



# SIGMA 688 ST

Fully automatic twisting machine  
with spot taping unit

**komax**

## SIGMA 688 ST

The Sigma 688 ST enables a fully automated overall process from processing and twisting to spot taping the open wire ends. It is the first automated solution to fulfill OEM quality requirements for UTP (unshielded twisted pairs) spot taped in the fully automatic twisting machine. Economically integrated and automated, it enables processing of two single wires (bulk goods) in a single step. At the same time, the modular system structure offers maximum flexibility with six stations for process modules as well as a twisting process and a spot taping unit consisting of two spot taping modules.

# FIRST FULLY AUTOMATIC TWISTING MACHINE WITH INTEGRATED SPOT TAPING

### Fully automated overall process

- Complete wire-end processing with high process security and stability
- Precise twisting of single wires with subsequent spot taping of the wire ends

### Simplified and secure logistics

- The logistics step from the machine to the manual spot taping station is omitted
- The spot-taped open wire ends are precisely maintained through downstream work processes

### Top performance and optimal quality

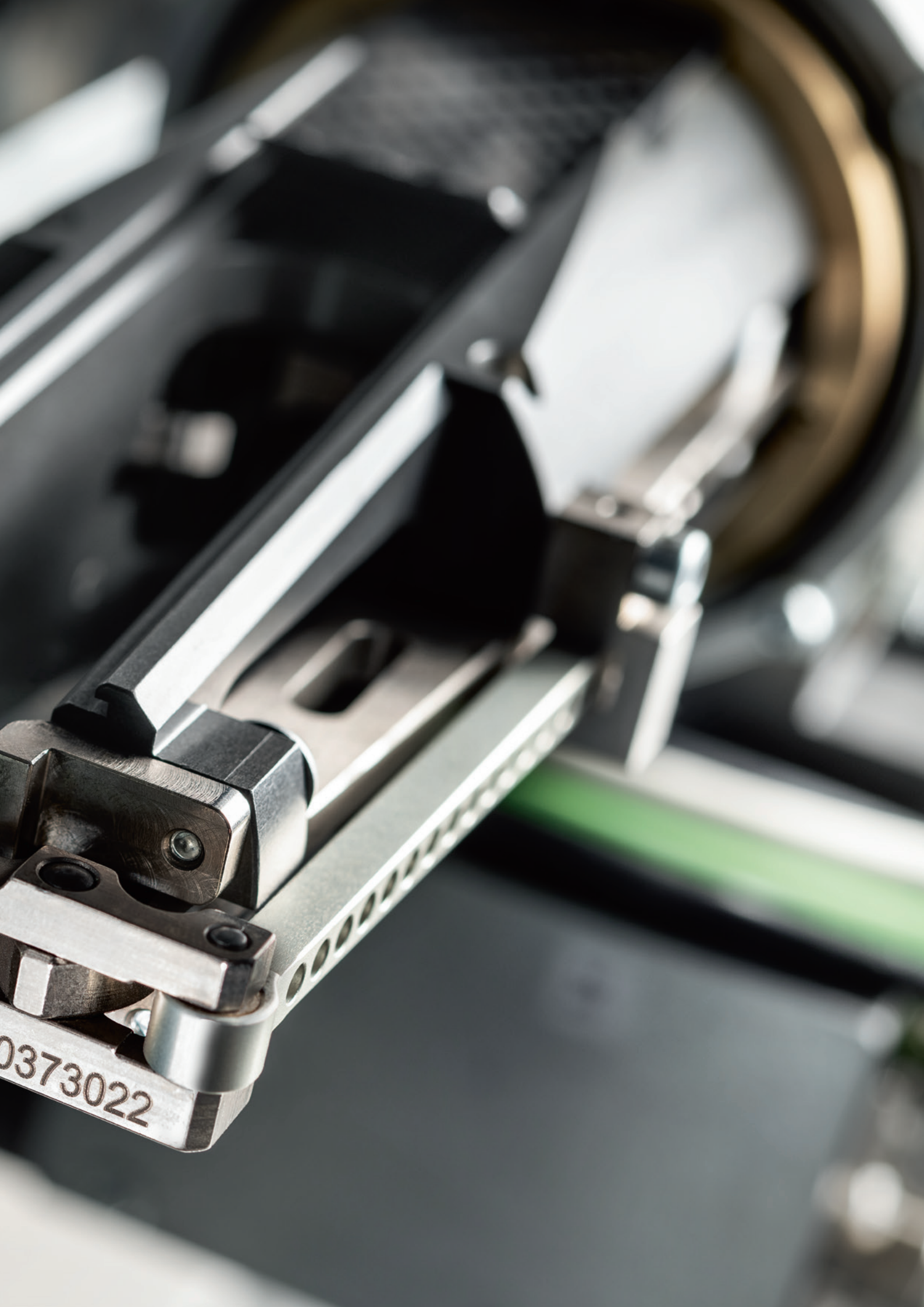
- Simultaneous, double-sided spot taping of wire ends
- Reproducible high quality without the risk of untwisting
- Automated process for the fulfillment of OEM quality requirements
- More efficient article setup

### Improved cost-effectiveness

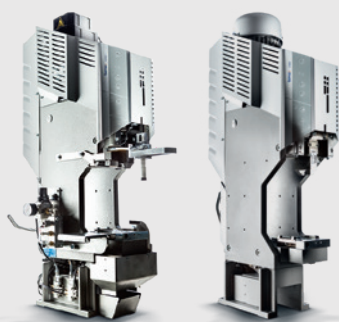
- Less floor space and resources needed due to the omission of manual spot taping
- Higher productivity overall

Precise twisting of  
single wires with  
short open ends.

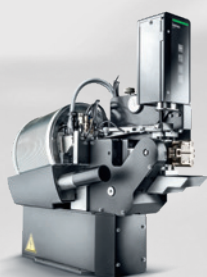
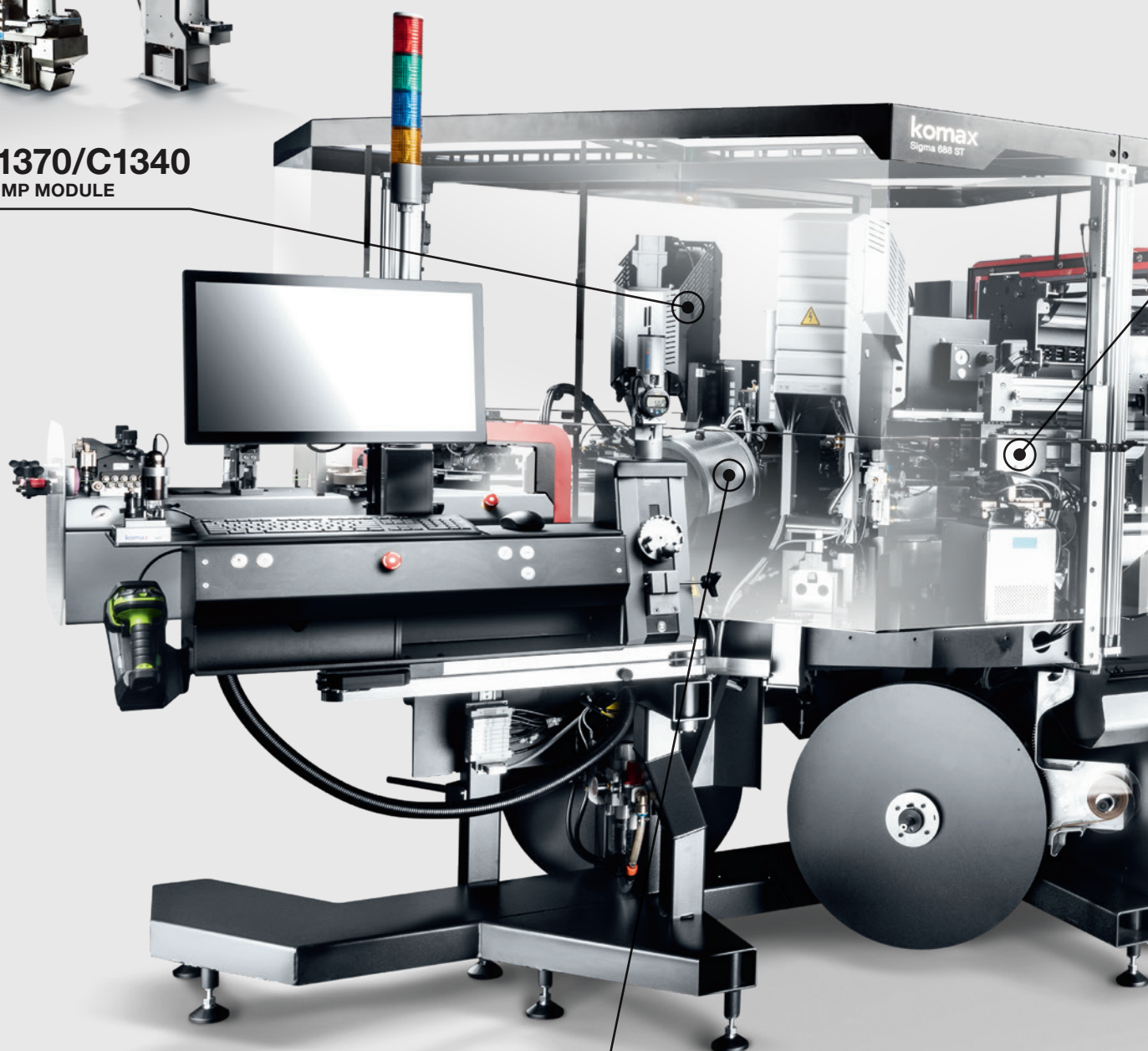




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**C1370/C1340**  
CRIMP MODULE



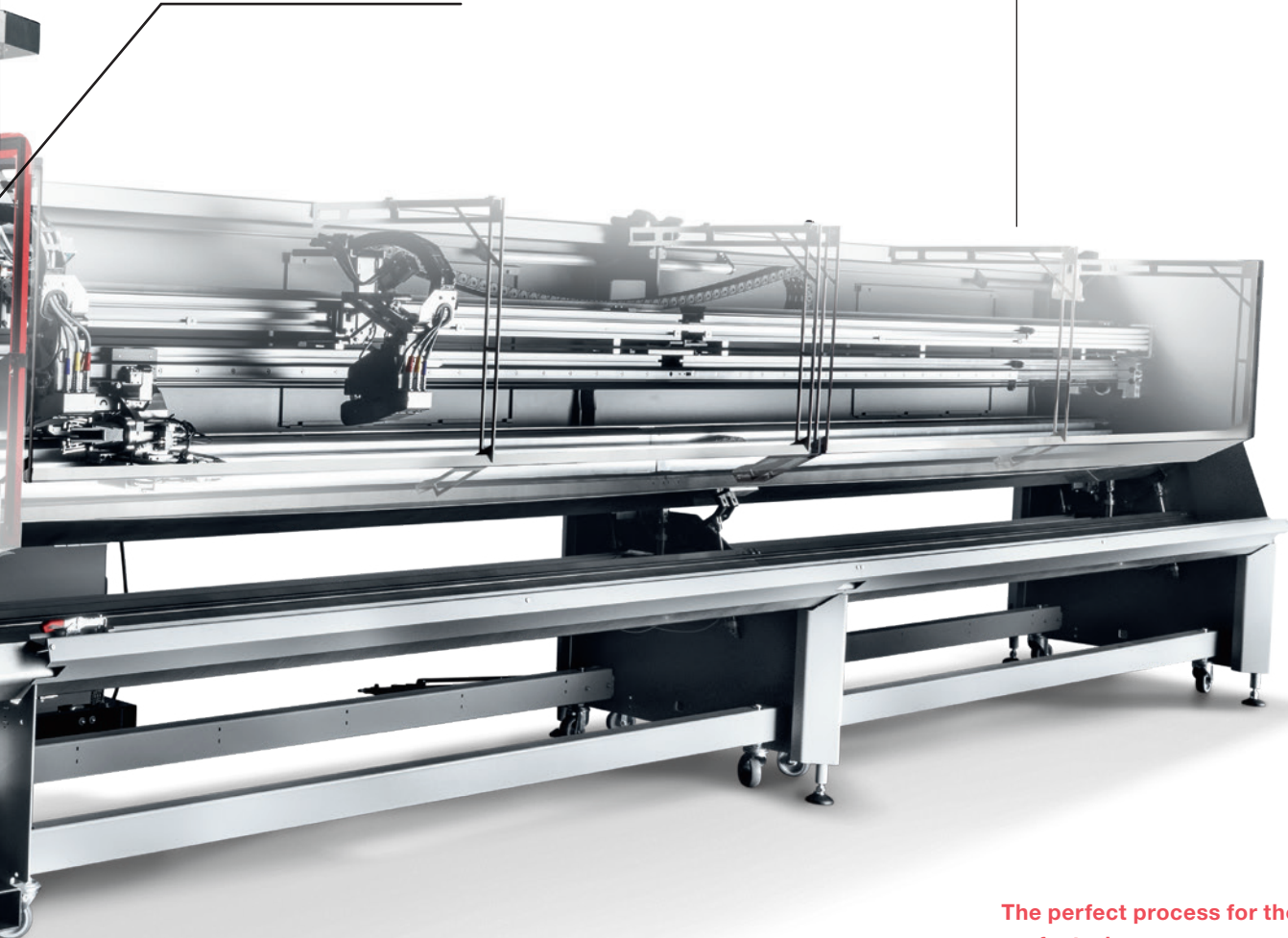
**S1441**  
SEAL MODULE





**X2880**  
TERMINAL  
PRE-ORIENTATION MODULE

# ONE MACHINE, THREE PROCESSES, HIGHER QUALITY



## **Reproducible OEM quality thanks to integrated spot taping**

For UTP wires for applications with high data transfer speeds (CAN FD, FlexRay or 100 MBit/s Ethernet), OEMs demand the spot taping of open wire ends for quality reasons. This prevents the unintended opening of the ends in downstream logistics steps or during manual insertion processes. For the first time, the Sigma 688 ST enables fully automated processing including double-sided spot taping at the first intersection point. This ensures reproducible quality with high performance. Proven and innovative quality monitoring systems ensure OEM-compliant quality and precision.

## **The perfect process for the perfect wire**

Fully automated processing including twisting and spot taping enhances product security and stability. Precision spot taping is executed while the UTP wires are held in place by the grippers of the twisting process. The careful wire handling guarantees damage-free articles. They can be taken out of the wire deposit ready for insertion.

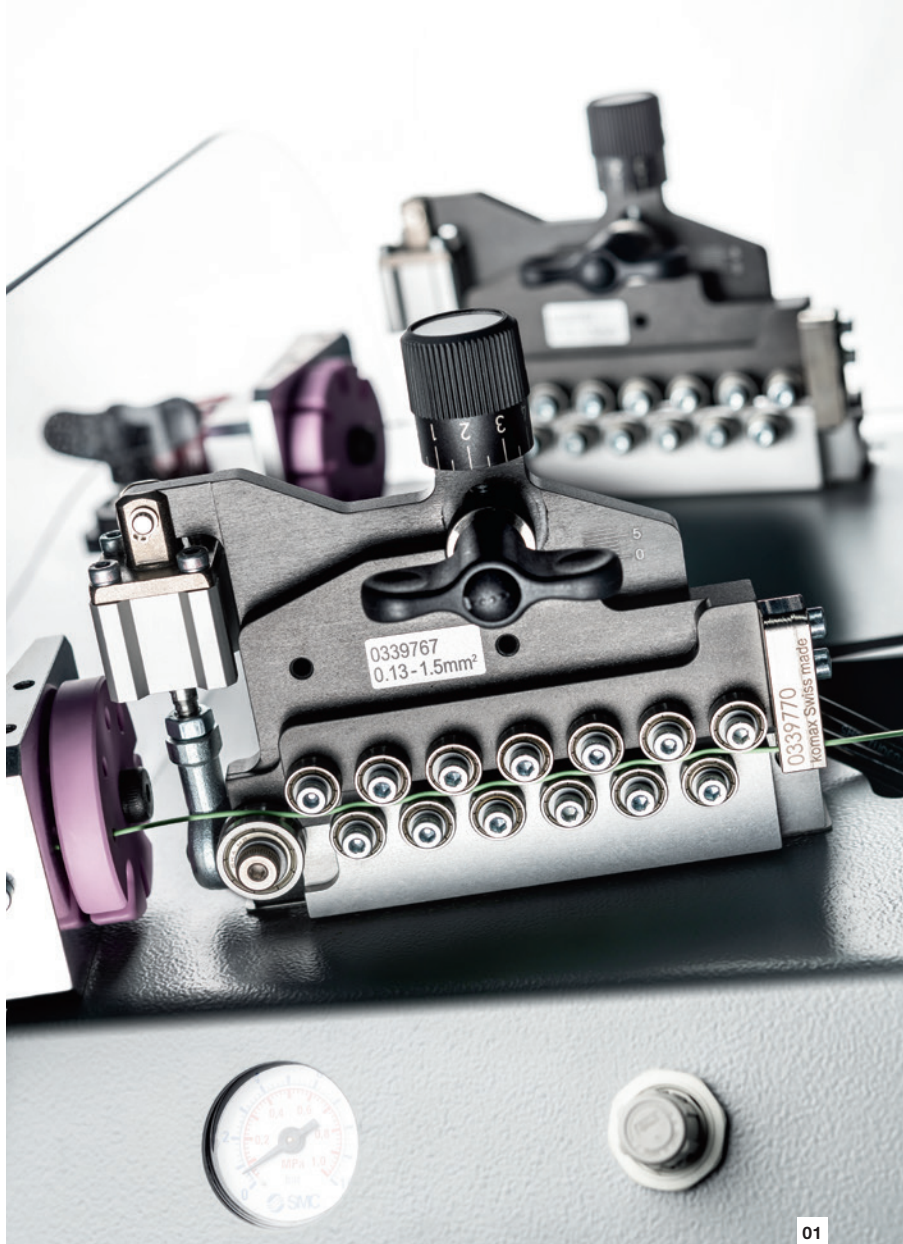
## **Simplified logistics pay dividends**

With spot-taped UTP wires, the need for further transport to a manual spot taping station is omitted. Unintended untwisting is prevented, making handling more secure. Manual spot taping is omitted, minimizing the needed floor space and resource consumption. Overall logistics costs are reduced.

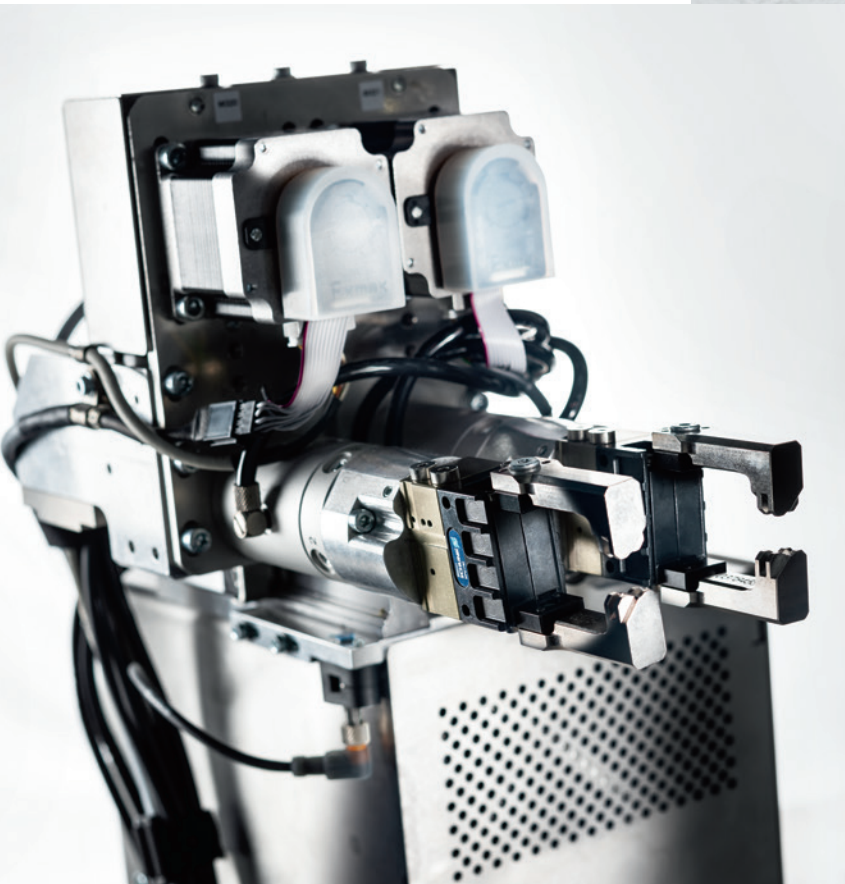
### Maximum flexibility and compelling options

Depending on the article, the spot taping modules can be activated or deactivated on both sides or exclusively on the right or left. The taping parameters stored for the article can be sent to the Sigma 688 ST via the WPCS (interface for data exchange between the wire processing automated machines and the ME system), which saves time. Depending on the application, the “short open ends” or “open ends standard” processing set can be selected. There are also three further optional processing sets: for long and unequal length open ends, for short lengths and for small cross sections. A variety of options for marking and quality assurance is also available. A wide selection of suitable accessories significantly boosts overall efficiency.

**01**  
Parallel wire processing  
for optimal process  
times.



01



### 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.

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



### 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 ST. 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 three main processes, all optimally synchronized with each other.

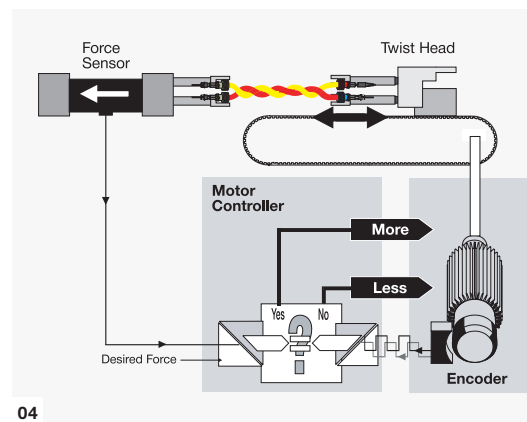
### Fast, secure operation and maintenance

Komax EtherCAT modules of the latest generation guarantee optimal processes. The ICS (inductive communication system) wireless power transmission system and autonomous air-pressure storage system allow the omission of the drag chain at the wire-puller carriage. The swiveling operator

console enables better ergonomics with minimal space requirements. The graphical user interface on the touchscreen is user friendly for simple and fast data entry. Two-hand operation directly on the module enables the efficient setup of the crimp module. All stations are easily accessible through the upward-opening safety cover. The cover of the wire pull-out carriage of the twisting and spot taping unit also opens seamlessly in an upward direction without extending beyond the machine footprint. The spot taping unit is designed for fast tape changes and the tape can be verified with the barcode scanner. 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.



03



04

**03**  
Quick and reliable setup directly on the crimp module.

**04**  
The integrated twist force analyzer (TFA) monitors forces during the twisting process.

02

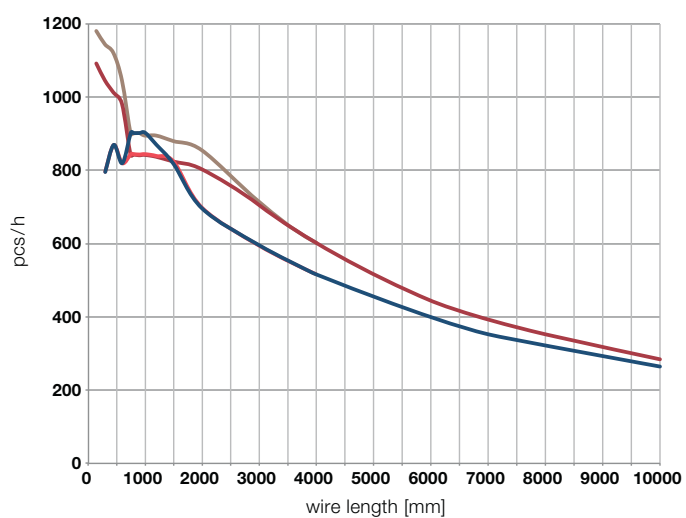
**02**  
Optional "short lengths" processing set for twisted wires from 150 mm (with activated spot taping modules from 300 mm).



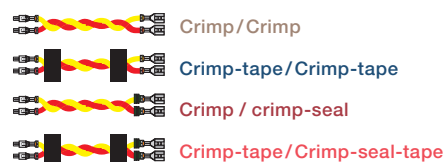


**Taped unshielded twisted pairs (UTP) that fulfill OEM quality requirements.**

## Production output



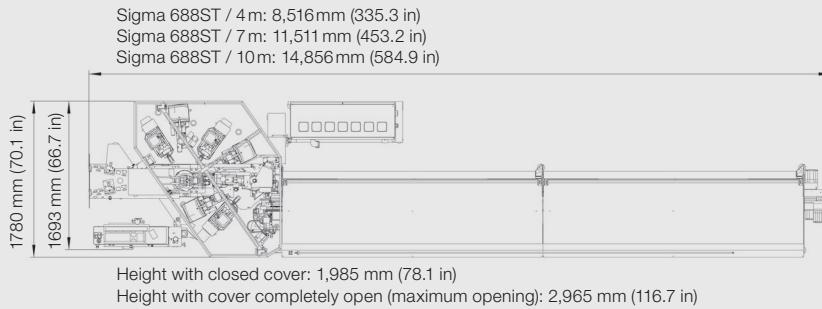
|                              |                               |
|------------------------------|-------------------------------|
| Wires 2 × FLRY conductors    | 0.35 mm <sup>2</sup> (AWG 22) |
| Pneumatic pressure           | 6 bar (87 psi)                |
| Wire draw-in speed           | 5 m/s (16.4 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 analysis         | Active                        |
| Q1240                        | Active                        |
| Processing set               | Short open ends               |



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



## Machine layout



## Technical data

|   |  |
|---|--|
| Length range  | 700 – 4,000 mm (27.6 – 157.5 in)<br>700 – 7,000 mm (27.6 – 275.6 in)<br>700 – 10,000 mm (27.6 – 393.7 in)<br>Optional 150 mm (5.9 in)<br>End length of twisted wires (with active spot taping module from 300 mm [11.8 in]) <sup>*</sup>   |
| Length accuracy   | +/- (0.1 % + 1 mm [0.04 in])   |
| Stripping lengths                                       | Side 1: 0.1 – 18 mm (0.004 – 0.7 in)<br>Side 2: 0.1 – 28 mm (0.004 – 1.10 in)<br>with short open ends processing set<br>Side 2: 0.1 – 35 mm (0.004 – 1.4 in)<br>with open ends standard processing set   |
| Wire cross-sections <sup>**</sup>                       | 2 × 0.22 mm <sup>2</sup> – 2 × 1.0 mm <sup>2</sup> (AWG 24 – 17)<br>with short open ends processing set<br>2 × 0.22 mm <sup>2</sup> – 2 × 2.5 mm <sup>2</sup> (AWG 24 – 14)<br>with open ends standard processing set<br>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<br>30 – 99 mm (1.2 – 3.9 in) with open ends standard processing set<br>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<br>Accuracy: ±10 %, max. ±5 mm (0.2 in)  |
| Spot tape position                                      | Last intersection point (default position) of 0.0 mm – 80 mm (0.0 – 3.1 in) in direction of wire center  |
| 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 <sup>***</sup>           | 6 ± 0.5 bar (87 ± 7.25 psi)  |
| Weight  | incl. 2 crimp and 2 seal modules<br>Sigma 688 ST / 4 m: approx. 2,800 kg (6,173 lb.)<br>Sigma 688 ST / 7 m: approx. 3,400 kg (7,496 lb.)<br>Sigma 688 ST / 10 m: approx. 4,000 kg (8,818 lb.)  |

<sup>\*</sup> Producible parameters depend on pitch, outer diameter and end processing. The producibility must be assessed with the software producibility check or a feasibility test.






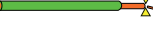





<sup>\*\*</sup> Certain extremely hard, tough wires may not be able to be processed even if they are within the indicated cross-section range. If in doubt, we produce samples of your wires.

<sup>\*\*\*</sup> Outside of the recommended operating pressure, the correct function of peripheral devices may be limited. Be sure to follow the technical data of the peripheral devices as well. The maximum permissible operating pressure depends on the ambient temperature. 6.5 bar to 40 °C / 6 bar over 40 °C.

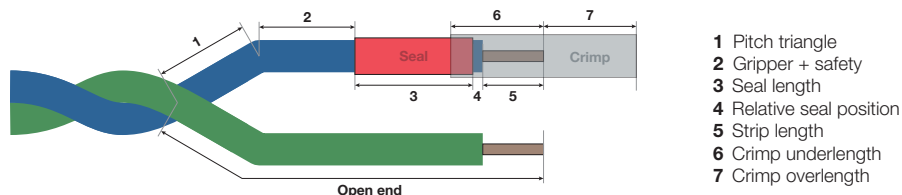
## Options and accessories

|                            |   |
|----------------------------|---|
| Automatic delivery systems | Komax 106   |
| Marking systems            | Komax 26 hot-stamp marker • Komax inkjet marking systems M1630 Jet • Laser marking on request   |
| Wire draw-in               | Straightener unit standard • Straightener unit pneumatic  |
| Process modules            | Crimp modules C1370/C1340 • Seal module S1441 • Terminal pre-orientation module X2880   |
| Quality control            | 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 • Small cross sections • Halogen-free insulation • Hold-up unit • Wire entry cover   |
| Accessories                | Tool case • Bar code scanner Zebra DS3678 • Printer tray • UPS • Software: WPCS networking interface • TopConvert data conversion   |

## Processing examples

|  |   |   |  |
|--|---|---|--|
| Twisted pair<br>(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   |  | Hot-stamp marking                         |  |
| Crimping   |  | Inkjet marking                            |  |
| Spot taping  |  |   |  |

## Composition of open end



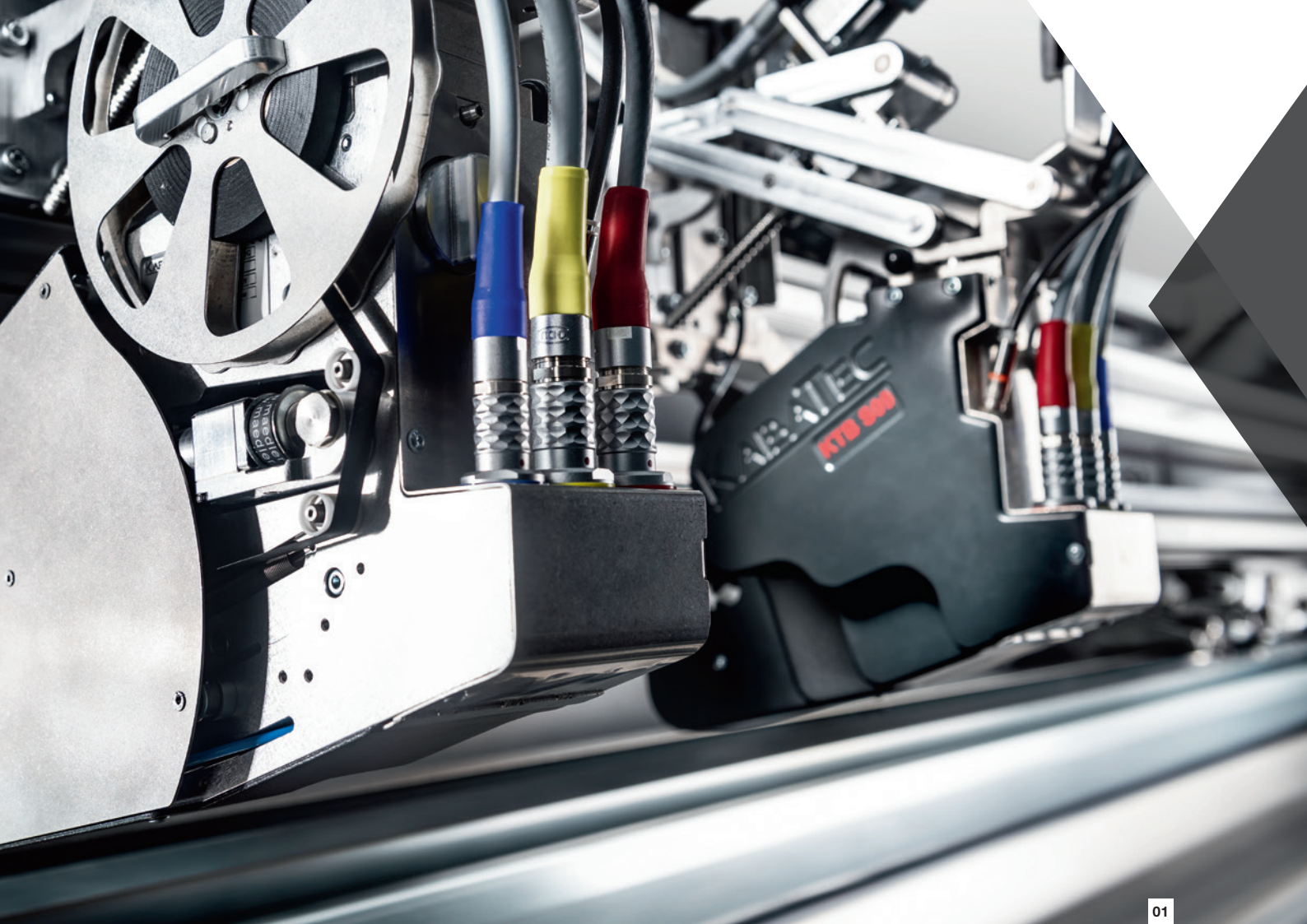
### Example article: 2 × FLRY 0.35 mm<sup>2</sup> (AWG 22), pitch 13 mm, crimp nanoMQS

- 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 definition and measurement of the open end is described in Komax Standard KX 0370000.  
Composition of the open end according to the Komax definition, see also graphic: Items 1 – 6.







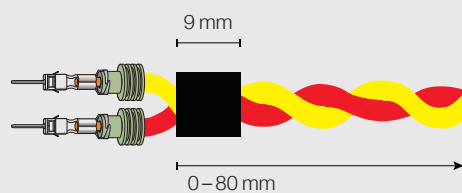
01

## Technical data for spot taping module KTB S09

|                                  |   |
|----------------------------------|---|
| Tape width                       | 9 mm (0.35 in)                            |
| Tape reel diameter               | 1.5 in (38.1 mm), 3 in (76.2 mm)          |
| Maximum tape reel outer diameter | 160 mm (6.3 in)                           |
| Weight                           | 4.5 kg (9.9 lb)                           |
| Configurable tape length         | 32 – 42 mm (1.3 – 1.7 in)                 |
| Tape types*                      | Komax recommendation or feasibility check |

\* The described process quality on the Sigma 688 ST can only be guaranteed with the tape types approved by Komax.

## Spot tape position (configurable)



Last intersection point (default position) of 0.0 – 80 mm (0.0 – 3.1 in) in direction of wire center.



02

**01**  
Time-saving, simultaneous, double-sided spot taping of wire ends.

**02**  
Spot taping module KTB S09.

## 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.

**40**  
**YEARS**  
**CUTTING**  
**EDGE**

### 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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