

ELEVATOR CONTROL MODULE

AUTOMATIC PUSH BUTTON MICROZED-AR REF. E-SMOKYR V3.04



USER'S MANUAL

FOR S/W VERSION BR304300 (Decimal / Gray / Binary/ Enhanced code Indicator) (Taxi / Collective Board) 1516

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1. GENERAL DESCRIPTION

1.1 MAIN FEATURES

Platform	Microcontroller
Туре	AC 1 speed – AC 2 speed – Hydraulic ¹ - VVVF
Self diagnostic	Error codes describing common faults related to periphery inputs
On-board display	A 3-Digit numeric display is used for floor, error messages and menu
Push buttons	Three push buttons used to access different parameter and the menu
Error count	Count of fatal errors is displayed
	End of shaft in the up direction
	End of shaft in the down direction
Shaft information	Slow down and final stop in the up direction
	Slow down and final stop in the down direction
	Car position is saved following a power failure ²
	Decimal – Positive common (one output per floor) or
	7-Segment – Positive common
Indicator signal	Gray Code or
	Binary Code or
	Enhanced Code(when using S.&A.S. scrolling display)
	10 stops or
Number of stops	7 stops for Gray or Binary registered calls or
	5 stops for Enhanced or decimal indicator with Collected calls or
_	7 stops for Gray collected calls
Door type	Swinging or automatic door
Door controls	Input for re-open, photocell and door jam switch + input to bypass closing delay
Door status	Parking with door opened or door closed
Floor Stop time	Variable from 0 to 9.9 seconds
Carlight	Automatic switch off after delay - 0 to 9.9 seconds
Inspection mode	For installation and maintenance purposes using slow speed
DTO Local	(bypasses all shaft information)
	Motor PIC input naits lift operation when motor overheats
Universal Outputs	Indicator outputs are suitable for both common positive and common negative
i erminais	All terminals are individually labeled according to function to facilitate identification

1.2 TECHNICAL DATA

Supply voltages	Board supply: 17vac +15% -25% - 120mA Periphery supply: 22vdc +15% -25%
Inputs	Each input has a led to indicate its status – all inputs are optically isolated Input active voltage level is 22vdc
Control outputs	Each output has a led to indicate its status – all outputs are dry relay contacts Rated at 250Vac 10A ¹¹
Call terminals	Each call has a led to indicate its status Call active voltage level is 22 volts (P) For registered calls: Each car call terminal consists of a combined input/output which is optically isolated Car call terminals are capable of driving lamps up to 2 watts operating on 22vdc Each car call terminal is protected by an additional output transistor
Indicator outputs	Each output has a led to indicate its status – all outputs are optically isolated LED On: Output voltage level is 0vdc (GND) LED Off: Output voltage level is 22vdc (P)
Connection	Screw type, plug-in connectors

¹ Selection by DIP switch, refer to section 3.1.

² When power returns, elevator resumes from where it was without the need of a homing trip.

 ³ Selection by DIP switch, refer to section 3.1.
 ⁴ For automatic door only.
 ⁵ Activated by a push button in the car.

⁵ Activated by a push button in the car.
⁶ For automatic door only.
⁷ Selection by presetting parameters in the auxiliary functions menu, refer to section 3.3.
⁸ Selection by presetting parameters in the auxiliary functions menu, refer to section 3.3.
⁹ Selection by presetting parameters in the auxiliary functions menu, refer to section 3.3.
¹⁰ Activated by an external key switch and two push buttons.
¹¹ Care should be taken to add a freewheeling diode in parallel with the coil of each DC contactor or DC relay driven from the board.

2.1 TERMINAL LAYOUT



2.2 INPUT TERMINALS

SDFS_UP	Slow down and final stop in the up direction
SDPF_DN	Slow down and final stop in the down direction
EOS_UP	End of shaft in the up direction
EOS_DN	End of shaft in the down direction
SFTY ON	Should be active when lift is moving
RE_OPN	Re-open for automatic door (when inactive) / door closed for swinging door (when active)
CLSE_NDLY	Bypasses reclosing delay in automatic door
LS_EO	Limit switch end of opening
LS_EC	Limit switch end of closing
INSP_EN	Inspection enable (when input is inactive)
INSP_UP	Inspection up
INSP_DN	Inspection down
17VAC A	Board power supply – 17vac a
17VAC B	Board power supply – 17vac b
PTC A	Input from the PTC
PTC B	Input from the PTC

2.3 OUTPUT TERMINALS 2.3.1 OUTPUT TERMINALS FOR AC1 SPEED, AC2 SPEED AND VVVF

P + 22∨	Biasing voltage from periphery supply – positive side ¹
GND	Biasing voltage from periphery supply – negative side ¹
STAR	Spare output – refer to the menu in section 3.3
LGHT	Car light relay
OPN	Open door relay or contactor ²
CLSE_CAM	Cam contactor ³ / Close relay or contactor ²
CDOOR	Common for CLSE_CAM and OPN outputs
CLGT	Common for LGHT output
CDRV	Common for DN_DIR, UP_DIR, HI_SPD, LOW_SPD and STAR outputs
LOW_SPD	Low speed contactor or speed reference 1 in VVVF
HI_SPD	High speed contactor or speed reference 2 in VVVF
UP_DIR	Up direction contactor or forward in VVVF
DN_DIR	Down direction contactor or reverse in VVVF

2.3.2 OUTPUT TERMINALS FOR HYDRAULIC

P +22∨	Biasing voltage from periphery supply – positive side ¹
GND	Biasing voltage from periphery supply – negative side ¹
STAR	Star output
LIGHT	Car light relay
OPN	Open door relay or contactor ²
CLSE_CAM	Cam contactor ³ / Close relay or contactor ²
CDOOR	Common for CLSE_CAM and OPN outputs
CLGT	Common for LGHT output
CDRV	Common for DN_DIR, UP_DIR, HI_SPD, LOW_SPD and STAR outputs
LOW_SPD	Releveling relay
HI_SPD	High speed valve
UP_DIR	Pump delta contactor
DN_DIR	Down direction valve

2.3.3 INDICATOR OUTPUT TERMINALS FOR MICROZED-AR⁴⁻⁸

F9	Floor 9 output ⁴ / Not Used ⁸
F8	Floor 8 output ⁴ / Not Used ⁸
F7	Floor 7 output ⁴ / Not Used ⁸
F6	Floor 6 output ⁴ / g output ⁸
F5	Floor 5 output ⁴ / f output ⁸
F4	Floor 4 output ⁴ / e output ⁸
F3	Floor 3 output ⁴ / d output ⁸
F2	Floor 2 output ⁴ / c output ⁸
F1	Floor 1 output ⁴ / b output ⁸
F0	Floor 0 output ⁴ / a output ⁸

2.3.4 INDICATOR OUTPUT TERMINALS FOR MICROZED-AR⁵⁻⁶⁻⁷

F8 Floor information C^5 / Floor information B^{6-7}	
F7 Floor information B ⁵ / Floor information A ⁶⁻⁷	
F6 Floor information A ⁵ / Call 6 output ⁶⁻⁷	
F5 Not used ⁵ / Call 5 output ⁶⁻⁷	
F4 Not used ⁵ / Call 4 output ⁶⁻⁷	
F3 Not used ⁵ / Call 3 output ⁶⁻⁷	
F2 Not used ⁵ / Call 2 output ⁶⁻⁷	
F1 Not used ⁵ / Call 1 output ⁶⁻⁷	
F0 Not used ⁵ / Call 0 output ⁶⁻⁷	

 1 Although this is not an output, it is listed with the outputs for convenience. 2 For automatic door only.

 ² For automatic door only.
 ³ For swinging door.
 ⁴ For Decimal.opr=dec.
 ⁵ For Gray or Binary code indicator not registered calls.opr=gnr or bnr
 ⁶ For Gray or Binary code indicator registered calls.opr=gr or br
 ⁷ For Collective 7 floors with gray code indicator.opr=CL7
 ⁸ For seven segment display indicator. Opr=7Sd

2.3.5 INDICATOR OUTPUT TERMINALS FOR OPR = COL¹

Floor 4 output
Floor 3 output
Floor 2 output
Floor 1 output
Floor 0 output
Call 4 output
Call 3 output
Call 2 output
Call 1 output
Call 0 output

2.3.6 INDICATOR OUTPUT TERMINALS FOR OPR = ENH²

F9	Up Arrow
F8	Down Arrow
F7	Floor information C
F6	Floor information B
F5	Floor information A
F4	Call 4 output
F3	Call 3 output
F2	Call 2 output
F1	Call 1 output
F0	Call 0 output

2.4 CALL TERMINALS

с9	Floor 9 call / Not Used ¹⁻²⁻³
C8	Floor 8 call / Not Used ¹⁻²⁻³
с7	Floor 7 call / Not Used ¹⁻²⁻³
C6	Floor 6 call / Not Used ¹⁻²
C5	Floor 5 call / Not Used ¹⁻²
C4	Floor 4 call
с3	Floor 3 call
c2	Floor 2 call
C1	Floor 1 call
C0	Floor 0 call

¹ For collective calls and decimal indicator .opr=coL ² For collective calls and enhanced scrolling display. opr=EnH ³ For Collective 7 floors with gray code indicator.opr=cL7 And For Gray or Binary code indicator registered calls.opr=gr or br

3. DIP SWITCHES AND PUSH BUTTONS

3.1 DIP SWITCHES FUNCTION DESCRIPTION

For any change made to the DIP switches to take effect (except DIP switch 3), the power has to be turned OFF and then ON again. Alternatively, changes of the DIP switches can be made when the power is OFF.



3.2 ON-BOARD DISPLAY AND PUSH BUTTONS FUNCTION DESCRIPTION

Three push buttons are used to simplify the access of the main menu. The first page in the menu displays the status of the elevator. The following three pages are used to access the historical of faults. The last page is used to initiate a homing trip. The **NEXT** and **PREV** buttons are respectively used to scroll downwards and upwards in the five pages menu. **SELECT** is used to access the function or information within the menu item. No functions are associated with the first item in the menu (i.e. Page 1). The following table describes the Main Menu along with all its functions:

Page	Display	Description
1 ¹ (default)	FL# In# E##	Normal operation with floor displayed on the right. The floor is replaced by a downward scrolling minus sign "-" when elevator is making a homing trip. Inspection mode with floor displayed on the right. The floor is replaced by a downward scrolling minus sign "-" when elevator is making a homing trip. Error detected with error code displayed on the two digits on the right.
2	Err	SELECT displays the most recent error in memory. The error code is displayed on two leftmost digits and the floor on which the error occurred is displayed on the rightmost digit. The error code and the floor are separated by a decimal point. noE is displayed if there are no errors in memory. PREV displays the previous error in memory. If no previous errors exist, the display returns to Err. NEXT displays the errors in memory in the opposite direction of PREV .
3	Fer	SELECT displays the count of level II errors in memory ² . noF is displayed if there are no level II errors.
4	ErA	SELECT clears all errors from memory. don is displayed to indicate the completion of this task.
5	Htr	SELECT initiates a homing trip

3.2.1 ON-BOARD CALL REGISTRATION FUNCTION

The operator can give calls using the push buttons to test the lift. The display has to be on Page 1. Lift has to be in normal operation with no faults. The display shows FL#. Press SELECT, the display will show Fr# with # blinking. Use the PREV and NEXT push buttons to change the floor selection. Once the desired floor is displayed, press SELECT push button. The call for this floor is registered and the appropriate led will light on the board as well as in the car. The lift will proceed to serve this call. If no buttons are pressed in 5 seconds, the # will stop blinking and will show the floor information. To exit the call registration mode, press the SELECT push button for 3 seconds. The board will also exit the call registration mode if no buttons are pressed for 1 minute.

3.2.2 ON-BOARD INSPECTION OPERATION

When in inspection mode, NEXT and PREV push button act as INSP_DN and INSP_UP inputs respectively. The INSP_DN and INSP_UP inputs have higher priority and will override the NEXT and PREV push buttons.

¹ If any other page is selected, page 1 is automatically restored if no push buttons are pushed for 10 seconds.

² Refer to sections 4.1 and 4.3.

3.3 DIP SWITCHES AUXILIARY FUNCTIONS MENU

To access the auxiliary functions menu:

- 1. Turn the power off.
- 2. Set DIP switch 4 to on.
- 3. Turn the power back on (elevator will become inactive).
- 4. Using NEXT and PREV push buttons go to the menu item you desire to edit or change.
- 5. Press **SELECT** to edit the parameter associated with the menu item.
- 6. Use **INC** and **DEC** push buttons to make the desired change.
- 7. Press OK to enter the new value in memory.
- 8. To modify another parameter repeat from step 4.
- 9. To end parameter editing, set DIP switch 4 to off (elevator will become active again).

Display	Description	Range					
D۸r	Selects the parking mode for automatic door:	Opp = Cld					
FAI	Cl d = Parking door closed						
Lat	Sets the car light time	0 - 25.0 sec					
FLt	Sets the floor stopping time	0 - 25.0 sec					
LdF	Sets the landing floor	non, 0 - 9					
Ldt	Sets the landing time	1 – 99 min					
Ado	The automatic door is considered jammed after this delay	Dis, 1 to 255sec					
CJd	Sets the car jammed delay	Dis, 1 to 255sec					
SPr	In case Hydraulic is not selected, sets the STR output function: gong, intermediate speed ¹ (used in VVVF operation) or base block (used in VVVF operation)	gng, Int, bbL					
	Sets the start time in hydraulic mode. If hydraulic is not selected, it selects VVVF						
Str	Zero: AC2-speed is selected (StP has to be set to zero as well)	-9 9 to 9 9 sec					
•	Positive value: VVVF selected with direction engaging before speed reference	0.0 10 0.0 000					
	Negative value: VVVF selected with speed reference engaging before direction						
	Selects VVVF and sets the Stop delay:						
S+D	Zero: AC2-speed is selected (Str has to be set to zero as well)	-9.9 to 9.9 sec					
50	Positive value: VVVF selected with speed reference disengaging before direction	-9.9 10 9.9 360					
	Negative value: VVVF selected with direction disengaging before speed reference						
rLL	Sets the re-leveling option in hydraulic mode	ALL – SEL					
EoS	Enables the EOS during the inspection	DIS – EnA					
Рон	Enables Power-on homing	DIS – EnA					
	dEc = Decimal floor information output – 10 stops dr. = Gray code floor information output with registered calls (using A. B. C). Zetos	dEc					
	$g_{II} = Gray code floor information output (using A, B, C, D) = 10 stops$	gr – gnr					
	br = Binary code floor information output with registered calls (using A, B, C)-7stps	br – bnr					
oPr	bnr = Binary code floor information output (using A, B, C, D) – 10 stops	7Sd					
	7Sd = Seven segment display information output -10 stops	EnH					
	EnH = Enhanced scrolling display information output with collected calls	COL					
	(using A, B, C, Up arrow, Down arrow) – 5 stops	CL7					
	coL = Decimal floor information output with collected calls – 5 stops						
	cL7 = Gray code floor information output with collected calls (using A, B, C) – 7 stps						
roP	Re-open Logic	<mark>nc - no</mark>					
PCL	Permanent Close	DiS – EnA					
Cod	Press push button to access CODE MENU ²						

3.3.1 CODE MENU

A blank screen appears with a decimal point on the first digit. Use the **INC** and **DEC** push buttons to set the first digit of the code. Use **OK** to enter it. The digit is instantaneously replaced by "c". A decimal point on the second digit prompts you to enter the second digit of the code by repeating the above procedure. Repeat this process until all six digits are entered. If you make a mistake in any digit, follow through till the end and then repeat from the beginning. If the code is correct, you will be able to access the following menu:

¹ When the intermediate speed is selected, the SPR is engaged when the destination is just one floor away. Note that once lift has initiated travel to a destination further that the next floor (SPR not engaged), calls received from the next floor will not be served in the current trip. ² Refer to section 3.3.1 for details on accessing **CODE MENU**.

0	

Display	Description	Range
StA	Selects the status of the code lock feature	DiS – EnA
ELA	Displays the count of the number of days elapsed Pressing INC or DEC push buttons resets counter to zero	N/A
DAy	Displays the preset number of operating days	0 to 999
out	Press SELECT push button to exit code menu	N/A

4. VIEWING ERRORS AND ERROR CODE DESCRIPTION

4.1 HOW TO VIEW THE ERRORS

Faults detected by the board are divided into three kinds:

- 1. <u>Level I faults</u>: faults that block the elevator when they occur. But the elevator can resume operation right after the fault disappears.
- 2. <u>Level II faults</u>: faults that can be tolerated for a few occurrences before the elevator is blocked by the board. The count of level II faults can be accessed in page 3 of the main menu. When the count of level II faults reaches 10, the board will block the elevator.
- 3. <u>Level III faults</u>: faults that the board considers to be fatal and will consequently block any further operation of the elevator.

The last 10 errors can be viewed on page 2 of the main menu¹.

4.2 HOW TO CLEAR THE ERRORS

To clear the errors as well as the count of level II faults from memory, go to page 4 of the main menu and press the **SELECT** button. Refer to section 3.2.

Error	Level	Description	Action taken
20 ²	I	Safety circuit and/or door opened during travel	Cancel calls and wait 5 sec before accepting new calls and resuming travel
21 ²	I	Door lock circuit opened during travel	Waits for lock circuit to close, cancels calls if fault persists more than 5sec ³
21 ⁴	I	Safety circuit failed to close after door closing	Cancels calls and opens door ³
22 ²	I	Failure in locking door after 3 attempts	Cancels calls ³
22 ⁴	II	Failure in closing door	Cancels calls, opens door ³
23 ⁴	II	Failure in opening door	Close door and resume
<mark>24, 25</mark>	N/A ⁸	Whenever EOS info does not correspond to the floor, a homing trip is done with no fault registered	N/A
26	II	Shaft information fault	Performs a homing trip
28		EOS-UP and EOS-DN faults (both open)	Blocks elevator ⁶
29	111	Motor has been powered for "CJd" time, car did not move	Blocks elevator ⁵
34	I	Motor has overheated (indicated by the PTC input), lift stops at nearest floor	Waits until motor cools down
35		Preset number of operating days expired	Blocks elevator ⁷

4.3 ERROR CODE DESCRIPTION

- ³ Waits for a call to resume operation.
- ⁴ For automatic door.

⁸ N/A means not assigned.

¹ Refer to section 3.2.

² For swinging door.

⁵ After repairing the faulty part, erase the faults. Refer to section 3.2.

⁶ When the cause of the fault is diagnosed and fixed, the elevator will automatically resume operation.

⁷ To recover from error 35, access code menu and clear the count of elapsed days. Refer to sections 3.3 and 3.3.1.

5. INSTALLATION GUIDE

Step 1

- Install and wire the panel according to wiring diagrams provided by the panel assembler.
- Double check all connections.

Step 2

- Make sure that the board is in the Inspection Mode (Inspection switch should be opened).
- Power the panel.
- The display of the board may show a downward scrolling minus sign. This is normal and it indicates that the board does not have a previous car position in memory. As soon as the elevator is switched from inspection to normal operation, it will make a homing trip and display will show FL0 when the elevator reaches the first stop.
- Regardless of what is on the display, if all safety circuits are closed, inspection up and inspection down push buttons are active (therefore inspection travel only requires the closing of safety circuit). Below is a visual indication of what the status of the input LEDs should be so that the elevator operates in the inspection mode:



Step 3

- Using the elevator in the inspection mode, adjust the position of all magnets according to the layout provided on the MicroZed-AR v3.04 wiring diagram INPUTS (Sheet 2 of 7), refer to section 6. APPENDIX A.
- If you are using bi-stable magnetic switches, proceed with inspection travel to terminal floors to properly set their contacts.
- When you finish, and prior to changing the operating mode from inspection to normal, the inputs should look as follows (given that elevator is on any intermediate floor and on floor level):

	SDFS UP	SDFS DN	EOS UP	EOS DN	SFTY ON	RE OPN	CLSE NDLY	LS EO	LS EC	INSP EN	INSP UP	INSP DN
Automatic door	0	0	0	0		0			0	0		
Swinging door	0	0	0	0		0				0		
Status Irrelevant Input Inactive (OFF) Input Active (ON)												

- Refer to section 3.3 to set all internal parameters according to the site's requirements.
- Refer to section 3.1 to set DIP switches according to the site's requirements.
- Change operating mode from INSPECTION to NORMAL. Elevator should proceed with its homing trip and will stop on the floor level of the first floor.

6. APPENDIX A

This appendix contains all wiring diagrams relevant to assembling the board in a panel.

¹ When an inspection up or down is given, board proceeds by closing the door before moving. Door is then kept closed.





















