Delta Line
www.delta-line.com

Start Up Guide

DLSpace

RoHS compliant

CE

IMPORTANT NOTICE

Release	Date	Description	Release
1.00	21/03/2024	GVE	First release

Delta Line

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Sommario

1.0 Hardware set-up

For what concerns the motor and drive connections, please follow the instruction in the short manual of the corresponding drive. Each drive has a different connector for: phases of the motor, power supply for the drive, inputs/outputs, feedback sensors and communication interface. In the short manual of the drive these connectors are numbered. You will find the meaning of all the connector pins, some of them are related to the motor phases and feedback. Get the information about the motor connection in the motor datasheet. So, by reading both the short manual of the drive and datasheet of the motor you should be able to match the cables and correctly connect the motor to the drive.

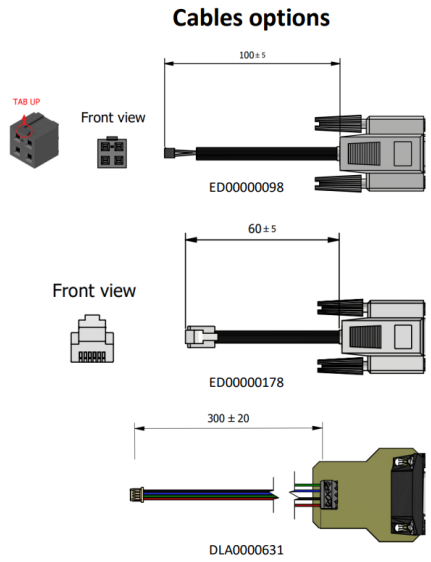
2.0 Software set-up

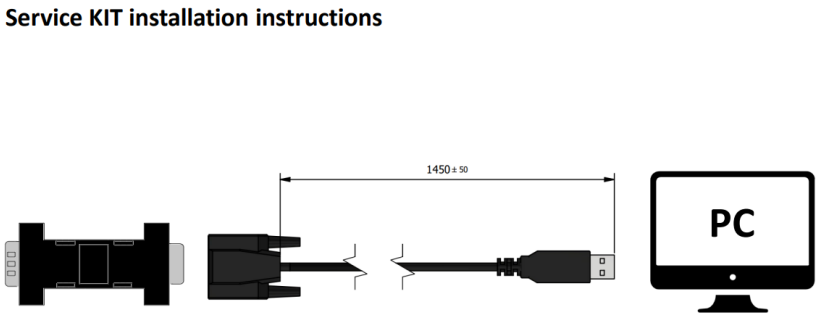
Once that the motor is correctly connected to the drive, follow in order the following instructions.

2.1 Communication Interface

2.1.1 Communication Interface Connection

The first thing to do, is to connect the communication service. Here you can see the three possible cables for the Service Serial Interface and how to connect them (check the short manual of the drive to know in which CN to connect it).

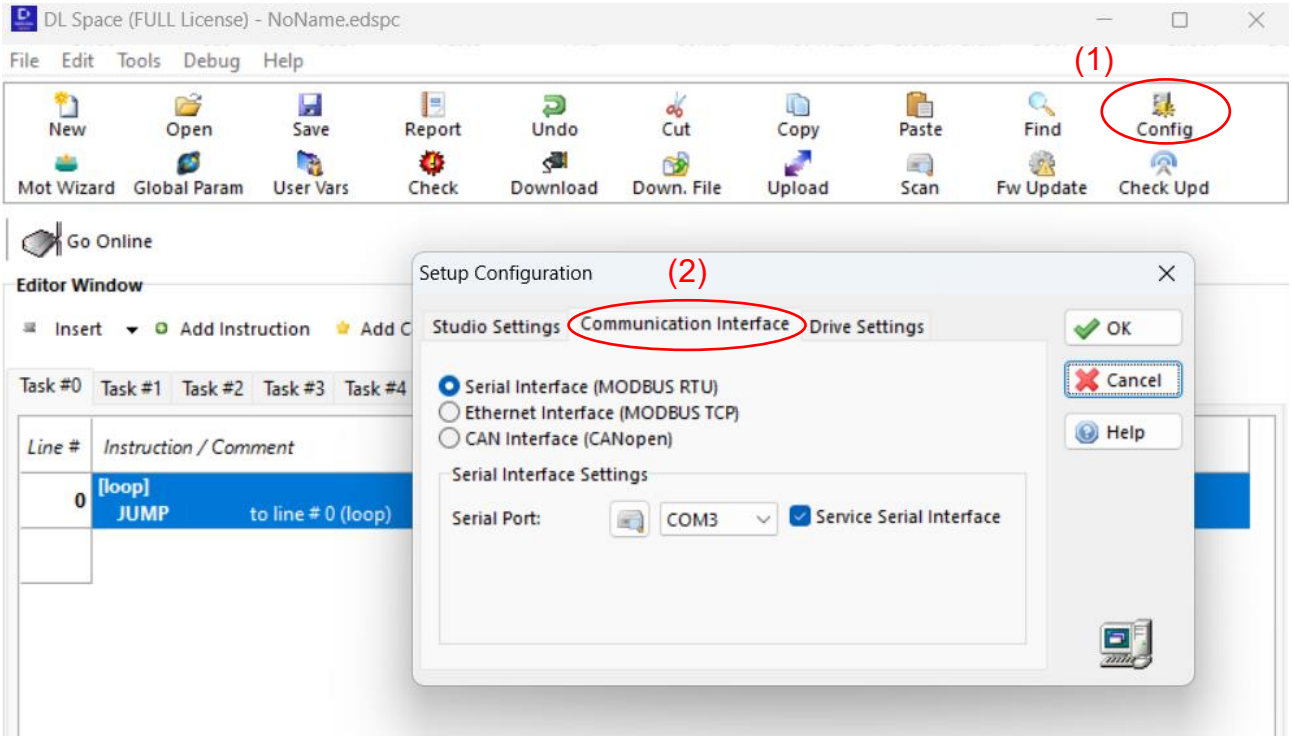




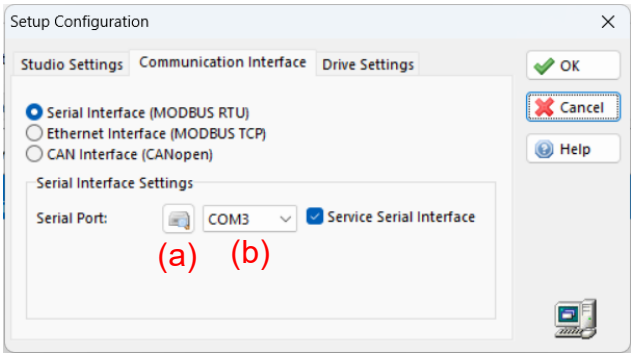
2.1.2 Communication Interface Selection

Now select the communication interface that you are using.

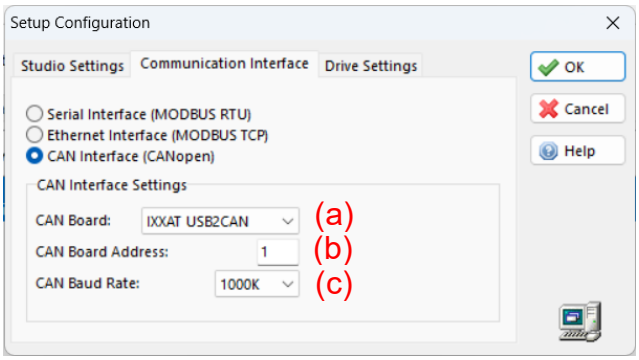
From the main window Click on ***Config*** (1) and a window will pop out. Go on ***Communication Interface*** section (2). There will be three types of communication interface, select the one that you are using.



Depending on the communication interface that you are using, you have some parameters to set (e.g. Serial port and Baud Rate, IP Address and port, CAN Board, Address and Rate). In the following picture you can find the three possibilities with the default values for each case.

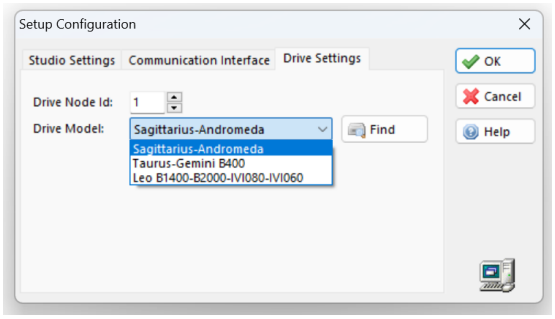


In case you have a drive that has the connection for a Service Serial (one out of the three cables shown previously), then select the first communication interface in this window.
Now check the ports number that are available (a).
Select one of the available ports here (b).
Click ***ok***.



In case you have a drive based on CAN or an integrated motor that does not have the connection for the Serial Interface, then you need a CAN converter, it can be for example: GCAN (property of Delta-Line), IXXAT, PEAK.
Select the third communication interface in this window.
Set the CAN board (a).
Set the Baud Rate (b).
Select the Drive Id (c).
Click ***ok***.

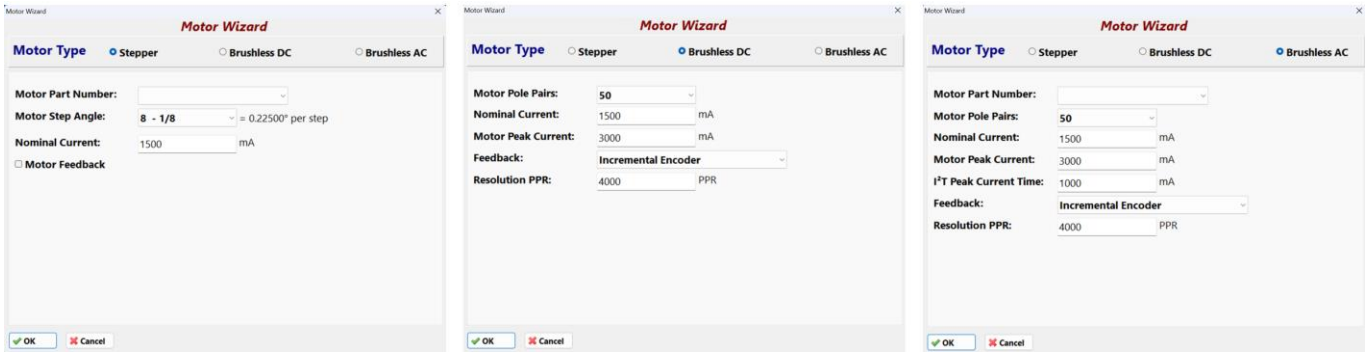
In the same window, go in ***Drive settings*** and choose the kind of drive that is in use.



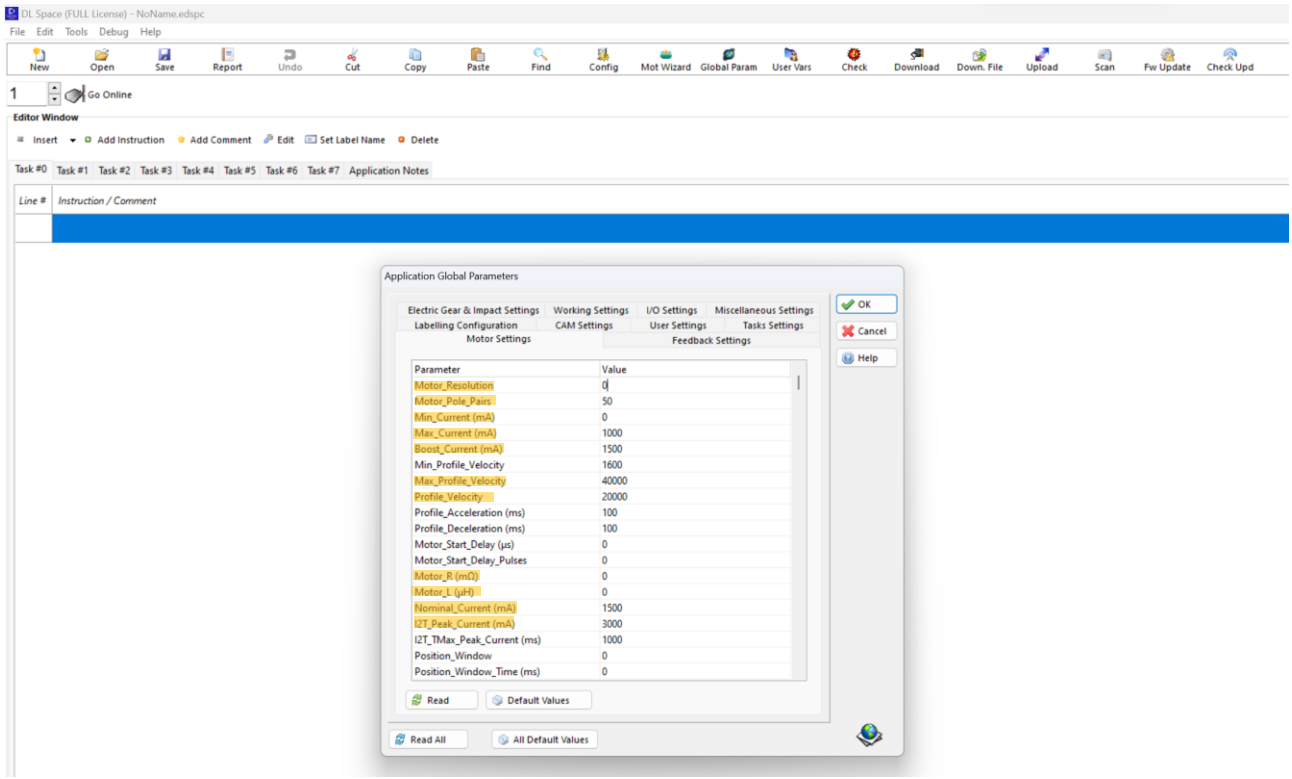
Sagittarius-Andromeda if you are using a stepper motor.
Taurus-Gemini if you are using a Brushless motor.
Leo if you are using Servo or brushless motor.

2.2 Motor Configuration

Back in the home window, click on ***Motor Wizard*** (next to Config.). One window with all the typologies of motor will open. Select the one that you are using and set its parameters (you can find these data in the datasheet of the motor). As follows you can find the three situations available:



A second section is used for setting the remaining parameters. Click in the ***Global Parameter*** icon:



Motor Settings: The underlined parameters are the ones that must be changed. Number of poles, nominal (=max) and peak (=boost) current, max(=nominal) speed, resistance and inductance can be found in the datasheet of the motor. Set the ***Min_Current*** to 500mA. Set ***I2T_Peak_Current()*** to the same value of the peak current, **do not exceed the max current of the drive.**
Pay attention that the velocity is measured in 0.01 RPM for brushless motors and in Hertz for the stepper. The relation between RPM and Hz is the following:

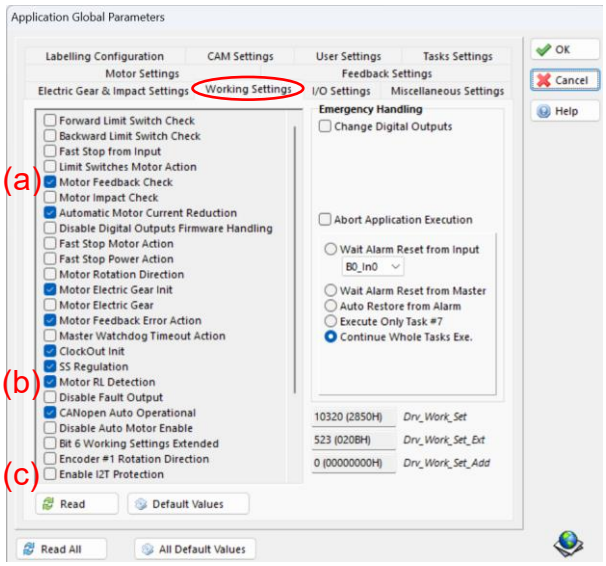
$$RPM = \frac{Hz}{\#steps\ per\ cycle} * 60.$$

If using a brushless motor, select the maximum resolution reachable, which is 65536.
If using a stepper motor, set the resolution that you want to use. For example: if you want to work in full step, then select 1/1, if you want to work in half step, then select ½ and so on.

2.3 Feedback Settings

2.3.1 Working Settings

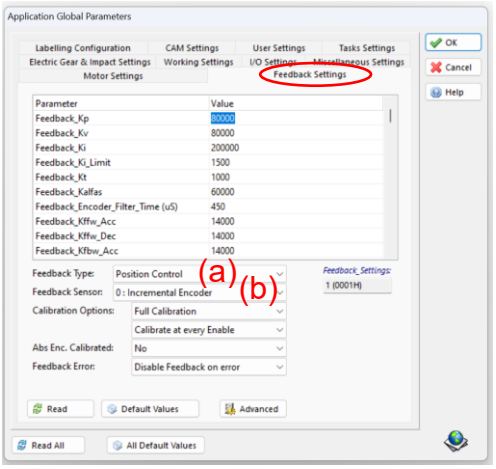
Always in the ***Global parameter*** section, select the ***Working Settings***:



If you want to work in closed loop, select the option ***Motor Feedback Check*** (a).
If you want to read the Inductance and resistance of the motor, select the ***Motor RL Detection*** (b). Set the flag ***Enable I2T Protection*** (c) to have a protection from high currents.

2.3.2 Feedback Section

If you work in closed loop, some feedback parameters need to be set. Go in the Feedback Settings:



Scroll the parameters until you find ***Feedback_Boost_Current()*** and set the value of the peak current that is written in the datasheet of your motor.
In (a) you can select the type of control, in (b) you can select the type of sensor that are used.
In the end, click ***ok***.
<u>If you are using an Incremental encoder,</u> you must change also the parameter

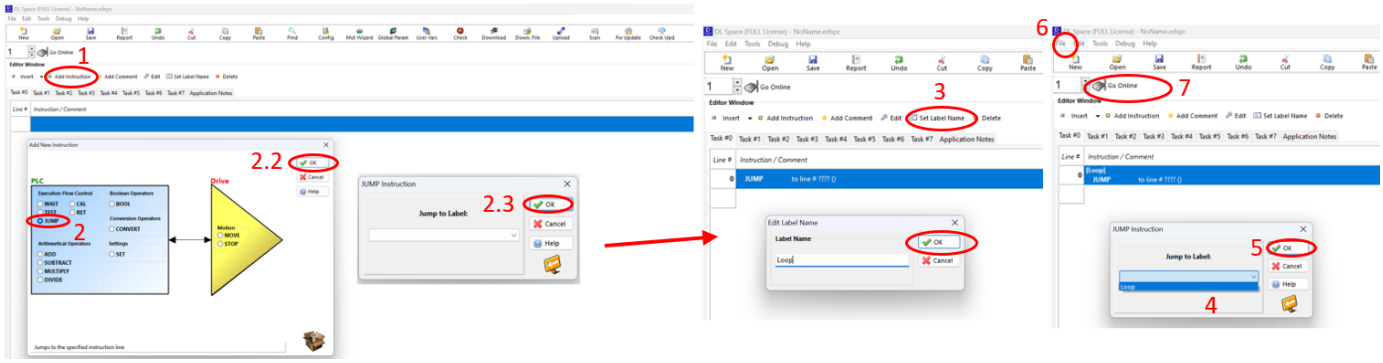
Feedback_Enc_PPR, that is in the *Feedback Settings* section, set the resolution of the encoder that is used expressed in PPR (which means that you have to set the value that you find in the datasheet multiplied by 4, if defined in CPR)

2.3.3 Hall Sensors Settings

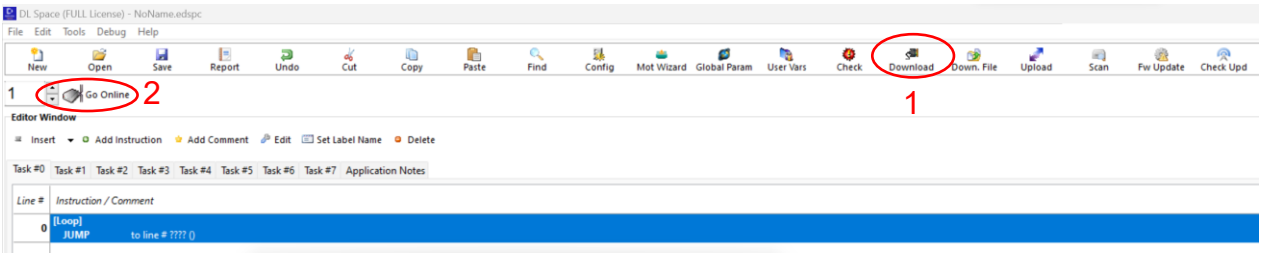
First, let's get in the condition to be able to move the motor:

1. Click on *Add Instruction*.
2. Select *Jump* and click on *ok* twice.
3. Click on the new action and set a label name (for example loop), click ok.
4. Double click on the *Jump* and select the name of your label, in that way you reproduced a kind of while loop jumping on itself.
5. Click ok.
6. Save the file.
7. Go *Online*.

All these steps are numbered and shown in the next picture.

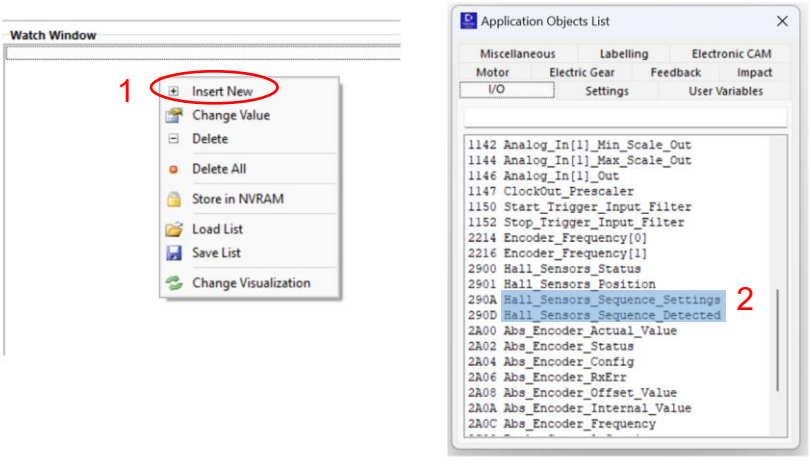


Download the application, so click on ***Download*** (you have to be offline to do the download).

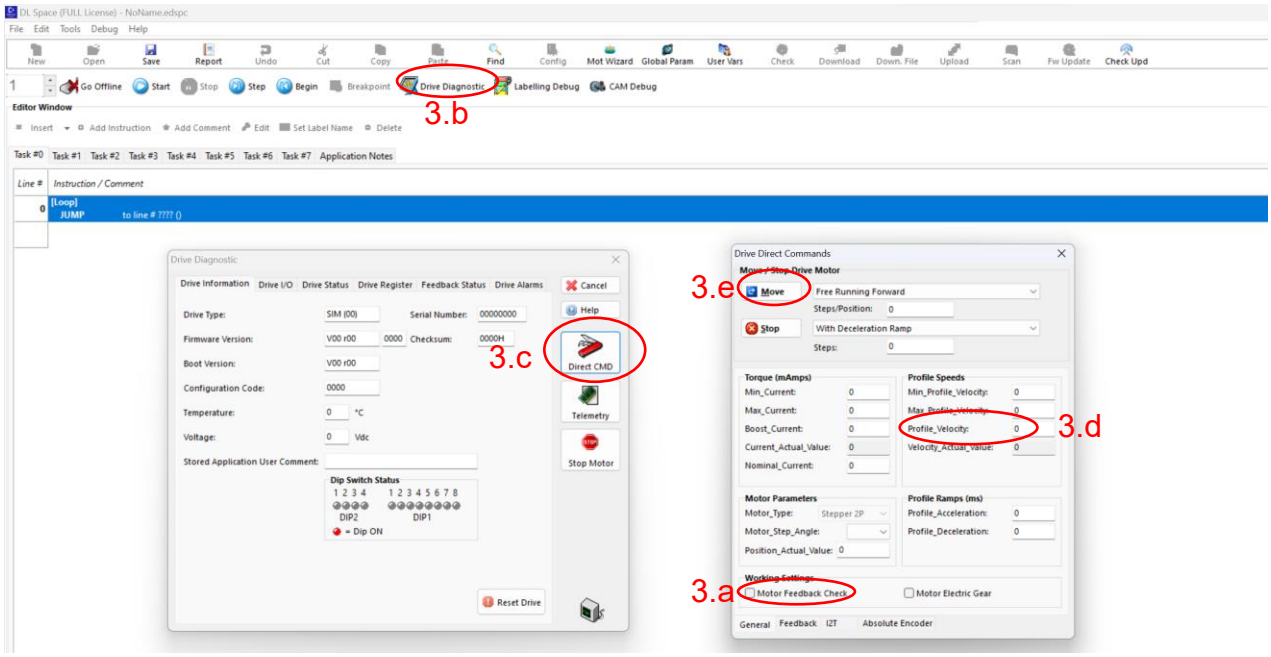


Now, the steps to insert the right hall sequence are the following:

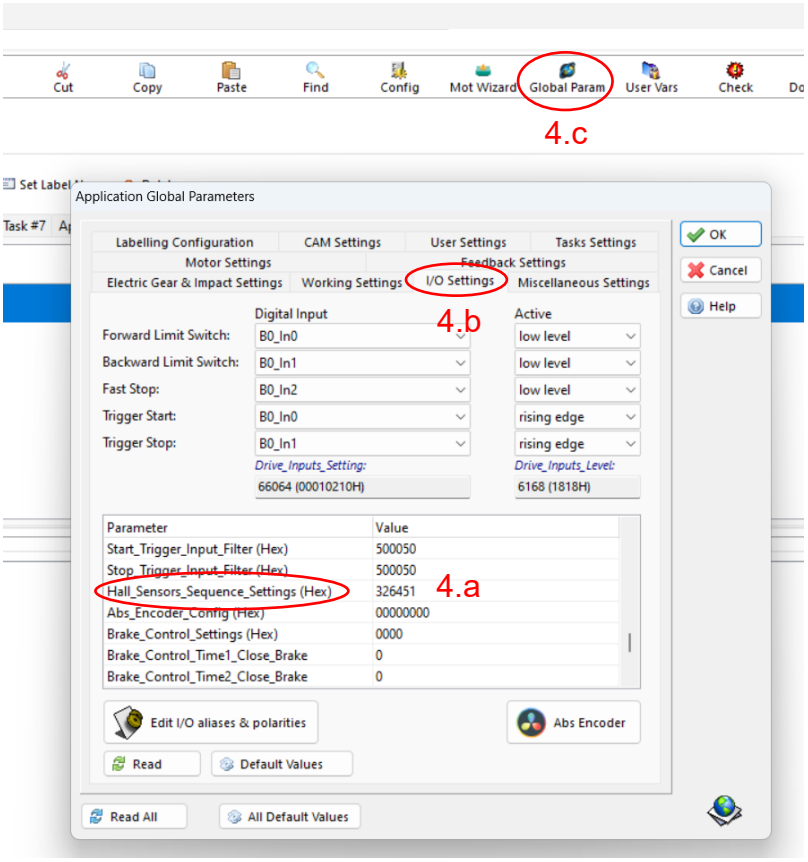
1-Right click on the watch window, select insert new.
2- go in the I/O section and select (double click) ***Hall_Sensors_Sequence_Detected*** and ***Hall_Sensor_Sequence_Settings*.**



3- Move the Motor in open loop (no feedback check 3.a) by clicking on Drive Diagnostic (3.b), Direct CMD (3.c), select the speed (Profile Velocity 3.d) and move (3.e):

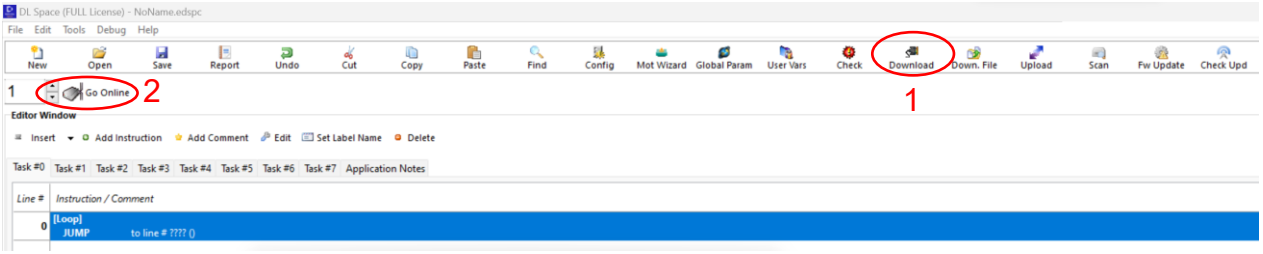


4- Read what is written in the variable ***Hall_Sensors_Sequence_Detected*** in the watch window, if it does not correspond to what is written in the variable ***Hall_Sensors_Sequence_Setting*** then: copy the value in ***Hall_Sensors_Sequence_Detected*** and paste it in the variable ***Hall_Sensors_Sequence_Setting*** (4.a) that you find in the section I/O Settings (4.b) of the Global Parameter (4.c) (see next picture).
In the end, click ***ok***.


Cut
Copy
Paste
Find
Config
Mot Wizard
Global Param
User Vars
Check
4.c
Application Global Parameters
Labelling Configuration
CAM Settings
User Settings
Tasks Settings
Motor Settings
Feedback Settings
Electric Gear & Impact Settings
Working Settings
I/O Settings
Miscellaneous Settings
OK
Cancel
Help
Digital Input
Active
4.b
Forward Limit Switch:
B0_In0
low level
Backward Limit Switch:
B0_In1
low level
Fast Stop:
B0_In2
low level
Trigger Start:
B0_In0
rising edge
Trigger Stop:
B0_In1
rising edge
Drive_Inputs_Setting:
66064 (00010210H)
Drive_Inputs_Level:
6168 (1818H)
Parameter
Value
Start_Trigger_Input_Filter (Hex)
500050
Stop_Trigger_Input_Filter (Hex)
500050
Hall_Sensors_Sequence_Settings (Hex)
326451
4.a
Abs_Encoder_Config (Hex)
00000000
Brake_Control_Settings (Hex)
0000
Brake_Control_Time1_Close_Brake
0
Brake_Control_Time2_Close_Brake
0
Edit I/O aliases & polarities
Abs Encoder
Read
Default Values
Read All
All Default Values

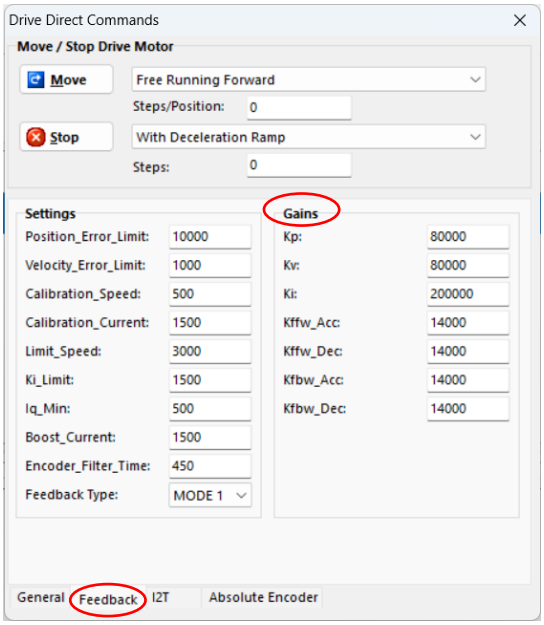
2.4 Motor Motion

Once that all the parameters and working settings are set, before moving the motor, Download and save the application, so click on ***Download*** (you have to be offline to do the download). Remember to close again the loop if you removed the flag “Motor Feedback Check” for setting the correct hall sequence.



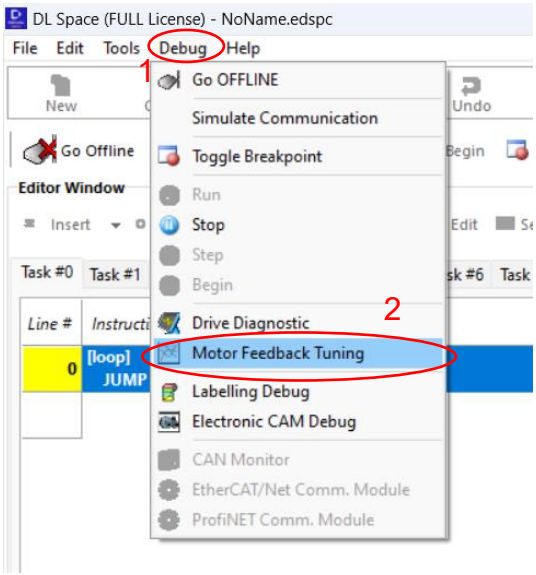
Now you can move the motor following the same instructions described in the section *Hall sensors Settings.*

In the Drive Direct Command (Direct CMD) there is a subsection called Feedback (see next picture). You can click on that icon and in here you can find the feedback parameters. Here you can try to tune the gains in order to get a better control.



In the same window, you can tune the gains of the control, Kp, Kv and Ki.
If you are working with a stepper motor it is better to put lower values of the gains with respect to the default ones. For example, try with Kp=1000, Kv=Ki=25000.

The performances of the control can be checked in the plot that you can find in:



1- From the main window, Click on Debug
2- Motor Feedback Tuning

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