

The World's First 13,824-fiber SWR™/WTC™ is Launched

Fujikura Ltd. has added the 13,824-fiber SWR™/WTC™, the world's best ultra-high-fiber-count fiber optic cable, to its product lineup for hyperscale data centers and has begun selling it.

This product and its related termination components have been delivered to an overseas hyperscale data center and have already been installed.

The new 13,824-fiber SWR™/WTC™ is a non-metallic fiber optic cable that incorporates Spider Web Ribbon™ (SWR™), a 12-fiber intermittently bonded optical fiber ribbon that enables multi-fiber fusion splicing, into our proprietary Wrapping Tube Cable™ (WTC™), a small-diameter, high-density fiber optic cable.

Owing to limitations on the quantity and inner diameter of burial conduits, smaller diameter cables are required when laying fiber optic cables underground in the construction of data centers.

Among conventional WTC™ products, fiber optic cables equipped with 6,912 SWR™ fibers had the largest fiber count. However, the new product achieves twice the fiber count while keeping the outer diameter to 40 mm or less.

In conjunction with the launch of the 13,824-fiber SWR™ / WTC™, a dedicated fiber optic cable breakout kit has been commercialized.

This breakout kit incorporates Spider Web Tube™ (SWT™)※1, which utilizes SWR™ technology. It features the ability to easily unitize multiple SWR™ optical fiber ribbons, contributing to a significant reduction in splice processing time on a fusion splice frame.

The fusion splice frame has a multi-play optical fiber fusion splicing function, allowing the internal trays to be removed for splicing operations. While a conventional

fusion splice frame without removable trays requires a single operator to perform fiber fusion splicing and breakout operations on ultra-high-fiber-count fiber optic cables, our fusion splice frame enables multiple operators to perform splicing simultaneously using its multi-play optical fiber fusion splicing function.

The fusion splice frame also employs SWT™, enabling compact storage of the excess fiber length required for multi-person operations. It achieves industry-leading, ultra-high-density, space-saving cabling while simultaneously reducing fiber installation time and supporting rapid data center construction.

Currently, the rapid proliferation and expansion of cloud services and generative AI are causing communication traffic to increase at an accelerating rate.

Fujikura contributes to the construction of advanced communication networks by supplying small-diameter, high-density SWR™/WTC™ products that efficiently utilize existing infrastructure networks. At the same time, we will continue to contribute to the realization of an even more advanced information society by developing innovative, high-quality technologies and products.

*1Spider Web Tube™(SWT™)

SWR™ structure tube, with its intermittent fixing and bonding, features excellent flexibility and elasticity. This product contributes to achieving industry-leading ultra-high-density, space-saving cabling within the fusion splice frame.

*SWR™ (Spider Web Ribbon™), WTC™ (Wrapping Tube Cable™), and SWT™ (Spider Web Tube™) are trademarks of our company.



13,824-fiber SWR™/WTC™



Fiber optic cable breakout kit



Fusion splice frame delivered to a hyperscale data center

Product Website: Outdoor WTC™ 144 - 13824F | Fujikura



■ Points relevant to the 17 SDGs

The 13,824-fiber SWR™/WTC™ and fusion splice frame allow multiple operators to work simultaneously, significantly increasing the number of optical fibers that can be fusion spliced at once. This greatly contributes to reducing work time. Additionally it is highly compatible with multi-fiber optic connectors and contributes to the construction of next-generation networks.



Introduction of a DC leakage current detector with automated step-up and judgment logic

Fujikura Dia Cable has jointly developed an automatic DC leakage current detector with TEPCO Power Grid, Inc. and Kanden Co., Ltd.

DC leakage current testing during high-voltage cable maintenance inspections is one of the most effective testing methods for preventing grounding fault accidents. However, during testing, repeated application of high voltage, current measurement, and voltage step-up may pose a risk of insulation breakdown, depending on the target cable's degradation state. Also, the measured waveform (current value behavior) must be visually inspected to determine whether it passes or fails. This device achieves a significant reduction in the risk of insulation breakdown during measurement, along with the automation and stabilization of pass/fail determination. It accomplishes this by adopting a PC-based automatic step charging method and incorporating automatic determination and automatic test termination functions

based on analysis of past diagnostic data.

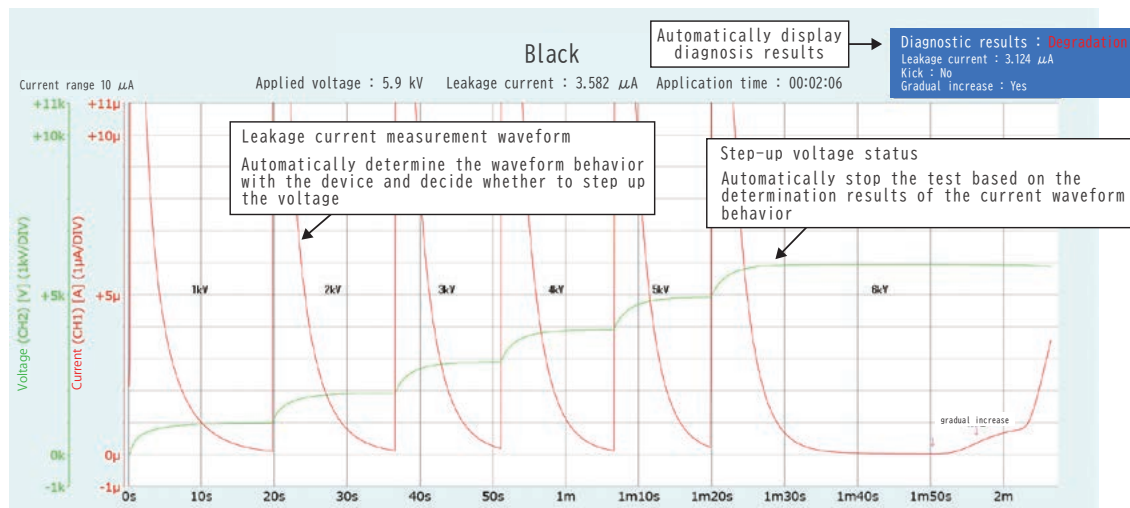
Additionally, the adoption of the guard terminal method and automatic report generation functions have streamlined measurement tasks that were previously cumbersome. The guard terminal method enables leakage current measurement of the cable alone, without disconnecting high-voltage equipment connected to cables such as VCT. The main unit of the measuring instrument is also connected to a digital multimeter for data acquisition and to a computer. Figure 1 shows the waveform obtained using a step-up voltage application method, where the test voltage was incrementally increased from 1 kV, and the test stopped automatically when the current exhibited a gradual rising trend at 6kV.

This device enables rapid and accurate understanding of the insulation condition of 6 kV-class CV cables, thereby achieving optimal maintenance and contributing to the stable supply of electricity.



Automatic DC leakage current measuring device ADC-10

■ Figure 1: Waveform illustrating automatic stop using the step voltage method and incremental current detection



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Proper maintenance of power cables using our diagnostic equipment ensures a stable energy supply, contributes to the promotion of sustainable industrialization and the development of safe, secure, and resilient infrastructure.



Development of Vapor Chamber Heat Spreader

Fujikura Ltd. has developed a vapor chamber (VC) heat spreader to respond to a wide range of demands, as well as countermeasures against heat generation due to higher CPU and GPU performance and density in data centers.

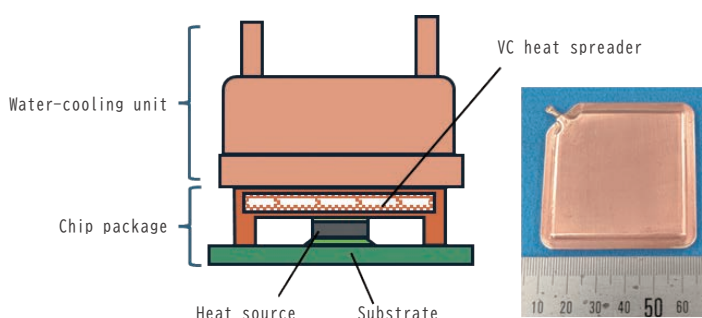
A heat spreader is a component that efficiently diffuses and dissipates heat generated by semiconductor chips. When mounted on a chip's surface, it optimizes heat transfer to cooling devices such as heat sinks or liquid cooling systems, thereby suppressing the chip's temperature rise. Generally, it is made of highly thermal conductive metals such as copper or aluminum and has a flat shape. However, this product adopts a flat-plate heat pipe structure that incorporates a porous body (wick) utilizing capillary action inside a hollow metal plate, and working liquid is enclosed. Compared to

conventional heat spreaders, this enables the efficient diffusion of large amounts of heat over a wide area in a short time, significantly reducing the thermal resistance of the chip unit.

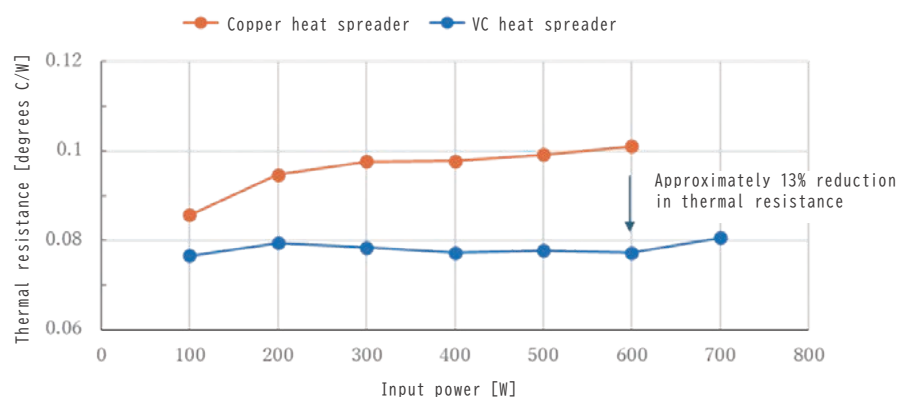
Our developed product can handle a maximum heat dissipation of 600 W, achieving an approximately 13% reduction in thermal resistance compared to conventional copper spreaders. Furthermore, by optimizing the internal structure, the required strength and heat resistance for the metal spreader have been secured, enabling stable soldering without deformation, even under reflow soldering conditions of 260 degrees C.

We will continue enhancing the performance of our cooling modules and expanding our product lineup to develop products that meet our customers' diverse needs.

■ Diagram of the use of the VC heat spreader



■ Comparison of thermal performance between copper heat spreader and VC heat spreader



■ Points relevant to the 17 SDGs

We will contribute to the development of environmentally friendly next-generation data centers through the advancement of high-performance cooling units.



Development of the One-Touch Lock FPC Connector “FFMS1”

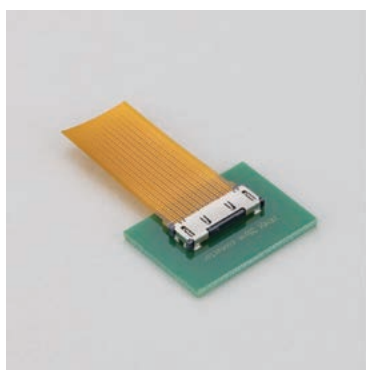
Next-generation high-speed and highly reliable interface that pioneers the CASE era.

The FFMS1 connector is a one-touch lock FPC connector with a one-action locking mechanism. It is suitable for a wide range of applications, including automotive internal wiring, communication equipment, and industrial machinery.

Conventional FPC connectors generally require a two-action process involving lever operation after FPC insertion. However, the FFMS1 employs our proprietary one-action structure, ensuring secure mating with FPC insertion alone. This significantly reduces the workload for customers and makes it possible to achieve full automation of the FPC insertion process. It also has

differential high-speed transmission performance of up to 20 Gbps and fully supports advanced modules that require high-speed communication, such as high-resolution cameras and high-precision sensors. It also uses a metal shell structure to enhance noise resistance, ensuring reliability in harsh automotive environments.

FFMS1 is the next-generation FPC connector that combines high-speed transmission, work efficiency, and reliability, serving as a core device supporting the evolution of next-generation mobility and industrial equipment. Mass production and sales are scheduled to begin in fiscal 2025.



Appearance of FFMS1 Connector

■ Product specifications

Series name	FFMS1
Rated current	0.5 A
Operating temperature range	-40 to 125 degrees C
Applicable FPC thickness	0.3 mm
Contact pitch	0.5 mm
Connector height	1.9 mm
Connector depth	4.9 mm
Number of contacts	10 to 50 contacts※

※Please inquire us for the number of contacts.

■ Points relevant to the 17 SDGs

We will continue to develop high value-added connectors and contribute to the advancement of the automotive and industrial equipment sectors.



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