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THE **KAWASAKI** TECHNICAL MAGAZINE

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Diesel MuleTM 2510

by Don Church Manager, Service Training and Communications

Hey Kawasaki Dealers, there's a new Mule[™] kickin' in its stall and it's a whole different breed. We're not ready to throw open the gate just yet, so some of the following details could change, but there are so many exciting new features, you just gotta listen up.

The new Diesel Mule 2510 utility vehicle (KAF950-A1) features a proven three-cylinder four-stroke diesel engine with a gear-driven camshaft and overhead valves. With a bore and stroke of 72 x 78mm, it displaces 952cc and produces 24.5 horsepower at 3600rpm with a maximum torque of 34.4 ft-lb at 2600rpm. The rest of the machine is based on the Mule 2510 4X4 with the same HI/LOW range transmission and two or fourwheel drive employing a limited-slip front differential. It uses the same beltdriven continuously variable transmission.

New Features

- New coil springs over the rear shocks help increase the cargo bed load capacity from 803 lb to 1100 lb. Larger 23inch tires help carry the load.
- A new Donaldson high capacity cyclone-type air cleaner has an air filter restriction indicator to monitor the air filter condition and indicate when cleaning is needed.



Where's the combustion chamber? (Answer: With a compression ratio of 24.8 to 1, there isn't one) Seriously, the removable plug in the head is part of the swirl-type auxiliary combustion chamber where fuel is injected and first ignited. Combustion exits the "bat wing" hole in the plug into the pocket in the piston and the main combustion chamber.

- Two radiators cool the new engine. The second radiator is located under the seat along with a fuel priming pump that has an integrated fuel filter and water drain.
- A separate, belt-driven, 40-amp alternator charges a heavy duty 52 amp/hour battery with power to spare for accessories.

Why a Diesel Mule?

- Economy—Diesel fuel is generally less expensive than gasoline and offers better fuel economy. Agricultural and industrial users can refuel from the same tank they use for other machinery.
- Durability and Reliability—There is no ignition system.
- Torque—This unit produces lots of torque over a wide speed range; just perfect for a vehicle made to work from sun up to sun down.

Diesel Technology

The basic engine from the pistons down to the oil pan is standard automotive technology, but extra sturdy for its diesel application. From the head gasket up, things are quite different from gasoline engines. It still uses a camshaft, rocker arms, and valves, but combustion is totally different. *Why*?

The answer lies in the basic principles of diesel technology. In the gasoline engine, the mixture of air and fuel is supplied into the cylinder then ignited by a spark plug and burned at a controlled rate. In a diesel engine, air alone is supplied into the cylinder where it is compressed to a very high pressure and temperature (500 to 700 degrees Celsius). An injector then sprays fuel into the combustion chamber near the end of the compression stroke and fuel particles ignite by themselves. Thus, combustion occurs almost simultaneously at many points within the combustion chamber, producing the diesel engine's characteristic knocking noise.

The compression ratio of the Diesel Mule 2510 is 24.8:1 with 483 psi of compression at 300 rpm. The standard Mule 2510 has a compression ratio of 10.3:1 with 206 psi of compression at 490 rpm.

Cont'd on page 12

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K-Tech News **Collections**

by Dave Corey Writer/Producer

TECHN



There are now six K-Tech News compilations available, including Street Motorcycles, Off-Road Motorcycles, Watercraft, Utility Vehi-STECH NEWS cles, ATVs, and Generators. You can purchase any of these handy reference manuals from Kawasaki's **Technical Services** Department for only \$6.50 each.

You will find these and Technical Services Depart-

To order, contact Technical Publications at (949) 770-0400 ext. 2472 or fax us at (949) 460-5629.

New Optional Parts Grid on KX Microfiche

RONT

by David Behlings Parts Data Coordinator

This year, along with

K-Tech News compilations,

we decided it was time to

volume. For the first time,

Kawasaki street motorcy-

cles ever published in K-

Tech News. Included are

add a street motorcycle

you can have access to

every article related to

the usual updates to the

Kawasaki has added a new microfiche grid called Optional Parts which shows the top-end rebuild kit with all included parts and quantities. You can find this grid at the end of the Chassis section on the microfiche, dated March 1999, for the KX60-B15, KX80-W1/W2, KX125-L1

and KX250-L1. This information will appear on the next edition of KIC, Volume 3, 1999, which is due to dealers the end of May.◆

NEWS

many other useful publications listed for sale on page 18 of the Kawasaki ment, Catalog of Resource Materials.

not be enough. If an employee had a bad attitude; the product was returned dirty; the customer had to wait forever for help, or

just did not perceive any value in your service, they may not be back. Dealers come up with ingenious ways to take care of customers. A dealer close to a movie theater, bowling alley, restaurant, or deli, could give out

Share Your

Customer

Service Tips

The importance of customer

service can never be overstated.

and at the right price, but it may

You may fix it right, on time.

free passes or meal tickets (they purchased at a discount) to customers waiting for extended repairs, tune-ups, or new vehicle assembly. These customers receive a special benefit and are no longer looking over the technician's shoulder. Customers waiting for shorter periods are encouraged to walk around your store to add potential sales.

K-Tech News would like to invite Kawasaki dealers to share vour customer service ideas with us. We will put the best tips along with your dealership name and location, in future issues of K-Tech News. Send your tips to:

Attention: John Griffin Kawasaki Motors Corp., U.S.A. 9950 Jeronimo Rd. Irvine, CA 92618-2084

News

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MIII B

CHNEWS





PISCATAWAY/ GRAND RAPIDS

IN SEARCH OF THE ELUSIVE 22MM ALLEN

Several dealerships have called to ask where they can get a 22mm Allen to remove the front axle and swingarm bolts on the new ZX-7R, ZX-9R, and ZRX1100. Unfortunately, none of the standard tool companies carry this tool.

Here are a few ways to solve the 22mm Allen problem:

- The tool kit with these models includes a spark plug wrench with a 22mm Allen on the opposite end. This can be used in a pinch but is not your everyday shop tool.
- A 9/16-inch American bolt from your local hardware store will have a



nominal 22mm (7/8-inch) head. This can be welded or brazed into an appropriate socket to make a better wrench than the one in the tool kit. Note—If you plan to use this Allen with an air impact wrench, use only an air impact socket.

- The impeller removal tool (P/N 57001-1228) also has a 22mm head and could be brazed or welded to a socket.
- For a first class shop tool, use 7/8inch cold rolled steel hexagonal bar stock and a half-inch drive 22mm impact socket. You will need to draw file .004 inches from each flat of the 7/8-inch bar stock as it is slightly larger than 22mm. Fit the stock to a 22mm impact socket and either rollpin or braze in place. Round off all sharp edges with a fine file and then wire brush to smooth all the corners.
- If you can't find 7/8-inch hex bar stock locally, you can order some from Blue Ridge Machinery, 2905 Putnam Avenue, Hurricane, WV 25526, at (304) 562-3538. They sell materials to the hobby industry and have six- and twelve-inch lengths of bar stock available for about \$5.00 plus postage. A 6-inch length makes at least two wrenches and you can make four wrenches from a 12-inch length.

Take the time now to make one of these 22mm wrenches. You will need one for setup and service, and the busy season is fast approaching!

> Fred DeHart 201 Circle Drive N. #107 Piscataway, NJ 08854 (732) 469-1221



ATLANTA/TULSA

An Easy Way to get More PRM

That's not a typo— PRM is Public Relations Mileage, and if you are near an AMA Supercross, Motocross, Road Race, Drag Race, or Off-Road event, one of the best ways to boost your PRM is to host an Open House featuring Team Kawasaki. Call Kawasaki's public relations firm, Freeman McCue at (714) 557-3663, to request an autograph session.

Millennium Kawasaki in Lilburn, Ga., near Atlanta, has held an event with the AMA Supercross two years running. Coowners Ken Shiver and Chris McDonald cite several benefits. "It's good PR because it shows your customers you care enough to bring in their heroes," says Shiver. It's automatically an exciting event. Add a few touches to make it festive and fun and it becomes something people will remember and associate with your shop.

The highlight is the riders and their autograph session, but don't stop there. Make the whole

evening an event. That's a big task, but there is a lot of help available if you ask. "We had great support from motocross vendors," Chris McDonald says. "Many of them (including your KMC Accessories rep) will donate items you can give away at the event. Give everyone a ticket at the door and draw prizes all night. That brings the crowd in early and keeps them interested. We even managed to feed the crowd, since Subway is a Supercross sponsor and they kindly donated sandwiches."

A lot can be done if it's a storewide event. Shiver and McDonald credit Parts Manager Keith Davis for a lot of the success. "He made sure we had plenty of the right gear and Kawasaki accessories, worked up sale prices for everything and made sure it was displayed attractively. With his help, we turned a stock KX into a Team Splitfire replica. It didn't sell that night, but it will." Davis has a tip to share: "If it can be autographed, you can sell it! Have plenty of Kawasaki Tshirts and ball caps on hand."

Hosting Team Kawasaki adds credibility to your store, says McDonald. "Serious dirt riders want a serious

News

Regional News -cont'd

shop; they want to know you're into it. Bringing in the pros sends that message." Millennium estimates a crowd of 350 to 450 at this year's Open House, but, says Shiver, "don't judge the success just by the day's receipts. Have a good event, spend time with the crowd, and you'll see these people again over the next weeks and months."

Walter Rainwater 6110 Boat Rock Blvd. S.W. Atlanta, GA 30378 (404) 349-2000



IRVINE/TACOMA

ULTRA 150 FEATURES

The all-new Ultra 150 Jet Ski® watercraft has many new features. Some can be a technician's nightmare if a little precaution is not used. As stated in Tool Corner (*this page*), there are four new special tools required to service the JH1200-A1. To remove the flywheel mounting bolt, hold the balancer drive gear, not the flywheel, with Rotor Holder (P/N 57001-1428). Do not use the Band Fly-0 wheel Holder (P/N 57001-1313) or any other holder on the flywheel because it is thin and can easily be damaged. Use the Flywheel Puller (P/N 57001-1426) which screws onto the flywheel hub to remove the flywheel. Once again, do not hammer or pry on the flywheel.

Use Coupler Holder (P/N 57001-1423) to remove the new couplers. Be sure to apply a small amount of silicone sealant on the coupler's threads before torquing. The new mixed flow pump uses a different impeller and impeller shaft which require the use of Impeller Holder (P/N 57001-1425) to hold the shaft during impeller removal. The JH1100/JT1100 Impeller Wrench (P/N 57001-1228) is also used on this model.

If the impeller or bearings are removed, make sure they are installed properly. After torquing the impeller, the impeller and shaft should rotate with 26 in.-lb of force or less. If not, check the condition of the pump housing bearings and make

Hold the balancer gear, NOT the flywheel



sure they are seated properly in the pump.

In the electrical department, the Ultra 150 uses a peak voltage adapter made by KOWA SEIKI (P/N KEK-54-9-B) that adapts to the Kawasaki analog multimeter (P/N 5700-1394). The adapter is required to check the primary voltage on the igniter and pick-up coil assembly.

The ULTRA uses two electrical boxes. The forward box contains the igniter and coils, and the rear contains the regulator/rectifier and starter relay. Be careful when removing the clips holding the top covers on the boxes because they appear to be hinged, but are not. They will probably fall into the hull. The electrical system is allnew on this boat so be sure to attend the Jet Ski Electrical Troubleshooting class this autumn.◆

> *Rob Taylor* 9950 Jeronimo Road Irvine, CA 92618 (949) 770-0400



by Rob Taylor Supervisor, Curriculum Development

New special tools for the Ultra 150

See the Irvine/Tacoma regional article (this page) for special precautions for using these tools. There are four new tools required for the JH1200-A1: Flywheel Puller (P/N 57001-1426), Rotor Holder (P/N 57001-1428), Coupler Holder (P/N 57001-1423), and Impeller Shaft Holder (P/N 57001-1425). To check the throttle position sensor use Harness Adapter (P/N 57001-1400) which is also used on the '98-99 ZX-9R, '99 KX125 and KX250, '99 ZRX1100, and the 1998-'99 Vulcan™ 1500 Classic and Nomad[™] cruiser models.

Vulcan™ 1500 Drifter™ special tools now available



There is one new tool for the Drifter, which is a Fuel Pressure Gauge Adapter (P/N 57001-1417). This is used with the existing Pressure Gauge (P/N 57001-164) to perform a fuel pressure check on the fuel injection system. Install the adapter between the main fuel filter and fuel supply block. Refer to the service manual for testing procedures.◆

Adding Electrical Accessories

by John Griffin Instructional Designer/Instructor

"How many accessories can I add? Can I hook up an electric vest? Can I add grip or glove warmers? What about adding a radio, CB, or cell phone? What if I just turn them on when going fast? Will my battery go dead or will it be ok?"

Adding electrical accessories to most motorcycles can create problems, but some customers demand them. What should you do? Conduct a "break-

even test" on their unit to determine if the electrical output is sufficient to power that accessory. Use the ammeter function of the Kawasaki multimeter (P/N 57001-1394). This function is included on most multimeters. To conduct this test:

turn the key off, switch the meter dial to 20A (or the equivalent on your meter), plug the red lead into the DC20A outlet and attach it to the negative (-) battery post - not the cable. Plug the black lead into the common (-) outlet on your meter and connect it to the battery end of the ground cable. Before you push the start button, hold the battery ground cable to its battery post, then hit the start button. If you forget to do this you will damage



Before you push the start button, hold the battery ground cable to its battery post. If you forget to do this you will destroy your meter or blow its fuse.

Once running, pull the battery ground cable away from the negative post. This bike is charging the battery with 6-7 amps at idle.



If the needle moves to the left, you have a negative flow of amperage.

This means the battery is actually discharging. As the engine rpm increases, the charging output should increase from a negative flow, to the break-even point which is the rpm at which the battery is neither charging nor discharging. In other words, when the charging system output is just enough to power all the electrical equipment in use. Write down the break-even rpm. Above this rpm positive (or charging) current will begin to flow. The positive flow of amperage will continue to increase with rpm until the voltage regulator kicks in. If you increase the electrical load by activating the high beam,



horn, or turn signals, or the cooling fan comes on, the engine will have to rev higher for the charging system to reach the breakeven point. Likewise, the more electrical accessories you power, the higher the rpm needed to achieve the break-even point. Ask the customer what type of riding they do, such as intown or highway or some combination of both. Try to determine at what rpm they typically ride. On Vulcan[™] motorcycles, you may need to use a digital tachometer to get some idea what rpm that is, since the customer will only know the speed and gear.

If a unit never reaches the break-even point, or reaches it at too high an rpm, there are a couple options. The customer can choose to remove some of the accessories, or you can wire accessories with a separate ON/OFF switch so the user can activate them only when riding above the determined break-even rpm or the customer can.◆

Personal Watercraft Test Tank

by Gregg Thompson Product Support Supervisor

A few years ago, we ran an article encouraging watercraft dealers to purchase a test tank. In that article we also recommended a supplier, Bresee Manufacturing, who we felt offered a good quality tank at a reasonable price. Since then Bresee Manufacturing has improved their tank significantly.



ech Tips

The improved design does a much better job of managing the water flow of today's high performance, large displacement personal watercraft. At wide-open throttle, these big personal watercraft move a tremendous amount of water. Designing a compact tank that will handle this water flow, continuously delivering smooth non-aerated water to the jet pump, without draining the test tank onto the ground or drenching the operator, is no easy task.

We recently had an opportunity to try out this redesigned test tank and were very impressed with the results. It handled a JT1100 at wide open throttle with barely a splash getting out of the tank and no pump cavitation at all. We've seen much larger custom-made tanks that couldn't do that. If you need a test tank, we suggest you consider this one.

For more information, call:

Bresee Manufacturing 14302 Plantana Drive La Mirada, CA 90638 (562) 944-7339.

1999 KX Jetting Recommendations

Here are Team Green's latest recommendations for jetting on the 1999 KX models. These specs are for Sea Level (up to 2500ft) and moderate weather conditions. You may remember we published some jetting recommendations for the KX125 and 250 in a previous issue (Fall '98), but these are different from those. The Team GreenTM technicians continued to experiment with different jetting and found calibrations that worked even better. We suggest you use these specs as a starting point when fine tuning carburetors.—*Ed.* \blacklozenge

KX JETTING	KX60-B15		KX80-	KX80-W2 KX125-L1		5-L1	KX250-L1	
	Stock	T.G.	Stock	T.G.	Stock	T.G.	Stock	T.G.
MAIN JET	200		125		158		158	155
КМС Р/N	92063-022		92063-1334		92063-1367		92063-1367	92063-1366
NEEDLE & CLIP	5114-3		N5HF-3		N7PW-3	N7NW-3	N3YK-4	N3YK-3
КМС Р/N	16009-1220		16009-1960		16187-1089	16187-1084	16187-1074	16187-1074
NEEDLE JET	N-8	N-6	N/A	N/A	N/A	N/A	N/A	N/A
KMC P/N	16017-1215	16017-1259						
POWER JET	N/A	N/A	N/A	N/A	52		55	60
KMC P/N					16159-1055		16159-1054	16159-1057
PILOT JET	30		58	55	45	48	45	
KMC P/N	92064-1030		92064-1146	92064-1145	92064-1142	92064-1143	92064-1142	
SLIDE	2.0		3.0		6.0		7.0	
KMC P/N	16025-1107		16025-1162		16025-1215		16025-1216	
AIR SCREW	N/A	N/A	1-1/2		1-1/2	1-1/2	1-1/2	1-1 3/4
TURNS OUT								



Ultra 150 Assembly and Preparation



by Don Church Manager, Service Training and Communications

How closely did you read the A&P Supplement (P/N 99931-1344-51) for the Ultra 150?

If you didn't read it, we'd like to point out something you haven't seen before on a Jet Ski® watercraft. Open to page 4, and at the bottom of the second column you will see the instruction to torque the three rear mounting plate nuts. Be sure to torque them to the new torque spec as listed here, and again after the first 10 hours of riding.

NOTE: The torque spec for these nuts has been reduced to 19.6 N-m (2.0 kg-m, 14.5 ft-lb).

The studs go through the hull to the deck ensuring that they are precisely aligned and rigidly bonded (especially important for a new boat when the fiberglass and bonding glue are in the final stages of curing).

Another item we want to point out is that the carburetor cable and oil pump cable must be adjusted at the same time - first the carbure-

tor, then the oil pump. See the procedure on pages 7 and 8. Although it seems confusing, if you follow the steps you will get it right. But here's another way to think of it.

First make sure the carburetor cable has slack with the throttle released (in the idle position). Adjust the carburetor cable if necessary. Then apply the throttle fully (wide-open throttle) and make sure there is a gap between the stopper pin on the oil pump and the pulley. (See drawing) Adjust the oil pump cable if necessary. That gap should be approx. 0.5mm.◆



JH1200-A1 Ultra 150 Oil Pump Secrets

by Kenny Osberg Product Support Specialist

Since some of your Ultra 150 customers will be buying them for racing, it won't take long before you get your first inquiry from a customer about removing the oil pump and running premixed fuel. You've been doing that for years, right? However, this time-honored and well known race secret is not a good idea on the new JH1200 engine. The problem is this; the oil pump doesn't just deliver oil to the carburetors, but it also maintains the proper oil level in the two balancer chambers.

Oil that goes to the front and rear balancer chambers passes from the balancer chamber through a check valve into the front and rear crankcases. The oil pump delivers less oil to the outer two carburetors to compensate for the oil coming from the balancer chambers.

Removing the oil pump will eventually result in low oil level in the balancer chambers (especially the rear one, which has a very small capacity) and cause damage to the balancer bearings. You might decide to leave the oil pump on with the balancer oil lines connected, and route the carburetor oil lines back to the oil tank. This would ensure proper lubrication to the balancers but would result in excessive oil to the front and rear cylinders since premixing delivers the same amount of oil to all three carburetors.

The bottom line is this: If you decide to experiment with applying that old race modification to this new product, remember that you are indeed experimenting and at your own risk! And remember that all 1999 watercraft are controlled by Federal emissions regulations. Modifications to the lubrication and fuel systems should only be done for use in closed-course racing.



Ultra 150 Tidbits

by Charles Yim Product Quality Engineer

We recently visited Kawasaki Heavy Industries, Ltd. (KHI) in Japan to learn more about our new flagship PWC, the Ultra 150. We learned a number of technical tidbits that I thought might interest you.

Oil Pump

The oil pump has five outlet fittings. It is important to connect each oil line to the correct fitting since oil output volume is not the same on all of them. As there are no markings on the oil pump to identify them, refer to the drawing in the service manual to assure you attach the lines correctly.

If the oil pump cable breaks or becomes disconnected from the oil pump pulley, the variable orifice inside the pump becomes wide open and oil flow goes to the maximum (for the engine rpm) similar to our older style non-variable pumps. The engine will not be damaged but the unit will begin to smoke and use oil at a faster rate.

Balancer Chambers

After a JH1200 engine bottom end is assembled, the balancer chambers must be filled with twostroke oil (the same as used in the injection tank). The rear chamber takes 20cc of oil and the front chamber, which also contains the starter gears and magneto, takes 200cc.

Cylinders

There are two cylinder





part numbers listed on the microfiche and KIC. One part number is listed for early engines up to number 00999 and the other part number is for engine number 01000 and later. They are not listed as interchangeable but the only difference is the lower exhaust manifold stud hole. On the early cylinder (P/N 11005-3745) that stud hole extends all the way into the water jacket. It requires a 66mm stud with a locking agent on the threads to prevent leakage. The later cylinder (P/N 11005-3737) uses a 56mm stud and doesn't require a locking agent. The earlier cylinder (P/N 11005-3745) has a "5" punched on the outer top surface of the exhaust port for easy identification.

Overheat Sensor

The engine overheat sensor is threaded into a small cavity located in the top of the expansion chamber. This cavity is filled with 10W30 engine oil. This cavity only holds 0.8cc of fluid, but it must be filled with oil for the sensor to function properly. Don't loosen this sensor unless you have to replace it because it's not that easy to refill the cavity due to its orientation.

Hull

There are grooves (seven on each side) at the bottom rear corners of the Ultra 150 hull. These grooves are about 260mm long and about 2 mm wide and are designed to reduce any tendency of the hull to bounce at high speeds on smooth water.

Meters

When the ignition is turned on, all eight LCD segments of the fuel gauge light up for two seconds as part of the self-check feature. After that, only seven of the eight segments will light even with the fuel tank completely full. The eighth (top) segment does not light during normal operation.◆

Salt Water Protection for your PWC



When a watercraft is used in salt water and not protected, salt deposits form throughout the cooling system and jet drive. These deposits produce

rapid corrosion of metal parts. The salt deposits and corrosion in the cooling system can reduce the effectiveness of heat transfer, causing the engine to run hotter and eventually (in extreme cases) engine damage. Deposits and corrosion in the jet pump can cause abnormal wear and premature failures.

Salt Eliminator is a salt "deactivator". It can be used to flush cooling systems or as a spray on watercraft exteriors and jet pumps to remove salt deposits and protect against corrosion after the vehicle was used in salt water. Once applied, a protective coating stays on the surface until the next use. Always rinse the craft and flush the cooling system with fresh water before applying Salt Eliminator.

When used to flush the cooling system, concentrated Salt Eliminator is placed in a mixer device (which comes with the quart size container), and connected between the flush hose and the watercraft. The mixer automatically provides the proper mix to fight salt-induced corrosion in the cooling system. It is also available in a pre-mixed spray to use on finished surfaces and jet pumps. —*by Roger Davis, Senior Product Specialist* Salt Eliminator:

Quart with mixer device	K61080-109	Dlr.: \$14.97	Ret.:	\$29.95
Gallon refill	K61080-108	Dlr.: \$17.47	Ret.:	\$34.95
Oz. spray	K61080-110	Dlr.: \$4.48	Ret:	\$8.95

Drifter™ Fuel-Injection Tips

by Gregg Thompson Product Support Supervisor

Engine Idle Speed

Do not adjust the engine idle speed on a Vulcan[™] 1500 Drifter[™] cruiser with a

Dowel Pins

cold engine. The idle speed is affected significantly by the ISC (Idle Speed Control) valves until the coolant temperature reaches about 100 degrees F. By the time the engine is warm, the ISC valves will no longer be operating and proper idle speed adjustments can be made.

Throttle Body Dowel Pins There are two brass dowel pins between the Fuel Injection Throttle Body and the Intake Manifold. They don't fit very tight in either part. Whenever you

KawaChem 100% Synthetic Motorcycle Engine Oil

Kawasaki has just released our new 100% Synthetic Engine oil in the USA. This is our top of the line, premium high performance engine oil. It is blended by MOTUL® and primarily designed for engines used in severe applications such as all-out sport bike riding or slow speed, high temperature stop-and-go traffic. The oil has a balanced lubrication package that allows the wet clutch to operate efficiently and helps to extend plate life. The oil has an extremely high resistance to thermal viscosity breakdown with the ability to handle running temperatures up to 330 degrees Fahrenheit and a maximum temperature of 475 degrees Fahrenheit. Because of the high-quality synthetic base oils, when the oil is super heated in critical areas such as valves and ring grooves, almost no coking deposits are left. This oil uses both PAO and ester synthetic base oils. The oil is polar, so it sticks to iron and steel. This means your engine never starts metal to metal. It has up to three times more film strength than petroleum oils and up to two times that of blends. It utilizes a strong anti-foam additive to keep oil



pressure high and heat transfer at a maximum level.

Available in one-quart easy-pour bottles. Exceeds API SG/SF/CD and CCMC G-5 standards. — by Roger Davis, Senior Product Specialist

separate those two parts, be careful not to drop the dowel pins into the engine.

Coolant Temperature Sensor

The engine temperature Sensor is mounted in the bottom of the thermostat housing under the speedometer. Unlike our previous fuel injection systems, which sensed cylinder head temperature, this one senses coolant temperature. It will not function properly if the coolant level is low. If the coolant level is low, you might notice the ISC valves working overtime or the vehicle might run rich when warm.

Vehicle Down Sensor

If a Drifter tips over while running, the fuel injection and fuel pump will shut off (after about five seconds). When this happens, the unit will not restart until the ignition switch has been cycled off and back on. However, the starter motor will work, so someone who is not aware of this could run the battery down trying to restart it. Make sure your dealership personnel and Drifter customers know about this.

Drifter TM Accessory Load

by Gregg Thompson Product Support Supervisor

Please be aware and inform your customers that the Kawasaki VN1500 Drifter[™] motorcycle has a maximum electrical accessory load capacity of 70 watts. Adding too many electrical accessories can cause the battery to discharge over time. This, of course, will depend to a great extent on how the motorcycle is ridden. The more time spent on the highway, the more electrical load it can handle. The more time spent in town and in traffic (where the engine is turning slower plus the demand from turn signals, brake light and the cooling fan is much higher) the less accessory load it can handle.◆

lech Tips

Drifter™ Throttle Sensor

by David Behlings Parts Data Coordinator

As you all know by now, the Vulcan[™] 1500 Drifter[™] is our newest fuel-injected model. Some of you may have worked on our older fuel-injected models like the ZX1100-A1 GPZ 1000 back in 1983. The throttle position sensor on that model was adjustable with a special tool. The Drifter's throttle sensor is incredibly sensitive and plays a large part in fuel delivery. It should not be adjusted and is not sold separately from the throttle body. Please take special care so you don't bump or damage the Drifter throttle sensor.



"...I Read About It on the Internet"

by Steve Rice Product Support Specialist

Ever had a customer come into your store waving a stack of computer printouts, all Internet postings, all from different Internet users, and all about the same problem on the same model motorcycle? Of course the customer wielding the Internet postings owns the same model motorcycle. If you've had this happen, you're not alone; if you haven't, you probably will.

Ah, the Internet, the Information Age, the Age of Enlightenment. Or is it the Misinformation Age, the Age of Confusion? The customer with the computer printouts will probably fall into one of two categories.

First, this customer may have been complaining about the same symptoms on his motorcycle as described in the Internet stories. In this case, the Internet may serve a useful purpose, especially if the customer's complaint has never been verified or if your repair attempts have been unsuccessful. In this case, the information the customer discovered on the Internet could serve to legitimize his complaint or even provide your service department with some clues as to the solution. This is good... the Age of Enlightenment.

The second category includes two possible scenarios. Either the customer has never complained of this problem before but now he says he has had the problem all along, or he doesn't claim to have experienced the problem but is sure he will and wants his bike fixed before he does. This is not so good...the Age of Confusion (or Fear).

These situations (the good scenarios as well as the bad) are often made much more difficult by the fact that these Internet postings are frequently riddled with incorrect or misleading information. After all, there are no minimum requirements for intelligence, education, experience, communication skills or honesty that someone must meet before posting a story on the Internet. And there is no way to know for sure what motivated a person to post a story. This is important for your dealership to remember when dealing with one of these customers. Anyone can post anything they want for any reason. This is why all Internet postings should be viewed with a healthy dose of skepticism. If you have any doubts about your customer's claims or stories on the Internet, call our Technical Hotline and discuss the situation.

Also be aware that millions of people (worldwide) read the Internet, and that your dealership is vulnerable to that same information/misinformation potential. A very happy customer or a very unhappy customer could decide to air his opinion publicly on his computer. Whether he's speaking the truth or not, what your customer writes about you will be read (and believed) by lots and lots of potential customers. As always, word-of-mouth advertising is a powerful thing, but now the stakes are much higher. And as always, an unhappy customer is much more likely to voice (or post) his opinion than a happy customer. So providing good customer service—treating your customers with fairness and honesty, may have more effect on your future success than ever before.

Diesel Mule™ Tour

by Carole Langford Media and Public Relations Coordinator

The Diesel Mule[™] Tour officially began with a stop in Central California, January 13, 1999. Since then they have made 43 stops, visiting dealers and customers in Nevada, Oklahoma, Texas, Louisiana, Mississippi, and Alabama. By the time you read this, the tour will have continued on through Georgia and Florida.

The tour has had an enthusiastic response. So far, 475 people have driven the Mule and Kawasaki has given away 620 hats! The dealers have received the tour in a variety of ways. Some demonstrated to their staff only, while others invited customers and had a catered breakfast and/or barbecue. The only problem so far has been telling the dealers and customers they must wait a short while before they can get their own.

<image>

Cove

The DM950D three-cylinder diesel engine in the Diesel Mule[™] 2510 uses a gear driven Bosch VE-type injection pump made by Nippon Denso. Fuel delivery is controlled mechanically. The throttle controls the amount of fuel delivered to three injectors via the carefully designed, equal-length fuel pipes. The injection pump incorporates a governor and timing advancer, also mechanical. The correct timing must be set using a dial indicator to measure plunger stroke at TDC of the number one piston.

Diesel Mule™ 2510 -Cont'd

The diesel combustion chamber design is critical since it must control the mixing of the injected fuel with air, and the uniform combustion of the mixture. The Diesel Mule engine uses a spherical auxiliary combustion chamber. Air compressed by the piston enters the swirl chamber where the fuel is injected. High turbulence in the swirl chamber helps most of the fuel to burn before it enters the main combustion chamber through a small transfer passage.

Fuel Injection Pump

The Nippon Densomade, Bosch VE-type injection pump delivers pressurized fuel to the injectors. It is gear driven and timed to the crankshaft to deliver fuel to each cylinder on the compression stroke. Accurate timing is critical. Fortunately, once timing is set, it doesn't need to be readjusted.

The injection pump has a mechanical advancer for optimum injection timing at different engine speeds. It controls engine power and speed by varying fuel volume to the injectors with its built-in governor connected by cable to the vehicle's throttle pedal.

Even the injectors are completely mechanical, with pin-type nozzles. As fuel from the pump rises in pressure, it overcomes the spring force and pushes the needle off its seat in the nozzle body and fuel sprays into the swirl chamber. Extra fuel flows through the injectors to cool them and then returns to the fuel tank. The fuel injection nozzles can be tested using a commonly available nozzle tester and disassembled and cleaned if necessary. The opening pressure can be adjusted by altering the spring tension with different thickness shims.

Requirements

Clean fuel is a must for diesel fuel pumps and injectors to function prop-

erly. The fuel pump is sensitive because it functions as a distributor and throttle since there are no spark plugs or throttle butterfly plates, for those of you new to diesel technology. Contaminants and water can cause expensive damage, so a fuel filter, water separator, and priming pump is mounted under the seat. The filter element is replaceable and there is an outlet on the bottom to allow the draining of water from the system.

Kawasaki will be releasing more information on this exciting new model as we get closer to its scheduled September 1999 release.◆