SEE IT BEFORE IT HAPPENS

Device Explorer User Manual

Preliminary

Motor Power Company s.r.l.
Via Leonardo Da Vinci, 4 42024 Castelnovo Sotto Reggio Emilia - Italia
Tel. +39 0522 682710 - Fax +39 0522 683552 info@motorpowerco.it - motorpowerco.com
Cap. Soc. € 1.000.000,00 i.v. - R.E.A. di RE 175521 Iscr. Reg. Impr. di RE n.01308390358 - N. Mecc. RE 010210 C.F. e P.IVA IT 01308390358 - SDI: MZO2A0U

Motor Power Company s.r.l.
Via Leonardo Da Vinci, 4 42024 Castelnovo Sotto Reggio Emilia - Italia
Tel. +39 0522 682710 - Fax +39 0522 683552 info@motorpowerco.it - motorpowerco.com
Cap. Soc. € 1.000.000,00 i.v. - R.E.A. di RE 175521 Iscr. Reg. Impr. di RE n.01308390358 - N. Mecc. RE 010210 C.F. e P.IVA IT 01308390358 - SDI: MZO2A0U

In the following pages are shown procedures to get started with this tool.

This interface user guide must be integrated with the drive's specifications downloadable from https://www.motorpowerco.com/it/download?c=Manuals .

1. Summary

1. Summary 4

2. Getting started 6

2.1 Downloading the latest DevExUI version 6

2.2 Installation 6

2.3 Connection 6

2.3.1 MODBUS RTU 7

2.3.2 MODBUS TCP/IP 7

2.4 Product code 8

2.5 User Mode 9

2.6 Default workspace 10

2.7 Drive info 10

3. Parameters Main features 12

3.1 Parameters Management 12

3.2 Drive Parameters and Memory Management 13

4. Motor configuration & tuning 13

4.1 Motor configuration 14

4.2 Loops tuning 15

4.2.1 Current Loop 16

4.2.2 Velocity Loop 17

4.2.3 Position Loop 19

5. Axis Motion 21

5.1 Conversion Factor 21

5.1.1 Speed Conversion Factor 21

5.1.2 Position Conversion Factor 22

5.1.3 Acceleration Conversion Factor 22

5.2 Run 23

5.2.1 Set Point 24

5.2.2 Live Values 24

5.2.3 Jog 24

5.3 Charts 25

5.3.1 Chart settings 25

5.4 Motion parameters 26

5.5 Status&Control 27

6. Homing 27
7. Input and output Management 28
8. Field Bus 30
8.1 CANopen 30
8.2 PROFINET 30
8.3 EtherCAT 30
9. Fault 32
10. Complementary applications 34
10.1 Scope 34
10.2 Firmware Uploader 34
11. SCOPE 36
11.1 Quick buttons 36
11.2 Toolbar 37
11.2.1 File 37
11.2.2 Window 38
11.2.3 Tools 38
11.2.4 About 39
12. FIRMWARE UPLOADER 40
12.1 Firmware organization 41
12.1.1 Modbus RTU/CANopen device. 41
12.1.1 Industrial Ethernet Devices 41
12.2 Modbus RTU 42
12.3 Modbus TCP and Http transfer 43
12.3.1 Modbus TCP/IP 45
12.3.2 Http transfer 45

2. Getting started

2.1 Downloading the latest DevExUI version

The latest version of DevExUI is available for free from https://www.motorpowerco.com/it/download?c=Software website.

2.2 Installation

Using DevExUI_Setup.exe, install our application following the installation wizard.

2.3 Connection

After plugging the communication cable, configure connection parameters through the dedicated window.

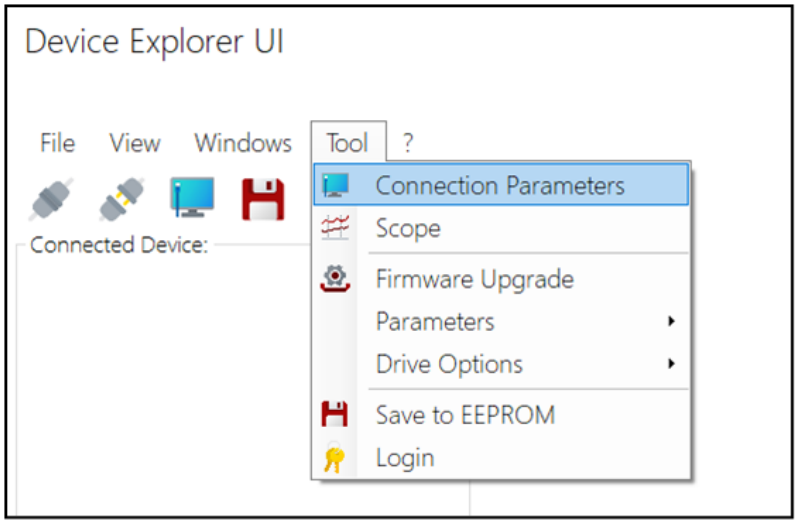


Figure 1- Connection Parameters icon

DevExUI supports Modbus RTU, Modbus TCP and Can Open (actually not implemented) connections. Communication port and other parameters can be changed inside the connection parameters window.

2.3.1 MODBUS RTU

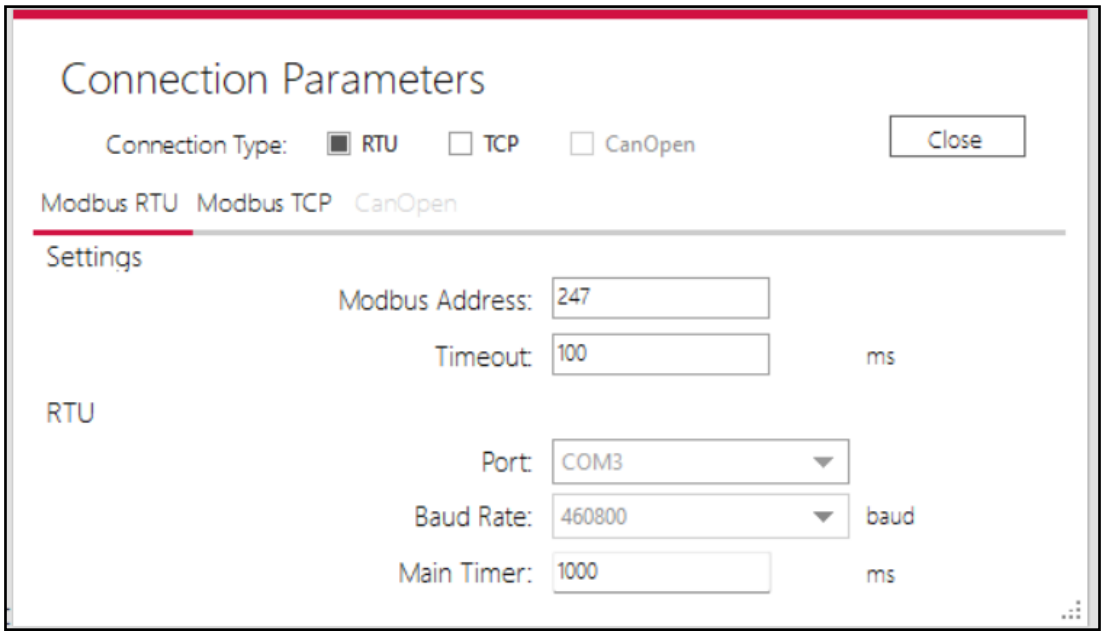


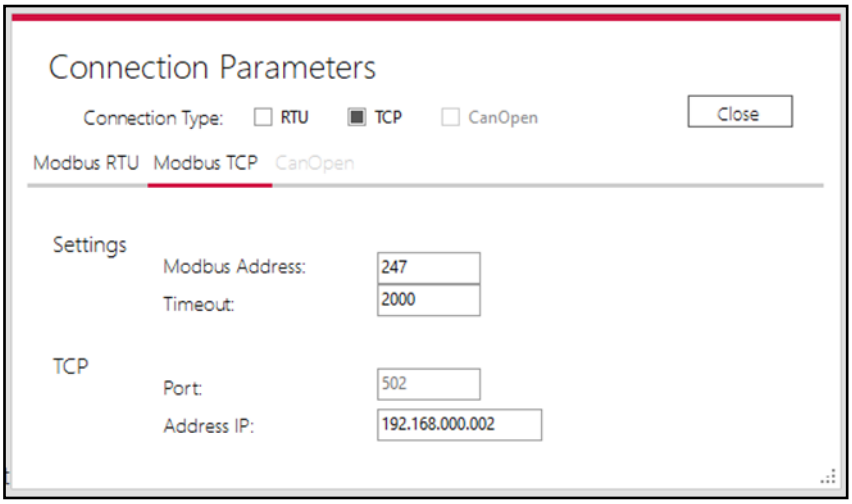
Figure 2

Port and Main Timer can be changed by the user.

Port combo box as default detects the last Com port connected.

Main Timer represents the cycle time in ms of the interface main timer, in other word the time to refresh all the outputs and fault detection.

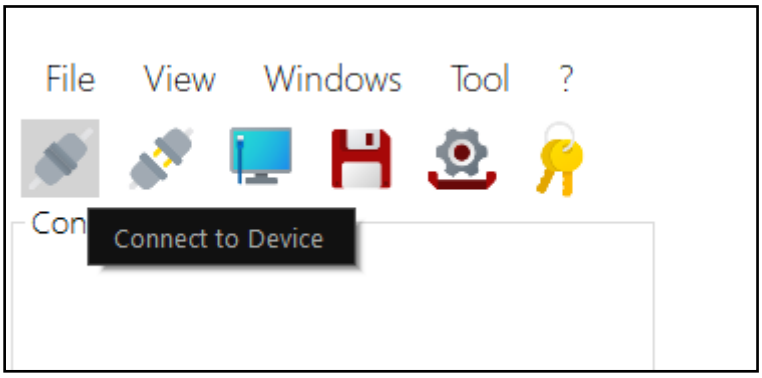
2.3.2 MODBUS TCP/IP



3. Connection Parameters TCP

Address IP is the only parameter that is useful to change, because it depends on the device connected.

Once checked the right connection type and filled in the related field in connection tab (Fig. 3), connect to the drive.



4. Connection Icon

2.4 Product code

Our drives are recognized by PRODUCT CODE a code number that distinguish every function proper to the drive.

If product code is not recognized, user can choose it manually through the device window that appears.

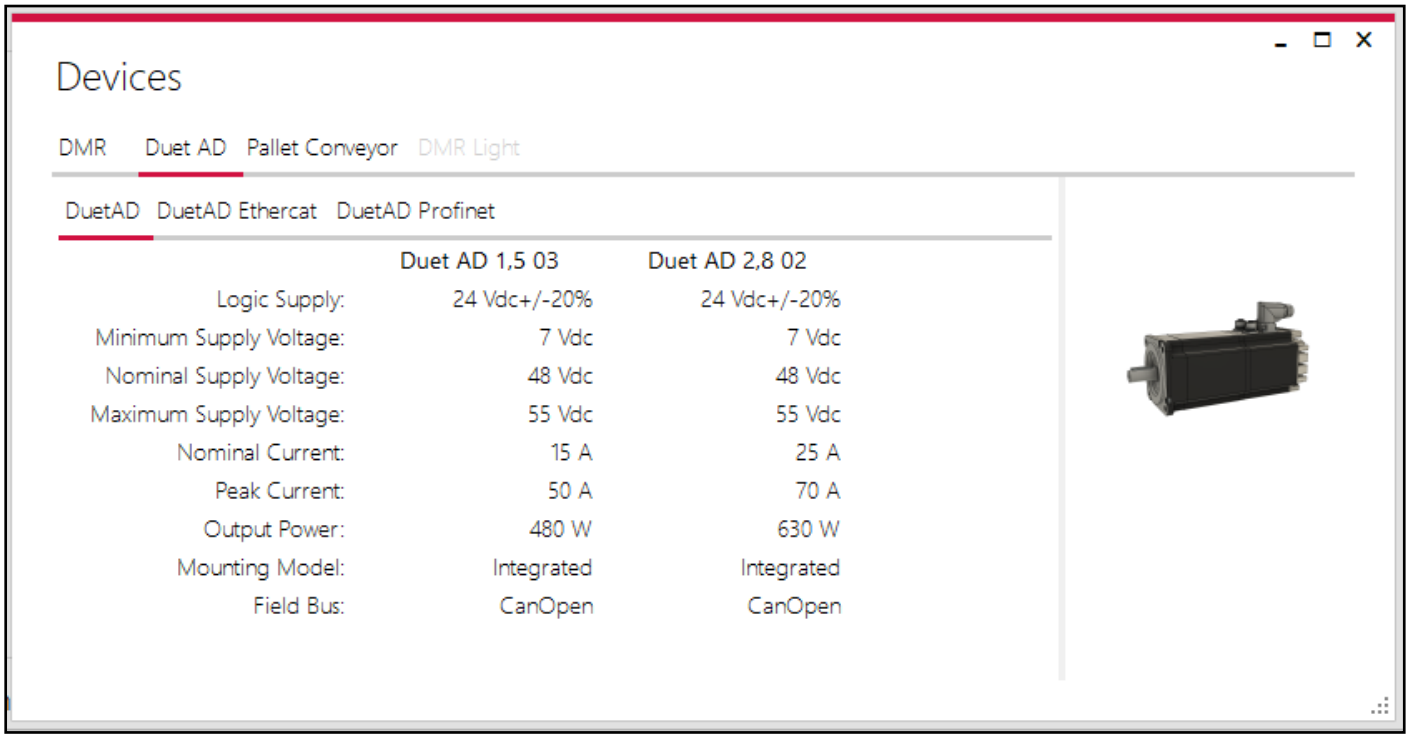


Figure 5-DevEx Device Window

2.5 User Mode

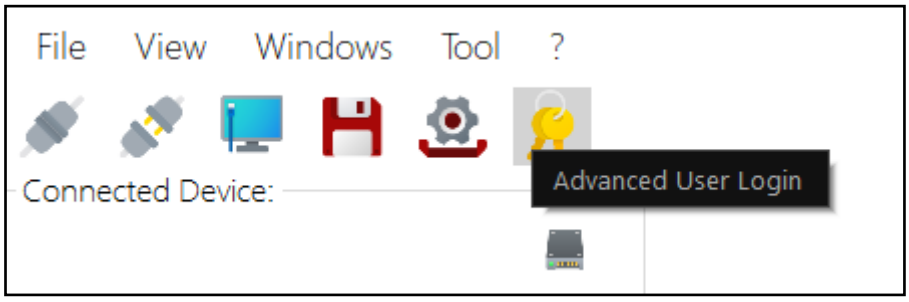
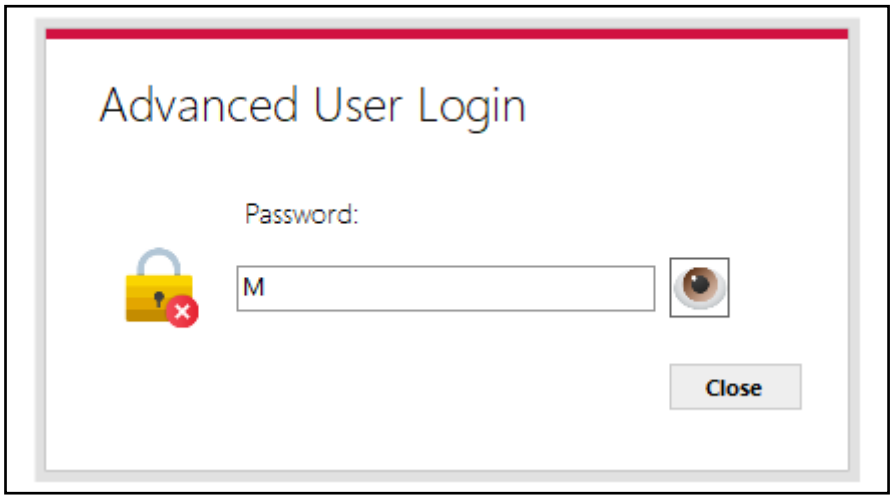


Figure 6

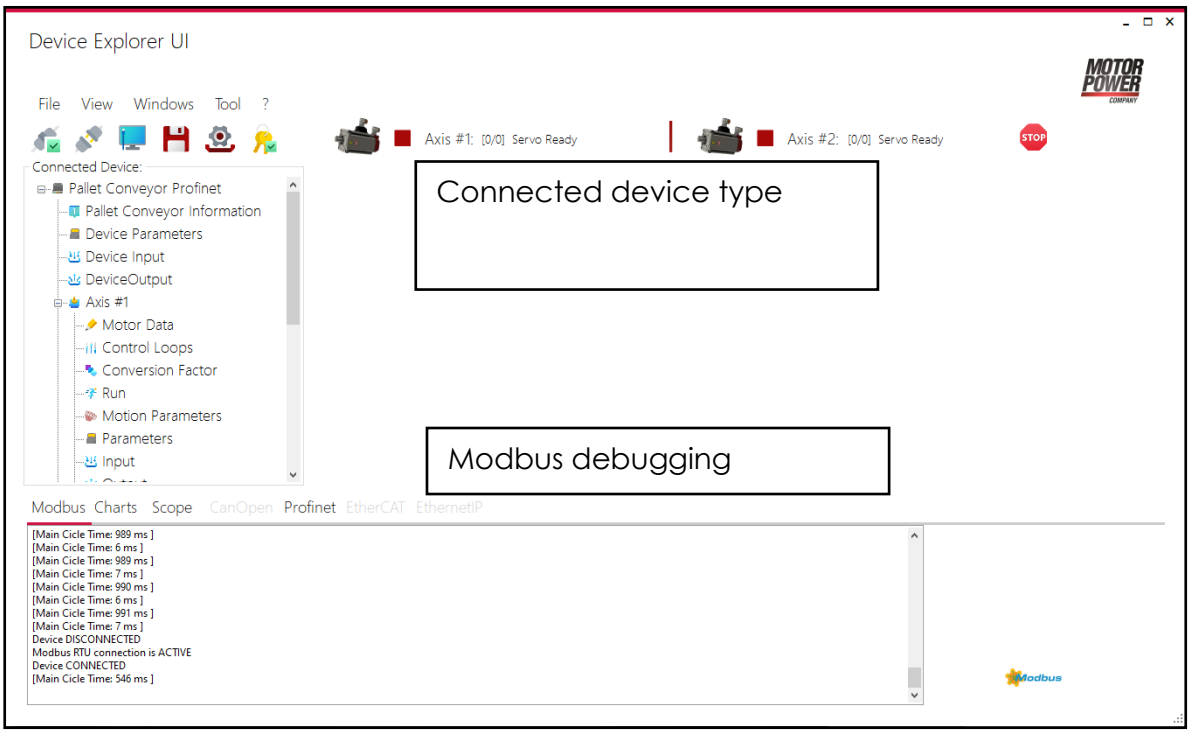
There are two operative modes: Standard Users and Advanced users. Login Icon is used to open a login panel. To unlock some functionalities user must have login password.



7. Login Window

2.6 Default workspace

(Fig. 9) In the bottom part of the Main Window, is displayed the communication status. If device connection succeeds, the side group box would display the type of the device connected.



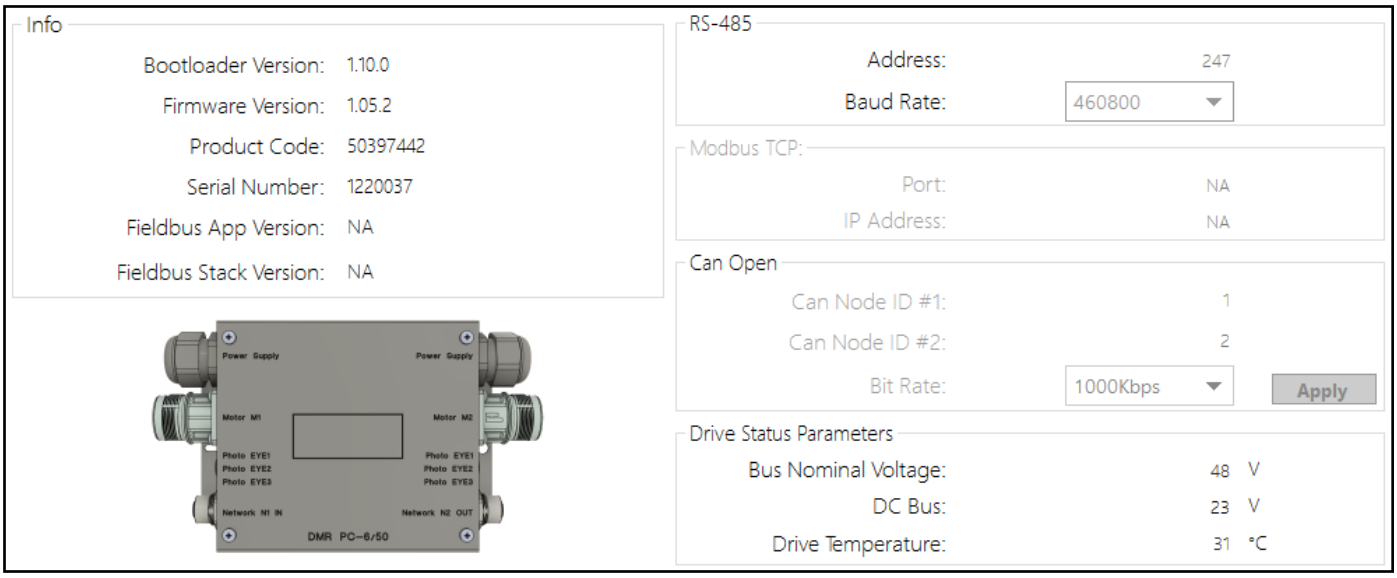
8.Main window with drive plugged

2.7 Drive info

(Fig. 11) First tab of the tree view, shows some main general information of the drive like serial connection parameters, drive status parameters (bus nominal voltage, dc bus or drive temperature), or firmware information (bootloader version, firmware version, product code, serial number).

If TCP connection is active *fieldbus app version* and *fieldbus stack version* can be read and the other TCP information.

Can Open box would be available if the connected drive supports can connection and user can change Node ID and Can Bit Rate.

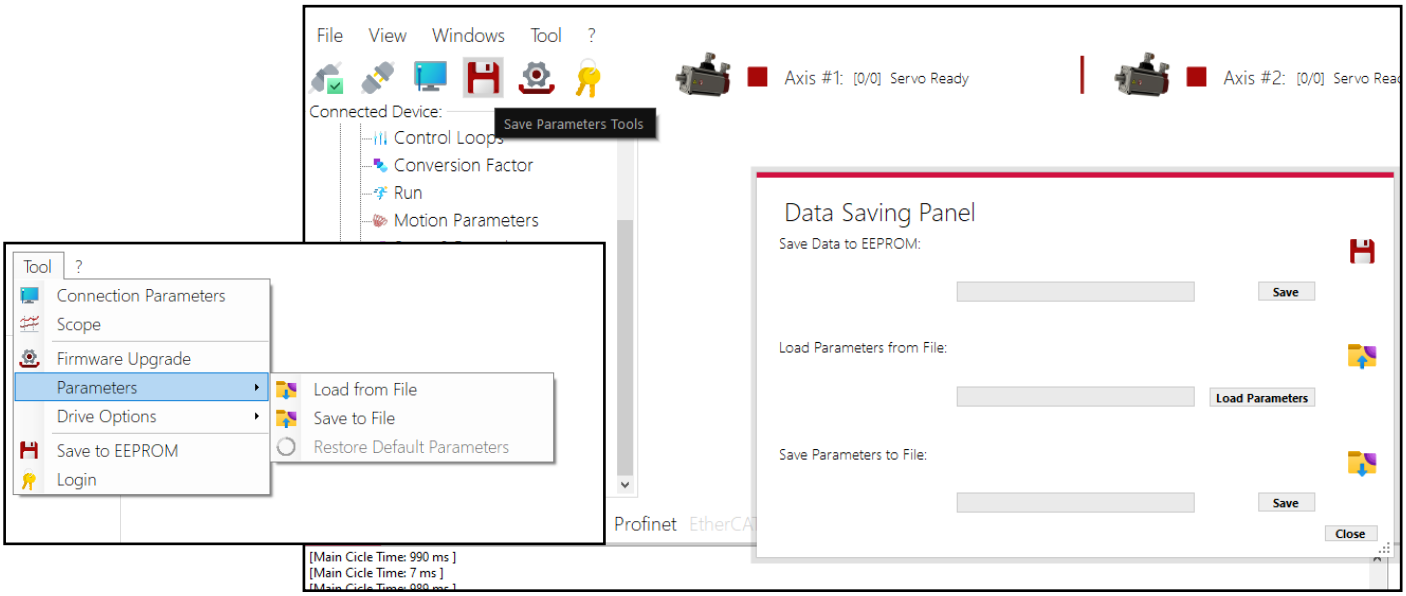


9. Drive information window

3. Parameters Main features

3.1 Parameters Management

Device Explorer User Interface allow to manage a parameter file (.par) while the drive is connected.



10. Load from file and save to file tools.

(Fig. 6) Under 'Tool' strip menu item or using floppy disk icon there are two options: *load from file* or *save to file*. The first option will copy the parameter from file (xxx.par). Whereas the second will copy the parameter from the drive connected to a file (xxx.par).

3.2 Drive Parameters and Memory Management

From 'Tool' strip user can also reset drive and save to EEPROM parameters (Fig. 7).

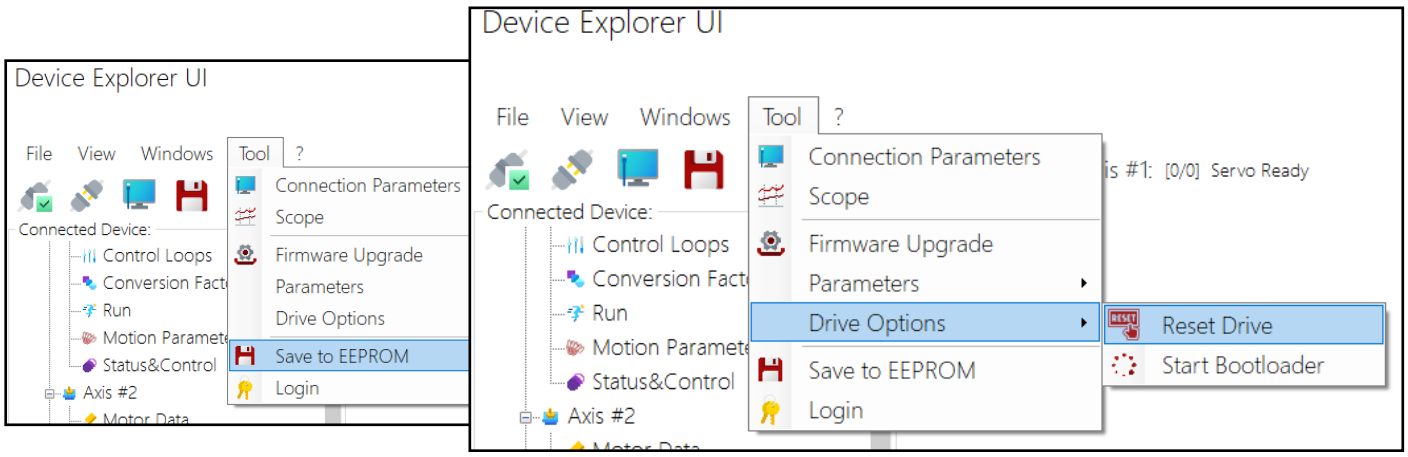


Figure 11

Save to EEPROM store the actual parameters in the EEPROM. If it isn't done, they will be lost after the first power cycle.

Reset drive execute an hardware reset is similar to a power cycle.

4. Motor configuration & tuning

Below is performed the configuration just for Axis n°1 even if the drive used can manage two axis. This pocedure will move the motor shaft. Can be unexpected movements, be careful and before to begin test your emergency stop equipment.

4.1 Motor configuration

13. Motor data tab

Motor configuration contains motor parameters that characterize the connected motor. These parameters can be found in motor catalogue.

Following an example:

			Motoroller 46 75 06	Motoroller 46 75 13	Motoroller 46 140 13	
Stall torque	Cn0	Nm	0,74	0,74	1,5	
Peak torque	Cpk	Nm	2,2	2,2	4,5	
Rated torque	Cn	Nm	0,6	0,6	1,35	
Rated working speed	nM	rpm	800	800	800	
Rated voltage	Un	Vdc	24	48	48	
Maximum working speed @ 24Vdc	nmax	rpm	1000	500	500	Max Motor Velocity
Maximum working speed @ 48Vdc	nmax	rpm	1150	1150	1000	
Rated output power	Pn	W	50	50	115	
Stall current	In0	Arms	3,3	1,63	3,3	
Peak current	Ipk	Arms	11	5,71	10,61	Imax
Rated current	In	Arms	2,7	1,33	3	In
Torque constant	Kt	Nm/Arms	0,22	0,45	0,45	kt
Voltage constant	Ke	Vrsm/Krpm	13,6	27,6	27,6	
Phase/phase resistance @25°C	Rff	Ohm	0,77	2,64	1,23	Motor Resistance
Phase/phase inductance	Lff	mH	1,35	5,4	2,81	Motor Inductance
Electrical time constant	Te	ms	1,75	2	2,3	
Rotor inertia	Jm	Kg cm²	5	5	6,1	Motor Inertia
Motor weight	m	Kg	1,96	1,96	2,73	
Axial shaft load @800 rpm	Fa	N		110		
Radial shaft load @800 rpm	Fr	N		220 (applied on the rotor's centering)		

14. Motoroller 46 Ratings and Specifications

Remarks:

- *Pulse per Revolution* = are the pulse (not count) each 360° of mechanical motor shaft.
- *Motor poles* = are the single poles not the couple.
- *Current* = All the current are aspect in Arms.
- *Max Speed* = is the conversion factor is set to default the speed is in RPM.
- *Phase angle* = the phase angle = 0 is considered as show in the user manual, regarding the synchronization between the hall sensor and the BEMF.
- *Encoder LPR* = encoder line per revolution.
- *Encoder PPR* = encoder pulse per revolution.
- *Position feedback type* = Type of feedback used by the motor.
- *Position feedback* = indicates if any feedback is used.
- *Position feedback phase* = phase angle find when motor phasing is done.

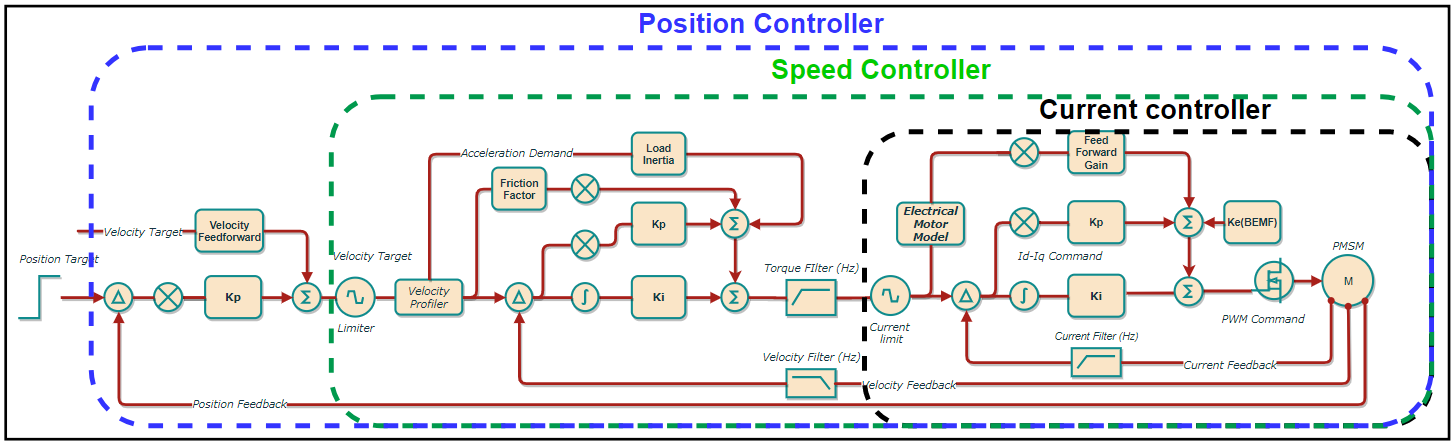
4.2 Loops tuning

The next step is to configure the regulation loops.

Step by step it is shown how to tune the following loops:

- Current loop;
- Velocity loop;
- Position loop;

The application load is mandatory in order to find the good parameter set up.



15. Full Feedback scheme

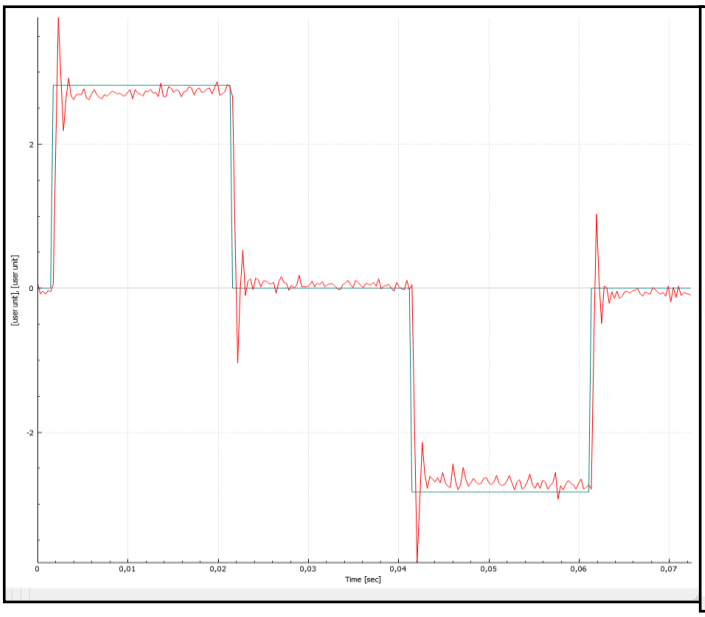
The final control mode of the drive defines the loops to tune

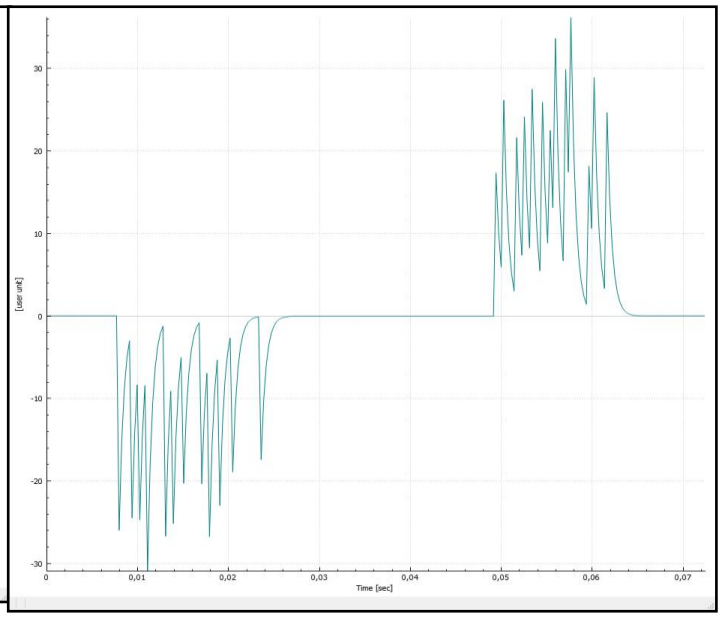
Application control mode:

- Torque = Current.
- Velocity= Current, Velocity
- Position= Current, Velocity, Position.

Start it from tree view menu, click on 'Control Loops' tab and select the desired loop.

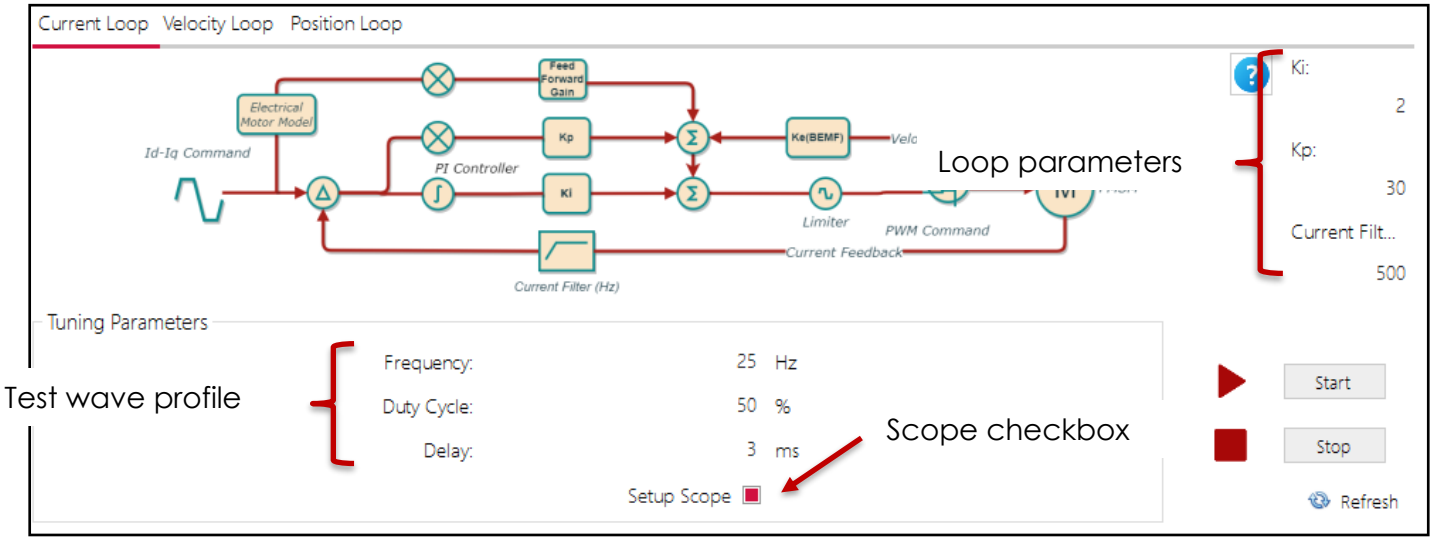
To start the tuning, user must press 'Start' button. If something goes wrong on the upper axis status bar (Fig.12) will appear a fault message.





If setup scope is checked, the scope will be automatically opened in order to show the results.

4.2.1 Current Loop



17. Current loop Tab

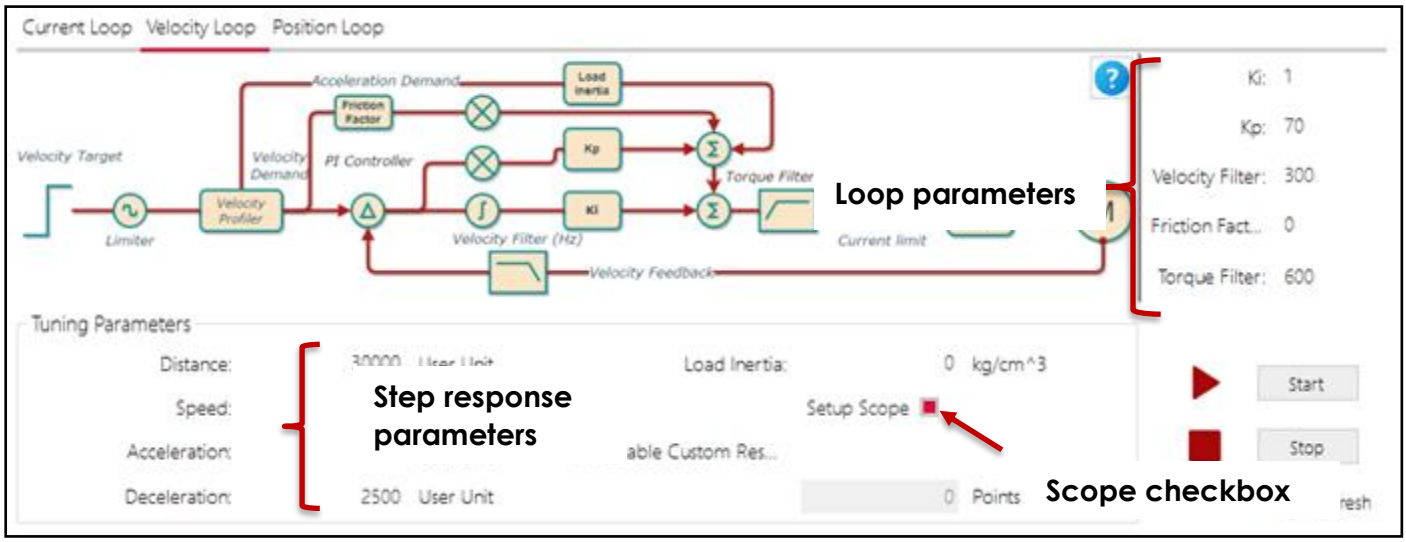
For standard motor the default *test wave profile* won't be modified.

As a first step it is necessary to configure the loop parameters in order to achieve a square wave. After that, loop could be started.

19. Current loop step response: [IqDemand],[ActualIq]

18.Current loop Step response: [VelocityDemand],[ActualVelocity]

4.2.2 Velocity Loop



20.Velocity Loop Tab

Using high acceleration and deceleration will need more performance. If the tune is performed on this condition, you will have more bandwidth. Set a speed according to your application.

Always check to be out of current saturation otherwise you will have bad response.

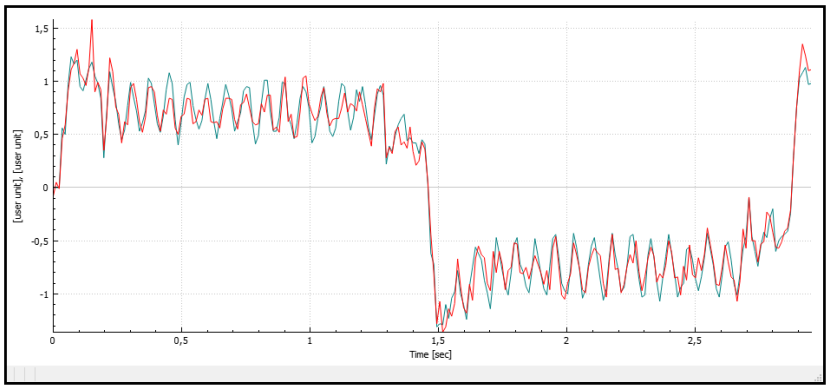
On the velocity loop you can configure a torque command filter.

The purpose is to smooth the current command to the motor, incoming from glitch in speed reading (can be mechanic components).

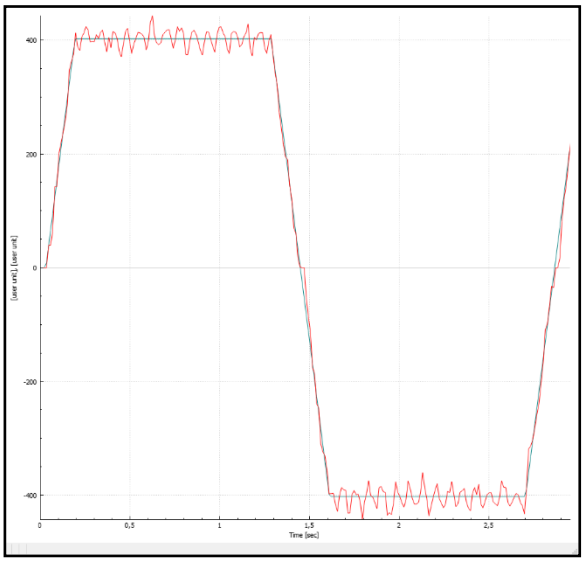
The *torque command filter* is a low pass (LPF). The filter is placed on velocity PID output. PID will work on the velocity noise. To avoid this regulation setting torque command filter can be useful. A reasonable value is 500Hz. Filter utilization is needed only if it is necessary, the use of it can be dangerous and generate oscillation in your system. The behavior can be seen from the scope reading the Iq command. The use of filter will decrease the bandwidth of final system.

On the velocity loop you can configure a *velocity filter*. The velocity filter is a low pass, it is useful in low pass application: the filter will smooth the incoming speed signals. Filter utilization is needed only if it is necessary, the use of it can be dangerous and generate oscillation in your

system. The behaviour can be seen from the scope reading the axis velocity. The use of filter will decrease the bandwidth of final system.

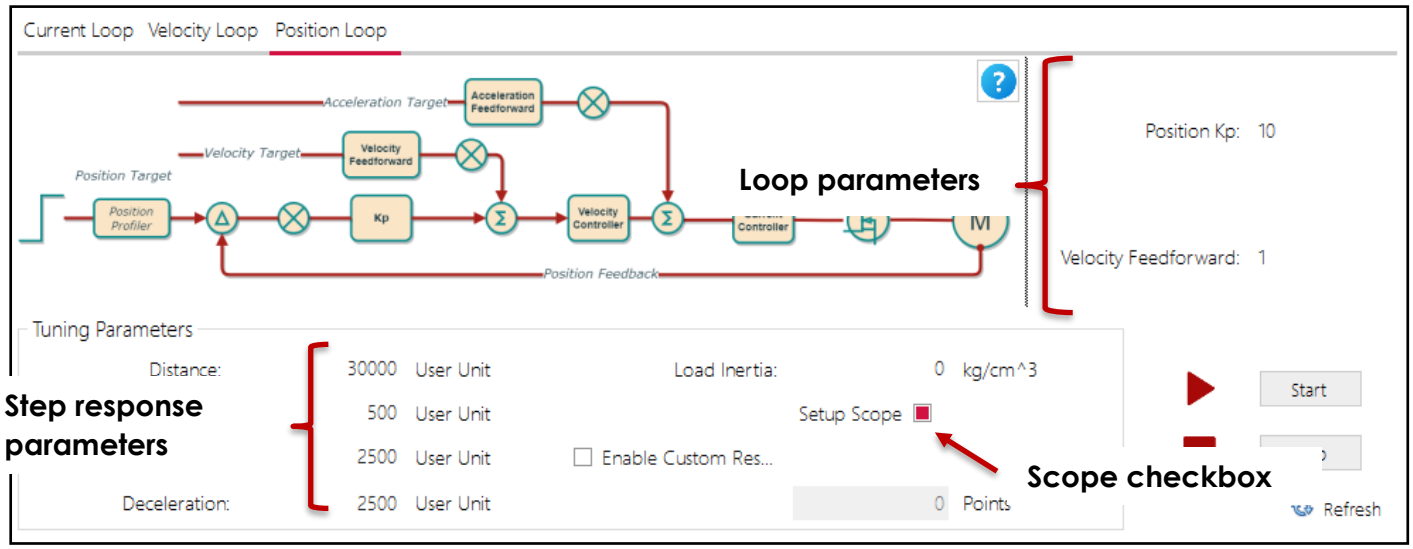


22.Velocity loop step response : [Iq Demand], [Actual Iq]



21. Velocity loop Step response: [VelocityDemand], [ActualVelocity]

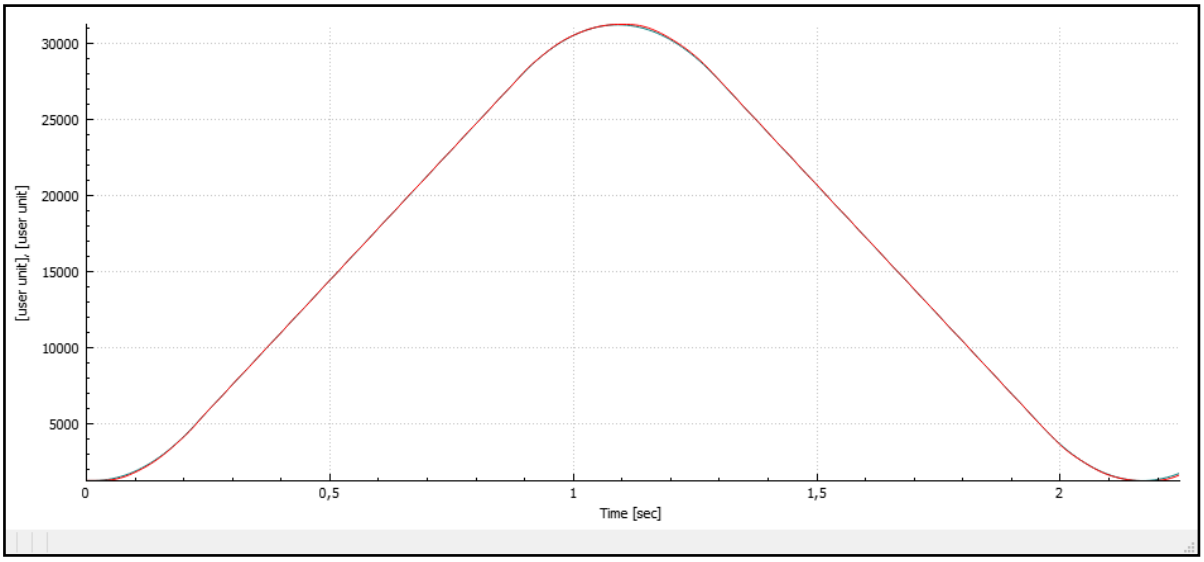
4.2.3 Position Loop



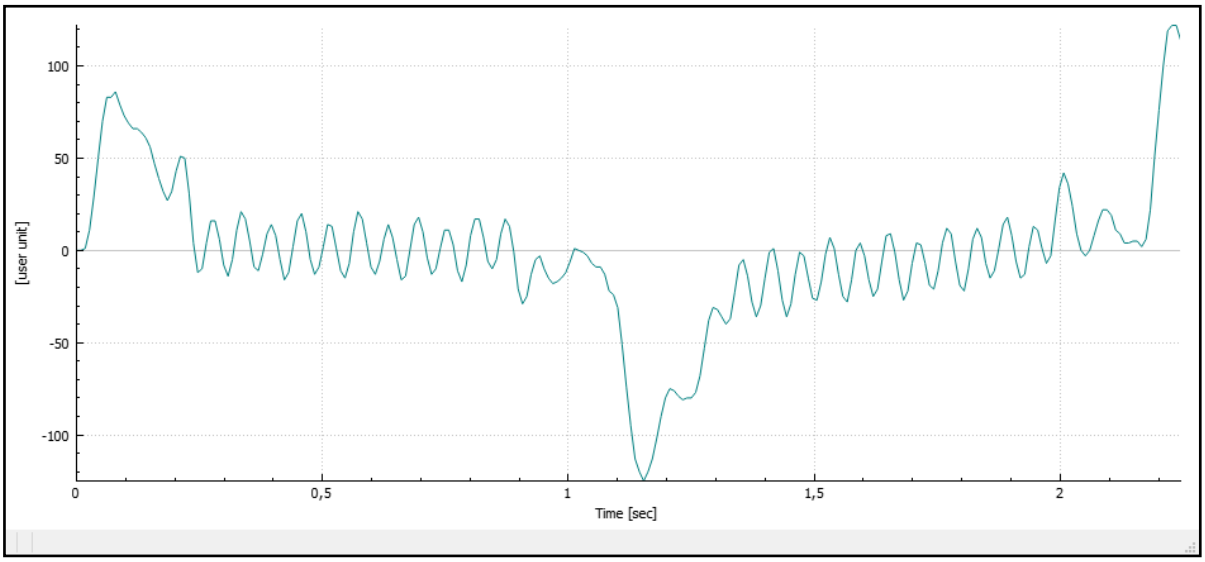
23. Position Loop Tab

As a first step it is necessary to configure the loop parameters in order to achieve a square wave. After that, loop could be started.

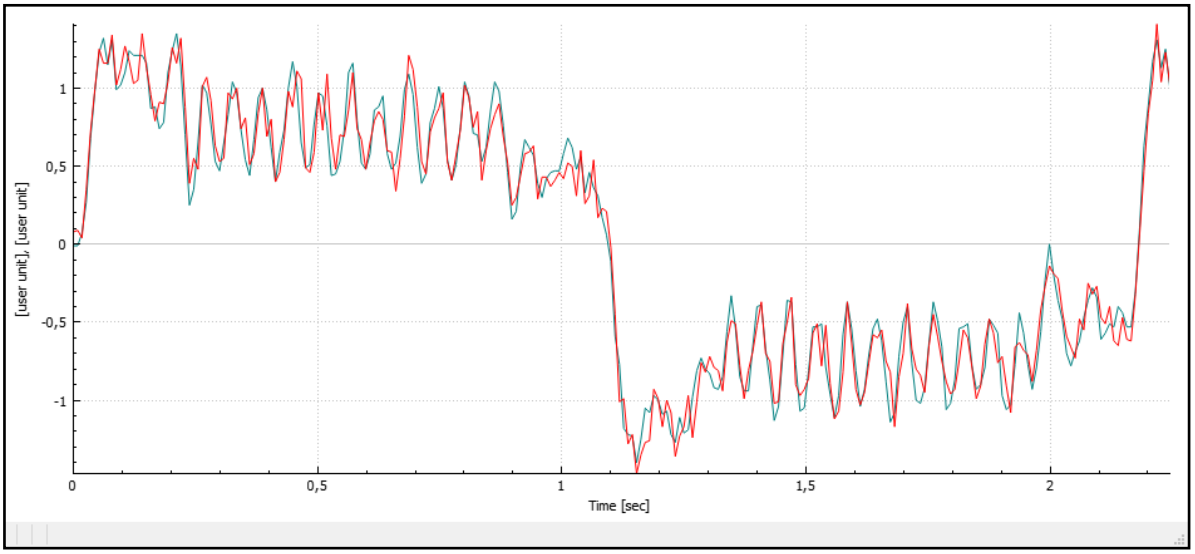
Using high acceleration and deceleration will need more performance. Speed must be set according to application.



24. Position loop: [PositionDemand], [ActualPosition]

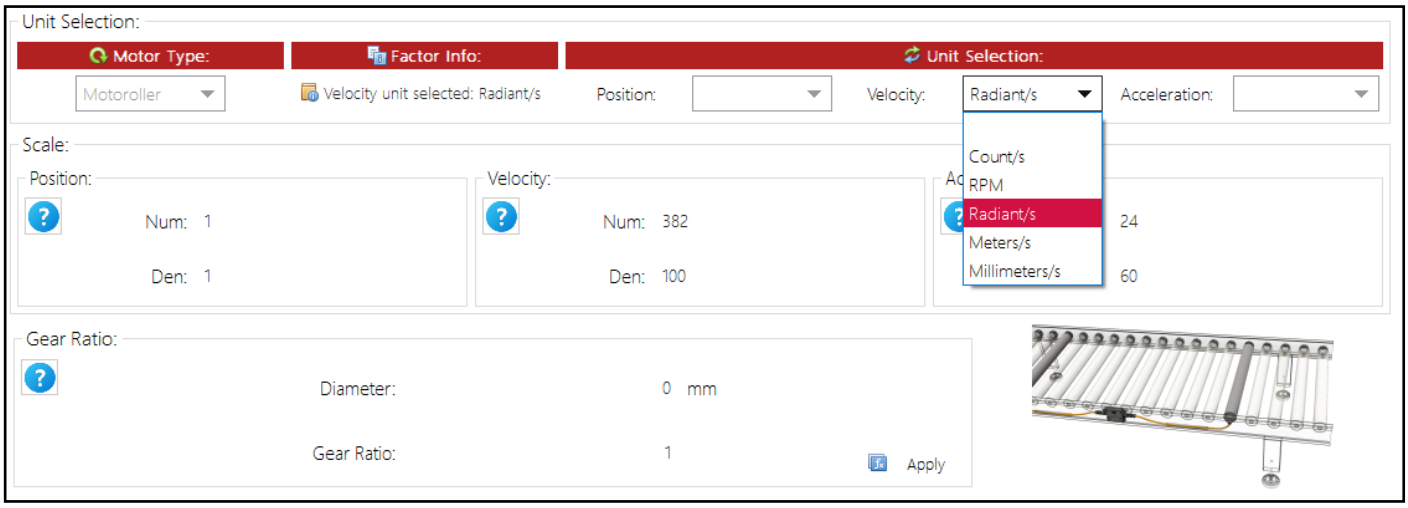


25. Position loop: [PositionTrackingError]



26 Position loop: [IqDemand], [ActualIq]

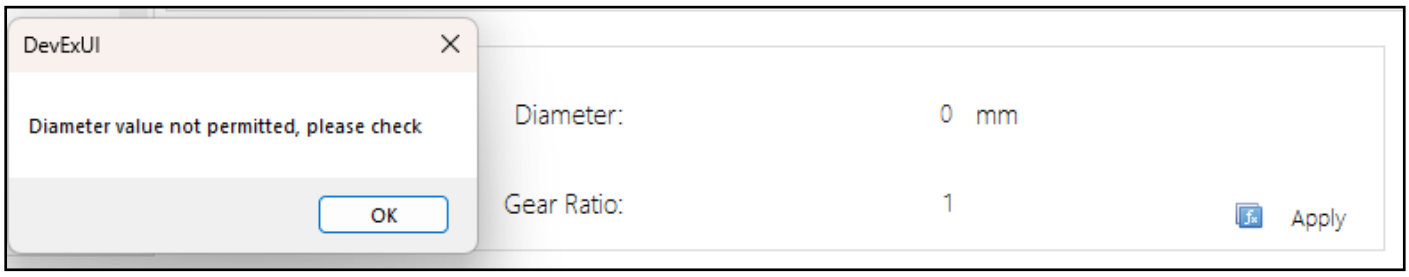
5. Axis Motion



27.Conversion factor tab

5.1 Conversion Factor

Conversion factor tab is used to change one set of units to another, by multiplying or dividing. Inside unit selection group box user can change which unit to convert. In every combo box are listed different unit with the same property. By selecting one of these, related scaling factors would change.



28.Gear ratio group box.

- *Diameter*: measure in mm of motoroller diameter;
- Gear ratio: ratio of the number of teeth in the gear to the number of teeth in the pinion;

If the selected unit is a metric measure, user have to set the diameter measure and the correct gear ratio of the motor plugged to the drive, these data are useful to calculate the correct conversion factors. (Fig. 27)

5.1.1 Speed Conversion Factor

Speed factor is calculated from the factor for numerator (6096h:01) divided by the factor for denominator (6096h:02).

So, the final unit for speed is:

$$Speed\ Units = \frac{Encoder\ Increment}{s} * \frac{6096\text{h}: 01\ (\text{Speed Conversion factor NUM})}{6096\text{h}: 02\ (\text{Speed Conversion factor DEN})}$$

5.1.2 Position Conversion Factor

Actually conversion factors for position are not implemented.

Position factor is calculated from the factor for numerator (6093h:01) divided by the factor for denominator (6093h:02).

So, the final unit for position is:

$$Position\ Units = Encoder\ Increment * \frac{6093\text{h}: 01\ (\text{Position Conversion factor NUM})}{6093\text{h}: 02\ (\text{Position Conversion factor DEN})}$$

5.1.3 Acceleration Conversion Factor

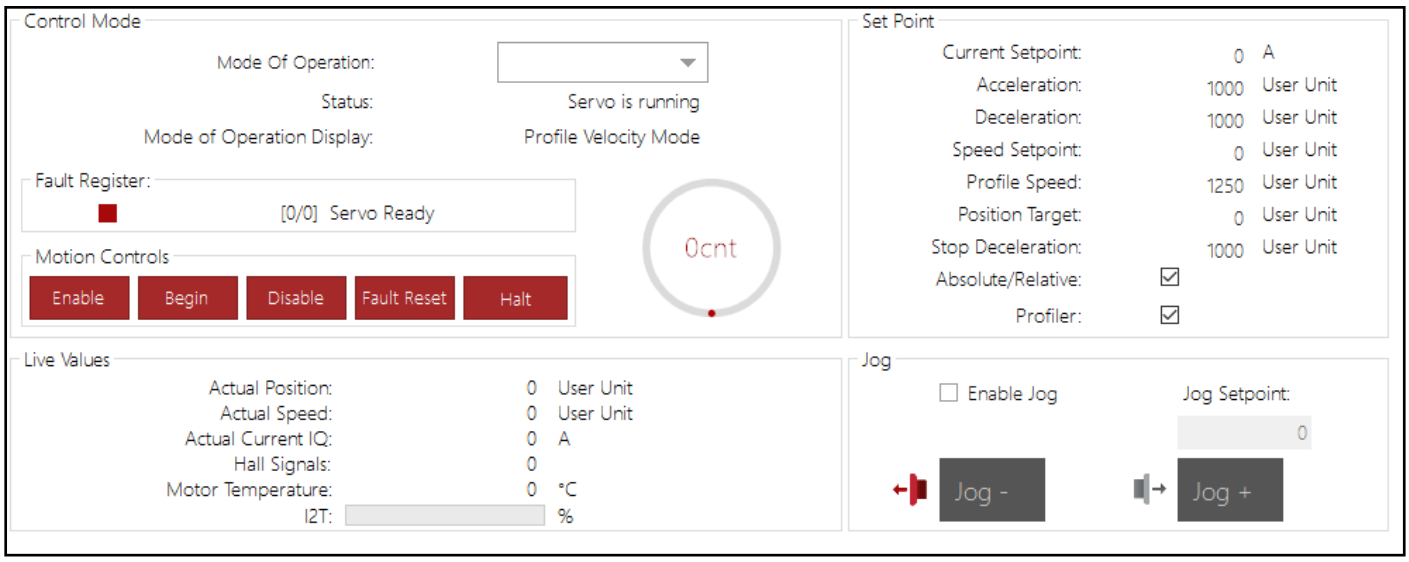
Acceleration factor is calculated from the factor for numerator (6097h:01) divided by the factor for denominator (6097h:02).

So, the final unit for acceleration is:

$$Acceleration\ Units = \frac{Encoder\ Increment}{s^2} * \frac{6097\text{h}: 01\ (\text{Acceleration Conversion factor NUM})}{6097\text{h}: 02\ (\text{Acceleration Conversion factor DEN})}$$

If all scaling factors are set to 1 the default unit is in count.

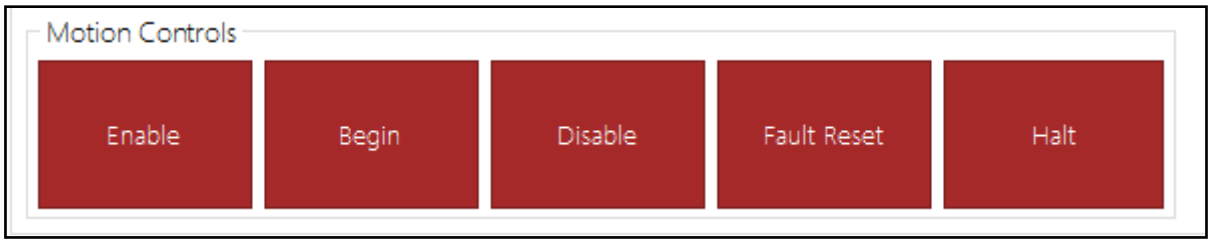
5.2 Run



29. Run tab.

Running tab is dedicated to controls that move the motor: four group boxes enclose everything is useful for it:

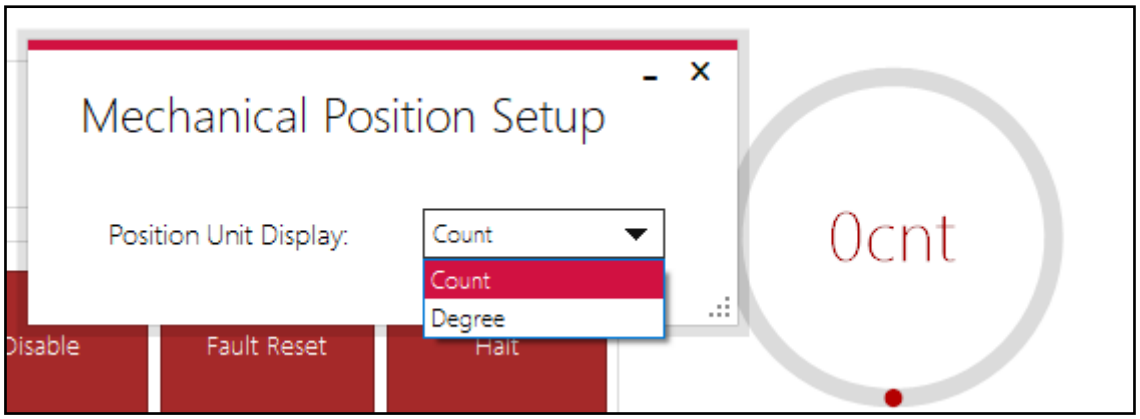
- Control mode. This box contains a combo box where the mode of operation can be set. In this section user can observe the motor status and eventually, faults. In the bottom part, inside *Motion Controls box*, five buttons control motor movement. (Fig.)



30. Motion controls buttons

a) *Enable*. Set Modbus register 546 or 596 (Axis1 or Axis2 input) to one. It pairs the motor.
b) Begin. Set Modbus register 547 or 597 (Axis1 or Axis2 input) to one. It moves the motor according to mode of operation, just in velocity mode user needs to press only *Enable*.
c) *Disable*. Set Modbus register 546 or 596 (Axis1 or Axis2 input) to zero. It stops the motor.
d) *Fault Reset*. Set Modbus register 548 or 598 (Axis1 or Axis2 input) to one. It resets every fault detected in order to resume the normal operations.
e) *Halt*. Set Modbus register 549 or 599 (Axis1 or Axis2 input) to one if it is zero or zero if it is one. It maintains motor in pairing but stop the movement until user press it again.

There's a window with a gauge that tracks rotor mechanical position in count or degree. By double clicking on it, another window appears where user can change the unit of measurement. (Fig.)



31. Mechanical position tracking

5.2.1 Set Points

This box encloses all the movement parameters that user can set according to active mode of operation.

- *Current setpoint*: sets iq setpoint for current mode.
- *Acceleration*: sets motor acceleration.
- *Deceleration*: sets motor deceleration.
- *Speed setpoint*: sets motor speed setpoint for velocity mode
- *Profile speed*: sets motor speed in position mode.
- *Position target*: sets the position target for position mode.
- *Stop deceleration*: deceleration when motor is halted.
- *Absolute/Relative*: enables (checked) the absolute position in position mode or relative positioning.
- *Profiler*: enables (checked) acceleration and deceleration profile.

5.2.2 Live Values

Some parameters are displayed in real-time.

5.2.3 Jog

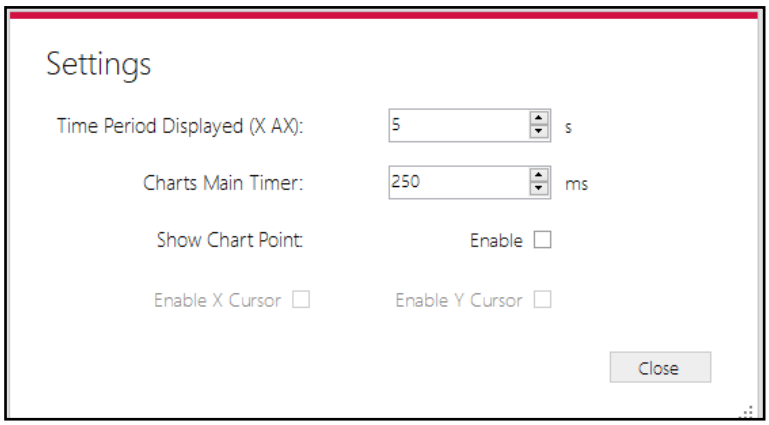
Jogging refers to repeated starting and stopping of a motor in short bursts to perform a particular movement.

- *Enable checkbox* : enables jog function.
- *Jog setpoint*: sets speed setpoint for jog movement.
- *Jog- & Jog+*: move back and forth the motor.

5.3 Charts

Real-time charts are very helpful for debugging. These charts with a poor resolution, plot output values. Scope graphs have more resolution (256 points) but its aren't in live.

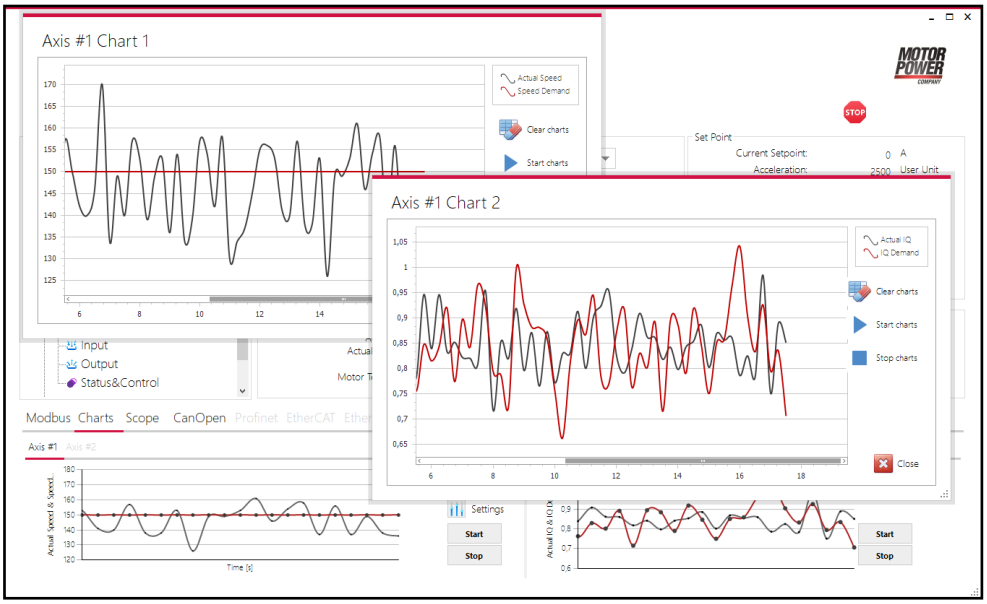
5.3.1 Chart settings



32. Chart settings

a) Time Period Displayed: dilates or resets the visible time axis.
b) Charts Main Timer: this timer is related to time that samples the output points displayed.
c) Show Chart Point: it shows or hide point values.

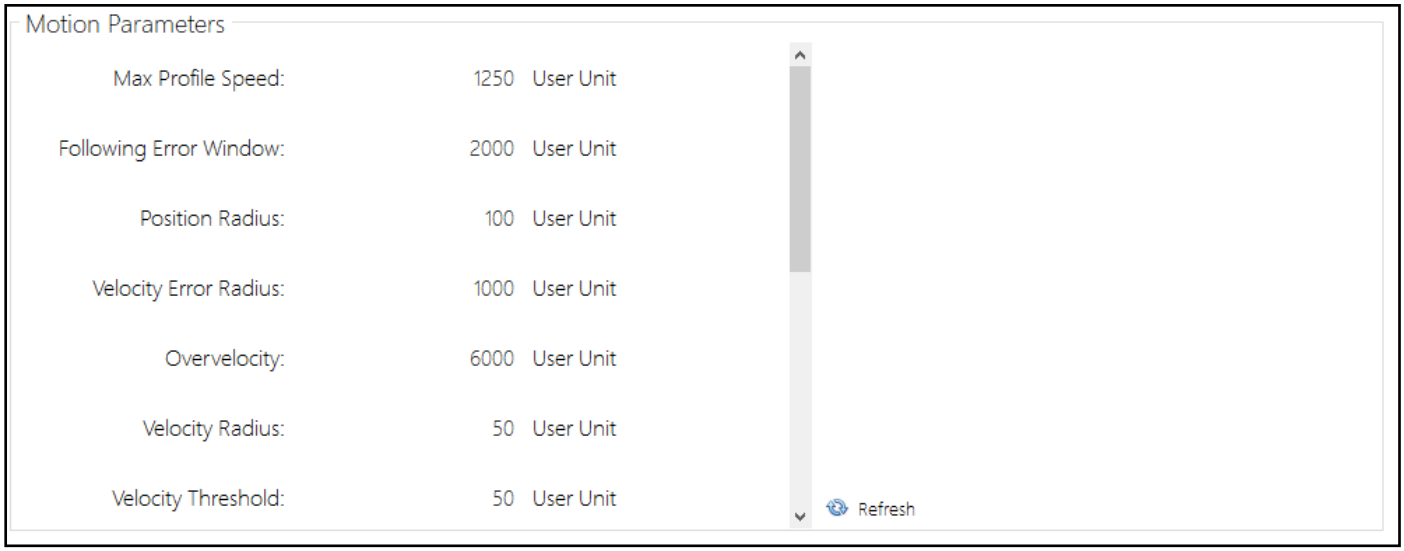
To open a separate window for chart, user must double click on chart tab.



33. Separate Charts

These windows are useful to monitor values (also the oldest) and read its point by point.

5.4 Motion parameters



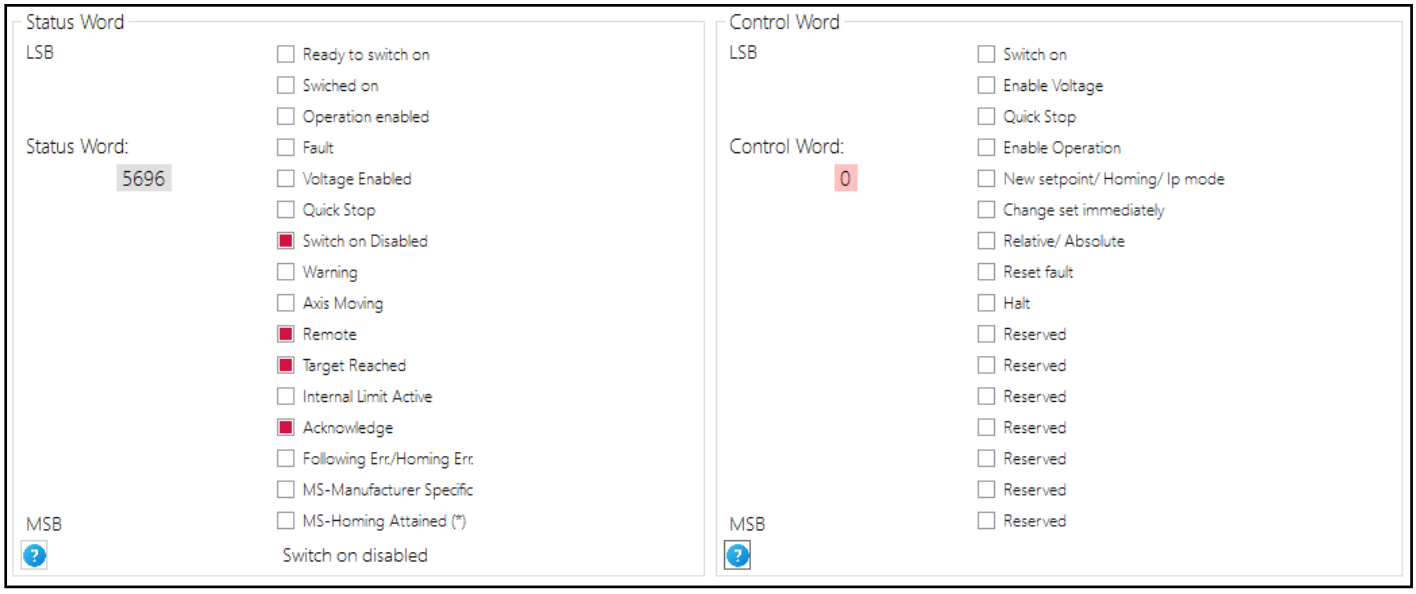
34. Motion parameters tab

Motion parameters tab is the only way to change other parameters related to motor movement.

- Max Profile Speed: Max Motor Velocity Axis (rpm default).
- Following error window: Velocity Following Error Window in Velocity Mode (rpm default).
- Position radius: This parameter define the Target Reached window defined in counts.
- Velocity error radius: This parameter set the velocity error window. If the velocity will leave the window a warning bit will be set in the status word.
- Over-velocity: Velocity Admissible Limit For Motor (rpm default).
- Velocity radius: This parameter configure the target velocity window. If the velocity is between this window the status word bit will reflect this situation.
- Velocity threshold: This parameter set the minimum velocity [rpm] value after that the status word will report that the axis is moving.
- Following Error: This parameter define a range of tolerated position values symmetrical to the Position Demand Value. If the Position Actual Value is out of the Following error window for Following Error timeout.
- Position radius time: This parameter define the time [ms] after that the position reached flag will be set in the status word.
- Velocity threshold time: This parameter set the time [ms] value after that the status word will report that the axis is moving.
- Velocity error radius: This parameter set the velocity error window. If the velocity will leave the window a warning bit will be set in the status word.
- Positive torque limit: Set the torque positive limitation value.
- Negative torque limit: Set the torque negative limitation value.
- I2t Time: This parameter define for how much time is possible to use the Peak current. This value will affect the Motor Usage Output Variable.
- I2t Protection Type: This parameter define the type of protection used for motor overload protection.

More details can be found in drive manuals.

5.5 Status&Control



35. Status&Control tab

In this tab user can have a control word and status word diagnostic.

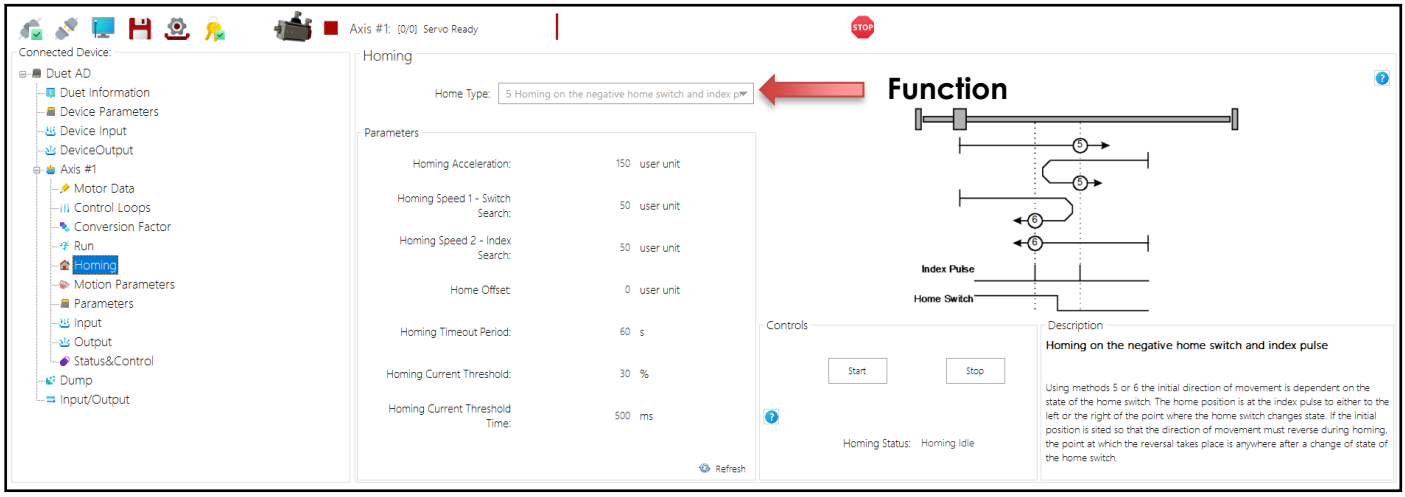
For more details see drive manuals.

6. Homing

When the system powers up, it doesn't know where the motor is currently positioned. Therefore, applications that have position or orientation must use sensors to detect a reference position on startup or periodically while it is active. This action is called homing.

In our case this function is related to Duet AD.

So, if a Duet motor is connected interface has an extra tab dedicated to Homing. (Fig. 36)



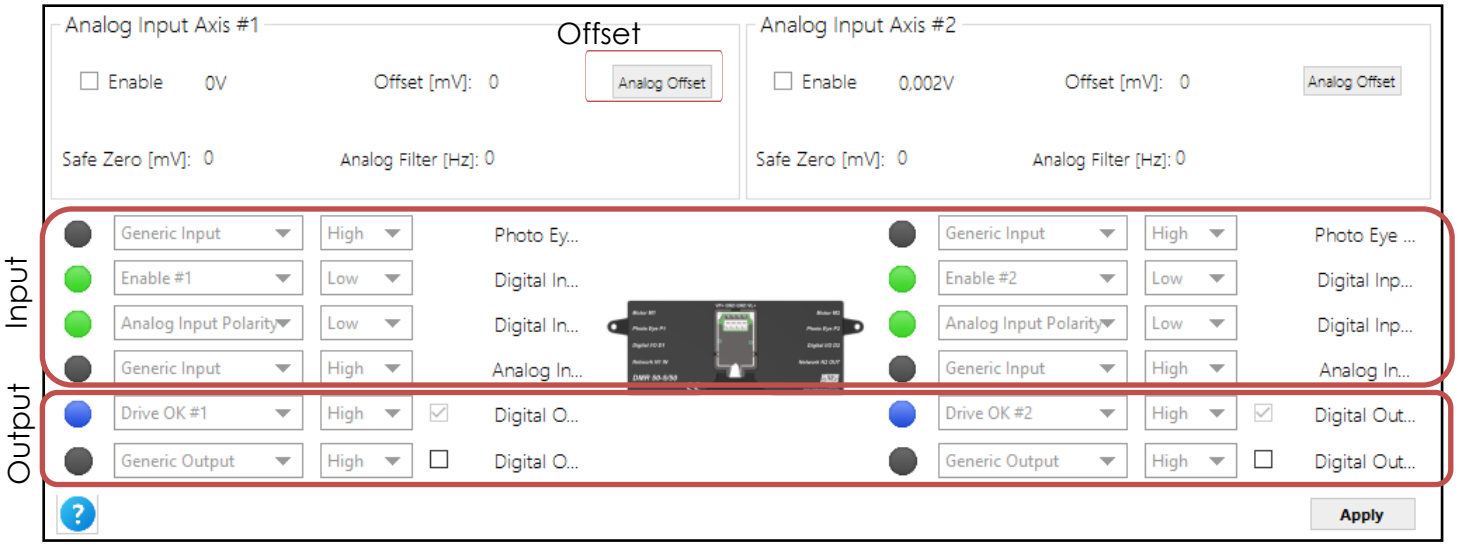
36. HOMING tab

- *Homing Acceleration*: define the homing acceleration and deceleration value in rpm/s.;

- *Homing Speed 1 – Switch Search*: homing routine involves a sensor or a switch, this parameter sets motor speed in rpm to reach switch;
- *Homing Speed 2 – Index Search*: this parameter sets motor speed in encoder signal searching;
- *Home Offset*: This parameter define the value that will be stored in the position counter when the homing condition is reached;
- *Homing Timeout Period*: This parameter define the homing timeout in [s]. If the homing function will not be reached during this time an error will rise;
- *Homing Current Threshold*: define the % of I2t value that rise and homing reached action;
- Homing Current Threshold Time: define the time [ms] where the Homing current threshold value condition have to be active before rising a homing reached action;

Homing is not necessary for applications with an absolute feedback.

7. Input and output Management

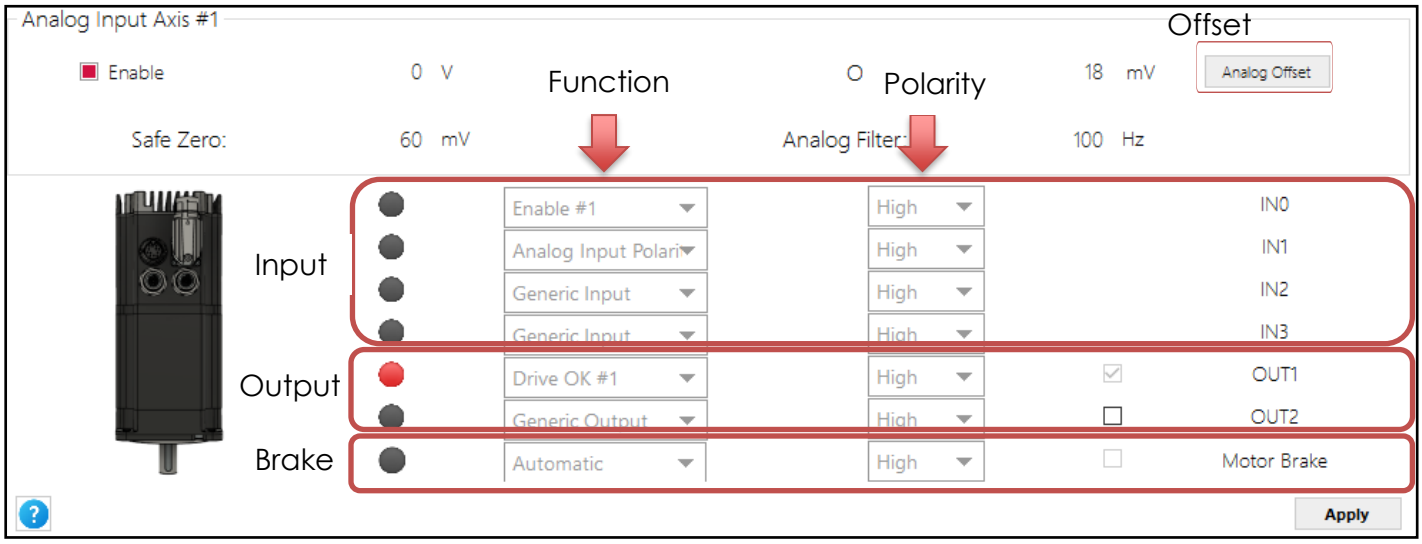


37. Input Output tab

Input and output tab is personalized depending on what drive is connected. Every drive has a different number of input and output. This tab is composed by two different part:

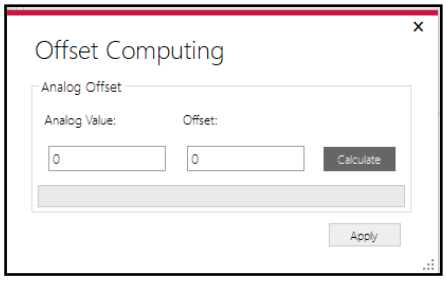
- Upper part. Axis one and two analog input and offset can be configured and tracked. To confirm any changes in the bottom part press 'Enter'.
- Bottom part. Input and output functions and relative polarity can be set. Three columns describe input output status: leds column displays the effective signal state in input, if it's high related led turns green, if It's low led turns black. Functions column defines the function linked to the input or output. At last polarity column defines at what signal level enable the I/O. To confirm any changes in the bottom part press 'Apply button'.

DuetAD tab is slightly different:



38. Duet AD I/O tab

Duet mounts a brake it is managed as an output pin by the drive, so user can control motor bake in this tab. Manual or automatic mode is selectable. In manual mode user can decide if lock or unlock brake using polarity combo box.



39. Offset computing window.

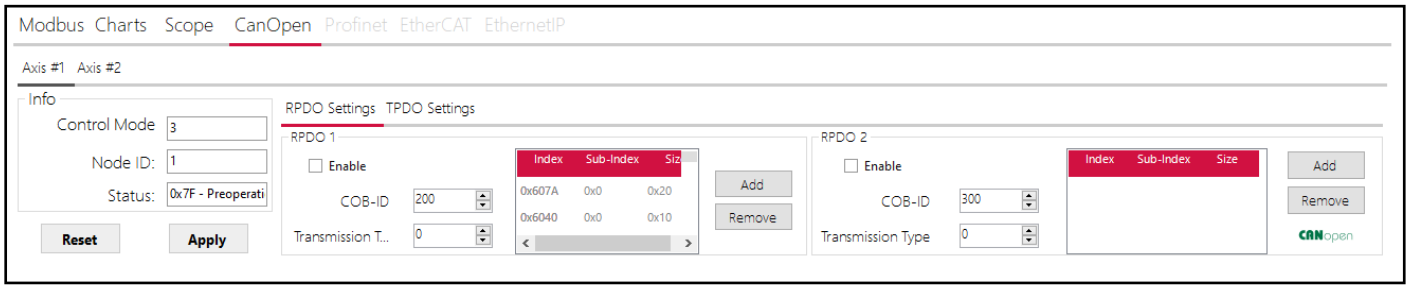
'Analog Offset' button open another window (fig. 39) dedicated to offset calculation. The user by clicking 'calculate' button, starts a process that computes the analog offset. 'Apply' button is used to apply offset to Analog input.

8. Field Bus

The bottom part of the main window is assigned also to Fieldbus communication. So CanOpen, Profinet or EtherCAT tab can be find unlocked.

8.1 CANopen

CANopen is a CAN-based communication system. It comprises higher-layer protocols and profile specifications.



40. CanOpen tab

Fig. 31 shows CANopen structure tab: every axis presents an information group box, where control mode, node ID and operative mode status can be checked, and a control tab for RPDO and TPDO settings, specifically, PDO's static mapping if master doesn't support it.

8.2 PROFINET

PROFINET is a communication protocol that lives at layer seven of the ISO/OSI model, the seven-layer model that generically describes the abstraction layers of a communication system.

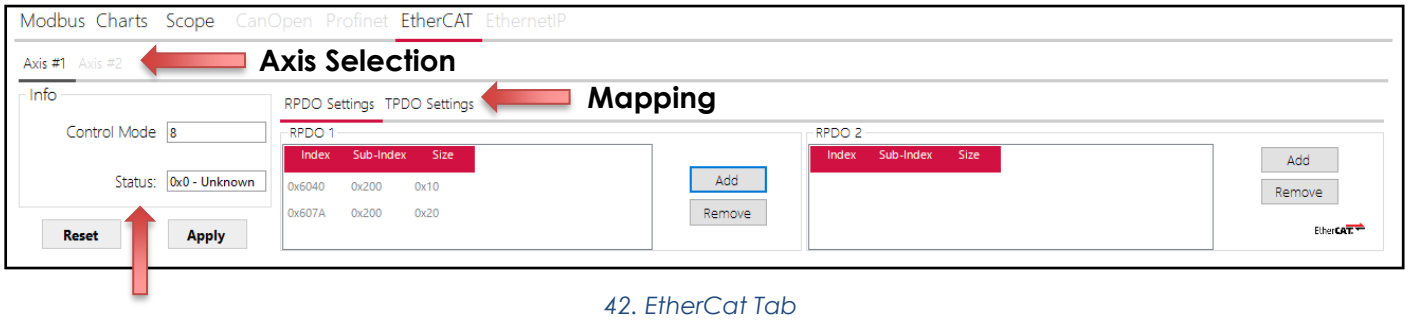
41. Profinet tab

A profinet tab is placed in the bottom control tab of the main window. This tab contains a visual representation of the profinet status. It appears only with four black leds that turn green when a profinet state is active.

8.3 EtherCAT

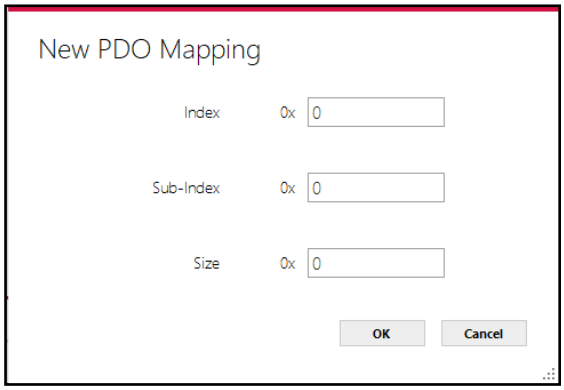
EtherCAT stands for "Ethernet for Control Automation Technology." It is a protocol that brings the power and flexibility of ethernet to the world of industrial automation.

EtherCAT tab is unlocked only if the device plugged supports this field bus. It has a structure similar to CanOpen tab.



42. EtherCat Tab

- Axis Selection: if the drive supports two axes, both tabs are unlocked;
- Info: Inside this group box Control Mode and Status can be tracked;
- Mapping: user can map RPDO and TPDO for each axes.(Fig.42)

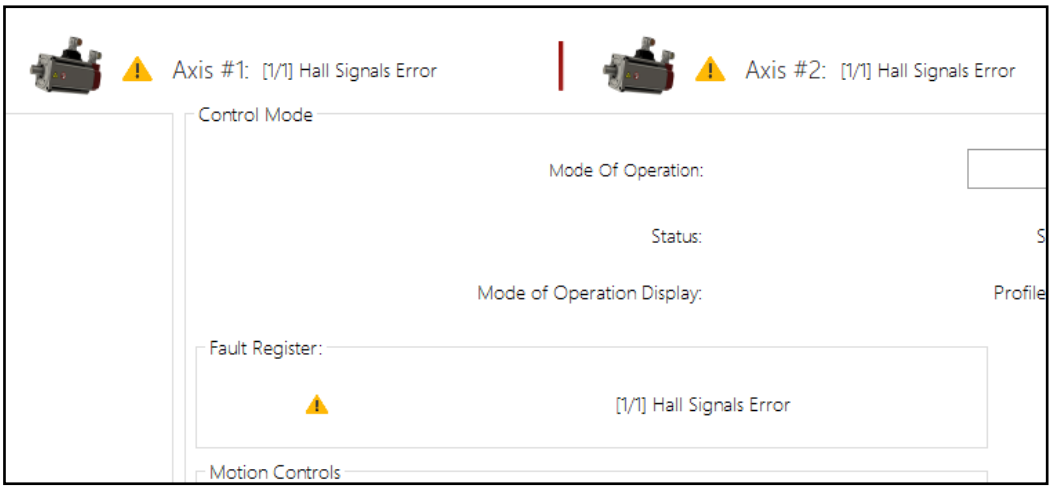


43. Pdo Condiguration

Pallet Conveyor drive doesn't support PDO mappig so EtherCAT tab doesn't present this function.

44. PC EtherCAT Tab

9. Faults



45. DevEx Fault detection

DevExUI has a reporting system of any errors of the drive. In Run tab and in the upper part of the main window user can monitor the status of the motor. Modbus register dedicated to faults is 669 for axis 1 and 719 for axis 2. For more information, refer to drive manual.

Below are the lists relative to each drive, of the faults code and faults description that user can see in *run tab*.

More details can be found in the drive software manual.

Fault Code (Bin)	Fault Code (Dec)	DMR Fault description	Duet AD Can Fault	Duet AD Profinet Fault	Duet AD EtherCAT Fault	DMR PC Fault
1	1	Over Voltage	Over Voltage	Over Voltage	Over Voltage	Over Voltage
10	2	Under Voltage	Under Voltage	Under Voltage	Under Voltage	Under Voltage
100	4	Peak Motor Current	Peak Motor Current	Peak Motor Current	Peak Motor Current	Peak Motor Current
1000	8	Rated Motor Current	Rated Motor Current	Rated Motor Current	Rated Motor Current	Rated Motor Current
1010	10	Short Circuit	Short Circuit	Short Circuit	Short Circuit	Short Circuit
1 0100	20	Rated Brake Current	Rated Brake Current			
10 1000	40	Hall Signals Error				Hall Signals Error
110 0100	100	Position Tracking Error	Position Tracking Error	Position Tracking Error	Position Tracking Error	Position Tracking Error
1100 1000	200	Velocity Tracking Error	Velocity Tracking Error	Velocity Tracking Error	Velocity Tracking Error	Velocity Tracking Error

1 1001 0000	400	Over Velocity	Over Velocity	Over Velocity	Over Velocity	Overvelocity
11 0010 0000	800	Motor Over Temperature	Drive Over Temperature	Drive Over Temperature	Drive Over Temperature	
11 1110 1000	1000	Drive Over Temperature				Drive Over Temperature
111 1101 0000	2000	CanOpen Heartbeat Event	CanOpen Heartbeat Event	FieldBus Cycle Time	FieldBus Cycle Time	FieldBus Cycle Time
1111 1010 0000	4000	CanOpen Sync	CanOpen Sync			

10. Complementary applications

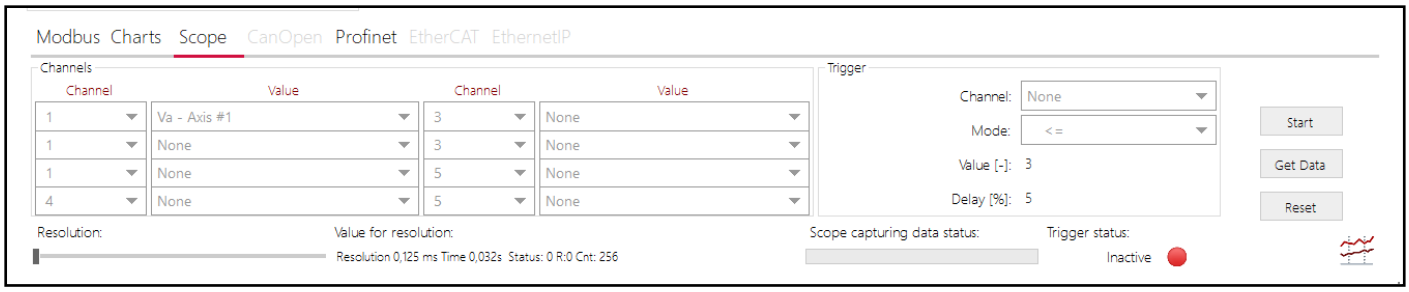
Our Interface includes other applications:

- Scope. Application for generating graphs capturing an amount of data points from drive.
- Firmware uploader. Application for uploading a firmware on the drive.

10.1 Scope

Scope application is used from the interface by tuning loops or can be set in dedicated control tab in the bottom part of the main window.

This tool interoperates with the program searching for requested data and plotting with the desired resolution.



46. Scope control box tab.

In the box assigned to trigger parameters, Channel, mode, value and delay can be set. If channel is set to 'NONE' trigger is disabled.

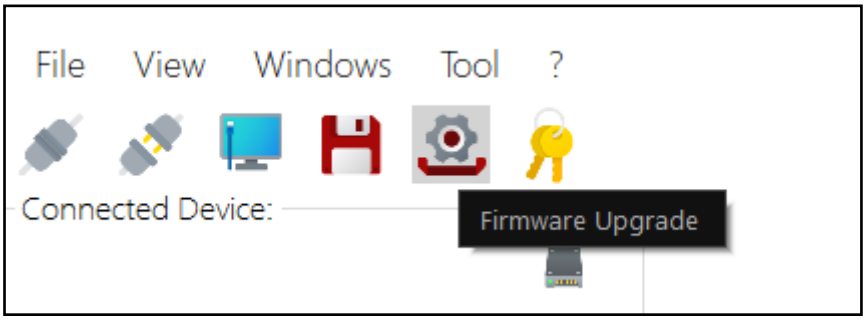
In 'Channels' box user can choose what variable/s to be monitored and assign to a spefic channel. Be careful to select the function for the correct axes.

Start will start scope.

Get data will plot the last caught data.

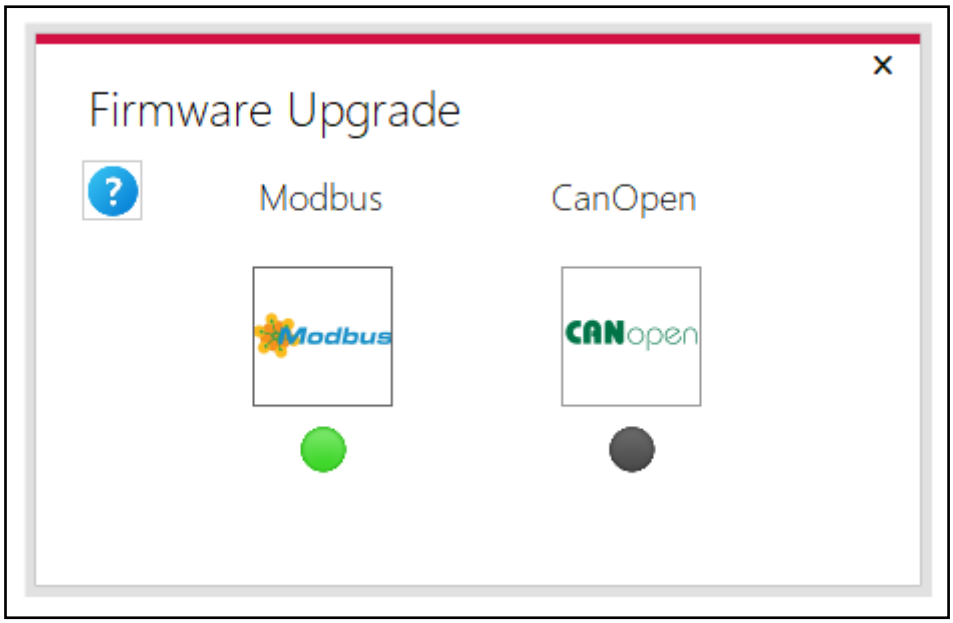
Reset will reset all combo box to 'NONE'.

10.2 Firmware Uploader



47.Firmware Upgrade icon

Inside the buttons tool bar there is a gear icon that opens a window where user can choose to upgrade firmware through Modbus or CanOpen. Canopen app hasn't available yet (led black).

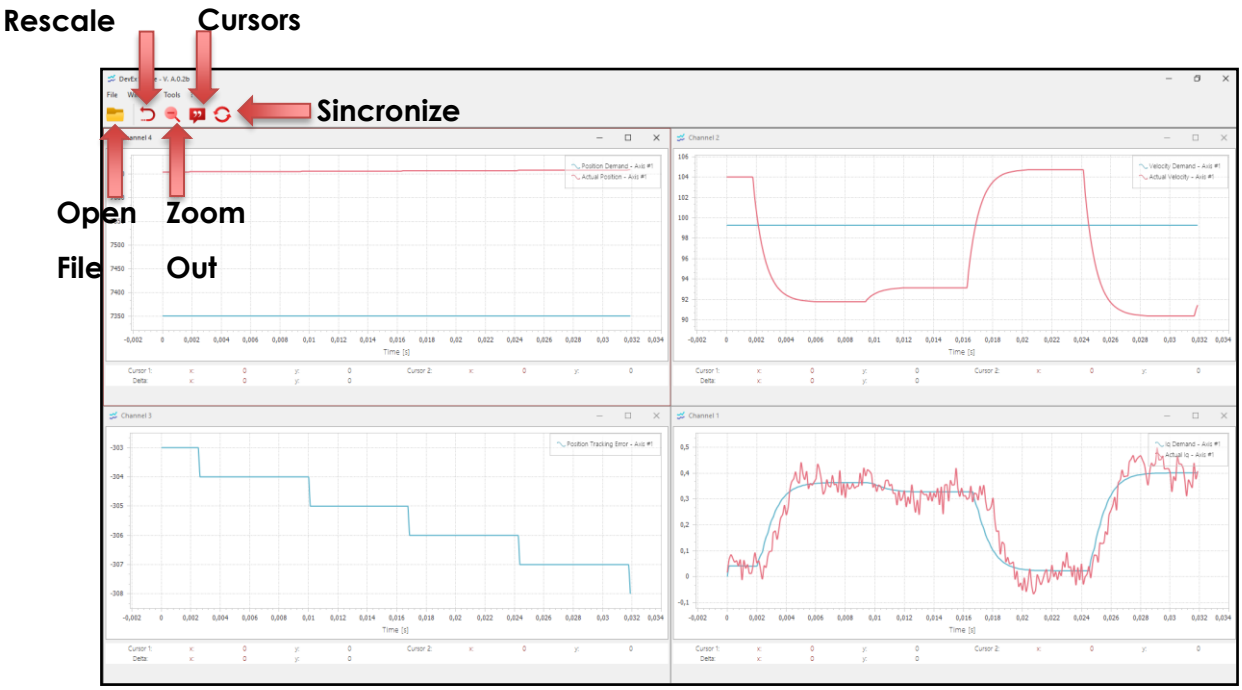


48. Firmware Upgrade window

It works just with Modbus RTU and TCP communications.

11. SCOPE

Below is presented a short guide of Scope application in order to make its use more fluid and understandable.

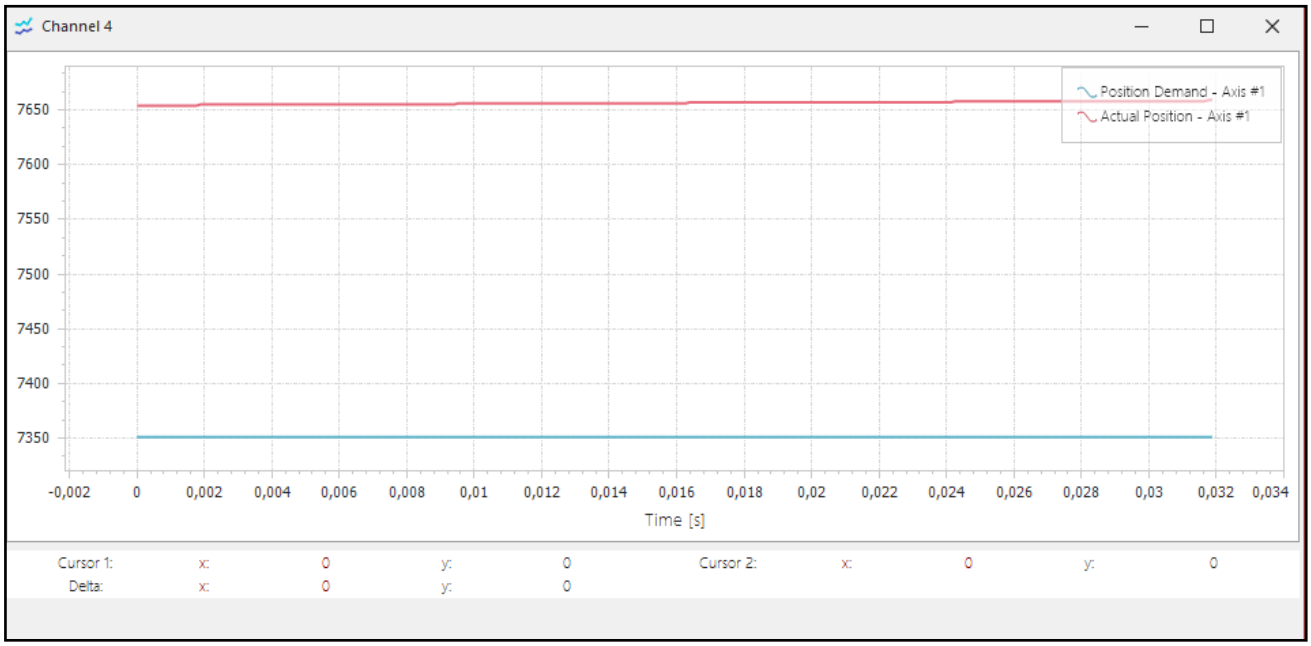


49. Scope Mainform

Scope Mainform has two Tool Bars. The upper bar enclose all functionalities of scope application, while the bottom one has some quick buttons.

11.1 Quick buttons

- Open File: allows the user to open the desired graph file.
- Rescale: adjust all child window, according to parent form size.
- Zoom Out: If a plot is zoomed in, zoom out button restore original view.
- Cursors: first click displays two x-Cursors, second click two y-Cursors, at the bottom there are cursors values.



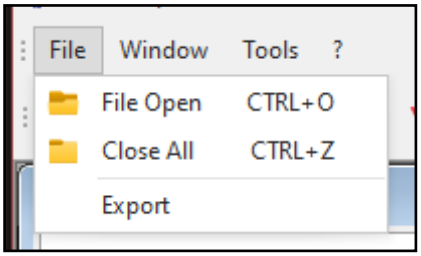
50. Scope Cursors

- Sincronize Windows : this button sincronize cursors position of the focused form in all opened windows.

11.2 Toolbar

Toolbar has four *menu-bar-item:* File, Window, Tools and ?. Some function can be called both with buttons and with the hotkeys.

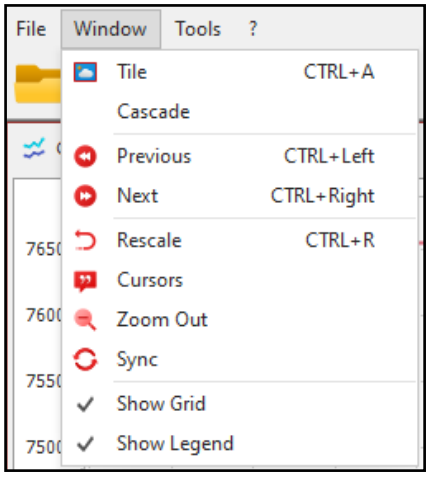
11.2.1 File



51. "File" Menu

- File Open: is the same of "File Open" in quick buttons.
- Close All: Close all opened windows.
- Export: Export data in .grf, .txt, .csv format.

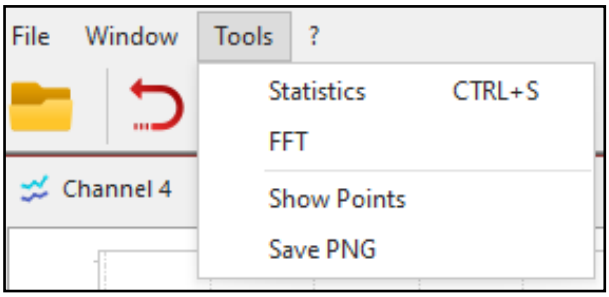
11.2.2 Window



52. "Window" Menu

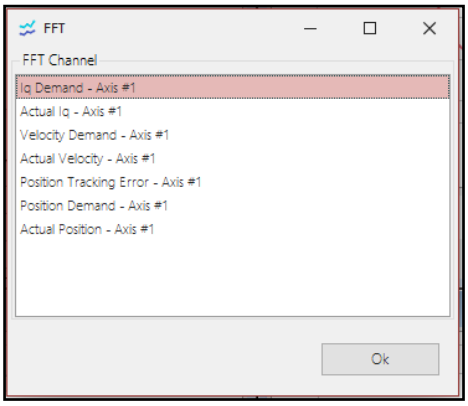
- Tile: enlarges the selected window.
- Cascade: cascades all the child windows.
- Previous: focus the previous child window, compared to the selected one.
- Next: focus the next child window, compared to the selected one.
- Rescale: is the same of "Rescale" in quick buttons.
- Cursors: is the same of "Cursors" in quick buttons.
- Zoom Out: is the same of "Zoom Out" in quick buttons.
- Sync: is the same of "Sincronize Window" in quick buttons.
- Show Grid: show or hide graph grid.
- Show Legend: show or hide graph legend.

11.2.3 Tools



53. "Tools" Menu

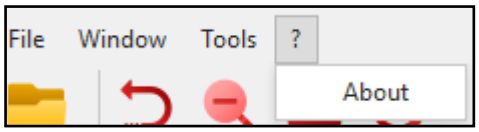
- Statistics: lift a curtain with some useful values like Max, Min, Mean, Peak to Peak and RMS extrapolated from the focused plot. Clicking again this curtain disappers.
- FFT: **fast Fourier transform** (**FFT**). Scope implements an algorithm that computes the discrete Fourier transform on a specific signal. Choosing the desired signal, FFT transform it and the relative graph appears. (Fig.53)



54. FFT Channel selection

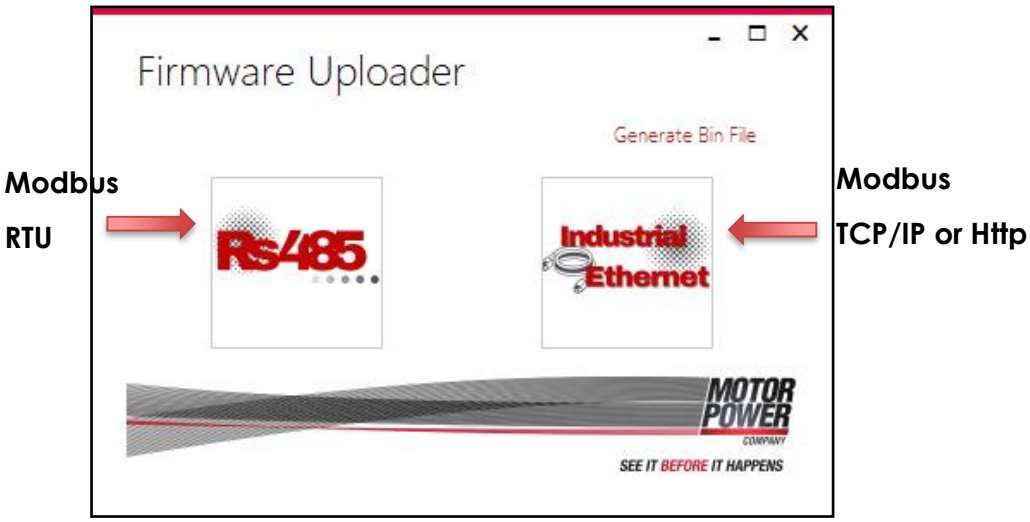
- Show Points: show all plot points.
- Save PNG: save the graph as a PNG.

11.2.4 About



- About: Open a window with development information.

12. FIRMWARE UPLOADER



55. Firmware Uploader main window

Firmware Uploader application is used to transfer binary or zip file of firmware to update the drive code.

Main window includes two buttons, one is useful to transfer firmware file by means of Modbus RTU connection and the other is used to transfer firmware file through Modbus TCP/IP or Http connection.

12.1 Firmware organization

The drive FW is organized in modular block that allows modular features too.

We can divide between device with industrial Ethernet communication and without.

12.1.1 Modbus RTU/CANopen device.

Standards CANopen or MODBUS RTU devices are organized as follow:

- Drive bootloader
- Drive FW

Possible FW operations:

- FW upload with serial communication (MODBUS RTU)

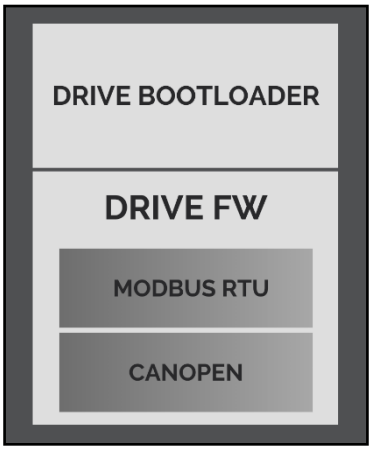


Figure 56-standard FW structure

12.1.1 Industrial Ethernet Devices

With a device equipped with an industrial ethernet communication more operation on FW are possible.

Industrial Ethernet devices are organized as follow:

- Drive bootloader
- Drive FW
- Industrial Ethernet Stack

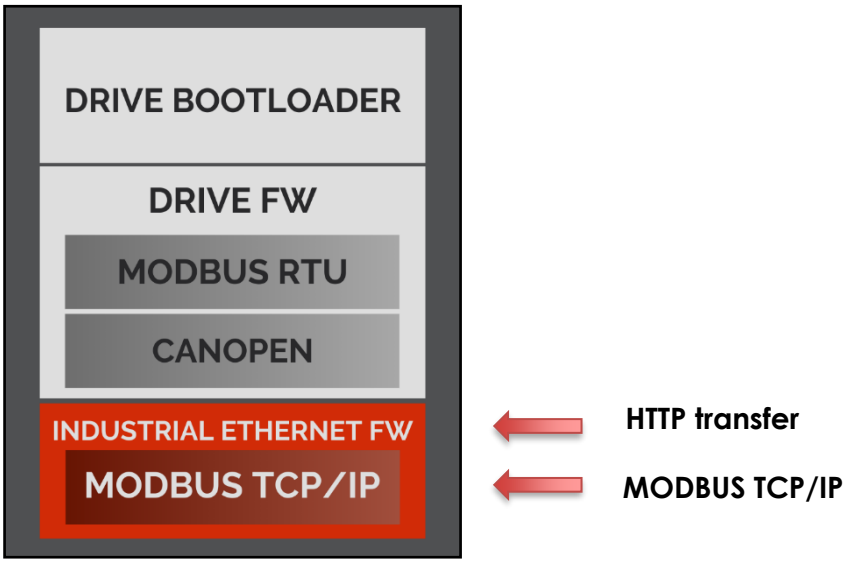
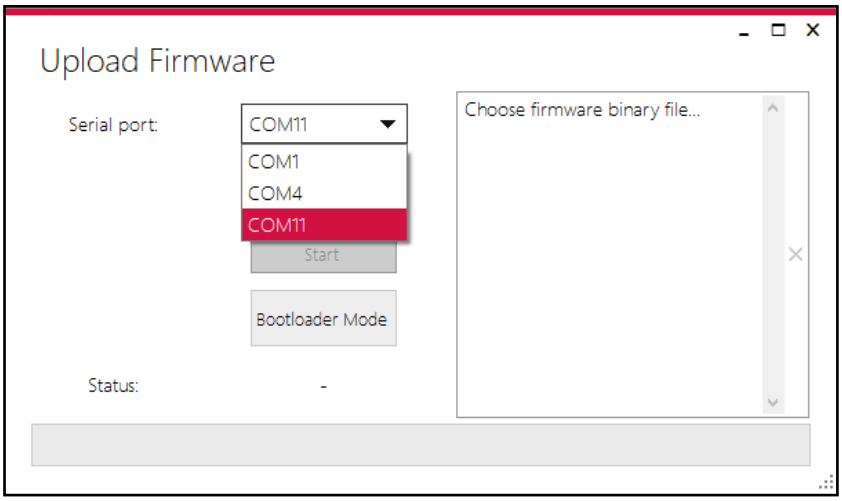


Figure 57-Indstrial Ethernet Device Memory Structure

Possible FW operations:

- Drive FW upload with serial communication (MODBUS RTU)
- Drive FW upload with MODBUS TCP/IP
- Industrial Ethernet Firmware Stack uploade with HTTP transfer.

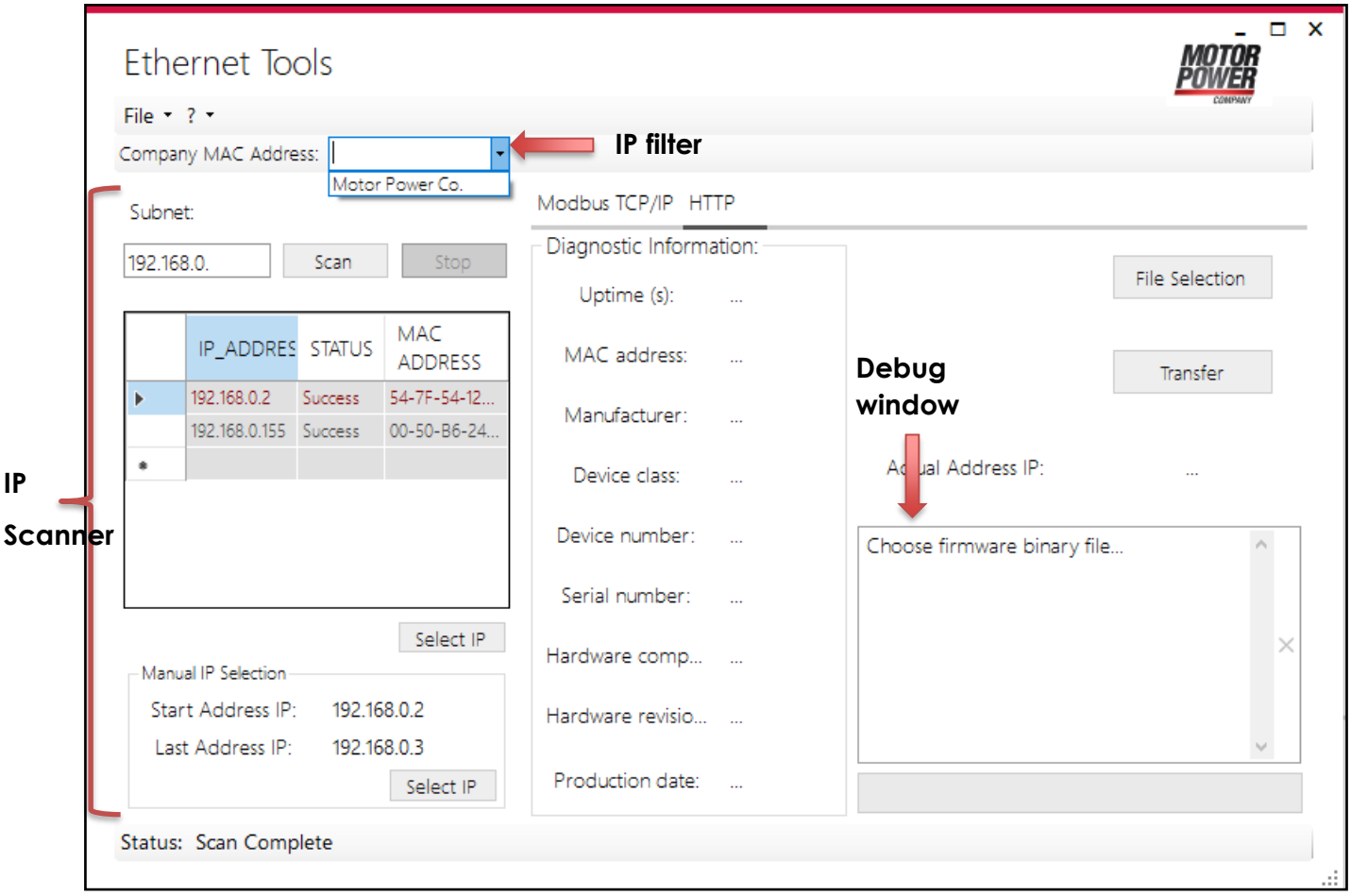
12.2 Modbus RTU



58. Modbus RTU upload firmware form

Starting with com port selection, select a file and press *bootloader mode* so that firmware is ready to receive. Lastly press *start* button to start transferring firmware. Process ends with the completion of transmission message box.

12.3 Modbus TCP and Http transfer

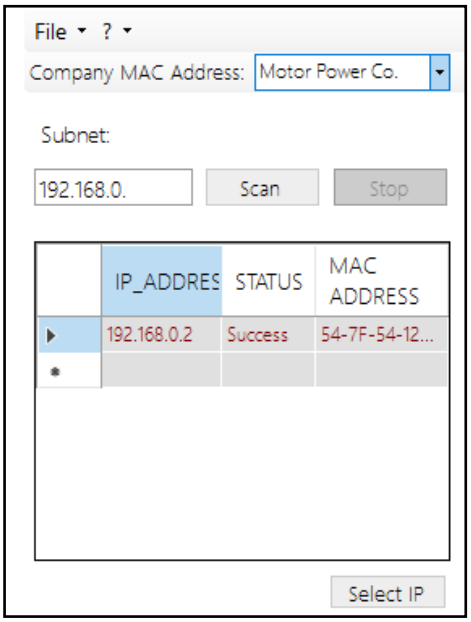


59. Industrial Ethernet Window

Two types of tranfer are possible with Ethernet operations.

The first thing that the user should do in both cases, is to connect ethernet cable the computer with a static Ip configured. If user doesn't know device Ip addresses, in the left part of the form is integrated an Ip Scanner otherwise a manual selection is just below. The first one is used if user does not know what are device's Ips, it takes more time than manual selection but Ip can be selected not necessarily in sequence, This process can be stopped with the button *stop*. Manual selection is faster but user must select a range of Ip addresses.

In the second toolbar at the top of the form user can select an Ip filter choosing the company name, therefore the addresses are filtered inside the IP Scanner window.



60. Filtered IP

Every connection tab has a debug window where transmission information is projected.

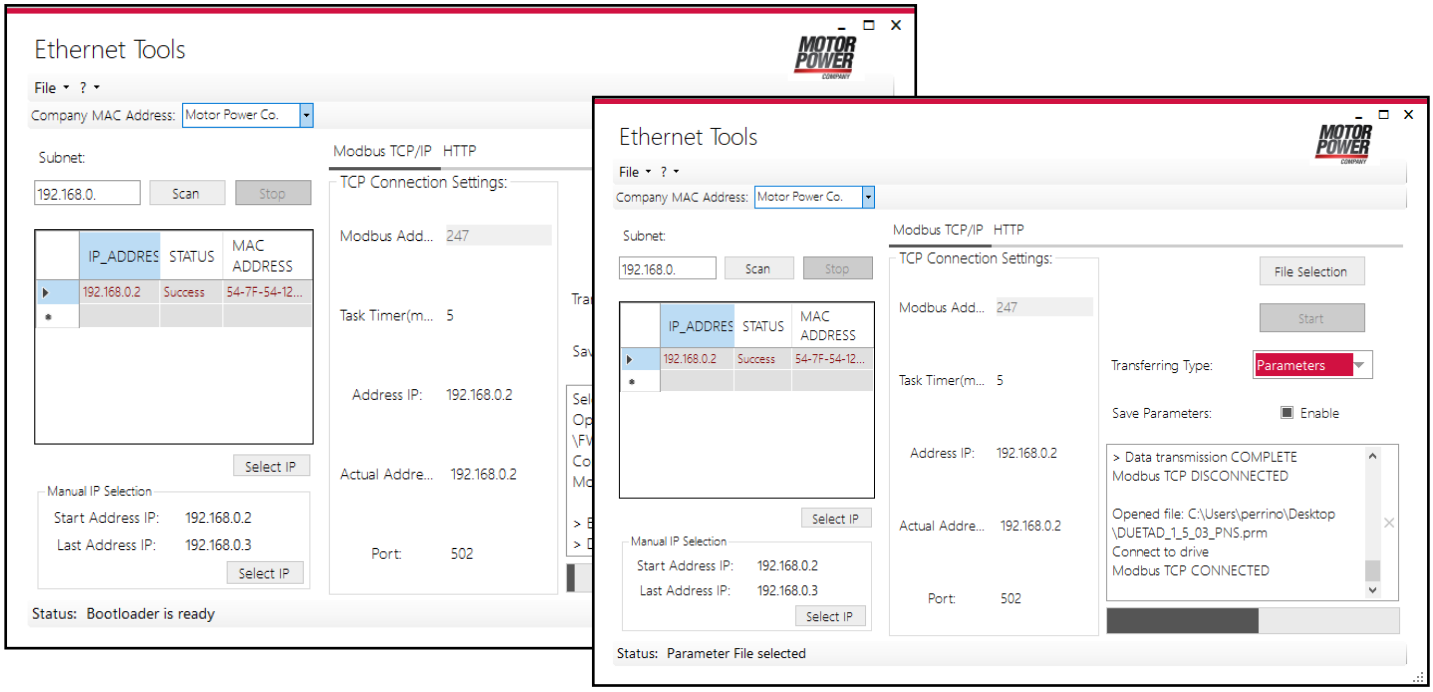
In the bottom part of the form a status label displays process information.

12.3.1 Modbus TCP/IP

Modbus TCP/IP is a set of standardized rules that allow computers to communicate on a network such as the internet. So with this tab, binary firmware file or parameter file is sent.

After selecting the IP addresses, user must select whether to transfer firmware or parameters under the *transferring type* combo box. If "Parameters" is selected, the user must decide whether to enable the saving of parameters. Then the choice of the binary (for firmware transfer) or parameter file must be made.

Pressing "Start" button transferring process begins.



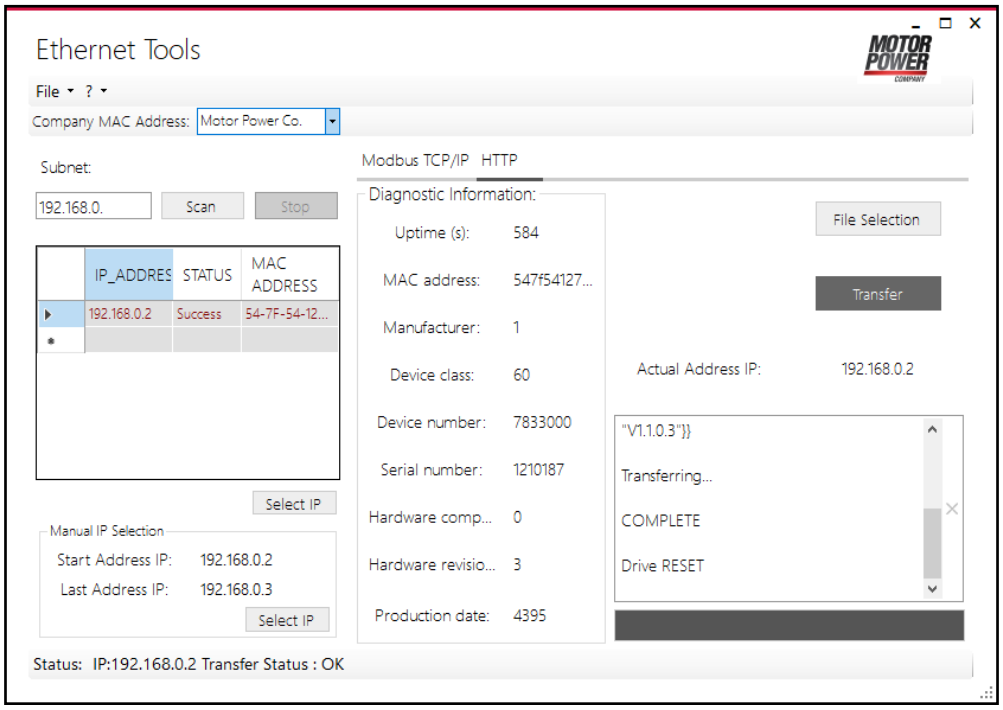
61. Firmware and Parameters file transfer

12.3.2 Http transfer

With HTTP tab, zip firmware file is sent via HTTP protocol.

After selecting the IP addresses, user must select zip file and pressing "Transfer" button transferring process begins.

Under Diagnostic Information after the connection with the drive, some communication information are displayed.


Ethernet Tools
File
?
Company MAC Address:
Motor Power Co.
Subnet:
192.168.0.
Scan
Stop
IP_ADDRES
STATUS
MAC ADDRESS
192.168.0.2
Success
54-7F-54-12...
Select IP
Manual IP Selection
Start Address IP:
192.168.0.2
Last Address IP:
192.168.0.3
Select IP
Modbus TCP/IP
HTTP
Diagnostic Information:
Uptime (s):
584
MAC address:
547f54127...
Manufacturer:
1
Device class:
60
Device number:
7833000
Serial number:
1210187
Hardware comp...
0
Hardware revisio...
3
Production date:
4395
File Selection
Transfer
Actual Address IP:
192.168.0.2
"V1.1.0.3"}}
Transferring...
COMPLETE
Drive RESET
Status: IP:192.168.0.2 Transfer Status : OK

62. Http Tab

14. Appendix

14.1 Additional document

Further information can be found online on MPC's site in the following manuals:

- " SOFTWARE GUIDE DUET AD V1 0". This manual describes, in detail, the software used with the Motor Power Company drive DUET AD. It is an integral part of the drives documentation set.
- " INSTALLATION GUIDE DUET AD V2 1". These operating instructions introduce you to the DUET AD device and provide you with information on all the stages required for the installation of the device.
- " PROFINET MANUAL DUET AD V1 2 ". This manual describes, in detail, the PROFINET implementation of Motor Power Company DUET AD.
- " ETHERCAT CO MANUAL DUET AD V1 2". This manual describes, in detail, the ETHERCAT implementation of Motor Power Company DUET AD.
- " INSTALLATION GUIDE DMR PC 6 50 X X V2". These operating instructions introduce you to the DMR 6-50 PALLET CONVEYOR device and provide you with information on all the stages required for the installation of the device.
- " CONTROL&PROGR MANUAL DMR PC 6 50 X X V1". This document is intended to describe DMR PC commissioning with industrial Ethernet fieldbus. For installation of the device and cabling please use INSTALLATION GUIDE at www.motorpowerco.com.

14.2 Revision Information

Name: Device Explorer User Manual. Program manual of Motor Power drive interface.

Version: 13.10.2023, 01.02

• This guide is delivered subject to the following conditions and restrictions: This guide contains proprietary information belonging to Motor power Company Srl. Such information is supplied solely for the purpose of assisting users of the MPC Devices and Servo drive in its installation and configuration.

• The text and graphics included in this manual are for the purpose of illustration and reference only. The specifications on which they are based are subject to change without notice.

• Motor power Company and the Motor power Company logo are trademarks of Motor power Company Srl.

• Information in this document is subject to change without notice.