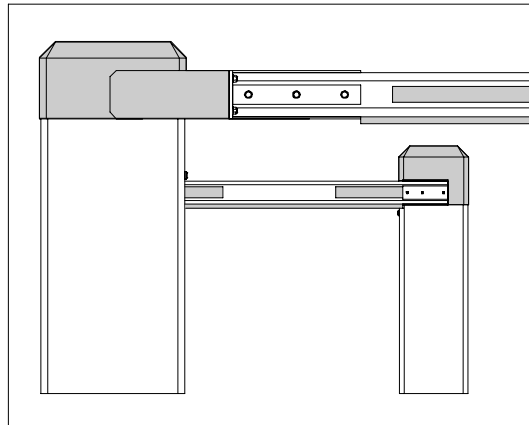


Installation and operating instructions



Barriers

**ES 25 – ES 25HS – ES 30HS – ES 30 – ES 40 –
ES 50 – ES 50S – ES 60 – ES 80**

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1. Technical data ES 25- ES 40

Operative range	
Application for ...	<ul style="list-style-type: none"> - Parking area, parking garage - Company entrance - Safety area - Toll-station
Drive pulse from ...	<ul style="list-style-type: none"> - Push-button, card reader, key switch, remote control, desk top panel etc. - Handsfree data-capture - Induction loop
Safety	<ul style="list-style-type: none"> - Reversing on obstacle - Best protection against vandalism - Ergonomic emergency release

General Data	
Mains supply	230V / 50Hz
Max. current	2,5A
Duty cycle	100%
Temperature range	-10°C to +70°C
Controller	MO 63
Measurements (w/l/h)	350x300x1100mm
Foundation (frost-proof)	550x500x800mm
Boom connector	left or right
Housing	aluminium
Mechanical parts	steel, zinc coated

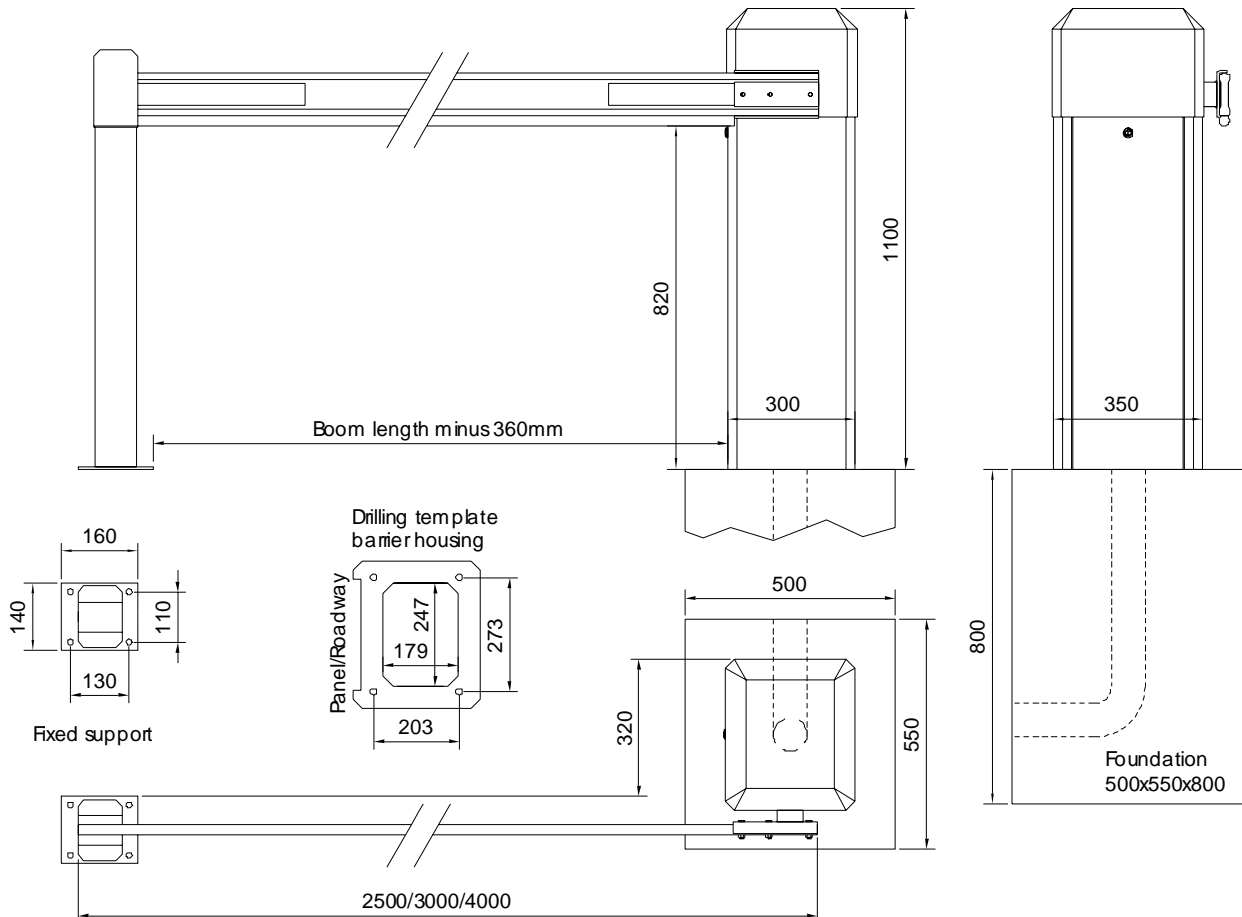
Typical Data	ES 25 *	ES 25 HS *	ES 30 HS *	ES 30	ES 40
Drawn power	0.37kW	0.37kW	0.37kW	0.25kW	0.26kW
Running time	ca. 1.4s	ca. 0.9s	ca. 1.4s	ca. 2.3s	ca. 3.2s
Maximum boom length	2500mm	2500mm	3000mm	3000mm	4000mm
Effective length	2280mm	2280mm	2780mm	2780mm	3780mm
Reversing on obstacle	switchable	switchable	switchable	switchable	switchable
Boom weight □/○	4 / 2kg	4 / 2kg	4.7 / 2.3kg	4.7 / 2.3kg	6 / 3kg
Barrier weight	47.5kg	47.5kg	47.5kg	47.5kg	50kg

* Vehicle traffic only



The accident prevention regulations and the approved safety rules have to be observed. Moving parts inside the barrier can cause accidents. Do not operate the barrier when housing is open.

1.1. Measurements ES 25 – ES 40

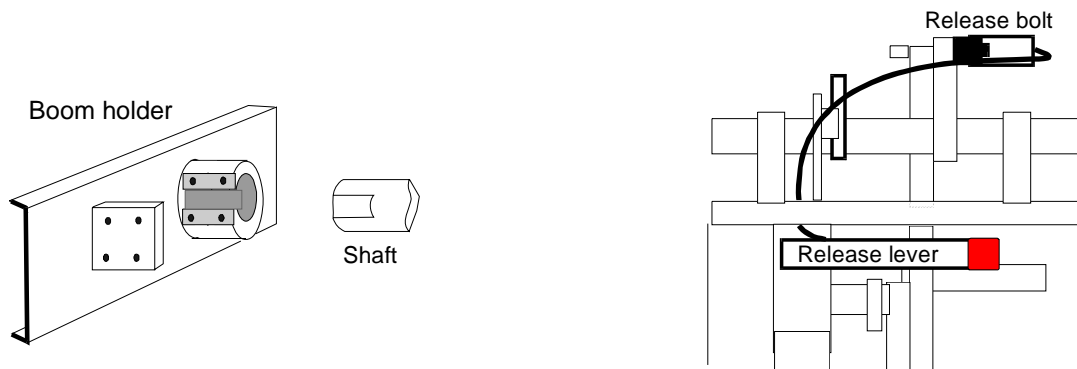


1.2. Installation ES 25 – ES 40

- a) When you prepare the concrete foundation lay enough cable or a plastic duct for the cable you need. The foundation must be at least 800mm deep with a horizontal surface 500 x 550mm.
- b) Using the template you can, either incorporate bolts in the foundation, or drill holes in the hardened concrete for heavy-duty fixings. The door side of the template must face towards the road on which the barrier will be closing.
- c) As an alternative 2 "U"-profile clamping-irons are delivered with the barrier. This gives more flexibility in positioning the fastening points and allows the barrier to be aligned exactly as required.

**Attention: The barrier is closed when shipped.
The door faces towards the road.**

- d) Secure the barrier on the foundation.
- e) Connect the boom holder to the shaft. Tighten all screws, the top ones first with 35 Nm. The enclosed nuts and bolts are a predetermined breaking point and should only be replaced with the same. (Bolt **M 8 x 45 ISO 4762 12.9**, Nut hexagonal **M 8 ISO 4032 5-2**)



- f) Emergency release during current failure etc. Pull the lever with the red end which is behind the access panel. The boom can then be raised manually. To engage the boom again pull the lever and pull the boom down, the release bolt will then lock at the appropriate position. The controller is switched off until the boom is locked at the operating position.
- g) Mount the boom before doing a test run. If necessary adjust the limit switches and the stoppers.
- h) Start the programming mode (6.1 – Running time and automatic closure).

The logic board MO 63 is connected to the terminals (X1) in the barrier and to the microswitches in the head. All electrical connections should be carried out at the front of the terminals (X1). The barrier is ready for use when delivered. The running time and a 'stay open' time of 5 seconds are stored in an EEPROM.

You only need the programming mode if the time to stay open (when automatic closure is being used) is to be altered, the photo-cell test is activated or when a controller is replaced.

Switch off the mains supply before altering the operating mode dip switches!

2. Technical data ES 50- ES 80

Operative range	
Application for ...	<ul style="list-style-type: none"> - Parking area, - Parking garage - Company entrance - Safety area
Drive pulse from ...	<ul style="list-style-type: none"> - Push button, card reader, key switch, remote control, desk top panel etc. - Handsfree data-capture - Induction loop
Safety	<ul style="list-style-type: none"> - Reversing on obstacle - Best protecting against vandalism - Ergonomic emergency release

General data	
Mains supply	230V / 50Hz
Max. current	2.5A (max.)
Duty cycle	100%
Temperature range	-10°C to +70°C
Controller	MO 63
Measurements (w/l/h)	400x450x1100mm
Foundation (frost-proofed)	600x650x800mm
Boom connector	central
Housing	aluminium
Mechanical parts	steel, zinc coated

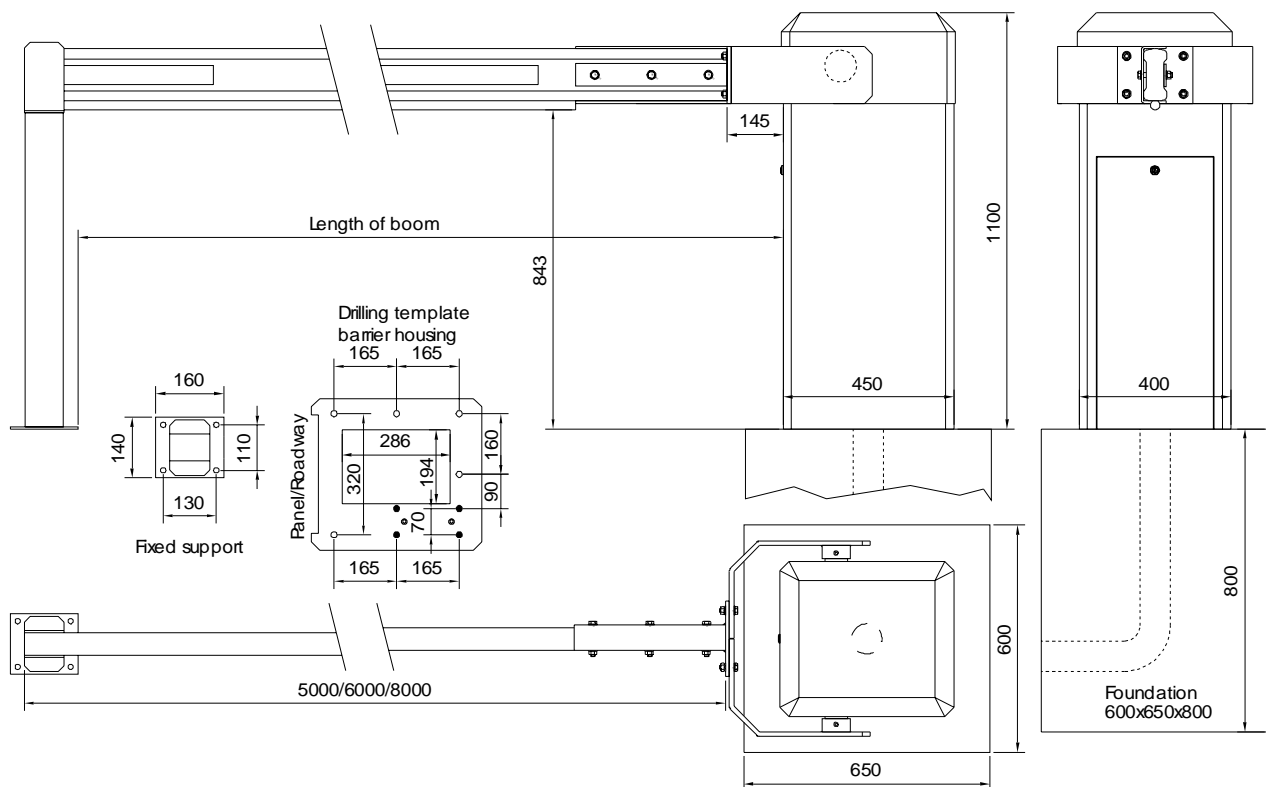
Typical Data	ES 50	ES 50S *	ES 60	ES 80
Drawn power	0.26kW	0.37kW	0.26kW	0.26kW
Running time	ca. 4.0s	ca. 4.0s	ca. 5.5s	ca. 8.5s
Maximum boom length	5000mm	5000mm	6000mm	8000mm
Effective length	5140mm	5140mm	6140mm	8140mm
Fixed- / swinging support	required	required	required	required
Reversing on obstacle	switchable	switchable	switchable	switchable
Boom weight □/○	10 / 9kg	10 / 9kg	16.5 / 11kg	23 / 14kg
Barrier weight	110kg	110kg	115kg	118kg

* Vehicle traffic only



The accident prevention regulations and the approved safety rules have to be observed. Moving parts inside the barrier can cause accidents. Do not operate the barrier when housing is open.

2.1. Measurements ES 50 – ES 80



2.2. Installation ES 50 – ES 80

- When you prepare the concrete foundation lay enough cable or a plastic duct for the cable you need. The foundation must be at least 800mm deep with a horizontal surface 600 x 650mm.
- Emergency release during current failure etc. Pull the lever with the red end which is behind the access panel. The boom can then be raised manually. To engage the boom again pull the lever and pull the boom down, the release bolt will then lock at the appropriate position. The controller is switched off until the boom is locked at the operating position.
- Using the template you can, either incorporate bolts in the foundation, or drill holes in the hardened concrete for heavy-duty fixings. The door side of the template must face towards the road on which the barrier will be closing. Secure the barrier on its foundation. Ensure that the housing is vertical. The screws or bolts at the thickly marked points (drawing on page 4) also secure the foot of the spring assembly.
- The left and right parts of the boom assembly aren't identical. The greater distance between the edge and the hub must be towards the access panel. Secure the boom assembly on both ends of the shaft. The barrier is delivered in the open position, which means the assembly must be vertical. Secure the boom holder on the assembly. The two parts are then joined together.
- Remove the adjusting nut from the spring assembly. If the boom is to be shortened reduce the number of springs. The following table shows approximate values, check that the balance is as described under f). The springs must be divided equally between the back and the front. One spring alone may not be used. The springs should be inspected regularly and be tightened or replaced, if necessary.

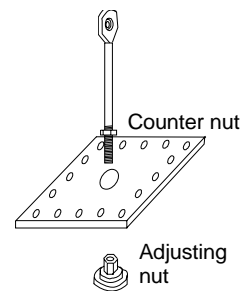
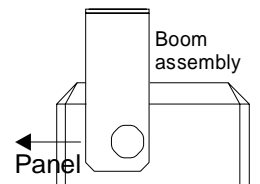
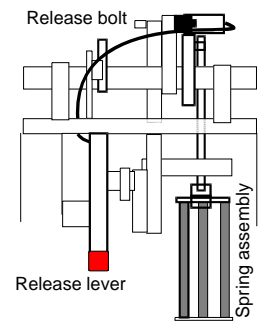


Table – Number of springs

Number of springs ES 50 / ES 50S Length of boom [mm]	3.000	3.500	4.000	4.500	5.000
without accessories	2	2	2	3	3
with swinging support	2	2	3	3	4
with folding skirt 75	2	3	4	4	5
with folding skirt 75 and swinging support	3	3	4	5	5

Number of springs ES 60 / ES 80 Length of boom [mm]	4.000	4.500	5.000	5.500	6.000	6.500	7.000	7.500	8.000
without accessories	3	4	5	6	6	8	10	11	12
with swinging support	4	5	6	6	6	10	11	12	13
with folding skirt 75	5	6	7	8	9	12	13	15	17
with folding skirt 75 and swinging support	5	6	7	8	9	12	14	16	18
with top and bottom skirt 150	7	8	10	11	13	x	x	x	x
with folding skirt 150	7	9	11	13	15	x	x	x	x

The following values are for round booms only.

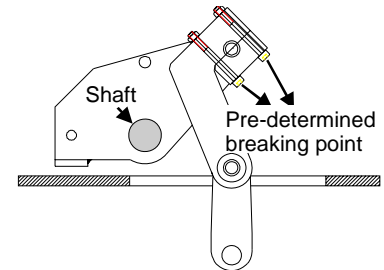
Number of springs ES 50 - ES 80 Length of boom [mm]	3.000	4.000	4.500	5.000	5.500	6.000	7.000	8.000
without swinging support	2	3	3	4	4	5	10	11
with swinging support	2	3	4	4	5	6	11	12

- f) When all electrical connections are completed, ensure that the spring assembly is not yet connected to the drive shaft. Close the barrier with the motor and then mount the boom. Pull the emergency release lever and push the boom into the vertical position. Screw the adjusting nut onto the connecting rod and tighten the springs. Pull the release lever again and push the boom down, if the spring tension is correct, it should move easily to about 45°. After that the boom has to be pushed down.



ATTENTION! In position CLOSED the barrier boom shall not be pushed upwards by the fixed or swinging support! Press the barrier boom slightly downwards when pulling the emergency release lever.

- g) The connecting rod of the ES 50 to ES 80 consists of two parts which are screwed together and form a predetermined breaking point in case of vertical force on the boom. The boom is then disconnected from the shaft and is pulled to about 45° by the springs. If a break occurs here the nut and the bolts must be replaced with the original vandalism set. The nuts must be secured with thread lock. **The nuts may only be replaced with those supplied by your supplier.**



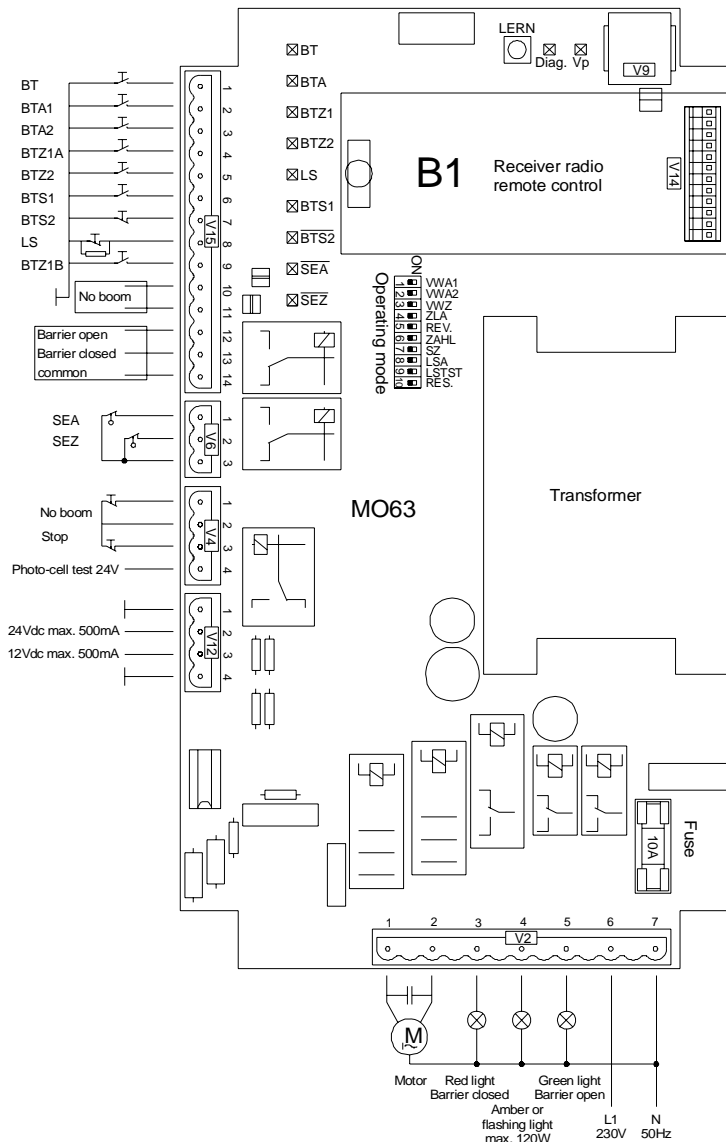
- h) Start the programming mode (6.1 – Running time and automatic closure).

The logic board MO 63 is connected to the terminals (X1) in the barrier and to the microswitches in the head. All electrical connections should be carried out at the front of the terminals (X1). The barrier is ready for use when delivered. The running time and a 'stay open' time of 5 seconds are stored in an EEPROM.

You only require the programming mode if the time to stay open (when automatic closure is being used) is to be altered, the photo-cell test is activated or when a controller is replaced.

Switch off the mains supply before altering the operating mode dip switches!

3. Controller MO 63



3.1. Connections

- BT** **Single push button** (n.o. – V15.1 – **X1/5t**)
 With the serial switching BT the barrier can be opened and closed. Additional functions of BT depend on setting of the dip switches for automatic closure (S4) and the counter settings (S6). When the automatic closure is activated, or the counter is deactivated, then the barrier can be closed by BT – otherwise the barrier will be opened. When the automatic closure is blocked (e.g. by a stop signal), and the counter is activated, then BT can only open the barrier. Which means that closing by BT is not possible.
- BTA1** **Push button 'open' 1 and 2** (n.o. – V15.2 – **X1/6t** and V15.3 – **X1/6b**)
BTA2 When one of the contacts BTA1 or BTA2 is open and the other is closing, the barrier opens. When the barrier is open and BTA1 or BTA2 is being closed, then the barrier cannot be closed (constant open).
- BTZ1A** **Push button 'close' 1A and 1B** (n.o. – V15.4 – **X1/7t** and V15.9 – **X1/10b**)
 When BTZ1A closes while BTZ1B is open, or BTZ1B closes while BTZ1A is open, the barrier closes. When the barrier is closed and at least one contact is closed, the barrier cannot be opened (constant closed).
- BTZ2** **Push button 'close' 2** (n.o. – V15.5 – **X1/7b**)
 When the contact BTZ2 is opening, the order 'close' is given.

- BTS1 Push button 'stop' 1** (n.o. – V15.6 – X1/4t)
When the contact BTS1 is closed the barrier stops. Stored signals are erased. Automatic closure is blocked until the next signal.
- BTS2 Push button 'stop' 2** (n.c. – V15.7 – X1/8b)
When the contact BTS2 is open the barrier stops. Stored signals are erased. Automatic closure is blocked until the next signal.
- LS Photo-cell** (n.c. – V15.8 – X1/9b)
When the photo-cell reports an obstacle the barrier cannot be closed. During the opening of the barrier an existing obstacle is not report. When an obstacle is reported during closing, the barrier stops and reverses. Additional functions of the photo-cell depend on operating mode, photo-cell closing automatic, and photo-cell test.

3.2. Further connections

Photo-cell +24V (transmitter)	V4.4	X1/26b	Power supply for photo-cell transmitter +24V (only for photo-cell test).
0V	V12.1	X1/26t	Ground for photo-cell transmitter 0V (only for photo-cell test).
Uext +24V	V12.2	X1/1b	+ 24Vdc stabilised, for external equipment. Max. 500 mA (for V12.1 + V12.2)
Uext +12V	V12.3	X1/3b	+ 12Vdc stabilised, for external equipment. Max. 500 mA
Gnd	V12.4	X1/2b	Ground for Uext – external equipment
Display 'barrier open'	V15.12	X1/11t	Display 'barrier open'. The contact V15.12 is connected with the contact V15.14 when the barrier is open. The contact will be closed when the green light is lit. Maximum permissible: 24V / 1A.
Display 'barrier closed'	V15.13	X1/12t	Display 'barrier closed'. The contact V15.13 is connected with the contact V15.14 when the barrier is open. The contact will be closed when the red light is lit. Maximal admissible: 24V / 1A.
	V15.14	X1/11b	Common terminal for display 'barrier open' and 'barrier closed'.
Motor	V2.1	X1/20	Motor open
Motor	V2.2	X1/22	Motor close
Red traffic light	V2.3	X1/13t	The red traffic light is on when the barrier is closed. The red traffic light is also on during the time 'warning prior to opening'. (max. 230V/120W)
Amber or flashing light	V2.4	X1/14t	The contact for the Amber or the flashing light is closed when the barrier is moving and during the time 'warning prior movement'. (max. 230V/120W)
Green traffic light	V2.5	X1/15t	The green traffic light is on when the barrier is open. During the time 'warning before closing' the green traffic light is out. (max. 230V/120W)
L1	V2.6	X1/17b	L1, power supply 230V 50Hz further connections : X1/ 16t, 16b, 17t, 17b
N	V2.7	X1/19b	N, power supply 230V 50Hz further connections: X1/ 13b, 14b, 15b, 18t, 18b, 19t, 19b

3.3. Visual indication

LED	Colour	Function
BT	green	LED is lit when contact BT is closed or the receiver of the radio remote control receives a signal.
BTA	green	LED is lit when contact BTA1 or BTA2 is closed.
BTZ1	green	LED is lit when contact BTZ1A or BTZ1B is closed.
BTZ2	green	LED is lit when contact BTZ2 is closed.
BTS1	green	LED is lit when contact BTS1 is closed.
BTS2	green	LED is lit when contact BTS2 is closed.
LS	green	LED is lit when the photo-cell is activated.
SEA	green	LED is lit when contact SEA is closed.
SEZ	green	LED is lit when contact SEZ is closed.
Vp	yellow	LED is lit when the main power is on.
Diag	red	Error code and display for radio remote control.

4. Operating mode MO63

Switch off the mains supply before altering the operating mode dip switches 1 - 9!

4.1. Pre-warning before opening (S1 und S2=VWA)

The warning light (flashing or amber light) illuminates right after a signal to open, if pre-warning time before opening is activated. The barrier opens after the pre-warning time has elapsed.

S1 off and S2 off:	No pre-warning time.
S1 off and S2 on:	1.5 s pre-warning time before opening.
S1 on and S2 off:	4.0 s pre-warning time before opening.

4.2. Pre-warning before closing (S3=VWZ)

The warning light (flashing or amber light) goes on right after a signal to close, if pre-warning time before closing is activated. The barrier closes after the pre-warning time has elapsed.

S3 off:	No pre-warning time before closing.
S3 on:	4.0 s pre-warning time before closing.

4.3. Automatic closure (S4=ZLA)

The open barrier closes automatically after the programmed 'stay open time' has elapsed. An earlier closing of the barrier is possible by BT or BTZ. Is a stop signal given during the stay open time, then the automatic closure is blocked and is only released again by a new signal. BTA1, BZA2, or LS keep the barrier in the end-position 'open' even after the stay open time has elapsed. The barrier closes immediately when a signal BTA1, BTA2, or LS is removed.

S4 off:	No automatic closure.
S4 on:	The barrier closes after the time which was saved during the setup (0 s up to 300 s).

4.4. Reversal on hitting obstacles (S5=REV)

When learning the running time during the setup the torque power for the reversing on obstruction is determined. When the barrier boom hits an obstacle during closing and blocks, the controller stops the movement or gives an 'open' signal.

S5 off:	The closing boom stops when it hits an obstacle and re-opens immediately.
S5 on:	The closing boom stops when it hits an obstacle and only moves when a new signal is received.

4.5. Counting (S6=ZÄHL)

The signals 'open' and 'close' are counted by the controller.

S6 off:	No counting. The barrier closes after one signal to close, even after two signals to open.
S6 on:	Counting is activated. The barrier closes after two signals to close if there were two consecutive opening signals.

4.6. Reversal during opening (S7=SZ)

When a 'close' signal is received during opening, the barrier will either open completely and then close or the barrier closes immediately.

S7 off:	The barrier always opens completely before reacting to a signal to close.
S7 on:	The opening barrier reverses immediately when it receives a signal to close.

4.7. Automatic closure by photo-cell (S8=LSA)

The photo-cell always gives a signal to close, when the obstacle is not longer present.

S8 off:	Automatic closure by photo-cell is not activated. The closing function by loop B3/2 is not applicable.
S8 on:	When an obstacle is not longer present the barrier closes.

4.8. Photo-cell test (S9=LSTST)

Before each closing of the barrier, the photo-cells may be tested.

S9 off:	Photo-cell test is not activated.
S9 on:	A photo-cell test occurs before each closing. Attention: The photo-cell test has to be learnt when programming the controller.

5. Photo-cell test

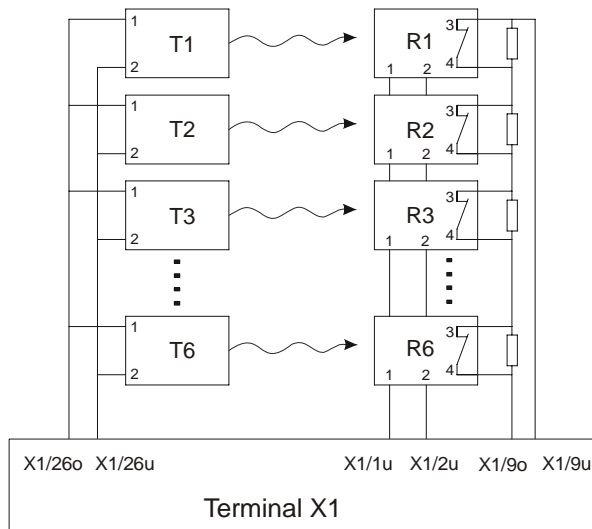
Before the closing of the barrier, the photo-cells may be tested. The photo-cell test consists of two parts.

Part one: The transmitter is taken off the power supply and then the receiver has to report an obstacle (within max. 2.5 seconds).

Part two: The transmitter is connected to the power supply again and then the receiver has to report that no obstacle is present.

If during part one the receiver does not report an obstacle, the photo-cell is faulty and an error code is shown on the Diag.-LED (flashes 6 times). If during part two the obstacle is still being reported (the controller assumes a real obstacle being present), the barrier will not close. No error code is shown.

Max. 6 photo-cells can be connected to the controller MO63 and be tested. For the testing of more than one photo-cell the relay connections of the receivers have to be connected in series. Parallel to the relay connections a resistor of 1k Ω each has to be connected.



For the photo-cell test the controller MO63 has to learn the quantity of photo-cells which are connected, by activating the dip switch S9=on and learning the running time again.

6. Programming

The controller has to learn the following parameters:

- Running time for opening and closing
- Torque power for reversal on hitting an obstruction.
- Quantity of photo-cells when the photo-cell test is activated
- Time to stay open for automatic closure
- Personal code for radio remote control

On delivery 5 seconds open before automatic closure and the running time for the barrier are already saved.

6.1. Running time and automatic closure

- Push the learn button approx. 3 seconds – the red Diag.-LED starts flashing.
- Push the learn button again. When the photo-cell test is activated (S9=on) the controller learns how many photo-cells are connected. During learning the Diag.-LED flashes at 1 second intervals, then the learning of the running time starts automatically.
When the photo-cell test is not activated (S9=off) the learning of the running time starts immediately.
- The Diag.-LED is lit during the learning of the running time. The barrier closes if it is not closed already. If it is closed then it opens and learns the running time for opening. Then the Diag.-LED flashes at 1 second intervals and the controller learns the stay open time.
- After the required stay open time push the learn button again. The barrier closes automatically and learns the running time for closing and the torque power for the reversing on obstruction. The learnt values are stored even if power failure occurs and the Diag.-LED turns off.

6.2. Setting personal code for radio remote

Push the learn button approx. 3 seconds – the red Diag.-LED starts flashing.

Push the corresponding button on your transmitter. The controller learns the code - the red Diag.-LED is lit while a signal is received. Release the button.

The code is stored even if power failure occurs and the Diag.-LED turns off.

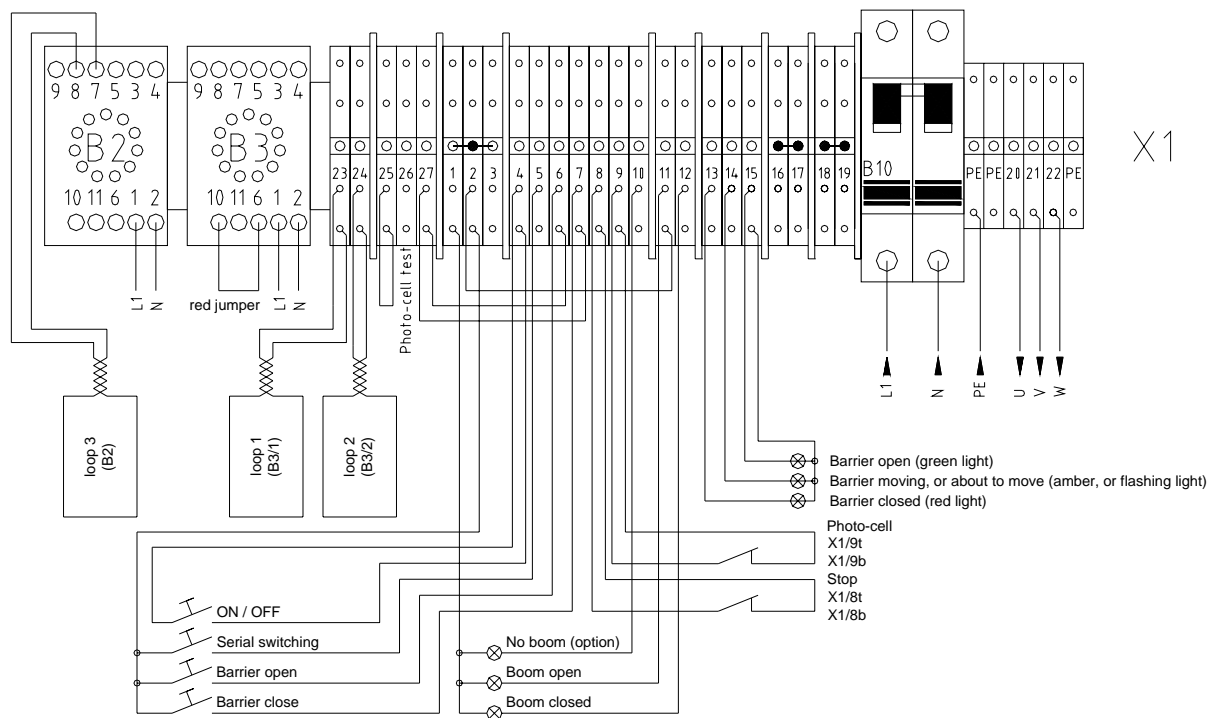
Cancel personal code

Push the learn button approx. 3 seconds – the red Diag.-LED starts flashing. Keep the learn button pushed for approx. 10 seconds. The red Diag.-LED lights for 2 seconds – the personal code is erased and the learning is finished.

7. External connections

For the power supply of the external equipment (e.g. photo-cells, induction-loops....) the controller provides stabilised 24 Vdc and 12 Vdc. Max. 500 mA can be drawn from the 12 V source and the 24 V source, but together max. 700 mA.

The supply of the photo-cell transmitter during photo-cell test comes from the 24 V source and has to be considered.



Important instructions when using loops for safety and closing

When using a loop-detector for safety remove the red jumper between contacts 6 and 10 on the socket B3. The socket B3 is always for the loop under the barrier boom, and is prewired for safety and for closing when leaving the loop. When B3 is equipped with a 2-channel-detector, the second channel may be used for an opening loop or a loop detecting that a vehicle is present.

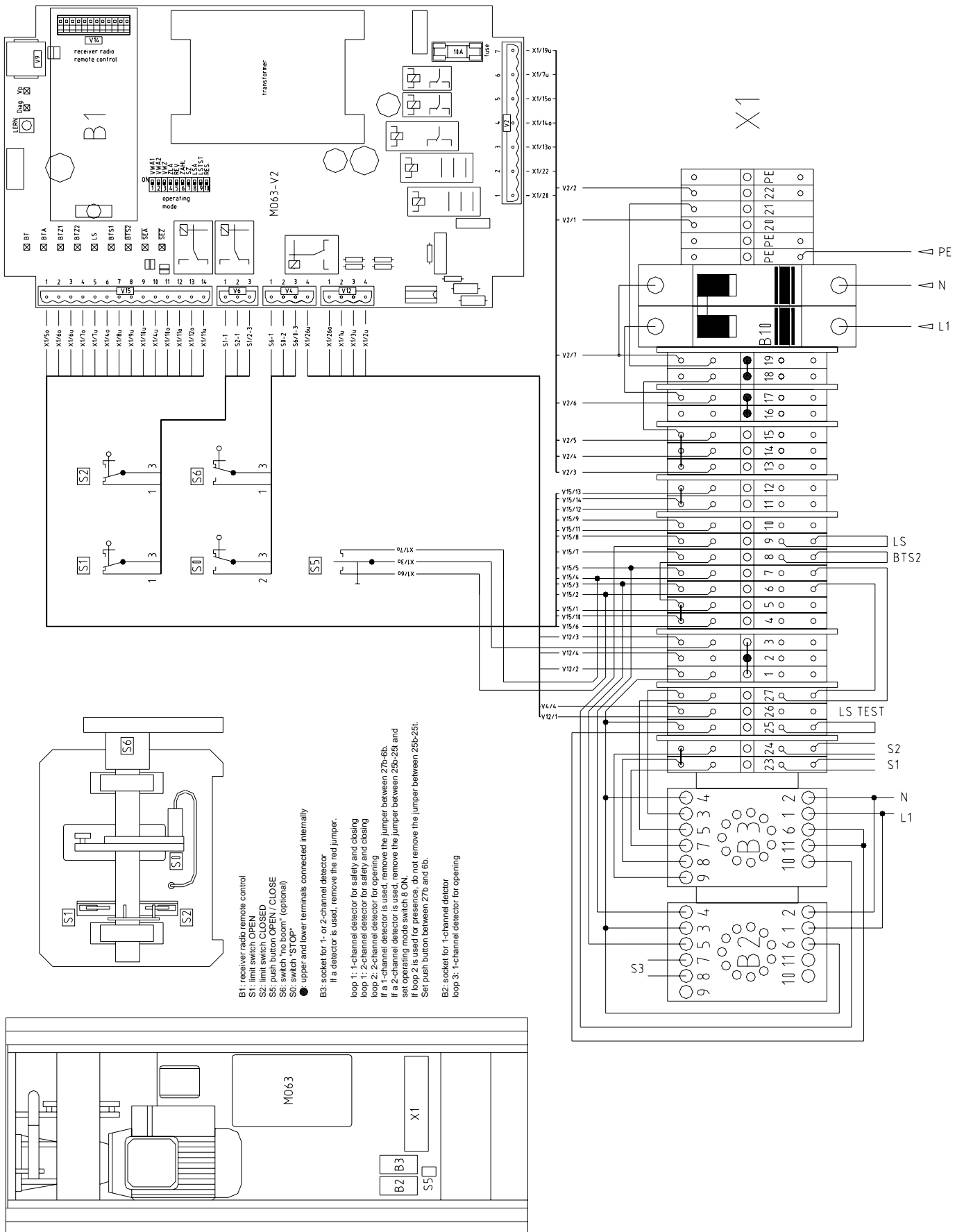
The socket B2 is prewired for an opening loop in connection with a 1-channel-detector. Please see chapter 10 "Examples for use of loop detectors".

When all connections are completed and the barrier is closed, only the following LEDs should be lit: the yellow LED Vp for main power, the green LED SEA and the green LED BTS2.

If is not the case then see chapter 9 "Fault finding".

Warning: Please check the direction of rotation of the transmission lever of the gearbox. The reversal by obstruction can only work when the rod always moves to the rear of the housing, never to the door.

8. Layout in the barrier



9. Fault finding

9.1. The closed barrier doesn't react to a signal to open

Symptom	Possible cause	Possible solution
The yellow power LED is out.	No mains supply.	Check the mains lead and the fuses.
The red diagnostic LED flashes non-stop.	Programming is started.	Carry it out to the end.
The green LED BTS1 is lit.	The controller is switched off.	a) Operating mode switch 1 off. b) Switch On/Off switch (X1/4 top and X1/4 bottom off).
The green LED BTS2 is out.	a) The stop button is pressed.	Release the button (X1/8 top and bottom).
	b) Emergency release in use.	Lock the shaft.
	c) Wiring fault.	Check the wiring.
The green LED SEA is out and the red Diag.-LED flashes 4 times – then a break.	a) Faulty limit switch 'open'.	Replace the limit switch.
	b) Wiring faulty	Check the wiring to the limit switch and plug V6 on the controller.
The green LED BTZ1 is lit.	There is a permanent signal to close.	Check the button (X1/2 bottom/top and 7 top).

When the controller gives an error code through the red Diag.-LED see the chapter 9.4.

9.2. The open barrier doesn't react to signals to close

Symptom	Possible cause	Possible solution
The yellow power LED is out.	No mains supply.	Check the mains lead and the fuses.
The red diagnostic LED flashes non-stop	Programming is started.	Carry it out to the end.
The green LED LS is lit.	a) Loop detector is activated.	Check the detector in socket B3.
	b) The red jumper is removed from the terminals 6 and 10 in socket B3, but the loop detector hasn't been inserted.	Plug the detector into the socket B3 or replace the red jumper.
	c) The photo-cell is activated.	Check it (X1/9 top and X1/9 bottom).
The green LED LS is lit when the photo-cell is free, and not lit when an obstacle is present	The photo-cell is connected as normally open.	Connect the photo-cell as normally closed.
The green LED BTA is lit.	There is a permanent signal to open.	a) Check the 'open' button (X1/2 bottom and X1/6 top) b) Check the loop detector in socket B2
The green LED SEZ is out and the red diagnostic LED flashes 4 times – then a break.	a) Faulty limit switch 'closed'.	Replace the limit switch.
	b) Wiring fault.	Check the wiring and plug V6 in the control box.
The green LED BTZ2 is lit.	There is a permanent signal to the terminals BTZ2.	Check the button (X1/7 bottom and X1/2 bottom/top)

When the controller gives an error code through the red Diag.-LED see the chapter 9.4.

9.3. Fault finding continued

Symptom	Possible cause	Possible solution
Delay before opening.	Warning is active.	Operating mode switch 1+2 off.
Delay before closing.	Warning is active.	Operating mode switch 3 off.
The barrier does the following when it hits an obstacle ...		
...switches off.	Reversing is not activated.	Operating mode switch 5 off.
...tries to carry on closing.	Torque setting is wrong.	Adjust it.
The boom isn't vertical when the barrier is open ...		
The green LED SEA is out.	Limit switch 'open' maladjusted, but still switches.	Re-adjust it and the corresponding mechanical stopper.
The green LED SEA is lit. The red diagnostic LED flashes twice then a break.	a) Faulty limit switch 'open'.	Replace it.
	b) The limit switch 'open' is maladjusted and doesn't switch.	Re-adjust it and the corresponding mechanical stopper.
The boom isn't horizontal when the barrier is closed...		
The green LED SEZ is out.	Limit switch 'closed' maladjusted, but still switches.	Re-adjust it and the corresponding mechanical stopper.
The green LED SEZ is lit. The red diagnostic LED flashes three times – then a break.	a) Faulty limit switch 'closed'.	Replace the limit switch.
	b) The limit switch 'closed' is maladjusted and doesn't switch.	Re-adjust the limit switch and the corresponding mechanical stopper.

9.4. Error code

The red Diag.-LED serves as a status indicator. During regular, fault free operation the LED is only lit, when a radio remote signal is received.

An error code is given, when the controller detects a fault. the Diag.-LED flashes max. 12 times, then a break, then repeats the flashing code.

Error code	Cause/solution
2 x flashing	Limit switch "OPEN" did not open after the learnt running time. The limit switch has a short circuit.
3 x flashing	Limit switch "CLOSE" did not open after the learnt running time. The limit switch has a short circuit.
4 x flashing	Both limit switches signal at the same time. While SEA and SEZ signal at the same time, the controller is blocked.
5 x flashing	The power supply limit for the external equipment 12 V and/or 24 v has been reached. The power source load is too high. The controller is blocked. Check the connected equipment.
6 x flashing	Photo-cell error. The following error occurred during the photo-cell test. The transmitter is inactive but the receiver does not signal an obstacle.
7 x flashing	An error occurred during learning of the torque power for the reversing on obstacle. Either the controller, the motor, or the capacitor of the motor are faulty. Check the above and repeat the learning of the running time. If the error still exists the controller is faulty.
8 x flashing	The EEPROM has lost the data. Repeat the learning of the running time. If the error still exists the controller is faulty.
9 x flashing	The EEPROM is faulty.
10 x flashing	The controller has detected a fault in the redundant detection of the "stop" contact. The controller is faulty.
11 x flashing	One of the motor relays has not switched off. The controller is faulty.
12 x flashing	The controller detects that the "Triac" has not switched off. The controller is faulty.

Attention: You may use the service device ZS701 to read the error memory of the controller.

10. Examples for use of loop detectors

B3/2 This loop may be used for opening or for detecting that a vehicle is present (connected to socket B3 by contacts X1/24 top und X1/24 bottom).

B3/1 This loop is for the safety only and is placed under the barrier boom (connected to socket B3 by contacts X1/23 top und X1/23 bottom).

B2 This loop is for opening only (connected directly to socket B2 – contacts 7 and 8).



Push button, key switch, card reader, coin selector, etc.

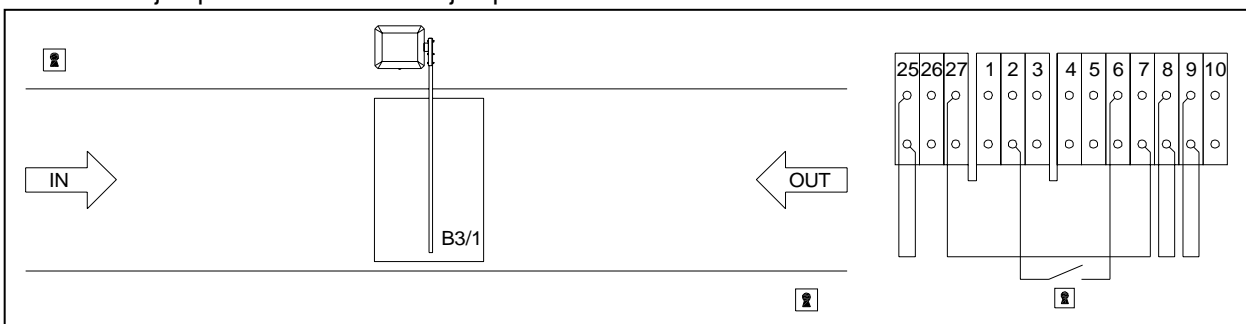


Photo-cell

Example 1 (for 1-channel loop detector on socket B3)

Entrance and Exit – opening with push button. Safety and closing with loop detector on socket B3/1 (all jumpers at default settings).

Remove red jumper of socket B3 and jumper between the terminals 27 bottom and 6 bottom.

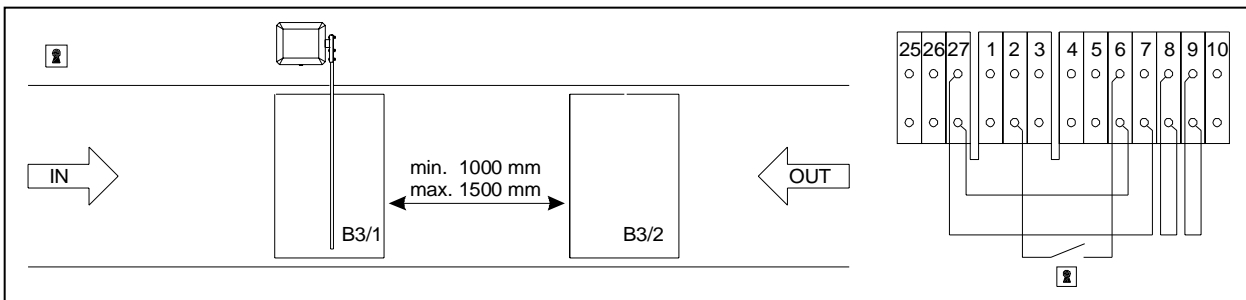


Example 2 (for 2-channel loop detector on socket B3)

Entrance – opening with a key switch. Safety and closing with both loops B3/1 and B3/2.

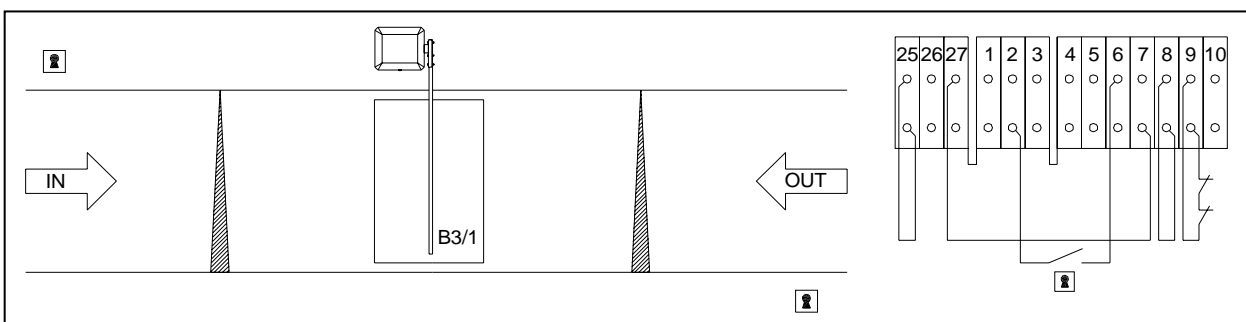
Exit - opening with loop B3/2. Safety and closing with both loops (all jumpers at default settings).

Remove red jumper of socket B3 and jumper between the terminals 25 top and 25 bottom. DIP S8 = 'on'.



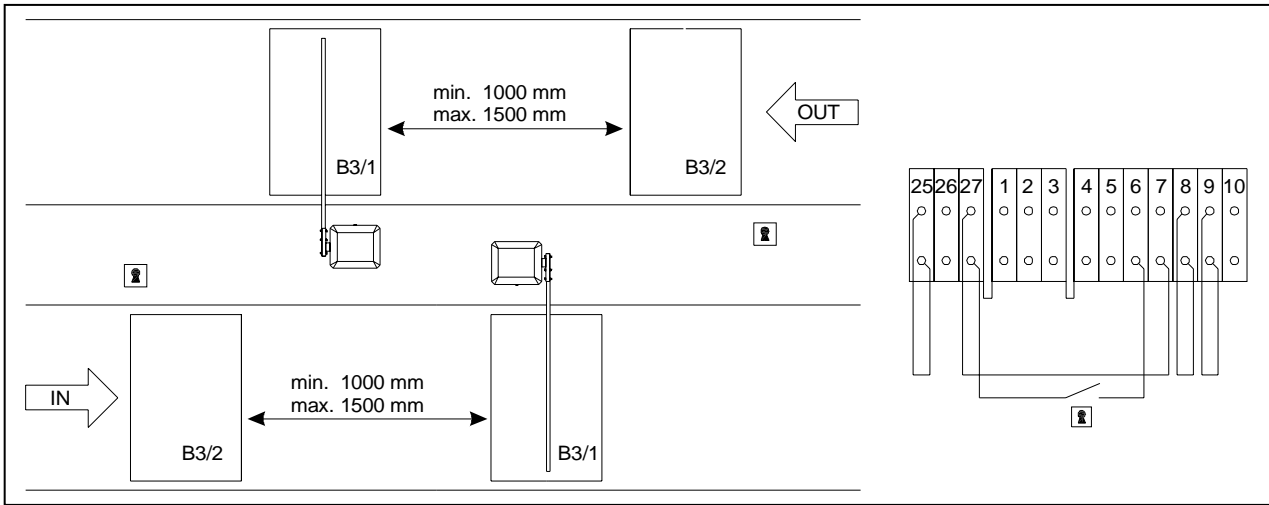
Example 3 (for 1-channel loop detector on socket B3)

Entrance and Exit – opening with a coin selector. Safety with photo-cells and loop B3/1. Automatic closure when the time to stay open has elapsed. Remove the jumper between 9 top and 9 bottom and connect the safety contact of the photo-cells to them (all jumpers at default settings). Remove red jumper of socket B3 and jumper between the terminals 27 bottom and 6 bottom.



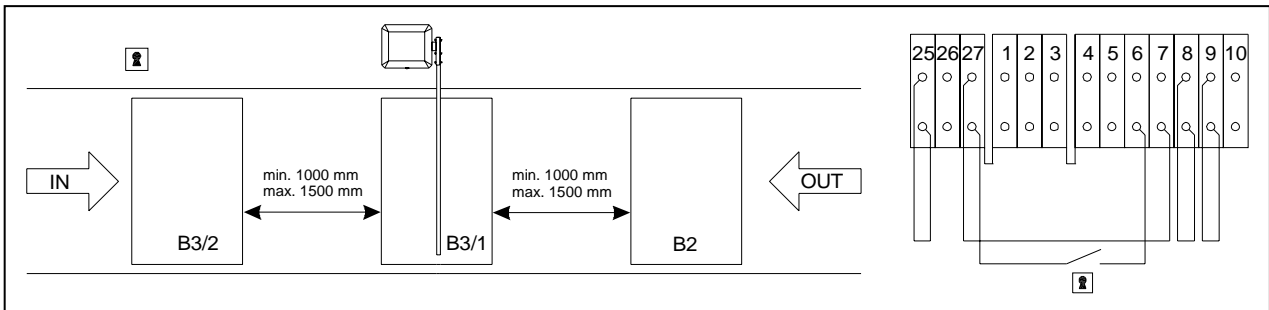
Example 4 (for 2-channel loop detector on socket B3)

Entrance and Exit - with card reader. The loop B3/2 allows use of the card reader only when a vehicle is on the loop. The loop B3/1 is for safety, and closing when a vehicle leaves the loop. The jumpers are at the default settings. Remove the jumper between terminals 6 bottom and 27 bottom and connect the contact from the card reader here. The red jumper on socket B3 between terminals 6 and 10 must remain in place.



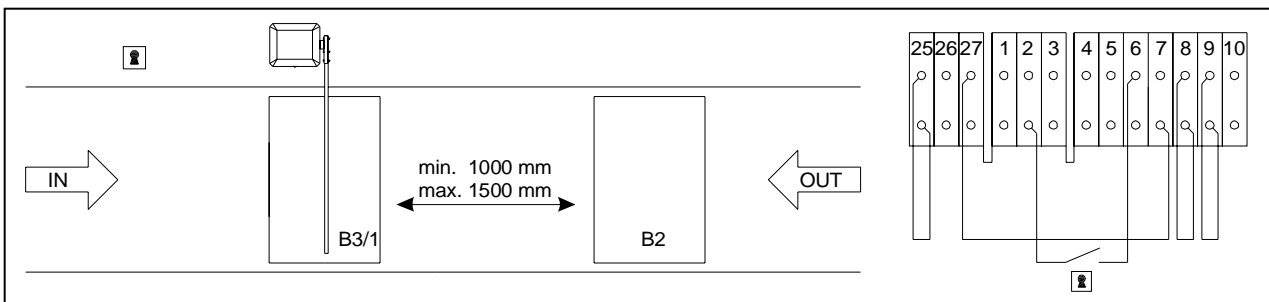
Example 5 (for 1-channel loop detector on socket B2 and 2-channel loop detector on socket B3)

Entrance – with card reader. The loop B3/2 allows use of the card reader only when a vehicle is on the loop. Remove the jumper between terminals 6 bottom and 27 bottom and connect the contact from the card reader here. Safety with loop B3/1, opening with loop B2, closing with B3/1 or B2. Remove the red jumper of socket B3 and set DIP-switch S8 'on'.



Example 6 (for 2 x 1-channel loop detector on socket B2 and socket B3)

Entrance – opening with key switch. Safety with loop B3/1, closing with both loops B3/1 or B2.
Exit – opening with loop B2, safety and closing with B3/1.
Remove red jumper of socket B3 and jumper between the terminals 27 bottom and 6 bottom.



11. Maintenance

11.1. Maintenance ES 25 – ES 40

The maintenance intervals must be decided individually as they are dependent on the frequency of use. We recommend maintenance at least once every six months.

- a. Check everything for mechanical damage and replace where necessary.
- b. Check that the boom reaches the horizontal and vertical positions. If necessary re-adjust the limit switches and the mechanical stoppers.
- c. Ensure that the potential earthing cable is still connected to the housing and to the door.
- d. Check that the operating instructions are complete.
- e. Check that all safety equipment works properly (Loops, photo-cells, and the reversal on obstruction).
- f. Check that the barrier is still secure on the foundation.
- g. Using a grease gun, grease the bearings of the main shaft (grease must be suitable for -25°C to $+125^{\circ}\text{C}$).
- h. Check the plastic screws at the boom holder.
- i. Oil the emergency release bolt and check the function.
- j. Check that the pre-determined breaking point has the correct nuts and bolts (bolts M8x45 ISO 4762 12.9 and nuts M8 ISO 4032 5-2).
- k. Tighten screws where necessary.

11.2. Maintenance ES 50 – ES 80

The maintenance intervals must be decided individually as they are dependent on the frequency of use. We recommend maintenance at least once every six months. The springs are designed for 250,000 openings.

- a. Check the spring assembly. In case of faulty springs all springs must be replaced at once.
- b. Check the spring tension as explained in **2.2**.
- c. Check everything for mechanical damage and replace where necessary.
- d. Check that the boom reaches the horizontal and vertical positions. If necessary re-adjust the limit switches and the mechanical stoppers.
- e. Ensure that the potential earthing cable is still connected to the housing and to the door.
- f. Check that the operating instructions are complete.
- g. Check that all safety equipment works correctly. (Loops, photo-cells, and the reversal on obstruction.)
- h. Check that the barrier is still secure on the foundation.
- i. Using a grease gun, grease the bearings of the main shaft. (grease must be suitable for -25°C to $+125^{\circ}\text{C}$.)
- j. Oil the emergency release bolt and check the function.
- k. Check that the pre-determined breaking point has the correct nuts and bolts (use vandalism set only).
- l. Tighten screws where necessary.

12. Extra equipment

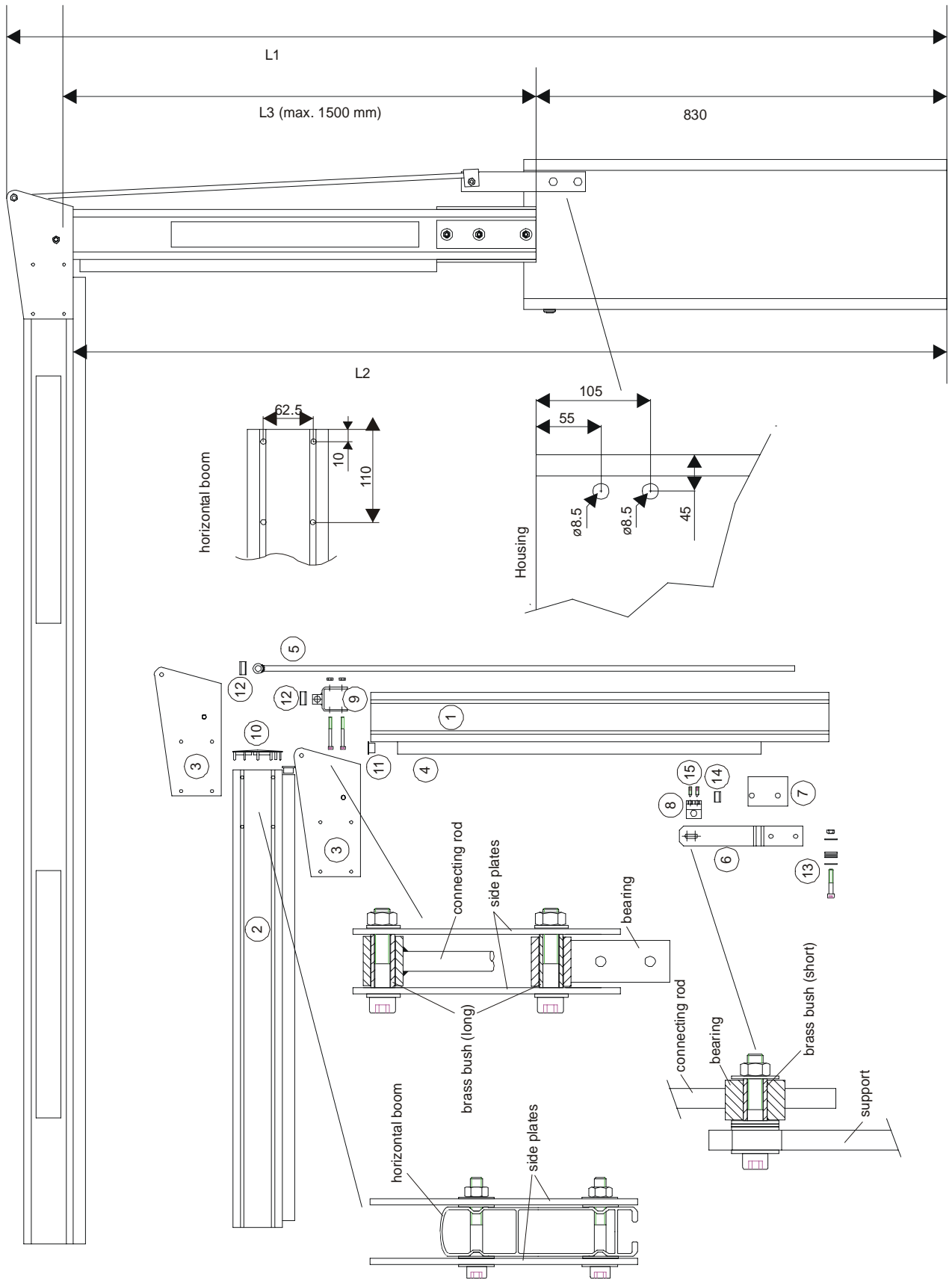
12.1. Folding boom for ES 25 – ES 40

All numbers refer to the following drawing.

Determine the length of the vertical part of the boom (1). The length (L3) should not be longer than the distance from the deck to the ceiling (L1) minus 945mm. The maximum vehicle height (L2) is the ceiling height (L1) minus 160mm. **L3 max. 1500mm.**

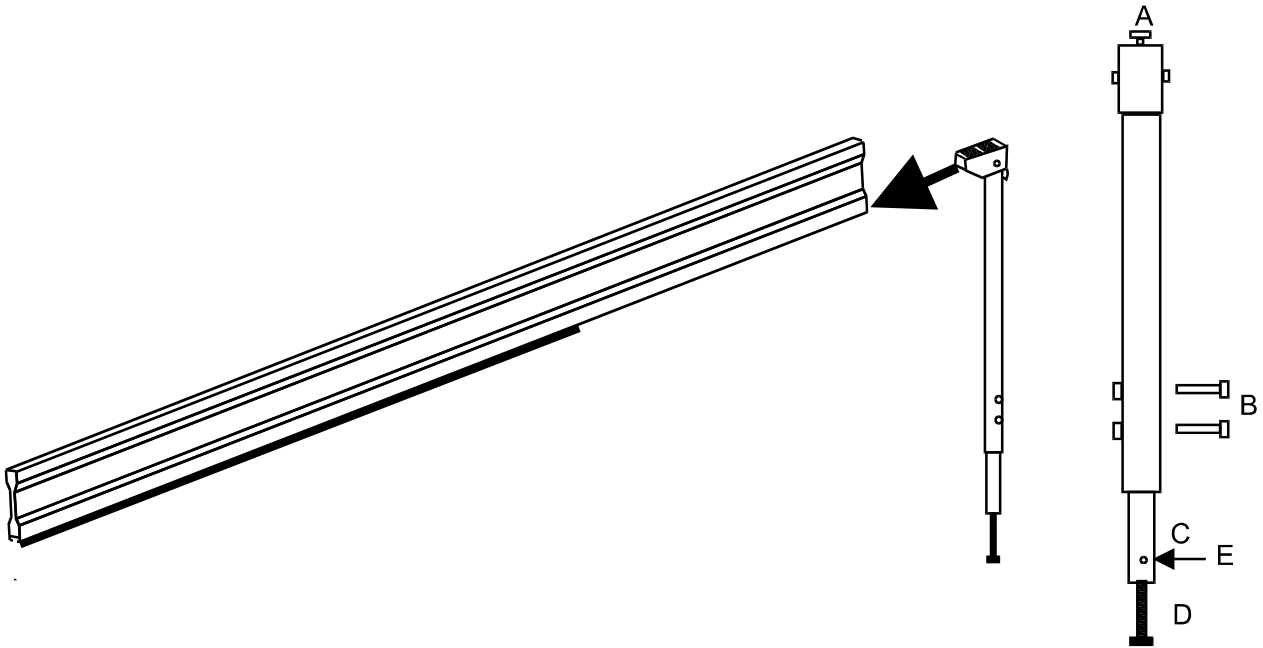
- a. Screw the support (6) with the internal reinforcing plate (7) onto the barrier casing.
- b. Cut the boom into two pieces with the appropriate length.
- c. Cut off 60 mm from the rubber tube from the vertical part of the boom.
- d. For the connection of the side plates to the horizontal boom, drill 2 x 2 holes \varnothing 6,5mm in the cut end of the boom (find the drawing on page 11). Using the four M 6 x 45 bolts, secure the side plates (3) on the boom. Place a washer M6 between side plate and boom to maintain clearance.
- e. Screw the pivot bolt (13) onto the support (6).
- f. Push the short brass bush (14) and the bearing (8) onto the pivot bolt M8x50 and secure them.
- g. Push the bearing (9) into the cut off end of the vertical part of the boom. Drill 2 holes \varnothing 5,0mm from the bottom side in the boom (15 and 40mm from the cut end) and secure the bearing with two M5x60 hex. socket screws.
- h. Fit the bearing (9) between the side plates (3) with a long brass bush and an M8 x 50 bolt.
- i. Fit the connecting rod (5) with a long brass bush between the side plates (3).
- j. Mount the boom on the barrier.
- k. Push the connecting rod into the bearing (8).
- l. Hold the second part of the boom horizontal and clamp the connecting rod with the grub screws (15).
- m. Pull out the emergency release bolt and push the boom into the vertical.
- n. Align the horizontal part by moving the pivot screw (13) up or down.
- o. Check that all screws are tight.
- p. Cut off the superfluous part of the connecting rod.

Folding boom for ES 50 – ES 80 upon inquiry.



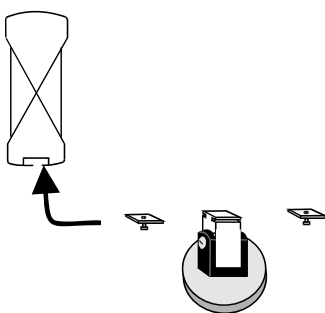
12.2. Swinging support for ES 40 – ES 80

- a. Close the barrier.
- b. Using the screws 'B', connect the upper and lower parts in the approximate length.
- c. Remove about 500 mm of the rubber tubing under the boom and push the securing piece 'A' into the slot. Secure it with the two hex. socket screws.
- d. Push the rubber tube into the slot and cut off the protruding part.
- e. A fine adjustment of the length can now be made on the foot 'D'.
- f. Screw a 4 mm screw into the hole 'E'.
- g. The foot can now be screwed to the appropriate position.



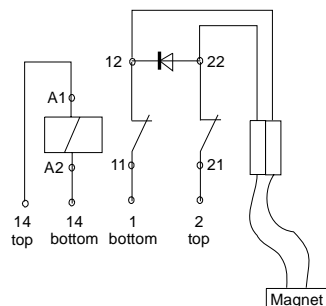
12.3. Fixed support with electromagnet

- Connect the flexible lead from the magnet to the cable from the barrier. There is enough room in the lower part of the support for a junction box.
- Fit the forked part onto the foot and secure it in the required height.
- Remove the rubber tube from the boom at the point at which the anchor plate is to be secured.
- Push one of the securing pieces, followed by the anchor plate, into the slot of the boom until the plate is immediately above the magnet.



- Push the second securing piece up to the magnet.
- Push the securing pieces from both sides against the anchor plate and secure them with the screws.

Connecting the magnet in the barrier



- The 4 seconds warning before opening **must** be activated. Switch 2 on the logic board.
- The coil of the relay must be connected to the terminals '14 top' and '14 bottom' in the terminal block.
- Connect contact 11 of the relay to '1 bottom' in the terminal block.
- Connect contact 21 of the relay to '2 top' in the terminal block.
- The leads to the magnet come from the contacts 12 and 22 of the relay.

OPERATION:

- The relay switches off on receipt of a signal to open. The magnet loses its residual magnetism during the 4 seconds warning time.
- The barrier opens after the 4 seconds.
- The magnet switches on again when the barrier reaches the limit switch at the closed position.

13. General notes of safety

These operating instructions must be available on site at all times. It should be read thoroughly by all persons who use, or service the appliances. Improper usage or servicing or ignoring the operating instructions can be a source of danger for persons, or result in material damage. If the meaning of any part of these instructions isn't clear, then please contact ELKA Torantriebe GmbH u. Co. Betriebs KG before you use the appliance.

This applies to all setup procedures, fault finding, disposal of material, care and servicing of the appliance.

The accident prevention regulations and applicable technical regulations (e.g. safety or electrical) and environment protection regulations of the country in which the appliance is used also apply.

All repairs on the appliances must be carried out by qualified persons. ELKA Torantriebe GmbH u. Co. Betriebs KG accepts no liability for damage which is caused by using the appliance for purposes other than those for which it is built.

ELKA Torantriebe GmbH u. Co. Betriebs KG cannot recognise every possible source of danger in advance. If the appliance is used other than in the recommended manner, the user must ascertain that no danger for himself or others will result from this use. He should also ascertain that the planned use will have no detrimental effect on the appliance itself. The appliance should only be used when all safety equipment is available and in working order. All faults which could be a source of danger to the user or to third persons must be eliminated immediately. All warning and safety notices on the appliances must be kept legible.

All electrical periphery equipment which is connected to the appliance must have a CE Mark, which ensures that it conforms to the relevant EEC regulations. Neither mechanical nor electrical alterations to the appliance, without explicit agreement of the manufacturer, are allowed. All alterations or extensions to the appliance must be carried out with parts which ELKA Torantriebe GmbH u. Co. Betriebs KG have defined as suitable for such alterations, and be carried out by qualified personnel.

Any contravention of these conditions revokes the manufacturer's guarantee and also the CE Mark and the user is alone responsible for the consequences.

Our service department is available to answer all queries about these conditions and, of course, about our appliances.

The operation of the system within CEN countries must also be conformant with the European safety-relevant directives and standards.
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We reserve the right to make technical improvements without prior notice.