

# DYNAMIC MARKET

Demand for automation solutions in the area of wire processing increased further in 2017. Komax benefited greatly from this development, recording a significant rise in both order intake and revenues. Momentum was particularly dynamic in the automotive market segment, although the aerospace, telecom & datacom, and industrial market segments likewise contributed to growth.

The automotive industry showed itself to be in robust shape once again in 2017. Global production of cars and light commercial vehicles increased by 2.2% to some 95 million vehicles (source: IHS Markit). According to IHS Markit, the largest automotive market remains China, which produced some 28 million vehicles last year. That was 1.8% more than in 2016. In comparison to 2016 (+15.4%), growth has slowed significantly. The European market is in good health, having produced 22.1 million vehicles (+3.5%).

North America was one of the few regions to record no growth in 2017. The world's third-largest market produced 17.2 million vehicles, or 3.9% less than in 2016. South America recorded growth of 19.7% (3.3 million vehicles produced). This is almost exclusively attributable to the production performance of Brazil (+26.2%), which has returned to the path of growth (2016: -10.3%). For 2018, IHS Markit is forecasting a 1.8% increase in global vehicle production.

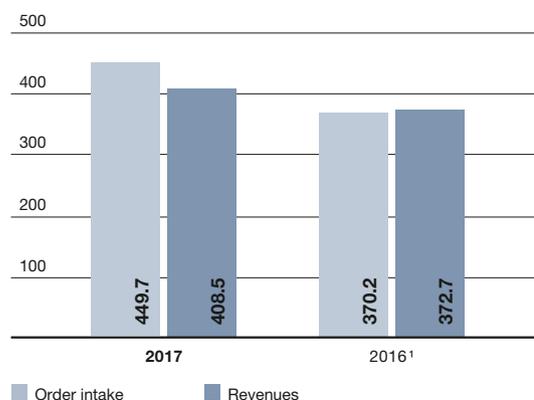
## **Strong growth in order intake and sales**

The rise in vehicle production and the sharp increase in pressure to automate wire processing ensured a powerful rise in both the order intake and the revenues of Komax. While revenues rose by 9.6% to CHF 408.5 million, the order intake rose by as much as 21.5% to CHF 449.7 million. The aerospace, telecom & datacom, and industrial market segments likewise benefited from the ever-strengthening trend towards automation, making their own significant contribution to Komax's growth.

The book-to-bill ratio came in at a high 1.10, a significant rise on the prior-year figure of 0.99. One of the reasons for this rise is the significant number of customer-specific systems ordered in 2017. Orders of this type often have longer delivery times than serial production machines. A good example is the major order received from the aerospace industry for a number of systems for automated wire processing. The delivery dates for these systems range from 2018 to 2020. To ensure that the revenues from these systems are appropriately booked over the period in question, in keeping with their degree of completion, Komax applies the POC (percentage of completion) method to large orders of this kind.

**Order intake and revenues**

in CHF million



Komax enjoyed stronger growth than the market as a whole. A contributory factor here was the significant growth rates seen in Europe, Asia and Africa. The strongest rise of all was recorded in Africa (+47.1%). Due to the increasing scarcity of personnel resources in Eastern Europe, a number of wire harness manufacturers have been strengthening their presence in North Africa. In North/South America, Komax recorded a slight decline in revenues (-2.1%). Following a sharp decline in the first half of the year, North/South America then recovered in the second half, almost matching the prior-year figure. In the US in particular, investment activity picked up as the year progressed, with the result that the decline in sales in the earlier part of the year was partly reversed. In South America, Brazil remains by far the most important market for Komax. The strong momentum in China meant that Komax sold more in Asia than in North/South America for the first time ever, to the point where Asia has now become the second-strongest region for the Group. Market observations suggest that this dynamism will persist in the individual regions, at least for the first half of 2018.

<b>Revenues by region</b>	2017	2016 <sup>1</sup>	+/- in %
in CHF million			
Switzerland	8.8	7.5	17.3
Europe	199.3	184.5	8.0
Asia/Pacific	81.4	73.8	10.3
North/South America	76.2	77.8	-2.1
Africa	42.8	29.1	47.1
<b>Total</b>	<b>408.5</b>	<b>372.7</b>	<b>9.6</b>

The strong growth recorded in China is also reflected in the breakdown of revenues by currency. The proportion of revenues booked in CNY increased from 11.5% to 14.1%. The changes in the key currencies are set out on page 100.

<sup>1</sup> Since the start of 2017, the consolidated financial statements have been drawn up in accordance with Swiss GAAP FER. The prior-year figures have been revised accordingly; order intake and revenues of the Medtech business unit, which was sold in April 2016, are not included.

## Market segments and service

Komax focuses on four market segments. The core business is the automotive market segment, which accounts for more than 85% of revenues. Komax is continuously strengthening its presence in the other three segments – aerospace, telecom & datacom, and industrial – and exploiting the synergy potential with the core business. All segments benefit from the global service network of the Komax Group and from service offerings such as the Komax Academy.



### Automotive

The automotive segment is by far the most important market segment for Komax. There are a number of reasons for this. In no other industry is the volume of wires to be processed so large; over the next five years, the volume of wires to be processed in the automotive industry is expected to rise by 2%–3% annually. In addition, the number of vehicles being produced continues to rise. In 2017, some 95 million vehicles were produced. Although the automotive industry has no peer when it comes to the degree of standardization and automation in the production process, there is still plenty of potential for additional automation steps, as wire harnesses are still manufactured by hand to a large extent.

### Aerospace

Issues such as safety, lightweight construction, and lower emissions have been at the forefront of developments in aerospace for many years. Komax can draw on these experiences when it comes to its core business too, as these issues are also gaining in importance in the automotive industry. Komax secured expertise in the aerospace area in a targeted way through its acquisition of Laselec in 2017 (see page 30). The degree of automation of wire processing in the aerospace industry is at a very low level. However, as the barriers to entry in this market are very high for suppliers, it has taken several years for Komax to record its first major success. The breakthrough was made in 2017. Following negotiations lasting many years, Komax succeeded in winning new orders for several large-scale systems from two leading companies in this field.





### Telecom & Datacom

Large volume data transfer and the permanent networking of people have become standard practice in the telecom & datacom market segment. The wiring used for these applications is being increasingly used in vehicles too, as cars become evermore interconnected, with comprehensive information systems that will facilitate autonomous driving in future. Komax can therefore also use the experience gained from the telecom & datacom market segment in the automotive segment.

### Industrial

The processing of wires for industrial applications, such as electric control cabinets, for example, often involves working with very small batches. To ensure that automation is nevertheless a cost-efficient option for control cabinet manufacturers, Komax has developed specific machines of the Zeta type. These machines manufacture all the various different wires that are needed automatically, ensuring that they are in the right sequence and of the right length. This has the effect of reducing manual labor to a minimum. Manual processes such as cutting, stripping, marking, and sleeve insertion are rendered obsolete. Automation of this kind has proven its worth in the area of wire processing in the automotive industry for many years, and is now increasingly finding its way into industrial applications.



### Service

In all market segments, customers benefit from Komax's global distribution and service network. Among other things, the service offering includes the Komax Academy, which provides a modular training program, including final certification. The training modules are tailored to customers' needs. Training programs are currently offered for all machines offered by Komax. These are broken down into the following modules: Basic (operators), Advanced (machine setters and maintenance technicians), Specialist (shift managers, production heads, service technicians), and Expert (future instructors). Participants receive certification based on both theoretical and practical learning assessments – involving standardized global criteria with identical quality levels. Komax offers training courses in nine countries: Brazil, China, Germany, Mexico, Romania, Switzerland, Singapore, Tunisia, and the US. Training is available in German, English, Chinese, Spanish, and Portuguese.

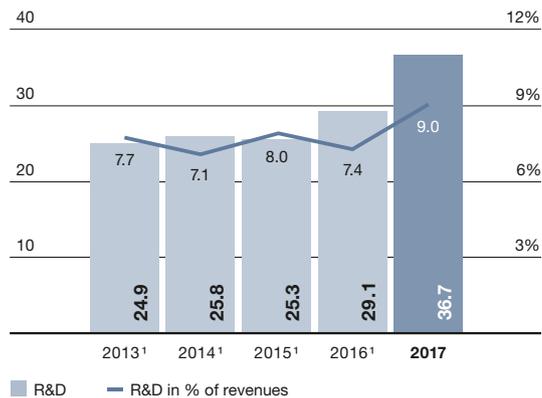
# HIGH DEGREE OF INNOVATION

In order to consolidate its market and technology leadership, Komax has been investing in research and development at an above-average rate – and will do so even more in future. Global developments such as electro-mobility and autonomous driving give Komax the opportunity to demonstrate once again its exceptional ability to innovate.

Over the last few years, Komax has invested some 7%–8% of Group revenues in research and development (R&D), and it will increase this figure to around 8%–9% over the next few years. In 2017, Komax invested 9.0% (2016: 7.4%) of Group revenues – or CHF 36.7 million – in research and development. That is some 26% more than the previous year. This figure includes expenditure on both internal development services (CHF 29.6 million) and the development services of third parties (CHF 7.1 million).

## R&D expenditure

in CHF million



<sup>1</sup> Since the start of 2017, the consolidated financial statements have been drawn up in accordance with Swiss GAAP FER. The prior-year figures have been revised accordingly. The years 2013–2015 are reported according to IFRS.

### **Electro-mobility and autonomous driving**

The automotive industry is currently in a state of flux, and the race to develop the “mobility of the future” is also having an impact on Komax. Issues such as electro-mobility and autonomous driving give Komax further opportunities to develop unique selling features. But if these opportunities are to be seized, the course needs to be set today. For this reason, Komax is increasing its investment in research and development. The technological transformation of the automotive industry means a rise in manufacturing demands, and the customers of Komax are confronted with a number of unusual challenges. In order to ensure the latest customer requirements are met in the best possible way, Komax often works with leading companies from the automotive industry on development projects.

### **366 staff employed in research and development and engineering**

As at 31 December 2017, the Komax Group employed a total of 200 employees (2016: 166) in the area of research and development. The majority (142 employees) work in Switzerland. In addition, Komax has development units in China, Germany, France, Japan, and Singapore. This innovative strength is additionally bolstered through 166 engineers (2016: 177) who make a key contribution through the development of customer-specific applications. The personnel costs of these employees are not contained in research and development expenditure if the staff in question have worked directly on customer projects. There are a number of reasons for the year-on-year increase of approximately 20% in headcount in the research and development area. In addition to the two acquisitions made in 2017 (Laselec and Practical Solution), this increase is also attributable to Komax’s determination to consistently seize the opportunities that present themselves in the current market environment. This increase in headcount should be viewed as a form of investment in a sustainably successful future.

### **Multiple awards**

The innovative successes of Komax have convinced not only the company’s customers in 2017, but also a number of specialist juries. These juries have conferred upon Komax the Red Dot Design Award, the Productronica Innovation Award, and the Innovation Prize of the Chamber of Commerce and Industry of Central Switzerland (IHZ). Komax received the renowned Red Dot Design Award for its design of the Mira 230, a benchtop machine for the professional stripping of electrical wires. Another jury singled out the Sylade 7H laser wire stripper from Laselec (see page 17) for the Productronica Innovation Award. Two other innovations were also nominated: the Mira 340 developed by Komax Japan and the completely new operating software Komax HMI (see page 16). Furthermore, Komax was awarded the IHZ Innovation Prize for the first time since 1987. This was for its Alpha 530/550 machine platform (fully automatic crimping machine), the development of which required the deployment of around 50 employees over many years.



## New products

Thanks to its targeted investment in research and development, Komax succeeds in bringing a variety of new products and product enhancements to market every year. 2017 was no different in this regard. Komax was able to demonstrate its technology leadership impressively, setting new standards with numerous market launches. Below we provide a selection of these new products.



### Komax HMI

Fully automated, high-performance wire processing machines are complex things. In order to allow these machines to nonetheless be operated in a way that is as straightforward, efficient and error-free as possible, Komax has spent many years developing its operating software Komax HMI (Human Machine Interface). Thanks to consistent logic and direct guidance, operation of this software can be learned in a short space of time. It helps the user avoid errors during setup and changeover, as well as during the production process itself, and assists with the manufacture of products of reliably high quality. At the same time, the reject rate is minimized. Thanks to an open interface, Komax HMI can be linked to a manufacturing execution system such as Komax MES. This facilitates the transparent analysis of production data in real time – and at any time. All data is documented and traceable without exception.

### Lambda 240 SP

The significance of electro-mobility continues to rise, and this development will become even more accentuated over the next few years. Produced by Komax Thonauer in Hungary, the Lambda 240 SP is a compact, semi-automatic solution for processing the shielded braid of high-voltage wires. Ultimate precision is called for if the shielded wires that are used in electrical vehicles are to avoid being damaged during processing. The cutting tube ensures that the inner insulation is not damaged during stripping, while the shielded braid is trimmed with the utmost precision. The reliable, controlled stripping of inner conductors and the removal of filling material is then executed by a freely configurable, rotating cutting unit.



### Omega 740/750

For wire harness production with double-sided insertion of housings, Komax has developed fully automatic block loader machines in the form of the Omega 740 (five process modules) and Omega 750 (eight process modules). As manual steps, i.e. interim storage of individual wires and transport, are no longer required with the Omega, savings are made in both time and logistics. Cutting, crimping, and loading of the terminals all take place on the same machine. The Omega series is the economical answer to ongoing miniaturization and ever smaller production batches. Thanks to these machines, a variety of stand-alone wire harnesses can be manufactured simultaneously. The automatic wire changer provides up to 36 different wires from the entire cross-section range without any need for changeovers.



### Sylade 7H

The Sylade 7H from Laselec is the handheld version of the Sylade 7 benchtop laser wire stripper. The patented Sylade laser technology uses high-precision semiconductor lasers that rotate around the wire perfectly and cut the insulation to the programmed depth with great repetition accuracy. At the touch of a button, the laser beam can process round, non-round, shielded, and twisted-pair wires with even the thinnest of insulation. Sylade 7H is perfectly suited for processing the wires used in the aerospace industry, but it is also suitable for industrial applications – such as the processing of aluminum wires for cars where the sensitive braids must not be damaged under any circumstances.

### KTR 160

Kabatec has developed the KTR 160 taping machine for taping wire harnesses and modules, such as door wire harnesses, battery wire harnesses, and roof wire harnesses. It is also well suited to the taping of high-voltage wires with large cross-sections. As cost considerations require wire harness manufacturers to develop their products ever more efficiently and with ever higher quality, requirements as regards the operability and process accuracy of the corresponding machinery are continually rising. With the KTR 160, Kabatec has developed a stable, agile machine that significantly increases efficiency in the manufacture of wire harnesses – thanks to the high-precision belt feed system, operational assistance in the form of an intuitive touch screen and an automatically closing protective hood.

