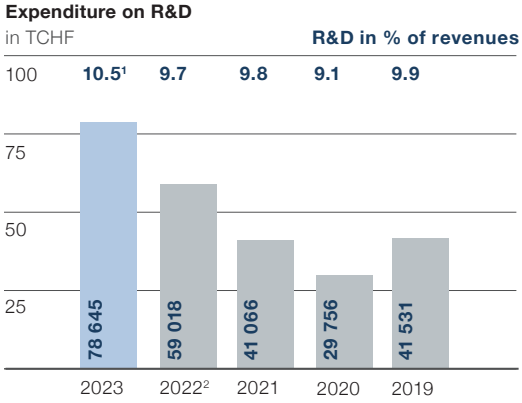
MARKET-LEADING INNOVATIVE STRENGTH

As the market leader in automated wire processing, the Komax Group possesses unparalleled innovative strength in the industry. Continuously bringing innovations to the market and thus helping its customers gain genuine competitive advantages is of paramount strategic importance. For that reason, the Komax Group channels some 8–9% of its revenues into research & development every year.

10.5%
of 2023 revenues invested in research and development

There is enormous growth potential for the Komax Group in the markets for automated wire processing (› page 24). Long-term megatrends such as e-mobility and autonomous driving along with growth drivers such as miniaturization, rising wage costs, and a shortage of specialist personnel offer numerous opportunities. What's more, the further automation of processes along the value chain and of digital services can significantly improve the efficiency of the machinery bases customers already have installed.

Expenditure on R&D



[1] Excluding one-time effect on renenues.
[2] 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.

In order to exploit these opportunities and offer its customers innovative solutions on an ongoing basis, the Komax Group has for many years been investing above-average sums in new developments, the optimization of the existing portfolio, and the expansion of its service spectrum. It has channeled CHF 250.0 million into this activity since 2019, thereby cementing its leading position in the automation of wire processing and helping to actively shape the radical transition in its key market, the automotive industry. In 2023, the Komax Group invested a total of CHF 78.6 million or 10.5%[1] (2022: CHF 59.0 million or 9.7%) of revenues in research and development. This amount comprises both investment in internal development services (CHF 67.4 million) and in the development services of third parties (CHF 11.2 million). As a consequence of the combination of Komax and Schleuniger and the commitment to driving forward various innovation projects, more than the targeted 8–9% of revenues was invested in research and development in 2023. These are crucial upstream investments that will allow the Komax Group to leverage additional unique selling propositions and secure competitiveness. The innovative output of the Komax Group was recognized in the form of multiple awards in 2023.

2023 AWARDS FOR INNOVATION

Komax Group wins Swiss Manufacturing Award 2023
Since 2019, the Institute of Technology Management of the University of St.Gallen has recognized the innovative achievement of a successful industrial company in Switzerland each year with the Swiss Manufacturing Award. In 2023, the Komax Group was selected from a large number of candidates.

Komax Group recognized as one of the most innovative companies in Switzerland
In conjunction with the market research company Statista, in September 2023 the Swiss business magazines Bilanz and PME ranked the Komax Group as one of the 30 most innovative companies in Switzerland.

Zeta 620 wins the SBB Innovation Award 2023
The magazine SCHALTSCHRANKBAU gave its Innovation Award to the Zeta 620 wire assembly machine in March 2023. The decision was made by an independent jury consisting of representatives of the control cabinet construction business, teaching and research, and the trade press.

B340 strip series takes podium place at productronica
In November 2023, Schleuniger's B340 stripping machine series was ranked in third place for the 2023 productronica innovation award at productronica in Munich, the leading European trade fair for automation.

724
employees in R&D and engineering

Unparalleled innovative strength

As at 31 December 2023, the Komax Group had a workforce of 368 employees (2022: 360 employees) working in research and development, the majority of whom (220 employees) were based in Switzerland. The lion's share of R&D expenditure is therefore incurred in this country. In addition, the Komax Group has development units in Belgium, China, Germany, France, Japan, Singapore, Hungary, and the US. There are also 356 engineers (2022: 353) 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.

The Komax Group continues to seek to invest 8–9% of revenues in research and development. Since the combination of Komax and Schleuniger, it enjoys even greater innovative strength. This enables market opportunities to be better exploited, while customers can be provided with innovative solutions for their needs more swiftly.

"Together with Schleuniger we possess a degree of innovative strength that is unique in the market, which we use to support our customers with new products and services to facilitate the ongoing increase in the level of automation."

Matijas Meyer, CEO Komax Group

Bundling of skills and overhaul of product portfolio

As part of the integration of the Schleuniger Group into the Komax Group, the heavily expanded product portfolio as well as all development projects were subjected to analysis in the reporting year. This focused on areas where there is overlap and how the different skills of both companies can be optimally exploited. Moreover, progress already made in ongoing projects was amalgamated in 2023. The key strategic objectives of Komax and Schleuniger are now the further bundling of skills and resources in research and development, as well as the overhaul and optimization of the product portfolio.

For example, the analysis revealed some overlap in the area of smaller benchtop cutting and stripping machinery. The Schleuniger Group has traditionally been strong in this area, but Komax, too, has a competitive market offering with its Mira range. In keeping with a "best of both worlds" strategy, only the products that best meet requirements will be continued in the future. Innovations contained in the other machines will likewise be taken over to ensure that the entire body of expertise of Schleuniger and Komax is incorporated into future generations of benchtop machinery. Another example is the fast-growing high-voltage area, where the Komax Group pursues a similar strategy and is merging product groups to create new and even better solutions.

Integration processes of this kind will have the effect of improving innovative strength and efficiency significantly, while at the same time freeing up capacity. The competitiveness of the Komax Group will be elevated to a new level in the longer term. This will enable the company to offer technologically leading products and services on an ongoing basis, increase the efficiency and reliability of customer processes, and thereby create additional competitive advantages for these customers.

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 (› page 49).

Greater productivity and flexibility for customers

When developing new products and services, the Komax Group focuses on the optimization of various value chains. With its solutions, the Komax Group can increase the degree of automation of its customers, which in turn has the effect of increasing their productivity and flexibility, while at the same time maintaining quality at the first go.

Actively driving forward industry trends

As the technology leader in automated wire processing, the Komax Group strives to actively shape key developments in its three market segments and thereby advance automation further. To this end, it partners with other leading companies in various organizations and initiatives.

Next2OEM – development of a digitalized, automatic value chain

The range of functions available in modern vehicles is continually expanding: driver assistance systems, comfort functions, infotainment packages, and new powertrains are well-known examples of this. What this in turn means for the wire harness is an increase in weight, cost, and complexity. The share of work undertaken manually in the production of wire harnesses stands at more than 80%, hence production is only commercially viable in low-wage countries, which means long transport routes. An additional complication here is the rise in supply chain uncertainties. Safeguarding these rather unsustainable value chains is a further challenge for automotive manufacturers. ›

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.

More information on the SMART FACTORY by KOMAX can be found in this video:
komaxgroup.com/en/expertise/smart-factory

In all five components, the Komax Group is working continuously on implementing the vision of the SMART FACTORY by KOMAX. After the first steps were taken in previous years, 2023 then saw further developments in all areas:

Operator influence in wire processing must be kept to a minimum if the goal is to achieve the ultimate in precision and process quality. For example, in addition to the development of fully automatic tooling change systems (Alpha 650), the new Sigma 438 twisting machine allows UTP wires to be produced in sequence. A variety of different wire bundles can be produced successively with no tooling changes, which significantly reduces manual changeover times, particularly in the case of small batches. Pre-assembly stages such as the taping of the wires and the assembly of fixing clips can likewise be automated with the use of robots.

Software plays a crucial role in the improvement of productivity and quality in wire processing. The MES solutions 4Wire CAO (cutting area optimization) and 4Wire Px from DiIT were specially developed for the wire-processing industry. These control and optimize complex assembly processes in customer cutting areas, thereby improving OEE (overall equipment effectiveness). Moreover, they can be easily integrated into existing IT infrastructures through variable interfaces. When these are combined with Komax Connect, customers can further increase productivity on the basis of comprehensive real-time information.

With the launch of its new website (www.komaxgroup.com), the Komax Group laid the basis in the previous year for its 24/7 online service offering in the form of a self-service platform. A further milestone was reached in 2023 with the online service ticketing system on the new “myKomax” customer portal. This offers greater transparency, accelerates processing times of orders and inquiries, and helps to further increase customer satisfaction. A pilot phase is currently underway with a few customers.

The Komax Group offers not just machinery and software but also holistic solution concepts. In addition to the machines themselves, new value creation packages encompass service agreements for individual machines or entire production sites, technical support, training, and financing offers such as leasing or pay-per-use concepts. In addition, the digital platform of the firm WUSTEC, which was acquired in 2023, enables companies active in control cabinet and machine building to order prefabricated wire sets in any quantity online. In this way, the Komax Group offers convenient solutions for all customer requirements.

For customers of the Komax Group, documenting production and quality information seamlessly is becoming ever more important. With the software solutions 4Wire Px, 4Wire CAO, and Komax Connect, comprehensive product data can be captured, stored, and analyzed in order to guarantee complete traceability at all times, which is of huge assistance in quality audits. The Komax Group’s broad spectrum of quality solutions and the multitude of data that these generate form the basis for real-time quality audits.

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, it is raising the quality, productivity, and flexibility of wire processing to a new level. This helps to open up optimization potential and minimize risks. Together with its customers, the Komax Group works intensively on making life simpler, more convenient, and safer.

SOLUTIONS TO INCREASE PRODUCTIVITY AND FLEXIBILITY IN DIFFERENT VALUE CHAINS

Batch production with IQC Technology

With crimping machines, changing crimp applicator, terminal, and contacts for a new order is time-consuming. The revolutionary IQC technology massively simplifies and accelerates set-up and changeover. The error rate drops drastically, while productivity increases by up to 50%.

Sequence production of different wire harness variants

Using a one-piece flow approach, different wire harness variants can be produced sequentially on the same machine without any changeover, which facilitates lower inventories, more rapid delivery times, and simple design alterations, with all the key steps in wire harness production optimized.

Data wire – processing solutions

Data wires are playing an increasingly important role in vehicles, given the focus on driving safety. This being the case, ensuring a high quality in wire processing is also extremely important. Thanks to its innovative solutions, the Komax Group offers the quality that is needed, at the first go – with a minimized level of material waste.

Scalable platforms for high-voltage applications

The Komax Group develops scalable platforms (including the Lambda series) to meet the rising demand for high-voltage applications in e-mobility and the non-automotive area. These cover all key process steps from cutting to testing, and can service high production volumes.

High mix – low volume: variable solutions for small batches

The Komax Group's broad product portfolio offers cost-efficient automation solutions for high-quality production of multiple-variant applications in small batches. This is part and parcel of the day-to-day work of small and mid-sized wire harness manufacturers, in particular.

Digital solutions for control cabinet construction

Digital, fully automated workflow systems cut production times by up to 80% for customers in the industrial segment. This results in a substantial reduction in costs and an increase in efficiency. Just as valuable is WUSTEC's service for the external production of wire sets.

Production planning – software solutions for all customer needs that steer processes in all areas of production, from cutting to testing.

Service – comprehensive service offerings such as Komax Care and Komax Connect help to create added value across the entire life cycle of the machines.

› The Next2OEM project, which was sponsored by BMWK (German Federal Ministry for Economic Affairs and Climate Action, economic package 35c, www.bmwk.de) on the basis of a resolution by the German parliament, is now developing a digitalized and automated value chain, extending from the development of the wire harness and its production through to assembly in the vehicle bodywork. The aim here is to promote "nearshoring", i.e. the repatriation of wire harness production back to Germany. As part of this project, the Komax Group has been working since 2023 with Audi and a number of other partners, namely Artiminds, Bär, Kostal, Kromberg & Schubert, Semantic PDM, Stefani, TE Connectivity, and the Friedrich Alexander University of Erlangen-Nuremberg. The project is designed to show how a high level of automation can master the various challenges, increase quality at a low cost, and design value chains in a more sustainable way.

VWS4LS – making wire harness production fit for the future

Another project sponsored by the BMWK on the basis of a resolution of the German parliament is the so-called asset administration shell for the wire harness (VWS4LS). The Komax Group in Germany has been collaborating since 2021 with its partners Coroplast, Dräxlmaier, Festo, Kostal Kontaktsysteme, Kromberg & Schubert, Kuka, Mercedes-Benz, Siemens, and Wezag on this project. VWS4LS implements the administration

shell as a digital twin across the entire product life cycle of the wire harness in a vehicle – from cross-company collaborative development through to final removal. Among other things, this results in an OPC UA Companion Specification, which creates a standardized interface for the wire processing industry. This is designed to facilitate the communication of machines with a manufacturing execution system (MES) and thereby simplify the interaction of various production processes. In a first step, the partners agreed on standardized cutting room processes. In the future, a shared digital twin will be created to allow all sorts of different machines to be operated with standardized digital processes.

ARENA2036

ARENA 2036 – zonal architecture for the wire harness

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. 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.

In ARENA2036 (www.arena2036.de), various interdisciplinary teams are researching how automotive production might work in the future. As part of the wire harness standardization initiative, the Komax Group is working with leading-name automotive manufacturers and their suppliers to draw up design guidelines for wire harnesses that lend themselves easily to automation. The goal is to enshrine these design guidelines in a newly created DIN norm together with Germany's Automotive Industry Association (VDA). These recommendations should help automotive manufacturers to develop wire harnesses that can be assembled in a highly automated, process-secure, and commercially viable way.

Digitalization with Industry 4.0 and the Industrial Ethernet of Things

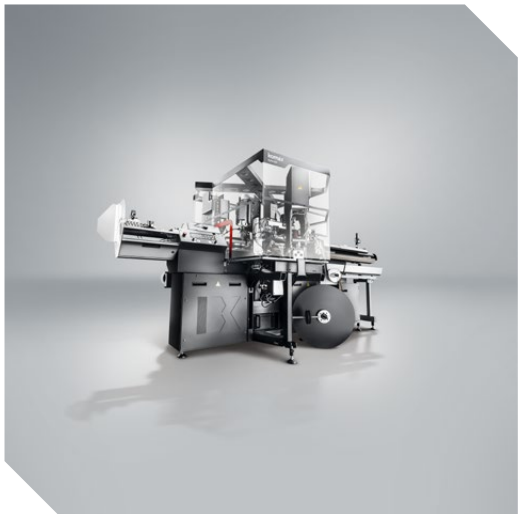
In the Open Industry 4.0 Alliance, the Single Pair Ethernet System Alliance, and the SPE Industrial Partner Network, the Komax Group is driving forward digitalization together with renowned partners from various sectors. The Open Industry 4.0 Alliance works in a specifically targeted way on a framework for communication between different machines. This could see the likes of digital interfaces and remote monitoring feed through into the development of new solutions for the Komax Group, which is particularly important for the SMART FACTORY by KOMAX. Single Pair Ethernet (SPE) is the infrastructure basis that facilitates the Industrial Ethernet of Things and Industry 4.0. Together with its partners, the Komax Group wants to promote SPE technology and create a common market standard. To this end, it cultivates a lively exchange of views and benefits from the transfer of expertise.

Smart Cabinet Building Initiative – comprehensive solutions for control cabinet construction

In the Industrial & Infrastructure market segment, the Komax Group is active in the control cabinet construction area, among others. There is plenty of automation potential here, which the Komax Group – together with four other technology companies, namely Armbruster Engineering, nVent Hoffman, Weidmüller, and Zuken – is keen to exploit through the Smart Cabinet Building Initiative (www.smart-cabinet-building.com). The aim of this initiative is to network 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 Komax Group and its partners will further increase automation and therefore the efficiency of control cabinet construction so that customers can remain productive despite the shortage of skilled personnel.

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. It demonstrated its technological leadership in 2023, unveiling numerous new products at various trade fairs (› page 35).



Alpha 520 – a crimp-to-crimp machine optimized for high-mix production

The Komax Group presented its fully automatic Alpha 520 wire processing machine directly to customers right across the US as part of its Komax Roadshow 2023. This machine is optimized for high-mix production, and its pronounced flexibility makes it ideally suited to customers who produce a variety of batch sizes with a wide spectrum of wire lengths, cross-sections, and end designs. The simple setup and changeover process guarantees economically viable production even with small batches. Integrated monitoring and verification functions improve productivity and simplify operation. Even non-standardized modules can be integrated without impairing the underlying software structure, which allows for further standard software upgrades.

Lambda 141 – compact, high-quality processing of high-voltage cables

With the Lambda 141 the Komax Group has expanded its portfolio for the high-voltage sphere with a compact and multifaceted machine at entry level. It features quick-change tooling and three cable processing modules with an integrated cleaning unit, and can execute tasks such as cutting, shield folding, and rotary stripping of insulation. At around 20 seconds, the production time per wire is very low. Operating the Lambda 141 is simple and involves a 10-inch touchscreen. Its MES interface allows seamless integration into manufacturing systems, while the swift tooling changeover ensures minimal downtime and flexibility of production. The Lambda 141 therefore delivers decisive added value for customers in the high-voltage area.

Sigma 688 LTT – perfect twisting of even the smallest wire cross-sections

The twisting of pairs of wires, e.g. for vehicle sensors and infotainment, is the simplest, most cost-effective way of reducing electromagnetic interference. In order to save weight, wires are becoming ever thinner. With the new Sigma 688 LTT (low torsion twisting), the Komax Group introduced a new automatic machine in 2023 that can perfectly twist two individual wires with small cross-sections measuring as little as 0.13 mm² to create unshielded twisted pairs (UTP). The Sigma 688 LTT features an innovative reverse torque unit, whereby small grippers at the respective wire end reverse the rotation that occurs in the individual wire during twisting. The result is a compactly twisted wire with exceptionally stable geometric properties that customers can produce at a consistently high level of quality.

New cutting and stripping machine series E300/E400

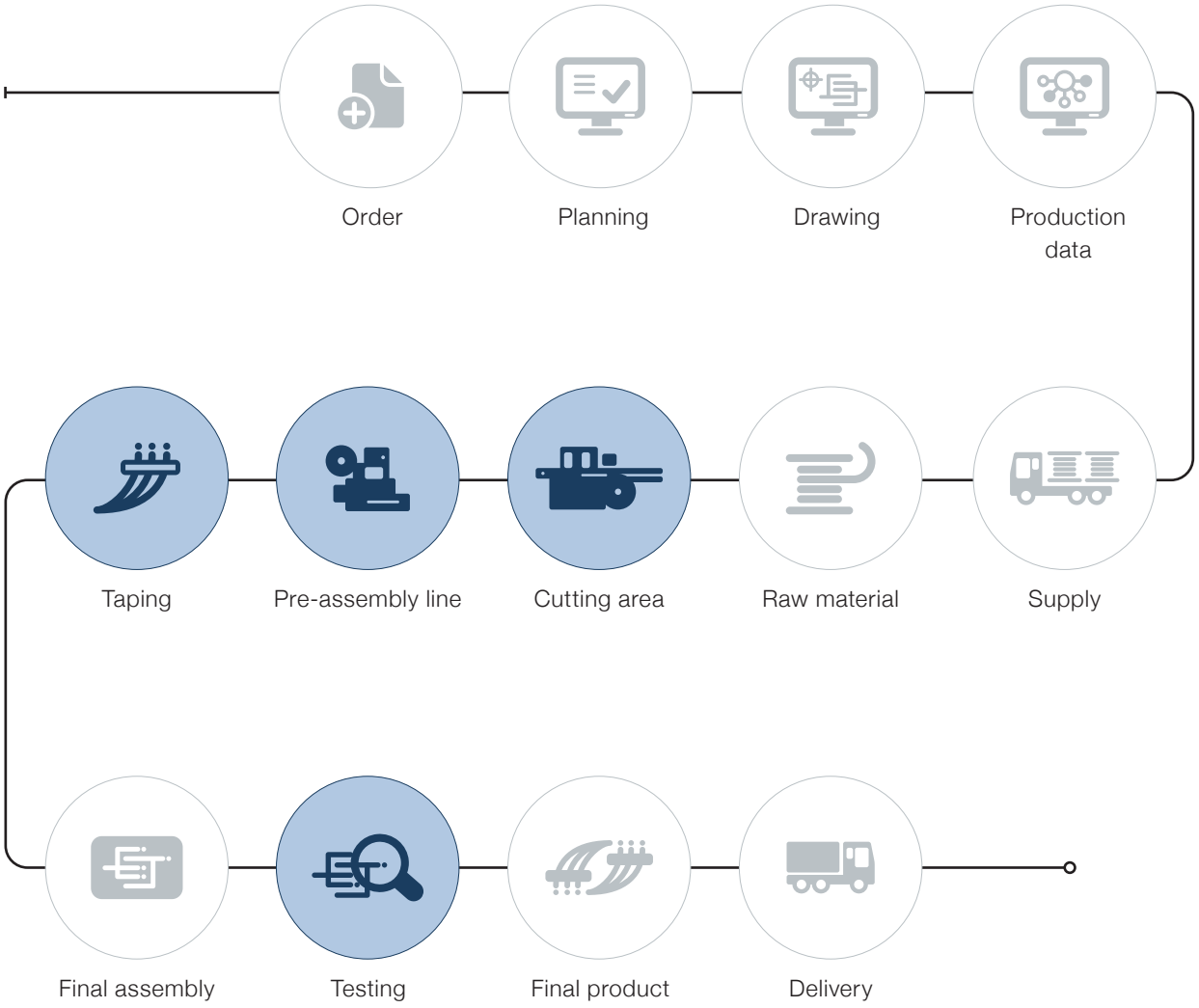
In 2023, Schleuniger introduced a new generation of cutting and stripping machines for smaller wire diameters with its E300 and E400 series. The E300 processes diameters of 0.3 mm up to 8.0 mm, while the E400 works with diameters up to 12.5 mm. Both machines can be used in all sorts of ways – such as with industrial applications, control cabinets, household devices, in the automotive and aviation industries, telecommunications, and consumer electronics. Operation is intuitive and involves a 10-inch touchscreen interface. What's more, the setup process is short thanks to pre-set standard values for the most common wire types. The actively guided software support for eliminating errors minimizes downtime and increases process reliability. The Cut & Strip Family E300 and E400 process stranded wires, tubing, ribbon and multiconductor cables, and insulation such as PVC (polyvinylchloride), PUR (polyurethane), and Teflon in high-precision quality.

In the 2023 financial year, the Komax Group continuously rolled out innovations, presenting the numerous solutions of the Komax, Schleuniger, adaptronic, Cirris, DilT, and WUSTEC brands simultaneously in Munich, Nuremberg, and Grafenau. Customers of the Komax Group will be able to benefit from this increase in innovative strength with further new products over the coming years.

SOLUTIONS ALONG THE VALUE CHAIN

The majority of customers of the Komax Group are wire harness manufacturers whose business consists of processing individual wires – predominantly by hand – into wire harnesses and delivering these to vehicle manufacturers (OEMs). The Komax Group offers its customers a wide range of solutions and systems for the automated and efficient processing of wires and for the taping and testing of wire harnesses. These are used in the cutting room, at the pre-assembly stage, and when taping and testing.

In addition, the Komax Group supports its customers throughout the value chain – from planning through to delivery – with its Manufacturing Execution System (MES) solutions. This software automates the planning, controlling, monitoring, and analysis of all resources and production processes. This has the effect of optimally deploying machines, materials, and employees, so that wire harnesses can be completed to deadline, as well as to the requisite quality.



● Komax Group automation solutions
— MES – Manufacturing Execution System