Research Report
ABOUT Automotive

Vehicle access and security systems: trends, forecasts and companies

2005 edition: Passive entry unlocks a new market

by Matthew Beecham

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Central locking

The user need not have to press a button to gain entry

In the 1970s, a typical vehicle security system would have involved a conventional car key and a lock for each door. Then central locking technology emerged, allowing the driver to unlock all door locks from his door. In Europe, the number of new cars fitted with central locking is reaching saturation point. Fitment rates are currently well above 90%, up from 60% in 1994.

Remote keyless entry systems

Advances in electronic gadgetry led to the introduction of remote controlled central locking or remote keyless entry (RKE). By simply pressing a button on the key fob, the driver can lock or unlock the car standing just a few feet away from the vehicle.

RKE systems consist of a key fob transmitter and a receiver inside the vehicle. Frequencies used are 315MHz in the US and Japan and 433.92MHz / 868MHz in Europe. Vehicles fitted with an RKE system lock and unlock all doors, including the boot. They also activate the vehicle's alarm system, protecting it against theft. The main challenges in designing RKE systems are achieving low power consumption in both the RKE transmitter and receiver while ensuring good range and reliability for the RKE system.

Passive entry systems

While RKE has become a standard feature, manufacturers are looking to the next generation of convenience called passive keyless entry (PKE). The system, which relies on a bi-directional IFF (Identification Friend or Foe) sequence to identify the key, is designed in such a way that the user need not have to press a button to gain entry, but just carry the electronic key on him. With the help of radio frequency communications, the controller in the doors senses whether the key is present and uses that to unlock the doors.

The design of future door systems will continue to be driven by consumer orientated styling and ergonomic design as well as regulatory constraints. Above all, we are unlikely to see the wholesale removal of backup mechanical systems until the industry is convinced that the overall reliability of the electronic system exceeds that of the mechanical system.

In terms of the lock cylinder and latch combination, the lock cylinder is a very small part of the overall door locking hardware and latching system. By eliminating the front passenger door lock set, the vehicle maker would save about €3.

Electronic ignition also means that the traditional ignition cylinder is no longer necessary. Could the ignition cylinder go the same way as the door lock cylinder? Could the traditional mechanical key eventually become little more than a last resort emergency device?

Valeo's Communications Department told us: "Ignition cylinder is necessary when you have a mechanical blocking of the steering wheel. As soon as you have an electrical device blocking the steering column lock, there are two possibilities: one with a traditional transponder where you have to plug something somewhere (transponder technology allows 2.5cm communication, it could be an ignition cylinder or any other process to plug) or passive entry without a necessity to use transponder function that becomes a back up function."

Remote keyless entry

RKE is now a standard feature in most new cars

RKE is now a standard feature in most new cars. As table 1 indicates, just over 90% of cars sold in Western Europe are sold with RKE installed. In North America, around 75% of cars are sold with RKE installed either as standard or as an option. That figure could reach 95% by the end of this decade. RKE systems are also a high volume aftermarket accessory.

Table 1: Remote keyless entry system fitment in Western Europe and North America, 2000 – 2010 (% OE fitment to new passenger cars)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Western Europe	80	84		9	92	93	4			9	5
North America	68	70	72	4	75	8	2	85		92	95
Overall fitment rate	73	76		1	83		7	89		9	95

Sources: ABOUT Automotive and industry estimates

Table 2: Remote keyless entry system market volumes in Western Europe and North America, 2000 – 2010 ('000s units)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Western Europe	11,884	12,63	73	13	13,5	3,894	30		3	14,9	21
North America	12,039	11,1	2,073	1	12,2	12	05	4,9	8	16,5	17,213
Total	23,923	23,776	46	39	5,8	2	40	9,	1	31,4	32,334

Sources: ABOUT Automotive and industry estimates

Chapter 4

Manufacturers

Competitors in the keyless entry system arena include Siemens VDO, Intier, Delphi Delco, Omron, Kostal, Strattec, Yazaki, Aisin, Valeo, Lear Corp, Visteon, Bosch, Tokai Rica, Matsushita, Alps, Honda Lock Manufacturing and Intier.

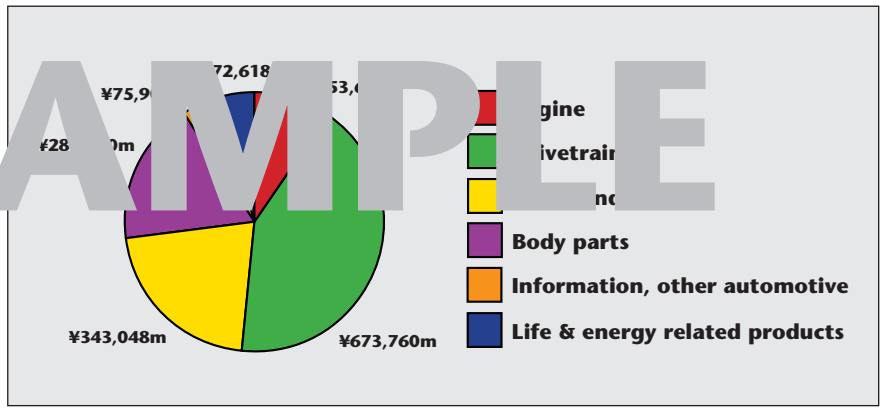
The main suppliers of door locks and latches include Cherry, Valeo, Kiekert, Siemens VDO, Bomoro, Intier, ArvinMeritor, Strattec, Hurd Corp, Witte, Huf and Italmec. In Japan, the main suppliers of door locks and latches include Aisin Seiki, U-Shin, Tokai Rika and Mitsui Mining & Smelting.

This chapter provides brief profiles of a selection of the main manufacturers.

Aisin Seiki

Aisin Seiki is the 8th largest automotive manufacturing company in terms of sales, employing 47,616 people across 128 companies in 16 countries. Aisin Seiki and other subsidiaries, whose head offices are located in Japan, make up the group's core operations. The Aisin Group is further organised into six product areas. They are: engine related products; drivetrain related products; brake and chassis related products; body related products; driver information related products; and life and energy related products.

Figure 3: Aisin Seiki breakdown of sales by product line, 2004
(millions of yen)

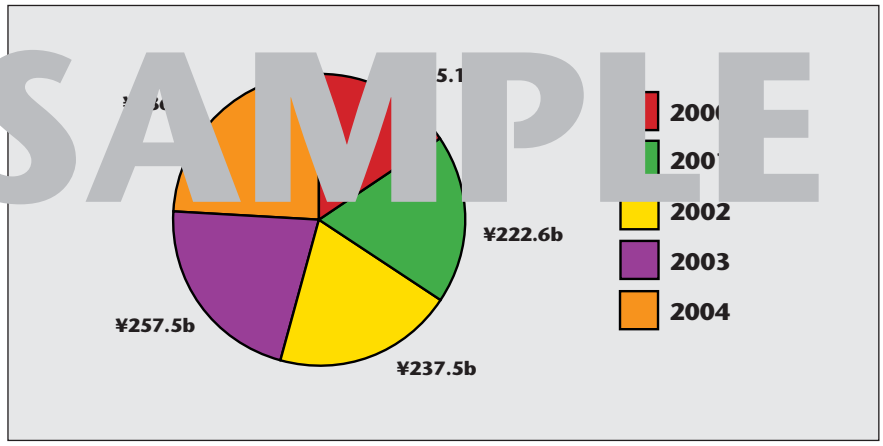


	millions of yen
Engine	153,695
Drivetrain	673,760
and c	048
arts	
ve	001
Life & energy related products	72,618

Source: Aisin Seiki

Its body related products include door latch, door frame, sunroof, power sliding door system; and power back door system, (accounting for approximately 18% of sales). Strong sales of Aisin Seiki's power sliding door systems, power back door systems and door handles for smart key systems (a joint development with Denso and Tokai Rica) accounted for the rise in sales year-on-year for the division.

Figure 4: Aisin Seiki net sales for the body related division, 2000 - 2004 (billions of yen)



	billions of yen
2000	185.1
2001	222.6
2002	237.5
2003	257.5
2004	286.2

Source: Aisin Seiki

Aisin Seiki's door latches represent the largest proportion of unit production. These latches are manufactured at four production bases in Japan, as well as in a further 10 bases in other countries:

- Aisin Seiki Co. Ltd – Japan
- Aisin Kiko Co. Ltd – Japan
- Saitama Kogyo Co. Ltd – Japan
- Aisin Kyushu Co. Ltd – Japan
- Aisin USA MFG, Inc – USA
- Aisin Mexicana SA DE CV – Mexico
- Aisin Do Brasil Com E Ind Ltda – Brazil
- Aisin Europe Manufacturing (UK) Ltd – UK
- Aisin (Australia) Pty. Ltd – Australia
- Elite Sewing Machine MFG. Co. Ltd – Taiwan
- Aisin Tianjin Body Parts Co. Ltd – China
- PT. Aisin Indonesia – Indonesia
- Aisin NTTF PVT. Ltd – India
- SIAM Aisin Co. Ltd – Thailand

During summer 2002, Aisin Australia began production of door locks for Toyota Motor's TMCA Australian production plant. Aisin Australia assembles 6,000 door locks annually using door lock bodies, motors and other parts sourced from China.

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