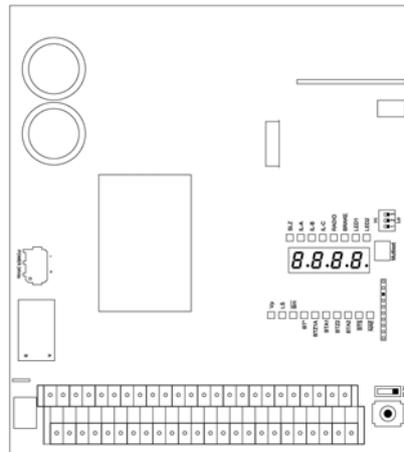


Installation and operating instructions

Barriers T 3000 - T 3500, P 2500 - P 5000, S 5000 - S 9000 Part 2 of 2 Controller MO 24



Translation of original installation and operating instructions

D-ID: V1_5 – 11.16



ELKA-Torantriebe GmbH u. Co. Betriebs KG, Dithmarscher Str. 9, 25832 Tönning, Germany
E-mail: info@elka-torantriebe.de, Internet: www.elka-torantriebe.de
Telephone: +49 (0) 48 61-96 90 0, Telefax: +49 (0) 48 61-96 90 90

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1 Preface

1.1 General notes

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 must 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. Please note that with any alteration of the product, no matter whether mechanical or electrical, the warranty expires and the conformity is revoked. Only the use of ELKA accessories and original ELKA spare parts is allowed. In case of any contravention ELKA disclaims liability of any kind.



INFORMATION!

The operation of the system within CEN countries must also be conformant with the European safety-relevant directives and standards.

We reserve the right to make technical improvements without prior notice.

1.1.1 Symbol explanation

**WARNING!**

Remarks regarding the safety of persons and the gate opener itself are marked by special symbols. These remarks have to be absolutely observed in order to avoid accidents and material damage.

**DANGER!**

...points to an imminent dangerous situation, which can cause death or serious injuries if it is not avoided.

**WARNING!**

...points to a potentially dangerous situation, which can cause death or serious injuries if it is not avoided.

**ATTENTION!**

...points to a potentially dangerous situation, which can cause minor or slight injuries if it is not avoided.

**ATTENTION!**

...points to a potentially dangerous situation, which can cause property damage if it is not avoided.

**REMARK!**

Important notice for installation or functioning.

1.2 Copyright

The operating manual and the contained text, drawings, pictures, and other depictions are protected by copyright. Reproduction of any kind – even in extracts – as well as the utilization and/or communication of the content without written release certificate are prohibited. Violators will be held liable for damages. We reserve the right to make further claims.

1.3 Information regarding installation instruction

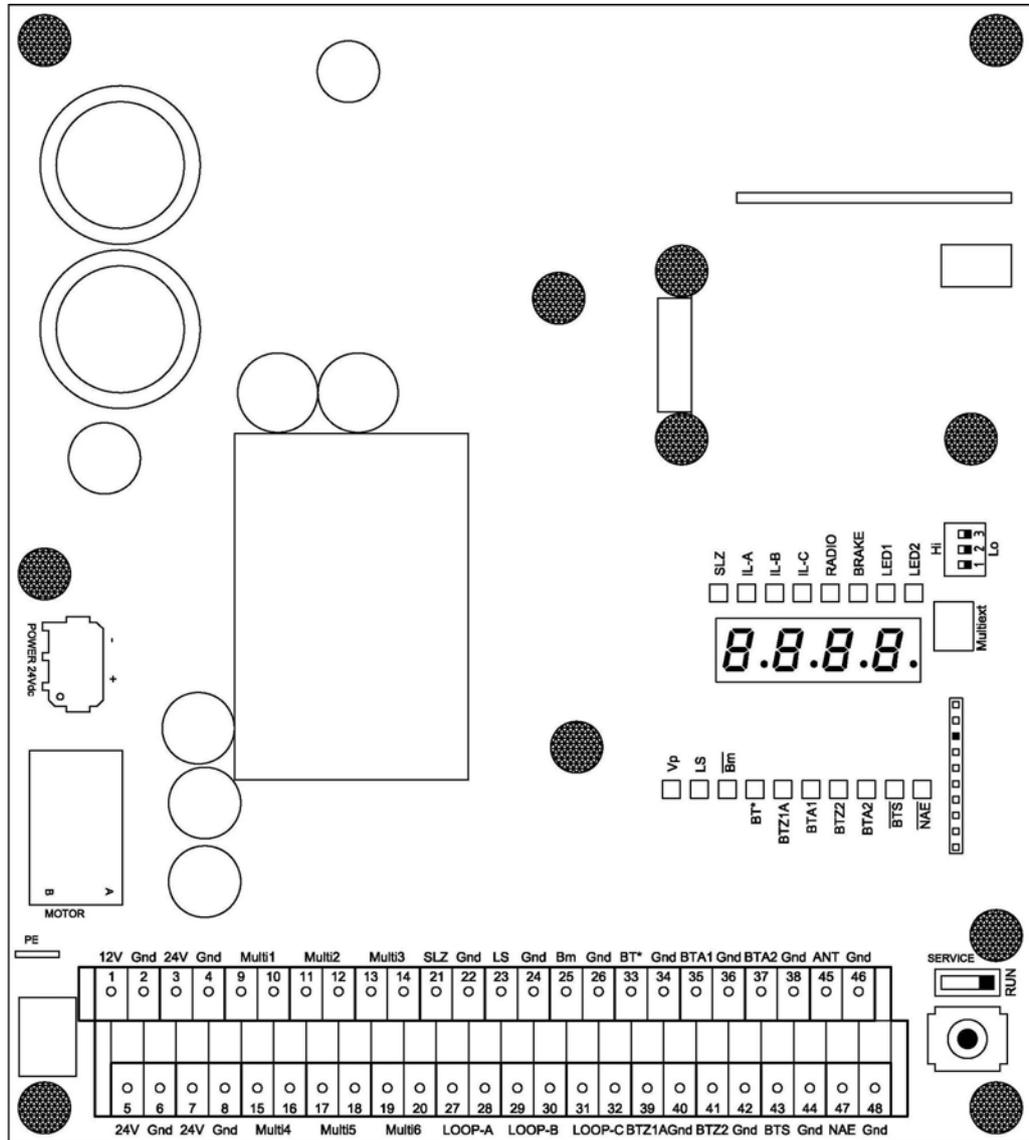
This document is to be used as installation instruction for partly completed machinery (according to machinery directive 2006/42/EG, article 13, (2)).

2 Controller MO 24

2.1 Connections of MO 24

2.1.1 Connection diagram MO 24

The following drawing shows an overview of the controller.



Drawing 1

2.1.2 Outputs

Output	Function
1 - 2 12V - Gnd	12Vdc, stabilized, max. 500mA.
3 - 4 24V - Gnd	24Vdc, stabilized, max. 1.500mA
5 - 6 24V - Gnd	24Vdc, stabilized, max. 1.500mA
7 - 8 24V - Gnd	24Vdc, stabilized, max. 1.500mA
9 - 10 Multi1	Multi-functional relays Multi1, potential-free. The function is configurable.
11 - 12 Multi2	Multi-functional relays Multi2, potential-free. The function is configurable.
13 -14 Multi3	Multi-functional relays Multi3, potential-free. The function is configurable.
15 - 16 Multi4	Multi-functional relays Multi4, potential-free. The function is configurable.
17 - 18 Multi5	Multi-functional relays Multi5, potential-free. The function is configurable.
19 - 20 Multi6	Multi-functional relays Multi6, potential-free. The function is configurable.

Table 1

2.1.3 Service switch



WARNING!

Danger of crushing by unexpected movements of the barrier mechanics!

Danger of crushing in the barrier mechanics.

- For programming work set the service switch of the barrier controller to "Service".
- Turn the power supply off when work at electrical connections is performed.

When the **service switch** is in position **RUN**, the controller processes all operating commands.

When the **service switch** is in position **SERVICE**, the controller operation is limited. The barrier can be opened and closed via joystick. Radio remote control commands, operating commands via bus-system, opening and closing commands from induction loops and external operating commands are ignored.

2.1.4 Inputs

Input	Contact	Function
21 - 22 SLZ	8,2kOhm	Safety contact profile (SLZ) with 8.2kOhm resistor to secure the closing movement. When SLZ reports, closing is not possible. When SLZ reports during closing, stop and opening follows. SLZ is tested before every closing movement. When the test fails, closing is not possible. An error message is issued.
23 - 24 LS	n.c.	A system of up to six photoelectric barriers (LS), whose contacts are connected in series. The contact opens when the photoelectric barrier detects an obstacle. The LS is not monitored during opening. When LS reports an obstacle the barrier cannot be closed. The stay-open time of the automatic closure is not started anew (retriggered). Further functions: - photoelectric barrier testing (see page 29) - photoelectric barrier closing automatic (see page 28)
25 - 26 Bm	n.c.	The boom-missing-contact opens, when the barrier boom breaks off. When the contact is open, the barrier shows the error message ERR on the display. Via bus system it can be configured whether the barrier stops as long as boom-missing is reported or if only the error message is issued.
27 - 28 LOOP-A		Induction loop A
29 - 30 LOOP-B		Induction loop B
31 - 32 LOOP-C		Induction loop C
33 - 34 BT*	n.o.	Configurable input: BT or BTA3 or BTZ1B. Preset is BT. Configured as BT: BT with sequential logic. The operating sequence of BT depends on the operating mode of the automatic closure and the counting function. When automatic closure is activated or when the counting function is deactivated, then BT closes the barrier when it is fully open. Otherwise it will be opened. When automatic closure is locked and the counting function is activated, then BT only opens and the counter of the counting function is incremented (+1). Closing by BT is not possible. Configured as BTA3: same function as BTA1 and BTA2. Configured as BTZ1B: same function as BTZ1A.
35 -36	n.o.	Push button OPEN 1: An OPEN-command (flank) is

Input	Contact	Function
BTA1		triggered when one of the contacts is being closed. As long as one of the contacts is closed, the barrier cannot be closed (stay-open function). The stay-open time of the automatic closure is not retriggered via BTA1.
37 - 38 BTA2	n.o.	Push button OPEN 2 An OPEN-command (flank) is triggered when one of the contacts is being closed. As long as one of the contacts is closed, the barrier cannot be closed (stay-open function). The stay-open time of the automatic closure is not retriggered via BTA2.
39 - 40 BTZ1	n.o.	Push button CLOSE 1A: The input BTZ1A is evaluated independent of BTZ1B. A CLOSE-command (flank) is issued, when one of the contacts is being closed. When the barrier is completely closed and at least one of the contacts BTZ1A or BTZ1B is closed, then the barrier cannot be opened (locking function).
41 - 42 BTZ2	n.c.	Push button CLOSE 2: A CLOSE-command (flank) is issued, when one of the contacts is being opened. BTZ2 has no locking function in end position CLOSED.
43 - 44 BTS	n.c.	Push button Stop 1: (e.g. desk-top panel). Evaluated is the contact status. When the contact is open the barrier stops. Stored commands are deleted. Automatic closure is locked until the next operating command.
45 - 46 ANT		Antenna connection
47 - 48 NAE		Power failure detection

Table 2

2.1.5 LED display

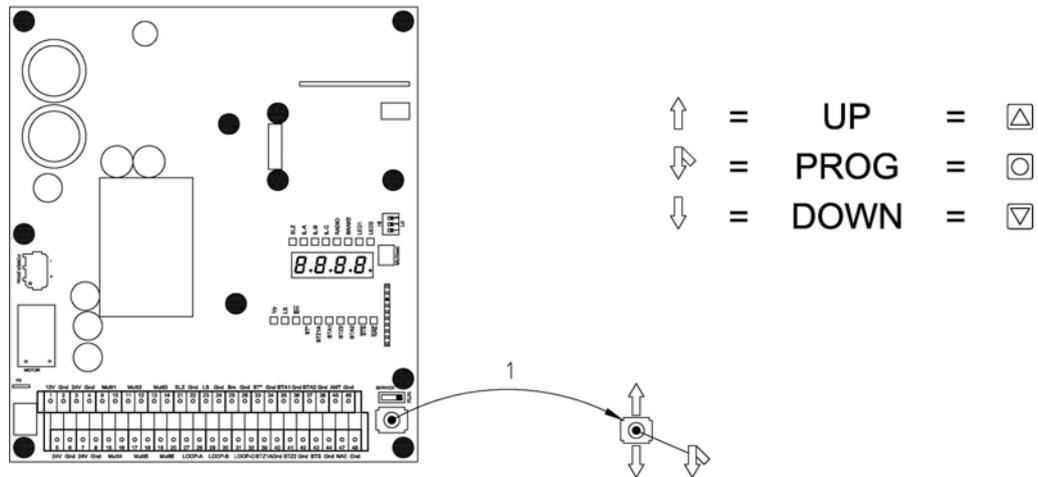
Mark	Colour	Function
Vp	yellow	Is lit, when the operating voltage is switched on.
LS	green	Is lit, when contact LS is opened.
Bm.	green	Is lit, when contact boom-missing is closed.
BT*	green	Is lit, when contact BT-BTA3-BTZ1B is closed.
BTZ1A	green	Is lit, when contact BTZ1A is closed.
BTA1	green	Is lit, when contact BTA1 is closed.
BTZ2	green	Is lit, when contact BTZ2 is closed.
BTA2	green	Is lit, when contact BTA2 is closed.
BTS	green	Is lit, when contact BTS is closed.
NAE	green	Is lit, when power failure detection ANAE is connected and power supply is on.
SLZ	red	Is lit, when the safety contact profile is activated.
IL-A IL-B IL-C	red	Is lit, when the corresponding induction loop is occupied. Flashes during error.
RADIO	red	Is lit, when the learned radio remote control code is received.
BRAKE	red	Is lit, when the motor is braking.
LED1	red	For future use
LED2	red	For future use
Display	red	Serves to set operating modes, parameters and displays error messages. In normal mode the display is turned off. The decimal point of the units digit flashes once per second to indicate operational readiness. The decimal point of the thousands digit lights when the TCP-module is attached and a socket-connection is established.

Table3

2.1.6 Connection for TCP/IP-module

Alternatively, instead of the RS485 bus system a TCP/IP module can be plugged on. The module then has an RJ45-socket.

2.2 Learning sequence



Drawing 2

To program the controller and to set the operating parameters a four-digit 7-segment-display and a joystick (1) are available on the control board. The joystick has the functions UP, DOWN, and PROG.

In the following description the writing format below will be used:

UP	Push the joystick upwards.
DOWN	Push the joystick downwards.
PROG	Press the centre of the joystick down.

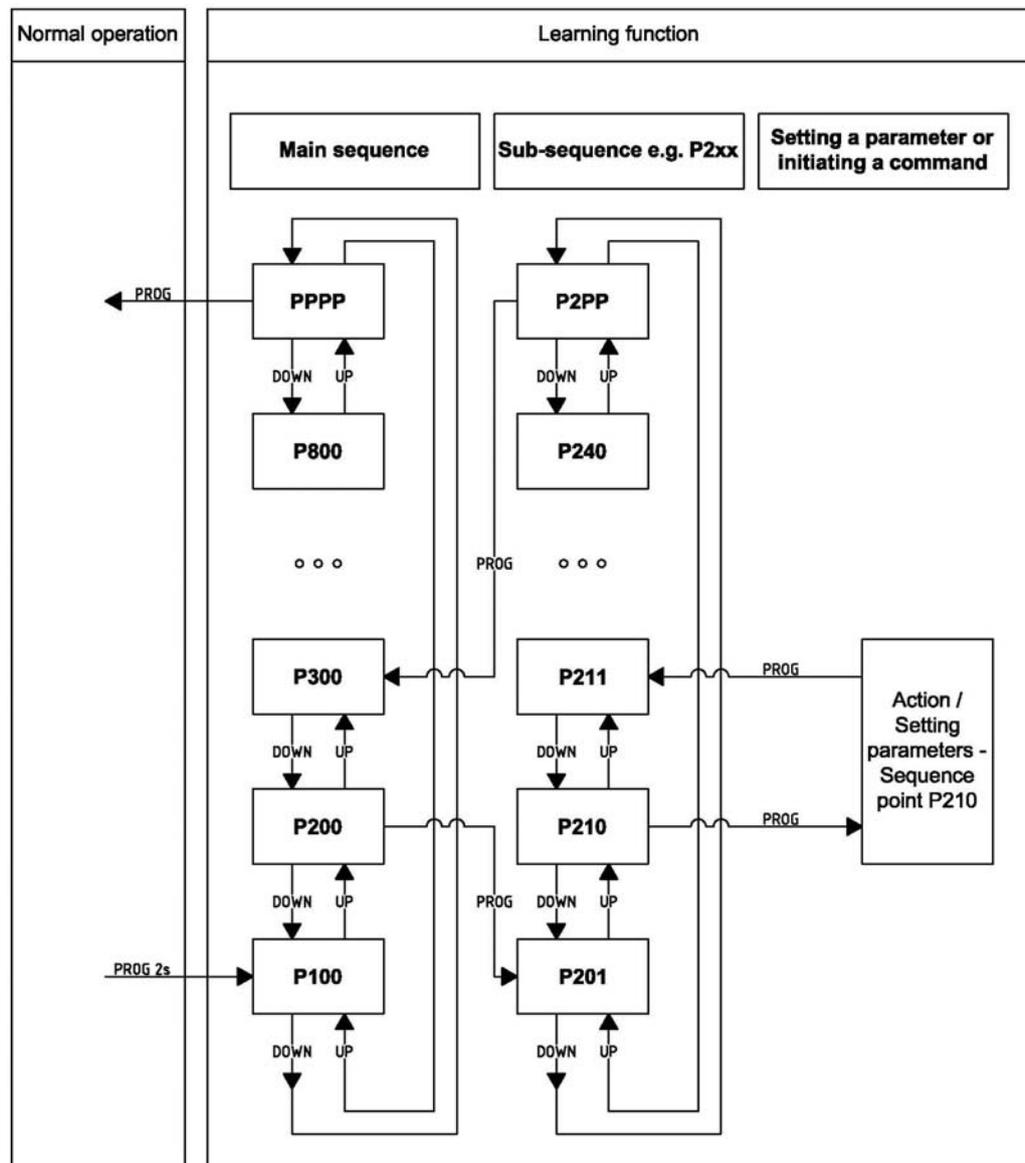
Table 4

The Learning Sequence consists of the Main Sequence and the Sub-Sequences.

During normal operation the display is switched off. Only the decimal point of the units digit flashes as stand-by indicator and the decimal point of the thousands digit is lit, when a TCP-socket connection is established.

Navigation in the Learning Sequence using the joystick and the foil keypad

The Main Sequence is activated when PROG is pushed for a period of approx. 2s. The display then shows **P 100**. You may navigate within the Main Sequence using the functions UP and DOWN. When the required Main Sequence point is selected use PROG for activation. Now you can reach the Sub-Sequence points e.g. P101. Using the functions UP and DOWN you may navigate within the Sub-Sequence. When the required Sub-Sequence point is selected use PROG for activation. Here the selected parameter can be set now. Using function PROG you reach the next Sub-Sequence point. In order to leave the Sub-Sequence, use UP or DOWN to navigate to the exit e.g. P1PP and push PROG. Now you automatically get to the next sequence point of the Main Sequence. In order to leave the Main Sequence, use UP or DOWN to navigate to the exit of the Main Sequence PPPP. Using PROG saves the data in the EEPROM and ends the learning sequence.



Drawing 3

Setting a number



The input of a number in the menu is always carried out the same way and therefore is only described at this point.

When activating a Sequence point where a number shall be set, the currently selected numerical value is shown in the display. Using UP the number can be increased (+1). Using DOWN the number can be decreased (-1). The number can "scroll through", when UP or DOWN is kept actuated.

- When UP is kept actuated, after a delay of 1.3s the number will be increased by 10 every 0.3s.
- When UP is kept actuated further, after another delay of 3s the number will be increased by 100 every 0.4s.
- When UP is kept actuated further, after another delay of 4s the number will be increased by 1000 every 0.5s.

If the permissible maximum value is exceeded, the numeric value is set to the permissible maximum value.

If the displayed number has a decimal place, then this will be ("scrolled through") set to zero during automatic increasing of the number.

The decreasing using DOWN happens in the same manner.

When the required number is set, leave the Sequence point using PROG.

Main sequence	Sub-sequence	Starting page	Function
P100			Basic functions
	P101	16	Selecting the barrier speed and learning the photoelectric barriers
	P102	17	Radio remote control code
	P103	17	Selecting the power supply: Normal (optional with battery) Normal with power failure detection
	P104	18	Opening limitation
	P105	18	Limitation of the safety device end position CLOSED
	P1PP		Return to main sequence to P200
P200			Configuring the bus system
	P201	20	RS485 barrier address
	P210	20	IP address Byte 1
	P211	20	IP address Byte 2
	P212	20	IP address Byte 3
	P213	20	IP address Byte 4
	P220	20	Gateway address Byte 1
	P221	20	Gateway address Byte 2
	P222	20	Gateway address Byte 3
	P223	20	Gateway address Byte 4
	P230	20	Subnet mask Byte 1
	P231	20	Subnet mask Byte 2
	P232	20	Subnet mask Byte 3
	P233	20	Subnet mask Byte 4
	P240	20	Socket port number - <i>ten thousands digit, thousands digit</i>
	P241	20	Socket port number - <i>hundreds digit, tens digit, units digit</i>
	P2PP		Return to main sequence to P300
P300			Setting time
	P301	22	Setting stay-open time and switching

Main sequence	Sub-sequence	Starting page	Function
	P302	22	Setting pre-warning before opening
	P303	22	Setting pre-warning before closing
	P3PP		Return to main sequence to P400
P400			Setting of counters
	P401	23	Setting maintenance interval
	P402	23	Display/erase service counter
	P410	23	Counting function setting lower limit
	P411	23	Counting function setting upper limit
	P4PP		Return to main sequence to P500
P500			Various operating modes
	P501	23	Operating mode for multi-functional relay 1 (Multi 1)
	P502	23	Operating mode for multi-functional relay 2 (Multi 2)
	P503	23	Operating mode for multi-functional relay 3 (Multi 3)
	P504	23	Operating mode for multi-functional relay 4 (Multi 4)
	P505	23	Operating mode for multi-functional relay 5 (Multi 5)
	P506	23	Operating mode for multi-functional relay 6 (Multi 6)
	P510	26	Red traffic light (RtApl) in end position CLOSED
	P511	26	Red traffic light (RtApl) at pre-warning before opening
	P512	26	Red traffic light (RtApl) at pre-warning before closing
	P513	26	Red traffic light (RtApl) during opening
	P514	26	Red traffic light (RtApl) during closing
	P515	26	Red traffic light (RtApl) at intermediate stop
	P516	26	Red traffic light (RtApl) in end position OPEN
	P520	26	Green traffic light (GnApl) in end position CLOSED
	P521	26	Green traffic light (GnApl) at pre-warning before opening
	P522	26	Green traffic light (GnApl) at pre-warning

Main sequence	Sub-sequence	Starting page	Function
			before closing
	P523	26	Green traffic light (GnApl) during opening
	P524	26	Green traffic light (GnApl) during closing
	P525	26	Green traffic light (GnApl) at intermediate stop
	P526	26	Green traffic light (GnApl) in end position OPEN
	P530	27	Warning light in end position CLOSED
	P531	27	Warning light at pre-warning before opening
	P532	27	Warning light at pre-warning before closing
	P533	27	Warning light during opening
	P534	27	Warning light during closing
	P535	27	Warning light at intermediate stop
	P536	27	Warning light in end position OPEN
	P540	28	Selection push button function BTBTA3-BTZ1B
	P541	28	Force monitoring
	P542	28	Photoelectric barrier mode
	P543	28	Photoelectric barrier closing automatic
	P544	29	Photoelectric barrier testing
	P545	31	Induction loops – safety mode
	P546	31	Immediate closing
	P547	31	Dead man's mode
	P548	32	Boom-missing function
	P549	32	Auto-Sync-Function
	P550	32	Setting password protection
	P560	33	Operating mode for multi-functional relay 7 (Multi7) (optional at extension board)
	P561	33	Operating mode for multi-functional relay 8 (Multi8) (optional at extension board)
	P562	33	Operating mode for multi-functional relay 9 (Multi9) (optional at extension board)
	P563	33	Operating mode for multi-functional relay 10 (Multi10)

Main sequence	Sub-sequence	Starting page	Function
			(optional at extension board)
	P564	33	Operating mode for multi-functional relay 11 (Multi11) (optional at extension board)
	P565	33	Operating mode for multi-functional relay 12 (Multi12) (optional at extension board)
	P566	33	Operating mode for multi-functional relay 13 (Multi13) (optional at extension board)
	P567	33	Operating mode for multi-functional relay 14 (Multi14) (optional at extension board)
	P570	33	Selecting the barrier series
	P5PP		Return to main sequence to P600
P600			Induction loops - basic settings
	P601	34	Sensitivity stage - loop A
	P602	34	Sensitivity stage - loop B
	P603	34	Sensitivity stage - loop C
	P610	35	Hold time - loop A
	P611	35	Hold time - loop B
	P612	35	Hold time - loop C
	P620	35	Loop readjustment counter - loop A
	P621	35	Loop readjustment counter - loop B
	P622	35	Loop readjustment counter - loop C
	P630	37	Standard loop mode
	P6PP		Return to main sequence to P700
P700			Setting induction loop functions manually
	P701	37	Loop A: switching on / off
	P702	37	Loop A: function during entering the loop / safety
	P703	37	Loop A: function when leaving the loop
	P704	37	Loop A: presence
	P711	37	Loop B: switching on / off
	P712	37	Loop B: function during entering the loop / safety
	P713	37	Loop B: function when leaving the loop
	P714	37	Loop B: presence

Main sequence	Sub-sequence	Starting page	Function
	P721	37	Loop C: switching on / off
	P722	37	Loop C: function during entering the loop / safety
	P723	37	Loop C: function when leaving the loop
	P724	37	Loop C: presence
	P730	38	Directional logic 1: input selection
	P731	38	Directional logic 1: opening and closing when passing from the left
	P732	38	Directional logic 1: opening and closing when passing from the right
	P733	38	Directional logic 1: vehicle counting when passing from the left
	P734	38	Directional logic 1: vehicle counting when passing from the right
	P735	38	Directional logic 1: opening and closing when entering the loop from the left
	P736	38	Directional logic 1: opening and closing when entering the loop from the right
	P737	38	Directional logic 1: reporting presence or blocking presence when entering the loop from the left
	P738	38	Directional logic 1: reporting presence or blocking presence when entering the loop from the right
	P740	38	Directional logic 2: input selection
	P741	38	Directional logic 2: opening and closing when passing from the left
	P742	38	Directional logic 2: opening and closing when passing from the right
	P743	38	Directional logic 2: vehicle counting when passing from the left
	P744	38	Directional logic 2: vehicle counting when passing from the right
	P745	38	Directional logic 2: opening and closing when entering the loop from the left
	P746	38	Directional logic 2: opening and closing when entering the loop from the right
	P747	38	Directional logic 2: reporting presence or blocking presence when entering the loop from the left
	P748	38	Directional logic 2: reporting presence or

Main sequence	Sub-sequence	Starting page	Function
			blocking presence when entering the loop from the right
	P7PP		Return to main sequence to P800
P800			Reset
	P801	40	Reset to factory settings
	P802	40	Reset to client's factory settings
	P8PP		Return to main sequence to PPPP
PPPP			Storing the data and exiting the learning sequence

Table5

2.2.1 Sequence P100 – Basic functions



WARNING!

During programming work external commands can trigger barrier movements, i.e. the motor and thus ALL moving parts can move unexpectedly.

Rotating and/or linear movable components can cause serious injuries.

- Set the service switch from “RUN” to “SERVICE” during programming work.
- Do not reach into moving parts or handle any moving components during operation.



The following LEDs must light up during operational readiness of the barrier:

- LED **Vp** (supply voltage)
- LED **Bm.** (boom-missing contact)
- LED **BTS** (stop-button)
- LED **NAE** (when optional power failure detection is connected)

2.2.1.1 P101 – Selecting the barrier speed and learning the photoelectric barriers

When activating this sequence the display shows the current setting of the barrier speed:

Display	Speed
0	fast
1	standard (factory setting)
2	slow

Table 6

The barrier speed can be changed using UP and DOWN Select the required speed and confirm using PROG. Now **Lrn 1** is displayed. If the photoelectric barrier testing is activated, the number of connected

photoelectric barriers is now learned. Otherwise this step is skipped and you return to sequence point P 102.



In sequence point P101 various errors can occur which might lead to a cancellation. In order to start the sequence point again, press PROG. briefly. To cancel the function and to return to the main sequence press and hold PROG for approx. 5s.

Display	Corresponds to:
<i>L r n 1</i>	The learning of the photoelectric barriers is in progress.
<i>L r n 2</i>	An error occurred during learning of the photoelectric barriers (LS). Check the connection of the photoelectric barriers – see page 29.
<i>L r n 3</i>	The photoelectric barrier reports an obstacle.

Table 7

2.2.1.2 P102 – Learning or deleting the radio remote control code

When activating this sequence point the display first shows whether a radio remote control code is learned (display *HHHH* / no radio code display *- - - -*).

Learning the radio remote control code

Push PROG briefly. The display shows *SEnd*. Send the desired radio remote control code by activating the coded transmitter. When a code is received *oooo* is displayed. Now this point is completed and you return to sequence point P102.

Deleting the radio remote control code

Push and hold PROG. The display shows *SEnd*. After 5s the display changes to *- - - -*. Now release PROG. The radio remote control code is deleted. Now this point is completed and you return to sequence point P102.

Cancellation without changing the radio remote control code

Push PROG briefly. The display shows *SEnd*. Push PROG briefly once again. Now this point is completed and you return to sequence point P102.

2.2.1.3 P103 – Selecting the power supply

When activating this sequence point the display shows the current value for the selected power supply:

Display	Power supply
0	Standard: The barrier is supplied with 24Vdc from the power supply unit. During power failure the barrier stops. With battery: The barrier is supplied with 24Vdc from the power supply unit. Additionally an (optional) 24V battery is available, which provides power for the barrier for a short time during power failure. The mains is monitored by the power failure detection. Remark: The status “Power supply failed”= “Battery mode” can be issued via a multi-functional relay.

1	With power failure detection: The barrier is supplied with 24Vdc from the power supply unit. Additionally the power supply is monitored. When power fails, the barrier receives a “push” in direction OPEN. The opening during power failure is then carried out via integrated springs. When the controller detects the power failure, the display shows P.O.F.F.
---	---

Table 8

Now this point is completed and you return to sequence point P104.

2.2.1.4 P104 – Setting the opening limitation

The opening limitation determines how far the barrier boom opens during operation. The standard opening width is 90° (end position OPEN). In case of a low ceiling or an obstacle above the barrier, the opening width can be limited. The barrier then stops earlier during opening. The motor holds the barrier boom in this position.

When activating this sequence point the display shows the current value for the opening limitation:

Display	Opening limitation
0	The barrier opens completely = 90°.
1	Opening limitation at approx. 85°
2	Opening limitation at approx. 80°
3	Opening limitation at approx. 75°
4	Opening limitation at approx. 70°
5	Opening limitation at approx. 65°
6	Opening limitation at approx. 60°
7	Opening limitation at approx. 55°

Table 9

Now this point is completed and you return to the sequence point P105.

2.2.1.5 P105 – Setting the limitation of the safety device

The limitation of the safety device determines whether the safety functions photoelectric barrier (LS), safety contact profile CLOSE (SLZ) and safety by induction loop in the selected areas before the end position CLOSED shall be evaluated or limited.

When activating this sequence point the display shows the current value for limitation of the safety function:

Display	Limitation range
0	The safety devices are evaluated in any position.
1	No evaluation of the safety devices in the range < 10° before end position CLOSED
2	No evaluation of the safety devices in the range < 20° before end position CLOSED
3	No evaluation of the safety devices in the range < 30°

	before end position CLOSED
--	----------------------------

Table 10

Now this point is completed and you return to the main sequence point P1PP.

2.2.2 Sequence P200 – Configuring the bus system

2.2.2.1 P201 – RS485 Barrier address

Here the RS485 bus address is set decimally. Allowed are the addresses **16** = 0x10 to **254** = 0xFE.

Factory setting: 16

2.2.2.2 P210-P213 – IP address

The 4 bytes of the IP address are set in decimal format under P210 to P213.

Example: for 192.168.0.200 perform the following settings:

- P210 = 192
- P211 = 168
- P212 = 0
- P213 = 200

Factory setting: 192.168.0.200.

2.2.2.3 P220-P223 – Gateway address

The 4 bytes of the gateway address are set in decimal format under P220 to P223.

Example: for 192.168.0.1 perform the following settings:

- P220 = 192
- P221 = 168
- P222 = 0
- P223 = 1

Factory setting: 192.168.0.1.

2.2.2.4 P230-P233 – Subnet mask

The 4 bytes of the subnet mask are set in decimal format under P230 to P233.

Example: for 255.255.255.0 perform the following settings:

- P230 = 255
- P231 = 255
- P232 = 255
- P233 = 0

Factory setting: 255.255.255.0.

2.2.2.5 P240-P241 – Socket port number

The socket port number is a 16-bit number with a range of 0 to 65535. The port number is divided into ten thousands and thousands digit, as well as hundreds, tens, and units digit. The ten thousands and thousands digit is set under P240. The hundreds, tens, and units digit is set under P241.

Example: for 52719 perform the following settings:

- P240 = 52
- P241 = 719



When under P240 the number 65 is set, then only values from 000 to 535 can be set under P241. When under P241 a number > 535 is set, then only values from 00 to 64 can be set under 240.

Alternatively:

Under P240 you can select any number from 00 to 65 and under P241 any number from 000 to 999. When storing P240 the value in P241 is checked and if necessary automatically corrected and when storing P241 the value in P240 is checked and if necessary automatically corrected, so that for the port number altogether a number within the range of 00000 to 65535 is set.

Factory setting: 52719 (=0xcdef)

2.2.3 Sequence P300 – Setting time

2.2.3.1 P301 – Stay-open time / Automatic closure

The barrier can close automatically. When automatic closure is selected, the learned stay-open time starts to run as soon as the barrier has reached the end position OPEN. The barrier closes automatically when the stay-open time has elapsed. The stay-open time for automatic closure can be set under P301 with a range of 0.0s to 655.0s. With a value of 0.0s the automatic closure is deactivated.

Factory setting: 0.0s = no automatic closure



When the barrier is open and a stop command is given, the automatic closure is locked. The automatic closure will only be unlocked again when a new command is given.



After power up or after completion of the learning, a completely open barrier with automatic closure selected closes after the stay-open time has elapsed.



The stay-open time of the automatic closure is not retrigged via BTA1 to BTA3.

2.2.3.2 P302 – Pre-warning time (opening)

Under sequence point P302 pre-warning time before opening can be set within the range of 0.0s to 655.0s. With a value of 0.0s the pre-warning time before opening is deactivated.

Factory setting: 0.0s = no pre-warning time before opening

2.2.3.3 P303 – Pre-warning time (closing)

Under sequence point P303 pre-warning time before closing can be set within the range of 0.0s to 655.0s. With a value of 0.0s the pre-warning time before closing is deactivated.

Factory setting: 0.0s = no pre-warning time before closing

2.2.4 Sequence P400 – Setting of counters

2.2.4.1 P401 – Maintenance interval

With each barrier movement the service counter is incremented (+1). A maintenance signal is issued when the service counter value is higher than the set maintenance interval. The maintenance message can be signalled e.g. through a multi-functional relay. The setting range is 1000 to 9999000 in multiples of 1,000.

Factory setting: 250 (corresponds to 250,000)



The controller features an operating hour counter. Readout is possible via the bus system.

2.2.4.2 P402 – Service counter

Under sequence point P402 the value of the service counter can be displayed and deleted. With each barrier movement the service counter is incremented (+1). The service counter is displayed in multiples of 1,000 only.

Example: The display **3456** stands for more than 3,456,000 and less than 3,457,000 movements.

To leave this sequence point push PROG briefly. To delete the service counter and leave the sequence point push PROG for 5s.

2.2.4.3 P410-P411 – Upper and lower limit of the counting function

The barrier is controlled by a command counter. Each OPEN-command increments the counter (+1), each CLOSE-command decrements the counter (-1). The switching of the program counter from 0 to 1 actuates the opening, the switching of the program counter from 1 to 0 actuates the closing of the barrier.

The counter can be incremented to the upper limit and can be decremented to the lower limit. The adjustment range for the lower limit is -9 to 0 and for the upper limit 1 to 9.

Example: lower limit = 0, upper limit = 3

With 3 consecutive OPEN-commands the counter is set as follows: 0 – 1 – 2 – 3. The barrier opens once and remains in position OPEN.

With 2 consecutive CLOSE-commands the counter is set as follows: 3 – 2 – 1. The barrier remains in position OPEN. The switching from 1 to 0 and thus the closing of the barrier occurs only after another CLOSE-command.

Factory setting: upper limit = 1

Factory setting: lower limit = 0

2.2.5 Sequence P500 – Various operating modes

2.2.5.1 P501-P506 – Operating modes for multi-functional relay 1 to multifunctional relay 6

The controller features six potential-free multi-functional relays (Multi1 to Multi6) which can switch 24V/1A. Optionally an extension board can be connected which contains 8 additional multi-functional relays (Multi7 to Multi14).

The operating mode of the six (optionally fourteen) multi-functional relays can be selected according to the following table:

Display	Operating mode / Function
0	The multi-functional relay is deactivated.
1	Error: The multi-functional relay is activated when an error message is displayed of the controller.
2	Maintenance: The multi-functional relay is activated when the service counter value is higher than the set maintenance interval.
3	Boom-missing message: The multi-functional relay is activated when the "boom-missing" contact is opened.
4	Tandem operation: The multi-functional relay is active, when the barrier is not in end position CLOSED. It is already active during pre-warning before opening.
5	Red traffic light: Configuration see page 26
6	Green traffic light: Configuration see page 26
7	Warning light: Configuration see page 27
8	LED boom lighting: The multi-functional relay is activated in end position CLOSED. In end position OPEN it is deactivated. In between the end positions it flashes.
9	End position OPEN: The multi-functional relay is activated when the barrier is open. During pre-warning before closing (clearance time) the relay is already deactivated.
10	End position CLOSED / electromagnet: The multi-functional relay is activated when the barrier is closed. During pre-warning before opening the relay is already deactivated. REMARK: for the use with an electromagnet, additionally the pre-warning time before opening has to be set to min. 1.5 seconds (P302).
11	Bus relay: The multi-functional relay is activated via the bus (switching on and off, 1-second-pulse).
12	Photoelectric barrier testing: The multi-functional relay activates the supply for the photoelectric barrier during photoelectric barrier testing (see page 29).
13	Emergency release: The relay is activated, when the barrier boom is moved manually more than half of the complete running distance (>50 %).
14	Presence: The multi-functional relay is activated, when the induction loop evaluation reports "presence".
15	Occupied message loop A - static: The multi-functional relay is activated when loop A is occupied.
16	Status message loop A: The multi-functional relay is activated when loop A is activated, is not faulty and not occupied.
17	Occupied message loop A – impulse: The multi-functional relay issues a pulse when loop A is being occupied.

Display	Operating mode / Function
18	Clearing message loop A – impulse: The multi-functional relay issues a pulse, when loop A is being cleared.
19	Occupied message loop B - static: The multi-functional relay is activated when loop B is occupied.
20	Status message loop B: The multi-functional relay is activated when loop B is activated, is not faulty and not occupied.
21	Occupied message loop B – impulse: The multi-functional relay issues a pulse when loop B is being occupied.
22	Clearing message loop B – impulse: The multi-functional relay issues a pulse, when loop B is being cleared.
23	Occupied message loop C - static: The multi-functional relay is activated when loop C is occupied.
24	Status message loop C: The multi-functional relay is activated when loop C is activated, is not faulty and not occupied.
25	Occupied message loop C – impulse: The multi-functional relay issues a pulse when loop C is being occupied.
26	Clearing message loop C – impulse: The multi-functional relay issues a pulse, when loop C is being cleared.
27	Counting +1: The relay issues a pulse when the vehicle counter is incremented (+ 1).
28	Counting -1: The relay issues a pulse when the vehicle counter is decremented (vehicle counter - 1).
29	Directional logic from the right: The relay issues a pulse when the directional logic detects a vehicle passing from the right.
30	Directional logic from the left: The relay issues a pulse when the directional logic detects a vehicle passing from the left.
31	The relay is activated when the barrier is closed. During the pre-warning before opening the relay is already deactivated. It is also deactivated, when contact BTS is open. This operating mode maybe used for the electromagnet.
32	The relay is activated when a TCP-SOCKET-CONNECTION is established.
33	The relay is activated when the power failure detection is connected and the power supply did not fail. This operating mode may be used for the “battery mode”. The relay is deactivated, when the power supply fails and the controller is supplied by the battery.
34	The relay is activated on when the acoustic signal device according to Directive UL 325 is switched on. The relay is activated for 5 minutes, when the force switch-off during opening or closing is activated and an obstacle detection during opening or closing through force control or during closing via LS or SLZ already occurred before. The memory for the obstacle detection and the 5-minutes-timer for the signal output are erased, when one of the operation

Display	Operating mode / Function
	commands BTA1, BTA2, BTA3, BusBA, Joystick UP, BT, BusBT, Funk BT, BTZ1A, BTZ1B, BTZ2, BusBZ or Joystick DOWN is recognized OR when the end position CLOSED is reached.

Table 11



The multi-functional relays work independent from each other. Therefore it is possible to select the same function for more than one relay.

2.2.5.2 P510-P516 – Operating modes for red traffic light

The controller features six multi-functional relays. The multi-functional relay 5 is provided for the red traffic light but may also be used otherwise – see page 26. The following table shows the possible operating modes for the red traffic light:

Sequence point	Function	Display	Operating mode	Factory setting
P510	Red traffic light in end position CLOSED	0 1 2	off on flashing	on
P511	Red traffic light at pre-warning before opening	0 1 2	off on flashing	flashing
P512	Red traffic light at pre-warning before closing	0 1 2	off on flashing	flashing
P513	Red traffic light during opening	0 1 2	off on flashing	on
P514	Red traffic light during closing	0 1 2	off on flashing	on
P515	Red traffic light during intermediate stop	0 1 2	off on flashing	on
P516	Red traffic light in end position OPEN	0 1 2	off on flashing	off

Table 12

2.2.5.3 P520-P526 – Operating modes for green traffic light

The controller features six multi-functional relays. The multi-functional relay 6 is provided for the green traffic light but may also be used otherwise – see page 26.

The following table shows the possible operating modes for the green traffic light:

Sequence point	Function	Display	Operating mode	Factory setting
P520	Green traffic light in end	0	off	off

	position CLOSED	1 2	on flashing	
P521	Green traffic light at pre-warning before opening	0 1 2	off on flashing	off
P522	Green traffic light at pre-warning before closing	0 1 2	off on flashing	off
P523	Green traffic light during opening	0 1 2	off on flashing	off
P524	Green traffic light during closing	0 1 2	off on flashing	off
P525	Green traffic light during intermediate stop	0 1 2	off on flashing	off
P526	Green traffic light in end position OPEN	0 1 2	off on flashing	on

Table 13

2.2.5.4 P530-P536 – Operating modes for warning light

No separate relay is available for the warning light. The warning light can be connected to a multi-functional relay. The multi-functional relay has to be set to operating mode “warning light” - see page 23.

The following table shows the possible operating modes for the warning light:

Sequence point	Function	Display	Operating mode	Factory setting
P530	Warning light in end position CLOSED	0 1 2	off on flashing	off
P531	Warning light at pre-warning before opening	0 1 2	off on flashing	on
P532	Warning light at pre-warning before closing	0 1 2	off on flashing	on
P533	Warning light during opening	0 1 2	off on flashing	on
P534	Warning light during closing	0 1 2	off on flashing	on
P535	Warning light during intermediate stop	0 1 2	off on flashing	off

P536	Warning light in end position OPEN	0	off	off
		1	on	
		2	flashing	

Table 14

2.2.5.5 P540 – Selection push button function BT-BTA3-BTZ1B

Only a mutual input is available for the functions BT, BTA3, and BTZ1B. Under sequence point P540 can be selected which function the input has.

Display	Function
0	BT – push button with sequence logic. The operating sequence of BT depends on the operating mode of the automatic closure and the counting function.
1	BTA3 – push button OPEN The barrier opens when the contact is closed.
2	BTZ1B – push button CLOSE. The barrier closes when the contact is closed.

Table 15

2.2.5.6 P541 – Force monitoring

The controller can monitor the force during closing of the barrier. The controller recognizes when the barrier boom moves against an obstacle during closing or opening and thus the current force value does not correspond to the reference value stored. Under sequence point P541 can be set how the controller shall react when an obstacle is detected.

Display	Function
0	Force monitoring with stop and immediate reopening
1	Force monitoring with stop

Table 16

2.2.5.7 P542 – Photoelectric barrier mode

The controller monitors the photoelectric barrier input during closing of the barrier. Under sequence point P542 can be set how the controller shall react when the photoelectric barrier reports.

Display	Function
0	Stop and immediate opening
1	Stop

Table 17



The function "... and closing after clearance of the photoelectric barrier" is realized by the use of photoelectric barrier closing automatic (P543).

2.2.5.8 P543 – Photoelectric barrier closing automatic

When the photoelectric barrier closing automatic is activated, the photoelectric barrier generates a closing command each time an obstacle leaves the photoelectric barrier. Under sequence point P543 the photoelectric barrier closing automatic can be activated or deactivated.

Display	Function
0	Photoelectric barrier closing automatic is deactivated.
1	Photoelectric barrier closing automatic is activated.

Table 18

2.2.5.9 P544 – Photoelectric barrier testing

In order to perform a photoelectric barrier testing it is necessary that the supply of the photoelectric barrier transmitter/s can be activated and deactivated by the controller, e.g. Multi4 switches the supply voltage (24Vdc) of the photoelectric barrier transmitter on or off.

The photoelectric barrier testing consists of two phases. During the first phase the photoelectric barrier transmitter is deactivated and it is waited that the photoelectric barrier receiver reports an obstacle within 2.5s.

During the second phase the photoelectric barrier transmitter is activated again and it is waited that the receiver reports that no obstacle is present. Only after that the closing starts.

When an error occurs during the first phase, the photoelectric barrier is faulty (error message **Er.07**).

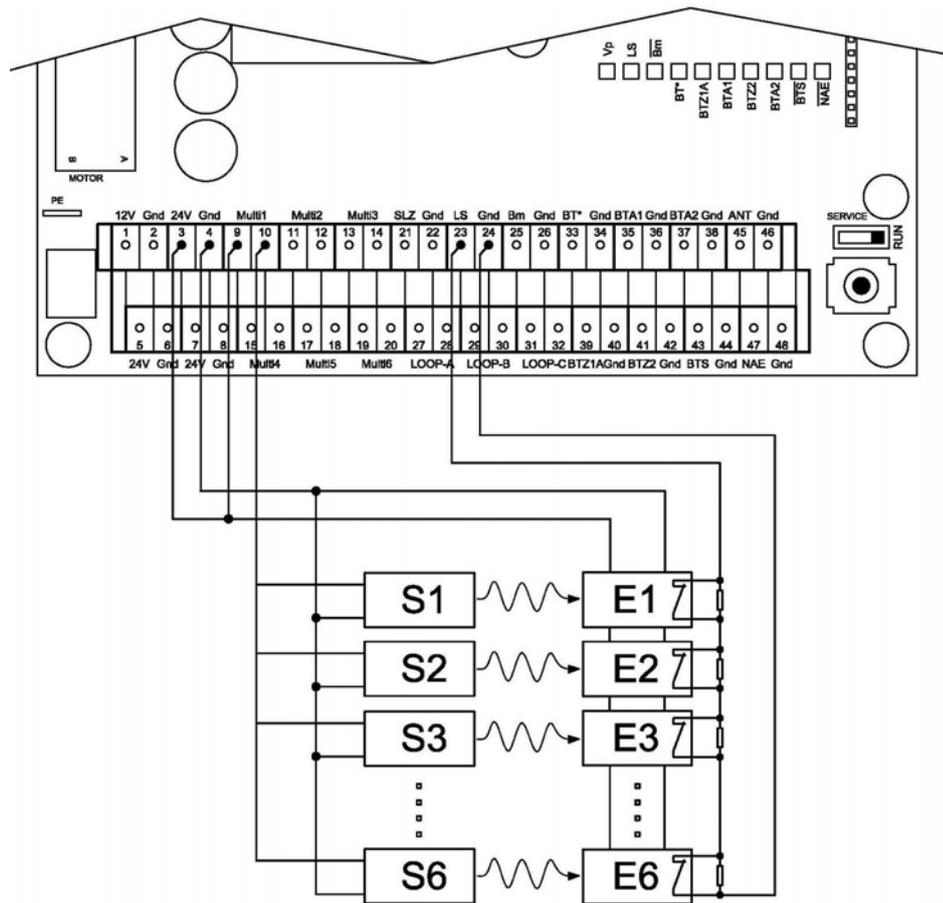
When an error occurs during the second phase, it is assumed that an obstacle is present. The closing is interrupted. An error message is not issued.

To the controller up to 6 photoelectric barriers can be connected and tested. For this all relay outputs of the receivers are connected in series.



The controller has to learn how many photoelectric barriers are connected. Therefore one resistor of 1kOhm has to be connected parallel to the relay contacts of each receiver. Then the photoelectric barrier testing has to be activated and the sequence point P101 (see page 16) has to be activated. Now each photoelectric barrier has to be tested for correct functioning.

Function example: Six photoelectric barriers are connected to the MO 24 (supply voltage 24Vdc). One 1kOhm resistor is switched parallel to the output of each photoelectric barrier. The supply voltage of the photoelectric barrier transmitters is switched via the multi-functional relay 1.



Drawing 4

- S1 – S6 Photoelectric barrier - transmitter
- E1 – E6 Photoelectric barrier - receiver

Under sequence point P544 can be selected if the photoelectric barrier testing is activated or deactivated.

Display	Function
0	The photoelectric barrier testing is deactivated.
1	The photoelectric barrier testing is activated.

Table 19

2.2.5.10 P545 – Induction loops - safety mode

One or more induction loops can have the function “safety“. Under P545 is determined, which function shall be activated by the induction loop during safety mode.

Display	Function
0	Stop and immediate opening
1	Stop (=“FREEZE“)

Table 20



The function “... and closing after clearance of the induction loop“ is realized by activating the function “Closing when leaving the loop“ at the corresponding loop.



FREEZE: Set the parameter P545 to 1. Additionally activate the function “Closing when leaving the loop“ under the parameters P703, P713, and P723 at the corresponding loop.

2.2.5.11 P546 – Immediate closing

Under sequence point P546 can be selected, how the barrier should react if a closing command is issued during the opening movement.

Display	Function
0	The closing command is stored, i.e. the barrier first opens completely and then at the end position OPEN executes the closing command.
1	The closing command is executed immediately, i.e. the barrier stops and then closes instantly.

Table 21

2.2.5.12 P547 – Dead man’s mode

Under P547 is specified, if the barrier shall work in dead man’s mode or in self-holding function.

In dead man’s mode the barrier can only be opened and closed by OPEN- and CLOSE-commands, **as long as the command is actually present.**

OPEN-commands are signals at the inputs: BTA1, BTA2 and BTA3, additionally the command “BUS_BA_Pegel“ via the bus system.

CLOSE-commands are signals at the inputs: BTZ1A, BTZ1B und BTZ2, additionally the command “BUS_BZ_Pegel “ via the bus system.

Display	Function
0	Self-holding function
1	Dead man’s mode

Table 22



The safety devices LS, SLZ, force, and safety by induction loops are active during closing and cause stop.

2.2.5.13 P548 – Boom-missing function

Under sequence point P548 can be selected, if an error message “Boom-missing” is generated and the barrier stops when the boom-missing contact is interrupted or if only the error message “Boom-missing” is generated and the barrier can continue to be operated.

Display	Function
0	No stop at boom-missing message
1	Stop at boom-missing message

Table 23

2.2.5.14 P549 – Auto-Sync-Function

Under sequence point P549 can be selected, if after power-on the barrier shall execute a synchronization movement.

Synchronization movement: After power-on a closing command is automatically issued after 3 seconds waiting time. During the waiting time the display shows “SYNC”. The safety devices are active. Automatic closure is tried until the barrier is synchronized to end position CLOSED.

Display	Function
0	Without Auto-Sync-Function
1	With Auto-Sync-Function

Table 24

2.2.5.15 P550 – Password protection

In order to prevent unauthorised persons from changing the settings of the controller, the parameters can be protected from alteration by the use of a simple password. A protected parameter can be displayed but not changed. Under P550 the password protection can be activated or deactivated.

Display	Function
3552	No password protection
all numbers, except 3552	Password protection active

Table 25



Via the bus system all parameters can always be changed. The password protection only applies to the manual settings by display and joystick.



The password protection is deactivated in the factory setting. When password protection is activated, all parameters except P550 are locked, but all parameters can be displayed.



The unchangeable factory setting for the deactivated password protection is **3552**.

2.2.5.16 P560-P566 – Operating mode for multi-functional relay 7 - 14

OPTIONALLY available is an extension board with 8 additional multi-functional relays (Multi7 to Multi14). The setting of the operating modes and possible functions is identical to the multi-functional relays 1-6 (see page 23).

2.2.5.17 P570 – Barrier series

The barriers are dispatched with the barrier type pre-set according to the name plate and with the standard running time.

Under this sequence point the barrier type can be amended in case of a structural modification or exchange of a controller.

Under sequence point (P101) the running time for each type can be set to “fast”, “standard” or “slow”. When changing the barrier type, automatically the “standard” time is pre-set.

When changing the barrier type of an existing barrier it is mandatory to adjust the boom length as well as the type and quantity of the balancing springs. In case of contravention ELKA has to refuse any warranty claims and the Declaration of Incorporation expires immediately.

Barrier type "Toll"		Barrier speed					
Type	Indicator	fast		standard		slow	
	(P570)	(P101)	Running time	(P101)	Running time	(P101)	Running time
T 3000	1	0	0.6s	1	0.9s	-	-
T 3500	2	0	0.9s	1	1.3s	-	-

Table26

Barrier type "Parking"		Barrier speed					
Type	Indicator	fast		standard		slow	
	(P570)	(P101)	Running time	(P101)	Running time	(P101)	Running time
P 2500	3	0	0.9s	1	1.3s	2	1.8s
P 3000	4	0	1.3s	1	1.8s	2	2.5s
P 3500	5	0	1.8s	1	2.5s	2	3.8s
P 4000	6	0	2.8s	1	3.8s	2	4.5s
P 5000	7	0	3.8s	1	4.5s	2	5.5s

Table 27

2.2.6 Sequence P600 – Induction loops - basic settings

2.2.6.1 Technical data (loop detectors)

Loop inductivity	Permissible range: 30µH to 450µH Recommended range: 50µH to 300µH
Loop resistance	< 8Ohm (incl. supply line)
Protection circuitry	Galvanic isolation (1kV electrical

	strength)
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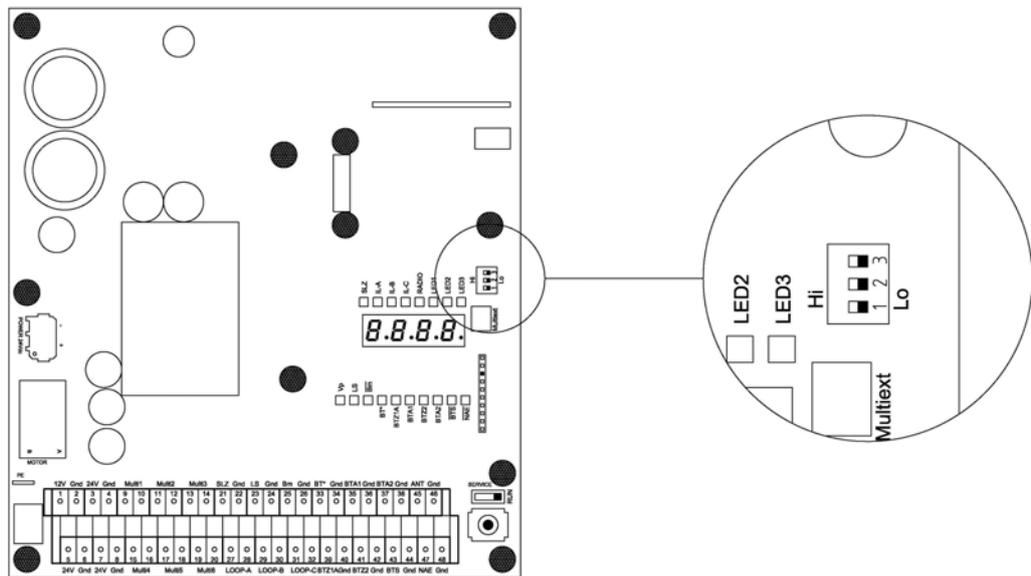
Table 28

2.2.6.2 Induction loop detection

The induction loop detection of the MO 24 consists of three detectors, two directional logics and one vehicle counter. Numerous operating modes are possible through different combinations.

For each induction loop A, B, and C a detector is available. When a vehicle drives on the loop, the loop’s inductivity drops. If thereby the switching threshold is exceeded, then the detector reports “Loop occupied”.

2.2.6.3 Frequency range



Drawing 5

Using a DIP switch the loop frequency can be switched between Hi and Lo for each induction loop. The three loops of the MO 24 work in multiplex mode and do not interfere with each other. However if nearby another / external loop is operated, which coincidentally works with the same frequency, this may lead to disturbances. In this case the operating frequency of the loop of the MO 24 can be changed using the dip switch.

DIP	Setting	Loop	Frequency
1	OFF	A	High frequency
	ON	A	Low frequency
2	OFF	B	High frequency
	ON	B	Low frequency
3	OFF	C	High frequency
	ON	C	Low frequency

29

2.2.6.4 P601-P603 – Sensitivity stages of loops A, B, C

The sensitivity of the induction loops is adjustable in 8 steps. Each loop can be adjusted individually. The frequency of the induction loops is learned. When a vehicle drives over a loop the frequency changes. The more sensitive a loop

detection is adjusted, the smaller the frequency changes which can be detected.

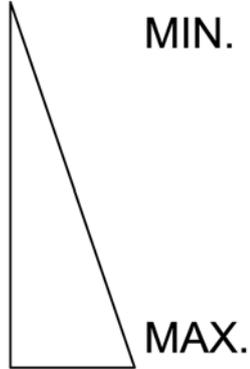
Sequency point	Loop	Setting range	
		Stage	Sensitivity
P601 P602 P603	Loop A Loop B Loop C	0	
		1	
		2	
		3	
		4	
		5	
		6	
		7	

Table 30

2.2.6.5 P610-P612 – Hold time stages of loops A, B, C

Is the barrier occupied for longer than the adjusted hold time, a readjustment of the loop is performed.

Is the hold time “infinite” („∞“) selected, no readjustment is performed.



ATTENTION!

If “Closing when leaving the loop“ is selected under sequence point P703, P713, or P723, the barrier closes after readjustment independently.

Sequence point	Loop	Setting range	
		Stage	Hold time
P610 P611 P612	Loop A Loop B Loop C	0	5 minutes
		1	30 minutes
		2	1 hour
		3	∞

Table 31



Is the hold time set to “infinite”, then through temperature drift while the loop is occupied, the leaving of the loop cannot be detected anymore.



Is a finite hold time selected and a vehicle stays on the loop, then after expiry of the hold time a readjustment of the loop will be executed. The loop will report “not occupied”, even though a vehicle stands on the loop.



For passenger car traffic only and a lower sensitivity stage, a longer hold time can be selected.
For a very high sensitivity stage, a short hold time should be selected.

2.2.6.6 P620-P622 – Loop readjustment counter display and deletion

Each totally completed readjustment of each induction loop is counted. The counter can count up to 9999.

Sequence point P620 is for loop A, P621 is for loop B, and P622 is for loop C.

To delete the counter and leave the sequence point push PROG for 5s.

To leave the sequence point push PROG briefly.

2.2.6.7 P630 – Induction loop mode

In chapter "Examples with induction loops" starting on page 48 eight examples for induction loops are described. The settings of the loop logic for these examples are stored in the controller. Only the number of the mode has to be set.

Alternatively you can adjust the loop logic manually, as described in chapter "Sequence P700 – Induction loop free operating mode" starting on Page 37.

By activating of sequence point P630 it is checked if the current configuration of the loop logic corresponds to one of the predefined modes.

When it corresponds, the number of the mode is displayed, otherwise the number "9" is displayed.

Display	Description	See also
0	All loops deactivated	
1	Mode 1 – Safety and closing with one loop	Page 48
2	Mode 2 – Safety and closing with two loops	Page 50
3	Mode 3 – Opening, safety and closing with two loops	Page 50
4	Mode 4 – Presence, safety and closing with two loops	Page 52
5	Mode 5 – Presence, opening, safety and closing with three loops	Page 53
6	Mode 6 – Opening with directional logic, safety and closing with three loops	Page 54
7	Mode 7 – Opening, safety and closing with three loops	Page 55
8	Mode 8 – Opening, safety and closing with three loops	Page 57
9	The set operating mode does not correspond to any of the predefined loop modes. The set operating mode is not changed if the sequence is left at this point.	

Table 32

2.2.7 Sequence P700 – Induction loop free operating mode

2.2.7.1 P701-P724 – Setting the loop logic for loop A, B, or C

The following table shows which parameters can be selected for the free configuration of the loop logic for loop A, B, or C.

Description sequence point	Mode	Function	Sequence point for loop A	Sequence point for loop B	Sequence point for loop C
Activation/deactivation	0	loop deactivated	P701	P711	P721
	1	loop activated			
Function during driving on the loop/safety	0	no function	P702	P712	P722
	1	safety			
	2	opening			

	3	opening and safety			
	4	closing			
Function when leaving the loop	0	no function	P703	P713	P723
	1	closing			
Presence	0	no function	P704	P714	P724
	1	reporting presence			
	2	blocking presence			

Table 33



Information for the loop function "Opening and safety":
 When using the loop function "Opening and safety" (P702, P712 or P722), the "Auto-Sync-Function" (P549 - page 32) must be activated.

2.2.7.2 P730-P748 – Setting directional logic 1 and directional logic 2

The signals "Loop occupied" of two loops each can be evaluated by the directional logic (1 or 2). Thus it is identifiable if a vehicle has driven **on** the two loops from a certain direction or if a vehicle has driven **over** the two loops from a certain direction.

The following steps have to be set for a directional logic:

- Induction loops which are to be combined with a directional logic have to be activated under 2.2.7.1 - P701-P724 – Setting the loop logic for loop A, B, or C.
- Then select under P730 or P740 which induction loops shall be evaluated by the directional logic.
- Now it can be configured what effect these signals shall have on the controller.



The message driving on the loop can e.g. be used for the presence detection. The message passing over the loop can e.g. be used for the vehicle counting.



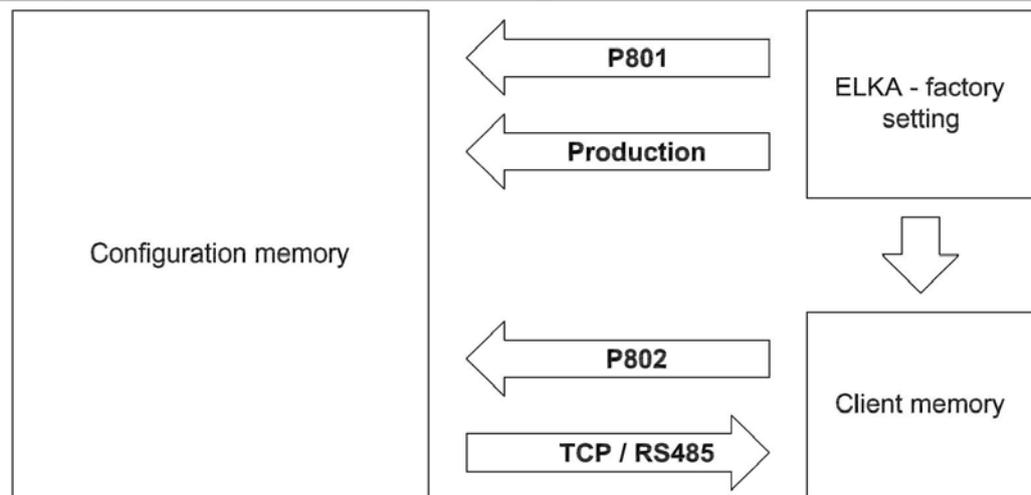
The loops used for the directional logic may be placed max. one vehicle length apart from each other.

Description sequence point	Mode	Set-up / Function	Sequence point for directional logic 1	Sequence point for directional logic 2
Allocation of the inputs	0	deactivated	P730	P740
	1	left – loop A right – loop B		
	2	left – loop B right – loop A		
	3	left – loop A		

		right – loop C		
	4	left – loop C right – loop A		
	5	left – loop B right – loop C		
	6	left – loop C right – loop B		
Opening or closing when passing from the left	0	no function	P731	P741
	1	opening		
	2	closing		
Opening or closing when passing from the right	0	no function	P732	P742
	1	opening		
	2	closing		
Vehicle counting when passing from the left	0	no function	P733	P743
	1	increment counter (+1)		
	2	decrement counter (-1)		
Vehicle counting when passing from the right	0	no function	P734	P744
	1	increment counter (+1)		
	2	decrement counter (-1)		
Opening and closing when entering from the left	0	no function	P735	P745
	1	opening		
	2	closing		
Opening and closing when entering from the right	0	no function	P736	P746
	1	opening		
	2	closing		
Reporting or blocking presence when entering from the left	0	no function	P737	P747
	1	reporting presence		
	2	blocking presence report		
Reporting or blocking presence when entering from the right	0	no function	P738	P748
	1	reporting presence		
	2	blocking presence report		

Table 34

2.2.8 Sequence P800 – Factory settings



Drawing 6

When the controller is dispatched, the configuration memory and the client memory are preset with the factory setting. During operation the controller works with the parameters of the configuration memory. During learning and configuring, configuring by display and joystick or via bus, the data in the configuration memory are changed and stored.

Only with a command via bus system the complete contents of the configuration memory can be transferred to the client memory. Also data like motor running time will be transferred to the client memory. However data like service counter, maintenance counter, or error memory etc. will not be transferred.



Writing on the client memory via the learning sequence is not possible.

When resetting to factory settings, it is distinguished between transferring the factory setting or the contents of the client memory into the configuration memory.



The transferring of the client memory to the configuration memory can only be realized via the learning sequence and not via the bus system.

2.2.8.1 P801 – Reset to factory settings

To reset the controller to the factory settings, sequence point P801 is activated. The display shows $r E - 0$. Now press PROG for 5s. The display shows 0000 and the factory setting is re-established. After that the sequence point is left. Is PROG pushed only briefly, the sequence point is left without changing the data.

2.2.8.2 P802 – Reset to client's factory settings

To reset the controller to the client's factory settings, sequence point P802 is activated. The display shows $r E - 1$. Now press PROG for 5s. The display shows $000 1$ and the client's factory setting is re-established. After that the sequence point is left. Is PROG pushed only briefly, the sequence point is left without changing the data.



Only by command **via the bus system** the complete content of the configuration memory can be **transferred to the client memory**. Thereby also data like motor running time are transferred into the client memory. Not transferred are data like service counter, maintenance counter and error memory etc.



Writing into the client memory is not possible via the learning sequence.

2.2.8.3 Factory settings

Main sequence	Subsequence	Factory setting	
P100			
	P101	1	Speed
	P102	- + - + - + - + -	Radio remote control code
	P103	0	Power supply
	P104	0	Opening limitation
	P105	0	Limitation of safety device
	P1PP		
P200			
	P201	16	RS485 barrier address
	P210	192	IP address – part 1
	P211	168	IP address – part 2
	P212	0	IP address – part 3
	P213	200	IP address – part 4
	P220	192	Gateway address - part 1
	P221	168	Gateway address - part 2
	P222	0	Gateway address - part 3
	P223	1	Gateway address - part4
	P230	255	Subnet mask - part 1
	P231	255	Subnet mask - part 2
	P232	255	Subnet mask - part 3
	P233	0	Subnet mask - part 4
	P240	52	Socket-port number - part 1
	P241	719	Socket-port number - part 2
	P2PP		
P300			
	P301	0s	Stay-open time

Main sequence	Subsequence	Factory setting	
	P302	0s	Pre-warning - opening
	P303	0s	Pre-warning - closing
	P3PP		
P400			
	P401	250000	Maintenance interval (set)
	P402		Maintenance interval (display/erase)
	P410	0	Counting function - lower limit
	P411	1	Counting function - upper limit
	P4PP		
P500			
	P501	0	Multi-functional relay 1
	P502	0	Multi-functional relay 2
	P503	0	Multi-functional relay 3
	P504	12	Multi-functional relay 4
	P505	5	Multi-functional relay 5
	P506	6	Multi-functional relay 6
	P510	1	Red traffic light – end position CLOSED
	P511	2	Red traffic light - pre-warning OPEN
	P512	2	Red traffic light - pre-warning CLOSE
	P513	1	Red traffic light - opening
	P514	1	Red traffic light - closing
	P515	1	Red traffic light – intermediate stop
	P516	0	Green traffic light - end position CLOSED
	P520	0	Green traffic light - end position CLOSED
	P521	0	Green traffic light - pre-warning OPEN
	P522	0	Green traffic light - pre-warning CLOSE
	P523	0	Green traffic light - opening
	P524	0	Green traffic light - closing

Main sequence	Subsequence	Factory setting	
	P525	0	Green traffic light - intermediate stop
	P526	1	Green traffic light - end position OPEN
	P530	0	Warning light - end position CLOSED
	P531	1	Warning light - pre-warning OPEN
	P532	1	Warning light - pre-warning CLOSE
	P533	1	Warning light - opening
	P534	1	Warning light - closing
	P535	0	Warning light - intermediate stop
	P536	0	Warning light - end position OPEN
	P540	0	Push button function
	P541	1	Force monitoring
	P542	0	Photoelectric barrier - mode
	P543	0	Photoelectric barrier - automatic closure
	P544	0	Photoelectric barrier - testing
	P545	0	Induction loops – safety-mode
	P546	0	Immediate closing
	P547	0	Dead man's mode
	P548	0	Boom-missing function
	P549	0	Auto-Sync-Function
	P550	3552	Password protection
	P560	0	Multi-functional relay 7
	P561	0	Multi-functional relay 8
	P562	0	Multi-functional relay 9
	P563	0	Multi-functional relay 10
	P564	0	Multi-functional relay 11
	P565	0	Multi-functional relay 12
	P566	0	Multi-functional relay 13
	P567	0	Multi-functional relay 14
	P570	7	Barrier series
	P5PP		

Main sequence	Subsequence	Factory setting	
P600			
	P601	4	Sensitivity loop A
	P602	4	Sensitivity loop B
	P603	4	Sensitivity loop C
	P610	3	Hold time loop A
	P611	3	Hold time loop B
	P612	3	Hold time loop C
	P620		Readjustment counter loop A
	P621		Readjustment counter loop B
	P622		Readjustment counter loop C
	P630	0	Loop mode
	P6PP		
P700			
	P701	0	Loop A - switching on / off
	P702	0	Loop A - entering and safety
	P703	0	Loop A - leaving
	P704	0	Loop A - presence
	P711	0	Loop B - switching on / off
	P712	0	Loop B - entering and safety
	P713	0	Loop B - leaving
	P714	0	Loop B - presence
	P721	0	Loop C - switching on / off
	P722	0	Loop C - entering and safety
	P723	0	Loop C - leaving
	P724	0	Loop C - presence
	P730	0	Directional logic 1 – input selection
	P731	0	Directional logic 1 – opening/closing - passing from left
	P732	0	Directional logic 1 - opening/closing - passing from right
	P733	0	Directional logic 1 – counting – passing from left
	P734	0	Directional logic 1 – counting – passing from right

Main sequence	Subsequence	Factory setting	
	P735	0	Directional logic 1 – opening/closing – entering from left
	P736	0	Directional logic 1 - opening/closing – entering from right
	P737	0	Directional logic 1 – presence – entering from left
	P738	0	Directional logic 1 – presence – entering from right
	P740	0	Directional logic 2 – input selection
	P741	0	Directional logic 2 - opening/closing passing from left
	P742	0	Directional logic 2 - opening/closing - passing from right
	P743	0	Directional logic 2 left
	P744	0	Directional logic 2 - counting passing from right
	P745	0	Directional logic 2 - opening/closing – entering from left
	P746	0	Directional logic 2 - opening/closing – entering from right
	P747	0	Directional logic 2 - presence – entering from left
	P748	0	Directional logic 2 - presence – entering from right
	P7PP		
P800			
	P801		Factory setting
	P802		Client's factory setting
	P8PP		
PPPP			

Table 35

2.3 Error messages

The controller monitors 16 different operating parameters and if an error occurs it generates and displays an error message.

Display	Telegram description	Corresponds to
<i>Er.01</i>	f_baum_ab	The contact boom missing is open.
<i>Er.02</i>	f_uext_12v	The external 12V power supply was switched off due to a detected overload. Check the external devices and the wiring.
<i>Er.03</i>	f_uext_24v	The external 24V power supply was switched off due to a detected overload. Check the external devices and the wiring.
<i>Er.04</i>	f_schleife_a_defekt	The frequency of loop A, B or C is not within the permitted range. Check the induction loop. If necessary change the frequency range.
<i>Er.05</i>	f_schleife_b_defekt	
<i>Er.06</i>	f_schleife_c_defekt	
<i>Er.07</i>	f_lstest_fehler	An error occurred during photoelectric barrier testing. Check the photoelectric barriers.
<i>Er.08</i>	f_slztest_fehler	An error occurred during safety contact profile testing. Check the safety contact profile.
<i>Er.09</i>	f_fehler_stopredundanz	An error in the evaluation of the stop input was detected. The controller is faulty.
<i>Er.10</i>	f_eeeprom_defekt	An error occurred when saving data in the EEPROM. The controller is faulty. Remark: When the EEPROM is faulty, the error memory can possibly not be read anymore. In this case the display shows EEP .
<i>Er.11</i>	f_eeeprom_checksummenfehler	An error occurred when reading data from the EEPROM. The data is lost. Reprogram the controller. When the error occurs again the controller is faulty. Remark: When the EEPROM is faulty, the error memory can possibly not be read anymore. In this case the display shows EEP .
<i>Er.12</i>	f_fehler_messverstaerker	An error occurred when checking the measuring amplifier for the motor current monitoring. The controller is faulty.

Er. 13	f_fehler_leistungsteil	An error in the power element was detected. The controller is faulty.
Er. 14	f_fehler_bldc_hot	The power element for the controller is too hot. The controller locks until the power element has cooled off. When this error message occurs more often, a failure exists.
Er. 15	f_fehler_24v_in	The controller monitors the 24V power supply and locks as soon as the voltage is outside of the permitted range. This error message is also shown, when the barrier is supplied by battery and the battery is discharged. Check the 24V-power supply unit or charge the battery.
Er. 16	f_notentriegelt	The controller detects, that the barrier boom was moved manually more than 50% of the running distance. The controller locks. To delete the error and to unlock the controller, either press PROG or switch the power supply on and off briefly, or move the barrier boom manually back into the original position.

Table 36



If an error occurs, its number will be displayed. If several errors occur at the same time, the numbers will be displayed successively.

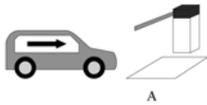
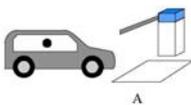
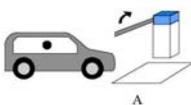
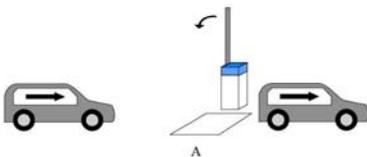


The controller has a 10-step error memory. With each change the current error status will be stored together with the operating hours counter as timestamp. The error memory can be queried and analyzed via the bus system.

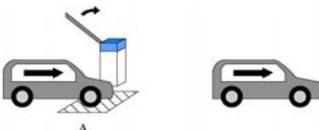
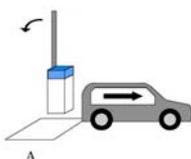
2.4 Examples with induction loops

Following the examples are described for the pre-programmed induction loop functions of page 37 - P630 – Induction loop model is shown how the required function can be realized by induction loop detection and directional logic. For the examples described the controller provides pre-settings which can be selected via the mode number.

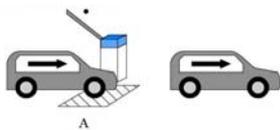
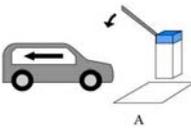
2.4.1 Mode 1 – Safety and closing with one loop

	<p>The vehicle drives to the barrier.</p>
	<p>The vehicle stops in front of the barrier.</p>
	<p>The barrier is opened by an external command (push button, radio remote control, bus system etc.).</p>
	<p>The vehicle passes the barrier. Safety by loop A.</p>
	<p>After passing the barrier it closes. The closing command is issued when leaving loop A.</p>

Version A

	<p>Induction loops-Safety (P545 = 0) The barrier opens, when a vehicle drives on loop A during closing.</p>
	<p>After passing the barrier it closes. The closing command is issued when leaving loop A.</p>

Version B

	<p>Induction loops-Safety (P545 = 1) The barrier stops, when a vehicle drives on loop A during closing.</p>
	<p>After driving backwards and clearing loop A the barrier closes.</p>



Further information - see 2.2.5.10 P545 – Induction loops - safety mode

2.4.2 Mode 2 – Safety and closing with two loops

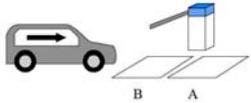
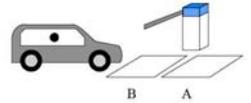
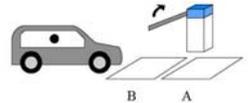
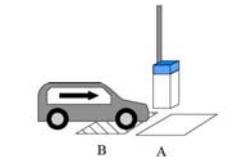
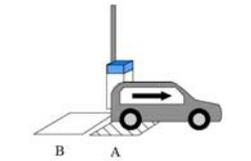
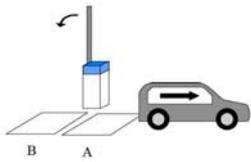
	<p>The vehicle drives to the barrier.</p>
	<p>The vehicle stops.</p>
	<p>The barrier is opened by an external command.</p>
	<p>Safety by loops A and B.</p>
	<p>When leaving loop B a closing command is issued, but safety through loop A is active.</p>
	<p>When leaving loop A a closing command is issued.</p>

Table 37

2.4.3 Mode 3 – Opening, safety and closing with two loops

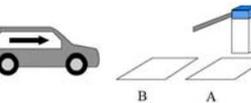
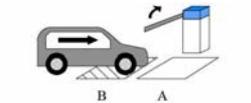
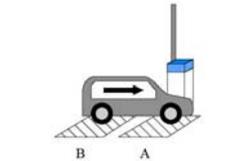
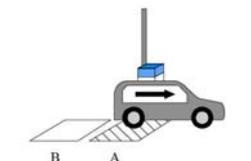
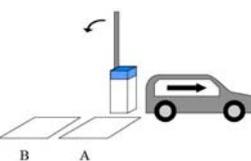
	<p>The vehicle drives to the barrier.</p>
	<p>When driving on loop B the barrier opens.</p>
	<p>The distance between loop B and A has to be less than the length of the vehicle.</p>
	<p>When leaving loop B a closing command is issued. Yet the barrier remains open, since safety through loop A is active.</p>
	<p>When leaving loop A the barrier closes.</p>

Table 38

Behaviour when a second vehicle follows:

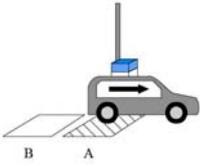
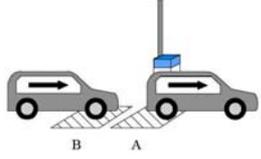
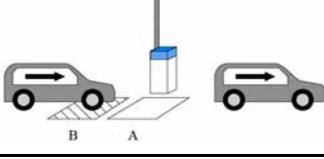
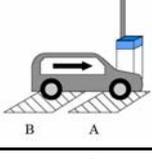
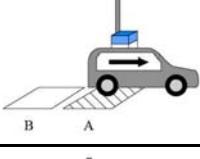
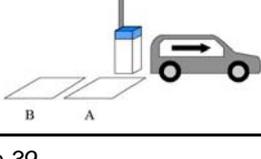
	<p>When leaving loop B a closing command is issued. Yet the barrier remains open, since the safety loop A is occupied.</p>
	<p>When the second vehicle drives on loop B an opening signal is issued. At the same time the barrier is kept open by the first vehicle on loop A.</p>
	<p>When the first vehicle leaves loop A a closing command is issued. In order to prevent the barrier from closing, also safety on loop B has to be activated.</p>
	<p>Then safety by loop A and B.</p>
	<p>When leaving loop B a closing command is issued. Yet the barrier remains open, since safety through loop A is active.</p>
	<p>When leaving loop A the barrier closes.</p>

Table 39

Behaviour when a vehicle drives backwards:

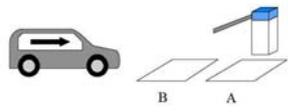
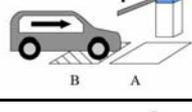
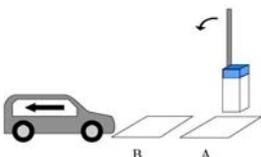
	<p>The vehicle drives to the barrier.</p>
	<p>When driving on loop B the barrier opens.</p>
	<p>The vehicle stops. The barrier remains open.</p>
	<p>The vehicle drives backwards. When leaving loop B the barrier closes.</p>

Table 40



Information for the loop function "Opening and safety":
 When using the loop function "Opening and safety (P702, P712 or P722), the "Auto-Sync-Function" (P549 - page 32) must be activated.

2.4.4 Mode 4 – Presence, safety and closing with two loops

	<p>The vehicle drives to the barrier.</p>
	<p>The vehicle stops on loop B. The barrier controller reports the presence to the ticket dispenser.</p>
	<p>The barrier is opened by an external command.</p>
	<p>The vehicle can pass. When leaving loop B a closing command is issued, but safety through loop A is active. The second vehicle can drive up.</p>
	<p>When the first vehicle leaves loop A, a closing command is issued. Loop B reports the presence to the ticket dispenser. The ticket dispenser can issue an external opening command. The barrier remains open.</p>

Table 41

2.4.5 Mode 5 – Presence, opening, safety and closing with three loops

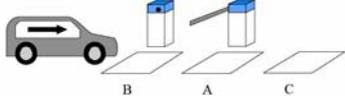
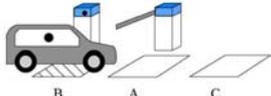
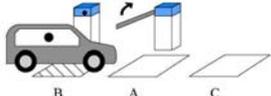
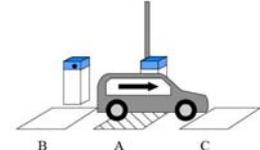
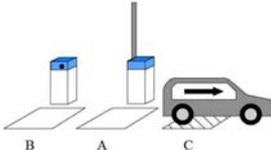
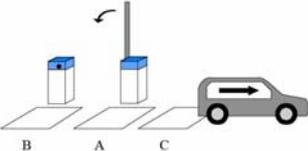
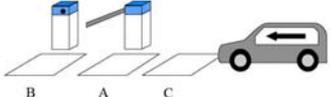
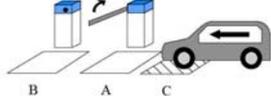
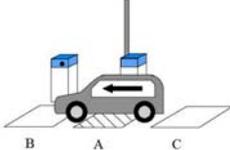
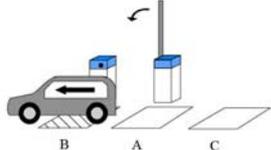
	<p>The vehicle drives to the barrier.</p>
	<p>The vehicle stops on loop B. The barrier controller reports the presence to the ticket dispenser.</p>
	<p>The barrier is opened by an external command.</p>
	<p>When leaving loop B a closing command is issued. Safety by loop A.</p>
	<p>When leaving loop A a closing command is issued but is not executed, since by occupying loop C an opening command is issued and safety by loop C is active.</p>
	<p>Leaving of loop C closes the barrier.</p>
	<p>The vehicle drives to the barrier.</p>
	<p>When driving on loop C the barrier opens.</p>
	<p>When leaving loop C a closing command is issued but is not executed since safety by loop A is active.</p>
	<p>When leaving loop A the barrier closes. Loop B issues a presence report as long as the barrier is occupied, but has no opening or safety function.</p>

Table 42



Information for the loop function "Opening and safety":
 When using the loop function "Opening and safety (P702, P712 or P722), the "Auto-Sync-Function" (P549 - page 32) must be activated.

2.4.6 Mode 6 – Opening with directional logic, safety and closing with three loops

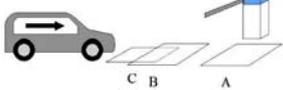
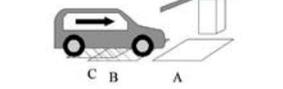
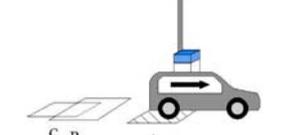
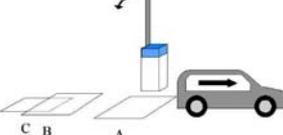
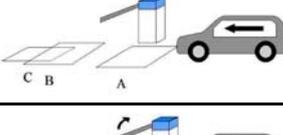
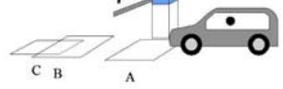
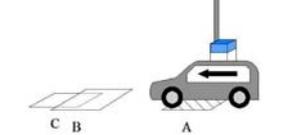
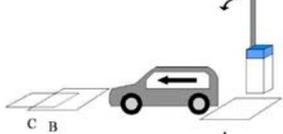
	<p>The vehicle drives to the barrier.</p>
	<p>The vehicle drives on loop C. There is no opening command issued yet.</p>
	<p>The vehicle additionally drives on loop B. Now an opening command is issued.</p>
	<p>When passing loop C and B from the left side no closing command issued.</p>
	<p>Safety by loop A.</p>
	<p>Leaving loop A closes the barrier.</p>
	<p>The vehicle drives to the barrier.</p>
	<p>The barrier is opened by an external opening command.</p>
	<p>Safety by loop A.</p>
	<p>Leaving loop A closes the barrier.</p>
	<p>When passing loop B and C from the right side no further commands are issued.</p>

Table 43

2.4.7 Mode 7 – Opening, safety and closing with three loops

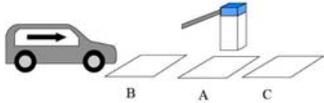
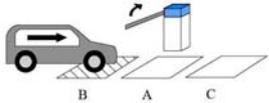
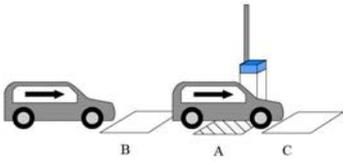
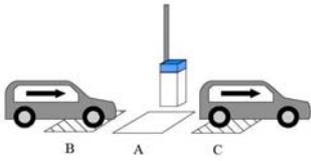
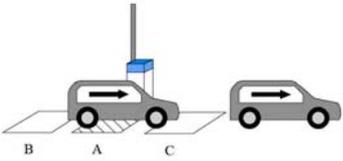
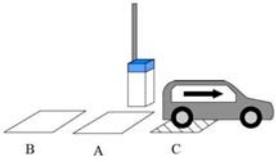
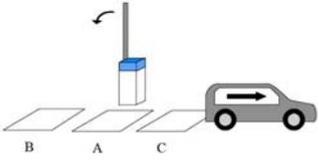
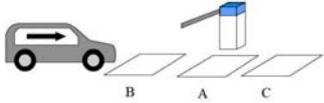
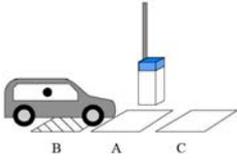
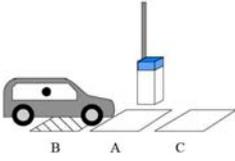
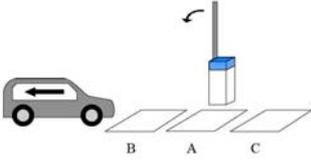
	<p>The vehicle drives to the barrier.</p>
	<p>When driving on loop B the barrier opens.</p>
	<p>The first vehicle passes the barrier. When leaving loop B a closing command is issued. Safety by loop A.</p>
	<p>When the second vehicle drives on loop B an opening command is issued. Leaving loop A issues a closing command which is overwritten since safety by loop C is active.</p>
	<p>When leaving loop B a closing command is issued. When leaving loop C a closing command is issued. The barrier remains open since safety on loop A is active.</p>
	<p>When leaving loop A a closing command is issued. But since safety by loop C is active, the barrier remains open.</p>
	<p>When leaving loop C, the barrier closes.</p>
	<p>The vehicle drives to the barrier.</p>
	<p>When driving on loop B the barrier opens.</p>
	<p>The vehicle stops. Safety on loop B.</p>
	<p>The vehicle drives back, the barrier closes.</p>

Table 44



The functions described above also apply to the opposite direction.



Information for the loop function "Opening and safety":
When using the loop function "Opening and safety" (P702, P712 or P722), the "Auto-Sync-Function" (P549 - page 32) must be activated.

2.4.8 Mode 8 – Opening, safety and closing with three loops

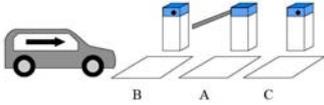
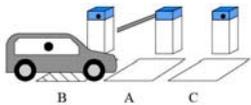
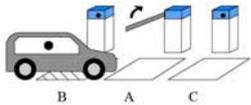
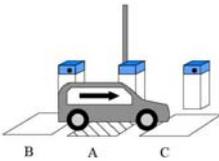
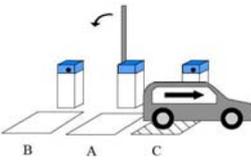
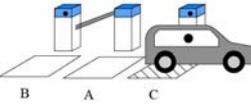
	<p>The vehicle drives to the barrier.</p>
	<p>When driving on loop B presence is reported. Remark: The presence is reported to both ticket dispensers.</p>
	<p>The ticket dispenser issues an opening command. The barrier opens.</p>
	<p>The vehicle passes the barrier. Safety by loop A.</p>
	<p>Leaving of loop A closes the barrier.</p>
	<p>Loop C reports the presence. Remark: The presence is reported to both ticket dispensers.</p>

Table 45



The functions described above also apply to the opposite direction.

3 Decommissioning

A product that is no longer usable should not be recycled as complete unit, but disassembled into individual components and recycled according to material types. Non-recyclable materials have to be disposed of in an environmentally compatible manner.

- The decommissioning, disassembly and disposal of the product must be carried out by qualified persons.
- The disassembly has to be carried out in reverse order to the assembly.
- The product has to be disposed of according with respective country-specific regulations.

3.1 Disposal



For any related questions to proper disposal of the electrical and electronic components contact ELKA or competent specialist dealer.



INFORMATION!

Environment hazard due to inappropriate disposal of the product (or parts thereof)!

Incorrect disposal can cause damage to the environment.

- The applicable environmental regulations must always be observed.
- After appropriate dismantling and disassembly use the dismantled components for recycling.
- Separate the valuable substances and recycle the relevant material.

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