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IGNITION TIMING

NIPPONDENSO TRIGGER COIL SYSTEM

Normally ignition timing adjustment should not be required. It has been set at factory and it should remain correctly adjusted since every part is fixed and not adjustable. The only time the ignition timing might have to be changed would be when removing and reinstalling the magneto housing, replacing the crankshaft, the magneto flywheel, the trigger coil or the MPEM. If the ignition timing is found incorrect, first check for proper crankshaft alignment. Refer to LEAK TEST AND ENGINE DIMENSION MEASUREMENT. This might be the indication of a twisted crankshaft.

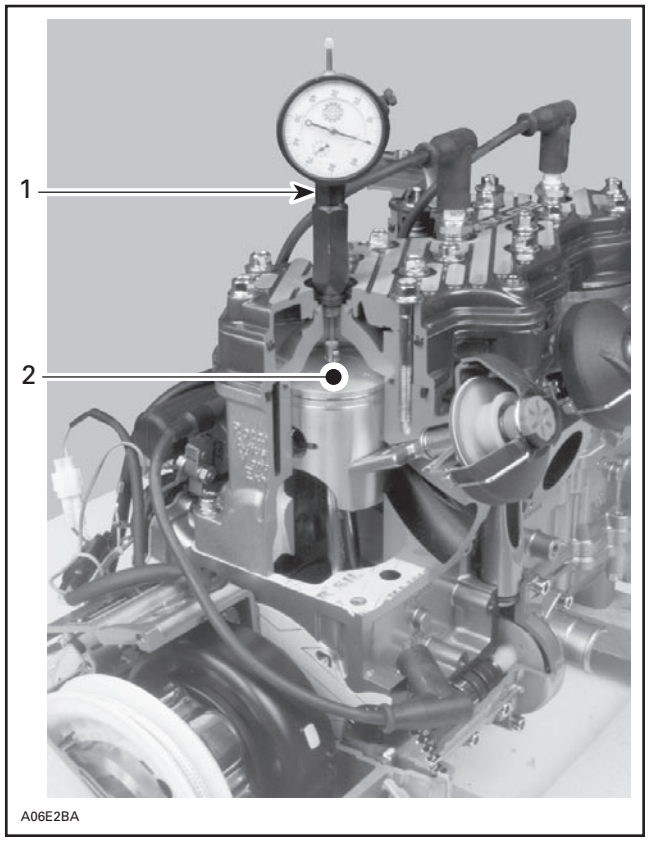
The ignition timing can be checked with either the engine hot or cold. Also, the ignition timing is to be checked at 3500 RPM with a timing light.

NOTE: Between 3000 and 4000 RPM, the spark advance does not change. So when checking ignition timing at 3500 RPM, a change in engine speed within ± 500 RPM will not affect the timing mark when checked with the timing light.

IMPORTANT: During the first 8 hours the timing curve is retarded by 2° between 4500 RPM and maximum RPM. Because checking ignition timing is done at a lower RPM, this will not affect the 3500 RPM timing specification. There will be no further timing adjustment required before and after these hours.

Scribing a Timing Mark

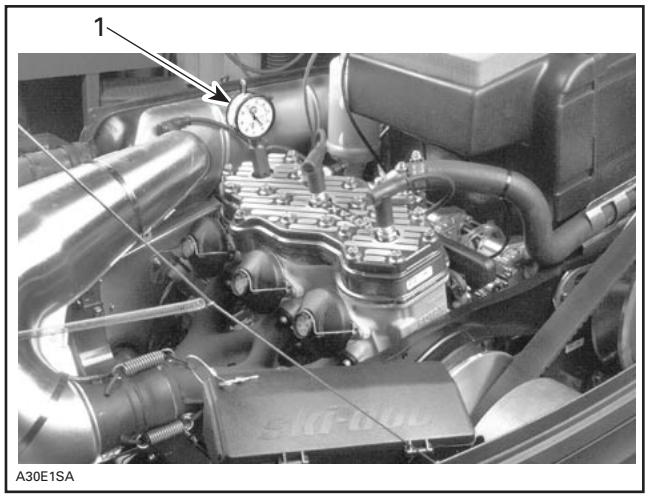
1. Clean the area around the MAG spark plug, and remove it.
2. Install the TDC gauge in the spark plug hole, (magneto side) and adjust as follows:
   a. Position the MAG piston at approximately TDC.



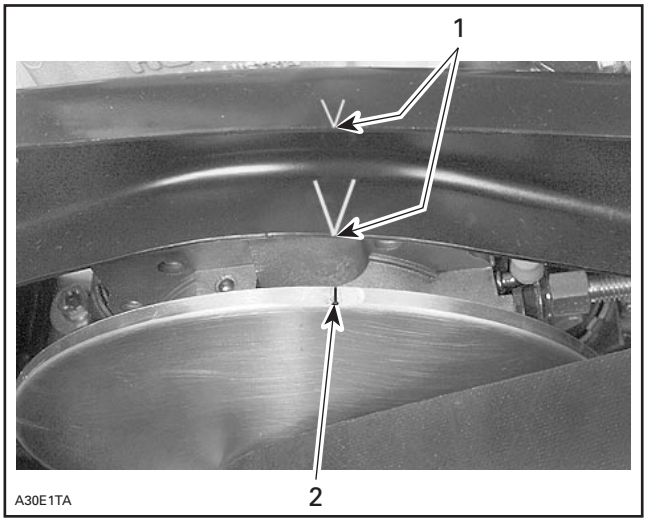
TYPICAL
1. TDC gauge on MAG side
2. MAG side piston at TDC

   b. Assemble the gauge to the adaptor and tighten the roller lock nut. Do not tighten the adaptor lock nut.
   c. Screw the adaptor into the spark plug hole and tighten to prevent movement in the plug hole.
   d. Position the dial face toward the PTO. Move the gauge down until the needle just begins to move, then move down a further 5 or 6 mm (approximately 1/4 in). Tighten adaptor lock nut by hand.

3. Locate the piston TDC position as follows:
   a. Slowly rotate the drive pulley back and forth across TDC while observing the needle. Note that the needle stops moving only as the piston is changing direction.
   b. Rotate the dial face so that "0" is in line with the needle when it stops moving.
   c. Again, slowly rotate the drive pulley back and forth across TDC and adjust the dial face to "0", until the needle always stops exactly at "0" before changing direction.
   d. "0" now indicates exact TDC.
4. Rotate the drive pulley clockwise, one-quarter turn then carefully rotate it counterclockwise until the needle indicates the specified measurement, indicated in TECHNICAL DATA.
5. Scribe one mark on removable side member upper ridge and one on lower ridge just above drive pulley center line. These both marks will be used as a reference point.
6. With the TDC gauge indicating specified timing, scribe a mark on drive pulley inner half in line with both marks previously scribed on removable side member.



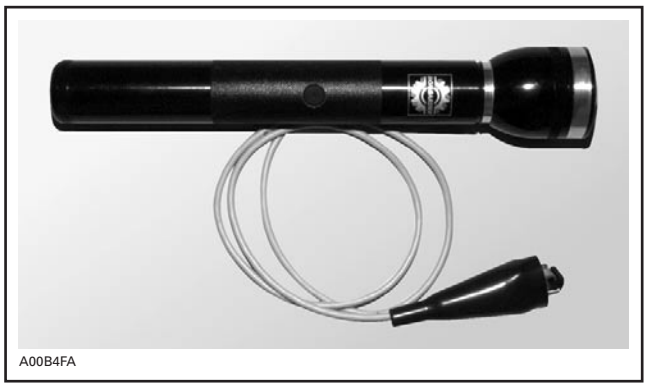
1. TDC gauge indicating specified timing



1. Marks on side member used as reference point
2. Timing mark in line with both marks on side member

Checking Ignition Timing

Use timing light (P/N 529 031 900).



TIMING LIGHT (P/N 529 031 900)

To check the ignition timing, refer to illustration and proceed as follows:

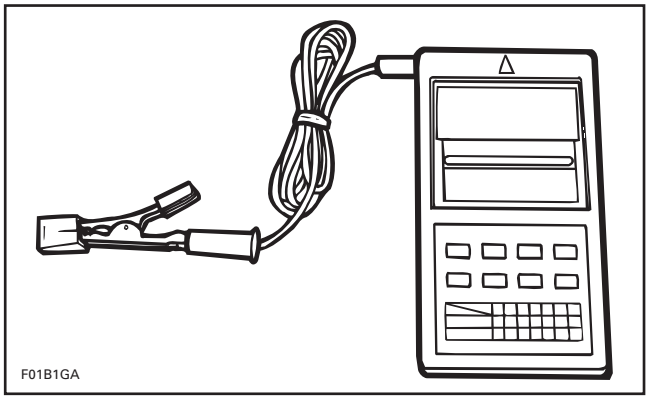
⚠ WARNING

Place ski tips against a wall, raise rear of vehicle on a stand, so that track does not contact the ground. Do not allow anyone in front of or behind the vehicle while engine is running. Keep clear of track and do not wear loose clothing which can get caught in moving parts.

1. Connect the timing light pick-up to a spark plug cable.

NOTE: To avoid an incorrect reading due to parallax, view both marks scribed on removable side member and the timing mark in a straight line.

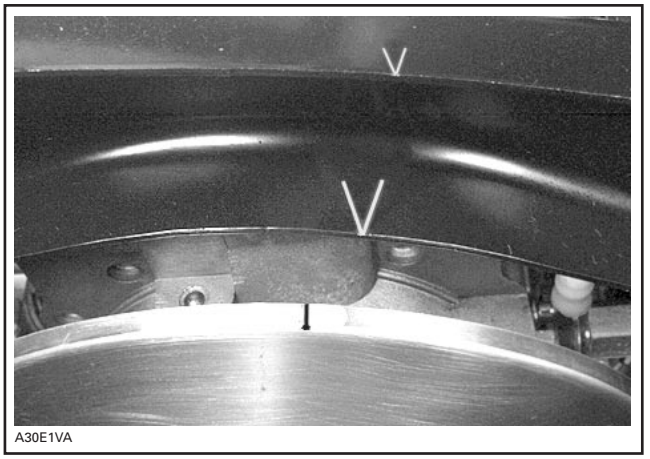
Connect a digital induction type tachometer (P/N 529 014 500).



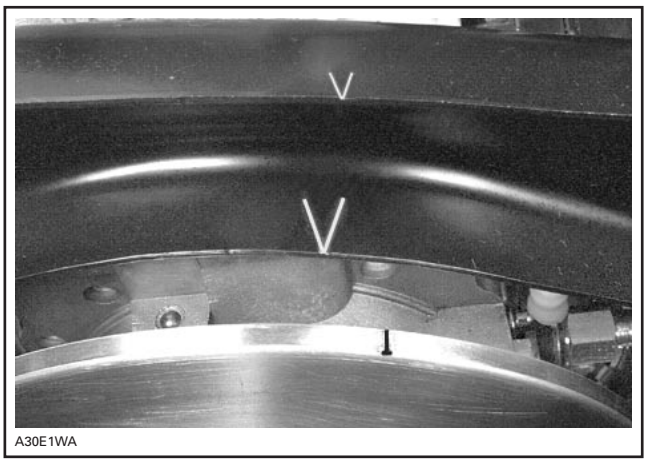
TACHOMETER (P/N 529 014 500)

2. Start the engine and point timing light on timing mark. Bring engine to 3500 RPM for a brief instant.

The timing mark must be aligned with both marks on side member. If not, note if timing is retarded or advanced. Tolerance is ± 1°.



TIMING RETARDED BY ABOUT 2°



TIMING ADVANCED BY ABOUT 2°

Changing Timing

Timing can only be changed using the programmer (P/N 529 035 718).

With Engine Running

All Models

If the below mentioned tools are not available start engine. Turn on programmer then enter password.

Increase engine speed to 2000 - 2500 RPM then follow the same procedure as **With Engine Stopped**.

When data are being transferred, you must rev the engine at 2000 - 2500 RPM and make sure connection between programmer and vehicle is good.

Engine will misfire during vehicle information is transferred from MPEM to programmer. If engine stalls, restart it, keep engine speed at 2000 - 2500 RPM and select no. 3 VEHICLE INFO again.

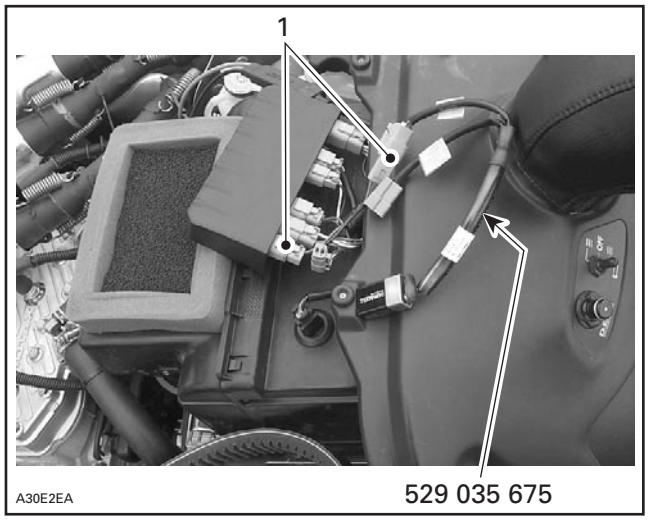
With Engine Stopped

Mach Z SPORT

Connect 9-volt adaptor (P/N 529 035 675) to MPEM.

Mach Z TECH PLUS

On this model MPEM can be supplied with external power using the 9-volt adaptor (P/N 529 035 675) and a homemade adaptor, refer to TOOL for details.

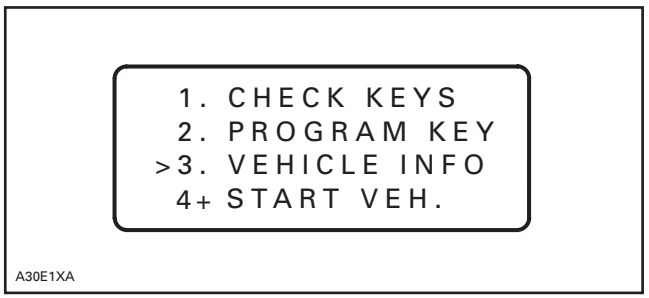


1. Homemade adaptor

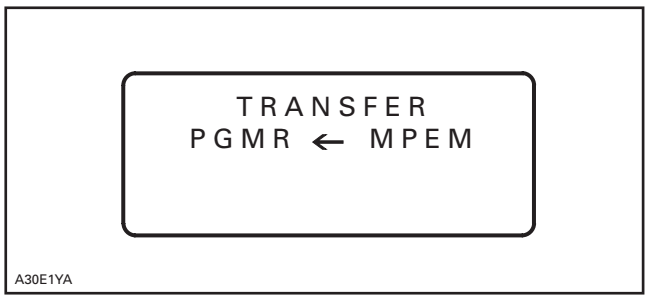
All Models

Turn on programmer then enter password.

From main menu select no. 3. INFO VEHICLE.



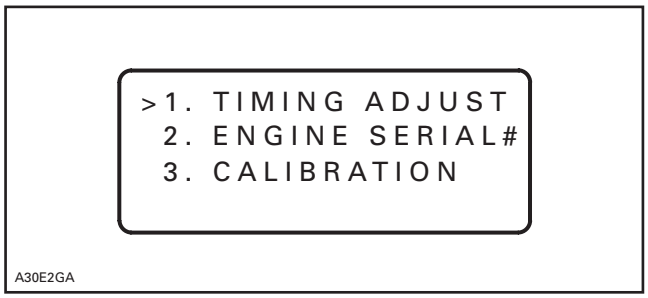
Vehicle information is transferred from MPEM to programmer.



NOTE: In fact the programmer takes a copy of all vehicle parameters scribed in MPEM. This copy will be modified within the programmer then transferred to the MPEM.

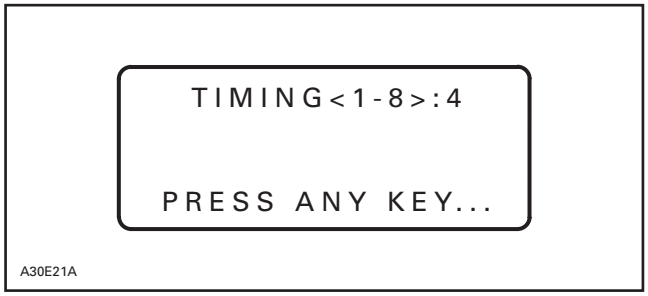
Select no. 4. ENGINE PARAMETER.

Select no. 1 TIMING ADJUSTMENT.



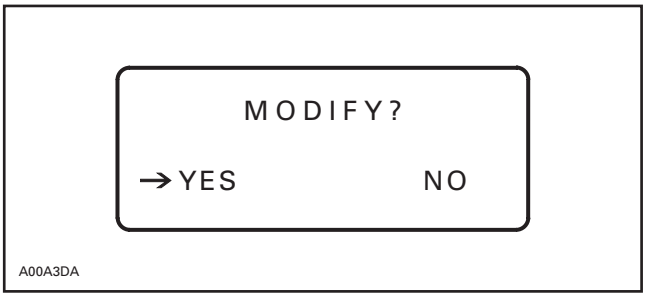
Press ENTER.

Now the display shows the engine timing correction factor that is programmed in the MPEM. In the following example timing correction factor is 4.

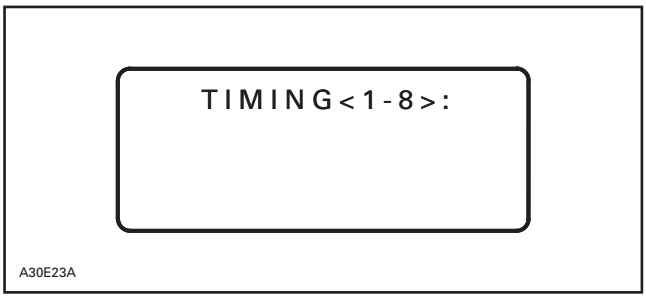


Press any key.

Select YES using the key ↔.



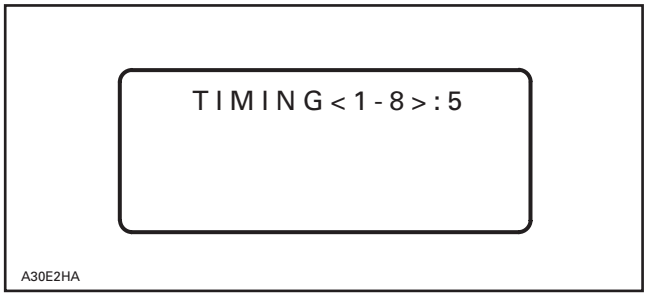
Press ENTER.



Select a timing correction factor corresponding to correction needed.

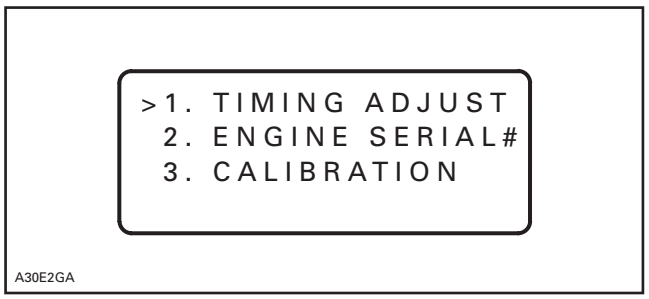
Example: Timing mark as verified with a timing light at 3500 RPM was too early by 2°. The correction factor programmed is no. 4.

Select correction factor no. 5. This will retard the timing by 2° because the difference between correction factor no. 4 and no. 5 is - 2° (passing from 1° to - 1°).

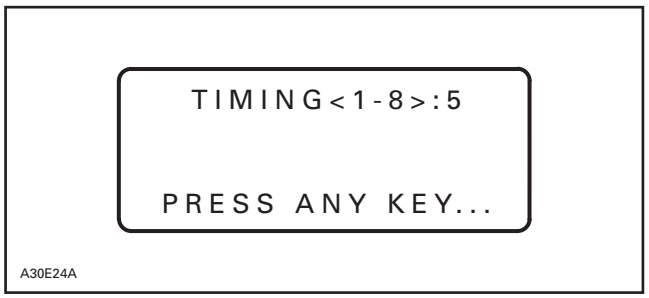


IGNITION CORRECTION FACTOR	
CORRECTION FACTOR PROGRAMMED IN MPEM	IGNITION TIMING CORRECTION
2	3°
3	2°
4	1°
1	0°
5	- 1°
6	- 2°
7	- 3°
8	- 4°

Press ENTER.

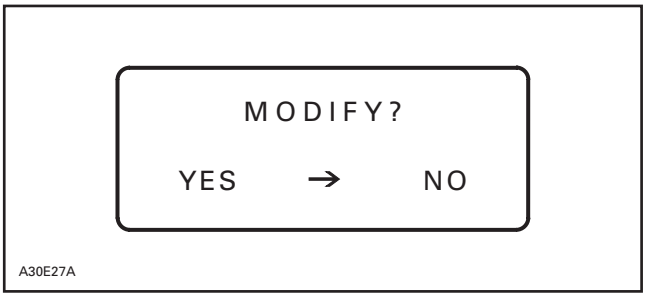


Press ENTER.

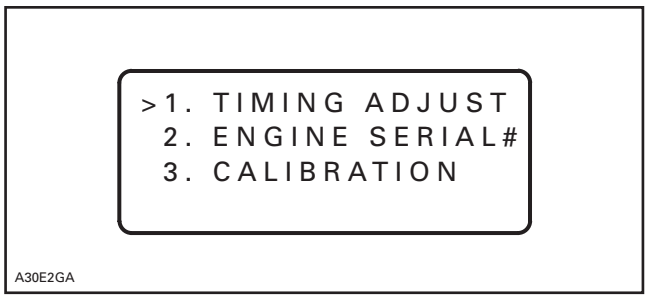


The display confirms that correction factor has been changed to no. 5.

Press any key.

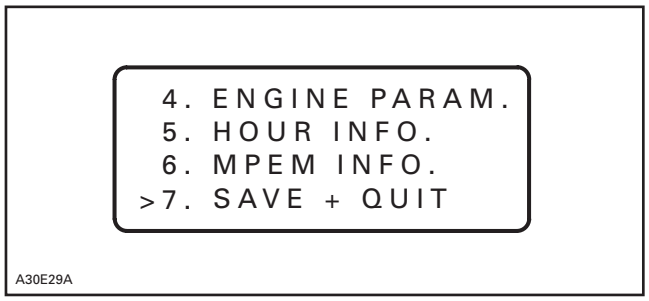


If the new correction factor selected above is the good one select NO and press ENTER. Otherwise select YES to choose an other correction factor.

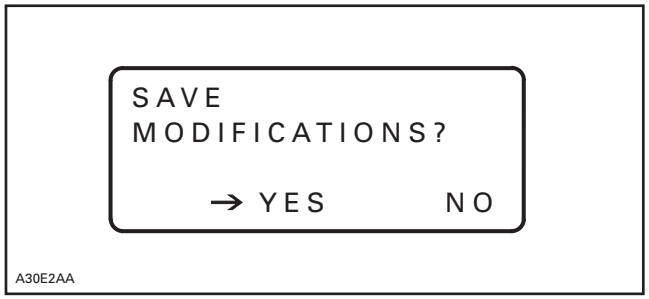


Press MENU.

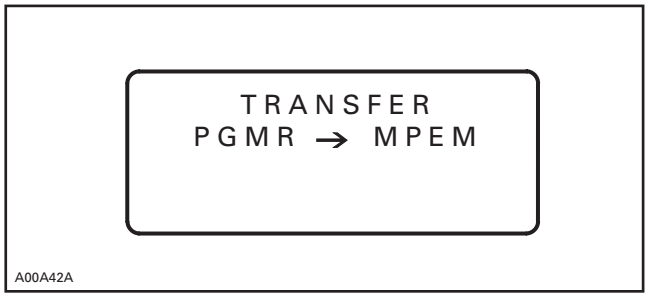
Scroll to no. 7 SAVE AND QUIT.



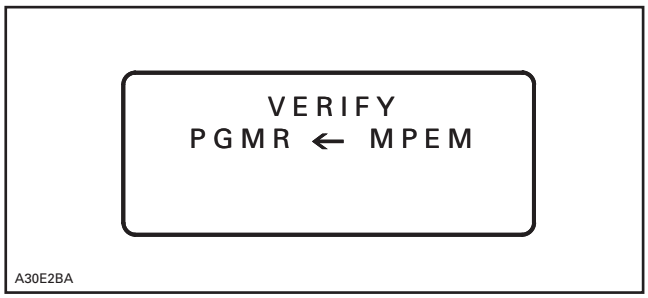
Press ENTER.



Press ENTER.

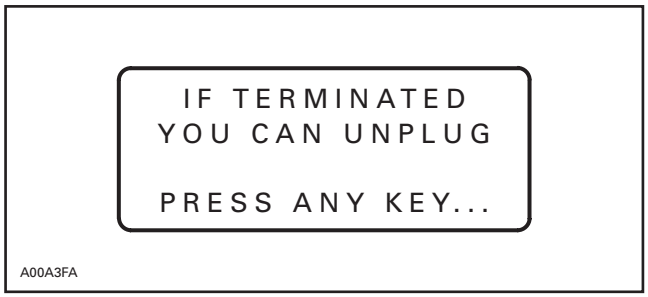


During a very short period of time the following message will appear.

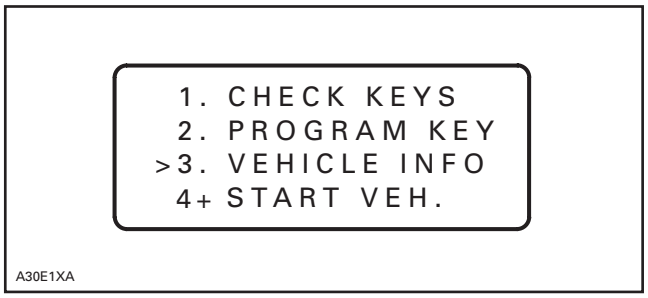


After the programmer has verified, following message will appear.

Press any key.



Press any key.



Unplug 9-volt adaptor. Stop engine when using the **With Engine Running** procedure.

SPARK PLUGS

NGK SPARK PLUG

All Models

NGK SPARK PLUG NUMBERING SYSTEM

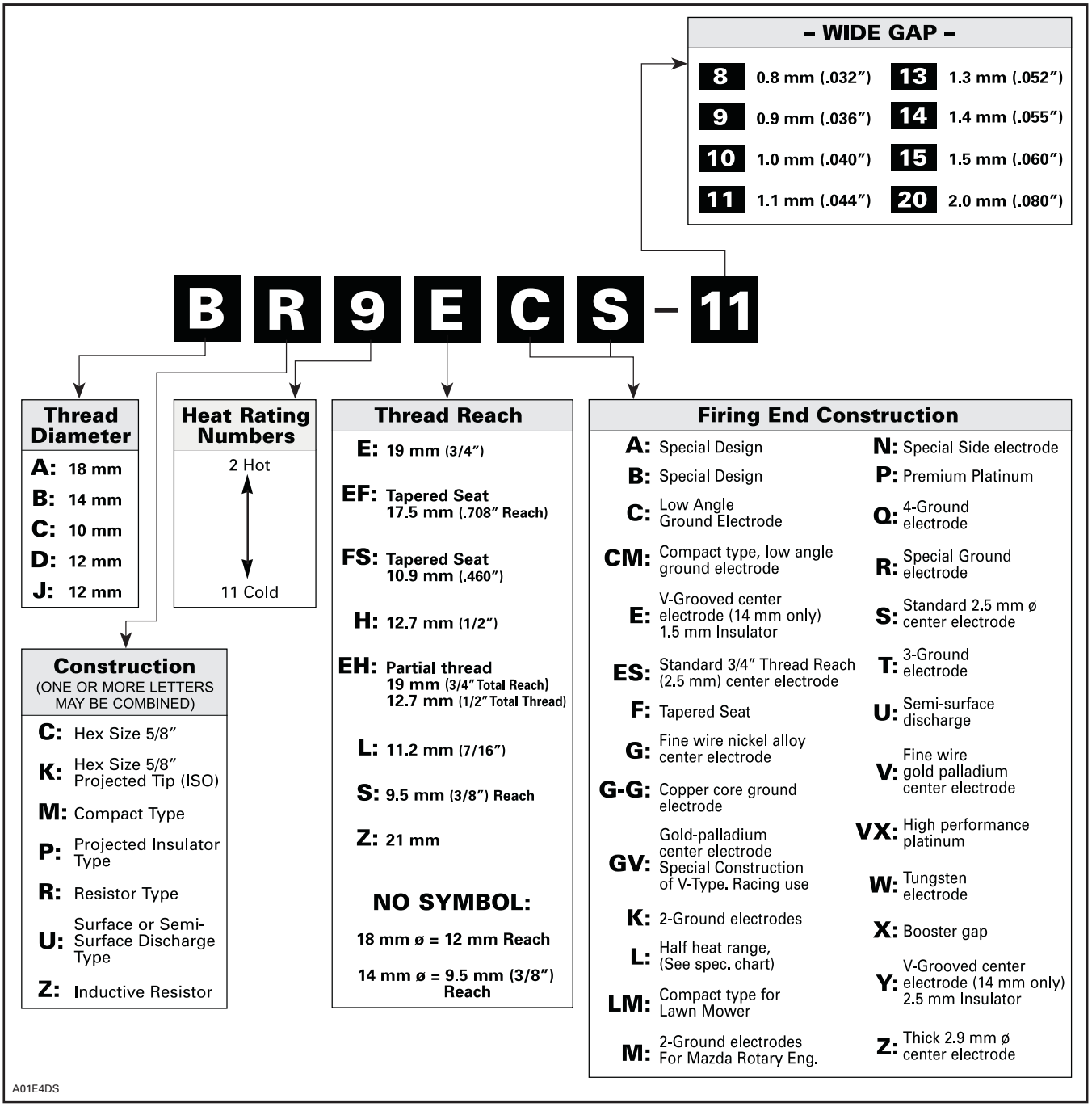
Bombardier uses NGK brand spark plugs on all its snowmobile models.

The heat range identification system is:

Low number → hot plug

High number → cold plug

DESIGN SYMBOLS USED IN NGK SPARK PLUGS



DISASSEMBLY

First unscrew the spark plug 1 turn.

Clean the spark plug and cylinder head with pressurized air, then completely unscrew.

⚠ WARNING

Whenever using compressed air, always wear protective eye wear.

HEAT RANGE

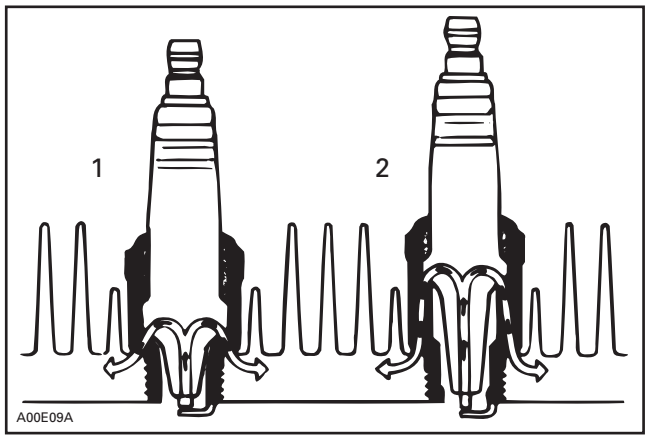
The proper operating temperature or heat range of the spark plugs is determined by the spark plug ability to dissipate the heat generated by combustion.

The longer the heat path between the electrode tip to the plug shell, the hotter the spark plug operating temperature will be — and inversely, the shorter the heat path, the colder the operating temperature will be.

A **cold** type plug has a relatively short insulator nose and transfers heat very rapidly into the cylinder head.

Such a plug is used in heavy duty or continuous high speed operation to avoid overheating.

The **hot** type plug has a longer insulator nose and transfers heat more slowly away from its firing end. It runs hotter and burns off combustion deposits which might tend to foul the plug during prolonged idle or low speed operation.



1. Cold
2. Hot

CAUTION: Severe engine damage might occur if a wrong heat range plug is used.

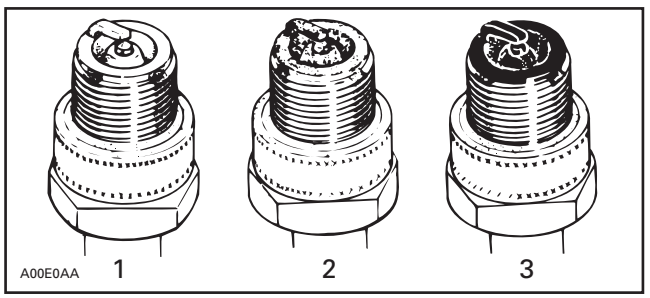
A **too hot** plug will result in overheating and pre-ignition, etc.

A **too cold** plug will result in fouling (shorting the spark plug) or may create carbon build up which can heat up red-hot and cause pre-ignition or detonation.

FOULING

Fouling of the spark plug is indicated by irregular running of the engine, decreased engine speed due to misfiring, reduced performance, and increased fuel consumption. This is due to a loss of compression. Other possible causes are: prolonged idling, or running on a too rich mixture due to a faulty carburetor adjustment or incorrect fuel and/or fuel mixing. The plug face of a fouled spark plug has either a dry coating of soot or an oily, glossy coating given by an excess either of oil or of oil with soot. Such coatings form a conductive connection between the center electrode and ground.

SPARK PLUG ANALYSIS



1. Overheated (light grey)
2. Normal (brownish)
3. Fouled (black)

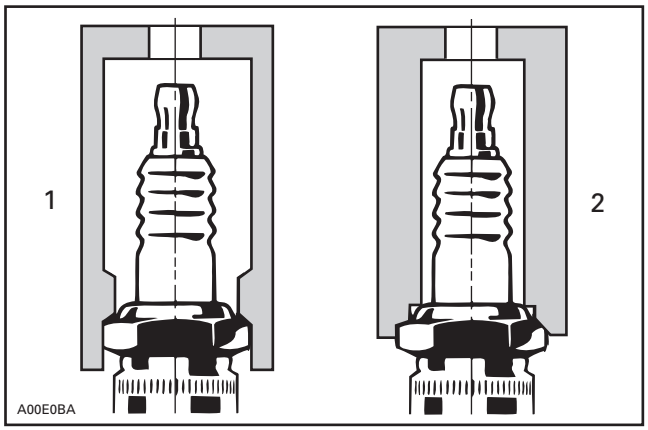
The plug electrode and piston dome reveal the condition of the engine, operating condition, method of driving and fuel mixture. For this reason it is advisable to inspect the spark plug at regular intervals, examining the plug electrode and the piston dome.

SPARK PLUG INSTALLATION

Prior to installation make sure that contact surfaces of the cylinder head and spark plug are free of grime.

CAUTION: Do not adjust electrode gap of spark plug BR9ECS.

1. Using a wire feeler gauge, set electrode gap according to TECHNICAL DATA.
2. Apply anti-seize lubricant (P/N 293 800 070) over the spark plug threads to prevent possible seizure.
3. Hand screw spark plug into cylinder head and tighten with a torque wrench and a proper socket.



1. Proper socket
2. Improper socket

SPARK PLUG TIGHTENING TORQUE

MODELS	SPARK PLUGS	TORQUE N•m (lbf•ft)
All models	NGK	27 (20)

TESTING PROCEDURE

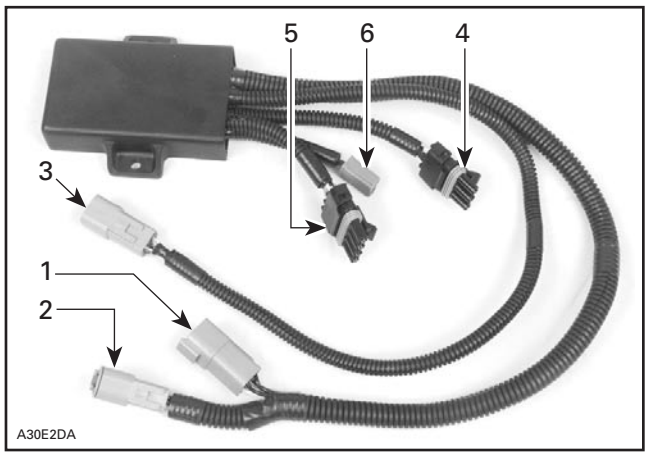
GENERAL

The following chart gives the engine types with their implemented system.

ENGINE TYPE	IGNITION SYSTEM	CHARGING SYSTEM OUTPUT
809 on Mach Z SPORT/ TECH PLUS	BOMBARDIER 290 W	290

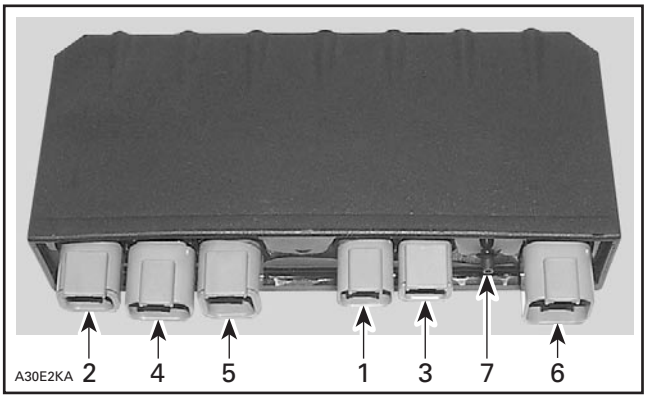
Multi-Purpose Electronic Module (MPEM) Identification

The BOMBARDIER 290 W MPEM receives electricity produced by 2 generating coils (low and high speed).



TYPICAL — BOMBARDIER 290 W MPEM — NON-RER MODELS

1. *High tension coils, 4-DC housing*
2. *Generating coils (low and high speed), 4-DD housing*
3. *Trigger coil, 4-DF housing*
4. *DESS switch, 4-DB housing*
5. *DESS pilot lamp and ignition/kill switches, 4-DA housing*
6. *External power supply 4-DE housing*



TYPICAL — BOMBARDIER 290 W MPEM — RER MODELS

1. *High tension coils, 6-DD housing*
2. *Generating coils (low and high speed), 6-DB housing*
3. *Air temperature sensor, 6-DF housing*
4. *Trigger coils, 6-DC housing*
5. *DPM solenoid, 6-DE housing*
6. *Reverse switch and alarm, DESS pilot lamp and ignition/kill switches, 6-DA housing*
7. *Atmospheric pressure nipple*

Checking Calibration Program

CAUTION: Do not interchange MPEM from a model to an other. Even if the P/N stamped on the MPEM is the same, calibration program may be different. When ordering a new MPEM always refer to appropriate model parts catalog. The service P/N published in parts catalogs are the ones with the good calibration program according to model.

With Engine Running

All Models

If the belowmentionned tools are not available start engine. Turn on programmer then enter password.

Increase engine speed to 2000-2500 RPM then follow the same procedure as **With Engine Stopped**.

CAUTION: Engine must run till the end of the procedure.

When data are being transferred, you must rev the engine at 2000-2500 RPM and make sure connection between programmer and vehicle is good.

Engine will misfire while vehicle information is being transferred from MPEM to programmer. If engine stalls, restart it, keep engine speed at 2000-2500 RPM and select no. 3 VEHICLE INFO again.

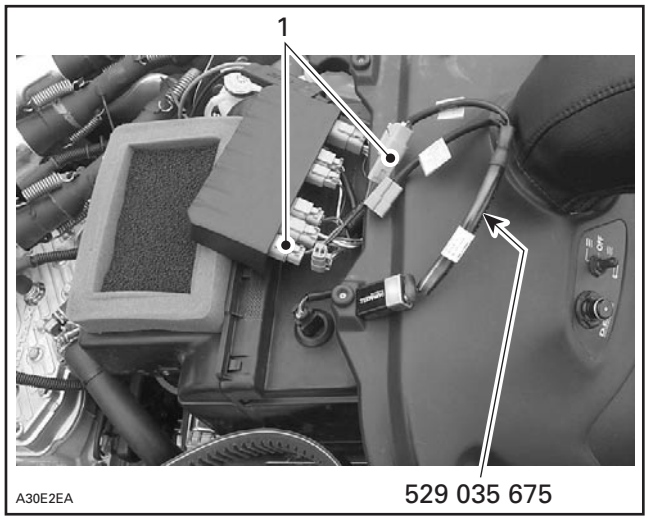
With Engine Stopped

Mach Z SPORT

Connect 9-volt adaptor (P/N 529 035 675) to MPEM.

Mach Z TECH PLUS

On this model MPEM can be supplied with external power using the 9-volt adaptor (P/N 529 035 675) and a homemade adaptor, refer to TOOL for details.

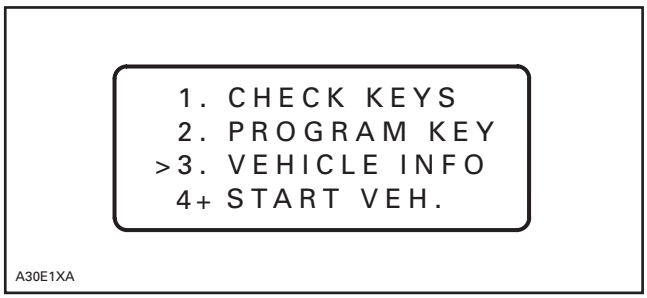


1. Homemade adaptor

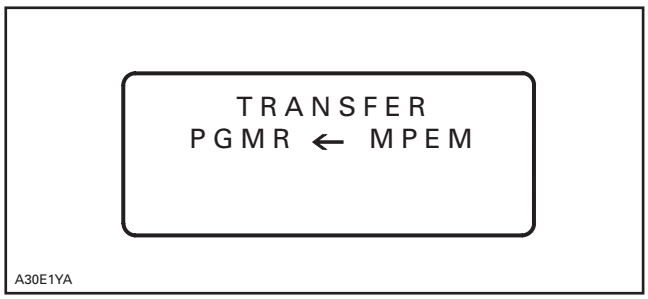
All Models

Turn on programmer then enter password.

From main menu select no. 3. INFO VEHICLE.



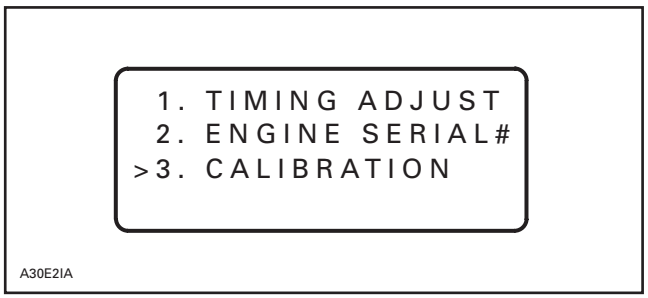
Vehicle information is transferred from MPEM to programmer.



NOTE: In fact the programmer takes a **copy** of all vehicle parameters scribed in MPEM. This copy will be modified within the programmer then transferred to the MPEM.

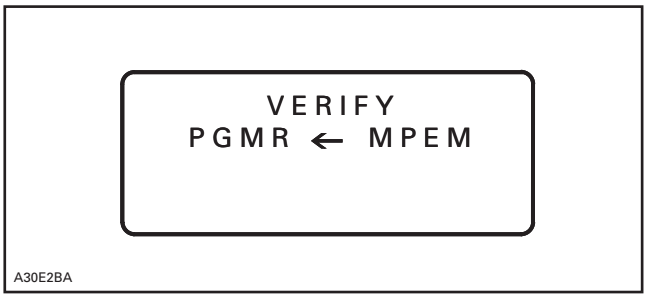
Select no. 4. ENGINE PARAMETER.

Select no. 3 CALIBRATION.

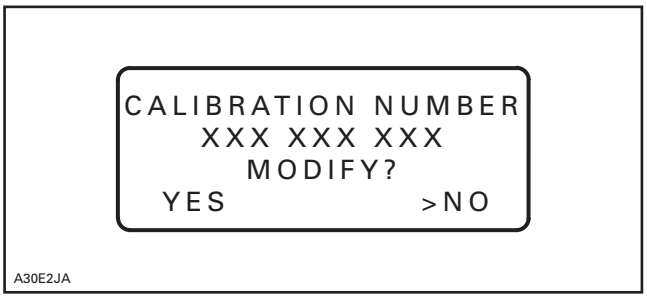


Press ENTER.

Following screen appears temporarily:



And then following screen showing the actual calibration number in the MPEM.



Check for proper calibration number. See table below.

Select NO and press ENTER.

Press MENU twice then turn off programmer, unplug it from MPEM. Remove 9-volt adaptor.

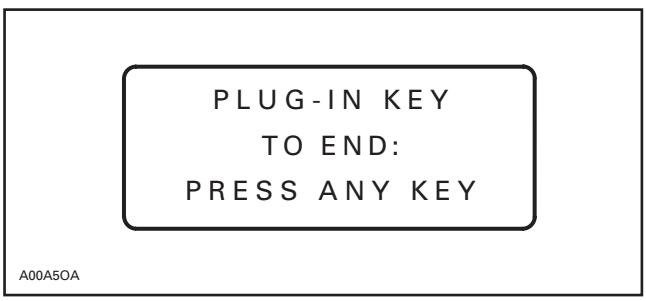
Stop engine when using **With Engine Running** procedure.

	MODEL	
	Mach Z SPORT	Mach Z TECH PLUS
CALIBRATION PROGRAM NUMBER (software)	515 175 431	512 059 293
MPEM N/P (hardware)	515 175 432	512 059 294
CALIBRATED MPEM N/P (hardware and software)	515 175 430	512 059 292

Changing MPEM Calibration Program

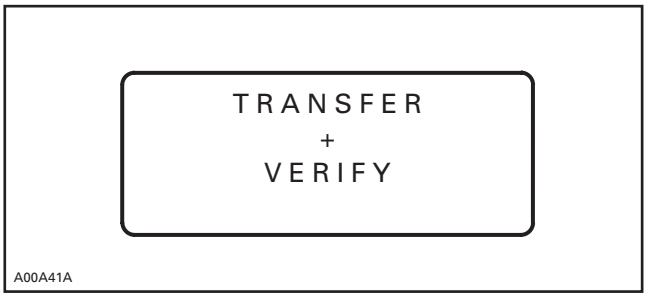
Proceed the same as for checking MPEM calibration but select YES to MODIFY? and press ENTER following screen appears:

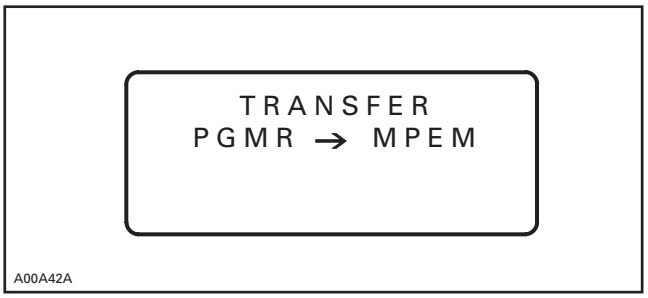
Enter new calibration number and press ENTER, following screen appears:

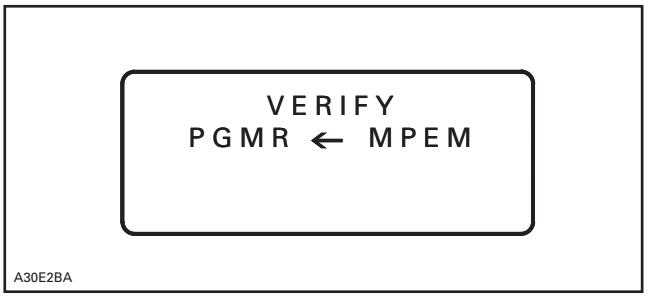


Simultaneously with the following operation a transfer will occur. At this point, be ready to rev the engine so it won't fall below the 2000 RPM mark when not using bypass wire or 9-volt adaptor.

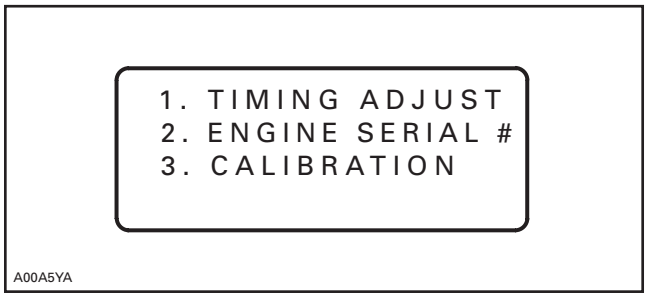
Plug-in the desired calibration cartridge (special red key) onto the programmer post, the following screens will appear temporarily:



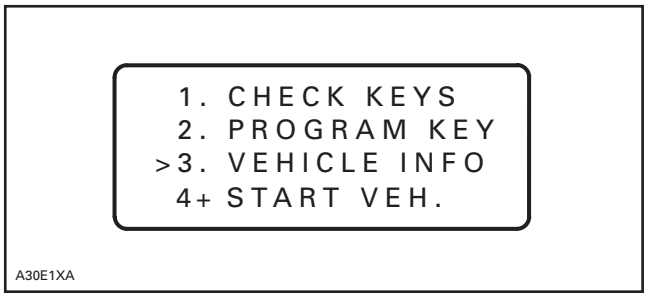




Press any key, transfer PGMR MPEM will show followed by next screen:



Press MENU twice, following screen will show:



After procedure is completed, ensure engine idle speed with engine hot is 1800-2200 RPM.

Stop the engine.

RER Equipped Models

After changing calibration, start engine with vehicle lanyard and verify the reverse (RER) function; this test will confirm that MPEM is correct. If reverse (RER) function does not operate, you must redo the calibration download.

SYSTEM TESTING

IGNITION SYSTEM TESTING SEQUENCE

In the case of ignition problems, check the following in the prescribed order until the problem can be solved.

1. Sparking/spark plug condition.
2. Electrical connectors.
3. Ignition switches, DESS switch and emergency switch.
4. Ignition generator coil voltage.
5. Trigger coil.
6. Ignition module voltage.
7. High voltage coil output.
8. MPEM voltage supply.
9. MPEM.

LIGHTING SYSTEM TESTING SEQUENCE

1. Electrical connectors.
2. Magneto output (lighting generator coil).

Testing Conditions

Voltage measurements are always taken upon vehicle starting. Readings when the engine is running will be higher than indicated range. Part temperature must be approximately 20°C (68°F) (room temperature), otherwise readings could be distorted.

Analysis of Readings

Voltage Readings

When testing the different magneto components, it is important to take into consideration that readings vary according to the force applied onto the manual starter. It is therefore important to employ enough force upon each trial.

The reading must be 3 times within or above the range indicated in the corresponding table. If the reading is too low, the part is considered to be defective and must be replaced.

Resistance Readings

Place multimeter selector switch to Ω in order to measure resistance. Readings must be within the indicated range. Otherwise, the part is considered to be defective and must be replaced.

CAUTION: When taking measurements, it is useless to try to start the vehicle since readings would then be distorted.

Intermittent Ignition Problems

It is difficult to make a diagnostic in the case of intermittent ignition problems. Thus, problems occurring only when the engine operating temperature is normal must be checked in similar conditions.

In most cases when problems are caused by temperature or vibrations, these can only be solved by replacing parts. Most problems cannot be detected when the engine is stopped.

Multiple Problems

As a matter of fact, more that one component can be defective. As a result, if the problem remains although a part was replaced, start over the whole verification from the beginning in order to identify the other defective component.

1. SPARKING

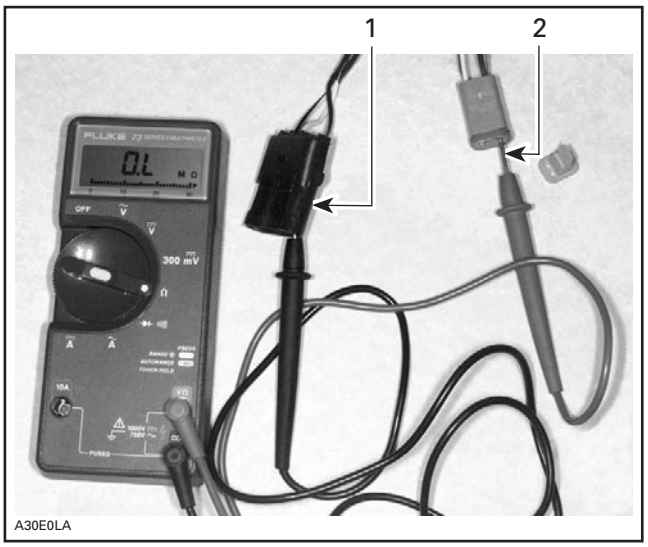
During this operation, it is important to use the snowmobile spark plug and not a new one. Bring the plug in contact with the engine. If no spark is produced, replace the spark plug with a new one and do the test again.

2. ELECTRICAL CONNECTOR TESTING

Make sure that none of the connectors are disconnected.

3. IGNITION SWITCH, TETHER CORD SWITCH AND EMERGENCY SWITCH TESTING

Disconnect connector housing from engine and check resistance as indicated in IGNITION table.



TYPICAL — 290 W

1. *BK/YL wire, 4-DA-A-M housing (harness side)*
2. *BK wire, 4-DD-2-F housing (harness side)*

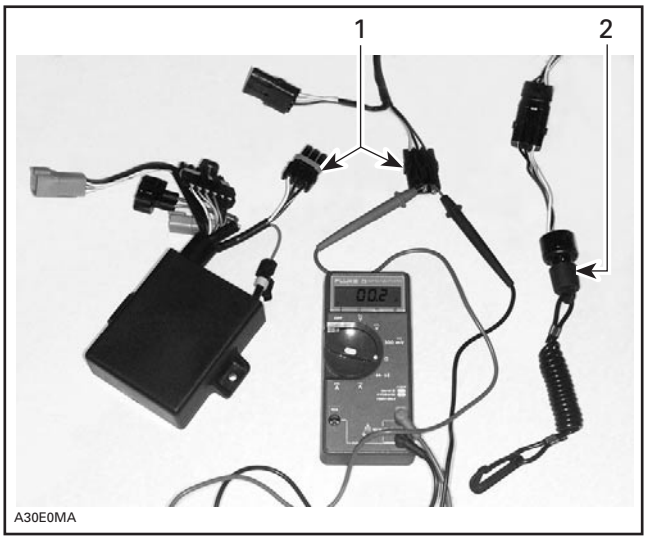
If readings are acceptable, go on to next step.

If readings are inadequate, individually check each switch as follows.

DESS Switch

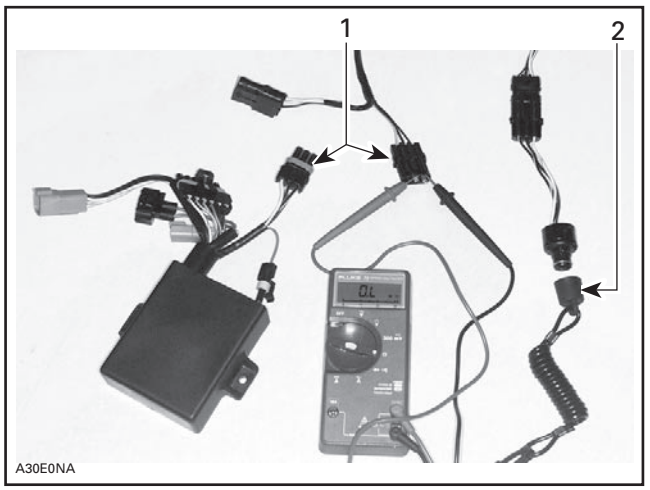
Tether Cord Switch

Unplug 4-DB housing connected to main wiring harness. Check using a multimeter by connecting probes to BLACK/GREEN and BLACK/WHITE wires. The multimeter should indicate a closed circuit (0 $_{\Omega}$) in operating position and a open circuit (0.L $_{M\Omega}$) 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 removed*

DESS Switch Wire

Check continuity (null resistance) between switch center terminal and WHITE/GRAY wire connector.

Check continuity (null resistance) between switch side ring and BLACK/GREEN wire connector.

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

If none of these verifications are conclusive, the problem finds its source in the main wiring harness. Proceed as follows:

NOTE: For the next step, no switch must be connected to the main wiring harness.

Disconnect all switches from the main wiring harness and check the continuity of each wire by connecting probes to the end of wires of the same color. Repeat with all other wires. It is important to mention that all wires of the same color within a given harness are connected together. These wires should therefore have a closed circuit. On the other hand, BLACK and BLACK/YELLOW wires must have an open circuit (0.L $_{M\Omega}$).

Repair or replace if necessary.

4. IGNITION GENERATOR COIL VOLTAGE TESTING

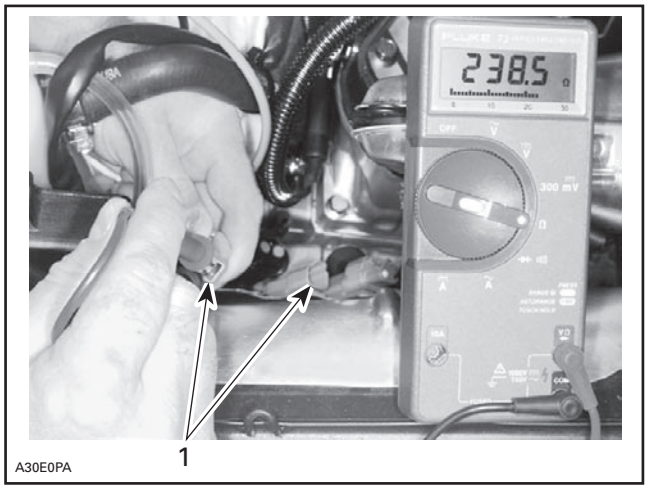
General

When manually starting the engine while the spark plug is installed, the engine will tend to accelerate beyond the compression point. This will result in higher magneto output power.

1. Disconnect 4-DD housing (6-DB on Mach Z TECH PLUS) between the magneto and the MPEM.
2. Connect multimeter probes to WHITE and RED wires and bring the selector switch to $\tilde{V}$ and the scale to 00.0^{VAC}.
3. Activate the manual starter and check values indicated by the multimeter.
4. Repeat operation 3 times.
5. Compare readings with those appearing in the IGNITION table.

5. TRIGGER COIL TESTING

1. Connect probes to WHITE/YELLOW and BLUE/YELLOW wires from trigger coil housing.
2. Activate the manual starter and check values indicated by the multimeter.
3. Repeat operation 3 times.
4. Compare readings with those appearing in the IGNITION table.



1. 10-04 housing

6. MPEM VOLTAGE TESTING

1. Disconnect the housing between module and high voltage coils.
2. Connect multimeter probes to WHITE/BLUE and BLACK wires coming out from module. Place the selector switch to $\tilde{V}$ and the scale to 00.0^{Vac}.
3. Activate the manual starter and check values indicated by the multimeter.
4. Repeat operation 3 times.
5. Compare readings with those appearing in the IGNITION table.

7. HIGH VOLTAGE COIL VOLTAGE TESTING

1. Disconnect spark plug cap from spark plug.
2. Fasten alligator clip to spark plug cable, near the spark plug.
3. Connect other multimeter wire to engine (ground), then place selector switch to $\tilde{V}$ and scale to 0.00^{Vac}.
4. Activate the manual starter and check values indicated by the multimeter.
5. Repeat operation 3 times.
6. Compare readings with those appearing in the IGNITION table.

CONCLUSION

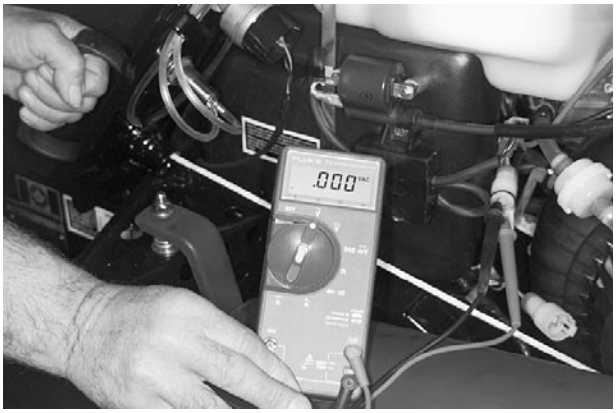
If none of the above testing operations produced valid results, it is strongly recommended to keep on testing according to the list appearing in the Resistance and voltage columns of the IGNITION table.

Set the multimeter as indicated.

LIGHTING GENERATOR COIL VOLTAGE TESTING

NOTE: For 290 W system, the lighting generator coil is not part of the ignition system. It is a self-contained system used to supply current to the lighting system and to other devices working on alternating current. However, this system can be tested using a multimeter.

1. Disconnect round 2-MO housing from engine (YELLOW, YELLOW wires).
2. Connect multimeter probes to YELLOW wires, then place selector switch to $\tilde{V}$ and scale to 0.00^{Vac}.
3. Activate the manual starter and check values indicated by the multimeter.
4. Repeat operation 3 times.



A05E0EA

TYPICAL

5. Compare readings with those appearing in the LIGHTING table.

CONCLUSION

If none of the above testing operations produced valid results, it is strongly recommended to keep on testing according to the list appearing in the Resistance and voltage columns of the LIGHTING table.

Set the multimeter as indicated.

IGNITION SYSTEM TESTING (CK3 SERIES — 290 W NON-RER)								
PART	TEST TO BE PERFORMED	WIRE COLOR	MULTIMETER PROBE CONNECTION	RESISTANCE Ω		VOLTAGE V		NOTE
				VALUE (OHMS)	MULTIMETER SCALE	VALUE (VOLTS)	MULTIMETER SCALE	
Ignition and kill switches	Running insulation	BK and BK/YL	4-DD-2-F 4-DA-A-M	0.L	00.0 MΩ	—	—	No stop switch must be in run position.
	Continuity in stop position	BK and BK/YL	4-DD-2-F 4-DA-A-M	00.0 - 00.5	00.0 Ω	—	—	Only one stop switch must be in run position. Test one at a time.
DESS switch	Insulation in stop position	BK/GN and BK/WH	4-DB-B-M 4-DB-C-M	0.L	00.0 MΩ	—	—	Tether cord cap should be off.
	Running continuity	BK/GN and BK/WH	4-DB-B-M 4-DB-C-M	00.0 - 00.5	00.0 Ω	—	—	Tether cord cap should be in place.
Ignition generator coil	Output	WH and RD	4-DD-3-F 4-DD-1-F	25.0 - 56.0	00.0 Ω	30.0 - 50.0	00.0Vac	—
		WH and BK/RD	4-DD-3-F 4-DD-4-F	3.5 - 8.1	00.0 Ω	4.0 - 10.0	00.0Vac	—
	Coil insulation	BK and RD	4-DD-2-F 4-DD-1-F	0.L	00.0 MΩ	—	—	—
	Ground continuity	BK and engine	4-DD-2-F and engine	00.0 - 00.5	00.0 Ω	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
Trigger coil	Resistance and output	WH/YL and BL/YL	4-DF-2-F 4-DF-1-F	190 - 300	00.0 Ω	.200 - .350	.000Vac	—
MPEM	Output voltage	WH/BL and BK	4-DC-(1,2,3)-M 4-DC-(6,5,4)-M	—	—	10.0 - 20.0 3 times	00.0Vac	No switch must be in run position and tether cord cap must be in place.
High voltage coil	Primary winding resistance	WH/BL and BK	4-DC-(1,2,3)-F 4-DC-(6,5,4)-F	00.2 - 00.5 3 times	00.0 Ω	—	—	—
	Secondary winding resistance (spark plug cap included)	Spark plug cap and engine	In spark plug cap and on engine	10.5 K - 19 K 3 times	00.0 KΩ	**CAUTION:** Do not measure high voltage coil output voltage.		
	Secondary winding resistance (without spark plug cap)	BK and engine	In spark plug wire and on engine	6 K - 13 K 3 times	00.0 KΩ	**CAUTION:** Do not measure high voltage coil output voltage.		
	Secondary winding voltage	BK and engine	On spark plug wire and on engine	—	—	1.5 - 2.5 3 times	0.00Vac	The measurement must be taken on the spark plug wire (without the spark plug).
Spark plug cap	Cap resistance	—	Spark plug side and wire side	4.0 K - 6.0 K 3 times	00.0 KΩ	—	—	—

M: Male F: Female

IGNITION SYSTEM TESTING (CK3 SERIES — 290 W RER)								
PART	TEST TO BE PERFORMED	WIRE COLOR	MULTIMETER PROBE CONNECTION	RESISTANCE Ω		VOLTAGE V		NOTE
				VALUE (OHMS)	MULTIMETER SCALE	VALUE (VOLTS)	MULTIMETER SCALE	
Ignition and kill switches	Running insulation	BK and BK/YL	6-DB-2-F 6-DA-3-F	0.L	00.0 MΩ	—	—	No stop switch must be in run position.
	Continuity in stop position	BK and BK/YL	6-DB-2-F 6-DA-3-F	00.0 - 00.5	00.0 Ω	—	—	Only one stop switch must be in run position. Test one at a time.
DESS switch	Insulation in stop position	BK/GN and BK/WH	6-DA-2-F 6-DA-1-F	0.L	00.0 Ω	—	—	Tether cord cap should be off.
	Running continuity	BK/GN and BK/WH	6-DA-2-F 6-DA-1-F	00.0 - 00.5	00.0 Ω	—	—	Tether cord cap should be in place.
Ignition generator coil	Output	WH and RD	6-DB-3-F 6-DB-1-F	25.0 - 56.0	00.0 Ω	30.0 - 50.0	00.0Vac	—
		WH and BK/RD	6-DB-3-F 6-DB-4-F	3.5 - 8.1	00.0 Ω	4.0 - 10.0	00.0Vac	—
	Coil insulation	BK and RD	6-DB-2-F 6-DB-1-F	0.L	00.0 MΩ	—	—	—
	Ground continuity	BK and engine	6-DB-2-F and engine	00.0 - 00.5	00.0 Ω	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
Trigger coil no. 1	Resistance and output	WH/YL and BL/YL	6-DC-1-F 6-DC-4-F	190 - 300	00.0 Ω	.200 - .350	.000Vac	—
Trigger coil no. 2	Resistance and output	GY/YL and GN/YL	6-DC-2-F 6-DC-3-F	190 - 300	00.0 Ω	.200 - .350	.000Vac	—
MPEM	Output voltage	WH/BL and BK	2-BA-(1,2,3)-M 2-BA-(6,5,4)-M	—	—	10.0 - 20.0 3 times	00.0Vac	No switch must be in run position and tether cord cap must be in place.
High voltage coil	Primary winding resistance	WH/BL and BK	6-DD-(1,2,3)-F 6-DD-(6,5,4)-F	00.2 - 00.5 3 times	00.0 Ω	—	—	—
	Secondary winding resistance (spark plug cap included)	Spark plug cap and engine	In spark plug cap and on engine	10.5 K - 19 K 3 times	00.0 KΩ	**CAUTION:** Do not measure high voltage coil output voltage.		
	Secondary winding resistance (without spark plug cap)	BK and engine	In spark plug wire and on engine	6 K - 13 K 3 times	00.0 KΩ	**CAUTION:** Do not measure high voltage coil output voltage.		
	Secondary winding voltage	BK and engine	On spark plug wire and on engine	—	—	1.5 - 2.5 3 times	0.00Vac	The measurement must be taken on the spark plug wire (without the spark plug).
Spark plug cap	Cap resistance	—	Spark plug side and wire side	4.0 K - 6.0 K 3 times	00.0 KΩ	—	—	—

M: Male F: Female

NOTE: Stop switches include the ignition 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.

LIGHTING SYSTEM TESTING (CK3 SERIES — 290 W)								
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	Output	YL and YL	2-MO-B-F and 2-MO-C-F	00.15 - 00.35	00.0 Ω	3.0 - 7.0	00.0 Vac	—
	Coil insulation	YL and engine	2-MO-(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	BK and engine	2-MO-A-F and engine	00.0 - 00.5	00.0 Ω	—	—	

M: Male F: Female

NOTE: 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.

INSPECTION OF AC CIRCUIT ISOLATION

290 W Models

If AC circuit is not isolated from frame, headlamp beam will weaken.

INSPECTION

Disconnect regulator/rectifier.

Pull off the rubber boot of brake light microswitch assembly.

Connect one digital ohmmeter probe (needle ohmmeter will not offer enough precision) to frame and other probe to YELLOW wire (2-RE-A).

Measured resistance must be infinite. If such is not the case, it means there is a connection between AC circuit and frame.

Disconnect one accessory at the time to identify the faulty circuit.

INSPECTION OF HEATING ELEMENTS

All measurements must be performed at 21°C (70°F).

Throttle Lever Heating Element

Resistance Measurement

Mach Z SPORT/TECH PLUS

HIGH INTENSITY	YELLOW/BLACK wire BROWN wire	1.96 to 3.64 ohms
LOW INTENSITY	YELLOW/BLACK wire BROWN/YELLOW wire	8.05 to 14.95 ohms

Current Measurement

Mach Z SPORT/TECH PLUS

HIGH INTENSITY	BROWN wire	0.23 A minimum
LOW INTENSITY	BROWN/YELLOW wire	0.13 A minimum

Handlebar Grip Heating Element

Resistance Measurement

Mach Z SPORT/TECH PLUS

LOW INTENSITY	YELLOW/BLACK wire ORANGE/VIOLET wire	17.7 to ① 20.7 ohms
HIGH INTENSITY	YELLOW/BLACK wire ORANGE wire	8.73 to ① 10.67 ohms

① When measuring resistance at terminals the actual value will be half the measurement in table. The reason for that is the elements are connected in parallel. Therefore the total resistance is half the resistance of one element.