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W W W . S A S C O N T R O L L E R S . C O M



VARIABLE VOLTAGE VARIABLE
FREQUENCY MOTOR DRIVE – VECTOR CONTROL
VX2 SERIES

USER'S MANUAL

FOR H/W VERSION 1.3
FOR S/W VERSION 1.00.30 ONWARDS
2108



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APPENDIX A



1. GENERAL DESCRIPTION

The VX2 series of variable voltage variable frequency motor drive (VVVF) is specifically designed for elevators. Ease of installation, adjustment and operation in addition to excellent performance and reliability are the strong points of this drive. The VX2 implements vector control algorithms for accurate speed tracking in closed loop operation.

1.1 MAIN FEATURES

Platform	Digital Signal Processor
Type	Vector control
Mode	Closed loop
Self-diagnostic	Fault messages describing common faults
Measured values	Motor current Motor ac voltage DC bus voltage Motor torque Feedback frequency measured by an incremental encoder Reference frequency Electrical output frequency Speed in m/s
Floor to floor	Automatic floor to floor and short floor compensation with no need for an intermediate speed
Cooling fans	Automatic shutoff after 15 minutes
Dynamic braking	By built-in transistor
Auto tuning	Automatic determination of motor parameters
User interface	Separate diagnostic tool with a 24 character, 2 lines liquid crystal display
Speed feedback	By incremental encoder (line driver) supplied with 5vdc
Terminals	All terminals are individually labeled according to function to facilitate identification
Communication	RS-485 port ready for communicating with a diagnostic tool or a PC

1.2 TECHNICAL DATA

Supply voltages	Control supply: 17vac +15% -25% - 800mA Power input supply: 430vac Periphery supply: 22vdc +15% -25%
Line frequency	45Hz to 65Hz
Power rating	7.5KW at 380vac / 11KW at 380vac / 15KW at 380vac
Current rating	17A / 25A / 35A
Switching freq.	10KHz
Modulation	Space vector
Output frequency	0 to 60Hz
Control inputs	Each input has a led to indicate its status – all inputs are optically isolated Active low
Control outputs	Relay outputs: 10A 250vac - Each relay has a led to indicate its status Optocoupler outputs: 50mA 50vdc
Connection	Screw type, plug-in connectors
Norms	Conforms to EN81



2. TERMINAL DESCRIPTION

2. TERMINAL DESCRIPTION

2.1 CONTROL TERMINALS

BRAKE NO	NO switch for Brake contactor output
BRAKE NC	NC switch for Brake contactor output
BRAKE C	Common for Brake contactor output
LOW FREQUENCY NO	NO switch for Frequency low output
LOW FREQUENCY NC	NC switch for Frequency low output
LOW FREQUENCY C	Common for Frequency low output
CONTACTOR NO	NO switch for contactor output
CONTACTOR NC	NC switch for contactor output
CONTACTOR C	Common for contactor output
NU	Not used
SUPPLY 17v ~	Control Supply 17vac
SUPPLY 17v ~	Control Supply 17vac
SUPPLY P +22v	Periphery Supply 22vdc P
SUPPLY GND (-)	Periphery Supply 0vdc GND
OUTPUTS FAULT	Fault output
OUTPUTS SPRE	Spare output (0 speed reached signal by default)
INPUTS FRWD	Forward input
INPUTS REV	Reverse input
INPUTS HIGH SPD	High speed input
INPUTS LOW SPD	Slow speed input
INPUTS SPRE INP1	Spare input 1 (Intermediate speed by default)
INPUTS SPRE INP2	Spare input 2(Evacuation input by default)
INPUTS SPRE INP3	Spare input 3(Contactor feedback by default)
INPUTS SPRE INP4	Spare input 4(Not used by default)



2.2 INCREMENTAL ENCODER TERMINALS

-Sup	Negative Supply
+Sup	Positive Supply
B	Encoder channel B
\bar{B}	Encoder channel B inverted
A	Encoder channel A
\bar{A}	Encoder channel A inverted

2.3 POWER TERMINALS

BR+	Brake resistor – terminal 1
BR-	Brake resistor – terminal 2
R	Line phase R
S	Line phase S
T	Line phase T
U	Motor phase U
V	Motor phase V
W	Motor phase W



3. CONTENTS OF PAGES DISPLAYED ON DIAGNOSTIC TOOL

Page 1	1st line: Company name, Software version 2nd line: Date and time
Page 2	Operations page 1st line: Output (motor) Current (A) Output (motor) Voltage (V) DC bus voltage (Vdc) Motor torque (%) 2nd line: Feedback frequency (Hz) (read from incremental encoder) Reference frequency (Hz) (Generated by the drive) Output frequency (Hz)
Page 3	1st line: Elevator speed (m/s) 2nd line: Minimum slow distance (m) required, based on the settings of Machine speed, Contract speed, Approach speed, S-curve dec.@ start, Dec. time and S-curve dec.@ end
Page 4	Serial Number
Page 5	View Faults



4. VIEWING FAULTS AND FAULTS DESCRIPTION

4.1 HOW TO VIEW THE FAULTS ON THE DIAGNOSTIC TOOL

VX2 v1.3 has a Fault Log that can save the last 10 faults that occurred on the drive. The Fault Log saves the type of the error along with the time and date of occurrence. The Fault Log can be accessed and erased through the Diagnostic tool. To access the Fault Log, scroll down to page 5 where "View Faults" is displayed and click on **Select**. If no faults are saved, a "No Faults to view" message is displayed. Otherwise, the last generated fault is displayed first. Use the **Previous/Next** push buttons to scroll between the faults. To exit the Fault Log, press **Previous** when the first generated fault is displayed or **Next** when the last generated fault is displayed.

4.2 HOW TO ERASE THE FAULTS ON THE DIAGNOSTIC TOOL

To erase faults, go to the drive **settings submenu** and scroll down to "Erase faults?" and press the **Select** button. You will be prompted to confirm your request. If Yes is pressed all faults are erased, if No is pressed, faults are not affected.

4.3 HOW TO VIEW THE FAULTS ON THE ON-BOARD LCD

The on-board LCD has four embedded push buttons, **Up/Down/Esc (left push button)/Select (right push button)**. After navigating to the main menu page by pressing **ESC**, select the **FAULTS** item to display the last 10 saved faults. The last generated fault is displayed first. Use the **Up/Down** push buttons to scroll between the faults.

4.4 HOW TO ERASE THE FAULTS ON THE ON-BOARD LCD

After navigating to the **settings submenu** menu, scroll down to "Erase faults" and press the **Select** button. You will be prompted to confirm your request. If **Select** is pressed all faults are erased.

4.5 FAULT CODE DESCRIPTION

Fault Message	Fault Description	Action taken
Speed deviation error	The drive could not track the reference speed	Drive is blocked, reset by clearing orders
Power drive error	The drive has experienced either a short circuit, an over current or it over heated	Drive is blocked, reset by clearing orders ❶
Over current error	The rated current of the motor has been exceeded for longer than the delay set in the Over Current Delay setting	Drive is blocked, reset by clearing orders ❶
Over current2 error	The rated current of the IPM block (fixed according to drive rating) has been exceeded for 5 seconds	Drive is blocked, reset by clearing orders ❶
Earth leakage error	One or more of the output phases is shorted to ground	Drive is blocked, reset by clearing orders ❶
DC over voltage	DC bus voltage exceeded the maximum allowable threshold	Drive is blocked, reset by clearing orders ❶
DC under voltage	Input voltage dropped below undervoltage setting for longer than the delay set by the DC Undervoltage delay setting	Drive is blocked, reset by clearing orders
Pulse absence	The speed reference reached 2.5Hz and no pulses were generated by the incremental encoder	Drive is blocked, reset by clearing orders
Phase Sequence	Motor phases are reversed	Drive is blocked, reset by clearing orders

❶ In case of 3 consecutive errors, the drive is blocked and power needs to be recycled.



**5. MENU
DETAILS**

5. MENU DETAILS

5.1 ACCESSING THE MENU ON THE DIAGNOSTIC TOOL

To access the menu, press the right most push button on the diagnostic tool. You will be prompted to enter a password. The first digit on the left starts blinking. Use the left most push button to decrement the digit and the middle push button to increment the digit. When the desired digit is reached, push the right most push button. The digit is accepted and replaced by “*”. The next digit starts blinking. Repeat the above procedure for all remaining three digits. If you have entered the right password, access to the menu will be granted, otherwise, access will be denied. Note that the push buttons have dynamic functions and their functions are at all times shown on the lower line of the display. For convenience, entry to the menu does not require the password if it is being accessed within 10 minutes after the last access.

5.2 ACCESSING THE MENU ON THE ON-BOARD LCD

The on-board LCD has four embedded push buttons, **Up/Down/Esc (left push button)/Select (right push button)**. To access the menu, navigate to the Main Menu page and choose **Settings**. You will be prompted to enter a password. The first digit on the left starts blinking. Use the **up/down** buttons to increment/decrement the digit and **Esc/Select** push buttons to switch between digits. When the desired digit is reached, push the **Select** button. The digit is accepted and replaced by “*”. The next digit starts blinking. Repeat the above procedure for all remaining three digits. If you have entered the right password, access to the menu will be granted. Note that the push buttons have dynamic functions. For convenience, entry to the menu does not require the password if it is being accessed within 10 minutes after the last access.

5.3 PASSWORD LEVELS

A password is required for accessing the settings menu. The password consists of 4 digits. Two passwords can access the settings menu. The first is provided by S. & A.S. Co. Ltd. and is referred to as **client password**. The second password is referred to as the **user password**. **Client password** must be entered in order to alter the **Drive rating** and to **Load factory settings**. When a user tries to alter the **Drive rating** or tries to **Load factory settings**, he will be asked to enter the **client password** in case menu was accessed by the **user password**. Upon exiting the settings menu, the access level will be downgraded to prevent accidental critical changes.

5.4 SETTINGS

5.4.1 DRIVE SETTINGS SUBMENU

What you see on the Diagnostic tool display	What you see on the LCD display	Description and Comments	Factory settings	Range
Drive rating	DRIVE RATING	Rating of the VX2 Drive	7.5 KW	-7.5 KW -11 KW -15 KW
Contactor position	CONTACTOR POS	Determines if contactors SF1 & SF2 are on input (Inp) or output (Out)	Inp	- Inp - Out
Time	TIME	Sets the time of the device	-	-
Date	DATE	Sets the date of the device	-	-
Erase faults?	ERASE FAULTS?	Clear faults on device	-	-
Load Factory Settings?	LOAD FACTORY SETTINGS?	Load the values shown under Factory settings.	-	-

5.4.2 MACHINE SETTINGS SUBMENU

What you see on the Diagnostic tool display	What you see on the LCD display	Description and Comments	Factory settings	Range
Lift speed m/sec	LIFT SPEED	Sets the lift speed at nominal freq	1.00 m/s	0.05 to 2.50 m/s
Pulses/Revolution	PULSES/REV	Sets the count of pulses per revolution of the incremental encoder	1024	512 to 9999

5.4.3 SITE SETTINGS SUBMENU

What you see on the Diagnostic tool display	What you see on the LCD display	Description and Comments	Factory settings	Range
Contract Spd (Hz)	CONTRACT SPD	Setting for the high or normal speed of the elevator	50.0	0 to 60.0Hz
Inspection Spd (Hz)	INSPECT SPD	Setting for the inspection speed of the elevator	10.0	0 to 60.0Hz
Approach Spd (Hz)	APPROACH SPD	Setting for the final approach or creeping speed of the elevator	3.0	0 to 60.0Hz
Evacuation Spd (Hz)	EVAC SPD	Setting for the evacuation speed of the elevator	3.0	0 to 60.0Hz
Intermed. Spd (Hz)	INTERMED SPD	Setting for the intermediate speed of the elevator	30.0	0 to 60.0Hz
Releveling Spd (Hz)	RELVING SPD	Setting for the releveling speed of the elevator	1.0	0 to 60.0Hz
Scurve Acc at start	S CRV ACC START	Sets the length in time of the initial curve of the acceleration ramp	1.0	0.5 to 10.0 sec
Acc Time	ACC TIME	Sets the length in time of the linear portion of the acceleration ramp	6.0	0 to 99.9 sec
Scurve Acc at End	S CRV ACC END	Sets the length in time of the final curve of the acceleration ramp	0.8	0 to 10.0 sec
Scurve Dec at start	S CRV DEC START	Sets the length in time of the initial curve of the deceleration ramp	0.6	0.5 to 10.0 sec
Dec Time	DEC TIME	Sets the length in time of the linear portion of the deceleration ramp	6.0	0 to 99.9 sec
Scurve Dec at End	S CRV DEC END	Sets the length in time of the final curve of the deceleration ramp	1.2	0 to 10.0 sec
Min slow down(m)	MIN SLOW DOWN	Minimum slow distance (m) required, based on the settings of Machine speed, Contract speed, Approach speed, S-curve dec.@ start, Dec. time and S-curve dec.@ end	-	-
I S curve dec start	IS CRV DEC START	Sets the length in time of the initial curve of the deceleration intermediate ramp	0.6	0.5 to 10.0 sec
i Dec. Time	I DEC TIME	Sets the length in time of the linear portion of the deceleration intermediate ramp	6.0	0.5 to 99.9 sec



**5. MENU
DETAILS**

What you see on the Diagnostic tool display	What you see on the LCD display	Description and Comments	Factory settings	Range
i S curve dec end	IS CRV DEC END	Sets the length in time of the final curve of the deceleration intermediate ramp	1.2	0.5 to 10.0 sec
Min Int SlowDown(m)	MIN INT SLOW DOWN	Minimum slow distance (m) required for intermediate	-	-
Direct approach	DIRECT APPROACH	Enables the direct approach feature	Dis	Ena/Dis
Dwell Freq(Hz)	DWELL FREQ	Sets the dwell frequency	0.1	0 to 9.9 Hz
Dwell Delay(sec)	DWELL DELAY	Sets the dwell delay in sec.	0.80	0 to 99.9 sec
DC brake time start	DC BRAKE TIME START	Sets the length in time of the dynamic braking before proceeding with the acceleration ramp. This time allows the mechanical brake to disengage completely.	0.3	0 to 10.0 sec
Phase sequence	PH SEQUENCE	Sets the sequence of the output phases	Normal	-Normal -Reversed
Phase check and align	PH CHECK AND ALIGN?	Prompts user to run phase check procedure	-	-

5.4.4 PROTECTION SETTINGS SUBMENU

What you see on the Diagnostic tool display	What you see on the LCD display	Description and Comments	Factory settings	Range
Spd deviation limit	SPD DEV LIMIT	Sets the maximum allowable difference between the feedback frequency and the reference frequency. If this setting is exceeded (positively or negatively), the drive stops the operation immediately.	10.0	0 to 25.0Hz
DC OverVoltage	DC OVER V	Sets the DC bus Overvoltage limit	700	400V to 700V
DC UnderVoltage	DC UNDER V	Sets the DC bus Undervoltage limit	400	50V to 500V
DC UV delay	DC UV DELAY	Sets the DC bus Undervoltage delay	0.5	0 to 5.0 sec
OverCurrent(%)	OVER CURRENT	Sets the over current trip point as a % of motor rated current	120	0 to 200%
OverCurrent delay	OVER CURRENT DELAY	Sets the delay before signaling an over current once the over current setting of the motor is exceeded.	25.0	0 to 99.9 sec
Freq low limit	FREQ LOW LIM	Sets the frequency below which the frequency low relay closes	6.0 Hz	0 to 60.0Hz

5.4.5 MOTOR SETTINGS SUBMENU

What you see on the Diagnostic tool display	What you see on the LCD display	Description and Comments	Factory settings	Range
Nominal Voltage(L-L)	NOM VOLTAGE	Sets the line to line nominal voltage of the motor (read from the nameplate of the motor)	380	190V to 430V
Rated current(A)	RATED CURRENT	Sets the current rating of the machine. This limit is intended for protecting the motor (read from the nameplate of the motor).	15.0	7.5KW: 3.1 to 17A 11KW: 3.1 to 25A 15KW: 3.1 to 35A
Nominal Freq(Hz)	NOMINAL FREQ	Sets the nominal frequency of the motor (read from the nameplate of the motor)	50	0 to 60Hz
Number of poles	NUM OF POLES	Sets the number of poles of the motor (a pair number) (read from the nameplate of the motor)	4	2 to 8
Nominal Spd(RPM)	NOM SPEED	Automatically set using the nominal frequency and number of poles settings	1500	0 to 9999
Rated Speed(RPM)	RATED SPEED	Sets the rated speed of the motor (read from the nameplate of the motor) (not currently used by the VX2)	1500	0 to 9999
Run auto tuning?	RUN AUTO TUNING?	Prompts the VX2 to initiate the auto tuning procedure	-	-

5.4.6 INPUT SETTINGS SUBMENU

What you see on the Diagnostic tool display	What you see on the LCD display	Description and Comments	Factory settings	Range
FRWD inp	FRWD INP.	Change FRWD input's pin function	FRWD	FRWD / REV / HIGH spd / LOW spd / INT spd / EVAC mode / CONT Fb / SPRE inp4
REV inp	REV INP.	Change REV input's pin function	REV	ALL INPUTS FUNCTIONS
HIGH Spd inp	HIGH SPD INP.	Change HIGH speed input's pin function	HIGH spd	ALL INPUTS FUNCTIONS
LOW Spd inp	LOW SPD INP.	Change LOW speed input's pin function	LOW spd	ALL INPUTS FUNCTIONS
SPRE1 inp	SPRE1 INP	Change Spare 1 input's pin function	INT spd	ALL INPUTS FUNCTIONS
SPRE2 inp	SPRE2 INP	Change Spare 2 input's pin function	EVAC mode	ALL INPUTS FUNCTIONS
SPRE3 inp	SPRE3 INP	Change Spare 3 input's pin function	CONT Fb	ALL INPUTS FUNCTIONS
SPRE4 inp	SPRE4 INP	Change Spare 4 input's pin function	SPRE inp4	ALL INPUTS FUNCTIONS



**5. MENU
DETAILS**

5.4.7 RELAY OUTPUT SETTINGS SUBMENU

What you see on the Diagnostic tool display	What you see on the LCD display	Description and Comments	Factory settings	Range
Brake output	BRAKE OUT	Change Brake output's pin function	Brake	Brake/ Low freq/ Cont
Low freq out	LOW FREQ OUT	Change Low frequency output's pin function	Low freq	ALL OUTPUTS FUNCTIONS
Contactora out	CONTACT OUT	Change Contactor output's pin function	Cont	ALL OUTPUTS FUNCTIONS

5.4.8 DIGITAL OUTPUT SETTINGS SUBMENU

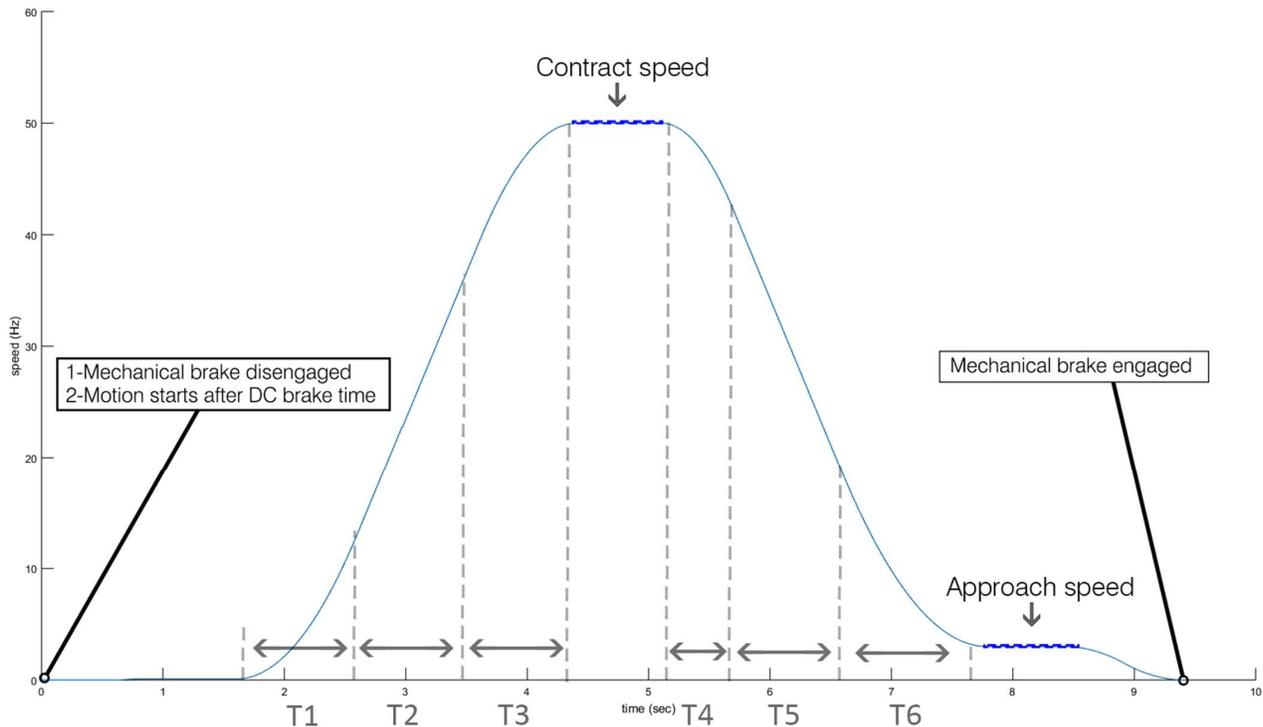
What you see on the Diagnostic tool display	What you see on the LCD display	Description and Comments	Factory settings	Range
Fault output	FAULT OUT	Change Fault output's pin function	Fault	Fault /Spre
SPRE out	SPRE OUT	Change Spare output's pin function	Spre	Fault /Spre

5.4.9 CONTROL SETTINGS SUBMENU

What you see on the Diagnostic tool display	What you see on the LCD display	Description and Comments	Factory settings	Range
Speed pole	SPD POLE	Configures the sensitivity of the speed loop	15	0 to 50
Flux strt mult	FLUX START MULTIPLIER	The multiplier of the nominal flux at start of travel	1.0	0.6 to 1.5
Min Volt	MIN VOLT	The minimum input Line to Neutral voltage at which nominal flux is established	150.0	70.0 to 160.0

6. DESCRIPTION OF ACCELERATION AND DECELERATION RAMPS

6.1 FOR NON-DIRECT APPROACH



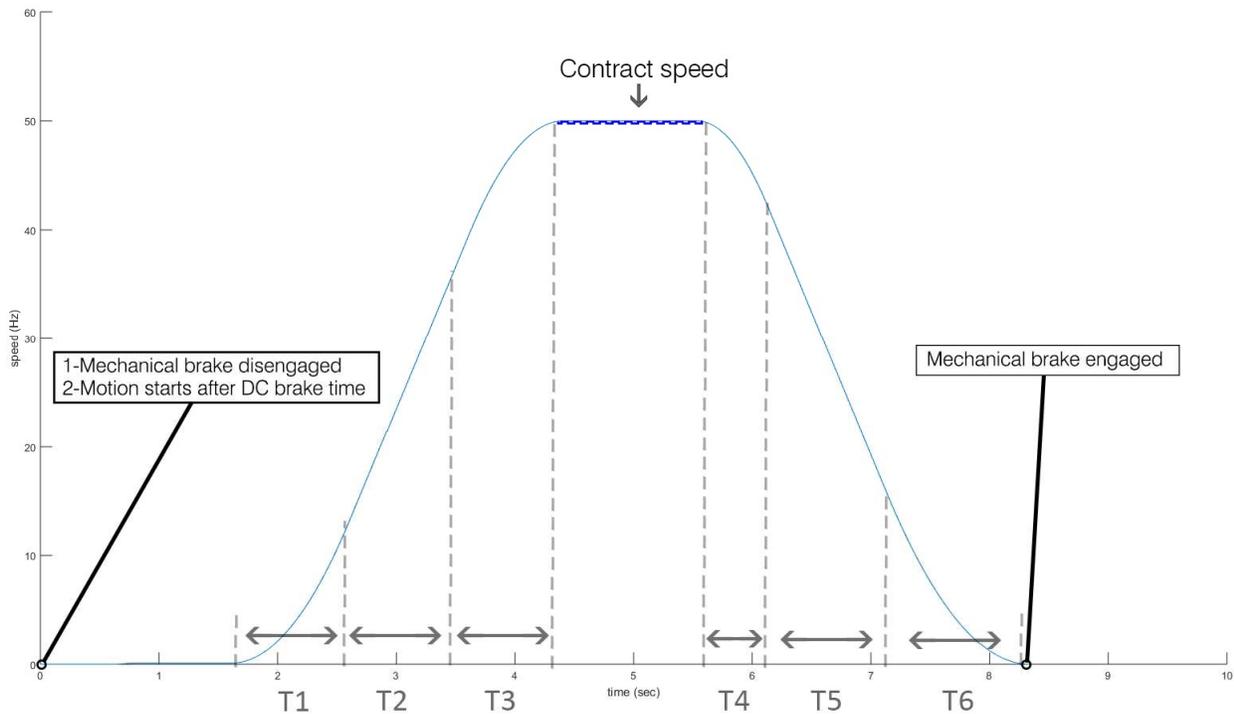
- T1 = Scurve Acc at start
- T2 = Acc Time
- T3 = Scurve Acc at End
- T4 = Scurve Dec at start
- T5 = Dec Time
- T6 = Scurve Dec at End

The values of T1 through T3 set the acceleration ramp, which in turn determines the smoothness and comfort of the elevator during the starting phase. As a reference, for an elevator speed of 1 m/s, typical values for T1, T2 and T3 are 1", 1.5" and 0.8" respectively.

Assuming that Contract and Approach speeds are 50Hz and 3Hz respectively (which is normally the case), T4, T5 and T6 set the deceleration ramp and thus the slow down distance needed (displayed on page 3 of the status pages). As a reference, for an elevator speed of 1 m/s, a good starting point for T4, T5 and T6 is 0.8", 1" and 1.2" respectively. Changing T4, T5 or T6 would affect the distance required for slow down. T4 has the largest effect, T5 has a lesser effect and T6 has the least effect on the slow down distance. The slow down distance is measured from the point where the slow down signal is received to the point where the final stop signal is received (which is normally about 3cm short of the floor for 1m/s). The drive follows a predetermined internally set s-curve that takes 1" to go down from the approach speed to zero speed. This ensures a very soft final stop.



6.2 FOR DIRECT APPROACH



- T1 = Scurve Acc at start
- T2 = Acc Time
- T3 = Scurve Acc at End
- T4 = Scurve Dec at start
- T5 = Dec Time
- T6 = Scurve Dec at End

The values of T1 through T3 set the acceleration ramp, which in turn determines the smoothness and comfort of the elevator during the starting phase. As a reference, for an elevator speed of 1 m/s, typical values for T1, T2 and T3 are 1", 1.5" and 0.8" respectively.

The acceleration in the direct approach is similar to that of the non-direct approach. However, the deceleration phase is different; a speed reference less than the previous speed reference forces a ramp down to 0 Hz. The approach speed is of no significance in the direct approach. Changing T4, T5 or T6 would affect the distance required for slow down. T4 has the largest effect, T5 has a lesser effect and T6 has the least effect on the slow down distance. The slow down distance is measured from the point where the slow down signal is received to the point where the cabin stops. A releveling feature is integrated in the deceleration phase to make sure the cabin stops perfectly on a floor level.



7. INSTALLATION GUIDE

7.1 INSTALLATION STEPS

Step 1

- Install and wire the panel according to wiring diagrams provided by the panel assembler.
- if "**Contactor position**" is set to **Inp** , the power line inputs (R, S and T) should feed the filter (with filter body properly connected to ground), then the contactors and finally the drive.
- if "**Contactor position**" is set to **Out** , the power line inputs (R, S and T) should feed the filter (with filter body properly connected to ground), then the drive.
- The brake resistor should be connected to the drive and its casing should be grounded.
- The drive casing should be properly grounded (connected to earth).
- The motor power should be connected using shielded cable with its shield properly grounded or alternatively, the motor cable can run in a flexible metallic tube properly grounded.
- Double-check all connections.

Step 2

- Feed in the settings via the Diagnostic Tool or the on-board LCD.
- Auto tune the machine. Refer to section 7.2

Step 3

- Make sure that the board is in the Inspection Mode (Inspection switch should be opened)
- Power the panel.
- Attempt turning the machine manually and verify that the frequency feedback on the drive is reading some arbitrary value. If not, check the connection and coupling of the incremental encoder.
- Check and verify that the mechanical brake is disengaging properly when powered.
- Attempt starting the elevator in the up direction in inspection mode. Three scenarios can happen:
 1. The elevator goes up. This indicates a properly functioning system.
 2. The elevator goes down instead of up, switch the forward and reverse control wires on the drive.
 3. The elevator barely moves and the drive halts along with a phase sequence error in the Fault Logs. The phase sequence can be reversed from the menu by altering the **Phase sequence** in the **Site submenu** from **Normal** to **Reverse**.

Step 4

For Lift with no direct approach installation:

- Using the elevator in the inspection mode, adjust the position of all magnets according to the layout provided on the Microzed WIRING DIAGRAM.
- The slow down distance should be set to the value shown on the drive or alternatively any slow down distance can be used and set the values of T4, T5 and T6 so that the drive shows this distance as well.
- If you are using bi-stable magnetic switches, proceed with inspection travel to terminal floors to properly set their contacts.

7.2 AUTOMATIC SETTING OF MOTOR PARAMETERS USING AUTO TUNING PROCEDURE

All the electrical connections should be properly made to the motor and the safety circuit should be closed to allow operation of the motor. The auto tuning procedure doesn't require the spinning of the motor and can be started either from the Diagnostic tool or from the on-board LCD.

When the auto tuning procedure is selected from the **motor sub menu**, the user is asked to confirm the start of the procedure. The auto tuning procedure takes about a minute to complete. Upon proper completion, "Auto tuning completed" message is displayed. Pressing the **Select** button while the auto tuning procedure is running aborts the auto tuning procedure. In case an error occurs the procedure will be halted and "Auto tuning halted" message is displayed.



7.3 PHASE SEQUENCE CHECK

The sequence check makes sure that the motor has been connected to the VX2 drive with the correct phase sequence. In case a sequence failure is detected, a phase sequence error fault will be logged. The phase sequence is checked only once on every power on. Upon the detection of a phase reversal, the drive halts and a phase sequence fault is logged. Instead of reversing the motor wires on the VX2 drive to correct the phase sequence, the phase sequence can be reversed from the menu by altering the **Phase sequence** in the **Site submenu** from **Normal** to **Reverse**.

An automatic phase sequence check can be initiated from the **Site submenu** by selecting **Phase Check and Align**. The phase check will run the motor for a short duration and return a message to the user if the phases are reversed. If the phases are found to be incorrect, the software will automatically correct the phases.

After running the auto tuning procedure and the phase sequence check, run the machine at its full speed 5-10 times in order to identify the inertia of the system (J_r parameter). Do not forget to run the auto tuning procedure and the phase sequence check every time a new motor is connected.



8. FIRMWARE UPGRADE

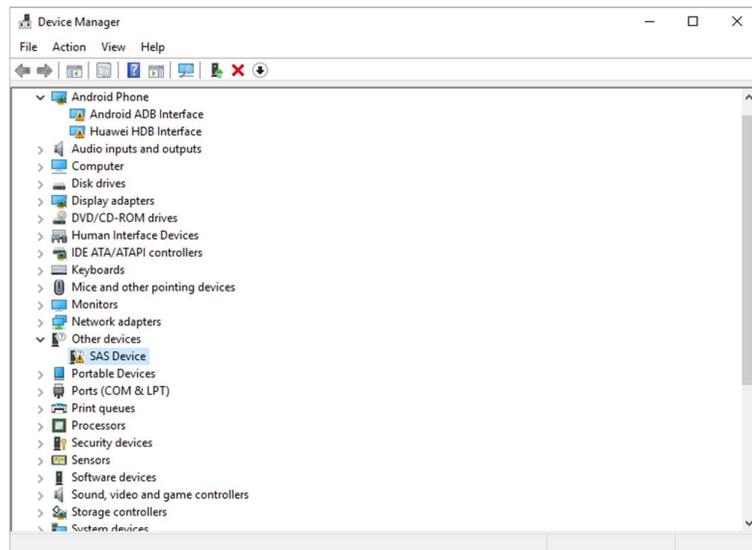
8.1 FIRMWARE UPGRADE USING PC

1. Plug in the USB cable to the VVVF device before turning power on
2. Turn on power of the VVVF device.
3. Please visit <http://www.sascontrollers.com/applications> and choose SAS Firmware Upgrade Driver or through the SASPTool desktop application.

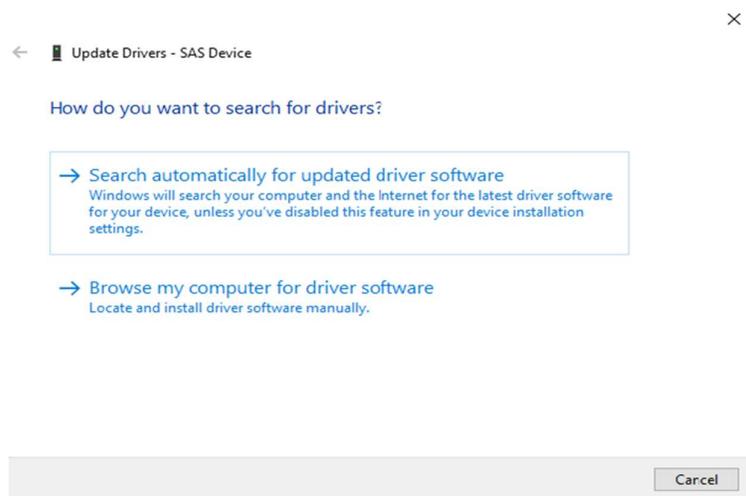
8.1.1 INSTALLING THE SAS DEVICE USB DRIVER*

The first SAS DEVICE plugged into the PC USB port may not launch an automatic start. In this case, right-click my computer and choose properties. On the left side of the window, click on Device Manager.

The “SAS DEV” device will appear in Other Devices, right-click it and choose “Update Driver Software”.

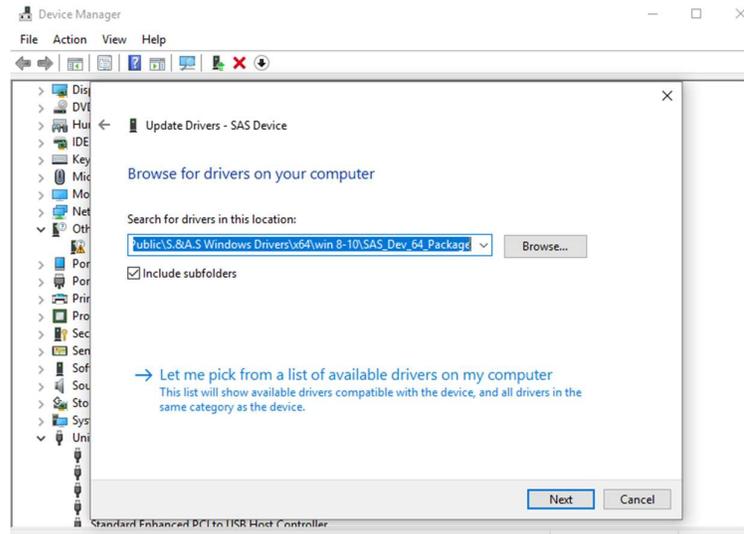


Select “browse my computer” and select the downloaded windows driver.



*This will be implemented only one time when the first VVVF is connected to PC through USB

8. FIRMWARE UPGRADE



The Driver SETUP procedure will be done only once for Windows.

So, the driver of any new VVVF connected to the PC USB port will be installed automatically.

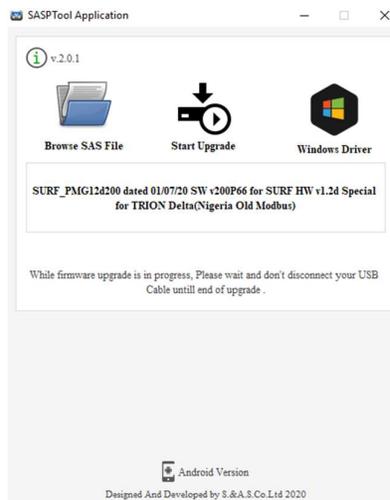
8.1.2 INSTALLING THE FIRMWARE UPGRADE SOFTWARE

In order to upgrade firmware on site, visit <http://www.sascontrollers.com/applications> and choose Desktop Firmware Upgrade App.

1. 64 and 32 bit folder will be downloaded respectively.
2. Run the executable file.

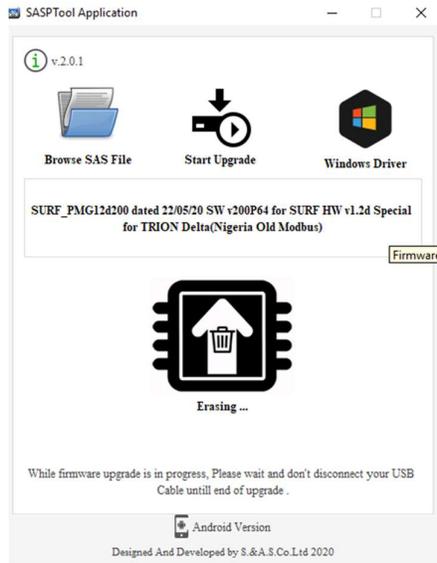
8.1.3 FIRMWARE UPGRADE PROCESS

- Run "SAS_PTool v.2.0" application.
 - Click Browse SAS File button to choose the *.sas file that will be used to upgrade the firmware.
- A Footnote will appear showing the file name, the software version and its date:

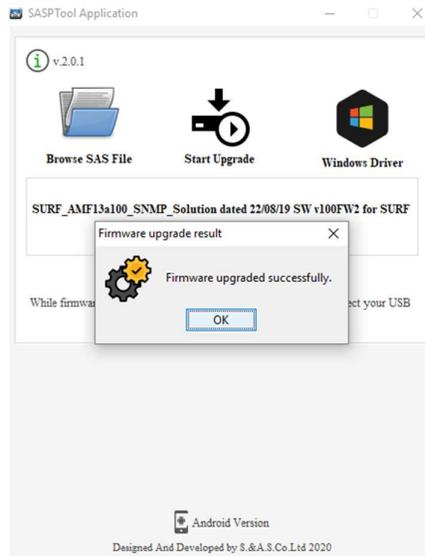


- Click "Start Upgrade". The upgrade progress is shown as below:

8. FIRMWARE UPGRADE



Once the upgrade is complete, a popup message "Firmware upgraded successfully" will appear:



The firmware is upgraded successfully and the VVVF will run automatically the firmware.



8.2 FIRMWARE UPGRADE USING GOOGLE STORE ON SMART PHONE

8.2.1 INSTALLING THE SASPTOOL FIRMWARE APPLICATION ON THE MOBILE

Search for the application "SASPTool" on google store and install it, or follow the link below:

<https://play.google.com/store/search?q=SASPTool>.

8.2.2 FIRMWARE UPGRADE PROCESS

In order to upgrade firmware from a mobile, follow the below steps:

1. Run "SAS_PTool" application from the mobile.

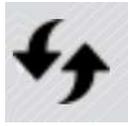


The below window appears showing all *.sas files already saved.

2. Power off the VVVF board
3. Use a USB cable to connect board to the mobile.
4. Turn power on.

The following window will appear:

8. FIRMWARE
UPGRADE



Press this button to refresh the firmware list.

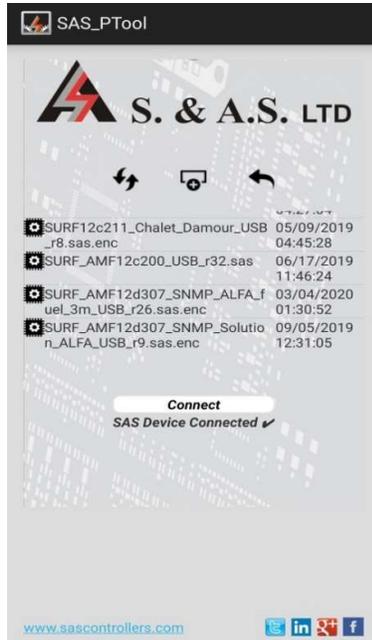


Press this button to create SAS folder.



Press this button to go back one directory.

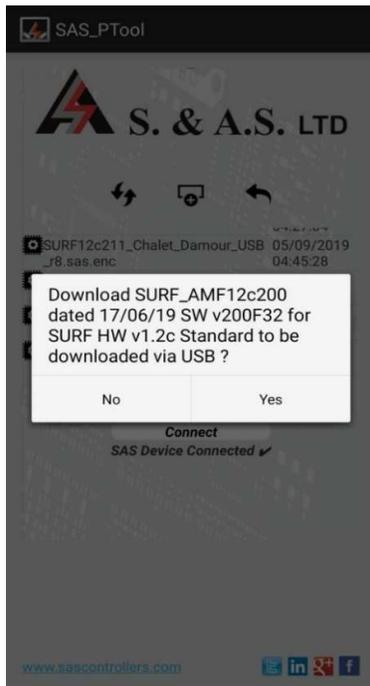
5. Click on the Connect button. The following window will appear showing that a SAS Device is now connected:



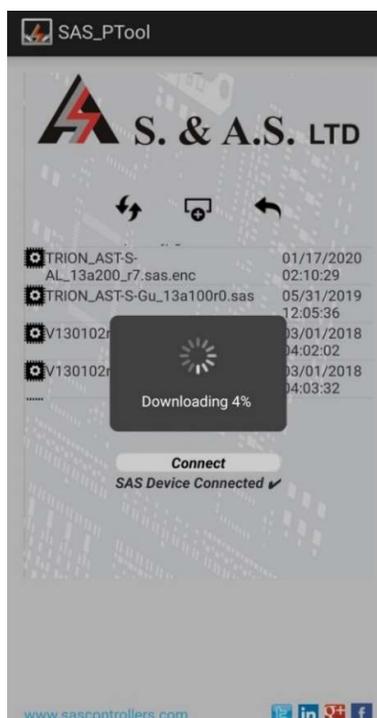
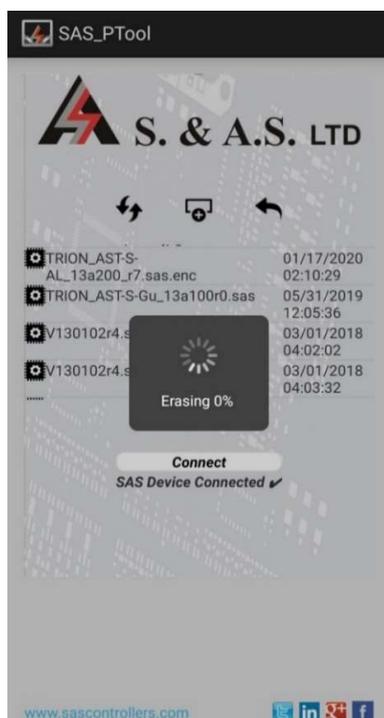
**8. FIRMWARE
UPGRADE**

6. Click on the SAS file that you need to download.

A Popup window will appear showing the file name, its description and its date:

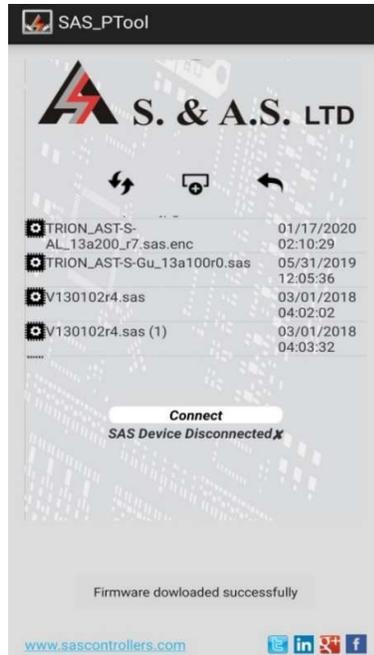


7. Click Yes. The download will start:



**8. FIRMWARE
UPGRADE**

Once the download is complete, the message "Firmware Downloaded successfully" will appear:



8. Disconnect the USB cable.

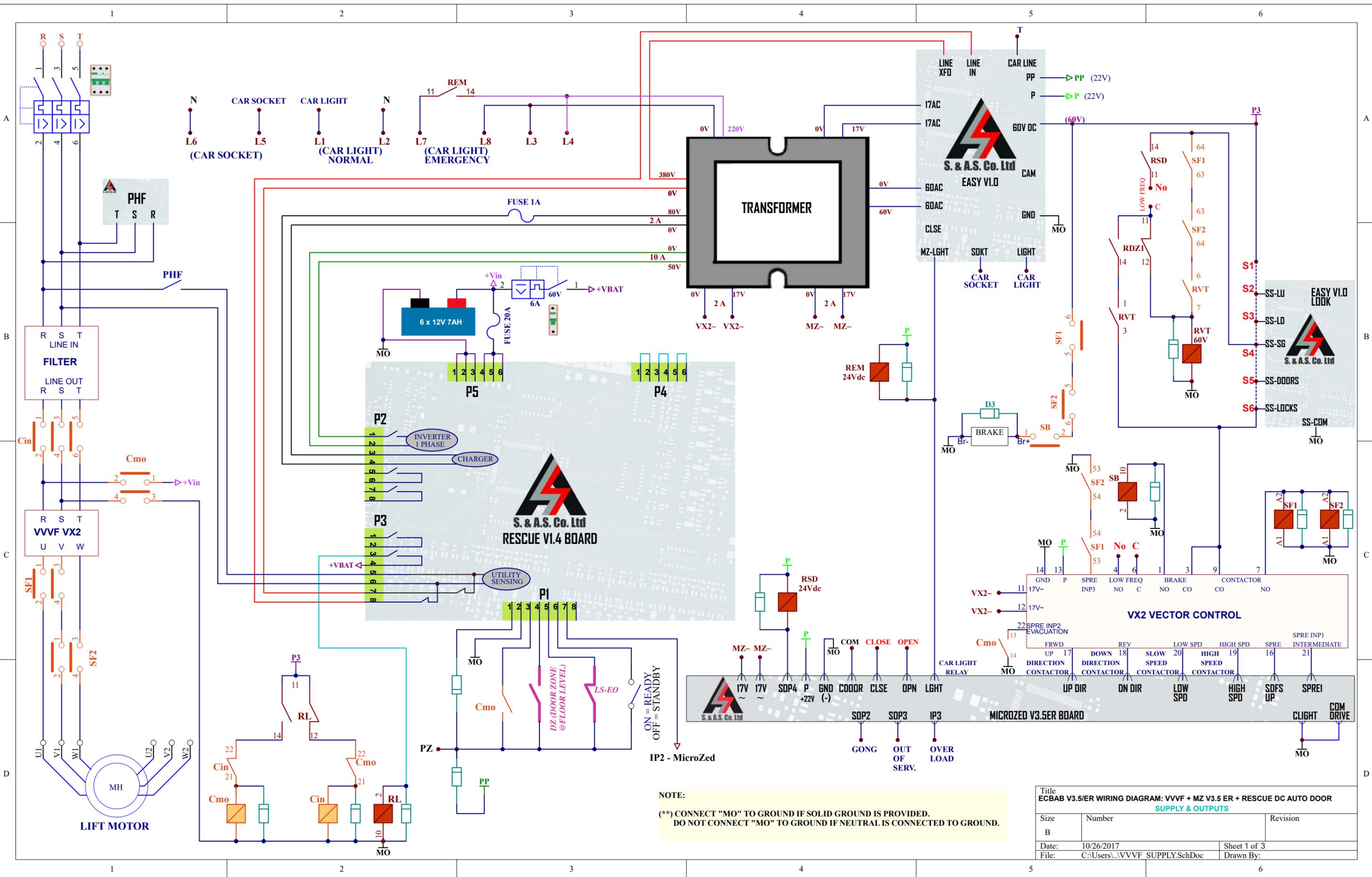
If you desire to delete any SAS file from the mobile list, press on the filename until a Popup window appears showing you multiple choices and then click on Delete.





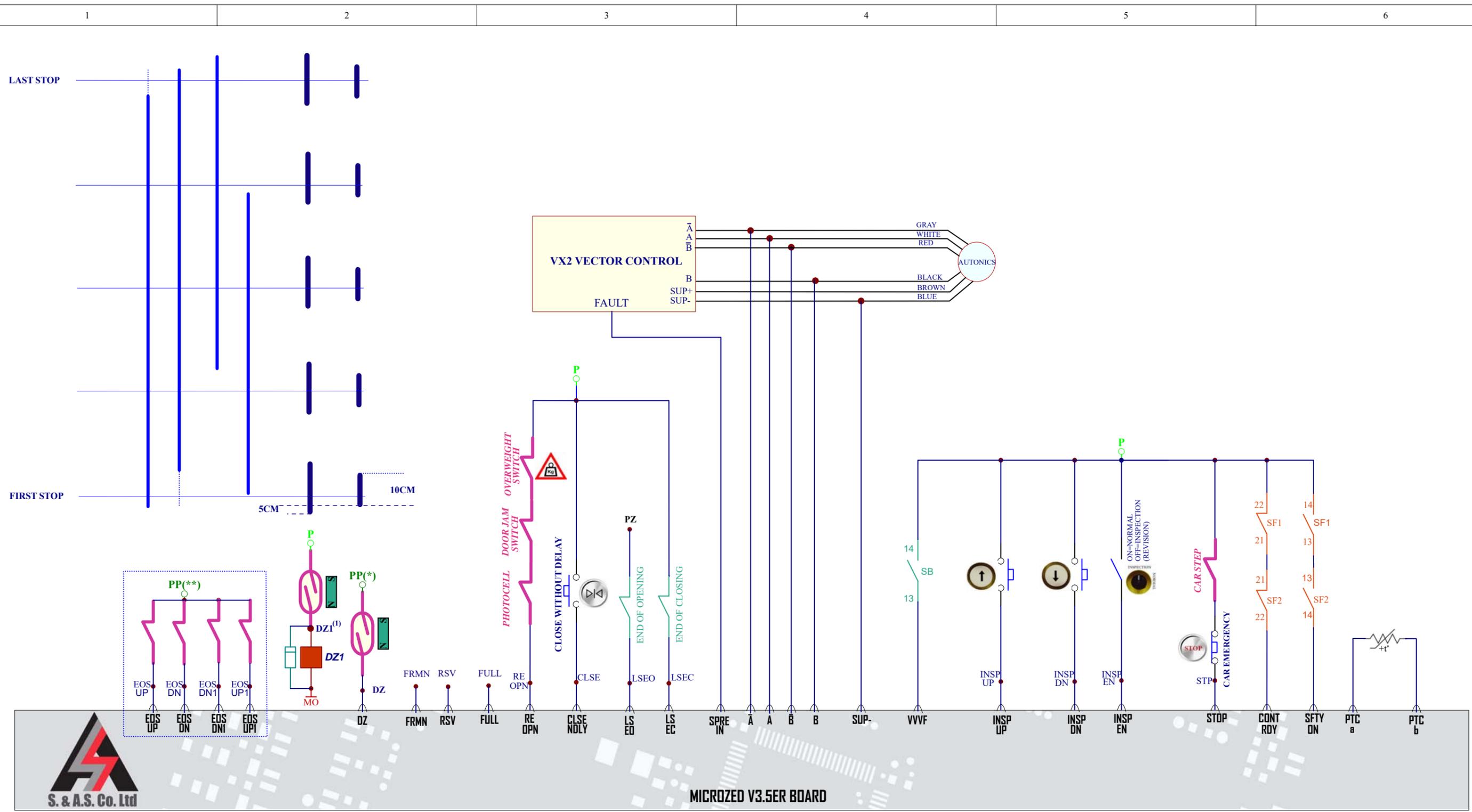
9. APPENDIX A

This section contains the wiring diagram of the VVVF v1.3



NOTE:
 (**) CONNECT "MO" TO GROUND IF SOLID GROUND IS PROVIDED.
 DO NOT CONNECT "MO" TO GROUND IF NEUTRAL IS CONNECTED TO GROUND.

Title ECBAB V3.5/ER WIRING DIAGRAM: VVVF + MZ V3.5 ER + RESCUE DC AUTO DOOR SUPPLY & OUTPUTS		
Size	Number	Revision
B		
Date:	10/26/2017	Sheet 1 of 3
File:	C:\Users\... \VVVF_SUPPLY.SchDoc	Drawn By:



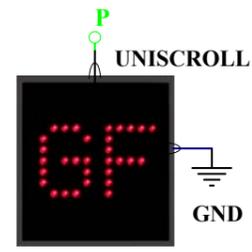
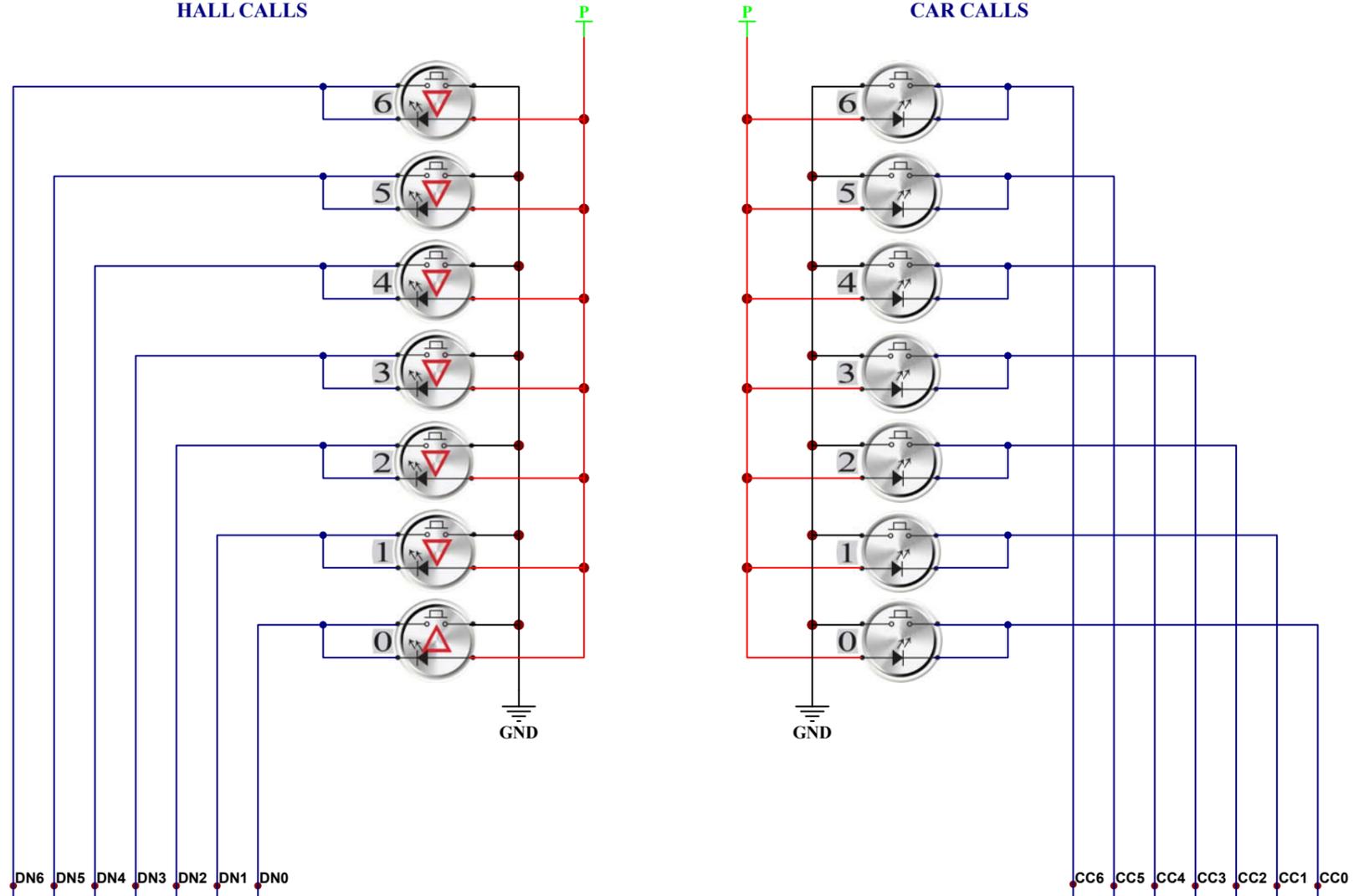
MICROZED V3.5/ER BOARD

Note:
 (1) DZ1 is recommended for preopening
 (*) "PP" ONLY FOR MAGNETIC SWITCHES.

Title ECBAB V3.5/ER DIRET APPROACH WIRING DIAGRAM: INPUTS		
Size B	Number	Revision
Date: 10/26/2017	Sheet 2 of 3	
File: C:\Users\...VVVF_INPUTS.Sch	Drawn By:	

HALL CALLS

CAR CALLS





S. & A.S. Co. Ltd

CT 15 CT 14 CT 13 CT 12 CT 11 CT 10 CT 9 CT 8

DN6 DN5 DN4 DN3 DN2 DN1 DN0

CT 7 CT 6 CT 5 CT 4 CT 3 CT 2 CT 1 CT 0

CC6 CC5 CC4 CC3 CC2 CC1 CC0

ARD DN ARD UP D C B A

MICROZED V3.5ER

Title		
MICROZED V3.x WIRING DIAG: CAR CALLS & LANDING CALLS WITH EXTENSION		
Size	Number	Revision
B		
Date:	2/23/2018	Sheet 3 of 3
File:	C:\Users\... \VVVF CALLS.Sch	Drawn By:

WHICH ELEVATOR CONTROLLER IS RIGHT FOR YOU?

	MicroZed-A v3.1 	MicroZed-AR v3.1 	ASTRA v1.2 	MicroZed v3.3a 	MicroZed v3.5a 
AC 1 speed	✓	✓	✓	✓	✓
AC 2 speed	✓	✓	✓	✓	✓
Hydraulic	✓	✓	✓	✓	✓
VVVF(1m/s speed)	✓	✓	✓	✓	✓
VVVF(1.6m/s speed)	—	—	—	✓	✓
VVVF(>=2m/s speed)	—	—	—	—	✓
Magnetic Switches for Shaft Information	✓	✓	✓	✓	✓
Incremental encoder for direct approach	—	—	—	—	✓
Simplex mode	✓	✓	✓	✓	✓
Group mode	—	—	—	✓	✓
Down Collective	—	—	✓	✓	✓
Full Collective	—	—	✓	✓	✓
Pseudo-collective	✓	✓	—	—	—
Maximum Number of Stops	10	10	10	32	48
Serial Calls	—	—	—	—	✓
Swinging door	✓	✓	✓	✓	✓
Automatic door	✓	✓	✓	✓	✓
Half automatic door	✓	✓	✓	✓	✓
Gray Code Indicator	✓	✓	✓	✓	✓

	MicroZed-A v3.1	MicroZed-AR v3.1	ASTRA v1.2	MicroZed v3.3a	MicroZed v3.5a
					
Binary Code Indicator	✓	✓	✓	✓	✓
Enhanced Code Indicator	✓	✓	✓	✓	✓
Decimal code Indicator	✓	✓	✓	—	—
DC Contactors	✓	—	—	✓	—
AC/DC Contactors	—	✓	✓	—	✓
Real Time Clock	—	—	—	✓	✓
Spare Outputs	1	1	2	2	8
Reservation Input	—	—	—	✓	✓
Fullload Input	—	—	—	✓	✓
Overload Input	—	—	—	✓	✓
Evacuation Input	—	—	—	✓	✓
Firemen switch and operation	—	—	—	✓	✓
Final Limit Switch Input	—	—	—	✓	✓
Integrated Evacuation	—	—	✓	✓	✓
Inspection Command via COP option	—	—	✓	✓	✓
Access Control	—	—	—	✓	✓
CarCall Cancellation	—	—	✓*	✓	✓
Double Door Entrance	—	—	—	✓	✓

	MicroZed-A v3.1	MicroZed-AR v3.1	ASTRA v1.2	MicroZed v3.3a	MicroZed v3.5a
					
Graphical Display	✓	✓	✓	—	—
24-Charx2-lines LCD alphanumeric display	—	—	—	✓	✓
Diagnostic Tool	—	—	—	✓	✓
English language	✓	✓	✓	✓	✓
French language	—	—	—	✓	✓
Arabic language	—	—	—	✓	✓
Swedish language	—	—	—	✓	✓
Faults Log	9	9	9	15	15
Events log	—	—	—	—	✓
Desktop Application for monitoring and control	—	—	—	✓	✓
USB port	✓	✓	✓	✓	✓
RS485 port	—	—	—	✓	✓
Firmware Upgrade on site	✓	✓	✓	✓	✓



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