ACP & D Limited

STEPPING MOTOR DRIVER
SERIES
STAR 2000
Mod.
APS x-B-Ex
ver. 09/01

RELEASE: 50FW1H
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For further questions please contact:

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1. GENERAL

The manual describes the version APS x-B-Ex of the series STAR 2000 with storeable programmes.

This drive can store 8 or 16 programmes and one start-up program (program “0”).

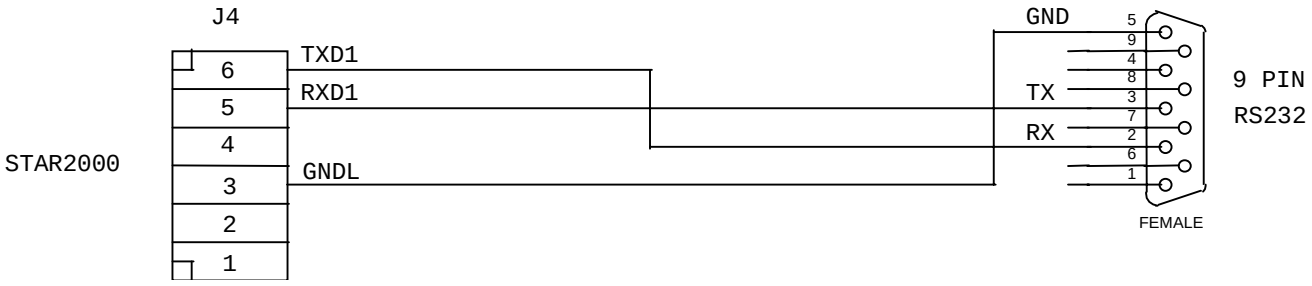
For more details please use also the manual **APS 1-5-0102-60fw2b-ivb** and the **Appendix**. For the starting apparatus we recommend all manuals.

1.1 REQUIREMENT

To start the driver via the PC (serial interface RS 232) you must use a serial cable (type: PCS 2) between PC and APS driver and you must install the terminal sofware **WinStarxx** (for systems under DOS you must use the DSTAR software).

1.1.1 RS 232 COMMUNICATION CABLE

Pin connections for connector J4 und RS 232 serieal interface on PC.



J4 – connector (item covered by the contract)
SUB-D connector, 9-pin, female

1.1.2 DIP-SWITCH SETTINGS

Before starting the driver the following DIP switch setting must be done:

DIP-SWITCH A		
DIP		
6		**OFF**
5		**OFF**
4		**OFF**
3		**OFF**
2		**OFF**
1	**ON**	**OFF**
	9600	19200

You can use a baud rate of 9600 or 19200 baud. We recommend to use 9600 baud.

DIP-SWITCH B		
DIP		
4		OFF
3	ON	
2	ON → 16 program	OFF → 8 program
1	ON	

Please note: The settings must be done before starting the driver.

1.2 BCD-INPUTS

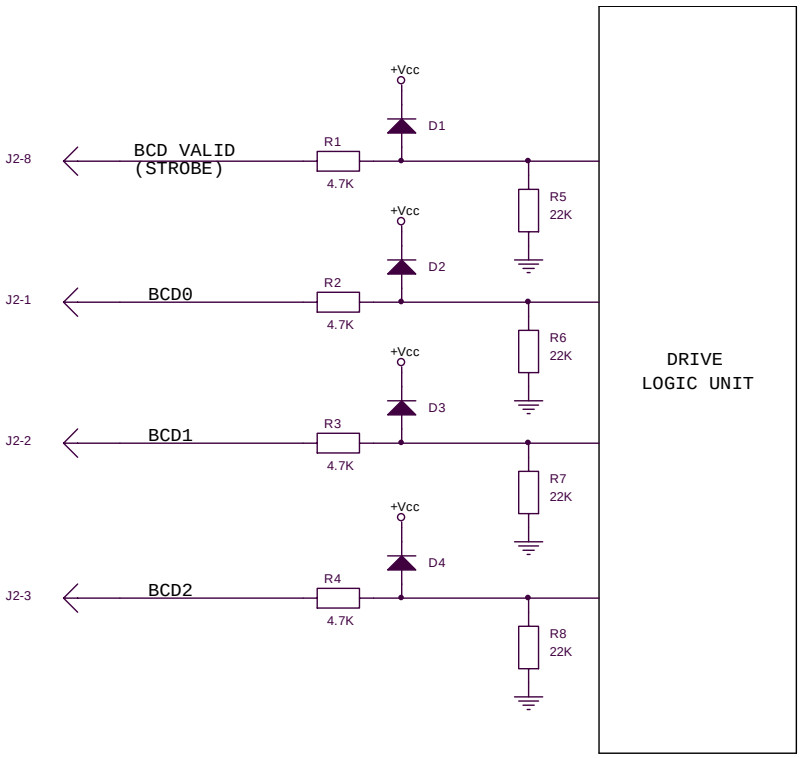
The 16 programmes can be chosen with 4 inputs and execute with the “BCD valid” input.

INPUTS		
BCD valid	J2 pin 8	non optoisolated
BCD 0	J2 pin 1	non optoisolated
BCD 1	J2 pin 2	non optoisolated
BCD 2	J2 pin 3	non optoisolated
BCD 4 (IN 1)	J2 pin 14	optoisolated possible
IN 2	J2 pin 15	optoisolated possible
IN 3	J2 pin 16	optoisolated possible
DISABLE	J2 pin 17	optoisolated possible

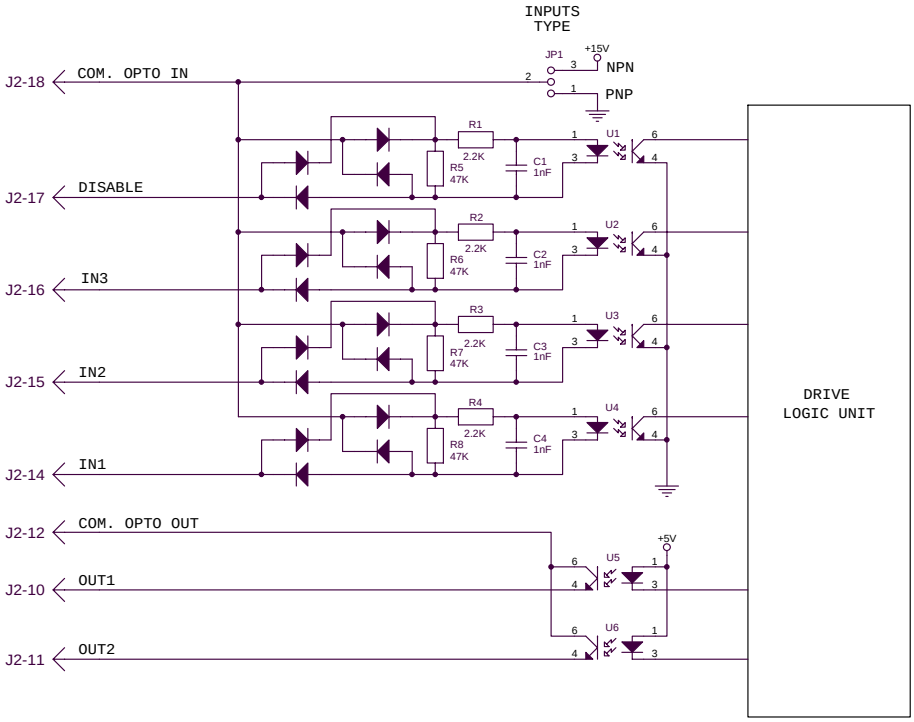
1.2 BCD - INPUTS

1.2.1 CIRCUIT DIAGRAM

Circuit diagram of the **non** optoisolated inputs



Circuit diagrAm of the optoisolated inputs



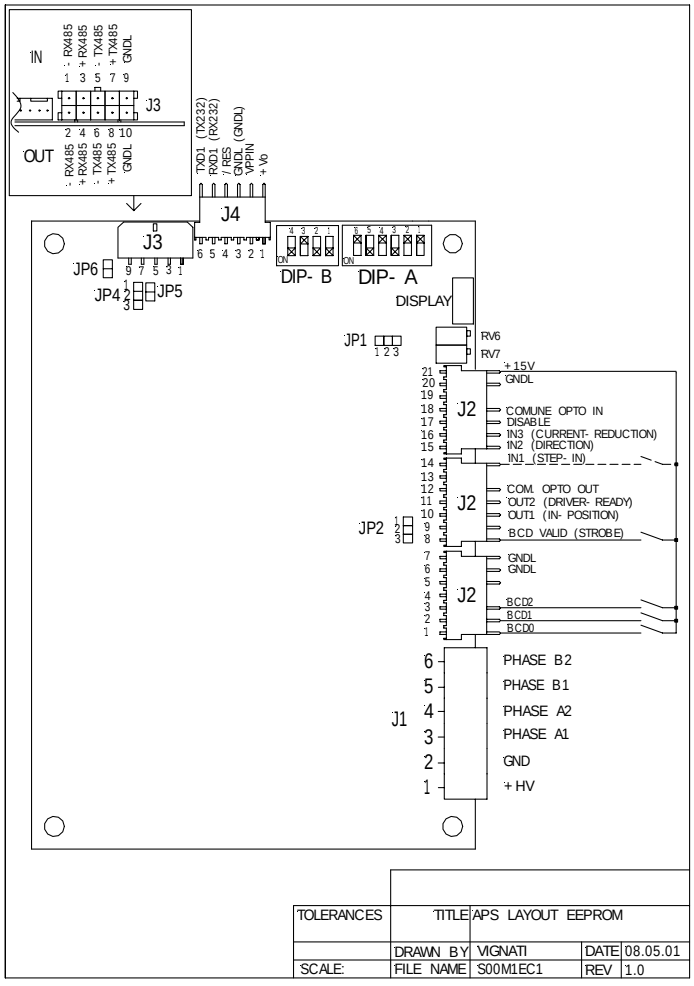
1.2.2 INPUT VOLTAGE LEVEL

VOLTAGE LEVEL	IN1 (BCD 4) INPUT	IN2, IN3, DISABLE INPUT	BCD 0, 1, 2 INPUT
LOW LEVEL	from 0 V to 8 V	from 0 V to 2.5 V	from 0 V to 1 V
HIGH LEVEL	from 11 V to 30 V	from 4.6 V to 30 V	from 4 V bto 30 V

1.2.3 INPUT SUPPLY VOLTAGE

The supply voltage for the BCD inputs with the internal 15 VDC

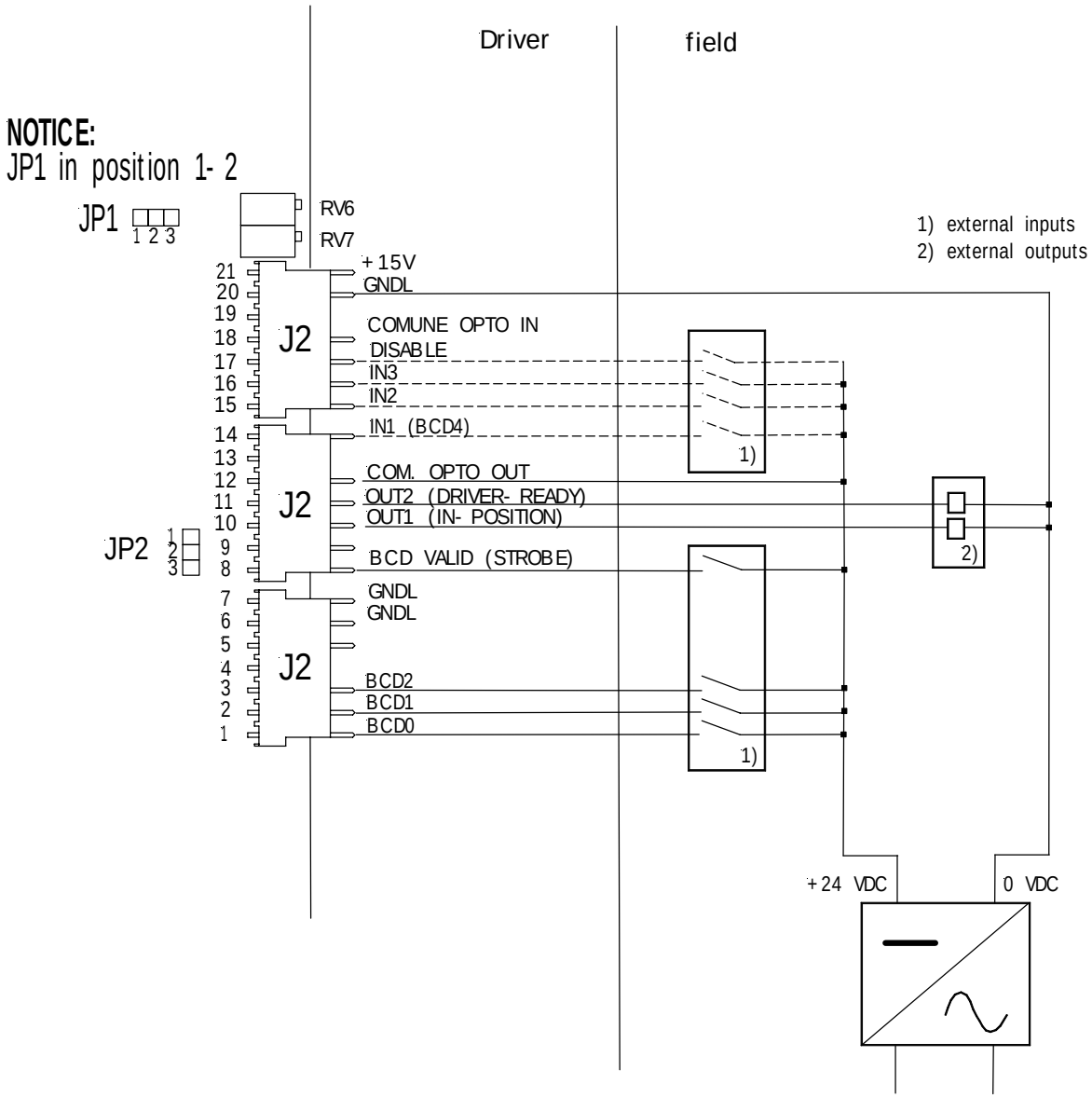
It is possible to use the existing output (J2 pin 21 → 15 VDC, max. current 150 mA) to supply the inputs (see drawing 1).



drawing 1

The supply voltage for the BCD inputs with external 24 VDC

If an external supply voltage is used the inputs can not be optoisolated (see drawing 2).



drawing 2

ATTENTION: ALL INPUTS AND OUTPUTS ARE NOT OPTOISOLATED.

2. TO STORE PROGRAMMES

Depending on the settings of the switch DIP B 2 you can store 8 (DIP B 2 → OFF) or 16 (DIP B 2 → ON) programmes plus the start-up program (program “0“).

Note: The DIP switch settings must be done before starting.

The start-up program will be execute after each starting. In this case it could be better to store all values which are all valid for all other programmes (program 1 to 16). For example the motor current, resolution, min. frequency, acceleration, current reduction a.s.o. It is also possible to store a reference drive in the start-up program. After each starting the reference drive will be executed automatically.

Note: If you change values in program “0”, do not forget to switch OFF and ON the power supply.

2.1 REQUIREMENT

1. Connect the APS x-B-Ex driver as shown in the manual.
2. Set the DIP swichtes according the to capital 1.1.2
3. Set the baud rate in the PC to 9600 or 19200 (DIP B 2 „ON“ or „OFF“)
4. Be sure that the WinStar – software is available on your PC
5. Connect the serial cable between the PC (RS 232) and the APS driver
6. Switch on the power supply for the APS; after an internal check the driver will show a “r“ at the display
7. Start the WinStar software

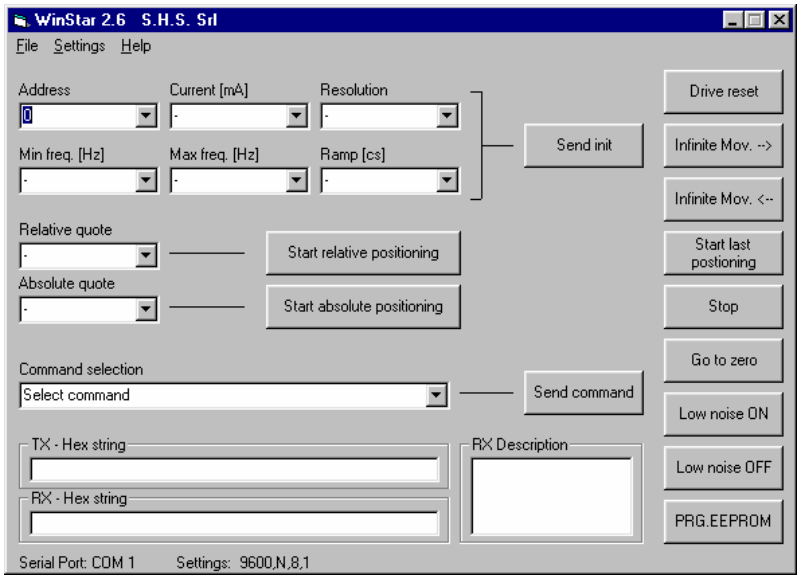
After the above procedure you can start the programming.

Note: The communication is only via the RS 232 serial interface.
The driver address must be set to “0”.
Check the baud rate on the PC and the driver.

2.2 PROGRAMMING

2.2.1 DIRECT MOVING

After loading the WinStar software the following window appears.



In the upper line you see the actual serial interface settings.

In the menue “settings”you can change the serial interface parameters and the language.

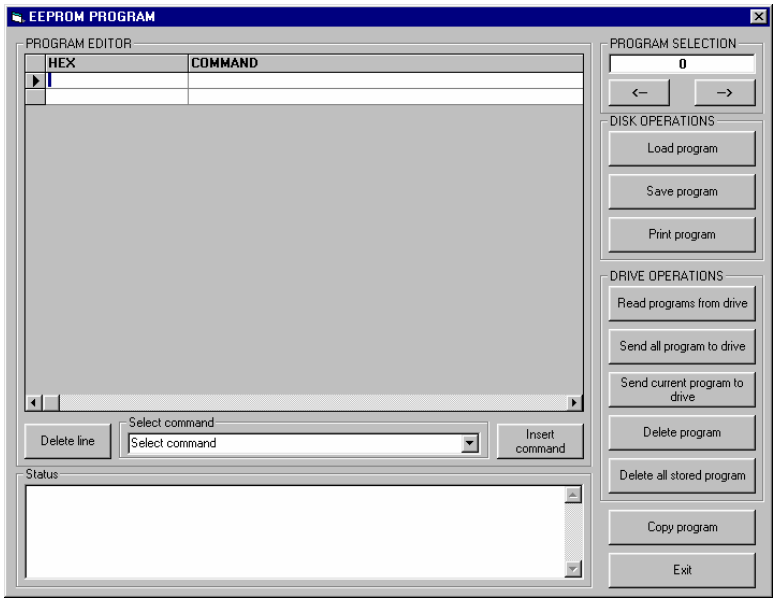
For controlling the function of the motor and the driver you can move the motor without storing a program.
In this case put the right datas for the motor in the field “ address” (by using the RS 232 serial interface the address is always “0”, “current”, “resolution”, “min freq.”, “max freq” and “ramp”.
Send the datas to the driver by using the bottom “send int”. In the control field “TX hex string” you see the datas which are sent.
When the data download is finished, the driver send back the code “06”, which can you see in the control field “RX hex string”.

If the driver send back “15” the data transfer was not successful.

Was the transfer successfuly you can move the motor directly with the bottom “infinite move →” or “infinite move ←”.

2.2.2 TO STORE A PROGRAM IN EEPROM

To store programmes use the bottom “PRG EEPROM” and the following window appears.



With the “disk operations” you can “load” or “store” programmes from disks or you can “print” programmes.

With the “drive operations” you can “read”, “send”, “send current”, “delete”or “delete all” programmes.

With the bottom “copy program” you can copy a single program.

With the bottom “exit” you will reach the start window.

With the bottom “delete line” you can delete lines in a program.

In the field “status” you see actual informations.

With the bottom “insert command” you can insert lines in the program.

2.2.2.1 EXAMPLE TO STORE A PROGRAM

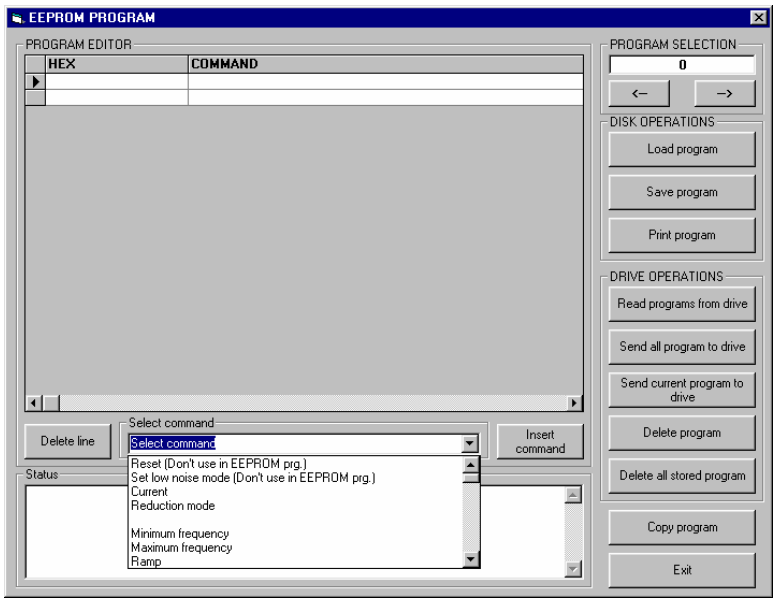
To store the programmes “0” and “1” see the next lines.

Store all values in program “0” they are all valid for all programmes. If you change values in program “0”, do not forget to switch OFF and ON the power supply.

Program “1” contains a relative positioning.

2.2.2.2 PROCEEDING

After chosing the program number you can start with the single commands. Open the field “select command” and chose the correct command

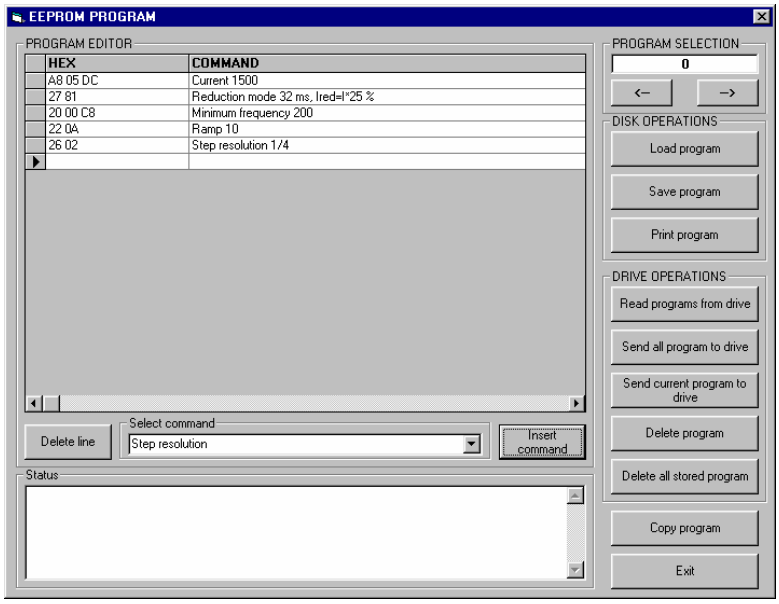


Use the bottom “insert command”. If necessary a new window appears in which you can put values.

For example: 1500 → is 1,5 A
Now you can set all other necessary commands

In the following example we show the commands for programm “0”

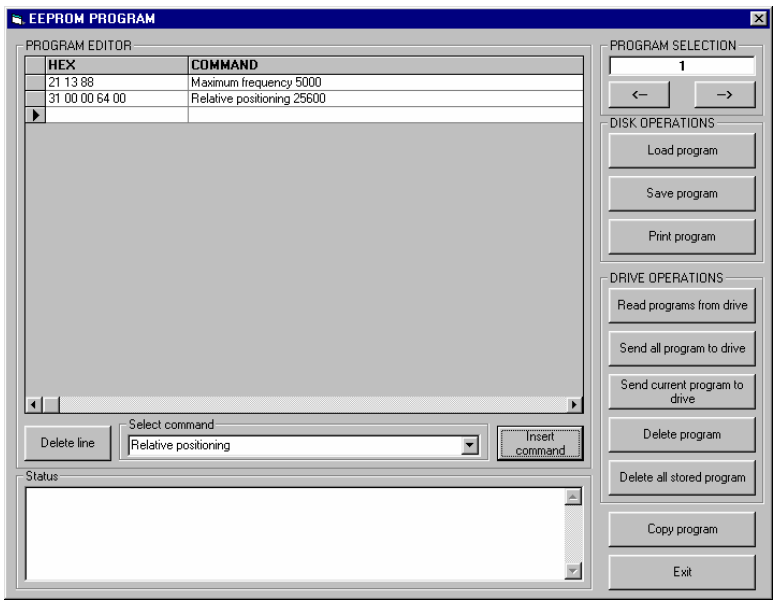
	Command	value		function
Line 1:	motor current	1500	→	means 1,5 A
Line 2:	reduction mode	1, 2	→	after 32 ms the current goes down to 50%
Line 3:	min freq	200	→	min frequency (start-stop frequency)
Line 4:	ramp	10	→	acceleration time in 10 x 10 ms = 100 ms to 10 kHz
Line 5:	resolution	2	→	2 = ¼ steps, this means 800 steps per round



With the bottom “send current program to drive” you can store the program immediately or you can write further programmes. With the bottom “send all programmes to drive” you can store all written programmes to the drive and finish the program creating.

The values for programm “1” are as follows:

	Command	value		function
Line 1:	maximum freqency	5000	→	frequency in Hz (¼ steps with 5000 = 375 rpm)
Line 2:	relative positioning	25600	→	25600 = 10 rounds (1 round = 25600)



3. EXECUTE PROGRAMMES

To select the programmes use the 3 or 4 BCD inputs. To execute the selected program use input “valid strobe”.

The input “valid strobe” must be high during the complete positioning. If you switch “OFF” the input before the positioning is finished, the motor stops immediately. Now you can select a new programm or you can use the same program by switch “ON” the input “valid strobe “.

3.1 SELECTION OF 8 PROGRAMMES

DIP- B 2 → OFF

BCD2	BCD1	BCD0	PROGRAM
0	0	0	PRG. 1
0	0	1	PRG. 2
0	1	0	PRG. 3
0	1	1	PRG. 4
1	0	0	PRG. 5
1	0	1	PRG. 6
1	1	0	PRG. 7
1	1	1	PRG. 8

1 = input selected 0 = input not selected

3.2 SELECTION OF 16 PROGRAMMES

DIP B 2 → ON

IN1	BCD2	BCD1	BCD0	PROGRAM
0	0	0	0	PRG. 1
0	0	0	1	PRG. 2
0	0	1	0	PRG. 3
0	0	1	1	PRG. 4
0	1	0	0	PRG. 5
0	1	0	1	PRG. 6
0	1	1	0	PRG. 7
0	1	1	1	PRG. 8
1	0	0	0	PRG. 9
1	0	0	1	PRG. 10
1	0	1	0	PRG. 11
1	0	1	1	PRG. 12
1	1	0	0	PRG. 13
1	1	0	1	PRG. 14
1	1	1	0	PRG. 15
1	1	1	1	PRG. 16

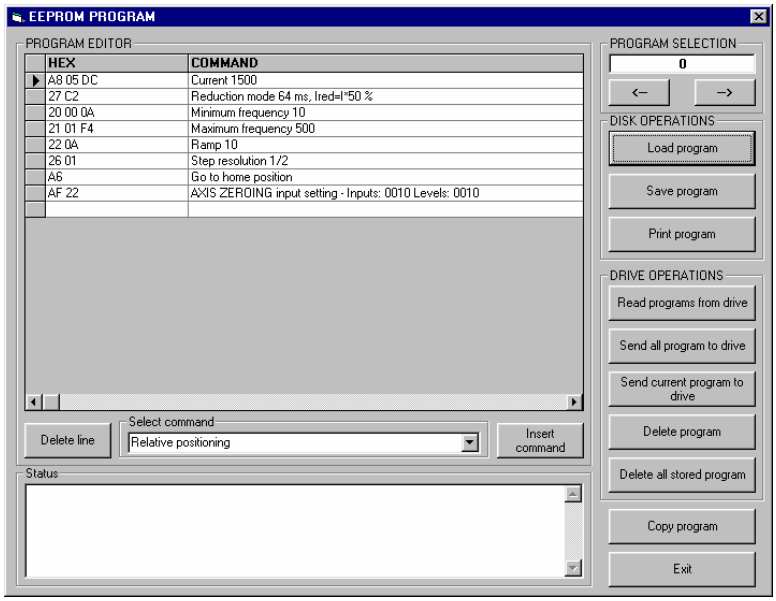
1 = input selected 0 = input not selected

PLEASE NOTE: If you change values in program “0”, do not forget to switch OFF and ON the power supply.

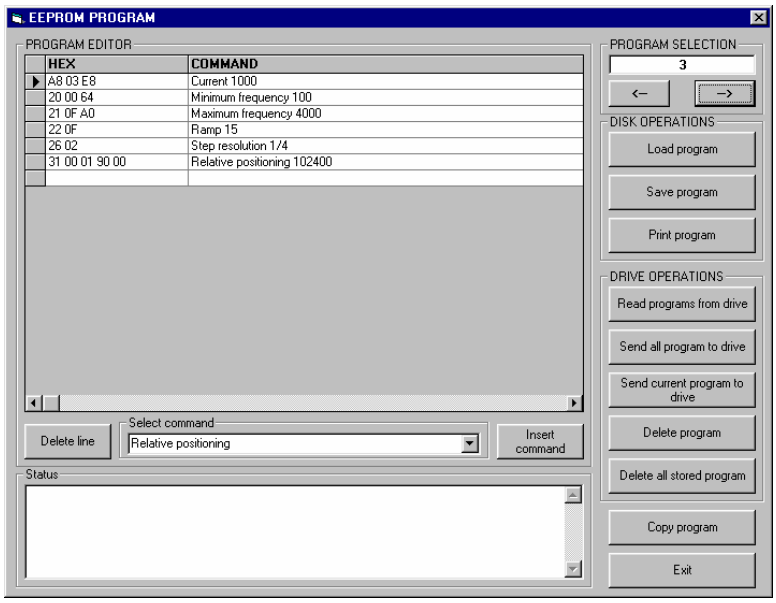
For programs 1 to 16 you do not need to switch OFF and ON the power supply.

4. APPENDIX PROGRAM EXAMPLES

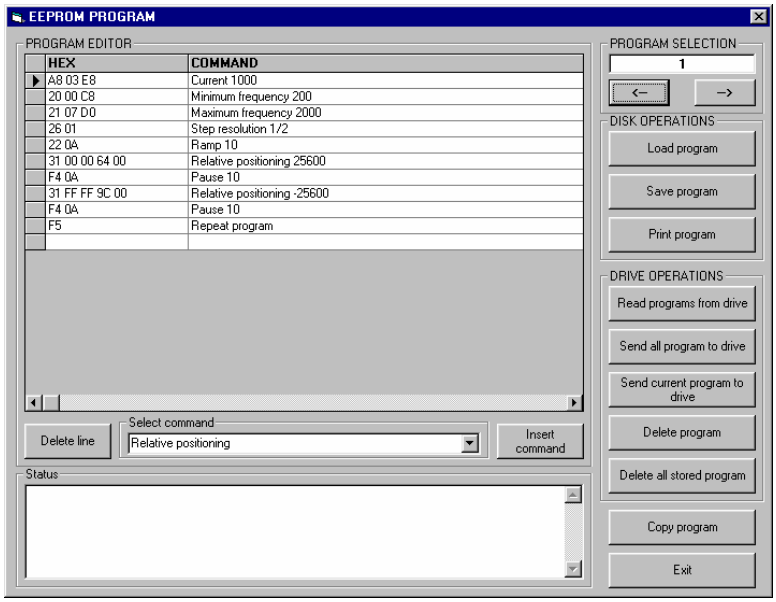
4.1 REFERENCE DRIVE STORED IN PROGRAM “0”



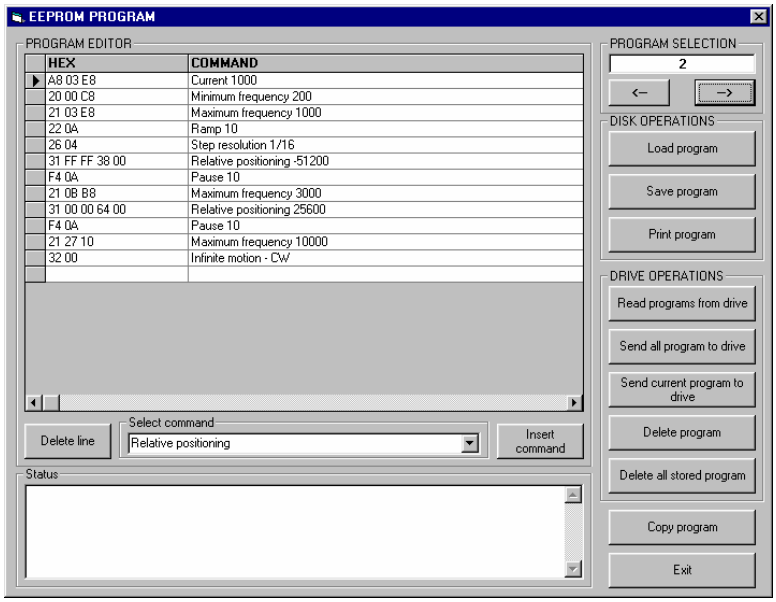
4.2 RELATIVE POSITIONING



4.3 REPEATING DRIVE WITH 1 ROUND LEFT AND 1 ROUND RIGHT



4.4 CONTINUE DRIVE AFTER EXECUTING 1 ROUND LEFT AND 1 ROUND RIGHT



4.5 CONTINUE DRIVE