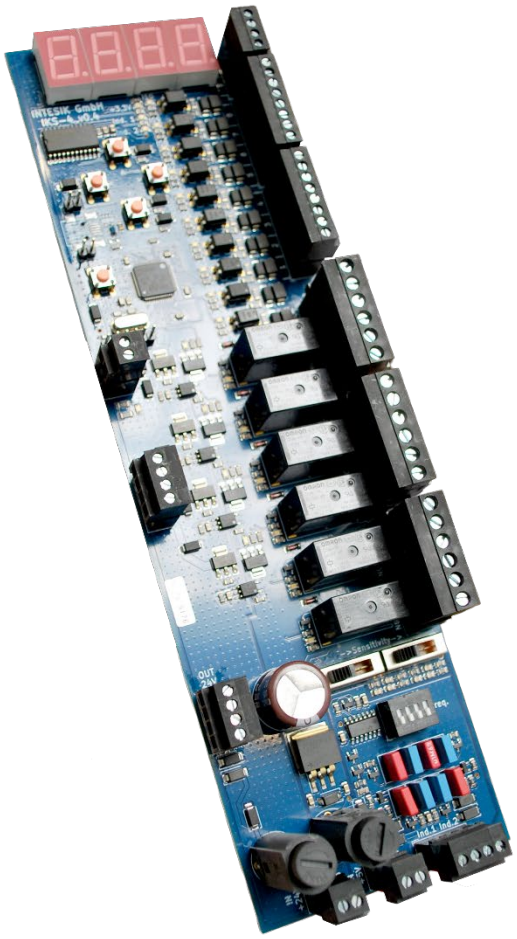
INTELLIGENT SAFETY BARRIERS

Barrier systems ■ Bollard systems ■ Vehicle barriers

Manual

Control unit IKS/F-IV



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Important notes, READ CAREFULLY!!!

IMPORTANT NOTES!!!

Read this entire manual before install and operate the barrier.

Electrical devices such as barriers may be installed, operated, serviced and maintained only by qualified personnel. The INTESIK GmbH takes no responsibility for any consequences arising from the use of this product.

Incorrect operation can result in dangers that include damage of the material, severe personal injury or even death.

Read these instructions carefully before installing and operating the barriers. Installation, adjustment, repair and maintenance may only be carried out by qualified personnel.

The user is responsible for compliance with all relevant international and national electrotechnical requirements regarding the protective earthing of all devices.

Numerous components of the barrier, including the circuit boards, are supplied via the mains voltage. DO NOT TOUCH! Use only electrically insulated tools.

- Do not touch unshielded components or screw connections with voltage present.
- Steps before servicing the barrier:
  - Cut off any electrical supply.
  - Install a sign with the words “DO NOT SWITCH ON” on all power switches.
  - Lock the circuit breaker or disconnector in the open position.
  - WAIT 15 MINUTES to allow the DC bus capacitors to discharge (barrier with IKS/F-III).
  - Measure the voltage of the DC bus between the PA/+ and PC/- terminals to ensure that the DC voltage is less than 42 volts (barrier with IKS/F-III).
  - If the DC bus capacitors do not discharge completely contact INTESIK GmbH. In this case the inverter must not be repaired or put into operation.
- Install all covers and close them before operating the barrier again.

Not following these instructions will result in death or serious injury!

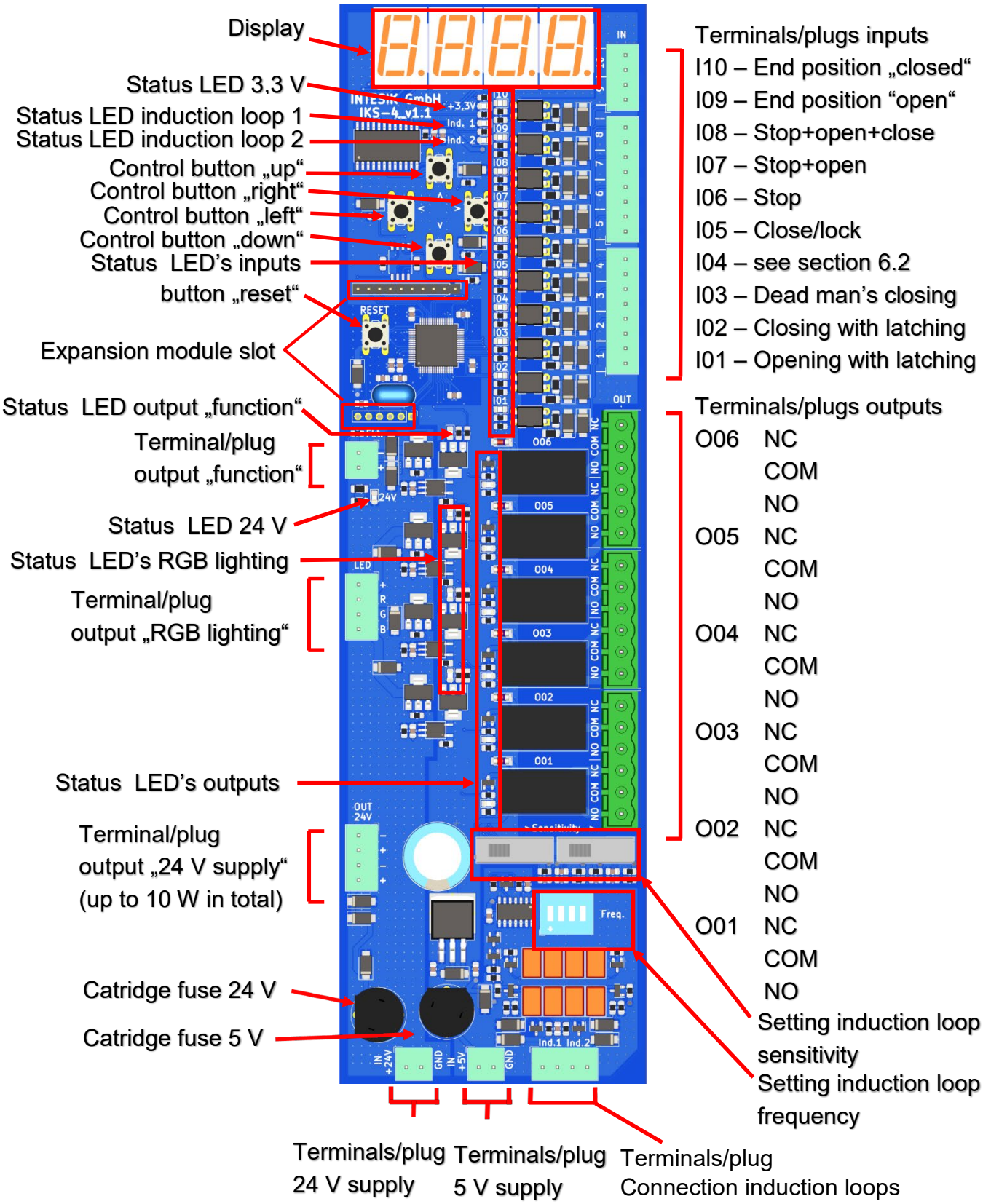
EQUIPMENT DAMAGE

Do not install the barrier or accessories and do not take it into operation if damages can be seen on any components.

Not following these instructions can result in death, serious injury or equipment damage!

1. Control unit IKS/F-IV

1.1. Illustration of control board IKS/F-IV



1.2. Signals from the terminal block - X1

1	Open Latching
2	Open Latching
3	COM
4	COM
5	COM
6	Close Latching
7	COM
8	Stop+open
9	Supply +24V
10	Supply +24V
11	Supply GND
12	Supply GND
13	COM
14	Reed sensor end position opened
15	COM
16	Reed sensor end position closed

1.3. Pushbutton, LED's, inputs and outputs

Pushbutton/plug:

Reset
- Restarts the control unit.
- The set parameters are retained.
- If at least one induction loop is activated, the re-learning of the induction loops must be acknowledged before the barrier is operational again.

Control pushbutton 'up'
- Outside of technician mode: Opening the barrier
- Within the technician mode: menu navigation
- After restarting the controller: Acknowledge the learning process of the induction loops

Control pushbutton 'down'
- Outside of technician mode: Close the barrier
- Within the technician mode: menu navigation
- After restarting the controller: Acknowledge the learning process of the induction loops

Control pushbutton 'left'
- Outside of technician mode: enter technician mode

	-	Within the technician mode: menu navigation
Control pushbutton ‘right’	-	Outside of technician mode: enter technician mode
	-	Within the technician mode: menu navigation
Slide switch	-	Setting the induction loop sensitivity
DIP-Schalter	-	Setting the induction loop frequency
LED’s:		
Status LED 3,3 V	-	Indicates the presence of the 3.3 V supply
Status LED 24 V	-	Indicates the presence of the 24 V supply
Status LED Ind. 1	-	switched off: Induction loop not damped or switched off
	-	Steady light: Induction loop is damped
	-	Flashing: Induction loop is faulty
	-	Flashing alternately with LED Ind. 2: Control system has been restarted, teach-in of the induction loops must be acknowledged
Status LED Ind. 2	-	switched off: Induction loop not damped, or not switched on
	-	Steady light: Induction loop is damped
	-	Regular flashing: Induction loop is faulty
	-	Flashing alternately with LED Ind. 1: Control system has been restarted , teach-in of the induction loops must be acknowledged
LED output ‘Fkt. ‘	-	Lights up when the output is switched.
Status LED’s RGB lighting	-	There is one LED each for the colours red, green and blue. Each of these LEDs represents the brightness of the respective colour, which is output via the RGB lighting output.
Status LED’s inputs	-	Lights up when potential-free contact is switched to input
Status LED’s outputs	-	Lights up when the output relay is switched

Digital inputs:

I10	End position 'open'	(de-energised inactive)
I09	End position ‘closed’	(de-energised inactive)
I08	Stop+Open+Close	(de-energised active)
I07	Stop+Open	(de-energised active)
I06	Stop	(de-energised active)
I05	Close/secure	(de-energised active)
I04	see section 0	-
I03	Dead man´s closing	(de-energised inactive)
I02	Opening with latching	(de-energised inactive)
I01	Clothing with latching	(de-energised inactive)

Other inputs:

Supply 24 V DC	-	Supply voltage 24 V DC of the control unit
Supply 5 V DC	-	Supply voltage 5 V DC of the control unit

Digital outputs:

O06	see section 0
O05	see section 0
O04	see section 0
O03	see section 0
O02	internally assigned
O01	internally assigned

Other outputs:

Output function:	-	see section 0
Output RGB lighting	-	Connection of the RGB lighting with COM = + 24 V DC
Output 24 V supply	-	Supply output with two terminal points for external components with a total power of up to 10 W

1.4. Technician mode

1.4.1. Entering technician mode:

Technician mode can only be entered when the control unit has been fully initialised. Technician mode cannot be entered while waiting for confirmation that the induction loops have been taught in.

To enter technician mode, the ‘left’ and ‘right’ buttons must be pressed simultaneously. Entering technician mode is signalled on the display by the closing of a rectangle and the subsequent display of the word ‘TeC’. If one of the buttons is released before this lettering is displayed, entry into technician mode is cancelled. As soon as the lettering is displayed, the buttons can be released and technician mode is entered.

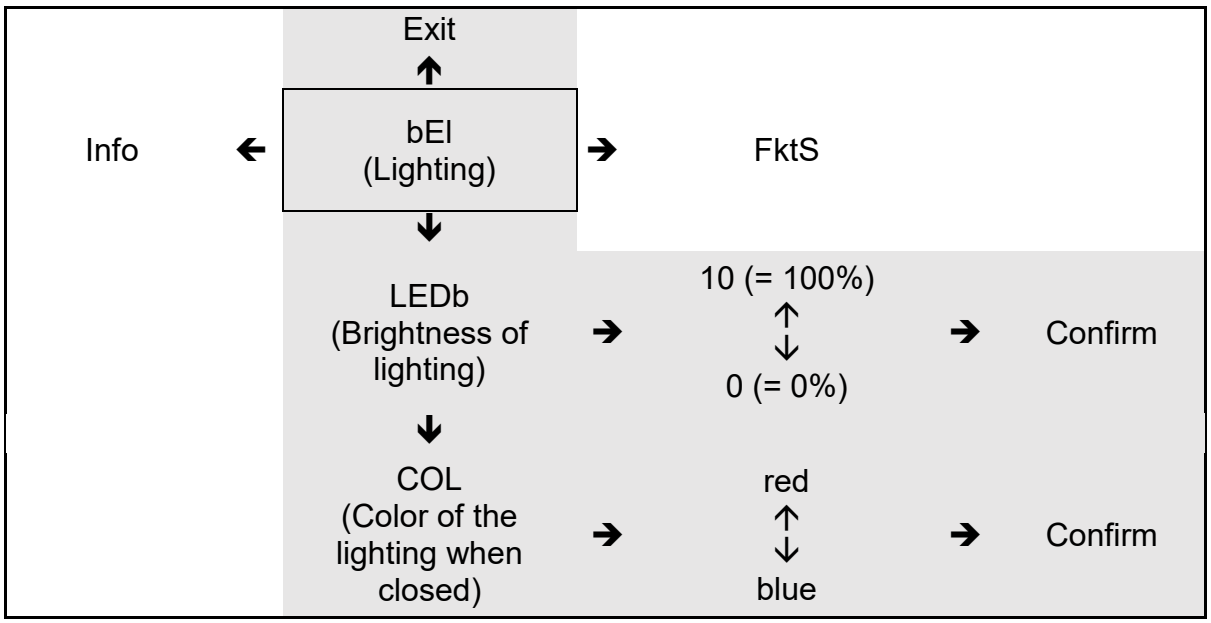
1.4.2. Barrier behavior during technician mode:

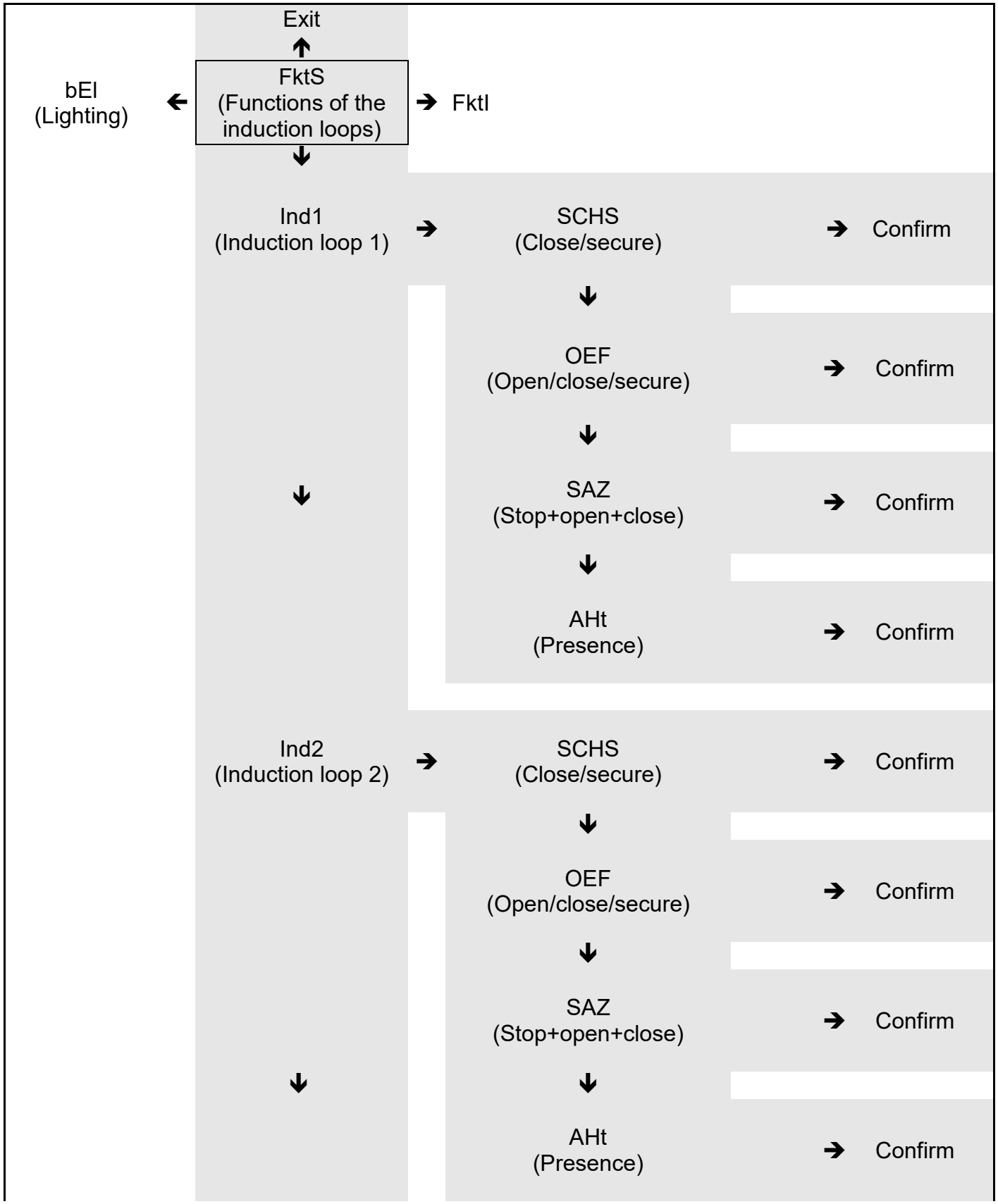
While technician mode is active, the processing of external signals is switched off, so the barrier cannot be operated during this time. For this reason, the parameterisation in technician mode only takes effect as soon as technician mode is exited. This also applies to changes to the brightness of the RGB lighting.

1.4.3. Structure of the technician mode:

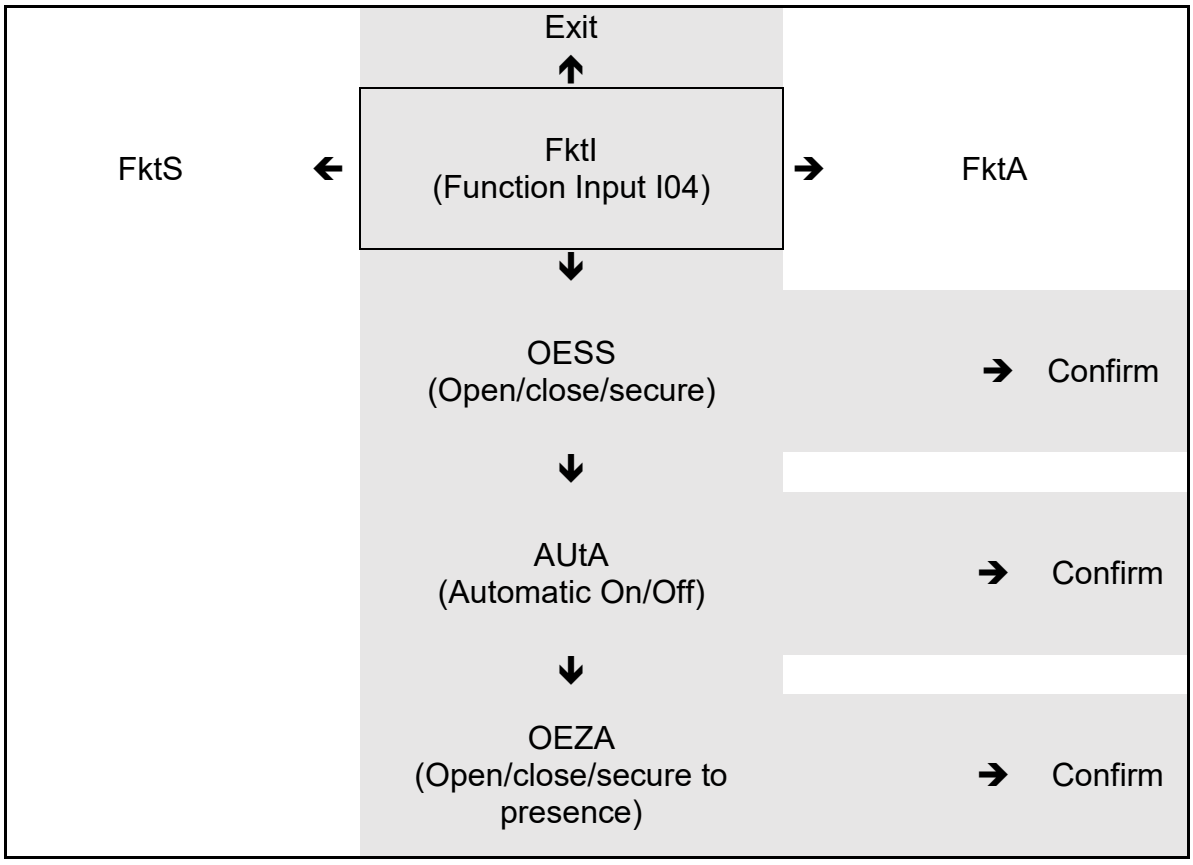
In Technician Mode, you can switch between barrier and bollard systems. The structure of the menu is described below for each system. In many areas, these are identical. However, since differences do exist, they are presented in separate tables to keep the layout clear and easy to follow.

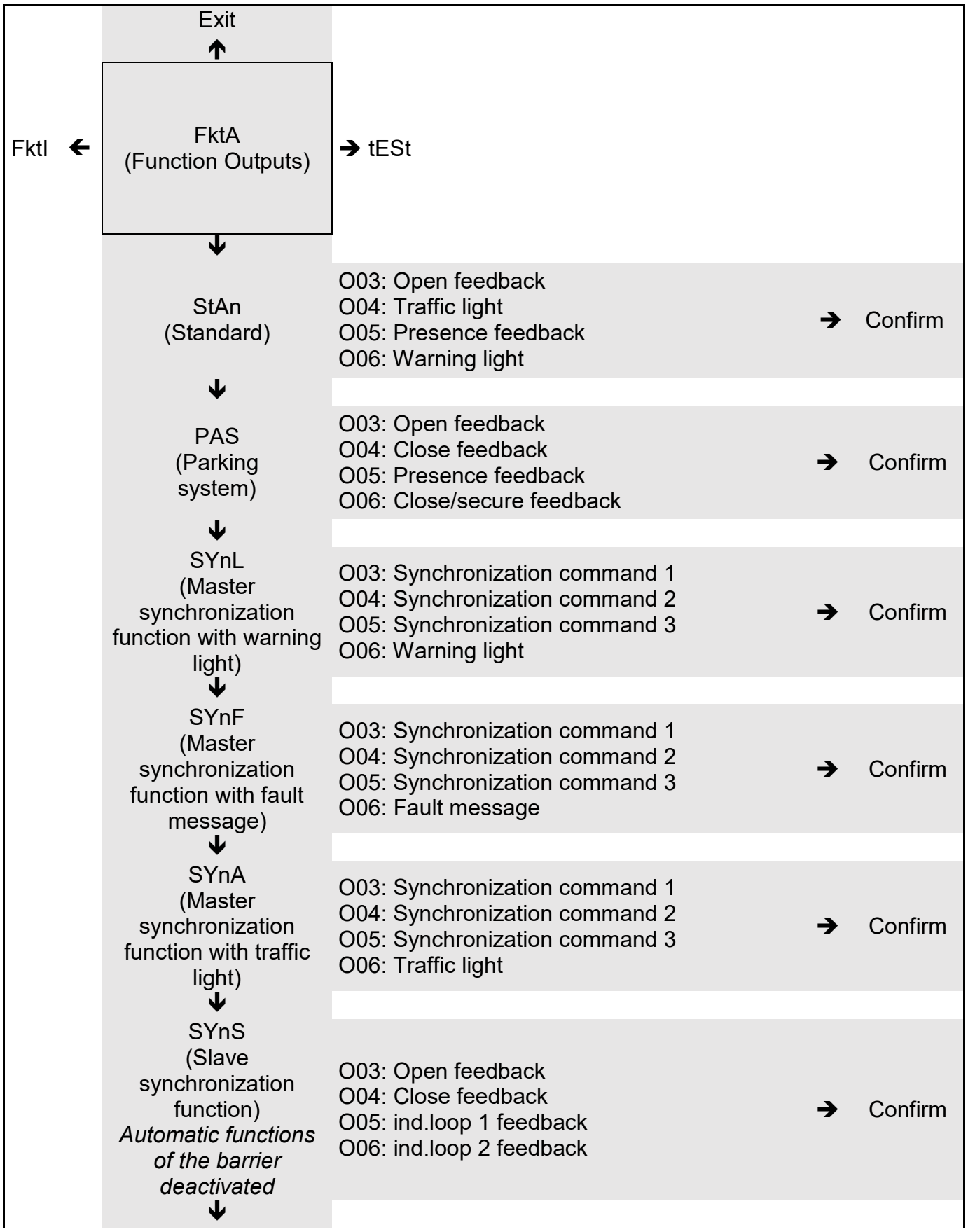
1.4.3.1. Barrier systems



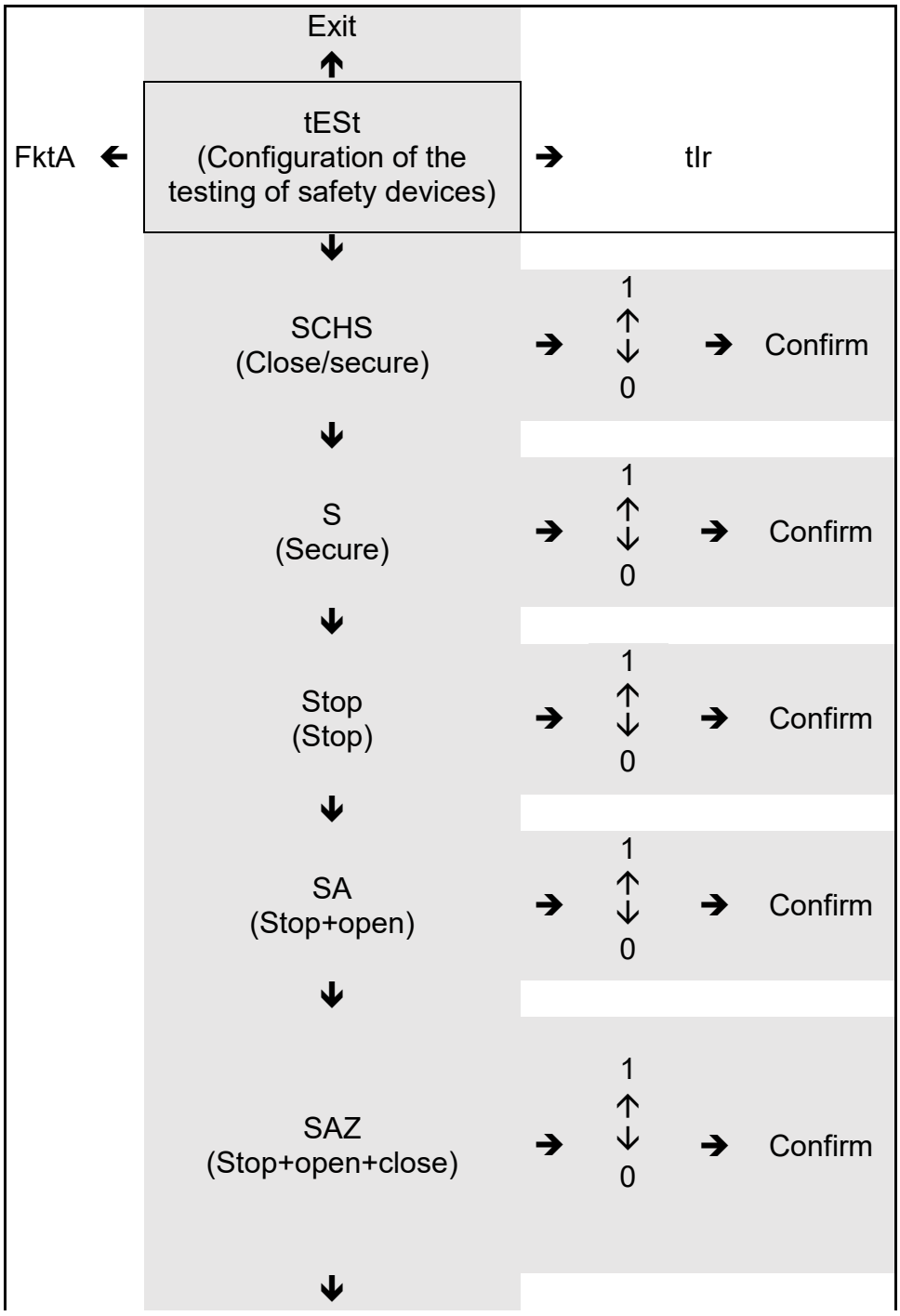

Exit
bEl
(Lighting)
FktS
(Functions of the induction loops)
FktI
Ind1
(Induction loop 1)
SCHS
(Close/secure)
Confirm
OEF
(Open/close/secure)
Confirm
SAZ
(Stop+open+close)
Confirm
AHt
(Presence)
Confirm
Ind2
(Induction loop 2)
SCHS
(Close/secure)
Confirm
OEF
(Open/close/secure)
Confirm
SAZ
(Stop+open+close)
Confirm
AHt
(Presence)
Confirm

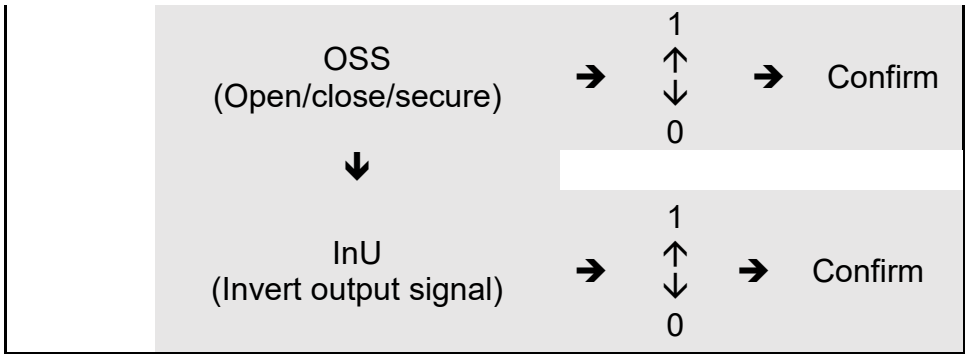
COnF (Acknowledgment of loop calibration upon restart)	➔	ON ↑ ↓ OFF	➔	Confirm

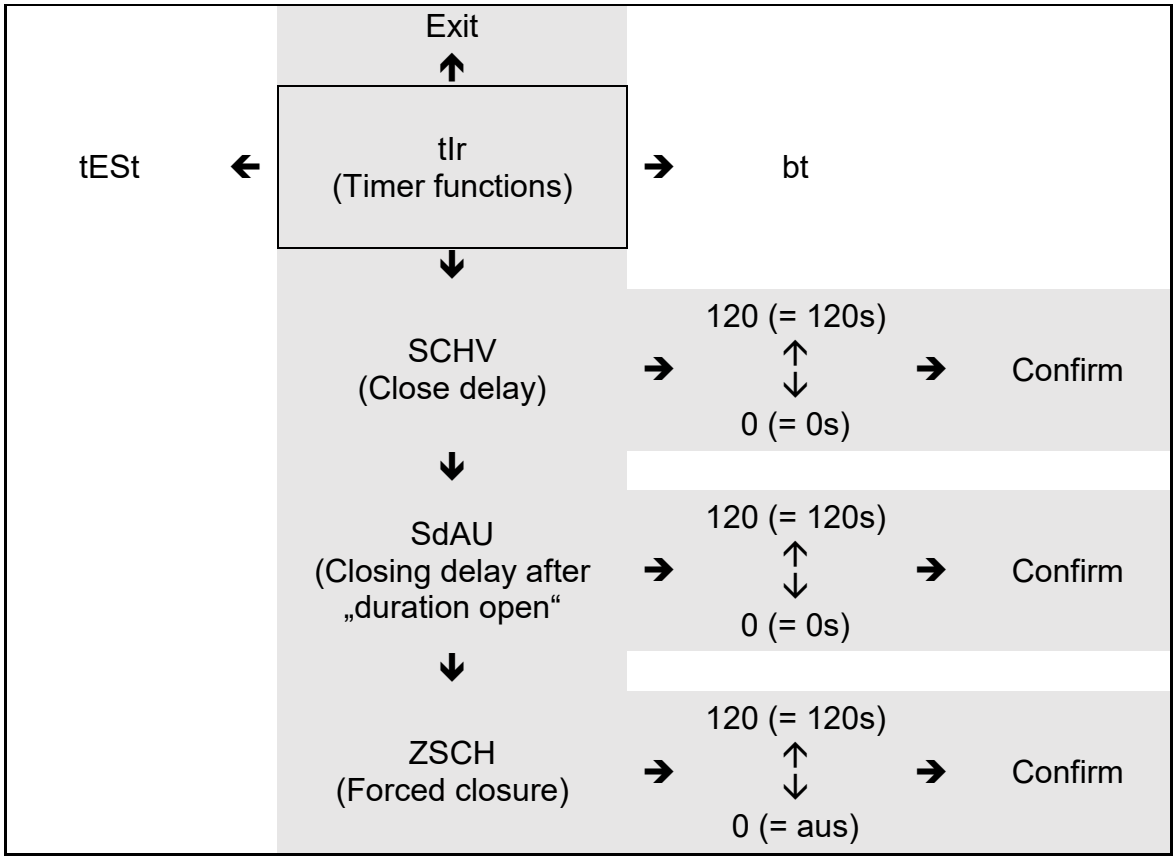


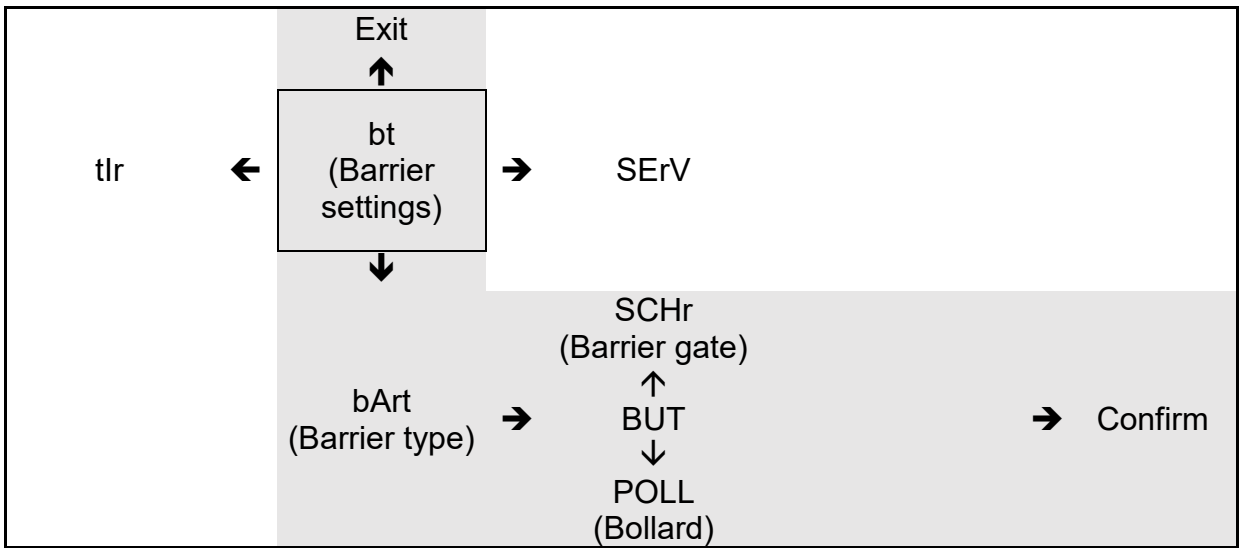

Exit
FktI
FktA
(Function Outputs)
tESt
StAn
(Standard)
O03: Open feedback
O04: Traffic light
O05: Presence feedback
O06: Warning light
Confirm
PAS
(Parking system)
O03: Open feedback
O04: Close feedback
O05: Presence feedback
O06: Close/secure feedback
Confirm
SYnL
(Master synchronization function with warning light)
O03: Synchronization command 1
O04: Synchronization command 2
O05: Synchronization command 3
O06: Warning light
Confirm
SYnF
(Master synchronization function with fault message)
O03: Synchronization command 1
O04: Synchronization command 2
O05: Synchronization command 3
O06: Fault message
Confirm
SYnA
(Master synchronization function with traffic light)
O03: Synchronization command 1
O04: Synchronization command 2
O05: Synchronization command 3
O06: Traffic light
Confirm
SYnS
(Slave synchronization function)
Automatic functions of the barrier deactivated
O03: Open feedback
O04: Close feedback
O05: ind.loop 1 feedback
O06: ind.loop 2 feedback
Confirm

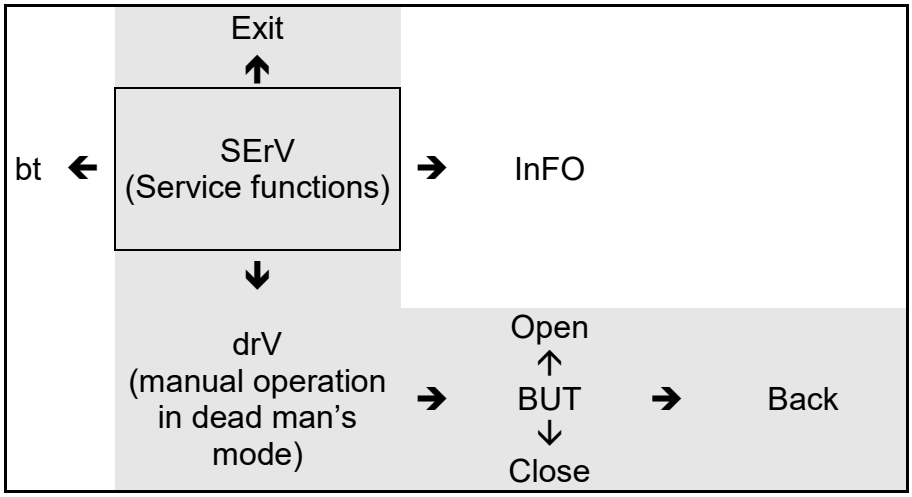
	SIG (Signal)	O03: Open feedback O04: Close feedback O05: ind.loop 1 feedback O06: ind.loop 2 feedback	➔	Confirm

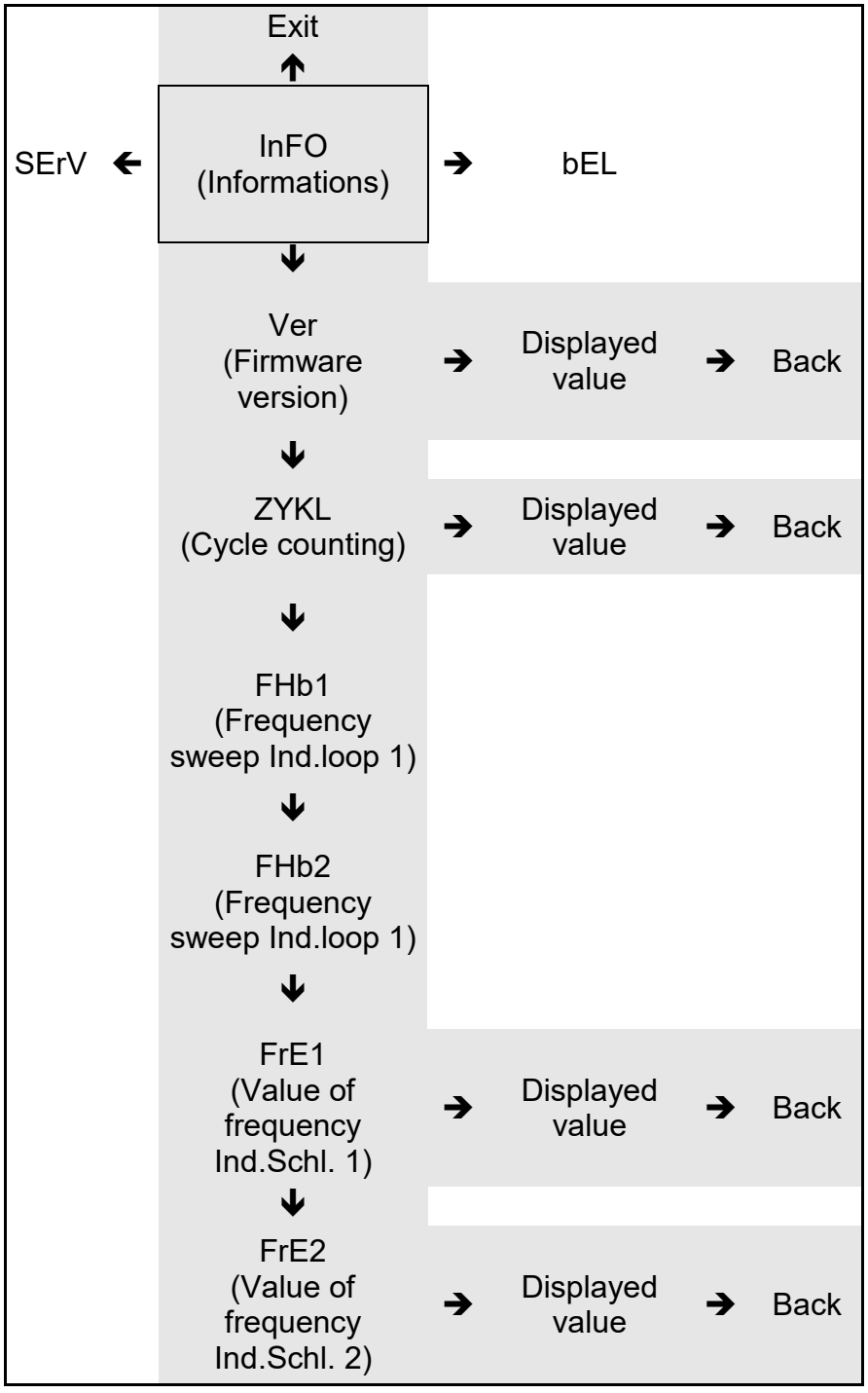



OSS
(Open/close/secure)
1
0
Confirm
InU
(Invert output signal)
1
0
Confirm

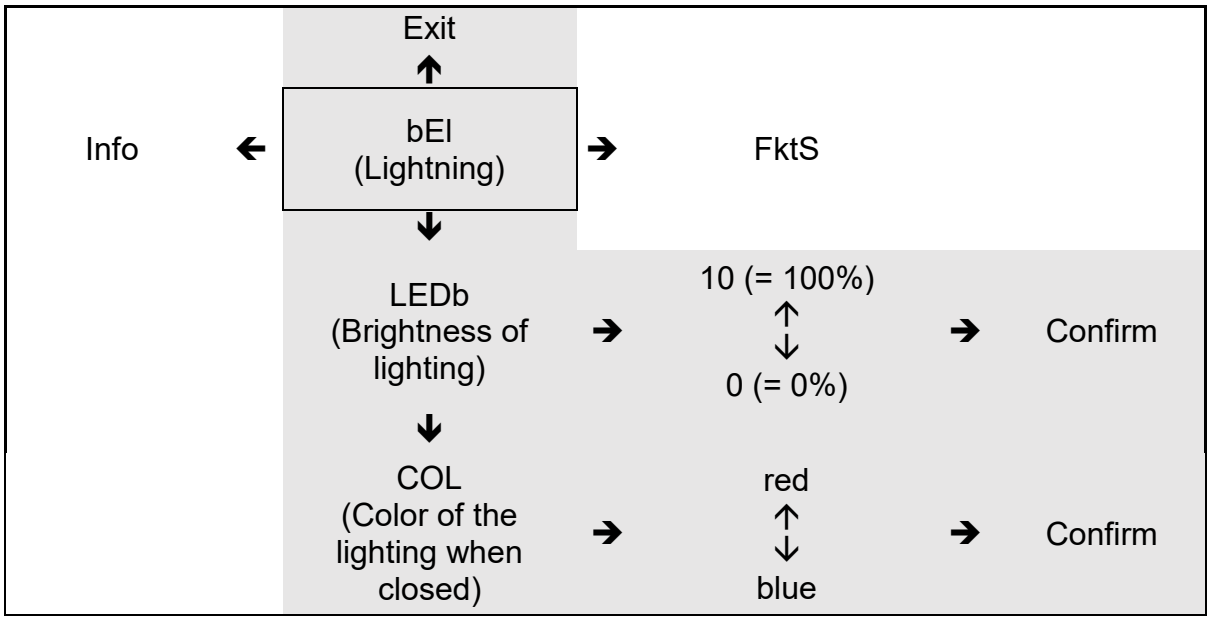

Exit
tESt
tIr
(Timer functions)
bt
SCHV
(Close delay)
120 (= 120s)
0 (= 0s)
Confirm
SdAU
(Closing delay after „duration open“
120 (= 120s)
0 (= 0s)
Confirm
ZSCH
(Forced closure)
120 (= 120s)
0 (= aus)
Confirm

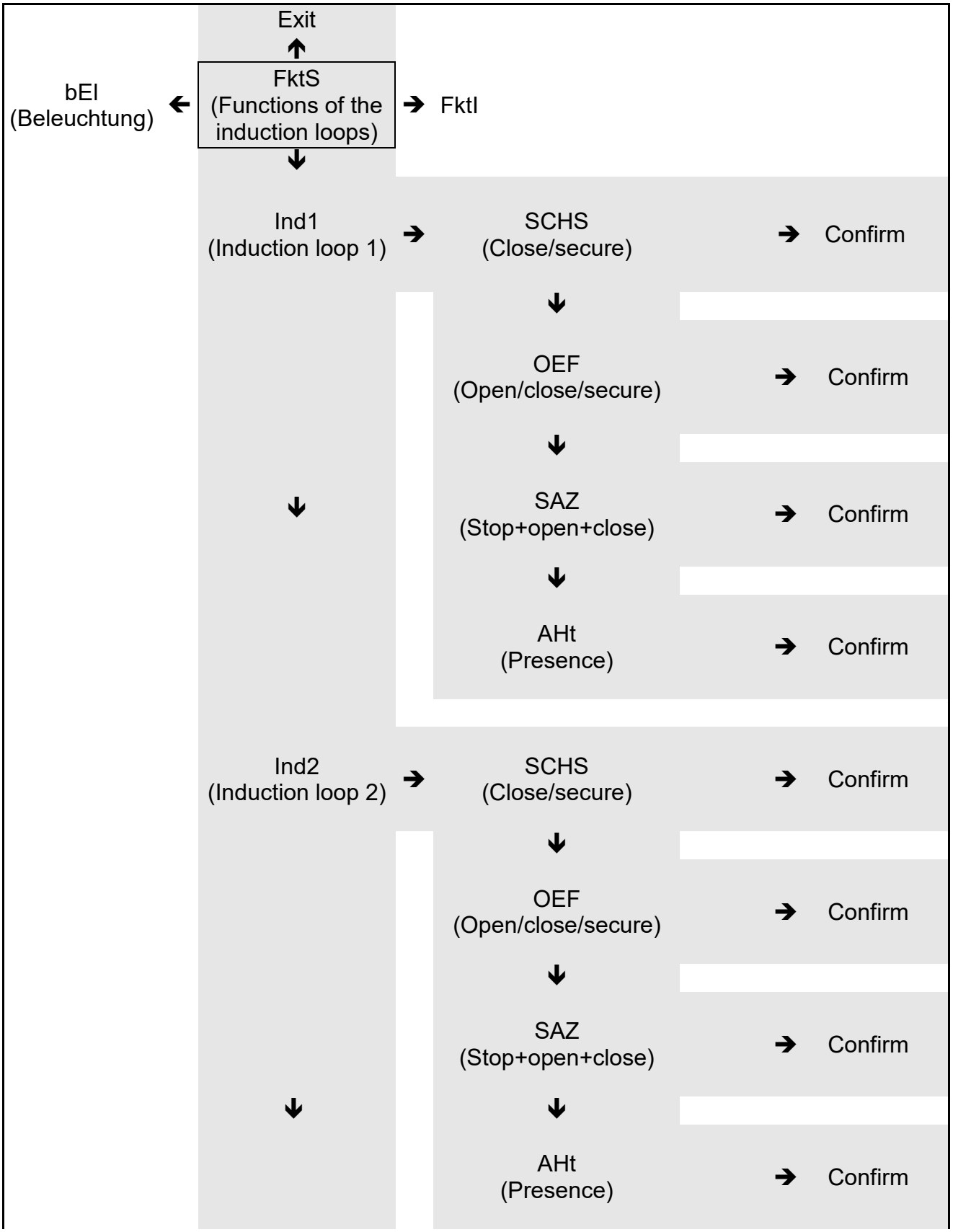

Exit
tIr
bt
(Barrier
settings)
SErV
SCHr
(Barrier gate)
bArt
(Barrier type)
BUT
Confirm
POLL
(Bollard)


Exit
bt
SErV
(Service functions)
InFO
drV
(manual operation
in dead man's
mode)
Open
BUT
Back
Close

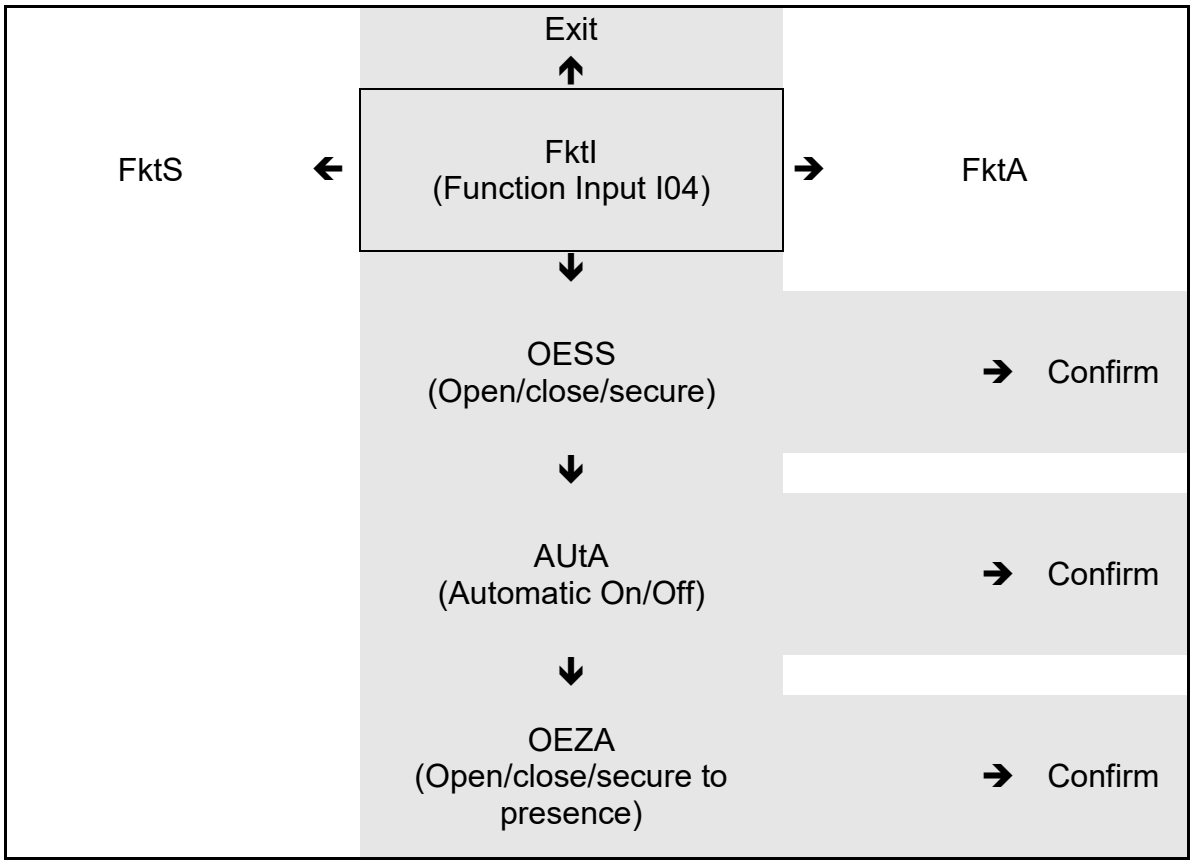

Exit
SErV
InFO
(Informations)
bEL
Ver
(Firmware
version)
Displayed
value
Back
ZYKL
(Cycle counting)
Displayed
value
Back
FHb1
(Frequency
sweep Ind.loop 1)
FHb2
(Frequency
sweep Ind.loop 1)
FrE1
(Value of
frequency
Ind.Schl. 1)
Displayed
value
Back
FrE2
(Value of
frequency
Ind.Schl. 2)
Displayed
value
Back

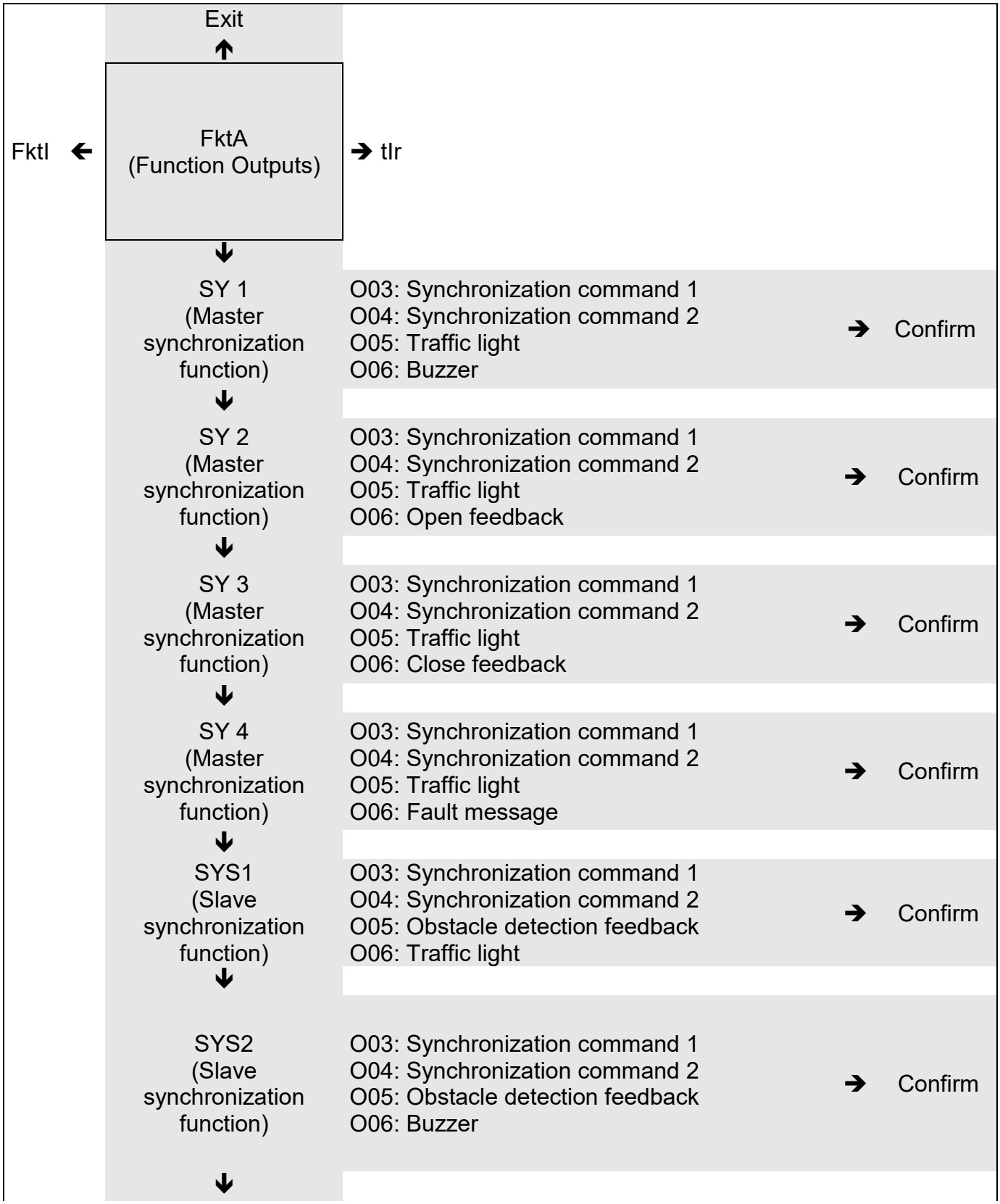
1.4.3.2. Bollard systems



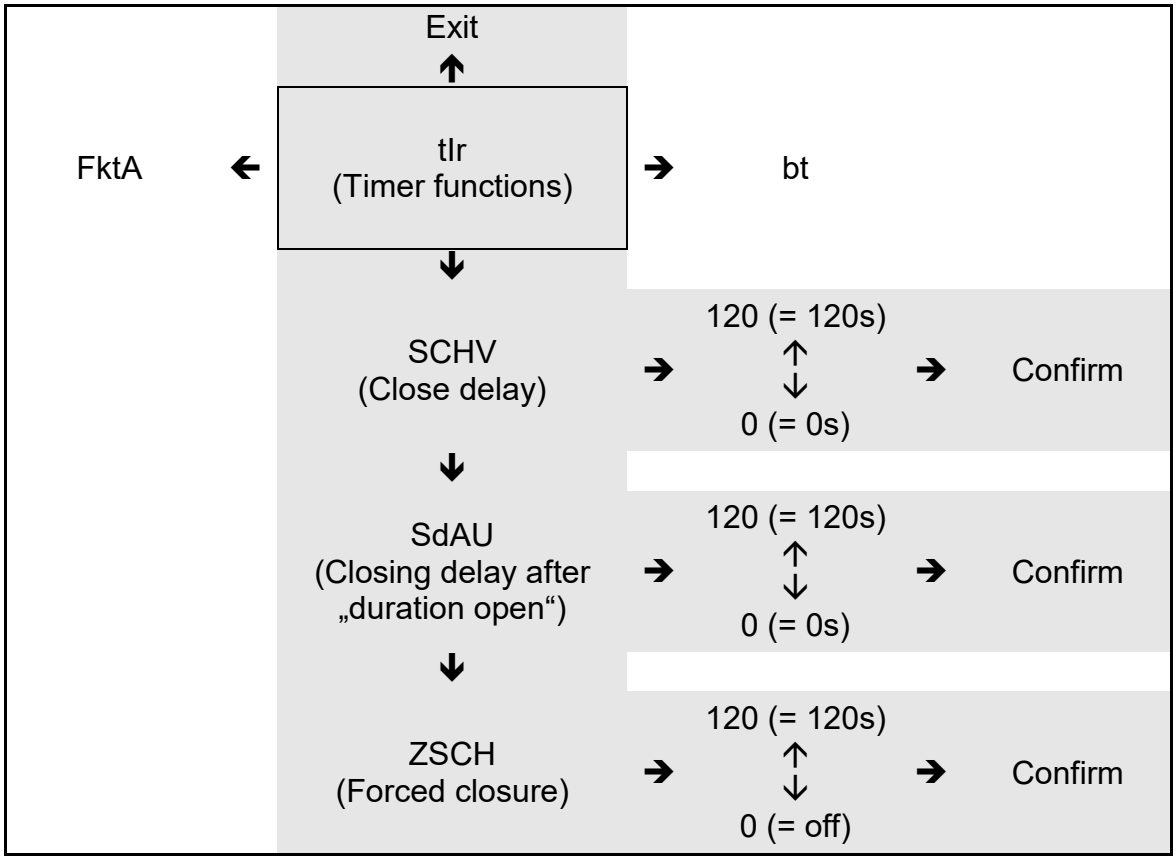

Exit
bEl
(Beleuchtung)
FktS
(Functions of the induction loops)
FktI
Ind1
(Induction loop 1)
SCHS
(Close/secure)
Confirm
OEF
(Open/close/secure)
Confirm
SAZ
(Stop+open+close)
Confirm
AHt
(Presence)
Confirm
Ind2
(Induction loop 2)
SCHS
(Close/secure)
Confirm
OEF
(Open/close/secure)
Confirm
SAZ
(Stop+open+close)
Confirm
AHt
(Presence)
Confirm

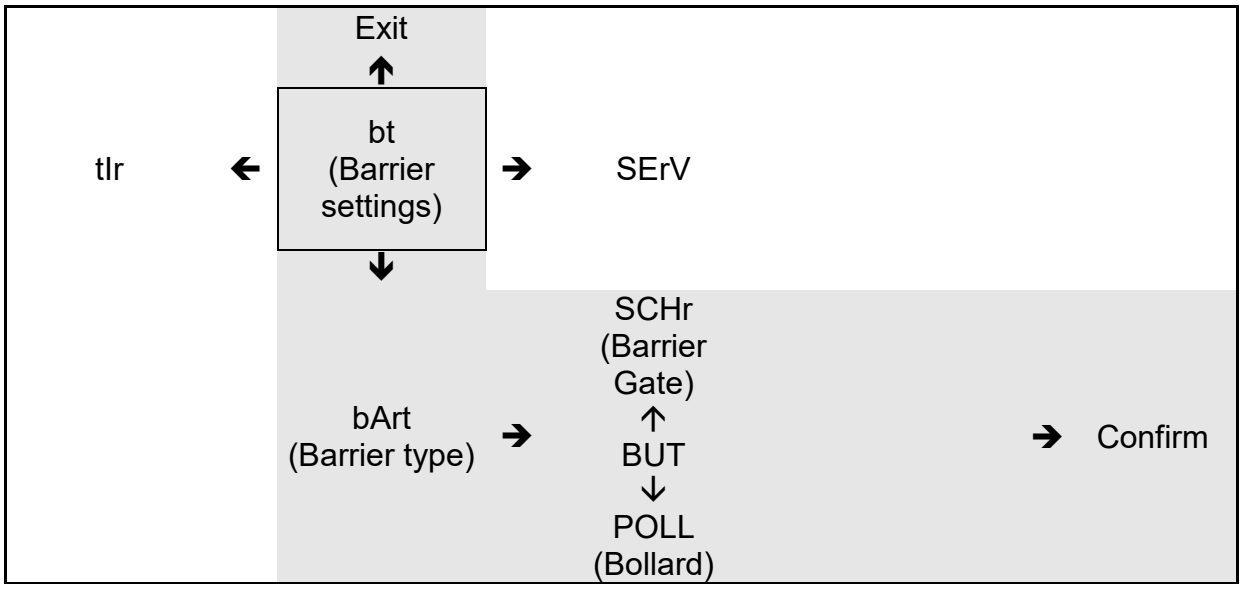
	COnF (Acknowledgment of loop calibration upon restart)	→	ON ↑ ↓ OFF	→	Confirm

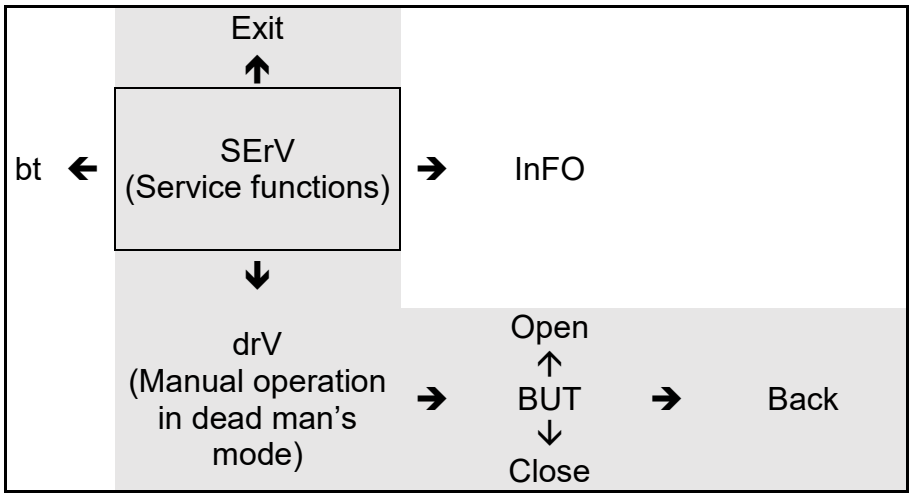


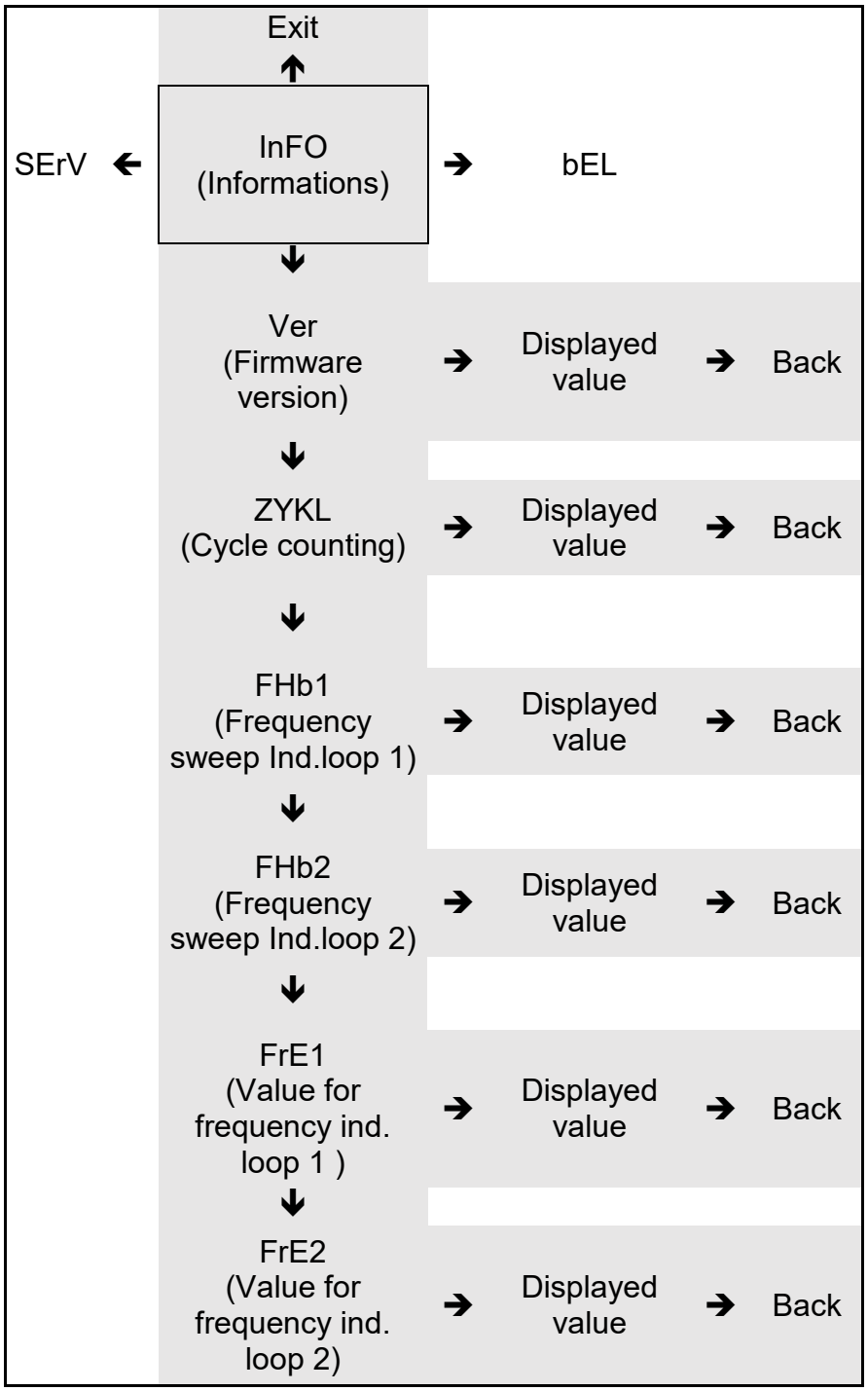

Exit
FktI
FktA
(Function Outputs)
tIr
SY 1
(Master synchronization function)
O03: Synchronization command 1
O04: Synchronization command 2
O05: Traffic light
O06: Buzzer
Confirm
SY 2
(Master synchronization function)
O03: Synchronization command 1
O04: Synchronization command 2
O05: Traffic light
O06: Open feedback
Confirm
SY 3
(Master synchronization function)
O03: Synchronization command 1
O04: Synchronization command 2
O05: Traffic light
O06: Close feedback
Confirm
SY 4
(Master synchronization function)
O03: Synchronization command 1
O04: Synchronization command 2
O05: Traffic light
O06: Fault message
Confirm
SYS1
(Slave synchronization function)
O03: Synchronization command 1
O04: Synchronization command 2
O05: Obstacle detection feedback
O06: Traffic light
Confirm
SYS2
(Slave synchronization function)
O03: Synchronization command 1
O04: Synchronization command 2
O05: Obstacle detection feedback
O06: Buzzer
Confirm

	SYS3 (Slave synchronization function)	O03: Synchronisation command 1 O04: Synchronisation command 2 O05: Obstacle detection feedback O06: Fault message	➔	Confirm
	↓			
	SYS4 (Slave synchronization function)	O03: Rückmeldung Auf O04: Rückmeldung Zu O05: Obstacle detection feedback O06: Fault message	➔	Confirm




Exit
tIr
bt
(Barrier
settings)
SErV
bArt
(Barrier type)
SCHr
(Barrier
Gate)
BUT
POLL
(Bollard)
Confirm


Exit
bt
SErV
(Service functions)
InFO
drV
(Manual operation
in dead man's
mode)
Open
BUT
Close
Back


Exit
SErV
InFO (Informations)
bEL
Ver (Firmware version)
Displayed value
Back
ZYKL (Cycle counting)
Displayed value
Back
FHb1 (Frequency sweep Ind.loop 1)
Displayed value
Back
FHb2 (Frequency sweep Ind.loop 2)
Displayed value
Back
FrE1 (Value for frequency ind. loop 1)
Displayed value
Back
FrE2 (Value for frequency ind. loop 2)
Displayed value
Back

1.4.3.3. Error messages

- ErrA – Induction loop detector error
- ErrC – Runtime monitoring
- ErrD – Testing Safety device
- ErrF – Testing Safety device

1.5. Induction loop detector

Sensitivity:

The higher the sensitivity is set, the greater the probability that the induction loop will go into a fault state.

Therefore, the lowest sensitivity, "Level 1", is always recommended. Temperature fluctuations, minor road surface movements, or influences from external interference fields can disrupt the induction loop.

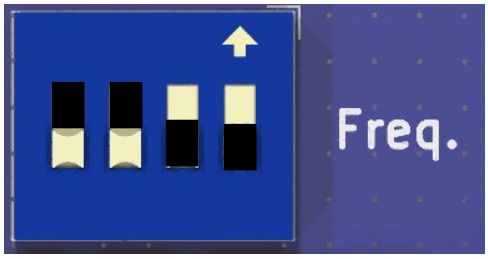
For safety reasons, the detector will then shut down. This state is signaled by a flashing LED Ind. 1 or LED Ind. 2. It is then the responsibility of the operator to perform a RESET of the induction loop by briefly pressing the "RESET" button (cf. 1.1). After the RESET, the induction loops are calibrated anew. For this purpose, the control unit expects an acknowledgment, which is signaled by the alternating flashing of LED Ind. 1 and LED Ind. 2, while the display shows "Loop". Before the calibration of the induction loops is acknowledged, it must be ensured that no vehicles or other metallic objects are within the measuring range of the induction loops. Any setting of the induction loop sensitivity only becomes active after a reset of the control unit.

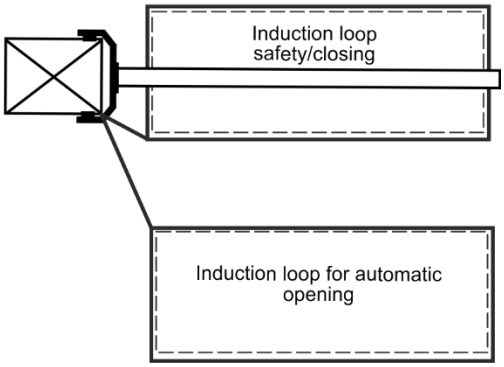
ATTENTION: The information under ‘Miscellaneous’ must be observed!

he sensitivity of the induction loops is set using the slide switches labeled "Sensitivity". If the corresponding slide switch is in the left position, the induction loop is switched off. If the slide switch is pushed from left to right, the first position reached corresponds to the least sensitive "Level 1". Moving further to the right sets "Level 2" and the most sensitive "Level 3".

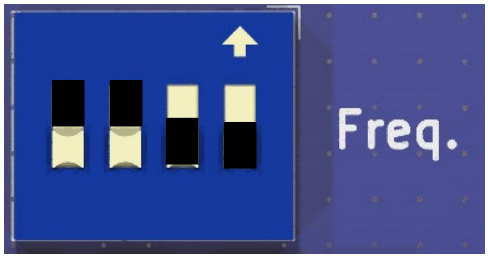
Frequency:

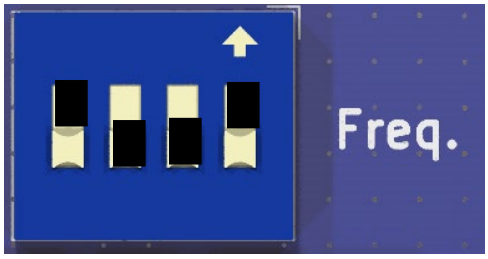
DIP switch settings for barrier systems with two induction loops

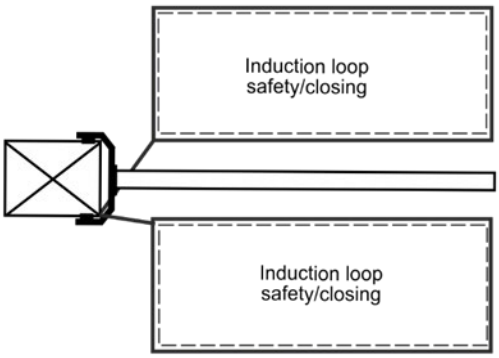


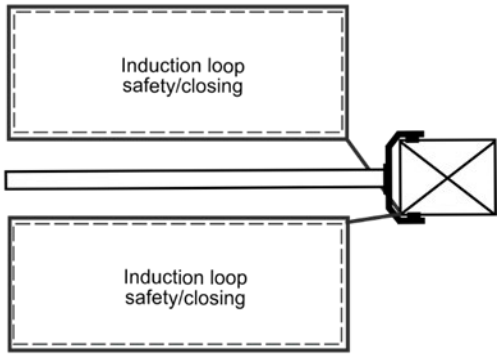


DIP switch settings for barrier systems with four induction loops







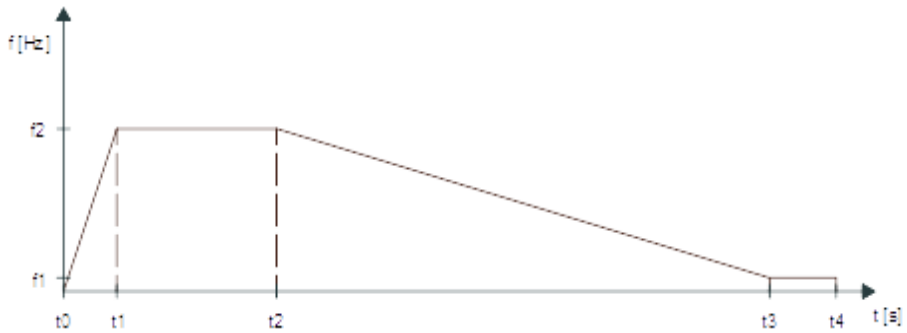


ATTENTION: The induction loops are recalibrated when the voltage at the barrier is switched off and on again.

This can lead to faults if there are vehicles on one of the loops when the power is switched back on!

1.6. Speed curve

The speed curve of the barrier includes an acceleration and a deceleration ramp. The speed curve is shown below.



The illustrated curve corresponds to the behaviour during a full movement. The ramps differ depending on the barrier type. These can be found in the following table.

	IPS 3.500	ITS 6.100
f1	10Hz	5Hz
f2	40Hz	60Hz
t1	1s	0,5s
t3 – t2	3,5s	3,8s

Triggering a function that interrupts the movement (e.g. stop and restart) causes the movement to stop immediately (without a ramp). The subsequent behaviour of the barrier deviates from the ramp shown above and depends on the position of the barrier arm at the moment of restarting and the direction of movement.

1.6.1. Synchronised wiring

In systems with a synchronous function, one barrier is parameterised as the master and the other as the slave (see 0). In this case, all signals from pulse generators, external components, etc. are processed by the master. The slave only follows the movements of the master.

It is therefore essential to ensure that the master is mounted in the intended position!

In the slave version, the signals from the induction loops are applied to outputs O05 and O06 without directly influencing the slave. The function of the induction loops, which are analysed by the slave's board detector, is therefore only determined by the wiring of the outputs to the master.

Timer functions must be configured manually to the same settings on both control units to ensure, for example, that both barriers have the same closing delay.

The signals from the safety devices must also be processed by the master. These must not be connected to the slave controller, otherwise malfunctions may occur!

The basic connections to be made are shown below:

For barrier systems:

Master O04 COM	Synchronization command 1	→	Slave X1.3 / X1.4 / X1.5
Master O04 NO	Synchronization command 1	→	Slave X1.1 / X1.2
Master O05 COM	Synchronization command 2	→	Slave X1.3 / X1.4 / X1.5
Master O05 NO	Synchronization command 2	→	Slave X1.6
Master O03 COM	Synchronization command 3	→	Slave I06
Master O03 NC	Synchronization command 3	→	Slave I06
Master I07	maximum lowering pressure	→	Slave R1B
Master R1B	maximum lowering pressure	→	Slave R1C
Master R1C	maximum lowering pressure	→	Master I07

The contacts R1B and R1C are located on the frequency inverter.

For bollard systems:

Master O03 COM	Synchronization command 2	→	Slave X1.3 / X1.4 / X1.5
Master O03 NO	Synchronization command 2	→	Slave X1.1 / X1.2
Master O04 COM	Synchronization command 3	→	Slave X1.3 / X1.4 / X1.5
Master O04 NO	Synchronization command 3	→	Slave X1.6
Master I07	maximum lowering pressure	→	Slave O-05 COM
Master R1B	maximum lowering pressure	→	Slave O-05 NC
Slave 1 O-03 COM		→	Slave 2 I-01 COM
Slave 1 O-03 NO		→	Slave 2 I-01
Slave 1 O-04 COM		→	Slave 2 I-02 COM
Slave 1 O-04 NO		→	Slave 2 I-02

Should there be multiple slaves, they will be numbered sequentially. Additional slave control units are connected in series to "I-07 Master".

1.7. Functions

Opening in self-holding mode:

To open the barrier automatically, a pulse on input I02 should not be present for longer than 2 seconds. Otherwise, the barrier may not close automatically, even though appropriate equipment (e.g. an induction loop with the close/secure function) is present and a vehicle has passed the barrier.

Permanent open:

To set a barrier to permanent open mode, the contact for the permanent open signal is statically connected to input I02 ‘Open in self-hold’ (X1.3 and X1.5). A pending signal on this input has priority over the other movement signals so that the barrier cannot be set to closing movement when the signal is applied.

If the barrier is in the ‘open’ end position and the signal is applied to this input for at least 15 seconds, the control unit switches to permanent open mode, which causes the barrier to close automatically after the signal drops out. Permanent open mode is indicated on the display with ‘dAUF’.

Timer functions:

Closing delay after permanent open:

A pre-warning time in the range from 0 s to 120 s can be set for this closing via the technician mode (at TIr → SdAV). In this case, the closing of the barrier is delayed by the set time. During the delay, a pre-warning is given that the barrier is about to close by any connected RGB lights pulsing red, the output for a warning light being switched (if this has been parameterised) and the output for a traffic light being switched (if this has been parameterised). If no delay time is set for closing after a permanent open signal, the delay time set under ‘Closing delay’ is also used for the delay after a permanent open signal.

Closing delay:

A pre-warning time in the range from 0 s to 10 s can be set for each closing via the technician mode (at Tir → SCHV). In this case, each closing in latching mode (not closing in dead man function) of the barrier is delayed by the set time. During the delay, a pre-warning is given that the barrier is about to close by any connected RGB lights pulsing red, the output for a warning light being switched (if this has been parameterised) and the output for a traffic light being switched (if this has been parameterised).

Forced closure:

The technician mode can be used (at TIr → ZSCH) to set a forced closing after each opening of the barrier. The time after which closing is triggered automatically can be set from 0 s to 120 s. If a closing delay is set, the set pre-warning is issued after the forced closing time has elapsed.

Automatic mode OFF function:

If input I04 is parameterised with the ‘Automatic OFF’ function, the following functions are switched over when connected:

Stop+open+close	→	Stop+open
Close/secure	→	Secure
Open/close/secure	→	Open/close/secure
Feedback presence	→	without function

Function: Switching between Open/Close/Secure based on presence detection:

If input I04 is parameterised with the ‘Open/close/secure to presence’ function, the ‘Open/close/secure’ function is switched to the ‘Presence’ function when it is switched on.

Interference contact:

In technician mode, it is possible to set a fault contact as a potential-free output. This switches

- if the control unit is still in TechMode
- if one of the errors from the error codes occurs
- if one of the induction loops is faulty

1.8. Breakaway function

If the bollard is unable to rise from the lower end position due to a potential blockage, e.g., icing, it will attempt to clear the obstacle three times using brief impulses. If this proves unsuccessful, it will enter a fault state.