ELGUIDER

Web guiding systems

Continuous web position detection and control

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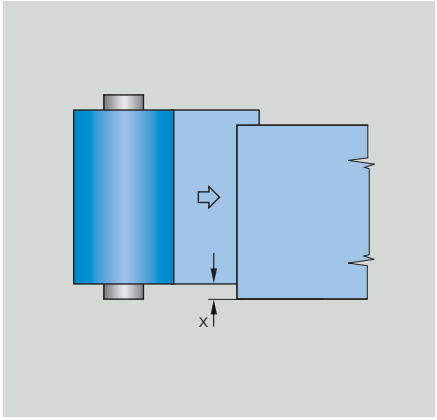
Web guiding systems for improved quality and productivity

Today, the manufacturers and users of processing machines for web-type materials are confronted with ever increasing demands: production processes should be even faster, while at the same time performed with greater precision, the quality of the finished product further improved while personnel, waste and, above all, downtimes, should be reduced to a minimum.

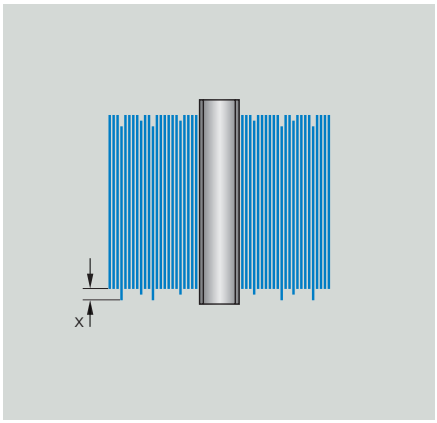
A decisive contribution in the fulfillment of these prerequisites is afforded by web guiding systems. Typically, web-type materials are fed from a reel to the machine, processed and then rewound. During these stages, various position errors may occur, examples of which are illustrated on this page.

E+L web guiding systems are designed to eliminate these influencing error variables and to assure permanent, precision web alignment and winding. Depending on the type of material, application and task, Erhardt+Leimer offer a wide variety of systems with the latest DCS* technology: for decisively more quality and productivity that pays off!

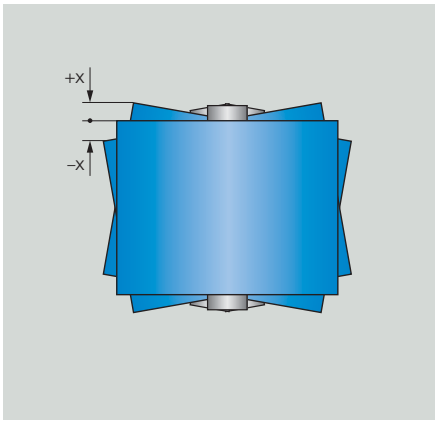
Typical position errors



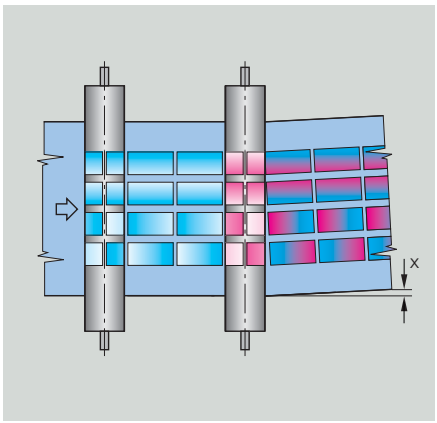
Web offset on reel change
On practically all reel changes, the finished and new web meet with an offset, causing irregularities in the following process stage.



Incorrectly wound reels
Fabric reels that are not precision-wound lead to incorrect web feeding to the processing machine.



Tumbling errors
Imprecisely adjusted fabric reels tend to tumble, thus creating a periodical position error.



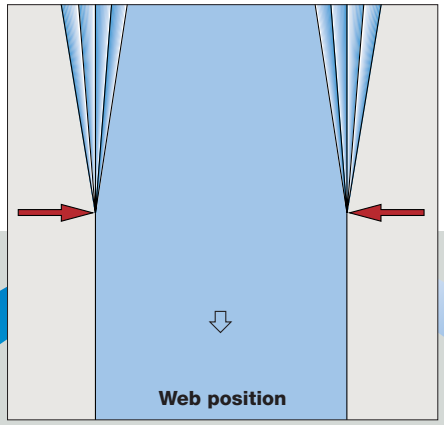
Web travel during production
During production mechanical processing, temperature, humidity or air currents influence the web and may effect web travel detrimentally.

* Digital-Control-System

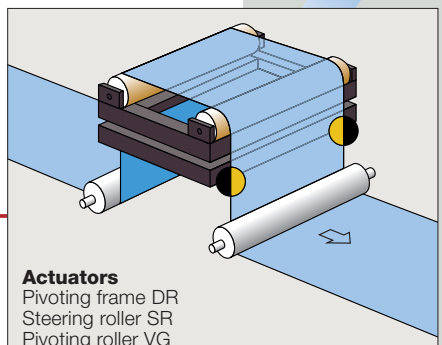
Control loop

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

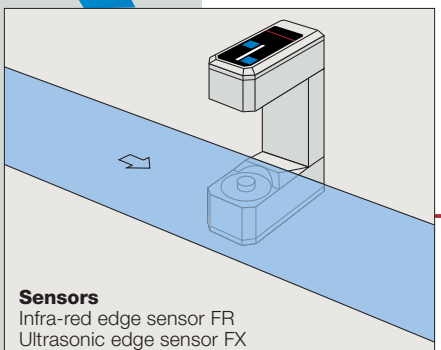
- Point of departure is the actual web position.
- A sensor detects the web actual position without touching. Depending on the task and fabric properties, this may be an infra-red, ultrasonic or line sensor.
- The controller compares the actual web value with the target set value and transmits the relevant corrective signal to the actuator.
- The actuator corrects web travel. Depending on the application and the fabric type, the actuator may be a pivoting frame, steering roller, pivoting roller, turning bar, lateral displacement roller or linear drive for reel stations.



Web position



Actuators
Pivoting frame DR
Steering roller SR
Pivoting roller VG
Turning bar VW
Reel station VP
Lateral displacement roller SV



Sensors
Infra-red edge sensor FR
Ultrasonic edge sensor FX
Pneumatic edge sensor FL
Color line sensor FE
CCD camera OL

Controller
Digital position controller DC
Pneumatic position controller HP

Operating panel DO

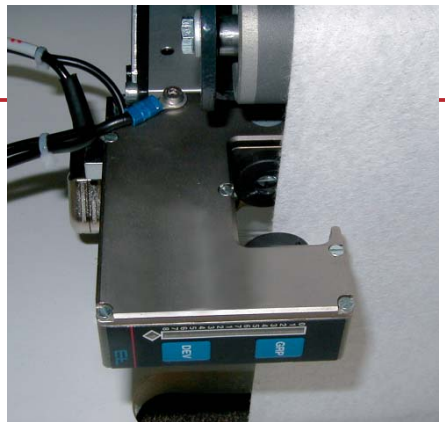
Interface DI

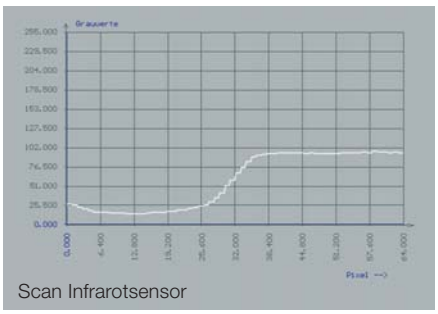
Infra-red edge sensors

Infra-red edge sensor FR 45
This extremely compact digital sensor operates on a back-light principle. The transmitter generates a paralled infra-red light with a wave length of 880 nm which is captured by a CCD array element in a receiver located opposite. A processor evaluates the signals and sends the actual position value to the CAN bus.
The sensor establishes the edge position with a precision of 0.01 mm within a measuring range of +/– 3 mm. A telecentrical optical unit only evaluates the parallel light beams. Position errors due to height fluctuations are thus excluded.
An automatic exposure control permanently monitors lens soiling and indicates any soiling to the controller. Each lens features a blower which may be connected to the air supply to deal with soiling such as paper dust or abraded particles.

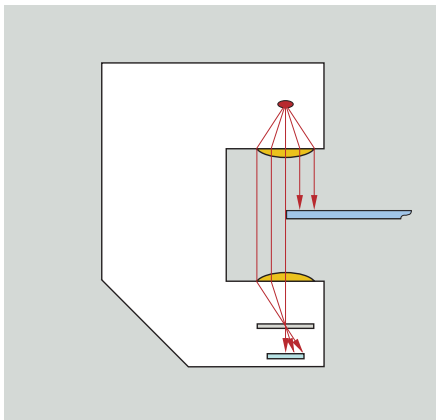
- Paper
- Nonwoven
- Rubber
- Mesh
- Textile
- Tire cord

Infra-red sensor FR 45
on a baby diaper machine





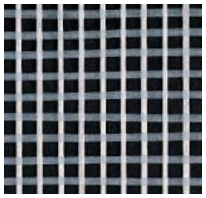
Scan Infrarotsensor

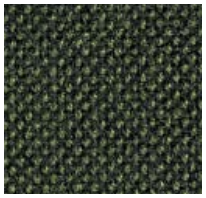


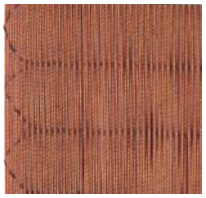
Technical data **Infra-red edge sensor FR 45**	
Operating voltage Nominal voltage Nominal voltage range	 24 V DC 20 to 30 V DC
Current rating	110 mA DC
Ambient temperature	+ 10 to + 50 °C
Measuring range Resolution	+/– 3 mm 0.01 mm (46 pixels x 16 subpixels)
Wave length	880 nm
Scanning rate	200 Hz
Cable length	max. 8 m
Protection class	IP 54
Weight	0.2 kg
Dimensions (L x W x H)	72 x 27 x 93 mm

Infra-red edge sensors

Infra-red edge sensor FR 50
The digital edge sensor FR 50 operates on a retroreflection principle. A transmitter generates a parallel infrared light with a wavelength of 880 nm which is reflected by a prism mirror located opposite and scanned in the CCD array element of the receiver. A processor evaluates the signals and sends the actual position value to the CAN bus.
The sensor establishes the edge position with a precision of 0.02 mm within a measuring range of +/– 10 mm. A telecentrical optical unit only evaluates the parallel light beams thus excluding position errors due to height fluctuations.
An automatic exposure control monitors lens soiling and sends the appropriate message to the controller in the event of soiling.
Adaptation for scanning smooth homogenous or mesh-type web edges may be conveniently selected via parameters.

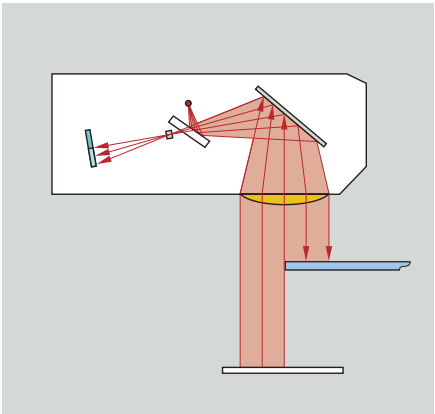






- Paper
- Nonwoven
- Rubber
- Mesh
- Textile
- Tire cord

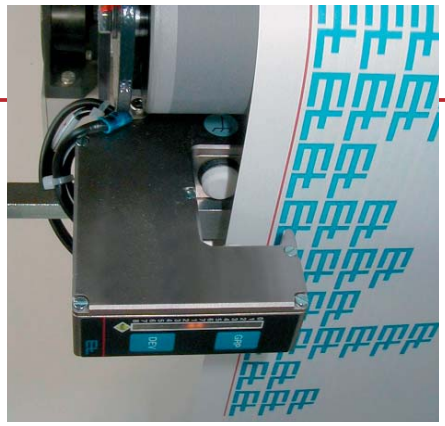
Infra-red sensor FR 50
on a rotary offset press



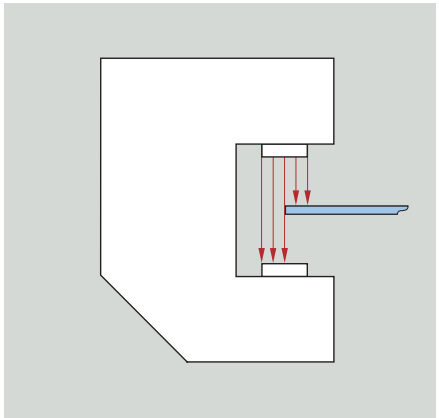
Technical data **Infra-red edge sensor FR 50**	
Operating voltage Nominal voltage Nominal voltage range	 24 V DC 20 to 30 V DC
Current rating	80 mA DC
Ambient temperature	+ 10 to + 50 °C
Measuring range Resolution	+/– 10 mm 0.02 mm (64 pixels x 16 subpixels)
Wave length	880 nm
Scanning rate	200 Hz
Cable length	max. 8 m
Protection class	IP 65
Weight	0.3 kg
Dimensions (L x W x H)	105 x 50 x 43 mm

Ultrasonic edge sensors

Ultrasonic edge sensor FX 45
These digital sensors detect web edges without touching by ultrasonic means. As such they are ideally suited for implementation on paper webs and with transparent foils. As these sensors are very small they are mainly used on small pivoting frames ELGUIDER DRS 12/22 for narrow webs.
The transmitter oscillates with an ultrasonic frequency of 200 kHz which is output in pulses of 1 kHz. Depending on the fork gap, the receiver measures the density of the ultrasonic waves that are not covered by the web edge.
Disturbances such as air movement or temperature fluctuations are compensated to such an extent that the edge may be recorded to an accuracy of 0.1 mm.
The analog ultrasonic sensor signal is digitalized via a A/D converter and output on the CAN bus. All calibration and evaluation processes are also run digitally.



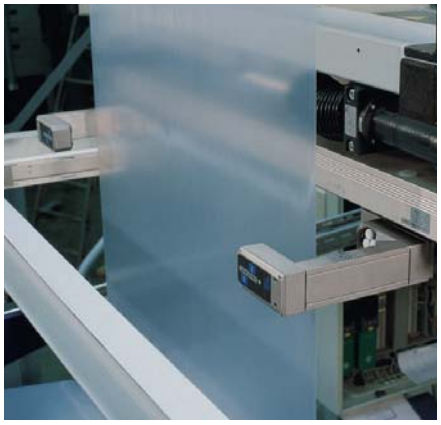
Ultrasonic edge sensor FX 45
on a re-rolling machine



Technical data **Ultrasonic edge sensor FX 45**	
Operating voltage Nominal voltage Nominal voltage range	 24 V DC 20 to 30 V DC
Current rating	110 mA DC
Ambient temperature	+ 10 to + 50 °C
Temperature drift (typical) at a relative air humidity of 60 %	approx. 0.025 mm/K
Measuring range	+/– 3 mm
Linearity deviation (Measuring range 10 – 90 %)	< 1%
Ultrasonic frequency Transmitting pulse frequency	~ 200 kHz 1 kHz
Resolution AD converter	0.016 mm
Scanning rate	200 Hz
Cable length	max. 8 m
Protection class	IP 54
Altitude	0 to 3000 m above sea level
Weight	0.2 kg
Dimensions (L x W x H)	72 x 27 x 93 mm

Ultrasonic edge sensors

Ultrasonic edge sensor FX 4/5
These digital sensors detect web edges without touching by ultrasonic means. As such they are ideally suited for implementation with transparent films, in the photo branch and due to their dust resistance, for paper webs.
The transmitter oscillates with an ultrasonic frequency of 200 kHz which is output in pulses of 1 kHz. Depending on the fork gap, the receiver measures the density of the ultrasonic waves that are not covered by the web edge.
Disturbances such as air movement or temperature fluctuations are compensated to such an extent that the edge may be recorded to an accuracy of 0.1 mm.
The analog ultrasonic sensor signal is digitalized via a A/D converter and output on the CAN bus. All calibration and evaluation processes are also run digitally.

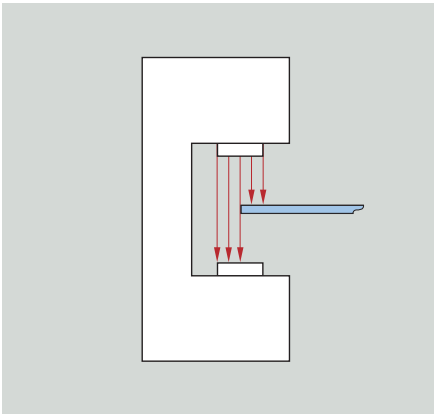


» Ultrasonic sensor FX 4 on a rotary offset press

« Ultrasonic sensor FX 5 on a blown film extruder

Option table
Ultrasonic edge sensors FX 4/5

Type	Measuring range +/– (mm)	Fork width (mm)
FX 4030	3	30
FX 4060	3	60
FX 4100	3	124
FX 5030	10	30
FX 5060	10	60
FX 5100	10	124

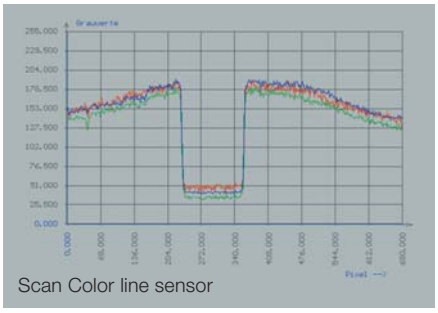


Technical data
Ultrasonic edge sensors FX 4/5

Operating voltage Nominal voltage Nominal voltage range	 24 V DC 20 to 30 V DC
Current rating	170 mA DC
Ambient temperature	+ 10 to + 50 °C
Temperature drift (typical) at a relative air humidity of 60 %	approx. 0.025 mm/K
Measuring range	see option table
Linearity deviation (Measuring range 10 – 90 %)	< 1 %
Ultrasonic frequency Transmitting pulse frequency	~ 200 kHz 1 kHz
Resolution AD converter	0.016 mm
Scanning rate	200 Hz
Cable length	max. 8 m
Protection class	IP 65
Altitude	0 to 3000 m above sea level
Weight	0.67 kg
Dimensions (L x W x H)	105 x 50 x (LW + 80) mm

Color line sensors

Color line sensor FE 50
The digital, optoelectronic color line sensor FE 50 operates with white light and can detect printed contrasts and color line with precision. Depending on the particular job, the sensor may be selected with front or back light. The reflected light is scanned pixel by pixel on a built-in CCD chip with RGB evaluation, then evaluated by a follow-up processor and output on the CAN bus as an actual position value. Breaks in the lines or color contrasts do not cause any disruption. If no reference characteristic is available, the FE 50 does not output an actual position value.
An automatic exposure control permanently monitors lens soiling and indicates any soiling to the controller. The sensor establishes the edge position with a precision of 0.05 mm within a measuring range of +/– 10 mm. Disturbances such as print marks or logos may be blanked out by restricting the scanning area.

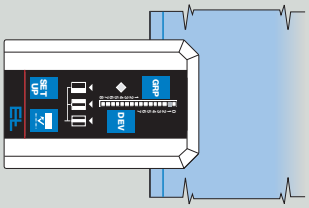

Scan Color line sensor

Sensor mounting bracket VA 6
A stable sensor mounting bracket is a decisive factor in precision, vibration-free scanning of the line/colored edge. Different versions are available depending on the application.

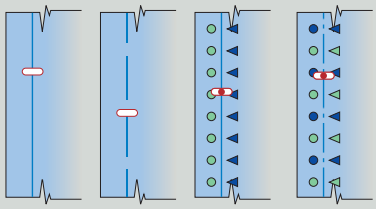
Color line sensors

Operation
The user-friendly sensor membrane keypad permits the performance of all settings directly via four keys, e.g. address change or selection of the guiding criterion.

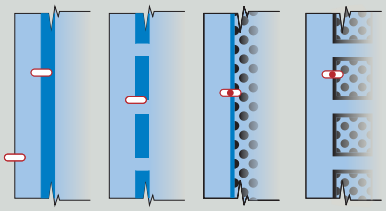
Guiding criteria
- Line scanning, light line on dark background
- Line scanning, dark line on light background
- Contrast scanning



Line scanning
- Continuous line with uniform background
- Broken line with uniform background
- Continuous line with uneven background
- Broken line with uneven background
- Line width 0.5 – 8 mm (Nominal width 2 – 3 mm)
- Background width on both sides minimum 1 mm
- Scanning range may be restricted to double line width



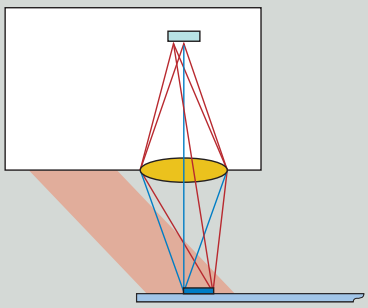
Contrast scanning
- Web edge scanning
- Contrasting edge with uniform background
- Broken contrasting edge with uniform background
- Contrasting edge with uneven background
- Broken contrasting edge with uneven background
- Color contrasting edge on both sides minimum 1 mm
- Scanning range may be restricted to 2 mm



Color line sensor FE 50 on a roll cutting machine

Option table
Sensor mounting bracket VA 6

Type	Mounting square bar (mm)	Mounting
VA 6007	20 x 20	fixed
VA 6027	20 x 20	variable
VA 6107	40 x 40	fixed
VA 6127	40 x 40	variable



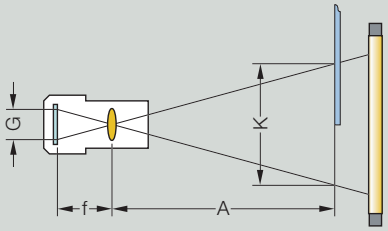
Technical data
Color line sensor FE 50

Operating voltage Nominal voltage Nominal voltage range	 24 V DC 20 to 30 V DC
Current rating	300 mA DC
Ambient temperature	+ 10 to + 50 °C
Measuring range	+/– 10 mm
Resolution No. of pixels	0.02 mm 3 x 1875 (red, green, blue)
Sensor/web spacing	24 mm +/– 2 mm
Scanning rate	200 Hz
Cable length	max. 8 m
Protection class	IP 65
Weight	0.75 kg
Dimensions (L x W x H)	125 x 76 x 76 mm

CCD Camera

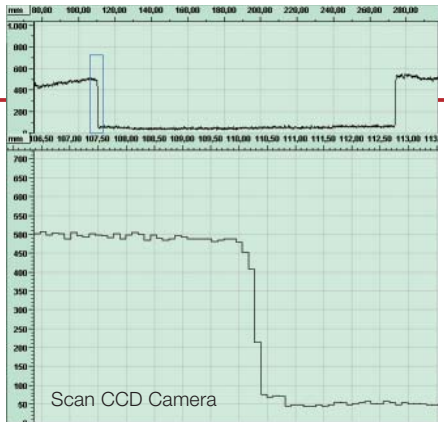
CCD camera OL 81
This compact CCD camera picks up light contrasts in a wavelength band from 400 to 1000 nm (UV to infra-red). Via a 28 mm, or optionally a 50 mm optical unit, contrasts are measured in a CCD line chip with 5150 pixels.
A true resolution of 1 : 41200 (measuring range : 41200) is achieved by a special subpixel evaluation. Depending on the web properties, the light is either measured in frontlight (measurement of reflected light) or backlight mode.
The CCD line camera OL 81 precisely detects the edge or contrast on the web surface. The particular advantage of this sensor is its vastly extended measuring range. Depending on the application, a CCD line camera can detect up to sixteen web events. As such, it is also suitable for width measuring or web center guiding – frequently a more cost-efficient solution than edge sensors with the necessary motor-driven positioners. The separate evaluation unit already comprises a clear text display. Up to 4 cameras may be operated via the evaluation unit.

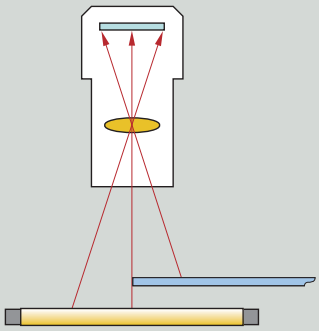
Calculation of distance to the web
The distance between the CCD camera and the web surface is calculated in the following manner:



$A = f \cdot (K + G)/G$

K CCD camera measuring range
G Length of CCD chip (36.05 mm)
A Distance between CCD camera and web surface (mm)
F Focal distance of lens (mm)





Technical data CCD Camera OL 81		
Operating voltage Nominal voltage Nominal voltage range		 24 V DC 20 to 30 V DC
Current rating		500 mA DC
Ambient temperature		+ 10 to + 50 °C
Resolution		28/50 mm
Resolution No. of pixels		Measuring range/(no. of pixels/subpixels) 5150 (8 x subpixels)
Cycle time		5 ms
Scanning rate		≤ 3 kHz
Active chip length		36.05 mm
Spectral range		400 to 1000 nm
Spectral maximum		500 nm
Interface		CAN-Bus USB Ether Net
Protection class		IP 54
Weight		1 kg
Dimensions	Camera Evaluation unit (L x W x H)	Ø 80 x 141 mm 180 x 190 x 95 mm

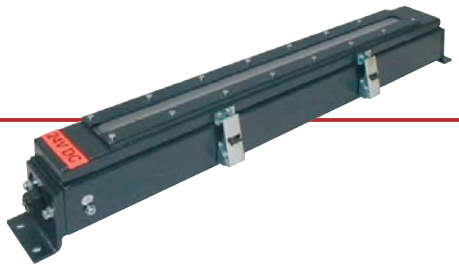
Accessories CCD Camera

Sensor mounting bracket VA 5538

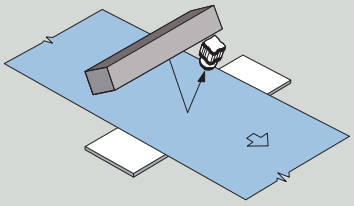
A stable sensor mounting bracket is a decisive factor for precision, vibration-free web edge scanning. The sensor mounting bracket may be precisely adjusted on 3 axes for the first-time commissioning of the camera.

Light transmitter FS 81

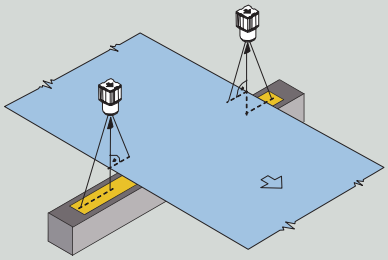
- Rugged light transmitter in a sheet steel housing with hinge-up cover
- Ballast 24 V DC or 230 V AC already built-in
- Matt or clear glass cover available for different scanning methods
- Pins for accommodating a calibrating template already built-in.



Frontlight mode
In frontlight mode the FS 81 light transmitter with clear glass cover is located in front of the web. The light is reflected by the web. Besides the detection of outer edges, this principle also permits the recording of lines, ribs or grooves on the web surface.



Backlight mode
In backlight mode the FS 82 light transmitter with matt glass cover is located behind the web to be scanned. Only the outer edges of non-transparent webs are recorded here.



Option table
Light transmitter FS 81/82

Type	Length of active light field (mm)	Glass cover
FS 8101	450	clear
FS 8101	750	clear
FS 8101	900	clear
FS 8101	1050	clear
FS 8101	1350	clear
FS 8101	1600	clear
FS 8201	450	matt
FS 8201	750	matt
FS 8201	900	matt
FS 8201	1050	matt
FS 8201	1350	matt
FS 8201	1600	matt

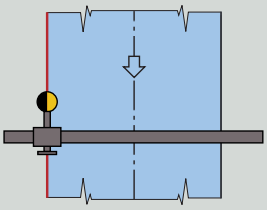
Technical data
Light transmitter FS 81/82

Light transmitter						
Length of active light field (mm)	450	750	900	1050	1350	1600
Length of lamp (mm)	590	895	1045	1200	1500	1764
Total length	650	960	1110	1260	1560	1830
Lamp power (W)	18	30	38	36	58	70
Protection class	IP 54					
Weight (kg)	4.4	6.3	7.1	7.9	9.7	11.5
Electronic ballast 230 V AC						
Nominal voltage	230 V AC					
Nominal voltage range	220 to 240 V AC					
Nominal frequency	50/60 Hz					
Nominal current (A)	0.095	0.18	0.18	0.18	0.26	0.33
Power (W)	18	36	36	36	58	70
Operating frequency	35 kHz					
Electronic ballast 24 V DC						
Nominal voltage	24 V DC					
Nominal voltage range	22 to 30 V DC					
Nominal current (A)	0.75 to 1.35	1.2 to 2.2	1.2 to 2.2	1.2 to 2.2	1.7 to 2.7	
Power (W)	15 to 18	30 to 36	30 to 36	30 to 36	58	
Operating frequency	28 kHz					
Ambient temperature	– 10 to + 50 °C					

Positioning control systems

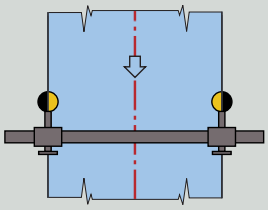
Web guiding is first of all determined by the degree of web processing. Unfinished fabric webs may only be guided by the edge as no other regular contrasting characteristics are featured. Finished webs offer a further field of possible guiding criteria. They may be guided by a printed characteristic line, water marks, notching or in addition to the web edge, according to a freely selected contrast.

Manual sensor positioning
Web edge guiding



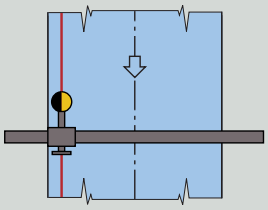
Guiding by the
left or right web edge

Manual sensor positioning
Web center guiding



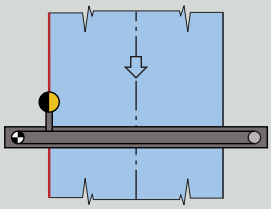
Guiding by the
ideal web center line/machine center line

Manual sensor positioning
Web contrast guiding



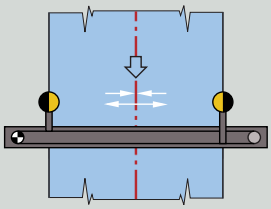
Guiding by a
printed line or existing contrasts

Motor-driven sensor positioning
Web edge guiding

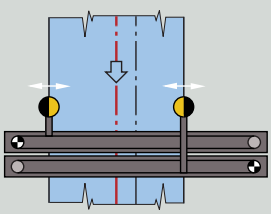


Guiding by the
left or right web edge

Motor-driven sensor positioning
Web center guiding

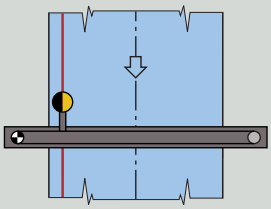


Guiding by the
ideal web center line/machine center line
with symmetric sensor positioning
(hybrid control)



Guiding by the
web center which does not correspond to
the machine center with motor-driven sensor
positioning for both sides
(Automatic edge search)

Motor-driven sensor positioning
Web contrast guiding



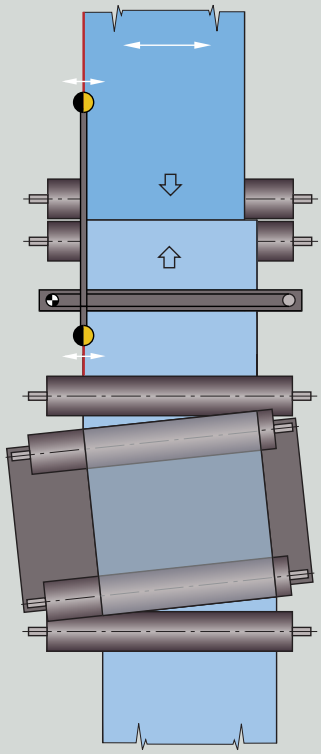
Guiding by a
printed line or existing contrasts

Positioning control systems

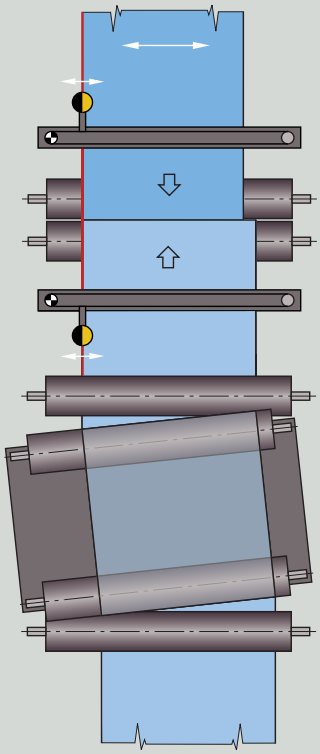
Web to web guiding
Laminating means combining two or several webs to produce a composite material. All fabric webs running together in front of the laminating unit must be positioned exactly in relation to one another.

The more precisely the webs are matched, the more economical the laminating process will be. This applies both to material input and the disposal of trimmings (wastage).

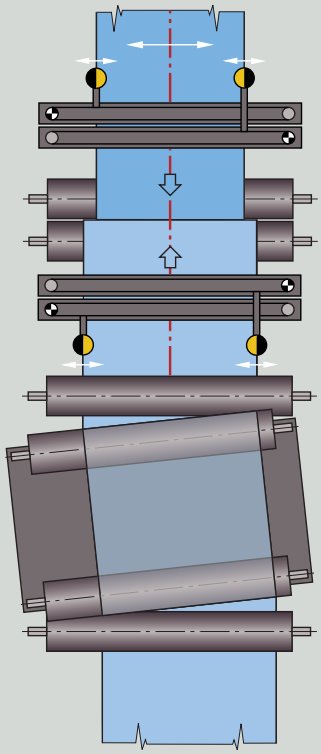
Web to web guiding by the web edge with one support beam



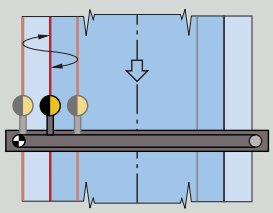
Web to web guiding by the web edge with two support beams



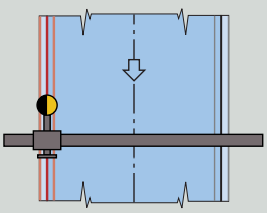
Web to web guiding by the web center line with two support beams



Web oscillation
Oscillating refers to the controlled changing of the web position within a specific cycle time. Here, a differentiation is made between two different types of set value specification. The main implementation area is on web guiders in front of rewinder.

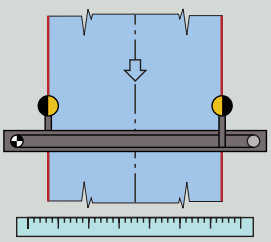


For larger oscillating strokes, the mechanical sensor set point is change via motor



For smaller strokes, a change in the electrical set point is sufficient

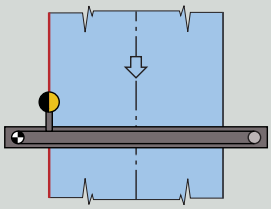
Web width measuring
If both web edges are scanned by two sensors, the actual web width may also be calculated and displayed.



Sensor positioning

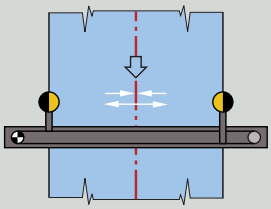
Support beam VS 45
If the sensor location is difficult to access or the scanning position must be changed frequently, it must be possible to set the sensor position manually or by motor.
This task is performed by VS 45 support beams. Depending on the version used they position one or two carriages via a toothed belt whereby the motor and positioning controller are pre-mounted in the linear system as an entity. A CAN bus connection is obligatorily featured.

Motor-driven positioning
Support beam VS 4515



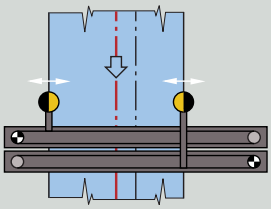
This basic version features a carriage and a drive unit in order to position the sensor at the required position.

Motor-driven positioning
Support beam VS 4525



This version comprises two carriages, linked to one another via a toothed belt. The former are protracted or extended together via a drive unit.

Motor-driven positioning
Support beam VS 4535

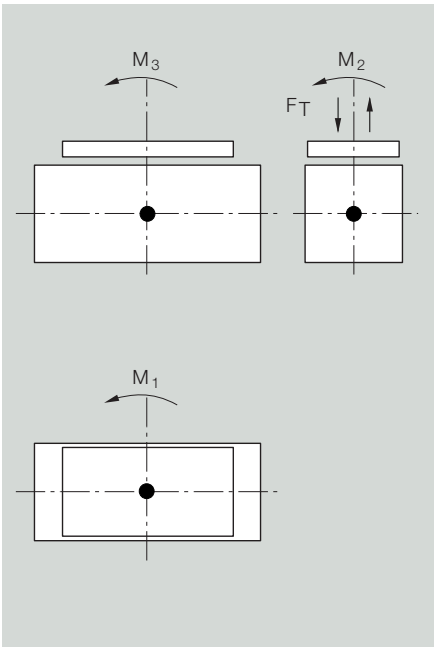


This support beam also features two carriages, each with its own independent drive unit. This means that the left and right sensors may be adjusted independently of one another. Due to a synchronous drive control, web offsetting is thus possible across the full width of the web.

Sensor positioning

Positioning controller RK 4008

- Extremely compact digital positioning controller with two integrated output modules, pre-mounted on the support beam
- Cascade-type control structure for precise sensor positioning
- CAN bus technology dispenses with extensive wiring and uses simple plug connections instead
- Software download via CAN bus or modem
- Temperature-monitored, short circuit-proof output module with 2 x 1.5 A output current.

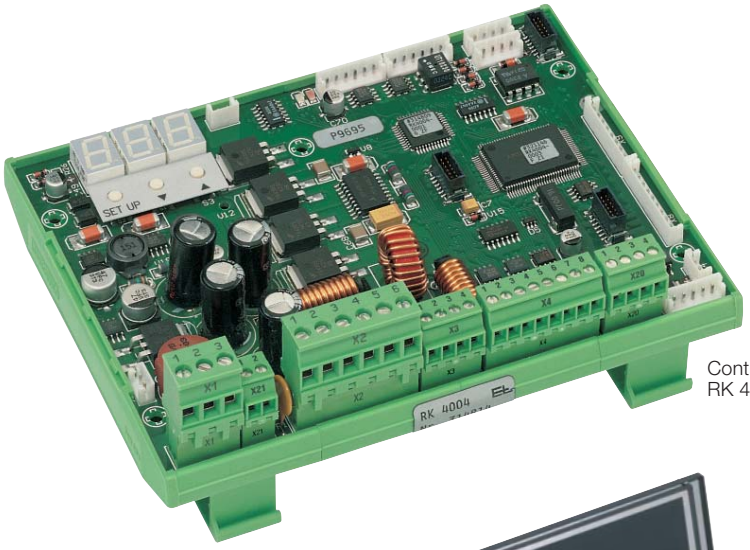


Technical data **Support beam VS 45**			
Operating voltage Nominal voltage Nominal voltage range		 24 V DC 20 to 30 V DC	
Current rating		0.9 A DC (1 positioning drive) 1.6 A DC (2 positioning drive)	
Nominal positioning path	VS 4515 VS 4525 VS 4535	 min. 250 mm min. 250 mm	max. 5850 mm max. 5850 mm max. 5850 mm
Nominal positioning speed		1 to 70 mm/s (variable)	
Nominal positioning force		20 N	
Centric bearing load per positioning carriage F_T		max. 50 N	
Torque M1, M2, M3		max. 2 Nm	
Reproducibility		≤ +/– 0.1 mm (per positioning drive)	
Ambient temperature		+ 10 to + 50 °C	
Ambient conditions		dry	
Protection class		IP 54	
Weight	VS 4515 VS 4525 VS 4535	for NB 1000 mm 15.7 kg for NB 1000 mm 16.2 kg for NB 1000 mm 16.7 kg	per 100 mm 1 kg per 100 mm 1 kg per 100 mm 1 kg

Position controllers

Position controller DC 03/13/23

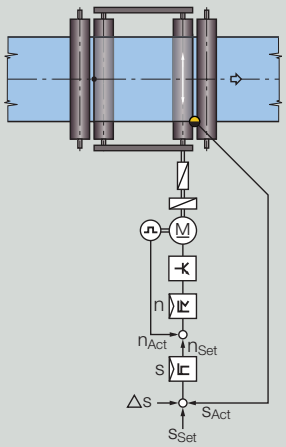
- Extremely compact digital position controller with built-in output module for triggering DC gear motors
- Cascade-type control structure for precision controlling of proportional and integral actuators
- CAN bus technology dispenses with extensive wiring and uses simple plug connections instead
- If the control electronics are integrated on the actuator, wiring is complete ex works, i.e. no separate control cabinet is required
- Software download via CAN bus or modem
- Setup operation integrated on the controller card
- Digital and analogue input and output modules may be connected via SPI (Serial Processor Interface)
- Temperature-monitored, short circuit-proof output module with 7 A output current.



Control board
RK 4004

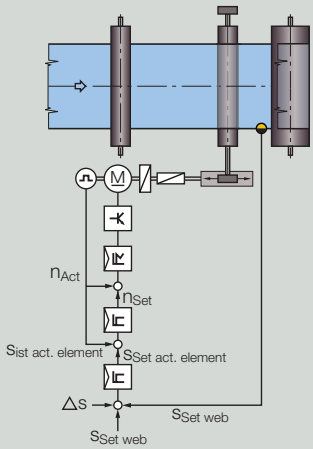
Position controller
DC 03

Controller diagram for proportional actuators
Besides a positioning controller for the web, the cascaded guiding structure for proportional actuators also features a speed and current controller for the actuator.



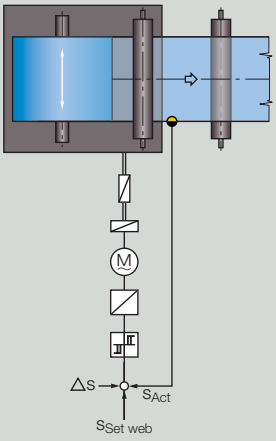
Proportional actuators
- Pivoting frames
- Steering rollers
- Turning bars
- Lateral displacement rollers
- Winding station

Controller diagram for integral actuators
Besides a positioning controller for the web, the cascaded guiding structure also features a positioning, speed and current controller for the actuator.



Integral actuators
- Pivoting rollers
- Segmented guider rollers
- Edge spreading devices
- Spreading devices

Controller diagram for proportional actuators with three-position controllers
Three-position controller with variable window and hysteresis variable.



Proportional actuators
- Reel stations with three phase a.c. drives
- Turning bars with three phase a.c. drives

Position controllers

Software function modules

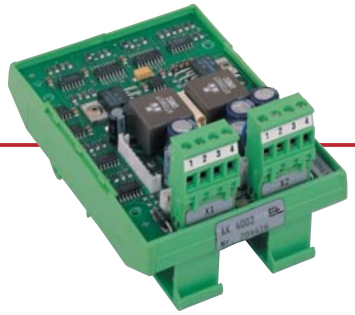
- Cascade-type guiding structures with position, speed and current controller for proportional and integral actuators already integrated
- Automatic sensor addressing assures effortless sensor replacement
- Web displacement in 1/10 mm and 1/100 mm steps possible
- Automatic reduction of the maximum positioning speed when guiding deviation too high, e.g. in the case of splice or web tear
- Automatic switch-over to edge sensor in the event of line loss (emergency guiding)
- Brief motor current increase assures improved dynamics
- Adaptation of the control loop to changing process variables e.g. web speeds
- Non-linear amplification characteristic curve for web position controller. Additional stabilization in the event of irregular web edges
- Cycle and path-dependent oscillation of the web position target value possible
- End position limiting and early display for actuator may be set.

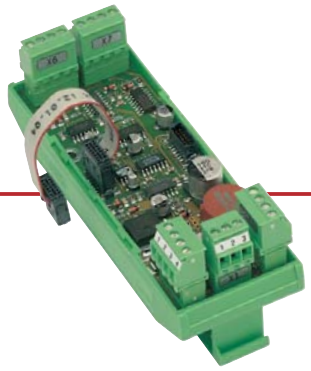
Function modules

Input module (analog) AK 4002
Input module with two analog inputs of +/– 10 V (9 bits) and +/– 12 V DC sensor supply voltage.
E+L sensors with analog output voltage may thus be operated on the digital guider.

Input module (analog) AK 4014
Input module with four inputs of 0 – 10 V (12 bits) and + 10 V DC sensor supply voltage.
Sensors or position sensors may thus be operated on the digital guider.

Input and output module LK 4203
Module with eight digital inputs and outputs each.
For all binary signals triggering the positioning controller.





Option table
Position controller DC without operating panel

Type	RK 4004	AK 4002	LK 4203	AK 4014
DC 0310				
DC 0311				
DC 0340				
DC 0341				
DC 0360				
DC 0361				

Option table
Position controller DC with operating panel

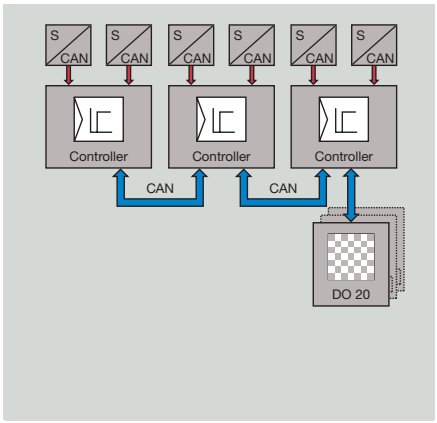
Type	RK 4004	AK 4002	LK 4203	RT 4019	DO 2000
DC 1310					
DC 1340					
DC 2340					
DC 2341					

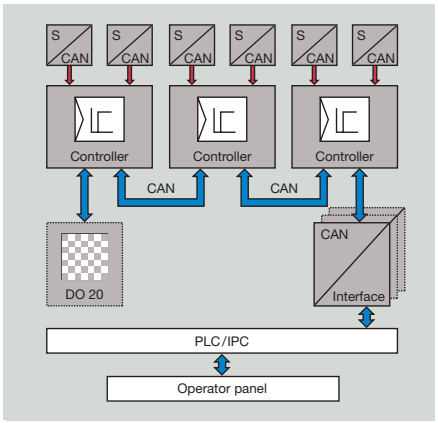
Technical data **Position controller DC**		
Positioning controller		
Operating voltage Nominal voltage Nominal voltage range		 24 V DC 20 to 30 V DC
Current rating	without motor with motor (maximum)	0.2 A DC 7.2 A DC
Output voltage	on motor terminal	+/– 22 V PWM (pulse-width modulated)
Output current		max. 7 A
Cycle time		10 ms
Ambient temperature		+ 10 to + 50 °C
Protection class	controller module with housing	IP 00 IP 54
Dimensions (L x W x H)		300 x 150 x 80 mm
CAN bus		
CAN bus level		+ 5 V (potential-free)
CAN baud rate		250 kBaud
Switch level digital inputs on RK 4004		
Terminal X 4.1/4.4/4.7/20.2/3.2		
Low "0"		0 to 3 V DC
High "1"		10 to 30 V DC
Incremental encoder frequency		5 kHz
Digital output terminal 20.4 on RK 4004		
Output current		max. 0.1 A (PNP)

Networking

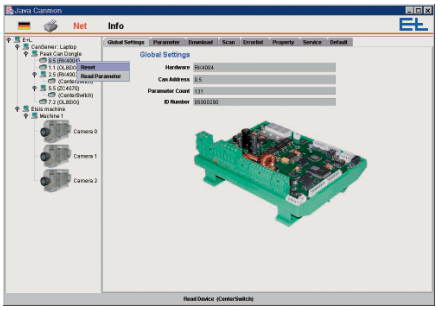
CAN bus

All functional modules of the DCS Digital-Control-System feature a CAN bus interface and are, moreover networked with one another. This assures not only a flexible adaptation of the E+L control system to new tasks but also guarantees maximum immunity to interference and a minimum wiring outlay.
A control group may comprise up to 16 devices including e.g. sensors, support beams, controllers, interfaces or operating panels. Up to eight control groups may be implemented together in a common CAN network up to a length of 160 m.
A CAN extension is available for lengths of 160 m and upwards. It is simply plugged in between CAN networks.



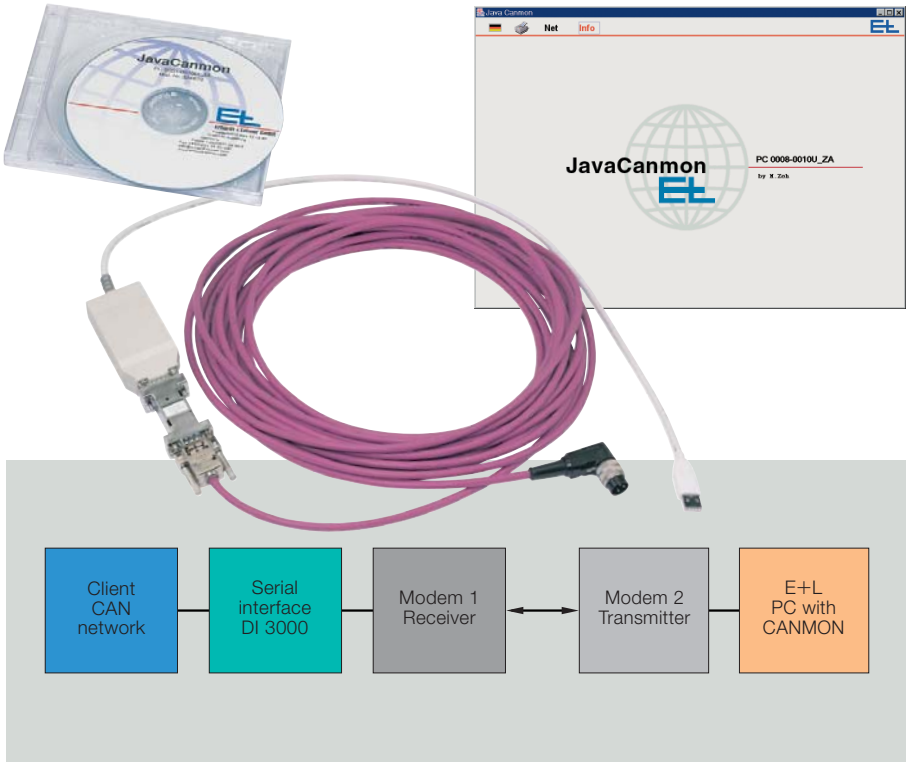


CAN extension
DI 0010



CANMON
Convenient diagnosis

Sophisticated systems require a simple, comprehensive representation of the entire network. The CANMON software tool illustrates the CAN network in a structured form and, at the same time, comprises a convenient set-up editor for setting all control parameters. Furthermore, CANMON permits both saving and printing out of the entire CAN network and the representation of a camera or sensor scan.



Worldwide teleservice

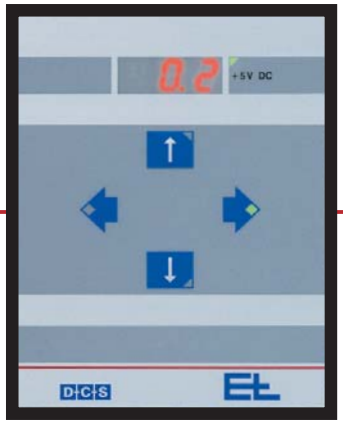
The decisive benefit of CANMON is that is may be implemented all over the world as a service tool. As such, Erhardt+Leimer offers an innovative teleservice for the commissioning, error diagnosis, fault clearance, maintenance and repair of all E+L control systems. This worldwide direct access to the machine process via modem assures long-term cost reductions and minimum response times.

Operating panels

Operating panel DO 200.
The user interface forms the link between man and machine. As such, major emphasis was placed on a clear keyboard arrangement and ergonomic design. The menues for the various actuating elements are easily and comprehensively illustrated via the user-friendly text display. The representation of the CAN network in a structured form considerably simplifies the optimization of control parameters during first-time commissioning.

Operating panel DO 002.
A digital display clearly displays the set and actual values of the web tension or web width given a width measuring function. Command station DO 002 contains a CAN connection for direct integration in a CAN network.

Operating panel DO 001.
To assure precision web feeding during processing, web guiders are typically positioned at the beginning of a production line. After the processing stage, however, the web position often has to be corrected.
With digital remote control DO 001. the web may be displaced from any position on the production line. The set position value may thus be adjusted in 0.1 mm steps via two push buttons and read off a digital display.



Option table
Operator panel DO

Type	Panel mounted	With enclosure
DO 2000		
DO 2001		
DO 0020		
DO 0021		
DO 0010		
DO 0011		

Technical data
Operator panel DO

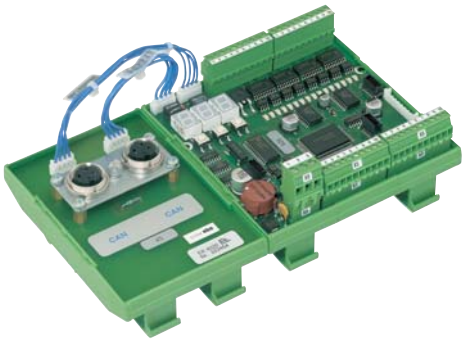
Operating voltage		
Nominal voltage	24 V DC	
Nominal voltage range	20 to 30 V DC	
Current rating	200 mA DC	
Ambient temperature	+ 10 to + 50 °C	
Serial interface (CAN bus)		
Level	5 V DC	
Transmission rate	250 kBaud	
Dimensions	DO 2000/1 (DO 0020/1)	DO 0010/1
Panel mounted		
Front frame	152 x 138.4 mm	101.6 x 128.4 mm
Assembly opening	121 x 111.5 mm	82 x 117 mm
With housing for field mounting (W x H x D)	180 x 190 x 95 mm	120 x 190 x 95 mm
Protection class		
Panel mounted (when built-in)	IP 54	
With housing for field mounting	IP 54	
Weight	DO 2000 0.55 kg DO 0020 0.70 kg DO 0010 0.55 kg	DO 2001 1.3 kg DO 0021 1.5 kg DO 0011 1.0 kg
Operation language	German English French Italian Spanish Portuguese Japanese	

Interfaces

Interface DI
Modern processing plants feature command controls or control centers. In this case web guiding systems may be linked to different bus systems or to a PLC/IPC. For this purpose, E+L offers the most varied of interfaces with standard protocols. Each interface features a CAN connection with appropriate bus drive module.

Serial interface RS 232/422 DI 3000

Ether Net interface DI C000



Parallel interface DI A020
with 16 digital inputs and outputs

Interbus S interface DI 4000

Control Net interface DI D000

Arcnet interface DI 2000

Profibus interface DI B000

Device Net interface DI E000

Option table
Interface DI

Type	Interface type	PC/IPC	PLC Siemens	PLC Allen Bready
DI A020	Parallel I/0			
DI 2000	Arcnet			
DI 3000	Seriell RS 232/422			
DI 4000	Interbus-S			
DI B000	Profibus DP			
DI C000	Ether Net			
DI D000	Control Net			
DI E000	Device Net			
DI F000	CAN open			

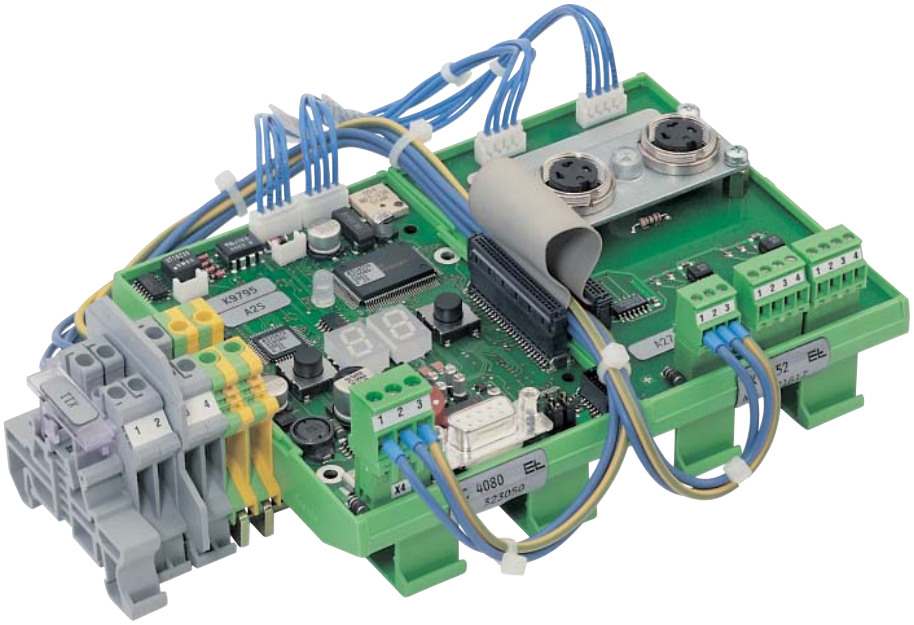
Technical data
Interface DI

Operating voltage Nominal voltage Nominal voltage range	 24 V DC 20 to 30 V DC
Current rating	200 mA DC
Ambient temperature	+ 10 to + 50 °C
Seriall interface (CAN bus) Level Transmission rate	 5 V DC 250 kBaud
Dimensions Top hat rail mounting (W x H x D)	 to EN 50022 75 x 111 x 130 mm
Protection class Top hat rail mounting With housing	 IP 00 IP 54

Data master

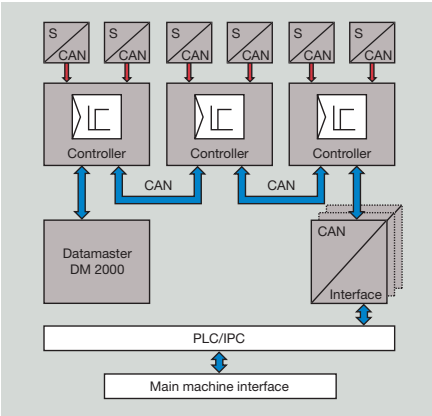
Data master DM 2
The data master provides the option of incorporating special functions in a network. Software modifications in the case of standard devices are thus superfluous.

- May be implemented for sophisticated special functions in an E+L CAN network
- Establishment of real time control loops.



Existing function modules

- Averaging units
  Filter for sensor signals for irregular web edges
- Thickness compensation
  Compensation of various material thicknesses for width measuring with CCD camera.
- Time delay
  Time delay for sensor signals in conjunction with lamination.
- Pre-positioning
  Positioning of edge sensors via motor-driven support beam to the required web width and target position.
- Target width controlling
  Positioning of cutters via motor-driven support beam to the specified target width. With follow-up actual width recording and target width corrector.
- Belt controlling
  Positioning controller for belt strips on tire building lines. Guiding by the left edge, center and right edge including correction of the material tip and integrated length measuring.

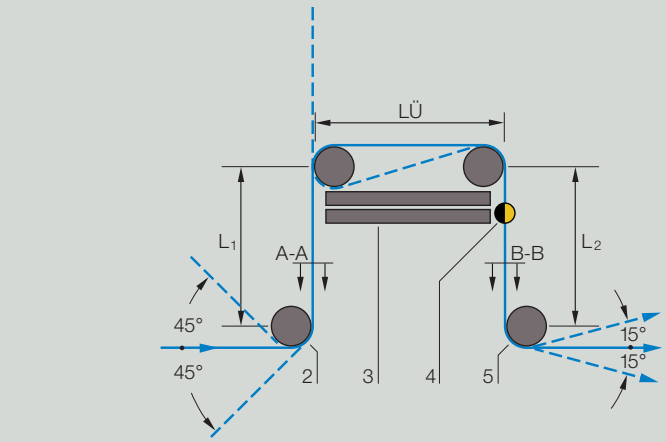


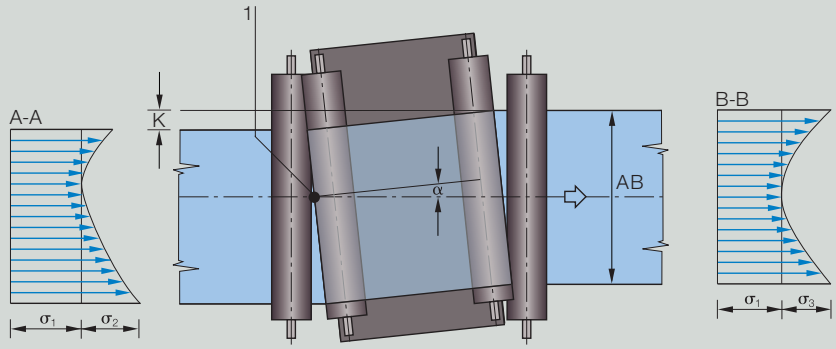
Technical Data **Data master DM**	
Operating voltage Nominal voltage Nominal voltage range	 24 V DC 20 to 30 V DC
Current rating	200 mA DC
Ambient temperature	+ 10 to + 50 °C
Serial interface (CAN bus) Level Transmission rate	 5 V DC 250 kBaud
Dimensions Top hat rail mounting Panel mounted (W x H x D) With housing	 to EN 50022 150 x 111 x 130 mm 300 x 150 x 80 mm
Protection class Top hat rail mounting With housing	 IP 00 IP 54

Web guiding with ELGUIDER

Function
On ELGUIDER pivoting frame system, the web changes direction four times, each time by 90°. The system is based on a pivoting frame with two path rollers. The imaginary pivot point is located on the infeed plane. Lateral web corrections may only be achieved by swivelling around this pivotal point. The prerequisite here is always sufficient tension for friction-locking between the web and the guide roller.

Implementation area
Due to the optimum utilization of elasticity, the pivoting frame is particularly suited for implementation in cramped conditions.





Application
The greater the web tension, the elasticity module and the required correction, the longer the infeed, outfeed and transfer paths should be designed. Experience has shown that these paths should be the equivalent of 60 – 100 % of the web width. The sensor should be located behind the guide roller as close as possible. Due to the short response times, increased guiding dynamics are achieved.

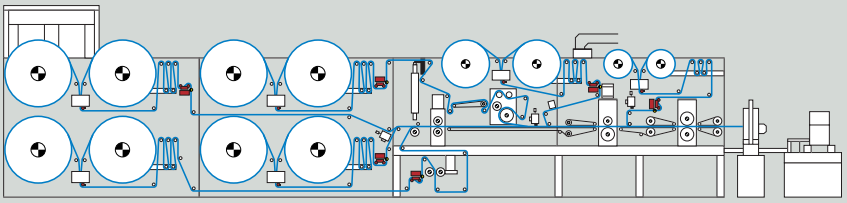
Guiding geometry and longitudinal tension distribution

A-A	Web tension distribution at infeed	1	Pivot point
B-B	Web tension distribution at outfeed	2	Infeed roller
K	Web correction	3	Roller frame
α	Correction angle max. +/– 5°	4	Sensor
σ_1	Web basic tension	5	Locking roller
σ_2	Tension distribution by pivoting action of roller frame at the infeed	LÜ	Transfer span
		L_1	Infeed path
σ_3	Tension distribution by pivoting action of roller frame at the outfeed	L_2	Exit path
		AB	Web width

ELGUIDER systems

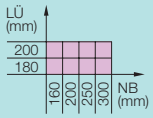
ELGUIDER DRS 12

- Implementation in the hygiene and labelling industry
- No additional space requirement as the position controller and command device are integrated
- Adjustment to different fabrics due to selection of infra-red or ultrasonic sensor
- May be implemented up to a web tension of 300 N
- Best possible correction due to optimized pivot point on the infeed plane
- Gearless drive system, therefore control frequencies up to 8 Hz may be achieved – especially important for narrow webs with tumbling errors.



ELGUIDER DRS 12 on a femcare machine

Option table
DRS 12



LÜ Transfer span
NB Roller width

Technical data **Pivoting frame system DRS 12**	
Operating voltage Nominal voltage Nominal voltage range Nominal range with power supply	 24 V DC 20 to 30 V DC 100 to 240 V, 50/60 Hz
Current rating	2.5 A DC
Roller width Transfer span	160/200/250/300 mm 180/200 mm
Roller diameter	40/60 mm
Nominal correction LÜ 180 mm LÜ 200 mm	 max. +/– 19 mm max. +/– 21 mm
Nominal correction speed LÜ 180 mm LÜ 200 mm	 1 to 135 mm/s (variable) 1 to 120 mm/s (variable)
Web tension	max. 300 N
Guiding accuracy	≤ +/– 0.1 mm (material-dependent)
Incoming error frequency	max. 8 Hz
Ambient temperature	+ 10 to + 50 °C
Protection class	IP 54

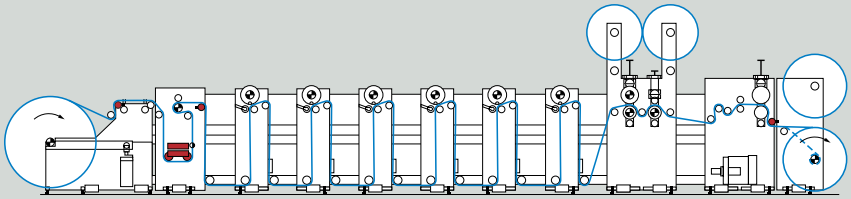
ELGUIDER systems

ELGUIDER DRS 22

- Implementation in the label and drinks industry
- Extremely compact with integrated position controller and operating panel
- Adjustment to various fabrics via option of infra-red, ultrasonic and color line sensors
- May be implemented up to a tension of 300 N
- Best possible correction due to optimized pivot point on the infeed plane
- Gearless drive system, thus control frequencies up to 8 Hz may be achieved, particularly important for narrow webs with a tumbling error
- Splice table may be optionally integrated in the top frame.

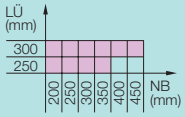
ELGUIDER DRS 22
with splice table

ELGUIDER DRS 22
on a label printing machine



ELGUIDER DRS 22 on a label printing machine

Option table
DRS 22



LÜ Transfer span
NB Roller width

Technical data **Pivoting frame system DRS 22**		
Operating voltage Nominal voltage Nominal voltage range Nominal range with power supply		 24 V DC 20 to 30 V DC 100 to 240 V, 50/60 Hz
Current rating		2.5 A DC
Roller width Transfer span		200/250/300/350/400/450 mm 250/300 mm
Roller diameter		60/80 mm
Nominal correction LÜ 180 mm LÜ 200 mm		 max. +/– 14 mm max. +/– 18 mm
Nominal correction speed LÜ 250 mm LÜ 300 mm		 1 to 100 mm/s (variable) 1 to 115 mm/s (variable)
Web tension	NB 200/250/300/350 mm NB 400/450 mm	max. 300 N max. 200 N
Guiding accuracy		≤ +/– 0.1 mm (material-dependent)
Incoming error frequency		max. 8 Hz
Ambient temperature		+ 10 to + 50 °C
Protection class		IP 54

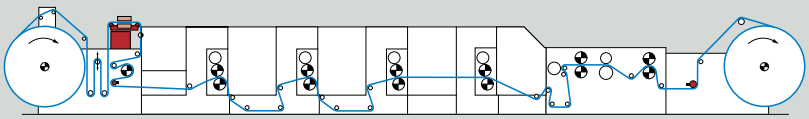
ELGUIDER systems

ELGUIDER DRS 24

- A compact “classic” for form printing machines with the latest technology
- Operating panel with clear text display
- Adjustment to various fabrics via option of infra-red, ultrasonic and color line sensors
- May be implemented up to a tension of 700 N
- Gearless drive system, thus control frequencies up to 8 Hz may be achieved – particularly important for narrow webs with a tumbling error
- Optionally available with integrated splice table or prepared for the assembly of a web cleaning system.

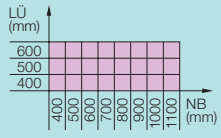
ELGUIDER DRS 2475
with splice table

ELGUIDER DRS 24
on a forms printing machine



ELGUIDER DRS 24 on a forms printing machine

Option table
DRS 24



LÜ Transfer span
NB Roller width

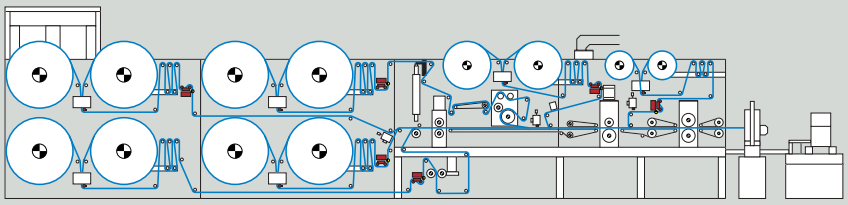
Technical data **Pivoting frame system DRS 24**		
Operating voltage Nominal voltage Nominal voltage range Nominal range with power supply		 24 V DC 20 to 30 V DC 100 to 120 V / 200 to 240 V, 50/60 Hz
Current rating		4.5 A DC (manual sensor positioning) 5.6 A DC (1 mot. positioning drive)
Roller width Transfer span		400 to 1100 mm 400/500/600 mm
Roller diameter		80/100 mm
Nominal correction	LÜ 400 mm LÜ 500 mm LÜ 600 mm	max. +/– 15 mm max. +/– 21 mm max. +/– 25 mm
Nominal correction speed		1 to 70 mm/s (variable)
Web tension		max. 700 N
Guiding accuracy		≤ +/– 0.1 mm (material-dependent)
Incoming error frequency		max. 8 Hz
Ambient temperature		+ 10 to + 50 °C
Protection class		IP 54

ELGUIDER systems

ELGUIDER DRS 08

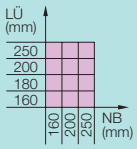
- Economical pivoting frame system for implementation in the hygiene and packaging industry
- Adaptation to various materials via selection of infra-red or ultrasonic sensor
- Individual position controller with operator panel and software for two infra-red and ultrasonic sensors each
- Best possible correction due to optimized pivot point on the infeed plane
- Swift assembly due to plug-in cable connections between the pivoting frame and controller
- May be implemented up to a web tension of 200 N.

Position controller
DC 9061



ELGUIDER DRS 08 on a femcare machine

Option table
DRS 08



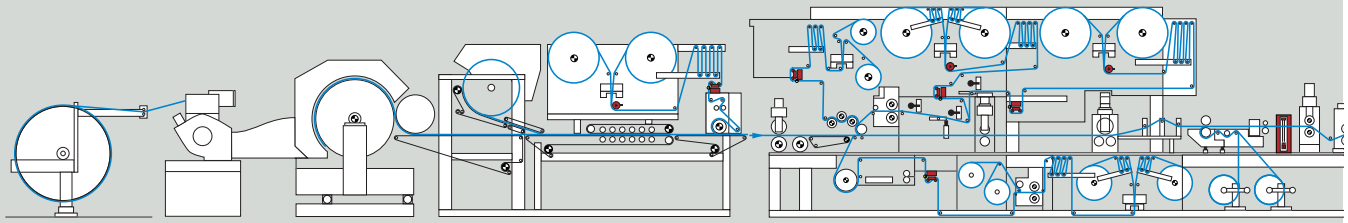
LÜ Transfer span
NB Roller width

Technical data **Pivoting frame system DRS 08**		
Operating voltage Nominal voltage Nominal voltage range Nominal range with power supply		 24 V DC 20 to 30 V DC 100 to 240 V, 50/60 Hz
Current rating		1.5 A DC
Roller width Transfer span		160/200/250 mm 160/180/200/250 mm
Roller diameter		50 mm
Nominal correction LÜ 160 mm LÜ 180 mm LÜ 200 mm LÜ 250 mm		 max. +/– 18 mm max. +/– 19 mm max. +/– 20 mm max. +/– 22.5 mm
Nominal correction speed		1 to 60 mm/s (variable)
Web tension	for U arc of contact for Z arc of contact	max. 200 N max. 150 N
Guiding accuracy		≤ +/– 0.2 mm (material-dependent)
Incoming error frequency		max. 2 Hz
Ambient temperature		+ 10 to + 50 °C
Protection class		IP 54
Weight		7 kg

ELGUIDER systems

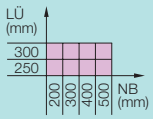
ELGUIDER DRS 09

- Economical pivoting frame system for implementation in the hygiene and packaging industry
- Adaptation to various materials via selection of infra-red or ultrasonic sensor
- Individual position controller with operator panel and software for two infra-red and ultrasonic sensors each
- Best possible correction due to optimized pivot point on the infeed plane
- Swift assembly due to plug-in cable connections between the pivoting frame and controller
- May be implemented up to a web tension of 600 N.



ELGUIDER DRS 09 on a baby diaper machine

Option table DRS 09



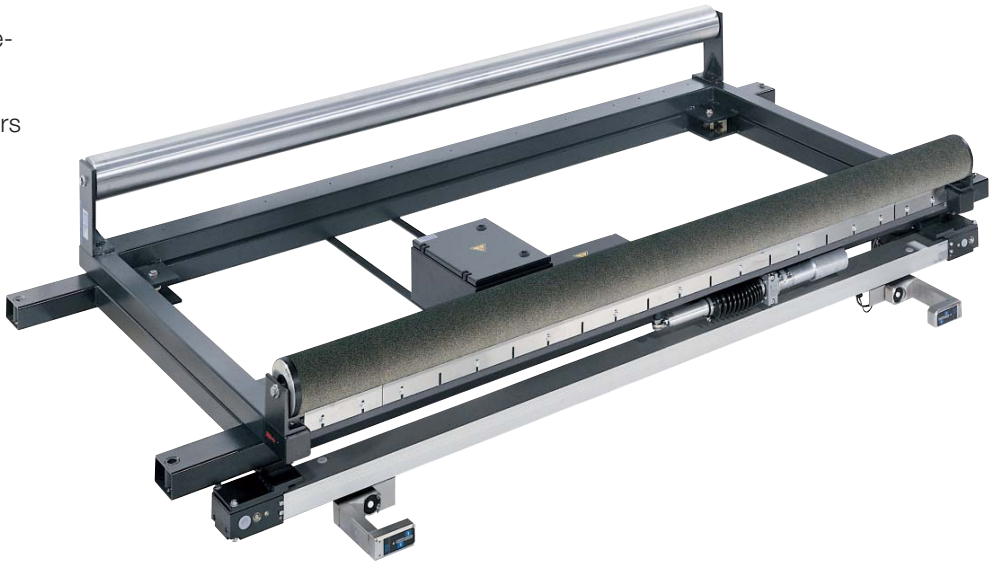
LÜ Transfer span
NB Roller width

Technical data Pivoting frame system DRS 09		
Operating voltage Nominal voltage Nominal voltage range Nominal range with power supply		 24 V DC 20 to 30 V DC 100 to 240 V, 50/60 Hz
Current rating		1.7 A DC
Roller width Transfer span		200/300/400/500 mm 250/300 mm
Roller diameter		60/80 mm
Nominal correction LÜ 250 mm LÜ 300 mm		 max. +/– 24 mm max. +/– 29 mm
Nominal correction speed		1 to 70 mm/s (variable)
Web tension	with U arc of contact with Z arc of contact	max. 600 N max. 300 N
Guiding accuracy		≤ +/– 0.2 mm (material-dependent)
Incoming error frequency		max. 4 Hz
Ambient temperature		+ 10 to + 50 °C
Protection class		IP 54
Weight		21 kg

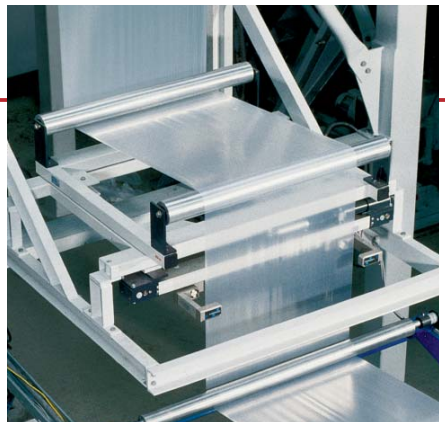
ELGUIDER systems

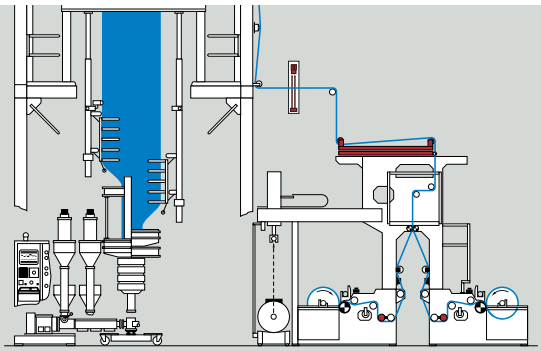
ELGUIDER DRS 31

- Low cost version for the plastics and packaging industry
- Position controller, already space-savingly integrated
- Depending on the fabric type, infra-red, ultrasonic or line sensors are available
- May be implemented up to a tension of 700 N.



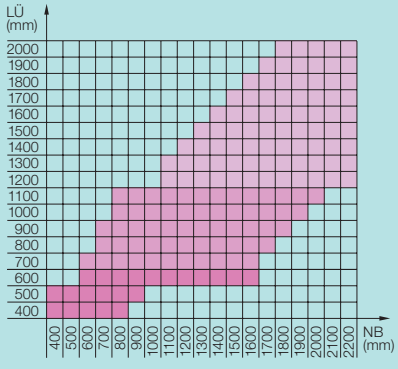
ELGUIDER DRS 31
on a blown film extruder





ELGUIDER DRS 31 on a blown film extruder

Option table
DRS 31



LÜ Transfer span NB Roller width

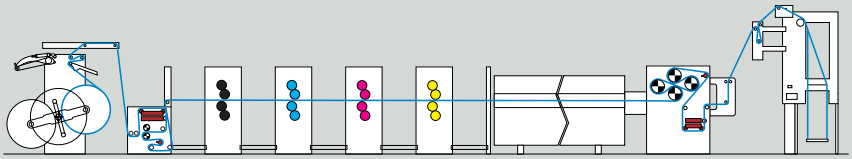
Technical data **Pivoting frame system DRS 31**		
Operating voltage Nominal voltage Nominal voltage range Nominal range with power supply		 24 V DC 20 to 30 V DC 115 to 460 V, 50/60 Hz
Current rating		3.8 A DC (manual sensor positioning) 5.3 A DC (1 mot. positioning drive)
Roller width Transfer span		400 to 3000 mm 400 to 2000 mm
Roller diameter	LÜ 400 to 600 mm LÜ 700 to 2000 mm	80/100 mm 100/120/160 mm
Nominal correction	LÜ 400 to 600 mm LÜ 700 to 1100 mm LÜ 1200 to 2000 mm	max. +/– 15 mm max. +/– 25 mm max. +/– 50 mm
Nominal correction speed		1 to 25 mm/s (variable)
Web tension		700 N
Guiding accuracy		≤ +/– 0.1 mm (material-dependent)
Incoming error frequency		max. 2 Hz
Ambient temperature		+ 10 to + 50 °C
Protection class		IP 54

ELGUIDER systems

ELGUIDER DRS 52

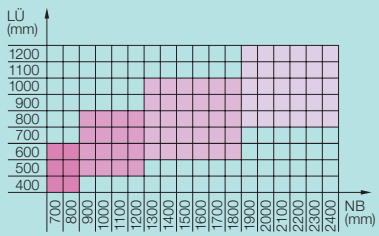
- Precision pedestal version for web offset presses
- Infra-red or ultrasonic sensors for various fabrics
- Improved web adhesion due to corundum-blasted hard-anodized roller surface
- Simple alignment of the path rollers due to set-up aid via eccentric movement
- May be implemented up to a tension of 1,2 N/mm web width
- Infeed roller optionally available with sensor roller PD 30.

ELGUIDER DRS 52
on a web offset press



ELGUIDER DRS 52 on a web offset press

Option table
DRS 52



LÜ Transfer span
NB Roller width

Technical data
Pivoting frame system DRS 52

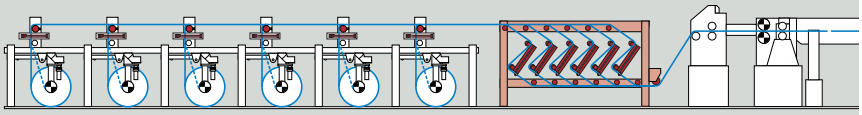
Operating voltage Nominal voltage Nominal voltage range Nominal range with power supply		 24 V DC 20 to 30 V DC 115 to 460 V, 50/60 Hz
Current rating		6.8 A DC
Roller width Transfer span		700 to 2400 mm 400 to 1200 mm
Roller diameter	NB 700 to 800 mm NB 900 to 1200 mm NB 1300 to 1800 mm NB 1900 to 2400 mm	80/100 mm 100/120/130 mm 120/130 mm 160 mm
Nominal correction	NB 700 to 800 mm NB 900 to 1200 mm NB 1300 to 1800 mm NB 1900 to 2400 mm	max. +/– 30 mm max. +/– 30 mm max. +/– 40 mm max. +/– 40 mm
Nominal correction speed		1 to 25 mm/s (variable)
Web tension		max. 1.2 N/mm web width
Guiding accuracy		≤ +/– 0.1 mm (material-dependent)
Incoming error frequency		max. 2 Hz
Ambient temperature		+ 10 to + 50 °C
Protection class		IP 54

ELGUIDER systems

ELGUIDER DRS 71

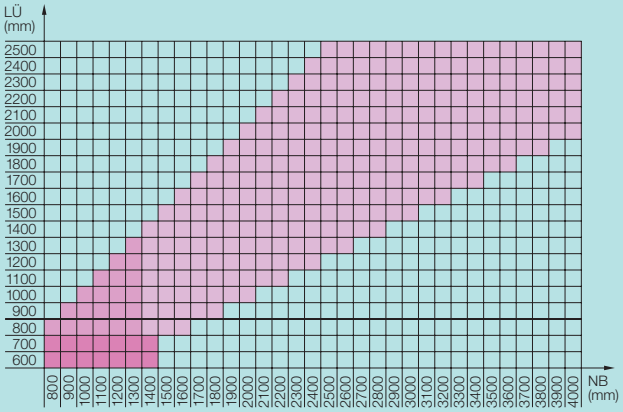
- Rugged pedestal design for the paper processing branch
- No additional space requirement as the position controller is already integrated
- Equipped with infra-red, ultrasonic or line sensor depending on web material
- Suitable for tensions up to 2000 N
- Optimum alignment of the web position via imaginary pivot point on the infeed plane.

ELGUIDER DRS 71
on a sheeter sorter



ELGUIDER DRS 71 on a sheeter sorter

Option table
DRS 71



LÜ Transfer span NB Roller width

Technical data
Pivoting frame system DRS 71

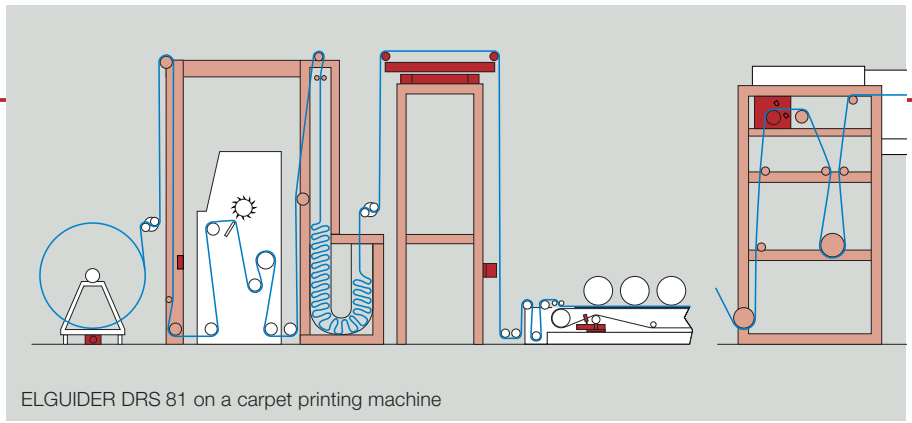
Operating voltage Nominal voltage Nominal voltage range Nominal range with power supply		 24 V DC 20 to 30 V DC 115 to 460 V, 50/60 Hz
Current rating		6.8 A DC (manual sensor positioning) 7.3 A DC (1 mot. positioning drive)
Roller width Transfer span		800 to 4000 mm 600 to 2500 mm
Roller diameter		100/120/160/200 mm
Nominal correction	LÜ 600 to 700 mm LÜ 800 to 1300 mm LÜ 800 to 2500 mm	max. +/– 25 mm max. +/– 50 mm max. +/– 80 mm
Nominal correction speed		1 to 25 mm/s (variable)
Web tension		2000 N (reinforced version 3000 N)
Guiding accuracy		≤ +/– 0.1 mm (material-dependent)
Incoming error frequency		max. 2 Hz
Ambient temperature		+ 10 to + 50 °C
Protection class		IP 54

ELGUIDER systems

ELGUIDER DRS 81

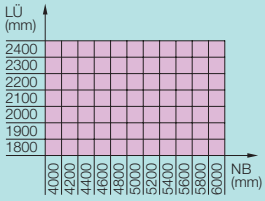
- Stable design for the carpet and plastic industry
- Position controller fully integrated in the assembly frame
- Adjustment to various fabrics via option of ultrasonic and infra-red sensors
- May be implemented up to a tension of 3000 N
- Construction with integrated pedestal bearings for mounting rollers with live shafts.

ELGUIDER DRS 81
on a coater



ELGUIDER DRS 81 on a carpet printing machine

Option table
DRS 81



LÜ Transfer span
NB Roller width

Technical data **Pivoting frame system DRS 81**	
Operating voltage Nominal voltage Nominal voltage range Nominal range with power supply	 24 V DC 20 to 30 V DC 115 to 460 V, 50/60 Hz
Current rating	7.3 A DC (1 mot. positioning drive)
Roller width Transfer span	4000 to 6000 mm 1800 to 2400 mm
Roller diameter	175/200/240 mm
Nominal correction	max. +/– 100/200mm
Nominal correction speed	1 to 25 mm/s (variable)
Web tension	max. 3000 N
Guiding accuracy	≤ +/– 0.3 mm (material-dependent)
Incoming error frequency	max. 2 Hz
Ambient temperature	+ 10 to + 50 °C
Protection class	IP 54

Web guiding with ELROLLER

Function

ELROLLER steering roller systems correct the web position already in the infeed path. They consist of a fixed base frame and a movable guide frame. The latter accommodates one or two guide rollers and swivels round an imaginary pivot point on the infeed path.

The pivot point should, on the one hand, be far enough away from the infeed roller to ensure that the web correction does not influence the infeed roller. On the other hand, it must be far enough away from the guide roller to ensure that the elasticity of the web may be fully exploited but not over-strained.

A steering roller is termed a proportional actuating element. It must therefore operate “friction-locked” and may not permit any sliding between the web and the guide roller.

Implementation area

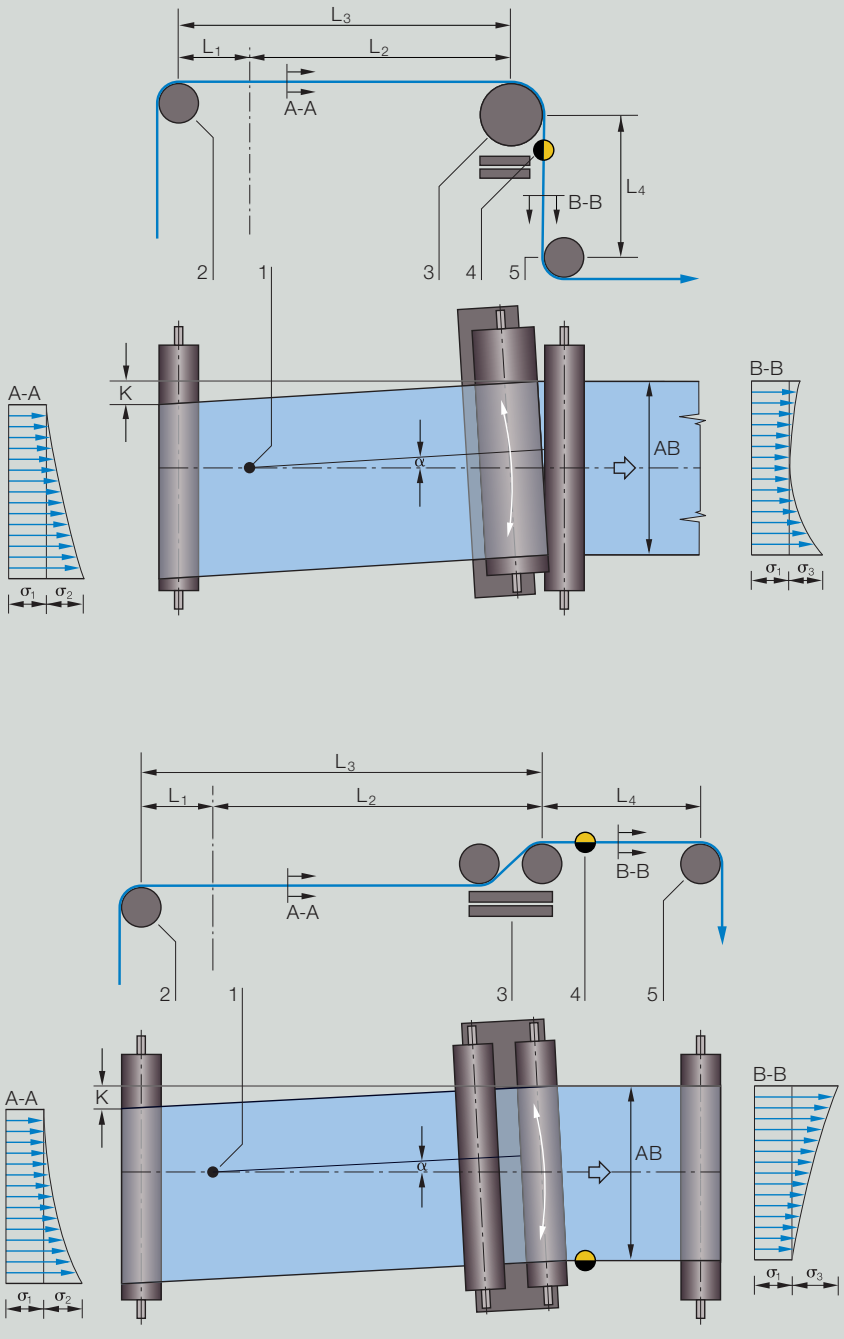
ELROLLER systems are always used where a long entry path is already featured due to technical process reasons.

Application

Depending on the space available, steering rollers may be fitted with one or two guide rollers. On versions with one roller, the web is turned at an angle of 90°. On versions with two guide rollers a smaller arc of contact is possible. In this case, the web runs at almost the same level as the outfeed roller.

The following applies when mounting an ELROLLER: the infeed path should be the equivalent of two to three times the web width, the outfeed path should be between 50 and 100 % of the web width.

The sensor should be positioned behind the guide roller as near to it as possible. Due to the short response time, improved corrective dynamics are achieved.



Guiding geometry and longitudinal tension distribution

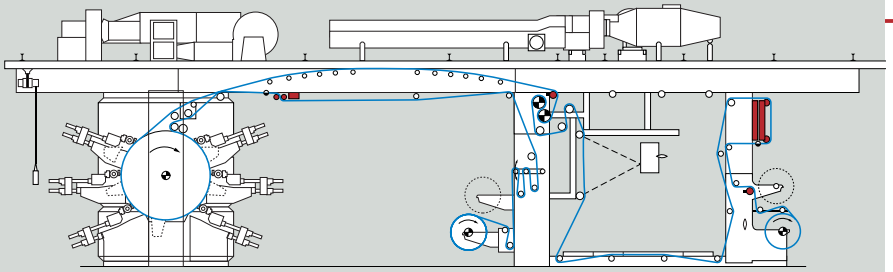
A-A	Web tension distribution at infeed	1	Pivot
B-B	Web tension distribution at outfeed	2	Infeed roller
K	Web correction	3	Guide roller(s)
α	Correction angle	4	Sensor
σ_1	Web basic tension	5	Lock roller
σ_2	Tension distribution by displacing positioning rollers at infeed	L_1	Infeed path to pivot
		L_2	Infeed path from pivot to steering roller
σ_3	Tension distribution by displacing positioning rollers at outfeed	L_3	Infeed path
AB	Web width	L_4	Exit path

ELROLLER systems

ELROLLER VGS 14

- Low cost systems for the plastics industry
- Optimum web correction via variable imaginary pivot point
- Adjustment to various fabrics via infra-red or ultrasonic sensors
- May be implemented up to a tension of 500 N on the straight web plane
- Available with a nominal width of 400 – 2000 mm.

ELROLLER VGS 14
on a bag making machine



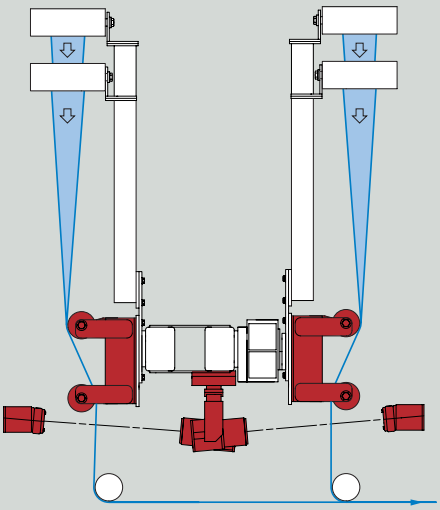
ELROLLER VGS 14 on a flexo printing machine

Technical data **Steering roller system VGS 14**	
Operating voltage Nominal voltage Nominal voltage range Nominal range with power supply	 24 V DC 20 to 30 V DC 115 to 460 V, 50/60 Hz
Current rating	1.6 A DC
Roller width	400 to 2000 mm
Roller diameter	80/100 mm
Nominal correction	max. +/– 50/75/100 mm
Nominal correction speed	1 to 25 mm/s (variable)
Web tension	max. 500 N
Guiding accuracy	≤ +/– 0.15 mm (material-dependent)
Incoming error frequency	max. 2 Hz
Ambient temperature	+ 10 to + 50 °C
Protection class	IP 54

ELROLLER systems

ELROLLER SRS 31

- Compact pedestal version for the paper and plastics industry
- Infra-red or ultrasonic sensor systems for different materials
- Implementation range up to 300 N tension force
- Optionally available with two rollers for straight web path or one roller for a 90° arc of contact.



ELROLLER SRS 31 on a laminating line

Option table SRS 31		
Type	NB min. (mm)	NB max. (mm)
SR 3119	200	250
SR 3129	300	350

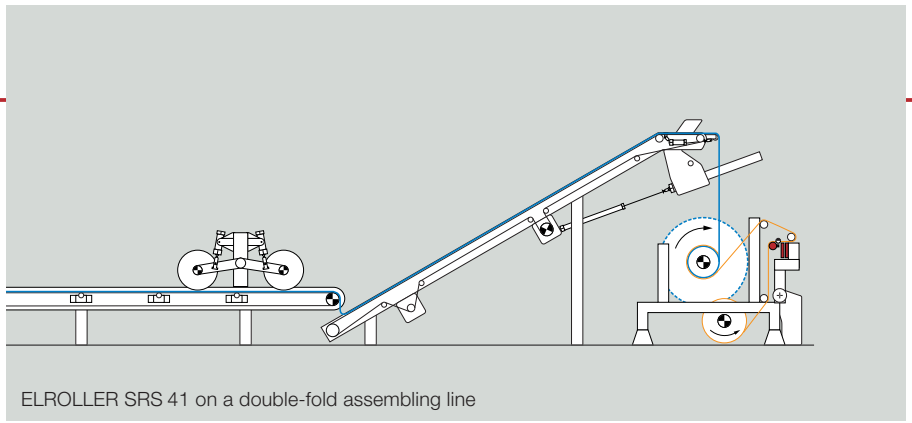
Technical data Steering roller system SRS 31	
Operating voltage Nominal voltage Nominal voltage range Nominal range with power supply	 24 V DC 20 to 30 V DC 115 to 460 V, 50/60 Hz
Current rating	1.6 A DC
Roller width	200/250/300/350 mm
Roller diameter	60/80 mm
Nominal correction	max. +/– 22.5 mm
Nominal correction speed	1 to 20 mm/s (variable)
Web tension	max. 300 N
Guiding accuracy	≤ +/– 0.15 mm (material-dependent)
Incoming error frequency	max. 2 Hz
Ambient temperature	+ 10 to + 50 °C
Protection class	IP 54

ELROLLER systems

ELROLLER SRS 41

- Compact pedestal version for the paper and plastics industry
- Position controller already space-savingly integrated
- Infra-red or ultrasonic sensors for various fabrics
- Implementation area up to 700 N
- Optionally available with two rollers for straight web path or one roller for a 90° arc of contact.

ELROLLER SRS 41
on a flexo printing press



ELROLLER SRS 41 on a double-fold assembling line

Option table SRS 41		
Type	NB min. (mm)	NB max. (mm)
SR 4111	400	800
SR 4121	900	1500
SR 4131	1100	2000

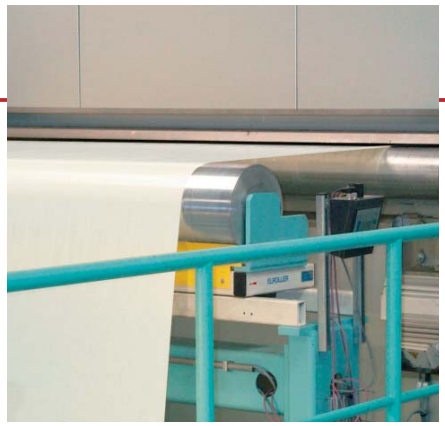
Technical data Steering roller system SRS 41		
Operating voltage Nominal voltage Nominal voltage range Nominal range with power supply		 24 V DC 20 to 30 V DC 115 to 460 V, 50/60 Hz
Current rating	Actuator AG 2491 Actuator AG 2591	1.6 A DC (manual sensor adjustment) 3.6 A DC (manual sensor adjustment)
Roller width		400 to 2000 mm
Roller diameter	NB 400 to 800 mm NB 900 to 2000 mm	80 mm 100/120/160 mm
Nominal correction	NB 400 to 800 mm NB 900 to 1500 mm NB 1100 to 2000 mm	max. +/– 25 mm max. +/– 50 mm max. +/– 75 mm
Nominal correction speed		1 to 25 mm/s (variable)
Web tension		max. 700 N
Guiding accuracy		≤ +/– 0.15 mm (material-dependent)
Incoming error frequency		max. 2 Hz
Ambient temperature		+ 10 to + 50 °C
Protection class		IP 54

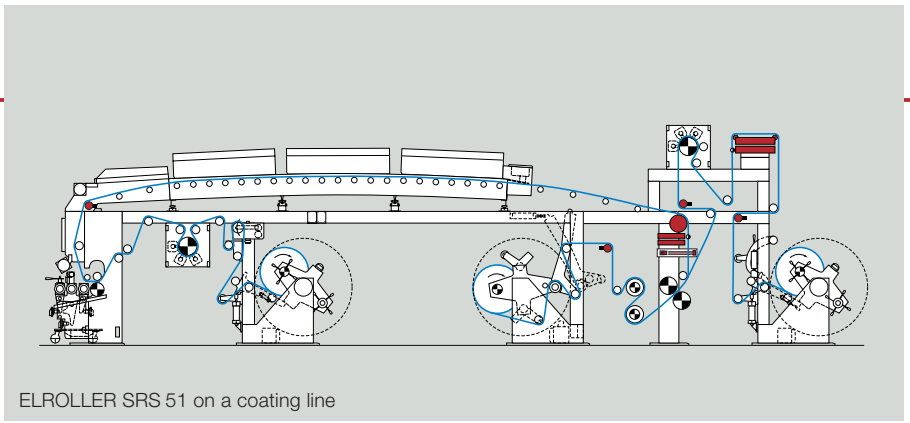
ELROLLER systems

ELROLLER SRS 51

- Steering roller system for coating lines
- No additional space required as the position controller is already integrated
- Infra-red or ultrasonic sensor for various fabrics
- May be implemented up to a tension of 2000 N
- Positioning roller may be optionally fitted with load cells
- With two rollers for straight web path or one roller for a 90° arc of contact.

ELROLLER SRS 51
on a coating line





ELROLLER SRS 51 on a coating line

Option table SRS 51		
Type	Roller width min. (mm)	Roller width max. (mm)
SR 5111	1100	2000
SR 5121	1500	3000
SR 5131	2500	4000

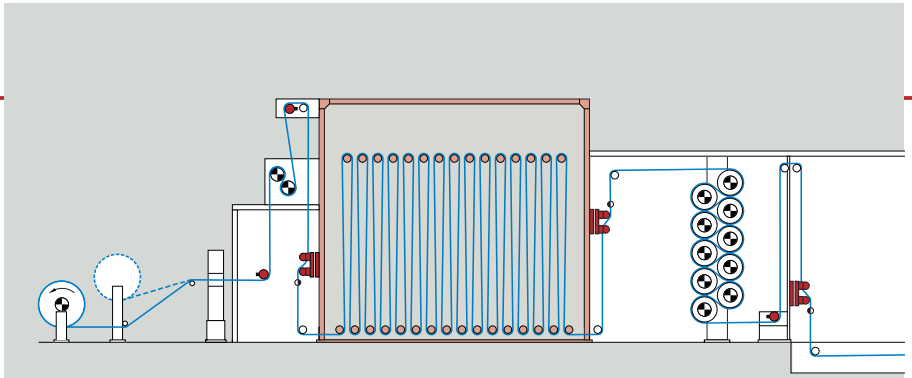
Technical data Steering roller system SRS 51		
Operating voltage Nominal voltage Nominal voltage range Nominal range with power supply		 24 V DC 20 to 30 V DC 115 to 460 V, 50/60 Hz
Current rating	Actuator AG 2591 Actuator AG 2691	3.6 A DC (manual sensor adjustment) 5.6 A DC (manual sensor adjustment)
Roller width		1100 to 4000 mm
Roller diameter	NB 1100 to 2000 mm NB 1500 to 3000 mm NB 2500 to 4000 mm	100/120/160 mm 100/120/160 mm 160/200 mm
Nominal correction	NB 1100 to 2000 mm NB 1500 to 3000 mm NB 2500 to 4000 mm	max. +/– 75 mm max. +/– 100 mm max. +/– 175 mm
Nominal correction speed		1 to 25 mm/s (variable)
Web tension		max. 2000 N
Guiding accuracy		≤ +/– 0.15 mm (material-dependent)
Incoming error frequency		max. 2 Hz
Ambient temperature		+ 10 to + 50 °C
Protection class		IP 54

ELROLLER systems

ELROLLER SRS 61

- Precision pedestal version for the tire and paper industry
- Position controller, compactly integrated in the frame construction
- Fabric-specific selection of infra-red or ultrasonic sensors
- With two rollers for straight web path or one roller for a 90° arc of contact.

ELROLLER SRS 61
on a calendering line



ELROLLER SRS 61 on a calendering line

Option table
SRS 61

Type	Roller width min. (mm)	Roller width max. (mm)	Ø Roller (mm)	Nominal correction +/– (mm)	Web tension max. (N)
SR 6111	1100	1200	160/200/240	50	5000
SR 6111	1300	3000	160/200/240	75	5000
SR 6115	1200	1300	210/240	50	20000
SR 6115	1400	3000	210/240	75	20000
SR 6141	1300	2000		75	5000
SR 6151	2000	6000		100	5000
SR 6161	2000	6000		200	5000
SR 6171	6000	10000		200	10000

Technical data
Steering roller system SRS 61

Operating voltage Nominal voltage Nominal voltage range Nominal range with power supply		 24 V DC 20 to 30 V DC 115 to 460 V, 50/60 Hz
Current rating	Actuator AG 2691	5.6 A DC (manual sensor adjustment)
Roller width		1100 to 10000 mm
Roller diameter		see option table
Nominal correction		see option table
Nominal correction speed		1 to 25 mm/s (variable)
Web tension		see option table
Guiding accuracy		≤ +/– 0.3 mm (material-dependent)
Incoming error frequency		max. 1 Hz
Ambient temperature		+ 10 to + 50 °C
Protection class		IP 54

Web guiding with ELTURNER

Function

Web guiding with ELTURNER turning bar systems is based on a simple principle: a bar is mounted at an angle of 45° to the longitudinal and transverse axes while the web runs over it with a 180° arc of contact. This has the immediate effect of changing the direction of web travel by 90°.
To correct the web at the same time, the turning bar is displaced in parallel to the infeed plane according to the actuating signal, thus offsetting the web to the side as it runs off.

Implementation area

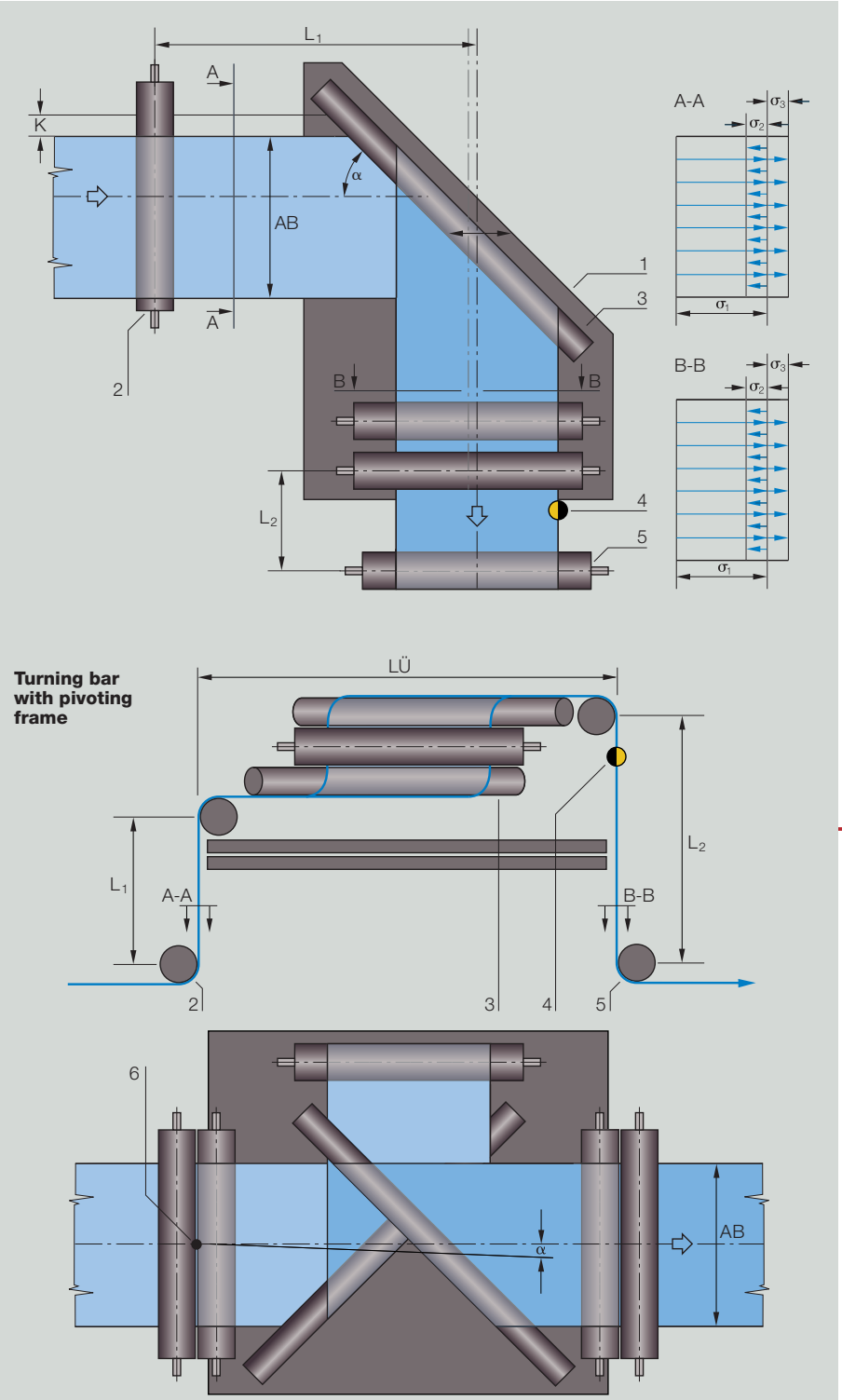
The use of turning bar control systems is recommended when, after the 90° arc of contact, an ELGUIDER or ELROLLER system may not be implemented due to space restrictions.

Application

When the turning bar is used there must be constant friction-locking between it and the web at certain points. To protect the web surface, friction may be avoided by inserting an air cushion between the turning bar and the web. Guiding precision of up to +/– 1 mm may thus be achieved.
To obtain improved corrective dynamics a guide roller should be implemented in addition to the turning bar. The distance between the guide and lock rollers should be the equivalent of half the web width. The sensor should be mounted immediately after the exit roller as close as possible.

Turning bar with pivoting frame application

A combination of pivoting frame and turning bar effects a turning of the web and at the same time assures precision positioning controlling in the range of +/– 0.1 mm.



Guiding geometry and longitudinal tension distribution

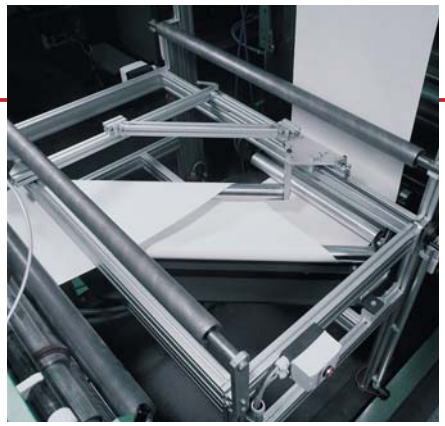
A-A	Web tension distribution at infeed	1	Positioning frame
B-B	Web tension distribution at outfeed	2	Infeed roller
K	Web correction	3	Turning bar
α	Correction angle	4	Sensor
σ_1	Web basic tension	5	Lock roller
σ_2	Tension distribution on corrective action to left	6	Pivot point
		LÜ	Transfer span
σ_3	Tension distribution on corrective action to right	L_1	Infeed path
		L_2	Exit path
		AB	Web width

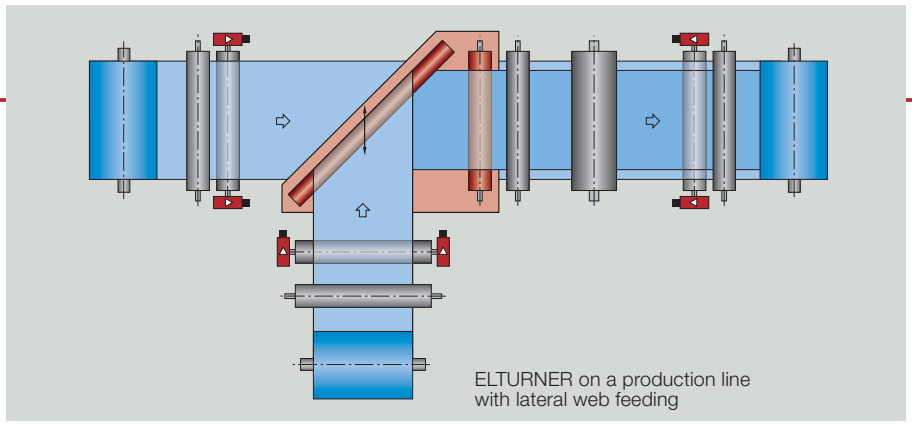
ELTURNER systems

ELTURNER VWS

- Turning bars are normally design-adapted to their machine environment
- Besides individual guiding components, complete systems with turning bars are also available
- Turning bars are also optionally available with pneumatic venting.

ELTURNER VWS
on a flexo printing press





ELTURNER on a production line
with lateral web feeding

Turning bar
system with
pivoting frame DRS 31

Technical data **Turning bar system VWS**		
Operating voltage Nominal value Nominal range Nominal range with power pack		 24 V DC 20 to 30 V DC 115 to 460 V, 50/60 Hz
Power input	Actuator AG 2491 Actuator AG 2591 Actuator AG 2691	1.6 A DC 3.6 A DC 5.6 A DC
Nominal width		400 to 3000 mm
Turning bar diameter		80/100/120/160/200 mm
Nominal positioning path		max. +/– 25/50/75/100 mm
Nominal positioning speed		1 to 25 mm/s (variable)
Web tension		max. 2000 N
Guiding precision		≤ +/– 1 mm (material-dependent)
Error frequency		max. 0.5 Hz
Ambient temperature		+ 10 to + 50 °C
Protection class		IP 54

Web guiding with ELBANDER

Function
Rollers located at an angle to the direction of web travel cause the web to wander off to side. This effective principle is used by ELBANDER pivoting roller systems.
The roller pivot point is one of the bearing sides. Depending on the required correction, the guide roller is set at an angle around this point. With this type of web guiding, the positioning control is sufficiently accurate without taking any web edge irregularities into account.

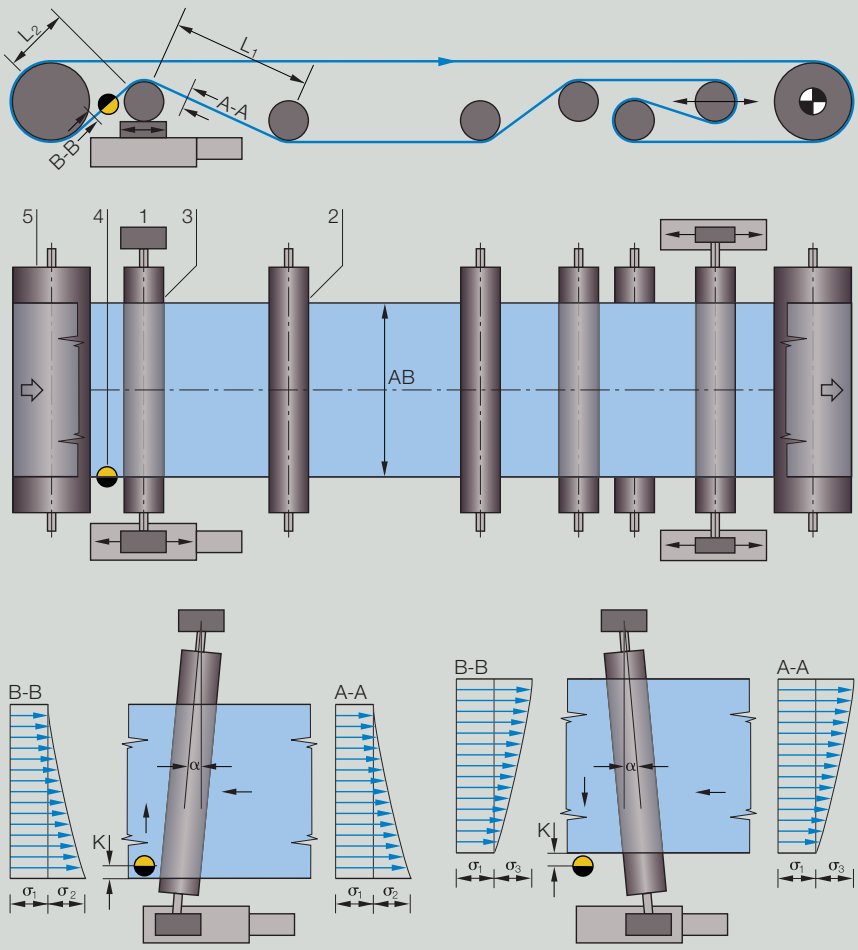
Implementation area
ELBANDER systems are implemented on continuously running material webs (conveyor belts) in order to assure their reliable run.

Application
The pivoting roller requires an infeed approximately equivalent to the width of the web. The exit path should be as short as possible. On continuous belts, the pivoting roller should be mounted in the lower pass immediately in front of the head roller. Its actuating movement should always be at an angle of 90° to the resultant tension force, issuing from the infeed and exit paths. The belt's arc of contact on the guide roller must be 40° – 60° (for processing speeds from 1000 m/min upwards 10° – 20°).

Digital position controller
The positioning device should be located parallel to the direction of web run. The sensor should be mounted as close as possible after the positioning roller on the exit path.

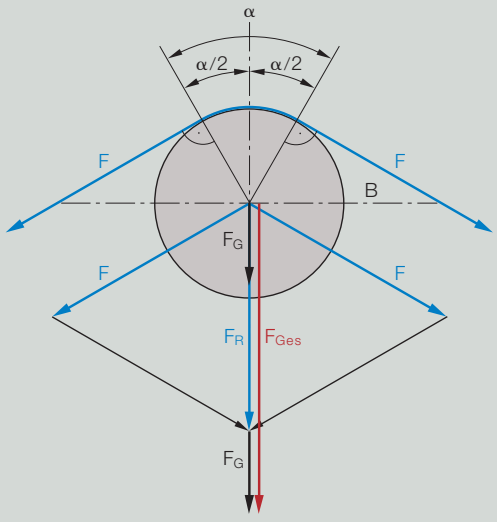
Three-position controller with manipulated variable feedback
For three-position controller with manipulated variable feedback the positioning device should be mounted at a angle of 15° to the direction of web run. In this case web edge detection should take place in front of the guide roller.

Application tensioning roller
To eliminate any interference by the tensioning roller on the guide system, the former may only be adjusted paraxially.



Guiding geometry and longitudinal tension distribution

A-A	Web tension distribution at infeed	1	Pivot
B-B	Web tension distribution at exit	2	Infeed roller
K	Web correction	3	Guide roller
α	Correction angle	4	Sensor
σ_1	Web basic tension	5	Locking roller
σ_2	Tension distribution during corrective act.	L_1	Infeed path
σ_3	Tension distribution during corrective act.	L_2	Exit path
		AB	Web width



Bearing force calculation
$F_{Ges/2} = (F_R + F_G)/2$

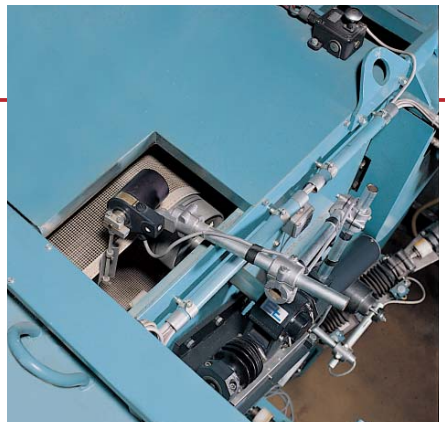
M	Movement plane positioning roller
F	Belt tension
α	Arc of contact
F_R	Resultant force
F_G	Weight of the guide roller
F_{Ges}	Total force
$F_{Ges/2}$	Force per bearing side

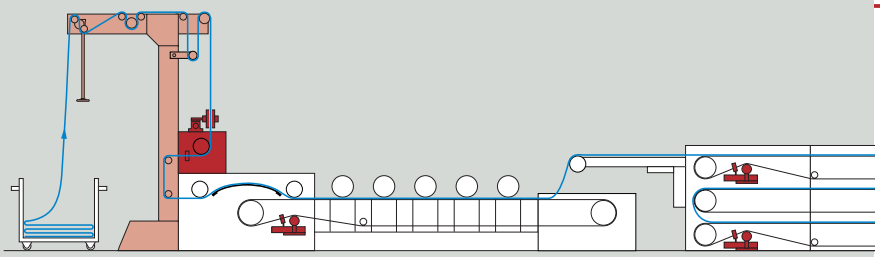
ELBANDER systems

ELBANDER VGA 18

- Compact pivoting roller system for the textile industry
- Electromechanical sensor for detecting the edge position
- Permanent position controller for monitoring the integral actuating element
- Linear guiding with self-arresting trapezoidal screw, torque support and DC drive
- The guide roller may also be optionally mounted in a track roller for heavier bearing loads.

ELBANDER VGA 18
on a dryer for textiles





ELBANDER VGA 18 on a dryer for textiles

Option table
VGA 18

Type	Bearing load (kN)	Ø Shaft (mm)	Mounting
VGA 18	2.5	25	on positioning device
VGA 18	15	35	in track roller

Technical data
Pivoting roller system VGA 18

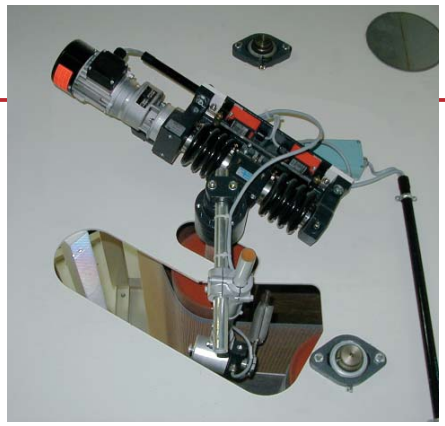
Operating voltage Nominal voltage Nominal voltage range Nominal range with power supply		 24 V DC 20 to 30 V DC 115 to 460 V, 50/60 Hz
Current rating		3.4 A DC
Nominal correction		+/– 55 mm
Nominal correction speed		1 to 3.5 mm/s (variable)
Nominal correction force		3000 N
Bearing load	Positioning device Track roller	max. 2500 N max. 15000 N
Guiding accuracy		≤ +/– 1 mm (depends on belt quality)
Ambient temperature		+ 10 to + 50 °C
Protection class		IP 54
Weight		16.5 kg

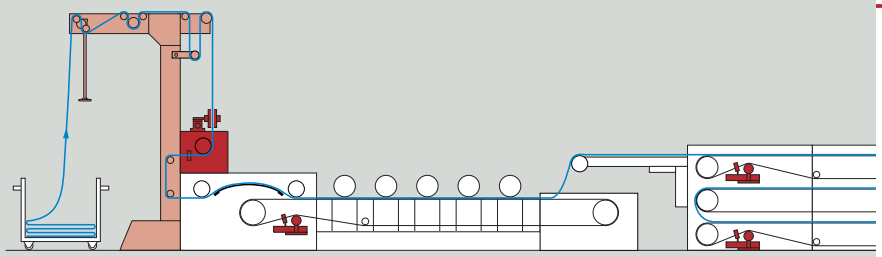
ELBANDER systems

ELBANDER VGA 19

- Compact pivoting roller system for the textile industry
- Electromechanical sensor F 31 for detecting the edge position
- Three-position controller with manipulated variable feedback for checking the integral actuator
- Linear guiding with self-arresting trapezoidal screw, torque support and DC drive
- The guide roller may also be optionally mounted in a track roller for heavier bearing loads.

ELBANDER VGA 19
on a dryer for textiles





ELBANDER VGA 19 on a dryer for textiles

Option table
VGA 19

Type	Bearing load (kN)	Ø Shaft (mm)	Mounting
VGA 19	2,5	25	on positioning device
VGA 19	15	35	in track roller

Technical Data
Pivoting roller system VGA 19

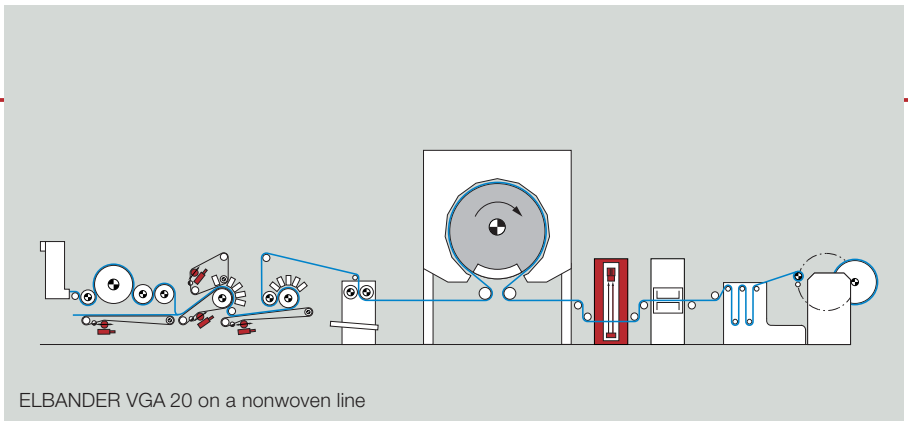
Operating voltage/current rating		3 x 180 to 265/310 to 460 V, 50 Hz, 0.72/0.42A 3 x 220 to 320/380 to 550 V, 60 Hz, 0.66/0.38 A
Control voltage		120/230 V, 50/60 Hz
Nominal correction		+/– 60 mm
Nominal correction speed		3.5 mm/s
Nominal correction force		3000 N
Bearing load	Positioning device Track roller Ø 35 mm Locating bearing Ø 35 mm	max. 2500 N max. 15000 N max. 15000 N
Guiding accuracy		≤ +/– 1 mm (depends on the belt quality)
Ambient temperature		+10 to + 60 °C
Protection class		IP 54
Weight		16.5 kg

ELBANDER systems

ELBANDER VGA 20

- Main implementation area in the textile, construction, wood and chemical industries
- Electromechanical sensor F 31 for detecting the edge position
- Three position controller with manipulated variable feedback to check the integral actuating element
- Linear guiding with self-arresting trapezoidal screw, torque support and three phase a.c. drive
- The guide roller may also be optionally mounted in a track roller for heavier bearing loads.

ELBANDER VGA 20
on a dryer



ELBANDER VGA 20 on a nonwoven line

Option table VGA 20			
Type	Bearing load (kN)	Ø Shaft (mm)	Mounting
VGA 20	5	35	on positioning device
VGA 20	39	60	in track roller

Technical data Pivoting roller system VGA 20		
Operating voltage/current rating		3 x 200 to 290/346 to 500 V, 50 Hz 3 x 200 to 330/346 to 575 V, 60 Hz
Control voltage		120/230 V, 50/60 Hz
Nominal correction		+/– 60 mm
Nominal correction speed		5 mm/s
Nominal correction force		5000 N
Bearing load	Positioning device Track roller Ø 35 mm Track roller Ø 60 mm Locating bearing Ø 35 mm Locating bearing Ø 60 mm	max. 5000 N max. 15600 N max. 39000 N max. 15600 N max. 39000 N
Guiding accuracy		≤ +/– 1 mm (depends on belt quality)
Ambient temperature		+ 10 to + 60 °C
Protection class		IP 54
Weight		34 kg

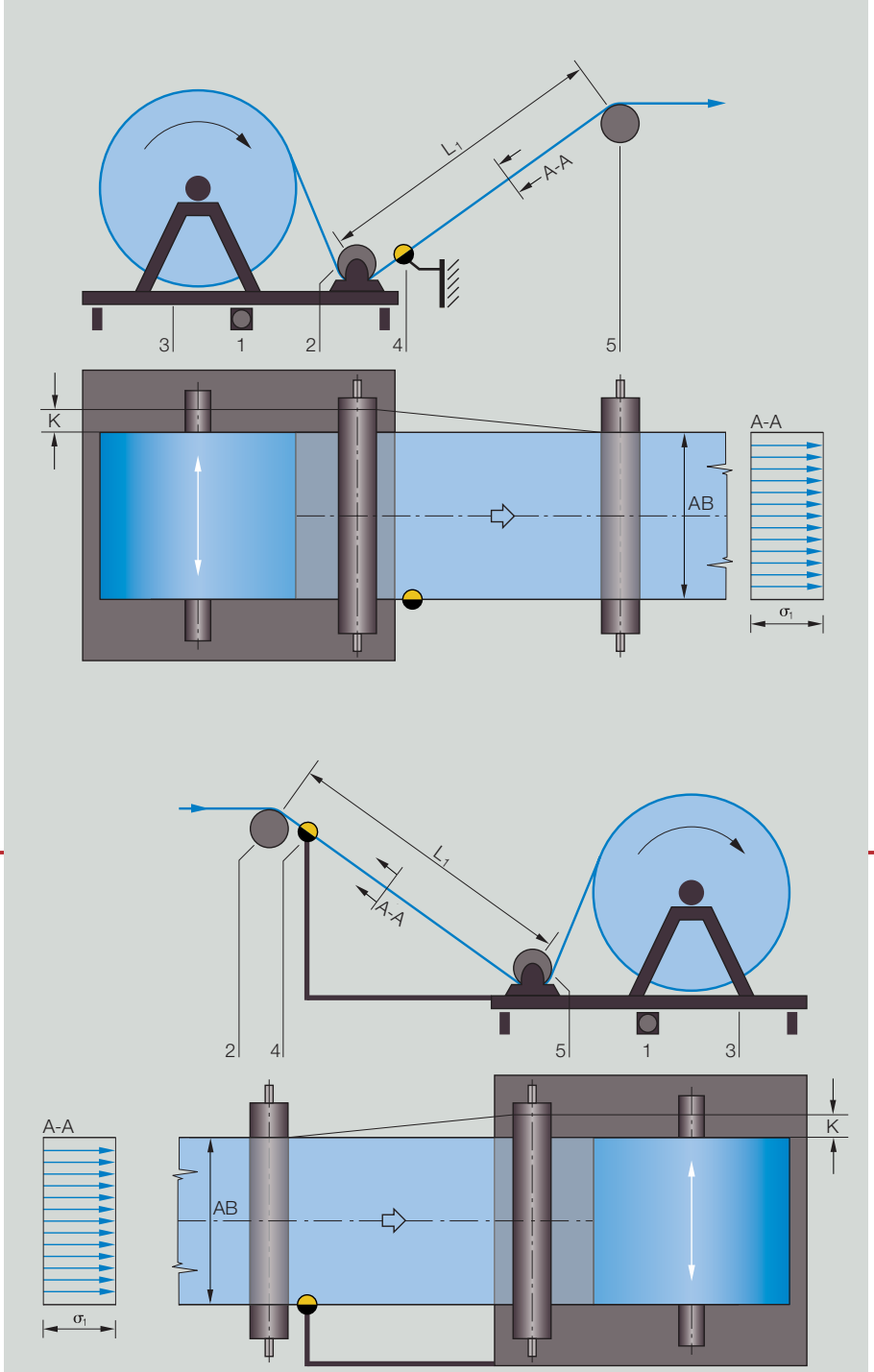
Web guiding with ELWINDER

Function
Typically in production processes involving moving webs, the unwind station is located at the machine infeed and the rewind station at the exit.
During unwinding, the reel station is moved via a linear drive in order to feed the web from the desired position.
On the other hand, during rewinding, the reel station follows up the constantly changing web position via a linear drive in order to achieve an evenly wound reel.

Implementation area
Web guiders with ELWINDER reeling stations are always implemented when, due to cramped conditions, an ELGUIDER or ELROLLER system cannot be accommodated.

Unwinding
During unwinding, the sensor is mounted to the machine in order to determine the web target set position. Position detection should hereby be located as close to the final reel station guide roller as possible.

Rewinding
During rewinding on the other hand, the sensor is mounted to the reel station in order to specify set target reel station position for the controller. Position detecting should hereby be located as close to the final machine guide roller as possible.
Guiding path L_1 depends on the elasticity of the web. The larger the transversal elasticity range is, the shorter path L_1 may be. Experience has shown that the guiding path should be the equivalent of half a web width.



Guiding geometry and longitudinal tension distribution

A-A	Web tension distribution on the guiding path	1	Linear drive
K	Web correction	2	Infeed roller
σ_1	Basic web tension	3	Reel station
AB	Web width	4	Sensor
		5	Locking roller
		L_1	Guiding path

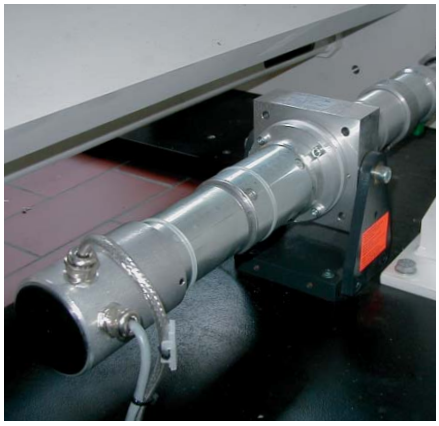
Linear drives for ELWINDER systems

Electrical actuators AG 25/26

- Electrical actuator with DC motor, planetary gear and ball screw
- Pivoting construction with stable base and flange mounting
- Flanged-on incremental encoder for speed and position recording
- Integrated reference sensor for position calibration.

ELWINDER WSS 51
on a slitter

Technical data WSS 51 with actuator AG 257		
System operating voltage Nominal voltage Nominal voltage range Nominal range with power supply		 24 V DC 20 to 30 V DC 115 to 460 V, 50/60 Hz
System current rating		3.8 A DC (manual sensor positioning) 5.3 A DC (motor-driven sensor positioning)
Nominal correction actuator	mechanical electrical	+/– 25/50/75/100 mm +/– 23/48/73/98 mm
Nominal correction speed actuator		24 mm/s 10 mm/s
Nominal positioning force actuator		1000 N 2500 N
System guiding accuracy		≤ +/– 0.2 mm (material-dependent)
System incoming error frequency		max. 0.5 Hz
Ambient temperature		+ 10 to + 50 °C
Actuator protection class		IP 54
Actuator weight		7.9 kg



ELWINDER WSS 52
on a slitter

Option table
Straight actuators AG

Type	v (mm/s)	F (N)	s +/– (mm)				
			25	50	75	100	150
AG 2571	24	1000					
AG 2571	10	2500					
AG 2671	15	3000					
AG 2671	7.5	5300					

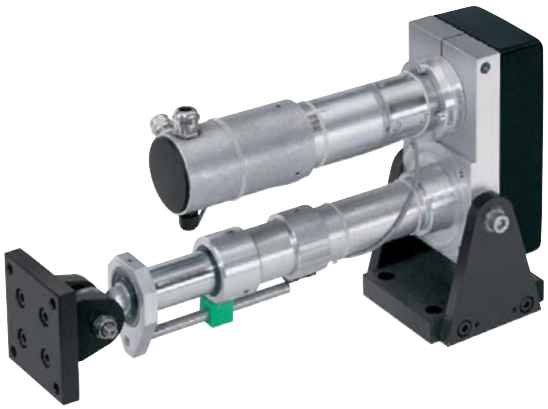
v Correction speed max.
F Correction force max.
s Correction max.

Technical data WSS 52 with actuator AG 267		
System operating voltage Nominal voltage Nominal voltage range Nominal range with power supply		 24 V DC 20 to 30 V DC 115 to 460 V, 50/60 Hz
System current rating		5.8 A DC (manual sensor positioning) 7.3 A DC (motor-driven sensor positioning)
Nominal correction actuator	mechanical electrical	+/– 25/50/75/100/150 mm +/– 23/48/73/98/148 mm
Nominal correction speed actuator		15 mm/s 7.5 mm/s
Nominal positioning force actuator		3000 N 5300 N
System guiding accuracy		≤ +/– 0.2 mm (material-dependent)
System incoming error frequency		max. 0.5 Hz
Ambient temperature		+ 10 to + 50 °C
Actuator protection class		IP 54
Actuator weight		13.4 kg

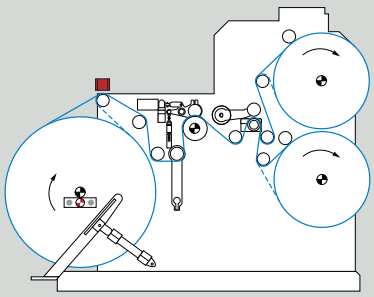
Linear drives for ELWINDER systems

Electrical actuators AG 45/46

- U-version for cramped conditions
- Electrical actuator with DC motor, planetary gearing and ball screw
- Play-free toothed belt drive for precision force transmission
- Pivoting design with stable base and flange mounting
- Flanged-on incremental encoder for speed and position recording
- Integrated reference sensor for position calibration.



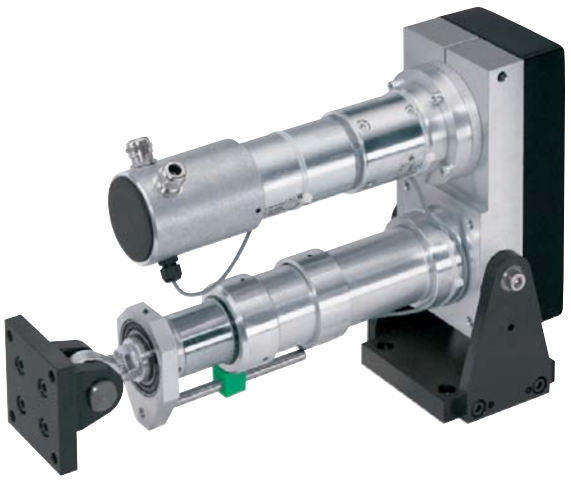
Technical data WSS 51 with actuator AG 457		
System operating voltage Nominal voltage Nominal voltage range Nominal range with power supply		 24 V DC 20 to 30 V DC 115 to 460 V, 50/60 Hz
System current rating		3.8 A DC (manual sensor positioning) 5.3 A DC (motor-driven sensor positioning)
Nominal correction actuator	mechanical electrical	+/– 25/50/75/100 mm +/– 23/48/73/98 mm
Nominal correction speed actuator		24 mm/s 10 mm/s
Nominal correction force actuator		1000 N 2500 N
System guiding accuracy		≤ +/– 0.2 mm (material-dependent)
System incoming error frequency		max. 0.5 Hz
Ambient temperature		+ 10 to + 50 °C
Actuator protection class		IP 54
Actuator weight		9.3 kg



ELWINDER WSS 51 on a slitter

Option table Actuators AG – U-Version							
Type	v (mm/s)	F (N)	s +/– (mm)				
			25	50	75	100	150
AG 4571	24	1000					
AG 4571	10	2500					
AG 4671	20	2400					
AG 4671	7	5300					

v Correction speed max.
F Correction force max.
s Correction max.



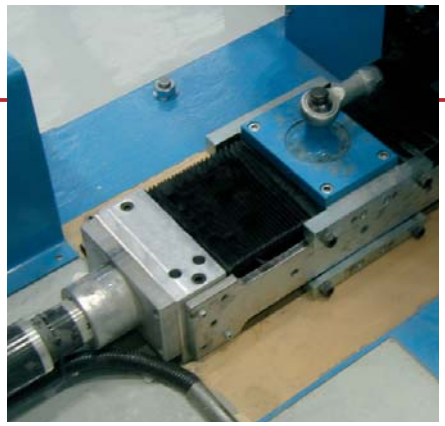
Technical data WSS 52 with actuator AG 467		
System operating voltage Nominal voltage Nominal voltage range Nominal range with power supply		 24 V DC 20 to 30 V DC 115 to 460 V, 50/60 Hz
System current rating		5.8 A DC (manual sensor positioning) 7.3 A DC (motor-driven sensor positioning)
Nominal correction actuator	mechanical electrical	+/– 25/50/75/100/150 mm +/– 23/48/73/98/148 mm
Nominal correction speed actuator		20 mm/s 7 mm/s
Nominal positioning force actuator		2400 N 5300 N
System guiding accuracy		≤ +/– 0.2 mm (material-dependent)
System incoming error frequency		max. 0.5 Hz
Ambient temperature		+ 10 to + 50 °C
Actuator protection class		IP 54
Actuator weight		15.6 kg

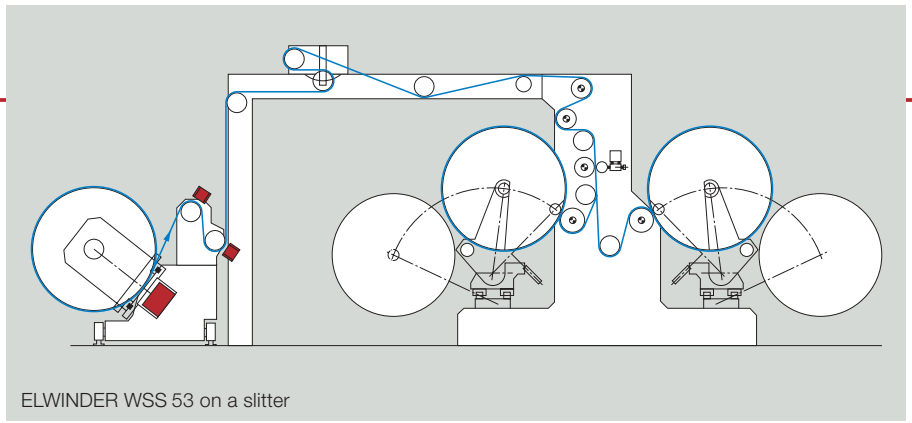
Linear drives for ELWINDER systems

Electrical actuators AG 57/58

- Electrical actuator with DC motor, planetary gearing and ball screw
- Precision linear guiding with torque support
- Reliable screw and guide protection against soiling via bellows-type cover
- Flanged-on incremental encoder for speed and position recording
- Integrated reference sensor for position calibration
- May only be implemented in conjunction with position controller DC 55.

ELWINDER WSS 53
on a slitter





ELWINDER WSS 53 on a slitter

Option table
Actuators AG 57/58

Type	v (mm/s)	F (N)	s +/– (mm)					
			50	100	150	200	300	500
AG 5791	25	10000						
AG 5871	10	20000						

v Correction speed max.
F Correction force max.
s Correction max.

Technical data
WSS 53 with actuators AG 57/58

System operating voltage Connection rating		1 x 110 to 600 V, 50/60 Hz 700 VA					
Nominal correction	mechanical electrical	+/– 50/100/150/200/300/500 mm +/– 48/98/148/198/298/498 mm					
Nominal correction speed actuator		25 mm/s	10 mm/s				
Nominal positioning force actuator		10000 N	20000 N				
System guiding accuracy		≤ +/– 0.3 mm (material-dependent)					
System incoming error frequency		max. 0.5 Hz					
Ambient temperature		+ 10 to + 50 °C					
Actuator protection class		IP 54					
Weight AG 5791	Traverse	+/– 50 36 kg	+/– 100 38 kg	+/– 150 40 kg	+/– 200 42 kg	+/– 300 46 kg	+/– 500 54 kg
Weight AG 5891	Traverse		+/– 100 40 kg	+/– 150 42 kg	+/– 200 44 kg	+/– 300 48 kg	+/– 500 56 kg

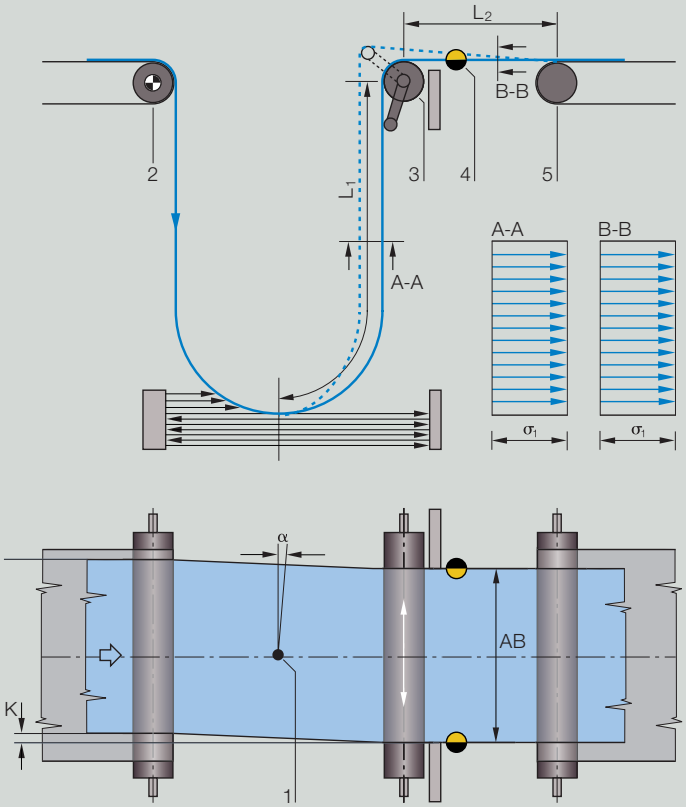
Web guiding with ELPLACER

Function

ELPLACER lateral displacement roller systems position moving webs via an axial movement of the guide roller. If, in doing so, the guide roller reaches the end position, the material is raised by a device, the guide roller is recentered and the web relowered. As the lateral displacement roller is implemented exclusively in clocked mode processing plants the lifting of the web is always performed during stop times.

Implementation area

The implementation area is mainly centred on machines in the tire industry as, due to its elasticity, the material here is fed to the follow-up process via loop guiding.



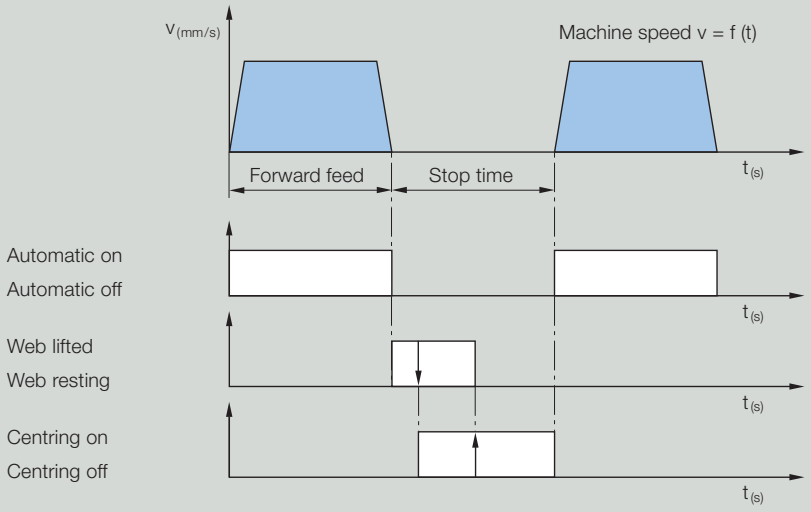
Guiding geometry and longitudinal tension distribution

A-A	Web tension distribution at infeed	1	Pivot
B-B	Web tension distribution at exit	2	Infeed roller
K	Web correction	3	Lateral displacement roller
α	Correction angle	4	Sensor
σ_1	Basic web tension	5	Locking roller
AB	Web width	L_1	Infeed path
		L_2	Exit path

Application

Infeeding is always from the loop, from bottom to top. Here, the infeed path L_1 should be the equivalent of one half to a full web width. The exit path L_2 should, on the other hand, be kept as short as possible. The sensor should be positioned behind the guide roller as close to it as possible. Due to the brief response time, high actuating dynamics are achieved.

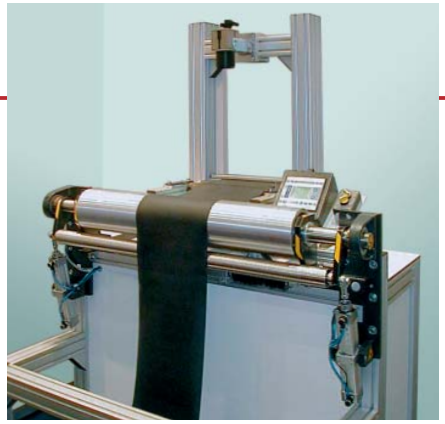
Lateral displacement roller function sequence

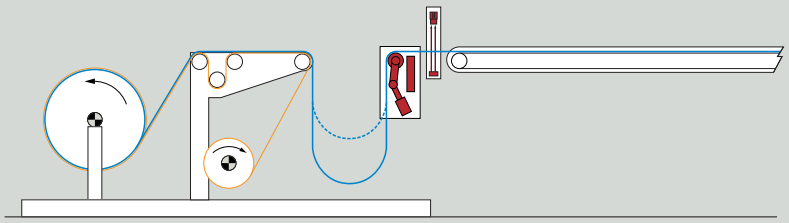


ELPLACER systems

ELPLACER SVS 11/21

- Lateral displacement roller system for guiding the inner liner on the tire building line
- Roller width from 600 to 1900 mm
- Positioning controller space-savingly pre-mounted on frame
- Material-specific option of infra-red sensor or CCD line camera
- May be implemented up to a nominal web tension of 500 N
- Available also as two-web version.





ELPLACER SVS 11 at the ply server of a tire building line

Option table SVS

Type	Number of webs	NB min. (mm)	NB max. (mm)
SVS 11	one	600	1900
SVS 21	two	300	600

Technical data
Lateral displacement roller system SVS 11/21

Operating voltage Nominal voltage Nominal voltage range Nominal range with power supply		 24 V DC 20 to 30 V DC 115 to 460 V, 50/60 Hz
Current rating	one-web version two-web version	3,6 A DC (manual sensor positioning) 7,2 A DC (manual sensor positioning)
Roller width	one-web version two-web version	600 to 1900 mm 2 x 300 to 600 mm
Roller diameter		160 mm
Nominal correction		max. +/– 50/75 mm
Nominal correction speed		1 to 25 mm/s (variable)
Web tension		max. 500 N
Guiding accuracy		≤ +/– 1 mm (material-dependent)
Incoming error frequency		max. 1 Hz
Ambient temperature		+ 10 to + 50 °C
Protection class		IP 54
Lifting device operating pressure		3 bar

Pneumohydraulic controllers

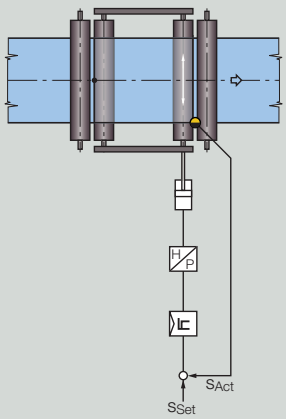
Pneumohydraulic controller HP 03

The HP proportional controller utilizes the medium of air for web guiding in conjunction with pneumatic edge sensors. Via their position, the rigidly mounted sensors determine the target set point. The web edge actual position is determined via the banking-up pressure on the sensor. The difference between it and the target set value is transferred as a signal to the proportional controller.

The controller supplies the necessary controlled variable which is converted into a hydraulic actuating movement in a proportional valve.

An additional hydraulic connection may be used, e.g. to control a single lever device on an unwind.

Controller diagram pneumohydraulic position controller for proportional actuators



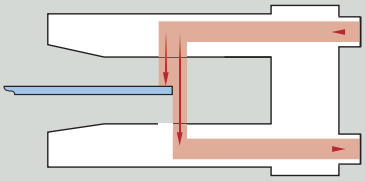
Technical data Pneumohydraulic controller HP 03					
Type		HP 036		HP 037	
Operating voltage		3 x 200 to 242/346 to 420 V, 50/60 Hz 3 x 230 to 290/400 to 500 V, 50/60 Hz			
Motor power		550 W			
Operating pressure (breakaway pressure)		20 bar		30 bar	
Pressure on cylinder during guiding		14 bar		21 bar	
Oil flow rate		1.5 to 3 l/min		3 to 6 l/min	
Oil topping-up		10 l		15 l	
Operating temperature Δt in cont. mode		35 °C		45 °C	
Operating temperature		max. + 80 °C			
Ambient temperature		+ 10 to + 45 °C		+ 10 to + 35 °C	
Valve voltage Valve power	 2/2 way 4/3 way	24 V DC 15 W 30 W	120 V, 60 Hz 31 VA 80 VA	230 V, 50 Hz 31 VA 80 VA	
Correction force	Cylinder diameter at 14 bar at 21 bar	40 mm 1340 N 2020 N	50.8 mm 2550 N 3820 N	63.5 mm 4160 N 6240 N	82.5 mm 6800 N 10200 N
Correction speed	Cylinder diameter at 1,5 l/min at 3 l/min at 6 l/min	40 mm 20 mm/s 40 mm/s 80 mm/s	50.8 mm 12 mm/s 24 mm/s 48 mm/s	63.5 mm 7.8 mm/s 16 mm/s 31 mm/s	82.5 mm 4.6 mm/s 9 mm/s 18 mm/s
Detecting air pressure		5 to 30 mbar (variable)			
Protection class		IP 54			
Weight with oil filling		30 kg		35 kg	

Pneumatic sensors

Pneumatic edge sensor FL 20
The pneumatic edge sensor detects the web edge position without touching by evaluating the continuity of air currents.
The sensor comes in a fork design, through which web runs. Air flows from both fork elements, although with a higher pressure from the transmitter element than from the receiver element.
Given a free flow of air, a measurable banking-up pressure of approx. 12 mbar is produced in the receiver, which, when the measuring area is fully covered, is reduced to 2 mbar. The edge position may be detected in this range. Its actual value may be evaluated in a pneumohydraulic controller.

Option table
Pneumatic sensor FL

Type	Gap width (mm)	Measuring range (mm)	Limb length (mm)
FL 2011	9,5	9	76
FL 2013	9,5	9	76/229
FL 2014	9,5	9	229
FL 2030	19	9	115
FL 2040	24	9	180



Hydraulic drives HZ
On hydraulic cylinders the linear motion is a direct result of their design. Their heavy duty design and the high power density it entails permit a maximum actuating force in a relatively small area.

Option table
Hydraulic cylinder HZ

Type	Ø pisten/pisten rod (mm)	Stroke (mm) 50	100	150	200	300	400
Hz 4101	40.0/16.0						
Hz 5080	50.8/15.9						
Hz 6380	63.5/15.9						
Hz 8280	82.5/25.4						

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Engineering based on experience
The engineering team at our headquarters in Augsburg will develop a customized solution for you even for the toughest jobs. With the experience gained from a diverse range of installations all over the world, our specialists do not handle tasks in isolation but look at them as part of the overall process.

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With Erhardt+Leimer all components are from a single source: if required, systems are supplied complete with electric drives and programmable controllers installed in the control cabinet. Our experts will be happy to adapt your new system to individual on-site conditions once it has been installed.

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To make sure you get the most out of your new E+L system, even on complex applications, we offer machine manufacturers and users of our products a “self help” course. One or several day courses for assembly and service engineers may be held whenever you wish at our headquarters in Augsburg or in your company.

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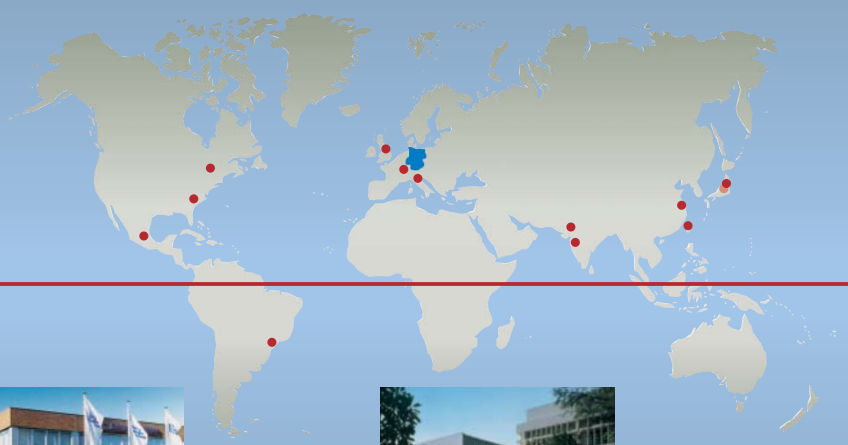

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