

# Automotive Application Guide

We classify automotive electronic equipment into the following four application categories and set usable application categories for each of our products. Therefore, we have the corresponding product series (the 2nd code from the left side of the part number is "A" or "C"). When using our products for automotive electronic equipment, please be sure to check such application categories and use the corresponding product series accordingly. Should you have any questions on this matter, please contact us.

Product Series (The 2nd Code from the Left Side of the Part Number)	Category	Automotive Electronic Equipment (Typical Example)
A	POWERTRAIN	<ul style="list-style-type: none"> <li>• Engine ECU (Electronically Controlled Fuel Injector)</li> <li>• Cruise Control Unit</li> <li>• 4WS (4 Wheel Steering)</li> <li>• Transmission</li> <li>• Power Steering</li> <li>• HEV/PHV/EV Core Control (Battery, Inverter, DC-DC)</li> <li>• Automotive Locator (Car location information providing device), etc.</li> </ul>
	SAFETY	<ul style="list-style-type: none"> <li>• ABS (Anti-Lock Brake System)</li> <li>• ESC (Electronic Stability Control)</li> <li>• Airbag</li> <li>• ADAS (Equipment that directly controls running, turning and stopping), etc.</li> </ul>
C	BODY & CHASSIS	<ul style="list-style-type: none"> <li>• Wiper</li> <li>• Automatic Door</li> <li>• Power Window</li> <li>• Keyless Entry System</li> <li>• Electric Door Mirror</li> <li>• Automobile Digital Mirror</li> <li>• Interior Lighting</li> <li>• Automobile Air Conditioning System</li> <li>• TPMS (Tire Pressure Monitoring System)</li> <li>• Anti-Theft Device (Immobilizer)</li> <li>• ADAS (Sensor, Equipment that doesn't directly control running, turning and stopping), etc.</li> </ul>
	INFOTAINMENT	<ul style="list-style-type: none"> <li>• Car Infotainment System</li> <li>• ITS/Telematics System</li> <li>• Instrument Cluster Panel</li> <li>• Automotive Display</li> <li>• Cockpit Domain Controller</li> <li>• Dashcam (genuine products for automotive manufacturer), etc.</li> </ul>

# Industrial Application Guide


We have the product series (the 2nd code from the left side of the part number is “B”) intended for use in telecommunications infrastructure and industrial equipment (its typical examples are as shown in the table below). Therefore, when using our products for these equipment, please check it carefully by referring to the part number or the individual product specification sheets and use the corresponding product series. Should you have any questions on this matter, please contact us.

Product Series (The 2nd Code from the Left Side of the Part Number)	Category	Telecommunications Infrastructure and Industrial Equipment (Typical Example)
B	Telecommunications Infrastructure	<ul style="list-style-type: none"> <li>• Base Station</li> <li>• Optical Transceiver</li> <li>• Router/Switch (Carrier-Grade)</li> <li>• UPS (Uninterruptible Power Supply), etc.</li> </ul>
	Factory Automation	<ul style="list-style-type: none"> <li>• PLC (Programmable Logic Controller)</li> <li>• Servomotor/Servo Driver</li> <li>• Industry Robot, etc.</li> </ul>
	Measurement	<ul style="list-style-type: none"> <li>• Gas Meter</li> <li>• Water Meter</li> <li>• Flow Meter</li> <li>• Pressure Gauge Meter</li> <li>• Magnetometer</li> <li>• Thermometer, etc.</li> </ul>
	Electric Power Apparatus	<ul style="list-style-type: none"> <li>• Power Conditioner (Solar Power System)</li> <li>• Smart Meter</li> <li>• GFCI (Ground Fault Circuit Interrupter)</li> <li>• Electric Vehicle Charging Station, etc.</li> </ul>

# Medical Application Guide

According to the medical devices classified as GHTF Classes A to C (Japan Classes I to III), we have the corresponding product series (the 2nd code from the left side of the part number is “M” or “L”) intended for use in the medical devices. Therefore, when using our products for the medical devices, please be sure to check the classification based on the GHTF Rules and use the corresponding product series.

On the other hand, we don't have the product series intended for use in (i) all medical devices classified as GHTF Class D (Japan Class IV) and (ii) implantable medical devices (bone-anchored hearing aid, artificial retina system, and external unit which is connected to internal unit which is implanted in a body, etc.). Therefore, please do not incorporate our products into these medical devices. Should you have any questions on this matter, please contact us.

Risk Level		Low  High			
Japan	Classification according to the PMD Act of Japan (based on the GHTF Rules)	<b>Class I</b> General Medical Devices (GHTF Class A)	<b>Class II</b> Controlled Medical Devices (GHTF Class B)	<b>Class III</b> Specially-controlled Medical Devices (GHTF Class C)	<b>Class IV</b> Specially-controlled Medical Devices (GHTF Class D)
		Medical devices with extremely low risk to the human body in case of problems  [Ex.] • In Vitro Diagnostic Devices • Nebulizer • Blood Gas Analyzer • Plethysmographs • Breathing Sensor • AC-powered Operating Table • Surgical Light • Cholesterol Analysis Device • Blood Type Analysis Device, etc.	Medical devices with relatively low risk to the human body in case of problems  [Ex.] • Electronic Thermometer • Electronic Blood Pressure Gauge • Electronic Endoscope • Hearing Aid • Electrocardiograph • MRI • Ultrasonic Diagnostic System • Diagnostic Imaging Equipment • X-ray Diagnostic Equipment • Central Monitor • Pulse Oximeter, etc.	Medical devices with relatively high risk to the human body in case of problems  [Ex.] • Dialysis Machine • Radiation Therapy Equipment • Infusion Pump • Respirator • Glucose Monitoring System • AED (Automated External Defibrillator) • Skin Laser Scanner • Electric Surgical Unit • Insulin Pump, etc.	Medical devices highly invasive to patients and with life-threatening risk in case of problems  [Ex.] • Cardiac Pacemaker • Video Flexible Angioscope • Implantable Infusion Pump • Cardiac Electrosurgical Unit • Inspection Device with Cardiac Catheter • Defibrillator, etc.
U.S.A.	FDA Classification	<b>Class I</b> General Controls	<b>Class II</b> General Controls and Special Controls	<b>Class III</b> General Controls and Premarket Approval	
		Medical devices without the possibility of causing serious injury or harm to the patient or user even if there is a defect or malfunction in such medical devices	Medical devices with the possibility of causing injury or harm to the patient or user if there is a defect or malfunction in such medical devices	Medical devices with the possibility of causing serious injury, disability or death to the patient or user if a defect or malfunction occurs in such medical devices	
Corresponding TAIYO YUDEN Product Series	Product Series for Medical Devices classified as GHTF Classes A or B (Japan Classes I or II) (The 2nd Code from the Left Side of the Part Number: “L”)		Product Series for Medical Devices classified as GHTF Class C (Japan Class III) (The 2nd Code from the Left Side of the Part Number: “M”) (See the Note below.)		N / A

\* Note : It is prohibited that our products are used in some medical devices such as implantable medical devices even if such medical devices are classified as GHTF Class C (Japan Class III).

# Mobile Application Guide

---

We have the product series (the 2nd code from the left side of the part number is “E”) intended for use only in mobile devices (its typical examples are as shown in the table below), where the applications covered by this product series are limited to mobile devices among general electronic equipment for consumer. The design, specifications and operating environment, etc. differ from those of the product series for “General Electronic Equipment” (Category: S) as described below, so please check the individual product specification sheets for details. The product series for “General Electronic Equipment” (Category: S) can also be used for mobile devices. Should you have any questions on this matter, please contact us.

Product Series (The 2nd Code from the Left Side of the Part Number)	Mobile Devices (Typical Example)
E	<ul style="list-style-type: none"><li>• Mobile Phone</li><li>• Smartphone</li><li>• Tablet PC</li><li>• Smartwatch</li><li>• Handheld Game Console</li><li>• Compact Digital Camera</li><li>• Electronic Calculator</li><li>• Portable Audio Player</li><li>• Watch</li><li>• Electronic Dictionary, etc.</li></ul>

## ■ Design of Product Series Only for Mobile Devices (Category: E)

The products in this product series are designed to have a useful life of 5 years or more if the following 2 conditions are met (Cf. for the product series for “General Electronic Equipment” (Category: S), the useful life is 10 years or more):

- (1) The product temperature in the actual equipment  $\leq$  guaranteed product temperature - 20 (°C), and
- (2) 80% of the rated voltage or less

\*The useful life is a reference for predicting the time when the cumulative failure rate reaches 1%, and the data is not intended as a guarantee of the product lifetime. Please use it only as a guide when designing mobile devices.