Smart Solution for Brake System

**Smart Solution 1**

**Compact and lightweight**
- Compact size and lightweight (W263×D223×H346mm, 23.0kg): Flexible layout
- Layout closer to the bogie: Improve braking response time

**Smart Solution 2**

**High performance and high reliability**
- Interacting between propulsion system and BC (Brake Cylinder) pressure control per bogie or per axle: Achievement of highly accurate braking performance
- Emergency brake control by variable load valve without SW: Ensure high reliability
- HW timer protection is applied for WSP: Ensure high reliability
- Diagnostic function: Contribution to failure detection at early stage and stable operation
- Certification: CMMI (level 2) / SIL (level 4 ~ 2)

**Smart Solution 3**

**Easy maintenance**
- Replace per package/module/board: Improve MTTR and reduce maintenance cost
- PCB replacement can be performed without removing the IERV from the car.: Improve MTTR

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**Brake system configuration**

- **Master Controller**
- **Propulsion System**
- **IERV**
  - Electronic Portion
  - Pneumatic Portion
- **Air Supply System**
  - **BC (Brake Cylinder)**

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Changes for the Better

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for a greener tomorrow
IERV Main Function

**Function**

**Service brake control**
Distributed braking system control is achieved by controlling per bogie or per axle. High accuracy braking performance is achieved by interacting between the control unit and propulsion system.

**Emergency brake control**
BC pressure of emergency brake is controlled only by the air suspension pressure from variable load valve.

**Wheel slide protection**
WSP is performed per bogie or per axle. HW timer is applied for WSP to prevent false skid detection.

**Networks**
Ethernet, Lon Works, RS485 and MVB are available for network connection between brake systems, monitoring system and propulsion system.

**Remote isolation of service brake**
As for service brake, BC pressure is released by external command. This is not applicable for emergency brake.

**BC pressure compensation**
When one IERV is failed, the lost BC pressure is compensated with other IERV by cross blending control.

**Diagnostic function**
Failure detection at early stage can be achieved by self diagnostic function.

**Monitoring**
Brake performance verification and adjustment are possible using maintenance PC.

**Maintenance**

**Replacement per package, per module or per board**
- Package replacement: IERV complete
- Module replacement: Pneumatic portion or electronic portion
- PCB replacement: Each unit consists of seven PCBs which can be removed separately. Easy to replace due to rack structure. (Without removing the IERV from the car)

**Environment**

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Water Proof</strong></td>
<td>IP66</td>
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<tr>
<td><strong>Shock and Vibration</strong></td>
<td>IEC61373 Cat 1 Class A</td>
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<tr>
<td><strong>EMC</strong></td>
<td>EN50121</td>
</tr>
<tr>
<td><strong>Design Temperature</strong></td>
<td>-40 to 85°C [-40 to 185°F]</td>
</tr>
<tr>
<td><strong>Operational Temperature</strong></td>
<td>-40 to 70°C [-40 to 158°F]</td>
</tr>
<tr>
<td><strong>Relative Humidity</strong></td>
<td>0 to 100%Rh (no condensation)</td>
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**Board replacement without dismounting the IERV from the car**

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http://www.MitsubishiElectric.com