

Flow2A

Tab 06: Systematic Fault Finding

2015.04.16



Flow2 - Stairlift

Tab 06: Systematic fault finding

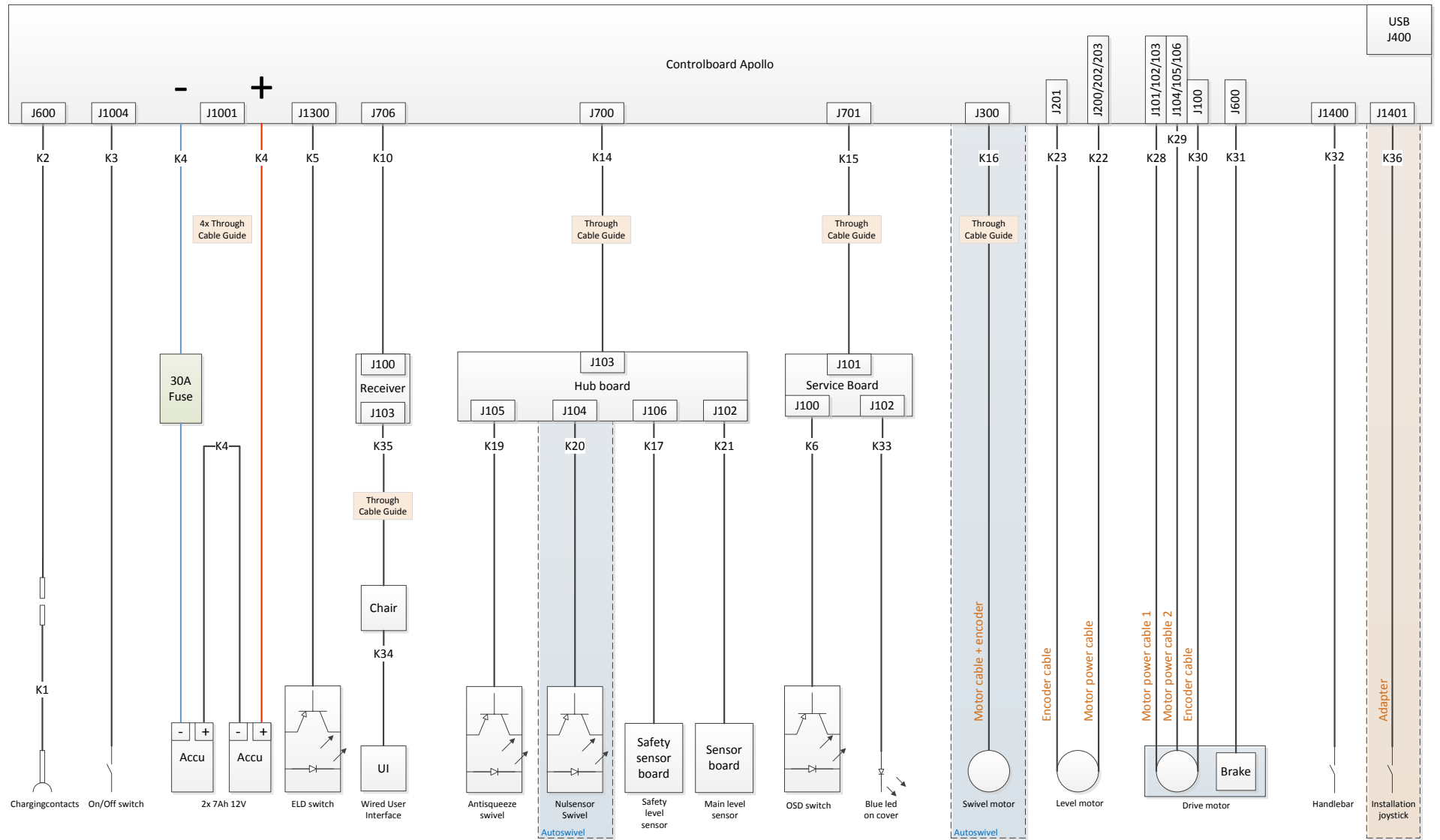
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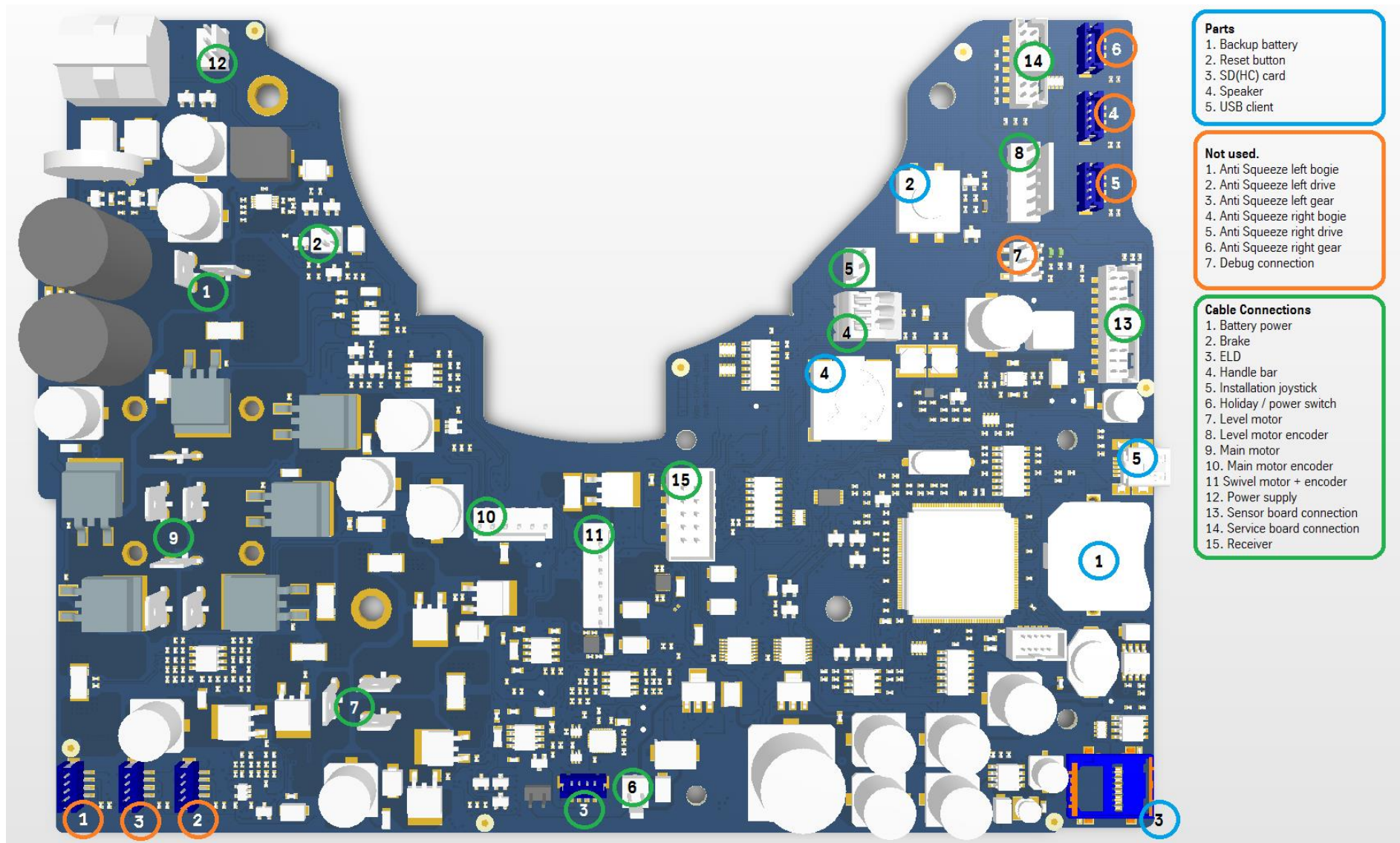
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1 Connection diagram

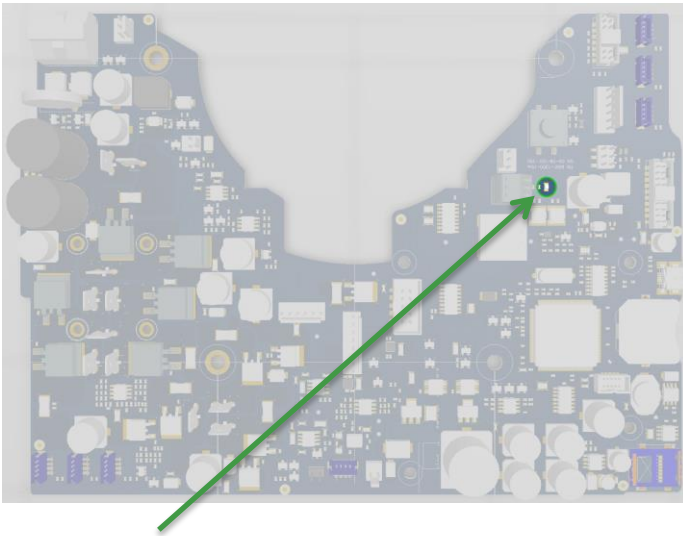


2 Connections on control board



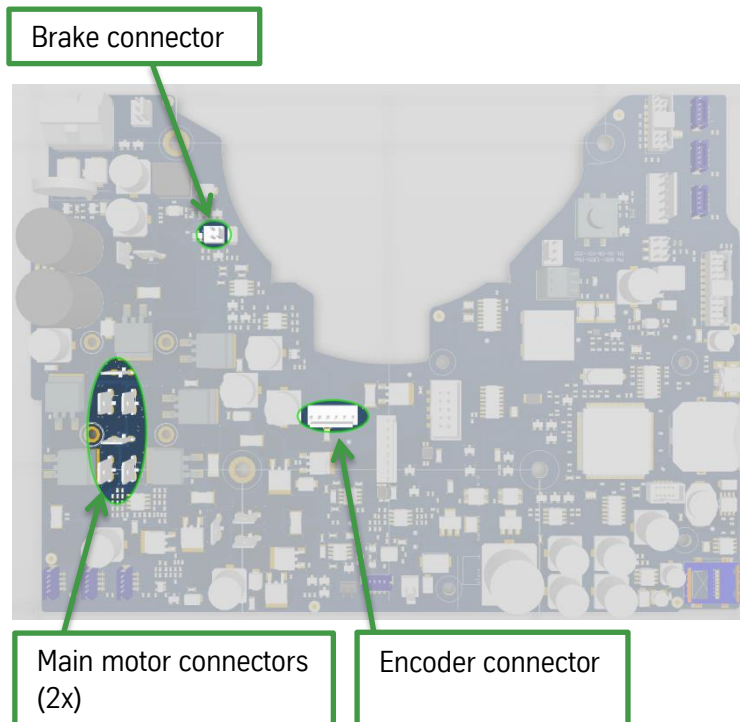
3 Subsystems

3.1 Power supply



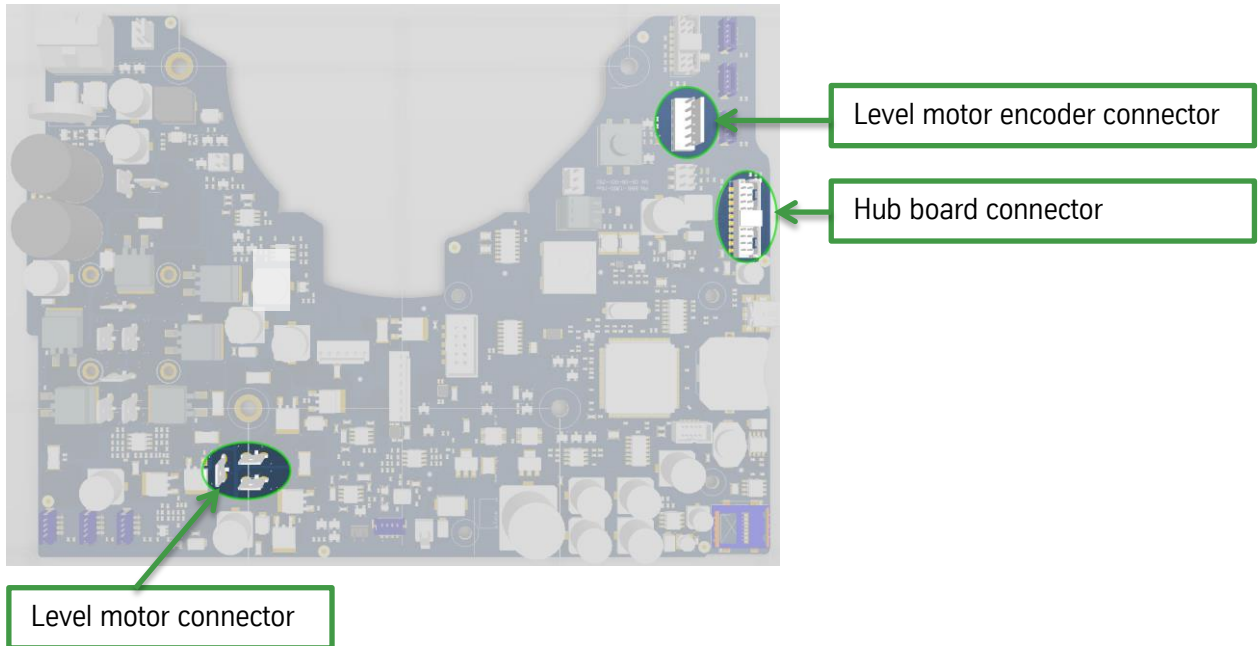
The green LED on the control board will be flashing bright if voltage is present on the control board. When the system is in sleep mode the LED will be on constantly but will be faint.

3.2 Drive system

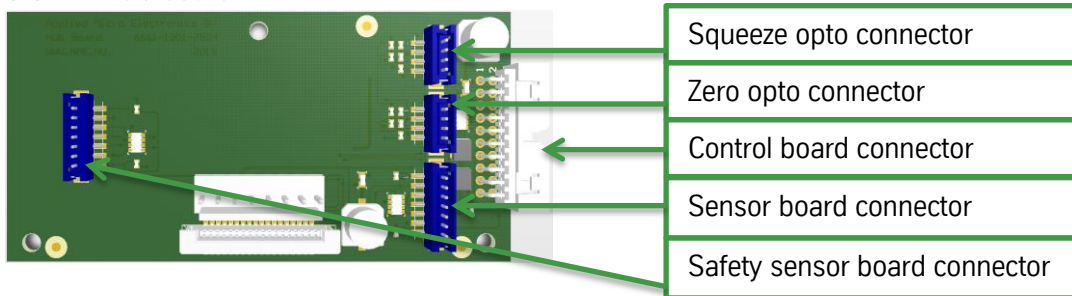


3.3 Level system

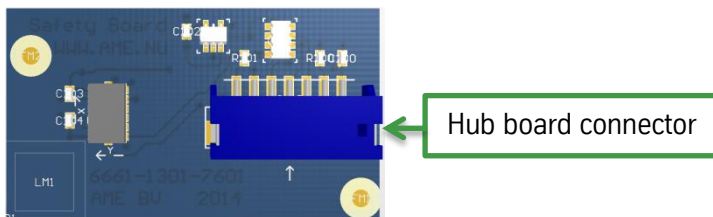
3.3.1 Control board connection



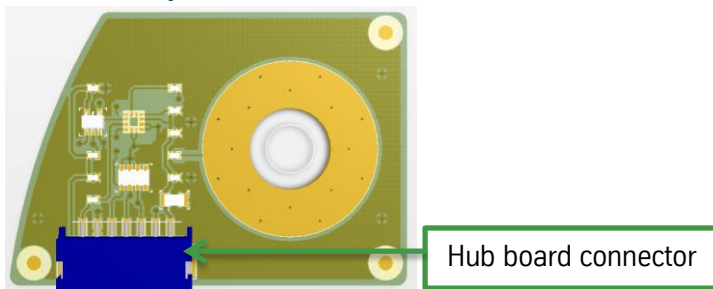
3.3.2 Hub board



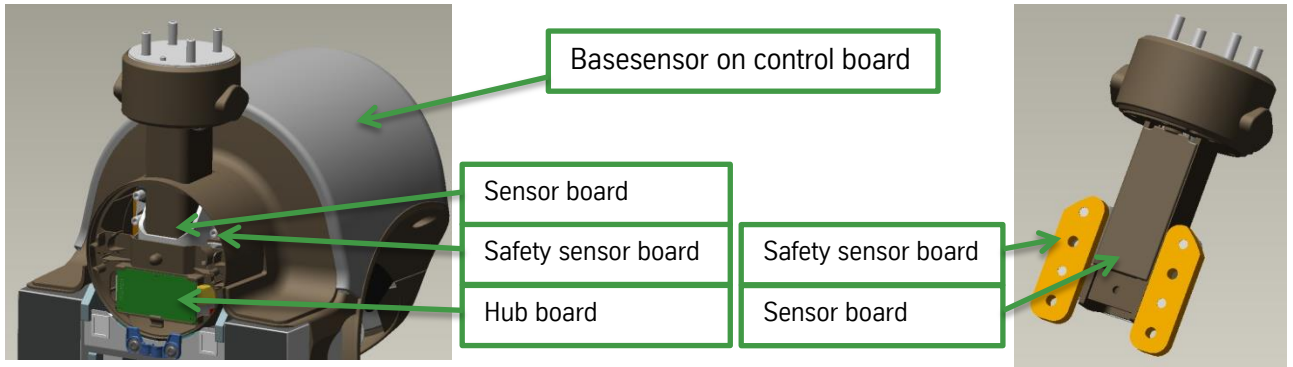
3.3.3 Sensor board



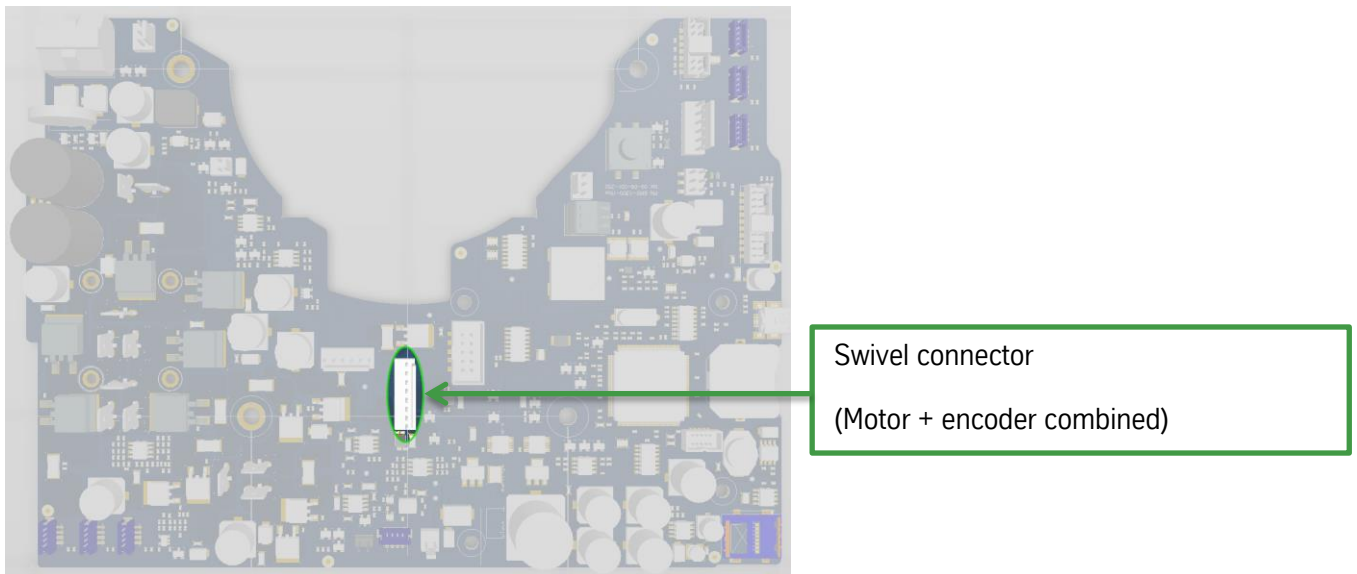
3.3.4 Safety sensor board



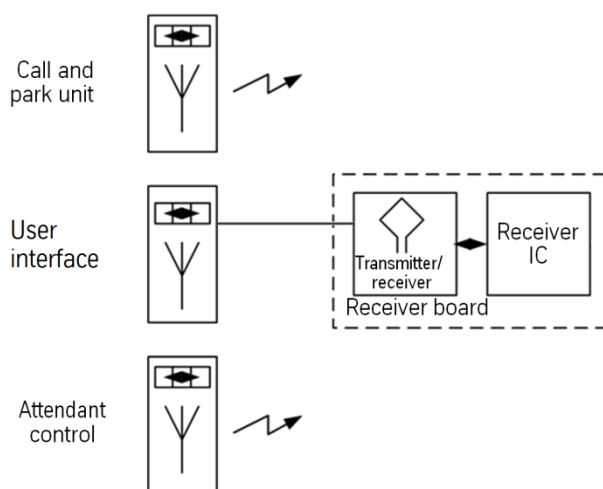
3.3.5 Locations of the sensors



3.4 Swivel system



3.5 Controls



3.6 Status indication (light and audio signals)

Status LEDs can be found on the drive front cover, the UI, the Call and Parks and Attendant control. The audio signals are generated on the control board.

3.6.1 On the drive front cover:

- A constant blue LED on the service front cover + Single Ping (2800 Hz) will be lit when the stair lift is switched on

3.6.2 On a Call and Park station:

- Constant green LED + Double ping (2600 Hz):
 - The stair lift is about to start (sound starts within 1 sec after the joystick has been operated on the UI or a C/P).
- Flashing green LED:
 - C&P batteries are almost empty
- Orange LED (both green and red):
 - Foreign RF

3.6.3 On the UI:

- Constant green LED + Double ping (2600 Hz):
 - The stair lift is about to start (sound starts within 1 sec after the joystick has been operated on the UI or a C/P).
- Flashing red LED + warning sound (intermittent ping of 2800Hz every 0.5 seconds):
 - Track not tested after track modification
 - Chair level beyond 2 degrees
 - Unexpected negative charging contact
 - Position beyond maximum track length
 - Swivel invalid pulse
 - Swivel invalid opto signal
 - User emergency stop test warning (maintenance due)
- Flashing red LED + warning sound (intermittent ping of 2800Hz every 1 second):
 - C&P is blocked due to recent UI operation
- Flashing red LED + error sound (fast intermittent pings of 2800Hz every 0.5 seconds):
 - The stair lift has encountered an obstacle and has stopped. Lift will only move in opposite direction.
- Constant red LED + error sound (fast intermittent pings of 2800Hz, 7 times a second):
 - There is a malfunction in the stair lift.
- Flashing green LED while operating the C&P:
 - C&P batteries are almost empty

3.6.4 Audio only:

- Two-tone beep (high 2400Hz - low 1750Hz) during 3 seconds, repeated every 13 seconds:
 - The lift is not on a charging point
- Double beep (1750 Hz):
 - ELD is operated

4 Error and warning messages

The Flow2 software has a number of error and warning messages. When a fault occurs the code is shown as a 2-digit number in the display preceded by an “F”, a warning is preceded by a “C”.

There are also source codes “S”, these will give further information for a hardware error. These will be shown in the display after the F24 error

F24 / S6 / F24 / S6 / ...

Hardware error, in 15V supply.

4.1 Error and warning list

F01	Obstruction in current drive direction detected: left	F53	Swivel position is found to be incorrect
F02	Obstruction in current drive direction detected: right	F54	Safety code is found to be incorrect
C04	Level beyond 2 degrees	F55	Brownout is triggered while moving
F05	Level beyond 5 degrees	C56	An unexpected negative contact was detected
F06	Drive speed beyond track operating range	C58	A negative contact was expected but not detected
F07	Level beyond 7 degrees	C60	The track position value is beyond the maximum track length
F08	Level sensor deviation	C61	The swivel sync opto 0 is detected at an unexpected swivel position
F09	Hardware failure of the main drive	C62	The swivel sync opto has an inverted value
F10	Hardware failure of the level drive	F63	Main drive moment detected without user input
F11	Hardware failure of the swivel drive	F64	Level drive moment detected without user input
F12	Drive motor current trip or overvoltage occurred	F65	Swivel drive moment detected without user input
F13	Level motor current trip or overvoltage occurred	F66	Wrong direction detected for main drive
F14	Swivel motor current trip or overvoltage occurred	F67	Wrong direction detected for level drive
F15	HALL sensor failure of the main drive	F68	Wrong direction detected for swivel drive
F16	HALL sensor failure of the level drive	F69	CPU startup check fails (includes code CRC check)
F17	HALL sensor failure of the swivel drive	C70	Lift driving in normal mode without test run performed
F18	Drive speed beyond maximum limit	C71	User emergency maintenance counter elapsed
F19	Drive speed beyond ELD operating range	F72	User emergency maintenance counter elapsed
F20	Software inconsistency detected (assert)	C73	Position outside track bounds
F21	Battery voltage low while moving up	F74	Manual swivel not in position while starting
F22	Battery failure: under or overvoltage detected	F75	Battery voltage below upwards level
F23	Brake circuit failure detected	F76	Battery voltage recharge required
F24	HW Error detected	F77	Drive I ² T critical Main
F25	Wrong HW/SW combination	F78	Drive I ² T critical Level
F26	Reduce speed failed	C80	Drive I ² T warning Main
F27	Normal stop failed	C81	Drive I ² T warning Level
F28	Emergency stop failed	F83	Level sensors are off, but there's drive moment (allowed in service because of mode -3-)
F29	Disable drive main failed	C85	Backup battery low (below 1.65V)
F30	Stop drive level failed	C86	Level sensor deviation > 4 degrees
F31	Stop drive swivel failed	C87	Swivel deviation > 10 degrees
F32	User emergency stop		
F33	Overspeed (OSG) tripped	S1	HW release circuit failure
F34	Level sensor failure	S2	Swivel current measurement too low
F35	Level sensor failure	S3	Swivel current offset calibration failed
F36	Level sensor failure	S4	Level current offset calibration failed
F37	Swivel position outside operating range (+/- 110 deg)	S5	Drive current offset calibration failed
F40	OSG opto failure	S6	+15V outside of limits
F41	ELD opto failure	S7	+5V outside of limits
F42	Swivel zero opto failure	S8	Reference voltage outside of limits
F47	Swivel squeeze opto failure	S9	+3V3 overload
F49	RF unit is not responding	S10	MCU internal failure
F50	Failed to read parameters (motor control or application)	S11	Check timeout
F51	Failed to read the track data	S12	Supply enable/disable circuit failure
F52	Drive position is found to be incorrect	S13	Main/Level/Swivel overcurrent protection failure

4.2 Error handling

Error code	F01
Error message	Obstruction Left
Description	Obstruction in current (left) drive direction detected
Safety action	Emergency stop
Possible solution	Drive in opposite direction to move away from obstruction.
Error suppressed in	Mode -3- / ELD mode

Error code	F02
Error message	Obstruction Right
Description	Obstruction in current (right) drive direction detected
Safety action	Emergency stop
Possible solution	Drive in opposite direction to move away from obstruction.
Error suppressed in	Mode -3- / ELD mode

Error code	F05
Error message	Tilt > 5°
Description	Chair is more than 5° out of level
Safety action	Normal stop
Possible solution	<ul style="list-style-type: none"> – Go to mode -3- and press the [E] button. Levelling must now move to the 0 position. – If the levelling of the chair works correctly, this error can have occurred because the lift went around a corner too quickly so that the level motor was unable to keep the chair horizontal. It is also possible that the level motor had insufficient force in this situation. If the nulling of the chair does not work in mode -3-, there is a hardware fault. – Check the connections on the sensor board and the safety board – Check the cables between the sensor board, the safety board and the control board. – Check the connections of the level motor on the control board. – Replace the safety board if it behaves suspiciously. – Replace the control board if none of the above solutions has helped or if the fault keeps coming back.
Error suppressed in	Mode -3- / ELD mode

Error code	F06
Error message	Speed higher than programmed
Description	Speed is more that 130% from the programmed speed
Safety action	Normal stop
Possible solution	Possibly the rail data have not been programmed correctly: allow sufficient distance between speed entries for acceleration and deceleration.
Error suppressed in	Mode -3- / ELD mode

Error code	F07
Error message	Tilt > 7°
Description	Chair is more than 7° out of level
Safety action	Emergency stop / Stop level drive
Possible solution	<ul style="list-style-type: none"> – Go to mode -3- and press the [E] button. Levelling must now move to the 0 position. – If the levelling of the chair works correctly, this error can have occurred because the lift went around a corner too quickly so that the level motor was unable to keep the chair horizontal. It is also possible that the level motor had insufficient force in this situation. If the nulling of the chair does not work in mode -3-, there is a hardware fault. – Check the connections on the sensor board and the safety board – Check the cables between the sensor board, the safety board and the control board. – Check the connections of the level motor on the control board. – Replace the safety board if it behaves suspiciously. – Replace the control board if none of the above solutions has helped or if the fault keeps coming back.
Error suppressed in	Mode -3-

Error code	F08
Error message	Level sensors disparity
Description	There is a difference of more than 3° between the signals from the main sensor and the safety sensor.
Safety action	Emergency stop / Stop level drive
Possible solution	Possibly one of the sensors is defective. Replace the sensor board and if this doesn't solve it, replace the safety board
Error suppressed in	Mode 3

Error code	F09
Error message	Drive failure main
Description	Hardware failure of the main drive
Safety action	Disable main drive
Possible solution	Replace main motor
Error suppressed in	--

Error code	F10
Error message	Drive failure level
Description	Hardware failure of the level drive
Safety action	Emergency stop / Stop level drive
Possible solution	Replace level motor
Error suppressed in	--

Error code	F11
Error message	Drive failure swivel
Description	Hardware failure of the swivel drive
Safety action	Emergency stop / Stop swivel drive
Possible solution	Replace swivel motor
Error suppressed in	--

Error code	F12
Error message	Drive overload main
Description	Overcurrent main motor
Safety action	Disable main drive
Possible solution	
Error suppressed in	--

Error code	F13
Error message	Drive overload level
Description	Overcurrent level motor
Safety action	Emergency stop / Stop level drive
Possible solution	
Error suppressed in	--

Error code	F14
Error message	Drive overload swivel
Description	Overcurrent swivel motor
Safety action	Emergency stop / Stop swivel drive
Possible solution	
Error suppressed in	--

Error code	F15
Error message	Hall sensor failure main
Description	Hall sensor failure of the main drive
Safety action	Disable main drive
Possible solution	Check cable and connection. If OK, replace main motor
Error suppressed in	--

Error code	F16
Error message	Hall sensor failure level
Description	Hall sensor failure of the level drive
Safety action	Emergency stop / Stop level drive
Possible solution	Check cable and connection. If OK, replace level motor
Error suppressed in	--

Error code	F17
Error message	Hall sensor failure swivel
Description	Hall sensor failure of the swivel drive
Safety action	Emergency stop / Stop swivel drive
Possible solution	Check cable and connection. If OK, replace swivel motor
Error suppressed in	--

Error code	F18
Error message	Overspeed
Description	Measured speed more than max. allowable rpm main motor (2780 rpm)
Safety action	Emergency stop
Possible solution	
Error suppressed in	--

Error code	F19
Error message	Speed too high during ELD use
Description	Measured speed more than 130% from normal ELD speed (1112 rpm)
Safety action	Emergency stop
Possible solution	
Error suppressed in	--

Error code	F20
Error message	Software inconsistency
Description	
Safety action	Disable main drive / Stop level drive / Stop swivel drive
Possible solution	(re-)install software
Error suppressed in	--

Error code	F21
Error message	Low battery voltage
Description	Battery voltage <19V while driving upwards
Safety action	Normal stop
Possible solution	Lift can be driven down to any halt position where the batteries have to be charged to a minimum voltage before the lift can be driven upwards again. While the lift is being charged F76 is shown in the display. The minimum voltage is set at 25V by default but can be modified in mode -9-
Error suppressed in	Mode -3- / ELD mode

Error code	F22
Error message	Battery failure
Description	Battery voltage < 14V or > 30V
Safety action	Disable main drive / Stop level drive / Stop swivel drive
Possible solution	Replace batteries
Error suppressed in	ELD mode

Error code	F23
Error message	Brake circuit failure
Description	This indicates that the main motor brake does not switch on and off properly. This can be the result of defective components on the control board.
Safety action	Disable main drive
Possible solution	Replace the control board.
Error suppressed in	--

Error code	F24
Error message	Hardware error
Description	All hardware errors that do not generate their own code
Safety action	Disable main drive / Stop level drive / Stop swivel drive
Possible solution	
Error suppressed in	--

Error code	F25
Error message	Hardware incompatible
Description	Wrong hardware / software combination
Safety action	Disable main drive / Stop level drive / Stop swivel drive
Possible solution	Replace hardware and/or software
Error suppressed in	--

Error code	F26
Error message	Speed reduction failed
Description	Safety action failed
Safety action	Normal stop
Possible solution	
Error suppressed in	--

Error code	F27
Error message	Normal stop failed
Description	Safety action failed
Safety action	Emergency stop
Possible solution	
Error suppressed in	

Error code	F28
Error message	Emergency stop failed
Description	Safety action failed
Safety action	Disable main drive / Stop swivel drive
Possible solution	
Error suppressed in	

Error code	F29
Error message	Disable main drive failed
Description	Safety action failed
Safety action	Fully disable main drive
Possible solution	
Error suppressed in	--

Error code	F30
Error message	Stop level drive failed
Description	Safety action failed
Safety action	Emergency stop / Fully disable level drive
Possible solution	
Error suppressed in	--

Error code	F31
Error message	Stop swivel drive failed
Description	Safety action failed
Safety action	Emergency stop / Fully disable swivel drive
Possible solution	
Error suppressed in	--

Error code	F32
Error message	User emergency stop
Description	User has removed joystick out of UI
Safety action	Emergency stop
Possible solution	
Error suppressed in	Mode -3- / ELD mode

Error code	F33
Error message	OSD tripped
Description	The overspeed device has been activated
Safety action	Emergency stop
Possible solution	
Error suppressed in	Mode -3-

Error code	F34
Error message	Level sensor failure drive
Description	Defective gyro sensor on control board
Safety action	Emergency stop / Stop level drive
Possible solution	Replace control board
Error suppressed in	Mode -3-

Error code	F35
Error message	Main level sensor failure chair
Description	Defective sensor on sensor board
Safety action	Emergency stop / Stop level drive
Possible solution	Replace sensor board
Error suppressed in	Mode -3-

Error code	F36
Error message	Safety level sensor failure chair
Description	Defective sensor on safety sensor board (behind chairleg)
Safety action	Emergency stop / Stop level drive
Possible solution	Replace safety board
Error suppressed in	Mode -3-

Error code	F37
Error message	Swivel beyond operating range
Description	Swivel has turned more than 110°
Safety action	Normal stop
Possible solution	
Error suppressed in	Mode -3- / ELD mode

Error code	F40
Error message	Opto failure OSD
Description	Defective opto overspeed device
Safety action	Normal stop
Possible solution	Replace opto
Error suppressed in	Mode -3- / ELD mode

Error code	F41
Error message	Opto failure ELD
Description	Defective opto emergency lowering device
Safety action	Normal stop
Possible solution	Replace opto
Error suppressed in	Mode -3-

Error code	F42
Error message	Opto failure swivel zero
Description	Defective opto swivel zero
Safety action	Normal stop
Possible solution	Replace opto
Error suppressed in	Mode -3- / ELD mode

Error code	F47
Error message	Opto failure squeeze
Description	Defective squeeze opto
Safety action	Normal stop
Possible solution	Replace opto
Error suppressed in	Mode -3- / ELD mode

Error code	F49
Error message	Receiver board failure
Description	Defective receiver board
Safety action	Normal stop
Possible solution	<ul style="list-style-type: none"> - Check cable and connections and receiverboard version. Replace if damaged. - Replace receiver board
Error suppressed in	Mode -3- / ELD mode

Error code	F50
Error message	Parameters corrupt
Description	Failed to read parameters (motor control or application)
Safety action	Normal stop
Possible solution	Reboot / Mode -9- CLR, <i>please note to backup your raildata.</i>
Error suppressed in	Mode -3-

Error code	F51
Error message	Rail data corrupt
Description	For example: less than 2 halt positions or speed entries programmed
Safety action	Normal stop
Possible solution	Program correctly or restore by Mode -9- (RES)
Error suppressed in	Mode -3- / ELD mode

Error code	F52
Error message	Drive position unknown
Description	Reset point not "seen" (yet).
Safety action	Normal stop
Possible solution	Drive to reset point in mode -3-
Error suppressed in	Mode -3- / ELD mode

Error code	F53
Error message	Swivel position unknown
Description	Reset point (zero opto) not "seen" (yet).
Safety action	Normal stop
Possible solution	Find reset point using [E] button in mode -3-.
Error suppressed in	Mode -3- / ELD mode

Error code	F54
Error message	Data corrupt
Description	Safety code is found to be incorrect.
Safety action	Disable main drive / Stop level drive / Stop swivel drive
Possible solution	In mode -9- first clear rail data (Crd), than restore (rES). If this does not clear the fault, the rail data have to be programmed manually.
Error suppressed in	--

Error code	F55
Error message	Brownout while moving
Description	Power is switched off or fails during ride
Safety action	Disable main drive / Stop level drive / Stop swivel drive
Possible solution	Check battery cable connection, fuse and measure voltage on battery control board connector.
Error suppressed in	--

Error code	F63
Error message	Unexpected main motor movement
Description	Main motor turns without user input (UI, RF, ELD, service buttons or installation joystick).
Safety action	Disable main drive
Possible solution	
Error suppressed in	--

Error code	F64
Error message	Unexpected level motor movement
Description	Level motor turns without user input (UI, RF, ELD, service buttons or installation joystick).
Safety action	Emergency stop / Stop level drive
Possible solution	
Error suppressed in	--

Error code	F65
Error message	Unexpected swivel motor movement
Description	Swivel motor turns without user input (UI, RF, ELD, service buttons or installation joystick).
Safety action	Emergency stop / Stop swivel drive
Possible solution	
Error suppressed in	--

Error code	F66
Error message	Wrong main motor direction
Description	Detected running direction of main motor is incorrect
Safety action	Disable main drive
Possible solution	
Error suppressed in	--

Error code	F67
Error message	Wrong level motor direction
Description	Detected running direction of level motor is incorrect
Safety action	Emergency stop / Stop level drive
Possible solution	
Error suppressed in	--

Error code	F68
Error message	Wrong swivel motor direction
Description	Detected running direction of swivel motor is incorrect
Safety action	Emergency stop / Stop swivel drive
Possible solution	
Error suppressed in	--

Error code	F69
Error message	CPU runtime check failure
Description	Processor startup check fails
Safety action	Disable main drive / Stop level drive / Stop swivel drive
Possible solution	Reboot
Error suppressed in	--

Error code	F72
Error message	Test user emergency stop required
Description	Maintenance timer has expired
Safety action	Normal stop
Possible solution	Joystick from User Interface has to be removed and re-inserted
Error suppressed in	Mode -3-

Error code	F74
Error message	Manual swivel turned.
Description	Swivel has been unlocked and turned.
Safety action	Normal stop
Possible solution	Turn swivel in normal ride position and lock before starting.
Error suppressed in	Mode -3-

Error code	F75
Error message	Battery voltage low
Description	If battery voltage is below 21V the lift won't drive up from halt position. It is still possible to drive down.
Safety action	Normal stop
Possible solution	Leave lift at charging station until battery is sufficiently charged.
Error suppressed in	Mode -3- / ELD mode

Error code	F76
Error message	Battery needs charging
Description	This error code appears after the lift has been placed on a charging contact after code F21 has occurred (voltage <19V). The batteries have to be charged to a minimum voltage of 25V by default and then the F76 will disappear.
Safety action	Normal stop
Possible solution	Let the stair lift charge the batteries
Error suppressed in	Mode -3- / ELD mode

Error code	F77
Error message	Main motor temperature too high
Description	The temp. of the main motor has risen to a critical level
Safety action	Normal stop
Possible solution	Let cool down.
Error suppressed in	Mode -3-

Error code	F78
Error message	Level motor temperature too high
Description	The temp. of the level motor has risen to a critical level
Safety action	Normal stop
Possible solution	Let cool down.
Error suppressed in	Mode -3-

Error code	F83
Error message	Level sensors are off, but there's drive moment
Description	Sensors are off while the drive is moving
Safety action	Emergency stop / Stop level drive
Possible solution	Reboot the lift
Error suppressed in	Mode -3-

4.3 Warning messages

These codes are used to draw the technician's attention to certain conditions.

When these warnings are generated they don't stop the lift and the user will not be aware of these. However, they are shown in the display on the service board and can be seen in the error log in mode -9- (except C04).

Warning code	C04
Warning message	Tilt > 2°
Description	Chair is more than 2° out of level
Safety action	Reduce speed
Possible solution	Program correct speed in rail data
Warning suppressed in	Mode -3- / ELD mode

Warning code	C56
Warning message	Unexpected negative charging contact
Description	An unexpected reset contact was detected
Safety action	Report the warning
Possible solution	
Warning suppressed in	Mode -3- / ELD mode

Warning code	C58
Warning message	Negative charging contact expected
Description	A reset contact was expected but not detected.
Safety action	Report the warning
Possible solution	
Warning suppressed in	Mode -3- / ELD mode

Warning code	C60
Warning message	Position outside max. rail length
Description	The maximum rail length is 45 m.
Safety action	Report the warning
Possible solution	
Warning suppressed in	Mode -3- / ELD mode

Warning code	C61
Warning message	Unexpected reset point swivel
Description	The zero opto has been detected at an unexpected position
Safety action	Report the warning
Possible solution	
Warning suppressed in	Mode -3- / ELD mode

Warning code	C62
Warning message	Inverted zero opto signal swivel
Description	Signal goes from high to low instead of from low to high or vice versa.
Safety action	Report the warning
Possible solution	
Warning suppressed in	Mode -3- / ELD mode

Warning code	C70
Warning message	Test run required
Description	Lift has not made a full trip yet.
Safety action	Report the warning
Possible solution	Make full test run.
Warning suppressed in	Mode -3- / ELD mode

Warning code	C71
Warning message	Test user emergency stop required
Description	Switches in UI must be tested on correct functioning.
Safety action	Report the warning
Possible solution	Remove joystick from UI and re-insert.
Warning suppressed in	Mode -3- / ELD mode

Warning code	C73
Warning message	Position outside programmed rail data
Description	
Safety action	Report the warning
Possible solution	Programm correctly
Warning suppressed in	Mode -3- / ELD mode

Warning code	C80
Warning message	Main motor temp. high
Description	
Safety action	Report the warning
Possible solution	
Warning suppressed in	Mode -3- / ELD mode

Warning code	C81
Warning message	Level motor temp. high
Description	
Safety action	Report the warning
Possible solution	
Warning suppressed in	Mode -3- / ELD mode

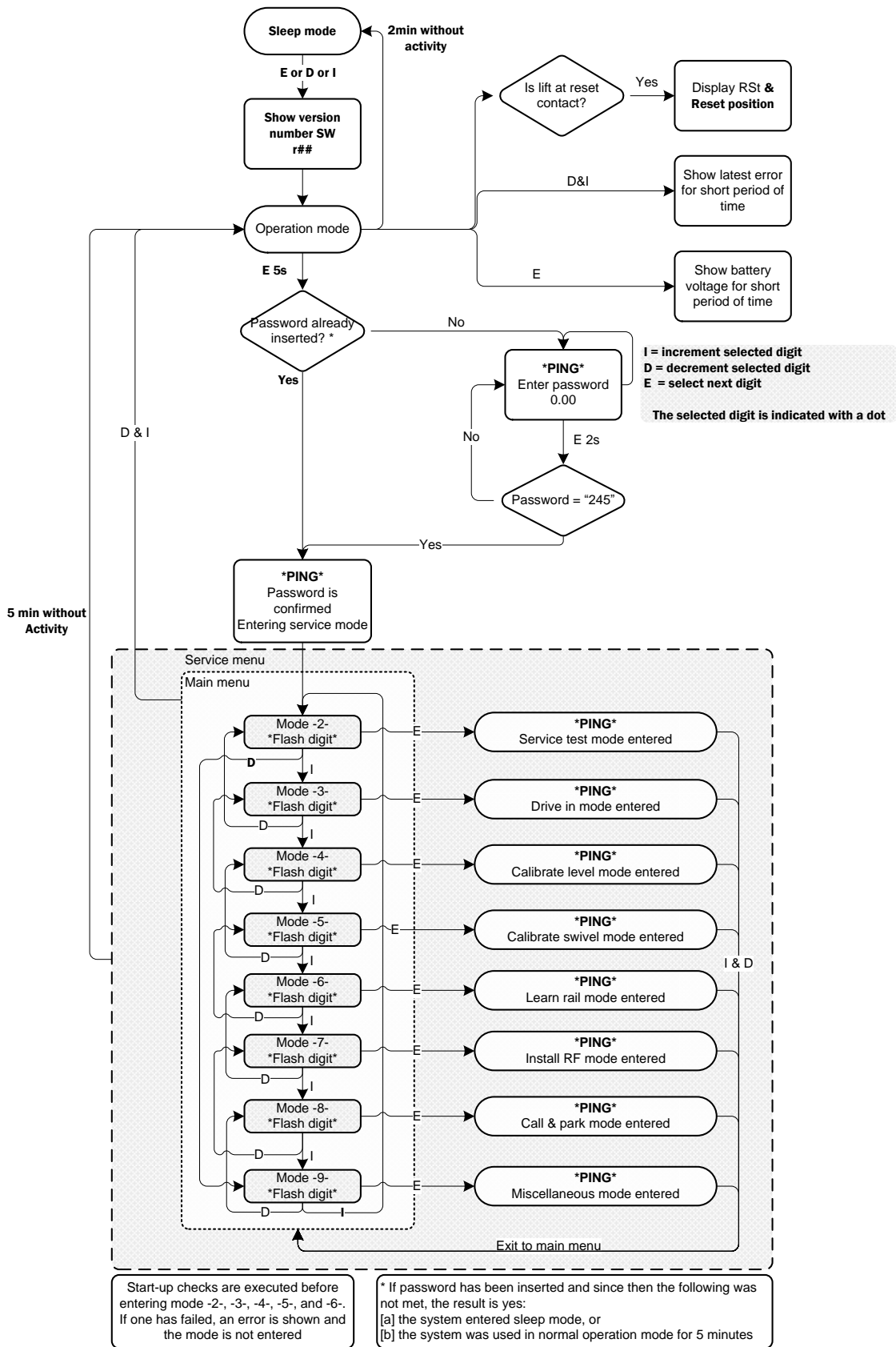
Warning code	C85
Warning message	Backup battery low warning
Description	The backup battery falls below 1,65V
Safety action	Report the warning
Possible solution	Replace battery
Warning suppressed in	-

Warning code	C86
Warning message	Level deviation warning
Description	Deviation between level sensors > 4°
Safety action	Reduce speed
Possible solution	<ul style="list-style-type: none"> - Reduce speed at point of occurrence - Recalibrate level sensors - Replace sensor board(s)
Warning suppressed in	Mode -3-

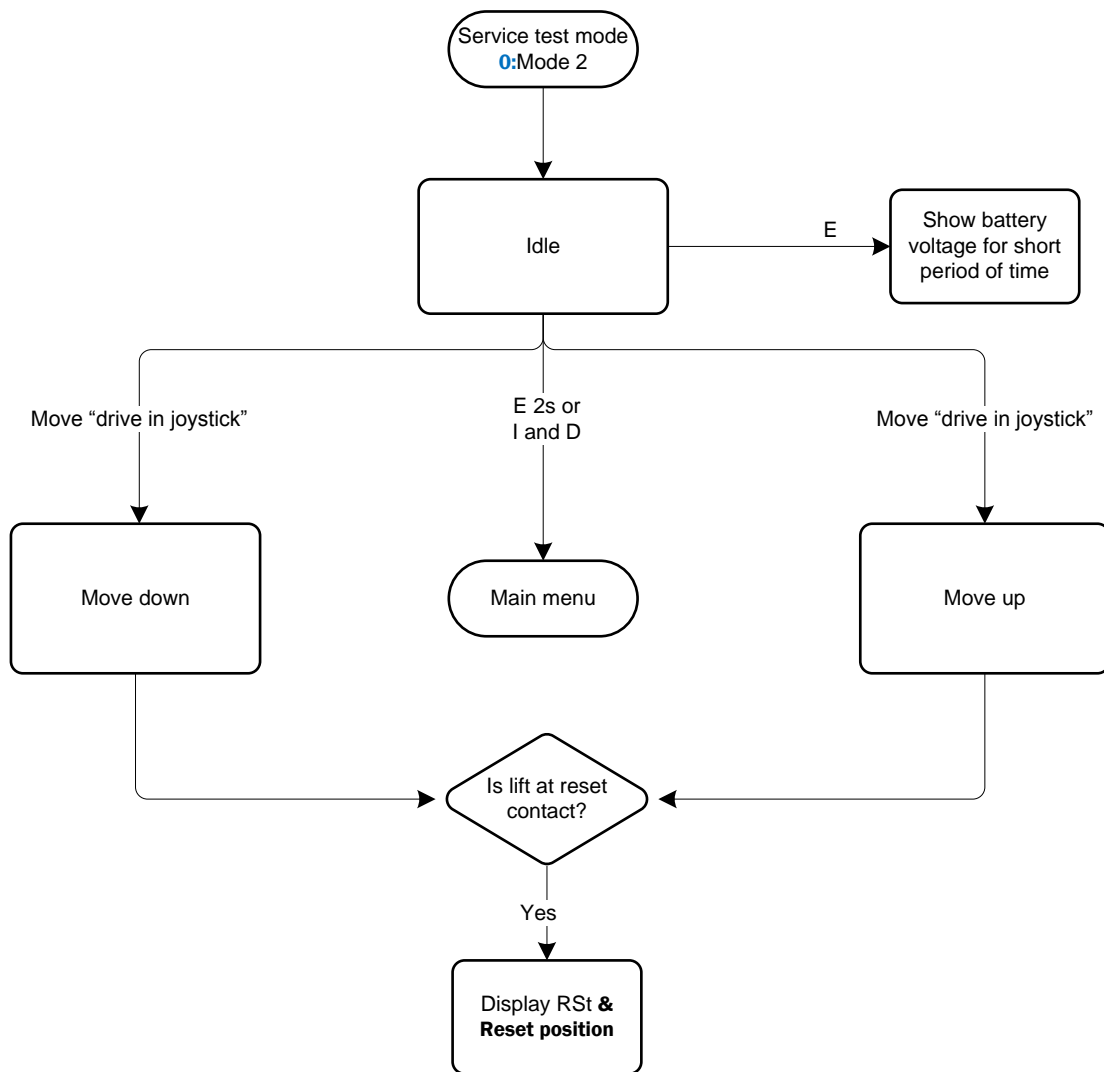
Warning code	C87
Warning message	Swivel deviation warning
Description	Swivel deviates > 10° from programmed value
Safety action	Report the warning
Possible solution	- Adjust programming of swivel angle - Replace swivel motor
Warning suppressed in	Mode -3-

5 Appendix

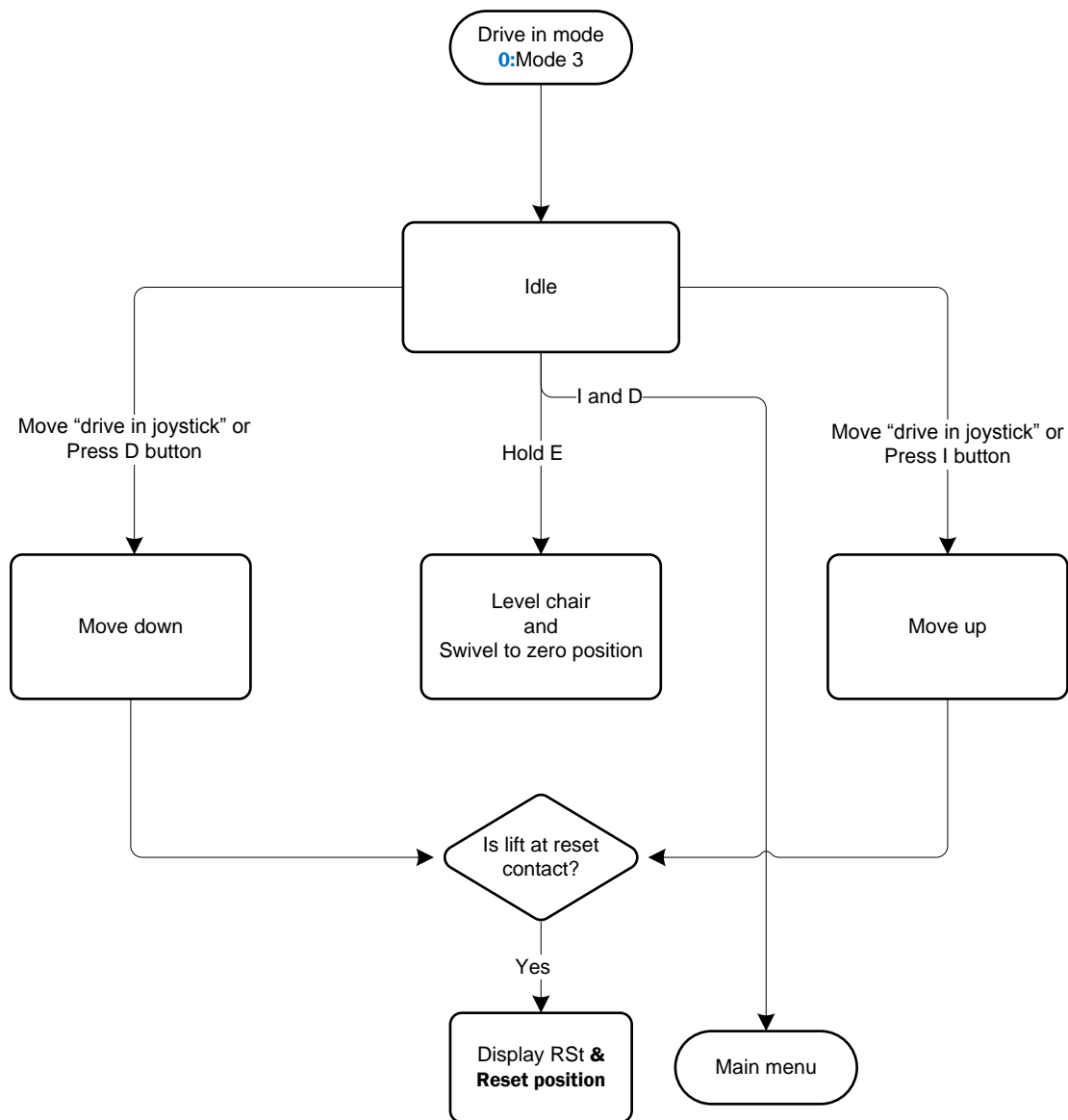
5.1 Main menu



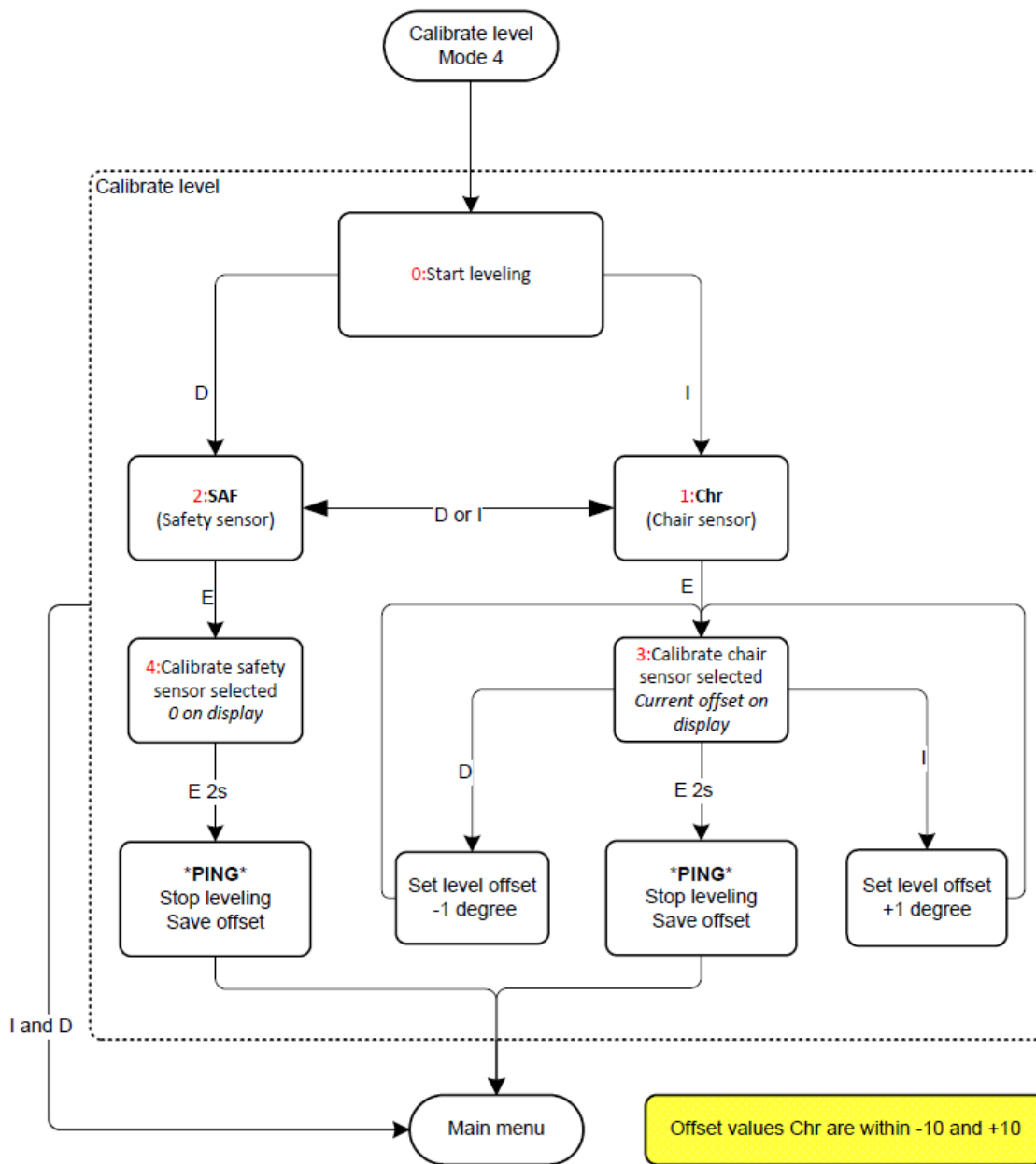
5.2 Mode 2



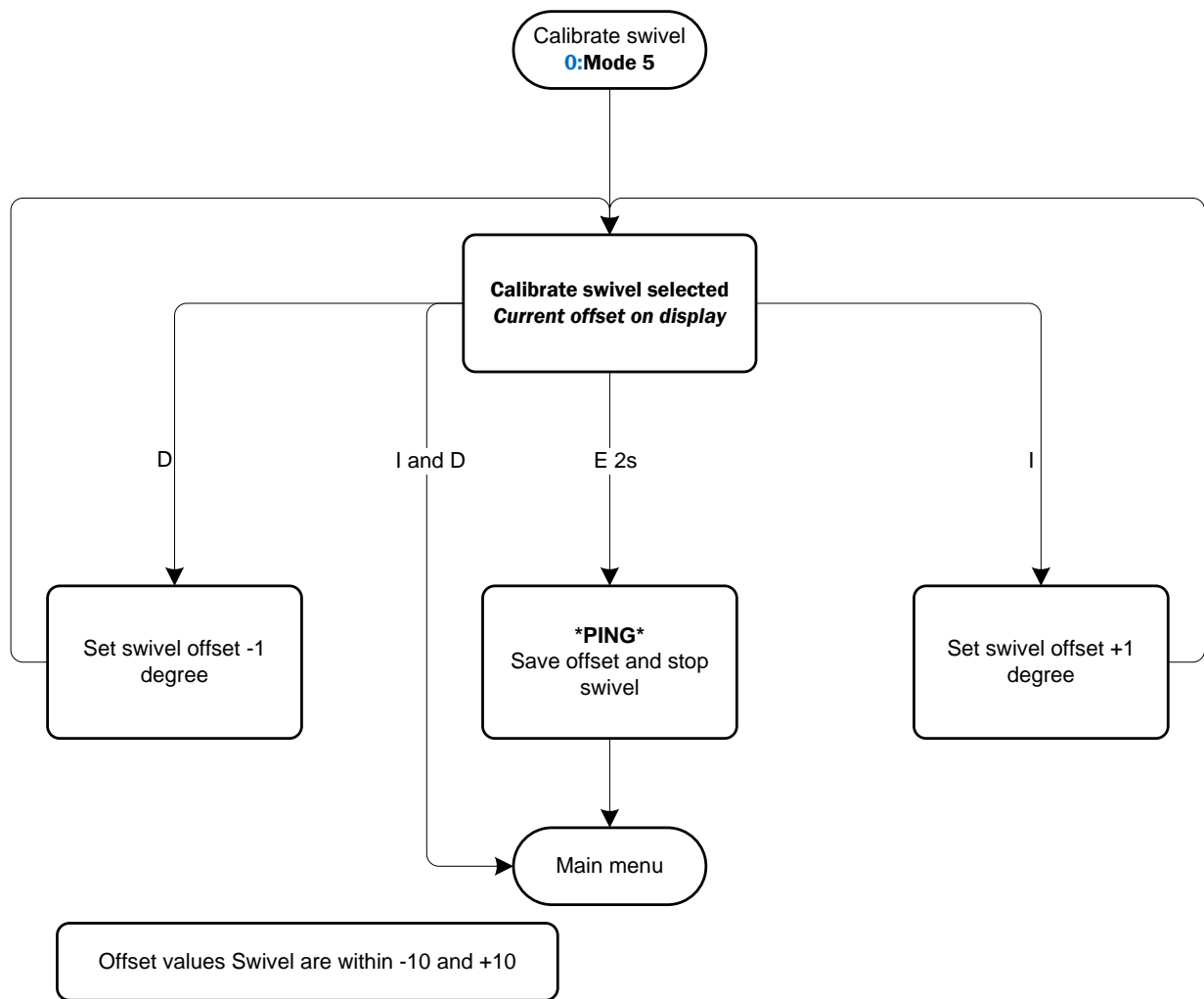
5.3 Mode 3



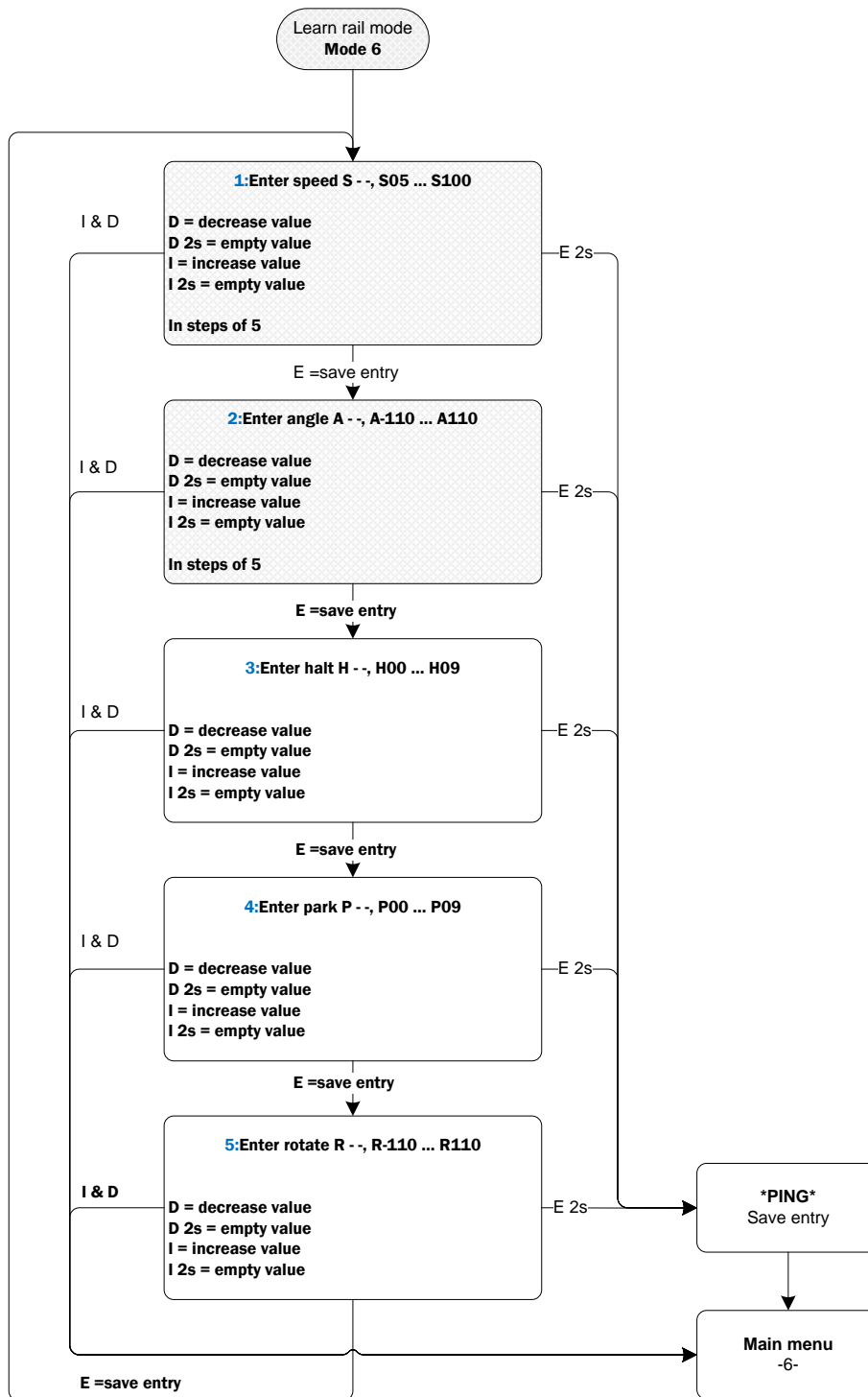
5.4 Mode 4



5.5 Mode 5



5.6 Mode 6



Actions need to be stored/saved individually (up until R31 at least; change request pending)

Settings can only be stored if position information available.

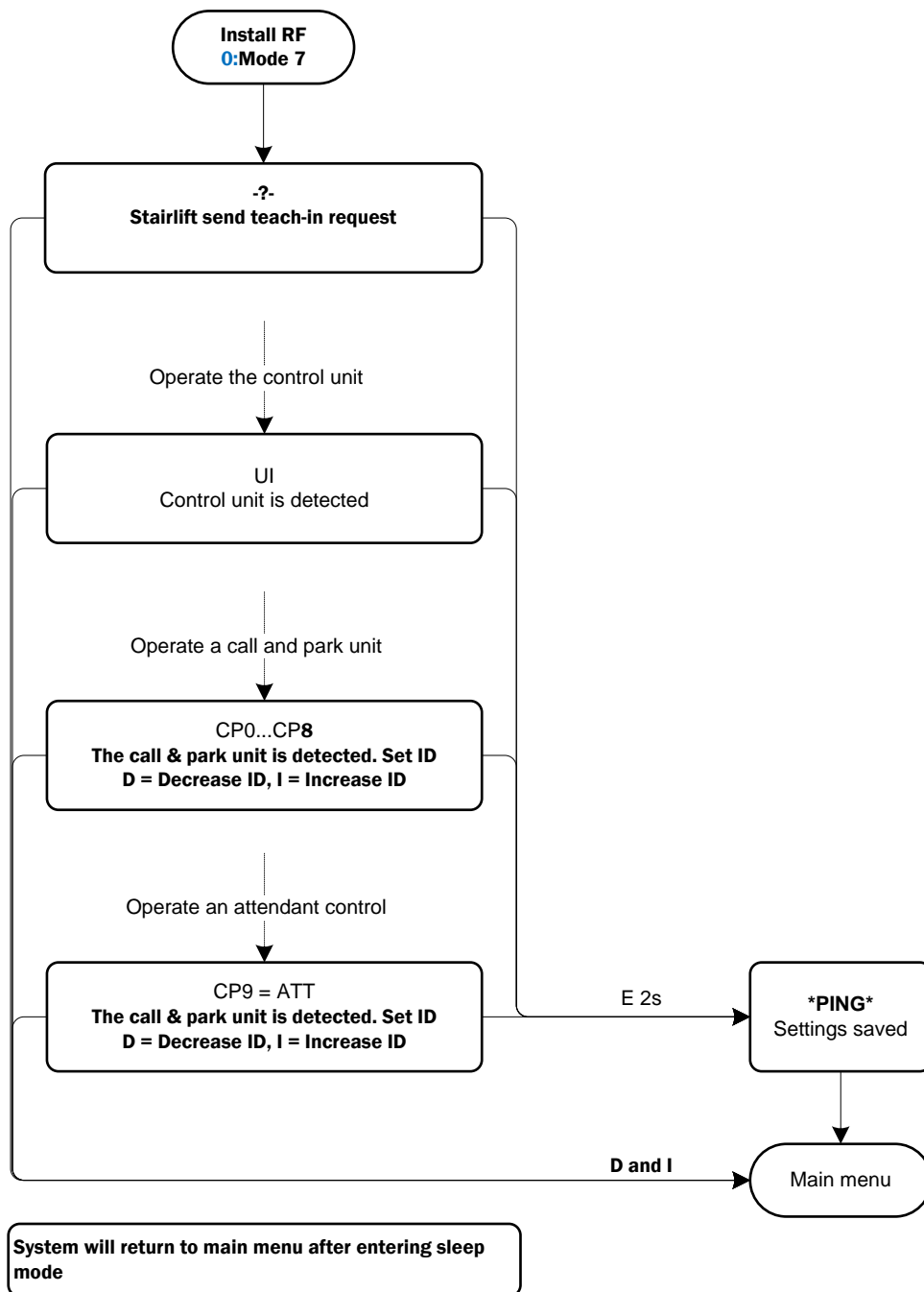
The stairlift can be driven to next setpoint while in menu using special drive-in joystick (not via buttons, UI or C&P, only drive-in joystick)

Driving stops automatically at next stored position of the setting selected.

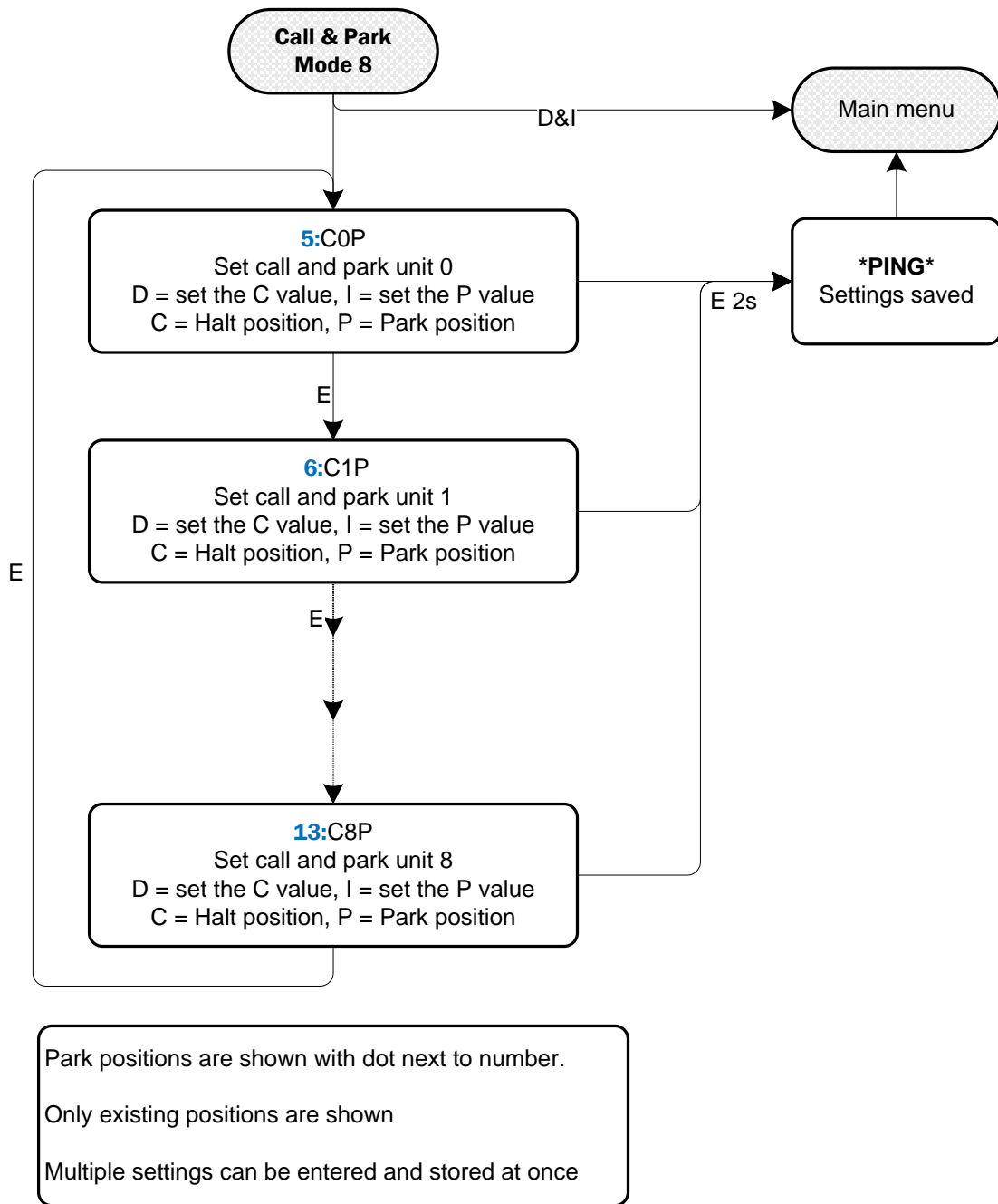
10 stop positions can be stored as either Halt or Park (so H00 and P00 do not simultaneously exist)

If the system gets to the negative charging contact and sees the reset, it shows rSt and resets it's position.

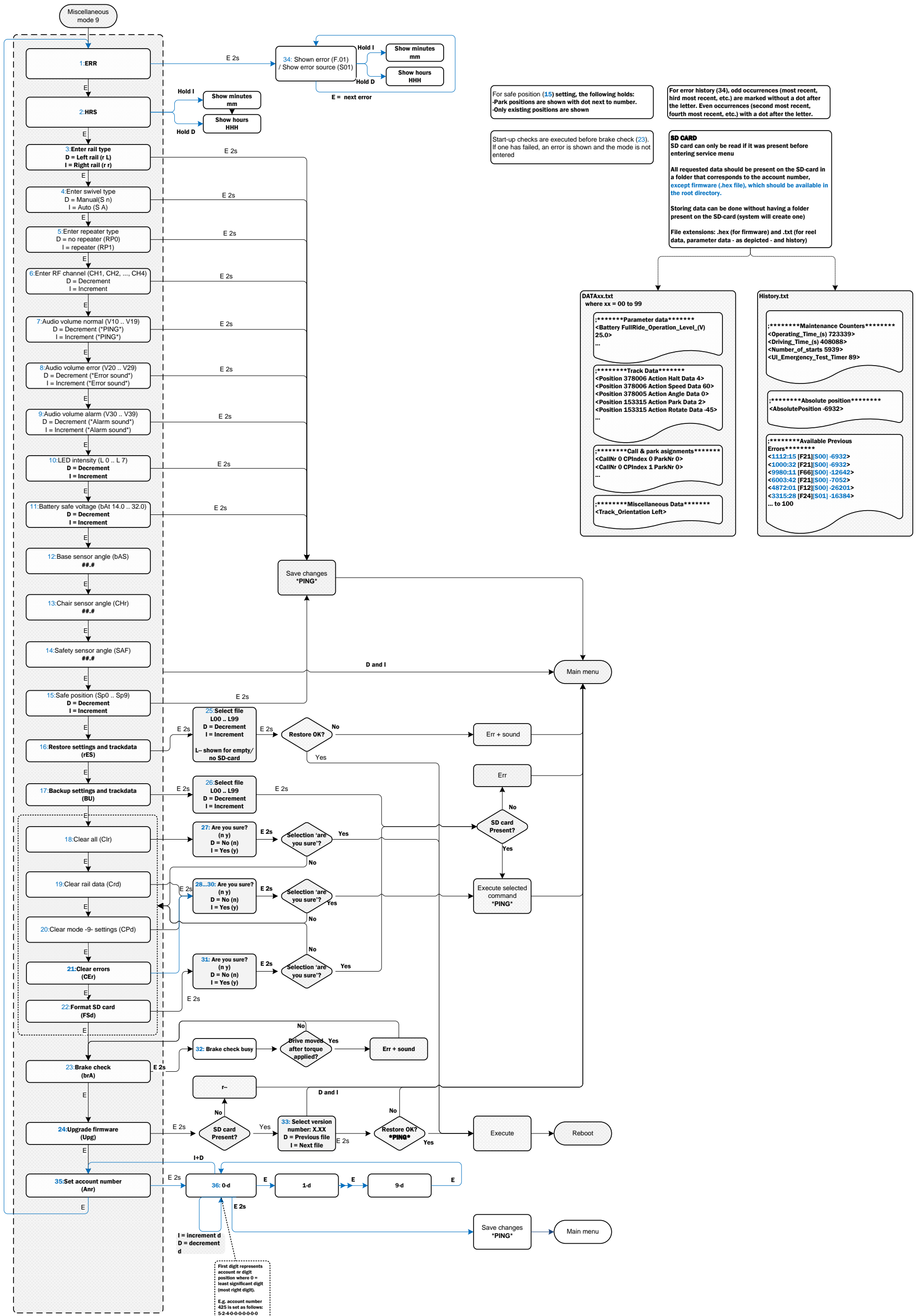
5.7 Mode 7



5.8 Mode 8



5.9 Mode 9



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