Shop Manual

Supplement

SUMMIT
x 670

484 0697 00

ski-doo®

1998 Shop Manual Supplement

SUMMIT x 670

USE IN CONJUNCTION WITH THE SKI-DOO SHOP MANUAL P/N 484 0682 00

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* Refer to *1998 Shop Manual volume 2* (P/N 484 0682 00) **VOLUME 2**

SAFETY NOTICE

This manual has been prepared as a guide to correctly service and repair the 1998 Ski-Doo Summit x 670. See model list on next page.

This edition was primarily published to be used by snowmobile mechanics who are already familiar with all service procedures relating to Bombardier made snowmobiles.

Please note that the instructions will apply only if proper hand tools and special service tools are used.

This *Shop Manual Supplement* uses technical terms which may be slightly different from the ones used in *Parts Catalog*.

The content depicts parts and/or procedures applicable to the particular product at its time of manufacture. It does not include dealer modifications, whether authorized or not by Bombardier, after manufacturing the product.

In addition, the sole purpose of the illustrations throughout the manual, is to assist identification of the general configuration of the parts. They are not to be interpreted as technical drawings or exact replicas of the parts.

The use of Bombardier parts is most strongly recommended when considering replacement of any component. Dealer and/or distributor assistance should be sought in case of doubt.

The engines and the corresponding components identified in this document should not be utilized on product(s) other than those mentioned in this document.

Torque wrench tightening specifications must be strictly adhered to. Locking devices (ex.: locking tab, elastic stop nut, etc.) must be installed or replaced with new ones, when damaged. If the efficiency of a locking device is impaired, it must be renewed.

This manual emphasizes particular information denoted by the wording and symbols;

◆ WARNING
Identifies an instruction which, if not followed, could cause serious personal injury including possibility of death.

▼ CAUTION
Denotes an instruction which, if not followed, could severely damage vehicle components.

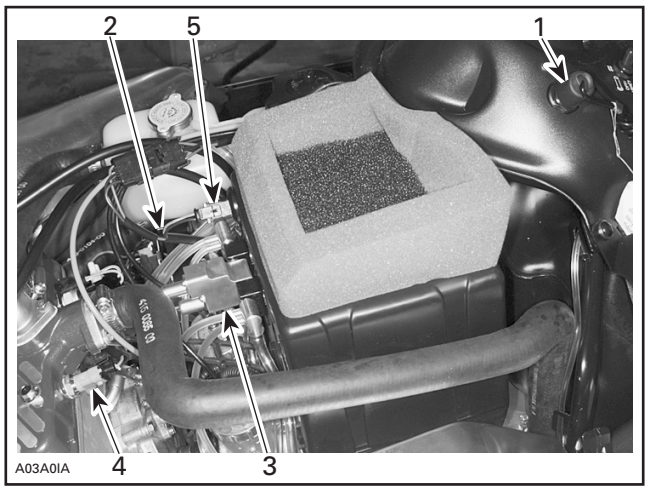
NOTE: Indicates supplementary information needed to fully complete an instruction.

Although the mere reading of such information does not eliminate the hazard, your understanding of the information will promote its correct use. Always use common shop safety practice.

This information relates to the preparation and use of Bombardier snowmobiles and has been utilized safely and effectively by Bombardier Inc. However, Bombardier Inc. disclaims liability for all damages and/or injuries resulting from the improper use of the contents. We strongly recommend that any services be carried out and/or verified by a highly skilled professional mechanic. It is understood that certain modifications may render use of the vehicle illegal under existing federal, provincial and state regulations.

INTRODUCTION

The 1998 Summit x 670 comprises 2 new systems compare with Summit 670. The *1998 Shop Manual Supplement* describes how these systems operate as well as the procedures to test them.



1. *DESS switch*
2. *MPEM module including DPM and ignition systems*
3. *DPM manifold*
4. *Engine temperature DPM sensor*
5. *Air temperature DPM sensor*

ABBREVIATIONS LIST

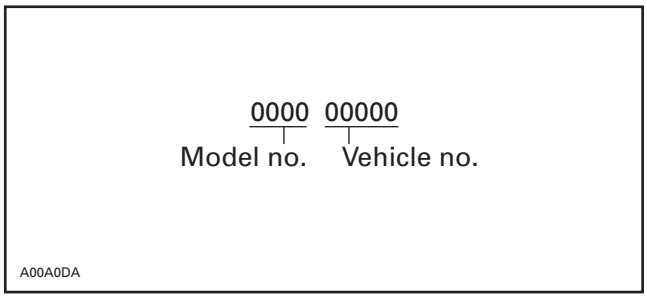
CDI	Capacitor Discharge Ignition
DESS	Digitally Encoded Security System
DPM	Digital Performance Management
Hz	Hertz (1 cycle per second)
PSI	Pound per Square Inch
MAG	Magneto (magneto side)
mbar	millibar
MPEM	Multi-Purpose Electronic Module
PTO	Power Take Off (drive pulley side)
ROM	Read Only Memory
RPM	Revolutions Per Minute
VDC	Volt Direct Current

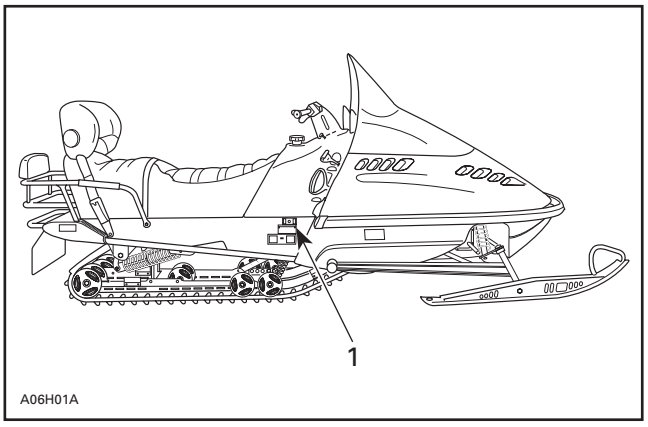
MODELS	MODEL NUMBER
SUMMIT x 670 (CANADA)	1307
SUMMIT x 670 (U.S.)	1310

SERIAL NUMBERS

Each Vehicle has its Particular Vehicle Serial Number

Serial Number Meaning



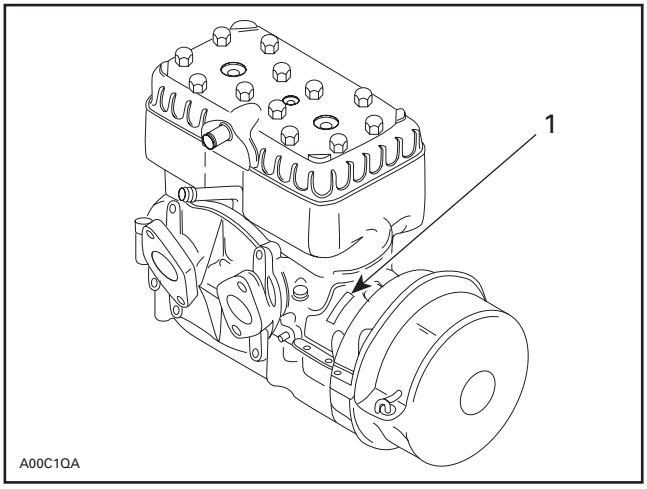


TYPICAL

1. *Vehicle serial number*

The engine also has a serial number.

Liquid Cooled Engines



1. Engine serial number

▼ CAUTION

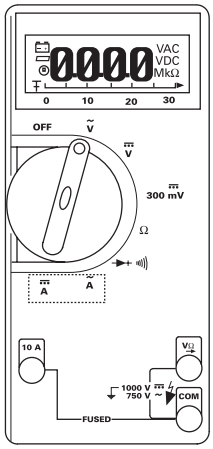
Most components of those vehicles are built with parts dimensioned in the metric system. Most fasteners are metric and must not be replaced by customary fasteners or vice versa. Mismatched or incorrect fasteners could cause damage to the vehicle or possible personal injury.

TOOLS

A00B4HA

TYPICAL — ADAPTOR (P/N 529 0338 00)

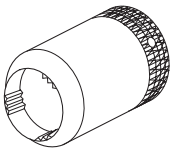
Fluke multimeter **242**
(P/N 529 0220 00)



F01B1O4

APPLICATION
All models.

Choke nut tool **782**
(P/N 529 0322 00)



A01B554

APPLICATION
All vehicles equipped with a choke.

Programmer
(P/N 529 0355 02)

A01B5B4

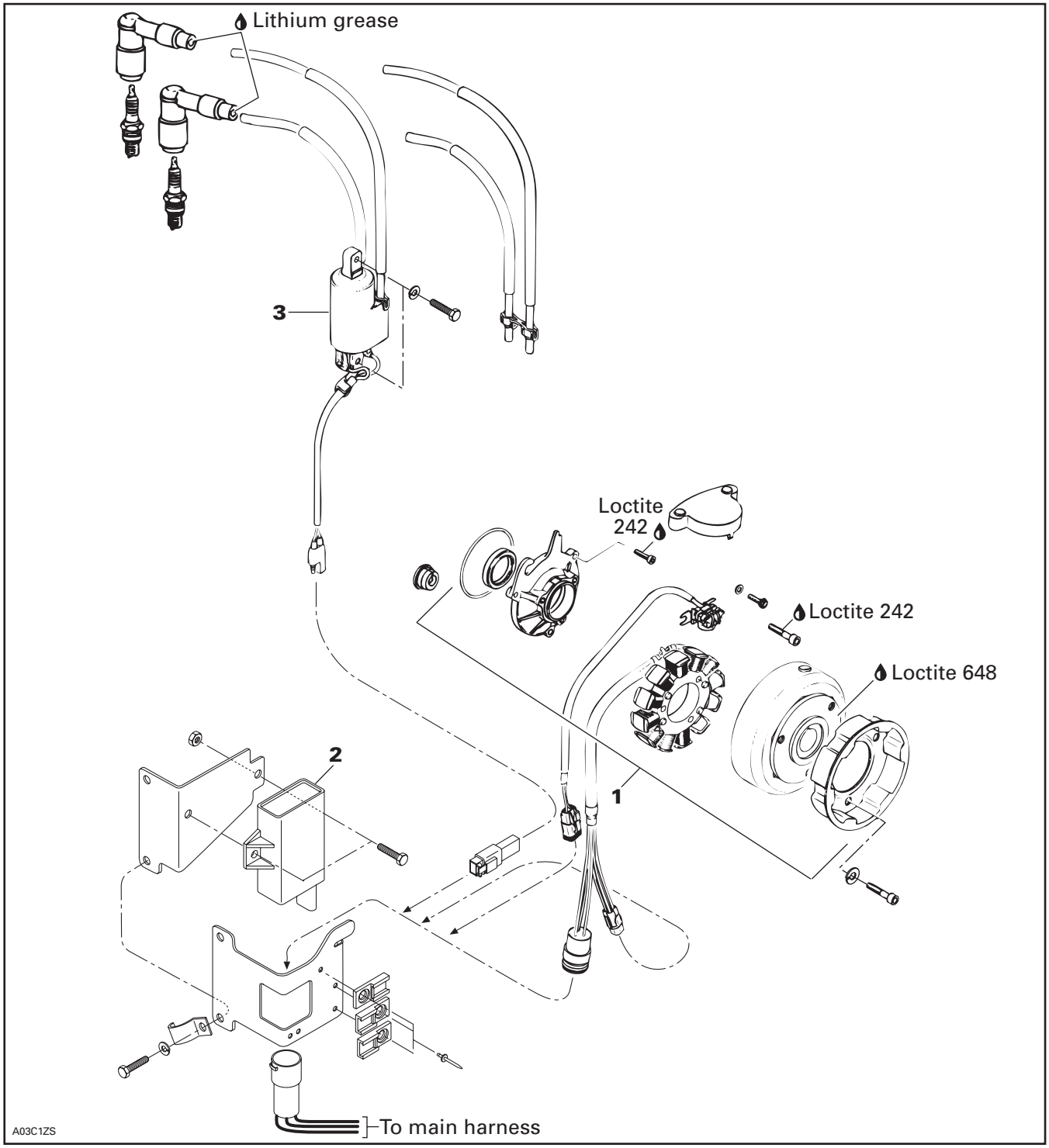
APPLICATION
All models equipped with a DESS.

TROUBLESHOOTING

DIGITAL PERFORMANCE MANAGEMENT (DPM) SYSTEM

If the DPM seems to be defective, unplug both solenoids while the engine is running. The carburation is now identical to that of carburetors without a DPM provided, of course, that all pipe fittings are tight and that solenoids are in good condition. None must be half-open.

ELECTRICAL SYSTEM



220-WATT MAGNETO SYSTEM

THEORY AND OPERATION

Charging System

Charging system is identical to Summit 670. Refer to *1998 Shop Manual volume 2*.

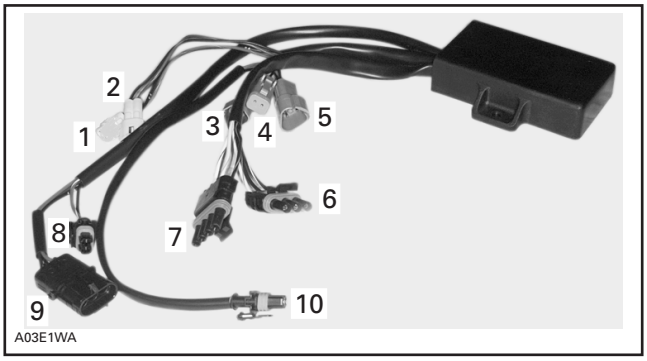
The 220-watt magneto **no. 1** produces alternating current.

MPEM Module (Multi-Purpose Electronic Module)

DPM (Digital Performance Management) system, DESS (Digital Encoded Security System) and ignition system are integrated into MPEM module **no. 2**.

DPM + DESS + Ignition module = MPEM module.

MPEM module operates on alternating current (AC).



1. Compensation solenoid (3-11 housing)
2. Enrichment solenoid (3-10 housing)
3. Trigger coil (2-02 housing)
4. Ignition coil (3-01 housing)
5. Magneto (3-05 housing)
6. Dess switch (6-03 housing)
7. Warning light, engine shut-off and trigger coil
8. Air temperature DPM sensor (4-09 housing)
9. Cold start switch (4-08 housing)
10. Liquid temperature DPM sensor (3-09 housing)

ENGINE RPM LIMITER

Ignition is cut at 8600 RPM and is re-activated at 8500 RPM.

Ignition

The 220-watt magneto has an ignition generator coil **no. 3**. A BLACK/YELLOW wire allows the engine to stop. Grounding this wire will short-circuit the ignition module.

Trigger coil pulses are sent to the MPEM module in order to ignite the spark plug at the right time.

TESTING PROCEDURE

Magneto

IGNITION GENERATOR COIL

Resistance Testing

Disconnect 3-05 housing.

Refer to the electrical diagram at the end of this supplement.

Connect an ohmmeter to the magneto RED and BLACK/RED wires (3-05A and 3-05B).

HOUSING 3-05 DISCONNECTED

The resistance must be as indicated in the following table.

WIRES	RESISTANCE VALUES Ω
RED and BLACK/RED	10,0 - 15,0

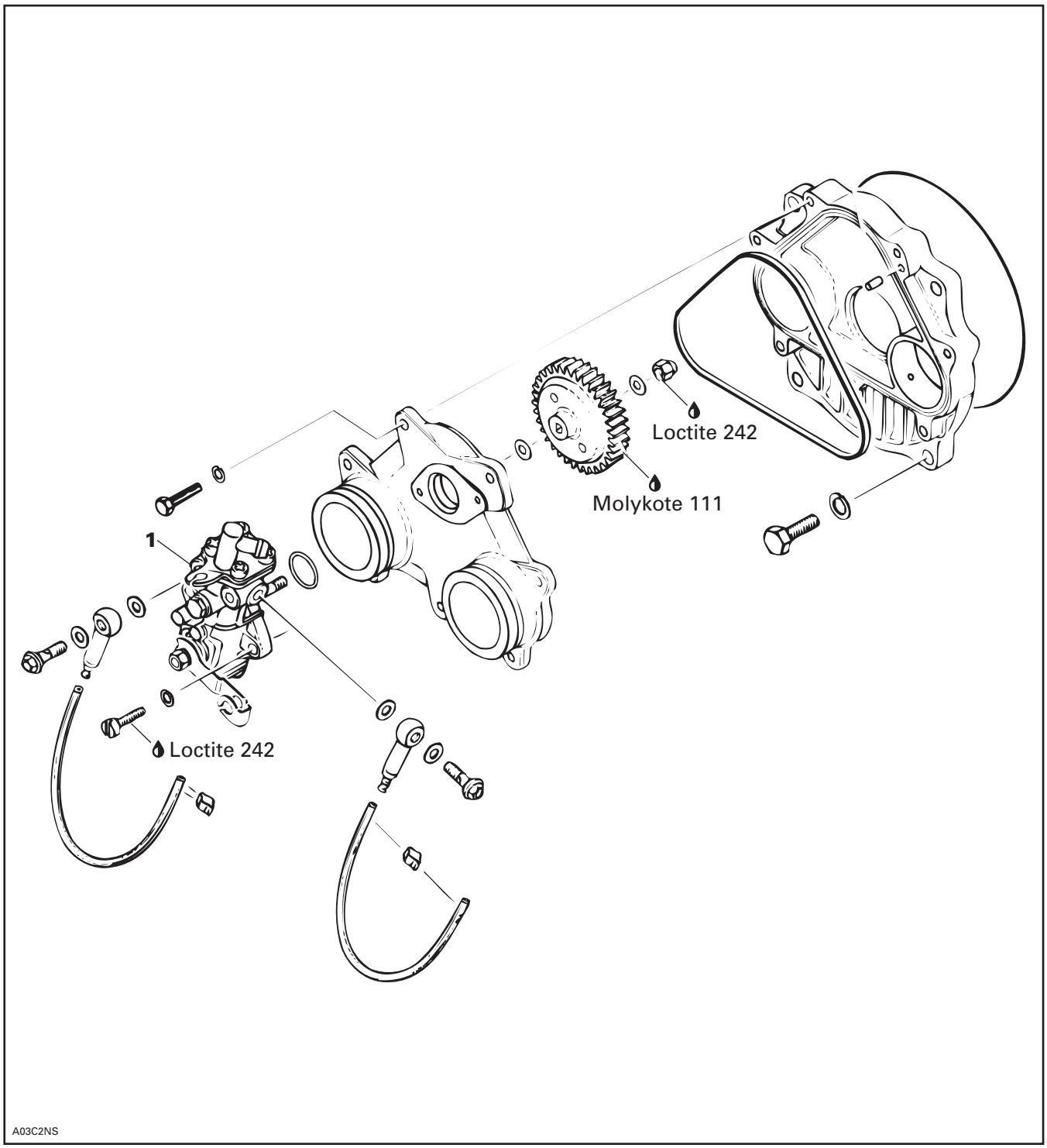
Insulation Test

Disconnect 2-01 housing.

Connect an ohmmeter probe to ground and the other probe to each of the YELLOW wires.

There must be no continuity.

OIL INJECTION SYSTEM



OIL INJECTION PUMP

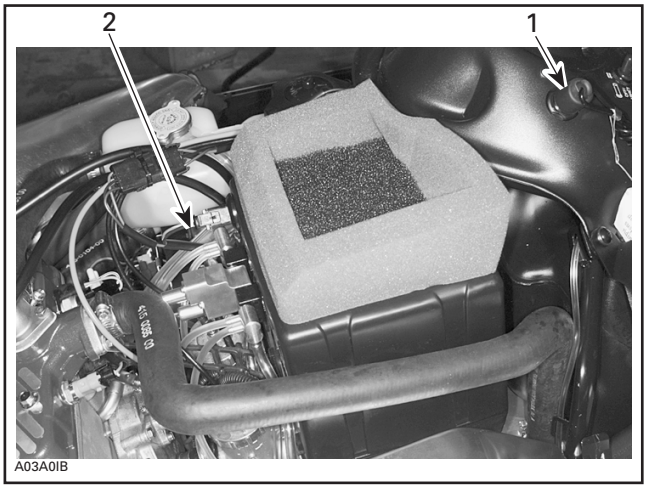
Oil injection pump **no. 1** is located above carburetors. Maintenance, adjustment and inspection remain the same has Summit 670.

Refer to section OIL INJECTION PUMP 04-06 of *1998 Shop Manual vol. 2.*

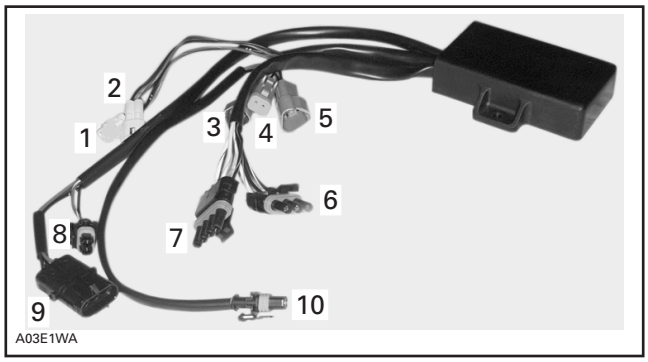
VOLUME 2

DESS SYSTEM (DIGITALLY ENCODED SECURITY SYSTEM)

COMPONENT LOCATION



1. *Safety lanyard switch and cap*
2. *MPEM*



MPEM

1. *Compensation solenoid (3-11 housing)*
2. *Enrichment solenoid (3-10 housing)*
3. *Trigger coil (2-02 housing)*
4. *Ignition coil (3-01 housing)*
5. *Magneto (3-05 housing)*
6. *DESS switch (6-03 housing)*
7. *Warning light, engine shut-off and trigger coil (10-01 housing)*
8. *Air temperature DPM sensor (4-09 housing)*
9. *Cold start switch (4-08 housing)*
10. *Liquid temperature DPM sensor (3-09 housing)*

THEORY AND OPERATION

This system is a deterrent against theft. Factory programmed, the tether cord provided with the snowmobile is the only one that allows engine to turn more than 3000 RPM. If a wrong tether cord is installed the engine can not reach engagement speed required to move vehicle.

The snowmobile micro-processor (MPEM) can be programmed to allow the use up to 8 tether cords.

After engine is started DESS indicator light blinking indicates bad connection or wrong tether cord. Refer to *DESS Indicator Light* on the next page.

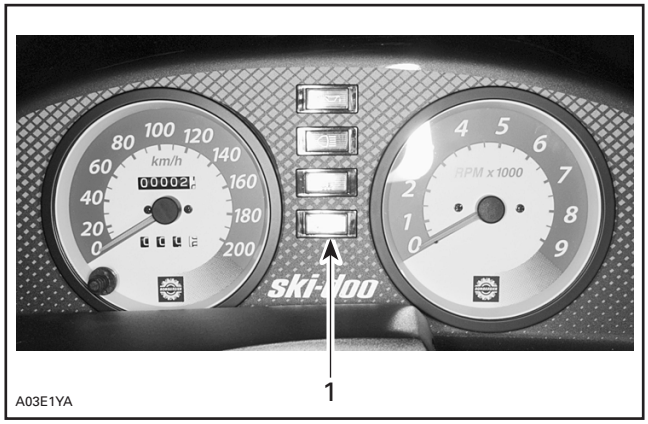
Multi-Purpose Electronic Module (MPEM)

NOTE: The module must be programmed in order to accept a tether cord.

This module cuts off the ignition at 3000 RPM in antitheft mode (wrong tether cord) or in case of a bad connection.

The module activates the indicator light (depending on the antitheft mode).

DESS Indicator Light

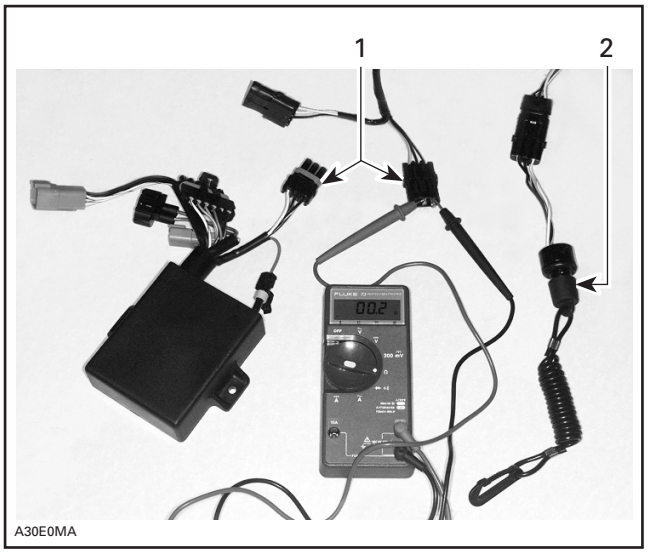


1. *DESS indicator light*

DESS LIGHT	CAUSE	REMEDY
Blinking rapidly	Wrong tether cord	Use tether cord programmed for snowmobile
Blinking slowly	Bad connection	Clean tether cord
Not blinking	Everything OK	Snowmobile can be driven normally

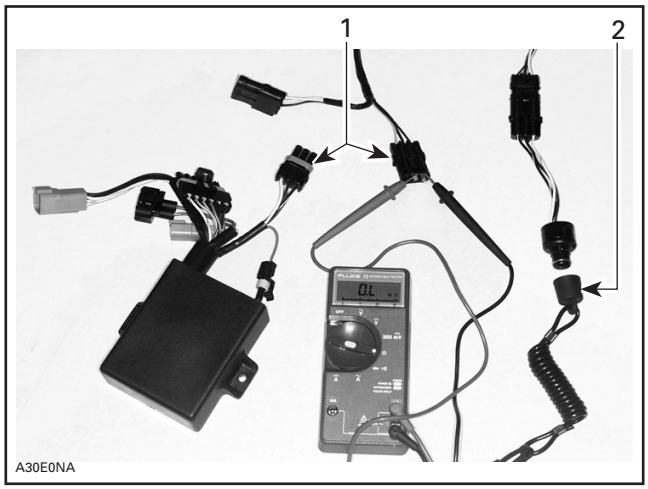
DESS Switch

Check using a multimeter by connecting probes to BLACK/GREEN and BLACK/WHITE wires. The multimeter should indicate a closed circuit (0.L $_{M\Omega}$) in operating position and a open circuit (0 $_{\Omega}$) in off position.



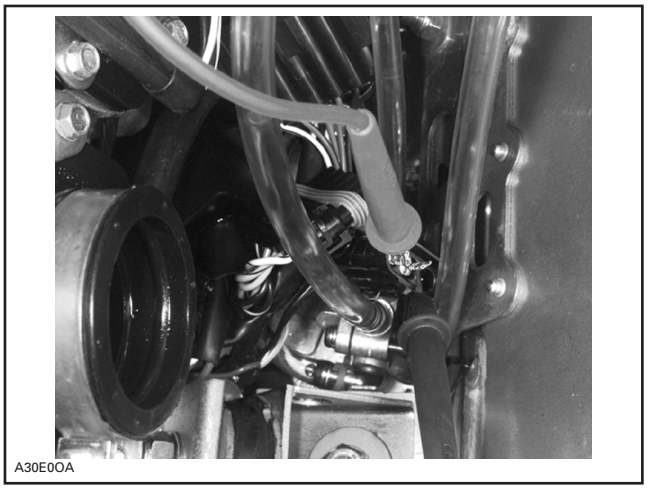
TYPICAL — HARNESS REMOVED FOR CLARITY

1. *Housing disconnected*
2. *DESS cap in place*



TYPICAL — HARNESS REMOVED FOR CLARITY

1. *Housing disconnected*
2. *DESS cap remove*



TYPICAL — IN-VEHICLE TESTING

If readings do not correspond to the above mentioned indications, replace switch.

Trigger Coil

Resistance Testing

1. Connect probes to WHITE/YELLOW and BLUE/YELLOW wires from trigger coil 2-02 housing.
2. Activate the manual starter and check values indicated by the multimeter.
3. Repeat operation 3 times.

Compare readings with those appearing in the IGNITION SYSTEM TESTING table.

IGNITION SYSTEM TESTING (Summit x 670)								
PART	TEST TO BE PERFORMED	WIRE COLOR	MULTIMETER PROBE CONNECTION	RESISTANCE Ω		VOLTAGE V		NOTE
				VALUE (Ohms)	MULTIMETER SCALE	Value (Volts)	MULTIMETER SCALE	
Stop switch	Running insulation	BK and BK/YL	3-05C-F and 10-01A-M	0.L	00.0 MΩ	—	—	No stop switch must be operational.
	Continuity in stop position	BK and BK/YL	3-05C-F and 10-01A-M	00.0 - 00.5	00.0 Ω	—	—	At least one stop switch must be operational.
	Insulation in stop position	BK/GN BK/WH	10-02B-M 10-02C-M	0.L	00.0 MΩ	—	—	Tether cord cap must be removed
	Continuity in running position	BK/GN BK/WH	10-02B-M 10-02C-M	00.0 - 00.5	00.0 Ω	—	—	Tether cord cap must be removed
Ignition generator coil	Power	RD BK/RD	3-05A-F and 3-05B-F	10.0 - 15.0	00.0 Ω	10.0 - 13.5	00.0VAC	
	Coil insulation	BK RD	3-05C-F and 3-05A-F	0.L	00.0 Ω	—	—	
	Ground continuity	BK and engine	3-05C-F and engine	00.0 - 00.5	00.0 Ω	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
Ignition module	Output voltage	BK and WH/BL	3-01-2-F and 3-01-1-F	—	—	4.5 - 8.0	00.0VAC	No stop switch must be operational and tether cord cap must be in place.
High voltage coil	Primary winding resistance	BK and WH/BL	3-01-2-M and 3-01-1-M	0.00 - 00.9	00.0 Ω	—	—	
	Secondary winding resistance (spark plug cap included)	Plug caps Plug cap	Into spark plug caps	19.5 K - 26.5 K	00.0 KΩ	▼ CAUTION Do not measure high voltage coil output voltage.		
	Secondary winding resistance	BK BK	On spark plug wires	11.5 K - 14.5 K	00.0 KΩ	▼ CAUTION Do not measure high voltage coil output voltage.		
	Secondary winding voltage	BK Engine	On spark plug wire and engine	—	—	0.1 - 1.4	0.00VAC	The measurement must be taken on the spark plug wire (without the spark plug).
	Insulation	Cap and BK	In cap and 3-01-1-M	0.L	00.0 Ω	—	—	—
Spark plug cap	Cap resistance	—	Spark plug side and wire side	4.0 K - 6.0 K	00.0 KΩ	—	—	—

LIGHTING SYSTEM TESTING (Summit x 670)								
PART	TEST TO BE PERFORMED	WIRE COLOR	MULTIMETER PROBE CONNECTION	RESISTANCE Ω		VOLTAGE V		NOTE
				VALUE (Ohms)	MULTIMETER SCALE	VALUE (Volts)	MULTIMETER SCALE	
Lighting generator coil	Power	YL and YL	2-01B-F and 2-01C-F	00.0 - 00.6	00.0 Ω	3.0 - 7.0	00.0VAC	—
	Insulation	YL and engine	2-01(B,C)-F and engine	0.L	00.0 MΩ	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
	Ground Continuity	YL and engine	2-01B-F and engine	0.L	00.0 MΩ	—	—	

M: Male

F: Female

NOTE: Stop switches include the ignition switch, the tether cord switch and the emergency cut-out switch.

It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

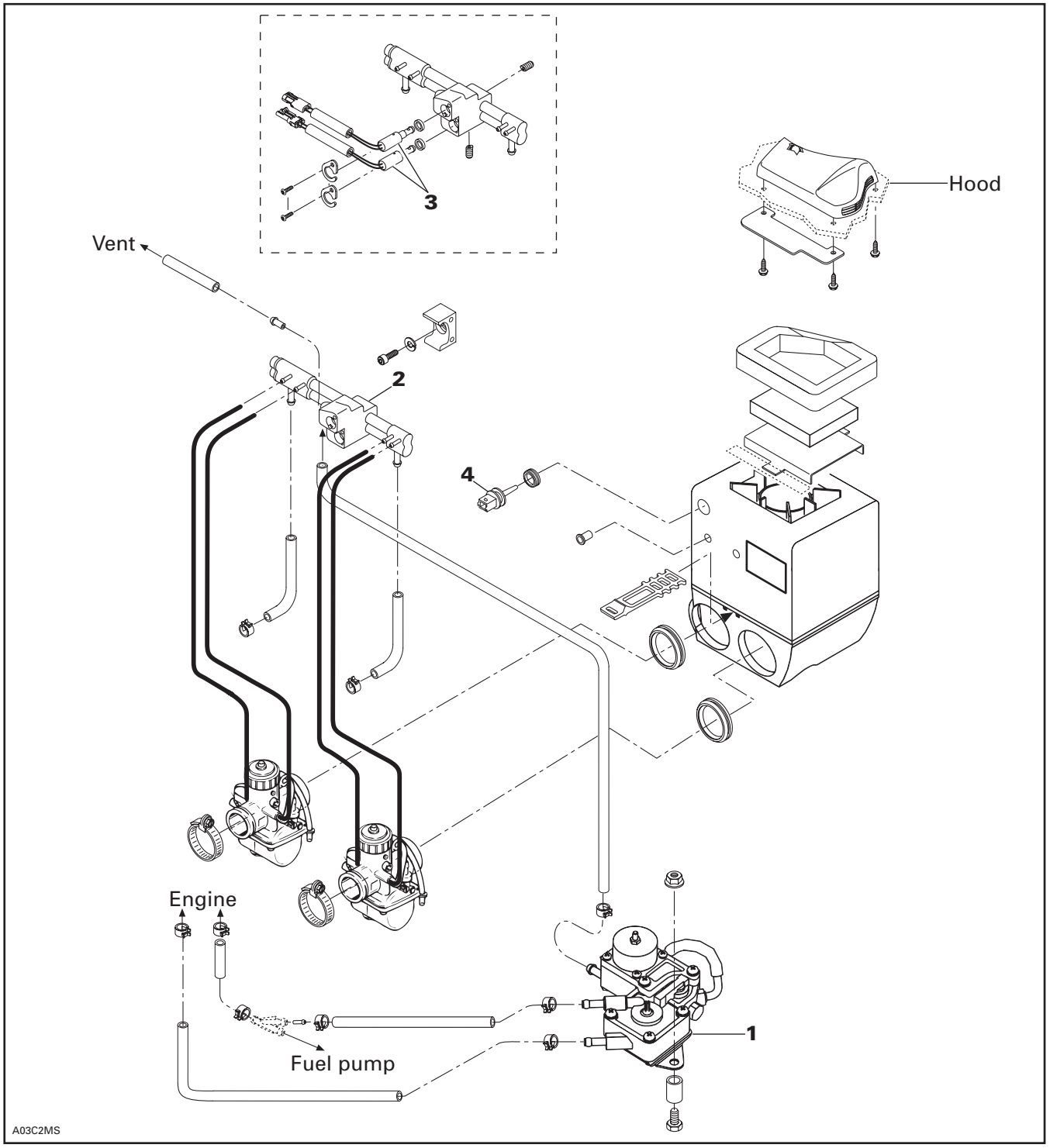
Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

Perform testing in the prescribed order and replace any parts not performing according to specifications.

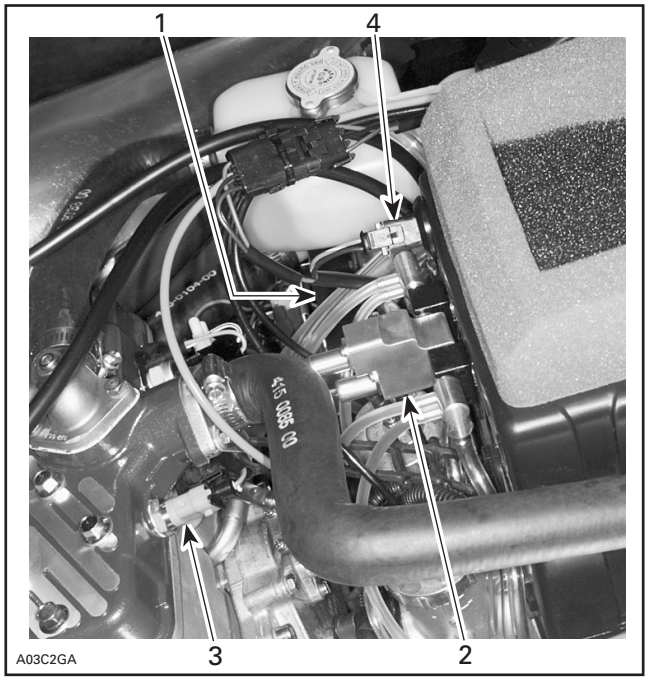
It is important to resume all tests when replacing a component.

If not specified, the probe connecting sequence is not important.

DIGITAL PERFORMANCE MANAGEMENT (DPM) SYSTEM



COMPONENT LOCATION



1. MPEM module
2. Manifold
3. Engine temperature DPM sensor
4. Air temperature DPM sensor

THEORY AND OPERATION

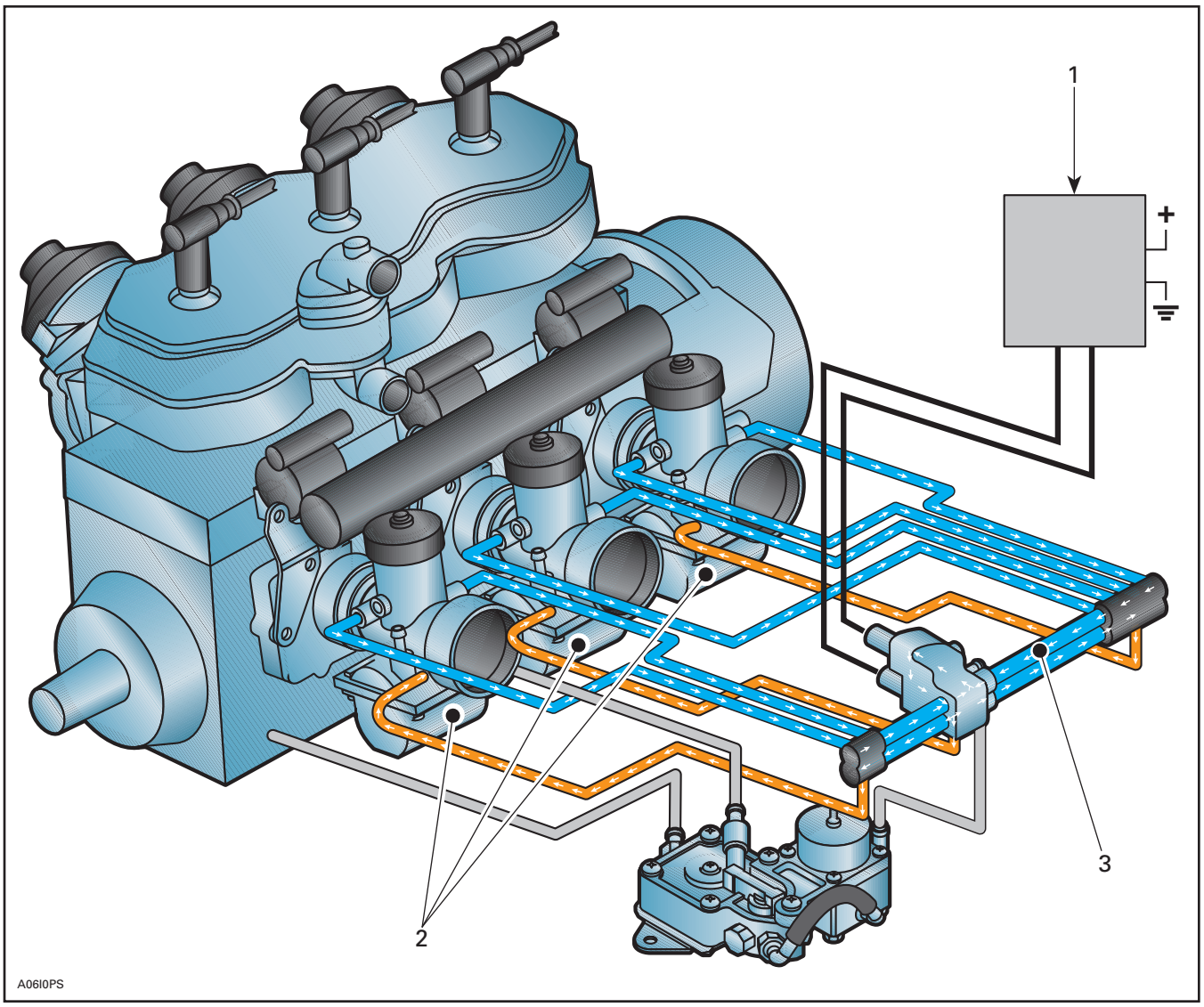
PURPOSE

Calibrate the air/fuel mixture in order to optimize the engine output while reducing fuel consumption.

METHOD

The system makes the pressure vary within the carburetor bowl.

OVERALL SYSTEM OPERATION



3 CYLINDER ENGINE SHOWN — SAME PRINCIPLE FOR 2 CYLINDER ENGINE

1. *MPEM module*
2. *Carburetor bowls*
3. *Distribution gallery (upper tube)*

Introduction

The engine is being started using the manual starter.

The Digital Performance Management (DPM) system increases pressure within all 2 carburetor bowls thus the air/fuel mixture is enriched. This is what we call the enrichment mode.

NOTE: On Summit x 670, use primer to ease cold starting. See STARTING PROCEDURE at the end of this section.

As soon as the spark plug gives off its first spark, the DPM system calculates the enrichment time and rate based on the engine temperature.

Once enrichment mode is completed carburetor bowls return to atmospheric pressure (DPM in standby mode), and the air/fuel mixture is identical to that of carburetors without the DPM system.

Over 3000 RPM, compensation mode is activated but will compensate only if the air temperature exceeds -20°C (-4°F) and the air pressure is lower than 1000 mbar.

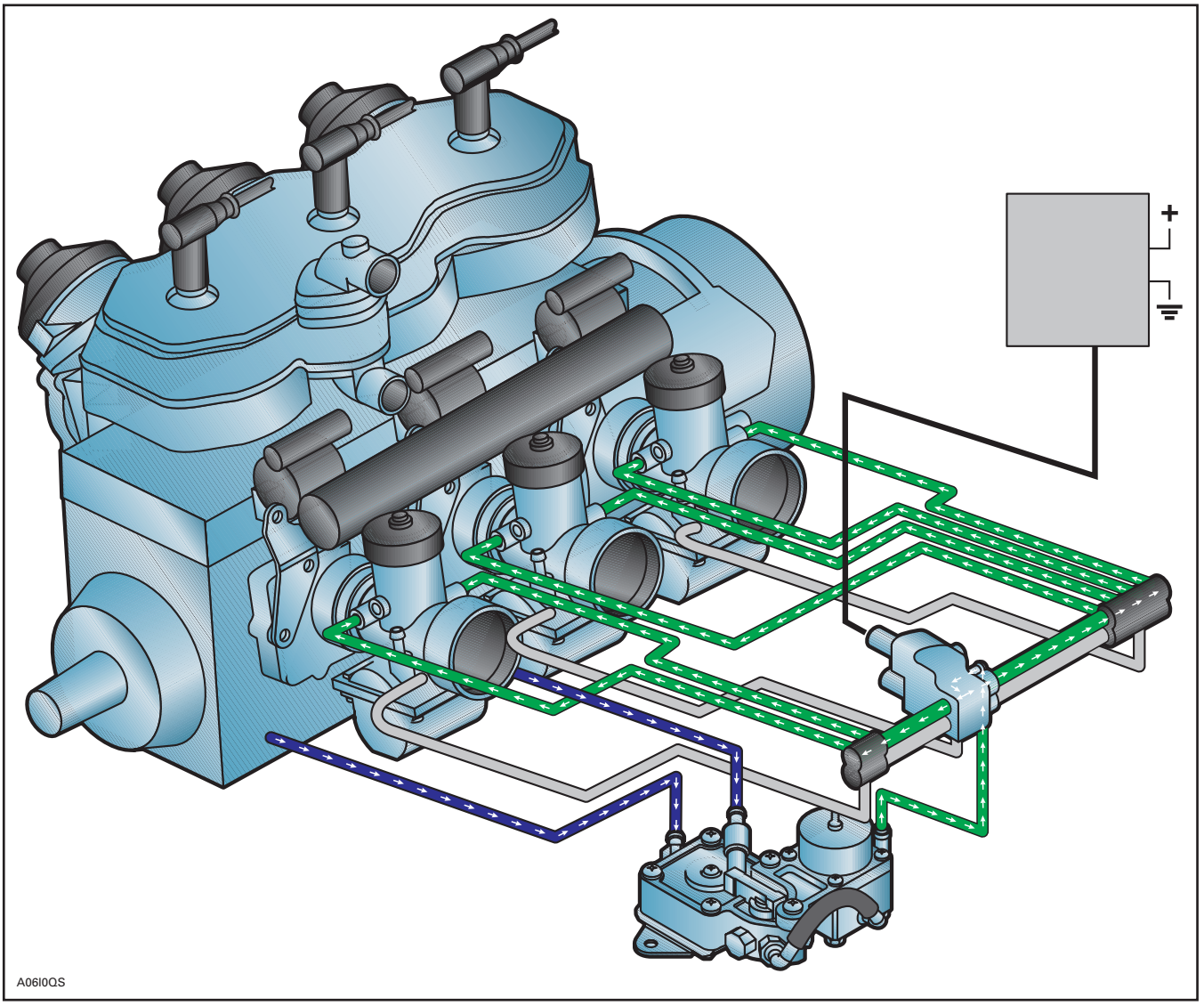
Float bowls are now under vacuum (lower than atmospheric pressure) and the air/fuel mixture is leaner.

NOTE: On Summit x 670 both modes (enrichment or compensation) **can** operate at the same time.

DPM SYSTEM OPERATION

BLACK and WHITE/GRAY wires (2-05 housing) are used for programming by the manufacturer. Nothing must be plugged to this housing.

Enrichment Mode (starting)



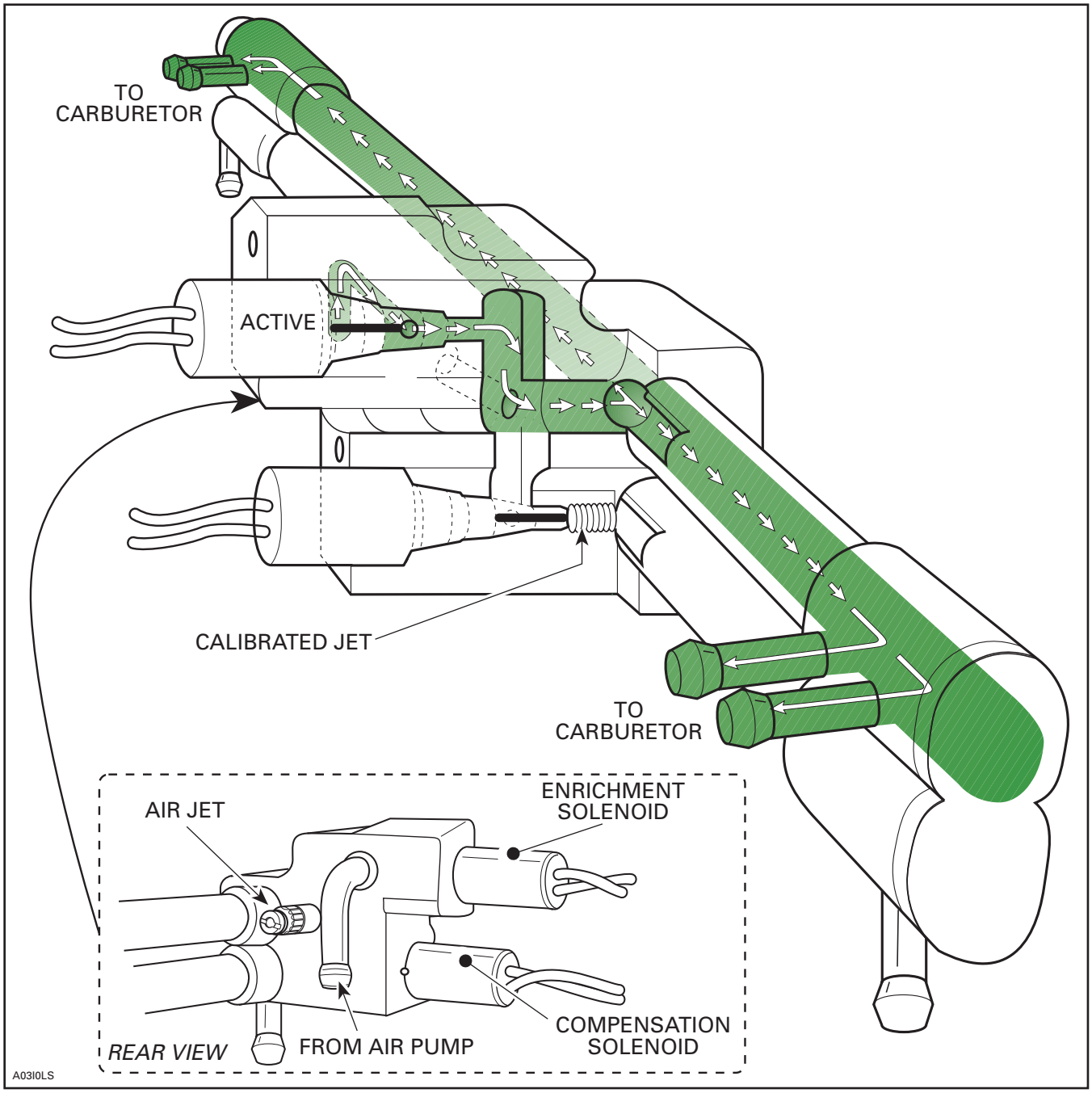
TYPICAL

Turning the ignition key to the ON position will not energize DPM system. The DPM system is energized only.

Once the engine turns over 250 RPM.

The DPM system then comes on by reading the engine temperature through the sensor located on the cylinder head. The DPM system calculates the enrichment solenoid opening time (duty cycle) and the enrichment rate according to the temperature. The air/fuel mixture is then enriched in order to facilitate starting.

The system pressurizes both carburetor bowls in order to enrich the air/fuel mixture. This is accomplished with the help of an air pump.



This enrichment mode of the air/fuel mixture takes place at start-up and during engine warm-up, and it depends on engine temperature.

The higher the engine temperature upon start-up, the leaner the mixture.

This enrichment mode progressively decreases (with time) by reducing the solenoid duty cycle. The warmer the engine, the shorter the enrichment mode.

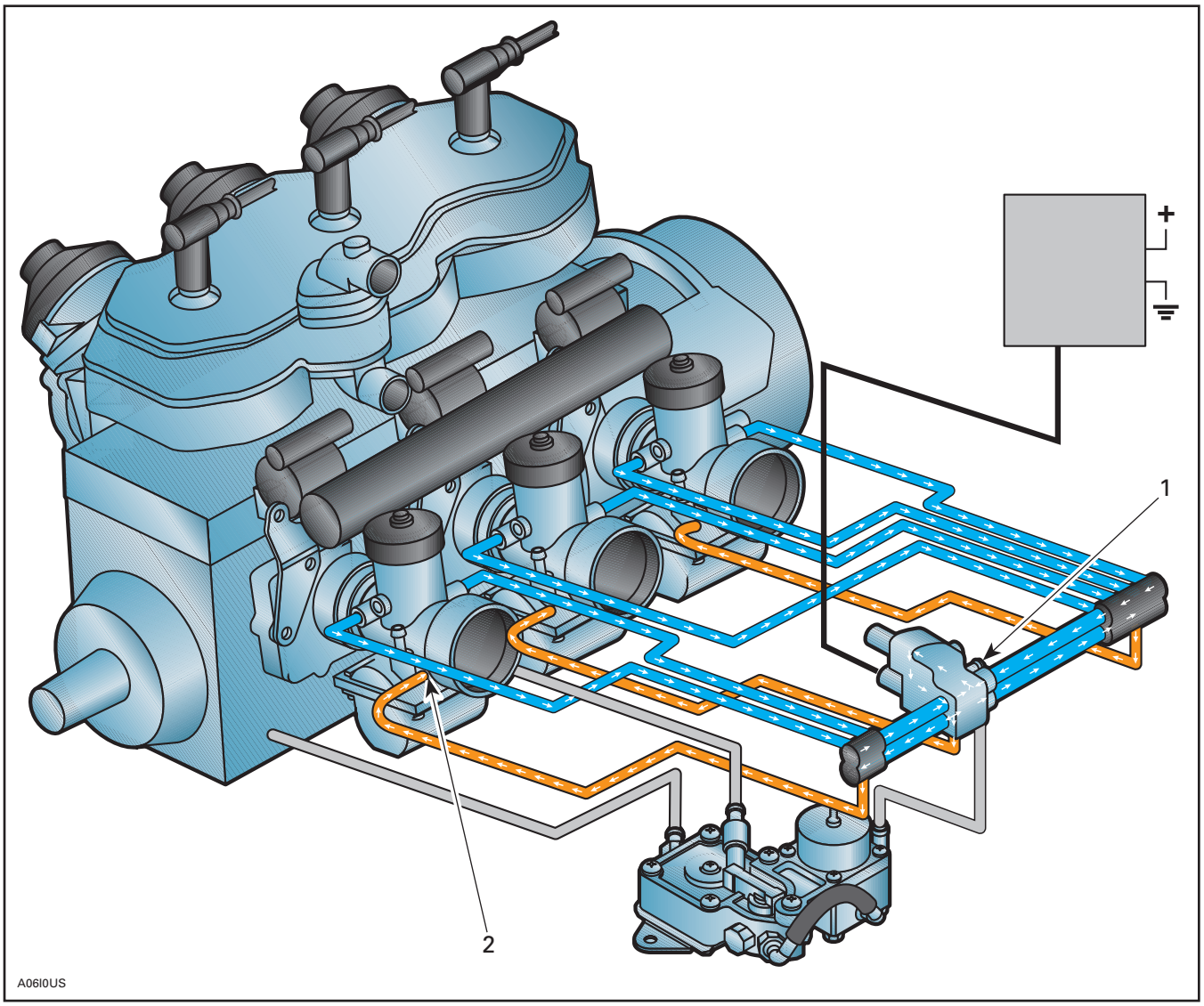
If the throttle opening exceeds one quarter, the enrichment mode is interrupted by a switch during the starting process, which allows unflooding the engine.

However, the enrichment mode is restored when releasing the throttle.

Following the enrichment mode, carburetors are operating normally, i.e. without additional pressure within bowls.

NOTE: Calibration is exactly the same on engines with a DPM system and those without.

Compensation Mode

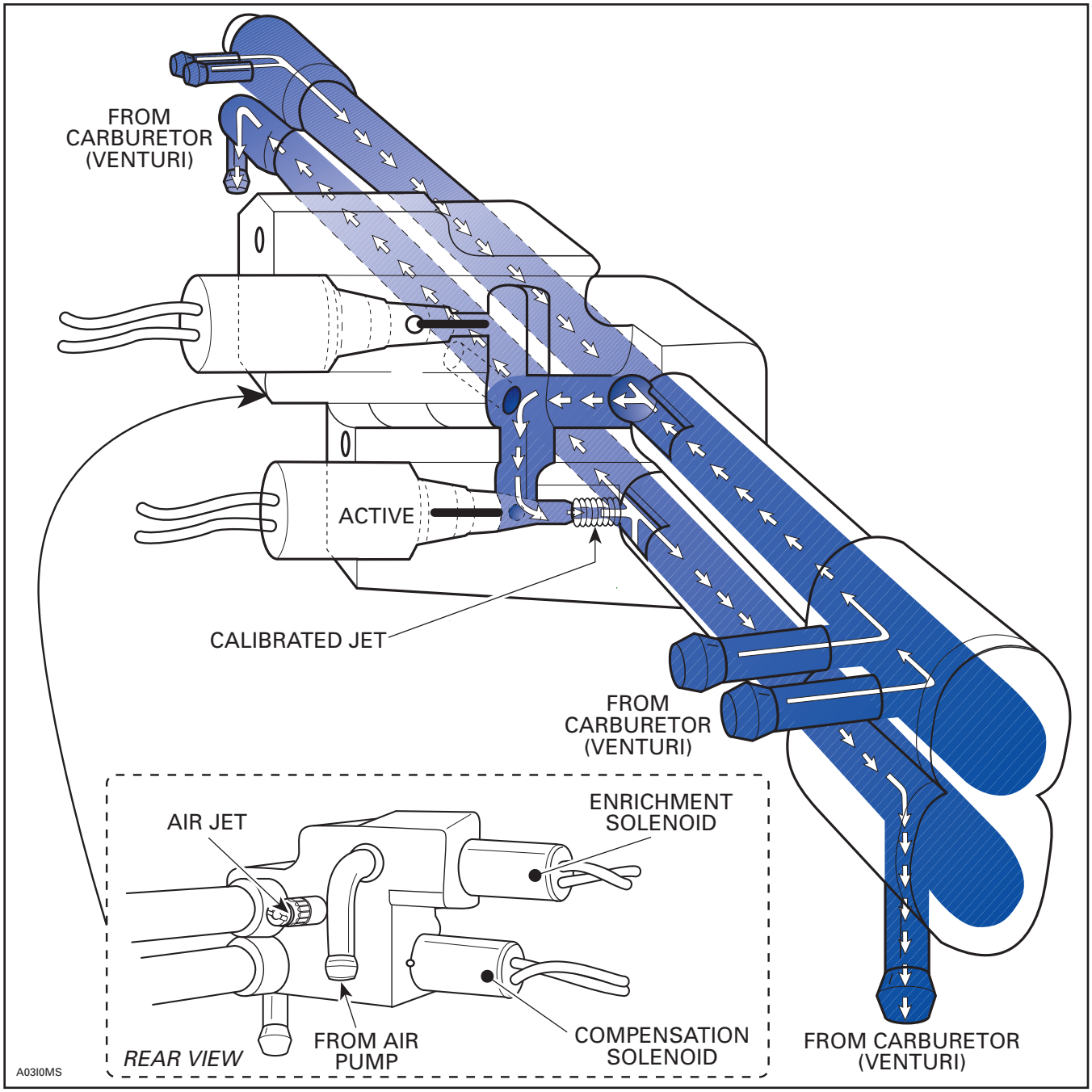


1. Air jet
2. Needle jet air inlet

Three conditions must be met for the compensation mode to operate:

1. Engine must rev over 3000 RPM.
2. Air temperature must exceed -20°C (-4°F).
3. Atmospheric pressure must be lower than 1000 mbar.

The compensation system brings both carburetor bowls under vacuum (lower than atmospheric pressure) in order to make the air/fuel mixture leaner. The required vacuum is produced within the needle jet air inlet.



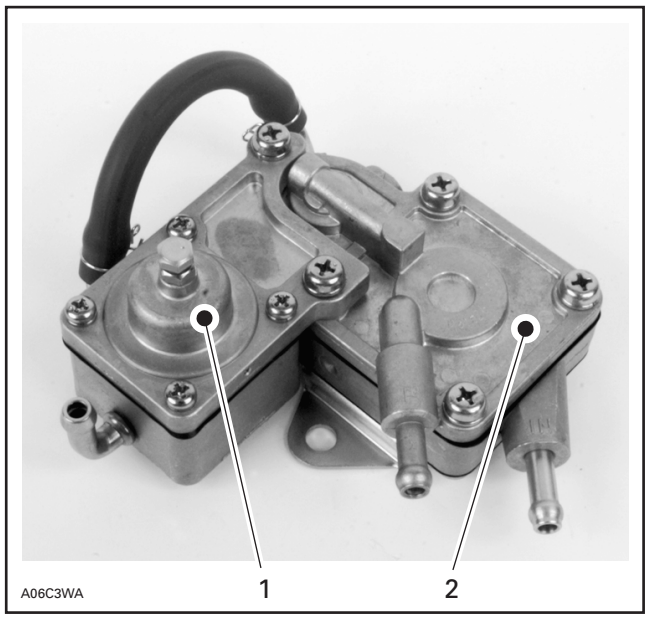
The compensation ratio will depend on the air temperature and the atmospheric pressure.

The higher the air temperature, the leaner the air/ fuel mixture.

The lower the atmospheric pressure, the leaner the air/fuel mixture.

NOTE: The atmospheric pressure decreases as the altitude increases.

AIR PUMP OPERATION



TYPICAL

1. *Regulator*
2. *Pump*

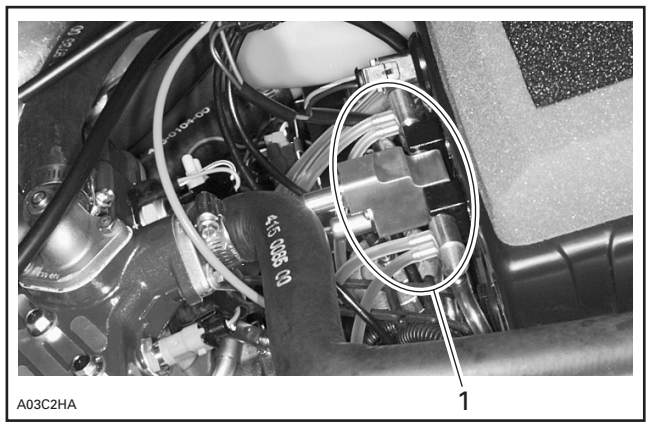
Air pump **no. 1** supplies the distribution gallery through a unique pipe.

Pump diaphragm is activated by the alternating pressure/vacuum within the engine crankcase. Two pipes connect the crankcase (cylinders nos. 1 and 2) to the pump.

A regulator within the pump stabilizes the pump pressure.

Since the pump pressure is insufficient upon starting, the regulator is fed directly by the crankcase pressure.

DPM MANIFOLD OPERATION

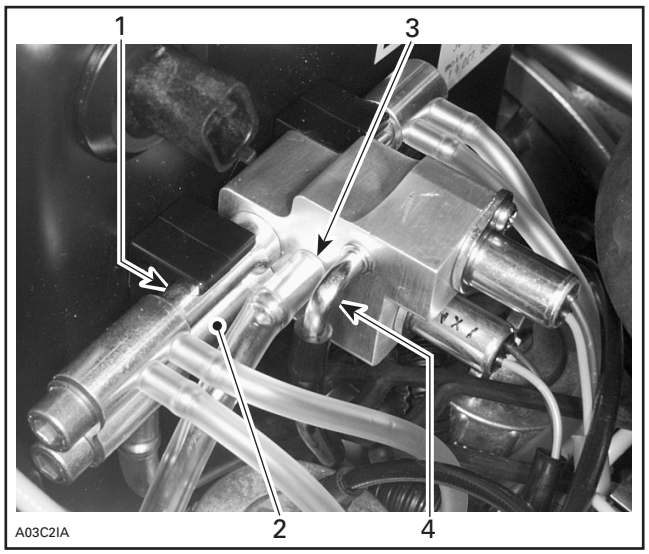


1. *Manifold*

The DPM manifold **no. 2** consists of 2 tubes. Depending on the mode, the upper tube (distribution gallery) distributes pump pressure or vacuum to each bowl through 2 pipes. The passage is then opened by the enrichment or the compensation solenoid, depending on the mode.

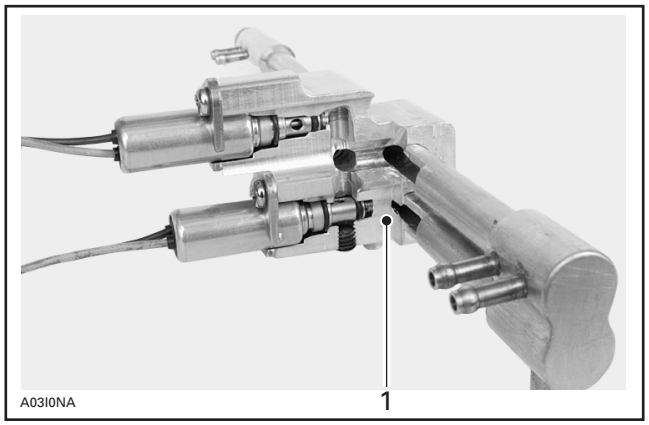
The lower tube (vacuum collector) receives the vacuum created by each carburetor within the needle jet air inlet.

An air jet (manifold air jet) also allows the atmospheric pressure to enter.



MANIFOLD ASS'Y

1. *Upper tube: distribution gallery*
2. *Lower tube: vacuum collector*
3. *Manifold air jet (1.2 mm) — atmospheric pressure*
4. *From air pump*



TYPICAL

1. *Compensation solenoid air jet (1.4 mm)*

Enrichment Solenoid

Solenoid Operating Principle

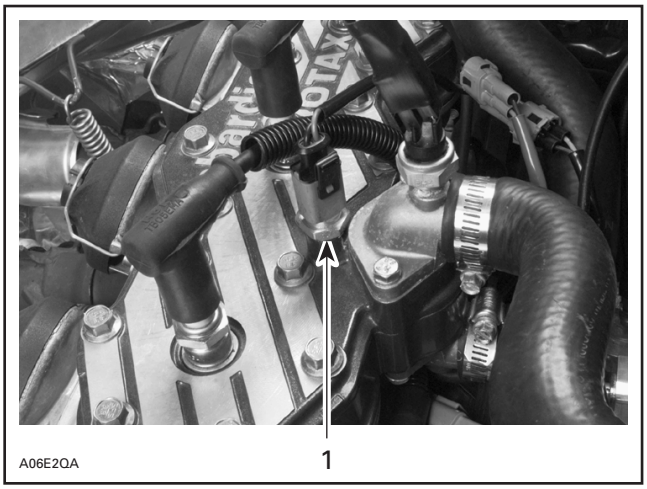
A solenoid is a winding coiled in order to produce a magnetic field. A metal rod crosses the coil and cuts the magnetic field. Each time the coil is activated, the magnetic field attracts the rod. If the supply current is interrupted, a spring pushes the rod.

Solenoid Function within the DPM System

The DPM system turns the solenoid **no. 3** ON and OFF 10 times per second, which means that it operates at 10 cycles/second or 10 Hertz (Hz). The solenoid therefore opens and closes 10 times per second, thus allowing the pump pressure to reach the distribution gallery (upper tube).

For the pressure to vary within the bowls, the solenoid is activated in part by the DPM during each cycle. This is what is called the duty cycle. In other words, the solenoid will not open throughout the whole cycle. The duty cycle depends on the engine temperature.

The colder the engine, the longer the duty cycle. Therefore, the solenoid will stay open longer, thus giving way to pressure.



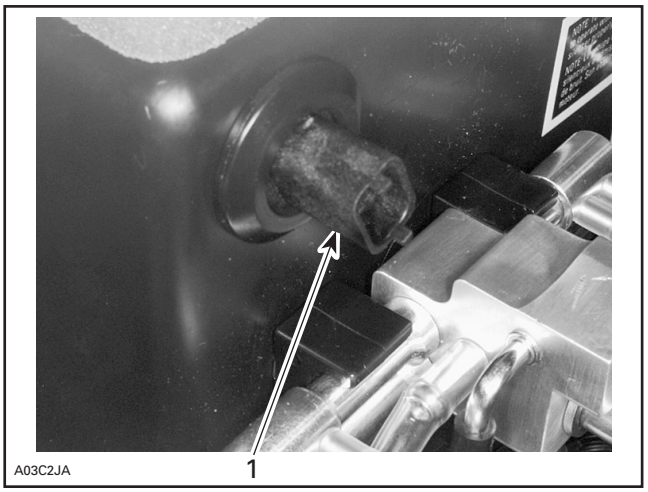
1. Engine temperature DPM sensor

Compensation Solenoid

NOTE: Same principle as enrichment solenoid. Read **Solenoid Operating Principle** at the beginning of the chapter concerning the enrichment solenoid.

The duty cycle of the compension solenoid depends on the air temperature and the atmospheric pressure.

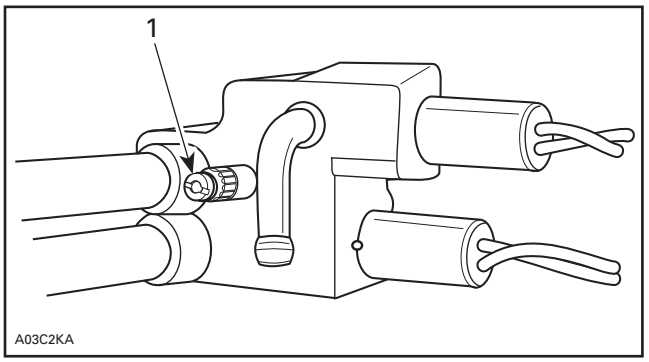
The warmer the air, the longer the duty cycle. Therefore, the solenoid will stay open longer, thus giving way to vacuum. The same applies when the altitude increases.



1. Air temperature sensor

Manifold Air Jet

This jet allows the atmospheric pressure to reach carburetor bowls when the DPM SYSTEM is on standby (returned to atmospheric pressure).



REAR VIEW

1. Atmospheric pressure air jet

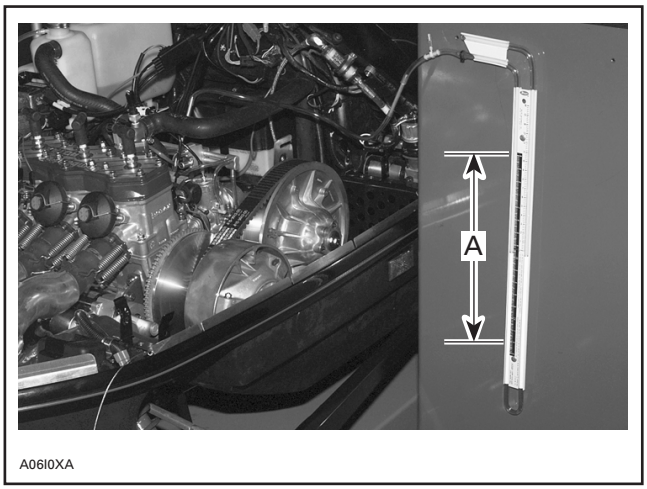
TESTING PROCEDURE

Pump

Pressure Test

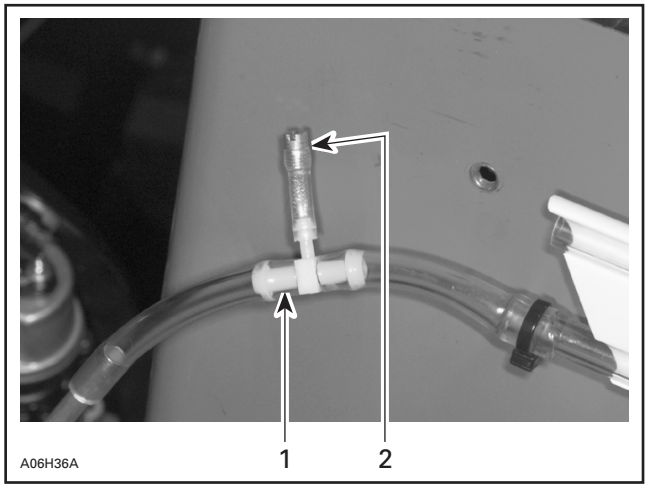
The pump must create a minimum pressure of 400 ± 50 mm of water.

Connect a jet (P/N 270 5001 57) to a hose then connect that little tube to the small nipple of a T-fitting (P/N 414 2225 00). Install that T-fitting between a U-tube and air pump outlet.



TYPICAL

A. 400 ± 50 mm of water



1. T-fitting (P/N 414 2225 00)
2. Jet (P/N 270 5001 57)

Start engine and note water height.

DPM System

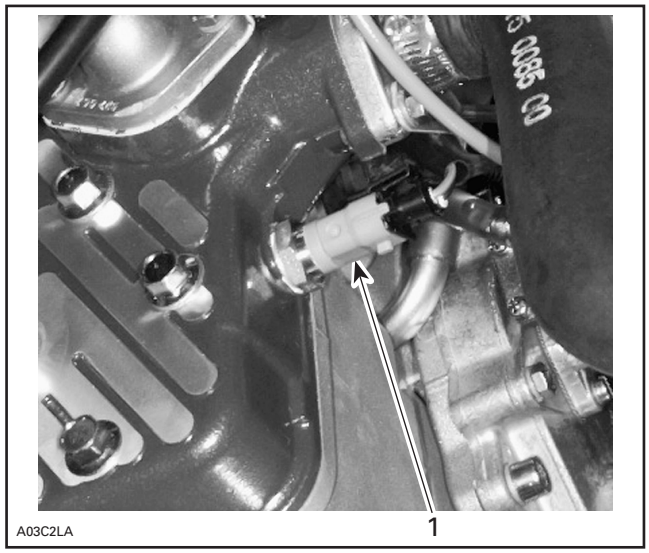
Solenoids are supplied by the MPEM module. If this module does not work, there will be no current on compensation solenoid RE/BL and BK connectors (3-10 housing); and on enrichment solenoid RE/GR and BK connectors (3-11 housing).

Unplug upper solenoid wire (enrichment). Connect a good solenoid to module output connector. Use adaptor (P/N 529 0338 00) as required.

▼ CAUTION

Do not disconnect both DPM connectors. The compensation solenoid must remain plugged.

Disconnect engine temperature sensor connector. The DPM system now operates as though the engine temperature was -20°C (-4°F) to allow maximum mixture enrichment.



1. Engine temperature sensor

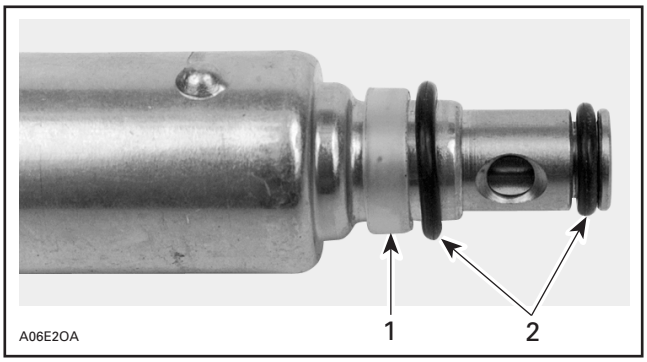
Start the engine and observe the solenoid. A vibrating solenoid indicates that the module is in good working order. If not, replace the module and repeat test.

Solenoid

Static Test

Disassemble the solenoid and connect it to a 12 V battery. The solenoid must open and stay open. Repeat test several times.

At reassembly, ensure that solenoid seals are in place.



1. Plastic seal
2. O-rings

Dynamic test

When checking the enrichment solenoid, disconnect engine temperature sensor connector. The DPM system now operates as though the engine temperature was -20°C (-4°F) to allow maximum mixture enrichment.

Remove the solenoid, hold it in hand and start the engine.

For the enrichment solenoid, check if it vibrates as soon as the engine is started.

For the compensation solenoid, the air temperature sensor no. 4 must be at room temperature. Operate the engine at 3500 RPM. The solenoid must vibrate.

Temperature Sensor (air and engine)

At room temperature 20°C (68°F), the sensor resistance must be 2500 Ω ± 300.

STARTING PROCEDURE

Apply brake.

Check throttle lever operation. Make sure it returns to idle position when released.

Ensure that the emergency cut-out switch is in the ON position.

Ensure that the tether cut-out cap is on the DESS post and that the cord is attached to your clothing.

Initial Cold Starting

NOTE: Do not operate the throttle lever.

Above Freezing Point Temperature (0°C)

Grasp manual starter handle firmly and pull vigorously to crank engine.

If engine refuses to start, activate the primer button once then crank the engine again.

Below Freezing Point Temperature (0°C)

Activate primer button 2 or 3 times before cranking engine to inject fuel into intake manifold.

In extremely cold temperature, more priming may be required.

After the engine is started, the Digital Performance Management (DPM) system will control the carburation.

Warm Engine Starting

Priming is not necessary when engine is warm.

Crank engine normally without operating the throttle lever.

IMPORTANT: Operating the throttle lever while cranking the engine will deactivate the DPM system.

ENGINE

	VEHICLE MODEL			SUMMIT x 670
	ENGINE TYPE			**670**
	Number of Cylinders			3
	Bore		mm (in)	78.00 (3.071)
	Stroke		mm (in)	70.0 (2.756)
	Displacement		cm^3 (in^3)	668.97 (40.82)
	Compression Ratio (corrected)			6.2
	Maximum Power Engine Speed ①		± 100 RPM	8000
	Piston Ring Type		1st/2nd	ST/R
	Ring End Gap	new wear limit	mm (in) mm (in)	0.25 (.0098) 1.0 (.039)
	Ring/Piston Groove Clearance	new wear limit	mm (in) mm (in)	0.04 (.0016) 0.2 (.008)
	Piston/Cylinder Wall Clearance	new wear limit	mm (in) mm (in)	0.10 (.0039) 0.15 (.0059)
	Connecting Rod Big End Axial Play	new wear limit	mm (in) mm (in)	0.39 (.0154) 1.2 (.0472)
	Maximum Crankshaft End-play ②		mm (in)	0.3 (.0118)
	Maximum Crankshaft Deflection		mm (in)	0.08 (.0031)
	Rotary Valve Timing ③ and P/N 420 924 XXX		Opening-Closing P/N	144 – 72 420 9245 00
	Magneto Generator Output		W	220
	Ignition Type			CDI
	Spark Plug Make and Type			NGK BR9ES
	Spark Plug Gap		mm (in)	0.45 (.018)
	Ignition Timing BTDC ④		mm (in)	1.93 (.076)
	Trigger Coil ⑤		Ω	190 – 300
	Generating Coil ⑤	Low Speed	Ω	N.A.
		High Speed	Ω	10 – 17
	Lighting Coil ⑤		Ω	0.20 – 0.35
	High Tension Coil ⑤	Primary	Ω	0.3 – 0.7
		Secondary	kΩ	8 – 16
	Carburetor Type		PTO/MAG	VM 44-34/35
	Main Jet		PTO/MAG	350/340
	Needle Jet			AA-8 (224)
	Pilot Jet			50
	Needle Identification – Clip Position			7ECY1-1
	Slide Cut-away			2.5
	Float Adjustment		± 1 mm (± .040 in)	18.1 (.71)
	Air Screw Adjustment		± 1/16 Turn	2-1/4
	Idle Speed		± 200 RPM	1700
	Gas Type/Pump Octane Number			Super Unleaded/91
	Gas/Oil Ratio			Injection
	Type			Liquid
	Axial Fan Belt Adjustment	Deflection ⑥	mm (in)	N.A.
		Force	kg (lbf)	N.A.
	Thermostat Opening Temperature		°C (°F)	42 (108)
	Radiator Cap Opening Pressure		kPa (PSI)	90 (13)
	ENGINE COLD N•m (lb•ft)	Drive Pulley Retaining Screw		⑦
		Exhaust Manifold Nuts or Bolts		23.0 (16.96)
		Magneto Ring Nut		125 (92)
		Crankcase Nuts or Screws	M6 M8	9 (6.64) 29 (21)
		Crankcase/Engine Support Nuts or Screws		40 (29.6)
		Cylinder Head Nuts		29 (21)
		Crankcase/Cylinder Nuts or Screws		29 (21)
		Axial Fan Shaft Nut		N.A.

VEHICLE

	VEHICLE MODEL				**SUMMIT x 670**
	ENGINE TYPE				**670**
	Chain Drive Ratio				21/43
	Chain	Pitch		mm(in)	9.53 (3/8)
		Type/Links Qty/Plates Qty			Silent/72/13
	Drive Pulley	Type of Drive Pulley			TRAC
		Ramp Identification			287 ®
		Calibration Screw Position or Calibration Disc Quantity			5
		Spring Color			Violet/Yellow
		Spring Length		± 1.5 mm (± 0.060 in)	157.9 (6.217)
		Clutch Engagement		± 200 RPM	4100
	Driven Pulley Spring Preload Cam Angle			± 0.7 kg (± 1.5 lb) degree	7.0 (15.4) 47°
	Pulley Distance Z			(+ 0, - 1) mm ((+ 0, - 1/32) in)	16.5 (21/32)
	Offset	X		± 0.4 mm (± 1/64 in)	35.0 (1-3/8)
		Y – X	MIN. – MAX.	mm (in)	1.0 – 2.0 (.039 – .079)
	Drive Belt Part Number (P/N)				415 0990 00
	Drive Belt Width (new) ①			mm (in)	35.0 (1-3/8)
	Drive Belt Adjustment		Deflection	± 5 mm (± 13/64 in)	32 (1-1/4)
			Force ②	kg (lbf)	11.3 (25)
	Track	Width		cm (in)	38.1 (15.0)
		Length		cm (in)	345.5 (136)
		Adjustment	Deflection	mm (in)	35 – 40 (1-3/8 – 1-9/16)
			Force ③	kg (lbf)	7.3 (16)
	Suspension Type		Track		SC-10 Mountain
			Ski		DSA
	Length			cm (in)	293.9 (115.7)
	Width			cm (in)	107.3 (42.24)
	Height			cm (in)	113.0 (44.5)
	Ski Stance			cm (in)	94.0 (37)
	Mass (dry)			kg (lb)	225 (495)
	Ground Contact Area			cm^2 (in^2)	7356.7 (1140.3)
	Ground Contact Pressure			kPa (PSI)	3.0 (.435)
	Frame Material				Aluminum
	Bottom Pan Material				Impact Copolymer
	Hood Material				RRIM Polyurethane
	Battery			V	12
	Headlight			W	H4 60/55
	Taillight and Stoplight			W	8/27
	Tachometer and Speedometer Bulb			W	2 x 3
	Fuel and Temperature Gauge Bulb			W	N.A.
	Fuse	Starter Solenoid		A	N.A.
		Tachometer		A	N.A.
	Fuel Tank			L (U.S. gal)	40 (10.6)
	Chaincase/Gearbox			mL (U.S. oz)	250 (8.5)
	Cooling System ④			L (U.S. oz)	5.0 (169.1)
	Injection Oil Reservoir			L (U.S. oz)	2.8 (94.7)

ENGINE LEGEND

CDI: Capacitor Discharge Ignition
BTDC: Before Top Dead Center
CTR: Center
K: Kilo (× 1000)
MAG: Magneto Side
PTO: Power Take Off Side
R: Rectangular
N.A.: Not Applicable
ST: Semi-trapez

① The maximum power engine speed is applicable on the vehicle. It may be different under certain circumstances and BOMBARDIER INC. reserves the right to modify it without obligation.

② Crankshaft end-play is not adjustable on these models. Specification is given for verification purposes only.

③ Rotary valve to crankcase clearance: 0.27 – 0.48 mm (.011 – .019 in).

④ At 6000 RPM (engine cold) with headlamp turned on.

⑤ All resistance measurements must be performed with parts at room temperature (approx. 20°C (68°F)). Temperature greatly affects resistance measurements.

⑥ Force applied midway between pulleys to obtain specified tension deflection.

⑦ Drive pulley retaining screw: torque to 90 to 100 N•m (66 to 74 lbf•ft), install drive belt, accelerate the vehicle at low speed (maximum 30 km/h (20 MPH)) and apply the brake; repeat 5 times. Recheck the torque of 90 to 100 N•m (66 to 74 lbf•ft).

VEHICLE LEGEND

DSA: Direct Shock Action
RRIM: Reinforced Reaction Injection Molding
TRA: Total Range Adjustable
N.A.: Not Applicable

① Minimum allowable width may not be less than 3.0 mm (1/8 in) of new drive belt.

② Force applied midway between pulleys to obtain specified tension deflection.

③ Force or downward pull applied to track to obtain specified tension deflection.

④ Coolant mixture: 60% antifreeze/40% water.

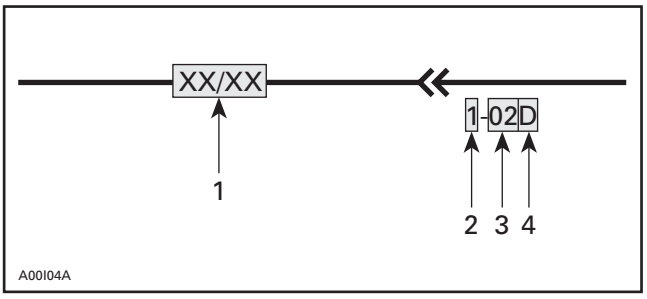
⑤ Lever with roller pin P/N 417 0043 03 (hollow).

WIRING DIAGRAM

WIRING DIAGRAM LEGEND

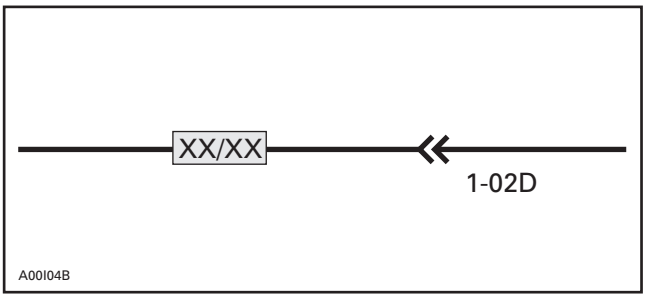
◆ WARNING

Ensure all terminals are properly crimped on the wires and all connector housings are properly fastened.



1. *Wire colors*
2. *Housing area*
3. *Housing number per area*
4. *Wire connector location in housing*

WIRE COLORS AND CIRCUIT



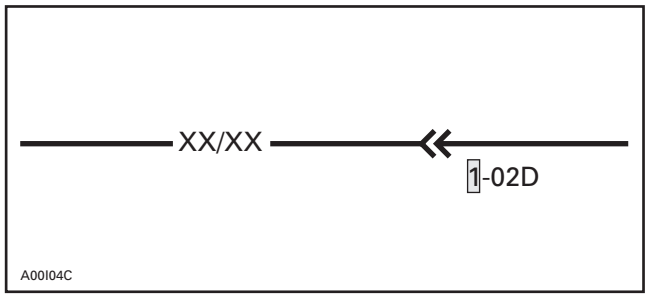
The first color of a wire is the main color, second color is the stripe.

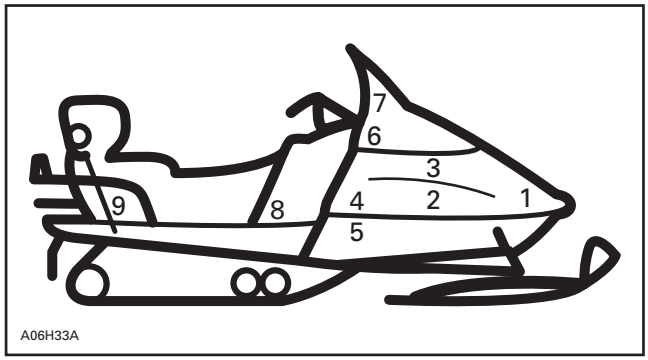
Example: YL/BK is a YELLOW wire with a BLACK stripe.

COLOR CODE	
BK — BLACK	GN — GREEN
WH — WHITE	GY — GREY
RD — RED	VI — VIOLET
BL — BLUE	OR — ORANGE
YL — YELLOW	BR — BROWN

CODE	CIRCUIT
WH	Rear brake light
WH/BL	Ignition: between CDI and coils
WH/GY	Safety lanyard cap
WH/YL	Trigger coil wire no. 1
WH/BK	DESS pilot lamp (-)
BR	Heated lever
BL	Fuel level sender; DPM enrichment switch
BL/YL	Trigger coil wire no. 2
GY	High beam
GY/VI	Low beam
YL	Alternating current supply AC +
YL	Direct current supply + regulator output
BK	Engine ground, frame, DC battery-, enrichment switch ground, DPM
BK/WH	Engine stopping + DESS switch
BK/YL	Engine stopping + Emergency cut-out switch
BK/GN	Digital signals ground: ROM key
OR	Heated grips
RD	DC + battery, DPM enrichment switch supply
RD/BL	DPM compensation solenoid
YL	Loads supply
RD/GN	Starter solenoid, DPM enrichment solenoid
VI	Coolant temperature (gauge)
VI	DPM coolant temperature (binary)
VI/WH	Air intake temperature

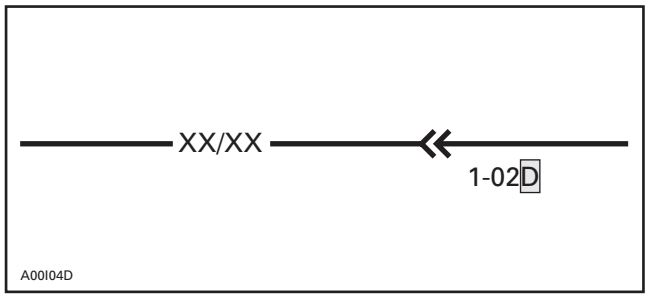
CONNECTOR HOUSING AREA

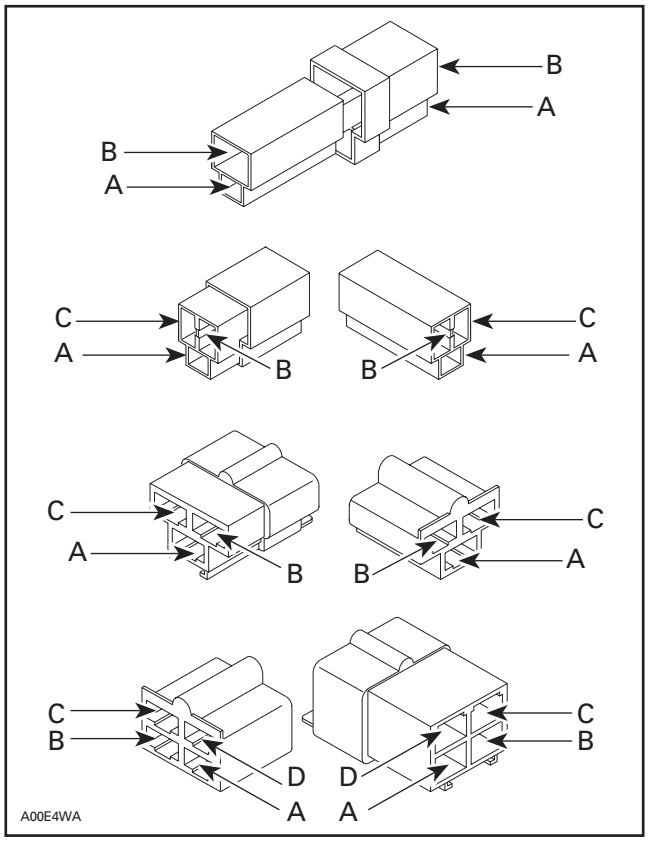




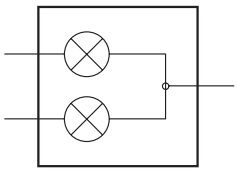
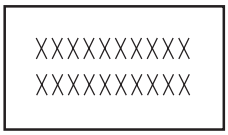
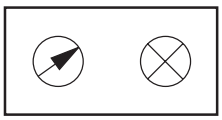
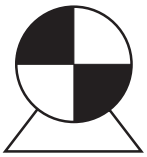
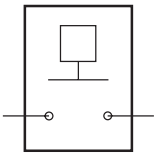
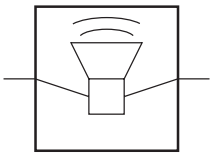
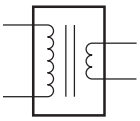
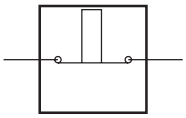
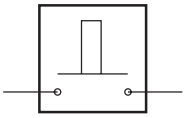
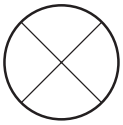
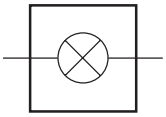
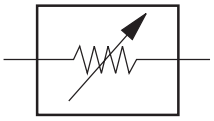
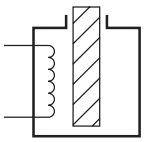
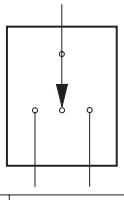
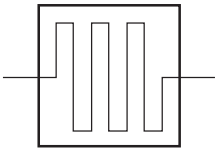
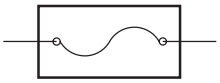
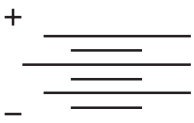
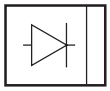
AREA	LOCATION
1	Frame and hood junction
2	Magneto
3	Carburetors
4	Rear of intake silencer
5	Near driven pulley
6	Under handlebar
7	Under hood
8	Near fuel tank
9	Rear of seat

CONNECTOR LOCATION IN HOUSING





SYMBOLS DESCRIPTION

Beam and tail light 	Female terminal 	Male terminal 	Electronic module 
Meter 	Electric motor 	Low level sensor 	Buzzer 
Ignition coil 	Normally close switch 	Normally open switch 	Male terminal on instrument 
Engine ground 	Frame ground  Frame	Spark plug 	Meter movement 
Bulb 	Pilot lamp 	Analog sensor 	Solenoid valve 
Magneto 	3 position switch 	Heating element 	Fuse 
Trigger coil 	Battery 	Diode 	

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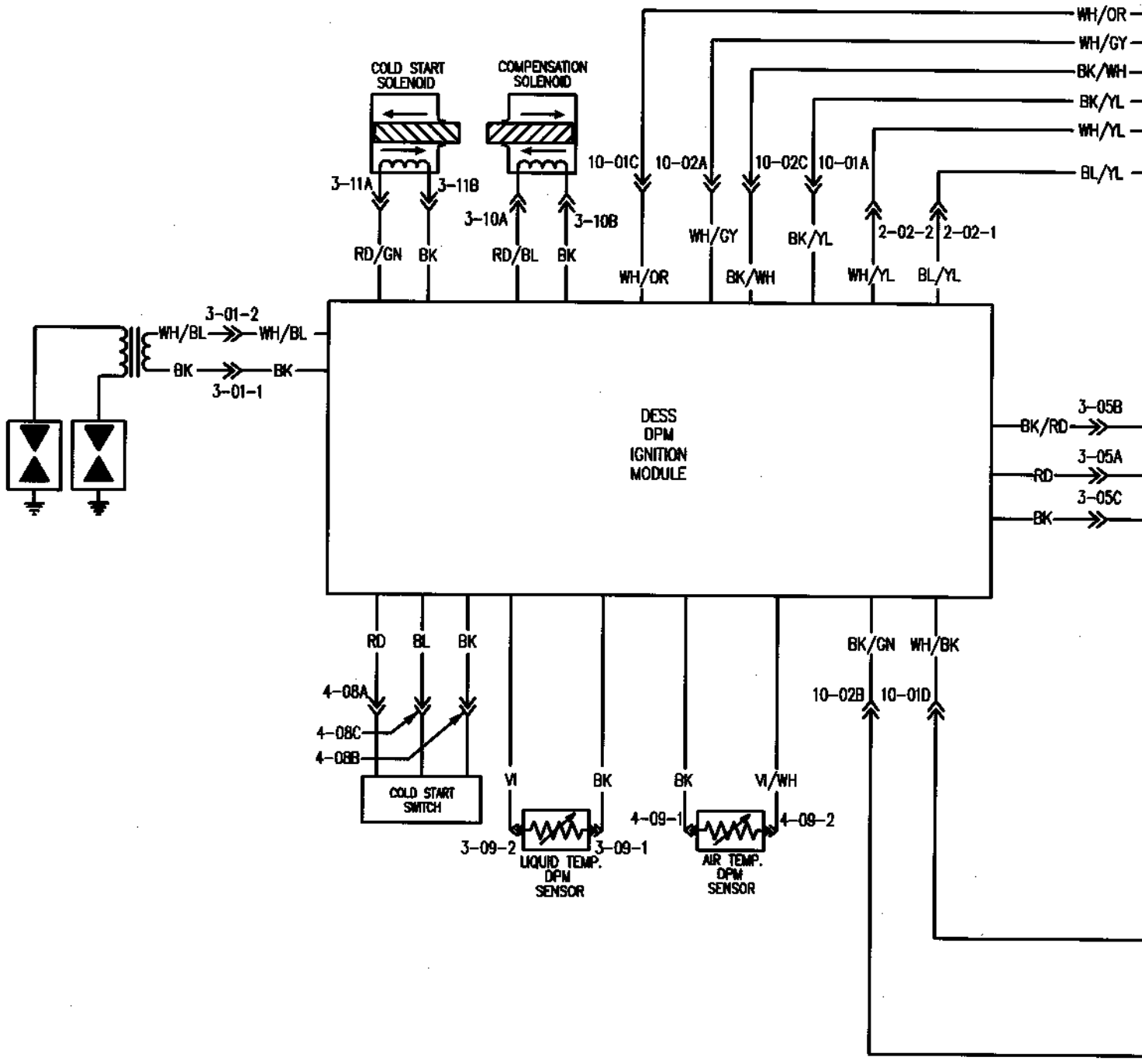
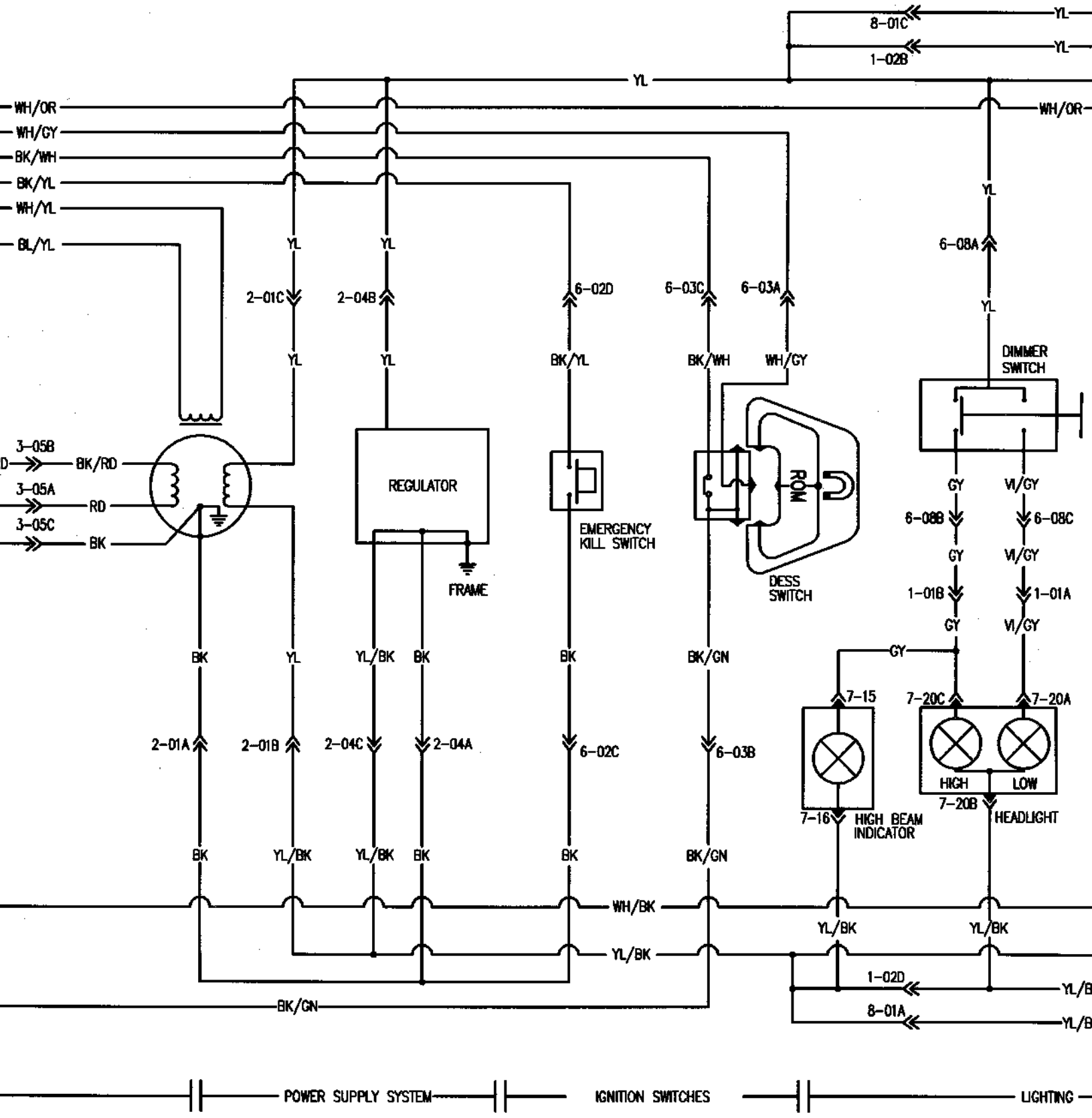
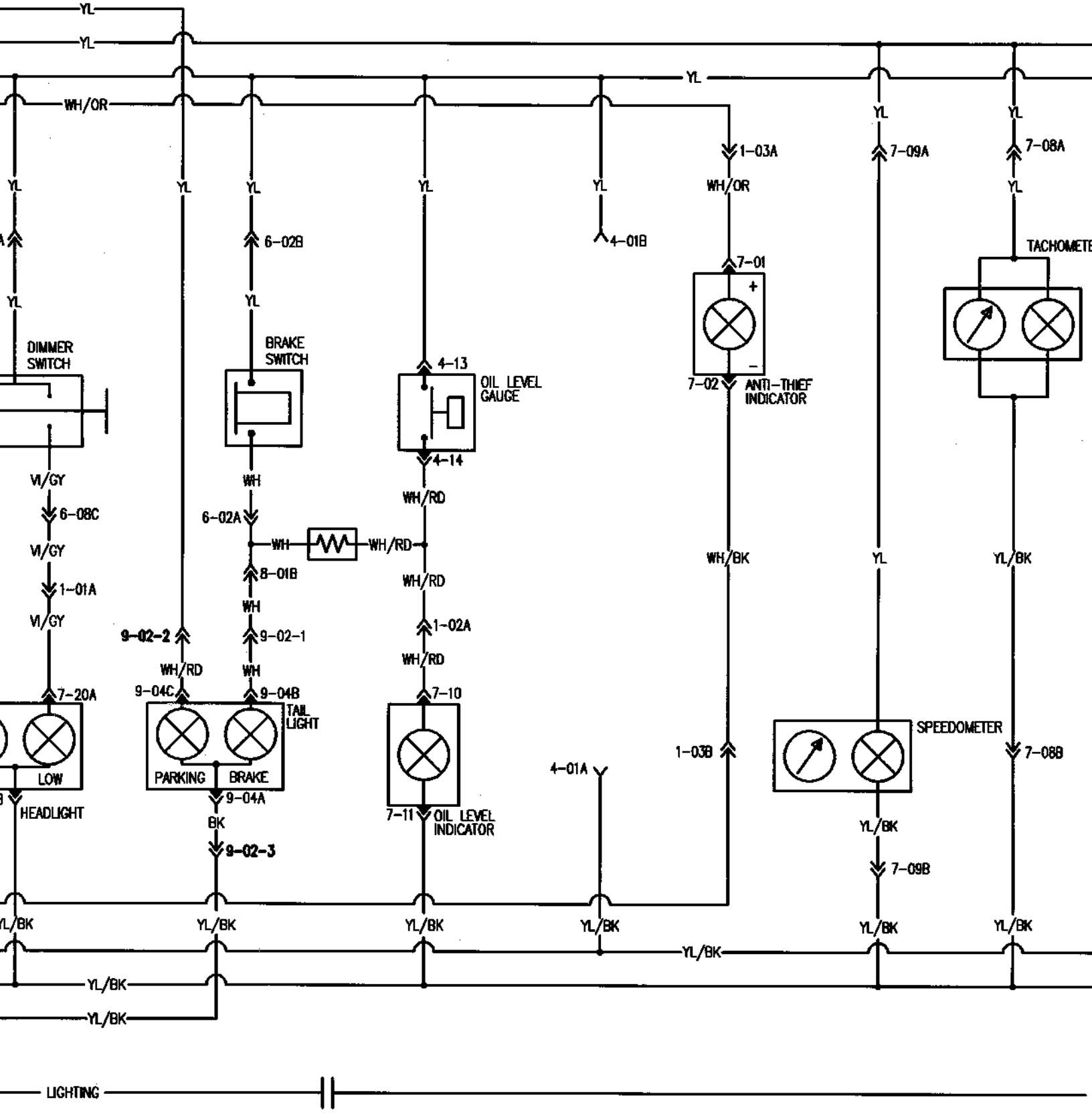
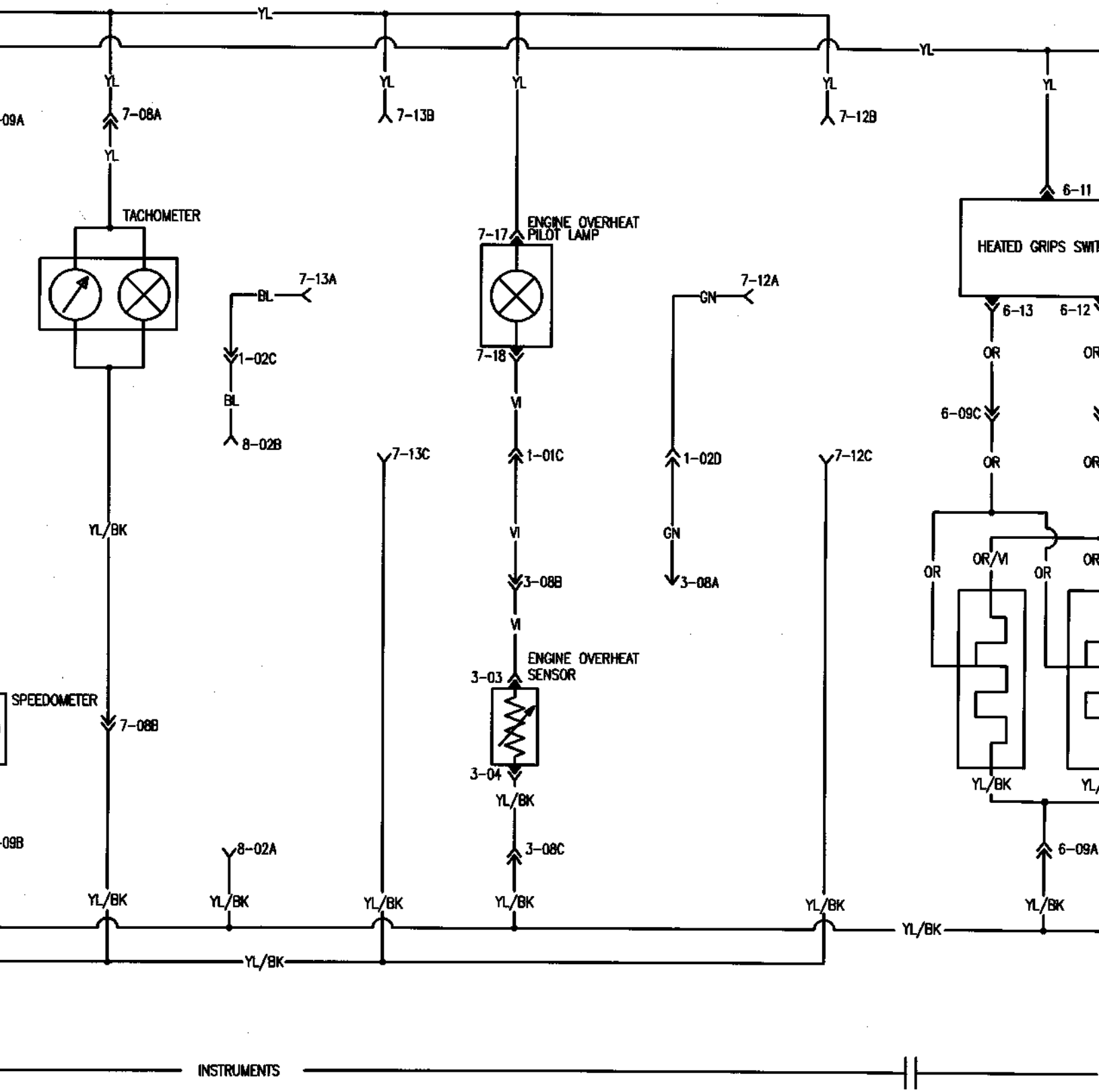
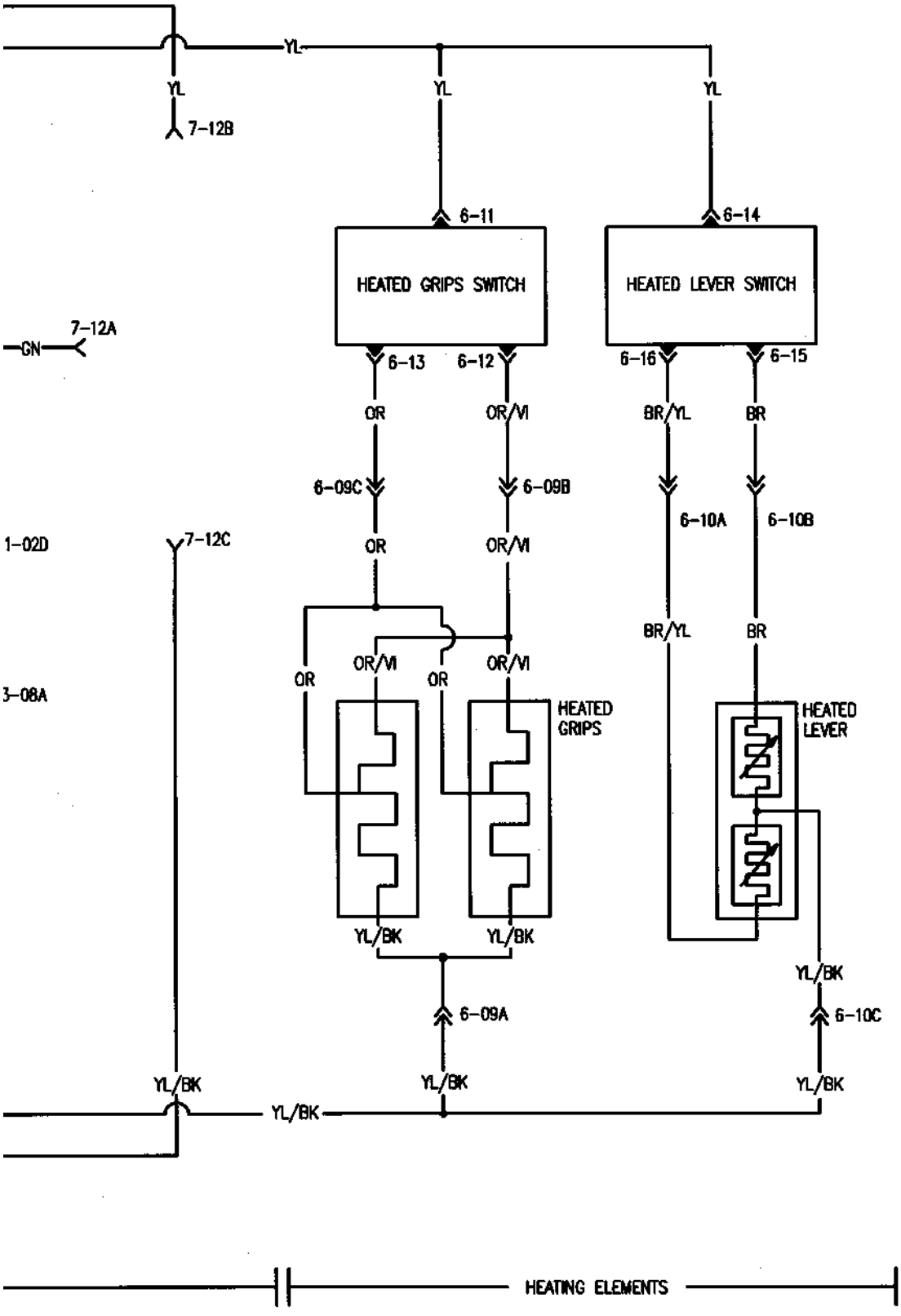



8-01C
YL
1-02B
YL
YL
WH/OR
WH/GY
BK/WH
BK/YL
WH/YL
BL/YL
WH/OR
YL
6-08A
YL
DIMMER SWITCH
YL
YL
2-01C
2-04B
6-02D
6-03C
6-03A
YL
YL
BK/YL
BK/WH
WH/GY
3-05B
BK/RD
3-05A
RD
3-05C
BK
REGULATOR
FRAME
EMERGENCY KILL SWITCH
DESS SWITCH
GY
VI/GY
6-08B
6-08C
GY
VI/GY
1-01B
1-01A
GY
VI/GY
BK
YL
YL/BK
BK
BK
BK/GN
GY
7-15
7-20C
7-20A
2-01A
2-01B
2-04C
2-04A
6-02C
6-03B
HIGH
LOW
7-20B
7-16
HIGH BEAM INDICATOR
HEADLIGHT
BK
YL/BK
YL/BK
BK
BK
BK/GN
WH/BK
YL/BK
YL/BK
1-02D
YL/B
BK/GN
8-01A
YL/B
POWER SUPPLY SYSTEM
IGNITION SWITCHES
LIGHTING


YL
YL
WH/OR
YL
YL
YL
YL
YL
YL
YL
1-03A
7-09A
7-08A
WH/OR
YL
YL
6-02B
4-01B
7-01
TACHOMETE
YL
DIMMER SWITCH
BRAKE SWITCH
4-13
OIL LEVEL GAUGE
7-02
ANTI-THIEF INDICATOR
4-14
VI/GY
6-08C
WH
WH/RD
6-02A
WH
WH/RD
VI/GY
8-01B
WH/BK
YL
YL/BK
1-01A
WH
VI/GY
9-02-2
9-02-1
WH/RD
WH
1-02A
WH/RD
9-04C
9-04B
7-10
7-20A
TAIL LIGHT
SPEEDOMETER
1-03B
4-01A
7-08B
LOW
PARKING
BRAKE
HEADLIGHT
9-04A
BK
7-11
OIL LEVEL INDICATOR
YL/BK
7-09B
9-02-3
YL/BK
YL/BK
YL/BK
YL/BK
YL/BK
YL/BK
YL/BK
YL/BK
YL/BK
YL/BK
LIGHTING


YL
YL
7-08A
YL
TACHOMETER
SPEEDOMETER
7-08B
YL/BK
YL/BK
YL/BK
YL/BK
7-13A
BL
1-02C
BL
8-02B
8-02A
YL/BK
7-13B
7-13C
YL/BK
YL/BK
YL
7-17
ENGINE OVERHEAT
PILOT LAMP
7-18
VI
1-01C
VI
3-08B
VI
3-03
ENGINE OVERHEAT
SENSOR
3-04
YL/BK
3-08C
YL/BK
YL/BK
YL
7-12B
7-12A
GN
1-02D
GN
3-08A
7-12C
YL/BK
YL/BK
YL
6-11
HEATED GRIPS SWIT
6-13
6-12
OR
OR
6-09C
OR
OR
OR
OR/VI
OR
OR
YL/BK
YL/
6-09A
YL/BK
YL/BK
YL/BK
YL/BK
INSTRUMENTS


YL
YL
7-12B
YL
YL
6-11
6-14
HEATED GRIPS SWITCH
HEATED LEVER SWITCH
7-12A
GN
6-13
6-12
6-16
6-15
OR
OR/VI
BR/YL
BR
6-09C
6-09B
6-10A
6-10B
1-02D
7-12C
OR
OR/VI
BR/YL
BR
OR
OR/VI
OR
OR/VI
3-08A
HEATED GRIPS
HEATED LEVER
YL/BK
YL/BK
YL/BK
6-09A
6-10C
YL/BK
YL/BK
YL/BK
HEATING ELEMENTS

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