KASvar

VFC-18

Elevator drive PLUS Emergency Rescue

User manual

Thank you for choosing KASvar AC-AC Power Inverter. Please take time to read the following manual before installing the power inverter. Please note that failure to follow the proper procedures may result in personal injury or damage to the Power Inverter.

We wish our Inverter will serve you for many years of high quality service and reliability.

Safety and Warning

Please read the following information carefully before using the Power Inverter:

Warning – Shock Hazard:

o DO NOT expose the Power Inverter to water, rain, snow or spray. Keep the Power Inverter dry at all times.
o DO NOT connect the Power Inverter to power utility AC distribution wiring or extension cords.

Warning – Heated Surface:

o DO keep all body parts and/or materials away from the Power Inverter while in operation. The Power Inverter may become uncomfortably hot during operating. If the Power Inverter overheats, it will automatically shutdown.
o DO provide adequate ventilation to the Power Inverter. Ensure the Power Inverter is never covered and always allow for proper ventilation.

Warning – Overload Situation:

o DO make sure the device you plug into the Power Inverter is less or equal to 150 W. If the device plugged into the Power Inverter is more than 150 W, the Power Inverter will automatically shutdown to avoid an overload of power.

Other Safety Precautions:

o DO NOT open the case of the Power Inverter. The high voltage inside the case is the same type of power as your electrical outlets at home. Opening case will automatically void the warranty.

o DO NOT expose this Power Inverter to flammable fumes or gases such as a gasoline powered vehicle, or near any propane tanks.

o DO NOT use this Power Inverter in an enclosure containing automotive-Type, lead-acid batteries to avoid hydrogen gas explosion, which can catch Fire by sparks from electrical connections

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Why choosing KASvar:

1) It allows the elevator to reach the nearest floor when the power is out, without the need for emergency system.
2) Works with KAS card using only 2 terminals, S2 & S2 without the need for extra relays.
3) The KASvar , keeps a log of all the errors occurred, which can be read later for monitoring.
4) The KASvar can operate on AC voltage varying from 340 VAC to 480 VAC.
5) All the motors' currents are measured and are displayed on the LCD
6) The KASvar isn't affected by switching the phases on its input.
7) The Cabin's speed can be increased to 130% of its actual speed.
8) Advanced programming for all speed curves.
9) The starting torque can be set to 150% from the rated torque.
10) The elevator is stopped on the selected floor by means of injecting DC voltage at very low frequency (0.1 HZ) not by means of brakes.
11) The mechnical brakes is not activated unless the elevator is completely stopped at the desired floor.

The KASvar self-protection:

The KASvar is equipped with many self-protection circuits and mechanisms that make KASvar ideal in many application and environments.

These self-protection circuits include:

1) Self-protection against any fluctuation in the power network, whether it is increase or decrease in the voltage.
2) Self-protection against any fault between any phase and the ground.
3) Self-protection against motor over-current.
4) Protection timer at all speeds.
5) Separate protection circuit, separated from the device itself, which insures an independent protection system, not depending upon the operation of the device itself.
6) The device can operate up to 85 **Ċ.**

The KASvar inverters have been tested in the worst operation and environment conditions and it gave excellent results and high stability and reliability.

All the KASvar inverter devices are tested prior to being sold in the market and this is to assure high reliability and quality.

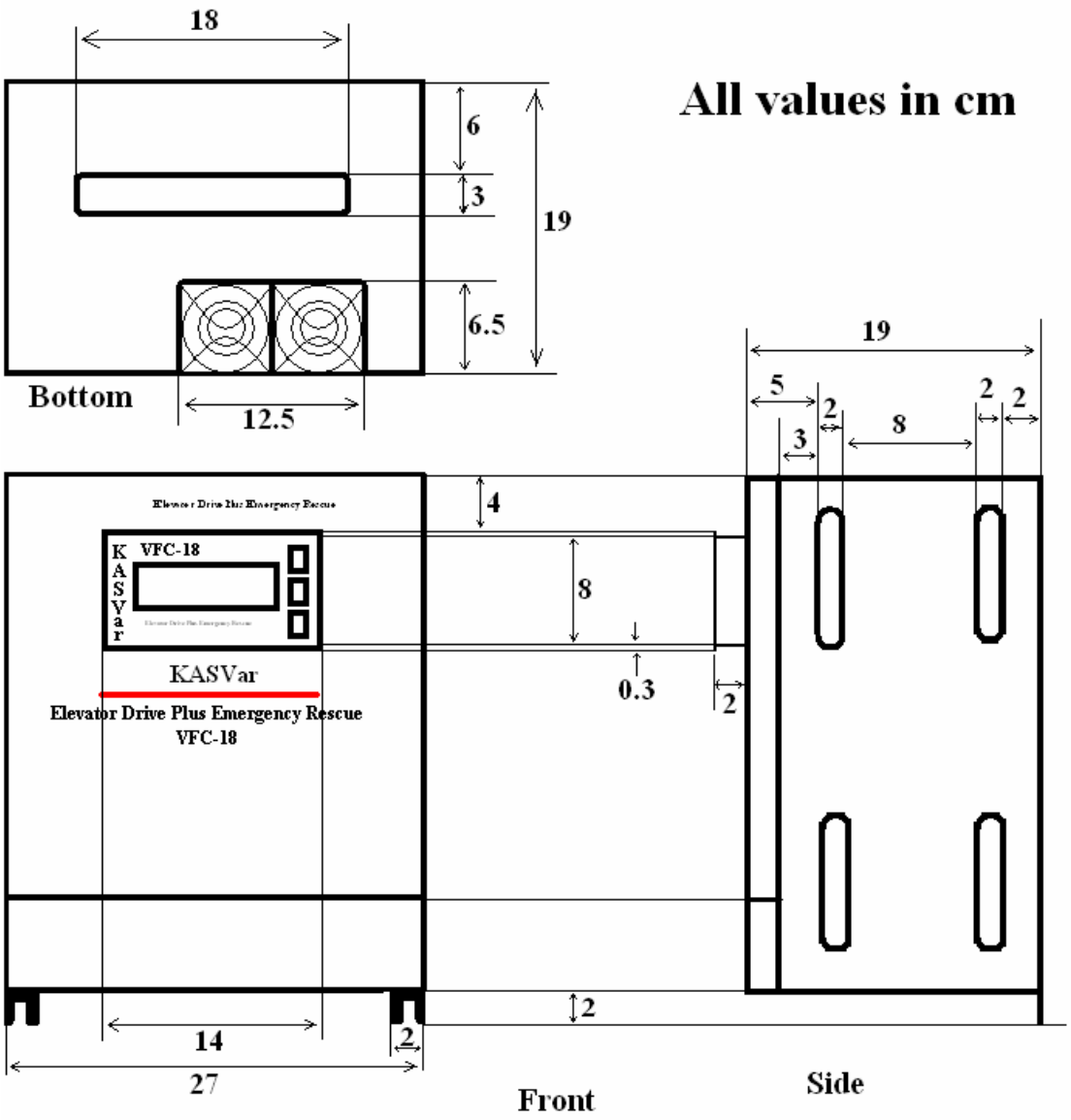
The protection circuits of the KASvar inverter devices are all tested, to assure their operation if required when in the runtime.

KASvar inverter devices , were proved to be the best solution when you need a hard-woking, reliable and stable inverter device, for almost every use.

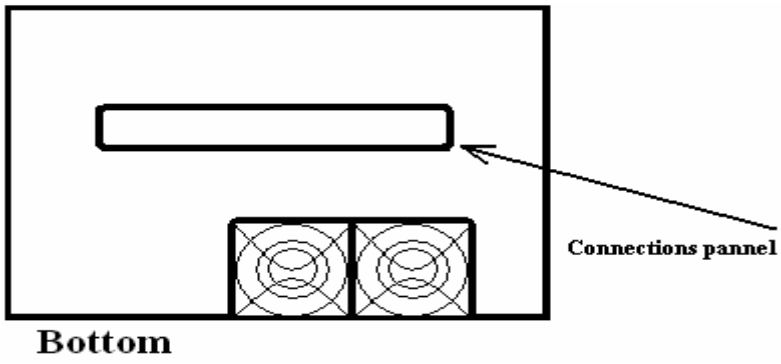
KASvar classes:

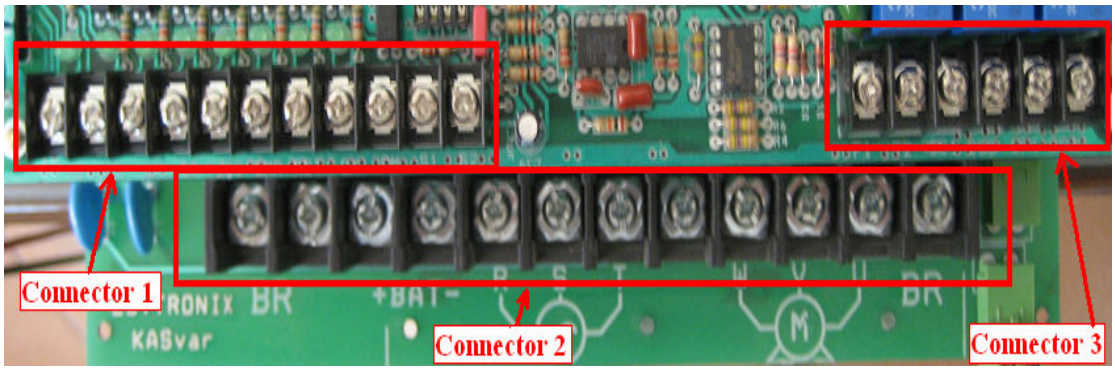
Model number		**11 KWATT**	**15 KWATT**
Motor Rating	**KW**	**11**	**15**
	HP	**15**	**20**
Output Ratings	**Capacity[KVA]**	**17.5**	**22.9**
	FLA[A]	**46**	**60**
	Frequency	**0-400HZ 0-300 Sensorless 300-400 Sensored vector control**	
	Voltage	**380 V³**	
Input Ratings	**Voltage**	**380 V ± 10%**	
	Frequency	**50 ˜ 60 HZ**	
Dynamic Barking	**Braking circuit**	**On Board**	**On Board**
	Max. Braking torque	**100 %**	
	Max. Continuous baking time	**15 seconds**	
	Max Duty	**10% ED**	
Weight[KG]			

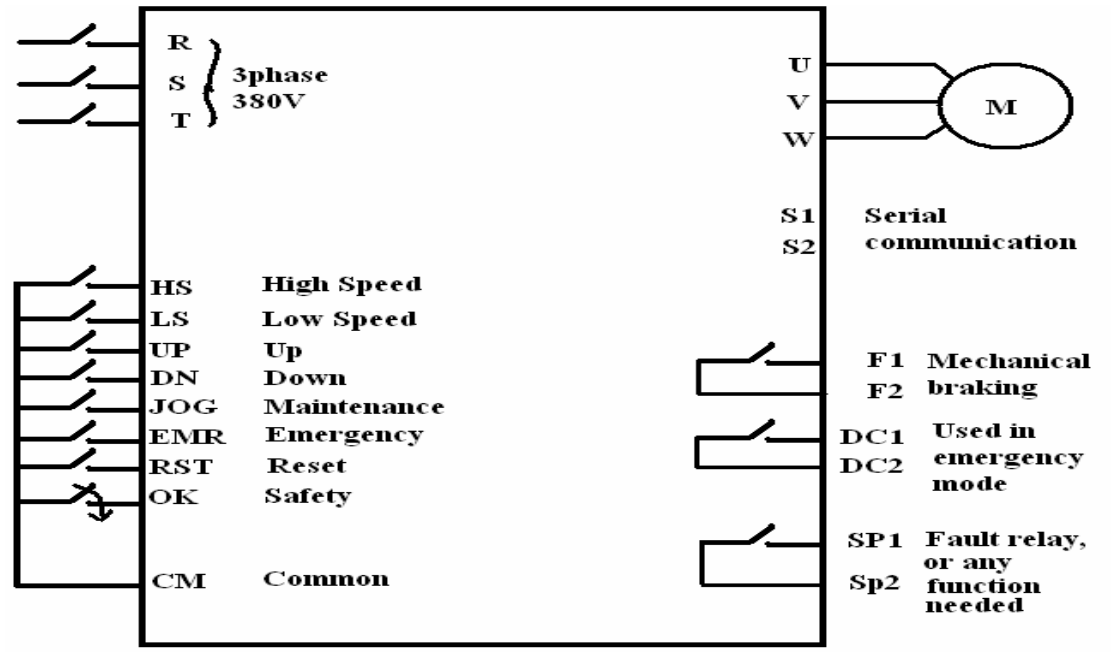
Diemensions :



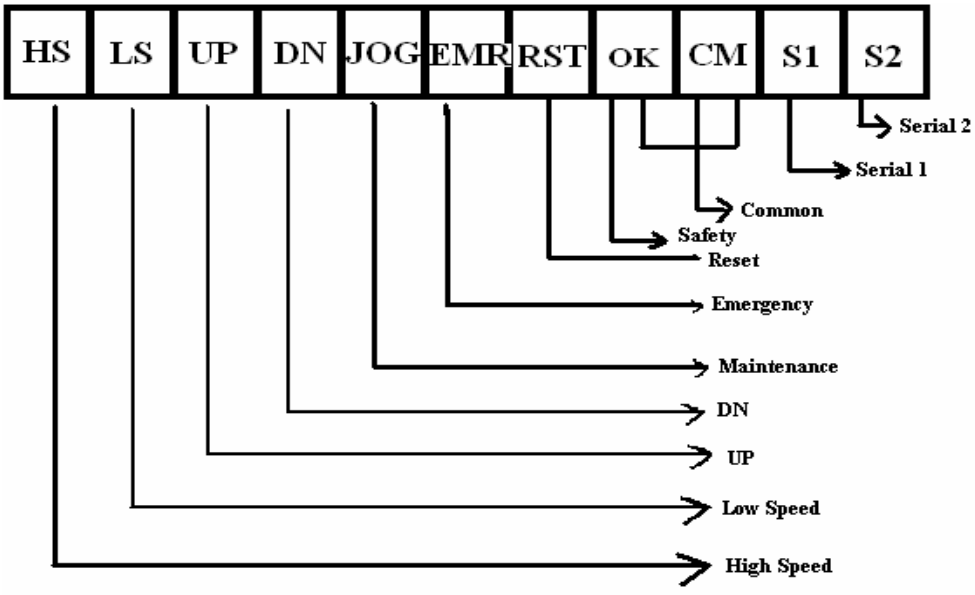
Basic wiring:



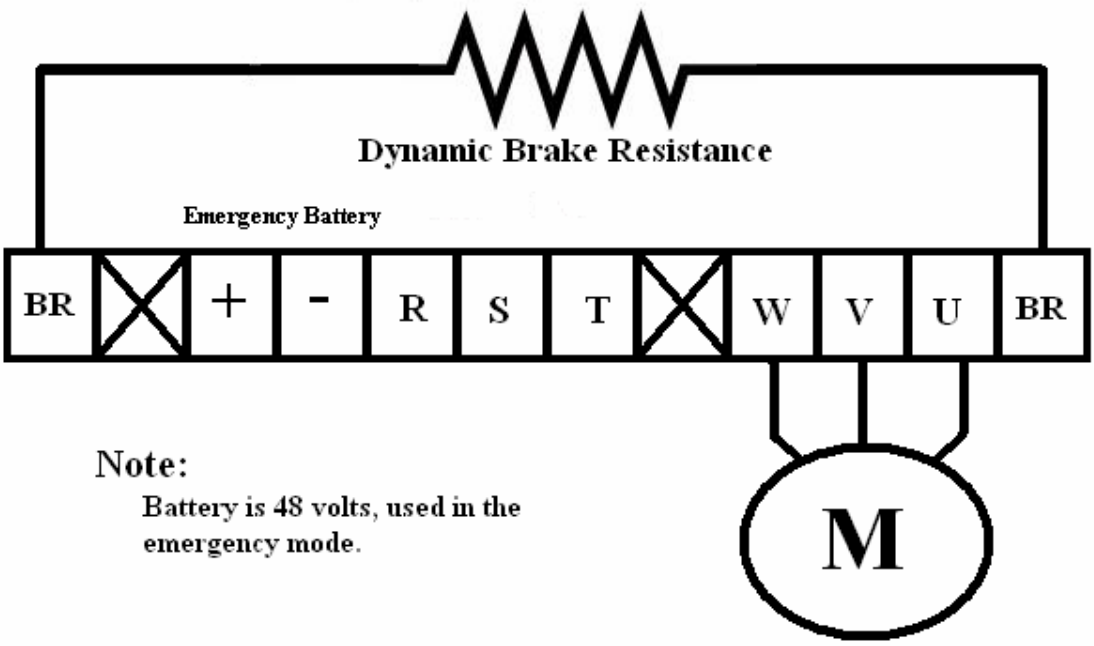

Connector 1
Connector 2
Connector 3


R
S
T
3phase
380V
U
V
W
M
S1
S2
Serial
communication
HS
High Speed
LS
Low Speed
UP
Up
DN
Down
JOG
Maintenance
EMR
Emergency
RST
Reset
OK
Safety
CM
Common
F1
F2
Mechanical
braking
DC1
DC2
Used in
emergency
mode
SP1
Sp2
Fault relay,
or any
function
needed

Connector 1:


HS
LS
UP
DN
JOG
EMR
RST
OK
CM
S1
S2
Serial 2
Serial 1
Common
Safety
Reset
Emergency
Maintenance
DN
UP
Low Speed
High Speed

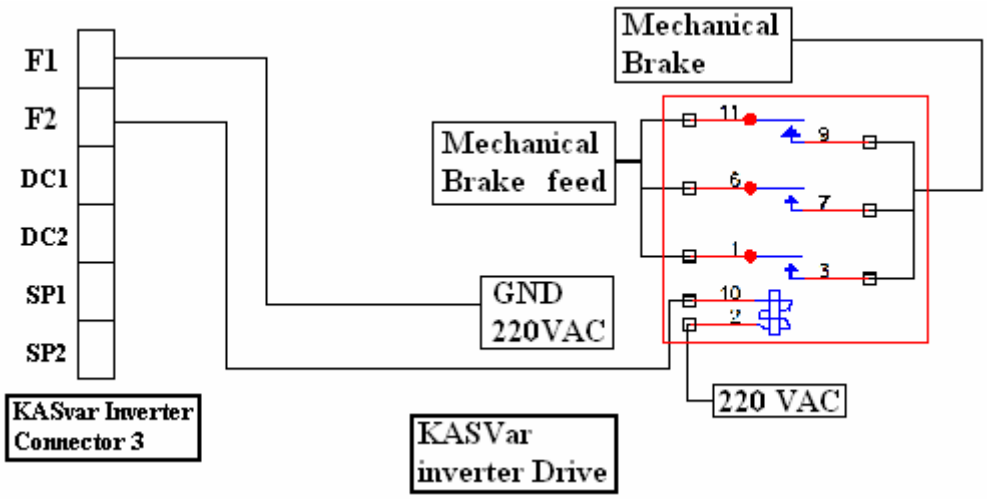
Connector 2:



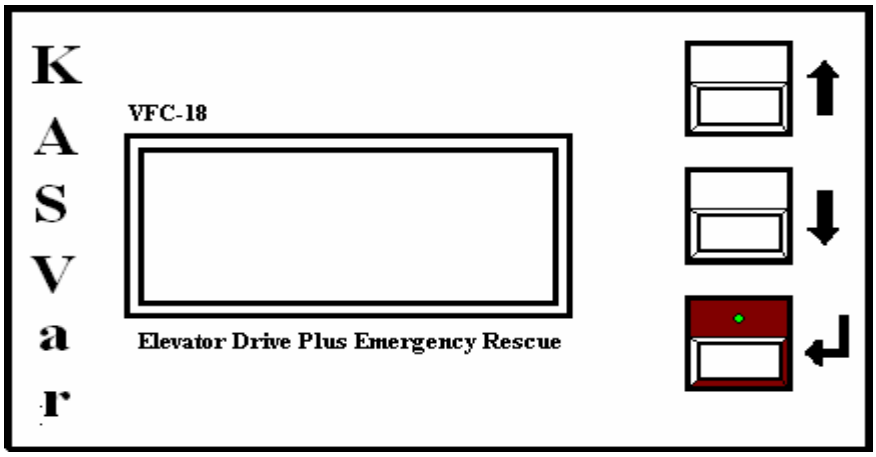
Notes:

In connector 1, the OK pin must be always connected to the CM (common) for inverter operation.

Mechanical brake connection:

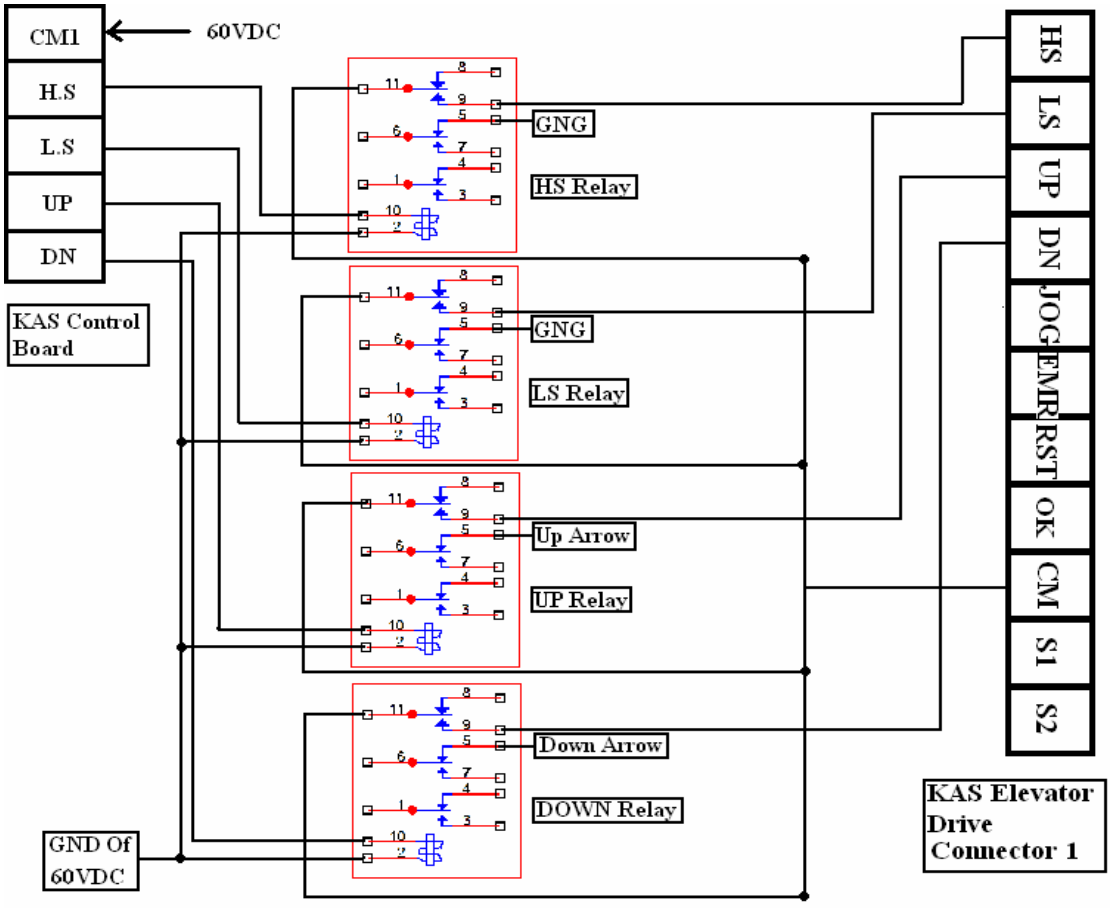


The LCD and keypad:

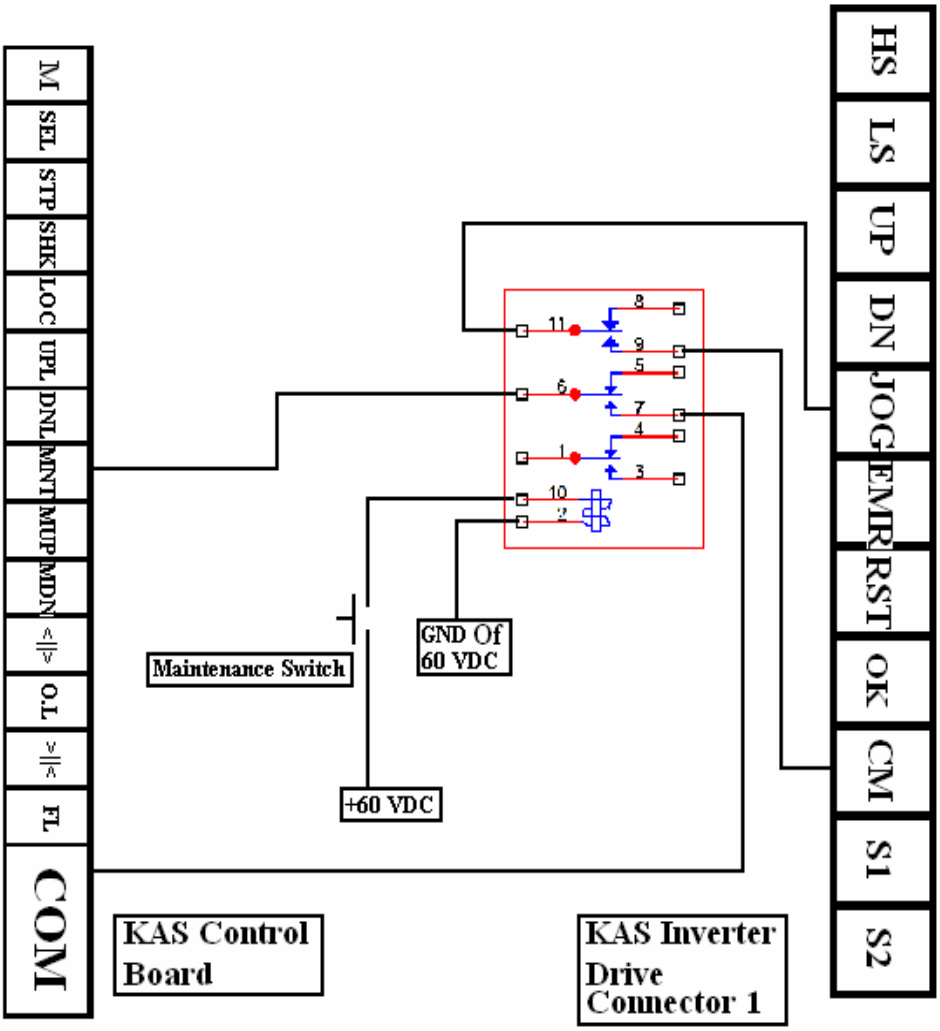


Connecting the KASVar Invertert to the KAS control card in the Parallel mode:

1) The regular working mode:



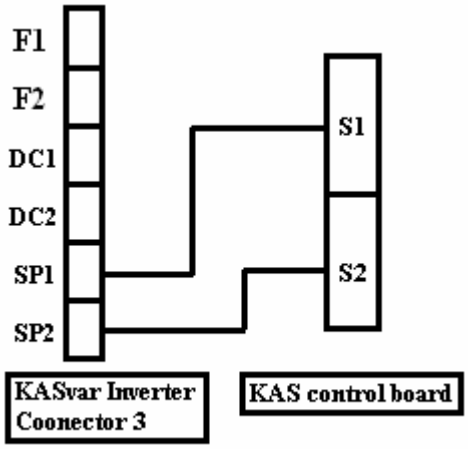
2) The Maintenance mode:



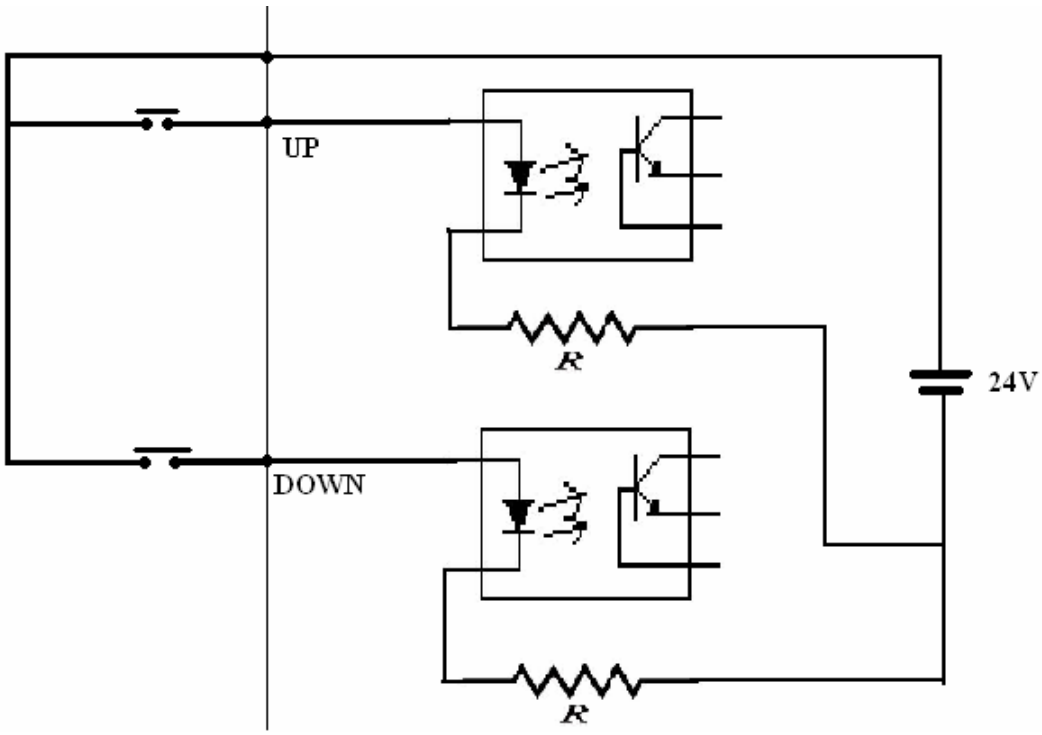
Connecting the KAS Invertert to the KAS control card in the Serial mode:

When connecting in serial mode, all the previous connections in the Parallel mode are replaced with a serial cable, thus simplifying the connectivity.

The pins S1 & S2 of the KAS control board respectively are connected to S1 & S2 of the KASVar inverter respectively.

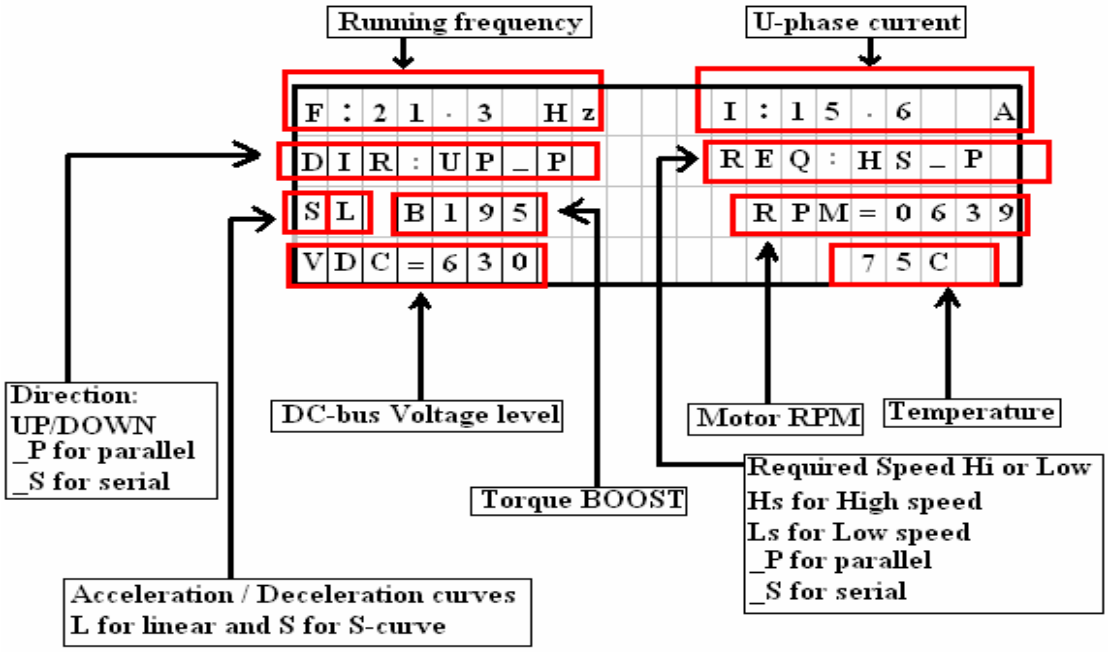


Control circuit terminal:



Operation of the KASvar:

When first plugging your inverter, the display will show the current settings and configurations of the inverter as follows:



The display will show the current configurations/settings at which the inverter is running.

While in the running mode you press the ENTER key for 5 seconds, a list with errors occurrence count is shown.

The errors list will give readings of the number of occurrences of the errors in the time interval specified for each error type.

The errors list and capturing will be discussed later in the programming section.

To return back press the ENTER key again.

The inverter at the first use will be running on the Factory defaults settings.

The Factory settings are set to the most common settings taken from the market and from the users of our inverters and are updated on regular basis.

So in most cases, you will find the settings suit or at least very close to your needs.

But if you decide to change the settings and customize the inverter you have to enter the OEM-Programming menu and change the settings according to your needs.

To enter the OEM-Programming menu, Press the Up and Down keys together till the "OEM-Programming" appears on the LCD, then release the Up and Down keys at the same time.

You will be then asked to enter the password of the programming mode, it is set to 0000 initially , then you will have the option to change it later from the programming menu.

To enter the password, press the ENTER key, this will allow you to enter the first digit, Up/Down keys change the value of the first digit.

Press Enter again, after you entered the first digit, and repeat this procedure after all the digits is entered.

Programming & Configuring the KASvar

By now, you should be in the first menu in the programming mode.

- Changing any item in the menus is done by , choosing this item by the UP/DOWN keys, then pressing the ENTER key, then pressing UP/DOWN keys again till the value of the parameter is set to

the desired value, then you press ENTER again, to save the current value of the parameter.

- If the parameter you choose contains a sub-menu, the sub-menu will open, and you will follow the same procedure with every menu item in the sub-menu.

NOTE:

1. After you finished setting your inverter , you have to press the RESET button for the changes to take effect
2. The new settings will only apply after the inverter is RESET.
3. To quit the menu at any instance, press the ENTER key, then while hodling the ENTER key, press the UP & DOWN keys together, keep all the keys pressed for 2 seconds, then release the ENTER key, then release the UP & DOWN keys.
4. If you quit the menus (OEM-PROGRAMMING menus) without making a RESET, the new parameter values will be saved, but the inverter will be operating on the older values till a RESET is done to the inverter.

Parameters Summary:

Parameter name	Menu no	Description	Default	Page
Motor Power KW	1	Motor power in KW	8.2	18
Rated frequency	1	Rated motor frequency on name plate in Hz	50	18
High Speed	1	Maximum required motor speed in Hz	43	18
MNT Speed In Hz	1	Maintenance speed in Hz	20	18
OVLoad Cur	2	Overload current	130%	18
OVLoad Per	2	Overload period in sec	4.0	18
Accel. Time	2	Acceleration time in sec	4.0	19
Decel. Time	2	Deceleration time in sec	2.2	19
Acc. Pattern	3	Acceleration Pattern	L	19
Dec. Pattern	3	Deceleration Pattern	L	19
Start freq	3	Starting frequency in Hz	0.2	14
Change password	3	Change OEM password	0000	14
Error enables	4	Error enabling list	Details page xxx	15
Errors timer	4	Error timers list	Details page xxx	16
Error Count	4	Error counts list	Details page xxx	16
Error Conditions	4	Errors occurrence	Details	16

		conditions	page xxx	
BRK ON Delay	**5**	**Mechanical brake ON delay time**	**0300**	**16**
BRK OFF Delay	**5**	**Mechanical brake OFF delay time**	**0040**	**16**
LOW Freq	**5**	**Low Speed frequency in Hz**	**05**	**16**
DB on V level	**5**	**In volts**	**060**	**16**
Max BST TRQ	**6**	**Maximum boost torque**	**11.0 %**	**17**
Min BST TRQ	**6**	**Minimum boost torque**	**00.1%**	**17**
Emer freq	**6**	**Emergency frequency**	**5.0**	**17**
Emergency OvLoad	**6**	**Emergency OverLOAD**	**150%**	**17**
DB offV level	**7**	**In volts**	**030**	**18**
LOW Freq. Time	**7**	**Low frequency timer in sec**	**10**	**18**
Rest FRQ	**7**	**Stop frequency in Hz**	**00.3**	**18**
Rest Time	**7**	**Stop Time in msec**	**0050**	**18**
DC Inj.BrT	**8**	**DC Injection braking time**	**0.25**	**18**
DC Inj.Br.F	**8**	**DC Injection braking frequency in Hz**	**01.9**	**18**
DC Inj.Br.V	**8**	**DC Injection braking voltage**	**13%**	**18**
Starting T	**8**	**Starting torque**	**50%**	**18**
P Gain PID	**9**	**proportional gain**	**10%**	**19**

I Gain PID	**9**	**integral gain**	**18%**	**19**
D Gain PID	**9**	**differential gain**	**06%**	**19**
DB Duty(Duty of dynamic braking)	**9**	**Duty of dynamic braking**	**11%**	**19**
S & L F1	**10**	**Frequency at point 1**	**50%**	**19**
S & L F2	**10**	**Frequency at point 2**	**15%**	**19**
S & L F3	**10**	**Frequency at point 3**	**50%**	**19**
S & L F4	**10**	**Frequency at point 4**	**15%**	**19**
S & L V1	**11**	**Voltage at point 1**	**15%**	**20**
S & L V2	**11**	**Voltage at point 2**	**78%**	**20**
S & L V3	**11**	**Voltage at point 3**	**15%**	**20**
S & L V4	**11**	**Voltage at point 4**	**60%**	**20**
Motor Eff.:	**12**	**Motor efficiency**	**85%**	**20**
Motor Vrms	**12**	**Rated motor voltage rms value**	**380**	**20**
Max Torq.o	**12**	**Maximum output torque from drive**	**180%**	**20**
Auto V Reg.	**12**	**Automatic voltage regulation**	**01**	**20**
Torq Com T	**13**	**Torque compensation Time in ms**	**02.0**	**21**
Torq Com G	**13**	**Torque compensation Gain**	**80%**	**21**
Slip Com T	**13**	**Slip compensation Time in ms**	**02.0**	**21**
Slip Com G	**13**	**Slip compensation Gain**	**02%**	**21**

Motor poles	**14**	**Number of the motor poles**	**04**	**21**
High T Offs	**14**	**High Torque offset**	**30%**	**21**
Low T Offs	**14**	**Low Torque offset**	**10%**	**21**
Midl T Offs	**14**	**Middle Torque offset**	**20%**	**21**

The 1st menu items are:

1) Motor Power:

The motor power in KW on name plate

2) Rated freq :

Rated motor frequency on name plate

3) High Speed:

Maximum required motor speed

4) MNT Speed:

Maintenance speed

The 2nd menu items are:

1) OVLoad Cur.:

Overload current, the maximum current that the inverter can deliver to the load, %Rated current. Default 120%

2) OVLoad Per.:

The Period over which the inverter will deliver the OVERLOAD CURRENT, after this period the inverter will cut-off its output .default 3 secs

3) Accel. Time:

Time taken for the motor to reach High speed from 0HZ

4) Decel. Time:

Time taken for the motor to reach High speed from 0 HZ

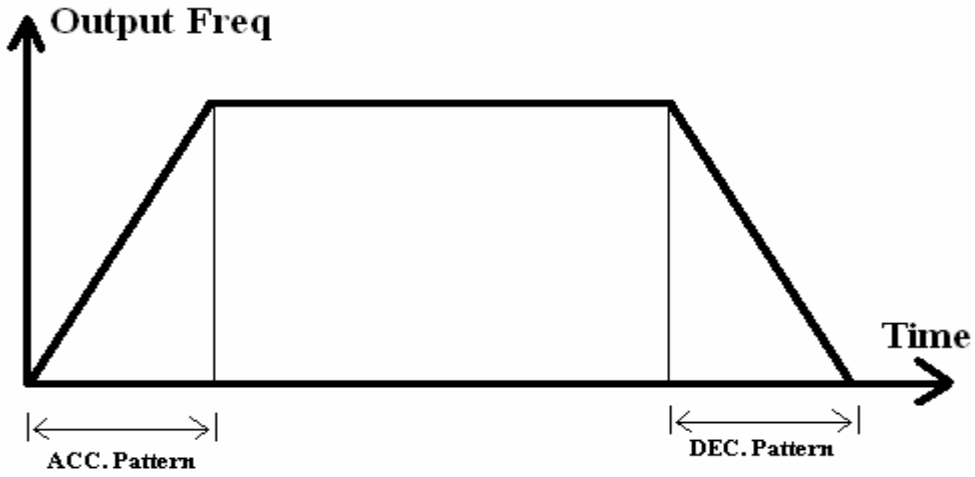
The 3rd menu items are:

1) Acc. Pattern:

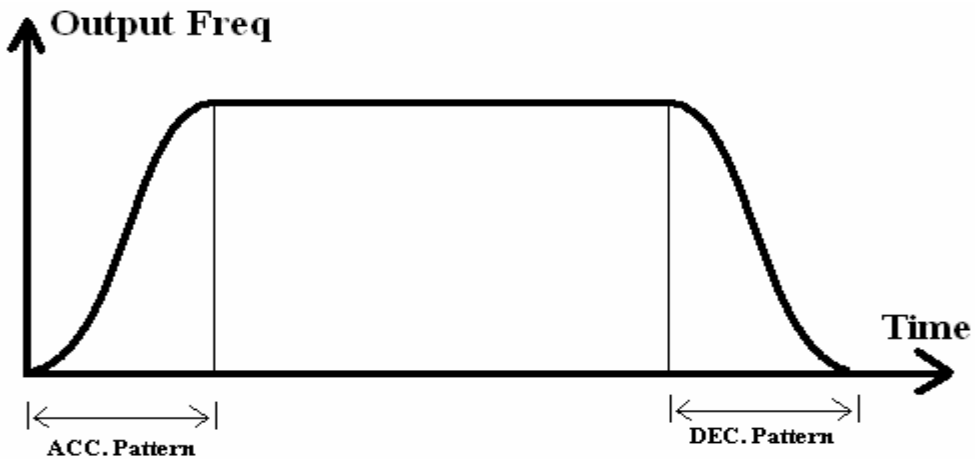
2) Dec. Pattern:

The 2 available options are L & S

L: stands for linear

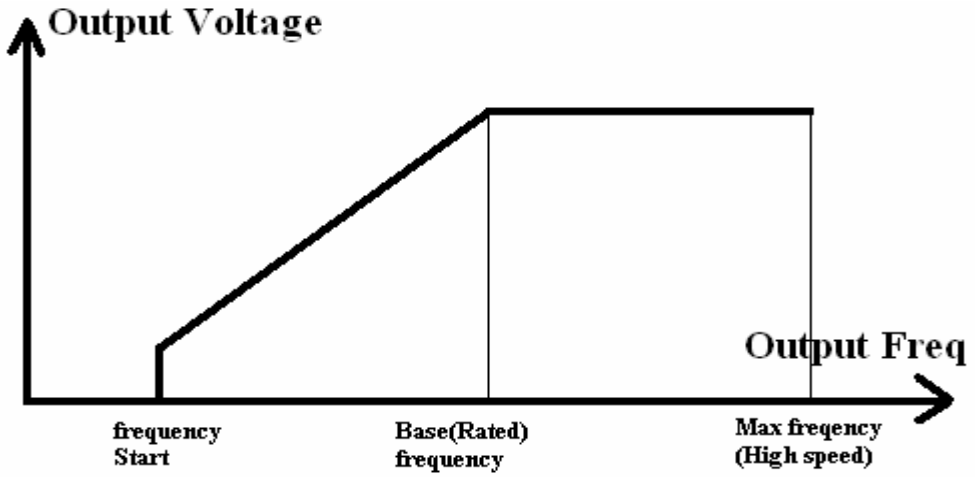


S:Stands for S-curve , this pattern allows the motor to accelerate and decelerate smoothly, the actual acceleration and deceleration takes about 40 % than the acceleration and deceleration times set in the 2nd menu items 3& 4.



3) Start freq.:

It is the frequency at which the inverter starts to output its frequency.



4) Change password:

To change your OEM-programming password.

When you enter this menu, you will be asked for the old password, after entering it , you will be asked for the new password.

You press the enter key, the first digit will start to blink, use the up/down keys to change the first digit,

after finished press ENTER key, to switch to the second digit.

Repeat till all digits are entered, then press RESET for the inverter to restart with the new password.

The 4th menu items are:

1) Error enables:

When entering this menu , a new submenu appears, it shows the available errors that can happen, and let you decide whether to capture and process them, or just ignore the error when it happens.

If the error is set to yes (Y) the error is captured and processed, if set to no (N) the error is ignored.

The errors are:

Ea, Over voltage error.

Eb Under voltage error

Ec phase u overload

Ed phase v overload

Ee phase w overload

Ef phase u open

Eg phase v open

Eh phase w open

Ei phase lost

Ej overheat

Ek excess current

2) Errors timer

3) Error Count

Items 2&3 work together, they set the maximum number of the error to happen during specific time, after that number of occurrence of specific error occurs in the specified time, and assuming the corresponding (Error enable) for this error is set Y (yes) the inverter stops working and is disconnected until a further RESET is done to the inverter.

Note:

- If the corresponding error enable (item no.1 in menu 4 is set to N, the error is completely ignored, even its timer and Count are set to values)

4) Error Conditions

When entering this menu, a sub-menu appears

In this menu you can indicate the conditions at which an error is counted, in other words, what are the conditions for an error to be counted in the ERROR COUNTER (current menu, item 2 & 3)

This menu consists of 8 sub items, distributed into 2 menus.

Sub-Menu 1:

1) DBR. TIMER:

The time at which the Dynamic brake will stay ON.

2) U.V. Period:

Duration of under voltage, after which the Under Voltage error counter is increased by 1.

3) Opn. Phs. frq :

The frequency at which the phase is supposed to be delivering more than (Opn.Phs.Cur , current menu ,next item)

4) Opn.Phs.Cur:

The current that is supposed to be delivered at the Opn.Phs.frq, if current below this value is delivered, an open phase error is reported, and the corresponding error in incremented by 1.

Sub-Menu 2:

1) Lst.Phs.Cur.

LOST PHASE CURRENT, it is the minimum current supposed to be delivered at rated frequency, if the delivered current is lower than this value, an open phase error is reported.

2) FLT.RST Time: Fault Reset Time.

The time after which the inverter resets itself, after a fault error is reported

3) OVR Heat Deg:

The temperature after which an Over heat error is reported.

4) FaultRelay:

The 5th menu items are:

1) BRK ON Delay:

   Mechanical brake ON delay time.

2) BRK OFF Delay:

   Mechanical brake OFF delay time.

3) LOW Freq:

   Low Speed frequency.

4) DB on V level.

The 6th menu items are:

1) Max BST TRQ:

   Maximum boost torque, increasing the starting torque by means of increasing the output voltage of the inverter. If the boost value is set too high than required, it may cause the motor flux to saturate, causing over current trip.

   Increase the boost value when there is excessive distance between the motor and the inverter.

Note:

the torque boost value is a percentage of the motor rated voltage.

2) Min BST TRQ:

   Minimum boost torque, at the Rated voltage of the motor/F rated of the motor.

3) Emer freq:

Emergency frequency.

4) Emergency OvLoad:

Emergency OverLOAD

The 7th menu items are:

1) DB offV level

2) LOW Freq. Time :(Low frequency timer) :

3) Rest FRQ. :(Rest frequency) { Stop frequency }

4) Rest Time:Stop frequency time.

The 8th menu items are:

1) DC Inj.BrT.:(DC Injection braking time):

By introducing DC voltage to the motor windings, this function stops the motor immediately.

DC injection braking time, is the time at which the DC current is applied to the motor, after the DC braking frequency is reached.

2) DC Inj.Br.F.: (DC Injection braking frequency)

It is the frequency at which the inverter starts to output DC voltage to the motor during deceleration.

3) DC Inj.Br.V.: (DC Injection braking voltage)

The DC voltage applied to the motor, based on its rated current.

4) Starting T.:(Starting torque)

The 9th menu items are:

1) P Gain PID:

   The proportional gain used for speed search, it is a percentage of the motor rated speed.

2) I Gain PID:

   The integral gain used for speed search, it is a percentage of the load inertia.

3) D Gain PID:

   The differential gain used for speed search

4) DB Duty(Duty of dynamic braking) :

   This must be set when using an external DB resistor, and the duty is calculated by

   %ED=Decel time * 100/(Accel time + Steady Speed time + Decel time + Stop Status time)

The 10th menu items are:

1) S & L F1

   S-curve & L-curve frequency1 at voltage1

2) S & L F2

   S-curve & L-curve frequency2 at voltage2

3) S & L F3

   S-curve & L-curve frequency3 at voltage3

4) S & L F4

S-curve & L-curve frequency4 at voltage4

The 11th menu items are:

1) S & L V1

S-curve & L-curve frequency1 at voltage1

2) S & L V2

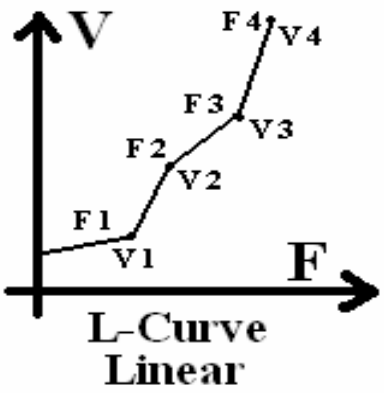
S-curve & L-curve frequency2 at voltage2

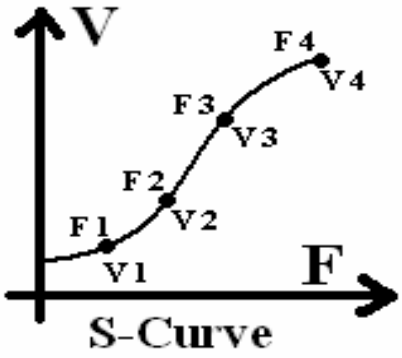
3) S & L V3

S-curve & L-curve frequency3 at voltage3

4) S & L V4

S-curve & L-curve frequency4 at voltage4





The 12th menu items are:

1) Motor Eff.: (Motor efficiency):

2) Motor Vrms: (Rated motor voltage rms value)

3) Max Torq.o: (Maximum output torque from drive)

4) Auto V Reg.: (Automatic voltage regulation)

00 for No and 01 for yes

The 13th menu items are:

1) Torq Com T: (Torque compensation Time)
2) Torq Com G: (Torque compensation Gain)
3) Slip Com T :(Slip compensation Time)
4) Slip Com G:(Slip compensation Gain)

The 14th menu items are:

1) Motor poles : Number of the motor poles.
2) High T Offs : High Torque offset
3) Low T Offs : Low Torque offset.
4) Midl T Offs: Middle Torque offset.