

EZEnergy

Training Program



CHAPTER 1

Hardware Orientation



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Hardware Orientation

- A. Technology
- B. Hardware Introduction
- C. First Operations
- D. Review



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A. Technology



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A. Technology

1. Definition



EZEnergy

measure accurately the
Mechanical Energy
your customer
has to provide
To close the door



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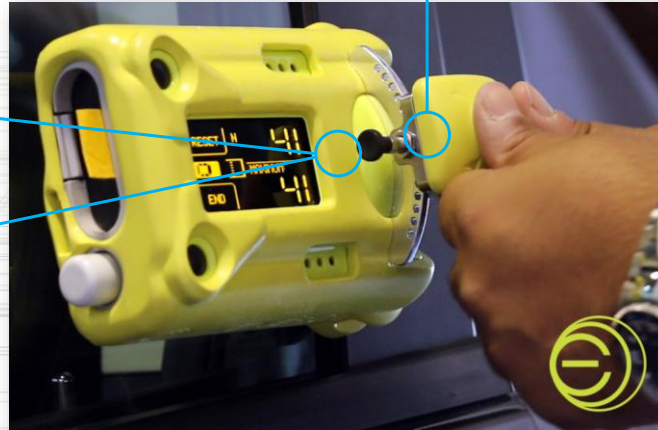
A. Technology

2. Integrated Sensors

Force Sensor:
0.1N-300N for 300N model
0.1N-500N for 500N model

Accelerometer:
Up to 2g

Gyroscope:
Up to 120 Deg/Sec



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B. Hardware Introduction



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B. Hardware Introduction

1. What's in the Box

1. EZEnergy Device
2. Battery
3. Battery Charger Base
4. Battery Charger Adapter
5. Battery Charger Power Cable



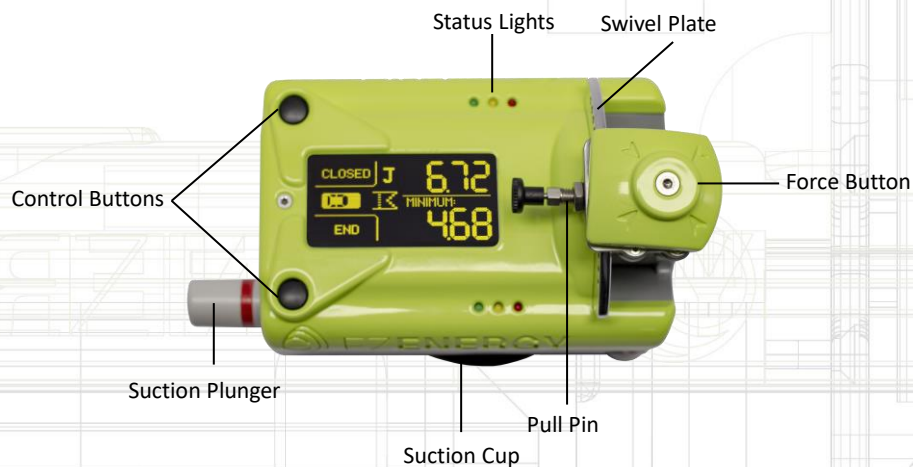
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B. Hardware Introduction

2. Device Overview



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B. Hardware Introduction

3. Technology

The on-board processor will be able to provide signal processing, calculate and display any of the desired metrics as part of the door evaluation:



1. ENERGY
2. FORCE
3. SPEED
4. ANGLE
5. MULTI-MODE



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B. Hardware Introduction

4. Operation

There are three steps in any standard operation with EZEnergy. They are addressed during the following section of this training course.

1. Install Unit

Unit is installed on vehicle at testing point.

2. Acquisition Process

Measurements are taken based on desired data

3. Evaluation

Results can be studied and compared to target values.



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C. First Operations



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C. First Operations

1. Device Power

Battery

A battery is necessary to power the device and can be replaced with a freshly charged one if power is low. Insert the battery into the rear of the device next to the suction plunger. The terminal slots on the battery should be facing up towards the LCD screen.

Power - On

Press either of the two black buttons to power on the device once the battery is inserted.

Power - Off

Press and hold either of the black buttons till the device says "Shutting Down" between the option bubbles.



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C. First Operations

2. Install EZEnergy

Popular Positions

- At latch level.
 - All Measurements
- At Handle level
 - All Measurements
- On window
 - All Measurements except closing Force as this is too high.



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C. First Operations

2. Install EZEnergy

Compatible Door Models

- Classic Hinged Doors (side, Rear)
- Hood and Trunk
- Tailgate, Liftgate



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C. First Operations

3. Install Device

Surface Preparation

Surface and suction cup should be **clean and debris free**.
For best suction, mist attachment area with water and soap solution.

Position EZEnergy

Remove the green protective cap from suction cup. Hold EZEnergy in position and press suction cup against door surface. Maintain **hold on the device to prevent it slipping off** the door before full attachment is achieved.

Activate Suction

Press the pump at the rear of the device repeatedly **until the red line disappears**. The device is now attached to the door and ready for final stability.

Verify Leveling Feet

Use the red disks at the front of the device to lower the leveling feet onto the door surface. They should be extended and be in contact with the door surface to prevent the device from shaking.



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Video

Leveling Feet

Use the red disks at the front of the device to lower the leveling feet onto the door surface. They should be extended far enough to brace the device in a solid stance.



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Video

Swivel Plate

- Allows repositioning of force button to align with force vector.
- Pull out on black knob to remove pin from hole.
- Rotate Force Button across plate.
- Should be perpendicular with door rotation axis.
- Release pin and move button around until the pin locks in a hole to secure.



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C. First Operations

4. Start measurement

1. Start a measurement

Make sure the door is in a stable position, preferably in the closed position. Press 'START' button to begin a measurement.

2. Stabilizing (1sec)

After hitting start, the device will stabilize before proceeding to the measurement screen.

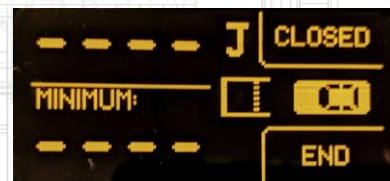
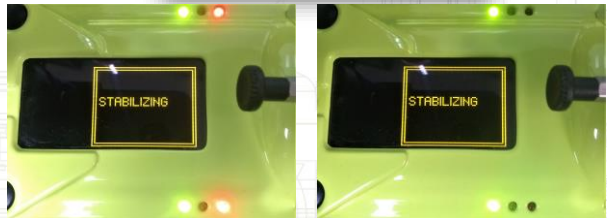
Sensor will be set to zero, if the door is moving it might increase measurement uncertainty!

3. Measurement screen

Top number: Current Measurement

Dashes will show when no measurement has been taken yet.

Bottom number: Minimum Closed Energy



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C. First Operations

5. Perform measurement

4. Open door

Open the door to a stable detent if it is not already open.

5. Apply Impulse

Push on the force button with enough force to move the door through its motion. The force should be **applied over the smallest distance possible** to reduce user interference in the measurement.

6. Closed?

If the door fully latched press the button with the CLOSED label.
If it did not latch then there is no need to press any button.



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Video

When Performing a Measurement...

- Apply force over a short distance
- Start with minimal force
- Mark door closed only when closed



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C. First Operations

9. Angle Error

Max Angle

User input must be finished before this angle or measurement is marked as invalid. The device will display a flashing angle symbol and the measurement must be repeated.

The Max Angle can be adjusted in the settings.



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C. First Operations

6. Final Measurement

7. Minimum closed measurement

- Push with the lowest impulse where the door does not latch.
- Keep increasing impulse force every test till the door finally latches.
- Press END to finish the measurement and return to the main screen.

8. Remove EZEnergy

- Hold device securely from below and make sure when suction is lost, device will not fall.
- Deform Suction Cup Edge with other hand to release suction.



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C. First Operations

7. Removal Don'ts

DO NOT Pull Suction Cup Off Directly

Pulling the suction cup off without disengaging the vacuum can damage the device, suction cup, or door.

DO NOT Rotate Device Laterally

Rotating or twisting the device in this way can damage the device or suction cup.



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D. Review



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D. Review

1. EZEnergy

Topics addressed during this chapter

EZEnergy Control

- Device Hardware and accessories
- Mounting positions and strategies
- Taking a Measurement



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