

In-vehicle Infrared Beacon for Driving Support Systems

1. Outline

The installation of infrared beacon systems has been ongoing since the beginning of the 1990s and there is currently a gradual transition towards more advanced infrared beacons that support an expansion of the communication traffic volume and can be used in driving support systems that utilize signal information (Fig. 1). In the background to this, the transition is being pushed forward by the increasingly active technology development related to lower fuel consumption and improved safety on vehicles.

These systems obtain road signal information via infrared communications and offer the drivers a service that encourages environmentally friendly driving and safe travel.

The three Sumitomo Electric Group companies of Sumitomo Wiring Systems, Ltd., Sumitomo Electric System Solutions Co., Ltd., and AutoNetworks Technologies, Ltd., have jointly developed an advanced infrared beacon for automobile use that can be installed in the systems above (Photo 1).

This product has been selected for use on the Accord from the Honda Motor Co., Ltd.

2. Features

2-1 Securing the amount of light arriving

The advanced infrared beacon uses a near infrared LED that has a high light output and a wide angle of radiation. This is to increase the amount of light arriving even in the growing communication traffic and also to thoroughly satisfy specifications under difficult conditions on automobiles. Furthermore, constant current circuits were added to the LED drive circuits to reduce the variation in the amount of light emitted.

2-2 Mounting of optical transceiver element

For the near infrared LED with a high light output and a wide angle of radiation as described above, it was necessary to consider a lead-free design, as is demanded for automobiles, and also to consider the requirements for heat resistance of the lens component.

We therefore used solder technology that avoids any heat on the lens and established soldering technology for optical transceiver elements, which require high precision mounting.

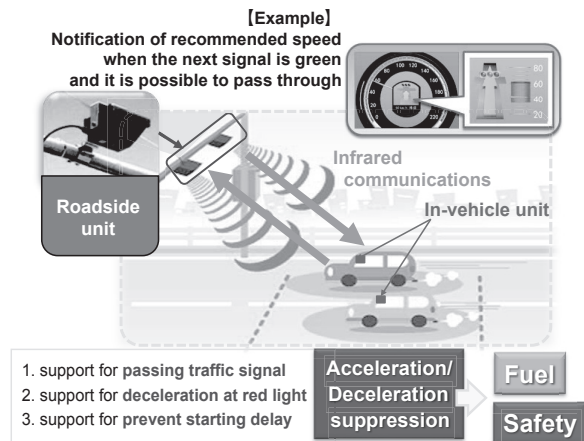


Fig. 1. Driving support system utilizing signal information

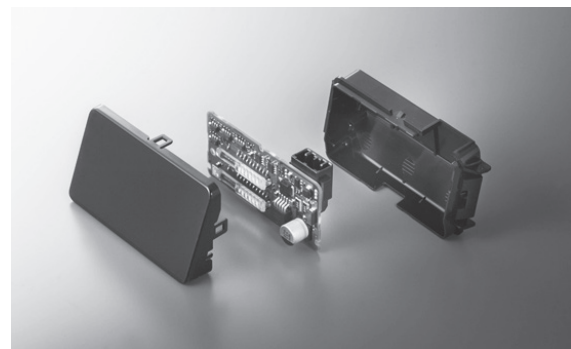


Photo 1. Advanced in-vehicle infrared beacon

Table 1. Technical challenges and comparison with conventional products

Technical item	Solution		
	Conventional	This product	Details
Securing light amount	Compliance with standards	N/A	✓ • Use of high light output and wide radiation angle element • Reducing variation by adding constant current circuits
Mounting optical transceiver element	Possibility of use of automotive quality solder	N/A	✓ • Soldering technology for components with low heat resistance
Method for validity verification	Establishment of system evaluation method	-	✓ • Review by internal and external experts • Repeat evaluations on actual cars in various locations to select and establish evaluation details