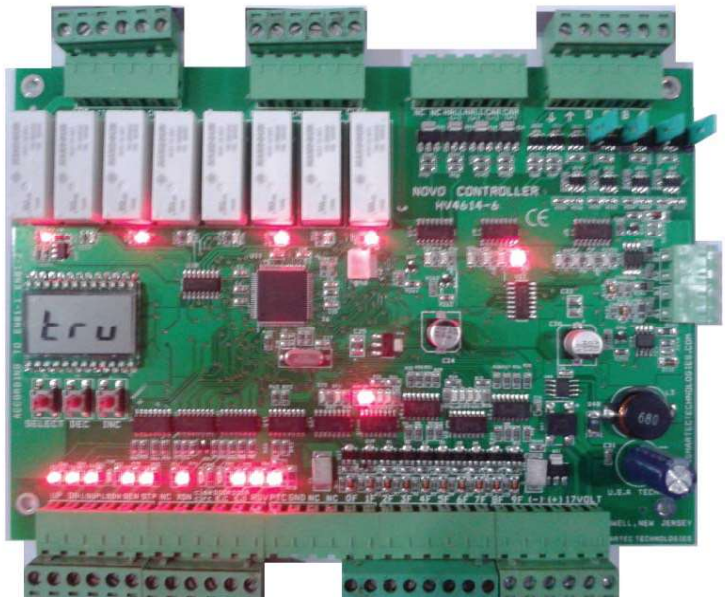
SMARTEC Technologies

NOVO Controller

HV4614-6

English User Manual

Revision: 9.1 p



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SMARTEC Technologies

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NOVO BOARD Elevator Control System

Can be up to 5 floors down collective in a single board,
and 10 stops down collective in serial communication.

SMARTEC Technologies specializes in the design and production of high technology electronic products. Today's electronic product development requires the skillful blend of expert hardware and software engineering together with a spirit of creativity and innovation, tempered by the practical concerns of manufacturability, cost consciousness, testability and on-time delivery. With hundreds of successful project completions, Smartec is uniquely suited to engineer your concept into reality. **Smartec** will work with your idea, perform detailed design, construct prototype units, refine the prototype design and manufacture your electronic product. Fast accurately, on time and on budget.

General Description:

NOVO Board Elevator Control System is a state-of-the-art high-speed Microcomputer based elevator control system that continuously collects and evaluates traffic demand patterns for each individual elevator car and the entire elevator system. Based on real time events when compared to predicted traffic conditions and anticipated system demands, the **NOVO** Board Elevator Control System automatically modifies its dispatching parameters to optimize system operation.

Individual elements of the **NOVO** Board Elevator Control System (Group Supervisory Panel, Car Control System, Motion Control System and Drive Control System) were created to interface in a cohesive manner to provide an elevator system with unmatched ride quality characteristics while exceeding the most stringent performance requirements.

NOVO Board Group Supervisory Panel Operating under standard serial communications protocol, the **NOVO** Board Group Supervisory Panel constantly monitors and analyzes changing traffic demands to predict the future movement of the entire elevator system and to create a real time traffic pattern scenario. Based in part on the following factors: (a) elevator status, (b) elevator direction of travel and hoist way position, (c) hall call assignments, (d) car call patterns, (e) door position, (f) stopping parameters, and (g) systems conditions, the **NOVO** Board Group Supervisory Panel automatically recognizes any fluctuations in traffic conditions and immediately adjusts the system operation.

Combining real time conditions, historical traffic patterns and predicted system demand, the **NOVO** Board Group Supervisory Control System continually creates an arrival time prediction diagram for each elevator car and constantly calculates the shortest waiting time when making a hall call assignment.

NOVO Board Car Control System Utilizing sophisticated **Smartec's** Microcomputer technology and advanced distributed controller design concepts, the **NOVO** Board Car Control System uses a distributed control network to provide an extremely powerful and incredibly flexible elevator control system. Operating under the Plug And Play® communications protocol (interconnected communication via high-speed serial data links), the **NOVO** Board Car Control System continuously distributes control to specific sections of the elevator car (elevator car top, elevator car operating panel, elevator hall fixtures, etc.) to provide superior system performance.

Alpha –numeric view on the LCD display

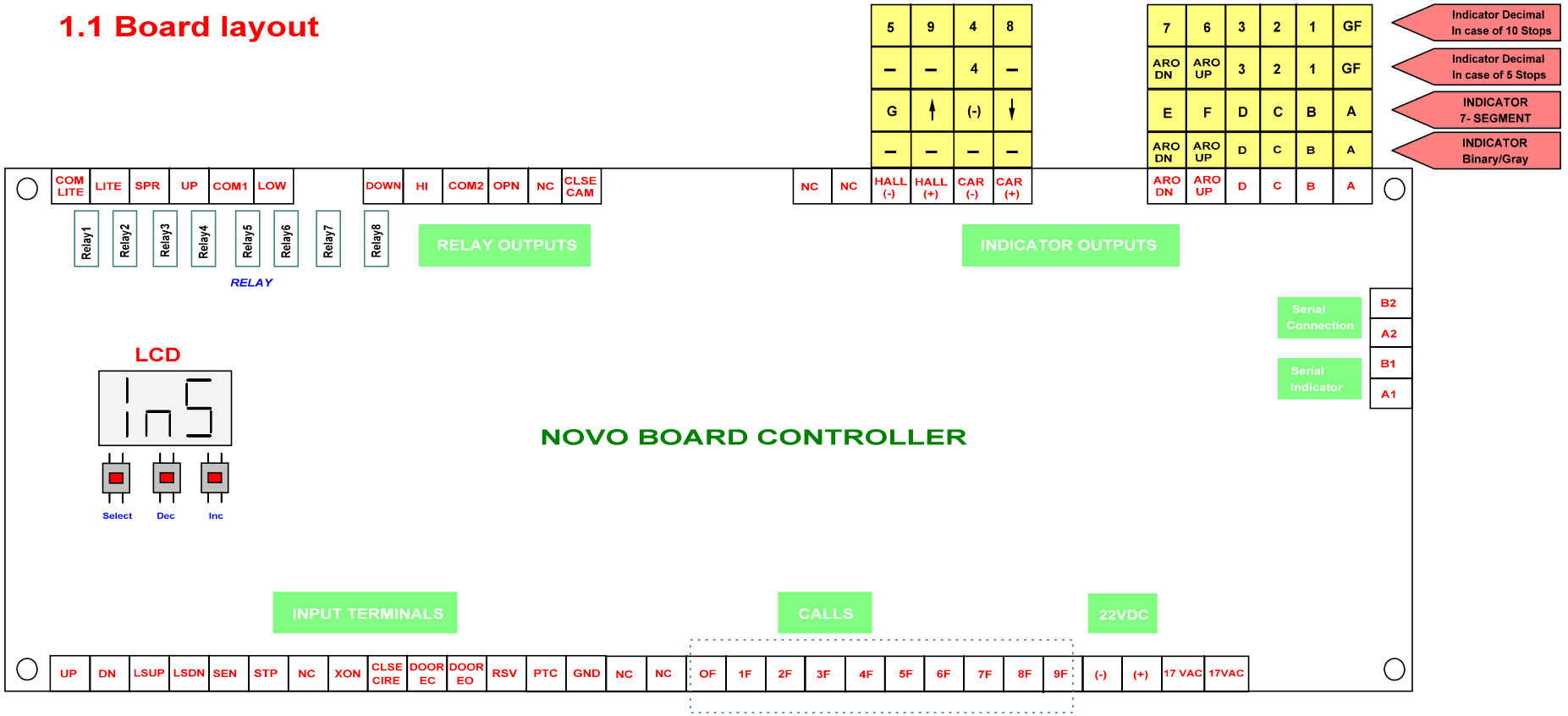
0	0	A	A	K	K	U	U
1	1	B	B	L	L	V	V
2	2	C	C	M	M	W	W
3	3	D	D	N	N	X	X
4	4	E	E	O	O	Y	Y
5	5	F	F	P	P	Z	Z
6	6	G	G	Q	Q		
7	7	H	H	R	R		
8	8	I	I	S	S		
9	9	J	J	T	T		

Main features

Platform Type	**Risk processor**
Type	**Single – Dual Speed - VVVF – Hydraulic**
Mode	**Single (1Board) - Serial(2Boards)**
Fault Capture	**Display more than 200 fault messages**
Status information	**Status of the elevator, door, mode and Limit switch Up &Down are displayed**
Fault count	**Counts and saves the number and code of errors that occur**
Shaft information	**End of the Shaft in the Up and Down Direction** **Slow down in the final stop in Up and Down Direction** **Level Zone** **Elevator position is saved at each stop**
Indicator signal	**Gray, Binary, 7- Segment and Decimal**
Number of Stops	**5(down collective), 10(down collective in serial mode)**
Door Type	**Swinging, Automatic**
Door Controls	**3 input for control: CLSE CIRC / Door E.C / and Door E.O**
Floor Stop Time	**Can specify time of stopping at each floor**
Car Light	**Light timer**
Home Floor timer	**Automatic Return to Home floor after preset time**
Inspection Mode	**Elevator goes to inspection/service mode**
Drop Out	**Cancels all the outside calls**
No Load	**At preset floor, it will cancel all the inside calls if the door was closed**
Full Load	**The elevator will not serve the out side calls**
Emergency Stop	**It will stop immediately and cancel all inside calls**
Fireman Operation	**It will cancel all calls and go to Fireman floor**

1. Board Description

1.1 Board layout



(-): Negative sign for 7- Segment display

_ : Not available

SMARTEC Technologies 55 Hamdan bldg., Suite UG., Milano Rd. Beirut - Lebanon Telefax: +961 1 278 956 www.smartectechnologies.com	Page Description: Board Description (Board layout)	Project: NOVO BOARD CONTROLLER

1.2 INPUT TERMINALS

UP	Magnetic switch Up direction
DN	Magnetic switch Down direction
LSUP	Limit switch Up direction
LSDN	Limit switch Down direction
SEN	Service enable
STP	Emergency Stop/ Fireman
XON	Auxiliary ON contactor for UP/DN direction
Clse Circ	Bypasses reclosing delay for automatic door/ defines the door status for swinging door , if its LED on the board is on= close, off=open
Door E.C	Limit switch end of closing
Door E.O	Limit switch end of opening
Last Fl/ RSV	Reserve
PTC	Motor PTC
SUP	Service UP is CALL **1F** in Inspection mode
SDN	Service DOWN is CALL **0F** in Inspection mode
17 VAC	Board power supply = 17vac

1.3 CALL TERMINALS

0F	Floor 0 call
1F	Floor 1 call
2F	Floor 2 call
3F	Floor 3 call
4F	Floor 4 call
5F	Floor 5 call
6F	Floor 6 call
7F	Floor 7 call
8F	Floor 8 call
9F	Floor 9 call

1.4 OUTPUT TERMINALS for AC2 speed and VVVF

(-) 22 V	Biasing voltage from periphery supply –negative side [1]
(+) 22V	Biasing voltage from periphery supply – positive side [1]
CLSE CAM	Cam contactor [3] / Close relay or contactor [2]
OPN	Open door relay or contactor [2]
CM2	Common 2 for CLSE CAM and OPN
HI	High speed contactor
LOW	Low speed contactor
DOWN	Down direction contactor
UP	Up direction contactor
SPR	Spare output
CM1	Common 1 for HI, LOW,UP, DOWN, and SPARE
LITE	Car light relay
COM LITE	Common for LITE output

[1] : Although this is not an output, it is listed with the outputs for convenience

[2] : For automatic door only

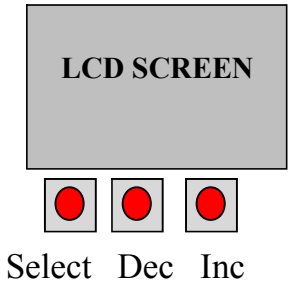
[3] : For swinging door

1.5 INDICATOR OUTPUT TERMINALS

A	Floor information A
B	Floor information B
C	Floor information C
D	Floor information D
↑	Arrow UP
↓	Arrow Down
CAR +	Reserved for switching mode and 7-segment display
CAR -	Reserved for switching mode and 7-segment display
HALL +	Reserved for switching mode and 7-segment display
HALL -	Reserved for switching mode and 7-segment display

2. PUSH BUTTONS

2.1 PUSH BUTTONS FUNCTIONS



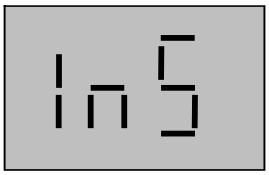
Inc= Increment. To increase a parameter value or scroll up in parameters or pages in increasing order
Dec= Decrement. To decrease a parameter value or scroll down in parameters or pages in decreasing order
Select= To enter a parameter value and save it

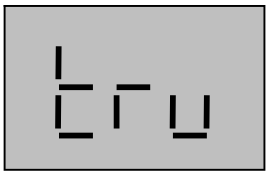
3. LCD SCREEN DISPLAY

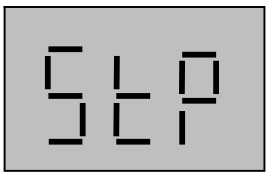
When the NOVO controller is powered up (17VAC),

The **mode** of the elevator will appear on the screen: **(Inspection , travel, or stop mode)**

According to the wirings that were made on the NOVO controller

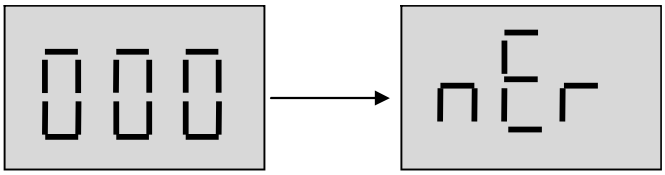






3.1 How to enter the ERROR PAGE

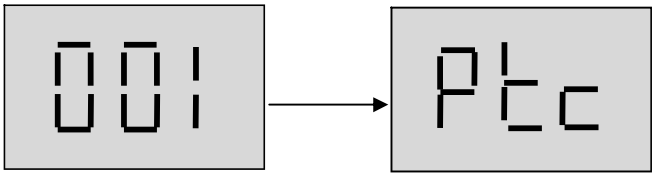
Once you are in the main screen (not in parameter's list), Click **DEC** button to enter the **ERROR PAGE** , then it will display 000.
000 is the last error. Wait for 1 sec for error code.



Error Count Error Code

(nEr indicates that there is **NO ERROR**)
Press on **INC button** to scroll between the error codes if more than 1 error occurred.
Novo can store the last 10 errors.
To leave ERROR List: Click the **SELECT** button to go to main page.

Example:



Error 1 Ptc (See section 3.2)

3.2 ERROR LIST DESCRIPTION AND SOLUTION

Error Displayed on LCD	Description	Controller Action	Solution
NOP	Motor powered but car didn't move	Block	Check the Brake or Pins, Turn electricity off then on.
LUP	Limit switch Up fault	Block	Check Switch up, Turn electricity off then on.
LDN	Limit switch Down fault	Block	Check Switch down, Turn electricity off then on.
LUD	Limit switch up & Down fault	Block	Check Switch up & Down, Turn electricity off then on.
GAN	Gamma fails in contactor up	Cancel calls	Check Gamma
YAL	Yale is opened	Cancel calls	Check Yale
PTC	PTC overheating. Motor Temperature exceeds limits.	Elevator will not take calls after the first stops.	Wait for motor to cool Or disable PTC.
DOR	End of closing automatic door	Door Blocked	Check auto door limit switch
STP	Stop key Error	Complete cycle	Check Stop Key
PLS	Missed Pulses.	Reset and make home trip	Check the pins or magnet
ODR	Door Lock circuit open during travel	Wait for lock circuit, Cancel calls if fault persists more than 5 sec	Check Yale
OUT	System timeout	Block	Contact the System Administrator
SFT	Safety and Ready circuits are open	Waits for Ready circuit to close	Check Aux Nc or Yale
DVF	Drive error	VVVF error	Check VVVF
UBL	unblock	-	-
BLC	Block	-	-
nEr	No error	-	-

NOVO Controller is capable of storing 10 errors on the LCD screen.

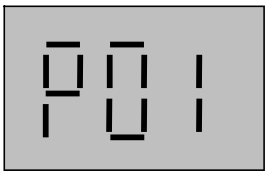
3.3 How to enter the PARAMETER page

When the NOVO board is powered up with 17VAC , click the **SELECT** push button to enter the password.

The default password is 000 000

Note: 6 digits for the password will be displayed when you try to enter parameter page. Because the LCD Screen of Novo can display only 3 digits, so the first 3 digits will Be displayed at first, then the next 3 digits will be displayed.

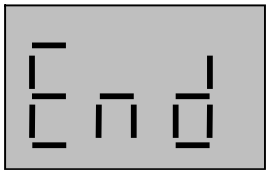
When you Click the **SELECT** push button, the **first parameter P01** will appear on the screen.



If you click the **INC** button you will move to parameter **P02** and so on to scroll between parameters in **increasing order.**

If you click the **DEC** button, you will scroll between the parameters in **decreasing order**.

There are 59 parameters, from P01 to P59. The end of the list specified as:



3.4 TO CHANGE A PARAMETER VALUE:

Once you are in a certain parameter, for example P04, click **SELECT**, and the default value of P04, which is 0 (checking the table), will appear on the screen.

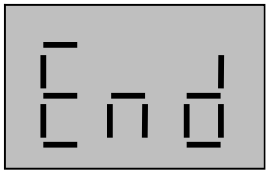
To change this value you can either click **DEC** **or** **INC** to scroll in the range of possible values for this parameter in increasing or decreasing order.

When you reach the value you want, click **SELECT** to choose and save that value for the parameter, and you will be back in the parameters list.

3.5 TO EXIT AND LEAVE THE PARAMETERS LIST:

To leave the parameters list and go back to the main page ,so

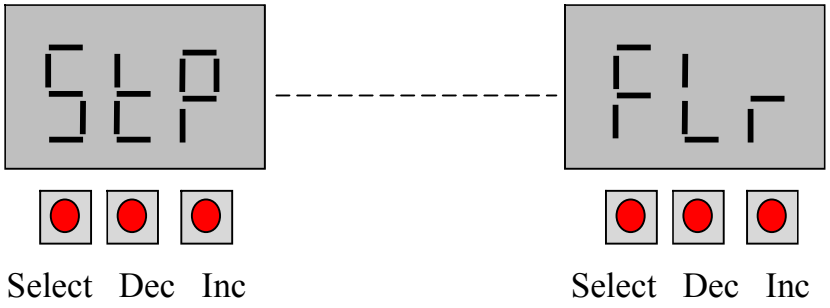
when you are in the parameters list, keep scrolling the parameter list with **DEC** or **INC** until you reach the END of the list:



Then click the **SELECT** button to exit to main page, where the mode of the elevator will appear on the screen (Inspection, Travel or Stop mode). See (Section **3**).

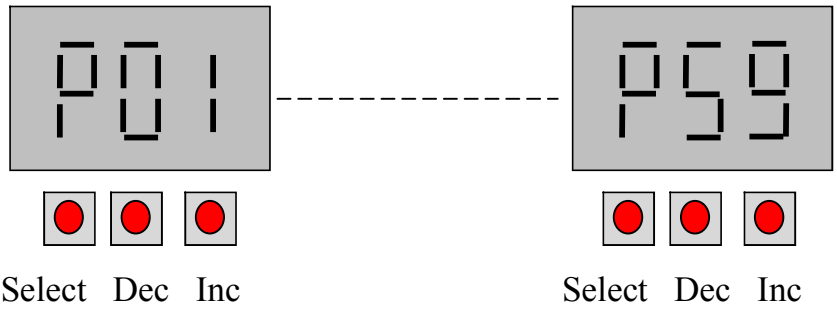
3.6 Function page:

Main screen of NOVO

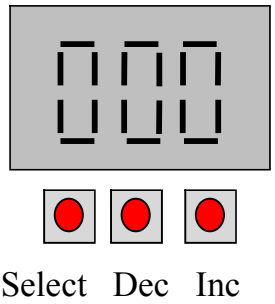


There are 3 different pages as shown below.

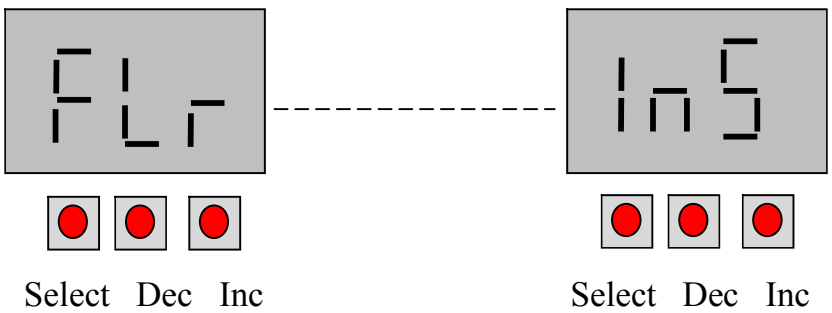
1. Parameter page: Press on **Select** button to enter Parameter page



2. Error page: Press on **Dec** button to enter Error page



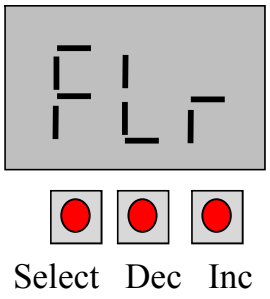
3. Function page:



How to Enter Function page:

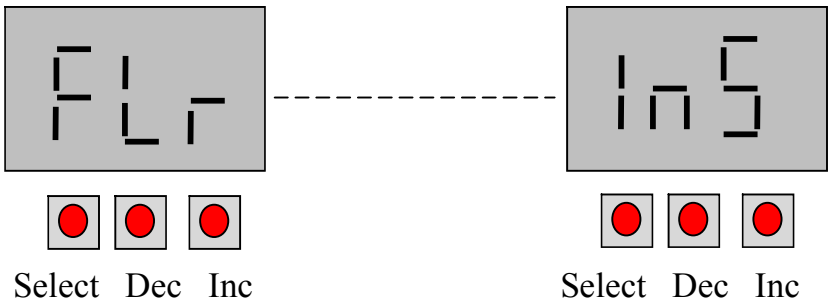
To enter function page press on **Inc** button .

This will appear on the screen



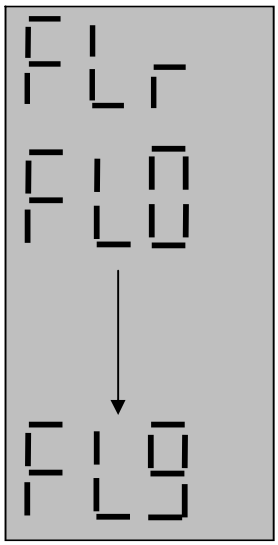
There are 2 sub-pages in the Function page :

1. FLr page: Floor page is used to switch between calls "Floor Request" (FL0 → FL9)
2. Ins page: Inspection page is used for Inspection up (Inu) or Inspection down (Ind).



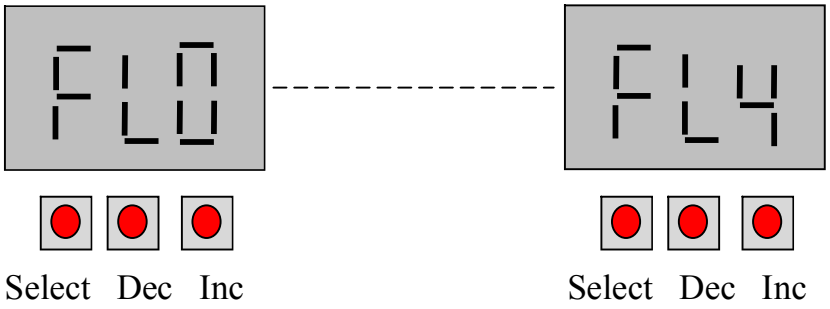
- To switch between FLr page and Ins page press on Inc button.
- To enter FLr page or Ins page press on Select button.
- To go to main screen from Function page press on Dec button.

1. FLr page:



- To increase call press on Inc button.
- To accept Floor Request press on Dec button.
- To exit Flr page press on Select button.

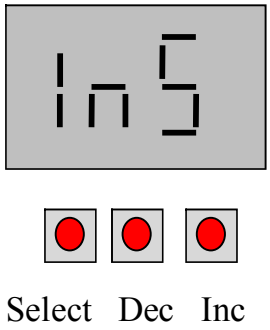
Example: How to move from FL0 to FL4:



- When you enter the FL0 page, press on Inc button until you reach FL4. Press on Dec button to accept the Floor Request.
- During travel the third digit "4" will remain blinking until the elevator reaches FL4.

2. Inspection page:

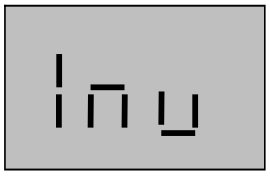
When you enter the Ins page, the 3 digits "Ins" on the LCD begins to blink



- To exit Ins page press on Select button.

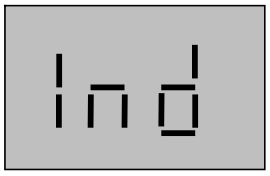
Inspection Up:

- To make Inspection up (Inu) , press on Inc button. In this case the first 2 digits "In" will stop blinking and the last digit "s" will be replaced by "u" and it remains blinking.



Inspection Down:

- To make Inspection down (Ind) , press on Dec button. In this case the first 2 digits "In" will stop blinking and the last digit "s" will be replaced by "d" and it remains blinking.



4. LIST OF PARAMETERS

Parameter Numbers	Parameters Description on LCD	Parameters Full Description	Default Values	Values Range
P01	Flr Stp Tmr: Floor Stop Timer	Time between travels in sec	3 sec	1 → 255 sec
P02	Door Type	Type of the door	Swinging	0=Swinging 1=Automatic
P03	Level Zone	Level of each floor	0	0= None 1= N.C 2= N.O
P04	MX Cnt of Err: Max. Count of Error	Maximum count before blocking	0	0 → 202
P05	Basements	Basement counts	0	0 → 9
P06	Home Floor	Floor of which the station is on	0	0…Last floor
P07	Home Flr Tmr: Home Floor Timer	Time out to go home floor	0 sec	1 → 255 min
P08	No Load	Multi calls anybody open door	0	1 → 9
P09	Collective	Switch between Down or Full collective	1	0= Full 1= Down
P10	Homing on Pwr: Homing on Power	If enabled, make a home trip at start up	1	0= Disable 1= Enable
P11	Truncate	Empty the fault log		N /A
		Automatic Door		
P12	Opn / Cls Dr Tm: Open / Close Door Time	The time of the open or close	6 sec	5 → 15 sec
P13	Park Stat Dr: Park Status Door	The status of the door when reach the station	Close	Close/Open
P15	Light Time	Cabin light timer	5 sec	1 → 60 sec
P16	Keep Close	Keep door active during travel	0	0= Disable 1= Enable
		Secondary		
P17	Retry Gamma	Number of retry	3	0 → 10
P18	Rtry Gama Tmr: Retry Gamma Timer	Gamma retry timer	3	0 → 30 sec
P19	Negative Output	To enter negative signal for 7 segment from car(-)	0	0= Disable 1= Enable
P20	Pulse Timeout	After the magnet timeout has passed then the elevator will block	20 sec	1 → 255 sec

Parameter Numbers	Parameters Description on LCD	Parameters Full Description	Default Values	Values Range
P21	Yal Timer	Retry yale time to next retry delay in sec	5 sec	0 → 60 sec
P22	PTC- NTC	Motor temperature	0	0= NTC 2= PTC
P23	Fireman Floor *Note: must be different From P27*	Floor of fireman (Programmable input). Check (section 4.1) for more details	STP	- STP: Stop floor - Fx: x=0 → 5 - Ful: Full load - Drp:Drop out - LVL: level zone - CLS: Close delay
P24	Flr Expenson: Floor Expansion	Floor Expansion. Check (section 4.2) for more details)	16	-16: up to 5 stops down collective - 17: up to 10 stops down collective (switching mode) - 64: up to 10 stops none collective (Simplex(+) mode) - 96: up to 10 stops none collective (Simplex normal mode) - 128: up to 10 stops full collective
P26	Indctor Type: Indicator type	Specify the hall and car display type	0	0= Gray 1= Binary 2= 7 segment 3= Decimal
P27	RSV Input *Note: must be different From P23*	Floor of fireman (Programmable input). Check (section 4.1) for more details	CLS	- STP: Stop floor - Ful: Full load - Drp:Drop out - LVL: level zone - CLS: Close delay
P30 *	Lmt Reopen Dr Ins: Limit reopen During inspection	Limit reopen during inspection	3	0= Disable limit Switch –Disable reopen During inspection 1= Enable limit Switch –Disable reopen During inspection 2= Disable limit Switch –enable reopen During inspection 3= Enable limit Switch –Enable reopen During inspection
P31	Count of Days	Days of operation	0	000
P36	Fmware Vrson: Firmware Version	The Firmware version of the board	3 digit version number	

Parameter Numbers	Parameters Description on LCD	Parameters Full Description	Default Values	Values Range
Hydraulic and VVVF Elevator				
P37	VVVF Hy Stp Dly: VVVF Hydraulic Stop Delay	Specify the stop delay for Hydraulic or VVVF	0	0 → 50 in 100 ms
P38	VF HY Strt Dly: VVVF Start Delay	Specify brake to turn of after time finished at startup elevator	0	0 → 30 in 100 ms
P39	V- Hi Spd Flr: VVVF high Speed Floor	Specified when we can turn to super high speed	4	4 → 10
P40	Hi 2Md Spd Flr: VVVF Med Speed	Specified when turn to medium speed before reach the request floor	2	2 → 5
P41	Spar2 Output	Very high speed output	Inspection	0= brake 1= inspection
P42	Hydr Strt Tm: Hydraulic Start Time	Specify Hydraulic start time after converting to delta	0	0 →99
P44	Psnger Cpcty: Passenger Capacity	The maximum number of Cabin calls to ignore outside calls	0	1 → 15
P45	Drv / VVVF Type: Drive VVVF Type	Type of engine	AC2 Speed	0= AC2 Speed 1= VVVF ABB350 2= Hydraulic 3= VVVF Standard 4= VVVF 3-Speed 5=VVVF Fuji 2-Speed 6=VVVF Fuji 3-Speed
P47	Board Type	Choose board type for serial communication	None	0= none 1= cabin 2= panel
P48	User Pass: User Password	Password of the user	000 000	******
P50	Input Value	To see the input value of the board		N/A
P51	LCD	Display mode	1	0= Digit 1= Number
P52	First Stop	To start the indicator from floor 1	0	0= Disable 1= Enable
P53	Double Door	Selection mode for dual door opening on certain floors.	Dis	Ena:Enable Dis:Disable Sel: Select
P54	Close Circuit/ SEN	Close Circuit or SEN to work active low or active high . check section 4.3	0	0= NC - NC 1= NO - NC 2= NC - NO 3= NO - NO
P56	Fuji Ena Delay	Makes delay at stop for enable inverter output	0	0 → 30

Parameter Numbers	Parameters Description on LCD	Parameters Full Description	Default Values	Values Range
P57	RVL	Relevel Option	Sel	Dis: Relevel is disabled. Sel: Relevel is done only when the door is closed and elevator has no calls to serve. Aly: Relevel is done when the elevator is opened or closed and ignores close circuits.
P58	Relevel time	During Relevel if this time end, the elevator will block	5	0 → 20
P59	Fact Default: Factory Restore	Restore factory settings		
	END	To exit the parameters		

*Note: Characteristics of P30 if P51 =0

Parameter Numbers	Parameters Description on LCD	Parameters Full Description	Default Values	Values Range
P51	LCD	Display mode	0	0= Digit 1= Number
P30	Lmt Reopen Dr Ins: Limit reopen During inspection	Limit reopen during inspection	LRE	LRD= Disable limit Switch –Disable reopen During inspection LEN= Enable limit Switch –Disable reopen During inspection REN= Disable limit Switch –enable reopen During inspection LRE= Enable limit Switch –Enable reopen During inspection

4.1: Programmable Inputs(RSV and STP)

NOVO board has **2 programmable inputs (RSV and STP)**

It can be programmed by changing the values of P23 & P27

CODE	DESCRIPTION	USE
STP	Stop floor	Click the button to stop the car
Fx	x= from 0 to 9	Click the button to stop at one certain floor from F0 to F9 for fireman emergency in P23 only
Ful	Full load	Stop the car when there is over-capacity
Drp	Drop out	Cancel all outside calls
lvl	Level zone	Level the car in the correct position in case there were missed pulses
cls	Close delay	To close the door

Note: P23 & P27 must have different values

4.2: Choosing P24 according to certain floor expansion

CODE	Description
16	**Up to 5 stops down collective**
17	**Up to 10 stops down collective** (SWITCHING mode)
64	**Up to 10 stops none collective** (SIMPLEX (+) mode), when travelling down, **only takes 1 outside call going down** as long as it is below the position of the car. If you want to go to GND floor, and floor 2 for example requested a down travel, the car will stop at 2 and continue down travel.
96	**Up to 10 stops none collective** (SIMPLEX normal mode)
128	**Up to 10 stops full collective BUT!** Inside and outside calls are the same (connected to each other)

4.3 Characteristics of Parameter (P54) :

P54		
Value	**CLSE CIRC**	**SEN**
0	NC: normally close	NC: normally close
1	NO: normally open	NC: normally close
2	NC: normally close	NO: normally open
3	NO: normally open	NO: normally open

4.4 Speed table for FUJI inverters

Use **P38** parameter for VVVF start delay, where (UP or Down) direction logic is set ON, it will delay to set (HI, Spare or Low **in the table below**) to ON

Use **P37** parameter for VVVF stop delay, where (HI, Spare, or Low) are ON, it will delay to set (UP or Down) to OFF

Put P45 = (5) For FUJI VVVF 2-speed:

Speed Ref	UP	Down	HI	LOW	Spare	CAR(-)	Relays of NOVO controller
	FWD	REV	(X3)	(X2)	(X1)	Enable inverter	Connections on Fuji drive
Zero speed (0000)	OFF	OFF	OFF	OFF	OFF	OFF	
Intermediate speed 1 UP (10001)	ON	OFF	OFF	ON	ON	ON	
Intermediate speed 1 DN (01001)	OFF	ON	OFF	ON	ON	ON	
Inspection speed UP (10010)	ON	OFF	OFF	OFF	ON	ON	
Inspection speed DN (01010)	OFF	ON	OFF	OFF	ON	ON	
High speed UP (10111)	ON	OFF	ON	OFF	OFF	ON	
High speed DN (01111)	OFF	ON	ON	OFF	OFF	ON	

Put P45 = (6) For FUJI VVVF 3-speed:

Speed Ref	UP	Down	HI	LOW	Spare	CAR(-)	Relays of NOVO controller
	FWD	REV	(X3)	(X2)	(X1)	Enable inverter	Connections on Fuji drive
Zero speed (0000)	OFF	OFF	OFF	OFF	OFF	OFF	
Intermediate speed 1 UP (10001)	ON	OFF	OFF	ON	ON	ON	
Intermediate speed 1 DN (01001)	OFF	ON	OFF	ON	ON	ON	
Inspection speed UP (10010)	ON	OFF	OFF	OFF	ON	ON	
Inspection speed DN (01010)	OFF	ON	OFF	OFF	ON	ON	
Intermediate speed 2 UP (10100)	ON	OFF	ON	OFF	OFF	ON	
Intermediate speed 2 DN (01100)	OFF	ON	ON	OFF	OFF	ON	
High speed UP (10111)	ON	OFF	ON	ON	ON	ON	
High speed DN (01111)	OFF	ON	ON	ON	ON	ON	

4.5. Drive VVVF Type

4.5.1 VVVF Standard Speed: Select VVVF type (P45=3)

Use VVVF Start Delay P38 and VVVF Stop Delay P37
Positive Value: VVVF selected with speed reference disengaging before direction.
Negative Value: VVVF selected with direction reference disengaging before speed.

Speed Ref.	UP	Down	HI	Low	Eout
	Direction		Speed		
Zero Speed	OFF	OFF	OFF	OFF	OFF
UP High Speed	ON	OFF	ON	OFF	OFF
Down High Speed	OFF	ON	ON	OFF	OFF
UP Low Speed	ON	OFF	ON	ON	OFF
Down Low Speed	OFF	ON	ON	ON	OFF
UP Inspection Reset	ON	OFF	OFF	ON	OFF
Down Inspection Reset	OFF	ON	OFF	ON	OFF
During Reset High	OFF	ON	ON	OFF	ON
During Reset Low	OFF	ON	ON	ON	ON

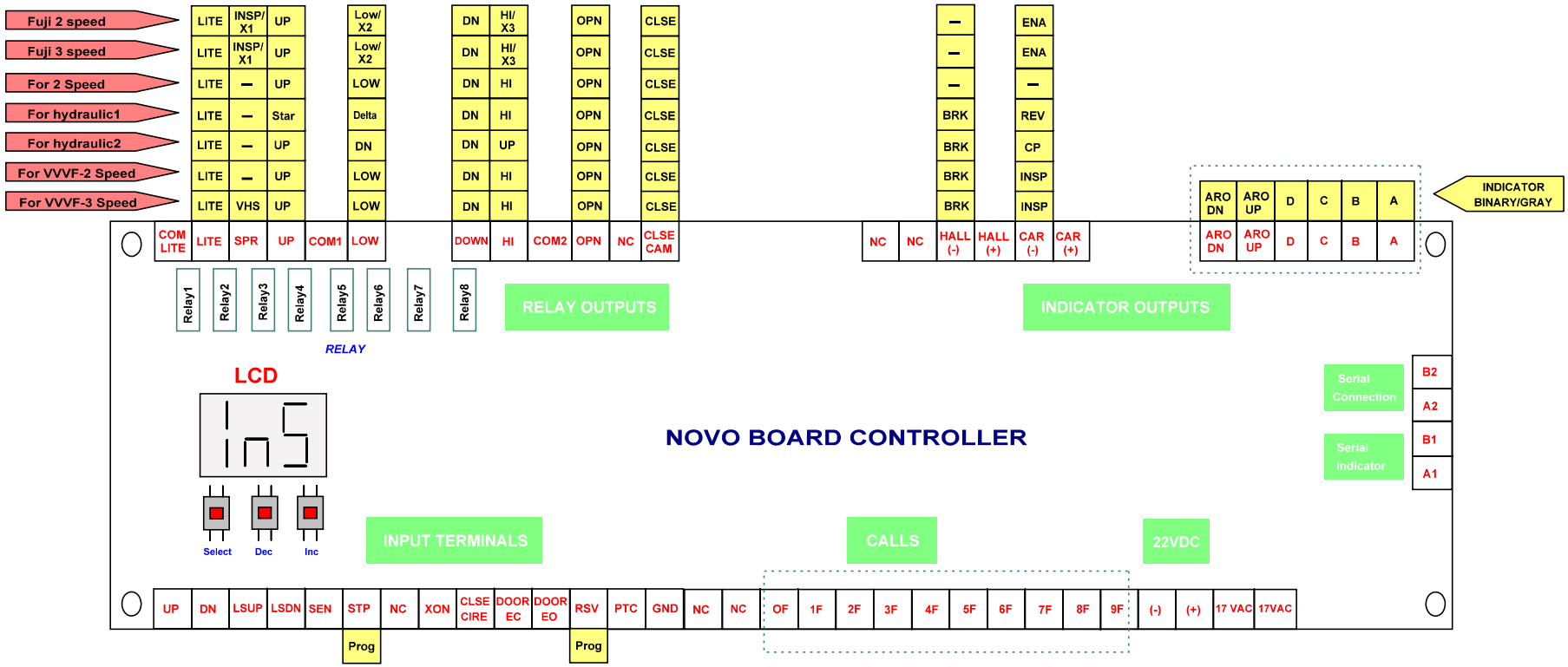
4.5.2 VVVF 3-Speed: Select VVVF type (P45=4)

Use VVVF Start Delay P38 and VVVF Stop Delay P37
Positive Value: VVVF selected with speed reference disengaging before direction.
Negative Value: VVVF selected with direction reference disengaging before speed.

Speed Ref.	UP	Down	HI	Low	Relay	Eout
	Direction		Speed			
Zero Speed	OFF	OFF	OFF	OFF	OFF	OFF
UP Slow Speed	ON	OFF	ON	ON	OFF	OFF
UP Medium Speed	ON	OFF	ON	OFF	OFF	OFF
UP Hi Speed	ON	OFF	OFF	OFF	ON	OFF
Inspection UP	ON	OFF	OFF	ON	OFF	ON
Down Slow Speed	OFF	ON	ON	ON	OFF	OFF
Down Medium Speed	OFF	ON	ON	OFF	OFF	OFF
Down Hi Speed	OFF	ON	OFF	OFF	ON	OFF
Inspection Down	OFF	ON	OFF	ON	OFF	ON

5. CONTROLLER CONNECTION

Terminals Position on the Board



VHS : very high speed	CP : contactor CP	SLO/X2: Slow speed x2
BRK : Break	Prog: Programmable	Hi/X3: High speed x3
REV: Releveling	INSP: Inspection	INSP/X1: Inspection speed X1
		ENA: Enable Inverter

*** A2 and B2 are for Serial connection cabin and Panel board ,to extend down collective stops to 10 stops**

*** A1 & B1 are reserved for serial indicator "SMARTEC" and landing calls**

Note: If you use Serial Indicator connection , do not use the above Indicator connection " A,B,C,D,Aro Up & Aro Down"

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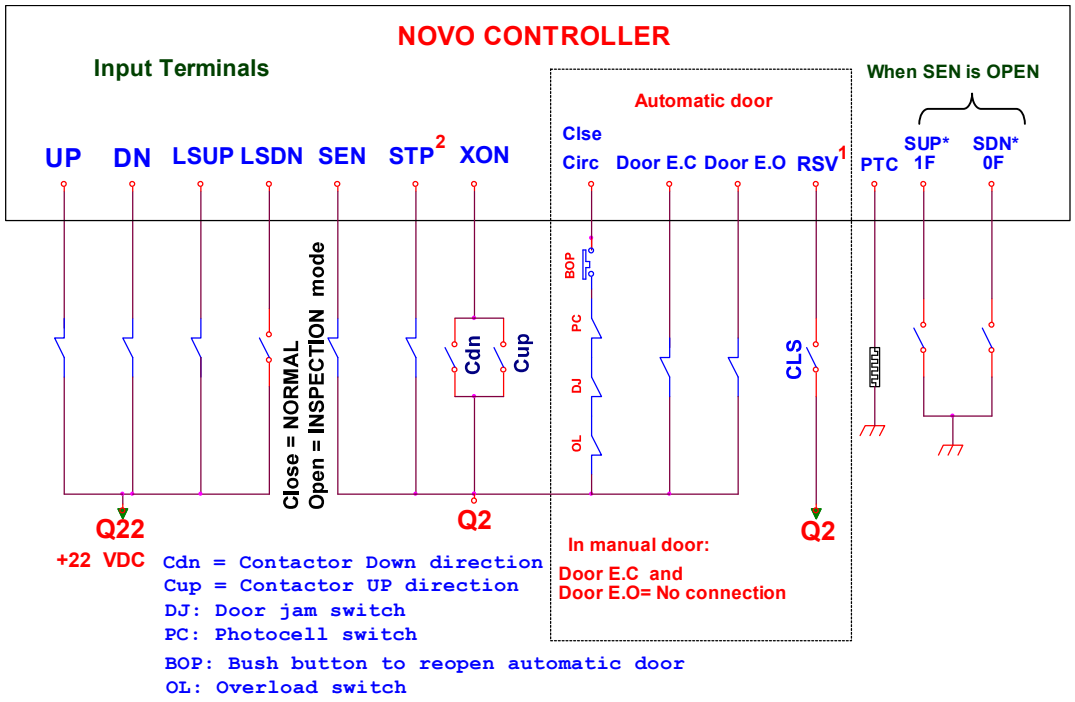
Page Description:	Project:
TERMINALS POSITION ON THE BOARD	NOVO BOARD CONTROLLER

5.1 INPUT CONNECTIONS

ATTENTION!

All voltages on inputs of the controller (+22V DC) must be supplied from the same transformer.

1- AT NORMAL MODE, STOP STAGE (GROUND LEVEL) :

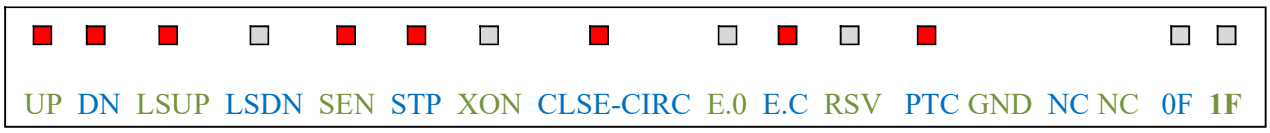


[1]: See Parameter P27

[2]: See Parameter P23

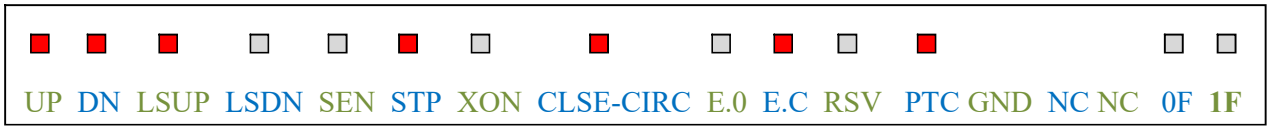
(*) These 2 inputs are service up and service down **only in inspection mode,** otherwise they are calls
Where **LSDN and RSV (Last Fl.)** are normally open **N.O**
UP, DN, LSUP, and **CLSE CIRC** are normally close **N.C**

LED Diagram lighting for inputs in NORMAL mode (At ground level) on the board:

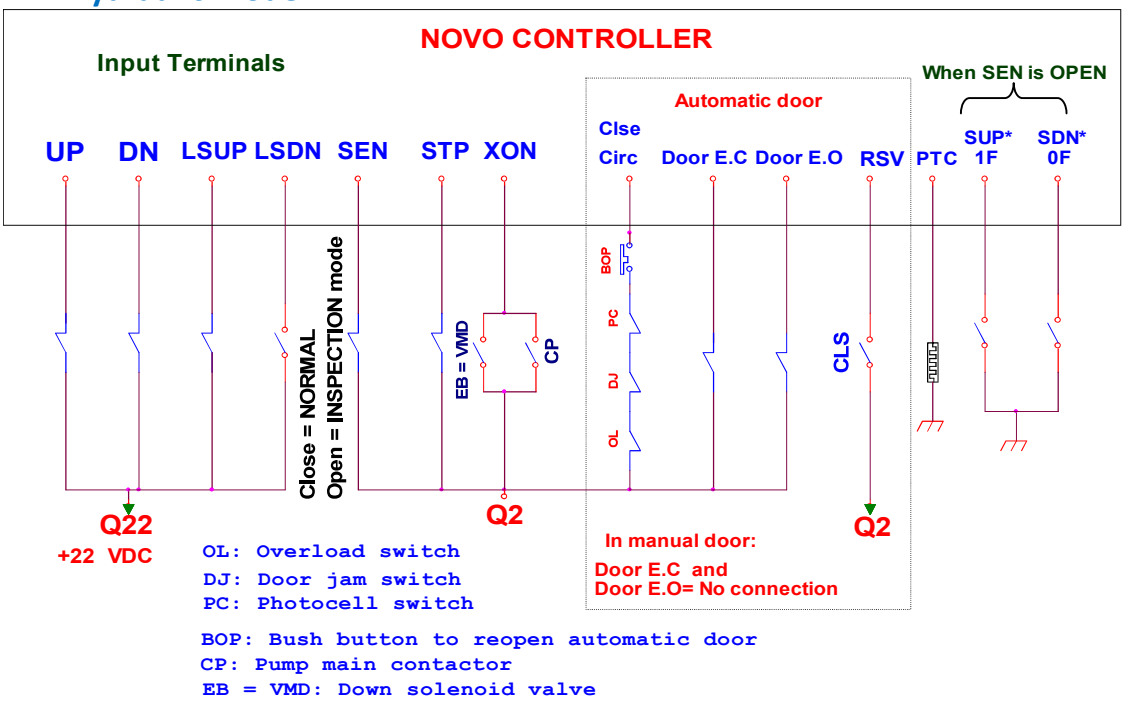


In case P22=PTC , LED is off
P22=NTC, LED is on

LED Diagram lighting for inputs in INSPECTION mode (At ground level) on the board:



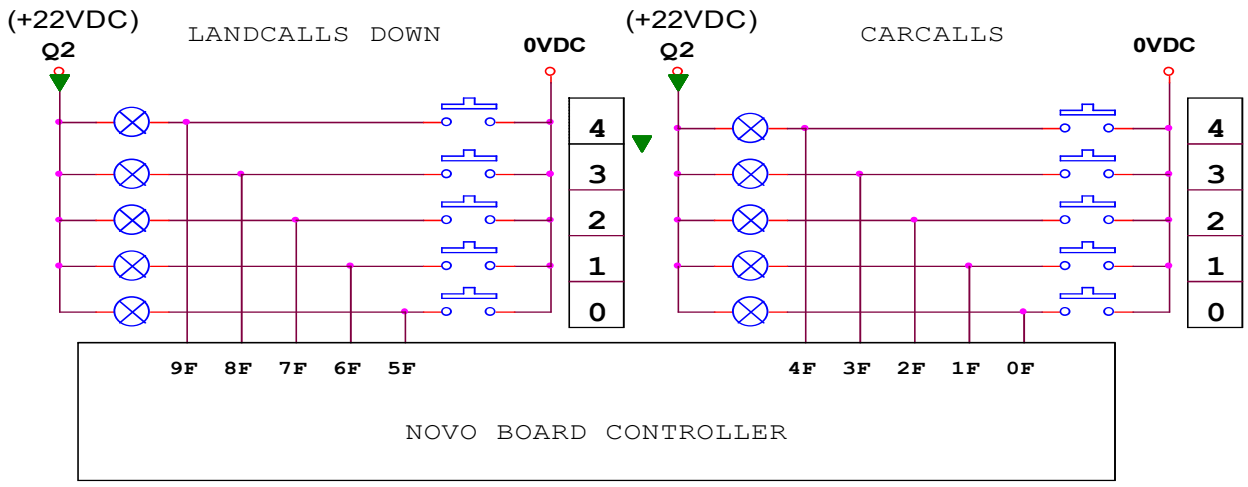
2- Hydraulic Mode



5.2 CALL CONNECTIONS

Novo board has 10 input/output pins or calls from 0F to 9F.
Their connection can be made up to **5 –stops down collective** (using 1 Novo board),
or up to **10-stops down or non collective**(using 2 Novo boards in serial communication).

5.2.1 5-stops down collective



5.2.2 10-stops down collective (serial connection)

Check (page 36) for wiring diagram

5.2.3 Simplex mode: 10-stops not collective

Check (page 37) for wiring diagram.

5.2.4 Switching mode : 10-stops down collective

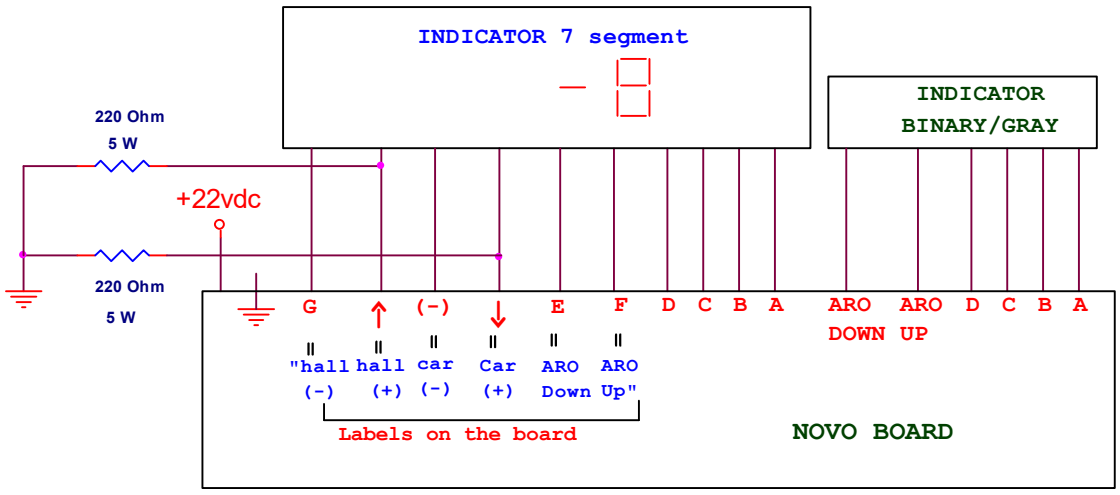
Check (page 38) for wiring diagram. 7-segment indicator not applicable for switching mode.

5.2.5 Standard mode: 5-stops Down- collective

Check (page 39) for wiring diagram.

5.3 INDICATOR CONNECTIONS

BINARY, **GRAY**, and **7-Segment** indicators.



Note: In case of use Arrow up & Arrow Down in 7-Segment only, install 2 resistances (220 Ohm, 5 W) each as shown in the diagram above. (7-segment is active low only)

Decimal indicator

In case of 5 Stops	
Label on the Board	**Decimal Indicator**
A	GF
B	1
C	2
D	3
Car(-)	4

In case of 10 Stops	
Label on the Board	**Decimal Indicator**
A	GF
B	1
C	2
D	3
Aro Up	6
Aro Down	7
Car(+)*	8
Car(-)	4
Hall(+)*	9
Hall(-)	5

* Note: In case of use Car(+) & Hall(+) in Decimal Indicator "10 Stops" only, 2 resistances (220 Ohm, 5 W) each must be installed and connected to Gnd. (Decimal is active low only)

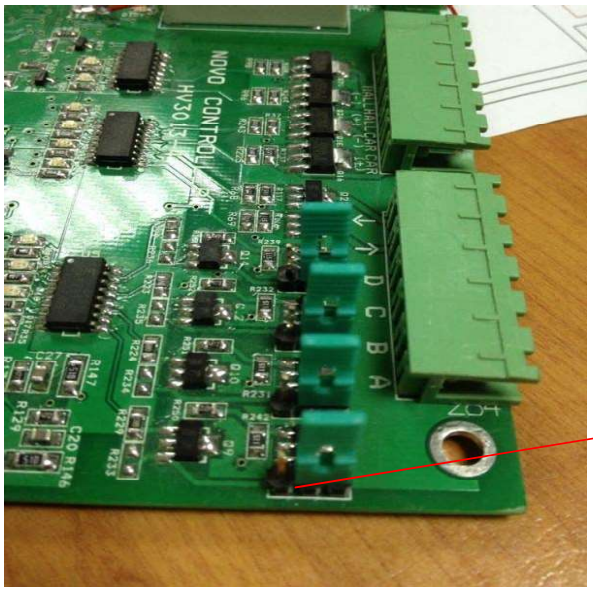
7 Segment :

A,B,C,D must be selected **ACTIVE LOW (check jumper position in section 5.4)**
ARO UP and ARO Down are **ACTIVE HIGH** always.

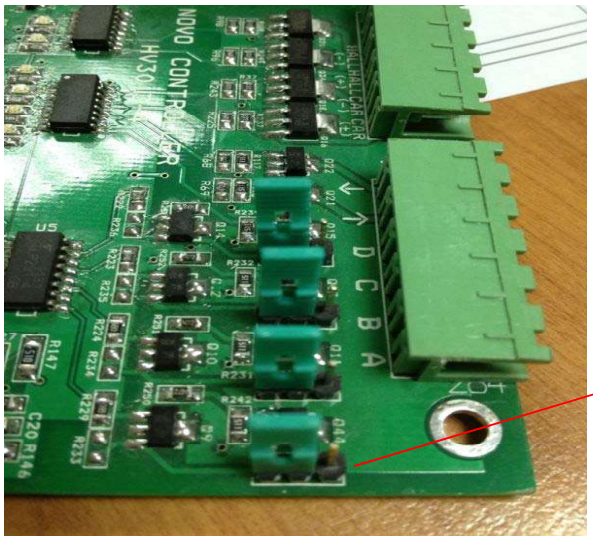
Binary /Gray code :

A,B,C,D can be selected either **ACTIVE LOW or ACTIVE HIGH**.
ARO UP and ARO DOWN are **ACTIVE LOW**

5.4 Changing jumper position for A, B, C and D for active high or low

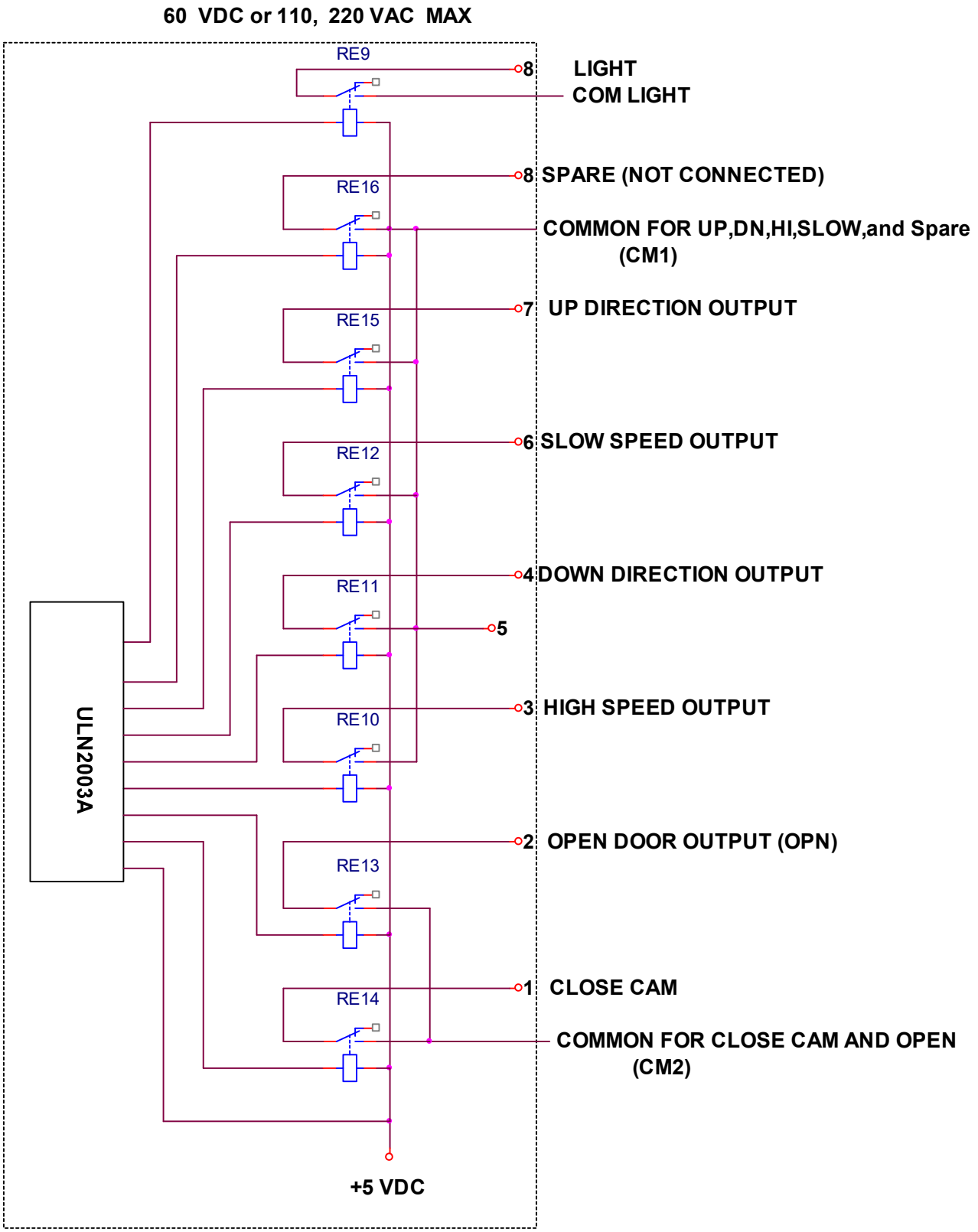


Last pin empty =Active Low



First pin empty =Active High

5.5 RELAY OUTPUT CONNECTIONS



6. Double door

6.1 Serial double Door up to 5 Stops with all have double doors:

Double door entrance

Double doors can be programmed by **P53** to open one of the double doors inside the elevator car from GF to 4th floor.

P53=Ena

6.2 Cabin Board: Inside calls " A " door and " B " door

0F	1F	2F	3F	4F	5F	6F	7F	8F	9F
0 InA	1 InA	2 InA	3 InA	4 InA	0 InB	1 InB	2 InB	3 InB	4 InB

0F	1F	2F	3F	4F	5F	6F	7F	8F	9F
0 OutA	1 OutA	2 OutA	3 OutA	4 OutA	0 OutB	1 OutB	2OutB	3 OutB	4 OutB

Close and open Output for the Double Door:

2nd door open output = cabin board slow
2nd door close output = cabin board down

Close delay for door A is Cabin board RSV
Close delay for door B is Cabin board STP

RE open door A is RE Open
RE open door B is cabin board XON

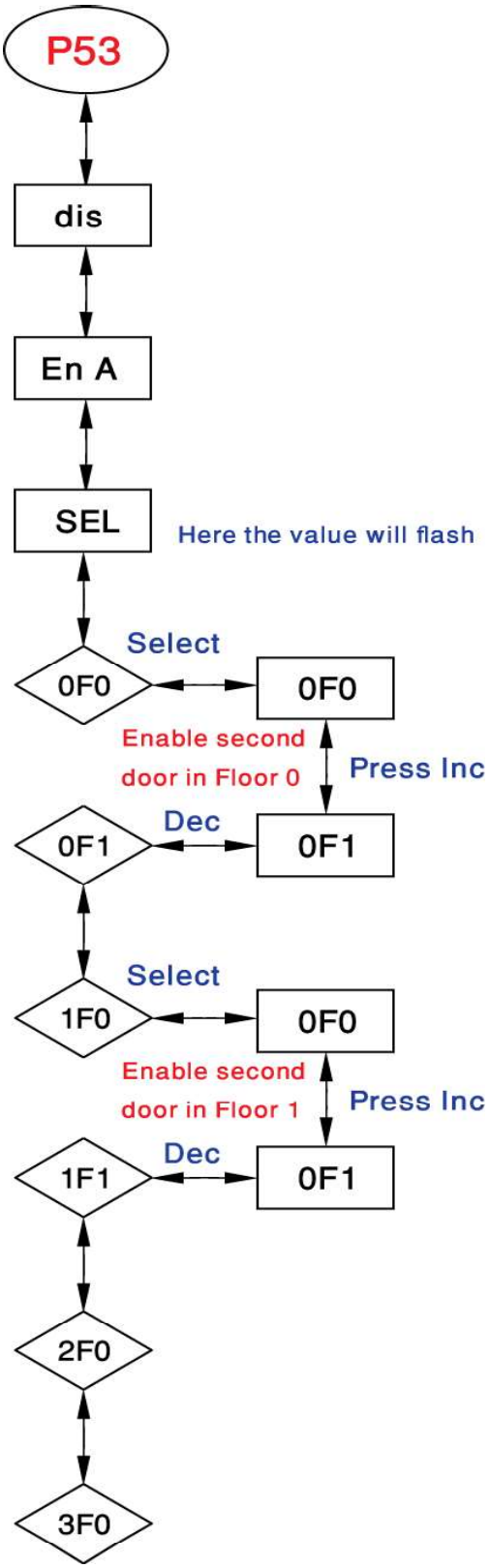
EC and EO for Double door

2nd door EC input = cabin board SDFS – UP
2nd door EO input = cabin board SDFS – DN

Inspection Up and Down from panel board:

EC input = Inspection Down
EO input = inspection UP

6.3 P53=SEL (specify which floor has double door)



6.4 Cabin Board: Inside calls " A " door and " B " door

Ex.: When you activate **0F & 5F** to have double door, the pins **In** & pins **Out** will be

0F	1F	2F	3F	4F	5F	6F	7F	8F	9F
0 InA	1 InA	2 InA	3 InA	4 InA	5 InA	6 InA	7 InA	0 InB	5 InB

0F	1F	2F	3F	4F	5F	6F	7F	8F	9F
0 OutA	1 OutA	2 OutA	3 OutA	4 OutA	5 OutA	6 OutA	7OutA	0 OutB	5 OutB

Note: To select "SEL" and you want to exit, press "DEC"

Close and open Output for the Double Door:

2nd door open output = cabin board slow
2nd door close output = cabin board down

Close delay for door A is Cabin board RSV
Close delay for door B is Cabin board STP

RE open door A is RE Open
RE open door B is cabin board XON

EC and EO for Double door

2nd door EC input = cabin board SDFS – UP
2nd door EO input = cabin board SDFS – DN

Inspection Up and Down from panel board:

EC input = Inspection Down
EO input = inspection UP

7. NOVO Normal LCD:

In main screen LCD will switch between 2 pages

7.1 Inspection mode will display:

1- INS
2- Status of elevator: "TRn" for travel and "STn" for Stop
n: is the floor number

7.2 Normal mode will display:

1. FLn: Floor number
2. Status of elevator: "TRV" for travel and "STP" for stop

8. NOVO Serial LCD:

8.1 Inspection mode will display :

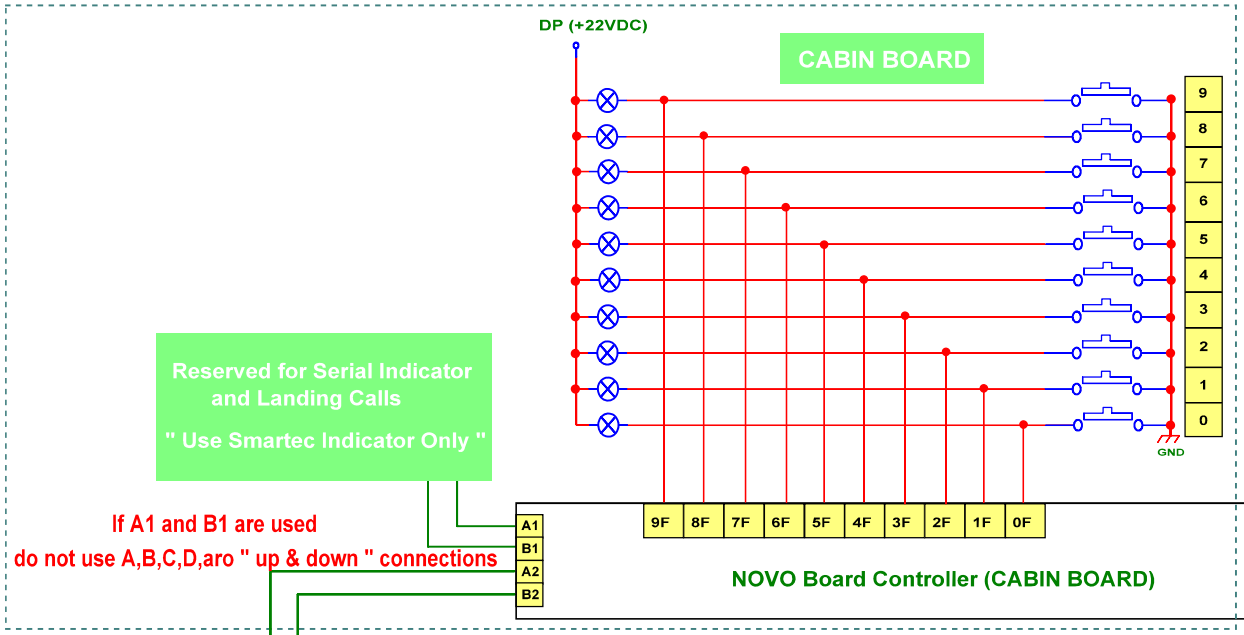
1- INC (C for connecting)
2- Status of elevator: "TRn" for travel and "STn" for Stop
n: is the floor number

8.2 Normal mode will display:

1. Con (for connecting)
2. Status of elevator: "TRn" for travel and "STn" for stop
n: is the floor number

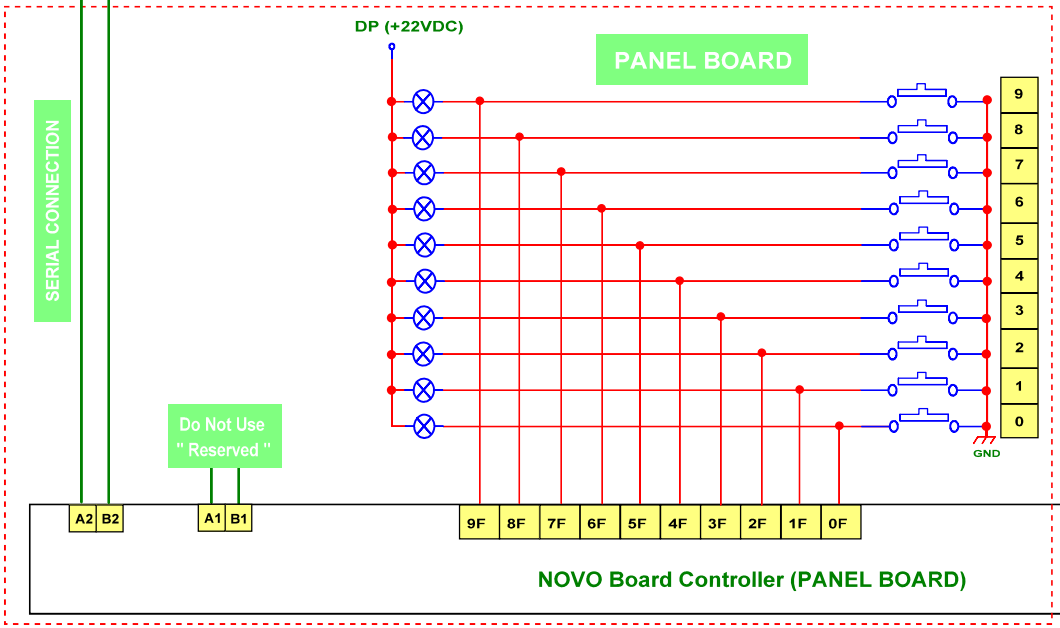
9. WIRINGS

10 STOPS DOWN COLLECTIVE (SERIAL CONNECTION)



Put (P47= 1) for Cabin Board

Wire Count	Flat cable needed for Serial Installation
1	+24 VDC
1	-24 VDC
1	A2 RS485 Serial Communication
1	B2 RS485 Serial Communication
2	For Auto / Manual safety line 60 VDC
Total Wires	6



Put (P47= 2) for Panel Board

Wire Count	Optional Wires
1	Neuter 220VAC, not required if Light 24VDC used
1	Phase 220VAC, not required if Light 24VDC used
2	For Parachute
2	Siren for Emergency
Total Wires	6

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Page Description:

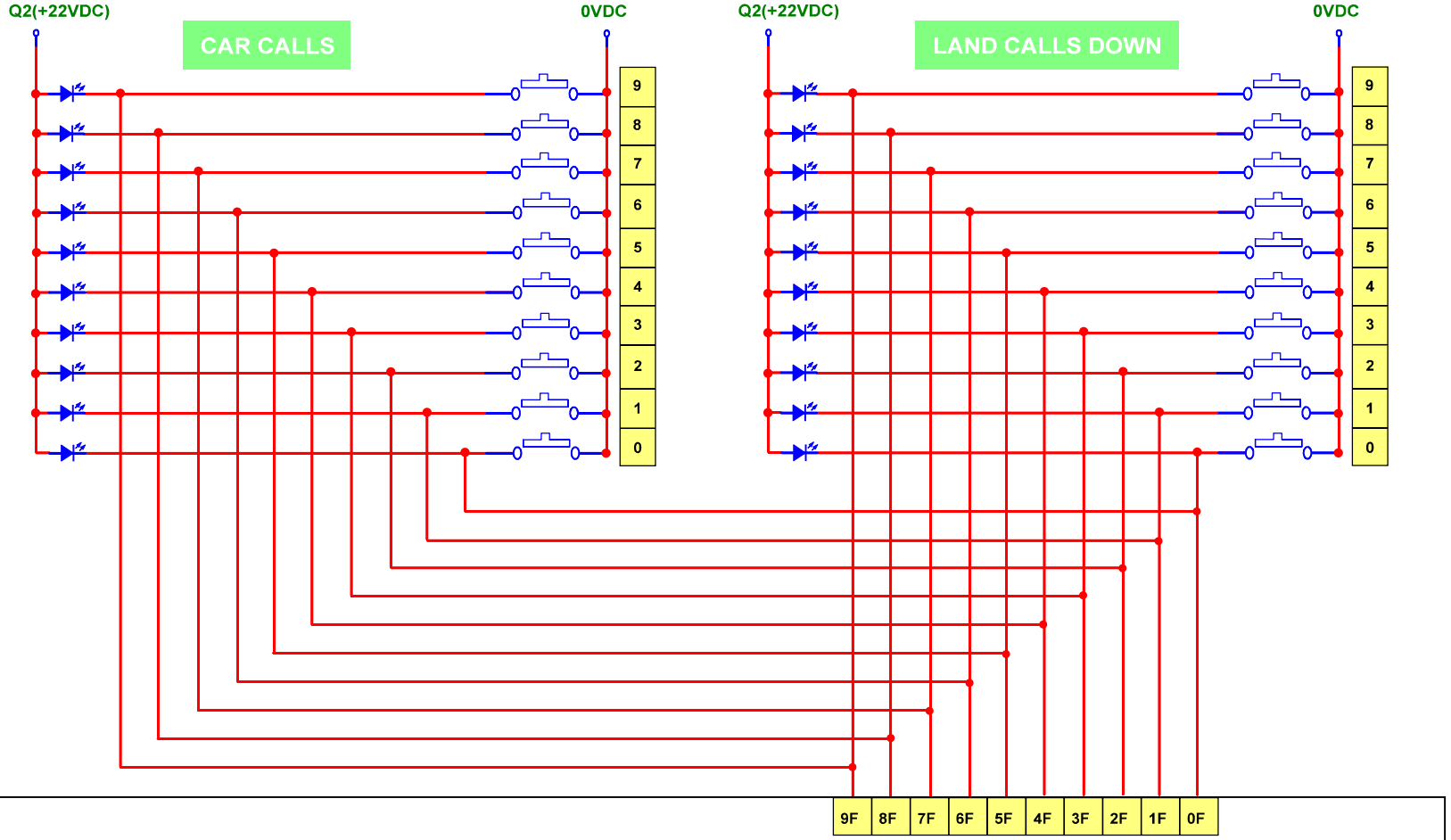
10 STOPS DOWN COLLECTIVE SERIALCONNECTION

Project:

NOVO BOARD CONTROLLER

SIMPLEX MODE: 10 STOPS NOT COLLECTIVE

P24= 64



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Page Description:

Simplex mode

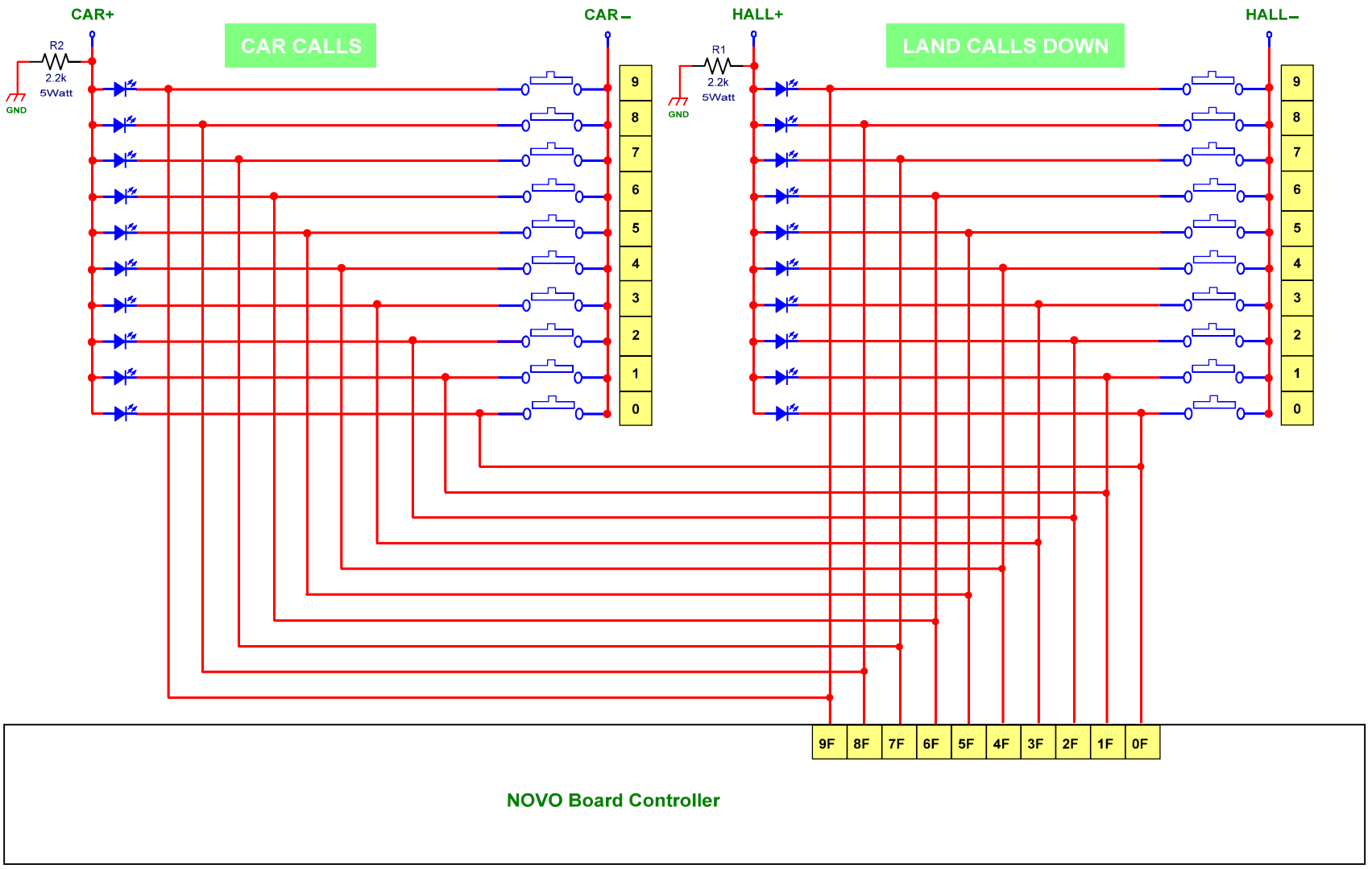
10 STOPS NOT COLLECTIVE

Project:

NOVO BOARD CONTROLLER

SWITCHING MODE: 10 STOPS DOWN COLLECTIVE

P24= 17



Note: 7-Segment Indicator doesn't work in switching mode, only Binary and Gray work

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Page Description:

SWITCHING MODE

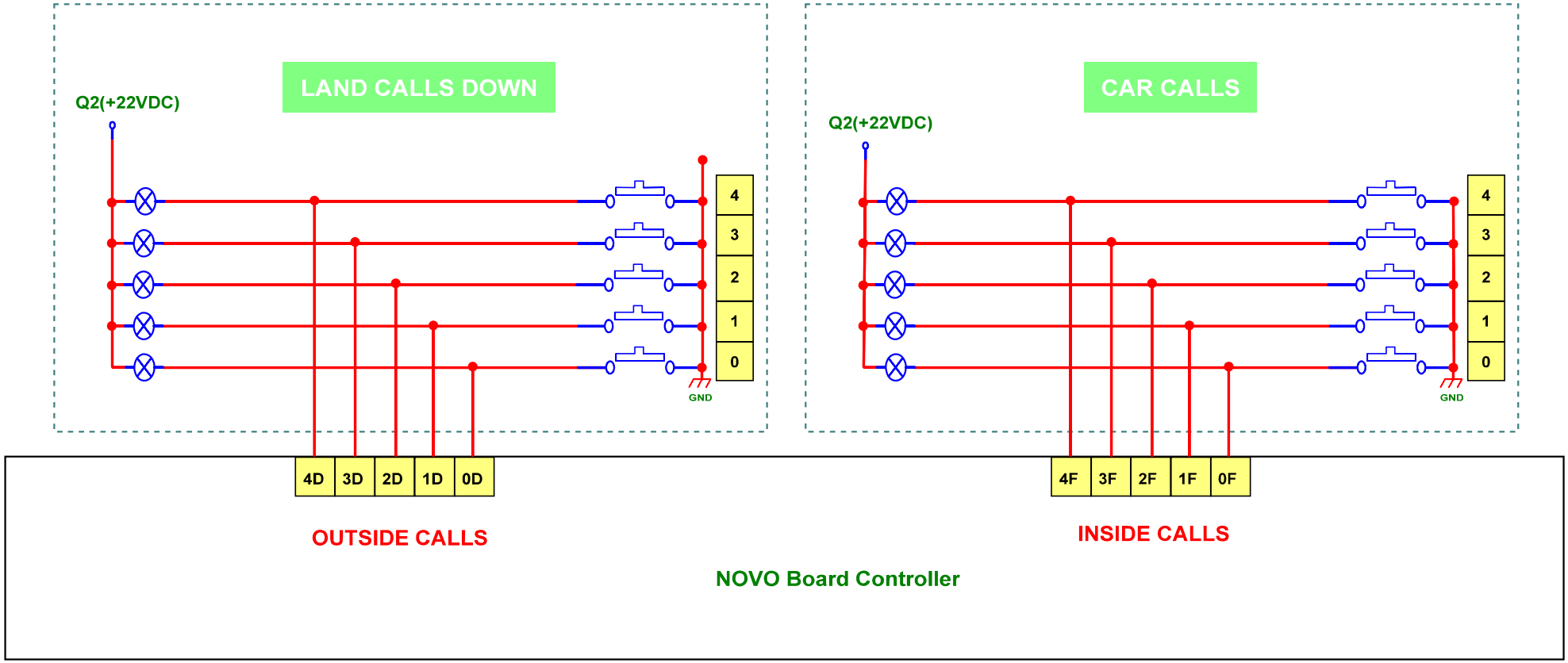
10 STOPS DOWN COLLECTIVE

Project:

NOVO BOARD CONTROLLER

STANDARD MODE : 5 STOPS DOWN COLLECTIVE

P24= 16



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Page Description:

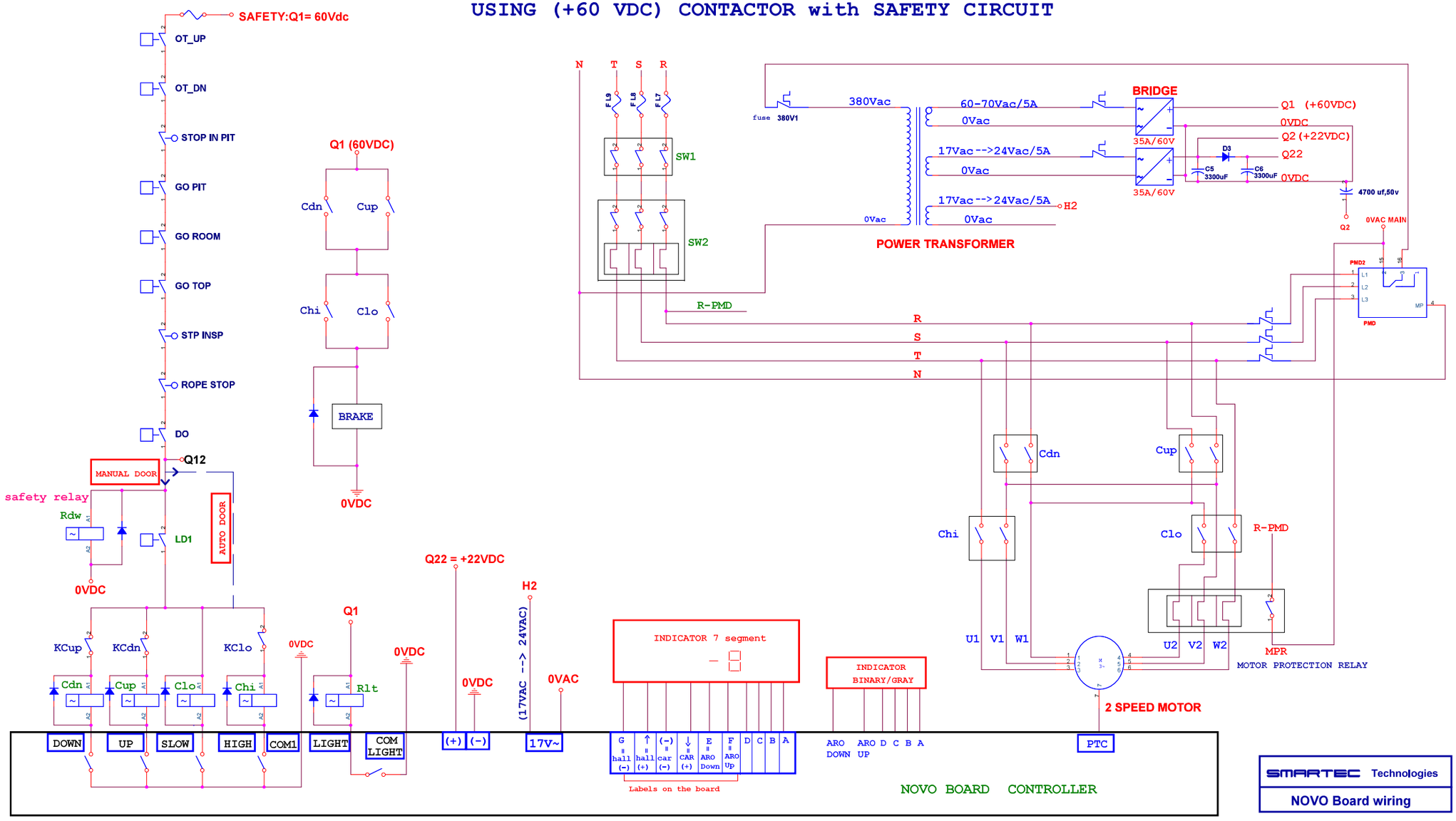
STANDARD MODE

5 STOPS DOWN COLLECTIVE

Project:

NOVO BOARD CONTROLLER

USING (+60 VDC) CONTACTOR with SAFETY CIRCUIT



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NOVO Board wiring

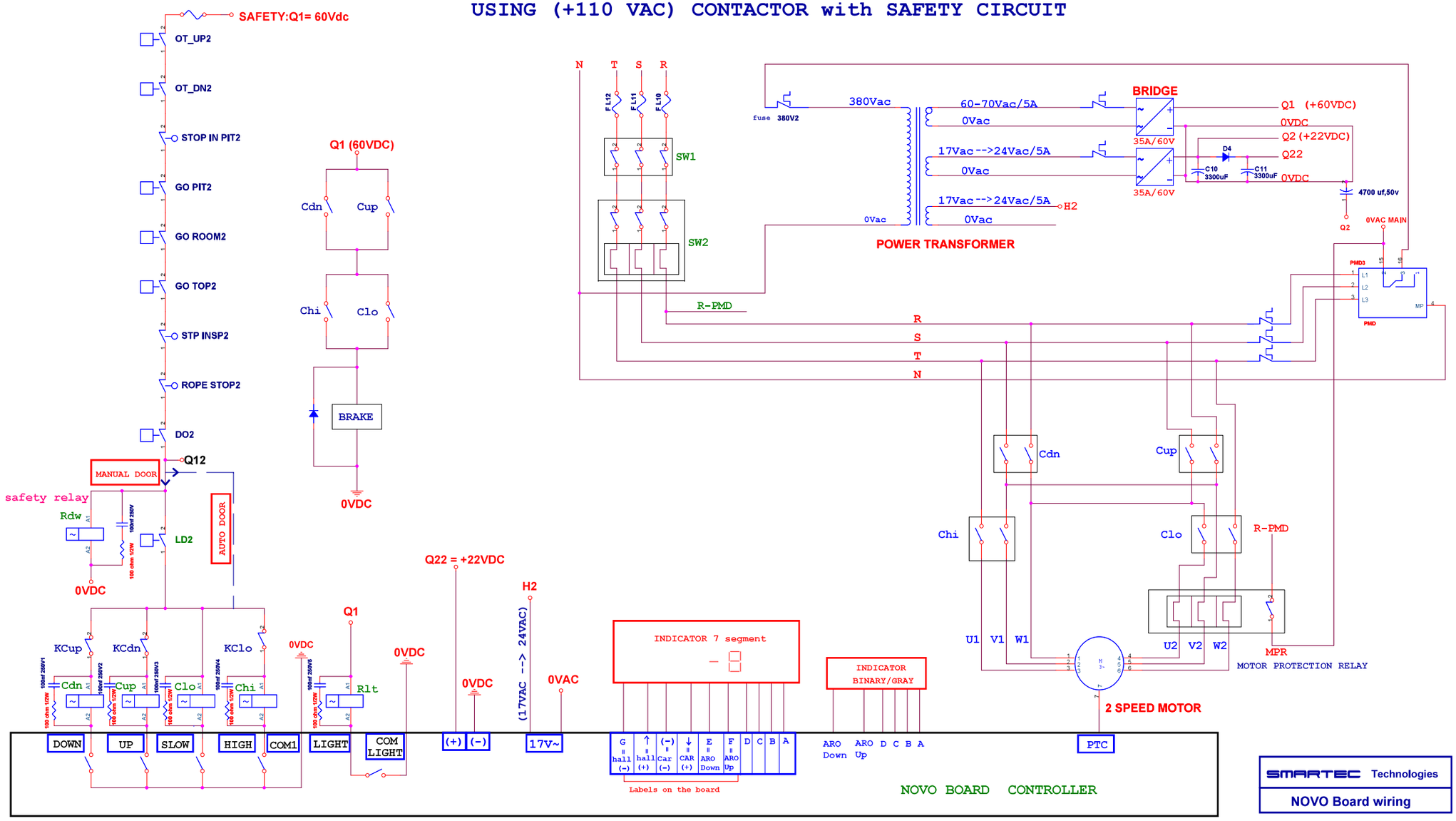
OT-UP: Over travel up mechanical limit switch
OT-DN: Over travel down mechanical limit switch
GO PIT: Overspeed governor pit
GO ROOM: Overspeed governor machine room
GO TOP: Overspeed governor top of cabine
STP INSP: Stop inspection top of cabine

DO : Door contact mechanical switch
LD : Door lock contact
Rdw: Door contact relay
KClo: Auxiliary switch for low speed contactor,should be N.C
KCdn: Auxiliary switch for down direction contactor,should be N.C
KCup: Auxiliary switch for up direction contactor,should be N.C

Cdn: Down direction contactor
Cup: Up direction contactor
CLo: Slow speed relay
Chi: High speed relay
Rlt: Light relay
MPR: Motor protection relay

PMD: Phase balance and phase sequence monitoring device
PTC: Connected to the PTC input in the HAPPY board
SW1: Main circuit breaker
SW2: Thermo-magnetic circuit breaker in control panel

USING (+110 VAC) CONTACTOR with SAFETY CIRCUIT



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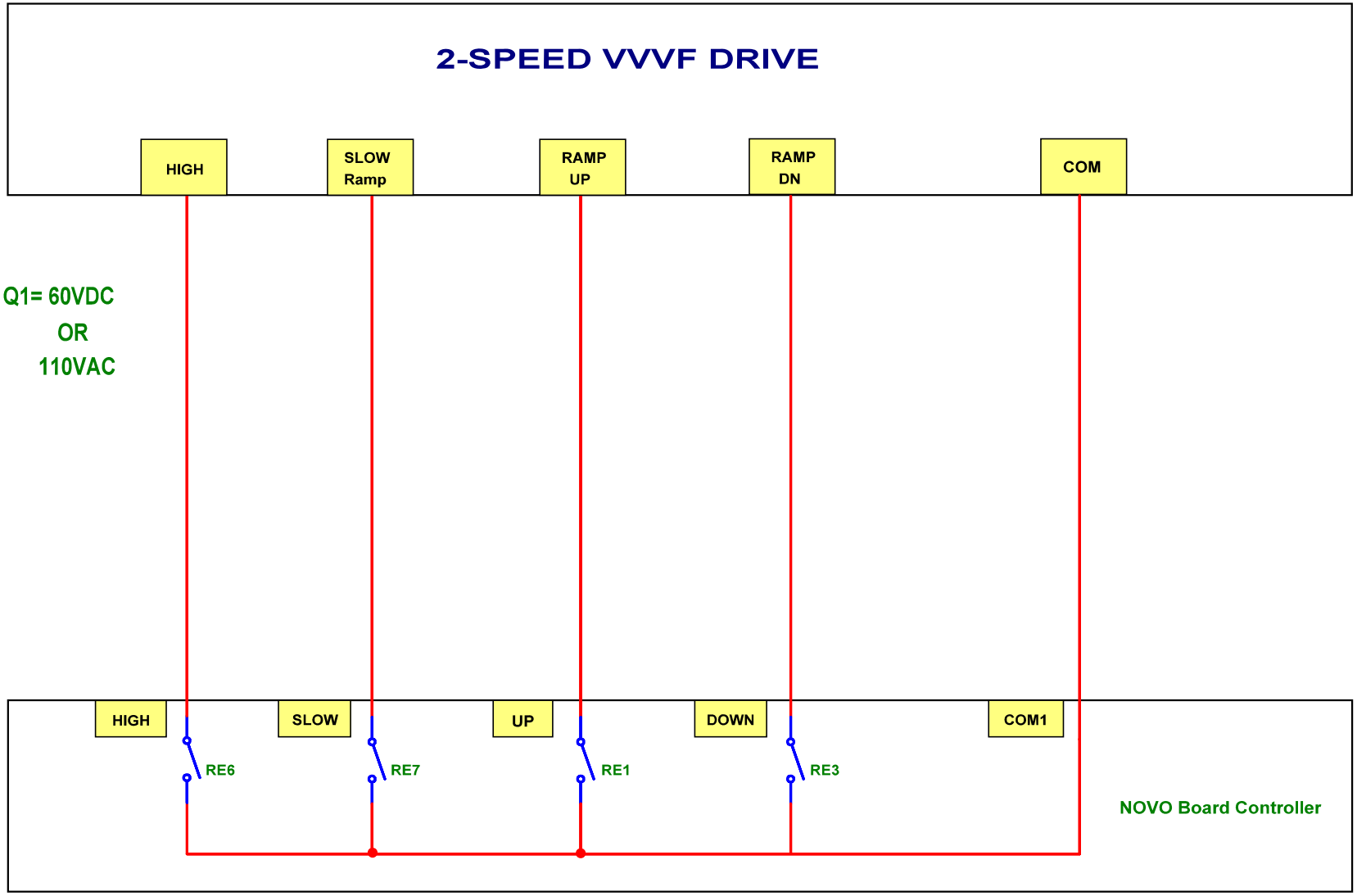
NOVO Board wiring

OT-UP: Over travel up mechanical limit switch
OT-DN: Over travel down mechanical limit switch
GO PIT: Overspeed governor pit
GO ROOM: Overspeed governor machine room
GO TOP: Overspeed governor top of cabine
STP INSP: Stop inspection top of cabine

DO : Door contact mechanical switch
LD : Door lock contact
Rdw: Door contact relay
KClo: Auxiliary switch for low speed contactor,should be N.C
KCdn: Auxiliary switch for down direction contactor,should be N.C
KCup: Auxiliary switch for up direction contactor,should be N.C

Cdn: Down direction contactor
Cup: Up direction contactor
CLo: Slow speed relay
Chi: High speed relay
Rlt: Light relay
MPR: Motor protection relay

PMD: Phase balance and phase sequence monitoring device
PTC: Connected to the PTC input in the HAPPY board
SW1: Main circuit breaker
SW2: Thermo-magnetic circuit breaker in control panel



(*): Do not install diodes with contactors if S1 was 110 VAC

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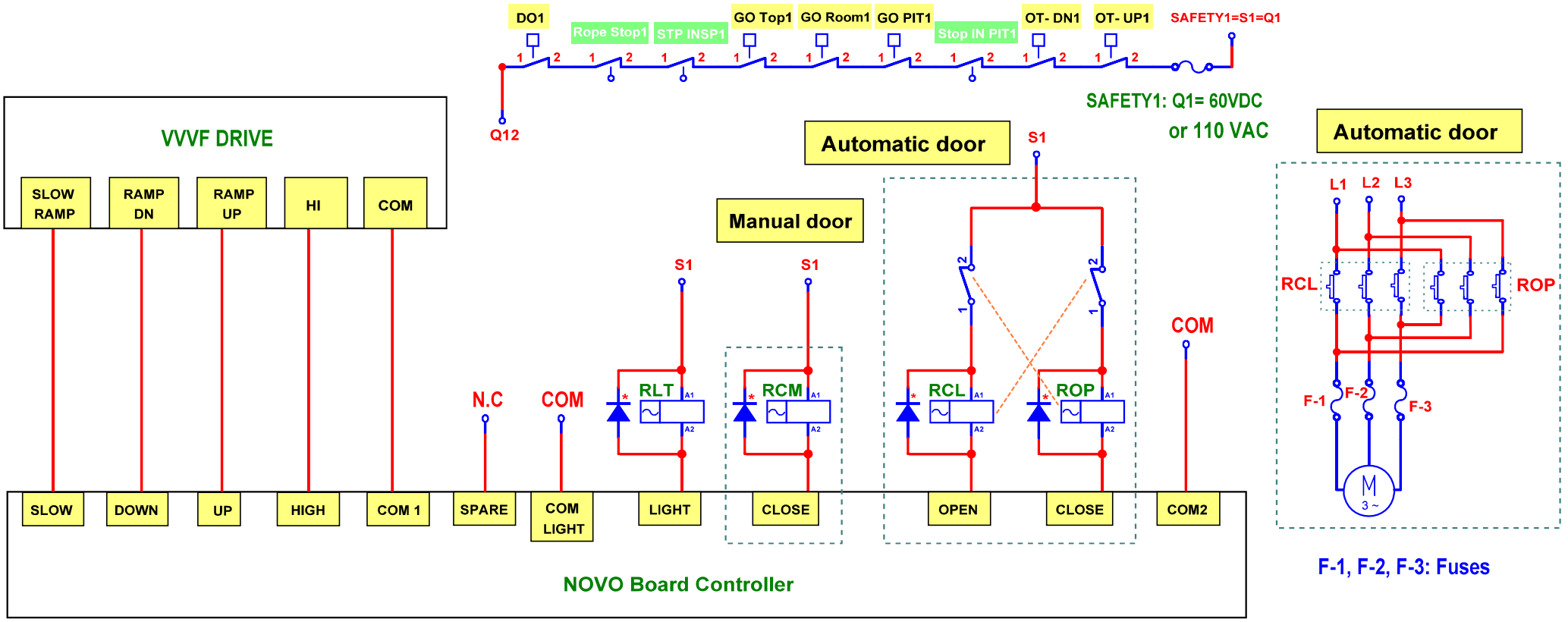
Page Description:

2-SPEED VVVF DRIVE

Project:

NOVO CONTROLLER

AUTOMATIC / MANUAL DOOR VVVF



(*): Do not install diodes with contactors if S1 was 110 VAC

DO1 : Door Contact Mechanical Switch	RLT : Light Relay
STP INSP1: Stop Inspection Top of Cabine	RCM : Cam Relay for Swinging Door
Go TOP1 : Over Speed Governor Top of Cabine	RCL : Close Door Relay
GO ROOM1: Over Speed Governor Machine Room	ROP : Open Door Relay
GO PIT1 : Over Speed Governor PIT	COM1: Commun for Relay(Slow,high,UP,Down & Spare) is connected to 0VDC or 0VAC depending on what you choose (110VAC or 60VDC)
OT-DN1 : Over Travel Down Mechanical Limit Switch	COM2: common for relay (open & close) is connected to 0VDC or 0VAC
OT-UP1 : Over Travel Up Mechanical Limit Switch	COM LIGHT: Common for relay car light is connected to 0VAC or 0VDC

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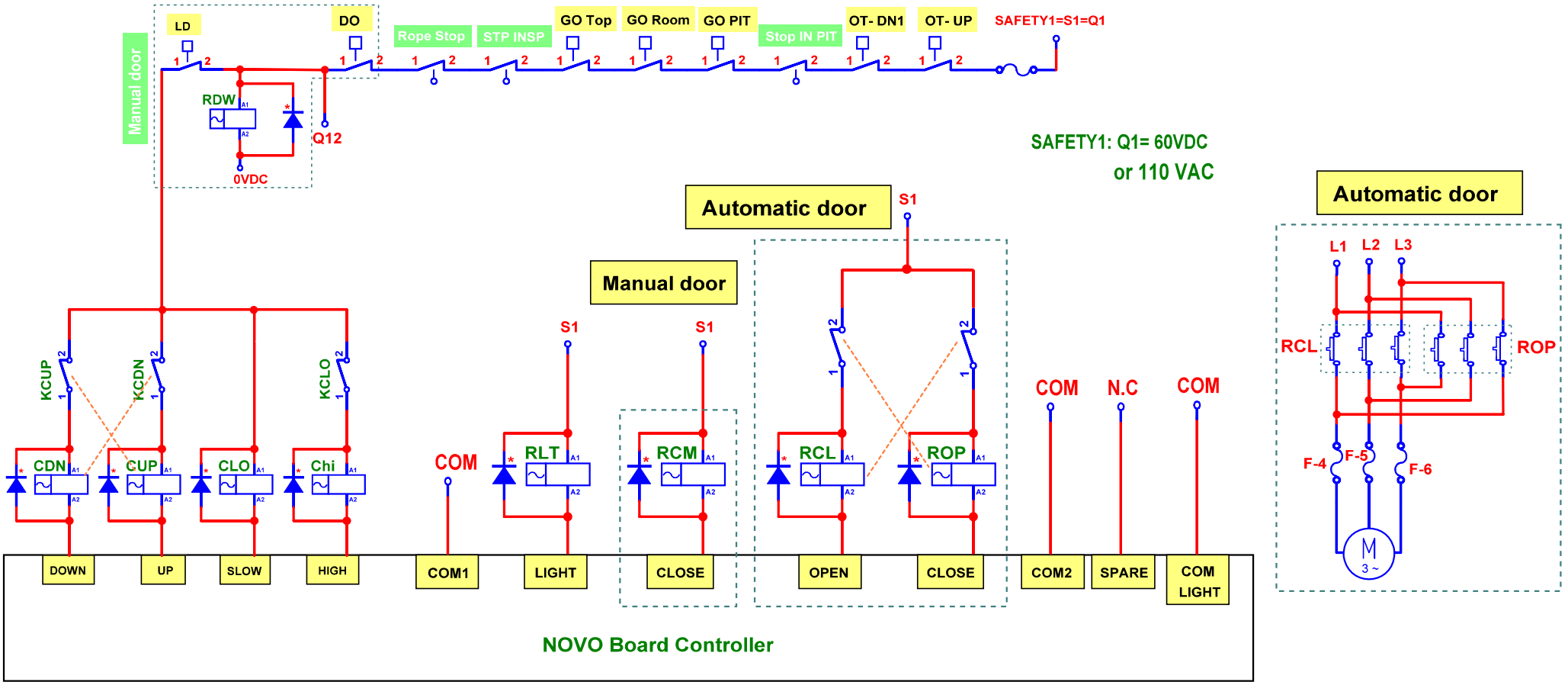
Page Description:

AUTOMATIC / MANUAL DOOR VVVF

Project:

NOVO BOARD CONTROLLER

AUTOMATIC / MANUAL DOOR AC2



(*): Do not install diodes with contactors if Q1 was 110 VAC

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Page Description:	Project:
AUTOMATIC / MANUAL DOOR AC2	NOVO BOARD CONTROLLER

Description of Components of " MANUAL / AUTOMATIC DOOR AC2 " Diagram

LD : Lock Door Contact	CUP : Up Direction Contactor
DO : Door Contact Mechanical Switch	CLO : Slow Speed Relay
STP INSP: Stop Inspection Top of Cabine	CHi : High Speed Relay
GO TOP: Overspeed Governor Top of Cabine	RLT : Light Relay
GO ROOM: Overspeed Governor Machine Room	RCM : Cam Relay For Swinging Door
GO PIT: Overspeed Governor Pit	RCL : Close Door Relay
OT-DN : Over Travel Down Mechanical Limit Switch	ROP : Open Door Relay
OT-UP : Over Travel UP Mechanical Limit Switch	COM1: Common for Relay(UP,Down,Slow ,High & Spare) is connected to 0VAC or 0VDC
Rdw :Door Contact Relay	COM2: Common for Relay(Close & Open) is connected to 0VAC or 0VDC depending on the chosen (110VAC or 60VDC)
KCUP : Auxiliary Switch for Up Direction Contactor , should be not connected	
KCDN : Auxiliary Switch for down Direction Contactor , should be not connected	COM LIGHT: Common for Relay Car Light is connected to 0VAc or 0VDC
KCLO : Auxiliary Switch for Low Speed Contactor , should be not connected	
CDN : Down Direction Contactor	F-4, F-5, F-6 : Fuses

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Page Description:

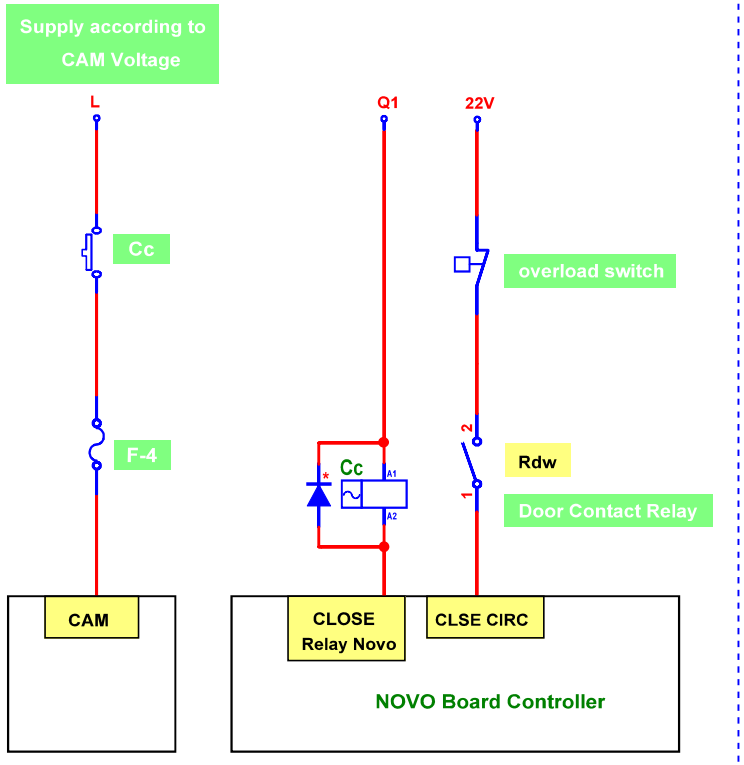
Description of Components of " MANUAL / AUTOMATIC DOOR AC2 " Diagram

Project:

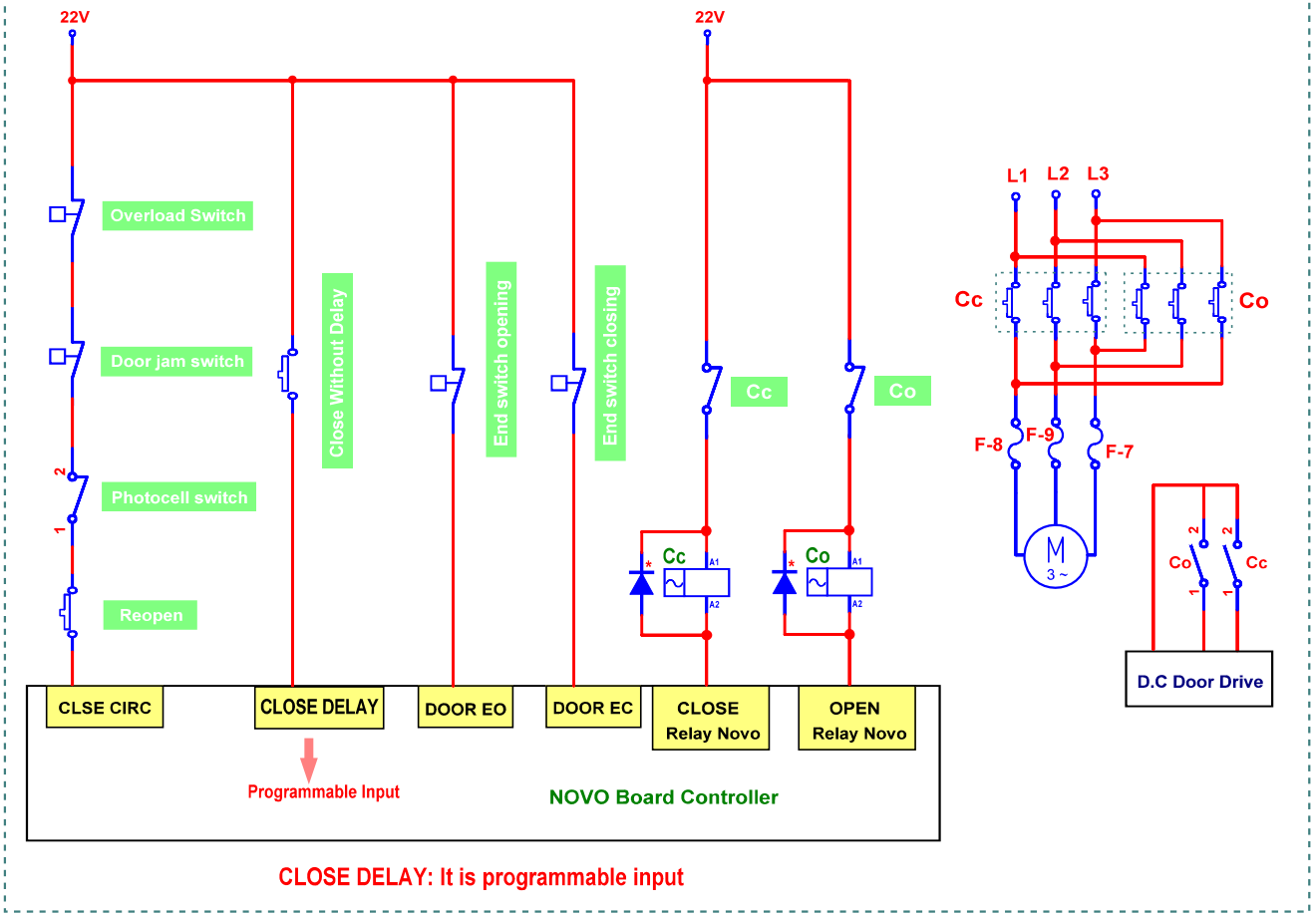
NOVO BOARD COTROLLER

TYPE OF DOOR

Swinging Door



Automatic door



CLOSE DELAY: It is programmable input

Rdw: Door Contact Relay

Cc: Close Contactor

Co: Open Contactor

(*): Do not install diodes with contactors if Q1 was 110 VAC

If 110 is applied, put instead of diode a resistor 100 ohm 1/2 Watt and a capacitor 100 nf / 250V

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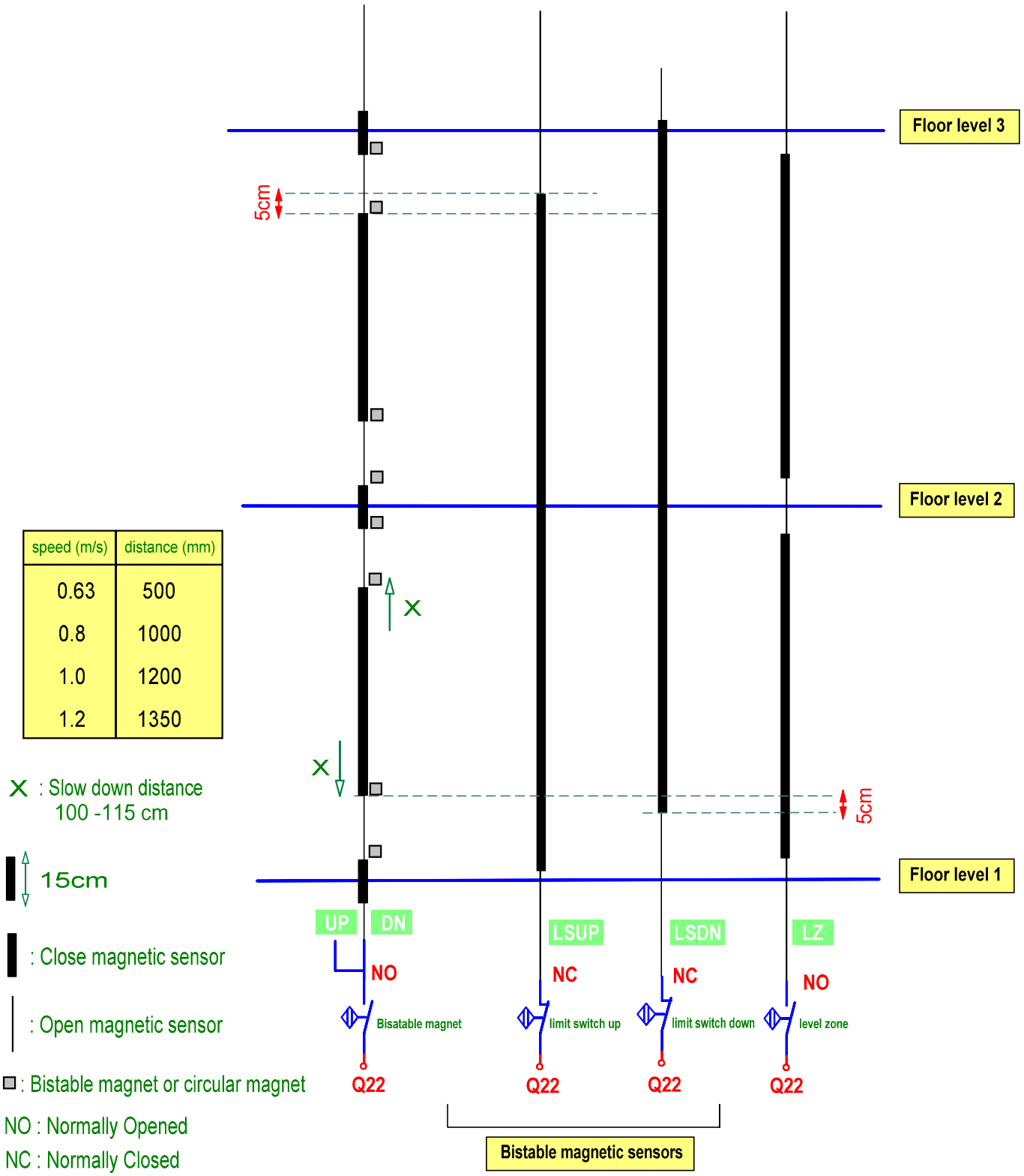
Page Description: TYPE OF DOOR

Project: NOVO CONTROLLER

MAGNETIC SENSORS' DISPOSITION
For Bistable Floor Count



speed (m/s)	distance (mm)
0.63	500
0.8	1000
1.0	1200
1.2	1350

X : Slow down distance
100 -115 cm

15cm

: Close magnetic sensor

: Open magnetic sensor

: Bistable magnet or circular magnet

NO : Normally Opened

NC : Normally Closed

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Page Description:

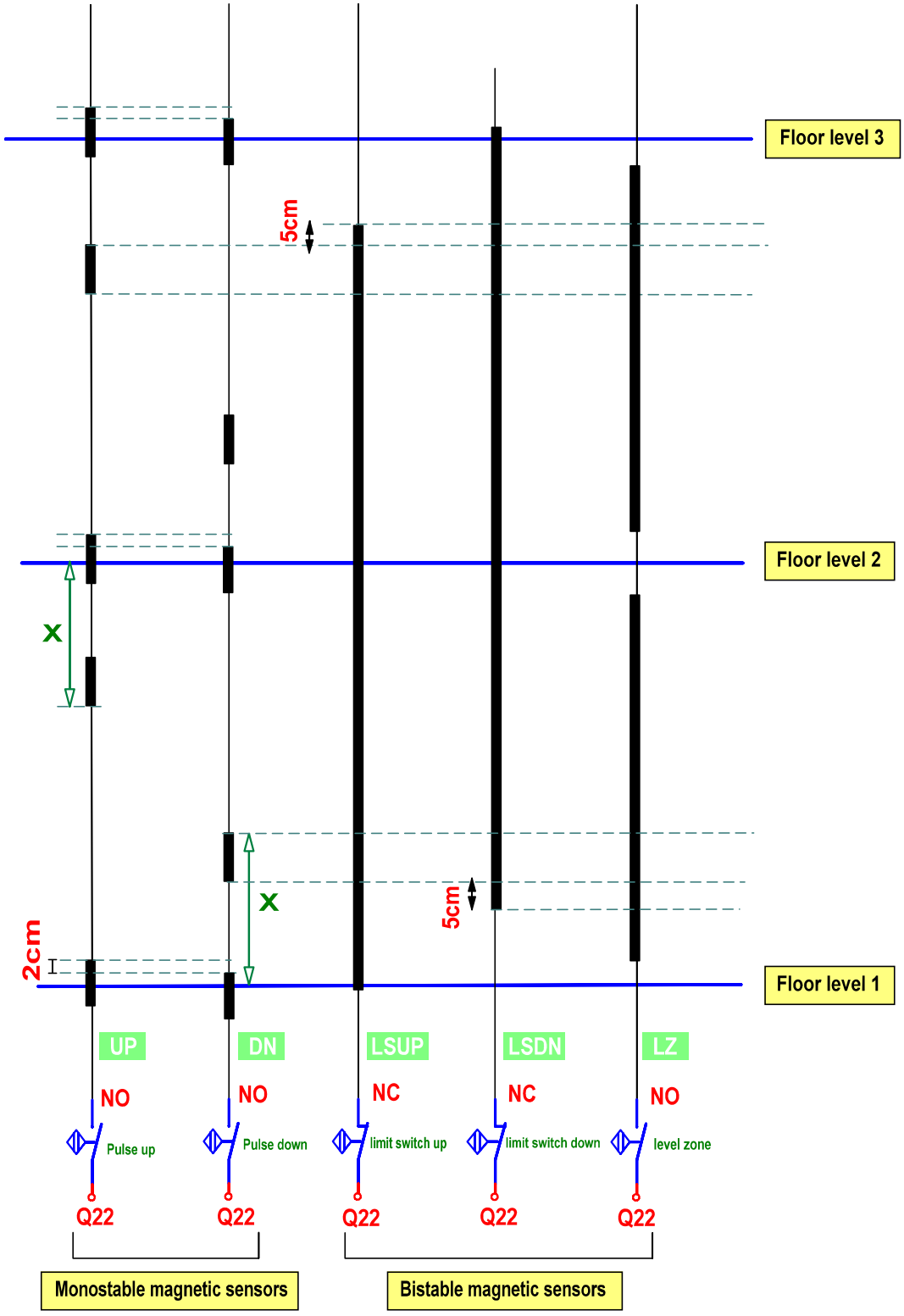
MAGNETIC SENSORS' DISPOSITION
For Bistable Floor Count

Project:

NOVO BOARD CONTROLLER

MAGNETIC SENSORS' DISPOSITION

For Monostable Floor Count



speed (m/s)	distance (mm)
0.63	500
0.8	1000
1.0	1200
1.2	1350

X : Slow down distance
100 -115 cm

15cm

: Close magnetic sensor

: Open magnetic sensor

NO : Normally Opened

NC : Normally Closed

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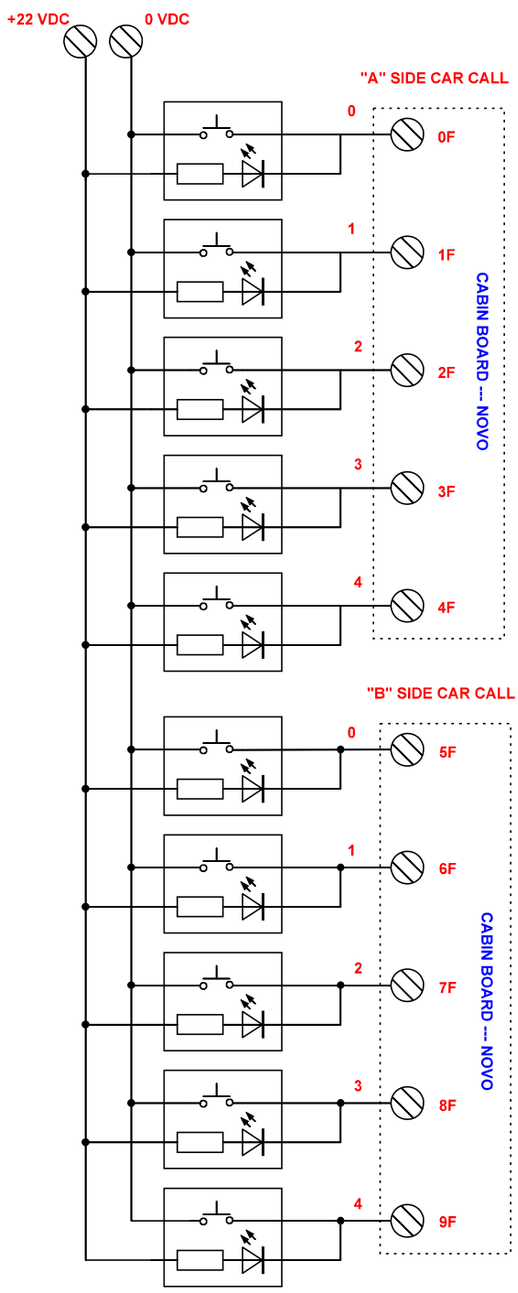
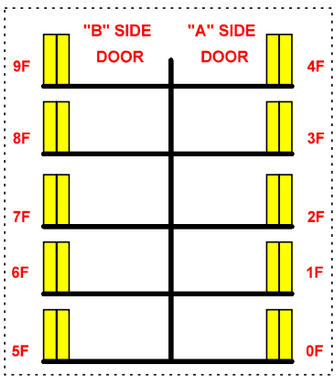
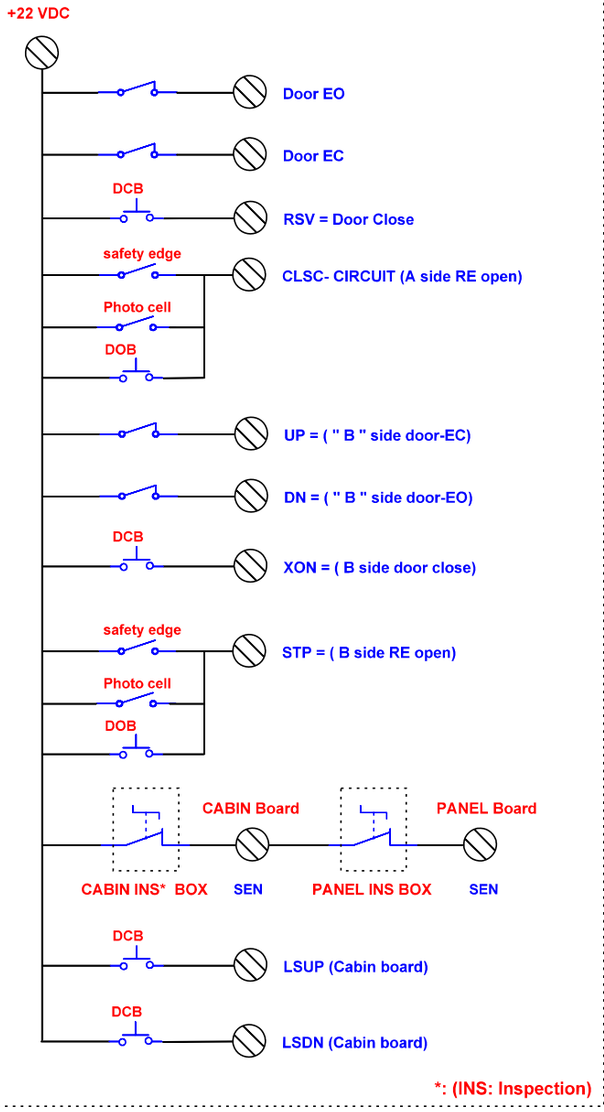
Dual Door (Cabin Board)

NOVO SERIAL-CALL CONNECTIONS FOR Dual DOOR



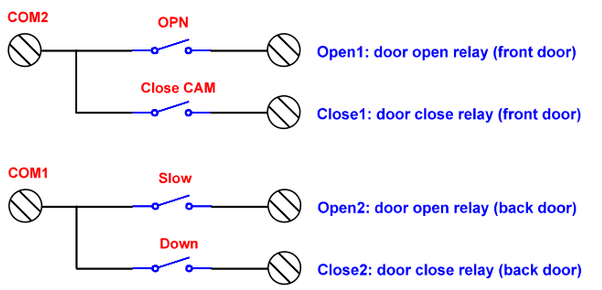


NOVO SERIAL CABIN BOARD ONLY FOR DUAL DOOR



*: (INS: Inspection)

NOVO SERIAL CABIN BOARD - DOOR OPEN & CLOSE



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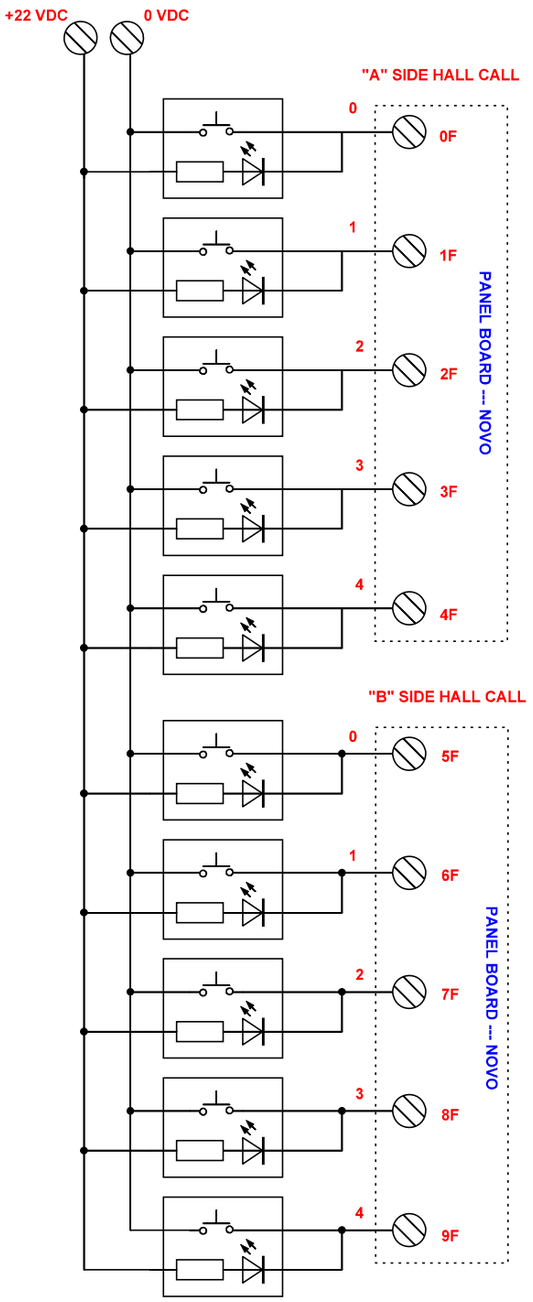
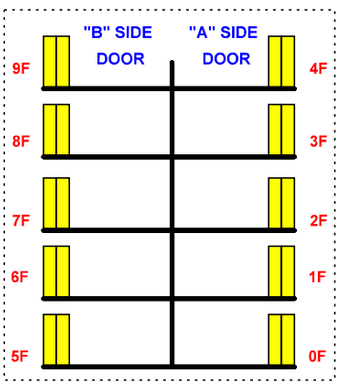
Page Description: Dual Door (Cabin Board)

Project: NOVO BOARD CONTROLLER

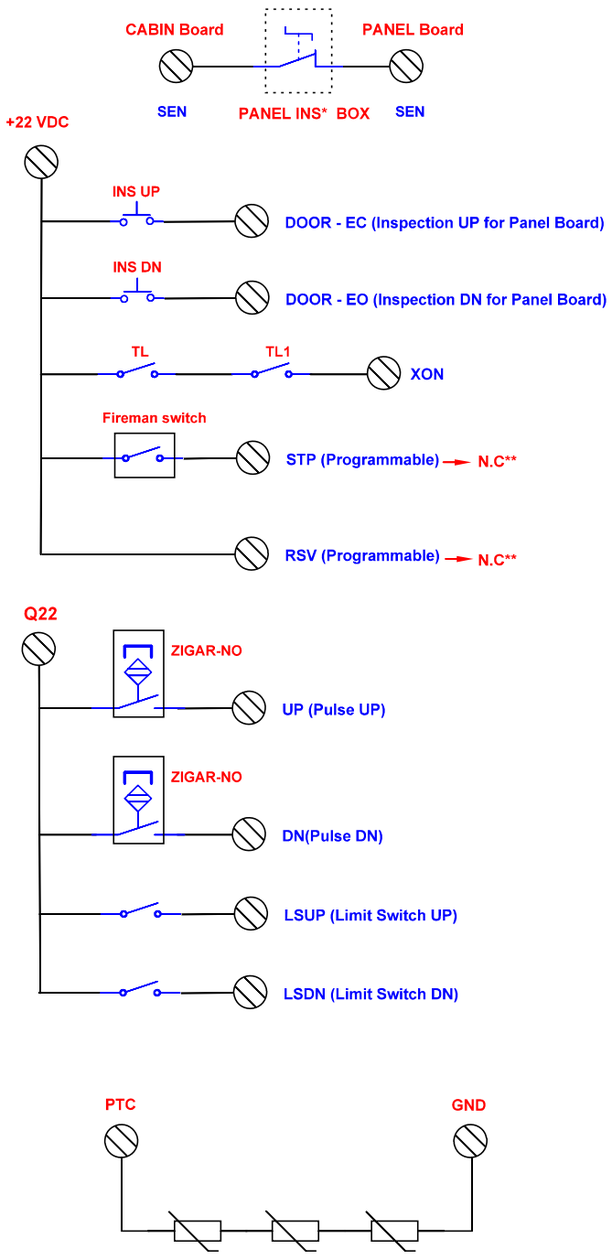
Dual Door (Panel Board)

NOVO SERIAL-CALL CONNECTIONS FOR Dual DOOR





NOVO SERIAL PANEL BOARD ONLY FOR DUAL DOOR



*: (INS: Inspection)

** N.C: not connected

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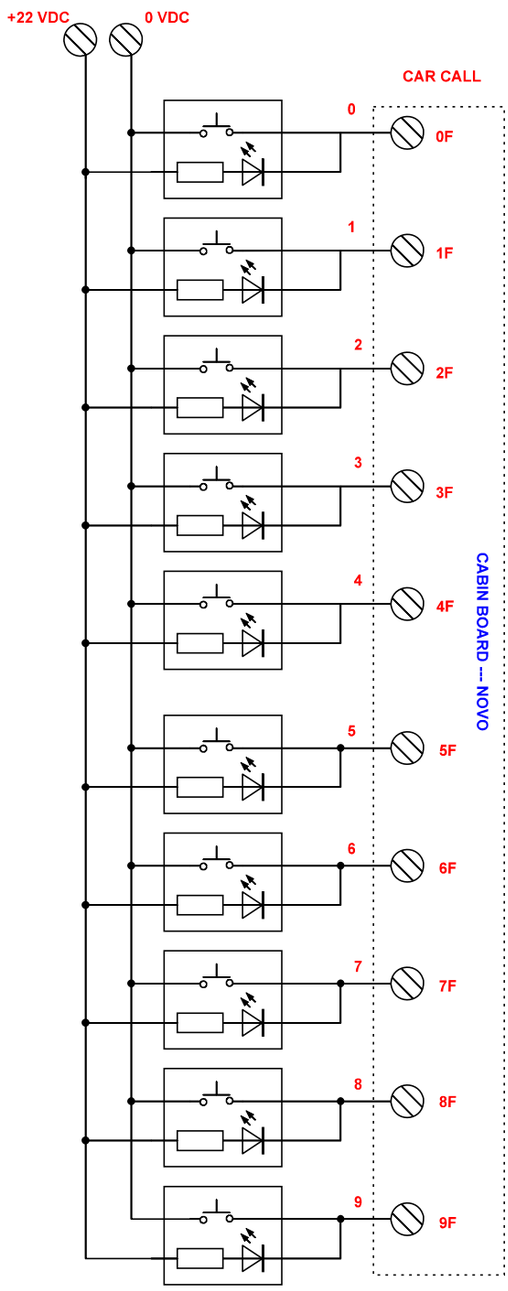
Page Description: Dual Door (Panel Board)

Project: NOVO BOARD CONTROLLER

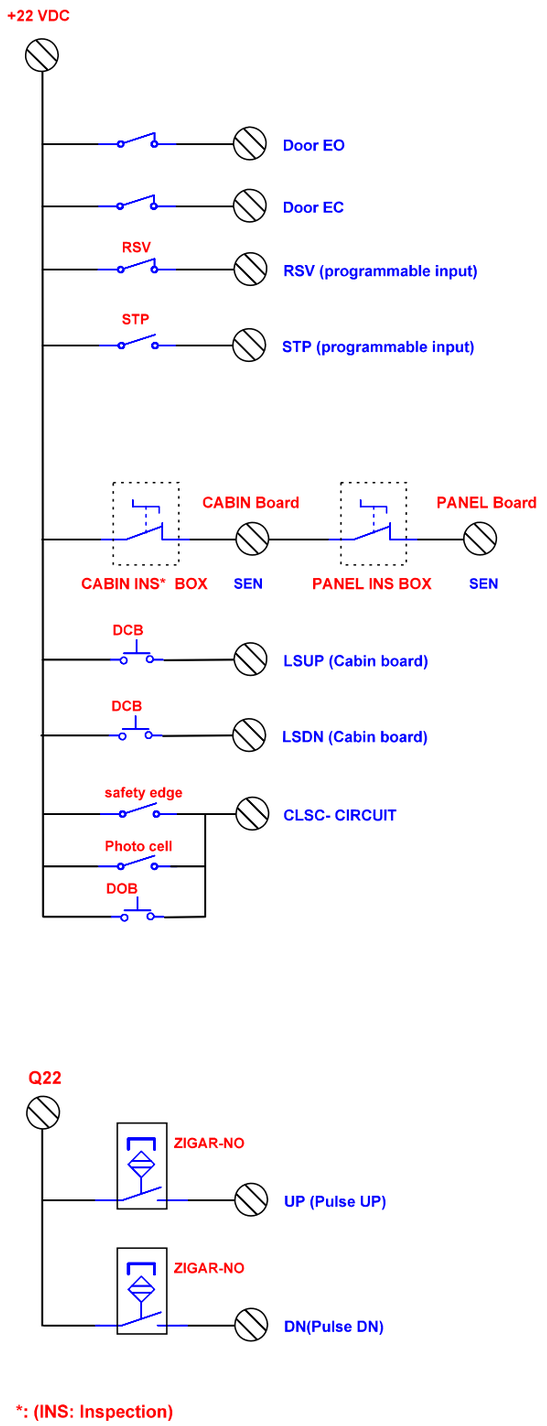
Serial Communication (Cabin Board)

P47 = 1

NOVO SERIAL-CALL CONNECTIONS



NOVO SERIAL CABIN BOARD



*: (INS: Inspection)

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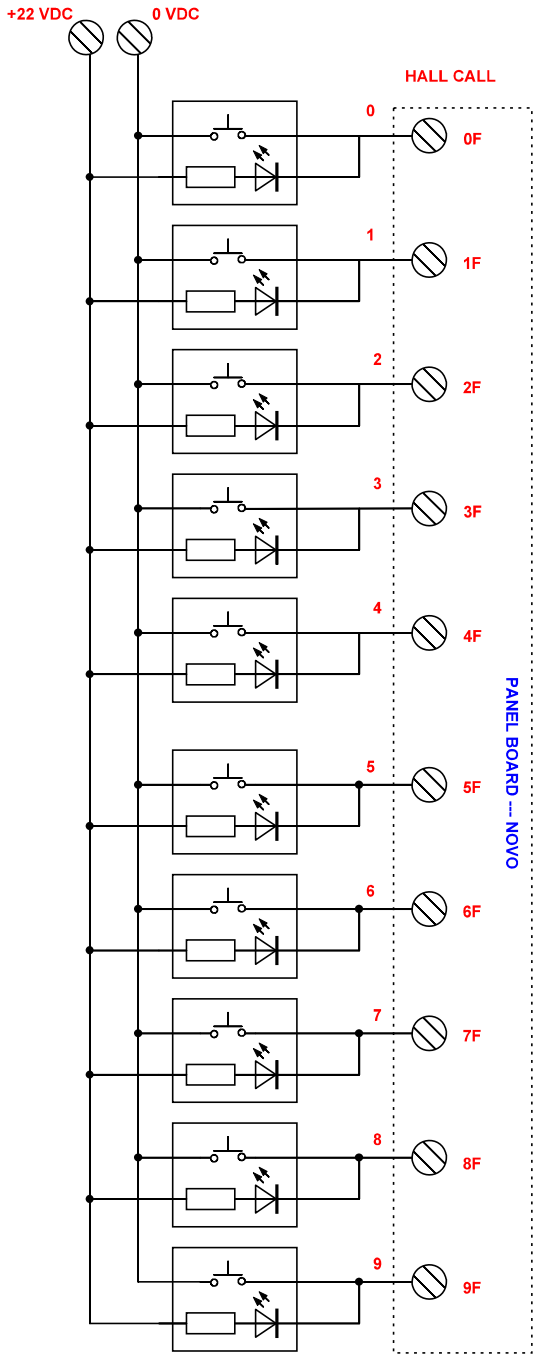
Page Description:	Project:
Serial Communication (Cabin Board)	NOVO BOARD CONTROLLER

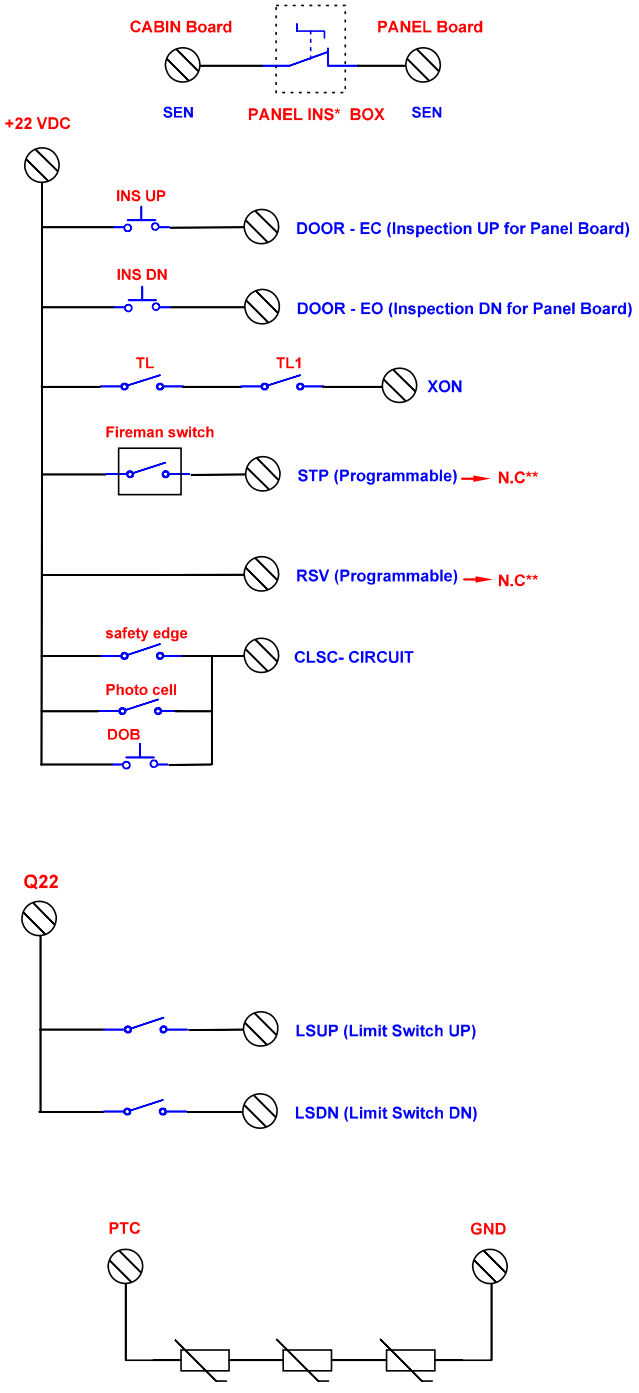
Serial Communication (Panel Board)

P47 = 2

NOVO SERIAL-CALL CONNECTIONS



NOVO SERIAL PANEL BOARD



*: (INS: Inspection)

** N.C: not connected

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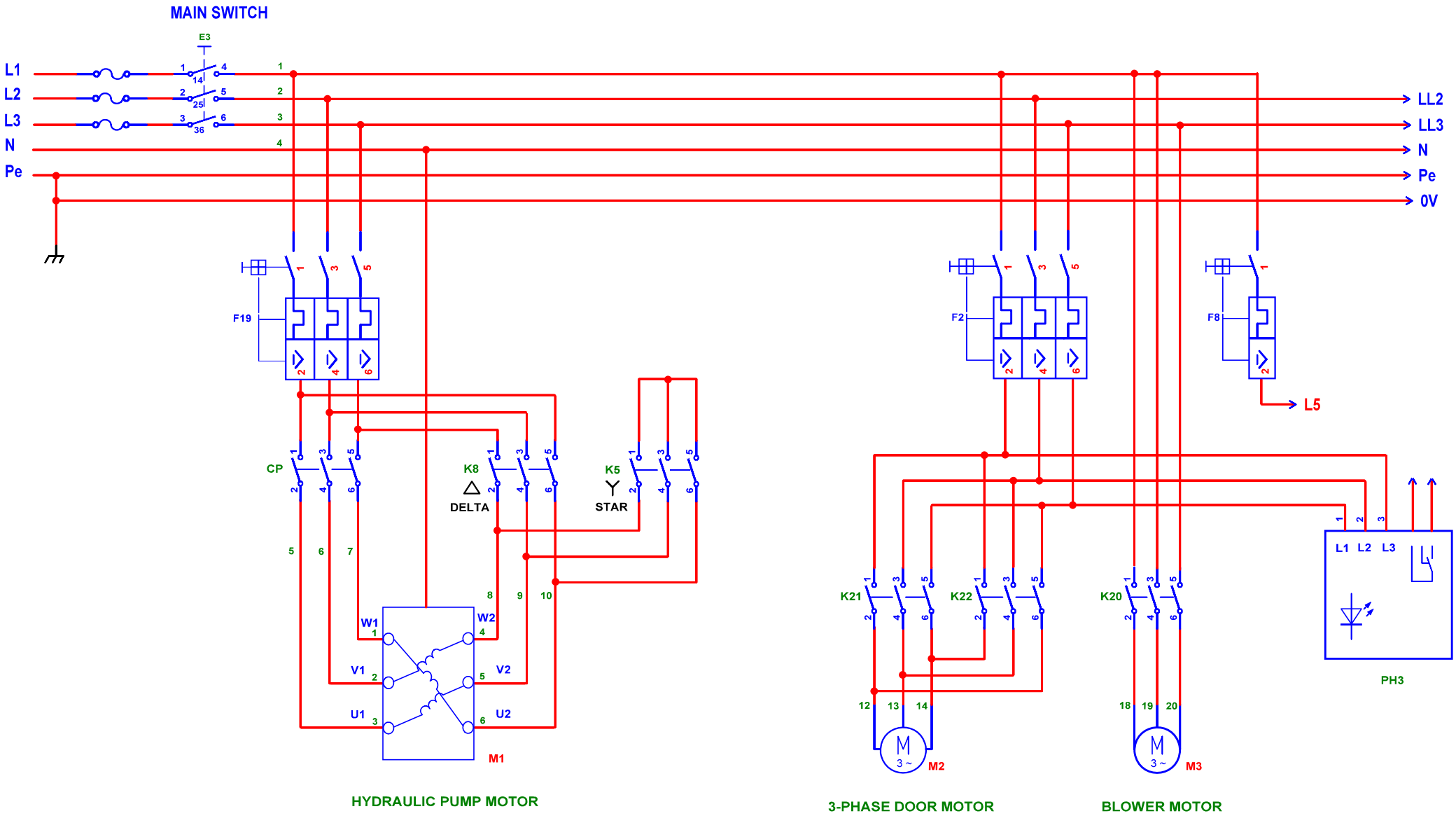
Page Description: Serial Communication (Panel Board)

Project: NOVO BOARD CONTROLLER



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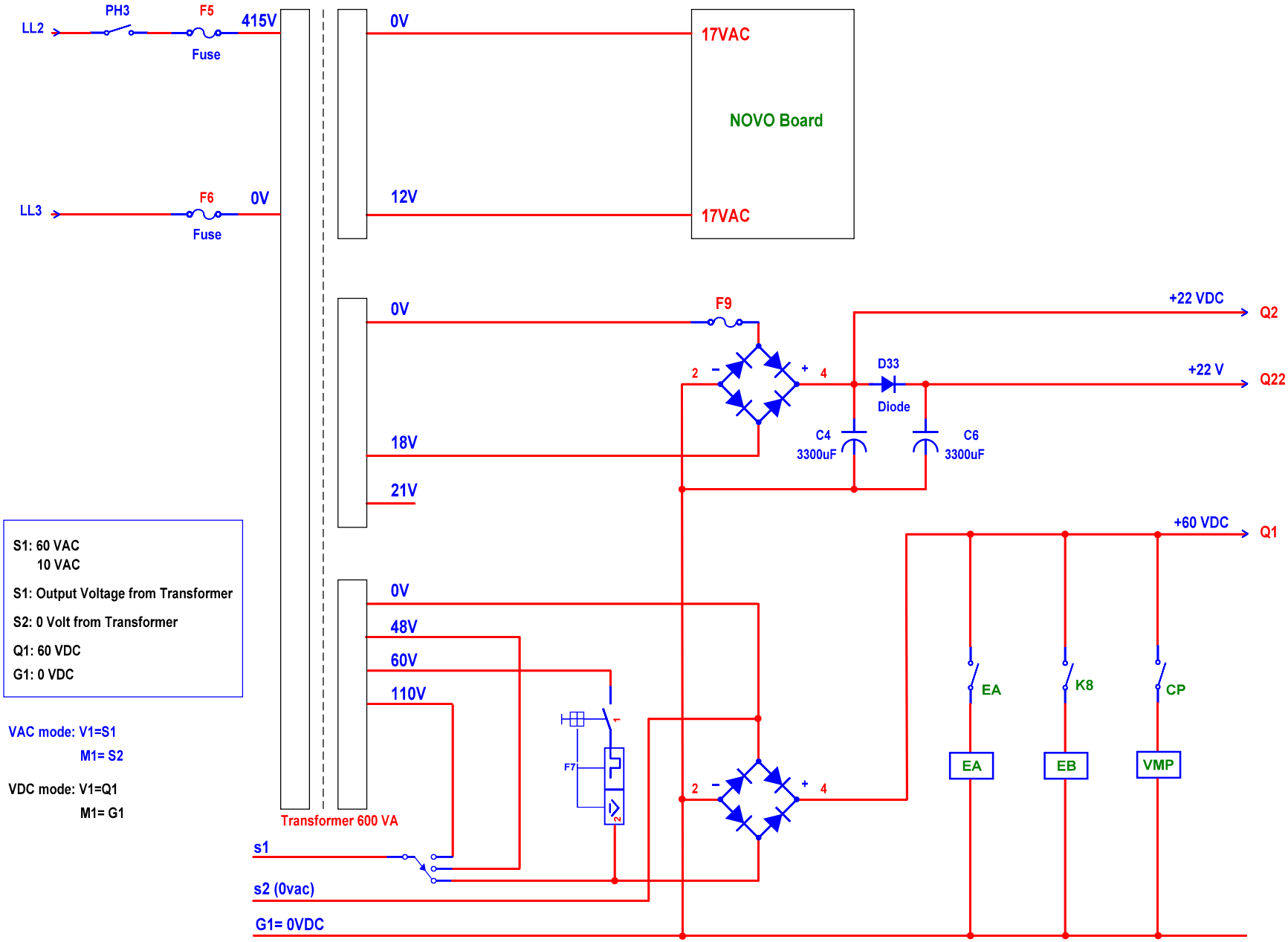
Page Description:

HYDRAULIC

POWER CIRCUIT 1

Project:

NOVO BOARD CONTROLLER



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Page Description:

HYDRAULIC

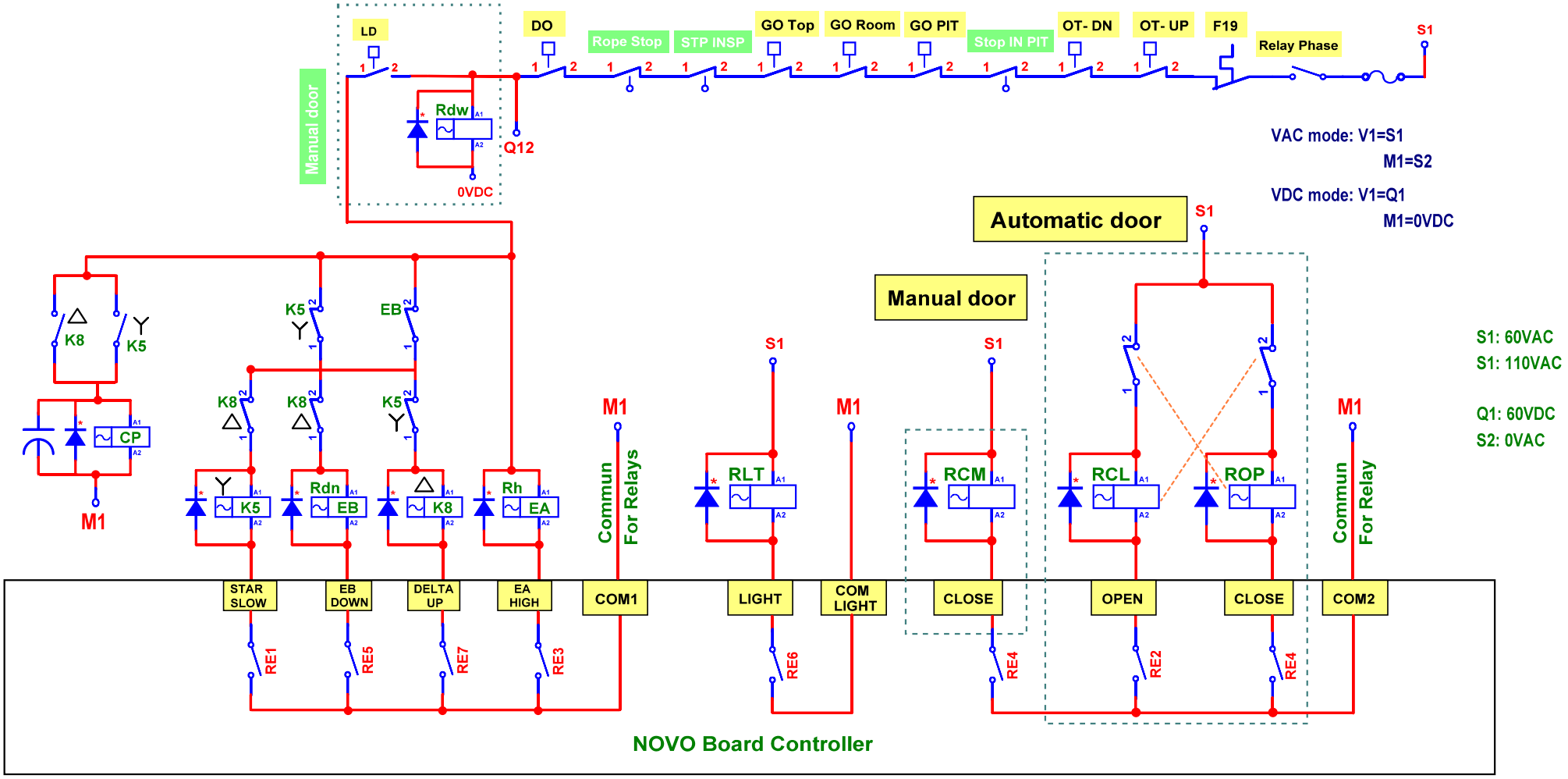
POWER CIRCUIT 2

Project:

NOVO BOARD CONTROLLER

HYDRAULIC

AUTOMATIC / MANUAL DOOR



(*): Do not install diodes with contactors if S1 is AC Voltage

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Page Description:

HYDRAULIC

AUTOMATIC / MANUAL DOOR

Project:

NOVO BOARD CONTROLLER

Explanation of Components of " HYDRAULIC (AUTOMATIC/MANUAL DOOR) " Diagram

LD : Lock Door Contact	EB =VMD: Down solenoid valve
DO : Door Contact Mechanical Switch	Rh: High direction relay
STP INSP: Stop Inspection Top of Cabine	EA = VML: Magnetic leveling valve
GO TOP: Overspeed Governor Top of Cabine	RLT : Light Relay
GO ROOM: Overspeed Governor Machine Room	RCM : Cam Relay For Swinging Door
GO PIT: Overspeed Governor Pit	RCL : Close Door Relay
OT-DN : Over Travel Down Mechanical Limit Switch	ROP : Open Door Relay
OT-UP : Over Travel UP Mechanical Limit Switch	COM1: Common for Relays(UP,Down,Slow ,High) is connected to 0V (M1)
Rdw :Door Contact Relay	COM2: Common for Relays (Close & Open) is connected to 0V (M1)
CP: Pump main contactor	COM LIGHT: Common for Relay (Light) is connected to 0V (M1)
Rdn: Down direction Relay	

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Page Description:

Explanation of Components of HYDRAULIC AUTOMATIC/MANUAL DOOR " Diagram

Project:

NOVO BOARD COTROLLER