

DTI MOTOR SETUP



dti

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V1.0

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OVERVIEW

In order for the user to be able to use our controller simply and unambiguously, we will describe in detail how to change the motor parameters during first use or motor replacement.

If you have any questions, please contact us. info@drivetraininnovation.com

SAFETY USE

Read the **HV-500 user manual** before use. Pay particular attention to the section of safe use. Note that the motor starts when the encoder is automatically calibrated. Make sure the motor area is clean and the motor rotation does not cause any damage. Perform the encoder calibration only if all parameters are entered correctly.



CONNECT TO THE GRAPHICAL INTERFACE.

Read **DTI Tool user manual** to find out how to connect to the graphics interface.

MOTOR PARAMETER SETTINGS

The first step is to set the motor and position sensor parameters.

POSITION SENSOR SETUP

1. Motor settings

○ General

- **Sensor Port Mode:**
Here you can select the type of position sensor. We recommend using an 11 bits RLS RM44SI encoder.
- **ABI Encoder Counts:**
Here you can set the resolution of the encoder. This is set automatically when you select Sensor Port Mode. If you use a Hall sensored motor, this value is ignored by the controller.
- **Dynamic Offset:**
All sensor has a small angle slip as a function of speed. This is due to logical operations in the sensor. Not necessarily necessary but recommended for perfect motor control. This is set automatically when you select Sensor Port Mode. If you use a Hall sensored motor, this value is ignored by the controller.

2. Write config:

After setting, please click the **Write config** button (in the right side). In the lower right corner you will see the **MCCONF Write OK** and then the **APPCONF Write OK** captions when the configuration write is successful.

Duty	0.3 %
Current	0.00 A
MCCONF Write OK	

You must make sure that the config is loaded on the controller. Values will only be interpreted in this case.

MOTOR PARAMETERS SETUP

1. Motor settings

o General

- **Motor Current Max:**

The maximum current of the motor can be set. This is the maximum AC current on the motor phases.

- **Motor Current Max Brake:**

The maximum braking current can be set. This current is AC on the motor phases. We can also use these two variables as a motor torque limiter.

- **Absolute Maximum Current:**

This is the setting for overcurrent protection. This is a very fast protection that protects the system from overload. This value must be higher than the previous two values. For example:

- Motor Current Max: 300A ---> Absolute Maximum Current: 360A
- Motor Current Max: 480A ---> Absolute Maximum Current: 540A

- **Max ERPM:**

This is the maximum electrical speed. This is directly proportional to the physical speed of the motor but depends on the motor poles number. EMRAX motors have 10 pole pairs of magnets. In this case, the ERPM will be 10 times greater than the motor physical speed.

- **Max ERPM Reverse**

This is the same as the previous but the opposite direction of rotation. It can be used mainly to limit the reverse speed of the vehicle.

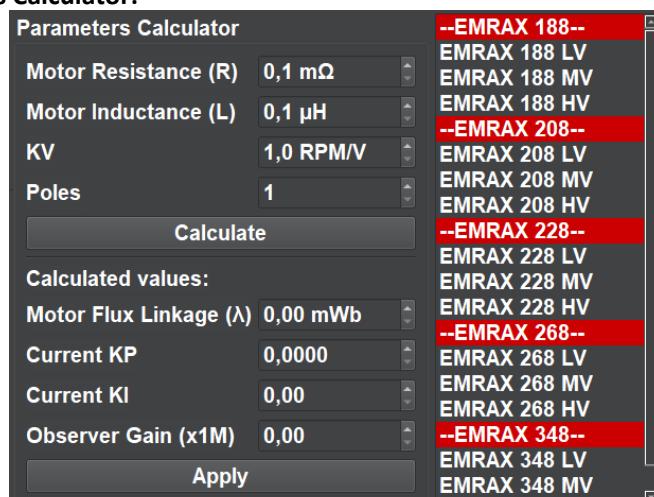
2. Write config:

As described in the previous section.

3. Control

o General

- **Parameters Calculator:**



We have implemented all the EMRAX motor parameters in the calculator. If one of these motors is connected to the controller

- then you just have to choose the right motor
- and click on the **Calculate** button
- and then click on the **Apply** button. If you use the motor with other parameters, enter the motor parameters in the calculator.
 - o Motor Resistance: internal phase resistance
 - o Motor inductance: induction
 - o KV: generated voltage RPM/1Vdc
 - o Poles: number of magnets (EMRAX: 20 magnets)

4. Write config

ENCODER CALIBRATION

1. Control

o Encoder

▪ Detect Encoder:

Before the encoder calibration, it is important to take the previous steps:

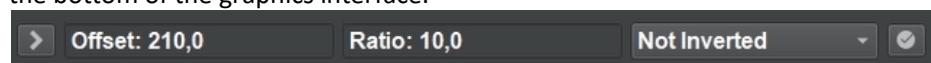
- Encoder parameter setup
- Motor parameter setup
- Select EMRAX or another motor and use calculator
- Write config to controller

After this steps just click the **Start detection** button to calibrate the encoder.



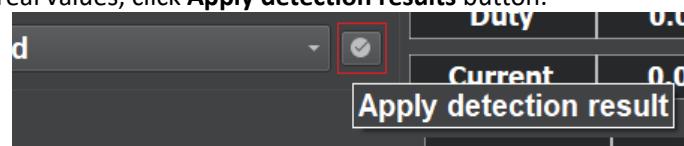
This operation will take a few minutes. The motor will rotate very slowly several times in both directions. You cannot cancel the operation. **In case of emergency**, turn off the low voltage power of the controller.

As soon as the calibration is successful, the calibration values are calculated at the bottom of the graphics interface.

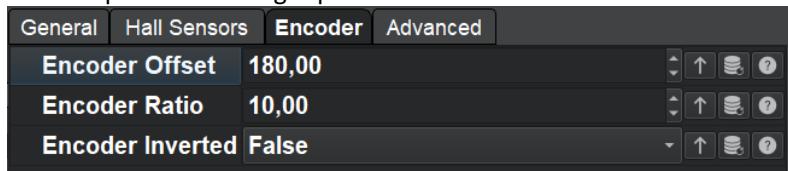


Calculated Offset and Ratio. Ratio value must be 10 for EMRAX motors because 10 pole pair. If Ratio value is different, the calibration must be performed again.

If you get real values, click **Apply detection results** button.



The values are placed in the right place.



2. Write config

HALL SENSOR CALIBRATION

If the motor has 120 ° hall sensors, the following steps must be performed for calibration.

1. Control

o Hall Sensor

▪ Detect Hall Sensor:

The steps are the same as the encoder calibration:

- Click to **Start detection** button
- After calibration is successful, click **Apply detection result** button.

2. Write config

OTHER INFORMATION AT FIRST START

It is important to write the configuration to the controller after the setup operations. If you do not do this, the calibration will fail, in the worst case the controller or the motor may be damaged.

Use the current control mode for the first operation. This provides great security and little chance of damaging the system.

You can configure the current control mode in the **App Settings** main menu.

1. **Analog I/O**
 - **General**
 - **Analog Input Functions:**
You can select **Current** mode

Of course, before you want to operate the motor, you need to set the input.

If you have any questions about setting up, please contact us. info@drivetraininnovation.com