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ADVANCED USER MANUAL

DMC Configurator



Modification History:

Revision	Issue Date	Author	Changes
1.0	01/12/2021	SM	First development
1.1	11/03/2022	SM	Update with back compatibility
1.2	13/04/2022	SM	Update including "CAN trace" function
1.3	29/04/2022	SM	Figure update for consistency. Add export EDS description. CAN Network trace details. Saving the ADO and ADV Live data config files.
1.4	02/05/2022	FM	Updates
1.5	20/09/2022	SM	Include description of "generate RxPDOs" feature

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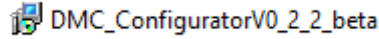
1 About this manual

This manual will describe the DMC configurator application. Both installation process, user interface and function will be described.

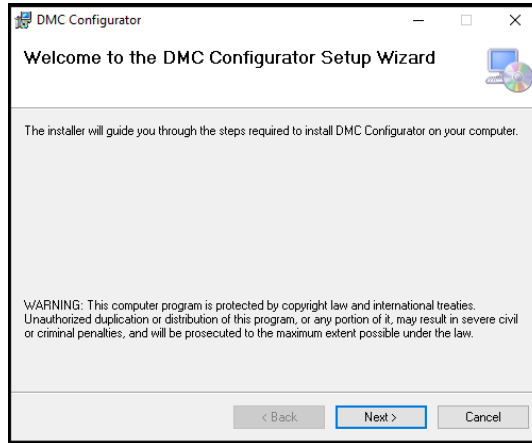
2 Installation

To install the DMC configurator on your PC, please follow this short guide:

1. In case of updating the DMC Configurator, it is highly suggested to run a “clean installation”. This means un-installing the previously installed version and then install the newer one;
2. Double click on the installer icon. It is highly suggested to run the setup with administrator rights;

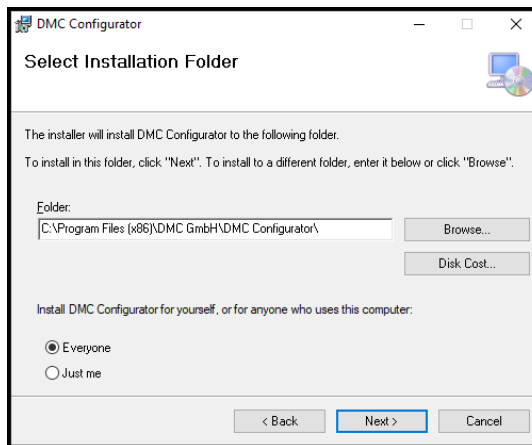


3. The installation will start, warning the user on the copyrights:



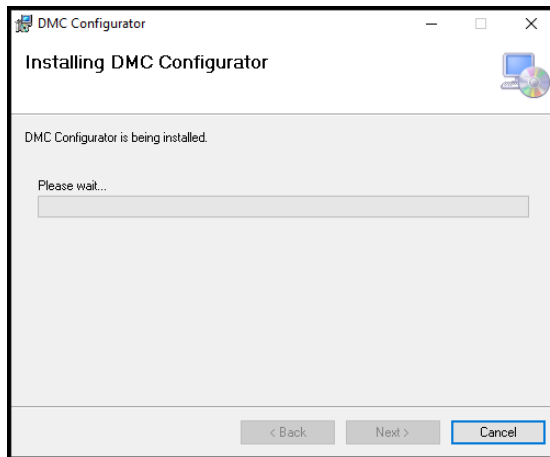
Click “Next” to proceed;

4. The user is then prompted to select an installation folder. It is highly suggested to leave the default installation path;

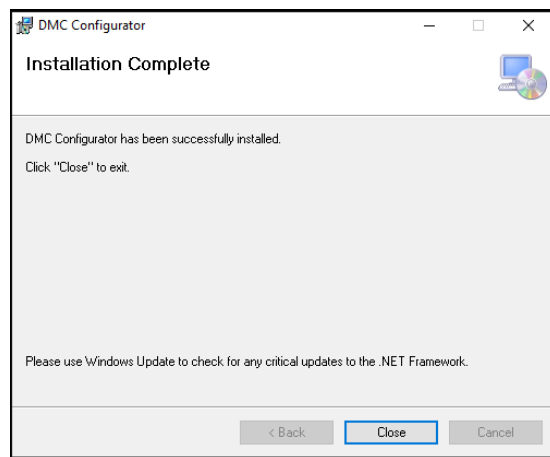


Click “Next” to proceed;

5. The installation will now start and its progress can be monitored through the status bar. The installation may take up to 3 minutes;



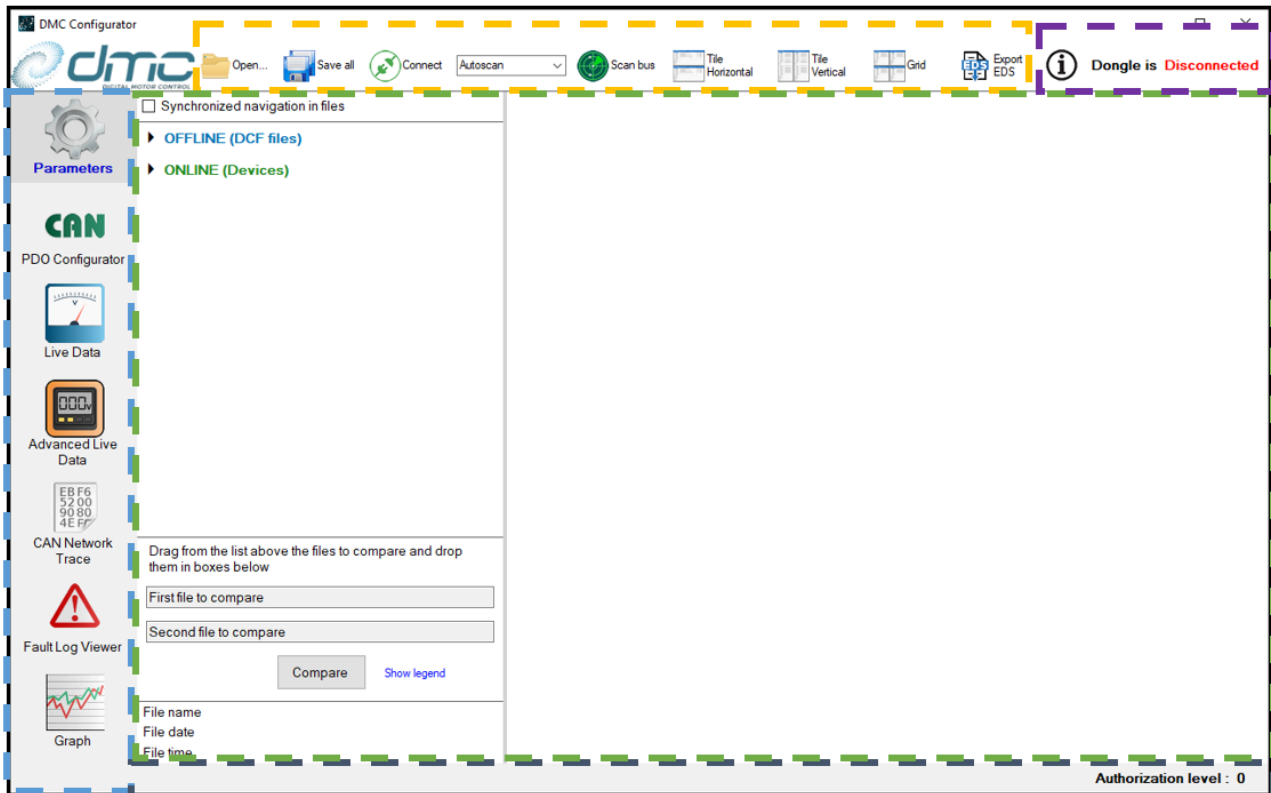
6. Once the installation is finished, the setup will signal it to the user. Please notice that a desktop icon will be generated automatically.



3 User interface

In this section the user interface will be generally described. The main instruments and buttons available for the user will be introduced, together with some general concept of usage.

At powerup, the DMC configurator will appear as in the following picture:



The interface is divided into 5 main areas, indicated in the figure with dashed boxes:

- The “General Tools” instrument panel, contoured by the **YELLOW** box, contains the buttons that can be used for general usage;
- The “Function selection” toolbar, contoured by the **SKY BLUE** box, contains the button for selecting the desired DMC Configurator function;
- The “Error & Information” bar, contoured by the **DARK BLUE** box, displays the active user authorization level and the eventual error and/or warning messages;
- The “About” section, contoured by the **PURPLE** box, contains the tool for changing the authorization level, the button for having information about the application version and the actual status of the Dongle (details about the Dongle will be given in “Chapter 5 - Connecting to the Controllers”);
- The “Workspace”, contoured by the **GREEN** box, will contain the various windows on which the user will operate for performing functions.

4 General usage – DCF and DMC files

Generally speaking, the DMC Configurator is designed to work with DCF or DMC files, that are sets of Controller’s parameter collections.

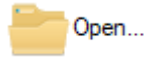
DCF files are proper to Full CAN Open devices and are generated as the CiA DS 306 specifies.

DMC files are proper to DMC CAN or CAN Open Compatible devices and in DMC proprietary format.

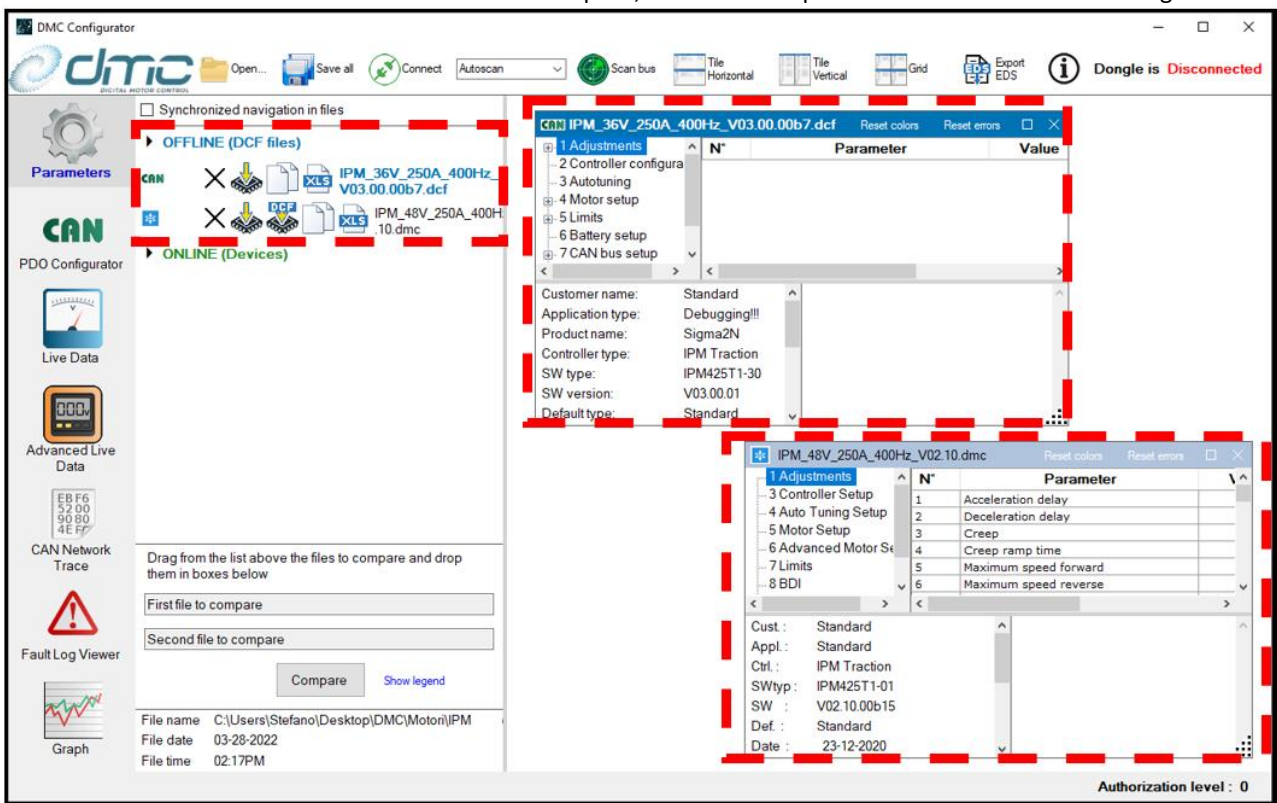
Those files can be either opened offline from the PC or generated from uploading the settings from an online device.

4.1 Open offline DCF or DMC files

To open an offline DCF or DMC file, click on the “open” button (see figure below).



A browsing window will appear and the user should select a DCF or DMC file to be opened. Once confirmed, the DCF or DMC file will be shown in the left section of the workspace, and the set of parameter will be shown in the right section:



The type of opened file will be displayed aside of its name:

- Full CAN Open devices are identified by the CAN standard logo
- Classic devices are identified by the DMC PC Interface classic logo

The user can open an arbitrary number of DCF and DMC files, also at the same time.

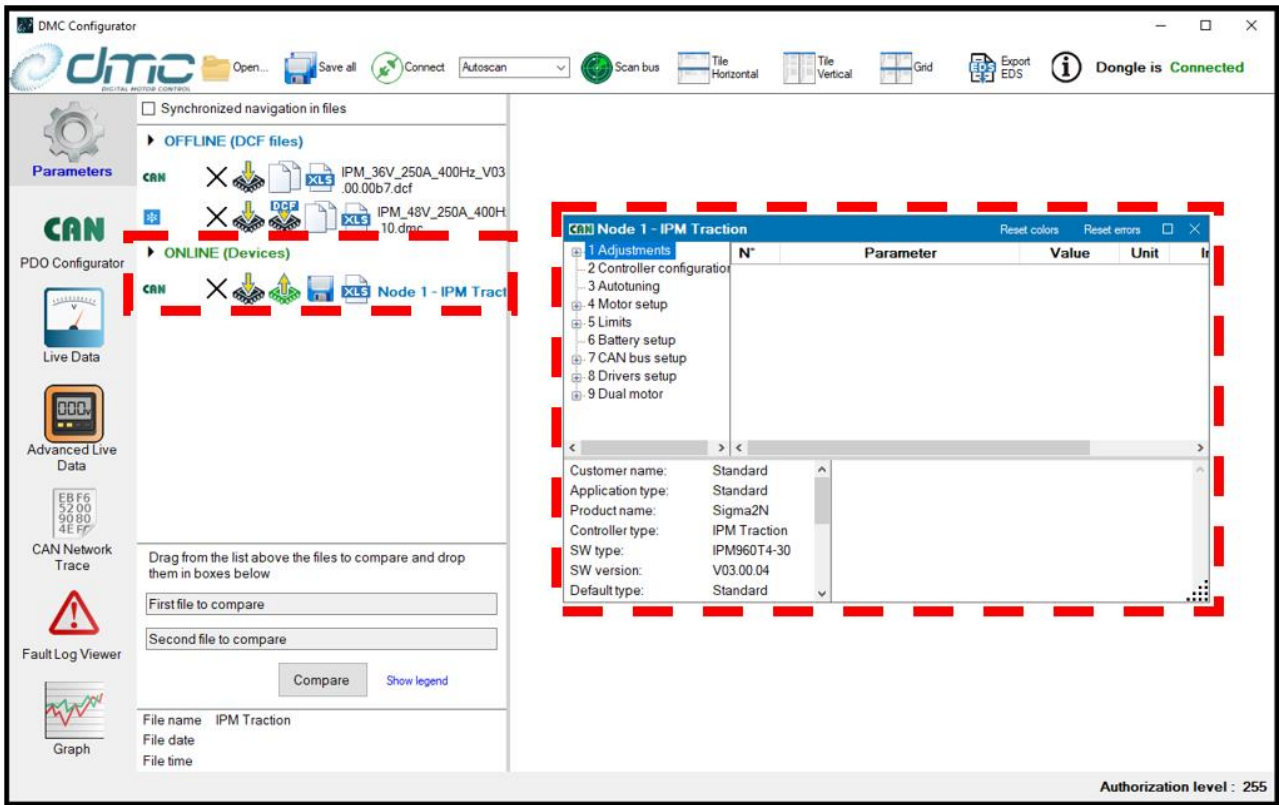
4.2 Upload a DCF or DMC file from an online device

To upload (and therefore generate) a DCF or DMC file from an online device, the user should first connect to the DMC Controller using the DMC Dongle and scan the CAN bus for online devices. To do so, please follow the procedure reported in “Chapter 5 - [Connecting to the Controllers](#)”.

Once the controller has been found by the DMC Configurator, the user can click on the “Upload” button (see image below), placed aside of the recognised online device, to retrieve the DCF or DMC file from the controller.



Similarly to the outcome of opening an offline file, the DCF or DMC file retrieved from an online device will be shown in the left section of the workspace, and the set of parameter will be shown in the right section:



As it can be seen from the image above, an arbitrary number of offline and online files can be opened at the same time.

4.3 Exporting the CAN Open EDS file

The DMC Configurator embeds the standard CAN Open EDS file, in the format specified by CiA DS 306. To export the said EDS file and use it in another program, the user can click on the “Export EDS” icon (see image below).



He will be then prompted to select a saving location.

5 Connecting to the Controllers

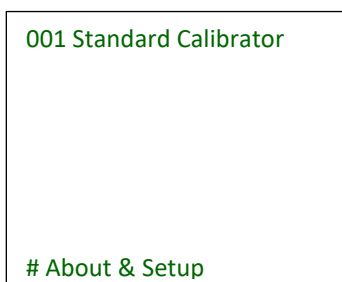
If the user wants to operate on a DMC controller, it must first be able to connect to the said device.

The connection with the DMC Controllers is performed by means of the DMC Calibrator (that will be referred to as “the Dongle” from now on), that will act as a dongle for transmitting and receiving data to and from the Controllers.

5.1 Connection between PC and Dongle

To establish the connection between a PC and the DMC Calibrator, the user should use an USB cable with a “Type A” connector at one end and a “Type B” connector at the other end, plugging the “Type A” connector into the PC and the “Type B” connector into the bottom of the Dongle.

Once this connection is performed, the Dongle should power up, showing the following screen:

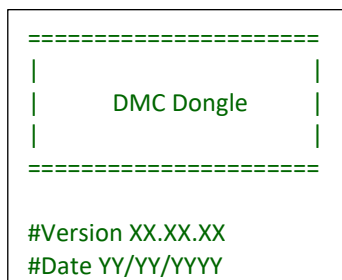


If the DMC Configurator is opened after connecting the Dongle to the PC, it will automatically try to connect to it.

If the DMC Configurator is opened before connecting the Dongle to the PC, the user should clicking the “Connect” button (see figure below) for forcing the connection.



When the connection is established, the DMC Configurator will display “Connected” status in the top right corner, and the Dongle will show the following screen:



5.2 Connection between Dongle and Controller(s)

To establish the connection between the Dongle and an arbitrary number of DMC controllers, the user should wire a CAN bus including all the Controllers and plug the Dongle into the CAN bus, using the cable provided by DMC. Then the user should power on the controllers, so that the Calibrator screen will show all active Controllers. Since the DMC Configurator can be used as a replacement of the “classic” DMC PC interface, the user can select the network type to be scanned. There are three different options:

- 1- Full CAN Open scan: the DMC configurator is expecting to scan a network with CAN Open devices only (i.e. Sigma2N products);
- 2- Classic mode scan: the DMC Configurator is expecting to scan a network with DMC classic protocol devices CAN Open compatible devices (i.e. SigmaDrive, SuperSigma2 products);
- 3- Autoscan: the DMC Configurator will scan the network and automatically recognize the connected devices;

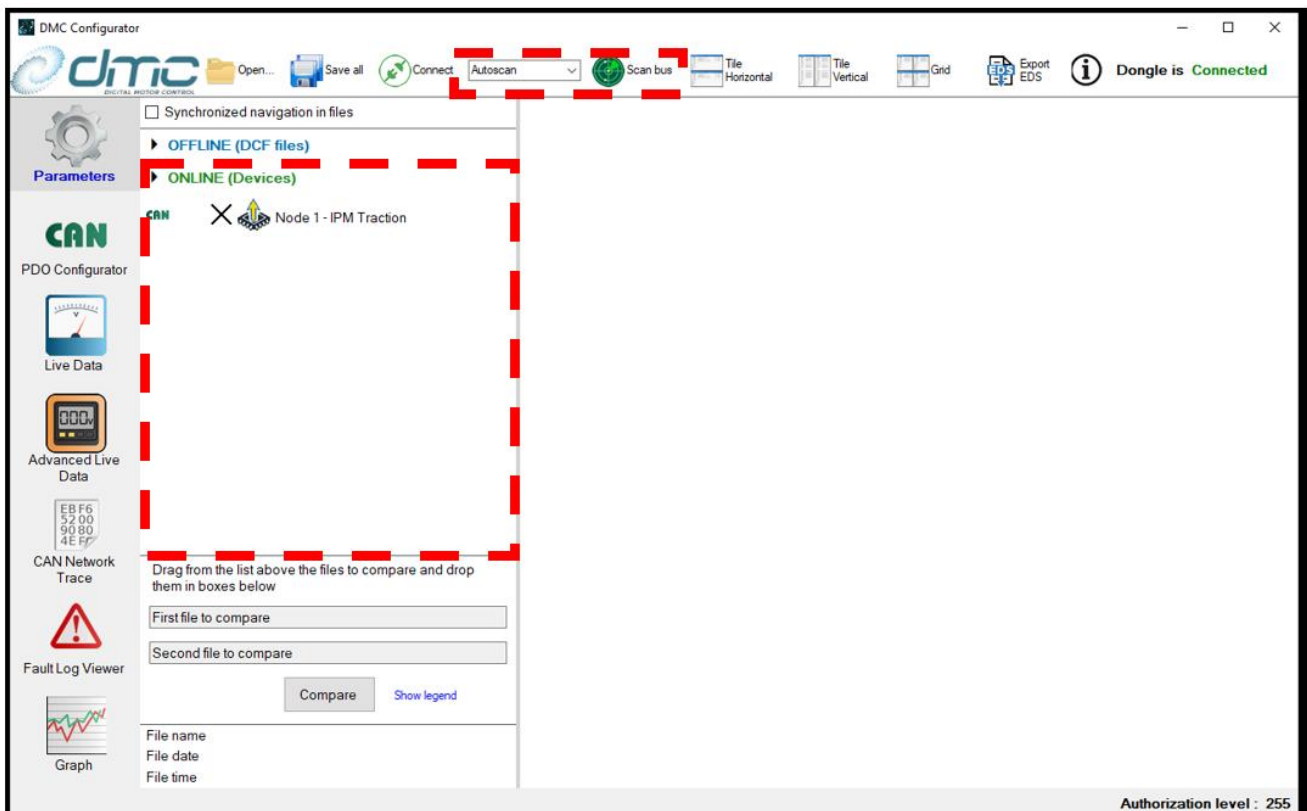
IMPORTANT: it is not possible to scan “mixed” networks that include both Full CAN Open and Classic devices. In this case, only one type of devices will be recognised by the DMC Configurator (i.e. Full CAN Open products in case of “Full CAN Open scan” and “autoscan”, Classic products in case of “Classic mode scan”).

!NOTICE: If the user wishes to monitor data from a Classic device (i.e. with DMC CAN or CAN Open Compatible protocols) through the “Can Network trace” function (See “6.5 CAN network tracer”), he has to make sure to not have scanned the network before doing so. In fact Classic devices stop outputting feedback and any kind of communication when they are scanned by the DMC Configurator.



At this stage, given the Dongle has been physically connected to the PC and that the communication between PC and dongle has been established, the user can click on the “Scan” button (see figure below).



The Dongle will then scan the CAN network in search of DMC devices and will show all the active devices in the proper section of the DMC Configurator workspace:



The type of scanned device will be displayed aside of the device name:

- Full CAN Open devices are identified by the CAN standard logo .
- Classic devices are identified by the DMC PC Interface classic logo .

6 DMC configurator functions

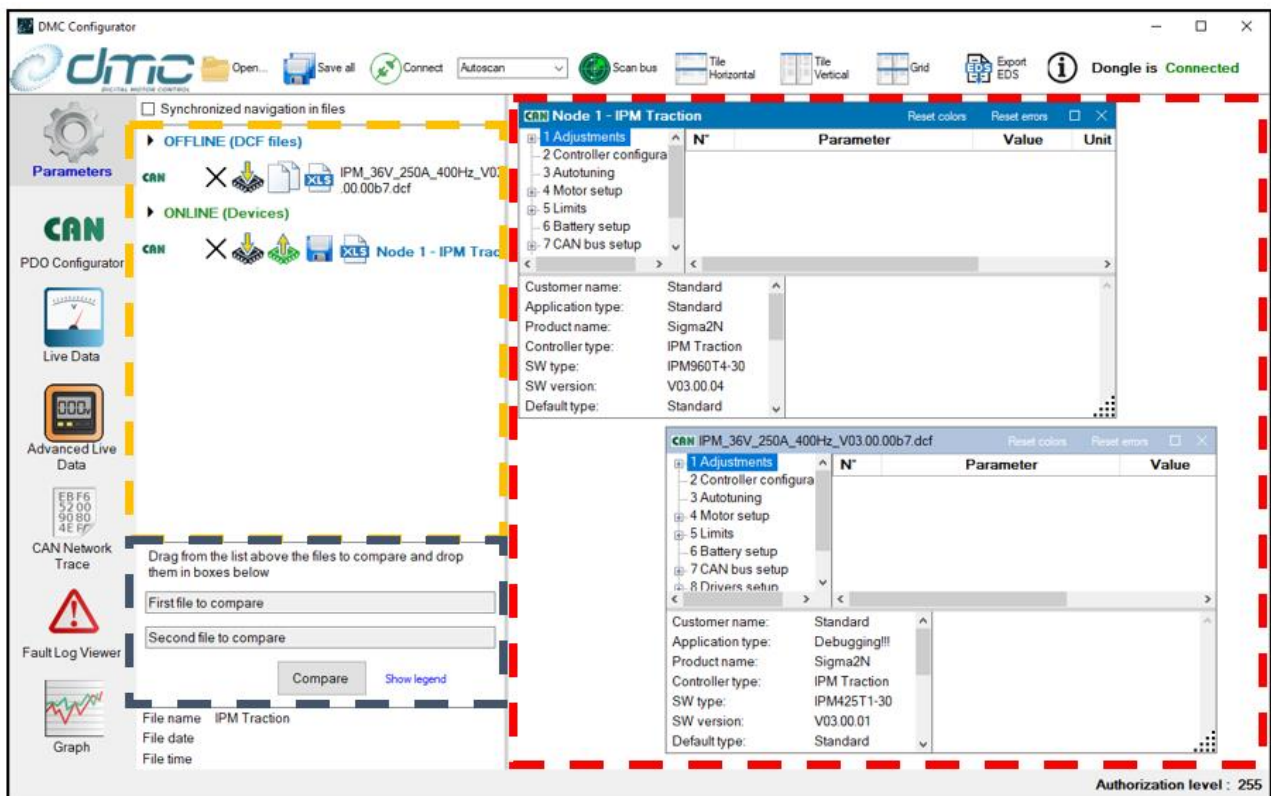
The DMC Configurator offers different functions, which can be accessed by pressing the correspondent button in the “function” toolbar placed on the left side of the screen.

6.1 Parameter viewer/configurator

The first function that the DMC Configurator is able to provide, allows the user to investigate and modify the DMC Controller’s parameters. This function can be accessed by pressing the “parameter” button (see image below) in the functions toolbar.



Doing so, the “parameter configurator” will be activated and the workspace will be divided into 3 main areas:



- The area contoured in **YELLOW** will display all the opened DCF and DMC files, divided between those generated from online devices and those opened from offline files on the PC;
- The area contoured in **RED** will display the windows for navigating into the DCF and DMC files;
- The area contoured in **BLUE** will allow to visualize information about the selected DCF and to compare different DCF files.

When more than one DCF or DMC file is opened, the user can decide to tile them horizontally or vertically or to place them in a grid-view to ease the distinction. To do so, simply press on the “Tile horizontally”, “Tile vertically” or “Grid” button (see image below).



Each DCF or DMC file window is on turn divided into 4 sections:

Big AC 24V 300A 100Hz.dcf

Parameter	Value	Unit	Index	Subindex
Control mode	1: Torque control	Key	0x2400	0x00
Vehicle type select	0: Ride-On	Key	0x2401	0x00
Digital Input 5 and 6 configuration	0: D15 as speed limit 1, D16 as speed limit 2	Key	0x2402	0x00
Digital Input 7 configuration	1: D17 as handbrake	Key	0x2601	0x01
Dual motor configuration	0: Single motor	Key	0x2403	0x00
Supply wire off detection	0: No wire off	Key	0x2404	0x00
Standby delay	0,0	min	0x2405	0x00
Digital inputs active low/high	0: Active low	Key	0x2406	0x00
Analog Input 2 configuration	0: Footbrake	Key	0x2407	0x00
Analog Input 3 configuration	0: Steerpot	Key	0x2408	0x00
Use speed limits instead of torque limits	0: Use torque limits	Key	0x2410	0x00
Use calibration values	0: Do not use calibration values	Key	0x2409	0x00
Loading Defaults	0: Do not load defaults	Key	0x240A	0x00

Customer name: Standard
 Application type: Standard
 Product name: SuperSigma2
 Controller type: AC Traction
 SW type: PAC960T4-00
 SW version: V03.00.00b2
 Default type: Standard

Control mode
 This sets whether the controller has to provide speed type control or torque type control:
 • If set to 0, the controller will apply speed control.
 • If set to 1, the controller will apply torque control.
 • If set to 2, the controller will apply torque control with speed control at zero speed.
 • If set to 3, the controller will apply Torque control with speed control at end of braking if footbrake operation or at zero speed.
 The definition of each type is detailed below.
 Speed control means that the Accelerator input is used as a speed demand between zero and the programmed


- The area contoured in **YELLOW** contains the DCF or DMC file navigator. It shows all the menus and submenus contained by the DCF.
- The area contoured in **GREEN** contains the parameters belonging to the selected menu and submenu;
- The area contoured in **BLUE** contains information about the controller from which the DCF or DMC file was generated;
- The area contoured in **RED** contains a brief description of the selected parameter.






Furthermore, in the Window bar on top of each DCF or DMC files, the name of the file is reported, together with some possible basic actions, which are:

- “Reset errors” is used in case the user wishes to reset the errors associated with downloading a DCF or DMC file to a Controller;
- “Reset compare” is used in case the user wishes to reset the colours coming from the comparison between DCF or DMC files;
- “Magnify” allows the user to select whether the DCF or DMC file window should fill the workspace screen or to be minimized;
- “Close” allows the user to clear the workspace from the unused DCF or DMC files. Please notice that this action will not close the file, it will just make the window disappear from the workspace.

6.1.1 Basic actions with DCF and DMC files

On offline and online DCF and DMC files, some basic actions can be performed;

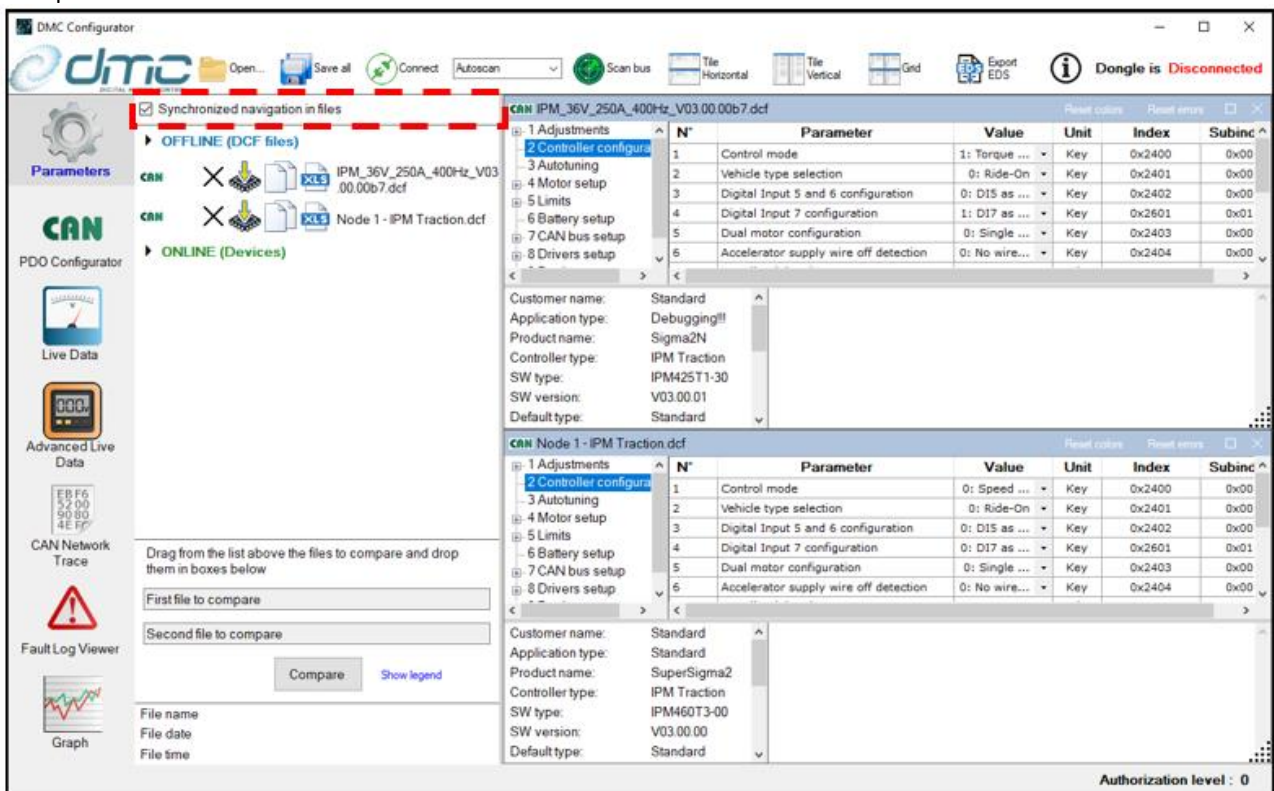
- By clicking on the “close” icon (), the DCF or DMC will be removed from the file list. If some change is pending, the user will be advised on the situation and he must confirm to close.

- By clicking on the “Export to XLS” icon (), the selected DCF or DMC will be exported in excel format. The user is free to choose the location where the file will be stored;
- On offline files only, the “clone” button () allows the user to duplicate the selected DCF or DMC file, to conserve a “clean” copy and work on a clone. The user is free to choose the location where the clone will be stored;
- On online files only, the “save” button () allows the user to save the uploaded DCF or DMC file. The user is free to choose the location where the DCF or DMC file will be stored;
- On online files only, the “refresh” buttons () allows to re-upload the DCF or DMC file. Please notice that any pending change will be overwritten when performing this action.
- By clicking the “Download” button (), the user can download the DCF or DMC file to an online controller. Details will be given in “Section 6.1.3 – Download settings to a Controller”
IMPORTANT: Please notice that it is not allowed to write a DCF file on a “Classic controller”.
IMPORTANT: It is also not allowed to write a DMC file on a “Full CAN Open” controller, but it is possible to convert the DMC file and download the converted DCF. Details will be given in section “6.1.4 Convert a DMC file to be downloaded on a Full CAN Open controller”.

6.1.2 Navigate into DCF and DMC files and change parameters

The DCF files are organized in a menu-submenu structure. The DMC files are organized in a menu structure. Their representation follows the one that can be accessed by means of the DMC Calibrator. To navigate into the parameters, use the tree-structured menu selector that can be found on the left side of every DCF or DMC file window.

If the user wishes to navigate to the same menu (or submenu) of multiple DCF or DMC files at the same time, it is possible to enable the “**synchronized navigation**” function. The function is enabled by ticking the box placed on top of the opened DCF and DMC files list.



When the synchronized navigation is enabled, all the opened DCF and DMC files will be synchronized (when possible): this means that clicking on any menu/submenu from any DCF/DMC tree-structure navigator, will result in all other DCF/DMC files to reach that menu/submenu visualization.

Synchronized navigation between files of a different nature (i.e. DCF and DMC files) is not supported by the different structure of the files themselves.

To change a parameter in the DCF or DMC file, the user should navigate to the menu/submenu containing the parameter, select it by clicking on the “Value” property and type the new value for the said parameter. In case the parameter represents a configuration, a drop-down window containing a brief description of the configuration can be accessed by clicking on the arrow on the right side of the “Value” field. Selecting a configuration in this way has the same effect of typing the value manually.

Once the new value is inserted, by pressing “ENTER” button on the keyboard or by clicking on another parameter, the change is confirmed and the “Value” field will be highlighted in bright green, indicating that a modification has been performed.

In case the **modification** has been performed in an **offline DCF or DMC** file, a “saving” icon (see image below) will appear on the side of the DCF or DMC file name, to indicate that the file has some pending modifications.



In case a **modification** has been performed in an **online DCF or DMC** file, a “write changes” icon (see image below) will appear on the side of the DCF or DMC file name, to indicate that the file has some pending modifications that can be written to the controller.



6.1.3 Download settings to a Controller

Write parameters of a DCF or DMC file

Settings can be written into a DMC Controller under 2 condition:

1. A DCF or DMC file is opened (either online or offline);
2. The DMC configurator is connected to the Controller Via the Dongle and the Controller has been detected on the network by means of a scan operation (i.e. it is visible under the “online” section of the parameter viewer workspace).

IMPORTANT: Please notice that it is not allowed to write a DCF file on a “Classic controller”.

IMPORTANT: It is also not allowed to write a DMC file on a “Full CAN Open” controller, but it is possible to convert the DMC file into a DCF one and download the converted DCF. Details will be given in section “6.1.4 Convert a DMC file to be downloaded on a Full CAN Open controller”.

Offline DCF or DMC files can be written to any online supported node. Online DCF or DMC files can only be written to the node they belong to.

When clicking the “Download” button (see image below), the user is prompted which section of the DCF or DMC file should be written;



There are three possibilities:

- Write motor settings only: this option allows to write only “Autotuning” and “Motor Setup” menus (plus “Advanced Motor Setup” and “Debug” menu in case of a DMC file);
- Write drive and configuration settings only: this option allows to write only “Adjustments”, “Controller configuration”, “Limits”, “CAN bus”, “Battery”, “Drivers” and “Dual Motor” menus;
- Write all settings (including PDO configuration): this option writes the whole DCF or DMC file to a Controller.

Once the user has selected this option, in case of an offline DCF or DMC file, he is prompted to choose on which online device the selected settings should be written and the writing operation starts.

Write changes performed to an online DCF or DMC file

When the user wants to change only few parameters, he can do so by uploading the DCF or DMC file from an online controller, modify the chosen parameters and write the changes only. This can be done by clicking the “write changes” icon (see image below) that appears aside of the online DCF or DMC file name when a parameter is modified.



Managing errors

In case an error occurs during writing, A fault is signalled at the bottom of the DMC Configurator and a warning symbol (see image below) appears aside of the online device.



By clicking on this symbol, the user can investigate which parameter caused the error.

Index	SubIndex	Parameter Name	Write error
0x330D	0x00	Nominal RMS motor current for autotuning (AT)	Value is too high

Once the error has been fixed, to reset the error icon, the user should select the “Reset error” option on the top right corner of the DCF or DMC file window. To make the error icon disappear, the user should refresh the online DCF or DMC file.

The following image shows a situation where a writing error occurred and the corresponding error icon is set. The reset error option is highlighted on the top right corner of the files windows.

The screenshot shows the DMC Configurator interface with a red warning icon next to 'Node 2 - AC Traction' in the ONLINE (Devices) list. The main window displays two parameter tables:

N°	Parameter	Value	Unit	Index
1	Adjustments			
3	Controller Setup			
4	Auto Tuning Setup	180		1000
2	N/A	15,6		1000
5	Motor Setup	3,80		1000
6	Advanced Motor Setup	0,88		1000
7	Limits	50,0		1000
8	N/A	60		1000
9	CAN Bus	8,0		1000
10	N/A	30		1000
11	N/A	45		1000
12	N/A	60		1000
13	N/A	70		1000
14	N/A	80		1000
15	N/A	94		1000
16	N/A	100		1000
17	N/A	110		1000

N°	Parameter	Value	Unit	Index
1	Adjustments			
3	Controller Setup	58		1000
4	Auto Tuning Setup	1,0		1000
5	Motor Setup	290,00		1000
6	Advanced Motor Setup	100,00		1000
7	Limits	-100,0		1000
8	N/A	100		1000
9	CAN Bus	-100,0		1000
10	N/A	0		1000
11	N/A	45		1000
12	N/A	102		1000
13	N/A	2,929		1000
14	N/A	2,973		1000
15	N/A	1,654		1000
16	N/A	1,684		1000
17	N/A	4,794		1000

At the bottom of the interface, a red banner displays the message: "Some parameters could not be written on node 2 - AC Traction. Please click on error icon beside the device for details".

6.1.4 Convert a DMC file to be downloaded on a Full CAN Open controller

For back-compatibility purposes, it is possible to open an offline DMC file and convert into a DCF file in order to be downloaded on a Full CAN Open controller. To do so, 2 condition must hold:

1. A DMC file is opened offline;
2. The DMC configurator is connected to the Full CAN Open Controller Via the Dongle and the Controller has been detected on the network by means of a scan operation (i.e. it is visible under the “online” section of the parameter viewer workspace).

Once these conditions hold, it is possible to click to the “convert to dcf and download” button (see image below) that appears aside of the offline DMC file.



Doing so, the DMC file will be converted and downloaded to the online controller.

After this, it is possible to upload the DCF from the controller to have the converted DCF file available.

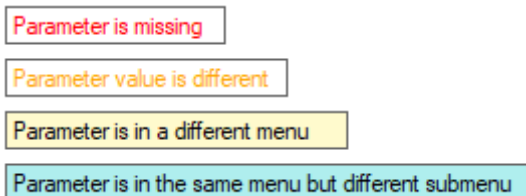
IMPORTANT: this operation will cause the online controller to be overwritten with the parameters coming from the DMC file.

IMPORTANT: It is highly suggested to follow the following procedure:

- 1- Scan the network and identify the online Full CAN open controller of interest;
- 2- Upload the existing parameters from the online controller. A DCF will be generated;
- 3- Save the generated DCF file on the disk to have a safe backup;
- 4- Click on the “convert and download” button to write the DMC file to the controller;
- 5- Upload the DCF file from the controller (it will contain the converted parameters coming from the DMC file);
- 6- Save this newly generated DCF file on the disk;

6.1.5 Compare DCF or DMC files

The DMC Configurator allows the user to compare 2 DCF or 2 DMC files. To do so, open the desired DCF or DMC files to be compared and drag them into the boxes of the “compare” section, visible in the bottom left corner of the “parameter” workspace. Clicking the “compare” button will start the comparison process. All the displayed DCF or DMC files windows (except the compared ones) will be removed from the workspace and the compared parameters will be coloured as follow:



When the user is satisfied with the comparison process, he can clear the colouring by means of the “Reset compare” option on the top right corner of the DCF or DMC file windows.

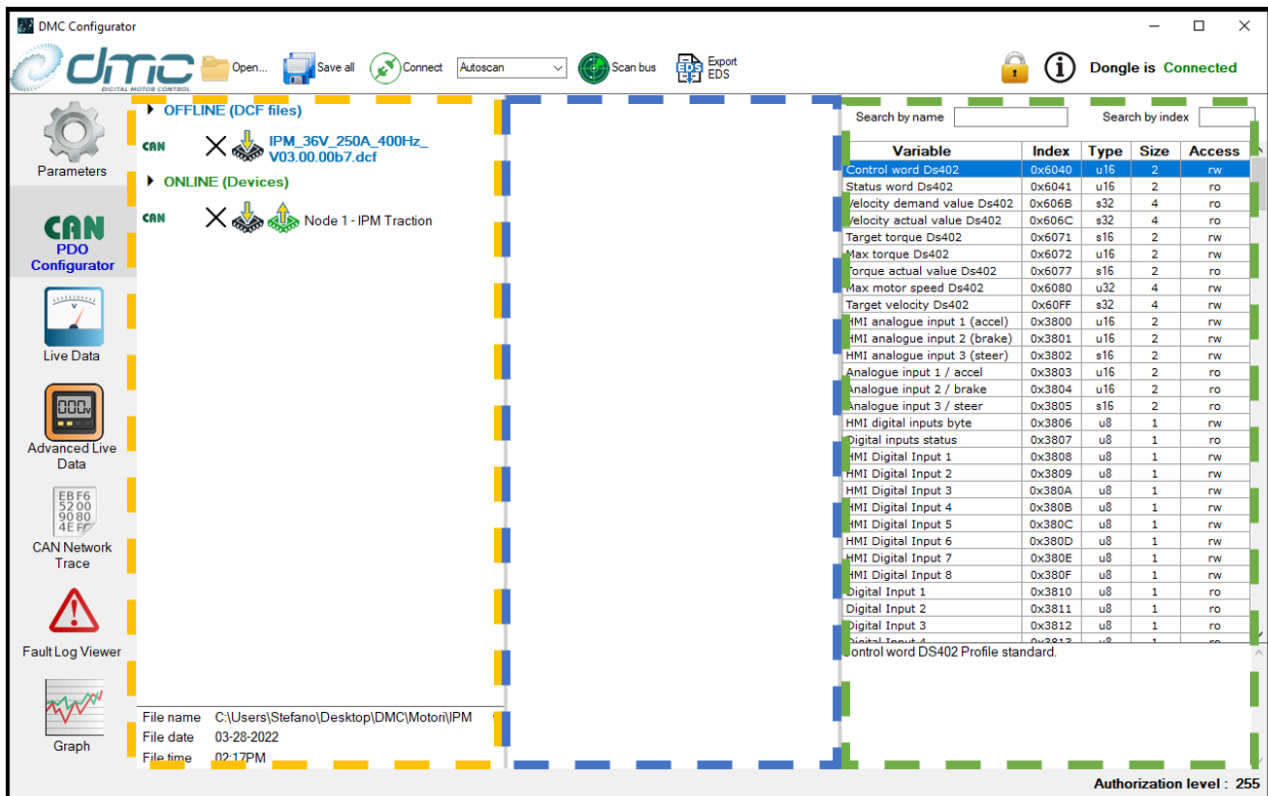
To navigate the open compared file is also possible to use the “Synchronized navigation in files” as described in section 6.1.2 Navigate into DCF and DMC files and change parameters.

6.2 PDO configurator

The second function provided by the DMC Configurator consist in modifying the CAN configuration of a DMC device. With the PDO configurator tool, the user will be able to freely configure the CAN messages that the DMC Controller will be able to receive and/or send on the CAN network. To access this tool click on the “CAN” button (see image below) of the function toolbar.



Doing so, the “PDO configurator” will be activated and the workspace will be divided into 3 main areas:



- The area contoured in **YELLOW** will display all the opened DCF files, divided between those generated from online devices and those opened from offline files on the PC;
- The area contoured in **BLUE** will display the windows for navigating into the PDO configuration files;
- The area contoured in **GREEN** contains a collection of all the variables that is possible to map into Tx/Rx PDOs.

When data is uploaded from an online device or when an offline DCF file is opened, the corresponding PDO configuration will be displayed in a dedicated window.

It is crucial to notice that the PDO configuration is actually part of a DCF file. The PDO configurator is therefore allowing the user to act on that section alone.

CAN AC 48V 130A 200 Hz V03.00.dcf

Factory mapping Free mapping **Advanced mapping** J1939 compatible

Receive

- Rx PDO 1
- Rx PDO 2
- Rx PDO 3
- Rx PDO 4
- Rx PDO 5
- Rx PDO 6
- Rx PDO 7
- Rx PDO 8

Transmit

- Tx PDO 1
- Tx PDO 2
- Tx PDO 3
- Tx PDO 4
- Tx PDO 5
- Tx PDO 6
- Tx PDO 7
- Tx PDO 8

Rx PDO 1 Enable PDO

Event timer 150 ms

ID 0x 0201

Transmission type

OnSynch

Asynchronous

Frame type

11 bit CAN-ID

29 bit CAN-ID

Parameter bytes allocation ■ ■ ■ ■ ■ ■ ■ ■ Generate by DMC Configurator

	Parameter	Index	Type	Size (Bytes)
	HMI analogue input 1 (accel)	0x3800	u16	■ ■
	HMI analogue input 2 (brake)	0x3801	u16	■ ■
	HMI analogue input 3 (steer)	0x3802	s16	■ ■
	HMI digital inputs byte	0x3806	u8	■
	Rollover counter RxPDO1	0x382A	u8	■

To add a parameter to PDO drag it from the list on the right and drop in the space above

6.2.1 Navigate into PDO configuration and change parameters

The header of this window contains the choice of the desired mapping access level.

This choice corresponds to parameter “M7.2-1 PDO free mapping configuration “FreeMap”” of the CAN menu. For details about the meaning of the said options, the user can refer to the CAN Open manual.

Once the mapping access level has been selected, the user can select which PDO to modify by selecting it from the list on the left side of the window. The PDO configuration can be sub-divided into two sections: the “communication” and the “mapping” parameters.

PDO configuration parameters

The user can freely configure the PDOs “communication” parameters in the following way:

- Select the PDO to be configured from the list on the left side of the window;
- Choose whether the PDO should be enabled or not, by checking/unchecking the corresponding box;
- Select the desired event timer. In case of RxPDOs, this is intended as the timeout time in which a new RxPDO should be received. In case of TxPDOs, this sets the refresh rate of the message;
- Select whether the PDO should be processed/sent (respectively for RX/TX PDOs) asynchronously or at the reception of a SYNC message (for details about SYNC message, please refer to CiA DS301 CAN Open standard), by checking the desired box;
- Select whether the message ID will be intended to be on an 11bit or 29bit frame type, by checking the desired box;
- Assign a CAN ID to the PDO by typing it in the appropriate box;
- In case of RxPDOs, choose whether it should be generated by the DMC Configurator.
This option is intended for test only and it will only affect the “Advanced Live data” tool of DMC Configurator, please refer to “6.4.2 - Control a device trough RxPDOs” for details. This setting will not affect any configuration in the DMC controller.

PDO mapping parameters

After configuring the “Communication” parameters as specified above, the user can move on mapping the variable into the PDO. To do so, search the desired variable to be mapped in the list shown in the right side of the workspace and drag-and-drop it into the PDO configuration window. The bytes allocation will specify where the variable will be allocated in the message payload. The representation is intended from byte 0 to byte 7, from left to right. controller.

6.2.2 Download PDO configuration to a Controller

Write parameters of a DCF file

Settings can be written into a DMC Controller under 2 condition:

1. A DCF file is opened (either online or offline);
2. The DMC configurator is connected to the Controller Via the Dongle and the Controller has been scanned (i.e. it is visible under the “online” section of the parameter viewer workspace).

Offline DCF files can be written to any online node; Online DCF files can only be written to the node they belong to. When clicking the “Download” button (see image below), the user is prompted which section of the DCF file should be written;



Once the user has clicked the button, in case of an offline DCF file, he is prompted to choose on which online device the selected settings should be written and the writing operation starts.

Write changes performed to an online DCF file

When the user wants to changes only few parameters, he can do so by uploading the DCF file from an online controller, modify the chosen parameters and write the changes only. This can be done by clicking the “write changes” icon (see image below) that appears aside of the online DCF file name when a parameter is modified.



Managing errors

In case an error occurs during writing, A fault is signalled at the bottom of the DMC Configurator and a warning symbol (see image below) appears aside of the online device.



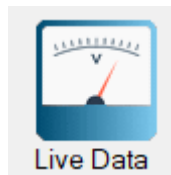
By clicking on this symbol, the user can investigate which parameter caused the error.

Node 2 - AC Traction			
Index	SubIndex	Parameter Name	Write error
0x330D	0x00	Nominal RMS motor current for autotuning (AT)	Value is too high

Once the error has been fixed, to reset the error icon, the user should select the “Reset error” option on the top right corner of the DCF file window. To make the error icon disappear, the user should refresh the online DCF file.

6.3 SDO live data

This function allows the user to monitor any variable of any DMC device through a point-to-point slow communication. It is available for CAN Open devices only. To access this tool, click on the “Live Data” button (see image below) of the function toolbar.



Doing so, the “SDO Live Data” tool will be activated and the workspace will be divided into 3 main areas:

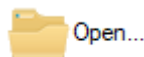


- The area contoured in **YELLOW** will display all the online devices that have been detected on the network;
- The area contoured in **BLUE** will display the live data windows;
- The area contoured in **GREEN** contains a collection of all the variables that is possible to monitor (i.e. all the objects contained in the DMC Data Dictionary).

6.3.1 Opening/creating a monitoring session

Before monitoring the devices, the user should create a new monitoring session configuration or open a previously saved one.

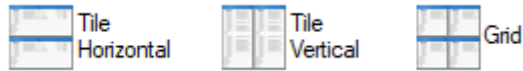
To open a previously created SDO monitoring session configuration, click on the “Open” button (see image below).



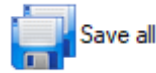
A browsing window will appear. Browse the location where the session is saved and open the file. SDO live data monitoring sessions configuration have extension “.sld”.

To create a new monitoring session configuration, please follow the following steps:

1. Connect the Dongle to the DMC Configurator (see “Chapter 5.1 - Connection between PC and Dongle”);
2. Power on the devices of the CAN network and scan the network to search for the active devices (see “Chapter 5.2 - Connection between Dongle and Controller(s)”). Mind that it is not necessary to upload data from the said devices;
3. Double click on the device that wants to be monitored. Doing so will result in a “monitoring window” to appear in the central section of the workspace. Multiple windows can be opened at the same time, and the windows can be tiled horizontally, vertically or combined in a grid view. To do so, simply press on the “Tile horizontally”, “Tile vertically” or “Grid” button (see image below);



4. Drag and drop from the variable list on the right side of the workspace the objects to be monitored into the monitoring windows;
5. If wished, the user can save the created monitoring session configuration by means of the “Save all” button (see image below).

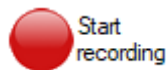


A browsing window will appear. Browse the location where the file has to be saved and save it. SDO live data monitoring sessions configuration have extension “.sld”.

6.3.2 Monitoring data from a device

To monitor data of a DMC device the user should follow the following steps:

1. Open a previously created monitoring session configuration or create a new one.
2. If a new monitoring session was created, skip this point; if a monitoring session was opened from a previously saved one, connect the Dongle to the DMC Configurator (see “Chapter 5.1 - Connection between PC and Dongle”), power on the devices of the CAN network and scan the network to search for the active devices (see “Chapter 5.2 - Connection between Dongle and Controller(s)”). Mind that it is not necessary to upload data from the said devices;
3. Select a suitable “polling interval” from the box placed on top of the active devices. Please notice that this is the refresh time of each open window. For example, if the polling interval is 50ms and one monitoring window is opened, the window will be refreshed every 50ms; if the polling interval is 40ms and three monitoring windows are opened, each window will be refreshed every 120ms. Please notice that setting a too low polling interval may result in overloading the CAN network. For general knowledge it is worth noticing that with a 250kbit/s baudrate on the CAN bus, 10 variables can be refreshed at maximum 5ms. It is evident that having 3 monitoring windows with 10 variables each must have a refresh time of at least 15ms, for avoiding overloading the CAN bus;
4. Start the live monitoring by clicking on the “Start” button (see image below).



When the recording is started, further than displaying the live data in the monitoring windows, the DMC Configurator will store the data in a trace file.

Please notice that monitoring windows can not be opened while recording data.

Please notice that variables can not be added to already opened recording window while recording data.

To perform the said operation, the user should pause or stop the recording and then restart it;

5. If the recording has to be paused, the user can do so by clicking on the “Pause” button (see image below).



When the recording is paused, the live data will not be refreshed and the trace file will be frozen. If the user presses the “Start” button again, the monitoring window will start to show data again, and the said data will re-start to be stored in the trace file;

6. If the recording has to be stopped, the user can do so by clicking on the “Stop” button (see image below).

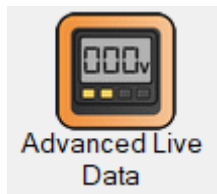


When this happens, the “live data” session is considered ended and the user is prompted to store the generated trace file. This file can in future be opened with the “Graph” function (see “Chapter 6.7 - Graph plotter”).

6.4 PDO advanced live data

This function allows the user to monitor all the object into Tx and Rx PDOs of any DMC device. It basically enhances the capability of the “SDO live data”, at the cost of allowing to monitor only variables mapped in the device’s PDOs. It is available for CAN Open devices only. To access this tool click on the “Advanced Live Data” button (see image below) of the function toolbar.

As an extended feature, this function is also capable of sending RxPDOs to controllers.



Doing so, the “PDO Advanced Live Data” tool will be activated and the workspace will be divided into 3 main areas, which are exactly the same of the “SDO Live Data” ones (see “Chapter 6.3 - SDO live data”). The only difference is that the right area of the screen will not be common for all devices and it will not include every variable contained in the DMC Data Dictionary. It will be instead be personalized for each online device, with the variable mapped in its active PDOs.

Also with Advanced Live Data function, the user can save the created monitoring session. In this case, the monitoring session have extension “.ald”.

6.4.1 Monitoring data from a device

To monitor data of a DMC device the user should follow the following steps:

1. Connect the Dongle to the DMC Configurator (see “Chapter 5.1 - Connection between PC and Dongle”);
2. Power on the devices of the CAN network and scan the network to search for the active devices (see “Chapter 5.2 - Connection between Dongle and Controller(s)”);
3. Upload the data from the devices that are to be monitored (see “Chapter 4.2 - Upload a DCF or DMC file from an online device”);
4. Double click on the device that wants to be monitored. Doing so will result in a “monitoring/controlling window” to appear in the central section of the workspace. Multiple windows can be opened at the same time, and the windows can be tiled horizontally, vertically or combined in a grid view. To do so, simply press on the “Tile horizontally”, “Tile vertically” or “Grid” button (see image below);



5. Drag and drop from the variable list on the right side of the workspace the objects to be monitored into the monitoring (Transmit PDO) section:

ObjId	Variable	Index	Type	Size	Access
0x8000181	Actual speed RPM	0x3832	s16	2	ro
0x8000181	Battery current	0x383E	s16	2	ro
0x8000181	Rollover counter...	0x3822	u8	1	ro
0x8000181	fault code	0x3840	u8	1	ro
0x8000181	Fault subcode	0x3841	u16	2	ro
0x8000281	Motor current	0x383C	s16	2	ro
0x8000281	Drive status indi...	0x3838	u8	1	ro
0x8000281	Speed limit indic...	0x383B	u8	1	ro
0x8000281	Actual Torque %...	0x3834	s16	2	ro
0x8000281	Torque limit indic...	0x383A	u8	1	ro
0x8000281	Rollover counter ...	0x3823	u8	1	ro
0x8000381	Controller tempera...	0x3837	u8	1	ro
0x8000381	Motor temperature	0x3836	u8	1	ro
0x8000381	Motor limit indica...	0x3839	u8	1	ro
0x8000381	Rollover counter ...	0x3824	u8	1	ro
0x8000381	Battery voltage	0x383F	s16	2	ro
0x8000381	Digital outputs st...	0x3819	u8	1	ro
0x8000381	State of Charge ...	0x3843	u8	1	ro

Actual speed RPM
 This object represents the actual speed of the motor expressed in RPM units in signed 16 bit format.
 The user can map this object for monitoring purposes into a TaPDO.
 Please notice that this value is not the one which is standardized by CAN Open DS402 profile (because of data type):
 unit = RPM
 scaling factor=1

Notice that, in case the user is drag and dropping a variable contained in an RxPDO, that will be placed into the “Receive PDO” section.

6. Start the live monitoring by clicking on the “Start recording” button (see image below).



In case one or more DMC Controllers are in “pre-operational” status (i.e. their CAN communication is deactivated) they will automatically be set into “operational” status (i.e. their CAN communication gets active). When the recording is started, further than displaying the live data in the monitoring windows, the DMC Configurator will store the data in a trace file.

Please notice that monitoring/controlling windows cannot be opened while recording data.

Please notice that variables cannot be added to already opened recording window while recording data.

To perform the said operation, the user should pause or stop the recording and then restart it;

7. If the recording has to be paused, the user can do so by clicking on the “Pause recording” button (see image below).



When the recording is paused, the live data will not be refreshed and the trace file will be frozen. If the user presses the “Start” button again, the monitoring window will start to show data again, and the said data will re-start to be stored in the trace file;

8. If the recording has to be stopped, the user can do so by clicking on the “Stop recording” button (see image below).



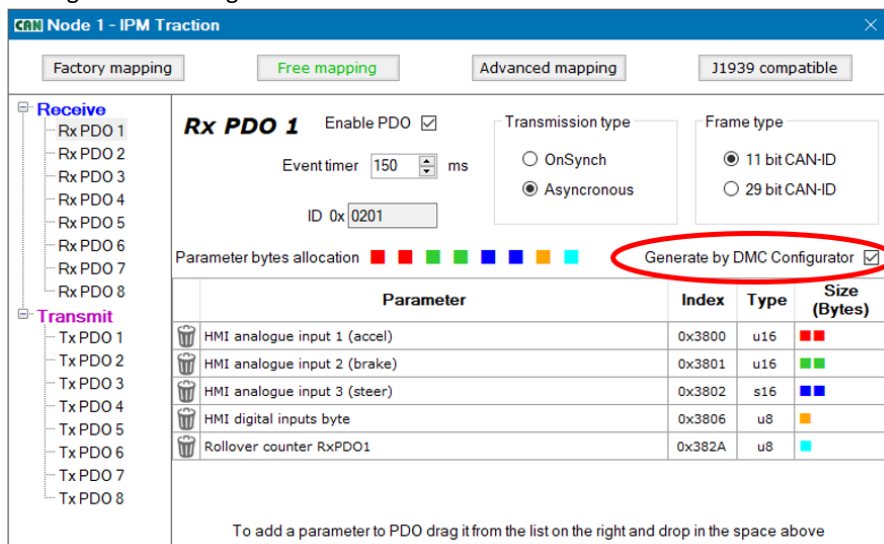
When this happens, the “live data” session is considered ended and the user is prompted to store the generated trace file.

Please notice that in this case also a “symbol” file will be saved. In order to be able to open the trace file with the “Graph” function (see “Chapter 6.7 - Graph plotter”) in future, it is mandatory to have both files with the same file name in the same directory.

6.4.2 Control a device through RxPDOs

To be able to transmit on the CAN network RxPDOs, the user should follow the following steps:

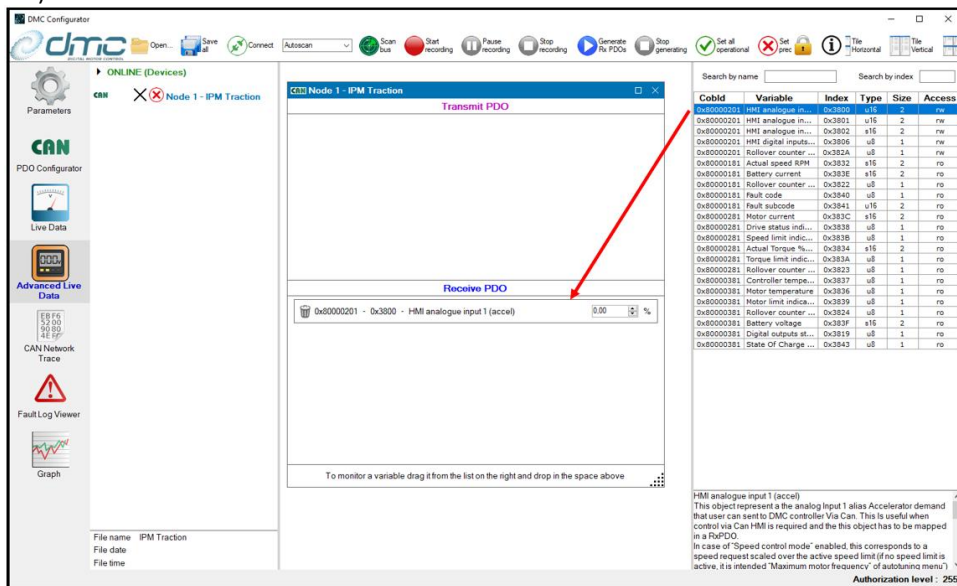
1. Connect the Dongle to the DMC Configurator (see “Chapter 5.1 - Connection between PC and Dongle”);
2. Power on the devices of the CAN network and scan the network to search for the active devices (see “Chapter 5.2 - Connection between Dongle and Controller(s)”);
3. Upload the data from the devices that are to be controlled (see “Chapter 4.2 - Upload a DCF or DMC file from an online device”);
4. In the “PDO configuration” tool (see “6.2 - PDO configurator”), tick the boxes corresponding to the RxPDOs that the DMC Configurator has to generate and send:



- Double click on the device that wants to be controller. Doing so will result in a “monitoring/controlling window” to appear in the central section of the workspace. Multiple windows can be opened at the same time, and the windows can be tiled horizontally, vertically or combined in a grid view. To do so, simply press on the “Tile horizontally”, “Tile vertically” or “Grid” button (see image below);



- Drag and drop from the variable list on the right side of the workspace the objects to be sent into the controlling (Receive PDO) section:



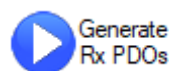
- Start the live monitoring by clicking on the “Start recording” button (see image below).



Notice that it is mandatory to start the recording before to start sending RxPDOs.

In case one or more DMC Controllers are in “pre-operational” status (i.e. their CAN communication is deactivated) they will automatically be set into “operational” status (i.e. their CAN communication gets active).

- Start the live controlling by clicking on the “Start generating” button (see image below).



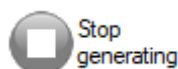
Please notice that variables cannot be added to already opened transmit window while generating or recording data.

- The desired value for each variable can freely be set by typing it in the box next to the said variable.
- If the user tries to pause or stop the recording by clicking on the “Pause recording” or “Stop recording” buttons (see image below), he will be asked whether he wants to set the controller back into “pre-operational” status first.



This is done to avoid the Controllers to go into error state due to RxPDO timeout, since stopping the recording would also stop the RxPDO generation.

- In case the user wishes to stop the recording only, he can do so by means of the “Stop generating” button (see image below).

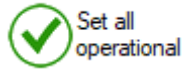


When this button is pressed, the user will be asked whether he wants to set the controller back into “pre-operational” status first. This is done to avoid the Controllers to go into error state due to RxPDO timeout, since stopping the recording would also stop the RxPDO generation.

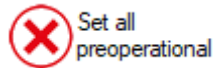
6.4.3 Managing the CAN node statuses of all controllers

In the “general toolbar” on top of the DMC configurator, two buttons are available to the user for managing the node status of each (scanned) DMC Controller in the network at once.

- By means of the “Set all to operational” button (see image below), the user can set each Controller into “operational” status (and therefore activate their CAN communication).



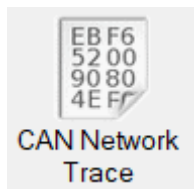
- By means of the “Set all to pre-operational” button (see image below), the user can set each Controller into “pre-operational” status (and therefore deactivate their CAN communication).



Please notice that in case the DMC Controllers are set into “pre-operational” status while recording/controlling, their CAN communication will be deactivated, resulting in the Live Data function not being able to communicate with the Controllers.

6.5 CAN network tracer

This function allows the user to monitor all the CAN messages travelling in the network. It basically enhances the capability of the “Advanced live data”, at the cost of not having data clearly divided in variables. To access this tool click on the “CAN Network Trace” button (see image below) of the function toolbar.



Doing so, the “CAN network tracer” tool will be activated and the workspace will be divided into 2 main areas: the left-side one contains the list of active DMC Controllers in the network, while the second will be used to display the network trace. This function will display any message travelling on the CAN network and is therefore available on both CAN Open, CAN Open Compatible or DMC CAN networks. Also third-party messages on the network will be traced and displayed.

!NOTICE: If the user wishes to monitor data from a Classic device (i.e. with DMC CAN or CAN Open Compatible protocols), he has to make sure to not have scanned the network before doing so. In fact Classic devices stop outputting feedback and any kind of communication when they are scanned by the DMC Configurator.

6.5.1 Monitoring can data on live network

To monitor data on a can network with can trace the user should follow the following steps:

1. Connect the Dongle to the DMC Configurator (see [“Chapter 5.1 - Connection between PC and Dongle”](#));
2. Power on the devices of the CAN network.
3. Start the live tracing by clicking on the “Start” button (see image below).



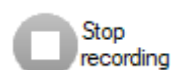
When the recording is started, further than displaying the live data in the tracing windows, the DMC Configurator will store the data in a trace file.

4. If the tracing has to be paused, the user can do so by clicking on the “Pause” button (see image below).



When the tracing is paused, the live data will not be refreshed and the trace file will be frozen. If the user presses the “Start” button again, the tracing window will start to show data again, and the said data will re-start to be stored in the trace file;

5. If the tracing has to be stopped, the user can do so by clicking on the “Stop” button (see image below).



When this happens, the “tracing” session is considered ended and the user is prompted to store the generated trace file.

In the following image the Can Network Tracer window where live can raw data numbers are running is shown. The message time in milliseconds, message ID in hex format and message content in hex format are shown where on each line a different messages.

DMC Configurator

Connect
Classic mode
Scan bus
Start recording
Pause recording
Stop recording
Export EDS

Synchronized navigation in files

- ▶ OFFLINE (DCF files)
- ▶ ONLINE (Devices)

Parameters

CAN

PDO Configurator

Live Data

Advanced Live Data

CAN Network Trace

Fault Log Viewer

Graph

Drag from the list above the files to compare and drop them in boxes below

First file to compare

Second file to compare

Compare [Show legend](#)

File name

File date

File time

4851.023 -	0211 - 00 00 00 00 00 00 00 00
4854.247 -	0152 - 48 Fa 04 00 00 00 00 00
4855.471 -	0132 - 00 00 00 00 00 00 19 00 00
4856.704 -	0142 - 00 00 00 00 00 20 00 00 90
4859.787 -	0202 - 03 01 04 00 00 00 00 00
4861.048 -	0212 - 00 00 00 00 00 00 00 00
4879.903 -	0201 - 03 01 04 00 00 00 00 00
4881.197 -	0211 - 00 00 00 00 00 00 00 00
4889.926 -	0202 - 03 01 04 00 00 00 00 00
4891.174 -	0212 - 00 00 00 00 00 00 00 00
4909.782 -	0201 - 03 01 04 00 00 00 00 00
4911.023 -	0211 - 00 00 00 00 00 00 00 00
4919.804 -	0202 - 03 01 04 00 00 00 00 00
4921.071 -	0212 - 00 00 00 00 00 00 00 00
4925.701 -	0131 - 00 00 00 00 00 00 19 00 00
4926.945 -	0141 - 00 00 00 00 00 20 00 00 80
4939.900 -	0201 - 03 01 04 00 00 00 00 00
4941.121 -	0211 - 00 00 00 00 00 00 00 00
4949.924 -	0202 - 03 01 04 00 00 00 00 00
4951.148 -	0212 - 00 00 00 00 00 00 00 00
4954.278 -	0152 - 48 Fa 04 00 00 00 00 00
4955.497 -	0132 - 00 00 00 00 00 00 19 00 00
4956.720 -	0142 - 00 00 00 00 00 20 00 00 90
4969.933 -	0201 - 03 01 04 00 00 00 00 00
4971.158 -	0211 - 00 00 00 00 00 00 00 00
4979.932 -	0202 - 03 01 04 00 00 00 00 00
4981.174 -	0212 - 00 00 00 00 00 00 00 00
4999.780 -	0201 - 03 01 04 00 00 00 00 00
5001.072 -	0211 - 00 00 00 00 00 00 00 00
5009.925 -	0202 - 03 01 04 00 00 00 00 00
5011.171 -	0212 - 00 00 00 00 00 00 00 00
5025.702 -	0151 - 48 0a 04 00 00 00 00 00
5026.923 -	0131 - 00 00 00 00 00 00 19 00 00
5028.173 -	0141 - 00 00 00 00 00 20 00 00 80
5029.850 -	0201 - 03 01 04 00 00 00 00 00
5031.127 -	0211 - 00 00 00 00 00 00 00 00
5039.904 -	0202 - 03 01 04 00 00 00 00 00
5041.170 -	0212 - 00 00 00 00 00 00 00 00
5054.419 -	0152 - 48 Fa 04 00 00 00 00 00
5055.576 -	0132 - 00 00 00 00 00 00 19 00 00
5056.798 -	0142 - 00 00 00 00 00 20 00 00 90
5059.771 -	0201 - 03 01 04 00 00 00 00 00
5061.026 -	0211 - 00 00 00 00 00 00 00 00
5069.937 -	0202 - 03 01 04 00 00 00 00 00
5071.182 -	0212 - 00 00 00 00 00 00 00 00
5089.901 -	0201 - 03 01 04 00 00 00 00 00
5091.148 -	0211 - 00 00 00 00 00 00 00 00
5099.922 -	0202 - 03 01 04 00 00 00 00 00
5101.197 -	0212 - 00 00 00 00 00 00 00 00
5109.372 -	0400 - 01
5119.896 -	0201 - 03 01 04 00 00 00 00 00
5121.148 -	0211 - 00 00 00 00 00 00 00 00
5125.704 -	0131 - 00 00 00 00 00 00 19 00 00
5126.962 -	0141 - 00 00 00 00 00 20 00 00 80
5129.915 -	0202 - 03 01 04 00 00 00 00 00
5131.179 -	0212 - 00 00 00 00 00 00 00 00
5149.872 -	0201 - 03 01 04 00 00 00 00 00
5151.127 -	0211 - 00 00 00 00 00 00 00 00
5154.407 -	0152 - 48 Fa 04 00 00 00 00 00
5155.616 -	0132 - 00 00 00 00 00 00 19 00 00
5156.813 -	0142 - 00 00 00 00 00 20 00 00 90
5159.919 -	0202 - 03 01 04 00 00 00 00 00
5161.163 -	0212 - 00 00 00 00 00 00 00 00
5179.774 -	0201 - 03 01 04 00 00 00 00 00
5180.995 -	0211 - 00 00 00 00 00 00 00 00

6.6 Fault log viewer

This function allows to view remotely the last 10 faults stored by a DMC device, further than the historical maximum and minimum motor and controller temperatures. To do so, either open an offline DCF file (see “[Chapter 4.1 - Open offline DCF or DMC files](#)”) or connect to an active controller and upload its parameters (see “[Chapter 4.2 - Upload a DCF or DMC file from an online device](#)”) and click on the “Fault log” button (see image below).



Doing so, the “Fault log viewer” tool will be activated and the workspace will be divided into 2 main areas; on the left side a list of all available offline and online logs will be displayed. By simply double clicking on the desired log, the related window will appear in the right side of the workspace.

Belo an image as example is reported. The last 10 occurred hard Failure codes and subcodes are reported together with the drive time. Other extra information like min and max voltages and temperatures for each device are reported together with total drive and key hour counter.

DMC Configurator

Parameters | CAN | PDO Configurator | Live Data | Advanced Live Data | CAN Network Trace | **Fault Log Viewer** | Graph

Node 1 - PMS Traction

Controller temperature: Min 21.1 °C, Max 22.2 °C
 Motor temperature: Min -40 °C, Max -40 °C
 Max Voltage: Battery 25.4 V, Capacitor 25.4 V
 Drive hours: 4:49:25
 Key hours: 71:58:19

Event	Error Code	Error Subcode	Event Drive Hour
Fault log #1	29	40	4:49:25
Fault log #2	24	17	4:49:19
Fault log #3	24	17	4:49:19
Fault log #4	29	40	4:49:19
Fault log #5	24	17	4:49:19
Fault log #6	29	20	4:49:17
Fault log #7	17	4	4:49:17
Fault log #8	29	20	4:49:15
Fault log #9	29	4	4:49:15
Fault log #10	29	4	4:49:15

Node 2 - AC Traction

Controller temperature: Min 20.9 °C, Max 22.6 °C
 Motor temperature: Min 151 °C, Max 200 °C
 Max Voltage: Battery 25.4 V, Capacitor 26.2 V
 Drive hours: 38:37:50
 Key hours: 229:43:50

Event	Error Code	Error Subcode	Event Drive Hour
Fault log #1	29	41	38:37:43
Fault log #2	34	5	38:37:39
Fault log #3	28	5	38:37:39
Fault log #4	28	5	38:37:39
Fault log #5	28	5	38:37:39
Fault log #6	34	9	38:37:39
Fault log #7	28	5	38:37:35
Fault log #8	28	5	38:37:35
Fault log #9	29	20	38:37:29
Fault log #10	29	20	38:37:29

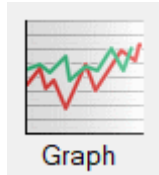
Node 3 - AC Pump

Controller temperature: Min 21 °C, Max 21.1 °C
 Motor temperature: Min 151 °C, Max 200 °C
 Max Voltage: Battery 25.3 V, Capacitor 25.3 V
 Drive hours: 33:37:11
 Key hours: 345:52:24

Event	Error Code	Error Subcode	Event Drive Hour
Fault log #1	29	40	33:37:02
Fault log #2	34	5	33:37:02
Fault log #3	28	5	33:37:02
Fault log #4	34	9	33:37:02
Fault log #5	29	1	33:37:02
Fault log #6	29	3	33:36:48
Fault log #7	29	21	33:36:48
Fault log #8	28	5	33:36:48
Fault log #9	29	3	33:36:48
Fault log #10	29	3	33:36:48

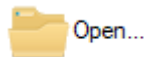
6.7 Graph plotter

This function allows to plot data previously acquired through SDO Live Data and PDO Advanced Live Data. To access this function click on the “Graph” button (see image below).



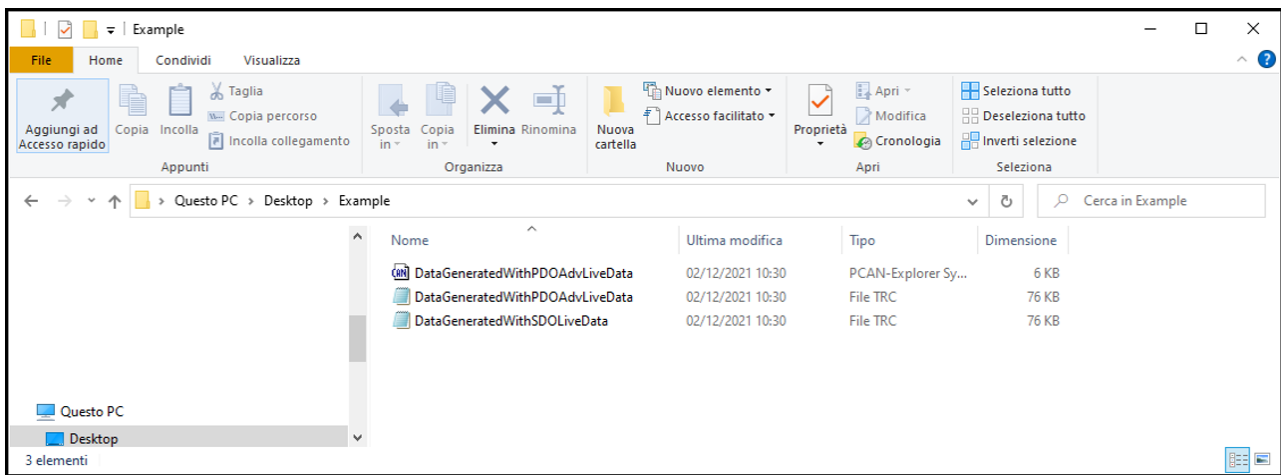
Doing so, the “Plotter” tool will be opened and the workspace will be divided into two section: on the left side, the “plottable” data will be present, while on the right side the graph will appear.

To have some data to be plotted, click on the “Open button” (see image below) located in the general tool toolbar and browse a trace file (.trc) from your PC.

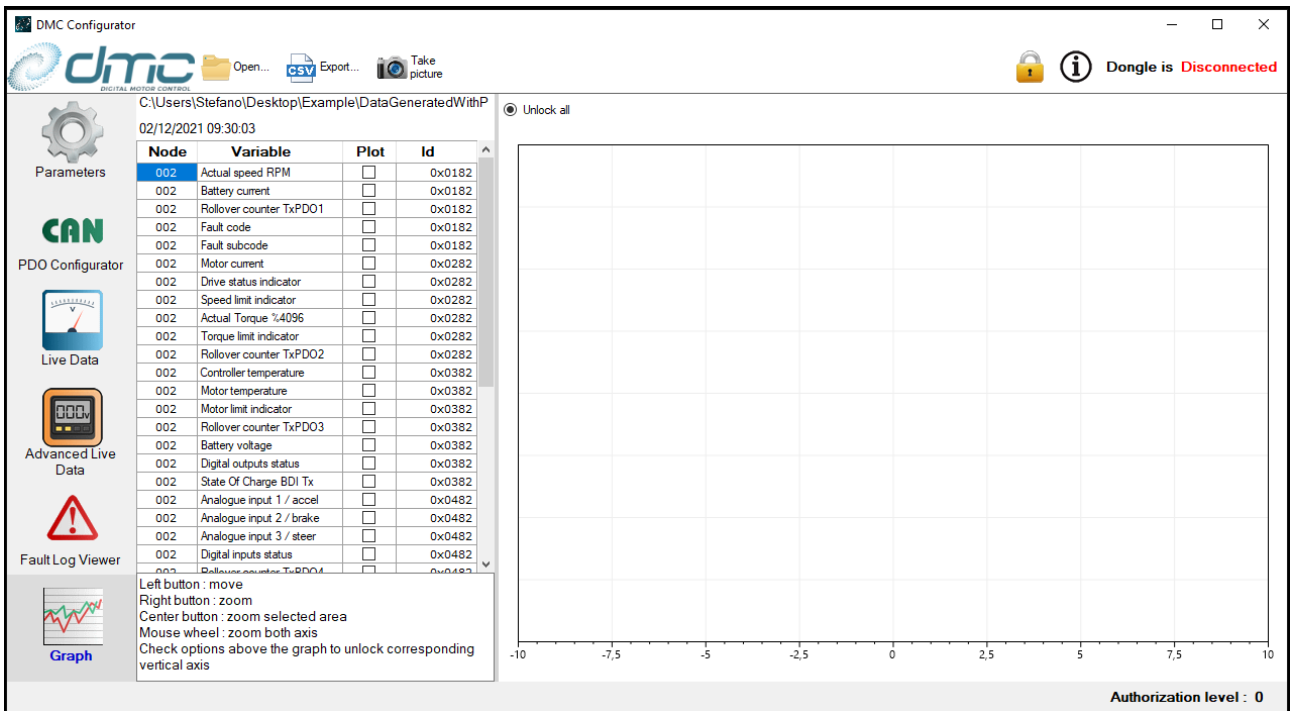


!NOTICE: In case the user wishes to open a trace file generated with the “Advanced Live Data” tool, a “Symbol file” (.sym) must be located in the same folder of the “trace” file and they must have the same filename.

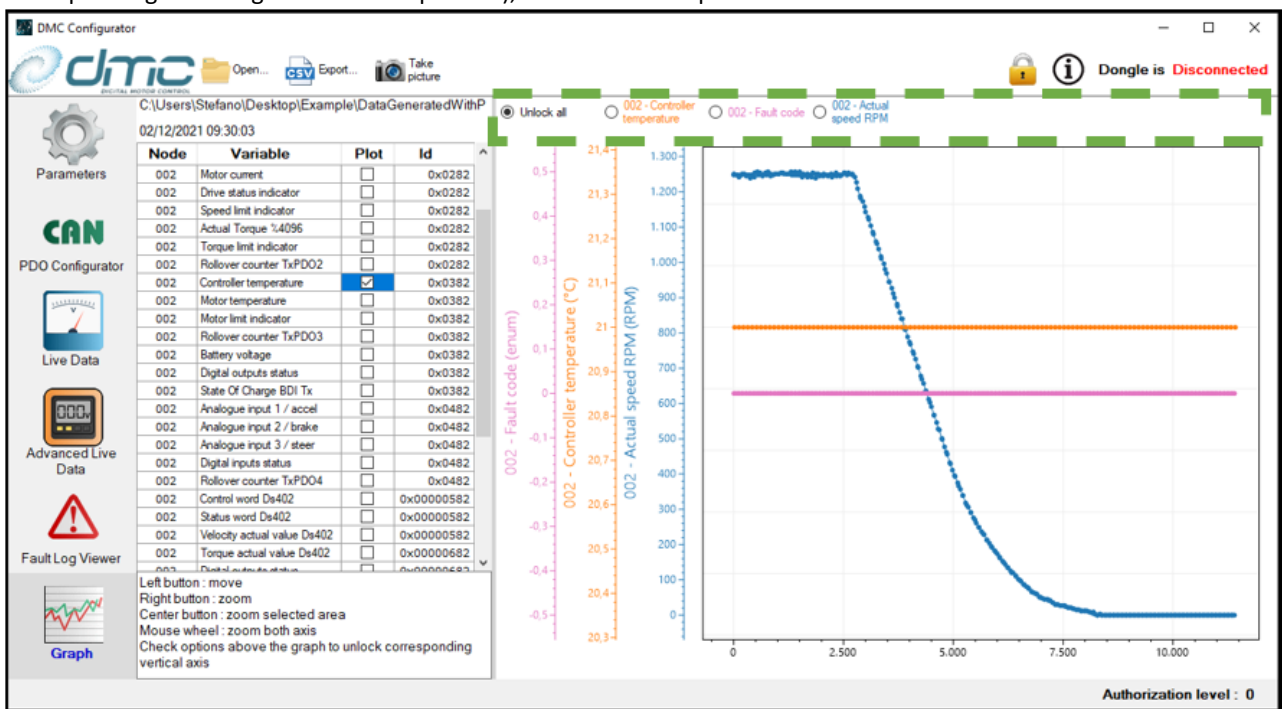
In case the used wished to open a trace file generated with the “Live Data” tool, no symbol file is needed.



Once the trace file has been opened, the workspace will appear as follows:



The user can decide to plot the desired signal by simply ticking the box located on the right side of the said signal. A short legend in the bottom left side of the workspace describes how to perform zooming/selecting/moving/pinching operations. Please notice that the said operations will be applied by default to all signals. If the user wishes to manipulate only one signals alone, he can do so by performing the proper selection on top of the graph (tick the box corresponding to the signal to be manipulated), as shown in the picture below.



Finally, the user can chose to "Export" the data in csv format of to take a screenshot of the graph area.

7 Updates

7.1 Dictionaries

The DMC Configurator operations are based on some internal dictionaries. At every powerup, it will automatically search for dictionary updates. Make sure you have an internet connection to download the most recent ones.

7.2 Configurator

DMC will occasionally release a DMC Configurator update. This will be notified by subscribing to DMC mailing list.