

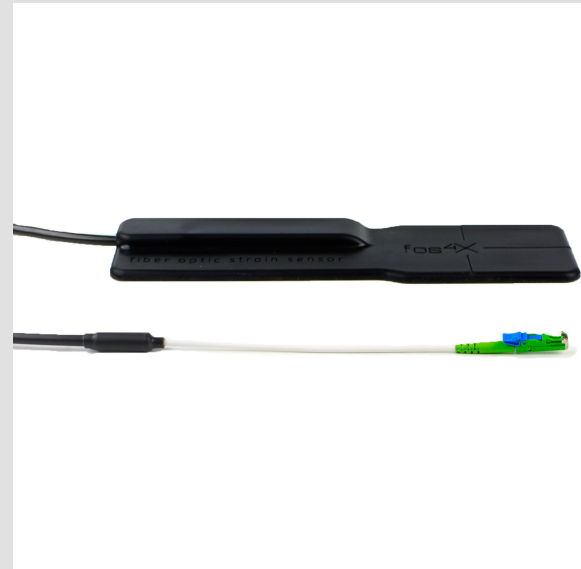
INSTALLATION MANUAL

FOS4STRAIN EXPERT

SN-I001_1.0_EN_fos4Strain expert

FIBER-OPTICAL STRAIN SENSOR

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1 Safety

1.1 Important Safety Notes

For all tasks:



NOTICE

Damage to the fiber-optical cables.

Too small bending radii and kinks can irreparably damage the fibers in fiber-optical cables.

- ☐ ▶ Observe the min. bending radii of the cable. See [Technical Data](#).
- ☐ ▶ Do not kink fiber optical cables.



NOTICE

Poor signal quality due to dust and dirt on the sockets and connectors.

Optical connections are very sensitive to dust and dirt.

- ☐ ▶ Ensure a clean working environment.
- ☐ ▶ Seal sockets and connectors with dust caps when not in use.
- ☐ ▶ Clean sockets and plugs with a optical connector cleaner before connecting.

When working with ergo 6305 or Sikaflex-521UV:



CAUTION

Severe irritations and allergic reactions caused by contact with adhesive.

- ☐ ▶ Wear protective gloves according to EN ISO 374-1 (nitrile, min. 0.4 mm).
- ☐ ▶ Wear safety goggles with side protection according to DIN EN 166.
- ☐ ▶ Observe the safety data sheet of the adhesive.



CAUTION

Health damage and allergic reactions caused by inhalation of adhesive fumes.

- ☐ ▶ Do not inhale fumes.
- ☐ ▶ Ensure adequate ventilation.
- ☐ ▶ Observe the safety data sheet of the adhesive.

**When working with
ergo 1665 or UHU
PLUS BLACK:**



CAUTION

Severe irritations and allergic reactions caused by contact with adhesive.

- ▶ Wear protective gloves according to EN ISO 374-1 (butyl, min. 0.5 mm).
- ▶ Wear safety goggles with side protection according to DIN EN 166.
- ▶ Observe the safety data sheet of the adhesive.



CAUTION

Health damage and allergic reactions caused by inhalation of adhesive fumes.

- ▶ Do not inhale fumes.
- ▶ Ensure adequate ventilation.
- ▶ In case of insufficient ventilation: Wear respiratory protection with protection level A2 P2 according to DIN EN 140.
- ▶ Observe the safety data sheet of the adhesive.

1.2 Personal Protective Equipment

Protective Gloves



For all tasks where surfaces are heated:

- ▶ Wear protective gloves with the following characteristics:
 - General requirements according to DIN EN 420
 - Protection against contact heat: Performance level 2 according to DIN EN 407



For all tasks with adhesives:

- ▶ Wear protective gloves according to EN ISO 374-1 (nitrile, min. 0.4 mm).



For all tasks with ergo. 1665:

- ▶ Wear protective gloves according to EN ISO 374-1 (butyl, min. 0.5 mm).

Safety Goggles



For all tasks with adhesives:

- ▶ Wear safety goggles with side protection according to DIN EN 166.



When grinding GRP:

- ▶ Wear safety goggles with side protection according to DIN EN 166.

Protective Clothing



For all tasks:

- ▶ Wear protective clothing (long-sleeved work clothing).

Respiratory Protection



When grinding GRP:

- ▶ Wear respiratory protection with protection level A2 P2 according to DIN EN 140.



For all tasks with ergo. 1665:

- ▶ In case of insufficient ventilation: Wear respiratory protection with protection level A P2 according to DIN EN 140.

1.3 Related Documents

For the complete product information, refer to the product manual **SN-M001 fos4Strain expert**.

1.4 Abbreviations

ETH	Ethernet
Max	Maximum
Min	Minimum

2 Installation

2.1 Preparing the Installation Position



CAUTION

Respiratory irritation and health damage due to inhalation of GRP dust.

- ▶ Wear respiratory protection with protection level A2 P2 according to DIN EN 140.
- ▶ Ensure adequate ventilation.

Material and equipment

Name	Type	Quantity
Cleaning cloth	Dry, lint-free	1
Sanding machine	-	1
Sanding disc/paper	Grit 80	1

Table 1: Material and equipment

Consumables

Name	Type	Quantity
Cleaning agent	Isopropanol	As required

Table 2: Consumables

Preparing the Installation Position of the Sensor

Preparing the installation position of the sensor:

- 1 Choose the installation position. See [Product Description](#).
- 2 Mark the installation position.
- 3 If the installation position is prepared with peel-ply: No grinding and cleaning necessary.
 - a. Remove the peel-ply.
 - b. Continue with step 8..



Figure 1: Grinding the installation position

- 4** Grind the installation position (sanding disc/paper grit 80).

Make sure that the surface is smooth and even.

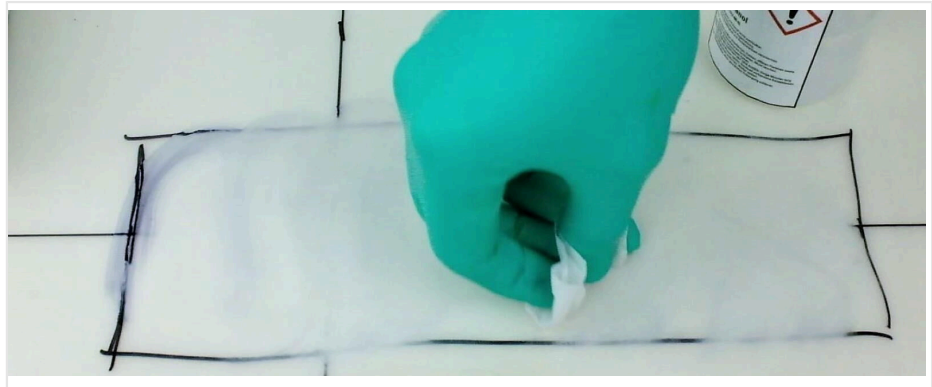



Figure 2: Cleaning the installation position

- 5** Clean the installation position with a dry, lint-free cleaning cloth and isopropanol.
- 6** Wait until the isopropanol has completely evaporated.
- 7** Wipe the installation position with a dry, lint-free cleaning cloth.
- 8** If necessary, mark the installation position again.
-  Installation position is prepared.




2.2 Attaching the Sensor

2.2.1 Attaching the Sensor with ergo 1665

NOTICE

Incorrect or inaccurate measurements due to incorrect installation.

After curing, the sensor is permanently bonded to the substrate and cannot be removed.

-  Ensure that the sensor is installed at the correct position.
-  Ensure that enough adhesive is applied.
-  Use the helix-mixer B-System / 4:1 & 10:1 / 50ml for the adhesive ergo 1665.

TIP

Experience shows that at least half a cartridge of ergo 1665 should be planned. On rippled surfaces, the required quantity can be considerably larger.

Material and equipment

Name	Type	Quantity
Mixer	4472043	1
	Helix-mixer, B-System / 4:1 & 10:1 / 50 ml	
Mixing gun	4472105	1
	Manual mixing gun / 10:1 / 50 ml	
Adhesive tape	-	As required
Thermometer	-	1
Optional:	Mobile Testing Device Blackbird	1
Mobile Testing Device	(8CH, ETH)	

Table 3: Material and equipment

Consumables

Name	Type	Quantity
Adhesive	ergo 1665	Min. 25 ml
	1665.050.DK.E500	
Cleaning agent	Isopropanol	As required

Table 4: Consumables

Attaching the Sensor

Conditions:

- Ambient temperature +10 ... +40 °C.
- Installation position is prepared. See [Preparing the Installation Position](#), page 8.

Form deviation and ripple max. 0.25 mm, $R_a = 3 \dots 12 \mu\text{m}$.

Attaching the sensor:

- 1** Ensure that the structure at the installation position is at rest strain.

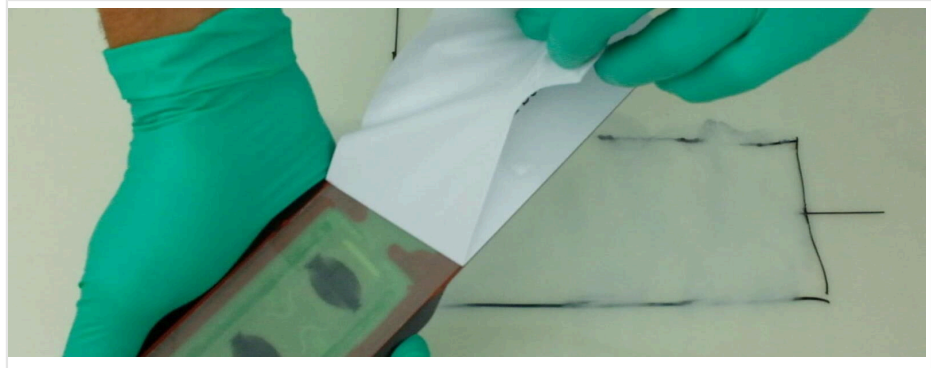


Figure 3: Removing the protective film

- 2** Remove the protective film.
- 3** Prepare ergo 1665:
 - a.** Push the safety lever of the mixing gun upwards and pull the piston rod all the way back.
 - b.** Insert the adhesive cartridge into the mixing gun.
 - c.** Remove the cap from the cartridge.
 - d.** Carefully operate the mixing gun until some adhesive comes out of both openings.
 - e.** Attach the mixer to the front of the cartridge.
 - f.** Press adhesive with the mixing gun into a suitable container until the mixer has been flushed once.



Figure 4: ergo 1665 on the bottom side of the sensor

- 4** Apply adhesive in the rear area of the sensor. Recommended layer thickness: **2 mm**.

- 5** Apply adhesive in the front area of the sensor. Recommended layer thickness: **3 ... 4 mm**.

Observe the pot life of the adhesive: 3 ... 6 minutes (temperature-dependent).

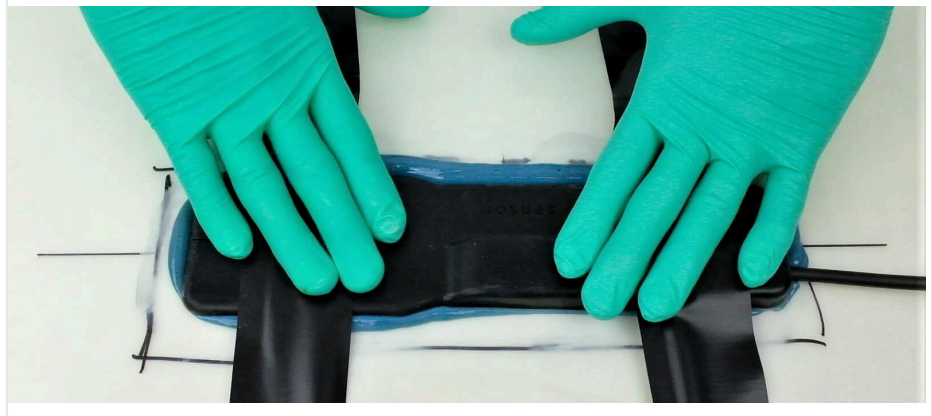


Figure 5: Pressing on the sensor and attaching it

- 6** Press the sensor evenly until adhesive is pressed out on all sides.

If **no** adhesive is visible: The installation has failed because not enough adhesive has been applied.

- 7** Temporarily attach the sensor for curing with adhesive tape.



NOTICE

Failure of the installation due to errors during curing.

- ▶ Observe curing time.
- ▶ Do not move the sensor during curing.

- 8** Wait for 13 minutes until the adhesive has cured to a functional strength.

At temperatures lower than +12 °C, the curing time is significantly longer.
At temperatures higher than +25 °C, the curing time is shortened.

For exact curing time see data sheet of the adhesive.

The adhesive is cured when it has changed color from blue to green.

- 9** Remove the adhesive tape.

- 10** Optional: Check the wavelength of the sensor with the Measuring Case:

- a.** Connect the sensor to the Measuring Case. See [Connecting E-2000/APC Connections](#).
- b.** Check the wavelength of the sensor. See instructions for use of the Measuring Case and datasheet of the sensor.

If the wavelength is not within the specified range: The sensor can only be used with a limited measuring range.

-  Sensor is attached.

2.3 Attaching the Cable

Material and equipment

Name	Type	Quantity
Cleaning cloth	Dry, lint-free	1
Caulking gun	-	1
Thermometer	-	1

Table 5: Material and equipment

Consumables

Name	Type	Quantity
Adhesive	ergo 6305 or Sikaflex-521UV	300 ml per 8 m cable

Table 6: Consumables

Attaching the Cable

Conditions:



NOTICE

Adhesives have very different adhesive properties on different materials.

- ▶ Observe the information in the adhesive manufacturer's data sheet.
- ▶ Ensure that the adhesive provides a secure grip on all materials to which the cable is to be attached.
- ▶ If sufficient attachment with adhesive is not possible: Switch to other mounting methods such as screwed cable anchors. For more information and assistance, contact technical support. See [Technical Support, page 15](#).

- Ambient temperature
 - Gluing with Sikaflex-521UV: +5 ... +40 °C.
 - Gluing with ergo 6305: +5 ... + 30 °C.
- Sensor is attached. See [Attaching the Sensor, page 10](#).

Attaching the cable:

- 1** Ensure that the installation position is dust-free, grease-free and dry.

If necessary: Clean the installation position of the cable with a dry, lint-free cleaning cloth.
- 2** Route the cable and attach it temporarily to the installation position with Kapton adhesive tape.
- 3** Attaching the cable:
 - a.** Put a Cartridge in the caulking gun.
 - b.** Apply the adhesive on the cable using the caulking gun.

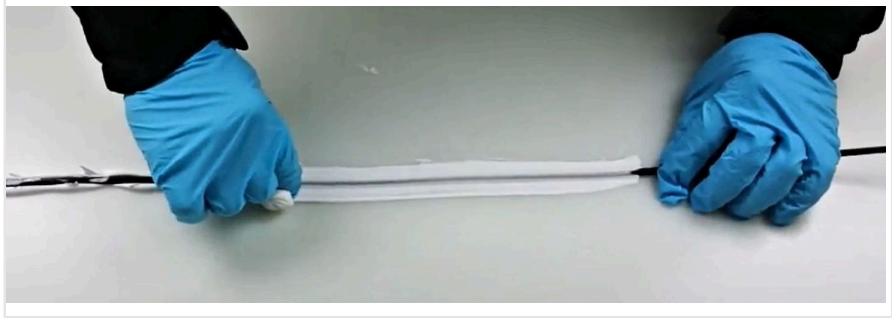



Figure 6: Spreading the adhesive and pressing on the cable

- c.** Spread the adhesive and press on the cable.
 - d.** Wait until the adhesive has cured. See data sheet of the adhesive.
- 4** Remove the Kapton adhesive tape.
-  Cable attached.

3 Technical Support

Email

support@polytech.com

Answers will be sent within one working day.

Phone

+45 88 444 500

Available 8:00-17:00 CET.

Please include the following information in your support request: Product name, Product type, serial number and nature of the problem.

