Egimotors

20 dicembre

Bollettino Tecnico

Numero: 20/12/2010

Modelli	Numeri di serie
MOTOSLITTE 800 CFI	TUTI I MODELLI 800 CFI

CORSO TECNICO MOTSLITTA 800CFI.

È DISPONIBILE UN CORSO TECNICO,IN LINGUA INGLESE, DEDICATO ALLE MOTOSLITTE CON MOTORE 800 CFI DUE TEMPI.
QUESTA SPECIALE PUBBLICAZIONE È DEDICATA A CHI VOLESSE APPRENDERE FINO IN FONDO IL FUNZIONAMENTO DELLA PROPRIA MOTOSLITTA ED AI CONCESSIONARI PER COMPLETARE LA LORO FORMAZIONE TECNICA.

CLEANFIRE™ FUEL INJECTION
Performance Diagnostics Guide

CLEANFIRE™ FUEL INJECTION
Performance Diagnostics Guide

Collect Customer and Service Information

The Service Advisor should collect accurate and relevant information from the customer to assist the service technician with an accurate diagnosis and successful repair.

Collect the following

- Customer and Machine Information
- Vehicle Identification Number verify VIN on the machine
- Miles and or hours as applicable on the machine
- Description of concern/fault in customers words
- Snow depth/conditions when fault occurred
- Ambient Temperature when fault occurred
- Operating Altitude when fault occurred

Collect Customer and Service Information (continued)

- Load carried on machine or being towed when fault occurs
- Frequency of fault occurrence intermittent or constant
- Warning lights or indicators illuminated (check engine, temperature, detonation)
- Engine RPM when fault occurred
- Machine speed when fault occurred
- Engine temperature at which fault occurs
- Throttle opening at which fault occurs
- Type of fuel being used/fuel selector position
- Determine type of oil currently being used

CLEANFIRE™ FUEL INJECTION Performance Diagnostics Guide

CLEANFIRE™ FUEL INJECTION Performance Diagnostics Guide

CLEANFIRE™ FUEL INJECTION
Performance Diagnostics Guide

CLEANFIRE™ FUEL INJECTION Performance Diagnostics Guide

Machine Maintenance History

- Obtain maintenance history from customer
- Consult periodic maintenance table in manual
- Lack of required maintenance may be cause of performance issue

2010-2011 Pro-Ride Rush/Switchback/RMK Service Manual

Periodic Maintenance Table

Item	Frequency / Intervals				
	150 mi. (240 km)	500 mi. (800 km)	1000 mi. (1600 km)	2000 mi. (3200 km)	Pre-Season
Drive / Driven Clutch					
Clutch Alignment / Offset			I		I
Drive Belt Condition / Ride Out	Pre-Ride Inspection				I
Drive / Driven Clutch Condition	I	C	I	I	C
Drive Belt Tension			I		I
Engine					
Engine Mounts		I	I	I	I
Engine Mount Screws	Re-torque engine mount screws every 1,000 miles (1,600 km).				
Recoil Handle / Rope / Function		I	I	I	I
Engine Torque Link	I			I	I
Cylinder Head Bolts	I	I	I	I	I
Cylinder Base Nuts		I	I	I	
Ignition Timing				I	I
Spark Plugs	I	I	I	R	I
Exhaust System / Retaining Springs		I	I	I	I
VES Valves / Solenoid / Hoses		I / C	I / C	I / C	I / C
Cooling System / Hoses / Coolant Level / Heat Exchangers	Pre-Ride Inspection				I
Oil Filter				I	I
Brake System					
Hose Condition / Routing		I	I	I	I
Fluid Level / Leaks / Fluid Condition		I	I	I	I
Brake Pads / Brake Disc		I	I	I	I
Parking Brake		I	I	I	I
Brake Fluid				R	
Fuel System					
Idle RPM		I	I	I	I
Fuel Filter	Replace every 2,000 miles (3,200km) or every 2 years.				
Throttle Lever / Throttle Cable	I	L	L	L	L
Oil Pump Adjustment				I	I

POLARIS INDUSTRIES INC.

Machine Maintenance History (continued)

Periodic Maintenance Table

Item	Frequency / Intervals				
	150 mi. (240 km)	500 mi. (800 km)	1000 mi. (1600 km)	2000 mi. (3200 km)	Pre-Season
Fuel / Vent Hoses	I	I	I	I	I
Oil Hoses	I	I	I	I	I
Air Box	I		I		I
Electrical System					
Auxiliary Shut-Off	Pre-Ride Inspection				I
Throttle Safety Switch	Pre-Ride Inspection				I
Ignition Switch	Pre-Ride Inspection				I
Headlights / Brake light / Taillights	Pre-Ride Inspection				I
Hand / Thumbwarmers	Pre-Ride Inspection				I
Perc Reverse System	Pre-Ride Inspection				I
Chassis / Suspension					
Ski Toe Alignment		I	I	I	
Suspension Mounting Bolts	Pre-Ride Inspection				I
Rear Chain Case Fasteners	Re-torque three lower fasteners every 1,000 miles (1,600 km).				
Steering Fasteners / Linkage / Handlebars	Pre-Ride Inspection				I
Driveshaft / Jackshaft Bearings		L	L	L	L
Ski Fasteners		I	I	I	I
Drive Chain Tension	I	I	I	I	I
Chaincase / Gearcase Oil	I	I	I	R	I
Track Alignment / Track Tension	I	I	I	I	I
Rebuildable IFP Shocks	High performance shocks should have oil changed and recharged at the end of every riding season.				
Rail Slide Condition	I	I	I	I	I
Bogie / Wheel Condition / Fastener Bolts	I	I	I	I	I
Hood / Seat / Chassis / Engine Compartment		C			C

L = Lubricate / I = Inspect or Adjust / R = Replace / C = Clean

2010-2011 Pro-Ride Rush/Switchback/RMK Service Manual

Inspection with customer

Perform walk-around inspection of machine with customer

Note any of the following

- Mechanical or cosmetic damage
- Performance accessories installed (or recently removed)
- Modifications to chassis/suspension

Machine Modifications

Modifications including but not limited to the following
may cause severe engine damage and void the limited warranty

- Intake Systems Aftermarket/Modified (Airbox, Reeds)
- Turbocharger
- Nitrous Oxide Injection System
- Engine Modifications - Cylinder porting or altering compression (ask customer)
- Exhaust Components Aftermarket/Modified
- Clutching modification(except factory recommended for elevation recalibration)
- Track/Final Gearing changes
- Engine Controller/Fuel Controller Modules
- Not using Polaris VES Gold Plus Engine Oil
- Fuels other than commercial 87-93 octane oxygenated/non-oxygenated unleaded

Note: Installing aftermarket parts that reduce the effectiveness of the emission system is a potential violation of the Clean Air Act. Tampering with emission controls is prohibited by federal law

Service Inspection and Testing (Technician)

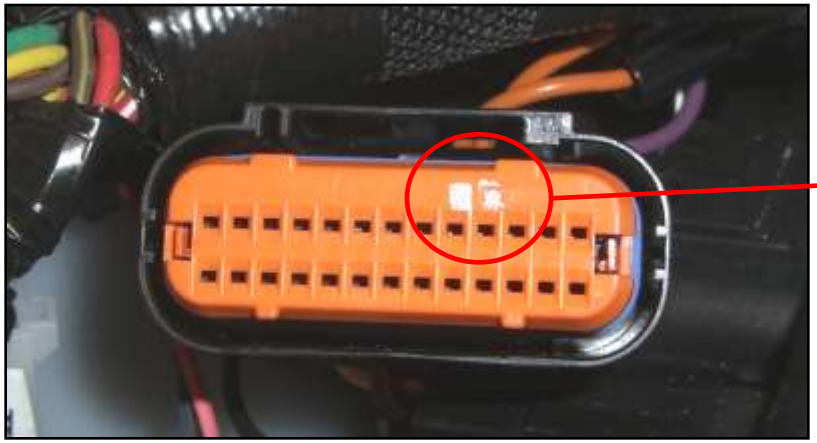
- Perform a walk-around inspection and note any damage or modification on machine
- Verify customer concern with a test ride (if local conditions allow)
- Consult service manual and verify all required scheduled maintenance has been performed
- Common maintenance items such as the drive belt, exhaust valves, fuel filter, spark plugs, and type of fuel used can reduce performance level
- Verify type of fuel in tank and the fuel selector position
- Verify all applicable service or safety bulletins have been performed (unit inquiry)

Digital Wrench Diagnostics

Utilize Digital Wrench to perform the following procedures

- Save a service report (include VIN) before starting any diagnostic procedures
- Verify most recent (up to date) version of Digital Wrench is installed
- Check for diagnostic trouble codes with Digital Wrench and utilize guided diagnostics procedure
- Verify most recent flash file-set is installed and injector color matches map file-set
- Compare engine management sensor values to known good data from saved service report(s)

  Note: if sensor values are not correct verify connector/terminal/wiring integrity



All wire terminals should be fully seated and not distorted

Clutch and Drive Belt Inspection and Service

- The PVT system transmits engine power to the track.
- Clutch components that are damaged, excessively worn, or misadjusted can reduce performance
- Inspect belt for excessive wear, glazing, or cord pop-out
- Polaris recommends using the 3211115 belt with 800 CFI machines
- The 3211080 drive belt is narrower and has a 2 degree greater angle the which will adversely change the belt-to-sheave clearance
- Inspect clutch/belt alignment, center-to-center, belt to sheave clearance and driven clutch float
- Verify installed weights, springs and helix are correct for application
- Inspect and clean clutch/crank taper
- Torque all clutch fasteners to specifications

Clutch and Drive Belt Inspection and Service (continued)

Engine Mounts and Torque Stop

- Inspect engine mounts and torque stop clearance spec 0.010”-0.030” (0.25mm-0.75mm)
- 2010 Front PTO side engine mount hardware can be installed on 2008-2009 800 CFI Models

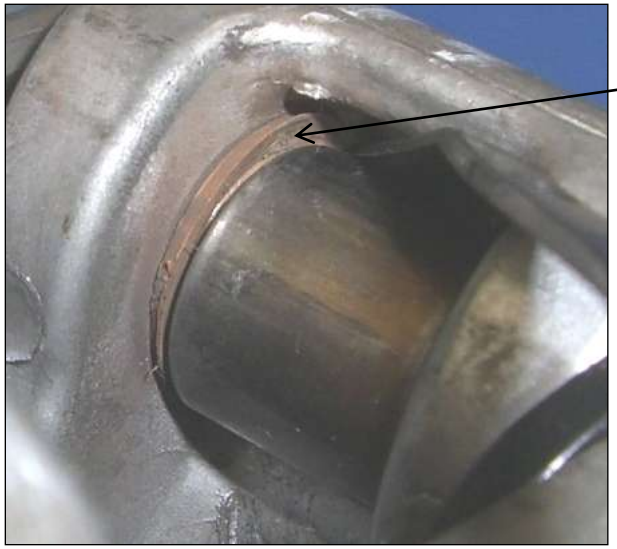
Front PTO side engine mount

Parts required to retrofit 2010 mount
(1) 1015891 – plate, nut, front
(1) 7518753 – bolt
(1) 5411685 – rubber mount top
(1) 5411686 – rubber mount bottom
(4) 7616637 – rivet

Clutch and Drive Belt Inspection and Service (continued)

Inspect the following clutch components

- Drive clutch sheaves for grooves or cracking
- Weight pockets for wear
- Drive and driven clutch rollers (washer should be flush with roller)
- Bushings in moveable sheave, cover, helix, and weights
- Weights for grooves or ramp damage and verify they move freely on pins
- Spring for distortion or breakage and measure free length
- Drive clutch spring should be replaced periodically



Note: Thrust washers not in alignment with roller indicates excessive roller bushing wear

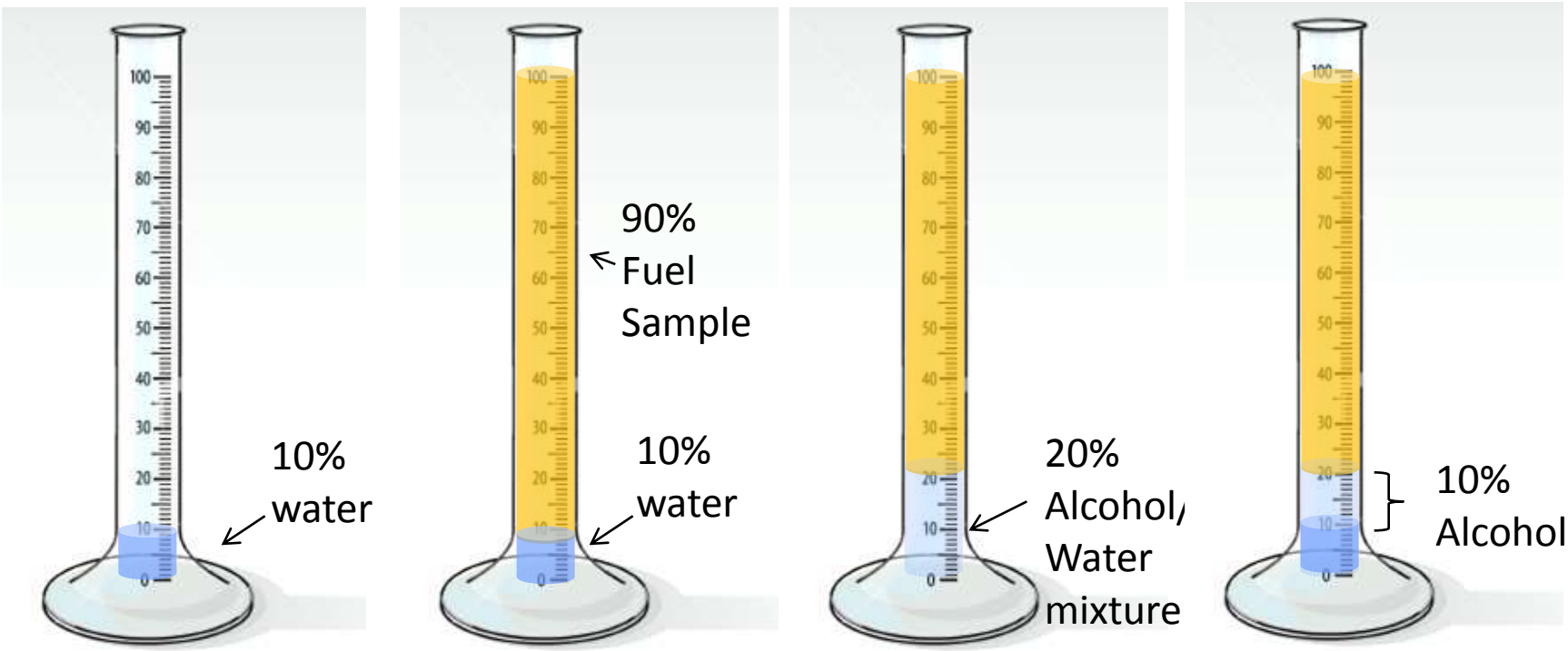
Fuel System

- Polaris recommends using the highest octane rating fuel available (91-93)
- Fuel should not be stored in metal containers
- Fuel used from storage containers should be poured through a screened funnel
- Period use of Polaris Carbon Clean Plus PN 2871326 is recommended
- Polaris Carbon Clean Plus is an excellent fuel stabilizer and removes unwanted carbon deposits from engine components and exhaust valves
- Do not use fuel de-icer with ethanol blended fuel

Polaris Carbon Clean Plus PN 2871326

Fuel System (continued)

- Determine fuel ethanol content with volume test
- Oxygenated fuel contains alcohol or ether compounds (Machines are calibrated for 91 Octane/Oxygenated)



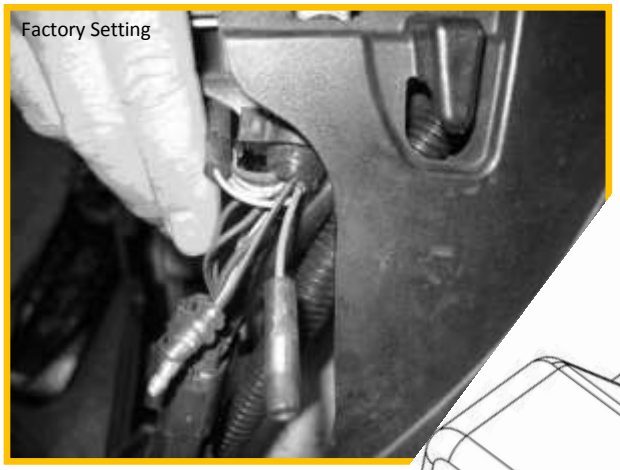
ethanol content test

Fuel System (continued)

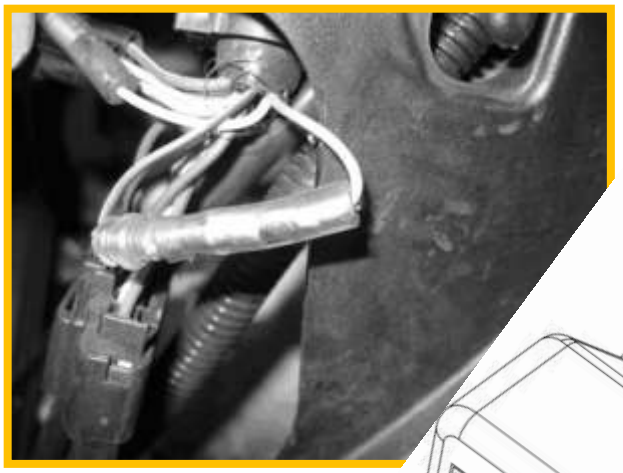
- Identify location of fuel selector wires/fuel resistor plug on machine
- If unsure of fuel Octane Rating or Oxygenated Compound content UNPLUG the selector wire or install the 10% ethanol 24 ohm fuel resistor

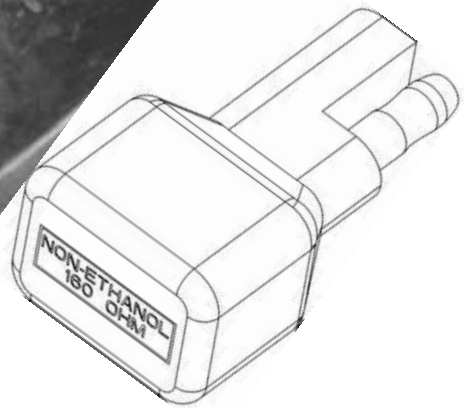
Fuel Octane (R+M/2)		Fuel Resistor	Wires
Non-oxygenated	91 or less	24 Ω	Un-plugged
Oxygenated (Up to 10%)	87/89/91+	24 Ω	Un-plugged
Non-oxygenated	91+	160 Ω	Plugged in

Factory Setting



Factory Installed

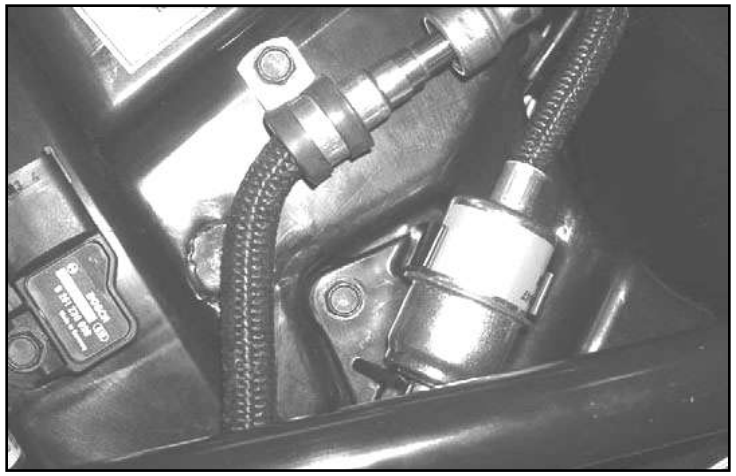




POLARIS INDUSTRIES INC.

Fuel System

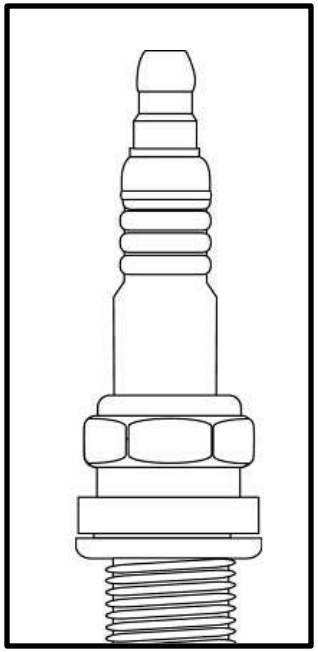
- Handle the fuel injectors with extreme care during service procedures
- Inspect condition of green injector isolators and o-rings prior to installation
- Thoroughly inspect the injector tip for damage
- Always replace a fuel injector that is damaged
- Verify fuel filter is not restricted (filter should be replaced initially at 1000 miles and every 2000 miles thereafter)
- A restricted filter can reduce fuel flow to the injectors which may result in serious engine damage
- Verify fuel pressure holds 58-60 psi at all RPM's
  (Note: fuel pressure should drop slowly when pump is not running)



Ignition System

- Verify spark plug cap retention with audible click
- Verify spark plugs are correct for application
- Do not use spark plugs with a threaded top terminal
- Route and secure plug wires to reduce movement
- Run engine to full operating temperature to avoid plug fouling

2010-2011 Pro-Ride Rush/Switchback/RMK



Note: Use only solid terminal spark plugs

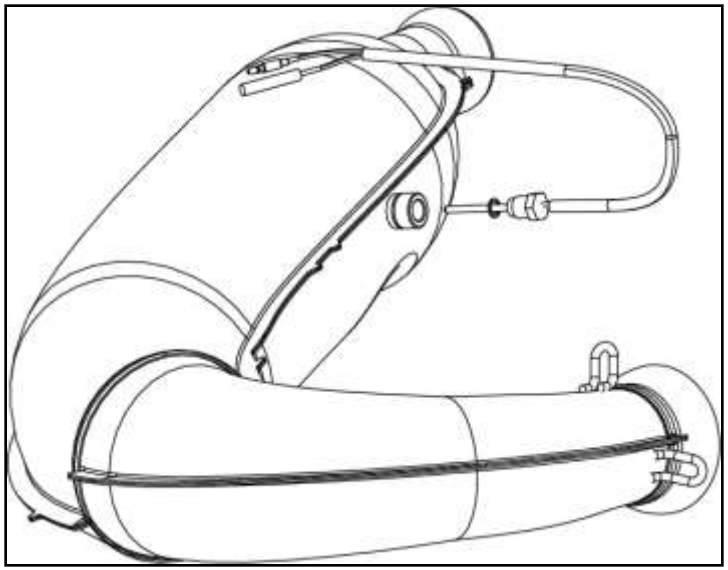
ignition System (continued)

Severely worn spark plug cap. Note damaged terminal and carbon/rubber deposits. Replace spark plug and plug cap if this occurs

Excessive wear on the spark plug terminal from a loose plug cap. Replace spark plug and plug cap if this occurs

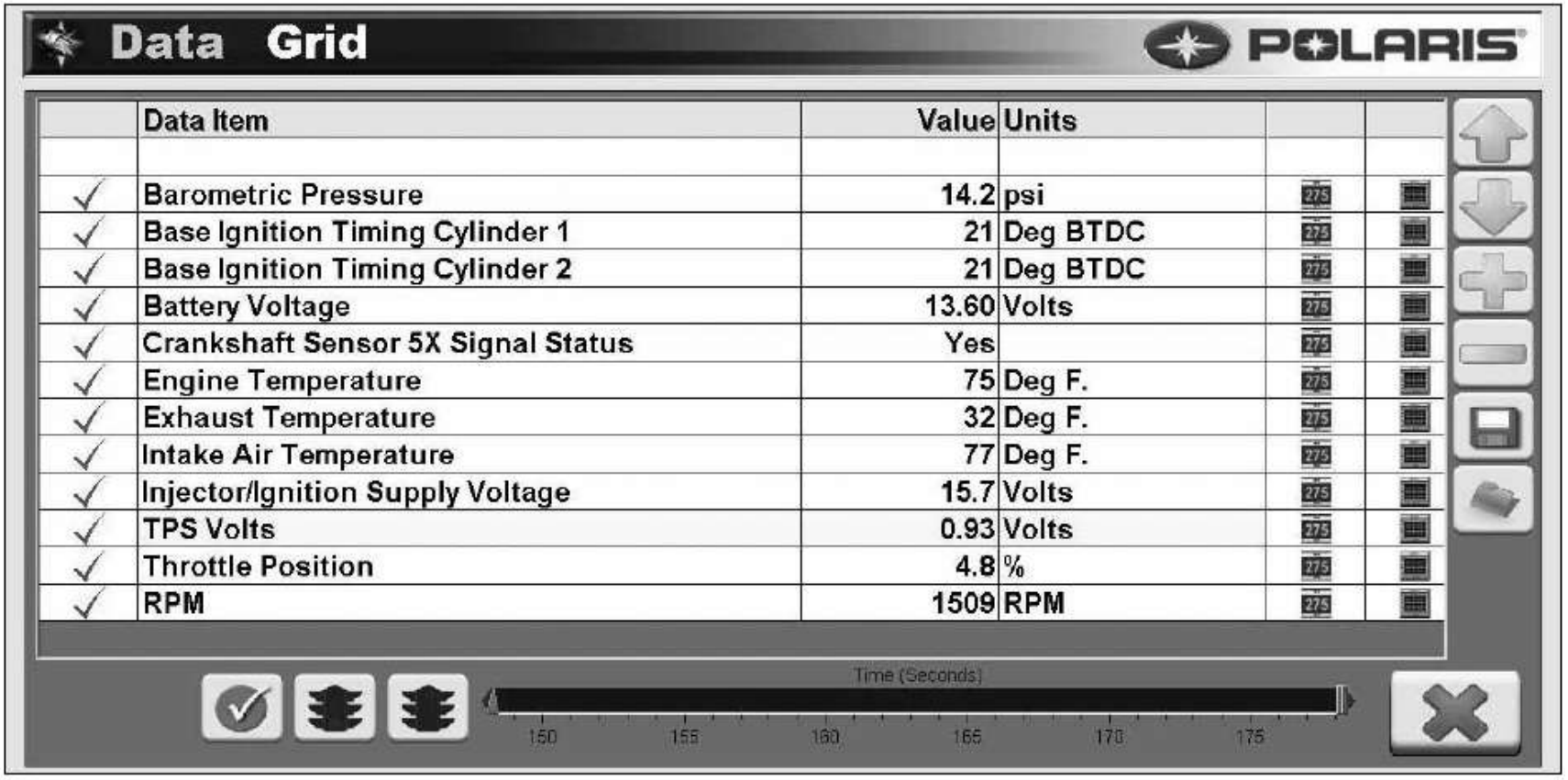
Exhaust System

- Verify integrity of exhaust temperature sensor wiring and terminals
- Apply anti-seize to exhaust temperature sensor threads
- Install single copper washer and torque exhaust temperature sensor to specifications (32 ft.lbs. 44Nm consult service manual)
- When servicing exhaust do not remove temperature sensor from pipe disconnect at connectors



Exhaust System (continued)

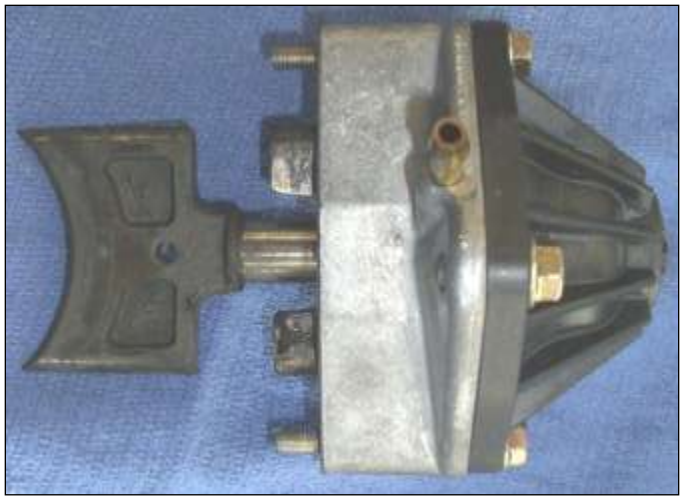
- Verify function of exhaust temperature sensor with Digital Wrench run engine at (3000 RPM/2Minutes)
- Perform exhaust temperature sensor resistance test *(2.3MΩ at 392˚F/76Ω at 1652˚F) Note: Do not test with temp sensor at room temperature*

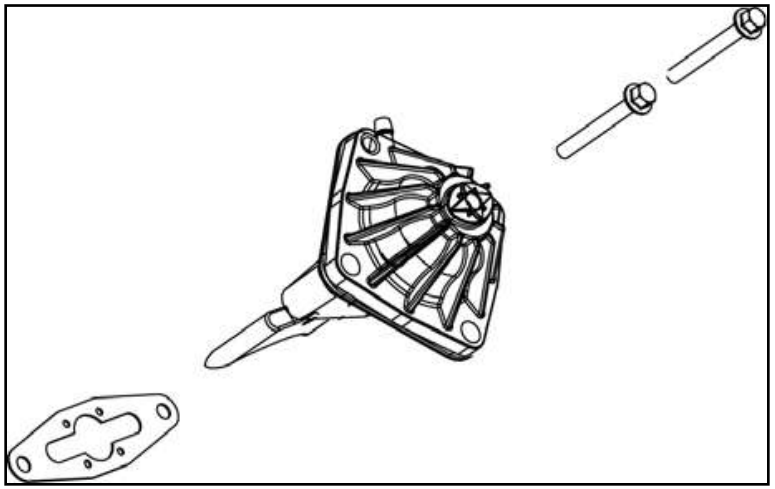


	Data Item	Value	Units
✓	Barometric Pressure	14.2	psi
✓	Base Ignition Timing Cylinder 1	21	Deg BTDC
✓	Base Ignition Timing Cylinder 2	21	Deg BTDC
✓	Battery Voltage	13.60	Volts
✓	Crankshaft Sensor 5X Signal Status	Yes	
✓	Engine Temperature	75	Deg F.
✓	Exhaust Temperature	32	Deg F.
✓	Intake Air Temperature	77	Deg F.
✓	Injector/Ignition Supply Voltage	15.7	Volts
✓	TPS Volts	0.93	Volts
✓	Throttle Position	4.8	%
✓	RPM	1509	RPM

Exhaust System (continued)

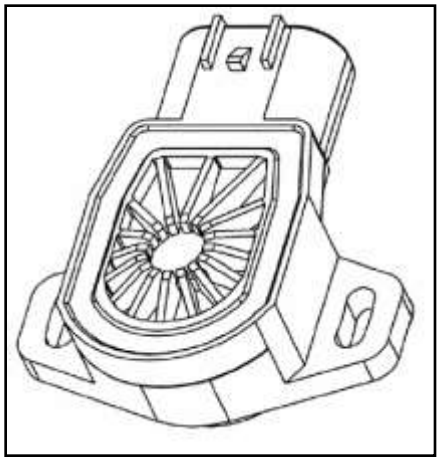
- Inspect exhaust resonator for loose internal components
- Service variable exhaust system components and verify operation of exhaust valves
- Always replace exhaust valve base gasket whenever removed





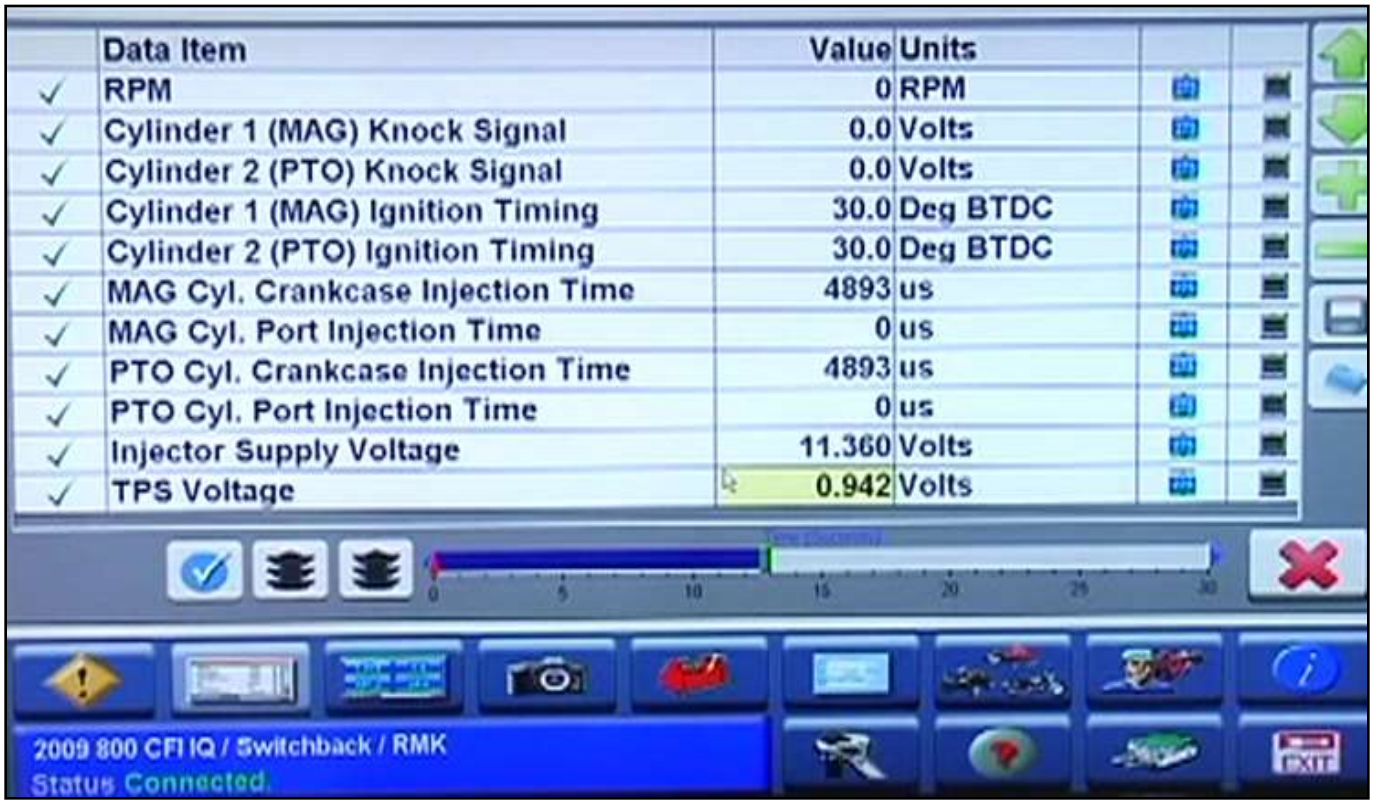
Engine Management System Throttle Position TPS Sensor

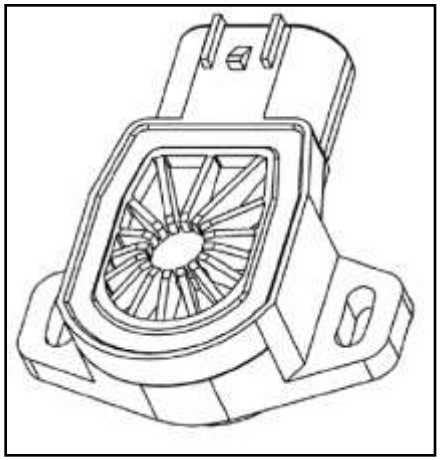
- Correct TPS voltage provides easy startup and maintains engine idle RPM
- Verify Throttle Position Sensor (TPS) voltage is within specifications
- Perform Throttle Position Sensor adjustment procedure outlined in service manual or Digital Wrench
- Use Digital Wrench to set/display TPS voltage since it displays the actual ECU values
- Verify warm engine idle RPM is within specifications 1700 +/-200 RPM
- Verify throttle plates are fully opened with throttle lever



Engine Management System TPS (continued)

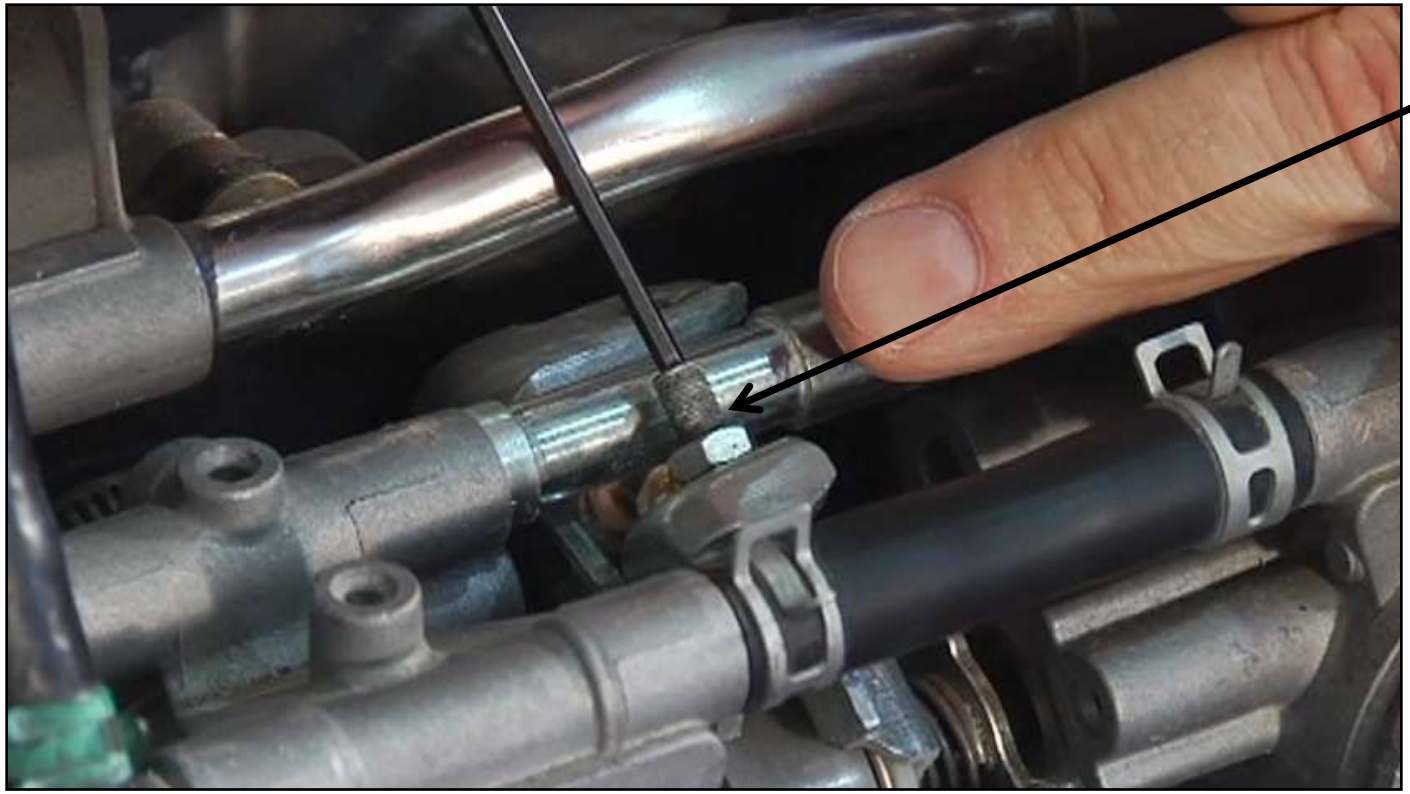
- New machine with no previous TPS adjustment
- Verify TPS voltage with Digital Wrench
- Verify TPS voltage is within specifications
- If TPS voltage is within specification no further action is required





Engine Management System TPS (continued)

- TPS has not been previously adjusted
- Verify TPS voltage with Digital Wrench
- TPS voltage is outside of specification
- Adjust air screw to bring TPS voltage into specification



Engine Management System TPS (continued)

- TPS out of specifications and has been previously adjusted
- Perform TPS voltage adjustment procedure located in Digital Wrench Special Tests Menu or service manual
- Perform TPS Base Setting Procedure
- Always perform TPS adjustment with Temperature Barometric Air Pressure TBAP sensor connected
- Visually verify throttle plate synchronization
- Check throttle lever free play
- Check throttle lever and cable for binding by turning handlebars through full range of motion

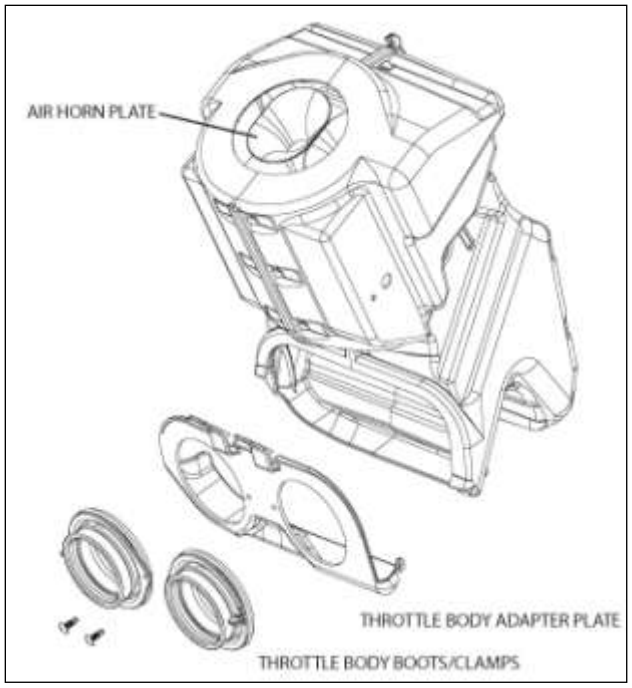
Engine Management System TPS (continued)

- TPS has been previously adjusted and throttle plates are out of synchronization
- TPS voltage adjustment procedure located in Digital Wrench Special Tests Menu or service manual
- Perform TPS Base Setting Procedure before attempting synchronization
- Perform Full Setting Procedure if TPS voltage is outside of specifications and the throttle plates are out of synchronization
- Always perform TPS adjustment with Temperature Barometric Air Pressure TBAP sensor connected
- Visually verify throttle plate synchronization
- Check throttle lever free play
- Check throttle lever and cable for binding by turning handlebars through full range of motion

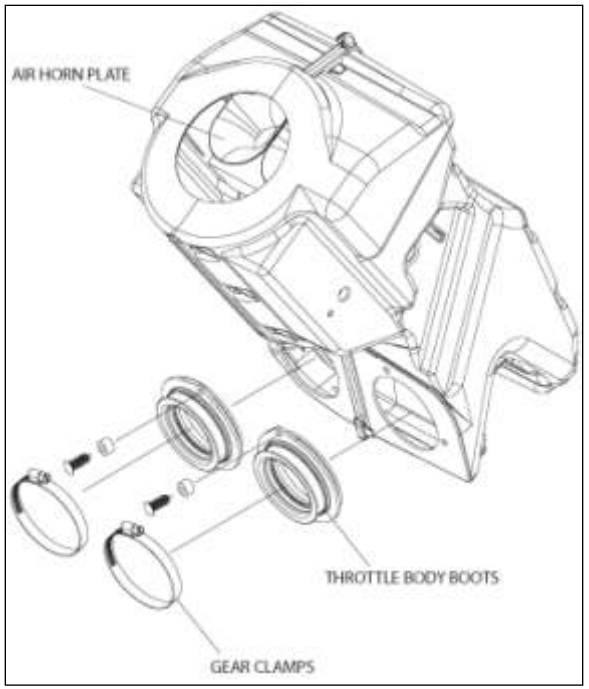
Engine Management System

- A broken, modified, or improperly mounted air box may cause detonation, backfiring and high-idle hang.
- The engine management system cannot compensate for air box flow changes
- Verify air box boot integrity
- Inspect air box/inlets for modifications or leaks

2007-2008 sealed two-piece air box with air horn plate



2009-2010 sealed air box



Engine Cooling System

- A correctly functioning cooling system maintains optimum engine temperature
- Thermostat begins to open at 115°F-125°F +/- 5°F (46°C-52°C)
- Do not operate machine without a thermostat
- Coolant bypasses the heat exchangers with thermostat closed to speed warm-up
- Engine operation above 175°F (80°C) the fuel and ignition timing adjusts to protect engine
- Hot lamp illuminates to alert the operator when overheat condition occurs
- Operation with hot lamp flashing and engine misfiring can damage engine
- Educate customer on use of ice scratches (if equipped)

Engine Temperature Limit Modes

MODEL	HOT LAMP MODE	THRESHOLD*
600/800 PRO-Ride	Hot Lamp ON	Hot Lamp Illuminates: Idle = 230° F/110° C WOT = 185° F/85° C
	Hot Lamp FLASH	Hot Lamp Flashes RPM Misfire at: Idle = 239° F/115° C WOT = 208° F/98° C

Engine Mechanical

- Perform engine compression test for extreme performance loss diagnosis
- Compression pressure will generally be 115-125psi on a broken in engine. (800 CFI at sea level)
- Always hold throttle wide open and pull recoil rope rapidly five times.
- Inspect condition of piston skirts (note: sacrificial graphite coating)
- Pistons are anodized underneath the graphite composite coating
- Pistons are packaged with a molybdenum based lubricant on the wrist pin bores and rings (do not remove lubricant)

800 CFI Pistons

Engine Mechanical (continued)

- Verify precision measurement tools are calibrated
- Verify torque wrench accuracy and calibration
- To avoid component distortion torque all engine fasteners to specifications
- Cylinder inspection and honing procedure
- Measure the bore 1/2" from the top of the cylinder in line with the piston pin and 90° to the pin to determine if the bore is out of round

Material transfer

FIGURE A

Deep grooves

FIGURE B:

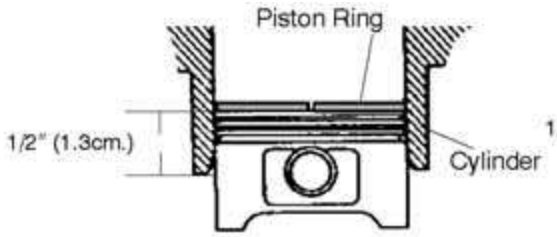
Flaking

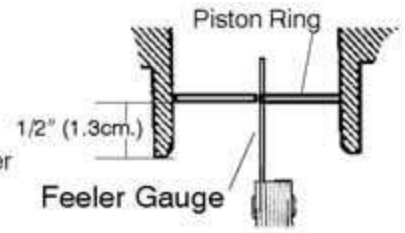
FIGURE C:

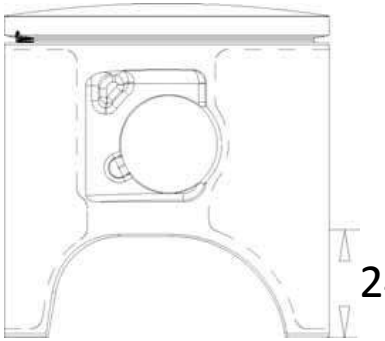
Engine Mechanical (continued)

Cylinder inspection and measurement procedures

- Refer to service manual for engine specifications
- Measure 800 piston 24.5 mm up from bottom of skirt
- Measure installed ring gap ½” from top and bottom of cylinder (variation
- between gaps indicates taper)
- Measure cylinder to piston clearance (note: measurement location on pistons, cylinder measuring techniques, and measurement tools)
- Follow engine break-in fuel/oil premix requirements (40:1 Polaris Blue Semi-Synthetic)







Polaris VES Gold Plus

- VES GOLD PLUS far exceeds the detergency, low smoke, lubricity and port blocking requirements of the JASO FD/ISO EGD 2 stroke oil classifications.
- Reduces deposit buildup on exhaust valves
- Pour Point- VES GOLD PLUS exhibits a pour point of less than negative 60 degrees Celsius. This insures superior and uniform oil delivery on cold start up a well as superior pour-ability at very low temps
- Lubricity Index- VES GOLD PLUS exhibits superior lubricating properties as opposed to the majority of aftermarket oils
- Smoke- VES GOLD PLUS is formulated to be extremely low smoke outperforming JASO criteria for low smoke two stroke oils by 50%
- Cold Engine Starting/Pull effort reduction- VES GOLD PLUS is formulated with super synthetic base stocks that maintain good flow and exhibit no resistance to movement at temperatures well below -40° F

Suspension and Chassis

- Inspect ski/track alignment
- Inspect suspension wheels, bearings and bushings for excess wear or binding
- Verify if factory/studded track is being used
- Verify factory recommended final gear ratio
- Inspect jackshaft and driveshaft bearings for excess wear or binding
- Verify brake caliper/pads are not dragging

Summary:

- Machine setup and calibration
- Verify required scheduled maintenance has been performed
- Inspect for modifications that can reduce performance
- Gather accurate and complete information from the customer
- Utilize Polaris information resources including STOP, Unit Inquiry, Team Tips, Service Manuals, and training materials
- Complete all available diagnostic procedures as outlined in service manuals or Digital Wrench
- Consult a service manual for specifications, repair and diagnostic procedure
- After using all available resources and you require additional diagnostic assistance use ASK Polaris to contact technical service