



INTRODUCTION

Welcome to the URAL Motorcycling Family! Your Ural has been built by the Irbit Motorcycle Factory in Russia and distributed by Irbit Motorworks of America, the United States affiliate of the Irbit Motorcycle Factory.

This Ural motorcycle conforms to all applicable US Federal Motor Vehicle Safety Standards and US Environmental Protection Agency regulations effective on the date of manufacture.

This manual covers the Gear-Up, Patrol, and T model and has been prepared to acquaint you with the operation, care and maintenance of your motorcycle and to provide you with important safety information. Follow these instructions carefully for maximum motorcycle performance and for your personal motorcycling safety and pleasure. It is critical that a beginning sidecar driver becomes thoroughly familiar with the special operating characteristics of sidecar outfit before venturing out on the busy roads.

Your Owner's Manual contains instructions for operation, maintenance and minor repairs. Major repairs require the attention of a skilled mechanic and the use of special tools and equipment. Your Authorized IMWA Ural Dealer has the facilities, experience and genuine Ural parts necessary to properly render this valuable service.

Any suggestions or comments are welcome!

Happy Uraling!

IMPORTANT SAFETY INFORMATION

WE STRONGLY SUGGEST THAT YOU READ THIS MANUAL COMPLETELY PRIOR TO RIDING YOUR NEW URAL MOTORCYCLE. THIS MANUAL CONTAINS INFORMATION AND ADVICE THAT WILL HELP YOU PROPERLY OPERATE AND MAINTAIN YOUR MOTORCYCLE. PLEASE PAY SPECIAL ATTENTION TO NOTICES IN THIS MANUAL MARKED AS FOLLOWS:

CAUTION

INDICATES POSSIBILITY OF EQUIPMENT FAILURE THAT MAY RESULT IN YOUR MOTORCYCLE BE UNSAFE TO OPERATE IF INSTRUCTIONS ARE NOT FOLLOWED

WARNING

INDICATES A VERY STRONG POSSIBILITY OF INJURY TO YOURSELF AND OTHERS OR LOSS OF LIFE IF INSTRUCTIONS ARE NOT FOLLOWED

NOTE

PROVIDES HELPFUL INFORMATION AND TIPS

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1. General Information

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SERVICE RULES

1. Always wear proper safety equipment including but not limited to safety glasses and gloves.
2. Allow your motorcycle to cool down completely prior to servicing to avoid getting burned.
3. Always use genuine Ural or Ural recommended parts, fluids and components when servicing your motorcycle. Parts that do not meet these requirements may result in damage.
4. Follow the service procedures as outlined in this manual.
5. Always follow the torque specifications when tightening nuts and bolts.
6. Clean all parts with non-flammable solvents prior to reassembly after servicing.
7. Always replace seals, O-rings, gaskets and cotter pins when reassembling.
8. If you remove self-locking nuts they should always be replaced with new ones.
9. Be responsible with solvents, cleaners and waste oils. Always dispose of them in accordance with your local regulations.

WARNING

IF THE ENGINE MUST BE RUNNING TO PERFORM A PARTICULAR SERVICE PROCEDURE BE SURE YOU ARE IN A WELL VENTILATED AREA. EXHAUST CONTAINS CARBON MONOXIDE GAS.

WARNING

GASOLINE IS VERY FLAMMABLE AND CAN BE EXPLOSIVE UNDER CERTAIN CONDITIONS. IT IS ALSO VERY HARMFUL TO THE SKIN AND EYES. DO NOT SMOKE OR ALLOW SPARKS IN OR NEAR YOUR WORK AREA.

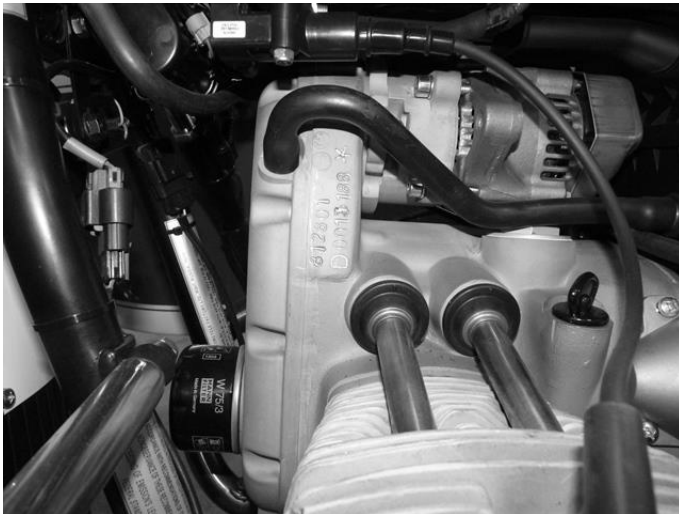
MODEL IDENTIFICATION



VIN (Vehicle Identification Number)

The VIN label is located on the right hand frame down tube and is also stamped on the frame directly above the label.

List Your VIN Here



Engine Number

The engine number is stamped near the crankcase breather, it is the second number.

List Your Engine Number Here



Gearbox Number

The gearbox number is stamped on the left side of the gearbox directly above the shift lever.

List Your Gearbox Number Here

MODEL SPECIFICATIONS

Model	M70/RETRO
Engine and transmission	
Displacement, cc	749
Engine type	OHV air cooled 2 cylinder 4 stroke "boxer" (flat twin)
Valve per cylinder	2
Bore and stroke (mm x mm)	78 x 78
Max output (hp)	41 @ 5500 rpm
Max torque (ft-lbs)	42 @ 4300 rpm
Compression	8.6:1
Fuel system	Throttle body EFI
Starting	Electric & Kick start
Clutch	Double-disc dry
Transmission type	Manual
Speeds	4 forward 1 reverse
Primary drive (rear wheel)	Driveshaft
Final drive ratio	4.62
Engagable sidecar wheel drive	No
Physical measures	
Overall length, inch.	94.6
Overall heights, inch.	53.4
Overall width, inch.	62.3
Seat height, (unladen), inch.	29.5
Ground clearance (unladen), inch.	4.9
Dry weight, lbs	710
Chassis	
Front suspension	40mm Marzocchi telescopic forks
Rear suspension	Double sided swing-arm with two Sachs hydraulic spring shock absorbers, 5x adjustable
Sidecar suspension	Single sided swing-arm with Sachs hydraulic spring shock absorber, 5x adjustable
Wheels	2.5X18 Aluminum rims with steel spokes
Tires	Heideneau K28, 4.0x18"
Front brake	4-piston fixed Brembo caliper with 295mm floating NG rotor
Rear brake	HB big bore single piston integrated floating caliper with 256mm fixed NG rotor
Sidecar brake	2-piston fixed Brembo caliper with 245mm floating NG rotor
Other	
Fuel grade	91 Octane, unleaded
Fuel tank capacity (gallons)	5.5
Reserve (gallons)	app. 1
Estimated fuel economy, mpg	31-37
Estimated range, miles	170-200
Recommended max cruising speed (mph)	70
Max permissible weight, lbs	1140
Trunk volume, cubic ft.	2.9
Electrical	
Alternator	Denso, Peak Output 40 Amp @ 14vdc, 560 Wt
Battery	FAYTX20HL (12V, 20Amp/h)
Headlight	H4 60/55W
Spark plugs	NGK BPR7HS
Warranty	2-years parts and labor unlimited mileage

TORQUE SPECIFICATIONS

Chassis	Newton Meters	Foot Pounds
Fork Pinch Bolts (Upper and Lower Bridges)	50	36.9
Upper fork Nuts	30	22.1
Steering Head Nut	34	25.1
Front fork Upper Shock Bolts	49	36.1
Upper Shock Bolts	30	22.1
Lower Shock Bolts	49	36.1
Front and Rear Brake Caliper Bracket Bolts	50	36.9
Rear Caliper Mounting Bolts	50	36.9
Front Caliper Mounting Bolts	50	36.9
Sidecar Caliper Mounting Bolts	50	36.9
Front Brake Reaction Link	70	51.6
Brake Rotors	30	22.1
Rear Swing Arm Mounting Bolts	88	64.9
Sidecar Swing Arm Mounting Bolts	88	64.9
Front Fork to Pivot of Swing Arm Mounting Bolts	50	36.9
Lower Sidecar Frame Mounting Bolts	88	64.9
Sidecar Strut Mounting Bolts	88	64.9
Spoke Nipple	4 to 6	2.9 to 4.4
Drive Train		
Engine, Gearbox, and Final Drive Drain Plugs	22	16.2
Cylinder Head Nuts	50	36.9
Valve Cover Nuts	24	17.7
Oil Pump Drive Gear Cap Bolt	10	7.4
Final Drive to Swing Arm Mounting Nuts	35	25.8
Final Drive Case Nuts	24	17.7
Engine Sump	10	7.4
Alternator Mounting Nuts	22	16.2
Intake Flange Mounting Bolts	20	14.8
Exhaust Header Pipe Nuts	24	17.7
Exhaust Mounting Clamp Bolts	16	11.8
Drive Wheel Splines (Spline Flanges)	30	22.1

CLEARANCES

Location	Millimeters	Inches
Intake Valves (Cold)	.1	.004
Exhaust Valves (Cold)	.1	.004
Spark Plug Electrode	1.00	0.04
Minimum Tread Depth	3.175	0.125
Minimum Brake Pad Thickness	1	0.04

FREE PLAY & ADJUSTMENTS

Location	Millimeters	Inches
Front Brake Lever	5 to 8	.2 to .3
Clutch Lever	5 to 8	.2 to .3
Minimum Brake Rod Free Play	1 to 1.5	.04 to .06
Toe-In (1wd)	8 to 12	.3 to .475
Toe-In (2wd)	3 to 8	.125 to .315
Lean Out	1 to 2 degrees	1 to 2 degrees

TIRE DATA

Location	Type	Recommended PSI
Front	Heidenau K28 (4.00x18)	32 PSI Cold
Rear	Heidenau K28 (4.00x18)	36 PSI Cold
Sidecar	Heidenau K28 (4.00x18)	32 PSI Cold
Spare (if equipped)	Heidenau K28 (4.00x18)	36 PSI Cold
Optional Knobby Tires	N/A	N/A

WARNING

IMPROPER TIRE INFLATION WILL CAUSE ABNORMAL TREAD WEAR AND COULD RESULT IN UNSTABLE HANDLING. UNDER-INFLATION COULD RESULT IN THE TIRE SLIPPING ON THE RIM.

URAL SERVICE SCHEDULE

Description	Odometer reading, km (miles)							
	New	500 (311)	5000 (3125)	10000 (6250)	15000 (9375)	20000 (12500)	25000 (15625)	30000 (18750)
Check the painted and chromed surfaces for dents, scratches and rust	I			I		I		I
Engine oil*	I	R	R	R	R	R	R	R
Oil filter*		R	R	R	R	R	R	R
Final drive and gearbox oil	I	R	I	R	I	R	I	R
Check valve clearance		I	I	I	I	I	I	I
Check tightness of the cylinder stud nuts		I	I	I	I	I	I	I
Spark plugs		I	I	R	I	R	I	R
Fuel tank filter		I		I		I		I
In-line fuel filter				R		R		R
Ignition timing				I		I		I
Air filter*		I	I	R	I	R	I	R
Check fuel hoses		I	I	I	I	I	I	I
Compliance flanges (check for cracks and other damage)		I	I	R	I	R	I	R
Throttle body synchronization		I	I	I	I	I	I	I
Shock absorbers					I			I
Inspect wheels and tires (tire pressure , tire wear, rims breakage and bents, wheel balancing)*	I	I	I	I	I	I	I	I
Tightness of spokes		I	I	I	I	I	I	I
Tightness of fasteners	I	I	I	I	I	I	I	I
Disc brake (pads, disc, hoses, calipers and cylinders, lever travel)		I	I	I	I	I	I	I
Brake fluid level*		I	I	I	I	I	I	I/R
Check operations of parking brake	I			I		I		I
Front fork oil								R
Clutch, throttle and odometer cables, clutch lever travel	I	I	I	I	I	I	I	I
Bearings of the motorcycle and sidecar swing arms. 2wd linkage on 2wd models, Retro reverse linkage				I		I		I
Steering head bearings				I		I		I
Wheel bearings				I		I		I
Sidecar alignment	I				I			I
Battery (charge level, contacts) *		I	I	I	I	I	I	I
Electrical equipment	I	I	I	I	I	I	I	I
Headlight position	I	I	I	I	I	I	I	I
Lubrication of lever axels, cable ends, rear brakes cams, splined parts of the drive shafts and hubs, drive shaft U-joints*				I/L		I/L		I/L
Test drive	P	P	P	P	P	P	P	P
SERVICE LABOR	.8hrs	2hrs	1.8hrs	3.5hrs	2hrs	3.5hrs	1.8hrs	4.5hrs

I - Inspect, if necessary – adjust, clean or replace
L – Lubricate

R – Replace
P – Perform

* - Also repeat after 1 year in use and after long storage
**- Also inspect when replacing tires

MOTORCYCLE STORAGE AND CARE

Storage

If you will be storing your motorcycle for the winter or long term, take the following steps:

1. The motorcycle should be cleaned.
2. Check all fluid levels and add as necessary.
3. Check tire pressure.
4. Lubricate all shafts, splines, cables and joints.
5. Use a battery maintenance charger or disconnect battery.
6. Always store in a warm dry place to avoid rust and moisture build up.
7. Use a protective cover when needed.

After storage take the following steps prior to running your motorcycle:

1. Perform the pre-ride inspection.
2. Reconnect battery and/or disconnect charger.
3. Follow starting procedures.
4. Take the motorcycle for a short ride prior to any long trips.

CLEANING

It is important to maintain your motorcycle properly and clean on a regular basis. Use the following guidelines when washing your motorcycle:

- Make sure the engine is completely cool
- Use warm soapy water and wash thoroughly
- Avoid water from entering the air filter and electrical components
- After washing dry the motorcycle with a cloth
- Lubricate joints and cables as necessary
- Run motorcycle to evaporate remaining water

WINTER CONSIDERATIONS

Motorists in many areas of the US experience the use of salt and other chemicals that are applied to road surfaces in the winter. Salt and other caustic chemicals should always be washed off your bike with fresh water as soon as possible to avoid rust and corrosion.

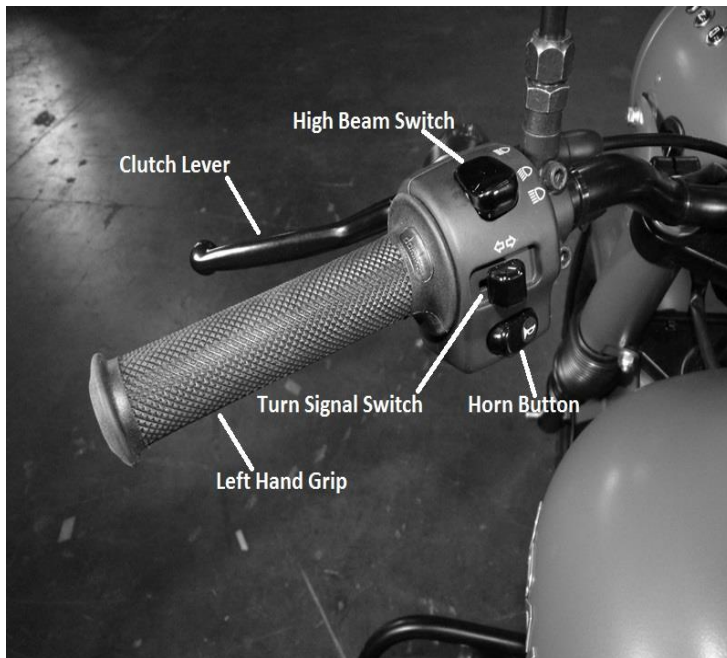
NOTE

RUSTED OR CORRODED PARTS CAUSED BY SALT ARE NOT COVERED BY WARRANTY.

2. Motorcycle Controls & Instrumentation

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HAND CONTROLS



Clutch Lever

Pulling the clutch lever will disengage the clutch while releasing the lever will engage the clutch.

High Beam Switch

Toggle the switch forward to turn on the high beam and toggle back for “Flash to Pass” feature.

Horn Button

Press the button to sound the horn.

Turn Signal Switch

Switch left or right to indicate turns and push the button to cancel.

Left Hand Grip

Place your left hand on the grip to steer and control the motorcycle.

Front Brake Lever

Pulling the lever will actuate the front brakes.

WARNING

IF THE BRAKE LEVER FEELS SPONGY DO NOT RIDE THE BIKE AND CONTACT YOUR DEALER.

Starter Button

Press the button to engage the starter motor.

CAUTION

DO NOT RUN STARTER FOR MORE THAN 5 SECONDS.

WARNING

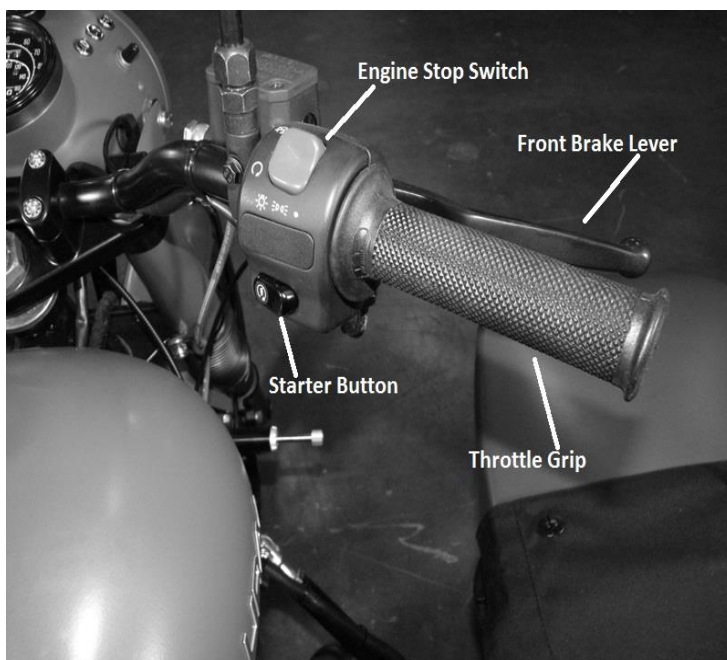
WHEN USING THE STARTER ALWAYS BE SURE THE GEARBOX IS IN NEUTRAL.

Engine “STOP” Switch

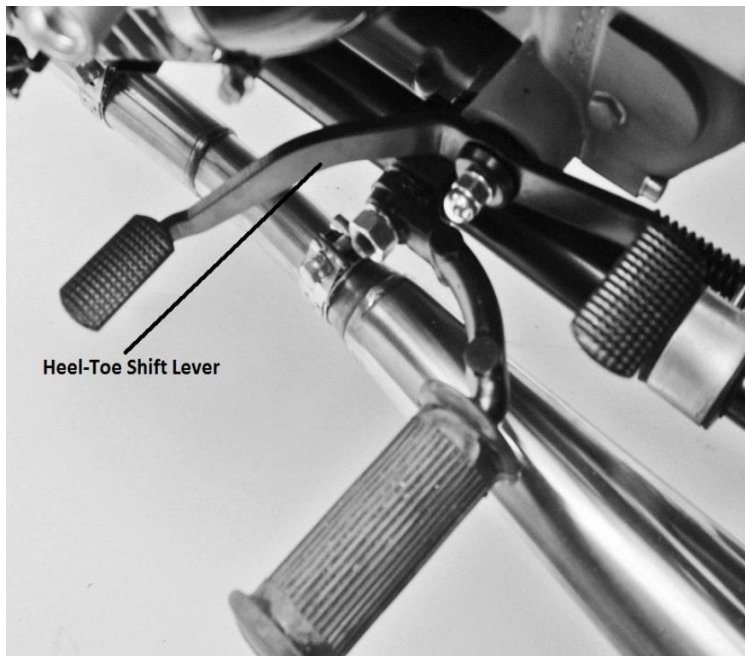
Toggle the switch forward to stop the engine, toggle back to run.

Throttle Grip

Place your right hand on the grip to steer and control the motorcycle. Rotate the grip back to open the throttle.

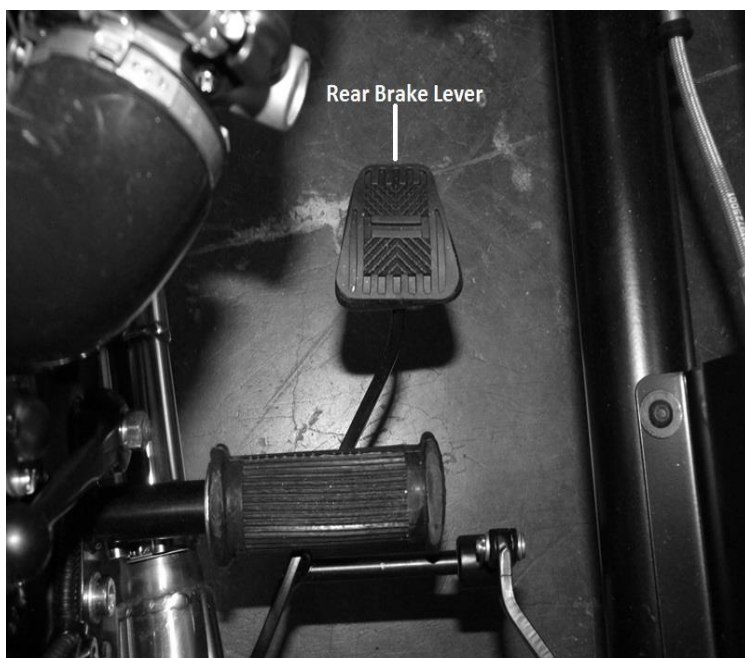


FOOT CONTROLS



Shift Lever

This is a heel-toe type shifter, to upshift use the heel portion of the shift lever, to down shift use the toe portion of the shifter.



Rear Brake Lever

Pressing the rear brake lever actuates the rear and sidecar brakes.

WARNING

IF THE BRAKE LEVER FEELS SPONGY DO NOT RIDE THE BIKE AND CONTACT YOUR DEALER.

IGNITION SWITCH



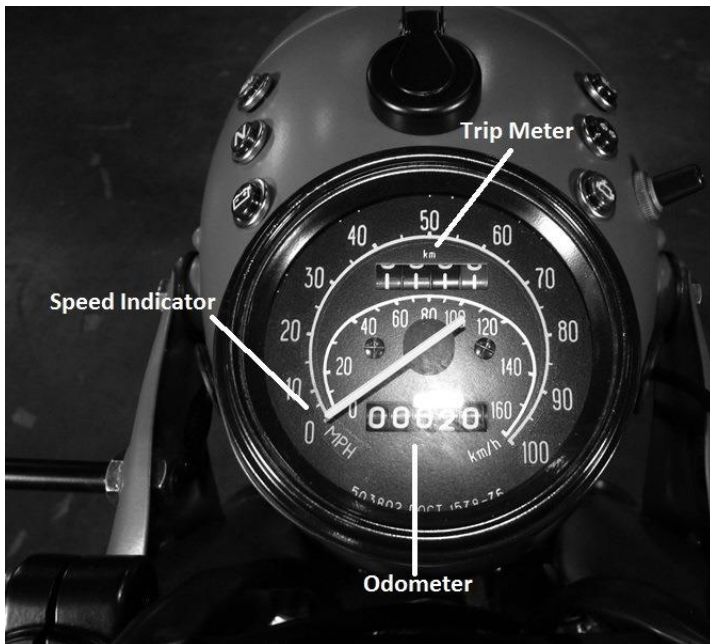
(3 Position Switch)

In the **"Off"** position the engine cannot be started.

In the **"On"** position the engine can be started and all electrical functions can be used.

In the **"Park"** position only the running lamps (not including headlight) are illuminated.

SPEEDOMETER



Speedometer Indicator

Displays motorcycle speed in both miles per hour and kilometers.

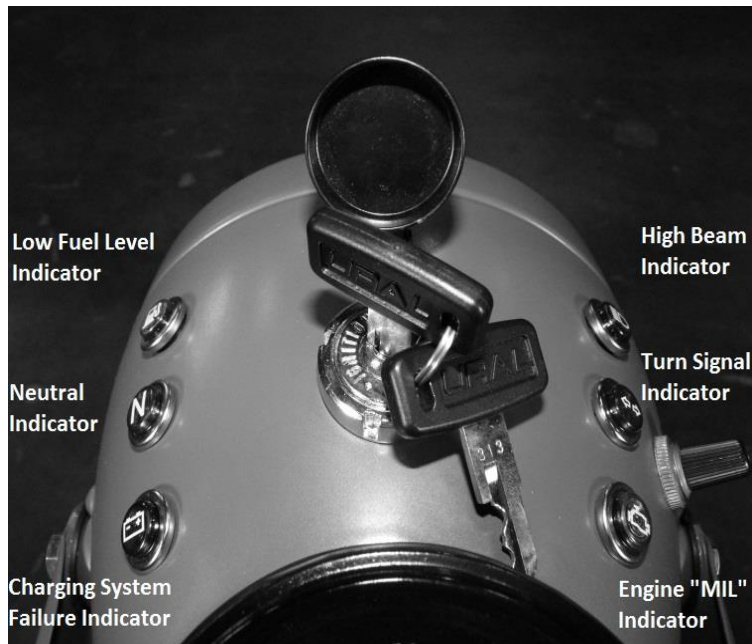
Odometer

The odometer displays total motorcycle Kilometers.

Trip Meter

The trip meter displays the total trip Kilometers and can be reset by twisting the reset knob on the right hand fork cover.

INDICATOR LAMPS



Low Fuel Level Indicator

While on Level ground lamp will flash when fuel level is low and become solid when on reserve level (app. 1 Gal.)

NOTE

FUEL LAMP CAN GIVE FALSE INDICATION DUE TO SLOSHING WHILE RIDING. CHECK LAMP ON LEVEL GROUND.

Gearbox Neutral Indicator

Lamp will illuminate when gearbox is in neutral.

Charging System Failure Indicator

Lamp will illuminate if the alternator fails.

High Beam Indicator

Lamp will illuminate when high beam is on.

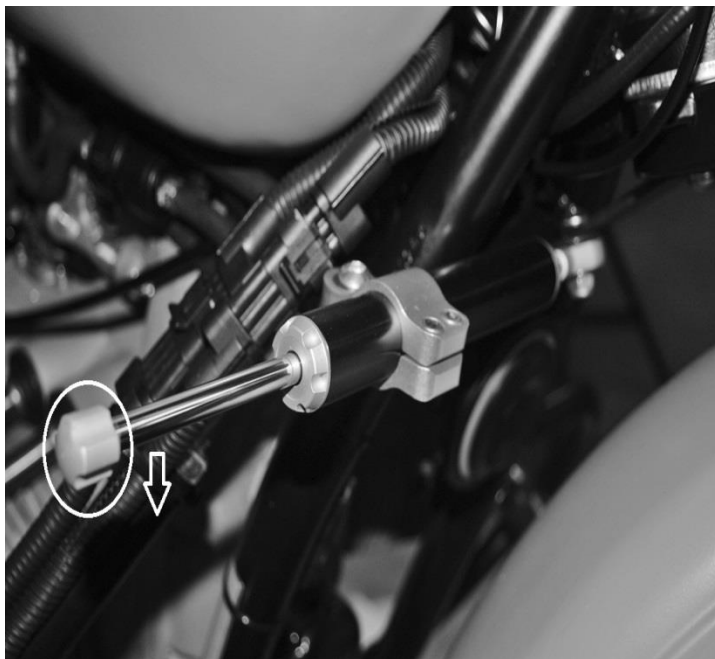
Turn Signal Indicator

Lamp flashes when signals are active.

Engine "MIL" Indicator

If lamp illuminates while engine is running refer to "Troubleshooting" section of this manual.

HYDRAULIC STEERING DAMPER



Adjustable Damper (16 Position)

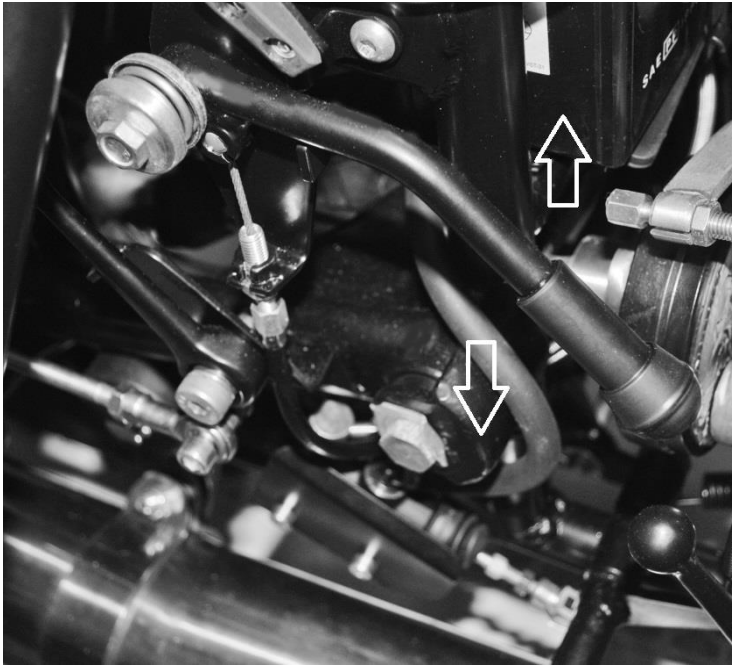
The steering damper is fully adjustable to accommodate different riding styles and conditions.

Rotate the adjustment rod clockwise to increase dampening and counter clockwise to reduce dampening.

CAUTION

OVER ROTATION OF THE ADJUSTMENT ROD CAN DAMAGE THE DAMPER AND/OR CAUSE FLUID LEAKS.

PARKING BRAKE



Parking Brake Lever

The parking brake lever is located on the right side of the motorcycle near the side panel.

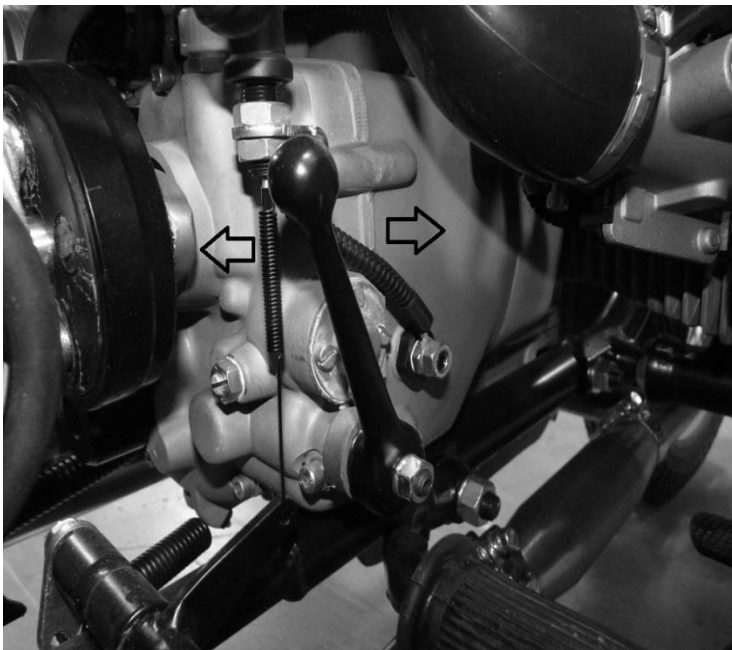
Pulling the handle up to the lock position sets the parking brake.

Release the parking brake by lowering the lever to the down position as shown.

CAUTION

OPERATING THE MOTORCYCLE WHILE THE PARKING BRAKE IS ENGAGED CAN DAMAGE THE BRAKE SYSTEM.

REVERSE LEVER



Reverse Engagement Lever

The reverse lever is located on the right side of the gearbox near the foot peg.

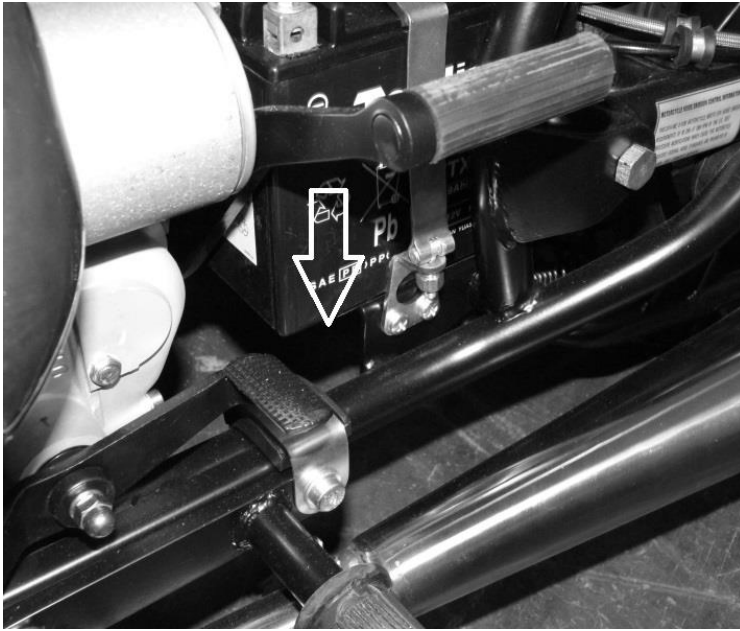
Pulling the lever back while in Neutral will engage the reverse gear.

Push the lever forward to put the gearbox back into Neutral and use forward gears.

CAUTION

THE REVERSE LEVER MUST BE IN THE FULL FORWARD POSITION FOR THE GEARBOX TO SHIFT PROPERLY.

KICK START LEVER



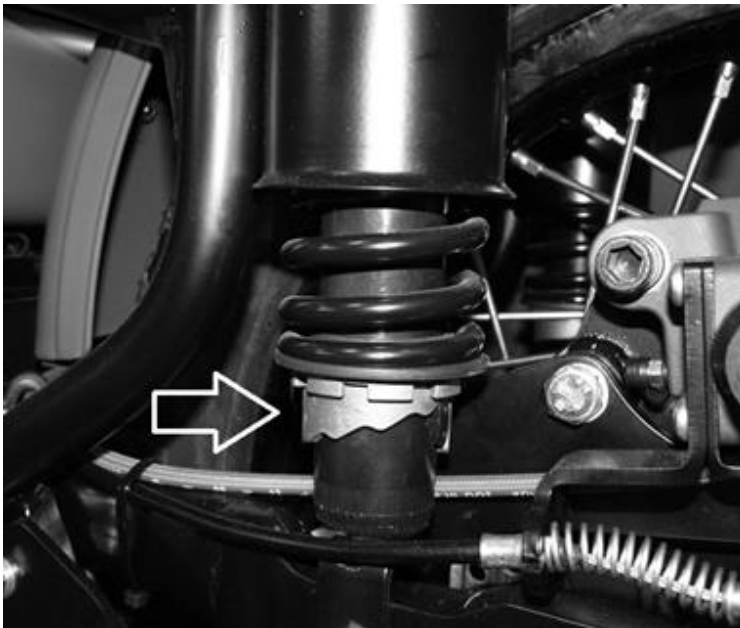
Kick Start Lever

To use the kick start lever rapidly press the lever downward with your right foot as shown.

WARNING

WHEN USING THE KICK STARTER ALWAYS BE SURE THE GEARBOX IS IN NEUTRAL.

HYDRAULIC SPRING SHOCK ABSORBERS



Adjustable Shock Absorbers

The shock absorbers have 5 preload adjustments.

Rotate the adjustment ring counter clockwise as shown to increase spring preload using the supplied wrench in your tool kit.

3. Motorcycle Operation

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PRE-RIDE INSPECTIONS

Prior to each ride you should inspect the motorcycles technical condition for safety. Use the following pre-ride inspection list to ensure your motorcycle is safe and ready to ride.

1. Check the oil level. Low oil level causes premature wear and possible engine damage.
2. Check the fuel level.
3. Check the tire pressure. Low tire pressure can cause poor handling, also inspect the tire for abnormal and/or excessive wear that may lead to a flat tire.
4. Check all lights for proper operations including headlight, running lights, turn signals, and brake lights.
5. Check the brakes for proper operations and correct fluid level. If for any reason the brakes feel abnormal or spongy do not ride the bike as it may be unsafe.
6. Inspect all cables to insure they are not pinched or routed improperly; also inspect the clutch cable for correct free play.
7. Check for any loose fasteners and tighten as necessary.
8. Be sure any luggage is secured before riding.

INSTRUCTIONS FOR INITIAL RIDE

The following steps should be taken prior and during your first ride:

1. Read the entire owner's manual prior to starting and/or taking you first ride.
2. Familiarize yourself with all controls and instruments.
3. Make any required adjustments to mirrors and controls for comfort.
4. Always wear safety gear including but not limited to: helmet, boots, gloves, and jacket regardless of weather.
5. Ride in a safe environment such as a parking lot or area you are familiar with while you learn the specific handling characteristics of your new sidecar motorcycle.
6. Follow the "Engine Run-in" instructions.

SIDECAR SAFETY

The Ural sidecar motorcycle, since it has three wheels, behaves quite differently from either a solo motorcycle or a car. For these reasons the following label has been attached to your motorcycle tank:

WARNING: LEFT-HAND AND RIGHT-HAND TURNS MAY BE DANGEROUS. EXCESSIVE SPEED AND AN UNWEIGHTED SIDECAR MUST BE AVOIDED.

Like any other motor vehicle, if the Ural is driven beyond its design limits, you can get hurt. Properly driven, since you have the added stability of the third wheel in case of sand, ice or slippery road conditions, the Ural will give you a much safer ride than a solo motorcycle in adverse conditions.

If possible, an experienced sidecar driver (preferably your Authorized Ural dealer) should ride along during your first ride. If not, put about 100 LB of ballast in the sidecar during your initial training. Although an experienced driver can safely drive the Ural with an empty sidecar a beginner should always have ballast or a passenger in the chair.

Check with your local IMWA Dealer to find out your particular state's sidecar driver's license requirements.

When you accelerate, the Ural will pull slightly to the right due to the inertia and drag of the side car.

When you let off the gas it will pull slightly to the left due to the inertia of the sidecar.

Practice starting and stopping from various speeds, shifting up and down, accelerating and decelerating in each gear, turning right and left at slow-to-medium speeds.

WARNING

The Patrol and Gear-up with engageable sidecar wheel handles differently with the sidecar driveshaft engaged and cannot turn on paved roads. For this reason, the sidecar drive must only be engaged when operating the vehicle off-road or where snow, ice and mud conditions are encountered on road.

SIDECAR SAFETY (CONT.)

Finally, practice lifting the sidecar. To do this drive in a clockwise circle about 20 feet in diameter. Gradually increase your speed until the sidecar wheel lifts from the surface 6 - 12 inches. Then roll off the throttle and ease steering pressure on the grips so it gradually comes back down. Repeat doing this until you feel comfortable with the wheel in the air. Remember, the moment you roll off the throttle it will come down. When you have mastered “flying the chair” to the point where you can keep it in the air for a full circle you will have a good feel for the speed and turn radius that will lift the sidecar.

If, after gaining proficiency with the Ural, you plan to drive on the street with an empty sidecar, go back to the parking lot and practice the above maneuvers with an empty sidecar. You’ll find that the sidecar will lift much more readily when it is empty, especially if you enter a decreasing radius turn (such as a freeway off ramp) at too high a speed. This is why we recommend generally carrying about 100 lbs or more in the sidecar.

WARNING

BALLAST WEIGHT SHOULD ALWAYS BE PROPERLY SECURED IN THE SIDECAR AND CENTERED FOR BEST BALANCE.

STARTING THE ENGINE WHEN COLD

Use the following instructions when starting a cold engine:

1. Check to be sure you have enough fuel.
2. Switch ignition on.
3. Be sure the transmission is in neutral.
4. Switch the kill switch to run.
5. Press the starter button or use the kick starter until engine starts.
6. Allow engine to warm for a few moments prior to riding.

NOTE

ENGINE CRANKING SPEED CAN BE REDUCED IN COLD WEATHER, FOLLOW THE RECOMMENDATIONS FOR PROPER OIL WEIGHT FOUND ON PAGE 4-2.

CAUTION

DO NOT ACCELERATE WHILE STARTING THE BIKE! DO NOT RUN STARTER FOR MORE THAN 5 SECONDS. NEVER STAND IN FRONT OF THE MOTORCYCLE WHILE THE ENGINE IS RUNNING.

STARTING THE ENGINE WHEN WARM OR HOT

Use the following instructions when starting a warm or hot engine:

1. Check to be sure you have enough fuel.
2. Switch ignition on.
3. Be sure the transmission is in neutral.
4. Switch the kill switch to run.
5. Press the starter button or use the kick starter until engine starts.

CAUTION

DO NOT ACCELERATE WHILE STARTING THE BIKE! DO NOT RUN STARTER FOR MORE THAN 5 SECONDS. NEVER STAND IN FRONT OF THE MOTORCYCLE WHILE THE ENGINE IS RUNNING.

ENGINE RUN-IN

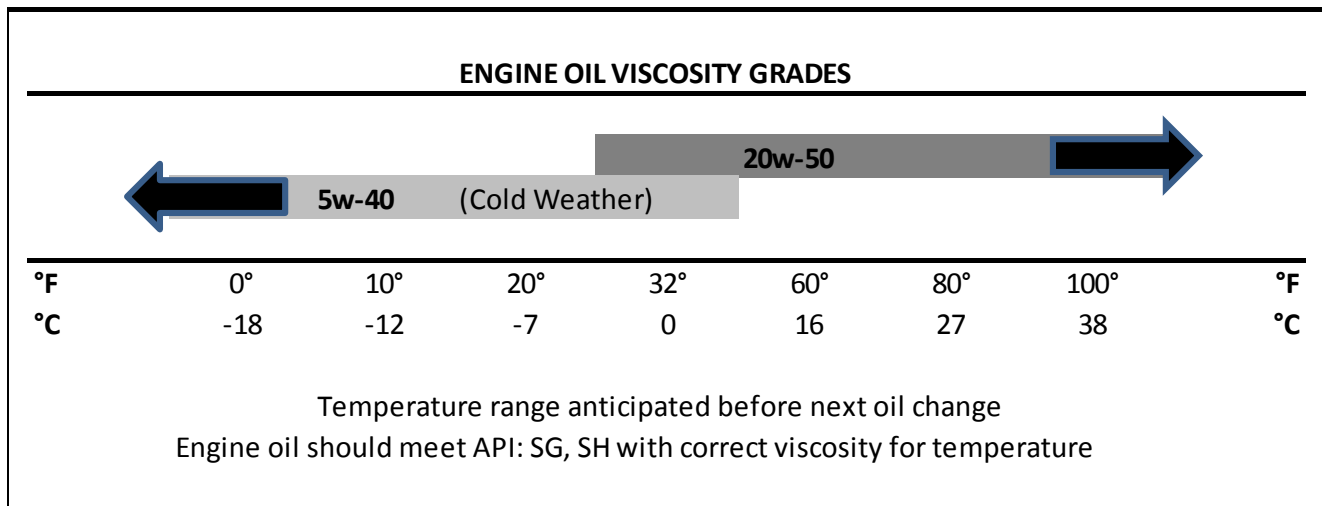
During the first 1000 kilometers it is important not to overload or over rev the engine while riding. To ensure proper break-in you should ride the motorcycle conservatively at varying speeds and loads. Use the following guidelines during the first 1000 kilometers prior to the initial break-in service:

1. Do not overload or “lug” the engine.
2. Do not exceed a top speed beyond 60mph.
3. Do not ride at a constant rpm for long periods of time.
4. Try to vary speed and load when riding.
5. Shift smoothly between gears and do not down shift at high rpm.
6. Always be sure the engine is warmed up before riding.
7. Follow the pre-ride inspection.

4. Lubrication

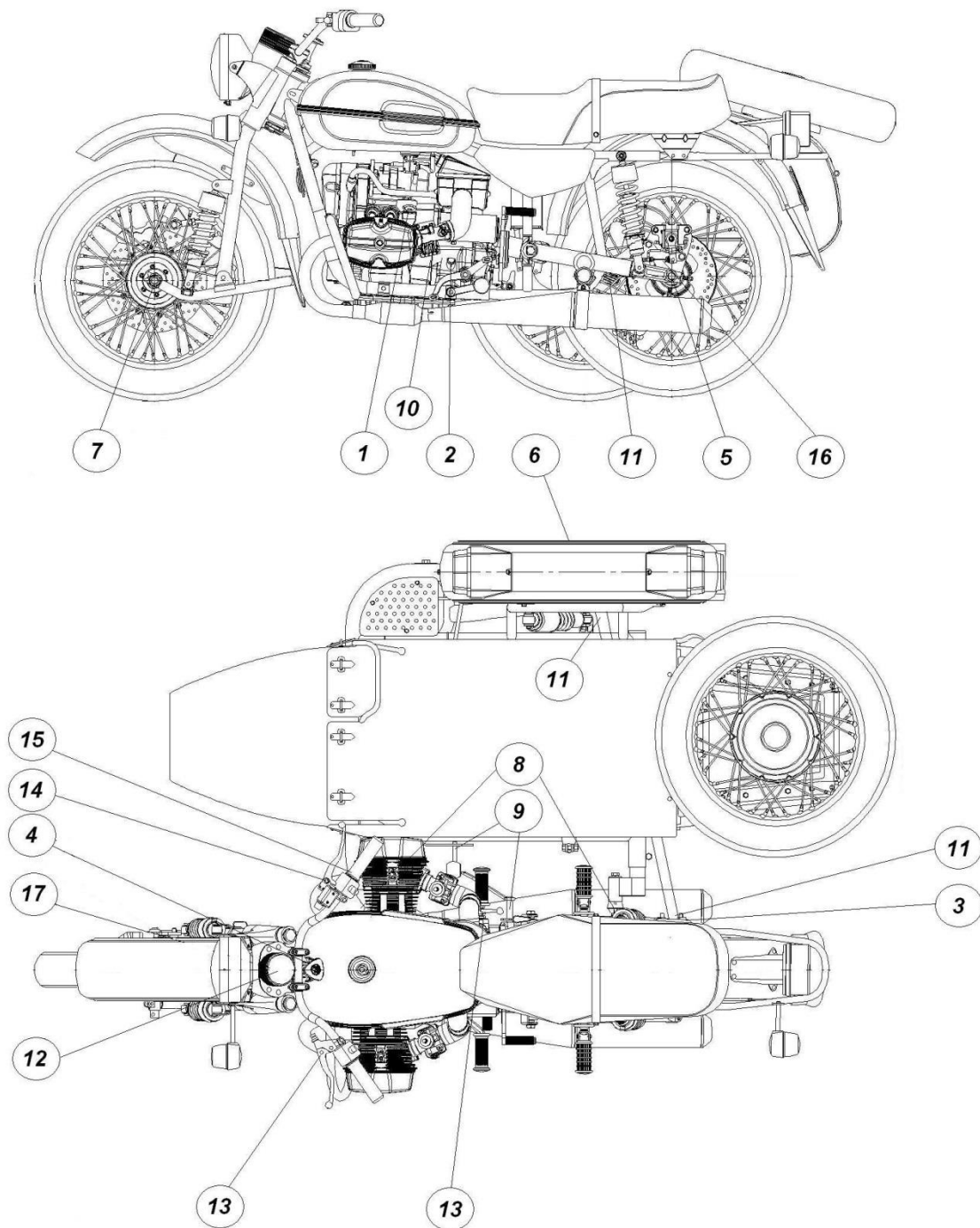
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FLUIDS, LUBRICANTS & CAPACITIES



Location	Capacity	Type
Engine (with Filter Change)	2.1 l	20w-50 API: SG, SH
Gearbox	0.9 l	20w-50 API: SG, SH
Final Drive 2wd	135ml	80W-90 GL-5 Gear Oil
Final Drive 1wd	110ml	80W-90 GL-5 Gear Oil
Front Brake Reservoir	20 cm ³	DOT 3 or DOT 4
Rear Brake Reservoir	15 cm ³	DOT 3 or DOT 4
Sidecar Brake Reservoir	30 cm ³	DOT 3 or DOT 4
Drive Shaft Joints	N/A	General Purpose Lithium Grease
Drive Shaft Spines	N/A	Moly EP Grease
Clutch Shaft Splines	N/A	Moly EP Grease
Drive Wheel Splines (Spline Flanges)	N/A	Moly EP Grease
Wheel Axles	N/A	General Purpose Lithium Grease
Brake Linkage and Pivots	N/A	General Purpose Lithium Grease
Cables	N/A	WD-40

LUBRICATION DIAGRAM



LUBRICATION POINTS

Diagram Position	Location	Type
1	Engine Oil Fill	20w-50 API: SG, SH
2	Gearbox Oil Fill	20w-50 API: SG, SH
3	Final Drive Oil Fill	80W-90 GL-5 Gear Oil
4	Steering Head Bearing	General Purpose Lithium Grease
5	Final Drive Output Spines	Moly EP Grease
6	Sidecar Drive Shaft Splines (2wd)	Moly EP Grease
7	Axles	General Purpose Lithium Grease
8	Sidecar Mounting Pivots	General Purpose Lithium Grease
9	Sidecar Brake Linkage Bushing	General Purpose Lithium Grease
10	Clutch Shaft Splines	Moly EP Grease
11	U-Joints	General Purpose Lithium Grease
12	Speedometer Cable	WD-40
13	Clutch Cable	WD-40
14	Front Brake Lever Pivot Bolt	WD-40
15	Throttle Cables	WD-40
16	Parking Brake Cables	WD-40
17	Front Brake Mount Axle Bushings	General Purpose Lithium Grease

ENGINE OIL & FILTER REPLACEMENT



Step 1

Place a drain pan under the oil sump and remove the drain plug using a 17mm socket wrench.



Step 2

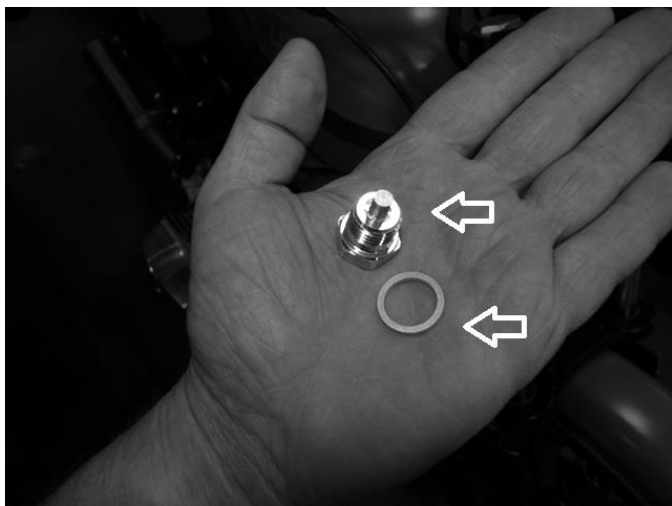
With the drain pan in place remove the oil filter.

NOTE

AN OIL FILTER WRENCH MAY BE REQUIRED FOR REMOVAL

CAUTION

BE SURE TO REMOVE THE OIL FILTER SEALING RING FROM THE ENGINE COVER TO AVOID OIL LEAKS



Step 3

Be sure to clean any metal contaminants from the drain plug and replace the drain plug sealing washer.

Step 4

Re-install drain plug and washer and torque to specification.

ENGINE OIL & FILTER REPLACEMENT (CONT.)



Step 5

Lightly lubricate the new oil filter sealing ring with fresh oil and install filter tightening approximately $\frac{1}{4}$ turn after seat of seal.

CAUTION

DO NOT OVER-TIGHTEN THE OIL FILTER

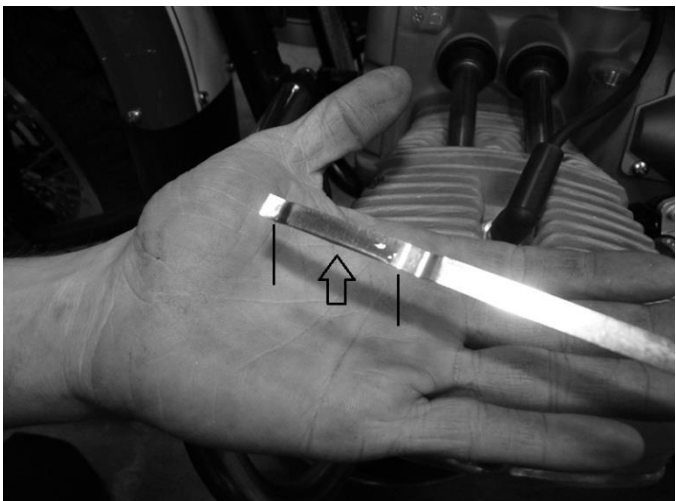


Step 6

Fill engine with 2.1L of recommended motor oil

Step 7

Start the engine and let run for 30 seconds, confirming you have no oil leaks at filter.



Step 8

Check oil level, oil should be full to the upper mark on the dipstick, add oil as needed.

NOTE

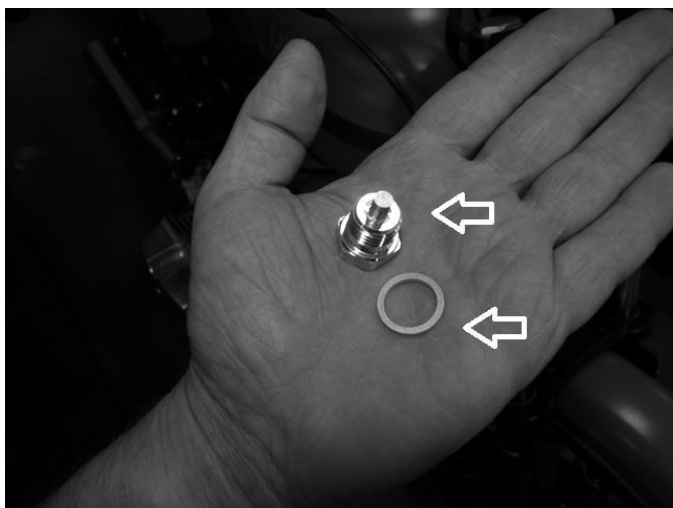
ALWAYS DISPOSE OF MOTOR OIL PROPERLY

GEARBOX OIL REPLACEMENT



Step 1

Place a drain pan under the gearbox and remove drain plug using a 17mm socket wrench.



Step 2

Be sure to clean any metal contaminants from the drain plug and replace the drain plug sealing washer.

Step 3

Re-install drain plug and washer and torque to specification.

Step 4

Fill the gearbox with .9L of recommended motor oil.



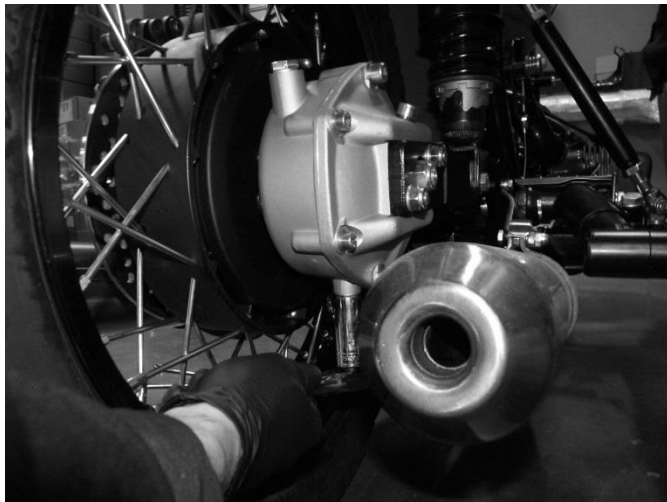
Step 5

Re-install fill plug and torque to specification.

NOTE

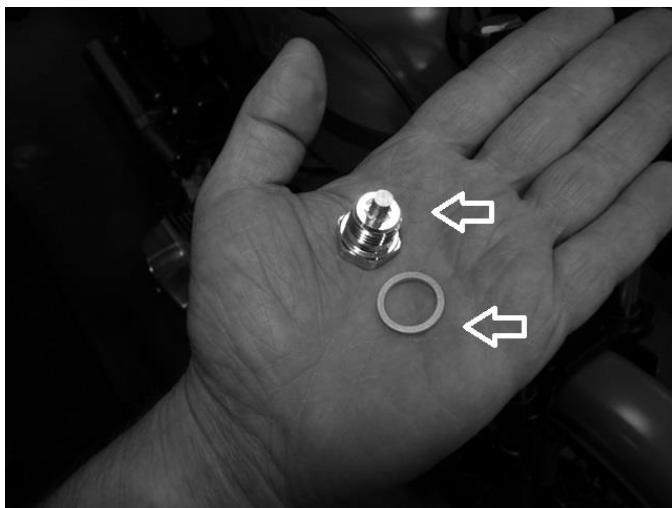
ALWAYS DISPOSE OF MOTOR OIL PROPERLY

FINAL DRIVE OIL REPLACEMENT



Step 1

Place a drain pan under the final drive and remove the drain plug using a 17mm socket wrench.

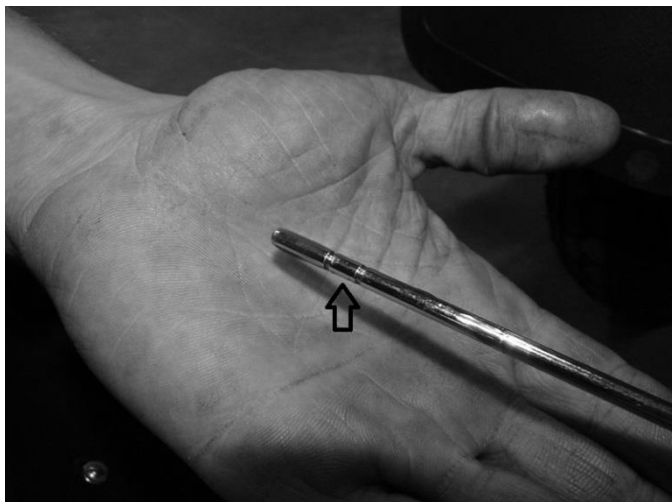


Step 2

Be sure to clean any metal contaminants from the drain plug and replace the drain plug sealing washer.

Step 3

Re-install drain plug and washer and torque to specification.



Step 4

Fill the final drive with 105ml (1wd) of recommended gear oil.

Step 6

Check oil level by threading the dipstick into the case, oil should be full to the upper mark, add fluid as needed.

NOTE

ALWAYS DISPOSE OF GEAR OIL PROPERLY
--

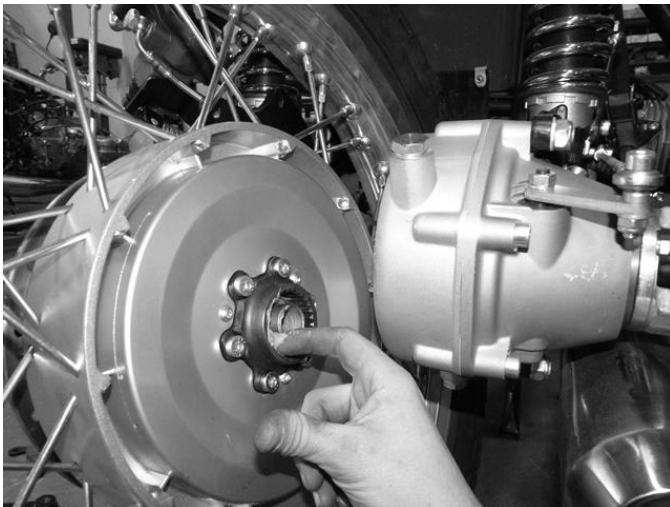
DRIVE SHAFT & SPLINE LUBRICATION



Final Drive Shaft

U-Joints should be lubricated with grease using a grease gun.

The rear drive shaft has one grease zerk located at the u-joint; grease this joint per the maintenance intervals or after off road use.



Drive Wheel Splines

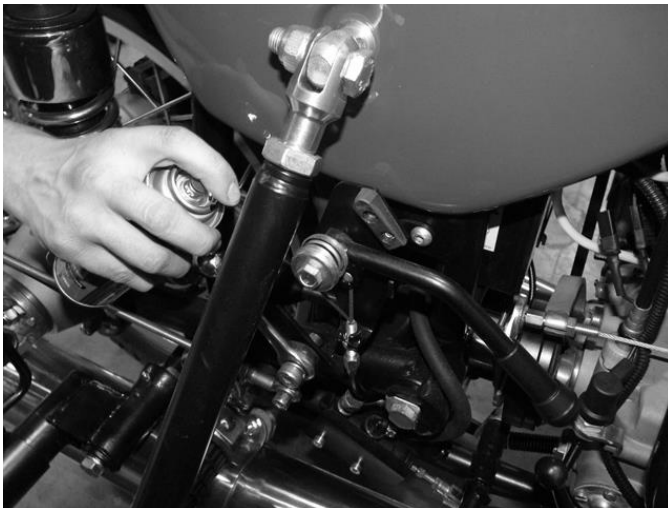
The rear wheel drive splines should be greased per the maintenance intervals or after off road use.

CABLE LUBRICATION



All cables including the clutch, speedometer, throttle, and parking brake cables should be lubricated with cable lube or WD-40 per the maintenance intervals. You should also lubricate all cables before and after extended periods of storage and/or after off road use.

To lubricate the cables pull back the protective covers and apply lube directly to the cable as shown, you can also use cable lubrication tools available by aftermarket companies.



5. Engine & Chassis Maintenance

	Page
Air filter Inspection & Replacement	5-2
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AIR FILTER INSPECTION & REPLACEMENT



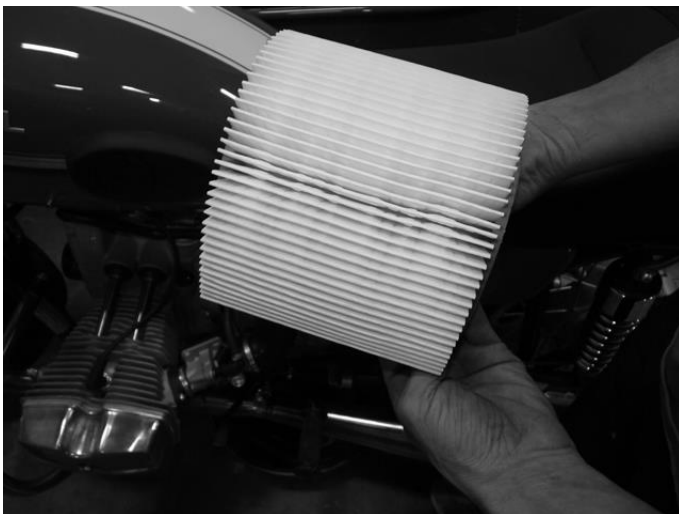
Step 1

Remove the four retaining bolts from the air box lid using a 5mm hex wrench.



Step 2

Carefully remove the air box lid by lifting the right side and sliding the lid to the left, be very careful not to pull wiring and cables near the air box inlet.



Step 3

Remove the paper filter element from the housing and inspect for debris. The filter should be replaced per the maintenance intervals and/or as need during inspections.

Step 4

Re-install the filter in reverse order, be sure the replacement filter is fully seated in to the air box housing and the lid is properly installed prior to tightening the retaining bolts.

CAUTION

A DIRTY OR CLOGGED AIR FILTER CAN REDUCE THE PERFORMANCE OF YOUR ENGINE AND POSSIBLY DAMAGE INTERNAL ENGINE PARTS.

FUEL SYSTEM MAINTENANCE



Step 1

Place a rag under the fuel pump return line located on the right side of the pump and remove the fitting by pinching the release tabs.



Step 2

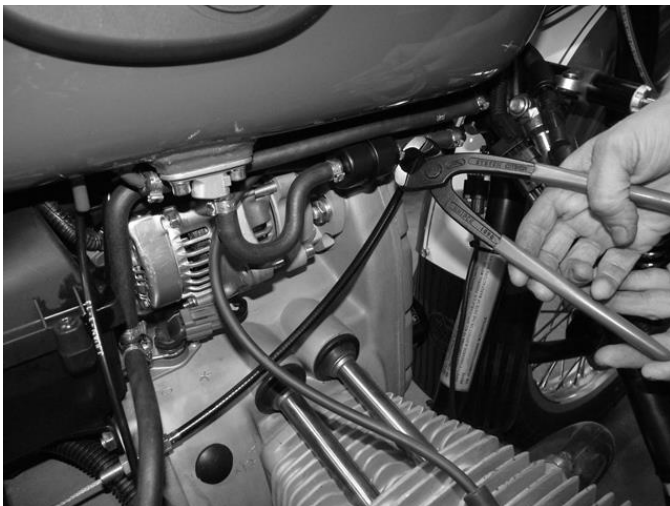
Connect a fuel hose to the pump outlet to drain the fuel into a fuel canister.

Step 3

Turn the ignition key on and switch the run switch to the on position so the pump can cycle all fuel from the tank into the canister. This can take a few moments. Be sure not to run the pump dry after all fuel has been drained from the tank.

Step 4

Re-install the return fuel line to the pump.



Step 5

Carefully remove the one-time-use clamps from both sides of the in-line fuel filter.

WARNING

THE FUEL SYSTEM IS UNDER PRESSURE.

WARNING

GASOLINE IS EXTREMELY FLAMABLE.

FUEL SYSTEM MAINTENANCE (CONT.)



Step 6

Remove the in-tank screen filter.



Step 7

Clean all debris for the intake filter and re-install in the tank.



Step 8

Install the new in-line fuel filter and replace all one-time use clamps.

NOTE

INSTALL IN-LINE FILTER WITH DIRECTIONAL ARROW POINTED FORWARD.

WARNING

THE FUEL SYSTEM IS UNDER PRESSURE.

WARNING

GASOLINE IS EXTREAMLY FLAMABLE.

VALVE TRAIN INSPECTION & ADJUSTMENT



Step 1

Starting with the left side cylinder, remove the valve cover and clean any contaminants found inside with a shop towel.



Step 2

Remove the timing plug located on the right side of the engine case. Slowly rotate the engine using the kick start lever until both valves are closed and the TDC (top dead center) mark located on the flywheel is centered in the window.



Step 3

Using a feeler gage check the free play on both valves to confirm they are within specifications.

VALVE TRAIN INSPECTION & ADJUSTMENT (CONT.)



Step 4

If the free play clearance is not within specifications adjust as necessary. First loosen the jam nut and turn the adjustment bolt.



Step 5

After adjustment reconfirm the clearance is within specifications.



Step 6

Replace the valve cover gasket if needed and re-install the valve cover.

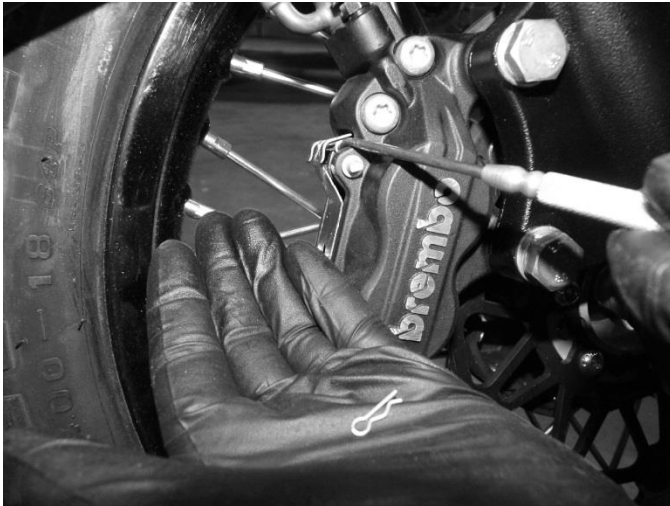
Step 7

Repeat the process on the right side by rotating the engine with the kick starter 360 degrees. Again, both valves will be closed and the TDC mark should be centered in the window.

CAUTION

OPERATING THE ENGINE WITH IMPROPERLY ADJUSTED VALVES CAN LEAD TO POOR PERFORMANCE AND POSSIBLE ENGINE DAMAGE.

FRONT BRAKE SYSTEM MAINTENANCE



Step 1

Remove the retaining pin safety clips.



Step 2

Carefully drive the retaining pins out of the caliper using a small punch or drift.



Step 3

Remove the brake pads by pulling them out the top of the caliper.

FRONT BRAKE SYSTEM MAINTENANCE (CONT.)



Step 4

Inspect the brake pads and replace as needed.

NOTE

MINIMUM PAD THICKNESS IS 1MM



Step 5

Re-install brake pads in reverse order.

Be sure to fully seat the retaining pins and install the safety clips.

Step 6

Confirm the brake fluid level is full in the reservoir and add as needed to FULL line.

DO NOT OVER FILL

CAUTION

OPERATING THE MOTORCYCLE WITH WORN BRAKE PADS CAN CAUSE DAMAGE TO THE BRAKE ROTORS.

WARNING

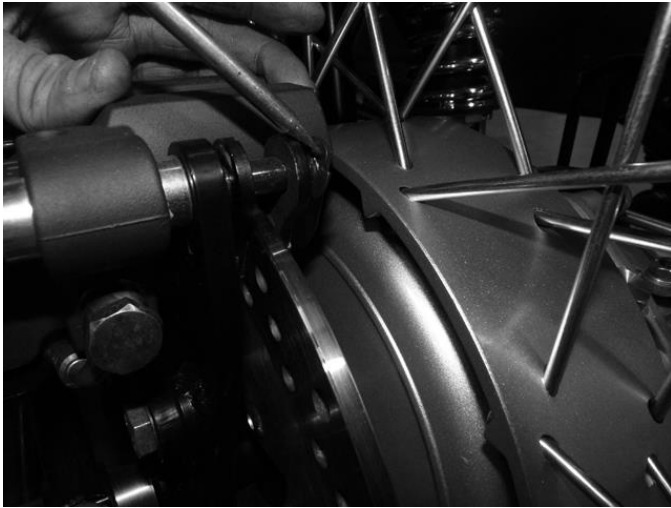
OPERATING THE MOTORCYCLE WITH WORN BRAKE PADS BELOW THE MINIMUM THICKNESS CAN RESULT IN POOR BRAKING AND POSSIBLE ACCIDENT.

WARNING

OPERATING THE MOTORCYCLE WITH LOW FLUID LEVEL CAN CAUSE LOSS OF BRAKING FORCE.



REAR BRAKE SYSTEM MAINTENANCE



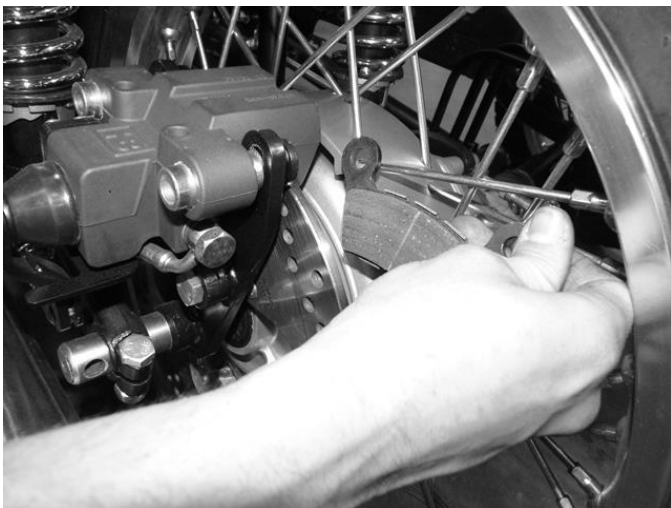
Step 1

Remove the caliper retaining bolt safety clips.



Step 2

Remove the caliper retaining bolts.



Step 3

Remove the brake pads by pulling to the rear of the motorcycle.

REAR BRAKE SYSTEM MAINTENANCE (CONT.)



Step 4

Inspect the brake pads and replace as needed.

NOTE

MINIMUM PAD THICKNESS IS 1MM



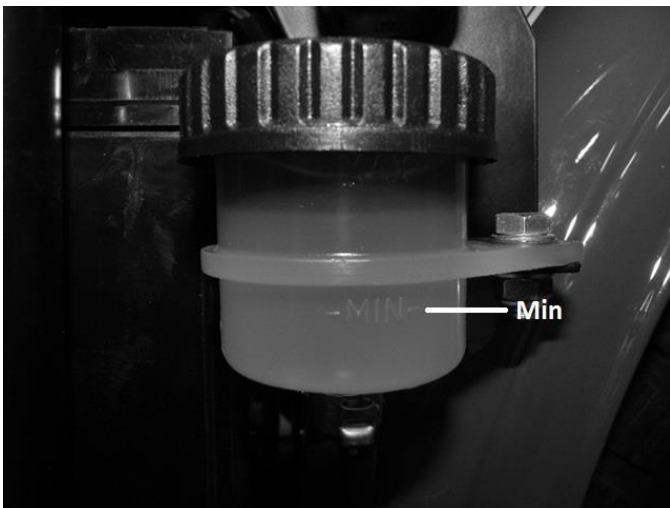
Step 5

Re-install brake pads in reverse order. **DO NOT** forget to install the safety clips.

Step 6

Confirm the brake fluid level is full in the reservoir and add as needed to **FULL** line.

DO NOT OVER FILL



CAUTION

OPERATING THE MOTORCYCLE WITH WORN BRAKE PADS CAN CAUSE DAMAGE TO THE BRAKE ROTORS.

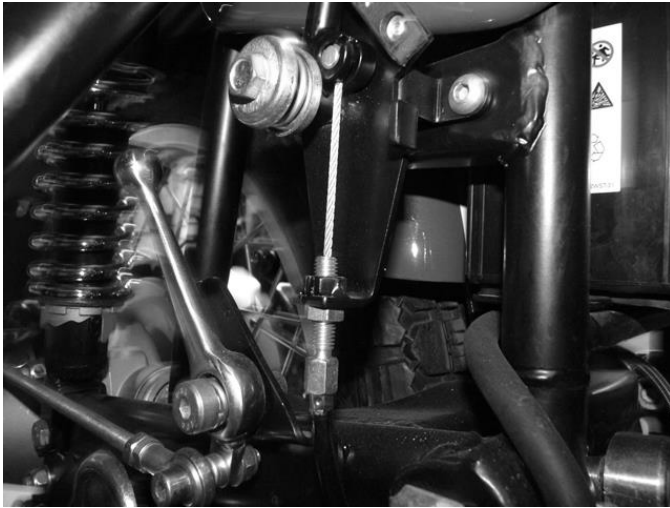
WARNING

OPERATING THE MOTORCYCLE WITH WORN BRAKE PADS BELOW THE MINIMUM THICKNESS CAN RESULT IN POOR BRAKING AND POSSIBLE ACCIDENT.

WARNING

OPERATING THE MOTORCYCLE WITH LOW FLUID LEVEL CAN CAUSE LOSS OF BRAKING FORCE.

PARKING BRAKE ADJUSTMENT



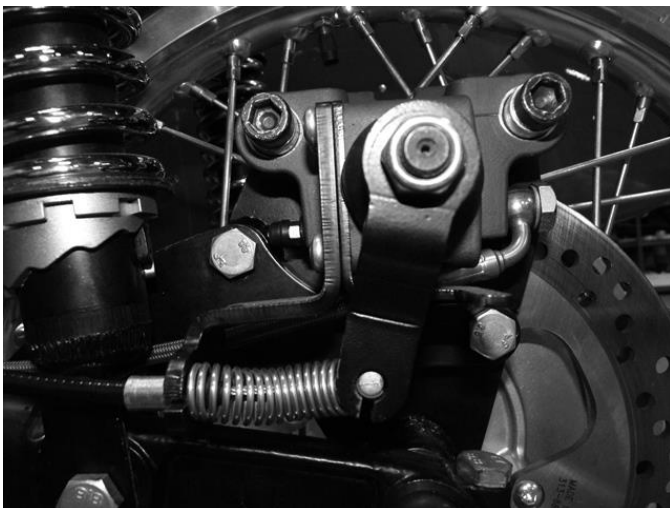
Step 1

Locate the cable adjuster connected to the parking brake handle and be sure the parking brake is in the “off” position.



Step 2

Adjust the cable to remove excess free play.



Step 3

With the parking brake set you will have approximately 12mm between the caliper stop bracket and the brake arm with spring.

SIDECAR BRAKE SYSTEM MAINTENANCE



Step 1

Remove the caliper mounting bolts.



Step 2

Remove the caliper from the sidecar swing arm.



Step 3

Remove the caliper safety clip and carefully drive the retaining pin out of the caliper with a punch or drift.

SIDECAR BRAKE SYSTEM MAINTENANCE (CONT.)



Step 4

Remove the brake pads by pulling them out of the bottom of the caliper.



Step 5

Inspect the brake pads and replace as needed.

NOTE

MINIMUM PAD THICKNESS IS 1MM

Step 6

Re-install the brake pads and caliper in reverse order. DO NOT forget to install the safety clip.

Step 7

Confirm the brake fluid level is full in the reservoir and add as needed to FULL line.

DO NOT OVER FILL



CAUTION

OPERATING THE MOTORCYCLE WITH WORN BRAKE PADS CAN CAUSE DAMAGE TO THE BRAKE ROTORS.

WARNING

OPERATING THE MOTORCYCLE WITH WORN BRAKE PADS BELOW THE MINIMUM THICKNESS CAN RESULT IN POOR BRAKING AND POSSIBLE ACCIDENT.

WARNING

OPERATING THE MOTORCYCLE WITH LOW FLUID LEVEL CAN CAUSE LOSS OF BRAKING FORCE.

FRONT WHEEL REMOVAL & INSTALLATION



Step 1

Loosen the axle pinch bolts.



Step 2

Loosen the axle by rotating clockwise.



Step 3

Remove the front axle.

FRONT WHEEL REMOVAL & INSTALLATION (CONT.)



Step 4

To re-install the wheel position the wheel into the forks with the wheel spacer.



Step 5

Install and tighten the axle by rotating counter-clockwise.



Step 6

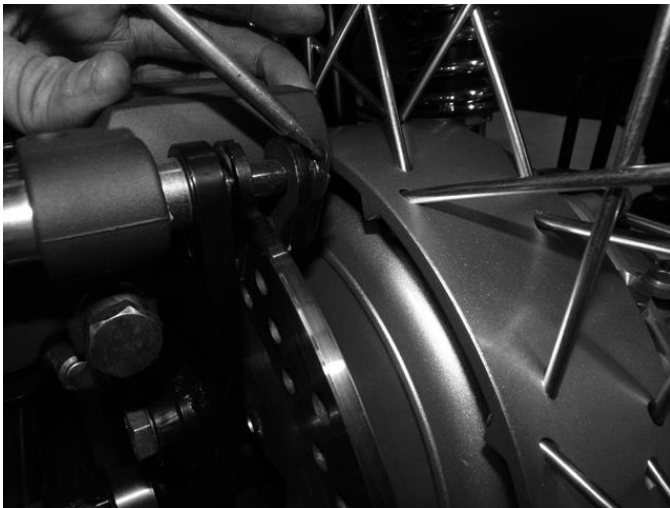
Tighten the axle pinch bolts

REAR WHEEL REMOVAL & INSTALLATION



Step 1

Place the motorcycle on the center stand.



Step 2

Carefully remove the caliper retaining bolt safety clips.



Step 3

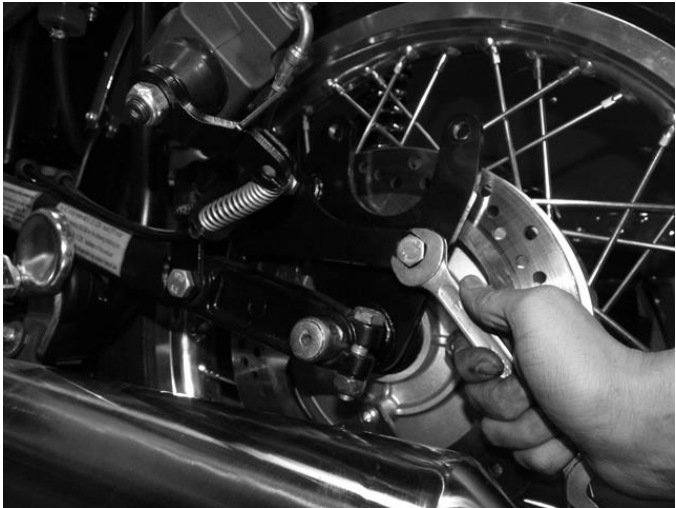
Remove the caliper retaining bolts and brake pads.

REAR WHEEL REMOVAL & INSTALLATION (CONT.)



Step 4

Support the brake caliper using a strap.



Step 5

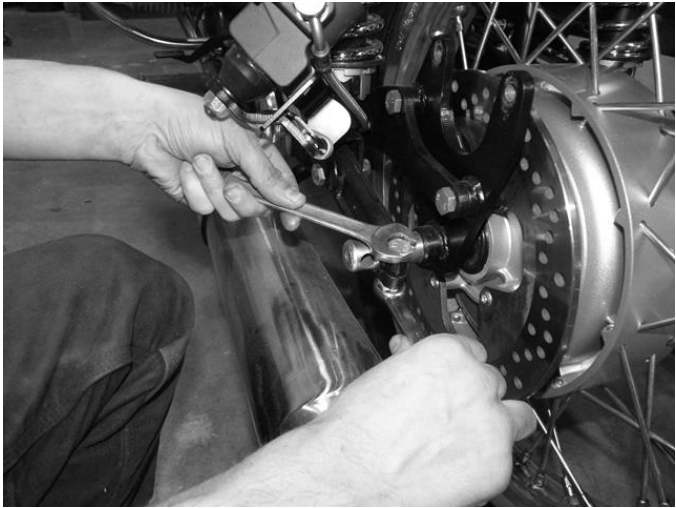
Remove the brake caliper mounting bracket bolts. Swing the support brace bracket up.



Step 6

Remove the rear axle nut.

REAR WHEEL REMOVAL & INSTALLATION (CONT.)



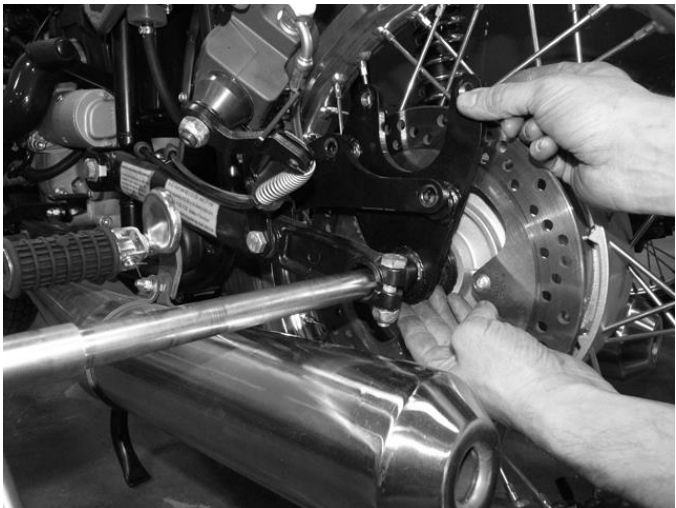
Step 7

Loosen the axle pinch bolt and remove the axle.



Step 8

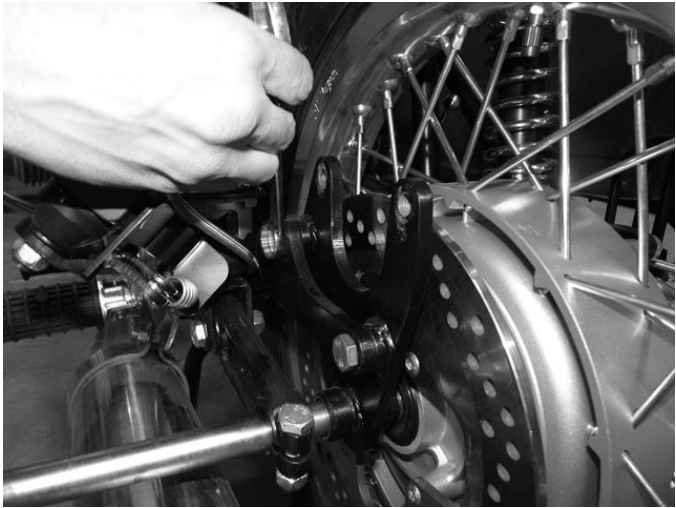
Remove the rear wheel by tilting the outwards towards you and rolling it back as shown.



Step 9

To re-install the rear wheel place the wheel back on the bike and push the axle through both the wheel and brake mounting bracket as shown.

REAR WHEEL REMOVAL & INSTALLATION (CONT.)



Step 10

Torque the caliper mounting bracket bolts to specification.



Step 11

Re-install the brake caliper and brake pads. Torque the caliper retaining bolts to specification.



Step 12

Re-install the caliper retaining bolt safety clips.

SIDECAR WHEEL REMOVAL & INSTALLATION



Step 1

Remove the sidecar brake caliper.



Step 2

Carefully remove the sidecar hub cap.



Step 3

Remove the axle cotter pin and axle nut.

Step 4

Re-install the sidecar wheel in reverse order.

USING THE SPARE WHEEL



WARNING

THE SPARE WHEEL IS INTENDED FOR USE ON THE REAR POSITION ONLY.

Step 1

Remove the rear wheel and rear brake rotor.

Step 2

Install the brake rotor on the spare wheel and torque to specification.

Step 3

Install the spare wheel on the motorcycle.

WHEEL SPOKE MAINTENANCE



The wheel spokes should be checked on a regular basis and per the maintenance intervals.

You check spoke tension by lightly tapping each spoke and listening to the ring. Loose spokes will make a low flat sound.

Step 1

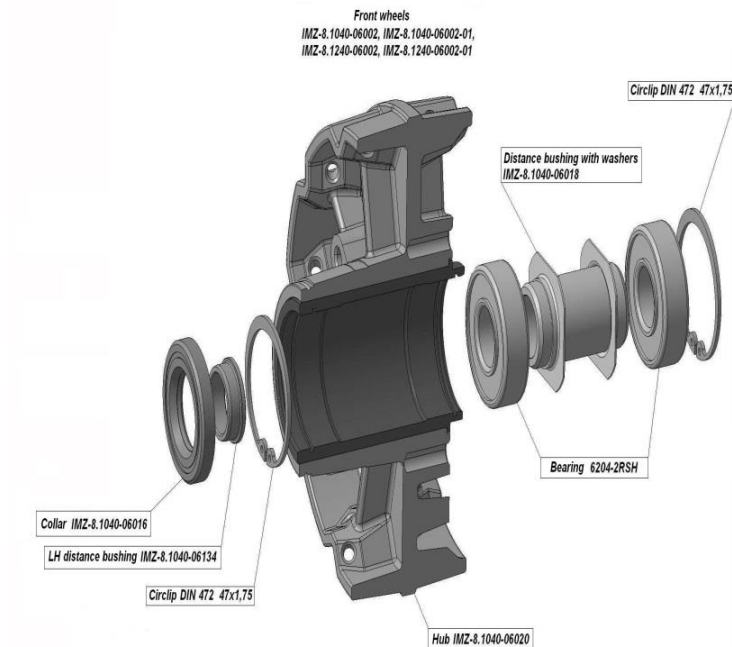
Tap each spoke and compare the sound from one to another.

Step 2

Tighten spokes as needed. If spokes require more than ½ turn to tighten you may need to remove the tire and have the wheel professionally trued.



WHEEL BEARING REPLACEMENT & DIAGRAMS



The wheel bearings are sealed type and cannot be service only replaced.

The bearings should be inspected and replaced per the maintenance intervals.

Step 1

Remove the wheel.

Step 2

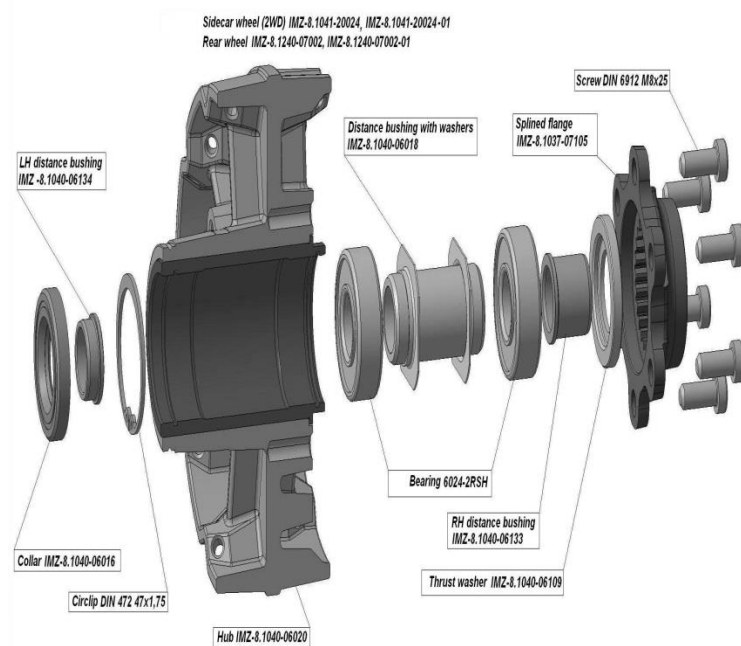
Remove the dust seals and retaining clips.

Step 3

Carefully drive the bearings out of the hub and replace.

Step 4

Re-install in reverse order replacing the dust seals as needed.



NOTE

WHEEL BEARINGS SHOULD BE INSPECTED AND REPLACED MORE FREQUENTLY THAN OUTLINED IN THE MAINTENANCE SCHEDULE WHEN THE MOTORCYCLE IS USED OFF ROAD OR IN ADVERSE WEATHER ON A REGULAR BASIS.

CAUTION

FAILURE TO REPLACE THE WHEEL BEARINGS WHEN NEEDED CAN DAMAGE THE WHEEL HUB AND AXLE.

WARNING

DAMAGED AND/OR WORN BEARINGS CAN PREVENT THE WHEEL FROM ROTATING FREELY.

TIRE & TUBE REPLACEMENT



Step 1

Remove the valve stem and deflate the tire.



Step 2

Using the provided tire spoons in your tool kit carefully remove one side of the tire from the rim.



Step 3

Remove the tube from the tire.

Step 4

Remove the tire from the rim.

Step 5

Re-install the tire in reverse order; be careful not to pinch the tube during installation.

NOTE

WHEN INFLATING THE TIRE, BE SURE THE TIRE BEAD IS FULLY SEATED AND EVEN AROUND THE RIM.

SIDECAR ALIGNMENT

The sidecar should be installed in a definite position relative to the motorcycle. The position is determined by the camber and toe-in of the motorcycle and the side car wheels. An incorrectly aligned side car will drag the motorcycle to either side and cause extensive tire wear. If the motorcycle is not stable on the road or is difficult to steer, check the alignment. Checking and measuring the alignment should be done on level ground.

Check toe-in of the motorcycle and the side car wheels with two straight bars applied to the side faces of the wheels just below the ax les. The toe-in should be 3 to 8mm (2wd models) or 8 to 12mm (1wd models) at the front wheel. When adjusting, unbolt the top of the strut legs fastening the side car to the motorcycle, loosen the bolt clamping the lower rear bracket, and adjust the position of the bracket relative to the rear tube of the side car frame to obtain necessary toe-in of the wheels. Tighten up the bolt fastening the bracket, adjust the length of the strut legs and secure them with bolts.

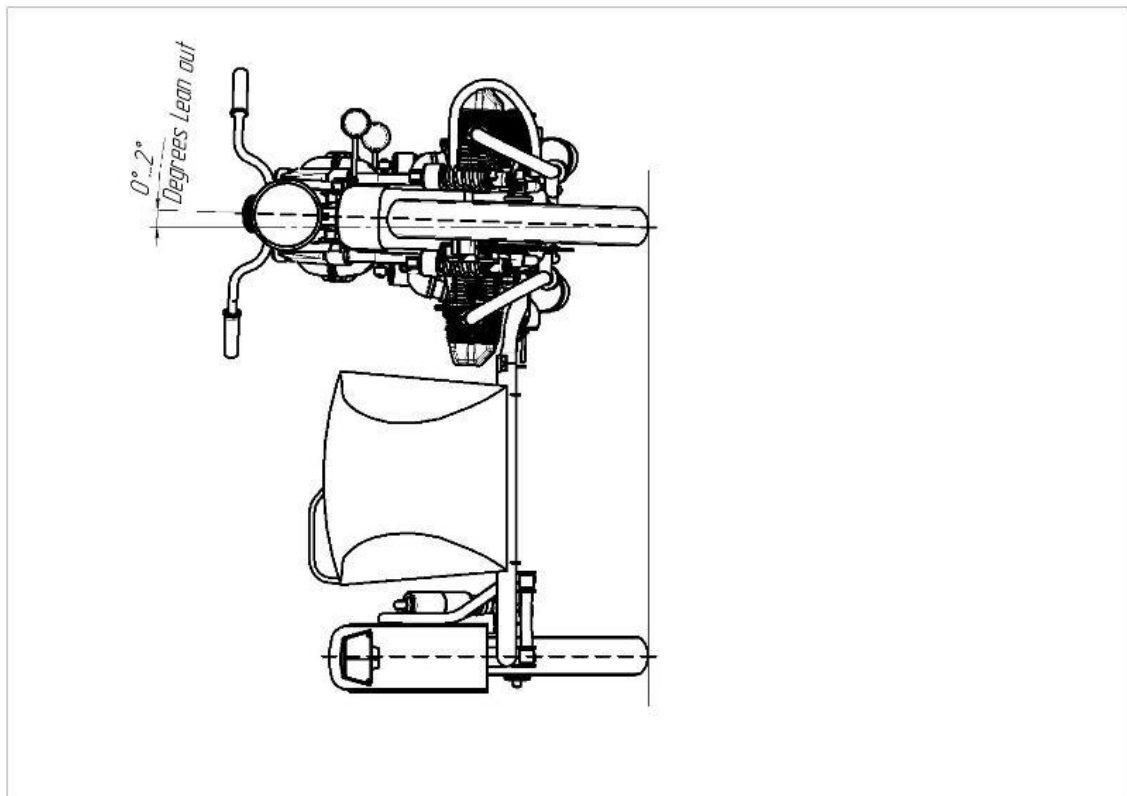
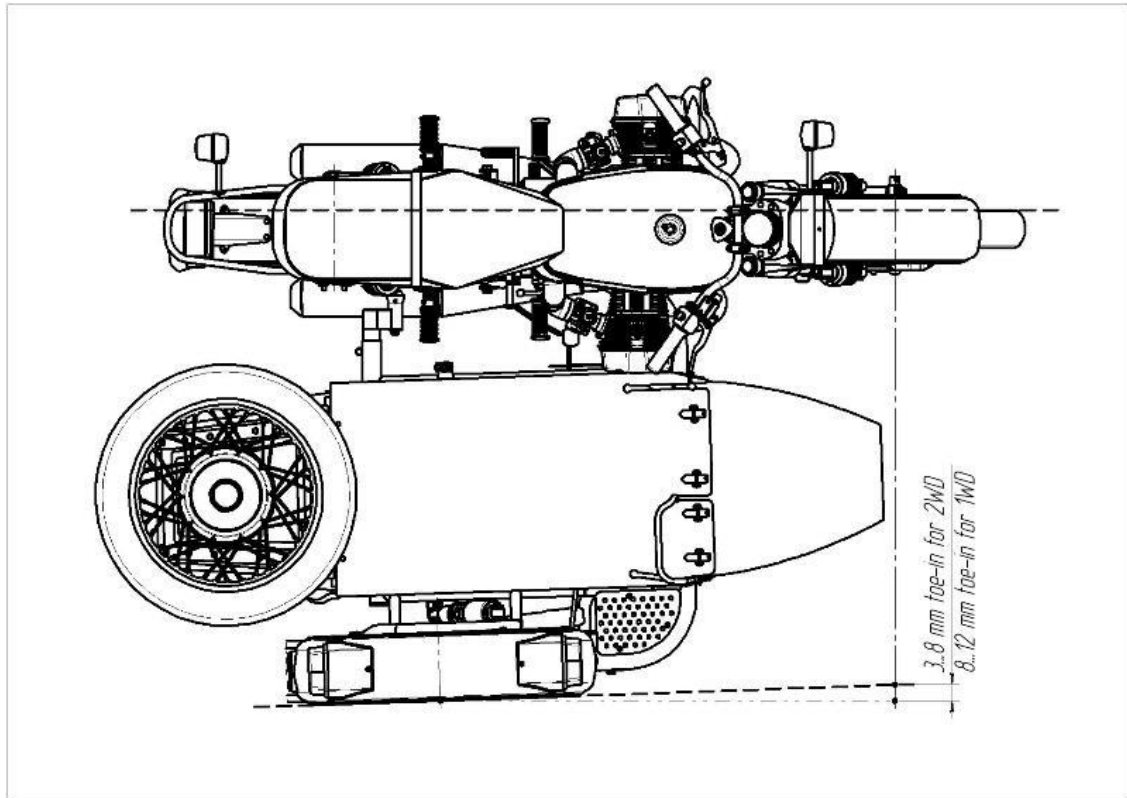
Check the lean-out of the motorcycle using a level gauge or protractor with a plumb bob and a ruler; standard lean-out is 1-2 degrees. Adjust the two inclined legs by screwing the forks in or out. When the lean-out is correct, the rider will remain vertical while riding on the local roads which may be slightly sloped to assist with water runoff.

Check the toe-in while the motorcycle is running on the road. With the toe-in properly adjusted, the motorcycle will not pull to either side while running at normal road speed. If it pulls to the right, increase the toe-in, if it pulls to the left, decrease the toe-in.

CAUTION

DOUBLE CHECK FOR CORRECT TOE-IN BEFORE MAKING ANY CHANGE TO LEAN-OUT.

SIDECAR ALIGNMENT DIAGRAM



6. Electrical

	Page
Lamp & Bulb Replacement	6-2
Battery Maintenance & Replacement	6-6
Fuse Locations	6-9
Relay Locations	6-10
Starter	6-11
Alternator	6-11
ECU Data Port	6-11

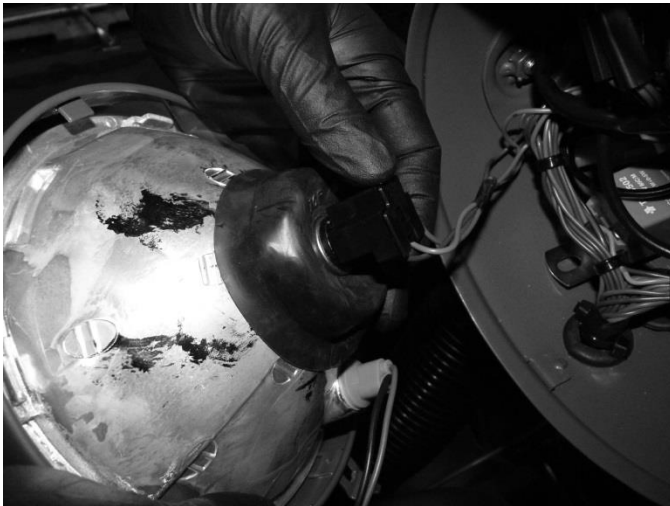
LAMP & BULB REPLACEMENT (HEADLIGHT)



Headlight Replacement

Step 1

Remove the lamp retaining ring screw and pull the lamp out of the bucket.



Step 2

Disconnect the lamp.



Step 3

Carefully remove the lamp retaining clips and replace lamp.

Step 4

Re-install in reverse order.

WARNING

ALWAYS WEAR EYE PROTECTION WHEN REMOVING LAMP RETAINING CLIPS.

WARNING

IT IS UNSAFE TO OPERATE YOUR MOTORCYCLE WITHOUT A FUNCTIONING HEADLIGHT.

LAMP & BULB REPLACEMENT (TAIL LIGHT)



Tail Light Replacement

Step 1

Remove the tail light lenses retaining screws.



Step 2

Inspect and replace bulbs as needed.

The upper bulb in the running/brake lamp and the lower is the license plate lamp.

NOTE

TO HELP PREVENT CORODED CONTACTS USE DIELECTRIC GREASE.

WARNING

IT IS UNSAFE TO OPERATE YOUR MOTORCYCLE WITHOUT A FUNCTIONING TAIL AND BRAKE LIGHT.

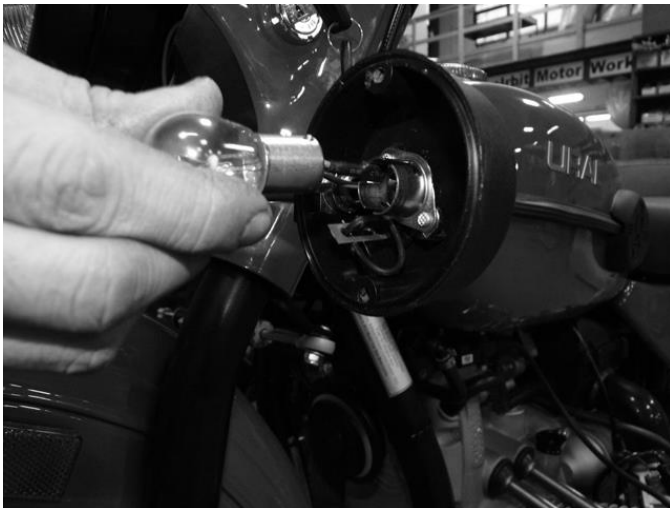
LAMP & BULB REPLACEMENT (TURN SIGNALS)



Turn Signal Bulb Replacement

Step 1

Remove the turn signal lenses retaining screws.



Step 2

Inspect and replace bulbs as needed.

Step 3

To remove the bulb twist and pull.



Step 4

Re-install the bulbs in reverse order.

NOTE

TO HELP PREVENT CORRODED CONTACTS USE DIELECTRIC GREASE.

WARNING

IT IS UNSAFE TO OPERATE YOUR MOTORCYCLE WITHOUT FUNCTIONING TURN SIGNALS.

LAMP & BULB REPLACEMENT (SIDECAR LAMPS)



Sidecar Lamps

Step 1

Remove the lenses retaining screws.



Step 2

Inspect and replace bulbs as needed.

NOTE

TO HELP PREVENT CORODED CONTACTS USE DIELECTRIC GREASE.

WARNING

IT IS UNSAFE TO OPERATE YOUR MOTORCYCLE WITHOUT FUNCTIONING SIDECAR LAMPS.

BATTERY MAINTENANCE

Stock battery on the motorcycle should function at ambient air temperature from -40°C to plus 60°C/ 40°F to 140°F.

As the battery is in service:

- Regularly check the voltage for 13.8 - 14.2 V
- Do not allow the battery to discharge.
- Coat bolts, nuts, washers and tips with petroleum jelly or battery grease. Use two wrenches for clamping or undoing the nuts to avoid breaking battery parts.

Before storage, fully charge the batteries, wash the battery surface with water and wipe dry, clean the bolts and nuts of dirt.

WARNING

BATTERIES CONTAIN SULFURIC ACID WHICH CAN CAUSE SEVERE BURNS. AVOID CONTACT WITH SKIN, EYS OR CLOTHING.

ANTIDOTE

EXTERNAL – FLUSH WITH WATER.

INTERNAL – DRINK LARGE QUANTITIES OF WATER FOLLOWED BY MILK OF MAGNESIA, VEGETABLE OIL, OR BEATEN EGGS.

CALL DOCTOR IMMEDIATELY

CAUTION

WHEN CHARGING THE BATTERY, DISCONNECT THE NEGATIVE TERMINAL FROM THE BATTERY TO PREVENT DAMAGE TO ELECTRICAL COMPONENTS.

NEVER JUMP START THE MOTORCYCLE!

WARNING

BATTERIES PRODUCE EXPLOSIVE HYDROGEN GAS AT ALL TIMES – ESPECIALLY WHEN BEING CHARGED. KEEP ANY OPEN FLAMES AND/OR SPARKS AWAY FROM THE BATTERY AT ALL TIMES. ALWAYS PROTECT HANDS AND FACE WHEN WORKING ON AND/OR NEAR A BATTERY.

KEEP BATTERIES OUT OF REACH OF CHILDREN AND PETS!

BATTERY REPLACEMENT



Step 1

Disconnect the white negative (-) battery cable.

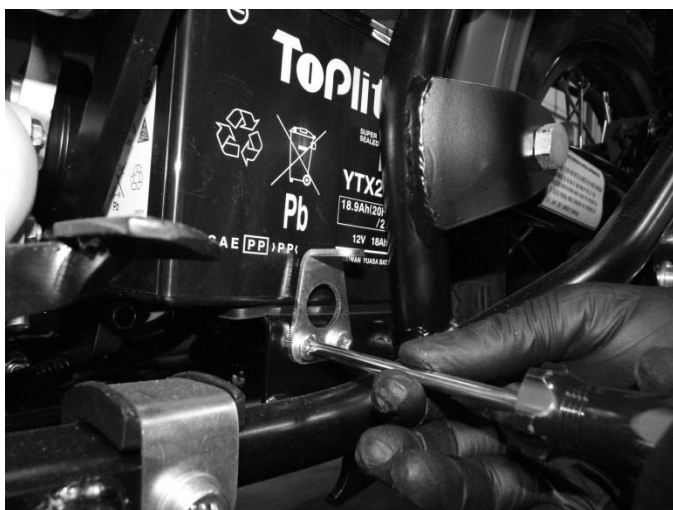
Step 2

Disconnect the red positive (+) battery cable



Step 3

Remove the battery hold down strap nut.



Step 4

Remove the battery hold down strap bracket

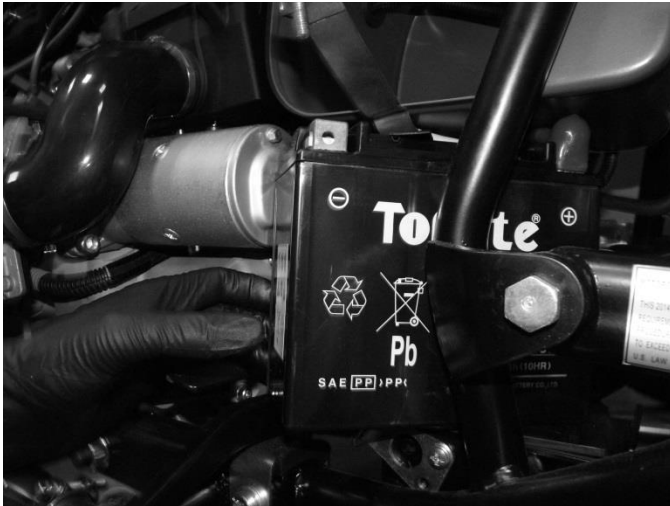
CAUTION

ALWAYS DISCONNECT THE NEGATIVE (-) BATTERY CABLE FIRST TO AVOID SHORTING THE BATTERY.

WARNING

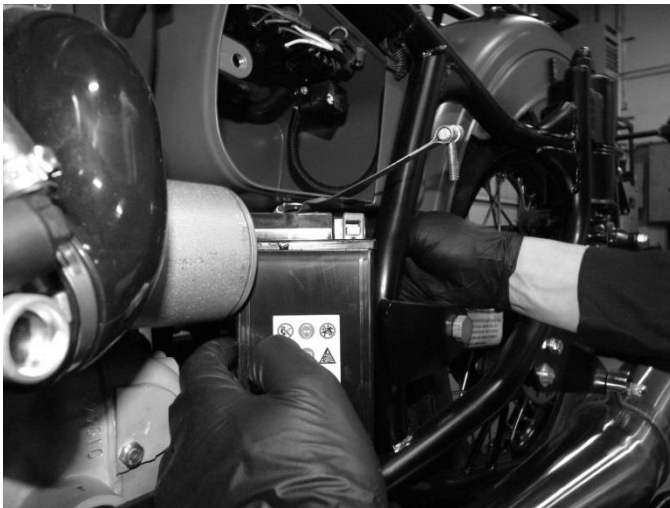
SHORTING THE BATTERY TERMINALS COULD RESULT IN A FIRE.

BATTERY REPLACEMENT (CONT.)



Step 5

Carefully slide the battery out between the frame tube and the starter.



Step 6

Re-install in reverse order by sliding the battery back into place and reconnecting all straps and cables.

CAUTION

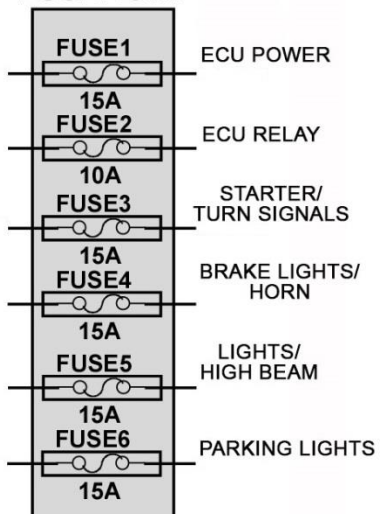
ALWAYS RECONNECT THE POSITIVE (+) BATTERY CABLE FIRST TO AVOID SPARKS.

NOTE

USE DIELECTRIC GREASE ON THE BATTERY CONNECTIONS TO PREVENT CORROSION.

FUSE LOCATIONS

FUSEBOX1

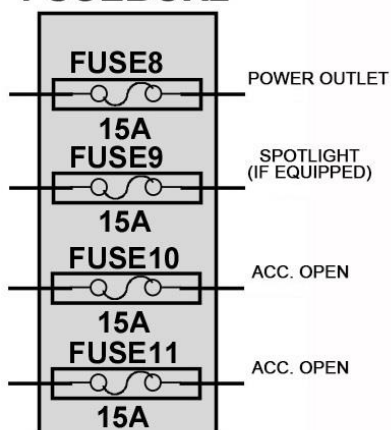


Fuse Box 1

The main motorcycle fuse box is located on the right side of the steering neck.

This diagram shows the position and function for each fuse.

FUSEBOX2



Fuse Box 2 (if equipped)

The sidecar on all models (except cT and M70) has a separate fuse box. This fuse box is located inside the sidecar nose on the left upper corner.

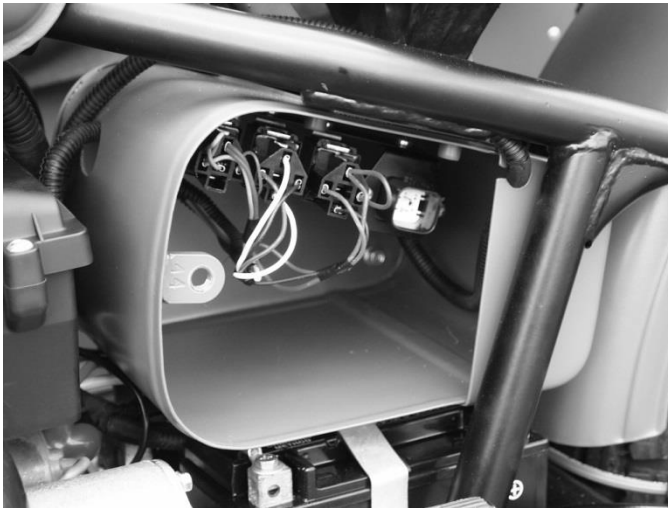
This diagram shows the position and function of each fuse.

RELAY LOCATIONS



Turn Signal Relay

The turn signal relay is located inside the headlight bucket. To access this relay you must first remove the headlight.



EFI and Starter Relays

To access the EFI and starter relays you must first remove the left side tool box panel.

ELECTRIC STARTER

The starter must provide 300-400 rpm to start the engine and requires a well maintained battery. If battery is below required voltage the electric starter may not operate efficiently. If the battery becomes low you may need to use the kick starter.

ALTERNATOR

This motorcycle is equipped with a Denso Alternator.

Specifications:

Rated Voltage 12V

Rated Output 40A, 480W

Peak Output 560W @ 14V

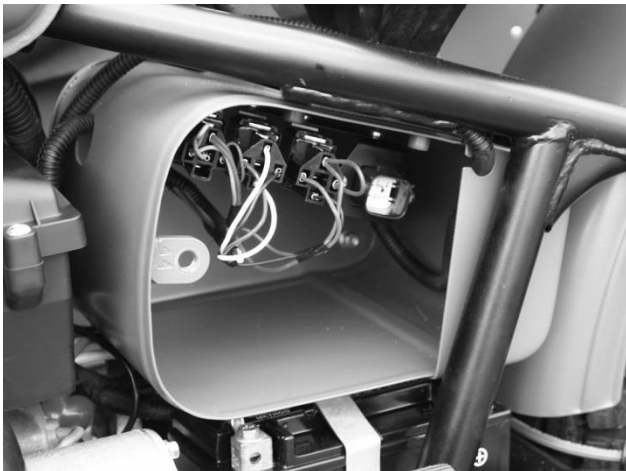
Testing the Alternator on the Motorcycle

If no test bench is available, check the output of the alternator with the engine running.

- Connect the voltmeter to positive and negative terminals of the storage battery
- Start the engine
- While starting the voltage will drop to as low as 9.5 V
- At 3500-4000 rpm output voltage should be 13.5-14.5 VDC

In the course of daily inspection, check the fastening of wires to the alternator terminals and fastening of the alternator on the engine crankcase.

ECU DATA PORT



The ECU Data port is located behind the left side tool box panel. This data port is intended for:

DEALER ONLY EFI DIAGNOSTICS

The data port has a protective cap that should be left in place to prevent debris from contaminating the connector.

7. EFI Troubleshooting

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Engine Management (MIL Blink Codes)	7-2
Service Notes	7-4

URAL ENGINE MANAGEMENT SYSTEM BLINK DIAGNOSTICS

Introduction

A basic blink code system has been implemented on the Ural EFI bikes to aid EMS (Engine Management System) diagnostics without the need for an additional computer diagnostic tool, greatly helping the user when during travels. When activated, the MIL (malfunction indicator lamp) blinks out a code sequence relating to the fault. This document is intended as a quick reference guide as supplemental information to the EMS Service Manual.

Operation

When the MIL is continuously lit with the key on, an EMS fault has occurred. With the key on and engine off, toggle the kill switch three times within a two second timeframe to initiate the blink sequence. Three changes are required, not three complete kill-run cycles. For example, if the switch is in engine kill state, the sequence would be "Kill -> Run -> Kill -> Run" with the '->' indicating a flick of the switch.

The MIL will now blink a code sequence corresponding with the EMS's diagnosed fault. Each code has a three digit sequence, with each digit having a value of 1-5. A short pause occurs between individual digits, while a long pause between repeating the code or displaying the next code, depending on the number of fault events.

To identify the fault, initiate the blink sequence, and count out blinks for each of the three digits. Writing down the pattern helps. The light will blink on half second intervals for each digit. Between each digit, a one second pause will occur. Between each blink code, or the repetition of the code if a single fault is present, a three second pause exists. When a fault presents a specific component on the vehicle system, the component must be inspected, along with electrical connections and harness components leading up to the component. This will aid in diagnosing and fixing the problem.

The blink sequence will continue to repeat until the function is deactivated. To deactivate the feature, toggle the kill switch three times within a two second time-frame, the same as to activate the feature.

Fault Category

The first digit is used to indicate the category of fault. This helps to identify if the problem is specific to one ECU or to the vehicle as a whole. These categories are defined as follows:

First Digit Value	Category	Description
1	Cylinder 1 Faults	Faults specific to the left EMS
2	Cylinder 2 Faults	Faults specific to the right EMS
3	System Faults	Vehicle level EMS faults

Blink Code	Category	Sub-Category	Fault Description	Action
111 / 211	Cylinder 1 / 2	Internal CPU	Cal CRC mismatch	See Dealer
112 / 212	Cylinder 1 / 2	Internal CPU	EEPROM Failure	See Dealer
113 / 213	Cylinder 1 / 2	Internal CPU	Program Error	See Dealer
121 / 221	Cylinder 1 / 2	Internal ECU	MAT Sensor Failure	See Dealer
122 / 222	Cylinder 1 / 2	Internal ECU	BAP Sensor Failed	See Dealer
123 / 223	Cylinder 1 / 2	Internal ECU	BAP Comm. Failure	See Dealer
124 / 224	Cylinder 1 / 2	Internal ECU	MAP Failure	See Dealer
125 / 225	Cylinder 1 / 2	Internal ECU	MC33814 Failure	See Dealer
131 / 231	Cylinder 1 / 2	INJ or IGN	INJ open or short to ground	Check wires to injector
132 / 232	Cylinder 1 / 2	INJ or IGN	INJ short to battery	Check wires to injector
133 / 233	Cylinder 1 / 2	INJ or IGN	IGN open or short to ground	Check wires to ignition coil
134 / 234	Cylinder 1 / 2	INJ or IGN	IGN short to battery	Check wires to ignition coil
141 / 241	Cylinder 1 / 2	O2 or O2 Heater	O2 Sensor Circuit Failed Low	Check O2 sensor
142 / 242	Cylinder 1 / 2	O2 or O2 Heater	O2 Sensor Circuit Failed High	Check O2 sensor
143 / 243	Cylinder 1 / 2	O2 or O2 Heater	O2 Heater open or short to ground	Check wires to O2 sensor
144 / 244	Cylinder 1 / 2	O2 or O2 Heater	O2 Heater short to battery	Check wires to O2 sensor
151 / 251	Cylinder 1 / 2	Other	Engine Temperature Sensor fault	Check temperature sensor
311	System	Battery	High Voltage	Inspect vehicle battery
312	System	Battery	Low Voltage	Charge or replace battery
313	System	Battery	Unstable Voltage	Inspect charging system
321	System	Fuel Pump / Pres.	Pump open or short to ground	Check wires to fuel pump
322	System	Fuel Pump / Pres.	Pump short to battery	Check fuel pump
323	System	Fuel Pump / Pres.	Pressure Sensor failed	Check fuel pump
331	System	VCOM	VCOM A Failed	Check ECU harness
341	System	Immobilizer	LED open or short to ground	Check wires to LED
342	System	Immobilizer	LED short to battery	Check wires to LED

SERVICE NOTES

8. Warranty Information

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WARRANTY AGREEMENT

Irbit MotorWorks of America, Inc., (IMWA, Inc.) warrants to the first retail purchaser of the URAL® motorcycle from an Authorized IMWA Dealer and each subsequent owner that the motorcycle is free from defects in materials and workmanship for the period stated below.

To Qualify For This Warranty

- The URAL® motorcycle must be purchased from a Dealer within the United States who is authorized by IMWA, Inc. to sell motorcycles. (See www.imz-ural.com for the authorized IMWA Dealer list)
- Prior to delivery to the purchaser, the Dealer who is authorized by IMWA, Inc. to sell motorcycles must perform set-up and pre-delivery service.

Warranty Time Period

- Duration: two (2) years parts and labor.
- There is no mileage limitation.
- Coverage begins the date the motorcycle is sold to the first retail purchaser and the warranty registration card is received by IMWA, Inc.

Warranty Coverage

- IMWA, Inc. will repair or replace, at its options, any part (including parts of the emission control systems) that is found to be defective in material or workmanship under normal use for the applicable time period.
- In cases when warranty repair takes longer than 14 days, the warranty time period (see **Warranty Time Period**) is extended for the time period of repair, during which the motorcycle could not be ridden due to failures.
- IMWA, Inc. provides warranty for spare parts for the following period of time starting from the time of purchase of the parts by a Dealer or retail customer.
 1. Engine – 12 months
 2. Gearbox – 12 months
 3. Final drive – 12 months
 4. Alternator – 6 months
 5. Electric starter – 6 months
 6. EFI Components – 6 months
 7. The rest of the motorcycle parts and parts assemblies - 30 days

The above applies ONLY in cases when Dealer or retail customer identifies defects before using parts and/or assemblies or these defects are identified during performance AND provided these parts have been properly installed by IMWA, Inc. or authorized IMWA Dealer.

- IMWA, Inc. will reimburse non-IMWA repair shops performing warranty repair for labor only if all the warranty processing and approval procedures are completely fulfilled and/or carried out according to IMWA, Inc. guidelines stated in the Warranty Claim Filing Procedures.

WARRANTY DISCLAIMERS LIMITATIONS & EXCLUSIONS

DISCLAIMER OF CONSEQUENTIAL DAMAGE & LIMITATION OF IMPLIED WARRANTIES

IRBIT MOTORWORKS OF AMERICA, INC. DISCLAIMS ANY RESPONSIBILITY FOR:

- Loss of time due to warrantable issue
- Loss of use of motorcycle
- Transportation expenses
- Any other incidental or consequential damage (i.e. storage)

Duration of Implied Warranties

Any implied warranties, including the implied warranty of merchantability and fitness for a particular purpose are limited to the duration of this written warranty.

State Laws May Vary

The previous listed limitations or exclusions may not apply to a motorcycle because of state laws. Some states may not allow limitations on how long an implied warranty lasts. Some states may not allow exclusion or limitation of incidental or consequential damages.

These Warranties Do Not Cover:

1. Failures or required services that is not due to a defect in material or factory workmanship

2. Parts or accessories affected or damaged by:

- Lack of required maintenance
- Owner abuse
- Accident and/or collision
- Misuse
- Normal wear
- Neglect
- Improper installation
- Unsuitable use in an application for which the part was not designed
- The incorporation or use of unsuitable attachments or parts
- The unauthorized alteration of any part or system
- Deterioration from the elements
- Failure to follow running-in (break-in) procedure

3. Replacement of expendable maintenance including, but not limited to:

- spark plugs
- filters
- lubricants
- compliance fittings (throttle body mounting flanges)
- tires
- gaskets
- fuel line
- fuses
- bulbs
- battery (after 1 year in service)

THESE WARRANTIES DO NOT COVER: (CONTINUED)

1. Paint and/or decal fading, peeling, blistering, chipping or rusting.
2. Use for the following activities; such use will VOID coverage:
 - Racing
 - Competition
 - Rental or other commercial use
 - Alteration of engine or drive train
 - Any operation or use outside of that described in Owner's Manual
3. Alteration of the odometer so that the actual mileage cannot be determined; alteration will VOID coverage.
4. Use of bike for towing purpose will VOID warranty

Dealer Is Responsible to:

- Thoroughly check and road test new units before delivery.
- Fill out, sign and send Warranty Registration and Card of Delivery to IMWA, Inc. within 3 business days of the sale of Motorcycle.
- Accept all eligible motorcycles for warranty service regardless of selling Dealer.
- Keep records of all warranty work.
- Attend service schools as provided by IMWA, Inc.
- Submit warranty claims to IMWA, Inc. IN WRITING within 10 business days of the repair date.
- Obtain authorizations for warranty repairs from IMWA, Inc. when estimated cost will exceed \$100.00 (see Advance Warranty Authorization).
- Send failed parts and/or parts assemblies for an inspection to IMWA, Inc. within 3 (three) business days upon IMWA's request at IMWA, Inc. shipping expense.
- Provide digital pictures of failed parts and/or parts assemblies immediately upon IMWA's request.

Customer Is Responsible to:

- Operate and maintain the motorcycle according to the IMWA, Inc. Owner's Manual and service schedule.
- Retain all service records for future reference.

CALIFORNIA EMISSION CONTROL SYSTEM WARRANTY STATEMENT

YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board and Irbis MotorWorks of America, Inc. (hereinafter IMWA) is pleased to explain the Emission Control System Warranty on your 2005 and later motorcycle. In California, new motor vehicles must be designed, built and equipped to meet the State's stringent anti-smog standards. IMWA must warrant the emission control system on your motorcycle for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your motorcycle. Your emission control system may include parts such as the carburetor, the ignition system, catalytic converter, and engine computer. Also included may be hoses, belts, connectors and other emission-related assemblies. Where a warrantable condition exists, IMWA will repair your motorcycle at no cost to you including diagnosis, parts and labor.

MANUFACTURER'S WARRANTY COVERAGE

Class III motorcycles (280cc and larger): for a period of use of five (5) years or 30,000 kilometers (18,641 miles), whichever first occurs. If an emission-related part on your motorcycle is defective, the part will be repaired or replaced by IMWA. This is your emission control system DEFECTS WARRANTY.

OWNER'S WARRANTY RESPONSIBILITIES

- As the owner of Ural motorcycle, you are responsible for the performance of the required maintenance listed in your owner's manual. IMWA recommends that you retain all receipts covering maintenance on your motorcycle, but IMWA 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 an IMWA dealer as soon as a problem exists. The warranty repairs should be completed in a reasonable amount of time not to exceed 30 (thirty) days.
- As the motorcycle owner, you should also be aware that IMWA may deny you warranty coverage if your motorcycle or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

If you have any questions regarding your warranty rights and responsibilities, you should contact Irbis MotorWorks of America at 1-866-943-7454 or the California Air Resource Board at 9528 Telstar Avenue, El Monte, CA 91731.

LIMITED WARRANTY ON EMISSION CONTROL SYSTEM

Irbit MotorWorks of America, Inc., 14700 NE 95th St. Suite 102, Redmond, WA 98052, USA (hereinafter IMWA) warrants that each new 2004 and later Ural motorcycle that includes as standard equipment a headlight, taillight and stoplight, and is street legal:

A. is designed, built and equipped so as to conform at the time of initial retail purchase with all applicable regulations of the United States Environmental Protection Agency, and the California Air Resources Board; and
B. is free from defects in material and workmanship which cause such motorcycle to fail to conform with applicable regulations of the United States Environmental Protection Agency or the California Air Resources Board for a period of use, depending on the engine displacement: of 30,000 kilometers (18,641 miles), if the motorcycle's engine displacement is 280 cubic centimeters or greater or 5 (five) years from the date of initial retail delivery, whichever first occurs.

I. COVERAGE. Warranty defects shall be remedied during customary business hours at any authorized IMWA motorcycle dealer located within the United States of America in compliance with the Clean Air Act and applicable regulations of the United States Environmental Protection Agency and the California Air Resources Board. Any part or parts replaced under this warranty shall become the property of IMWA. In the State of California only, emission related warranted parts are specifically defined by the state's Emission Warranty Parts List. These warranted parts are: injectors, electronic valves, air box, air cleaner element, spark plug, ignition coil, ignition control valve module, catalyst, carbon absorber. In the State of California only, Emission Control System emergency repairs, as provided for in the California Administrative Code, may be performed by other than an authorized IMWA dealer. An emergency situation occurs when an authorized IMWA dealer is not reasonably available, a part is not available within 30 (thirty) days, or a repair is not complete within 30 days. Any replacement part can be used in an emergency repair. IMWA will reimburse the owner for the expenses, including diagnosis, not to exceed IMWA's suggested retail price for all warranted parts replaced and labor charges based on IMWA's recommended time allowance for the warranty repair and the geographically appropriate hourly labor rate. The owner may be required to keep receipts and failed parts in order to receive compensation.

II. LIMITATIONS. This Emission Control System warranty shall not cover any of the following:

A. Repair or replacement required as a result of

(1) Accident

(2) Misuse

(3) Repairs improperly performed or replacements improperly installed

(4) Use of replacement parts or accessories not conforming to IMWA specifications which adversely affect performance and/or

(5) Use in competitive racing or related events.

A. Inspections, replacement of parts and other services and adjustments required for required maintenance

B. Any motorcycle on which the odometer mileage has been changed so that actual mileage cannot be readily determined.

LIMITED WARRANTY ON EMISSION CONTROL SYSTEM (CONTINUED)

II. LIMITED LIABILITY

A. The liability of IMWA under this Emission Control System Warranty is limited solely to the remedying of defects in material or workmanship by authorized IMWA motorcycle dealers at its place of business during customary business hours. This warranty does not cover inconvenience or loss of use of the motorcycle or transportation of the motorcycle to or from the IMWA dealer. IMWA 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 IMWA

MOTORCYCLE 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 IMWA 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 STATEMENT 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 IMWA Limited Emission Control System Warranty.

III. LEGAL RIGHTS. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS, WHICH VARY FROM STATE TO STATE.

IV. THIS WARRANTY IS IN ADDITION TO THE IMWA LIMITED MOTORCYCLE WARRANTY.

V. ADDITIONAL INFORMATION. Any replacement part that is equivalent in performance and durability may be used in the performance of any maintenance or repairs. However, IMWA 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 on the date the motorcycle is delivered to an ultimate purchaser.

Irbit Motorworks of America, Inc.
14700 Ne 95th St. Suite 102
Redmond, WA 98052

REPORTING SAFETY DEFECTS

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

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

To contact NHTSA you may either call the Auto Safety Hotline toll-free at:

1-800-424-9393 (366-0123 in Washington, DC area).

Or write to:

NHTSA
U.S. DEPARTMENT of TRANSPORTATION
400 7th Street SW, (NSA-11)
Washington, DC 20590

You can also obtain other information about motor vehicle safety from the Hotline.

9. Emission Control Information

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Crankcase Emission Diagram	9-2
California Emission Control Diagram	9-3
Vehicle Emission Control Label	9-4

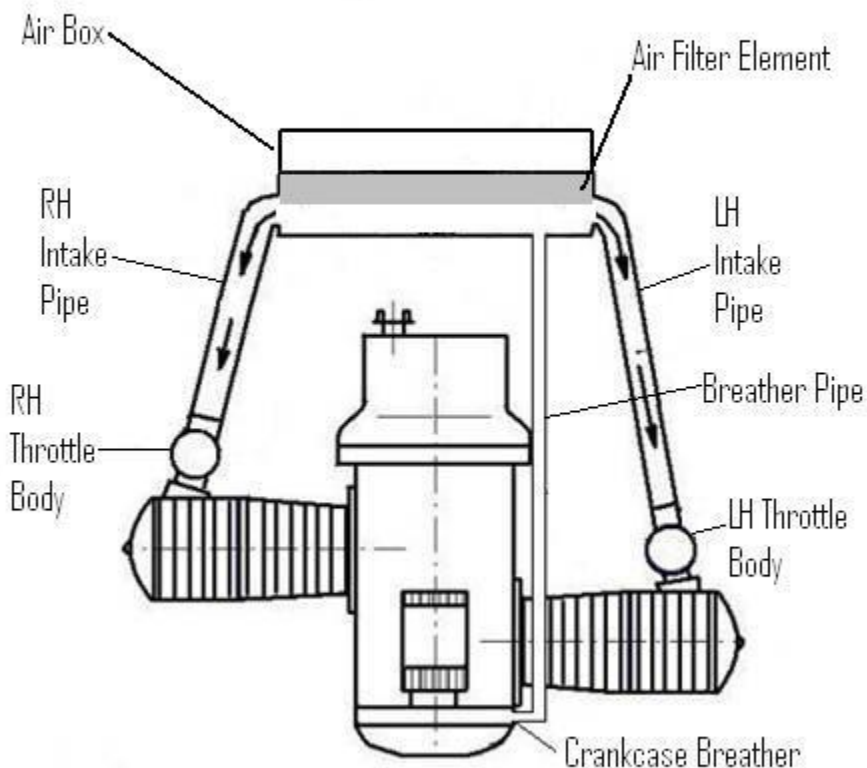
CRANKCASE EMISSION DIAGRAM

CLOSED CRANKCASE:

No crankcase emissions will be discharged directly into the ambient atmosphere throughout the useful life by any vehicle to be covered by EPA Certification.

Crankcase exhaust emitted by the timed breather is routed to the air filter box and ends prior to the filter. The crankcase exhaust is recycled through the air filter and inducted back into the engine.

Please see the diagram below:



NOTE

IT IS AGAINST FEDERAL LAW TO TAMPER WITH OR REMOVE EMISSION RELATED COMPONENTS.
--

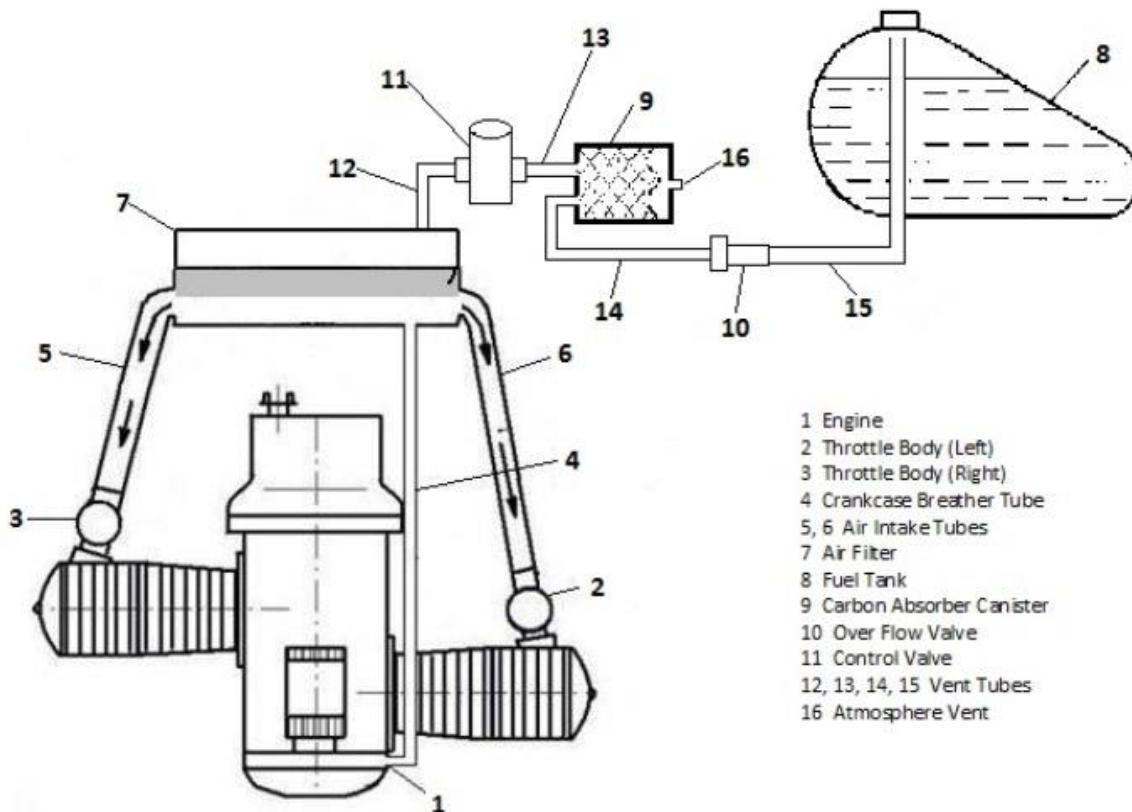
CALIFORNIA EMISSION CONTROL DIAGRAM

EVAPORATIVE EMISSION CONTROL:

All models sold and shipped into the state of California are equipped with an evaporative emission control system. This system prevents fuel vapors from being discharged directly into the ambient atmosphere throughout the useful life.

Evaporative emission are routed from the fuel tank through a carbon canister to the air box and controlled by an electrical valve. The evaporative emissions are recycled through the air filter and inducted back into the engine.

Please see the diagram below:



NOTE

IT IS AGAINST FEDERAL LAW TO TAMPER WITH OR REMOVE EMISSION RELATED COMPONENTS.

VEHICLE EMISSION CONTROL LABEL

The emission control label is located on the left hand frame down tube on all motorcycles.

Please see the sample diagram below:

VEHICLE EMISSION CONTROL INFORMATION

Engine tune-up specification for: Irbit Motorcycle Factory, Ltd.

"IMZ" Engine Displacement 749cc; EIMFC.750A02; EIMFPMETALU1 (Please Read Owner's Manual for Details)

Idle Speed: 800 RPM (at normal temp)

Max RPM: 5,600

Ignition Timing: Factory Preset

Idle Mixture: factory preset

Plug type: NGK BPR6HS

Lubricant: SAE 20W50

Plug Gap: 0.040 (1.0-1.02mm)

Fuel: 91 Octane min.

Valve Clearance (cold): 0.05-0.10 mm (.002-.004in) (exhaust and intake)

Exhaust Emission Control System: 3TWC

This vehicle conforms to all US EPA and California regulations applicable to 2014 Model Year New Motorcycles.

10. Owner's Documents

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New Address Form	10-3



NEW OWNER FORM

To transfer warranty / register with Ural when purchasing a pre-owned Ural Motorcycle, please fill out this form and mail to the address below. This will ensure that you will benefit from any remaining warranty coverage.

☐ Check here if you also want to receive newsletters and other promotional materials from Ural **

VEHICLE IDENTIFICATION NUMBER

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

NEW OWNER'S NAME _____

ADDRESS _____

_____ APT. NO. _____

CITY _____ STATE _____ ZIP CODE _____ - _____

PHONE NUMBER (_____) _____

E-MAIL (optional) _____

DATE OF SALE ____/____/____
MO DAY YEAR

ODOMETER READING AT THE TIME OF TRANSFER _____

Purchased From _____

City _____ State _____ Zip Code _____ - _____

Mail this form to:

Irbis Motorworks of America, Inc.
14700 NE 95th St., Suite 102
Redmond, WA 98052

Or fax to: (425) 250-6762

**We never sell or rent your personal information to third parties unaffiliated with Ural.



NEW ADDRESS FORM

If you move, please fill out the form and mail to the address below. This will insure that you continue to receive all correspondence from Irbit Motorworks of America.

VEHICLE IDENTIFICATION NUMBER

OWNER'S NAME _____

OLD ADDRESS _____ APT. NO. _____

CITY _____ STATE _____ ZIP CODE _____

MY NEW ADDRESS IS:

NEW ADDRESS _____ APT. NO. _____

CITY _____ STATE _____ ZIP CODE _____

Mail this form to:

Irbit Motorworks of America, Inc.
14700 NE 95th St., Suite 102
Redmond, WA 98052

Or fax to: (425) 250-6762

****We never sell or rent your personal information to third parties unaffiliated with Ural.**

11. Schematics

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Wiring Diagram	11-2

2014 URAL Motorcycle Wire Harness

