ELGUIDER

Web guiding systems

Continuous acquisition
and control of the web position

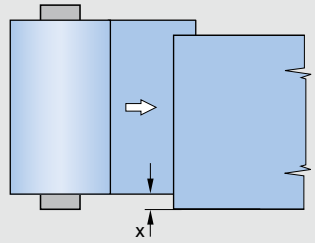
Content

Web guiding systems for improved quality and productivity

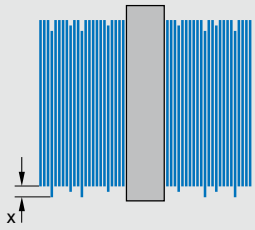
Today, the manufacturers and users of machines for processing web-type materials are confronted with ever increasing demands: production processes should be even faster, while at the same time performed with greater precision, the quality of the finished product further improved while personnel, waste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

A decisive contribution to the fulfillment of these prerequisites is made 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 sources of errors and to ensure permanent, precise web alignment and winding. Depending on the type of material, application and task, Erhardt+Leimer offers a wide variety of systems with the latest networking technology: for decisively more quality and productivity that pays off!

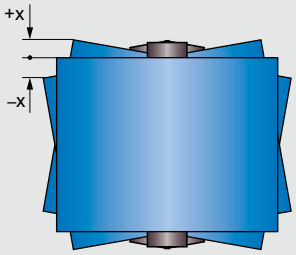
Typical position errors



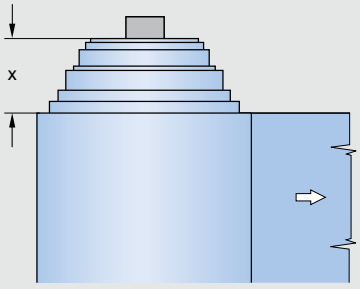
Web offset on reel change



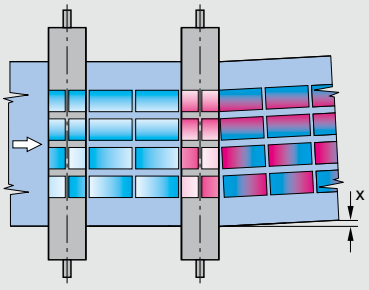
Incorrectly wound reels



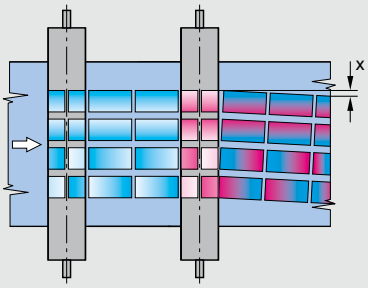
Tumbling errors



Telescoped reels



Web travel in the process

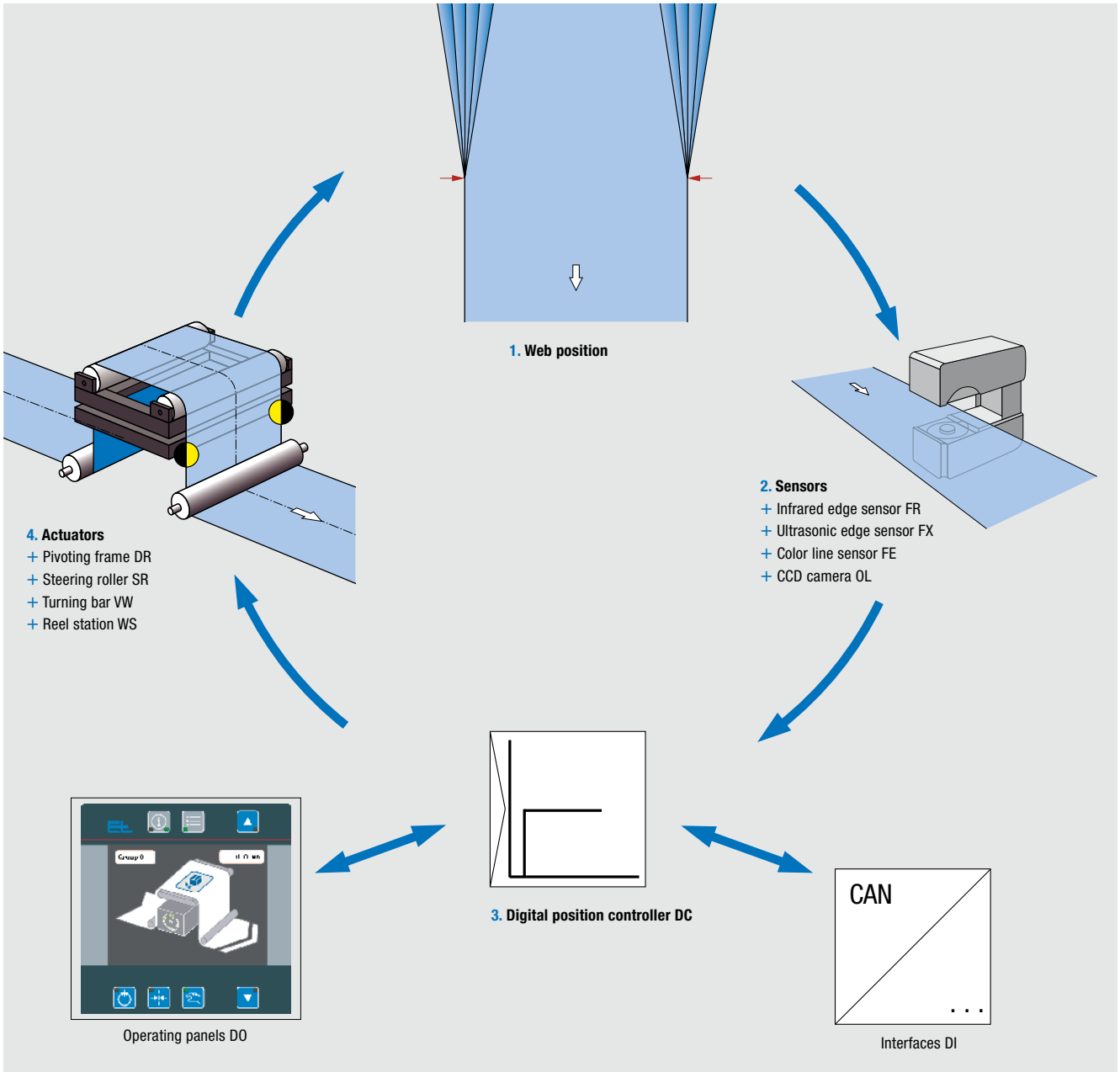


Printed image travel

The 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 this control loop.

1. The starting point is the actual web position.
2. A sensor detects the web actual position without physical contact. Depending on the task and fabric properties, this may be an infra-red, ultrasonic or line sensor.
3. The controller compares the actual web value with the specified set value and transmits the relevant corrective signal to the actuator.
4. The actuator corrects web travel. Depending on the application and the fabric type, the actuator may be a pivoting frame, a steering roller, a turning bar or a linear drive for a reel station.



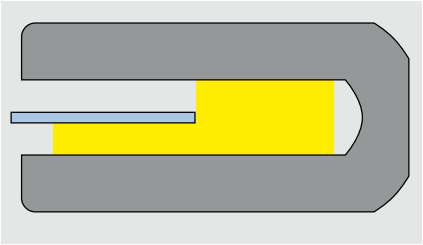
Broadband sensor FR 60

Infrared broadband sensor FR 60

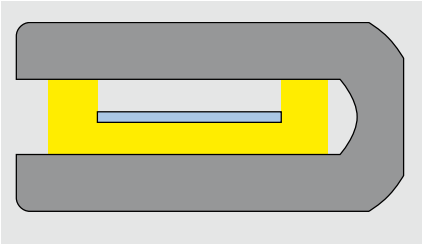
+ Infrared transmitted light transmitter with large field of view of 150 mm
+ Electronic web offset in the sensor field of view without manual adjustment of the sensor
+ Scanning of homogeneous materials such as non-woven fabric, woven and knitted fabrics up to a transparency of 70 %
+ Simultaneous evaluation of up to four edges
+ Insensitive to external light
+ Stable operating point independent of the material transparency
+ Exposure controller for the compensation of soiling
+ Optional integrated clearing device in case of extreme dust conditions
+ Bar display for the indication of the actual edge position or diagnostic information

Broadband sensor FR 60

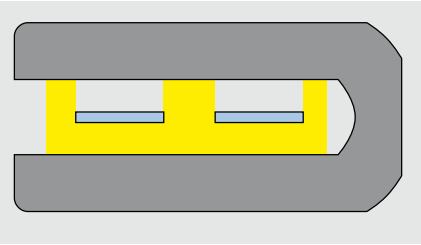
Edge configurations



+ Acquisition and evaluation of a web edge

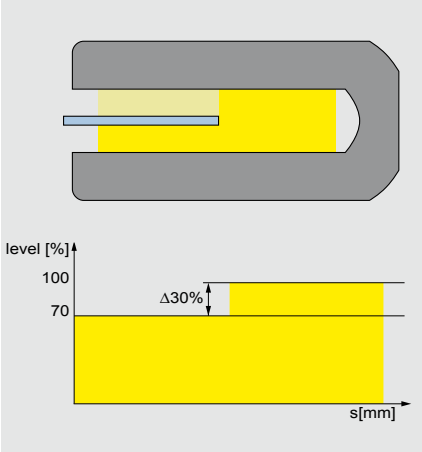


+ Acquisition and evaluation of two web edges
+ Application for narrow webs from 10 to 130 mm



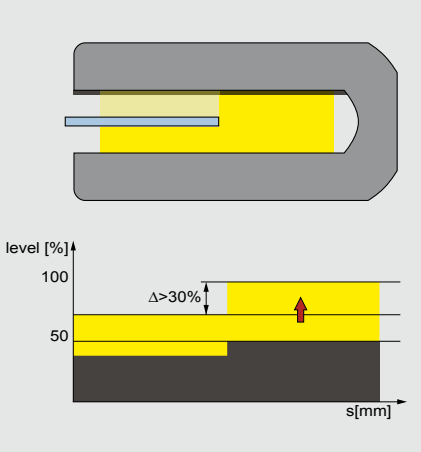
+ Acquisition and evaluation of four web edges
+ Application for two narrow webs from 10 to 55 mm

Edge acquisition on transparent webs



+ Reliable edge detection at max. 70 % transparency of the material webs

Edge acquisition on transparent webs in case of soiling



+ Integrated exposure controller ensures constant light intensity even in case of soiling
+ Reliable detection of transparent webs even in case of heavy dust deposits

Selection table

Broadband sensor FR 60	
Type	Clearing device
FR 6001	Yes
FR 6011	No

FR 60 in baby diaper machine

Technical data

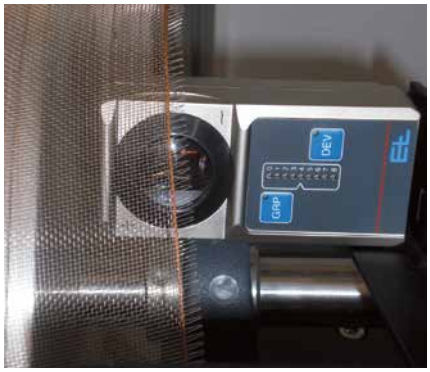
Infrared broadband sensor FR 60	
Measuring range	±79 mm
Operating voltage	
Nominal value	24 V DC
Nominal range (ripple included)	20 to 30 V DC
Current consumption	150 mA DC
Ambient temperature	10 to 50 °C
Resolution	0.1 mm
Linearity	±0.2 mm
Scan rate	200 Hz
Cable length	Max. 10 m
Protection class	IP 54
Weight	1.25 kg
Number of edges evaluated	Max. 4 edges (= 2 narrow strips)
Clearing device operating pressure	2.0 bar
Clearing device air consumption	1.55 m^3/h (at 2.0 bar)
Service unit filter	5 µm
Service unit residual oil content	< 0.01 mg/m^3
Fork width	40 mm
Dimensions (L x W x H)	
FR 6001	232 x 106 x 31 mm
FR 6011	221 x 106 x 31 mm

Infrared edge sensor FR 52

Infrared edge sensor FR 52

+ Infrared edge sensor based on the principle of retroreflection
+ Field of view ±10 mm with a resolution of 0.02 mm
+ Distance-independent edge evaluation based on parallel light beams
+ Acquisition of edges and threads
+ Scanning with CCD array guarantees a stable operating point independent of the material transparency
+ Exposure controller for the compensation of soiling
+ Optional integrated clearing device in case of extreme dust conditions
+ Bar display for the indication of the actual edge position or diagnostic information

Infrared edge sensor FR 52

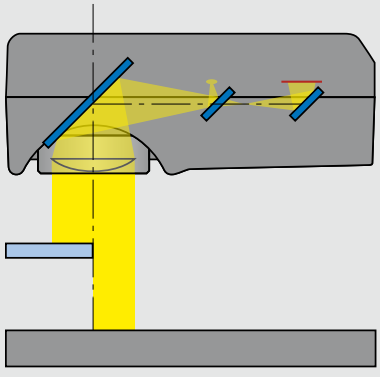


Infrared edge sensor FR 52 for mesh acquisition

FR 52 with reflector bar

Selection table

Reflector bar	
Type	Fork width (mm)
FR_5000-95	30
FR_5000-97	75
FR_5000-98	160



Principle of operation FR 52

Technical data

Infrared edge sensor FR 52	
Operating voltage	
Nominal value	24 V DC
Nominal range (ripple included)	20 to 30 V DC
Current consumption	80 mA DC
Ambient temperature	10 to 50 °C
Measuring range	±10 mm
Resolution	0.02 mm
Linearity	±0.1 mm
Wavelength	850 nm
Scan rate	200 Hz
Cable length	Max. 10 m
Protection class	IP 54
Weight	0.3 kg
Clearing device operating pressure	Min. 0.1 bar; max. 0.2 bar
Service unit filter	5 µm
Service unit residual oil content	< 0.01 mg/m³
Fork width	See selection table
Dimensions (L x W x H)	105 x 50 x 40 mm

Ultrasonic edge sensor FX 42/FX 52

Ultrasonic edge sensor FX 42/FX 52

+ Ultrasonic edge sensor with digital evaluation
+ Field of view ±3 mm or ±10 mm
+ Fork widths in 30, 60 and 124 mm
+ Insensitive to soiling due to dust
+ Scanning of materials opaque to sound such as paper, plastic and metal films independent of the material transparency
+ Internal temperature compensation for stable operating point
+ Bar display for the indication of the actual edge position or diagnostic information

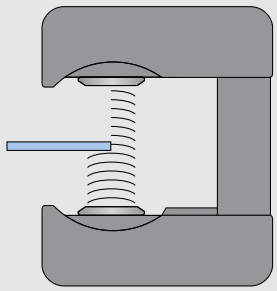
Ultrasonic edge sensor FX 52

Ultrasonic edge sensor FX 5 in film manufacturing machine

Selection table

Ultrasonic edge sensors FX 4/5

Type	Measuring range ±(mm)	Fork width LW (mm)
FX 4230	3	30
FX 4260	3	60
FX 4200	3	124
FX 5230	10	30
FX 5260	10	60
FX 5200	10	124



Principle of operation FX 42

Technical data

Ultrasonic edge sensor FX 4/5	
Operating voltage	
Nominal value	24 V DC
Nominal range (ripple included)	20 to 30 V DC
Current consumption	170 mA DC
Ambient temperature	10 to 50 °C
Measuring range	See selection table
Linearity deviation (measuring range 10 – 90 %)	±1 %
Ultrasonic frequency	~ 200 kHz
Resolution	0.02 mm
Scan rate	200 Hz
Cable length	Max. 10 m
Protection class	IP 54
Installation altitude	0 to 3000 m above sea level
Weight	0.7 kg
Fork width	See selection table
Dimensions (L x W x H)	105 x 50 x (LW + 80 mm)

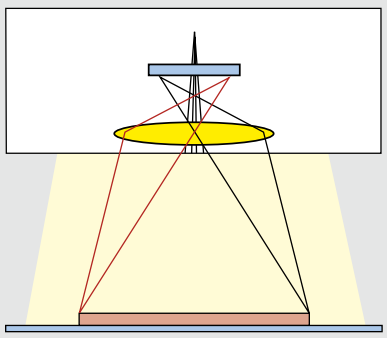
Color line sensor FE 52 with ELPAD

Color line sensor FE 52

+ Digital color matrix sensor for the acquisition of color lines and color contrasts
+ Exposure controller for the compensation of soiling
+ Integrated light source with automatic adaptation to matt and gloss surfaces
+ Adjustable search range for masking interfering contours

Operating unit DO 4021

+ Intuitive operation with color touch-display
+ Real 2D depiction of the guiding criterion
+ Straightforward teach-in of the guiding reference using color touch-display
+ Depiction of scanning quality
+ Operation of both line sensor and web guider
+ Connection to the FE 52 via PoE (PowerOverEthernet)



Principle of operation FE 52

Technical data

Color line sensor FE 52	
Operating voltage	
Nominal value	24 V DC
Nominal range	20 to 30 V DC
Current consumption	300 mA DC
Ambient temperature	10 to 50 °C
Measuring range	±10 mm
Resolution	0.02 mm
Sensor/web spacing	24 mm, ±2 mm
Scan rate	200 Hz
Cable length to the controller	Max. 10 m
Protection class	IP 45
Weight	0.75 kg
Dimensions (L x W x H)	126 x 80 x 46 mm

Operating unit DO 4021	
Operating voltage	
is supplied with power by the FE 52 color line sensor via PoE (PowerOverEthernet)	
Current consumption	200 mA DC
Ambient temperature	10 to 50 °C
Display resolution	320 x 240 pixels
Length of cable to FE 52	max. 20 m
Protection class	IP 54
Weight	0.5 kg
Dimensions (L x W x H)	100 x 100 x 29 mm

Guiding criteria

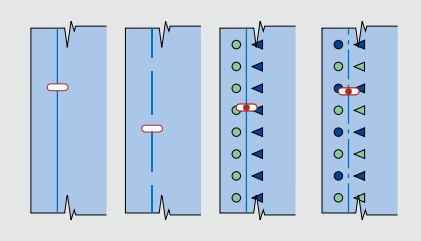
+ Line scanning, light line on dark background
+ Line scanning, dark line on light background
+ Contrast scanning

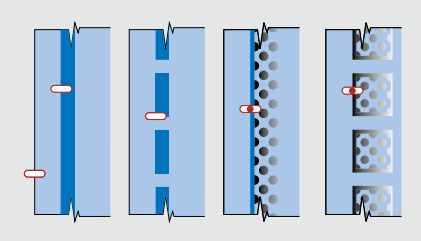
Line scanning

+ Continuous line with even background
+ Broken line with even 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
+ Field of view can be restricted to double line width

Contrast scanning

+ Web edge scanning
+ Contrasting edge with even background
+ Broken contrasting edge with even background
+ Contrasting edge with uneven background
+ Broken contrasting edge with uneven background
+ Color contrasting edge on both sides minimum 1 mm
+ Field of view can be restricted to 2 mm





Sensor mounting bracket VA 6

A stable sensor mounting bracket is a decisive factor in precision, vibration-free scanning of the line/color edge. This feature makes it possible to quickly and straightforwardly change the scanning angle without affecting the mounting distance. Different versions are available depending on the application.

Variable sensor mounting bracket

Fixed sensor mounting bracket

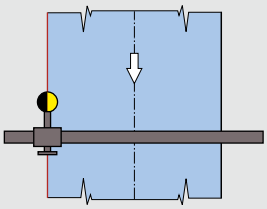
Sensor mounting bracket VA 6

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

Position control methods

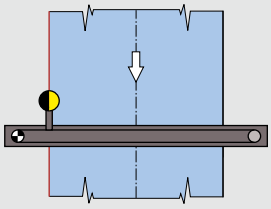
Web guiding is initially defined by the type of web processed. Unfinished fabric webs may only be guided by the edge as no other regular contrasting characteristics are featured. Finished webs offer a further field of possible guiding criteria. They may be guided by a printed characteristic line, water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

Manual sensor positioning web edge guiding



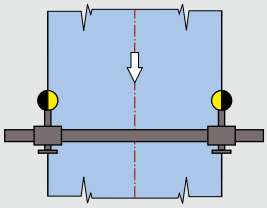
Guiding by the left or right web edge

Motorized sensor positioning web edge guiding



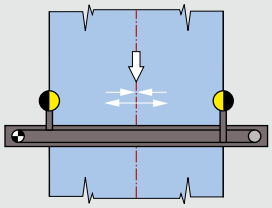
Guiding by the left or right web edge

Manual sensor positioning web center guiding

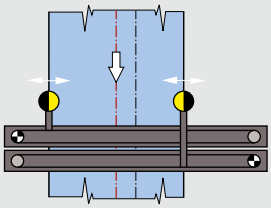


Guiding by the ideal web center line/machine center line

Motorized sensor positioning web center guiding

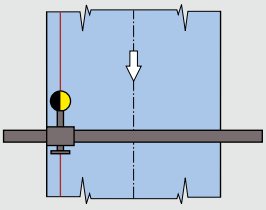


Guiding by the ideal web center line/machine center line with symmetric sensor positioning (hybrid control)



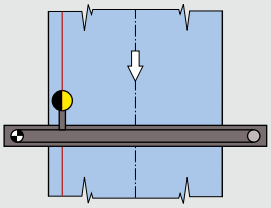
Guiding by the web center which does not correspond to the machine center with motorized sensor positioning for both sides (automatic edge search)

Manual sensor positioning web contrast guiding



Guiding by a printed line or existing contrasts

Motorized sensor positioning web contrast guiding



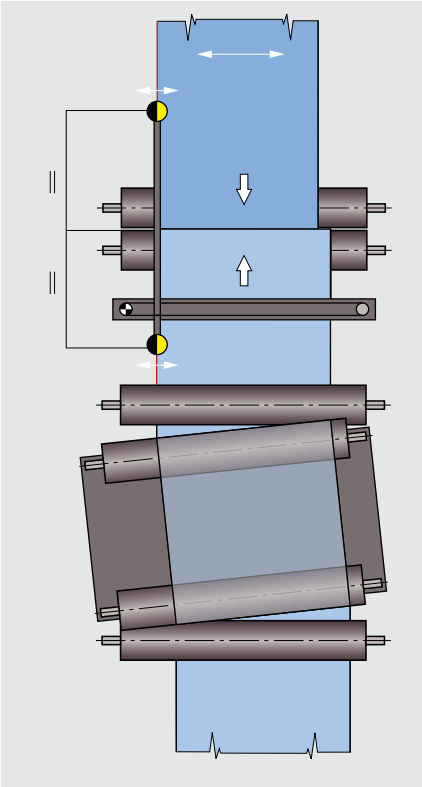
Guiding by a printed line or existing contrasts

Web to web guiding

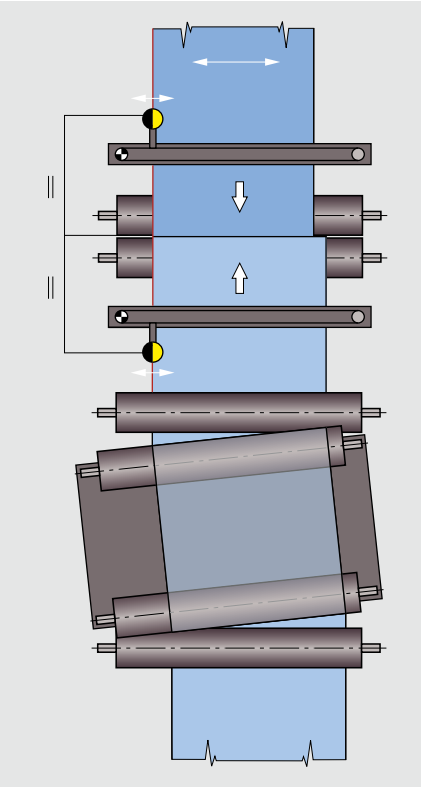
Laminating means combining two or several webs to produce a composite material. All the webs that come together in front of the laminating unit must be positioned exactly in relation to one another.

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).

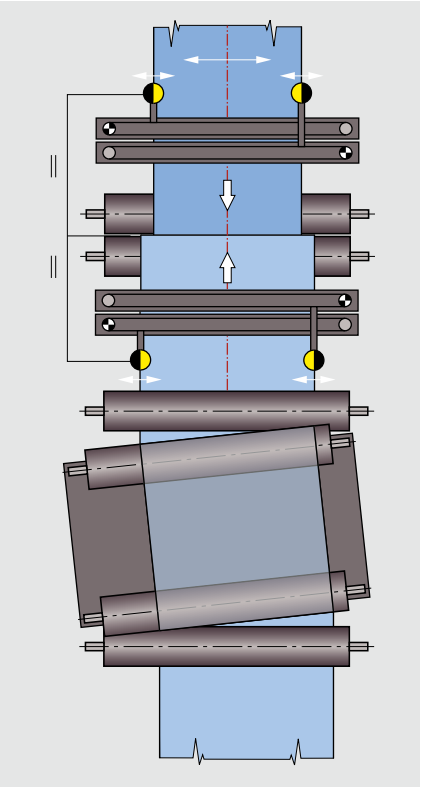
Web to web guiding by the web edge with one support beam



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



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



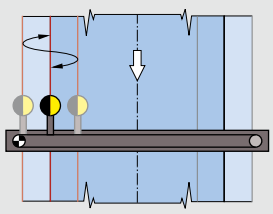
Web oscillation

Oscillation refers to the controlled changing of the web position following a specific cycle. This cycle can be time-based or length-based.

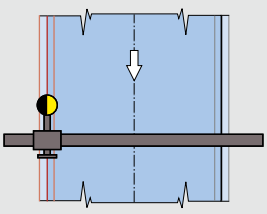
Web oscillation is primarily used for web guiding in front of rewinders.

Web width measuring

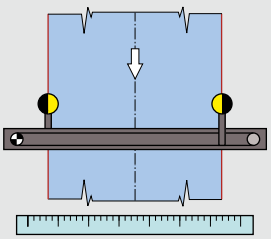
If both web edges are scanned by two sensors, the actual web width may also be calculated and displayed.



For larger oscillation strokes, the mechanical sensor set point is changed using a motor.



For smaller oscillation distances, a change in the electrical set point within the sensor range is sufficient.



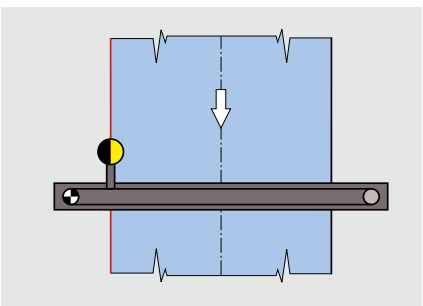
Sensor positioning VS 45

Support beam VS 45

+ Motorized linear position adjustment for ultrasonic, infrared and color line sensors
+ Versions with 1 and 2 motors
+ Compact design with integrated, temperature-monitored, short circuit-proof motor and control electronics
+ CAN bus connection for straightforward connection to the web guider
+ Functions such as sensor pre-positioning, edge search, move clear and width measurement possible
+ Integrated wiring harness

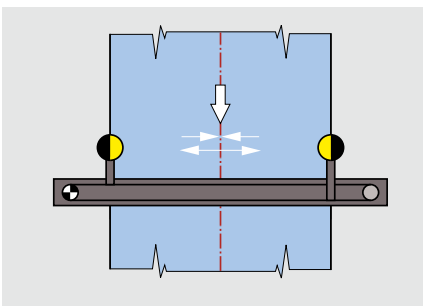
Motorized sensor positioning
Support beam VS 4515

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



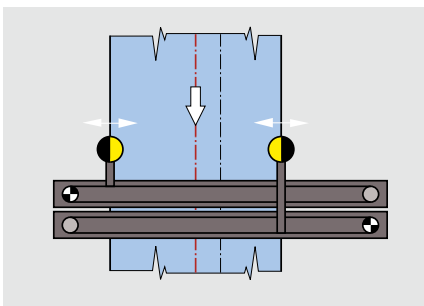
Motorized sensor positioning
Support beam VS 4525

This version comprises two carriages that are coupled together via a toothed belt moved in or out together by a drive unit.

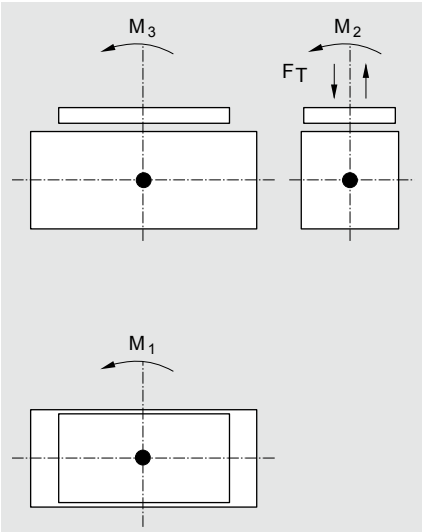


Motorized sensor positioning
Support beam VS 4535

This support beam 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. By synchronously controlling the drives it is possible to offset the web over the full width of the web.



Support beam VS 45 with infrared edge sensor FR 52



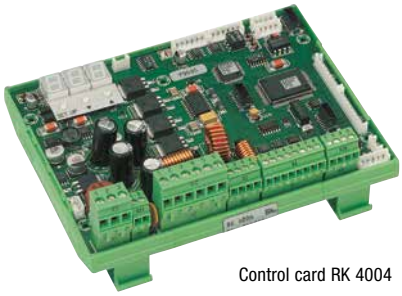
Technical data

Support beam VS 45			
Operating voltage			
Nominal value		24 V DC	
Nominal range		20 to 30 V DC	
Current consumption		1.4 A DC (1 positioning drive) 2.8 A DC (2 positioning drives)	
Nominal operating width	VS 4515		Max. 5850 mm
	VS 4525	Min. 250 mm	Max. 5850 mm
	VS 4535	Min. 250 mm	Max. 5850 mm
Nominal actuating speed		1 to 70 mm/s (adjustable)	
Nominal actuating force		20 N	
Load centered per positioning carriage		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	With NB 1000 mm 15.7 kg	per 100 mm step 1 kg
	VS 4525	With NB 1000 mm 16.2 kg	per 100 mm step 1 kg
	VS 4535	With NB 1000 mm 16.7 kg	per 100 mm step 1 kg

Position controller DC

Position controller DC 33

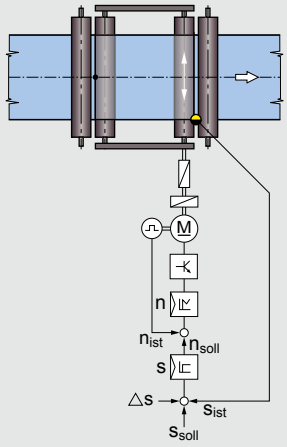
+ Digital position controller with integrated output stage for the operation of DC gear-motors
+ Color LC display 1/4 VGA with touch control unit
+ Visualization of the application
+ User-friendly commissioning due to configuration wizard
+ Multiple operation possible
+ Cascaded control structure for the precise control of proportional and integral actuators
+ Integrated CAN bus, optional Ethernet interface
+ Expansion possible by means of analog input and output modules
+ Selection of the country-specific language
+ Integrated backup features for saving the device settings
+ Language-neutral error messages



Control card RK 4004

Control structure for proportional actuators

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

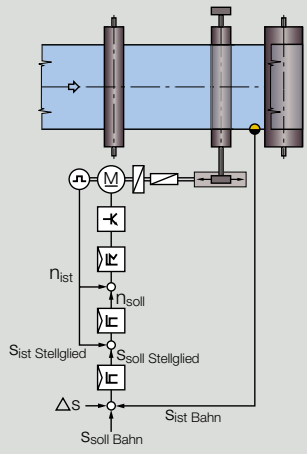


Proportional actuators

+ Pivoting frames
+ Steering rollers
+ Turning bars
+ Reel stations

Control structure for integral actuators

Besides a positioning controller for the web, the cascaded control structure for integral actuators also features a positioning-, speed and current controller for the actuator.

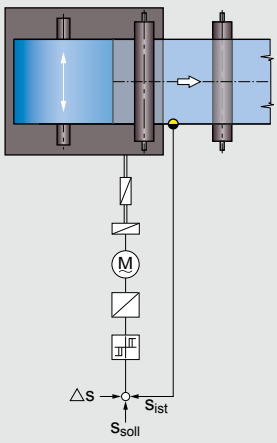


Integral actuators

+ Pivoting rollers
+ Segmented roller guiders
+ Edge spreading devices
+ Web spreading devices

Control structure for proportional actuators with three-position controller (only possible with DC 03)

Three-position controller with adjustable window and hysteresis variables.



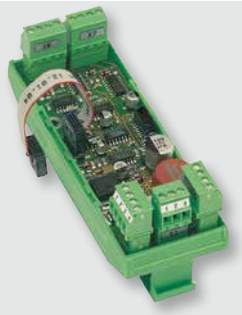
Proportional actuators

+ Reel stations with three phase drive
+ Turning bars with three phase drive

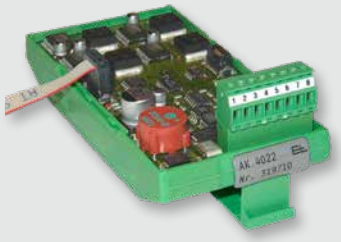
Controller function modules

+ Automatic sensor addressing
+ Web offset possible in 1/10 mm and 1/100 mm steps
+ Web offset and web tear monitoring: automatic reduction of the actuating speed if guiding deviation too high
+ Emergency guiding: automatic switch-over to edge sensor in the event of line loss
+ Improved dynamic behavior due to brief motor current increase
+ Adaptation of the control loop to changing process variables e.g. web speeds
+ Adjustable dead zone for uneven web edges
+ Cycle and path-dependent oscillation of the web position target value possible
+ Adjustable end position limiting

Input/output modules



Input module AK 4014 with four inputs from 0 – 10 V (12 bits) and +10 V DC sensor supply voltage. Sensors or position sensors can therefore be used with the digital controller.



Output module AK 4022 with four analog outputs 0 – 10 V/4 – 20 mA/0 – 20 mA (12 bits) that can be selected for the output of sensor signals, motor actual position, web speed, controller actuating signal, actual width, width deviation, set width

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

Technical data

Position controller		
Operating voltage		
Nominal value		24 V DC
Nominal range		20 to 30 V DC
Current consumption	without motor	0.2 A DC
	with motor (maximum)	5.2 A DC
Output voltage	at motor terminal	Operating voltage -2 V (pulse-width modulated)
Output current		max. 5 A
Cycle time		6 ms
Ambient temperature		10 to 50 °C
Protection class		IP 54
Dimensions (L x W x H)		300 x 150 x 80 mm
CAN bus		
CAN data rate		250 kbit/s
Ethernet		
Data rate		100 Mbit/s
Connection		RJ45
Digital inputs RK 4004	**05**	
Switching level		Low = 0 to 3 V DC, High = 10 to 30 V DC
Digital status output	**1**	
Switching level		max. 0.5 A

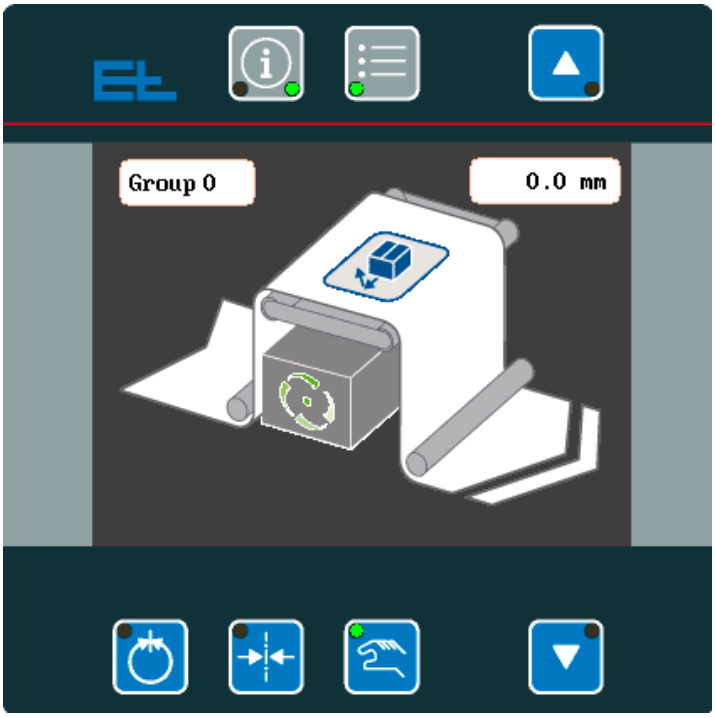
Selection table DC 03/23/33

Position controller							
Type	RK 4004	DO 2000	DO 4000	AK 4002	AK 4014	LK 4203	Ethernet
DC 0340	■						
DC 0341	■					■	
DC 0310	■			■			
DC 0311	■			■		■	
DC 0360	■				■		
DC 0361	■				■	■	
DC 2340	■	■					
DC 2341	■	■				■	
DC 3340	■		■				
DC 0344	■						■
DC 3341	■		■			■	
DC 3344	■		■				■

Command stations DO 40

Command station DO 40

+ Man-machine interface with intuitive user prompts
+ Visualization and operation of web guiding systems
+ Multiple operation of up to eight web guiding control loops
+ Selection of the country-specific language
+ Integrated backup features for saving the device settings
+ Color LC display 1/4 VGA with touch control unit
+ User-friendly commissioning due to configuration wizard
+ Language-neutral error messages
+ Integrated CAN bus, optional Ethernet interface



Command station DO 40

Selection table

Command station DO 4		
Type	Mounting kit	Console housing
DO 4003		■
DO 4002	■	

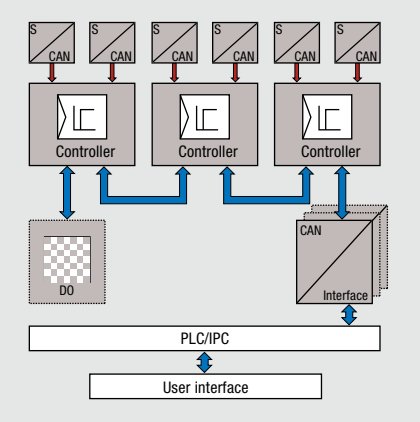
Technical data

Command stations DO 4	DO 4002/3
Operating voltage Nominal value Nominal range	 24 V DC 20 to 30 V DC
Current consumption	200 mA DC
Ambient temperature	10 to 50 °C
CAN interface Ethernet interface	250 kbit/s 100 Mbit/s
Dimensions Front frame panel mounting Cut-out for panel mounting With housing for field mounting	 100 x 100 x 8 mm 90 x 90 mm 130 x 130 x 105 mm
Protection class panel mounted (at front) Protection class with housing (for field mounting)	IP 54 IP 54
Weight	1.3 kg
Operation language	German, English, French, Hindi, Chinese, Polish

Networking

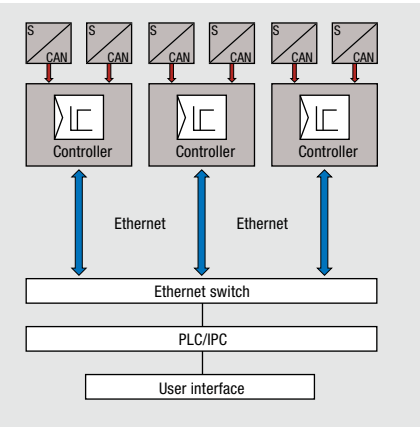
CAN bus

All functional modules in the DCS Digital-Control-System feature a CAN bus interface and are also networked with one another. This feature ensures not only flexible adaptation of the E+L control system to new tasks but also guarantees maximum immunity to interference and a minimum wiring outlay.
A controller group may comprise up to 16 devices including e.g. sensors, support beams, controllers, interfaces or operating panels. Up to eight controller groups may be implemented together in a common CAN network up to a length of 160 m. A CAN extension DI 0010 is available for lengths of 160 m and upwards; it is simply plugged in between two CAN networks.



Ethernet

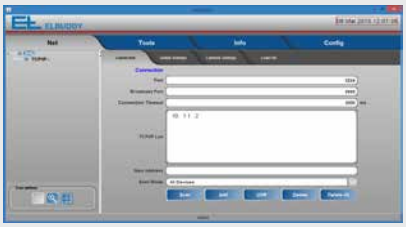
While in the case of networking via CAN bus, the limit is a maximum of eight controller groups, networking via Ethernet is unlimited. Within a DCS controller group the functional modules communicate via the CAN bus system. Each controller group is integrated into the customer's control system via the Ethernet interface. Due to the support for protocols such as Ethernet/IP, EGD, UDP, integration in the most common control systems is possible.

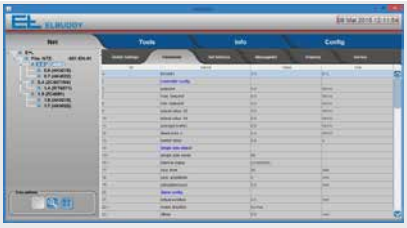


Diagnostic tool ELBUDDY

Convenient diagnostics

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





Interfaces DI

Interfaces DI

Modern production facilities have a central control station or a control room. In this case the web guiding systems can be connected to different bus systems or to a PLC/IPC.

For this purpose E+L offers a very wide range of interfaces with standard protocols. Each interface contains a CAN connection with a corresponding bus driver module.

Profibus interface DI B000 Profibus

ControlNet interface DI D000 Control net

CANopen interface DI F000 Can Open

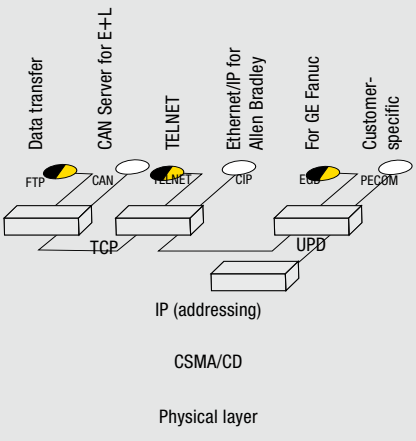
DeviceNet interface DI E000 Device net

DI G000 Ethernet interfaces

+ Function module Ethernet/IP:
  Ethernet/IP based on the application layer "CIP" (Common Industrial Protocol) for usage for data exchange between E+L CAN network and Allen Bradley control systems (CompactLogix and ControlLogix series)
+ Function module EGD:
  EGD (Ethernet Global Data) protocol for the exchange of data between E+L CAN network and GE Fanuc control systems
+ Function module PECOM:
  Customer-specific protocol for PECOM control systems
+ Function module File Transfer:
  Convenient software download with ELBUDDY
+ Function module CAN server:
  CAN server already integrated for direct access to E+L CAN network using ELBUDDY Diagnostics, configuration, data backup for the parameters, device configuration restore, program download for CAN devices with flash memory

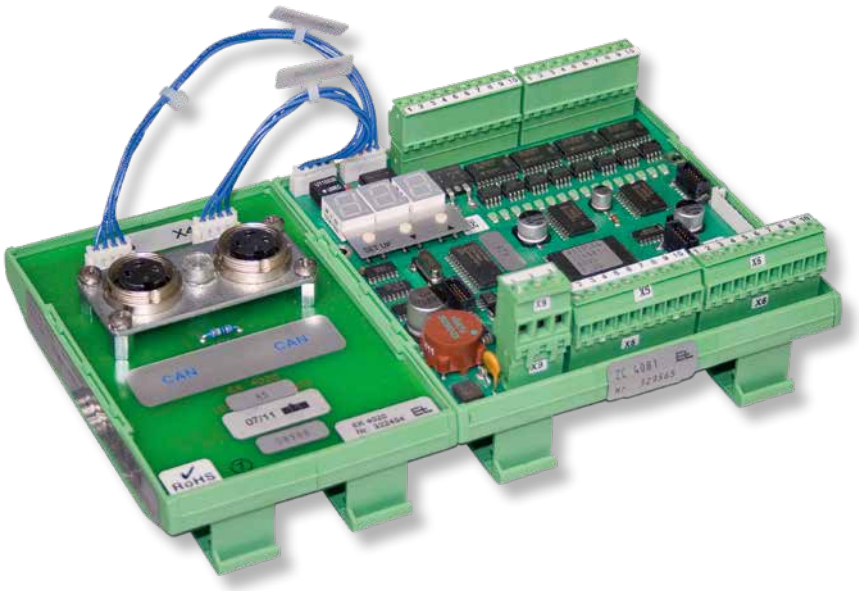
Ethernet interface DI G000 Ethernet

Principle of operation Ethernet



Interface DI A

+ Interface with 16 digital inputs and outputs
+ Floating inputs and outputs
+ Short circuit-proof



Selection table

Type	Type of interface	PC/IPC	PLC Siemens	PLC Allen Bradley
DI B000	Profibus DP	■	■	
DI D000	ControlNet	■		■
DI E000	DeviceNet	■		■
DI F000	CANopen	■		
DI G000	EtherNet	■	■	■
DI A020	I/O	■	■	■

Technical data

	DI A020	DI B000	DI D000	DI E000	DI F000	DI G000
Operating voltage Nominal value Nominal range				 24 V DC 20 to 30 V DC		
Current consumption	200 mA	200 mA	200 mA	200 mA	200 mA	500 mA
Ambient temperature				10 to 50 °C		
Dimensions Top hat rail mounting L x W x H in mm	 185 x 111 x 70	 75 x 111 x 90	 76 x 126 x 131	 in acc. EN 50022 76 x 126 x 131	 76 x 126 x 131	 45 x 105 x 185
Protection class top hat rail mounting				IP 00		
Weight	0.2 kg	0.2 kg	0.2 kg	0.2 kg	0.2 kg	0.53 kg

Pivoting frame system ELGUIDER

Function

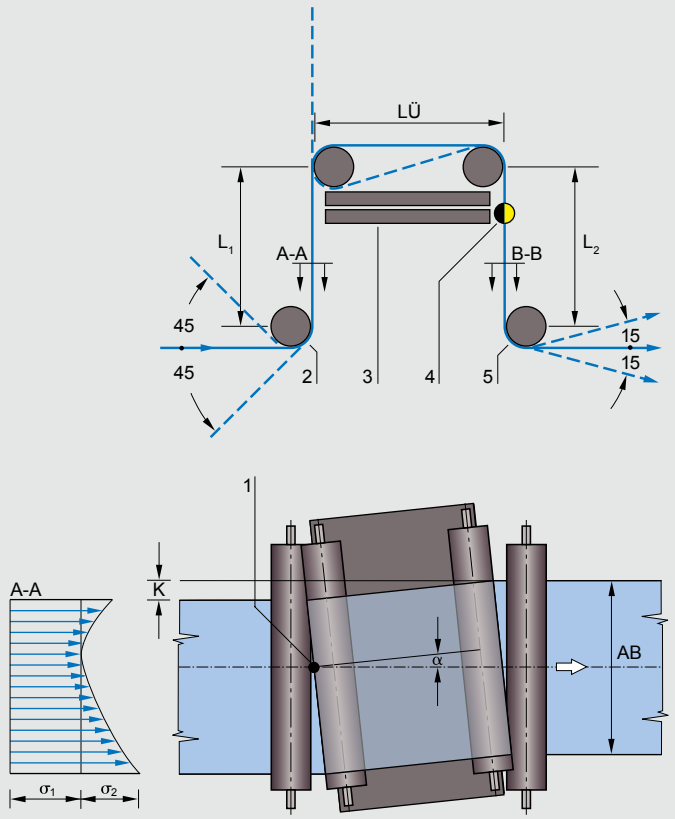
On ELGUIDER pivoting frame system, the web changes direction four times, each time by 90°. The system is based on a pivoting frame with two path rollers. The imaginary pivot point is located on the infeed plane. Lateral web corrections may only be achieved by swiveling around this pivot point. The prerequisite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

Usage

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

Usage

The greater the web tension, the modules of elasticity 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 to 100 % of the web width. The sensor should be located behind the guide roller as close as possible.



Legend

A-A	Web tension distribution at infeed
B-B	Web tension distribution at outfeed
K	Web correction
α	Correction angle max. ±5°
σ_1	Web basic tension
σ_2	Tension distribution due to pivoting action of roller frame at the infeed
σ_3	Tension distribution due to pivoting action of roller frame at the outfeed
1	Pivot point
2	Infeed roller
3	Roller frame
4	Sensor
5	Locking roller
LÜ	Transfer length
L_1	Infeed path
L_2	Outfeed path
AB	Operating width

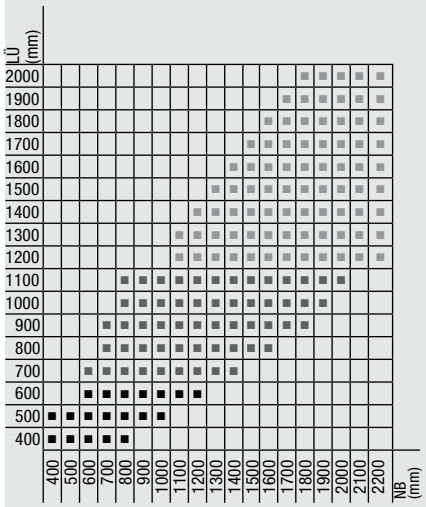
ELGUIDER DRS31

+ Compact pivoting frame with integrated control technology and remote operation
+ Simple adaptation to different materials by using infrared edge sensors (FR 52), ultrasonic edge sensor (FX 52) or color line sensor (FE 50)
+ Can be used with web tensions of up to 700 N
+ Optional motorized sensor positioning
+ For use in the plastics and packaging industry

ELGUIDER DRS 31 with ultrasonic edge sensor FX 52

Selection table

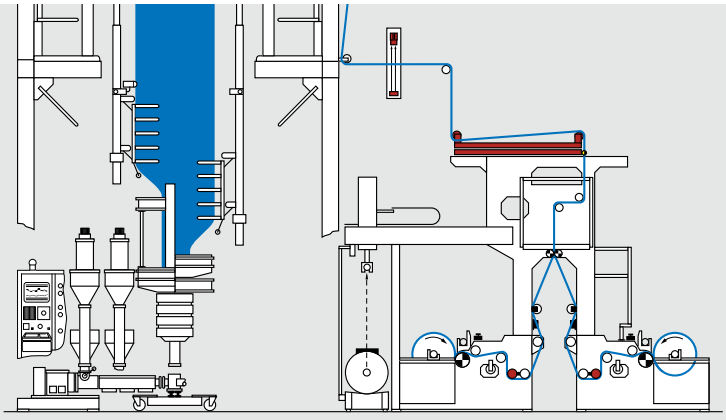
ELGUIDER DRS 31



LÜ = Transfer length
NB = Nominal width

Technical data

DRS 31	
Operating voltage Nominal value Nominal range Nominal range with power supply	 24 V DC 20 to 30 V DC 115 to 460 V 50/60 Hz
Current consumption Current consumption	Max. 3.8 A DC (manual sensor pos.) Max. 5.3 A DC (1 positioning drive)
Nominal width NB / transfer length LÜ	See selection table
Roller diameter LÜ 400 to 600 Roller diameter LÜ 700 to 2200	80/100 mm 100/120/160 mm
Nominal actuating travel LÜ 400 to 600 Nominal actuating travel LÜ 700 to 1100 Nominal actuating travel LÜ 1200 to 2200	Max. ±15 mm Max. ±25 mm Max. ±50 mm
Actuating speed	25 mm/s adjustable
Web tension	Max. 700 N
Positional accuracy	< ±0.1 mm (material-dependent)
Error frequency	Max. 2 Hz
Ambient temperature	10 to 50 °C
Protection class	IP 54



ELGUIDER DRS 31 on blow film extruder

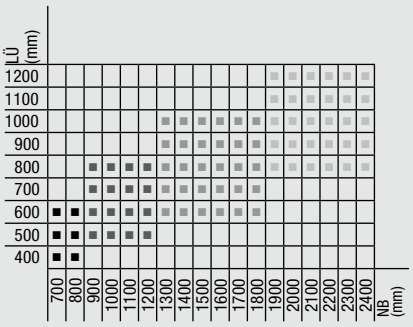
ELGUIDER DRS52

- Compact pivoting frame with integrated control technology and remote operation
- Simple adaptation to different materials by using infrared edge sensors (FR 52) or ultrasonic edge sensors (FX 42, FX 52)
- Can be used with web tensions of up to 2900 N
- Integrated motorized sensor positioning
- Optional with sensor roller PD 30
- For use in the graphics industry

ELGUIDER DRS 52 with infrared edge sensor FR 52

Selection table

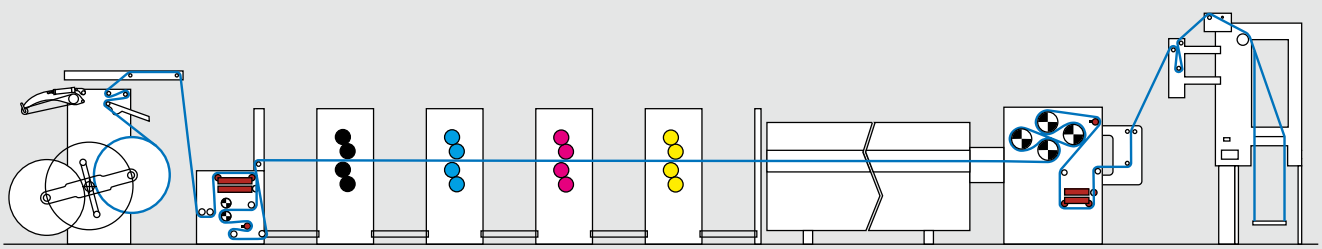
ELGUIDER DRS 52



LÜ = Transfer length
NB = Nominal width

Technical data

DRS 52	
Operating voltage	
Nominal value	24 V DC
Nominal range	20 to 30 V DC
Nominal range with power supply	115 to 460 V, 50/60 Hz
Current consumption	6.8 A DC
Nominal width NB / transfer length LÜ	See selection table
Roller diameter DR 5211 ■	80/100 mm
Roller diameter DR 5221 ■	100/120/130 mm
Roller diameter DR 5231 ■	120/130 mm
Roller diameter DR 5241 ■	160 mm
Nominal actuating travel DR 5211 ■	±25 mm
Nominal actuating travel DR 5221 ■	±30 mm
Nominal actuating travel DR 5231 ■	±40 mm
Nominal actuating travel DR 5241 ■	±40 mm
Actuating speed	25 mm/s adjustable
Web tension	Max. 1.2 N/mm web width
Positional accuracy	< ±0.1 mm (material-dependent)
Error frequency	Max. 2 Hz
Ambient temperature	10 to 50 °C
Protection class	IP 54
Measuring range	
Infrared edge sensor FR 52	±10 mm
Ultrasonic edge sensor FX 52 (FX 42)	±10 mm (±3 mm)



ELGUIDER DRS 52 on web offset press

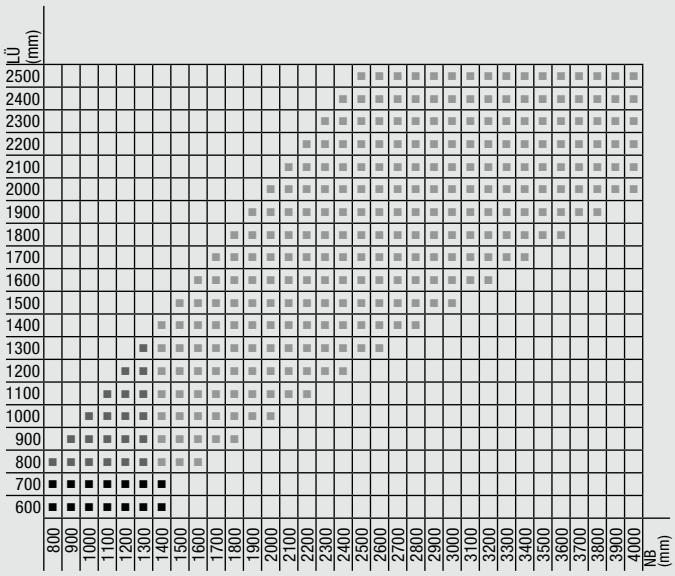
ELGUIDER DRS71

+ Compact pivoting frame with integrated control technology and remote operation
+ Simple adaptation to different materials by using infrared edge sensors (FR 52) or ultrasonic edge sensors (FX 42, 52)
+ Can be used with web tensions of up to 2000 N
+ Optional motorized sensor positioning
+ For use in the paper processing industry

ELGUIDER DRS 71 with infrared edge sensor FR 52

Selection table

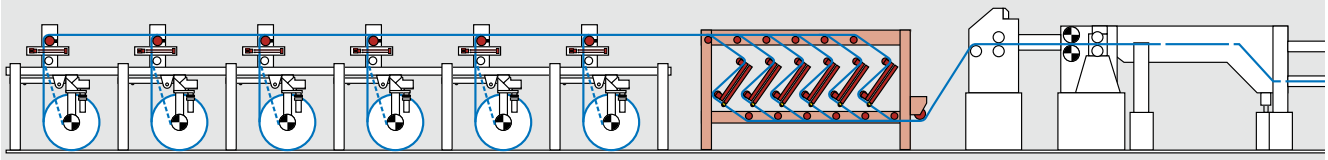
ELGUIDER DRS 71



LÜ = Transfer length
NB = Nominal width

Technical data

DRS 71	
Operating voltage	
Nominal value	24 V DC
Nominal range	20 to 30 V DC
Nominal range with power supply	115 to 460 V, 50/60 Hz
Current consumption	
(manual sensor positioning)	6.8 A DC
(1 motorized positioning drive)	7.3 A DC
Nominal width NB/transfer length LÜ	See selection table
Roller diameter D	100/120/160/200 mm
Nominal actuating travel	
LÜ 600 to 700 mm	Max. ±25 mm
LÜ 800 to 1300 mm	Max. ±50 mm
LÜ 800 to 2500 mm	Max. ±80 mm
Actuating speed	25 mm/s adjustable
Web tension	2000 N (reinforced version 3000 N)
Positional accuracy	< ±0.1 mm (material-dependent)
Error frequency	Max. 2 Hz
Ambient temperature	10 to 50 °C
Protection class	IP 54
Measuring range	
Infrared edge sensor FR 52	±10 mm
Ultrasonic edge sensor FX 52 (FX 42)	±10 mm (±3 mm)



ELGUIDER DRS 71 on cutter sorter

Steering roller system ELROLLER

Function

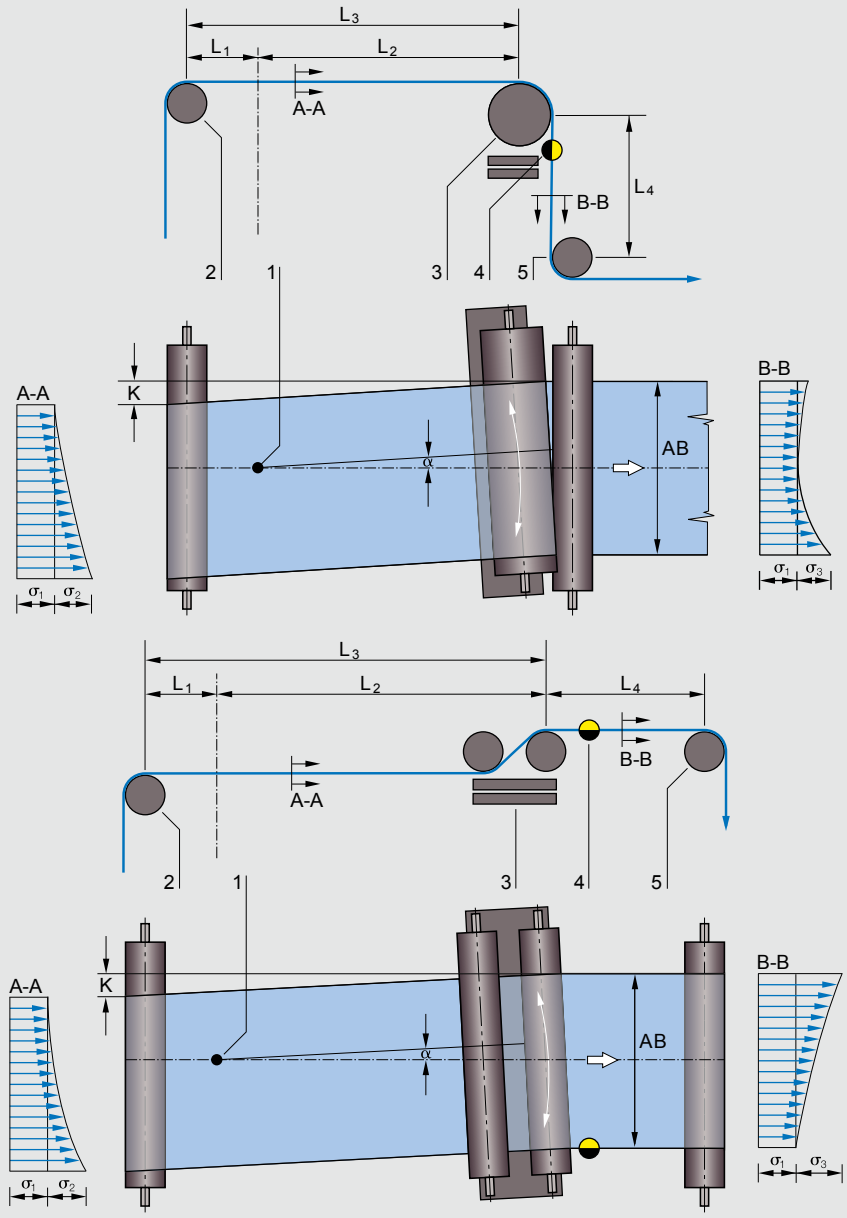
ELROLLER steering roller systems correct the web position already in the infeed path. They consist of a fixed base frame and a movable guide frame. The latter accommodates one or two guide rollers and swivels round an imaginary pivot point on the infeed path. The pivot point should, on the one hand, 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 actuator. It must therefore operate friction-locked and may not permit any sliding between the web and the guide roller.

Usage

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

Usage

Depending on the space available, steering rollers may be fitted with one or two guide rollers. On versions with one roller, the web is guided with a wrapping of 90°. On versions with two guide rollers less wrapping 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 actuating dynamics are achieved.



Legend

A-A	Web tension distribution at infeed	1	Pivot point
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	Locking roller
σ_2	Tension distribution due to pivoting action of roller frame at the infeed	L_1	Infeed path to the pivot
		L_2	Infeed path from pivot to steering roller
σ_3	Tension distribution due to pivoting action of roller frame at the outfeed	L_3	Infeed path
		L_4	Outfeed path

ELROLLER VGS14

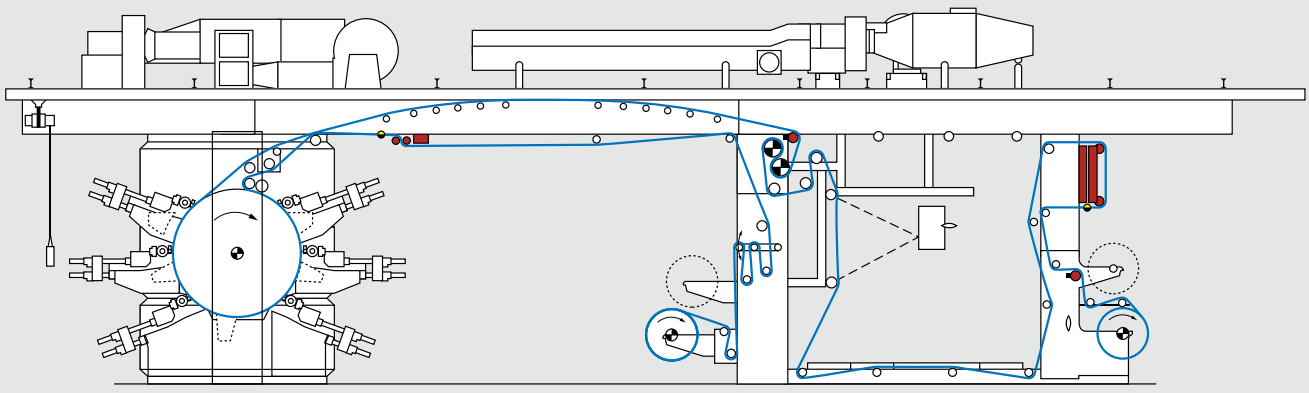
+ Steering roller with adjustable imaginary pivot in the infeed path
+ Simple adaptation to different materials by using infrared edge sensors (FR 52) or ultrasonic edge sensors (FX 42, FX 52)
+ Can be used with web tensions of up to 500 N
+ For use in the plastics and packaging industry

ELROLLER VGS 14

Technical data

ELROLLER VGS 14 on bag making machine

VGS 14	
Operating voltage	
Nominal value	24 V DC
Nominal range	20 to 30 V DC
Nominal range with power supply	115 to 460 V, 50/60 Hz
Current consumption	1.6 A DC
Nominal width NB	400 to 2000 mm
Roller diameter D	80/100 mm
Nominal actuating travel	Max. ±50/75/100 mm
Actuating speed	25 mm/s adjustable
Web tension	Max. 500 N
Positional accuracy	< ±0.2 mm (material-dependent)
Error frequency	Max. 2 Hz
Ambient temperature	10 to 50 °C
Protection class	IP 54
Measuring range	
Infrared edge sensor FR 52	±10 mm
Ultrasonic edge sensor FX 52 (FX 42)	±10 mm (±3 mm)



ELROLLER VGS 14 on flexo printing machine

ELROLLER SRS31

+ Compact steering roller with one or two rollers for different wrapping variants
+ Simple adaptation to different materials by using infrared edge sensors (FR 52) or ultrasonic edge sensors (FX 42, FX 52)
+ Can be used with web tensions of up to 300 N
+ For use in the rubber and packaging industry

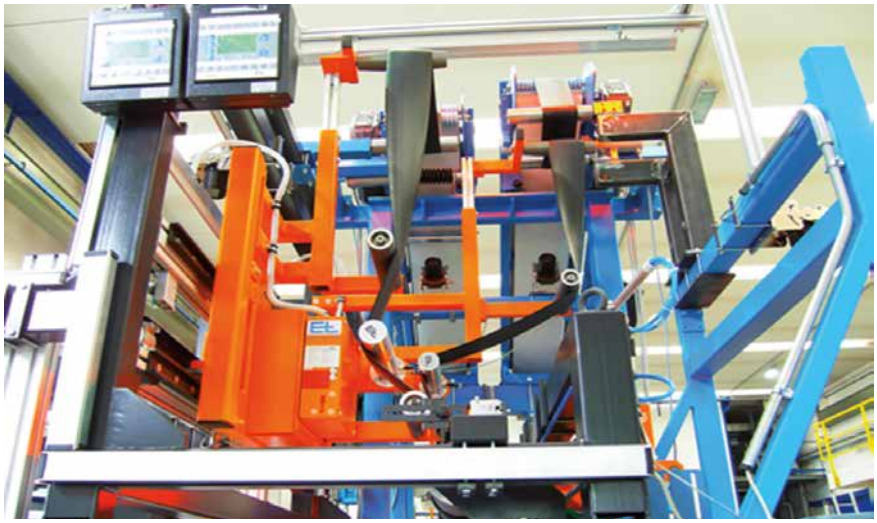
ELROLLER SRS 31
with infrared edge sensor FR 52

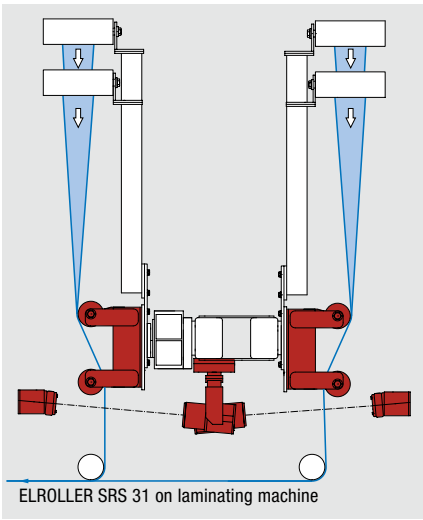
Selection table

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

Technical data

SRS 31	
Operating voltage	
Nominal value	24 V DC
Nominal range	20 to 30 V DC
Nominal range with power supply	115 to 460 V, 50/60 Hz
Current consumption	1.6 A DC
Nominal width NB	200/250/300/350 mm
Roller diameter D	60/80 mm
Nominal actuating travel	Max. ±22 mm
Actuating speed	20 mm/s adjustable
Web tension	Max. 300 N
Positional accuracy	< ±0.15 mm (material-dependent)
Error frequency	Max. 2 Hz
Ambient temperature	10 to 50 °C
Protection class	IP 54
Measuring range	
Infrared edge sensor FR 52	±10 mm
Ultrasonic edge sensor FX 52 (FX 42)	±10 mm (±3 mm)





ELROLLER SRS 31 on laminating machine

ELROLLER SRS41

+ Compact steering roller with one or two rollers for different wrapping variants
+ Position controller efficiently integrated
+ Simple adaptation to different materials by using infrared edge sensors (FR 52) or ultrasonic edge sensors (FX 42, FX 52)
+ Can be used with web tensions of up to 700 N
+ Optionally with motorized sensor positioning
+ For use in the paper, tire and plastics industry

ELROLLER SRS 41 with ultrasonic edge sensor FX 42

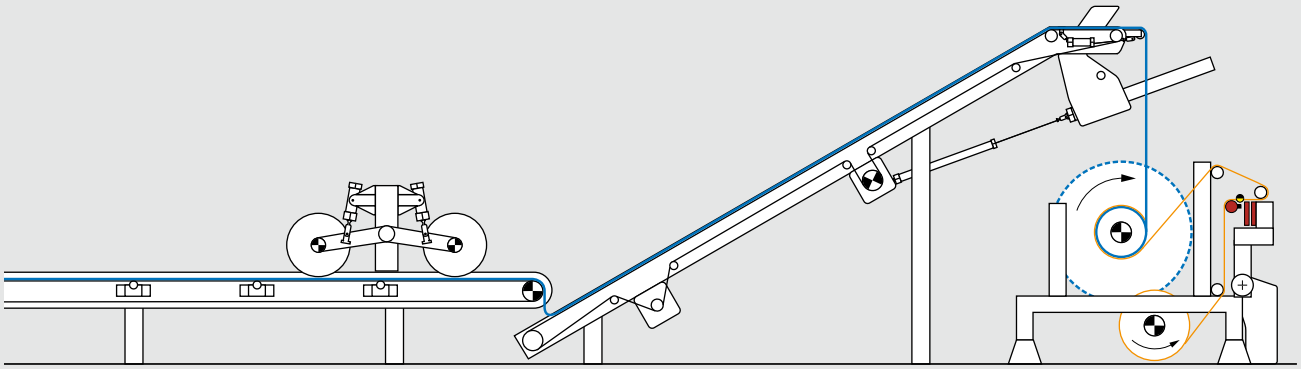
Selection table

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

ELROLLER SRS 41 on flexo printing machine

Technical data

SRS 41		
Operating voltage Nominal value Nominal range Nominal range with power supply		 24 V DC 20 to 30 V DC 115 to 460 V, 50/60 Hz
Current consumption	Actuator AG 2491 Actuator AG 2591	1.6 A DC (manual sensor adjustment) 3.6 A DC (manual sensor adjustment)
Nominal width NB		400 to 2000 mm
Roller diameter D	NB 400 to 800 mm NB 900 to 2000 mm	80 mm 100/120/160 mm
Nominal actuating travel	NB 400 to 800 mm NB 900 to 1500 mm NB 1100 to 2000 mm	Max. ±25 mm Max. ±50 mm max. ±75 mm
Actuating speed		25 mm/s adjustable
Web tension		Max. 700 N
Positional accuracy		< ±0.15 mm (material-dependent)
Error frequency		Max. 2 Hz
Ambient temperature		10 to 50 °C
Protection class		IP 54
Measuring range Infrared edge sensor FR 52 Ultrasonic edge sensor FX 52 (FX 42)		 ±10 mm ±10 mm (±3 mm)



ELROLLER SRS 14 on laminating and assembling machine

ELROLLER SRS51

- Compact steering roller with one or two rollers for different wrapping variants
- Position controller efficiently integrated
- Simple adaptation to different materials by using infrared edge sensors (FR 52) or ultrasonic edge sensors (FX 42, FX 52)
- Can be used with web tensions of up to 2000 N
- Optionally with motorized sensor positioning
- For use in the converting industry

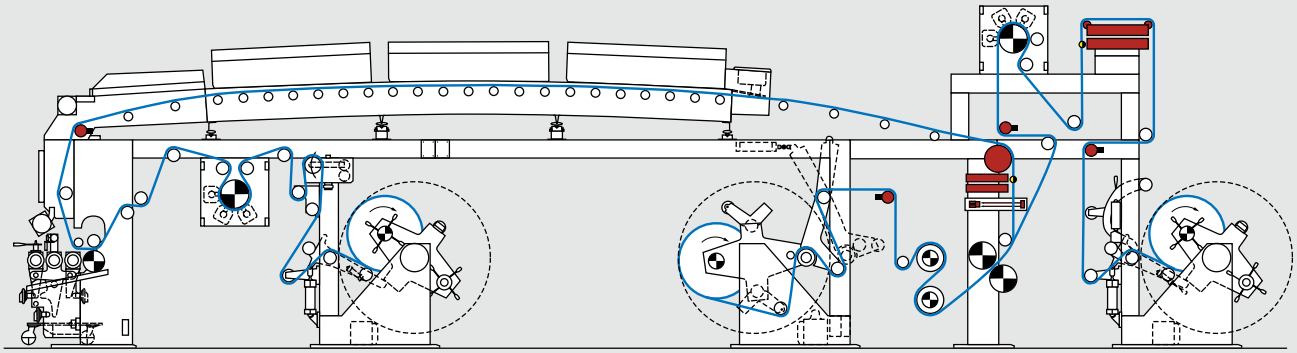
ELROLLER SRS 51 with ultrasonic edge sensor FX 42

Selection table

SRS 51		
Type	NB min. (mm)	NB max. (mm)
SR 5111	1100	2000
SR 5121	1500	3000
SR 5131	2500	4000

Technical data

SRS 51		
Operating voltage Nominal value Nominal range Nominal range with power supply		 24 V DC 20 to 30 V DC 115 to 460 V, 50/60 Hz
Current consumption	Actuator AG 2591 Actuator AG 2691	3.6 A DC (manual sensor adjustment) 5.6 A DC (manual sensor adjustment)
Nominal width NB		1100 to 4000 mm
Roller diameter D	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 actuating travel	NB 1100 to 2000 mm NB 1500 to 3000 mm NB 2500 to 4000 mm	max. ±75 mm Max. ±100 mm Max. ±175 mm
Actuating speed		25 mm/s adjustable
Web tension		Max. 2000 N
Positional accuracy		< ±0.15 mm (material-dependent)
Error frequency		Max. 2 Hz
Ambient temperature		10 to 50 °C
Protection class		IP 54
Measuring range Infrared edge sensor FR 52 Ultrasonic edge sensor FX 52 (FX 42)		 ±10 mm ±10 mm (±3 mm)



ELROLLER SRS 51 on coating line

ELROLLER SRS61

- Compact steering roller with one or two rollers for different wrapping variants
- Position controller space-savingly integrated
- Simple adaptation to different materials by using infrared edge sensors (FR 52) or ultrasonic edge sensors (FX 42, FX 52)
- Can be used with web tensions of up to 20 kN
- Optionally with motorized sensor positioning
- For use in the paper, converting and tire industry

ELROLLER SRS 61 with infrared edge sensor FR 52

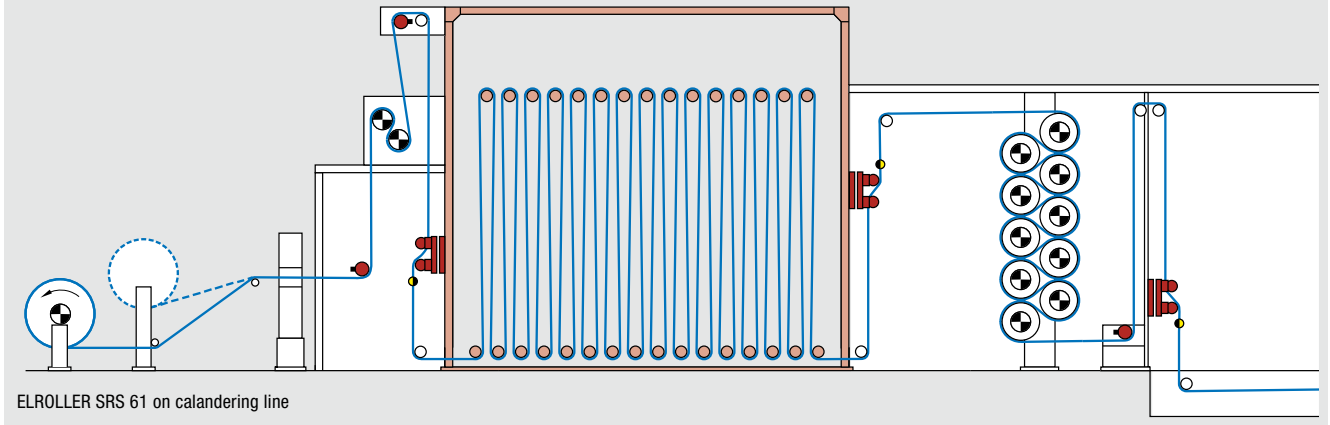
Selection table

SRS 61

Type	NB min. (mm)	NB max.(mm)	Ø roller (mm)	Actuating travel ±(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

SRS 61		
Operating voltage Nominal value Nominal range Nominal range with power supply		 24 V DC 20 to 30 V DC 115 to 460 V, 50/60 Hz
Current consumption	Actuator AG 2691	5.6 A DC (manual sensor adjustment)
Nominal width NB		1100 to 10000 mm
Roller diameter D		See selection table
Nominal actuating travel		See selection table
Actuating speed		25 mm/s adjustable
Web tension		See selection table
Positional accuracy		< ±0.3 mm (material-dependent)
Error frequency		Max. 1 Hz
Ambient temperature		10 to 50 °C
Protection class		IP 54
Measuring range Infrared edge sensor FR 52 Ultrasonic edge sensor FX 52 (FX 42)		 ±10 mm ±10 mm (±3 mm)



ELROLLER SRS 61 on calandering line

Turning bar system 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 180° wrapping. 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.

Usage

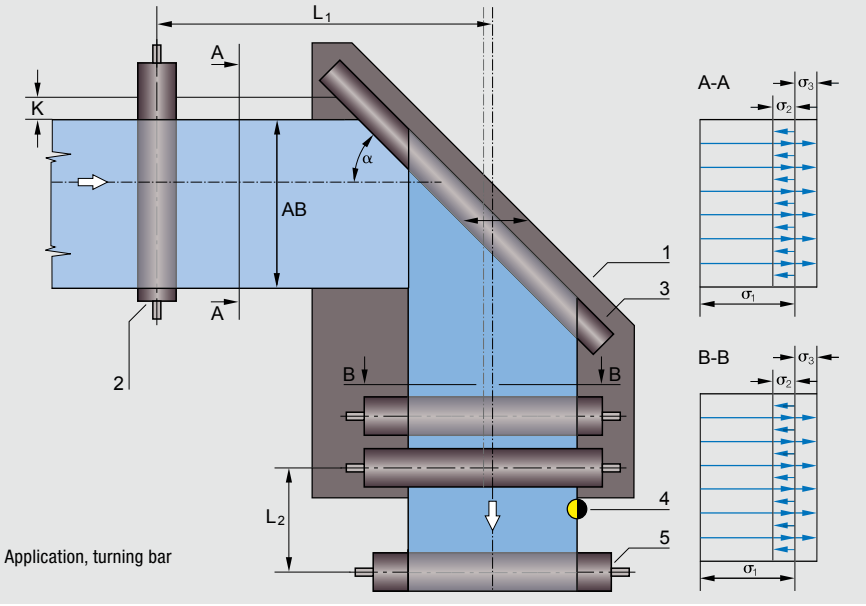
The use of turning bar control systems is recommended when, after the 90° deflection, an ELGUIDER or ELROLLER system may not be used due to space restrictions.

Application, turning bar

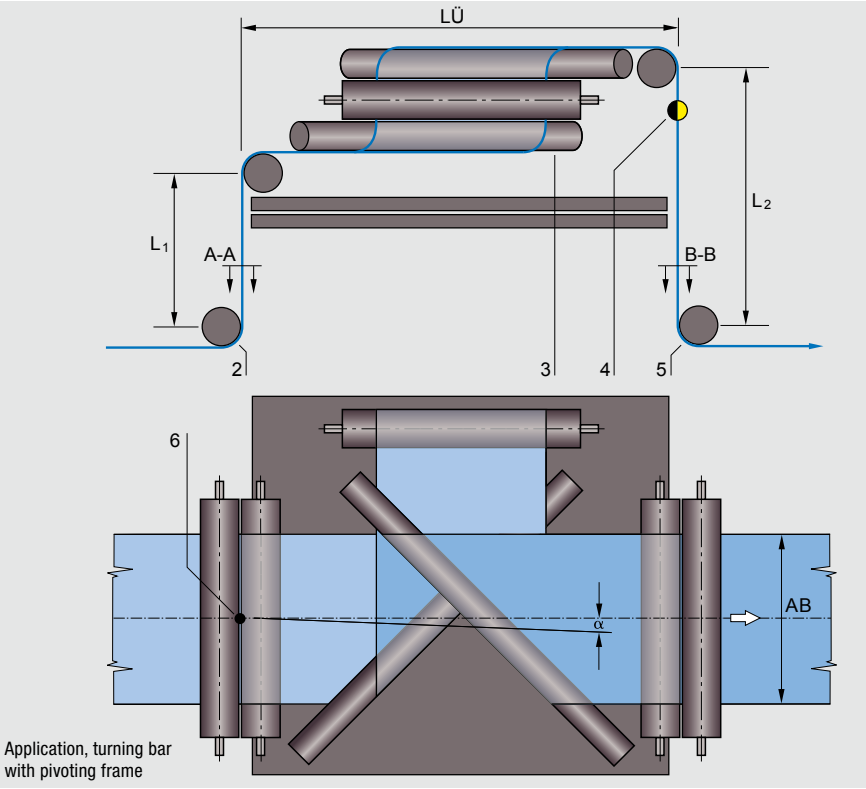
When the turning bar is used there must be constant friction-locking between it and the web at certain points. To protect the web surface, the friction may be reduced by inserting an air cushion between the turning bar and the web. Guiding precision of up to ±1 mm can be achieved. To obtain improved 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 outfeed roller as close as possible.

Application, turning bar with pivoting frame

A combination of pivoting frame and turning bar causes the web to turn and at the same time ensures precision positioning control in the range of ±0.1 mm.



Application, turning bar



Application, turning bar with pivoting frame

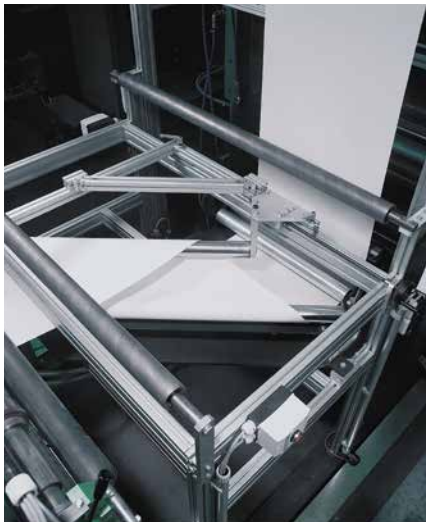
Legend

A-A	Web tension distribution at infeed	1	Pivoting frame	LÜ	Transfer length
B-B	Web tension distribution at outfeed	2	Infeed roller	L_1	Infeed path
K	Web correction	3	Turning bar	L_2	Outfeed path
α	Correction angle	4	Sensor	AB	Operating width
σ_1	Web basic tension	5	Locking roller		
σ_2	Tension distribution during actuating movement to left	6	Pivot point		
σ_3	Tension distribution during actuating movement to right				

ELTURNER VWS

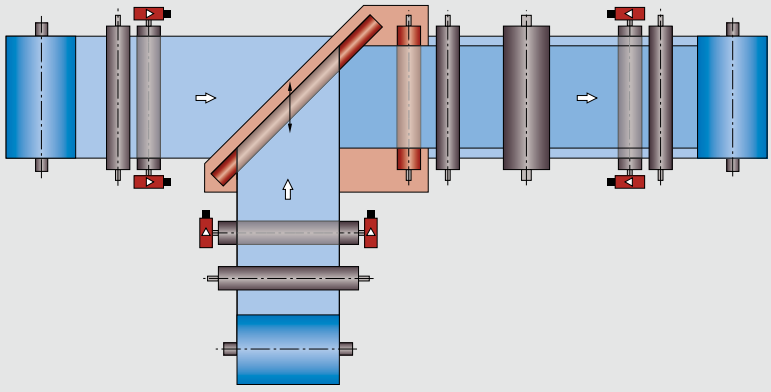
+ Individual adjustment of the turning bars to the situation on the machine
+ Control components and complete systems with turning bar available
+ Optional turning bar with pneumatic ventilation

ELTURNER VWS with ultrasonic edge sensor FX 42



ELTURNER VWS on flexo printing machine

VWS		
Operating voltage Nominal value Nominal range Nominal range with power supply		 24 V DC 20 to 30 V DC 115 to 460 V, 50/60 Hz
Current consumption	Actuator AG 2491 Actuator AG 2591 Actuator AG 2691	 1.6 A DC 3.6 A DC 5.6 A DC
Nominal width NB		400 to 3000 mm
Turning bar diameter		80/100/120/160/200 mm
Nominal actuating travel		Max. ±25/50/75/100 mm
Actuating speed		25 mm/s adjustable
Web tension		Max. 2000 N
Positional accuracy		< ±1 mm (material-dependent)
Error frequency		Max. 0.5 Hz
Ambient temperature		10 to 50 °C
Protection class		IP 54
Measuring range Infrared edge sensor FR 52 Ultrasonic edge sensor FX 52 (FX 42)		 ±10 mm ±10 mm (±3 mm)



ELTURNER VWS on production machine with lateral web feeding

Questionnaire

General data

Customer			
Street			
Zip code		**City/town**	
Country		**Internet**	
Phone		**Fax**	
Contact person			
Phone		**E-mail**	
Project			

Technical data

Type of machine					
Make					
Position on the machine					
Web type	❑ Paper	❑ Cardboard	❑ Film/foil	❑ Metal	❑ Rubber
	❑ Textile	❑ Carpet	❑ Non-woven fabric	❑	
Transparency	❑ Transparent	❑ Not transparent		❑	
Web width	Min _____mm		Max _____mm		
Web weight	Min _____g/mm²		Max _____g/mm²		
Web speed	Min _____m/min		Max _____m/min		
Web tension	Min _____N		Max _____N		
Condition in operation	❑ Dry	❑ Moist	❑ Wet	❑	
Ambient temperature	_____°C				
Ambient conditions	❑ Dry	❑ Dusty	❑ Wet	❑	
Infeed error	+/- _____mm				
Error frequency	_____Hz				
Operating voltage	❑ 24 V DC	❑ _____V		❑ _____Hz	

Application

Technical specifications

Type of control	❑ By web edge	❑ Manual positioning		
	❑ By line	❑ Manual positioning		
	❑ By web center	❑ Manual sensor positioning		
	❑ Oscillation	❑ With sensor	❑ Without sensor	+/-_____mm
	❑ Width measurement			Accuracy +/-_____mm
Sensor	❑ Ultrasonic	❑ Infrared		❑ Line

❑ Pivoting frame systems	Nominal width	NW _____mm			
	Transfer length	TL _____mm			
	Assembly dimension M	M _____mm			
	Roller diameter	D _____mm			
	Roller material	❑ Aluminum	❑		
	Roller surface	Infeed	❑ Bare	❑ Cork	❑
		Exit	❑ Bare	❑ Cork	❑

Command station	❑ With command station		❑ Without command station		
	Mounting	❑ Front panel installation	❑ Wall mounting	❑ Console mounting	
	Cable length, pivoting frame - command station	❑ 5 m	❑ 10 m	❑ 15 m	❑
Networking	Ethernet	❑ With networking		❑ Without networking	
Interface	❑ With interface		❑ Without interface		
	❑ Digital I/O	❑ Ethernet UDP	❑ Ethernet IP	❑ Profinet	❑
	Cable length To interface	❑ 5 m	❑ 10 m	❑ 15 m	❑

Comments

Date		**Issuer**	

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