ELFEED

Tenter guider

Continuous acquisition and
control of the rail position

Contents

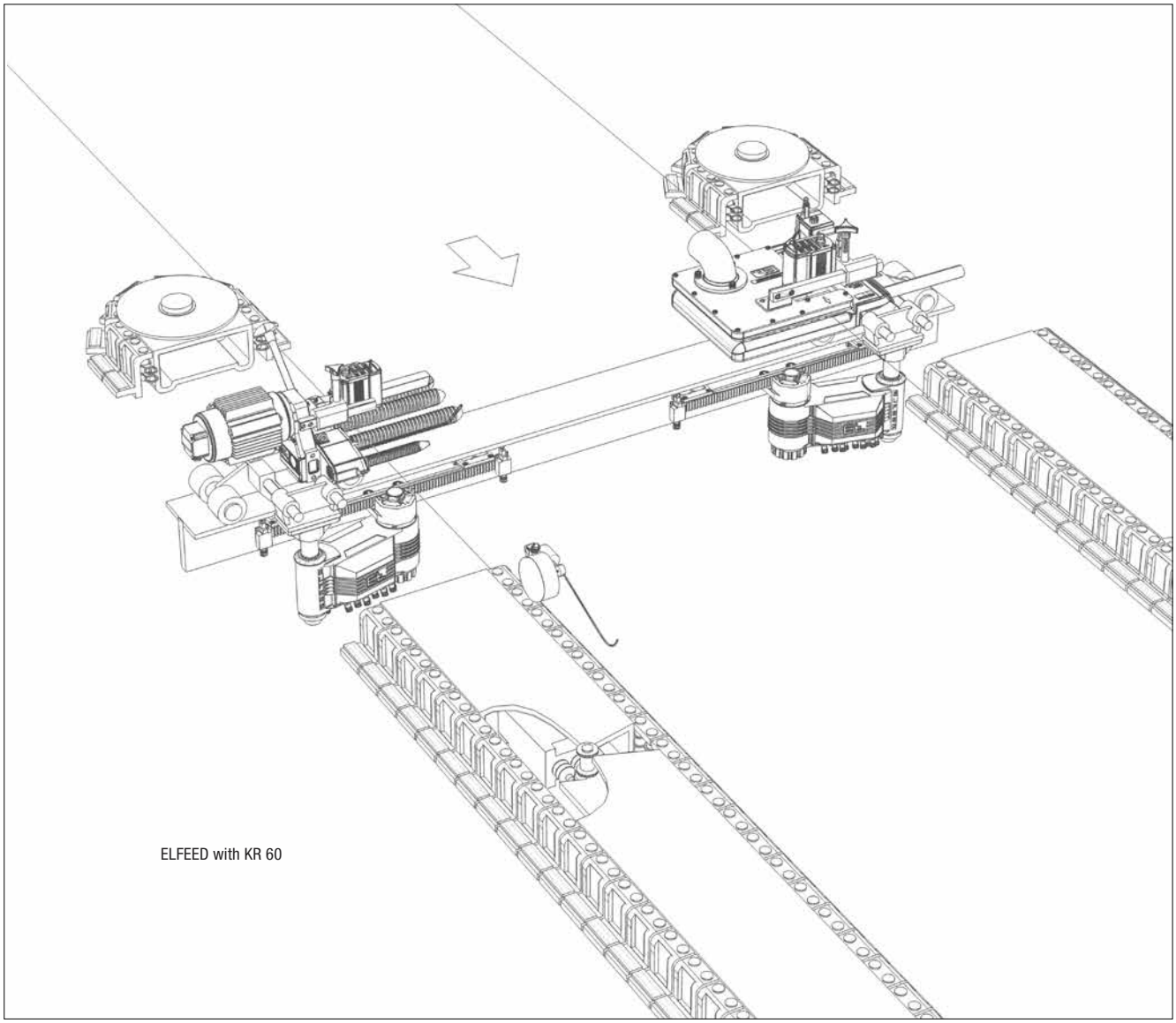
Task and function

Task
The effectiveness of a tenter is defined already at the infeed, as here the edges of the web must be reliably acquired by pins or nippers on the transportation chain.

A continuously changing web position makes a tenter guider for correction imperative. Fully unrolled edges on knitted fabrics are crucial for minimizing the cut waste. Only optimal web guiding will ensure high machine utilization and therefore the high production performance of the drier.

Function
On a tenter guider an infrared edge sensor detects the edge of the web. A position controller ensures that the rail is always precisely adjusted to the continuously changing web.

Digital technology
Digital control combined with a high-resolution infrared edge sensor always ensures exact pining with very low overpinning . The system solution with – all in one – AC/EC (alternating current – electronic commutation) compact actuators is technologically unique with its integrated controller and direct line operation and is maintenance-free.

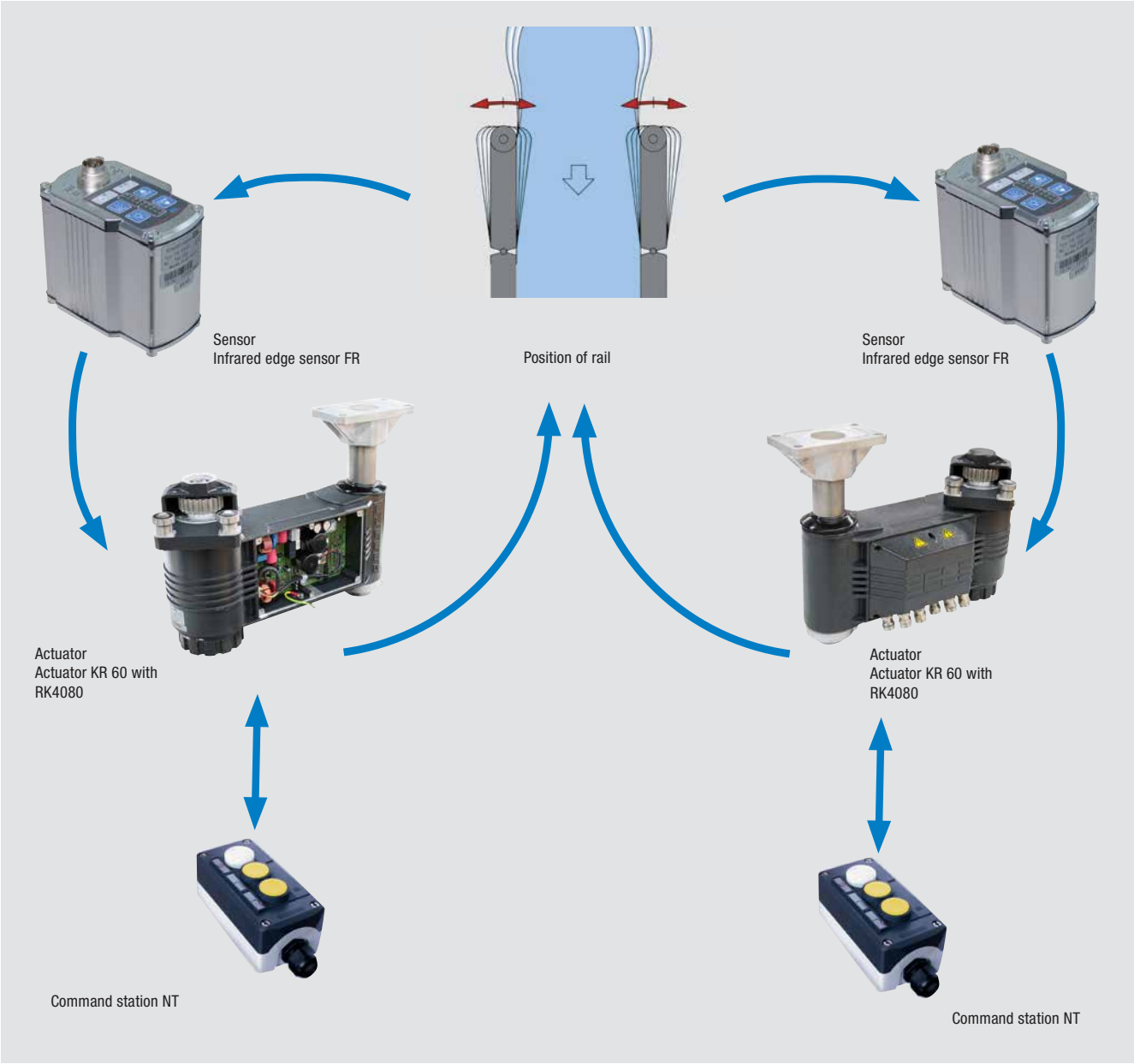


ELFEED with KR 60

The control loops

All automated control systems are based on the principle of a simple control loop. Even the most complex of tasks may be reduced to this control loop.

+ The starting point is the actual position of the web which changes continuously
+ An infrared sensor contactlessly acquires the actual position of the rail
+ The controller compares the actual position (actual web position) with the set position for the rail and outputs a corresponding correction signal to the actuator
+ The actuator corrects the position of the rail and in this way ensures correct web acquisition



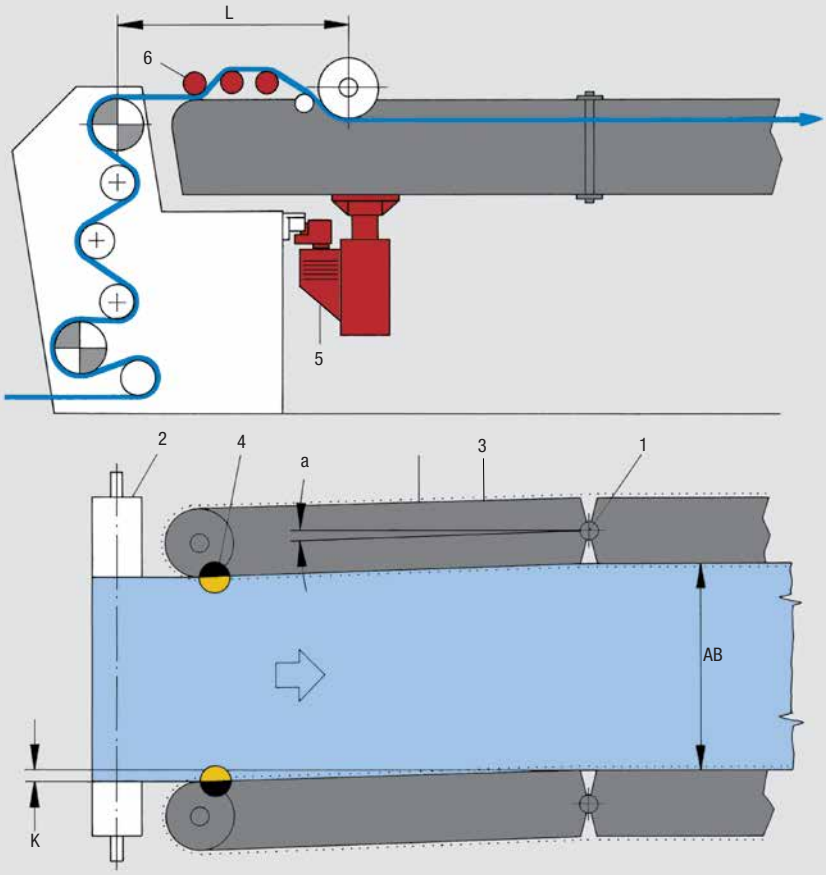
Rail position control

Function
The task is always to bring the infeed rails to a defined position over either the pins or the nippers on the tenter chain.

Application
The rail position control is used on all normal tenters, coating and leveling frames for woven and knitted fabrics, as well as for carpets.

Design
Nowadays the infeed rails are operated either via a rack drive or a spindle drive. The rack solution covers almost all applications. The trapezoid spindle is used if self-locking is required at machine standstill with high cross tension.

Application
The compactness of the KRS 60 is not achieved by any other system. For optimal control behavior, as far as possible sensor and KR 60 should be arranged in a vertical line.



Legende

K	Correction path for rail	α	Correction angle	L	Infeed path	AB	Operating width
1	Pivot points	2	Infeed roller	3	Rails	4	Sensors
5	Actuator	6	Spreading device				

Tenter guider ELFEED KRS 60

The – all in one – AC/EC compact actuators with integrated controller are maintenance-free and highly dynamic, an aspect that permits machine speeds of up to 150 m/min without problems. Together with the infrared sensor FR 55 each side of the machine forms a dedicated control loop.

Design

Transfer of the rail adjustment either via rack (more than 98 %) or via spindle for special applications.

Application

The actuators must be fitted as close as possible to the infeed roller on the tenter's infeed. Ideally the sensor and the actuator are arranged on a common vertical line so that optimal control precision is achieved.

Technical data

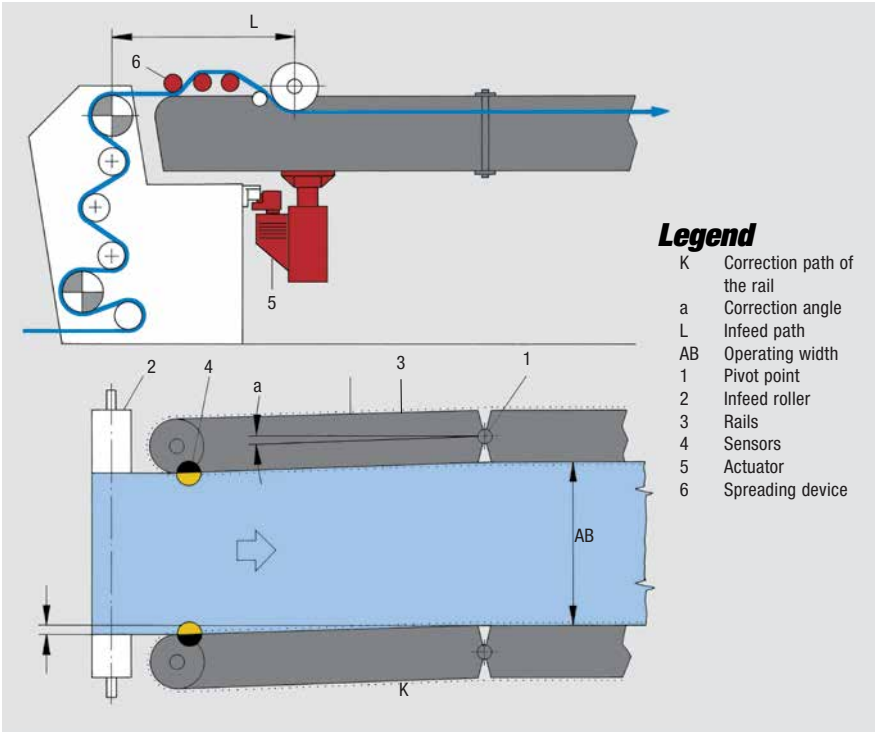
Nominal voltage	100 to 240 V AC, 50/60 Hz
Maximum current consumption (110 V)	4 A
Nominal power	350 W
Nominal actuating force	1300 N
Actuating speed max.	120 mm/s
Protection class	IP 54
Ambient temperature	+10 to +60 °C
Storage temperature	-10 to +80 °C
Installation altitude max.	2000 m above sea level
VDE test	in acc. DIN EN 61010-1
Weight Without flange column With flange column	 16 kg 23 kg

ELFEED KRS60

The tenter guider ELFEED KRS60 sets new standards for precise pinning at high production speeds. The KRS60 is the world's first tenter guider to use an "all in one" compact actuator with integrated controller for direct line operation (100 V to 250 V).

The combination of a CCD infrared sensor with a resolution of 0.1 mm and dynamic control ensures the webs are always pinned with precision.

The actuator KR 60 is a maintenance-free, brushless motor. Combined with a planetary gearbox, it impresses with very high dynamic performance and excellent efficiency. The power is transmitted to the feed rail via a pinion on a rack. This simple, robust system has been proven over decades, also in adverse ambient conditions. In addition, the sensitivity of the controller can be adjusted at the sensor.



Legend

K	Correction path of the rail
a	Correction angle
L	Infeed path
AB	Operating width
1	Pivot point
2	Infeed roller
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5	Actuator
6	Spreading device

Actuator KRS60

Tenter guider ELFEED KRS 62

The tenter guider ELFEED KRS 62 is a variant of the tried-and-trusted KRS 60 series for slow-moving tenters and coating machines (up to 50 m/min), in which high adjustment forces and self-locking are required. With the KRS 62 series, the transmission of the movement to the infeed rail is performed via a trapezoidal threaded spindle, which can be designed to be self-locking.

When used, for example, on mercerizing machines, the actuating drive can also be attached outside the strongly corrosive zone.

The „All in One“ compact actuator with integrated controller for direct line operation (100 V to 240 V) is a maintenance-free, brushless motor, combined with planetary gears. Optimizations (controller sensitivity, setting of the actuating speed) of the ELFEED KRS 62 can be performed on the FR 55.3 sensor.

Optional drive package with toothed washer and double toothed belt.

Actuator KRS 62

Technical data, actuator KR 62 with integrated controller

Nominal voltage	100 to 240 V AC, 50/60 Hz
Current consumption max. (110 V AC)	4 A
Nominal power	350 W
Nominal torque	55 Nm
Nominal speed	43 1/min
Protection class	IP 54
Ambient temperature Storage temperature	+ 10 to + 60 °C - 10 to + 80 °C
Weight	24 kg
Installation altitude max.	2000 m above sea level
VDE test	In acc. DIN EN 61010-1

Technical data, drive package

Belt pulley KR Dw	280 mm
Belt pulley spindle dw	112 mm
Ratio	1: 2,5 (n_{KB} : $n_{Spindel}$ = 0,4)

Infrared edge sensor FR 55.3

The digital infrared edge sensor FR 55 completes the control loop for the digital tenter guider. The FR 55 permits optical or mechanical scanning of the edge of the web; in accordance with the reflection principle the web is used as a reflector. The infrared light transmitter and also the receiving elements are mounted inside the sensor housing. Infrared light also guarantees reliable scanning of the web edge with both high contrast printed colors and poorly reflecting colors.

In case of very uneven web edges (e.g. protruding threads) mechanical scanning by using the scanning lever (also possible during production) will dampen the response of the control. The mechanical scanning lever is optional and can be added at any time. The contact pressure on the scanning lever can be adjusted.

Usage

The web edge is indicated and the address is set manually on the top of the housing using a membrane keypad. In addition it is possible to set at the sensor the sensitivity characteristic for the control of the actuator KR 60. as well as the sensitivity of the sensor.

The correct distance to the web of 36 mm is always ensured by E+L in conjunction with a selvedge opening device and the related sensor adjustment. In other cases a web guide bar is required.

Technical data

Supply voltage Nominal voltage Permissible range	 24 V DC 20 to 30 V DC (ripple included)
Current consumption	100 mA
Power consumption	2,4 W
Scanning frequency	100 Hz
Measuring range	±10 mm
Distance edge sensor - web	36 mm
Protection class	Max. IP 65 with suitable connector inserted
Ambient temperature	10 to 60 °C
Storage temperature	-10 to +80 °C
Weight Without scanning lever With scanning lever	 0,37 kg 0,46 kg

Selection table

Tipo FR 55..	**..03**	**..13**
Measuring range ±10 mm	■	■
With scanning lever	■	
Without scanning lever		■

Rail limit switch ATL 0103

Limit the correction angle of the rail and therefore protect the transportation chain against damage.

ATL 0103

Pinning/depinning monitors FM 05

Monitor reliable pinning and depinning in the transportation chain.

FM 05

Selvedge opening devices ELSPREADER

Pneumatic selvedge opener LPA 03

The pneumatic selvedge opener, ELSPREADER LPA 03, is used for spreading and smoothing out very delicate knitted and woven fabrics that are particularly susceptible to curling. Depending on the characteristics of the curled edge or sometimes even fringed edges, jets can be used on one side or both sides. Furthermore, the air outlet angle on each jet can be adjusted to suit the requirements. The air flow, very carefully directed via the optimally adjusted jets, reliably spreads any curled or folded web edges.

The ELSPREADER LPA 03 is the only system in the world that functions efficiently without mechanical contact with the surface of the web.

LP 0301

LP 0303

Motorized selvedge opener LA 82/83/84

Only the usage of motorized, pivoting opening spindles guarantees reliable acquisition of web to be fed in the transportation chain. Selvedge openers with two or three spindles ensure reliable spreading of woven fabrics. With a further, fourth spindle even knitted fabrics are reliably spread.

LA 82

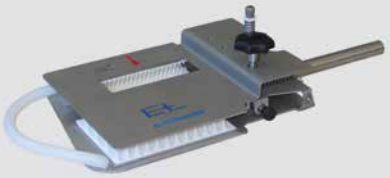
LA 84

Mechanical selvedge spreader LS 3

The mechanical plate spreaders LS 3 supplement our extensive range of the spreading devices for the infeed on tenters. The plastic spreading plates with angled profile reliably spread the rolled edges on knitted fabrics. The plastic profiles have high resistance to wear. The spacing between the plates is adjusted using a handwheel, the spacing setting is dynamic. When thick seams pass through, the two plates move apart to prevent damage to the web or the plates.

Mechanical selvedge spreader LS 50

The LS 50 is used, e.g., on the foulard ahead of the tenter. The complete operating width range is covered with a pair of LS 50. It is not necessary to adapt the spreading device to the related operating width required.



LS 30

LS 36

LS 3202

LS 50

Selection table ELSPREADER

Type	Woven fabricW	Knitted fabric	Dry	Damp	Wet	Application notes
LP 03	■	■	■	■		For delicate web, for heavily curled edges
LA 82	■		■	■		For folded or slightly curled edges
LA 83	■	■	■	■		For normally curled edges
LA 84	■	■	■	■		For heavily curled edges
LS 30/32	■	■	■	■		For normally curled edges, for pin chains
LS36	■	■	■	■	■	für eingeschlagene oder leicht eingerollte Kanten,
LS 3202	■	■	■	■	■	For folded or slightly curled edges, for clip or combined chains

Stainless steel spreader rollers BG

The spreader rollers spread the web over the entire width without creases. Due to the specially developed profiles the web is spread as gently as possible.

E+L expertise in the tenter sector

Edge cutter ELCUT BTA 77

BTA 77 is an easy to use cutting tool. The cut is made at the depinning wheel. As the web is still fixed to the pins on cutting, it is also suitable in case of high cross tension on the web.

BT 7713

Edge cutter ELCUT BTA 80

The edge cutter ELCUT BTA 80 is used in pairs on the tenter's outfeed for cutting the glued edges of the web.

Features

- \+ Shear cut
- \+ Continuous blade lubrication
- \+ Front and rear of blades can be used
- \+ Cutting force adjustment at the bottom blade
- \+ Motorized lateral adjustment for waste strip setting or automatic blade follow-up
- \+ Nozzles for pneumatic selvedge opening or mechanical selvedge opening device
- \+ Adjustment of the cutting speed to the web speed using frequency inverter (optional)
- \+ Loss of the web by infeed and outfeed roller in cutting plane not possible
- \+ Minimum edge material cutting setting possible

Usage

Outfeed on tenters for woven fabrics, knitted fabrics, technical textiles

BT 8013

Flange load cells

These cells are available in aluminum, steel or stainless steel to suit the required application. Path rollers with spigots and their ball bearings are fitted in the load cell.

Web tension measuring and control ELTENS

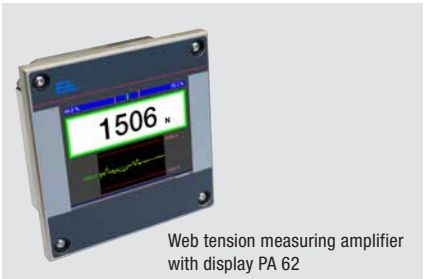
Processes with controlled web tension are reliable due to reproducible operation and therefore contribute efficiently to increasing quality. The load cell has almost no moment of inertia like a dancer roller and therefore controls more dynamically and with greater precision. This statement applies both to cutting and to winding processes. The optimal tension to suit the web is always used. As a result the material is protected to the maximum. A constant web tension during the cutting process minimizes malfunctions and in this way increases the performance of the complete system.

Block load cell PD 50

Load cell PD 25

Load cell PD 21

Web tension measuring amplifier CV 22



Web tension measuring amplifier with display PA 62

Web tension controller DC 62

Sensor roller PD 30

This roller is particularly suitable for upgrades. This sensor is delivered in the necessary length. Installation is complete with just two screws.

Sensor roller PD 30

Web width measurement and monitoring FES with wide band sensor FE 45 and DO 48

The digital wide band sensor operates with infrared light, is self-supporting and detects the edges of the web using a scanning process. The web width is displayed and the alarm limits output via the DO 48 command station. With various variants of the DO 48, it is possible to output the width in an analog manner or via Ethernet fieldbus. The digital alarm output can be used for visual or acoustic monitoring. The FE 45 wide band sensor is also ideal for the trouble-free upgrading of an existing web guiding solution and for use on a new, customer web guiding solution.

Wide band sensor FE 45

Versions

Web guiding by web center:

Type	Measuring range	Accuracy
FE 451.	3400 mm	±5 mm
FE 452.	3400 mm	±3 mm
FE 453.	1800 mm	±1 mm

Command station DO 48

Web guiding by web edge:

Type	Measuring range	Accuracy
FE 457.	1700 mm	±5 mm
FE 458.	1700 mm	±3 mm
FE 459.	900 mm	±1 mm

Measurement of the web width:

Type	Measuring range	Accuracy
FES457.	3400 mm	±10 mm
FES458.	3400 mm	±6 mm
FES459.	1800 mm	±2 mm

Weft straightener ELSTRAIGHT

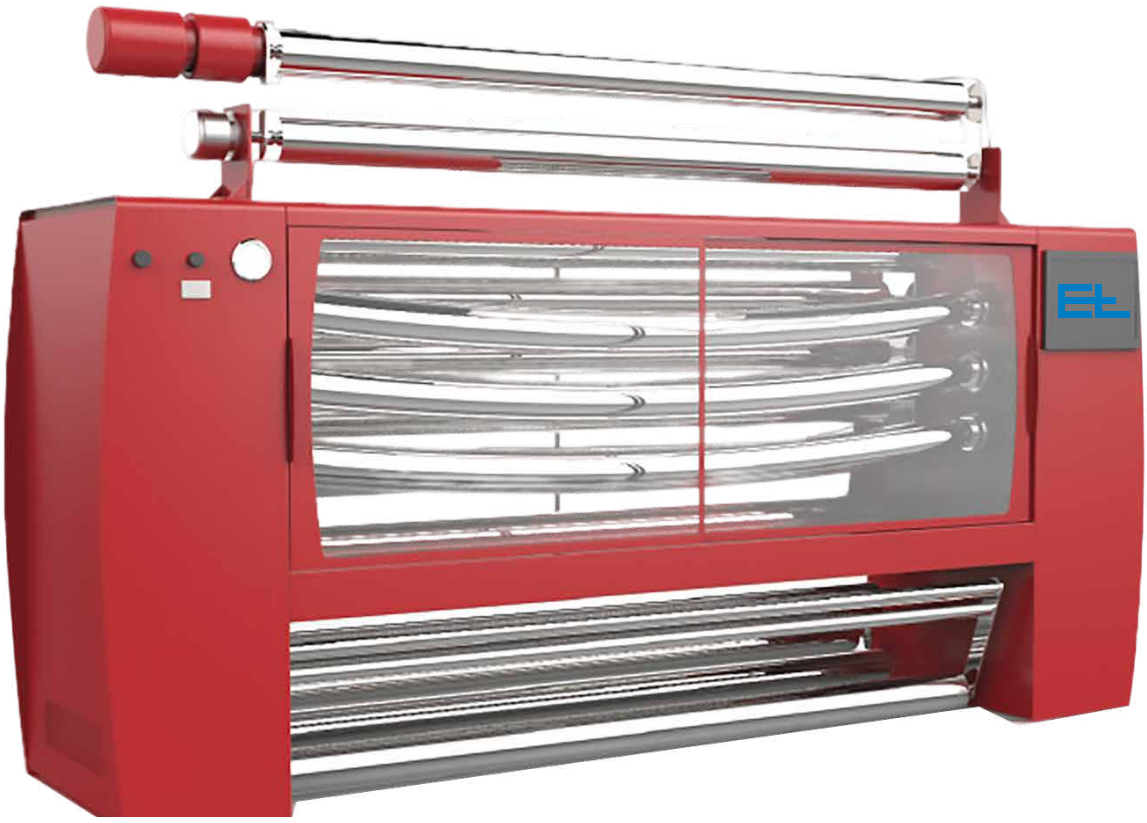
Weft straightener for woven and knitted fabrics. CCD matrix technology is used in the weft straightener ELSTRAIGHT.
Intelligent cameras evaluate the distortion across the width; the controller then adjusts the integrated skew and bow rollers proportionally to the angle. Highly dynamic AC motors combined with frequency converters guarantee fast and accurate adjustment of the correction rollers. Due to the usage of intelligent evaluation algorithms, ELSTRAIGHT is able to automatically adjust to a very wide range of fabric structures.

The heart of the system is formed by a camera bridge that supports 4 to 8 CCD matrix cameras depending on the operating width.
Key advantages of the matrix camera are

+ A single-sided measurement,
+ The large two-dimensional measuring area and
+ The large measuring distance to the web.

Along with the standard ELSTRAIGHT, Erhardt+Leimer also offers weft straightening systems, e.g., for the printing/carpet/denim and automotive industry.

ELSTRAIGHT camera



ELSTRAIGHT Standard

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