STRENGTHENING INNOVATION

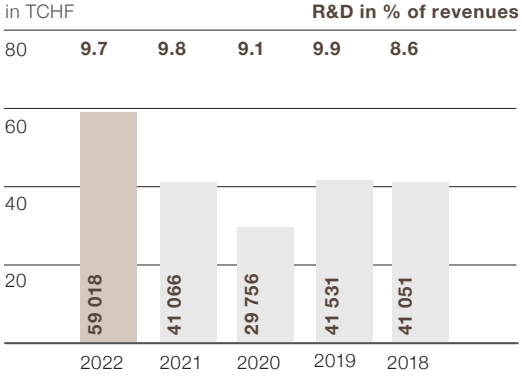
For a market leader like the Komax Group, the ability to roll out innovations on an ongoing basis and thereby enable its customers to gain genuine competitive advantages is of the utmost strategic importance. For that reason, the Komax Group channels some 8–9% of its revenues into research and development every year. The combination with Schleuniger is now opening up further avenues of opportunity.

9.7%
of 2022 revenues invested in research and development

Megatrends such as electro-mobility, digitalization, and autonomous driving offer many opportunities in the market of automatic wire processing. In order to exploit these and be in a position to offer customers further innovative solutions, the Komax Group has for many years been investing above-average sums in new developments and the optimization of its existing product portfolio. Specifically, the Komax Group has spent CHF 212.4 million in this area since 2018. In doing so, it has consolidated its leading position, driven forward the automation of wire processing, and actively influenced the process of radical change in the automotive industry. These are crucial upstream investments that will allow the Komax Group to leverage additional unique selling propositions and secure the company's competitiveness. The goal is to develop additional innovative and differentiating products and solutions for customers.

In 2022, the Komax Group, including Schleuniger, invested a total of CHF 59.0 million or 9.7% of revenues (2021: 9.8%) in the development of new products and the optimization of existing ones. This amount comprises both investment in internal development services (CHF 49.5 million) and in those of third parties (CHF 9.5 million).

Expenditure on R&D[1]



[1] The Schleuniger Group was consolidated as of 1 September 2022. Accordingly, four months of Schleuniger's R&D expenditure are included in the financial year 2022.

Bundling of innovative strength thanks to the combination with Schleuniger

A key strategic target of the combination of Komax and Schleuniger at the end of August 2022 is to bundle the companies' skills and resources in the area of research and development. Market opportunities can be better exploited jointly. Customers can be more rapidly provided with innovative solutions for their needs, and can further increase automation.

The Schleuniger Group is likewise a technological leader in the automation of wire processing, and regularly brings new products with unique selling points to the market. In particular, Schleuniger has brought market-leading expertise in automatic benchtop cutting and stripping equipment, as well as in the high-voltage area to the Komax Group.

As part of the integration of the Schleuniger Group into the Komax Group, all development projects are being scrutinized. The analysis focuses on where there is overlap and how the different skills of both companies can be optimally exploited. Here it is important to ensure that the progress already made on ongoing projects is not lost but merged. This integration process will have the effect of strengthening the company's power of innovation and freeing up new capacity. This in turn will mean that future development projects that the Komax Group has previously had to defer can be realized more quickly. The Komax Group will thereby secure its competitiveness for the long term and be in a position to continue to offer its customers cutting-edge technological products and solutions.

713
employees in R&D and engineering

271 additional employees in research and development, and engineering

As of 31 December 2022, the Komax Group had a workforce of 360 employees (2021: 222 employees) in research and development. The strong year-on-year headcount increase of 62% is the result of the combination with Schleuniger. The majority of these (224 employees) continue to work in Switzerland, which is why the majority of R&D expenditure is incurred there. In addition, the Komax Group maintains development units in Belgium, China, Germany, France, Japan, Singapore, Hungary, and the US.

The power of innovation of the Komax Group is strengthened by no less than 353 engineers (2021: 220 engineers), who make an important contribution through the development of customer-specific applications. The personnel costs of these engineering employees are not included in research and development expenses where these individuals have worked directly on customer projects.

SMART FACTORY by KOMAX

The trend towards digitalization is in full swing, particularly in the automotive industry. More digitalization also means more data, more electrification, and more wiring and cabling. This is good for the business of the Komax Group, but presents its customers with growing challenges. A wide range of components and products are becoming increasingly intelligent and, at the same time, more complex on the electronic side. The miniaturization of contact systems is continuing, adding a further layer of complication to manual production steps. Compounding this problem are ever-rising personnel costs along with a global shortage of skilled labor.

Customers of the Komax Group have to deliver consistently high quality and reliability despite rising complexity and higher personnel expenses, while the same time keeping costs as low as possible. The Komax Group helps them to meet these growing challenges. Specifically, the Komax Group has developed a vision for how wire manufacturing can be optimized in the future – the SMART FACTORY by KOMAX. It features five components.

"Through the combination with Schleuniger, the Komax Group has gained additional expertise and more resources to support its customers with innovative products and services as the degree of automation continues to rise."

Matijas Meyer, CEO Komax Group

THE FIVE COMPONENTS OF THE SMART FACTORY BY KOMAX – OUR VISION OF WIRE PROCESSING IN THE FUTURE

Real-Time Quality Audits

The Komax Group enables real-time quality audits. Quality data is collected using IoT technology, stored in the cloud, and processed in a user-friendly manner. This means that customers can produce quality reports immediately and easily, and thereby demonstrate compliance with quality requirements at at any time and trace processes.

No Operator Influence

The Komax Group develops fully-automatic, networked solutions in order to minimize operator influence. For customers this means a reduction in both personnel costs and dependency on labor. Moreover, productivity and transparency are improved while quality remains consistently high.

On-Demand Service

The Komax Group offers solutions and services on demand. These include performance- or usage-based payment for systems, financing and leasing services, and procurement of production capacities to handle production peaks, for example. This enables customers to reduce their capital requirement and increase flexibility, stability, and responsiveness.

Self-Optimizing Factory

The self-optimizing factory improves productivity while also reducing quality costs. To achieve this, the Komax Group provides cloud-based algorithms based on production and behavioral data. Customers therefore significantly improve machine utilization while at the same time reducing their quality costs.

Self-Service Boutique

The Komax Group offers access to a digital self-service boutique. Customers benefit from services such as product and spare parts ordering, web-based training, software downloads and upgrades, license management, plus analysis and optimization tools. This means they can access the services of the Komax Group at any time, from anywhere, and get a customized picture of their business.

You can find more information on the SMART FACTORY by KOMAX in this video:
komaxgroup.com/en/expertise/smart-factory

In all these areas, the Komax Group is working continuously on implementing its vision, and has already taken the first steps:

In order to minimize the influence of the operator in wire processing, the Komax Group has developed the Alpha 650 crimp-to-crimp machine with its intelligent, fully automatic tool changeover system. This executes the material change in less than a minute – rather than the standard 15 minutes by hand – while at the same time selecting all the key settings autonomously. This prevents incorrect handling and guarantees the ultimate in precision and process quality.

Comprehensive production data from machinery makes a key contribution to improving productivity and quality in wire processing. This becomes apparent with Komax Connect, a cloud-based digital platform that processes and visualizes this data. Customers receive all the information they need for the targeted productivity optimization of every machine in real time. For example, machine downtimes can be immediately analyzed and the parameters recognized for the ideal ratio of quantity to quality.

With the launch of its new website (www.komaxgroup.com) in October 2022, the Komax Group laid the basis for its 24/7 online service in the form of an e-shop platform. This platform enables the Komax Group to effect flexible, ongoing optimizations. This includes – as a further step – online service ticketing for customers.

The Komax Group offers its customers flexibility on the financing side. This encompasses payment for machines based on performance or usage (e. g., pay-per-use), as well as financing and leasing services. Among others, the Komax Group cooperates with Siemens Financial Services in this area. With Komax Care, customers receive individually tailored service packages that enable them to maintain machine quality and productivity over the longer term.

The Komax Group offers comprehensive quality solutions along the value creation chain – from the cutting area through to the testing stage. A good example of this is the Q1250 quality tool – the “digital eye.” With its intelligent image analysis, the Q1250 module monitors crimp quality wholly automatically, thereby eliminating the need for laborious visual checks by the machine operator. The broad spectrum of quality solutions and the multitude of data that these generate form the basis for implementing the real-time Quality Audits Vision.

As a driver of innovation and market leader in automated wire processing, the Komax Group is implementing its vision of the SMART FACTORY by KOMAX on an ongoing basis. In doing so, the company is raising the quality, productivity, and flexibility of wire processing to a new level. Together with its customers, the Komax Group works intensively on making life simpler, more convenient, and safer.

Breaking new ground for wire harness production

The wire harness is currently one of the most laborious, complex, and expensive individual components in any vehicle, and is therefore of crucial importance to the entire automotive industry. The move to e-mobility and autonomous driving is changing the requirements for the design and manufacture of the wire harness. For automotive groups this means significant investment. Their suppliers must develop solutions for new customer needs. The direction of this process has been clear for several years now.

As a specialist in automated wire processing, the Komax Group proactively shapes these developments, and joins forces with leading companies from the automotive industry in a number of organizations. ARENA2036 is an example of this (www.arena2036.de). Here, interdisciplinary teams are busy researching the automotive production processes of the future. The Komax Group is working on several projects as part of this collaborative effort. Among other things, this includes the development of guidelines on how automotive manufacturers should design wire harnesses so that they can be assembled reliably thanks to a high degree of automation.

Both Komax and Schleuniger cooperate in this context with leading automotive manufacturers and suppliers such as Aptiv, BMW, Bosch, Daimler, Dräxlmaier, Kromberg & Schubert, Kuka, Nexans, Rosenberger, Siemens, TE Connectivity, and Yazaki. One of the first results of this initiative was the development of a DIN standard in 2022 to address the rise in complexity and facilitate inherently consistent standardization.

In keeping with the zonal approaches that apply in wire harness architecture, the wire harnesses of the future need to be designed in a modular way, with the smallest possible component diversity. Several compact wire harnesses with shorter wires are less complex, more cost-efficient to produce, and above all more conducive to automation than one large wire bundle. And this is what the Komax Group is committed to.

Digitalization with Industry 4.0 and the Industrial Ethernet of Things (IIoT)

In order to drive forward digitalization, the Komax Group collaborates with various leading companies in a range of organizations. These include the Open Industry 4.0 Alliance, which is developing a framework based on existing norms, standards, and protocols (e. g. OPC UA, IO-Link, RAMI 4.0), so that machines can communicate with one another in a uniform language. Thanks to this development, potential solutions for optimum networking at customers' premises – such as with digital interfaces and remote monitoring – can be incorporated in the development of new solutions of the Komax Group. This is particularly important for the SMART FACTORY by KOMAX. The Open Industry 4.0 Alliance now has more than 100 members, including companies such as Beckhoff, Endress+Hauser, Kuka, Microsoft, Samson, and SAP.

Single Pair Ethernet (SPE) – the infrastructure basis that facilitates the IIoT (Industrial Ethernet of Things) and Industry 4.0 – is important for the process of data transfer in vehicles. The Komax Group joined two SPE associations at the start of 2022. The SPE Industrial Partner Network is a network of companies whose aim is to promote this technology as the basis for rapid and successful growth of the IIoT. Its members include companies such as Hirose Electric, Hirschmann, Leoni, Nexans, and TE Connectivity. In addition, the Single Pair Ethernet System Alliance sees companies such as dormakaba, Phoenix Contact, Rosenberger, Shenzhen Signal Electronics, and Weidmüller joining forces to establish SPE solutions in as many markets and applications as possible, while at same time creating a uniform market standard. The Komax Group cultivates regular exchange of ideas, and benefits from the transfer of expertise between the partners.

Smart Cabinet Building Initiative – comprehensive solutions for control cabinet construction

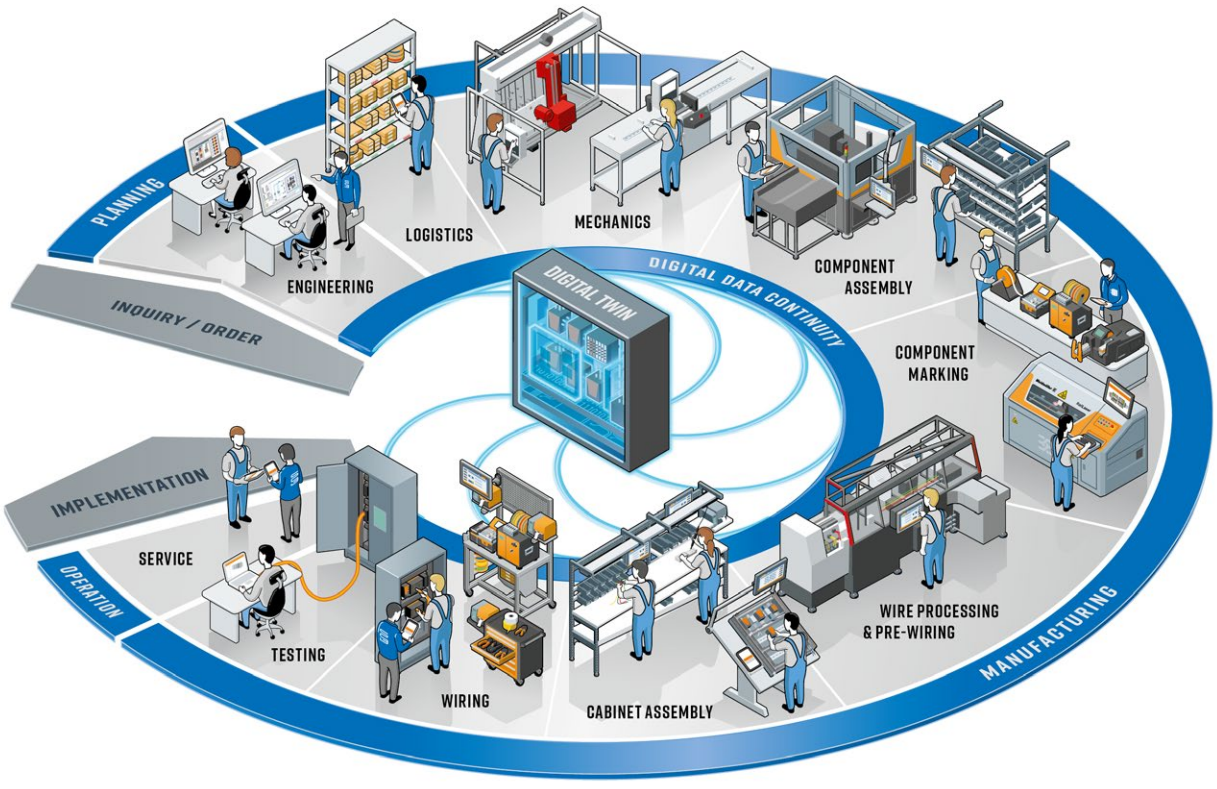
In the industrial market segment, the Komax Group is active in the control cabinet construction area, among others. Up until now, control cabinets have typically been constructed manually and step by step, as one-off constructions. But there is a great deal of automation potential in this area. To be able to tap into this potential to maximum effect, the Komax Group and three other leading technology companies – Armbruster Engineering, Weidmüller, and Zuken – launched the Smart Cabinet Building Initiative in 2020. They were then joined by nVent Hoffman in 2021 (www.smart-cabinet-building.com).

The aim of this initiative is to use the networking of technology and expertise across all process steps to deliver comprehensive solutions for control cabinet construction. This would enable working stages that have so far taken place chronologically to be executed in parallel, thereby saving both time and costs. The five partners cover the complete spectrum – from engineering, including the creation of a "digital twin", through to component selection, the pre-assembly of wire harnesses, operating resources and housings, and assisted final assembly.

In order for the individual process steps to be interconnected, a full digital description of the control cabinet and its components is crucial. This involves the creation of a digital twin, which is used to control the various process steps and permits the efficient parallelization of work on the control cabinet, while at the same time making it possible to exploit the full optimization potential. The systematic collaboration that characterizes the Smart Cabinet Building Initiative allows the digital twin to be deployed to maximum effect. The Komax Group and its partners will be further increasing automation and therefore efficiency levels in the control cabinet construction area going forward. This will enable customers to remain productive despite the shortage of skilled labor.

In 2022, the partners jointly presented the progress made at the Hanover Fair in Germany and at WirePro Expo in Dierikon, Switzerland. Customers were impressed by the thoroughness of the concept.

THE AREAS OF EXPERTISE OF THE FIVE PARTNERS COMPLEMENT EACH OTHER TO PERFECT EFFECT, AND COVER ALL THE PROCESS STEPS IN CONTROL CABINET CONSTRUCTION.



EXAMPLES OF CURRENT INNOVATIONS

Thanks to its targeted investment in research and development, the Komax Group succeeds in bringing a variety of new products, product enhancements, and services to market every year. The Komax Group demonstrated its technology leadership impressively in 2022.

Zeta 620 for control cabinet construction
With the Zeta 620, a fully automatic wire processing machine, Komax launched a product in 2022 that makes it easier for cabinet constructors to get started with the automation of wire processing, and is therefore very much in harmony with the Smart Cabinet Building Initiative. In the smallest of spaces, this wire processing machine produces complete parts lists, and sorts and labels the wires so that they then only need to be laid in the control cabinet. Without any change being required, it can process up to 24 wire types in any order with a cross-section of between 0.5 and 6.0 mm², with up to seven different ferrules. The available module options simplify the production process and deliver clear savings in terms of both time and costs. With the Zeta 620, even smaller control cabinet constructors can make the transition to automation cost-effectively.

Omega 840/850 – first automatic insertion machine for twisted-pair wires
Twisted-pair wires are a major challenge for automatic wire assembly, as two ends must be aligned at a small distance apart from one another and then inserted into the connector housing. As things stand, the great majority of partial wire harnesses in vehicles are fitted with these twisted wires, and this proportion is on the rise. They now account for up to 40% of the entire wire harness, as an increasing number of sensors and actuators need to be incorporated that rely on these wires. This increases the amount of manual production work, while at the same time increasing susceptibility to operator error. With the new Omega 840/850, wire harnesses can for the first time be assembled fully automatically with almost any combination of single and twisted wires. Customers therefore bring down their costs, increase product quality, and reduce the amount of testing and correction work that would be required with manual assembly.

Lambda X – greater flexibility and lower space requirement
In October 2022, Komax unveiled its new Lambda X generation of transfer lines. This machine is a modular platform for the semi-and fully-automatic wire processing of data lines. Wires can be fitted on either one or both sides. The modular set-up of hardware and machine control is conducive to efficient and intuitive operation. Single production modules can be individually added by the customer, which in turn facilitates great flexibility. The Lambda X is therefore only as large as the customer requires. This allows for a space saving of up to 45% compared to the predecessor generation as well as competitor products. What's more, the Lambda X can be expanded after its initial commissioning at the customer's factory, and the degree of automation can be further increased.

Schleuniger Transfer Line Family S70

Schleuniger has unveiled a number of innovative transfer machines in recent years. Indeed, with its Transfer Line Family S50 it has simultaneously won two prestigious design prizes: the iF Design Award in the “Industry/Tools” category, and the German Design Award in the “Excellent Product Design – Industry” category. The Transfer Line Family S70, a modular platform for high-voltage applications, likewise scooped a number of awards in 2022, including the most significant technology prize in Switzerland – the Swiss Technology Award in the “Industry Innovation” category.

New Rotar 500 taping machine for highly complex wire harnesses

With the new Rotar 500 series, wire harnesses can be efficiently processed for vehicle doors, mirrors, or batteries. The process of taping – i. e., the administering of adhesive tape – protects and orders the individual wire bundles and reduces the noise emissions of loose wires. The program controlling of the Rotar 500 guarantees reproducible quality. Thanks to the new design, the handling time can be reduced significantly compared to competitor products. What’s more, automated taping using the Rotar 500 series reduces the consumption of adhesive tape by up to 25% compared to manual taping. The installation is compatible with MES (Manufacturing Execution System), and can therefore be seamlessly integrated into the value chain of automatic wire processing.

Strip Series B300 – new benchtop stripping machine

In 2022, the Schleuniger Group launched its Strip Series B300 – a new class of portable, programmable benchtop stripping machines. When developing this machine, which weighs in at just 11 kg, the focus was on ergonomic superiority and simplicity of use, as these aspects have clear repercussions for productivity. The front cover is slanted at an ergonomic angle and ensures a good line of sight for feeding in the wire. A clear, high-resolution, five-inch color touchscreen is combined with guided menu navigation for immediate, intuitive handling. The B300 is therefore easy to operate even without programming knowledge, and permits the rapid and reliable stripping of wires with cross-sections of 0.03–8.0 mm^2.

The Komax Group is continuously driving forward innovations. At the WirePro Expo trade fair in October 2022, which was held at the company’s headquarters in Switzerland, a specialist audience was shown numerous new developments. Customers of the Komax Group will be able to benefit from a range of further new products this year and in the coming years.