Automotive Systems & Products
The Sumitomo Electric Group supports an automotive society characterized by “Clean”, “safe”, and “Comfortable”.

The Sumitomo Electric Group has extended its expertise in copper wire production, which had evolved from the Sumitomo copper business. Standing on the firm foundation of our accumulated technologies, we have been developing our business into five business segments of “Automotive”, “Information & Communications”, “Electronics”, “Electric Wire & Cable, Energy” and “Industrial Materials.”

With the aim of serving as an interface between humans and vehicles, we offer a wide range of automotive components and systems.

As the paradigm change in the automotive industry continues, we will advance the development of products toward the realization of “wonderful automobiles in comfortable society,” focusing on the connection among electric power infrastructure, information and telecommunications networks, and homes.
The Sumitomo Electric Group supports an automotive society characterized by “Clean”, “Safe”, and “Comfortable”.

“Ingenious” represents outstanding knowledge and unique creativity along with the customer-oriented determination of the Sumitomo Electric Group. “Dynamics” refers to the motivation (the Sumitomo Business Spirit), dynamism (diversified business and technology synergized for the overall strength of the group), and energy for transformation (enterprising spirit). For the Sumitomo Electric Group, “ID” stands for Ingenious Dynamics and at the same time stands for fulfilling and embodying the identity (ID) of the Sumitomo Electric Group and the determination to continually contribute to the infrastructure development (ID) of the greater society.

Each company of the Sumitomo Electric Group combines its unsurpassed creativity with knowledge and experience to generate dynamics that allow the group to contribute to society.

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**Sumitomo Electric Group’s Tagline**

**Ingenious Dynamics**

- Superior capabilities and unique creativity
- Customer-oriented determination

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Each company of the Sumitomo Electric Group combines its unsurpassed creativity with knowledge and experience to generate dynamics that allow the group to contribute to society.
A hybrid electric vehicle uses this high-voltage, three-phase AC harness under the floor to connect the inverter in the rear part and the motor in the engine room in the front part of the vehicle. The three-dimensional high-voltage harness is equipped with aluminium pipe for the exterior that functions as a shield and protector as well.

In consideration of the environment, the high-voltage cable uses a halogen-free material for the insulator and lead-free PVC for the sheath. Moreover, the cable is so flexible that it is suitable to cars that require long-distance high-tension circuit, such as hybrid electric vehicles (HEVs).

These high-voltage connectors, which are sealed against water and electromagnetic interference, are suited for use in high-voltage wiring of electric vehicles (including hybrid cars and fuel-cell powered cars).

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High-voltage Under-floor Harness for Hybrid Electric Vehicles

Sumitomo Wiring Systems

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High-voltage Cable for Hybrid Electric Vehicle

Sumitomo Wiring Systems / Sumitomo (SEI) Electronic Wire

These high-voltage connectors, which are sealed against water and electromagnetic interference, are suited for use in high-voltage wiring of electric vehicles (including hybrid cars and fuel-cell powered cars).

High-voltage Sealed Connector

Sumitomo Wiring Systems

We have been developing the products applying magnetic dust cores, such as reactors by utilizing the proprietary technologies for electromagnetic, thermal, vibrational analysis that are based on computer aided engineering (CAE) and reliability evaluation, and realize small size, light weight and superior functions of the products.

Reactor

Sumitomo Wiring Systems / AutoNetworks Technologies

CMSH, which consists of copper(Cu) or aluminium(Al) to ensure high heat conductivity and tungsten(W) or silicon carbide(SiC) to ensure low heat expandability, is used for semiconductor devices for variety of communications equipment and power devices for hybrid electric vehicles. CMSH products made of a variety of materials (e.g., AlN, Al-SiC, and Si-SiC) efficiently dissipate heat while making thermal expansion adjustment with peripheral components.

Heatspreaders Materials (CMSH)

A.L.M.T.

GaN semiconductors are used in blue-violet lasers. By making use of the feature that the dielectric strength of the GaN semiconductor is higher than that of the conventional Si semiconductor, the manufacturer is advancing the development of GaN products including power semiconductors.

Gallium Nitride (GaN) Substrate

Sumitomo Electric, Semiconductor Division
Automotive Systems & Products

The FM-CM material has excellent magnetic properties in a high frequency range and greatly contributes to the miniaturization of a variety of actuators for auto parts with improvement in their high-speed response performance. Moreover, with the development of unique material adjustment technique and high-density molding technique, the manufacturer aims at developing a low-loss component with a higher magnetic flux density.

**FM-CM Material**
(Sintered Soft Magnetic Member with High Magnetic Property)

Sumitomo Electric Sintered Alloy / Sumitomo Electric

Sumiboron cBN manufactured by making excellent use of ultra-high pressure sintering technology only unique to us is an ideal tool material to satisfy the needs of high speed and precision cutting of hardened steel or cast iron. The application of Sumiboron cBN in hardened steel machining replaces grinding with cutting, reducing power consumption and minimizing waste by adopting dry cutting.

**Cutting Tools “SUMIBORON”**

Sumitomo Electric Hardmetal

We offer hoses in a wide variety made from suitable materials for the systems in cars to connect each system of automobiles, such as the fuel, air, and water cooling system. In recent years, the manufacturer is concentrating on the development of products in compliance with the environmental regulations of each country of the world.

**Hoses**

Sumitomo Riko

Total engineering services are offered to realize functional materials added with the characteristics of ceramics by gaseous phase coating. The selection of coating methods and coating materials for each purpose is possible (e.g., DLC coating for a reduction of friction with no lubricous material).

**Ceramic Coating Products**

Nippon ITF

Magnet wires are widely used in automotive electric components, including the drive motors of hybrid vehicles. Our wire materials can withstand harsh coil winding process environments, so are used in high-efficiency motors and coils, such as alternators, starters, and wiper motors besides HEV motors as shown in the pictures.

**Magnet Wires for Automotive Electric Components**

Sumitomo Electric Wintec

CELMET is a porous metal with a three-dimensional reticular structure. Due to its high porosity, large specific surface, low electric resistance and low pressure loss, it is widely used for nickel hydrogen battery polar plates for HEV, catalyst carriers and sound-deadening materials.

**High Porosity Metal “CELMET”**

Sumitomo Electric Toyama

Tab-Lead is a terminal for lithium-ion batteries of automobile. This terminal realize excellent sealing reliability and insulation performance by high-temperature insulating resin based on our material technology of heat resistant wiring. These characteristics extend the life of battery and improve the performance.

**Tab-lead**

Sumitomo (SEI) Electronic Wire

Tab-Led is a terminal for lithium-ion batteries of automobile. This terminal realize excellent sealing reliability and insulation performance by high-temperature insulating resin based on our material technology of heat resistant wiring. These characteristics extend the life of battery and improve the performance.

**Tab-lead**

Sumitomo Electric Wintec

Teralink™ and Ganpla™ are engineering plastic, which have excellent toughness and low friction. They are suitable for automotive parts as gear. Teralink™ is also available for infrared-transparent lens and can be applied for SMT process.

**Irradiated Cross-Linked Engineering Plastic “Teralink” / Oil-Contained Engineering Plastic “Ganpla”**

Sumitomo Electric Fine Polymer
The FM-CM material has excellent magnetic properties in a high frequency range and greatly contributes to the miniaturization of a variety of actuators for auto parts with improvement in their high-speed response performance. Moreover, with the development of unique material adjustment technique and high-density molding technique, the manufacturer aims at developing a low-loss component with a higher magnetic flux density.

**FM-CM Material**
(Sintered Soft Magnetic Member with High Magnetic Property)

To avoid the risk of price increase and sourcing instability of Ni, newly developed Ni-free sintered material “DMC-44” and “HMC-81” have achieved strength equivalent to the conventional high strength material that contains 4% of Ni.

**Ni-free High Strength Sintered Materials**

We offer hoses in a wide variety made from suitable materials for the systems in cars to connect each system of automobiles, such as the fuel, air, and water cooling system. In recent years, the manufacturer is concentrating on the development of products in compliance with the environmental regulations of each country of the world.

**Hoses**

Sumiboron cBN manufactured by making excellent use of ultra-high pressure sintering technology only unique to us is an ideal tool material to satisfy the needs of high speed and precision cutting of hardened steel or cast iron. The application of Sumiboron cBN in hardened steel machining replaces grinding with cutting, reducing power consumption and minimizing waste by adopting dry cutting.

**Cutting Tools “SUMIBORON”**

Sumitomo Electric Sintered Alloy / Sumitomo Electric, Advanced Material R&D Laboratories

**Sumitomo Electric Sintered Alloy**

**Sumitomo Electric Hardmetal**

**Sumitomo Riko**
Small Sized & Weight Reduction

16 Flexible Flat Cable
Using the flat square conductor, this flat cable SUMI-CARD® reduces its thickness and allows multi-wiring assembly. We have various types of SUMI-CARD®, such as whisker-free, halogen free and terminal-processed types.

19 Compact Relay Module
The newly developed high-performance compact relay module with low heat generation and high-efficiency heat dissipation technology has realized downsized relay boxes with a great weight reduction, thus allowing the high-density integration of fuses and relays, the required number of which is rapidly increasing with the constantly advancing computerization of automobiles.

17 Flexible Printed Circuit (FPC)
FPCs are the flexible wiring boards that use film bases made of such materials as polyimide or polyester, and are suitable for high-density wiring applications. FPCs are used in various electronic products including sensors and audio equipment, and can also be mounted on components.

18 Irradiated Cross-Linked Products
Sumitube™ heat-shrinkable tubes, Irrax™ tubes, Irrax™ tapes and other irradiated cross-linked products provide excellent heat resistance and electrical characteristics. They are used for insulating wiring harnesses and other electrical equipment as well as for protecting pipes from corrosion.

20 Aluminium Wiring Harnesses
It is a wiring harness lightened by using thin aluminium wire of stranded structure. The reliability of its electrical connection is ensured with improvements such as revised terminal structures.
21 Magnesium Alloy Sheet and Parts

Among structural metals, magnesium alloys are the lightest, and they are energy efficient and recyclable. It contributes for environmental load reduction. Our AZ91 magnesium alloy sheet features outstanding strength, corrosion resistance and press workability. Application will be expanded to many fields like mobile devices, automobiles, trains, and medical equipment.

Sumitomo Electric, Magnesium Alloy Development Division

22 Aluminium Wires

It is aluminium wire for vehicles. Its conductor is made of aluminium replacing conventionally used copper. As aluminium weighs about one third of copper, this wire will materialize further lightened wire harness.

Sumitomo Wiring Systems

23 Silicon Nitride Ceramics

Our unique manufacturing process enables the manufacturing of silicon nitride ceramics that have higher strength (1.5 times) and higher impact value (2 times) than standard silicon nitride. Silicon nitride ceramics are used in a wide range of applications where high wear-resistance and high reliability are required, including automotive engine parts and precision machinery components like high-speed bearings.

A.L.M.T.

24 Aluminium Alloy Wires and Rods for Forging

Aluminium alloy wires and rods for forging are processed in a unique continuous casting and rolling method, and contribute to a weight reduction of auto parts. Moreover, the wear resistance technology of the 4000 series (Hi-Si) has been established as well. Further size extension and the betterment of the quality of aluminium alloy wires and rods greatly contribute to yield rate and productivity improvements.

Sumitomo Electric Toyama

25 High Performance Aluminium Alloy “SUMI ALTOUGH”

SUMI ALTOUGH series aluminium alloys, which are fabricated using rapidly solidified alloy powders, have better mechanical strength, wear resistance, heat resistance and machinability than conventional aluminium alloys. SUMI ALTOUGH aluminium alloys are the best new materials for weight reduction of mechanical parts such as automotive components.

Sumitomo Electric Sintered Alloy
**Integrated Traffic Control Systems (ITCS)**

Sumitomo Electric provides a wide range of products, from detectors, signal controllers, central devices, to data transmission devices. These products are employed in many facilities across the country including the Metropolitan Tokyo Traffic Control Center, the world’s largest traffic control center.

**Vehicle Detector**

Sumitomo Electric will realize driving comfortable condition by monitoring matching situations between road spaces and vehicles with ITS technologies.

**Driving Safety Support Systems (DSSS)**

The DSSS is designed to prevent traffic accidents. This system transmits traffic information through optical beacons to on-board devices, to warn drivers about unexpected situations. Based on the incoming data from beacons and driving status, on-board devices provide information to drivers.

**Telematics Software**

SEI’s Telematics Software is system building software for supporting economical and safe driving, location management, and information supplement such as traffic congestion prediction and optimal routes.
**30 Micro Smart Grid System**

We have developed a micro smart grid system and started a demonstration test at the company’s Osaka Works. This system incorporates three types of solar power and one wind power. To ensure stable electricly, the system uses redox flow battery technology. Generated electricity is transmitted via 1km DC power cables to a DC/AC inverter and then converted AC power is consumed by lighting in some areas of the works as well as electronic appliances. It is also used to charge electric vehicles with a superconducting motor.

Sumitomo Electric, Power System R&D Center

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**31 Standard Charging Connector (Inlet)**

This connector is used to charge electric vehicles and plug-in hybrid electric vehicles at home, complying with the international standard of IEC62196-1, SAE J1772 and UL2251.

Sumitomo Wiring Systems

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**32 Vehicle Communication Technology**

To ensure standardized communication between vehicle and charging station, ISO, IEC and SAE are in the process of setting international standards for vehicle-to-grid communication. Sumitomo Electric has joined with ISO, IEC and SAE, in leading the activities of JARI/JSAE in Japan.

Sumitomo Electric, Advanced Automotive Systems R&D Center

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**33 Quick EV Charger Connector Compliant with the CHAdeMO Specifications**

SEVD-01 is a quick EV charger connector compliant with the CHAdeMO specifications. The good weight balance and lightweight aluminium alloy body make excellent operability. Equipped with our proprietary multiple locking mechanisms, SEVD-01 ensures a high level of safety.

Sumitomo Electric, Power Cable Division
**Connected Technology**

34 **Wiring Harness**

Wiring harnesses are a wiring system that conveys power and information. Their constituent electronic components are required to be smaller, lighter and more reliable. With an increase in the number of computerized control functions of automobiles, the wire harness is becoming a still more important auto part.

Sumitomo Wiring Systems

35 **Wiring Harness for Power Sliding Doors**

The wiring harnesses used for the sliding doors of minivans supply electricity uninterruptedly so that the electrical components accommodated within the door can be operated irrespective of the status of the door. These wiring harness units contain the twisted bending-resistant cables in the caterpillar type cable protector and the stainless rail case.

Sumitomo Wiring Systems

36 **CAN Gateway ECU**

This ECU functions as an intermediate point to transmit data of CAN bus within a vehicle. The amount of the ECU that can connect with one unit of CAN communication bus is limited. When it is exceeded, the waveform of communication data is disturbed and exact data exchange will be impossible. Therefore, it is essential to divide a unit of CAN communication bus into some parts. CAN gateway ECU transmits only the necessary data between divided buses.

Sumitomo Wiring Systems

37 **Display Panels**

The B&W and color display panels and other apparatus installed in the instrument panel center are advanced information devices that collect sophisticated “in-car contents” through automotive LANs to communicate information to drivers.

Sumitomo Wiring Systems / AutoNetworks Technologies
Connected Technology

Automotive Systems & Products

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Waterproof connectors provide satisfactory connection performance in a moistened condition. These connectors are ideal for enhanced applications like use in vehicle engine compartments.

8BUFSQSPPG$POOFDUPS

Sumitomo Wiring Systems

Automotive Coaxial Connector (HFC series)

An in-vehicle HFC connector is used to connect a coaxial cable and a VICS, GPS, or TV receiver. The connector reduces reflection and transmission loss and suppresses noise radiation from the connector. Moreover, the downsized connector saves the mounting space of in-vehicle equipment.

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Sumitomo Wiring Systems

Optical Fiber Harness

It is an optical wiring harness component applying All Glass Fiber (AGF) cable for the very first time within vehicles. Thin and lightweight, yet properly protected cables offer high flexibility and easy handling as an automotive harness. AGF cable is optimal for navigation or audio system which needs Gbps-range high speed communication.

Sumitomo Wiring Systems / AutoNetworks Technologies

Module Connector Multi-pole Low Insertion Force Connector

Module connectors for automobile modules are connected automatically on completion of the assembly of the automobile modules. Multi-pole low insertion force connectors provided with a lever-type double-power mechanism ideally connects to multi-pole wire harnesses or electrical equipment. Besides, connectors in a wide variety ranging from 0.64 to 9.0 mm in size for a broad range of fields including the cutting-edge area are offered in response to customers.

Sumitomo Wiring Systems

Waterproof Connector

Waterproof connectors provide satisfactory connection performance in a moistened condition. These connectors are ideal for enhanced applications like use in vehicle engine compartments.

Sumitomo Wiring Systems

Interconnecting Products for Automotive Electrical Components

Based on the elemental technologies like wiring, resin molding, pressing, connecting and sealing, we have originally developed interconnecting products for automotive components in car electronic systems such as powertrains, brakes, vehicle body electrical systems, fuel systems and sensors.

Sumitomo Wiring Systems
**Safety & Comfortable**

### 43 Wheel Speed Sensor

Our wheel speed sensors, which are manufactured using our solid technologies of sensor and wiring harness, achieve high reliability and high cost-performance. Our lineup includes a wide variety of sensor types: magnetic-generating type, semiconductor type, and heat resistance type. Wheel speed sensors support the safety driving systems like ABS and ESC systems.

*Sumitomo Wiring Systems / Sumitomo (SEI) Electronic Wire*

### 44 Heat Control Panel

The heat control panel has a security alarm indicator besides air conditioner control and display functions, thus providing a user-friendly operating environment. Besides, the built-in microcomputer performs heat control and communication.

*Sumitomo Wiring Systems*

### 45 ZnS Lenses for Far-infrared Camera

ZnS lenses (spherical & aspherical) can transmit far-infrared light with a wavelength 8-12µm. Our unique molding process makes it possible to reduce the mass-production cost. The ZnS lenses have low temperature dispersion and maintain good optical characteristics at low and high temperatures.

*Sumitomo Electric, Hybrid Products Division*

### 46 Anti-vibration Rubber

Anti-vibration rubber is an important functional component that absorbs and controls the vibrations of automobile engines and road surface, and realizes a safe comfortable drive. In recent years, the number of high-function products under electronic control is on the increase.

*Sumitomo Riko*

### 47 Interior Product

Interior products are mainly made from urethane in pursuit of safety, functionality, and design performance, including engine covers and spacers that suppress engine room noise and realize a comfortable driving environment.

*Sumitomo Riko*
Safety performs heat control and communication functions, thus providing a user-friendly operating environment. Besides, the built-in microcomputer harness, achieve high reliability and high cost-performance. Our lineup includes a wide variety of heat control panel has a security alarm indicator besides air conditioner control and display sensors support the safety driving systems like ABS and ESC systems.

Our wheel speed sensors, which are manufactured using our solid technologies of sensor and wiring harness, realize a safe comfortable drive. In recent years, the number of high-function products under electronic control is on the increase. Anti-vibration rubber is an important functional component that absorbs vibration and noise. Spacers that suppress engine room noise and realize a comfortable driving environment. Interior products are mainly made from urethane in pursuit of safety, functionality, and design performance, including engine covers and interior products.

ZnS lenses (spherical & aspherical) can transmit far-infrared light with a wavelength 8 ~12µm. Our unique molding process makes it possible to reduce the mass-production cost. The ZnS lenses have low temperature dispersion and maintain good optical characteristics at low and high temperatures.

Our efforts are directed toward developing a nanometer-level structural analysis technology for predicting the service life of such wires and cables until breakage due to twisting and bending. The product improvement is done by testing in our in-house big anechoic chamber and by analyzing radiation field and surface current inducing electromagnetic wave for wireless communication between vehicles and outside.

We develop new analysis technologies using synchrotron radiation and neutrons, for such applications as structure analyses on an atomic scale and in-situ measurements of chemical reactions. We also explore high performance materials, combining the above analyses with simulation technologies of first-principles calculation and molecular dynamics.
What a dazzling future!