

Battery Busbar Module (BBM) Portfolio

Function

- Connect battery cells for modularization
- Detect the state of each individual battery cell to enable battery control

Suggestion

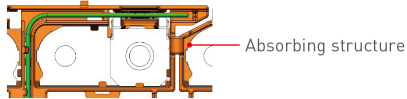
- Provide low height, integrated, compact, and lightweight BBM for batteries in electrification vehicles, whose capacities and densities are increasing

Wire Type Battery Busbar Module

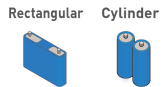
Mass-production

Feature

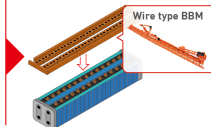
- Develop and produce BBM for various types of battery cells such as rectangular and cylinder
- The absorbing structure suppresses variation due to expanding / shrinking battery cells



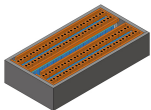
Battery Cell



Battery Module



Battery Pack



FPC Type Battery Busbar Module

Mass-production

Feature

- Reduce part numbers and weight
Reduce 50% weight than conventional Yazaki products
- Ensure stable product quality by automatic production
No wrong assembly and low failure risk due to printed technology
- Directly implement electronic parts to FPC

FPC Type Battery Busbar Module with Cell Voltage Sensor

Developing

Feature

- Saving space and height reduction by integrated functions
- The best layout of fuses, thermistors and circuit areas
- Directly implement electronic parts

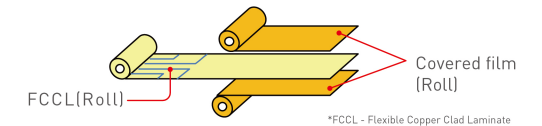
Long FPC Battery Busbar Module

Developing

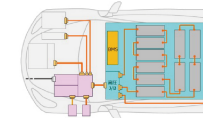
Feature

- Various size of FPC can be produced with a same equipment in Roll to Roll process

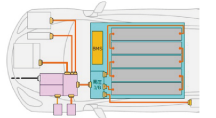
Roll to Roll Process | Put FCCL* → Paste cover lay → Test



- Available large capacity of battery



#of BBM: 11 BBMs
BBM length: About 500mm



#of BBM: 5 BBMs
BBM length: 1200 to 1800mm

Flexible Wire

Developing

Background

- Wire size is getting bigger due to being higher voltage and larger current in electric vehicles. The mounting space for wire harness is being narrow.

Function

- Flexible wires that can be routing for narrow space

Feature

- Improve 60% flexibility by using flexible insulations
- It has a great environmental resistance and can be mounted anywhere.
- Same production methods as before

Performance/Specification

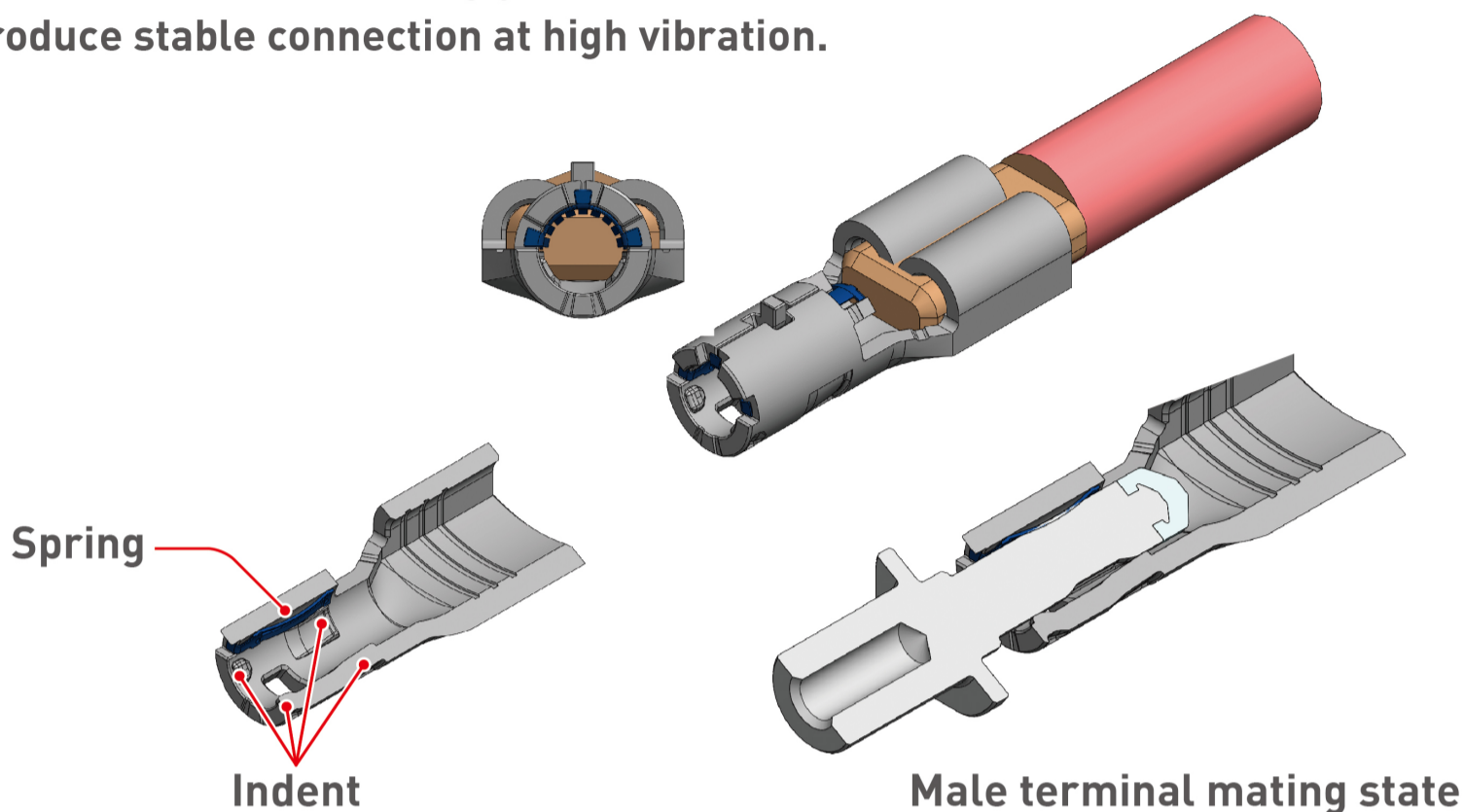
Size	Conductor			Insulation thickness [mm]	Finished outer diameter [mm]
	Cross-sectional area [mm ²]	Outer diameter [mm]	Conductor resistance [mΩ/m] Max(20°C)		
30	29.03	7.8	0.647	1.3	10.4
40	39.73	9.1	0.473	1.4	11.9
50	50.43	10.1	0.368	1.5	13.1
70	70.29	12.0	0.259	1.5	15.0
95	96.27	14.0	0.196	1.6	17.2

Joint Terminal with Great Vibration Resistance

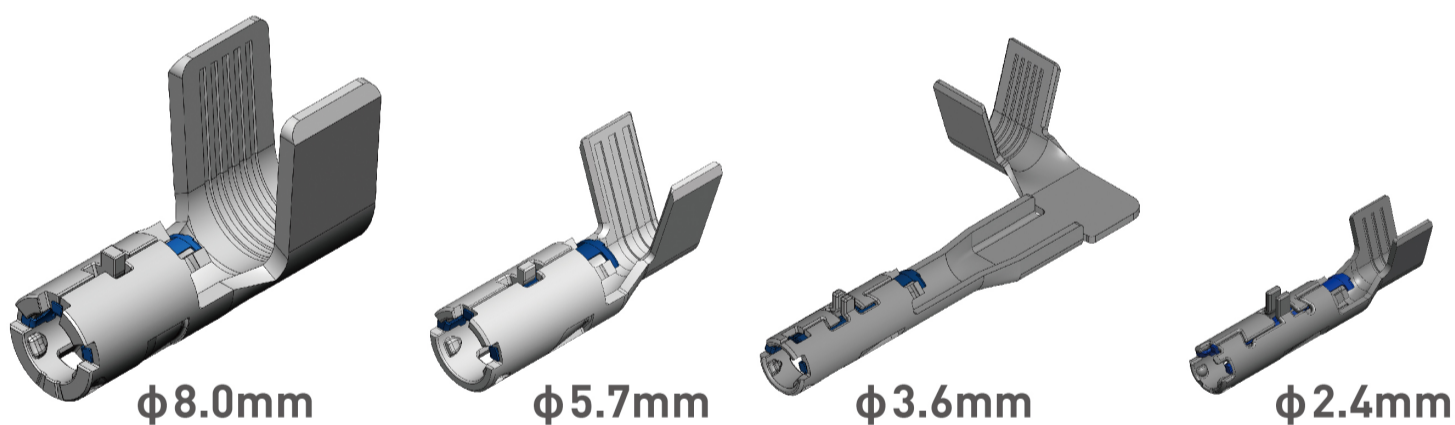
Mass-production

Feature

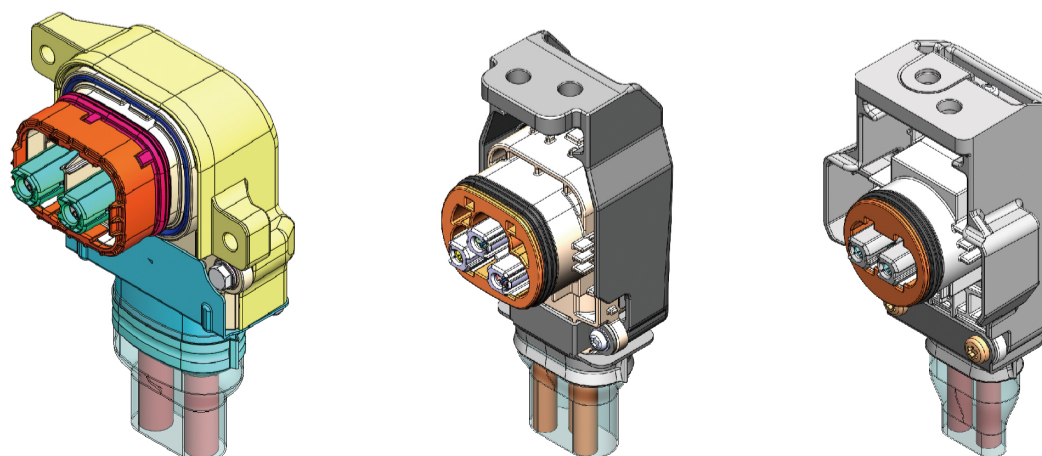
- Configurational indents strongly hold a male terminal and produce stable connection at high vibration.



Variety of wire size is available by setting various pin size



Connector products with this terminal



High Voltage Semiconductor Junction Box

Developing

Background

- It is necessary to develop products with high output charging specification to reduce charging time as one of the challenges for electric vehicles.

Function

- Supply/distribute high voltage power
- Change over series- parallel battery

Feature

- Reduce charging time by changed over series- parallel battery
- Downsize with a semiconductor relay (Decrease in 50% volume of Yazaki's product)

Specification

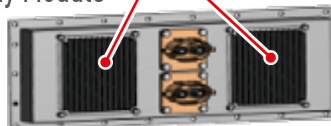
- Voltage: Up to 800V
- Voltage of battery pack: Change over between 400V & 800V
- Current: Continuous 200A
- Implement semiconductor FUSE function
- Internal voltage/ current sensor

High Voltage Junction Box (Power supply / distribution)

Heatsink

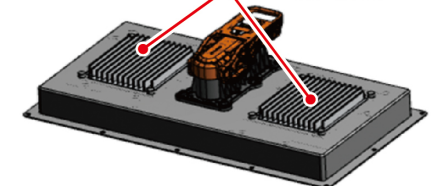


Semiconductor
Relay Module

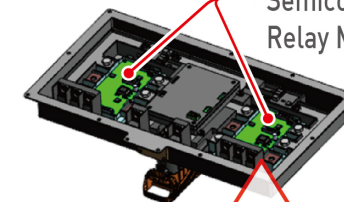


High Voltage Junction Box (Switching battery voltage)

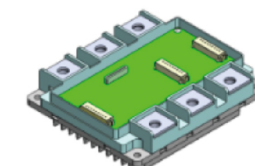
Heatsink



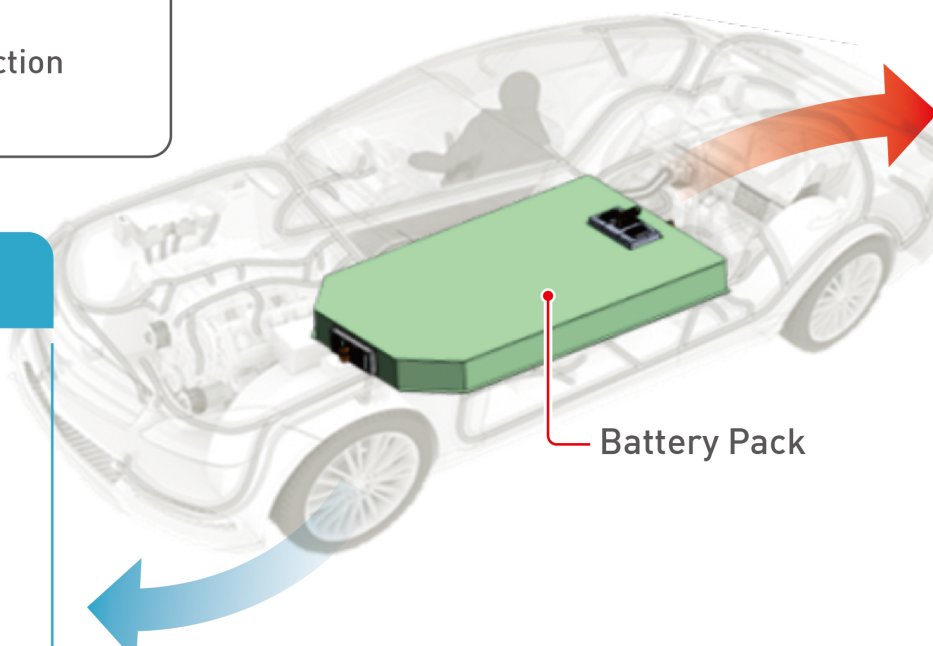
Semiconductor
Relay Module



Internal SiC
Semiconductor



Semiconductor
Relay Module



Battery Pack

Power Switch Unit

Developing

Background

- Critical systems (load, ECU) directly linked to safety, comfort and convenience are getting increased and also it tends to increase dedicated batteries for each critical system.

Function

- Select critical systems and supply power to stop a vehicle according to a battery condition when the power is down or failed.

Feature

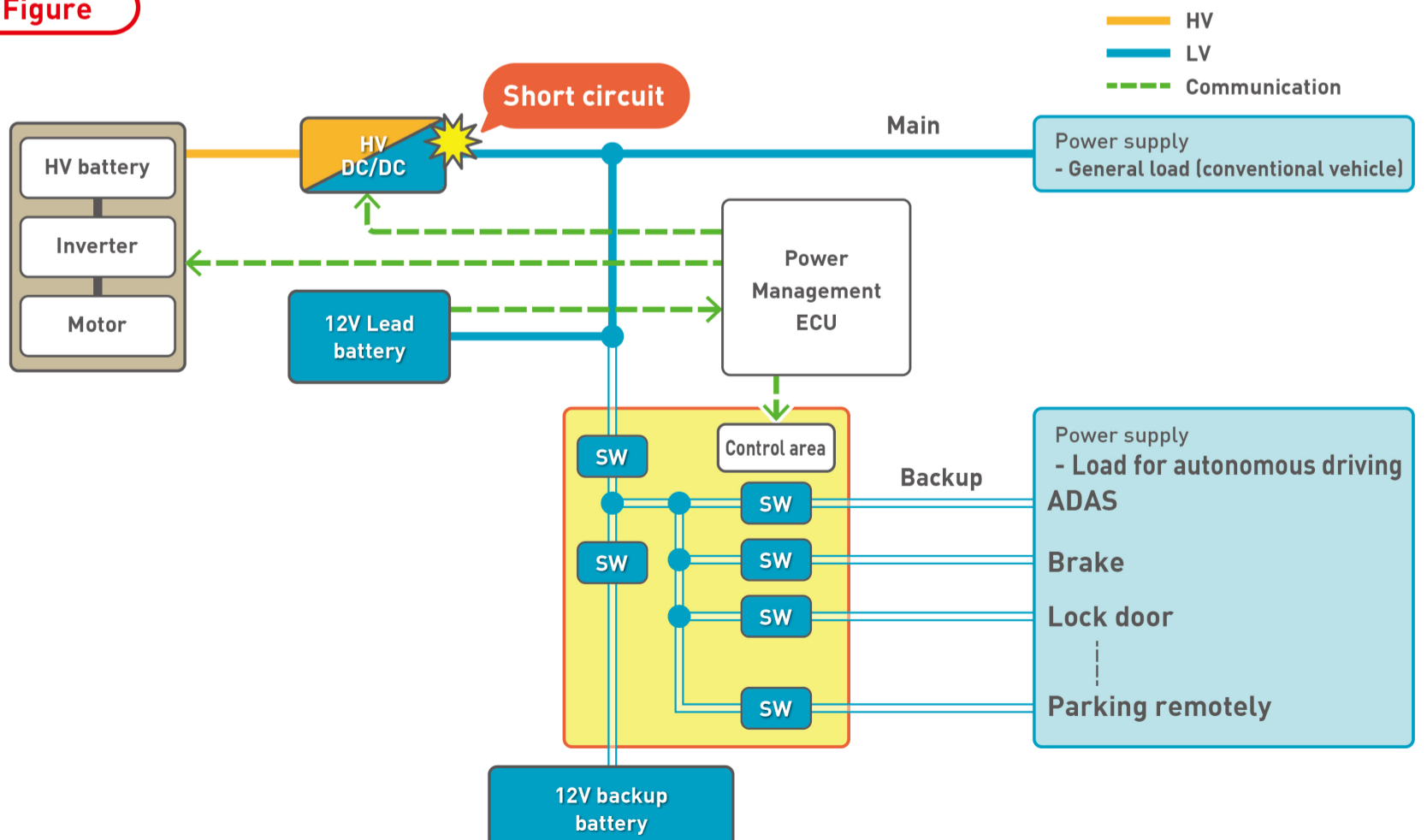
- Switch control algorithms contribute to reduce dedicated batteries for each critical system.
- Supply power for critical systems with interpolating 2 batteries. (main & 2nd)
- Critical systems can be added.

Performance/Specification

Main Features

- Detect failures
 - Failed power
 - Overcurrent
 - Overtemperature
- Cutout routes
- Precedence control
- Fail safe

System Figure



Backup Battery Control Unit

Developing

Background

- Stable power supply to a specific load is required for failed power in an advanced driving support system.

Function

- Supply power safely to stop a car depending on the battery condition in case of power failed

Feature

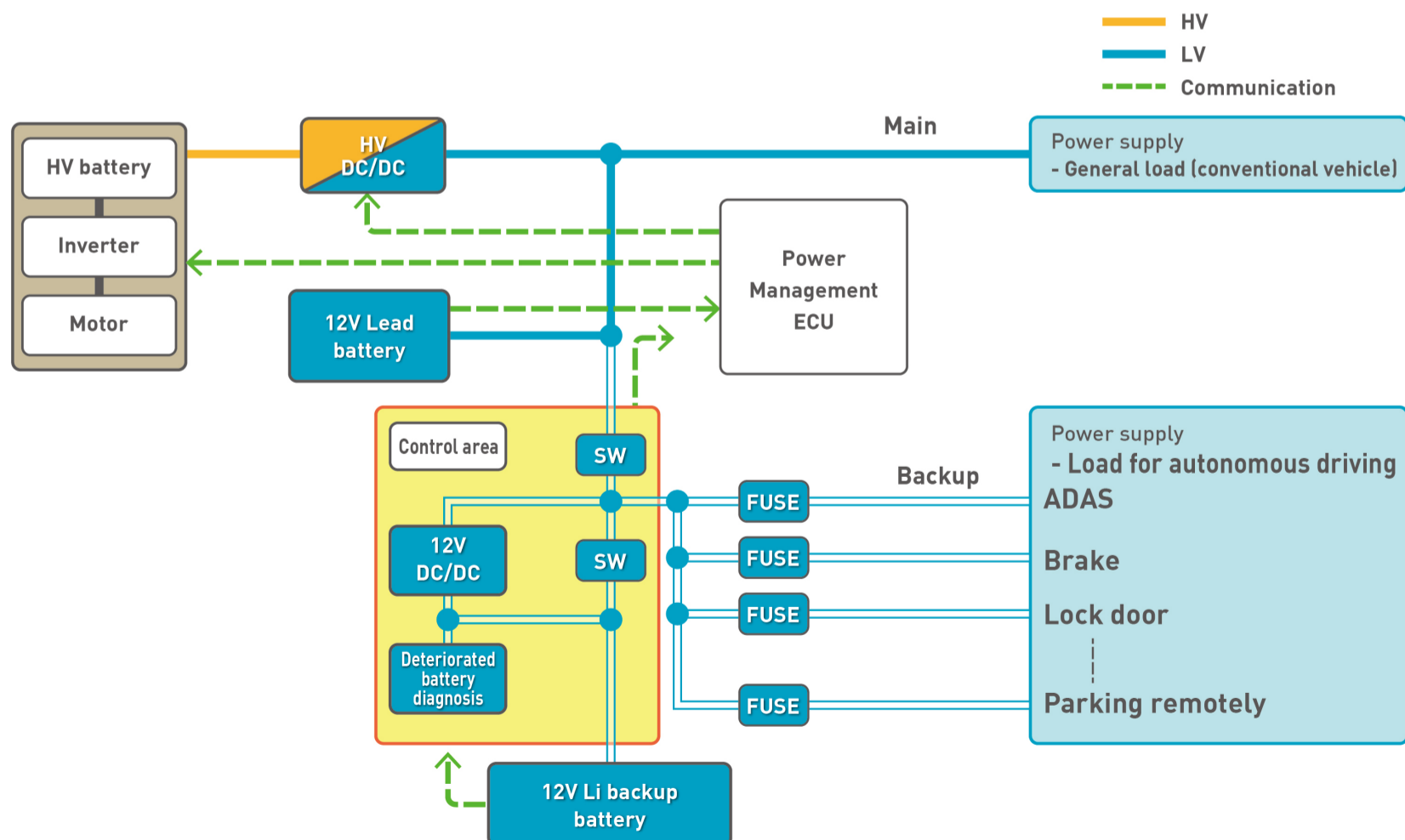
- Self-contain from detecting failed power to backup
- Maintain and control battery charging state based on checking the deterioration

Performance/Specification

Main Features

- Detect failures
 - Failed main power
 - Overcurrent
 - Overtemperature
- Cutout routes
- Detect backup battery status & control charging

System Figure



*Using 12V Li back up battery for failed main power

LED Digital Meter

Mass-production

Background

- Required low cost and short-term development
To make low cost, simple and unique product

Function

- Speedometer that enables customizing features and design according to vehicle requirements

Feature

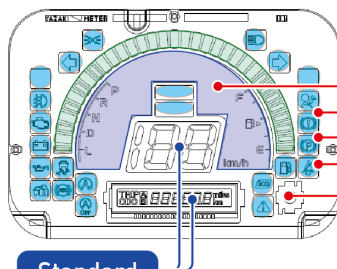
- Reasonable and highly visible LED digital display speedometer
- Customize from basic specification to satisfy vehicle requirement
- Features such as telltales, gauges, lighting color and etc.. are selectable

Performance/Specification



Basic Specification

Speedometer, Fuel indicator,
ODO / TRIP shift display,
Each telltale, Buzzer



Standard Setting

Speedometer (3 digits)
ODO / TRIP (6 digits)

Customizable

- Features
- Telltale (Max.24)
- Design, Dial
- Lighting color
- Switch knob

Design Examples



Minor changes of design or software
realize various designs.

HMI Integrated Control Unit

(Exhibit: Integrated Meter Type)

Developing

Background

- E/E architecture changes and trends of feature integration in response priority software to provide the latest HMI to users at anytime.

Function

- Integrate HMI devices, such as a meter, HUD*¹, Center display etc. and showing various types.

Feature

- Various integrated control unit types allow users to select it matching features or costs for various vehicle types.

Yazaki HMI Control Unit Types	
Products	Feature
<p>Unit Type</p> <p>CID**2, HUD, Meter, Separated control unit (Embedded MM*) CarPlay etc.</p>	<ul style="list-style-type: none"> - Using Hypervisor - High scalability - Using Yazaki Integrated Connector(size reduction) <p>Applicable Vehicle Type</p> <p>Luxury vehicles with many features / services</p>
<p>Integrated Meter Type</p> <p>CID, HUD (option), Meter, Integrated meter (Embedded MM)</p> <p>Exhibit</p>	<ul style="list-style-type: none"> - Integrate features with a meter (saving space) - Not use Hypervisor for safety display of meter - Reduce memory by using cloud navigation <p>Applicable Vehicle Type</p> <p>Various types of vehicle with popularly price</p>
<p>Pairing Smartphone Type</p> <p>CID, Meter, Integrated meter (Embedded DA**4 function) CarPlay etc.</p>	<ul style="list-style-type: none"> - Integrate DA function with a meter - Utilize mobile apps. (low cost) <p>Applicable Vehicle Type</p> <p>Small / commercial vehicles at Min. cost</p>

※1 HUD - Head Up Display , ※2 CID - Center Information Display
 ※3 MM - Multi Media , ※4 DA - Display Audio

Driver Monitoring System

Developing

Background

- Driver Monitoring System is required to detect driver state and let driver know the condition for safe driving.

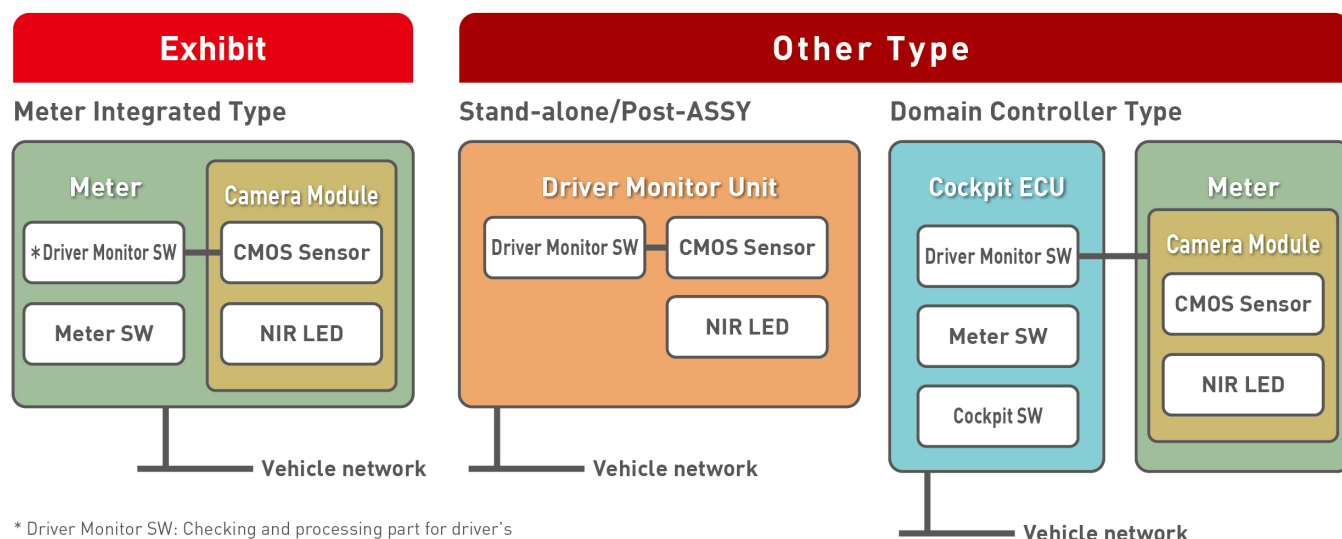
Function

- Driver Monitoring System can detect head pose and eye movement day and night to analyze driver state based on the camera built in the meter.

Feature

- Detecting driver's distraction, drowsiness, unusual driving and behaviors
- High designed meter with a built-in camera
- Compatible with various systems

Performance/Specification



* Driver Monitor SW: Checking and processing part for driver's condition by detecting face direction and eyes from camera images

Floating Display Meter

Developing

Background

- Regarding to increase vehicle information, provide suitable & clear information to drivers.

Function

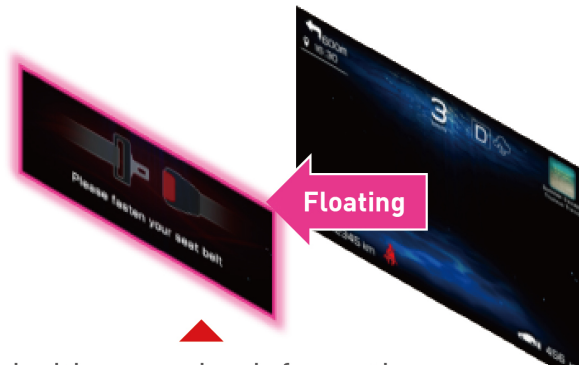
- The meter realizes floating images by using general-purpose display & virtual image technology.

Feature

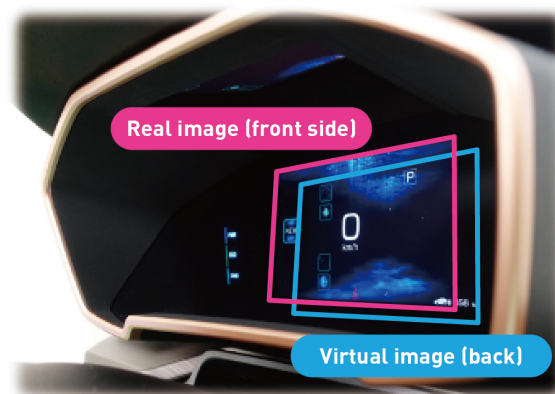
- Improve clear visibility with floating images
- Specific floating images naturally lead driver's eyes.
- Yazaki unique virtual image technology enables displaying real & virtual images to be linked.



Specifically showing the accelerating speed



Prioritize warning information and specifically showing it.



Far-sighted Meter

Developing

Background

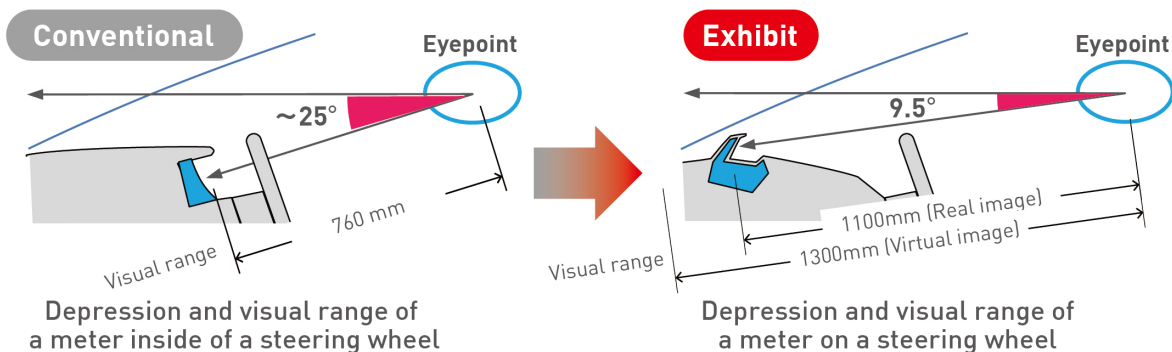
- Increasing mounted graphic meter and diversifying the mounting position
- Required more visibility improvements according to increasing autonomous driving and advanced safety functions

Function

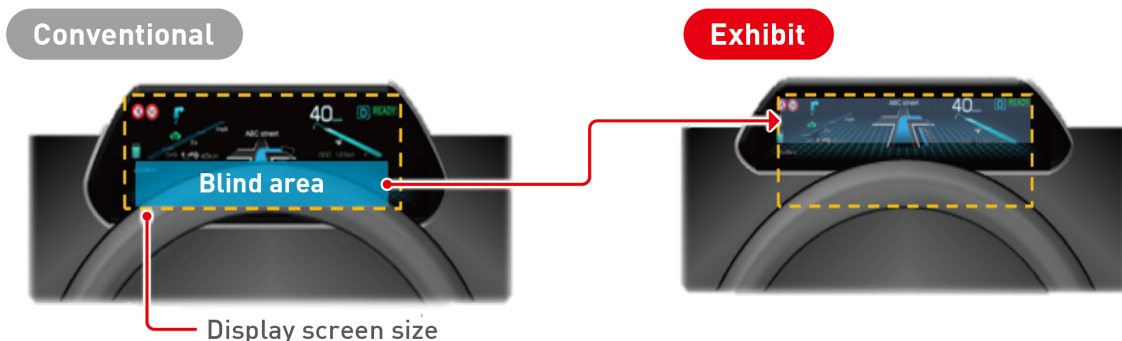
- 12.3 inch display is positioned at a distance and the meter has the technology for turning back the display area hidden by steering wheel with a mirror to make a virtual image.

Feature

- Minimize line of sight movement by positioning the meter on the steering wheel and improve the visibility by displaying virtual image at a distance



- 1 display realizes 2 layers



Display area hidden by a steering wheel is shown as a virtual image in the effective area.

Large Display Meter

Developing

Background

- Meter displays have become larger and more than one, display contents are also required to be variety.

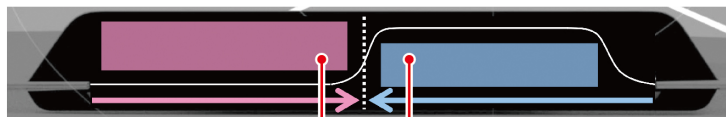
Function

- The meter improves passenger's experience and the value through flexible multi-display according to the scene and optimized display according to priority.

Feature

- Optimized display according to scenes, priority and emergency

Display area is changed by each scene



External info. area
unrelated driving

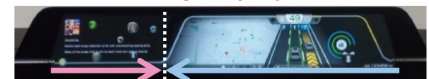
- Community icon
- Recommend info. from friends
- Entertainment etc.

Necessary info.
area for driving

- Display speed on the meter
- Drive assist
- Reminder etc.

Example

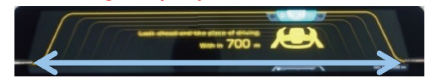
Manual driving display



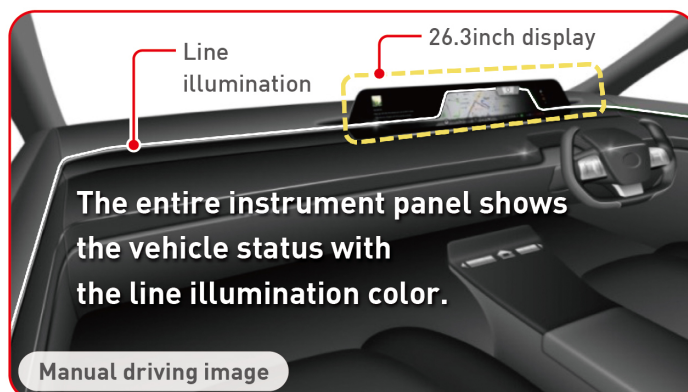
Autonomous driving display



Warning display



- Intuitively provide information with the entire instrument panel



Manual driving image



Autonomous driving image

Link between display contents line illumination