

Development of High-Performance Heat Pipe for Data Centers

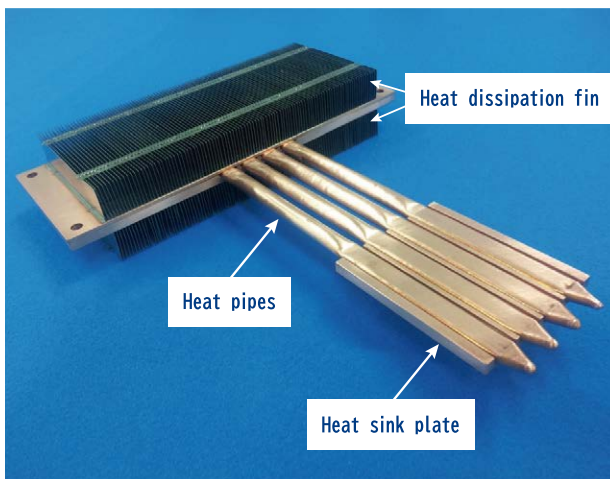
Fujikura Ltd. has developed a high-performance heat pipe for data center cooling application by doubling the maximum heat transfer capacity compared with our conventional heat pipes.

With the rapid spreading of 5G/AI, high data processing rate becomes essential for the chips which are using in data center. High data processing rate leads to high heat generation from chips using in data center server. To remove this highly generated heat, high capacity cooling module is required. In general, two types of cooling solutions are available for data center cooling; one of that is liquid cooling (cold plate, immersion cooling etc.) and another type is air cooling (heat pipe-heat sink assembly). For liquid cooling large scale infrastructure cost is a bottle neck for the data center users. To avoid high infrastructure cost of liquid cooling, there is a trend of extension of air cooling for hyper scale data center

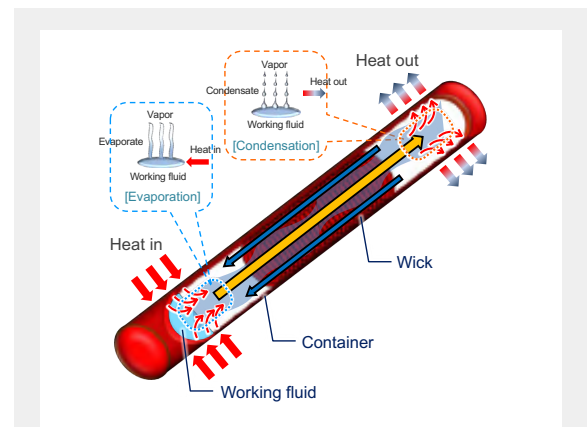
cooling. This kind of extended air cooling solution requires high performance heat pipe.

A heat pipe is an evacuated and sealed metal container charged with a small volume of working fluid and with a wick structure which generates capillary force. It can transfer heat from one to another end because of the repeated action of evaporation and condensation. To achieve even higher performance, wick structure is improved which provides better circulation of working fluid and vapor. Because of this wick structure improvement; for the new heat pipe (original diameter 8 mm and flattening thickness 4 mm) maximum heat transfer capacity largely increased up to 100W compared to the 55W of conventional heat pipes.

We will continue to meet our customers' expectations and contribute to the further development of information and communications infrastructure by improving the performance of cooling modules.



Heat pipe module for data centers



Working principle of a heat pipe

A heat pipe consists of an evacuated and sealed metal container charged with a small volume of working fluid and with a wick structure which generates capillary force. When heat is input in one end of the heat pipe vaporization of the liquid occurs and due to the pressure difference the generated vapor moves to the other end of the heat pipe where it condensed back to liquid by releasing the latent heat; then condensed liquid returns to the heating section via the wick structure which is attached along the container of the heat pipe. Because of the repeated action of vaporization and condensation heat is transferred from one end to the other without the assistance of any kind of external force.

Points relevant to the 17 SDGs

We will contribute to the further development of information and communications infrastructure by improving the performance of cooling modules.



Introduction of Vibration-Resistant CMV1 Series Connectors for One-touch Mating

As the performance of arm-type robots and machine tools is improving, signal supply connectors for servo motors need to be more vibration resistant and compact. The CMV1 series connectors meet these needs.

This product employs our proprietary one-touch mating structure, which greatly reduces the time required to connect connectors. We also offer a lineup of products in the CMV1S series, which has a screw-mating structure with vibration resistance higher than that of the one-touch

mating structure, which can be fitted to the same receptacle.

Users can select the contact wiring method—crimped or soldered—and connector shapes for straight, angled, and relayed connections are available. To support a wide range of cable sizes, we offer several clamp sizes; in addition, commercially available conduits can be combined, supporting a wide range of customer applications.

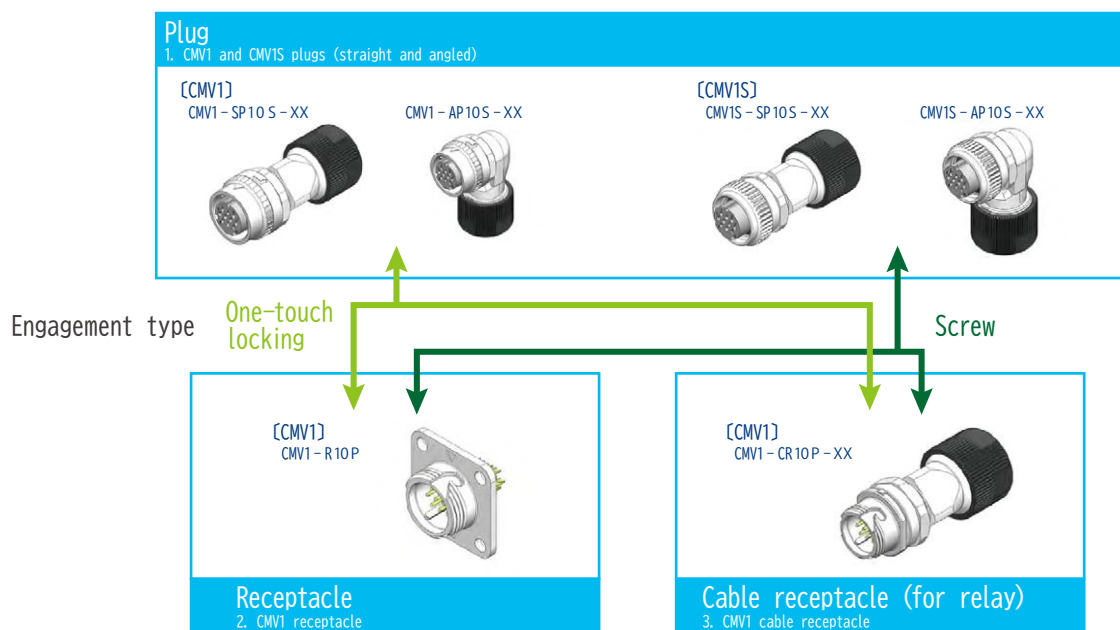
■ Table 1. Product specifications

Item	2-Core	10-Core
Rated current	3 A/Contact	
Rated voltage	200 VAC (r.m.s.)	
Withstand voltage	1,500 VAC (r.m.s.)/minute	900 VAC (r.m.s.)/minute
Insulation resistance	1,000 MΩ or more at 500 VDC	
Operating temperature range	-25°C to 85°C	
Contact size	#22	
Waterproof (dustproof)	IP67 (when engaged)	
Compatible wire	Plug • Crimped : AWG 16 to 20 • Soldered : AWG 16 or less	Plug • Crimped : AWG 20 to 28 • Soldered : AWG 20 or less
UL standard	Certified (Standard: UL 1977 File No.: E7124)	

■ Figure 1. Appearance



■ Table 2. Combination table (10-core)



■ Points relevant to the 17 SDGs

We will contribute to the innovation and development of industrial technologies by producing structures that support FA equipment with higher performance.



Rare-Earth-Based High-Temperature Superconductors Acquired ISO 9001 Certification

We have acquired ISO 9001:2015 certification, the international standard for quality management systems. We have developed and manufactured rare-earth (RE: Rare-Earth)-based high-temperature superconductors that do not require liquid helium. We have provided high-quality products with high current characteristics to customers in the world. Superconducting applications are used for medical MRIs, silicon single-crystal pulling-up furnaces, and nuclear fusion power development. High-temperature superconductors does not require liquid helium, which is a rare resource, and perform high current characteristics even in high magnetic fields; therefore, it is very promising for the realization of next-generation superconducting applications.

We have world-class technologies and have long provided rare-earth-based high-temperature superconductors in the world. With the acquisition of ISO 9001 certification, we will strive to

further improve quality management and continue to provide products and services that satisfy our customers.



Certificate

■Points relevant to the 17 SDGs

High-temperature superconductivity technology is expected to contribute to the realization of fusion power generation as next-generation energy. We will contribute to the realization of next-generation superconducting equipment toward a carbon-neutral society.



✉ Superconductor Business Development Division : ask-sc@jp.fujikura.com

2022 BICSI JAPAN District Conference & Exhibition

Fujikura will exhibit our optical-related products for data center solutions at the 2022 BICSI* JAPAN DISTRICT Exhibition and Conference hosted by the BICSI Japan, an international educational institution for network engineers, which will take place on Monday, November 21 and Tuesday, November 22.

Although the impact of COVID-19 is ongoing, this conference will be held in a hybrid style at an in-person local venue and an online web venue. At our booth, we will display new products and data center solutions to provide the latest technology trends and information to the industry. We look forward to seeing you.

BICSI's activities are aimed at improving the skills of network engineers and installation engineers, and we have long endorsed and supported these activities. We will continue to support an increasingly advanced ICT society by contributing to the reliable installation of even better quality products with proper network wiring designs.

*BICSI (The Building Industry Consulting Service International): Established in 1974 in the United States. BICSI is a professional association supporting the advancement of the information and communications technology (ICT) profession and currently serves more than 26,000 members and credential holders. BICSI is the preeminent resource for the Connected World. Headquartered in Tampa, Florida, USA, BICSI membership spans nearly 100 countries.



Dates

November 21 (Mon.) 13:00 ~ 18:00
November 22 (Tue.) 09:00 ~ 18:00

Site

Special website for the web venue (online)
URL: <https://www.bicsi.jp/>

*all content is available until December 16 (Fri.)

■Points relevant to the 17 SDGs

We will contribute to the improvement of technology for the reliable installation of even better quality products with proper network designs.



✉ Solution Engineering Department : telcon@jp.fujikura.com

The NETIS-Listed Period for Foam-Dielectric Leaky Coaxial Cables Extended for Five Years

As a result of a demonstration evaluation of foam-dielectric leaky coaxial cables (LCXs) by Fujikura Dia Cable registered in NETIS^{*1}, their listing period in NETIS was extended by five years: from the year following the initial registration to 10 years later (until fiscal 2028). The registration number was also changed to “KK-180001-VE.”^{*2}

These LCXs achieved weight reduction and an improvement in flexibility by changing the dielectric from polyethylene strings to high-foam polyethylene and also changing the inner conductor from a copper tube to a corrugated copper tube using high-foam-dielectric extrusion technology that we have cultivated over many years. Also, we reduced the weight of connectors and simplified their structure, reducing the time required to attach them. This technology was registered as a new technology with NETIS under the registration number “KK-180001-A”^{*3} on April 3, 2018. Based on the results of

seven utilization effect evaluations from 2018 to 2020, its economical efficiency, workability, safety, etc., were evaluated, and the registration number was changed to “KK-180001-VE” on February 14, 2022.

^{*1} NETIS: The New Technology Information System by the Ministry of Land, Infrastructure, Transport and Tourism

^{*2} “KK-180001-VE”: Suffix “-VE”: A technology whose evaluation information is listed and is not subject to continued investigation

^{*3} “KK-180001-A”: Suffix “-A”: A technology whose evaluation information is not listed

Main applications

Transmission/reception antenna system for radio communication equipment in closed spaces such as tunnels, underground malls, and underground parking lots



Foam-dielectric leaky coaxial cable



Connector

Table 1. Key points evaluated

	Characteristic values, etc.	Comparison with conventional product
Approximate weight of cable	1.5 kg	21% weight reduction
Approximate weight of connector	1.0 kg	41% weight reduction
Bending rigidity of cable	257 N·m ²	27% improvement
Number of parts of connector	10	63% reduction
Number of mounting processes of connector	12	29% reduction
Attaching time of connector	14 minutes	42% reduction

Points relevant to the 17 SDGs

This technology supports communication infrastructure such as emergency communications essential for protecting daily lives and people’s lives. Time for cable laying work can be reduced thanks to the weight reduction.



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