



Application Note

InterBus



VLT® 5000

Abstract

This application note describes how to set up Interbus communication between a Danfoss VLT 5000 frequency converter and Interbus CMD G4. CMD stand for Configuration Monitoring and Diagnostics.

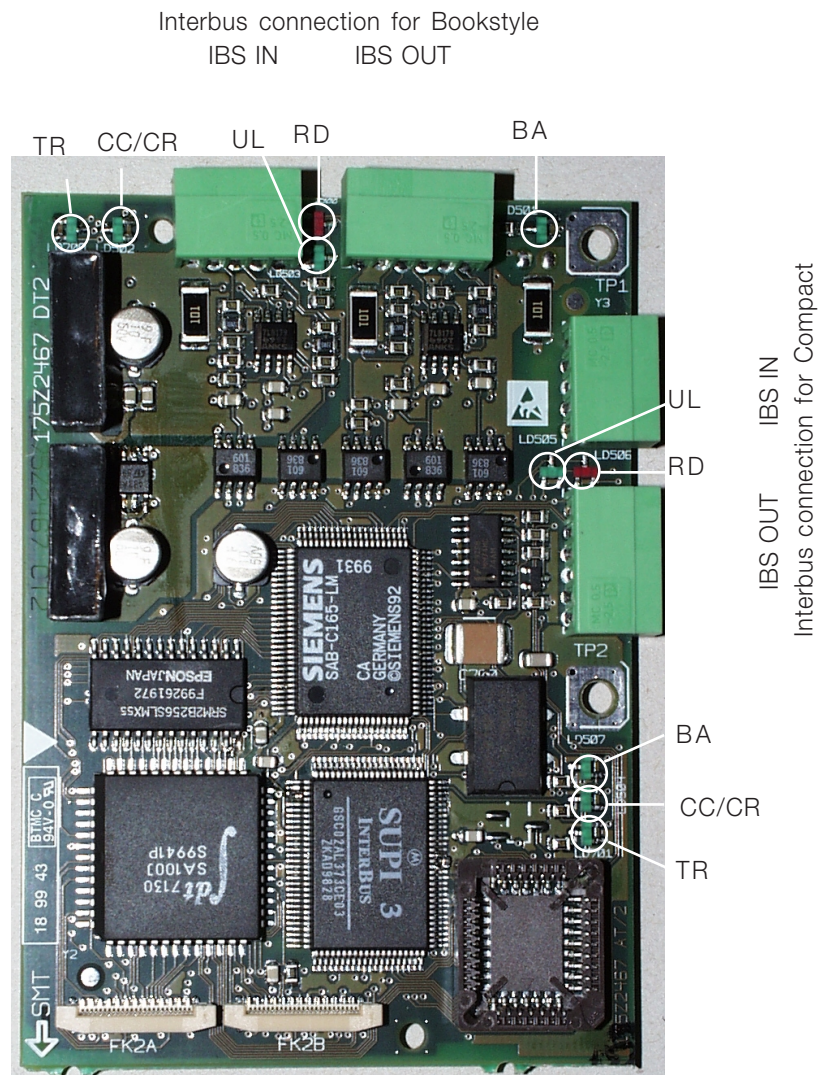
This note will describe:

- Configuring of the VLT 5000 and CMD
- Drivecom profile
- PCP communication

All examples in this instruction are shown with a PLC card as an Interbus master, but they are also relevant to a PC system with an Interbus Master.

VLT 5000 Interbus card

The photo shows the Interbus card which can be installed in VLT 5001 - 5500.



LED identification

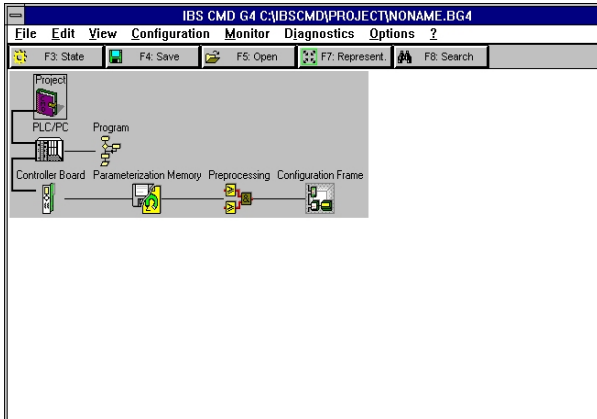
Name	Indicates	Color	On	OFF
CC/CR:	Cable Check.	Green	Incoming bus active	Incoming bus switched off
BA	Bus Active.	Green	Bus active	Bus stopped
RD:	Status of outgoing bus.	Red	Outgoing bus stopped	Outgoing bus active
TR:	Transmit/Receive.	Green	PCP Communication running	NO PCP Communication running
UL:	Power OK.	Green	Voltage within permissible range	No Voltage

■ Configuring of the CMD and VLT 5000

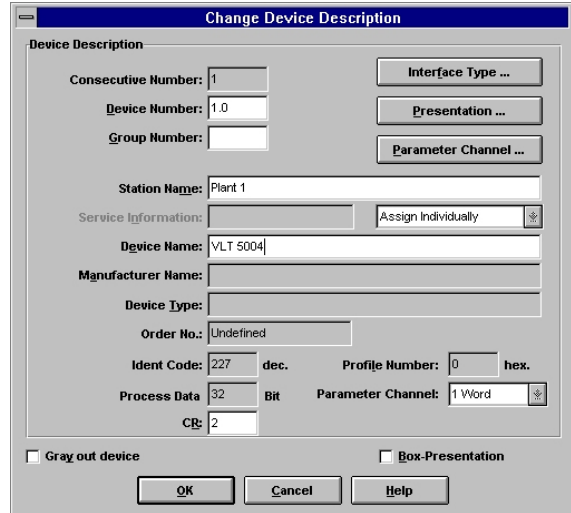
The first step is to connect all Interbus slaves to the master and power up all units.

Start the IBS CMD software and choose a new project from *File* and *New*.

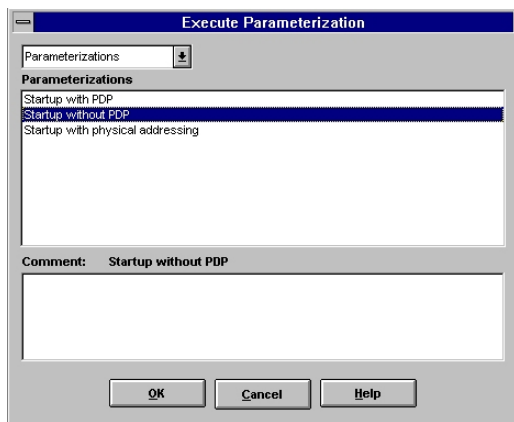
The screen should now look like this:



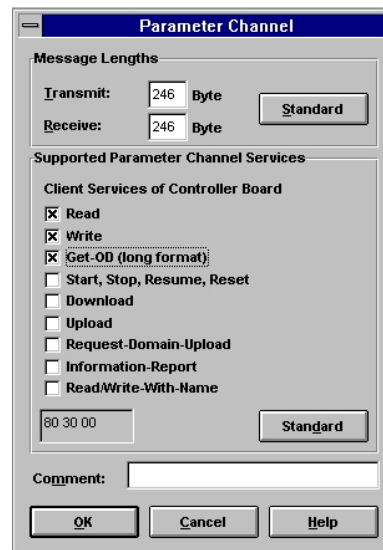
Next step is to configuring the Interbus system. This is done by clicking on the VLT symbol and pressing the right mouse button. Select *Description*.



Next step is to read the slaves on the bus system. Click on *Configuration frame* and click on the right mouse button. Select *Read In* and choose *Startup without PDP*.

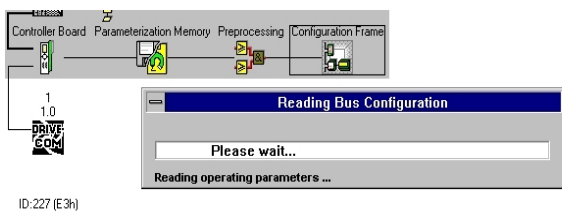


Here you can type a Station name, Device name and a Device number. Click on *Parameter Channel*.



The state will be changed from Offline to Online when the Read In is finished. Please look at the bottom of the screen.

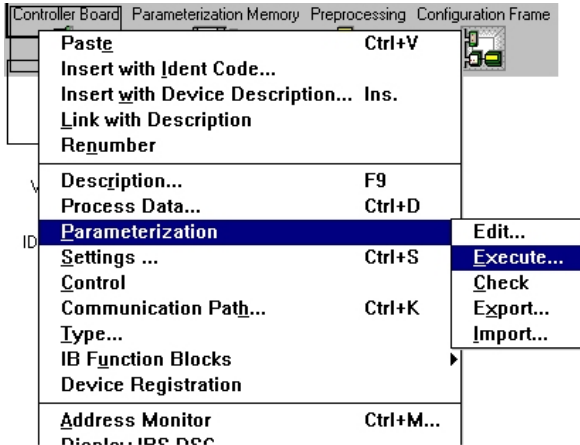
After the Read In, CMD will indicate each VLT frequency converter with a DriveCom symbol, a station number and an ID number.



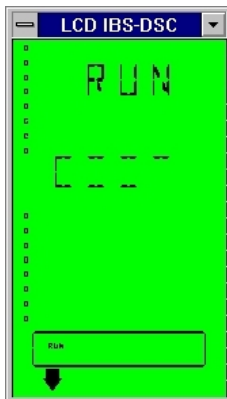
By message length transmit and receive enter 246 Byte and select Get-OD (long format). The message length now corresponds to the internal buffer in the VLT frequency converter. Get-OD (long format) means that the master will read the English parameter description text from the VLT frequency converter.

Press OK twice.

The VLT frequency converter is now set up and the program can be downloaded to the PLC master. This is done by clicking with the right mouse button on the *Controller board*. Select *Parameterization* and *Execute*.



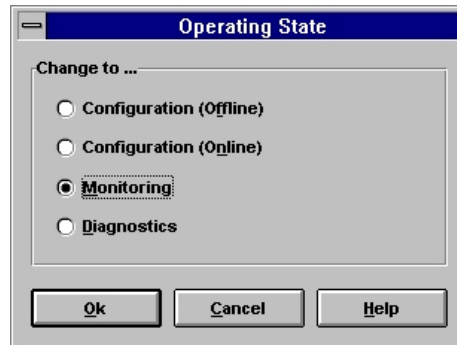
After the parameterization is done, the master will start to run. If you are using a Siemens S7 or S5 master, the LCD will look like this:



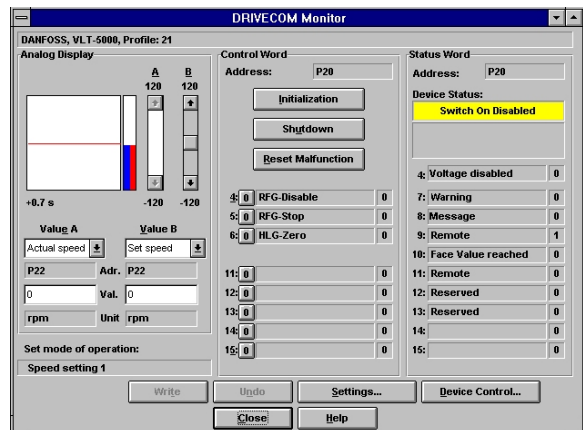
■ Drivecom profile

VLT 5000 has implemented the Drivecom profile in the Interbus software. In order to be able to run with the Drivecom profile, VLT parameter 512 *Telegram profile* must be set to *Fieldbus option*.

If you change the operating state from *Online* to *Monitor* you can write the control word and reference to the VLT frequency converter. In Monitor state you can also read and write to parameters.



Now you can start the built in Drivecom monitor in CMD by clicking on the *Controller board* and clicking on the right mouse button. Select *Drivecom*.



The Drivecom monitor will now show *Danfoss, VLT 5000, Profile: 21*, in the upper left corner.

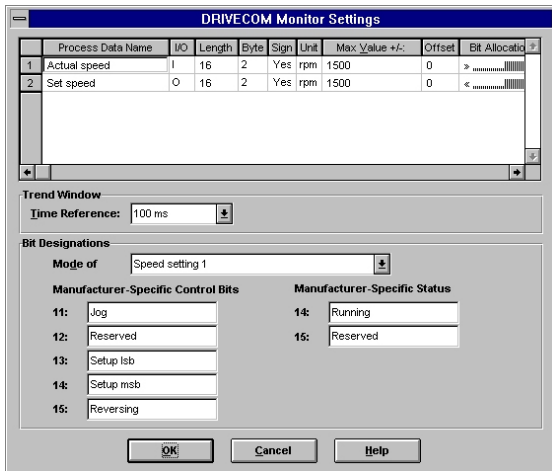
The Drivecom monitor is split up in three parts: Analog Display, Control Word and Status word. In the Analog Display part you can set a reference and in the Control word part you can start and stop the VLT frequency converter. In the Status word part you can see the actual status word from the VLT frequency converter.

■ **Drivecom profile, cont.**

By clicking Settings you can setup the Drivecom monitor.

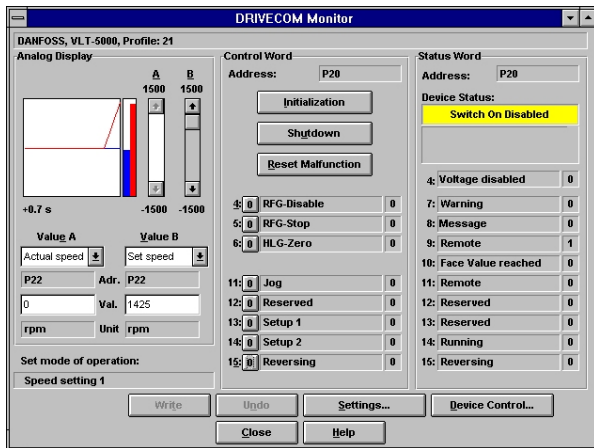
In *Manufactured Specific Control bits* Danfoss have chosen to implement Jog, Setup select and Reversing, and in *Manufactured Specific Status* the Running Status bit is implemented.

Press OK when the Monitor settings are done.

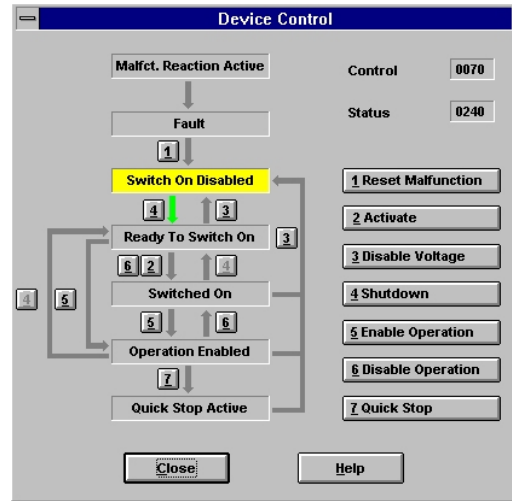


The *Manufactured Specific bits* are now added to the Drivecom monitor.

Type a reference in rpm below *Set Speed* and click on Write to send the reference to the VLT frequency converter. The rpm value can now be seen in the VLT display as a reference from 0 - 100 %.

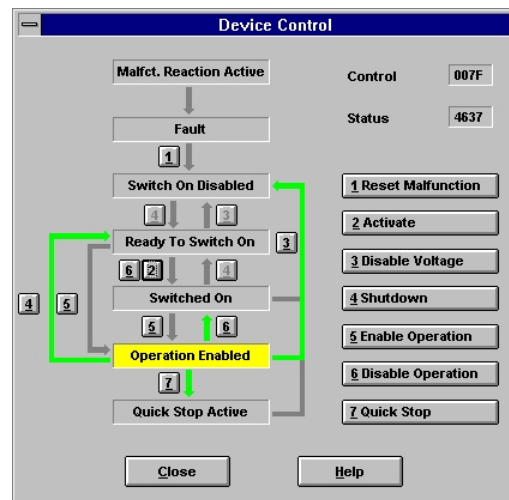


Click on Device Control for controlling the VLT frequency converter. Please notice that the control word will change when you change the states.



Click 4 for *Ready to Switch On* and click 2 for *Switch On*.

By Clicking 5 the VLT frequency converter should start the motor. Do not forget to set VLT parameter 502 Coasting to *Bus*.

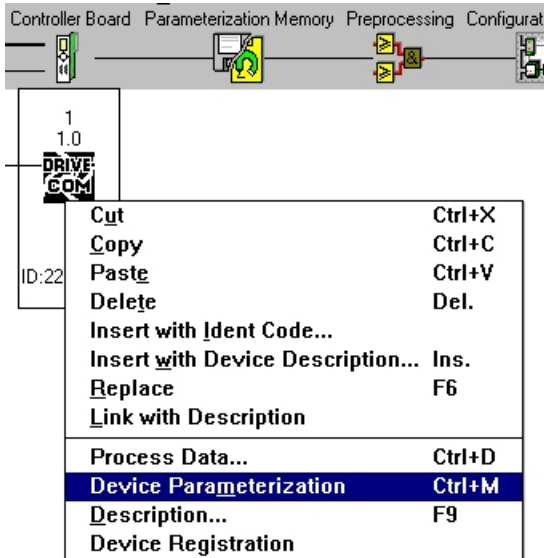


The control word is now 7F Hex. Press Close.

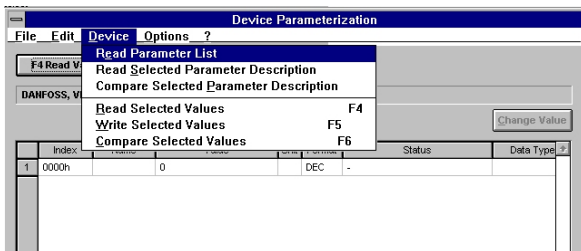
■ PCP communication

Via the CMD tool you are able to read and write to parameters and read the English parameter text of each parameter.

To start PCP communication you must be in Monitor state. Click on the station number and click on the right mouse button and choose *Device Parameterization*.



The dialog box will now show *Danfoss, VLT 5000, Profile: 21*. In order to be able to read in all parameters in the VLT frequency converter select *Device* and *Read Parameter List*. The CMD tool will now start reading all parameters, this will take 3-4 minutes.

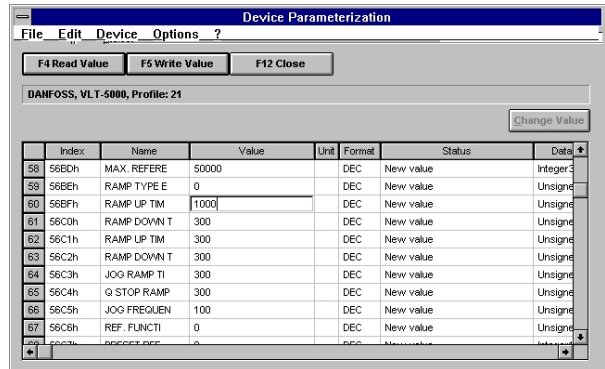


When all parameters have been read, CMD will show the first parameter 55F1 Hex *Language* at the first row.

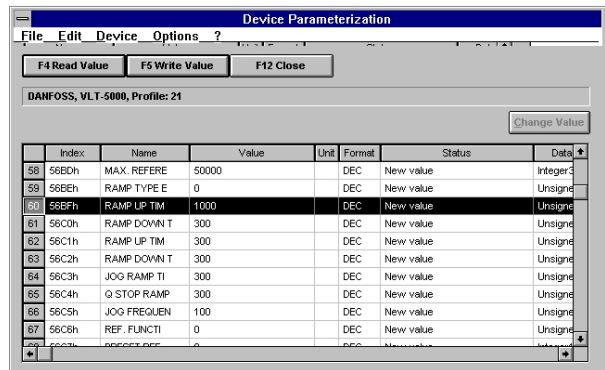
55F1 Hex corresponds to 22001₁₆. This means that all VLT 5000 parameters simply can be accessed by adding 22000₁₆ to the VLT 5000 parameter. For example if you want to write to parameter 207 *Ramp up time 1* you must write to 22207₁₆ (56BF Hex).

The CMD tool can only indicate parameters by hexadecimal numbers.

If you want to change the value of parameter 207 *Ramp up time 1* to 10 sec you must write 1000 in column next to index 56BF Hex. You have to enter 1000 because VLT parameter 207 has a conversion index of -2 = 10⁻².

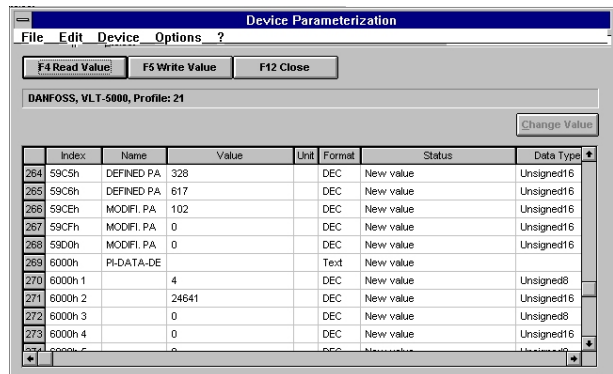


Highlight the row by clicking on 60 and click on *F5 Write Value*. The ramp up time in parameter 207 has now been changed to 10 sec.



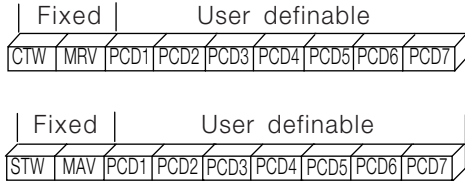
At the bottom of the parameter list the Interbus Drivecom 21 objects are available. These objects are not accessible via the LCP but only via Interbus PCP communication.

Please have a look at the Interbus operating instructions for further description of these objects.



Process and PCD data

The process data is split up in two parts, a fixed 2 words data part for controlling the VLT frequency converter and a flexible part, called PCD, that can consist of 7 words.



For controlling the VLT 5000 you can select between the FC profile or Drivecom profile (VLT parameter 512).

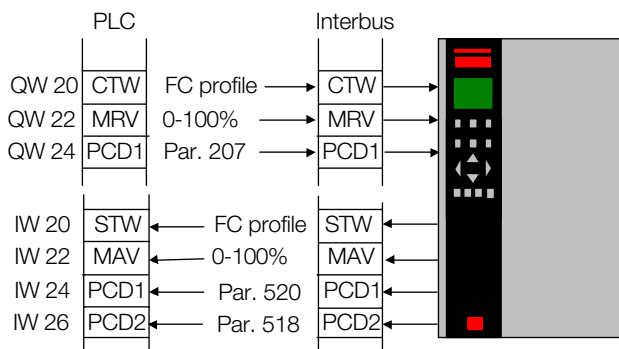
Please have a look at the Interbus operating instructions for further description of each profile.

PCD data is very useful if you need a constant update of process parameters/variables, for example motor current or torque.

Programming example

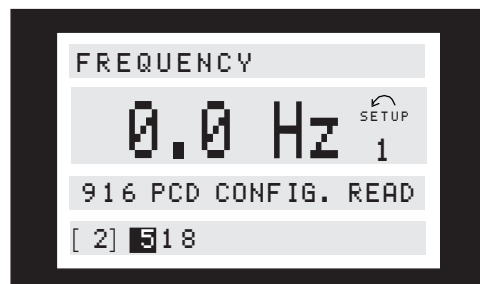
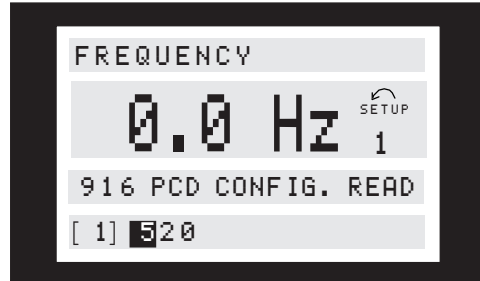
The following example will show how to set up process and PCD data.

The chosen profile is Drivecom profile and as PCD data we will readout parameter 520 *Motor current* and 518 *Motor frequency*. We will also write to parameter 207 *Ramp up time 1* as PCD data. The data for the VLT frequency converter in our PLC program starts at address 20. So we have to map address 20 to the Interbus card in the VLT frequency converter. This is done with the CMD tool.

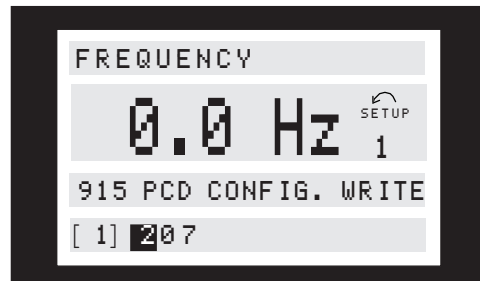


First we have to setup the VLT frequency converter to run with two PCD's. This is done in the respective parameter 807 *PCD size select* and parameter 915/916 *PCD config. write/read*.

PCD 1 has to be set to read the motor current via parameter 520. This is done by setting sub index 1 in parameter 916 *PCD configuration read* to 520. PCD 2 has to be set to read parameter 518 *Motor frequency*. Set sub index 2 to 518.

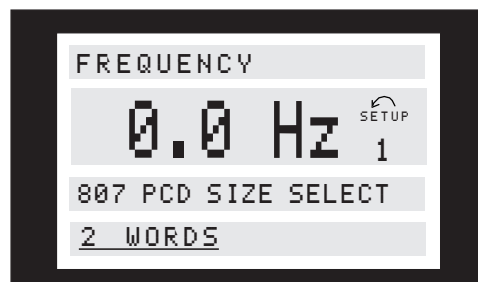


PCD 1 has to be set to write the ramp up time 1 via parameter 207. This is done by setting sub index 1 in parameter 915 *PCD Configuration write* to 207.



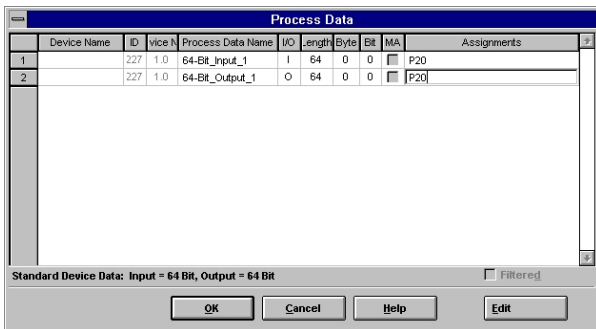
In parameter 807 *PCD size select* you have to assign the number of PCD's which the VLT frequency converter is using.

Choose 2 WORDS [2] and power down the VLT frequency converter. At next power up the PCD's will be active.



To activate the new settings with PCD, the CMD need to read the configuration from the VLT frequency converter again.

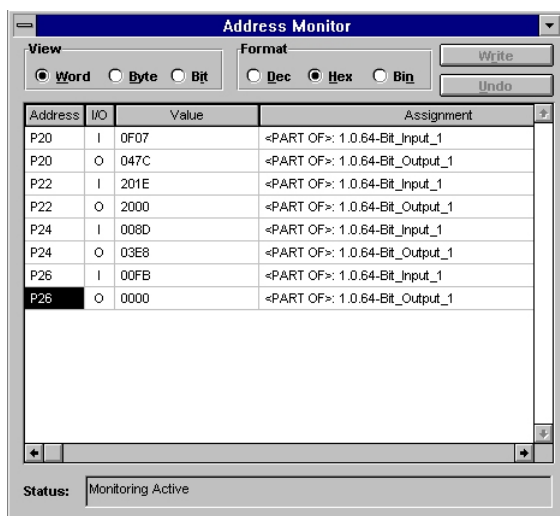
The process data should start at address 20 and this has to be assigned to the master and slave. Click on controller board and select *Process data*. The Process data should now be 64 bits, corresponding to 4 words: control word, reference, PCD 1 and PCD 2.



See *Configuring of the CMD and VLT 5000* for how to parametrize the system.

When the system is running, change the state to Monitor.

Click on controller board and select Address Monitor.



The Address Monitor shows the I/O area.

P20 Input 0F07 Hex:

Shows the status word from the VLT frequency converter.

P20 Output 047C Hex:

Here you can write the control word to the VLT frequency converter.

P22 Input 201E:

Shows the actual reference from the VLT frequency converter.

P22 Output 2000 Hex:

Here you can write a reference to the VLT frequency converter.

P24 Input 008D Hex (PCD 1):

This I/O area shows the actual motor current in Hex (parameter 520 *Data readout: Motor current*).

The value corresponds in decimal to 141. But as Parameter 520 has a conversion index of -2 (see Manual) the actual motor current is 1.41 Amp.

P24 Output 03E8 Hex (PCD 1):

The same I/O area as reading of motor current was set up to write to parameter 207 *Ramp up time 1*. 03E8 hex corresponds to 10 sek in ramp up time as this parameter has a conversion index of -2.

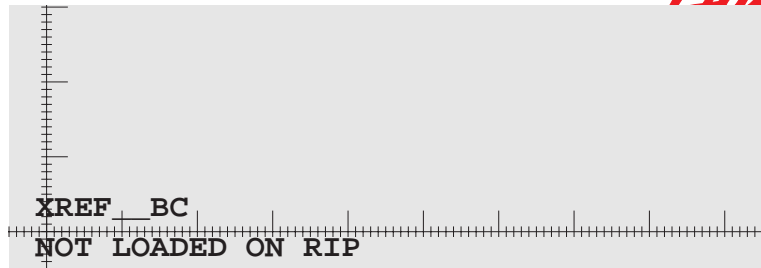
P26 Input 00FB Hex (PCD 2):

This I/O area shows the actual motor frequency in Hex (parameter 518 *Data readout: Frequency*).

The value corresponds in decimal to 251. But as Parameter 518 has a conversion index of -1 (see Manual) the actual motor frequency is 25.1 Hz.

P26 Output 0000 Hex (PCD 2):

This output is not configured.



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