OETIKER FAST 3000
Safety light curtain

User manual

Supplement to the original user manual item no. 08903979
Issued April 2019

Item no. 08904518
OETIKER Schweiz AG
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Issued April 2019
1 Scope

This supplement is valid for all OETIKER FAST 3000 with the Safety Light Curtain type LC. In this type the drive of the OETIKER FAST 3000 is switched off by means of a safety relay. This supplementary user manual is valid only in conjunction with the original user manual of the OETIKER FAST 3000, item no. 08903980. Comply with all safety instructions. Available OETIKER FAST 3000 complete systems:

<table>
<thead>
<tr>
<th>Description</th>
<th>Item number</th>
</tr>
</thead>
<tbody>
<tr>
<td>OETIKER FAST 3000 + CFM - Ethernet/IP, LC</td>
<td>13500294</td>
</tr>
<tr>
<td>OETIKER FAST 3000 + CFM - PROFINET, LC</td>
<td>13500295</td>
</tr>
</tbody>
</table>

Installation of the “Light Curtain” option does not change the purpose for which the OETIKER FAST 3000 is intended; the Declaration of Conformity for this type remains in force.

2 Requirements for the installed safety light curtain

A two-channel safety light curtain must be used in compliance with the following standards:

- EN ISO 13849-1:2015: at least Cat. 3, PL d
- EN 62061+A1:2009: at least Cat. 3, SIL 2

Available safety light curtain: Keyence GL-R (GL-R08H)

Response time of the OETIKER FAST 3000 for calculation of the safety distance of the safety light curtain: 0.15 s
## 3 Compatible accessories

The following components should be used for operation of the OETIKER FAST 3000 with safety light curtain:

<table>
<thead>
<tr>
<th>Component</th>
<th>Description (DE)</th>
<th>Description (EN)</th>
<th>Item number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete system</td>
<td>OETIKER FAST 3000 + CFM - EtherNet/IP, LC</td>
<td>OETIKER FAST 3000 + CFM - EtherNet/IP, LC</td>
<td>13500294</td>
</tr>
<tr>
<td></td>
<td>OETIKER FAST 3000 + CFM - PROFINET, LC</td>
<td>OETIKER FAST 3000 + CFM - PROFINET, LC</td>
<td>13500295</td>
</tr>
<tr>
<td>Control cabinet</td>
<td>Schaltschrank kpl. - EtherNet/IP, LC</td>
<td>Control cabinet, cpl. - EtherNet/IP, LC</td>
<td>13500290</td>
</tr>
<tr>
<td></td>
<td>Schaltschrank kpl. - PROFINET, LC</td>
<td>Control cabinet, cpl. - PROFINET, LC</td>
<td>13500289</td>
</tr>
<tr>
<td>2-hand dongle</td>
<td>Zweihand Dongle LC</td>
<td>Two-hand dongle LC</td>
<td>13500297</td>
</tr>
<tr>
<td>Dongle E-Stop (corresponding to the standard type)</td>
<td>Zweihand Dongle dünn</td>
<td>Two-hand dongle, thin</td>
<td>13500283</td>
</tr>
<tr>
<td>Tool mechanism (corresponding to the standard type)</td>
<td>Verstemm-Trennwerkzeug + CFM</td>
<td>Crimping cut-off tool + CFM</td>
<td>13500269</td>
</tr>
<tr>
<td>Two-hand control</td>
<td>Zweihandschaltung LC</td>
<td>2-hand control LC</td>
<td>13500298</td>
</tr>
<tr>
<td>Touch panel, cpl. (corresponding to the standard type)</td>
<td>Bedienpanel kpl.</td>
<td>Touch panel, cpl.</td>
<td>13500278</td>
</tr>
<tr>
<td>Verification Unit (when a safety light curtain is used)</td>
<td>Verifizierungseinheit PG135 arretierbar</td>
<td>Verification Unit PG135, lockable</td>
<td>13500299</td>
</tr>
</tbody>
</table>
4 Commissioning

4.1 Cabling

Connection of the light curtain, see circuit diagram no. 154534 (for Ethernet/IP) and 155553 (for Profinet).

- Connect the power supply and the signal of the 2-channel sensor to the port 350X0, using the plug supplied:
  - Power supply + 24V: Pin K
  - Power supply 0 V: Pin M
  - Signal channel 1: Pin A / Pin B (PNP / NPN)
  - Signal channel 2: Pin H / Pin J (PNP / NPN)

![Cabling diagram]

Fig. 1 Cabling of the safety light curtain

- Wire the light curtain as shown in the documentation for the light curtain.
4.2 Installing the safety light curtain

<table>
<thead>
<tr>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The safety distance of the safety light curtains must be determined by the integrator.</td>
</tr>
<tr>
<td>• Comply with EN ISO 13855:2010.</td>
</tr>
</tbody>
</table>

Response time of the OETIKER FAST 3000 for calculation of the safety distance of the safety light curtain: 0.15 s
5   Functional testing during commissioning

NOTE

• The operating company of the system must ensure that the safety light curtain and the emergency stop circuit operate correctly.
• The function of the safety relay can be checked during the IO test (Fig. 2).

5.1   Testing the safety light curtain

► In the GUI (Graphical User Interface), navigate to the graphical I/O test.
► Monitor the status of the input to the safety light curtain.
► To acknowledge the status, press the Init button.

5.2   Testing the Emergency Stop

► Navigate to the graphical I/O test.
► Monitor the status of the input to the emergency stop.
► To acknowledge the status, press the Init button.
6 Operation

6.1 Initialization

▶ Start the initialization by pressing the Init button (Industrial Communication Init command).
If the safety light curtain triggers a Stop, the initialization routine will be interrupted. An appropriate message will appear on the GUI.
Acknowledge the message:
▶ Press the Init button again.
Initialization will now restart. For the sequence see also the flowchart (initialization), section 8.1.5:

![Message window if the safety light curtain is interrupted during initialization](image)

Fig. 3 Message window if the safety light curtain is interrupted during initialization
6.2 Verifying the closing force

NOTE

To check the correct operation of the force load cell, verify the measured force at least once a week, using an Oetiker CAL 01.
If the force is set to 1850 N, the force measured by the OETIKER CAL 01 must be within a tolerance of ± 100 N of that value.
The tensioning strap should be replaced after about 50 verifications.

Setting with CAL 01: SKS mode: hold-ME-EL / average (see user manual OETIKER FAST 3000)

1. Activate the verification.
   - Switch to the “Settings” tab.
   - In order to access force verification mode you must be logged in.
2. Press the “Force verification” button.
3. Press the “Pulling unit” button.
4. Press the “Force verification” button.

Inserting the closing force verification unit (1)
1. Pull the locking hook (2) back.
2. Insert the end of the tensioning strap fully into the crimping cut-off head.
3. Engage the locking hook (2) and release it.

Fig. 4 "Settings" tab

Fig. 5 Inserting the closing force verification unit
The cams of the verification unit must be correctly positioned in the bores of the crimping cut-off head. The locking hook must be engaged.

4. Press the button at the top of the handle.

Fig. 6  Positioning the locking hook - OK

Fig. 7  Positioning the locking hook - wrong

Fig. 8  Button at the top of the handle
5. Press on “Target force” to change the verification force to the desired value.
6. Press on “Verification activation”.
7. Input the force measured by the CAL 01 into the “Ext. Force value "CAL")” field. The value that is input will be saved in the verification log.
8. Press "Quit routine").
   The values are now written to the relevant log file.
9. Remove verification unit (1) from the tool (see Fig. 10).

Removing the closing force verification unit (1)
1. Pull the locking hook (2) back.
2. Pull the verification unit (1) out of the crimping cut-off head.
If the safety light curtain triggers a Stop, the “Verifying the closing force” routine will be interrupted. An appropriate message will appear on the GUI. Acknowledge the message:

- Press the OK field.

The notification is acknowledged, the window closes. Lever moves to the insertion position and the tensioning unit moves to the start position. The verification value is not determined and is set to the value 0 N. For the sequence see also the flowchart (verification of the tensioning force), section 8.1.2:

![Fig. 11 Message window for closing force verification and interruption by the safety light curtain](image)

**6.3 Crimping force monitoring verification**

For verification of the crimping force monitoring there is no difference in the procedure with or without the safety light curtain. Tensioning unit is not required.
6.4 Setting the force offset to zero

If the safety light curtain triggers a Stop, the “Zero balance” routine will be interrupted. An appropriate message (Fig. 12) will appear on the GUI.

Acknowledge the message:
- Press the OK field.

The notification is acknowledged, the window closes.

Lever moves to the insertion position and the tensioning unit moves to the start position. For the sequence see also the flowchart (Setting the force offset to zero), section 8.1.3:

![Message window for setting the force offset to zero and interruption by the safety light curtain](image)

*Fig. 12 Message window for setting the force offset to zero and interruption by the safety light curtain*
6.5 Tightening clamps

If the safety light curtain triggers a Stop, the “tightening cycle” routine will be interrupted. An appropriate message will appear on the GUI.

Resuming the “tightening cycle” routine:

- Restart the routine by pressing the start buttons or via the bus.
- On resumption, the process is resumed at a position depending on the point at which it was interrupted. This position may not necessarily be the same point as the one at which the process was interrupted.
- If at interruption by the safety light curtain a threshold value of the tensioning force was exceeded, the tightening will be evaluated as defective.

- Perform a restart by pressing the start buttons or via the bus.

For the sequence see also the flowchart (tightening cycle), section 8.1.1:

![Message window for the tightening cycle and interruption by the safety light curtain](image)
6.6 Friction test

If the safety light curtain triggers a Stop, the “Friction test” routine will be interrupted. An appropriate message will appear on the GUI. Acknowledge the message:

- Press the OK field.

The notification is acknowledged, the window closes.

If the interruption occurs before the tensioning unit has reached the end position, the friction force value will be set to 0 N. For the sequence see also the flowchart (Friction test), section 8.1.4:

![Flowchart showing the friction test sequence](image-url)

Fig. 14 Message window for the friction test when the safety light curtain is interrupted
6.7 Manual movement

There is no change regarding the lever. The tensioning unit must be energized and initialized in order that the operator can move it manually.

- Press the “Power Axis”.

The tensioning unit is now energized.

![Diagram](image)

Fig. 15 Energizing the tensioning unit drive
The drive will be stopped if during the movement of the tensioning unit the safety light curtain triggers a stop. An appropriate message will appear on the GUI. Acknowledge the message:
- Press the OK field.
The notification is acknowledged, the window closes.

Fig. 16 Message window for setting the force offset to zero and interruption by the safety light curtain

The movement of the lever will not be stopped if during the movement of the lever the safety light curtain is interrupted.

7 Industrial communication

The new list for communication must be used (see separate document).

Status word1 Bit 21: The “Status Restart Light Curtain” is no longer implemented directly. Technically the individual channels of safety light curtains are no longer evaluated; instead the status of the safety light curtain safety relay is monitored. As soon as the tightening cycle has been stopped due to the safety light curtain signal and the routine “Stop by light barrier” is ready, the signal is set by the OETIKER FAST 3000 to process a restart.

Status word1 Bit 22: Status of the emergency stop circuit safety relay

Status word1 Bit 23: “Status E-Stop” is omitted, since the new concept no longer evaluates the individual channels in the PLC but evaluates the emergency stop circuit safety relay.
## 8 Appendix

### 8.1 Flowchart

#### Legend

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Symbol" /></td>
<td>Start / end the routine</td>
</tr>
<tr>
<td><img src="image2" alt="Symbol" /></td>
<td>Action for which the light curtain is inactive</td>
</tr>
<tr>
<td><img src="image3" alt="Symbol" /></td>
<td>Decision whilst the light curtain is inactive</td>
</tr>
<tr>
<td><img src="image4" alt="Symbol" /></td>
<td>Action for which the light curtain is active</td>
</tr>
<tr>
<td><img src="image5" alt="Symbol" /></td>
<td>Decision whilst the light curtain is active</td>
</tr>
<tr>
<td><img src="image6" alt="Symbol" /></td>
<td>Several scenarios are possible, light curtain is active</td>
</tr>
<tr>
<td><img src="image7" alt="Symbol" /></td>
<td>Sub-program: Light curtain active</td>
</tr>
<tr>
<td><img src="image8" alt="Symbol" /></td>
<td>Information</td>
</tr>
<tr>
<td><img src="image9" alt="Symbol" /></td>
<td>Interrupt (light curtain): Jump to the sub-program with return</td>
</tr>
<tr>
<td><img src="image10" alt="Symbol" /></td>
<td>Interrupt (light curtain): Jump to the sub-program without return</td>
</tr>
</tbody>
</table>
8.1.1 Tightening cycle with light curtain

Start

Tool ready (drives have been referenced)

Yes

Lever in the insertion position: Tensioning unit in the start position

Insert clamp

Start clamping

Lever moves to the home position

Release the clamp

Release the clamp or start the tightening process

Start the process

Status of the tensioning unit: Safe torque off (light curtain interrupted)

Status of the lever: Not dependent on the light curtain

Lever moves to the insertion position

No

Lever in the insertion position: Tensioning unit in the start position

Status of the tensioning unit: Safe torque off (light curtain interrupted)
Start the process

Acknowledging the STO tensioning unit

Interruption by the light curtain: Stopping the tensioning unit

Force relaxation with movement of the tensioning unit

No

Force relaxation with movement of the tensioning unit

Yes

Tensioning force reached

Interruption by the light curtain: Stopping the tensioning unit; message window active on the GUI; tightening defective if the pre-defined force threshold is reached; resumption of the process by restarting (acknowledgement of the STO → further in the process)

Stopping the tensioning unit

Interruption by the light curtain: Stop the tensioning unit; message window active on the GUI; tightening defective; resumption of the process by restarting (acknowledgement of the STO → further in the process)

Lever moves to the crimping position

Interruption by the light curtain: Stop the tensioning unit; message window active on the GUI; tightening defective; resumption of the process by restarting (acknowledgement of the STO → further in the process)

Relaxing the clamp: Tensioning unit moves back relatively

Interruption by the light curtain: Stop the tensioning unit; message window active on the GUI; resumption of the process by restarting (acknowledgement of the STO → further in the process)

Cutting off the strap: Lever moves to the cutting position

Interruption by the light curtain: Stop the tensioning unit; message window active on the GUI; resumption of the process by restarting (acknowledgement of the STO → further in the process)

Tensioning unit moves to the ejection position

Interruption by the light curtain: Stop the tensioning unit; message window active on the GUI; resumption of the process by restarting (acknowledgement of the STO → further in the process)
Lever moves to the home position

Tensioning unit moves to the home position

Interruption by the light curtain: Stop the tensioning unit; message window active on the GUI, tightening defective; resumption of the process by restarting (acknowledgement of the STO → further in the process)

Tightening error

Yes

Waiting for acknowledgement

No

Lever moves to the insertion position

Quit by error (emergency stop) or menu selection

End
8.1.2 Verification of tensioning force with light curtain

Start

Tool ready (drives have been referenced...)

Yes

Reset STO

Lever drive moves to the insertion position

Insert the verification unit

Clamp the strap; the lever moves to the home position

Status of the lever: not dependent on the light curtain

Status of the tensioning unit active: Safe torque off (light curtain interrupted)

Release the clamp or start the tightening process

Release the clamp

Start verification

Acknowledging the STO tensioning unit

Force build-up with movement of the tensioning unit

Tensioning force reached

No

Yes

No

Insert the verification unit

No

Acknowledging the STO tensioning unit

Acknowledging the STO tensioning unit

Interruption by the light curtain: Stop the tensioning unit and the lever; message window active on the GUI

Acknowledge message; reset STO; tensioning unit moves to the insertion position; verification value set to 0 N
Move the lever to the insertion position

Move the tensioning unit to the start position

Evaluate

Stopping the tensioning unit

Yes

End
8.1.3 Zero offset with light curtain

Start

Tool ready (drives have been referenced)

Yes

Start the zero offset routine by pressing the «Start zero offset» button

Acknowledge the STO tensioning unit

Lever moves to the home position

Tensioning unit moves to the start position

End the zero offset or routine

Zero offset

Quit routine

No

Acknowledge the STO tensioning unit

Start the zero offset routine by pressing the «Start zero offset» button

Acknowledge the STO tensioning unit

Lever moves to the home position

Tensioning unit moves to the start position

End the zero offset or routine

Zero offset

Quit routine

Interruption by the light curtain: Stop the tensioning unit & lever; hide the GUI message window; wait for acknowledgment; reset ST; move to the drives start position
Tensioning unit moves to the start position

Lever moves to the insertion position

End
8.1.4 Friction test with light curtain

Start

Tool ready (drives have been referenced)

Yes

Press the button on the GUI to start the routine

Acknowledging the STO tensioning unit

Lever moves to the insertion position

Tensioning unit moves to the start position

Insert strap

Command: Clamp strap

No

Interruption by the light curtain: Stop the tensioning unit & lever; hide the GUI message window

Friction test value not determined; value set to 0 N

STO tensioning unit active: Tensioning unit is no longer energized

Interruption by the light curtain: Stop the tensioning unit & lever; hide the GUI message window
Lever moves to the home position

Release the clamp or start the friction test

Start

Acknowledging the STO tensioning unit

Tensioning unit moves to the friction test position

Lever moves to the safe cutting position

Tensioning unit moves to the ejection position & the lever moves to the home position

Lever moves to the insertion position

End

STO lever move OK: Lever move is not affected by the light curtain

Interruption by the light curtain: Stop the tensioning unit & lever; hide the GUI message window

Wait for acknowledgment; reset the STO tensioning unit; exit the friction test process (lever in the insertion position and tensioning unit in the start position)
8.1.5 initialization with light curtain

Start

Request for initialization

Yes

Press Init button to start the Init routine

Acknowledge the STO tensioning unit

Acknowledge the notification «Remove the strap»

Decide on scenarios

Interruption by the light curtain: Stop the tensioning unit & lever

Drive not initialized

Homing the lever

Homing the tensioning unit

End

No

Yes

Acknowledge the notification «Remove the strap»
9 Help and Support

If you need help or technical support, contact your local Oetiker Service Center. Further information can be found at www.oetiker.de.

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