GE

DCT-10 AF-650™ GP, AF-600 FP™, & AF-60 LP™
DCT-10

Operating Instructions

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1 Safety Precautions

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With this software package you can remote-control the frequency converter, thereby starting an electric motor which may act as a drive for dangerous machinery.
Therefore the necessary caution must always be observed when using the software, and suitable measures should be taken to prevent injury and damage to machinery and equipment.

1.2 Safety Precautions

The voltage of the drive is dangerous whenever connected to line. Incorrect installation of the motor, drive or network may cause damage to the equipment, serious personal injury or death. Consequently, the instructions in this manual, as well as national and local rules and safety regulations, must be complied with.

Safety Regulations

1. The line supply to the drive must be disconnected whenever repair work is to be carried out. Check that the line supply has been disconnected and that the necessary time has elapsed before removing motor and line supply plugs.
2. The [OFF] button on the keypad of the drive does not disconnect the line supply and consequently it must not be used as a safety switch.
3. The equipment must be properly earthed, the user must be protected against supply voltage and the motor must be protected against overload in accordance with applicable national and local regulations.
4. The earth leakage current exceeds 3.5 mA.
5. Protection against motor overload is not included in the factory setting. If this function is desired, set F-10 *Electronic Overload* to data value Elec. OL trip 1 [4] or data value Elec. OL warning 1 [3].
6. Do not remove the plugs for the motor and line supply while the drive is connected to line. Check that the line supply has been disconnected and that the necessary time has elapsed before removing motor and line plugs.
7. Please note that the drive has more voltage sources than L1, L2 and L3, when load sharing (linking of DC intermediate circuit) or external 24 V DC are installed. Check that all voltage sources have been disconnected and that the necessary time has elapsed before commencing repair work.

Warning against unintended start

1. The motor can be brought to a stop by means of digital commands, network commands, references or a local stop, while the drive is connected to line. If personal safety considerations (e.g. risk of personal injury caused by contact with moving machine parts following an unintentional start) make it necessary to ensure that no unintended start occurs, these stop functions are not sufficient. In such cases the line supply must be disconnected.
2. The motor may start while setting the parameters. If this means that personal safety may be compromised (e.g. personal injury caused by contact with moving machine parts), motor starting must be prevented by disconnection of the motor connection.
3. A motor that has been stopped with the line supply connected, may start if faults occur in the electronics of the drive, through temporary overload or if a fault in the power supply grid or motor connection is remedied. If unintended start must be prevented for personal safety reasons (e.g. risk of injury caused by contact with moving machine parts), the normal stop functions of the drive are not sufficient. In such cases the line supply must be disconnected.
4. Control signals from, or internally within, the drive may in rare cases be activated in error, be delayed or fail to occur entirely. When used in situations where safety is critical, e.g. when controlling the electromagnetic brake function of a hoist application, these control signals must not be relied on exclusively.

Touching the electrical parts may be fatal - even after the equipment has been disconnected from line.

Also make sure that other voltage inputs have been disconnected, such as external 24 V DC, load sharing (linkage of DC intermediate circuit), as well as the motor connection for kinetic back up.
Systems where frequency converters are installed must, if necessary, be equipped with additional monitoring and protective devices according to the valid safety regulations, e.g law on mechanical tools, regulations for the prevention of accidents etc. Modifications on the frequency converters by means of the operating software are allowed.

Protection Mode

Once a hardware limit on motor current or dc-link voltage is exceeded the drive will enter "Protection mode". "Protection mode" means a change of the PWM modulation strategy and a low switching frequency to minimize losses. This continues 10 sec after the last fault and increases the reliability and the robustness of the drive while re-establishing full control of the motor.
The "Protection mode" can be disabled by setting SP-26 *Trip Delay at Drive Fault* to zero which means that the drive will trip immediately if one of the hardware limits is exceeded.

The DC link capacitors remain charged after power has been disconnected. To avoid electrical shock hazard, disconnect the frequency converter from line before carrying out maintenance. When using a PM-motor, make sure it is disconnected. Before doing service on the frequency converter wait at least the amount of time indicated below:

Voltage	Power	Waiting Time
380 - 480 V	0.25 - 7.5 kW	4 minutes
	11 - 75 kW	15 minutes
	90 - 200 kW	20 minutes
	250 - 800 kW	40 minutes
525 - 690 V	37 - 315 kW	20 minutes
	355 - 1000 kW	30 minutes

For further information, please see *www.geelectrical.com/drives*

1.2.1 Connectivity

NB!

USB is a serial bus utilizing 4 shielded wires with Ground pin 4 connected to the shield in the PC USB port. Connecting the PC to a frequency converter through the USB cable, there is a potential risk of damaging the PC USB host controller. All standard PC's are manufactured without galvanic isolation in the USB port. Any earth ground potential difference caused by not following the recommendations described in the chapter *Connection to Mains and Earthing* in the Operating Instructions, can damage the USB host controller through the shield of the USB cable.

It is recommended to use a USB isolator with galvanic isolation to protect the PC USB host controller from earth ground potential differences, when connecting the PC to a frequency converter through a USB cable.

It is recommended not to use a PC power cable with a ground plug when the PC is connected to the frequency converter through a USB cable. It reduces the earth ground potential difference but does not eliminate all potential differences due to the Ground and shield connected in the PC USB port.

2 Introduction

2.1 About this Manual

This manual provides the user with the basic knowledge required to use the DCT-10 with GEDrives. Familiarity with the following is assumed:

- MS®-Windows™ at user level
- Set-up and operation of frequency converters, including knowledge of processes of which the drives forms part
- Use of and linkage with communication equipment

The manual does not provide any detailed information regarding specific applications or possible solutions and related parameter combinations in the set-up and use of a frequency converter. Instead, please refer to the Operating Instructions and Design Guide of the frequency converter. An update of the manual and instructions related to the DCT-10 are available on the GE Homepage:
www.geelectrical.com/drives

2.2 What is DCT-10?

DCT-10 is designed as an interactive commissioning tool for quick and easy commissioning. The DCT-10 can be used as follows:

- For planning a new communication network off-line. The DCT-10 contains a complete database with all GE products.
- For commissioning frequency converters online.
- If a frequency converter requires replacement.
- If a communication network is to be expanded with more frequency converters.
- For back-up of all parameter settings of frequency converters in a communication network.
- The DCT-10 supports Profibus DP-V1 communication via a Master class 2 connection, which makes it possible to go online on a Profibus network and read from/write to parameters. This will eliminate the need for an extra communication network.
- The DCT-10 supports AF-60, AF-600 FP, AF-650 GP series frequency converters from GE.

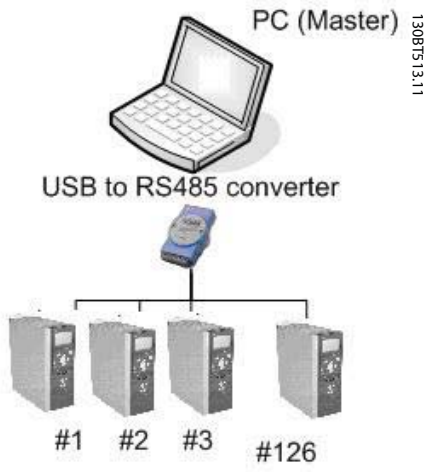


Illustration 2.1: With for example an Advantech ADAM 4510 repeater you can connect up to 126 nodes. Without a repeater you can connect up to 31 nodes.

With the DCT-10 PC software tool you can control and configure your system simultaneously, and monitor the entire system more effectively for faster diagnosis, and better preventive maintenance. Simplify commissioning, maintenance and documentation using DCT-10.

2.2.1 Features of DCT-10

- Project-oriented PC tool, one tool for all series
- Links to all Windows applications possible
- Supports Siemens CP PCMCIA- and PCI cards, for Profibus DP-V1 Master Class 2 connection
- Support of standard interfaces: COMx, USB, RS 232 (Flux)
- Siemens PG / Field PGs already have the necessary hardware
- View is highly individually configurable
- Downwards compatibility with Dos-Dialog (*.mnu) and WinDialog (*.vlt)

2.2.2 Help

The Help feature is located in the main menu, at the far right. Select Help from the main menu, then Help again, and a Help file will be opened, displaying the DCT-10 manual in .pdf format. To open the Help file you will require Acrobat Reader software. If you do not have this software installed, it can be downloaded free of charge at www.adobe.com.

2.3 System Requirements

In order to use the DCT-10, your IBM-compatible personal computer must meet the following minimum system requirements:

- a Pentium PIII 350Mhz or compatible microprocessor
- 256 MB of RAM (512 MB of RAM Recommended)
- a CD-ROM drive
- 200 MB of available space on the hard drive;

Recommended system:

- a Pentium PIII 450Mhz microprocessor
- 256 MB of RAM (512 MB of RAM Recommended)
- a CD-ROM drive
- 200 MB of available space on the hard drive;

DCT-10 runs under MS Windows versions:
Windows™ 2000 (with service pack 3 or higher)
Windows™ XP (Professional when using Siemens Profibus CP Cards)
Windows™ Vista
Windows™ 7.

2.4 Background Knowledge

Familiarity with the PC or PLC you intend to use as a master in your system is assumed. Issues regarding hardware or software produced by other manufacturers are beyond the scope of this manual, and are not the responsibility of GE.

If you have questions regarding set-up of master-to-master communication, or communication to a non-GE slave, please consult the appropriate manuals.

3 Installation and De-installation

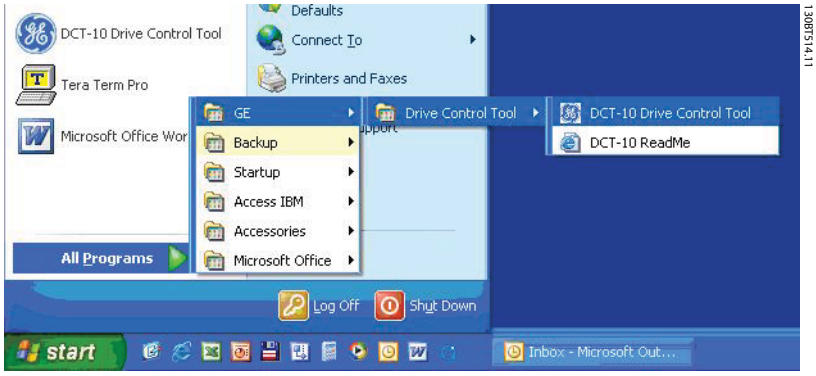
3.1 Installation and De-installation

The DCT-10 installed by means of a multilingual, self-explanatory installation program.

3.1.1 How to Start the Installation Program

1. Choose the sub-menu Run from File in Windows programming control.
2. In the command line you enter: [DRIVELETTER]:\SETUP and press the <Return> key.
3. Then you just follow the instructions of the installation program.

When the installation process is complete the DCT-10 can be found on the following path:



3.1.2 De-installation of DCT-10 under a Windows® Operating System

1. Click the Start button
2. Select Settings
3. Select Control Panel
4. Double-click on Remove/Add Programs icon
5. Select DCT-10
6. Choose the Remove option

4 Introduction to User Interface

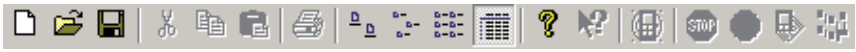
4.1 DCT-10 Features

4.1.1 MS® Windows™ Explorer-like Interface

DCT-10 has a familiar MS® Windows™ Explorer-like interface, to make it quick and easy for you to get started and find your way around the software.

4.1.2 Toolbar

A toolbar displays icons for the most commonly used functions.



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The toolbar can be activated by selecting *Toolbar* under *View* from the main menu bar, whereupon the Toolbar will be marked with a tick to show it is active. To deactivate the Toolbar, again select *View* and then *Toolbar*, and after this the tick will be removed, indicating that the toolbar is no longer active.

4.1.3 Display

The DCT-10 is displayed in two parts, Left View and Right View.

4.1.4 Left View

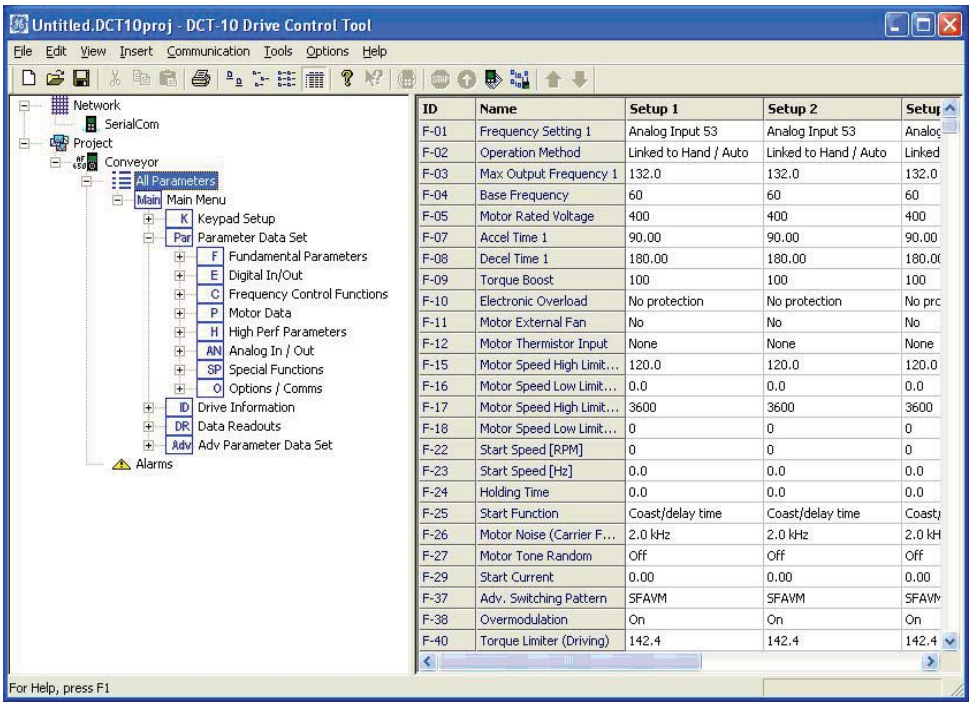
The Left View shows the Network (real, online) and Project (simulated, offline) views of the frequency converter network. In the Left View new folders and network elements can be added or existing folders and elements deleted.

It is also in the Left View that the user records changes made to the real online set-up into the Project folder, thus storing the changes in the simulated, offline set-up for later use.

For more information on saving data, please refer to the chapter *Saving Data*.

4.1.5 Right View

The Right View displays details of the element highlighted in the Left View. In the Right View the elements of the frequency converter network can be programmed.



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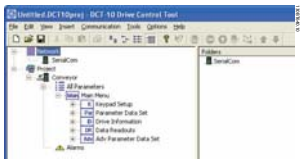
4.1.6 Tree View

The Left View can be expanded or compressed according to the level of detail the user wishes to view. The Left View has a tree structure, where folders containing un-displayed content are marked with +. By clicking on the + with the mouse, the folder will open and its contents display in a tree structure.



Folders containing content which is on display in a tree structure are marked with -. By clicking on the - with the mouse, the folder will close and its contents will be hidden.

4.1.7 Network Mode - Online

The Network folder contains the frequency converter(s), online connected to the PC. The user can monitor and make changes in the parameter settings exactly as if operating on the keypad.

Data entered from online will be stored in the frequency converter not on the hard disk. For information on saving data to the hard disk, please refer to the chapter *Saving Data*.

4.1.8 Project Mode - Offline

The Project folder contains the frequency converter, network inserted by the user, opening a project file or from an online backup.

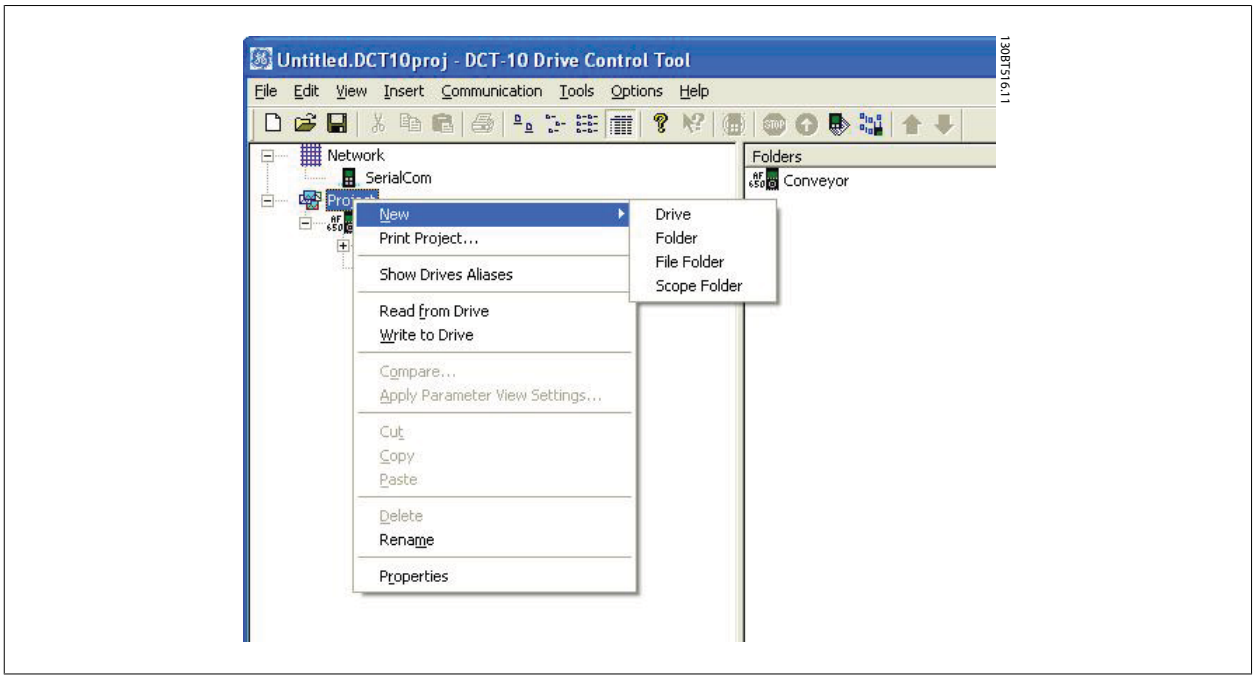
1. Data entered from offline will be stored on the hard disk. The Project folder is also where to insert folders or store other files related to the project. These other files can be in any format, for example Word, *.pdf, etc.
2. Mark the location in offline and insert a frequency converter or a specific foler.

Drive

Inserting a frequency converter into the Project folder can be done in two ways:

1. Right clicking at the offline location and choose *New Drive*
2. Mark the location in offline and select *New Drive* under *Insert*, on the main menu bar.

4.1.9 Folders



Alternatively, you can select Insert on the menu bar, then New, and then Drive, Folder or File Folder:

Folder

Is a group of frequency converters forming part of a machine or of a system. Folders are used for organising a large system into several smaller systems.

Inserting a folder in offline can be done in two ways:

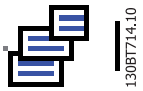
1. Right clicking at the Project or an existing folder and choose *New Folder*.
2. Mark the Project or an existing folder and select *New Folder* under *Insert*, on the main menu bar.

File Folder

Is a folder for storing files belonging to the Project. These files can be in any format, Word documents, PDF files etc.

Inserting a file folder in offline can be done in two ways:

1. Right clicking on the location and choose *New File Folder*.
2. Mark the offline location and select *File New Folder* under *Insert*, on the main menu bar.

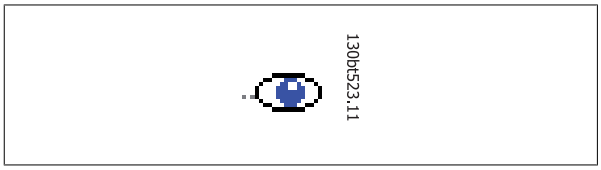


Parameter Folder

Is a folder for storing parameter settings temporary or for documentation purposes. The folder can contain a single parameter, subgroup, parameter group or the entire parameter database.

Inserting a parameter folder in offline can be done in two ways:

1. Right clicking on the frequency converter and choose New Parameter Folder.
2. Mark the frequency converter and select File Parameter Folder under Insert, on the main menu bar.

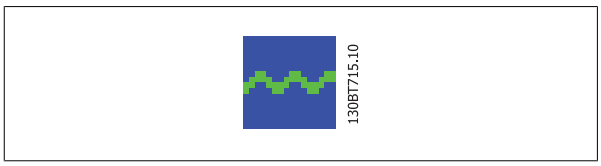


Scope Folder

Is a folder for diagnostic purposes analysing the behavior of one or several parameters by visualising as a curve(s).

Inserting a scope folder in offline can be done in two ways:

1. Right clicking on the location and choose *New Scope Folder*.
2. Mark the offline location and select *Scope Folder* under *Insert*, on the main menu bar.



5 Set-up of Communication

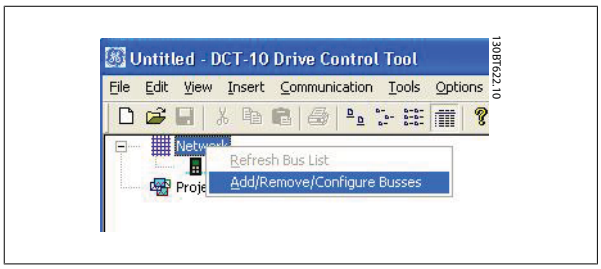
5.1 How to Establish Communication

Data communication between a PC and the frequency converter(s) can be established via a hardwired connection. The hardwired connection can be via the standard built-in RS-485 or USB port. If the OPCPDP, OPCEIP, or OPCMBTCP network option is mounted in the frequency converter(s), the connection can be obtained via a Profibus Master Class 2 connection (MSAC 2) or an Ethernet based network.

The USB interface socket is controlled by the Microsoft operating system providing plug-and-play capabilities by allowing devices to be connected and disconnected using hot swapping. Connecting a frequency converter using USB DCT-10 will automatically add on to the network list.

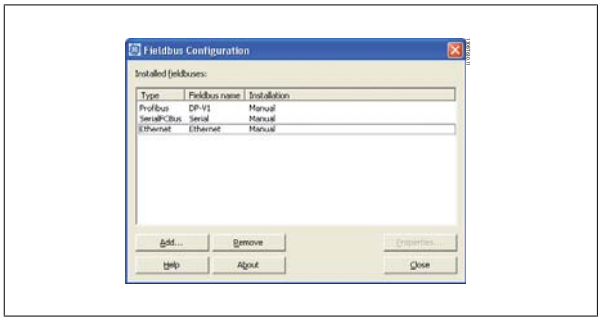
The communication framework part of DCT-10 is handling the control of the networks. It provides enhanced capabilities allowing multiple concurrent network communication. Several networks can be configured and combined in the same Network within DCT-10. If several networks are created with the same type, please make sure they are configured with different scan ranges.

Starting DCT-10 the first time after installation the non plug-and-play networks must be manually configured from the network configuration dialog.



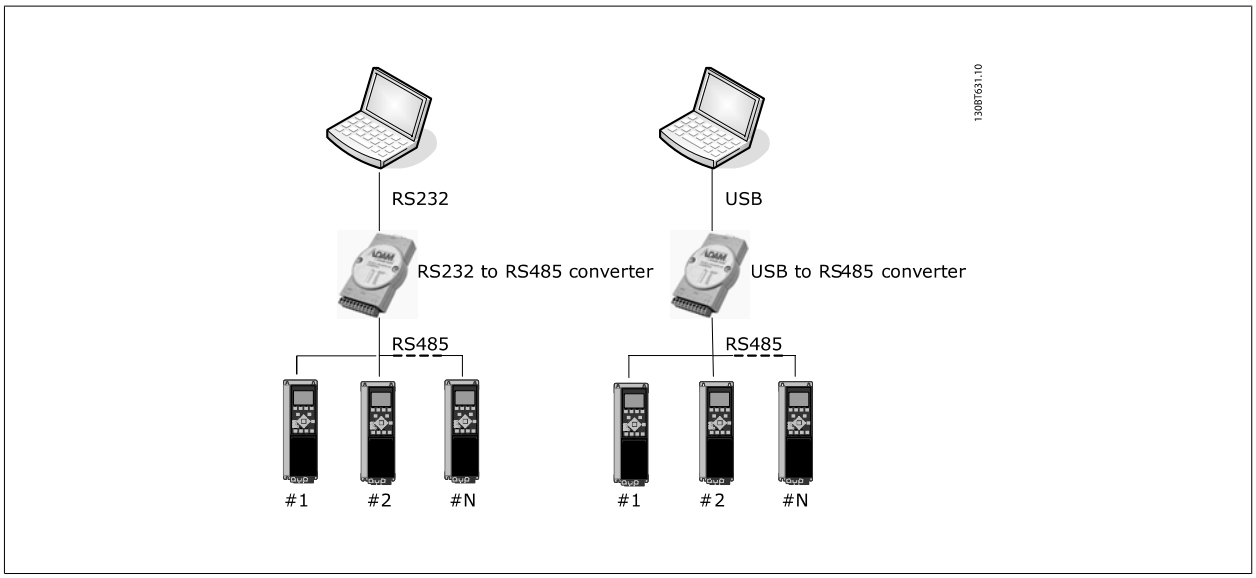
From the network configuration dialog non plug-and-play networks can be added, removed or reconfigured from the installed list.

For DCT-10 to indicate the available frequency converter(s) on the non plug-and-play networks the user manually has to scan the network for active drives. The scanning is available from a right click on the appropriate network.



5.2 RS-485 Data Communication

The majority of GE products have the drive protocol as standard RS-485 data communication. Communication from a PC can be established via RS232 to RS-485 converters or via USB to RS-485 converters.



All frequency converters are default set to 9600 baud, but can also be configured to 300, 1200, 4800, 19200, 38400, 57600 or 115200 baud. The serial configuration is always configured with 8 data bits, 1 stop bit and even parity.

NB!

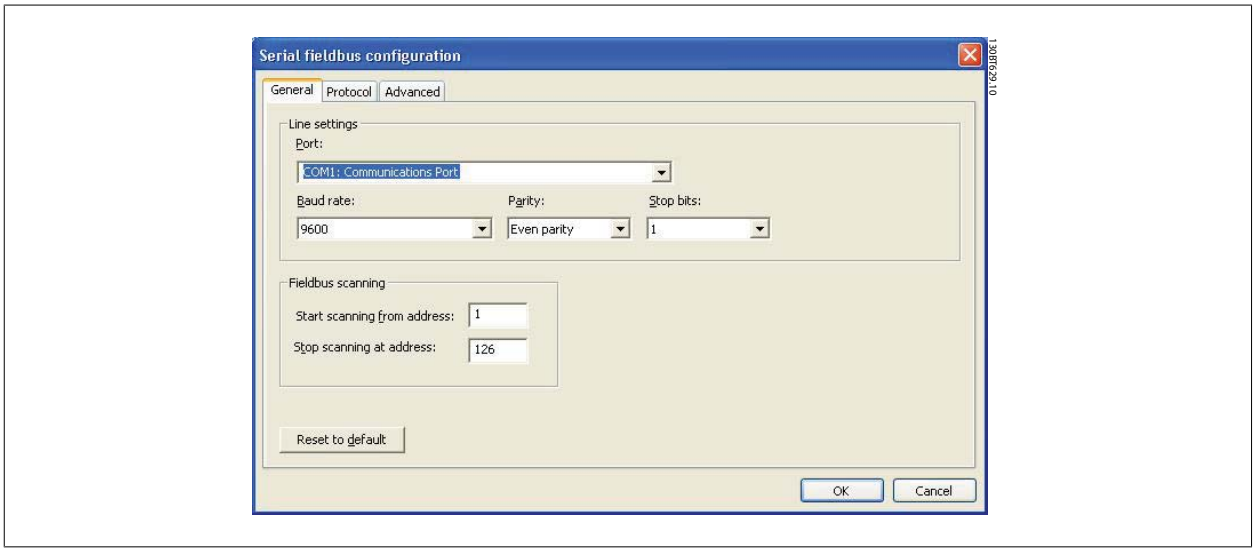
Choose a relevant scan range. It takes too much time to scan all available addresses (1-126).

Using the Drive series AF-600 FP and AF-650 GP: Drive MC Protocol (par. O-30 "Drive MC") is required for correct functionality. The parameter is only available from the keypad.

5.2.1 Serial Configuration

When using a RS-485 converter as the Advantech ADAM converter, DCT-10 will indicate online frequency converter(s) available on the serial network after scanning the network.

The network can be configured from the *Serial fieldbus configuration* dialog box or by *right-clicking* the appropriate serial network.

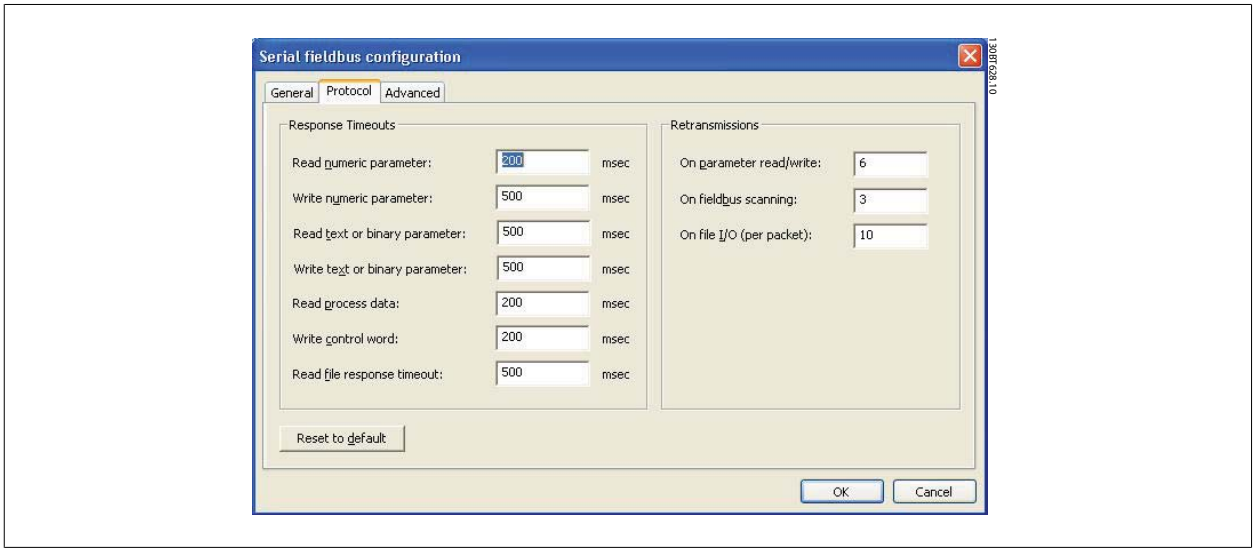


The COM port number must be set to the appropriate one used. When using USB to RS-485 converters, the actual comport number can be identified from the Device Manager part of the Windows Control Panel.

The Baud rate, Parity and the number of Stop bits must match the settings in the drive.

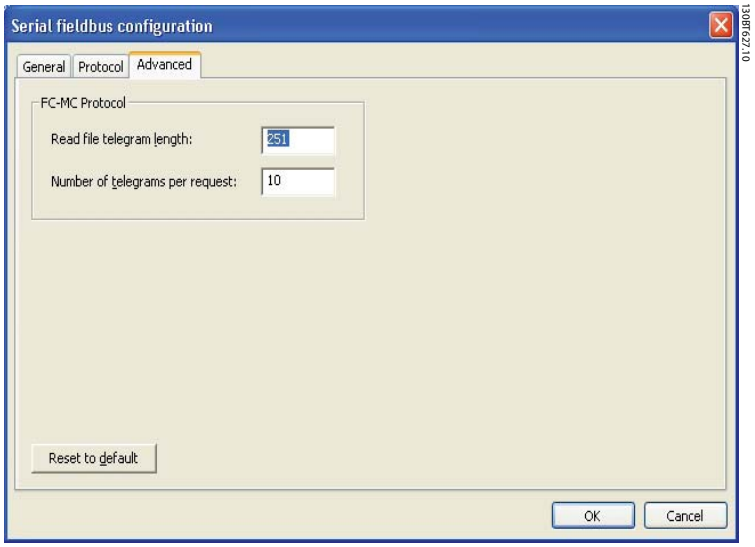
The network scanning range should be set to the available addresses only to limit the time scanning for active drives.

Reset to default bottom restores the Line settings and network scanning to factory configuration values.



The Response Timeouts and Retransmissions are settings editable for performance optimization, but should normally not be changed.

Reset to default bottom restores the Protocol settings to factory configuration values.

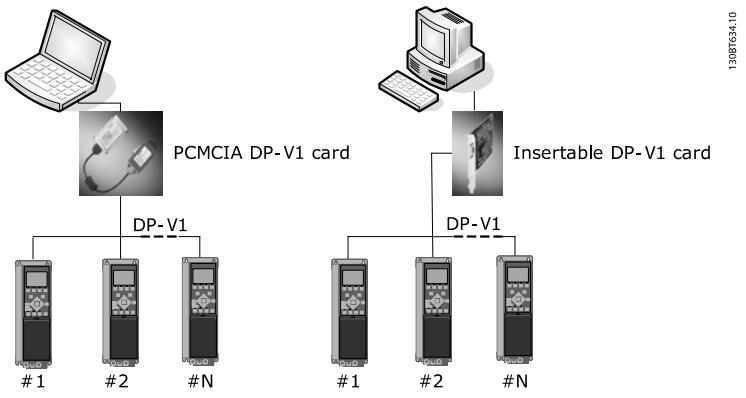


The Drive-MC Protocol are settings editable for performance optimization, but should normally not be changed.

Reset to default bottom restores the Protocol settings to factory configuration values.

5.3 Profibus DP-V1 Data Communication

To setup a Profibus DP-V1 communication, the OPCPDP Profibus option module is required. Communication from a PC using Profibus DP-V1 can be established using a Profibus PCMCIA card or a card installed in the PC. The Profibus cable from the frequency converter is connected to the 9-pin sub D socket connector located on the card.



The following Master class 2 cards are currently supported from Siemens:

- CP 5411
- CP 5511
- CP 5512
- CP 5611
- CP 5613

- CP 5614
- CP 5711

(Please also consult the Siemens website for latest supported cards for PC's.)

NB!
Please consult the chapter *DP-V1 Connection and PG/PC Interface*, covering more details about setting up the Simatic Manager.

5.3.1 Profibus DP-V1 Configuration

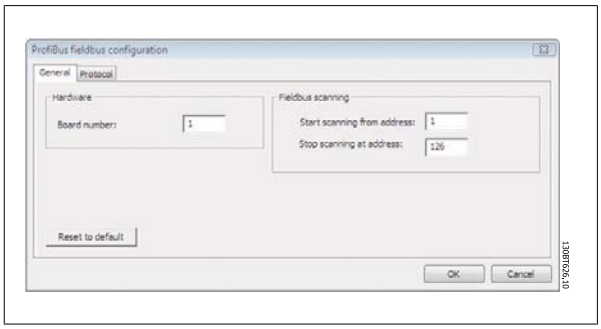
When using a Profibus interface card with the associated driver installed, DCT-10 will indicate online frequency converter(s) available on the specific Profibus after scanning the bus for active drives.

The network can be configured from the *Fieldbus Configuration dialog* or from right click on the appropriate Profibus network.

The Board number must be set to the appropriate one used.

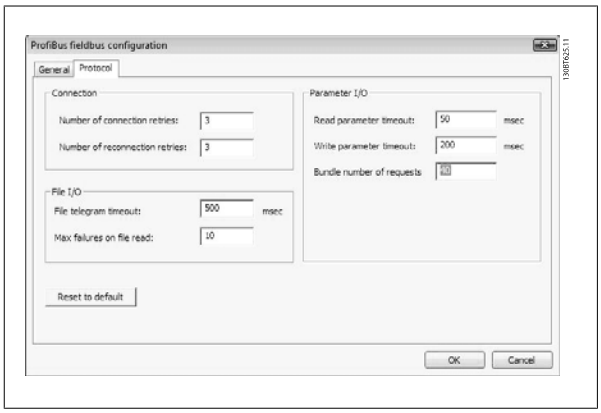
The network scanning range should be set to the available addresses only to limit the time used for scanning active drives.

Reset to default bottom restores the Hardware settings and network scanning to factory configuration values.



The Connection, Parameter I/O and File I/O are settings editable for performance optimization, but should normally not be changed.

Reset to default bottom restores the Protocol settings to factory configuration values.



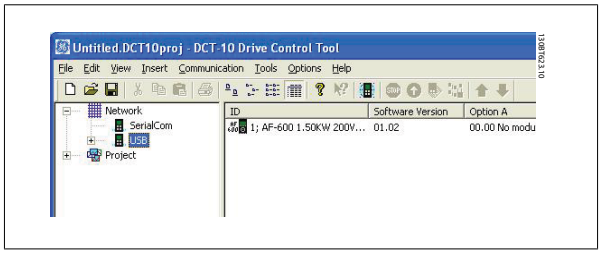
Bundle number of requests is used to configure the number of requests associated within a multi telegram. The value is configurable in the range from 10 to 40 requests with 40 defined as the default value.

Increasing the value improves the Profibus communication performance but be aware not all drives supports this. It is recommended to use the following settings:

- *Bundle number of requests* = 10 – for connectivity to the AF-600 FP and AF-650 GP platform and all derived series based on a drive platform
- *Bundle number of requests* = 40 – for improved connectivity to the AF-600 FP and AF-650 GP series and all derived ones based on the drive series.

5.4 USB Data Communication

GE frequency converters in the AF-600 FP and AF-650 GP series are standard equipped with a USB port. Communication from a PC can be established using a standard A – B male to male USB cable connected to the frequency converter. No extra hardware or bus configuration is required. If the PC is equipped with more than one USB port several frequency converters can be connected. The USB bus will in DCT-10 automatically be add on to the Network bus list.



When the USB cable is disconnected, the frequency converter connected via the USB port will be removed from the Network bus list.

NB!
A USB bus has no address-setting capacity and no bus name to configure. Connecting more than one frequency converter through USB, the bus name will be auto incremented in the DCT-10 Network bus list.
Connecting more than one drive through a USB cable often causes computers installed with Windows XP to throw an exception and crash. Therefore it is advised only to connect one drive via USB to the PC.

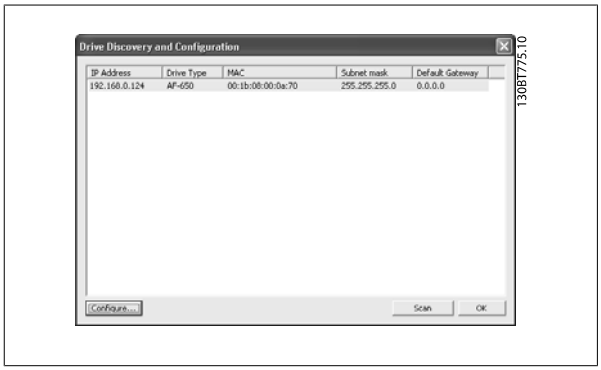
5.5 Ethernet-TSC Data Communication

To setup an Ethernet-TSC (Transparent Socket Channel) communication, the OPCEIP or OPCMBTCP option module is required within the drive. Communication from a PC can be established using a standard Ethernet cable connected to the drive.

5.5.1 Ethernet-TSC Configuration

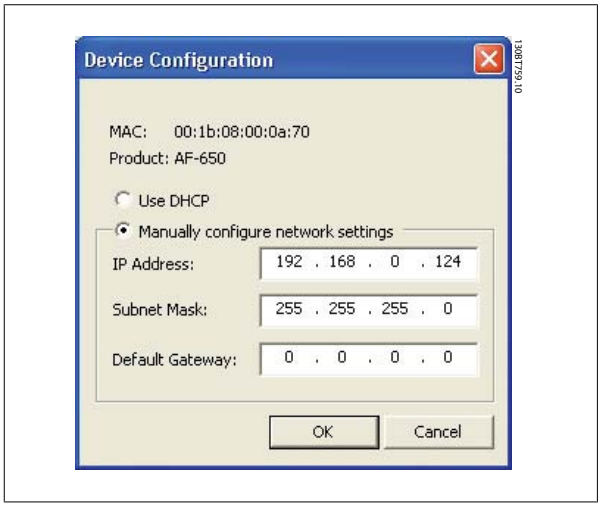
Ethernet-TSC bus is scanned using ADDP (Advanced Digi Discovery Protocol). The protocol does not require an IP Port number and IP scan range. It is capable to identify drives even without an IP address configured and in this case it is identified based on the MAC address.

All active drives scanned from the Ethernet bus are listed in the *Drive Discovery and Configuration* dialog when pressing the *Scan* button.



Drive types without any IP configuration uses per default its Auto IP Class B address, which is 169.254.yy. xx, with *yy.xx* corresponding to the last two segments in the MAC address. Several uncommissioned drives without any IP configuration can be scanned on the same network. DCT-10 will signal a warning when identifying a drive(s) with the Auto IP address, requiring the user to setup the IP configuration.

The Configure button is used to assign the drive a static *IP address*, *Subnet Mask*, *Default Gateway* or to setup using DHCP (Dynamic Host Configuration Protocol) lookup.

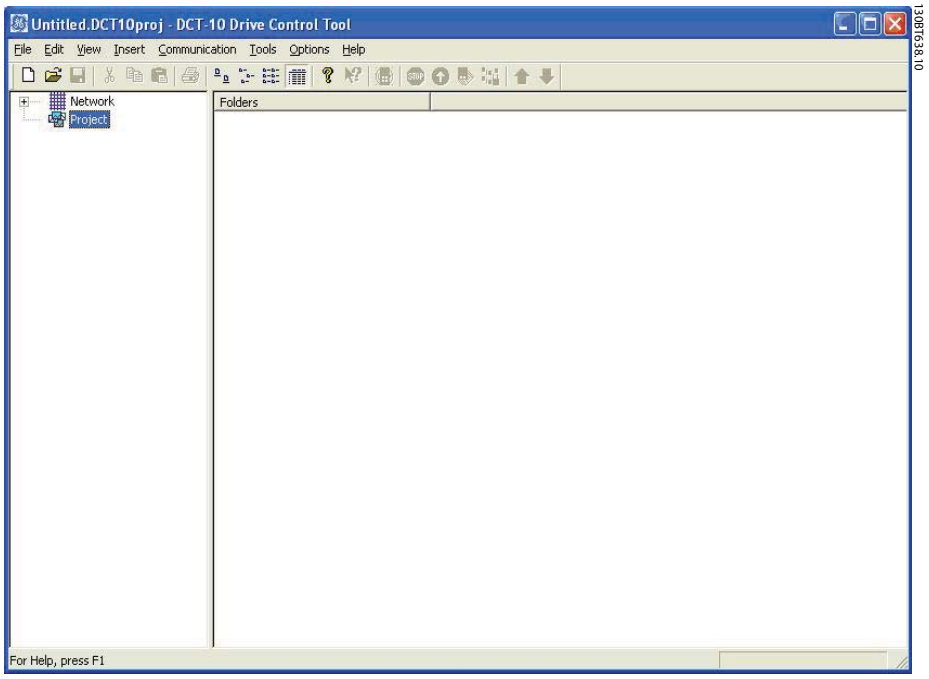


Scanning a bus, all active drives are per default identified. It is possible by using a corresponding offline drive to read or write to a single drive without requiring the time for DCT-10 to scan and identify all drives. The user opens the project file or manually creates the offline drive and configures the connection properties. Then the user can right click on the offline drive and choose to read or write to the drive without scanning the bus.

6 Parameter Handling

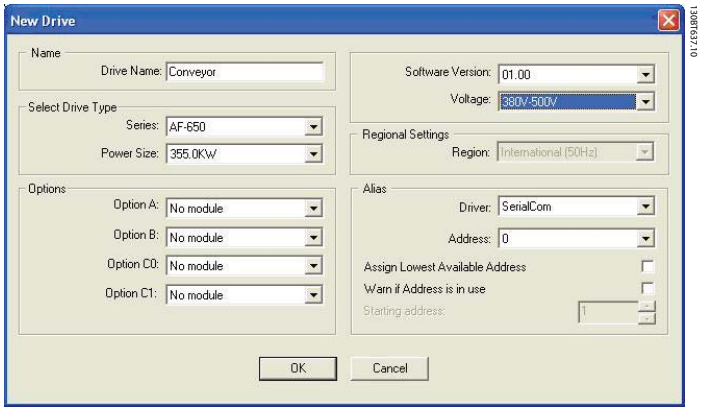
6.1 Set-up

This chapter explains how to control a frequency converter using the DCT-10. After starting the DCT-10, the main window looks like this:



Insert a new drive, folder or file folder by selecting the Project icon with a right-click on the mouse. Alternatively, you can select Insert on the menu bar, then select New, then Drive, Folder or File Folder.

Drive refers to the type of frequency converter you wish to set up. Inserting a frequency converter will bring up the drive selector window.



The New Drive window consists of four main parts; Name, Drive Identification, Regional Settings and Connection. All parts are mandatory to be Fill in:

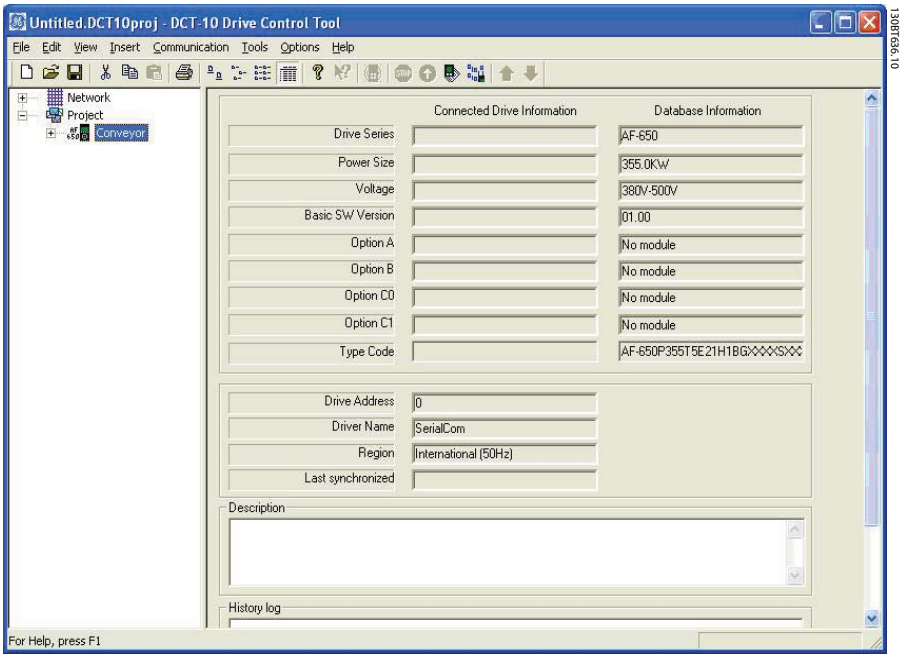
Name is the name you want to identify the frequency converter with. This can be any text/number combination.

Drive Identification is the information regarding the frequency converter series, power size, options installed, software version and voltage level. The different selections are available from the drop down menus.

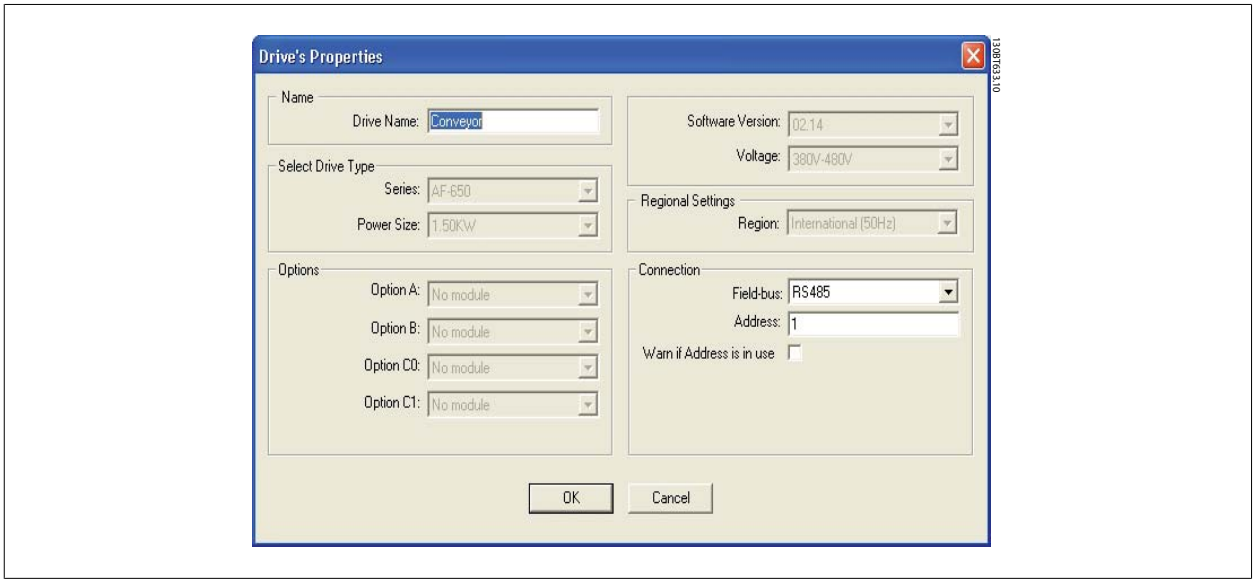
Regional Settings is configurable for International 50Hz or North America 60Hz settings. These discriminate mainly between horse power, kW and voltage level.

Connection means the network used between the PC and the frequency converter associated with the address to communicate. The specific network type is available from the drop down menu.

Once the new frequency converter is added in the Project folder, the drive icon is selectable to display the database information as entered above:



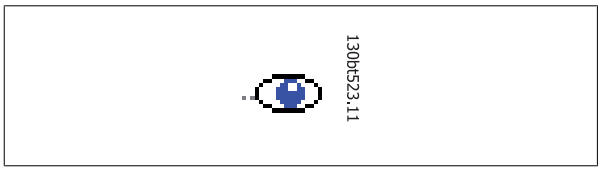
The frequency converter(s) located in the offline project folder are reconfigurable right click on the specific drive icon and choose Properties. The Drive's Properties dialog appears providing the possibility to rename the drive Name and reconfiguring the Connection Set-up.



Note that the Connected Drive Information fields are empty. This is because at this point, you have not yet accessed the online frequency converter represented by the new frequency converter created offline. To view information from the online frequency converter, please refer to the Read From Drive feature.

6.1.1 Parameter Folders

When you have set up a drive within the Project folder, you can create new parameter folders within that drive. Create a new Parameter Folder by right-clicking on the Drive icon, then selecting New, then Parameter Folder. The default name for the new parameter folder will be New Folder 1, New Folder 2, etc.



6.1.2 Custom Parameter Folders

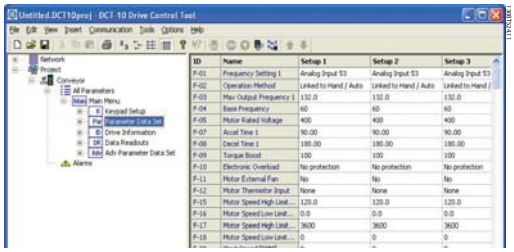
You can give the new parameter folder the desired identity using the Rename function, accessible by right-clicking on the New Folder icon.

6.1.3 Generic Folders

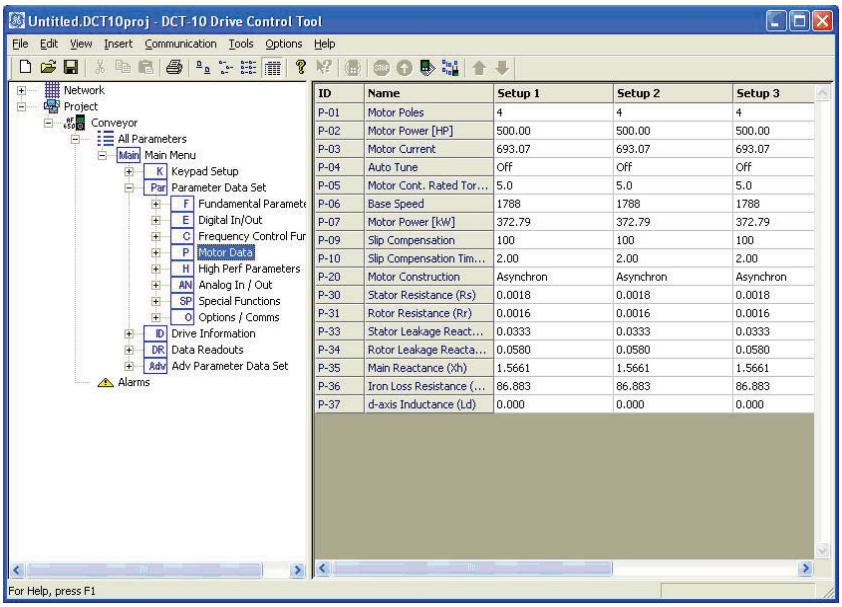
When a new drive is set up according to drive, it will take the form of a folder named by the user, containing an All Parameters folder, which comprises a series of inner folders with generic names. These generic names cannot be changed or personalised, i.e. there is no rename function for these folders. The generic folders within most frequency converters are as follows:

- Operation and Display
- Load and Motor
- References and Limits
- Inputs and outputs
- Special functions
- Serial communication
- Technical functions

The generic folders can vary according to the type of frequency converter selected.



The contents of the generic folders are fixed, and comprise the parameters relevant to the frequency converter type selected. The ID, name and settings of these parameters become visible in the Right View, with a left-click on the generic folder icon or name in the Left View.

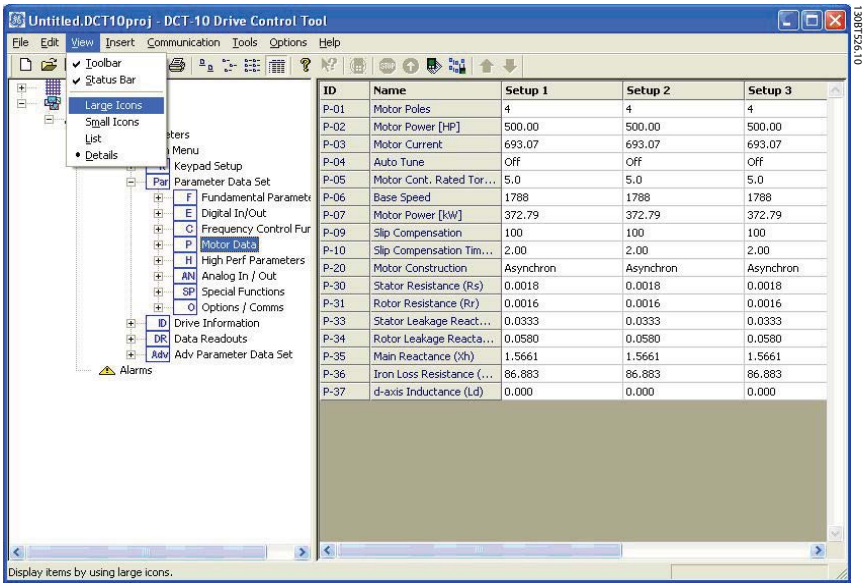


6.1.4 Display Options

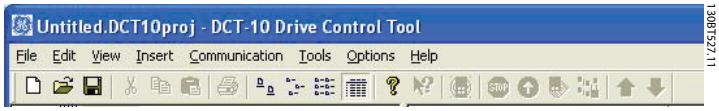
Display Options By selecting View in the main menu bar, a range of display options are presented. The user can choose to display or hide the Toolbar and the Status Bar.

The user can also select the desired form of the Right View:

- **Large icons**
- **Small icons**
- The Right View display can be presented in the form of a **List** of folders and elements
- The Right View display can present **Details** of Network and Project elements



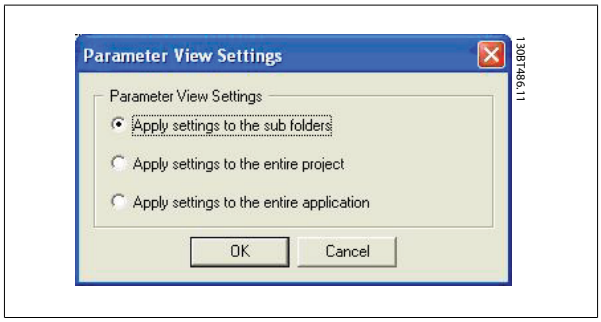
The final four display options (Large icons, Small icons, List and Details) are also accessible by clicking on the toolbar, options 8 through 11 from the left.



6.1.5 Parameter View Settings

You can apply the chosen parameter view settings described above to subfolders, to an entire project, or to the entire application, i.e. all DCT-10 folders in Network or Project mode.

Right-click on the parameter cell or set-up column then select Apply Parameter View Settings. Alternatively, select Apply Parameter View Settings under Tools on the main menu bar. The following pop-up will appear:



6

Select the option you wish to apply then click OK to activate that option.

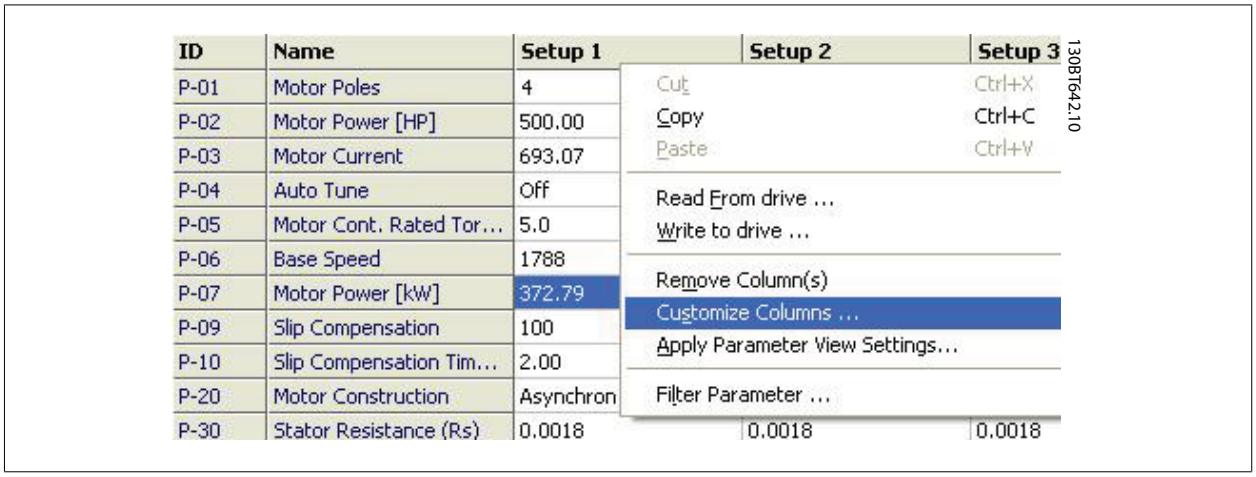
6.2 Filters

The DCT-10 can be configured by view filters to display parameters in a special way or to display parameters of interest. This is a powerful tool in maintaining an overview of the drive, without becoming confused by irrelevant parameters.
Filters can be applied to the parameter set-ups, which are displayed in the Right View when highlighting a generic folder in the Left View, i.e. one of

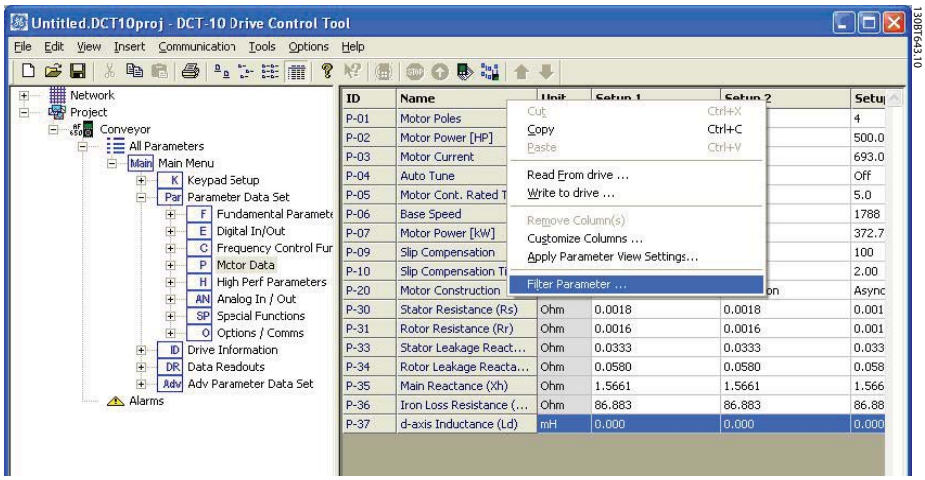
- Operation and Display
- Load and Motor
- References and Limits
- Inputs and outputs
- Special functions
- Serial communication
- Technical functions

The parameters displayed in the Right View are presented in a series of columns, containing ID, parameter name, four set-ups, units and factory set-up.

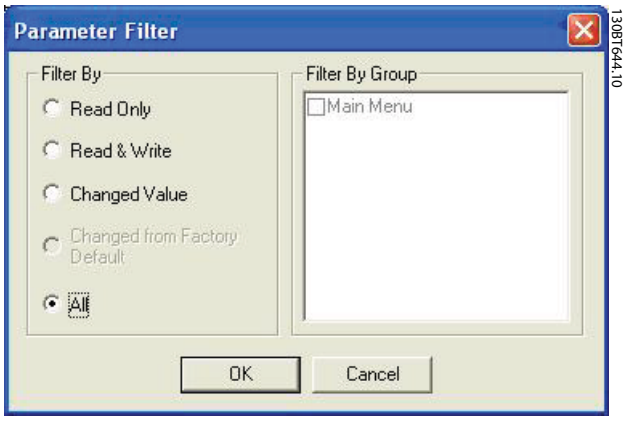
Each set-up can be hidden by removing it. This is done by selecting the set-up in the parameter view and then selecting the remove menu. Changes made to the removed set-up are still stored inside the DCT-10 and can be displayed again by selecting Customize Columns.
By adding or removing columns the user can decide which information he wants to view.



The actual view can also be made valid for the complete Project or for the Folder only. This allows the user to adjust his view setting quickly for parts or the complete Project.



Another flexible way to adjust the display is via the Filter function.

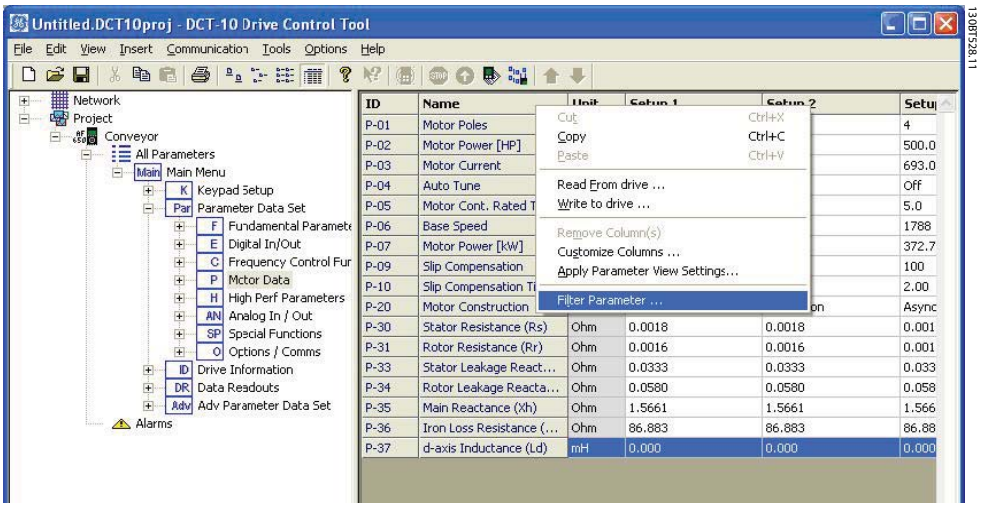


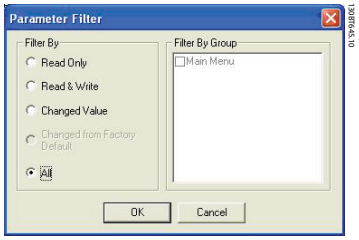
Just by selecting Change Parameters, the number of Parameters displayed is reduced to 5 Parameters in this example.

6.2.1 Parameter Filters

To find the Parameter Filter dialog:

Right-click on any column in Right View, then select Filter Parameter.





6.2.2 Read Only

In the Right View showing details of parameter set-ups, the user can select the Read Only filter to display those parameters which are read only and cannot be changed by the user. Right-click on any parameter column in the Right View, and then select the Filter Parameter option. Under Filter By, the user can then mark Read Only, and the display will show only those parameters which are read only.

6.2.3 Read & Write

In the Right View showing details of parameter set-ups, the user can select the Read & Write filter to display those parameters which are read/write and can thus be changed by the user. Right-click on any parameter column in the Right View, then select the Filter Parameter option. Under Filter By the user can then mark Read & Write, and the display will show only those parameters which are read/write, i.e. can be changed by the user.

6.2.4 Changed

In the Right View showing details of parameter set-ups, the user can select the Changed Value filter to display those parameters which have been changed by the user in the current session. Right-click on any parameter column in the Right View, and then select the Filter Parameter option. Under Filter By, the user can then mark Changed Value and the display will show only those parameters which have been changed during the current session.

6.2.5 All

To display all parameters in the Right View, following a filtering which has hidden some of the parameters, right-click on any parameter column in the Right View, and then select the Filter Parameter option. Under Filter By, the user can then mark All, and the display will show all parameters.

6.2.6 Filter By Group

To display only parameters from a particular group or groups in the Right View, the user can right-click on any parameter column in the Right View, and then select the Filter Parameter option. Under Filter By Group, the user can then mark the desired group or groups to be displayed and the Right View display will show only those group(s).

6.2.7 Column Select

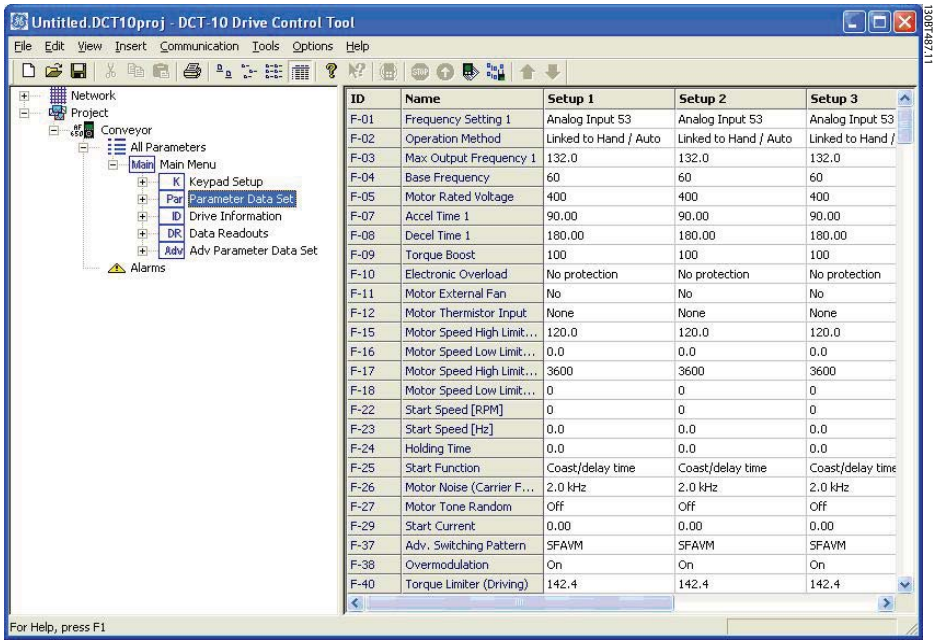
Select a column in the Right View by left-clicking on the column title cell.

6.2.8 Folder Select

Select a folder in the Left View by left-clicking on the folder name or folder icon.

6.2.9 Parameter Display

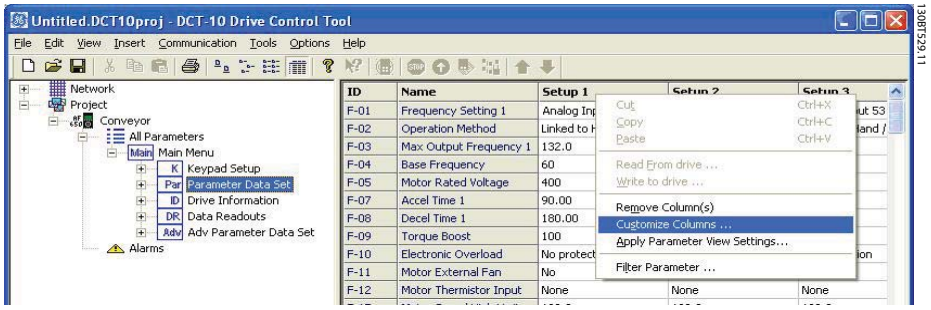
By selecting a parameter folder in the Left View you can view the parameters in the Right View, including their ID code, name and configuration details.



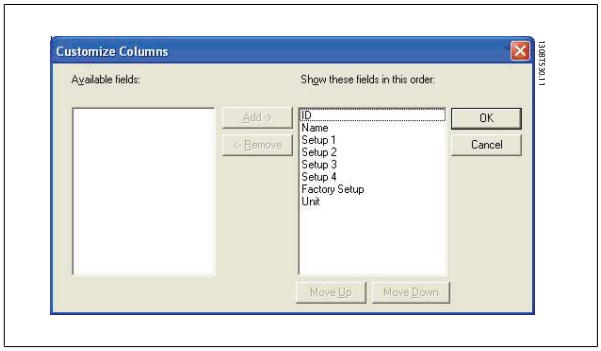
ID	Name	Setup 1	Setup 2	Setup 3
F-01	Frequency Setting 1	Analog Input 53	Analog Input 53	Analog Input 53
F-02	Operation Method	Linked to Hand / Auto	Linked to Hand / Auto	Linked to Hand /
F-03	Max Output Frequency 1	132.0	132.0	132.0
F-04	Base Frequency	60	60	60
F-05	Motor Rated Voltage	400	400	400
F-07	Accel Time 1	90.00	90.00	90.00
F-08	Decel Time 1	180.00	180.00	180.00
F-09	Torque Boost	100	100	100
F-10	Electronic Overload	No protection	No protection	No protection
F-11	Motor External Fan	No	No	No
F-12	Motor Thermistor Input	None	None	None
F-15	Motor Speed High Limit...	120.0	120.0	120.0
F-16	Motor Speed Low Limit...	0.0	0.0	0.0
F-17	Motor Speed High Limit...	3600	3600	3600
F-18	Motor Speed Low Limit...	0	0	0
F-22	Start Speed [RPM]	0	0	0
F-23	Start Speed [Hz]	0.0	0.0	0.0
F-24	Holding Time	0.0	0.0	0.0
F-25	Start Function	Coast/delay time	Coast/delay time	Coast/delay time
F-26	Motor Noise (Carrier F...	2.0 kHz	2.0 kHz	2.0 kHz
F-27	Motor Tone Random	Off	Off	Off
F-29	Start Current	0.00	0.00	0.00
F-37	Adv. Switching Pattern	SFAVM	SFAVM	SFAVM
F-38	Overmodulation	On	On	On
F-40	Torque Limiter (Driving)	142.4	142.4	142.4

6.2.10 Customize Columns

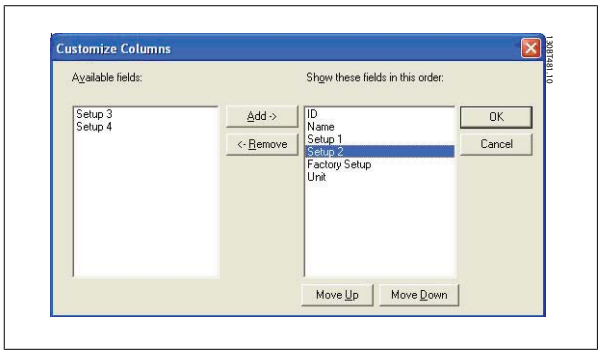
The user can rearrange the display of columns in the Right View display by right-clicking on any column title, then selecting Customize Columns.



The Customize Columns window will be displayed and there, the user can change the order of fields in the display by highlighting a field, then selecting Move Up, Move Down or Remove.



Removed columns are still stored in memory and can be retrieved into the Right View by highlighting the relevant field name and selecting Add.



6.2.11 Read/Write Parameters

The majority of parameters are read/write, i.e. they can be configured by the user. Use the Filter function to view which parameters are read/write.

6.2.12 Read Only Parameters

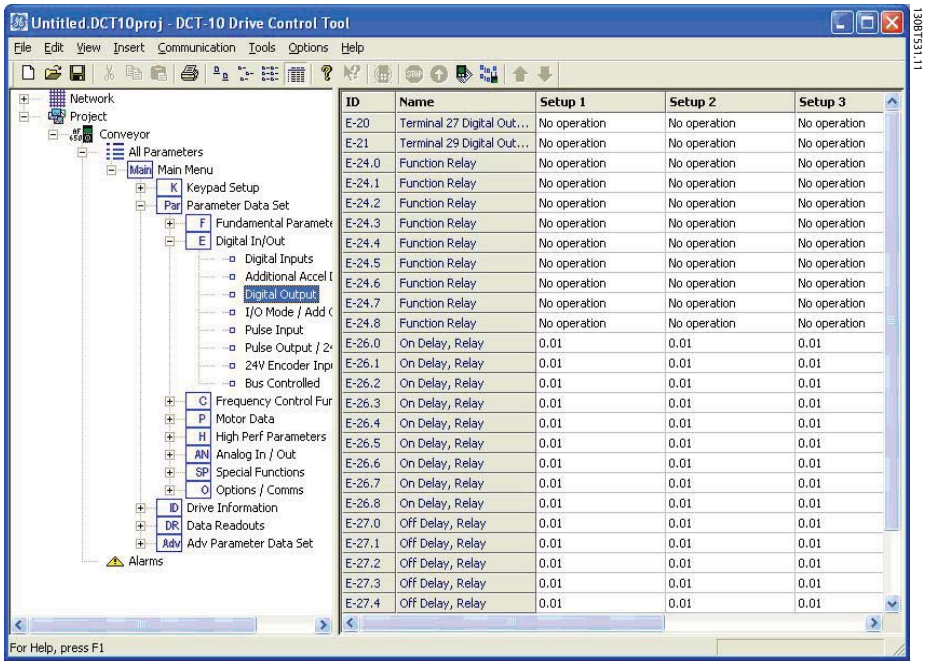
A few parameters are read only, i.e. they provide data only and cannot be configured by the user. Use the Filter function to view which parameters are read only.

6.2.13 Factory Defaults

The parameter factory defaults are viewable by highlighting the parameter folder in the Left View, whereupon the parameter details will be displayed in the Right View. The factory defaults will be displayed in the Set-up columns unless a user has changed the parameter configuration. If the parameter configuration has been changed since factory supply, the factory defaults are displayed in the Factory Set-up column.

6.2.14 Array Parameters - DCT-10

Parameters containing data in the form of an array are displayed as a matrix in the Right View, where the rows of the matrix are identified as ID.1, ID.2, etc. For example, in the view below, array parameters E-24 and E-26 are displayed over several entries as E-24.1, E-24.2, etc, and E-26.1, E-26.2, etc in the Right View below.



ID	Name	Setup 1	Setup 2	Setup 3
E-20	Terminal 27 Digital Out...	No operation	No operation	No operation
E-21	Terminal 29 Digital Out...	No operation	No operation	No operation
E-24.0	Function Relay	No operation	No operation	No operation
E-24.1	Function Relay	No operation	No operation	No operation
E-24.2	Function Relay	No operation	No operation	No operation
E-24.3	Function Relay	No operation	No operation	No operation
E-24.4	Function Relay	No operation	No operation	No operation
E-24.5	Function Relay	No operation	No operation	No operation
E-24.6	Function Relay	No operation	No operation	No operation
E-24.7	Function Relay	No operation	No operation	No operation
E-24.8	Function Relay	No operation	No operation	No operation
E-26.0	On Delay, Relay	0.01	0.01	0.01
E-26.1	On Delay, Relay	0.01	0.01	0.01
E-26.2	On Delay, Relay	0.01	0.01	0.01
E-26.3	On Delay, Relay	0.01	0.01	0.01
E-26.4	On Delay, Relay	0.01	0.01	0.01
E-26.5	On Delay, Relay	0.01	0.01	0.01
E-26.6	On Delay, Relay	0.01	0.01	0.01
E-26.7	On Delay, Relay	0.01	0.01	0.01
E-26.8	On Delay, Relay	0.01	0.01	0.01
E-27.0	Off Delay, Relay	0.01	0.01	0.01
E-27.1	Off Delay, Relay	0.01	0.01	0.01
E-27.2	Off Delay, Relay	0.01	0.01	0.01
E-27.3	Off Delay, Relay	0.01	0.01	0.01
E-27.4	Off Delay, Relay	0.01	0.01	0.01

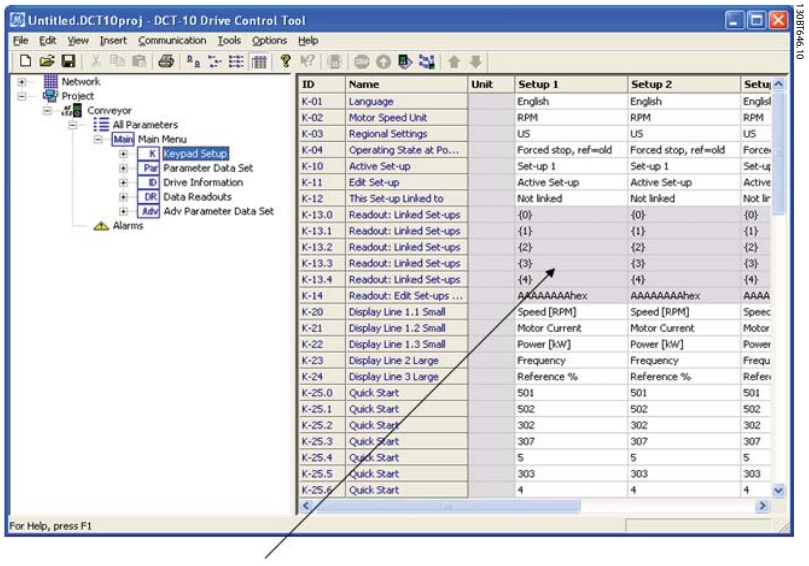
6.3 Special Parameters

6.3.1 Edit Set-up

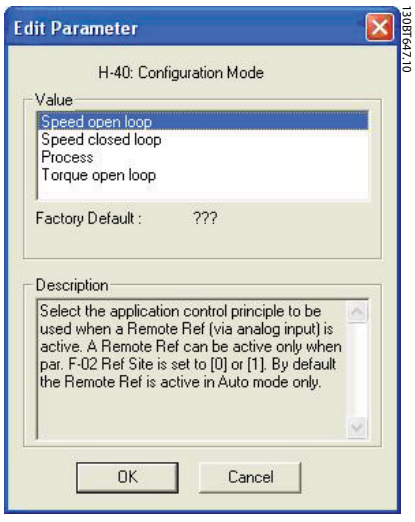
The user can change parameter set-up by manually entering new value(s) into the cells in the Right View.
Alternatively, the parameter set-up can be altered by importing values from an active drive, using the Read From Drive function.

6.4 Parameter Edit

Parameters are organized into the same groups found on the keypad of the drive. A parameter can easily be modified by simply double-clicking on the desired parameter entry. If an entry cell is shaded in light grey it means that it is read only, and cannot be modified.



The settings of a parameter are checked for correct value upon their entry. If a parameter value is set to an illegal value the DCT-10 displays an error. Parameters can be edited in two different modes, dialog-based and inline. In dialog-based edit mode DCT-10 will make a window pop up explaining the usages of the parameter.



6.4.1 Inline Edit

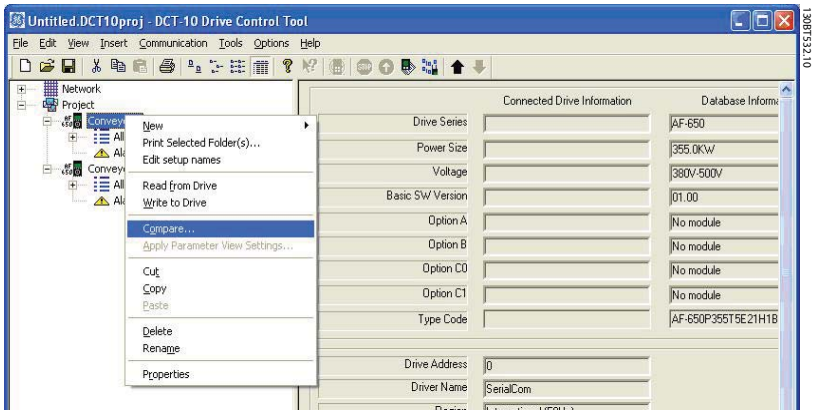
In inline edit mode, DCT-10 displays only the setting options available for a parameter. This works faster but is recommended only for the experienced user, since each possible setting is not followed by a detailed description of the setting.

6.4.2 Dialog Based Edit

If you would prefer to have details of parameters available whilst editing, use Dialog Based Edit. Parameter options, ranges and functions will be displayed whilst you edit the parameters. You will automatically enter Dialog Based Edit if you de-select Inline Edit.

6.5 Comparison of Parameters

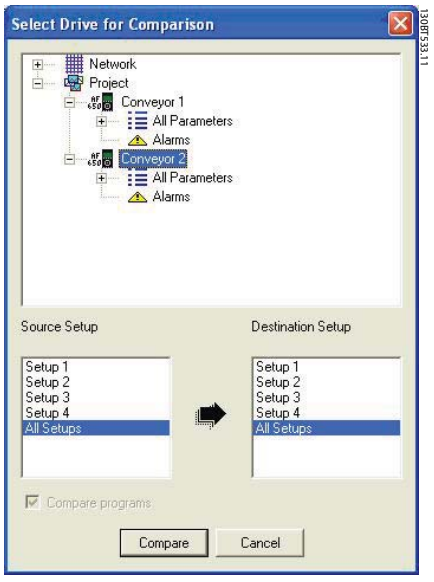
Parameter settings can be compared to the parameter settings in another drive. Comparisons can be made either to another drive inside the project or to an online drive. The comparison function is a powerful tool that evaluates whether settings inside the drive have been changed, or checks if two or more drives have the same settings. The compare function is activated by highlighting the desired drive and selecting Compare.

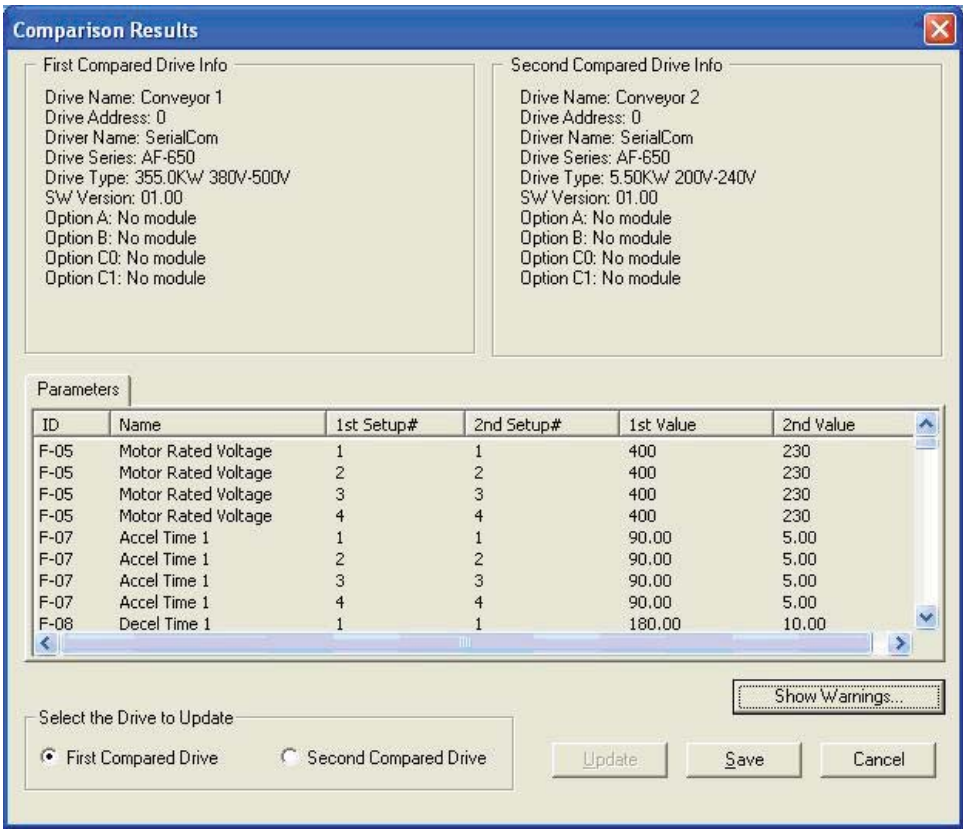


The compare window asks the user for a drive with which to make the comparison. This can be an online drive from the network, or it can be a drive in the offline folder (Project folder).

The result of a comparison can be stored in an ASCII text file for documentation or for subsequent import into a spreadsheet.

It is possible to compare all set-ups, or to compare one set-up against another. The result of a comparison could look like this:



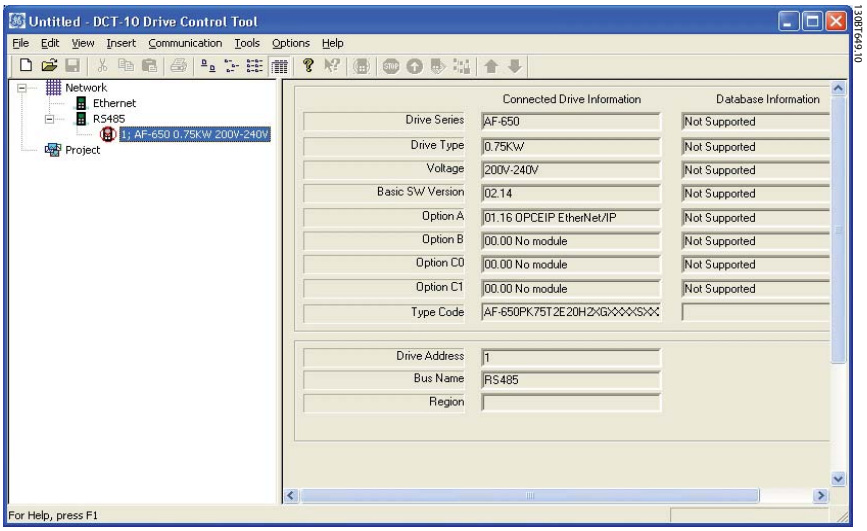

Comparison Results
130BT648.19
First Compared Drive Info
Drive Name: Conveyor 1
Drive Address: 0
Driver Name: SerialCom
Drive Series: AF-650
Drive Type: 355.0KW 380V-500V
SW Version: 01.00
Option A: No module
Option B: No module
Option C0: No module
Option C1: No module
Second Compared Drive Info
Drive Name: Conveyor 2
Drive Address: 0
Driver Name: SerialCom
Drive Series: AF-650
Drive Type: 5.50KW 200V-240V
SW Version: 01.00
Option A: No module
Option B: No module
Option C0: No module
Option C1: No module
Parameters
ID | Name | 1st Setup# | 2nd Setup# | 1st Value | 2nd Value
F-05 | Motor Rated Voltage | 1 | 1 | 400 | 230
F-05 | Motor Rated Voltage | 2 | 2 | 400 | 230
F-05 | Motor Rated Voltage | 3 | 3 | 400 | 230
F-05 | Motor Rated Voltage | 4 | 4 | 400 | 230
F-07 | Accel Time 1 | 1 | 1 | 90.00 | 5.00
F-07 | Accel Time 1 | 2 | 2 | 90.00 | 5.00
F-07 | Accel Time 1 | 3 | 3 | 90.00 | 5.00
F-07 | Accel Time 1 | 4 | 4 | 90.00 | 5.00
F-08 | Decel Time 1 | 1 | 1 | 180.00 | 10.00
Show Warnings...
Select the Drive to Update
First Compared Drive
Second Compared Drive
Update
Save
Cancel

6

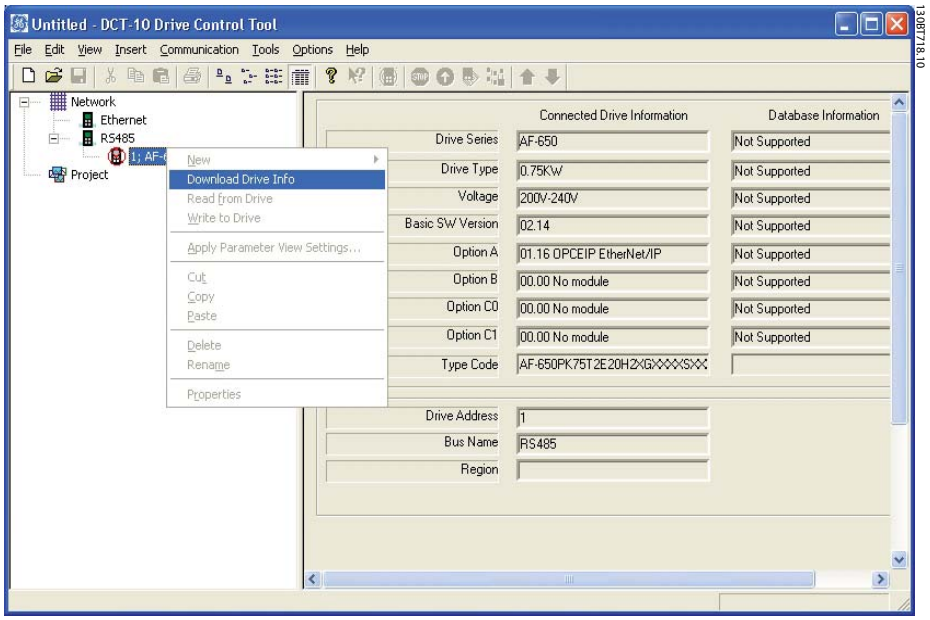
6.6 Read Frequency Converter Database

In the event that the DCT-10 database information is outdated, for example when a drive newer than the software version is introduced to the network, the DCT-10 database can be updated either by download from Internet or when this is not possible, by reading from the frequency converter itself.

When the DCT-10 database for a frequency converter is outdated, the frequency converter icon will be displayed with a red line through it and the Database Information cells will display the message Not supported, as shown:

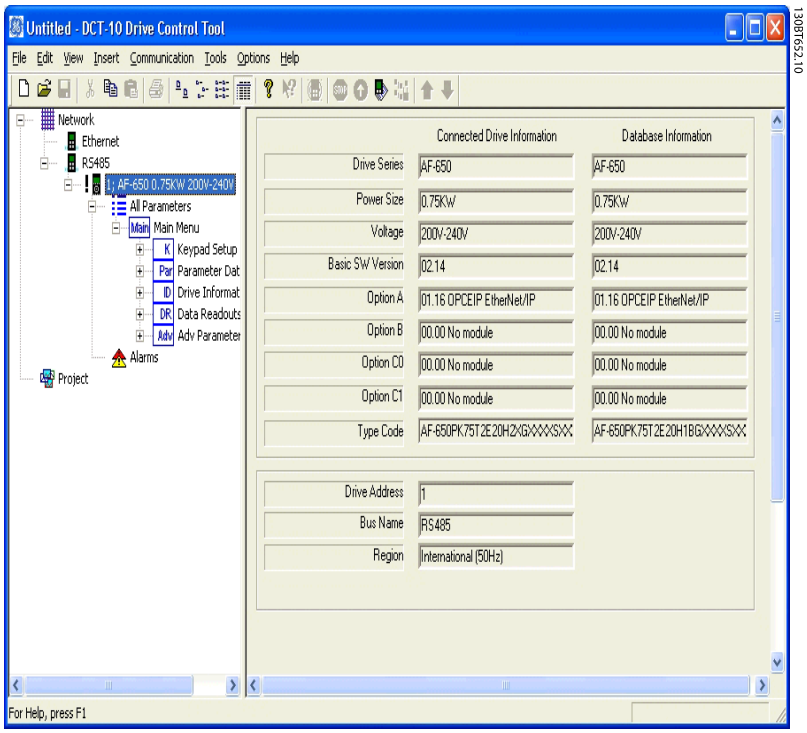


Update the database by uploading the DLL file as follows:
Right-click on the frequency converter icon and select Download Drive Info.



The following message will appear. To read from the frequency converter select Yes and reading from the frequency converter will commence.

When reading from the frequency converter is complete, the frequency converter icon will no longer have a red line through it and the Database Information in the Right View will display settings identical to the Connected Drive Information.



7 Read/Write Parameters

7.1 Reading and Writing Parameters

Parameter settings can be read from or written to an online connected frequency converter. The options for reading from or writing to parameters are manifold.
One single set-up value can be read/written.
All four set-ups of a parameter can be read/written.
A group of parameters can be read/written and so on.

The user performs reading or writing by selecting the value(s) to be read/written and then selecting the *Read From drive or Write to drive* menu.

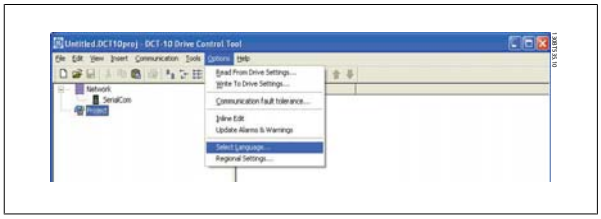
You can select

- A single parameter in the Right View
- All Parameters in the Left View
- One group of parameters in the Left View, e.g. Load and Motor group

and the Read From drive and Write to drive functions will apply to the whole selection.

7.2 Read/Write Settings

Access a range of functions by selecting Options on the main menu bar:



7.2.1 Read From Drive Settings

Select the desired options for reading from an active frequency converter, which will then become applicable for all reading from frequency converter(s).

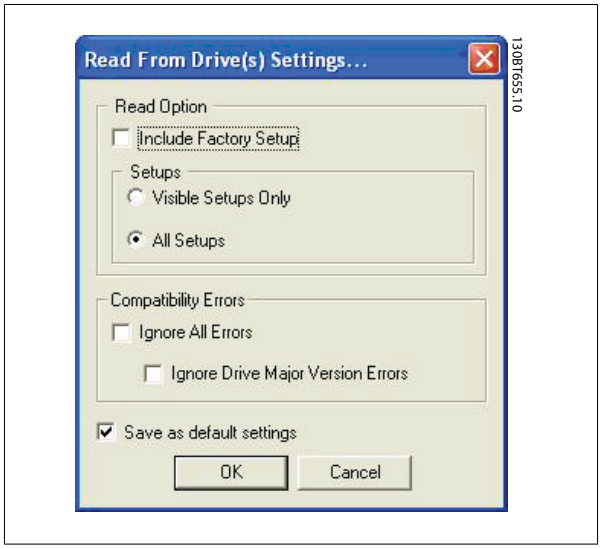
Include Factory Set-up
If this option is selected, the factory set-up data (i.e. default values) will be included in the data read from the frequency converter. The factory set-up is not always standard, it can be changed, and therefore this can be a useful option when needing to check the actual default values.

Set-ups
Select whether you wish to read only visible set-ups or wish to read all set-ups.

Compatibility Errors
If the field device software is not exactly identical with the DCT-10 version of the device, this is where you can specify what level of compatibility is acceptable. You can choose to *Ignore All Errors*, i.e. ignore all compatibility errors.
Alternatively, if this is unacceptably broad, you can choose *Ignore Drive Major Version Errors* to restrict the acceptable compatibility errors to those occurring in a major software version. Minor version differences such as v3.1 to v3.4 will be ignored, but major version differences such as v3.1 to v4.1 will not be accepted.

Save as Default Settings

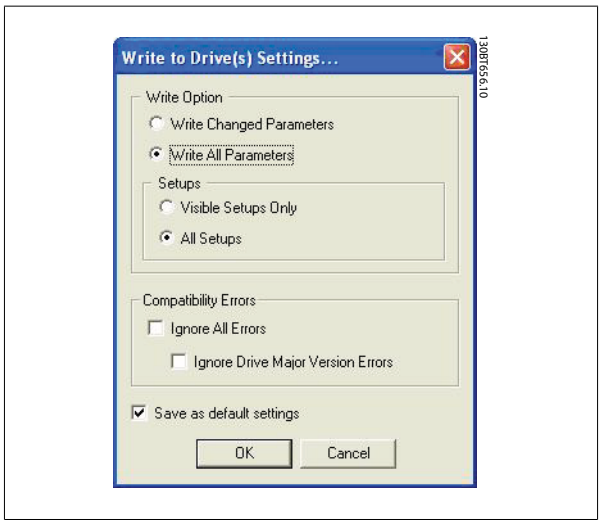
Selecting this option will activate the above settings for all reads from drive.



7

7.2.2 Write to Drive Settings

Select the desired options for writing to an active drive, which will then become applicable for all writing to drive(s).



7.2.3 Communication Fault Tolerance

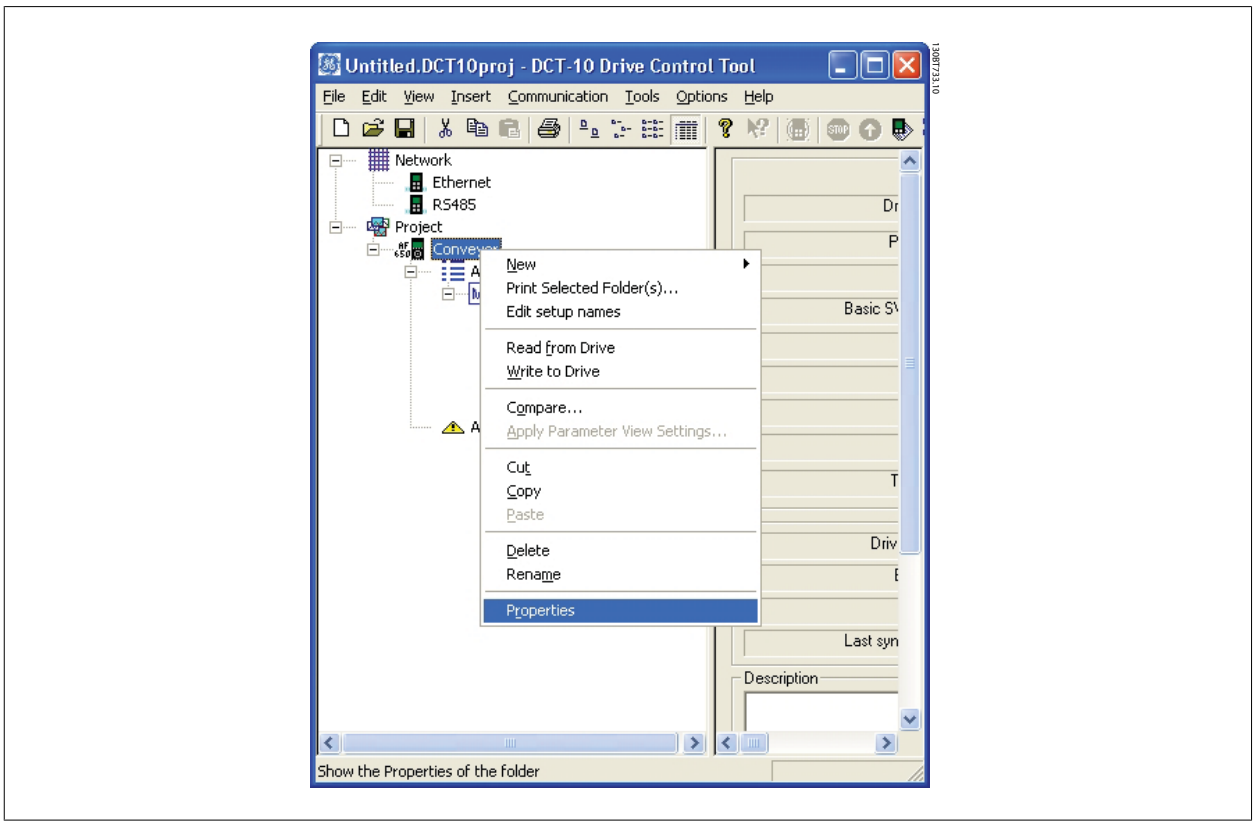
Here you can set up the number of communication faults tolerable before breaking off the connection. The default Number of Failures value is 0 or 1, which in practice is usually too low a fault tolerance for smooth communications, i.e. the connection will constantly be cut off.

For normal operating conditions, set Number of Failures to 3 to achieve reasonably smooth communications. For operating conditions where the electrical noise level is high, or where the standard of the installation is low, set Number of Failures to 5.

7.3 Connection Properties

To read or write between on- and offline drive(s), the connection properties must be correct configured in the offline project. If the network do not refer to one available in the Network tree, DCT-10 will not be able to identify the online drive.

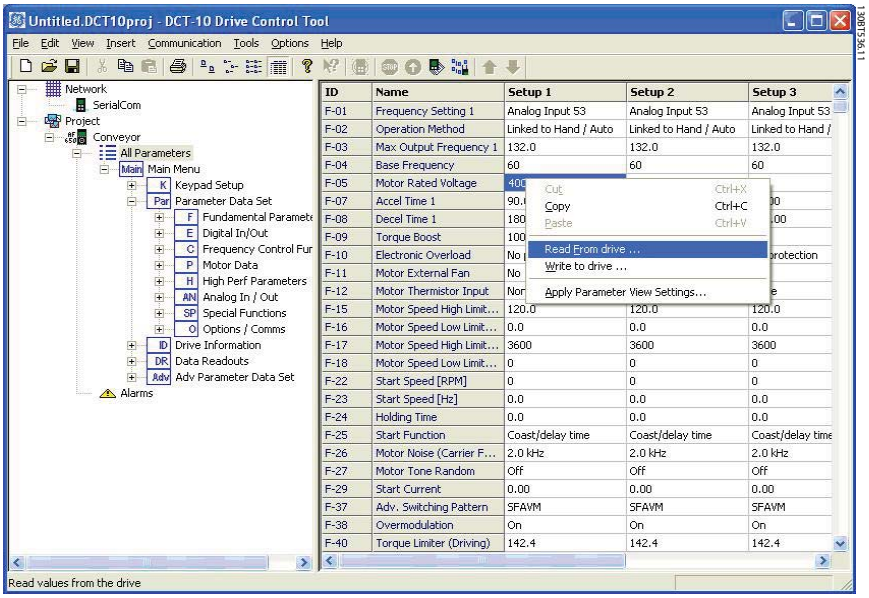
The network can be reconfigured by right clicking on the offline project and choose Properties.



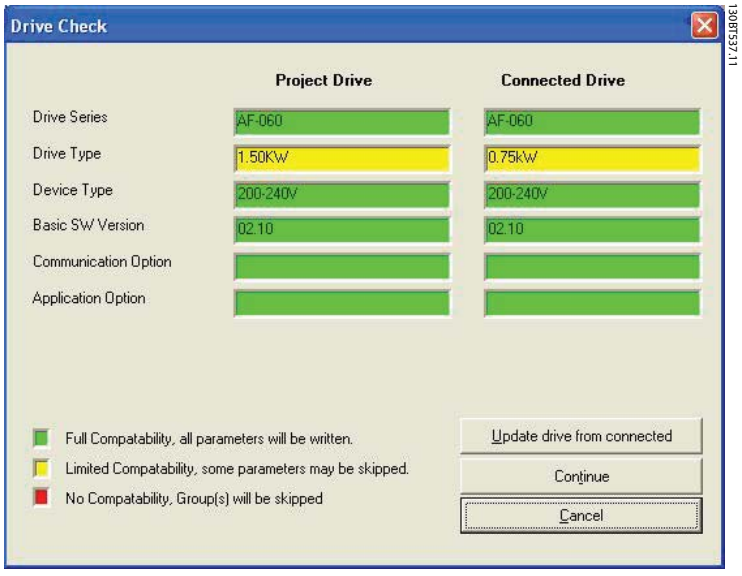
From the Drive's Properties dialog, the fieldbusses added to the Network tree can be configured in the Fieldbus dropdown.

7.4 Read From Drive

Values can be read from an active frequency converter by right-clicking on the desired selection (in this example a parameter column title in the Right View), then selecting Read From Drive.



Once Read From Drive is selected, the software accesses the online device and the Drive Check window pops up, showing the compatibility of the properties of the offline Project drive (where the properties are based on database information) with the online device, i.e. Connected Drive, as in the following example:



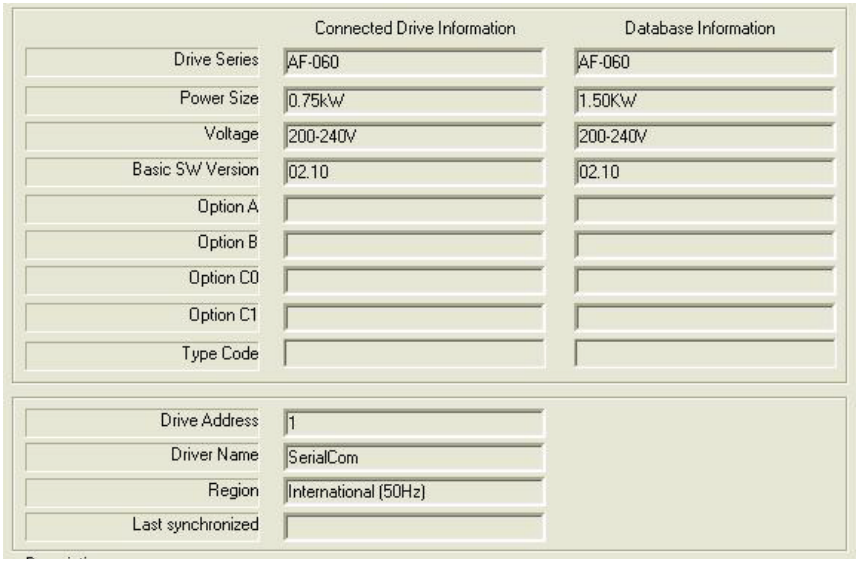
The colour codes indicate the level of compatibility between the theoretical Project Drive and the actual Connected Drive, for each property.

In the Drive Check pop-up you can select one of three options: Cancel, Continue, or Update drive from connected.
Cancel will stop the Read From Drive process, for example if the level of compatibility between Project drive and Connected drive is unacceptably low.
Continue will activate the Read From Drive process to show the properties of the connected drive.

Update drive from connected will activate the Read From Drive process, deleting the data in the Project drive and replacing it with the data from the Connected drive.

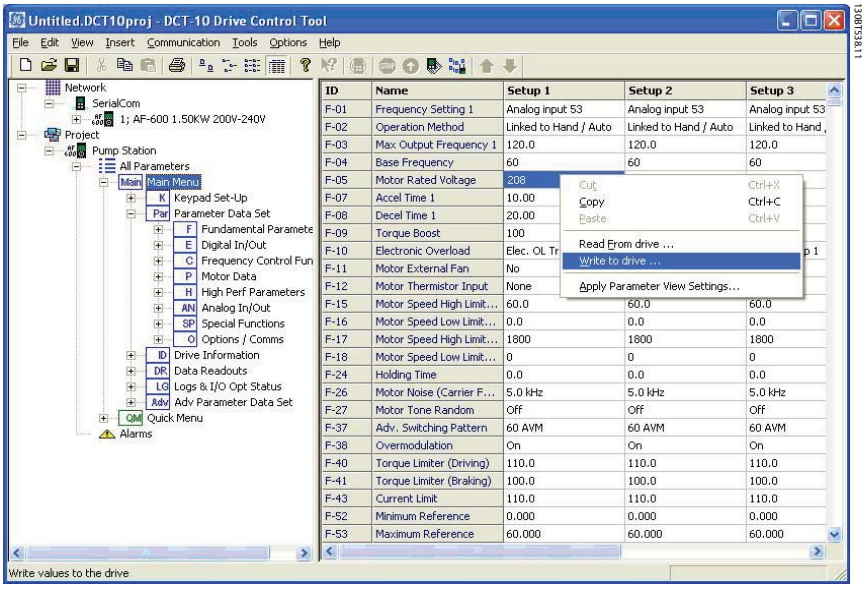
NB!
The Update *drive from connected* selection will cause all information stored in the Project Drive to be deleted and then replaced in the Read From Drive process. If you wish to retain the information entered into the Project Drive, *Continue* is the appropriate selection.

Once the Read From Drive process is completed, the display shows details of both the Connected Drive Information and the Database Information.

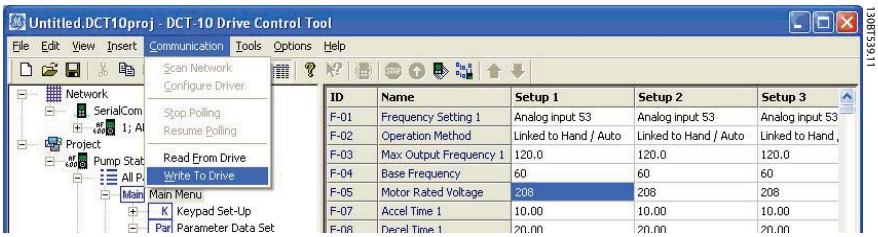


7.5 Write to Drive

Values can be written to an active frequency converter by right-clicking on a parameter column title in the Right View and then selecting Write To Drive.



Alternatively, access Read From Drive and Write To Drive by selecting Communication in the main menu:



7.6 Views

The DCT-10 can be configured by view filters to display parameters in a special way or to display parameters of interest. This is a powerful tool when wanting to maintain an overview of the frequency converter, without becoming confused by irrelevant parameters.
Each set-up can be hidden by removing it. This is done by selecting the set-up in the parameter view and then selecting the remove menu. Changes made to the removed set-up are still stored inside the DCT-10 and can be displayed again by selecting "Customize Columns".
By adding or removing columns the user can decide which information he wants to view.

7

The actual view can also be made valid for the complete Project or for the Folder only. This allows the user to adjust his view setting quickly for parts or the complete Project.
Another flexible way to adjust the display is via the Filter function.

Just by selecting Change Parameters, the number of parameters displayed is reduced to 5 in this example.

7.7 Scan

Only the USB network is automatically scanned when a drive is connected to the PC. For all the none plug-and-play networks, it is required manually to scan the network for active drives.

7.7.1 Scan Configuration

You can enter your preferred scan settings by right-clicking on SerialCom and then selecting Configure Driver.

Adding a Standard bus RS-485 or Profibus to the Network tree, the scan range is per default configured to scan the entire address range. The Ethernet-TSC bus is added using the current IP address settings.

The network scan range can be configured in three ways:

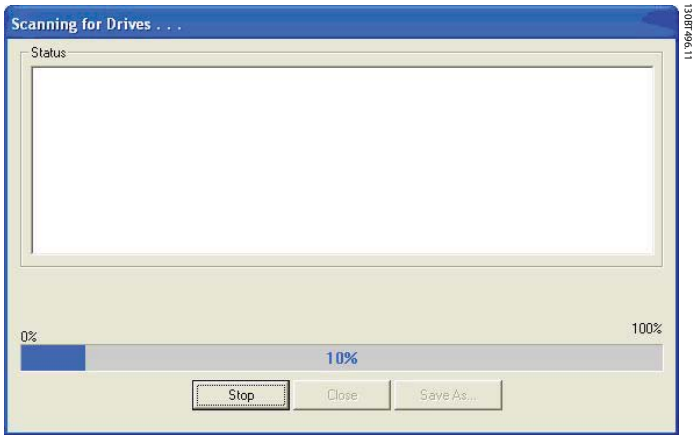
- Right click on the fieldbus icon in the Network tree and select Configure Bus
- Mark the fieldbus icon in the Network tree and select Configure under Communication on the main menu bar.
- Open the Fieldbus Configuration dialog, right clicking on the Network icon and select Add/Remove/Configure Busses or from the Windows Control Panel.

7.7.2 Scan Network

A fieldbus can scanned in three ways:

- Right click on the fieldbus icon in the Network tree and select Scan Bus for active Drives.
- Mark the fieldbus icon in the Network tree and select Scan/Refresh under Communication on the main menu bar.
- Mark the fieldbus icon in the Network tree and select the Scan icon on the toolbar.

The Scanning for Drives window will pop up, and will indicate the progress of the scan:

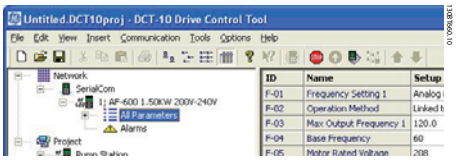


7.8 Poll

When in Network mode, DCT-10 will automatically poll the parameters in the Right View to continuously update their status to reflect live operation.

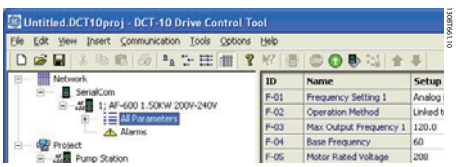
However, if you wish to stop polling, for example to freeze and analyse a particular moment, you can do this in two ways:

1. Select Stop Polling under Communication on the main menu bar
2. Select Stop Polling from the toolbar



You can also resume polling in two ways:

1. Select Resume Polling under Communication on the main menu bar.
2. Select Resume Polling from the toolbar:



8 Saving Data

8.1 Network and Project Folders

It is important to note the difference between Network and Project folders in the Left View.

Through the Network folder the user gains access to physical devices operating in the field. Here the user can configure the physical frequency converters just as if he were configuring them on the device. Configuration changes made in the Network folder are therefore saved only in the physical device in the field. The Network folder contains online data.

The Project folder contains those data saved to the user's hard disk, remote from the field. The Project folder therefore contains offline data.

NB!
Changes made in the Network folder are not automatically saved to the Project folder. That is, the user must actively save changes to his hard disk.

8.2 Changing the Set-up of a Device in the Field

In order to change settings for a field device, the user opens the Network folder and selects the relevant device. The configuration window will pop up, showing where the user sets the scan range, scans for frequency converters and finds the device he is seeking.

The user can stop polling by selecting the stop icon on the tool bar, and then make changes to settings directly in the set-up columns in the Right View.

At this point the changes will be implemented online in the field device, but are not recorded elsewhere.

8.3 How to Save Data

8.3.1 Save Changes to a Hard Disk

To record online changes to a hard disk, select the relevant device in the Network folder. Right-click on the device and select *Copy*.
Select the Project folder, right-click and select *Paste*.
Then select *File* from the main menu bar, and select *Save As*.
The user can then save the device file under the desired title into a directory on his hard disk.

8.3.2 Save a Project

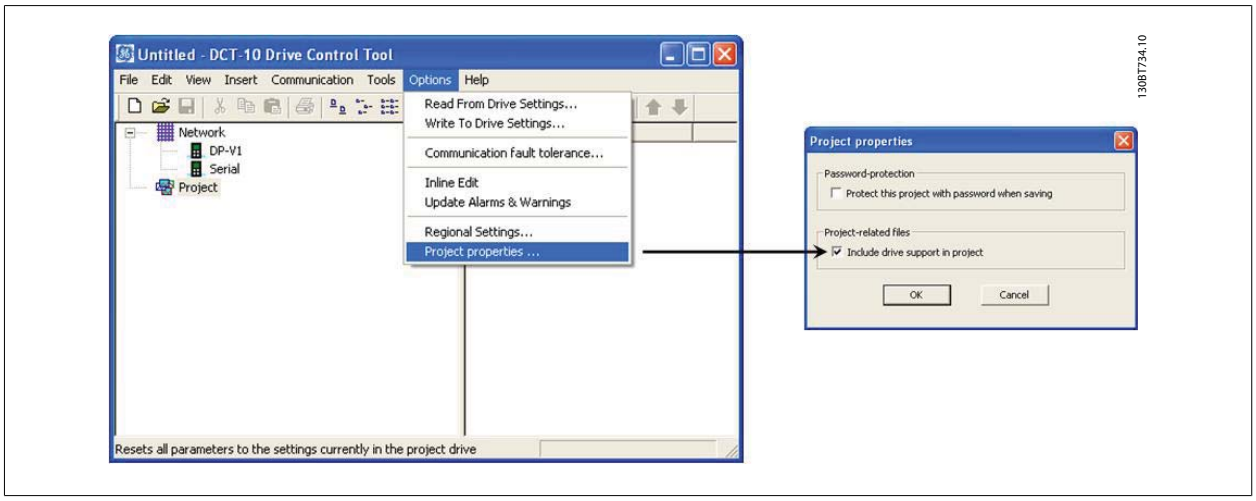
Save a project by selecting *File* from the main menu bar, then *Save*. Alternatively, select the *Save icon* on the toolbar, the third icon from the left.

Include Drive Information

If a project file is open including a firmware version not supported by DCT-10, it cannot be open. Including the drive information in the project file, makes it possible to open in other DCT-10 installations without having the firmware installed. Opening the project file, the drive information is updated similar to:

- Selecting Update Drive Support under Tools on the main menu bar.
- Downloading the drive information from an online drive.

The drive information is per default saved in the project file. From Project properties under Options on the main menu bar, the user can setup not the include the drive information in the project file.



8.3.3 Archive / Unarchive

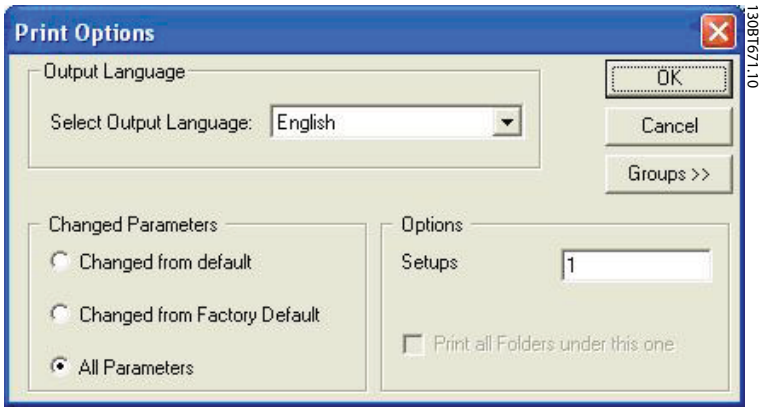
Projects that include links to other documents, can store not only the drives but also the linked files.
By selecting the *Archive* function the DCT-10 generates a file that contains all drives and the linked files into a *.ssa File. If this file is sent to other computers the user will get a copy of the linked files on his computer.

9 Printing

There are two options for printing from DCT-10: Print Project or Print Selected Folders.
Both options are located under File in the main menu bar.
Alternatively, Print Project can be selected by right-clicking on the Project icon. Print Selected Folders can be selected by right-clicking on the icon for a folder within the Project.

If you wish to print parameter settings for an entire project, select Print Project.
If you wish to print parameter settings for part of a project, select Print Selected Folders

The following dialog box will pop up:



In this box you can set the options as follows.

9.1.1 Output Language

Select the desired print language from the list, which appears by left-clicking on the default language displayed.

9.1.2 Changed Parameters

Select this option to print all parameters, or if you only wish to print the parameters which have changed. Select between parameters

- Changed from default
- Change from factory default
- All parameters

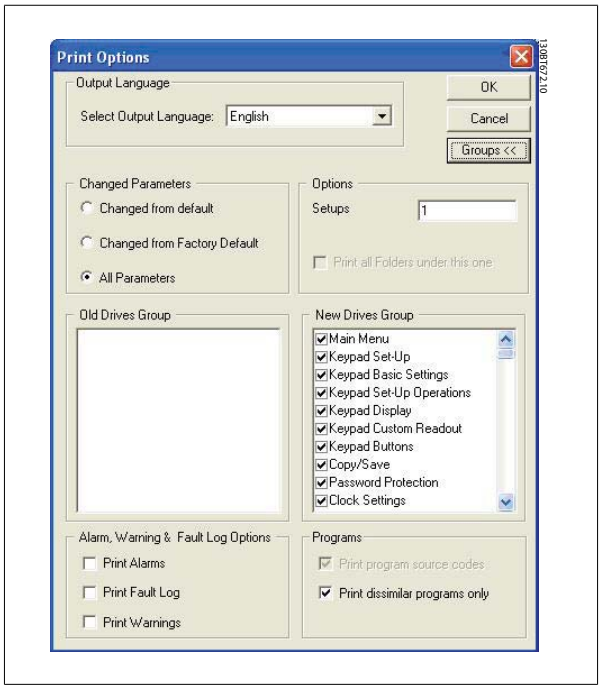
Make your selection, and then press ok for printing to begin.

9.1.3 Options

Specify which set-up you wish to print.

9.1.4 Groups

You can choose to print only selected parameter groups.
If you select Groups >> the Print dialog box will expand to look like this:



9

Make your selection of which parameter groups to print.

To return to the original unexpanded Print dialog box, select Groups <<.

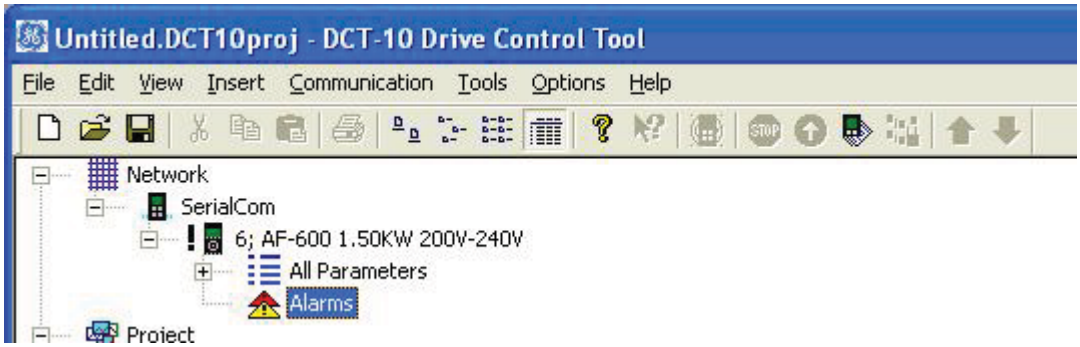
To print, select OK.

10 Alarm, Warning and Fault Log Readout

DCT-10 supports the feature of reading out the alarms, warnings and fault logs of the online frequency converters. This allows the user to quickly locate alarms and warnings in the connected drive system, and investigate the fault log for previous trips. This feature also allows the user to gather and store events in the project file for later evaluation or the project file can be sent to a remote specialist for further investigation.

10.2 Localisation of Alarms and Warning

After a complete scanning of a Drive Network, the DCT-10 indicates if the connected drives have active warnings or alarms. Both warnings and alarms are indicated by a ! sign in front of the drive icon. A missing ! indicates that no alarms or warnings are present at the time the Network was scanned.
The picture below shows a small network with 1 drives, where the drive at address 1 has an active Alarm or Warning.



By selecting the + sign the view of the AF-600 FP is expanded. In this view the user has the active alarm/warning icon, which is represented by the double triangle icon. The single triangle icon indicates no warning/alarms.

Illustration 10.1: Active Alarms/Warnings

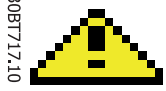
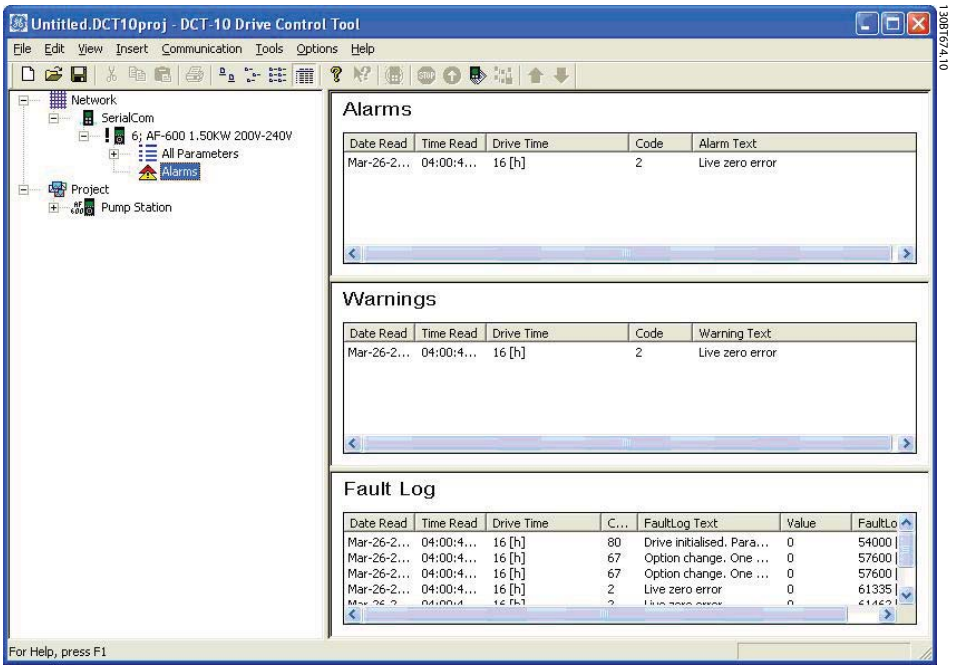


Illustration 10.2: No Active Alarms/Warnings

Selecting the active alarm/warning icon will split the right view into three main areas:

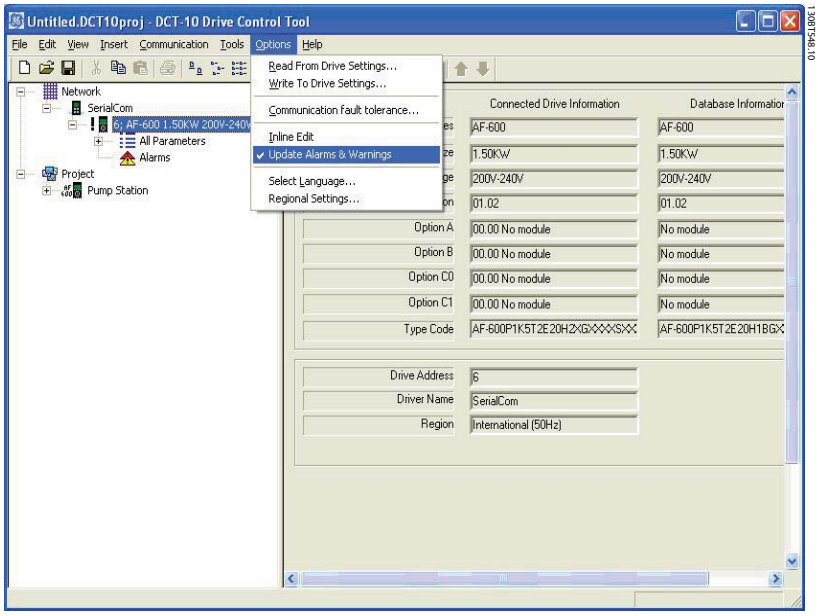


The alarms and warnings are displayed at the top of the Right View. Both views consist of five columns. The first two columns are the date and time of the PC at the time the information was read from the drive. The third column is the Drives Operating Hours counter. Column for is the code for the warning/alarm. For a more detailed description of the code, please consult your Operating Instructions for the particular drive. The last column is the warning in clear text.
In case of a trip the drive stores the reason for the trip in a fault log buffer. The log consist of three values; code, value and time. When DCT-10 reads the fault log it displays the PC's time and date at the time where the log was read.

NB!
Since the drives do not have a built-in real time clock, the actual time of when a fault occurs can only be estimated. This requires that the user knows exactly the total amount of time in which the drive has been disconnected, between the time the fault occurred and the time the trendings were read.

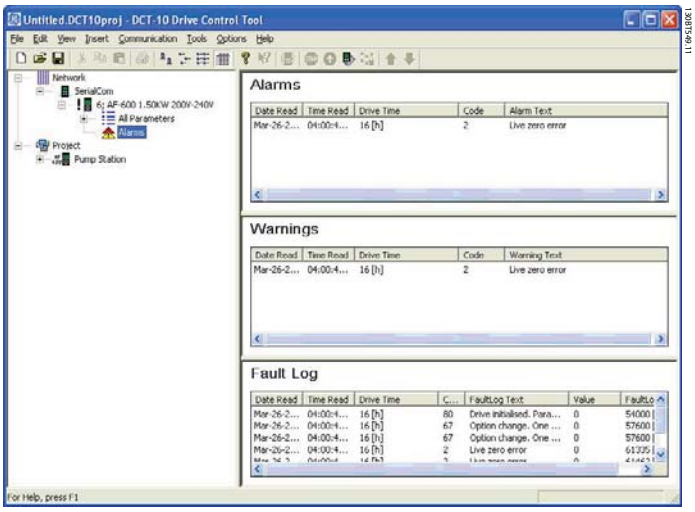
10.3 Handling Alarms/Warnings in Project Files

Before alarms/warnings and the fault trendings are stored into the Project File, the user has to enable this function in DCT-10. This is done under the main menu Options Updating Alarms and Warnings. By simply adding the checkmark, the DCT-10 now automatically reads the alarms, warnings and fault trendings at every read from/write to the drive.



10.4 Handling the Alarms and Warning Trendings

Every time the DCT-10 reads from or writes data to a connected drive the trendings are updated. Since the drive has no real time clock built-in there is no way to evaluate if a fault has occurred only once or if it has occurred twice or more. Due to this behaviour in the drive, DCT-10 consequently stores active alarms and warnings in the project file at each read/write command. These functions ensure that no alarm is lost, but can lead to a situation where one alarm has multiple entries in the log.



DCT-10 stores space for more than 200 alarms and warnings for each drive in the project. The trendings can be individual cleared. This is done by entering the trendings you wish to clear, and right-click with the mouse. Clearing the log only clears the PC log, the drives onboard information is unaffected by this handling.

11 Scope Function

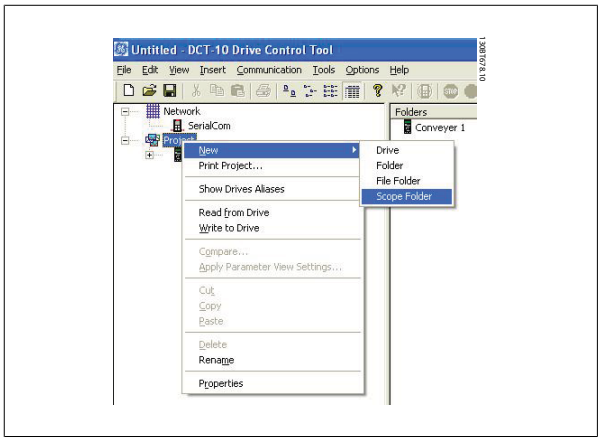
11.1 Introduction to the Scope Function

In many situations the use of viewing a parameter as a curve improves the way to diagnose and understand a system. Curves also provides the possibility to graphically evaluate if a system is unstable e.g. PID loops.

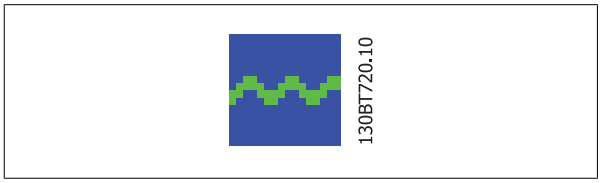
Faults detectable within a short time (e.g. over current) can be diagnosed by the use of the scope function and thus be a valuable feature to the user.

11.2 Activating the Scope

The Scope is inserted similar like a new Drive, Active Filer, Folder or File Folder, using the Insert menu or by right clicking the mouse over the Project Folder, Drive Folder, a regular Folder or a Drive.

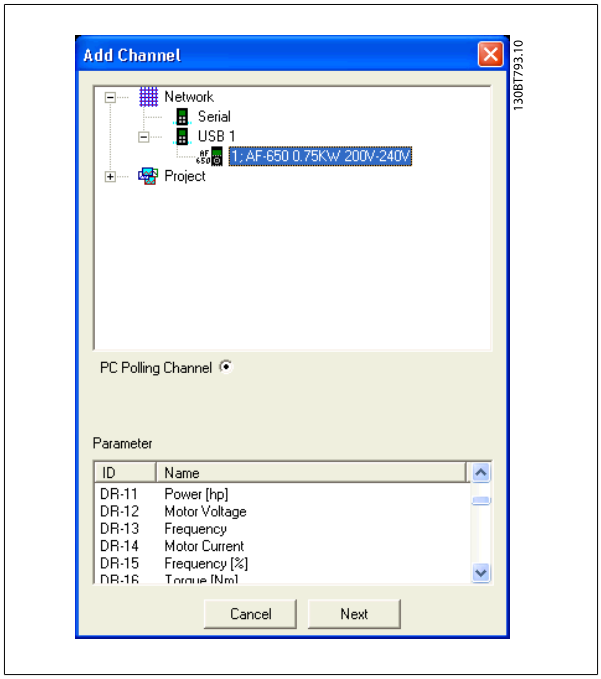


The Scope folder can be inserted at any place under the Project, within a folder or under a Drive. There are no limitations related to the place were a scope is inserted. As soon as the Scope folder has been inserted it is being visualised with the icon.



The default name for the Scope folder can be renamed via the Edit menu or by right clicking on the icon and choose Rename.

The first time the user select the Scope folder, DCT-10 will pop-up the Add Channel dialog. From this dialog, the drive to measure, can be selected among the ones available in the Network. Then depending on the drive series the user must select the type of channel to collect samples from.



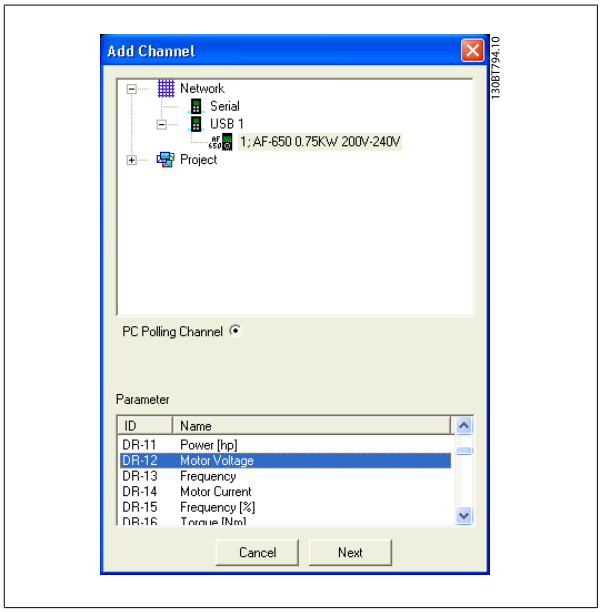
11.3 Channel Types

The scope function provides two different channel types to sample parameters:

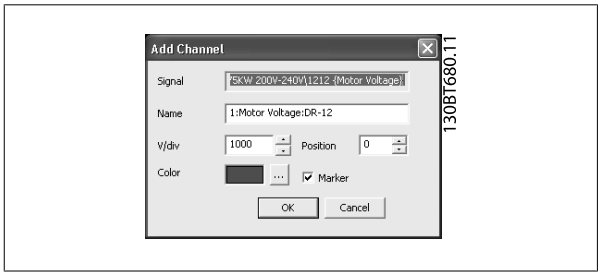
- PC Polling Channel – the normal channel selected were the DCT-10 itself request the parameters from the drive. The Channel do not have any time limitation, the buffer size is user configurable and corresponds with the number of samples. Fast sampling with accurate sampling rate cannot be obtained because the Windows operating system does not support real-time extension.
- Drive Real Time Channel – the second channel type is only available in the series. This type of channel uses an internal 16kByte buffer located in the drive. Preferable with requirements to high and precise sampling rates but limited in time due buffer size. It is required to setup a trigger event for the drive to start filling up the buffer with samples.

11.4 Initial "Add Channel" (PC Polling Channel)

The channel is supported by all GE released drives, Softstarter MCD500 and Active Filters. The radio bottom *PC Polling Channel* is default enabled when the drive is selected within the Network- or Project folder. All parameters available in the list are visible by ID and Name and are automatically updated according to the product.



Selecting one the available parameters in the *Parameter* list activates the Next bottom which updates the Add Channel dialog to configure A/div (value/division). Setting a wrong value is not critical. DCT-10 stores the values, but they may not be shown within the visible area. The value can be adjusted later to fit the level inside the visible area without losing information.

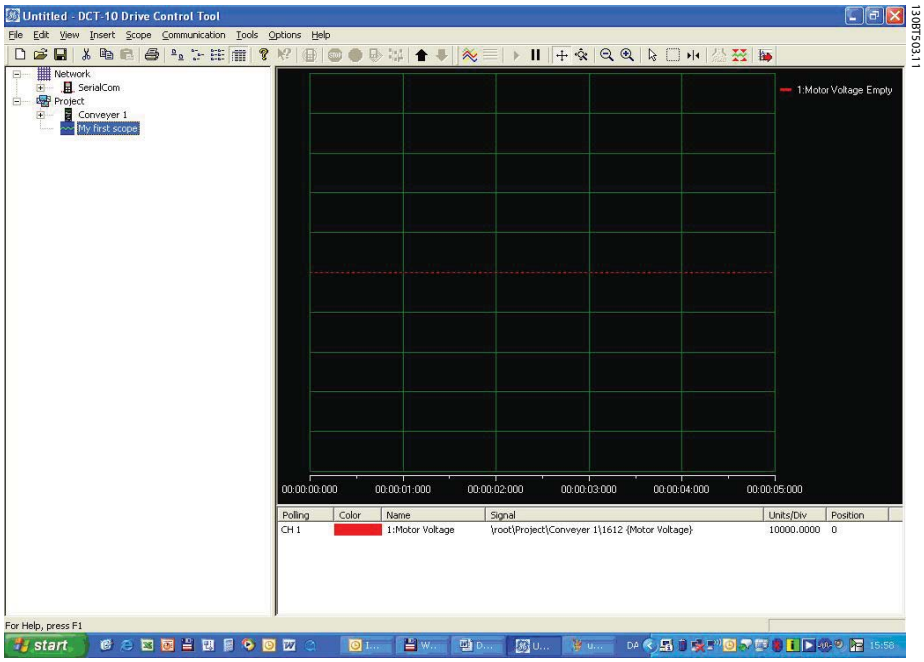


The Position number is vertical Zero line (on the Y Axis). If there are several signals on top of each other, it is useful to have them plotted apart.

The Marker allows to differentiate the different curves in a black and white printout. Each curve gets a marker as box, triangle, cross etc.

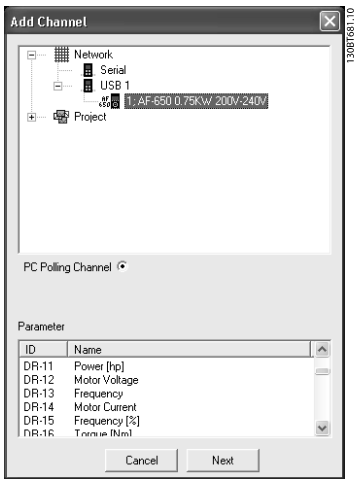
Color sets the colour of the curve.

The selection done by now, gives the following graph window:



If further is needed, the user can insert an additional channel by right-clicking the mouse cursor in the channel box:

This will open the Add Channel dialog again, following the same procedure like the previous channel insert.



11.5 Communication Control

By now we have pointed out the variable that will be shown. The next vital part of DCT-10 Scope is the control of the Communication Driver. The toolbar of the Scope has four main buttons for the communication.

Start (Data Acquisition):

This icon controls the driver of DCT-10. By pressing this button the driver of DCT-10 starts collecting the requested data from the drive network.

Stop (Data Acquisition):

The driver of DCT-10 is stopped no communication to the drive network while the Scope part is active on the screen.

Start (resume) all tracking:

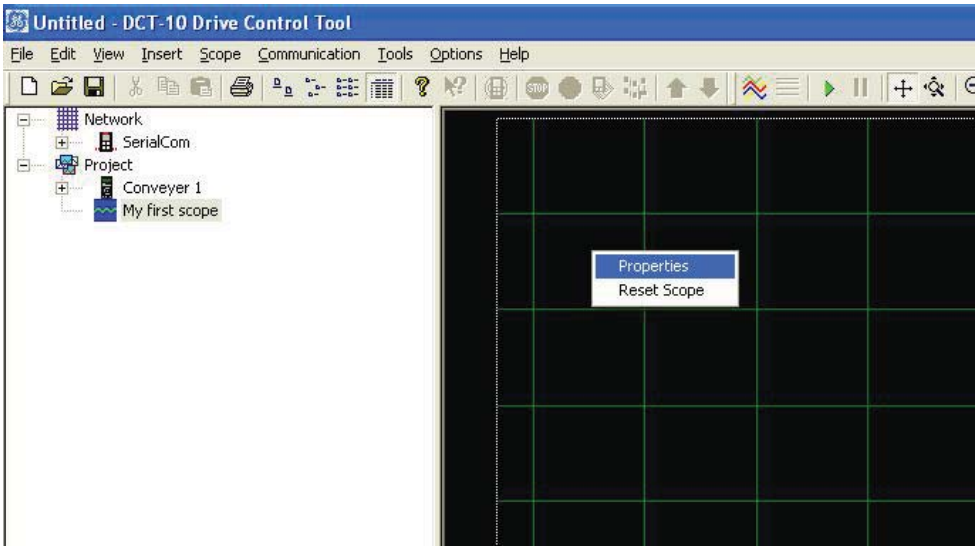
Activating the tracking mechanism of DCT-10 starts the readout of variables to the screen and to the buffer of DCT-10. Variables are checked up against the trigger settings. If the buffer has been partially filled (use of the Pause All Tracking button), DCT-10 will continue to fill data into the buffer.

Pause All Tracking:

Deactivates the tracking. Buffer remains at its current state, no new data is entered into the buffer. The buffer pointer keeps its current value. The screen remains at its current state, no new data is visualised.

11.5.1 Additional Settings

The Scope tool has more settings, which can be adjusted by right-clicking on the Scope window, and selecting Properties (depending on channel type the scope properties dialog will differ):

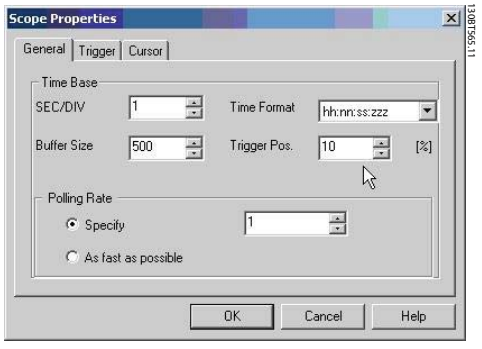


The General tab holds four basic settings for the Scope, seconds per division (SEC/DIV), Time Format, Buffer Size and Polling Rate.

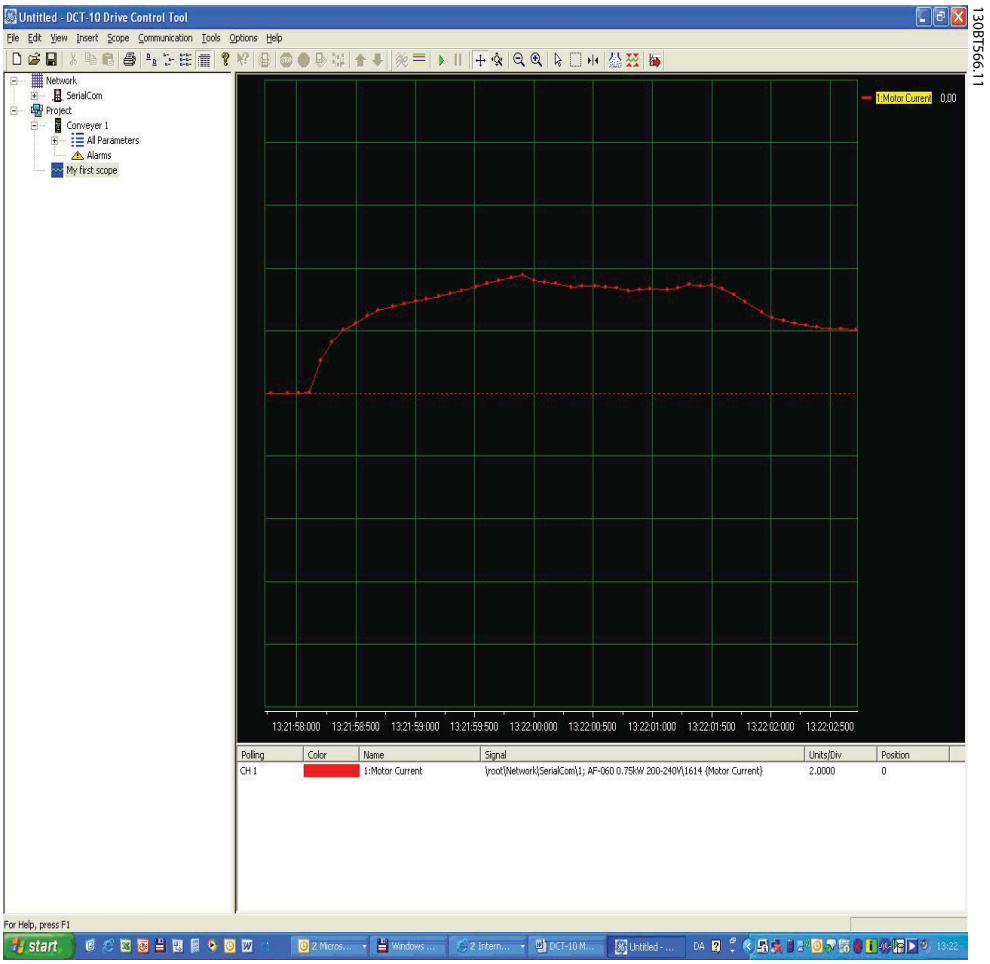
The SEC/DIV sets the time base on the X-axis. The number can be set between 0.01 sec and 100000 sec. Time format can be set to contain year, month, date, hour, seconds and milliseconds in eight different formats. The buffer size is the number of data sets in the buffer. The number can be set to a number between 0 and 1 .000.000

The last of the General setting for the Scope is the Polling Rate. Polling rate is time in milliseconds between two samples.

For systems with large inertia a high time may be used, since the value changes slowly. For systems with low inertia a high polling rate (low time between the samples) is needed. Setting the polling rate to As fast as possible, lets DCT-10 run without a fixed sample time between each sample. By doing so, DCT-10 does not control the actual time between each sample and this can lead to a high jitter between two samples.

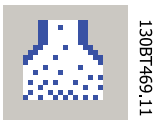


Knowing the first four buttons allows the user to generate a graph out of one drive variable. By selecting the Resume Poll button, DCT-10 starts tracing the motor current, which based on the motor load can generate a current curve like this:

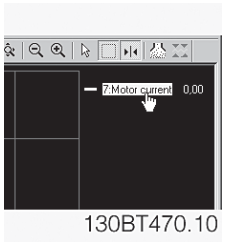


To stop the tracing press the Stop Poll button or Pause All Tracking. The tracking will continue until the buffer is filled (default 1000 samples). If the tracing stops due to a filled buffer, the buffer has to be emptied before a new trace can be activated. To clear the buffer and to reset the Scope, the following two buttons are defined:

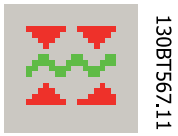
Clear all buffer for the channel:



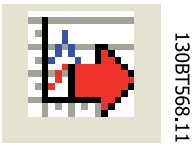
By selecting the trace with:
The buffer for this channel can be individually emptied.



Reset Scope
The reset Scope works in the same way in that it clears all buffers for the channel. The difference is that it clears all buffers at once. This is more convenient if many channels are activated at the same time, or if a new channel is added to an existing track. Before new values can be added to a track all channel buffers must be emptied, since DCT-10 requires that all buffers have the same amount of data.



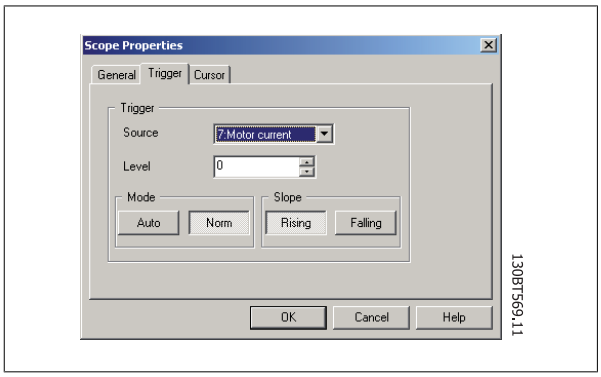
Export to Excel
The export to Excel enables the user to have the scope data stored in a file which Microsoft Excel can open.
A save file dialog will appear, so the user can store the file in an appropriate place.



11.6 Triggers

A trigger is a tool that allows only starting the sampling of values when a certain value is reached. This will reduce the need for large buffer sizes. A trigger is also a valuable tool to see if values cross border where the drive does not store any warnings.
Setting up Trigger:
By right-clicking on the Scope window and selecting Properties (See under Polling Rate) the property for the Scope is brought up.

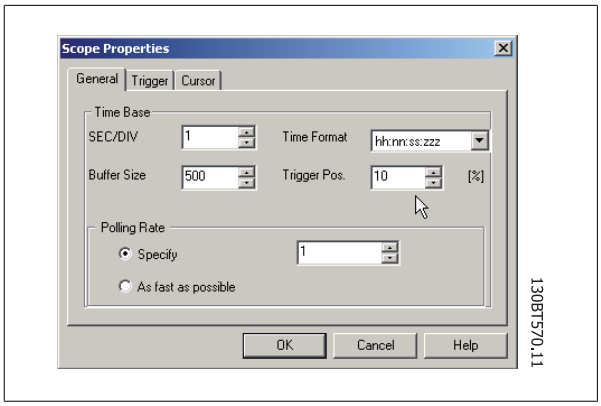
Under the Trigger tab the Source for triggering, the level for activating, Mode and Slope for the trigger can be set.



The source is selected out of the channels that are currently active. The level is the level for the source where the Trigger has to be activated. For Mode, there are two different modes, Auto and Normal. With Auto the user will trigger the trigger automatically by pressing the Resume All button. This means that the trigger line will be set to the time when the user pressed the Resume button. Selecting Normal (Norm) the trigger is activated when the level and the slope settings are fulfilled. The slope sets if the value has to be rising (source value goes from low values to higher values) or the slope has to be falling (source value goes from high values to low values).

11.6.1 Trigger Position

In many cases it is worth knowing what happens before the trigger is activated. This can be achieved by setting the trigger position value to a value different from the default, which is 0%. If the buffer has a size of 1000 samples and the trigger position is set to 10%, the buffer will contain 100 samples before the triggering point and 900 after the triggering point.

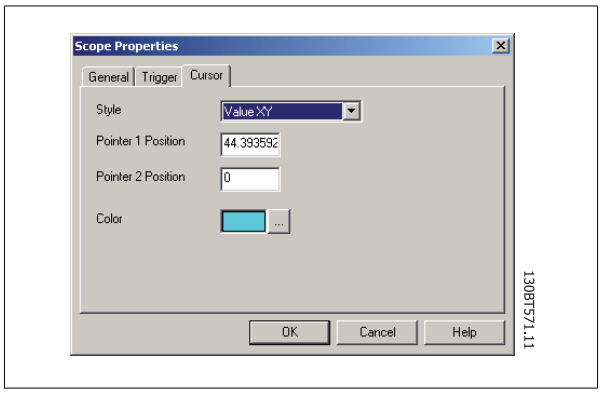


11.6.2 Cursors

To evaluate a trace or show the actual values of the buffer, the cursor is used to point out the data. The Cursor tab contains four different settings:

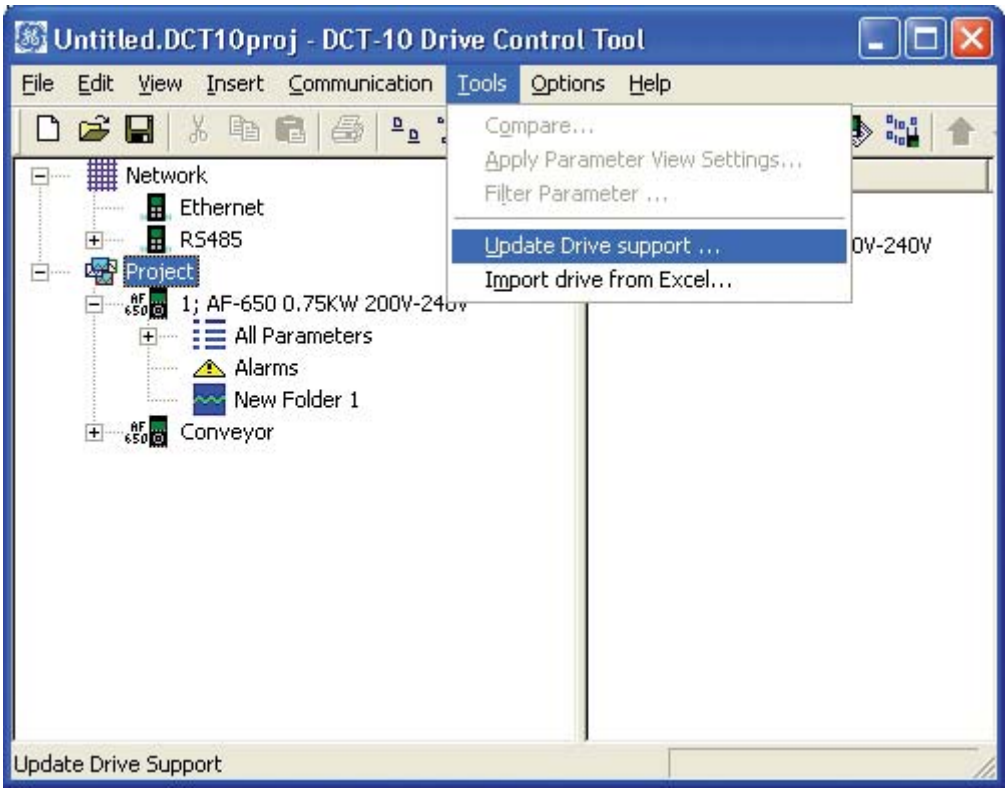
The style contains six different possibilities:
Value XY
Value X
Value Y
Delta X
Delta Y
Inverse Delta X

Value XY shows the time and value of each signal at the cursor location, Value X the time alone. Value Y the value alone. Delta X shows two cursors, and the time between the two cursors are calculated. Delta Y works like Delta X, but this time the difference between two levels is calculated.



12 Update Drives Firmware Support in DCT-10 Set-up

DCT-10 can be updated, regarding what firmware versions of drives are supported.



The update files can be installed without the user having administrator rights in Microsoft operating systems.

12.2 How to Find Out if DCT-10 Has Been Updated

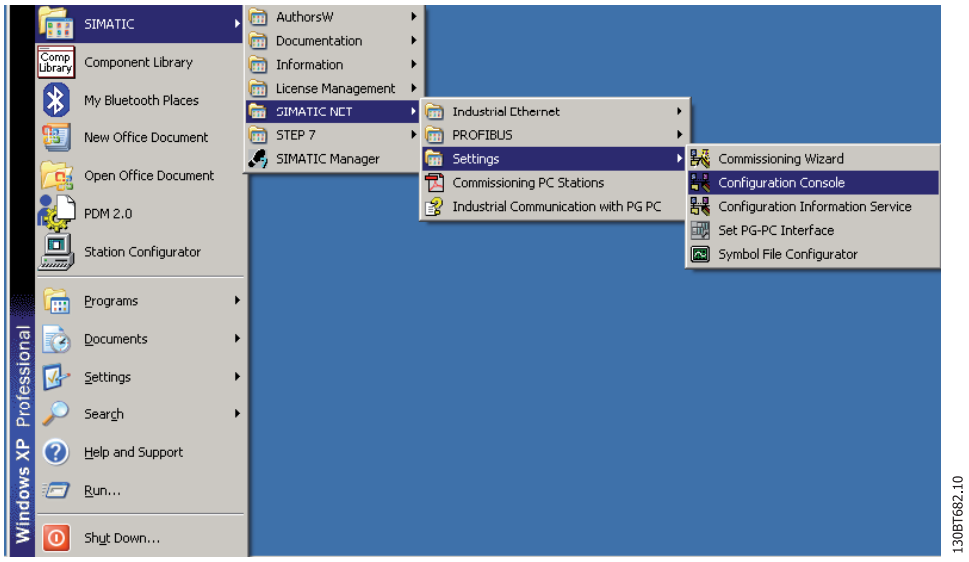
Finally DCT-10 can be checked in the About box, regarding what updates the user has installed.

Also when contacting the hot-line support, system information can be copied directly to the Windows Clipboard.

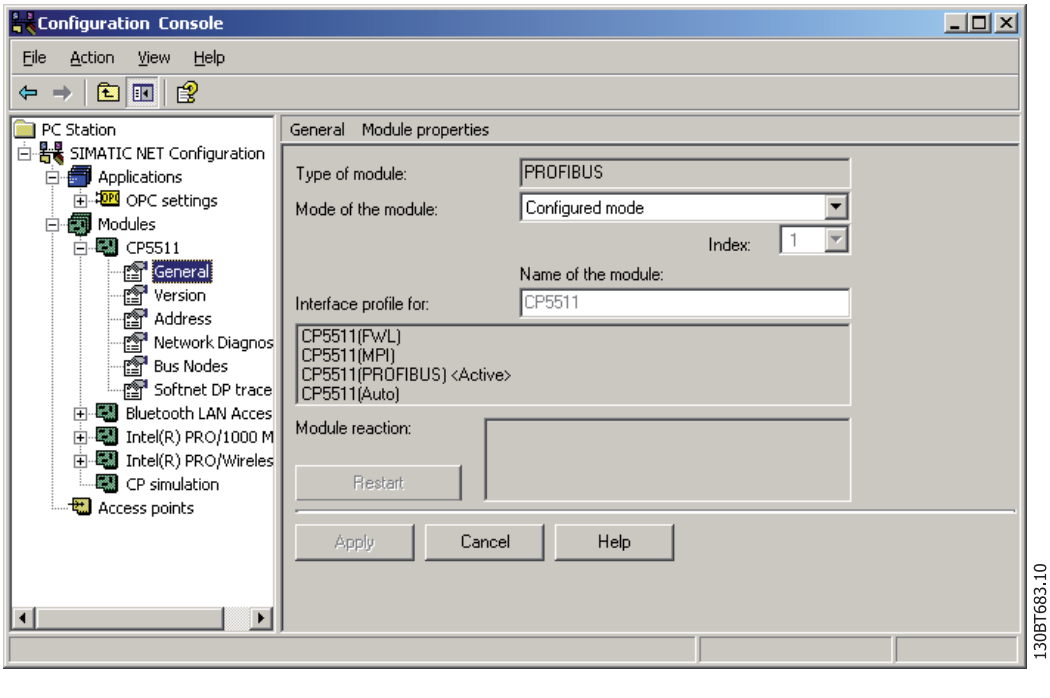
13 Guide to DP-V1 Connection and Simatic Manager

The following guide explains how set-up SIMATIC NET to work together with DCT-10.

Start Configuration Console:

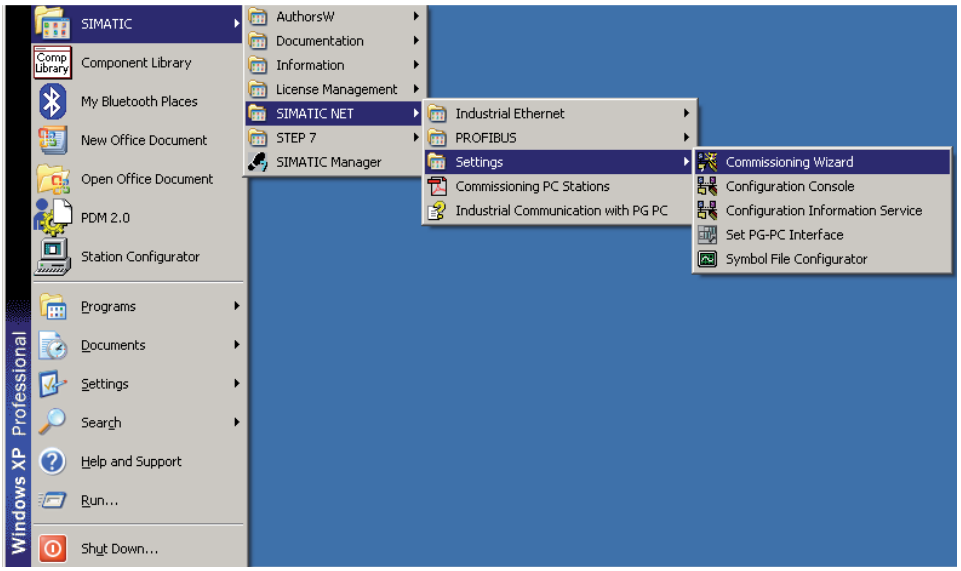


Set the Mode of the module to Configure mode and press apply:

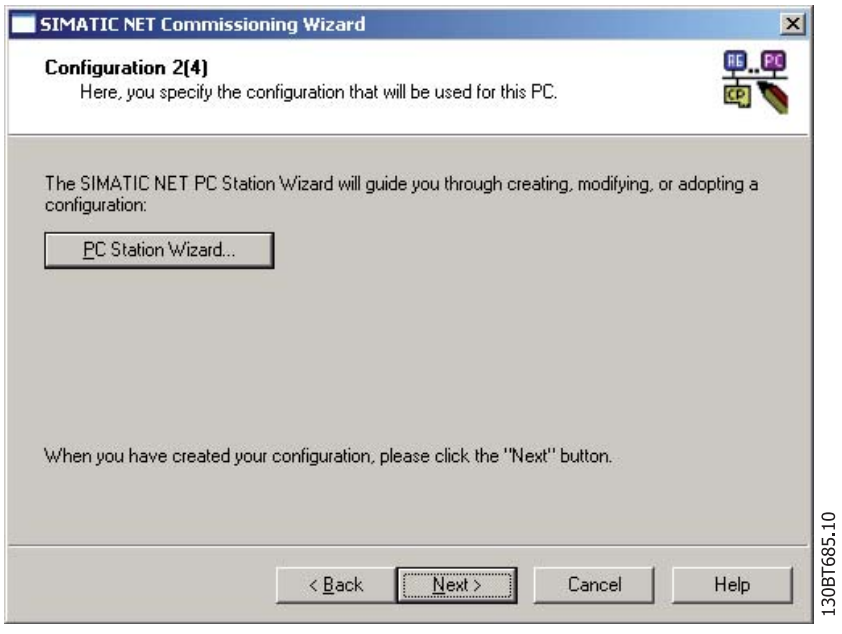


Close the Configuration Console.

Start *Commissioning Wizard*:

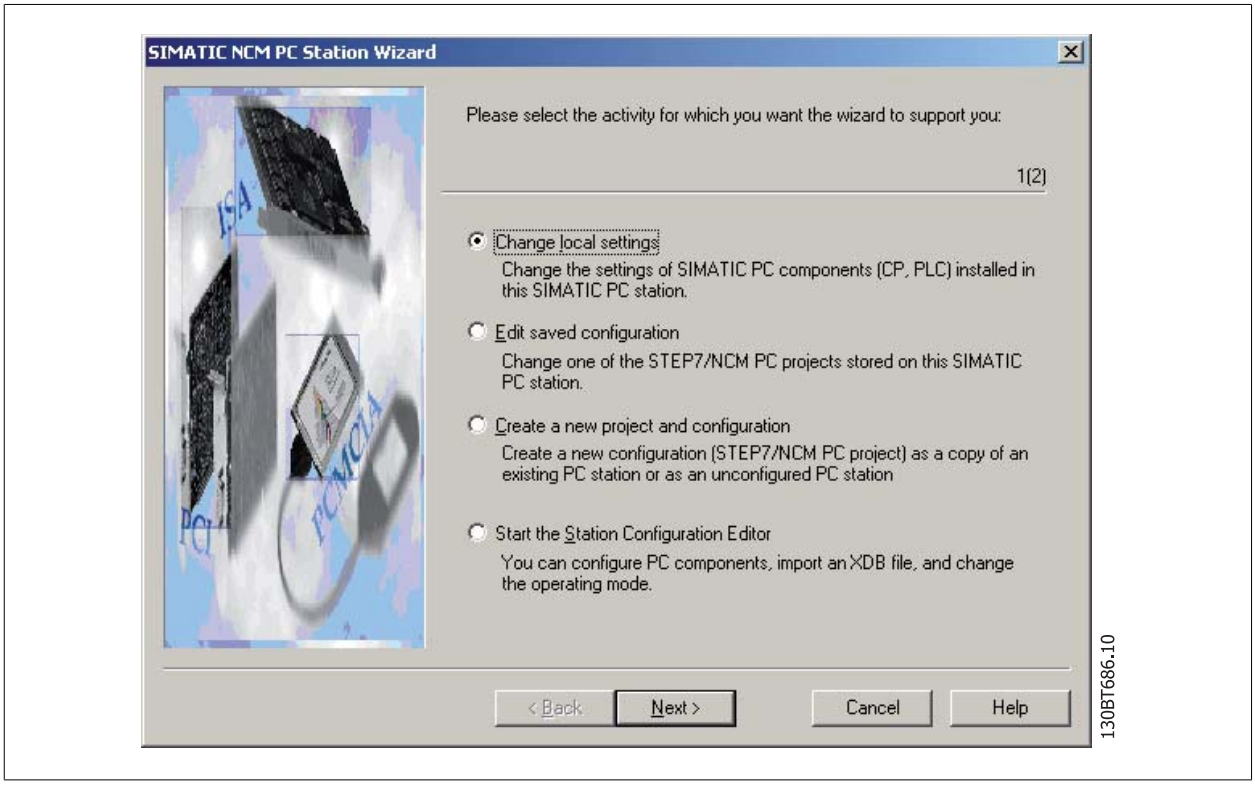


Press *Next* and the following screen is shown:

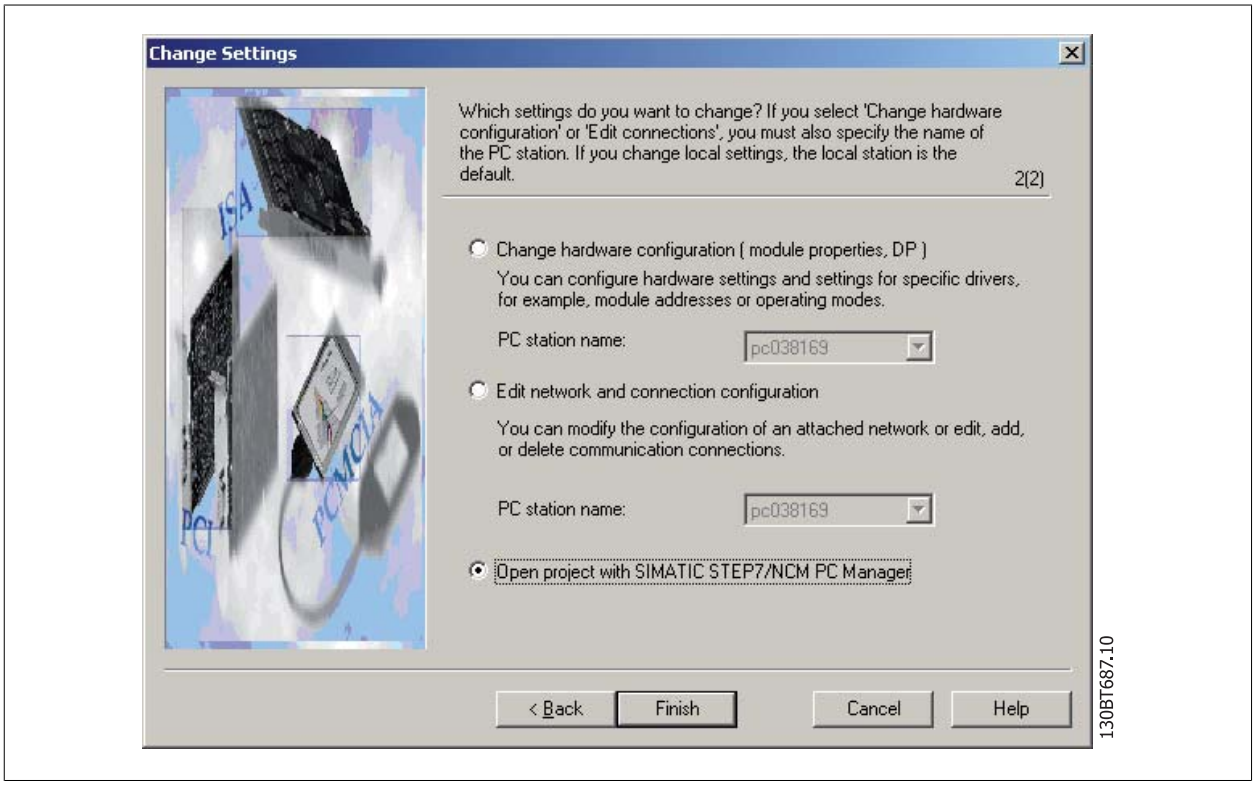


13

Press on *PC Station Wizard* and *Change local setting* and then on *Next*:

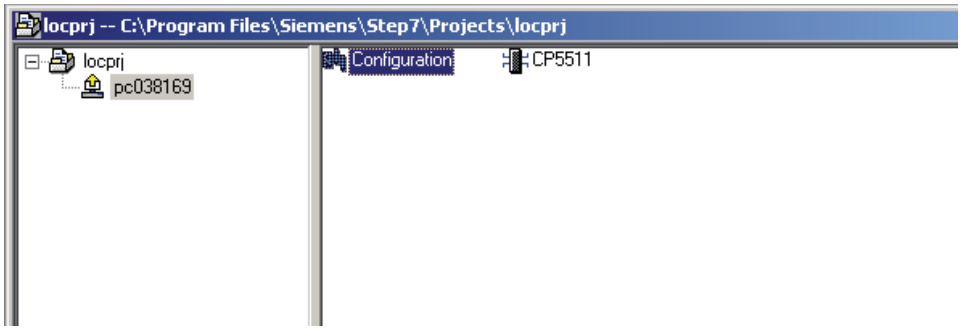


Choose *Open project with Simatic Step7/NCM PC Manager*:

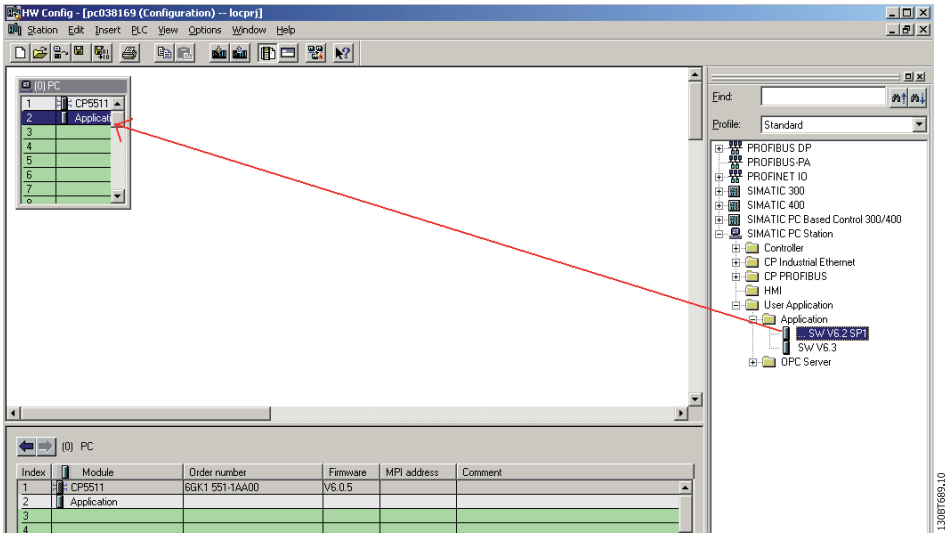


Simatic Manager is now opening a new project.

Open *Configuration*:

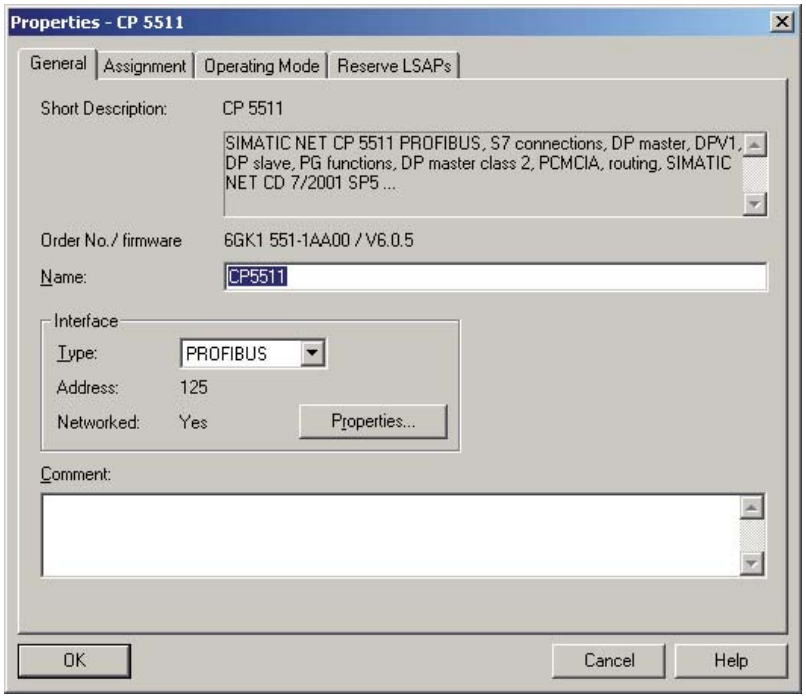


Drag and Drop a Application to the PC index 2.

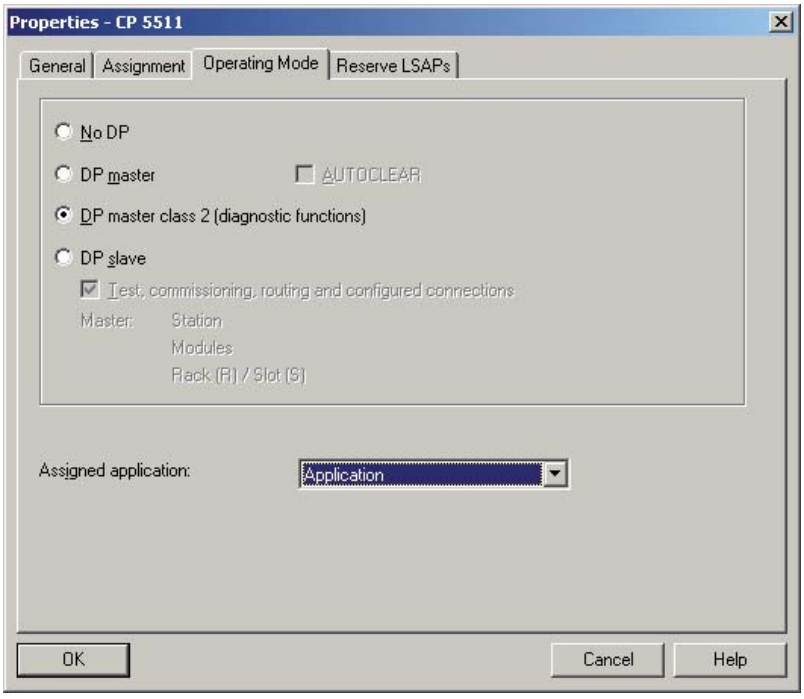


13

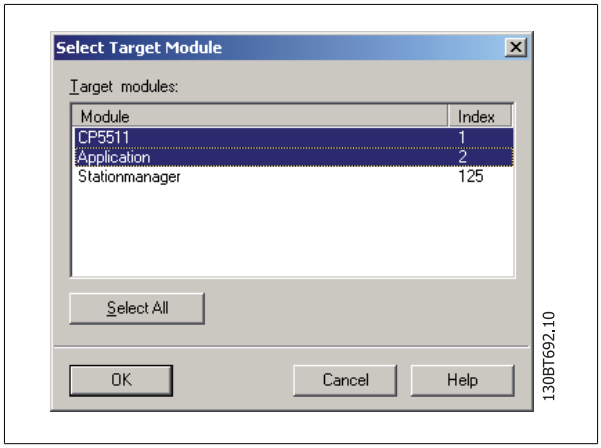
Open the properties on your Master Class 2 card (here shown as a CP5511 card).



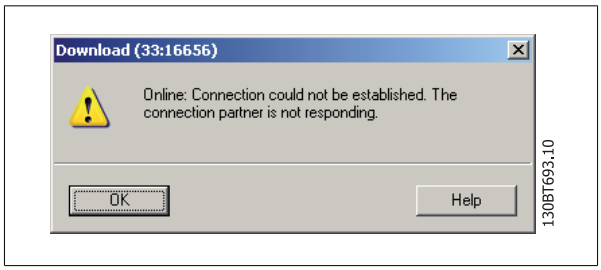
Press on *Operating Mode* and select *DP master class 2* and assign an Application. Press on *OK* and on *Save and Compile*.



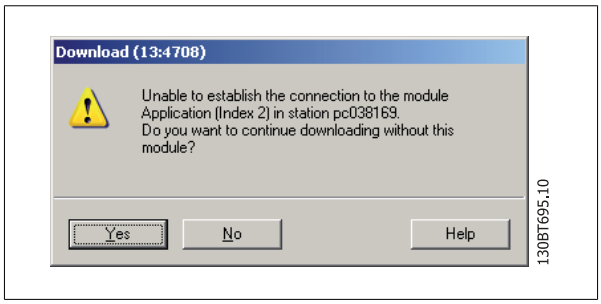
Press on Download and select to download CP5511 (index 1) and the Application (index 2).



Press OK and also OK to the Warning:



Press Yes to this Warning:

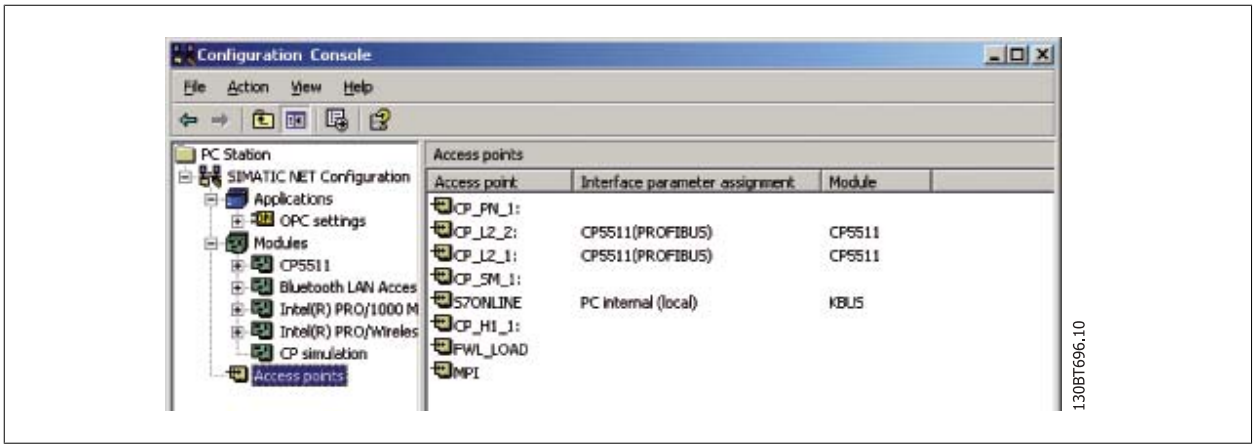


Press OK to Stop Target Modules and the download and set-up of the CP5511 card is completed. Close Simatic Manager.

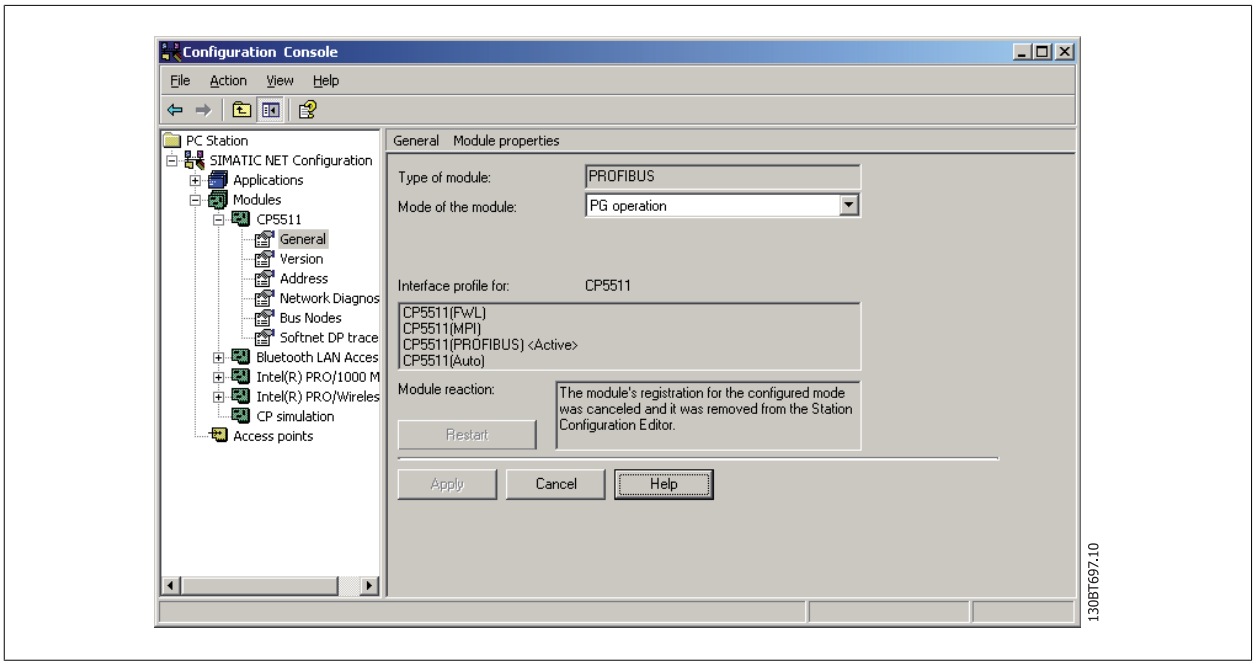
Click on Simatic Net Commissioning Wizard and on *Next*.

Click on Next again and click on finished.

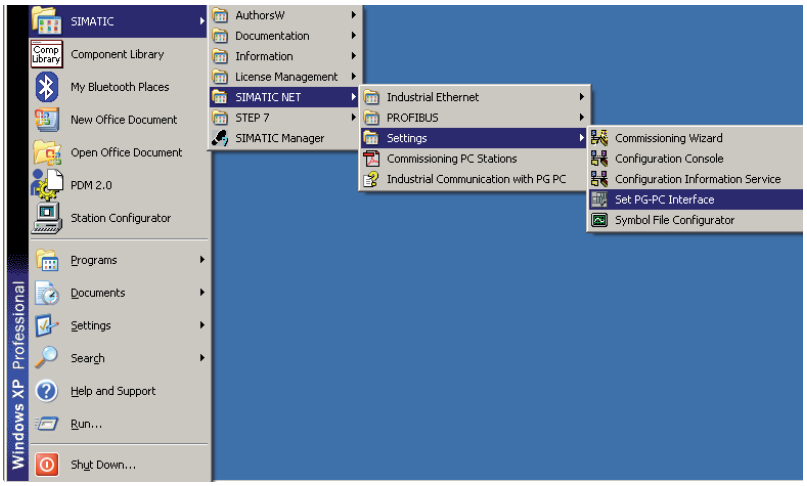
By Configuration Console and by *Access points* set the CP_L2_1 and CP_L2_2 Interface parameter assignment to *CP5511(PROFIBUS)*.



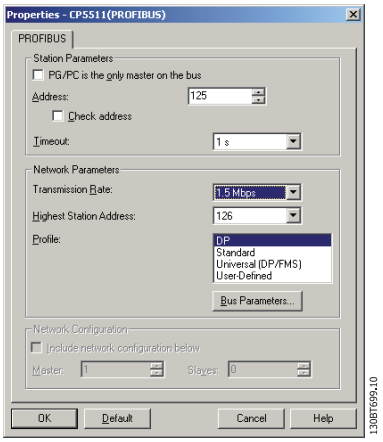
Set the Mode of the module from *Configure mode* to *PG Operation* and press apply and OK.
Close the program.



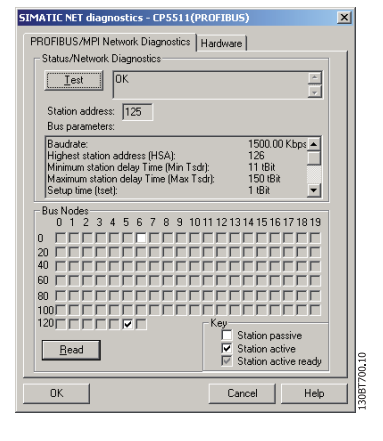
Open the *Set PG-PC Interface*:



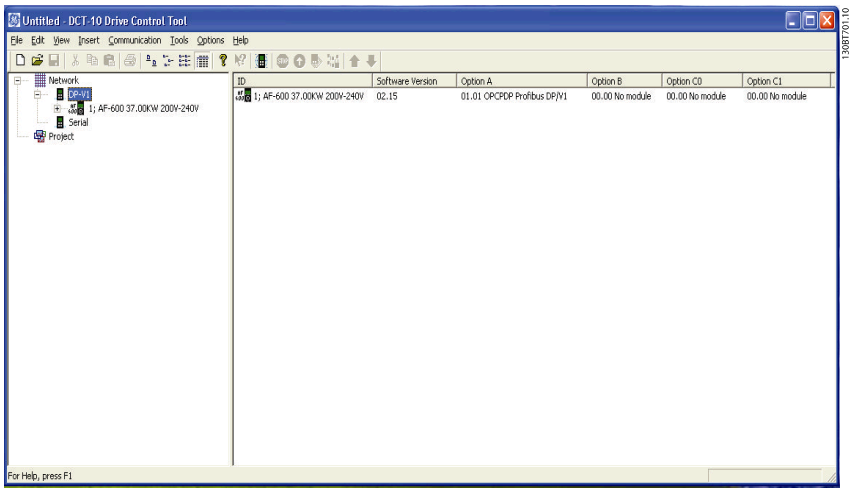
Set *Interface Parameter Assignment Used* to CP5511(Profibus) and click on Properties:

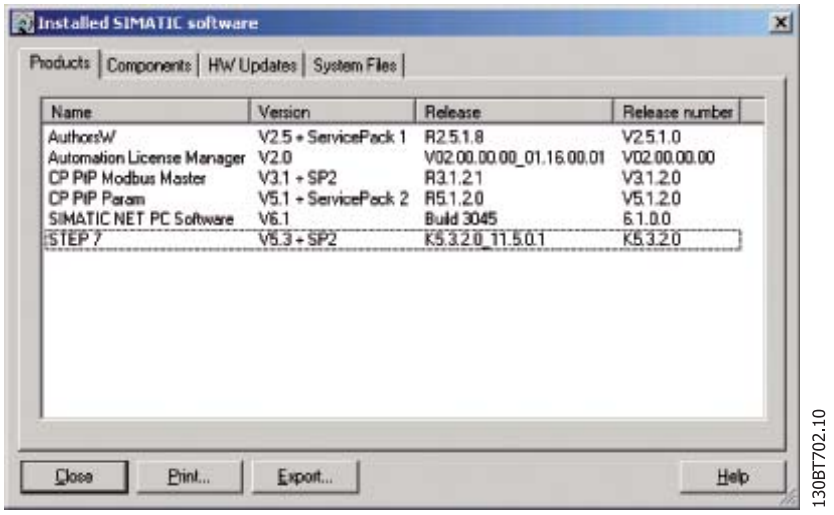


The tag *PG/PC is the only master on the bus* should only be set active if no PLC is active on the bus. Set the Transmission Rate (Baud Rate) to the same baud rate as the PLC and click on OK. Click on *Diagnostic* and on *Test* and *Read* and the CP5511 card will read all nodes on the Profibus network. In this example it finds a Slave on address 6.



Open DCT-10 and a DP-V1 connection should be detected by *Network*.



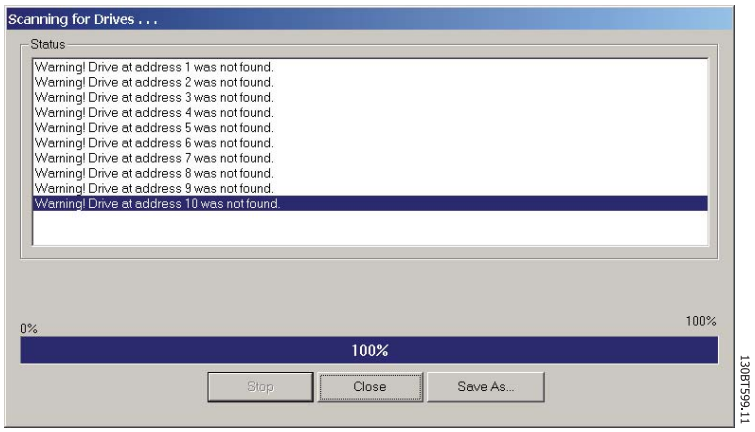


14 Troubleshooting

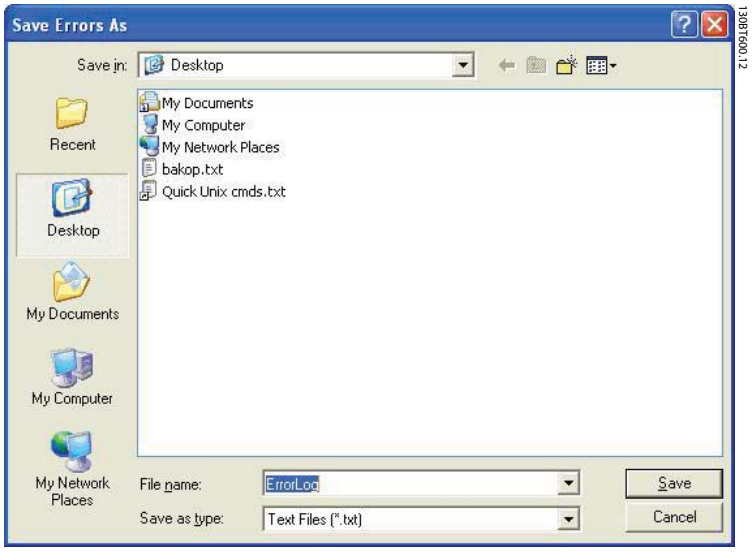
14.1 Save Error Dialog

When an error dialog appears on the screen DCT-10 has a facility for saving to a text file to record the error message for later reference, for example to obtain help from Support. Within the error dialog window, select the option Save As and you will be able to record the error message as a text file with free choice of file name and location.

For example, when scanning the network for frequency converters, an error dialog will appear showing the frequency converters not detected:



Select Save As.. to store the error log and the following dialog will appear:



14.2 Common Problems and Solutions

14.2.1 Changes Are Not Saved to PC

Checks that changes made in the Network folder have been copied over to the Project folder, and then saved to a directory on the users hard disk. Changes made in the Network folder are implemented in the field device only, and are not automatically saved to a PC.

14.2.2 Error Message Whilst Installing DCT-10

Message such as "Cannot open the bus" This error may occur if there is a second PC program installed, using the same COM port of the PC. Such a program could be a PLC programming tool, Palm pilot driver or Cellular Phone driver etc. Investigate whether other programs use the same COM port. If this is the case make sure that the other PC tool does not lock or reserve the COM port.

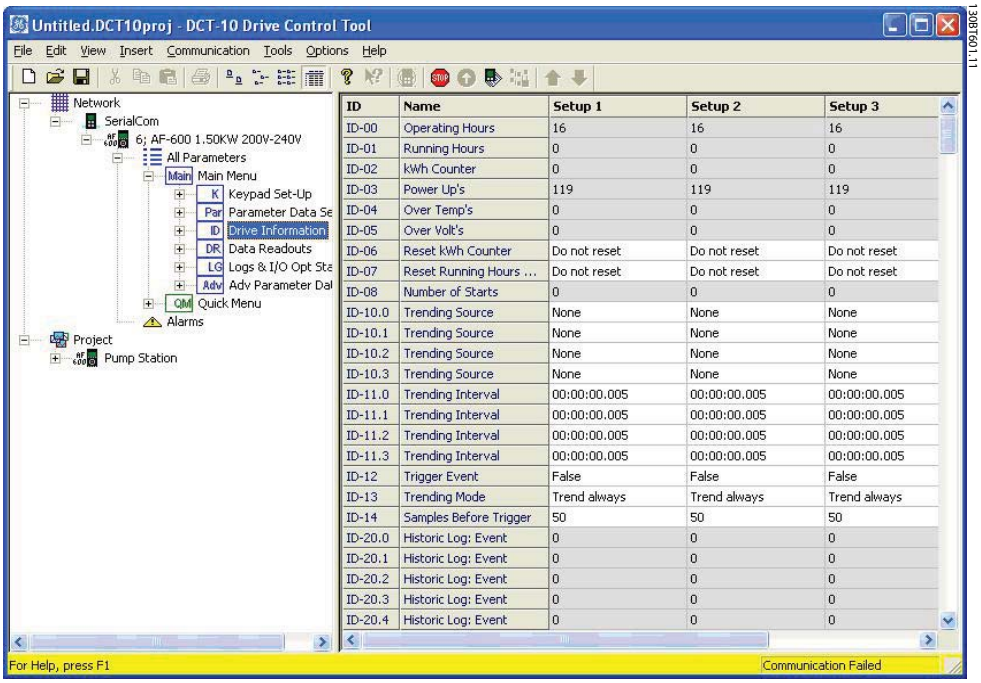
Error message whilst storing parameter settings and reading / writing via
Profibus DP-V1 using the function Database readout from the Drive.

14.2.3 Error Message Communication Failed

The communications error comes and goes sporadically:
This type of communications error typically occurs when cables are inadequately screened, in which case EMC noise can affect the communications. Check that the cables are installed according to the guidelines in the Operating Instructions for the frequency converter.

The communications error is permanent:
This type of communications error is typically due to an error in network configuration. Check that the network configuration is in accordance with the frequency converter Operating Instructions guidelines.

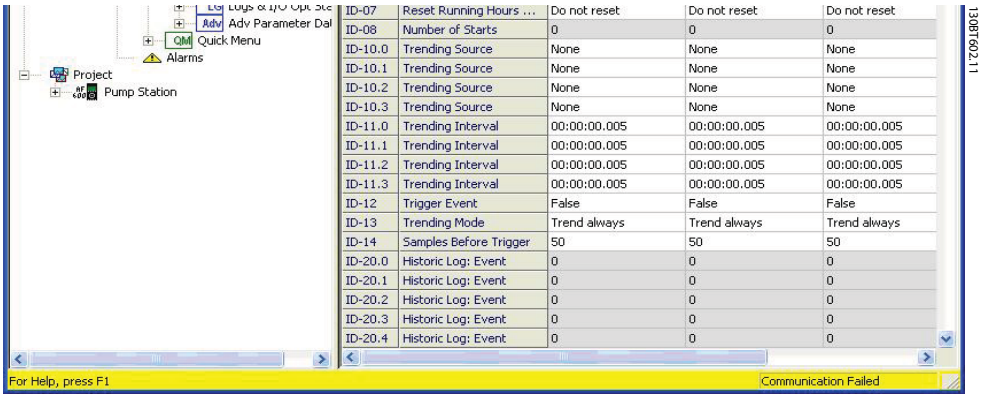
The Communication Failed error message appears in the status bar as shown:



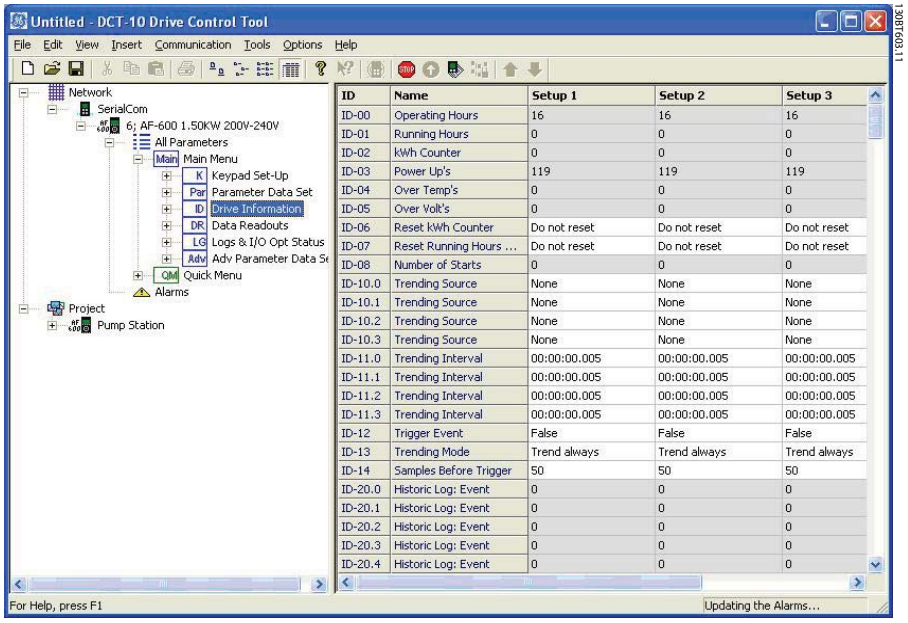
14.2.4 Communication Errors

If an erroneous/illegal action has been attempted, an error highlight will appear in the status bar at the bottom of the DCT-10 window.

When a communications error arises, the status bar at the bottom of the DCT-10 window will be highlighted and display a *Communications Failed* error message, as shown in the following example:



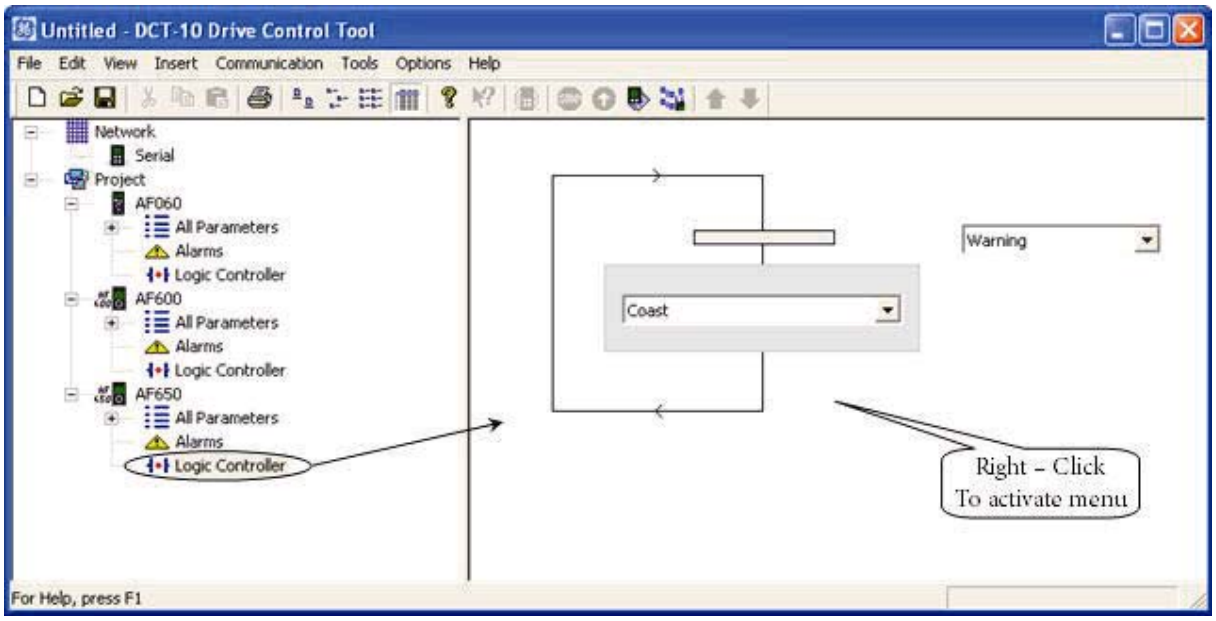
When no communications error has occurred the same window will appear as:



Communications errors typically occur due to inadequate screening of cables, i.e. cable is not installed in accordance with installation instructions.

15 Logic Controller Plug-in

From Version 3.14, DCT-10 supports the Smart Logic Controller Plug-in for the AF-060, AF-600 and AF-650 series. This feature enables the user to do very quick set-up of logical sequence programs by means of a graphical user interface, instead of setting up each single parameter by hand.



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This plug-in is easy to use, and items can be added, just by performing a right-click in the sequence tree area. It is recommended to consult the Design guide to get a full overview of the Logic Controller features.

One of the great advantages of the built-in Logic Condition Controller is its easy-to-use programmability. You can easily configure it without previous training and it enables a host of advanced functionalities.

The condition controller is a simple, but at the same time very clever way to have your drive, motor and application work together. The principle is this: The controller monitors a pre-determined event. When the specified event occurs, it performs a pre-determined act and starts monitoring the next predetermined event – and continues that way in up to twenty different steps until it returns to step one – monitoring the first specified event.

The logic controller is able to monitor any parameter that can be characterised as "true" or "false". This includes digital commands and also logic expressions, which allows sensor outputs to determine the operation. Temperature, pressure, flow, time, load, frequency, voltage and other parameters combined with the operators ">", "<", "=", "and" and "or" forms logic expressions that controls the drive logically in any application. That is why GE calls it a "logic" controller.

- Makes the drive act according to your specific application
- Standard feature
- Simple to programme
- Easy to correct
- Program via DCT-10 or keypad

The instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the GE company.

AF-650 GP, AF-600 FP and AF-60 LP are trademarks of the General Electric Company.

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