



# SIGMA 688

Fully automatic twisting  
machine

**komax**

## **SIGMA 688**

The impressive Sigma 688 offers all the benefits of the new generation of machines. It offers process security and stability for the fully automated production of twisted wires. Within the Sigma product family that also includes the Sigma 688 ST with a spot taping unit for the integrated taping of open wire ends, the same parts and assemblies are used wherever possible, which makes operator training and maintenance as well as spare parts logistics much easier.

With the same reliability as its predecessor, the Alpha 488 S, the Sigma 688 simultaneously twists two single wires into UTP wires (unshielded twisted pairs). Its modular structure, with up to six process modules, offers maximum flexibility.

# THE NEW GENERATION OF TWISTING MACHINES

RELIABLE AND PROVEN

### **Fully automatic twisting machine – a safe investment**

- Fully automatic UTP production by one person
- The proven technology of the Alpha 488 S has been developed further in the Sigma 688
- The tried-and-tested technology of the Sigma product family increases planning security

### **Reliable, innovative and flexible processes**

- Optimized quality assurance for consistently high OEM quality
- EtherCAT real-time technology ensures optimal processes
- Configuration of up to six process modules offers maximum flexibility

### **Simplification due to common parts within the product family**

- The common parts strategy and improved accessibility standardizes maintenance and spare parts logistics
- Optimized operation simplifies and shortens training and handling by the operator

▶ **Precise twisting of  
single wires with  
short lengths and  
short open ends.**



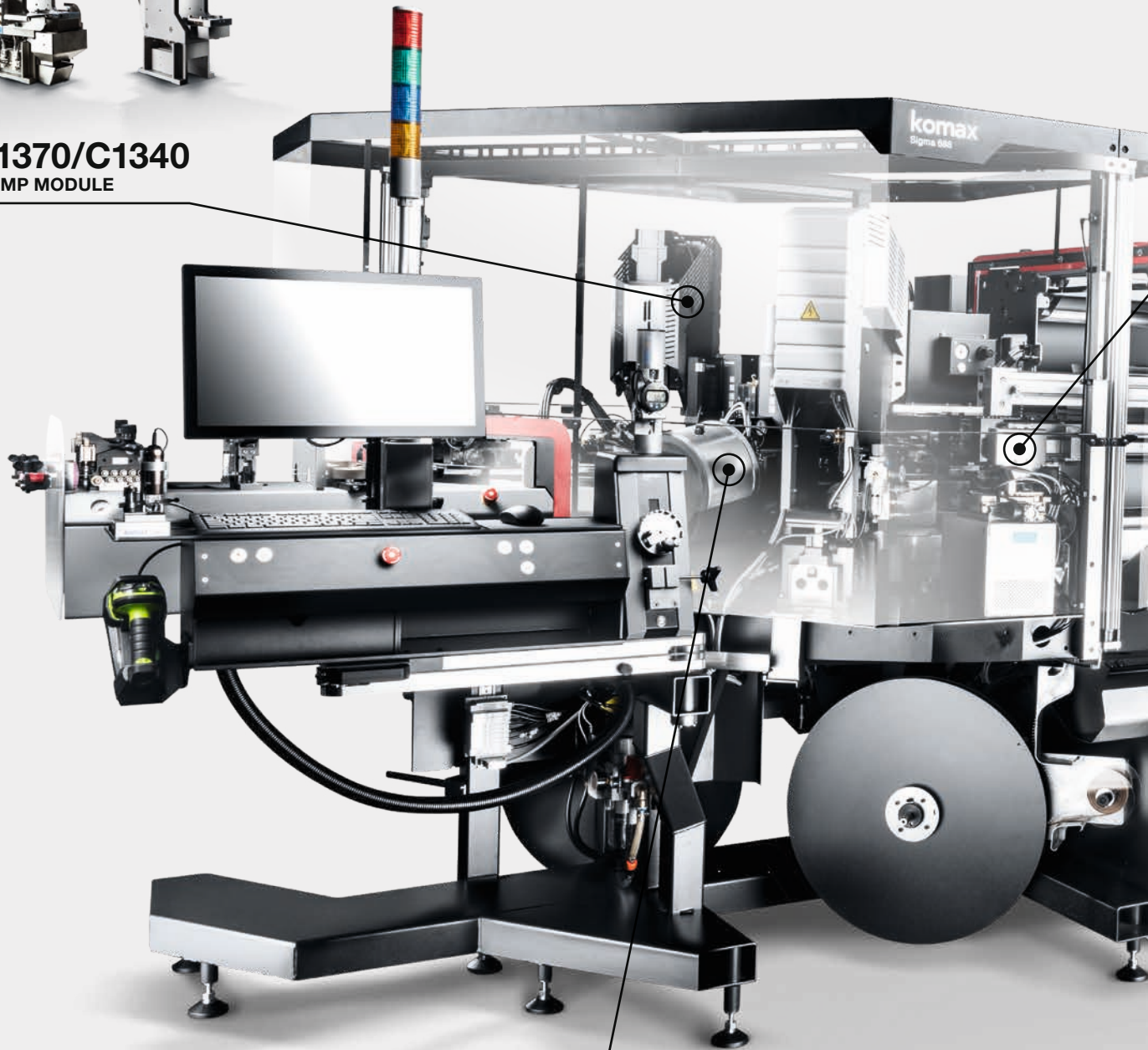


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**C1370/C1340**  
CRIMP MODULE

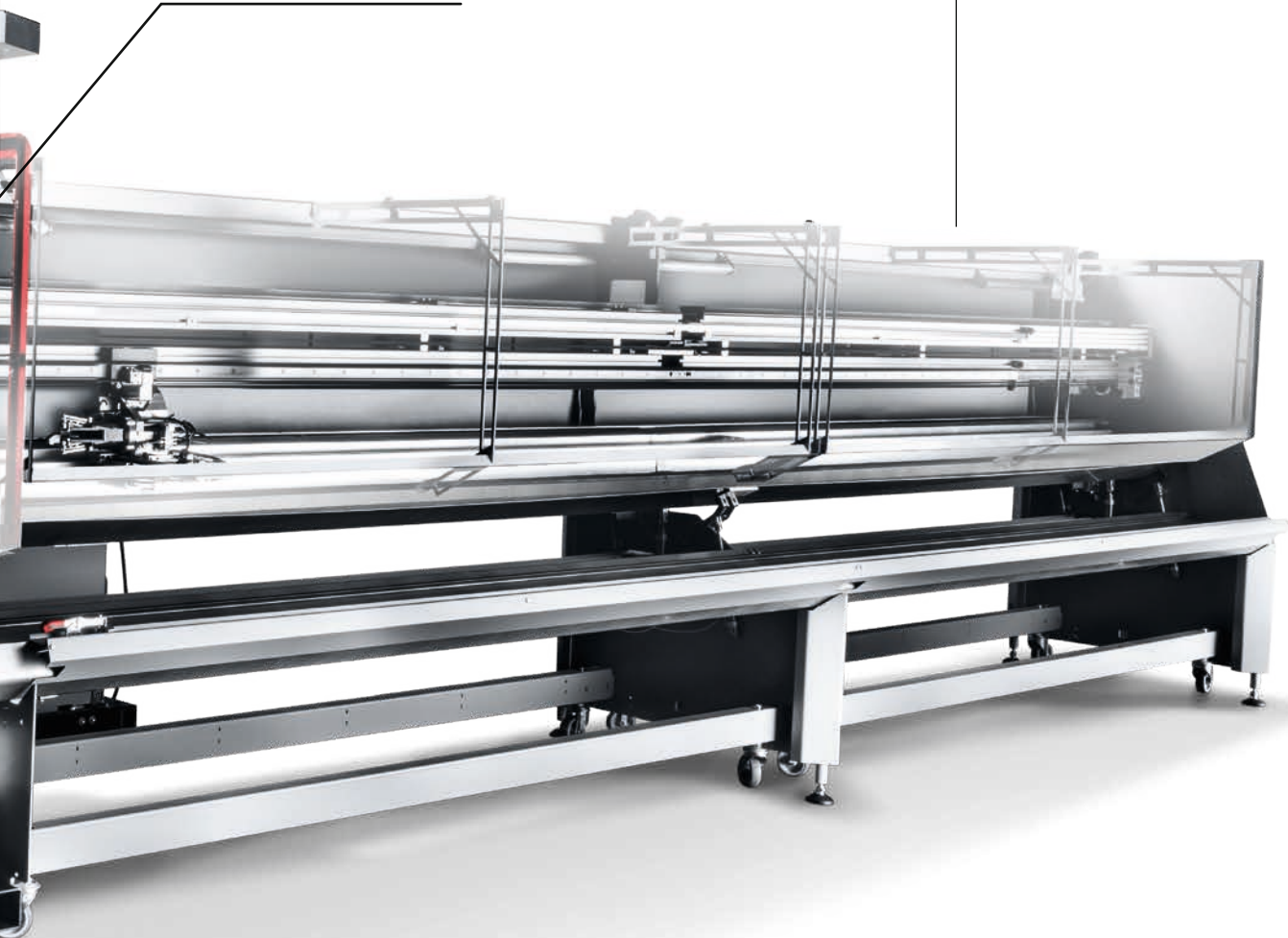


**S1441**  
SEAL MODULE



# HIGH PROCESS SECURITY AND STABILITY

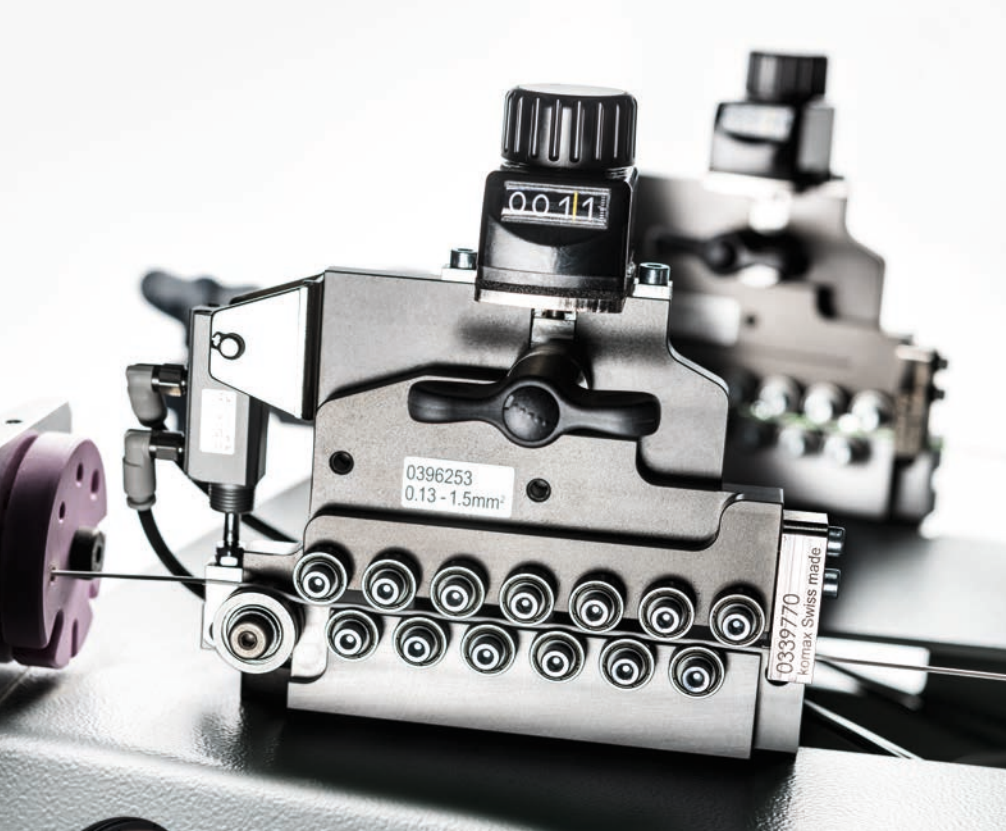
**X2880**  
TERMINAL  
PRE-ORIENTATION MODULE



**Quick and reliable setup directly on the crimp module.**

## **Sigma 688 – the latest generation, based on proven technology**

This latest generation fully automatic twisting machine allows the production of UTP wires for applications with high data transfer speeds (CANFD, CANXL, MOST, FlexRay or Automotive Ethernet). The tried-and-tested machine technology has already proved its value in the Sigma 688 ST. Thanks to fully automatic wire end processing, the Sigma 688 offers increased process security and stability. The latest generation EtherCAT modules guarantee optimal processes and maximum flexibility during processing. The two-hand operation, directly on the module, enables the efficient and fast setup of the crimp modules.



**Straightener unit pneumatic with wire diameter display recommended for: 0.13–1.5 mm<sup>2</sup>.**

### **Technology in the market leader's design**

The new product design of market leader Komax perfectly embodies the maximum functionality and innovative power of the Sigma 688. The twisting head with AC servo drive is the heart of the unit. The integrated twist force analyzer (TFA) guarantees uniform twisting by analyzing the forces exerted during twisting and regulating the subsequent adjustment movements of the twisting head. The wire pull-out unit with integrated delta length analyzer (DLA) guarantees gentle handling of the wires as well as high length accuracy and length symmetry. This machine's high output results from the parallel processing of the two conductors and a division of overall processing into two main processes, both optimally synchronized with each other.

### **Options included as standard**

Experiences gained from the predecessor Alpha 488 S and the Sigma 688 ST have influenced the design of the Sigma 688. Options have been incorporated into the standard machine, resulting in a cost saving. All grippers are therefore the halogen-free version as standard, meaning that the machine is also capable of handling demanding wires at any time. Depending on the application, the optional "short open ends" or "open ends standard" processing set can be selected. Options are also available for long and unequal length open ends, for short wire lengths and for small cross sections.

### **Sustainable OEM quality**

Quality monitoring systems like visual strip quality monitoring (Q1240) with optional control of the seal position or of defective items ensure OEM-compliant quality. The machine is designed for sustained use and delivers the required performance with a high level of reliability to safeguard production. Support by Komax is also guaranteed long term.

### **Benefits of the common parts strategy**

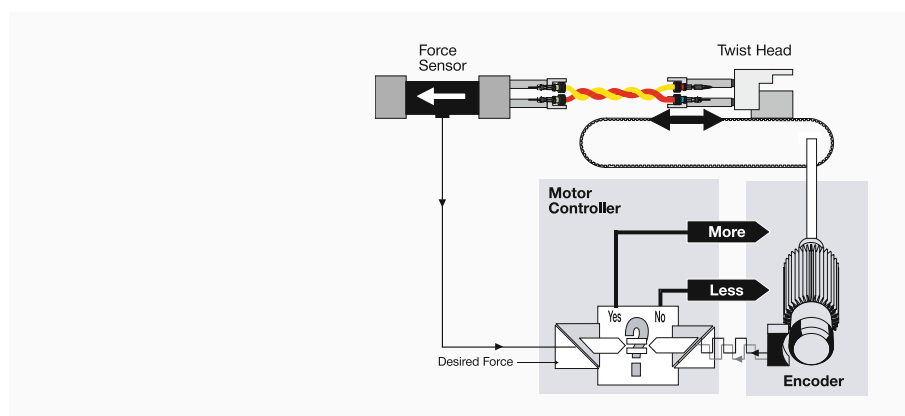
The identical software and hardware parts within the Sigma product family make the training of operators easier. This, in turn, shortens the training time. The common parts also include peripherals like printing systems, quality control modules, etc. This enables operators to feel more secure and familiar with the equipment, while allowing production managers flexibility in how they assign their employees. The

swiveling operator console with touch-screen is perfectly positioned for all processes and offers improved work ergonomics.

The graphical user interface helps operators to operate the machine quickly and safely using simple and fast data input.

### **Maintenance benefits**

The common parts strategy within the product family also simplifies spare parts logistics significantly. A single tool case per plant is sufficient for all Sigma machines. For set-up and maintenance work, all work stations are easily accessible through upward-opening hoods and covers. Advantages such as an oil-free compressed air supply and the consistent use of simplified hardware architecture keep maintenance costs and effort to a minimum.



**The integrated twist force analyzer (TFA) monitors forces during the twisting process.**



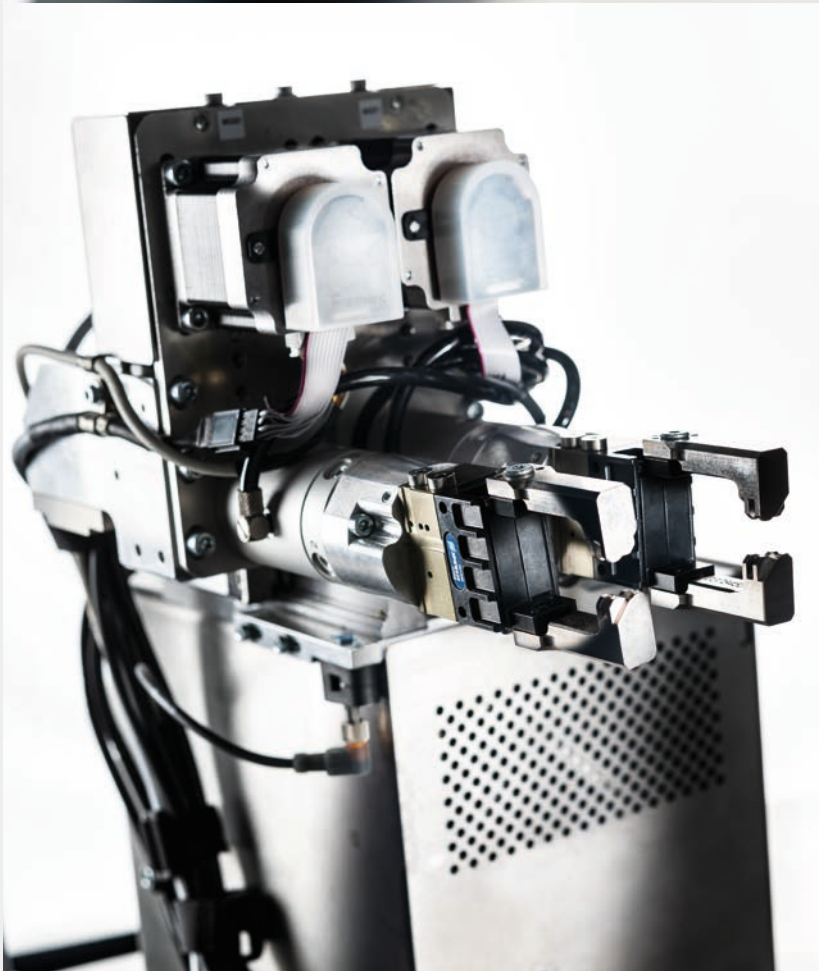


▲ Processing set short open ends.

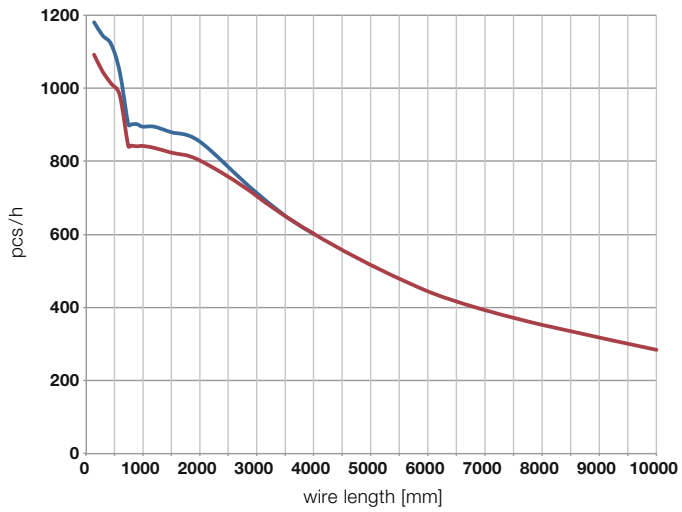
◀ Terminal pre-orientation module for simplified sequential block loading.

### Optimized insertion thanks to pre-orientation

For small cross sections up to 1.0 mm<sup>2</sup> and very short open ends, the optional terminal pre-orientation module X2880 can be used on one or both ends. This simplifies the subsequent block loading. The insertion process becomes faster and the risk of terminal damage is reduced, while fewer rejects and less post-processing lower costs.



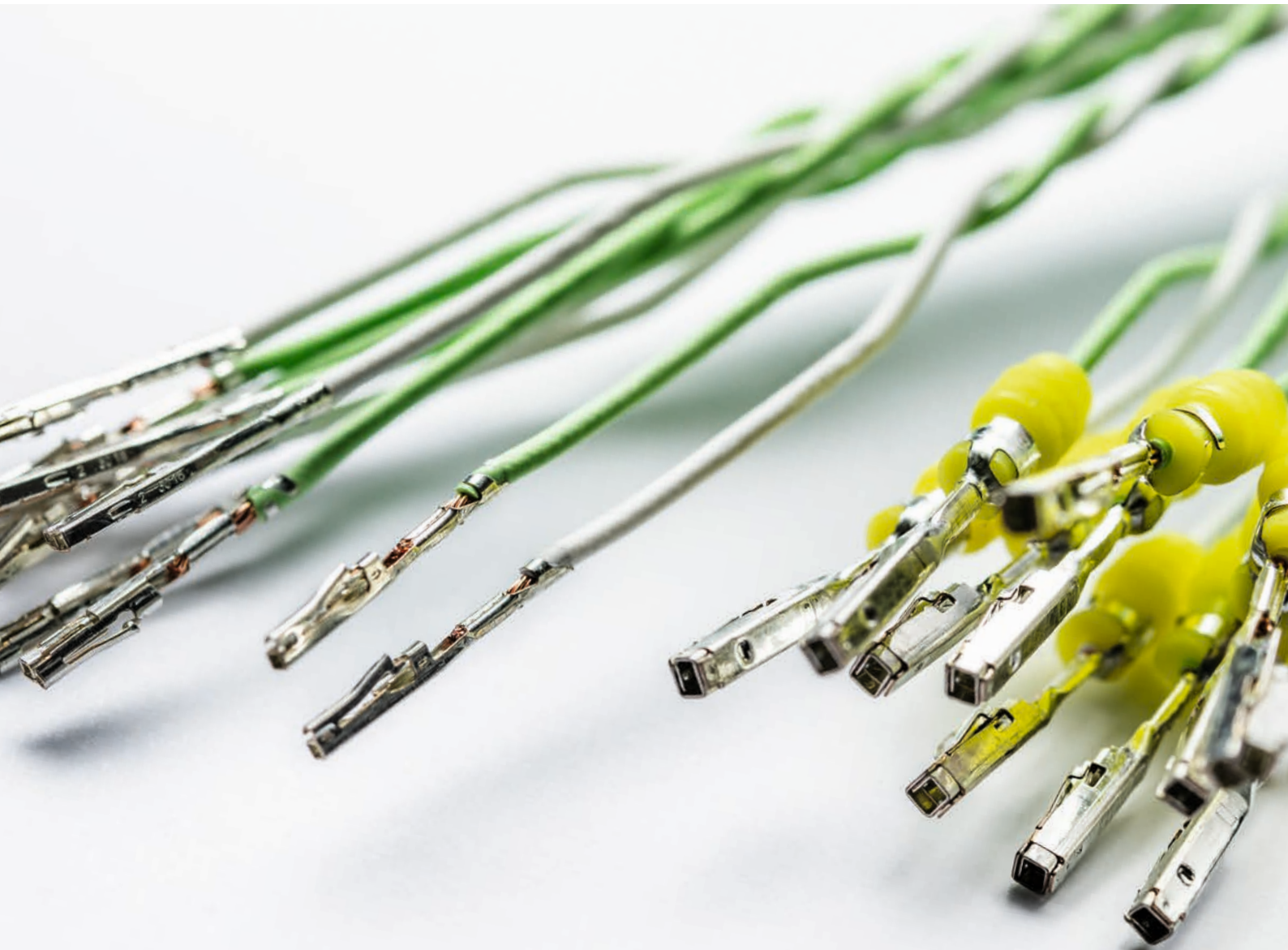
## Production output



Wires 2 × FLRY	0.35 mm <sup>2</sup> (AWG 22)
Pneumatic pressure	6 bar (87 psi)
Infeed speed	5 m/s (16.4 ft/s)
Pitch length	20 mm (0.8 in)
Open ends, side 1 and side 2	40 mm (1.6 in)
Crimp module	C1370
Seal module	S1441
Crimp force monitoring	Active
Q1240	Active
Processing set	Short open ends



The actual piece output may vary depending on the application and machine configuration.





## Machine layout

Sigma 688 / 4 m: 8516 mm (335.3 in)  
 Sigma 688 / 7 m: 11511 mm (453.2 in)  
 Sigma 688 / 10 m: 14856 mm (584.9 in)



Height with closed hood: 1985 mm (78.1 in)  
 Height with cover completely open (maximum opening): 2965 mm (116.7 in)

## Technical data

Length range	700 – 4,000 mm (27.6 – 157.5 in) 700 – 7,000 mm (27.6 – 275.6 in) 700 – 10,000 mm (27.6 – 393.7 in) Optional 150 mm (5.9 in) End length of twisted wires
Length accuracy	+/- (0.1% + 1 mm [0.04 in])
Strip lengths	Side 1: 0.1 – 18 mm (0.004 – 0.7 in) Side 2: 0.1 – 28 mm (0.004 – 1.1 in) with short open ends processing set Side 2: 0.1 – 28 mm (0.004 – 1.1 in) with open ends standard processing set
Wire cross-sections**	2 × 0.22 mm <sup>2</sup> – 2 × 1.0 mm <sup>2</sup> (AWG 24 – 17) with short open ends processing set 2 × 0.22 mm <sup>2</sup> – 2 × 2.5 mm <sup>2</sup> (AWG 24 – 14) with open ends standard processing set Optional with feasibility test from 0.13 mm <sup>2</sup> (AWG 26)
Open wire ends* (specifications without end processing)	15 – 99 mm (0.6 – 3.9 in) with short open ends processing set 30 – 99 mm (1.2 – 3.9 in) with open ends standard processing set 30 – 125 mm (1.2 – 4.9 in) with long and unequal length open ends processing set on side 1
Pitch length	5 – 80 mm (0.2 – 3.2 in) programmable Accuracy: ±10 %, max. ±5 mm (0.2 in)
Wire draw-in speed	max. 5 m/s (16.4 ft/s)
Noise level	< 80 dB (without crimp module)
Electrical connection	3 × 208 – 480 V / 50 – 60 Hz / 10 kVA
Compressed air connection	5 – 8 bar (73 – 116 psi)
Recommended operating pressure***	6 ± 0.5 bar (87 ± 7.25 psi)
Weight	including 2 crimp and 2 seal modules Sigma 688 / 4 m: approx. 2350 kg (5181 lb.) Sigma 688 / 7 m: approx. 2850 kg (6283 lb.) Sigma 688 / 10 m: approx. 3410 kg (7518 lb.)

\* Productible parameters depend on pitch, outer diameter and end processing. Productibility must be tested using the software producibility check or a feasibility test.

\*\* Certain extremely hard, tough wires may not be able to be processed even if they are within the indicated cross-section range. If in doubt, we are happy to provide you with samples of your wires.










\*\*\* Outside of the recommended operating pressure, the correct function of peripheral devices may be limited. Please also observe the technical data for peripheral devices. The maximum permitted operating pressure is determined by the ambient temperature: 6.5 bar up to 40 °C / 6 bar above 40 °C.



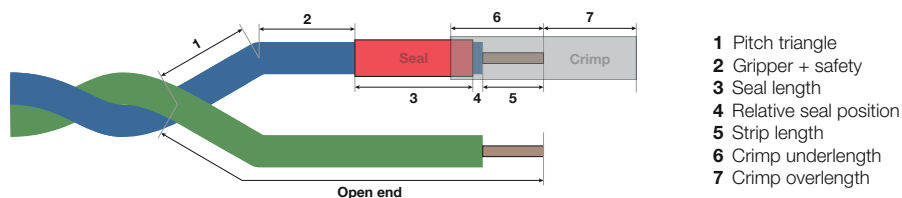
## Options and accessories

Automatic delivery systems	Komax 106
Marking systems	Komax inkjet marking systems M1630 Jet • Laser marking on request
Wire draw-in	Swirl brake • Straightener unit for 0.35–2.5 mm <sup>2</sup> • Straightener unit with wire diameter display • Straightener unit pneumatic with wire diameter display
Process modules	Crimp modules C1370/C1340 • Seal module S1441 • Terminal pre-orientation module X2880
Quality assurance	Integrated crimp height measurement K341 • Integrated pull-out force measurement Q1210 • Crimp force monitoring CFA/CFA+ • Q1240 (integrated in S1441 or standalone instead of S1441) • Material change detection • Material verification • Wire length correction • Splice detection • Microscope K345
Filing systems	Deposit cells 4 m (157.5 in) • 7 m (275.6 in) • 10 m (393.7 in)
Processing sets / options	Short lengths • Short open ends • Open ends standard • Long and unequal length open ends • Hold-up unit • Wire entry cover
Accessories	Tool case • Bar code scanner Zebra DS3678 • Printer tray • UPS • Software: WPCS networking interface • TopConvert data conversion • Producibility check

## Processing examples

Twisted pair (incl. with open wire ends of different lengths)		Seal insertion	
Cutting to length		Split cycle function for closed terminals	
Half stripping		Cutting pulled strands	
Full stripping		Inkjet marking	
Crimping			

## Composition of open end



### Example article: 2 × FLRY 0.35 mm<sup>2</sup> (AWG 22), pitch 13 mm, crimp nanoMQS

– Possible open ends of example article with short open ends processing set:

25.5–99 mm (1–3.9 in)

– Possible open ends of example article with open ends standard processing set:

44–99 mm (1.7–3.9 in)



THE SIGMA PRODUCT FAMILY

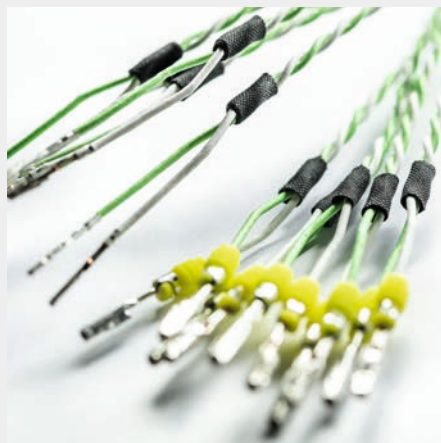
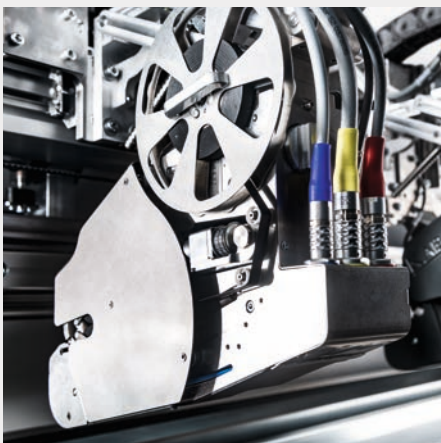
# SIGMA 688 ST

## FULLY AUTOMATIC TWISTING MACHINE WITH SPOT TAPING UNIT



### First fully automatic twisting machine with spot taping unit for integrated spot taping

The Sigma 688 ST enables a fully automated overall process from processing and twisting to spot taping the open wire ends. The UTP wires produced in this way fulfill the stipulated OEM quality requirements for spot-taped open wire ends. There are considerable benefits associated with this: reproducible high quality without the risk of untwisting in downstream operations and no additional transport to a manual spot taping station. Cost-effectiveness is improved thanks to the lower logistics costs as well as the reduced need for resources and floor space.



**It is not possible to retrofit a spot taping unit for spot taping to fix the open wire ends on the Sigma 688.**

## Komax – leading the field now and in the future

As a pioneer and market leader in the field of automated wire processing, Komax provides its customers with innovative and sustainable solutions for any situation that calls for precise contact connections. Komax manufactures series and customer-specific machinery for various industries, catering for every degree of automation and customization. Its range of quality tools, test systems, and intelligent networking solutions complete the portfolio, and ensure safe and efficient production. Komax is a globally active Swiss company with development and production facilities on several continents. Komax uses its extensive distribution and service network, which includes local companies and their employees, to support customers across the world on site, thus ensuring the availability and value of their investments after equipment commissioning through standardized service processes.



### Market segments

**Komax offers outstanding competence and solutions for various areas of application and draws on them to generate the desired value-added for the entire process and optimize economic efficiency in line with customer requirements. The main markets of Komax are as follows: automotive, aerospace, industrial and telecom & datacom. With this breadth of experience, customers obtain expert knowledge for process optimization and access to the latest technologies.**

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