



## FIFE DSE-17

### Operating Instructions

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# 1 INTRODUCTION

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## About these operating instructions

These Operating Instructions describe the installation, commissioning, operation, and maintenance of the DSE-17 digital infrared sensor and provide important instructions for proper use.

The operating instructions must be carefully stored and must always be available at or near the customer's system during the service life of the sensor.

### Translation of the original Operating Instructions:

These Operating Instructions are a translation. The original Operating Instructions were composed in German.

## Target groups

These Operating Instructions are directed to both the *system construction master* as well as the *operator* who uses the sensor in production line.

### Read operating instructions

The Operating Instructions must be read and used by *all persons* who have the responsibility of installing, commissioning, operating and maintaining the sensor.

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## Proper use

The DSE-17 digital infrared sensor is used for no-contact measurements of the lateral offset of a material web that is being guided. The sensor is suitable for

- web edge guiding and
- web center guiding

The sensor can be used to control both opaque and transparent materials.

The sensor must only be used in accordance with its intended purpose and in a technically flawless conditions.

The sensor must not be changed or opened. The protection panes are fastened with a special adhesive.

**Air supply (optional)**

The sensor is also available with air supply. Depending on the type of dirt contamination, this makes it possible to keep the protection panes, which cover transmitter and receiver, free of large pieces of dirt with a continuous or pulsing flow of air. Depending on the degree of dirt contamination and the installation location, it may be necessary to vary the air pressure. The air must be clean and oil-free.

→ [\*Air supply \(optional\), page 9-5\*](#)

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**Improper use**

- Operation outside of the technical specifications is not permitted.
- Operation in areas where there is a danger of explosions is prohibited.
- The sensor may not be used as a support, handle or step.
- Any use other than the designated use is not permitted.

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**Mode of functioning**

The DSE-17 sensor works with infrared light. Because of this the sensor is relatively insensitive to visible light.

Several measuring cells measure the difference in transparency between the material web and the open field of view. This makes the sensor relatively tolerant to dirt contamination on the sensor and fluctuations in the transparency of the web material.

Depending on how far the material web covers the sensor field of view, a part of the infrared light strikes the receiver. The output signals are generated from this information.

The following rules are used for this purpose:

- The sensor searches for the two largest positive and negative contrast values in the sensor field of view.
- To prevent improper functionality due for example to slight amounts of contamination on the sensor protection panes, only contrast values greater than the set minimum contrast are used for further signal processing.
- This minimum contrast is set to 32% by default.
- The position of the positive contrast with the smallest distance from the closed end of the sensor is assigned to the output function "Edge 1."

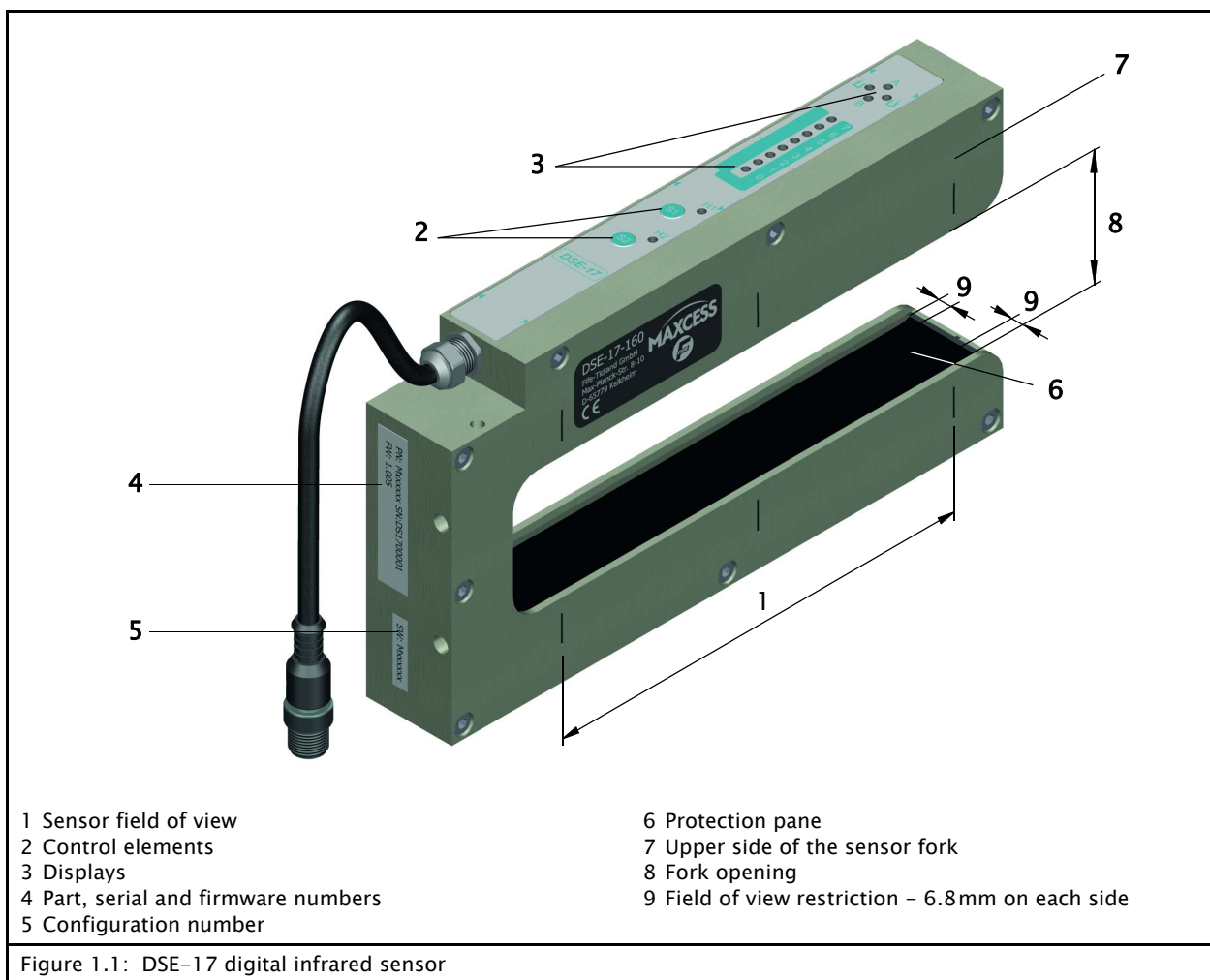
- The nearest negative contrast is assigned to the output function "Edge 2."
- The remaining contrasts are assigned in the same manner to output functions "Edge 3" and "Edge 4."



Important information:

- The distance between two material webs must be greater than 40mm.
- If a material web less than 40mm in width is within the sensor field of view, a configuration designed especially for narrow webs must be used. Otherwise invalid values will be generated.

The configuration number (item 5 in [Figure 1.1](#)) identifies the user-specific assignment of the signals. For further information refer to the configuration drawing in the system documentation.



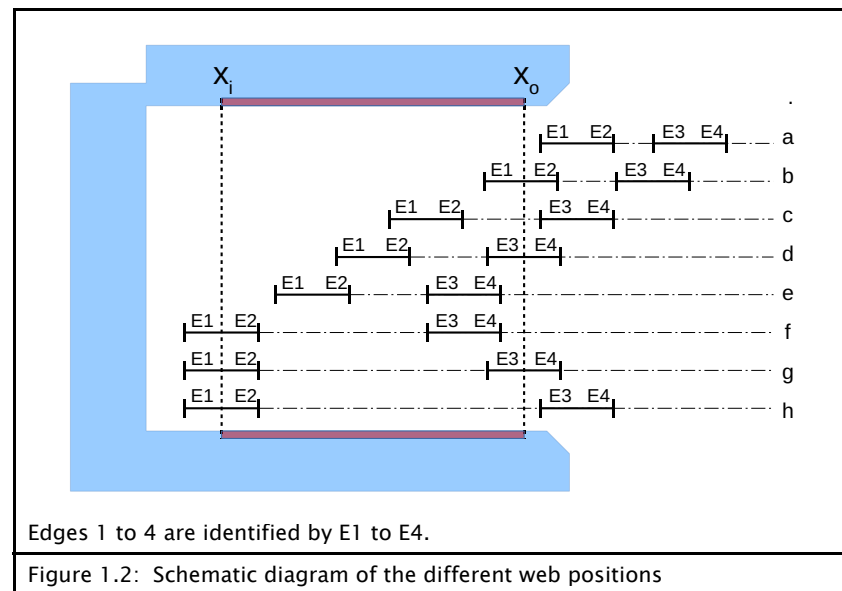
**One Web Mode**

The way the sensor works can also be changed with the *One Web Mode* parameter. It can be turned on or off.

*One Web Mode: OFF*

Parameter *One Web Mode* is turned off.

- If there is no suitable contrast value, it is assumed that the corresponding material edge is outside the sensor field of view.  
→ See [Figure 1.2](#) for 8 different cases a to h
- The corresponding extreme value of its signal range  $x_i$  or  $x_o$  is assigned to the relevant output functions.  
→  $x_i = 0$  or 4mA and  $x_o = 10$  or 20mA with normal output functions and vice versa for the inverted output functions.

*One Web Mode: ON*

Parameter *One Web Mode* is turned on.

This parameter setting is intended for materials with unevenly distributed material thickness (cloudy) in which edges may incorrectly be detected in the middle of the material web.

The position of the positive contrast with the smallest distance from the closed end of the sensor is assigned to the output function "Edge 1." Of the two negative contrasts, the position of the contrast with the greatest distance from "Edge1" is assigned to output function "Edge 2." The two remaining contrasts are not used for any further purposes.

If there is no suitable contrast for an outer edge, it is assumed that the edge is outside the field of view. The corresponding extreme value of its signal range is assigned to the relevant output functions.



Note:

When materials with unevenly distributed material thickness (cloudy) are being scanned, this sensor behavior for blocking web guiding (ASC job) by a corresponding setting or special programming of the web guide controller should always be used to prevent incorrect web guiding (for example for D-MAX M404074).

→ table [page 9-2](#)



Note:

The sensor is automatically calibrated to the transparency of the material. If the density of the material is not distributed evenly (cloudy), it is therefore possible that the output signal will be subject to greater fluctuations than is the case without these properties.



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## 2 SAFETY INSTRUCTIONS

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### Important information

To ensure safe and problem-free operation of the DSE-17 sensor it must be

- properly shipped and stored,
- properly mounted and placed in operation,
- properly used and carefully maintained.

Proper operation and careful maintenance will ensure a long service life for the sensor.

#### Please note the following:

- The content of these operating instructions
- Any safety instructions that are printed on the unit
- The requirements of the machine manufacturer
- Applicable national, state and local requirements for accident prevention and environmental protection

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### Information about safety instructions

The safety instructions and symbols described in this section are used in these Operating instructions. They are used to avoid possible dangers for users and to prevent material damage.



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#### SIGNAL WORD

Source of danger and its results.

⇒ Avoiding dangers

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#### Signal words

The signal word **DANGER** indicates an immediate danger of serious injury or death.

The signal word **WARNING** indicates a possible danger which could lead to serious injury or death.

The signal word **CAUTION** refers to a possible danger which could lead to slight to moderate injury.

The signal word **ATTENTION** refers to a possible danger which could lead to material damage.

**Symbols**

Reference to general hazards that may result in bodily injuries



Refers to danger of injury caused by crushing



Refers to danger of injury caused by cutting



Refers to general hazards that will result in damage to the device or system



Read operating instructions  
Follow these operating instructions for proper and safe use.  
Keep for future use.

**Additional markings**

- Bulleted list
- Instructions
  1. Instructions which must be processed in the specified order
  2. End of the instructions
- Reference or cross-reference



Note:  
Reference to important information.

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## Personnel requirements

The tasks listed in these operating instructions may only be carried out by appropriately qualified personnel commissioned by the operator. The responsibilities of the personnel for the work on the system must be clearly defined by the operator.

### Transport, assembly, Electrical connection or disconnection, maintenance, troubleshooting, disassembly:

- Specialized staff
  - Mechatronics engineer, industrial mechanic, etc.

### Control during operation:

- Specialized staff
  - Machine and system operators, etc.
- Personnel or trainees trained and supervised by the system operator

### Repair:

- Specialized staff
  - Service technician of Fife-Tidland GmbH

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## Preventing hazards

- No changes may be made to the sensor.
- The parameters specified in Section *Technical data* must be observed.
- Only accessory and replacement parts that have been approved by Fife-Tidland GmbH may be used.
- The sensor may not be used as a support, handle or step. There is a danger that the sensor will become damaged (breaking off/snapping), resulting in personal injury.

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## Residual risks

Installing the product in a machine/system makes it possible to form clamping, squeezing and cutting points.

Despite a safe design and supplementary protective measures, residual risks may remain for the machine/system in which the product is installed. These risks must be recorded in a risk assessment by the machine/system builder and taken into consideration in the operating instructions.

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## 3 INSTALLATION

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### Transport and storage

- The sensor and/or the unit on which the sensor is mounted must be secured against slipping during transport.
- The sensor must be stored in a cool, dry place.
- The sensor must not be stored in the vicinity of powerful magnetic fields. The electronic components of the sensor may be damaged.

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### Included with delivery

- Sensor DSE-17  
The model designation, part number, and the firmware and configuration numbers are on the nameplates on the housing.
- Operating instructions

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### Mounting



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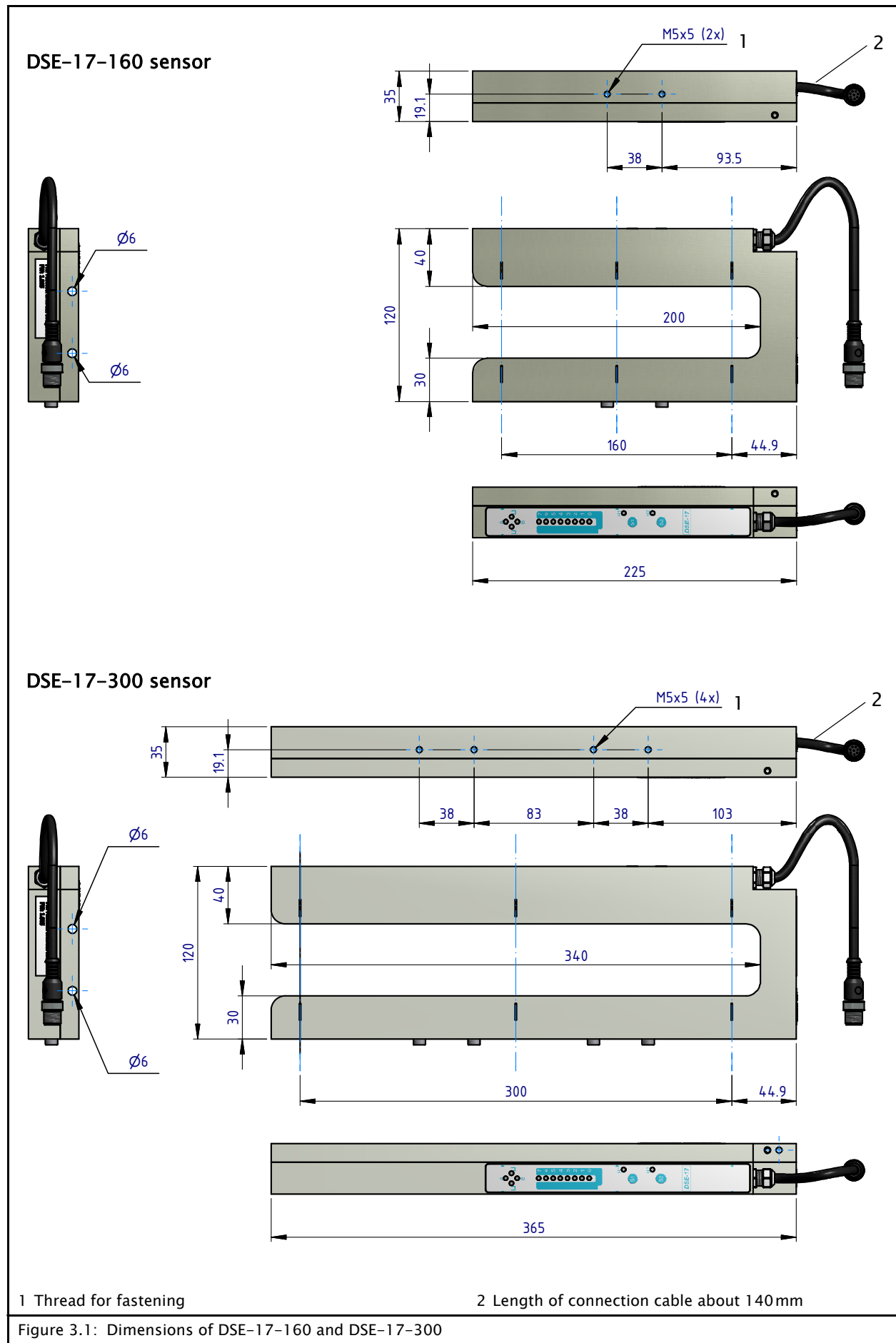
#### WARNING

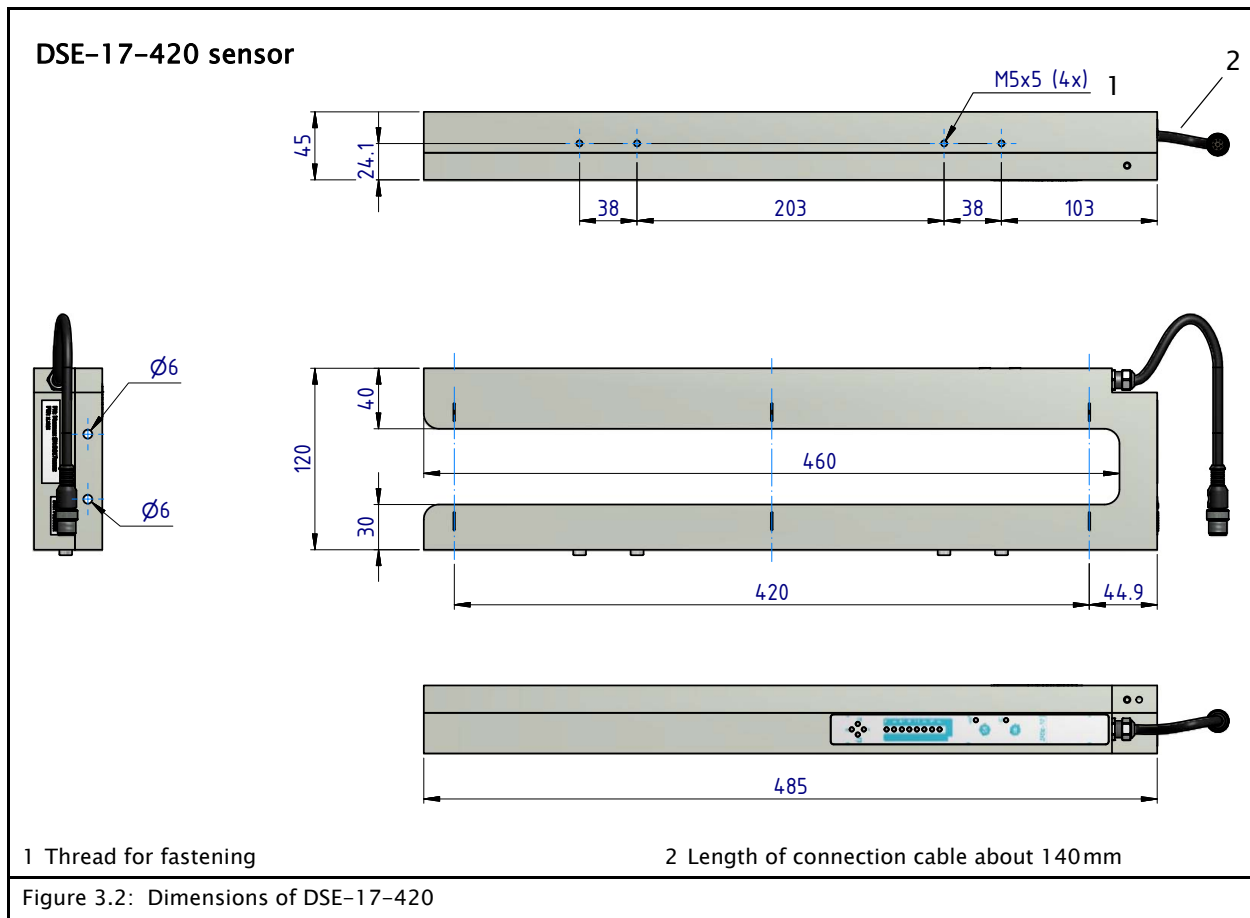
- ⇒ If a sensor is damaged, it must not be installed or placed in operation.
  - ⇒ All assembly tasks on the sensor must be performed when there is no electrical power in the system.
  - ⇒ Assembly tasks and mechanical settings must only be performed when the machine has been stopped and has been secured from being turned on again.
- 

### Mounting location

- Protection Class: IP65
- Operating temperature: 10°C ... 50°C
- Relative humidity: up to 90% non-condensing
- Operating altitude: max. 3000m
- Protect from vibrations
- Not in the vicinity of strong magnetic fields  
The electronic components may be damaged.
- Not in places where there is a risk of explosions.

# Dimensions



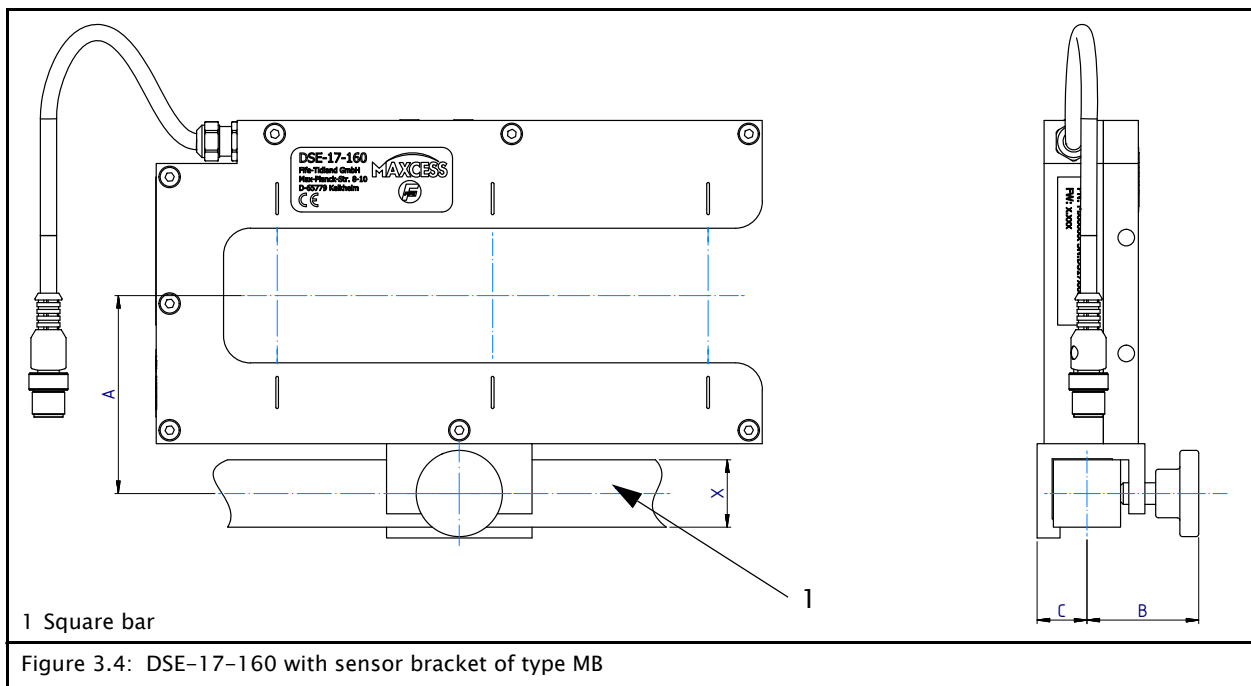
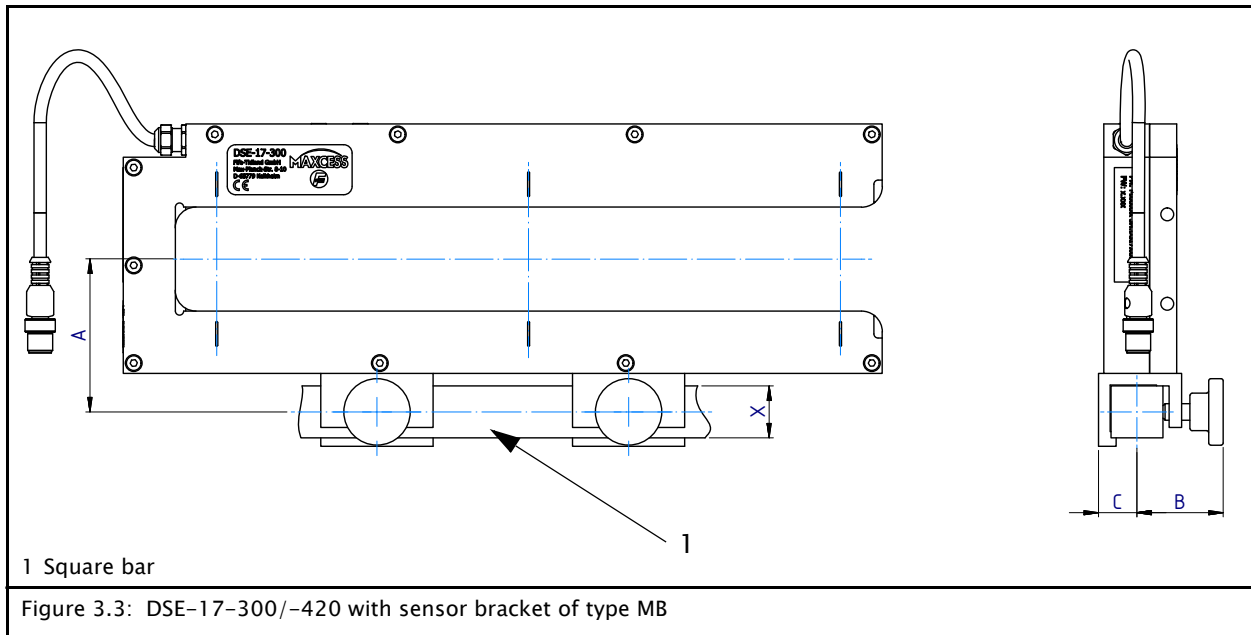


### Mechanical fastening

Holes with M5 threads are available on the housing for mounting the DSE-17 sensor.

→ [Figure 3.1](#) and [Figure 3.2](#)

- A sensor bracket is required for the DSE-17-160 sensor.
- Two sensor brackets are required for the DSE-17-300 and DSE-17-420 sensor.



Mechanical fastening	Square bar				A	B	C
	X	Max. length					
		DSE-17-160	DSE-17-300	DSE-17-420			
MB-20	20	1450	1400	1350	70,5	ca. 43	15
MB-25	25	1800	1750	1700	73,5	ca. 47	19
MB-32	32	2350	2300	2250	78,5	ca. 52	24

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## Electrical connection



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### ATTENTION:

The sensor could be damaged.

- ⇒ The safe function of the sensor and the system is only guaranteed if it is properly installed.
  - ⇒ Electrical connections should always be made or disconnected on the sensor while there is no electrical power in the system.
  - ⇒ When attaching the connector with the jack on the sensor, pay close attention to the guide and groove! The connector and jack must not be connected with incorrect orientation or by force, as this will destroy the sensor.
  - ⇒ Electrical lines must not be subjected to any mechanical loads.
- 

- The sensor must be connected to the web guide controller according to the system diagram in the system documentation.



### Note:

Normally the sensor must be connected to the web guide controller with a cable on the corresponding sensor input. In some cases the sensor can be connected via a Y-cable or an external distributor box to two sensor inputs on the web guide controller.





## 4 CONTROL ELEMENTS

### Control elements





The DSE-17 sensor has the following control and display elements.

#### LEDs and :

- The LEDs identify the position of the material that is being tracked in terms of the upper  and lower  sensor sides.



#### Note:

When the material web is in the center of the sensor fork, LEDs  and  are not lit.

#### LEDs A and B:

- Not assigned in its regular operation state

#### LED bar graph:

- Shows the tracked edges of the material web when the sensor is working in the regular operation state.

#### S1 key:

- Generate auxiliary signals for calibrating the connected web guide controller

#### S2 key:

- Perform calibration of the sensor

#### LED H1:

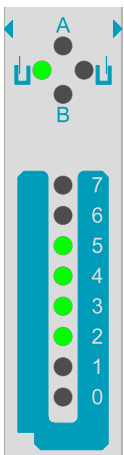
- LED H1 is continuously lit when the sensor is turned on and working in its regular operation state.
- LED H1 flashes while it is generating auxiliary signals for calibrating the connected web guide controller.

#### LED H2:

- LED H2 is turned off in its regular operation state.
- LED H2 flashes while the sensor is being calibrated.
- LED H2 flashes in a certain pattern. The sensor is indicating an error.

→ [table, page 8-1](#)

## Examples



Example 1



Example 2

**Example 1:**

- The sensor detects two material web edges.
- The material web is located in the center of the sensor field of view.
- The material web is located closer to the upper sensor side ▮.

**Example 2:**

- The sensor detects one material web edge.
- The material web covers the outer part (3/8) of the sensor field of view.
- The material web is located closer to the lower sensor side ▮.

## 5 COMMISSIONING

### WARNING

- ⇒ Unexpected movements of the machine may lead to injuries or death.
- ⇒ Commissioning must only be performed while the machine is stopped and protected against being turned on again.
- ⇒ Make certain there is no one in the hazardous area of the drives.

### Calibrating the sensor inputs of the web guide controller

When the DSE-17 sensor is connected to the web guide controller for the first time, the selected sensor input of the web guide controller must be calibrated to the output signals of the DSE-17. This ensures that the web guide controller and sensor use the same standard of evaluation.

**This process must be performed for each of the up to four signals of the sensor (for example the edge signal or dirt contamination signal).**

For the assignment of sensor signals to inputs of the web guide controllers, see the configuration drawing for the DSE-17 in the system documentation.



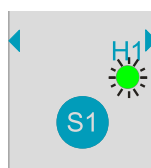
Note:

If no key is pressed for more than 2 minutes the sensor returns to its regular operation state.

### Calibration



- Press S1 and hold it for 3 seconds



LED H1 flashes (short on – long off)

Depending on the configuration, all analog outputs of the sensor return 0 mA or 4 mA.

This assigned value is used to determine the reference value for the uncovered sensor on the web guide controller (no material in the field of view).

- Calibrate the web guide controller to the lower reference value



Note:

For further information see the Operating Instructions for the web guide controller in the system documentation.

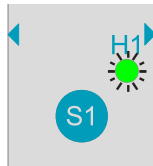
**DP-20, DP-30:** Menu 3x.1.4 Calibration for edge sensors

**D-MAX:** Menu 1y.5.1.1.1 Calibration

**FIFE 500:** Sensor setup menu



- Press key S1 and hold 0.5 s to continue with the calibration of the upper reference value.



LED H1 flashes (long on – short off)

Depending on the configuration, all analog outputs of the sensor return 10mA or 20mA.

This assigned value is used to determine the reference value for the covered sensor on the web guide controller (field of view completely covered by material).

- Calibrate the web guide controller to the upper reference value



- Press key S1 and hold 0.5 s to return to calibration of the lower reference value.  
The web guide controller can be calibrated to the next sensor signal.

or

Press the S1 key and hold it for 3 seconds to return to the regular operation state

## Calibrating sensor DSE-17

After final installation, the sensor must be recalibrated to achieve the best accuracy.

Due to certain circumstances such as changes in environmental conditions (major changes in temperature, etc.) or wear tracks on the safety panes of the sensor, it may become necessary to recalibrate the sensor. Especially when transparent material is being scanned, regular calibration may be required to maintain measurement accuracy.



Note:

If no key is pressed for more than 2 minutes the sensor returns to its regular operation state. No calibration data will be saved.

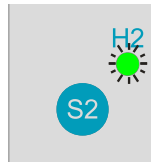
**Precondition:**

- There must not be any material in the sensor field of view.
- The protection panes of the sensor must be clean.

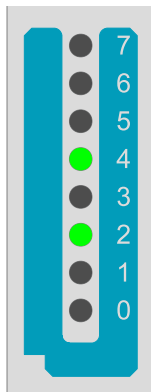
**Calibration**

S2

- Press the S2 key and hold it for 5 seconds



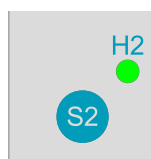
LED H2 flashes (long on – short off)  
The brightness values of the sensor are calibrated.



The bar graph represents the minimum and maximum level of brightness values.

S2

- Press key S2 and hold 0.5s to complete the calibration process:



- If the calibration data is correct it will be saved.  
LED H2 is lit for 3 seconds before the sensor returns to its regular operation state.



- If the calibration data is not correct, LED H2 flashes quickly for 10 seconds.  
The sensor returns to its regular operation state without saving the data from the calibration.

or

Press the S2 key and hold it for 3 seconds to return to the regular operation state  
Calibration data will not be saved.

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## 6 OPERATION

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**WARNING:**

Danger of injury by crushing

⇒ Do not place your hands on or near moving parts (rollers, material web, etc.) during operation.



Danger of injury due to cutting on the edge of the material web

⇒ Do not place your hands on the edge of the (moving) material web during operation.

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**ATTENTION**

The sensor could become unusable during the operation by damages.

⇒ The sensor must not be placed in operation unless it has been securely mounted.

⇒ Depending on the material of the guided web, if the web rubs on the protection pane of the sensor, the protection pane may become damaged. If a sensor's protection pane is scratched and/or unclear, the material web can no longer be reliably guided.

⇒ Depending on the material of the web that is being guided, it is possible that the web edge could grind against the inside of the sensor fork, resulting in notches and incisions on the sensor.

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### Operation

No tasks or settings are required for the sensor during operation.

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## 7 MAINTENANCE

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**WARNING:**

Danger of injury by crushing.

⇒ Maintenance work must only be performed on the sensor when the power is turned off and the machine is stopped and protected against being turned on again.

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### Maintenance

#### Cleaning

Ambient dust and dirt must be cleaned from the protection panes at regular intervals using a neutral synthetic cleaning agent and a soft cloth. Make certain the cleaner is suitable for PMMA plastics.

→ [Protection panes, page 9-1](#)

#### Recalibration of the sensor

If the protection panes begin to show signs of wear, the accuracy of the sensor can be improved by adjusting the brightness values of the sensor to the changed conditions with a new calibration.

→ [Calibrating sensor DSE-17, page 5-2](#)

No other maintenance work is required for the sensor.

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### Decommissioning

1. Turn off the electrical power to the system.
2. Disconnect the signal cable from the sensor.
3. Unscrew the sensor from its bracket.
4. Store the sensor in a cool, clean and dry place.

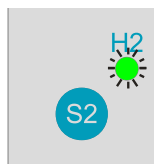
OR

Dispose of the sensor according to your national requirements.

## 8 TROUBLESHOOTING

### Error display

LED H2 of the DSE-17 sensor flashes to indicate errors. The flashing patterns identify the error.



When an error occurs, LED H2 flashes *n* times with a certain pattern for 1 second, followed by a 3-second pause. "*n*" and the information corresponding to it are described in the table below.

" <i>n</i> "	Error	Remedy
2	No calibration data	Calibrate the sensor again.
3	Hardware error (LED array)	The error should not be remedied by the customer. The sensor must be sent back to Fife-Tidland GmbH for repairs.
4	Temperature sensor faulty	
5	Overtemperature error	Software version 1.022 and later: The error is set at 65°C and canceled when the temperature falls back to 55°C.

An error is displayed until it has been remedied.



**Note:**  
Error display is suppressed during calibration.



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## 9 TECHNICAL DATA

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### General information

#### Dimensions

→ [Figure 3.1, page 3-2](#)

#### Weight

DSE-17-160 sensor: 900g

DSE-17-300 sensor: 1500g

DSE-17-420 sensor: 2900g

#### Protection class

IP65

#### Ambient conditions

Ambient temperature: 10°C – 50°C

Relative humidity: up to 90% non-condensing

Operating altitude max. 3000m above sea level

#### Protection panes

PMMA (polymethylmethacrylate)

A data sheet for this material is available on request.

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### Optical properties

#### Light source

Modulated infrared light

Wavelength: 850nm

#### Sensor field of view

DSE-17-160 sensor: 160mm

DSE-17-300 sensor: 300mm

DSE-17-420 sensor: 420mm

#### Number of edges to evaluate

Normal mode: maximum 4 edges (2 webs)

Mode for narrow webs: maximum 2 edges (1 web)

#### Distance between the edges

Normal mode: > 40 mm

Mode for narrow webs: > 15 mm within the central 25 mm  
of the fork opening  
> 12 mm at the center of the fork  
opening

**Recommendations for different modes**

Normal mode:

- "One Web Mode": ON  
The web can have transparent places on the inside
- "One Web Mode": OFF  
4 edges are possible

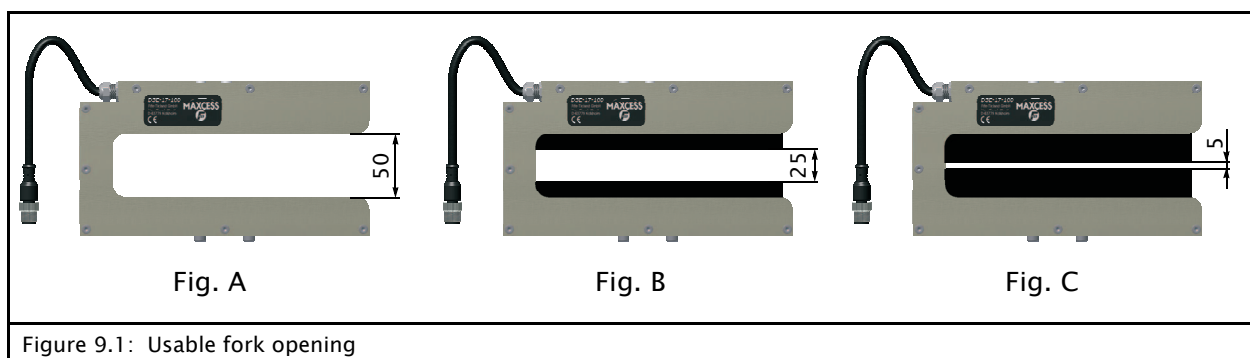
Mode for narrow webs ("Narrow Web"):

- The web width can be smaller than 40mm

Modes	Usable fork opening	ASC function of the web guide controller (limit values 95%)*	Web widths W [mm]		
			DSE-17-160	DSE-17-300	DSE-17-420
Normal mode	$\pm 25$ mm (total fork opening) Fig. A	Turned off	$40 < W < 150$	$40 < W < 290$	$40 < W < 410$
		Activated	$40 < W < 140$	$40 < W < 275$	$40 < W < 390$
Mode for narrow webs	$\pm 12,5$ mm (half of fork opening) Fig. B	Turned off	$15 < W < 150$	$15 < W < 290$	$15 < W < 410$
		Activated	$15 < W < 140$	$15 < W < 275$	$15 < W < 390$
	$\pm 2,5$ mm Fig. C	Turned off	$12 < W < 150$	$12 < W < 290$	$12 < W < 410$
		Activated	$12 < W < 140$	$12 < W < 275$	$12 < W < 390$

\* for One Web Mode of the sensor

When the mode for narrow webs is used, the relevant web must be guided by suitable mechanisms within the central range of the fork opening.



**Absorption thresholds**

Opaque materials: 30% ... 50%

"Cloudy" fleece materials: 20% ... 40%

Transparent films: 15% ... 20%

The absorption thresholds listed here are based on experience.

**Characteristic values**

Characteristic values of measurement deviations for opaque, homogeneous materials

Characteristic values	Sensor variant mm		
	DSE-17-160	DSE-17-300	DSE-17-420
Linearity*	± 0.80%	± 0.43%	± 0.30%
Web plane change:	± 0.31%	± 0.17%	± 0.12%
Temperature change**	± 0.10%	± 0.10%	± 0.10%
Analog signal transfer***	± 0.40%	± 0.40%	± 0.40%

\* The sensor calibration was performed in the installation position.

\*\* from 10°C to 40°C

\*\*\* The calibration of the web guide controller was performed at operation temperature.

**Resolution of the analog signals**

12-bit resolution for 20 mA

11-bit resolution for 10 mA

## Electrical connection

### Power supply

+10V – +28V

### Output signal (depends on configuration)

0 – 10mA to  $\leq 400\Omega$

0 – 20mA to  $\leq 200\Omega$

4 – 20mA to  $\leq 200\Omega$

### Power consumption

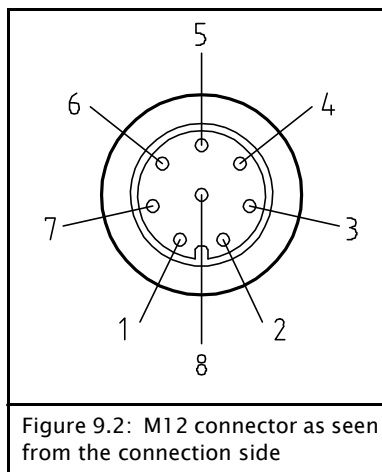
Operating voltage	Configuration	Maximum power consumption
12V	4 x 20mA	150mA
	4 x 10mA	130mA
24V	4 x 20mA	75mA
	4 x 10mA	65mA

### Extension cable

Up to 15m (standard)

Up to 40m (optional)

## X1 plug connector



Normally the sensor must be connected to the web guide controller with a cable on the corresponding sensor input. In some cases the sensor can be connected via a Y-cable or an external distributor box to two sensor inputs on the web guide controller.

Pin on connection cable	Function
1	VCC (+12V)
2	Signal 2
3	GND
4	Signal 1
5	RS485-B
6	RS485-A
7	Signal 3
8	Signal 4

Use of individual analog signals is configuration-dependent. For information regarding the specific configuration of this sensor, refer to the drawing under the configuration number in the system documentation.

**Note:**

The configuration of the sensor cannot be changed by the user.

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**Air supply (optional)**
**DSE-17-160**

Operating pressure*	Air consumption*
3 bar	7.42 m <sup>3</sup> /h
Up to 6 bar pulsing	3.7 l/s

**DSE-17-300**

Operating pressure*	Air consumption*
1 bar	3,76 m <sup>3</sup> /h
2 bar	7,78 m <sup>3</sup> /h

**DSE-17-420**

Operating pressure*	Air consumption*
1 bar	5,26 m <sup>3</sup> /h
2 bar	10,89 m <sup>3</sup> /h

\* These figures are approximate values. They can be adjusted to the relevant application if necessary.

**Filtration rating**

5 µm or better

**Residual oil content**

0.01 mg / m<sup>3</sup> or better

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**Standards**

The DSE-17 sensor has been designed and constructed according to the standards and regulations of the European Union. A declaration of conformity is available on file.

# 10 SERVICE

## Requests for Service

When requesting service, please have a copy of the order confirmation ready with the order number.

When requesting replacement parts, please indicate also the part numbers, drawing numbers, model descriptions and configuration number.

→ item 5 in *Figure 1.1, page 1–3*

Please be careful to keep all documents accompanying the product in a safe place. This will allow us to help you more quickly in the event that service is required.

## Addresses

To request service, or if you need replacement parts, please contact one of the following addresses.

### Fife-Tidland GmbH

Max-Planck-Straße 8                      Siemensstraße 13–15  
65779 Kelkheim                      48683 Ahaus  
Deutschland                      Deutschland  
Telefon: +49 – 6195 – 7002 – 0  
E-Mail: [service@maxcess.eu](mailto:service@maxcess.eu)  
Web: [www.maxcess.eu](http://www.maxcess.eu)

### Fife Corporation

Post Office Box 26508  
Oklahoma City, OK 73126, USA  
Telefon: +1 – 405 – 755 – 1600  
E-Mail: [service@maxcessintl.com](mailto:service@maxcessintl.com)  
Web: [www.maxcessintl.com](http://www.maxcessintl.com)



#### EUROPE, MIDDLE EAST AND AFRICA

Tel +49.6195.7002.0  
[sales@maxcess.eu](mailto:sales@maxcess.eu)  
[www.maxcess.eu](http://www.maxcess.eu)

#### NORTH, CENTRAL AND SOUTH AMERICA

Tel +1.405.755.1600  
[sales@maxcessintl.com](mailto:sales@maxcessintl.com)  
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