EBIKE DIAGNOSIS FLOWS

1

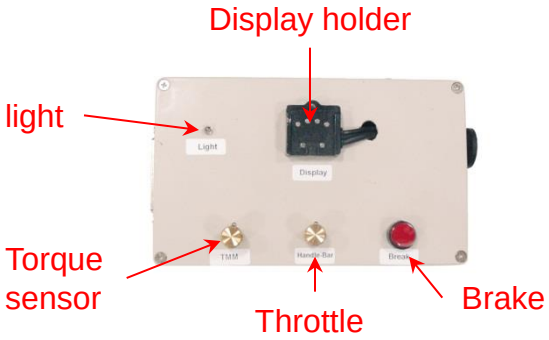
SUMMARY

CHECK TOOL INSTRUCTIONS

3 DISPLAY AND CONTROLLER CHECK TOOL (1)

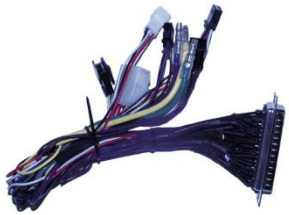
The tool is composed of four elements:

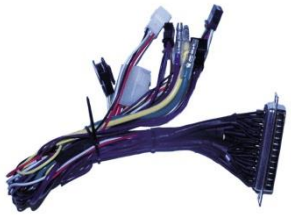
1. Control device.



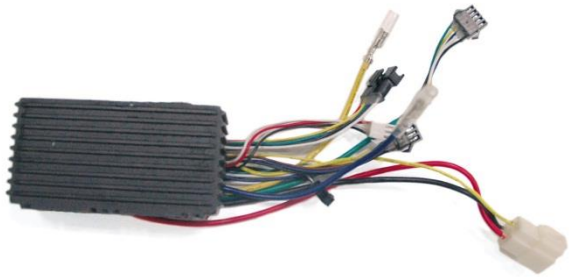
2. Power supply cable.

3. Adapters to connect the display and controller.


Controller V1


Controller V2

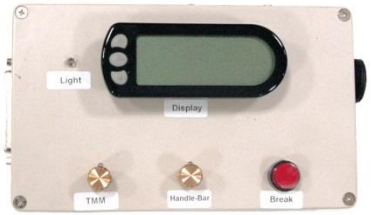
4. Controller



4

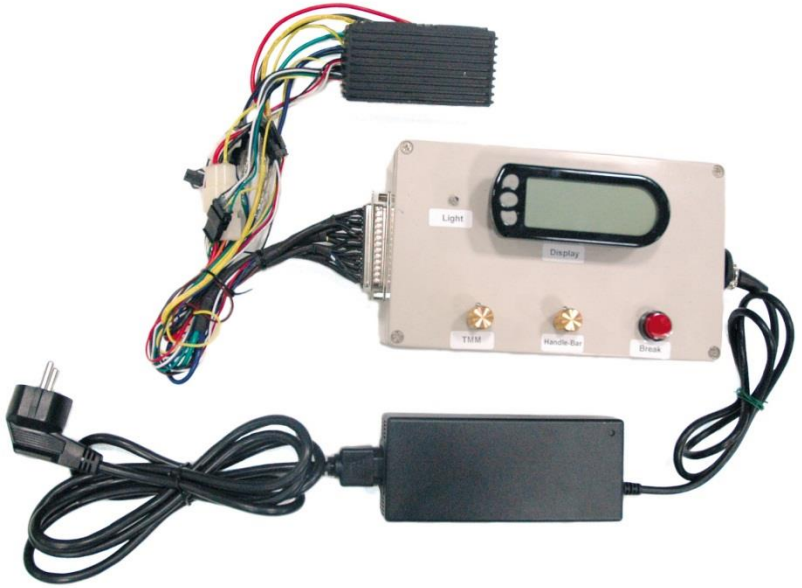
DISPLAY AND CONTROLLER CHECK TOOL (2)

1. Connect the bike display to the dedicated plug on the control device front panel.



2. Connect the control device to the bike and to the external power and to the bike

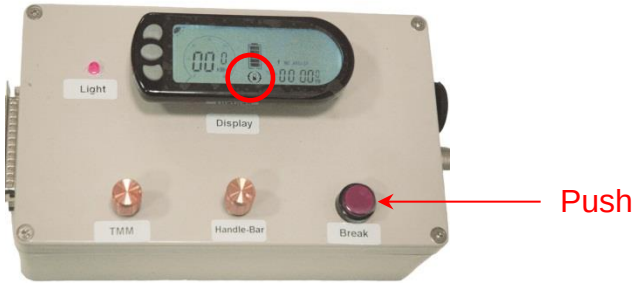
3. Connect the controller to each one of the cables differentiated by color. It is not necessary to connect the white and black programming cable in the controller. Same with the black, blue and brown throttle cable (only in the Hi-Speed models).



5 DISPLAY AND CONTROLLER CHECK TOOL (3)

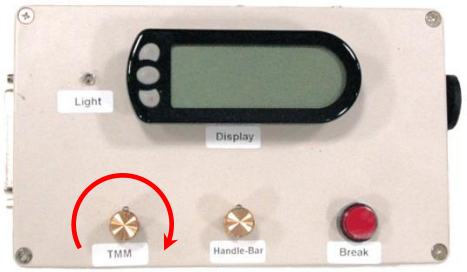
This tool simulates the normal riding conditions, in order to accurately check the following functions:

- **Brake**: When pressing the red button on the front panel, the brake icon should appear on the display.



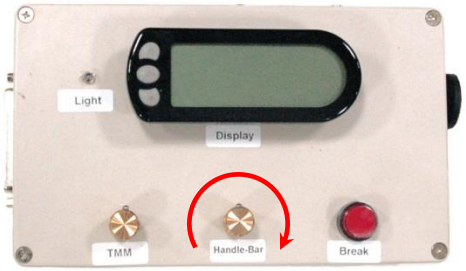
- **Light**: When pressing the light button on the display, the “light” led should light up.

- **Torque sensor**: Turning the torque sensor button on the front panel should activate a motor inside the check tool. This means that the controller is working correctly.

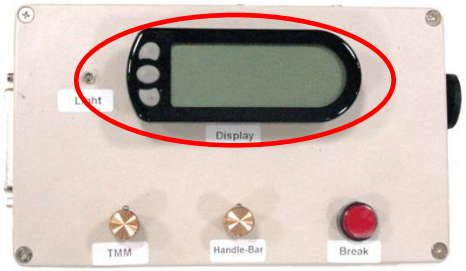


DISPLAY AND CONTROLLER CHECK TOOL (4)

- **Throttle***:* Turning the throttle button on the front panel should activate the inside motor indicating that the throttle function is working (only in the Hi-Speed models).



- **Display***:* The assistance levels, battery charge and other functions can be directly checked on the display screen using the display function buttons.



If all these checks are correct, this indicates that the display and controller work correctly.

7 DISPLAY HOLDER CHECK TOOL

1. Connect the display holder (1) to the display holder check tool (2).

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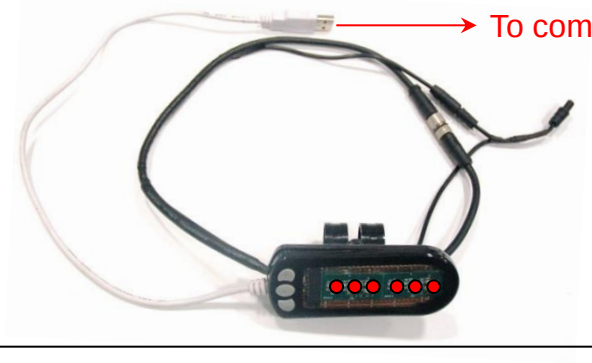
2. Connect all the cables, then plug the USB data cable to the computer. The test display will show 6 LED lighting up if the display holder works correctly

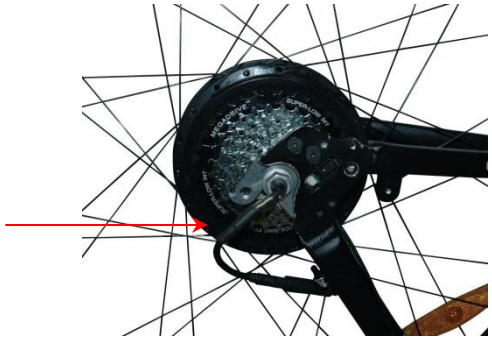


Diagnosis

If the six LED diodes of the display stay on, the display holder works correctly. If they do not light up, the display holder needs to be repaired or replaced

8 MOTOR CHECK TOOL

1. First switch off the display, then disconnect the motor power supply cable.



2. Connect the motor check tool to the motor power plug. Make sure that the two arrows marked on both plugs are aligned so the pins fit correctly.

3. Switch on the Motor Check Tool.

Diagnosis

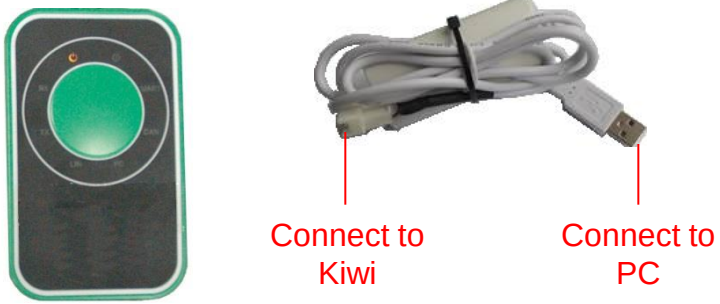
Turn the wheel backwards (anti-clockwise when we are at the gears side). If the three LED of the central line light up, all the motor phases work correctly. If not, the motor needs to be repaired or replaced.

BATTERY CHECK TOOL (1)

1. First, download the SOH by Emotion software (compatible with Windows 7 and XP SP3). This software is available for free download at the BH B2B, area Support.
http://www.bhbikes.com/web/en/support/service.html

BATTERY CHECK TOOL (2)

2. Connect the USB cable of the battery check tool to the computer.



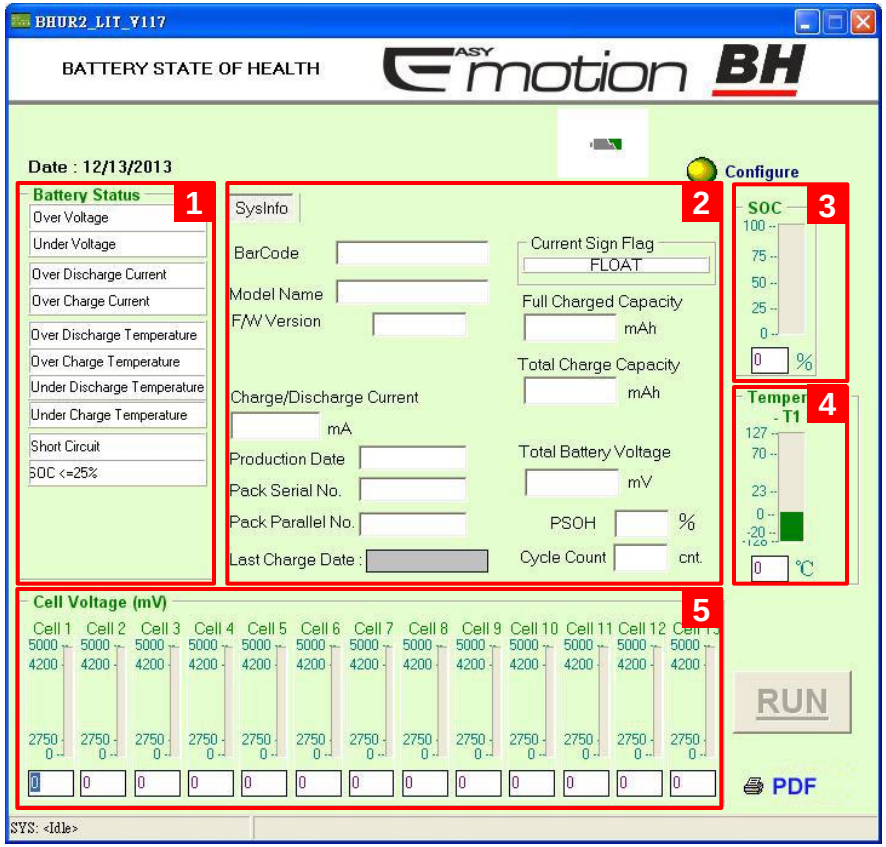
3. Connect the battery adaptor to the battery check tool

4. First connect the battery to the bike to make sure that it is active. Once this is confirmed, remove the battery from the bike and connect it to the battery check tool with the battery adaptor.

BATTERY CHECK TOOL (3)

5. Install and execute the battery program (SOH by Emotion)

6. Press RUN. Immediately the battery information will be displayed. If one of the parameters is incorrect, it will be highlighted in red.



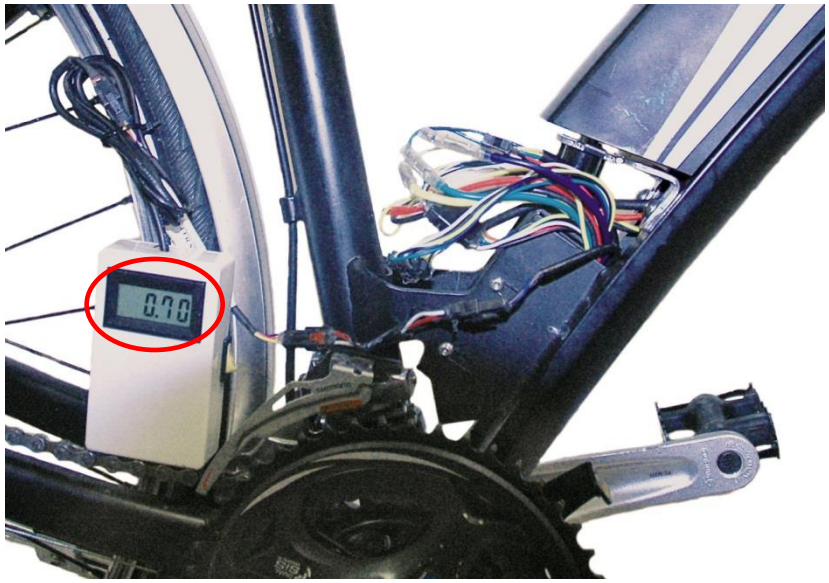
1. Protection Status – These fields will be highlighted in red if the value is not within the normal range.
2. Battery Operation – This area shows the constructions characteristics and battery information. The relevant information is:
   - Last charge date
   - Cycle count
   - PSOH (state of health of the battery), calculated as follows:

$$\textbf{PSOH} = \frac{\textbf{Full Charged Capacity}}{\textbf{Total Charged Capacity}}$$

3. Status of Capacity – Shows the current charge of the battery
4. Temperature information – Shows the current temperature of the battery cells
5. Cell Voltage – Shows the current voltage of each serial cell.

TORQUE SENSOR CHECK TOOL

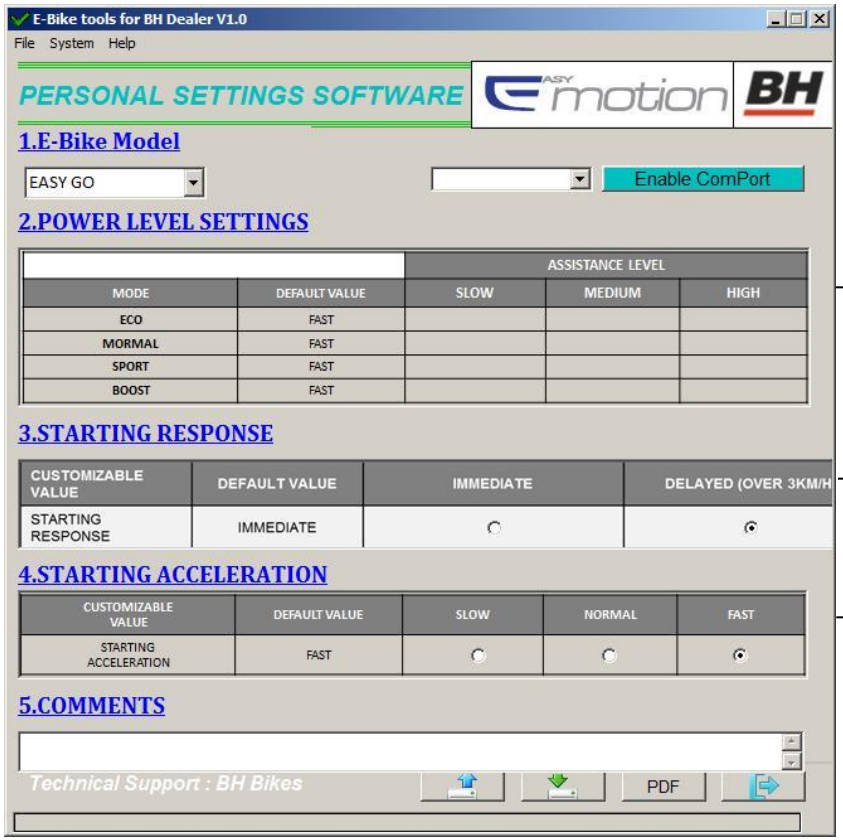
This tool helps to check if the torque sensor is correctly calibrated. Connect the torque sensor cable (cable between the controller and the torque sensor) to the “Torque sensor Check Tool".



The value shown on the screen of the check tool should be within the range 0.6V and 2V. If this is not the case, the torque sensor needs to be either calibrated or replaced (**see pages 18 and 19)**.

CUSTOMIZED CONTROLLER SETTINGS (1)

The most important controller settings can be customized using the Personal Settings Software. Please note that changing these parameters will affect to the maximum range and the riding sensations.



→ **Power level**: The default values are set to HIGH for all the modes. Each mode can be separately set to ***low***, ***medium*** or ***high***.

→ **Starting response**: The default value is set to IMMEDIATE. This can be changed to ***delayed*** (assistance response only over 3 km/h)

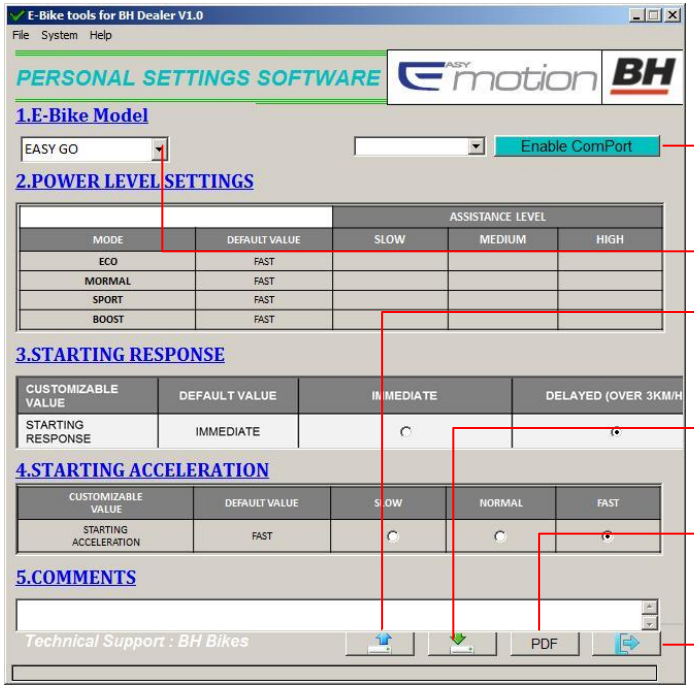
→ **Starting acceleration**: The default value is set to FAST. This can be changed to ***slow***, ***medium*** or ***fast***.

CUSTOMIZED CONTROLLER SETTINGS (2)

1. Connect the bike to the computer using the dedicated connection cable included in the check tool case.

To bike

To computer



2. If the port is not automatically identified, click on ***enable ComPort*** and select the correct USB port.

3. Select the E-Bike model

4. Download the current settings to the computer clicking on 

5. After changing the settings upload the new parameters to the controller clicking on 

6. Click on the PDF button to print a report showing the new settings.

7. Click here to exit the program.

ERROR DIAGNOSIS FLOWS

NEO / EVO ERROR DESCRIPTION CHART

ERROR CODE	DESCRIPTION	LIMIT	POSSIBLE REASON AND TROUBLE SHOOTING
00	Normal		
01	Over current		Check if connector motor – controller is loose. If correct, replace the controller
02	Static current over limit		Change the controller
03	Throttle or atypical TMM Signal		Check if connector TMM – controller is loose. Check output current from TMM exceeds the normal values (0,1V – 3,5V)
04	Motor phase absence		Check motor connector or controller
05	Motor hall sensor error		Check if connector motor – controller is loose Hall sensor inside the motor may be faulty. Change motor. Faulty contact of the controller – motor cable. Change controller
06	Walk or push mode icon	6 km/h	
07	Brake sensor input		EBS regenerating mode signal. Non available in current models
08	Battery low		Check battery output or replace battery
09	Motor blocked		Motor stalled.. Go to the nearest service
10	Current over limit		Faulty contact of the controller – motor connector. Replace the connector.
11	Motor over-heat alarm	>100ºC	The current will start to weaken progressively until the motor cools down
12	Motor over-heat protection	>120ºC	Entering into the temperature protection mode. The controller stops.
13	Communication error		Check all the cabling and connectors
14	Foot error		Switch off, stop applying force on the pedal and switch on again.

ERROR 1: OVER CURRENT

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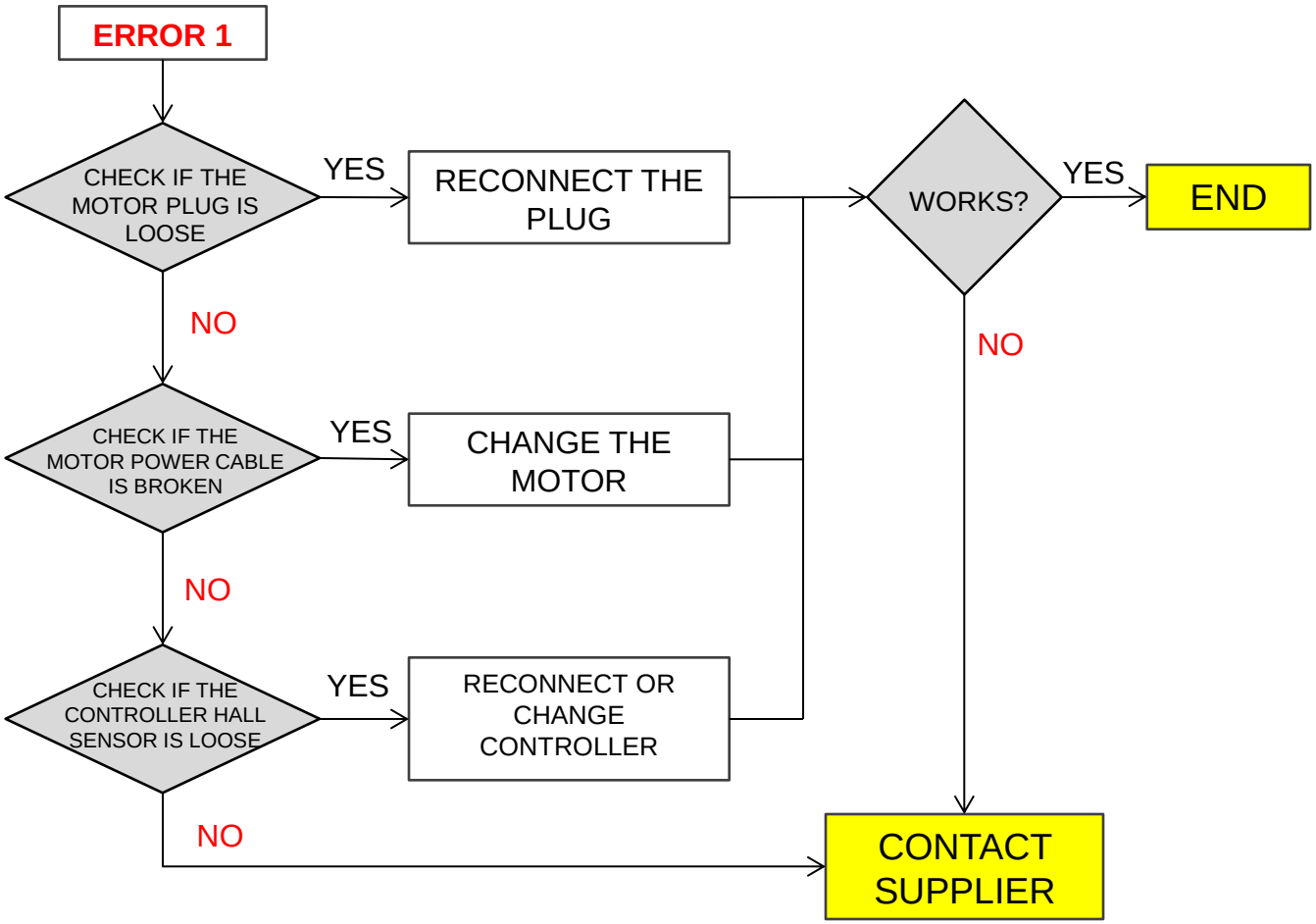
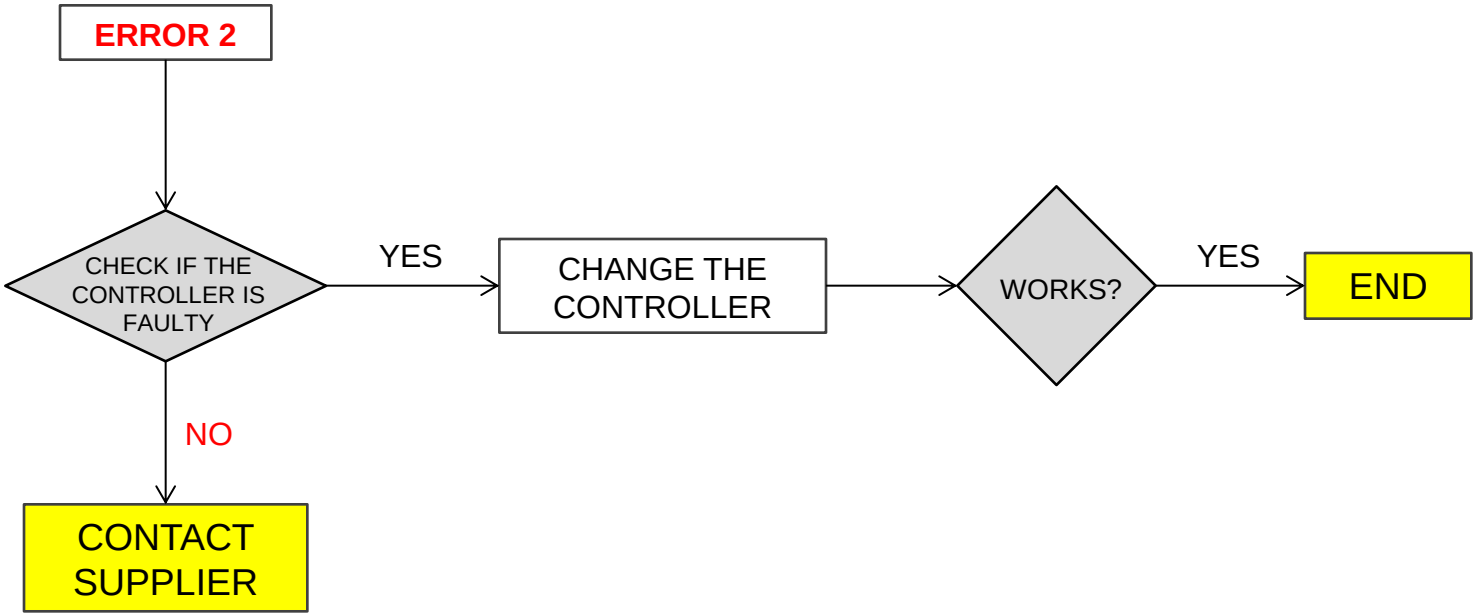


ERROR 2: STATIC CURRENT OVER LIMIT – DIAGNOSIS FLOW



ERROR 3: THROTTLE OR ATYPICAL TTM SIGNAL (1)

- Check TMM sensor cable:
  - Sensor cable could be cut

- Sensor is not calibrated or faulty (Use sensor check tool)
  - Sensor could be damaged
  - Calibrate the sensor: Tension must be between 0,6V to 2V

✓ **REPAIR (if any defect found): Change sensor or replace sensor cable**

ERROR 3: THROTTLE OR ATYPICAL TTM SIGNAL (2)

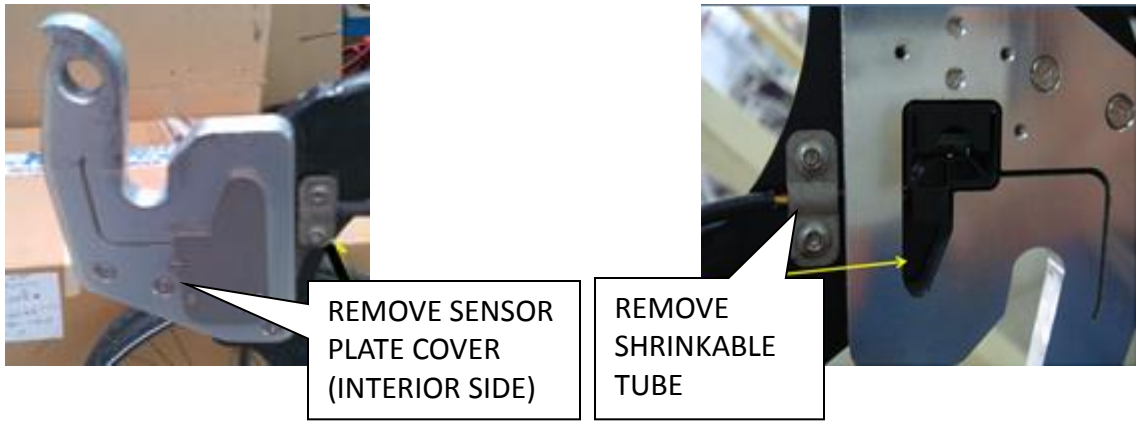
SENSOR : DIAGNOSIS CHART

- Typically, this error occurs when the user switches on the system (push display button ON) while applying pressure on the pedal.

  - ✓ **ACTION: SWITCH OFF AND RESTART WITHOUT APPLYING FORCE ON THE PEDAL**

If the problem persists:

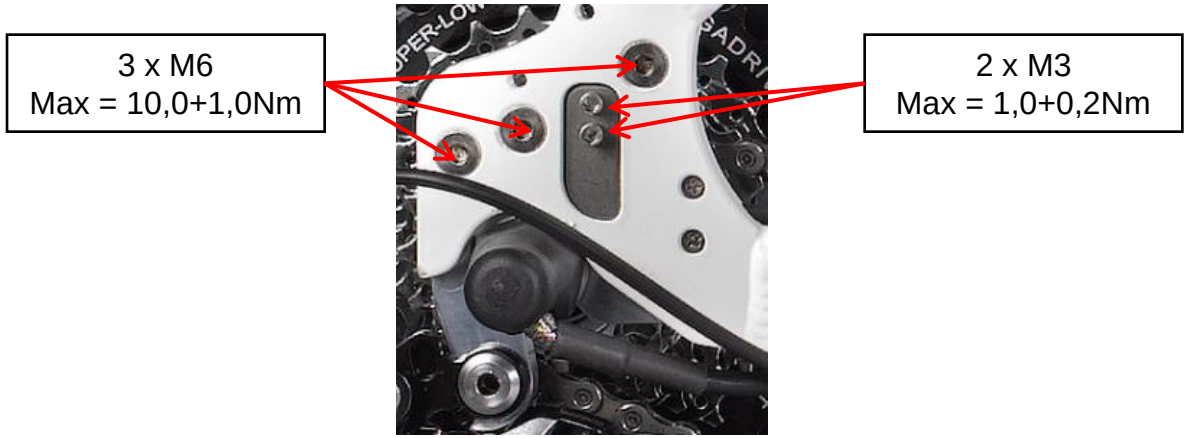
- Remove sensor plate cover (located in the interior side of the plate)
- Removal of the shrink-wrap around the sensor cable and attention to the cable routing.
- Switch on again and check if the problem has disappeared.



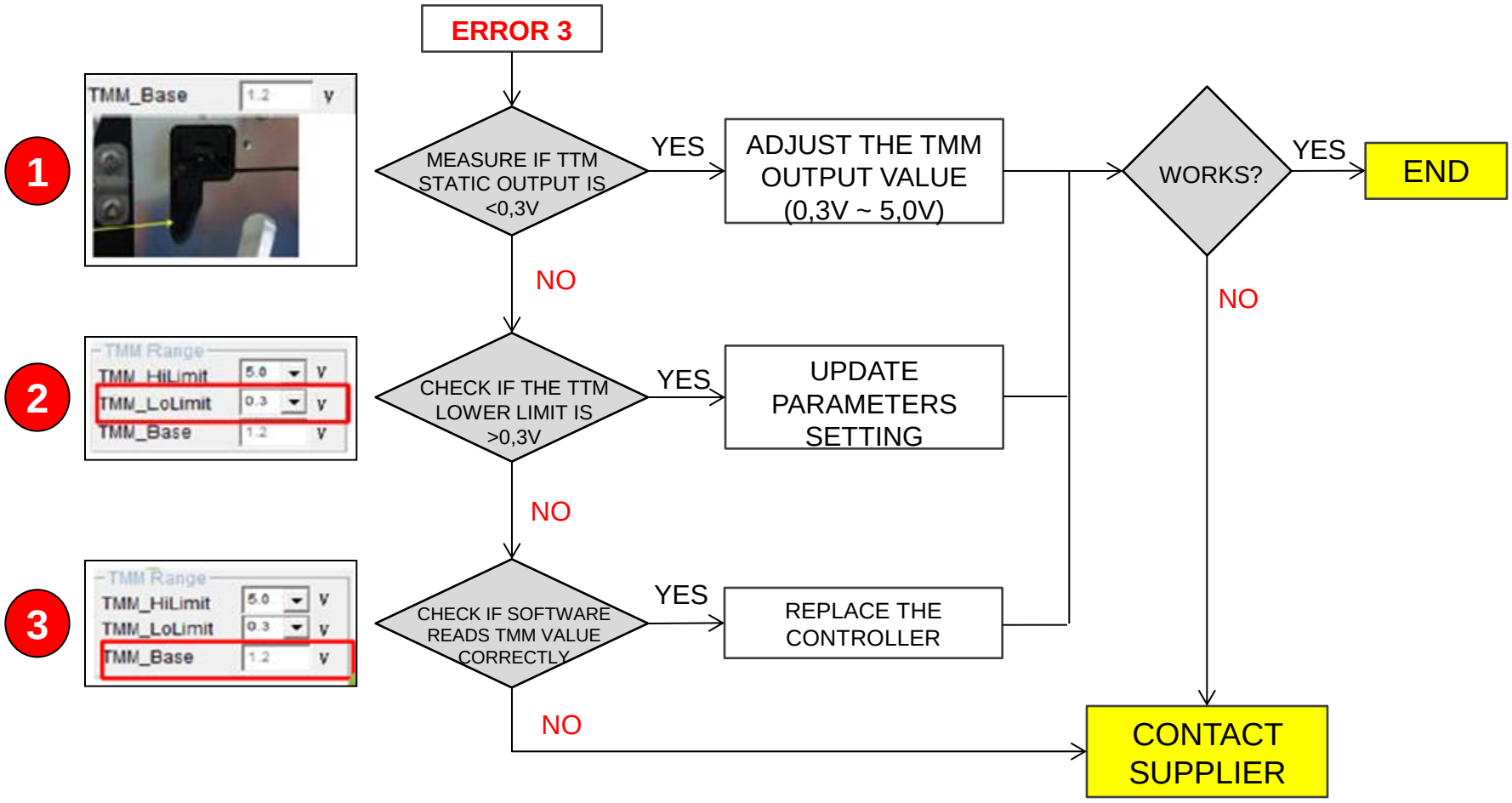
ERROR 3: THROTTLE OR ATYPICAL TTM SIGNAL (3)

HOW TO ADJUST THE TORQUE SENSOR

The incorrect adjustment of the torque sensor may cause incorrect functions of the motor assistance. To prevent this the controller software includes several additional security parameters. The torque sensor reads the instant chain tension, which is proportional to the torque generated on the pedal by the cyclist. It is located at the rear right dropout, and it is attached to the frame by 3 x M6 screws.
The torque sensor is totally sealed and can be washed with water without impairing function.
It can be easily adjusted just applying the correct torque to the screws (see indications). A higher or lower torque will produce a system malfunction.



ERROR 3: THROTTLE OR TTM SIGNAL ATYPICAL – DIAGNOSIS FLOW



ERROR 4: MOTOR PHASE ABSENCE – DIAGNOSIS FLOW

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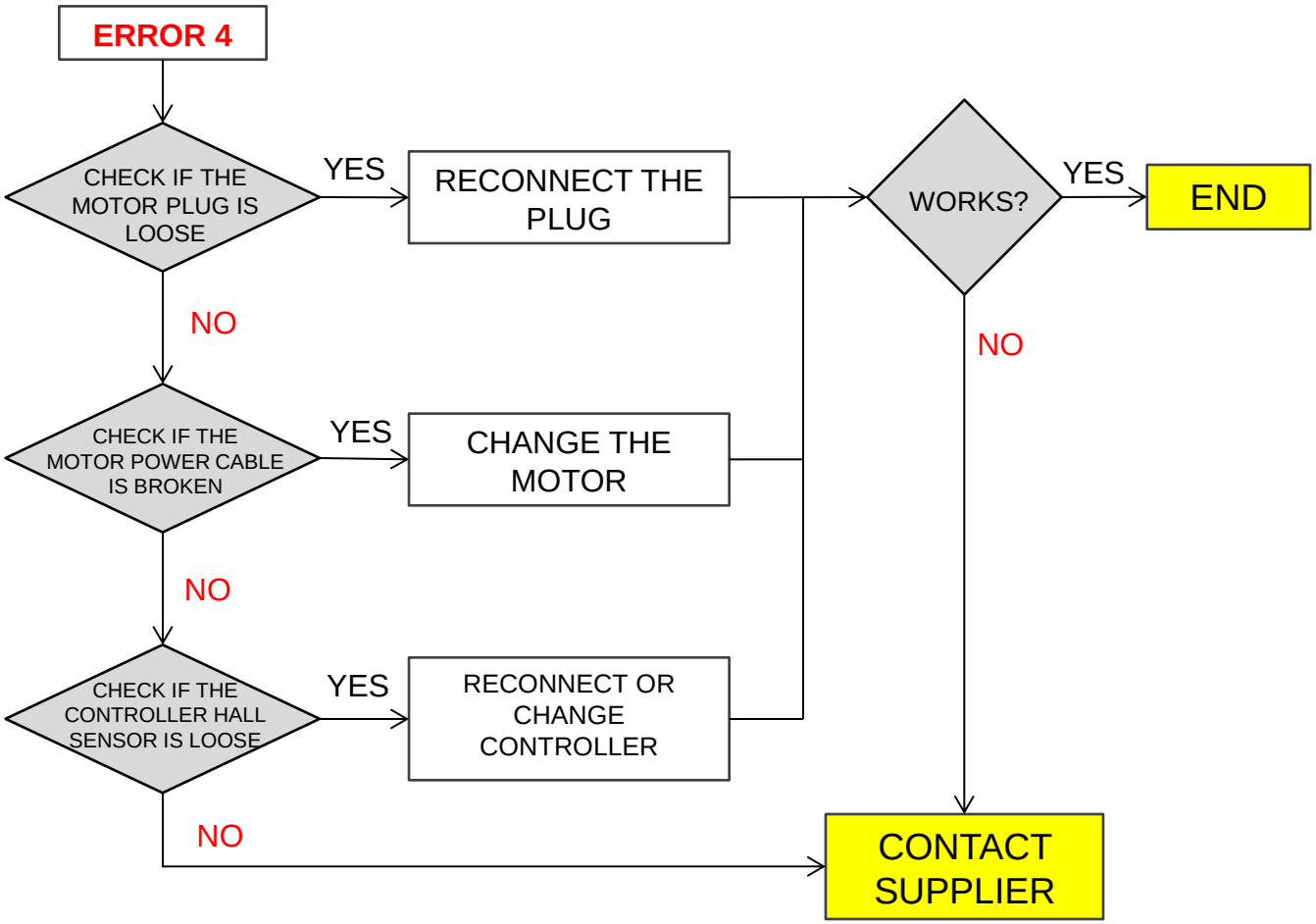


ERROR 5: MOTOR HALL SENSOR ERROR (1)

- **Check motor status:**
  - Any electric wires could be cut in rear motor cable output
  - Motor plug and pins
  - Motor hall sensor

✓ **REPAIR (if any defect found): Change motor**

- **Check controller status,**
  - Any electric wires could be cut in rear motor cable output
  - Motor plug and pins

✓ **REPAIR (If any defect found): Change controller**

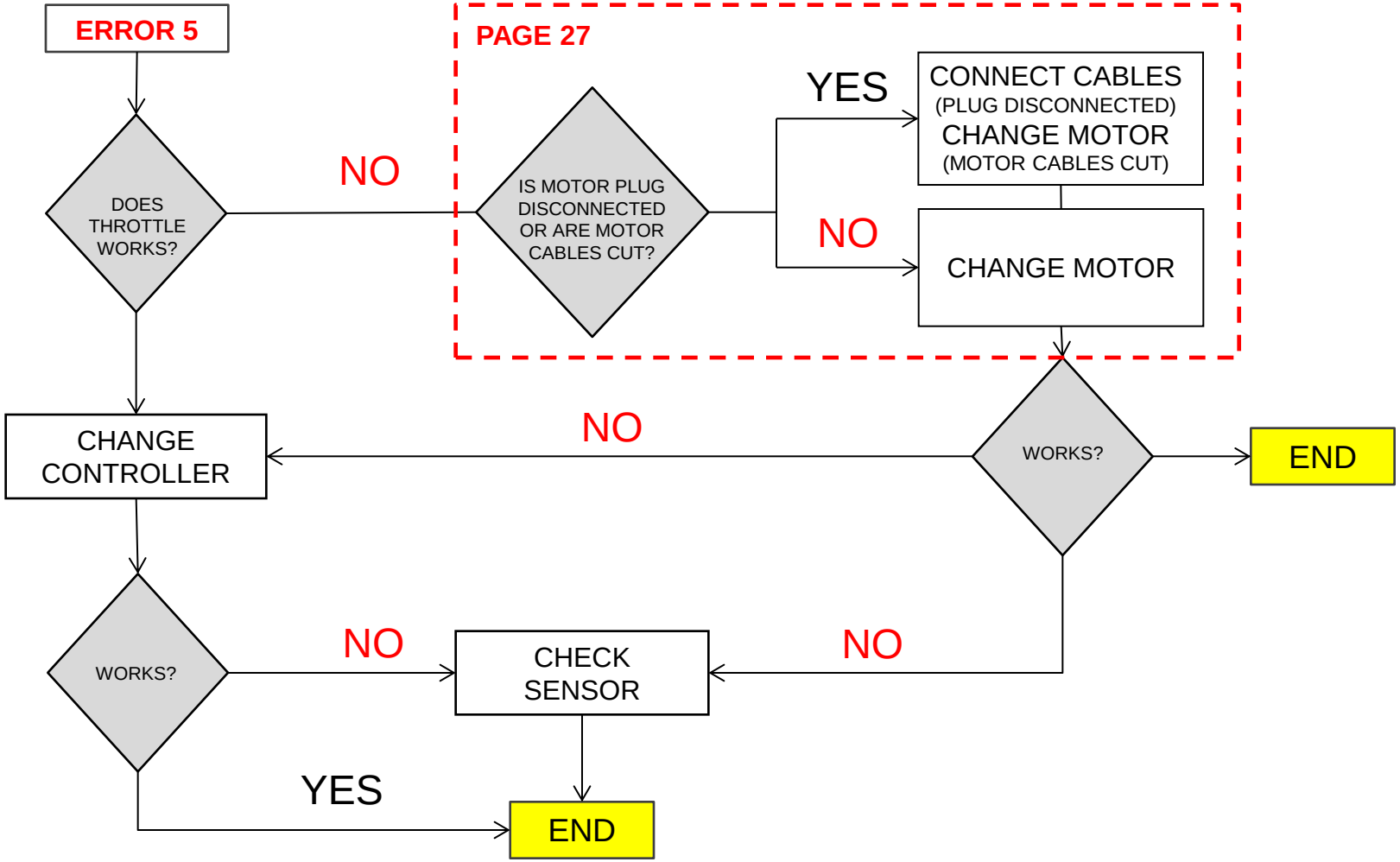
ERROR 5: MOTOR HALL SENSOR ERROR (2)

1 Check if the motor output cable is damaged
Try with a new rear wheel and check if the system functions correctly

2 The hall sensor is damaged, no magnetic field is generated
Check the motor hall status with the motor check tool. If it is damaged, change the motor

3 The motor connector is not welded inside
Check the motor hall status with the motor check tool. If it is damaged, change the motor

ERROR 5: MOTOR HALL SENSOR ERROR – DIAGNOSIS FLOW (1)



ERROR 5: MOTOR HALL SENSOR ERROR – DIAGNOSIS FLOW (2)

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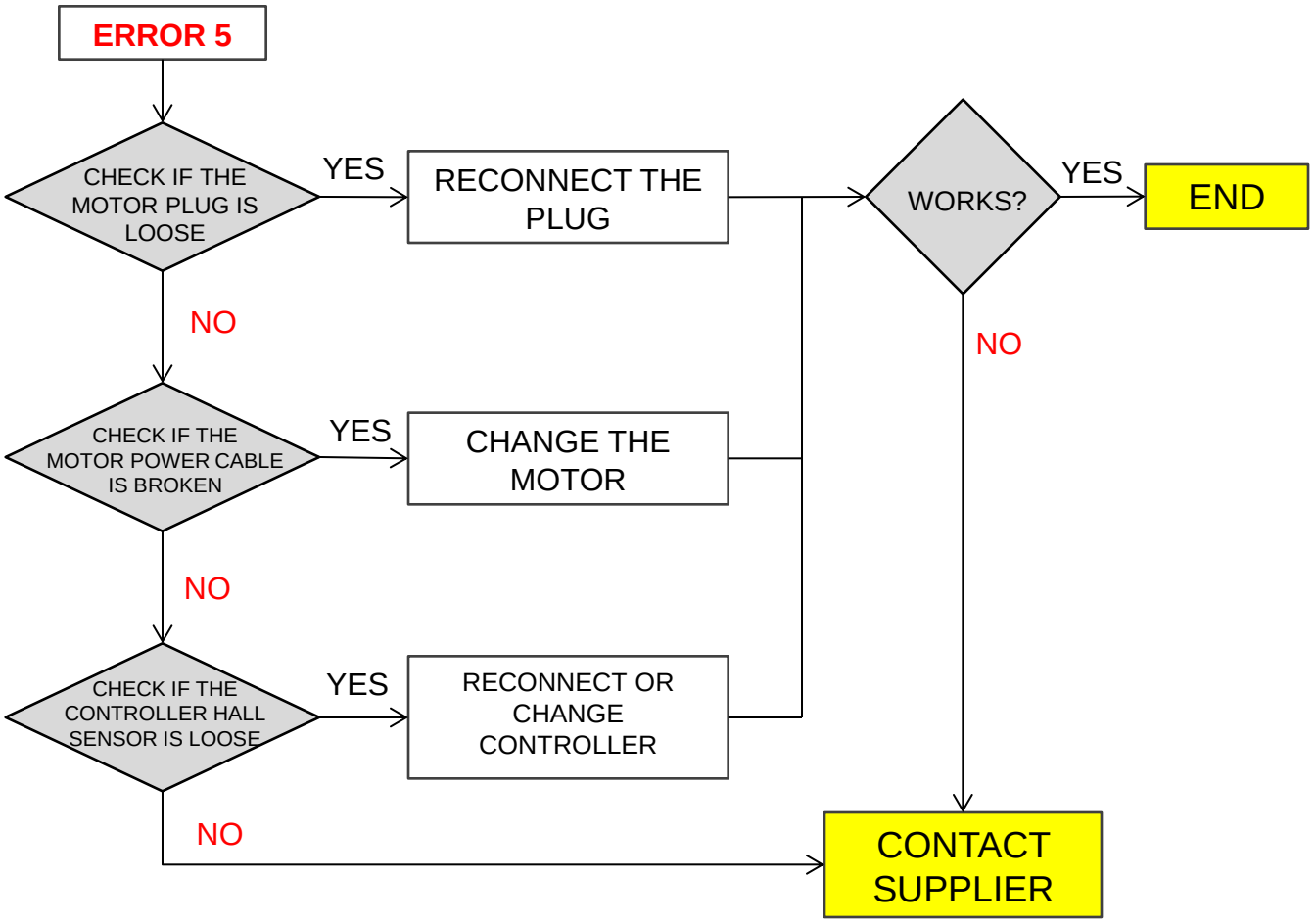
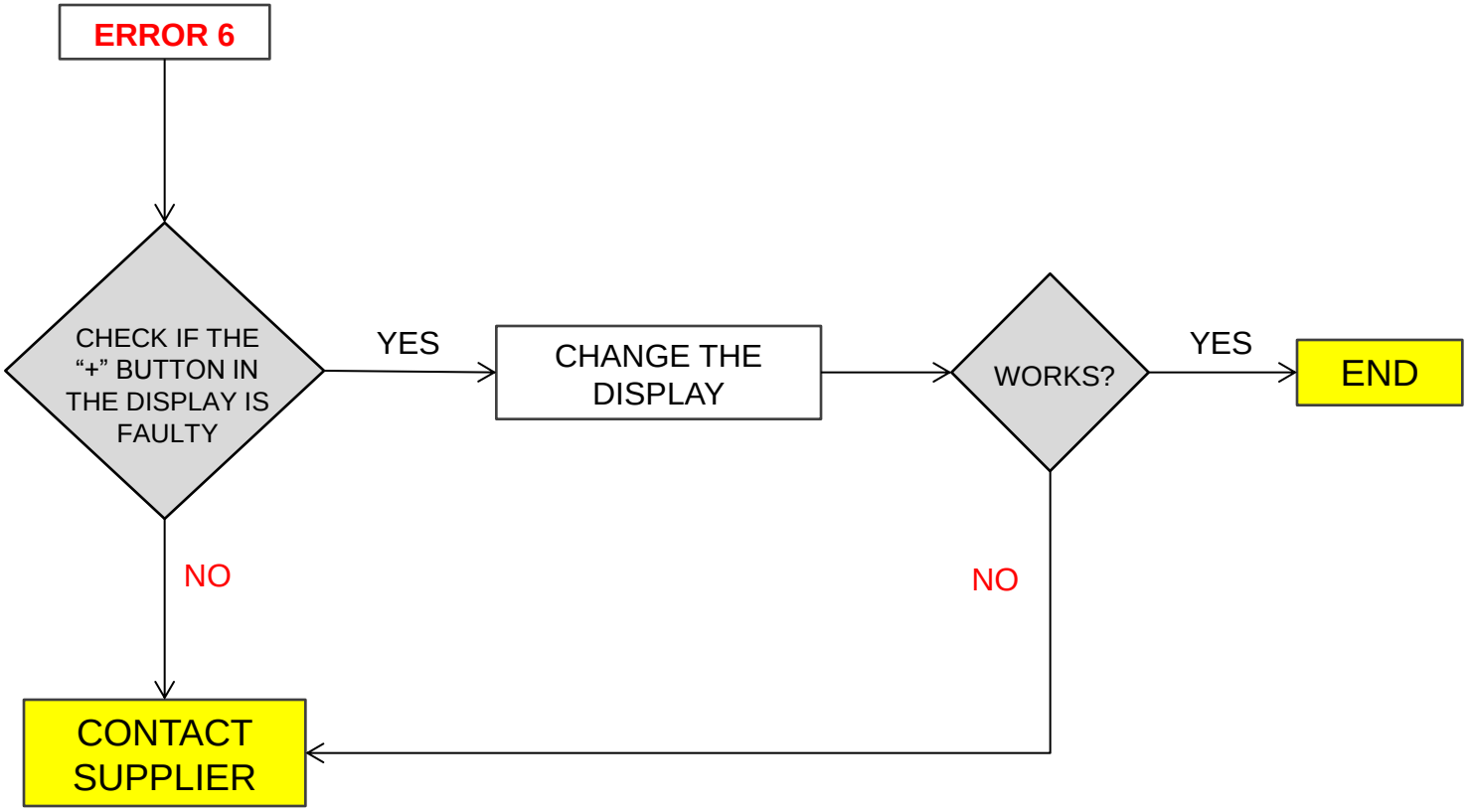


ERROR 6: WALK OR PUSH MODE ICON



ERROR 7: BRAKE SENSOR INPUT

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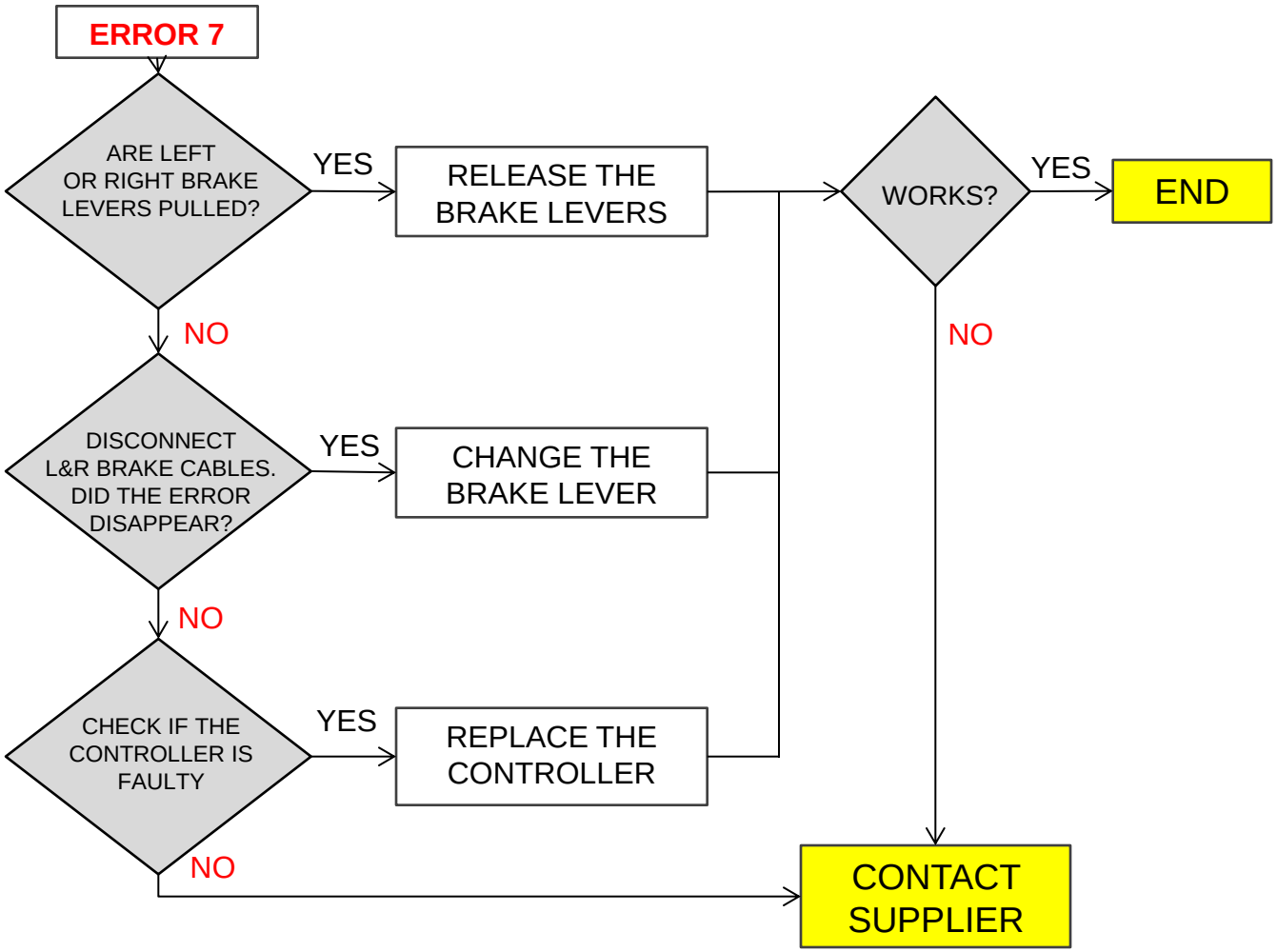

ERROR 8: BATTERY LOW – DIAGNOSIS FLOW

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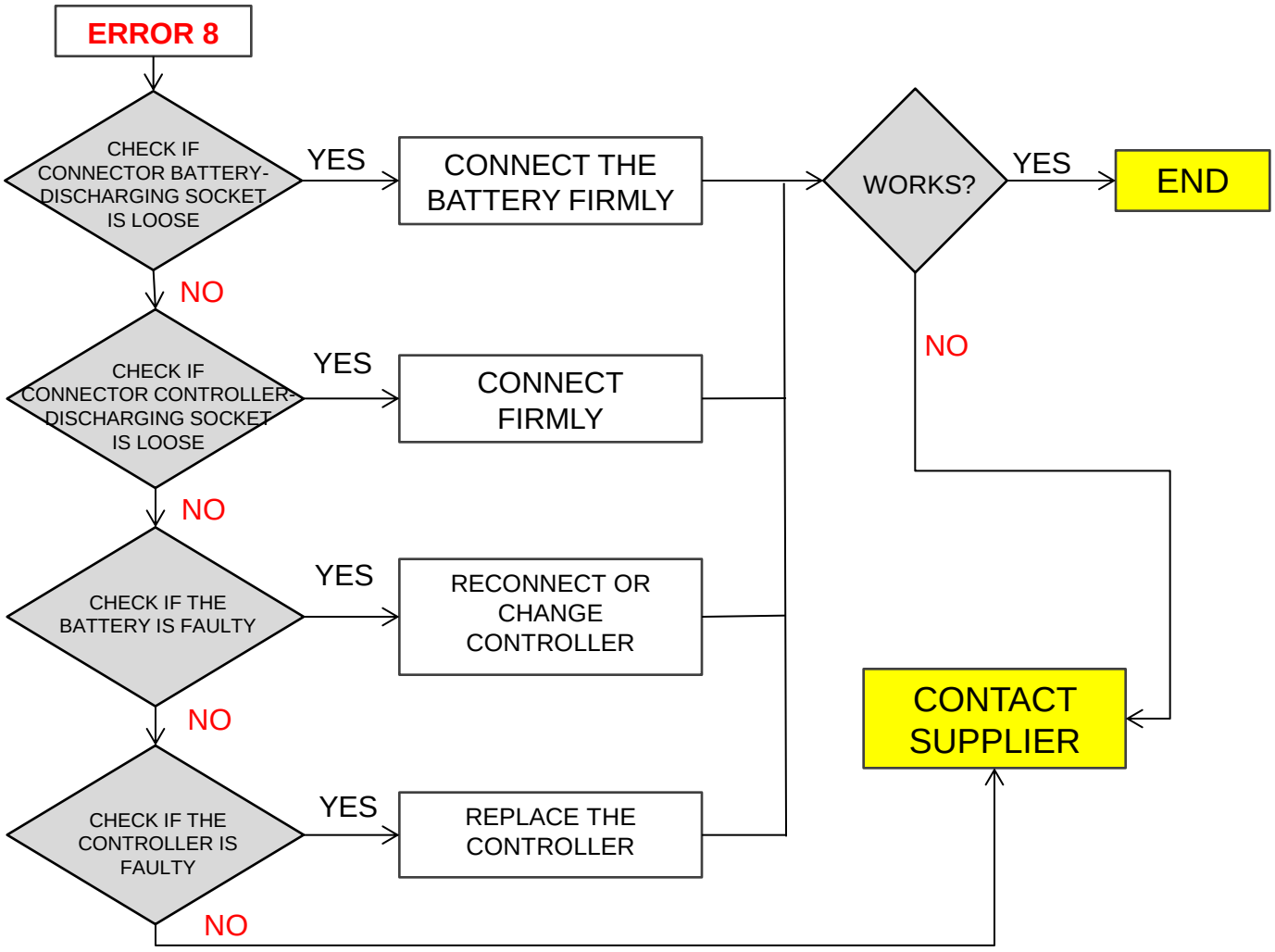


ERROR 9: MOTOR BLOCKED (1)

- Check motor status:
  - The electric cables may be cut around the motor cable output
  - Motor plug and pins may be faulty

✓ **ACTION (if any defect found): Change motor**

- Check controller status
  - The electric cables may be cut or disconnected in the controller
  - Controller plug and pins may be faulty

✓ **ACTION (If any defect found): Change motor**

ERROR 9: MOTOR BLOCKED (2)

1 The connector between the motor cable & motor and the extension cable may be loose

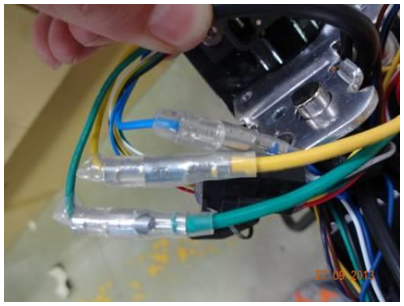
Ask your dealer to confirm if these cables are connected

3 The motor extension cable may have a defective wire welding inside

Ask your dealer to replace the motor extension cable

2 The connectors between the motor phase wire at the controller side & motor extension cable may be loose

Ask your dealer to confirm if these cables are connected



4 Dapu motor connector was not correctly welded inside

Replace the rear wheel

ERROR 9: MOTOR BLOCKED – DIAGNOSIS FLOW (1)

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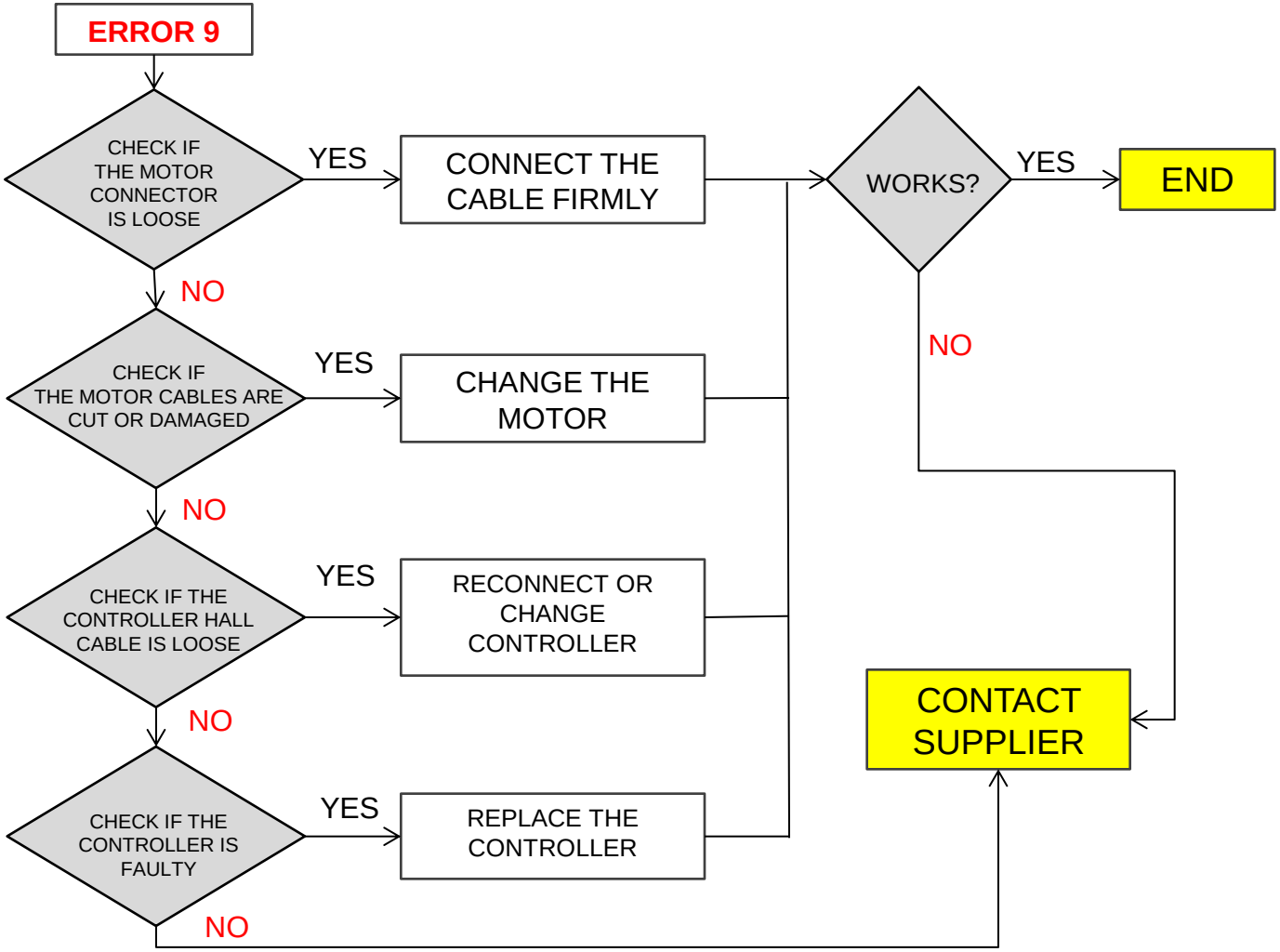
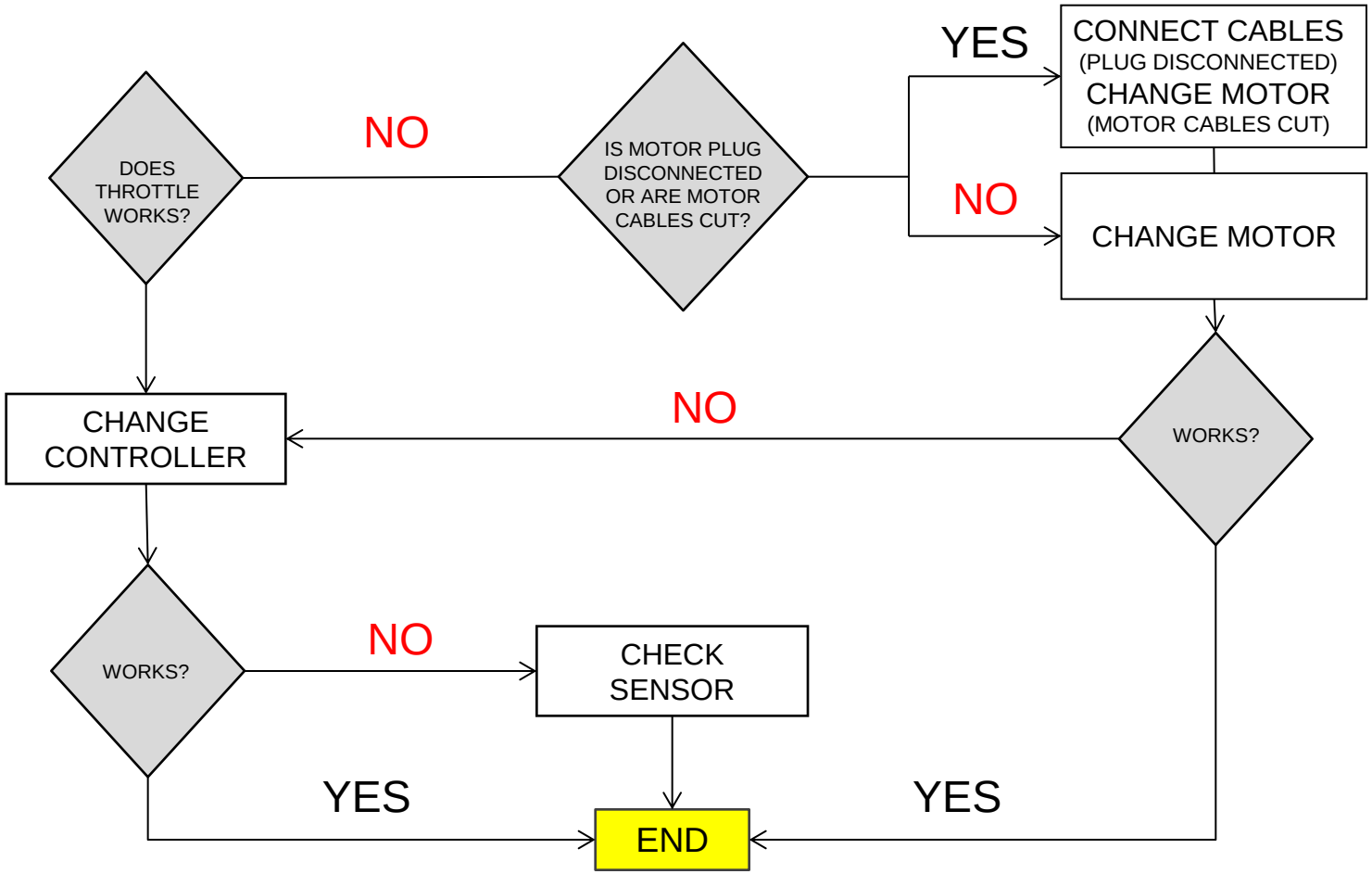


ERROR 9: MOTOR BLOCKED – DIAGNOSIS FLOW (2)



ERROR 10: CURRENT OVER LIMIT– DIAGNOSIS FLOW

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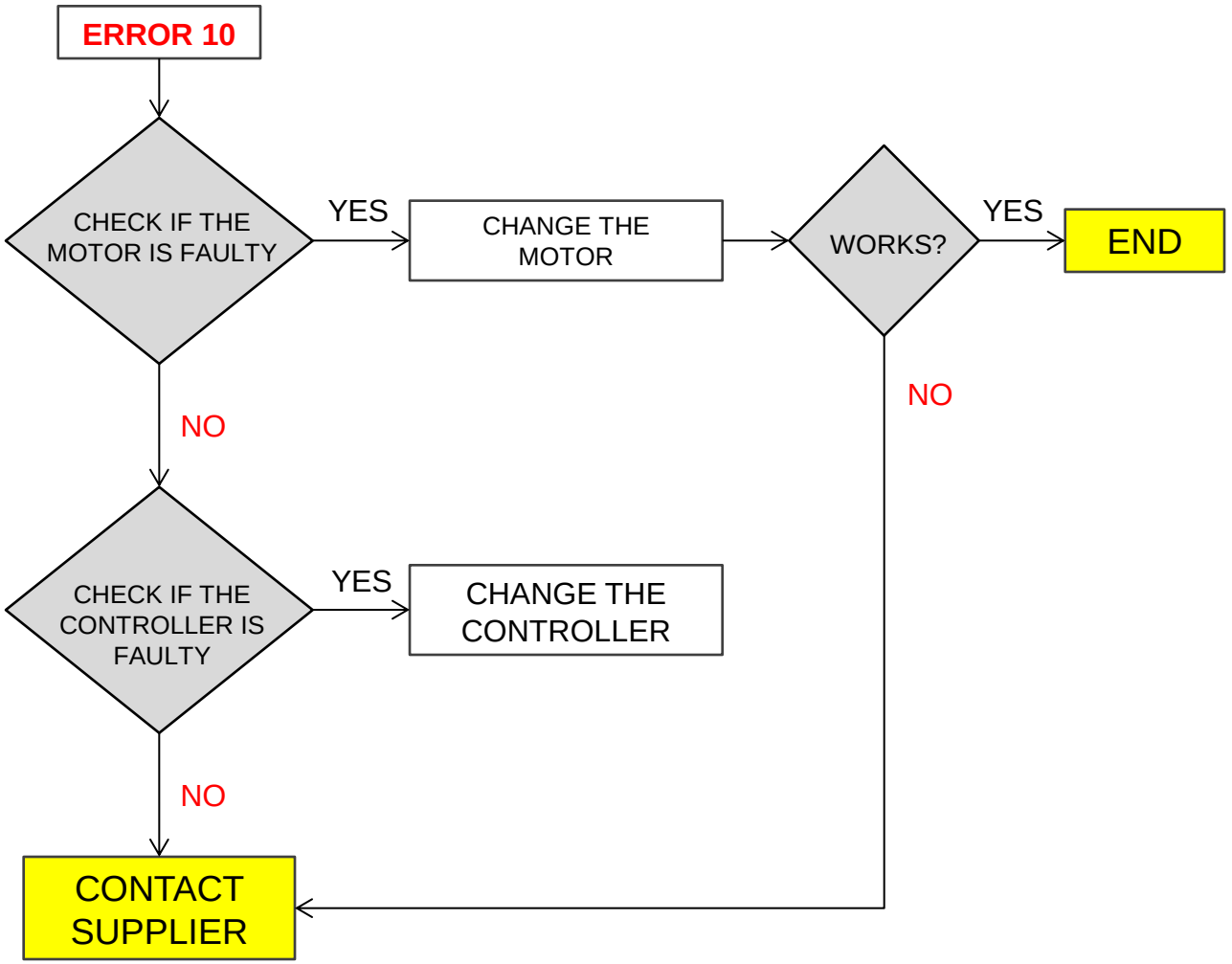
2



ERROR 11-12: CONTROLLER OVER-HEAT PROTECTION – DIAGNOSIS FLOW

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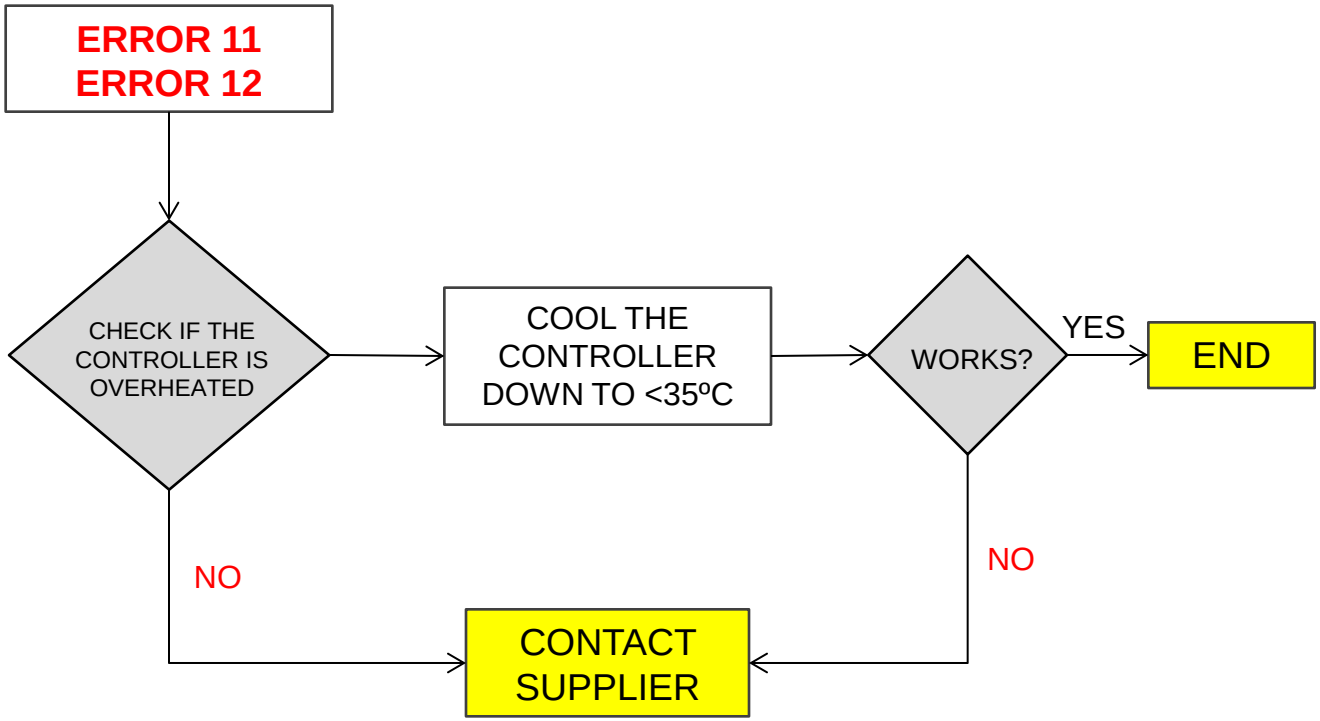


ERROR 13: COMMUNICATION PROBLEM (1)

- Display
  - Change the display and check

✓ **ACTION: Change Display**

- Display Holder
  - Change display holder and check

✓ **ACTION: Change display holder**

- Controller
  - Change controller

✓ **ACTION: Change controller**

- Electric connections
  - Change the connection kit

✓ **ACTION: Change connection cables**

ERROR 13: COMMUNICATION PROBLEM (2)

1 Check display status with Display and Controller Check Tool

Replace the display if it is damaged and check if the new one works. If it does not, go to 2

2 Check the display holder status using the Display Holder Check Tool

Replace the display holder if it is damaged and check if the new one works. If it does not, go to 3

3 Check the controller status using the Display and Controller Check Tool

Replace the controller if it is damaged and check if the new one works. If it does not, go to 4

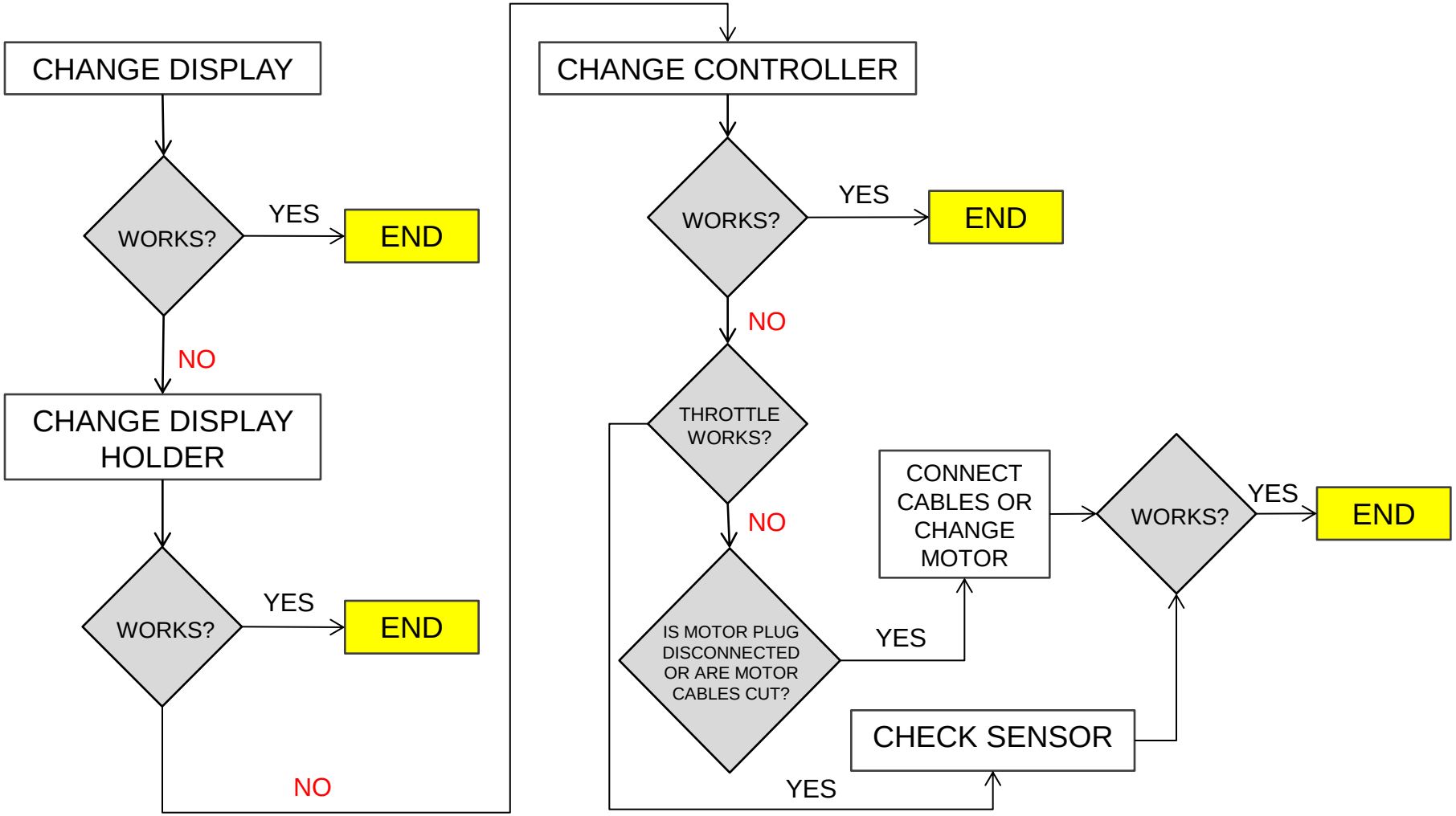
4 Check the motor status using the Motor Check Tool (see page 10)

Replace the motor if it is damaged and check if the new one works. If it does not, go to 5

5 Check the torque sensor status using the Torque Sensor Check Tool (see page 5)

Replace the torque sensor if it is damaged

ERROR 13: COMMUNICATION PROBLEM – DIAGNOSIS FLOW (1)



ERROR 13: COMMUNICATION PROBLEM – DIAGNOSIS FLOW (2)

1 

2 

3 

4 

5 

CHECK IF THE DISPLAY IS FAULTY → CHANGE DISPLAY

NO

CHECK IF THE DISPLAY HOLDER IS FAULTY → CHANGE DISPLAY HOLDER

NO

CHECK IF THE 5 PIN CONNECTOR IS LOOSE → PLUG CONNECTIONS

NO

CHECK IF THE CONNECTION DISPLAY – CONTROLLER IS LOOSE → CONNECT TIGHTLY

NO

CHECK IF THE CONTROLLER IS FAULTY → CHANGE CONTROLLER

WORKS?

YES → END

NO → CONTACT SUPPLIER

ERROR 14: FOOT ERROR

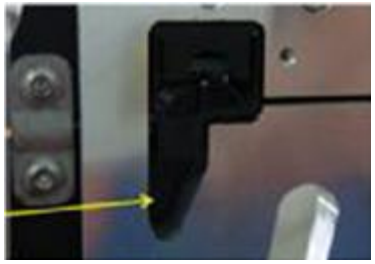
- Typically, this error occurs when the user turns on the system (Push display button ON) while applying pressure on the pedal

  - ✓ **ACTION: Switch off and re-start without applying any pressure on the pedals**

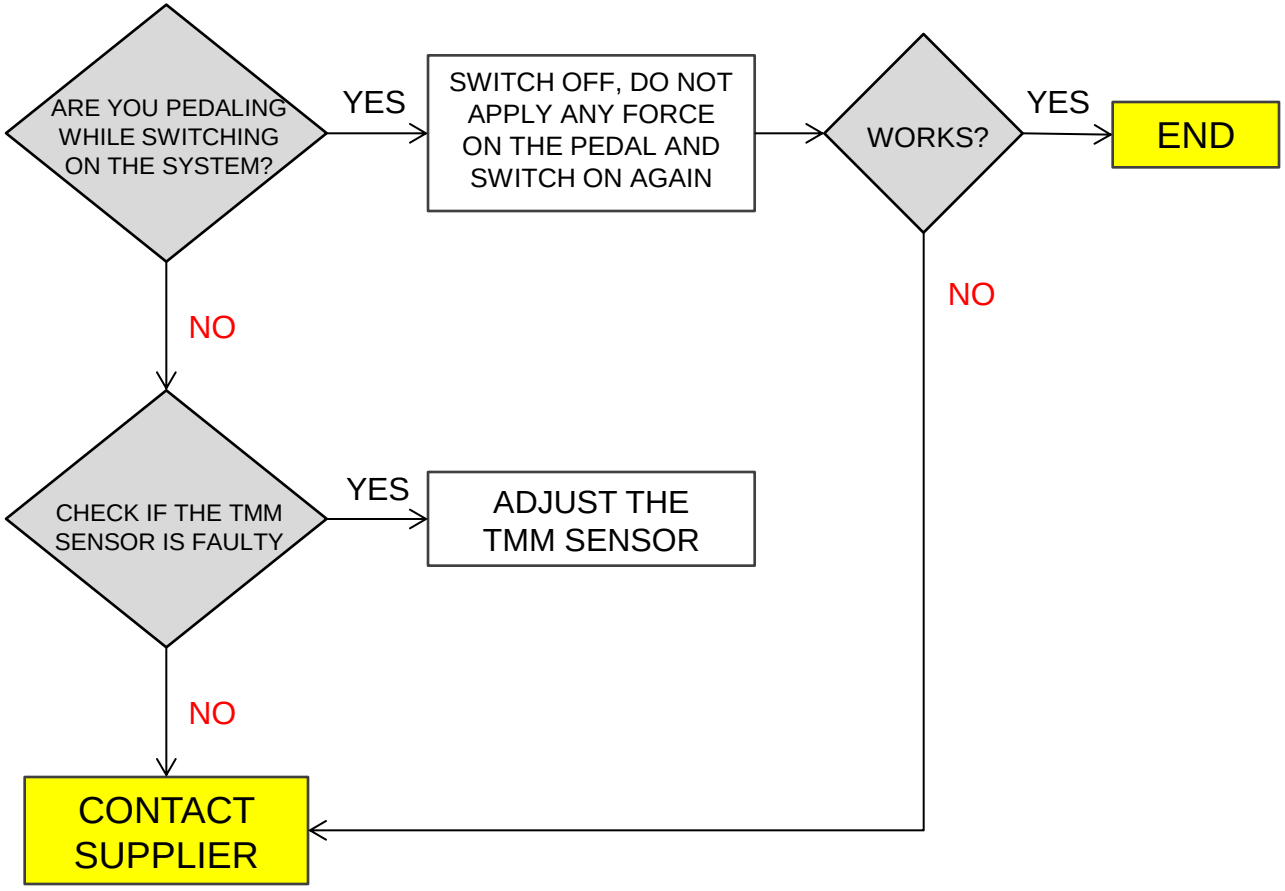
- Re-program the system

ERROR 14: FOOT ERROR – DIAGNOSIS FLOW

1



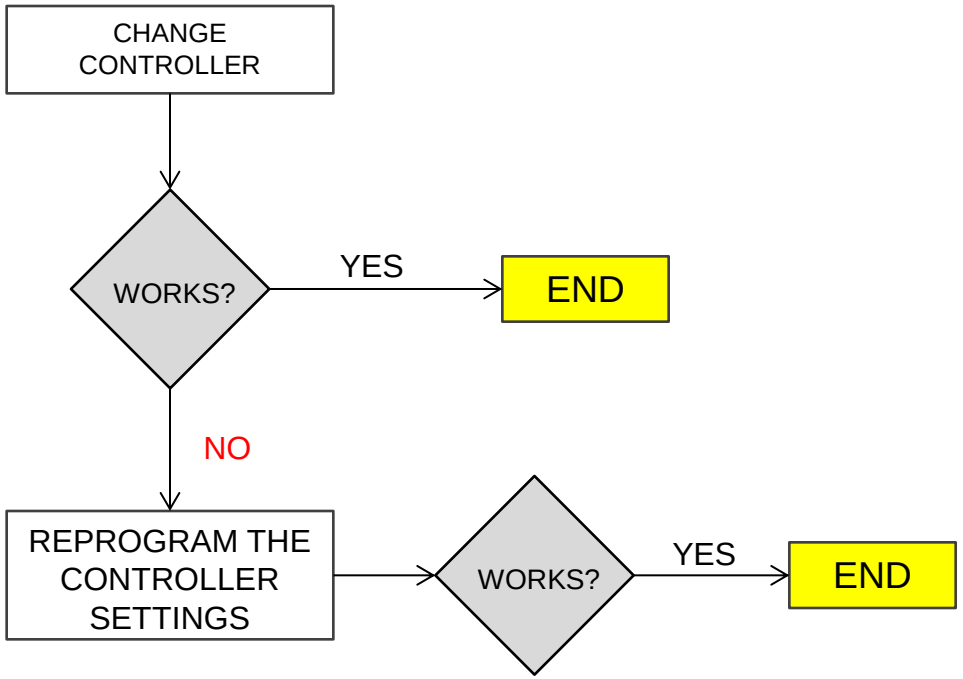
2



OTHER ERRORS: CONTROLLER

PROBLEM: Display does not switch on. Screen flash

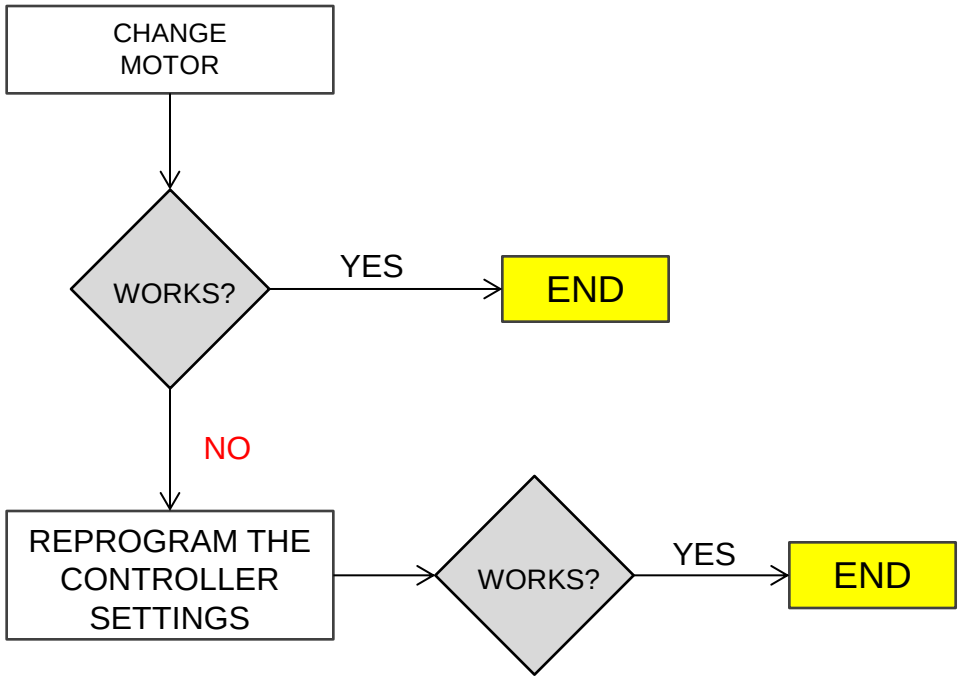
✓ **ACTION: Replace the controller**



OTHER ERRORS: MOTOR

PROBLEM: Display does not indicate the speed: motor speedometer is damaged

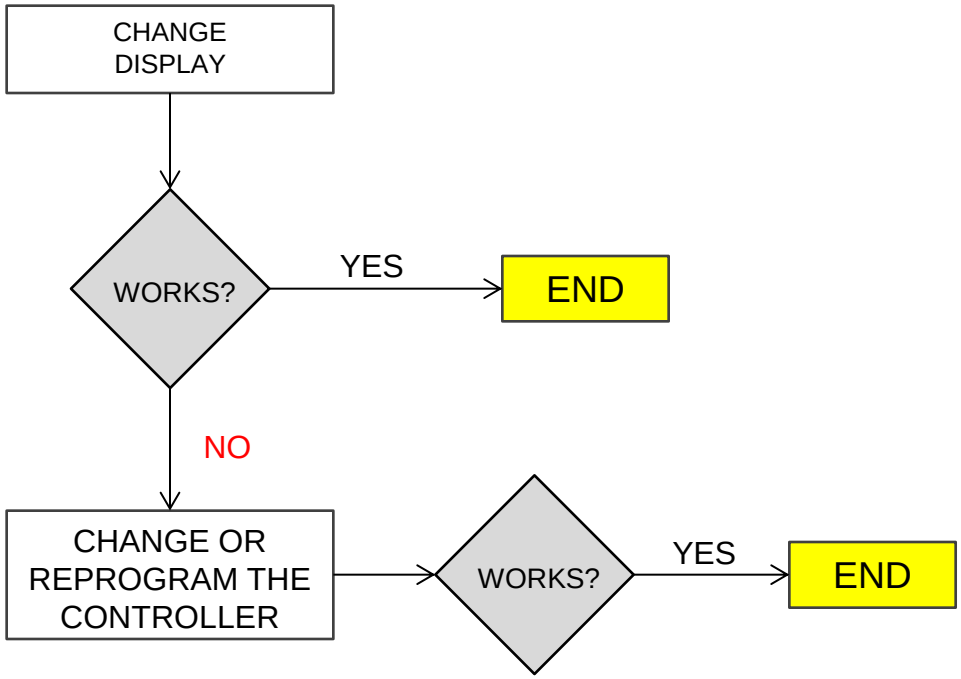
✓ **ACTION: Change the motor**



OTHER ERRORS: DISPLAY

PROBLEM: The bike works only in ECO mode. Selecting other assistant levels does not increase the power. The user will perceive the same assistance through all the levels.

✓ **ACTION: Change display or controller**



ERROR SUMMARY

This summary guides you through the most common actions when any error happens:

1. Error 3 – Action: Change TMM Sensor
2. Error 5 – Action: Change motor or controller
3. Error 9 – Action: Change motor or controller
4. Error 13 – Action: Change display, display holder or controller
5. Error 14 – Action: Reprogram the controller
6. Display Flash – Action: Change the controller
7. Display does not indicate the speed – Action: Change motor
8. Assistance does not increase – Action: Change display or controller
9. Irregular assistance – Action: Change sensor
10. Motor noise – Action: Change motor or replace bearings
11. Battery charge indicator empty (battery charged) - Action: Change display
12. Short range – Action: Check battery status, change or reprogram controller