User manual

Avimax - Lift-Positioning-System (LPS)

Code No. 99 97 0072

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EC Declaration of conformity

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In accordance with EC Directives:

- **Machines 2006/42/EG, Annex II / Part 1 / Chapter A**

Further applicable EC directives:

- Electromagnetic compatibility 2004/108/EC
- Low voltage 2006/95/EC

The product mentioned below was developed, constructed and produced in accordance with the above mentioned EC Directives and under sole responsibility of Big Dutchman.

Description:	System for controls for the removal of manure and birds
Type:	Avimax Lift-Positioning-System
System no. and year of construction:	see customer order no.

The following harmonised standards apply:

- EN ISO 12100:2010 Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)
- EN 60204-1:2006/AC:2010: Safety of machinery - Electrical equipment of machines Part 1: General requirements
- DIN EN ISO 13850 (2008-09): Safety of machinery - Emergency stop - Principles for design

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Vechta	16.01.2010	Managing Director	
Place	Date	Signer and information regarding signer	Signature

Table of contents:

Part I: Operation: removing manure and birds from the coop using AVIMAX Lift Positioning System

Introduction 3

Manure removal 7

Moving birds out 8

Electrical connection 10

Bus addresses 12

Commissioning the lift control unit 15

Overview of status indicators for the P100 control unit in service mode: 20

Possible fault indicators on the P100 control unit 21

Operating message on the P100 control unit 22

Emergency operation 23

Part II: Quick instructions and checklist for commissioning

Overview of the P100 module 25

Overview of the inputs on control unit P100: 26

Procedure for Teach mode 27

Procedure for Test mode 29

Reset the control unit to its factory state 32

Querying the software version 33

Possible status indicators 34

Possible fault messages 35

Notes 36

Document Status/Changes

Version	Initials	Date	Description
1.0	ABo	24.02.2010	Initial version
1.1	ABo	03.05.2010	Changes from ELGO incorporated

Part I:

Operation: removing manure and birds from the coop with

AVIMAX lift positioning system

Introduction

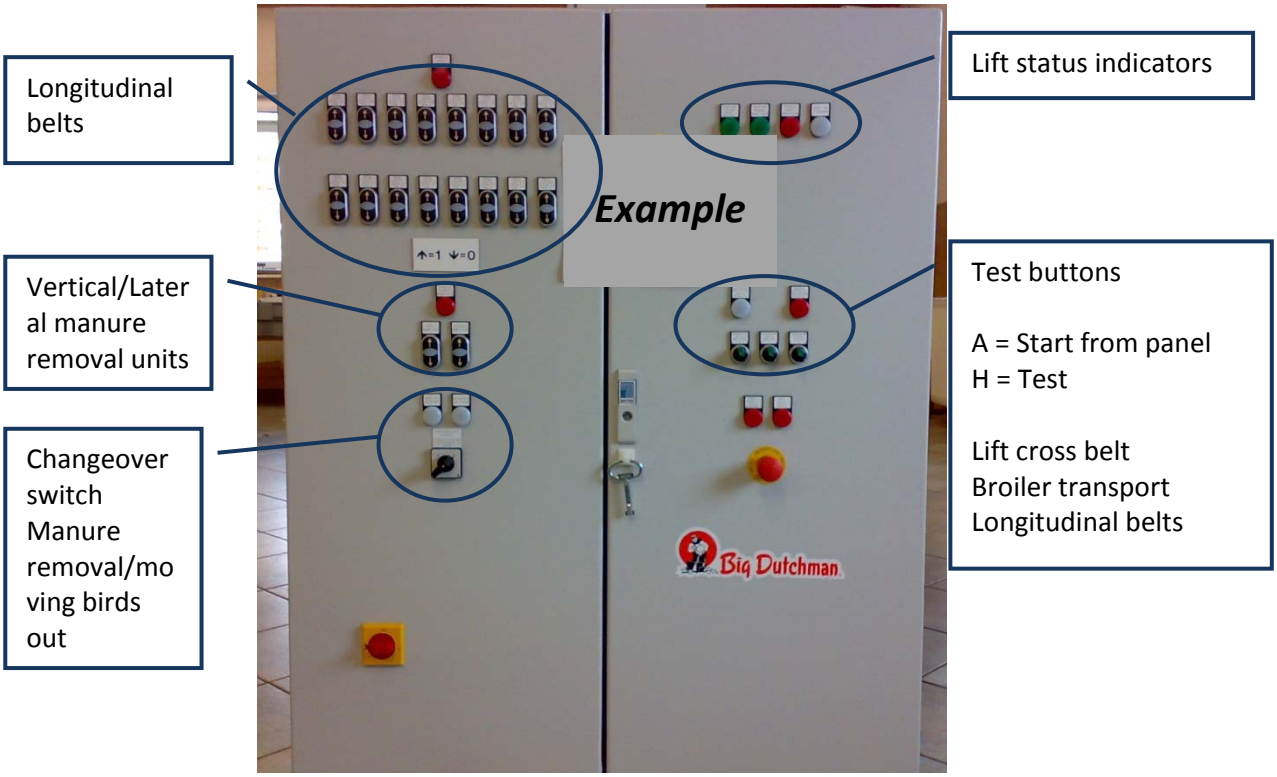
The system is intended for the controls for the removal of manure and birds from the coop in an AVIMAX Transit System.

The manure removal process works as follows: the vertical and lateral belts for manure removal are started from the switch cabinet. The desired longitudinal belts must then also be switched on at the switch cabinet.

The lift control unit is used for moving the birds out of the coop. The lift and lift cross belt are moved to the desired tier either using the (↑↓) buttons on the switch cabinet or with the remote control. The flaps at the handover point between the longitudinal belt to the lift cross belt must be folded down and the longitudinal belts selected on the switch cabinet for the tier from which the birds are to be removed. The motors are started from a separate control panel.

The system consists of the following individual control units:

1. The switch cabinet for manure removal/moving birds out. This cabinet contains the power modules and motor protection switches for the longitudinal belts, cross belts and lift motors. One such cabinet is required per house.



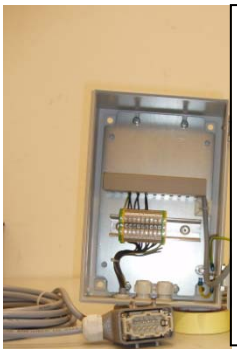
2. Junction box 1, which is located in the coop and establishes an outside connection from the Manure removal/Move birds out switch cabinet to the control panel and the broiler conveyor belt. One such junction box is required per house.


External view


Internal view

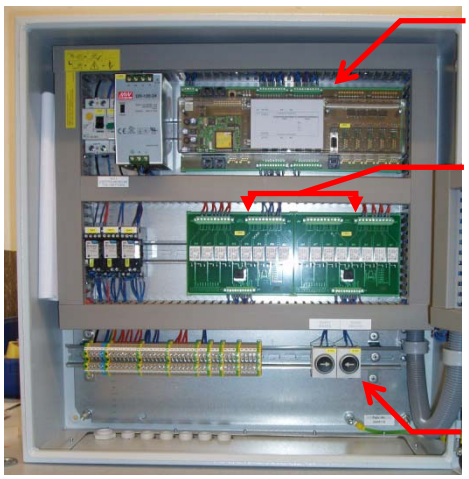
3. Junction box 2, which is attached to the external broiler conveyor belt and establishes the connection for the external-broiler-transport-belt drive and the control panel Start/Stop/Emergency Stop. One such junction box is required per farm.


External view


Internal view

4. The Start/Stop/Emergency Stop control panel. This panel is used to start the process of removing the birds. One such panel is required per farm.

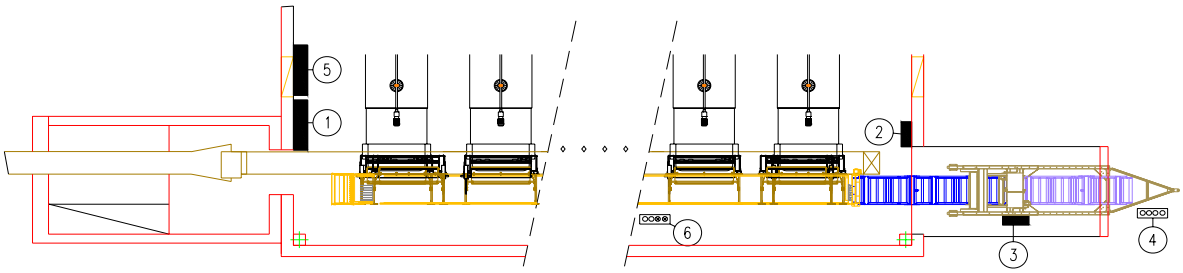
5. The AVIMAX lift control unit. The functions of this control unit include analysis of the sensors. It is required to control the lift. One such control unit is required per house.

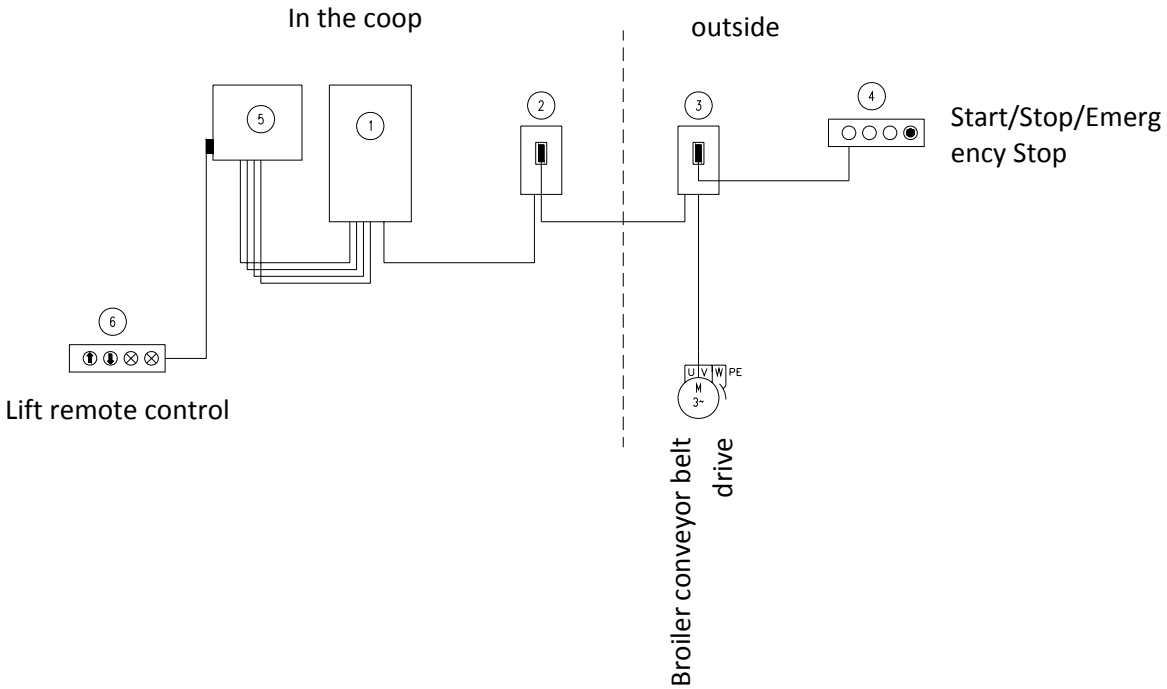


6. The control panel for the lift remote control. One such panel is required per house.

Proposed control unit positions

1 = Manure removal/Move birds out switch cabinet
2 = Junction box 1 (in the coop)
3 = Junction box 2 (on the external broiler conveyor belt)
4 = Start/Stop/Emergency Stop control panel
5 = Lift control unit
6 = Lift remote control





Manure removal

Preparing for manure removal

- The selector switch for “Manure removal/Move birds out” must be in position 1.
- The lift cross belt for removing the birds from the coop must be in the "Park" position.

Activation sequence for manure removal

- Press the On button for the vertical manure removal unit. The belt starts up.
- Press the On button for the lateral manure removal unit. This belt can only start up when the belt for vertical manure removal is operating.
- Use the On button to activate the motor for the particular longitudinal belts from which the manure is to be removed. It is, however, only possible for the longitudinal belts to start up if the vertical and lateral manure removal units are already running. Manure removal should be performed one row at a time.

There are two shutdown options:

- Switch off the belts in reverse order or
- Press the Off button for the vertical manure removal unit. All subsequent belts are also switched off and are prevented from starting up again automatically. Manure removal can only be restarted by performing the activation sequence for manure removal.

Moving birds out

Information on moving birds out

- The lift may only be operated if all handover flaps are up and there are no faults.
- The lift will stop at each tier, regardless of whether it is being raised or lowered.
- The buttons (↑↓) for raising and lowering the lift must be held during operation. As soon as the button is released, the lift stops for safety reasons, so that no-one can be injured in the lift area and no damage can occur.
- The lift cross belt and the external broiler conveyor belt can only be started if the lift is at a particular tier and all handover flaps are down.
- If differences greater than 10mm are detected while the lift is in motion, motors which have moved too far ahead stop and wait until the others have closed the gap. When all motors are again at the same height, the motors which had been leading before are automatically switched back on.
- If, after a certain number of start attempts (default = 3), a drive does not comply, the control unit will halt operation, activate the fault indicator and report the fault via the status LED.
- If the user wishes to operate the lift, but the enable input is missing because, for instance, the flaps have not been lowered or a motor protection switch has been pressed, the fault indicator flashes until one of the two arrow buttons is pressed. The display shows the fault code.
- If a response is received from a limit switch during operation, a fault and fault code are also issued. The system may only continue to operate once the RESET has been actuated.
- If the default orientation of individual sensors changes without an operation command or after a power failure by more than x mm, a fault is indicated. The sensors and fasteners must be inspected. If everything has been put right and the fault can still not be reset, realignment and calibration are required.

Preparing to move birds out

- The selector switch for “Manure removal/Move birds out” must be in position 2, Move birds out.
- The Start/Stop/Emergency Stop panel for moving the birds out must be plugged into junction box 2.
- Junction box 1 must be connected to junction box 2.
- The lift control unit must be switched on.

Procedure for moving the birds out

1. All chutes for transferring from the longitudinal belt to the lift cross belt must be up.
2. The lift control unit is used to raise or lower the lifting motors by pressing and holding the buttons (↑↓) on the door or using the remote control. The lift stops as soon as it has reached a tier, the buttons are released, or there is a fault.
3. If differences greater than 10mm are detected while the lift is in motion, motors which have moved too far ahead stop and wait until the others have closed the gap. The motors then switch back on automatically.
4. If the lift is positioned at a tier, this is shown by the “Lift in Position” indicator lights. All handover flaps must then be folded down.
5. On the Manure removal/Move birds out switch cabinet, **only** those longitudinal belts which will be used in moving out should be selected. The selection of longitudinal belts remains in force as long as the lift is located in the current tier, no Emergency Stop button is pressed, and no handover flap is folded up.
6. The longitudinal belt drives only run when the exterior broiler conveyor belt and lift cross belt are also running.
7. The process of moving the birds out is started using the external buttons “0-1” on the external control panel. The external broiler conveyor belt starts first. This is followed by the lift cross belt. The longitudinal belts then start up in turn after a time delay. This delay can be set via a time delay in the Manure removal/Move birds out switching cabinet.
8. The moving out process is stopped by setting the external button to 0.
9. For the next tier, start "Move birds out" at item 1 of “Procedure for moving the birds out” again..

After moving the birds out

- All handover flaps must be folded up.
- The lift must be raised all the way up to its "Park" position.
- Once the lift is in the "Park" positon, switch off the lift control unit.
- Turn the function selector back to position 1 (Manure removal).
- Remove junction box 2 external panel.
- Remove the connecting cable from junction box 1 to junction box 2.
- The external broiler conveyor belt can now be moved to the next coop.

Electrical connection

The electrical connection may only be established and commissioning performed only by a trained electrician.

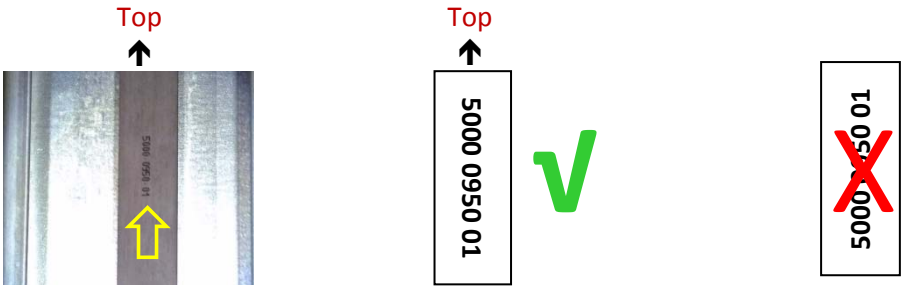
Connections between the individual control units must be made in accordance with Chapter F of the "Manure removal/Move birds out" circuit diagrams and the "AVIMAX lift control unit".

The Emergency Stop buttons in passageways must be located so that they are easily accessible.

Each lift motor must be individually connected to the control unit.

The limit switches of the flaps and max. top and bottom sensors must be connected as ***break contacts***!!! This will improve safety in the event of a wire break.

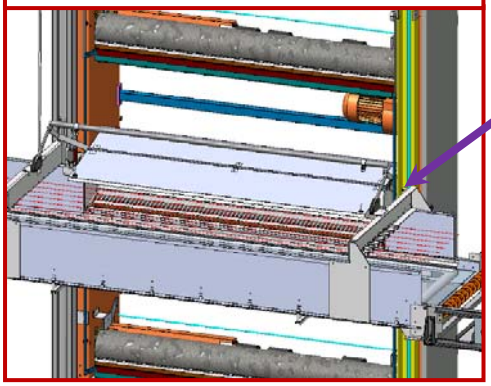
The magnetic tape must be fitted the right way round. You can determine the correct direction from the arrow, which must point to the ceiling, or by reading the "Ceiling" writing from left to right (the left side should be at the top). In addition, the magnetic tape must have the strongly-magnetised side facing forward towards the conveyor belt (dark side).



The EMAX sensor must be introduced into and secured in the appropriate bracket on the guide system, with the arrow pointing upwards to the ceiling.

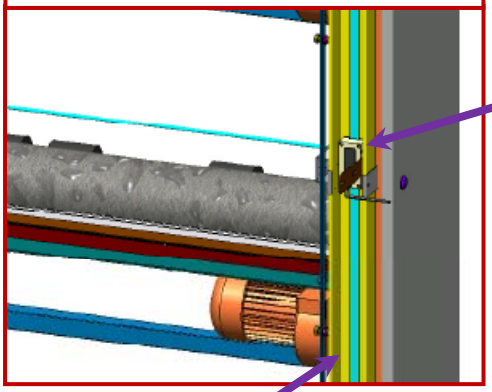
The cable of the EMAX sensor must be inserted into a junction box which should be located near of each sensor on the lift bridge. The cable for connecting the sensor must be routed from one junction box to the other, and to the lift control unit. It must not be laid along with other live cables, in order to eliminate induction voltages. Only the shielded EMAX CAN+PS cable may be used as a cable for this connection.

Front view of the lift bridge with cross belt



The EMAX sensor sits in this position behind the lift bridge

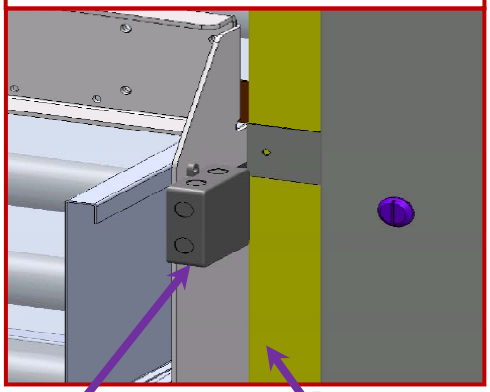
Front view of the lift bridge without cross belt



EMAX sensor

Guide rail for the EMAX sensor

Rear view of the lift bridge with cross belt

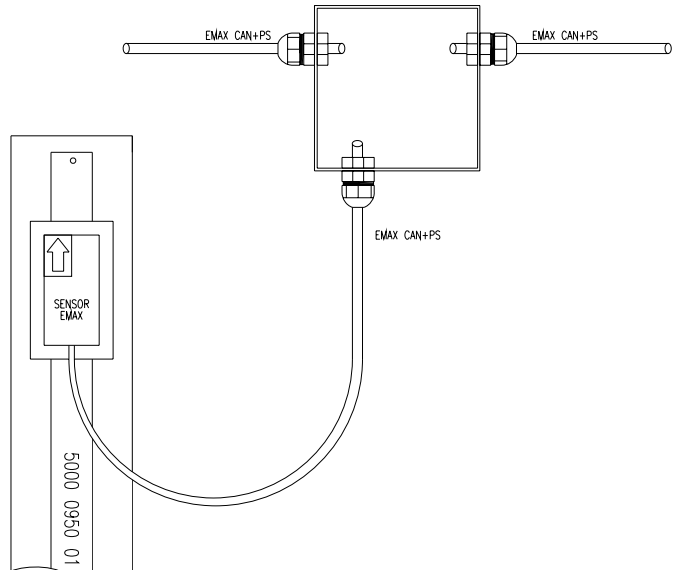


EMAX guide rail

Junction box for EMAX sensor

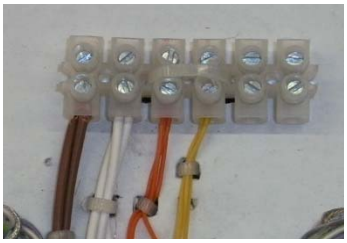
Bus addresses

Each junction box must be wired. This also determines the respective bus address of the EMAX sensor for the lift column in question. The address range is from 0-7, meaning that a max. of 8 EMAX sensors can be addressed. The EMAX sensors are numbered sequentially from left to right, starting with address 0. The numbering must proceed in ascending order.



Wiring for the addresses:

Address 0:



24VDC	brown	connect
0VDC	white	connect
CAN-L	orange	connect
CAN-H	yellow	connect

Additional to the cable of the EMAX sensor

Address 0	leave open

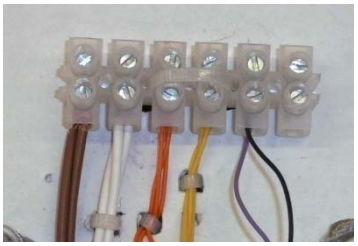
Address 1:

24VDC	brown	connect
0VDC	white	connect
CAN-L	orange	connect
CAN-H	yellow	connect

Additional to the cable of the EMAX sensor

Address 1	black + green	connect

Address 2:

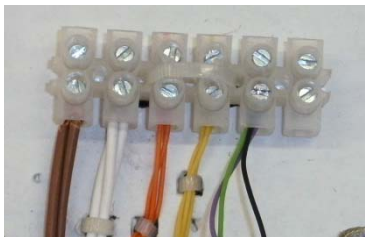


24VDC	brown	connect
0VDC	white	connect
CAN-L	orange	connect
CAN-H	yellow	connect

Additional to the cable of the EMAX sensor

Address 2	black + purple	connect

Address 3:

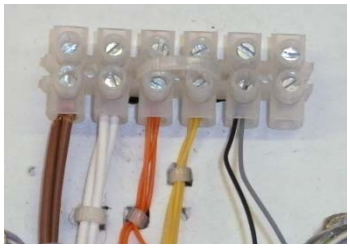


24VDC	brown	connect
0VDC	white	connect
CAN-L	orange	connect
CAN-H	yellow	connect

Additional to the cable of the EMAX sensor

Address 3	black + green + purple	connect

Address 4:

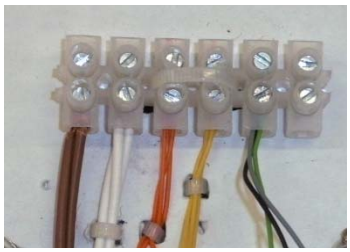


24VDC	brown	connect
0VDC	white	connect
CAN-L	orange	connect
CAN-H	yellow	connect

Additional to the cable of the EMAX sensor

Address 4	black + grey	connect

Address 5:

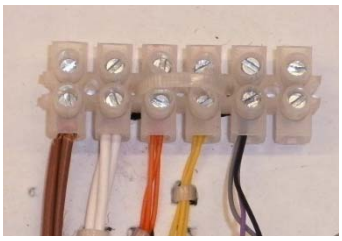


24VDC	brown	connect
0VDC	white	connect
CAN-L	orange	connect
CAN-H	yellow	connect

Additional to the cable of the EMAX sensor

Address 5	black + green + grey	connect

Address 6:



24VDC	brown	connect
0VDC	white	connect
CAN-L	orange	connect
CAN-H	yellow	connect

Additional to the cable of the EMAX sensor

Address 6	black + purple + grey	connect

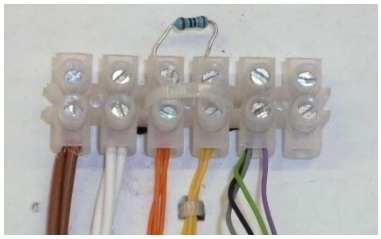
Address 7:

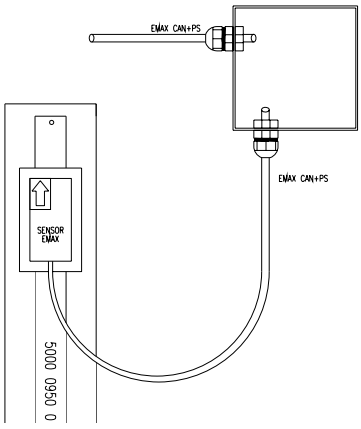
24VDC	brown	connect
0VDC	white	connect
CAN-L	orange	connect
CAN-H	yellow	connect

Additional to the cable of the EMAX sensor

Address 7	black + green + purple + grey	connect

In the last socket of the branch, seen from the switch cabinet, a 120 Ohm terminating resistor must be placed across the CAN bus. Only two cables are inserted in the last socket, that of the EMAX sensor and that of the branch.



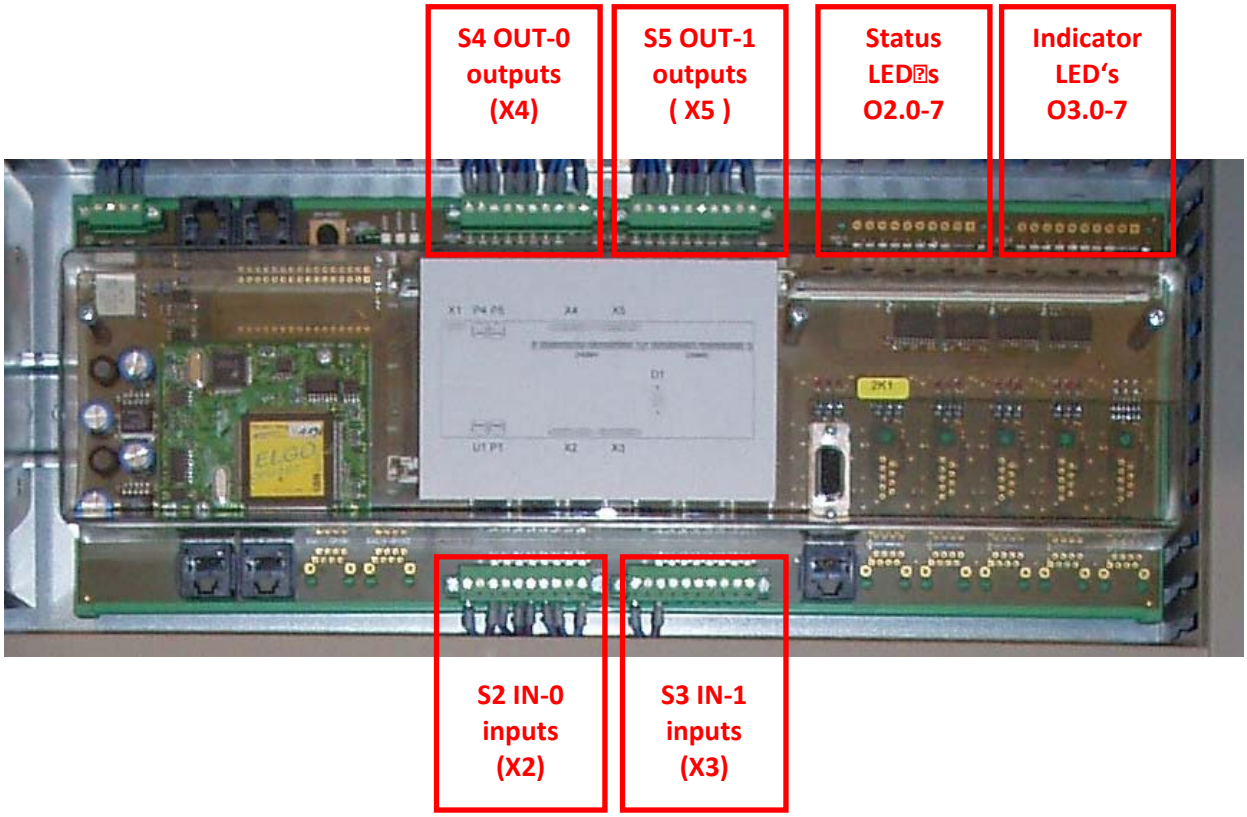


Commissioning the lift control unit

Mechanical design of the system

- Inspect the AVIMAX end sets for consistently horizontal construction.
- Place lift bridge on chocks and align horizontally.
- Screw the lift bridge onto the drive columns, there should be at least a 1cm gap between the chocks and the lift bridge, so that the system is pre-tensioned.

Overview of control unit P100



Overview of the inputs on control unit P100:

No.	Description	Function	Terminal
Terminal block S2 IN-0 (X2)			
1	GND		X2:1 (GND)
2	24VDC (output)		X2:2 (24V+)
3	Lift button ↑	Raise lift	X2:3 (10.0)
4	Lift button ↓	Lower lift	X2:4 (10.1)
5	Enable	Everything OK electrically	X2:5 (10.2)
6	Max. limit switch (top)		X2:6 (10.3)
7	Min. limit switch (bottom)		X2:7 (10.4)
8	Fault reset	Fault acknowledgement	X2:8 (10.5)
9	Without bridge 655mm/with bridge 775mm	Distance between tiers	X2:9 (10.6)
10	Next step → button	Service	X2:10 (10.7)

No.	Designation	Function	Terminal
Terminal block S3 IN-1 (X3)			
1	GND		X3:1 (GND)
2	24VDC (output)		X3:2 (24V+)
3	← previous step button	Service	X3:3 (11.0)
4	Unassigned		X3:4 (11.1)
5	Unassigned		X3:5 (11.2)
6	Unassigned		X3:6 (11.3)
7	Service mode		X3:7 (11.4)
8	Align service point	Calibrate sensors	X3:8 (11.5)
9	Teach-in service point	Confirmation and learn function	X3:9 (11.6)
10	Test service point		X3:10 (11.7)

Calibrating the lift control unit

1. Use a cable bridge on the input of the terminal block (X3) between terminal X3:2 (24V+) + X3:7 (service mode) to enable the service function.
2. Energise the control unit for the lift control. After switch-on, all 16 LEDs light up on the status indicator.
3. Check the “Enable” inputs and the two “Min”/“Max” limit switches by enabling and checking the corresponding input LEDs on the control unit (terminal X2:5/6/7). The LED must be switched on when the limit switch is not activated.
4. Set the number of drives/sensors: enable the Teach-In function by triggering a short 24V+ pulse to terminal X3:9. After activating the Teach-In input, the number of drives is displayed. One status LED lights up per drive, starting with LED output O2.0. This can be changed via the internal service buttons (➔🡐). The first time the unit is switched on, 2 LEDs are illuminated. It is not possible to select less than one LED. After the number of drives has been defined, another short 24V+ pulse must be triggered at terminal X3:9. This signal at the “Teach-In” input finalises your input.
5. Test sensors: the control unit records communication with the set sensors.
   a) (●) = For sensors which have been detected, the associated LED is lit permanently.
   b) (○) = The LEDs for sensors which are not required are off.
   c) (✷) = LEDs flash for sensors which are required but cannot be reached. The fault code shows the cause of the fault.

   Only when this entry is made is another commissioning possible.
6. Finally align the lift bridge horizontally and even out any imbalances if necessary.
7. “Alignment” function: A short 24V+ pulse at the “Alignment” output, terminal X3:8, is used to inform the control unit that comparison must now take place. The system is synchronised and subsequent modifications to the mechanical system will necessitate realignment. All 16 LEDs are lit.

8. Test drives/drive assignment. This test mode is started by applying a short 24V+ pulse to the input “Test”, terminal X3:10.
    a) The LED outputs O2.0 and the status LEDs of Drive 1 flash. The service buttons (➔➔) in the switch cabinet can be used to select which drive should be tested. The corresponding LED outputs O2.0-O2.7 indicate the drive selection. When the last possible drive is reached, pressing ➔ again causes the selection to jump back to LED output O2.0 (= Drive 1). This also works in the other direction.
    b) If the relay for the lift motor of the selected drive is actuated for ***max. 0.2 sec*** via the Up/Down buttons in the switch-cabinet door (🡻🡹) and the direction of movement or axis positioning are not correct, LED output O3.0 is activated. If the test is successful, only LED output O2._ of the selected drive remains enabled.
    Additional info: It is only possible to move the lift column a maximum of 10mm up or down. For a successful test, however, the lift column must be moved at least 2mm upwards and downwards.
    c) Then use the service buttons (🡸🡺) to select and test each of the lift motors in succession. Only when all drives have been tested in both directions (up and down) can normal jog mode be permitted. Tests may be repeated on an individual basis.
9. The drive test/drive assignment is confirmed by applying a short 24V+ pulse to the input “Test”, terminal X3:10.
10. Pressing the 🡻 button in the door of the lift control unit moves the entire lift down to Tier 1. Lift motor 1 is the master, the other lift motors are slaves, as it were, and align themselves to the master. You can make corrections using the two arrow buttons.
    Caution! In the event of a malfunction, the system can only be stopped by the limit switches if they have been checked in advance.
11. After reaching Tier 1, apply 24V+ to terminal X3:9 (“Teach-In”) until the green “Lift in Position” indicator lamp lights up in the door. Lift drive 1 remains in its position. In order to correct possible residual faults in the other drives, the latter are now precisely aligned.

12. Tier 1 is now the reference point (0mm). All other tiers are now also set automatically, using the distance between tiers of x mm, which is preset in the program.
    If, however, readjustment is deemed necessary for the particular tiers, the level can be adjusted by up to a half of the distance between tiers, i.e. ±655mm / 2 = ±327mm (at 775mm / 2 = ±387mm). To do this, proceed as follows:
    a. In service and in normal modes, use the arrow buttons to move to the tier. The lift stops automatically at the next tier, and the green “Lift in Position” indicator light comes on as soon as all drives have been aligned.
    b. If this position is not OK, it is possible to make minor corrections using the ↑↓ arrow buttons.
    c. Applying a short 24V+ pulse to the “Teach-In” input, X3:9, for this tier adopts and saves the current height. At the same time, all drives are realigned.
    d. Fine tuning also modifies the distance between higher tiers, but not for those below.
    e. If you would like to fine-tune the next tier rather than this one, it is also possible to continue. immediately. The control unit is able to detect on its own when the lift is approaching a tier position and then switch off again. Fine tuning is automatically assigned to the correct position as soon as the input is actuated.
13. In service mode, the lift must travel once to all the tiers. At the end, if the top limit switch (max.) is reached, the control unit then knows that this is the top position and how many tiers there are in the coop. "Park" position is then set as 20mm below this position. During normal operation, the limit switches should never be reached.
14. The setting procedure is concluded by removing the bridge on the input of terminal block (X3) between terminal X3:2 (24V+) + X3:7 “Service” (service mode).
15. Switch off the lift control unit completely, wait approx. 10 sec. and then switch it back on.

Special function - factory settings:

By setting “Service”, “Teach-In” and “Test” inputs at the same time, all settings are reset to their factory state, when the power supply is switched on .

Overview of status indicators for the P100 control unit in service mode:

Status LEDs on the P100 control unit															
O O2.7	O O2.6	O O2.5	O O2.4	O O2.3	O O2.2	O O2.1	O O2.0		O O3.7	O O3.6	O O3.5	O O3.4	O O3.3	O O3.2	O O3.1	O O3.0

No.	LED	Description	Info
1	O2.●●●●●●●● O3.●●●●●●●●	Service mode enabled All 16 LEDs are lit.	LEDs go out as soon as the first action is completed.
2	O2.●●●OOOOO O3.OOOOOOOO (Example)	Each LED which is lit on LED output O2.__ corresponds to a drive.	The number of drives can be changed using the service buttons ➔➔. To confirm the number actuate the Teach-In input.
3	O2.●✹●OOOOO (Example) O3.OOOO✹OOO	Indicator/Communication status of the path sensors (sensor input) 1-8	● For sensors which have been detected, the associated LED is lit permanently. O The LEDs for sensors which are not required are off. ✹ LEDs flash for sensors which are required but cannot be reached. The fault code shows the cause of the fault.
4	Before the test O2.OO✹OOOOO After a successful test O2.OO✹OOOOO (Example)	Test run, lift motor x	Each lift can be moved up and down by a maximum of 10mm. The flashing Lift LED indicates that this lift needs to be tested. A movement of at least 2mm must be made in both directions. If the LED is permanently lit, the drive has been successfully tested.

Possible fault indicators on the P100 control unit

If a fault occurs, the red indicator light indicates if this fault can be acknowledged with the RESET button. If this is not successful, the status LEDs on the P100 control unit provide information on what has caused the fault.

Status LEDs on the P100 control unit															
O2.7	O2.6	O2.5	O2.4	O2.3	O2.2	O2.1	O2.0		O3.7	O3.6	O3.5	O3.4	O3.3	O3.2	O3.1	O3.0

No.	LEDs	Description	Info
1	O3.●○○○○○○○ O3.7 on	Teach mode or Test mode not completed successfully	
2	O3.○●○○○○○○ O3.6 on	Min. limit switch (bottom) activated	
3	O3.○○●○○○○○ O3.5 on	Max. limit switch (top) activated	
4	O3.○○○●○○○○ O3.4 on	No response from sensor x	Check wiring and addressing; if necessary replace sensor and recalibrate
5	O3.○○○○●○○○ O3.3 on	No magnetic tape at sensor x	Sensor has become detached from the magnetic tape, magnetic tape faulty or has fallen off. Check bracket and magnetic tape, replace if necessary and recalibrate
6	O3.○○○○○●○○ O3.2 on	Lift column does not move or moves in the wrong direction	
7	O3.○○○○○○●○ O3.1 on	Enable input not present	
8	O3.○○○○○○○● O3.0 on	Lift drive x inhibited	3 start-up attempts have been unsuccessful. Check motor protection of motors driven. Resolve the issue, possibly obstructions/stiffness on lift x
9	O3.●●○○○○○○ O3.7+O3.6 on	Default alignment of sensors x has changed	Default orientation of individual sensors changes without an operation command

Operating message on the P100 control unit

Status LEDs on the P100 control unit																
O2.7	O2.6	O2.5	O2.4	O2.3	O2.2	O2.1	O2.0		O3.7	O3.6	O3.5	O3.4	O3.3	O3.2	O3.1	O3.0

No.	LEDs	Description	Info
1	O2.●●●●●●●● O2.0-7 on O3.○○○○○○○○ O3.0-7 off	Top "Park" position reached	Limit switch or top position has been reached
2	O2.●○○○○○○○ O2.7 on	Control unit enabled, not in operation, lift located on Tier 1	All motors are switched off, “Lift in tier position” is switched on.
3	O2.○○✹○○○○○ O2.5 flashes	Lift moves up from Tier 2 to Tier 3	
4	O2.○✹○○○○○○ O2.6 flashes	Lift moves down from Tier 3 to Tier 2	
5	O2.✹✹✹✹✹✹✹✹ O2.0-7 flashes	Lift moves to "Park" position	

Emergency operation

Emergency operation is only intended to be used if a fault with the P100 control unit, the relay cards or the EMAX sensors cannot be rectified or if there is a delay in waiting for a replacement part. In such a situation, proceed as follows:

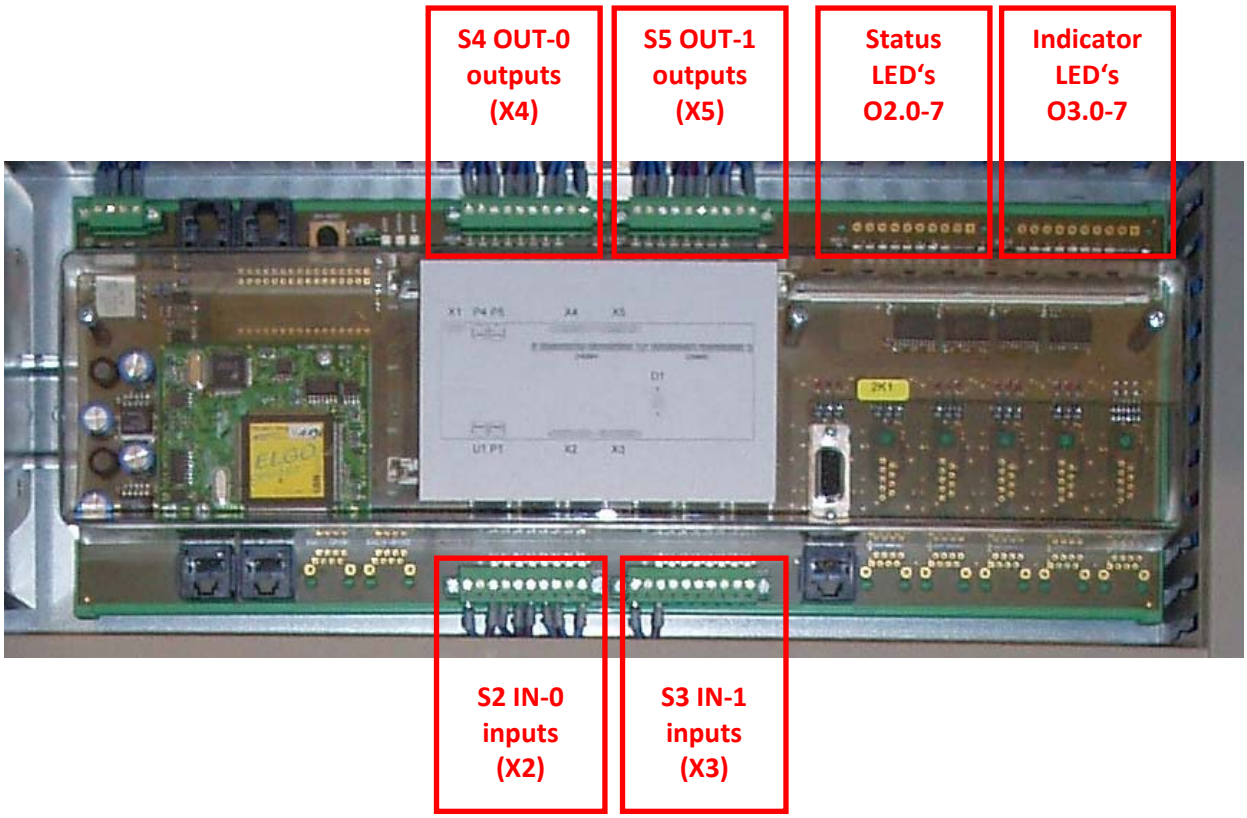
1. A bypass must be inserted in the lift control unit. Information on which terminals the bypass should be placed on can be found in the “AVIMAX lift control unit” circuit diagram. In this situation, the P100 control unit and RP8K relay cards must be switched off and the lift-control-unit indicator light comes on whenever the lift is moved. The red fault indicator on the “AVIMAX lift control unit” control unit may also come on.
2. The tier position or "Park" position must now be determined manually.
3. The min. (bottom) and max. (top) limit switches are now the only limits that the lift has left.
4. Indicator lights on the door of the "Manure removal/Move birds out" switch cabinet, for when the lift is moving up or down, are still enabled when the lift is raised or lowered. If there is a fault on a motor protection switch, the red indicator light comes on. The white indicator light “Lift in Position” is always on.
5. After the fault has been fixed, the bypass must be removed again and the system recalibrated as per the “***Commissioning the lift control unit***” procedure.

Part II:

Quick instructions and checklist for commissioning

AVIMAX lift positioning system

Overview of the P100 module



Overview of the inputs on control unit P100:

No.	Designation	Function	Terminal
Terminal block S2 IN-0 (X2)			
1	GND		X2:1 (GND)
2	24VDC (output)		X2:2 (24V+)
3	Lift button ↑	Raise lift	X2:3 (10.0)
4	Lift button ↓	Lower lift	X2:4 (10.1)
5	Enable	Everything OK electrically	X2:5 (10.2)
6	Max. limit switch (top)		X2:6 (10.3)
7	Min. limit switch (bottom)		X2:7 (10.4)
8	Fault reset	Fault acknowledgement	X2:8 (10.5)
9	without bridge 655mm/with bridge 775mm	Distance between tiers	X2:9 (10.6)
10	→ next step button	Service	X2:10 (10.7)

No.	Designation	Function	Terminal
Terminal block S3 IN-1 (X3)			
1	GND		X3:1 (GND)
2	24VDC (output)		X3:2 (24V+)
3	← previous step button	Service	X3:3 (11.0)
4	Unassigned		X3:4 (11.1)
5	Unassigned		X3:5 (11.2)
6	Unassigned		X3:6 (11.3)
7	Service mode		X3:7 (11.4)
8	Align service point	Calibrate sensors	X3:8 (11.5)
9	Teach-in service point	Confirmation and learn function	X3:9 (11.6)
10	Test service point		X3:10 (11.7)

Procedure for Teach mode

Step	Action	Bridge/ Pulse	LED status [O2.]	Indicator LED [O3.]	compl.
1	Switch off control unit				
2	Activate the ***service function*** . Insert the bridge	X3:2 + X3:7 *[bridge]*			
3	Switch on the control unit				
4	Status LED and indicator LED indicate that service function is active		●●●●●●●●	●●●●●●●●	
5	Enable ***Teach-In mode***. Apply a 24VDC pulse to the Teach-In input	X3:2+X3:9 [pulse]			
6	The status LEDs indicate the enabled selected lift columns		*[Example indicator]* ●●○○○○○○ *[The LEDs for the selected lift columns are on]*	*[Example indicator]* ○○○○○○○○ *[Successful, all LEDs are off]*	
7	he service buttons in the switch cabinet ➔ ➔ are used to select the number of ft columns. It is not possible to select ess than one lift column.		*[Example indicator]* ●●●○○○○○ *[The LEDs for the selected lift columns are on]*	*[Example indicator]* ●●●○○○○○ *[Successful, all LEDs are off]*	
8	Conclude ***Teach-In mode***. Apply a 24VDC pulse to the Teach-In input	X3:2+X3:9 [pulse]			
9	CAN communication with the EMAX sensors is established. The status LEDs indicate the status. LEDs for successful communication are lit. Flashing LEDs indicate faults. (The indicator LED shows the particular fault). The LEDs for sensors which are not required are off.		*[Example indicator]* ●●●○○○○○ *[**Successful**, LEDs for the detected sensors are on]* *[Example indicator]* ●✱●○○○○○ *[**Unsuccessful**, undetected sensors are flashing]*	*[Example indicator]* ○○○○○○○○ *[**Successful**, all LEDs are off]* *[Example indicator]* ○●○○○○○○ *[**Unsuccessful**, the illuminated LED displays the fault]*	

Step	Action	Bridge/ pulse	Status LED [O2.]	Indicator LED [O3.]	Compl.
10	All lift drives must now be set to the same height. Then apply a 24VDC pulse to the ***Alignment*** input This position of the sensors is now saved in the control unit as an offset, i.e. all sensors now have a height, which is saved. This is used to automatically determine their position	X3:2+X3:8 [pulse]			
11	Status LED and indicator LED indicate that service function is active Teach mode successfully concluded		●●●●●●●●	●●●●●●●●	

Continue with Test mode at step 5 if the control unit will not be switched off beforehand!!!!

Procedure for Test mode

Step	Action	Bridge/ Impuls	Status LED [O2.]	Indicator LED [O3.]	Compl.
1	Switch off control unit				
2	Activate the ***service function***. Insert the bridge	X3:2 + X3:7 *[insert bridge]*			
3	Switch on the control unit				
4	Status LED and indicator LED indicate that service function is active		●●●●●●●●	●●●●●●●●	
5	Activate ***Test mode***. Apply a 24VDC pulse to the Test input	X3:2 + X3:10 [pulse]			
6	A flashing status LED indicates if the drive of the lift column has yet to be tested. Move the selected lift column at least 2mm up and down using the ↑+↓ buttons, but no more than 10mm up or down from the starting point. If the LED is permanently lit, the drive has been successfully tested. If a fault occurs, this is indicated by a corresponding indicator LED. Use the service buttons in the switch cabinet →← to select the next lift column and perform this test on it as well. ***All lift columns must be tested.***		*[Example indicator]* ○✱○○○○○○ *[Test Drive 2]* *[Example indicator]* ○●○○○○○○ *[Successful, Drive 2 tested]* *[Example indicator]* ○●○○○○○○ *[Unsuccessful, Drive 2 tested]*	*[Example indicator]* ○○○○○○○○ *[Example indicator]* ○○○○○○○○ *[Example indicator]* ○●○○○○○○ *[The illumiinated LED displays the fault]*	
7	After all lift columns have been successfully tested, confirm this by applying a 24VDC pulse to the ***Test*** input.	X3:2 + X3:10 [pulse]			

Step	Action	Bridge/ pulse	Status LED [O2.]	Indicator LED [O3.]	Compl.
8	Use the ↑↓ buttons to move the lift down to the first tier				
9	Apply a 24VDC signal at the Teach-In input until the ***LIFT in Position*** indicator light comes on. The lift motor with the address 0 remains stationary, and the other lift motors align themselves with it. ***Tier 1 is now the reference point***	X3:2+X3:9 [24VDC signal]			
10	Since Tier 1 is now the reference point, the levels for all tiers above this are calculated automatically using a gap of 655mm. _____ To change this gap to 775mm, a bridge must be inserted	**Without bridge:** 655mm _____ **With bridge:** 775mm **X2:2 + X2:9** ***[insert bridge]***			
11	Use the ↑ button to move the lift to the next tier. The lift stops automatically when the tier has been reached, and the ***LIFT in Position*** indicator light comes on				
14	If this position is not OK, you can use the ↑↓ buttons to make small corrections. Then apply a 24VDC signal at the Teach-In input until the ***LIFT in Position*** indicator light comes on. The lift motor with the address 0 remains stationary, and the other lift motors align themselves to it. The levels for all tiers above this are recalculated using the selected distance between tiers	X3:2+X3:9 [24VDC signal]			

Step	Action	Bridge/ pulse	Status LED [O2.]	Indicator LED [O3.]	Compl.
12	The lift must now travel to all higher tiers, and also to the top (max.) limit switch				
13	If the top limit switch (max.) is reached, the "Park" position is fixed 20mm below this position and the number of tiers available is also fixed.				
14	Status LED and indicator LED indicate that service function is active Test mode successfully concluded		●●●●●●●●	●●●●●●●●	
15	Switch off control unit				
16	Deactivate the ***service function***. Remove bridge	X3:2 + X3:7 *[remove bridge]*			
17	Switch on the control unit				
18	Use the 🡻 button to move the lift downwards The lift stops automatically when the "Park" position has been reached, and the ***LIFT in Position*** indicator light comes on All 16 LEDs are lit		●●●●●●●●	○○○○○○○○	

The system is now calibrated!!!!

Reset the control unit to its factory state

NOTE:
This is only advisable if absolutely nothing else works. It is not normally necessary to reset the control unit

Step	Action	Bridge/ pulse	Status LED [O2.]	Indicator LED [O3.]	Compl.
1	Switch off control unit				
2	Insert the bridge between ***24VDC + Service + Teach-In + Test***	X3:2 + X3:7+X3:9+X 3:10 *[insert bridge]*			
3	Switch on the control unit				
4	Status LEDs flash and indicator LEDs are permanently lit		✱✱✱✱✱✱✱✱	●●●●●●●●	
5	Switch off control unit				
6	Remove the bridge between ***24VDC + Service + Teach-In + Test***	X3:2 + X3:7+X3:9+X 3:10 *[remove bridge]*			
7	Switch on the control unit				

Now start again with Teach mode!!!!

Querying the software version

Step	Action	Bridge/ pulse	Status LED [O2.]	Indicator LED [O3.]	Compl.
1	Switch off control unit				
2	Insert the bridge between ***24VDC Service + Teach-In + Test + Alignment***	X3:2 +X3:7 +X3:8 +X3:9 +X3:10 *[insert bridge]*			
3	Switch on the control unit				
4	The status LEDs show the main version number and the indicator LEDs show the sub-version ***Main version:*** The flashing status LEDs show the main version number. The other status LEDs are permanently lit ***Sub-version:*** The indicator LEDs which are permanently lit show the sub-version in hexadecimal form, whereby indicator LEDs 1-4 stand for the smallest rated digit of the sub-version and indicator LEDs 5-8 for the second smallest Full version indication ***(this is only an example)*** Version 2.13 (only an example)		*[Example indicator]*  *[Version 2.xx]* *[Example indicator]*  *[Version 2.xx]*	*[Example indicator]* *[Version x.13]* *[Example indicator]* *[Version x.13]*	
5	Switch off control unit				
6	Remove the bridge between ***24VDC Service + Teach-In + Test + Alignment***	X3:2 +X3:7 +X3:8 +X3:9 +X3:10 *[remove bridge]*			
7	Switch on the control unit				

Possible status indicators

Step	Action	Bridge/ pulse	Status LED [O2.]	Indicator LED [O3.]	Compl.
1	***Example indicator:*** Lift moving to Tier 3 (status LED 3 flashes)		*[Example indicator]* OO✱OOOOO *[Lift moving to Tier 3]*		
2	***Example indicator:*** Lift is at Tier 1 (status LED 1 is permanently lit)		*[Example indicator]* ●OOOOOOO *[Lift is at Tier 1]*		
3	***Example indicator:*** Lift moving to "Park" position (status LEDs 1-8 flash)		*[Example indicator]* ✱✱✱✱✱✱✱✱ *[Lift moving to "Park" position]*		
4	***Example indicator:*** Lift is in "Park" position (status LEDs 1-8 are permanently lit)		*[Example indicator]* ●●●●●●●● *[Lift is in "Park" position]*		

Possible fault messages

If a fault occurs, the red indicator light indicates if this fault can be acknowledged with the RESET button. If this is not successful, the status LEDs on the P100 control unit provide information on what has caused the fault.

Step	Action	Bridge/ pulse	Status LED [O2.]	Indicator LED [O3.]	Compl.
1	Unable to enter Teach mode or Test mode			●○○○○○○○	
2	Min. limit switch (bottom) activated			○●○○○○○○	
3	Max. limit switch (top) activated			○○●○○○○○	
4	No response from the EMAX sensor Check wiring and addressing; if necessary replace sensor and recalibrate			○○○●○○○○	
5	No magnetic tape at the EMAX sensor Sensor has become detached from the magnetic tape, magnetic tape defective or has fallen off. Inspect the bracket and magnetic tape; if necessary replace and recalibrate			○○○○●○○○	
6	Lift column does not move or moves in the wrong direction			○○○○○●○○	
7	Enable input not present			○○○○○○●○	
8	Lift drive obstructed 3 start-up attempts have been unsuccessful. Check motor protection of motors operated. Resolve the issue, if applicable jams / stiffness on a lift motor			○○○○○○○●	
9	Default orientation of individual EMAX sensors has changed without an operation command			●●○○○○○○	

Notes