MAXCESS

FIFE SE–46C with OI–TS
Operating Instructions

OI-TS

MAXCESS

EXTENDED OPERATION

MENUS

MAINTENANCE

1 INSTRUCTION

About these operating instructions

These operating instructions describe the installation, commissioning, operation and maintenance of the SE-46C digital line sensor with an operator interface OI-TS and provide important instructions for proper use.

These operating instructions are intended for both the system construction master as well as the operator who uses the SE-46C digital line sensor in production. The Operating Instructions must be read and applied by everyone who is responsible for installation, commissioning, operating or maintaining the SE-46C digital line sensor.

The Operating Instructions must be carefully kept and must always be available throughout the service life of the SE-46C digital line sensor.

Translation of the original Operating Manual:
This Operating Manual is a translation. The original Operating Manual was composed in German.

Proper use

The SE-46C sensor is a line sensor for web guiding systems with an optical viewing range of 30mm. The SE-46C recognises a calibrated reference on the material web and generates guide signals from it that are used together with a web guide controller from Fife-Tidland GmbH for precise guiding of the material web.

The SE-46C sensor must only be used in accordance with its intended purpose and must be in flawless technical condition. Unauthorised conversions or changes to the SE-46C sensor are not permitted.

Any other use of the SE-46C sensor requires the prior approval of Fife-Tidland GmbH.

Note:
The SE-46C sensor must not be opened.
➔ If the SE-46C sensor is opened, no claims will be honoured under the warranty.

Einführung.fm

Improper use

– Operation outside of the technical specifications is not permitted.
– Operation in areas where there is a danger of explosions is prohibited.
– Any use other than the designated use is not permitted.

Operating principle

Active illumination (5) makes the material web brighter, which makes Information such as contrast transitions, lines or structures more visible. The SE–46C sensor samples this information with an imager (6) and compares it with an image line of the template saved during the calibration (reference). The sensor derives the position difference (offset) from this information if the similarity is sufficient.

1 Threading for sensor bracket
2 Software numbers
3 Connections
4 Nameplate
5 Illumination
6 Imager

Figure 1.1: Layout of the SE–46C sensor

1 Sensor field of view
2 Marking of viewing direction
3 Viewing area (ca. 30 x 1 mm)
4 Material web

5 Recommended distance from the material web to
  the sensor
6 The lower edge of the SE–46C must be aligned
  parallel to the material web.

Figure 1.2: SE–46C sensor and Material web

Illumination

The SE–46C sensor provides high–intensity colour lighting (RGB) for on–light applications that can be used to make even very faint orientation features visible.

Operation

Figure 1.3: OI–TS Operating Interface

The SE–46C sensor is adjusted and calibrated with an OI–TS operator interface. The OI–TS operator interface is available for panel installation or wall mounting. A PC–based virtual OI–TS operator unit is also available.

2 SAFETY INSTRUCTIONS

Important information

To ensure safe and problem-free operation of the SE-46C 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 SE-46C sensor.

Only persons who are acquainted with the installation, commissioning, operation and maintenance of the sensor and who possess the necessary qualifications for their activities may work on the SE-46C sensor.

Please note the following:

- The content of these operating instructions

- The safety instructions printed on the unit

- The requirements of the machine manufacturer

- National, state and local requirements for accident prevention and environmental protection

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.

SIGNAL WORD
Source of danger and its results.

⇨ Avoiding dangers

The signal word **WARNING** refers to the danger of moderate to sever bodily injuries.

The signal word **CAUTION** refers to the danger of slight to moderate bodily injuries or material damage.

Symbols

Warning/caution – dangerous area

Reference to general hazards that may result in bodily injuries or damage to the device

Warning/caution – danger due to crushing

Refers to danger of injury caused by crushing

Warning/caution – danger due to cutting

Refers to danger of injury caused by cutting

Warning/caution – danger due to temporary blinding

Refers to dangers that may be caused by being briefly blinded.

Additional symbols

– This endash is followed by an enumeration.

• This dot is followed by a prompt to do something.

Note:
Reference to important information.

Preventing hazards

Observance of the following points is mandatory to ensure reliable work with the SE–46C sensor.

Installation and commissioning

• If a sensor is damaged, it must not be installed or placed in operation.

• All assembly tasks on the sensor must only 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 secured from being turned on again.

• The sensor must only be placed in operation if it has been securely mounted.

• Electrical connections on the sensor should always be made or disconnected while there is no electrical power in the system. Failure to observe this instruction may result in damage to the sensor.

Sicherheit.fm

- The parameters specified in Section *Technical Data* must be observed.

- Only accessories and replacement parts that have been approved by Fife Tidland may be used.

- No changes may be made to the sensor.

- Electrical lines must not be subjected to any mechanical loads.

- Avoid direct visual contact with the sensor lighting. The radiated power is very high and may result in temporary blindness or damage to eyes.

  Temporary blindness or dazzling may diminish visual capacity and cause afterimages. This in turn may result in accidents in the workplace.

  Care must therefore be taken not to place the sensor in operation until it is mechanically fastened to its intended support rod and the material web has been moved in front of the sensor's field of vision.

Operation

- Danger of injury by crushing
  ⇨ Do not grasp moving parts (rollers, material web, etc.) or anything close to them during operation

- Danger of injury due to cutting on the edge of the material web
  ⇨ Do not touch the edges of the (moving) material web during operation.

- Avoid direct visual contact with the sensor lighting during operation (for example during a web change).

- Sensors damaged during operation must be decommissioned.

Maintenance

- 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.

3 INSTALLATION

Transport and storage

– The sensor must be protected against slipping during transport.

– The sensor and the operator interface must be stored in a cool, clean, and dry place.

– The sensor and the operator interface must not be stored close to strong magnetic fields. The electronic components of the sensor could be damaged.

Scope of delivery

– Sensor SE–46C
The model designation, serial number, and the firmware and software numbers are on the nameplates on the housing. (see *figure 1.1, page 1-2*).
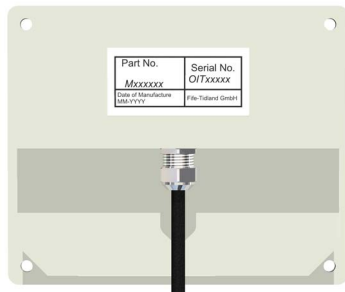
– Operator interface OI–TS
The model designation and the serial number are on the rating plates on the housing. The firmware and software numbers are affixed to the side of the housing.

– Operating Instructions

Mounting

WARNING

⇨ 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 secured from being turned on again.

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Dimensions

A Mounting holes
B Material web
C Recommended distance from the material web to the sensor

D Viewing area (approx 30 x 1 mm)
E Sensor field of view
F The lower edge of the SE–46C must be aligned parallel to the material web.
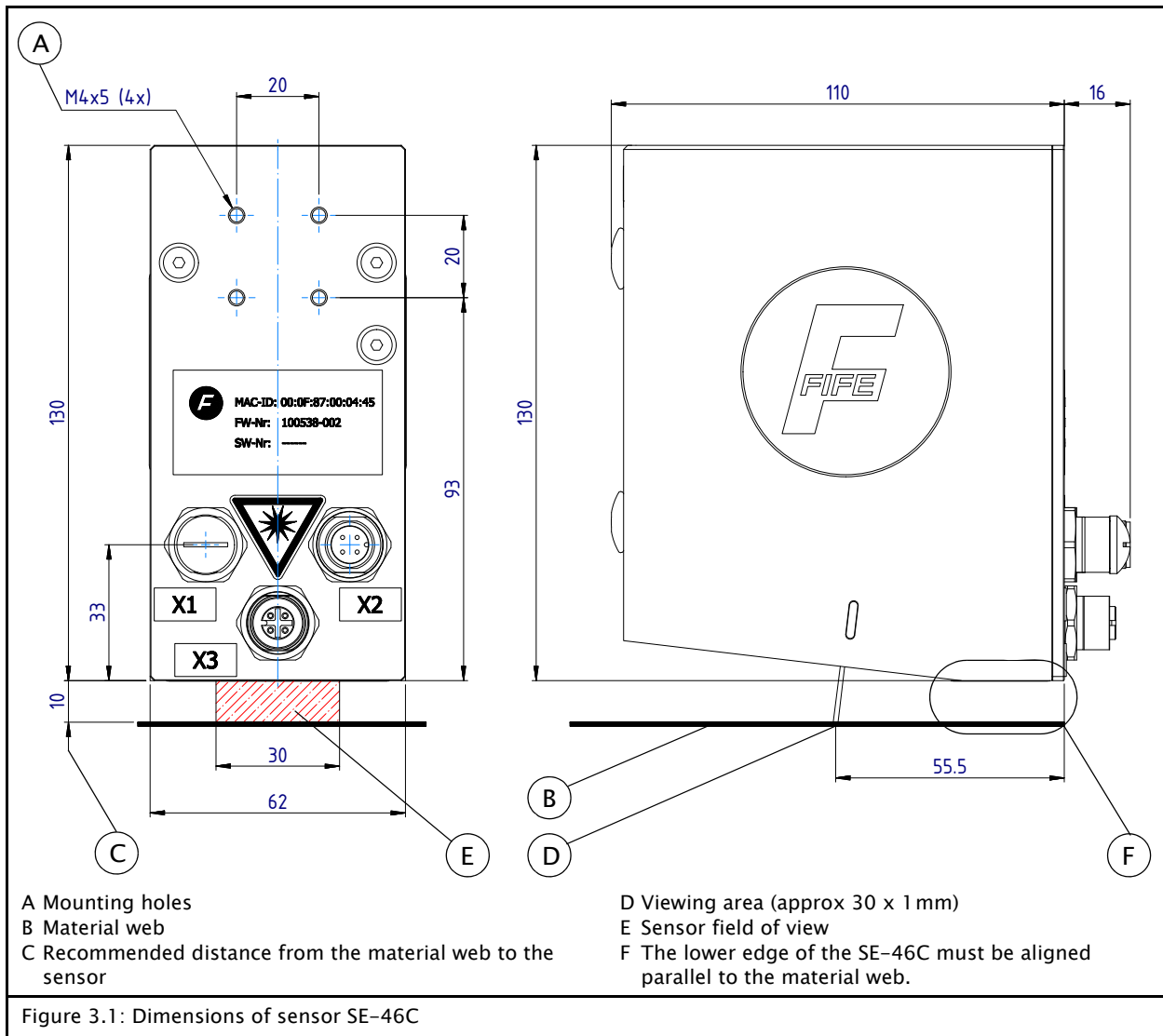
Figure 3.1: Dimensions of sensor SE–46C

Installation location of sensor SE–46C

– Protection class: IP54

– Operating temperature: 5°C ... 60°C
60° up to 1000 m above sea level
50° up to 3000 m above sea level

– Relative humidity: up to 90% non condensing

– Operating altitude above sea level: maximum 3000 m

– Protected from vibrations

– Do not place close to strong magnetic fields:
The electronic components may be damaged.

– Not in places where there is a risk of explosions.

– Unless another arrangement is recommended, mount the SE–46C sensor directly behind the offset pivot guide. The greater the distance from the sensor to the offset pivot guide, the lower the guiding accuracy.

Figure 3.2: Assembly location of SE-46C

– The material edge must be guided through a support roller in the sensor field of view so that there is no plane change (see *figure 3.2*).
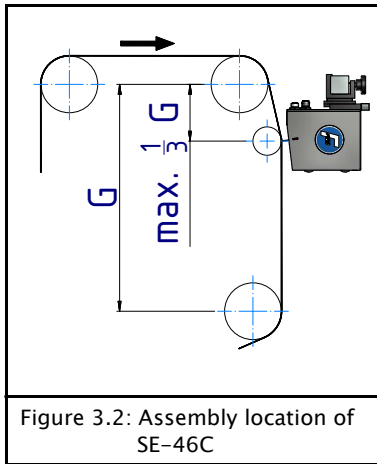
– The material web must run parallel to the lower edge of the sensor (see *figure 3.1*)

– On-light applications:
Ideally the viewing area on the material web should be on or just behind the support roller.

Sensor bracket
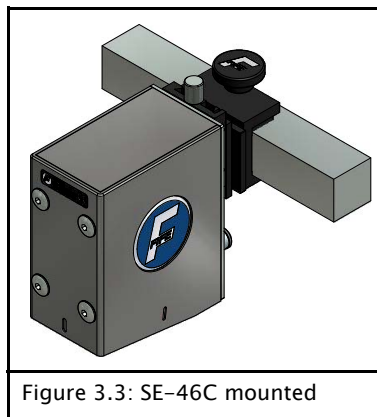
Figure 3.3: SE-46C mounted

To assist in mounting the SE-46C sensor, holes have been drilled in the housing (see A in *figure 3.1*). Together with various sensor bracket, this provides a wide range of installation options.
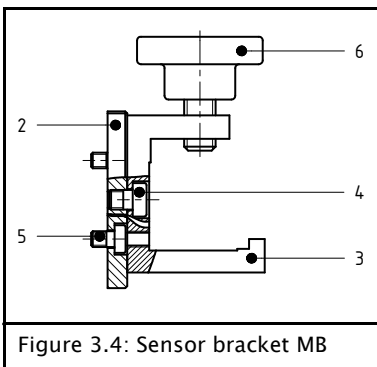
Figure 3.4: Sensor bracket MB

Sensor bracket MB – Sensor bracket without distance adjustment

• Screw the adapter plate (2) onto the sensor with the M4x6 screws (5)

⚠ **CAUTION**
If longer screws are used, there is a danger of destroying the electronics located in the sensor's housing.

⇨ Because of this, make certain when fastening the sensor bracket onto the SE-46C sensor that only the original M4x6 screws or identical ones are used.

• Screw the sensor bracket (3) onto the adapter plate with the M5x6 (4) screws

• Screw in the star knob (6)

• Push the assembled unit onto the rectangular bar

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Figure 3.5: Sensor bracket M

Sensor bracket M – Sensor bracket with distance adjustment

- Screw the distance adjustment (1) onto the SE–46C sensor with the M4x6 screws

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CAUTION
If longer screws are used, there is a danger of destroying the electronics located in the sensor's housing.

⇨ Because of this, make certain when fastening the sensor bracket onto the SE–46C sensor that only the original M4x6 screws or identical ones are used.

- Screw the adapter plate (2) onto the distance adjustment (1) with the M4x6 screws (5)

- Screw the sensor bracket (3) onto the adapter plate with the M5x6 (4) screws

- Screw in the star knob (6)

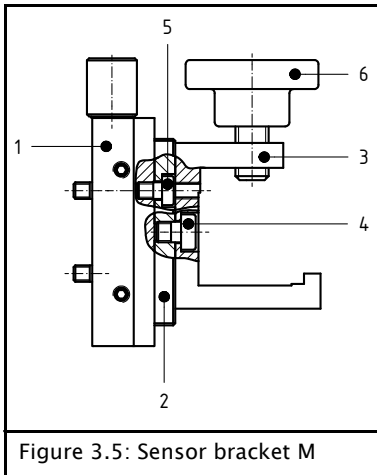- Push the assembled unit onto the rectangular bar

Note:
Sensor bracket M can also be assembled directly onto the sensor with the adapter plate and without the distance adjustment (see *Sensor bracket MB – Sensor bracket without distance adjustment, page 3–3*).

Scanning edges of non-transparent materials

1 option: sensor bracket M

Figure 3.6:
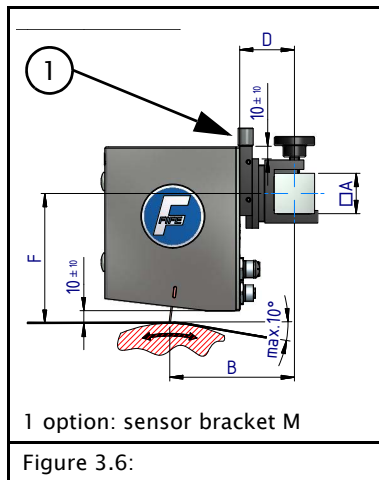
Scanning color lines printed on non-transparent materials

The SE–46C sensor works best when the distance to the material web is a constant 10 mm and the surface of the material has no ripples or other discontinuous unevenness. These conditions are most fully ensured close to or on a support roller.

Note:
Dirty rollers can lead to malfunctions with printed, transparent films if they are visible through places on the film that are not printed.

Sensor bracket		MB	M	MB	M
Distance adjustment		no	yes	no	yes
Dimensions [mm]	A	25	25	32	32
	B	79	94	84	99
	D	23,5	38,5	28,5	43,5
	F	113	103	113	103

Scanning edges of transparent films

Example of mounting arrangements

1. Scanning the edge of a transparent film against a matte black support roller

The surface of the support roller must be considerably less glossy than the light reflection on the surface of the material. This arrangement cannot be selected if this condition is not met.

– The smaller the diameter of the support roller, the lower the permissible angular deviation of the sensor. The angle setting for smaller rollers is therefore critical.

– Additional aids for fine adjustment of the sensor angle are available on request for difficult adjusting conditions with small roller diameters.

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1 option: sensor bracket M

Figure 3.7:
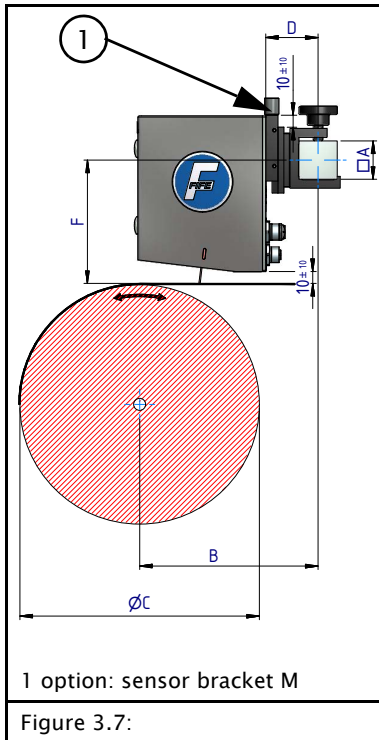
Mounting arrangement: The film should preferably be scanned in an area with a support roller in such a way that it has no contact with the support roller yet and the surface of the roller forms an angle to the material web.

Advantage: Stable, even position of the film edge.

Disadvantage: Visible signs of wear on the roller surface hinder the detectability of the web edge.

Note: If the SE–46C sensor scans the film in the area of contact with the roller and the surface of the film is curved as a result, the sensitivity of the sensor to angular changes increases.
→   The smaller the diameter of the roller, the lower the permissible angular deviation of the sensor.

Sensor bracket		MB	M	MB	M
Distance adjustment		no	yes	no	yes
Dimensions [mm]	A	25	25	32	32
	B	B_1	B_2	B_3	B_4
	D	23,5	38,5	28,5	43,5
	F	113	103	113	103

C [mm]	B_1			B_2			B_3			B_4		
	B_{min}	B_{typ}	B_{max}	B_{min}	B_{typ}	B_{max}	B_{min}	B_{typ}	B_{max}	B_{min}	B_{typ}	B_{max}
50	89,5	91,5	97,8	104,5	106,5	112,8	94,5	96,5	102,8	109,5	111,5	117,8
75	94,7	97,8	107,1	109,7	112,8	122,1	99,7	102,8	112,2	114,7	117,8	127,2
100	99,9	104,0	116,5	114,9	119,0	131,5	104,9	109,0	121,5	119,9	124,0	136,5
150	110,4	116,5	135,3	125,4	131,5	150,3	115,4	121,5	140,3	130,4	136,5	155,3
200	120,8	129,0	154,0	135,8	144,0	169,0	125,8	134,0	159,0	140,8	149,0	174,0
250	131,3	141,5	172,8	146,3	156,5	187,8	136,3	146,5	177,8	151,3	161,5	192,8

2. Scanning the edge of a transparent film against a matte black contrast plate

Better contrast conditions are often achieved if the sensor detects a fixed mating plate through the transparent material web. This contrast plate should be located close to a support roller. The contrast plate must have a matte black surface.

1 option: sensor bracket M

Figure 3.8:
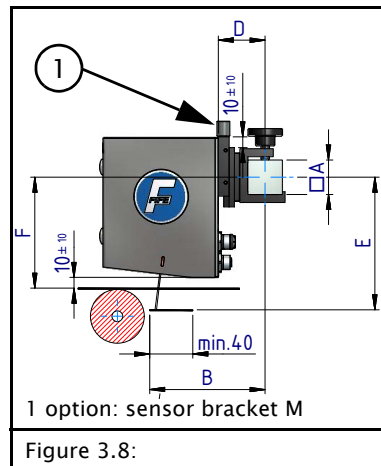
Mounting arrangement: The film should preferably be scanned in an area with a supporting roller in such a manner that the SE–46C is not affected by the surface of the roller.

Advantage: The roller surface has no effect on the detectability of the film edge.

Disadvantage: Low film tension can hinder the detectability of the film edge due to reduced positional stability of the edge.

Sensor bracket		MB	M	MB	M
	Distance adjustment	no	yes	no	yes
Dimensions [mm]	A	25	25	32	32
	B	B_1	B_2	B_3	B_4
	D	23,5	38,5	28,5	43,5
	F	113	103	113	103

E [mm]	B_1	B_3	E [mm]	B_2	B_4
123	86	91	113	101	106
133	87	92	123	102	107
143	89	94	133	104	109
153	90	95	143	105	110
163	91	96	153	106	111
173	92	97	163	107	112
183	94	99	173	109	114
193	95	100	183	110	115
203	96	101	193	111	116

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3. Scanning the edge of a transparent film at the apex of a matte black deflection roller.

This arrangement is not optimal. It places higher requirements on the quality of the roller surface and sensor mounting. The curved surface of the film increases the sensitivity of the sensor to angular changes.

→ **The smaller the diameter of the roller, the lower the permissible angular deviation of the sensor.**

Disadvantage: Visible signs of wear on the roller surface hinder the detectability of the web edge.


1 option: sensor bracket M

Figure 3.9:

Sensor bracket		MB	M	MB	M
Distance adjustment		no	yes	no	yes
Dimensions [mm]	A	25	25	32	32
	B	B_1	B_2	B_3	B_4
	D	23,5	38,5	28,5	43,5
	F	113	103	113	103

C [mm]	B_1			B_2			B_3			B_4		
	B_{min}	B_{typ}	B_{max}	B_{min}	B_{typ}	B_{max}	B_{min}	B_{typ}	B_{max}	B_{min}	B_{typ}	B_{max}
50	78	79	82	93	94	97	83	84	87	98	99	102
75	77	79	83	92	94	98	82	84	88	97	99	103
100	76	79	85	91	94	100	81	84	90	96	99	105
150	75	79	87	90	94	102	80	84	92	95	99	107
200	73	79	90	88	94	105	78	84	95	93	99	110
250	72	79	93	87	94	108	77	84	98	92	99	113

4. Scanning the edge of a transparent film against a glossy chrome support roller

This arrangement is difficult. Detection of the film edge will only be successful if a dark background or a dark object is reflected in the roller from the line of sight of the SE-46C. This environment of the roller must never be illuminated by light sources.

Angle setting

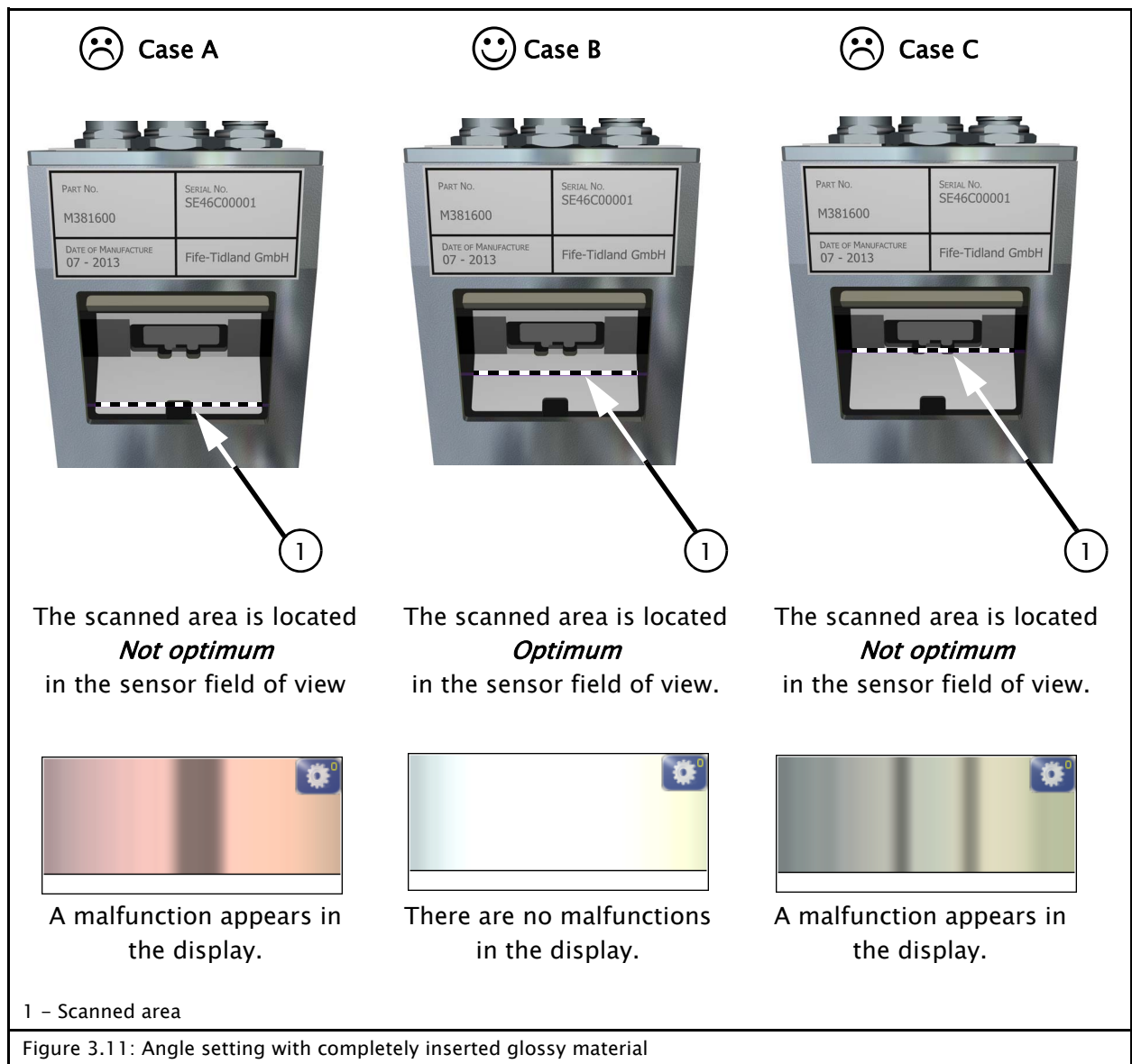1 Optional:
2 Alignment parallel

Figure 3.10:
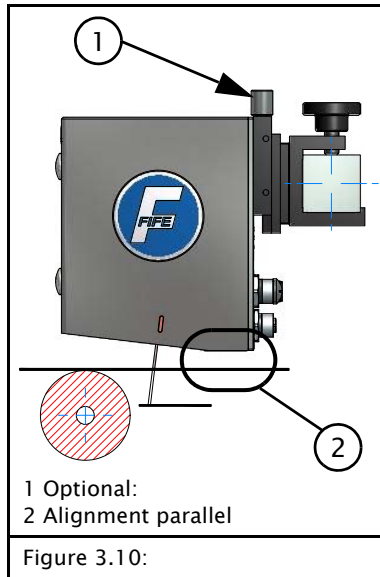
For some critical materials such as glossy or transparent materials it may be necessary to check the angle settings. Incorrect information could be detected by reflections on the material web.

Precondition

- The SE–46C sensor is permanently mounted on the square bar.

- The lower edge of the SE–46C is aligned parallel to the material web.

- Check whether the scanned area is correctly centered in the sensor field of view.
  → Case B in *figure 3.11*
  It may be necessary to turn the square bar slightly with an appropriate tool.

☹ Case A	☺ Case B	☹ Case C
The scanned area is located *Not optimum* in the sensor field of view	The scanned area is located *Optimum* in the sensor field of view.	The scanned area is located *Not optimum* in the sensor field of view.
A malfunction appears in the display.	There are no malfunctions in the display.	A malfunction appears in the display.

1 – Scanned area

Figure 3.11: Angle setting with completely inserted glossy material

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Electrical connection

CAUTION:
Electrical connections on the sensor should always be made or disconnected while there is no electrical power in the system.

⇨ Failure to observe this instruction may result in damage to the sensor.

The sensor must be connected to the web guide controller as shown in the system diagram that appears in the system documentation.

Connections on sensor SE-46C

Figure 3.12: Connections

Connection	Designation
X1	Ethernet (M12, D-coded)
X2	Power supply and control signals
X3	Connection for OI-TS operator interface

For technical details and additional information, please consult Section *12 Technical Data*.

Power supply of operator interface OI-TS

The power supply for the OI-TS operator interface is via the signal cable, which is connected to the web guide controller. For further information refer to the system diagram in the system documentation.

4 COMMISSIONING OF THE SE-46C SENSOR

Before commissioning

The sensor can be placed in operation when

– all assembly and connection tasks have been checked and
– the SE-46C is in proper working condition.
– It is also important to become familiar with the basic operation of the OI-TS operator interface.
  ➔ see section *OI-TS Operator interface*

Commissioning of the SE-46C sensor

Once all assembly and connection tasks have been checked and are in proper condition, the SE-46C sensor can be placed in operation.

WARNING:
Before commissioning, ensure that:

⇨ Commissioning of the SE-46C sensor is performed while the web is stopped.

⇨ No one is in the danger zone of the moving parts.

WARNING:
There is a risk of crushing and cutting injuries on the web material itself and/or due to the motion of the web.

⇨ Do not grasp moving parts (rollers, web, etc.) or anything close to them during commissioning.

⇨ Do not touch the edges of the material web.

WARNING:
If there is direct visual contact with the sensor lighting, there is danger of temporary blinding and accidents occurring as a result (see also page *2-3*).

⇨ Avoid direct visual contact with the sensor illumination.

1. **Turn on the electrical power**
   Turn on the electrical power to the sensor, either through the connected web guide controller or through a separate power supply.

   The most recently active settings are loaded.

2. **Select the language**
   It may be necessary to change the language for menu guidance on the operator interface.
   ➔ see menu *A Language, page 5–3*

3. **Select sensor**
   ➔ see menu *B Select Device, page 5–3*

4. **Check mounting position**
   The sensor should be mounted at a distance of 10mm from the surface of the material web.
   ➔ see *figure 3.1, page 3–2*

5. **Set up reference**
   The sensor is now ready for operation and can be set up to the desired reference (contrast transitions, lines or patterns.
   ➔ see menu *Setting up references, page 6–5*

   i Note:
   Despite the SE–46C's high immunity to extraneous light, drastic changes in ambient lighting conditions should be avoided during operation. This could result in the reference no longer being clearly detected or being lost entirely.

6. **Calibrate web guide controller**
   If the sensor is used with a web guide controller, the web guide controller must be set up.
   ➔ see Commissioning Manual „FIFE SE–46C and Web Guide Controllers"

   i Note
   When a complete system is delivered the web guide controller has already been mostly calibrated in the factory. However, this does not apply to replacement parts or replacement part deliveries.

5 OI–TS OPERATOR INTERFACE

OI–TS description

The OI–TS operator interface has a touch screen.

⚠️ **CAUTION**
Danger of damaging the touch screen with pointed and/or hard objects (such as pens or screwdrivers).

⇨ The touch screen must only be operated with a finger or suitable touch screen stylus.

⚠️ **CAUTION**
Danger of the touch screen being operated accidentally by falling objects.

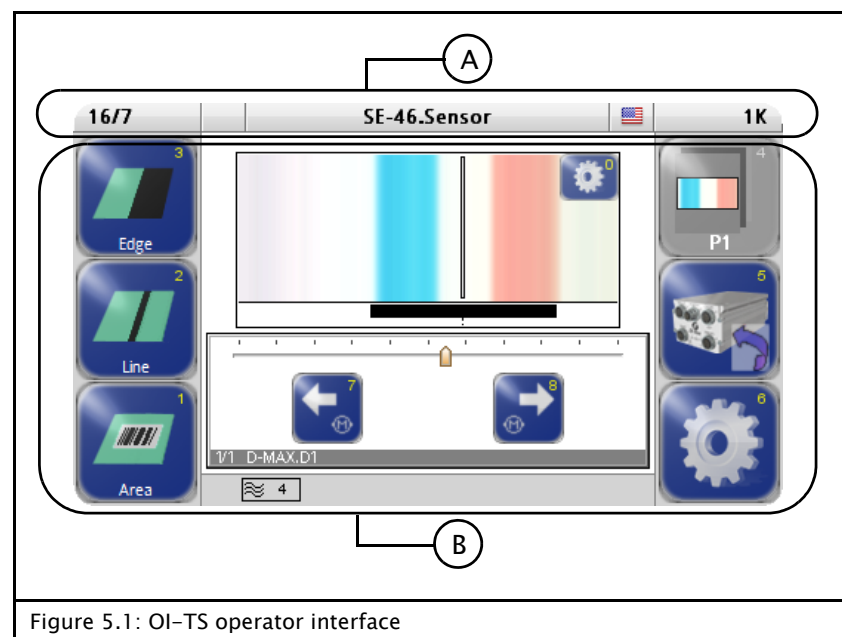⇨ The operator interface must be protected against falling objects.

Figure 5.1: OI–TS operator interface

A Header
– see *Header, page 5–2*

B Control area
– Contains all the buttons and displays needed to operate the SE–46C sensor
– Changes depending on the menu selected (user level, menus)

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Buttons and Displays

	The settings will be applied
	The settings will be discarded
	Return to the previous menu level

Buttons represented in colors can be operated in the current operation state.
Buttons represented completely in gray cannot be operated in the current operation state.

A keyboard appears for entering characters.

Header

The header contains information about the currently selected device. It is always available in this form.
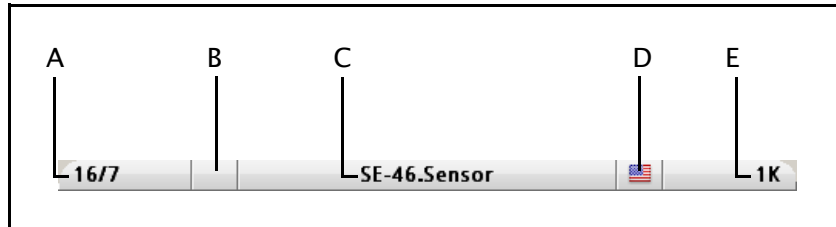
A   Shows the currently selected device, for example an SE–46C sensor
→ If the SE–46C sensor is not selected yet:
B Select Device, page 5–3

B   no connection

C   Shows the name of the currently selected device e.g. SE–46C sensor
→ can be edited, *Device Names, page 8–4*

D   Language selection
→ see menu *A Language, page 5–3*

E   Menu identification
Each menu has its own identification. This makes it possible to retrace every step in the control tree of the SE–46C sensor precisely.

Setting up the operator interface

- Touch the header
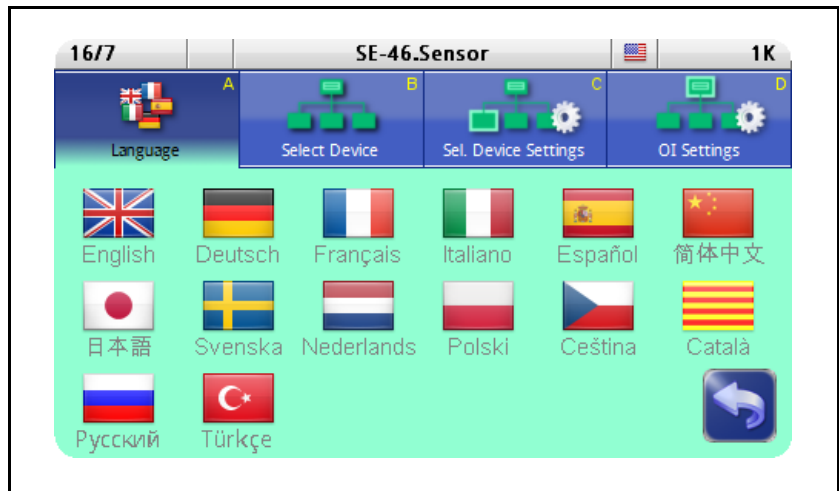
A Language

Select the language for menu labels

B Select Device

In the list of devices select the one you want to operate with the OI-TS

C Select Device Settings

Set up the parameters of the selected device for the display

Flip horizontally

The graphic in the display can be adapted to the installation position of the sensor or operator interface.
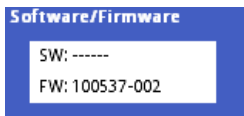

standard – Display not mirrored
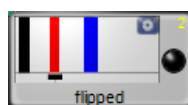
flipped – Parts of the display are mirrored, for example the bar graph or the Right and Left buttons

D OI Settings

Set up the parameters of the OI-TS

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Labels   This screen contains the details on the nameplate which is affixed to the OI–TS operator interface.

– Software number
  Firmware number

– Serial number

Settings

– Switch between the American and British flag for display in the header for "English"

– Calibration of the touch screen
  Calibration is required if the activity of the buttons is not synchronous with the location that is displayed. The user is prompted to touch the screen at two points. Use of a suitable touch screen stylus is recommended to improve the accuracy of the calibration.

Debugging

Other than the *Touch Test*, this collection of functions is intended for Service and is not relevant for the operator.

Touch Test

This test can be performed if no actions or incorrect actions are performed on the OI–TS operator interface.
→ see *OI–TS Operating Interface, page 11–1*
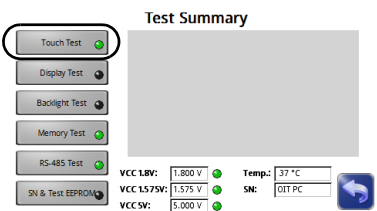
6 OPERATING THE SE-46C SENSOR

Safety instructions

While the sensor is in operation, the following safety instructions must be observed.

WARNING:

When the web guide controller to which the sensor is wired is in operation, there is danger of cutting on the material web and danger of crushing on the actuator.

⇨ Therefore, do not reach onto or close to the material web or moving parts of the connected actuator.

WARNING:

If there is direct visual contact with the sensor lighting, there is danger of temporary blinding and accidents occurring as a result (see also page *2–3*).

⇨ Avoid direct visual contact with the sensor illumination.

Select sensor SE–46C

The OI-TS can be used to operate various devices present in the network (D-MAX controllers and their actuators, any system menus or gateways that are present).

- Touch the header and select menu *B Select Device*
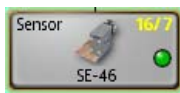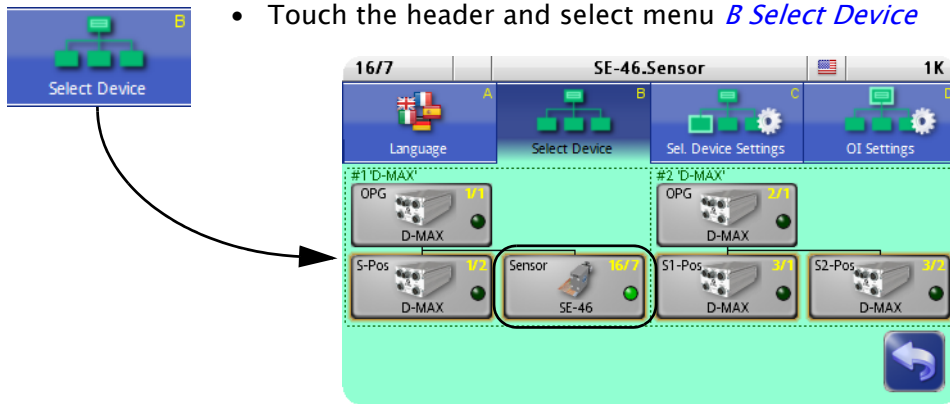
- Select the device you want to operate with the OI-TS (the SE-46C sensor in the example)

User level

All the functions required for normal operation of the SE-46C sensor are available on the user level.
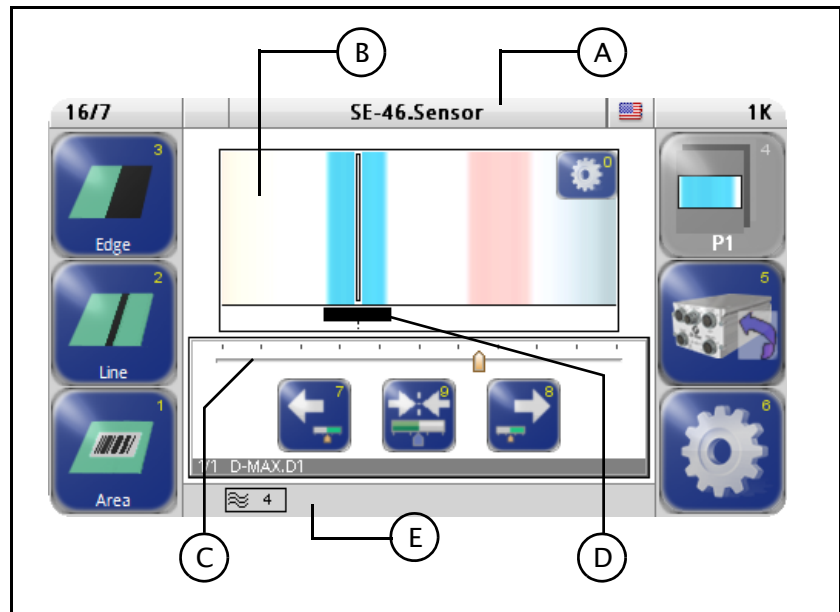
Legend

A   Header: Select devices / actuators / sensors

B   Display of the sensor field of view (about 30 mm)

C   Display of the guide point offset of the active sensor

D   Reference mark:
    Display of the area in which the reference is detected

E   Status line
    Symbols see *Appendix B – Symbols, page 14–1*

Buttons

0   Switch display options

1   Select reference type "Area"

2   Select reference type "Line"

3   Select reference type "Edge"

4   Select saved profiles (optional)
    → see section *Extended operation, page 7–1*

5   Switch to control of a D-MAX web guide controller
    Note:
    This button is only available if the SE-46C sensor is
    connected with a D-MAX web guide controller via an Ethernet
    cable.

6   Press and release: Open the *Profile Settings* menu for the
                        current profile
    Press and hold: Open the *Setup* menu

7 and 8: Move the guide point in the sensor field of view
          For a D-MAX web guide controller in "Manual" and
          "Servo-center" operation modes: move actuator

9   reset the guide point to 0
    For a D-MAX web guide controller in "Automatic" operation
    mode: reset the guide point

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Switching display options

The information recorded by the SE-46C sensor can be displayed in 4 different options.
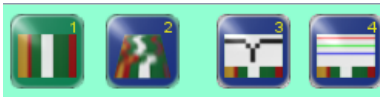
Note:
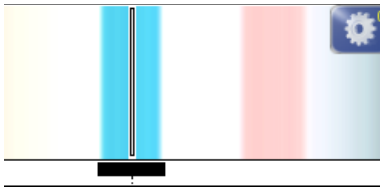These displays can be shown as mirror images if that option was selected in the device settings of the OI-TS.
➔ See *Flip horizontally, page 5-3*
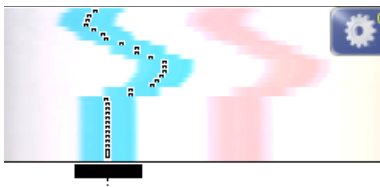
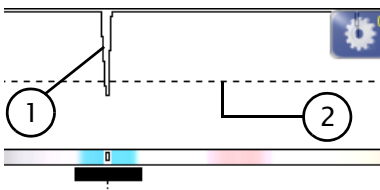• Touch the 0 button and select the desired display option

1 Surface view

This display option shows the scanned area of the material web as a line image.

2 Surface view with history

This display option shows a short history of the scanned area of the material web. The current scan is represented at the bottom of the display.

3 Detection signal

This display option shows a diagram of the similarity of the current scan compared to a saved setting (2 ➔ see *5 Detection Threshold, page 7-2*). The similarity is shown as a signal peak in the detection signal (1).

4 Color signal
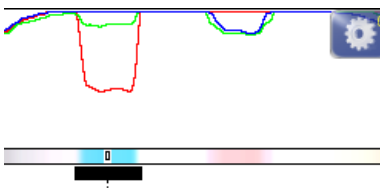
This display option shows 3 RGB color signals.

Setting up references

Selecting suitable references

Because the SE−46C scans the material in lines, the sensor records the entire print image during the calibration of a small segment. The user must select a suitable reference (a line, transition in contrast or a line pattern) that can be found unambiguously within the sensor field of view (see also *figure 1.2, page 1−3*).

Precondition:

– Position the SE−46C so that the desired reference is approximately centered in the sensor field of view.

– The reference must be set up while the material web is stopped.

Selecting a reference type

Depending on which reference is selected on the material web, one of the 3 available modes is selected for calibrating the sensor. The modes are optimized for the applications listed here.

i Note:
As long as you are in one of the three following menus, guiding is blocked. The material web is not guided.

Edge

With reference type *Edge* the SE−46C searches selectively for a contrast or color transition.
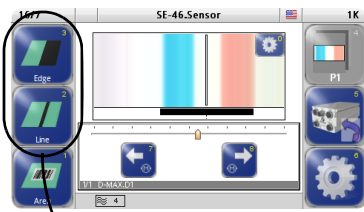

Line

The *Line* reference type of the SE−46C is especially well suited for lines that are defined as a constant brightness or color with two sharp adjacent contrast transitions.
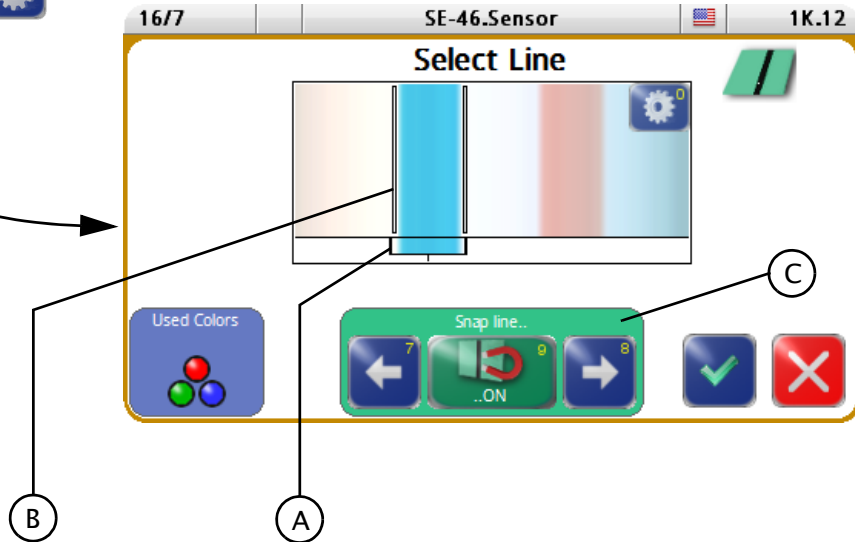

Area

The *Area* reference type uses an arrangement of lines as a uniquely coded position mark on the material web (barcodes or a simple pattern of a few lines, etc.).

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Set up an edge / line as a reference

- Press the 1 button or the 2 button to open the menu for calibrating the sensor to the selected reference (edge / line)
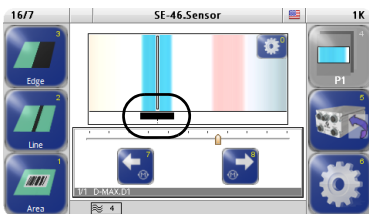

The reference found by the sensor

– marked with a reference mark (A) and
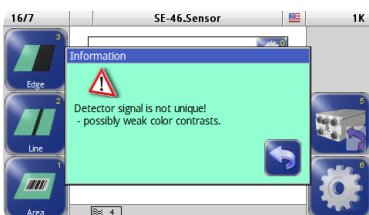– by the flashing cursor (B) in the display.

Another reference can be selected with the keypad (C). The 9 button is always set to ON when the menu is called.

- Accept the reference
  The sensor is programmed to the reference that was set up.

The display switches back to the operator level. The reference mark identifies the area used by the sensor for guiding.

If information appears in the operator interface display, the selected reference is not suitable for guiding. However, the sensor will attempt to work with that reference. Finding a better reference and repeating the process is recommended.

9 button: ON

Automatic cursor positioning is set to edge / line. Both cursors flash and their position can be changed:

- Jump to the next edge / line with the arrow buttons or
- touch directly in the graphic

Note:
Automatic cursor positioning places very narrow limits around the selected edge so that nearby imprints do not lead to faults. This is disadvantageous with weak contrast and can be corrected with manual cursor positioning.

9 button: OFF

Manual cursor positioning is set to edge / line.

- Wait until a cursor is flashing.

Now the cursor can be manually

- moved to the desired position with the arrow buttons or
- set at the desired position in the display by touching it.
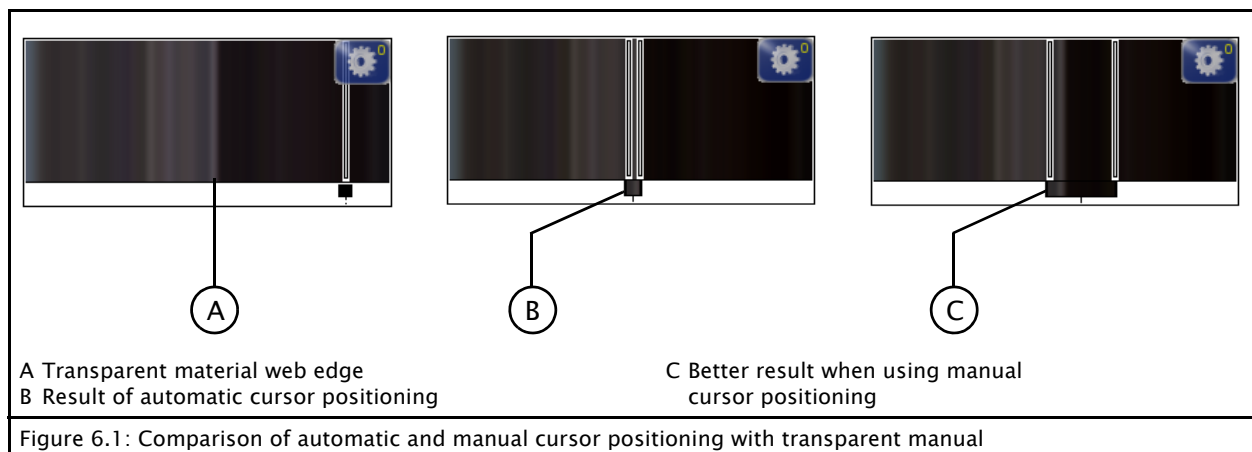
Change cursor

- Touch the display in the area between the desired cursor and the outer edge of the screen

Recommendation for setting up the reference for transparent materials on black rollers / contrast plates:
A manual extension of the reference into the uniform dark area on the black roller / contrast plate next to the web edge results in a considerably better interference distance and a significantly higher detection limit value.
→ See example C in *figure 6.1*

A Transparent material web edge   C Better result when using manual
B Result of automatic cursor positioning   cursor positioning

Figure 6.1: Comparison of automatic and manual cursor positioning with transparent manual

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Setting up an area as a reference

- Press the 3 button to open the menu for calibrating the sensor to the selected reference (area)
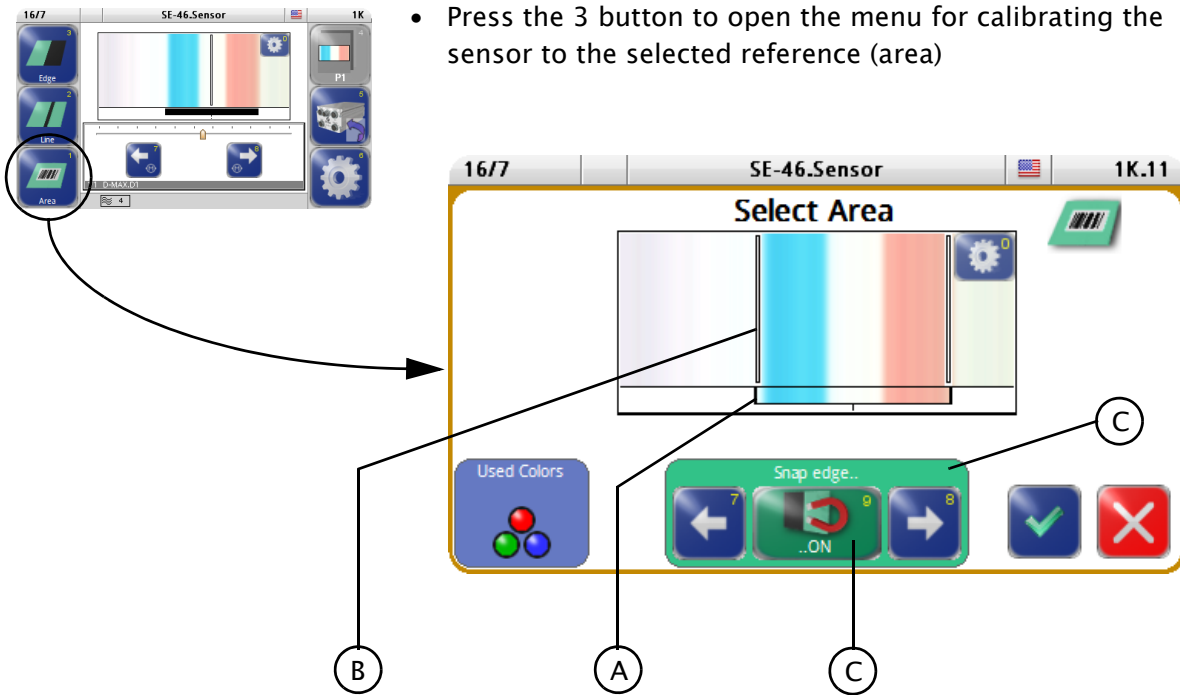
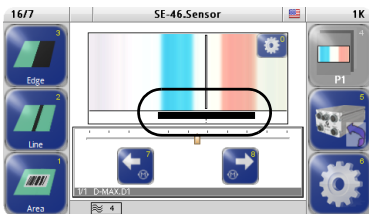The reference found by the sensor
- marked with a reference mark (A) and
- by the flashing cursor (B) in the display.

Another reference can be selected with the keypad (C). The 9 button is always set to ON when the menu is called.
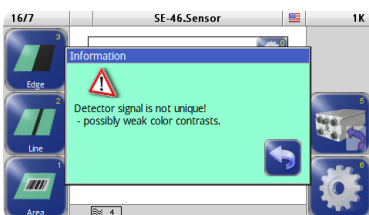
- Change cursor
  Touch the display in the area between the desired cursor and the outer edge of the screen

- Accept the reference
  The sensor is programmed to the reference that was set up.

The display switches back to the operator level. The reference mark identifies the area used by the sensor for guiding.

If information appears in the operator interface display, the selected reference is not suitable for guiding. However, the sensor will attempt to work with that reference. Finding a better reference and repeating the process is recommended.

9 Button: ON

A cursor flashes and its position can be changed:

- Jump to the next contrast line with the arrow buttons or
- touch directly in the graphic

9 Button: OFF

- Wait until a cursor is flashing.

Now the flashing cursor can be manually

- moved to the desired position with the arrow buttons or
- set at the desired position in the display by touching it.

Change cursor

- Touch the display in the area between the desired cursor and the outer edge of the screen

7 EXTENDED OPERATION

Selecting profiles

Users can load another setting for the sensor by switching the active profile and then begin working with that reference immediately. The settings of continually recurring references (for example with frequent changes of material) can be reused without having to perform a new calibration.

- Select the active profile with the 4 button
  The 4 button is identified by the name of the actively selected profile. The name of the profile can be edited.
  → See *1 Profile Name, page 7–2*.

Note:
The display on the button shows the saved reference.

Setting up profiles

This section describes menus for setting up the parameters of a profile. A set of these parameters is available for every profile (→ see menu *1y.5.1 Profiles, page 8–2*) enabled in the system.

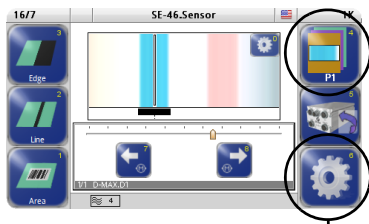A profile contains the following information:

- Reference
- Filter (can only be changed in Expert mode)
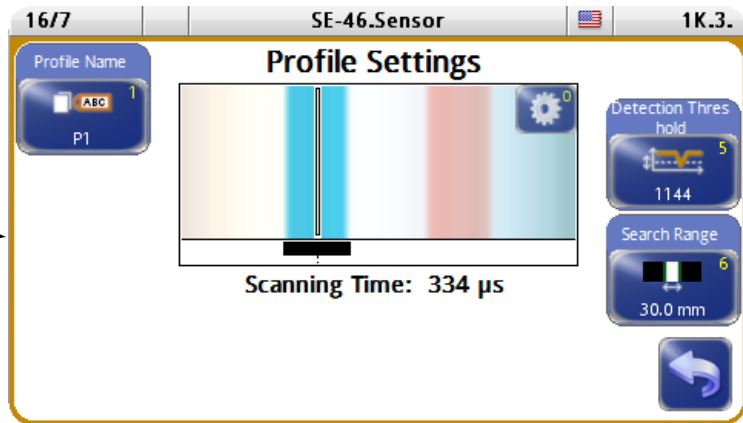- Type of illumination (can only be changed in Expert mode)

briefly
press

- Profile Name
- Detection Threshold
- Search Range

- Select the desired profile with the 4 button
  Check: Check the display on the 4 button

- Press and release the 6 button *briefly* on the operator level

  Menus are available for setting up the parameters of the selected profile.

1 Profile Name

The designation of the selected profile can be changed with the *Profile Name* parameter. A keyboard appears in the display to do this. A maximum of 7 characters can be entered.

5 Detection Threshold

The *Detection Threshold* parameter is used to define a value that characterizes the tolerance for similarity to the reference. The tolerance of the sensor to deviations in shape, color and saturation increases with this value. However, the risk of confusion with similar references also increases.
The limit value for detection is automatically preset to the existing reference for each teach-in process. The higher the value, the better the selected reference in comparison to its environment.

6 Search Range
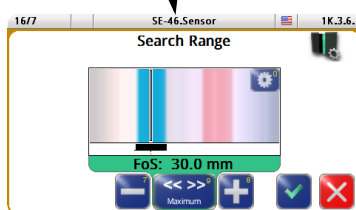
The *Search Range* parameter is used to reduce the active area of the SE-46C sensor.
The large field of view of 30 mm may be disadvantageous for some applications, for example if there are patterns with similar properties close to the desired reference. This can destabilize control of the web path. The active range can be reduced to the size of the reference.
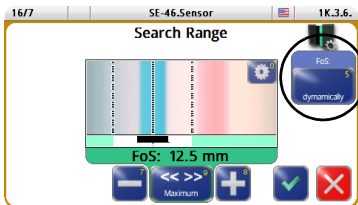
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- Change the search range with the plus and minus buttons
- Set the search range to the maximum of 30 mm with the 9 button

i Note:
If the search range is limited, the 5 button *FoS* is available.

5 FoS

The property of "Dynamic" or "Static" can be assigned to the *Search Range* parameter.

– Dynamic:
If the reference is not in the active search range, that range is automatically extended to search for the reference. Once the reference is found, the active search range is moved to the position of the reference.

– Static:
If the reference is not in the active search range, the search range is not extended.
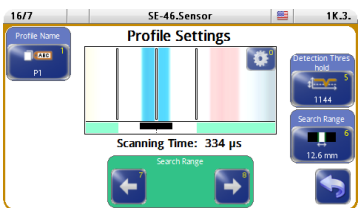
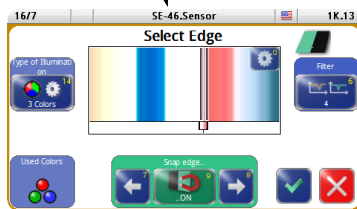The limited search range can be moved with the arrow buttons.

Extended functionality in Expert mode
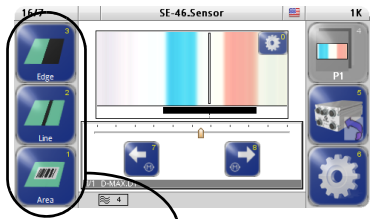
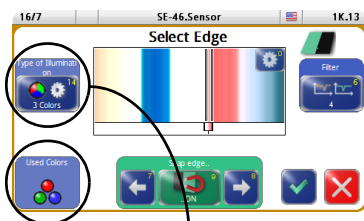Additional parameters may be available for setting up a reference.

Precondition

The parameter in menu *1y.5.3 Expert Mode, page 8–2* is set to ON.
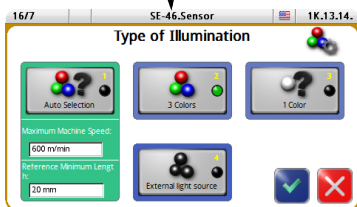
14 Type of illumination

The 14 button is used to open menus for setting up the illumination of the sensor for current needs.
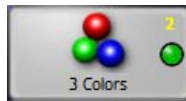
The current selection appears in the small "Used Colors" display for information.

2 Three Colors

The 2 button is used to switch to standard RGB illumination (white light).

3 One Color


With low contrast levels it may be better to use only one color to illuminate the material web.
The 3 button can therefore be used to switch the SE–46C sensor from the RGB illumination set as standard to a monochrome mode. The sensor selects the color from Red, Green or Blue that provides the best contrast. The "Used Colors" display shows which color is selected.

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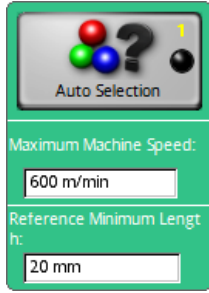
1 Auto Selection

If there is no clear decision between the settings "3 Colors" and "1 Color," an automatic setting can also be used.
The sensor will make a selection based on the existing ambient conditions and the required information about the customer system (machine speed and reference length).

The "Used Colors" display shows the selection that was made.

For lines, edges or areas that are longer than those listed in the table below, there is no need to turn on this function.

Web speed [m/min]	Continuous sections mm
100	1.2 or longer
500	6.1 or longer
1000	12 or longer

Proportionally interpolated values can be used for other web speeds.
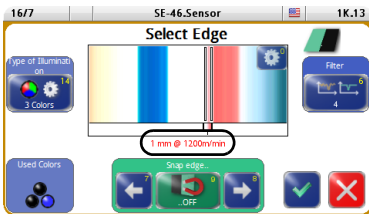
If the reference is too short for the required web speed, this is indicated by a minimum length and web speed appearing in red in the display.

4 External light source
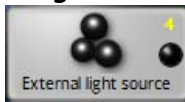
In some cases it is advantageous to use external illumination. In this case the internal illumination must be turned off with the 4 button.
→   starting with firmware version 004

6 Filter

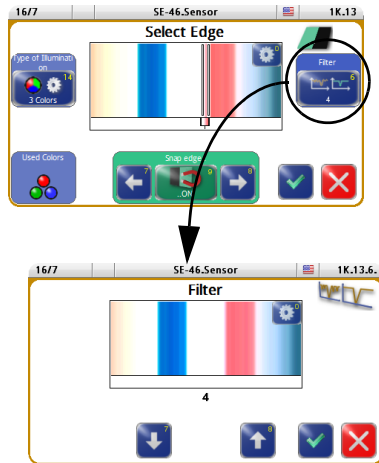The 6 button is used to adjust the blur filter. These settings affect the detectability of thin lines and the tolerance of the sensor to deviations in the line width.

The default setting of this filter is 4. Lines up to 0.25 mm in width can be used with this setting. The tolerance for deviations in the line width is approximately +/–0.1 mm. These figures apply to strong contrasts, for example black lines against a white background. The tolerance to deviations in the line width may be lower for lines with low contrast or changing color contrasts.

| Filter setting	Minimum line width	Maximum tolerance of line fluctuation
1	0.1 mm	+/– 0.03 mm
4	0.25 mm	+/– 0.1 mm
16	1 mm	+/– 0.5 mm
31	2 mm	+/– 1 mm

Note:
If the properties of the line differ from the saved reference too greatly, web guiding is blocked.

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Operating the D-MAX web guide controller

A D-MAX web guide controller already present in the system can also be completely set up and operated with the OI-TS operator interface. For further information see the "FIFE D-MAX/OI-TS" Operating Instructions.
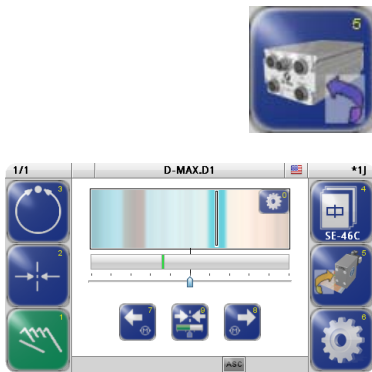
- Switch to the operating level of the D-MAX web guide controller with the 5 button

  Note:
  The 5 button is only available if the SE-46C sensor is connected with the D-MAX web guide controller via an Ethernet cable.

The *Guide Point* parameter and the drives can also be affected directly from the operator level of the SE-46C.

Shifting the guide point

The guide point can be shifted within the sensor's field of view during ongoing operation.
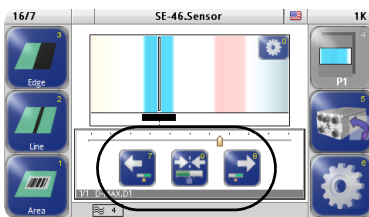
- Move the guide point to the desired position with arrow buttons 7 and 8
  A cursor appears in the display at the location to which the guide point was moved.
- Reset the guide point to 0 with the 9 button

Note:
If the SE-46C is digitally connected to a D-MAX web guide controller, the 7 and 8 buttons in the operator level will respond as they have been set up on the D-MAX web guide controller.

8 MENUS

Notes

This section describes menus that are needed for commissioning and other settings of the SE–46C sensor.

Menu identification

Each menu has its own identification. This makes it possible to retrace every step in the control tree of the SE–46C sensor precisely.
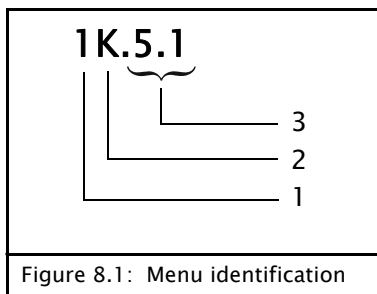
Figure 8.1: Menu identification

1. **Main menu**

2. **Profile (y)**
   K, L, M, N, or O possible

3. **Menu levels**
   Identifies the position of a menu within the menu structure of the SE–46C sensor

Conventions

The following conventions apply to the menus described here:

y
The placeholder "y" identifies the currently selected profile (in this example y = K).
This position in the menu identification changes depending on the profile selected by the customer.
→   see *Selecting profiles, page 7–1*

Figure 8.2: Placeholder

1y.5 Control

> 2 s

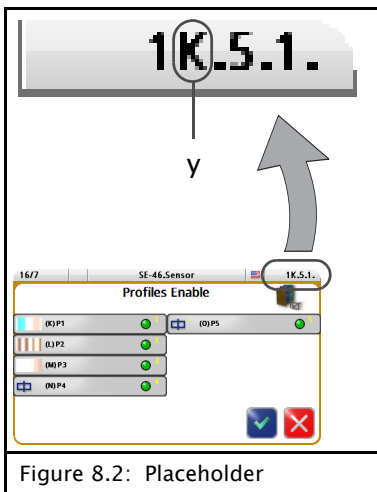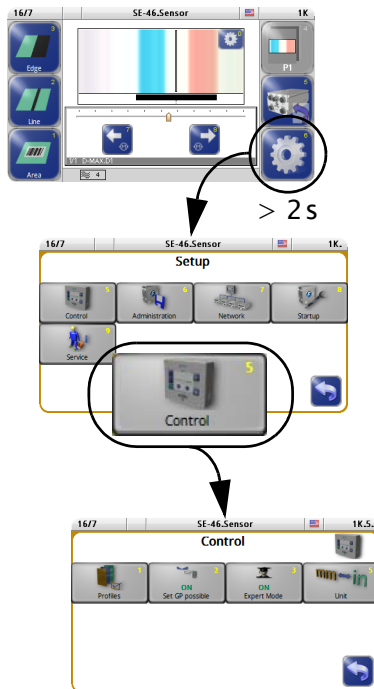This section describes menus for viewing or setting up the properties for operating the sensor.

1y.5.1 Profiles

This menu is used to allow or disable selection of profiles 1 to 5 with the 4 button.

1y.5.2 Set GP possible

The *GP adjustable* menu is used to set up whether or not the guide point for the web guide controller can be adjusted from the user level of the sensor.

1y.5.3 Expert Mode
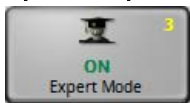
The *Expert mode* menu is used to switch the display for setting up a reference from standard mode to extended functionality. This may be necessary if the nature of the reference is not sufficient for setting up the sensor.

➔ See *Extended functionality in Expert mode, page 7–4*

1y.5.5 Unit

Setting up the desired length unit

1y.6 Administration

> 2 s
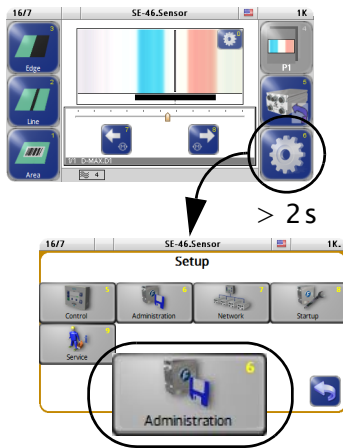
This section includes a list of menus containing information about the SE–46C sensor. This information is required when ordering replacement parts or for service inquires.
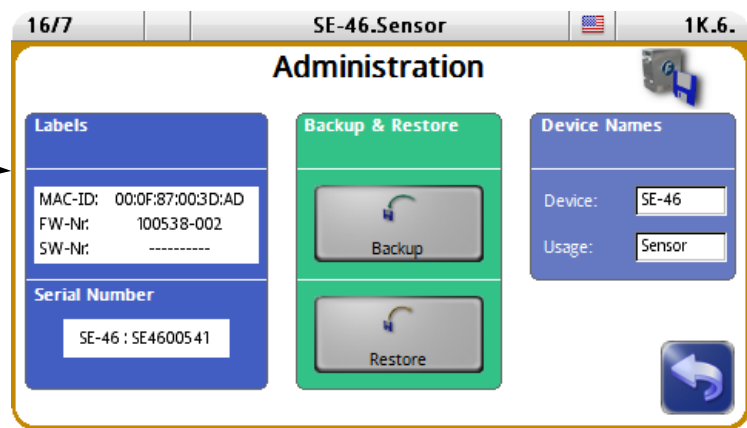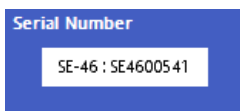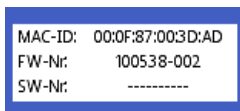
Labels

This screen contains the details on the label which is affixed to the sensor housing.

– MAC ID,
  firmware number and
  the SE–46C sensor software number

– SE–46C sensor serial number

Backup & Restore

Backup
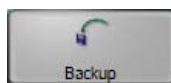
You can use the *Backup* menu to save all current user settings of the SE–46C sensor to a backup copy in the module.
If a backup has already been saved, the old values will be overwritten by the current ones.

Menüs.fm

Restore

You can use the *Restore* menu to set all settings of the SE-46C sensor to the values of a backup copy.

1 from previous backup

The settings from a backup saved by the customer are restored.

Note:
If no backup has been performed yet in the sensor, this menu is not available.

2 factory settings

The factory settings are restored. The following basic values are set:

- Detection Threshold:
  Set automatically while setting up a reference
- Search Range:
  Set to the maximum of 30mm
- Filter:
  Set to the default value of 4
- Type of illumination:
  Set to "Three colors"

Note:
These values correspond to the basic setting of the SE-46C. In some cases customer-specific may already have been preset in the factory.

Note:
If nothing appears in the operator interface display after a restart, select a device with the header.
Then commissioning of the SE-46C sensor must be performed.

Device Names
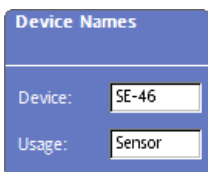
The designations in the header can be changed:

- Device
- Usage

1y.7 Network

> 2 s

You can use these menus to view network settings and make changes to them.
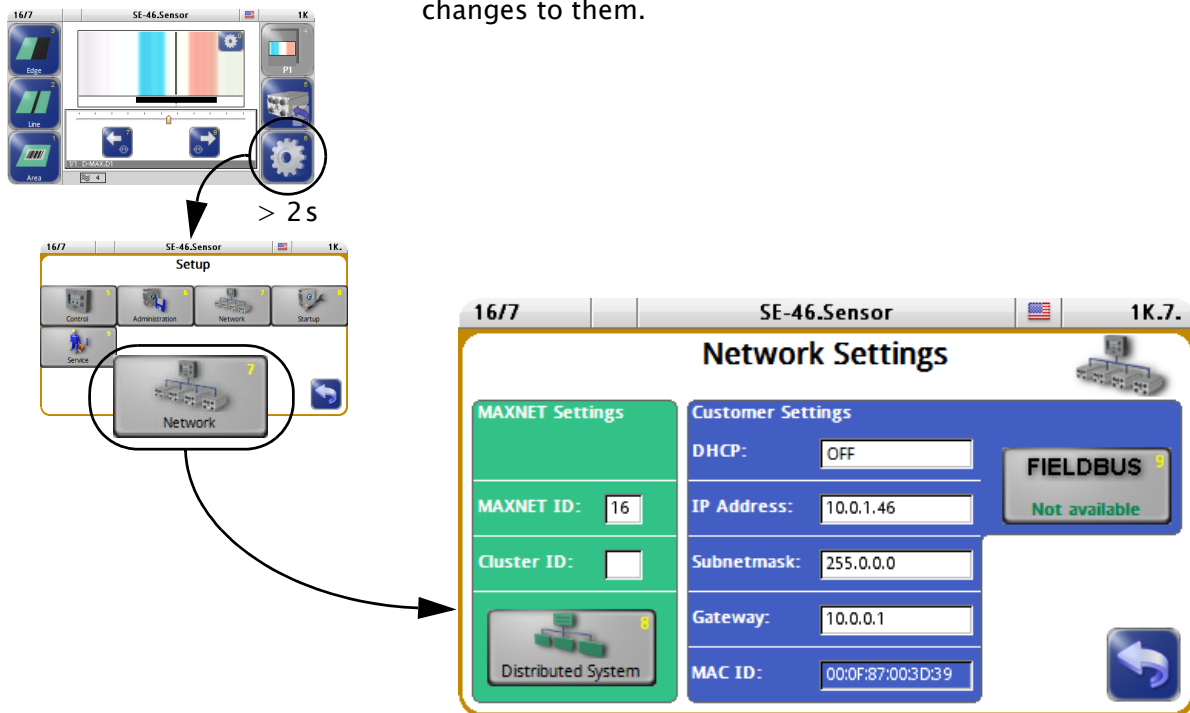
MAXNET Settings

Display and change the network settings for MAXNET:

– The MAXNET ID is used for addressing of individual devices.

– The Cluster ID is used to
  – operate identical systems in a network.
  – operate more than 31 devices in a network.

MAXNET ID	MAXNET Cluster	Use
Cannot be edited	Not visible	A system distributed over several devices and present once in the network
Cannot be edited	Visible and can be edited	A system distributed over several devices and present several times in the network
Can be edited	Visible and can be edited	Grouped independent devices
Can be edited	Not visible	Independent devices

i Note:
The MAXNET address/the MAXNET cluster address is only to be changed in accordance with the appropriate instructions in "Supplementary Operating Instructions" (see system documentation) or following consultation with a member of staff at Fife-Tidland GmbH.

Menüs.fm

Note:
If nothing appears in the operator interface display after a restart, select a device with the header.

Distributed System

The parameters under the *Distributed System* menu are used to group the devices connected to a common network and their menu structures depending on how they are used and to display them selectively on a D-MAX operator interface.

→ Detailed information can be found in the "FIFE D-MAX" Operating Instructions.

Customer Settings

- Display and change the network settings for TCP/IP
- show the MAC-ID of the SE-46C sensor
- optional:
  Display of the fieldbus type and its properties

1y.8 Startup

These menus are used for commissioning the SE–46C sensor.
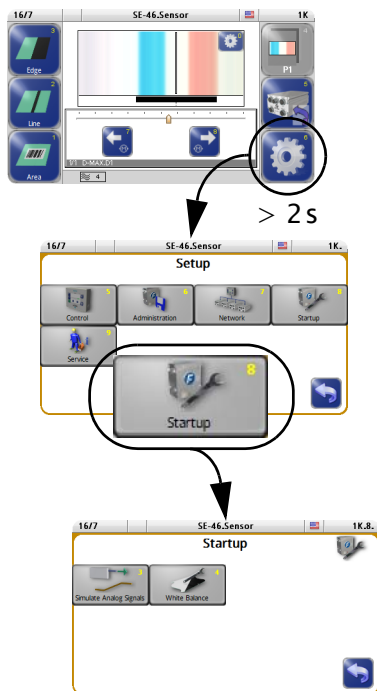
1y.8.3 Simulate Analog Signals
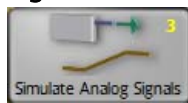
If a web guide controller is processing the analog control signals of the sensor, the web guide controller must be checked during commissioning or after a component has been replaced (SE–46C, cable or web guide controller) and adjusted if necessary.

i Note:
Devices delivered from the factory have already been largely preset for the customer application and checked.
The same is not true of replacement part deliveries, however.

1y.8.4 White Balance

The *White Balance* has been preset in the factory and cannot be changed by the customer.

i Note:
Using this parameter only changes the appearance of the display. The parameter has no effect on detection of the saved reference.

1y.9 Service

> 2 s
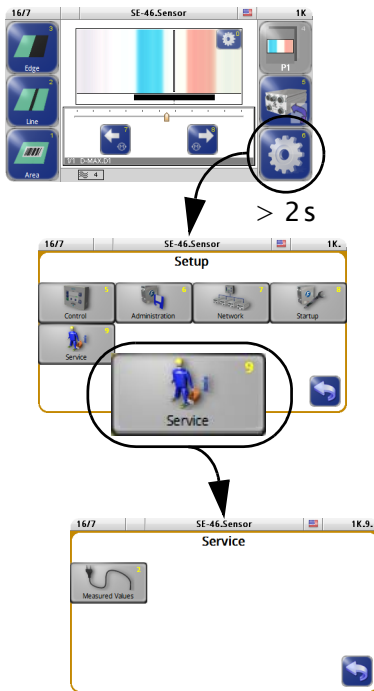
The purpose of these menus is to show information about settings of the SE–46C sensor that is important for Customer Service.

1y.9.2 Measured Values

Display of values of the SE–46C sensor
– Input Voltage
– RGB Illumination Current

9 MAINTENANCE

⚠️ **WARNING:**
Danger of injury by crushing

⇨ Maintenance work must only be performed on the SE–46C sensor when the power is turned off, the machine is stopped, and it is protected against being turned back on.

Maintenance work

OI–TS Operating Interface

There are no maintenance tasks to perform on the OI–TS operator interface.

To clean the display on the operator interface:

Depending on how dirty the environment is, carefully wipe off the operator interface display at regular intervals with a soft dry cloth.

If the display becomes very dirty, a moist cloth can be used to clean it.

ℹ️ Note:
Do not use any solvents or aggressive cleaning agents to clean the display. Doing so could damage the display.

SE–46C sensor

There are no maintenance tasks to perform on the SE–46C sensor.

To clean the viewing window:

Do not allow the sensor viewing window to become dirty. Ambient dust and dirt must therefore be cleaned from the viewing window at regular intervals using a glass cleaner and a soft cloth.

Wartung.fm

10   DECOMMISSIONING

Decommissioning

1. Turn off the electrical power to the system.

2. Remove all cables from the SE-46C sensor.

3. Unscrew the sensor from its bracket.

4. The Sensor SE-46C can be stored according to the specified ambient conditions (see *Transport and storage, page 3-1*).

   OR

   Dispose of the SE-46C sensor according to your national requirements.

11 TROUBLESHOOTING

Troubleshooting Procedure

Go through the following items if an error occurs:

1. **Check the display on the OI-TS**

   ➔ see table *page 11–2*

2. **Has a reference already been set up?**

   ➔ no: Set up reference, see *page 6–5*

3. **Was the reference set up successfully?**

   ➔ no: see *Problem while setting up the reference, page 11–2*

4. **Does the sensor find the reference that has been set up in operation?**

   ➔ no: see table *page 11–2*

5. **Check the settings on the web guide controller**

   ➔ See the displays and Operating Instructions for the web guide controller

OI-TS Operating Interface
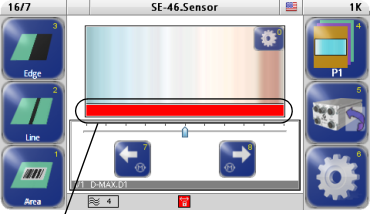
Faulty behavior	Possible cause	Remedy
Incorrect actions are performed or none at all	The touch screen is calibrated incorrectly	Test the touch screen (see *Debugging, page 5–4*) Recalibrate if necessary (see *Settings, page 5–4*)

Fehlersuche.fm

Problem while setting up the reference
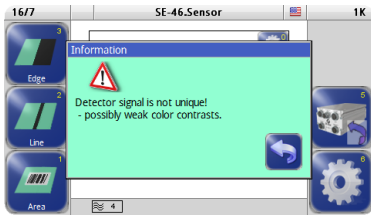
- Mounting position (angle, distance) correct?

- Is the desired reference in the field of view?

- The reference used for the setup cannot be reliably used for control.
  Setup must be repeated with a more suitable reference.

Problems during operation

Malfunction	Cause	Remedy
Symbol ❌ in the header	No data connection between SE-46C and OI-TS	Check the connecting cable to the OI-TS
The sensor is detecting the reference poorly or not at all Flashes red	The ambient light has changed significantly	Restore the original lighting conditions or Set up the reference again, see *Setting up references, page 6-5*
	Sensor field of view is dirty	See section *Maintenance work, page 9-1*
	There may be a change in the reference within the material For example color gradients or fluctuations in the width of the reference	Set up the reference again See *Setting up references, page 6-5*
	Unprinted film is not detected	Check angle See *Angle setting, page 3-9*

Problems with control

If errors on the sensor can be excluded, incorrect settings on the web guide controller can also lead to problems.

Check whether the correct function is selected on the web guide controller and whether the parameters for gain and polarity are set correctly.

i Note:
Information can be found in the commissioning instructions for "FIFE SE-46C and web guide controllers."

12 TECHNICAL DATA

SE–46C Sensor

Housing

ABS coated

Covering window

Glass

Protection type to DIN EN 60529:

IP54

Housing dimensions

Length = 110 mm
Width = 65 mm
Height = 120 mm

Weight

about 1100 g

Ambient conditions

5°C – 60°C at max. 90% relative humidity, non-condensing
60°C up to 1000 m altitude
50°C up to 3000 m altitude

Electrical parameters

Power supply

12 V or 24 V

Power consumption

< 350 mA at 12 V
< 180 mA at 24 V

Position signal

0 to 10 mA [1]

Blocking signal

0 mA (block) / ≥ 2.5 mA (enable)[1]

[1] max. load = 250 Ω

Optical parameters

Optimum distance between sensor and material web

10 mm ± 2 mm

Sensor field of view

about 30 mm x 1 mm

Line width

0,25 mm to 25 mm

optionally 0.1 mm

→   See also table in *6 Filter, page 7–6*

OI–TS Operating Interface

Power supply

12 – 24 V nominal
10 V minimum – 30 V maximum

Power consumption

2 W

Dimensions

Wall mounting: 128 x 105 x 38 mm
Desk installation: 128 x 105 x 33^{+5} mm

Weight

0,6 kg (only the OI–TS, without mounting accessories
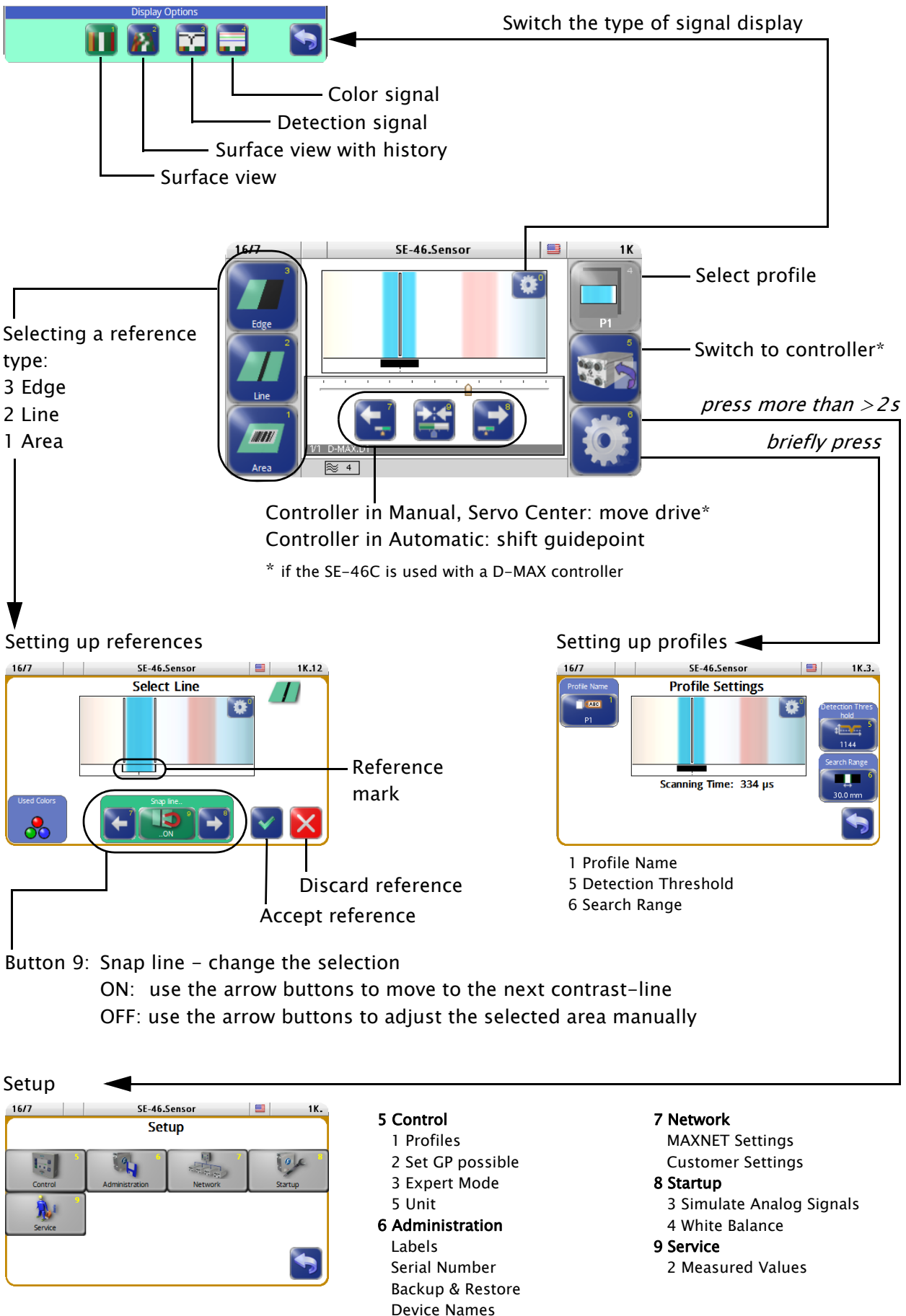
Protection class

IP64 according to DIN EN 60529

Ambient conditions

Ambient temperature: 0°C to 60°C
Relative humidity: 10% to 95% non–condensing
Altitude above sea level: maximum 3000 m

13 APPENDIX A – OVERVIEW

Display Options

Switch the type of signal display

Color signal

Detection signal

Surface view with history

Surface view

16/7   SE-46.Sensor   1K

Select profile

Selecting a reference type:
3 Edge
2 Line
1 Area

Edge

Line

Area

P1

Switch to controller*

press more than >2s

briefly press

Controller in Manual, Servo Center: move drive*
Controller in Automatic: shift guidepoint

* if the SE-46C is used with a D-MAX controller

Setting up references

16/7   SE-46.Sensor   1K.12

Select Line

Reference mark

Used Colors

Snap line..
..ON

Discard reference

Accept reference

Button 9: Snap line - change the selection
           ON: use the arrow buttons to move to the next contrast-line
           OFF: use the arrow buttons to adjust the selected area manually

Setting up profiles

16/7   SE-46.Sensor   1K.3.

Profile Settings

Profile Name

P1

Detection Threshold

1144

Search Range

30.0 mm

Scanning Time: 334 µs

1 Profile Name
5 Detection Threshold
6 Search Range

Setup

16/7   SE-46.Sensor   1K.

Setup

Control   Administration   Network   Startup

Service

5 Control
  1 Profiles
  2 Set GP possible
  3 Expert Mode
  5 Unit
6 Administration
  Labels
  Serial Number
  Backup & Restore
  Device Names

7 Network
  MAXNET Settings
  Customer Settings
8 Startup
  3 Simulate Analog Signals
  4 White Balance
9 Service
  2 Measured Values

14 APPENDIX B – SYMBOLS

Symbols	Description
⊠	no connection ➔ see *Problems during operation, page 11–2*
🟢	Green is used as the color for illumination.
🔴	Red is used as the color for illumination.
🔵	Blue is used as the color for illumination.
≈	Filter ➔ see *6 Filter, page 7–6*
🔒	The reference is not found. The blocking signal will be generated: – analog: 0 mA

15 APPENDIX C – TERMS

Automatic

Operating mode
The web course is automatically corrected by an actuator based on sensor information.

Device

Devices refer to the drives on the D-MAX Controllers present on the network as well as any sensors, customer-specific CM system menus or Gateways.

Manual

Operating mode
There is no guiding of the web course.

OI (Operator Interface)

Designation of an operator interface.

Profile

The settings of continually recurring references can be saved and reused without having to perform a new calibration.

Reference

Extract from an image recorded by the sensor for control.

Servo Center

Operating mode
The actuator is moved to the mechanical center position depending on the servo-center transducer.

Supplementary Operating Instructions

Customer-specific software adjustments of the software are described in the "Supplementary Operating Instructions" for the D-MAX system and are included in the system documentation.

Web/strip

The web/strip is the customer's material, which is affected in its direction of movement as it is guided by the D-Max system.

For simplicity sake, these Operating Instructions will refer only to the web.

16 SERVICE

Requests for Service

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

When ordering replacement parts, please indicate, (where possible) Part Number, Drawing Number and Model description (see *page 3–1*).

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.

Adresses

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
Fax: +49 – 6195 – 3018
E–Mail: service@maxcess.eu
Web: www.maxcess.eu

Fife Corporation
Post Office Box 26508
Oklahoma City, OK 73126, USA
Telefon: +1 – 405 – 755 – 1600
Fax: +1 – 405 – 755 – 8425
E–Mail: service@maxcessintl.com
Web: www.maxcessintl.com

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