units for cooling CPUs of supercomputers. A cold plate with a micro channel fin (0.2 mm to 0.4 mm in thickness) structure enables a mount height one third and cooling capacity several times that of an air-cooling system. We will continue to be committed to developing products that will meet customer demands for high-performance supercomputer cooling.



● Comparison of space occupied by air-cooling and water-cooling

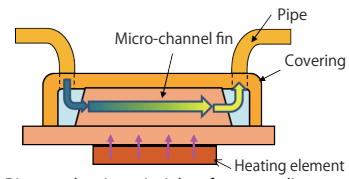
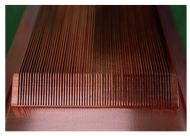


Diagram showing principles of water-cooling



micro-channel fin structure

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Power and Telecommu-nication

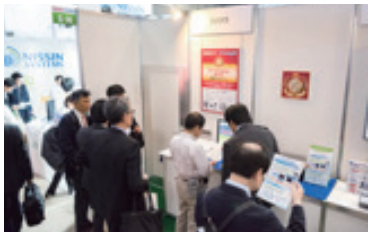
Multi-hop Wireless Energy Harvesting Sensor System

A multi-hop wireless energy harvesting (EH) sensor system developed by Fujikura's Sensor and System Research Department won the IoT Technology Excellent Prize in ET/IoT Technology section at Embedded Technology & IoT Technology 2017 held in Pacifico Yokohama. This exhibition hosted by Japan Embedded System Technology Association (JASA) was held from November 15 (Wed) to 18 (Fri) 2017.
This prize was granted in recognition of results and achievements accomplished by our technology that contributes to advancing the embedded technology industry and improving the competitiveness of domestic industries. This sensor system was highly evaluated in that it has allowed energy harvesting with dye-sensitized solar cells (DSCs) and has been presented after due deliberation on the use to cover outdoors and wide areas by 920 MHz multi-hop wireless communication. The news of our award was reported in the media such as Nikkei Technology Online, @IT MONOist and EE Times Japan. This product will be released in the last quarter of the fiscal 2017.

● IoT Technology Excellent Prize

● Multi-hop wireless EH sensor system

● Award ceremony



● Booth exhibiting awardees and their achievements on that day

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Information

The 55th National Skills Competition

The 55th National Skills Competition, hosted by the Ministry of Health, Labour and Welfare, Japan Vocational Ability Development Association and Tochigi Prefecture, was held from November 24 (Fri) to 27 (Mon) in Tochigi Prefecture. In this competition, technicians at the ages of 23 and younger pit their skills against others'.
On October 24, the first day, the opening ceremony for the players was held at Tochigi Prefectural Gymnasium in Utsunomiya City, and on 25 and 26, competitions by occupation took place at 17 venues in the prefecture.
In these competitions, 1,340 players joined 42 events consisting of fields such as electronic technology, telecommunications, machinery, metal, construction, service and fashion to compete for the title of Japan's best technician. Fujikura as a sponsor company cooperated in the event of telecommunications network installation, in which players competed in fiber-optic cabling and fusion splicing, by supplying materials and helping with the operation.

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Website dedicated to splicers https://www.fusionsplicer.fujikura.com/jp

Power and Telecommu-nication

New Model of 8 kW High-power Fiber Laser Goes on Sale

Fujikura has released a fiber laser that has a new laser oscillator with an increased optical output power up to 8 kW while maintaining its stable laser processing feature, which is one of the advantages, in processing high-reflective materials. Our group commercializes high-quality high-reliability fiber lasers by combining our core technologies including optical fiber related technology, optical semiconductor technology, and refrigeration technology. For high-power fiber lasers with an optical output power over a kW, there have been growing demand for further increases of power to deal with increased processing speeds, thicker metal workpieces, and hard-to-process materials. The optical output power of the fiber laser has been increased from 6 kW of the existing version to 8 kW by integrating our latest technological development results such as increases in power of the semiconductor laser for pumping, efficiency of the laser oscillator, and performance of optical components.

In addition, the fiber laser is less affected by nonlinear optics, which occurs and raises problem at high power outputs, than the 6 kW fiber laser because of its unique design of the optical fibers and optical components. This secures stable processing features of the laser in processing highly reflective workpieces.
We will continue to be committed to meeting customer demands and providing new solutions by improving fiber laser technology and expanding our fiber laser product lineup.

● External view of new model

Model	FLC-1000S-W	FLC-1000M-W	FLC-2000M-W	FLC-3000M-W	FLC-4000M-W	FLC-6000M-W	FLC-8000M-W
Output power (W)	1000	1000	2000	3000	4000	6000	8000
Wavelength	1070 nm						
Optical mode	Single-mode	Multi-mode					
Oscillation mode	CW/Modulated						
Maximum modulation	10 kHz						
Power stability	≦ 2%						
Fiber core diameter	—	50 μm, 100 μm				100 μm	
Beam quality	M^2 ≦ 1.4	BPP ≦ 2.5 mm・mrad @ Core dia. 50 μm BPP ≦ 4.5 mm・mrad @ Core dia. 100 μm					
Fiber termination	QBH connector						
Dimensions (H×W×L)	1195 × 750 × 1428 mm						
Delivery fiber length (standard)	10 m	10 m / 20 m					
Cooling	Water cooling						
Power suppl	Three-phase AC180-220 V or AC380-405 V, 50 / 60 Hz						
Control Mode	Analog, RS-422, Ethernet						

*Some types of this product are subject to export restrictions imposed by the Foreign Exchange and Foreign Trade Control Law.

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