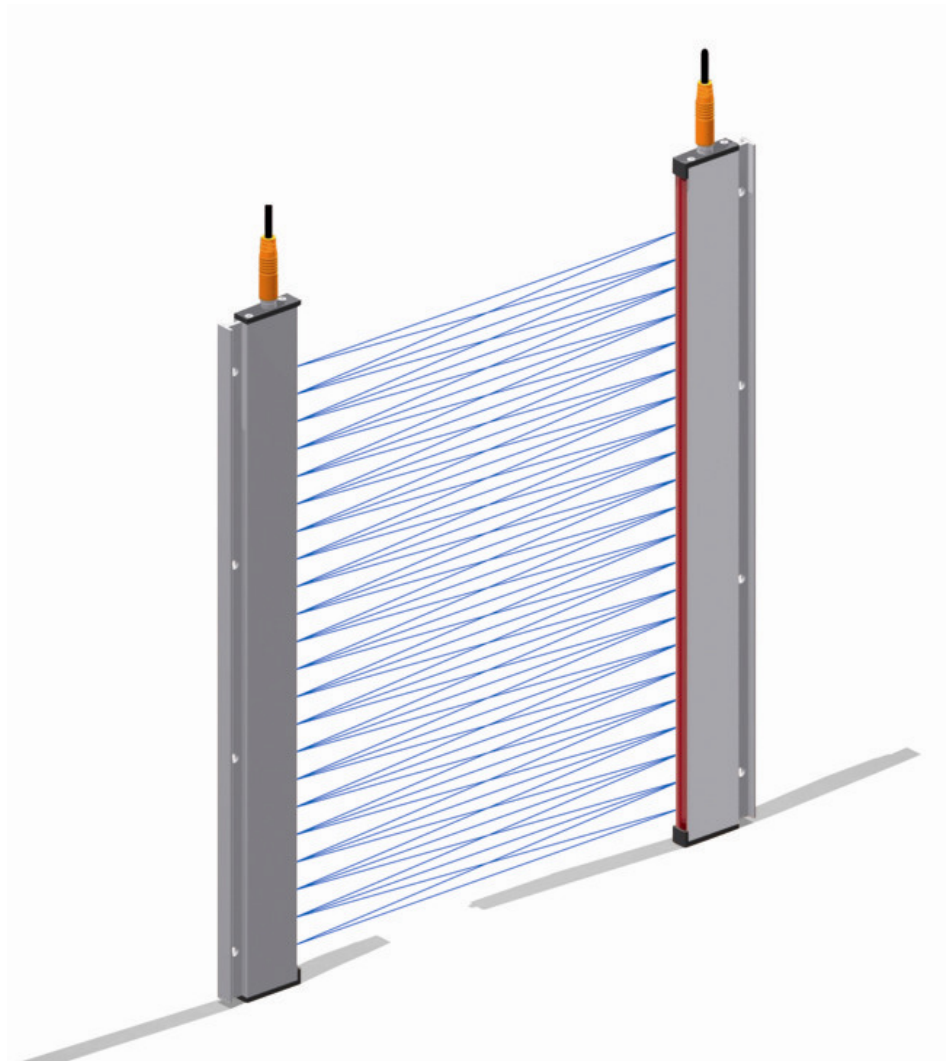


Operating and Maintenance Manual

F3E

Fully automatic multi-beam sensor for elevators

Status: 15 January 2007



Important note:

The data and information in this documentation were compiled with greatest care. Although every reasonable effort has been made to make the information contained in this documentation correct and up to date at the time of publication, no guarantee can be given for absolute freedom from errors.

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1 Safety instructions

1.1 Understanding of symbols and meaning and safety instructions

The following typographic conventions apply to this document.

Symbol	Meaning
	"NOTE:" Includes special information and useful tips concerning the work with the product
	"IMPORTANT:" Danger warnings are designated with this danger sign. It points out existing danger of accident entailing personal injury or property damage if the measures to be taken are not complied with.

1.2 Product liability and Warranty

STRACK LIFT AUTOMATION GmbH rejects any legal warranty concerning the saleability, economic efficiency or suitability of this product for a certain purpose. STRACK LIFT AUTOMATION GmbH is not liable for defects of this product or for indirect or direct damages in connection with the delivery, performance or use of this manual. STRACK LIFT AUTOMATION GmbH reserves the right to revise and modify the product from time to time without prior notice. The operation of this product is not permitted in the USA and countries with similar legal provisions. Otherwise the General Terms and Conditions of Trade and Delivery of STRACK LIFT AUTOMATION GmbH apply.

1.3 Assembly and operating personnel

All chapters of this operating manual include important information for the intended use of the product. These chapters are intended for technically qualified personnel according to VDE 105 or IEC364 that has been specially trained for installation, initial operation, maintenance and repair of lift systems as well as power operated doors and gates that are installed according to the applicable guidelines. It must be ensured that all activities are carried out according to the respective statutory provisions of industrial safety. For installation please observe the applicable accident prevention precautions (UVV). Normally only one fitter is required for the installation.

1.4 Risk assessment

The knowledge and technical realisation of the safety instructions included in this documentation is a prerequisite for a defect-free product. However, this documentation cannot take into account all details of any possible case occurring during the installation. Therefore an element of risk of human failure remains as in any other case. This documentation is intended to limit this residual risk to a minimum.

1.5 Operational safety

In order to ensure a trouble-free operation of the system the instructions contained in the diagrams and plans supplied with the system and the notes on electromagnetic compatibility in these operating instructions must be observed.

2 Scope of services

- ☺ Ultra flat design with a height of only 9 mm
- ☺ Range 5 m (10 m on request)
- ☺ Fully automatic rapid sensitivity regulation with fuzzy logic
- ☺ Can be installed stationary or travelling
- ☺ Highest immunity to foreign light > 200,000 Lux for installations with directly incident solar radiation
- ☺ Very short response time of 50 or 140 ms
- ☺ IP54 (IP65 and integrated heater for outdoor utilisation on request)
- ☺ Parameter configuration possible on site (without further auxiliary devices)
- ☺ Protected against incorrect polarity and short circuit
- ☺ Electronic relay output, floating and not subject to wear
- ☺ Output as closing contact and opening contact (can be configured as parameter)
- ☺ Switch on delay with configurable time parameter (e.g. as door open time for modernisations)
- ☺ Switch off delay with configurable time parameter (function "slow light curtain")
- ☺ Test input +V or 0V (can be configured as parameter)
- ☺ Compact LED grid up to 20 mm (by modification)
- ☺ Up to 190 light beams (by modification)
- ☺ Beam failure tolerance (configurable as parameter)
- ☺ Arbitrary channel gate-out on site (configurable as parameter)
- ☺ Electronics fully integrated, 10-30 VDC, optional separate mains power supply unit NTR18/04 available for mains connection, e.g. 230VAC
- ☺ Processor controlled buzzer optional in the NTR18/04 (can be configured as parameter)
- ☺ Also fulfils the requirements according to EN81-70
- ☺ High reliability through 48-hour endurance tests
- ☺ High reliability also in the presence of severe dirt accumulation

3 Utilisation as intended

3.1 F3E standard variants

F3E light curtains are utilised as reversing devices on power-operated doors and gates indoors, in lifts for persons, on access routes of industrial production lines, in automated stores, for monitoring goods loading, etc.

3.2 Restrictions



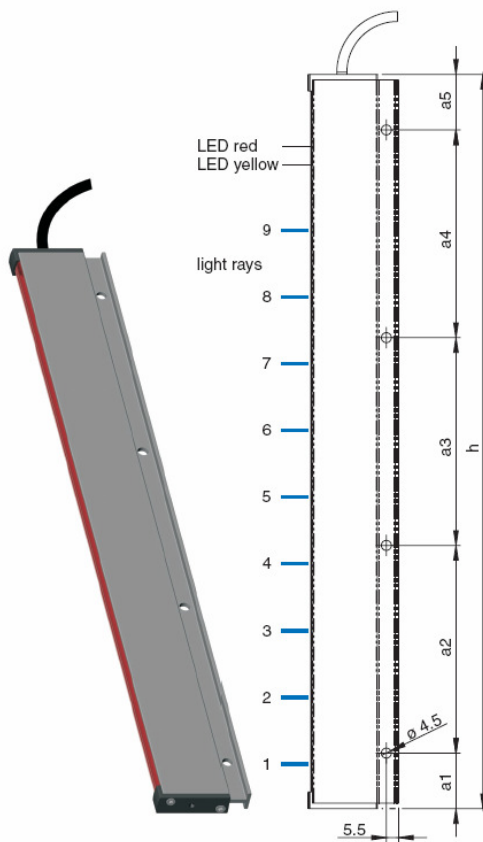
1. Utilisation in applications for which the safety of persons depends exclusively on the device function is not permitted. In such cases so-called safety light curtains must be used.
2. The F3E must not be used in the vicinity of gases or dusts that are able to explode.
3. Strong smoke production or fog patches interrupt the light path of the F3E and thus could hold the door or gate open inappropriately. This must be observed when utilising the F3E together with fire confining control systems, etc.

4 Type key

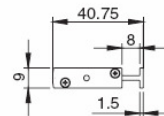
Model number	Detection area	channels	Number of optical axis	Pitch	Connection	Output
F3E-16-T1 5M	1800mm	16	46	120mm	5m cable pre-wired	potential-free output
F3E-16-T6					M8 Connector (4-pin)	
F3E-46-T1 5M	1800mm	46	136	40mm	5m cable pre-wired	
F3E-46-T6					M8 Connector (4-pin)	

5 Dimensions

Mounting strap fixation



Dimension	F3E-16...	F3E-46...
a5	25 mm	25 mm
a4	690 mm	650 mm
a3	640 mm	650 mm
a2	690 mm	650 mm
a1	25 mm	25 mm
h	2070 mm	2000 mm



6 Functional principles

6.1 General

The F3E consists of a transmitting strip (".../S" type designation) and a receiving strip (".../E" type designation). The LEDs in the transmitting strip emit infra red light rays in a predefined time sequence, whereby in the crossed beam function each LED transmits 3 times in each cycle. The receiving LEDs in the receiving strip receive this cyclic sequence whereby in crossed beams mode each receiving LED receives three times in each cycle with and without offset with respect to the transmitter. After each cycle the receiver evaluates according to the preset parameters, whether an object is present between the transmitting strip and the receiving strip, and switches its output to the corresponding state.. One cycle has a maximum duration of 50 ms or 140 ms (see the technical data). A new cycle starts thereafter, repeatedly.

The entire electronics module is incorporated within the sensor strips, and a voltage supply of 10-30V DC means that no separate power supply is required. The "relay" output is floating and electronic, i.e. without mechanical contacts subject to wear. Closing or opening contact function can be configured locally without requiring auxiliary equipment (see under parameter setting). It is also possible to connect the F3E to the mains voltage with the mains power supply unit NTR18/04 (see NTR18/04).

6.2 Object detection / monitoring grid

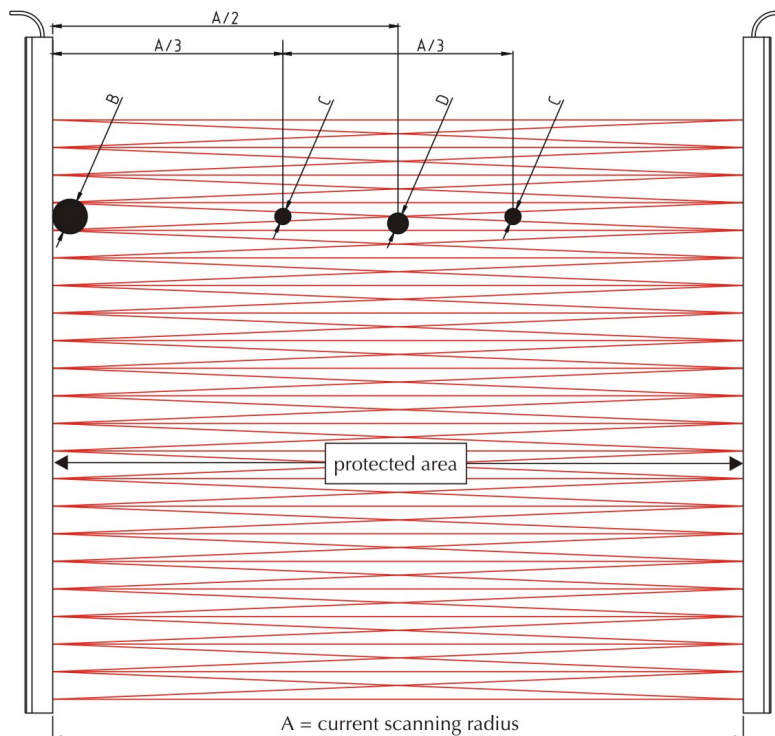
The mutual separation of the light rays (resolution) is equal to the separation of the LEDs in the transmitting and receiving strip (channels) directly at the sensor strips. Through the threefold crossing of the light rays a higher resolution is obtained inside the protection field than directly at the sensor strips. The resolution is almost twice as great in the middle of the protection field and almost three times as great at a distance of 33% and 66% of the actual range.

The size of the reliably detected objects is specified in the figure on the left with B, C and D.

This gives the following values for the various F3E variants:

F3E-16 (120 mm pitch): **B=125 mm** D=65 mm C=45 mm

F3E-46 (40 mm pitch): **B= 45 mm** D=25 mm C=18 mm



6.3 Fully automatic sensitivity regulation

The signal strength of the F3E is regulated automatically with the help of fuzzy logic (fuzzy interference). With the help of the fuzzy logic the quality of the signal (form and power) is assessed and the ratio with respect to previous signals is described.

This always achieves optimum light power without adjustment tasks, in the near field, in the fringe area and in the case of dirt accumulation. This functionality is sustained down to range "zero" also with F3E travelling on the doors or gates, irrespective of the door speed.

6.4 Parameters configurable locally

The parameters can be reconfigured locally without additional auxiliary equipment (see under parameter setting). Functions such as closing/opening contact, arbitrary channel suppression, inputs active on plus or minus, beam failure tolerance, etc., can be set. The respective parameter settings are made only for the transmitter. The data are optically transmitted to the receiver and stored permanently in both. It must be ensured that the transmitter and the receiver are located within the nominal range and that the light path is unobstructed throughout the parameter setting operation.

6.5 Beam failure tolerance

If it is found in the course of operation that a limited number of light beams are obstructed for longer than 60 seconds, the F3E assumes that a defect or manipulation (chewing gum) is the cause and deactivates these channels. The F3E then functions normally again, but indicates the failed beams with the red fault LED as continuous signal. The monitoring time and the number of beams (max. 9) can be configured as parameters. The positions of the light beams relative to each other is arbitrary. This status is reset after switching off and on.

Note: The sync channel is an exception. It must not fail.

6.6 Arbitrary channel suppression

By covering (obstructing) receiving LEDs (channels) and activating the function "Channel suppression" (see parameter setting) the F3E can be taught to exclude the covered channels from the object detection. After removing the coverings, the F3E functions quite normally, but without the suppressed areas. This setting is permanently saved and thus retained even after switching off and on again. In the case of intended changes, the procedure can be cancelled and repeated any desired number of times.

6.7 Test input

In order to be able to detect a possible functional disturbance, the F3E can be checked via the test input for proper functioning, e.g. prior to every door movement. The transmitter switches off when a signal is applied to this input. The receiver output should then switch off, too, within the maximum response time, and this can be verified by the higher-level control system. If the test input is not required, it can be left with nothing connected to it. The test input can be driven as +10-30V or as 0V signal (see under parameter setting).

6.8 Switch-on delay (door open time)

When the light path of the F3E becomes unobstructed (again), the F3E normally switches back to the active state with the fastest possible response time. However, it is possible to configure a delay time (see under parameter setting) to delay restoration of the active state. For example, this can be used without additional effort to take into account an open time required by the door, when retrofitting the F3E on older types of doors.

6.9 Switch-off delay (function "slow light curtain")

When the light path of the F3E is interrupted, the F3E normally switches off with the fastest possible response time. However, a switch-off delay can be configured (see under parameter setting), in order to delay detection of the interrupted state of the light path.

Example: If a switch-off delay time of 1 second is configured, the F3E switches off the output only after the light beam has been interrupted continuously for at least one second. If, for example, the obstruction of the light path disappears again within this one second, the time delay will restart from the beginning when the light path is interrupted again.

6.10 Buzzer

When using the mains power supply unit NTR18/04, an optional processor controlled buzzer is provided in the mains power supply unit (see mains power supply unit NTR18/04). The buzzer sounds when the light curtain is interrupted for too long (configurable time), or immediately with configurable duration, in each case as intermittent or as continuous sound. If both times are configured, the buzzer will start to sound upon interruption of the light path after the first time has elapsed, and it will then continue to sound until the set maximum duration time has elapsed. The buzzer can also be deactivated.

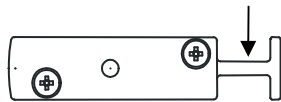
7 Installation

7.1 Mounting instructions



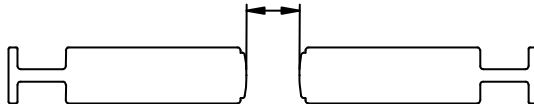
The following instructions must be observed to ensure undisturbed operation:

1. The connection of the sensor strips to the earthed car must be conductive. This is usually already ensured by the standard fastening.
2. The F3E operates with a modulation frequency of approx. 90 kHz (see under the technical data). Please avoid foreign light sources in the vicinity of the F3E receiver if they operate with a similar frequency (60 - 120 kHz). If such foreign light sources radiate too strongly into the receiver, incorrect switching operations of the F3E could take place during the times when these foreign light sources are switched on.
3. It is not admissible to open the sensor strips. Opening them would void all warranty and liability of the manufacturer.
4. The sensor strips with lug attachment have 2 to 4 fixing holes. If you require more holes, they can be added in the same form (see the arrow).

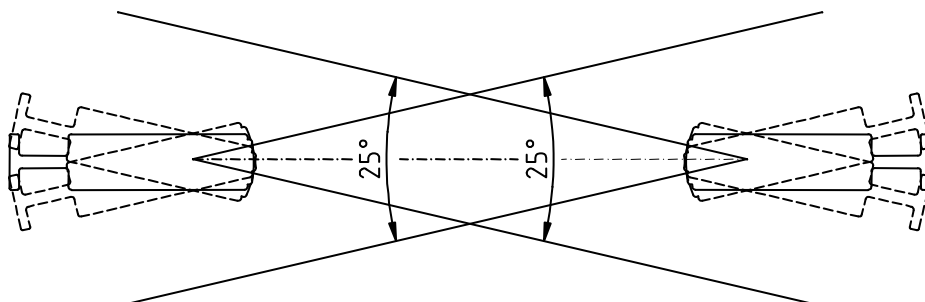


5. No further fixing bolts may be welded onto the sensor strips with bolt attachment. Modifications will be made only by the manufacturer.
6. Minimum permitted separation of the sensor strips

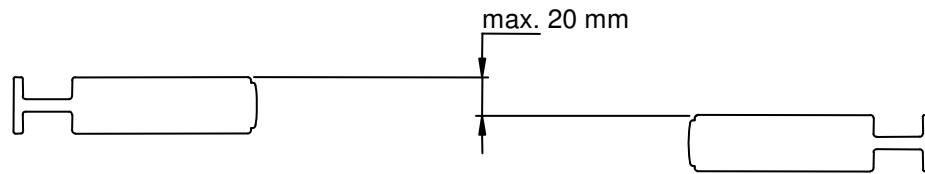
Range 5m: min. 10 mm
Range 10m: min. 500 mm



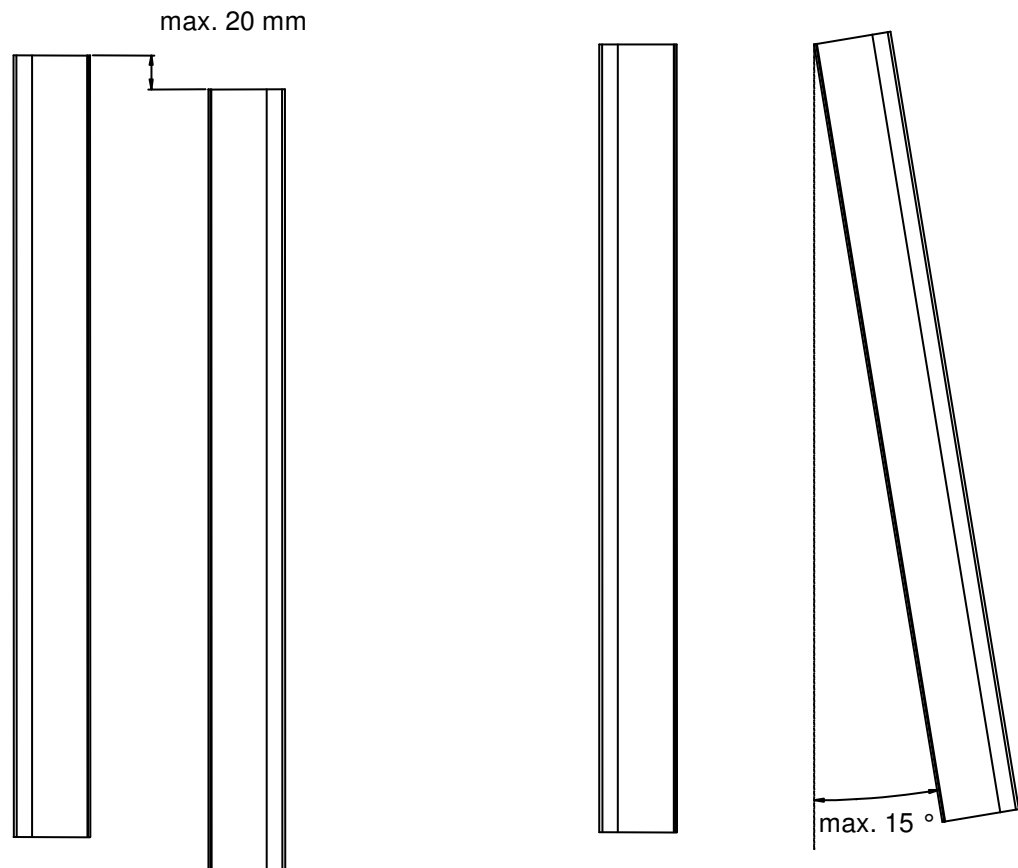
7. Maximum permissible rotation (depending on the range)



8. Maximum permissible lateral displacement (depending on the range)



9. Maximum permissible vertical displacement and deviation from parallel (depending on the range)



10. The limit values specified above must not be reached in combination, i.e. the sensor strips must not be mounted strongly rotated and at the same time not parallel.

7.2 Static mounting

7.2.1 General

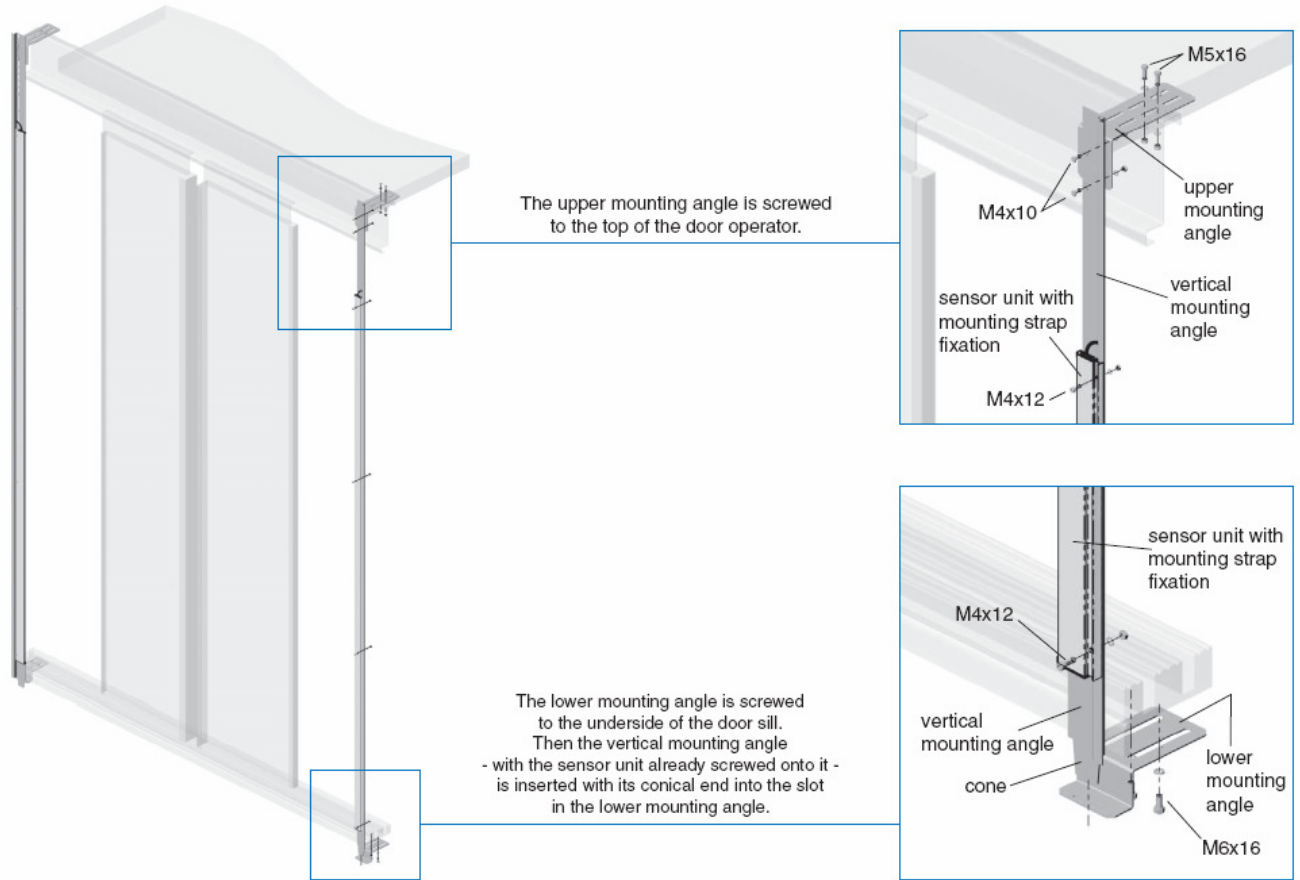
For static mounting the sensor strips are attached to non-moving parts of the door or gate. Thus they do not move with the door. All F3E variants may be utilised in this mode.

7.2.2 F3E Installation Kit S

The Installation Kit S has been specially developed for lifts. The F3E sensor strips with lug attachment are mounted with the help of the Installation Kit S in the door operating region between the cabin and the landing door. Thus the F3E can be mounted on almost all centrally and laterally opening automatic doors.

The Installation Kit S serves at the same time as twist-preventing stable extension of the F3E sensor strips. This provides a low-cost standardised mounting possibility for normal lift cage heights (see the illustration).

Installation Kit S



7.3 Dynamic mounting

7.3.1 General

In dynamic mounting the sensor strips are attached to moving parts of the door or gate. Thus they travel with the door.

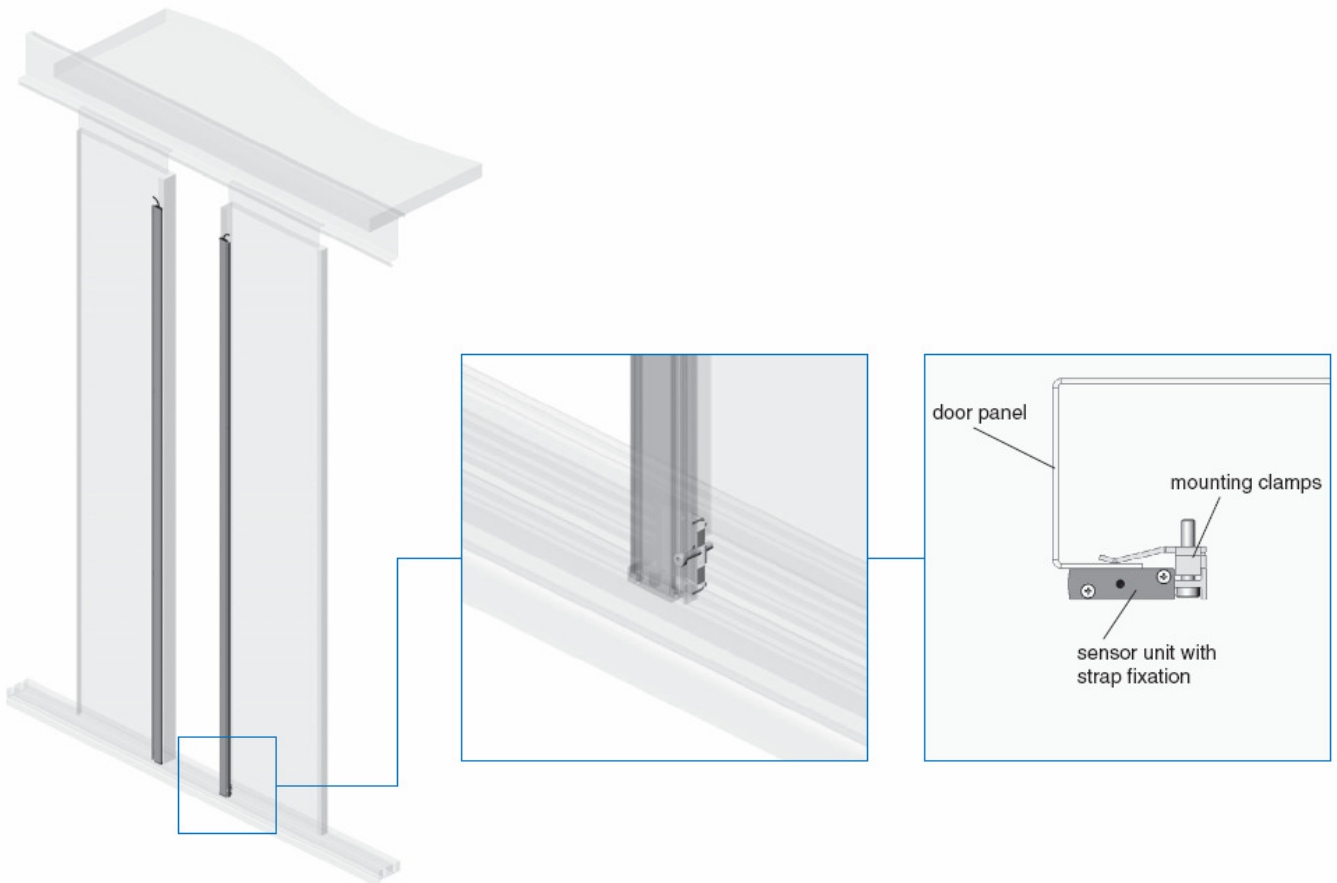


NOTE: Only the F3E variants with highly flexible connecting cables (see type key) can be used for this purpose.

7.3.2 F3E Installation Kit M

For mounting the F3E on the door wings the F3E sensor strips with lug attachment can either be bolted directly onto the fold of the door wings, or the Kit M clamp holders can be used. With Installation Kit M the sensor strips can be clamped very quickly on the fold of the door wings without having to drill a hole.

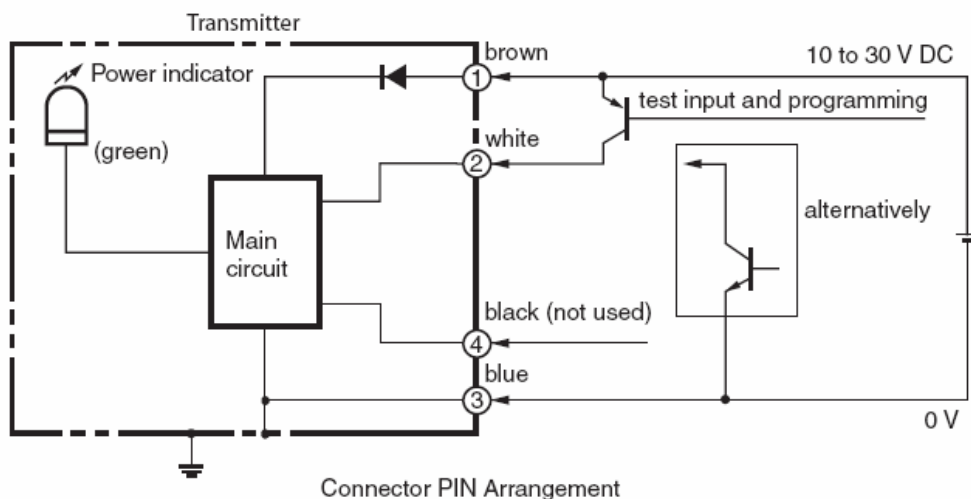
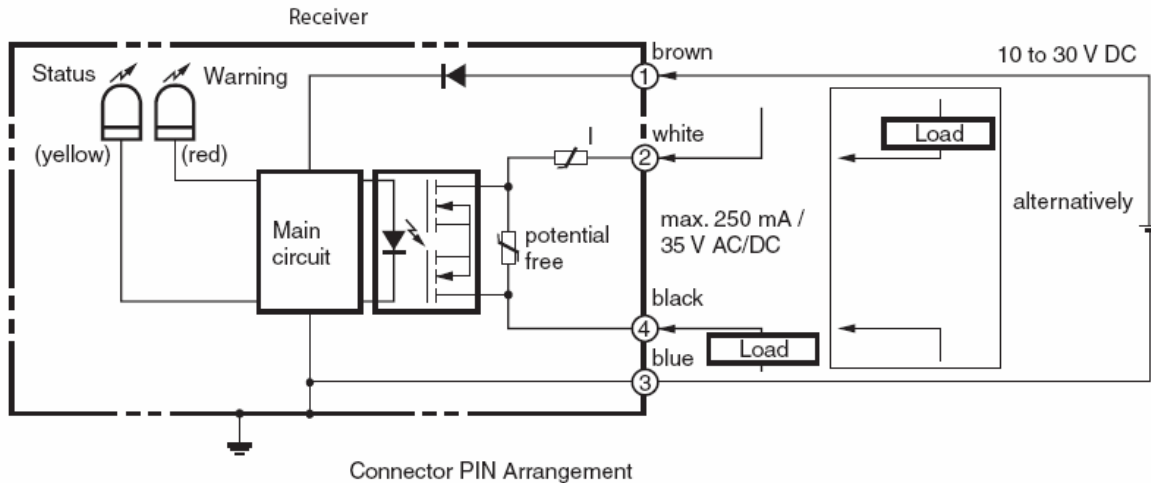
Installation Kit M



8 Connection

8.1 General

Normally the F3E is connected directly to the +10...30V DC power supply of the higher level system (see the technical data for current drain, switching capability, etc.). The terminal assignments are in each case also shown in the rating plate on the sensor strip.



8.2 Switching output on the receiver

The switching output between the pins 2 and 4 or between the conductor colours white and black is designed as floating electronic "contact". This output circuit also contains an electronic fuse. When this fuse operates in response to an excessive current drain due to overcurrent or short circuit in the output circuit (see under technical data), the output impedance becomes high (the output opens). The output operates normally again only after removing the excessive current drain and elapse of a waiting time of a few seconds thereafter.



NOTE:

In the non-powered state of the F3E the output is always open, regardless of the configuration as closing or as opening contact.

9 LED status indicators

Transmitter	
Yellow LED	Description 0 = off / 1 = on
0	Transmitter is off (no voltage)
1	Transmitter is operating
flashing	Test input is active

Receiver		
Yellow LED	Red LED	Description 0 = off / 1 = on
0	0	Receiver is off (no voltage)
0	1	Light path is interrupted (output is not switched)
1	0	Light path is unobstructed (output is switched)
1	1	Light path is unobstructed, but beam failure tolerance is activated (output is switched)
0	flashing	Dirty, incorrectly adjusted or range limit (output is not switched)
1	flashing	Dirty, incorrectly adjusted or range limit (output is switched)

10 Parameter setting

All parameters have already been set in the factory. However, if it is necessary to make changes locally, this will be possible by means of the test input on the transmitter without requiring any further auxiliaries. All parameters are permanently stored in the so-called flash memory (the stored values are always preserved, even without applied voltage).

10.1 Notes and instructions

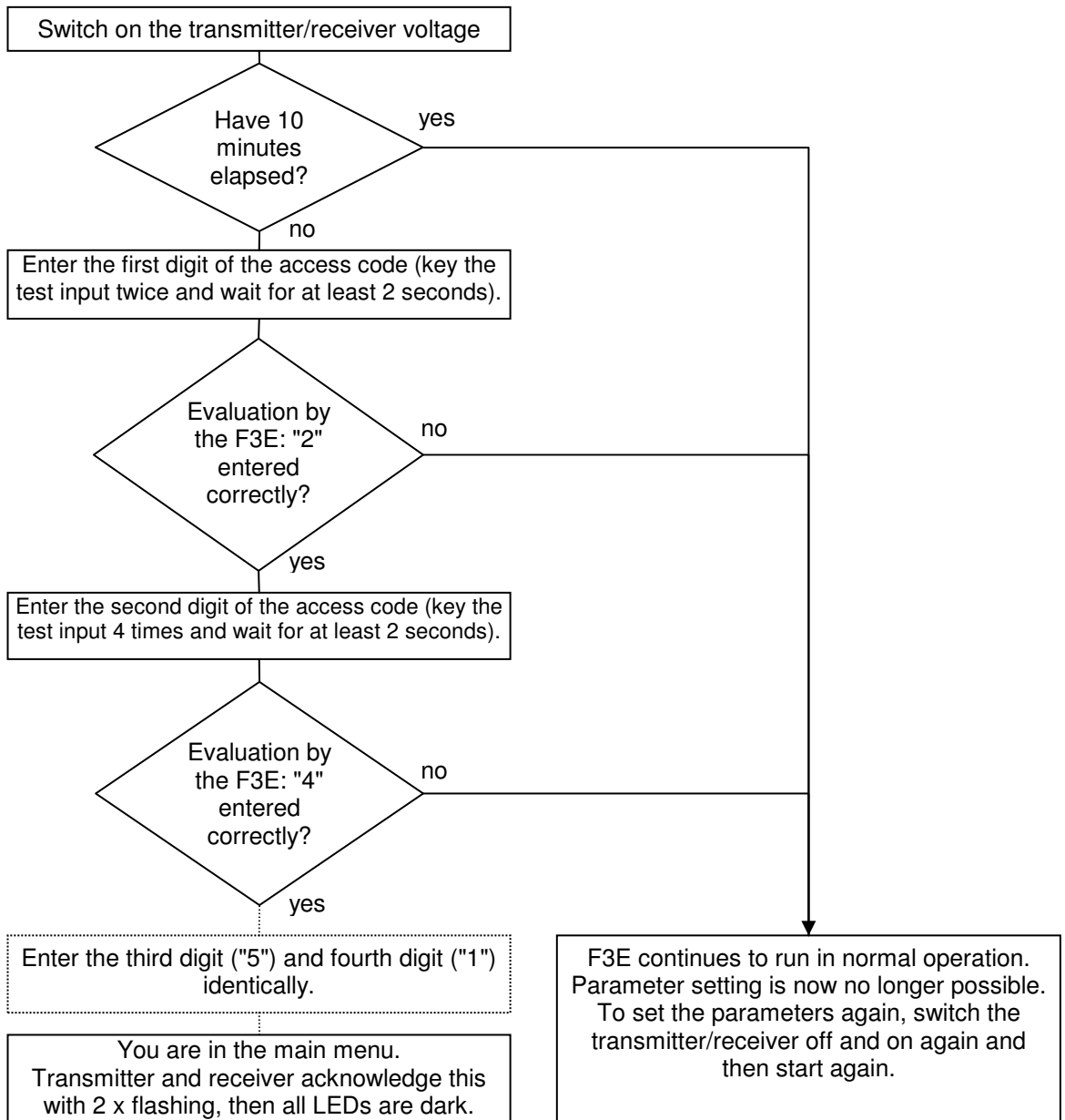


- The parameter setting mode can be activated only within the first 10 minutes after switching on the F3E.
- If you wish to activate the parameter setting mode, the test input must not be switched previously otherwise.
- For parameter setting the transmitter and the receiver must "see each other" and must be operating within the nominal range.
- During code input for activating the parameter setting mode the F3E is in normal operation, i.e. the test input also functions normally for the time being (transmitter and receiver switch off too).
- If an incorrect digit is entered during the code input, the F3E will wait for a new code sequence. This must then be entered from the beginning.
- For the subsequent counting of channels (LED No.), counting is always from the top (on the cable side) to the bottom. On F3E with LED grid 20mm, 40mm and 60mm count the LEDs as 1, 2, 3, 4, ..., on F3E with LED grid 120 count 2, 4, 6, 8,
- The changed parameters are saved immediately when the value is correct.
- The access code is the same for all F3E and cannot be changed. Since access to the connecting cables must always also be possible to enter the code, extensive protection against abuse is given in connection with the access code.
- When no further entries are made during parameter setting, the transmitter and receiver automatically revert to normal operation after 10 minutes.
- If you find during parameter setting that something has come into the light path or the receiver has not received a value (it does not acknowledge, or the transmitter is back in the main menu, but not the receiver), simply switch the F3E off and on again, type in the access code again and then re-enter the same parameter.

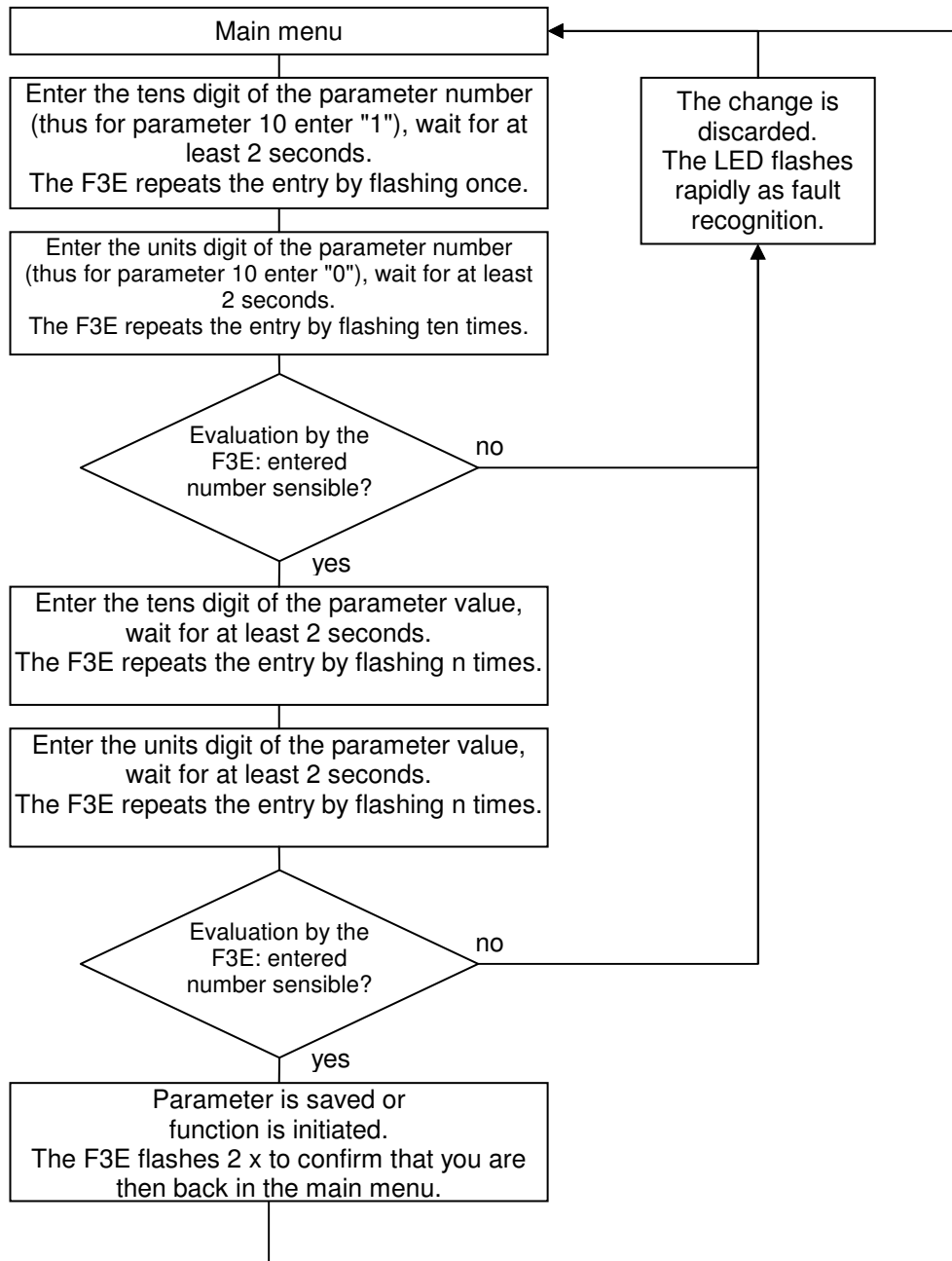
10.2 Action sequence of parameter setting

- Use the test input on the transmitter for entering all digits. A digit must be entered at the test input with a keying rate of 100 ms to 1.5 s (thus for a 5 you must hold the keying input 5 times in succession briefly on +24V, or for low active inputs 5 times on 0V). You must then wait for at least 2 seconds. If a typed-in digit was plausible, the transmitter and receiver repeat the entered digit as confirmation. You can then enter the next digit in the same manner, and so on.
- The access code for all F3E is the **digit sequence "2451"**.
- During parameter setting (i.e. after entering the access code) the receiver acknowledges each value with its yellow LED after the entry.
- At the same time as with the LED, the receiver also acknowledges the value with its output. This means that you can also make the parameter settings of the F3E with the help of the higher-level control system (PLC) and thereby receive the return message via the normal receiver output. Note: If parameter 13 = 00, the output will acknowledge with contact closing pulses. If parameter 13 = 01 it will acknowledge with contact opening pulses
- The transmitter additionally acknowledges the value with its yellow LED (also after the entry).
- Always look at the yellow LED of the receiver while setting parameters.

10.2.1 Entering the access code



10.2.2 Changing parameters / function initiation



10.3 Parameter list

No.	Description	Value	Description								
11	Sync channel No.	01 – N	<p>01 = Highest channel (on the side of the connecting cable)</p> <p>N = Lowest channel (thus 16 for an F3E-16/xx)</p> <p>With crossed beam function (see Par. 14) settings in the range 2 to N-1 are here allowed. With parallel beam function settings in the range 1 to N are allowed. Note: The transmitter and receiver synchronise with respect to each other with the help of the sync channel. Data transmission during parameter setting also runs via this channel. The sync channel must always remain activated.</p> <p>Factory setting: <u>grid 20,40,60:</u> From F3E-03 to -08: channel 02 From F3E-09 to -16: channel 07 From F3E-17 to -64: channel 14</p> <p><u>grid 120:</u> From F3E-03 to -08: channel 04 From F3E-09 to -16: channel 14 From F3E-17 to -64: channel 28</p>								
12	Polarity of the inputs e.g. test input	00 01	<p>00 = Input activated with 0V at the input ("low active" / "common anode")</p> <p>01 = Input activated with +10-30V at the input ("high active" / "common cathode")</p>								
13	Output closing contact / opening contact	00 01	<p>00 = Closing contact ("bright switching")</p> <p>01 = Opening contact ("dark switching")</p> <p>Note: The output is always open when the light curtain is not powered up</p>								
14	Beam type	00 01	<p>00 = Parallel beams</p> <p>01 = Triple crossed beams</p> <p>Note: The maximum response time of the F3E is 50 ms for parallel beams and 140 ms for crossed beams</p>								
15	-	-	Reserved for future applications								
16	-	-	Reserved for future applications								
17	Time for beam failure toleration	00 – 60	<p>00 = Off</p> <p>01 – 60 = Time in 10-second steps</p> <p>Example: 06 means that a defective LED will be gated out after 60 seconds</p>								
18	Maximum number of beams for beam failure tolerance	01 – 03	<table border="0"> <tr> <td>For parallel beams:</td> <td>For crossed beams:</td> </tr> <tr> <td>01 = 1 light beam</td> <td>01 = 3 light beams</td> </tr> <tr> <td>02 = 2 light beams</td> <td>02 = 6 light beams</td> </tr> <tr> <td>03 = 3 light beams</td> <td>03 = 9 light beams</td> </tr> </table> <p style="text-align: right;">Factory setting: 02</p>	For parallel beams:	For crossed beams:	01 = 1 light beam	01 = 3 light beams	02 = 2 light beams	02 = 6 light beams	03 = 3 light beams	03 = 9 light beams
For parallel beams:	For crossed beams:										
01 = 1 light beam	01 = 3 light beams										
02 = 2 light beams	02 = 6 light beams										
03 = 3 light beams	03 = 9 light beams										
19	Switch-on delay (door open time)	00 – 60	<p>00 = Off</p> <p>01 – 60 = Time in one-second steps</p> <p>Example: 03 means that the light curtain switches on again only when 3 seconds have elapsed after the light path has become unobstructed</p>								
20	Energy saving mode	01 – 03	<p>The current drain (without heater) of the F3E is reduced by approx. 10% for each increment of the numerical value</p> <p>Attention: At the same time the maximum response time becomes smaller by the set factor, thus as follows depending on the set beam mode (see Par.14):</p> <ul style="list-style-type: none"> - Crossed beams: Value x 110 ms + 30 ms - Parallel beams: Value x 38 ms + 12 ms 								
21	Switch-off delay (Function "slow light	00 – 99	<p>00 = Off</p> <p>01 – 99 = Time in 100-ms steps</p>								

	curtain")		Example: 10 means that the output of the F3E switches off only when the light beams have been interrupted since 1 second
No.	Description	Value	Description
51	Function activation	10 – 14	10 = End of the parameter setting 11 = Reset to the factory settings 12 = Channel gate-out 13 = Output all parameters as flashing code 14 = Copy all parameters of the transmitter to the receiver (any set channel gate-out, parameter 51 12, is not copied either) 15 = Input all parameters from a PLC
<p>For 10) The F3E reverts to normal operation. Can take place alternatively by switching the power supply voltage off and on again.</p> <p>For 11) The transmitter and the receiver set themselves back to their respective factory settings.</p> <p>For 12) <ul style="list-style-type: none"> • On activation the free channels are read in and the obstructed channels are permanently deactivated. • All relevant <u>receiver</u> LEDs must previously be covered with opaque adhesive tape • The sync channel must not be obstructed. If it has to be covered too, it must first be moved to a position of the F3E that can remain unobstructed. The sync channel is moved with Par. 11. • The position of the covered channels is in other respects arbitrary. You can also deactivate several ranges. • At least two channels must be left active, namely the sync channel and any one other channel. • If a neighbouring channel with respect to a still active channel is deactivated, of course the crossed beam function to this deactivated channel is inactive. </p> <p>For 13) All stored parameters are output successively. The transmitter and the receiver output their values independently of each other. Thus in the case of doubt let this function run twice and write down the values separately. They must always agree, otherwise the F3E will not function correctly. After the "3" of the entered "13" has also been acknowledged, the parameter output commences: X = Value of the parameter 11 (tens digit) X = Value of the parameter 11 (units digit) X = Value of the parameter 12 (tens digit) X = Value of the parameter 12 (units digit) ... X = Value of the parameter 21 (tens digit) X = Value of the parameter 21 (units digit) Example: 0 4 ... means that parameter 11 is set to the value 04, etc.</p> <p>For 15) xx</p>			

11 The most common errors

<i>Symptom</i>	With dynamic mounting the F3E sometimes interrupts when opening and closing the door / the gate.
<i>Possible cause</i>	<ol style="list-style-type: none"> 1. The sensor strips are not adjusted properly according to the instructions 2. Severe EMC disturbance of the door/gate drive 3. An object is sporadically present in the light path
<i>Solution</i>	<p>For 1. Check the adjustment (see the mounting instructions)</p> <p>For 2. Check the earthing of the sensor strips. The housing of the transmitter strip and of the receiver strip must be earthed. Check the feeder cables. No lines for voltages <30V should be located together with lines for voltages >30V in the same cable, e.g. 230VAC and 24VDC signals.</p> <p>For 3. Check whether, for example, a cable, loose sticker or other such object can come into the light path while the door/gate is running</p>

<i>Symptom</i>	With dynamic mounting the F3E interrupts shortly before reaching the open state of the door or gate. With static mounting the F3E always interrupts.
<i>Possible cause</i>	<ol style="list-style-type: none"> 1. The sensor strips are not adjusted properly according to the instructions 2. The filter discs are dirty 3. An object is present in the light path 4. The F3E is defective
<i>Solution</i>	<p>For 1. Check the adjustment (see the mounting instructions)</p> <p>For 2. Clean the filter discs of the transmitter strip and of the receiver strip (see under maintenance). Possibly the filter discs are scratched or blind due to improper cleaning.</p> <p>For 3. Check that there is really not an object in the light path</p> <p>For 4. The F3E must be replaced (see the instructions for replacement)</p>

<i>Symptom</i>	With dynamic mounting the F3E interrupts when the door or gate is almost closed.
<i>Possible cause</i>	<ol style="list-style-type: none"> 1. The sensor strips are not adjusted properly according to the instructions 2. The sync channel is set differently at the transmitter and at the receiver after replacing a sensor strip
<i>Solution</i>	<p>For 1. Check the adjustment (see the mounting instructions)</p> <p>For 2. The transmitter and the receiver must always be replaced as a matched pair (see the instructions for replacement). Alternatively: Set the sync channel such that it is matched at the transmitter and receiver (see under parameter setting).</p>

<i>Symptom</i>	The red LED at the receiver does not switch off, but the F3E is functioning normally
<i>Possible cause</i>	This is the indication of beam failure tolerance (see under beam failure tolerance)
<i>Solution</i>	<p>Switch the F3E off and on again.</p> <p>If the F3E then does not switch active immediately, but only after about 60 s (depending on the parameter settings), exactly one LED is still obstructed or defective. Immediate replacement of the F3E is not necessary.</p>

<i>Symptom</i>	The red LED on the receiver flashes with a period of 1 s, but the F3E is functioning normally
<i>Possible cause</i>	This is the indication of weak signal detection, i.e. the range limit is nearly reached. Possible causes for this are: <ol style="list-style-type: none"> 1. Incorrect adjustment 2. Dirty filter discs
<i>Solution</i>	For 1. See the mounting instructions for adjustment For 2. Clean the filter discs if necessary (see under maintenance)

<i>Symptom</i>	No LED is lit on the transmitter and/or: No LED is lit on the receiver
<i>Possible cause</i>	<ol style="list-style-type: none"> 1. no power supply voltage 2. The F3E is defective
<i>Solution</i>	For 1. Check the connection (correct conductor colours?). Measure the voltage at the terminals of the F3E (see under connections) For 2. Replace the F3E pair (see the instructions for replacement)

<i>Symptom</i>	During initial operation, the yellow LED is lit on the transmitter, but only the red LED is lit on the receiver. The F3E does not switch to the active state.
<i>Possible cause</i>	<ol style="list-style-type: none"> 1. The transmitter and the receiver do not match 2. The parameter settings of the transmitter and of the receiver are different
<i>Solution</i>	For 1. Please check the rating plates on the transmitter and receiver. The type keys must be identical except for /S and /E. For 2. See under parameter setting

<i>Symptom</i>	The receiver does not switch to the activated state (the yellow LED is off), and the yellow LED is flashing on the transmitter
<i>Possible cause</i>	<ol style="list-style-type: none"> 1. The test input on the transmitter is active
<i>Solution</i>	For 1. Check the test input. If it is configured to "high active", it must lie at 0V potential or be open. If it is configured to "low active", it must lie at +10-30V potential or be open (see under parameter setting)

<i>Symptom</i>	The red and yellow LEDs flash irregularly, partly furiously. Reducing the range brings improvement, but sporadic interruptions persist even with small ranges.
<i>Possible cause</i>	<ol style="list-style-type: none"> 1. Condensation is present inside the F3E housing, i.e. the circuit boards have become moist. There is (partial) condensation on the inside of the red filter discs. 2. When connecting / during initial operation of the higher-level control system or of the F3E an error has occurred. A voltage > 63V was connected between the 0V supply line of the F3E and earth. Some control systems permit brief false terminal connections during initial operation (e.g. a short circuit between the 230V phase line and the 24VDC signal voltage). This makes a 230VAC voltage appear between 0V and ground and destroys the internal protection capacitors of the F3E and possibly also other electronic devices, without this becoming immediately apparent. The devices (F3E) then behave unstable with respect to EMC disturbances. 3. A fault has occurred in operation of the higher-level control system or in operation of the F3E. A voltage >63V appeared

	between the 0V supply line and earth (see 2.)
<i>Solution</i>	<p>For 1. Check whether the protection system of the transmitter strip and receiver strip is IP54 or IP65. Protect IP54 strips against weather influence, rapid temperature changes, fog, etc. If this is impossible, at least the protection system IP65 must be provided. If the F3E is utilised outdoors, also consider using the variant with heater. The variant with heater must also not be exposed directly to the weather. Protect this variant too, e.g. with a rain roof.</p> <p>For 2+3. Measure the potential difference between 0V and earth, also when the lift is running or the door/gate is moving. Normally there should be no potential difference, not even briefly. The 0V line should normally be connected to earth in the control system (see the circuit diagram of the higher level control system). If there is any doubt, power down the plant and then measure the resistance between the 0V line and earth. The ideal value is 0 Ohms. After checking and remedying the fault, the F3E pair must be replaced (see the instructions for replacement).</p>

<i>Symptom</i>	The output of the F3E does not close. But the yellow status LED indicates the switching state correctly.
<i>Possible cause</i>	<ol style="list-style-type: none"> 1. There is an electronic fuse in the output circuit. When this fuse operates in response to an excessive current drain due to overcurrent or short circuit in the output circuit (see under technical data), the output impedance becomes high (the output opens). 2. The output circuit is defective
<i>Solution</i>	<p>For 1. The output operates normally again only after removing the excessive current drain and elapse of a waiting time of a few seconds thereafter.</p> <p>For 2. The output circuit has possibly been destroyed by a voltage that was too high. Replace the F3E (transmitter and receiver, see the instructions for replacement). Before the next switch-on of the control system check whether the output was closed correctly and that no excessively high voltage can appear (see the technical data).</p>

<i>Symptom</i>	The access code for parameter setting is not accepted.
<i>Possible cause</i>	<ol style="list-style-type: none"> 1. More than 10 minutes have elapsed since switching on the transmitter or receiver 2. The light path between the transmitter and receiver is obstructed 3. The distance between the transmitter and receiver is too great 4. The polarity of the test input is + (i.e. test input active with +10-30VDC) but you are trying to enter the code by keying/bridging to 0V. You can determine the polarity setting as follows: If the F3E is functioning normally while the test input is connected to 0V, you must key-in the code with +, (and conversely). 5. The polarity of the test input is - (i.e. the test input is active with 0V), but you are trying to enter the code by keying/bridging to +
<i>Solution</i>	<p>For 1. Follow the instruction in the parameter setting section</p> <p>For 2. Follow the instruction in the parameter setting section</p> <p>For 3. Follow the instruction in the parameter setting section</p> <p>For 4. -</p> <p>For 5. -</p>

12 Technical data

Item/Type	F3E-16-T[..]	F3E-46-T[..]
Rated sensing distance	0-5 m	
Number LEDs	16	46
Number of optical axis	46	136
Resolution	120 mm	40 mm
Vertical detection area ¹	20-1820 mm	
Response time	max. 110ms (signal interruption)	
Light source (wave length)	Infrared LED (880 nm)	
Power supply voltage	10-30 VDC	
Current consumption	max. 120 mA / pair	max. 240 mA / pair
Control output	Wearless potential free output, 35 V AC/DC max., 150mA max. at 20°C, 100mA max. at 60°C, D-ON (parameterization by emitter test input), max. leakage at open contact 0,001mA, contact resistance 4/12 Ohm	
Test input / light emission stop function	110 ms max. response time	
Ambient light immunity ²	200.000 lux	
Ambient temperature	-20...+60°C (operation) ³ , -40...+70 (storage)	
EMC conformity/standards	73/23/EWG; 89/336/EWG; 95/16/EG; EN81-1; EN81-2; EN12015; EN12016; EN61000-6-x	
Protective degree	IP54	
Connection methods	Pre-wire type (5 m PVC cable), M8-4-PIN	
Indicator LEDs	Emitter: power indicator (yellow); Receiver: output indicator (yellow), output indicator (red)	
Error status indication	Red LED blinking: unstable operation, contamination, max. exceeding sensing distance Red LED ON + yellow LED ON: beam channel defect	
Dimension ¹	2070x40,7x9 mm	2000x40,7x9 mm
Weight	880g (connector version), 1040g (cable version)	
Material	Case	Aluminum
	Cable	PVC

¹ other sizes available on request

² Measured at angle of 20°

³ No icing and condensation

13 Maintenance

1.1 Safety instructions

The light curtain F3E can only be used in technically perfect condition. Keep all documentation included in the delivery such as this manual ready at hand and constantly at the site of operation. Keep the documentation always current. This especially applies to modifications of the higher-ranking control system carried out later. Please observe all safety and danger notes of the system and always keep them legible.

1. If there are changes to the environmental influences such as temperature, humidity or a potentially explosive atmosphere during the operating time of the system or storage period of the F3E the manufacturer (STRACK) must be notified to adjust the system if necessary, to the new circumstances.
2. Only the manufacturer's original spare parts (STRACK) must be used.
3. Do not perform repairs on control units or sensor strips independently.

A failure to comply with these instructions or changes to the F3E can cause additional danger excluding the liability of the manufacturer for damages resulting from this.

1.2 General maintenance intervals

The F3E is designed and constructed to function largely trouble-free and with low maintenance. However, it is mandatory to check the functions of the F3E at regular intervals.

1.3 Cleaning the sensor strips

Depending on the degree of dirt accumulation on the plant, the filter discs of the sensor strips must be cleaned at corresponding intervals. However, only clean the discs with a soft, moist cloth, if necessary, with a small amount of detergent.

Do not use any abrasives or additives that attack plastics. Do not rub in the dry state, because this can make the plastic discs go blind and thus reduce the range.

14 Instructions for replacement

1. Always replace the complete F3E consisting of the transmitter strip and the receiver strip. Make sure that the replaced pair is returned together for repair.
2. If an F3E has to be replaced, please check whether the present parameter settings have been noted (see under parameter setting). If not, please check whether the F3E transmitter is still functioning to the extent that the parameter settings can be read out. Note these parameter settings in the table in the parameter setting section.
3. After replacement it may be necessary to make parameter settings in the new F3E (see under parameter setting). The factory settings are also noted on every F3E transmitter strip and receiver strip. Only transmitters and receivers that have the same parameter settings will function properly as pair.
4. Make sure that the type designations on the transmitter and receiver differ only with the specification /S for the transmitter and /E for the receiver.
5. Bolt the transmitter again on the door/gate side on which the transmitter was mounted previously.

15 Storage


1. Only store the units at an admissible temperature (see technical data) under normal broader storage conditions for electrical appliances.
2. Check the condition of the units when removing them from storage. They must not show any severe contamination with dirt, mechanical damage or deformation.

16 Packing and disposal

The customer is responsible for disposing of the delivered goods after termination of their service life at his own expense and in accordance with the statutory regulations, and to hold STRACK LIFT AUTOMATION GmbH free from obligations according to Art 10 Section 2 ElektroG (Manufacturer's take back obligation) and third party claims in connection therewith.

17 EC Declaration of conformity

We hereby declare that the units listed below fully comply with the relevant essential protection requirements of the listed directives with regard to their design and components as well as in the version marketed by us in compliance with our circuit and assembly suggestions. The units complying with this declaration are provided with CE emblem. This declaration becomes invalid should the unit be modified without our approval.

Type designation	F3E - ...
Short description	Infra red light curtain as reversing control device for power-actuated doors and gates for indoor and outdoor operation
Basis are the following directives	Low voltage directive 73/23/EEC EMC directive 89/336/EEC Lift directive 95/16/EC
Applied standards	EN 81-1 EN 81-2 EN 12015 EN 12016
Applied draft of standards	EN 61000-6-1 (2005) EN 61000-6-2 (2005) EN 61000-6-3 (2005) EN 61000-6-4 (2005)
	

This explanation is issued by the responsible manufacturer

on
26 September 2006 by
Dipl.-Ing. Dirk Strack, General Manager



Note: The STRACK products mentioned above are intended exclusively for incorporation in power-actuated doors and gates or in assembly together with other plant parts. The initial operation or distribution within the European Community is admissible only if the finished product conforms to the relevant harmonised directives of the EC.