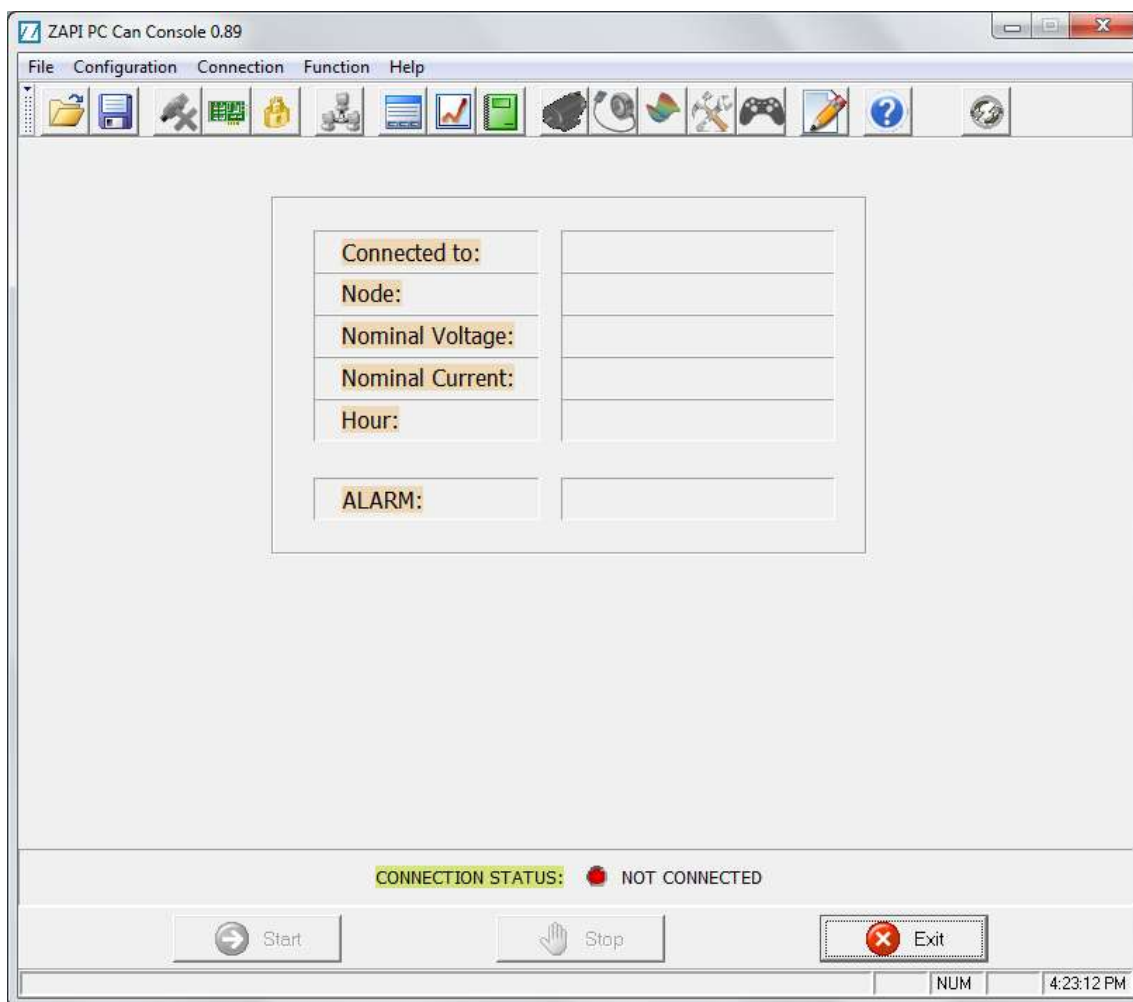



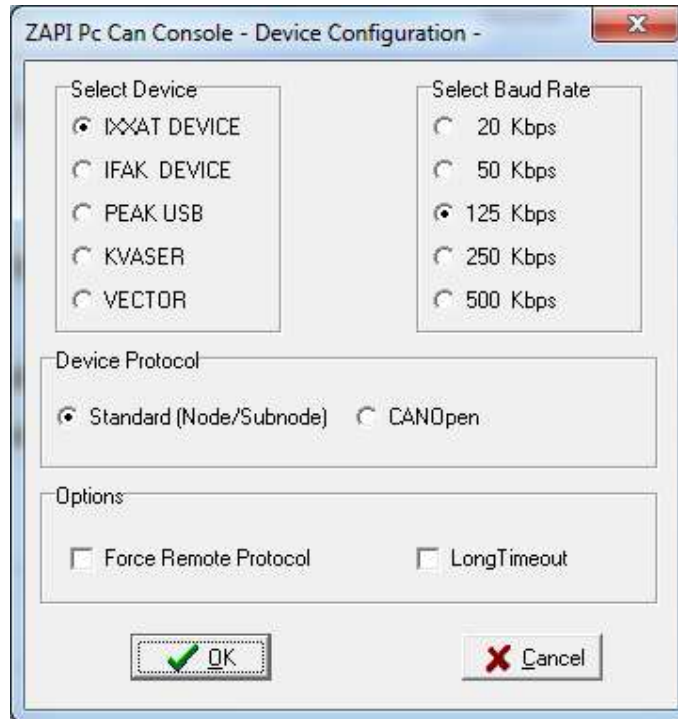
User guide for “PC CAN CONSOLE” software

ZAPI CANCONSOLE software permit to test and adjust the setup configuration of the ZAPI inverter.

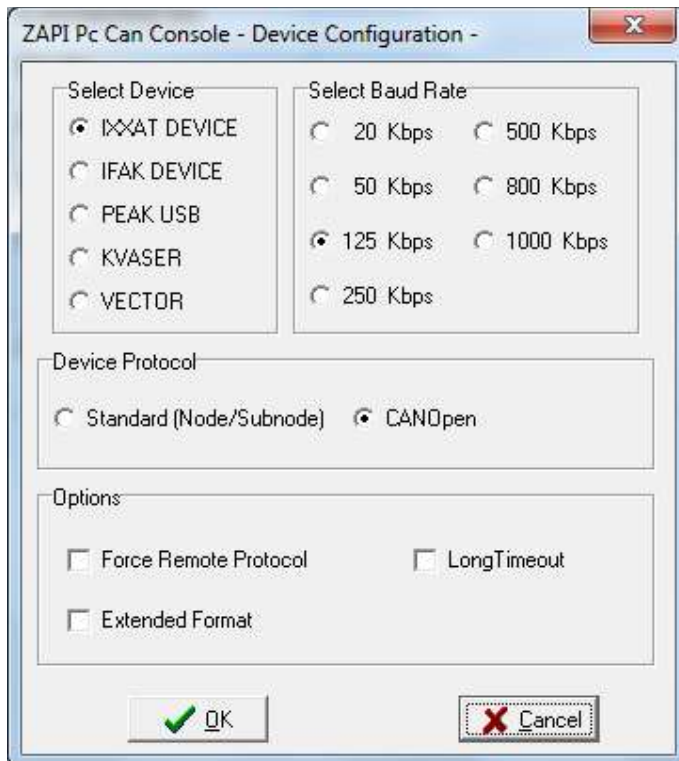


CONFIGURATION - CAN DEVICE  permit to Select the USB-to-CAN device, the Baud Rate and the Communication protocol to connect with the inverter.

STANDARD PROTOCOL:



CANOPEN PROTOCOL: For all inverter 2uC or single uP set like canopen

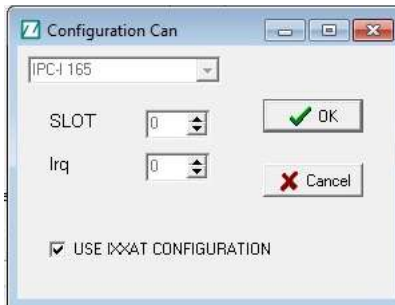


In this example, it is used an IXXAT Device set with a 125 kbps Baud Rate (depending on the controller) and Standard Protocol (Zapi Protocol).

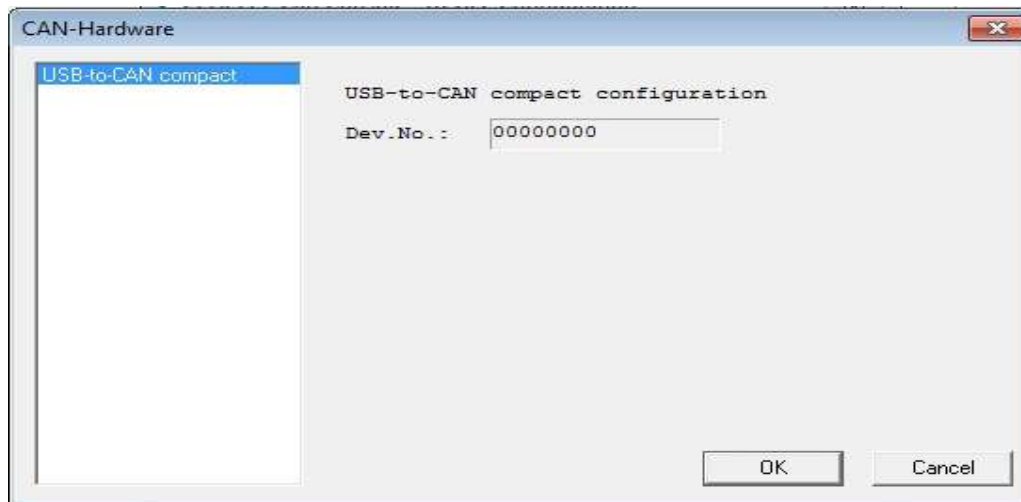
FORCE REMOTE PROTOCOL – (Suggested to use only in case of communication problem) communicate with the controller using the serial protocol. If the Remote protocol is not forced the Speed communication will be faster using the CAN message.


LONG TIMEOUT – (suggested not to use)


Confirming with OK button the device parameter will be opened the configuration window to select USE IXXAT CONFIGURATION checkbox



Confirming the CONFIGURATION CAN then select the used IXXAT device connected to the PC for the communication of the Controller (on the example is shown only one device but It could be more) indicated on Device Number:



FREE DOGLE BUTTON  disconnect the Device used to connect with the CAN

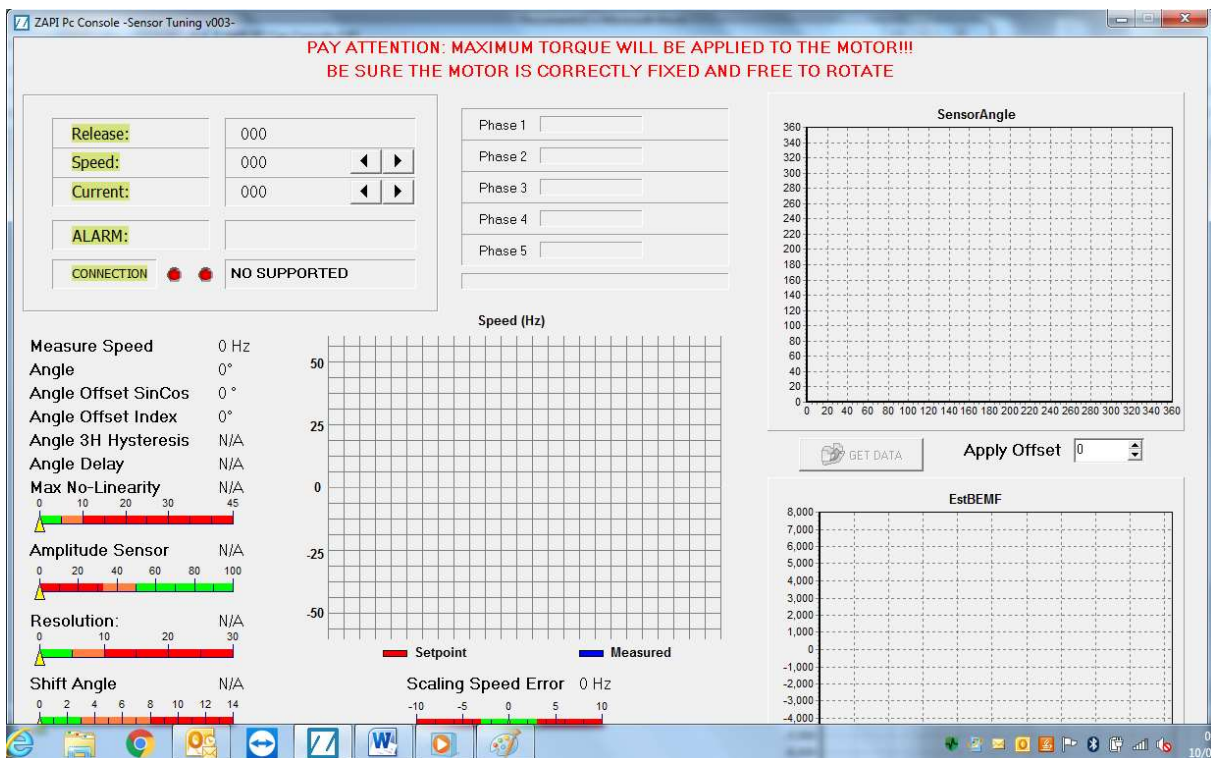
CONFIGURATION - ENTER PASSWORD  enable to change the controller parameters.
It is necessary to insert the right password, "ZAPI" with all capital letters



Then select again Enter Password and set password **"TUN00"** to have special menu for tuning of sensor, tuning of motor and to joystick picture for drive inverter by can-open system directly by ZpCanConsole:



A.Sensor Acquire:



NOTE: For Acquire Sensor and Motor Tuning ask dedicated procedure.



B. Motor tuning:

ZAPI Pc Console - Motor Tuning v010

PAY ATTENTION: MAXIMUM TORQUE WILL BE APPLIED TO THE MOTOR!!!

BE SURE THE MOTOR IS CORRECTLY FIXED AND FREE TO ROTATE

Release: 37

BandWidth: 0Hz

Voltage: 48V


Nominal Current: 0Arms



Current: 320Arms



Error: 0000

ALARM:

CONNECTION: ● ● ACQ_PAR_DISABLE

ENABLE ACQ: ☒ Max Torque: ☒ Next: 

SCREENSHOT:  Max Efficiency: ☒ Retry: 

SAVE TO EEPROM: ☒ EXPORT TO FILE:  Close: 

Constant	Actual Value		Constant	Actual Value	
Rs*_25deg	0	moHm	IDRMS MIN	0	Arms
Rd*	0	moHm	IDRMS MIN DEF	0	Arms
Ld*	0	uH	LD*	0	uH
Rq*	0	moHm	LD*	0	uH
Lq*	0	uH	LD*	0	uH
MAX FLUX	0	mWb	LD*	0	uH
IDRMS MAX	0	Arms	LQ*	0	uH
Lm*	0	uH	LQ*	0	uH
TR_MSEC_25deg	0	ms	LQ*	0	uH
IDGAIN	0		LQ*	0	uH
IDOFFSET	0		CUR.ANGLE 0%	N/A	*
KP_VD_GAIN	0		CUR.ANGLE 25%	N/A	*
KI_VD_GAIN	0		CUR.ANGLE 50%	N/A	*
KP_VQ_GAIN	0		CUR.ANGLE 75%	N/A	*
KI_VQ_GAIN	0		CUR.ANGLE 100%	N/A	*
FREQ_FOR_IMAX	0	Hz	CUR.ANGLE I REF	N/A	Arms
IQ1MAX	0	A	MAX TORQUE	N/A	Nm
FREQ1 FOR IQ1	0	Hz			
IQ2MAX	0	A			
FREQ2 FOR IQ2	0	Hz			
IQ3MAX	0	A			
FREQ3 FOR IQ3	0	Hz			
IQ1MAX EFF	0	A			
IQ2MAX EFF	0	A			
IQ3MAX EFF	0	A			
KP_V_WEAK	0				
KI_V_WEAK	0				

NOTE: For Acquire Sensor and Motor Tuning ask dedicated procedure.



C. Joypad canopen module (this function works only for inverter set like canopen):


CANOPEN MODULE V0.01


NMT REQUEST: OPERATIONAL PRE-OPERATIONAL RESET


PO01TX:


☐ EnablePower ☐ Lc Enable ☐ Ebrake ☐ Fwd ☐ Bwd ☐ Aux1 ☐ Aux2


☐ Aux3 ☐ Aux4 ☐ Aux5 ☐ Horn ☐ Lc_output

TARGET SPEED:  VALUE: 0 MAX VALUE: 1000


BRAKE:  VALUE: 0


SPEED PUMP:  VALUE: 0


EVP:  VALUE: 0

EVP2:  VALUE: 0

PO02TX:


TORQUE MOT.:  VALUE: 0

TORQUE BRK:  VALUE: 0

STEER ANGLE:  VALUE: 0

NODE ID: .20

LIFE TIME ms: 200

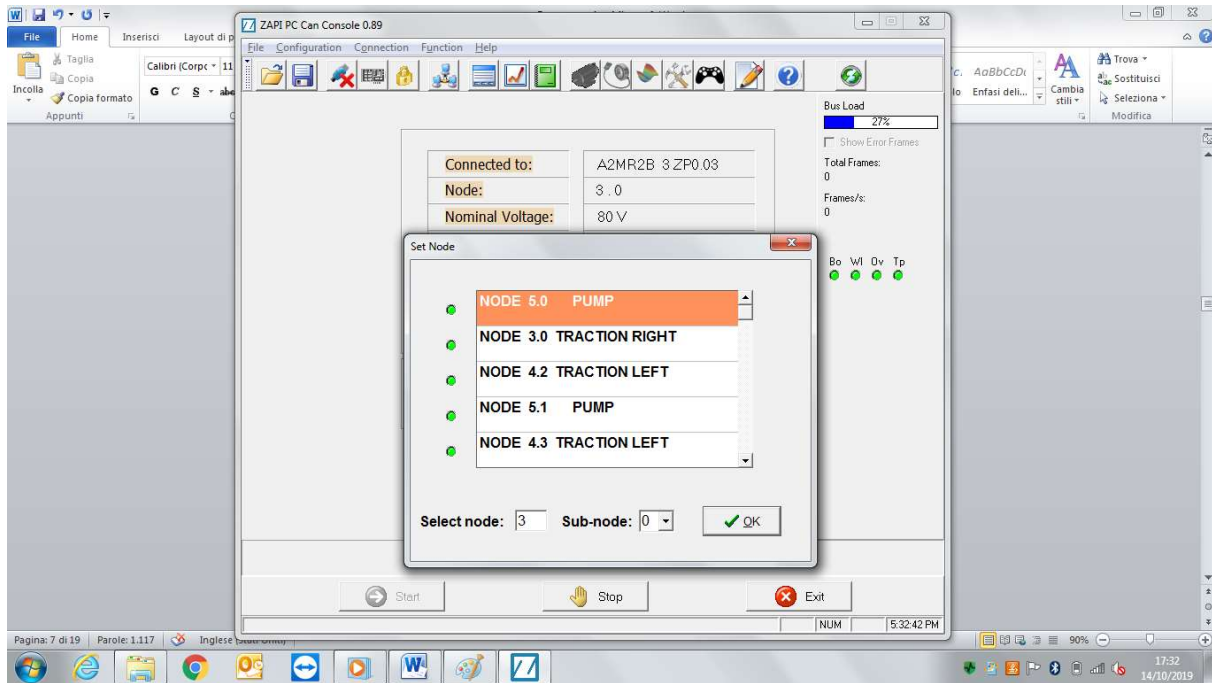
Close: 

NOTE: You could send command to inverter by can-bus, it simulate master vehicule control.

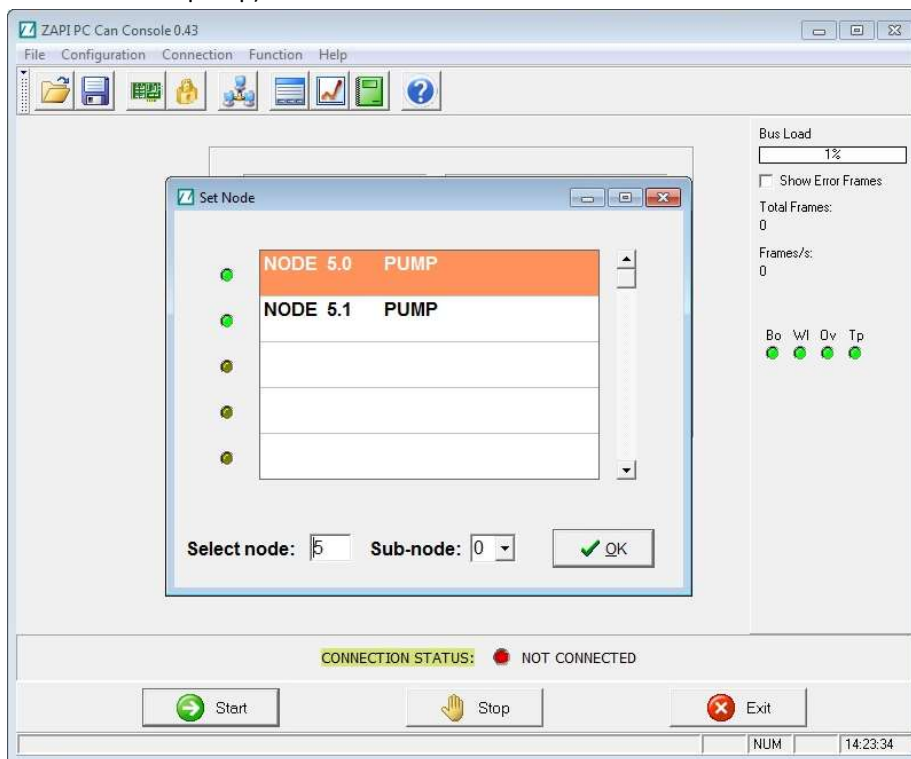


CONNECTION - SET NODE permit to connect to the detected network nodes.

STANDARD PROTOCOL (node/subnode) → More than one inverter on can-bus line:



STANDARD PROTOCOL (node/sub-node) → Only one inverter stand-alone on can-bus line (for example inverter set like pump):




SET MODEL Node or Node in Standard Protocol:

Number associated in CANBUS net inverter 1uP	Number associated in CANBUS net for inverter 2uC	Module Zapi
1.0	Not available	Sicos
2.0	2.0-2.1	Traction
3.0	3.0-3.1	Traction Master
4.0	4.0-4.1	Traction Slave
5.0	5.0-5.1	Pump
6.0	Depend from software installed 6.0-6.1	EPS-AC/EPS-AC0/EPsACW
8.0	Not available	Can Tiller/VCM
9.0	Not available	Mhyrio Flash
11.0	Not available	Smart Antenna
16.0	Not available	Smart/Eco-smart/Graphic smart display

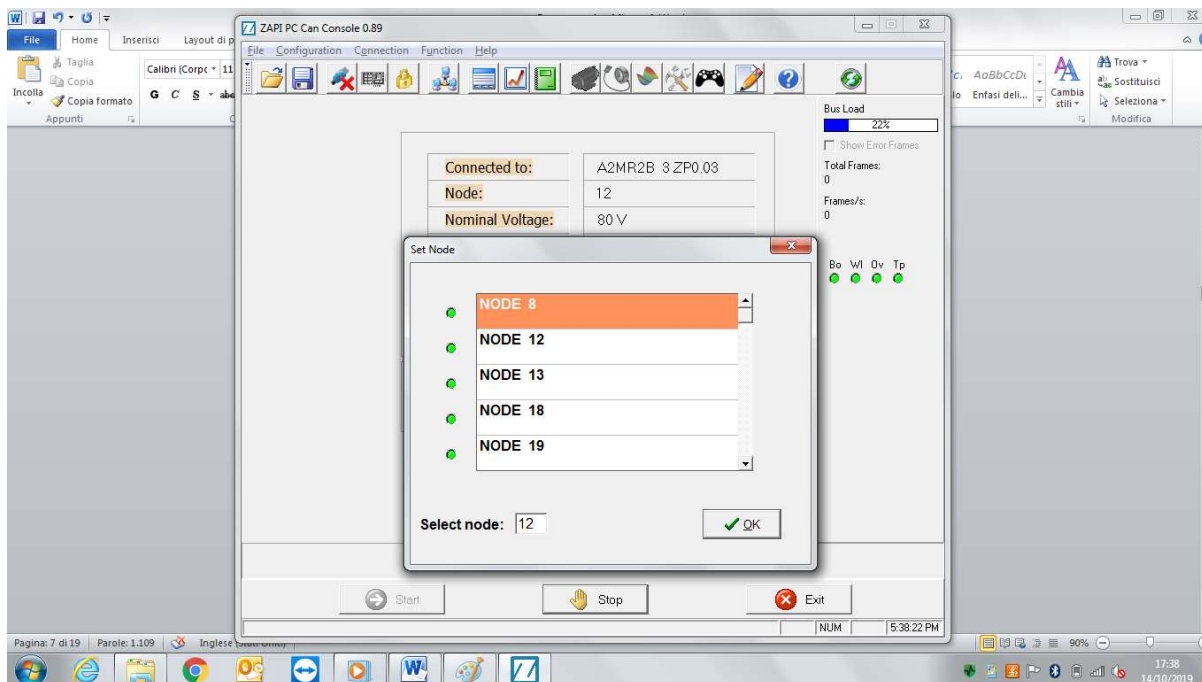
NOTE: Sometimes it may be necessary to force the node manually to connect to the Zapi control unit to which you want to connect, follow the table above.

Once you have defined the CAN interface, you have to choose which CAN device you want to connect to:

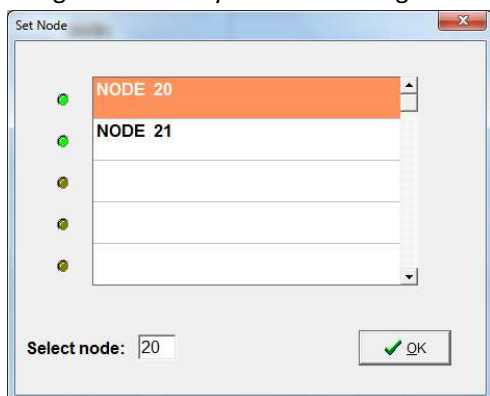
Click on  button or "Connection" → "Set Node" to select the wanted Zapi controller.

Controller type	Standard protocol		CAN open protocol	
	Master MCU	Slave MCU	Master MCU	Slave MCU
Traction	2.0	2.1	8	9
Pump	5.0	5.1	20	21
CAN operated	2.0	2.1	8 (*)	9 (*)
Multi-motor traction (master)	3.0	3.1	12	13
Multi-motor traction (slave 1)	4.0	4.1	16	17
Multi-motor traction (slave 2)	20.0	20.1	80	81
Multi-motor traction (slave 3)	24.0	24.1	96	97
Generation set	18.0	18.1	72	73
C.O., multi-motor (master)	3.0	3.1	12 (*)	13 (*)
C.O., multi-motor (slave)	4.0	4.1	16 (*)	17 (*)

CANOPEN PROTOCOL → More than one inverter on can-bus line:



CANOPEN PROTOCOL → Only one inverter stand-alone on can-bus line(for example inverter set like pump or using to connect by SDO with new generation of inverter with 2uC):

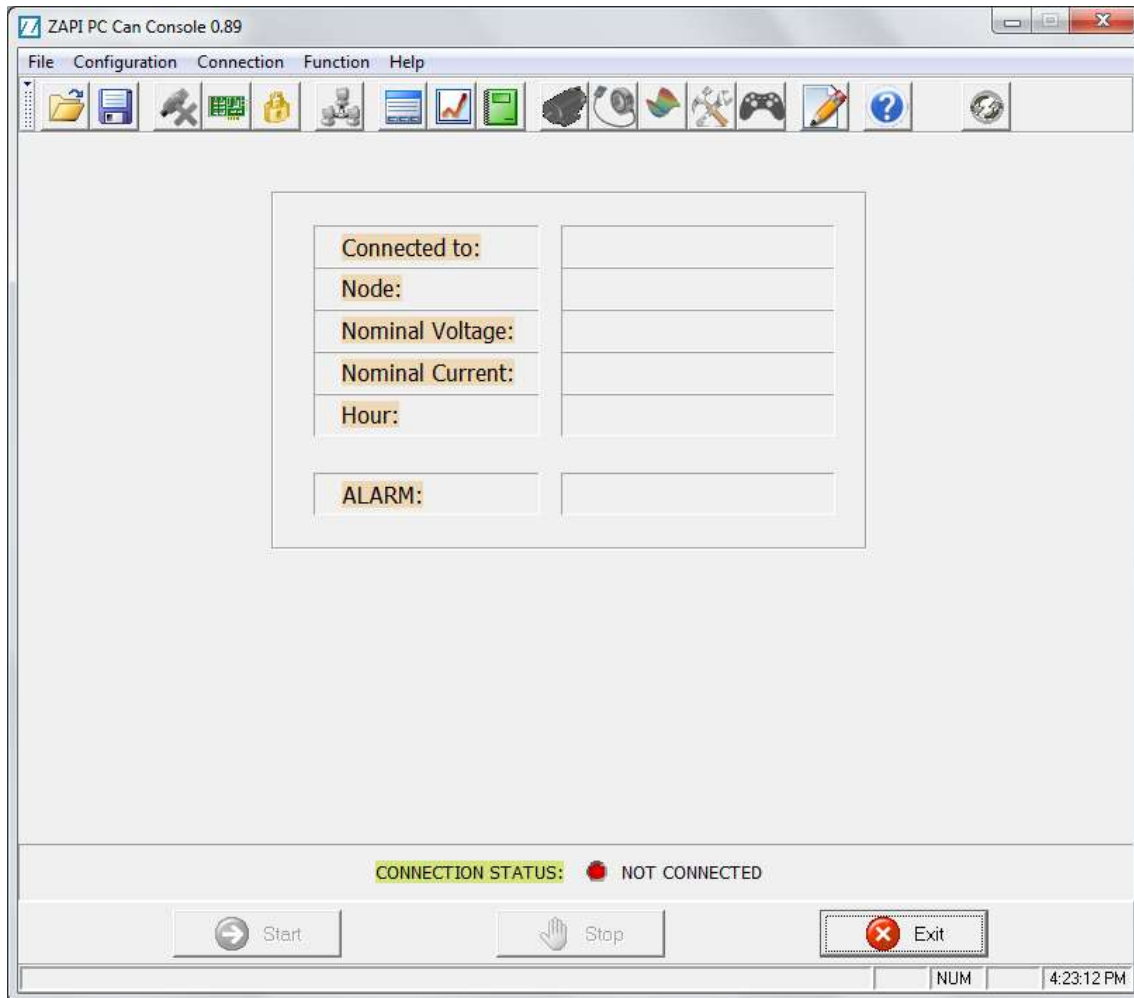


SET MODEL Node or Node in Standard Protocol:


Number associated in CANBUS net inverter 1uP	Number associated in CANBUS net for inverter 2uC	Module Zapi
Not available	Not available	Sicos
8	8-9	Traction
12	12-13	Traction Master
16	16-17	Traction Slave
20	20-21	Pump
24	Depend from software installed 24-25	EPS-AC/EPS-AC0/EPSACW
Not available	Not available	Can Tiller/VCM
Not available	Not available	Mhyrio Flash
Not available	Not available	Smart Antenna
64	Not available	Smart/Eco-smart/Graphic smart display

NOTE: Sometimes it may be necessary to force the node manually to connect to the Zapi control unit to which you want to connect, follow the table above.

Selecting the desired node and the sub-node, click OK and START button in the main window:



Try establish the connection between PC and the ZAPI controller. The status LED in the lower part of the will change when connection will be successful:

CONNECTION STATUS:  CONNECTED

the right central part of the window 4 green LEDs will light and on the main window will appear the information concerning the software version, the node number, the nominal battery voltage and current, the hour counter, and if present the last detected alarm.

If everything is ok, you will be connected with inverter that will show you window like below, with the main information of inverter:

CONNECT TO: SOFTWARE VERSION INSTALLED ON INVERTER

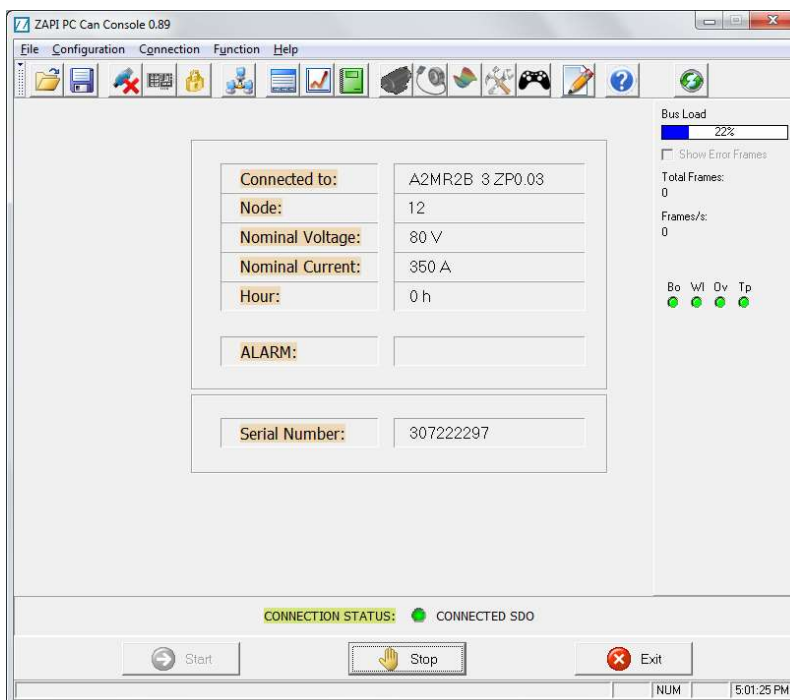
NODE: NODE WHERE YOU ARE CONNECTED

NOMINAL VOLTAGE: NOMINAL VOLTAGE OF BATTERY (SETTED BY PARAMETER)

NOMINAL CURRENT: NOMINAL CURRENT OF INVERTER (SETTED BY PARAMETER)

HOUR: WORKING HOUR COUNTER OF INVERTER

ALARM: IT WILL SHOW ALARM, CHECK USER MANUAL OF INVERTER FOR MEANING OF ALARM SHOW.



13.1.2 Headline

The encoder resolution, the motor pole pairs and other pieces of information are specified by means of an head line like the following.

A2MT2B 3 ZP0.56

Where:

A2: ACE2 NEW GENERATION (B2: BLE2 NEW GENERATION).

M: Master microcontroller (S: Supervisor microcontroller).

T: Traction controller (P: pump controller).

2: Motor poles pair number.


B: 64 pulses/rev encoder.

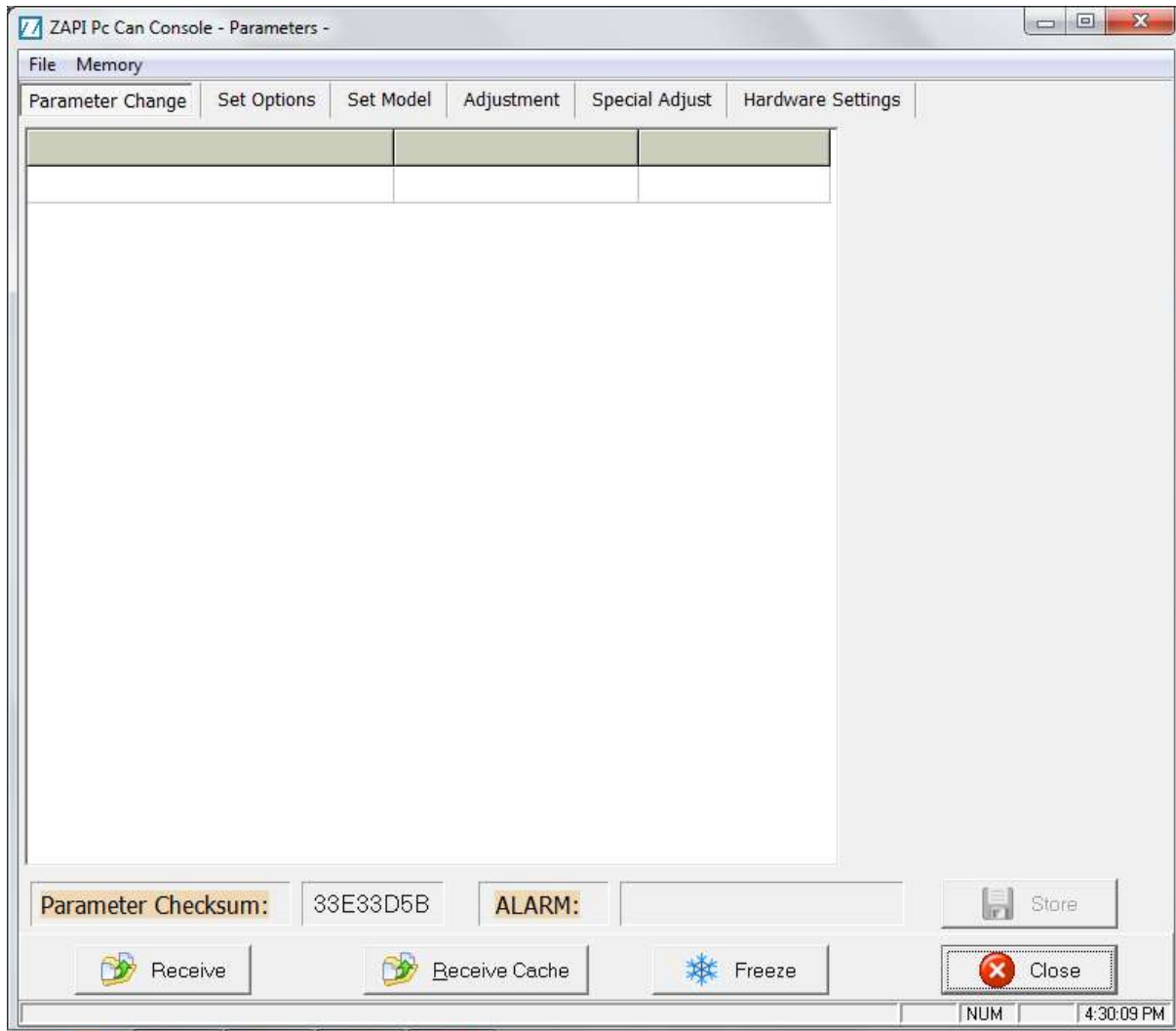
3: Zapi FOC motor control generation.


ZP0.56: Firmware version.

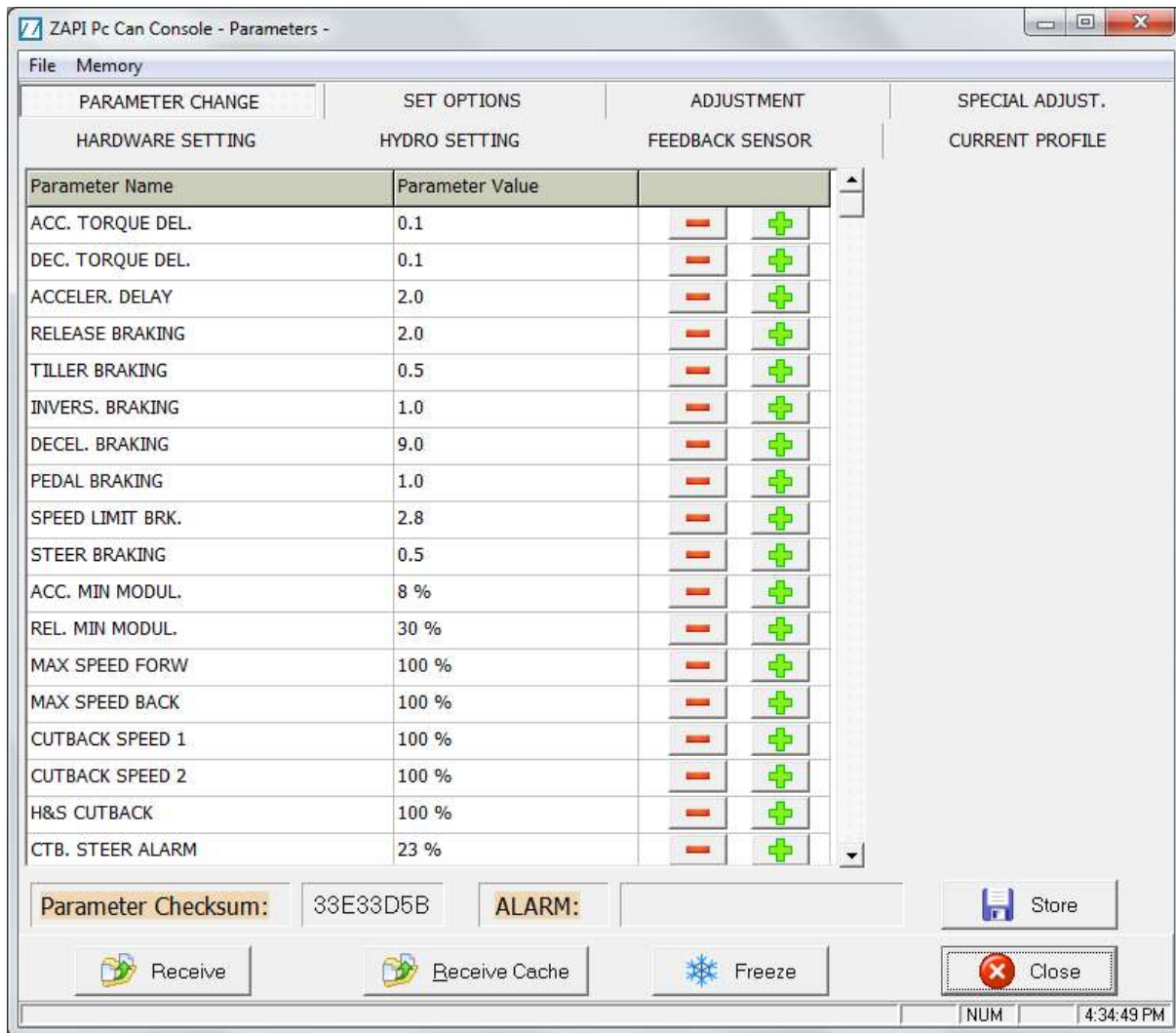
The encoder resolution is encoded in the last letter of the first batch as:



Code:	A	B	C	D	E	G	H
Pulses/rev:	32	64	80	128	177	256	512
Code:	I	K	L	P		X	
Pulses/rev:	1024	48	96	107		124, 143, 500, 1000	


 FUNCTION – PARAMETER by RECEIVE button will be loaded all the configuration present on the inverter and, if Password is inserted correctly, it will be allowed to change all the parameters:



Then click on Receive  Receive for acquire parameter inside inverter subdivided for different menu PARAMETER CHANGE, SET OPTION, SET MODEL, ADJUSTMENT, SPECIAL ADJUSTMENT, HARDWARE SETTING, HYDRO SETTING, (FEEDBACK SENSOR, CURRENT PROFILE for new software generation FOC3):




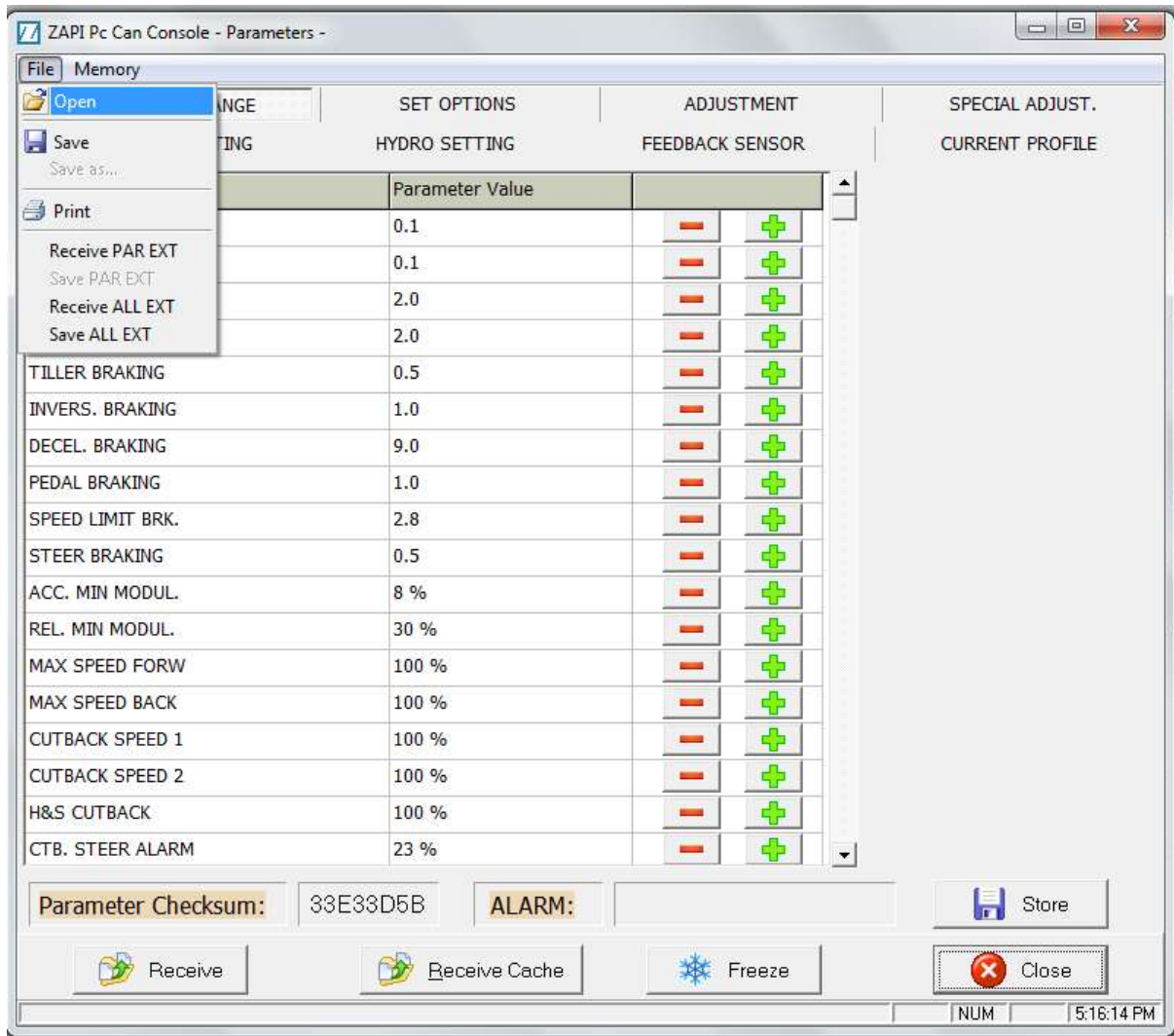
Parameters can be modified in the different sub-menu: PARAMETER CHANGE, SET OPTIONS, ADJUSTMENT, SPECIAL ADJUSTMENT e HARDWARE SETTING, decreasing and increasing their values with the appropriate button  and  or selecting the appropriate function on the Drop-Down Box or acquiring analog parameter.

Note: Special Buttons  and  for Zapi or expert technician.

After changing parameters, click on , it will save on EEPROM the changes made.

Check on user manual of inverter meaning and function of several parameter before to change it

FILE - OPEN  Open menu permit to load in the controller a parameters list from a file (.csv) previously saved



It will open csv file selected like window below and decide if transfer parameter of file to your inverter, or verify parameter on your inverter.

PCCanConsole - File Cvs -

[Info]									
Chopper_									
Chopper_									
Chopper_									
User_Cor									
Program_									
Save_Dat									
[Code]	Name	Position	Menu	Value	Scaled Value	CodeOpenCan	Node	NotSaved	NameMenu
243	BLK. TRAC. THRES	0	0	10	10	0	2	0	Parameter Change
0	ACCELER. DELAY	1	0	13	1,3	0	2	0	Parameter Change
11	RELEASE BRAKING	2	0	20	2,0	0	2	0	Parameter Change
220	DEADMAN BRAKING	3	0	10	1,0	0	2	0	Parameter Change
12	INVERS. BRAKING	4	0	25	2,5	0	2	0	Parameter Change
237	DECEL. BRAKING	5	0	90	9,0	0	2	0	Parameter Change
13	PEDAL BRAKING	6	0	25	2,5	0	2	0	Parameter Change
16	SPEED LIMIT BRK.	7	0	28	2,8	0	2	0	Parameter Change
241	WG BRAKING	8	0	28	2,8	0	2	0	Parameter Change
242	WG BRAK END PATH	9	0	20	2,0	0	2	0	Parameter Change
15	CURVE BRAKING	10	0	5	0,5	0	2	0	Parameter Change
30	MAX SPEED FORW	11	0	75	75 Hz	0	2	0	Parameter Change
31	MAX SPEED BACK	12	0	75	75 Hz	0	2	0	Parameter Change
52	AUX SPEED #1	13	0	2	2 Hz	0	2	0	Parameter Change
29	CURVE CUTBACK	14	0	40	40 Hz	0	2	0	Parameter Change
21	CUTBACK SPEED 1	15	0	54	54 Hz	0	2	0	Parameter Change
139	AUX FUNCTION 1	16	0	10	10 Hz	0	2	0	Parameter Change
22	CUTBACK SPEED 2	17	0	27	27 Hz	0	2	0	Parameter Change

Verify TxFile Close

VERIFY shows the difference between the actual parameter and the parameter loaded from a previously saved configuration file *.csv.

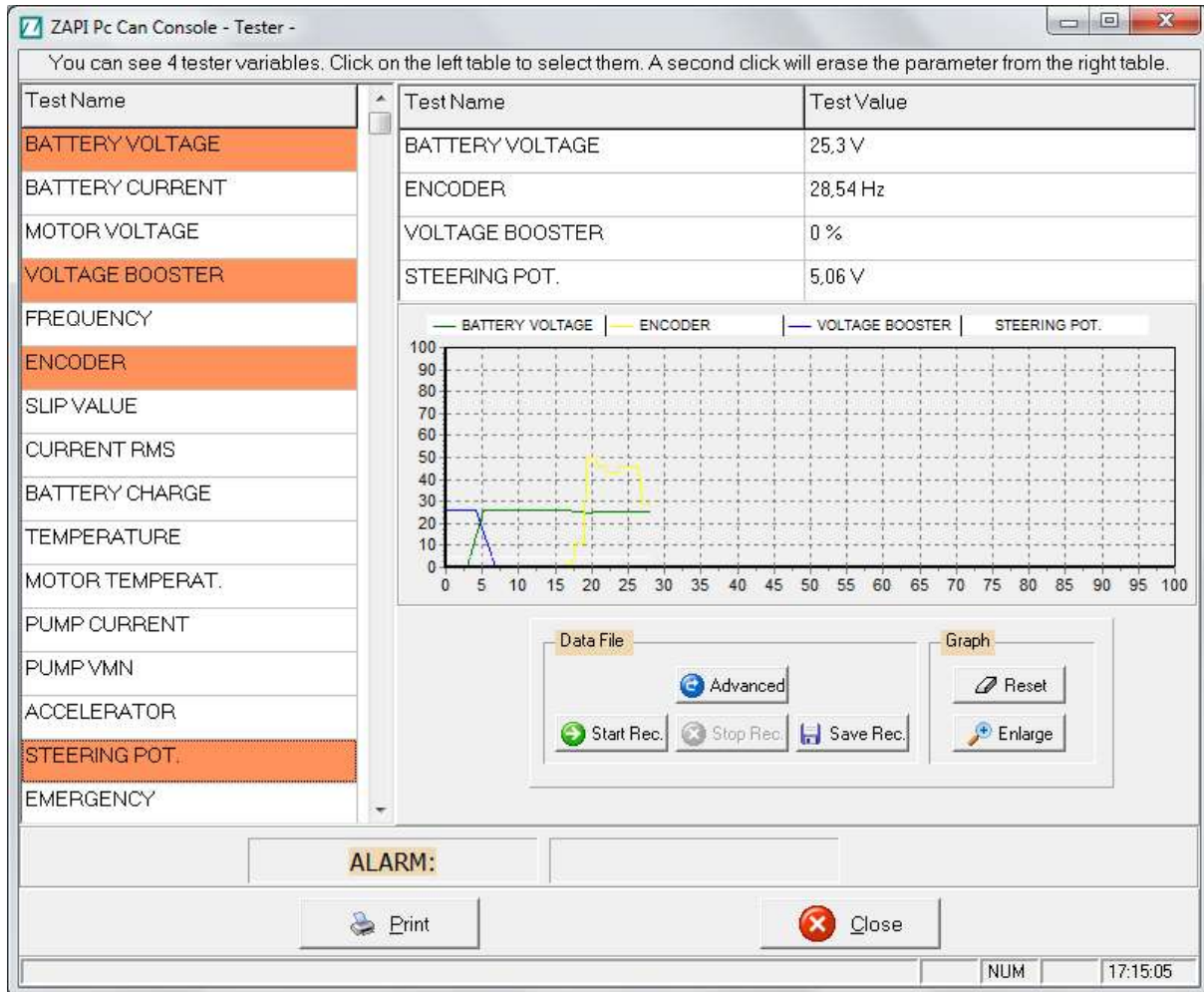
TxFile permit to load the configuration file *.csv previously saved on the controller


FILE - **CLOSE** permit to come back in the main menu

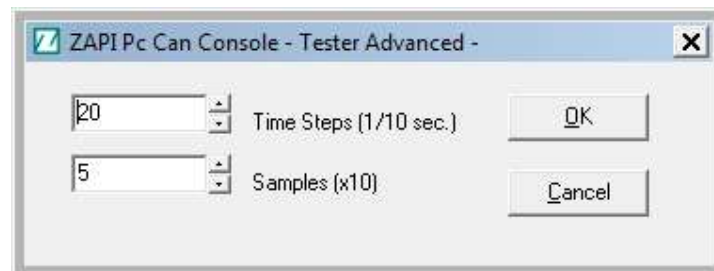


FUNCTION - TESTER show on real time the analog/digital input and output stages (Active/Off).

It's possible to check up to 4 measured variables at the same time. Selecting the desired variables on TEST VALUE it will be possible to check it on real time and the graphic chart will display their value.



ADVANCED - DATA FILE  set the sampling time and the samples acquired on each period and record the acquisition of the selected variables on a file.




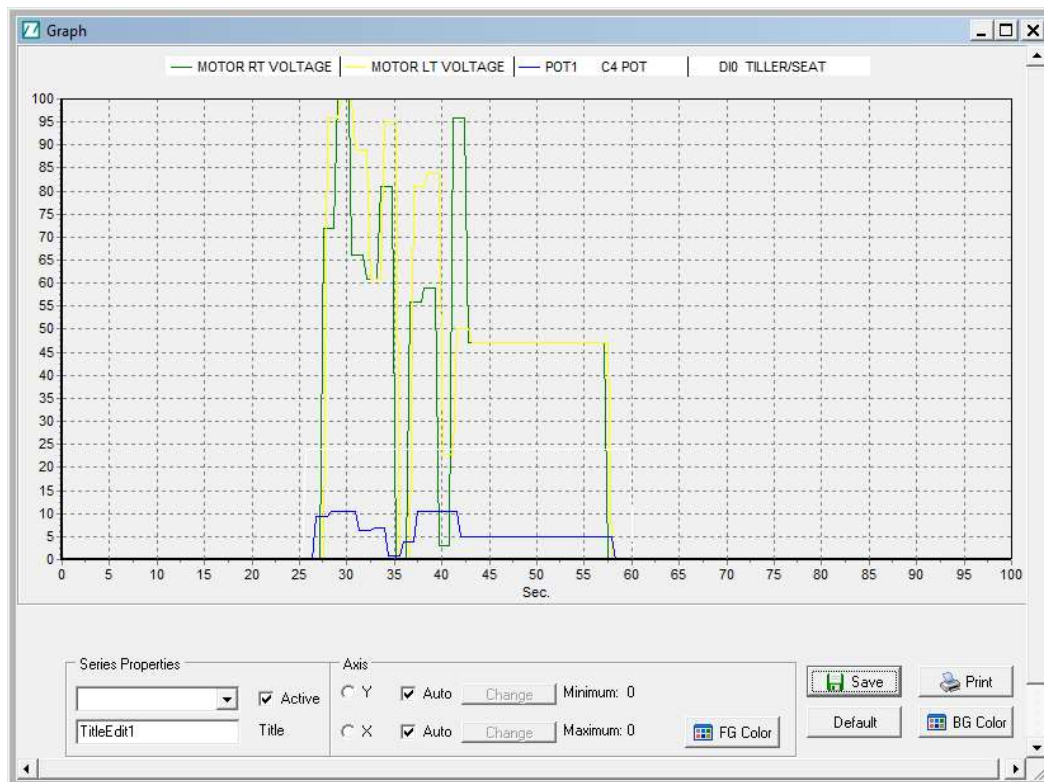
ZAPI Pc Can Console - Tester Advanced

Time Steps (1/10 sec.): 20

Samples (x10): 5

OK Cancel

GRAPH - ENLARGE  zoom the view of the selected parameter and save it on Bitmap file





FUNCTION – ALARM LOGBOOK show all the alarms present or that has been occurred during operation of the controller. The alarms are listed with the number of occurrences, the inverter temperature and the time at which the event occurs.

ZAPI Pc Can Console - ALARM LOGBOOK -

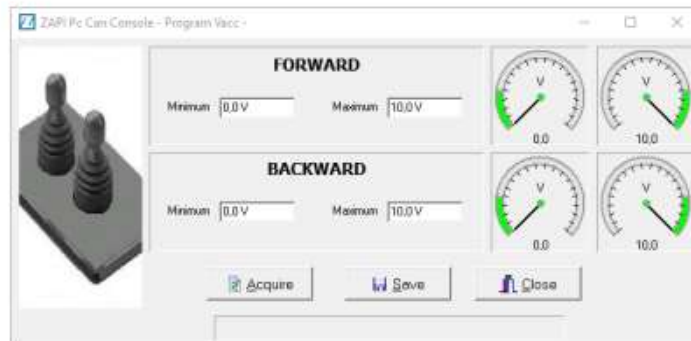
CURRENT ALARM: NO CAN MSG. 02

Alarm Name	Repetitions	Temperature	Hour
WRONG SET BAT05	2	22 °C	0 h


Update Clear Close Print


13.1.5 Program VACC


Click "Function" → "Program Vacc" or press CTRL+V to open the accelerator acquisition window.



ZAPI PC CAN Console: Program VACC function.

Click on  Acquire button to start the acquisition procedure. By pressing the accelerator (combined with the direction switch) the referred voltage box follows the accelerator voltage. Depress the accelerator over its full range for both the directions (forward/backward).

Click on  Save button to save the values acquired.

Click on  Close button to close the accelerator acquisition window.

13.1.6 Lift & Lower acquisition

Once you have connected to the inverter, you need to download the parameters; choose "Function" → "Parameters" menu (or press the "Parameter" icon).

Select the "ADJUSTMENT" menu.

Select the value you want to acquire by pressing the "acquiring" button and the acquisition will start:



ZAPI PC CAN Console: acquisition of analog signals

- Activate the Enable switch, if any.
- Activate the control switch (either lift or lower).
- Move the control sensor (lift/lower potentiometer) to the correct position according to what you are acquiring.
- Click "Stop Teach" button.

The procedure is the same for both lift and lower potentiometers.

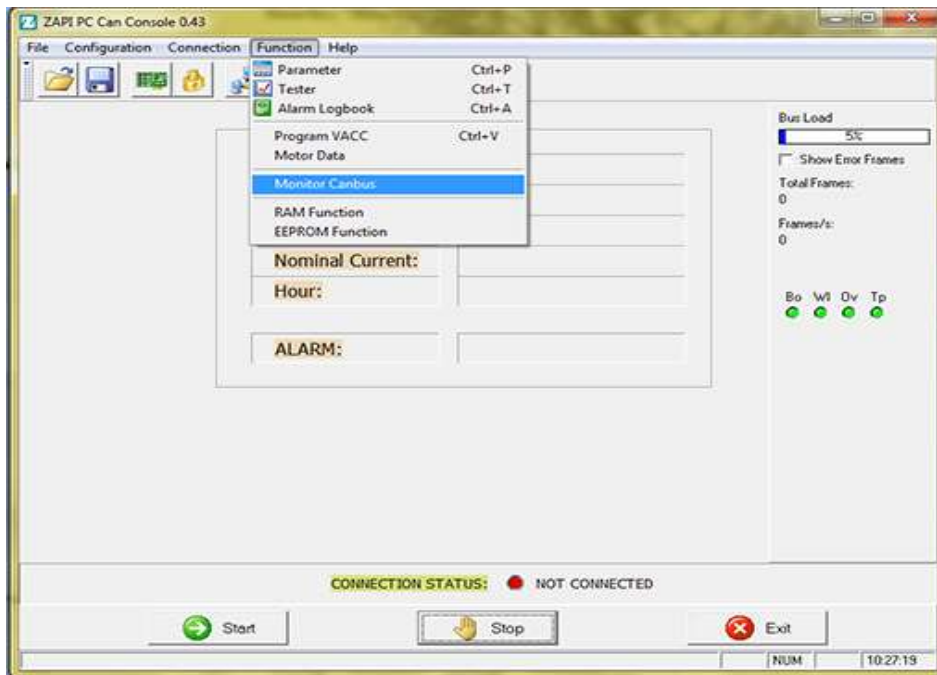
13.1.7 Steering acquisition

Once you have connected, you need to receive the inverter parameter; choose "Function" → "Parameter" menu (or press the "Parameter" icon).

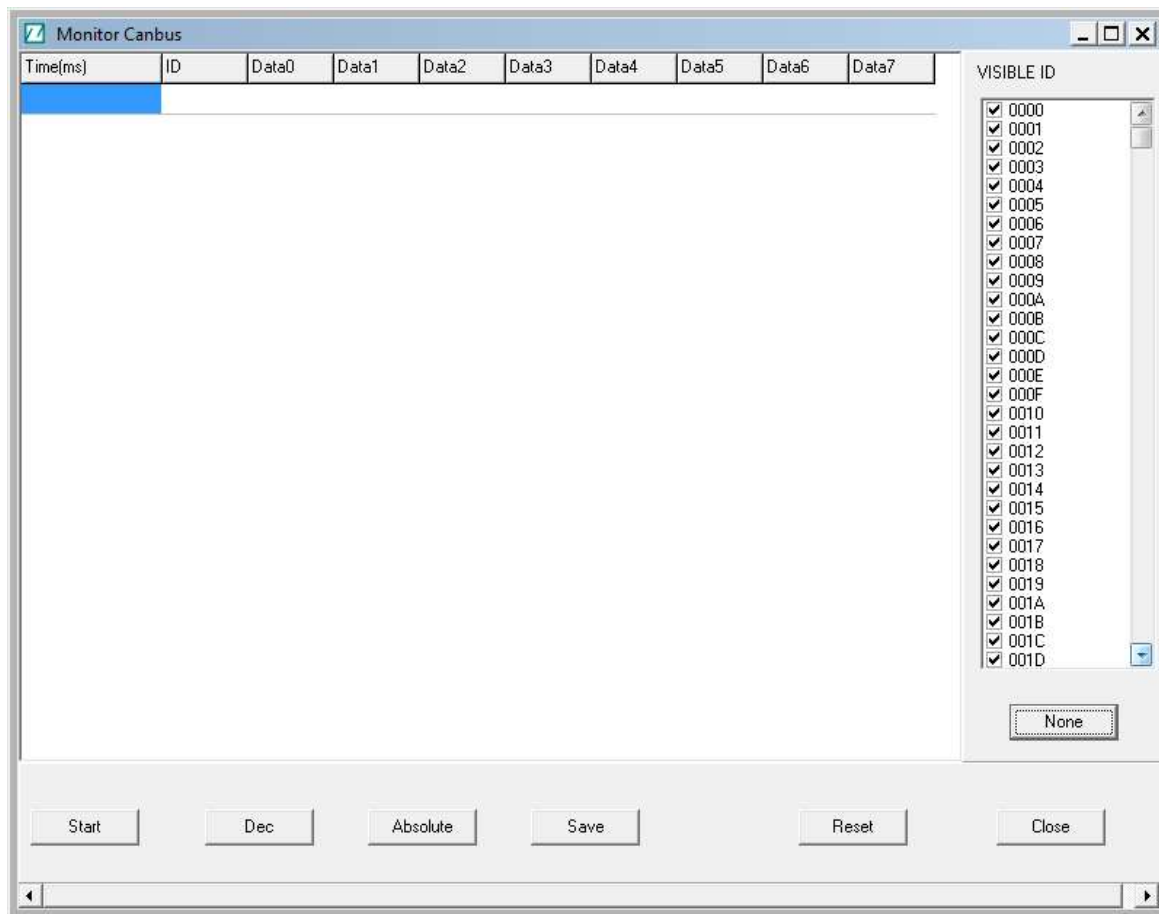
Select the "ADJUSTMENT" menu.

Select the value to acquire by pressing "acquiring" button, the acquisition will start: the procedure is the same described for Lift & Lower acquisition in the previous paragraph.

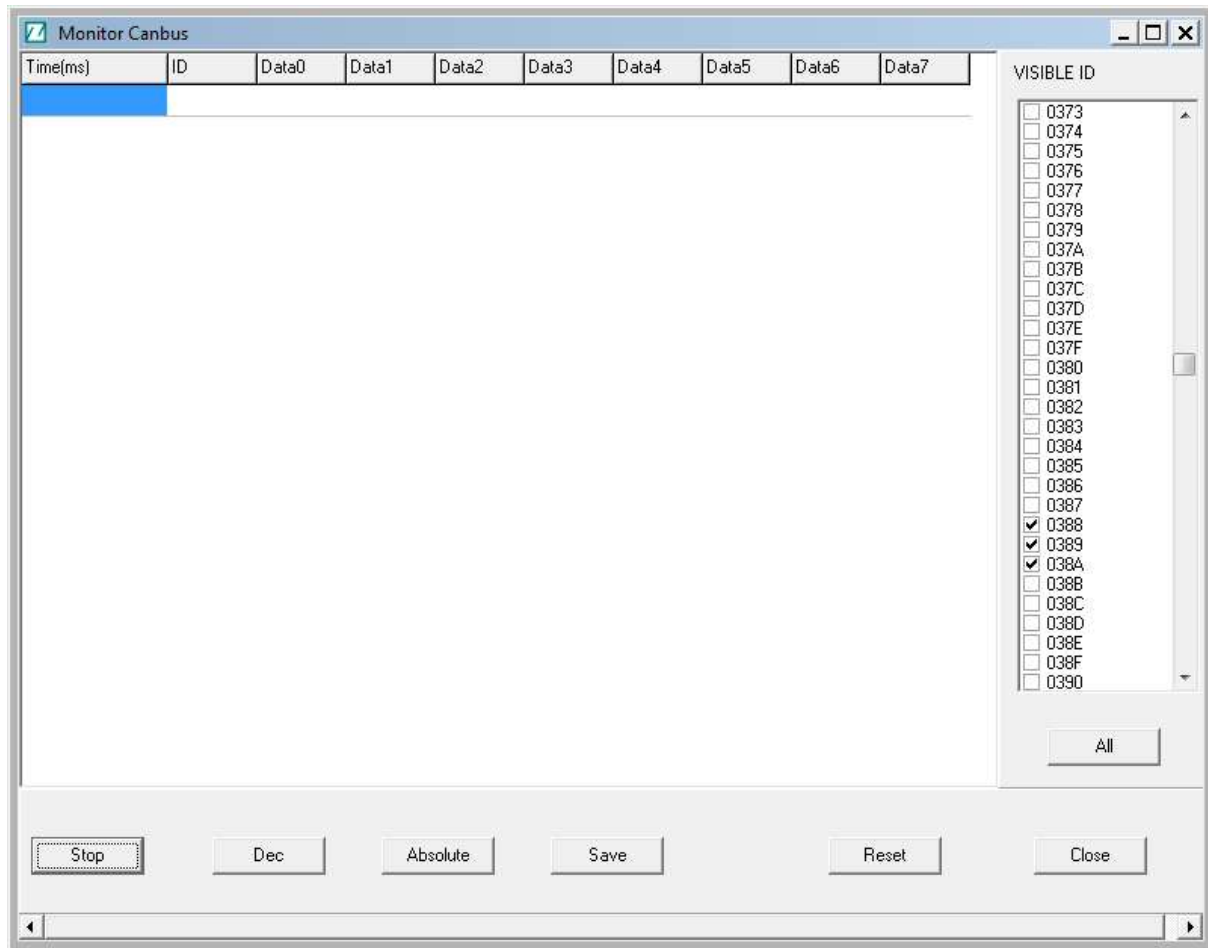
MONITOR CANBUS acquire the CAN message that flow on the net and allow to save the data on a file to be analyzed



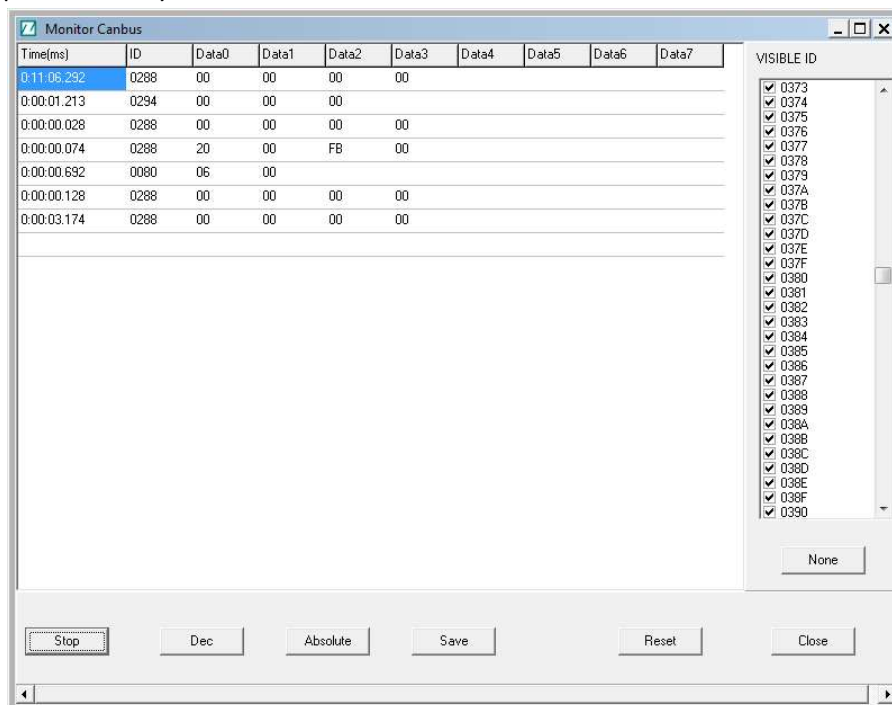
All the ID message are automatically selected



Filtering the ID address necessary for test it's possible to focusing only on some ID message



START will begin to acquire the data from the CAN net. **STOP** and **SAVE** will store the data on a *.txt file, processable by excel or other tools



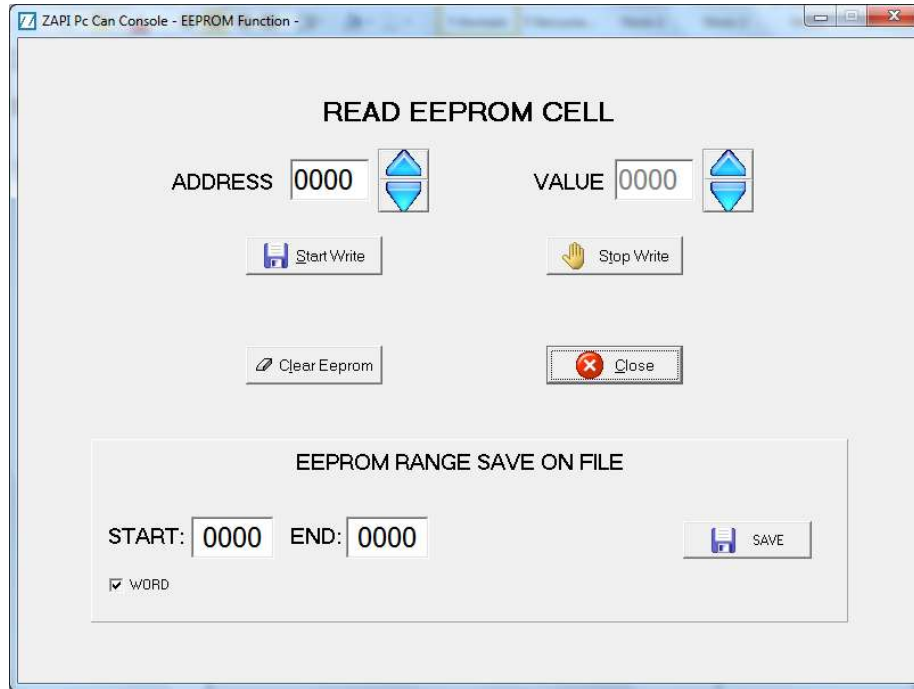
EEPROM FUNCTION permit to read and write in the EEPROM memory.

Selecting the desired EEPROM CELL ADDRESS it is reported the related VALUE

START WRITE button permit to insert the desired value on EEPROM cell and test a different behavior of the controller. Recycling the Key any modify will be stored inside the EEPROM.

STOP WRITE save the modified value of the CELL ADDRESS

CLEAR EEPROM erase all the entire memory of the controller and set the DEFAULT parameter of the SW

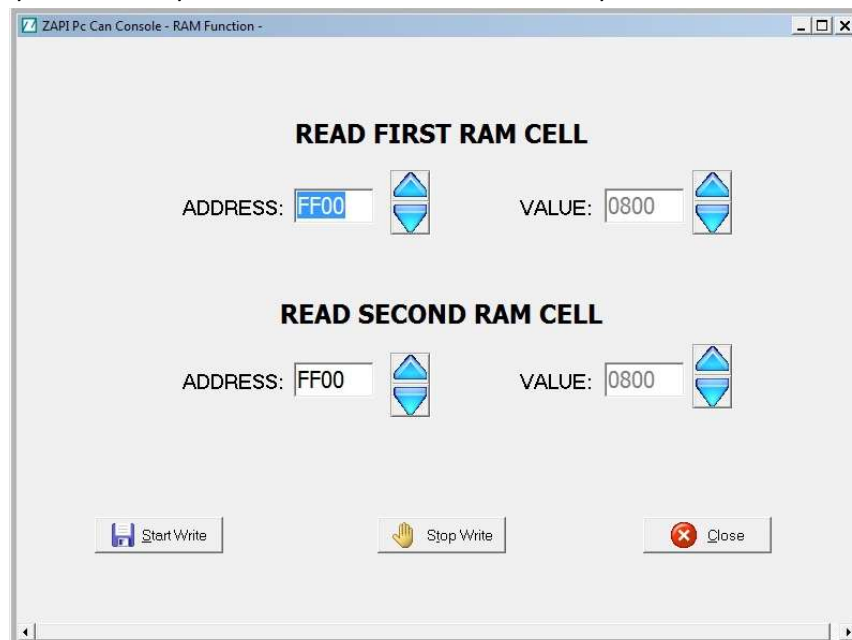


RAM FUNCTION permit to read and write the RAM into two memory cell ADDRESS

START WRITE allow to modify, on the selected ADDRESS, the desired value on RAM cell.

STOP WRITE permit to store temporary the value on RAM ADDRESS and test the different behavior.

Recycling the Key all the modify will be reset to the EEPROM Memory value.

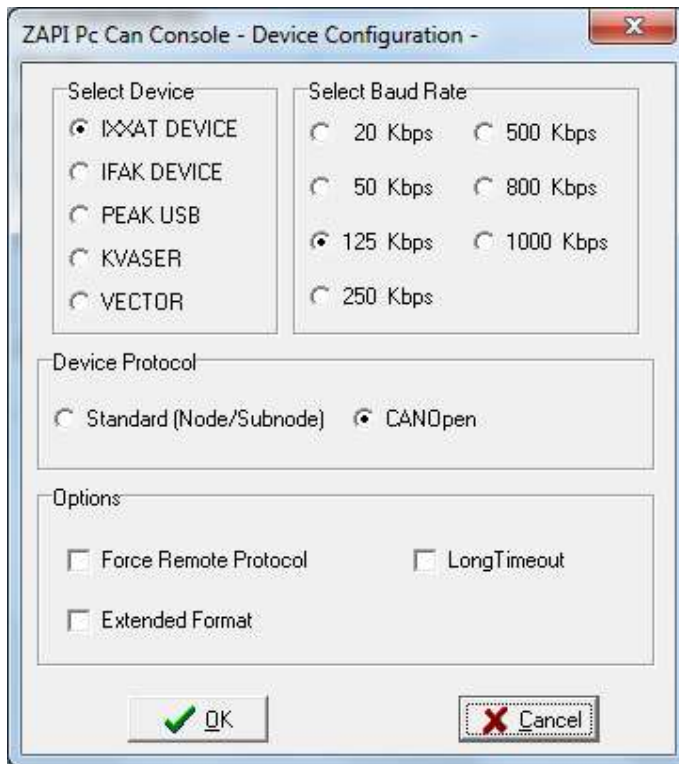


How to Download software by ZpCanconsole:

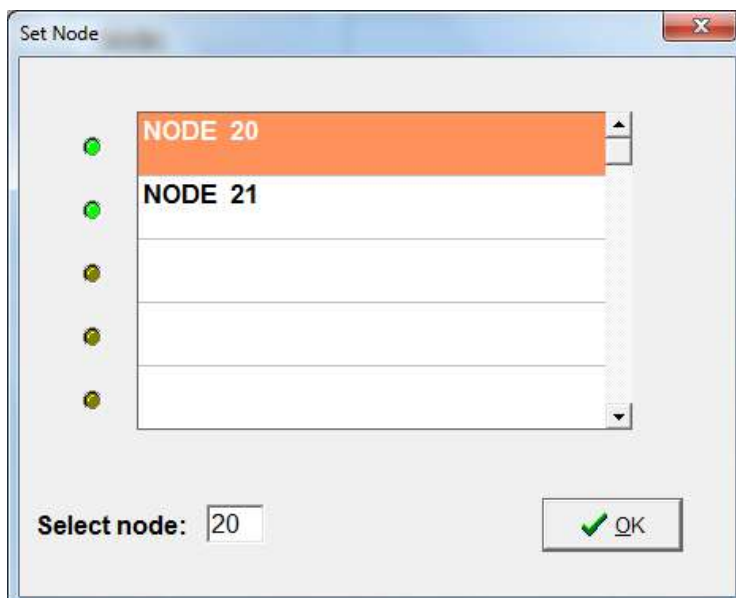
With new version of ZpCanConsole is possible to download directly software inside inverter using software file with extension *.z86.

IMPORTANT: Download software with ZpCanConsole is possible only with inverter of new generation with 2uC and only if we connect with inverter using CANOPEN PROTOCOL.

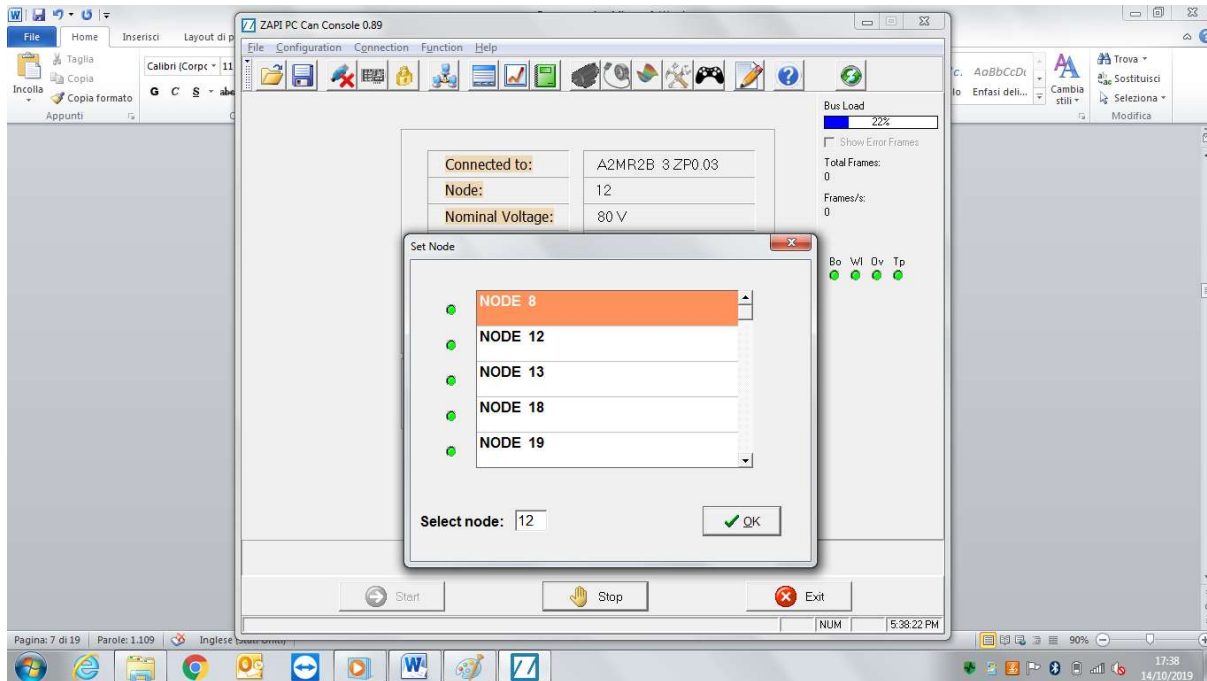
1.CONNECT USING REMOTE PROTOCOL:




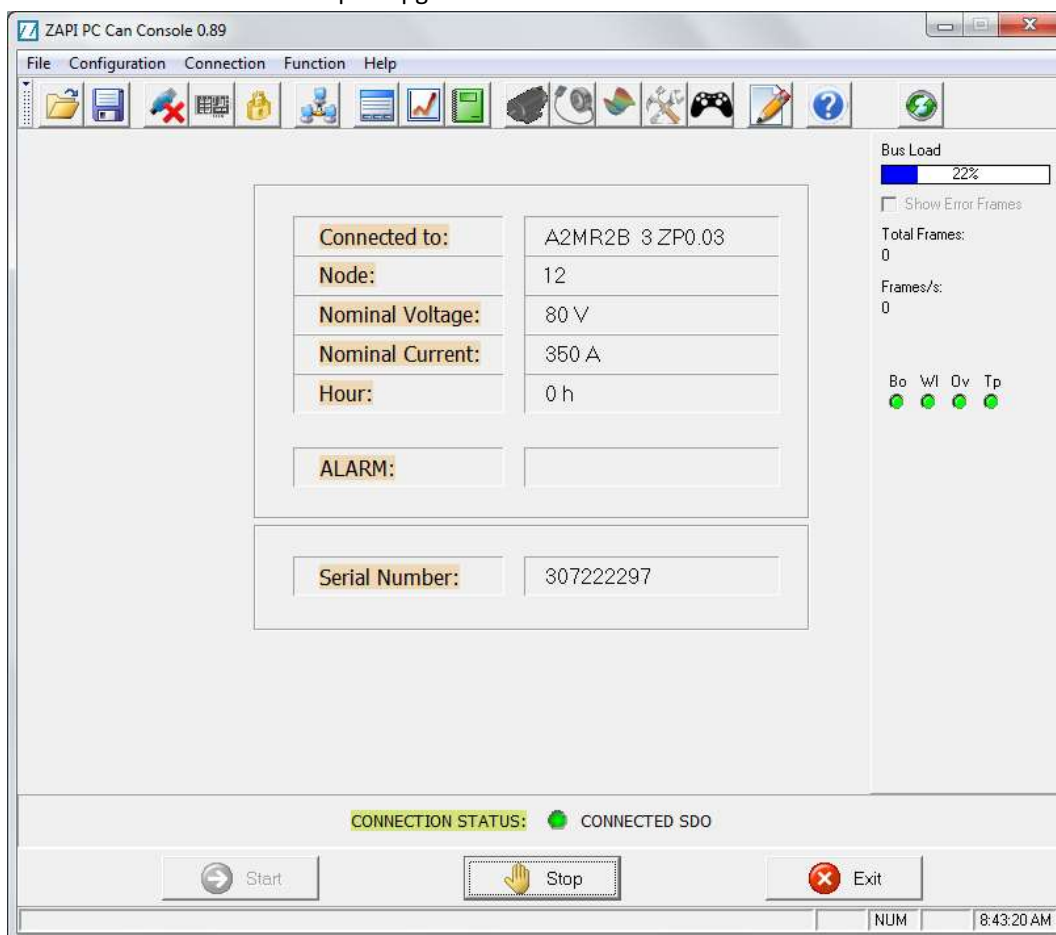
2.Select Node to connect with inverter 2uC that could be in stand alone mode:



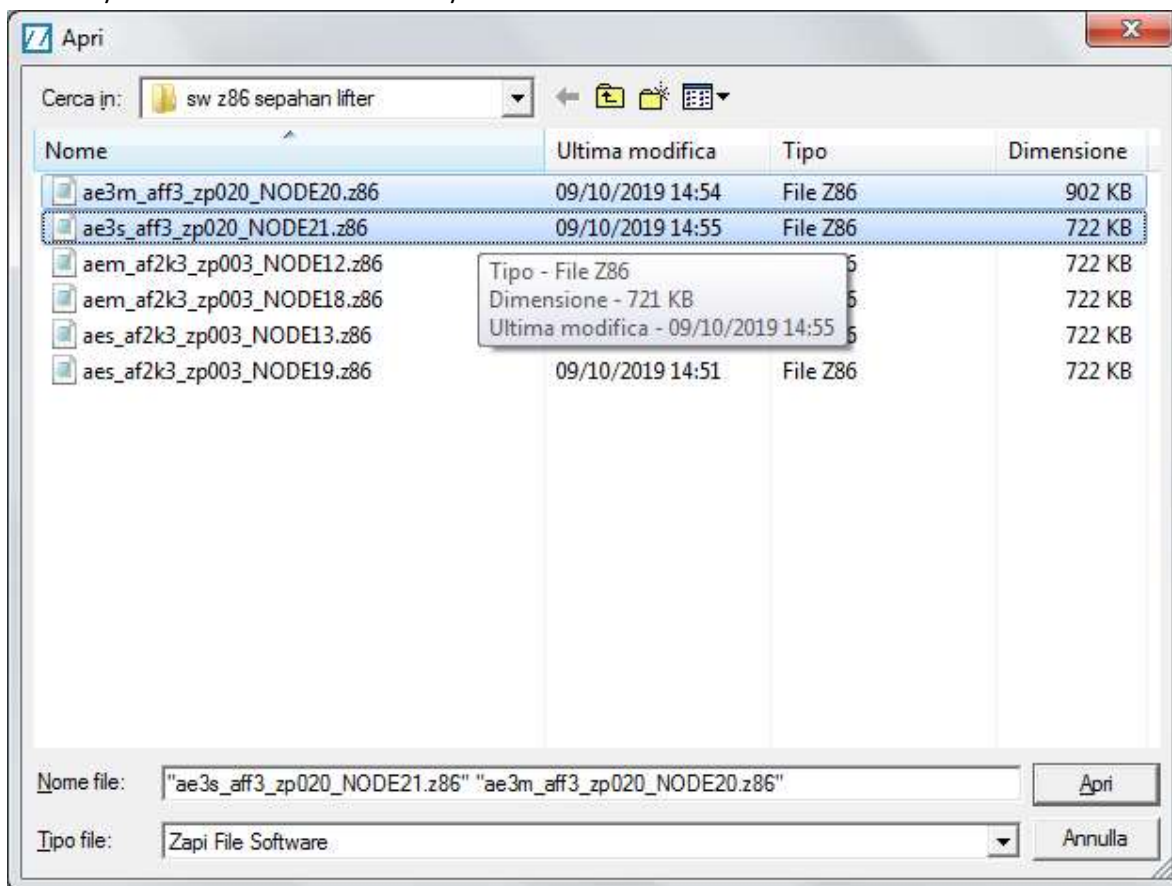
Or in a complex can-bus line with more than one inverter:



3. Click on the icon  to open upgrade software function:

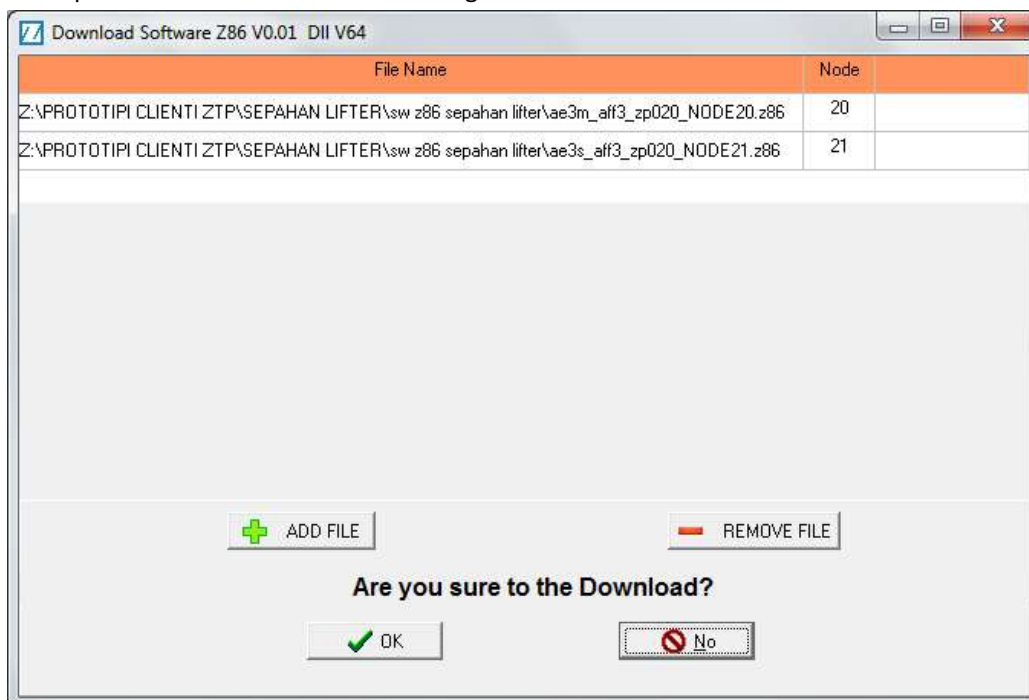


4. Select your software to download on your inverter with extension z.86:

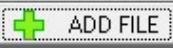



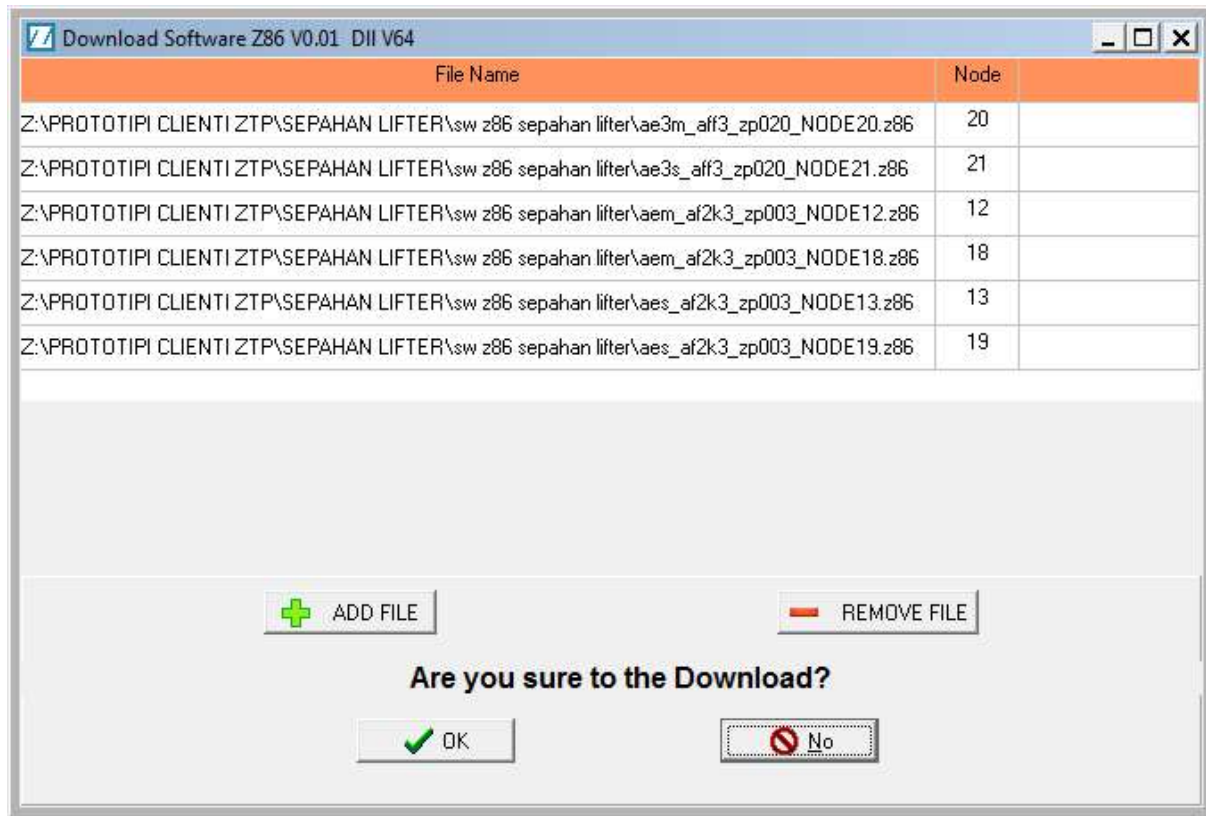
NOTE: If we have inverter 2uC, you must select firmware for uP master (EX:ae3m_aff3_zp020_NODE20.z86) and firmware for uP slave (EX:ae3s_aff3_zp020_NODE21.z86).

5. It is possible download software for single inverter 2uC or more than one inverter:

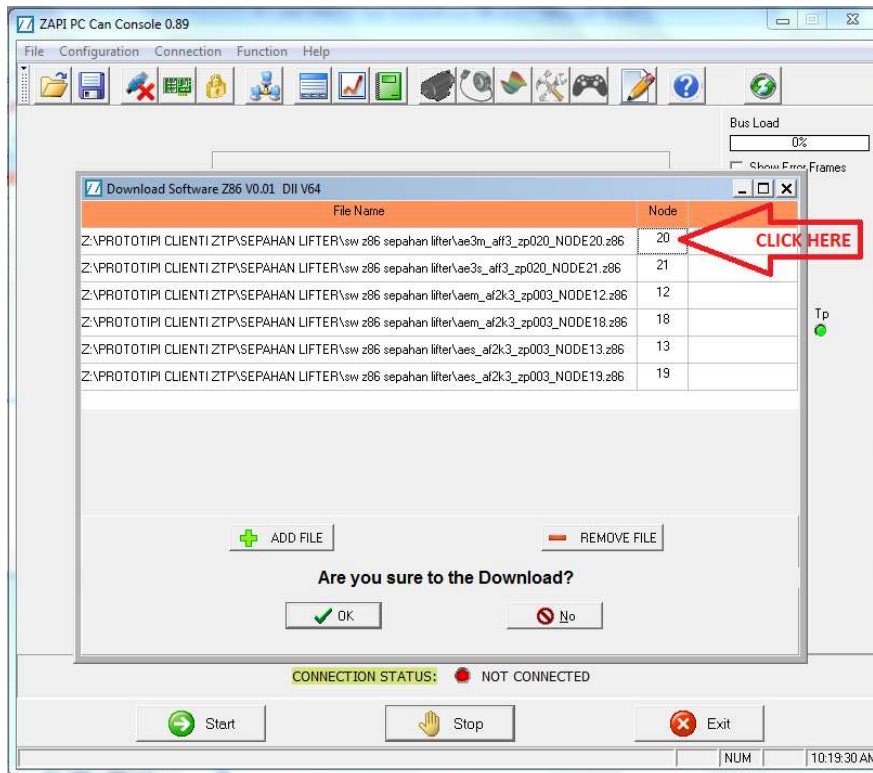


NOTE: If you have more than one inverter in a complex can bus line (more than one inverter), is possible

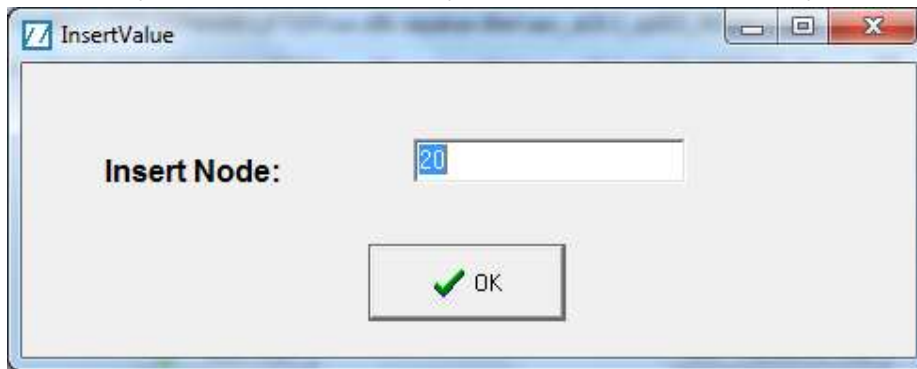
add file with button  or remove file with button .



IMPORTANT: It will be possible after software file *.z86 selection, change directly NODE of inverter to flash:



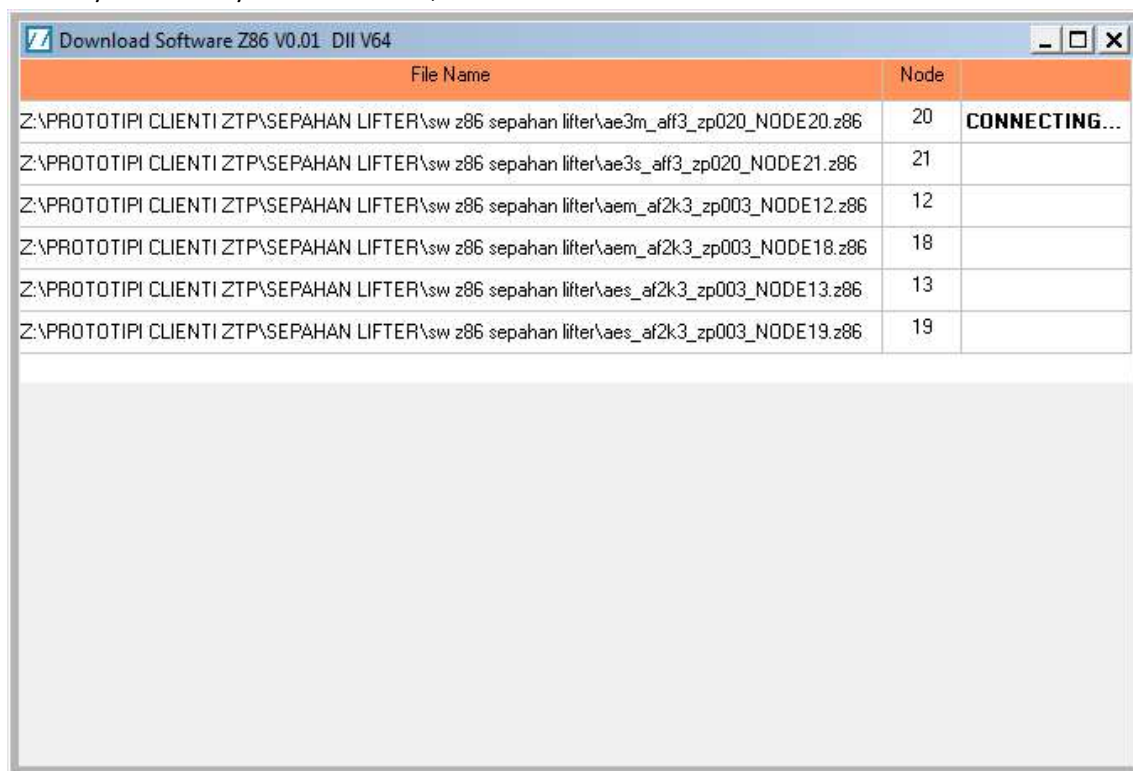
Click directly on NODE window, it will open window where write directly NODE that you want flashing:



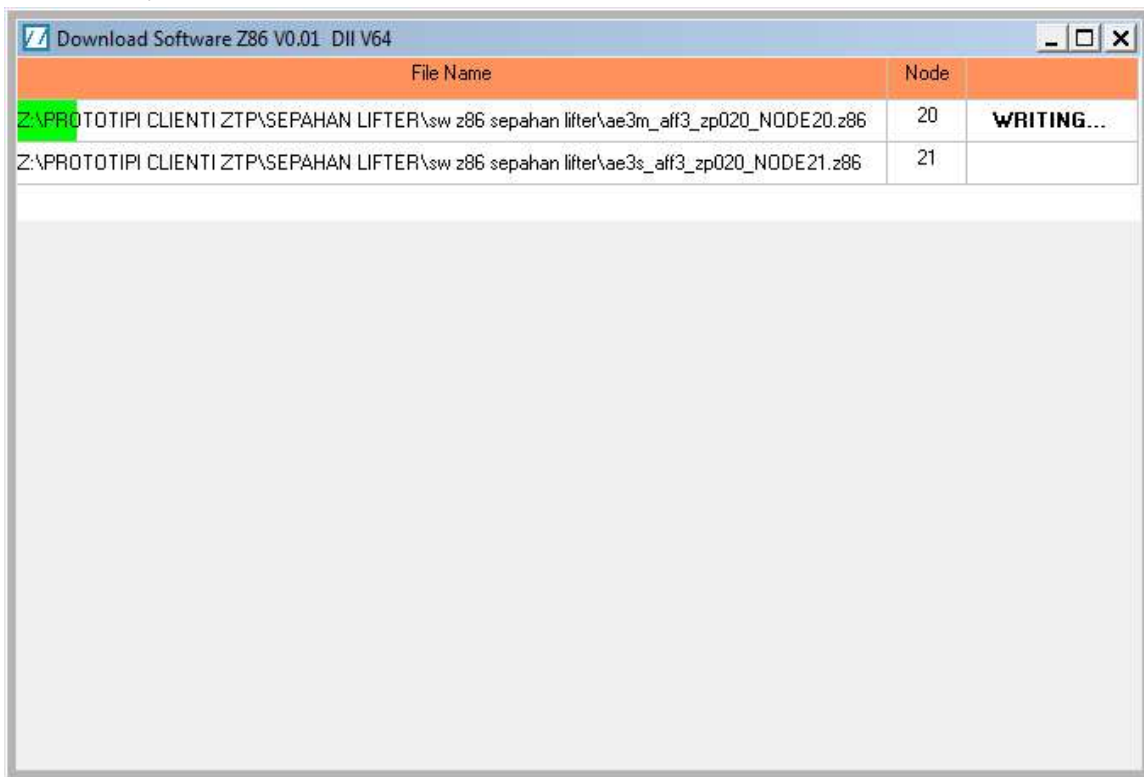
IMPORTANT NOTE: If in parameter of menu special adjustment there is 2ND SDO ID OFST set different to 0, node to select for flash inverter will be NODE ID+ is 2ND SDO ID OFST.

**EXAMPLE → NODE ID=16 and 2ND SDO ID OFST=12,
node ID to insert for flash inverter will be 16+12=28**

6. Now you are ready to flash inverter, click on  and it start to "CONNECTING..":



7. After connecting, if all will be ok, inverter will open Main Contactor and it starting to "WRITING..." software on your inverter:



File Name	Node	
Z:\PROTOTIPI CLIENTI ZTP\SEPAHAN LIFTER\sw z86 sepahan lifter\ae3m_aff3_zp020_NODE20.z86	20	WRITING...
Z:\PROTOTIPI CLIENTI ZTP\SEPAHAN LIFTER\sw z86 sepahan lifter\ae3s_aff3_zp020_NODE21.z86	21	

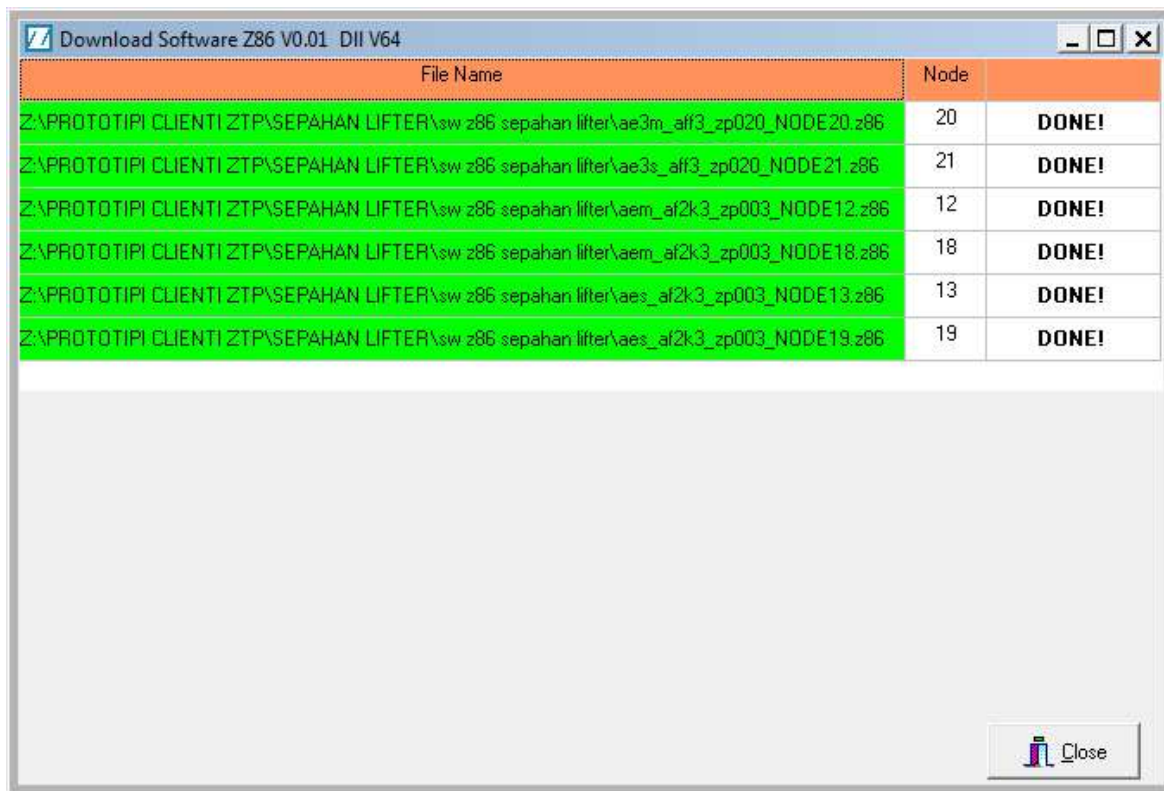
8. When will be complete operation of "WRITING..." it will showing "DONE!" and starting to flashing the other node that you had select before:


Download Software Z86 V0.01 DII V64		
File Name	Node	
Z:\PROTOTIPI CLIENTI ZTP\SEPAHAN LIFTER\sw z86 sepahan lifter\ae3m_af3_zp020_NODE20.z86	20	DONE!
Z:\PROTOTIPI CLIENTI ZTP\SEPAHAN LIFTER\sw z86 sepahan lifter\ae3s_af3_zp020_NODE21.z86	21	WRITING...

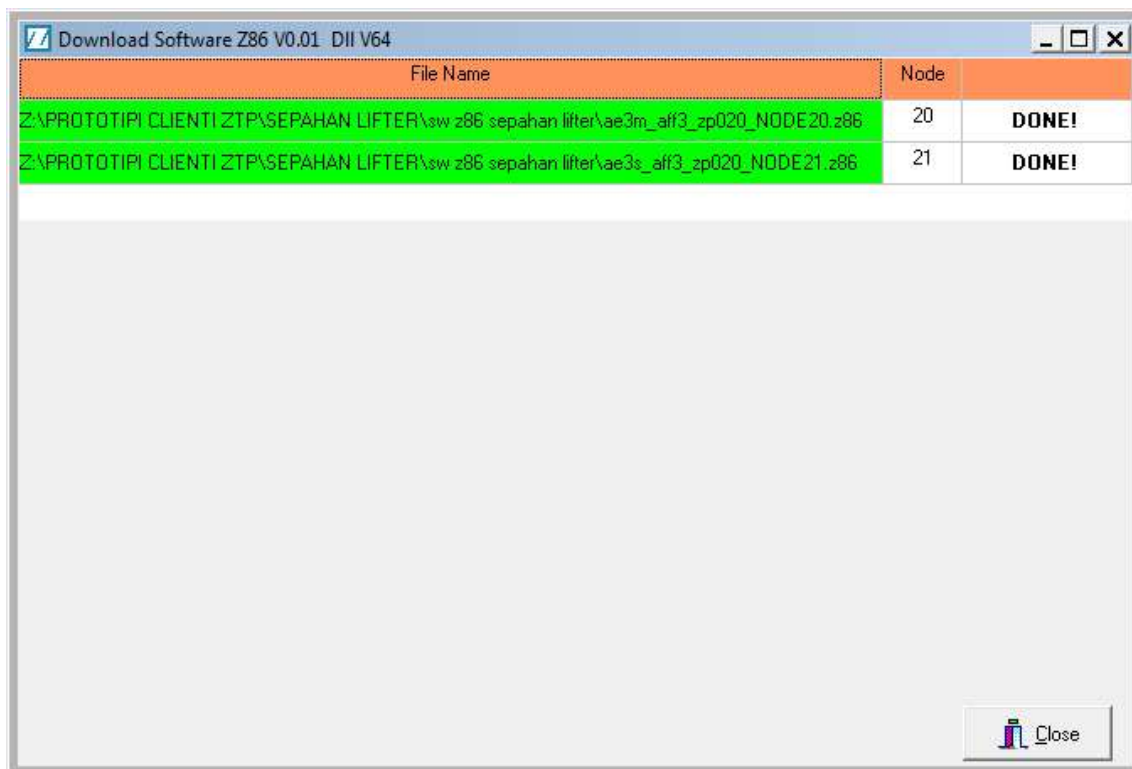
NOTE: If you have a complex can-bus line with more than one inverter, it will writing and flashing software in all node present and selected:

Download Software Z86 V0.01 DII V64		
File Name	Node	
Z:\PROTOTIPI CLIENTI ZTP\SEPAHAN LIFTER\sw z86 sepahan lifter\ae3m_af3_zp020_NODE20.z86	20	DONE!
Z:\PROTOTIPI CLIENTI ZTP\SEPAHAN LIFTER\sw z86 sepahan lifter\ae3s_af3_zp020_NODE21.z86	21	DONE!
Z:\PROTOTIPI CLIENTI ZTP\SEPAHAN LIFTER\sw z86 sepahan lifter\ae3m_af2k3_zp003_NODE12.z86	12	DONE!
Z:\PROTOTIPI CLIENTI ZTP\SEPAHAN LIFTER\sw z86 sepahan lifter\ae3m_af2k3_zp003_NODE18.z86	18	DONE!
Z:\PROTOTIPI CLIENTI ZTP\SEPAHAN LIFTER\sw z86 sepahan lifter\ae3s_af2k3_zp003_NODE13.z86	13	WRITING...
Z:\PROTOTIPI CLIENTI ZTP\SEPAHAN LIFTER\sw z86 sepahan lifter\ae3s_af2k3_zp003_NODE19.z86	19	

If all operation of downloading software, complete with success it will show you "DONE" for all node:

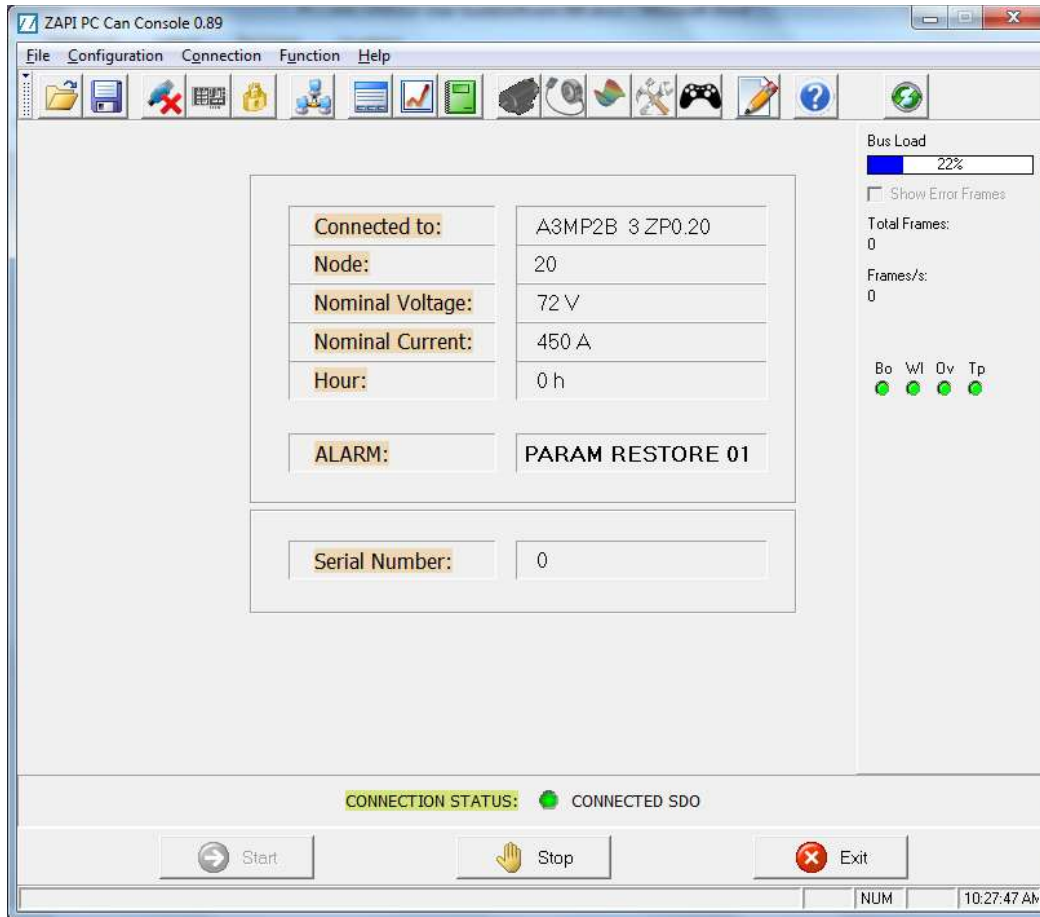


10. When "WRITING..." operation finish, Click on Close  and Key-off inverter.



NOTE: When you upgrade software, at the end of "WRITING..." it will do automatically an erase of memory (CLEAR EEPROM) and when you Key-on machine you will have default parameter of inverter and will be necessary re-setting parameters of inverter.

11. At the first key-on after updating of software, you could have some alarm (because of default parameter), check user manual of inverter to set right parameter and remove alarm present:



EXAMPLE OF ALARM AND TROUBLESHOOTING AFTER FLASHING AND CLEAR EEPROM:

1PARAM RESTORE

Cause:

The controller has restored the default settings. If a CLEAR EEPROM has been made before the last key re-cycle, this warning informs you that EEPROM was correctly cleared.

Troubleshooting:

- A travel demand or a pump request does cancel the alarm.
- If the alarm appears at key-on without any CLEAR EEPROM performed, replace the controller.

WARNING SLAVE

Cause:

Warning on supervisor uC.

Troubleshooting:

Connect the Console to the supervisor uC and check which alarm is present.

WRONG ENC SET (MDI/LED code = 83)

Cause

Mismatch between parameters ENCODER PULSES 1 and ENCODER PULSES 2 (see paragraph 8.2.5).

Troubleshooting

Set the two parameters with the same value, according to the adopted encoder.

