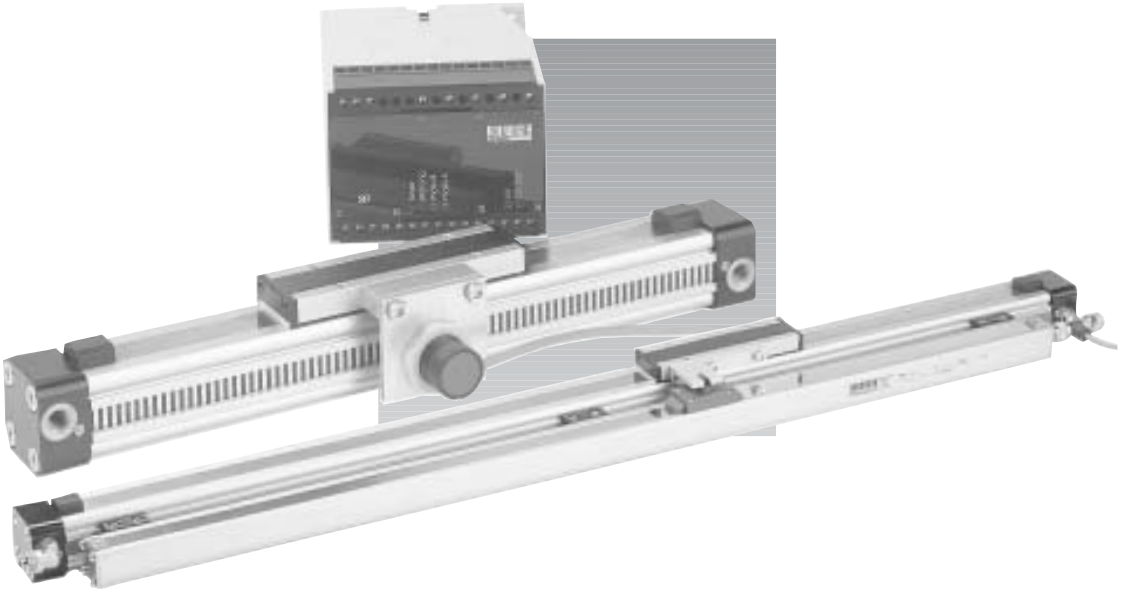
PNEUMATIC
GROUP

ORIGA-SENSOFLEX
DISPLACEMENT MEASURING SYSTEMS
FOR CYLINDER SERIES OSP-P



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ORIGA-Sensoflex

Displacement measuring systems for automated movement

Series SFI

(incremental measuring system)

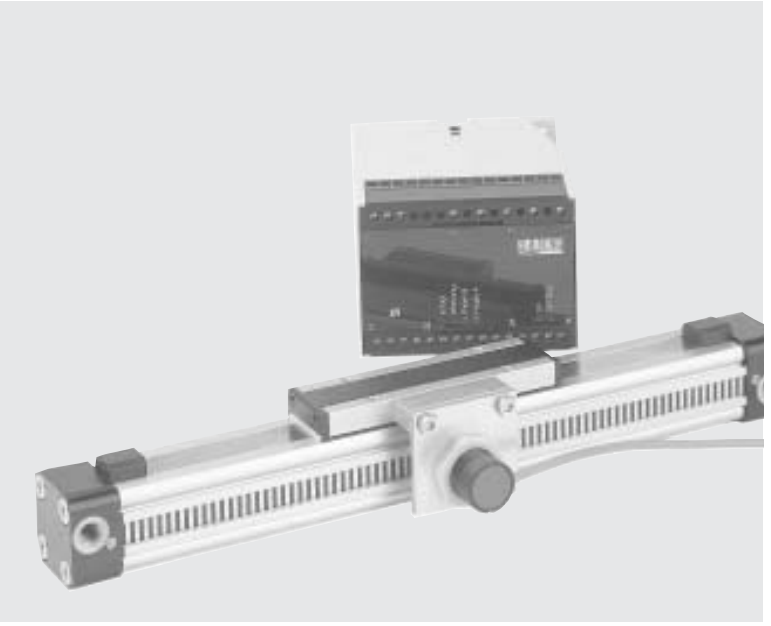
for cylinder series

- **OSP-P...**

Characteristics

- Contactless optical displacement measurement system (reflection-based)
- Unlimited displacement length
- Resolution to 1 mm
- Easy installation: self adhesive measuring scale, reader, encoder
- Displacement speed up to 7 m/s
- For linear and non-linear motion forms
- Suited for virtually all impulse recognition systems with counter input.

For further specifications, see page 67



System SFI consists of 3 components

- **Measuring scale**
  Self adhesive polyester tape with 2mm black/white increments

- **Sensing head**
  The sensing head converts the fluctuations in the reflections of the black/white increments into electrical signals, for further processing in additional counting equipment (e.g. PLC, PC, digital counter).

- **Encoder**
  Optional unit, that converts the signals from the sensing head into new signals (Modes). Three different Modes are available and digital outputs are provided.
  The encoder is also equipped with:
  - a digital input filter
  - a power supply for the sensing head
  - an extra signal output with RS 422 physical interface

Series SFA

(analogue displacement measuring system)

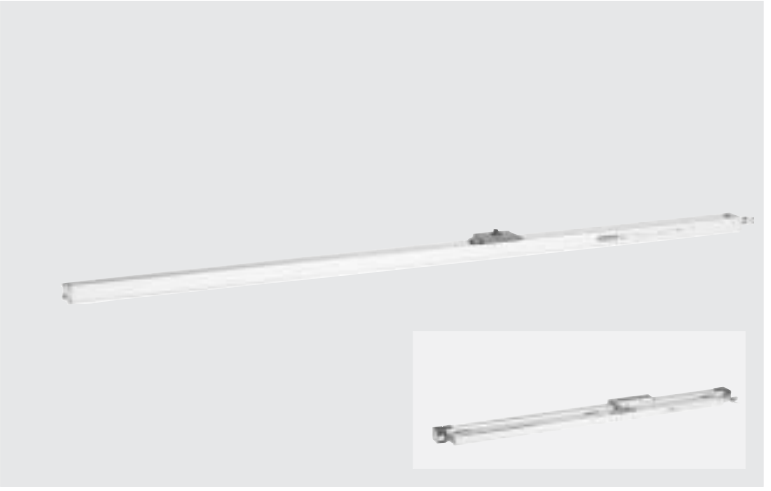
for cylinder series

- **OSP-P...**

Characteristics

- Measurement up to 4000mm (stepless)
- Resolution infinitely accurate, typically 0,01 mm
- No moving energy supply
- Preservation of measuring value in case of loss of power.

For further specifications, see page 71



This analogue displacement measuring system is based on a conductive plastic potentiometer for the direct and absolute measurement of displacement in control, monitoring and measurement applications.
The system is simple, robust and insensitive to electrical or magnetic interference.

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Displacement measuring system

for automated movement

ORIGA-Sensoflex

(incremental displacement measuring system)

Series SFI

for cylinder series

- **OSP-P...**

General

The optical displacement measuring system SFI consists of 3 components

- **Measuring scale**
  Self adhesive polyester tape with 2mm black/white increments

- **Sensing head**
  The sensing head converts the fluctuations in the reflections of the black/white increments into electrical signals, for further processing in additional counting equipment (e.g. PLC, PC, digital counter)

- **Encoder**
  Optional unit, that converts the signals from the reader into new signals (Modes). Three different Modes are available and digital outputs are provided.
  The encoder is also equipped with:
  - a digital input filter
  - a power supply for the sensing head
  - an extra signal output with RS 422 physical interface

Characteristics

Characteristics		Unit	Description
Measuring scale	Material		self adhesive polyester tape
	Bar-code		4 mm intervals between each black/white increment
	Linearity	mm	± 0.1 to 5 m length
	Measuring scale length	m	max. 50 per reel (reels can be linked)
	Width	mm	25 (pre-cut at 10 mm)
	Thickness	mm	0.1
Sensing head	Scanning method		opto-electronic, contactless, reflection-based
	Velocity	m/s	max. 7
	Electrical protection	IP	64
	Temperature range	°C	-20 to +50
	Relative humidity	%	10 – 95 (non condensating)
	Weight (Mass)	kg	0.17
	Connection		Cable 5.0 m length, fixed, open end, diameter: 4 x 0.20 mm^2
	Voltage	V DC	Input: Ue = 12 to 24 Output: Open Collector
	Power consumption	W	max. 3.5
	Delivery includes		sensing head, incl. cable and 2 nuts
Encoder	Housing		for wall and rail mounting (35mm DIN-rail)
	Connection		terminal screws
	Voltage	V DC V AC	Input: 12 to 24 115, 230, 400
	Power consumption	W	max. 12
	Electrical protection	IP	20
	Temperature range	°C	0 bis 50
	Relative humidity	%	10 – 80 (non condensating)

Characteristics
- Contactless optical displacement measurement system (reflection-based)
- Unlimited displacement length
- Resolution to 1 mm
- Easy installation: self adhesive measuring scale, sensing head, encoder
- Displacement speed up to 7 m/s
- For linear and non-linear motion forms
- Suited for virtually all impulse recognition systems with counter input.

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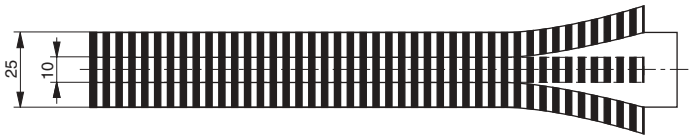
Measuring scale

The measuring scale can be applied to virtually all smooth surfaces. The adhesive is water-, oil-, and grease resistant to a very high degree. For easy adjustment of the scale width, it has been pre-cut.

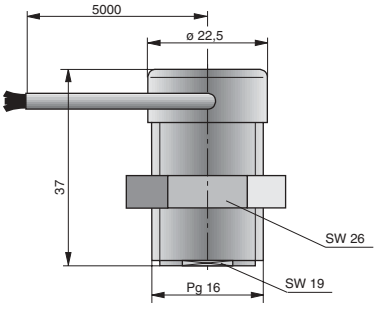
Dimensions (mm) – Measuring scale



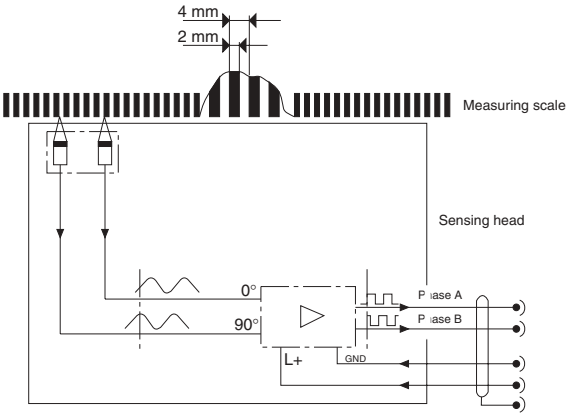
Sensing Head

The sensing head provides two pulsating, 90° out ot phase counter signals (phase A/B) with a 4mm resolution. External processing can improve the resolution to 1mm. The counting direction can be determined automatically from the phase variance of the counter signals.

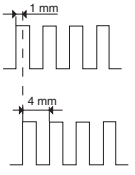
Dimensions (mm) – Sensing Head



Connection diagram – Sensing head



Output signal – Sensing head

$U_a = U_e$	Phase B	U_{a1}	0°	
	Phase A	U_{a2}	90°	

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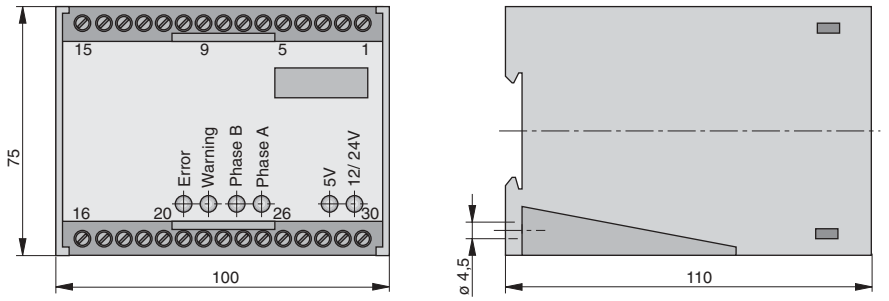
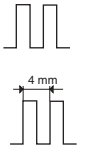
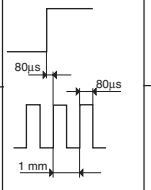
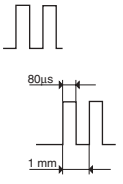
Dimensions (mm) – Encoder



Output signal - Encoder

		Signal		Mode 1 Distance indicator		Mode 2 Impulse generator		Mode 3 Impulse generator	
Input	U_e	L+		12 – 24 V DC					
		GND		O V DC					
Output	U_a = 5 - 12 - 24 V DC	Phase A	U_{a1}	0°		Direction		Count forward	
		Phase B	U_{a2}	90°		Count		Count backward	

Encoder

The encoder is an optional unit, that converts the signals from the sensing head into new signals (Modes). Three different Modes are available.

Mode 1 (Distance Indicator)
Just as in the sensing head, phase A and B provide two 90° out of phase counter signals, but the encoder has an additional digital filter.

Mode 2 (Impulse generator mode)
Phase A provides counter impulses with a length of +/- 80 µs („Count“). Internal signal processing renders a resolution of 1mm. Phase B gives a static High/Low signal for indication of the displacement direction.

Mode 3 (Impulse generator mode)
When counting upwards, phase A provides counter impulses with a length of 80 µs. Internal signal processing renders a resolution of 1mm. Phase B gives a Low-signal. When changing direction, the signals of phases A and B are switched.

Two additional digital outputs are also available: ”Warning” and ”Error”, and it is possible to vary the output voltage.

- 5 V TTL / CMOS level
- 12 V / 24 V PLC level
- RS 422 level

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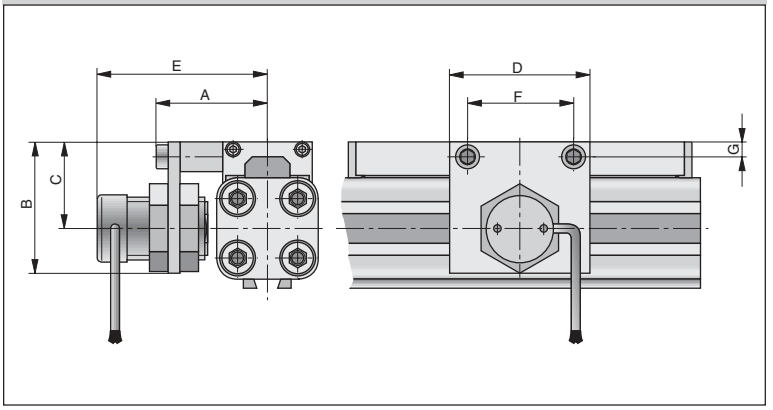
SFI mounted on a rodless cylinder series OSP-P

The SFI system can be mounted directly on a rodless OSP-P cylinder with the special mounting kit.

Dimensions – in combination with OSP-P cylinders



Dimensions (mm)

Series	A	B	C	D	E	F	G
OSP-P25	40	46.5	30.5	50	60	38	5.5
OSP-P32	45.5	53.5	37.5	50	66	38	6.5
OSP-P40	50.5	59.5	43.5	50	71	38	6.5
OSP-P50	60.5	64.5	48.5	50	78	38	6.5
OSP-P63	67.5	75	59	50	88	38	10.0
OSP-P80	81.5	75.5	91.5	50	101	38	12.0

Order instructions

Description	Order No.
Sensing head with measuring scale (please provide displacement length)	**20494**
Encoder	**20495**
Measuring scale per meter (spare part)	**4271**
Mounting kit for OSP-P25	**20426**
Mounting kit for OSP-P32	**20427**
Mounting kit for OSP-P40	**20428**
Mounting kit for OSP-P50	**20429**
Mounting kit for OSP-P63	**20771**
Mounting kit for OSP-P80	**20772**

General

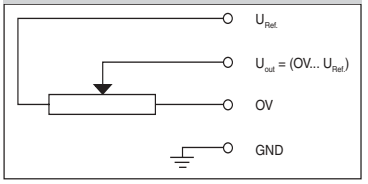
Characteristics

- Displacement measuring system without propulsion rod
- Minimal space requirements through compact design and minimal dead stroke
- Pin for easy connection
- Assembly with mounting brackets

In spite of its high resolution, this analogue displacement measuring system is inexpensive and ideally suited for rough industrial use because of its robust design. Easy handling and very low energy consumption make this system ideally suited for measuring, control and automation technology.
Basically, the SFA displacement measuring system functions as a voltage divider. A wiper is moved over a resistor, which in this modern system is a high-quality and robust conductive plastic layer.

This allows a high velocity and provides a very high resolution and a long life span.

Electrical connection



Assembly instructions

To achieve the linearity and life-span values specified in the technical data sheets, it is imperative that the wiper-voltage is read at a very low current (I < 10 µA). A higher current (I >10mA) would destroy the measuring system.

Characteristics

Characteristics	Unit	Description
General Features		
Measuring length		1-3000 mm stepless on request to 4000 mm
Life span		6000 km or 15 Million movements over ± 2 mm
Velocity	m/s	max. 1.5 *
Acceleration	m/s^2	max. 200
Actuating force	N	typ. 2
Repeatability	mm	± 0.02 (from one direction)
Reproducibility	mm	± 0.05 (from both directions)
Housing		anodized Aluminium
Weight (Mass)	kg/m	ca. 1.2
Temperature range	°C	-20 to +80
Relative humidity	%	10 to 95 (non condensating)
Electrical features		
Recommended wiper current	µA	0,1 – maximum wiper current 10 mA
Potentiometer voltage	V (DC)	max. 42
Recommended power	V (DC)	6.8 to 30
Connector		plastic elbow connector, cable 5mtr insulated, with open end
Temperature coefficient of the voltage divider ratio	ppm/°C	5
Enclosure class	IP	40
Signal output		potentiometric (voltage divider)
Insulation resistance	MΩ	10
Dielectric strength	V	500 eff

* higher speed decreases the life span

Displacement measuring system

for automated movements

ORIGA-Sensoflex

(analogue displacement measuring system)

Series SFA

for Cylinder Series OSP-P

Characteristics

- Stepless displacement length of up to 4000 mm
- Resolution infinitely accurate, typically 0.01 mm
- No moving power supply
- Preservation of measuring values in case of powerloss

This analogue displacement measuring system is based on a conductive plastic potentiometer for the direct and absolute measurement of displacement in control, monitoring and measurement applications.
The system is simple, robust and insensitive to electrical or magnetic interference.

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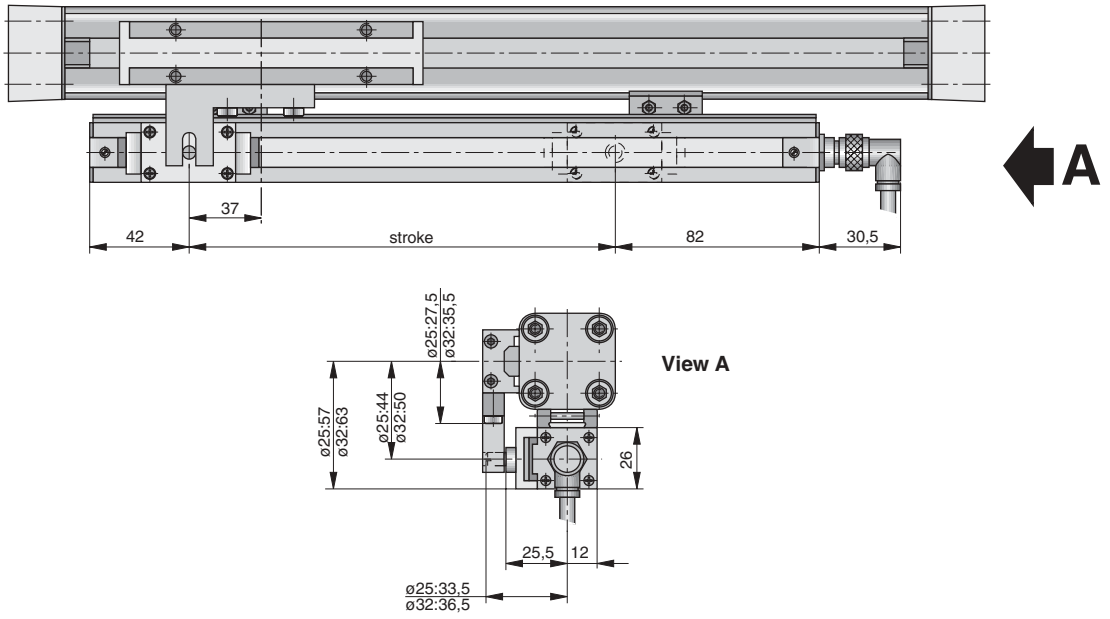
Electrical Measuring Range

Description	Measuring distance (mm) 125	150	300	600	1000	1500	1800	3000
Resistor value (kΩ) typical	2	5	5	5	10	10	20	20
Resistor tolerance (%)	± 40							
Independent linearity (%)	±0.09	±0.08	±0.07	±0.05	±0.04	±0.03	±0.03	±0.02

Dimensions (mm) – SFA with cylinder OSP-P



Order instructions

Description	Order-No.
SFA with measuring length of 1-3000 mm*, without Cable	**4650**
Mounting for OSP-P ø 25 mm (Coupling, mounting, cable)	**20430**
Mounting for OSP-P ø 32 mm (Coupling, mounting, cable)	**20431**
Cable 5 m	**4618**

* (longer lengths on request)

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