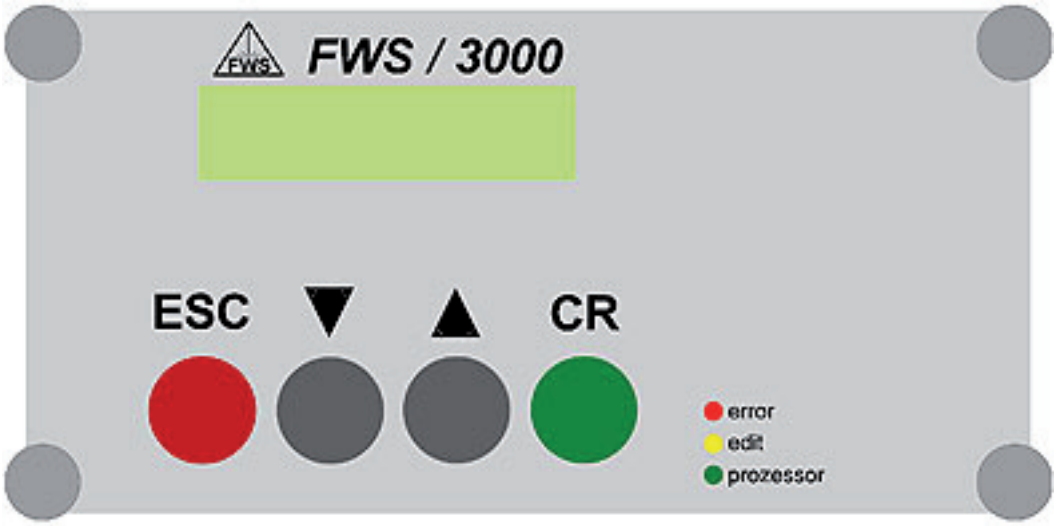
FWS / 3000

Operating Instructions



Lift installation:		
Type of diagramm applied (No.):		
Special programming to be noted:	O yes	O no
Direct levelling to be observed:	O yes	O no

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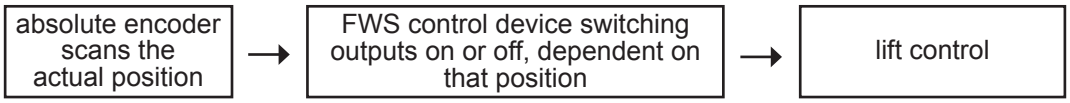
INTRODUCTION

Principle of functioning

Each lift control needs to know the actual position of the lift car. Normally, the lift control receives this information from switches mounted in the lift shaft. Exactly at this point the FWS is setting in. The shaft switches are replaced in such a way that the lift control will not find any difference at all.



All advantages of a digital shaft copying system are becoming effective and, moreover, owing to the application of the absolute encoders, it is granted that the actual position cannot get lost even in case of a voltage failure.
Originally, this system has been developed for the replacement of old and inaccurately working floor selection systems. It turned out, however, that it is suitable for considerably more fields of application (key word: direct levelling) owing to the high processing speed, and the flexible and simple handling.
In the course of developing we have, besides the function itself, attached great importance on a user friendly system. So, a system has been created that is easy to handle despite its high flexibility.The uniform mode of operation in connection with the various encoder systems or the input automatics are just examples.

FWS in brief

- Basically, the position encoder system is suitable for **all** lift controls, irrespective whether relay or processor controlled.
- non-erasability of lift position
- depending on the type of encoder: accuracy of switching positions 0.1 mm to 1 mm
- very fast reaction time of about 1 millisecond
- direct levelling by data transfer between closed loop control and FWS, independent on the lift control.
- input in mm for all systems.
- easy setting into first operation by user-friendly data input.
- in case of panorama lifts: no visible switches.
- replacement for mechanical floor selection system.
- special switches like directional switches, external switching-off, delayed switching-off, etc.

An investment that pays !

- saving in installation cost.
- no time consuming adjustment of magnets etc.
- special switches are realisable within minutes.
- for the modification of the travelling speed or of the acceleration the switch-points can be changed within minutes as well.
- with the exception of only one zone switch there are basically no additional shaft switches required.
- integrated safety devices with fault memory for the last 99 faults, with date and time.
- integrated counter for operational hours and number of drives .
- increase of operational safety (improvement of the availability of the plant).
- replacement for old, inaccurately working floor selection systems.
- increased transporting capacity by direct levelling.

The path encoder control consists of two components:

1. Absolute encoder

The absolute encoder is able to establish immediately the actual position, without reference switches etc. Miscounting is prevented by the system itself. Therefore, no information will get lost, even in case of power failure. This is imperative for the compatibility with any available lift control.
Lift installations have to fulfil various requirements. In order to be able to offer the right system for each and any demand we have got a selection of different absolute encoders.

System 10: flat tooth belt with absolute encoder for lifting height up to 80m
System 11: Ex-version for explosion group I, II a and II b
System 12: flat tooth belt with absolute encoder for lifting height up to 45m
System 20: spring-return rope based sensor system with absolute encoder for lifting height up to 30 m

2. FWS - Control unit

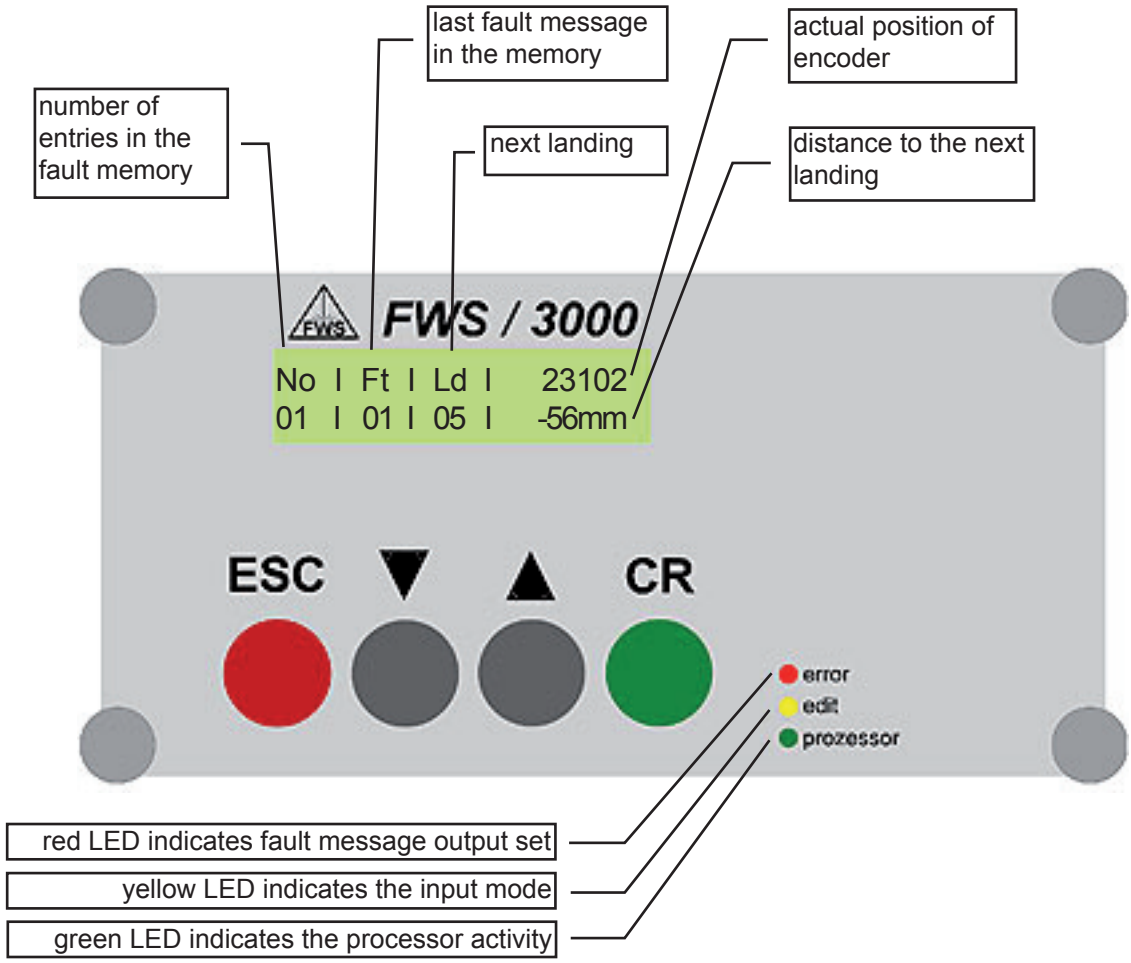
The core of the control unit FWS / 3000 is the NEC microprocessor V25 with sufficient capacity for the quick solution of complex tasks. For the indication of fault messages and settings a twoline LCD-display is used. The device can be adjusted via four keys. For the recording of overviews, for diagnosis and documentation a printer interface in industrial standard is available.

Standard design:
• 16 transistor outputs for 10 - 50V= and 1 relay make-contact for 230V-.

Specialdesign:
• relay version with I to 32 relay make-contacts for 230V*.
• transistor outputs with negative logic
• extension for 32 transistor outputs

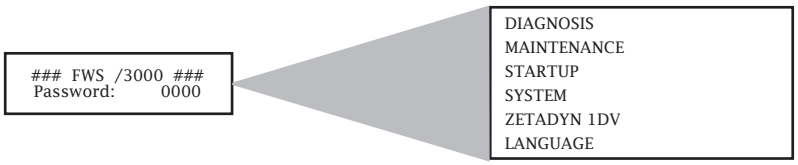
Operation

Overview



With password into the main menu

After pressing a key - prior to proceeding in the main menu - you will be asked to enter a password. An overview of the menu design is attached.



The pre-set standard passwords can be modified in menu „SYSTEM/PASSWORDS/“.

password	
0010	cursory reading: fault messages etc. (caretaker)
0020	menu MAINTENANCE, otherwise reading only, not modifying
0030	unlimited reading and modifying
others	no access

Moving in the menu

Only two lines of the whole menu can be seen at a time. The arrow at the beginning of the line marks the actual position in the menu. By means of the black keys [↑] and [↓] you move in the menu line by line up resp. down. When you reach top or bottom of the menu you will not be able

to proceed by repeated pressing of the key, i.e. the menu does not scroll. By means of the green key [CR] you enter a sub-menu resp. you select a menu level. By means of the red key [ESC] you leave the sub-menu resp. quit the active function.
By pressing the red key [ESC] in the main menu you quit the menu system. Thereafter follows a plausibility check, i.e. the system tries, as far as possible, to trace input errors. If an error is found it will be indicated and it will not be possible to quit the menu. Warnings can be by passed. Only with plausible inputs the data will be written automatically into the EEprom, the operating outputs be set (events generated) and the system be activated.

Inputs and modifications

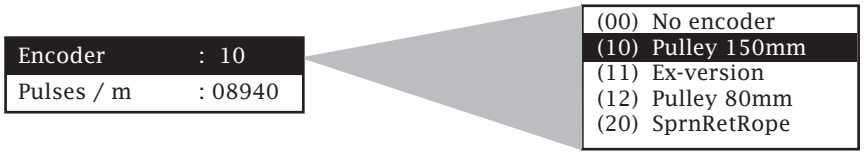
By pressing the green key [CR] you will be changing to the input mode, and the red key [ESC] breaks off the input at any time. There are two modes of input, depending on the variables:

1st Mode of input

A flashing rectangle marks the figure to be processed. With the black keys [↑],resp. [↓] this number can be modified. By pressing the green key [CR] you reach the next number or you confirm the input after processing the last figure.

2nd Mode of input

After changing into the input mode the actual line is equal to the set value (in brackets). With the black keys [↑] resp. [↓] upward or downward stepping line-by-line is possible . By pressing the green key [CR] the input will be confirmed and the value in brackets will be entered.



Language setting

All texts and enterings in the menu can be displayed in German or English. Select the respective language.

Leaving the menu

By pressing the red key [ESC] in the main menu you leave the menu system. Then a plausibility check follows, i.e. the system checks the inputs with regard to discrepancies, which will be indicated if there are any. There are two different modes of recording, depending on fault level.

Fault signals

If a fault is spotted it is not possible to leave the menu before the cause of trouble is eliminated.

Warning messages

If an irregularity is detected, which possibly might be intended, a warning message is displayed. In that case you have the choice either to continue leaving the menu with the red key [ESC] or to return to the menu with the green key [CR] in order to eventually modify any inputs. If multiple warnings are detected, these will be indicated one-by-one after pressing any key.

SETTING INTO FIRST OPERATION (STARTUP)

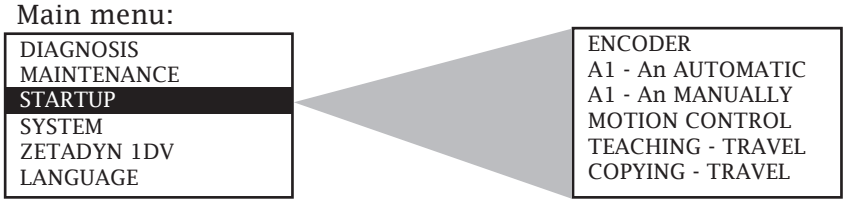
Safety instruction:
As long as the FWS is not ready for operation, floor selector is not existent! This refers to all switches that are to be generated by the FWS. As a rule, this refers also to the pre-limit switches.

As the first step check the most important connections:
(1) For the teaching travel external voltage (from control) at terminals 53 + 54, and for the teach-key at terminal 51.
(2) Screening from encoder to terminal 39.
(3) Mal function signal. Terminal 44 and 45.
(4) External voltage at terminal 55 for all inputs at terminals 56 to 62.
(5) Signal input for inspection travel (and emergency electrical operation) at terminal 59. Signal is active as long as inspection travel is not operative. In case of direct levelling, parallel inspection signal at terminal 58.

Procedures during lift installation:
(1) As the case may be, the mal function message is to be shunted out. Terminal 44 and 45.
(2) If the pre-limit switches are laid out as make-contacts, they are to be shunted out till the setting into first operation of the FWS has been terminated.

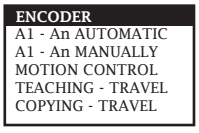
Basically, the putting into operation follows this sequence:
(1) Adjusting of the encoder
(2) Programming of outputs (possible by using the type-of-diagram automatic mode)
(3) Teaching travel for landings and possible copying travel for zone switches
(4) Test travel
(5) Fine adjustment

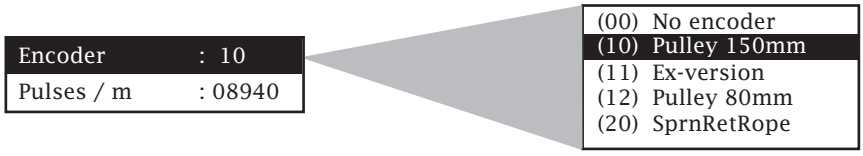
Refer also to page 32
The settings in menu ,,STARTUP“ will be entered only after leaving the main menu (by pressing [ESCI]).



Adjusting the absolute encoder

Upon setting of the type of encoder the standard values (see table) for the number of encoder pulses per meter are set automatically. Be careful in setting the correct encoder type.





Designation	Type	Pulses / meter
no encoder set	00	-
tooth belt system with 150mm pulley	10	8940 [l/m]
tooth belt system Ex-version	11	8692 [l/m]
tooth belt system with 80mm pulley	12	15368 [l/m]
spring return rope system up to 30m travel	20	13653 [l/m]

Automatically programming of outputs

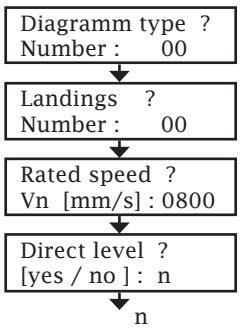
ENCODER
A1 - An AUTOMATIC
A1 - An MANUALLY
MOTION CONTROL
TEACHING - TRAVEL
COPYING - TRAVEL

After you have answered a couple of questions, the outputs will be programmed automatically according to the pre-set diagram type. Please observe that all outputs will be re-programmed and therefore any outputs set before will be cancelled manually.
Under the instruction title „FWS / 3000 Diagram types“ those different pulse diagrams are explained in detail, for which an automatically setting of the outputs is possible. Mind, that the settings of the respective lift control (pulse diagram) are conforming to the pre-defined type of diagram. All outputs are then newly calculated and adjusted according to the data. Subsequently, the individual outputs can be normally processed or partially recalculated by going to menu level “MAINTENANCE/BRAKING DISTANCE“

Remark
If special switches will be required, e.g. second gate, short landings or second zone switch via FWS, probably an automatic programming is possible; however, it might be necessary to assign some additional outputs.
If a diagramm is supposed to serve as a pattern for programming of other lift controls, please observe the exact association with respective outputs.
Furthermore, it is to be clarified whether, for example, the pulse switches shall be set in each landing or not (e.g. in the top landing).

Sequence of input

After the indication of some warning hints, following sequence is shown:



Remark:
With hydraulic drive, two-speed motor, analogue controlled or inverter controlled lifts without direct levelling, set <u>always</u> „Direct levelling: no“ in the output-automatic of the FWS!

With „Direct levelling: no“ the values for „Braking distance up“ (a) and „Braking distance down“ (b) are, basing on the rated speed, automatically calculated according to the formula

a = **b** = 2,15[s]x Vn [mm/s] - 350 [mm]

The values of the braking distances for the second gate (with near landing as well) „Braking distance up“ (**c**) and „Braking distance down“ (**d**) are calculated according to the braking distances (a) and (b)

c = **d** = 1 / 2 * **a**

With „Direct levelling: yes“ the braking distances are to be set directly. If the motor control shows via display the required braking distance, the value is to be entered here; as for the rest the distances following hereafter can be set.

Braking distances **a/b** for the high speed:

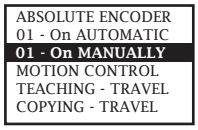
at v_n	Brake dist. **a/b**	at v_n	Brake dist. **a/b**	at v_n	Brake dist. **a/b**
0,6 m/s	940mm	1,4 m/s	2300mm	2,5 m/s	3800mm
0,8 m/s	1350mm	1,6 m/s	2700mm	3,0 m/s	4200mm
1,0 m/s	1600mm	1,8 m/s	3050mm	3,5 m/s	4900mm
1,2 m/s	1880mm	2,0 m/s	3400mm		

For the intermediate speed **c/d** half of the value for the braking distance **a/b** of the rated speed can be set.

Remark:
Please observe that the FWS automatically adds the pulse distance. That is important for the ratio of landing distance to braking distance (e.g. pulse exceeds landing).
The total length of pulse + braking distance can be read after the input in the menu „Maintenance / Braking distance“. Refer also to chapter „Direct levelling“ (under Miscellaneous“).

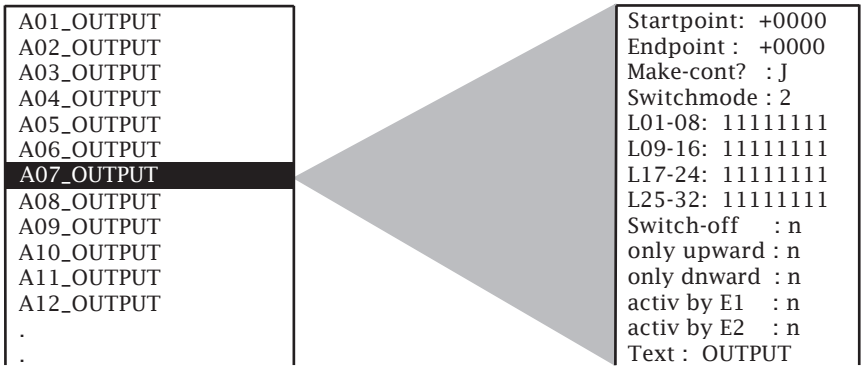
Manual setting or modifying of outputs

Manual input is needed only if automatic programming is not possible, if additional outputs shall be set , or if outputs which have been programmed automatically must be modified in a special way. **If this is not the case, the teaching-run can be performed immediately.**



For the manual setting use the pulse diagram of the lift control and program the outputs according to the instructions given. Which outputs of the FWS are intended for switches like Level, Pulse etc., are to be taken from the electrical diagram of the lift control.

Overview of menu „STARTUP / OUTPUTS“:



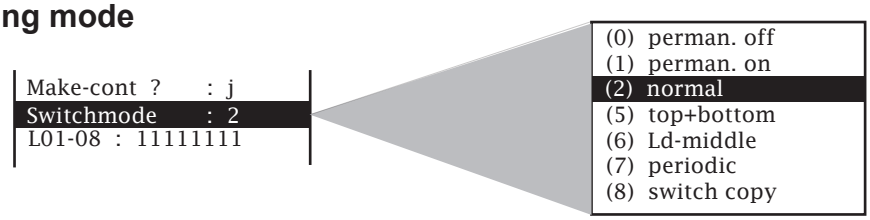
Start-point and End-point

Between the two values for the Start-point and the End-point the switch will be operated. Start-point and End-point can be exchanged and lead to the same result, with the exception of the values 9999 mm and -9999 mm. In these cases the output remains active beyond the end of the shaft.

Make-contact

Defines whether the switch is a maker (yes) or a breaker (no).

Switching mode



Mode 0: Output not active and permanently OFF.
Mode 1: Output not active and permanently ON.
Mode 2: Normal output set from start point to end point; basically, this goes for each landing.
Mode 5: Output is getting active above and below each landing.
Mode 6: Special mode for switches in graycode or binary code. The switch is set at the mean point to next landing resp. to shaft end. That means, in the ex treme landings the switch is set at a position beyond landing level, towards the shaft end. The settings for start point and end point remain unconsidered. Then, with the aid of the landing mask, the respective code can be set.
Mode 7: Special mode for path-dependent periodical switching ON and OFF of the output (Woodstock). Hereby, the difference between start point and end point defines the pulse length, and the start point defines the offset to the 1st landing.
Mode 8: Special mode for copying existing switches. In this mode, the switching positions memorised during copying-run are reproduced. By the definition „*Maker: y/n*“ the switch can be inverted. All the other definitions of switches remain unconsidered.
Possible applications:
Set any zone switch in the shaft, copy this one upon copying-run and reproduce it during operation as 2nd zone switch.

Landing mask L01-L32

For each landing it can be individually defined whether a switch shall be activated or not. The settings are presented in four lines for a total of 32 landings.

1	Switch getting active for this landing
0	Switch remains inactive for this landing

Example for a correction switch below, which shall be set only in the lowest landing:

L01-08 : 10000000
L09-16 : 00000000
L17-24 : 00000000
L23-32 : 00000000

Switching off

With the setting „yes“ the output can be switched OFF via the input E3. The polarity of the input can be modified in the menu ,*“SYSTEM\ INPUTS\ E3_MAKE: y“*. This function is used only with the compensation outputs for direct levelling, in order to switch OFF the compensation in inspection/emergency electrical operation.

Only upwards

By setting “yes“ the output is active in upward direction only. This function is used at the compensation outputs of the direct levelling.

Only downwards

By setting “yes“ the output is active in downward direction only. This function is used at the compensation outputs of the direct levelling.

Activation E1

Only with input E1 set, the output is getting enabled. After switching OFF the input E1 the enabling remains still active for a set period. This delay time can be set in milliseconds in the menu „*SYSTEM \ MISC. \ E1 / E2 List: 0200*“. The polarity of the input can be modified in the menu ,“*SYSTEM \ INPUTS\ E1_MAKE: Y*“. This function is used only at the compensation outputs with direct levelling, if short landings are to be considered. In the so-called „Weber mode“ the mode of operation can be additionally varied.

Activation E2

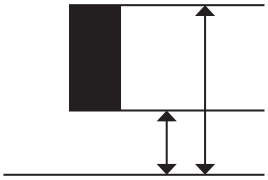
Only with input E2 set, the output is getting enabled. Otherwise the same as with ‚Activation E1‘.

Text

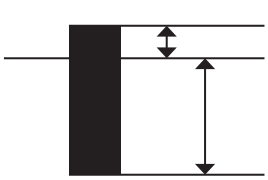
Designation of the output freely selectable. The same selected designation will be used also by the menu.

Examples

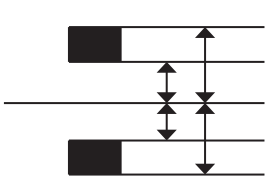
Example 1:
Startpoint: +80
Endpoint: +12
Normally open contact: yes
Mode: 2
Text: LEVEL



Example 2:
Startpoint: +10
Endpoint: -80
Normally open contact: yes
Mode: 2
Text: LEVEL

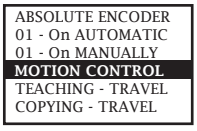


Example 3:
Startpoint: +20
Endpoint: +10
Normally open contact: yes
Mode: 5
Text: IMP



Setting of motion-control

In case of applying an automatic diagram type, no settings are required; the teaching travel can be performed immediately.



Rated speed

If this value is exceeded by 10%, the error code „VMAX REACHED“ will be displayed. The further treatment of the error code is described in section „Mal function signals (fault signal treatment)“.

Exceeding the value range
This value indicates by how many millimetre the top landing and the bottom landing can be overrun without error code „VALUE RANGE“ being activated. The further treatment of the error code is described in section ,,Mal function signals (fault signal treatment)“. Observe that - as a standard - the treatment of the fault message differs between normal operation and inspection operation.

Travel control activated
This function activates or deactivates the travel control via input E5 (Terminal 59). It is checked whether with set travel signal, encoder modifications happen. If the condition is not met, the error code „Travel control“ will be activated. The polarity of E5 can be changed in the menu *„SYSTEN\ INPUTS\ E5_Make: y“*. The further treatment of the error code is described in the section ,,Mal function signals (fault signal treatment)“.

Delay for motion check E5
The maximum possible delay in seconds between setting of the travel signal and the actual encoder modifications (important for hydraulic lifts).

Remark:
For travelling speed of more than 0.8 m/s we recommend to generally wire and activate the travel control. For travelling speed of more than 1.6 m/s we recommend to additionally install external deceleration control switches.

All outputs ON
Upon setting the fault signal, all outputs can be switched off. Whether upon setting the fault signal, the outputs shall be switched off or not, can be determined individually for each and any fault signal. See also section „Mal function signals (fault signal treatment“. Here - upon setting of the mal function signals - on this position you can adjust whether all outputs shall be switched on alternatively. Additional safety is provided if in case of an inadmissible condition of the floor selector a fault message is given to the lift control.

Teaching-travel for landings

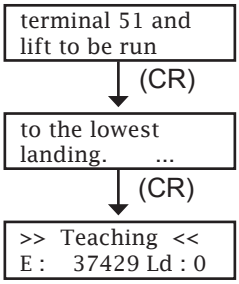
ENCODER
A1 - A15 AUTOMATIC
A1 - A15 MANUALLY
MOTION CONTROL
TEACHING TRAVEL
COPYING - TRAVEL

Preparations
Connect teach-key to input EA1 (terminals 51, 53 and 54 or car terminal block). As the case may be, the mal function signal is to be shunted (terminals 44 and 45), and if the pre-limit switches are laid out as make-contacts, these are to be shunted, too.

Remark:
If no smoothed direct voltage of 5-30V is available, it is possible to use the FWS-internal voltage for the teaching travel. Connect terminal 53 to terminal 11 and terminal 54 to terminal 12. These connections must be removed after successful setting into first operation in order to avoid mal functions of the internal operation voltage.

Starting the teaching travel
After selection confirm with CR. Some lines of information will follow. Confirm each one with CR till „>> Teaching travel <<“ appears on the display. Before the teaching travel starts; all previous settings are automatically saved in the EEprom

Teach - key to be connected to
↓ (CR)



Hereby **E** represents the value that is defined by the absolute encoder and **Ld** the number of the teached-in landings.
The following table shows the range of the valid encoder values and possible sources of error.

Display	Meaning
Values higher than 0	no fault, Encoder can be read out
-2	Encoder has not yet been selected
-4 or -8	Fault upon reading-out of the encoder. Possible causes: connecting cable or encoder defective

If the values supplied by the encoder are plausible, move the car to the landings one-by-one **from bottom to top**, set level and press the teach-key.

Identified: If the position has been identified the teach-key is illuminated within a zone of +/- 5 cm.
Double: Multiple teaching-in is prevented within a zone of +/- 1 cm.
Cancel: Position will be cancelled if within a zone of +/- 5 cm the teaching-key is pressed for more than 5 seconds.

Teaching travel will be terminated by pressing any key. As a control, the number and the minimum and maximum distances of the teached-in landings are displayed.

Input terminated, the system being generated

Press the red key [ESC] as often as required till you have quit the menu completely (approx. 7x [ESC]). This will be followed by a plausibility check, i.e. the system tries - as far as possible - to detect input faults. If a fault has been detected it will be indicated and it is not possible to leave the menu. Warning messages can be by passed.

The warnings „Pulse exceeds shortest landing distance“ and „Pulse too close to nearest landing“ may be by passed only if short resp. near landing are existent, otherwise faults may occur in the processing of pulses.
The warning “Inspection operation at present“ refers to signal at the input terminal 59 (E4). Refer also to section Inputs.

Only with plausible inputs the data are automatically written into the EEprom, the switching outputs set (events generated) and the system activated.

Test run

The first run with the lift should be started cautiously. You should only start travelling, when you are absolutely be sure that all previous instructions have been followed correctly.

Checklist

1.
Remove all shunts set before the setting into first operation (mal function signal, pre-limit switches, connection of terminals 53/11 and terminals 54/12 for teaching travel, as far as existent, etc.).

2.
If zone switches are provided, they should be put into operation before. If a zone switch is set by the FWS, the copying-run required should also be performed before and the outputs be connected, as provided in the lift control.

3.
See to it, that the inspection switch is connected in accordance with the diagram, as it is possible that outputs might be switched off via this signal (e.g. 2nd Zone at STA2).

4. (does not apply in conjunction with **wecon control**)
Now, disconnect the outputs for eventual fine relevelling.

5.
Move the lift to an extreme landing by means of the emergency electrical operation or inspection control and check whether the outputs (LED's) of the FWS correspond to the stipulations in the pule diagram of the lift control. If not, the values should be re-checked carefully. Particularly the outputs of the upper landings, for example the pre-limit switches, should be checked. For help, the output conditions can be read out in the menu *"DIAGNOSIS / MONITOR"*.

6. (does not apply in conjunction with **KEB F4**)
For digital frequency inverters, compare the braking distances in menu *„Maintenance / Braking distance up resp. down"* with the pre-settings of the braking distance in the inverter. The braking distance in the FWS must be longer than the value in the inverter, as the pulse length must be added. Some frequency inverters use a zone switch for a final adjustment of levelling during braking phase. For this purpose, if need be, the output A16 of the FWS is intended. If the same is also used, observe the instructions of the manufacturer of the controller for the first operation travel.

7.
Upon setting into first operation with direct levelling, read at first the information regarding function and operation in the chapter „Direct levelling".

8.
As the next step you should enter a command for the next landing. See to it that the lift stops there. If not, the lift is to be **stopped immediately**. If **no** automatic programming of the outputs has been performed, check the programming of the outputs. Particularly see to 'Mode' and ‚Landing mask'. Also check the general settings like ‚Encoder type' and ‚Pulse per meter' (observe diameter of pulley for tooth belt).

9.
Travel again to the upper landing by emergency electrical operation, check the set values and compare them once again with the pulse diagram (pre-limit switch, level, etc.). Enter another travel command to the next landing. Particularly the upper landings are to be approached cautiously.

10.
Approach all landings one-by-one and check the transition to slow speed, etc.

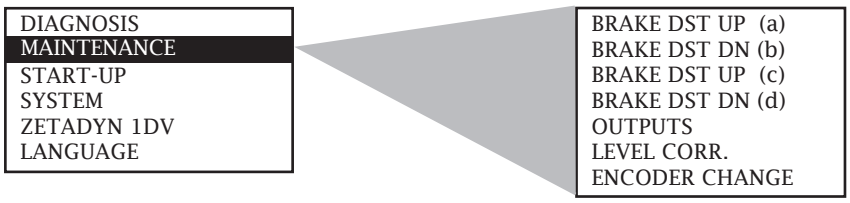
11.
Thereafter follows the fine adjustment.

1. Fine adjustments

The fine adjustments are divided into two scopes. Firstly, the precise stopping at the programmed positions and secondly the adaptation of the programmed positions to the actual level-values of the landings.

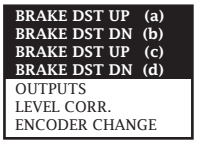
The following settings are performed in menu ,,Maintenance“ (refer also to the next chapter). If upon setting into first operation an automatic diagram type has been quoted, the stopping distances will be set via the menu points for braking distance.

Main menu :



1. Braking distance adjustment

Subject of this section is the setting of the correct braking distance. See to it, that the braking distance will not be too short as otherwise problems will arise with the further adjustments.



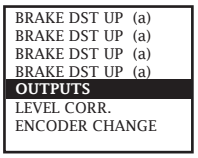
1.1 With preceding diagram type automatic

Approach any landing from below and check the length of the inching speed resp. the braking travel. After that select ,,MAINTENANCE / BRAKE DST UP(a)“ and adjust the braking distance accordingly.

Repeat the procedure in the same way for approaching the landing from above (menu point,,MAINTENANCE / BRAKE DST DN(b)“). For the braking distances of the second gate (near landing) the values for **c** and **d** are valid.

1.2 Without preceding diagram type automatic

If no automatic programming has been performed, the individual pulse outputs are to be set in such a way that the lift - depending on the individual equipment - makes an inching travel of about 2-5 sec. Normally, for that, the outputs „Pulse up“, „Pulse dn“, „Prelim top“ and „Prelim bttm“ are changed. Select for this the respective output and extend resp. shorten the start point resp.end point.

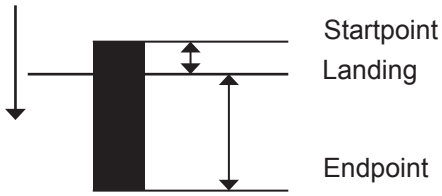


2. Level stopping with / without preceding automatic

This subject is to be worked-on only, when the initiation of the inching travel has been performed before and if upon stopping a distance to level position is indicated. **Hereby the indications in the display are decisive.**
If the display indicates, for example, +20 mm on stopping after an upward travel, the level switch has been set too late and the car has passed the landing. Select for that the respective **output** for the level switch (refer to the pulse diagram resp. electrical diagram) and modify the start point resp. end point (in menu ,,MAINTENANCE / OUTPUTS“) .
Even if an automatic programming of the outputs has been effected, the precise level positioning is performed by modifying the start points resp. end points.

Example:

Startpoint:	+10
Endpoint:	-80
Normally open contact:	yes
Mode:	2
Text:	Level down



A lift with these settings travels downwards into a landing and comes to a stop only 20mm below level position (indication in the display -20mm). Thus, the car has passed by 20mm, the stop signal was coming too late. That means in our case that the start point is to be corrected by 20mm in upward direction, i.e. from +10mm to +30mm.The level signal is always set **equal** for **all** landings.

3. Level adjustment

BRAKE DST UP (a)
BRAKE DST UP (b)
BRAKE DST UP (c)
BRAKE DST UP (d)
OUTPUTS
LEVEL CORR.
ENCODER CHANGE

This subject is to be worked-on only if in the display a distance to the next landing close to zero is indicated, the car position, however, is not flush. If up to here all settings are correct, it makes no difference whether a landing is approached from above or from below; in that landing the car is always equally unlevelled and the display shows always zero.
Drive to all landings one-by-one from car. Measure in each landing, for example with a meter stick, the distance to the precise level position. Note down the measurements. Afterward select the menu point *,,Maintenance / Levet correction / EACH IN MM“* and enter the noted values.

```
Each in MM :
Ld : 01    - 0010
```

Example:
ZERO is indicated on the display and the car position is 10mm too high:
the correction value -10mm is to be set.

4.Relevelling

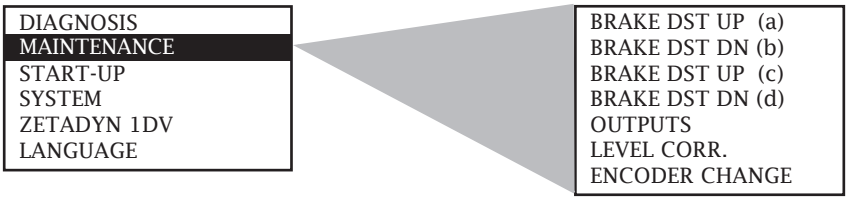
BRAKE DST UP (a)
BRAKE DST UP (b)
BRAKE DST UP (c)
BRAKE DST UP (d)
OUTPUTS
LEVEL CORR.
ENCODER CHANGE

If up to this status all settings are correct, connect the relevelling switches. Depending on the kind of installation, the relevelling switches should be set between 4 and 15mm in the menu *,,MAINTENANCE / OUTPUTS/ A...“*. If the switches are adjusted too tight the car begins to shuttle.

MAINTENANCE

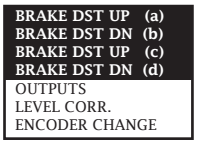
References to the following settings can be found also in the section „Fine adjustment“ in chapter „Setting into first operation“. For more information go to the respective section at the end of the previous chapter.

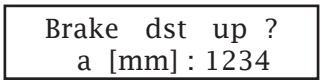
The settings in menu „MAINTENANCE“ are getting active immediately, i.e. after each modification in this menu the system will be newly generated. However, the settings will be memorised only after leaving the main menu.



Braking distance modification

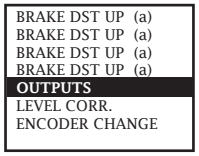
If an automatic diagram type has been used when setting into first operation, the start points and end points of all outputs depending on the respective braking distance (**a-d**) can be programmed anew. The value calculated by the FWS will be displayed and can be modified here.





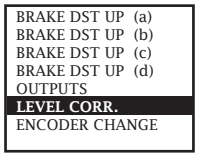
Afterwards, the pulse length and the newly calculated end point will be displayed till any key is pressed.

Outputs

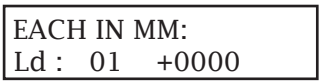


Start point and end point
These two menu levels are identical to the corresponding levels in menu “STARTUP“.

Levelling corrections
This subject is to be worked-on only if in the display a distance to the next landing close to zero is displayed, the car position, however, is not flush.



Modifying of a single landing
Modifies the teached position of the respective landing by the correction value quoted(-9999 mm to +9999 mm).



Example:
ZERO is indicated on the display and the car position is 10mm too high:
the correction value -10mm is to be set.

Identical modifying of all landings
Modifies the teached positions of landings by the correction value quoted (-9999 mm to +9999 mm)

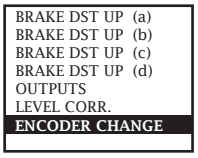
Proportional modification from top

Modifies all teached landing positions proportionally from top by the correction value quoted(-9999 mm to +9999 mm), i.e. the top landing will be modified by the correction value quoted, the bottom landing by zero, and the intermediate landings by the linearly adjusted value.
The function can be used if, after a couple of years, a settling of the building is observed.

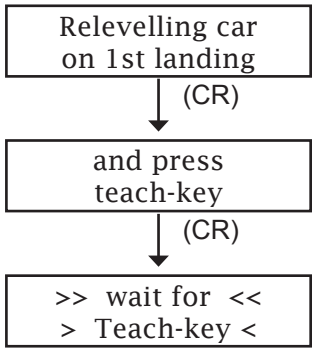
Proportional modification from bottom

Modifies all teached landing positions proportionally from bottom by the correction value quoted(-9999 mm to +9999 mm), i.e. the bottom landing will be modified by the correction value quoted, the top landing by zero, and the intermediate landings by the linearly adjusted value.
The function can be used if, after a couple of years, a settling of the building is observed.

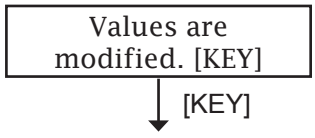
Encoder exchange resp. replacement of tooth belt



Upon exchanging the absolute encoder or replacement of the tooth belt all the teached landing positions are no longer valid. Only the number of encoder pulses between the landings remain the same. It now becomes necessary to adjust the teached landing positions with the new encoder positions.
The red key [ESC] quits the procedure.



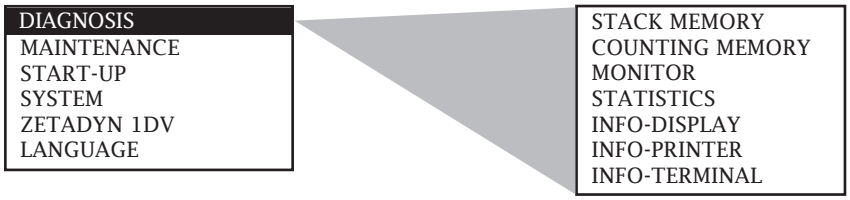
Move to bottom landing and operate teach-key.



Press the red key [ESC] repeatedly till the inputs get automatically memorised and you have quit the menu.

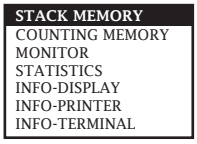
DIAGNOSIS

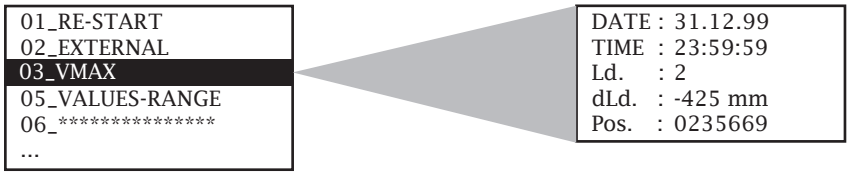
Overview of menu „Diagnosis“:



Stack memory

In a stack memory the 99 previous fault messages are memorised. The stack memory is designed as a ring, i.e. if there is no more memory capacity, the first fault message gets cancelled. On top of the list is the most recent fault message. For each fault message further information can be retrieved. Upon leaving the menu a question appears whether the stack memory shall be cancelled. By pressing [CR] it will be cancelled, by pressing any other key the contents remains unchange

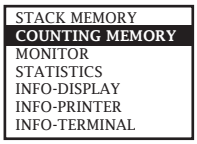




Date: Date of fault.
Time: Time of fault.
Ld. : Next landing to encoder value.
dLd.: Distance in millimetre to next landing.
Pos. : Encoder value when fault appears.

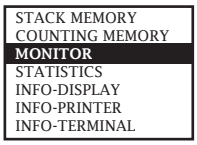
Counting memory

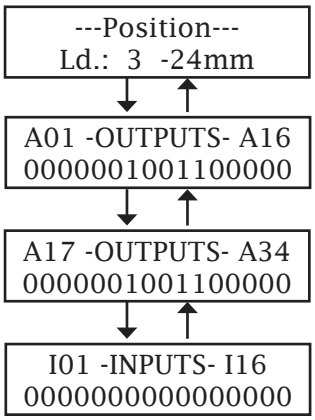
In the counting memory for each type of faults a counter is operative. Upon leaving the menu a question appears whether the counting memory shall be cancelled. By pressing [CR] it will be cancelled, by pressing any other key the contents remains unchanged.

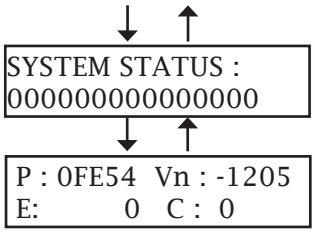


Monitor

The purpose of the monitor is, to display various internal system states in real time. By operating [↑] and [↓] it can be changed between various indications.
[ESC] quits the monitor. For example, on setting into first operation it can be checked here whether the outputs were set at the correct moment.



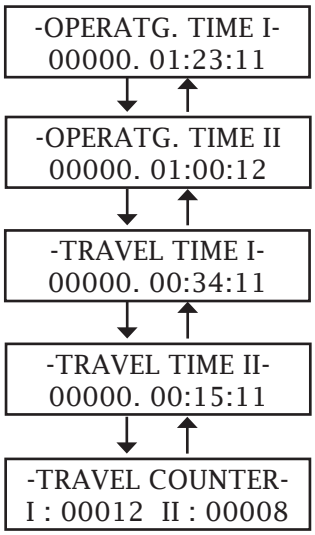




Statistics

STACK MEMORY
COUNTING MEMORY
MONITOR
STATISTICS
INFO-DISPLAY
INFO-PRINTER
INFO-TERMINAL

During operation a couple of statistical data are acquired. In this menu the acquired data can be interrogated. By operating [↑] and [↓] you can choose between two different displays. [ESC] quits the statistics. Type I marks the data entered since setting into first operation, type II those entered since the last start of the device. The data of type I are saved in the EEprom once in an hour, thus the data remain as currently as possible. Display shows DAYS.HOURS:MIN:SEC.



Information on the display

STACK MEMORY
COUNTING MEMORY
MONITOR
STATISTICS
INFO-DISPLAY
INFO-PRINTER
INFO-TERMINAL

Lifting height:
shortest landing distance
longest landing distance
No. of landings
Landing distance 1st /2nd floor:
Landing distance 2nd /3rd floor:
Landing distance 3rd /4th floor:
:

```
Lifthgt      : 361663
minDist      : 3015mm
maxDist      : 3084mm
NoLds        : 11
 [mm] 01-02 : 3032
 [mm] 02-03 : 3104
 [mm] 03-04 : 3084
 ...
```

Overviews on the printer

STACK MEMORY
COUNTING MEMORY
MONITOR
STATISTICS
INFO-DISPLAY
INFO-PRINTER
INFO-TERMINAL

Stack memory

```
30.04.94================================================ 02:53
                    FAULT  MESSAGES
============================================================

Pos    Date  /  Time      Ld    Enc. Val.        St.     Text
------------------------------------------------------------
1      30.10   02:53:36   03          0          01     Restarting
2      30.10   02:52:59   02     420829          08     ext. message
3      30.10   02:52:44   02     418559          04     encoder fau
```

Outputs

```
29.04.94 ============================================================ 00:07
                        O V E R V I E W  -  O U T P U T S
=================================================================== ==

Name of output:          SP            EP S M A A A 1 2 Landing mask
-------------------------------------------------------------------------
A01_OUTPUT           :     0          0 y 0 n n n n n  11111111  ...
A02_SPEC.SW.         :   -10         10 n 2 n n n n n  00100000  ...
A04_FLUSH            :   -50         50 y 2 n n n n n  11111111  ...
A05_RELEVEL_UP       :   -50        200 y 2 n n n n n  11111111  ...
A06_RELEVEL_DN       :  -200         50 y 2 n n n n n  11111111  ...
A07_PRELIMIT_UP      : -1200       2000 n 2 n n n n n  00000001  ...
A08_PRELIMIT_DN      : -2000       1200 n 2 n n n n n  10000000  ...
A09_PULSE_UP         : -1200       -900 y 2 n n n n n  01111110  ...
      .
      .
      .
```

Landings

```
29.04.94 ============================================================ 00:07
                        O V E R V I E W  -  L A N D I N G S
=========================================================================

No. of teached in values    : 3
Teached-in direction        : 1
Correction value            : 270990
Travel height               : 4802
Shortest distance           : 2023
Longest distance            : 2778

Landing       Encoder values  normalized      in mm
-------------------------------------------------------------------------
  1           166378 = 437368 <=>              0mm
  2           148786 = 419776 <=>           2023mm
  3           124632 = 395622 <=>           4802mm
```

Copy of switches

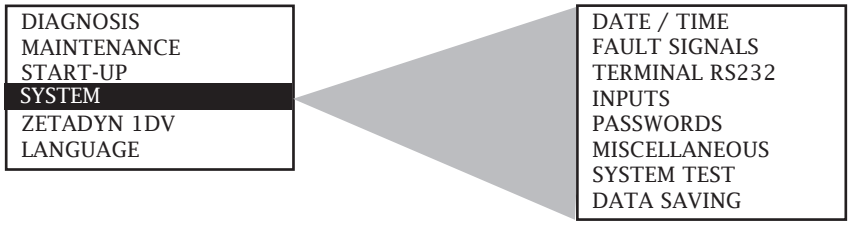
```
29.04.94 ============================================================ 00:39
                        O V E R V I E W  -  S W I T C H  C O P Y
=========================================================================

Starting controller     :    on

Pos.   Enc. value          in mm
-------------------------------------------------------------------------
  1    433566 =             0 mm
  2    432093 =           169 mm
  3    430402 =           364 mm
  ...
```

Events

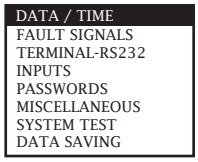
```
29.04.94 ============================================================ 06:36
                              F I E L D  O F  E V E N T S
=========================================================================

Number of positions         : 48
max. encoder value          : 395188
min. encoder value          : 437802
max. encoder diff../ZE      : 34
max. encoder diff.at. Vmax  :  7648
min. encoder diff.at Vmin   : 191
min. encoder diff. time     : 30

                                                 00000000 01111111 11122222222222333
Pos    Ld      Encoder values                    12345678 90123456 78901234 56789012
-------------------------------------------------------------------------------------
  1    1       604915 = -300 mm      00000000 00100000 00000000 00000000
  2    1       604914 = -300 mm      00001000 00100000 00000000 00000000
  3    1       602142 =  -20 mm      00000000 00100000 00000000 00000000
  4    1       587322 =  +20 mm      00001000 00100000 00000000 00000000
  ...
```

SYSTEM

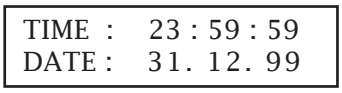
Overview menu „SYSTEM“



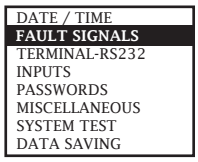
Date/Time



By pressing [CR] you can change into the editing mode. Then, the new time and date can be set numeral by numeral.



Mal function signals (fault signal treatment)



If during operation a fault has been identified, a code will be set. The further treatment can be set for each fault individually.

Fault signal types

01. Restarting

This message will be issued after the system has been started. It serves for identification of power failures resp. of (Watchdog)-System-Reset.

02. Encoder fault

This message is issued in case of application of SSI encoders, when the path difference corresponds to a speed higher than 4 m/s. The path difference is checked once in a millisecond. In the case that the path difference is too long, the old value will be set. The replacement of the new value by the old one occurs maximum 200 times (about 200 msec), then the error code will be set.

03. Encoder time out

This message is issued when a Laser is used. Subject of checking is the time difference to the arrival of the last valid value via the serial interface. If at the Laser the value of 150 msec is exceeded, the message will be set. Checking interval is 100 msec.

04. Value range

The message is issued if the current encoder value is beyond the range of valid values. For the comparison the maximum valid encoder value (top landing + value range excess) and minimum valid encoder value (bottom landing - value range excess) is pre-calculated. Checking interval is 1msec.

05. Vmax reached

The message is issued when the difference of the current encoder value to the last encoder value (about 1 sec before) is higher than the set rated speed **Vn** plus 10%. Checking interval is about 1 second.

06. Slow travel
The message is issued if the difference of the current encoder value to the last encoder value (about 1 sec before) between 0,02 m/s and 0,3 m/s is more than 30 seconds. Checking interval is about 1sec.

07. Motion check
The message is issued if a travel signal is set via input E5, however the encoder value does not change. The quoted delay (standard 7 sec.) will be considered. Checking interval is about 1sec.

08. External
The message is issued if a signal is set at input E7. Checking interval for this input is about 1sec.

Pre-setting of the mal function signal treatment

The pre-set fault treatment should be modified only in exceptional cases.

St:	01	02	03	04	05	06	07	08
Setting mal function message (normal op.)	no	yes	yes	yes	yes	no	yes	no
mal function message reset (normal op.)	0	2	2	0	2	0	0	0
mal function message (inspection op.)	no	yes	yes	no	yes	no	no	no
mal function message reset (insp. op.)	0	2	2	0	2	0	0	0
memorise in EEprom	yes	yes	yes	yes	yes	yes	yes	yes
switch off outputs	no	yes	yes	no	yes	no	no	no
indication on display	no	yes	yes	yes	yes	yes	yes	yes
send via RS232 to control station	no	no	no	no	no	no	no	no

Adjustment of the fault signal treatment

Mal function signal during normal operation
When the fault occurs in normal operation (inspection input not activated) - shall the fault message be set?

Mal function signal reset during normal operation
Indicates - in normal operation (inspection input not activated) - the delay of the automatic mal function signal reset in seconds. If „set mal function signal“ is not activated, the quoting of the delay will be ignored. If the delay value is zero, the mal function signal is not getting cancelled automatically. In this case the mal function signal can be cancelled only by quitting the fault memory or by restarting the system.

Mal function signal during inspection operation
Shall mal function signal be set if fault occurs during inspection operation (with inspection input set)?

Mal function signal reset during inspection operation
Indicates - for the inspection operation (with inspection input set) - the delay of the automatic mal function signal reset in seconds. Otherwise like delay during normal operation.

Memorising
Shall the fault be memorised ?

Switching off outputs
Shall all outputs be switched off when a fault occurs? Applies only as long as the mal function signal is set. Alternatively, all outputs could be switched on as well (Menu level ,,STARTUP/ TRAVEL, CONTROL/ OUTPUTS on: y“).

Indication
Flashing fault indication on the display ?

Inputs

DATE / TIME
FAULT SIGNALS
TERMINAL-RS232
INPUTS
PASSWORDS
MISCELLANEOUS
SYSTEM TEST
DATA SAVING

Defines whether the input is designed as a normally open contact (yes) or a normally closed contact (no). If it is designed as a normally open contact the incoming signal will be inverted. The following settings are normalised.

Input	Function	Pre-setting	Remarks
E01	Switching off E01	Yes	provided with 2nd gate with Zetadyn-direct levelling
E02	Switching off E02	Yes	as E01
E03	Switching off	No	provided for Zetadyn-direct levelling
E04	Inspection	No	for mal function treatment
E05	Travel control	Yes	unlimited in all menus
E06	Switch copy	Yes	provided for copy of the 1st zone switch
E07	External signal	Yes	

Passwords

DATE / TIME
FAULT SIGNALS
TERMINAL-RS232
INPUTS
PASSWORDS
MISCELLANEOUS
SYSTEM TEST
DATA SAVING

For each one of the three access levels its own password can be arranged. The following passwords are normalised:

Level	Password	
0	others	no access
1	0010	mal function signals, setting the clock, etc. (janitor)
2	0020	menu MAINTENANCE unlimited access, all further settings reading only
3	0030	unlimited access in all menus

Miscellaneous

Display mode

DATE / TIME
FAULT SIGNALS
TERMINAL-RS232
INPUTS
PASSWORDS
MISCELLANEOUS
SYSTEM TEST
DATA SAVING

Sets the kind of presentation on the display when the display indicates the status.

Mode 0:

```
No I Ft I LD   256996
00 I 00 I 01     0mm
```

Rough encoder value,
No. of faults in the memory, last fault, next landing, distance to next landing

Mode 1:

```
No I Ft I   01 . 01 . 93
00 I 00 I   12 : 30 : 58
```

Current date
No. of faults in the memory, last fault, current time

Mode 2:

```
No I Ft I      256996
00 I 00 I   12 : 30 : 58
```

Rough encoder value,
No. of faults in the memory, last fault, current time

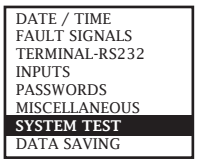
Delay of direction

Setting of the delay time in milliseconds for the deactivating of those outputs where the indications ‚only upward‘ resp. ‚only downward‘ are set to ,,yes“.

E1/ E2-delay
Setting in milliseconds of the delay time for the re-activation of outputs which have been de-activated via E1 resp. E2.

Weber Mode
That special mode changes the operation method of the E1/ E2-activation. The outputs with E1 resp. E2-activation will be getting active only, if additionally the input E6 is set. That means, an AND relation of E1 and E6 resp. E2 and E6.

System test
For the functional test of individual system components various functions are available. The copying system will be de-activated prior to the initiation and afterwards is not re-activated again. Settings in the EEprom will not be changed as long as they, are not automatically memorised by quitting the main menu. By switching the mains voltage OFF and ON (or simply by de-plugging and re-plugging of K1), the copying process can be re-started with the settings from the EEprom.



Testing of the inputs
The activated inputs are indicated in the display and will be copied 1:1 to the outputs. Press [ESC] to quit.

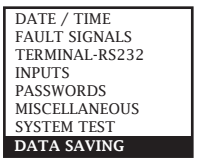
Testing of the outputs
By [↑] resp. [↓] all outputs can be switched ON or OFF. Press [ESC] to quit.

Moving light:
A moving light function sets outputs A1 to A16 in succession until any key will be pressed.

Full test 1
A complete system for encoder type 20 will be generated so that upon movement of the encoder over a distance of one meter all outouts are set one-by-one.

Resetting of the system
This function is rarely used and should - generally - not be applied. Set the device back to its manufacturer-defined basic settings. Hereby, all data in the memory and in the EEprom will be cancelled (refers also to the passwords!).

Saving of data in the EEprom
Saves all settings in the EEprom. No plausibility test of the data will be performed.



MISCELLANEOUS

FWS/3000: Important advices for the installation

Controller unit

- The control cabinet is conductive and well grounded
- The mounting plate is zinc galvanised, unpainted and also well grounded.
- The top-hat rails are zinc galvanised and well conductive, and with the mounting plate flatly connected.
- Use cross-sections as large as possible for all ground conductors. Copper braiding is also an ideal means.
- See to it, that control cables and power cables are laid separately from each other.
- When positioning the control unit mind for the maximum possible distance from frequency inverters and similar interfering components.
- Base plate flatly grounded via top-hat rails and mounting plate
- Modifications in or on the device are not allowed. For purpose like that apply to the manufacturer.
- The printer interface serves only for diagnostic purposes and may be used only **for a short period**.

Encoder

- Install the encoder in such a way, that the encoder housing is conductivity connected to the ground potential.
- Connect the encoder cable directly to the control unit. By no means perform the connection via series terminals.
- Do not modify the length of the encoder cable. For cable extensions use only the cable that is provided for that purpose. Do not coil up the excess length of the encoder cable, however loop it as wide as possible.
- See to it, that the unshielded ends of the wires are not longer than 5 cm.
- Do not twist the shielding tightly together, however connect the braiding wide-spread to the terminal provided for that purpose. By no means extend the length of the shield. Alternatively, the shielded cable can be clamped to the mounting plate by means of a cable clip, so that at this place the shielding is conductivity connected to ground.

When a mains filter is used

- Place the filter as close as possible to the control unit and keep the conductor between filter and controller as short as possible.
- Fasten the filter flatly conductive on the mounting plate.
- Care for a good connection to the ground potential.
- Twist the cable between filter and controller.

Copying travel for copy of switch

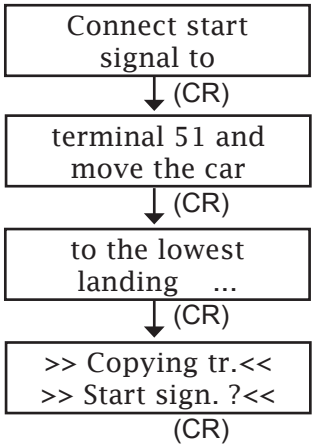
A copying-run is required for outputs that are programmed with mode 8. For that reason, check in the diagram whether the second zone switch has been set by the FWS. The copying-run is possible only, if prior to it the teaching travel for landings has been completed.

Preparations

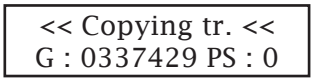
- For the start signal connect the teach-key to input EA1 (terminal 51 or car terminal block), as with normal teaching travel.
- Connect the existing switch (e.g. 1st zone switch) that shall be copied
  a) in case of 230V≈ to EP1 (terminals 41 and 42) or
  b) in case of 24V= potential free to E6 (terminal 61) and - (terminal 55).
  If the control potential is 24V= and equal to the potential at terminal 55, the contact can remain permanently closed (e.g. Strack-control).
- Zone 1 and 2 possibly are to be shunted for the copying-run.

Start the copying of switches

Select menu point ,,Copying travel“ with CR. Some lines of information follow. Confirm with CR till the following indication of the copying-run appears. Before the copying-run starts, all previous settings are automatically saved in the EEprom.



Move the car to lowest starting position and set the starting signal via input EA1 (terminal 51). After that the following indication appears:



Hereby is *G* the value that is set by the absolute encoder, and *PS* is the number of the learnt switch positions.
Move the car slowly **from bottom to top**. The copying-run is completed by pressing any key. For control, finally the number of the learnt switch positions is displayed. The switch-on and switch-off points are each counted as an operating point.

Near landing (2nd gate)

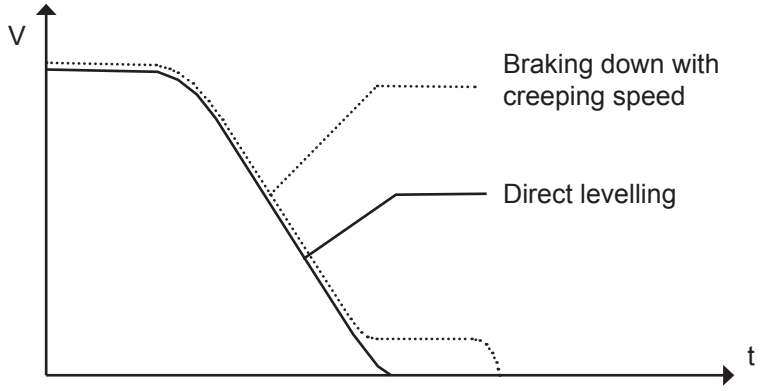
Landings that are to be levelled with an intermediate speed are designated as „near landing“. Lifts with a rated speed of more than 1,6 m/s - in case of a travel between two adjacent landings - must operate with intermediate speed. Therefore, in this case all landings, including the extreme landings, are to be defined as near landings. For activation of the brake in each landing a particular braking pulse is required. We define these as „2nd pulse up“ for the upward travel, and as „2nd pulse down“ for the downward travel or, if only one pulse switch is provided for both directions, as „pulse for intermediate speed“. In the attached diagram types, the near pulses are also designated as „2nd gate“. Which FWS-settings are required you may take from the description of the automatic diagram type or from the pulse diagram of the lift control.
Before setting into first operation whether the FWS outputs for near landing have been considered in the wiring and if the lift control has been adjusted for that, accordingly.

Short landing

As short landings we define landings with a distance of only few cm up to about 1,5 m. Normally they result from cars with more than one access. In this case the pre-set braking distances for the landing distances documented in the pulse diagram are to be observed strictly. By means of the clear menu of the FWS/3000 the required settings can be executed quickly.

Direct levelling

Direct levelling is the terminus, when the car‘s braking down from high speed to standstill is performed continuously without creeping speed.



Direct levelling with path-dependent voltage controller and frequency inverters (frequency control)

The FWS transfers all switching pulses with millimetre-precision via the absolute encoder and its non-slip connection with the lift car.

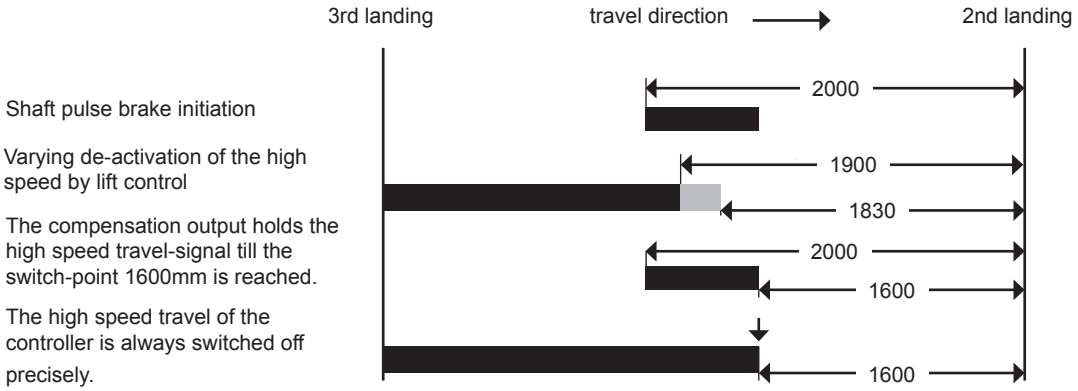
The extremely short response-time differences (less than 1 ms) of the FWS-processor enable millimetre-precise switch-off points, even at higher travelling speed. In comparison, lift controls normally have response-time differences of 20 ms to 100 ms. For travelling speed 1 m/s inaccuracies of 2 cm to 10 cm are resulting therefrom, which are to be compensated.

Owing to the difference in the response time of the lift control, direct levelling is not possible without additional provisions. In order to enable an optimal direct levelling with absolute encoders, there are **three** methods that can be employed alone or in combination, depending on the manufacture of the controller.

It is to be clarified in advance whether the intended controller fulfils the following criteria:
=> the controller works path-dependent (not time-dependent)
=> the controller works load-independent
=> the controller is suitable for direct levelling

1. Compensation of the high speed switch-off points

In order to compensate for the different response time of the lift control, particularly on switching off the high speed, the FWS compensation outputs can be applied.



Operational sequence

As an example we use the electrical diagram of an automatic diagram type (see annex) with direct levelling. It can be seen that the controller input v3 (high speed) is directly controlled by the FWS compensation outputs, in parallel to the normal lift control. If these outputs are pre-selected by an automatic diagram type they are laying in the sequence diagram exactly parallel to the normal pulse outputs for the lift control.

Example:

=> Lift runs downward from 3rd landing with travelling speed 1 m/s

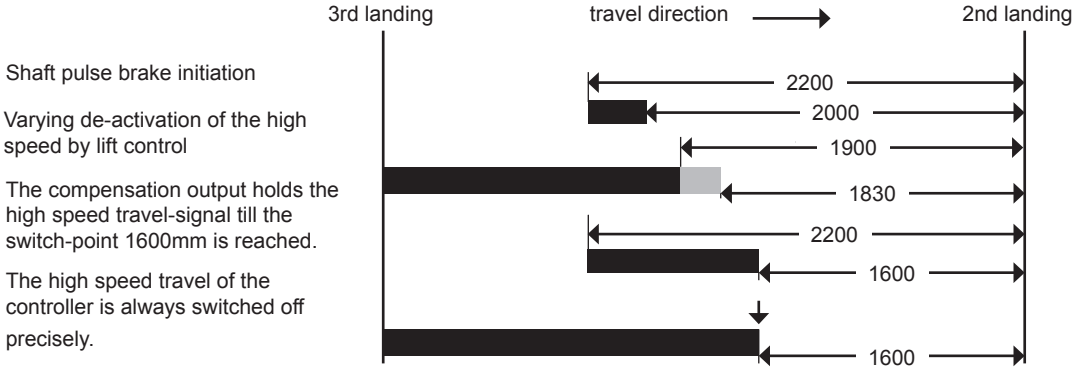
=> Call from 2nd landing is set

=> Pulse for switching the high speed begins at (start-point) 2000mm before the 2nd landing

=> As the processor of the lift control executes many processing steps while the lift is running, the high speed travel is always switched off differently, e.g.with: 100ms normal response time + 0ms response difference time = 1900mm, or with 100ms normal response time + 70ms response difference time = 1830mm.

=> FWS compensation output with start-point 2000mm and end-point 1600mm holds the signal voltage for the high speed till the end-point 1600mm is reached, and switches always off precisely.

Operational sequence for *wecon*-Webersteuerun gen and KEB-*F4*



As an example we use the electrical diagram of the Weber automatic diagram type 15 (see annex) with direct levelling. The KEB-F4 signal inputs X3.2, X3.3 and X3.4 are set binary !

Fast speed Vn: X3.2=1, X3.3=1, X3.4

levelling speed Vn: X3.2=0, X3.3=1, X3.4

You see that the signalautputs of the wecon-controller set the KEB-F4 inputs X3.2, X3.3 and also parallel the FWS inputs E1, E6. Through this lens the KEB-F4 input X3.4 is not necessery (X3.4=0). The FWS compensation outputs A10, A11 are activated by the FWS inputs E1 and E6. If input E1 and also E6 are 1, then the outputs A10, A11 send at the right time a parallel control-signal to the KEB-F4 input C3.2.

Example: FWS with wecon-Webersteuerung and KEB-F4
=> Lift runs downward from 3rd landing with travelling speed 1 m/s
=> Call from 2nd landing is set
=> Pulse for switching the high speed begins at (start-point) 2200mm before the 2nd landing
=> As the processor of the lift control executes many processing steps while the lift is running, the high speed travel is always switched off differently, e.g.with: 100ms normal response time + 0ms response difference time = 1900mm, or with 100ms normal response time + 70ms response difference time = 1830mm.
=> FWS compensation output with start-point 2200mm and end-point 1600mm holds the signal voltage for the high speed till the end-point 1600mm is reached, and switches always off precisely.

Note:
No optimal direct levelling is reached for short travels. This is also, if the KEB levelling optimation (parameter LF.71) is not set to 0.0cm. The direct levelling is planned for fast travel speed. You find more information about the direct levelling in the Weber operating instruction.

2. Test input „Controller Stop“

Some of the digital voltage converters and frequency inverters have an input at which - during the travel, shortly before reaching a stop - the actual position of the car is checked once again. We designate this input as „Controller Stop“ and use for that the FWS output 416. In the FWS this output is preset as a normally open contact, 200 mm below and above the landing. The output can be adjusted to the respective controller as required (e.g. normally closed contact instead of normally open contact). According to the information that we have got, the following controllers have this test input:
=> ascentronic avc, acd, vfc
=> RST Elektronic FRC-Q (available from 01.10.97)
=> DIETZ electronic VECTORDRIVE DSV 5444 LIFT

For sequence and the exact integration of the input see the operation instructions of the respective controller manufacturer.

3. Pulse outputs A,B (e.g. Zetadyn 1DV)
Provided that the controller has been laid out adequately, incremental signals coming from the absolute encoder can be used. These signals provide the actual position of the car, slip-free.

Example:
=> by means of the compensation the high speed has been switched off at 1600mm before the landing
=> the controller counts via an interface the incremental signals of the non-slip absolute encoder from the moment of switching off the high speed and, therefore, always terminates the travel directly and precisely to the millimetre.

The most frequent problems

Lift does not run

Symptom: Upon lift installation lift does not run under inspection control.
poss. cause: FWS not ready for operation as setting into first operation has not yet been executed.
Solution: Mal function signal to be shunted. Terminal 44 and 45 at FWS, probably pre-limit switch till setting into first operation.

Symptom: Lift does not run for teaching.
poss. cause: Pre-limit switches laid out as normally closed contact (for example Böhnke bp302).
Solution: Shunt-out the pre-limit switches till after completion of teaching travel.

Symptom: Lift does not exit from or enter into the zone.
poss. cause: Copying travel for the 2nd zone switch is not yet executed.
Solution: Shunt zones 1 and 2 out, execute copying-run and remove the shunts afterwards.

Symptom: Strack-control does not run into extreme landings during inspection operation.
poss. cause: Landing information signal for the extreme landings is set. Control does not operate.
Solution: Remove at the Strack-control the plug for the landing information signal.

Encoder value is always (-2)

Symptom: Only (-2) is displayed for the current encoder value.
poss. cause: No functioning system could be generated (e.g. no landing teached-in or no outputs set)
Solution: Setting into first operation.

Encoder value is (- 4) or (- 8)

Symptom: Values smaller than zero are displayed for the current encoder value.
poss. cause: Connection to encoder interrupted, encoder is signalling a fault.
Solution: Check connection cable to encoder, eventually exchange the encoder.

Braking distances not correct

Symptom: Braking distances are too short or too long and the displayed millimetres do not correspond to the current values.
poss. cause: Wrong type of encoder set.
Solution: Check in menu „STARTUP/ ENCODER/ ENCODER TYPE: ??“. Hereby, the diameter of pulleys for the tooth belt is to be observed.

Teaching travel not possible

Symptom: No external voltage for the teaching travel is available.
Solution: A voltage of 5VDC is provided for teaching-run at terminals 11 and 12, if from the lift control no adequate voltage can be provided. The voltage may be used only for the purpose of teaching-run. During normal operation the terminals 11 and 12 must remain free, in order to prevent interference to the internal voltage of the control unit.

Symptom: LED not lit although a signal is set.
poss. cause: As long as the screw terminals are loose, the functioning of the contact is not secured.
Solution: Tighten screws at terminals 51-54.

Symptom: Landing is not accepted, although the LED at the input EA1 is lit.
poss. cause: Voltage at terminals 53 and 54 is not sufficiently smoothed
Solution: Smooth the voltage by means of a capacitor.

Fault upon teaching travel

Symptom: The landing distance indicated after the teaching-run is only half as long.
poss. cause: Signals from the absolute encoder are twisted.
Solution: Exchange the yellow and the beige wires at terminals 35 and 36.

poss. cause: Wrong type of encoder set resp. wrong setting of the pulses per meter.
Solution: Correct the type of encoder and the pulses per meter in the menu „STARTUP/ ENCODER“.

Travelling control is activated

Symptom: On the display appears the fault message „travelling control“ and the fault signal is set.
poss. cause: At terminal 60, input E5, a travelling signal is activated without encoder value modification being executed.
Solution: Fault in the lift control, torn tooth belt, tooth belt unseated, hydraulic system wrong adjusted or car overloaded. The travelling control should be activated preferably with higher speeds.

Encoder fault

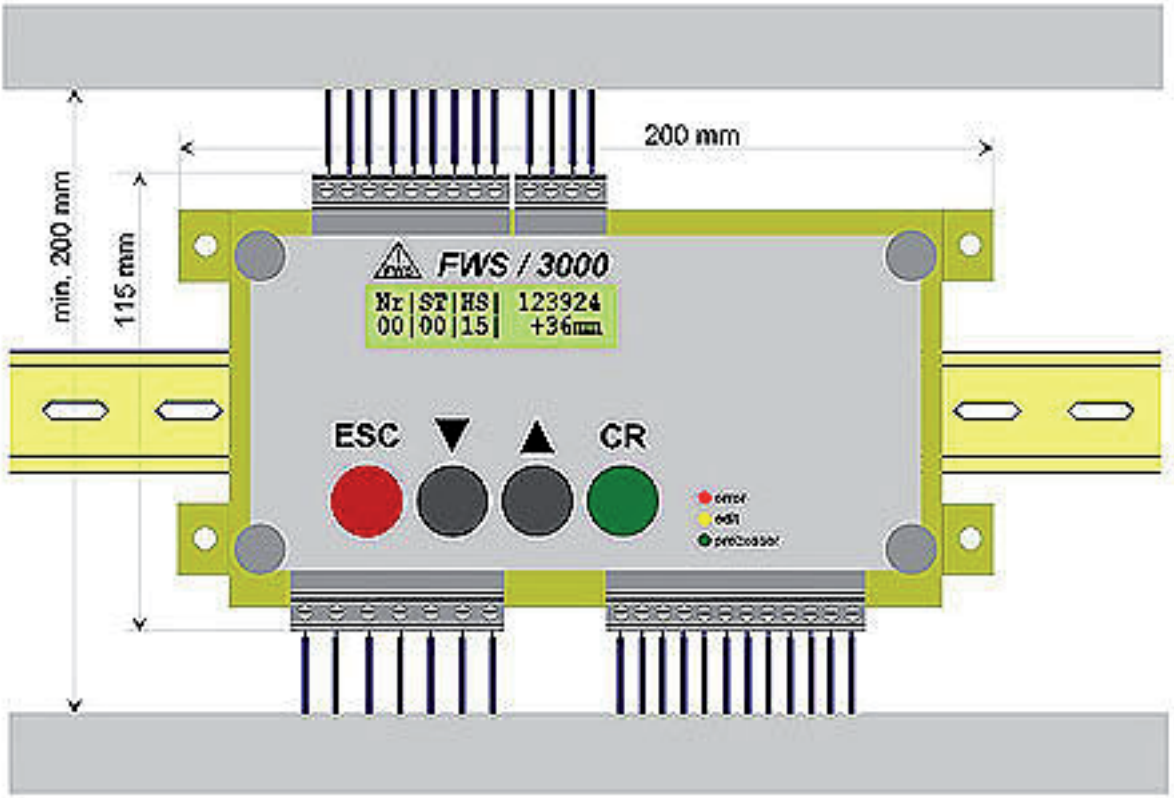
Symptom: Frequent activation of the fault message „encoder fault“
poss. cause: Shielding of encoder cable not effective
Solution: 1) Check the connection of the screening at terminal 39.
2) Check the connection of the grounding resp. PE at terminal 15.
3) Use only the original FWS cable for cable extensions.
4) Terminals 11+12 not disconnected after completion of teaching-run.
Should none of these proceedings help, please apply to us.

EEprom-fault

Symptom: On display appears ,,EEprom fault cancel ? CR=yes“.
poss. cause: Upon start of the system, the contents of the EEproms is checked for validity with help of a check-sum. If the contents is not valid the system is stopped and an examination is required. If settings have never been memorised before by the FWS in the EEprom, the message is to be understood as a demand for cancelling.
Solution 1: a) The EEprom will be cancelled by pressing the CR key (refer to System reset) and after that another setting into operation is required.
b) By pressing the keys [ESC], [↑] and [↓] tne cancelling of the EEprom gets by passed, but the fault-free function cannot be guaranteed as it is not known which place in the memory location has been changed. A recheck of **all** settings and a complete functional test is imperative in this case.

Technical data

Dimensions
Length 200mm, width 115mm, depth 115mm to 180mm (depending on the configuration and the number of required relay cards). For better wiring and handling of the plug-in connections a distance against the cable duct of at least 40 mm should be considered.



Voltage supply
Integrated power supply: 100-240V4C, 0,16-0,6A

External voltage
A voltage of 5VDC is available for the teaching travel at terminals 11 and 12, if a suitable voltage is not available from the control.
The voltage may only be used for the purpose of teaching travel. During normal operation the terminals 11 and 12 must remain free in order to avoid parasitic in the internal voltage of the control unit.

Outputs
In the standard version 1 potential-free relay normally open contact and 16 transistor outputs are available. If required, all outputs can be switched off via the inputs E1, E2 and E5.

Transistor outputs
The transistor outputs are divided into 4 groups. To each group another potential can be assigned. The maximum load on the outputs is 250 mA per output. The maximum voltage is 50V.

Relay outputs and mal functions signal output
The relay outputs are laid out as potential free normally open contacts for 230V~. The maximum ohmic switching capacity of the relays is 200VA.

Inputs/outputs for the teach-key
The voltage range is around 5-30V d.c. (residual ripple max. 5%). The current input is typ. 10mA. Maximum current output 250 mA.

Inputs
In total 9 potential-free inputs with one common potential. The voltage range is around 18-28V d.c. (residual ripple max. 5%). The current input at 24V is typ.20 mA per input.

Printer interface
Parallel 8-bit printer port in industrial standard.

Index

ANNEX
Menu-tree

```
No  I Ft I Ld     23102
01  I 01 I 05    -56mm
```

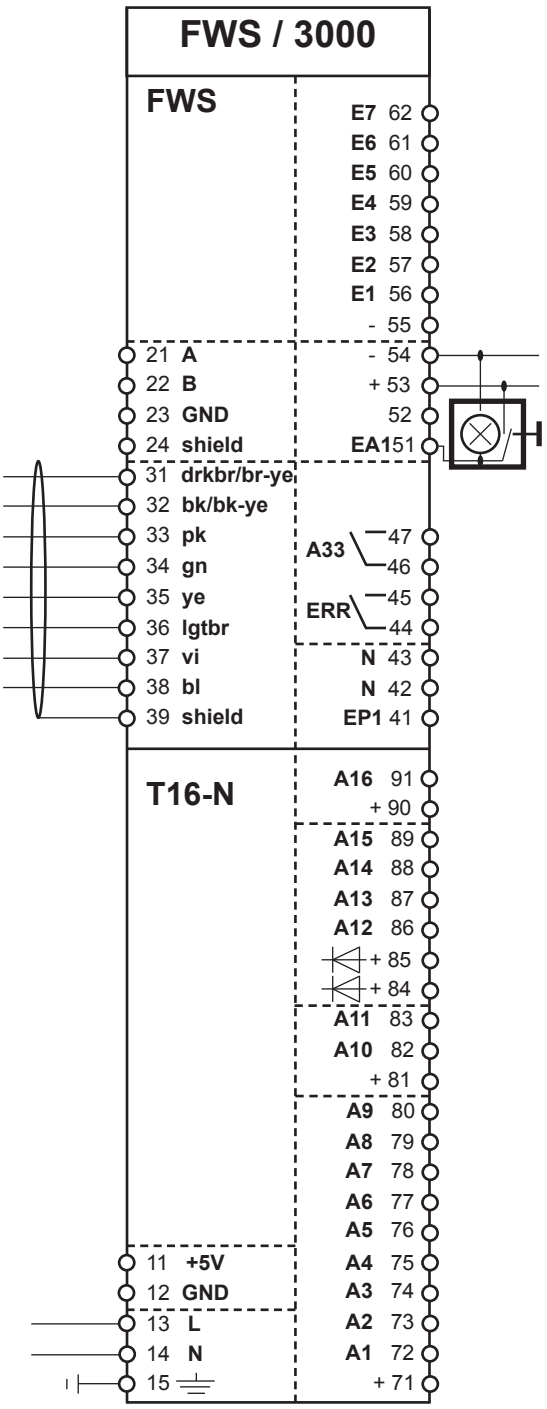
```
PASSWORD - + -- DIAGNOSIS - + -- STACK-MEMORY - + -- 01_FAULT-TEXT  - +-- Date :  31.12.99
                           |                   |                      +-- Time:  23:59:59
                           |                   |                      +-- Ld    :  2
                           |                   |                      +-- LdD  :  +0mm
                           |                   |                      +--  Pos. :  0
                           |                   +-- 02_*****...
                           |                   +-- ...
                           |
                           +-- COUNTER-MEMORY
                           +-- MONITOR
                           +-- STATISTICS
                           +-- INFO-DISPLAY    - +-- Lifthgh :     0mm
                           |                     +-- minDist :     0mm
                           |                     +-- maxDist:      0mm
                           |                     +-- Ld.Nbr   :    0mm
                           |                     +--  [mm] 01-02:0
                           |                     +--  [mm] 02-03:0
                           |
                           +-- INFO-PRINTER    - +-- Stack-Memory
                           |                     +-- Events-Field
                           |                     +--  Outputs
                           |                     +-- Landings
                           |                     +-- Switchcopy
                           |                     +-- All Data
                           |
                           +-- INFO-Terminal   - +-- Stack-Memory
                                                 +-- Events-Field
                                                 +--  Outputs
                                                 +-- Landings
                                                 +-- Switchcopy
                                                 +-- All Data

           +-- Maint.      - +-- BRAKEDIST UP  (a)
                             +-- BRAKEDIST DN (b)
                             +--  BRAKEDIST UP (c)
                             +-- BRAKEDIST DN (d)
                             +-- OUTPUTS       - +-- A01_OUTPUT  -+-- Startpoint: +0000
                             |                   |                -+-- Endpoint : +0000
                             |                   |
                             |                 - +-- A02_OUTPUT  -+-- ...
                             |                 - +-- A03_...
                             |                 - +-- ...
                             |
                             +-- LVELLG. CORRECT - +-- INDIV. IN MM
                             |                     +-- ALL EQUAL
                             |                     +-- PROP. FROM ABOVE
                             |                     +-- PROP. FROM BELOW
                             |                     +-- INDIV. ABSOLUTE
                             +-- ENCODER CHANGE

           +-- STARTUP ------- +-- ABSOL.ENCODER -------- +-- Encodertype: 00
                                                          +-- Pulse/m      : 08940
                               - +-- A1-A33 AUTOMAT
                                 +-- A1-A33 MANUAL -------- +-- A01_OUTPUT ------------ +-- Startpoint : +0000
                                 |                          |                          +-- Endpoint  : +0000
                                 |                          |                          +-- Make-cont ? : y
                                 |                          |                          +-- Switching mode: 2
                                 |                          |                          +-- L01-08 : 00000000
                                 |                          |                          +-- L09-16 : 00000000
                                 |                          |                          +-- L17-24 : 00000000
                                 |                          |                          +-- L25-32 : 00000000
                                 |                          |                          +-- Switching off : n
                                 |                          |                          +-- only upwards : n
                                 |                          |                          +-- only dnwards : n
                                 |                          |                          +-- active at E1 : n
                                 |                          |                          +-- active at E2 : n
                                 |                          |                          +-- Text : OUTPUT
```

```
                                    +-- A02_OUTPUT  -+-- ...
                                    +-- A03_...
                                    +-- ...

                    +-- TRAVELCONTROL  - +-- Vn [mm/s]       : 0800
                                        +-- Valuerange       : 1000
                                        +-- TRAVELCONTR : n
                                        +--  DECELERAT      : 07
                                        +--  OUTPUTS to     : n

                    +-- TEACHINGTRVL
                    +-- COPYINGTRVL

+-- SYSTEM  -+-- DATE / TIME
             +-- FAULTSIGNAL  -+-- M1_RESTART    - +-- NormFltSig. :  y
                               |                   +-- NormFltDel : 00
                               |                   +-- InspFltSig.  :  y
                               |                   +-- InspFltDel   : 02
                               |                   +-- Display      :  y
                               |                   +-- Memorize     :  y
                               |                   +-- Outp. discon: n
                               |                   +-- RS232-Send  :  n
                               |
                               +-- M2_ENCFLT  -+-- ...
                               +-- M3_ ...
                               +-- ...

             +-- TERMINAL-RS232   - +-- Mode  :  00
                                    +-- Init    : ATZ
                                    +-- Exit    : +++
                                    +-- ID-Text :  FWS/ 3000
                                    +-- ID-Nummer  :  0

             +-- PASSWORDS     - +-- LEVEL 1:  0010
                                 +-- LEVEL 2:  0020
                                 +-- LEVEL 3:  0030


             +-- INPUTS      - +-- E1_Make? : y
                               +-- E2_Make? : y
                               +-- E3_Make? : n
                               +-- E4_Make? : n
                               +-- E5_Make? : y
                               +-- E6_Make? : y
                               +-- E7_Make? : y

             +-- MISCELLANEOUS    - +-- Disp.Mode   :
                                    +-- DirDelay     :
                                    +-- E1/E2 Del    :
                                    +-- Weber-Mode :

             +-- SYSTEM TEST    - +-- INPUTS
                                  +-- OUTPUTS
                                  +-- TRAVELLG LIGHT
                                  +-- FULLTEST (1)
                                  +-- FULLTEST (2)
                                  +-- !RESET!

             +-- DATA SAVING


+-- LANGUAGE
```

FWS/ 3000-T16 (16 Transistor outputs)

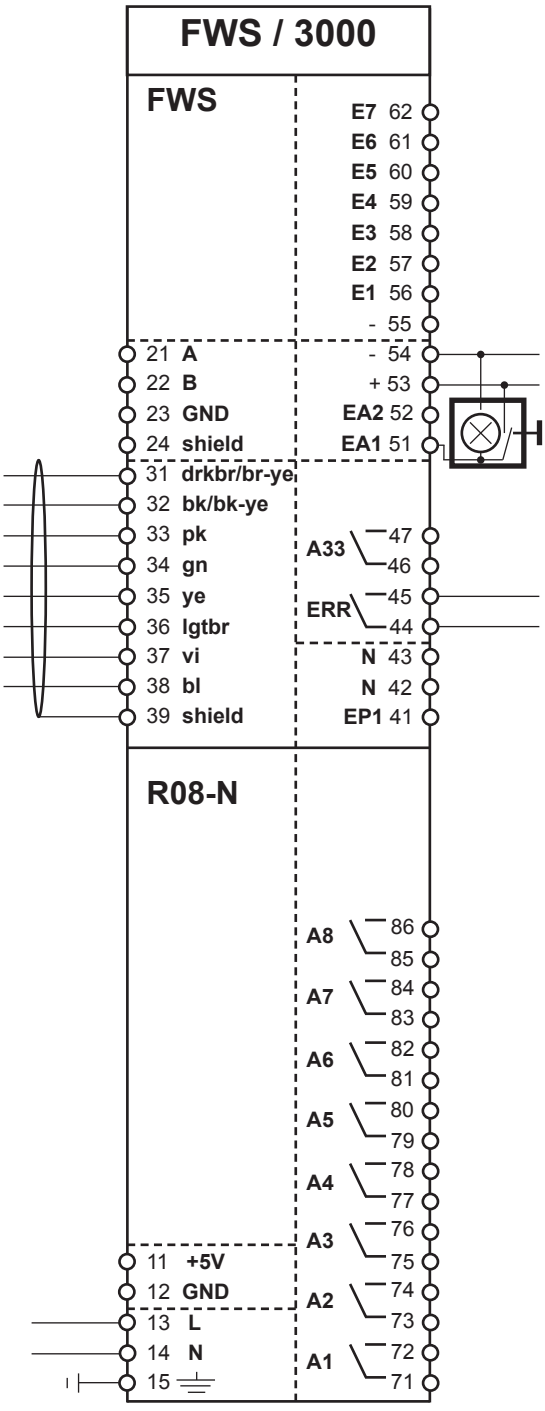
T.	Sort	Connection
		Optional pick-off for teaching travel
11	+5V	
12	GND	
		Voltage supply
13	L	Phase
14	N	Neutral
15	PE	PE conductor
		ZETADYN 1DV inverter
21	A	A
22	B	B
23	GND	
24		Cable shielding
		SSI absolute encoder
31	VCC	dark brown / brown-yellow
32	GND	black / black-yellow
33	pk	pink
34	gn	green
35	ye	yellow
36	lgtbr	light brown
37	vi	violet
38	bl	blue
39		Cable shielding
		230V ≈ input
41	EP1	(Zone-)switch possible to be copied
42-43	N	Neutral
		Relay make-contact (up to 230V)
44-45	ERR	Mal func. Sig.(open under fault condition)
46-47	A33	
		Teach-key
51	EA1	Teach-key for teaching travel
53	(+)	external voltage for teach-key
54	(-)	external voltage for teach-key
		Inputs
55	(-)	Voltage for inputs
56	E1	Switch-off E1
57	E2	Switch-off E2
58	E3	Switch-off normal
59	E4	Inspection/ emergency electrical operat.
60	E5	Travel control
61	E6	(Zone-)switch possible to be copied
62	E7	External
		Transistor outputs
71	(+)	External voltage for A1-A9
72	A1	
73	A2	
74	A3	
75	A4	
76	A5	
77	A6	
78	A7	
79	A8	
80	A9	
81	(+)	External voltage for A10-A11
82	A10	
83	A11	

T.	Sort	Connection
		Transistor outputs
84	(+)	external voltage for A12-A15
85	(+)	external voltage for A12-A15
86	A12	
87	A13	
88	A14	
89	A15	
90	(+)	external voltage for A16
91	A16	



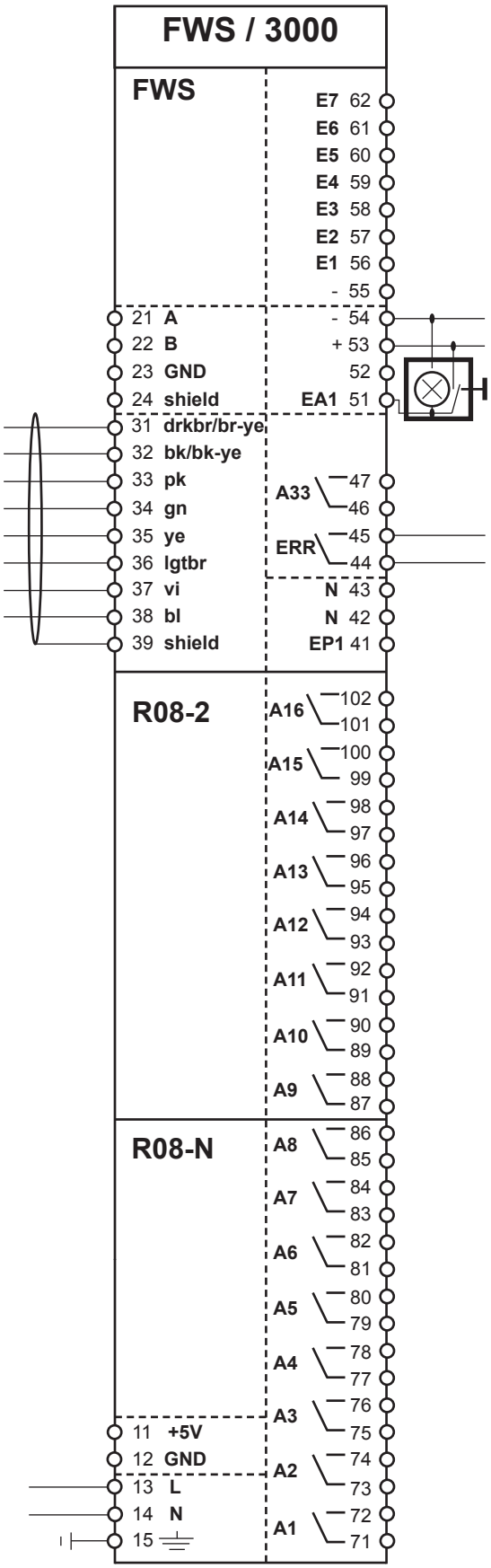
FWS/ 3000-R8 (8 Relay outputs)

T.	Sort	Connection
		Optional pick-off for teaching travel
11	+5V	
12	GND	
		Voltage supply
13	L	Phase
14	N	Neutral
15	PE	PE conductor
		ZETADYN 1DV inverter
21	A	A
22	B	B
23	GND	Controller
24		Cable shielding
		SSI absolute encoder
31	VCC	dark brown / brown-yellow
32	GND	black / black-yellow
33	pk	pink
34	gn	green
35	ye	yellow
36	lgtbr	light brown
37	vi	violet
38	bl	blue
39		Cable shielding
		230V≈Input
41	EP1	(Zone-)switch to be copied
42-43	N	Neutral
		Relay make-contact (up to 230V)
44-45	ERR	Mal func. Sig.(open under fault condition)
46-47	A33	
		Teach-key
51	EA1	Teach-key for teaching travel
53	(+)	external voltage for teach-key
54	(-)	external voltage for teach-key
		Inputs
55	(-)	External voltage for inputs
56	E1	Switch-off E1
57	E2	Switch-off E2
58	E3	Switch-off normal
59	E4	Inspection/ emergency electrical operat.
60	E5	Travel control
61	E6	(Zone-)switch to be copied
62	E7	External
		Relay make-contact
71/72	A1	
73/74	A2	
75/76	A3	
77/78	A4	
79/80	A5	
81/82	A6	
83/84	A7	
85/86	A8	



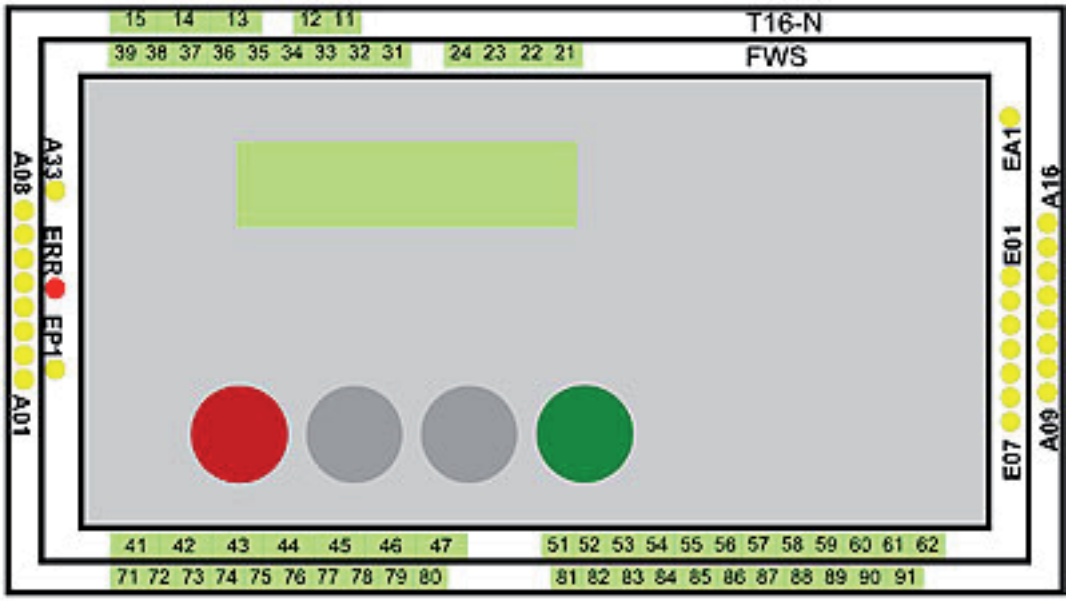
FWS/ 3000-R16 (16 Relay outputs)

T.	Sort	Connection
		Optional pick-off for teaching travel
11	+5V	
12	GND	
		Voltage supply
13	L	Phase
14	N	Neutral
15	PE	PE conductor
		ZETADYN 1DV controller
21	A	A
22	B	B
23	GND	Controller
24		Cable shielding
		SSI absolute encoder
31	VCC	dark brown / brown-yellow
32	GND	black / black-yellow
33	pk	pink
34	gn	green
35	ye	yellow
36	lgtbr	light brown
37	vi	violet
38	bl	blue
39		Cable shielding
		230V ≈ input
41	EP1	(Zone-)switch to be copied
42-43	N	Neutral
		Relay make-contact (up to 230V)
44-45	ERR	Mal func. Sig.(open under fault condition)
46-47	A33	
		Teach-key
51	EA1	Teach-key for teaching travel
53	(+)	external voltage for teach-key
54	(-)	external voltage for teach-key
		Inputs
55	(-)	External voltage for inputs
56	E1	Switch-off E1
57	E2	Switch-off E2
58	E3	Switch-off normal
59	E4	Inspection/ emergency electrical operat.
60	E5	Travel control
61	E6	(Zone-)switch to be copied
62	E7	External
		Relay make-contact
71/72	A1	
73/74	A2	
75/76	A3	
77/78	A4	
79/80	A5	
81/82	A6	
83/84	A7	
85/86	A8	
87/88	A9	
89/90	A10	
91/92	A11	
93/94	A12	
95/96	A13	
97/98	A14	
99/100	A15	
101/102	A16	

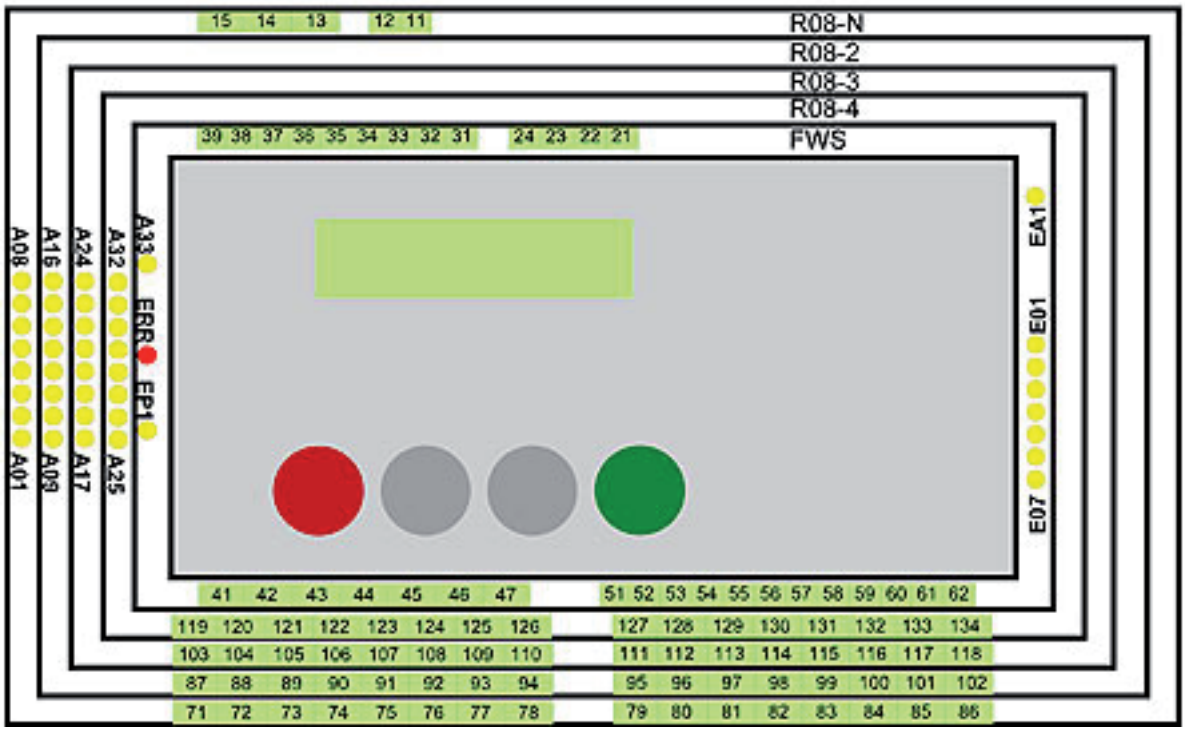


Overview of terminals and LED‘s

FWS/ 3000-T16



FWS/ 3000-R32



Notes

Lift	
Location:	
Person in charge:	

General Data			
FWS-Serial. No.:		No. of landings:	
Encoder type:		Shaft height:	
Automatic type:		Control:	
Direct levelling:		Drive:	
Date:		Controller:	

Programming of the outputs with manual setting

Output	Start-point	End-point	Maker	Mo-de	Landing mask	off	only up	only dwn	off E1	off E2	Info
A1						n	n	n	n	n	
A2						n	n	n	n	n	
A3						n	n	n	n	n	
A4						n	n	n	n	n	
A5						n	n	n	n	n	
A6						n	n	n	n	n	
A7						n	n	n	n	n	
A8						n	n	n	n	n	
A9						n	n	n	n	n	
A10											
A11											
A12											
A13											
A14											
A15											
A16						n	n	n	n	n	
A17						n	n	n	n	n	
A18						n	n	n	n	n	
A19						n	n	n	n	n	
A20						n	n	n	n	n	
A21						n	n	n	n	n	
A22						n	n	n	n	n	
A23						n	n	n	n	n	
A24						n	n	n	n	n	
A25						n	n	n	n	n	
A26						n	n	n	n	n	
A27						n	n	n	n	n	
A28						n	n	n	n	n	
A29						n	n	n	n	n	
A30						n	n	n	n	n	
A31						n	n	n	n	n	
A32						n	n	n	n	n	
A33						n	n	n	n	n	

Miscellaneous