



 **TRiO**
OWNER'S MANUAL



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SAFETY WARNING!

Read, understand, and follow all of the instructions and safety precautions in this Owner's Manual and on all product labels. Failure to follow the safety precautions could result in serious injury or death.

About This Manual

For the safe and enjoyable operation of your TRiO front-end conversion, be sure to follow the instructions and recommendations in this Owner's Manual. If your Owner's Manual is misplaced or damaged, please obtain a replacement.

- If you have questions about the operation or maintenance of your TRiO after you've read this Manual, please contact Tilting Motor Works .
- All references in this Owner's Manual to RIGHT, LEFT, FRONT, OR REAR are from the operator's perspective when in the driver's seat.
- Keep this Manual in the motorcycle's Storage Compartment so you have it handy when you ride.
- Owner's Manual Part number: **006328**
- For the most up-to-date version of this Owner's Manual, visit: www.tiltingmotorworks.com.

SAFETY SYMBOLS

The following symbols appear throughout this Owner's Manual. Your safety is involved when these words and symbols are used:



DANGER

DANGER indicates a hazardous situation which, if not avoided, WILL result in death or serious injury.



WARNING

WARNING indicates a hazardous situation which, if not avoided, COULD result in death or serious injury.



CAUTION

CAUTION indicates a hazardous situation which, if not avoided, COULD result in minor to moderate injury.

NOTE

NOTE provides key information by clarifying instructions.

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SAFETY

Overview

Read this manual carefully and completely before operating your TRiO front-end conversion. Do not attempt to ride with TRiO until you have attained adequate knowledge of its controls and operating features, and until you are trained in safe and proper riding techniques.

Regular inspections and proper maintenance, along with good riding skills, help you safely enjoy your TRiO front-end conversion. Disregarding the aforementioned, however, may render the warranty invalid.



TRiO is for experienced motorcycle riders only. Only riders who already have the balance, strength, skills, and confidence to safely operate a heavyweight two-wheeled motorcycle should operate the TRiO-converted motorcycle. It is not suitable for novice riders, or for riders whose experience is limited to conventional trikes, Can-Am[®] on-road vehicles, sidecar rigs, scooters, or smaller motorcycles.



Always heed all safety precautions and follow all operation, inspection and maintenance procedures outlined in this Owner's Manual. Failure to follow recommended precautions and procedures will result in severe injury or death.



The TRiO conversion may alter the handling characteristics of your motorcycle. It is your responsibility to learn how to use and maintain the modified vehicle safely and to ensure that other people you allow to use the vehicle do so too. Operation of the vehicle by unprepared riders may result in property damage, injury, or death..



Never leave children unattended with a parked or standing TRiO-equipped motorcycle. If TiltLock is engaged and the child switches it off, the motorcycle will fall. If TiltLock is not engaged and the motorcycle is in neutral, switching TiltLock on could allow the motorcycle to roll away.



If your motorcycle was equipped with an anti-lock braking system (ABS), it may have been modified or disabled as part of the TRiO conversion. If the ABS warning light is illuminated, then ABS is NOT available. See the [Anti-lock Braking System \(ABS\) section on page 1](#) for details.

Important Safety Information



DANGER

Do not attempt to alter or override the functionality of the TiltLock system as installed by your authorized TMW dealer. The system is carefully calibrated to account for many specific riding conditions and situations. Altering system behavior will cause you to lose control of the motorcycle, resulting in property damage, injury, or death.



WARNING

A TRiO conversion, even with TiltLock, does not function like a conventional, non-leaning trike or Can-Am[®] on-road vehicle. You must have the strength, the visual acuity, and the physical dexterity to operate a conventional heavyweight motorcycle at any speed in order to operate the TRiO.



WARNING

If you are uncertain how to use TiltLock or how it responds in certain conditions, switch the system off and ride the vehicle like a regular motorcycle. You will have to put your feet down when stopped to support the weight of the motorcycle.



WARNING

Because it leans, the TRiO is not suitable for riders who might fall off in a quick stop. Even though the TRiO can right itself, the rider must have the strength to remain on the motorcycle.



WARNING

You must not allow your feet to contact either fender. If your foot interferes with the movement of either front wheel, you may be unable to steer the motorcycle. You must remove or extend any heel shifter or floorboard railing if it could trap the foot against the fender.



WARNING

On certain motorcycles you cannot see the front wheels of the TRiO. You must understand and remember where they are to avoid running into curbs and other obstructions.

- This product is not designed or tested to address the specific needs of people with disabilities. Unlike conventional trikes and Can-Am[®] vehicles, the TRiO can fall over and is not suited for riders who do not have full use of both arms and legs.

- When powered ON, the TiltLock system automatically engages and disengages at varying speeds as described in this manual. It is your responsibility to learn how to safely operate the vehicle if so equipped. If you are uncertain how to operate the TiltLock system, you should leave it switched OFF.
- There are no user-serviceable parts inside the TiltLock system. Do not attempt to access internal components under any circumstance. Failure to follow recommended precautions and procedures could result in severe injury or death, and voids TRiO's warranty. If you ever have any questions or concerns regarding the electrical or hydraulic systems in your TRiO, contact Tilting Motor Works Technical Support at **(360) 302-3008**.

Operating Conditions

Note that state regulations vary for three- wheeled vehicles. Review your local laws regarding the operation of a three-wheeled motorcycle. To avoid a loss of control that could result in injury or death, heed all of the following drive conditions:

NEVER:

- Drive the TRiO-equipped motorcycle with a passenger until you have familiarized yourself with the handling as a solo rider.
- Drive the TRiO-equipped motorcycle off-road.

Risk of Damage

There is a risk of damage to the TRiO if the TRiO is:

- Driven off-road.
- Driven too fast over an obstacle such as a curb, speed bump or pothole.
- Struck by a heavy object impacting the TRiO front-end conversion.

In such scenarios, the TRiO could be damaged without the damage being visible. Hidden damage may not be noticeable during operation. Components damaged in this way can potentially fail. In this case, have the TRiO inspected at a TMW Authorized Dealer location.

If your TRiO has been damaged, contact Tilting Motor Works Technical Support at **(360) 302-3008** for help.

Safe Driving Practices

Operating a TRiO-equipped motorcycle requires training and practice to use the TRiO system safely and effectively. It is your responsibility to learn how to use the TRiO system under controlled circumstances, such as in large parking lots or on empty roads, before attempting complicated maneuvers in traffic.

Safe operation of you TRiO-equipped motorcycle requires you to take the necessary time to complete all of the training exercises in this manual (see [TiltLock Training on page 19](#)) before operating your TRiO-equipped motorcycle on the streets.



Operating a TRiO-equipped motorcycle without proper training could lead to a loss of control with potential for property damage, injury, or death.



It is the responsibility of the operator to learn and obey all country, federal, state, and local laws governing the operation of a 3-wheeled motorcycle.

- **Do not lane split:** The front wheels are 36" apart on center, and the overall width of the front end is 43".
- **Obey All Driving Laws:** Motorcycle helmets and a motorcycle license or endorsement may be required in your area for legal operation of the TRiO-equipped motorcycle or three-wheeled motorcycle. Follow the laws of your state. A state-by-state guide to motorcycle laws is provided online by the *Motorcycle Legal Foundation* at: <https://www.motorcyclelegalfoundation.com/motorcycle-legal/>.
- **Ensure Fasteners are Secure:** Before every ride, hold the motorcycle vertical and wiggle the handlebars back and forth to ensure fasteners are secure. There should be no free play, and you should see the motion of the bars transmitted via the steering column and the tie rods out to the wheels. See the [Fasteners on page 27](#) for more information.

Operating a TRiO has Inherent Risks

Operating a three-wheel motorcycle has inherent risks. You can minimize risks, but you cannot eliminate them completely. Even if you are an experienced 3-wheel motorcycle operator or passenger, read all of the safety information in this Owner's Manual before operating the TRiO-equipped motorcycle.

- Until you are familiar with the safe operation of a TRiO-equipped motorcycle, practice riding and braking at moderate speeds in a safe area before riding in traffic.
- Ride defensively, as if you are invisible to other motorists, even in broad daylight. Smaller profile vehicles such as the TRiO-equipped motorcycle may not be immediately seen and recognized by some motorists, which can lead to accidents. Ride where you're clearly visible to other motorists, and observe their behavior carefully. Always be prepared to take evasive action.
- Know your skills and limits, and ride within them.

Modifications



Your TMW Authorized Dealer has insured that the conversion kit is installed to specification. Any alteration or damage to the motorcycle following your conversion can create unanticipated hazards resulting in property damage, injury, or death.

For example, adding “forward controls” or highway pegs that interfere with the lean of the vehicle or trap a rider’s foot can be very dangerous.

Modifying the TRiO by removing any components, or by adding components not approved by TMW, may void your warranty. If uncertain, contact TMW Technical Support at **(360) 302-3008** for help.

Understanding the TRiO Conversion

It is crucial to understand how a TRiO conversion alters the original characteristics of your motorcycle:

Overall Weight and Length of your TRiO-Equipped Motorcycle

The TRiO with TiltLock conversion doesn’t change the seat height or stance of the original motorcycle. However, it does add about 120 lbs to the overall weight of the motorcycle. While the extra weight carries low where you might not notice it most of the time, it can affect cornering at low speeds.

The overall length of the motorcycle and the wheelbase may vary from the original by an inch or so. The trail is set at 5.0 inches.

Maneuverability

*The front wheels are **36”** apart on center and the overall width of the front end is **43”**.*

Your TRiO-equipped motorcycle has a larger turning radius than the original motorcycle. However, if you’re able to perform a U-turn on a two-lane road on a two-wheeled motorcycle, you should also be able to do it on the TRiO. Because the third wheel acts as an extra gyroscope, at speed the motorcycle may take slightly more effort to turn.

Anti-lock Braking System (ABS)

If the original motorcycle had ABS, its operation may have been altered or disabled as part of the TRiO conversion. Note that on most Harley Davidson[®], Indian[®], and 2018 and newer Honda Gold Wing[®] motorcycles, the ABS is retained following TRiO installation.

NOTE

Where ABS functionality is present, it retains two sensor inputs—one for the rear tire and one for the front. The front sensor is used on the right front wheel (in countries that drive on the right), as it is more likely to get off-pavement and skid. When ABS activates, it modulates braking pressure on both front calipers, not just the wheel generating the sensor input.

The ABS warning light on your motorcycle indicates whether the system is operational.

Normally, the ABS lamp begins flashing when the vehicle is turned on. The flashing lamp indicates that the system is in self-diagnosis mode. It continues to flash until motorcycle speed exceeds 3 mph.



With some motorcycles, it may be possible to disable the ABS warning light. If you do this, enable ABS before allowing others to ride it. If you bought your TRiO-converted motorcycle second-hand and the ABS warning light is not illuminated, it DOES NOT mean that the ABS system is functioning normally, as the previous owner may have disabled the ABS warning light.

Airbag Systems

If the original motorcycle had an airbag, any fork-mounted sensor has been removed as part of the TRiO conversion.

The airbag warning light on your motorcycle illuminates to alert you that the airbag is NOT functioning.

Tire Pressure Management System (TPMS)

The TRiO system does NOT include Tire Pressure Management System (TPMS) sensors.

If the motorcycle has a TPMS system, the front sensor will be missing and a warning light may be lit.



Do NOT add aftermarket external TPMS sensors that can contact the caliper as the wheel rotates. The valve stem will break off, causing the tire to deflate.

Online Resources

To view and print or download the most recent version of this Owner's Manual, and other related documents, visit www.tiltingmotorworks.com.

Check our website frequently for updates; web documents are updated with the most current information. You can also find additional TRiO content, along with other Tilting Motor Works products and accessories documentation.

TRiO Conversion Kit

Overview

The TRiO Conversion Kit replaces the standard single wheel front end on your motorcycle with a hydraulic two-wheel TRiO system and includes a handlebar-mounted controller with ON/OFF switch and Status LED:



The TRiO features a sophisticated hydraulic system equipped with sensors that measure speed and calculate acceleration and deceleration. Other sensors track steering and lean angles and direction of travel. All of these inputs are used to determine whether the TRiO system should be LOCKED and supporting the motorcycle (via TiltLock) or UNLOCKED and free to lean while cornering.

Benefits of the TRiO system include:

- No need to put your feet down or support the weight of the motorcycle when stopped or when rolling at very low speed (less than 7 mph).
- Improved grip on the road for more secure cornering, Improved tracking stability and increased resistance to crosswinds.
- Improved front braking.
- Coaxial A-arms provide a plush ride with no fork dive and no bump-steer.

TiltLock™

The hydraulic system in the TRiO kit provides a patented feature called *TiltLock*. TiltLock automatically levels and holds your motorcycle in a level upright position at slow speeds and when stopped, so you don't have to put your feet down or support the weight of the motorcycle.

When the TRiO system is turned ON, TiltLock is engaged, and the motorcycle is raised and LOCKED in an upright level position. TiltLock remains engaged while the motorcycle is parked, or at very low speeds (less than 7 mph).

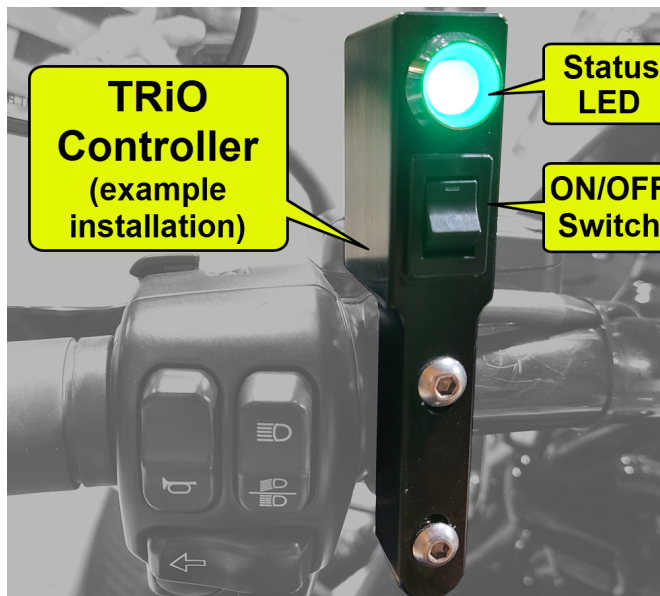
The TiltLock Status LED on the TRiO Controller lights solid GREEN to indicate that the TRiO system is ON, and TiltLock is LOCKED.

Once the motorcycle is traveling at a minimum of 7 mph, TiltLock is automatically UNLOCKED, allowing the motorcycle to lean as needed for cornering. The Status LED lights solid BLUE to indicate that TiltLock is UNLOCKED.

- The TiltLock system locks and unlocks automatically as you ride. Refer to the [Riding With TiltLock on page 13](#) for more details on how TiltLock behaves at different speeds.
- Review and practice each of the training exercises provided in the [TiltLock Training on page 19](#) until you're comfortable with the operation of the system in all conditions.

TRiO Controller

The TRiO Controller is typically mounted on the left-hand side of the handlebar (as shown below), but can be mounted on either side. The TRiO Controller features an ON/OFF switch and Status LED:



Status LED

The LED on the TRiO Controller lights to indicate that the TRiO system is turned ON, and indicates system status as follows:

Color	Status
GREEN	TiltLock is LOCKED .
BLUE	TiltLock is UNLOCKED .
FLASHING RED	Indicates a system fault. The TRiO system can still be used but redundancy is lost and the issue must be addressed. <i>Indicates a system fault requiring that you switch the system off and consult with your authorized dealer.</i>
SOLID RED	If this occurs while riding, immediately pull over, stop the motorcycle, and turn off TiltLock. Under these circumstances, TiltLock will not function correctly. Be prepared to put your feet down to support the motorcycle as you come to a stop. You can continue to ride the motorcycle normally but TiltLock will not function.
UNLIT (LED OFF)	If the LED is not lit at all while TRiO is turned on (check the ON/OFF switch), a system fault has occurred. Put your feet down immediately, turn off TiltLock, and consult your dealer for further instructions.



WARNING

Do NOT ride with TiltLock switched ON if the LED is illuminated solid red or is not illuminated at all during operation.

LED Fault Conditions

The following table describes the different fault conditions indicated by a solid or flashing red LED on the Status LED:

CONDITION	FAULT 1	FAULT 2	FAULT 3	RED LED STATE	SOLENOID STATE / MOTOR STATE
Both quadrature sensors are missing or malfunctioning	X			SOLID	Unlocked / No leveling
Quadrature sensor missing			X	Flashing (fast)	Locked / Leveling
Motor current draw is below 1000mA for 5 sec		X		Flashing (slow)	Locked / No Leveling
Motor overloaded	X			Solid	Unlocked / No leveling
Takes longer than 30 secs to level		X		Flashing (slow)	Locked / No Leveling
Faulty signal from steering sensor			X	Flashing (fast)	Locked / Leveling
Battery voltage less than 10.5 Volts			X	Flashing (fast)	Locked / Leveling
Accelerometer failure	X			Solid	Unlocked / No leveling
Solenoid failure	X			Solid	Unlocked / No leveling
Motorcycle is tipped over (over 55 degrees)		X		Flashing (slow)	Locked / No Leveling

Fault Class Descriptions:

FAULT 1	Fault 1 conditions cause a solid, non-flashing, red LED with an unlocked / No leveling state
FAULT 2	Fault 2 conditions cause the red LED to blink 500 ms on and 500 ms off continuously
FAULT 3	Fault 3 conditions cause the red LED to blink 250 ms on and 250 ms off continuously

Using TRiO

Detailed training exercises are located in the [TiltLock Training on page 19](#), explaining how to start, stop, and maneuver with TiltLock. You must review and practice these exercises until you are proficient in order to safely operate TiltLock.

Turning TRiO ON



CAUTION

The TRiO system is independent of the motorcycle ignition. It must be turned on and off separately using the ON/OFF switch on the TRiO controller.

With the motorcycle parked, flip the ON/OFF switch on the TRiO Controller to the **ON** position (→).

When turned ON, the TRiO hydraulic system will raise the motorcycle from its resting angle (for example, leaning on the kickstand) to a level upright position.



*TiltLock turned OFF
(motorcycle is resting on the kickstand)*



*TiltLock turned ON
(motorcycle is held upright by TiltLock,
kickstand not in use)*

NOTE

You can sit on the motorcycle as it levels, but it is not recommended that a passenger be on the motorcycle too, as this can strain the TRiO hydraulic system.

- The TiltLock LED blinks through several colors as the system starts up. When TiltLock is operating correctly and locked, the LED glows steadily **GREEN** (see [Status LED on page 9](#)).
- The motorcycle is not rigid when TiltLock is engaged; you can rock the motorcycle slightly to the left or right as you compress the front shocks. If you lean to one side, the system counteracts your motion. If you turn the handlebars, you'll notice that the motorcycle leans slightly in that direction. This is to assist in making sharp right or left turns from a stop (see [Riding With TRiO on page 1](#)).
- Leave TRiO turned ON for the duration of your ride, and do not turn TRiO off until the motorcycle has been stopped and parked.

Turning TRiO OFF



TRiO does not turn off automatically when you turn off the ignition.

Safely stop your motorcycle and extend the kickstand. If you have a passenger, have them dismount.

While easing the motorcycle to the left, flip the ON/OFF switch on the TRiO Controller to the **OFF** position (O).

When turned OFF, the TRiO hydraulic system will no longer support the motorcycle, and the motorcycle will settle onto the kickstand.



When the switch is turned OFF, the only things supporting the motorcycle are you and the kickstand. Without TiltLock engaged, a TRiO-equipped motorcycle can fall over just like any two-wheeled motorcycle.

Always Turn TRiO OFF When Not In Use

It is safe to leave TRiO turned on to allow TiltLock to hold the motorcycle upright for a short time (while getting gas or getting off the motorcycle for a few minutes, for example). However, do not leave TRiO on for hours (or overnight), or the battery will drain.

To protect the battery, always turn TRiO off when not in use.



If the battery fails or is disconnected while TRiO is turned on, TiltLock will unlock and the motorcycle can fall over with potential for property damage, injury, or death.



Do not use TiltLock to support the motorcycle when performing maintenance or repairs. In the event of battery failure or system failure, the motorcycle could fall over with potential for property damage, injury, or death.

Turning TRiO On or Off While Riding

DO NOT turn TRiO ON or OFF while riding. Depending on speed, lean, and other factors, the results of going from ON to OFF, or going from OFF to ON while riding can be difficult to predict.



Do not turn TRiO ON or OFF during operation. This could lead to a loss of control with potential for property damage, injury, or death.

Riding With TiltLock



CAUTION

Detailed training exercises are located in the [TiltLock Training on page 19](#), explaining how to start, stop, and maneuver with TiltLock. You must review and practice these exercises until you are proficient in order to safely operate TiltLock.

- The TiltLock system is always **LOCKED** when moving forward at speeds **below 1 mph**, when **stopped**, or when moving **backwards**.
- The TiltLock system is always **UNLOCKED** when moving forward at speeds **above 7 mph**.

With practice, you will learn to recognize when the system is locking and unlocking, and you will learn to control when it occurs. It is important to anticipate how your actions might cause the system to lock or unlock so it doesn't happen unexpectedly.

Low Speed (1-7 mph) Operation

Between 1 mph and 7 mph, the TiltLock system may be locked or unlocked depending what you're doing:

- At very low speed (less than 7 mph) the TiltLock system remains LOCKED as long as you don't accelerate quickly.
- Any hard acceleration between 1 mph and 7 mph causes the TiltLock system to be instantly UNLOCKED.
- Decelerating at any speed below 7 mph causes the TiltLock system to be LOCKED.

NOTE

TiltLock can also unlock at as low as 2 mph if the sensor detects a large instantaneous acceleration. For example, disengaging the clutch quickly.



CAUTION

Changes in the ground surface may cause the sensor to detect an acceleration, which can cause the TiltLock system to be instantly UNLOCKED.

Take Off and Acceleration

When you set off for the first time, look straight ahead and don't set off tentatively. If you throttle as you normally do on two wheels, you'll quickly accelerate through the 1 mph threshold and TiltLock releases just about the same time you'd normally put your feet up.

If you're driving straight you probably won't feel or hear it. Note that the TiltLock Status LED turns from **GREEN** to **BLUE**, to indicate that the TiltLock is **UNLOCKED** for riding and operating normally.

Slowing and Stopping

As you slow to a stop, the TiltLock system is LOCKED once you are traveling at 7 mph or slower. Note that the TiltLock Status LED turns from **BLUE** to **GREEN** to indicate that the TiltLock is **LOCKED**. This occurs at generally the same time that you would normally put your feet down.

With TiltLock system LOCKED, it is not necessary to put your feet down to support the motorcycle. The TiltLock system is designed to bring the motorcycle vertical to the horizon even if the road surface is sloping to the left or the right.

Executing a Sharp Turn From a Standing Start



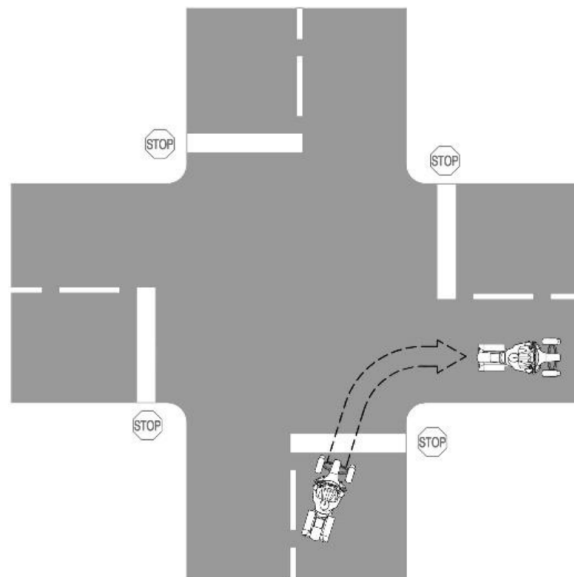
You must learn and practice this maneuver under controlled circumstances before attempting it in cross-traffic. If you go too slowly you will not achieve the turning radius needed to stay in your lane while making a right turn, or you will drop the motorcycle.

Make sure you're in first gear, and that you have a good grip on the throttle. Don't lose your nerve or momentum part way through the turn, because you'll be leaning in and not traveling very fast as you set off; if you let off the throttle while traveling faster than 7 mph, the motorcycle will drop just like a two-wheeler. Instead, accelerate smoothly out of the turn and straighten up as you normally would.

NOTE

Remember that with the TRiO, you're carrying an extra 120 lbs., so you have to be prepared to balance the motorcycle accordingly.

In general, you're always well advised to set up for a sharp turn by swinging wide as you come to a stop and getting the motorcycle pointed in the direction of the turn.



Roll up to a stop sign with the intention of making a hard right turn, and turn the handlebars to the right to pre-lean the motorcycle.

Moving in Reverse

If you're moving backwards, TiltLock remains locked regardless of speed or acceleration. It will continue leveling if the surface is sloped to either side. This makes it easy to back downhill out of a driveway, for instance.

U-Turns

When going into a U-turn from a stop, turn the handlebars fully to the left or right. With the handlebars turned in this way, TiltLock bypasses the acceleration function and stays locked until 7 mph. TiltLock releases as you accelerate out of the U-turn either because you straighten out, or because you start moving faster than 7 mph.

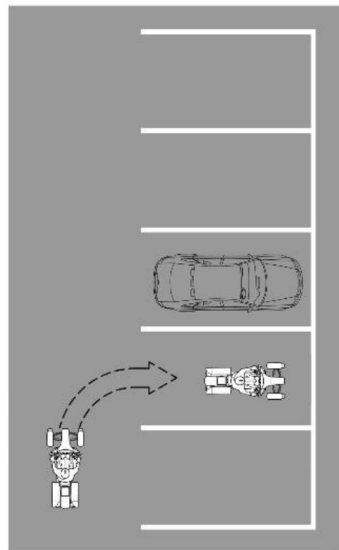
Try this maneuver at varying speeds in an empty parking lot to understand what happens as TiltLock releases at various points in the arc of the U-turn. With practice you can find a speed and a turning radius and an acceleration pattern that works well for you.

When decelerating into a U-turn, be aware that TiltLock begins locking and leveling as you slow down through 7 mph. The ideal point to lock is when you're just entering the turn and are starting to lean slightly. As you turn the handlebars, TiltLock maintains the lean as you complete the U-turn, and releases as described above when you accelerate out of the turn.

Parking

When learning how to use TiltLock, come to a complete stop in front of the parking space you want. Then, turn the handlebars fully left or right, and then slowly pull in. to the parking space. Once you are more familiar with TiltLock you can pull directly into the parking spot without stopping.

If you're leaning as the motorcycle decelerates through 7 mph, TiltLock locks and begins leveling as you slow to a stop. However, you may find yourself leaned over at a full stop, and you will have to hang on while the motorcycle corrects itself.



Do not pull into a parking lot stall quickly with the motorcycle leaned over in this way until you understand how the system behaves.

Special Driving Situations

Potholes and Bumpy Surfaces

You may find yourself on a street that's in poor condition, with a lot of potholes or surface irregularities. Here are two strategies for dealing with the situation:

1. Go EXTREMELY slowly, potentially as slow as 1 or 2 mph.

The hydraulic system is well equipped to level the motorcycle as you go along, but it won't be able to keep up if you're moving too fast.

Driving through a deep pothole too quickly can produce strong side-to-side thrust that makes it difficult to hang onto the motorcycle.

2. Accelerate to greater than 7 mph so TiltLock is disengaged and ride through the area without hesitation.

The front suspension of the TRiO handles these situations well, and if you can stand up off the seat a little bit, you won't get jolted by the rear wheel. Just drive straight and let the suspension do the job. This approach works well on washboard surfaces or other mildly bumpy surfaces where traveling greater than 7 mph isn't too difficult.

Slippery Surfaces



Even with TiltLock, your TRiO-equipped motorcycle is NOT suitable for use on icy or snowy surfaces.



When skidding with the front wheels locked up, such as on snowy or icy surfaces, TiltLock engages and brings the motorcycle vertical. Make sure you understand this behavior before you encounter this situation.

If the front wheels lock up and skid on a slippery surface, the speed sensors will indicate a speed of zero and TiltLock will begin to lock and level.

Depending on circumstances, this can either be positive or negative:

- On the positive side, TiltLock can help you stay upright while skidding where a two-wheeled motorcycle would immediately fall.
- On the negative side, you may spin to some degree while sliding and then regain traction as you exit the slippery area. This can cause a high-side accident.

Your choice is whether to keep the brakes locked up, thus keeping TiltLock engaged, or to release the brakes and let the wheels roll so that TiltLock stays disengaged.

This is similar to deciding whether sliding or rolling will produce a better outcome in an automobile.

We can't advise you on exactly how to handle every possible situation, but we encourage you to think through how skidding affects TiltLock *before* you need to decide.

Stop and Go Traffic

TiltLock can be a big convenience in stop-and-go traffic, whether it's on the freeway at rush hour, cruising the main street at a motorcycle rally, or just approaching a four-way stop in a long line of cars. You won't have to put your feet up and down all the time.

As a general strategy, leave as much room as you can between you and the car in front of you. This allows you to accelerate and decelerate smoothly, and you will know when to expect TiltLock to engage and disengage.

You may choose to move slowly along at 5 mph and leave TiltLock locked up, or you may cruise along at 8 or 9 mph using your own balance.

You may encounter situations where you're constantly accelerating and decelerating at slow speed. This means TiltLock will frequently engage on and off.

As you gain familiarity with the system, using it should become second nature.

Sudden Stops

Sudden straight-line stops pose little difficulty with TiltLock. But if you're leaning hard and suddenly have to come to a stop, hang on tight. Suppose that you're accelerating through a hard right turn at a light when a pedestrian steps off the curb into your path. On a two-wheeled motorcycle, you might have no choice but to hit the brakes and throw your foot out.

With TiltLock, you'll be locked and leveling as soon as your speed drops below 7 mph. If you're able to hang on, the motorcycle rights itself with you on it. You don't have to put your feet down. You can make a slow-speed turn to get straightened out and then be on your way.

It can happen that with all your body weight leaned in at slow speed, you'll lift the outside wheel in a sudden stop. You can probably recover and let the wheel come back down. If it doesn't, you'll have to get off the motorcycle. By tipping it up until all three wheels are on the ground you can let TiltLock take over to straighten it up.

In the unlikely event the motorcycle winds up all the way over on its side, the system automatically shuts off.

In this case:

1. Turn the TiltLock switch off,
2. Tip the motorcycle up onto three wheels,
3. Switch the TiltLock system on again, and the motorcycle will right itself.

Moving the Motorcycle While Not Riding

TiltLock can be useful for moving your motorcycle around the garage or out of a parking space. As long as you're going backwards, TiltLock won't unlock at any speed. However, when going forwards, take care not to push the motorcycle downhill or it could accelerate and unlock while you're pushing it.

Transporting Your TRiO

The TRiO can be difficult to tie down and transport successfully in a trailer unless you're prepared.

First, you'll find that you can't push the TRiO up against the front wall of a trailer because the bodywork contacts the wall before the wheels do. In a pinch you can put some blocks in front of the wheels, but they have a way of moving around in transit and then the motorcycle falls over. Don't let it happen to you!

At Tilting Motor Works we use two Condor chocks spaced 36" apart for roll-on/roll-off simplicity. If they're bolted securely to the floor it only takes one person to load and unload a motorcycle.

Make sure to strap the motorcycle down securely at the rear, pulling it forward against the chocks. Run the straps to anchor rings that are bolted through the floor, not just screwed in.

TiltLock Training

It is crucial that you take the time required to complete all of the training exercises in this section before operating your TRiO-equipped motorcycle on the streets.



Operating a TRiO-equipped motorcycle without proper training could lead to a loss of control with potential for property damage, injury, or death.

Set Up

A large (at least 100' x 250'), empty parking lot, without poles or other obstacles, is an optimal place to practice TiltLock maneuvers.

TMW uses 9-inch Safety Cones (widely available and inexpensive).

Set up the course with 24 cones, with each cone spaced about seven paces from the next cone, according to the diagrams in this section.

NOTE

Thoroughly read and understand the preceding sections of this manual prior to beginning your training program.

Starting and Stopping Straight

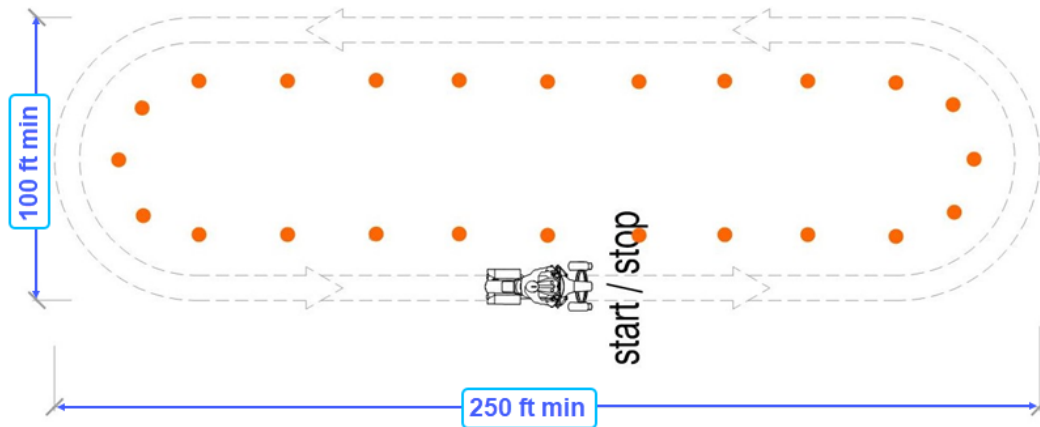
The first skill to learn is to start and stop straight. In this training, you will perform large ovals in a parking lot for this skill. The oval should be marked out with cones. See the following page to review an illustration depicting cone placement.

NOTE

You no longer have to put your feet down when you come to a stop. If you are a long-time motorcyclist, not putting your feet down may take time to become a habit.

1. Start from a standstill in the middle of the oval's straightaway.
2. Turn TiltLock on. After the start-up sequence, the handlebar LED should be solid green; if not, see [Turning TRiO ON on page 11](#).
3. Place your feet on the floorboards or foot pegs; you will be vertical to the horizon.
4. Accelerate from the stop as normal and you will see the green LED turn blue as the system unlocks.
5. Complete one full lap, slow down and come to a stop where you started.

As you decelerate through 7 mph, TiltLock lock unlocks and the green LED displays again. If you are not vertical to the horizon and leaned over as you come to a stop, the motorcycle will lock and level you. *Perform this exercise until you are comfortable.*



Accelerating

1. In the same oval course, try starting very slowly by feathering the clutch.

TiltLock remains locked as you slowly move forward. The green LED stays lit indicating TiltLock is locked.

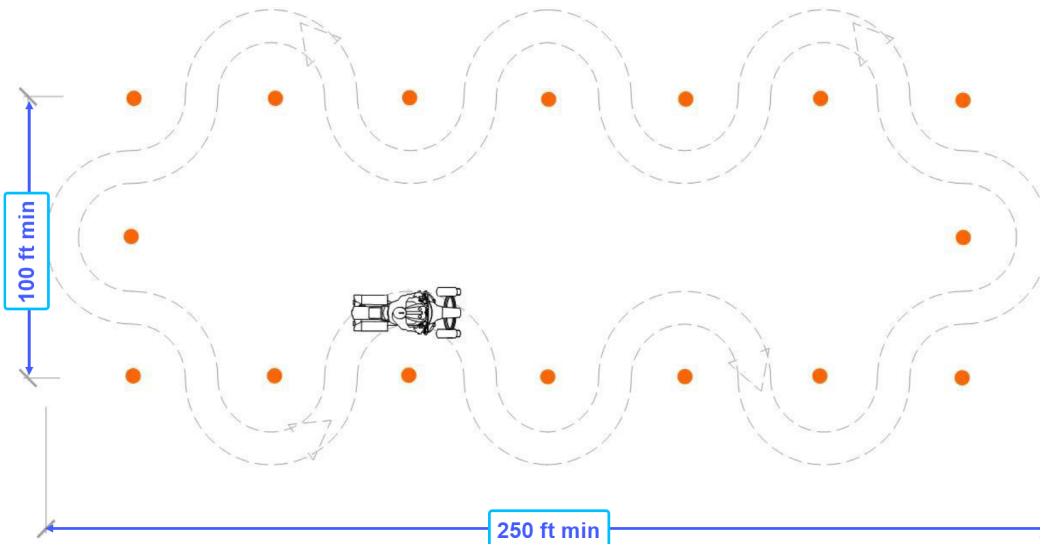
2. Accelerate and notice that the green LED immediately turns off.

Perform this exercise as many times as you need to get a feel for how soft you need to be on the clutch and how slowly you have to accelerate for TiltLock to stay locked.

You may find this skill easier to practice while riding the rear brake. This is a helpful skill for moving slowly around parking lots or moving along in stop and go traffic.

When your speed exceeds 7 mph, TiltLock unlocks.

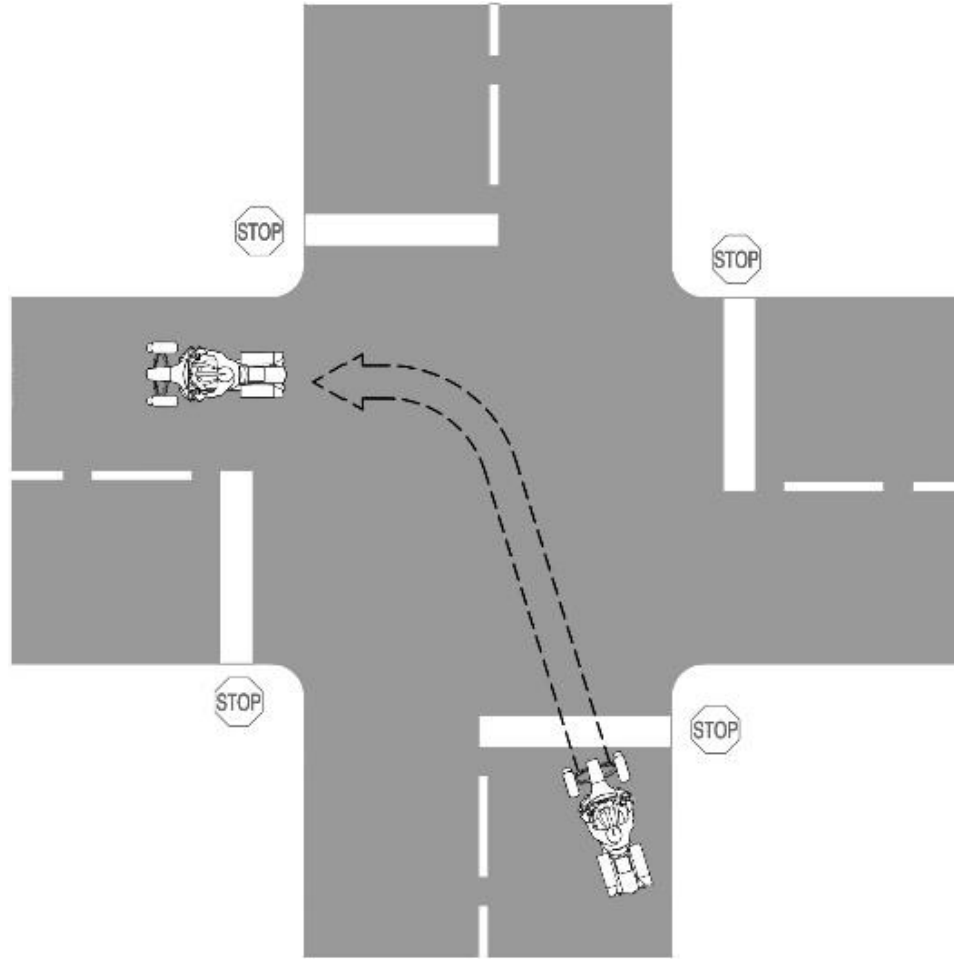
3. Use the cones on the oval course to perform S-turns at very slow speeds.



Left Turns

Starting and Making a Left Turn

Set up the cones to represent an intersection:



1. Line the motorcycle up to the right side of your lane as illustrated. Notice that the motorcycle is angled in the direction of the turn.
2. After angling the bike in the lane, ensure to return you handlebars to the straight/square position.

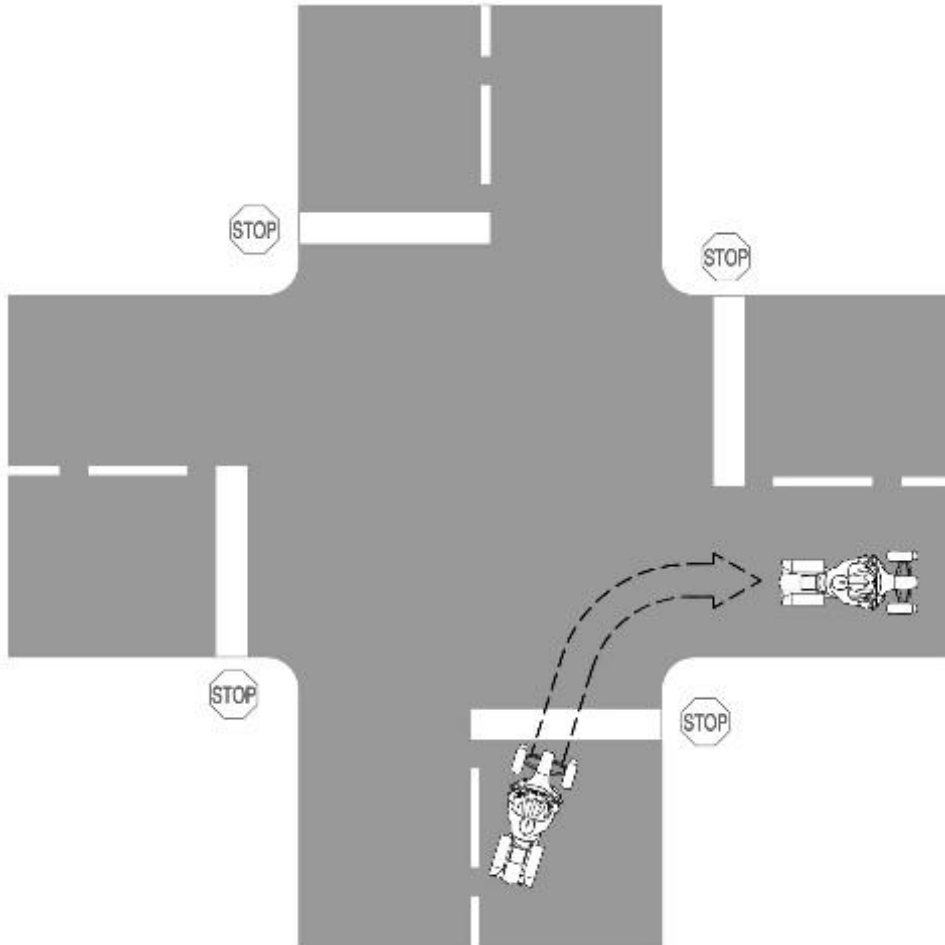
If you accelerate promptly, TiltLock will release at 1 mph and you'll be leaning freely within a matter of a foot.

Perform this exercise several times until you are comfortable.

Right Turns

Starting and Making a Right Turn

With the cones still set to represent an intersection, as shown below:



1. Line the motorcycle up to the left side of your lane as illustrated. Notice that the motorcycle is angled in the direction of the turn.
2. After angling the bike in the lane, ensure to return you handlebars to the straight/square position.

If you accelerate promptly, TiltLock will release at 1 mph and you'll be leaning freely within a matter of a foot.

Perform this exercise several times until you are comfortable.

U-Turns

The acceleration function of TiltLock is disabled when your handlebars are turned fully to the left or the right. This means that TiltLock will remain locked no matter how hard you accelerate until you reach 7 mph.



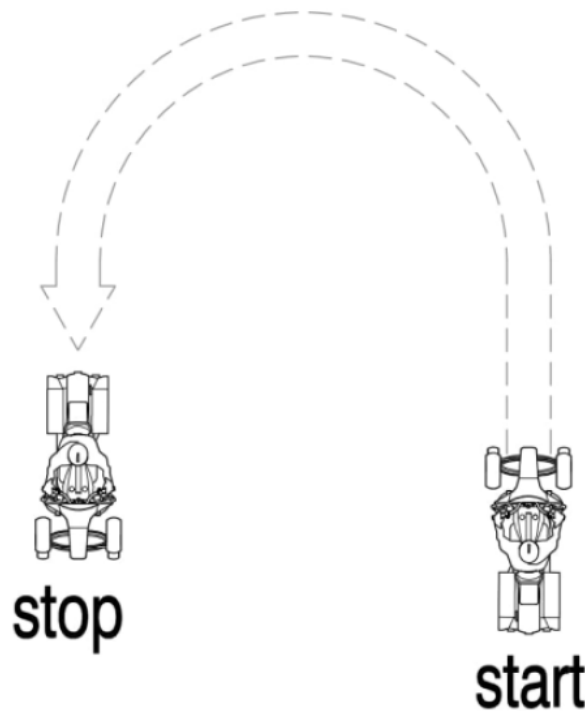
CAUTION

Do NOT exceed 7 mph with your handlebars in the full locked left or right position. If you do, TiltLock will release and the motorcycle will handle just like a regular motorcycle performing a tight maneuver.

With the handlebars in the full locked position TiltLock will lean the motorcycle over in the direction you have the handlebars turned.

Left U-Turn

The first exercise for learning to do a U-turn with TiltLock locked is to do a 180-degree turn to the left:

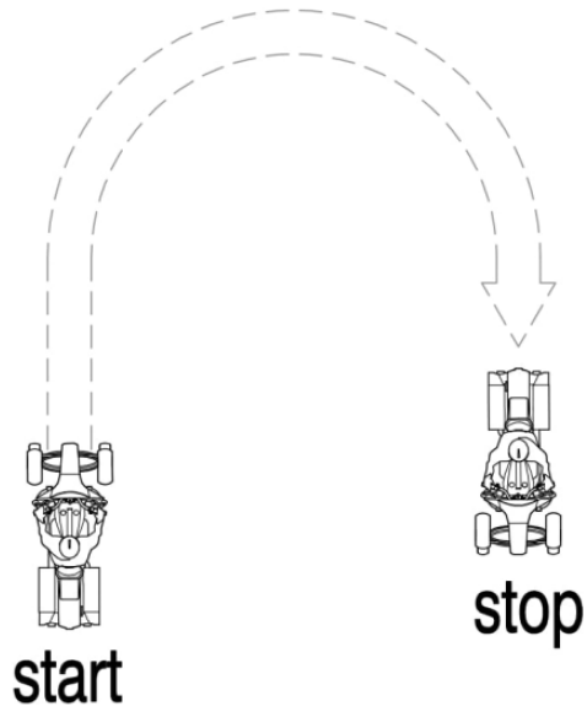


1. Start with the motorcycle stopped and TiltLock locked.
2. Turn the handlebars full lock to the left. The motorcycle will pre-lean slightly to the left.
3. Slowly release the clutch but not all the way. You will exceed the 7 mph locked limit if you fully release the clutch.
4. Do a 180 degree turn until you are facing the complete opposite direction from where you started and come to a complete stop.
5. Turn the handlebars until they are facing straight forward. You should be stopped, locked and level.

Perform this exercise several times until you are comfortable.

Right U-Turn

Perform the same U-turn exercise listed above but to the *right*.



Next, try linking U-turns to the right and to the left:

1. Make a full 180 degree U-turn to the right and come to a stop.
2. Do a U-turn to the left and come to a stop.
3. Repeat.

Cornering: High Speed vs Low Speed

TRiO won't restrict your motorcycle's lean angle when cornering at speed. Feel free to lean into turns normally. In fact, the extra traction up front is your friend. However, the TRiO-equipped motorcycle does not have full lean when the handlebars are turned hard at low speed.

It is important to learn where the limits of travel are, at varying speeds.



Do not attempt maneuvers requiring that you turn the handlebars hard while leaning hard. Typically these are low-speed parking-lot or trick maneuvers. The motorcycle will hit its lean stop, restricting the steering, and you won't be able to accelerate or steer out of the turn. As a result, the motorcycle may fall, which could result in property damage, injury, or death.

Your First Ride

Below are three important tips to keep in mind as you ride with TRiO for the first time.

1. Look Forward

When you set off, don't be looking down at the new front end; you can't get your balance that way.

There's nothing you need to monitor, nothing you need to do to get underway that's any different than a regular motorcycle. Forget you're on three wheels, look straight ahead and get your balance as you always do.

2. Use Your Throttle

Don't be tentative when you're trying it out for the first time. As with any motorcycle, you need to get underway promptly to get your balance.

When turning at low speeds, as in a parking lot, you'll feel the extra weight. Don't let gravity pull you down!

3. Watch the Line

If you're used to riding the center line or the white line on the shoulder, back it off a little bit. You might forget you're on three and run a wheel over the line by mistake. If you catch a little gravel on the shoulder, just ride out of it. The other two wheels remain squarely on the pavement.



WARNING

You must not allow your feet to contact either front fender. If your foot interferes with the movement of either front wheel, you may be unable to steer. You must remove or extend any heel shifter or floorboard railing if it could trap the foot against the fender.



WARNING

On certain TRiO-equipped motorcycles, it is impossible to see the front wheels. In this case, you must remember where they are in order to avoid running into curbs and other obstructions.

When you're underway, you'll find the motorcycle leans and counter steers just like it used to:

- To go right, push the right handgrip and feel the motorcycle lean to the right.
- To straighten up again, push the left handgrip.

NOTE

For a refresher on countersteering, read David Hough's book, "Proficient Motorcycling."

Advanced Maneuvers

Tight Left Turns

For tight left turns, line up the motorcycle to the right of the lane and turn the handlebars slightly to the left.

You will feel the motorcycle pre-lean to the left. Don't fight it, lean with it. If you accelerate decisively, the pre-lean will set you up for a quick turn.

You can also make a turn by accelerating SLOWLY into the intersection and remaining locked up until the motorcycle is pointed in the right direction.

This maneuver is not advised for intersections with fast-moving cross-traffic.

Tight Right Turns

For tight right turns, after lining up the motorcycle to the left of the lane try turning the handlebars slightly to the right.

You will feel the motorcycle pre-lean you to the right. Don't fight it, lean with it. If you accelerate decisively, the pre-lean will set you up for a quick turn.

Try the quick stop drill as laid out in the left turn section but this time making a stop mid right turn.

You can also make a right turn by accelerating SLOWLY into the turn while remaining locked until the motorcycle has completed the 90-degree turn.

With the front wheels pointed in the direction you want to go, accelerate smoothly and the lock will release.

TRiO Maintenance

Tools for the Road

We recommend that you carry a selection of basic tools when you ride, including:

- The *hub cap wrench* included with your conversion, for tire changes.
- A selection of *hex keys* to fit the various allen-head bolts used in the conversion.

NOTE

TRiO kits use Society of Automotive Engineers (SAE) standard sizes (i.e., not metric). However, Honda Gold Wing™ conversions utilize some metric fasteners.

- A *ratchet* and *sockets* to fit the various hex bolts used in the conversion.
- An open-end *adjustable wrench* (or a selection of common open-end wrenches) to grip the nuts on the bodywork and other fasteners.
- A *tire pressure gauge*.
- *Pliers* to remove the cotter pin from the spindle.

Materials to Have at Home

The following items are needed for maintenance, but not typically needed on the road:

- *Anti-seize compound* for threading hub caps onto the wheels.
- *Threadlocker* (such as blue Loctite™ #243) to secure loose fasteners.

Fasteners

Normal vibration of the motorcycle can shake fasteners loose. It is important to check them frequently to make sure that they are secure.

Checking for Loose Fasteners (Free Play)

Before every ride, hold the motorcycle vertical and wiggle the handlebars back and forth. There should be no free play, and you should see the motion of the bars transmitted via the steering column and the tie rods out to the wheels.



If you detect any free play, it can indicate that a fastener is loose in the steering linkage. You must find the loose fastener and tighten it before you ride again. Riding with free play in the steering linkage could lead to loss of control resulting in property damage, injury, or death.

Locating Loose Fasteners

NOTE

You will need the assistance of another person to locate loose fasteners.

Inspect both ends of the steering column and the tie rods, while someone else wiggles the handlebars. You will see that the steering column or the tie rod wiggles on one side of the loose fastener and not the other side.

Additional areas on your motorcycle to routinely check for loose fasteners are listed below with their torque values and/or tightening instructions:

All fasteners attaching the TRiO frame to the frame of the bike:	6mm hardware @ 15 lb· ft 5/16 hardware @ 20 lb· ft 3/8 hardware @ 35 lb· ft
Fasteners attaching the fender bracket to the top of the spindle housing:	15 lb· ft with blue Loctite
Screws attaching the fenders to the fender brackets:	7 lb· ft or 84 lb· in with blue Loctite
Caliper bolts:	Tighten Nyloc until there is 1/16" additional space from compressing the o-ring.
Jam nuts securing the rod ends to the tie rods:	20 lb· ft
Screws attaching the triple tree to the down tubes:	55 lb· ft with blue Loctite
Bolts attaching the lower rocker plate to the main arch support:	60 lb· ft with red Loctite
Anchor bolts at each end of the tie rod, including the bolt attaching the universal joint to the steering column:	Tie rod to knuckle: 20 lb· ft U-joint to steering yoke: 25 lb· ft with blue Loctite
Bolts attaching the steering yoke to the steering column:	3/8 clamp bolts: 25 lb· ft with blue Loctite 5/16 retainer: 15 lb· ft with blue Loctite
Screws attaching the steering column to the underside of the triple tree:	15 lb· ft with blue Loctite



CAUTION

If you detect free play in the steering and find no loose fasteners, contact your factor-trained TRiO dealer about replacing the rod ends on the tie rods. Free play shouldn't occur before 30,000 miles and is best left to your TMW authorized dealer, as the front end needs to be re-aligned using specialized tools after replacing the rod ends.

Tightening Loose Fasteners

NOTE

Note the torque values associated with fasteners in this Manual to avoid over-tightening, which breaks a bolt, stretches a bolt, and creates fastener fatigue. Fasteners can be snugged down securely without using great force.

- Use a wrench to firmly tighten the fastener.
- If the same fastener becomes loose again remove it, and add blue Loctite #243 to the threads before replacing.
- Loctite is not needed on fasteners secured with nylon-insert locknuts.

Tires

Tire Wear Patterns

Observe the wear pattern on the front tire treads to verify that your TRiO remains correctly balanced and aligned. The wear surface should be centered on the tread, wearing evenly from side to side, with no evidence of scuffing or cupping.

You can expect the front tires to wear much more slowly than the rear tire, so don't gauge the condition of the rear tire by looking at the front tires. Inspect the rear tire frequently for signs of excess wear.

If you detect irregular tread wear, contact your TRiO dealer for instructions. Provide photographs to help service technicians with the diagnosis.

Tire Inflation

Tires are inflated to 36 PSI of pressure and spin-balanced at installation with wheel weights. Carry a tire pressure gauge and frequently check tire pressures.



DANGER

Tighten valve caps securely after checking or adjusting tire pressure. If a valve cap becomes loose, it can contact the caliper as the wheel rotates, break off the valve stem, and cause a total loss of pressure. This can result in losing control of the motorcycle, with a potential for property damage, injury, or death.

Replacing Tires

Tires should be replaced when the grooves in the tread have worn down to less than 1/16th inch, or if skidding has worn a flat patch on the tread.



CAUTION

Tires with foreign objects penetrating the tread or sidewalls cannot be repaired and must be replaced.

If worn, you should replace both front tires at the same time.

Factory original equipment is **Dunlop American Elite 130/80B17**. This tire is available in blackwall and white-striped versions; there is no whitewall version.

Tires are directional, and care must be taken to mount them properly to insure correct rotation on the left and right front wheels.

The wheels themselves are identical; it doesn't matter which wheel is used on the left and which on the right as long as the rotation of the tires is correct.

Use the directional arrow on the tire's sidewall to ensure proper orientation.

NOTE

It is normal for the front tires to wear much more slowly than the rear tire. Do not gauge the condition of the rear tire by looking at the fronts. Inspect the rear tire frequently for signs of excess wear.

Wheel Alignment

The tie rods connecting the steering shaft to the wheels never need adjusting.

If a locknut comes loose, tighten the nut and then take your motorcycle to a service technician to ensure that the locknuts are securely and safely tightened.

Motorcycle Wobbling

Any type of wobble is cause for concern. Certain two-wheeled motorcycles are known to wobble at the rear end under various circumstances, and the TRiO conversion does not change that behavior.

Rutted pavements can also produce unexpected wobbles. Experiment with the tracking of the wheels relative to the ruts to find the most secure position.



WARNING

Persistent wobbles that can't be attributed to specific maneuvers or road conditions may indicate that something is coming loose! Do not continue riding without checking for loose fasteners. If nothing is found, consult your dealer.

Brakes

Motorcycle braking systems are configured very differently from one model to the next. Features such as ABS, proportional braking, and fork dive sensors are handled in different ways when installing your TRiO. It is not practical to list them all, but here are some basic rules:

- **If your motorcycle was equipped with factory ABS, it was disabled in the installation of the standard TRiO.** It is retained when installing TRiO with TiltLock on certain Honda Gold Wing[®], Harley Davidson[®] and Indian[®] motorcycles.
- If you retrofit the standard TRiO to add TiltLock on those models, ABS will be reinstated. See the [Anti-lock Braking System \(ABS\) section on page 1](#) for more information.
- **On Honda motorcycles, linked braking is disabled.** This means that the front brake lever controls only the front wheels, and the rear brake pedal controls only the rear wheel. You may need to adjust your braking style to apply more foot pressure to the rear brake pedal than you did before.
- **The front fork is removed in all TRiO installations, including fork dive sensors.** Since there is no fork dive on a TRiO, compensating for fork dive is no longer necessary.

Front Brake Lever Response

The front brake lever should normally feel quite firm. However, there are situations where the braking might become quite soft.

Specifically, making very tight turns at very low speed can make the front brake lever seem unresponsive. This usually occurs when wheeling a motorcycle around a garage or when backing out of a driveway while turning hard.

Squeeze the brake lever once to recover full function.

NOTE

If the front brake lever feels unresponsive, do not simply hold it or squeeze harder. Instead, release the lever and squeeze it again.

Check the brake fluid in the handlebar reservoir using the procedure recommended by the manufacturer of the motorcycle.

If you detect any loss of fluid, check for leaks at all brake line fittings and at the caliper. Should you detect any leaks, contact your authorized TRiO dealer for instructions.

Replacing Brake Pads

1. Remove the wheel. See [Wheel Removal section on page 1](#) for more information.
2. Use a 1/4" hex key to remove the center pin from the caliper.
3. Remove the brake pads.
4. Replace with aftermarket pads designated **FA345HH**.

Your conversion uses high-performance brake pads from EBC Brakes®, which are widely available through motorcycle dealers.

5. Insert the new pads and replace the center pin.
6. Reinstall the wheel and the caliper as directed in [Wheel Removal section on page 1](#). For the caliper, tighten Nyloc until there is 1/16" additional space from compressing the o-ring.

Checking the Hydraulic Fluid

- Check for leakage from hydraulic cylinders, hoses, hose fittings and the pump periodically.
- Check the hydraulic fluid level annually.

NOTE

For replacement fluid use **MIL-H-5606A** hydraulic fluid.

1. Remove the snorkel/filter fitting from the side of the fluid reservoir below the pump.
2. Add more fluid until it trickles down the side.
3. Clean off excess fluid and replace the fitting.

Bearings

Your TRiO includes several types of bearings with differing maintenance requirements.

Wheel Bearings

Each wheel uses two Timken® bearings, part **#11949**.

The bearings and races should be inspected and re-greased whenever you replace the front tires.

Once the wheel has been removed, nothing retains the outside bearing and it can be removed easily. To get to the inside bearing, remove the circular oil seal with only your fingers to avoid damaging it.

Each wheel uses one SKF® oil seal, part **#8860**.

If the oil seal is damaged, replace it using a new seal from SKF®.

Clean the bearings in a solvent and allow to dry. Then pack each bearing liberally with clean, good-quality wheel bearing grease before replacing.

Steering Bearings

Your TRiO uses one or more cylindrical needle bearings around the steering shaft or shafts (depending on your model).

They should be inspected and re-greased every 25,000 miles by removing the steering shaft or shafts. This operation is best left to your TMW authorized dealer.

Rocker Plate Bearings

The large aluminum rocker plate is affixed to the bottom frame tube with shoulder bolts that pass through ½" sealed needle bearings.

These bearings should be inspected and re-greased every 25,000 miles, and this work should be left to your TMW authorized dealer.

Universal Joint Bearings

Front and center on your TRiO kit is a universal joint that employs several sealed roller bearings. They are unlikely to need maintenance or replacement over the life of your motorcycle.

A-Arm Pivot Bearings

The A-arms are affixed to the frame tubes using Needle bearings that require no maintenance. Do not use lubricants here as they can contaminate bearing surfaces.

Rod Ends

The A-arms are affixed to the wheels with Teflon-lined rod ends (also known as Heim joints) that require no maintenance.



Do not use lubricants such as WD-40 or oil here as they can contaminate bearing surfaces. The same is true of the smaller rod ends used at the ends of the horizontal tie rods.

If you detect free play in the steering and find no loose fasteners, contact your factory-trained TRiO dealer about replacing the rod ends on the tie rods.

Free play shouldn't occur before 30,000 miles and is best left to your TMW authorized dealer to service, as the front end needs to be re-aligned using specialized tools after replacing the rod ends.

Fuses

The TRiO system has two fuses located on its power cables, near the battery. One is a 5 amp fuse protecting the circuit board and the other is a 15 amp fuse on the power line to the hydraulic pump.

If either fuse blows, do not replace it until the reason for the surge is identified and the underlying problem has been addressed. You will not be able to use the TiltLock system until the blown fuse is replaced.

NOTE
ABS-equipped motorcycles may have an additional 2 amp fuse connected to power that is switched on by the ignition.

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Shock Installation and Adjustment

TRiO front-end conversions feature high performance **490 Sport Shocks** by Progressive Suspension®.



For detailed instructions on installing and adjusting your 490 Series Shocks, please refer to the **INSTALLATION INSTRUCTIONS for 409 SERIES SHOCKS**, available to view or download from the Progressive Suspension website. This document provides details regarding:

- Installation
- Preload Adjustment
- Rebound Adjustment
- Safety Information and Progressive Suspension's Warranty Statement.

Always check the website for the most recent version of this document.

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Wheel Removal & Replacement

Tools Needed

- 3/16" or 1/4" Allen Key
- Hub Wrench (provided with TRiO Kit)
- Scissor Jack
- Tie-down Straps
- 9/16" Socket
- Needle-nose pliers
- 1 1/4" socket
- Loctite™ #243
- Snippers
- Threadlocker

NOTE

You will need a new 7/64" x 1.5" stainless steel cotter pin for this procedure.

1) Remove the Fender / Mounting Bracket and Hub Cap

On each side, remove the Fender and Fender Bracket as an assembly (leaving the Fender Mounting Bracket attached to the Fender).

1. Use a 3/16" or 1/4" allen key to remove the two allen-head screws that secure the Fender Mounting Bracket to the top of the Hub. These screws are accessed from the inner side of the wheel:



2. On each wheel, use the provided Hub Wrench to remove the Hub Cap:



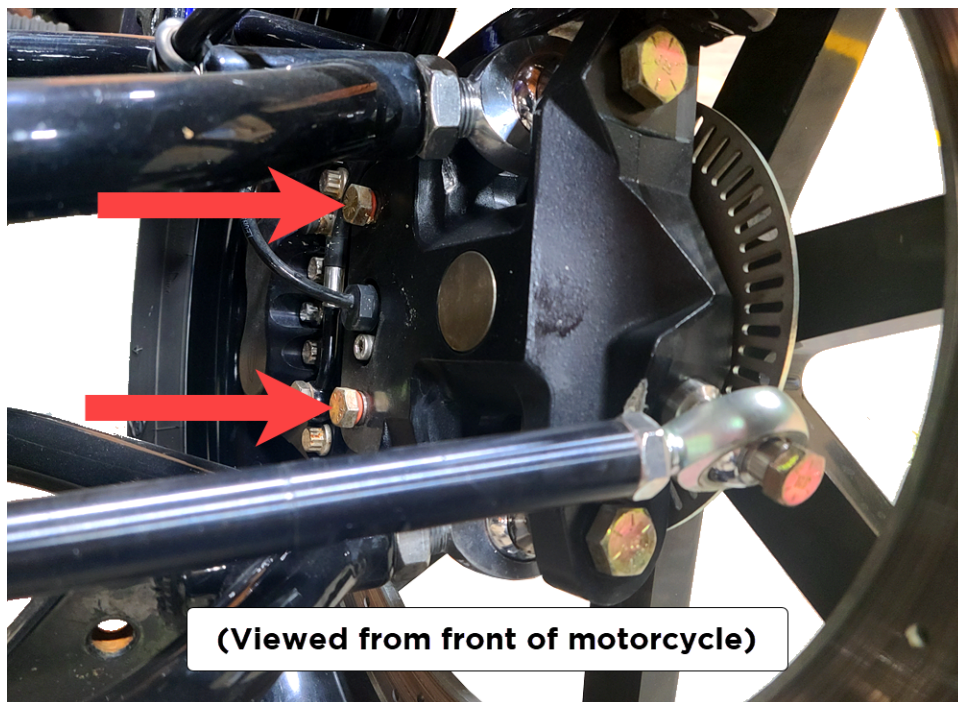
2) Elevate the Front Wheels and Secure the Motorcycle

1. Using a scissors jack positioned toward the front of the motorcycle's frame, lift the motorcycle until the front wheels come off the ground.
2. Use tie-down straps to secure the motorcycle to ensure it can't fall over.



3) Unbolt the Brake Calipers

Each Brake Caliper assembly is secured to the Spindle Housing with two mounting bolts. The photo below indicates the location of these bolts - on the inner surface of the Brake Caliper assembly:



(Viewed from front of motorcycle)

On each Caliper, use a 9/16" socket to remove the two mounting bolts that secure the Caliper to the Spindle Housing.

NOTE

Once the Caliper is unbolted, it may slide down the rotor, but remains trapped until the wheel is removed.

NOTE

If the Caliper Bolts on your motorcycle employ locknuts, then remove the locknuts using a 9/16" wrench. A flex-head wrench with a ratcheting box end is an ideal tool for reaching these locknuts.

4) Remove the Wheels

1. On each wheel, use needle-nose pliers to remove the cotter pin securing the wheel nut. Discard the used cotter pin.



2. Use a 1.25" socket to remove the wheel nut and the washer beneath it.



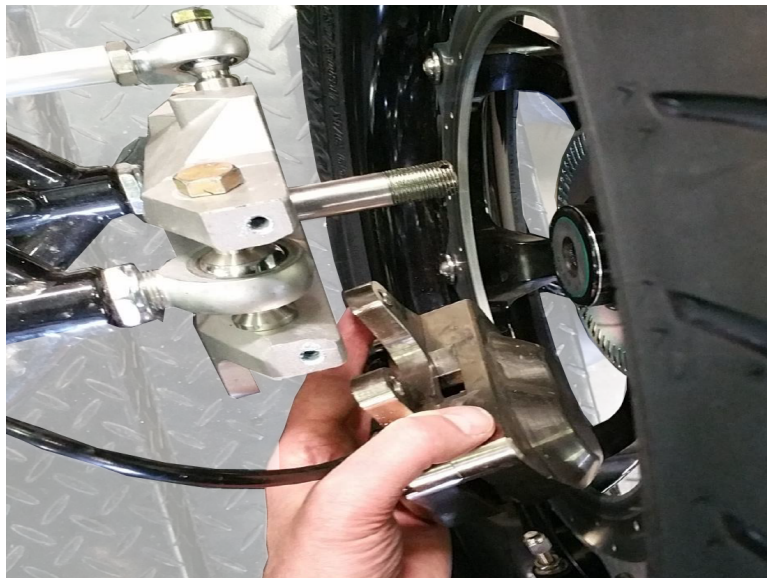
NOTE

Place the wheel nut and washer in a clean plastic bag or other container to protect them from debris.

3. Carefully slide the wheel off the axle, taking care that the outside bearing doesn't fall out accidentally.
4. Remove the bearing, taking care to keep it clean.



5. Leave the Brake Caliper on the Rotor until the wheel clears the spindle shaft.



6. Remove the Brake Caliper from the Rotor and rest the Caliper on the A-arm so that it does not hang by the brake line. The Caliper remains connected to the motorcycle by the brake line.

NOTE

Do not squeeze the front brake lever once a Caliper has been removed. This will result in a loss of brake fluid which will require corrective action.

7. Bring the wheel and bearing to any motorcycle shop for proper tire repair or new tire replacement.

5) Re-Install the Wheels

Once the tire(s) have been repaired or replaced, the wheel(s) are ready to be re-installed. If removing and replacing both wheels at the same time, note that the tires are directional. The correct rotation direction is indicated on the tire.

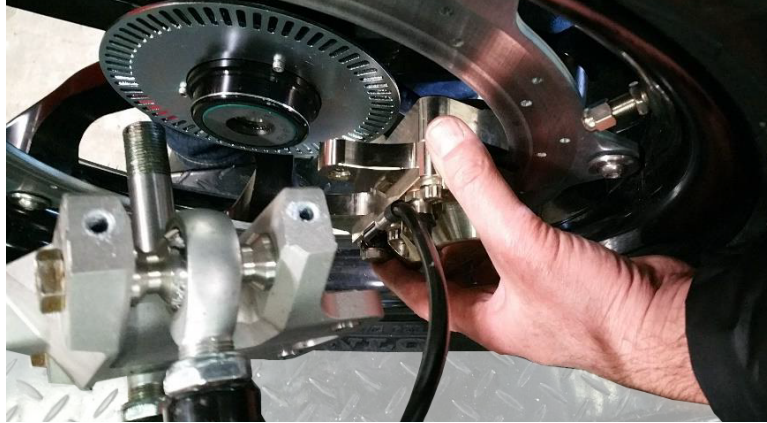


1. Mount the wheels so the ROTATION arrows on the tire match the forward rotation of the wheel.
2. Use a use a 9/16" socket to replace the mounting bolts that secure the Caliper assembly to the Spindle Housing.
 - If the caliper mounting bolts on your motorcycle DO NOT employ locknuts, apply a threadlocker such as blue LocTite™ #243 to the threads to keep them from vibrating loose. Tighten the caliper mounting bolts down securely.
 - If your caliper bolts DO use locknuts, first screw the bolts through the hub and caliper.



- a. Tighten until the red rubber O-ring under the head of the bolt just begins to compress against the collar protruding from the hub. The o-ring should not be compressed and the caliper should be allowed to float.
- b. Hold the bolt stationary while tightening down the locknut from the outside.
- c. Tighten the locknut securely. No threadlocker is needed.

- When replacing the wheel, place the caliper over the rotor and replace the outside wheel bearing before sliding the wheel onto the axle.

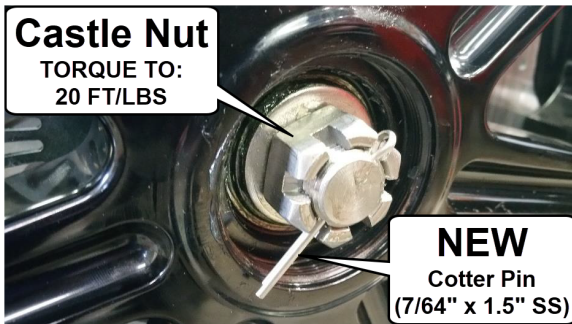


- Replace the washer and tighten the castle nut to **20 ft/lbs** until drag on the wheel prevents it from spinning freely.
- Unscrew the castle nut up to a 1/6 turn until you can place a new cotter pin through the hole in the spindle.

NOTE

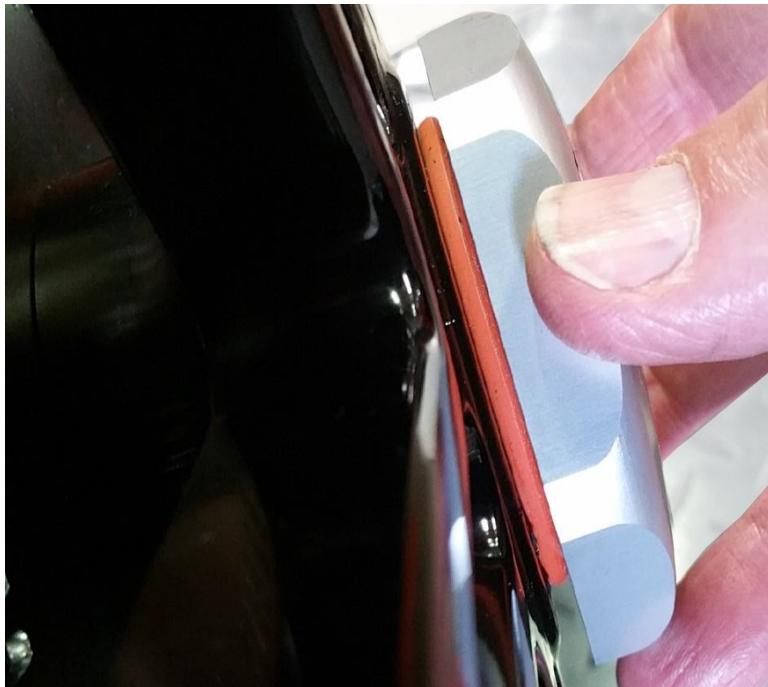
Always use a NEW 7/64" x 1.5" stainless steel cotter pin.

- Bend one leg of the cotter pin across the end of the spindle.
- Use snippers to remove the other leg of the cotter pin to ensure that the cotter pin can't contact the inside of the hub cap once the hub cap is replaced.:





8. Replace the hub cap, tightening until the red rubber O-ring compresses against the face of the wheel.



9. Snug the Hub Cap down gently with the Hub Wrench provided with the TRiO kit.

Replace the Fenders

On each Fender, use a 3/16" or 1/4" allen key to replace the two allen-head screws that secure the Fender Mounting Bracket to the top of the Hub.

NOTE

Use a threadlocker on the two allen-head screws so they don't vibrate loose.



Lower the Front Wheels and Release Tie-Down Straps

1. Lower the motorcycle's kickstand.
2. Carefully lower the scissor jack to allow the motorcycle to rest on the front wheels.
3. Lean the motorcycle to the left as it comes off the jack so that the motorcycle settles to the left onto the kickstand, rather than falling over to the right.
4. Release and remove the tie-down straps.

Limited Warranty

Tilting Motor Works, Inc. ("TMW") warrants that an authorized TMW dealer will repair or replace, without charge, any parts found under normal use to be defective in factory materials or workmanship. Such repair and replacement will be owner's sole remedy under this warranty and the following terms and conditions apply:

Duration

1. The duration of this limited warranty is thirty-six months starting from the date of initial retail purchase and conversion by an authorized TMW dealer.
2. Any unexpired portion of this limited warranty will be transferred to subsequent owners, upon the resale of the original converted motorcycle with the TMW kit installed during the warranty period.

Owner's Obligations

1. Register your initial or subsequent purchase with TMW within 30 days of the transaction by visiting <https://www.tiltingmotorworks.com/registration/>.
2. To obtain warranty service, return the original motorcycle with the TMW kit installed at your expense, within the warranty period, to a TMW authorized dealer. Warranty service will be provided during normal business hours as soon as possible depending on the dealer's workload and parts availability.

Exclusions

This warranty does not cover any motorcycle:

1. Which has not been operated or maintained as specified in the TMW Owner's Manual.
2. Which has been abused, misused, improperly stored, used "off the highway", or used for racing or competition of any kind.

Other Limitations

This warranty does not cover:

1. Parts and labor for normal maintenance as recommended in the TMW Owner's Manual.
2. Parts and labor for normal wear and tear item such as tires, brake pads and bearings.

Notice and Registration

You can contact TMW at:

311 Chambers.
Eugene, OR 97402

<https://www.tiltingmotorworks.com/registration/>

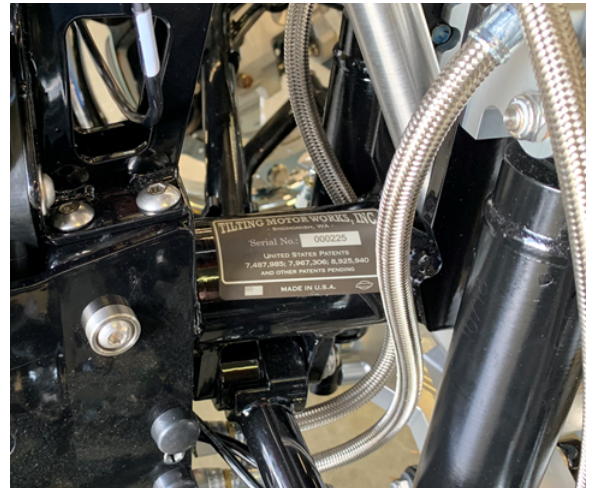
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Consumer Information

Tilting Motor Works is always interested in hearing from you about any unexpected or newly discovered handling characteristics of the TRiO, and we will make every effort to answer any questions you may have as quickly as possible. Write to support@arcimoto.com, describe the situation as clearly as possible, and let us know how best to reach you. We may ask for additional information and/or photographs to learn more about what you're experiencing.

For service to your TRiO front-end conversion, or warranty claims, contact us. Please have the following information when contacting Tilting Motor Works with questions, comments, or concerns about your conversion:

- Owner's name, address, and telephone number
- TMW Serial Number. Your TMW serial number is provided on a manufacturer label, located behind the right front fender:



Website

- TiltingMotorWorks.com: www.tiltingmotorworks.com/
- TMW page at Arcimoto.com: www.arcimoto.com/tmw

TMW Phone/Email

For service or warranty claims:

- 24-Hour Support: **(541) 780-0032**
- Email: support@arcimoto.com

TMW Address

Tilting Motor Works, Inc.
311 Chambers
Eugene, OR 97402

Change of Address

If you change your address (physical and /or email), let us know. Maintaining your current information with Tilting Motor Works enables us to contact you should important new information about your conversion kit become available.



(541) 780-0032

TiltingMotorWorks.com: www.tiltingmotorworks.com/

TMW page at Arcimoto.com: www.arcimoto.com/tmw

Tilting Motor Works is a division of
Arcimoto, Inc.

Arcimoto part#: 006328 (REV 1)

last revised: 8/24/2023