EZEnergy
Training Program

CHAPTER 1
Hardware Orientation

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Hardware Orientation

A. Operation Modes
B. Setup Options
C. Advanced Measurements
D. Review

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A.
Operation Modes

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A. Operation Modes
1. Modes List

EZEnergy has five main operation modes. The final mode augments the way Energy and Multimode work to promote better user agnostic results.

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

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A. Operation Modes

2. Operation Review

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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A. Operation Modes

2. Operation Review

Standard Buttons

Reset

Resets Maximum or live reading and will run Stabilizing again.

Closed

Flags last displayed number as a closed measurement.

Will set number as Minimum if it is lower than current Minimum.

End

Completes the measurement on this door.

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A. Operation Modes

3. Energy Mode

Energy Mode

Top Number

Last measured energy provided by the user to make the door move. The value should show bright, a dim number indicates a previous incorrect measurement.

Bottom Number

Lowest closed will be displayed once a value has been marked as Closed

Application

This mode is ideal for measurement of

- Minimum Closing Energy

STE102, Slide 7

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Video

Energy mode

- Ideal for finding minimum closing energy
- Aim for not closed measurements
- Increase energy until fully closed

STE102, Slide 8

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A. Operation Modes

4. Live Mode

Live Mode

Top Number

Speed mode sets EZEnergy to measure the speed of the device in real-time.

Bottom Number

EZEnergy will also keep track of the peak speed experienced.

Application

This mode is ideal for measurement of

- Maximum speed during close

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A. Operation Modes

4. Speed Mode

Speed Mode

Top Number

Speed mode sets EZEnergy to measure the speed of the device at a set angle from the closing position.

Bottom Number

Minimum speed set by the Closed button.

Application

This mode is ideal for measurement of

- Maximum speed during close

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A. Operation Modes

5. Force Mode

Force Mode

Top Number

Force mode sets EZEnergy to measure the force imparted to the device in real-time.

Bottom Number

EZEnergy will also keep track of the maximum force imparted.

Application

This mode is ideal for measurement of

- Static closing force
- Detent Peak Force

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A. Operation Modes

6. Angle Mode

Angle Mode

Top Number

Last measured angle that the door traveled during the smooth movement.

Bottom Number(s)

Registered open angle.

Application

This mode is ideal for measurement of

- Angle of the door
- Angle of the detent position

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A. Operation Modes

7. Multi Mode

Multi Mode

Is identical to Energy Mode from an operational perspective. Upon achieving the gap mode three values will be displayed

Top Number

Last measured energy provided by the user to make the door move. The value should show bright, dim numbers indicate a false or incorrect manipulation.

Bottom Number(s)

- NRG: Lowest closed energy
- VEL: Most recent closed speed
- FOR: Most recent closed force

Closed - Button

Flags the last displayed number as a closed measurement.

End - Button

Completes the measurement on this door.

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B. Setup Options

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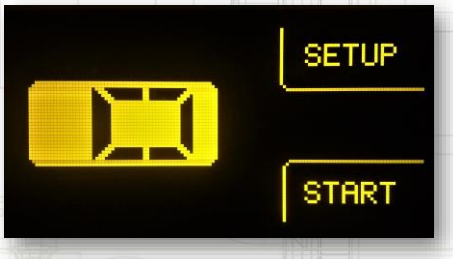
B. Setup Options

1. Navigate the Setup Menu

Device settings can be changed in the **Setup menu**.
OR
Wireless Devices can be configured using **Audit Software**.

- Press the option buttons labelled '**SETUP**' from the home screen to enter the menu.
- Once in the menu, scroll down by pressing the button with the **downward facing** arrow.
- Press the button with the **return key** to enter the highlighted menu.
- To Exit, press the return key when '**EXIT**' is highlighted.

Subsequent menus are navigated in the same manner.



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Video

Navigating settings

- Press SETUP to enter Setup Menu
- Use down arrow button to move through menu
- Use enter button to select
- Only scrolls one way
- Enter button increments numbers or selects letters

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B. Setup Options

2. Operation Modes

Available Modes

The operation mode of EZEnergy can be changed in

Setup > Operation.

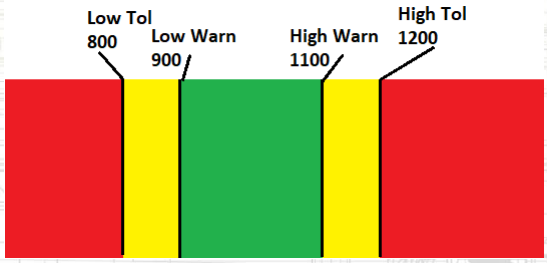
The following modes are available :

- **Force:** Live Force and Peak Force
- **Energy:** Energy from measurement and lowest closed energy
- **Speed:** Live Speed and Peak Speed
- **Angle:** Angle from measurement and previous Angle
- **Multimode:** Energy, Force, and Speed from measurement.

(*) See next chapter for details of operation for each mode.

B. Setup Options

3. Tolerances



Upper Tolerances

Any measured value (or gap if enabled) above this value will trigger the red LEDs.

Upper Warning

Any measured value (or gap if enabled) above this value, but below the upper tolerance will trigger the

yellow LEDs.

Lower Warning

Any measured value (or gap if enabled) below this value, but above the upper tolerance will trigger the

yellow LEDs.

Lower Tolerance

Any measured value (or gap if enabled) below this value will trigger the red LEDs.

Video

Tolerances

- Change tolerances by incrementing digits
- Enable/Disable Tolerances as needed
- Tolerances of 0.00 are automatically disabled

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B. Setup Options

4. Gap Mode

How to Use

What is this mode?

Gap mode sets a maximum gap between the highest Not-Closed value and the lowest Closed value. The two values must be within this Gap Tolerance of each other to achieve gap and display the minimum, Fit, and Gap values. It is used to find the Minimum Closed Energy or to minimize operator differences during measurements.

Bottom Number(s)

In Gap Mode: Highest Not Closed (NC) and Lowest Closed (C) will be displayed. When the gap tolerance has been reached the system then shows the average energy as well as the uncertainty 'FIT' and difference 'GAP'.

Application

This mode is ideal for measurement of

- Minimum Closing Energy

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B. Setup Options

4. Gap Tolerances

Gap Mode

In gap mode:

- The highest not closed value is stored
- The lowest closed value is stored

A result is achieved when they are within a 'distance' or 'gap' from each other.

The minimum closing energy is the average between the two registered values.

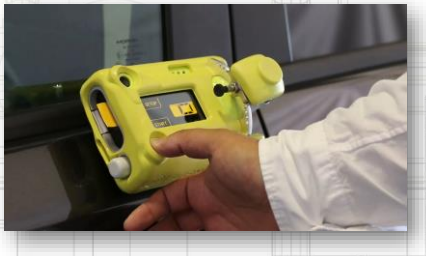
The tolerance LEDs illuminate only when the gap tolerance has been reached.

The uncertainty on this value is half of the gap value.

Gap Mode is automatically enabled if the Gap tolerance is enabled and non-zero.

Gap Tolerance

The Gap Tolerance is set in the Tolerances menu.



B. Setup Options

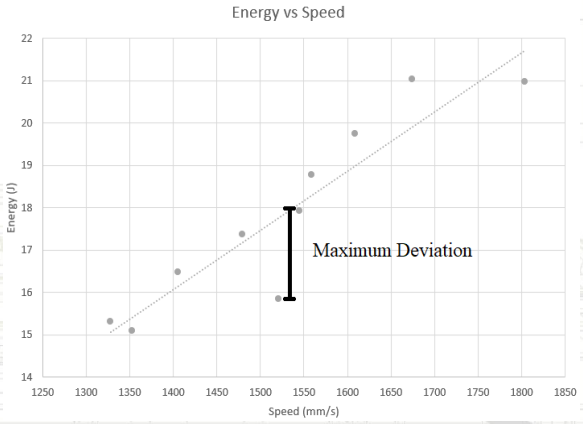
5. Gap FIT

Gap FIT

During the measurement session, we store all information (energy, speed and force) of every measurement.

Once GAP is achieved, we make a linear regression of the **energy vs speed curve** (the speed points are the speed at the velocity angle defined in the setting menu).

The **FIT** value displayed on the screen is **the maximum vertical deviation between the fitted curve and the measurements** (see picture below). **FIT** value unit is in Joule.



B. Setup Operations

6. Settings

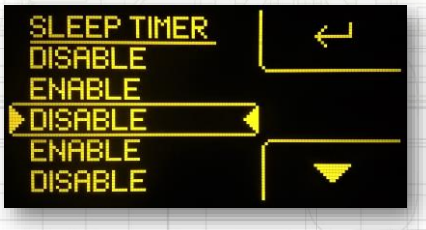
Units

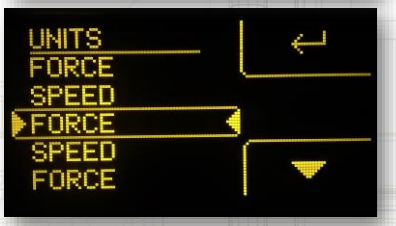
Force: Newton, Pound, Kilogram

Speed: mm/s, m/s, ft/s, degrees/s

Sleep Timer

The device has a timer and will go into sleep mode after 15 minutes of being on to save battery. The device can be awakened with just a button press. This option can be turned off in the sleep timer setting.





B. Setup Operations

7. Settings

MAX ANG (Max Angle)

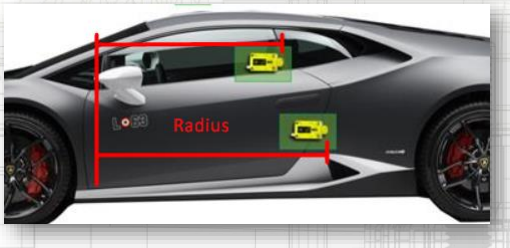
Maximum angle over a measurement where force can be applied to the force button for a good measurement. Force applied after this measure will result in an Angle Error. An angle symbol will flash on the screen indicating the error. This can be disabled if desired, but it is recommended to leave it on.

Radius

Radius is defined in meters. It is the distance between the center of rotation and EZEnergy.

VEL ANG (Velocity Angle)

This is the angle before closing where the speed is measured. We set an angle before the door has large contact with the seals to minimize the effect of seals on the measurement.



B. Setup Operations

8. Language, Calibration, Operator Mode

Language

Available languages are English, German, Spanish, and French.

Calibration

Used by EZMetrology technicians for device calibration.

Lock Device

This option will prevent the operator to access the SETUP menu from the interface and replaces it with a START button.

There is a confirmation when enabling this mode to make sure it was the intended action. If the device is locked in Operator mode it can be unlocked with the **password "ADMIN"**.

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B. Setup Operations

9. Device Info

Device Info

Device info shows general device information

- Serial Number
- Cycles
- Firmware version
- Calibration date
- IP Address (Wi-Fi models only)
- Processor version

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C. Advanced Measurements

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C. Advanced Measurements

1. Static Push Test

Minimum Static Latching Force

Uses force mode to measure static latch force. This test should not exceed the rated load of the EZEnergy device. This test should generally be performed with the device attached at the latch position. This test should never be done when mounted at a window location.

Operation

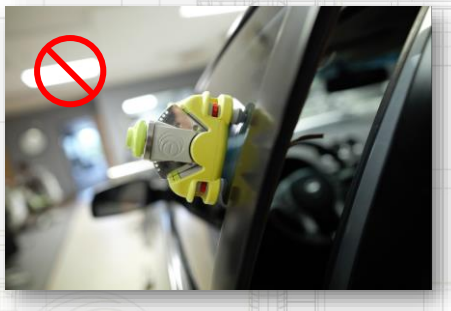
Select Force Mode from the operations list then mount the device to the vehicle making sure it is stable and secure.

Line up the force button angle with the direction of the force being applied.

Open the door and rest the door on the latch without closing.

Press Start to initialize the measurement.

Apply force to the force button evenly and increase the force till the door fully latches or the max force rating is reached.



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C. Advanced Measurements

2. Angle Measurement

Measure Angles

Uses Angle mode to measure a closing angle. This test can be done at any door mounting location. It is meant to measure open angle from a specific point on door rotation. Fully open and detent angles are the basic measurements.

Operation

Select Angle Mode from the operations list then mount the device to the vehicle making sure it is stable and secure.

Press Start to start the stability test an initialize measurement.

Open the door to the desired angle.

Apply an impulse of force to the force button to start the measurement and close the door at the same time.

C. Advanced Measurements

3. Overcome Detent Force

Detent Force

Uses Force mode to measure the minimum force needed to overcome a detent position. Test can be performed at any mounting location on the door.

Operation

Select Force mode from the operations list.

Mount device securely to desired location on door.

Tilt Force button to align with the force applied.

Open door to desired test point.

Press Start to begin measurement.

Apply pressure to the Force button slowly and evenly until the door accelerates away from your force.

The peak force is the force to overcome the detent.

F. Review

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F. Review

1. EZEnergy

Topics addressed during this chapter

EZEnergy Control

- Operation Modes
- Setup Options
- Advanced Measurement

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