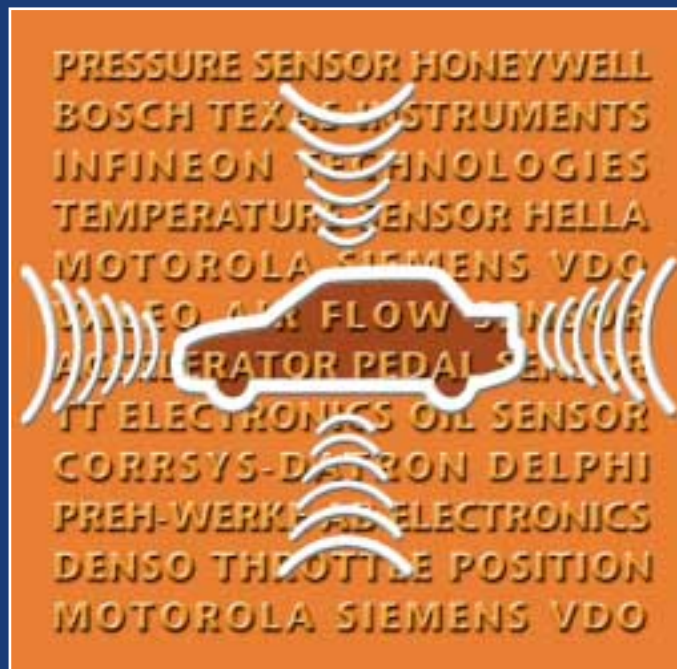


Research Report
ABOUT Automotive

Automotive sensors: market shares, trends, companies and forecasts to 2010

by Matthew Beecham



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Chapter 2 **The market**

Market trends

Sensor suppliers must now deliver more capability at a lower price

As the electronic content in vehicles increases - driven by consumer demand for increased safety, security, comfort and convenience features as well as by increasingly strict government regulations concerning air quality (emissions) - demand for automotive sensor applications will continue to grow unabated. Precise and robust sensors are needed to supply the required information for the correct functioning of these systems.

While certain types of sensor have long since featured inside vehicles, such as oil pressure, coolant temperature, vehicle speed and fuel level sensors, new applications are emerging, particularly in the emissions and safety related areas.

More stringent emissions regulations are fuelling demand in Europe, creating a larger market for oxygen lambda and nitrogen oxide sensors¹. Consequently, the development push is for more accurate sensors that are equipped with 'smart' features that are able to give timely, precise signals.

Denso believes that safety and environment are key fields for automotive sensors. A spokeswoman for Denso said: "In the field of safety, while improving each safety system including braking, steering control and airbag sensing systems, those systems will be integrated in the future. We anticipate this movement will require sensors to have higher capabilities and/or be integrated with other sensors. Also, safety systems will require sensors to more closely monitor the environment around vehicles, including road conditions and vehicle running conditions. We believe these movements will be two of the factors driving demand for automotive sensors. In the field of the environment, one factor is emission regulations becoming more stringent worldwide, which require sensors to more precisely detect exhaust gas conditions including air/fuel ratio, temperature and amounts of pollutants to reduce emissions. Another factor is next-generation vehicles such as hybrid and fuel cell vehicles, which will create new demands for sensors."

One of the biggest migrations in technology has been the shift from analogue to active

Sensors for passenger safety applications are also showing massive growth prospects, with tyre pressure, run-flat tyres, driver assistance and occupant position sensing pushing demand. In addition, the penetration of EPS and electronic braking systems is fuelling demand in Europe, ahead of the US.

Overall, demand is being fuelled by the vehicle makers, who need to build cleaner, safer, more reliable, fuel efficient, convenient and comfortable cars. Cost is also a major consideration. Sensor suppliers must now deliver more capability at a lower price.

One of the biggest migrations in sensor technology has been the shift from analogue to active (or digital) with the aim to make a sensor with integrated computing capability. In Europe, the industry is gradually moving from first to second generation active sensor technology, aimed mainly at providing a compensated and processed signal. Some of the notable

Table 1: Automotive sensor market volume, Western Europe, Japan, North America, China, South Korea and Brazil, 2000 - 2010
(million units)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Western Europe	386	406	417	415	440	475	507	541	544	568	591
Japan	257	258	280	291	298	308	321	333	346	357	369
North America	46	29		475	0				12	6	5
China		79	2	130					72	3	393
South Korea	79	78	86	93					25	1	9
Brazil	39	2		47		6		71	4	7	80
Total	1,2	1,29	1,387	1,5	1,5	1,6	1,	1,883	2,1		7

Source: Auto Research Analysts.

As the average number of sensors per car increases year-on-year, we forecast total revenues increasing by about 39% between 2004 and 2010.

Table 2: Automotive sensor market value, Western Europe, Japan, North America, China, South Korea, Brazil, 2000 - 2010
(€ millions)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Western Europe	2,316	2,395	2,418	2,365	2,464	2,612	2,737	2,867	2,828	3,010	3,191
Japan	1,542	1,522	1,624	1,658	1,668	1,694	1,733	1,765	1,799	1,892	1,992
North America	2	2,531		2,7	800			074	,182	3	591
China		466	5	74	0		5	56	,414	1	2,122
South Korea	4,	460	49	53	5			,41	550		50
Brazil	234	248		26				376	384		432
Total	,,	7,6	8,042	,2	8,	9,		9,979	,11		,078

Source: Auto Research Analysts.

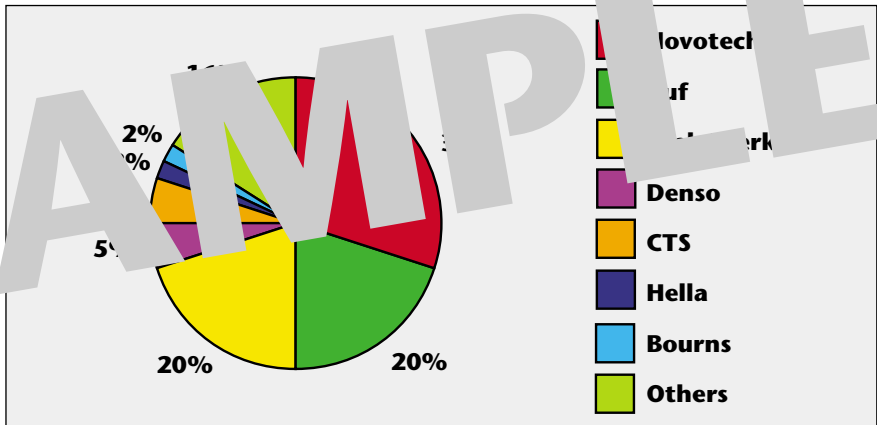
¹ A lambda, or exhaust gas sensor, is placed into the exhaust outlet in order to monitor the amount of oxygen in the exhaust gas.

² MEMS is also referred to as Micro Systems Technology in Europe and Micro-Machines in Japan.

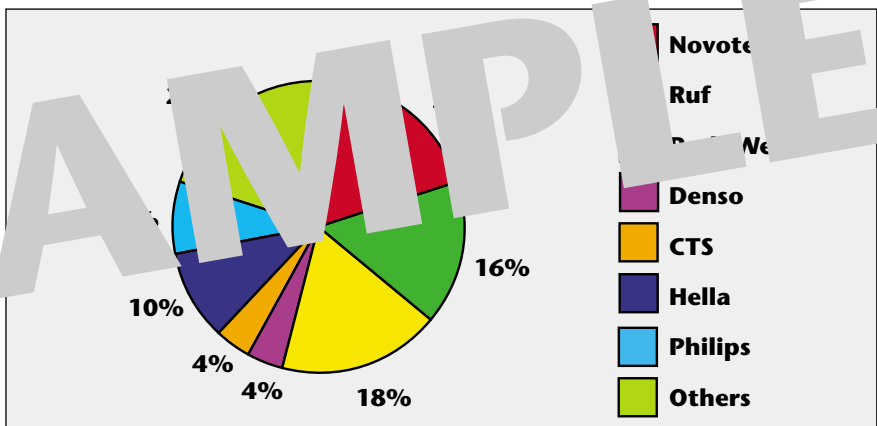
Previously, throttle opening was largely linear and directly proportional to the movement of the accelerator pedal inside the vehicle. Now the throttle opening, which is still controlled by the driver’s foot, can be adjusted by the engine management computer, to better suit the operating conditions for a smoother response. Throttle valve opening is performed by an electric motor controlled by an electronic control unit, based on input from the accelerator pedal sensor and, as a failsafe precaution, the throttle position sensor.

Figure 2: Europe: Throttle position sensor market shares, 2003 and 2007 (% of volume)

Europe: Throttle position sensor market shares, 2003



Europe: Throttle position sensor market shares, 2007



	2003	2007
Novotech	30	20
Ruf	20	
Preh-Werke		
Denso		
CTS		
Hella		
Bourns	2	0
Philips	0	8
Others	16	20
Total	100	100

Sources: Auto Research Analysts; industry estimates.

Outlook

Table 3 sets out our estimates and forecasts for all types of automotive position sensor through to the end of this decade. Growth in each region is largely in line with vehicle production forecast volumes.

Table 3: Automotive position sensor market, Western Europe, Japan, North America, China, South Korea, Brazil, 2000 - 2010
(million units)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Western Europe	30.9	32.5	33.4	33.2	35.2	38.0	40.6	43.3	43.5	45.4	47.3
Japan	20.6	20.6	22.4	23.3	23.8	24.6	25.7	26.6	27.7	28.6	29.5
North America	36.0	44.3	50.0	58.0	65.0	72.0	79.0	86.0	93.0	100.0	107.0
China	4.0	6.3	8.6	10.4	12.2	14.0	15.8	17.6	19.4	21.2	23.0
South Korea	6.3	6.2	6.9	7.4	7.9	8.4	8.9	9.4	9.9	10.4	10.9
Brazil	3.1	4.4	5.7	7.0	8.3	9.6	10.9	12.2	13.5	14.8	16.1
Total	102.9	140.3	177.0	211.0	244.0	276.0	307.0	338.0	369.0	400.0	431.0

Source: Auto Research Analysts.

³ A potentiometer is a variable resistor used to alter voltage.

⁴ An inductive solution involves contactless sensors.

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