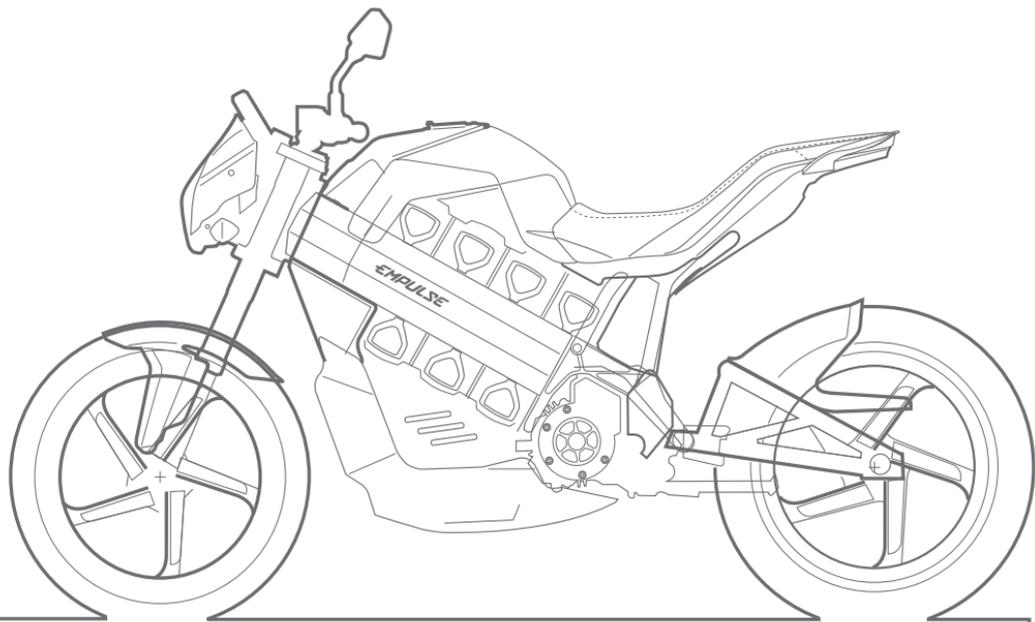




# Owner's Manual

*EMPULSE / EMPULSE R*

2013 - 2014





## **Congratulations, and thank you for choosing a Brammo Empulse**

Thorough familiarity with your Empulse and its features will provide you with enhanced control and enjoyment when you ride it. Please take the time to read this owner's manual and familiarize yourself with all the information that we have prepared for you before riding your new Brammo Empulse. The manual contains important data and instructions intended to assist you in gaining maximum use and satisfaction from your Empulse's capabilities.

The manual also contains information on maintenance to enhance operating safety and contribute to maintaining the value of your Brammo Empulse throughout its life.

We wish you an enjoyable riding experience.

Brammo Inc.



## USING THIS MANUAL

For your own safety, follow the instructions and warnings contained in this manual. Ignoring them could result in damage to your Empulse or personal injury to you or others. Damage caused by failing to follow instructions is not covered by the Empulse's warranty.

To help you make informed decisions about safety, we have provided operating procedures in this manual. Within these procedures you will find the following alerts to emphasize specific information.



### WARNING

*A warning alerts you to potential hazards that could result in either injury to you or others, or damage to your Empulse. Always heed this information.*

**Note:** *A note provides useful supporting information and sometimes suggests how to make better use of your Empulse.*

Of course, it is not practical or possible to warn you about all hazards associated with operating or maintaining a motorcycle. You must use your own good judgment.

Keep this manual with your Empulse as a reference for safe and enjoyable riding. Should you resell your Empulse, please pass this manual on to the next owner.

## NOTES ABOUT THIS MANUAL

All specifications and descriptions are accurate at the time of printing. Because improvement is a constant goal at Brammo, we reserve the right to make changes at any time, without notice and without obligation.

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# Important Information

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## **SAFETY FIRST**

Your Empulse will provide many years of service and pleasure if you take responsibility for your own safety and understand the challenges you can experience while riding.

**Always Wear a Helmet** – It's a proven fact: helmets significantly reduce the number and severity of head injuries. Always wear an approved motorcycle helmet. We also recommend that you wear eye protection, sturdy boots, gloves, and other protective gear.

**Take Time to Learn and Practice** – Even if you have ridden other motorcycles, take time to become familiar with how this Empulse works and handles. Practice in a safe area until you build your skills and get accustomed to the Empulse's size and weight. Because accidents often involve inexperienced or untrained riders, we urge all riders to take a government-certified riding course.

**Ride Defensively** – The most frequent motorcycle collision happens when an oncoming car turns left in front of a motorcycle. Another common situation is a car moving suddenly into a motorcyclist's lane. Always pay attention to other vehicles around you, and do not assume that other drivers see you. Be prepared to stop quickly or make an evasive maneuver.

**Make Yourself Easy to See** – Some drivers do not see motorcycles because they are not looking for them. To make yourself more visible, wear bright, reflective clothing, position yourself so other drivers can see you, signal before turning or changing lanes, and use your horn when it will help others notice you.

**Ride within Your Limits** – Pushing limits is another major cause of motorcycle accidents. Never ride beyond your personal abilities or faster than conditions warrant. Remember that alcohol, drugs, fatigue, and inattention can significantly reduce your ability to make good judgments and ride safely.

**Don't Drink and Ride** – Alcohol and riding don't mix. Even one drink can reduce your ability to respond to changing conditions, and your reaction time gets worse with every additional drink. So don't drink and ride, and don't let your friends drink and ride, either.

**Keep Your Empulse in a Safe Condition** – It's important to keep your Empulse properly maintained and in safe riding condition. To help avoid problems, inspect your Empulse before every ride and perform all recommended maintenance. Never exceed load limits, and do not modify your Empulse or install accessories that would make your Empulse unsafe.

## ACCESSORIES AND MODIFICATIONS



### WARNING

*Improper accessories or modifications can cause a crash in which you can be seriously hurt or killed.*

*Follow all instructions in this owner's manual regarding accessories and modifications.*

Modifying your Empulse or using non-Brammo accessories can make your Empulse unsafe. Before you consider making any modification or adding an accessory, be sure to read the following information.

### Accessories

We strongly recommend that you only use Brammo accessories that have been specifically designed and tested for your Empulse. Because Brammo cannot test all other accessories, you must be personally responsible for the proper selection, installation, and use of non-Brammo accessories.

Check with your Brammo Authorized Service Agent for assistance and always follow these guidelines:

- Make sure the accessory does not obscure any lights, reduce ground clearance, limit lean angle, limit suspension travel or steering travel, alter your riding position, or interfere with operating any controls.

- Do not add any electrical equipment that will exceed the Empulse's electrical system capacity. A blown fuse can cause a loss of lights or motor power.
- Do not pull a trailer or sidecar with your Empulse. This Empulse was not designed for these attachments, and their use can seriously impair your Empulse's handling.

### Modifications

We strongly advise you not to remove any original equipment or modify your Empulse in any way that would change its design or operation. Such changes could seriously impair your Empulse's handling, stability, and braking, making it unsafe to ride.

Removing or modifying your lights or other equipment can also make your Empulse illegal.

# Important Information

## SAFETY LABELS

Safety labels on your Empulse either warn you of potential hazards that could cause serious injury or provide important safety information. Read these labels carefully and don't remove them.

**Note:** If a label comes off or becomes hard to read, contact your Brammo Authorized Dealer for a replacement.

## Emissions Compliance Label



BRM1001

When applicable, the emissions compliance label is attached to the left side of the frame by the suspension forks.

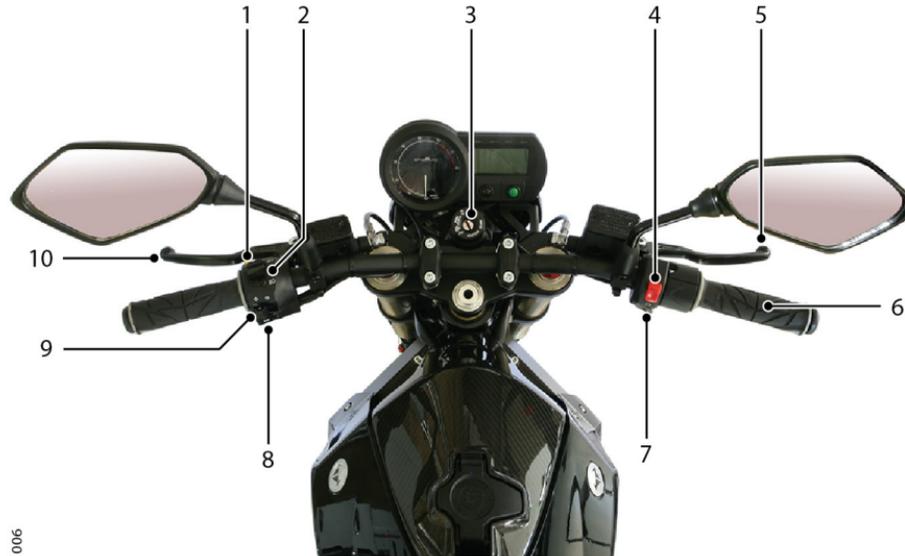
## Certification Label



BRM1002

The certification label is attached to the right side of the frame by the suspension forks. The certification label shows the VIN, date of manufacture, recommended "Cold" tire pressures and, gross vehicle weights.

## HANDLEBARS



1. Headlight high beam flash
2. Headlight high/low beam
3. Ignition switch
4. On/Off switch
5. Front brake
6. Throttle
7. Start button
- Operating mode (Normal/Sport)
8. Horn
9. Turn signals
10. Clutch

BRM1006

## OTHER CONTROLS



1



2

3

- 1. Rear brake pedal
- 2. Gear shifter

- 3. Kickstand

## INSTRUMENT CLUSTER



### 1. Tachometer

The tachometer needle will swing to maximum RPM and then zero when the Empulse powers up.

**Note:** *If the tachometer needle does not zero, contact your Brammo Authorized Dealer as soon as possible.*

### 2. Drive-enabled/gear shift indicators

- Sequentially flash green when the drive system is enabled and the Empulse is stationary.
- Progressively illuminate if the motor speed exceeds 6500 RPM to indicate that a gear shift is recommended.

### 3. Liquid Crystal Display (LCD)

### 4. Mode button

Press to cycle between:

- Power consumption in kilowatts
- Air temperature
- Motor temperature
- Estimated range remaining

### 5. Odometer/Trip button

Press to cycle between the odometer and trip displays. Press and hold to reset the trip counter.

## INDICATOR LIGHTS

All indicators will light for a few seconds and then turn off when the Empulse powers up. The ON indicator will then light and remain on. When applicable, the other indicators will light under certain conditions. These conditions are identified as follows.

**Note:** If one of the indicators does not light during the indicator check, contact your Brammo Authorized Dealer as soon as possible.

 **ON (Amber)**  
Illuminates when the ignition is on.

 **Headlight Low Beam (Green)**  
Illuminates when the headlight is operating on low beam.

 **Headlight High Beam (Blue)**  
Illuminates when the headlight is operating on high beam.

 **Left Turn Signal (Green)**  
Flashes when the left turn signal is operating.

 **Right Turn Signal (Green)**  
Flashes when the right turn signal is operating.

 **System Attention (Red)**  
Flashes when the Empulse has detected a fault or warning. Will also be accompanied by a fault or warning message on the LCD. See *“System Warning and Error Codes”, page 81.*

 **Kickstand Down (Red)**  
Illuminates when the kickstand is in the down position.

 **Motor Over Temperature (Red)**  
Illuminates when the temperature of the motor reaches its thermal operating limit. Illumination of the indicator will be accompanied by a THERMAL CUTBACK message on the LCD.

**Note:** To protect the motor from damage, the motor controller will reduce the available power according to the motor temperature:

- Power reduced: Empulse = 110°C (230°F), Empulse R = 120°C (248°F).
- Power reduced to 50% of normal: Empulse = 115°C (239°F), Empulse R = 125°C (257°F).
- Power reduced to 0% of normal: Empulse = 120°C (248°F), Empulse R = 130°C (266°F).

Once the temperature of the motor drops below the thermal operating limit, the indicator will turn off and full power will be restored.

 **Battery Low/Discharged (Amber/Red)**  
Illuminates orange when the battery State of Charge (SoC) drops below 20%; a BATTERIES LOW message will also be displayed on the LCD.

Flashes red when the battery State of Charge (SoC) drops below 0%; a RECHARGE REQ'D message will also be displayed on the LCD.

 **Charge Status (Amber/Green)**  
Illuminates amber when the Empulse is in charge mode and A/C power is connected.

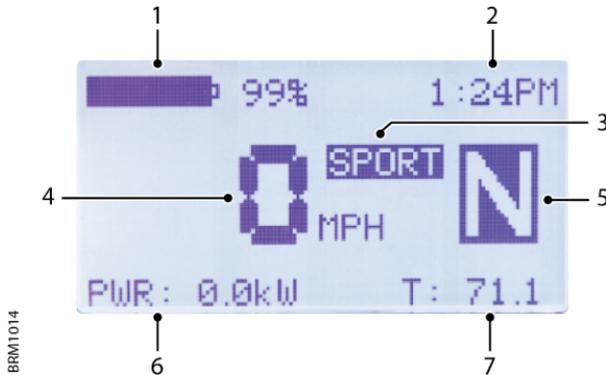
Illuminates green when the Empulse's batteries are at, or above, 99% State of Charge (SoC).

## LIQUID CRYSTAL DISPLAY (LCD)

When the Empulse powers up, the LCD will temporarily show all black so you can make sure it is functioning properly. The LCD backlight is always illuminated when the Empulse is powered up.

**Note:** If any part of the display does not come on, or the backlight is not illuminated, contact your Brammo Authorized Dealer as soon as possible.

### Drive mode



1. Battery State of Charge (SoC)
2. Current time
3. SPORT operating mode selected
4. Speed (mph or km/h)

5. Gear selected
6. Information - press the mode button to cycle through the following functions.
  - Power consumption in kilowatts
  - Air temperature
  - Motor temperature
  - Estimated range remaining
7. Odometer/Trip display

### Charge mode



1. Charging rate for the connected supply
2. Estimated time remaining to fully charge the Empulse

# Controls and Features

## IGNITION SWITCH

The ignition switch is used to select the operational mode of the bike, either ON or PARK mode, and to lock the steering for theft prevention.



### 3. Lock

Turn the handlebar all the way to the left or right, push down on the key, and turn counter-clockwise to the Lock (steering lock) position to lock the steering head. No electrical circuits function.

### 4. Park

From the Lock position, turn the key counter-clockwise to the Park position. The parking lights and the instrument cluster operate. Drive mode cannot be engaged.

**Note:** The key can be removed in the Off, Lock and Park positions.

### 1. Off

No electrical circuits function.

### 2. On

Insert the key and turn clockwise to the On position.  
The Impulse powers up. Drive mode can be engaged.

## LEFT HANDLEBAR



BRM1009

### 1. Headlight high/low beam

The headlight dimmer switch is used to change between the high and low beams of the headlight. To operate, move the switch forward for high beam, or back for low beam.

**Note:** A blue LED on the instrument cluster illuminates whenever the headlight high beam is on.

### 2. Headlight high beam flash

The high beam flash is used to alert other motorists. To operate, pull the momentary switch.

### 3. Turn signal switch

The turn signal switch is used to signal a turn or a lane change. To operate, move the switch all the way in the proper direction and release it. The appropriate turn signal lights will start blinking and an indicator will flash on the instrument cluster. To cancel the light, push the switch in.

### 4. Horn

The horn is used to alert others motorists. To operate, push the horn button.

## RIGHT HANDLEBAR



### 1. On/Off switch

The On/Off switch is used to turn the motor controller On and Off. Before powering up the Empulse, ensure that the switch is in the Off position.

### 2. Start button/Operating mode

With the ignition in the On position and the On/Off switch in the On position, press and hold the Start button for approximately two seconds to put the Empulse in Drive mode. You will hear a click from the main contactor as the drive system is energized and the drive indicators on the instrument panel will flash green.



### WARNING

*Once the Empulse is in Drive mode, the throttle is live; use extreme caution if the Empulse is not in N (Neutral).*

## OPERATING MODE

With the Empulse stationary and in Drive mode, press and hold the Start button for two seconds to change the operating mode between NORMAL and SPORT modes.



When the Empulse is in SPORT Mode, the LCD will display the SPORT indicator. There is no indicator shown on the LCD when the Empulse is in NORMAL mode.

Brammo recommends that you spend some time riding in both NORMAL and SPORT modes to become fully familiar with the how the bike handles in each mode. This will help you can best determine which mode is suitable for your riding conditions.

As a guideline:

- NORMAL mode provides a smoother transition in to regenerative braking. Ideal for city riding.
- SPORT mode provides more regenerative braking with a different transition point from off throttle to regenerative braking. Sport mode is perfect for canyon or more aggressive riding.

## SETTING THE TIME

The time and date on your Empulse were set at the factory to Pacific Standard Time. If you need to adjust the time on your Empulse:

1. Connect the charging connector to the Empulse and a wall outlet. This will put the Empulse in charging mode.



2. Press and hold the Mode and Trip buttons simultaneously for approximately two seconds to enter Setup mode.
3. Press the Mode button to select either HOURS or MINUTES.



4. Press the Trip button to increase the selected setting.
  5. Once you have finished adjusting the time, press the MODE button to select EXIT and then press the Trip button to confirm.
- Note:** If no button is pressed for more than 30 seconds, the Empulse will revert back to Charging mode.
6. Disconnect the charging connector from the Empulse.

# Are You Ready to Ride?

## PREPARATION



*Alcohol is the leading cause of death among motorcyclists. Each year, nearly 50% of the riders killed in motorcycle crashes have been drinking. **DON'T DRINK AND RIDE!***

Before you ride, you need to make sure you and your Empulse are both ready. To help get you prepared, this section discusses how to evaluate your riding readiness, what items you should check on your Empulse, and adjustments to make for your comfort, convenience, and safety. This section also includes important information about loading.

Before you ride your Empulse for the first time, we urge you to:

- Read this owner's manual.
- Make sure you understand all the safety messages.
- Know how to operate all the controls

Before each ride, be sure you:

- Feel well and are in good physical and mental condition.
- Are wearing an approved motorcycle helmet (with chin strap tightened securely), eye protection, and other protective clothing.
- Don't have any alcohol or drugs in your system.

## PROTECTIVE APPAREL

For your safety, we strongly recommend that you always wear an approved motorcycle helmet, eye protection, boots, gloves, long pants, and a long-sleeved shirt or jacket whenever you ride. Following are suggestions to help you choose the proper gear.

### Helmets and Eye Protection



*Not wearing a helmet increases the chance of serious injury or death in a crash.*

*Be sure you always wear a helmet, eye protection, and other protective apparel when you ride.*

Your helmet is your most important piece of riding gear because it offers the best protection against head injuries. A helmet should fit your head comfortably and securely. A bright-colored helmet and reflective strips can make you more noticeable in traffic.

An open-face helmet offers some protection, but a full-face helmet offers more. Regardless of the style, look for a DOT (Department of Transportation) sticker on any helmet you buy (USA only). Always wear a face shield or goggles to protect your eyes and help your vision.

## **Additional Riding Gear**

In addition to a helmet and eye protection, we also recommend:

- Sturdy boots with non-slip soles to help protect your feet and ankles.
- Leather gloves to help protect your hands.
- A motorcycle riding suit or jacket for comfort, as well as protection. Bright-colored and reflective clothing can help make you more noticeable.

## **RIDER TRAINING**

Developing your riding skills is an ongoing process. Even if you have ridden other motorcycles, take time to become familiar with how this motorcycle works and handles. Practice riding the Empulse in a safe area to build your skills. Do not ride in traffic until you get accustomed to the Empulse's controls and feel comfortable with its size and weight.

We urge all riders to take a government-certified riding course. New riders should start with the basic course, and even experienced riders will find the advanced course beneficial.

# Is Your Empulse Ready to Ride?

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## PRE-RIDE INSPECTION



### WARNING

*If you notice any damage or find a problem while inspecting the Empulse, please correct it or have your Brammo Authorized Dealer correct it before you ride.*

Check the following items before you get on the Empulse:

- **Wheels and tires**

Use an air pressure gauge to check the tire pressures. See *“Tire Pressures”, page 64*. Also look for signs of excessive wear or damage to the tires and wheels.

- **Chain**

Check the condition of the chain. Adjust the chain tension and lubricate as needed.

- **Leaks and loose parts**

Walk around your Empulse and look for anything that appears unusual, such as a leak or loose parts.

- **Lights**

Make sure the headlight, running light, brake light, taillight, license light, and turn signals are working properly.

Check these items after you get on the Empulse:

- **Throttle**

Rotate the throttle to ensure it moves smoothly without binding.

- **Brakes**

Pull the brake lever and press on the brake pedal to check that they operate normally.

- **Clutch and gear shift lever**

Pull the clutch lever and operate the gear shift lever to check that they operate normally.

- **Gauges and indicators**

Power up the Empulse and check for normal operation of the gauge and indicators.

Periodic maintenance should be done at least once a month, no matter how often you ride. See *“PERIODIC MAINTENANCE”, page 38*.

## GENERAL INFORMATION

Your Empulse has been designed to carry you and only one passenger. When you carry a passenger or cargo, you may feel some difference during acceleration and braking, but as long as you keep your Empulse well-maintained, with good tires and brakes, you can safely carry loads within the given limits and guidelines.

## LOADING



### WARNING

*Overloading or improper loading can cause a crash and you can be seriously hurt or killed.*

*Follow all load limits and other loading guidelines in this manual.*

How much weight you put on your Empulse, and how you load it, are important for your safety. Any time you ride with a passenger or cargo, you should be aware of the following information.

## Loading Guidelines

The maximum loading weight capacity for your Empulse is 313 lbs (142 kg) This includes the weight of the rider, passenger, all cargo, and any accessories installed.

Your Empulse is primarily intended for transporting you and a passenger. Light weight or small items (for example, a jacket) may be secured to the seat, but If you wish to carry more cargo, we recommend using saddle bags or a top trunk. Check with your Brammo Authorized Dealer for the complete range of Brammo approved accessories.

Improperly loading your Empulse can affect its stability and handling. Even if your Empulse is properly loaded, you should ride at reduced speeds when carrying cargo.

Follow these guidelines whenever you carry cargo:

- Check that both tires are properly inflated.
- If you change your normal load, you may need to adjust the suspension.
- To prevent loose items from creating a hazard, make sure that all cargo is tied down securely.
- Place cargo weight as low and close to the center of your Empulse as possible.
- Distribute cargo weight evenly on both sides.

# Enabling the Drive System

## PREPARATION

The Empulse has many safety features designed to keep the drive system disabled until you are ready to ride. Before enabling the drive system:

1. The ignition switch must be in On position.
2. The kickstand must be up.
3. The Start/Off switch must be in the On position.

The drive system on the Empulse will not be enabled unless these conditions are satisfied. If the Empulse's drive system is enabled and one of these conditions is not satisfied, e.g., the kickstand is down, the drive system will be disabled.

## ENABLING THE DRIVE SYSTEM



1. Insert the key into the ignition switch.
2. Turn the ignition switch clockwise to the On position.
3. The Empulse start-up tone will sound and the indicator lights on the instrument cluster will illuminate briefly as a system check.
4. The amber ON indicator will remain illuminated.

**Note:** If the KICKSTAND DOWN message is displayed on the LCD, the Empulse will not go into Drive mode.

5. It is recommended that you always make sure that the Empulse is in N (Neutral) before engaging the motor controller.



BRM1017

6. Set the On/Off switch to the On position to activate the motor controller.
7. Raise the kickstand.  
**Note:** The warning message on the LCD will turn off and the warning light will go out.
8. Press and hold the Start button for approximately two seconds to put the Empulse in Drive mode. You will hear a small relay “click” under the seat followed by a click from the main contactor in the motor area as the drive system is energized.



BRM1018

9. The Empulse performs some system safety checks for a few seconds, and then the four LEDs above the LCD will now flash in sequence from left to right, indicating that the Empulse is in Drive mode.
10. Your Empulse is now ready to ride.

### WARNING

Once the Empulse is in Drive mode, the throttle is live; use extreme caution if the Empulse is not in N (Neutral).

# Selecting a Gear

## CLUTCH



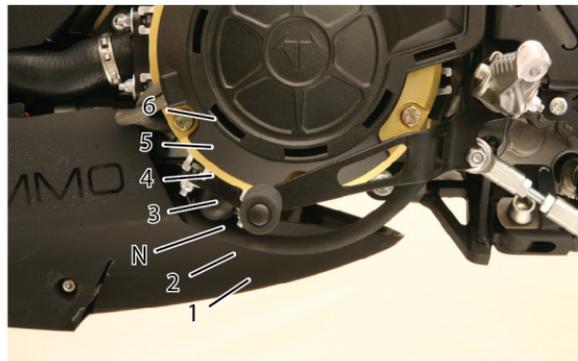
BRM1019

1. Slowly pull the clutch lever towards the handlebar grip to fully disengage the clutch.
2. Use the gear shifter lever to select a gear.
3. Slowly release the clutch hand lever to engage the clutch.

### Using the clutch

- ALWAYS use the clutch when shifting between gears
- DO NOT use the clutch when accelerating from a stop. Modulation of the clutch is not required and will cause excessive clutch wear and contamination of the oil.
- DO NOT use the clutch when coming to a stop as this will reduce the amount of regenerative braking applied.

## GEAR SHIFTER LEVER



BRM1020

The transmission is a six speed sequential gear box. Neutral is located between second and third gear. The currently selected gear is displayed on the LCD.

- Push the gear shifter lever all the way down to shift the transmission to the next lower gear.
- Lift the gear shifter lever all the way up to shift the transmission to the next higher gear.

Release the gear shifter lever after each gear change, the lever must return to its central position before another gear change can be made.

### WARNING

*To prevent damage to the clutch or transmission, the clutch must be fully disengaged before attempting a gear shift.*

## RIDING THE EMPULSE

**Note:** Before riding your Empulse for the first time, please review the *Motorcycle Safety* section (see *“Motorcycle Safety”, page 4*) and the *Before Riding* section (see *“Before Riding”, page 16*). Even if you have ridden other motorcycles, take time to become familiar with how your Empulse works and handles. Practice in a safe area until you build your skills and get accustomed to the Empulse’s size and weight.



Enable the Drive system so that the four LEDs above the LCD are flashing.

**Note:** These LEDs will flash whenever drive mode is active and the Empulse is stationary. The LEDs will stop flashing once the Empulse is moving, but will flash again when it comes to a stop.

If desired, select SPORT mode by pressing the mode button for two seconds. The SPORT indicator will be displayed on the LCD.

Pull the clutch lever fully towards the handlebar grip to disengage the clutch and select a gear using the gear shifter lever.

**Note:** Remember that N (Neutral) is positioned between 2nd and 3rd gears.

Gradually release the clutch lever to engage the gear. There is no need to hold the clutch while moving away from a stop.

Carefully twist the throttle towards you to apply power. As power is applied to the motor the Empulse will accelerate. When you twist the throttle away from you, you limit or eliminate power to the motor and the Empulse will start to slow.

As you ride, use the clutch and gear shifter to select a gear suitable for the terrain you are riding on.

**Note:** There is no need to slow down to rev-match your downshifts to road speed.

## Riding the Empulse

BRM1023



Unlike a gas powered bike where you select a gear to keep the engine speed as low as possible for the terrain, the optimum motor speed for the Empulse is between 4000 and 6000 RPM regardless of the gear you are in or the current road speed.

If you try to “lug” the bike in a tall gear and apply heavy throttle, it puts a very heavy strain on the batteries which will greatly reduce the operating range of the Empulse.

BRM1024



As you accelerate, if the motor speed exceeds 6500 RPM the green LEDs above the LCD will progressively light up as an indicator that it is recommended to shift up to the next gear. At 7000 RPM, all four LEDs will be lighted.

Your Empulse has a regenerative braking system installed. Similar to engine braking on a gas powered bike, whenever the Empulse is moving and the throttle is not applied, regenerative braking slows the bike and feeds energy back to the high voltage battery.

By anticipating your stops and simply releasing the throttle to slow down, you can take advantage of the energy gained from regenerative braking to extend the operating range of the Empulse.

The amount of regenerative braking applied when you release the throttle will vary depending on the mode the Empulse is operating in.

### WARNING

*Regenerative braking does not replace the need to use the lever or foot operated brakes to stop the Empulse. Only allow regenerative braking to slow the Empulse when it is safe to do so.*

**BRAKES**

Your Empulse is equipped with front and rear disc braking systems that are hydraulically activated.



BRM1025

Operating the brake lever applies the callipers on the dual front brake discs.



BRM1026

Depressing the brake pedal applies the calliper on the rear brake disc.

As a general rule, the front braking system provides about 70% of total stopping power. For full braking effectiveness, use both the pedal and the lever simultaneously.

Using both braking systems together will stop your Empulse faster and with greater stability.

# Braking

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## USING THE BRAKES

1. To slow or stop, apply the brake lever and the brake pedal smoothly.
2. Gradually increase braking as you feel the brakes slowing your speed.
3. For support, put your left foot down first, then your right foot when you are finished using the brake pedal.

## BRAKING DOS AND DON'TS

- Applying the brakes too hard may cause the wheels to lock and slide, reducing control of your Empulse. If this happens, release the brake controls, steer straight ahead until you regain control, then reapply the brakes more gently.
  - When possible, reduce your speed or complete braking before entering a turn. Avoid braking while turning. Braking in a turn may cause one or both wheels to slip and reduce control of your Empulse.
  - The ability to brake in a turn and to brake hard in an emergency situation are important riding skills. We suggest attending a Motorcycle Safety Foundation experienced rider training course to retain these skills.
  - When riding in wet or rainy conditions, or on loose surfaces, the ability to maneuver and stop will be reduced. All of your actions should be smooth under these conditions. Rapid acceleration, braking, or turning may cause loss of control. For your safety, exercise extreme caution when braking, accelerating, or turning.
- When descending a long, steep grade, intermittently use both brakes. Continuous brake application can overheat the brakes and reduce their effectiveness.
  - Riding with your foot resting on the brake pedal or your hand on the brake lever may actuate the brake light, giving a false indication to other drivers. It may also overheat the brakes, reducing effectiveness.

## DISABLING THE DRIVE SYSTEM

There are a couple of different ways to disable the drive system:

- If the kickstand is put down, the drive system will be temporarily disabled (the LEDs will stop flashing). If the kickstand is then put up, the drive system will be enabled again (the LEDs will resume flashing).
- Set the Start/Off switch to the Off position. This will switch off the drive system. You will need to follow the procedure for enabling the drive system before you can ride the Empulse. See ["ENABLING THE DRIVE SYSTEM", page 20.](#)

## TURNING THE EMPULSE OFF



1. Set the Start/Off switch to the Off position to disengage the drive system.
  2. Turn the ignition key counter clockwise to the Off position.
- The Empulse will now power off.

# Parking

## GENERAL INFORMATION

Look for a level parking area. If you can't find a paved surface, make sure the ground surface is firm, especially under the kickstand. If you must park on a hill, back the rear tire downhill against the curb with the Empulse at a 45-degree angle to the curb.

## KICKSTAND

Use the kickstand to support the Empulse while parked.

1. To lower the kickstand, use your foot to guide it down. Remember that lowering the kickstand will disable the drive system.
2. Check that the kickstand is down all the way.
3. If you have to park on a soft surface, insert something solid under the kickstand for support.

## STEERING LOCK

The steering lock is used to lock the handlebars in place.

### Locking the Steering Lock



1. Turn the handlebars all the way to the left.
2. Insert the key into the ignition.
3. Push in on the ignition key and turn it to the Lock position (counter clockwise).
4. Remove the key from the ignition.

## Unlocking the Steering Lock



1. Insert the key into the ignition.
2. Push in on the ignition key and turn it to the Off position (clockwise).

**Note:** You may need to move the handlebars left or right to release any tension on the steering lock and allow the key to rotate freely.

## THEFT-PREVENTION TIPS

- Park your Empulse in a locked garage whenever possible. If a garage isn't available, park in a concealed area or a well-lit area with enough pedestrian traffic to discourage a thief.
- Always take the ignition key with you.
- Always use the steering lock, even if you're parking for just a minute or two. A thief can easily push an unlocked Empulse to a waiting truck.
- In addition to the steering lock, use a good-quality anti-theft device made specifically to lock a motorcycle to a secure object.

# Batteries and Charging

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## GENERAL INFORMATION

This section of the owner's manual covers the charger, onboard battery modules and batteries. All information regarding charging and keeping your Empulse's batteries in peak operating condition will be covered here.

Your Empulse is equipped with:

1. Seven (7) rechargeable lithium-ion (BPM15/90) battery modules that use lithium nickel-manganese-cobalt technology to provide the lithium-ion advantages of high energy, light weight, and long cycle life without the fear of thermal runaway event under abuse conditions. Each battery module is rated at 1.33 kWhr for a total of 9.3 kWhr onboard. Each of the seven battery modules contains four cell stacks for a total of 28 onboard cell stacks. Each cell has a nominal cell voltage of 3.7 volts for a total battery stack voltage of just under 103.6 volts. Under normal operating conditions, your Empulse's battery modules are rated for thousands of charge cycles.
2. A Battery Management System (BMS) that monitors each battery module's State of Charge, current, cell voltage, and temperature.
3. An onboard charger connected to a standard J1772 charging port connector.

## Maximizing Battery Capacity and Battery Life

By following the tips listed below, you can assure long life and high performance of your Empulse's battery modules.

- Operate your Empulse at temperatures below 104°F (40°C) and charge at temperatures between 32°F (0°C) and 113°F (45°C).
- Cell balance as often as possible. Battery module cell variability and environmental conditions can cause a slight state of charge imbalances between cells. After the normal charge cycle (batteries charged to 99%), cell balancing starts. During cell balancing, the battery modules, BMS and charger attempt to perfectly match all of the cell voltages.
- Cycle the batteries (complete charge and discharge) every three months.
- Charge battery modules fully if your Empulse has been stored for more than a month.

**Note:** *Leaving your Empulse powered up in charge mode with charging cable connected will maximize your battery modules' performance when not in use.*

## Operating in Low Temperatures

The batteries are designed to operate at temperatures as low as 15°F (-10°C). When charging or riding in low temperatures, the battery modules will automatically go through a warm-up phase to optimize their performance.

## USING THE CHARGING CABLE

### WARNING

*Using the charging cord with a worn or damaged wall outlet may cause a fire. Periodically, check the wall plug and charging cord while the vehicle is charging. If the plug feels hot, unplug, the charging cord and have the outlet replaced by a qualified electrician.*



BRM1078

The Empulse was supplied with a Level 1 charging cable that connects between the bikes J1772 connector and a standard 110V wall outlet.

## Electrical Outlets

Ideally, the wall outlet should be grounded and on a dedicated circuit rated at 15A or more. That means there should be no other major appliances connected to the same circuit.

If a non dedicated circuit is used, the current rating of the wall outlet circuit breaker could be exceeded and cause it to trip or open. If you are having issues using the charging cord at a particular wall outlet, try the following:

- Use another wall outlet if available
- Remove other loads on the same circuit

## Extension cords

### WARNING

*Use of an extension cord may increase the risk of electric shock or other hazards.*

The use of an extension cord is not recommended. If an extension cord is used because of limited access to a power outlet, please observe the following guidelines:

- The wall outlet should be RCD protected.
- The extension cord should be RCD protected
- The extension cord should be 12 or 14 gage, and must be a 3 pin conductor.
- The extension cord should be rated for outdoor usage.

**Note:** *The charging cord automatically detects the amount of current it can draw from the wall outlet. Using an extension cord with a long cord or smaller gage conductors may prevent the Empulse from charging.*

# Batteries and Charging

## Connecting and disconnecting the convenience charging cord

To charge the Empulse, the charging cable MUST be connected in the following sequence:

1. Insert the plug into the wall outlet.
2. Attach the charging connector to the charging port on the Empulse.

To disconnect the charging cable:

1. Disconnect charging connector from the Empulse.
2. Remove the plug from the wall outlet.

## Status indicators

The status indicators on the charging cable illuminate green or flash red to identify the charge cable status.



BRM1079

When both the POWER AND CHARGING indicators are illuminated, the Empulse will charge.



BRM1080

If any indicator is flashing red, a fault has been detected. For safety reasons, the charging cord will not allow the Empulse to charge.

The charging cable will automatically attempt to reset itself. If the flashing continues for more than 30 seconds, unplug the charging cord from the wall to reset. If the fault remains, contact your Brammo Authorized Dealer for advice.

## PUBLIC EV CHARGING STATIONS

In addition to charging your Empulse using the supplied charging cable, it is possible to charge it using the network of public EV charging stations. EV charging stations are typically connected to a higher voltage (240V) and are classed as a Level 2 charger. Charging the Empulse from a Level 2 charger will take less time than when using the supplied charging cable.

The procedure for charging the Empulse using one of these charging station is exactly the same as using the charging cable.

## CHARGING THE EMPULSE



### WARNING

*The use of an extension cord is not recommended, as they can increase the risk of electric shock or other hazards (e.g., fire and trip).*

Your Empulse is designed to take a charge from any J1772 electric vehicle charger (Level 1 - 110V or Level 2 - 240V).

1. Position your Empulse as close as possible to an available AC wall outlet.



BRM1081

2. Open the charging cap on the Empulse by pressing the vertical tab forward.



BRM1082

3. Plug the J1772 charging connector into the charging receptacle on the Empulse. Once connected, charging automatically starts. The key should be removed for security when charging in public. As a safety feature, the headlight stays on while the Empulse is charging.

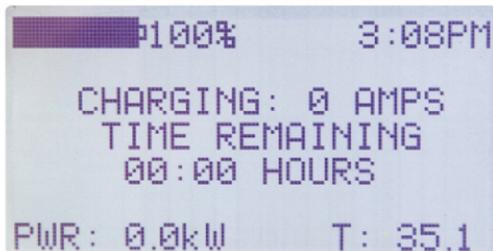


During charging, the battery charging indicator on the instrument cluster is illuminated orange.



When charging is complete, or at 100% State of Charge (SoC) the battery charging indicator turns green.

BRM1083



The SoC is indicated in the upper left corner of the LCD. The LCD also displays the estimated time left to charge the Empulse to 100%.

## STOPPING THE CHARGE PROCESS

When the charging is complete or the desired SoC level is reached, unplug the J1772 charger from the Empulse.

After disconnecting the charge cable, close the charging port cap to prevent the ingress of dirt and moisture into the charging port.

## CHARGING COMPLETE

Once the SoC reaches 99%, the majority of the charging is finished and your Empulse is ready to ride.

**Note:** Battery balancing occurs at the top of the charge cycle; therefore your Empulse should be left plugged in periodically.

## BATTERY CELL BALANCING

Keeping all of the battery cells balanced is vital for optimal battery performance. Brammo recommends that you leave your Empulse on in charge mode with AC power connected to allow the cells to balance.

## 100% STATE OF CHARGE

When all of the battery modules report 100% SoC to the BMS, the LCD will display 100%. Typically, you will see the % SoC toggling between 100% and 99% once all battery modules reach 100% SoC.

## CHARGING TIME

The amount of time it takes to fully charge the Empulse is dependent upon the remaining battery charge level and the available electricity supply (amperage and voltage).

As a guide, the following are approximate times to charge the batteries from fully depleted.

Charging Times	
Level 1 - 110V	8 Hours (0 – 99% SOC, no cell imbalances)
Level 2 - 240V	3.5 hours (0 – 99% SOC, no cell imbalances)

## BATTERY SYSTEM PERFORMANCE GUIDE LINES

The Brammo Empulse is the world's fastest production electric motorcycle and represents the latest in electric motorcycle technology.

A key part of the Empulse is the BPM15/90 battery system, the BMP15/90 is a "smart" battery module and communicates voltages, currents, state-of-charge, temperature, humidity, and other parameters to the Vehicle Control Unit (VCU) to monitor, and if necessary, take action on to protect your battery modules from permanent damage or degradation.

Here are some situations where the VCU will take corrective action to protect your battery system:

### 1. Cold weather riding.

The internal resistance of battery cells increases in cold weather (anywhere near or below 32°F or 0°C), creating more significant voltage sag in the cells and less power being available. The BPM 15/90 battery system has cell heaters that will work to overcome this issue anytime the bike is turned on or charging. If you are going to be riding in cold conditions, we recommend keeping your Empulse plugged in overnight or giving it a 10-15 minute "warm-up" period before riding. If you're riding at low State-of-Charge (SoC) – say, below 30%, in cold conditions, **please be aware that this increased voltage drop can manifest as a reduction in available power. When this happens you should safely reduce your speed and adjust your riding style accordingly.**

### 2. Low State of Charge.

The BPM 15/90 battery system indicates a State-of-Charge that is calculated by counting the energy expended as current and comparing that to the present time voltage of the pack and cells. At low SoC, high current demands from the battery can cause the voltage to drop quickly resulting in less power being available (Power = Voltage(Volts) x Current (Amps)) than when the bike is fully charged. If too much current is demanded, then it is possible for the batteries to reach their Low Voltage Cut-out point (LVC). If this occurs, the VCU will make the decision to disconnect the main relay on the Empulse to prevent potential permanent damage to your battery system. To prevent a potentially hazardous situation, please be aware of and respond to this condition by adjusting your riding style. Your Empulse will flash the green lights at the top of the display and display a "Low Battery" warning on the digital LCD display when this condition is a possibility. **When this happens you should safely reduce your speed and avoid heavy throttle use until you can reach a location where the Empulse can be recharged.**

### 3. Very heavy throttle demand

Because voltage sags as current is delivered from the battery, very heavy throttle usage at a low SoC will amplify the effect. An example of when this condition might occur is at a racetrack, where throttle demand is very high. Be aware that reduced power and even main relay cut-out protection can occur with SoC as high as 30%. This is not a SoC inaccuracy as the energy is still available in the battery. **Should you experience reduced power or main relay cut-out, you should safely reduce your speed and avoid heavy throttle use.**

# Service and Maintenance Requirements

## SAFETY PRECAUTIONS



*Failure to properly follow maintenance instructions and precautions can cause you to be seriously injured or killed. Always follow the procedures and precautions in this owner's manual.*

This owner's manual includes instructions on how to perform some important maintenance tasks. If you have basic mechanical skills, you should be able to perform many of these tasks.

Other tasks that are more difficult and require special tools are best performed by professionals. Wheel removal should normally be handled by a Brammo Authorized Dealer or a qualified mechanic.

Some of the most important safety precautions follow. However, we cannot warn you of every conceivable hazard that can arise in performing maintenance. Only you can decide whether or not you can or should perform a given task.

Remember that your Brammo Authorized Service Agent or Dealer knows your Empulse best and is fully equipped to maintain it.

### Before Starting Work

- Read the instructions before you begin, and make sure you have the tools and skills required.
- To help prevent the Empulse from falling over, park it on a firm, level surface, using the kickstand or a maintenance stand to provide support.
- Make sure the ignition is off and the key removed before you begin any maintenance or repair.

## Electric Shock Hazard



*Your Empulse has high-voltage DC and AC electrical systems (103.6V nominal) which can be dangerous and cause personal injury, severe burns, electric shock and even fatal injury unless appropriate precautions are taken.*

*Your Empulse has been designed and built with user safety as a priority but please be aware of the following precautions:*

- *Always use extreme caution when working with or around any battery terminals, cables, or other high voltage components.*
- *Always observe and obey the instructions on labels attached to components - they are there for your safety.*
- *The high voltage system has no user serviceable parts. Do not disassemble, remove or replace high voltage components, cables or connectors.*

Brammo recommends that you always disconnect the Battery Safety Disconnect before working on any of the electrical systems. See "BATTERY SAFETY DISCONNECT", page 51.

### Moving Parts



*Never run the motor during any service task; there is always the risk of clothing, limbs, or tools coming into contact with rotating components leading, to serious injury or death.*

## THE IMPORTANCE OF MAINTENANCE



### WARNING

*Improperly maintaining your Empulse or failing to correct a problem before you ride can cause a crash in which you could be seriously hurt or killed.*

*Always follow the inspections and maintenance recommendations and schedules in this owner's manual.*

Keeping your Empulse well-maintained is absolutely essential to your safety. It's also a good way to protect your investment, get maximum performance, avoid breakdowns, and have more fun. A properly maintained Empulse will also help to reduce costly future repairs.

Remember, proper maintenance is the owner's responsibility. Be sure to inspect your Empulse before each ride, perform the periodic checks, and follow the maintenance schedule in this section.

If your Empulse overturns or is involved in a crash, be sure your Brammo Authorized Dealer inspects all major parts.

To ensure the best quality and reliability, use only new Brammo Parts or their equivalents for repair and replacement.

## SERVICING YOUR EMPULSE

To help keep your Empulse in good shape, this section of the owner's manual includes a maintenance schedule for required service, a list of periodic checks you should perform at least once a month, and step-by-step instructions for specific maintenance tasks. You'll also find important safety precautions, information on fluids and lubricants, and tips for keeping your Empulse looking great.

The following table summarizes the types of inspections and servicing recommendations for your Empulse. Both the pre-ride inspection and the scheduled maintenance at the recommended intervals are necessary to ensure safe and dependable performance. The periodic checks provide additional confidence in your Empulse's performance.

Inspection type	Interval	Performed by
Pre-ride inspection	Before every ride	You
Periodic maintenance	At least monthly	You
Scheduled maintenance	As stated on maintenance schedule	Your Brammo Authorized Dealer

# Service and Maintenance Requirements

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## PERIODIC MAINTENANCE

In addition to the regularly scheduled maintenance and daily pre-ride inspections, consider performing the following periodic checks at least once a month, even if you haven't ridden your Empulse, or as often as once a week if you ride frequently or for long distances. It's a good idea to perform this maintenance any time you clean your Empulse.

Check the odometer reading and perform any scheduled maintenance checks that are needed.

**Note:** *Perform these checks more often if you ride frequently, for long distances, or in severe conditions.*

### Wheels and Tires

- Check the air pressure with a gauge and add air if needed.
- Examine the tread for wear. Look closely for nails, embedded objects, cuts, and other types of damage. Roll your Empulse so you can inspect the entire surface of the front and rear tires.
- Check the condition of the wheels.

### Brake Fluid

- Check the fluid levels of the front and rear brake fluid reservoirs. Add the correct fluid as necessary and investigate the cause of any low fluid levels.

### Clutch Fluid

- Check the fluid level of the clutch fluid reservoir. Add the correct fluid as necessary and investigate the cause of any low fluid level.

### Lights

- Make sure the headlight, running light, brake light, taillight, license light, and turn signals are working properly.

### Throttle Freeplay

- Check the freeplay of the throttle grip. Ensure that it turns smoothly and returns to the closed position when released.

### Drive Chain

- Check condition, adjust tension, and lubricate as needed.

### Fuses

- Make sure you have a full supply of spare fuses.

### Nuts and Bolts

- Check the major fasteners and tighten as required.

## **MAINTENANCE RECORD**

Keeping an accurate maintenance record (see *"Maintenance Record"*, [page 99](#)) will help ensure that your Empulse is properly maintained. Retain detailed receipts to verify the maintenance was performed. If the Empulse is sold, these receipts should be transferred to the new owner.

Make sure whoever performs the maintenance completes the appropriate record. All scheduled maintenance, including the 600 mile (1,000 km) initial maintenance, is considered a normal owner operating cost, and you will be charged by your Brammo Authorized Dealer.

## **SCHEDULED MAINTENANCE**

The required maintenance schedule that follows specifies how often you should have your Empulse serviced and what items need attention. It is essential to have your Empulse serviced as scheduled to maintain safe, dependable performance.

The service intervals in this maintenance schedule are based on average riding conditions. Some items will need more frequent service if you ride in unusually wet or dusty areas. Consult your Brammo Authorized Dealer for recommendations applicable to your individual needs and use.

Some items in the maintenance schedule can be performed with basic mechanical skills and hand tools. Procedures for these items are provided in this manual. Other items involve more extensive procedures and may require special training, tools, and equipment.

We recommend that you have your Brammo Authorized Dealer perform these tasks unless you have advanced mechanical skills and the required tools and equipment.

If you do not feel capable of performing a given task or need assistance, remember that your Brammo Authorized Dealer knows your Empulse best and is fully equipped to maintain and repair it. If you decide to do your own maintenance, use only Brammo Parts or their equivalents for repair or replacement to ensure the best quality and reliability.

Perform the pre-ride inspection and owner maintenance at each scheduled maintenance period.

Each item on the maintenance schedule requires some mechanical knowledge. Certain items (particularly those marked \* and \*\*) may require more technical information and tools. Consult your Brammo Authorized Dealer.

# Service and Maintenance Requirements

## Maintenance Schedule

The following table summarizes the types of inspections and servicing recommendations for your Empulse. Both the pre-ride inspection and the scheduled maintenance at the recommended intervals are necessary to ensure safe and dependable performance. The periodic checks provide additional confidence in your Empulse's performance.

Items to Check	Odometer Reading/time Interval (Whichever Occurs Soonest)								Reference
	300 mi/500 km or 1 month	600 mi/1,000 km or 2 months	3,000 mi/4,800 km or 6 months	6,000 mi/9,600 km or 12 months	9,000 mi/14,400 km or 18 months	12,000 mi/19,300 km or 24 months	15,000 mi/24,100 km or 30 months	18,000 mi/28,900 km or 36 months	
<b>Throttle Operation</b> <ul style="list-style-type: none"> <li>Twist throttle to ensure smooth action and "snap" back to 0% throttle.</li> </ul>	√	√	√	√	√	√	√	√	<u>Page 52</u>
<b>Drive Chain</b> <ul style="list-style-type: none"> <li>Check chain condition, tension, alignment (*)</li> <li>Adjust and lubricate chain</li> </ul>	EVERY 300 MILES and after RIDING IN WET AND/OR DIRTY AREAS or washing the Empulse. Replace if needed.								<u>Page 67</u>
<b>Gear Oil (*)</b> <ul style="list-style-type: none"> <li>Change (warm gearbox before changing)</li> </ul>	<i>Optional</i>	√	√	√	√	√	√	√	<u>Page 59</u>
<b>Cooling System</b> <ul style="list-style-type: none"> <li>Inspect hoses for cracks and leaks</li> <li>Inspect fluid level</li> </ul>	√	√	√	√	√	√	√	√	
<ul style="list-style-type: none"> <li>Change coolant (*)</li> </ul>								√	

## Service and Maintenance Requirements

Items to Check	Odometer Reading/time Interval (Whichever Occurs Soonest)								Reference
	300 mi/500 km or 1 month	600 mi/1,000 km or 2 months	3,000 mi/4,800 km or 6 months	6,000 mi/9,600 km or 12 months	9,000 mi/14,400 km or 18 months	12,000 mi/19,300 km or 24 months	15,000 mi/24,100 km or 30 months	18,000 mi/28,900 km or 36 months	
<b>Front Brakes</b> <ul style="list-style-type: none"> <li>• Check operation, fluid level, look for leaks.</li> <li>• Replace pads if needed (**)</li> </ul>	√	√	√	√	√	√	√	√	<u>Page 56</u>
<b>Rear Brake</b> <ul style="list-style-type: none"> <li>• Check operation, fluid level, look for leaks</li> <li>• Replace pads if needed (**)</li> </ul>	√	√	√	√	√	√	√	√	<u>Page 56</u>
<b>Brake System, Front And Rear</b> <ul style="list-style-type: none"> <li>• Inspect hoses, caliper and bolts</li> </ul>	√	√	√	√	√	√	√	√	
<ul style="list-style-type: none"> <li>• Replace brake fluid (**)</li> </ul>				√		√		√	
<b>Brake Light Switch, Front And Rear</b> <ul style="list-style-type: none"> <li>• Check operation</li> </ul>	√	√	√	√	√	√	√	√	
<b>Signals And Headlight</b> <ul style="list-style-type: none"> <li>• Check operation.</li> <li>• Adjust headlight beam if needed (*)</li> </ul>	√	√	√	√	√	√	√	√	
<b>Kickstand</b> <ul style="list-style-type: none"> <li>• Check operation</li> <li>• Apply all-purpose grease to pivot</li> </ul>	√	√	√	√	√	√	√	√	<u>Page 66</u>

## Service and Maintenance Requirements

Items to Check	Odometer Reading/time Interval (Whichever Occurs Soonest)								Reference
	300 mi/500 km or 1 month	600 mi/1,000 km or 2 months	3,000 mi/4,800 km or 6 months	6,000 mi/9,600 km or 12 months	9,000 mi/14,400 km or 18 months	12,000 mi/19,300 km or 24 months	15,000 mi/24,100 km or 30 months	18,000 mi/28,900 km or 36 months	
<b>Front Forks</b> <ul style="list-style-type: none"> <li>Check operation, look for leaks</li> </ul>	√	√	√	√	√	√	√	√	
<ul style="list-style-type: none"> <li>Replace suspension oil (**)</li> </ul>				√		√		√	
<b>Rear Shock</b> <ul style="list-style-type: none"> <li>Check operation, look for leaks</li> </ul>	√	√	√	√	√	√	√	√	<u>Page 53</u>
<b>Fasteners (*)</b> <ul style="list-style-type: none"> <li>Check all chassis fasteners and fittings</li> <li>Tighten and adjust as needed.</li> </ul>	√	√	√	√	√	√	√	√	
<b>Tires</b> <ul style="list-style-type: none"> <li>Check air pressure.</li> <li>Inspect tread depth</li> <li>Look for cracks or damage</li> </ul>	√	√	√	√	√	√	√	√	<u>Page 64</u>
<b>Wheels</b> <ul style="list-style-type: none"> <li>Inspect for out of round, or dents</li> <li>Replace if necessary (**)</li> </ul>	√	√	√	√	√	√	√	√	<u>Page 64</u>

## Service and Maintenance Requirements

Items to Check	Odometer Reading/time Interval (Whichever Occurs Soonest)								Reference
	300 mi/500 km or 1 month	600 mi/1,000 km or 2 months	3,000 mi/4,800 km or 6 months	6,000 mi/9,600 km or 12 months	9,000 mi/14,400 km or 18 months	12,000 mi/19,300 km or 24 months	15,000 mi/24,100 km or 30 months	18,000 mi/28,900 km or 36 months	
<b>Steering Bearings (**)</b> <ul style="list-style-type: none"> <li>• Check for looseness</li> <li>• Repack with all-purpose grease</li> </ul>	√	√	√	√	√	√	√	√	
<b>Battery Inspection (**)</b> <ul style="list-style-type: none"> <li>• Look for visible damage to modules or cables</li> </ul>	√	√	√	√	√	√	√	√	<u>Page 70</u>
<b>Clutch Master Cylinder</b> <ul style="list-style-type: none"> <li>• Check operation</li> <li>• Inspect fluid level</li> </ul>	√	√	√	√	√	√	√	√	
<b>Motor (**)</b> <ul style="list-style-type: none"> <li>• Check operation</li> <li>• Visually inspect power cables for any cracks or damage</li> </ul>	√	√	√	√	√	√	√	√	
<b>Clutch Assembly (*)</b> <ul style="list-style-type: none"> <li>• Inspect clutch plates and springs</li> </ul>			√	√	√	√	√	√	
<p>(*) Should be serviced by your Brammo Authorized Service Agent or Dealer, unless you have the proper tools, service data and are mechanically qualified.</p> <p>(**) In the interests of safety, we recommend these items be serviced only by your Brammo Authorized Service Agent or Dealer.</p>									

# Component Locations

## HANDLEBARS



1. Clutch lever
2. Clutch fluid reservoir
3. Front brake fluid reservoir
4. Front brake lever
5. Throttle

## LEFT-HAND SIDE OF THE EMPULSE



1. Fuse box (under upper body panel)
2. Front brake caliper
3. Kickstand
4. Drive chain

# Component Locations

## RIGHT-HAND SIDE OF THE EMPULSE



1. Rear brake fluid reservoir
2. Fuse box (under upper body panel)
3. High voltage connector (behind upper body insert)
4. Rear brake caliper
5. Rear suspension spring
6. Transmission oil - drain plug
7. Transmission oil - fill plug
8. Coolant filler cap (behind front cover)
9. Front brake caliper

## REMOVAL AND INSTALLATION OF BODY PANELS



### WARNING

To prevent the risk of an electric shock, always make sure that the ignition switch is in the Off position and the key is removed. Never work on the Empulse if the charging cable is connected.

The removal of some of the body panels is required for normal inspection and service of the Empulse. Use the following procedures to remove the body panels as required.

### SEAT



1. Remove the bolt securing the seat assembly to the Empulse and collect the washers.
2. Lift the rear of the seat and remove.

## Installation



### WARNING

Riding with a loose or incorrectly fitted seat could cause you to crash and be seriously injured.



1. Position the seat on the Empulse and make sure the seat tongue is inserted into the mounting bracket.
2. Fit the seat retaining bolt and washers and tighten to 8 Nm.
3. Check that the front and rear edges of the seat are firmly secured to the Empulse.

# Body Panels

## UPPER BODY PANEL

1. Remove the seat. See [“SEAT”, page 47.](#)



2. Remove the two bolts securing the rear of the upper body panel to the frame. Collect the washers.



3. Remove the two bolts securing the front of the upper body panel to the frame.

4. Lift the rear of the upper body panel and carefully slide the upper body panel rearwards to release it from the upper body insert.
5. Remove the upper body panel.

**Note:** Always store body panels face up to prevent the painted surfaces from becoming scratched.

## Installation

1. Carefully position the upper body panel on the Empulse and make sure it is correctly located under the upper body insert.  
**Note:** When positioning the panel, make sure that no harnesses or cables will be trapped between the panel and the frame.
2. Loosely install the four retaining bolts to correctly align the panel to the frame.
3. Tighten the four bolts to 1 Nm.
4. Install the seat. See [“SEAT”, page 47.](#)

## UPPER BODY INSERT

1. Remove the upper body panel. See ["UPPER BODY PANEL," page 48](#).



BRM1037

2. Remove the bolt securing the rear of the upper body insert to the frame.



BRM1038

3. Remove the two bolts securing the front of the upper body panel to the frame. Take care not to scratch the panel when removing the bolts.



BRM1039

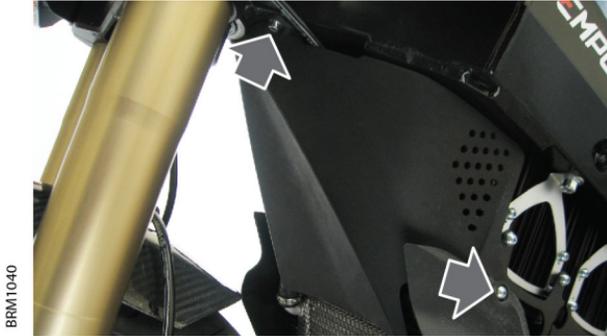
4. *For 2013 models only:* Lift the upper body insert to gain access to the speaker harness connector and disconnect the connector.
5. Remove the upper body insert.

### Installation

1. Position the upper body insert on the Empulse and make sure it is correctly located around the charging connector.
- Note:** *When positioning the panel, make sure that no harnesses or cables will be trapped between the panel and the frame.*
2. Loosely install the three retaining bolts to correctly align the panel to the frame.
  3. Tighten the three bolts to 1 Nm.
  4. Install the upper body panel. See ["UPPER BODY PANEL," page 48](#).

# Body Panels

## FRONT COVER



1. Remove the two upper bolts securing the front cover to the frame.
2. Remove the two lower bolts securing the front cover to the radiator mounting bracket.
3. Carefully release the front cover from the body panel and remove.

### Installation

1. Position the front cover and make sure it is correctly located inside the body panel.

**Note:** When positioning the panel, make sure that no harnesses or cables will be trapped between the panel and the frame.

2. Loosely install the retaining bolts to correctly align the panel to the frame and body panel.
3. Tighten the four bolts to 1 Nm.

## BODY PANEL



1. Remove the two upper bolts securing the body panel to the radiator mounting bracket.
2. Remove the two lower bolts securing the body panel to the motor controller mounting bracket.
3. Carefully remove the body panel.

### Installation

1. Position the body panel and loosely install the retaining bolts to correctly align the panel to the mounting brackets.
2. Tighten the four bolts to 1 Nm.

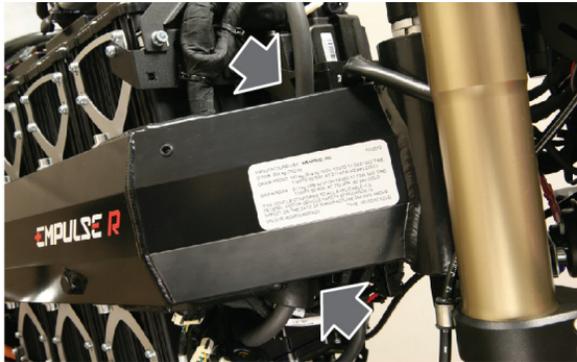
**BATTERY SAFETY DISCONNECT****WARNING**

*High voltage (103.6V nominal) exists on your Empulse; use extreme caution when working with or around any battery terminals, cables, bus bars, or other high voltage components.*

Brammo recommends that you always disconnect the Battery Safety Disconnect before working on any of the electrical systems.

To disconnect the Battery Safety Disconnect:

1. Remove the upper body insert See [“UPPER BODY INSERT”, page 49.](#)
2. Remove the front cover See [“FRONT COVER”, page 50.](#)



BRM1042

3. Locate the upper and lower halves of the Battery Safety Disconnect.



BRM1043

4. Reaching up from the underside of the frame, locate the blue button on the connector.
5. Press the button and separate the two halves of the connector.
6. Position the two halves of the connector outside the frame as a visual reminder to reconnect it when work is complete.

**Reconnection****WARNING**

*After reconnecting the Battery Safety Disconnect, the Empulse must be powered on to allow for a full electrical system test and then, if necessary, charged.*

To reconnect the Battery Safety Disconnect, position the two halves of the connector in the frame and then fully insert the lower half into upper half until it 'clicks' into position.

# Maintenance

## THROTTLE

Your Empulse is equipped with a fly-by-wire electronic throttle. There is no throttle cable or throttle freeplay to inspect or adjust.

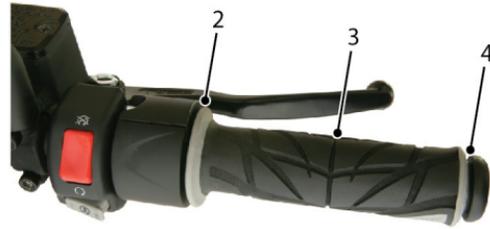
### Inspection



#### WARNING

*A sticking throttle could result in a runaway condition that could cause a crash in which you can be seriously hurt or killed. If your throttle is sticking, determine what is causing the sticking and remedy the problem before riding your Empulse.*

You should ensure that the throttle assembly is secure and that it operates smoothly and freely. If the throttle assembly is loose or if there is any binding or sticking, inspect the following or contact your Brammo Authorized Dealer.



BRM1044

1. Check that the throttle assembly is positioned properly and securely mounted on the handlebars.
2. Check that the throttle housing and throttle grip are not binding and are clean of dirt and debris.
3. Check for smooth rotation of the throttle from fully open to fully closed. The throttle should snap fully closed when released from fully open.
4. Check that the throttle grip and bar end have adequate clearance.

## SUSPENSION ADJUSTMENT

### Front Forks - Empulse



BRM1087

Spring preload adjustment nuts (both forks). Adjusting the preload lets you change the “unloaded” sag of the suspension system

- Turning the nut clockwise increases the spring preload and reduces the “unloaded” sag of the suspension system.
- Turning the nut counter-clockwise decreases the spring preload and increases the “unloaded” sag of the suspension system

To adjust the spring preload, always start from the minimum preload position (nut turned fully counter-clockwise). Take note of number of turns and adjust both forks equally.

**Note:** Factory setting= three full turns in from the full out position.



BRM1088

Rebound damping (right fork) - rotate the adjuster screw clockwise to stiffen the damping (+) and counter-clockwise to soften it (-).

**Note:** Factory setting= two full turns out from the full in position.



BRM1086

Compression damping (left fork) - rotate the adjuster screw clockwise to stiffen the damping (+) and counter-clockwise to soften it (-).

**Note:** Factory setting= two full turns out from the full in position.

# Maintenance

## Front Forks - Empulse R

BRM1054



Spring preload adjustment nuts. Adjusting the preload lets you change the “unloaded” sag of the suspension system

- Turning the nut clockwise increases the spring preload and reduces the “unloaded” sag of the suspension system.
- Turning the nut counter-clockwise decreases the spring preload and increases the “unloaded” sag of the suspension system

To adjust the spring preload, always start from the minimum preload position (nut turned fully counter-clockwise). Take note of number of turns and adjust both forks equally.

**Note:** *Factory setting= three full turns in from the full out position.*

BRM1084



Rebound damping - rotate the adjuster screw clockwise to stiffen the damping (+) and counter-clockwise to soften it (-).

**Note:** *Factory setting= two full turns out from the full in position.*

BRM1055



Compression damping - rotate the adjuster screw clockwise to stiffen the damping (+) and counter-clockwise to soften it (-).

**Note:** *Factory setting= two full turns out from the full in position.*

## Rear Shock



1. Spring pre-load - adjust the spring pre-load by rotating the two pre-load rings:
  - counter-clockwise to decrease the pre-load.
  - clockwise to increase the pre-load.

To adjust the pre-load back to the original setting used during manufacture, raise the rear wheel off the ground using a safety stand or a hoist. Rotate the pre-load ring counter-clockwise until it is loose then rotate the pre-load ring clockwise four turns.

2. Compression damping (Empulse R only) - rotate the adjuster clockwise to stiffen the damping (+) and counter-clockwise to soften it (-).

**Note:** Factory setting= 18 clicks (2.25 turns) from full in position.

3. Rebound damping (Empulse R only) - rotate the adjuster clockwise to stiffen the damping (H) and counter-clockwise to soften it (S).

**Note:** Factory setting= 1.25 turns from full in position.

## BRAKES

### WARNING

*Brake fluid is highly toxic; keep containers sealed and out of the reach of children. If accidental consumption of fluid is suspected, seek medical attention immediately.*

*If the fluid comes into contact with the skin or eyes, rinse immediately with plenty of water.*

*Brake fluid can damage plastic and painted surfaces. Handle with care, and wipe up spills immediately.*

Your Empulse is equipped with a front and rear hydraulic braking system.

As the brake pads wear, the brake fluid levels will drop. A leak in either of the systems will also cause the level to drop. Frequently inspect the systems to ensure there are no fluid leaks.

Periodically inspect the brake fluid levels and the brake pads for wear. If the brake lever or brake pedal freeplay does not feel within the normal range while riding, check the brake pads for wear.

Worn pads should be replaced. If the pads are not worn beyond the recommended limit, there is probably air in the brake system. See your Brammo Authorized Dealer to have the air bled from the system.

## Recommended Brake Fluid

### WARNING

*Only use new brake fluid from an airtight container. Fluid from open containers or previously bled from the system will have absorbed moisture, which will adversely affect performance and must not be used.*

The recommended fluid is DOT 4 brake fluid. Be sure to read the label before opening the sealed container.

## Fluid Level Inspection

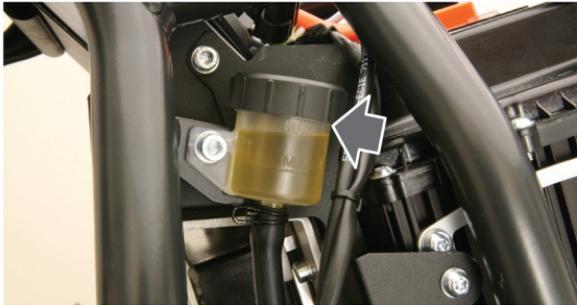
**Note:** Before commencing any work on your Empulse, refer to *“SAFETY PRECAUTIONS”*, page 36.

Place your Empulse in an upright position on a firm, level surface.



**Front brake fluid reservoir:** The sight glass should be a solid dark color all the way to the top. Rock the bike slightly to check the level.

BRM1046



Rear brake fluid reservoir: The fluid level should be above the **MIN** mark.

If your inspection indicates a low fluid level, have your Brammo Authorized Dealer add the recommended brake fluid. Do not add or replace brake fluid yourself, except in an emergency. If you do add fluid, have your Brammo Authorized Dealer check the system as soon as possible.

## Brake Pad Wear

Brake pad wear depends upon the severity of usage, the type of riding, and road conditions. Generally, the pads will wear faster on wet and dirty roads. Inspect the pads at each regular maintenance interval.

Always inspect both pads in each brake caliper, and always replace brake pads as a set.

**Minimum brake pad material thickness = 1 mm.** Brake pads should be replaced by your Brammo Authorized Dealer if the thickness is less than 1 mm.

## CLUTCH

### WARNING

*Clutch fluid is highly toxic; keep containers sealed and out of the reach of children. If accidental consumption of fluid is suspected, seek medical attention immediately.*

*If the fluid comes into contact with the skin or eyes, rinse immediately with plenty of water.*

*Clutch fluid can damage plastic and painted surfaces. Handle with care, and wipe up spills immediately.*

Your Empulse is equipped with a hydraulic clutch system. Periodically inspect the clutch fluid level. If the clutch lever does not feel within the normal range, or you have difficulty changing gear while riding, inspect the system to ensure there is not a fluid leak. Contact your Brammo Authorized Dealer for assistance.

### Recommended Clutch Fluid

### WARNING

*Only use new clutch fluid from an airtight container. Fluid from open containers or previously bled from the system will have absorbed moisture, which will adversely affect performance and must not be used.*

The recommended fluid is DOT 4 brake/clutch fluid. Be sure to read the label before opening the sealed container.

## Fluid Level Inspection

**Note:** Before commencing any work on your Empulse, refer to *"SAFETY PRECAUTIONS"*, page 36.

Place your Empulse in an upright position on a firm, level surface.



The fluid level should be above the **MIN** mark.

If your inspection indicates a low fluid level, have your Brammo Authorized Dealer add the recommended brake/clutch fluid. Do not add or replace fluid yourself, except in an emergency. If you do add fluid, have your Brammo Authorized Dealer check the system as soon as possible.

## TRANSMISSION OIL

### WARNING

*The Empulse's Limited Warranty will be invalidated if damage is caused by the use of improper transmission oil. Failure to use an oil that meets the required specification could cause excessive wear, a build-up of sludge and deposits. It could also result in transmission failure.*

*Do not use oil additives of any type as transmission damage could occur.*

The transmission oil should be changed every 3,000 mi (4,800 km) after the initial break-in period. Depending on riding conditions, it may be necessary to change the oil more frequently. Speak to your Brammo Authorized Dealer for more information.

**Note:** *There is no oil filter that needs to be replaced or cleaned.*

### Draining the transmission oil

It is recommended that the transmission oil is drained when the transmission is at its normal operating temperature. Prior to draining the oil, ride the Empulse for at least 10 minutes before stopping and removing the ignition key.

1. Position a drain pan below the transmission.
2. Clean the area around the oil filler plug.



BRM1067

3. Remove the oil filler plug.



BRM1066

4. Remove the oil drain plug and allow the oil to drain.
5. Clean the drain plug and inspect the sealing washer for damage. Replace the washer if necessary.
6. Install the drain plug and tighten to 25 Nm.

# Maintenance

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## Refilling the transmission oil

The transmission should be filled with the Empulse standing on level ground and supported on the kickstand.

1. Fill the transmission with approximately 1.0L (1 quart) of Synthetic 10W-30 API GL-1 Motorcycle oil (wet clutch approved).
2. Install the oil filler plug and tighten to 15 Nm.
3. Clean the exterior of the transmission to remove any oil deposits.

## Disposal of used transmission oil



### WARNING

*It is illegal to pollute drains, water ways or soil. Only use authorized waste disposal sites to dispose of used oil and other fluids from the Empulse.*

## FRONT WHEEL REMOVAL/INSTALLATION

**Note:** Before commencing any work on your Empulse, refer to “[SAFETY PRECAUTIONS](#)”, page 36.

We recommend that removal of the wheel be done by your Brammo Authorized Dealer or another qualified mechanic. Do not attempt to remove the wheel on your own. Wheel removal requires mechanical skill and professional tools.

### Removal

1. Park your Empulse on a firm, level surface.
2. Support the Empulse securely and raise the front wheel off the ground using a safety stand or a hoist.



BRM1069

3. Remove the two bolts securing LH front brake caliper to the front forks.

4. Release the brake pads from the rotor and position the caliper assembly aside. Support the caliper and avoid twisting the brake hose.
5. Remove the two bolts securing RH front brake caliper to the front forks.
6. Release the brake pads from the rotor and position the caliper assembly aside. Support the caliper and avoid twisting the brake hose.

**Note:** Avoid depressing the front brake lever with the calipers removed. Avoid getting grease, oil, or dirt on the disc or pad surfaces.



BRM1068

7. Loosen the two left-side front axle pinch bolts.
8. Loosen the two right-side front axle pinch bolts.



BRM1069

9. Using a 27 mm wrench or socket, remove the front axle nut.
10. Remove the axle and wheel.

## Installation

1. Position the wheel and insert the front axle. Verify that the axle is fully seated, then install and tighten the axle nut to 115 Nm.
2. Tighten the four front axle pinch bolts to 5 Nm.
3. Clean the mating faces of the brake caliper assemblies and forks.
4. Position the calipers on the front forks.
5. Clean the threads of the caliper bolts and apply a small drop of Loctite 243 to the threads.
6. Install the caliper bolts and tighten to 46 Nm.

**Note:** If a torque wrench was not used during installation, see your Brammo Authorized Service Agent as soon as possible to verify proper assembly. Improper assembly may lead to loss of braking capability.

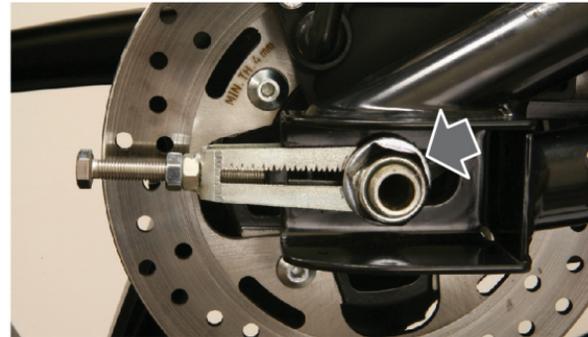
## REAR WHEEL REMOVAL/INSTALLATION

**Note:** Before commencing any work on your Empulse, refer to [“SAFETY PRECAUTIONS”](#), page 36.

We recommend that removal of the wheel be done by your Brammo Authorized Dealer or another qualified mechanic. Do not attempt to remove the wheel on your own. Wheel removal requires mechanical skill and professional tools.

### Removal

1. Park your Empulse on a firm, level surface.
2. Support the Empulse securely and raise the rear wheel off the ground using a safety stand or a hoist.



BRM1071

3. Remove the axle nut and washer securing the rear axle.
4. Remove the rear axle and lower the wheel.



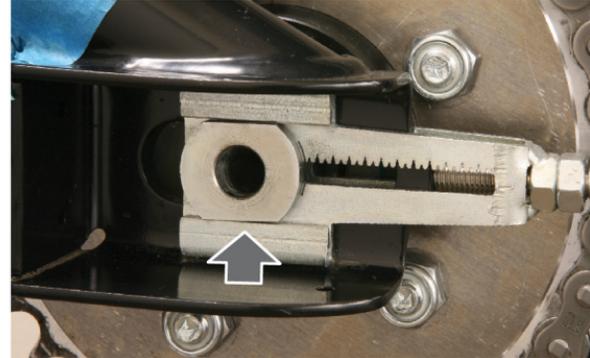
BRM1073

5. Release the caliper mounting bracket from the swingarm and then carefully remove the caliper assembly from the disc.
  6. Support the caliper assembly once removed. Do not twist the brake hose. Avoid getting grease, oil, or dirt on the disc or pad surfaces.
- Note:** Avoid depressing the rear brake lever with the wheel removed.
7. Move the rear wheel fully forward and release the drive chain from the rear wheel sprocket.
  8. Remove the rear wheel.

## Installation

1. Position the rear wheel between the swing arm and install the chain on to the rear sprocket.
2. Using assistance, raise the rear wheel while positioning the rear caliper assembly on the brake disc and locating it in the slot on the swingarm.

3. Insert the rear axle from the left side of the swingarm, through the wheel, the caliper mounting bracket and through the right side of the swingarm.



BRM1072

4. Make sure the rear axle is correctly located in the slot on the left side axle block.
5. Install the rear axle nut and washer.
6. Check the drive chain tension and adjust as necessary. See *"DRIVE CHAIN"*, page 67.
7. Tighten the rear axle nut to 55 Nm.

**Note:** If a torque wrench was not used during installation, see your Brammo Authorized Service Agent as soon as possible to verify proper assembly. Improper assembly may lead to loss of braking capability.

## TIRES



### WARNING

*Using tires that are excessively worn or improperly inflated can cause an accident in which you can be seriously hurt or killed. Follow the instructions in this owner's manual regarding tire inflation and maintenance.*

To safely operate your Empulse, your tires must be the proper type and size, in good condition with adequate tread, and correctly inflated for the load you are carrying.

The following gives detailed information on how and when to check your air pressure, how to inspect your tires for wear and damage, and our recommendations for tire repair and replacement.

### Tire Pressures

**Note:** Before commencing any work on your Empulse, refer to "SAFETY PRECAUTIONS", page 36.

Properly inflated tires provide the best combination of handling, tread life, and riding comfort.

Generally, under-inflated tires wear unevenly, adversely affect handling, and are more likely to fail from being overheated. Overinflated tires make your Empulse ride harshly, are more prone to damage from road hazards, and wear unevenly.

We recommend that you visually inspect your tires before every ride and use an air pressure gauge to check the air pressure at least once a month or any time you think the tires might be low.

Tubeless tires have some degree of self-sealing ability if they are punctured. However, because leakage is often very slow, you should look closely for punctures whenever a tire is not fully inflated.

Always check air pressure when your tires are "cold" – after the Empulse has been parked for at least three hours. If you check air pressure when your tires are "warm" – even if your Empulse has only been ridden for a few miles – the readings will be higher. If you let air out of warm tires to match the recommended cold pressures, the tires will be under-inflated.

The recommended "cold" tire pressures are:

	2013 Models	2014 Models
Front	220 kPa / 2.25 kgf/cm <sup>2</sup> 32 PSI	248 kPa / 2.53 kgf/cm <sup>2</sup> 36 PSI
Rear	234 kPa / 2.39 kgf/cm <sup>2</sup> 34 PSI	290 kPa / 2.95 kgf/cm <sup>2</sup> 42 PSI

### Inspection

Whenever you check the tire pressures, you should also inspect the wheel and tire to see if any of the following are evident:

- Dents, cracks or any other damage to the wheel. Replace the wheel if damaged.
- Bumps or bulges in the side of the tire or the tread. Replace any tire that has a bump or bulge.
- Cuts, slits, or cracks in the tire. Replace the tire if you can see fabric or cord.

- Nails or other foreign objects embedded in the side of the tire or tread. Repair or replace the tire
- Excessive tread wear.

**Note:** If you hit a pothole or hard object while riding, pull to the side of the road as soon as you safely can and carefully inspect the tires for damage.

### Tread Wear

For the best performance, the tire should be replaced by your Brammo Authorized Service Agent or Dealer before the tread depth at the center reaches the following limits:

Front	1.5 mm (0.06 inch)
Rear	2.0 mm (0.08 inch)

### Tire age degradation

Tires degrade over time due to the effects of ultraviolet light, extreme temperatures, high loads, and environmental conditions. It is recommended that tires are replaced every six years, but may require replacement more frequently.

### Tire Replacement



#### WARNING

*Mounting improper tires on your Empulse can affect the handling and stability. This can cause a crash in which you can be seriously hurt or killed. Always use the size and type of tires recommended in this owner's manual.*

*It is recommended that the replacement of wheels and tires is performed by your Brammo Authorized Service Agent or Dealer.*

The tires that came on your Empulse were designed to match the performance capabilities of your Empulse and provide the best combination of handling, braking, durability, and comfort. You should replace the tires with tires of the same size, load range, and speed rating.

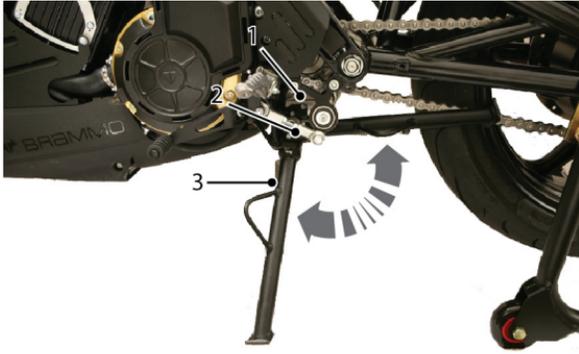
The recommended tire sizes for your Empulse are:

Front	120/70-17
Rear	180/55-17

Whenever you replace a tire, remember to have the wheel balanced after the tire is mounted

## KICKSTAND

**Note:** Before commencing any work on your Empulse, refer to “SAFETY PRECAUTIONS”, page 36.



BRM1052

1. Kickstand sensor
2. Kickstand magnet
3. Kickstand spring

## Inspection

1. Check that the kickstand assembly is working properly. If the kickstand is stiff or squeaky, clean the pivot area and lubricate the pivot pin with clean grease.
2. Check the kickstand spring for damage or loss of tension.
3. Check the kickstand system cut-off:
  - Power up the Empulse in drive mode (see “ENABLING THE DRIVE SYSTEM”, page 20).
  - Raise the kickstand. The drive system should be enabled.
  - Lower the kickstand. The drive system should be disabled.

**Note:** If the drive system doesn't enable with the kickstand up or disable with the kickstand down, contact your Brammo Authorized Dealer for service.

## DRIVE CHAIN

**Note:** Before commencing any work on your Empulse, refer to “SAFETY PRECAUTIONS”, page 36.

A 86-link (2014 models: 84 link) 520 ISO X-Ring Chain connects the motor’s 14 tooth sprocket to the rear wheel’s 38 tooth sprocket.

The service life of the chain depends on proper lubrication and adjustment. Poor maintenance can cause premature wear or damage to the drive chain or sprockets. The drive chain should be checked, adjusted, and lubricated as part of the pre-ride inspection (see “PRE-RIDE INSPECTION”, page 18). Under severe usage, or when the Empulse is ridden in unusually dusty or muddy areas, more frequent maintenance will be necessary.

Before servicing your drive chain, turn the ignition switch to the Off position and lower the kickstand. It is not necessary to remove the drive chain to perform the recommended service in the maintenance schedule.

## Inspection

**Note:** The tension of the drive chain should be checked (and adjusted, if necessary) every 300 miles (500 km)

The Empulse should be supported using a rear wheel stand when checking the chain tension.



BRM1064

Check the tension in the lower drive chain at the mid point between the sprockets, this is approximately level with the edge of the tire. The vertical deflection in the drive chain (**A**) should be measured using hand force only (no greater than 1kg (2.2lbs)) and should not exceed 17mm.

Rotate the wheel, and repeat the measurement at the same point midway between the sprockets.

# Maintenance

It is recommended you repeat the measurement several times to get an average value for the chain deflection in case there are any tight spots on the chain.

Inspect the drive chain for:

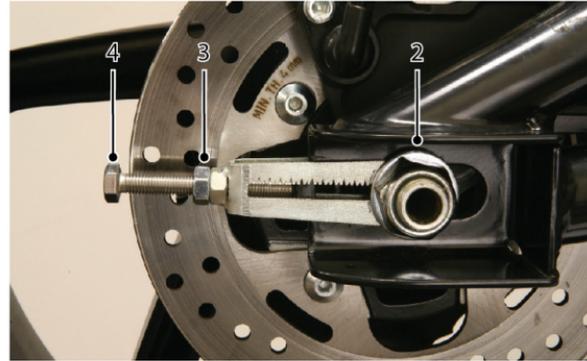
- Damaged rollers
- Dry or rusted links
- Excessive wear
- Improper adjustments

Replace the drive chain if it has damaged rollers, loose pins, or kinks that cannot be freed. Lubricate any kinked or binding links and work them free. Adjust chain slack if needed.

Inspect the front motor sprocket and rear wheel sprocket teeth for excessive wear or damage. If necessary, have your Brammo Authorized Dealer replace a worn sprocket.

## Adjustment

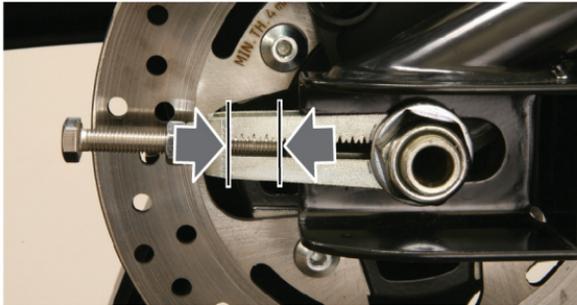
1. Place the Empulse on a rear wheel stand with the ignition switch in the Off position.



2. Using a 27 mm wrench or socket, loosen the rear axle nut.
3. Loosen the lock nuts on the drive chain adjusting bolts on both sides of the swingarm.
4. Turn both the left and right drive chain adjusting bolts an equal number of turns until the correct drive chain tension is obtained.
  - Turn the drive chain adjusting bolts clockwise to tighten the chain.
  - Turn the drive chain adjusting bolts counter-clockwise and push the wheel forwards to loosen the chain tension.

Check the chain tension at a point midway between the front motor sprocket and the rear wheel sprocket. Move the Empulse forward and recheck the chain tension.

BRM1061



5. Use the measuring marks, “teeth” on the chain adjusters aligned with the end of the swing arm to check the alignment of the swingarm. Make sure that the mark positions are equal on the left and right sides. If the rear axle is misaligned, turn the right or left adjusting bolts until the distances are equal.
6. Torque the rear axle nut to 55 Nm.

**Note:** *If a torque wrench is not used during installation, see your Brammo Authorized Dealer as soon as possible to verify proper assembly. Improper assembly may lead to loss of braking capability.*

7. Tighten the drive chain adjusting bolts lightly by turning them counter-clockwise, then tighten the lock nuts by holding the drive chain adjusting bolts with a wrench.
8. Recheck the drive chain tension.

## Cleaning



### WARNING

*Always clean a chain after contact with road salt or salt water and then lubricate with a recommended lubricant.*

Wipe down the O-ring chain with a rag and soapy water, rinse it off with a light spray of water, and when it dries, lubricate the chain with O-ring safe chain spray. The only maintenance an O-ring chain requires is to be kept in adjustment and lubricated regularly to prevent corrosion.

## Lubrication

Lubricate with a high quality lubricant every 300 miles (500 km), or sooner if the chain appears dry. When operating in wet, hot, dry, and/or dusty conditions, you may need to lubricate the chain more frequently.

Recommended lubricants

O-Ring and X-ring chain compatible.  
Apply as directed on can. Use a rag to prevent over spray on the Empulse, especially on the tires and brake rotors.

## Removal and Replacement

**Note:** *Removal of the chain is not required for normal maintenance.*

*Replace of the drive chain requires specialized equipment and should be carried out by your Brammo Authorized Dealer.*

## BATTERIES



BRM1063

The battery modules used on the Empulse are maintenance free. Aside from normal charging, there is no other maintenance to perform on the battery modules. The maintenance schedule requires battery inspection every 3,000 miles (4,800 km). This is a visual inspection to verify that all battery modules are secure, the battery cable bolts are tight, and all modules are properly charged and balanced (see [\*"BATTERY CELL BALANCING"\*](#), page 34).

Verify that all the battery cables are securely attached and the bolts are tight. If you discover a loose battery cable on one of the battery modules contact your Brammo Authorized Service Agent.

**Note:** *In order to maximize the life of the batteries, Brammo highly recommends cycling the batteries (discharged to 30% SoC or less and then charged to 100% SoC) every three months.*

## CLEANING YOUR EMPULSE



*Do not use a pressure washer to clean your Empulse. High-pressure water (or air) may damage certain parts of you Empulse. Never aim jets of water at the batteries or other electrical components. Damage caused from using a pressure washer will not be covered by the Brammo Limited Warranty.*

Frequent cleaning and polishing will keep your Empulse looking newer for longer and identifies you as an owner who values your Empulse. A clean Empulse is also easier to inspect and service.

To clean your Empulse, you may use:

- Water
- A mild, neutral detergent and water
- A mild spray and wipe cleaner/polisher
- A mild spray and rinse cleaner/degreaser and water

Avoid products that contain harsh detergents or chemical solvents that could damage the metal, paint, and plastic on your Empulse.

Park in a shady area. Washing your Empulse in bright sunlight may cause the finish to fade, because water droplets intensify the sun's brightness. Spotting is also more likely because surface water can dry before you have time to wipe it off.

Clean your Empulse regularly to protect surface finishes.

## Washing

**Note:** *We recommend the use of a garden hose to wash your Empulse. High-pressure washers (like those at coin-operated car washes) can damage certain parts.*

1. Wash your Empulse with a sponge or a soft towel, mild detergent, and plenty of water.
2. Use care when cleaning the matte plastic parts (dash, fenders, and side panels), which can scratch easier than the other parts of your Empulse.
3. After washing, rinse your Empulse thoroughly with plenty of clean water to remove any detergent residue.
4. Dry your Empulse with a chamois or a soft, dry towel.
5. Use a spray cleaner/polish or a quality liquid or paste wax on the painted body panels (apply according to the container instructions).
6. Touch up any chipped paint or scratches (contact your Brammo Authorized Dealer for touch-up paint).
7. After cleaning, inspect for damage, wear, and leaks.
8. Lubricate the chain to prevent rusting.
9. As a precaution, ride your Empulse at a slow speed and apply the brakes several times. This will help dry the brakes and restore normal braking.

# Appearance and Care

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## Removing Stubborn Marks

Type of Mark	Recommended Cleaning
Dust and fingerprint smudges.	Apply a spray cleaner/polish and wipe.
Light road grime.	Spray any difficult-to-reach or very dirty areas with a spray cleaner/degreaser. Rinse and dry. Apply a spray cleaner/polish and wipe with a non-abrasive cloth.
Heavy grime and brake dust.	Use a spray cleaner/degreaser. If necessary, rub with a sponge. Rinse and dry. Apply a spray cleaner/polish and wipe with a non-abrasive cloth.

## Painted Aluminum Wheels

Aluminum may corrode from contact with dirt, mud, or road salt. Clean the wheels after riding through any of these substances. Use a wet sponge and mild detergent. Avoid stiff brushes, steel wool, or cleaners containing abrasives or chemical compounds.

After washing, rinse with plenty of water and dry with a clean cloth.

If the paint is chipped, apply touch-up paint.

## Matte Surfaces

Use a soft cloth or sponge, plenty of water, and mild detergent to clean the matte surfaces. Dry with a soft, clean cloth.

Do not use polishing compounds or wax containing polishing compounds on these surfaces. These can damage or discolor the surface.

## STORAGE INFORMATION

If you won't be riding for an extended period, such as during the winter, thoroughly inspect your Empulse and correct any problems before storing it. That way, needed repairs won't be forgotten and it will be easier to get your Empulse running again.

We suggest you perform the following procedures to keep your Empulse in top condition and will reduce the deterioration that can occur during storage.

### Preparation for Storage

1. Wash and dry your Empulse. Wax all painted surfaces (except matte surfaces).
2. Lubricate the drive chain. See *"Lubrication", page 69*.
3. Inflate the tires to their recommended pressures. See *"Tire Pressures", page 64*.
4. Store your Empulse in a dry, unheated area that is away from sunlight and has minimal daily temperature variation.
5. Place your Empulse on stands to lift both tires off the floor.
6. Cover your Empulse with a porous material. Avoid using plastic or similar non-breathing materials that restrict air flow and allow heat and moisture to accumulate.

### Recommendations for storage periods longer than two (2) weeks

In order to maximize the life of the batteries, the following guidelines should be followed:

- The recommended state of charge (SoC) at the start of storage should be between 50% and 70%.
- The ideal storage temperature should be between 32°F and 75°F (0°C and 24°C).
- Periodically check the SoC of the batteries and charge if necessary.
- Disconnect the Battery Safety Disconnect to reduce quiescent drain on the batteries. See *"BATTERY SAFETY DISCONNECT", page 51*.

**WARNING**

*After reconnecting the Battery Safety Disconnect, the Empulse must be powered on to allow for a full electrical system test and then, if necessary, charged.*

### Removal from Storage

1. Uncover and clean your Empulse.
2. Fully charge the bike. See *"CHARGING THE EMPULSE", page 33*.
3. Lubricate the drive chain. See *"Lubrication", page 69*.
4. Perform a pre-ride inspection (see *"PRE-RIDE INSPECTION", page 18*), then test ride your Empulse at low speeds.

# Transporting Your Empulse

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## TRANSPORTATION INFORMATION

If your Empulse needs to be transported, it should be carried on a motorcycle trailer or a truck or trailer with a flatbed area. Do not tow your Empulse.

When contacting a towing or transporting service, be sure to ask if they have a flatbed area, loading ramp, or power ramp to safely lift the Empulse. Also ask if they have motorcycle tie-down straps.



BRM1085

Use tie-down straps over each lower triple clamp to secure your Empulse.

Tighten the tie-down straps until the front forks are compressed.

**Note:** Do not fully compress the forks, as this may damage them.

### GENERAL GUIDELINES

Keeping your Empulse well-maintained is the best way to reduce the possibility of having a problem on the road.

Remember to always take along your owner's manual and any other items that might help you solve a problem on your own, (e.g., 4mm & 5mm hex drivers, Torx T20 & T25, emergency tire repair kit).

Should you ever have a problem while riding, please follow these guidelines:

- Always put personal safety first.
- Do not continue riding if you are hurt or your Empulse is not in safe riding condition.
- Take time to assess the situation and your options before deciding what to do.
- If the problem is relatively minor and you have the tools, supplies, and skills, make a temporary repair.

**Note:** Remember to have the problem permanently repaired as soon as possible.

Additional recommendations for specific problems follow.

# If You Have a Flat Tire

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## REPAIR INFORMATION



### WARNING

*The use of a temporary tire repair kit to repair a puncture is not recommended. Riding your Empulse with a temporary tire repair can be risky. If the temporary repair fails, you could crash and be seriously injured or killed.*

*It is recommended that the repair or replacement of tires is performed by your Brammo Authorized Service Agent or Dealer.*

A flat tire is always unwelcome, especially if you are far from help. If you think you are losing air, or you hit a pothole or hard object, pull safely to the side of the road so you can inspect the tires and assess the situation. Be sure to park on a firm, level surface and use the kickstand for support.

You should examine the tire treads and sidewalls for foreign objects or damage. If you find a tire that has been punctured or damaged, have your Empulse transported to a Brammo Authorized Service Dealer or other qualified service facility. For transportation information, refer to *"Transporting Your Empulse", page 74.*

## FUSE BOXES



### WARNING

To avoid electrical shock, disconnect the blue Battery Safety Disconnect before replacing the fuses in the high voltage fuse box.

Only use replacement fuses of the same rating and type, or fuses of matching specification. Using an incorrect fuse may result in damage to the Empulse's electrical system and can result in a fire.

All of the electrical circuits on your Empulse have fuses to protect them from damage caused by excess current flow (short circuit or overload).

If something electrical stops working, the first thing you should check for is a blown fuse. Determine from the diagram to the right which fuse or fuses control that component. Check those fuses. Replace any blown fuses and check component operation.

If the replacement fuse blows after installation, the system should be checked by your Brammo Authorized Dealer or another qualified mechanic.

**Note:** The two fuse boxes are located under the upper body panel. See "UPPER BODY PANEL," page 48.

## Low Voltage Fuse box - Left Side



BRM1074

Fuse	Rating	Circuit protected
1	5A/32V	Running Lights
2	15A/32V	Headlight
3	5A/32V	Brake Light Horn
4	5A/32V	Turn Signals
5	5A/32V	Vehicle Control Unit Auxiliary Input Module
6	5A/32V	Coolant Pump Cooling Fan
7	5A/32V	Auxiliary Power
8	-	Not Used

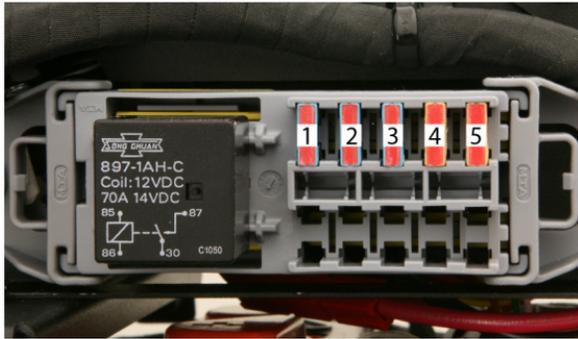
# If a Fuse Blows

## High Voltage Fuse box - Right Side



### WARNING

*To prevent the risk of an electric shock, always make sure that the ignition switch is in the Off position and the key is removed. Never work on the Empulse if the charging cable is connected.*



3RM1075

Fuse	Rating	Circuit protected
1	15A/125V	Charger
2	15A/125V	Charger
3	15A/125V	Charger
4	5A/125V	Motor Controller
5	5A/125V	DC/DC

### **SAFETY ADVICE**

Personal safety is your first priority after any accident. If you or anyone else has been injured, take time to assess the severity of the injuries and whether it is safe to continue riding. Call for emergency assistance if needed, and follow applicable laws and regulations if another person or vehicle is involved in the accident.

If you decide you are capable of riding safely, carefully inspect your Empulse for damage and determine if it is safe to ride. Check the tightness of critical nuts and bolts securing such parts as the handlebars, control levers, brakes, and wheels.

If there is minor damage, or you are unsure about the safety of your Empulse DO NOT ride it. Sometimes, crash damage is hidden or not immediately apparent, so you should have your Empulse thoroughly checked at a qualified service facility as soon as possible. Also be sure to have your Brammo Authorized Service Dealer check the frame and suspension after any serious crash.

If your Empulse cannot be ridden, refer to *"Transporting Your Empulse", page 74.*

# If You Lose Your Key

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## REPLACEMENT KEYS



BRM1076

Your Empulse was supplied with two keys. Brammo recommends that you keep one key in a safe location, as a spare, in case you misplace the other.

If one or both keys are lost, contact your Brammo Authorized Dealer for replacement options.

## WARNING AND ERROR MESSAGES

Your Empulse has the ability to detect warning and error conditions. These warnings and errors are designed to alert you, the rider, that a condition exists that is out of specification.



If a fault is detected, the system attention indicator light will illuminate on the tachometer and a message will be displayed on the LCD panel.

Most of these warnings and errors will require a Brammo Authorized Dealer to diagnose your Empulse. However, some issues can be addressed by you, either by correcting the issue or by changing your riding style.

The following is a list of error codes and what they mean.

Code	Message		Description
A6	SYSTEM FAULT A6		AIM Module Not Communicating
B6	SERVICE REQ'D B6	SYSTEM FAULT B6	BMS Not Communicating
B7	SERVICE REQ'D B7	SYSTEM FAULT B7	Battery Fault: Module Lost
B8	SERVICE REQ'D B8	SYSTEM FAULT B8	Battery Fault: Temperature Sensor Failure
B28	SERVICE REQ'D B28	SYSTEM FAULT B28	Battery Fault: Voltage Sensor Failure
B29	SERVICE REQ'D B29	SYSTEM FAULT B29	Battery Fault: Current Sensor Failure
B30	RECHARGE REQUIRED B30		Battery Fault: Critically discharged alarm
B31	SERVICE REQ'D B31	SYSTEM FAULT B31	Battery Fault: Over Volt alarm
B32	SERVICE REQ'D B32	SYSTEM FAULT B32	Battery Fault: Sanity Error (No communication)
B33	RECHARGE REQUIRED B33		Charge (SOC) is at 0%
B35	ALLOW COOLDOWN B35		Battery Fault: Over Temperature Shutdown
B36	ALLOW COOLDOWN B36		Battery Fault: Over Temperature Alarm

# System Warning and Error Codes

Code	Message		Description
B40	SERVICE REQ'D B40	SYSTEM FAULT B40	BMS Back in Idle Mode
B41	SERVICE REQ'D B41	SYSTEM FAULT B41	Battery Fault: Isolation measurement failed
B53	RECHARGE REQUIRED B53		Battery Fault: Critically discharged warning
B54	SERVICE REQ'D B54	SYSTEM FAULT B54	Battery Fault: Over Volt warning
B55	SERVICE REQ'D B55	SYSTEM FAULT B55	Battery Fault: SOC Mismatch > 30%
B56	ALLOW COOLDOWN B56		Battery Fault: Over Temperature Warning
B67	SYSTEM FAULT B67		Battery Fault: Battery tried to activate Fuse protection
C2	SERVICE REQ'D C2	SYSTEM FAULT C2	Charger Fault
C3	SYSTEM FAULT C3		Battery Fault: Safety Interlock is open
C4	SYSTEM FAULT C4		Charger Fan Current Too High
C65	COOLDOWN CYCLE C65		Charger Temperature Too High
D4	SERVICE REQ'D D4	SYSTEM FAULT D4	Motor Controller Not Communicating
D5	THERMAL CUTBACK D5		Motor Temperature Too High
D6	THERMAL CUTBACK D6		Motor Controller -- Temperature Too High
D9	SERVICE REQ'D D9		Motor Controller -- Internal Memory Error
D15	SERVICE REQ'D D15		Motor Controller -- Motor Controller Internal 12V Supply Too Low
D17	SERVICE REQ'D D17		Motor Controller -- Battery Voltage Too Low
D20	SERVICE REQ'D D20		Motor Controller -- Motor Over-Current
D21	SERVICE REQ'D D21		Motor Controller -- Contactor Coil Error

Code	Message		Description
D22	SERVICE REQ'D D22		Motor Controller -- Battery Voltage Too High
D24	SERVICE REQ'D D24		Motor Controller -- Controller error or contactor coil error
D25	SERVICE REQ'D D25		Motor Controller -- Contactor Error
D26	SERVICE REQ'D D26		Motor Controller -- Controller Error
D29	SERVICE REQ'D D29		Motor Controller -- CAN error
D30	SERVICE REQ'D D30		Motor Controller -- Over speed or encoder error
D31	SERVICE REQ'D D31		Motor Controller -- One or more motor sensor wires not connected
H34	SERVICE REQ'D H34		Discharge Precharge Error
H52	SERVICE REQ'D H52		Gear Select or Side Stand Sensor Failure
H73	GET SERVICE H73		USB Flash Drive bad or removed
I51	SERVICE REQ'D I51		Dash Power Current Too High
S53	SERVICE REQ'D S53		Motor Controller -- Low battery
S54	SERVICE REQ'D S54		Motor Controller -- High battery
S55	SERVICE REQ'D S55		Motor Controller -- Vbat below rated min
S56	SERVICE REQ'D S56		Motor Controller -- Motor low voltage
S57	SERVICE REQ'D S57		Motor Controller -- Motor high voltage
S58	THERMAL CUTBACK S58		Motor Controller -- Controller too hot
S59	THERMAL CUTBACK S59		Motor Controller -- Motor in thermal cutback
S60	SERVICE REQ'D S60		Motor Controller -- Motor too cold

## System Warning and Error Codes

Code	Message		Description
S61	SERVICE REQ'D S61		Motor Controller -- Controller in Preoperational Mode
S65	SERVICE REQ'D S65		Motor Controller -- Sequence Fault (usually, throttle was not closed when controller powered on)
S69	SERVICE REQ'D S69	SYSTEM FAULT S69	Motor Controller -- Entering cutback
S70	SERVICE REQ'D S70	SYSTEM FAULT S70	Motor Controller -- RPDO Timeout (CAN bus timing error)
S71	SERVICE REQ'D S71	SYSTEM FAULT S71	Motor Controller -- Supply Critical
S72	SERVICE REQ'D S72	SYSTEM FAULT S72	Motor Controller -- RPDO Timeout (Severe CAN bus timing error)
S73	SERVICE REQ'D S73	SYSTEM FAULT S73	Motor Controller -- Internal Fault
S77	SERVICE REQ'D S77	SYSTEM FAULT S77	Motor Controller -- Autozero range
S81	SERVICE REQ'D S81	SYSTEM FAULT S81	Motor Controller -- Line Contactor overcurrent
S82	SERVICE REQ'D S82	SYSTEM FAULT S82	Motor Controller -- Line Contactor welded
S83	SERVICE REQ'D S83	SYSTEM FAULT S83	Motor Controller -- Alg In Wire Off (usually, throttle output voltage problem)
S85	SERVICE REQ'D S85	SYSTEM FAULT S85	Motor Controller -- Encoder fault
S86	SERVICE REQ'D S86	SYSTEM FAULT S86	Motor Controller -- Motor over current
S87	SERVICE REQ'D S87	SYSTEM FAULT S87	Motor Controller -- Current Control Fault
S88	SERVICE REQ'D S88	SYSTEM FAULT S88	Motor Controller -- Motor over speed
S94	SERVICE REQ'D S94	SYSTEM FAULT S94	Motor Controller -- Mtr Slv in Wrong State
S96	SERVICE REQ'D S96	SYSTEM FAULT S96	Motor Controller -- DSP Over voltage
S97	SERVICE REQ'D S97	SYSTEM FAULT S97	Motor Controller -- Mosfet s/c M1 Top

Code	Message		Description
S98	SERVICE REQ'D S98	SYSTEM FAULT S98	Motor Controller -- Mosfet s/c M1 Bottom
S99	SERVICE REQ'D S99	SYSTEM FAULT S99	Motor Controller -- Mosfet s/c M3 Bottom
V1	SERVICE REQ'D V1	SYSTEM FAULT V1	VCU Temperature Too High
V3	SERVICE REQ'D V3	SYSTEM FAULT V3	BMS CAN processor failure
V4	SERVICE REQ'D V4	SYSTEM FAULT V4	Motor Controller CAN processor failure
V58	SERVICE REQ'D V58	SYSTEM FAULT V58	VCU +12V Out of Spec
V59	SERVICE REQ'D V59	SYSTEM FAULT V59	VCU +5V Out of Spec
V69	SERVICE REQ'D V69	SYSTEM FAULT V69	SPI Flash Memory Failure
V70	GET SERVICE V70		USB interface failure
V71	GET SERVICE V71		USB Flash Power Fail
V72	GET SERVICE V72		VCU Temperature Vref out of spec
V77	GET SERVICE V77		Sound Failure
V78	GET SERVICE V78		Real Time Clock Not Working
-	DISCONNECT POWER		AC Connected In Drive Mode
-	KICKSTAND DOWN		Kickstand is down in Drive Mode
-	CONNECT POWER		AC Not Connected In Charge Mode
-	DASH OFF - NO MESSAGE		Dash not connected
-	DASH OFF - NO MESSAGE		Dash CAN Processor Failure
-	BATTERIES LOW		Battery Fault: BMS SOC < 20%

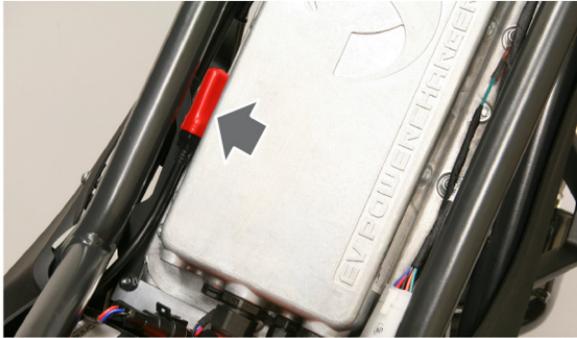
## System Warning and Error Codes

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<b>Code</b>	<b>Message</b>	<b>Description</b>
-	HEADLIGHT OFF	Headlights off in Drive Mode
-	ACCELERATOR STUCK?	Accelerator Deflected -- should be at 0 position
-	COME TO FULL STOP	Vehicle Speed not zero when throttle switch was turned on
-	CYCLE THROTTLE SW	Throttle Switch on at power up
-	SERVICE MODE	Diagnostic Cable Connected
-	CYCLE THROTTLE SW	Motor Controller switch Sequence Error
-	ACCELERATOR STUCK?	Motor Controller Accelerator deflected at power up
-	TWIST THROTTLE TO 0	Motor Controller -- Throttle Fault
-	BATTERY TOO HOT	Battery Fault: Over Temperature Shutdown with different temperature limit for Drive or Charge
-	BATTERY TOO COLD	Battery Fault: Battery is too cold to charge
-	BATTERY TOO COLD	Battery Fault: Battery is too cold to drive
-	BATTERY TOO HOT	Battery Fault: Over Temperature Shutdown with different temperature limit for Drive or Charge

## Brammo DDC™

Brammo DDC™ (Dynamic Data Collection) records key motorcycle parameters at 1Hz (1 sample/second) for analysis and service support.



The data is recorded onto a USB drive located beneath the seat. When your motorcycle is serviced Brammo technicians and authorized dealers access this information to make sure the motorcycle is performing as intended and to promptly diagnose and resolve any issues that may exist.

# Identification Numbers

## IDENTIFICATION NUMBER LOCATIONS

The Vehicle Identification Number (VIN) and motor serial number are required when you register your Empulse. They may also be required when ordering replacement parts.

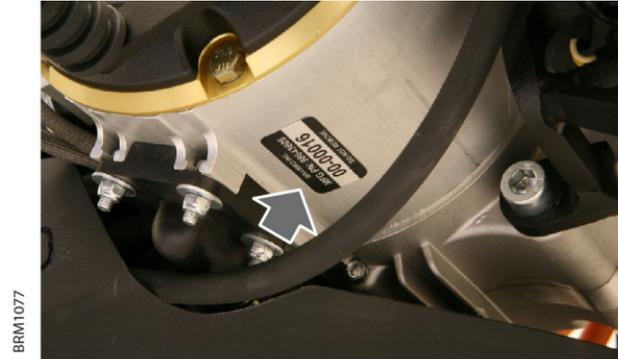
### Vehicle Identification Number (VIN)



The 17-digit VIN is stamped onto the frame's steering head behind the headlight. Turn the handlebars fully left to view the number,

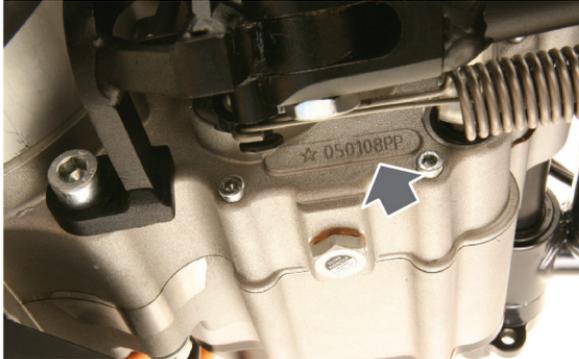
**Note:** The VIN is also shown on the safety certification label. See "SAFETY LABELS", page 6.

### Motor Serial Number



The motor serial number is located on a label on the underside of the motor.

## Transmission Serial Number



The transmission serial number is stamped on the lower left face of the transmission case - visible behind the kickstand.

## RECORD OF IDENTIFICATION NUMBERS

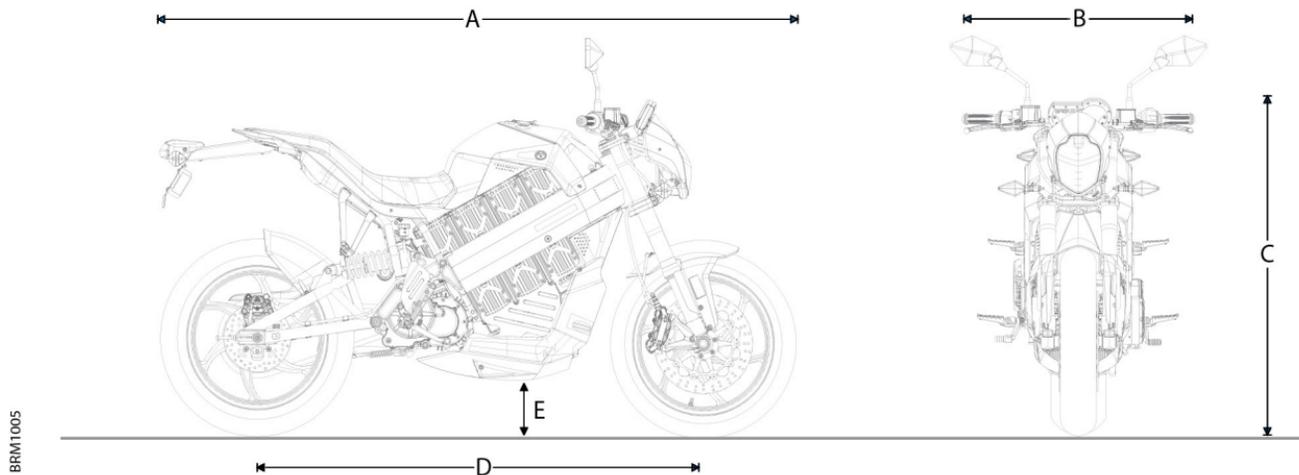
For your convenience, record the VIN and motor serial number in the spaces below.

**VIN:**

**Motor/Transmission  
Serial Number:**

# Specifications

## DIMENSIONS



A	Length	2 065 mm	81.3 in
B	Width (bar end-to-bar end)	808 mm	31.8 in
C	Height (highest portion of the dash)	1 082 mm	42.6 in
D	Wheelbase	1 473 mm	58.0 in
E	Ground Clearance	1 854 mm	7.3 in

**MOTOR**

Type	Permanent Magnet AC (PMAc) - Water Cooled	
Rating:	<i>Empulse:</i>	<i>Empulse R:</i>
- Power	40 kW @ 6,000 rpm (54 hp)	40 kW @ 4,500 rpm (54 hp)
- Max Motor Torque	63 Nm (46.5 foot pounds)	90 Nm (66 foot pounds)
Current	550 amps	

**TRANSMISSION AND FINAL DRIVE**

Transmission	IET 6 speed gearbox with multi-plate, hydraulic activated wet clutch
Drive (Motor) Sprocket	14 Tooth
Driven (Rear Wheel) Sprocket	38 Tooth
Chain	520 X-ring chain (2013 models: 86 link, 2014 models: 84 link)

**BATTERIES**

Battery Type	Brammo Power BPM 15/90 Lithium-ion (NCM Chemistry)
Number of Modules	7
Battery Pack Capacity	9.31 kWh (nominal), 10.2 kWh (max)
Battery Pack Voltage	103.6 V (nominal)
Battery Life	1,500 cycles to 80% capacity (100% DOD)
Recharge Time	Level I maximum charging time: 8 Hours. (0-99% SOC, no cell imbalances) Level II maximum charging time: 3.5 Hours. (0-99% SOC, no cell imbalances)

# Specifications

## WHEELS AND TIRES

Wheels: - Front - Rear	17" x 3.5" Marchesini 17" x 5.5" Marchesini	
Tires: - Front - Rear	<i>2013 Models:</i> - 120/70-17 AVON AV79 - 180/55-17 AVON AV80	<i>2014 Models:</i> - 120/70-17 ContiRoadAttack 2 - 180/55-17 ContiRoadAttack 2
Tire Pressures (Cold): - Front - Rear	<i>2013 Models:</i> 220 kPa / 2.25 kgf/cm <sup>2</sup> (32 PSI) 234 kPa / 2.39 kgf/cm <sup>2</sup> (34 PSI)	<i>2014 Models:</i> - 248 kPa / 2.53 kgf/cm <sup>2</sup> (36 PSI) - 290 kPa / 2.95 kgf/cm <sup>2</sup> (42 PSI)
Wheel Axle Nut Torque: - Front - Rear	115 Nm (85 lb/ft) 55 Nm (40.5 lb/ft)	
Front Forks - Axle Pinch Bolts Torque	5 Nm (4 lb/ft)	

## WEIGHTS

Unladen weight*	212.7 kg	469 lbs
Maximum laden weight	354.7 kg	782 lbs
Maximum number of riders	2	
Maximum total weight of rider, passenger and cargo	142 kg	313 lbs
* The unladen weight is inclusive of all fluids.		

**REPLACEMENT LIGHT BULBS**

Headlight	H4 - Halogen 55/60W Bulb
Brake/Tail Light	12V 21/5W Bulb
Turn Signals	12V 18W Bulb
License Plate Light	12V 5W Bulb
Front Parking Light	12V 4W Bulb

**APPROVED FLUIDS**

<b>Fluid</b>	<b>Specification</b>
Transmission Oil	Synthetic 10W-30 API GL-1 Motorcycle oil (wet clutch approved)
Brake Fluid	Use any proprietary brand of brake fluid meeting DOT 4 specification
Clutch Fluid	Use any proprietary brand of brake fluid meeting DOT 4 specification
Coolant	Peak Global Lifetime 50/50. 50% aqueous ethylene Glycol OAT
Chain Lubricant	Aerosol lubricant designed specifically for motorcycle O-ring and X-ring chains. Apply as directed on can.

# Warranty

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## Warranty Period

Under regular use, the valid term for the parts warranty is:

- General Warranty: 24 months
- Battery and Motor Warranty: 24 months

## Brammo Warranty

Brammo warrants the Empulse under the terms of the Owner's Manual during the applicable warranty period from any defects in material and workmanship. If any such defect should be found within the applicable warranty period, Brammo has appointed Brammo Authorized dealers and Regional Dealer Support Representatives for the servicing of those products and parts under the manufacturer's warranty.

The Brammo Authorized Dealer or Regional Dealer Support Representative will perform warranty services on the Empulse after first ascertaining that the product is under warranty. Acceptable proofs of purchase for the purpose of establishing your warranty period include the original warranty registration card, receipts issued to the customer at the time of sale from an Authorized Brammo dealer (such as bill of sale) or data retrieved from electronic records held by Brammo Inc

## Brammo's Warranty Obligation

If any defect in material or workmanship should be found within the applicable Brammo warranty period specified in this Owner's Manual, Brammo's only obligation is to have the defect either repaired or replaced, at Brammo's option, with a new part or the equivalent without charge for parts and labor, at an authorized dealer, if such defect is attributable to faulty material or workmanship at the time of manufacture.

All parts removed under this limited warranty become the property of Brammo. At Brammo's sole option, warranty service may be made by replacing a larger component of which the defect is part, or with the owner's permission by replacing the vehicle.

The owner is responsible for any repairs or replacements which are not covered by this limited warranty. Brammo reserves the right to make improvements to, and/or change, the design of any model at any time without obligation to make the same improvements or changes to models previously sold.

## Limitation Of Liability

TO THE FULLEST EXTENT PERMITTED BY LAW, THE PRECEDING WARRANTY IS THE ONLY WARRANTY GIVEN BY BRAMMO FOR THE VEHICLE, AND THE VEHICLE OTHERWISE IS SOLD "AS IS". EXCEPT FOR THE WARRANTY EXPRESSLY STATED HEREIN, THE CUSTOMER AND NOT THE MANUFACTURER OR DEALER ASSUMES THE ENTIRE COST OF ALL NECESSARY SERVICING AND REPAIR SHOULD THE VEHICLE PROVE INEFFECTIVE FOLLOWING ITS PURCHASE, AND THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE VEHICLE IS WITH THE CUSTOMER. BRAMMO MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY MAKES NO WARRANTY OF MERCHANT ABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

BRAMMO IS NOT RESPONSIBLE FOR DIRECT, INDIRECT, CONSEQUENTIAL, INCIDENTAL, OR SPECIAL DAMAGES, INCLUDING, WITHOUT LIMITATION, ANY DAMAGES FROM LOSS OF USE OF THE VEHICLE. TO THE FULLEST EXTENT PERMITTED BY LAW, BRAMMO'S ENTIRE LIABILITY, WHETHER IN TORT, CONTRACT, OR OTHERWISE, SHALL BE LIMITED TO REPAIR OR REPLACEMENT DURING THE APPLICABLE WARRANTY PERIOD OF DEFECTS IN MATERIAL OR WORKMANSHIP.

## Items Not Covered By Warranty

The warranty shall NOT apply to:

- Normal maintenance and service, including, without limitation, adjustments to brakes, tire pressure, and chain tension, due to wear and tear from operation of the vehicle and not as a result of a defect in materials and workmanship;

- The replacement of normal wear parts, including, without limitation, all rubber parts, bulbs, lenses, wires, cables, fuses, tires, tubes, brake lines, and chains, due to wear and tear from operation of the vehicle and not as a result of a defect in materials and workmanship;
- Any repairs or replacements required as a result of accidents or collision;
- Any defects caused or repairs required as a result of abusive operation, negligence, accident, improper installation (modification), or inappropriate use as outlined in this Owner's Manual;
- Any products tampered with, modified, adjusted, or repaired by any unauthorized party, including the owner;
- Any damage caused or resulting from the use of inappropriate tools;
- Any additional accessory installed by the owner which causes defect of additional parts;
- Any cosmetic damage to the surface or exterior;
- Any damage caused by external or environmental conditions such as abnormal weather, accidents, earthquake, etc;
- Any product received without appropriate model and frame serial number identification;
- Any product used for rental or racing purposes;
- Failure to use vehicle in the proper manner, or follow the maintenance and storage procedures in this Owner's Manual (i.e., motorcycle designed for "on the road use" and used as "off road vehicle").

## **Owner's Warranty Responsibilities**

It is the responsibility of each owner to:

1. Obtain from the Authorized Brammo Empulse Dealer from whom the vehicle was purchased:
  - A signed copy of the sales registration form indicating the pre-delivery inspection has been completed in accordance with the manufacturer's instructions;
  - The appropriate Owner's Manual for the model of vehicle purchased;
2. Ensure, at his own expense, the vehicle has the maintenance service inspections specified in this owner's manual conducted by a Brammo Authorized dealer or Regional Dealer Support Representative and to maintain adequate proof that such service inspections have been conducted; and,
3. Ensure that the Brammo Authorized Dealer or Authorized technician conducting the service inspections has certified and documented the work performed in the "Maintenance Record" section of this Empulse owner's manual.

## Roadside Assistance

24 hour emergency roadside assistance is standard on all new Brammo Empulse models for the duration of the warranty period.

Once your warranty registration card has been processed by Brammo, you will receive a membership card with your policy number, the emergency 1-800-234-1353 number and an explanation of benefits.

Here are some of the benefits of the roadside assistance program:

- Two years of coverage.
- Up to three (3) recoveries per year.
- Program will cover up to \$200.00 per recovery.
- Only recovery services specializing in motorcycles will be dispatched out.

## Customer Satisfaction

Product quality and customer satisfaction are critical ingredients to the success of Brammo. This information is designed as a tool to help you understand how to efficiently service our products by working with an Authorized Brammo Dealer near you or a Regional Dealer Support Representative. Should a question or problem arise concerning service and warranty which cannot be resolved by an Authorized Brammo dealer or a Regional Dealer Support Manager, please contact Brammo headquarters directly. Our goal is to quickly resolve your problem. A list of your nearest Authorized Brammo dealers and Regional Dealer Support Manager can be located by visiting our website at:

[www.brammo.com](http://www.brammo.com)

Should you have any further questions after visiting our website you can write or call:

Brammo Inc.  
550 Clover Lane  
Ashland, OR 97520  
USA  
Tel: 1-888-482-7266

# Reporting Safety Defects

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## Reporting Safety Defects

If you believe that your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying Brammo Inc.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or Brammo Inc.

To contact NHTSA, you may call the Vehicle Safety Hotline toll-free at:

1-888-327-4236 (TTY: 1-800-424-9153); go to <http://www.safercar.gov>; or write to:

Administrator  
NHTSA Headquarters  
1200 New Jersey Avenue, SE  
Washington, DC 20590

You can also obtain other information about motor vehicle safety from:

<http://www.safercar.gov>

## MAINTENANCE RECORD

After you have had your Empulse serviced, please make sure that the appropriate maintenance record has been completed.

Use the space under "Notes" to record issues you want to remind yourself about or mention at the next service.

300 miles (500 km)	
Odometer reading:	Date:
Notes:	
Performed by:	

600 miles (1,000 km)	
Odometer reading:	Date:
Notes:	
Performed by:	

3,000 miles (4,800 km)	
Odometer reading:	Date:
Notes:	
Performed by:	

6,000 miles (9,600 km)	
Odometer reading:	Date:
Notes:	
Performed by:	

9,000 miles (14,400 km)	
Odometer reading:	Date:
Notes:	
Performed by:	

# Maintenance Record

---

<b>12,000 miles (19,200 km)</b>	
Odometer reading:	Date:
Notes:	
Performed by:	

<b>15,000 miles (24,000 km)</b>	
Odometer reading:	Date:
Notes:	
Performed by:	

<b>18,000 miles (28,800 km)</b>	
Odometer reading:	Date:
Notes:	
Performed by:	

<b>21,000 miles (33,600km)</b>	
Odometer reading:	Date:
Notes:	
Performed by:	

<b>24,000 miles (38,400 km)</b>	
Odometer reading:	Date:
Notes:	
Performed by:	

<b>27,000 miles (43,200 km)</b>	
Odometer reading:	Date:
Notes:	
Performed by:	

<b>30,000 miles (48,000 km)</b>	
Odometer reading:	Date:
Notes:	
Performed by:	

<b>33,000 miles (52,800 km)</b>	
Odometer reading:	Date:
Notes:	
Performed by:	

<b>36,000 miles (56,600 km)</b>	
Odometer reading:	Date:
Notes:	
Performed by:	

<b>39,000 miles (62,400 km)</b>	
Odometer reading:	Date:
Notes:	
Performed by:	

<b>42,000 miles (67,200 km)</b>	
Odometer reading:	Date:
Notes:	
Performed by:	

<b>45,000 miles (72,000 km)</b>	
Odometer reading:	Date:
Notes:	
Performed by:	

# Maintenance Record

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<b>48,000 miles (76,800 km)</b>	
Odometer reading:	Date:
Notes:	
Performed by:	

<b>51,000 miles (81,600 km)</b>	
Odometer reading:	Date:
Notes:	
Performed by:	

<b>54,000 miles (86,400 km)</b>	
Odometer reading:	Date:
Notes:	
Performed by:	

<b>57,000 miles (91,200 km)</b>	
Odometer reading:	Date:
Notes:	
Performed by:	

<b>60,000 miles (96,000 km)</b>	
Odometer reading:	Date:
Notes:	
Performed by:	

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