

K-TECH NEWS

WINTER 1998

THE KAWASAKI TECHNICAL MAGAZINE

VOL. 11, NO. 4

IT'S ALMOST HERE



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ROUTE LIST SERVICE PARTS SALES
PLEASE RETURN TO SERVICE LIBRARY

It's Almost Here!

Introducing Kawasaki's Newest Generation Fuel Injection System

by Don Church
Manager, Service Training
and Communications

Judging by its styling alone, the VN1500-J1 hearkens to a bygone era, but underneath its smoothly flowing lines lies Kawasaki's newest generation digital fuel injection system. Not only do Vulcan™ 1500 Drifter™ customers get a beautiful, retro-styled motorcycle, but they also get the reliability and sophistication of modern technology. So the benefits of fuel injection, such as easy starting, improved fuel economy, and excellent driveability and

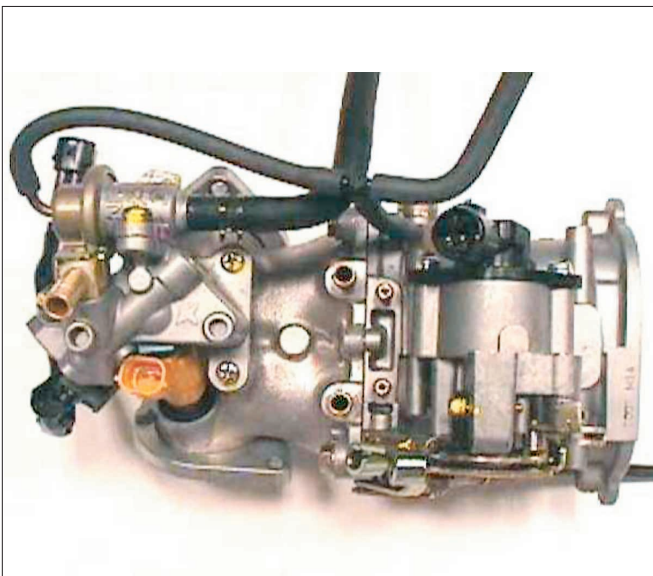
power come as a welcome surprise.

The new Digital Fuel Injection (DFI) system replaces carburetors to supply the engine with an optimized air/fuel ratio to compensate for a variety of temperature, altitude, and engine operating conditions. Kawasaki's new DFI system is a Sequential Multi-port Fuel Injection utilizing two fuel injectors, each delivering a fine spray of fuel in the direction of each intake valve beginning at 60 degrees BTDC on every stroke. The amount of fuel is controlled by the duration that the injector is open. Constant fuel pressure is

maintained in the system by the fuel pump. The DFI system also controls the ignition system to further enhance driveability and performance.

Inside the Electronic Control Unit (ECU) is an analog/digital converter, a 16-bit central processing unit, and the control programs in memory. The control unit is also equipped with a self-diagnosis system to help pinpoint problems, a fail-safe function, and a back-up memory function.

The DFI system takes input from the sensors, applies corrections to a basic programmed amount of fuel, and controls the actuators to optimize the air/fuel mixture ratio. There are some other special functions of the ECU. For example, the fuel pump continues to supply fuel at 41 psi to the injectors as long as the ignition is ON. A vehicle down sensor signals the ECU to shut off the fuel pump if the motorcycle falls over. The ECU maintains a stable idle speed and good throttle response during engine warm-up by opening and closing the idle speed controllers to allow the correct amount of air into



This two-piece throttle body assembly is the heart of the DFI system. The left half is the intake manifold, housing two injectors and the fuel pressure regulator. The right half houses two throttle plates and the throttle position sensor.

Cont'd on page 12

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Warranty Flat Rate Paper Manuals Updated For 1999

by Dave Corey
Writer/Producer

We continue to have good response to our Warranty Flat Rate paper booklets. If you prefer to work from a book rather than microfiche these manuals are for you. For your awareness, however, these manuals are not published as often as the microfiche versions, and the fiche are not updated as often as KIC. So, if you want to rely on the Warranty Flat Rate books, check on KIC or K-Share to see if the part number on your book supersedes to a new number and order a new book.

Updated '99 Motorcycle, ATV and Jet Ski® Watercraft manuals are in stock. Please note the new part numbers. ♦

Part Number	Description	Warranty Flat Rate Manual	Dir. Cost
99960-0077-02	Motorcycle		\$20.00
99960-0078-02	Jet Ski® Watercraft		\$20.00
99960-0079-02	ATV		\$20.00
99960-0034-04	Utility Vehicle		\$6.57
99960-0056-01	Portable Generator		\$2.99

Prices Current at of 2/1/99 See the Parts Retail Price Guide for latest prices.

1999 Model Information on CD-ROM

by Don Church
Manager, Service Training and Communications

The Technical Services Division just mailed a CD-ROM to Kawasaki Dealers containing:

* **1999 Product Sales Guides for motorcycles, ATVs, Jet Ski Watercraft, and Mule™ utility vehicles**

* **The 1999 Quick Reference Guide with spec sheets that will print on 8 1/2 x 11 in. paper.**

* **New Model Presentations which are designed**

as "slide shows" that allow you to control the pace.

We encourage all dealership employees to take a look at this CD.

Whether you work in service, parts or sales you can benefit by having this information close at hand. All pages in the Product Sales Guides and Quick Reference Guide can easily be printed for you or your customer's reference.

The new model presentation "slide shows" are especially designed for the sales staff to use with customers. Be sure to follow the instructions on how to set "ADVANCE ON ANY CLICK" in Acrobat under File/Preferences/Full

Screen. This allows you to advance from screen to screen with a mouse click so you set the pace of the presentation and pause whenever you like to explain details to your customer.

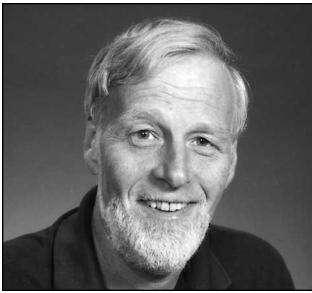
One important feature that is quite important for you to know is this—some screens have small buttons on them. These buttons take you on a very informative, in-depth tour of some of the outstanding features of significant new models such as the Ultra 150, Vulcan™ 1500 Drifter™, and ZRX1100.

To order more copies of this CD, call the Tech Training Department at (949) 770-0400 ext. 2463. They are being offered at just \$7.50 each. ♦

How We Stack Up 1999

You may already have your free copies of the "Stack Up." If not, you'll see them in the mail soon. How We Stack Up 1999 compares all '99 model Kawasaki motorcycles, ATVs, personal watercraft, and utility vehicles, to their principle competition in the market. It lists the features and advantages from the Product Sales Guides, and the specifications from the Quick Reference Guide. The specifications for the competing models are also listed. The book fits in your pocket so you can carry it with you on the sales floor.

Knowledge is power: The more you know about the product, the more effectively you can sell it. So grab your copy of the How We Stack Up 1999 and go to it! For additional copies, call (949) 770-0400, ext. 2472. ♦—Ray St. John, Supervisor, Technical Writing



**PISCATAWAY/
GRAND RAPIDS**

Jet Ski® 1100STX Used for Patrol Duty

In June of 1998, the New York State Office of Parks and Historic Preservation's Bureau of Marine & Recreational Vehicles purchased fourteen Jet Ski 1100STX personal watercraft to be used for police patrol duty. The units were deployed throughout the state of New York in areas where the Bureau has jurisdiction.

According to the Bureau of Marine & Recreational Vehicles, the 1100STX has performed admirably. Agility, speed, and the ability to cover the same type of waterways as other personal watercraft has made the Jet Ski 1100STX a great choice as a patrol unit.

A special 1100STX personal watercraft seminar was arranged for key personnel because the Bureau plans on maintaining



these units at their own facilities. Attending the three-day seminar at Kawasaki's Piscataway, N.J., Training Center were Mr. Thomas P. Watt, Marine Service Representative, and Mr. James Dinsmore of Navigational Aids. Their enthusiasm for personal watercraft was refreshing. It was a pleasure having them.

Jet Ski personal watercraft can be of great use in capacities other than pure recreation, and this is a prime example of one such use. The positive exposure of the 1100STX as a marine patrol unit is an excellent avenue toward greater universal acceptance of personal watercraft.

*Fred DeHart
201 Circle Drive N. #107
Piscataway, NJ 08854
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ATLANTA/TULSA

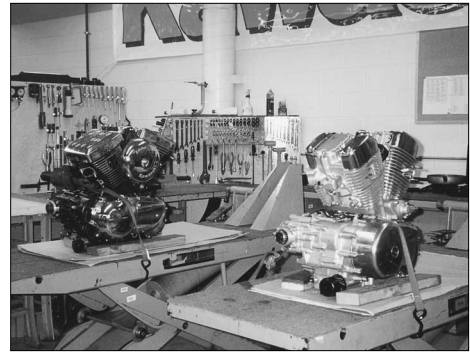
Tulsa Technology Center

On December 1, K-Tech Training officially opened Kawasaki's newest training center at the Tulsa Technology Center (TTC) in Broken Arrow, Oklahoma. We kicked off the week with

the Service Update '99 seminar for 27 dealership employees (and owners!). The course that followed that week, Motorcycle Engine Service, was also well attended. Danny Ray, the Motorcycle-Power Products Instructor, had his shop ready. The tool boards at each work station are absolute works of art; with everything so well organized, students were able to go right to work with no time wasted.

The TTC South Campus is an ideal location for Kawasaki Dealer training. Tulsa is a central location for many dealers in the surrounding states, and is easy to get to by car or plane. The Campus itself is beautifully maintained with plenty of parking and a cafeteria. The programs offered at TTC such as Mechanical Technology and Machine/Metal Technology are extremely well equipped. In fact the administrative staff at TTC have been so supportive of our "factory training" program, they installed a watercraft test tank before our first class!

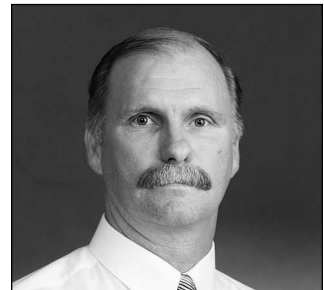
A special note to dealers considering Kawasaki training programs at TTC—we have classes scheduled in February and



again in April. Sign up and check us out. We have a pool of twenty-two current motorcycles, watercraft, ATVs, and utility vehicles for our courses. If there is a Kawasaki class not on the schedule that you want to attend, by all means, call me. Our schedule is not cast in stone; I can add it.

In conclusion, I want to offer special thanks to Bud Sanders and Danny Ray of TTC, Tod Hammock (Kawasaki's local District Sales Manager), and the Kawasaki dealers attending our first classes for making our new training site a success.

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



IRVINE/TACOMA

New Service Training Classes

Thanks to the technicians who made last

Regional News - cont'd

year's training season a great success. We had record attendance in all regions! With all the new products introduced for 1999, we look to do even better this year. We have a simple idea for technical training; make it simple, understandable, and offer classes at all levels. The Professional, Master, and Specialty courses meet those needs. Learn more about each course in the 98/99 National Training Schedule (bulletin TR 98-01) or the Kawasaki Catalog of Resource Materials (PN 99960-2017-01).

We now have seven training centers with the opening of our newest training center at Tulsa Technology Center in Broken Arrow, Okla. We also expanded the number of Service Update '99 seminars to 35 locations, and are expanding the number of classes held at the Tacoma and Orlando training centers. The Orlando training center offers once a year training for Latin America dealers.

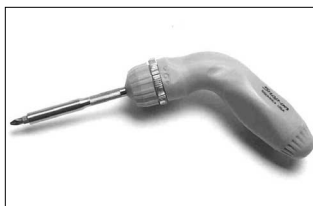
New Specialty classes for 1999 include Motorcycle Fuel Injection, JH1200-A1: Ultra 150, Service Department Management, and Parts Department Management. ♦

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

K-Tech News

Service
Contest #1

Award Winners



Congratulations to all winners. Your award will be a Snap-On pistol grip ratcheting screwdriver.

Tool
Corner

by Rob Taylor
Supervisor, Technical
Writing

**Incorrect KVF300-A1/B1
Service Manual
Tool Listing**

The KVF300-A1/B1 service manual (P/N 99924-1239-01) incorrectly states to use flywheel puller (P/N 57001-1403) to remove the flywheel. The correct flywheel puller is P/N 57001-1191, which is also listed on page 59 in the Kawasaki Special Tool catalog. Don't forget this tool must be used with rotor puller (P/N T57001-291).

Technician	Dealership	Location
CRAIG FAITH	SMITHS CYCLE	RUSSELLVILLE, AR
GARY BUSTILLOS	BEAUMONT KAWASAKI	BEAUMONT, CA
DOUG STONE	ULTIMATE MOTORSPORTS	FORT COLLINS, CO
MARK NEWMAN	ULTIMATE MOTORSPORTS	FORT COLLINS, CO
WADE HAFENSTINE	SUN ENTERPRISES	THORNTON, CO
DANIEL HARRINGTON	KAWASAKI OF OCALA	OCALA, FL
DANNY BARCLAY	CYCLE WORKS	CARROLLTON, GA
RAY SUMNER	MILLENIUM KAWASAKI	LILBURN, GA
BILL BARKELL	CARL'S CYCLES	BOISE, ID
BRYAN FRANKS	CARL'S CYCLES	BOISE, ID
JOHN LORENZO	CARL'S CYCLES	BOISE, ID
ROBERT MOUNCE	GARRETT'S KAWASAKI	KANGLEY, IL
RICK KING	MACH 1	HARRISBURG, IL
MARK HOLMES	FDR KAWASAKI	PADUCAH, KY
BOB HOFFSES	K K MOTORS SPORTS	PRESQUE ISLE, ME
ALAN BUSH	CLASSIC MOTOR SPORTS	TRAVERSE CITY, MI
JASON CLYMER	JACKSON CYCLE	JACKSON, MN
DOUG ENGIE	NORTHERN KAWASAKI	CLOQUET, MN
LARRY CLYMER	JACKSON CYCLE	JACKSON, MN
DAVID MYERS	SPRINGFIELD KAWASAKI	SPRINGFIELD, MO
DOUG FARNEN	DOUG'S CYCLE SHOP	SALISBURY, MO
JEFF REDDICK	ST. LOUIS PWR SPORTS	VALLEY PARK, MO
CHRIS PIERCE	COAST CYCLE WORLD	GULFPORT, MS
DAVE SLAMANS	COAST CYCLE WORLD	GULFPORT, MS
JAMES SCOTT WITHY	COAST CYCLE WORLD	GULFPORT, MS
MARK PIERCE	COAST CYCLE WORLD	GULFPORT, MS
MIKE HOVER	COAST CYCLE WORLD	GULFPORT, MS
RANDY SUTTON	COAST CYCLE WORLD	GULFPORT, MS
SCOTT ALLEN	COAST CYCLE WORLD	GULFPORT, MS
SCOTT DAILEY	SPORTS CITY CYCLERY	GREAT FALLS, MT
DUSTY SCHALLER	KAWASAKI OF LAS VEGAS	LAS VEGAS, NV
CHRIS ADAMS	BIG 4 KAWASAKI	MARIETTA, OH
GREG BECKER	BIG 4 KAWASAKI	MARIETTA, OH
JAMIE WHITE	REHMERT CYCLE SALES	VERSAILLES, OH
BRIAN BERTLER	AJAX KAWASAKI	OKLAHOMA CITY, OK
JIM WESTCOTT	AJAX KAWASAKI	OKLAHOMA CITY, OK
KENDELL ROBERTSON	AJAX KAWASAKI	OKLAHOMA CITY, OK
JIM TRIBOU	WAYNE CYCLE SHOP	WAYNESBORO, VA
PAUL CROWE	TEAM WINNEBAGO LAND	OSHKOSH, WI

**Removing the clutch hub
nut on the VN1500
engine**

There is no special tool to hold the clutch assembly while removing the clutch hub nut on a VN1500 engine. Holding the clutch housing during nut removal (with a hand tool) will cause the clutch hub assembly to rotate with the nut. This is because the Deceleration Torque Limiting Clutch (featured on page 1-11 in the VN1500-D1 manual) will engage causing the clutch plates to slip. An air impact wrench is the only way to remove the nut. To torque the clutch hub nut, hold the primary gear bolt with a closed end wrench and torque the hub nut to 110 ft-lb.

**Special Tool Catalog
Correction**

Page 17 in the Kawasaki Special Tool catalog (PN 99960-0065-03) has an incorrect part number (PN T59001-6000-01) under tool description Cutter Set, V/S KM25. The correct part number should read T57001-6000-01.

**New special tools for
the Drifter™**

The all-new VN1500-J1: Vulcan™ 1500 Drifter uses state-of-the-art fuel injection. The special tools for this model will be available in the near future. We will publish a Special Tool Bulletin as the tools become available. ♦

New KIC Features

by David Behlings
Parts Data Coordinator

Some of you have noticed ongoing changes to the KIC program like the addition of the Publications diagram, the same as on microfiche grid A-2. This page reveals part numbers for Owner's, Service, and A&P manuals and microfiche for all 1987 and newer models (see *K-Tech News*, Spring 1998).

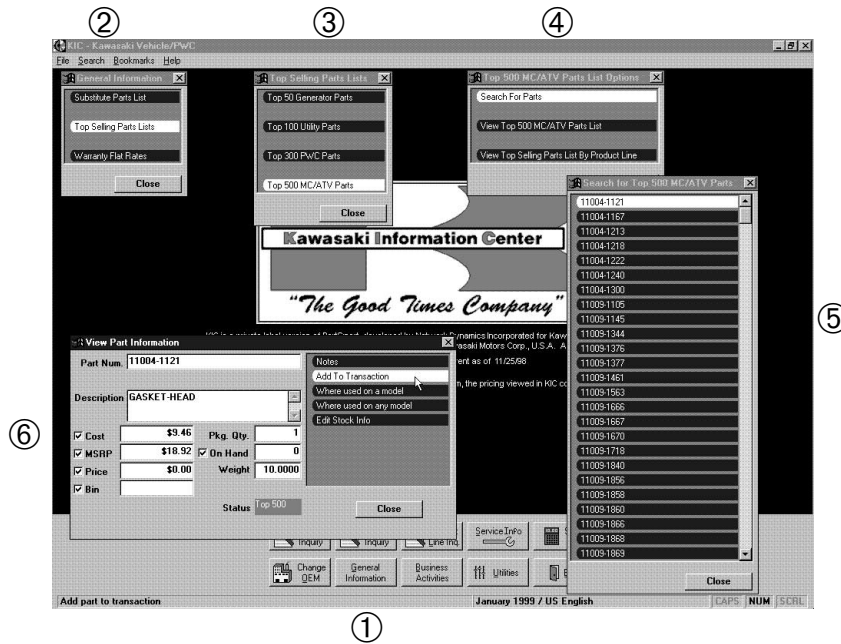
In KIC, Volume 1, for 1999 we added a whole new function. The top

selling parts are now offered in a scrollable, searchable list giving you the ability to click on the part number to access the parts information window and then add parts to a Transaction (Counter Sale, K-Share parts order, or warranty

claim). Previously the top selling parts lists were only displayed as an image of the printed book.

Access the lists under General Information (#1), then Top Selling Parts Lists (#2) for the Top 500 MC/ATV, Top 300 PWC,

Top 100 Utility, and Top 50 Generator Parts. We have clicked on the Top 500 MC/ATV Parts (#3), then Search for Parts (#4), which reveals a complete list of the 500 parts. We then clicked on 11004-1121 (#5) to View Part Information (#6). ♦



K-Share for Your Shop

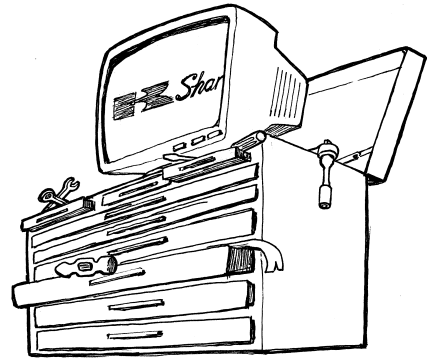
by Kenny Osberg
Technical Support

Service Managers: Have you ever asked your dealership owner for another K-Share terminal? One for your shop? Maybe it's time to do that. After all, this is the information age and information can be turned into happy customers and income for your shop.

As Kawasaki continues to make more and more service-related information available through K-Share, it becomes more and more apparent that you need your own K-Share terminal right there in your service department. Programs such as VSI (Vehicle Service Inquiry) and KIC (Kawasaki Information Center) are powerful tools that you can use to provide the best possible customer service.

On your own K-Share terminal (using VSI) you could check every customer-owned vehicle that comes into your service department for any outstanding Recalls and FDMs. (Don't let those vehicles out of your shop without that repair campaign completed.) You can check if the current owner (your customer) is also the owner-of-record in Kawasaki's computer. You could work on warranty claims or parts orders without having to compete with the parts people for the terminal. You could learn to use KIC (an ever-improving service department tool) to its full potential!

You can lease a K-Share terminal from Kawasaki for a minimal monthly fee or for an insignificant one-time charge, you can load K-Share into most any PC you have at your dealership. ♦



Reprint: KLF400-B Snorkel Kit

In our Fall 1995 (Vol. 8 No. 3) issue of *K-Tech News* we ran an article about an air inlet snorkel kit for the early KLF400-B (Bayou® 4X4s). This kit (P/N 99995-1350) was a great modification for units that were used in dusty conditions. We highly recommend it for anyone who experiences a need for frequent air cleaner maintenance and/or abnormal engine wear from dirt ingestion. When we first ran the article in '95, the kit was very reasonably priced at \$210. We feel certain there are still customers out there who could benefit greatly from adding this kit to their vehicle, so we have reduced the price to \$137 to make it easier for you to sell. Here is a reprint of our original article for your information. ♦—Ed.

KLF400-B Air Inlet Snorkel Kit

The '96 KLF400-B4 Bayou® comes with an improved air intake system for the engine.

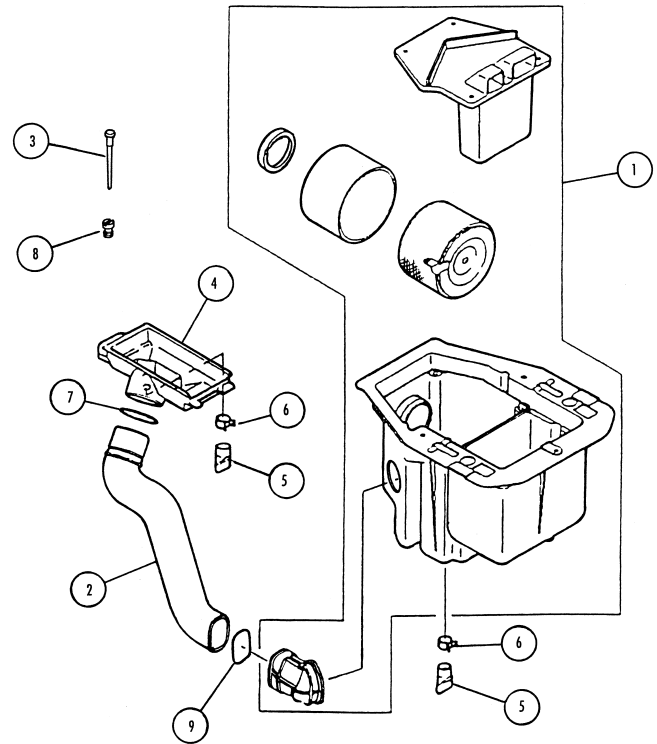
Earlier models take air directly into the top of the air box under the seat. This can be a very dirty environment in dusty conditions. The new B4 has a snorkel tube that goes forward and upward from the airbox and draws air from under the fuel tank. In dusty conditions, the air under the fuel tank stays much cleaner than under the seat.

Obviously, less dirt entering the air box means less air cleaner maintenance. But, more importantly, it reduces the chances of accelerated engine wear when air

cleaner maintenance isn't as frequent or thorough as it should be.

The good news is that all the parts needed to update a KLF400-B1, B2 or B3 are available in kit form. If you have customers with '95 or earlier model KLF-400s who are encountering problems with too much dirt in the air box, we suggest you recommend this kit to them. The kit includes a new air box assembly (complete with air filter); the snorkel tube and inlet tray; and new carburetor jets.

Note: If you install one of these kits, pay close attention to the condition of all the duct conditions between the new air inlet and the air box after assembly. Any leaks at these connections will reduce the effectiveness of the kit. ♦



KLF400-B ATV Snorkel Kit (P/N 99995-1350)			
Ref. #	P/N	Qty.	Description
1	11010-1562	1	Air Cleaner Housing Assembly
2	14073-1638	1	Duct
3	16009-1870	1	Jet Needle, N2LF
4	16146-1175	1	Cover Assembly
5	49006-1292	2	Boots
6	92037-1860	2	Clamps
7	671B2550	1	O-Ring
8	92063-1118	1	Main Jet, #115
9	92081-1638	1	Spring Band

Special Spark Plugs for the Ultra 150™

by Gregg Thompson
Product Support Supervisor

Kawasaki's powerful new JH1200-A1 engine subjects the spark plugs to such extreme conditions that common spark plugs didn't have a good service life. Even the toughest plugs commonly used in the motorcycle and watercraft industries today would either loosen over time or suffer a broken ground electrode. Engine damage resulting from either

of these spark plug failures could vary widely but there is potential for severe top end damage to occur.

So the new Kawasaki Ultra 150 watercraft uses a



unique spark plug, the R6918C-9, which was designed to be used in racing engines. Since there is currently no other mass production vehicle using this plug, it will be available only through Kawasaki dealers (at least for now). Because of expensive

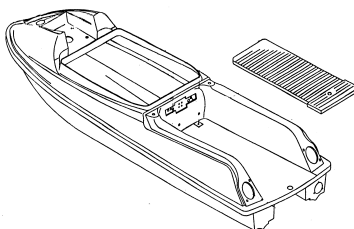
materials used to make this plug and very limited production quantities, it will be more expensive than most other spark plugs. Kawasaki has done everything possible to keep the cost to the customer reasonable.

To get the customers going on the right foot, a set of plugs will be sent to each retail customer free of charge along with a letter explaining the need to always use this special spark plug in their Ultra 150.

Also Kawasaki is working on implementing an initial stocking program to help insure that the dealers always have these plugs on hand. ♦

More Durable 750 SXi Pro Floor Mat

For your information, the 1999 JS750-C1 (SXi Pro) comes with a thicker, more durable floor mat than previous models. This new mat is also adhesive-backed so no glue is needed to install it. For your customers with older JS750s, this new floor mat fits all models of the 750 stand-up from 1992 to present. ♦—Gregg Thompson

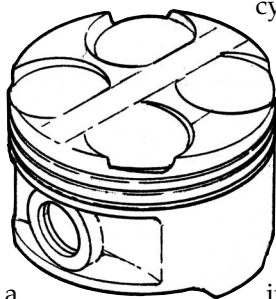


1998 and 1999 ZX-6R Pistons

by John Griffin
Instructional Designer/Instructor

The pistons for the 1999 ZX600-G2 are now the only pistons available for the 1998 ZX600-G1. If you remember, we had a Service Bulletin (MC98-04) which corrected the piston diameter and piston-to-cylinder clearance specifications of the ZX600-G1 Service Manual because Kawasaki

used smaller pistons in cylinders 3 & 4 than in cylinders 1 & 2. The new piston (P/N 13001-1546) supercedes the old pistons, and fits all four



cylinders of the ZX600-G1 or G2. When using the new pistons, use the following service

information:

	<u>Standard</u>	<u>Service Limit</u>
Piston diameter	65.93 ~ 65.95 mm	65.78 mm
Piston/cylinder clearance	0.05 ~ 0.082 mm	-----

KLF220-A12 Blown Fuse Tip

Recently we learned that later-production KLF220 Bayous may blow their fuse due to misrouted wiring on some units. At this time, we're not sure how many units may be affected so we're giving you advance notice. If the fuse blows on a late model 220, check for a melted brown wire near the exhaust pipe, inside of the RH frame tube, just to the rear of the engine.

The KLF220 main wire harness has a brown wire and a blue wire that connect to a rear brake lamp switch for some markets. Normally these wires are tied to the outside of the RH frame tube. On affected units, the brown and blue wires may have no wire tie and may be routed inside of the RH frame tube, closer to the exhaust pipe.

The brown wire has battery voltage when the ignition switch is ON and will blow the fuse if it becomes shorted to ground (as in melted to the exhaust pipe).

On DC-CDI equipped 220s (1996 and later models), the engine will stop when the fuse blows. Try to remember to check these wires on later units running through your shop. ♦—Keith Pestotnik

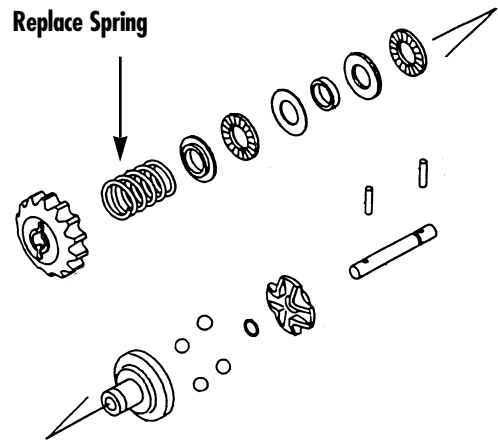
KIPS Governor Spring — A Mini Tune-up

by Craig Martin
Team Green™ Motocross Supervisor

We all have the same results in mind when we freshen up a KX or KDX engine. We are trying to get the power back to the way it was when the engine was new.

Unfortunately there is an item that is too often overlooked and can

greatly reduce the effect of all your hard work. That item is the KIPS Governor Spring. The RPM at which the exhaust valve opens is controlled by this spring's rate and assembled pre-load. Under the extreme conditions that this spring is subjected to, the spring tends to relax a little (lose some of its tension), causing the exhaust valve to open at a lower RPM. This happens gradually over several races so the rider is usually not aware of the resulting power loss. With a weakened spring, the valve can open as much as 1000 RPM earlier than it is



designed to. The midrange power loss can be significant.

Some professional tuners actually replace this spring before every race.

We don't think that is necessary, but we do

believe that every time you freshen up the top end of a KX or KDX engine, you should also replace this spring. The spring itself costs less than \$5 and your customer will appreciate the difference it makes. ♦

Drain the Engine Oil at PDI

by Steve Rice
Technical Support

For some reason we have recently had a rash of dealers calling us to complain that the engine oil drain plug for some customer's new ATV was left loose at the factory. Unfortunately, the complaint usually comes from someone who is unhappily rebuilding the engine because the drain plug fell out, the customer didn't notice, and the engine seized for lack of oil.

Of course, the customer is upset because his new

ATV has a major engine failure; and usually the dealer is upset because he thinks the factory screwed up by not tightening

Oil." On the assembly line at KMM, each vehicle is filled with oil and run for a brief period as part of the last

worried about under-tightening it because the dealer is supposed to remove it to drain the remaining "run-up" oil, and then torque it properly during the Pre-delivery service.

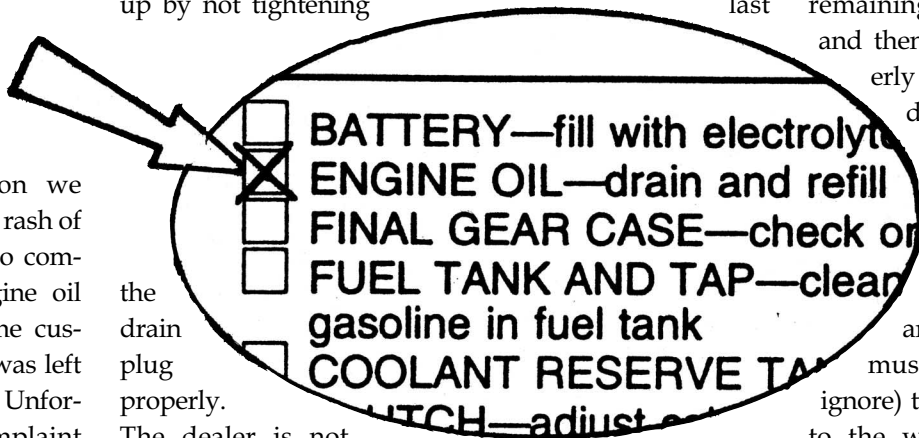
the drain plug properly.

The dealer is not made any happier when we tell him the factory did not screw up, but he did!

One of the first items listed in the "Preparation" portion of the General Assembly and Preparation Manual and on the A&P Checklist is "Drain Engine

Oil." On the assembly line at KMM, each vehicle is filled with oil and run for a brief period as part of the last checks before crating. That oil is then quickly drained and the drain plug replaced. The assembly line workers who do this are concerned about not cross-threading and not OVER-tightening the drain plug. They are not

You should be filling out an A&P Checklist for each unit you sell. If you are doing this, you must check (or ignore) the little box next to the words "ENGINE OIL - drain and refill." Please make sure that whoever does the pre-delivery services at your store knows to drain the oil and then properly torque the drain bolt before filling the engine with new oil. ♦



Jet Ski® Watercraft Engine Seizures— Thinking About Blaming the Oil Pump?

by Charles Yim
Product Quality Engineer

About a year ago, we started testing so-called “bad” Jet Ski® watercraft oil pumps collected nationwide from our dealers. Since then, we have flow-tested a total of 112 pumps. Each one of these pumps was replaced under warranty as the cause of an engine seizure. In most cases the dealer had tested the pump output and decided it was inadequate. Amazingly when we tested them only two of these 112 pumps were actually defective. That’s right, just two. One pump was missing an internal part and didn’t pump any oil at all, not a drop. The other one was damaged internally and the shaft was very hard to turn. It too did not pump

any oil. Apparently some debris had gotten into this pump and caused the worm gear teeth to strip. This may have been the result of a faulty (or removed) strainer in the oil tank. The other 110 pumps were all within 10% (plus or minus) of what a new pump of the same part number would put out, and most likely did not contribute to a seizure.

Below is a table showing the output quantities we came up with after testing several new pumps of each part number.

These amounts are different from the specs printed in Kawasaki Service Manuals. Many factors contribute to the differences. Doing precise and repeatable oil pump output measurements is difficult. Oil type and vis-

cosity, ambient temperature and of course pump rpm are all important factors affecting any pump’s output. We use a custom-made fixture with an adjustable speed electric motor and tachometer that allows us to maintain very precise pump speeds. It is very difficult, using the engine in the boat or an electric drill, to find the exact rpm called for in the spec and maintain it for 2 or 3 minutes.

After testing more than 100 oil pumps, the rule-of-thumb I’ve been preaching is “if it pumps oil, it’s good.” We have never tested a pump that proved to have any kind of partial failure such as a substandard flow rate.

The Mikuni oil pump used on our watercraft engines is a simple and reliable positive displacement mechanical pump capable of producing very high pressure but very low volume. It can produce enough pressure

to blow up an oil line like a balloon if the oil line is blocked off. Which brings us to the question: “If not the oil pump, what would be the cause of an apparently oil-related top end seizure?” Consider the following:

1. Check that all the oil lines are connected and not leaking. Oil pooled on the engine compartment floor indicates a leak somewhere. And leaks can cause oil starvation.
2. If an oil line has become disconnected at either end (the oil pump or the carburetor fitting), there may be a stuck check valve involved. The check valve at the carburetor fitting should open at less than 5 psi, so it can be tested with a simple hand pump such as the one in your crankcase pressure tester. Early models that have the oil line(s) connected at the intake manifold rather than the carburetor do not have check valves at those fittings.
3. Look for hardened and cracked oil lines. The hostile conditions in the engine compartment can require occasional replacement of oil lines due to hardening. Even small cracks in these lines can allow enough leakage to cause a seizure.

Jet Ski® Models Model Year	Oil Pump P/N	KMC Measured Flowrate @3000 rpm for 3 minutes
JH1100A: 1100ZXi JT1100A/B: 1100STX	1996-1999 1997-1998	16082-3720 11.5 cc
JH900A: 900ZXi JT900A: 900STX	1996-1997 1997-1999	16082-3719 7.9 cc
JH900: 900ZXi	1995	16082-3717 6.5 cc
JH750C: 750ZXi JT750B: 750STS	1995-1997 1995-1998	16082-3718 9.3 cc
JH750G: 750Xi JS750B: 750SXi	1998-1999 1995-1996	16082-3713 7.0 cc
JH750A/E: 750SS JT750A: 750ST JF650A: X2 JF650B: TS JB650: Jet Mate JS650: 650SX	1992-1997 1994-1995 1989-1994 1989-1996 1989-1992 1989-1993	16082-3710 5.6 cc

Cont'd

Watercraft Engine Seizures - cont'd

4. Look for air bubbles in the oil lines. Dealers often blame this condition on the oil pump, but in fact it's usually just that the vehicle was run out of oil. The absence of air bubbles in the lines however, doesn't necessarily mean that it was NOT run out of oil. After a top end seizure, the engine will usually restart almost immediately and go. In fact most engines are seized many times before finally getting bad enough that the customer brings it in for repairs. If the customer realized what has happened early enough, the oil tank can be refilled and the vehicle run long enough to purge the air from the system leaving no trace of the real cause of the seizure.

Note: On models that have the oil line(s) connected to the intake manifold (all 300s, later 650s and early 750s), it is normal to see air bubbles in the lines between the oil pump and the manifold. Because there is no check valve at the manifold, crankcase pressures can push air bubbles backward up the oil lines. This does not affect oil flow on these models. The oil continues to flow around the air bubbles at the normal rate.◆

KVF300 Knocking Noise

by Gregg Thompson
Product Support Supervisor

We have had a few calls from dealers who were experiencing trouble diagnosing a loud knocking noise from the general area of the engine on Prairie® 300 ATVs. Usually the dealer was convinced the noise was coming from the torque converters but couldn't find anything wrong with them. The noise is normally heard loudest above idle and under

load.

The common problem turned out to be a gap between the frame and



the engine cases at the lower rear motor mount. In each case the motor mount bolt was tightened properly but there was still a gap between the frame and the rubber damper in the engine cases. Sometimes the gap was not obvious in a visual inspection because the rubber damper in the engine case had worked its way out to contact the frame concealing the gap.

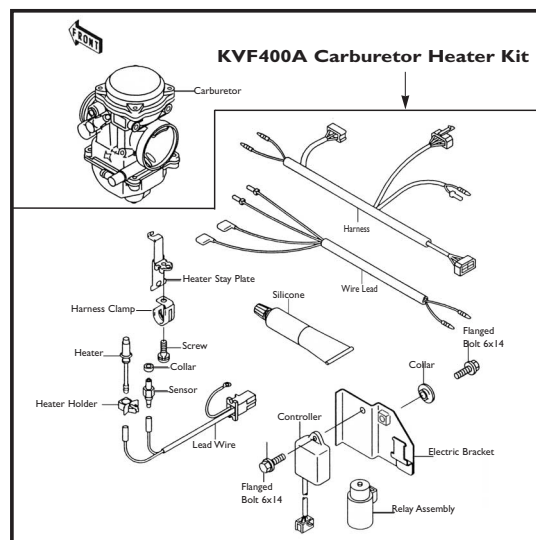
If you run into one of these, the solution is to put a shim in there to take up the gap. Loosen the motor mount bolt, pry the rubber damper all the way back into the cases and measure the gap. Try to find a shim (or washer) that fits snugly in the space without tightening the bolt. Then install and tighten the bolt to the proper torque.

If you have trouble finding a shim around your shop, you can order the U-shaped engine mount shims from the old 750 H-2 motorcycle. They are available in many sizes ranging from .2mm to 2.0mm thick and cost about a quarter apiece. Because of their shape, they can be installed without removing the bolt.◆

More ATV Kit News

A couple years ago Kawasaki became aware of a need in very cold conditions for a carburetor warmer for the Prairie® 400 ATV. In response to that need, Kawasaki developed an electronic carburetor heater kit (Part Number 99995-1422) and made it available through our Accessories department.

By the middle of the second year of production, this model was coming with a coolant-type carburetor heater as standard equipment. So the KVF400-A1 and early production A2 are the only models that might need this kit, which includes the heater plus a sensor, controller, relay and all the wires and brackets needed for a very clean installation. Considering the complexity of this kit, the original retail price of \$175 was quite reasonable. But since most of the units that could use this kit are beginning to get old, we have decided to drop the price in order to make it more affordable for those customers who still could benefit from it. So in mid-January the retail price of the kit was reduced to \$130. We hope this helps you sell these to some of your cold weather customers.◆



Caution: The Drifter requires gasoline with a minimum pump octane rating of 90. The Assembly and Preparation Sheet lists a 95 octane requirement.

Motorcycle Fuel
Injection Training
(One Day)

Irvine, CA
(949) 770-0400 Ext. 2452
March 10
March 11
March 29
March 30

Tacoma, WA
(949) 770-0400 Ext. 2452
February 19

Tulsa, OK
(817) 589-1180
April 12

Grand Rapids, MI
(732) 469-1221
April 21

Atlanta, GA
(404) 349-2000 ext. 4227
March 8
April 1

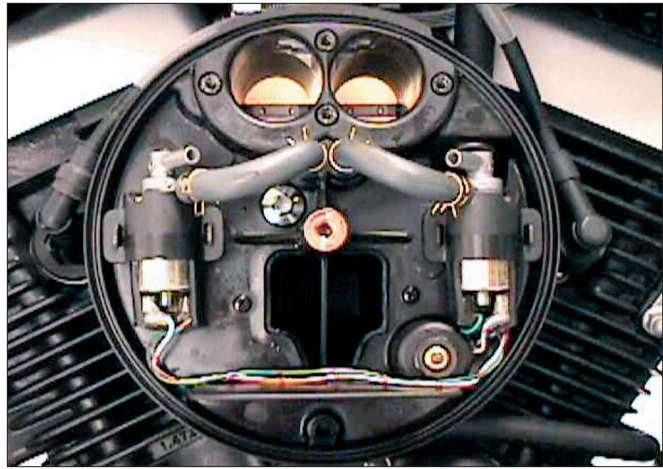
Piscataway, NJ
(732) 469-1221
March 19
April 1
April 12
April 15
April 29

Fuel Injection

Cont'd from page 2

each cylinder.

When the engine is started, the ECU calculates injection time and controls idle speed based upon water temperature and air temperature. During operation the ECU calculates the injection time in two different ways. When there is a light load on the engine, the ECU utilizes engine intake pressure and rpm, called the D-J method. When the load becomes medium to heavy, the ECU uses the K-TRIC throttle position sensor and rpm called the α -N method. The ECU also uses the throttle position sensor to control ignition timing similar to other Kawasaki models.



Two idle speed control valves under the RH air filter cover (3 o'clock and 9 o'clock positions) alter the idle by opening and closing extra air passages into the intake. An air temperature sensor lies at the 4 o'clock position.



The compact fuel injectors deliver a fine spray of fuel to each intake valve by using four tiny holes in the tip of each injector.

A failure diagnosis function programmed into the ECU is of major importance to service technicians. If any sensor or actuator fails, the technician can use a test lead to ground pin 37 on the ECU and "decode" the blinking display patterns shown by the FI warning light in the speedo assembly.

The Tech Training

Department has developed a one-day Fuel Injection class covering the theory, disassembly, and diagnosis of this significant new system for Kawasaki. You will see this system used on future models, so now is the time to learn about it. Refer to the K-Tech Training schedule and register right away. It will be a popular class. ♦



By grounding pin no. 37 on the ECU, the DFI self-diagnosis system will blink failure codes through the FI warning light in the speedometer face.