Erhardt+Leimer

ELSTRAIGHT

Textile straightening systems

Continuous detection and
correction of weft distortions

Contents

Improved quality and productivity with textile straightening systems	4
Closed loop control circuit	5
Sensors	6
Open/closed-loop control unit	8
Operation and visualization	9
Function of the straightening system	10
ELSTRAIGHT straightening system	11
ELSTRAIGHT Mini straightening system	12
ELSTRAIGHT Heavy Duty straightening system	13
ELSTRAIGHT Combi straightening system	14
Questionnaire	16
Other products for the textile industry	17
Notes	18

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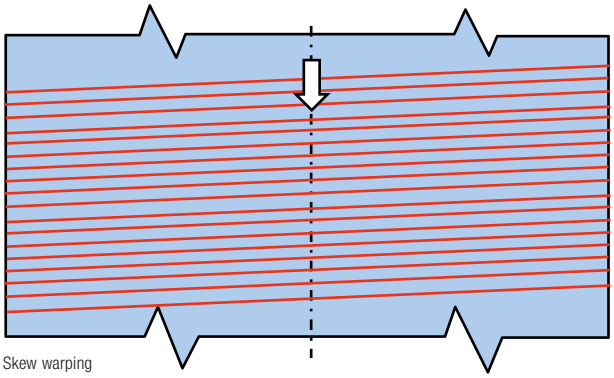
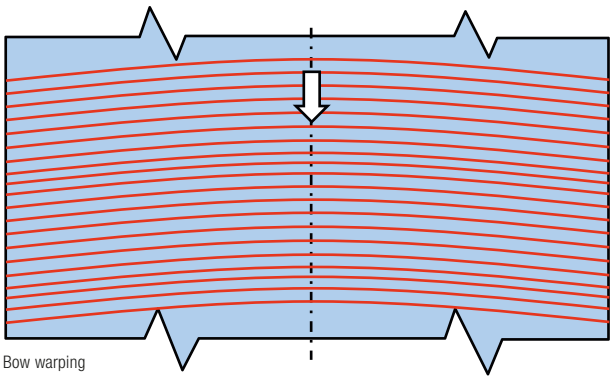
Improved quality and productivity with textile straightening systems

Today, manufacturers and users of textile production systems face ever increasing demands in terms of production speeds, which are set to rise even further in the future. Quality must be ensured, while the number of rejects and any machine down time must kept to a bare minimum. Textile webs typically pass through a wide range of different production processes. Warping is caused primarily by transport through the various wet processes. Correction of any warping before processes such as drying, thermal fixing, coating or printing is absolutely essential. E+L straightening systems are guaranteed to keep textile webs free of warping.

Typical web warping



Skew warping

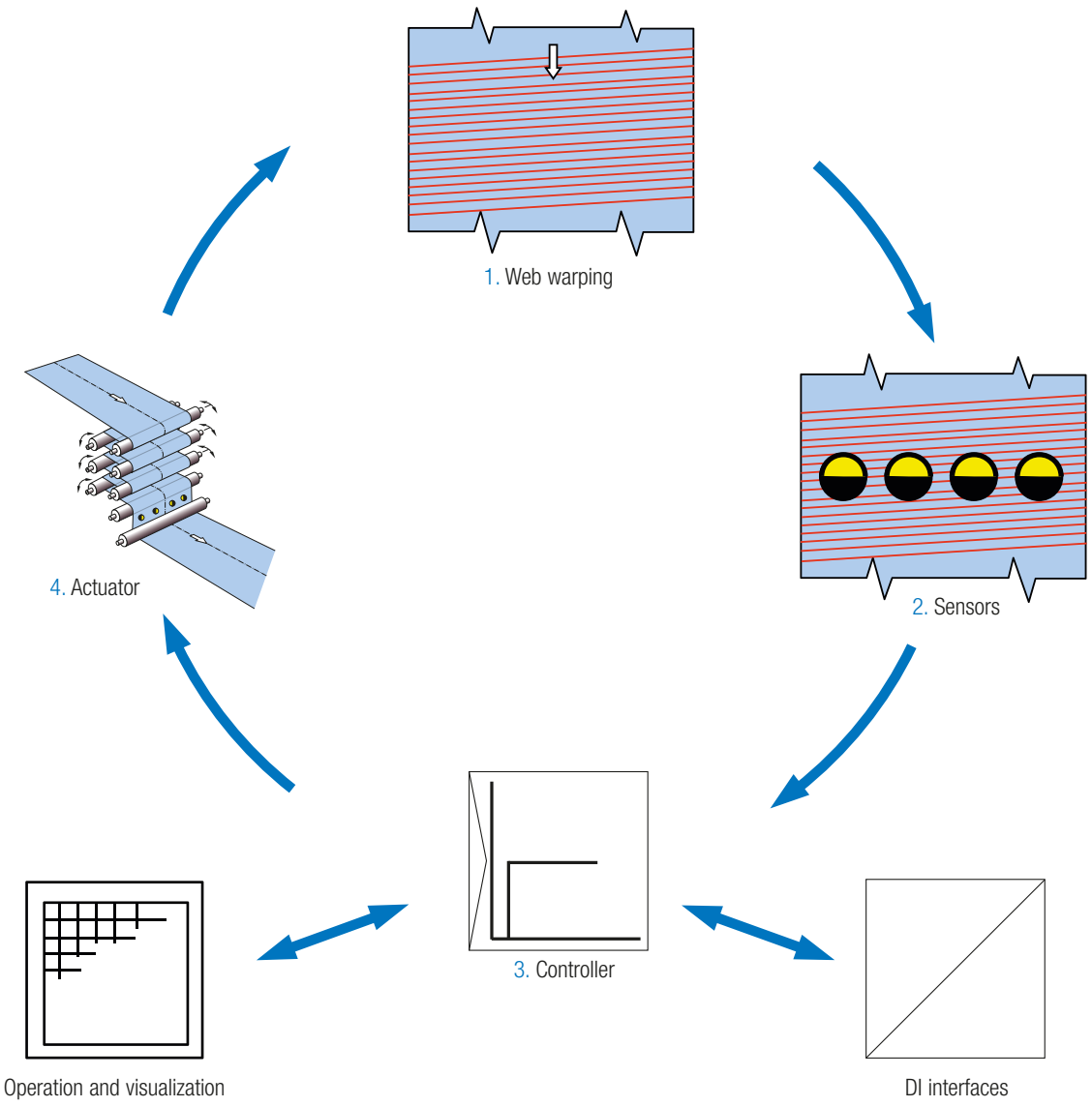


Bow warping

Closed loop control circuit

Every E+L controller is based on the classic principles of closed loop control. More complex tasks are solved with supplementary functional modules.

1. The starting point is the current warping of the textile web.
2. Matrix cameras contactlessly measure the warping of the web.
3. The controller compares the actual position value with the target value and sends a corresponding correcting signal to the actuator.
4. The actuator corrects the skewing or bowing.

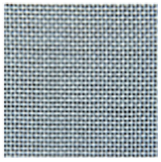


Sensors

Matrix camera for fabric structures

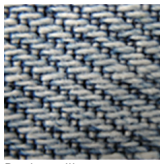
- Smart cameras with a high resolution for reliable detection of all woven and knitted fabrics
- Accurate structure detection through FFT (Fast Fourier Transformation)
- Ring layout of infrared LED light sources for incident-light illumination
- Integrated evaluation
- Fast detection of bow and skew warping with 4 – 8 cameras per web width

Matrix camera with integrated infrared LED flash



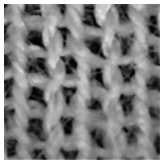
Plain weave

Tweed twill weave



Denim twill weave

Satin weave



Weft-knitted fabrics

Warp-knitted fabrics

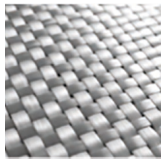
Ribbed weave

Jacquard

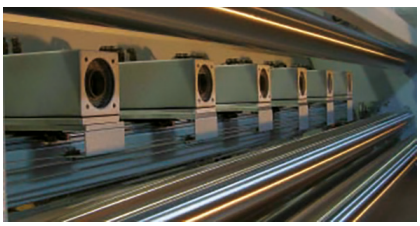
Carpet

Lace

Curtains



Industrial textiles



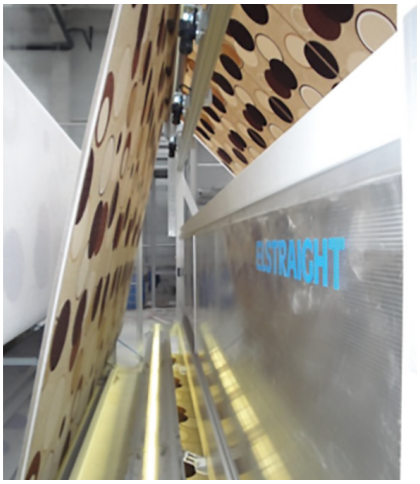
6 matrix cameras integrated in the weft straightener

Technical data – Matrix-CCD-Camera	
Sensor chip	CMOS
Field of view	40 mm x 30 mm
Resolution	640 x 480 pixels (VGA)
Zoom	digital
No. of threads	10 to 75 wefts (stitches)/cm
Scan rate	Max. 10 images/s
Spacing between sensor and web surface	50 mm
Ambient temperature	+10 °C to +50 °C
Protection class	IP 65

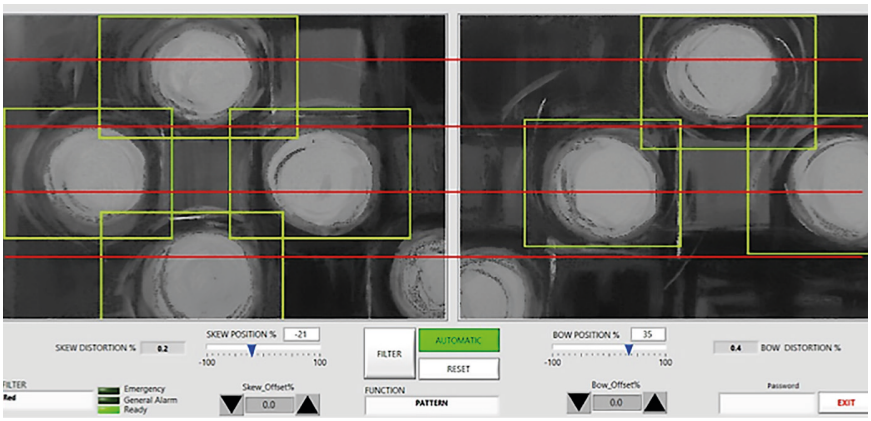
Matrix color camera for pattern detection

- Smart camera with a high resolution for reliable detection of printed patterns on carpets
- Precise evaluation through FFT (Fast Fourier Transformation)
- External LED white light ewithter for incident-light methods
- Integrated evaluation
- Fast detection of bow and skew warping with 2 – 3 cameras per web width

Matrix color camera (RGB)



Matrix color camera in carpet production line



Straightening according to printed patterns

Technical data – Matrix-Color Camera	
Sensor chip	CMOS (RGB)
Field of view	500 mm x 250 mm
Resolution	2048 x 1024 (2 megapixels)
Zoom	digital
Scan rate	1 to 2 images/s
Spacing between sensor and web surface	2000 mm
Ambient temperature	+10 °C to +50 °C
Protection class	IP 54

Open/closed-loop control unit

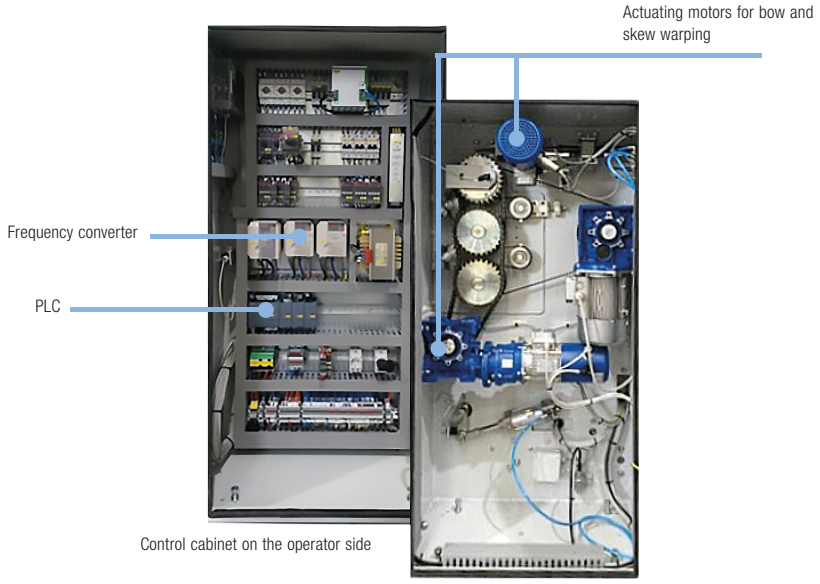
Smart camera
- From every position the cameras accurately determine the magnitude and type of warping.
- Automatic positioning of the cameras depending on the web width

Computers
- All camera signals are evaluated in a PC
- Adjusting signals for bow and skew warping are calculated

Control
- Positions the bow and skew warping control rollers

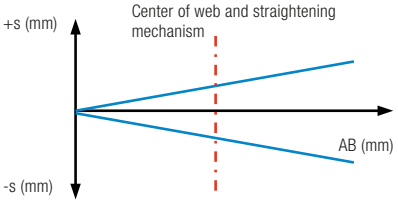
Interface
- Ethernet for remote service

Alarm function
- Output of alerts if the set liwiths for bow and skew warping are exceeded

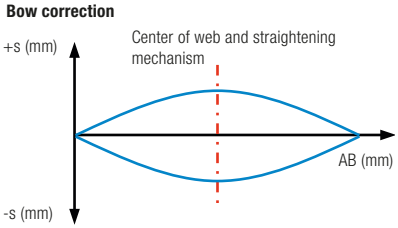


Correction options

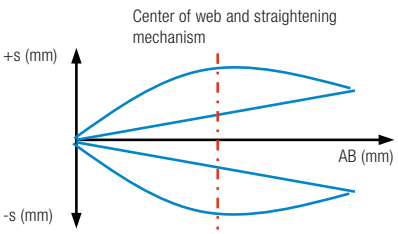
Skew correction



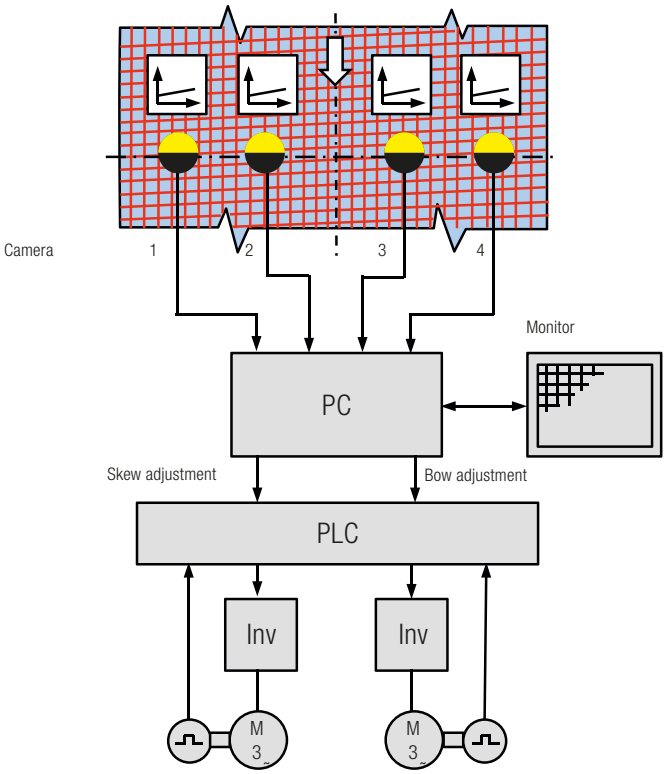
Bow correction



Combined bow and skew correction



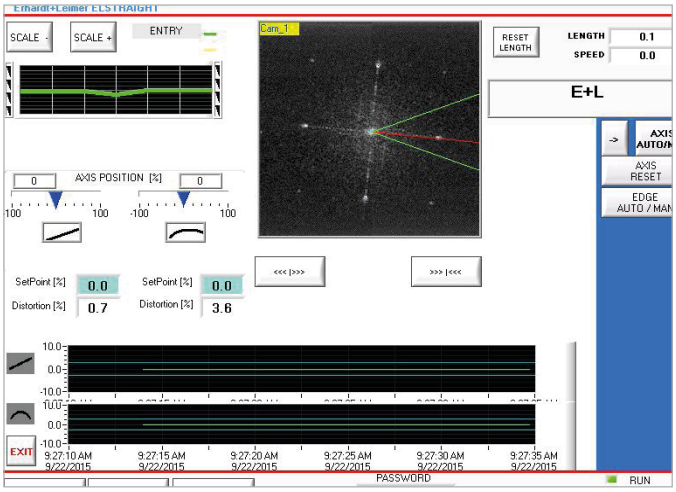
Block diagram



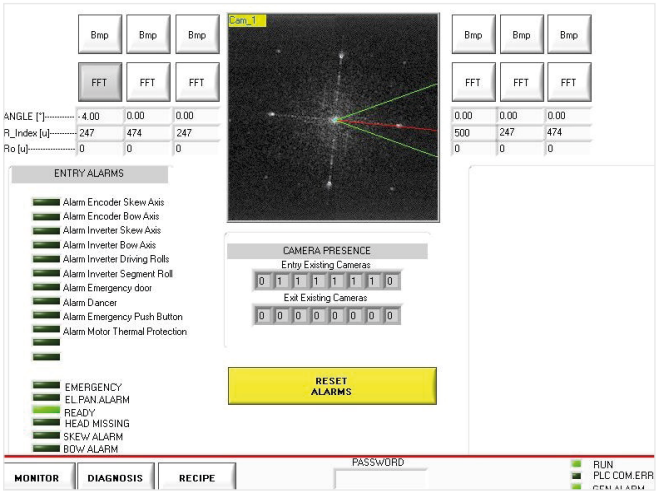
Operation and visualization

Operation

- User-friendly 12/15-inch touchscreen operation
- Visualization of the progression of the warping
- Percentage warping setting
- Histogram
- Recipe management
- User administration for User, Administrator and Service Technician



Monitor



Diagnostics

Recipe management

Function of the straightening system

Function

The sensor system continuously detects warping at predefined positions across the web. The evaluation logic decides whether skewing or bowing is present. The position controller compares the actual value of the warping with the target value and controls the actuators for skewing and bowing.

Area of use

- Infeed of the tenter and correction frame
- Decatizing systems
- Printing machine infeed
- Flame-laminating systems
- Coating systems

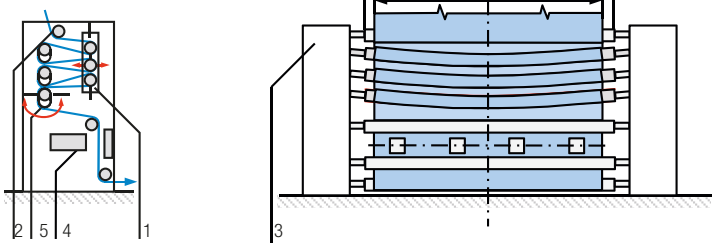
Application

As a general rule, the straightening system should always be installed immediately before the process.

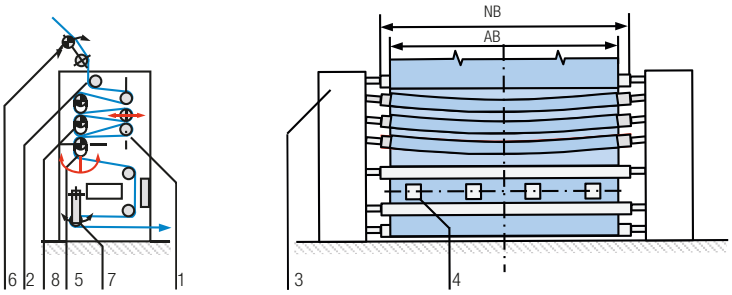
Woven and knitted fabrics must always be fed centrally into the straightening system with sufficiently consistent tension.

With knitted fabrics, a selvedge opening device must also be provided.

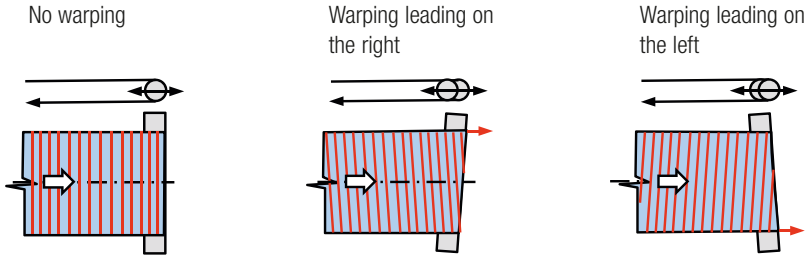
Application with woven fabrics



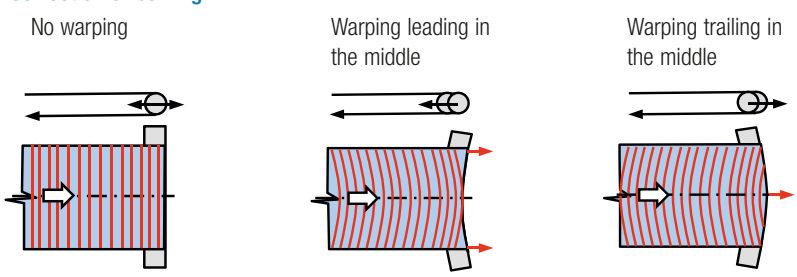
Application with knitted fabrics



Correction of skew warping



Correction of bowing

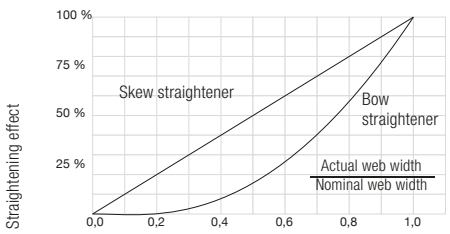


Legend

AB Working width
NB Nominal width

1 Skewing
2 Infeed roller
3 Weft straightener
4 Sensor
5 Bow adjustment
6 Selvedge opening device
7 Dancer position control
8 Additional drive

Correction diagram



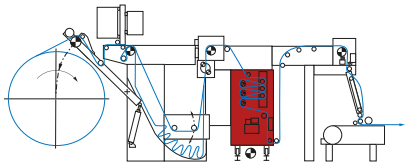
Straightening effect of bow and skew straighteners

ELSTRAIGHT straightening system

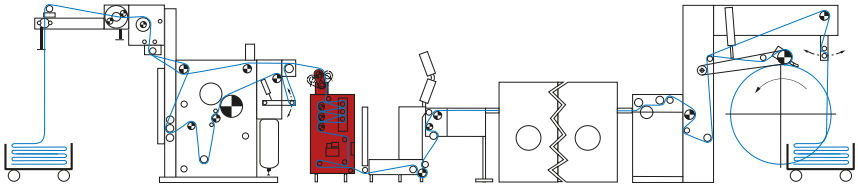
Straightening system

- Compact straightening system for woven and knitted fabrics
- 4 to 8 (max.) cameras for reliable detection of bowing and skewing
- Automatic positioning of the cameras to match the current web width
- 2 or 3 bow rollers and 3 skew rollers for corrections
- Optionally with dancer control for synchronization of the driven bow rollers with knitted fabrics
- Three-phase motors with frequency converters for adjustment of the bow and skew rollers
- Optionally with spreader roll for crease-free spreading of the web

ELSTRAIGHT standard



ELSTRAIGHT straightening system in the infeed of the printing machine



ELSTRAIGHT straightening system in the infeed of the tenter

Smart cameras insight the weft straightener

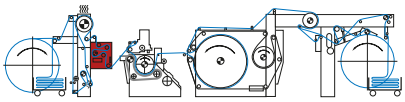
Technical data – Straightening system ELSTRAIGHT	
Sensors	4 to 8 matrix-cameras
Angular resolution	0,5 °
Straightening mechanism	
Actuating travel for skew correction	±400 mm with 3 Skew rollers
Actuating travel for bow correction	±390 mm with 2 Bow rollers ±260 mm with 2 Bow rollers
Roller diameter	101 mm (NB < 2600 mm) 114 mm NB > 2600 mm)
Type of web	Woven and knitted fabrics
Web width	900 mm to 3600 mm
Web speed	1 m/min to 150 m/min
Web tension	20 N to 1000 N
Ambient temperature	10 °C to 50 °C
Operating voltage	3 x 400 V 50 Hz
Current consumption	7 A to 10 A
Power consumption	3 kW to 4 kW
Protection class	IP 54

ELSTRAIGHT Mini straightening system

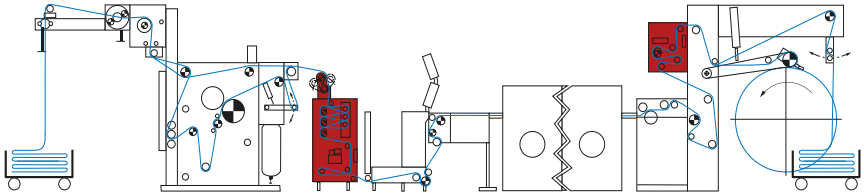
Mini straightening system

- Compact fine adjustment system for woven and knitted fabrics on sanforization, coating, flame lamination and printing machines
- 4 to 8 (max.) cameras for reliable detection of bowing and skewing
- Automatic positioning of the cameras to match the current web width
- One bow roller and skew roller each for correction
- Optionally with dancer control for synchronization of the driven bow roller with knitted fabrics
- Three-phase motors with frequency converters for adjustment of the bow and skew rollers

ELSTRAIGHT Mini



ELSTRAIGHT Mini straightening system at the infeed of a sanforization machine



ELSTRAIGHT Mini straightening system at the outfeed of a tenter

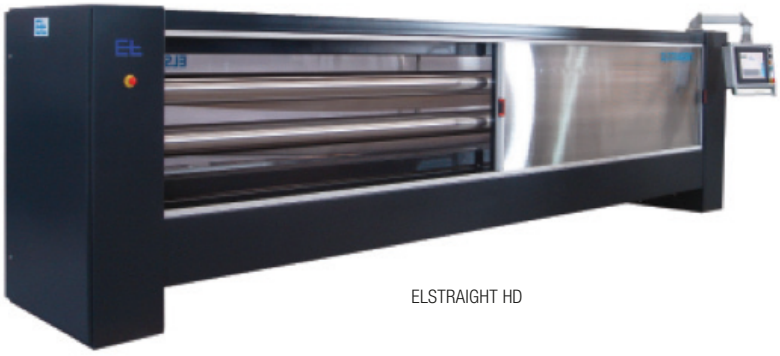
ELSTRAIGHT Mini at the tenter outfeed

Technical data – ELSTRAIGHT Mini straightening system	
Sensors	4 to 8 matrix-cameras
Angular resolution	0,5 °
Straightening mechanism	
Actuating travel for skew correction	±140 mm with 1skew roller
Actuating travel for bow correction	±130 mm with 1 bow roller
Roller diameter	101 mm (NB < 2600 mm) 114 mm NB > 2600 mm)
Type of web	Woven and knitted fabrics
Web width	900 mm to 3600 mm
Web speed	1 m/min to 150 m/min
Web tension	20 N to 1000 N
Ambient temperature	10 °C to 50 °C
Operating voltage	3 x 400 V 50 Hz
Current consumption	7 A to 10 A
Power consumption	3 kW to 4 kW
Protection class	IP 54

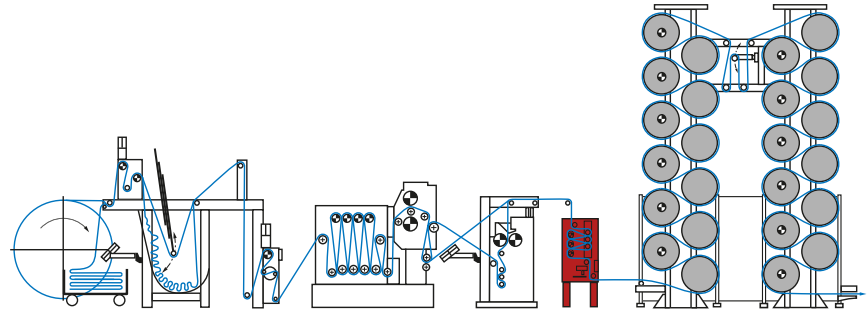
ELSTRAIGHT Heavy Duty straightening system

HD straightening system

- Heavy duty straightening system for high web tension
- 4 to 8 (max.) cameras for reliable detection of bowing and skewing
- Automatic positioning of the cameras to match the current web width
- 2 or 3 bow rollers and 3 skew rollers for corrections
- Three-phase motors with frequency converters for actuation of the bow and skew rollers



ELSTRAIGHT HD



ELSTRAIGHT HD straightening system in a denim production system

ELSTRAIGHT HD in a carpet plant

Technical data – ELSTRAIGHT HD straightening system in a denim production system	
Sensors	4 to 8 matrix-cameras
Angular resolution	0,5 °
Straightening mechanism	
Actuating travel for skew correction	±600 mm with 3 skew rollers
Actuating travel for bow correction	±300 mm with 3 bow roller
Roller diameter	168 mm
Type of web	Carpet, denim, technical textiles
Web width	1500 mm to 5500 mm
Web speed	1 m/min to 150 m/min
Web tension	100 N to 4000 N
Ambient temperature	10 °C to 50 °C
Operating voltage	3 x 400 V 50 / 60 Hz
Current consumption	12 A
Power consumption	5 kW
Protection class	IP 54

ELSTRAIGHT Combi straightening system

Function

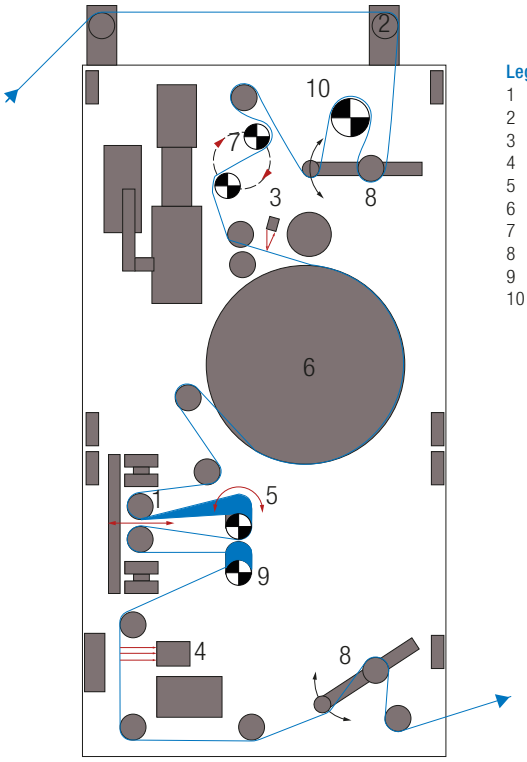
The Combi straightening system comprises two modules. The mechanical module straightens S-shaped warping and trailing edges by means of free-running needle wheels. The electrical module corrects bow and skew warping.

Function

- Infeed of the tenter and correction frame
- Decatizing systems
- Printing machine infeed
- Flame-laminating systems
- Coating systems

Function

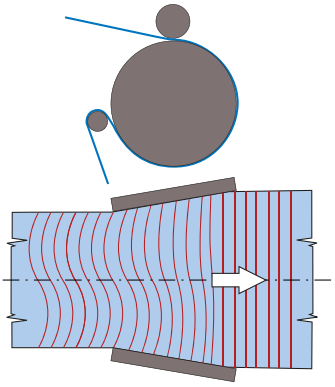
As a general rule, the straightening system should always be installed immediately before the process. Woven and knitted fabrics must always be fed centrally into the straightening system with sufficiently consistent tension. With knitted fabrics, a spreading device must also be provided.



Legend

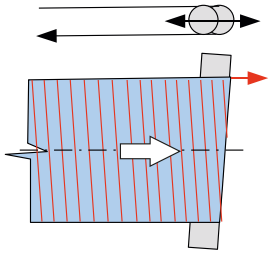
1 Skew adjustment
2 Infeed roller
3 Infrared edge sensor
4 Matrix camera
5 Bow adjustment
6 Needle wheel
7 Spreading device
8 Dancer position control
9 Additional drive
10 Transport drive

Correction of S-shaped warping



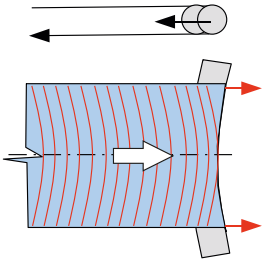
Correction of skew warping:

Warping leading on the right

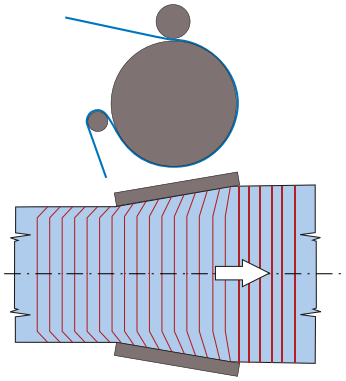


Correction of bowing:

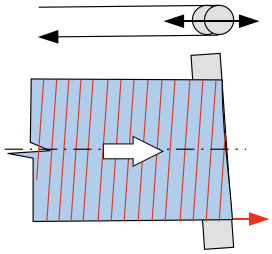
Warping leading in the middle



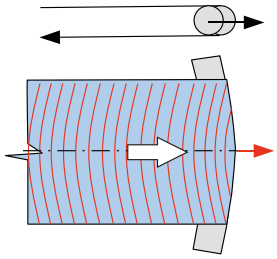
Correction of trailing edge



Warping leading on the left



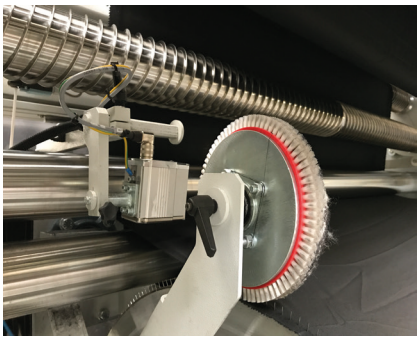
Warping trailing in the middle



Combi straightening system

- Compact straightening system for the correction of S-shaped warping and trailing edges
- Reliable pinning of the web edges by means of follow-up control system with infrared edge sensor FR 5503
- 4 to 8 (max.) cameras for reliable detection of bowing and skewing
- Automatic positioning of the cameras to match the current web width
- 2 bow rollers and 2 skew rollers for correction
- Optionally with dancer control for synchronization of the driven bow rollers with knitted fabrics
- Three-phase motors with frequency converters for adjustment of the bow and skew rollers
- Optionally with spreader roll for crease-free spreading of the web

ELSTRAIGHT Combi



Pin wheel and straightening rollers

User interface

Technical data – ELSTRAIGHT Combi straightening system	
Sensors	4 to 8 matrix-cameras Infrared edge sensor FR 5503
Straightening mechanism	2 needle wheels, 2 bow rollers, 2 skew rollers
Actuating travel, needle wheels (angular position)	20°
Actuating travel skew rollers	±200 mm
Actuating travel bow rollers	±260 mm
Diameter of the needle wheels	800 mm
Diameter of the rollers	101 mm (nominal width < 2600 mm) 114 mm (nominal width > 2600 mm)
Web type	Woven and knitted fabrics
Web width	800 mm to 3600 mm
Web speed	Max. 100 m/min
Web tension	20 N to 1000 N
Ambient temperature	10 °C to 50 °C
Operating voltage	3x 400 V 50 Hz
Current consumption	16 A
Power consumption	8.5 kW
Operating pressure	6 bar
Weight	Approx. 4000 kg
Protection class	IP 54

Questionnaire

General data			
Customer			
Street			
Zip code		City/town	
Country		Internet	
Telephone		Fax	
Contact person			
Tel. (direct line)		E-mail	
Project			

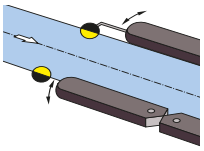
Technical data				
Type of machine				
Make				
Position on the machine				
Type of web	☐ Woven fabrics	☐ Knitted fabrics	☐ Denim	☐ Carpet
	☐			
Web width	Min. _____ mm		Max. _____ mm	
Web weight	Min. _____ g/m²		Max. _____ g/m²	
Weft density	Min. _____ wefts/cm		Max. _____ wefts/cm	
Web speed	Min. _____ m/min		Max. _____ m/min	
Web tension	Min. _____ N		Max. _____ N	
Web condition during operation	☐ Dry	☐ Moist	☐ Wet	☐
Ambient temperature	_____ °C			
Ambient conditions	☐ Dry	☐ Dusty	☐ Wet	☐
Operating voltage	☐ 3x _____V	☐ _____Hz		
Target speed value	☐ 0 to 10 V DC	☐ Other		

Specifications of the straightening system		
☐ Skew warping	±_____ mm	
☐ Bow warping	±_____ mm	
Operation	☐ On the left in the direction of production	☐ On the right in the direction of production
	☐ Offset	Cable length _____ m
Drive side	☐ On the left in the direction of production	☐ On the right in the direction of production
Climate control unit for the control cabinet	☐ With	☐ Without

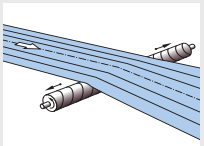
Comments

Date	Issuer

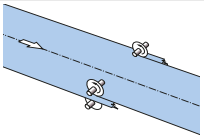
Other products for the textile industry



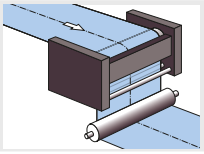
ELFEED – Tenter infeed systems



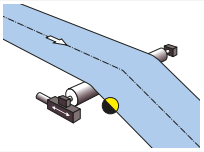
ELSPREADER – Web spreading systems



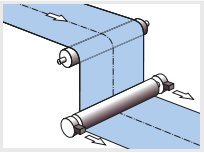
ELCUT – Web cutting systems



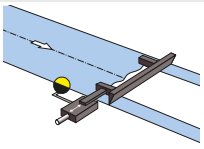
ELSMART – Web guiding systems



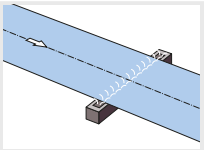
ELBANDER – Conveyor belt control systems



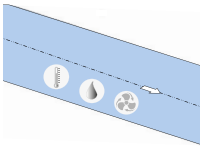
ELTENS – Web tension control systems



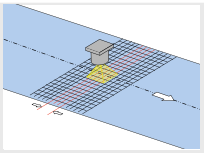
ELPOSER – Positioning and follow-up control systems



ELMETA – Metal detection systems



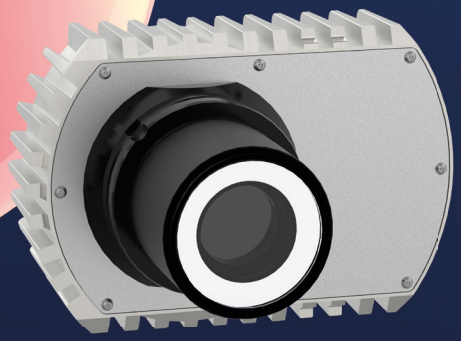
ELMAT – Process control systems for tenters

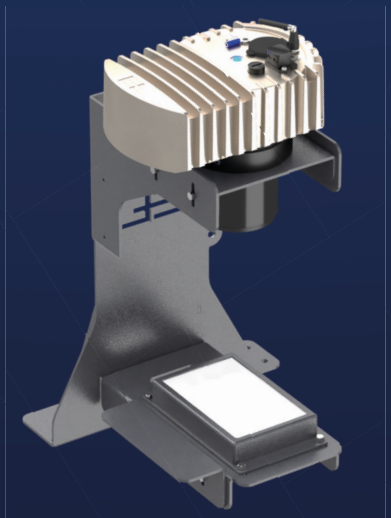


ELCOUNT – Thread counting systems

Notes

PROTECT YOUR PRODUCTION LINE WITH AI





ELSEAMTEX
Seam sensor SI 1001

ARTIFICIAL INTELLIGENCE DETECTS EVERY SEAM

- Artificial Intelligence based on more than 60.000 data records for highest reliability
- Non-contact detection with partial data recording
- Reliable protection of calender rollers, digital printing heads and shearing knives

Lern more about seam sensor

ELWARP
Warp thread sensor SI 2001

ARTIFICIAL INTELLIGENCE FINDS THE SELVEDGE END RELIABLY

- Direct detection of the selvedge thread instead of offset estimation
- Statistically supported algorithm forhighest precision
- Saving money and protecting the infrastructure has never been easier

Lern more about warp thread sensor

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