1. PURPOSE:

This document describes the procedure for resolving the error that appears on the screen when winding: “Bobbin Motor can be blocked or Stalled.”

Figure 1: Screen of the error message

2. SCOPE:

This procedure applies to all Tonewinder models, regardless of the drivers used by your unit.

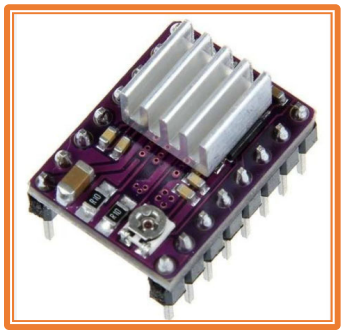


Figure 2: Old drivers (DRV8825). Purple color and grey heat sink.

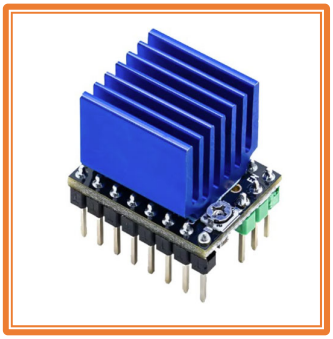


Figure 3: New drivers (TMC2226). Blue color and big blue heat sink.

3. MOST LIKELY CAUSES FOR THIS PROBLEM:

The most likely causes for this error are (In order of probability):

1. **Low sensitivity of the tachometer sensor (hall sensor).**
2. **Issue with the motor control driver.**
3. **Problem with the plate's stepper motor.**
4. **Other causes.**

The procedures for diagnosing and resolving each of these possible cases are listed below.

4. LOW SENSITIVITY OF THE TACHOMETER SENSOR (HALL SENSOR):

In most of the cases, this problem will be caused by low sensitivity or malfunction of the tachometer sensor or Hall sensor. This sensor is located above the plate motor and is connected directly to the PCB.

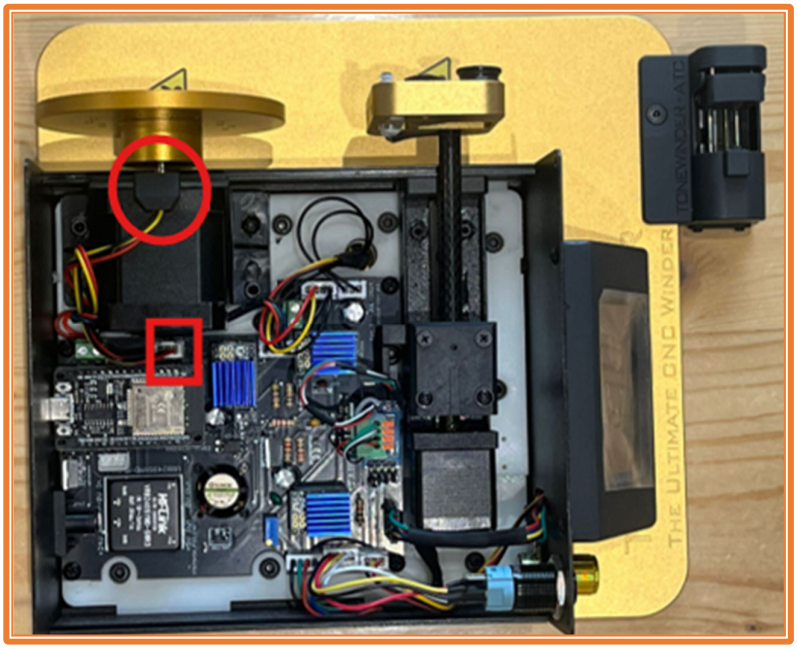


Figure 4: Location of the tachometer sensor.

4.1. HOW TO DIAGNOSIS:

The quickest way to diagnose whether the problem is related to the tachometer sensor is to disconnect the sensor directly from the PCB and perform several tests with the sensor disconnected (it is recommended to check both directions of rotation). If the problem does not reappear, this sensor is the cause of the error.

To do this, turn the power off and remove the power cord from the winder. Also, remove the four screws from the top cover. Then carefully remove the top cover from the winder and place it on the bench close to the winder as the Gaussmeter sensor is still connected to the circuit board.

Figure 5: Remove the top screws from the front and rear cover (x4).

Disconnect the cable from the Gaussmeter sensor and remove the top cover.

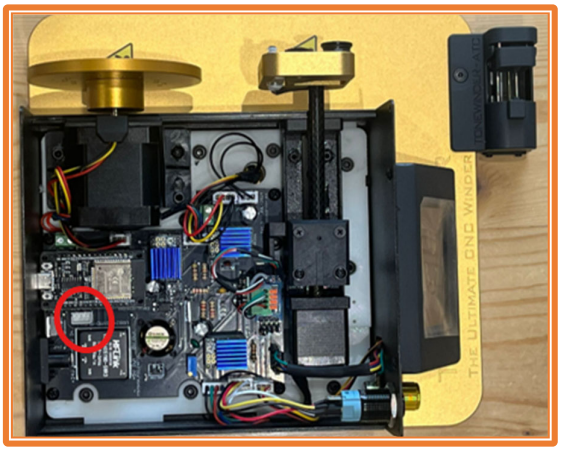


Figure 6: Disconnect Gaussmeter sensor wire from the PCB.

Then, reconnect the power cable and turn the power on. When your Tonewinder unit has finished the initialization process (you must do this in the same way as with the sensor connected), perform several tests to check whether the problem has disappeared or, on the contrary, persists.

If the issue is gone, the cause of this issue is the sensor itself. Next, we will discuss how to fix it in the field.

4.2. HOW TO FIX IT:

NOTE:

Before discussing potential solutions to this problem, it's important to note that your unit can operate normally with the sensor disconnected. However, if your motor locks up, which is highly unlikely, the microcontroller will not realize it has stopped and will not abort the winding process.

To solve this problem, three solutions are proposed, ranging from least to most complex:

SOLUTION 1: Bring the plate closer to the enclosure of your winding machine.

The goal is to adjust the position of the magnet located at the rear of the plate so that it is closer to the tachometer sensor and can detect it correctly. If possible, it is usually sufficient to move the plate 0.5 or 1 mm, as it may otherwise rub against the enclosure.

Figure 7: Move the plate closer to the enclosure.

Loosen the screw located on the plate shaft using a 2.5 mm Allen key.

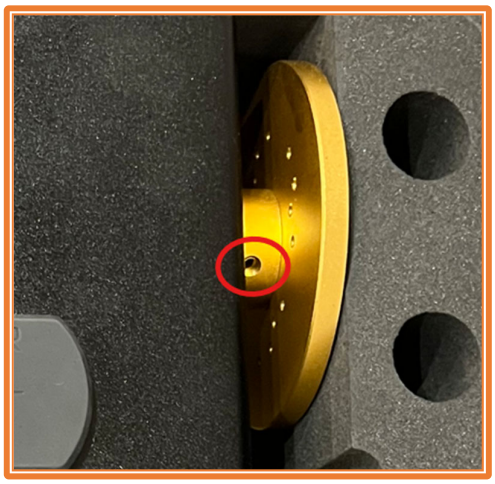


Figure 8: Loosen the screw located in the Plate (Allen screw 2.5 mm).

Then, move the plate as close as possible to the enclosure, making sure it does not touch either side of the enclosure. Place the top cover in position to check that it does not touch before continuing with the procedure.

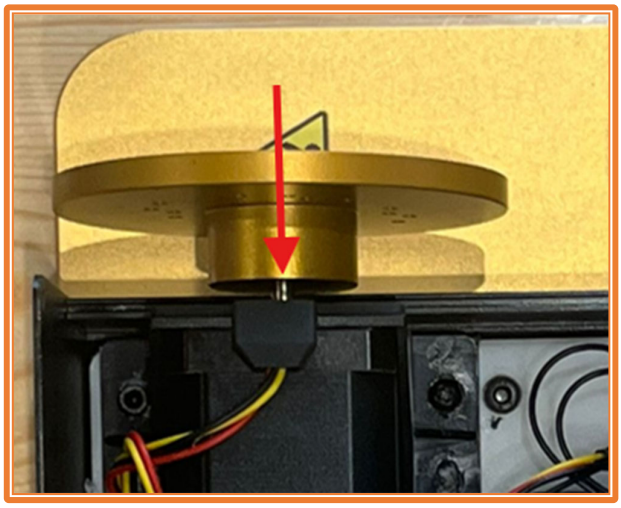


Figure 9: Bring the plate closer to the enclosure without touching the enclosure.

With the plate in its new position, place the top cover of the enclosure (Remember to reconnect the gaussmeter before tightening the screws) and perform several dry tests to verify that the problem has been resolved. Check the operation in both directions of rotation of the plate.

One consequence of moving the plate is that we will need to adjust the OFFSET parameter because the distance from the plate plane to the home sensor has changed. Follow the procedure described in section 6.4.1 of the Operator's Manual to do this. You can also watch a video by clicking this link:

https://www.youtube.com/watch?v=GnAl0vZAZYg

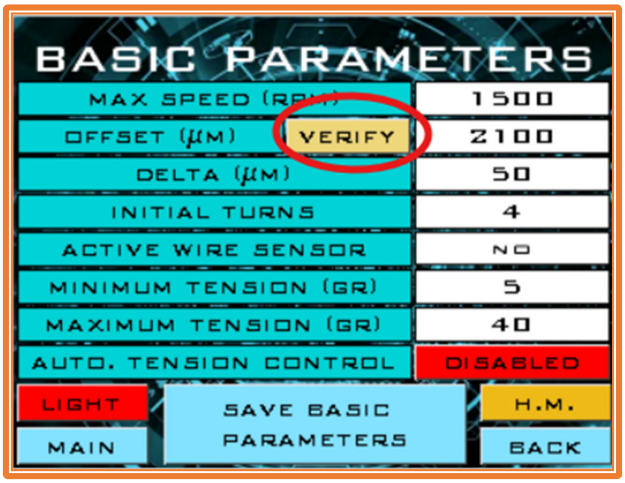


Figure 10: Set up the offset after readjusting the plate.

If you have not been able to resolve the issue and it continues to occur, please follow the instructions in the next section.

SOLUTION 2: Place a spacer under the Hall sensor.

In this case, we will try to move the tachometer sensor closer to the plate to reduce the distance between them. A spacer of 1 or 1.5 mm is usually sufficient.

To perform this task, turn off your winding machine and disconnect the power cord, remove the top cover of the enclosure (see previous point), and completely remove the plate (by loosening the shaft screw).

Loosen the screws on the hall sensor bracket and place the spacer under the sensor to bring the sensor closer to the plate. You can use a piece of wood, plastic, or cardboard measuring 6x6 mm or similar. The idea is to separate the hall sensor from the motor and bring it closer to the plate.

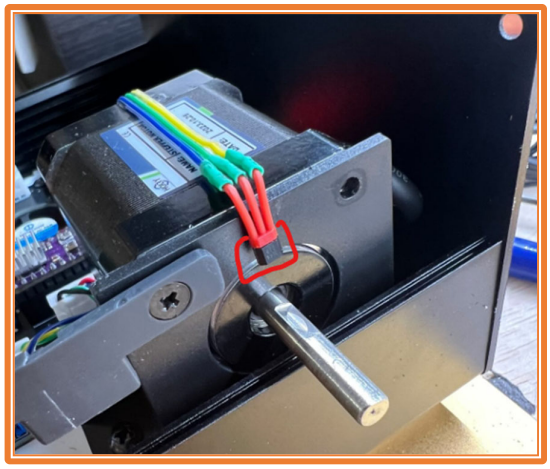


Figure 11: Place the spacer under the sensor.

Reposition the sensor holder by tightening the two screws. It is important that these two screws are tightened securely, as they also hold the motor to the motor holder. Do not worry if the sensor holder becomes deformed in the center due to the placement of the spacer.

With the sensor in its new position, reinstall the plate as close to the enclosure as possible, without touching it, and perform several tests (in both directions of rotation) to verify that the problem has been resolved.

One consequence of moving the plate is that we will need to adjust the OFFSET parameter because the distance from the plate plane to the home sensor has changed. Follow the procedure described in section 6.4.1 of the Operator's Manual to do this. You can also watch a video by clicking this link:

https://www.youtube.com/watch?v=GnAl0vZAZYg

If you have not been able to resolve the issue and it continues to occur, please follow the instructions in the next section.

SOLUTION 3: Email us to request support or a hall sensor replacement.

If you have not been able to resolve the issue, send us an email to explain your situation and we will provide remote support to try to resolve it.

info@tonewinder.es

If it cannot be resolved, we can send you a new sensor (with support included) to replace the existing one, following the instructions in solution 2.

Please note that you can continue to use your unit with the sensor disconnected until we provide you with a new one.

5. ISSUE WITH THE PLATE MOTOR CONTROL DRIVER:

In a small number of cases, we have found that the problem lies with the motor control driver. This may be due to insufficient power in the driver or an issue with microstep management. You will see that the motor stops and displays an error message.

We suggest the following approaches to try and solve the issue:

5.1. SOLUTION 1: Increase the plate motor driver current by 5 or 10%.

In some cases, the problem can be solved by increasing the driver current, probably because the plate motor requires more energy to rotate normally. Do not increase the current by more than 10%.

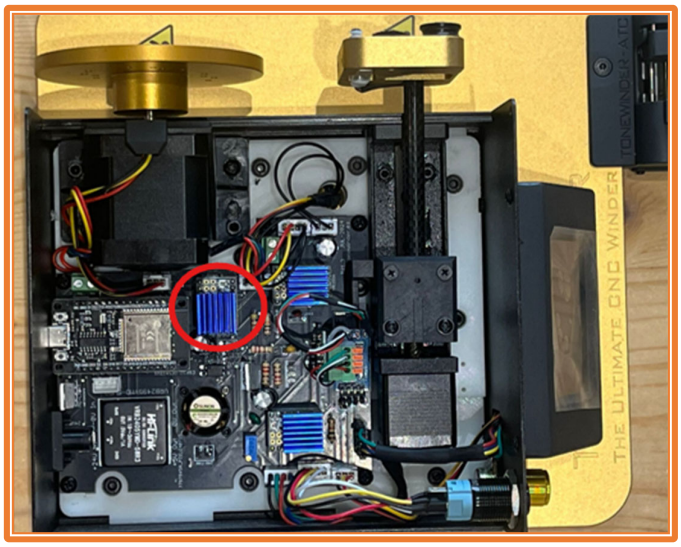


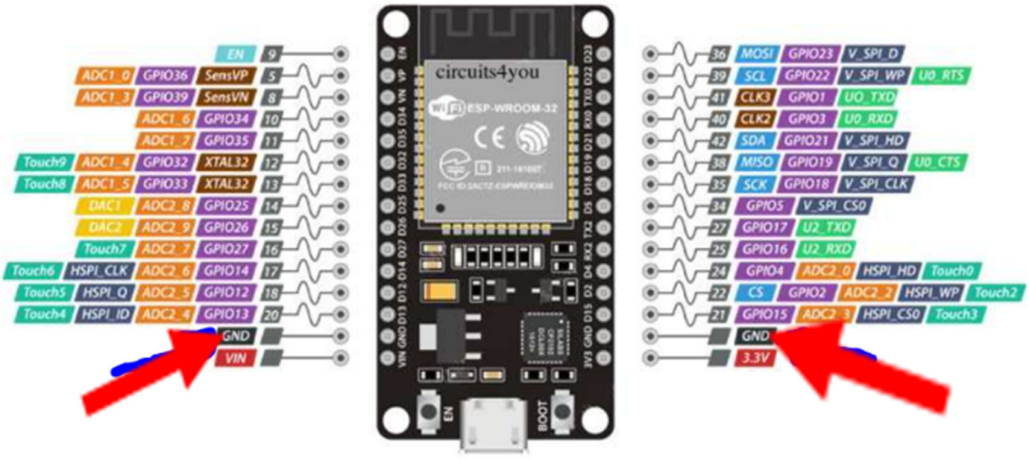
Figure 12: Plate motor control driver.

To increase the current, turn the minipotentiometer 5–10 degrees counterclockwise and measure the voltage again. The resulting voltage should be less than 1000 mVDC for TMC2226 drivers and 700 mVDC for DRV8825 drivers.

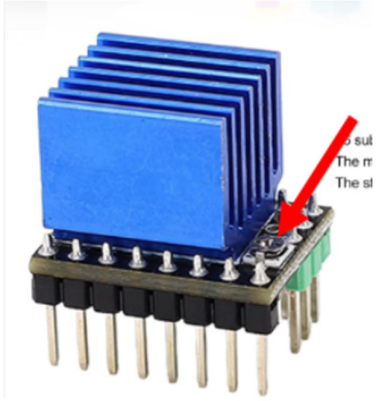
To measure this values, you need a multimeter, and select VDC scale (less than 2 VDC). Then, with the top cover removed, turn on the winder and wait until the initialization process has been finished (**remember to wait until motors X and Z move to the home position, and the blue light on the base must light up**).

Once the winder is on standby (the light is blinking slowly), you can measure the voltage in the drivers.

Use the black probe of the multimeter and touch one point of ground (GND) in the ESP microcontroller:



And touch the mini potentiometer of the driver with the red probe:



Adjust the tension by moving the potentiometer (CW=decrease and CCW=increase). You will need a small flat screwdriver.

NOTE: be careful when measuring this voltage (which is a proportional measure of the current that is passing through the motor), because if you do so without the initialization process being completed, you may burn out the driver, and it will have to be replaced.

Once you have adjusted its current, you can perform several tests to see if the problem has been solved. Remember to test the winder in both directions.

If the problem has disappeared means that the system (motor+driver) needed a little bit more current to work normally. Then you can connect the Gaussmeter, close the enclosure, for working with the winder.

If you didn’t move the plate, you don’t need any other verification or calibration.

5.2. SOLUTION 2: Swap the motor drivers inside the winder for diagnosis.

Maybe the problem could be related with the microstepping of the plate motor driver. In this case, to diagnosis it, we suggest to swap the internal motor drivers of the winder, in order to check if with the other driver (arm motor) the issue is figured it out.

You can use the driver for the arm motor, increasing its current to 800/850 mV for TMC2226 drivers or 600/650 mV for DRV8825 drivers.

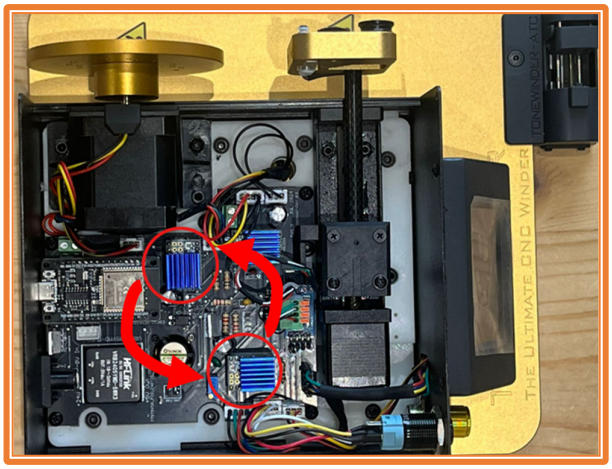


Figure 13: Swap the motor driver for diagnosis.

To swap the drivers, first turn off your unit and open the top cover. Then disconnect the Gaussmeter from the PCB.

Now swap out the existing ones.

NOTE: Pay attention to the orientation of the driver, because if you install it in the wrong direction, turning on the unit will cause a short circuit that will permanently damage the drivers and the microcontroller.

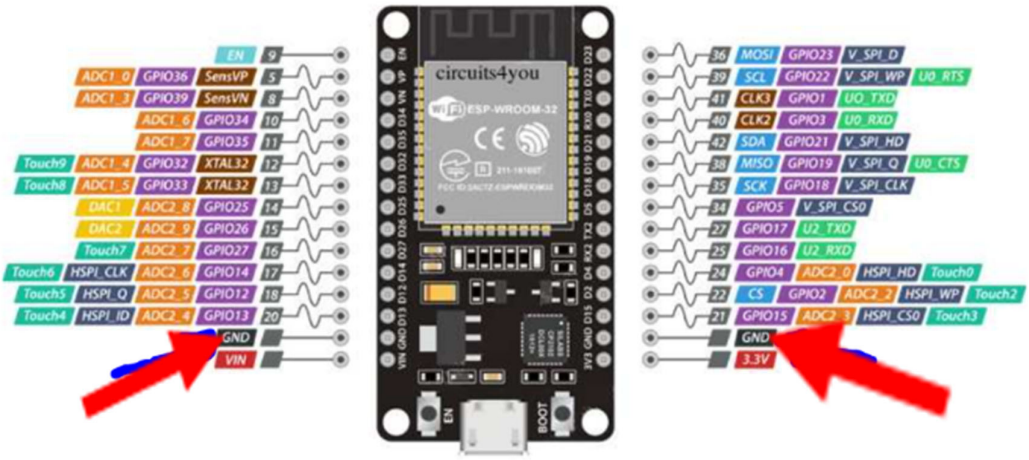
Since each motor needs a different current, each driver needs to be adjusted to a specific value. You must use the values for the Motor Y (Plate):

	DRV8825	TMC2226
Motor X (Guider Arm)	400/450 mVDC	600/650 mVDC
Motor Y (Plate)	**600/650 mVDC**	**800/850 mVDC**
Motor Z (ATC)	n.a.	200/250 mVDC

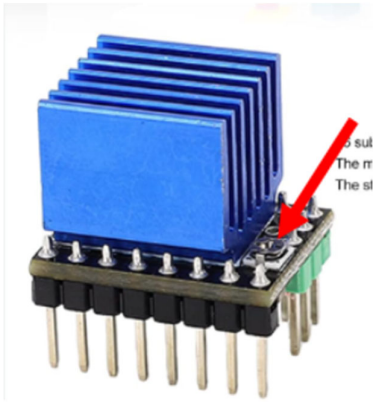
To measure or modify these values, you need a multimeter, and select VDC scale (less than 2 VDC). Then, with the top cover removed, turn on the winder and wait until the initialization process has been finished (**remember to wait until motors X and Z move to the home position, and the blue light on the base must light up**).

Once the winder is on standby (the light is blinking slowly), you can measure the voltage in the drivers.

Use the black probe of the multimeter and touch one point of ground (GND) in the ESP microcontroller:



And touch the mini potentiometer of the driver with the red probe:



Adjust the tension by moving the potentiometer (CW=decrease and CCW=increase). You will need a small flat screwdriver.

NOTE: be careful when measuring this voltage (which is a proportional measure of the current that is passing through the motor), because if you do so without the initialization process being completed, you may burn out the driver, and it will have to be replaced.

If you have swapped the drivers for diagnosis purposes, you should re-adjust the current driver for those drivers since they are now in a different position.

Now you can perform several tests to see if the problem has been solved. Remember to test the winder in both directions.

If the problem has disappeared, it means that the driver is damaged and must be replaced.

If your unit is under warranty, contact us and we will provide you with a replacement free of charge. If your unit is not under warranty, you can purchase these drivers on Amazon or ask us for a new one.

5.3. SOLUTION 3: Replace the motor driver directly.

If you have doubts that the drivers is not working properly, or when you swapped the drivers your unit didn’t initialize correctly, it means plate motor driver needs to be replaced directly.

If your unit is under warranty, contact us and we will provide you with a replacement free of charge. If your unit is not under warranty, you can purchase these drivers on Amazon or ask us for a new one.

Remember to adjust the current in the new driver.

6. PROBLEM WITH THE PLATE’S STEPPER MOTOR:

If the problem has not been solved by the previous steps, it may mean that there is a problem with the plate motor and it is actually stopping. Even increasing the current by 5 or 10%, or replacing the driver, will not solve the problem.

6.1. HOW TO DIAGNOSIS:

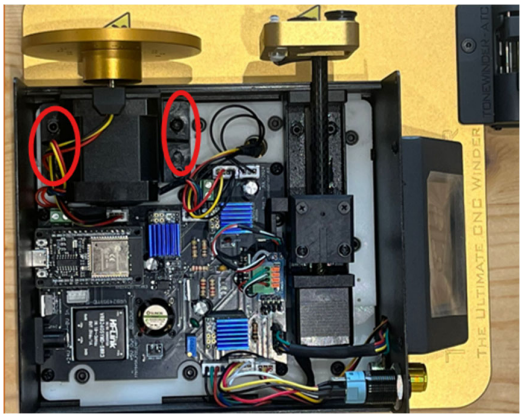
Diagnosing this fault is easy, as the motor plate still does not turn and remains blocked.

6.2. HOW TO FIX IT:

In this case you need to replace the plate’s motor. If your unit is under warranty, contact us and we will provide you with a replacement free of charge. If your unit is not under warranty, ask us for a quotation.

To replace the motor plate follow the next steps:

- STEP 1: Turn off your winder and disconnect the power cable.
- STEP 2: Remove the top cover and disconnect the Gaussmeter.
- STEP 3: Remove the plate from the motor shaft.
- STEP 4: Disconnect the hall sensor and the motor from the PCB.
- STEP 5: Remove the screws from the motor holder and extract the assembly:



- STEP 6: Install the new assembly.
- STEP 7: Reinstall the plate and verify the orthogonality with the base. In case the plate plane is not perpendicular, add a supplement (a paper ribbon) underneath the holder to get this.
- STEP 8: Reconnect the hall sensor and the motor to the PCB.
- STEP 9: Verify that the issue is gone. Check both directions.
- STEP 10: Connect the Gaussmeter and close the top cover.
- STEP 11: Calibrate the offset.

7. CONTACT FOR SUPPORTING:

If you face any kind of problem during this procedure, please email us:

info@tonewinder.es