



SIGMA 688 ST

Fully automatic twisting machine
with spot taping unit

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.**



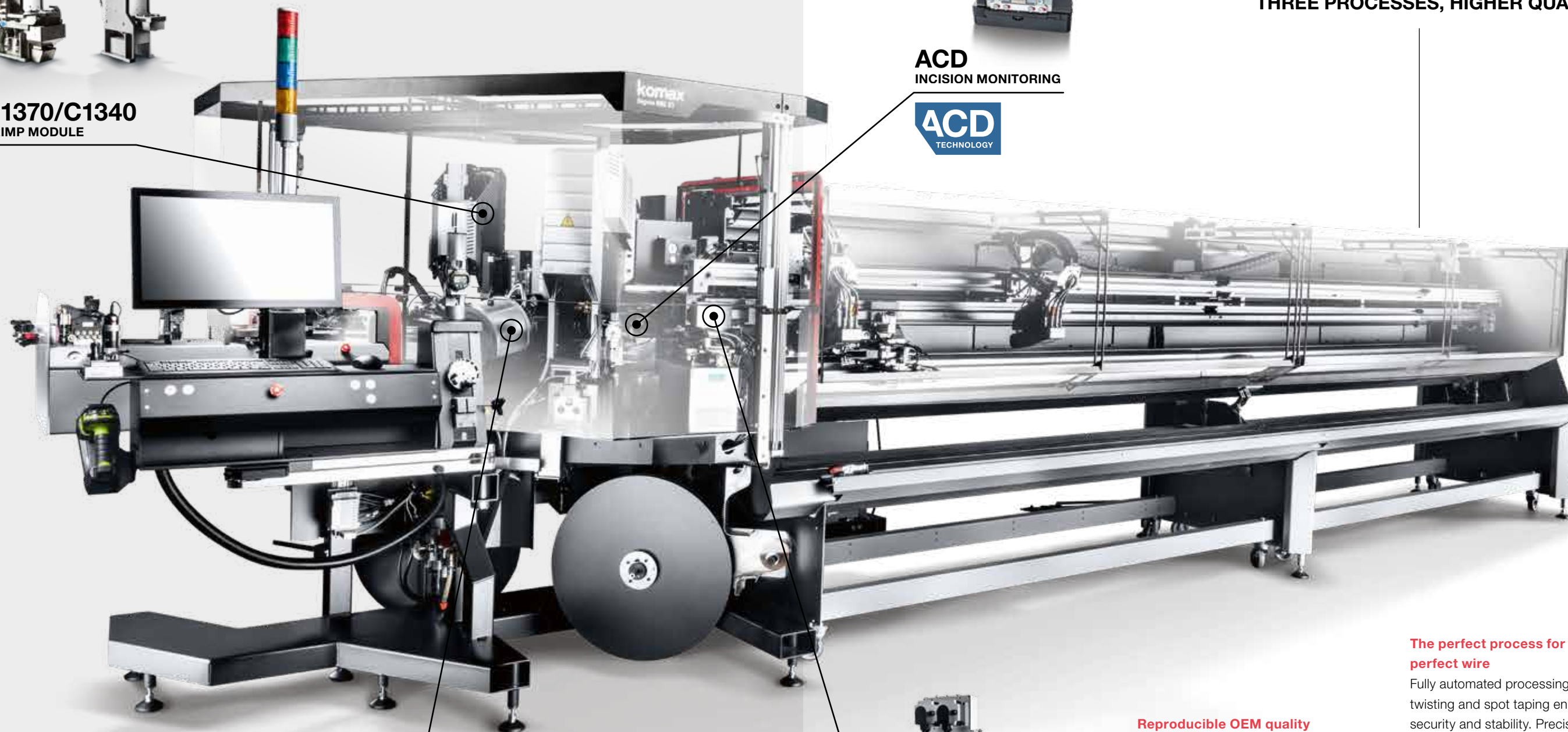
ONE MACHINE, THREE PROCESSES, HIGHER QUALITY



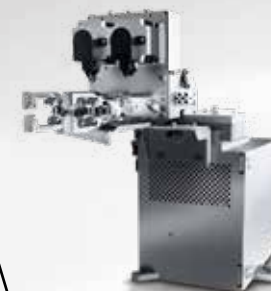
C1370/C1340
CRIMP MODULE



ACD
INCISION MONITORING



S1441
SEAL MODULE



X2880
TERMINAL
PRE-ORIENTATION MODULE

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.

▶ **Reproducible straightening and changing of wires due to clearly indicated and precisely re-adjustable parameters.**



Technology in the market leader's design

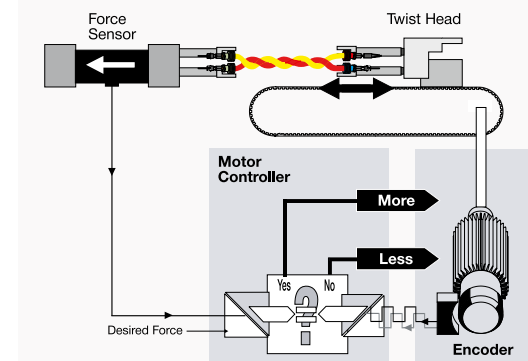
The new product design of market leader Komax perfectly embodies the maximum functionality and innovative power of the Sigma 688 ST. The twisting head with AC servo drive is the heart of the unit. The integrated twist force analyzer (TFA) guarantees uniform twisting by analyzing the forces exerted during 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.

01 Quick and reliable setup directly on the crimp module.
02 The integrated twist force analyzer (TFA) monitors forces during the twisting process.



Optimized insertion thanks to pre-orientation

For small cross sections up to 1.0 mm² 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.**

Controlled quality of every single incision

The optional high-precise, fully automatic incision monitoring system detects the slightest contact between the blade and the conductor strands when processing copper and aluminum cables. The operator is assisted in the set-up process by determining the depth of incision and the quality of each produced wire is monitored. The sensitivity of the monitoring can be individually adjusted per wire line to react to a wide range of cable characteristics and to achieve optimum results. Cables that do not meet the quality requirements are sorted out fully automatically.

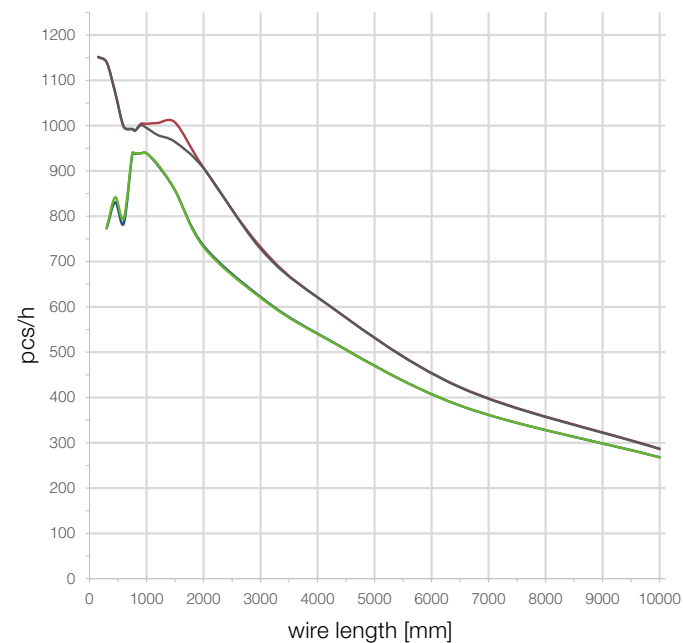


▶ **Quality monitoring of the incision process by ACD**



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

Production output

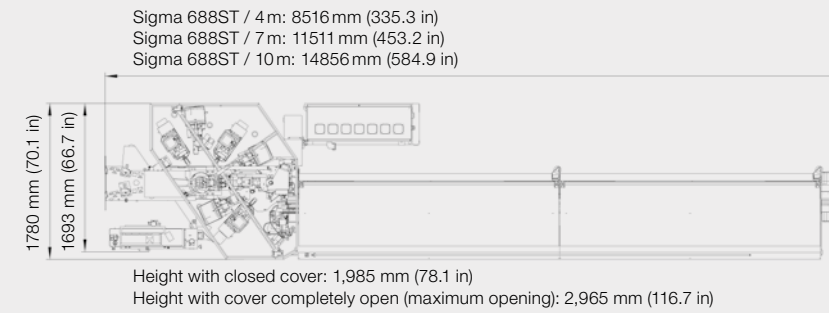


Wires	2 × FLRY conductors	0.35 mm ² (AWG 22)
Pneumatic pressure		6 bar (87 psi)
Wire draw-in speed		5 m/s (16.4 ft/s)
Pitch length		20 mm (0.8 in)
Open ends, side 1 and side 2		40 mm (1.6 in)
Crimp module		C1370
Seal module		S1441
Crimp force analysis		Active
Q1250i		Active
Processing set		Short open 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)
	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 (with active spot taping module from 300 mm [11.8 in])*	
Length accuracy	+/- (0.1 % + 1 mm [0.04 in])
Stripping lengths	Side 1: 0.1 – 18 mm (0.004 – 0.7 in)
	Side 2: 0.1 – 28 mm (0.004 – 1.10 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 ² – 2 × 1.0 mm ² (AWG 24 – 17) with short open ends processing set
	2 × 0.22 mm ² – 2 × 2.5 mm ² (AWG 24 – 14) with open ends standard processing set
	Optional with feasibility test from 0.13 mm ² (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)
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***	6 ± 0.5 bar (87 ± 7.25 psi)
Weight	incl. 2 crimp and 2 seal modules
	Sigma 688 ST / 4 m: approx. 2,800 kg (6,173 lb.)
	Sigma 688 ST / 7 m: approx. 3,400 kg (7,496 lb.)
	Sigma 688 ST / 10 m: approx. 4,000 kg (8,818 lb.)

* Productible parameters depend on pitch, outer diameter and end processing. The producibility must be assessed with 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 produce samples of your wires.

*** 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.

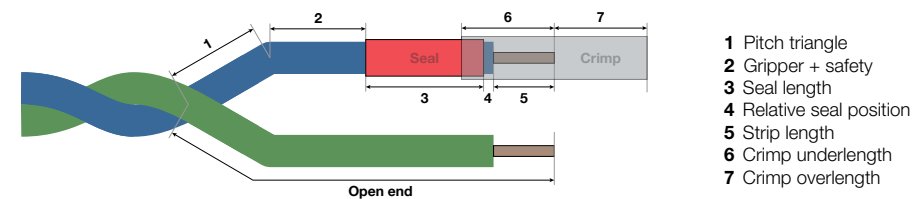
Options and accessories

Automatic delivery systems	Komax 106
Marking systems	Komax inkjet marking systems M1630 Jet • Laser marking on request
Wire draw-in	Straightener unit pneumatic • Straightener unit mechanic
Process modules	Crimp modules C1370/C1340 • Seal module S1441 • Terminal pre-orientation module X2880
Quality control	ACD incision monitoring • Integrated crimp height measurement Komax 341 • Integrated pull-out force measurement Q1210 • Crimp force monitoring CFA/CFA+ • Q1250i (integrated in S1441) • Material change detection • Material verification • Wire length correction • Splice detection • Microscope Komax 345
Filing systems	Deposit cells 4 m (157.5 in) • 7 m (275.6 in) • 10 m (393.7 in)
Processing sets / options	Short cable length • 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

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		Hot-stamp marking	
Crimping		Inkjet marking	
Spot taping			

Composition of open end



Example article: 2 × FLRY 0.35 mm² (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.



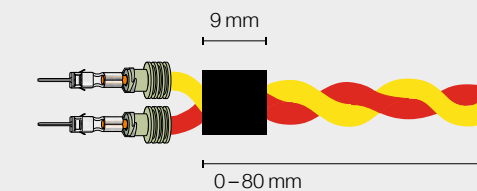
01

Technical data for spot taping module KTB S09

Tape width	9 mm (0.35 in)
Tape reel diameter	38.1 mm (1.5 in), 76.2 mm (3 in)
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 automated wire processing, Komax provides its customers with innovative solutions. Komax manufactures series and customer-specific machinery, catering to every degree of automation and customization. Its range of quality tools, test systems, and intelligent software and networking solutions complete the portfolio, and ensure safe, flexible, and efficient production.

Komax is a globally active Swiss company with highly qualified employees and development and production facilities on several continents. It provides local support to customers worldwide through its unique sales and service network and offers services that help them get the most out of their investments.

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