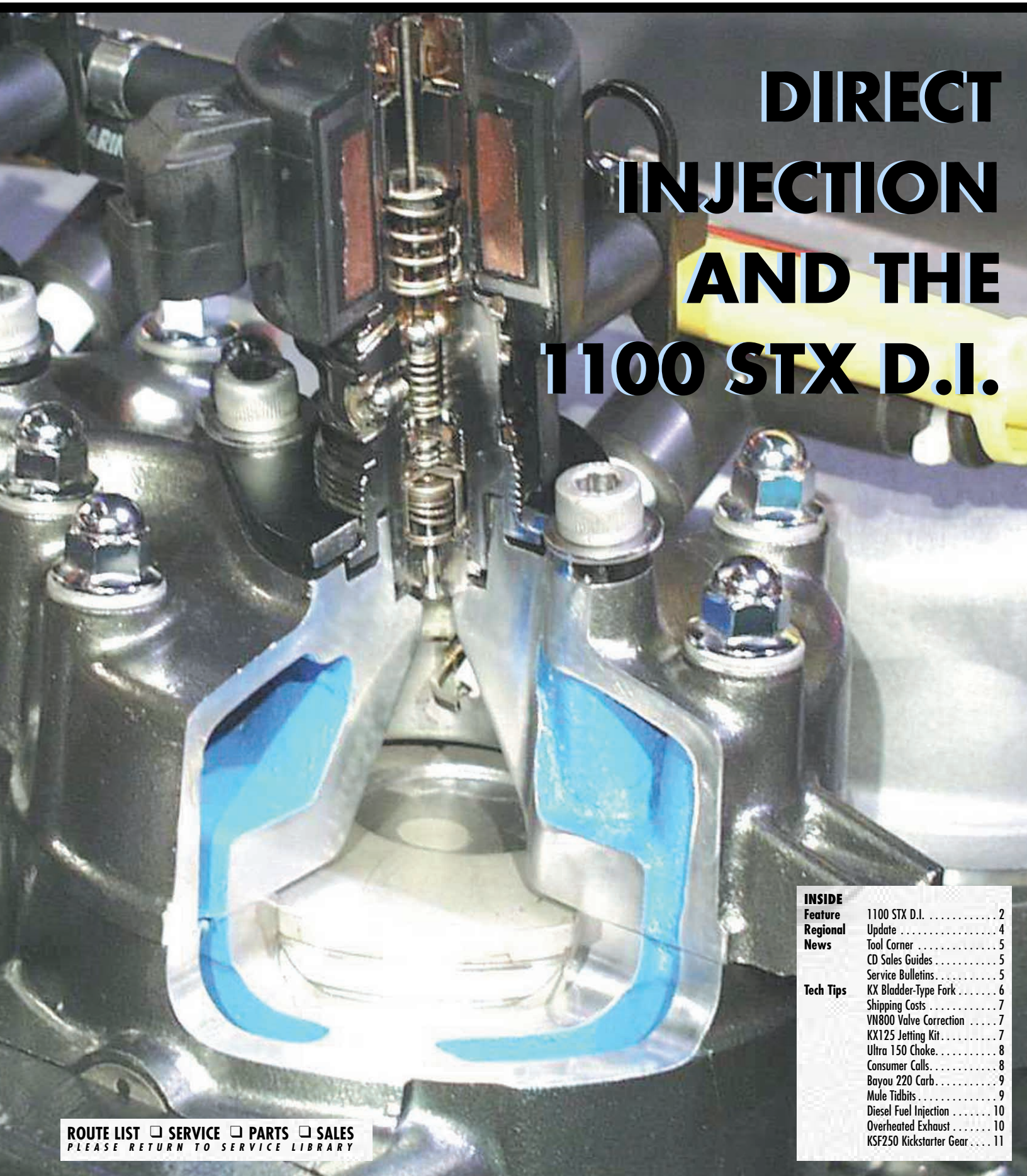
K-TECH NEWS

WINTER 1999-'00 THE **KAWASAKI** TECHNICAL MAGAZINE VOL. 12, NO. 4

DIRECT INJECTION AND THE 1100 STX D.I.



Direct Injection and the new 1100 STX D.I.

by John Griffin
Instructional
Designer/Instructor

The FICHT® Direct Injection on the new 1100 STX D.I. is the most sophisticated induction system ever used on a Jet Ski® Watercraft. A brain called the Engine Management Module (EMM) controls unique fuel injectors to spray a precise amount of fuel directly into the combustion chamber for unmatched throttle response and acceleration. Most of the fuel is sprayed into the cylinder after the exhaust port is closed by the piston, so there is little waste. It uses about 30% less fuel and nearly 50% less oil for about a 60% reduction in emissions.

The Engine

The engine has many similarities with the 1100 STX because the FICHT® system does not require radical changes to the bottom-end or cylinders. The main change below the cylinder head is that the crankshaft now uses a double row bearing between the #1 cylinder and a new high output stator assembly.

The double row bearing is lubricated directly by the oil pump with a new (fourth) oil line connecting to the cases. The other bearings, connecting rods, cylinders, and pistons are lubricated in a more traditional manner.

Ficht engine with sensor layout (Use sensor.ppt with arrows & letters or sensor.jpg and K&D can add their own.)
No caption

Intake system with oil pipe (jt1100int.jpg)

Lubrication is handled by oil pumped through nozzles into the air stream and by an extra oil line pumping oil into the cases for a new double row #1 main bearing.

An all-new hull softens the ride by reducing wave shock, while new sponsons improve cornering. A revised jet pump and more powerful engine boost thrust to 851lb. ft. for a craft that is 8 mph faster and has quicker acceleration. Storage is nearly doubled to 23.5 gallons, with a new tub under the front hood.

Oil is pumped from the variable output pump into each intake where it is picked up by the air stream between the throttle plates and new six-petal reed valves. Because there is no fuel to dilute the oil, much less is required.

The top-end of the engine is all new. The cylinder head has new bell-shaped combustion

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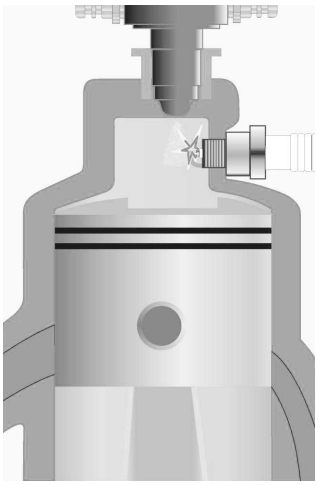
chambers with access for one high-pressure injector on the top and one extended nose spark plug (NGK PZFR7G-G) in the side for each cylinder. The pistons have a "splash port" dish formed in the crown to help atomize the fuel spray in the homogeneous mode (more on this later).

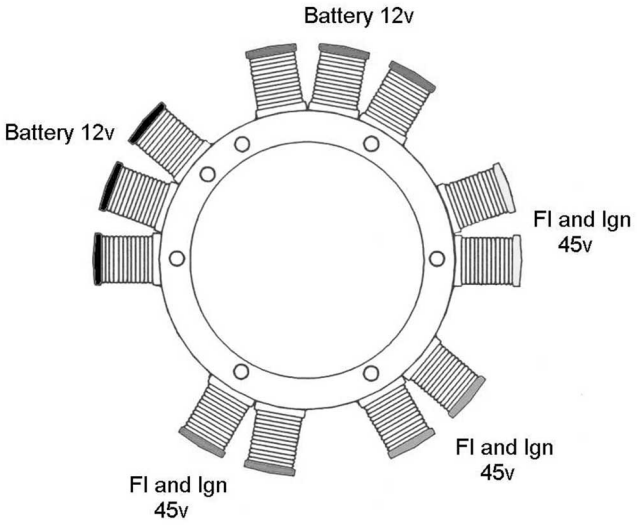
The Injectors

The EMM powers an electromagnet in the injectors with 45 Volts to blast fuel into the cylinder at pressures over 250 psi, up to 150 times per second. The electromagnet moves an armature, which acts like a high-speed piston pressurizing the fuel in the nozzle end of the injector. When this fuel pressure exceeds the nozzle's poppet valve spring pressure, it sprays fuel into the combustion chamber. It takes high pressure to overcome normal engine compression in the combustion chamber. Since the injector produces the high pressure, a standard fuel pump and fuel lines are used at a regulated 25 psi.



Stratified combustion is used below 5500 RPM. Fuel is ignited just after it leaves the injector with the spark plug firing as many as 15 times to burn fuel more completely.

Each injector is flow tested for fuel output. These flow rates are programmed into the EMM map data to achieve near identical output in each cylinder for optimum combustion. Each injector is marked with a serial number and the number cylinder it is installed in. Make sure you keep the injectors with the correct cylinder. To replace an injector, you must use a computer linked to the EMM to tell it that you have installed a "replacement" injector. This changes the injection program map for that cylinder to a special default setting. To replace the EMM, you must use the service utilities function in the diagnostic software to transfer data from the old EMM and program it into the replacement. This may sound complicated, but is a simple procedure.



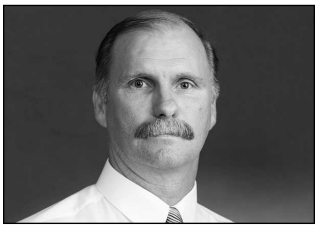
The high output stator has separate coils for a 45-Volt system and a 12-Volt system

Engine Management Module (EMM)

The EMM is more than just the brain of this boat. It also contains the regulator/ rectifier for a 12-Volt system used for the battery and gauges, as well as a 45-Volt system for the injectors and ignition system. Water from the engine cooling system flows through the EMM's water jacket to fight heat

Continued on pg. 12

IRVINE/TACOMA



Diesel Mule Notes

Note #1

If you plan to check engine compression on a Diesel Mule keep this in mind. You will need the unique compression gauge adapter (57001-1431) and a compression gauge that has a range up to 1,000 psi. Make sure you find the fused brown wire under the seat and remove the fuse before you turn the engine over. If you don't, the engine can start while you are checking compression.

Note #2

The Diesel Mule valve guides are replaceable with an oversize guide. When installing a new valve guide, DO NOT hammer the guide into the head using the driver. The guides are pre-sized and have a slightly larger ID than the final specification. When installed in the head, the interference fit will put the guide into proper specification. Install the guide into the head using the guide driver and a PRESS. Hammering the guide into place with the driver could distort the guide making it unusable since there is no reamer available.◆

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

ATLANTA/TULSA

Can You KIC?

While recently conducting the 2000 Service Update Seminars, I learned there was a large percentage of attendees that have still never used KIC. They don't realize how valuable a tool KIC is, and have not learned to use it.

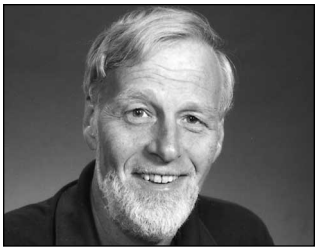
KIC (*Kawasaki Information Center*) is part of K-Share and is sent to K-Share dealers on a CD-ROM with updates every two months. KIC has all of the parts information like a "microfiche on CD," but it offers much more. KIC has all of the flat rate information, service bulletins, and even sales literature. There is so much information available with just a few clicks of a mouse button!

K-Share is full of features to help dealers conduct business with Kawasaki. Kawasaki continually adds new features like the latest, Electronic Document Distribution (EDD). To keep you and all your employees up to date on K-Share and KIC, we are offering a one-day training class at our training centers. The course is great for new and experienced users. Please refer to the 2000 Training Schedule for the class dates nearest you and register early.

K-Share/KIC is a valuable business tool. Use it to its fullest extent.

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

PISCATAWAY/ GRAND RAPIDS



Power Partner 6000 Low Oil Level Sensor

On some Power Partner 6000 Generators, the low oil level sensor causes the engine to not start, or quit, even if the oil level is correct. This could happen all the time, occasionally, or just in cold weather. Disconnecting the lead wire to the switch will allow the engine to start and run continuously. Be sure to confirm the unit is at the proper oil level before disconnecting the sensor switch lead wire!

If you encounter this problem, the Kawasaki Small Engine Division developed a kit (P/N 99916-2152) to fix it. The kit consists of a new oil level sensor, switch bracket, and a spacer that better positions the sensor in the crankcase. These parts are pre-assembled and can be bolted directly in place of the old parts.

Power Partner 6000 engines above # 57823 should have the new parts installed from the factory.

If you install the oil level sensor kit parts, it's recommended that you also install a new ignition controller (P/N 21177-2064) with a third wire lead. The third wire is an external ground that should be bolted to the engine along with the ignition ground wire. The old controller could burn out the reed switch contacts in the oil level sensor due to high current levels when the switch shuts off the ignition in a low oil level situation.

If you have any problems obtaining these parts, contact Mr. Jerry Hooker at the Kawasaki Grand Rapids Parts Department, 616-949-6500.

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

2000 Product Sales Guides on CD

Kawasaki has distributed a CD-ROM containing the new Product Sales Guides and Quick Reference Guide again this year. Even though your store received one CD, you can order additional copies for only $10.00 each. These publications have detailed information on every 2000 model and the valuable KAW-PEDIA. The "Tech Features" sheets towards the back of each book are full of technical highlights. The Quick Reference Guide contains specifications in a format that simplifies model comparisons. Contact us at (949) 770-0400 ext. 2463 to order extra CDs.

Note: this CD contains Adobe Acrobat Reader 4.0 which is used to view the documents and search for information. This CD will run with the 3.0 version, if you already have that installed on your PC.◆

–Don Church, Manager, Service Training and Communications

Reminder! Important Service Bulletins

by Don Church
Manager, Service Training and Communications

Kawasaki has recently issued some important service bulletins. Reacquaint yourself with these bulletins now. It is likely that many customers will wait until spring to have these repairs made since their machines are currently in storage.

Make this a policy in your service department: use the K-Share Vehicle Service Inquiry (VSI) to check the warranty history of every Kawasaki you take in for service. VSI will show you if a unit is eligible for a Recall or Factory Directed Modification (FDM). Plus, it will show you if a claim has already been submitted for the repair.◆

Jet Ski Watercraft

Bulletin Number	Subject	Model
JS 99-03 RECALL	Steering Cable Nut Failure	JH1200-A1
JS 99-04 RECALL	Fuel Pump Leakage	JH1100-A3/A4 JT1100-B1/B2, JT900-B1
JS 99-05 FDM	Exhaust System Overheating	JH1200-A1

Motorcycle

Bulletin Number	Subject	Model
MC 99-02 RECALL	Vehicle Down Sensor	VN1500-J1/L
MC 99-04 RECALL	Back Torque Limiter Spring Breakage	ZX750-P4/4L/5/5L ZG1000-B14/14L/15/15L ZG1200-B13/13L/14/14L
MC 99-05 RECALL	Fuel Hose Leakage	VN1500-J1/L

ATV

Bulletin Number	Subject	Model
ATV 99-02 & ATV 99-03 RECALL, issued 6/99	Steering Knuckle Failure	1997-'99 Prairie Models

Tool Corner

Mule 2510 Diesel

There are nine tools needed to service the diesel engine and they are all now in stock. These tools are shown in the Service Manual starting on page 1-17. All other drive train and chassis tools are the same as the 2510 gas model. The first new tool is a dial gauge adapter (57001-1430) which is used with a dial gauge you supply to check the fuel pump adjustment. This adjustment is critical since it controls injection timing.

2000 ZX-6R, ZX-9R, and ZX-12R

These models share a new type of steering head bearings. Instead of tapered roller bearings, they use ball bearings held in races that require a new procedure to install or adjust them. You will need two new head pipe driver tools (57001-1446 and 57001-1447). Check the A&P sheets for new higher torque values for the steering stem locknut and head nut.

The '00 ZX-9R has a new engine mounting system requiring a special wrench (57001-1450) to adjust the frame-to-engine clearance during installation. There is also a new adapter (57001-1448) needed to measure charging output voltage with a multimeter. To measure the primary peak voltage of a stick-type ignition coil, use adapter 57001-1449.

To disassemble '00 ZX-12R front forks, hold the fork cylinder with a new holder (57001-1443) while removing the allen bolt on the bottom of the fork. A new fork spring compressor (57001-1452) is required to compress the fork to loosen the push rod nut. The procedure is almost impossible without the spring compressor set. The last special tool (57001-1445) aligns the scissor-type primary gear on the clutch housing for installation.◆—*Rob Taylor*

2000 KX Bladder-type Fork Update

by John Griffin
Instructional
Designer/Instructor

The bladder forks on the 2000 KX125 and KX250 are receiving great reviews. Unfortunately there have been several incorrect theories published about how these forks work, even by myself in the last K-Tech News. Since then, we have learned more about the inner workings of the bladder fork.

Bladder-type Front Fork for Speed Sensitive Springing

There are two types of springs at work in contemporary forks, the metal spring and air pressure. The air pressure is affected by the size of the air chamber, which can be altered by raising or lowering the fork oil level. Raising the fork oil level increases air pressure as the fork collapses to better resist the fork collapsing.

The Compromise

Designers and riders must always compromise between a high oil level to resist bottoming and a low level for supple action. What if you could have an oil level that varies while you hit a bump? If you land hard it gives you a high oil level and if you land smoothly it gives you a low oil level.

The Bladder

Enter the Bladder-type front fork that offers speed sensitive springing. One internal bladder per leg acts as a secondary air chamber that is variable in size. The primary air chamber is between the oil and cap. The bladder covers the cartridge and acts like a balloon compressed by the fork oil surrounding it.

The Oil Divider

A new washer (A) and bushing (B) rest on a piston mounted on top of the cartridge assembly. They make the bladder work by dividing the oil chambers as fork speed increases. When you hit a bump, oil is pushed from the top of the fork above the cartridge down into the bladder area by flowing around the washer and the semi-sealing bushing.

NEED ART FROM JOHN

NEED ART FROM JOHN

So What Is It Doing?

The bladder has an air capacity of 70cc, which can be compressed to absorb or "hide" a similar amount of oil. Since the cartridge rod displaces 26 - 30cc of oil into the bladder area, it leaves up to 40cc available to absorb oil from the top of the fork. The only variable is how much oil (0-40cc) will get pushed down from the upper chamber to compress the bladder.

1. At slow fork speeds the oil has more time to flow down past the washer and bushing so the bladder really gets compressed so more oil moves from the top of the fork to the bottom, lowering the fork oil level in the upper chamber.

2. At high fork speeds, the oil can't flow fast enough down past the washer and bushing, so the bladder does not get as compressed and more oil stays up by the fork cap for a higher fork oil level.

Oil Level Rule

A rule of thumb for oil level in our 46mm forks is that 1cc of oil = 1mm of fork oil level. So if the bladder fork can vary the oil in the upper chamber by 30cc, that equals a fork oil level that can vary as much as 30mm.

Servicing

The service procedures are identical to last →

Special Shipping Costs on Warranty Claims

by Gregg Thompson
Product Support Supervisor

Occassionally dealers call the Hotline and ask us to authorize reimbursement for air shipping costs on parts for a warranty claim. Usually this happens when the repair has been delayed for some reason and the customer is getting anxious.

It is not our policy to reimburse dealers for shipping costs on warranty parts. Instead, dealers receive a 25% handling credit for all the parts on any claim submitted over K-Share. If a claim has $300 (dealer cost) in parts, the handling credit is $75. That money is supposed to pay for shipping and handling costs at your end. It should easily do that and in many cases will even cover air shipping. Remember, you get that extra 25% for all parts on the claim, including the ones you already have in stock.

Be aware that there are handling costs involved in placing either a small regular order or any emergency order. Small regular orders (any order below $350 dealer cost) carry a 5% handling charge. Any emergency order (regardless of the dollar amount) carries a 10% handling charge. In both cases normal (ground) shipping is paid by KMC.

We realize that to expedite warranty repairs, it is sometimes necessary to place small emergency orders. But whenever possible, you should put your small warranty parts orders together with regular stocking orders in order to avoid those handling charges and take full advantage of the 25% handling credit. The next time you need to air ship warranty parts, you'll already be way ahead of the game.

In case you're wondering, claims submitted by mail, using the old paper forms, receive a 10% handling credit on the parts.◆

Bladder-type Fork Update - cont'd

year except there is one tip to follow. When refilling the forks with oil, leave out the new washer (under the spring) until you have bled the forks and are ready to set the oil level. With the washer in place, it takes a long time for the oil to flow into the lower leg. There is a new cartridge rod holder (P/N 57001-1442) which you will need for disassembling these forks. This tool does not work on L1 models.◆

VN800 Valve Clearance Correction

by John Griffin
Instructional Designer/Instructor

VN800-A, B, C (all years)	
Intake Valve Clearance	**0.10~0.15mm**
Exhaust Valve Clearance	**0.20~0.25mm**

This is the correct intake and exhaust valve clearance for all VN800 models (A,B, and C) for all years. The Service Manual for the VN800-A and supplement for the VN800-B (Classic) show an incorrect exhaust valve clearance range. Please correct your manuals.◆

2000 KX125 JETTING KIT

Recently, Kawasaki began sending a jetting kit to all original registered owners of 2000 KX125-L2 units. Some owners feel that the original jetting is rich at low to mid-range throttle openings, so Kawasaki is sending out this kit to ensure customer satisfaction. The kit includes a leaner slow (pilot) jet, power jet, and instructions to raise the jet needle clip one notch.

You can help by submitting the warranty registration quickly whenever you sell a new KX125-L2. Kawasaki uses that information to send out the kits. You can even promise this "freebie" to help sell new units.

The kits are not available to anyone but the original retail purchaser, though the parts are still sold separately. Remember, this jetting is still just a starting point for fine-tuning. Your conditions may require different jetting. Every track is different. Every rider is different.◆—*Ray St. John*

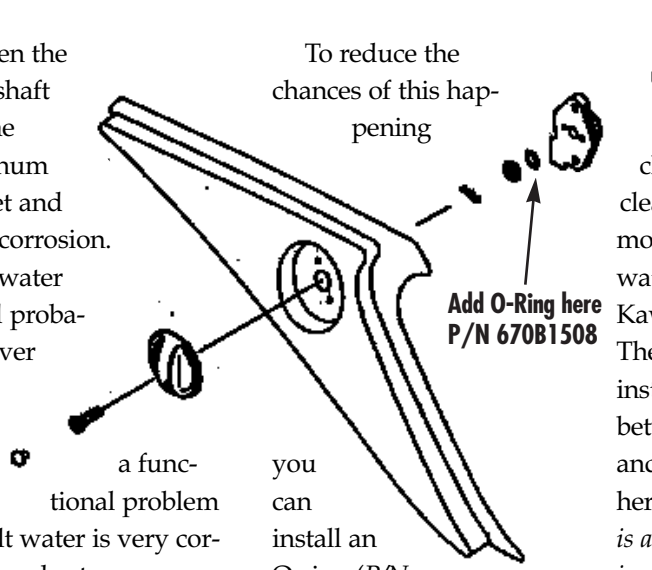
KX125-L2 Carburetor Specifications

Item	Original	Kit
Slow (pilot) Jet	#45	#40
Power Jet	#55	#42
Needle Clip Position	3rd Groove	2nd Groove from top

Ultra 150 Choke Knob Corrosion

by Charles Yim
Product Quality Engineer

Have you ever run across an Ultra 150 with the choke control knob that was very hard to operate because of corrosion? Your customers could experience this trouble especially if you are in an area with salt water nearby. The Ultra 150 does not have an O-ring on the choke knob shaft, as do some other models. Water can get in between the brass shaft and the aluminum bracket and cause corrosion. Fresh water would probably never cause a functional problem but salt water is very corrosive and acts very quickly on dissimilar metals.



To reduce the chances of this happening you can install an O-ring (*P/N 670B1508*) on the shaft. Before installing the O-ring it's best to disassemble the choke control assembly, clean it and lubricate all moving parts with a waterproof grease, such as Kawasaki P/N MC-11. Then reassemble it installing the O-ring between the 8mm washer and the bracket as shown here. *Note: If the mechanism is already corroded and binding, order new parts and assemble it with the O-ring.*◆

Referring Calls to Consumer Services

by Rick Roddewig
Consumer Services Technical Analyst

In Kawasaki Consumer Services we often get calls from customers wanting to know why Kawasaki has denied their request for warranty assistance. In many such cases, the dealer had referred his customer to us but has never actually contacted Kawasaki about the problem. Often the customer's next question to us is something like "Where can I find another dealer in the area who can help me?"

At your dealership you frequently have to make decisions whether to honor a customer's request for repairs under warranty. When your answer is "no," regardless of how you deliver it, your customer will probably not be pleased. Sometimes a customer will even ask for a repair to be covered when the vehicle is not in warranty! Again the same results if you say no.

If your customer really presses the issue and won't take your "no" for an answer, we suggest you first call the

Kawasaki Technical Hotline and discuss it with them. This way you can discuss the technical aspects of the situation and explain your decision to the Hotline technician. Your reasons for denying the warranty request will be accurately recorded including any technical details that support that decision. In addition, the Hotline technician may, for some reason that you were not aware of, offer to cover the failure, getting you off the hook entirely.

By you taking the time to make the call, your customer can be assured that you have made every effort to find a satisfactory solution. If the Hotline decides to authorize the repair, you're the hero. If the Hotline agrees with your decision to deny coverage, the call establishes the background needed to support your position if the customer contacts Kawasaki Consumer Services.◆

Diesel Mule Tidbits

by Gregg Thompson
Product Support Supervisor

ADD OIL TO THE ENGINE CAREFULLY

When filling a Kawasaki Diesel Mule engine with crankcase oil, it is possible to add the oil too quickly, overfilling the valve cover. If this happens, oil can run down the crankcase breather hose into intake manifold and past any open intake valve into the cylinder. If enough oil gets into the cylinder, a hydraulic lock will occur bending the connecting rod. An engine with a bent connecting rod will run very rough and emit black smoke from the exhaust. To avoid this problem, observe the following steps.

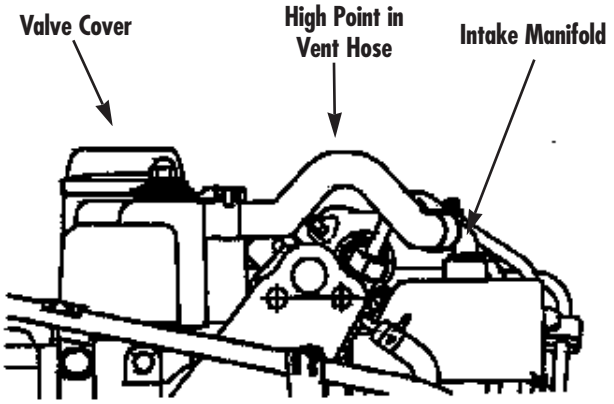
- Before adding the oil, pull the engine oil dipstick upward a couple inches to allow the crankcase to breathe.
- Make sure the breather hose at the valve cover is installed correctly with a high spot in the middle (see drawing).
- It is best to not use a funnel when pouring the oil because it obstructs your view of the oil level in the valve cover. However, if you do use a funnel, pour the oil slowly enough that it does not rise and fill the valve cover higher than the vent hose fitting. Please read service bulletin UV 00-02 for more details.

ENGINE NUMBER LOCATION

The Kawasaki engine number is printed on a bar code label and attached to the valve cover. The number looks like this: AF950AE000001. There is another number stamped into the crankcases by the engine manufacturer, Daihatsu. The Kawasaki engine number is the one you will use in normal communications with KMC.

IDLE RPM

The engine idle speed specified by Kawasaki for this engine is 850-950 RPM. The engine will comfortably idle at much lower speeds, however vibration felt by the occupants will dramatically increase below 850 RPM.◆



2000 Bayou 220 Carb Adjustments

by Ray St. John
Supervisor, Technical Writing

The 2000 Bayou 220 has a new carburetor with a number of internal changes including jets and settings. Jet changes include the main jet, jet needle, needle jet, needle jet holder, pilot jet and pilot air screw. If you need to know exact details about any of those changes, check the parts catalog.

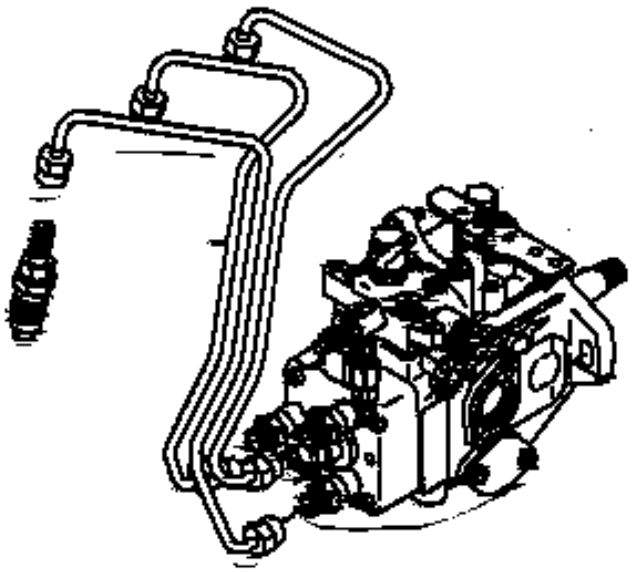
As far as setting changes go, the revised service manual will contain that information but that manual is not yet available (*). Until the new manual comes out please refer to the table below. It would be a good idea to pencil the Y2K specs into your current manual to make it easier to find. Do not try to use these settings on older model carburetors.

***Revised manuals do not ship to you automatically.◆**

Bayou 220 Carb Adjustments

Model Years	*Float Height*	*Air Screw Setting*
1988 thru 1999 (A1 thru A12)	21.8mm	1-1/2 turns out
2000 (A13)	22.6mm	2-5/8 turns out

Diesel Fuel Injection by DENSO



The new KAF950-A1 Diesel Mule Utility Vehicle sports a fuel injection system manufactured by DENSO (formerly Nippon Denso) of Japan. The heart of this system is the pump, a fairly large and complicated component located just below the intake manifold and mounted to the gear case at the end of the engine block.

From time to time you may have units in your shop that require service to the fuel injection pump. There is a timing adjustment that, with the help of a special tool (P/N 57001-1430) and a dial indicator, you can perform in your shop. But beyond that, any internal repairs or reconditioning must be done at an authorized DENSO Service Center where they have the proper equipment (including a flow bench) and trained technicians to perform such work. These authorized service centers can also perform maintenance on the injectors.

If you have a KAF950 with running problems caused by the fuel injection pump or nozzles, call the Kawasaki Hotline and we can put you in touch with the nearest DENSO Service Center.◆—*Ed.*

Side Effects from Overheated Exhaust

by Charles Yim
Product Quality Engineer

We have received some reports of damage that has occurred to other components on the Ultra 150 as a result of exhaust overheating problems. The potential for overheating in the exhaust is addressed by the FDM Bulletin JS 99-05, and actual overheating of exhaust systems is fairly rare. However, if overheating does take place, residual damage can occur to things which are in contact with or very close to the water muffler.

The two items most likely to be damaged by an overheated water box are the speedometer sensor wire harness and the trim cable. These are both routed very close to and often touching the water muffler.

If the speedometer sensor wire harness melts, it usually shorts one of the power leads which in turn damages the multi-function meter. If this happens, both the meter and the sensor must be replaced. If your customer complains of a dead speedometer, check the sensor wire harness for signs of melting. To prevent this from happening, route the sensor harness so it will not touch the muffler. Adding an extra stick-on zip-tie holder (P/N 13280-3706) will help with this. Make sure the area you stick the zip-tie holder to is very clean and smooth.

If the trim cable is in contact with the water muffler during an overheated condition, the blue plastic outer sleeve of the cable can become melted and discolored. The cable may continue to function but its life expectancy will no doubt be shortened and the customer won't like the looks of it. As with the sensor harness, careful routing is the key to prevention. There is a black rubber cable holder near the water muffler. This holder can be repositioned to hold the trim cable away from the muffler. To do this you must peel it off the hull and reglue it. Rotating it slightly is usually all it takes to provide the necessary clearance for the cable. Before gluing the holder, make sure it and the hull surface are very clean. Use an instant glue such as Kawasaki P/N TB1762B.

The JT1100A/B and JT900B models can also experience Multi-Function meter failures due to melted sensor wires. As with the Ultra 150, careful routing of the speedometer sensor wire harness can prevent this expensive failure.◆

KSF250 Kickstarter Gear Confusion

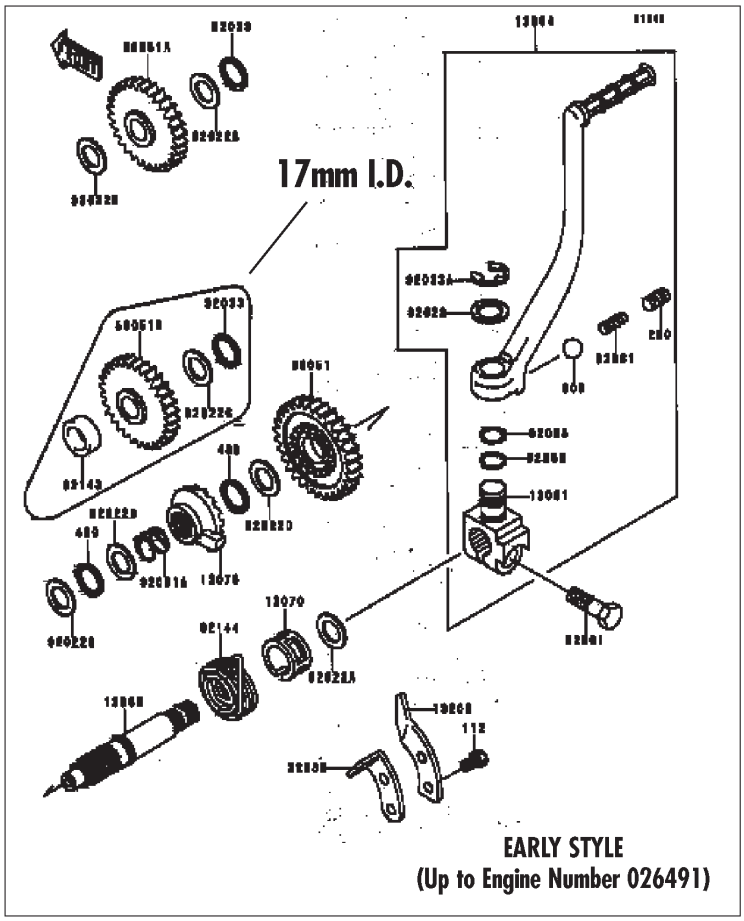
by Alex Dell

Product Support Specialist

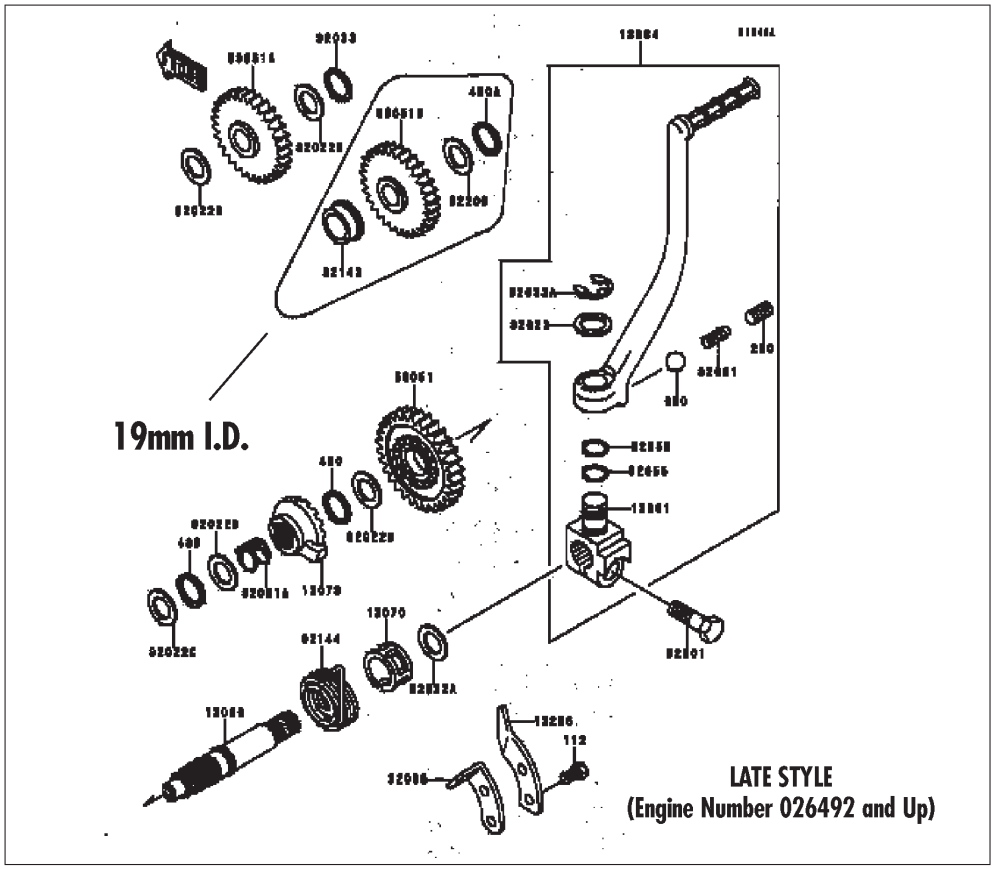
When ordering replacement parts for the kickstarter idler gears on the Mojave ATV, it should be noted that there was a running (mid-year) design change on the 1998 model KSF250-A12. The parts microfiche shows two separate drawings and identifies the engine number range for each. Except for some very minor differences the drawings look the same. However, as of this writing the KIC system shows the same drawings but does not identify the engine number range for each drawing. The parts are not interchangeable, so please be careful when ordering these parts.

The idler gear we are discussing is the one that fits on the small end of the transmission output shaft. The new gear has a larger I.D. to match an increase in the diameter of the transmission shaft where the idler gear rides. The early shaft and gear are 17mm and are used in engine numbers up to 026491. The late parts are 19mm and are used in engine numbers 026492 and up.

In addition to the gear, the collar, washer and snap-ring were also changed to fit the new shaft. It might be worth putting a copy of this article in your Mojave service manual as a reminder should you ever have to repair the kickstarter gears on a KSF250-A12. ◆



EARLY STYLE
(Up to Engine Number 026491)



LATE STYLE
(Engine Number 026492 and Up)

1100 STX D.I. *-Cont'd*

build up. It also has an internal temperature sensor, which activates the Speed Limiting Operational Warning (S.L.O.W.) system to reduce engine RPM if the EMM begins to overheat. Excessive voltage (over 45V) and high engine temperature also activate S.L.O.W.

A barometric pressure sensor housed inside the EMM senses altitude changes for consistent running even as high as 14,000 feet. This sensor uses a delicate diaphragm that connects to a small hole on the outside of the EMM. Do not use high air pressure to clean this cavity or you will rupture the diaphragm.

Stratified and Homogenous Combustion

The engine uses a stratified combustion mode from idle up to approximately 5500 RPM. In this mode, the injector waits until the piston closes the exhaust port then fires a dense plume of fuel at the spark plug. Elsewhere in the combustion chamber the air / fuel mixture is extremely lean. The spark plug fires up to 15 times as the fuel passes by the electrode. This unique multi-strike ignition burns fuel thoroughly and keeps the spark plug insulator clean.

The homogenous combustion mode starts above 5500 RPM. In this mode, injector timing advances and fuel is sprayed further into the cylinder where it bounces off the top of the piston and disperses throughout the combustion chamber in a uniform air/fuel mixture. The ignition timing also advances and the spark plug fires only once per cycle. Engineers were able to bump the compression ratio from 5.8:1 to 6.6:1 without detonation.

Diagnostic main menu (mainmenu.doc)

The diagnostic capabilities of the 1100 STX D.I. have brought cheers from technicians

Diagnostic Software

Technicians are thrilled with the diagnostic capabilities of Kawasaki's FICHT® system. Dealers can now use a computer program to inspect and test nearly all facets of the injection and electrical system. Your computer monitor will display error codes for any problems recognized by the EMM during operation. You can check voltages and the condition of all onboard sensors, some of them without even running the Jet Ski. You can even view the percentage of time the rider has run the engine in each RPM range.

Training

Direct Injection brings too many changes to discuss in this article. Please attend the "hands on" 1100 STX DI training classes offered at each of our Training Centers. Many classes have been rescheduled so contact your Training Center for the latest schedule and sign up now!◆

RPM profile (rpmprofi.doc)

This R&D test boat knows only two throttle positions: closed for no wake zones, and wide open!