48V Integrated Electric Powertrain for Micro EVs

Benefits :

- Achievement of superior power saving power train (for integrated compact package, high efficiency and extensibility)

  -Improvement of coursing distance by creating wider space of battery installation by minimizing package size

- Improvement of power consumption and proposal of optimized system component by MBD development

  -Adoption of Model Simulation technology

Technical Advantage :

Effect of System Integration

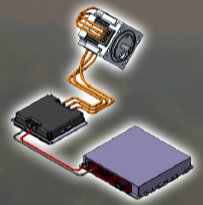
Effective Of Downsizing And Integration		Current Commuter	Panasonic System		Effective
			Before	After	
Downsizing	L	29.5	24.2L	12.4L	▲49%
Mileage	Km/kWh	13.2	13.5	14.9L	+10%
Efficiency	%		86	91	+5%

Panasonic AUTOMOTIVE

48V Integrated Electric Powertrain for Micro EVs

Application : 48V Integrated System for Micro EVs

Before



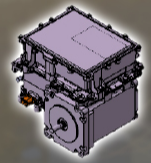
Shorter I/F
Low loss
Optimum Control

Downsizing ▲49%

Output power ×2

Mileage Simulation

After



High efficiency

Max Mileage
14.9km/kWh (JC08)

Mileage +10%

Charging Time 1/2

Mode	[km/kWh]
JC08	14.9
NEDC	11.9
60km/h	14.1

Panasonic AUTOMOTIVE

On Board Charger

Benefits :

- Achieving both high power (11kW) and a small size (1.62kW/ℓ)
- Achieving both high efficiency (more than 95%) and low noise using a new circuit model
- Realization of automatic assembly by combination of “Top structure” and “sub assembly”

Technical Advantages :

- New circuit method (LLC resonance circuit method)
  * IH cooking heater technology application
- Adoption of new construction method
  * Friction Stir Welding method

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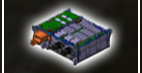
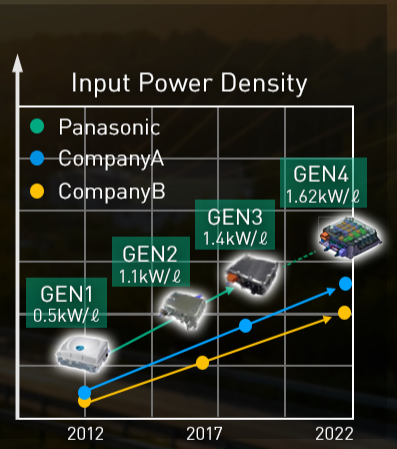
On Board Charger

Applications :

- Euro/China
  3 phase power supply compatible 11kW
- North America
  Single phase power source compatible 11kW
- Other
  Single phase power source compatible 3.7kW

	MP		Under desisgn	
Model	**Pana GEN2**	**Pana GEN3** (Exhibited item)	**Pana GEN4**	
Appearance				
Function	OBC:7.2kW (Exhibited item)	OBC:7.68kW (2phase input)	OBC:7.68kW (Single phase input)	OBC:11kW (3phase input)
Pow Density	1.1kW/L	1.4kW/L	1.63kW/L	1.62kW/L
Volume	6.7L	5.5L	4.7L Target	6.8L Target
Weight	9.0kg	7.3kg	7.0kg Target	10kg Taraget
Efficiency	94.0%	95.0%	95.0%以上	
Frequency	65kHz	100kHz	~300kHz	
Topolpgy	Phase-Shift	Phase-Shift	LLC-Resonant	
Control	Analog	Analog	Digital (DSP)	



Panasonic AUTOMOTIVE

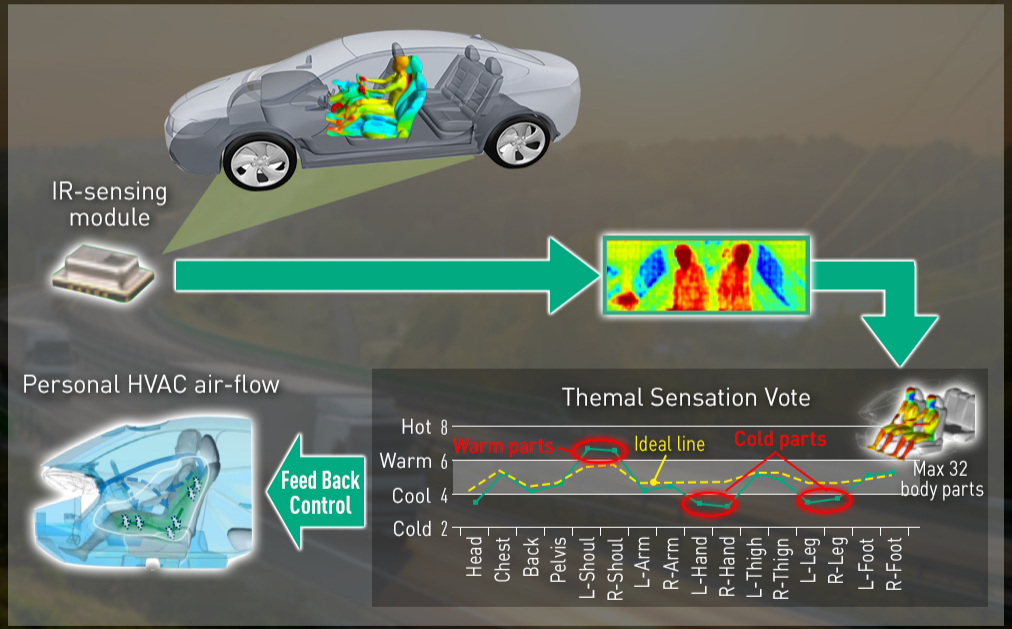
Integrated Climate Control System

Benefits :

- Personal comfort improvement attributed to sensing each crew physical condition and personal air-conditioning
- Compatibility between passenger's comfort and air-conditioning energy saving

Technical Advantages :

- Thermal sensation IR-sensing module <Grid-EYE>
- Climate control based on human thermal sensation and comfort model
- Personal HVAC designed based on human thermal sensation and comfort model



Panasonic AUTOMOTIVE

Integrated Climate Control System

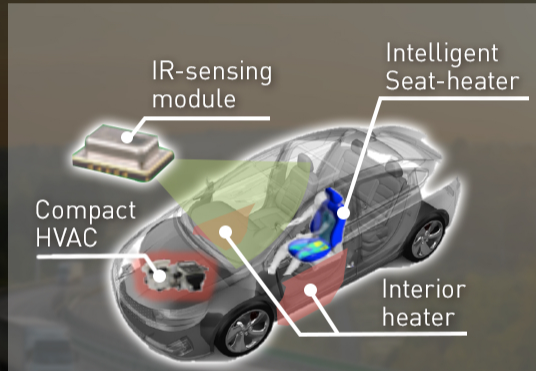
Applications :

- Eco-mode climate control

  Thermal energy saving in keeping with thermal sensation and comfort

- Personal climate control

- Passenger's physical condition monitor



Heating Energy Saving

0deg.C Warm-Up test 60min-after

	HVAC only	Integrated Climate Control System
Radiant heaters	0	51
Steering heater	0	21
Seat heater	0	5
HVAC	1,610	1,023

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