



# Manual

# F5021B

*Lift controller 32 bit system*

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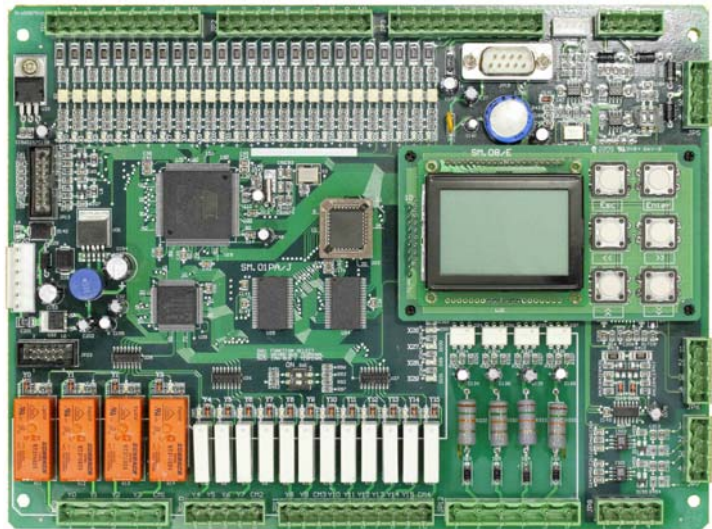
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## 1. F5021 Main board

### Product characteristics

- À 32bit processor ARM7 industrial standard
- À Double-processor-architektur for extended security needs
- À 2x CAN interfaces separate for internal and external communication
- À high EMV-stability (EFT-4000V)
- À high ESD- stability (ESD 8000V)
- À certified for EN81, GB7588, CE



### Functionality area

- À For rope- and hydraulik-lifts
- À A lot of functions possible to parametrize for nearly all kinds of lifts.
- À Lifts from 0,63m/s to 4m/s.
- À Up to 64stops, also with selective door controlling
- À Replace the 16bit-board F2021 (longtime supply with replacement parts is secured)
- À Analoge or digital triggering of the frequency inverter respectively chopper.
- À Shaftdetection via incremental shaft encoder (RS422, HTL, SSI)
- À Duplex groupe function integrated, possible to extend up to group times 8
- À Weight compensation at start-up with according weight measuring system.
- À ID-card system (credit card -transponder) possible to integrate.
- À Remote control locally and globally
- À Graphical LCD direct on board or a separate controller.
- À Description of Drive cycle, on- and off- activities, status information etc.
- À Error information memory (20 digits) with real-time coverage and full text advice.
- À As standard are 2 cabine doors, possible to expand for 3 doors.
- À Lot of special features, e.g. automatical evacuation with choose of direction conditioned to the weight.





## 2. System overview

SmartCom is a modern, based on newest technology controller system, especially for elevators.

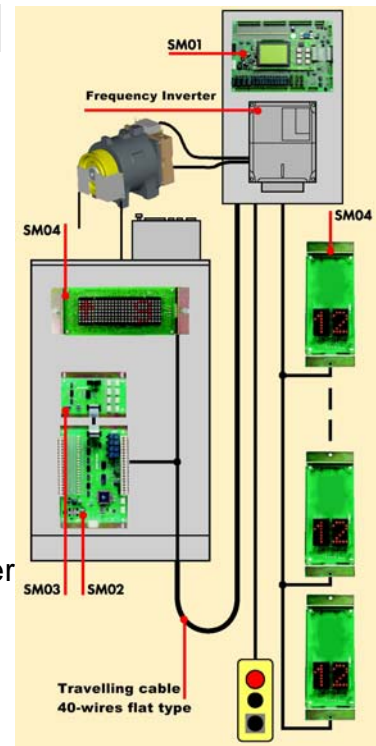
The system basically composed of following components:

- x Main module SM01
- x Car module SM02
- x Command-module SM03
- x Floor module SM04
- x Expansion module SM09

Different variations of the several modules make the best and optimized adjustment of the controller system possible for the respective lift and the requested functionality area.

Based on the never changing CAN-journal its possible to realize controller for simple and complex lifts.

All components are, due to the CAN-systems, nearly in any order possible to be combined, and after all possible to be extended.



### Main module SM01

The main module is in the Controlcabinet and is the heart of the controller. It contains all functions, especially triggering the handler, recognize the position of the lift and lots of parameters, which are normally directed to the shaft and the engine room. It is communicating with the other modules via CAN-Bus.

### Car module SM02

All functions, which are directed to the car, are done by the car module. It is linked via CAN with the main module.

There are two possible options, the „classic“ with only one module SM02/03, and from now on the, with 32bit Board F5021 established „spreaded“ option. In this case there are each a SM02/H in the Inspection box and a SM02/G in the car operation panel (COP) used. Due to this, the till now needed 36pin cable from the Inspection box to the COP, is reduced to a maximum of 12 pins. Now the connection for up to 3 cabinet tables or side, console panel via CAN is really easy.

### Command-module SM03

This module is connected with the cabinet module. It is possible to connect 8 of these modules with one SM02. One command module allocate 8 entrances for inside commands and 8 outputs for the respective indication.

### Floor module SM04

Modules of this kind of art can be used as well as floor display in the car or as floor module with floor display and driving display at the floors. The addressing is really simple without any tools, by settings via the floor push buttons or via the DIL-switches.

The SM04 is available in different forms: horizontal, vertical and vertical slim. The Displays are different in their kind of art and coverage and its also possible to be manufactured client-specific. They are all communicating via CAN-Bus and can be teamed together nearly in any order.

At the floors, the Exterior call buttons and key buttons will be connected with the AM04 modules (Display + CAN-module) for special features. New modules also allow the connection of a speaker to make possible the, in EN81-70 required, „tones“.

### Extra module SM09

Via this module client specific special features can be complemented without changing the central module. For example the connection to lift-maintenance-systems of the client or additional alerts, etc.

### Function overview

Standardfunktionen		
1	Collectioncontrolling	Collecting hall calls with respect on the given direction
2	Inspection Drive	Manual drive up and down. Within the area of doors, the door open button can be used for opening the door.
3	Self liberation with slow drive	In case of missing the door area within the normal mode, the lift is driving slowly with closed safets circuit into flush position and open the door.
4	Test dive	For Testcases, the lift can do a indicated number of accidentally test drives.
5	Real time clock	Errors are registred with date and time. Time-dependent funktions can be activated.
6	Time to keep doors open	Dependent of the kind of call(interior, exterior, service, special call), the time to deep doors open can be indicated.
7	Door opening by lokal call	Is the lift allready in the floor from which the call comes, the door opens. With the Door open button, the door can be kept in open position
8	Early door closing	With the Close door button, the door can be closed, earlier than the keep door open time frame.
9	Forced opening of doors	Inside the door area, with the Door open botten, the door opening can be forced for closed doors or doors which are actually close.
10	Controlling of door closing. (return motion automatic)	In case the bar is not closed within 15 sec. after arrival at the door-close-endswitch, the door open again for a new try.
11	Controlling of door opening	In case that 15 seconds after the door opened and the door-openswitch is not activated, the door is closing until further command.
12	Call cancel	By double-pushing a call button, the call is canceled.
13	Terminal stops	At paramount stage the up command gets canceled, at the lowermost stage the down command gets canceled.
14	Direct drive	Direct drive without rat run. This function is activated at standard when incremental detection and analog trigger of the inverter.  The driving cycle is preset by the controller. There are no special demands on the inverter.
15	Cabinet full	If full load, the cabinet do not stop anymore for hall calls.
16	Cabinet light cut off	After 5 minutes without any activity, the cabinet light will be switched off.
17	Park drive	After an indicated time without any activity, the lift drives to the main purchase postion.
18	LCD controller	Graphical display with comprehensive status informations and menu navigation.
19	Analoge speed control	The rotation speed of the frequency inverter is triggered by the analog output







20	Digitale speed control	Alternatively the speed can be controlled via contactors
21	Error memory	The last 20 Errors get saved and displayed with information of time, floor and error code.
22	Learn trip for schaft information	The controller is learning with encoders and floor flags the bulk of the schaft and stopping distance. After that, the lift can merge into standard mode.
23	Floor approval	Free adjustments of floors, which can be departed.
24	Adjustment of the floor display	The icons, which should appear in the respective floors, can be free adjusted to a large extent.
25	Liftboy control	The lift gets driven via interior control manually. Hall calls will be served.
26	Priority inside	Hall calls are deactivated only interior calls are effective. The door must be closed with the door-close-button. The Push-button have to be compressed until the close-door-end-switch is activated.
27	LED-dot matrix-display, LCD graphic-display	At every stop there ist a dot matrix display with floor update, direction and status. The user can see that there is something going on.
28	Display with roll function	Respectively to the drive direction, the display is „rolling“.
29	Automatic schaft data correction	Continously the schaft datas gets corrected
30	Remote off	The lift can be shut down, but before all still open cabinet commands need to be completed.
31	Door only opens inside the door areas	Outside the door areas, the cabinet doors can not be opened.
32	Safty light barrier/ light gate	The safty light barrier/ light gate gets evaluated by the controller. In case of activation, the controller avoids closing the door.
33	Overload	In case of overload, the door stay open and an alert sounds (buzzer)
34	Abuse recognition	If the cabinet is empty (empty load) the number of cabinet calls is bordered.
35	Stop in case of wrong agitator direction	In case the controller recognize a wrong agitator direction the handler gets stopped.
36	Drive inspection (skidding)	If the cabinet is not moving despite active handler, the handler gets stopped after 40 seconds (drive inspection). New drives only possible after Reset.
37	Inspection of traction	In case of cabinet is moven despite deadlock, alarm get raised.
38	Inspections end switch	The inspections end switch avoid, that the lift drives to the emergency limit switch during inspections, return motion drives or learn trip.
39	Contactore monitoring	The controller check at every drive the correct functionallity of the main contactors and brake contactore .
40	Speed monitoring	If over speed is detected an emergency stop will be effected
41	CPU monitoring	The processor is monitored by watchdog, if needed restarted.
Optionale functions		
1	preopening doors	Using safty circuit
2	relelling with open doors	Using safty circuit. At hydraulic lifts standard function
3	Fire controll	In case of fire signal the lift drive to the fire floor and stay there with open door.
4	Fireman control	All commands get canceled and the lift drives to the fire floor stage. Now the firemen can use the lift. The door is not open atuomatically, but have to be opened with the door-open-button. Unhand the button makes the doors closing immediatelly.  European (EN81) und Russian (PUBEL) variant.
5	Additional COP	It is easy to install a second car operation panel
6	COP for 2 <sup>nd</sup> door	Selective door control
7	Disabled COP	Particular COP (e.g. desk COP) for disabled people (longer door

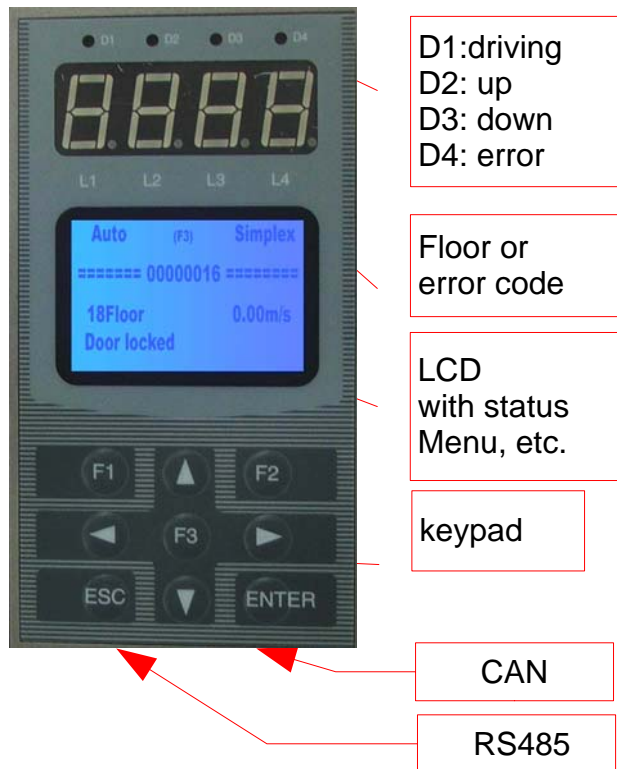
## Manual F5021B - System overview

8	Duplex-function	opening times) Via the second CAN-Bus 2 lifts can be connected to a two- group. The lifts than parting calls respective to the actual situation; so it can be achieved that the times of waiting can be reduced to a minimum. In addition there can be activated a function, that, if there are no more open calls, the one of the lifts which is nearer the main stop position, gets driven there and keep it prepared there.
9	Group function	With a optional group controller board, lift groups with up to 8 lifts can be realized. The group control collects the hall calls and allocate these respectively to the condition of the several lifts in order to reach short time of waiting.
10	Rush hour handling – fill up building	Via internal time frame inputs, the capacity can be adapted to the building. (type office buildings)
11	Rush hour handling – clear building	Via internal time frame inputs, the capacity can be adapted to the building. (type office buildings)
12	Distribution of waiting lifts	If there are no more open calls, the lifts of the group get distributed after 1 min. in the building, means one drives to main stop position, the others disperse themselves, in order to achieve short waiting times.
13	Interface to building control service engineering	RS485 interface for connection to a PC of the building control service engineering.
14	Remote control	The lift can be integrated into a region comprehensive remote control system.
15	Lift arrival gong	During the drive in, the gong on the cabin roof or under the cabin floor, about the arrival of the lift.
16	direction indicator HOP	Inside the exterior panels it is possible to install an optical and akustical continued travel display.
17	Floor gong	For every stop an lift arrival gong can be arranged.
18	Card reader in the cabin	With a transponder card, either a specific call can be activated or defined calls can be approved.
19	Card reader at the floor	Approval of exterior calls
20	Selective door triggering	Frontside and backside of the lift can be controlled separately.
21	Scramble	After one minute the door is closing slowly despite of the safety light barrier.
22	VIP Service	A key switch in exterior panels cancels all hall calls and fetches the empty cabin. Now multiple interior calls can be done. After these calls are done, the lift change back to standard handling.
23	PIN entry via Push buttons	For certain floor approvals the Push buttons can be used for entering a PIN.
24	Local controlled floor approval	For several and duplex lifts a changed floor approval via key switch can be activated.
25	Via group controlled floor approval	Floor approvals can be temporary changed via the group add-on.
26	Temporary block of several floors	Temporary, the user can block floors
27	Automatic evacuation	In case of black out with following auxiliary power supply, the cabin will be driven to the next stop.
28	Auxiliary power supply evacuation	For lift groups an evacuation will be done separate one after another
29	Earthquake function	Lift get stopped during the drive and will be driven to the evacuation stop.
30	Voice message	Serial and parallel access for voice message

### 3. Operation equipment

Overview of push button functions:

	Next parameter/ menu item Increase the number of selected decimal
	Former parameter/ menu item Decrease the number of selected decimal
	Jump 10 parameters back, one decimal place to the left
	Jump 10 parameters forward, one decimal place to the right
ENTER	Access parameter menu parameter set/adopt
ESC	Parameter/menu item leaving
F1 2x F1 3x F1	Hot key: change from status-window to error display, to encoder diagnostic and to CAN-diagnostic
F2 2x F2	Hot key: change to call entry and to status display of in-/outputs.
F3	Hot key: to travel cycle display
All functions from F1 to F3 also accessible via the menu!	



Optional a control element can be directly inserted on board F5021B, or the external control element can be connected with a special cable with the 9pin Sub-D-linkage JP15. The USB-plug of the cable have to be plugged in the left plug (RS485). A plug-in into the right plub by mistake arose no claims, the control element is just not working.

**Attention!** Never use the special cable to link with the PC. The PC can be damaged!

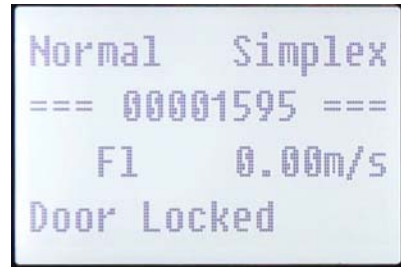
**Again Attention!**

The inserted control element and the external control element may not be connected at the same time! In case this occurs, there won't be any damage, but the parameter are not possible to be setted because two control elements at one time are not allowed to access the parameter memory!



## Handling:

The handling via the inserted control element and the external control element are identical. The external control element processes additionally to the shortcuts F1, F2 and F3 whereby assigned diagnostic-windows directly can be recalled. At the inserted control element all windows only accessible via the menu.



Start window

## Log-in:

In order to see the status and for setting parameters, first you have to log-in. In case you are not logged in yet, it is displayed after pushing the ENTER button the window for log-in. By default the password is „1234“. After log-in it is possible to change this in „Chg.Password“. Attention! Do not forget the password!. The controller can without password only in the factory be unlocked!

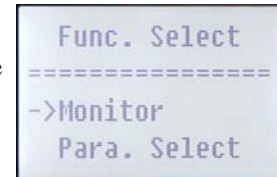


Log-in

## Menu

The complete menu tree you can find in: “Menu tree & parameter“.

The start window shows mode, group status, journey counter, floor, speed and the actual activity. With Enter you can change to the main menu. Repushing Enter show you the monitor-menu auf, which occupies all diagnostic windows.



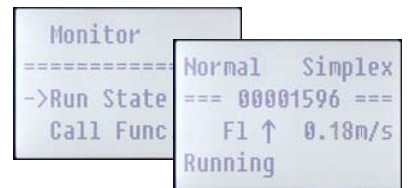
Main menu

## Status window in Submenu „Monitor“

Run State is the start window.

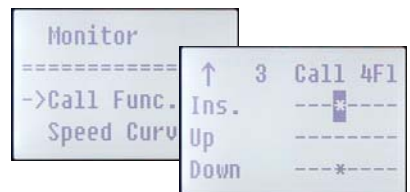
In the first line you can see the mode (Normal, Inspection, Fire Return, Firemen, Park) and the group status (Simplex, Group).

Among the journey counter, floor, speed and actual activity.



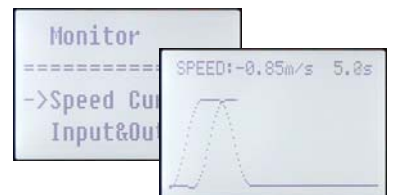
In Call. Func. are displayed the actual calls and it is also possible to enter calls (with the arrow buttons on the respective call and Enter).

Cabin call, hall calls for up and down.



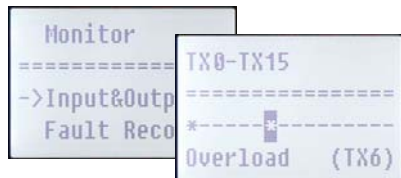
Speed Curve is the graphical display of the as-is-value (of the encoder) of the speed.

Above it is displayed the actual speed value and the time of journey.



At the window Input&Output it is possible to display all outputs and inputs. With the up/down-buttons you can switch between the several 16fold groups. With the right/left-buttons a single input/output can be marked. Then in the line among is shown the function of the input/output.

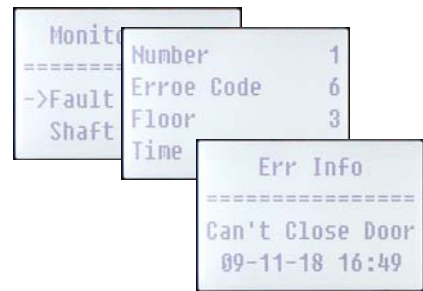
The marking X (inputs SM01) and Y (outputs SM01), also TX (inputs SM02) and TY (outputs SM02) you can find again in the diagram.



In the error memory (Fault Record) there are displayed the last 20 errors with date, time and floor.

The latest error is displayed at first.

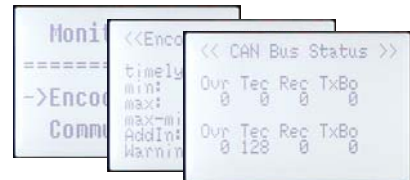
With up/down you can move between the items in the list. With Enter an additional window pops up, in which date, time and full-text-error message is displayed.



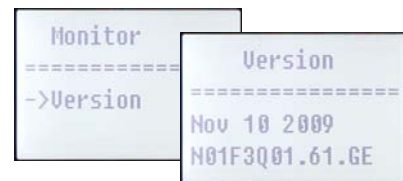
The list Shaft Data contains the floor postions in mm which were identified at the learn trip. If there are problems in the shaft selection you can really fast identify if the floors were learned correctly.



The two windows Encoder Eva and Communication are helpful if you have problems with the encoder or the CAN-bus.



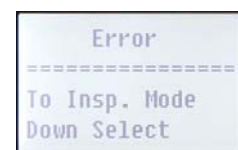
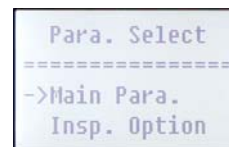
In the version window are shown date and version number of the firmware. Before doing an update it should be checked if the new software is really more active than the allready existing version.



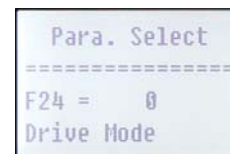
## Parameter setting in the sub menu Para.Select

Via the parameter menu you can access to the numerous parameters. There are parameter groups, in which the parameters combined thematically (e.g. engine or door parameter), as well as a list in which all parameters are sorted by numbers.

Most of the parameters can only be setted in the inspection or return motion mode. If the alert window shows up, switch to inspection.



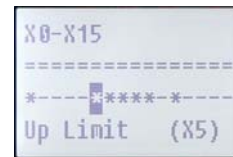
All parameter are achived as 16bit integer. Most of them are shown as decimal, with adjustment value (e.g. means the value 50 at a device of 0,1s a parameter value of 5 seconds).



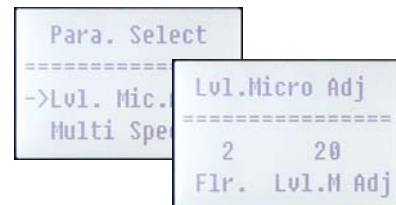
Some parameters are available as bitmask. Indeed is shown the decimal, at once you want to set the value, it will be shown as bitmask and you can set it with right/left button (move between the bits) and up/down button (\* means setted/ - means canceled).

In the line below shows up the description of the bit.

Thus you can configure e.g. for every several input the logic (\*NC/-NO)

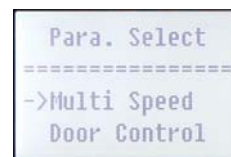


Lvl.Mic.Adj. allows you the correction of serverl precisions in all floors. Normally this is not necessary as the floors get messured at the learn trip.

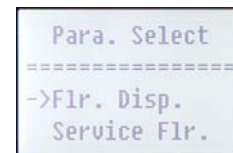


Multi Speed contains all parameters, which are necessary for the handling of the frequency inverters in multistep-mode (prallel control).

Door Control allows you to set parameter for the lift-door-control.



Flr.Disp. Guides you to the list with floor displays. For every floor it is possible to do the settings for the displayed letter-combination. (at Step SM04 displays). At the same time, the display code configure the voice message, which get annouced at the respective floor when lift drives in. The display codes are configured in a table in the attachment.

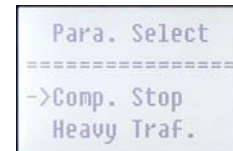


Service Floor configure the floors, which are approved. Furthermore floors can be configured, which are only can be unblocked via key-switch.



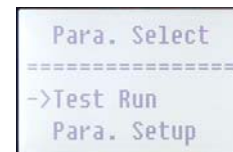
Block Floor allow the locking of a floor by time or key-switch.

Comp. Stop (forced stop) define stops, at which the lift by passing enforced stops. In some cases it make sence for hotels.



Heavy Traf. Allows the configuration of the function fill-up building and clear building. By this, especially for office buildings, it is possible to improve the hoisting capacity.

In Test Run it is possible to configure the parameter F34 to a number of journeys, the lift have to do test journey without any commands (accidentially).

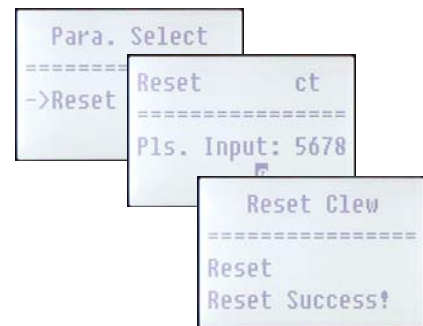


Para. Setup is the access to the complete parameter list.

Reset restores all parameters to factory setting. This should only be done if absolutely necessary. Before Reset there have to be entered a number in order to avoid to do a reset by mistake.

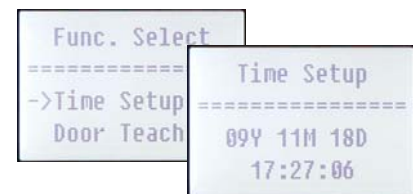
Attention! After entry of the number the reset of all parameters starts without any further query!

F146 necessarily have to be setted to "0"!

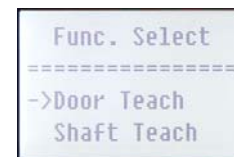


## Different functions (Func.Select)

**Time Setup:** Configuration of the real time clock. This is used for Error recording and the time relevant floor approvals and the functions fill-up building and clear building.

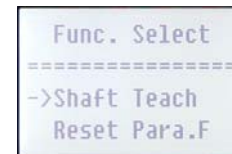


**Door Teach:** Detect by opening and closing the function of the door-end-switches.



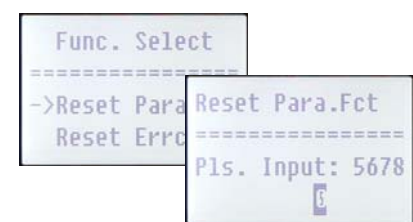
**Shaft Teach:** learn trip, have to be done before switch to standard mode (after installation or change of door positions).

Door, bus, shaft selection and cabine light have to operate correctly. After activation of the learn trip, the lift is driving self-consistent to the lowermost stop and starts the learn trip. As soon as the learn trip is finished, the lift can be switched to standard mode. If an Error occurs, the learn trip is stopped with an error message.



**Reset Para.F:** Restore to factory setting!!!

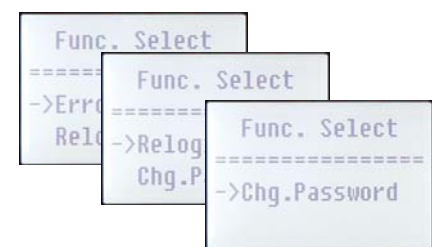
**Reset Errco.:** Clearance of the error memory!



**Error Reset:** Reset after Lift Error (fatal error) as e.g. drive monitoring, contactor monitoring, brake monitoring, etc.

**Relogin:** Log out and if so new log in. Normally after 10 minutes without operation the log out is automatically.

**Chg.Password:** Changing password. Attention! Do not forget password! Only possible to can be restored without password in the factory!







## 4.Menu tree & parameter

Func.Select	Monitor	Run State	Status of the lift (Floor, speed,. etc.)
		Call Func	Enter and display calls
		Speed Curve	Graphical display of the speed curve
		Input&Output	Status of the inputs and outputs
		Fault Record	Error memory
		Shaft Data	List of floor values
		Encoder	Analysis of encoder
		Communicat.	Analysis of CAN-system
		Version	Display of software version
Para.Select		Main Para.	Basic parameter
		Insp.Option	Inspection parameter
		S-Curve	Travel cycle parameter
		Lvl.Mic.Adj	Fine adjustment precision
		Multi Speed	Parameter for multistep operation
		Door Control	Door-parameter
		Flr.Disp.	Adjustment of floor display
		Service Flr.	Floor approval
		Block Flr.	Floor blocking (access control)
		Comp.Stop	Define forced stops
		Heavy Traf.	Fill-up building/ clear building
		Test Run	Number of accidental test drives
		Para.Setup	All parameters in one list
		Reset	Restore to factory setting!
Func.Select		Time Setup	Configure time
		Door Teach	Learns door-end-switches
		Shaft Teach	learn trip shaft
		Reset Para.F	Parameter to factory setting
		Reset Errco.	Reset Error memory
Error Reset			Reset from error mode
Relogin			Again log-in
Chg.Password			Password change

Basic-parameter (Main Para.)

No.	Standard	Description	Advise
F6	1m/s	Nominal speed lift	
F7	1450rpm	Nominal rotation speed engine	
F8	1024ppr	Encoder pulses	
F24	1	Trigger of FU analog	
F11	18	Number of floors	
F182	1	Number of delay switches	
F60	3	motor contactors : 3= K1 and K2 after the inverter and monitored	
F36	0	Break-monitoring-switch, 0= no monitoring	
F153	0	Door lock det. type	
F156	1	Safety loop type	
F62	32	Journey time monitoring. For test set to 2s.	
F25	35296	Configureing, if the several inputs wired as closer (NO=normally open) or as opener (NC=normally closed). Depends on the diagram and the conected switches	Bitmasks
F26	83		
F27	835		
F28	0		
F23	0	Group function 09as Simplex, or rather Duplex-master 19as Duplex Slave 29as for external groupe processor 39as at group-ring (look at F181)	
F181	0	Lift number within a group: minimum value have most priority. (F32=3)	0~7; for F23=3

Inspections-parameter (Insp.Option)

No.	Value	Description	Advise
F201	0	at 1 it is possible to drive above the reference-journey-end-switch	For test purpose
F200	0	Distance for early stop at paramount stop (headgear)	mostly UK
F40		Top Access Dis.	
F42		Bot.Access Dis.	
F64	1	0= no door operation for inspection	
F165	Bit 1=0	Bit 1 avoid movements of door at inspection (door B)	

Travel cycle parameter (S-Curve)

No.	Value	Description	Advise
F0	0,55m/s <sup>2</sup>	Acceleration	
F1	0,55m/s <sup>2</sup>	Deceleration	
F2	1,3s	Rounding at start	

No.	Value	Description	Advise
F3	1,1s	Rounding at the change to constant drive	
F4	1,1s	Rounding at leaving of constant drive	
F5	1,3s	Rounding at stopping	
F12	0,25m/s	Inspection speed VI	
F13	0,06m/s	Levelling speed VN	
F48		Down Rev. Speed	
F183	0,8m/s	learn trip speed (for analog-trigger)	
F21	6mm	V0 stop distance	
F175	0,06m/s	Creep speed at start	
F186	0,5s	Time of creep speed at start	
F180	100,00%	Analog value at nominal speed (Vmax)	
F16	0,2	Time between inverter run signal and break release	
F58	0,5	Deceleration of the driving cycle at start	
F17	0,6	Deceleration of break after rotation speed Zero	
F122	0,3s	Time between break off and direction off	
F141	0,5s	Time between inverter run signal off and motor contactors off	
F144	0	Time between inverter direction off and inverter run signal off	
F56	50	Stopping distance up, >100 stop with creep speed	
F57	50	Stopping distance down, >100 stop with creep speed	
F126	300mm	Short-journey deceleration distance	
F193	0	Empty load-compensation	Only relevant for very high assets in order to balance the weight of the ropes.
F194	0	Full load compensation lowmost stop	
F195	0	Full load compensation paramount stop	

### Multistep-parameter (Multi Speed)

No.	Value	Description	Advise
F32	0	Type of frequency inverter: 0: YASKAWA,CT,FUJI,iAStar 1: SIEMENS 2: KEB 3: MICO 4: SIEI 5: Dietz 6: NEW FUJI 7: user-defined (look at F240:* F249)	
F63	2	Number of drive positions at Multistep-controller of inverter	
F16	0,2s	Deceleration between inverter run signal and break contactor on.	
F17	0,6s	Deceleration between inverter stop command and break contactor off	

## Manual F5021B - Menu tree & parameter

No.	Value	Description	Advise
F58	0,5s	Deceleration between FU run signal and start of drive cycle	
F122	0,3s	Time between break off and FU drive signal off (speed and direction) .	
F141	0,5s	Follow-up time of the engine-schuetze: approval off=>Schuetze off.	
F144	0,000s	Follow-up FU-approval after switch off the direction signal.	
F21	6mm	V0 stop distance	
F45	1,300m	Breaking distance for V1 (floor drive)	
F46	2,900m	Breaking distance for V2 (2 floors drive)	
F47	4,000m	Breaking distance for V3 (more floors drive)	
F157	5,500m	Breaking distance for V4 at 4 floors drive (for fast lifts)	
F158	6,500m	Breaking distance for V5 at 5 floors drive (fast lifts)	
F126	300	Short drive deceleration distance	
F143	0	spare	
F147	0	spare	
F56	0	Fine adjustment for stopping upwards: 50 for direct drive in, >100 with creep speed	
F57	0	Fine adjustment for stopping downwards: 50 for direct drive in, >100 with creep speed	
F240	0	Release brake	User defined Multistep control of the frequency inverter: F24 = 090 F32 = 7
F241	4	Inspection slow	
F242	4	Releveling	
F243	3	Creep speed	
F244	4	Inspection fast	
F245	5	Speed floor-drive-in	
F246	6	Speed 2-floor-drive-in	
F247	7	Speed 3-floor-drive-in	
F248	1	Speed 4-floor-drive-in	
F249	2	Speed 5-floor-drive-in	

### door Parameter (Door Control)

No.	Value	Description	Advise
F50	65535	Door A approval floor 1 to 16	
F51	65535	Door A approval floor 17 to 32	
F52	65535	Door A approval floor 33 to 48	
F191	65535	Door A approval floor 49 to 64	
F53	0	Door B approval floor 1 to 16	
F54	0	Door B approval floor 17 to 32	

F55	0	Door B approval floor 33 to 48	
F192	0	Door B approval floor 49 to 64	
F128	0	0= charging, 1 = selective door control	
F130	0	Door control (keep closed/keep open): 09 <del>no</del> keeping of closed/open Bit 19 <del>keep</del> door open (in case cabin door get drawn back from shaft door) Bit 29 <del>keep</del> door closed (in case door-bracing opens without keep-shut moment) Bit 39 <del>keep</del> shut during travel (in case door-braking would bump against the bar) Bit 49 <del>no</del> door-close-end-switch Bit 59 <del>AT</del> 120 door control Bit 69 <del>an</del> manual door	
F140	0	At door open, second doorzone active: 09 <del>X</del> 9/X10 configures door opening. 19 <del>X</del> 18 configures door opening	
F129	0	re-levelling with open door/ in advance door opening (require safety circuit): 09 <del>no</del> safety circuit 19 <del>pre</del> opening door 29 <del>re</del> -levelling with open door 39 <del>both</del>	
F14		Door-open-time frame after hallr call	
F15		Door-open-time frame after car call	
F121	0	Door scramble: 09 <del>on</del> , 19 <del>off</del>	
F115	15	Run-time at door closing (in case there is no end-switch)	
F116	15	Run-time at door opening (in case there is no end-switch)	
F117	60s	Door open time frame after confirmation keep-door-open-button.	
F118	30s	Door open time frame after confirmation open-door for disabled person.	
F165	0	Door opening functionality: Bit 1: no opening/ closing during inspection. Bit 2: no opening of doors during test mode Bit 3: Door A basic postion open at main stop Bit 4: Door A basic postion open at every stop Bit 5: Door B basic postion open at main stop Bit 6: Door B basic postion open at every stop	
F142	0,1s	Follow-up time of the door-engine-contactors (after end-switch confirmation)	
F145	2	spare	
F119	0	Door mode when priority inside 09 <del>keep</del> close-door-button pushed for closing the door 19 <del>no</del> door is closing after command	

## Floor display adjustment (Flr.Disp.)

No.	Value	Description	Advise
F65	49	Display Code for floor 1	

## Manual F5021B - Menu tree & parameter

F66	1	Display Code for floor 2	
F67	etc.	Display-codes in respect to the table in the attachment.	

### Floor approval (Service Flr.)

No.	Value	Description	Advise
F29	65535	Approval floors 1 - 16	Enter as bitmask!
F30	65535	Approval floors 17 - 32	
F31	65535	Approval floors 33 - 48	
F190	65535	Approval floors 49-64	
F137	65535	Defines floors, which can be blocked with key-switch: Bitmask 1-16	
F138	65535	Bitmask 17-32	
F139	65535	Bitmask 33-48	
F199	65535	Bitmask 49-64	
F236	65535	NS-CB Floor 1-16	
F237	65535	NS-CB Floor 17-32	
F238	65535	NS-CB Floor 33-48	
F239	65535	NS-CB Floor 49-64	

### Floor blocking (Floor Block)

No.	Value	Description	Advise
F161	0	Floor blocking (F137,F138,F139) 0: no block 1: block by time F131 2: block by key-switch	
F131	0	Floors able to block 0: inactive 1:* 64: number of the floor to block.	
F132	0	Time from when floor <F131> have to be blocked: e.g. 730 for 7:30.	
F133	0	Time from when floor <F131> have to be un-locked. e.g.: 930 for 9:30.	

### Forced stop definition (Comp. Stp.)

No.	Value	Description	Advice
F134	65535	Bitmask floors 1 - 16	When crossing the setted floors, the lift mandatory stops, even without command.
F135	65535	Bitmask floors 17 - 32	
F136	65535	Bitmask floors 33 - 48	Makes only sence in hotels.

### Fill-up building/clear building definition (Heavy Traf.)

No.	Value	Description	Advice
-----	-------	-------------	--------

F231	0	Approval for function fill-up building/ clear building 0: no function 1: fill-up building 2: clear building 3: both functions	
F232	730	Starting time for fill-up building: e.g. 730 means 7:30	
F233	930	Finish time for fill-up building: e.g. 930 means 9:30	
F234	1700	Starting time for clear building: z.B. 1700 means 17:00	
F235	1830	Finish time for clear building: z.B. 1830 means 18:30	





## 5. Shaft selection

The shaft selection consists of an incremental encoder and solenoid switches, respectively sensors.

The incremental encoder optionally is positioned on the engine or in the shaft.

Especially for rope lifts it is used the encoder of the engine, which can hand over at the most of the frequency inverters via encoder output (encoder simulation) to the controller.

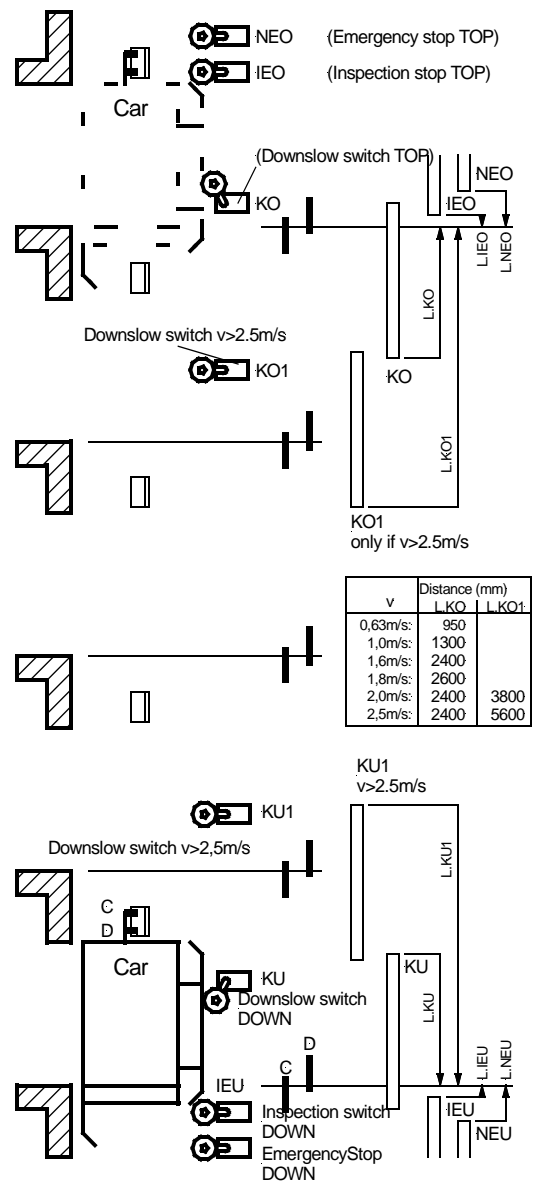
In this case it is entered the effective data for the parameters F6 (nominal speed), F7 (engine speed) and F8 (encoder release).

For slowly running synchronous motors it mostly have to be juggled with the parameters nominal-rotation-speed and encounter-puls-rate. E.g. 150U/min at 2048ppr changed to 600U/min (\*4) and 512 ppr.

If the encoder is assembled in the shaft (rotating string) for the nominal-rotation-speed have to be entered an equivalence-rotation-speed (equates encoder-rotation-speed).

For the system used by us with carbon cord show up the following values:

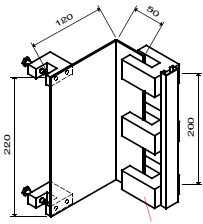
(F7)	0,8	1	1,2	1,4	1,6	m/s
(F8)	294	367	441	514	588	RPM



### re-levelling sensors:

As the shaft selection is done with the engine encoder, the slip of the tractions sheave have to be compensated. For this, there are in every floor re-levelling-plates installed with about 220mm length. (The

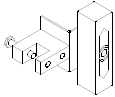
## Manual F5021B - Shaft selection



length is not important, but it have to be identic in all floors).

This plate will be evaluated by two inductiv sensors C and D. C is the upper, D the lower.

### Solenoid switch:



Additionally there are in the shaft ceiling and in the shaft pit each 2 bi-stable solenoid-switches (there could also be roller-switches with repective curves at the cabin). Correction above and below, as well as inspection-end above and below.

It is important, that the switches are installed as opener. By crossing the above correction- and inspection-switch they have to be open on the upper side and closed on the lower side. For the lower positioned ones, the same is valid respectively contrairiwise.

### Correction switch

The correction switches serve the deceleration at the termian end stops in case of error (blackout of incremental encoder) and for learn trip. They are also used for correction of the incremental-encoder-datas. In the set of drawings, page 50 you can find these respectivly to the speed recommendet distances. The exact pitch for the braking distance which is choosen by the controller is not important, as this is assigned by the chossen parameters. However, braking distance and pitch should not have a bigger difference than 45cm.

### Inspection end switch

The lower inspection end switch have to be installed in that way, that it opens right before the emergency limit switch is activated, but after the re-levelling-sensor D lower the precision plate is freed. C is mentionend in the plate.

For the upper inspection switch it is in the respective way, means IEO will be activated (open contact) if the sensor C is upper the precision plate and D is still at the plate. Also in this case the emergency limit switch should be a bit away, that the lift stops before the emergency limit switch is activated.

The inspection end switches are important for the learn trip.

## Intelligent magnetic sensors iMS45

Meanwhile, all above mentioned switches are integrated in one compact sensor-system. Due to this the montage and adjustments are made really easy.

The iMS45 have up to 4 solenoid sensors, which are together with a programmable analysis-electric can generate up to eight switching signals. For a complete shaft selection one iMS45-POS is enough. Especially for machineromless an additional iMS45-SPD sensor will be attached, which detect the speed and rotation of the driving wheel. This is displayed at the Drive monitor, which is the display and analysis unit.

The sending of datas itself will be done via a serial connection without malfunction rate RS485-connection.

### Assembly and function

#### Assembly

The sensor is in a stable aluminium housing, which is also available as IP54-version which is used in firefighter lifts.

The solenoids are flat solenoids with 15mmx7mm of cross-section and a variable length. The solenoids are installed at the button of the arrester rails.

#### Function

In the iMS45 are 4 solenoid sensors, which are measuring the strength and polarity of the magnetic field.

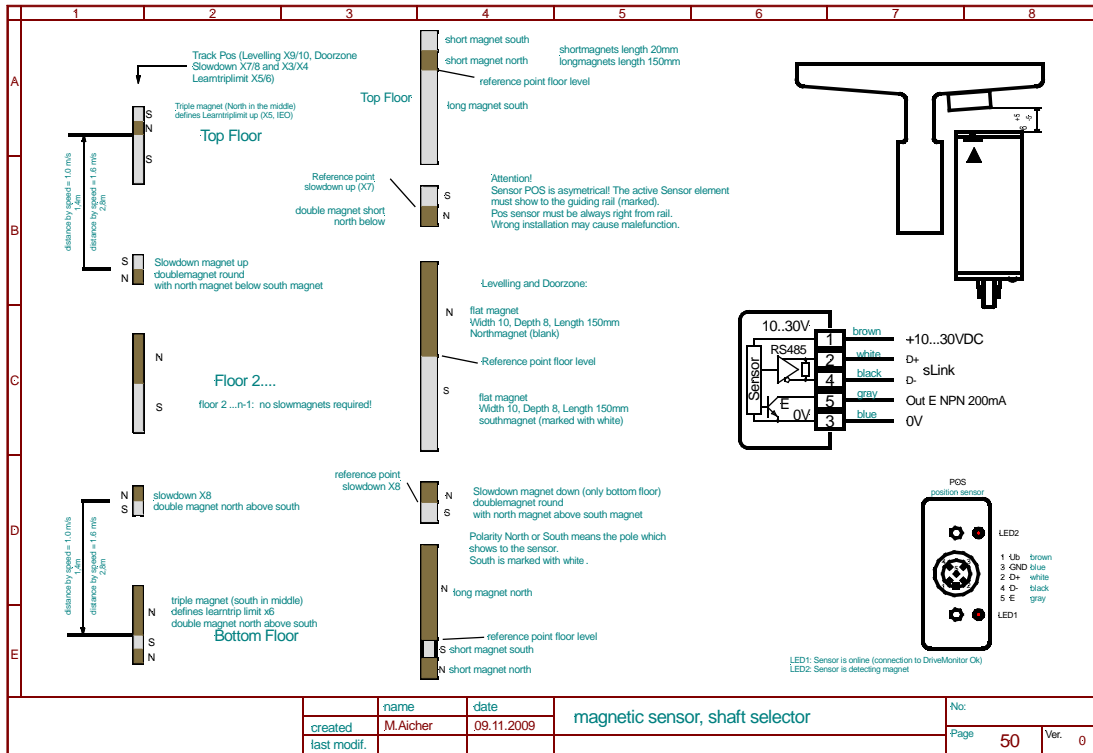
An analysis unit detect the respective switching signals and send these serial to the cabine, respectively to the drive (driving wheel) for controlling/ steering. Additionally the iMS45-POS have an independent transistor output for e.g. contacting a channel of a security circuit.

different detections:

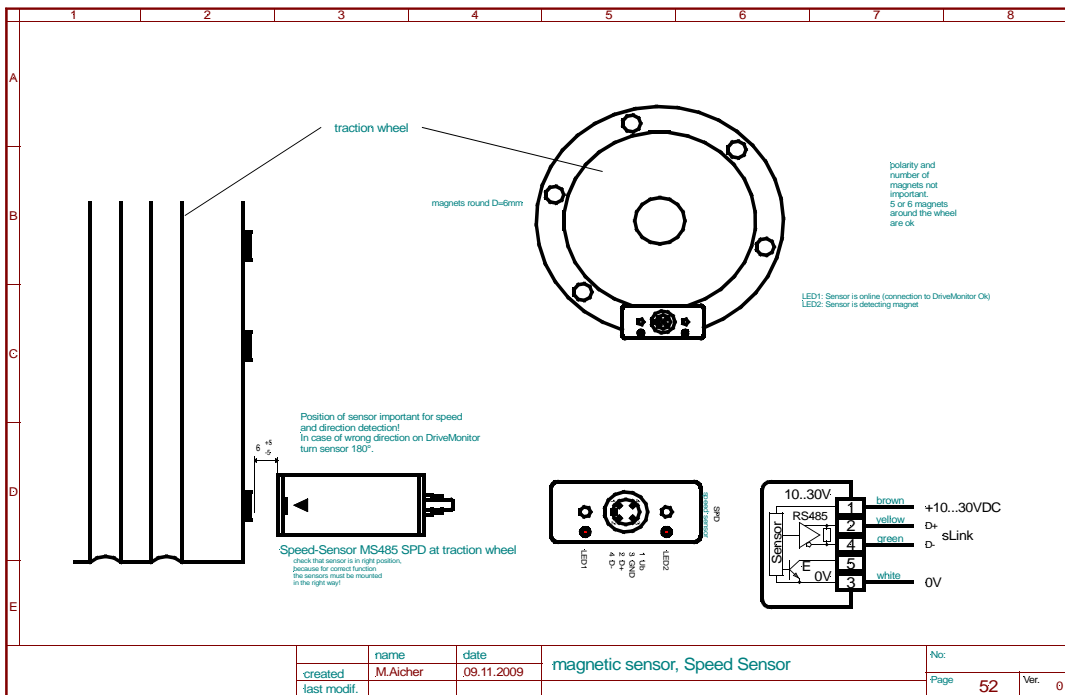
- \* Single magnet north
- \* Single magnet south
- \* Double magnet upper north/ lower south
- \* Double magnet upper south/ lower north
- \* Tripple magnet north in the middle
- \* Tripple magnet south in the middle
- \* Crossing direction
- \* Crossing speed
- \* North/south transition is detected exactly of each milimeter, mostlikely independent on the distace sensor/ magnet

# Manual F5021B - Shaft selection

## Montage scheme iMS45\_POS

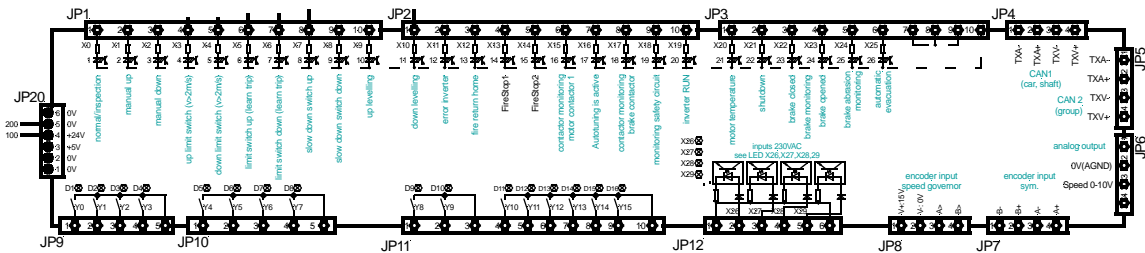


## Montage scheme iMS45\_SPD (only for machine room less lifts)



## 6.SM01 F5021 main board

### SM01 F5021 Mainboard Terminals



Configuration of inputs and outputs:

The in- and outputs are limited free configurable. The following table shows the basic settings which are ok in the most of cases. Some signals have a different configuration in some special cases. These specials you can find in the electrical drawing of each case. Thus significant is the electrical drawing.

### SM01 terminals:

Terminal	Name	Description	Function	Advise	
JP1	1	X0	Signal inspection on, respectively normal operation	input N	
	2	X1	Inspection/return motion up	input N	
	3	X2	Inspection/return motion down	input N	
	4	X3	Delay switch upwards/above for $v > 2,5\text{m/s}$ , at short stop in the upmost stop.	input N	F24=5
			Counting impulse B (hydraulic lift with magnet switch)		F24=3
	5	X4	Delay switch downwards for $v > 2,5\text{m/s}$ , at short floor in the lowest stop.	input N	F24=5
			Counting impulse A (hydraulic lift with magnet switc)		F24=3
	6	X5	learn trip -end-switch upwards/top	input N	
	7	X6	learn trip -end-switch downwards/down	input N	
	8	X7	Delay switch upwards/top	input N	
9	X8	Delay switch downwards/down	input N		
10	X9	re-levelling upwards (levelled)	input N		
	1	X10	re-levelling upwards (levelled)	input N	
	2	X11	Converter error signal or ready signal	input N	Rope lift
			Monitoring approval-relay of the downwards valve		Hydraulic lift
	3	X12	Firedepartement-controlling on	input N	
	4	X13	Fire stop 1	input N	
	5	X14	Fire stop 2	input N	
	6	X15	Motor contactor K1 Monitoring	input N	
7	X16	Motor contactor K2 Monitoring	input N		

# Manual F5021B - SM01 F5021 main board

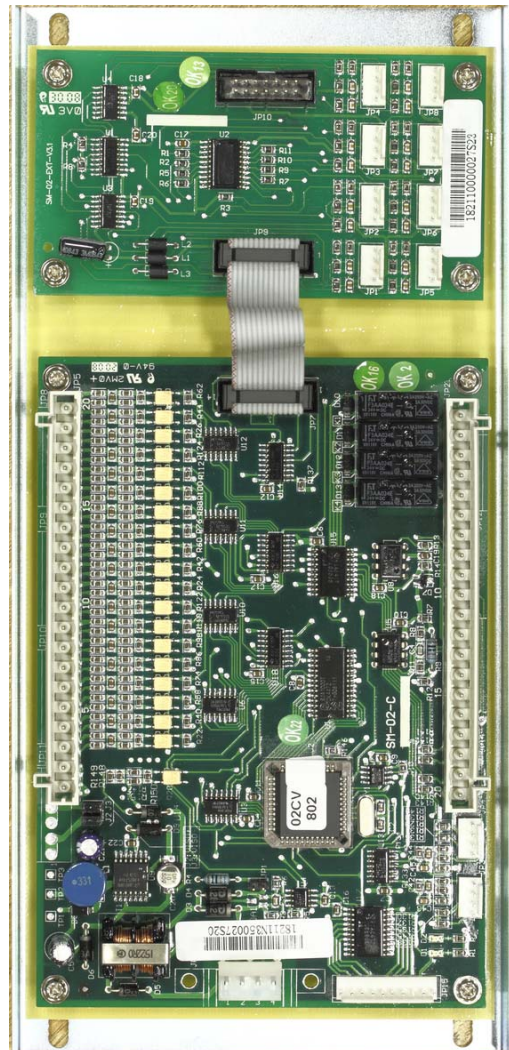
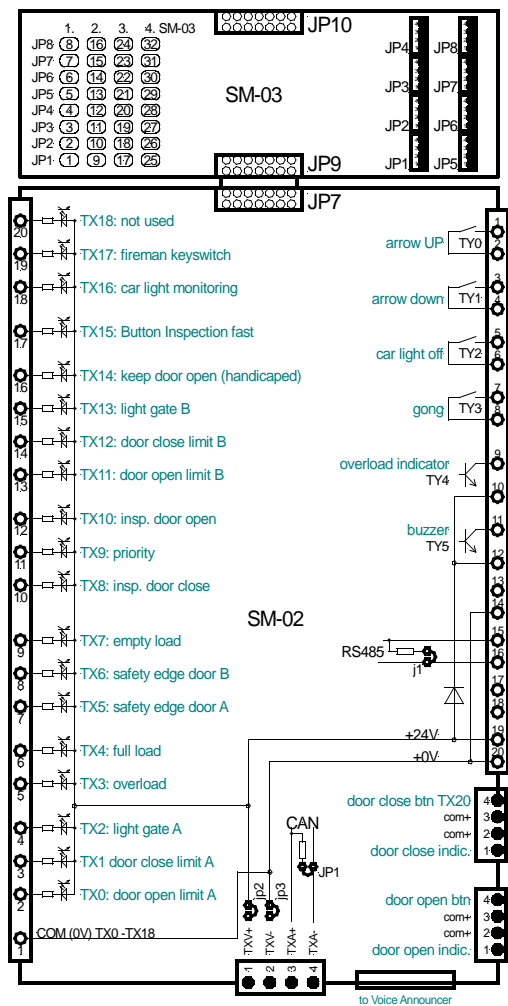
Terminal	Name	Description	Function	Advise	
	8	X17	Break contactor K8 Monitoring	input N	Rope lift
			Monitoring of the valve approval relay		Hydraulic lift
	9	X18	Door-zone-signal/ monitoring of safety circuit	input N	
	10	X19	Inverter RUN signal (open breaks signal)	input N	Rope lift
Softstart RUN signal (Approval for drive upwards)				Hydraulic lift	
JP3	1	X20	Monitoring of the engine temperature	input N	
	2	X21	Lift shutdown at the next stop	input N	
	3	X22	Monitoring open breaks	input N	Rope lift
			Monitoring minimum pressure		Hydraulic lift
	4	X23	Monitoring closed breaks	input N	Rope lift
			Monitoring pressure relief		Hydraulic lift
	5	X24	Anti surf (shaft door monitoring) deactivation	input N	
	6	X25	automatical evacuation on	input N	
	7	COM	common mass for inputs		
	8	COM			
9	COM	Feed-in mass of the optocoupler	0V feed-in		
10	+24V	Supply of the optocoupler	24V feed-in		
JP4	1	TXA1+	CAN_H of CAN-Bus 1 inside the lift	datas	Use Twisted Pair lines!
	2	TXA1-	CAN_L of CAN-Bus 1 inside the lift	datas	
	3	0V	GND		
	4	+24V	+24V		
JP5	1	TXA2+	CAN_H of CAN-Bus 2 for lift groups	datas	Use Twisted Pair lines!
	2	TXA2-	CAN_L of CAN-Bus 2 for lift groups	datas	
	3	0V	GND		
	4	+24V	+24V		
JP6	1	AI1	Analog output current 4...20mA	output AI	
	2	AGND	Feed-in mass for analog output	supply	
	3	AVS	Analog output power 0...10V speed set point FU	output AV	
	4	AVL	Analog output power 0...10V torque set point FU	output AV	
JP7	1	B-	Encoder input channel B symmetric	input RS422-	
	2	B+		input RS422+	
	3	A-	Encoder input channel A symmetrisch	input RS422-	
	4	A+		input RS422+	
JP8	1	+15V	Powersupply for HTL encoder!!	supply output	Attention! Do not connect 5V encoder!

Terminal	Name	Description	Function	Advise	
	2	0V			
	3	A	HTL inputs A and B (Open Collector) 0-100kHz		
	4	B			
JP9	1	Y0	Pre-controller-relay break contactor K8	relay-output	Rope lift
			Valve-approval-relay		Hydraulic lift
	2	Y1	Pre-controller-relay break contactor High voltage for around 2s	relay-output	Rope lift
			Approval-relay downwards-valve		Hydraulic lift
	3	Y2	motor contactor K1	relay-output	
	4	Y3	motor contactor K2	relay-output	
5	COM1	COM of relay-contacts Y0-Y3			
JP10	1	Y4	Door-open relay door A	relay-output	
	2	Y5	Door-close relay door A	relay-output	
	3	Y6	Door-open relay door B	relay-output	
			Collected malfunction message		Circuit plan!!
	4	Y7	door-close relay door B	relay-output	
Engine tuning FUJI Gearless with incremental encoder				Circuit plan!!	
5	COM2	COM of relay-contacts Y4-Y7			
JP11	1	Y8	Trigger K14 (bypass door switch)	relay-output	For Safety circuit
	2	Y9	End of automatical evacuation	relay-output	
	3	COM3	COM of relay-contacts Y8-Y9		
	4	Y10	Trigger frequency inverter upwards	relay-output	Rope lift
			valve fast open		Hydraulic lift
	5	Y11	Trigger frequency inverter downwards	relay-output	Rope lift
			valve slow open		Hydraulic lift
	6	Y12	Inverter Run-signal	relay-output	Rope lift
			valve fast down		Hydraulic lift
	7	Y13	Multi-Step 1 speed signal	relay-output	Rope lift
valve slow down				Hydraulic lift	
8	Y14	Multi-Step 2 speed signal	relay-output	Rope lift	
		LRV inspection		Hydraulic lift	
9	Y15	Multi-Step 3 speed signal	relay-output	Rope lift	
		LRV additional speed		Hydraulic lift	
10	COM4	COM of relay-contacts Y10-Y15			
JP12	1	N	N-wire of the input terminals	inputs 230VAC for scan of the	
	2	X26	Scan emergency stop sector of the safety loop		
	3	X27	scan end of safety loop		

Terminal	Name	Description	Function	Advise
	4	X28	scan revolving door contacts	security circuit
	5	X29	additional highvoltage input	
	6	N	N-type to the engine and break contactor	
JP20	1	GND	Voltage supply contact of the main board	
	2	GND		
	3	-		
	4	+24V		
	5	GND		
	6	GND		
JP15	1	DCD	RS232 interface	
	2	RXD	RS232 interface	
	3	TXD	RS232 interface	
	4	DTR	RS232 interface	
	5	SGND	RS232 interface	
	6	X		
	7	X		
	8	X		
	9	+5V	Only active if jumper J2 is installed. (hand terminal)	
JP22	1	X		
	2	GND		
	3	D+	RS485-A	
	4	D-	RS485-B	



7.SM02/SM03 cabin module



Advise:

This SM02 will be replaced in future by SM02/H (in the cartop box) and SM03/G (in the COP). The trigger of the doors (open and close) won't be done anymore by SM01 in the control cabinet; this will be done by SM02/H in the cartop box. (changed configuration)

SM02 Anschlüsse

Terminal	Name	Description	Function	Advise	
JP2	1	TY0	direction upwards	relay-output	
	2	C.TY0	COM TY0		
	3	TY1	direction downwards	relay-output	
	4	C.TY1	COMTY1		
	5	TY2	Cabin light switch off	relay-output	
	6	C.TY2	COMTY2		

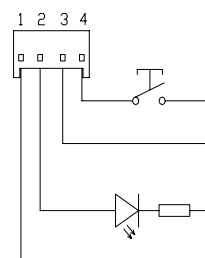
Terminal	Name	Description	Function	Advise	
	7	TY3	Gong (acoustic signal)	relay-output	
	8	C.TY3	COM TY3		
	9	TY4-	Overload indicator -	Transistor NPN	
	10	TY+	Overload indicator +	+24V	
	11	TY5-	Buzzer- (acoustic signal)	Transistor NPN	
	12	TY5+	Buzzer+ (acoustic signal)	+24V	
	13	AV+	Analog input 0..10V (weight measurement)		
	14	AV-	Analog input GND		
	15	D+	RS485-A	datas	
	16	D-	RS485-B	datas	
	17	-			
	18	-			
	19	+24V	Power supply optocoupler		
	20	0V			
JP3	1	TY	Indicator door-open-button -	Transistor NPN	
	2	C+	Indicator door-open-button -	+24V ü. R	
	3	C+	Door-open-button contact	+24V ü. R	
	4	TX19	Door-open-button contact	input P	
JP4	1	TY	Indicator door-close-button -	Transistor NPN	
	2	C+	Indicator door-close-button -	+24V ü. R	
	3	C+	Door-close-button contact	+24V ü. R	
	4	TX20	Door-close-button contact	input P	
JP5	1	COM	COM for the inputs from TX0 till TX18	GND	
	2	TX0	Door-open-end-switch door A	input N	
	3	TX1	Door-close-end-switch door A	input N	
	4	TX2	Light gate door A	input N	
	5	TX3	Over load switch	input N	
	6	TX4	Full load switch	input N	
	7	TX5	Return motion switch door A	input N	
	8	TX6	Return motion switch door B	input N	
	9	TX7	Empty load-switch	input N	
	10	TX8	Door-open-button inspection	input N	
	11	TX9	Priority inside	input N	
	12	TX10	Door-close-button inspection	input N	
	13	TX11	Door-open-end-switch door B	input N	
	14	TX12	Door-close-end-switch door B	input N	

Terminal	Name	Description	Function	Advise	
	15	TX13	Light gate door B	input N	
	16	TX14	button door keep open	input N	
	17	TX15	button inspection fast	input N	
	18	TX16	Cabin light monitoring	input N	
	19	TX17	Firedepartement-key-switch	input N	
	20	TX18	Free	input N	
JP6	1	TXV+	+24V supply SM02		
	2	TXV-	GND supply SM02		
	3	TXA+	CAN_H		
	4	TXA-	CAN_L		
JP15	1	D0	output to control of a voice announcement up to 255 announcements.	output NPN	
	2	D1		output NPN	
	3	D2		output NPN	
	4	D3		output NPN	
	5	D4		output NPN	
	6	D5		output NPN	
	7	D6		output NPN	
	8	D7		output NPN	
	9	GND	Voltage supply voice message		
	10	+24V			
JP1		Jumper for CAN Bus termination. Only if the termination is not activated yet in the cabin indicator board. (SM04)			
JP7		Connector for button-connection-module SM03			
J2/J3		In case voltage supply is only via JP6 install both bridges. In no case install if JP2.19 and JP2.20 get supplied in separate!			

### SM03 button module

It is possible to connect up to eight SM03 each with 8 buttons (up to 64 floor buttons)

Plug	SM03 Nr.1	SM03 Nr.2	...	SM03 Nr.8
JP1	floor 1	floor 9	...	floor 57
JP2	floor 2	floor 10	...	floor 58
JP3	floor 3	floor 11	...	floor 59
JP4	floor 4	floor 12	...	floor 60
JP5	floor 5	floor 13	...	floor 61
JP6	floor 6	floor 14	...	floor 62
JP7	floor 7	floor 15	...	floor 63



Plug	SM03 Nr.1	SM03 Nr.2	...	SM03 Nr.8
JP8	floor 8	floor 16	...	floor 64

## 8.SM02/H cartop box module

Terminal	Name	Description	Function	Advise
JP1	1	TXV+ +24V		
	2	TXV- GND		
	3	TXA+ CANH		
	4	TXA- CANL		
JP3	1	COM COM for TY0,TY1		
	2	TY0 Drive-in-gong down	output TU	
	3	TY1 Drive-in-gong up	output TU	
	4	GND GND		
	5	+24V +24V		
JP4	1	COM COM for TX0,TX1		
	2	TX0 End-switch door open door A	input N	
	3	TX1 End-switch door close door B	input N	
	4	COM COM for TY2-TY4		
	5	TY2 Scrambling door A	output TU	
	6	TY3 Door A closing	output TU	
	7	TY4 Door A opening	output TU	
JP5	1	COM COM for TX2,TX3		
	2	TX2 Return motionswitch door A	input N	
	3	TX3 Light grid door A	input N	
JP6	1	COM COM TX4-TX6		
	2	TX4 Monitoring cabin light	input N	

































































