

REV.1 - 2018-11-25

Cleveland CycleWerks Misfit 250 Gen II

SERVICE MANUAL OHV 250



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GUIDE TO THE MANUAL	3
VEHICLE IDENTIFICATION	9
SPECIFICATIONS	10
TIGHTENING TORQUE	14
MAINTENANCE SCHEDULE	15
EMISSIONS CONTROL SYSTEMS	16
MAINTENANCE	18
SEAT/TANK/EXHAUST/ENGINE REMOVAL/INSTALLATION	37
HEAD/CYLINDER	43
CLUTCH/ALTERNATOR/STARTER CLUTCH	53
CRANKCASE/TRANSMISSION/CRANKSHAFT	66
FUEL/AIR SYSTEM	82
FRONT WHEEL/STEERING	90
REAR WHEEL/SUSPENSION	115
BRAKES	126
IGNITION/STARTING SYSTEM	147
CHARGING SYSTEM/BATTERY	153
LIGHTING/HORN/INSTRUMENTS	156
WIRING SCHEMATIC	161
TROUBLESHOOTING	162
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Safety Symbols

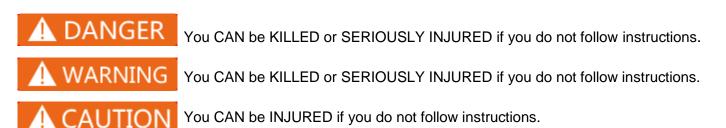
Your personal safety, and the safety of those around you, is extremely important. Operating this motorcycle safely is an important responsibility. Cleveland CycleWerks has provided operating procedures and other information on labels in this manual to help you make informed decisions about safety. This information will alert you to potential hazards that could harm you or others.

It is not practical or possible to warn you about all possible hazards associated with operating and maintaining a motorcycle. You must use your own good judgment and common sense. In many cases "common sense" seems to be less and less common. Please use solid judgment, do not ride above your ability and respect the fact that you are a sack of water traveling through space at a high rate of speed. Respect the bike, respect the terrain and use caution.

Safety information will come in a variety of different forms, including:

- Safety Labels on the Motorcycle.
- ✤ Safety Messages preceded by a safety symbol ▲ and one of these signal words below:

Sections of text in this manual, which are particularly important in terms of safety or possible damage to the motorcycle are marked with the following symbols:



- Safety Headings such as important safety reminders and/or precautions.
- Safety Section such as motorcycle safety.
- Instructions how to use the motorcycle properly and safely.



Important Safety Precautions

This vehicle has a minimum age requirement of 16

Always wear necessary and properly fitting protective gear when operating this vehicle.

WARNING

Obtain, review and follow provisional/municipal government laws and regulations pertaining to owning and operating an on-road vehicle before using this product

WARNING

Operating, servicing and maintaining a passenger vehicle can expose you to chemicals such as lead, phthalates, engine exhaust and carbon monoxide that are known to the State of California cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, service your vehicle in a well-vented area and wear gloves or wash your hands frequently when servicing your vehicle.

For more information go to: www.P65Warnings.ca.gov/PassengerVehicle.

Proper service, maintenance and repair are mandatory to operate any motor vehicle safely.

Keeping your motorcycle in good operating condition is absolutely essential to your safety. It is essential to ensure your motorcycles longevity. Proper maintenance will ensure you are achieving maximum performance, avoid breakdowns, and will ultimately have more fun.

The service intervals in this manual are based on average riding conditions. More frequent service is needed if you subject your motorcycle to severe use, or ride in unusually wet and dusty areas. Frequent checks of the air cleaner are very important to help you avoid engine damage.

The information contained herein is valid at the time of printing. Cleveland CycleWerks reserves the right to make changes required by the future development of the above mentioned products. We do our best to verify the accuracy of this manual, but mistakes do happen, no liability is accepted for mistakes during the drafting of this manual.

For your safety and reliability of your vehicle, use original CLEVELAND CYCLEWERKS spare parts ONLY.

WARNING

I!! DO NOT use the motorcycle or try to service it if you do not possess the necessary skills, if you have never turned a wrench, please entrust your safety to a motorcycle service professional!!!

- Make sure the engine is off before you begin any maintenance or repairs. This will help eliminate the following hazards:
- 1. Carbon Monoxide Poisoning From Engine Exhaust Be sure you have adequate ventilation whenever you operate the engine.
- 2. Burns From Hot Motorcycle Parts Let the engine and exhaust system cool before you touch them.
- 3. Injury From Moving Parts Do not run the engine unless your hands and body parts are clear from danger or risk of injury.

Read all instructions before you begin a procedure. Make sure you have all of the tools and skills required. To help prevent the motorcycle from falling over, park it on a firm, level surface, using the side stand or a maintenance stand to provide support. To reduce the chance of a fire or explosion, be careful when working around gasoline. Use only a non-flammable (high flash point) solvent such as mineral spirits to clean parts. Keep cigarettes, sparks, and flames away from all fuel related parts.

Emissions Warranty

Cleveland CycleWerks LLC., and our authorized Distributor are pleased to explain the emission control system warranty on your Motorcycle. New motor vehicles must be designed, built and equipped to meet the state and national emissions laws for which they are certified for. Distributor must warrant the emission control system on your vehicle for 30 months or 5,000 km, whichever comes first, provided that there has been no abuse, neglect or improper maintenance of your vehicle.

Your emission control system includes the carburetor, the ignition system, catalytic converters and engine control unit. Also included are hoses, connectors and other emission-related assemblies.

Where a warrantable condition exists, Distributor will repair your vehicle at no cost to you, including diagnosis, parts and labor.

If an emission-related part on your vehicle is defective, the part will be repaired or replaced by Distributor. This is your emission control system DEFECTS WARRANTY.

Noise Control System

The following warranty applies to the noise control system and is in addition to the general Cleveland CycleWerks Authorized Distributor warranty and the emission control warranty.

Cleveland CycleWerks Authorized Distributor warrants to the first, and each subsequent owner, that the vehicle was designed and built so as to conform, at the time of sale, with the regulations at the time of manufacture, was free from defects in materials and workmanship which would cause the motorcycle not to meet the noise control system warranty extends for a period of six (6) calendar months starting from the date of purchase. Same warranty applies to a demonstration motorcycle or company motorcycle.

WE RECOMMEND THAT ONLY FACTORY GENUINE CLEVELAND CYCLEWERKS PARTS BE USED FOR MAINTENANCE REPAIR OR REPLACEMENT OF THE NOISE CONTROL SYSTEM.



If Non-Factory Genuine Parts are used to repair your motorcycle, warranty claims may be denied.

This motorcycle should be checked for repair or replacement if the motorcycle noise has increased significantly through use, otherwise the owner may become subject to penalties under state and local laws

Tampering With Noise Control System

Owners are warned that the law prohibits:

- (A) The removal or rendering inoperative by any person other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use;
- (B) The use of the vehicle after such devise or element of design has been removed or rendered inoperative by any person.

Acts which are likely to constitute tampering include the following;

- 1. Removal or tampering with the muffler's, baffles or header pipes or any other component, which conducts exhaust gases.
- 2. Removal of or puncturing of any part of the air intake system.
- 3. Failure to carry out maintenance as prescribed in the owner's manual.
- 4. Replacing any part of the exhaust or air intake system with parts other than those specified by Cleveland CycleWerks.

The following items are not covered by the noise control system warranty;

- 1. Failures, which arise through misuse, alterations or accident damage.
- 2. Replacing, removing or modifications of any part of the noise control system (consisting of the exhaust system and air intake system) with parts not certified to be noise legal for street use.
- 3. Cleveland CycleWerks Authorized Distributor shall not be liable for loss of use, inconvenience, lost time, commercial losses or other incidental or consequential damages.



Owner's Warranty Responsibility

As the motorcycle owner, you are responsible for the performance of the required maintenance listed in your owner's manual.

Cleveland CycleWerks recommends that you retain all receipts covering maintenance on your motorcycle, but Cleveland CycleWerks Authorized Distributor cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

You are responsible for presenting your motorcycle to a Cleveland CycleWerks dealer as soon as a problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.

As the motorcycle owner, you should also be aware that Cleveland CycleWerks Authorized Distributor may deny you warranty coverage if your motorcycle or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

NOTICE! Use of any Cleveland CycleWerks brand vehicle in any type of competitive event completely and absolutely voids this and all other warranties offered by Cleveland CycleWerks Authorized Distributor.

If you have any questions regarding your warranty right and responsibilities, you should contact Cleveland CycleWerks or Cleveland CycleWerks authorized Distributor.

A. Is designed, built and equipped so as to conform at the time of initial retail purchase with all applicable regulations of the state and country in which they are authorized to be sold.

B. Is free from defects in material and workmanship which cause such vehicle to fail to conform to applicable regulations.

- C. Coverage: Warranty defects shall be remedied during customary business hours at any authorized Cleveland CycleWerks dealer and/or service center. Any part or parts replaced under this warranty shall become the property of Cleveland CycleWerks Authorized Distributor.
- . This Emission Control System Warranty shall not cover any of the following:
 - A. Repair or replacement as a result of
 - 1. Accident(s)
 - 2. Misuse
 - 3. Repairs improperly performed or replacement parts improperly installed
 - 4. Use of replacement parts or accessories which are not genuine Cleveland CycleWerks replacement parts which adversely affect performance and/or
 - 5. Use in competitive racing or related events.
 - B. Inspections, replacement of parts and other services and adjustments required for required maintenance.
 - C. Any vehicle equipped with an odometer or hour meter on which the odometer mileage or hour meter reading has been changed so that the actual mileage cannot be readily determined.

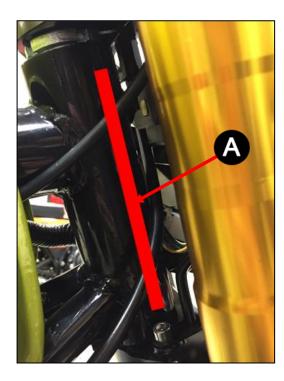


D. Limited Liability

- A. The liability of Cleveland CycleWerks Authorized Distributor, under this Emission Control System Warranty is limited solely to the remedying of defects in material or workmanship by an authorized Cleveland CycleWerks dealer at its place of business during customary business hours. This warranty does not cover inconvenience or loss of use of the vehicle or transportation of the vehicle to or from the Cleveland CycleWerks dealer. CLEVELAND CYCLEWERKS AUTHORIZED DISTRIBUTOR SHALL NOT BE LIABLE FOR ANY OTHER EXPENSES, LOSS OR DAMAGE, WHETHER DIRECT, INCIDENTAL, CONSEQUENTIAL OR EXEMPLARY ARISING IN CONNECTION WITH THE SALE OR USE OF OR INABILITY TO USE THE CLEVELAND CYCLEWERKS VEHICLE FOR ANY PURPOSE. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.
- B. NO EXPRESS EMISSION CONTROL SYSTEM WARRANTY IS GIVEN BY CLEVELAND CYCLEWERKS AUTHORIZED DISTRIBUTOR, EXCEPT AS SPECIFICALLY SET FORTH HEREIN. ANY EMISSION CONTROL SYSTEM WARRANTY IMPLIED BY LAW, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, IS LIMITED TO THE EXPRESS EMISSION CONTROL SYSTEM WARRANTY TERMS STATED IN THIS WARRANTY. THE FOREGOING STATEMENTS OF WARRANTY ARE EXCLUSIVE AND IN LIEU OF ALL OTHER REMEDIES. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.
- C. No dealer is authorized to modify this Cleveland CycleWerks Authorized Distributor Limited Emission Control System Warranty.
- E. LEGAL RIGHTS. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.
- F. THIS WARRANT IS IN ADDITION TO THE CLEVELAND CYCLEWERKS AUTHORIZED DISTRIBUTOR LIMITED ON ROAD VEHICLE WARRANTY.
- G. ADDITIONAL INFORMATION. Any replacement part that is equivalent in performance and durability may be used in the performance of any maintenance or repairs. However, Cleveland CycleWerks Authorized Distributor is not liable for these parts. The owner is responsible for the performance of all required maintenance. Such maintenance may be performed at a service establishment or by any individual. The warranty period begins in the date the motorcycle is delivered to an ultimate purchaser.

VEHICLE IDENTIFICATION



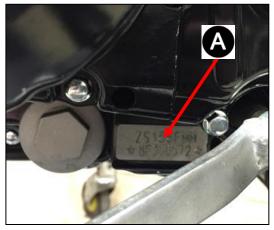


VIN – Chassis Number

The VIN number identifies the motorcycle. When placing orders for spare parts, you may be required to provide the VIN, engine serial number and the color of the motorcycle.

The VIN number is located in one of three places on the chassis.

- 1. Right side of frame on compliance sticker.
- 2. Left side of frame on compliance sticker.
- 3. Steering head tube Aright side of frame.



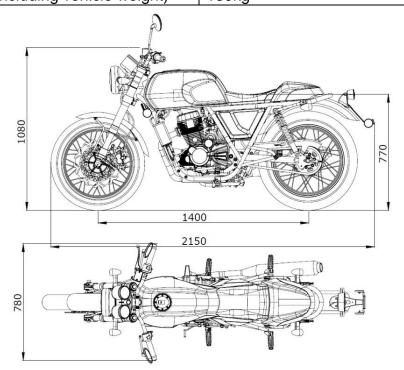
Engine Model & Serial Number

The engine model number and serial number is stamped on the left side of the engine below the countershaft sprocket.

SPECIFICATIONS



Dimensions	
Length	2150mm
Width	780mm
Height	1080mm
Wheelbase	1400mm
Seat height	770mm
Ground clearance	150mm
Curb/wet weight	144kg
Max capacity (not including vehicle weight)	180kg



Chassis	
Seat	Rider/pillion seat with pillion strap
	Removable pillion seat cover
Foot rests	Spring loaded rider foot rests
	Folding pillion foot rests
Frame type	Tubular backbone, double cradle
	High carbon steel
Rake	25 degree
Trail	114mm
Swing arm	Large diameter tubular arms.
	Needle roller axial bearings
	Needle roller side thrust bearings
Fork clamps	Billet CNC 6061 aluminum
Handle bar	7/8" Tubular steel
Handle bar clamp	Billet CNC 6061 aluminum black anodized
Stem bearings	Tapered needle caged bearings
	25mm x 47mm x 15mm

SPECIFIC	
Front suspension	Inverted forks, 38mm stanchions
	Cartridge type damping
	Shim stack valving for rebound and
	compression
	Fork seals 33 x 45 x 10.5
Rear suspension	Twin coil over, oil damped shocks
	325mm length eye to eye
	Spring pre load adjustable 5 stage
Rear wheel travel	90mm
Front wheel travel	110mm
Front wheel	2.50" x 18" steel
Front tire	Kingstone 100/90-18 tube type 6P.R. 62P
	Max. load 583 lbs.
	Max. load 265 Kg.
Tire pressure front	200kPa (29psi)
Front axle diameter	15mm
Rear wheel	2.75" x 18" steel
	Full floating cush sprocket carrier
Rear tire	Kingstone 120/90-18 tube type 6P.R. 71M
	Max. load 759 lbs.
	Max. load 345 Kg.
Tire pressure rear	265kPa (38psi)
Rear axle diameter	17mm
Front brake	Single 320mm full floating wave rotor
	4 piston radial mount caliper
	Braided and bonded DOT stainless steel brake
Rear brake	hose 220mm wave rotor
	2 piston slide caliper
	Braided and bonded DOT stainless steel brake
	hose
Engine	
Туре	CCWCG250
	OHV single cylinder four stroke push rod
	Air cooled
	Counter balanced
Bore	67.0mm
Stroke	65.0mm
Displacement	229.0cc
Compression ratio	9.2:1
Maximum power	11.5 kW /15.4 HP @7000RPM
Maximum torque	16.0 N-m @6000 RPM
Maximum speed	8500RPM
Idle speed	1500±100RPM

SPECIFIC	
Minimum fuel consumption	≤354g/kW-h
Starting	Electric and kick
Ignition type	CDI
Ignition advance	15° @1500RPM
Spark plug	DR8EA, DPR8EA-9, Torch D8TC
Spark plug gap	0.6-0.8mm
Intake Valve Open (BTDC)	10°
Exhaust Valve Open (BBDC)	40°
Intake Valve Closed (ABDC)	40°
Exhaust Valve Closed (ATDC)	10°
Intake valve clearance (cold)	0.08mm
Exhaust valve clearance (cold)	0.13mm
Clutch	Wet multi-plate
Clutch lever free play	3-5mm at ball end
Transmission	Constant mesh, five-speed
Primary Reduction 21/70	3.333
First gear ratio 11/32	2.909
Second gear ratio 15/28	1.867
Third gear ratio 19/25	1.316
Fourth gear ratio 23/23	1.000
Fifth gear ratio 24/20	0.833
Final drive	520 roller chain
Front sprocket	13T
Rear sprocket	36T
Fuel	Unleaded gasoline
Minimum fuel octane	87 (R+M/2), 95(RON)
Carburetor model 2016-2017	Sheng Wey PZ30 with accelerator pump
	Main jet #98
	Pilot jet #40
	Needle #145S1
	Mixture screw 2.5 turns
	Float height 14mm
Carburetor model 2018	KF PZ30
	Main jet #100
	Pilot jet #38
	Needle #K140+washer
	Mixture screw 1.5 turns
	Float height 14mm
Air filter	Stainless steel mesh (clamp filter)
	Pleated paper element (air box)
Exhaust emission system	3 x three way catalyst in muffler
	PAIR air injection
Engine lubrication	Pressure-splashed
Oil Pump Type	Inner/outer rotor

SPECIFICATIONS



Electrical	
Battery	YTX9-BS AGM maintenance free
Battery capacity	12V /9 Amp/hour
Generator	Three-phase A.C. generator
Generator output	160 watts.
Main fuse	15A
Secondary fuse	15A
Headlight	H4 35/35W
	High/low/passing
Brake/Tail light	12V 21/5W
Speedometer	Cable driven
	Electronic stepper motor needle
	LCD odometer/trip meter
Tachometer	Electronic stepper motor needle
Emergency lighting	Four way flasher
Side stand safety switch	Stops engine if driven with side stand down
Turn signal light	12V 21W
License plate light	12V 5W
Neutral indicator light	12V LED
High beam indicator light	12V LED
Turn signal indicator lights	12V LED
Capacities	
Fuel tank capacity including reserve	15L
Engine oil capacity	1200ml
Engine oil	SAE10W-40, 15W-50, 20W-50
	API SF/SG or SH/SJ with JASO MA
Fork oil capacity	270cc per fork
	10W fork oil
	Air gap level 115mm

TIGHTENING TORQUE



Chassis	
Front axle	65N-m
Front axle pinch bolts M6 x 1.0	11N-m
Rear axle	65N-m
Rear axle adjuster nuts M8 x 1.25	20N-m
Swing arm pivot nut	65N-m
Rear shock nuts M10 x 1.25	39N-m
Front brake caliper bolt M10 x 1.25	39N-m
Rear brake caliper bolt M8 x 1.25	23N-m
Front brake rotor bolt M8 x 1.25	23N-m use thread lock
Rear brake rotor bolt M8 x 1.25	23N-m use thread lock
Engine mount bolts M8 x 1.25	23N-m
Engine mount bolts M10 x 1.25	39N-m
Steering stem top nut	65N-m
Steering stem bearing adjust nut	30N-m then turn back 1/4 turn
Handle bar clamp bolts M8 x 1.25	20N-m
Fork clamp bolts M8 x 1.25	20N-m
Fork cartridge bolt M10 x 1.50	39N-m
Fork top	20N-m
Rider footrest bolts M10 x 1.25	39N-m
Pillion rest bolt M10 x 1.25	39 N-m
Seat bolts M8 x 1.25	23N-m
Rear sprocket nut M8 x 1.25	23N-m use thread lock
Front sprocket retainer bolt M6 x 1.0	11N-m
Engine	
Spark plug	18N-m
Oil filter screen cover	20N-m
Oil drain bolt M12 x	20N-m use a new aluminum crush washer
Valve clearance adjusting screw lock-nut	15N-m
Cylinder head nut M8 x 1.25	37N-m
Rocker arm holder bolts M8 x 1.25	23N-m
Cylinder base bolts M6 x 1.0	11N-m
Flywheel bolt M10 x 1.25	39N-m
Shift drum detent bolt M6 x 1.0	11N-m use thread lock
Clutch spring bolts M6 x 1.0	11N-m
Centrifugal oil filter nut M12 x 1.25	32N-m use 24mm OD nut tool
Crank case bolts M6 x 1.0	11N-m
Engine side cover bolts M6 x 1.0	11N-m
Exhaust nuts M8 x 1.25	23N-m
Kick starter bolt M8 x 1.25	23N-m

MAINTENANCE SCHEDULE



Maintenance Schedule				
Item	300 Mile/ 500km First	Every 1800Miles/	Every 3600Miles/	Every 5400Miles/
	Service *	3000km	6000km	9000km
Fuel Hose	I	I	I	R
Petcock Sediment Bowl		С	С	С
Fuel Cap and Gasket	I	I	I	I
EVAP Control System	I		I	
Secondary Air System	I		I	
Spark Plug	I		l	R
Valve Clearance			I/A	
Engine Oil	R	R	R	R
Oil Filter Screen	С	С	С	С
Centrifugal Oil Filter				С
Air Cleaner	С	С	С	R
Throttle Adjustment	I			I
Carburetor Choke	I			I
Clutch	I		_	
Idle Speed	Ι	Ι	Ι	I
Drive Chain	I/L	I/L Every 300 miles/ 500Km.		0Km.
Battery	I	I	I	I
Brake Pad/Disc Wear	Ι	I	l	I
Brake Fluid	Ι	I	I	R
Headlight Aim	Ι	I	I	I
Brake Switches, Horn, Side Stand Switch	I	I	I	I
Bolts, Nuts, Fasteners	1		<u> </u>	
Tire Pressure	I/A	I/A	I/A	I/A
Wheels, Spokes	I			I
Steering Head Bearings	Ι	l		А
Suspension	I	I	I	I

Please use this guide as reference to the maintenance schedule mileage chart:

I = Inspect condition and clean, adjust, lubricate, or replace as necessary. Replace more frequently under extreme conditions, heavy use, or in wet or dusty environment.

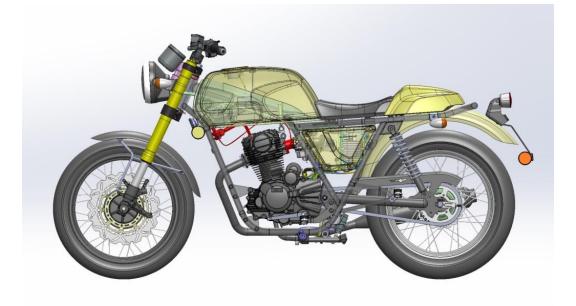
- $\mathbf{C} = Clean$
- $\mathbf{R} = \text{Replace}$
- L = Lubricate
- A= Adjust

*First Service is critical and required for Warranty.



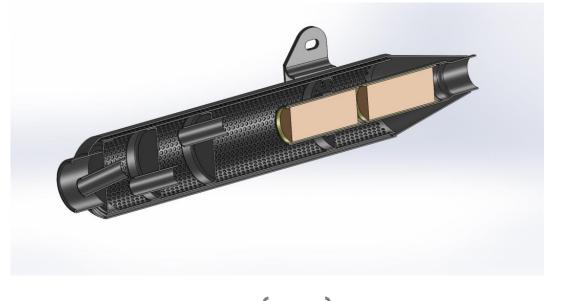
Secondary Air Injection System

The pulsed secondary air injection system allows atmospheric air to enter the exhaust system and mix with the exhaust gas to promote complete burning of excess hydrocarbons. The pulsed air injection (PAIR) valve contains a one way reed valve and an air cut diaphragm valve. During normal engine operation, negative pressure periods in the exhaust head pipes draws fresh air through the one way reed valve into the exhaust. During engine deceleration, manifold vacuum closes the diaphragm valve and prevents air from entering the reed valve and the exhaust.



Catalyst Exhaust

The exhaust system is equipped with metal substrate three-way catalysts to convert pollutants in the exhaust gas to less toxic pollutants.

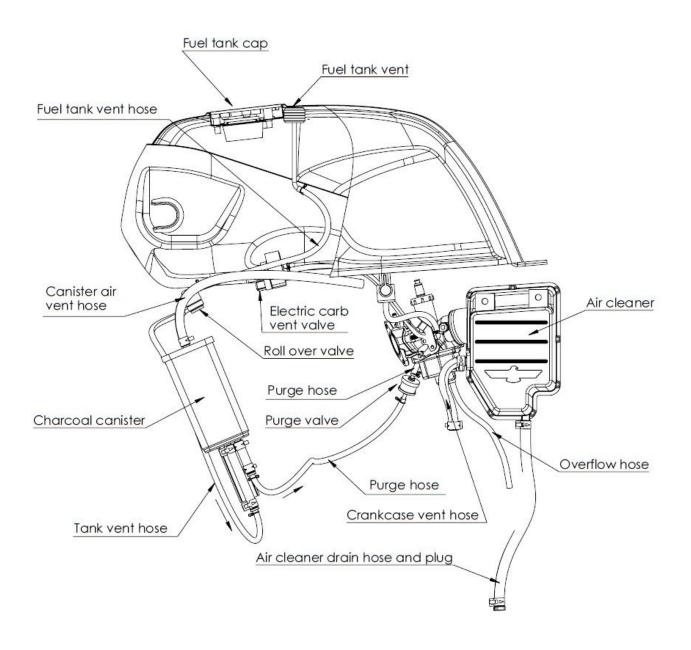




EVAP/ Crankcase Emissions Control System

The Cleveland CycleWerks motorcycle is equipped with an evaporative emissions control system (EVAP) to prevent fuel and oil vapors from escaping into the atmosphere and polluting the environment. Fuel vapors evaporating in the fuel tank and oil vapors from the crankcase are collected in the charcoal canister when the motorcycle is not being ridden. The vapors in the fuel tank are vented through the vent hose into the canister. During normal operation of the motorcycle, vacuum from the intake manifold opens a diaphragm valve to allow engine vacuum to purge the vapors collected in the canister to be burned in the engine.

Combustion blow by and oil vapors generated in the crankcase during engine operation are directed into the air box and therefore burned in the engine.





Introduction

Routine maintenance of your motorcycle is required to keep it running well and keep it in top condition. Lack of proper lubrication will let parts wear or rust prematurely; dirt or salt will harm paint and plated parts. Washing your motorcycle when it becomes dirty will prevent dirt from abrading the paint and keep it looking good. A mild sop with water is recommended. Oiled surfaces may be washed with an engine degreaser, rinsed with plenty of water. Do not wash your motorcycle when hot, or in the direct sun. Soaps may harm the finishes if it is allowed to dry on the motorcycle, rinse the motorcycle with water if the soap is drying. Do not pressure-wash the motorcycle or spray direct water into the air filter, electrical connectors or air box. The first service at about 300 mi /500 km is critical as this is when the engine is run-in and parts bed in.



All service procedures are recommended with the engine cool to the touch. Park the motorcycle on the side stand on level firm ground or in a service stand. Motorcycle are heavy, do not take the risk of having the motorcycle fall on you during maintenance!

Note: The service intervals are based on average riding conditions. Service the motorcycle more frequently in harsh, dirty conditions or if the motorcycle is run hard.



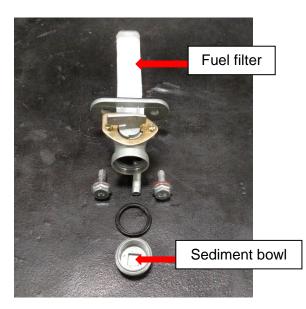
Maintenance Table of Contents

FUEL HOSES/FUEL FILTER	20
EVAP CONTROL SYSTEM	
SECONDARY AIR INJECTION SYSTEM	
THROTTLE OPERATION	22
SPARK PLUG	23
VALVE CLEARANCE	24
ENGINE OIL/OIL FILTER SCREEN	26
CENTRIFUGAL OIL FILTER	28
ENGINE IDLE SPEED	29
CARBURETOR CHOKE	29
DRIVE CHAIN	30
BATTERY	-
BRAKE SYSTEM	32
ELECTRICAL COMPONENTS/SIDE STAND SWITCH/LIGHTING SYSTEM	34
BOLTS/NUTS/FASTENERS	34
WHEELS/SPOKES/TIRES	34
STEERING HEAD BEARINGS	35
SUSPENSION	35
CLUTCH SYSTEM	36



Fuel Hoses/Fuel Filter

- 1. Inspect the fuel hoses, petcock and carburetor for fuel leaks. Repair as necessary. All fuel hoses should have a metal retaining clamp on each end. Fuel leaks are a fire hazard; do not operate the motorcycle with a fuel leak.
- 2. The petcock features a sediment bowl on the bottom. Remove the bowl and clean of water or dirt. Replace the bowl O-ring if it is damaged.
- The fuel filter is a plastic screen inside the fuel tank. Excessive debris caused by poor fuel or rust in the fuel tank may clog the fuel flow. If fuel flow is restricted, the tank may be removed, drained of fuel and the petcock removed to clean or replace the filter screen as necessary.
 See page 38 for fuel tank removal.
- 4. Replace the fuel hoses at 5400 mi /9000 km with the original fuel-resistant type.





Air Filter

- 1. Motorcycles equipped with a clamp-on screen air filter may have the filter removed and cleaned with a low flash-point solvent.
- 2. Motorcycles equipped with an air box may have the filter element removed for service. If dirt is light, the pleated paper type element may be cleaned with compressed air. Excessive air pressure will break down the fibers and clog the paper. Do not use excessive air pressure. Large amounts of dirt will require that the filter element be replaced.
- **3.** Remove the drain plug at the bottom of the air box and drain any water or oil condensation. Replace the plug after draining.



Λ ΝΟΤΙCE

IMPROPER COMPLETION OF AIR FILTER MAINTENANCE CAN DAMAGE THE ENGINE AND CAUSE POOR PERFORMANCE.

EVAP Control System / Fuel Cap and Gasket

See "EVAP Control system" page 15, for more information.

Inspect the charcoal canister and hoses for damage. Inspect the vacuum hoses for damage or leaks, replace if damaged.

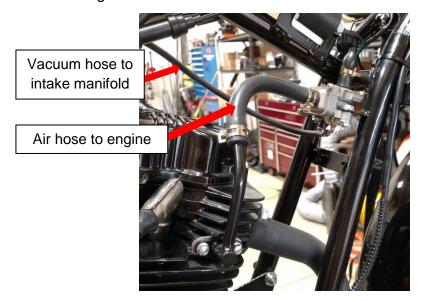
Inspect the fuel cap and gasket for sealing. Replace the gasket if it appears cracked or damaged.





Secondary Air Injection System

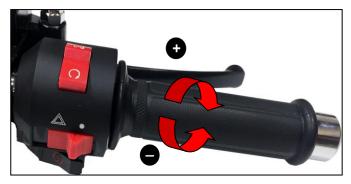
See "Secondary Air Injection System" **page 16**, for more information. Inspect the hoses for damage. Inspect the vacuum hoses for damage or leaks, replace components if damaged.

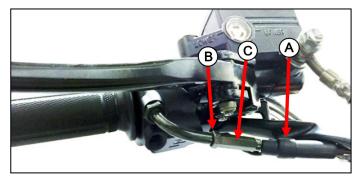


Throttle Operation

Idle speed is controlled by the speed screw on the carburetor. Throttle cable free-play is required to allow the carburetor slide to fully close against the speed screw during idle.

- 1. Inspect the throttle cable for free movement without binding. Lubricate as necessary. The throttle should close fully by itself when released. Frayed, kinked or rusted cables require replacement.
- 2. Check that free-play at the throttle is 3-5 mm. If adjustment is required, remove the rubber cover (A) to access the adjustment.
- **3.** Loosen the lock nut (B) and adjust the barrel (C) for more or less free-play. Tighten the locknut to retain the adjustment.
- 4. Check for minimum free-play with the steering at full lock left and right. Adjust for more freeplay if the idle speed increases when at full lock.



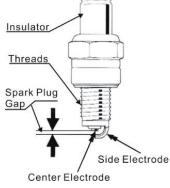




Spark Plug

- 1. Before removing the spark plug for inspection, clean any dirt from around spark plug base. Do not allow dirt or debris to fall into the engine.
- 2. Disconnect spark plug cap and remove the spark plug.
- 3. Normal spark plug condition will show a center ceramic insulator from white to light brown color. The insulator should not be cracked or chipped. Deposits of black carbon or oil indicate a poor running condition. Replace the spark plug if it is carbon or oil fouled and rectify the running condition.





- **4.** Check the spark plug gap. The spark plug gap should be **0.6 0.7 mm**. Always check the gap of a new spark plug before installation.
- 5. Ensure all dirt has been cleaned from spark plug threads. Before installing, a drop of oil or small dab of grease on the threads will aid installation. Install spark plug by hand, and then tighten to **14N-m**. This will prevent stripping or cross threading of the threads.

Recommended spark plug: NGK DR8EA, DPR8EA-9, TORCH D8TC or equivalent

NOTICE

A

USING A SPARK PLUG WITH AN IMPROPER HEAT RANGE OR INCORRECT REACH CAN CAUSE ENGINE DAMAGE. NOTICE

DO NOT OVER-TIGHTEN SPARK PLUGS. TIGHT PLUGS CAN STRIP THREADS. TIGHTEN PLUG TO 14 N·M.



Valve Clearance

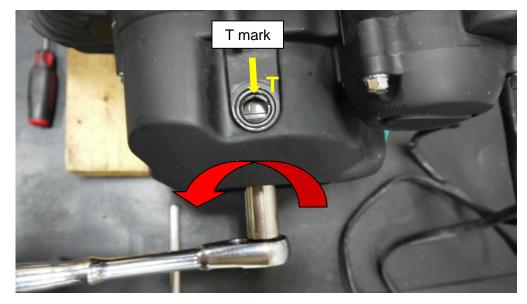
Valve clearances should be inspected and adjusted on a cool engine. The fuel tank may be left in place.

Valve Clearance Inspection and Adjustment

1. Remove the valve cover on top of the engine. It is held on by three screws. Wipe off any dirt or oil on the rubber gasket and the gasket surface of the engine. Do not allow dirt to fall into the engine.

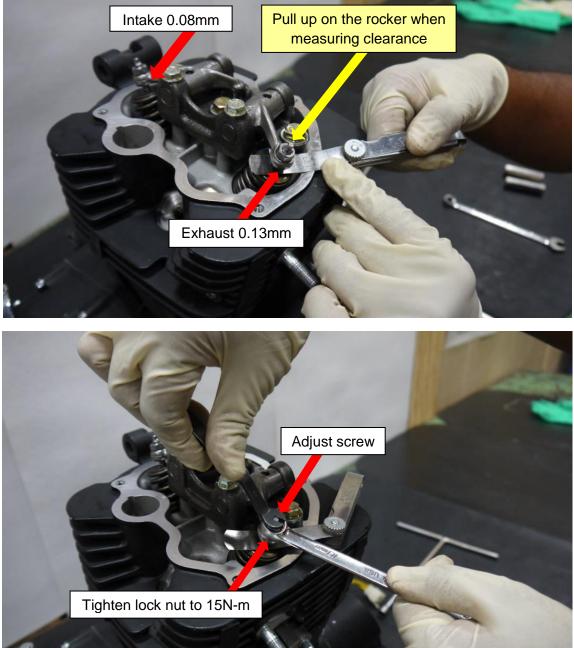


- 2. Remove the spark plug to allow the engine to be rotated easily.
- 3. Remove the left side engine timing cap and crankshaft inspection cap. Rotate the engine forward at the crankshaft (counterclockwise as viewed from the left side of the motorcycle) and observe the opening and closing of the valves. After the intake valve closes, continue turning until the T (Top) mark on the flywheel is showing in the timing inspection window. Both intake and exhaust valves should be slightly loose, and the piston at top dead center as viewed through the spark plug hole. The piston will be at top dead center on the compression stroke.





4. Measure the clearance between the valve tip and the adjuster screw with a feeler gauge. Intake should be 0.08mm, exhaust should be 0.13mm. When inserting the feeler gauge, pull up on the rocker arm adjust screw to take up the clearance slack of the push rod. A slight drag on the feeler gauge is best. If the clearance is too tight or loose, loosen the lock nut and adjust the screw. Tighten the lock nut to 15N-m, and measure the clearance again. Tightening the lock nut may alter the final clearance, so always measure again after the lock nut is tightened.



5. Inspect the rubber valve cover gasket and inspection cover O-rings for damage, replace if damaged. Reinstall the valve cover, inspection covers and spark plug. Tighten the valve cover bolts to 11N-m. Tighten the spark plug to 18N-m.

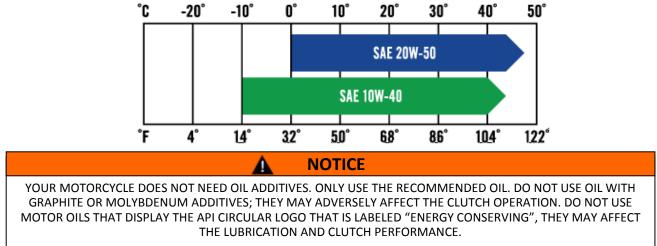


Engine Oil/Oil Filter Screen

Engine Oil Recommended:

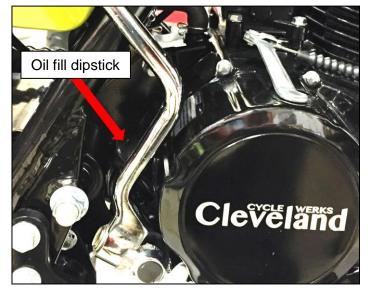
SAE 10W-40, 15W-50, 20W-50, (Society of Automotive Engineers: viscosity) API SF/SG, (American Petroleum Institute: service code for gasoline, grade) API SH/SJ *with* JASO MA (MA is Japanese Automotive Standards Organization 4-stroke motorcycle grade)

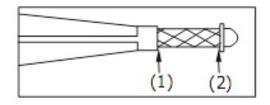
The chart below indicates recommended oil weight for common air temperatures. Cleveland CycleWerks recommends **20W-50 full synthetic oil** as an all-around.



Checking and Adding Oil

- **1.** Support the motorcycle so that it is vertical.
- 2. Remove the oil filler cap, wipe it clean, and insert it into its place but DO NOT screw it back in.
- Check that the oil level is within the (1) & (2) hash-marks on the dip stick. If the oil level is at or near the upper mark (1), no oil needs to be added. If the oil level is at or near the lower mark (2), add oil until the upper mark (1), is reached. DO NOT OVERFILL.
- 4. Reinstall the dipstick and check for any leaks after running the engine.

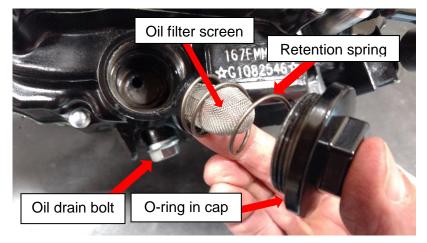






Changing the Oil

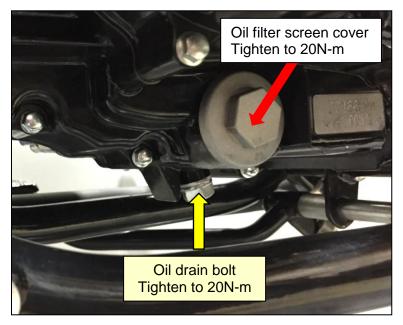
- 1. Place an oil drain pan under the engine.
- 2. Remove the **oil drain bolt** and crush washer from the bottom of the motor.
- **3.** Remove the **oil filter screen cover**, **screen** and **retention spring**. Let the oil drain thoroughly.



NOTICE

IMPROPER DISPOSAL OF OIL / DRAINED FLUIDS IS HARMFUL TO THE ENVIRONMENT.

- 4. Clean the **oil filter screen** with a low flash point solvent.
- 5. Reinstall the **oil drain bolt** with a new crush washer. Tighten **to 20N-m**.
- 6. Reinstall the oil filter screen, retention spring, O-ring and cover. Replace the O-ring if damaged. Tighten to 20N-m.
- Refill the engine with oil (1.2 liter after draining). Check for leaks after running the engine. See Checking and adding oil, page 26



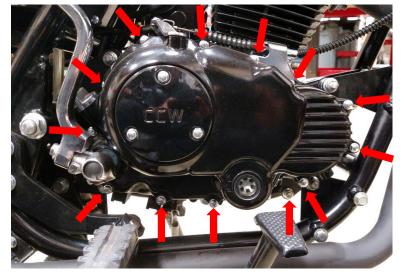


Centrifugal Oil Filter

The centrifugal oil filter is located behind the right crankcase cover. Drain oil before servicing. **Recommended service is every 5400 mi/9000 km.**

Centrifugal Oil Filter Service

- 1. Remove the kick starter.
- 2. Remove 13 x M6 hex head bolts from the right crankcase cover and remove the cover. The clutch cable bracket will come off when the bolts are removed.
- 3. Remove the **gasket** and scrape clean any residual gasket material from both the cover and the engine case. Do not scratch or damage the sealing surfaces of the cover and engine case. Do not allow any gasket material to fall into the engine.
- 4. Remove 3 x Phillips head screws and remove the centrifugal oil filter cover.
- **5.** Scrape off bulk contaminant deposits from inside the filter housing.





- **6.** Using a solvent and a brush, flush out any remaining deposits from the filter housing.
- Replace the oil filter cover and 3 x screws. Replace the gasket if it is damaged.
- 8. Reinstall the right crankcase cover, kick starter and clutch cable bracket. Install a new side cover gasket during assembly.
- **9.** Tighten the side cover **bolts** progressively to **11N-m**.
- **10.** Refill the engine with **oil** (1.2 liter after draining). Check for oil leaks after running the engine.

See Checking and adding oil, page 26

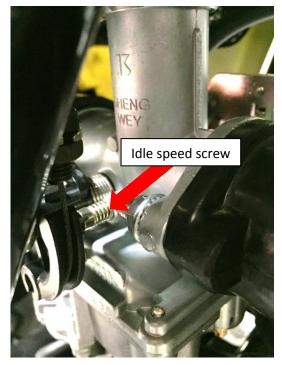




Engine Idle Speed

Idle speed (RPM) of the engine is best set after regular service is performed. Valve clearance out of specifications, stale/dirty fuel, varnish or contaminants in the carburetor, dirty air filter, fouled spark plug or tight throttle cable can all adversely affect the engine idle speed. The idle speed must be set after the engine is at full operating temperature.

Idle speed is set with the slide stop (idle speed) screw located on the right side of the carburetor. Set the engine idle speed to **1500 RPM ±100 RPM**.

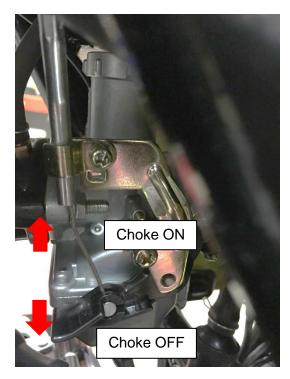


Carburetor Choke

Choke Inspection

Note: Inspection of the carburetor choke system is important for the proper running of the engine. Choke enables the motorcycle to cold start more easily, yet excessive use of the choke will cause carbon fouled spark plugs, poor fuel mileage, and excessive exhaust emissions. Do not operate a warm engine with the choke on.

Operate the choke lever on the handlebar (pull towards the rear) and observe that the cable pulls up the black choke lever on the carburetor to the **ON** position (choke butterfly is closed, restricting air). Push the handlebar choke lever forward to turn **OFF** the choke. The black lever on the carburetor should return to the lower position (choke butterfly is open, allowing full air flow).



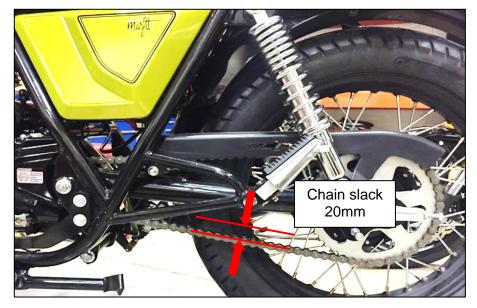


Drive Chain

Before the drive chain is serviced, be sure the motorcycle is parked on a level surface and the engine is turned **OFF**. Be sure the transmission is in neutral. It is not necessary to remove or replace the chain to perform recommended maintenance service.

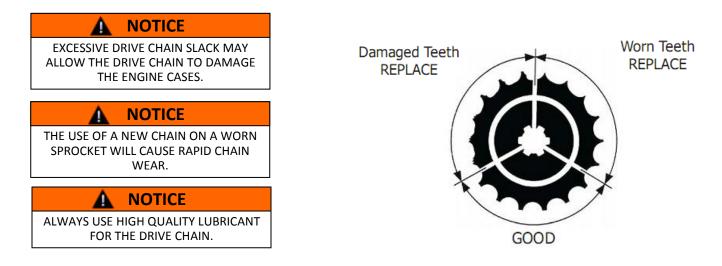
Chain Inspection

- Check the slack in the lower drive chain midway between the sprockets. Push upward on the chain with a finger. The vertical movement should measure 20 mm.
- 2. Inspect the drive chain for the following: damaged rollers, dry or rusted links, kinked or binding links and excessive wear. Replace a chain with excessive stretch or damage.
- Lubricate the drive chain if it appears dry or shows signs of rust.



4. Inspect the front and rear sprockets for excessive wear or damage. If needed, replace any worn or damaged sprockets. Sprockets should be replaced as a pair with a new chain, to avoid rapid chain wear.

Use the diagram below to determine if the sprockets need to be replaced. Never use a new chain with a damaged or worn sprocket.





Chain Slider Inspection

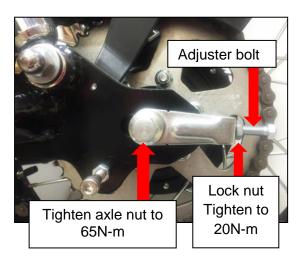
Inspect the chain **slider** for wear. Minimum thickness is **2.0mm**. Replace if worn down to minimum thickness.



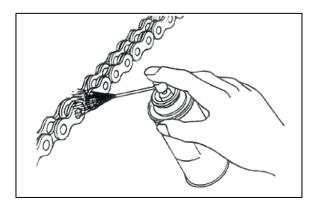
Chain Adjustment

Follow the procedure below to adjust the drive chain slack. Be sure that the motorcycle is parked on a level surface and the engine is turned **OFF**.

- 1. Loosen the rear axle nut.
- 2. Loosen the adjuster bolt **lock nuts** on both the right and left side of motorcycle.
- **3.** Turn the **adjusting bolts** in to decrease slack in the chain, or out to decrease slack. Push the wheel forward to be sure that the adjuster bolts are touching the swing arm.
- Make sure the right and left side are aligned the same. Tighten the axle nut to 65N-m. Tighten the lock nuts to 20N-m.
- 5. Re-check chain slack and re-adjust if necessary.



Chain Lubrication



Commercial motorcycle chain lubricants may be purchased at most motorcycle shops and should be used instead of motor oil. Chain lube or gear oil (80w or 90w) is recommended.

Saturate each joint so that the lubricant penetrates the space between each surface of the link plates and rollers. Wipe off excess lube with a rag.



Battery

The Misfit is equipped with an Absorbed Glass Mat (AGM) maintenance free battery. The battery electrolyte (acid) is filled at the time of battery commission and is not serviceable. Do not attempt to open an AGM battery and fill with electrolyte.

Battery Inspection/Charging

Remove the **seat** and Check that the battery terminal bolts are tight and the cables not loose. Measure the battery voltage, engine off, with a volt meter. Normal static battery voltage should be **12.6VDC minimum**. If below this voltage, charge the battery. The battery may be charged at a rate of between **0.5-2.0A-h** at a voltage of **13.8 - 14.5 volts** to properly charge the AGM battery.

Inspect the battery for acid leaks, corroded terminals or other damage. Replace the battery if it is leaking or damaged. If acid is present, clean the motorcycle with soap and water. Acid may damage paint, metal and plastic.

BATTERY ACID CAN CAUSE SEVERE BURNS. WEAR EYE PROTECTION AND RUBBER GLOVES IF ACID IS PRESENT AND NEEDS TO BE CLEANED OFF THE MOTORCYCLE.

Battery type: YTX9-BS (12V 9Ah)

Brake System

Brake Fluid Inspection/Filling-Front

- Move the handlebars until the brake master cylinder is level. Brake fluid level should be between the LOWER level in the window and the top of the window. Fluid should be a clear color. If the fluid is yellow or brown, this indicates that the fluid is contaminated and needs to be changed. See page 121
- If the fluid level is low, clean any dirt from the reservoir cap and remove the cap by removing the 2 Philips head screws.
- **3.** Remove the rubber diaphragm and wipe clean of any fluid. Clean the cap and diaphragm with contact cleaner and dry. Any spilled fluid must be cleaned immediately.



- 4. Add DOT 3 OR 4 brake fluid to the reservoir until the top level is reached. (DO NOT OVERFILL)
- 5. Replace the diaphragm, cap and screws.

NOTICE

USE ONLY DOT 3 OR 4 BRAKE FLUID FROM A SEALED CONTAINER. AN OPEN CONTAINER MAY HAVE THE FLUID CONTAMINATED WITH WATER ABSORBED FROM THE ATMOSPHERE

NOTICE

DO NOT SPILL BRAKE FLUID ON PAINTED SURFACES OR IT WILL DAMAGE THE PAINT. CLEAN ANY SPILLS IMMEDIATELY.



Brake Fluid Inspection/Filling-Rear

- Remove the right side motorcycle cover to access the rear brake fluid reservoir. Brake fluid level should be between the LOWER level and the UPPER level. Fluid should be a clear color. If the fluid is yellow or brown, this indicates that the fluid is contaminated and needs to be changed.
- 2. If the fluid level is low, clean all dirt and dust from the reservoir cap and remove the cap.
- 3. Remove the rubber diaphragm and wipe clean of any fluid. Clean the cap and diaphragm with contact cleaner and dry. Any spilled fluid must be cleaned immediately.



- Add DOT 3 or 4 brake fluid to the reservoir until the UPPER level is reached. (DO NOT OVERFILL)
- 5. Replace the diaphragm and cap.

USE ONLY DOT 3 OR 4 BRAKE FLUID FROM A SEALED CONTAINER. AN OPEN CONTAINER MAY HAVE THE FLUID CONTAMINATED WITH WATER ABSORBED FROM THE ATMOSPHERE NOTICE

DO NOT SPILL BRAKE FLUID ON PAINTED SURFACES OR IT WILL DAMAGE THE PAINT. CLEAN ANY SPILLS IMMEDIATELY.

Brake Pad/Rotor Wear

- 1. Inspect the front and rear brake pads for minimum thickness of the friction material.
- **2.** If the material is worn down to a thickness of 1 mm, both pads need to be replaced. (Never replace only one pad).
- **3.** If one side has worn down more extensively than the other, the caliper may need to be serviced.
- Inspect the brake rotors for severe galling or uneven surface, indicating damage. Replace the rotors if damaged or warped. Measure the rotors for wear. Minimum thickness is 4.5mm front and 3.5mm rear.



Electric Components/Side Stand Switch/Lighting System

Inspect the functioning of the following electric components:

- > Headlight high beam, low beam, pilot (parking) lamp.
- > Turn signals, front and rear. Indicator light in the instruments.
- > Emergency (hazard) flasher, front and rear.
- Front brake light, rear brake light.
- Instrument illumination.
- > Neutral light in the instruments.
- > Clutch safety switch. Clutch must be pulled **IN** to activate the starter motor.
- Side stand safety switch, relay and diodes. The side stand in the **DOWN** position will stop the engine if the transmission is in gear.

Bolts/Nuts/Fasteners

Check the following chassis fasteners for tightness.

- Front and rear axle nuts
- Front and rear engine mount bolts
- Swing arm pivot bolt
- Fork clamp bolts
- Rear shock nuts
- Handlebar bolts
- > Foot peg bolts, main and passenger
- Gear shift and kick start bolts
- Side stand bolt
- Exhaust fasteners

Wheels/Spokes/Tires

Tire Inspection

Inspect the tire condition. Look for wear, cuts, cracks, bulges, or imbedded debris. Minimum tread depth is **2.0mm**. Replace tires that are worn or damaged.

Set tire pressures to: Front 200kPa (29psi) Rear 265kPa (38psi)

Wheels and Spoke Inspection

Inspect wheel rims for dents or being out of round. Inspect for loose wheel spokes. Loose spokes must be tightened. Out of round wheels may be trued, if no large dents are present.



Tire Replacement

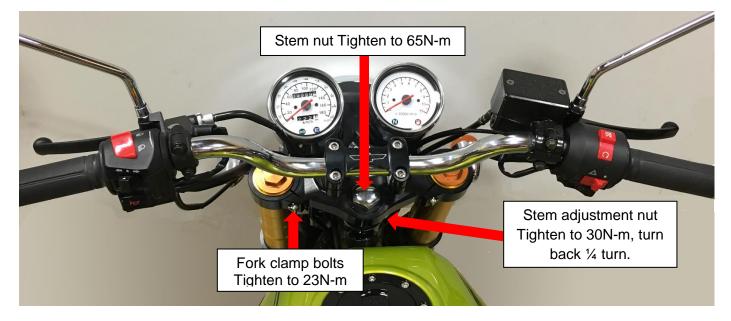
Cleveland CycleWerks does not recommend patching inner tubes. A repaired inner tube may not have the same reliability as a new one and could fail while riding.

Always use replacement tires that are the same size and type as the original. Balance the wheel after a new tire has been installed.

FRONT TIREKingstone 100/90-H18 Tube Type, 6P.R 62PREAR TIREKingstone 120/90-H18 Tube Type, 6P.R 71M

Steering Head Bearings

Inspection and adjustment



- 1. Support the motorcycle in a paddock stand or rear wheel in a vice with the front wheel off the ground.
- 2. From the front, grasp the forks and turn the steering assembly from side to side and pull front to back. The side movement should be smooth with no binding. There should be no perceived front to back movement. If the forks have binding or are stiff to turn, this indicated tight or dry bearings. If the forks move front to back, this indicates loose or worn bearings.
- 3. To adjust the bearings:
 - 1. Loosen 2 x top fork clamp bolts and the stem nut.
 - 2. Loosen, then tighten the bearing adjustment nut to 30N-m, then loosen ¼ turn.
 - 3. Tighten the stem nut to 65 N-m.
 - 4. Tighten 2 x top fork clamp bolt to 23 N-m.
 - 5. Check again the steering assembly movement, and adjust as necessary.



Suspension

Loose, worn or damaged suspension components may affect the stability and handling of the motorcycle.

Suspension Inspection Front

- 1. Check the fork operation by pulling in the front brake lever and holding it to lock the front wheel.
- 2. Pump down on the handle bars several times. The suspension should feel smooth.
- 3. Check the lower end of the forks (near the wheel) for oil leaks.
- 4. Inspect the upper and lower fork clamp bolts for tightness.

Suspension Inspection Rear

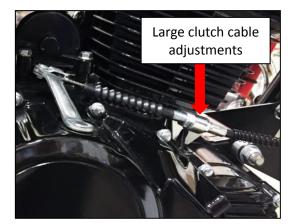
- 1. Move the motorcycle by bouncing it up and down to check for smooth suspension action.
- 2. Check the shock absorber for a bent damping rod or any oil leaks.
- 3. Check the shock nuts for tightness.
- 4. Check the swing-arm bolts for tightness.
- 5. Push the rear wheel from side to side feeling for any loose or worn swing-arm bearings.

Clutch System

A small amount of free play is necessary in the clutch cable to allow the clutch to fully engage. A clutch cable with no free play may allow the clutch to slip during riding and cause wear and overheating of the clutch plates.

Clutch Cable Adjustment.

- Normal free play at the lever end is 3-5mm with cold engine.
- 2. Small adjustments may be made at the clutch perch adjuster nut and barrel.
- **3.** Large adjustments may be made at the cable bracket on the engine.





Introduction

Engine removal from the chassis is **required** to service the following: **Crankcases, crankshaft, balance shaft and transmission.**

The following may be serviced with the engine in the chassis:

Head and cylinder Left case cover and alternator Right case cover, oil filter, oil pump and clutch

Notes on engine removal

• Allow a hot engine and exhaust to cool. Drain the engine oil.



- Engine removal requires fuel tank and carburetor removal. Fuel is highly flammable. Avoid sparks, flames and smoking when working on the fuel system and components.
- Dirt inside the engine will damage parts. Clean a dirty engine before disassembly. Dirt and mud may be washed off with soap and water. Oil and chain lube may be washed off with a water solvent engine degreaser or contact cleaner.



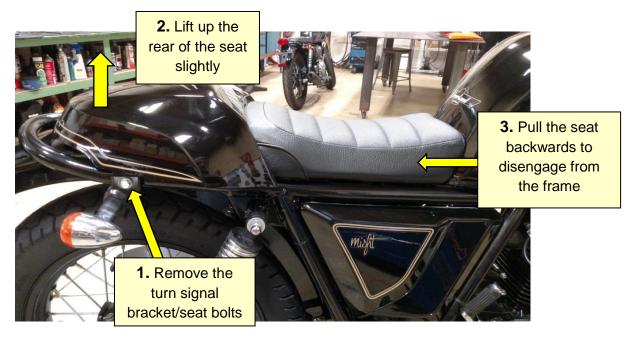
- Park the motorcycle on the side stand on level firm ground or in a service stand. Motorcycles are heavy; do not take the risk of having the motorcycle fall on you during service!
- Engines are heavy, exercise caution when removing and lifting the engine.
- Do not damage the engine, frame, exhaust or other parts when removing the engine. Work cautiously, cover the frame with tape and shop towels before engine removal and before engine installation to prevent damage to the paint.

Table of Contents

SEAT REMOVAL/INSTALLATION	38
FUEL TANK REMOVAL/INSTALLATION	38
DISCONNECT WIRE HARNESS	39
EXHAUST AND AIR VALVE REMOVAL	39
CARBURETOR REMOVAL	40
ENGINE REMOVAL FROM FRAME	40
ENGINE INSTALLATION	42

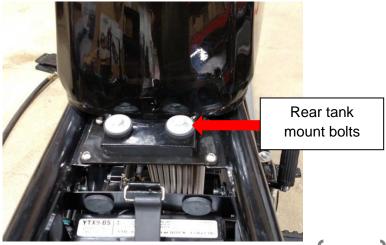
Seat Removal/Installation

- 1. Remove the rear seat bolts/turn signal brackets from the frame.
- 2. Lift the rear of the seat slightly.
- 3. Pull the seat backwards to disengage the front of the seat from the frame. Do not lift up on the rear of the seat fully without pulling backwards, or the front seat mounting tab may break.
- 4. Seat installation is the reverse of removal. Tighten the 2 x M8 seat bolts to 23N-m.



Fuel Tank Removal/Installation

- 1. Close the fuel valve. Remove the **fuel hose** from the fuel valve (petcock).
- 2. Remove the 2 x M6 rear tank mount bolts.
- **3.** Lift the **fuel tank** up and to the rear to disengage the front tank mounts and lift the tank from the frame.
- The fuel tank installation is the reverse of removal. Tighten the 2 x M6 tank mount bolts to 11N-m.



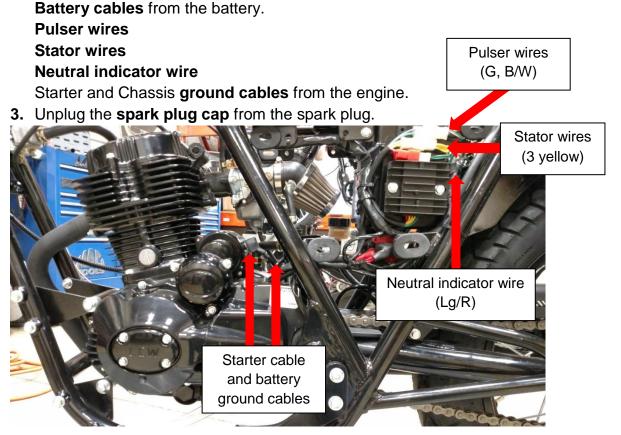


Fuel is highly flammable. Avoid spills. Avoid sparks, flames and smoking when working with the fuel tank and fuel system.

38

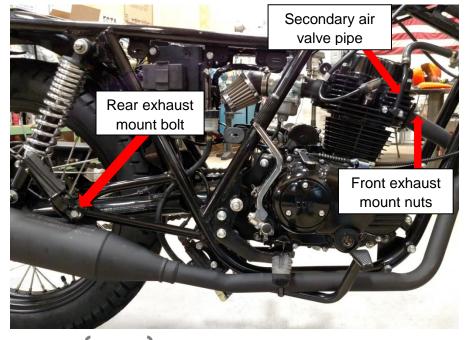
Disconnect Wire Harness

- 1. Remove both motorcycle side covers by slowly pulling outward from the rubber grommets.
- **2.** Disconnect the following, **cut fastening ties as required**.



Exhaust and Air Valve Removal

- 1. Remove the front exhaust mount **nuts**.
- 2. Remove the rear exhaust mount **bolt** and **pillion rest** bracket.
- 3. Carefully lift off the exhaust system and disengage from the rear brake pedal.
- Unbolt the secondary air valve pipe from the engine.
 Disconnect the vacuum hose from the intake manifold.



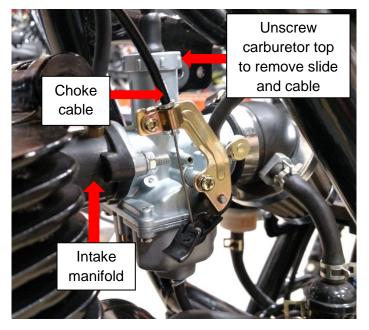
Carburetor Removal

 Place a suitable container or shop towel under the drain hose of the carburetor. Unscrew the drain screw at the bottom of the carburetor 2 turns to drain of fuel.

A DANGER

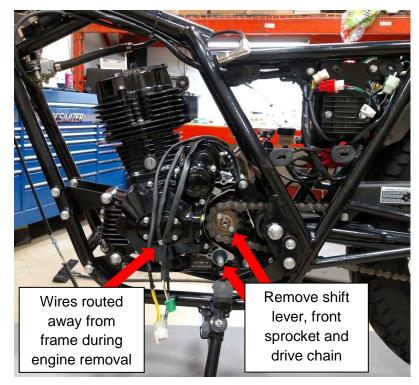
Fuel is highly flammable. Avoid spills. Avoid sparks, flames and smoking when working with the fuel system.

2016 model. (clamp filter) Remove the clamp on air filter. Remove the accelerator pump cable from its bracket.
 2018 model (with air box) Remove the battery, unbolt the battery box and move the battery box slightly to the rear inside the frame. Unbolt the air box from the frame and move slightly to the rear inside the frame.



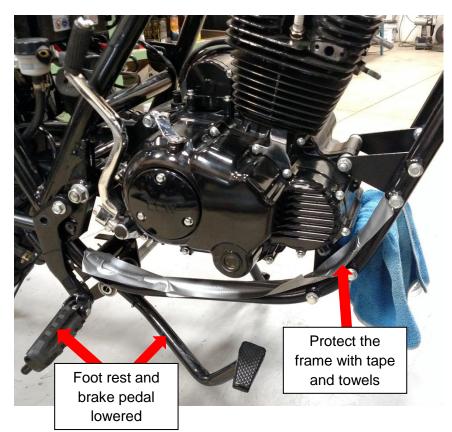
- 3. Remove the choke cable.
- 4. Unscrew the carburetor top and remove the top, slide and throttle cable as a unit.
- 5. Unbolt the carburetor from the intake manifold to remove the carburetor.

Engine Removal from Frame



1. Remove the shift lever and sprocket cover.

Route the engine wires away from the frame in preparation of engine removal.
 Remove the front sprocket and lay the drive chain over the swing arm.



 Unbolt the right foot rest bracket to lower the foot rest.
 Unbolt the rear brake master cylinder and tie the brake pedal away for clearance.
 Cover the frame tubes with shop towels and tape to protect the

frame paint and engine during

removal.

7. Support the front of the **engine** with a suitable wood block.

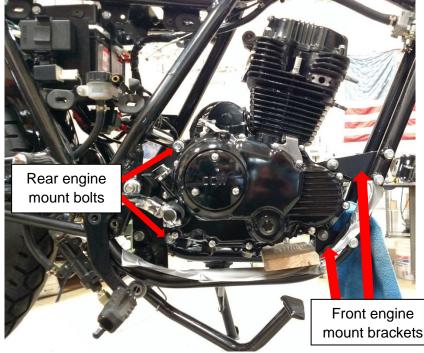
8. Remove the front engine mount brackets, 8 x M8 bolts in frame and 2 x M10 bolts in engine.

9. Remove the 2 x M10 rear engine mount **bolts**.

10. Carefully lift the **engine** from the frame to the right.



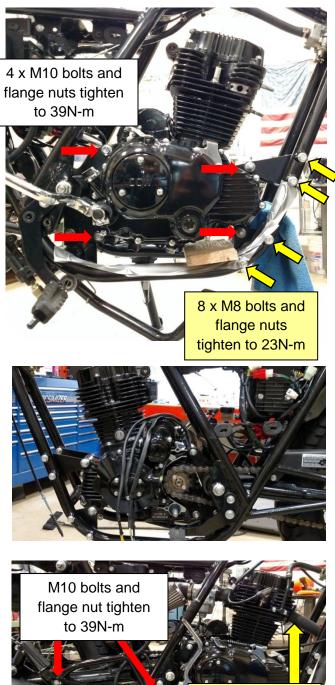
The engine is heavy! Obtain assistance to lift heavy engines. Wear gloves to protect the fingers.



Engine Installation

Engine installation is the reverse of removal. Follow these guidelines during installation.

- 1. Cover the frame tubes with tape and shop towels to avoid damaging the frame paint.
- 2. Engine is installed from the right side of the frame. Have an assistant insert the rear M10 bolts and nuts in the rear of the engine first, when the engine is lifted into place. Do not tighten the bolts until all engine mounting brackets, bolts and nuts are installed loosely first.
- Install the 4 x engine mounting brackets and 8 x M8 bolts and nuts loosely.
- **4.** Tighten the engine bolts and nuts in the following order:
 - 1. 2 x M10 rear bolts tighten to 39N-m.
 - 2. 2 x M10 front bolts tighten to 39N-m.
 - 8 x M8 engine bracket bolts tighten to 23N-m.
- 5. Install and adjust the drive chain, shift lever and sprocket cover. See page 30
- Carburetor installation is the reverse of removal.
 See page 40. Install the choke and throttle cables. After installation, follow the adjustment procedures in Maintenance: Throttle Operation page 22
- 7. Install and adjust the clutch cable. See cable routing page 114, adjustment page 36
- Connect and route the engine wires to the harness. See page 39
- 9. Install the exhaust with a new gasket and the secondary air pipe.
- 10. Install the foot rests. Tighten the 2 x M10 bolts to 23N-m. Install the rear brake master cylinder, if removed. Tighten the 2 x M6 bolts to 11N-m.
- 11. Install the fuel tank and seat. See page 38



2 x M8 flange exhaust nuts tighten to 23N-m

42



Introduction

WARNING

An improperly assembled engine or motorcycle may fail while being ridden, causing possible injury or harm to the rider. **Do not service or assemble an engine unless the mechanic is certain of his skills and uses proper assembly procedure**. If the mechanic is in doubt, find assistance from a trained professional!

- Engine assembly requires clean parts; dirt or loose gasket material may clog oil passages and starve an engine of oil. Dirt inside an engine may destroy bearings and gears.
- Gasket surfaces may not seal if damaged or if they have remaining old gasket material on them.
- Do not use sealant on gaskets, sealants are not required and may leave excess material inside the engine that may clog oil passages.
- Lubricate all parts with engine oil during assembly.
- Replace the following with new parts upon assembly of the head and cylinder:

Cylinder base gasket Head gasket Valve stem seals Head joint O-ring Piston circlips

• All other parts must pass inspection and be suitable for service. Replace any part that is out of specification, worn or damage.

Head and Cylinder Table of Contents

CYLINDER AND PISTON REMOVAL AND INSPECTION	44 47 49
HEAD ASSEMBLY	51
	52



Head Removal and Inspection

The head and cylinder may be removed with the engine in the chassis. For the purposes of illustration, the following procedures are shown with the engine on a work bench. To remove the head and cylinder in the chassis, remove the **seat**, **fuel tank**, **exhaust** and **carburetor** first.

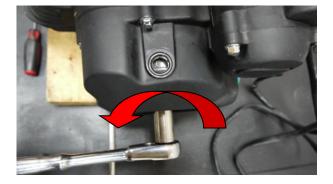
1. Remove the valve cover 3 x M6 bolts and spark plug.

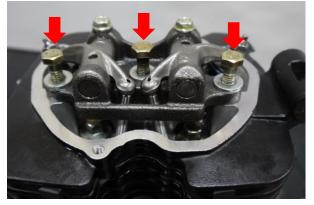
Spark plug

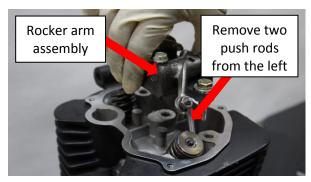
- 2. Remove the left crankshaft inspection plug and timing cap. Rotate the engine forward (counterclockwise as viewed from the left) until both valves are closed. This will relieve valve spring pressure on the rocker arms.
- **3.** Remove the **3 x M8 bolts** and **washers** holding the rocker arm holder.

4. Lift off the rocker arm holder and lift out the two push rods.

Note: If the push rods fall into the engine, they may be retrieved with a magnet.







5. The rockers, rocker pins and push rods may be inspected for wear or damage.

Galling, rough surfaces, or bluing indicate excessive wear or overheating. Inspect the push rods for straightness or loose and worn ends. Replace worn or damaged parts.

6. Remove the 4 x M8 cylinder stud nuts and washers and the M8 bolt with copper washer and lift off the head.

Remove any **gasket material** from the head surface. Do not scratch or damage the sealing surface.

7. To remove the **valves**, the valve springs may be compressed with a valve spring compressor tool.

8. The valve collets may be removed with a magnet after the springs are compressed.

Remove two valve collets per valve









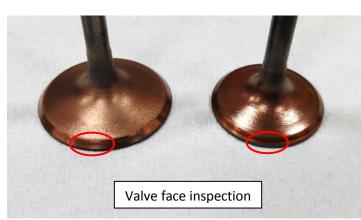


9. Remove the valves, springs, spring seats and valve stem seals.

Note the order of installation; each spring will have a spring seat washer underneath, and each valve will have the paint mark in the top position.

10.Before inspection, **decarbonize** the valves with a wire wheel.

11. Inspect the valve faces for wear or pitting. Replace the valves if wear or damage is present. The valve faces are hard-coated and cannot be reground.



12. Before inspecting the head, **decarbonize** the combustion chamber and valve seats with an abrasive pad and low flash point solvent. Clean the head of any loose carbon, dirt or abrasives with contact cleaner and blow dry with compressed air.

Inspect the valve seats for wear, pitting or damage. Valve seats may be recut by a specialist, or the head replaced if the seats are worn or damaged.







13. Inspect the vale guides for wear. With the valve lifted 10mm off the seat, the valve should move 0.1-0.6mm side to side and front to back. The valves should move freely without binding or tight spots. Excessive movement indicates worn guides and requires a head replacement.

Spin each valve against its seat. Look through the ports and observe any air gaps in the valve sealing against its seat. Light showing through gaps will indicate that valves may be bent, valve faces are worn or that the valve seats are worn.

14. Measure the free length of the inner and outer valve springs. Replace the springs if under their limit length:

Inner valve spring limit: **32mm** Outer valve spring limit: **39mm**





Cylinder and Piston Removal and Inspection

1. Remove the 2 x M6 bolts from the cylinder base and lift off the cylinder.

Note the order of installation; there are 3 x 10mm locating dowel pins, one **O-ring** and the head gasket.

MY2018-up metal head gaskets do not require the O-ring.

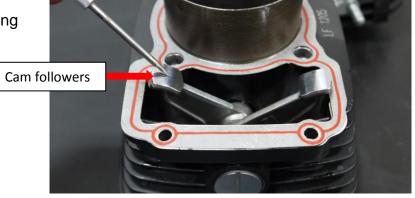
Remove the head and cylinder base **gaskets** and any remaining material. Do not scratch or damage the sealing surface.



Remove 2 x M6 bolts



2. Inspect the **cam followers** for wear, galling or bluing, indicating overheating and a need for replacement.



3. Cover the crankcase opening with shop towels. Remove the **piston circlip** and push the **piston pin** out. Lift off the **piston**.

The **piston rings** may be removed and the piston decarbonized. An abrasive pad is recommended. Do not scratch or damage the piston or ring grooves. Clean the piston of any loose carbon, dirt or abrasives with contact cleaner and blow dry with compressed air.

 Inspect the piston pin for wear, galling or bluing, indicating a need for replacement. Insert the pin into the connecting rod, it should move freely and have no perceptible up and down movement.

Measure the piston pin at its center. Replace the pin if it measures under its wear limit.

Piston pin wear limit: 15.96mm

5. Inspect the **piston** for galling or cracks, indicating a need for replacement. Measure the piston diameter at 90 degree to the piston pin, 10mm from the bottom. Replace the piston if it measures under its wear limit.

Piston wear limit: 66.85mm







6. Inspect the cylinder bore for galling and excessive wear, indicating a need for replacement. Measure the bore diameter with a dial bore gauge. Replace the cylinder if the bore measures larger than the wear limit.

Cylinder bore wear limit: 67.10mm

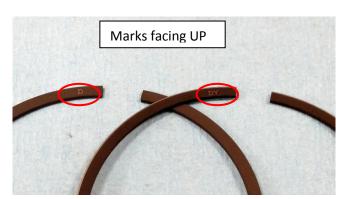
Note: Nominal piston to cylinder clearance is **0.06mm** Piston to cylinder clearance wear limit is **0.25mm**

Cylinder and Piston Installation

 Install the piston rings onto the piston. Install the oil control spring ring first; do not allow the ends to overlap. The oil scraper rings are installed one above and one below the spring ring. Be sure that the scraper rings are seated against the spring ring and do not hang outside of the piston ring groove.

2. Install the top and lower **compression rings**. The lower compression ring has a "DY" mark, orient this mark facing **UP**. The top compression ring has a hard chrome face, orient the ring with the "D" mark facing **UP**.









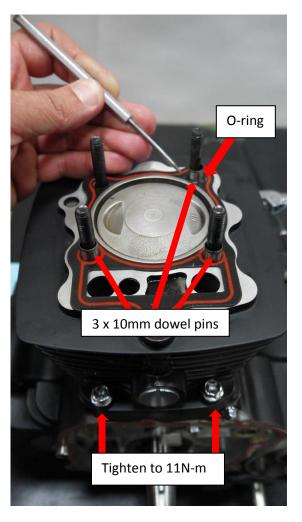


3. Cover the crankcase opening with shop towels to prevent a circlip from falling into the engine. Lubricate the **piston pin** with engine oil and install the **piston** onto the connecting rod. Orient the piston with the "IN" mark facing the rear. Install the two **circlips** into their grooves. Be sure that the circlips are completely seated in their grooves.



- 4. Install a new cylinder base gasket onto the crankcases and install the cylinder over the piston. Verify the presence of the 2 x 10mm locating dowels over the cylinder studs. Oil the cylinder bore with engine oil before installation. Do not use force; guide the piston rings into their grooves with a small screwdriver as the cylinder is lowered. The cylinder bottom has a chamfer to help guide the rings into their grooves. Be sure that the oil scraper rings are in position as the cylinder is lowered over the piston. Install the 2 x M6 bolts in the cylinder base; tighten to 11N-m.
- Install the 3 x 10mm locating dowel pins into the cylinder top, the oil passage O-ring and head gasket.

Note: MY2018 head gasket does not require the O-ring.

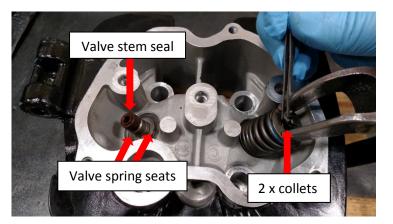




Head Assembly

 Install new valve stem seals onto the valve guides; lubricate the seals with engine oil before installation. Installing one valve at a time, install the valve spring seats, inner and outer, the valve springs and valve spring top. Position the paint marks on the valve springs facing UP. Lubricate the valve with engine oil and install into the guide. Compress the valve springs with a valve spring compression tool and install the 2 x collets.

Verify that the collets are seated into the spring top after the compression tool is removed.





 Assemble the rocker arm assembly by installing each rocker arm into the rocker arm holder with a rocker arm pin. Lubricate the pins with engine oil. The pins are located by 2 x M6 bolts. Tighten the bolts to 11N-m.



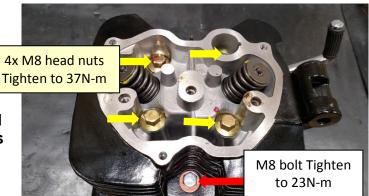


Head Installation

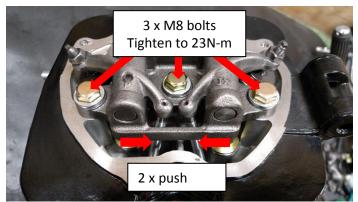
- 1. Refer to page 42 to install the cylinder, piston, head gasket, dowels and O-ring.
- Install the head onto the cylinder and hand thread the 4 x M8 head nuts and washers and M8 bolt with copper sealing washer into the head. Lubricate the threads with engine oil during assembly. Tighten the 4x head nuts progressively to 37N-m and the M8 bolt to 23N-m.

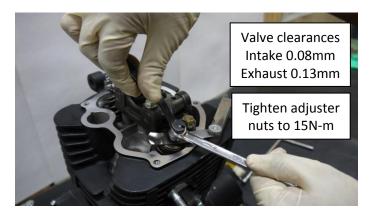
Note: Progressively tighten the head nuts to compress the head gasket evenly.

- Be sure that the engines crankshaft is positioned at top dead center on the compression stroke. (The cam follower arms will both be in a lowered position) Install the 2 x push rods into the cam follower cups. (If the push rods fall into the cylinder, they may be retrieved with a magnet.)
- Install the rocker arm assembly onto the head. Position the push rod ends into the rocker arm cups. Hand thread the 3 x M8 bolts with washers. Tighten to 23N-m.
- Adjust the valves to 0.08mm intake and 0.13mm exhaust. Tighten the adjuster screw nuts to 15N-m.
 See Maintenance, page 20
- Install the valve cover and gasket with 3 x M6 bolts. Tighten the bolts to 11N-m. Install the spark plug, tighten to 18N-m.











Introduction

The clutch, centrifugal oil filter, oil pump, starter motor and alternator may be serviced with the engine in the chassis, or with the engine on a work bench. For the purposes of illustration, this manual shows the clutch and alternator service with the head and cylinder removed.



An improperly assembled engine or motorcycle may fail while being ridden, causing possible injury or harm to the rider. Do not service or assemble an engine unless the mechanic is certain of his skills and uses proper assembly procedure. If the mechanic is in doubt, find assistance from a trained professional!

- Engine assembly requires clean parts; dirt or loose gasket material may clog oil passages and starve an engine of oil.
- Gasket surfaces may not seal if damaged or if they have remaining old gasket material on them.
- Do not use sealant on gaskets, sealants are not required and may leave excess material inside the engine that may clog oil passages.
- Lubricate all parts with engine oil during assembly.
- Replace the following with new parts upon assembly of the clutch and alternator:

Right side engine cover (clutch cover) gasket Left side engine cover gasket

• All other parts must pass inspection and be suitable for service. Replace any part that is out of specification, worn or damaged.

Clutch and Alternator Table of Contents

CENTRIFRUGALOIL FILTER AND OIL PUMP DRIVE REMOVAL AND INSPECTION	_54
CLUTCH REMOVAL AND INSPECTION	_ 55
SHIFTER ARM AND SHIFT DETENT REMOVAL AND INSTALLATION	_ 57
CLUTCH INSTALLATION	_ 58
OIL PUMP DRIVE AND CENTRIFRUGAL OIL FILTER INSTALLATION	_ 59
LEFT ENGINE COVER AND STARTER MOTOR REMOVAL AND INSPECTION	_ 61
CAMSHAFT REMOVAL AND INSPECTION	_ 62
CAMSHAFT INSTALLATION AND TIMING	_ 63
STARTER CLUTCH INSPECTION	_ 63
ALTERNATOR AND LEFT ENGINE COVER INSTALLATION	_ 64



Centrifugal Oil Filter and Oil Pump Drive Removal and Inspection

1. Drain the engine oil if removing the right side engine cover (clutch cover). Remove the kick starter. Remove the13 x M6 bolts fastening the cover.

- 2. Remove the right side engine cover. Remove the cover gasket and any gasket material on the cover or crankcase. Do not allow any material inside the engine. Do not scratch or damage the gasket sealing surface.
- **3.** Remove the **3 x Phillips head screws** on the oil filter cover. Remove the **cover**.





4. Remove the oil filter nut and concave washer with a 24mm ID lock nut tool. Remove the filter housing.





5. Remove the **M6 nut** holding the oil pump drive sprocket. Remove the **sprocket** and **chain**.

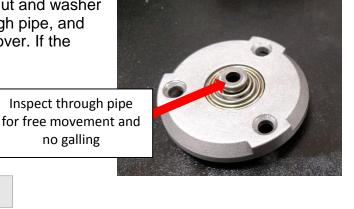
6. Clean the centrifugal oil filter housing, cover, nut and washer with solvent. Inspect for galling of the oil through pipe, and be sure that the pipe moved smoothly in the cover. If the cover gasket is damaged, replace.

Clutch Removal and Inspection

1. Lift out the clutch lifter and bearing.

2. Progressively unscrew the 6 x M6 bolts fastening the clutch spring plate. Remove the spring plate and 6 x clutch springs.







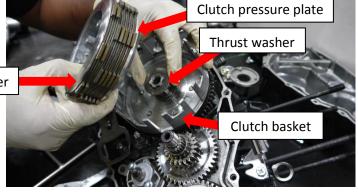


3. Remove the clutch center **circlip** with circlip pliers.



 Lift off the clutch center, pressure plate and clutch plates. Lift off the thrust washer and clutch basket.

Clutch center

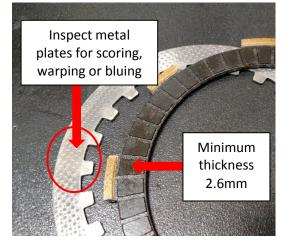


5. Inspect the **clutch basket** for excessive notching wear on the tabs. Replaced if scored or worn excessively. Γ

 Inspect the 6 x metal clutch plates for scoring, warping or bluing, indicating a need for replacement. Measure the thickness of the 7 x fiber plates. Replace if below the minimum thickness.

Fiber clutch plate minimum thickness: 2.60mm







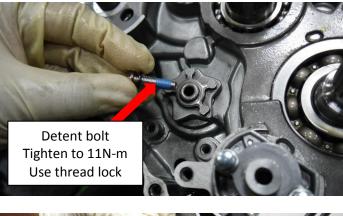
Shifter Arm and Shift Detent Removal and Installation

 Clean any dirt or chain lube from the shift shaft before removal. The shift shaft is exposed to dirt and chain lube from the drive chain (left side of engine). Lift out the shift shaft and arm from the crankcase.

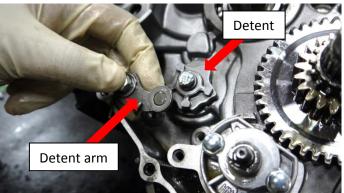
- 2. Remove the M6 bolt and washer retaining the detent arm. Remove the arm, center collar and spring.
- 3. Remove the M6 bolt retaining the detent.

 Installation is in the reverse order of disassembly. Locate the detent on the shift drum with the locating pin on the drum. Install the M6 bolt with medium strength (blue) thread lock. Tighten to 11N-m.

- Install the detent arm and spring with the collar against the engine, and the washer towards the outside. Tighten the arm bolt to 11N-m. The spring is positioned to pull UP on the detent arm.
- **6.** Verify correct arm movement by turning the shift drum to shift through the gears. Spin the transmission main shaft during shifting to aid gear selection.





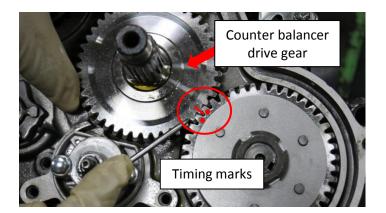


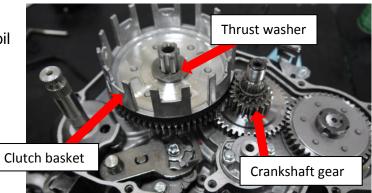




Clutch Installation

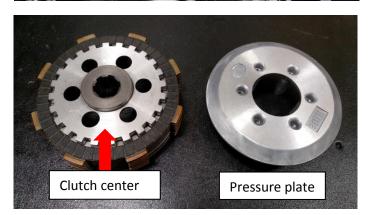
- Install the counter balancer drive gear and the crankshaft gear. Time the counter balancer drive gear with the counter balancer gear. Align the marks. Lubricate the gears with engine oil during assembly. The crankshaft gear is timed on the crankshaft splines.
- 2. Install the clutch basket and thrust washer. Lubricate the gears with engine oil during assembly.





- 3. Install the 7 x fiber clutch plates and 6 x metal clutch plates onto the clutch center. Lubricate all plates with engine oil before assembly. Alternate the metal and fiber plates during installation, starting with a fiber plate against the clutch center. Align the tabs on the fiber plates. Install the pressure plate into the clutch center.
- 4. Install the clutch center assembly into the **clutch basket**. Align the splines on the countershaft to the clutch center, and the fiber plate tabs into the basket tabs during installation. Install the **circlip**.

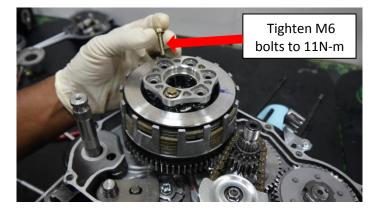
Note: Position the sharp edges of the circlip to the outside. Verify that the circlip is seated in its groove.







- Install the 6 x clutch springs into the clutch. Install the spring plate and fasten with the 6 x M6 bolts. Tighten the bolts progressively to 11N-m; the springs will clamp the clutch plates tightly between the pressure plate and the clutch center.
- 6. Install the clutch lifer and bearing. Lubricate the bearing with engine oil.



Oil Pump Drive and Centrifugal Oil Filter Installation

 Install the oil pump drive chain and sprocket onto the oil pump. Fasten the sprocket with the M6 nut; tighten the nut to 11N-m. Install the chain guard and fasten with the 2 x M6 bolts; tighten to 11N-m.

 Install the centrifugal oil filter housing onto the crankshaft. Position the conical washer with the marks "OUTSIDE" facing OUT.





3. Tighten the oil filter nut with a 24mm ID lock nut tool to 32N-m. A soft strip of aluminum may be inserted between the gears to prevent the crankshaft from turning. Remove the aluminum strip from the gears after tightening and verify that no metal remains on the gears.



Aluminum strip to hold gears

59

4. Install the oil filter cover and gasket; fasten with the **3 x Phillips screws**.



5. Be sure that the gasket sealing surfaces are clean and flat. Install the right side engine cover with a new gasket. Hold the clutch lifter arm in the position shown (against the spring pressure) during installation. Verify that the 2 x 10mm locating dowel pins are present in the crankcase. Fasten with the 13 x M6 bolts. Tighten the bolts progressively to 11N-m. The clutch cable bracket is installed in the location shown.

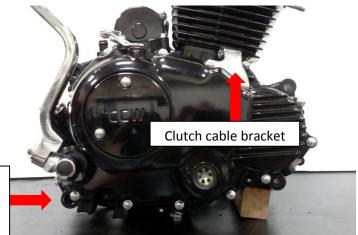


Clutch lifer arm position during cover installation

Tighten bolts progressively to 11N-m

 Install the kick starter. Tighten the M8 Bolt to 23N-m. Verify that the kick starter does not hit the case.

> Kick starter Tighten M8 bolt to 23N-m





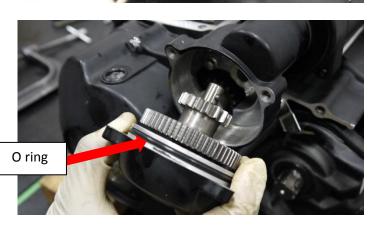
Starter reduction gear cover

Left Engine Cover and Starter Motor Removal and Inspection

 Remove the crankshaft inspection cover by unbolting the 4 x M6 bolts. Remove the 3 x bolts fastening the starter reduction gear cover.

Inspection cover removed

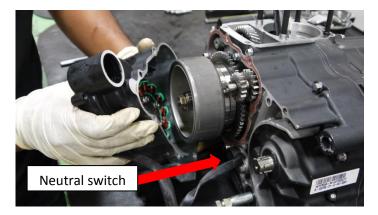
 Remove the starter reduction gear, cover, shaft and thrust washers. Inspect the Oring, replace if damaged.

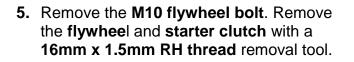


 Unbolt the 2 x M6 bolts fastening the starter motor, and extract the starter motor to the right. Inspect the O-ring, replace if damaged. Unbolt the stator wire clip from the engine.



 Remove the 8 x M6 bolts fastening the left side engine cover. Remove the cover with stator. Remove the neutral switch, fastened by 2 x M6 bolts.









CLE

Camshaft Removal and Inspection

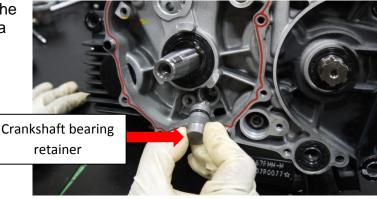
1. Unbolt the camshaft retainer and remove the spring.



2. Extract the camshaft **spindle** and **thrust washer** from the left. Lift out the **camshaft**. Inspect the camshaft bushing for galling or excessive wear. Inspect the cam lobe for galling or excessive wear. Replace if damaged.

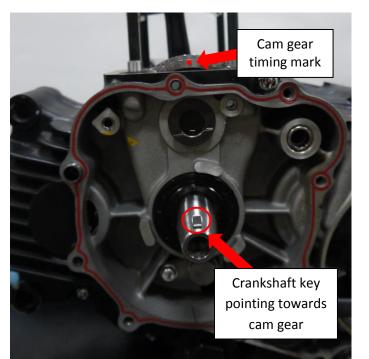


3. If the crankcases are to be split, remove the crankshaft bearing retainer fastened by a M6 bolt.

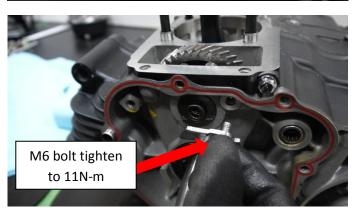


Camshaft Installation and Timing

4. Lubricate the camshaft and spindle with engine oil before installation. Position the thrust washer on the spindle before inserting into the crankcase from the left. The cam gear is timed with the crankshaft at top dead center (key is pointing UP) and the gear mark pointing UP.



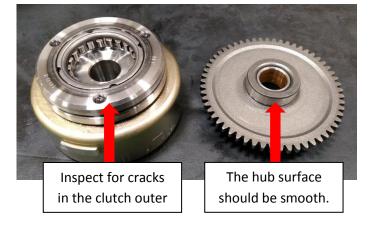
 Install the camshaft spindle retainer and spring. Fasten with the M6 bolt. Tighten to 11N-m.



Starter Clutch Inspection

 Inspect the starter clutch outer for cracks. The one-way sprag clutch cams should allow the gear to spin smoothly in one direction, and lock in the opposite direction with no slipping. The gear hub should be smooth with no dimples or rough areas.

Replace the starter clutch as an assembly if there is wear or damage to the clutch parts.



2. To remove the starter clutch from the flywheel, remove the 3 x M8 bolts and separate the flywheel.



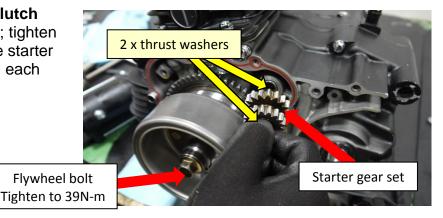
 The starter clutch, cams and gear with hub should be replaced as an assembly. Insert the cams and friction ring into the clutch outer as shown. Note that the ring flange and flange split will face the flywheel. Install the clutch onto the flywheel with the 3 x M8 bolts. Apply medium strength thread lock and tighten the bolts to 23N-m.

> Flange to face the flywheel

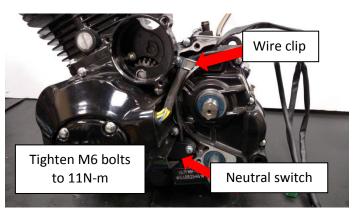


Alternator and Left Engine Cover Installation

 Install the flywheel and starter clutch onto the crankshaft. Align the key; tighten the M10 bolt to 39N-m. Install the starter gear set with a thrust washer on each end.



 Install the left engine cover and stator with a new gasket. The cover is located by 2 x 10mm dowel pins. Fasten with the 8 x M6 bolts; tighten to 11N-m. Install the neutral switch; fasten with the M6 bolt. Route the wires as shown, fasten with the clip and M6 bolt; tighten bolts to 11N-m.

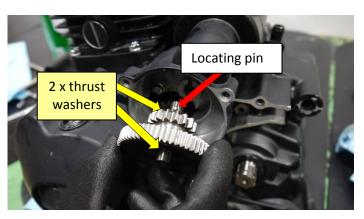


 Insert the starter motor from the right, oil the O-ring to aid installation; fasten the motor with 2 x M6 bolts. Tighten the bolts to 11N-m.

 Install the reduction gears and shaft with the 2 x thrust washers against the gears. Lubricate the parts with engine oil before installation. Position the locating pin into the matching slot during installation.

5. Install the reduction gear cover and Oring, fasten with the 3 x M6 bolts; tighten to 11N-m.











Introduction



An improperly assembled engine or motorcycle may fail while being ridden, causing possible injury or harm to the rider. **Do not service or assemble an engine unless the mechanic is certain of his skills and uses proper assembly procedure**. If the mechanic is in doubt, find assistance from a trained professional!

- Engine assembly requires clean parts; dirt or loose gasket material may clog oil passages and starve an engine of oil. Dirt inside an engine may destroy bearings and gears.
- Gasket surfaces may not seal if damaged or if they have remaining old gasket material on them.
- Do not use sealant on gaskets, sealants are not required and may leave excess material inside the engine that may clog oil passages.
- Lubricate all parts with engine oil during assembly.
- Replace the following with new parts upon assembly of the crankcase:

Crankcase gasket

• All other parts must pass inspection and be suitable for service. Replace any part that is out of specification, worn or damaged.

Service of **the crankcase, transmission, crankshaft and counter balance**r requires the removal of the engine from the chassis and removal of the following: **clutch, shift shaft, shift drum detent, crank gear, head, cylinder, piston, crank bearing retainer and flywhee**. Refer to the following chapters for the disassembly procedures:

- Engine Removal- Page 37
- Head and Cylinder- Page 43
- Clutch and Alternator Page 53

Crankcase, Transmission and Crankshaft Table of Contents

CRANKCASE DISASSEMBLY OIL PUMP INSPECTION	
TRANSMISSION SHAFTS DISASSEMBLY	70
MAIN SHAFT ASSEMBLY COUNTER SHAFT ASSEMBLY	
KICK STARTER DISSASSEMBLY KICK STARTER SHAFT ASSEMBLY	
CRANKCASE ASSEMBLY	



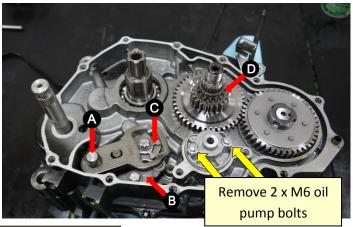
Crankcase Disassembly

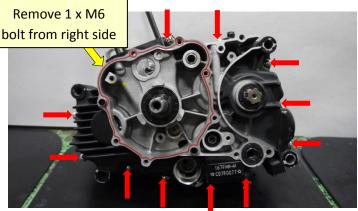
- 1. Prior to separating the crankcases, remove the following parts from the right crank case.
 - A. Shift shaft
 - B. Detent arm and spring
 - C. Shift drum detent
 - D. Crank shaft gear

Remove the countershaft sprocket from the left side.

Remove the 2 x M6 bolts and remove the oil pump.

- 2. Remove the 11 x M6 Bolts from the left side crank case. Remove the M6 bolt from the **right** side crankcase. The counter balance gear may be left installed to separate the cases.
- 3. The cases may be separated. If the cases do not separate easily, small blows with a plastic dead blow hammer on the crank and transmission shafts will separate the cases. Do not use force. Do not use pry bars. Do not damage the gasket sealing surfaces.
- Lay the engine on the left side on the work bench to remove the transmission. Lift out the **fork shaft**.
- 5. Remove the shift drum.
- Remove the 3 x forks. Inspect the forks for galling or heat damage. Replace any damaged forks.



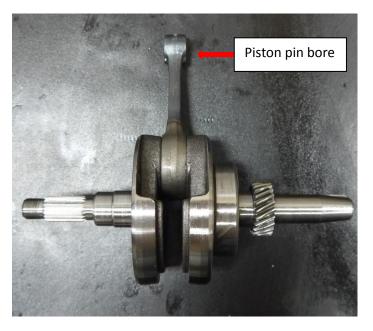






- 7. The transmission shafts may be removed together. Note the position of the thrust washers. Remove the crankshaft. Remove any gasket material from the crankcases. Do not scratch or damage the gasket sealing surfaces. Clean the cases of dirt and oil with low flash point solvent. Clean all bearings with solvent and inspect for free turning without excessive wear.
- 8. Clean the crankshaft and bearing with low flash point solvent. Inspect the crankshaft for galling or heat damage to the piston pin bore. Inspect the connecting rod bearing for free turning and no vertical movement.





Oil Pump Inspection

- Disassemble the oil pump assembly by withdrawing the shaft and removing the 2 x M3 screws.
- 2. Inspect the pump parts for scoring or damage.

Replace the pump as an assembly if any parts are damaged.







3. Measure the body side clearance as shown with a feeler gauge.

Standard 0.15-0.20mm Wear limit: 0.25mm

Replace the pump as an assembly if the wear limit is reached.

4. Measure the tip clearance as shown with a feeler gauge.

Wear limit 0.20mm

Replace the pump as an assembly if the wear limit is reached.

5. Measure the side clearance as shown with a feeler gauge and straight edge.

Standard 0.05-0.10mm Wear limit 0.15mm

Replace the pump as an assembly if the wear limit is reached.

Assemble the rotors in the pump body with the dot marks facing out as shown. Insert and locate the shaft as shown. Lubricate the rotors with oil. Assemble the pump cover with the 2 x M3 screws. Rotate the shaft and verify that there is smooth operation with no binding.





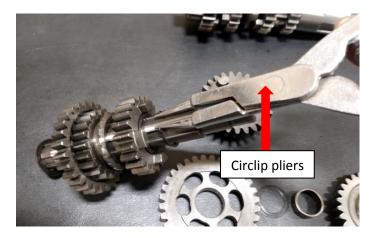






Transmission Shafts Disassembly

The **transmission shaft** assemblies may be disassembled, if required. Use internally expanding **circlip pliers** to remove the **circlips**. Clean the transmission parts with a low flash point solvent and dry. Inspect the **gears** for cracks or damage to the gear teeth. Inspect for galling or heat damage to the **fork grooves**. Inspect the **dogs** for damage. The stationary gears must spin freely and the slider gears must move side to side without resistance. Replace any damaged parts.



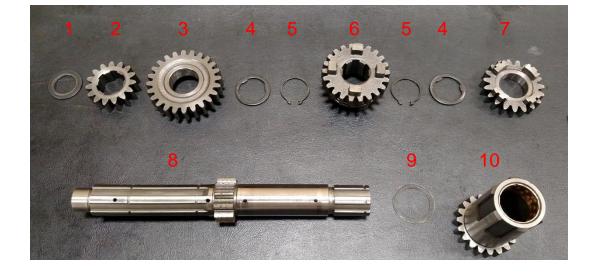
Main Shaft Assembly

Transmission Main Shaft Parts Identification

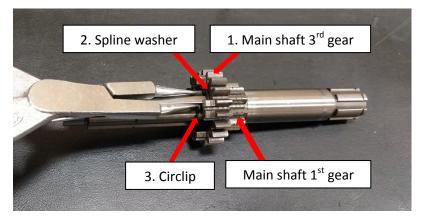
- 1. Thrust washer 15.2 x 24.8 x 1.0
- 2. Main shaft gear 2nd 15T
- 3. Main shaft gear 5th 24T
- 4. Spline washer
- 5. Circlip
- 6. Main shaft gear 4th 22T
- 7. Main shaft gear 3rd 19T
- 8. Main shaft with main shaft gear 1st 11T
- **9.** Thrust Washer 20.2 x 26.8 x 0.5
- 10. Starter gear

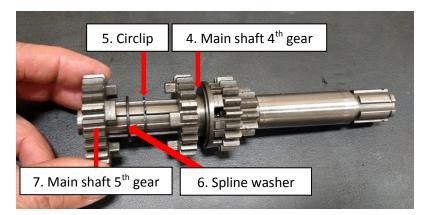
NOTICE

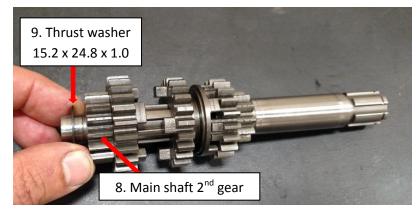
LUBRICATE ALL TRANSMISSION PARTS WITH ENGINE OIL DURING ASSEMBLY.



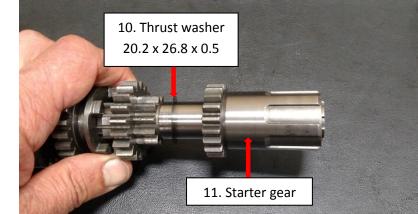
- Install Main shaft gear 3rd onto the main shaft. The dogs face away from the main shaft 1st gear integral to the main shaft.
- Install a spline washer against the 3rd gear.
- **3.** Install a **circlip** in the groove. Face the sharp edges away from the spline washer.
- **4.** Install **sliding main shaft gear 4**th onto the main shaft. Position the gear teeth away from the 3rd gear.
- Install a circlip in the shaft groove. Position the sharp edges towards the 4th gear.
- 6. Install a **spline washer** onto the main shaft.
- Install main shaft 5th gear onto the main shaft. Position the dogs towards 4th gear.
- 8. Install main shaft gear 2nd onto the main shaft.
- 9. Install thrust washer 15.2 x 24.8 x1.0 onto the main shaft.







- **10.** Install **thrust washer 20.2 x 26.8 x 0.5** onto the main shaft.
- **11.** Install the **starter gear** onto the main shaft.





Counter Shaft Assembly

Counter Shaft Parts Identification

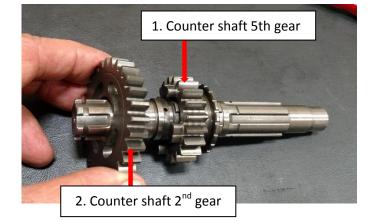
- 1. Thrust washer 20.2 x 26.8 x 1.0
- 2. Counter shaft gear 2nd 28T
- 3. Counter shaft gear 5th 20T
- 4. Counter shaft
- 5. Counter shaft gear 4th 22T
- 6. Spline washer
- 7. Circlip
- 8. Counter shaft gear 3rd 25T
- 9. Thrust washer 16.7 x 23.8 x 0.5
- 10. Bush Ø20.0 OD
- 11.Counter shaft gear 1st 32T
- 12. Bush Ø19.5 OD
- 13. Starter Idler Gear
- 14. Thrust washer 15.2 x 29.8 x 1.0

NOTICE

LUBRICATE ALL TRANSMISSION PARTS WITH ENGINE OIL DURING ASSEMBLY.



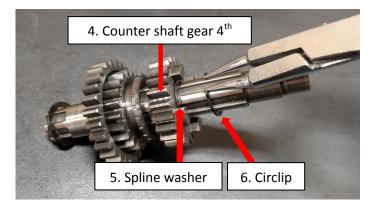
- 1. Install sliding counter shaft gear 5th onto the counter shaft.
- Install the counter shaft gear 2nd onto the counter shaft. Position the recess towards the 5th gear.

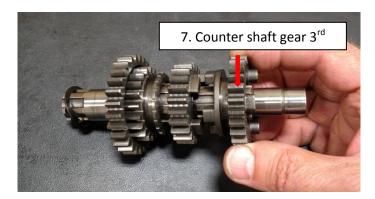


3. Install **thrust washer 20.2 x 26.8 x 1.0** onto the counter shaft.

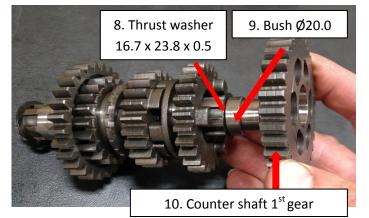


- **4.** Install **counter shaft gear 4**th onto the counter shaft. Position the dogs away from 5th gear.
- 5. Install a spline washer onto the counter shaft.
- Install a circlip into the counter shaft groove. Position the sharp edges of the circlip away from counter shaft gear 4th.
- Install slider counter shaft gear 3rd onto the counter shaft. Position the gear teeth away from 4th gear.

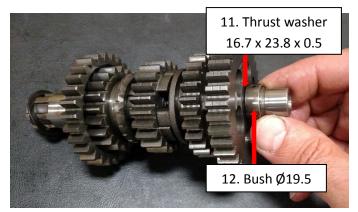




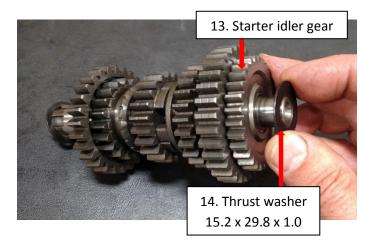
- 8. Install thrust washer 16.7 x 23.8 x 0.5 onto the counter shaft.
- 9. Install **bush Ø20.0** OD onto the counter shaft.
- **10.** Install **counter shaft gear 1st** onto the bush. Position the recess towards 3rd gear.



- **11.** Install **thrust washer 16.7 x 23.8 x 0.**5 onto the counter shaft.
- **12.** Install **bush Ø19.5** OD onto the counter shaft.



- **13.** Install the **starter idler gear** onto the counter shaft.
- 14. Install thrust washer 15.2 x 29.8 x 1.0 onto the counter shaft.



Kick Starter Shaft Disassembly

The kick starter assembly may be disassembled for cleaning and inspection, if required.





Kick Starter Shaft Assembly

Kick Starter Shaft Assembly Parts Identification

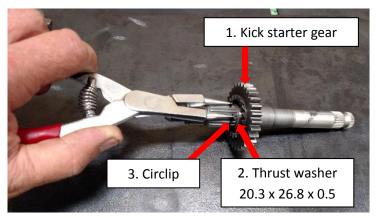
- 1. Thrust washer 12.2 x 17.8 x 1.0
- 2. Circlip
- 3. Thrust washer 16.3 x 23.8 x 1.0
- 4. Arm
- **5.** Coil spring
- 6. Ratchet piece
- 7. Circlip
- 8. Thrust washer 20.3 x26.8 x 0.5
- 9. Gear
- **10.** Kick starter shaft
- 11.Conical washer
- **12.**Return spring
- 13. Split collar
- 14. Thrust washer 16.2 x 29.8 x 1.0

NOTICE

LUBRICATE ALL KICK STARTER PARTS WITH ENGINE OIL DURING ASSEMBLY.



- 1. Install the kick starter gear onto the kick starter shaft.
- 2. Install thrust washer 20.3 x 26.8 x 0.5 onto the kick starter shaft.
- Install the circlip into the shaft groove. Position the sharp edges away from the gear.



 Install the ratchet piece onto the kick starter shaft. Align the marks on the arm and shaft. Position the ratchet teeth towards the gear.

- 5. Install the **coil spring** onto the shaft.
- 6. Depress the coil spring and install the arm onto the kick starter shaft. Position the arm around the **boss** as shown.

- 7. Install the **thrust washer 16.3 x 23.8 x 1.0** onto the shaft.
- **8.** Install the **circlip** into the shaft groove. Position the sharp edges of the clip away from the arm.

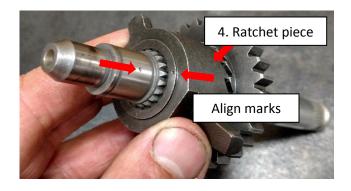
Apply grease to the thrust washer 12.2 x 17.8 x 1.0 and install onto the shaft. The grease will retain the washer during crank case assembly.



9. Thrust washer 12.2 x 17.8 x 1.0



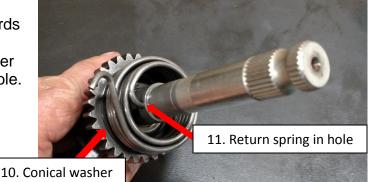
Boss



6. Arm

5. Coil spring

- **10.** Install the **conical washer** onto the kick starter shaft. Position the recess side towards the gear.
- **11.** Install the **return spring** onto the kick starter shaft. Insert the spring end into the shaft hole.



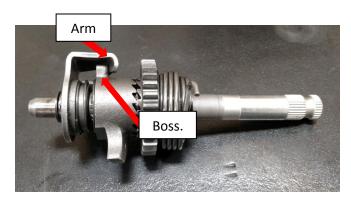
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12. Install the **split collar** onto the shaft. Position the notch towards the gear.

13. Install thrust washer 16.2 x 29.8 x 1.0 onto the shaft.

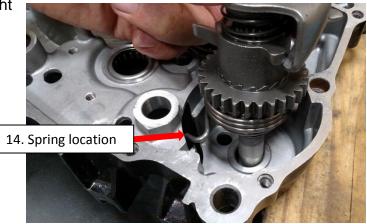






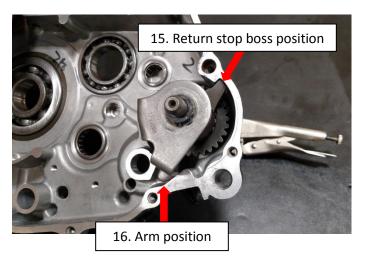
Complete kick starter shaft assembly. The arm is positioned around the boss.

14. Install the kick starter assembly into the right clutch cover. Position the return spring to hook the case as shown.



CLE<u>XELR∩</u>D

- **15.** Position the **return stop boss** as shown.
- **16.** Locate the **arm** in the groove as shown. Grip the shaft with locking pliers to aid case installation on the crank case. The shaft will have spring tension to return to the **stop** position.





Crankcase Assembly

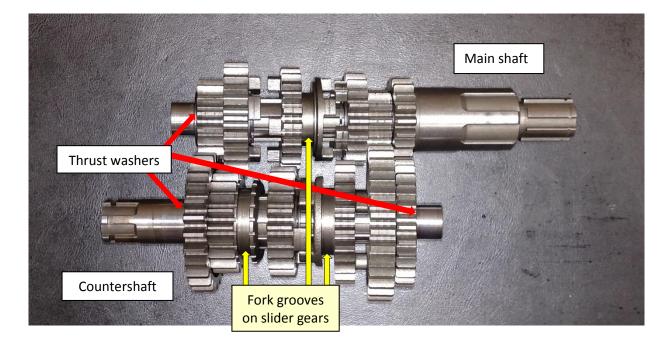
 Engine cases must be clean of dirt or material that can clog oil passages. Lubricate the bearings with engine oil. Prepare to assemble the transmission and crankshaft into the left engine case. The case may be supported with two suitable wood blocks.

Install the **crankshaft** with **left crankshaft bearing** into the **left case**.

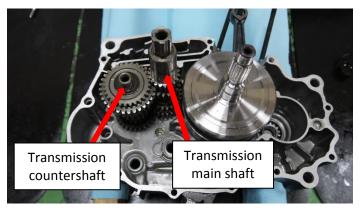
Support the left case with wood blocks

Be sure that the bearing is seated fully into

the case with no binding. The crankshaft bearing should drop in with no force.



2. Pair the two transmission shafts with gears and washers together during installation. Lubricate the shafts and gears with engine oil prior to assembly. Install into the left case. Be sure that the thrust washers are in place, and that the shafts are fully seated into the left case bearings.



Move the shift forks to the side to allow the

shift drum to drop in

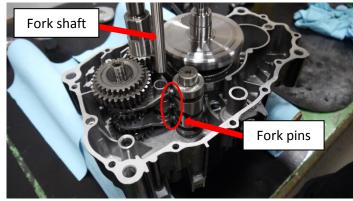
3. Install the 3 x transmission forks into their grooves on the slider gears. The fork diameters will match the gear grooves, and all of the shift drum pins will be facing towards the shift drum location.

4. Install the **shift drum** into the case. The shift forks will need to be moved to the side to allow the shift drum to drop down into the case.

5. Align the **fork pins** into the **drum grooves** and install the **fork shaft**.

6. Install the oil pump assembly in the right crank case as shown with a new gasket. Tighten the 2 x M6 bolts to 11N-m.



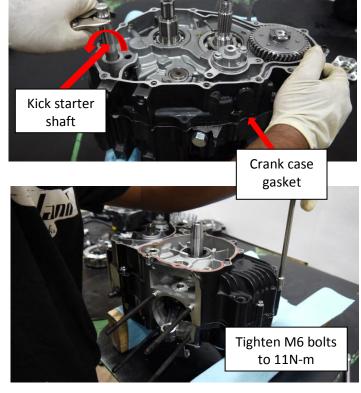




CLEVELAND (leveland

Shift drum

- 7. Install a new crank case gasket. Be sure that the 2 x locating dowel pins are in place. Hold the kick starter shaft as shown against the spring pressure during assembly. Install the right case onto the left crankcase. The cases will seat together with no excessive force when all of the shafts and the shift drum are aligned. Be sure that the cases seat fully before bolting together.
- Hand thread all crankcase **bolts** to be sure that the case gasket is aligned correctly. Tighten all bolts progressively to **11N-m**.
- **9.** Check that all of the shafts spin freely without binding.
- Install the crank bearing retainer into the left crankcase. Tighten the M6 bolt to 11Nm.







Introduction

The Misfit 250 is equipped with a single PZ30 slide valve carburetor. The airflow is manually operated by opening or closing the slide via the cable operated throttle. The carburetor features a manually operated choke butterfly valve to aid cold starting. Depending on the market, the carburetor may be equipped with an accelerator pump that adds a small additional squirt of fuel during quick throttle openings.

The carburetor settings are pre-set at the factory for **best drivability** and to meet exhaust emissions standards to **reduce air pollution**.

Improper storage of the motorcycle, water contamination or contaminated fuel may require the carburetor to be serviced to regain proper working condition.

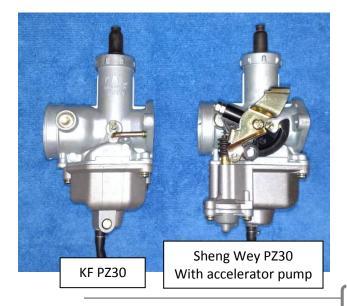
Air cleaning is by either a clamp-on type stainless steel screen type air filter, or by a pleated paper air filter element inside an enclosed air box.

- See **page 12** Specifications for stock carburetor settings.
- See page 22 Maintenance for throttle operation adjustments.
- See page 21 for air filter service.

Fuel/Air Table of Contents

CARBURETOR IDENTIFICATION	82
CARBURETOR REMOVAL	83
AIR BOX REMOVAL/INSTALLATION	83
CARBURETOR DISASSEMBLY	85
CARBURETOR CLEANING AND INSPECTION	86
CARBURETOR ASSEMBLY	87
CARBURETOR INSTALLATION	

Carburetor Identification





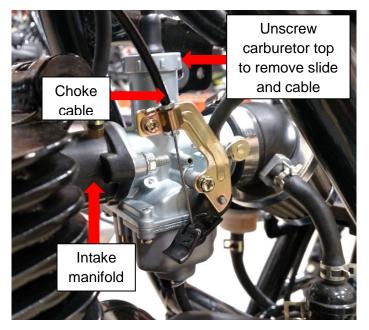
Carburetor Removal

6. Place a suitable container or shop towel under the drain hose of the carburetor. Unscrew the **drain screw** at the bottom of the carburetor 2 **turns** to drain of fuel.

A DANGER

Fuel is highly flammable. Avoid spills. Avoid sparks, flames and smoking when working with the fuel system.

7. 2016 model. (clamp filter) Remove the clamp on air filter. Remove the accelerator pump cable from its bracket.
2018 model (with air box) Remove the battery, unbolt the battery box and move the battery box slightly to the rear inside the frame. Unbolt the air box from the frame and move slightly to the rear inside the frame.



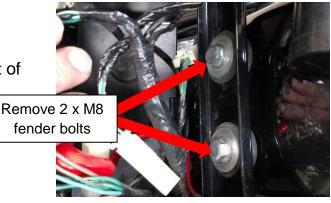
- 8. Remove the choke cable.
- 9. Unscrew the carburetor top and remove the top, slide and throttle cable as a unit.
- **10.** Unbolt the **carburetor** from the intake manifold to remove the carburetor.

Air Box Removal/Installation

- **1.** Support the motorcycle in a suitable service stand and raise the rear wheel.
- 2. Remove the rear wheel. See page 116
- 3. Remove the seat. See page 38



- 4. Remove the battery.
- **5.** Disconnect the rear turn signal and tail light connectors under the seat.
- Remove the 2 x M8 bolts mounting the front of the rear fender.

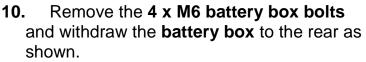




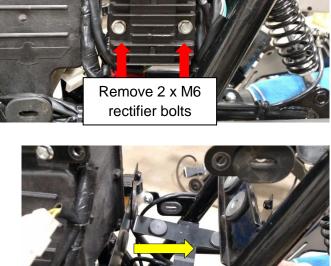
7. Remove the 2 x M8 bolts mounting the center of the rear fender and remove the rear fender.

Remove 2 x M8 fender bolts

- 8. Unbolt the **rectifier/ regulato**r and lay aside. Remove the **CDI unit** from the battery box mounting on the right.
- **9.** Withdraw the **wire harness** from the battery box and lay aside to the left of the frame.



- Disconnect the carburetor-to-air box rubber connector from the air box. Remove the 4 x M6 air box bolts and withdraw the air box to the rear as shown.
- **12.** Air box installation is the reverse order of removal.



Remove 4 x M6

battery box bolts

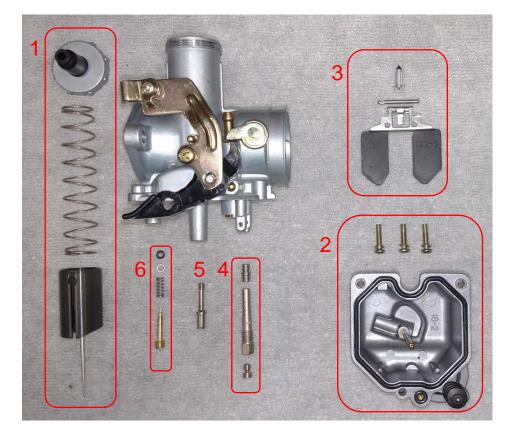




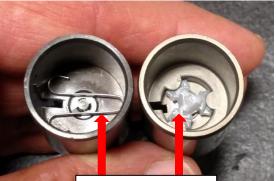
Carburetor Disassembly

After removing the carburetor (see **page 23**), disassemble the carburetor in the following sequence:

- 1. Slide valve top, including slide, slide spring and slide needle. Unscrew the top and extract the slide with needle and spring.
- 2. Float bowl. Remove the three screws.
- **3.** Float. Push the float pin out to remove the float and float needle.
- 4. Main jet, emulsion tube and needle jet. Press the needle jet down from the top.
- 5. Pilot jet.
- 6. Idle mixture screw, spring, washer and O-ring.



7. Use needle nose pliers to remove the metal or plastic type slide needle **retainer**. Remove the slide needle. Note: slides and needle types are not interchangeable between the two types.



Needle retainers



Carburetor Cleaning and Inspection

Fuel and carburetor cleaners can absorb into the skin and are dangerous to health. Wear chemical resistant gloves, eye protection and work in a well ventilated area.



Fuel and cleaning chemicals are highly flammable. Avoid sparks, flames and smoking when working on the fuel system and components.

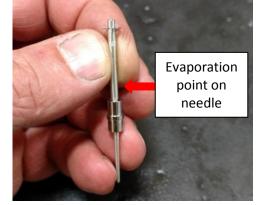
It is recommended to place small parts in a chemical resistant tray or bowl for cleaning. Use a commercial carburetor cleaner spray and soft brush to clean the parts. Blow dry with compressed air after cleaning.



NOTICE

Commercial carburetor cleaners and ethanol fuel may swell rubber parts. Avoid soaking rubber Orings and gaskets in cleaners.

Fuel quality and formulations varies from region and season. All formulations of fuel may evaporate and form unwanted varnish or deposits in the carburetor if the fuel is left in the carburetor during periods of storage. Fuels containing ethanol may additionally cause corrosion of aluminum parts and damage to rubber parts.





1. Clean the exterior and interior of the carb body with cleaner and a soft brush.

2. Soak the main jet, pilot jet, emulsion tube, slide needle, needle jet and mixture screw in carburetor cleaner. Blow dry with compressed air. Examine jets with a magnifying glass to be sure that the bore is clear of varnish or debris. A small wire may be needed to clear blocked passages. Do not enlarge the jet bores when cleaning.

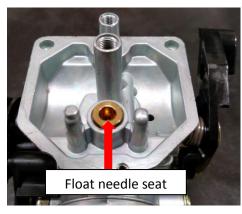
3. Clean the carburetor float bowl with cleaner and a soft brush. Be sure that there is no loose gasket material or glue in the bowl.

4. Thoroughly examine the slide needle and needle jet at the evaporation point for varnish, clean any varnish. Do not sand, scrape or otherwise damage the slide needle or jet bore.

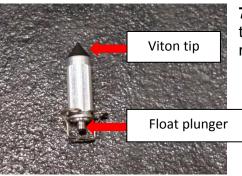
5. Spray into the main jet and pilot jet air bleed passages and blow through with compressed air.

Clean air passages with spray and compressed air





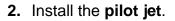
6. Examine the float needle seat. The bore of the seat should be shiny brass in color with no varnish deposits. Polish the bore with a roll of 2000 grit wet/dry sandpaper to clean.

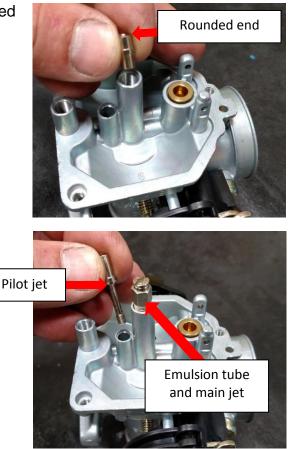


7. Examine the Viton float needle tip; replace the needle if the tip is damaged. Be sure that the float needle plunger is free to move, and returns to the extended position when depressed.

Carburetor Assembly

- 1. Install the **needle jet** into the carb body. The rounded end is towards the float bowl.
- 2. Install the emulsion tube and main jet.





3. Install the idle mixture screw as an assembly; spring, washer and O-ring installed on the mixture screw prior to inserting into the carb body. Screw into a lightly seated position, and then unscrew to the specified number of turns.

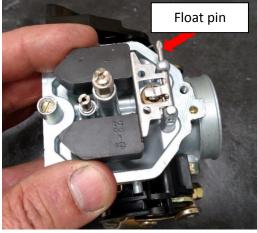
See Specifications page 12.

 Hold the float together with the float needle into position in the carb body. The float needle retainer wire wraps around the float adjusting tab. Install the float pivot pin.

5. Position the float to rest on the float needle without depressing the plunger. Set the float height to 14mm.

6. Replace the float bowl **gasket** and accelerator **pump Oring** if damaged.









7. Install the **float bowl**. Be sure that the accelerator pump **cam arm** is in the UP position. Install the three float bowl **screws**.

8. The **slide** is installed with the cutaway facing the intake. Locate the slide groove into the pin in the carb body. Screw down the **cap**.

Slide groove on Left



Cutaway

Carburetor Installation

Carburetor installation is the reverse of removal. **See page 40**.

Inspect the manifold and carburetor mounting O-rings for damage, replace as necessary.

After installation, follow the adjustment procedures in Maintenance: Throttle Operation **page 22** Engine Idle Speed **page 29**



Carburetor O-ring



Cam arm in the UP position



Introduction

Proper operation of the front wheel, forks and steering are critical for safe riding.



- Wheels that are out of round or unbalanced can cause wobbles or shaking that can cause a crash, in which the rider can be injured or killed.
- Forks that are bent or damaged may not absorb road bumps properly and cause a crash, in which the rider may be injured or killed.
- Oil leaks of the forks may leak oil onto the front brake pads and impede brake function, causing a crash in which the rider may be injured or killed.
- Steering stem bearings that are too tight or too loose may cause a crash in which the rider may be injured or killed.



- Motorcycles are heavy; do not take the risk of having the motorcycle fall on you during service! Park the motorcycle on a suitable service stand to remove the front wheel and steering. Strap down the motorcycle in the rear on both sides evenly
- Suitable points to lift the front of the motorcycle are:
 1. Under the frame tubes. Support evenly on both sides. A block of wood covered with a shop towel will protect the frame paint.
 2. Oil drain bolt.
- Remove parts carefully, do not damage the front fender, forks or fuel tank when working on the motorcycle.

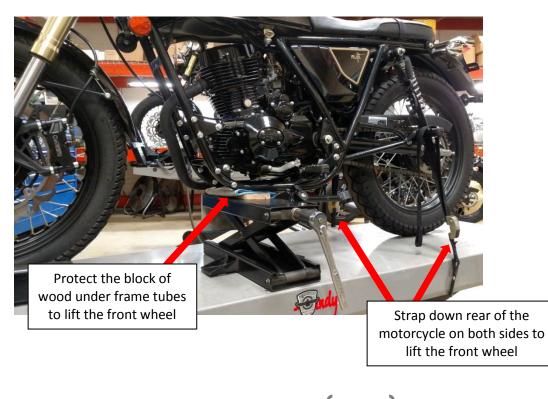




Table of Contents

FRONT WHEEL REMOVAL	91
FRONT WHEEL INSPECTION	92
FRONT WHEEL/FENDER INSTALLATION	92
FRONT FORK REMOVAL	94
FORK DISASSEMBLY	95
FORK INSPECTION	97
CARTIDGE REMOVAL/DISASSEMBLY	98
CARTIDGE INSPECTION	100
CARTIDGE ASSEMBLY- REBOUND VALVE	101
CARTIDGE ASSEMBLY- COMPRESSION VALVE	102
FORK ASSEMBLY	103
STEERING STEM/FORK CLAMP REMOVAL	106
STEERING STEM DISASSEMBLY	109
STEERING STEM/ FORK CLAMP ASSEMBLY	
CABLE ROUTING	114

Front Wheel/Fender Removal

Front Wheel Removal

- **1.** Support the motorcycle in a service stand and raise the front wheel.
- 2. Unfasten the **speedometer cable** from the speedometer drive.
- 3. Unbolt the front brake caliper and lay aside.
- 4. Remove the front **axle nut**, loosen the **axle pinch bolts**, and then remove the **front axle**.

Front Fender Removal

- 1. Remove the right front fender stay
- 2. Remove the front fender and left fender stay as a unit.



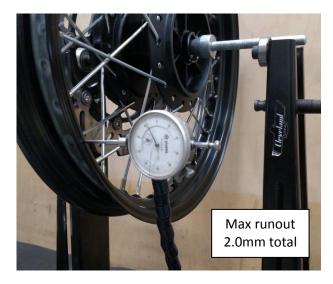


Front Wheel Inspection

- 1. Wheel true may be measured on a truing stand using a dial indicator.
- 2. Measure total side to side movement and total up-down movement at the rim.

Maximum permissible runout: 2.0mm.

- **3.** Check that the spokes are evenly tensioned. Loose spokes or spokes that are too tight must be adjusted accordingly. Re-check wheel true after adjusting spoke tension.
- **4.** Small adjustments to wheel true may be made by re-tensioning the spokes; large dents in the wheel rim require wheel replacement.



Tire replacement requires that the tire be checked for roundness. Spin the tire on a truing stand and visually check for the tire to run true. A defective tire must be replaced.

NOTICE

Tire replacement requires that the tire be balanced with wheel weights as necessary.

Front Wheel/Fender Installation

Front Fender Installation

Install the **front fender stays** and f**ender**. Hand thread all bolts before tightening. Tighten the **8 x M6 fender bolts** to **11N-m**.





Front Wheel Installation

- Apply grease to the left side dust seal prior to installing the left side axle spacer. Engage the speedometer drive box in the notches on the right side of the wheel. Align the speedometer drive box notch with the tab on the right fork.
- Apply a thin film of grease to the axle prior to installing. Install the front axle and nut. Tighten the nut to 65N-m. Tighten the 4 x M6 axle pinch bolts to 11N-m. Spin the front wheel to verify there is no binding
- Install the front brake caliper with the 2 x M10 x
 1.25 bolts and 2 x 6mm spacers. Tighten to 39Nm. Pump the front brake lever and check for firm brake pressure and free spinning of the wheel when the brake is released.



Tighten front axle nut to 65N-m.

Tighten 4 x M6 axle pinch bolts to 11N-m.

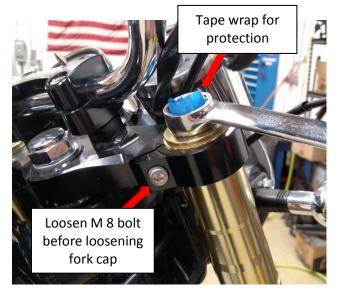
> Tighten front caliper bolts to 39N-m.

CHECK AND VERIFY THE PROPER OPERATION OF THE FRONT BRAKE AFTER INSTALLATION. DOUBLE CHECK THE TIGHTNESS OF ALL FASTENERS.



Front Fork Removal

- 1. Remove the front wheel and fender. See page 86.
- 2. If forks are to be serviced, loosen the **fork cap** before removing from the fork clamps. Loosen the top clamp **bolt**; cover the **fork cap** with tape to protect the aluminum. Loosen one turn.



3. Loosen the two lower fork **clamp bolts** and remove the f**ork**. Work carefully so not to damage or scratch the forks.



Front Fork Disassembly

1. Unscrew the **fork cap** and lower the upper fork tube to expose the spring and cartridge rod.

2. Hold the cartridge rod nut to unscrew and remove the **fork cap**.

- 3. Pull down on the spring and spring guide to remove the rod nut.
- 4. Remove the spring guide and spring.

5. Drain the fork oil into a suitable container.











6. Pry away the **dust seal** from the fork tube. Use a thin flat screwdriver, work slowly around the fork. Do not damage the seal or tube.

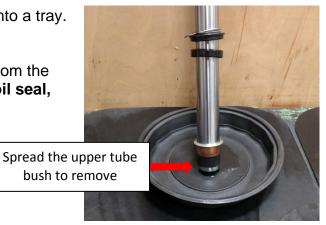
7. Pry out the seal circlip with a hook pick.

 Hold the upper fork firmly, and pull down sharply the lower tube to separate the fork. The seals and fork bushes will be retained on the lower fork tube. Several strikes may be required to separate the fork.

- 9. Resume draining the fork oil from the cartridge into a tray.
- 10. Spread the lower tube bush slightly to remove from the lower tube. Remove the upper bush, washer, oil seal, circlip and dust seal.









Pry around the

tube slowly



Fork Inspection

- Wash the fork parts in a low flash point solvent and dry.
- Inspect the lower tube for scratches, rust or damage.
- Lower fork chrome may be lightly polished clean with 1500 grit oiled sandpaper. Do not sand excessively!
- Replace the bushes if the Teflon coating is worn away more than 30% of the sliding area.
- Oil seals must be replaced in all cases of disassembly.
- Fork tubes may be rotated to check for bends.
- Cartridge rod action must be smooth with no binding.

Fork Parts Identification

- 1. Lower fork tube assembly with cartridge.
- 2. Dust seal.
- 3. Oil seal circlip.
- 4. Oil seal.
- 5. Upper tube bush washer.
- 6. Lower tube bush.
- 7. Upper tube bush.
- 8. Upper tube.
- **9.** Fork spring.
- **10.** Spring guide.
- **11.**Cartridge rod washer.
- **12.**Cartridge rod nut.
- **13.** Fork cap with O-ring.





Cartridge Removal/ Disassembly

Note: cartridge removal is not necessary for regular fork maintenance, fork seal change or fork oil change.

- 1. Disassemble the fork as per page 95.
- 2. Remove the M10 bolt, flat washer and lock washer from the fork lower.

 The fork lowers are secured to the fork tube with thread lock. Heat the **fork lower** with a hot air gun to 140°C to soften the thread lock. Temperature measurements may be taken with an infrared thermometer.



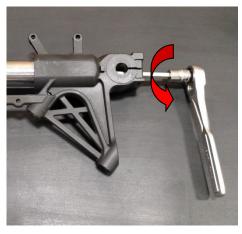
Fork lower will be HOT. Wear protective gloves to handle the fork.

 Use a steel rod, Ø8mm x 200mm to press the lower tube from the fork lower. Support the lower with two parallel bars and work slowly.



Proceed slowly and wear gloves and eye protection when using a hydraulic press.

5. After separation, allow the fork parts to cool, then clean the thread lock residue from the **fork lower** and **lower tube** before cartridge disassembly.







6. The lower tube cap may be removed with an impact gun. The cartridge is attached to the lower fork cap and the cartridge will be removed with the lower fork cap. Extract the cartridge from the lower fork tube.

7. Remove the **lower fork cap** from the **cartridge tube** with an impact gun.

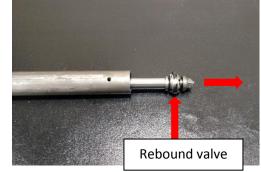
Do not dent or damage the cartridge tube by clamping in a vice.

8. Remove the cartridge rod from the cartridge tube. The rebound valve is installed on the cartridge rod.

9. Remove the M6 bolt on the lower fork cap to disassemble the compression valve.

10. Remove the **M6 lock nut** on the cartridge rod to disassemble the **rebound valve**.





Compression valve

Remove M6 bolt









Cartridge Inspection

- Wash the cartridge parts in a low flash point solvent and dry.
- Inspect the cartridge tube for dents, out of round or damage.
- Inspect the cartridge rod for bends or excessive wear.
- All shims must lay flat, check on a surface plate.
- Inspect piston seal for excessive wear or damage.

Cartridge Internal Parts Identification

- 1. Cartridge rod.
- 2. Shim collar
- 3. Check spring.
- 4. Check shim Ø19.
- 5. Piston.
- 6. Piston seal.
- **7.** Shim Ø20.
- 8. Shim Ø18.
- 9. Shim Ø17.
- **10.**Shim Ø16.
- **11.**Shim Ø14.
- **12.**M6 lock nut.
- **13.**Lower fork cap.
- 14.M6 lock washer.
- 15.M6 flat washer.
- 16.M6 bolt.





Cartridge Assembly- Rebound Valve

- 1. Install a **shim collar** onto the **cartridge rod**. The base flange is **towards** the rod shoulder.
- **2.** Install a **check spring** onto the shim collar. The spring should move without binding.
- **3.** Install a **check shim** onto the shim collar. The shim should move feely without binding.
- **4.** Install a **piston** onto the cartridge rod. The recess is **towards** the shim collar.
- 5. Install shims onto the cartridge rod in the following order:
 - 1. Ø 20mm
 - **2.** Ø18mm
 - **3.** Ø17mm
 - **4.** Ø16mm
 - 5. Ø14mm

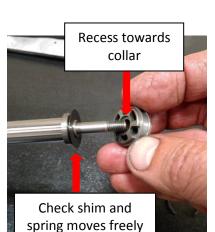
Shim collars are interchangeable. Pistons are interchangeable. Shims of the same size and type are interchangeable.

NOTICE

- 6. Install a **shim collar** onto the cartridge rod. The base flange is **away** from the shim stack.
- Install the M6 lock nut onto the cartridge rod. Tighten to 11Nm. Check that the check shim moves freely, and is held against the piston when at rest.
- 8. Install a **piston seal** onto the piston.
- **9.** Install the **top out spring** over the cartridge rod and slide the rod into the **cartridge tube**.

Compress the **piston seal** when inserting the rebound valve into the **cartridge tube**.

Check the cartridge rod and valve for smooth movement throughout the stroke with no binding.









Compress the piston seal when installing



Cartridge Assembly- Compression Valve

- 1. Install the M6 flat and lock washer onto the compression valve M6 bolt.
- **2.** Install a **shim collar** onto the bolt. The base flange is **towards** the bolt head.
- **3.** Install a **check spring** onto the shim collar. The spring should move freely with no binding.
- **4.** Install a **check shim** onto the shim collar. The shim should move freely with no binding.
- 5. Install a **piston** onto the bolt. The recess is **towards** the shim collar.
- 6. Install shims onto the M6 bolt in the following order:
 - **1.** Ø 20mm
 - 2. Ø18mm
 - 3. Ø17mm
 - **4.** Ø16mm
 - 5. Ø14mm

Shim collars are interchangeable. Pistons are interchangeable. Shims of the same size and type are interchangeable.

- 7. Install a **shim collar** onto the bolt. The base flange is **away** from the piston.
- 8. Apply medium strength thread lock to the bolt; install the valve assembly onto the lower fork cap. Tighten to 11N-m.

Check that the check shim moves freely with no binding. A pick may be used to actuate the check shim for inspection.







Use a pick to check for free movement of the check shim

- 9. Install a **piston seal** onto the piston. Inspect the condition of the lower fork cap **O-ring**, replace if damaged.
- Install the lower fork cap into the cartridge tube. Compress the piston seal when installing. Tighten the lower fork cap to 20N-m.





Fork Assembly

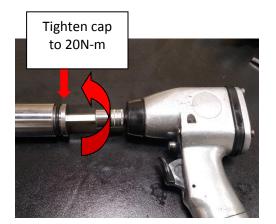
Note- if the fork lower or cartridge have NOT been disassembled, proceed to page 104, step 4 for assembly instructions.

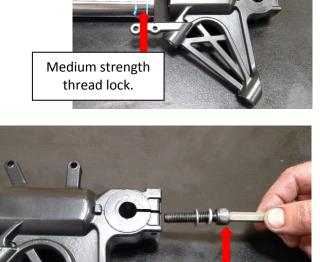
1. Install the cartridge into the lower fork tube. Tighten to 20N-m.

2. Apply two beads of medium strength (blue) thread lock to the lower fork tube.

3. Install the fork lower onto the lower fork tube. Install the M10 bolt, lock washer and flat washer and tighten to 39N-m. Clean away any excess thread lock.







Tighten M10 bolt to 39N-m

- 5. Install the dust seal, circlip and oil seal onto the lower fork tube. Apply grease to the groove of the oil seal. Orient the oil seal numbers towards the dust seal.
- 6. Install the bush washer, upper tube bush and lower tube bush onto the lower fork tube. Spread the lower fork bush slightly to install.

7. Insert the lower fork tube into the upper fork tube. Hold the seals and circlip away from the upper fork tube.

> The upper fork bush must be installed and seated **fully** before the seals are seated.

8. Use a Ø37mm fork seal driver to seat the upper fork bush. Strike down on the washer to seat the bush.

> Hold the seals and circlip away when seating the bush

104





Wrap with tape

for protection







9. Seat the oil seal with the fork seal driver. Hold the dust seal and circlip away when striking down with the seal driver. The oil seal is seated when the circlip groove is exposed for circlip installation.

Check that the circlip groove is exposed after seating the oil seal

- 10. Install the circlip into the circlip groove.11. Seat the dust seal into the upper fork tube.
- Circlip seated into the groove



12. Fill the fork with **270cc** of **10W fork oil**. Pour slowly and stroke the cartridge rod to bleed out air from the cartridge.

Verify the correct level of fork oil after bleeding of air:

Collapse the outer fork tube, raise the cartridge rod, and measure the oil level from the top of the fork tubes:

Oil level 115mm





13. Install the **fork spring, spring guide** and **washer**. Hold down the spring guide to install the cartridge rod **M10 nut**. Screw the nut down to the bottom of the threads.

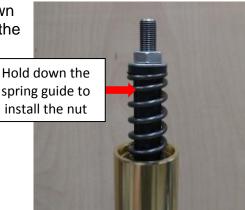
Install the fork cap onto the cartridge rod. Tighten to 23N-m.
 Wrap the fork cap with tape to protect the finish.

- 15. Bring the upper tube to the fork cap and tighten to 15N-m.
 - Tighten cap to fork tube to 15N-m.

- Steering Stem/ Fork Clamp Removal
- 1. To avoid possible damage, remove the fuel tank. See page 38
- 2. Remove front fender, front wheel and forks. See page 91, 94
 - Parts removed: Seat, fuel tank, fender, front wheel and forks









- 3. Remove the headlight lens and bezel as an assembly. Remove the 2 x M5 shouldered screws from the bezel and release the headlight assembly from the top tab in the headlight case.
- **4.** Unplug the **electrical connectors** in the headlight case and withdraw the **wires** from the headlight case.

- 5. Remove the 2 x M8 bolts and spacers holding the headlight case. Remove the headlight case.
- 6. Disconnect the clutch cable from the handlebar perch. Slacken the cable adjuster to release the cable.

7. Disconnect the choke cable from the carburetor.

Disconnect the choke cable at the carburetor

Unplug the wire connectors and withdraw the wires from the headlight case

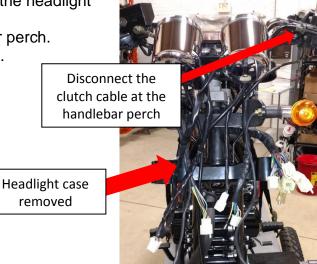
8. Remove the two M5 screws on the right handlebar switch.



Remove two M5 screws on switch



hoke tretor





9. Open the **right handlebar switch** and release the **throttle cable** from the **throttle pipe**. The right switch may hang away on the throttle cable.

10. Remove the 4 x M8 bolts and handlebar clamp. Remove the handlebar as an assembly with left switch, mirrors, clutch perch, front brake assembly and throttle pipe.

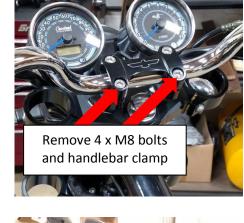
> **NOTICE** Do not hang the handlebar assembly from the brake hose, throttle cable, clutch cable, choke cable or wires. These parts may be damaged from hanging.

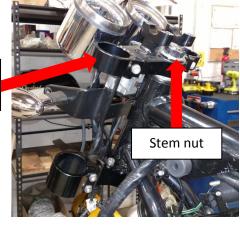
11.Remove the **stem nut** and **top fork clamp** as an assembly with the **instruments**.

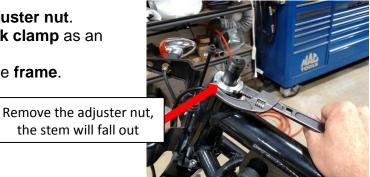
Top fork clamp and instruments

- **12.** Use a **spanner wrench** to remove the **adjuster nut**.
- **13.** Remove the **steering stem** and **lower fork clamp** as an assembly.
- 14. Remove the top steering bearing from the frame.















Steering Stem Disassembly

1. Remove the two **M8 bolts** holding the headlight bracket. Remove the **headlight bracket.**

> Remove 2 x M8 bolts to remove the headlight bracket

2. The lower steering bearing may be removed by pressing out the steering stem.



Proceed slowly and wear gloves and eye protection when using a hydraulic press.

Support the lower fork clamp with suitable parallel bars.





Support the lower fork clamp with suitable parallel bars



3. Remove the lower steering bearing, washer, seal and steering stem.

4. Remove the **steering bearing races** with a **drift**. Remove the races evenly; tap out in a circular pattern.

Clean and inspect the **bearing races** for wear and damage.

Steering Stem/Fork Clamp Assembly

If the steering stem has not been disassembled, proceed to step 5.

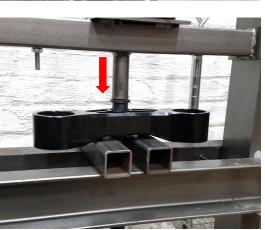
 Inspect the bearing bores for damage. Sand down any burrs or raised edges. Lightly grease the bearing bores to aid installation of the bearing races. Install the bearing races with a bearing driver tool to a fully seated position.

Tap down the races evenly to a fully seated position

2. Lightly grease the **steering stem** to aid installation. Support the **lower fork clamp** with suitable parallel bars in a hydraulic press. Press in the steering stem **concentric** to the bore. Do not allow the stem to get cocked sideways. Press in to a fully seated position.



Proceed slowly and wear gloves and eye protection when using a hydraulic press.

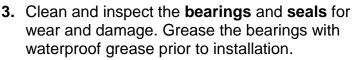












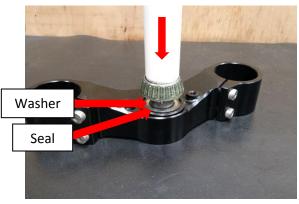
- 1. Seal.
- 2. Washer.
- 3. Bearing 32005X.
- 4. Adjuster nut.
- 4. Install the seal and washer on the steering stem. Install the steering bearing over the steering stem and seat with a bearing driver tool.

- 5. Install the steering assembly into the frame. Grease the top steering bearing and position in the top bearing race. Install the top seal and adjuster nut.
- Install the head light bracket with 2 x M8 bolts. Tighten to 23N-m.

 Tighten the adjuster nut to 30N-m, then unscrew ¼ turn. This will set the proper tension on the steering bearings. Rotate the steering stem left and right to inspect for smooth operation.









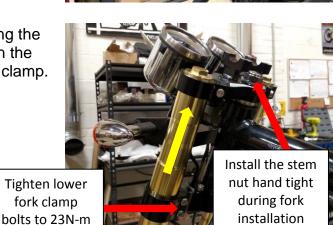


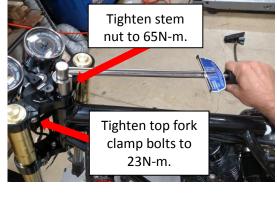
111

8. Install the top fork clamp. Position the 2 x head light bracket rubber collars into their respective holes in the top fork clamp. Install the stem washer and nut. Tighten the stem nut by hand, to allow the forks to be inserted.

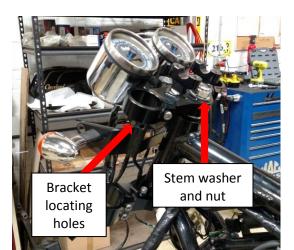
9. Install the forks. Insert one fork at a time, rotating the top fork clamp slightly to aid installation. Position the top of the fork tube even with the top of the fork clamp. Tighten the lower fork clamp bolts to 23N-m.

- 10. Tighten the steering stem nut to 65N-m.
- 11. Tighten the top fork clamp bolts to 23N-m. Rotate the steering and inspect for smooth operation with no binding. There should be moderate resistance to the steering bearings, and no forward-back movement.
- 12. Install the handle bars. Center the bars. Position the bar rise to be parallel to the forks. Tighten the handle bar clamp bolts to 23N-m.











- **13.** Feed the **wire harness**, **switch wires** and **turn signal wires** through the head light case.
- 14. Install the head light case with the 2 x M8 bolts and spacers.

- **15.**Connect the following wires:
 - 1. Right handle bar switch
 - 2. Left handle bar switch
 - 3. Head light
 - 4. Ignition switch
 - 5. Turn signals
 - 6. Tachometer
 - 7. Speedometer
- 16. Position the wires as shown, and install the head light by clipping the top of the bezel into the head light case, and installing the 2 x shouldered M5 screws.
- **17.** Install the **throttle cable** into the throttle pipe. Locate the switch pin into the hole in the handle bar

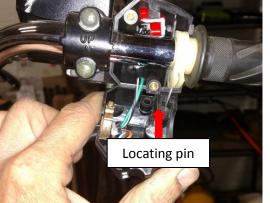
17. Reattach the clutch and choke cables, verify the correct cable routings. See page 109.

18. Install the front wheel and fender. See page 92



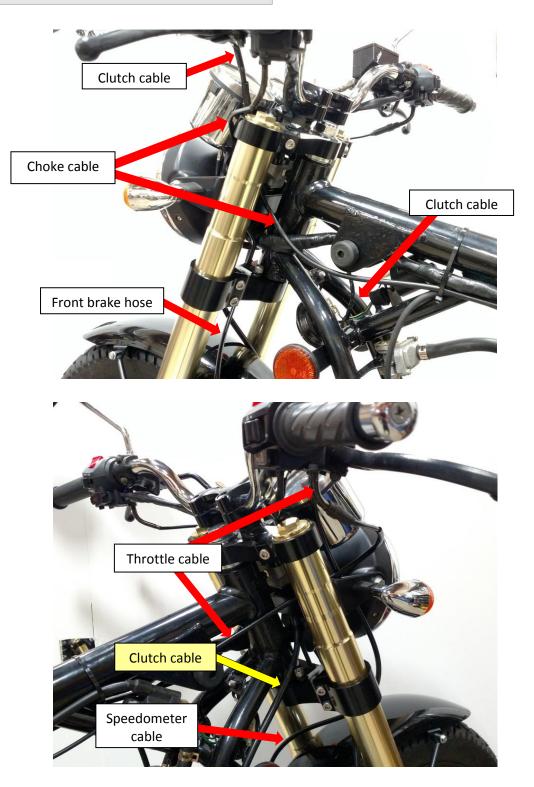








Cable Routing





Introduction

Proper operation of the rear wheel, rear shocks and swing arm are critical for safe riding.



- Wheels that are out of round or unbalanced can cause wobbles or shaking that can cause a crash, in which the rider can be injured or killed.
- A swing arm or rear shocks that are bent or damaged may not absorb road bumps properly and cause a crash, in which the rider may be injured or killed.
- Oil leaks of the shocks may leak oil onto the rear brake pads and impede brake function, causing a crash in which the rider may be injured or killed.



- Motorcycles are heavy; do not take the risk of having the motorcycle fall on you during service! Park the motorcycle on a suitable service stand to remove the rear wheel, rear shocks and swing arm.
- Suitable points to lift the rear of the motorcycle are:
 1. Under the frame tubes. Support evenly on both sides. A block of wood covered with a shop towel will protect the frame paint.
 - 2. Oil drain bolt.
 - 3. Brake pedal pivot tube.
- Remove parts carefully, do not damage the swing arm, muffler, or brakes when working on the motorcycle.

Table of Contents

REAR WHEEL REMOVAL	
WHEEL BEARING REPLACEMENT	-
REAR WHEEL INSTALLATION	119
REAR SHOCKS	121
SWING ARM REMOVAL	122
SWING ARM BEARING INSPECTION	123
SWING ARM INSTALLATION	123



1. Support the motorcycle in a suitable service stand and raise the rear wheel.

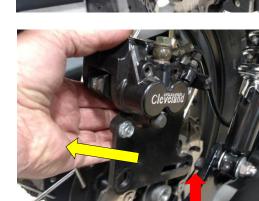
- 2. Remove the rear axle nut and withdraw the axle.
- 3. Remove the **right side axle spacer**, and move the wheel to the right to allow the **left axle spacer** to be removed.

4. Disengage the rear brake **caliper bracket** from its locating tab and lay the caliper to the side. The caliper may be covered with a shop towel and lay on the exhaust muffler.

- 5. Move the wheel to the right and lift the **drive chain** off the rear sprocket.
- 6. Remove the rear wheel







Remove left axle spacer before caliper removal.

Disengage the caliper bracket from tab

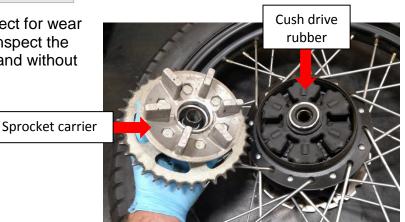






Rear Wheel Inspection

1. Remove the sprocket carrier and inspect for wear or damage to the cush drive rubber. Inspect the wheel bearings for smooth operation and without excessive play.

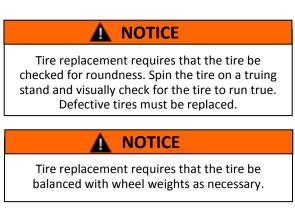


- 2. Wheel true may be measured on a truing stand using a dial indicator.
- 3. Measure total side to side movement and total up-down movement at the rim.

Maximum permissible runout: 2.0mm.

- **4.** Check that the spokes are evenly tensioned. Loose spokes or spokes that are too tight must be adjusted accordingly. Re-check wheel true after adjusting spoke tension.
- 5. Small adjustments to wheel true may be made by re-tensioning the spokes; large dents in the wheel rim require wheel replacement.





Wheel Bearing Replacement

Wheel Hub Bearings

- 1. Remove the 2 x dust seals from the rear wheel hub.
- 2. The **bearings** may be removed with a suitable drift punch. Move the hub **center collar** slightly to the side to gain purchase on the bearings. Remove the bearings square by punching in a circular pattern.

- **3.** Inspect the bearing bores of the wheel hub for wear or burrs. Smooth any ridges or burrs to allow the bearings to be installed.
- 4. Lightly grease the bearing bores and install the **bearings** with a suitable bearing driver. Install one bearing at a time to fully seated position before installing the next bearing. The center collar should not have excessive play after bearing installation.
- **5.** Install the **dust seals**. Apply grease to the seal lips after installation.





Sprocket Carrier Bearing

- 1. Remove the dust seal
- 2. Drive out the **bearing** from the inside with a suitable driver pressing on the **spacer collar**.
- **3.** The **spacer collar** may be driven from the bearing with a suitable driver.





- 4. Install the **spacer collar** into the **bearing** with a suitable bearing driver.
- 5. Inspect the bearing bores of the sprocket carrier for wear or burrs. Smooth any ridges or burrs to allow the bearing to be installed.

- 6. Lightly grease the bearing bore and install the **bearing** with a suitable bearing driver.
- 7. Install the **dust seal**. Grease the dust seal lips after installation.







 Position the wheel forward and to the right between the swing arm and drape the drive chain over the rear sprocket.



Rear Wheel Installation

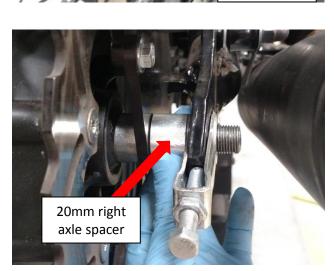
1. Install the **sprocket carrier** into the rear wheel hub. Apply grease to the dust seal.

- 3. Insert the 15mm long left axle spacer in position on the sprocket carrier.
- 4. Apply grease to the right side dust seal and install the 24mm axle spacer.

5. Move the wheel to the left to install the rear brake caliper with bracket. Engage the locating tab in the caliper bracket slot.

- 6. Lightly grease the rear axle and install from the left. Position the 20mm right side axle spacer during installation.
- 7. Install the **axle nut** and adjust the chain slack to 20mm. See page 20-21. Tighten the rear axle nut to 65N-m. Tighten the M8 axle adjuster nuts to 20N-m.
- 8. Pump the rear brake pedal and check for firm brake pressure and free spinning of the wheel when the brake is released.





24mm axle spacer



Locating tab



Rear Shocks

Rear Shock Removal

- 1. Support the motorcycle in a suitable service stand and raise the rear wheel.
- 2. Remove 2 x M10 nuts with washers per shock.

1.

3. Remove the shock.

Rear Shock Inspection



Inspect the shock for smooth operation without binding.

Inspect the shock for oil leaks or 2. damage to the damper rod.

The shocks are not serviceable and will need replacement if leaking or damaged.

Remove 2 x M10

nuts and washers

CAUTION

Do not operate the motorcycle with leaking shocks. Oil may contaminate the rear brake pads and impair braking performance.

Rear Shock Installation

- 1. Install the 2 x 12mm washers onto the shock mounts. Lightly grease the shock mounts.
- 2. Install the shock, 2 x 12mm washers and M10 nuts. Tighten the nuts to **39N-m**.





Swing Arm Removal

Swing Arm Removal

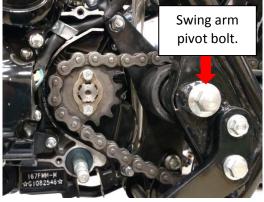
- 1. Support the motorcycle in a suitable service stand and raise the rear wheel.
- 2. Remove the rear wheel. See page 116
- 3. Remove the rear shocks. See page 121

- 4. Remove the shift lever and front sprocket cover.
- 5. Remove the **drive chain.** If equipped with a clip master link, the link may be removed. If the drive chain has a rivet master link, the chain may be withdrawn from around the front sprocket.

- 6. Remove the swing arm pivot nut and withdraw the swing arm bolt.
- 7. Remove the swing arm to the rear.

- 8. Remove the dust seals, radial thrust bearings, spacer and center collar.
- **9.** The **needle bearings** may be removed with a 26mm flat washer and drift. Support the swing arm on a wood block with protective shop towel.









122

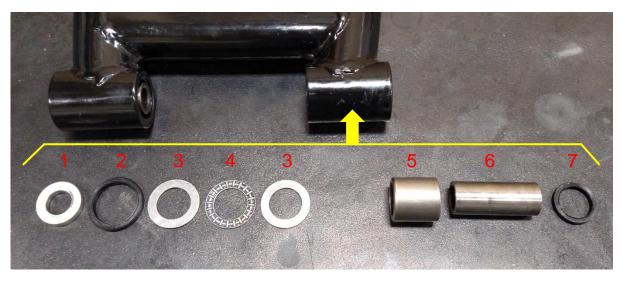


Swing Arm Bearing Inspection

- Wash the bearing parts in a low flash point solvent and dry.
- Inspect the bearings for rust, pitting, broken rollers, or damage.
- Inspect the bearing collar for excessive wear.
- Inspect the dust seals for excessive wear or damage.
- Damage or excessive wear will require part replacement.

Swing Arm Bearing Parts Identification

- 1. Spacer Ø30 x Ø17 x 6
- 2. Inner dust seal Ø30 x Ø37 X 4
- 3. Thrust washer
- 4. Radial thrust bearing Ø34.5 x Ø22 x 6
- 5. Needle bearing Ø29 x Ø22 x 30
- 6. Center collar Ø22 x Ø15 x 54.5
- 7. Outer dust seal Ø29 x Ø21 X 4

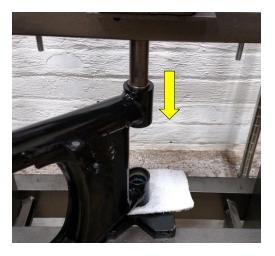


Swing Arm Installation

- 1. Clean the bearing bore and grease lightly to aid the bearing installation.
- 2. Press the **bearing** in to a depth of 6mm ±1mm.



Proceed slowly and wear gloves and eye protection when using a hydraulic press.



Bearing depth is 6mm ±1mm.

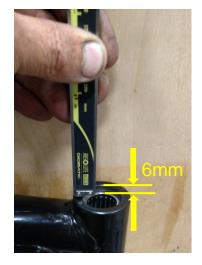
3. Grease the needle bearing, thrust washers, thrust bearing and center collar and install.

- 4. Apply grease to the dust seals and install.
- 5. Install the inner spacers.

Apply grease to the dust seal lips

6. Install the chain guard and drive chain slider. Tighten the M6 bolts to 11N-m.

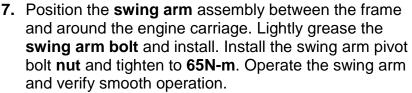


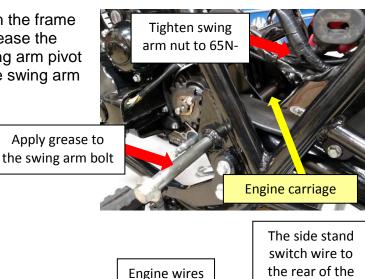






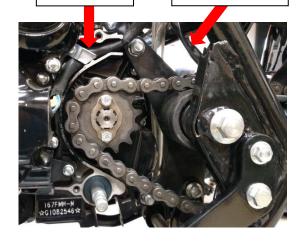
Tighten M6 bolts to 11N-m





secured

- 8. Install the **drive chain**, if the chain master link was removed.
- **9.** Install the **front sprocket cover** and **shift lever**. Verify that the engine wires are clamped secure and are not pinched during the cover installation. Verify that the side stand switch wire is to the rear of the swing arm pivot along the frame.
- 10. Install the rear shocks. See page 116
- 11. Install the rear wheel. See pages 119



swing arm pivot



Introduction

Proper operation of the front and rear brakes are critical for safe riding.



- Brakes that are inoperable or defective can cause a crash, in which the rider can be injured or killed.
- Brake fluid leaks onto the brake pads may impede brake function, causing a crash in which the rider may be injured or killed.
- Do not service brakes unless you have the mechanical ability to do so safely. Entrust the brake system service to a trained technician.



• Brake fluid will damage painted parts. Clean any spilled brake fluid immediately.

Table of Contents

	127
FRONT BRAKE FLIUD FLUSH/BLEEDING OF AIR	
FRONT BRAKE MASTER CYLINDER REMOVAL/DISASSEMBLY	128
FRONT BRAKE MASTER CYLINDER INSPECTION	129
FRONT BRAKE MASTER CYLINDER ASSEMBLY/INSTALLATION	130
FRONT BRAKE PAD REPLACEMENT	131
FRONT BRAKE CALIPER REMOVAL/DISASSEMBLY	133
FRONT BRAKE CALIPER INSPECTION	134
FRONT BRAKE CALIPER ASSEMBLY/INSTALLATION	135
REAR BRAKE PAD REPLACEMENT	137
REAR BRAKE FLUID FLUSH/BLEDING OF AIR	138
REAR BRAKE MASTER CYLINDER REMOVING/DISASSEMBLY	139
REAR BRAKE MASTER CYLINDER INSPECTION	141
REAR BRAKE MASTER CYLINDER ASSEMBLY/INSTALLATION	142
REAR BRAKE CALIPER REMOVAL/DISASSEMBLY	144
REAR BRAKE CALIPER INSPECTION	145
REAR BRAKE CALIPER ASSEMBLY/INSTALLATION	146

Front Brake Flush/Bleeding Of Air

- Move the handlebars until the front brake master cylinder is level. Cover the master cylinder as shown to catch fluid spills. Remove the 2 x screws and remove the cap, diaphragm plate and diaphragm.
- 2. Separate the cap, plate and diaphragm and wipe clean of any fluid. Clean the cap and diaphragm with contact cleaner and dry. Any spilled fluid must be cleaned immediately.

NOTICE

DO NOT SPILL BRAKE FLUID ON PAINTED SURFACES OR IT WILL DAMAGE THE PAINT. CLEAN ANY SPILLS IMMEDIATELY.

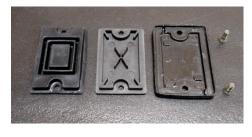
 Drain the brake fluid from the reservoir with a commercial vacuum brake bleeder. Refill the reservoir with DOT 3 or 4 brake fluid from a sealed container.

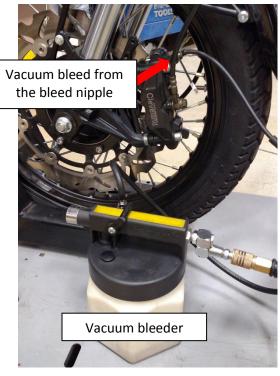


USE ONLY DOT 3 OR 4 BRAKE FLUID FROM A SEALED CONTAINER. AN OPEN CONTAINER MAY HAVE THE FLUID CONTAMINATED WITH WATER ABSORBED FROM THE ATMOSPHERE

- 4. Connect the vacuum bleeder to the front brake caliper bleed nipple and apply vacuum. Open the bleed nipple ¼ turn to allow the vacuum to pull brake fluid down from the master cylinder and through the caliper. Refill the reservoir as necessary when the fluid level lowers.
- 5. Close the bleed nipple and pump the front brake lever to build and verify hydraulic pressure. Typical movement at the lever end is 30-40mm to build firm pressure.
- Set the fluid level in the reservoir to the top of the inspection window and install the cap, diaphragm plate and diaphragm. Fasten the cap with the 2 x screws.











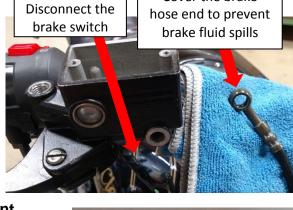
Front Brake Master Cylinder Removal/Disassembly

BRAKES

- 1. Remove the reservoir **cap**, **diaphragm plate** and **diaphragm** and drain the reservoir with a vacuum bleeder.
- Connect a commercial vacuum bleeder to the caliper bleed nipple and apply vacuum. Open the bleed nipple ¼ turn and drain the brake system of remaining brake fluid.
- 3. Remove the master cylinder **banjo bolt** and lay the **brake hose** aside. Cover the hose end with a shop towel to prevent fluid spills.
- 4. Remove the right side **mirror** and disconnect the **front brake switch**.
- 5. Remove the brake lever and brake switch.

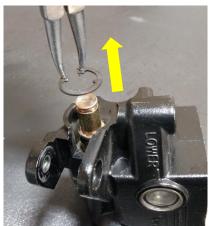
6. Remove the dust boot.

- 7. Use circlip pliers to remove the piston **circlip** and remove the **piston**.
- 8. Use a pick tool to carefully remove the **piston seals** from the piston.
- **9.** Clean all parts with contact cleaner and blow dry with compressed air.











Cover the brake



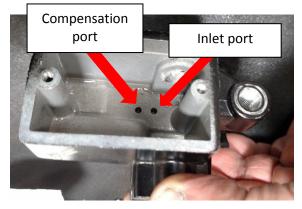
Front Brake Master Cylinder Inspection

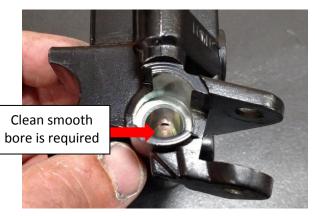
Swing Arm Bearing Parts Identification

- 1. Dust boot
- 2. Circlip
- 3. Piston seal outer
- 4. Piston
- 5. Piston seal inner
- 6. Piston spring
- 7. Master cylinder body



- 1. Examine the master cylinder reservoir for corrosion or damage. Clean any corrosion from the body.
- **2.** Verify that the compensation port hole and inlet port holes are clear.
- **3.** Examine the piston for corrosion or damage. Clean the piston as necessary. Excessive damage will require that the master cylinder assembly be replaced.
- 4. Examine the piston seals for excessive wear or damage. Excessive wear or damage will require that the master cylinder assembly be replaced.
- 5. Examine the piston bore for corrosion or damage. The piston bore needs to be clean, smooth and without corrosion pits. Pits or damage to the bore will require that the master cylinder assembly be replaced.





Front Brake Master Cylinder Assembly/Installation

BRAKES

- 1. Lubricate the piston seals with DOT 3 or 4 brake fluid from a sealed container.
- 2. Install the **piston seals** onto the **piston**. Verify correct direction and seating of the seals.
- 3. Insert the piston with spring into the master cylinder body.

USE ONLY DOT 3 OR 4 BRAKE FLUID FROM A SEALED CONTAINER. AN OPEN CONTAINER MAY HAVE THE FLUID CONTAMINATED WITH WATER ABSORBED FROM THE ATMOSPHERE

4. Press down on the piston and install the circlip.

NOTICE DO NOT SPILL BRAKE FLUID ON PAINTED SURFACES OR IT WILL DAMAGE THE PAINT. CLEAN ANY SPILLS IMMEDIATELY.

5. Install the dust boot. Seat the boot around the piston and seat the boot base into the master cylinder body.

> Seat boot around the piston and into the body

6. Apply grease to the brake lever and brake lever pivot.











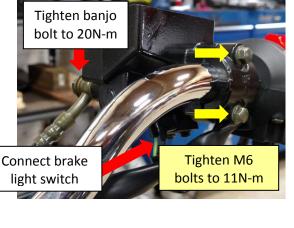
- 7. Install the lever, pivot and lock nut. Tighten the M6 lock nut to 11N-m.
 2. Install the broke light ewitch
- 8. Install the brake light switch.

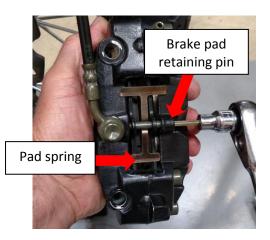
- Install the master cylinder assembly onto the handle bars. Position the clamp with the UP mark facing up. Tighten the top M6 bolt first to 11N-m. Tighten the lower M6 bolt to 11N-m.
- **10.** Install the **brake hose** with **2 x sealing washers** and tighten to **20N-m**.
- **11.**Connect the brake switch wires to the **switch**.
- 12. Install the mirror.
- Fill and bleed the brake system with DOT 3 or 4 brake fluid from a sealed container see page 121.

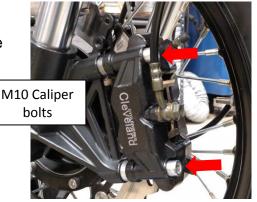
Front Brake Pad Replacement

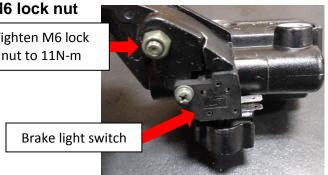
- 1. Remove the 2 x M10 caliper bolts and spacers.
- 2. With draw the **caliper** from the front brake rotor. The brake hose may be left attached.

3. Remove the brake pad retaining pin and pad spring.







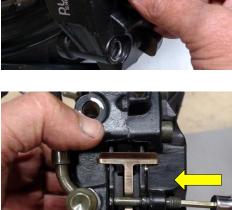




4. Replace the brake pads.

5. Position the pad spring as show and install the pad retaining pin. Tighten the pin to 11N-m.

- 6. Pry the pads apart to allow the caliper to be installed around the brake rotor.
- 7. Install the 2 x M10 caliper bolts and spacers. Tighten the caliper bolts to 23N-m.
- 8. Pump the front brake lever and verify firm hydraulic pressure. Check and adjust the front brake master cylinder fluid level as necessary. See page 32



Tighten the pin to 11N-m







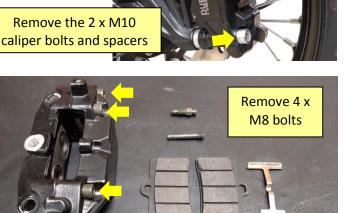
Front Brake Caliper Removal/Disassembly

- 1. Remove the reservoir **cap**, **diaphragm plate** and **diaphragm** and drain the reservoir with a vacuum bleeder.
- Connect a commercial vacuum bleeder to the caliper bleed nipple and apply vacuum. Open the bleed nipple ¼ turn and drain the brake system of remaining brake fluid.

DO NOT SPILL BRAKE FLUID ON PAINTED SURFACES OR IT WILL DAMAGE THE PAINT. CLEAN ANY SPILLS IMMEDIATELY.

- Remove the front brake caliper banjo bolt and lay the brake hose aside. Cover the brake hose end with a shop towel to prevent spills.
- 4. Remove the M10 caliper bolts and spacers and remove the caliper.
- 5. Remove the brake pad retaining pin, pad spring, brake pads and bleed nipple.
- 6. Remove the 4 x M8 bolts to separate the caliper halves.
- 7. Remove the 2 x caliper O-rings and lay aside.
- 8. The caliper **pistons** may be removed by applying compressed air to the caliper. Hold the caliper wrapped in a shop towel to prevent the pistons from becoming projectiles. Air applied to alternate passages may be required to remove the pistons.







Remove the banjo bolt

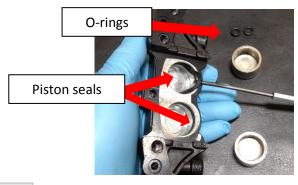
Drain the front brake system of fluid







- 9. The piston seals may be removed with a hook pick.
- **10.** Clean all parts with contact cleaner and dry with compressed air.



Front Brake Caliper Inspection

Front Brake Caliper Parts Identification

- 1. Pistons
- 2. Bleed nipple
- **3.** Piston seals
- 4. O-rings
- 5. Caliper bodies
- 6. Caliper M8 bolts



Front Caliper Inspection

- Clean all corrosion from the caliper bodies, including the seal grooves. The piston bore and seal grooves must be smooth and clean.
- **2.** The pistons must be smooth with no flaking or damage to the chrome.



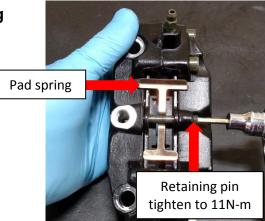
Front Brake Caliper Assembly/Installation

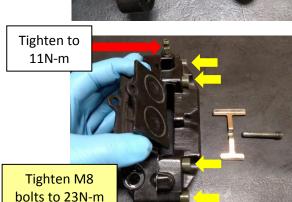
- 1. New piston seals and O-rings are required to assemble the calipers. Lubricate the **piston seals** and install into the seal grooves.
- 2. Insert the **pistons** into the caliper halves.

3. Position the O-rings into their recesses and bolt the caliper halves together. Tighten the M8 caliper bolts to 23N-m.

- 4. Install the bleed nipple. Tighten to 11N-m
- 5. . Insert the brake pads into position.

6. Install the **pad spring** as shown and install the **retaining pin**. Tighten the retaining pin to **11N-m**.











- **7.** Pry the pads apart to allow the **caliper** to be installed around the brake rotor.
- Install the 2 x M10 caliper bolts and spacers. Tighten the caliper bolts to 23N-m.
- Install the brake hose with the banjo bolt and 2 x sealing washers. Tighten the banjo bolt to 20N-m.
- **10.** Fill and bleed the front brake system with DOT 3 or 4 brake fluid from a sealed container. **See page 127**

NOTICE

USE ONLY DOT 3 OR 4 BRAKE FLUID FROM A SEALED CONTAINER. AN OPEN CONTAINER MAY HAVE THE FLUID CONTAMINATED WITH WATER ABSORBED FROM THE ATMOSPHERE

Rear Brake Fluid Flush/Bleeding Of Air

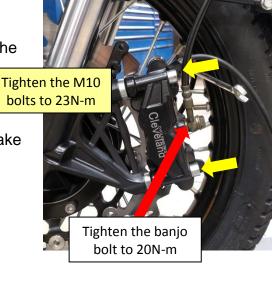
- **1.** Remove the rear brake master cylinder reservoir cap.
- 2. Separate the cap, plate and diaphragm and wipe clean of any fluid. Clean the cap and diaphragm with contact cleaner and dry. Any spilled fluid must be cleaned immediately.

DO NOT SPILL BRAKE FLUID ON PAINTED SURFACES OR IT WILL DAMAGE THE PAINT. CLEAN ANY SPILLS IMMEDIATELY.

3. Drain the brake fluid from the reservoir with a commercial vacuum brake bleeder. Refill the reservoir with **DOT 3 or 4** brake fluid from a sealed container.

NOTICE

USE ONLY DOT 3 OR 4 BRAKE FLUID FROM A SEALED CONTAINER. AN OPEN CONTAINER MAY HAVE THE FLUID CONTAMINATED WITH WATER ABSORBED FROM THE ATMOSPHERE









BRAKES

Vacuum bleed from the bleed nipple

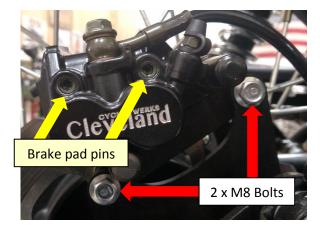
- 4. Connect the vacuum bleeder to the front brake caliper bleed nipple and apply vacuum. Open the bleed nipple ¼ turn to allow the vacuum to pull brake fluid down from the master cylinder and through the caliper. Refill the reservoir as necessary when the fluid level lowers.
- 5. Close the bleed nipple and pump the brake pedal to build and verify hydraulic pressure. Typical movement at the pedal end is 30-40mm to build firm pressure.
- 6. Set the fluid level in the reservoir to the top of the level mark and install the cap, diaphragm plate and diaphragm.

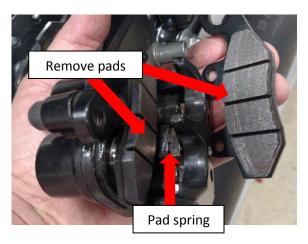
Vacuum bleeder

Rear Brake Pad Replacement

- 1. Remove the 2 x M8 bolts securing the rear brake caliper to its bracket. The brake hose may remain attached to the caliper.
- 2. Remove the 2x brake pad pins from the caliper.





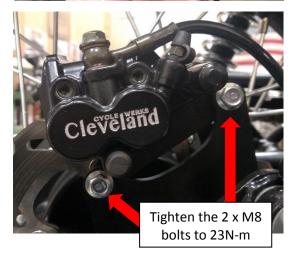


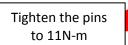


- Clean dirt from the spring and around the pistons. Inspect the exposed surface of the piston for damage to the chrome or excessive corrosion, which would indicate that the caliper may need to be serviced. See page 144
- 5. Install the **spring** as shown. The pad away from the pistons remains fixed, the pad against the pistons will slide against the spring.
- 6. Install new brake pads as shown. The pads will need to compress the spring slightly to allow the 2 x pins to be inserted. Tighten the pins to 11N-m. Verify that the pad away from the piston is retained by the spring, and the pad against the pistons is allowed to slide.
- **7.** If necessary to fit around the brake rotor, spread the pads from each other with a flat screwdriver.
- Position the caliper around the brake rotor and install the 2 x M8 bolts. Tighten the bolts to 23N-m.
- Pump the rear brake and verify correct action with a firm pedal pressure. If air has entered the system, bleed the system of air. See page 136











139

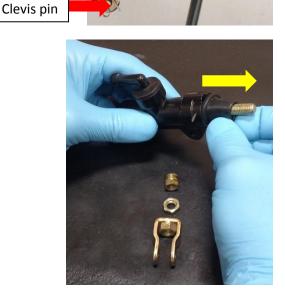
Rear Brake Master Cylinder Removal/Disassembly

- 1. Remove the reservoir cap, diaphragm plate and diaphragm and drain the reservoir with a vacuum bleeder.
- 2. Connect a commercial vacuum bleeder to the caliper bleed nipple and apply vacuum. Open the bleed nipple 1/4 turn and drain the brake system of remaining brake fluid.

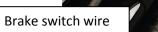
- 3. Remove the brake pedal clevis pin. Disconnect the rear brake switch at the wire harness.
- 4. Remove the master cylinder banjo bolt and lay the brake hose aside. Cover the hose end with a shop towel to prevent fluid spills.
- 5. Remove the rear brake master cylinder.

- 6. Remove the clevis, lock nut and boot collar.
- 7. Remove the piston dust boot.









Remove the



BRAKES

he **piston circlip** and withdraw the **rod, wa**

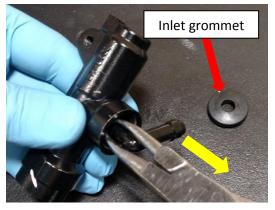
BRAKES

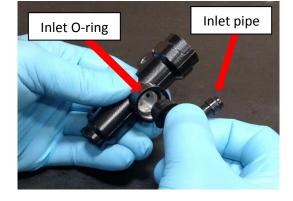
8. Remove the **piston circlip** and withdraw the **rod**, **washer**, **piston** and **spring**.

- 9. Remove the inlet grommet.
- **10.** Use circlip pliers to remove the **inlet circlip** and remove the **inlet pipe**.

- 11. Remove the inlet O-ring.
- **12.** Use a pick tool to carefully remove the **piston seals** from the piston.
- **13.** Clean all parts with contact cleaner and blow dry with compressed air.











Rear Brake Master Cylinder Inspection

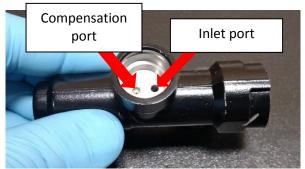
Rear Brake Master Cylinder Parts Identification

- 1. Spring
- 2. Outer piston seal
- 3. Piston
- 4. Inner piston seal
- 5. Washer
- 6. Piston circlip
- 7. Master cylinder body
- 8. Inlet grommet

- 9. Inlet pipe
- 10. Inlet circlip
- 11. Inlet O-ring
- **12.** Piston rod **13.** Dust boot
- **14.** Boot collar
- **15**. Lock nut
- **16.** Clevis



- 1. Examine the master cylinder reservoir for corrosion or damage. Clean any corrosion from the body.
- **2.** Verify that the compensation port hole and inlet port holes are clear.
- **3.** Examine the piston for corrosion or damage. Clean the piston as necessary. Excessive damage will require that the master cylinder assembly be replaced.
- 4. Examine the piston seals for excessive wear or damage. Excessive wear or damage will require that the master cylinder assembly be replaced.
- Examine the piston bore for corrosion or damage. The piston bore needs to be clean, smooth and without corrosion pits. Pits or damage to the bore will require that the master cylinder assembly be replaced.

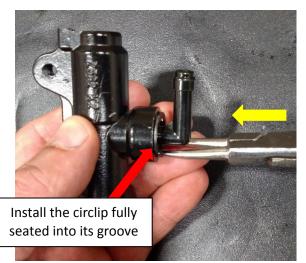




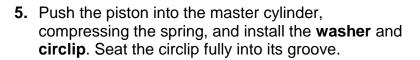


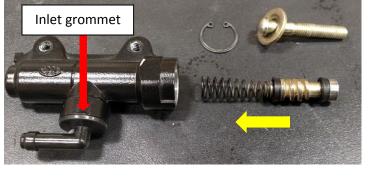
Rear Brake Master Cylinder Assembly/Installation

- 1. Install the inlet **O-ring** and **inlet pipe** into the rear brake master cylinder. Lube the **O-ring** prior to assembly with brake fluid.
- 2. Install the inlet pipe **circlip**. Be sure that the circlip is seated fully into its groove. Install the inlet grommet over the inlet pipe.



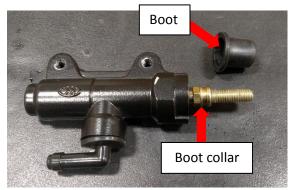
- 3. Lubricate the inner and outer **piston seals** with brake fluid and install onto the **piston** as shown. Inspect the seals after installation for any damage or tears that may have happened during installation.
- 4. Install the **spring** onto the piston as shown, and insert the piston into the master cylinder.







- 6. Thread the **boot collar** onto the rod as shown.
- 7. Install the boot. Seat the large end square into the master cylinder and seat the small end around the boot collar.



6mm Clevis pin, 6mm washer and cotter pin

BRAKES

8. Install the M8 nut and clevis onto the rod.

- **9.** Install the master cylinder onto the chassis. Tighten the $2 \times M6$ bolts to 11N-m.
- **10.** Using 2 x new crush washers, install the rear brake hose as shown. Tighten the banjo bolt/rear brake switch to 15N-m.

- **11.** Install the 6mm **clevis pin**, **washer** and **cotter pin** as shown. Adjust the brake pedal height as required by moving the clevis up or down on the rod. Tighten the M8 nut onto the clevis to 23N-m.
- **12.** Install the rear brake reservoir **hose** and **clamp** onto the master cylinder inlet.

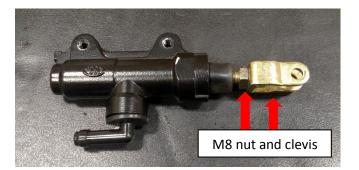
 Fill the rear brake system with DOT 3 or 4 brake fluid from a sealed container and bleed the system of air. See page 136

🛕 ΝΟΤΙCΕ

USE ONLY DOT 3 OR 4 BRAKE FLUID FROM A SEALED CONTAINER. AN OPEN CONTAINER MAY HAVE THE FLUID CONTAMINATED WITH WATER ABSORBED FROM THE ATMOSPHERE











144

BRAKES

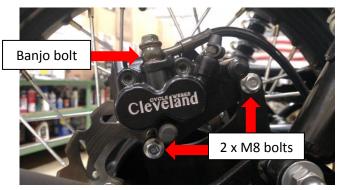
Rear Brake Caliper Removal/Disassembly

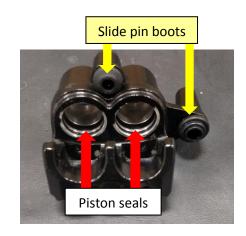
- 1. Remove the **reservoir cap**, **diaphragm plate** and **diaphragm** and drain the reservoir with a vacuum bleeder.
- Connect a commercial vacuum bleeder to the caliper bleed nipple and apply vacuum. Open the bleed nipple ¼ turn and drain the brake system of remaining brake fluid.

- 3. Remove the brake hose **banjo bolt** and 2 x **washers**. Cover the hose end with a shop towel to prevent brake fluid spills.
- 4. Remove the 2 x M8 bolts and remove the caliper.

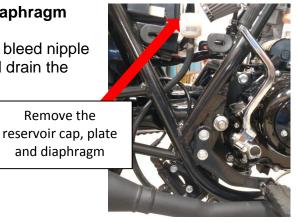
- 5. Remove the 2 x pins and remove the brake pads.
- 6. Extract the slide pins and bracket from the caliper rubber boots.

- 7. The **piston seals** may be removed with a hook pick. If the **slide pin boots** are damaged, they may be removed by collapsing the boot and withdrawing.
- 8. Clean all parts with non-chlorinated brake cleaner and dry with compressed air.











BRAKES



Rear Brake Caliper Inspection

Rear Brake Caliper Parts Identification

- 1. Pistons
- 2. Slide pin boot
- 3. Slide pin boot
- 4. Piston seal
- 5. Piston dust seal
- 6. Slide pins and bracket
- 7. Bleed nipple



Rear Caliper Inspection

- 1. Clean all corrosion from the caliper bodies, including the seal grooves. The piston bore and seal grooves must be smooth and clean.
- **2.** The pistons must be smooth with no flaking or damage to the chrome.





Tighten the pins to 11N-m

BRAKES

Rear Brake Caliper Assembly/Installation

- 1. Lubricate the **piston seals** with brake fluid and install in the seal grooves.
- 2. Install the slide pin boots if removed. Lubricate the inside of the boots with waterproof grease to allow the slide pins to move freely.
- **3.** Install the **pistons** into the caliper body with the closed end inward. Press the pistons to the bottom of the bores.
- 4. Install the **slide pins** with **bracket**. Verify that the pins and bracket move freely side to side.
- 5. Install the **spring** as shown. The pad away from the pistons remains fixed, the pad against the pistons will slide against the spring.
- 6. Install the brake pads as shown. The pads will need to compress the spring slightly to allow the 2 x pins to be inserted. Tighten the pins to 11N-m. Verify that the pad away from the piston is retained by the spring, and the pad against the pistons is allowed to slide.
- 7. If necessary to fit around the brake rotor, spread the pads from each other with a flat screwdriver.
- Position the caliper around the brake rotor and install the 2 x M8 bolts. Tighten the bolts to 23N-m.
- **9.** Using 2 x new crush washers, install the rear brake hose as shown. Tighten the banjo bolt to 15N-m.
- **10.** Fill the brake system with DOT 3 or 4 brake fluid from a sealed container. Bleed the system of air. **See page 136**

USE ONLY DOT 3 OR 4 BRAKE FLUID FROM A SEALED CONTAINER. AN OPEN CONTAINER MAY HAVE THE FLUID CONTAMINATED WITH WATER ABSORBED FROM THE ATMOSPHERE



Pad spring







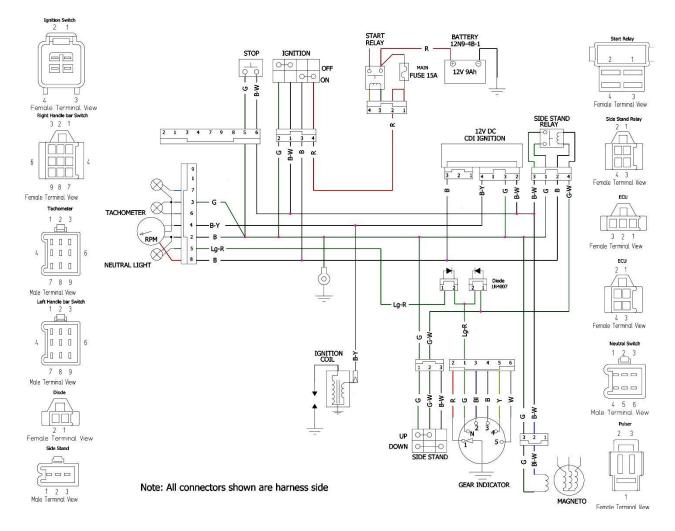




System Description

The Misfit 250 is equipped with a Direct Current Capacitive Discharge Ignition system (DC CDI). The ignition system is all electronic and provides a strong ignition spark with automatic advance and retard of the ignition timing to suit the engine speed (RPM).

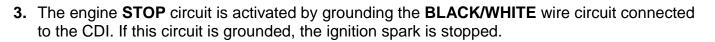
Refer to the following wire schematic for the system description:



 The ignition system is powered by the battery. 12 Volt DC battery power feeds through the 15Amp blade fuse housed in the starter solenoid, through the 4 pin connector and RED wire in the wire harness to the ignition switch. The ignition switch connects the power to the BLACK wire circuit in the harness during ignition switch key-on.

The **BLACK** wire circuit is key-on power to the motorcycle. The **BLACK** wire circuit powers the **tachometer**, **CDI module** and the **side stand relay**.

2. The CDI module, ignition switch, stop switch, side stand switch and side stand relay are grounded via the **GREEN** wire circuit in the wire harness, connected to the frame through the terminal bolted at the ignition coil mount under the fuel tank.



The **BLACK/WHITE** stop circuit may be grounded by:

- The Ignition switch in the "OFF" position.
- The handlebar STOP switch in the 'OFF" position.
- The side stand relay, if the side stand is DOWN and the transmission is in gear.
- 4. The CDI module is triggered by an AC pulse from the pulser coil in the engine. A pole on the flywheel swings past the pulser coil and generates the AC pulse. If there is no pulse, the spark will not be triggered.
- 5. The Ignition coil is triggered by the CDI module via the **BLACK/YELLOW WIRE**. The ignition coil is grounded to the chassis by being bolted to the frame.

Ignition System Inspection

Follow the following sequence when inspecting the ignition system.

When checking for spark, lay the spark plug base against the engine with the ignition wire on. **Do not hold the spark plug with your hand, you will receive a shock!** Crank the engine; you should see a blue spark at the gap. (Please note, you may not see the spark in bright sunlight)

NOTICE

DO NOT TOUCH THE SPARK PLUG OR PLUG CAP WHILE TRYING TO START THE ENGINE. YOU WILL RECEIVE AN ELECTRICAL SHOCK WHICH COULD RESULT IN SERIOUS INJURY OR DEATH.

1. Harness

Inspect the wire harness, connectors, electric components and battery terminals for damage or corrosion. Clean or repair connectors and wires as necessary. If the lights do not illuminate and meters activate at key-on, inspect the main **15A fuse** in the starter solenoid.

2. Battery

Measure DC voltage at the battery terminals while cranking the engine with the electric starter. Minimum battery voltage for ignition when cranking is **10VDC**.

3. Spark Plug

Remove the spark plug. The ceramic insulator should be white to light brown in color. If the

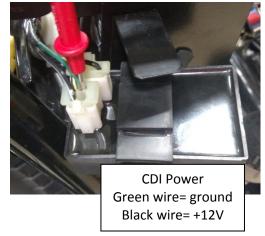
insulator is black with carbon deposits, replace. If the insulator is white but wet with fuel, replace the spark plug or allow the spark plug to dry. Spark plug gap is 0.6mm.

4. CDI Module

Measure the ground and power to the **CDI Module** with a volt meter. With the ignition key **ON** and the volt meter negative probe at the **negative** battery terminal:

• **GREEN** wire 0-0.2VDC.

If the voltage is higher, inspect for a broken harness ground connection to the frame under the fuel tank.





 BLACK wire: battery voltage. (typically 11-12.5VDC) If the voltage is substantially lower than the battery voltage, inspect the ignition switch wire connector and switch contacts for continuity.

5. STOP Circuit

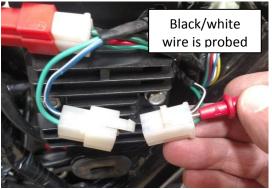
Remove the positive battery cable from the battery and lay aside.

For testing the circuit, remove the side stand relay from the circuit by unplugging the connector under the seat.

Disconnect the pulser coil from the circuit by unplugging the connector under the left side cover as shown. Measure the **BLACK/WHITE** wire with an Ohms meter to the **negative** battery terminal:

- Ignition switch OFF: 0-2 Ohms (continuity to ground)
- Ignition switch ON, STOP switch STOP: 0-2 Ohms (continuity to ground)





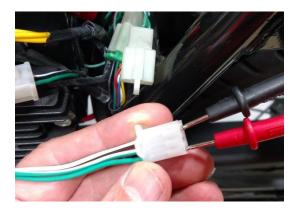
Ignition switch ON, STOP switch RUN. ∞ Ohms (no continuity) If there is continuity to ground, inspect for a short to ground of the BLACK/WHITE wire in the harness, STOP switch, ignition switch or CDI Module.

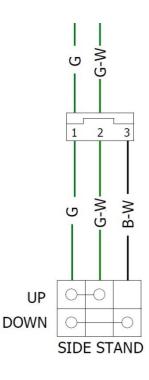
Reconnect the negative battery cable, the pulser connector and side stand relay after testing.

6. Side stand switch

Disconnect the side stand switch connector under the left side cover as shown and measure the switch continuity with an Ohms meter.

- Side stand UP- GREEN continuity to GREEN/WHITE.
- Side stand **DOWN- GREEN** continuity to **BLACK/WHITE**.



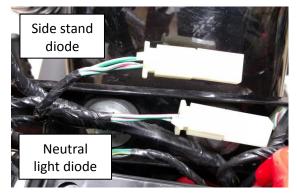




The side stand relay activates to turn **ON** the spark during ignition key-on. If the side stand is **DOWN**, and the engine is in gear, the relay deactivates and spark is stopped. Activation of the relay disconnects the **BLACK/WHITE** pulser wire from ground, allowing the pulser signal to the CDI and allowing spark (unless the STOP switch or ignition switch grounds the **BLACK/WHITE** circuit)

- 12V power is provided to the BLACK harness wire during ignition key-on. Check for battery voltage between the BLACK (+) and GREEN (ground) wires on the harness side of the side stand relay connector under the seat.
- The **GREEN/WHITE** wire is the signal wire to activate the relay. When the side stand is **UP**, the **GREEN/WHITE** wire is grounded, the relay is activated to allow spark (unless the **STOP** switch or ignition switch grounds the **BLACK/WHITE** circuit)
- If the side stand is DOWN, the neutral switch activates the relay through the side stand diode by grounding the GREEN/WHITE wire. When the transmission is in gear, the neutral switch does not ground the GREEN/WHITE wire. A faulty or missing side stand diode will not activate the relay when the side stand is DOWN in neutral, and not allow spark.
- If the side stand relay is faulty, disconnecting the relay will allow spark (unless the STOP switch or ignition switch grounds the BLACK/WHITE circuit)





CAUTION

DO NOT OPERATE THE MOTORCYCLE WITH AN INOPERABLE SIDE STAND SWITCH. RIDING THE MOTORCYCLE WITH THE SIDE STAND DOWN WILL RESULT IN A CRASH WHICH COULD RESULT IN SERIOUS INJURY OR DEATH.

8. Ignition coil

Inspect the ignition coil under the fuel tank for signs of damage. Replace if damaged or signs of melting or cracks. The coil mounting post requires good electrical contact to the motorcycle frame and harness ground (**GREEN**) wire. Clean of corrosion or paint if necessary.

• The spark plug cap may be unscrewed from the wire to inspect for corrosion or damage to the cap. Measure the cap resistance with an Ohms meter. Typical resistance **5.0-5.5K Ohms**.



 Disconnect the BLACK/YELLOW wire and measure the resistance of the primary (low voltage) side of the coil with an Ohms meter. Typical resistance 0.4 Ohms.

Reconnect the wire after testing.

Measure the resistance of the secondary (high voltage) side of the coil with an Ohms meter.
 Typical resistance 3.8K Ohms without the spark plug cap.

Reinstall the spark plug cap after testing.

9. Pulser coil

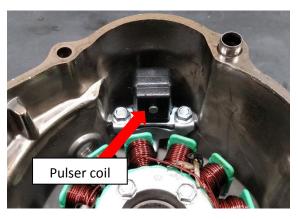
The pulser coil is mounted inside the left engine cover and produces an AC voltage pulse to trigger the ignition spark. The pulse is generated when the pole on the flywheel spins past the coil.

- Disconnect the pulser wire connector under the left side cover as shown and measure the resistance of the coil with an Ohms meter. Typical resistance 140-150 Ohms.
- Measure the resistance of the BLUE/WHITE wire to a bare metal bolt on the engine case with an Ohms meter. Resistance ∞ Ohms (no continuity)

Reconnect the wire connector after testing.



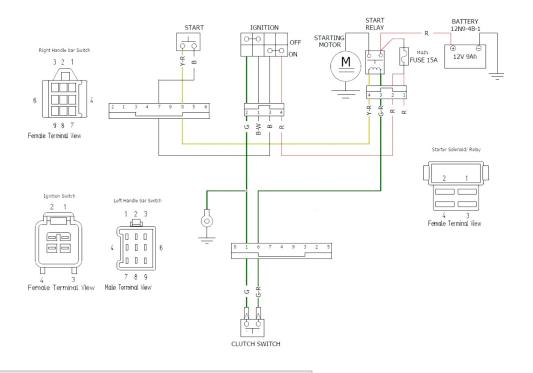






Starter System Description

The Misfit 250 starter motor is activated by a solenoid relay located under the battery box. During key-on, +12VDC power is supplied to the starter button switch on the right handle bar through the **BLACK** wire circuit. The **YELLOW/RED** wire provides +12VDC to the **solenoid** when the starter button is pressed. The clutch lever has a switch that completes the activation of the solenoid by grounding the **GREEN/RED** wire of the solenoid through the clutch switch.



Starter System Inspection

- Inspect the solenoid for signs of corroded or damaged terminals. Battery and starter motor cables must be clean and tight.
- Activation of the solenoid will be heard and felt by an internal click of the relay. If the relay does not activate, check with a volt meter:

Negative at the **GREEN/RED** wire at the solenoid, positive at the YELLOW/RED wire at the solenoid:

Battery voltage (+11.0-12.5VDC)

- Insufficient voltage at the solenoid indicates damaged wires or switch contacts in the clutch switch and starter button switch.
- If the solenoid activates, check for voltage at the starter motor terminal. If battery voltage is present, and the starter motor does not turn, this indicates a defective or damaged starter motor.
- If the solenoid activates, and voltage is present at the battery terminal of the solenoid but not at the starter motor terminal, this indicates a defective or damaged solenoid.

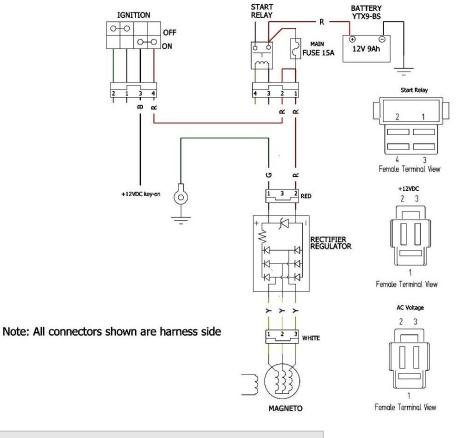


System Description

The Misfit 250 charging system features a permanent magnet flywheel spinning around stator windings of wire to produce an AC (Alternating Current) voltage output. The AC voltage is converted to DC (Direct Current) voltage by a rectifier/regulator to charge the battery.

The Misfit is equipped with an Absorbed Glass Mat (AGM) maintenance free battery. The battery electrolyte (acid) is filled at the time of battery commission and is not serviceable. Do not attempt to open an AGM battery and fill with electrolyte. The AGM battery must be kept in a state of charge to prevent sulfation of the internal plates and to prevent freezing damage.

Refer to following wire schematic for the system description.



Charging System Inspection

The charging system voltage output can be measured at the battery terminals. Full battery charging is output at 3000 RPM and above. Run the engine and measure the DC voltage with a volt meter:

13.5-14.5 VDC @3000 RPM

CHARGING SYSTEM/BATTERY



1. Battery Inspection/Charging

Remove the seat and Check that the battery terminal bolts are tight and the cables not loose.

Measure the battery voltage, ignition off, with a volt meter. Normal static battery voltage should be **12.6VDC minimum**. If below this voltage, charge the battery. The battery may be charged at a rate of between **0.5-2.0A-h** at a voltage of **13.8 - 14.5 volts** to properly charge the AGM battery.

Inspect the battery for acid leaks, corroded terminals or other damage. Replace the battery if it is leaking or damaged. If acid is present, clean the motorcycle with soap and water. Acid may damage paint, metal and plastic.

Battery type: YTX9-BS (12V 9Ah)

2. Harness

Inspect the wire harness and connectors for damage or corrosion. Disconnect the stator connector and verify that the terminals are clean and not corroded or melted.

Verify that the battery cable from engine ground to the negative battery terminal has contact to bare metal and is not loose.

Inspect the Rectifier/regulator wire connector for damage or corrosion.

3. Stator

The Misfit stator is a 3 pole AC generator featuring three coil windings with a common internal connection. Disconnect the stator connector under the left side cover as shown. With the engine **NOT** running, measure the following with an Ohms meter:

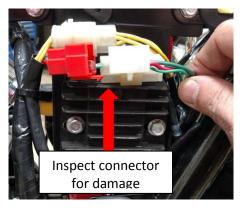
- YELLOW wire to YELLOW wire: 1.0 Ohms
- YELLOW wire to next YELLOW wire 1.0 Ohms.
- Any YELLOW wire to the engine case ∞ Ohms (no continuity)



For an open circuit or short to ground, remove the engine sprocket cover and inspect for damaged wires.

Run the engine and measure the AC voltage with a volt meter.

- YELLOW wire to YELLOW wire 15VAV @1500 RPM typical.
- YELLOW wire to YELLOW wire 30VAC @3000 RPM typical.



CAUTION

BATTERY ACID CAN CAUSE SEVERE BURNS. WEAR EYE

PROTECTION AND RUBBER GLOVES IF ACID IS

PRESENT AND NEEDS TO BE CLEANED OFF THE

MOTORCYCLE.

CHARGING SYSTEM/BATTERY



Stop the engine and reconnect the stator wire connector. Measure the AC voltage at the connector.

- YELLOW wire to YELLOW wire 11VAV @1500 RPM typical.
- YELLOW wire to YELLOW wire 30VAC @3000 RPM typical.

Low voltage indicates a faulty stator and warrants replacement.

4. Rectifier/regulator

Verify that sufficient AC voltage is present at the YELLOW wires input to the rectifier/regulator.

If the rectifier/regulator output is low, replace the unit.



System Description

The **BROWN** wire circuit is energized by the **BLACK** wire circuit at ignition key-on through the **15Amp lighting fuse**.

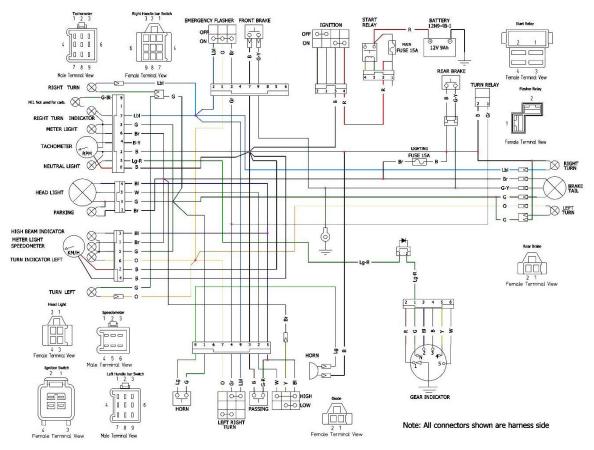
The **BROWN** circuit powers:

- Tail light
- Headlight Hi/Low
- Parking light
- Tachometer and speedometer illumination lights

The **BLACK** wire circuit powers:

- Front/rear brake lights circuits
- Electronic speedometer and tachometer
- Passing light circuit
- Horn circuit
- Turn signals
- Neutral light circuit

Refer to following wire schematic for the system description.

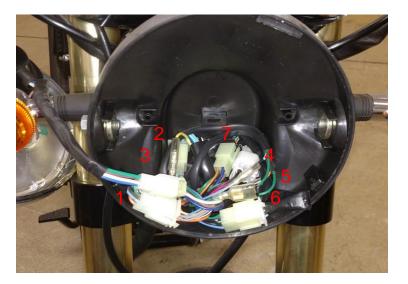


LIGHTING/HORN/INSTRUMENTS



The following wire connectors may be accessed inside the head light case:

- 1. Right handle bar switch
- 2. Left handle bar switch
- 3. Head light
- 4. Ignition switch
- 5. Turn signals
- 6. Tachometer
- 7. Speedometer



Lighting System Inspection

1. Headlight

The Misfit headlight is an always-on for safety during daylight riding. If **BOTH** high and low beam illumination is not working, inspect the 15Amp lighting fuse under the seat.

If the fuse appears good, check for power at the fuse holder with a volt meter:

- **BLACK** wire: ignition key-on battery voltage. (typically 11-12.5VDC)
- **BROWN** wire: circuit to power the headlight Hi/Low switch, tail light, meter illumination and parking light.

If the **BROWN** wire circuit has battery power, and the meters and tail light illuminate, inspect for a faulty head light bulb.

If the bulb appears good, check for power at the head light bulb connector with a volt meter as shown: **GREEN** wire negative ground

BLUE wire high beam +12V **WHITE** wire low beam +12V



If battery voltage is low or not present in either Hi or Low circuits inspect the left handlebar Hi/Low switch for damage or corrosion.

LIGHTING/HORN/INSTRUMENTS



2. Turn signals

The turn signals are powered by the **BLACK** wire circuit through the flasher relay under the right side cover. The relay is load-sensitive, and will blink fast if one signal bulb is burnt out.

If **no left or right** blinking occurs when signaling, disconnect the relay from its connector, and jumper a wire between the terminals in the connector. If the signals illuminate without blinking, this indicates a faulty relay.



If **only the left or right sides** illuminate, inspect the left handle bar switch for damaged or corroded terminals.

If only **one bulb** does not illuminate, inspect the individual bulb and wire connectors under the seat (for rear signals) or in the headlight case (for front signals).

3. Brake lights

The brake light circuits are powered by the **BLACK** wire circuit during ignition key-on. The **BLACK** wire circuit provides power to both the front and rear brake light switches which turn power to the **GREEN/YELLOW** wire to the brake light bulb.

If the brake light does not illuminate from **either front or rear** brake application, inspect the tail light/brake light bulb for damage or corrosion.

If the bulb appears good, check for power at the Tail/brake light bulb socket with a volt meter as shown:

GREEN wire negative ground **GREEN/YELLOW** wire brake light +12V



If the brake light illuminates from **only one brake** (either front brake or rear brake), disconnect the brake switch at its connector and jumper a wire between the connector terminals. If the brake light illuminates, replace the faulty switch.



Horn Inspection

The horn is powered by the **BLACK** wire circuit at ignition key-on, and is sounded by grounding the opposed horn terminal by the **LIGHT GREEN** wire through the horn switch on the left handle bar.

If the horn does not sound, check for power (typically 11.0-12.5VDC) at the **BLACK** wire terminal at the horn.

If power is present, measure the **LIGHT GREEN** wire terminal with a volt meter (negative meter probe to ignition coil ground bolt):

- Not depressing the horn switch: battery voltage. (typically 11.0-12.5VDC)
- **Pressing** the horn switch: 0-.5VDC.

If the voltages do not match these values, this is an indication of a damaged or corroded horn switch or left handlebar switch connector.



Instruments Description

The speedometer and tachometer feature analog needles driven electronically by stepper motors, LED indicator lamps and an LCD odometer/ trip mileage display. The internal parts are not serviceable and a defective or damaged instrument should be replaced as a unit.

Circuit description. See schematic page 161

- Power to each instrument is by the **BLACK** +12VDC wire circuit during key-on, and the **GREEN** ground wire.
- The illumination of both instruments is through the **BROWN** wire circuit and 15A lighting fuse that powers the headlight, tail light and instrument illumination during key-on.
- The tachometer needle is driven by the **BLACK/YELLOW** RPM signal wire from the CDI unit.
- The indicator lamps are driven by a +12VDC signal for each lamp: Left turn indicator. LIGHT BLUE wire Right turn indicator, ORANGE wire Neutral indicator, LIGHT GREEN/RED wire High beam/passing indicator, BLUE wire
- The speedometer is driven by a mechanical cable from the front wheel to the speedometer. The mechanically driven spindle inside the speedometer generates pulses to signal the stepper motor for the needle.
- The speedometer drive box on the front wheel may be inspected with the front wheel removed. **See page 91**
- The speedometer drive cable may be removed from the front wheel drive box and speedometer unit for inspection. The cable should by lightly greased when removed for inspection.

LIGHTING/HORN/INSTRUMENTS



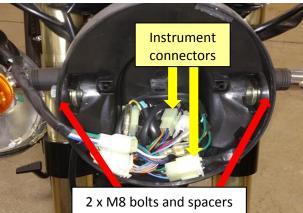
Instruments Removal/Installation

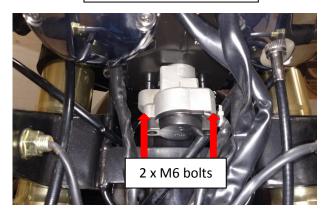
1. Remove the 2 x M5 headlight bezel screws and remove the headlight.

- 2. Disconnect the instrument wire connectors in the headlight case.
- 3. Remove the 2 x M8 headlight bolts and spacers and lower the headlight case.
- 4. Unfasten the speedometer drive **cable** at the front wheel **drive box**.
- 5. Remove the 2 x M6 ignition switch **bolts** to remove the **instrument** and **bracket assembly**.

- 6. Remove 2 x screws to remove each instrument case. Instruments may be removed from the bracket by removing the 2 x nuts inside the case.
- Instrument assembly is the reverse of disassembly. Tighten the 2 x M6 ignition switch bolts to 11N-m.

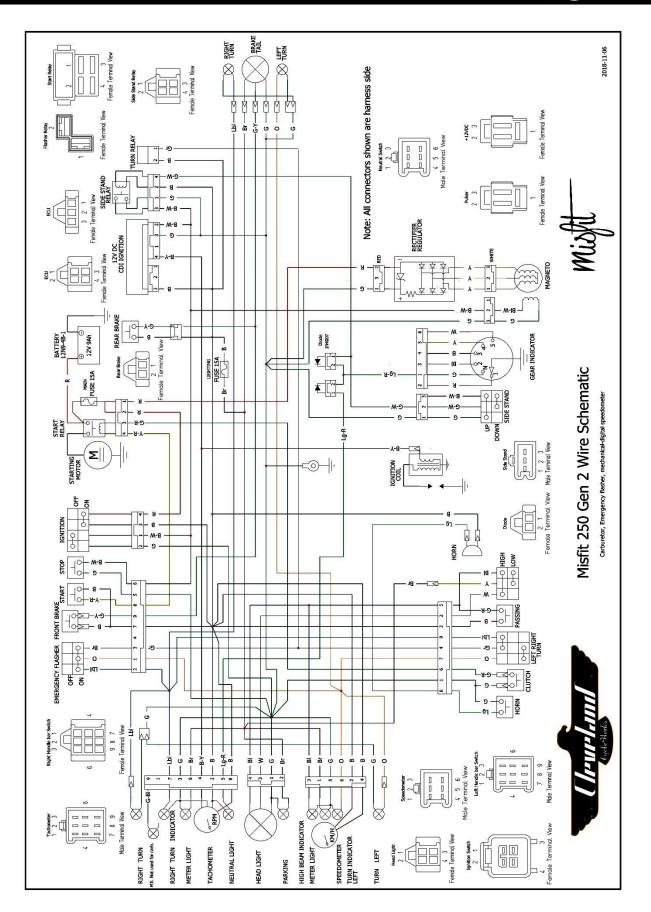








WIRE SCHEMATIC



161



Before troubleshooting a problem, read and understand the operation of your motorcycle as described in the Misfit 250 Gen 2 Owner's Manual.

Engine Does Not Start

Engine will not crank (turn over)

- Turn on the ignition key: The headlight and instrument lights should illuminate. The transmission needs to be in neutral with the green neutral light on.
- Check that the STOP switch is in the RUN position. (Right handlebar)
- The clutch lever has a safety switch that requires the clutch lever to be pulled in to operate the starter motor.
- The side stand has a safety switch that will stop the ignition spark if the engine is in gear with the side stand down.

No Instrument lights:

- Remove the seat and check that the battery cables are connected and tight, with no corrosion.
- Inspect the fuse, replace if burned out.
- Check the voltage of the battery, voltage should be 11.5VDC minimum to start. If voltage is low, charge the battery or replace as necessary. A bad battery may indicate good voltage until a load is put on it, check voltage at the battery when trying to crank the engine.

Instrument lights ON, neutral light is ON, side stand is UP, clutch pulled IN:

- Clicking from the starting solenoid indicates a weak battery, defective solenoid, defective wires or defective starting motor.
- Try starting with the kick starter.



Engine will crank (turn over) but will not start:

- Cold engines require the choke to be ON to start. (Look at the carburetor and verify that the choke lever is UP).
- Warm engines will foul the spark plug if run with the choke on, check that the choke is OFF (Lever is DOWN on the carburetor)
- Throttle should be 1/8 to ¼ open during cranking.

Check fuel:

- Verify that fresh fuel is in the tank, petcock is ON or RESERVE (Depending on fuel level in tank).
- Open the drain screw on the carburetor and verify that fuel flows out, see page 24. (Put a pan under the drain hose to catch the fuel) Fresh fuel is clear, and has a sharp, acidic smell; yellow fuel indicates stale fuel, the engine will not start with stale fuel.
- If fuel does not flow from the carburetor, remove the fuel hose from the carburetor and check for fuel flowing from the fuel valve (petcock). If fuel does not flow out of the hose, the fuel valve (petcock), fuel hose and/or sediment bowl may be clogged and need cleaning.
- If fuel flows from the fuel hose, and not from the carburetor drain, the float needle in the carburetor may be stuck closed. Disassembly and cleaning of the carburetor is required.
- The fuel tank is vented to the atmosphere (through the EVAP System) to allow fuel to flow out. If fuel does not flow out of the tank, or is slow, inspect the tank vent hose and related parts of the EVAP system for blockage. Opening the fuel cap will fully ventillate the tank to bypass a blocked tank vent.

Check spark:

- Remove the spark plug. The ceramic insulator should be white to light brown in color. If the insulator is black with carbon deposits, replace. If the insulator is white but wet with fuel, replace the spark plug or allow the spark plug to dry.
- Check for spark. Lay the spark plug base against the engine, with the ignition wire on.
 Do not hold the spark plug with your hand, you will receive a shock! Crank the engine; you should see a blue spark at the gap. (Please note, you may not see the spark in bright sunlight) Spark plug gap is 0.6mm.

DO NOT TOUCH THE SPARK PLUG OR PLUG CAP WHILE TRYING TO START THE ENGINE. YOU WILL RECEIVE AND ELECTRICAL SHOCK WHICH COULD RESULT IN SERIOUS INJURY OR DEATH.

- If a blue spark is visible, reinstall the spark plug.
- If no spark is present, see Ignition system, page 147.



Check compression:

- Crank the engine with the kick starter. (Spark plug in) You should feel a strong resistance as the engine spins past the compression stroke. This will indicate sufficient compression to start the engine. If strong compression is felt, and the engine still will not start, this may indicate clogged carburetor jets, problems with the cam timing, ignition timing, or other mechanical faults.
- Low resistance when cranking the engine indicates low compression. Low compression can be caused by tight valve clearances, bent valves or other mechanical problems inside the engine.

Engine Starts but Runs Poorly

Check in the following order:

Carburation:

- Good running motorcycles require that all of the fuel and air circuits in the carburetor are clean and of the proper setting. If the motorcycle was previously running good and is now running poorly with no change to carburation, exhaust or air intake: Remove and disassemble the carburetor and inspect for varnish, debris, corrosion, broken or worn parts.
- If the previous running history is not known: Remove and disassemble the carburetor and inspect for varnish, debris, corrosion, broken or worn parts. Check and verify that all of the carburetor settings are correct. See **Specifications** page 50 for stock carburetor settings.

Fuel Tank:

• The fuel tank is vented to the atmosphere (through the EVAP System) to allow fuel to flow out. If fuel flows out, and then slows, inspect the tank vent hose and related parts of the EVAP system for blockage.

Ignition:

• A poor running motorcycle may be the result of weak or intermittent spark. Weak spark can be caused by loose or corroded wire connectors, faulty wires, faulty switches, faulty ECU (Electronic Control Unit), ignition coil, pulser coil or ignition wire.

Intake and Exhaust:

- Poor running may be caused by a clogged or blocked air filter. Inspect the air filter, clean or replace as necessary.
- Poor running or performance may be caused by a blocked exhaust system. Inspect the exhaust system for blockage.



Clutch/Transmission

Clutch slips:

- A slipping clutch is indicated by engine speed increasing but not a corresponding road speed increase. Verify that there is free play in the clutch cable. The clutch lever should free for the first 3-5mm when pulled in, and then a stronger resistance as the clutch plates are disengaged. If the clutch is still slipping, this may indicate worn plates, disassemble and inspect the clutch.
- If there is great resistance when pulling in the clutch, this may indicate a rusted or frayed inner clutch cable. Inspect and repair/replace as necessary.

Won't shift properly:

- A transmission that will not change gears may indicate a broken shift shaft, transmission drum, or shift forks.
- Jumping out of gears. Ratcheting noise in the transmission may indicate bent shift forks, broken gears or severely worn drive sprockets.

Handling

Steering is heavy

- Check tire pressure/tires low on air.
- Damaged or dry steering head bearings.
- Steering stem nut is too tight.
- Either wheel has a Wobble (Weebles Wobble)
 - Wheel/tire out of round or out of balance.
 - Bent Rim.
 - Axle loose.
 - Swing arm loose.
 - Damaged swing-arm.
 - Bent frame.
 - Loose or broken spokes.

• Loose nut on the handle bar.

The motorcycle pulls to one side

- Front and rear wheels are out of alignment.
- Faulty shock absorber
- Damaged fork(s).
- Bent Swing-arm.
- Damaged axle.
- Damaged frame.
- Damaged upper or lower triple clamp.

Electrical

Battery has low voltage:

Charging:

- The motorcycle will charge the battery when the engine speed is above 3000RPM. A low voltage battery may take an hour or more to charge fully. Many short rides may deplete the battery without allowing it to fully charge. The owner may supplement regular charging with a trickle charger, periodically as needed.
- Normal charging voltage is measured at the battery terminals. Typical voltage will be 13.5-14.5VDC at 3000RPM.

Battery storage:

- Motorcycle batteries loose a small amount of voltage over time when in the motorcycle is not running. If the motorcycle has not been operated for a month, the owner may want to bring the battery up to full capacity by charging with a trickle charger once a month when in storage.
- Batteries that are in a low voltage state or depleted for an extended time may develop sulfated plates internally. Sulfated plates are permanent damage that will not allow the battery to regain full capacity, indicating the need for a new battery.
- Batteries with a full charge are resistant to freezing. A battery low in voltage will freeze at a higher temperature, causing permanent damage.

Brakes

Squeaking brakes

- Inspect the caliper brake pads for thickness. Some squeaking may be caused by light glazing of the brake pads from normal use. This may be a problem that needs attention, have your Cleveland CycleWerks dealer inspect the brakes and pads.
- Inspect the rotor for galling. If the rotors are damaged or out of specification, they may need to be replaced.

No hydraulic pressure in the front brake lever or rear brake pedal

- Check the fluid level in the brakes master cylinder reservoirs.
- Check for leaking brake fluid.
- Air may have entered the brake system, requiring that the air be bled out. See the Misfit 250 Service manual.

Reduced braking power

- Inspect the rotors and pads for oil contamination. Leaking fork seals may contaminate the front pads with oil.
- Lubricate the front brake lever pilot bolt if the front brake lever is difficult to pull in.
- Brakes that do not release may indicate a blocked pressure relief hole in the calipers. Have your Cleveland CycleWerks dealer inspect the brakes.
- Brakes that do not release may indicate sticking caliper pistons. Have your Cleveland CycleWerks dealer inspect the brakes

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