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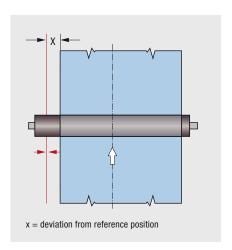
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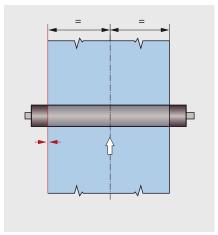
Higher quality due to fabric position control

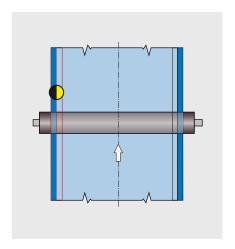
Today, users of paper machine clothing are confronted with ever increasing requirements: It must be possible to realize production processes more quickly, but also more precisely. The quality of the results must improve while personnel costs, scrap and machine downtimes are reduced to a minimum.

Felt and wire guides from E+L make a crucial contribution to meeting these requirements. Experience shows there are many sources of disturbance on felt and wire. Incorrect clothing positions significantly affect the quality and quantity of paper production.

E+L felt and wire guiding systems eliminate these sources of error and ensure the clothing position remains constant during the production process.







Incorrect clothing position

- Reduces the service life of the clothing
- Results in irreparable damage to the cloth-
- Can cause marks on the paper web
- Has a negative effect on the control of the fabric tension.

Correct clothing position

- + Increases the quality and quantity of paper production
- + Is a prerequisite for a long clothing service life
- + Improves the control of the fabric tension on the clothing.

Fabric oscillation

Fabric oscillation is the controlled offset of a fabric over a stipulated cycle time.

The fabric oscillation feature is provided by the infrared edge sensor FE 4184 N as well as the electromechanical edge sensor SH 8902 U.

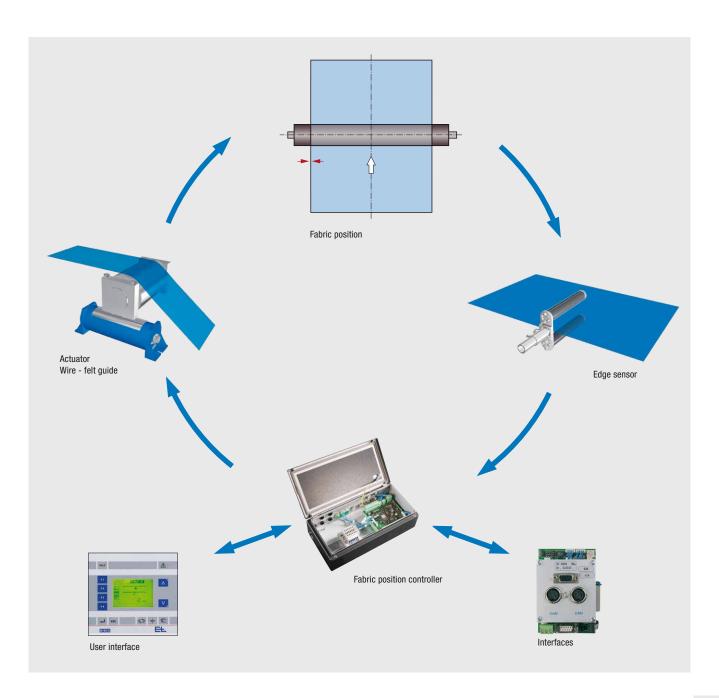
- + Extension of the felt and wire service life
- + Reduced wire abrasion in the high wear
- + Reduction of edge bonding
- + Support for felt conditioning
- + Longer service life of the squeezing elements and suction cup facings
- + Reduced tendency of edges to curl on press



The control loop

The automation of any control system is based on the principles of the simple control loop. Even complicated tasks can be reduced to this control loop.

- 1. The starting point is the actual position of the moving clothing
- 2. Edge sensors continuously and precisely detect the position of the clothing.
- 3. The controller compares the actual position value with the set value defined and outputs an appropriate correction signal to the actu-
- 4. The actuator positions the guide roll and in this way corrects the position of the clothing.



Felt and wire guides

ELGUIDE

- + Flexible in application due to positionindependent installation
- + Pneumatic adjustment for harsh ambient conditions
- + Guide roll mounted in bearing bracket or version with flat support for pillow block bearing mounting
- + Doctor mounting possible
- + Precise fabric edge detection by pneumatic, electrical or optical edge sensor
- + Integrated mechanical or electrical actuating variable feedback
- + Optionally with manual adjustment feature
- + Optionally with mechanical locking of the guide roll by one-way valves on failure of compressed air supply
- + Optionally with supporting cylinder for compensation of the roller weight in case of inclined or vertical installation position

Your benefits

- + Stable control in operation
- + Exact positioning of the clothing
- + Increased clothing service life
- + Reduced compressed air consumption
- + Robust design
- + In comparison to air bellows, durable high temperature resistance
- + Even doctor contact pressure against the guide roll due to linear actuating movement

Function

Rolls at an angle to the direction of fabric travel cause a sideways drift on the fabric.

ELGUIDE felt and wire guiding systems exploit this principle.

The pivot point for the guide roll is one of the two bearings. The guide roll is positioned at an angle around this point to suit the correction required.

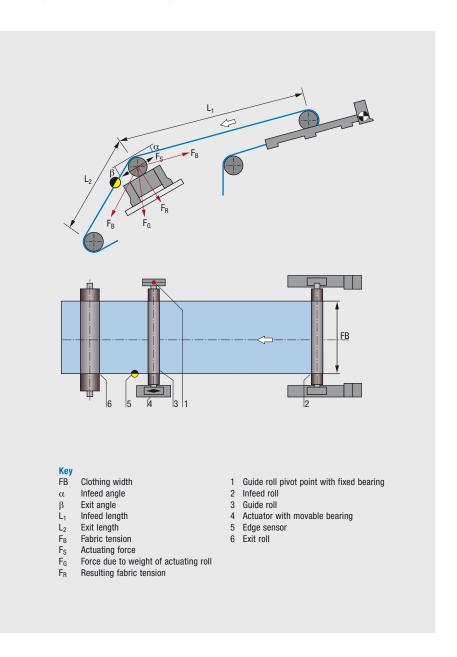
Mechanical or electrical actuating variable feedback provides a stable control loop.

Application

The guide roll requires a pre-entry with a length that is around 2/3 of the width of the clothing. The exit length should be approximately 1/3 of the width of the clothing. The clothing must wrap $20^{\circ} - 40^{\circ}$ around the

The clothing must wrap 20° – 40° around the guide roll, the infeed angle being smaller than or equal to the exit angle.

The edge sensor is to be positioned in the exit path as close as possible after the guide roll.









Felt and wire guide SK 1603 with manual adjustment feature

Selection table

Туре	SK 0443 SK 0703 SK 1103 SK 1603	SK 0444 SK 0704
₽ P		



Туре	SK 02	SK 04	SK 07	SK 11	SK 16
Nominal load	2500 N	13000 N	18000 N	30000 N	50000 N
Nominal actuating force at 3.5 bar	1300 N	3500 N	5400 N	9500 N	14100 N
Nominal travel – automatic	+/- 40 mm	+/- 45 mm	+/- 60 mm	+/- 60 mm	+/- 80 mm
Nominal travel – manual (optional)		+/- 25 mm	+/- 30 mm	+/- 30 mm	+/- 40 mm
Cylinder diameter	70 mm	125 mm	150 mm	200 mm	250 mm
Ambient temperature	+10 to +150 °C				
Material					
Wet area	Stainless steel				
Dry area	Painted steel				
Nominal pressure	0 – 10 bar				

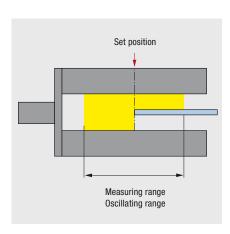
Infrared edge sensor wet area

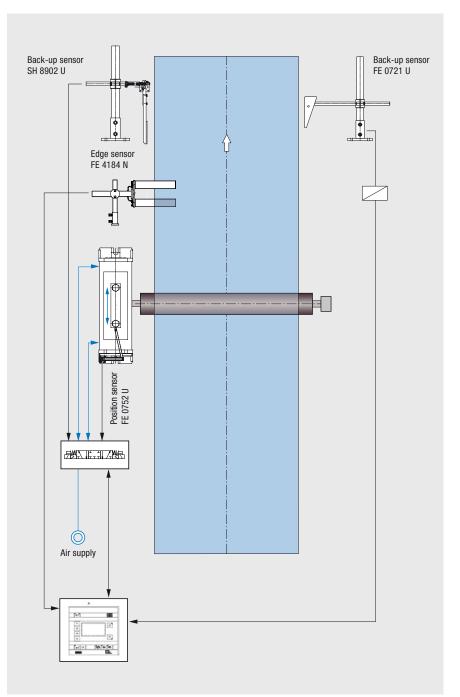
Broadband edge sensor FE 4184 N

- + Digital broadband edge sensor for noncontact detection of the clothing position in the wire and press section
- + Transmitted light principle with infrared transmitter and receiver
- + Large measuring range of 240 mm
- + Stainless steel version for wet ambient conditions
- + Insensitive to external light
- + Suitable for the oscillation of the clothing within the entire measuring area
- + Non-contact scanning prevents edge wear on the clothing
- + No mechanically operated sensor components
- + Can be added to all existing felt and wire guides
- Optionally with back-up system to prevent damage to the clothing on sudden soiling of the sensor
- + Optionally with water cleaning

Function

The edge of the wire or felt is scanned using infrared light barriers and a scanning technique. The signals are evaluated using a microcontroller that outputs the edge position determined over the CAN bus to the digital position controller.











Infrared edge sensor FE 4184 N	
Actual position value output	Sensor CAN
Nominal operating voltage	24 V DC
Operating voltage nominal range	20 – 30 V DC
Current consumption	0.4 A
Ambient temperature	+10 to +50 ° C
Measuring range	240 mm
Resolution	1 mm
Clearance	100 mm
Scan rate	200 Hz
Oscillating range	1 – 240 mm
Oscillating time	0.1 – 546 min
Cable length	30 m
Material	Stainless steel
Protection class	IP 68
Weight	7 kg
Dimensions (LxWxH)	500x80x250 mm

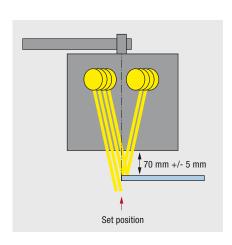
Infrared edge sensor dry area

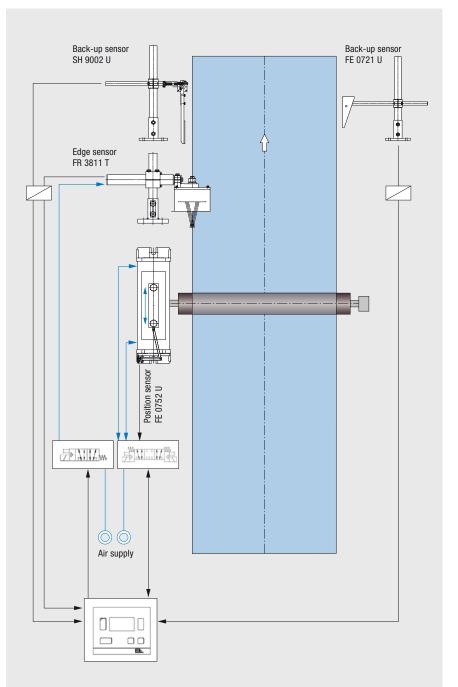
Edge sensor FR 3811 T

- + Digital edge sensor for non-contact detection of the clothing position in the dry
- + Reflected light principle with infrared transmitter and receiver
- + High temperature resistance up to +125 °C
- + Insensitive to external light
- + Non-contact scanning prevents edge wear on the clothing
- + No mechanically operated sensor compo-
- + Integrated cleaning feature with compressed air
- + Can be added to all existing felt and wire
- + Optionally with back-up system to prevent damage to the clothing on sudden soiling of the sensor.
- + Optionally with function for clothing offset and as a result shorter tail feeding times

Function

The edge of the dry wire is scanned using infrared reflected light barriers and a scanning technique. The signals are then transmitted to the digital position controller.













Nominal operating voltage	5 V DC	
Current consumption	0.4 A	
Ambient temperature	+10 to +125 ° C	
Measuring range	28 mm	
Resolution	1 mm	
Sensor/web distance	70 mm +/- 5 mm	
Scan rate	200 Hz	
Cable length	max. 40 m	
Material	Aluminum	
Protection class	IP 68	
Weight	8.3 kg	
Dimensions (LxWxH)	Ø175x172 mm	

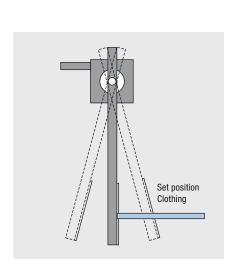
Electromechanical edge sensor

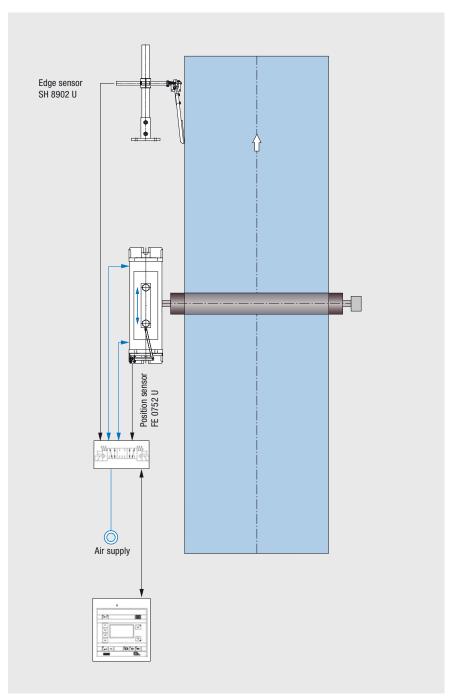
Edge sensor SH 8902 U / SH 9002 U

- + Electrical edge sensor for the exact detection of the position of the clothing in the wire, press and dry section
- + Electromechanical principle with Hall sensors
- + High temperature resistance up to +125 °C
- + Robust design
- + Ceramic plate
- + Suitable for oscillation of the clothing
- + Can be added to all existing felt and wire

Function

The edge sensor's mechanism transmits the position of the edge of the clothing to a permanent magnet. The magnetic field changes as a function of the position of the magnet. This change in the magnetic field is converted into an analogue electrical signal by a Hall sensor without contact and therefore wearfree. The signals are then transmitted to the digital position controller.











Electromechanical edge sensor SH 8902 U with sensor stand ST 7006

Nominal operating voltage	10 V DC
Current consumption	0.1 A
Plate contact force	Approx. 1.5 N can be set
Dead zone	+/- 0,5 to +/- 25 mm can be set
Oscillating range	1 – 240 mm
Oscillating time	1 – 250 min
Ambient temperature	+10 to +125 °C
Material	Housing: stainless steel Plate: SH 8902 U stainless steel with ceramic plate SH 9002 U stainless steel
Cable length	10 m
Protection class	IP 67
Weight	2.8 kg
Dimensions (LxWxH)	Housing: 134x50x50 mm

Mechanical-pneumatic edge sensors

Mechanical-pneumatic edge sensors

- + Applications in the wire, press and dry section
- + Low air consumption
- + High temperature resistance up to +150 °C
- + Robust design

Edge sensor FM 3081 / FM 3085

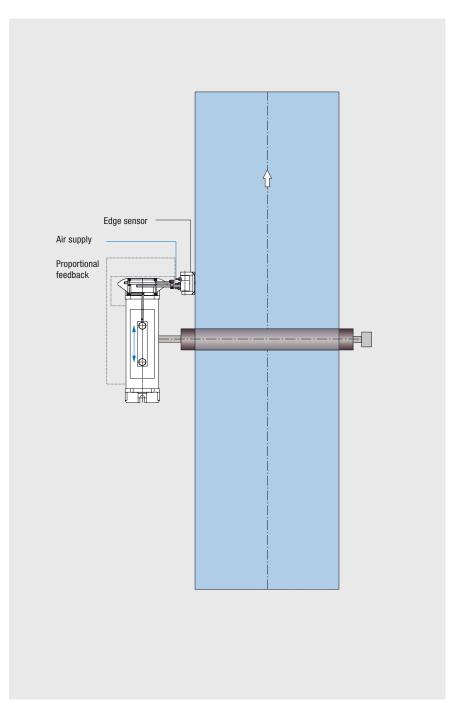
- + Very high guiding precision
- + Very low contact force
- + Pneumatic three-position controller (slide piston valve) integrated into sensor
- + Neutral position at 18° to the vertical
- + Optimized valve design with either small or large dead zone
- + Optional ceramic plate

Edge sensor SK 78

- + High guiding precision
- + Low contact force
- + Pneumatic three-position controller (rotary piston valve) integrated into the sensor
- + Neutral middle position
- + Optional ceramic or plastic plate

Function

The pneumatic edge sensor's mechanism transmits the position of the edge of the clothing to a slide piston valve (FM 30) or to a rotary piston valve (SK78). The related valve opens the air supply to the corresponding actuator cylinder chamber in proportion to the position of the plate as a function of the position of the clothing. At the same time, the opposite cylinder chamber is vented. The valves are completely closed in the neutral position. Air is only consumed if travel is required.















Mechanical-pneumatic edge sensor FM 30, horizontal and vertical plate position

Mechanical-pneumatic edge sensor	FM 3081/FM 3085	SK 7800
Measuring range	+/- 65 mm	+/- 50 mm
Pneumatic pressure	4 – 6 bar	2.5 – 3.5 bar
Compressed air treatment	Filtered compressed air with water removed	Filtered compressed air with water removed
Plate contact force	Approx. 1 N	Approx. 2 N
Dead zone	FM 3081: +/- 0.5 mm FM 3085: +/- 2.5 mm	+/- 7.5 mm
Ambient temperature	+10 to +150 ° C	+10 to +150 °C
Material	Valve housing: stainless steel Plate: stainless steel, optionally with ceramic plate	Valve housing Wet area: bronze Dry area: nickel-plated brass Plate: stainless steel, optionally with ceramic plate
Weight	Valve: 1.9 kg Horizontal plate: 0.4 kg Vertical plate: 0.9 kg	2.4 kg
Dimensions (LxWxH)	Valve: 86x75x150 mm Horizontal plate: 57x15x335 mm Vertical plate: 90x24x382 mm	110x120x322 mm

Actuator position sensor

Position sensor FE 0752 U

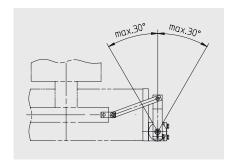
- + Electrical position sensor for the exact detection of the guide roll position in the wire, press and dry section
- + Electromechanical principle with Hall sensors
- + High temperature resistance up to +125 °C
- + Robust design
- + Can be added to all existing felt and wire guides

Function

The sensor's mechanism transmits the position of the guide roll to a permanent magnet. The magnetic field changes as a function of the position of the magnet. This change in the magnetic field is converted into an analogue electrical signal by a Hall sensor without contact and therefore wear-free. The signals are then transmitted to the digital position controller.



Position sensor FE 0752 U with mounting bracketry for felt and wire guides



Electrical position sensor FE 0752 U	
Nominal operating voltage	10 V DC
Current consumption	0.1 A
Ambient temperature	+10 bis +125 °C
Material	Housing: stainless steel
Cable length	10 m
Protection class	IP 67
Weight	2.2 kg
Dimensions (LxWxH)	Housing: 114x50x50 mm



Mechanical sensor feedback

Sensor feedback PR

- + Mechanical sensor feedback for improved guiding precision
- + Guide roll movement proportional to the error variable
- + Stable control loop without tendency to oscillation
- + Robust mechanical design
- + Usage on all ELGUIDE systems with mechanical-pneumatic edge sensors

Function

The sensor feedback mechanism transfers the travel of the wire or felt guide to the edge sensor's position. The displacement of the edge sensor's operating position enables the actuator to use proportional error correction.



Sensor feedback with mechanicalpneumatic edge sensor SK 78

Mechanical sensor feedback PR	
Material	Housing: stainless steel
Weight	Dependent on the type of actuator
Dimensions (LxWxH)	Dependent on the type of actuator

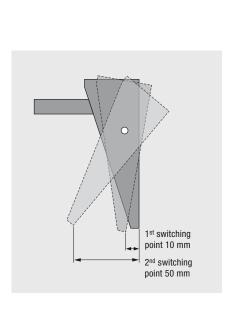
Alarm sensor

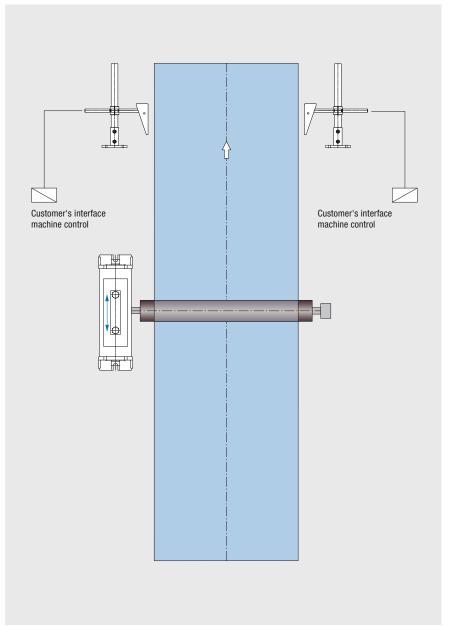
Alarm sensor FE 0721 U / FE 0722 U

- + Electrical alarm sensor suitable for the wire, press and dry section
- + Reliable provision of alarms and machine shut down in case of clothing problems
- + Prevention of clothing damage in case of failure or insufficient fabric guiding
- + Spring-loaded plate for preventing false alarms
- + Optionally with 2nd switching point
- + High temperature resistance up to +130 °C, optionally up to +180 °C
- + Robust, maintenance-free design
- + Can be added to all existing systems

Function

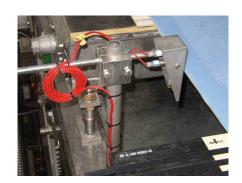
During the normal production process the alarm sensor is in a position beside the clothing where it is not in contact. The sensor's mechanism opens/closes the inductive proximity switch on activation by the clothing. Then, depending on the alarm sensor selected, an alarm is output or first an alarm is output and then a machine stop.











Selection table

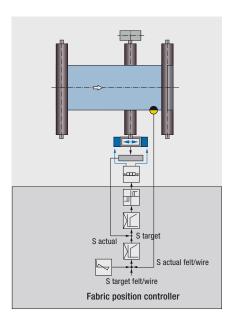
Туре	
FE 0721 U	1 switching point - alarm
FE 0722 U	2 switching points - alarm/stop

Alarm sensor FE 0721 U / FE 0722 U	
Nominal operating voltage	24 V DC
Operating voltage nominal range	20 – 30 V DC
Current consumption	4 mA
Ambient temperature	+10 to +130 °C, optional to +180 °C
Material	Stainless steel
Cable length	10 m
Protection class	IP 68
Switching point activation	
Plate travel 1st switching point	10 mm
Plate travel 2 nd switching point	50 mm
Weight (FE 0721 U / FE 0722 U)	2.7 kg / 3.0 kg
Dimensions (LxWxH)	613x70x186 mm
	Plate: 70x70x186 mm

Fabric position controller

Fabric position controller DC 08/28

- + Highly compact digital fabric position controller with integrated, digital inputs and
- + Three-position controller for the operation of a solenoid valve
- + CAN bus technology makes expensive cabling unnecessary resulting in simpler connectors
- + Download of the software using CAN bus or modem
- + Analogue output module can be connected via SPI bus (serial-processor interface).
- + Easy-touch calibration



Control structure for fabric position controller Three-position controller with adjustable window size

Selection table

Туре	RK 4310	AK4022	D02000
DC 0840			
DC 0870			
DC 2840			•
DC 2870		•	•
RK 4310	Fabric positi	ion controlle	r
AK 4022	Analogue ou outputs at 0 0-20 mA/4-		with four
DO 2000	User interfa	ce with plain	text display

Function modules

- + Monitoring of the supply voltage
- + Two digital alarm outputs
- + Additional indication of errors using error code on a seven-segment display on the control card and on the command station DO 2000



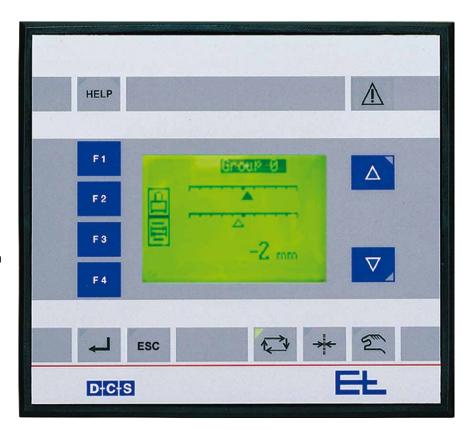
Application	Infrared sensor FE 4184 N
	Electromechanical sensor SH 8902 U
Operating voltage	
Nominal operating voltage	24 V DC
Operating voltage nominal range	20 to 30 V DC
Current consumption	0.5 A DC
Cycle time	10 ms
Ambient temperature	+10 to +50 °C
Digital inputs	4 x floating
Input voltage for "1" signal	+10 to +30 V DC
Input voltage for "0" signal	0 to 3 V DC
Input current	Max. 10 mA per input
Digital outputs	4 x floating and short-circuit proof
Output voltage for "1" signal	Supply voltage
Output current per output	1 A
Analogue inputs	2 x
Resolution	12 bits
Input voltage	0 to 10 V DC
Sensor supply	4x 10 V +/- 10 mV, 50 mA each
Serial interface (CAN bus)	
Level	5 V
Transmission rate	250 kBaud
Protection class	
Controller module	IP 00
With housing	IP 54
Housing size	300x150x80 mm



User interface

Command station DO 20

- + User interface with easy to use plain text display
- + Structured graphic of the CAN network
- + Easy "Set up Editor" for setting the parameters on initial commissioning
- + Indication of the actual positions of the edge sensor and actuator as well as deviation on the actuator's mechanical middle position
- + Indication of error messages
- + Multiple operation of a maximum of eight control systems
- + As an option, operation can be completely locked using a key switch
- + Network including the parameters for all users can be saved in the command station as a "Back up".



Technical data

Nominal operating voltage	24 V DC
Operating voltage nominal range	20 to 30 V DC
Current consumption	200 mA DC
Ambient temperature	+10 to +50 °C
Serial interface (CAN bus) level	5 V DC
Serial interface (CAN bus) transmission rate	250 kBaud
Dimensions	
Front panel installation kit	152 x 138.4 mm
Cut-out for installation kit	121 x 111.5 mm
With housing for field use	180 x190 x 95 mm
Protection class installation kit (installed)	IP 54
Protection class with housing for field use	IP 54
Weight DO 2000	0.55 kg
Weight DO 2001	1.3 kg
Language for prompts	German, English, French
	Italian, Spanish, Portuguese

Selection table

Туре	Installation kit With housing
DO 2000	
DO 2001	•

Interfaces













Interfaces DI

Modern production plants have a central control point or a command station. In this case the fabric position control systems can be connected to a range of different bus systems or to a PLC/IPC.

E+L offers a wide range of interfaces with standard protocols for this purpose. Every interface has a CAN connection with related bus driver block.

Selection table

Туре	Type of interface	Modem	PC/IPC	PLC Siemens	PLC Allen Breadly
DI B000	Profibus DP		•		
DI D000	ControlNet		•		•
DI E000	DeviceNet		•		•
DI F000	CANopen		•		
DI G000	EtherNet		•		•
DI 3000	RS 232/422				

Nominal operating voltage	24 V DC
Nominal operating voltage range	20 to 30 V DC
Current input	200 mA DC
Ambient temperature	+10 to +50 °C
Serial interface (CAN bus) level	5 V DC
Serial interface (CAN bus) transmission rate	250 kBaud
Dimensions DIN rail mounting	In accordance with DIN EN 50022
Protection class: DIN rail mounting in	
acc. with DIN EN 50022	IP 00
Protection class: with housing for field mounting	IP 54
Weight	0.2 kg

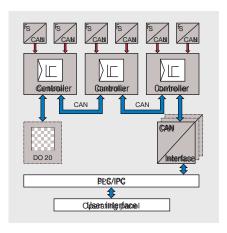


Networking

CAN bus

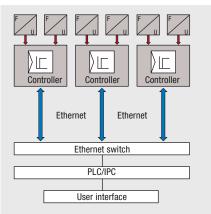
All the functional modules in the digital control system (DCS) feature a CAN bus interface and are also networked with one another. This feature ensures not only flexible adjustment of the E+L control system to new tasks but also guarantees maximum immunity to interference and a minimum wiring outlay.

A controller group may comprise up to 16 devices including, for example, sensors, support beams, controllers, interfaces or operating panels. Up to 8 controller groups may be implemented together in a common CAN network up to a length of 160 m. For lengths from 160 m a CAN extension DI 0010 is available; it is simply plugged in between two CAN networks.



Ethernet

While networking via CAN bus, the limit is a maximum of 8 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, 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.







Accessories

Service unit

- + Pressure reducer with pressure gauge, water separator, filter and oiler
- + Compressed air treatment in accordance with regulations
- + Ensures the reliable function of the mechanical-pneumatic sensors FM 30 and SK 78





Technical data

Service unit	NT 7003	NT 7004
Ambient temperature	+10 to +150 °C	+10 to +60 °C
Oil container capacity	170 ml	50 ml
Inlet pressure	Max. 30 bar	Max. 16 bar
Outlet pressure	0.5 - 8 bar	0.5 - 10 bar
Weight	3.5 kg	0.9 kg
Dimensions (LxWxH)	229x107x169 mm	118x122x196 mm

Air pipe set

- + Required for the function of all wire and felt guides
- + Pre-assembled length of 10 m
- + Suitable for all connections on the ELGUIDE systems



Stop valve

+ Fixes the guide roll position on failure of the compressed air supply

One-way restrictor valve

+ For mechanical-pneumatic edge sensor FM 30 for the adjustment of the actuator travel speed





Enquiry form

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Co	no	rai	d	ata

Customer	Conta	act person
Zip code	City	Country
Tel.	Fax	E-mail
Paper machine no. /Project	Mach	ine manufacturer
Installation		
☐ Wire section	\square Press section	☐ Dry section
Technical data		
Felt/wire width (mm)	Max.	felt/wire tension (N/mm)
Weight of guide roll (kg)	Weigh	ht of doctor (kg)
Machine speed (m/min)	Max.	ambient temperature in the place of use (°C)
Installation position of the felt and w	vire guide	
	γ =	°
\square Horizontal standing, quantity:	\square Horizontal inclined, quant	tity: Uertical, quantity:
Useinantel banging quantity	γ =	
☐ Horizontal hanging, quantity:	☐ Horizontal, hanging, incli	nea, quantity:
Guide roll wrap angle $\alpha = \underline{\hspace{1cm}}^{\circ}$ $\beta = \underline{\hspace{1cm}}^{\circ}$		
Edge sensor		
☐ Mechanical-pneumatic edge senso	or	lge sensor
Electrical data		
Control voltage	□ 24 V DC □ W	ith power supply for control voltage V Hz
Machine drawing Please attach		
Date	Issue	r



Notes	



Services from A-Z

We help right from the start

Your new, web guiding system starts with a thorough analysis by your personal E+L consultant. As a specialist for the entire product range from Erhardt+Leimer, your consultant will be pleased to also advise you on other aspects of your production.

Planning with experience

The project team in the Augsburg headquarters will prepare a customized solution for you even for difficult applications. With the experience of many installations all over the world, our specialists do not view the problems of felt and wire guiding in isolation, but always in the overall context of the related process.

Complete solutions

Erhardt+Leimer supply you with everything from a single source: on request the system comes complete with PLC controller, and control system, all installed in the control cabinet. Our PLC control and drive technology specialists will be pleased to assist with adapting your new system to the specific situation on site after installation.

Worldwide service

Our work does not finish with installation on your site, as intensive customer support is a matter of course for E+L. Our tightly-meshed, worldwide service network uses the latest diagnostics technology, e.g. teleservice or modem-based remote diagnostics. Whether complete installation and commissioning, repair or maintenance - give us a call and we will take care of everything.

Training for every application area

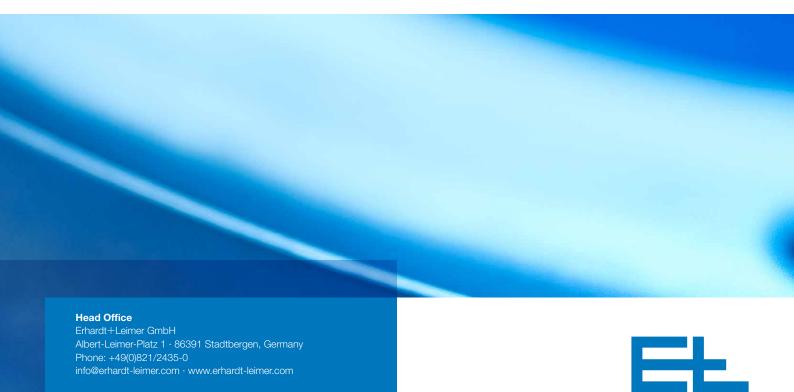
To fully exploit the high performance of your new E+L system even in complex applications, we offer machine manufacturers and users our "help for self-help" products. Oneday training courses or courses lasting several days are held as required for installation engineers and service engineers in our Augsburg training center, or on your site.











Subsidiaries

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