A Few Words About Safety

Service Information

The service and repair information contained in this manual is intended for use by qualified, professional technicians.
Attempting service or repairs without the proper training, tools, and equipment could cause injury to you or others. It could also damage the vehicle or create an unsafe condition.

This manual describes the proper methods and procedures for performing service, maintenance, and repairs. Some procedures require the use of specially designed tools and dedicated equipment. Any person who intends to use a replacement part, service procedure or a tool that is not recommended by Honda, must determine the risks to their personal safety and the safe operation of the vehicle.

If you need to replace a part, use genuine Honda parts with the correct part number or an equivalent part. We strongly recommend that you do not use replacement parts of inferior quality.

For Your Customer's Safety

Proper service and maintenance are essential to the customer's safety and the reliability of the vehicle. Any error or oversight while servicing a vehicle can result in faulty operation, damage to the vehicle, or injury to others.

⚠WARNING

Improper service or repairs can create an unsafe condition that can cause your customer or others to be seriously hurt or killed.

Follow the procedures and precautions in this manual and other service materials carefully.

For Your Safety

Because this manual is intended for the professional service technician, we do not provide warnings about many basic shop safety practices (e.g., Hot parts–wear gloves). If you have not received shop safety training or do not feel confident about your knowledge of safe servicing practice, we recommended that you do not attempt to perform the procedures described in this manual.

Some of the most important general service safety precautions are given below. However, we cannot warn you of every conceivable hazard that can arise in performing service and repair procedures. Only you can decide whether or not you should perform a given task.

⚠WARNING

Failure to properly follow instructions and precautions can cause you to be seriously hurt or killed.

Follow the procedures and precautions in this manual carefully.

Important Safety Precautions

Make sure you have a clear understanding of all basic shop safety practices and that you are wearing appropriate clothing and using safety equipment. When performing any service task, be especially careful of the following:

- Read all of the instructions before you begin, and make sure you have the tools, the replacement or repair parts, and the skills required to perform the tasks safely and completely.
- Protect your eyes by using proper safety glasses, goggles or face shields any time you hammer, drill, grind, pry or work around pressurized air or liquids, and springs or other stored-energy components. If there is any doubt, put on eye protection.
- Use other protective wear when necessary, for example gloves or safety shoes. Handling hot or sharp parts can cause severe burns or cuts. Before you grab something that looks like it can hurt you, stop and put on gloves.
- Protect yourself and others whenever you have the vehicle up in the air. Anytime you lift the vehicle, either with a hoist or a jack, make sure that it is always securely supported. Use jack stands.

Make sure the engine is off before you begin any servicing procedures, unless the instruction tells you to do otherwise.
This will help eliminate several potential hazards:

- Carbon monoxide poisoning from engine exhaust. Be sure there is adequate ventilation whenever you run the engine.
- Burns from hot parts or coolant. Let the engine and exhaust system cool before working in those areas.
- Injury from moving parts. If the instruction tells you to run the engine, be sure your hands, fingers and clothing are out of the way.

Gasoline vapors and hydrogen gases from batteries are explosive. To reduce the possibility of a fire or explosion, be careful when working around gasoline or batteries.

- Use only a nonflammable solvent, not gasoline, to clean parts.
- Never drain or store gasoline in an open container.
- Keep all cigarettes, sparks and flames away from the battery and all fuel-related parts.

HOW TO USE THIS MANUAL

This service manual describes the service procedures for the ARX1200T3, ARX1200T3D and ARX1200N3.

Follow the Maintenance Schedule (Section 4) recommendations to ensure that the personal watercraft is in peak operating condition.

Performing the first scheduled maintenance is very important. It compensates for the initial wear that occurs during the break-in period.

Sections 1, 4 and 5 apply to the whole personal watercraft. Section 3 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections.
Section 6 through 19 describe parts of the personal watercraft, grouped according to location.

Find the section you want on this page, then turn to the table of contents on the first page of the section.

Most sections start with an assembly or system illustration, service information and troubleshooting for the section. The subsequent pages give detailed procedures.

If you are not familiar with this personal watercraft, read Technical Features in Section 2.
If you do not know the source of vehicle trouble, go to section 21 Troubleshooting.

Your safety, and the safety of others, is very important. To help you make informed decisions we have provided safety messages and other information throughout this manual. Of course, it is not practical or possible to warn you about all the hazards associated with servicing this vehicle.
You must use your own good judgement.
You will find important safety information in a variety of forms including:

- Safety Labels – on the vehicle
- Safety Messages – preceded by a safety alert symbol ⚠ and one of three signal words, DANGER, WARNING, or CAUTION. These signal words mean:

⚠DANGER You WILL be KILLED or SERIOUSLY HURT if you don't follow instructions.

⚠WARNING You CAN be KILLED or SERIOUSLY HURT if you don't follow instructions.

⚠CAUTION You CAN be HURT if you don't follow instructions.

- Instructions – how to service this vehicle correctly and safely.

As you read this manual, you will find information that is preceded by a NOTICE symbol. The purpose of this message is to help prevent damage to your vehicle, other property, or the environment.

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Honda Motor Co., Ltd.
SERVICE PUBLICATION OFFICE

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SYMBOLS

The symbols used throughout this manual show specific service procedures. If supplementary information is required pertaining to these symbols, it would be explained specifically in the text without the use of the symbols.

	Replace the part(s) with new one(s) before assembly.
	Use the recommended engine oil, unless otherwise specified.
	Use molybdenum oil solution (mixture of engine oil and molybdenum grease in a ratio of 1 : 1).
	Use multi-purpose grease (lithium based multi-purpose grease NLGI #2 or equivalent).
	Use water resistant grease #0 (Urea based multi-purpose grease NLGI #0 or equivalent). Example: EXCELITE EP0 manufactured by KYODO YUSHI, Japan
	Use water resistant grease #2 (Urea based multi-purpose grease NLGI #2 or equivalent). Example: EXCELITE EP2 manufactured by KYODO YUSHI, Japan
	Use water resistant molybdenum disulfide grease (containing more than 3% molybdenum disulfide, NLGI #2 or equivalent). Example: UNILITE M No.2 manufactured by KYODO YUSHI, Japan
	Use molybdenum disulfide grease (containing more than 3% molybdenum disulfide, NLGI #2 or equivalent). Example: Molykote® BR-2 plus manufactured by Dow Corning, U.S.A. Multi-purpose M-2 manufactured by Mitsubishi Oil, Japan
	Use molybdenum disulfide paste (containing more than 40% molybdenum disulfide, NLGI #2 or equivalent). Example: Molykote® G-n Paste manufactured by Dow Corning, U.S.A. Honda Moly 60 (U.S.A. only) Rocol ASP manufactured by Rocol Limited, U.K. Rocol Paste manufactured by Sumico Lubricant, Japan
	Use silicone grease.
	Apply a locking agent. Use a medium strength locking agent unless otherwise specified.
	Apply sealant (engine).
	Apply silicone sealant (SHIN-ETSU KE45T or equivalent).

1. GENERAL INFORMATION

SERVICE RULES

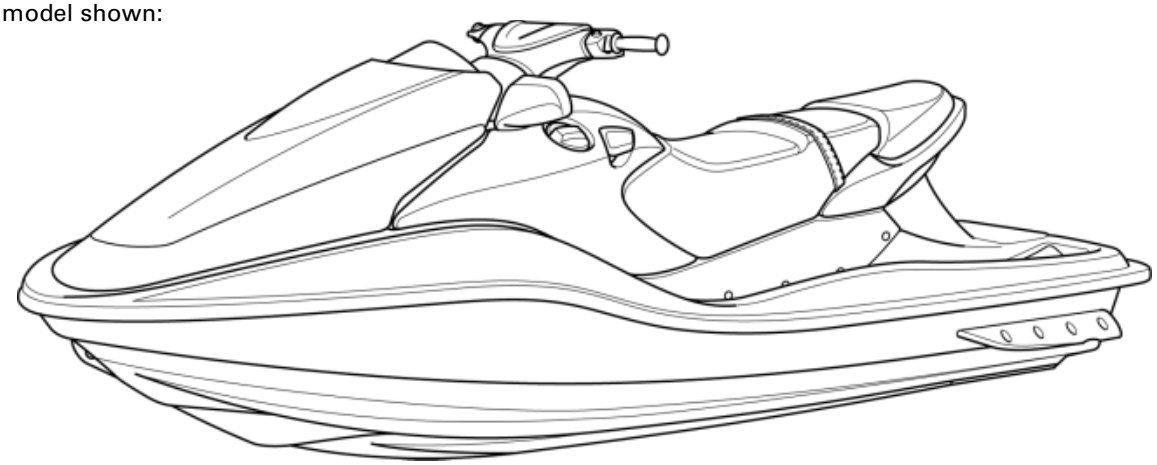
1. Use genuine Honda or Honda-recommended parts and lubricants or their equivalents. Parts that do not meet Honda's design specifications may cause damage to the watercraft.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the watercraft. Metric bolts, nuts and screws are not interchangeable with English fasteners.
4. Install new gaskets, O-rings, cotter pins, and lock plates when reassembling.
5. When tightening bolts or nuts, begin with the larger diameter or inner bolt first. Then tighten to the specified torque diagonally in incremental steps unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as shown in the Cable and Harness Routing (page 1-31 or 1-52).

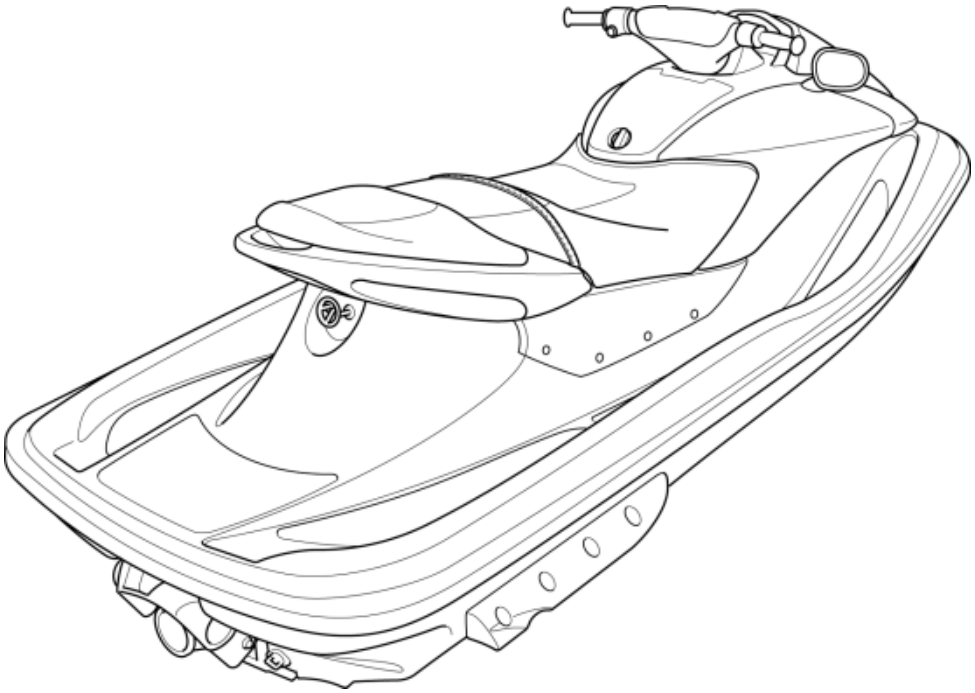
MODEL IDENTIFICATION

This manual covers two types of ARX1200 models:
- T3: Turbocharger model
- T3D: Turbocharger model equipped with GPS receiver and boarding step (After '04)
- N3: Standard (no turbocharger)

Be sure to refer to the procedure that pertains to the appropriate version of the ARX1200.

'04 model shown:

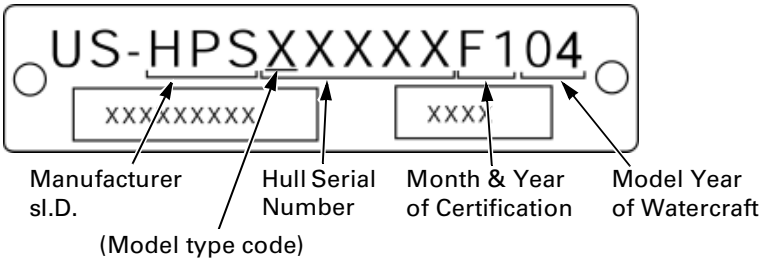




The engine serial number and hull identification number are used to register the watercraft. They are unique numbers that distinguish each watercraft from other similar models.

If the watercraft is ever stolen these numbers will help identify it. The owner should keep a record of these numbers in a place other than the watercraft.

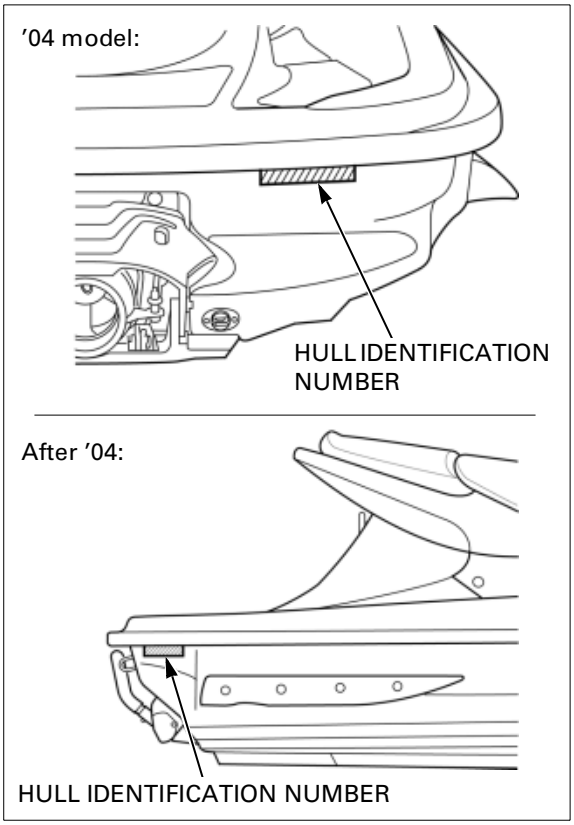
HULL NUMBER IDENTIFICATION



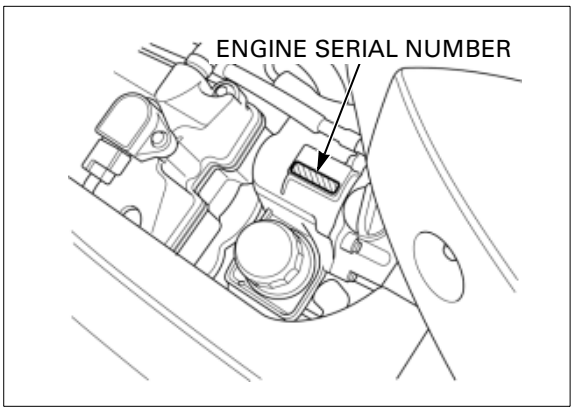
Month code: A = January, B = February·····L = December

Year of certification: 04 = 2004, 05= 2005; etc.

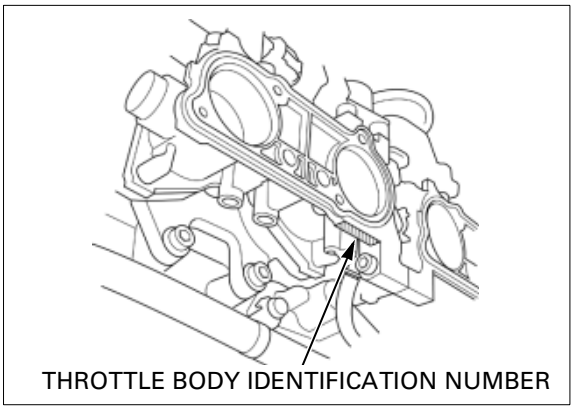
The hull identification numbers are located on the rear of the hull.



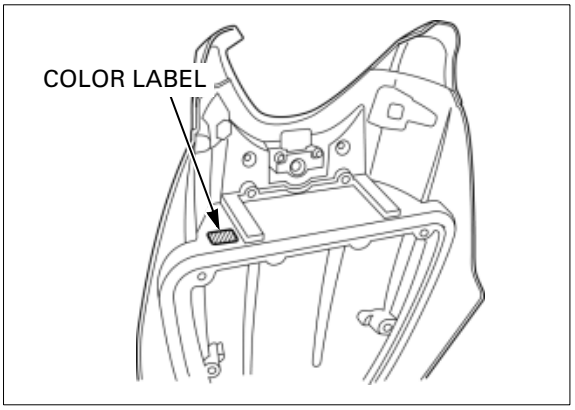
The engine serial number is located on the upper side of the oil tank.



The throttle body identification number is stamped on the lower side of the throttle body.



The color label is attached on the inside of the front hood. When ordering color-coded parts, always specify the designated color code.



GENERAL SPECIFICATIONS: ARX1200T3

ITEM		SPECIFICATIONS
MODEL CODE	Hull	ARX1200T3 (SW01)
	Engine	SW01E
DIMENSIONS	Overall length	3,200 mm (126.0 in)
	Overall width	1,245 mm (49.0 in)
	Overall height	1,060 mm (41.7 in)
	Dry weight '04 model	358 kg (789 lbs)
	Dry weight After '04	359 kg (791 lbs)
	Rider capacity	3 person
	Maximum weight capacity	238 kg (525 lbs)
PERFORMANCE	Maximum output	121.4 kW (165 PS) at 6,100 rpm
	Maximum torque	191.8 N·m (19.6 kgf·m) at 5,500 rpm
	Maximum fuel consumption	53 liters (14.0 US gal, 11.7 Imp gal)/hour
	Cruising range at full throttle	1.2 hour
	Fuel tank capacity	63 liters (16.6 US gal, 13.9 Imp gal)
	Fuel tank reserve capacity	12.9 liters (3.41 US gal, 2.84 Imp gal)
HULL	Hull type	Deep V
	Hull material	FRP
ENGINE	Engine type	4 stroke
	Cylinder arrangement	4 cylinders in-line, longitudinal installed
	Bore and stroke	79.0 X 63.0 mm (3.11 X 2.48 in)
	Displacement	1,235 cm^3 (75.3 cu-in)
	Compression ratio	8.5 : 1
	Intake system	Turbocharged with intercooler
	Valve train	Chain driven, DOHC
	Intake valve opens at 1 mm lift	10° BTDC
	closes at 1 mm lift	20° ABDC
	Exhaust valve opens at 1 mm lift	25° BBDC
	closes at 1 mm lift	5° ATDC
	Lubrication system	Dry sump
	Oil pump type	Trochoid
	Cooling system	Water cooled
	Engine dry weight	94.5 kg (208 lbs)
	Firing order	1 - 3 - 4 - 2
FUEL DELIVERY SYSTEM	Type	PGM-FI (Programmed Fuel Injection)
	Throttle bore	38 mm (1.5 in)
PROPULSION	Jet pump type	Single stage, axial flow
	Impeller rotation (viewed from rear)	Counterclockwise
	Transmission	Direct drive from engine
	Steering nozzle angle (horizontal)	23°
	Impeller type	Stainless steel, 3-blades
	Impeller diameter	154.6 mm (6.09 in)
	Minimum water level for jet pump	90 cm (35 in)
	Bilge pump type	Automatic siphon type
	Reverse system	Reverse bucket type
ELECTRICAL	Ignition system	Computer-controlled digital transistorized
	Starting system	Electric starter motor
	Charging system	Triple phase output alternator
	Regulator/rectifier	SCR shorted, triple phase full-wave rectification

GENERAL SPECIFICATIONS: ARX1200T3D

ITEM		SPECIFICATIONS
MODEL CODE	Hull	ARX1200T3D (SW01)
	Engine	SW01E
DIMENSIONS	Overall length	3,200 mm (126.0 in)
	Overall width	1,245 mm (49.0 in)
	Overall height	1,060 mm (41.7 in)
	Dry weight	361 kg (796 lbs)
	Rider capacity	3 person
	Maximum weight capacity	238 kg (525 lbs)
PERFORMANCE	Maximum output	121.4 kW (165 PS) at 6,100 rpm
	Maximum torque	191.8 N·m (19.6 kgf·m) at 5,500 rpm
	Maximum fuel consumption	53 liters (14.0 US gal, 11.7 Imp gal)/hour
	Cruising range at full throttle	1.2 hour
	Fuel tank capacity	63 liters (16.6 US gal, 13.9 Imp gal)
	Fuel tank reserve capacity	12.9 liters (3.41 US gal, 2.84 Imp gal)
HULL	Hull type	Deep V
	Hull material	FRP
ENGINE	Engine type	4 stroke
	Cylinder arrangement	4 cylinders in-line, longitudinal installed
	Bore and stroke	79.0 X 63.0 mm (3.11 X 2.48 in)
	Displacement	1,235 cm^3 (75.3 cu-in)
	Compression ratio	8.5 : 1
	Intake system	Turbocharged with intercooler
	Valve train	Chain driven, DOHC
	Intake valve opens at 1 mm lift	10° BTDC
	closes at 1 mm lift	20° ABDC
	Exhaust valve opens at 1 mm lift	25° BBDC
	closes at 1 mm lift	5° ATDC
	Lubrication system	Dry sump
	Oil pump type	Trochoid
	Cooling system	Water cooled
	Engine dry weight	94.5 kg (208 lbs)
	Firing order	1 - 3 - 4 - 2
FUEL DELIVERY SYSTEM	Type	PGM-FI (Programmed Fuel Injection)
	Throttle bore	38 mm (1.5 in)
PROPULSION	Jet pump type	Single stage, axial flow
	Impeller rotation (viewed from rear)	Counterclockwise
	Transmission	Direct drive from engine
	Steering nozzle angle (horizontal)	23°
	Impeller type	Stainless steel, 3-blades
	Impeller diameter	154.6 mm (6.09 in)
	Minimum water level for jet pump	90 cm (35 in)
	Bilge pump type	Automatic siphon type
	Reverse system	Reverse bucket type
ELECTRICAL	Ignition system	Computer-controlled digital transistorized
	Starting system	Electric starter motor
	Charging system	Triple phase output alternator
	Regulator/rectifier	SCR shorted, triple phase full-wave rectification

GENERAL SPECIFICATIONS: ARX1200N3

'04 model

ITEM		SPECIFICATIONS
MODEL CODE	Hull	ARX1200N3 (SW02)
	Engine	SW02E
DIMENSIONS	Overall length	3,200 mm (126.0 in)
	Overall width	1,245 mm (49.0 in)
	Overall height	1,060 mm (41.7 in)
	Dry weight	338 kg (745 lbs)
	Vehicle capacity	3 person
	Maximum weight capacity	238 kg (525 lbs)
PERFORMANCE	Maximum output	91.9 kW (125 PS) at 7,000 rpm
	Maximum torque	125.5 N·m (12.8 kgf·m) at 7,000 rpm
	Maximum fuel consumption	35 liters (9.2 US gal, 7.7 Imp gal)/hour
	Cruising range at full throttle	1.8 hour
	Fuel tank capacity	63 liters (16.6 US gal, 13.9 Imp gal)
	Fuel tank reserve capacity	12.9 liters (3.41 US gal, 2.84 Imp gal)
HULL	Hull type	Deep V
	Hull material	FRP
ENGINE	Engine type	4 Stroke
	Cylinder arrangement	4 cylinders in-line, longitudinal installed
	Bore and stroke	79.0 X 63.0 mm (3.11 X 2.48 in)
	Displacement	1,235 cm^3 (75.3 cu-in)
	Compression ratio	11 : 1
	Intake system	Normal aspiration
	Valve train	Chain driven, DOHC
	Intake valve opens at 1 mm lift	10° BTDC
	Intake valve closes at 1 mm lift	30° ABDC
	Exhaust valve opens at 1 mm lift	30° BBDC
	Exhaust valve closes at 1 mm lift	10° ATDC
	Lubrication system	Dry sump
	Oil pump type	Trochoid
	Cooling system	Water cooled
	Engine dry weight	80 kg (176 lbs)
	Firing order	1 - 3 - 4 - 2
FUEL DELIVERY SYSTEM	Type	PGM-FI (Programmed Fuel Injection)
	Throttle bore	38 mm (1.5 in)
PROPULSION	Jet pump type	Single stage, axial flow
	Impeller rotation (viewed from rear)	Counterclockwise
	Transmission	Direct drive from engine
	Nozzle angle (horizontal)	23°
	Impeller type	Stainless steel, 3-blades
	Impeller diameter	154.6 mm (6.09 in)
	Minimum water level for jet pump	90 cm (35 in)
	Bilge pump type	Automatic siphon type
	Reverse system	Reverse bucket type
ELECTRICAL	Ignition system	Computer-controlled digital transistorized
	Starting system	Electric starter motor
	Charging system	Triple phase output alternator
	Regulator/rectifier	SCR shorted, triple phase full-wave rectification

After '04

ITEM		SPECIFICATIONS
MODEL CODE	Hull	ARX1200N3 (SW02)
	Engine	SW02E
DIMENSIONS	Overall length	3,200 mm (126.0 in)
	Overall width	1,245 mm (49.0 in)
	Overall height	1,060 mm (41.7 in)
	Dry weight	339 kg (747 lbs)
	Vehicle capacity	3 person
	Maximum weight capacity	238 kg (525 lbs)
PERFORMANCE	Maximum output	101 kW (137 PS) at 7,750 rpm
	Maximum torque	127.7 N·m (13.0 kgf·m) at 7,000 rpm
	Maximum fuel consumption	40 liters (10.6 US gal, 8.8 Imp gal)/hour
	Cruising range at full throttle	1.6 hour
	Fuel tank capacity	63 liters (16.6 US gal, 13.9 Imp gal)
	Fuel tank reserve capacity	12.9 liters (3.41 US gal, 2.84 Imp gal)
HULL	Hull type	Deep V
	Hull material	FRP
ENGINE	Engine type	4 Stroke
	Cylinder arrangement	4 cylinders in-line, longitudinal installed
	Bore and stroke	79.0 X 63.0 mm (3.11 X 2.48 in)
	Displacement	1,235 cm^3 (75.3 cu-in)
	Compression ratio	11 : 1
	Intake system	Normal aspiration
	Valve train	Chain driven, DOHC
	Intake valve opens at 1 mm lift	12° BTDC
	Intake valve closes at 1 mm lift	38° ABDC
	Exhaust valve opens at 1 mm lift	33° BBDC
	Exhaust valve closes at 1 mm lift	10° ATDC
	Lubrication system	Dry sump
	Oil pump type	Trochoid
	Cooling system	Water cooled
	Engine dry weight	80 kg (176 lbs)
	Firing order	1 - 3 - 4 - 2
FUEL DELIVERY SYSTEM	Type	PGM-FI (Programmed Fuel Injection)
	Throttle bore	38 mm (1.5 in)
PROPULSION	Jet pump type	Single stage, axial flow
	Impeller rotation (viewed from rear)	Counterclockwise
	Transmission	Direct drive from engine
	Nozzle angle (horizontal)	23°
	Impeller type	Stainless steel, 3-blades
	Impeller diameter	146.7 mm (5.78 in)
	Minimum water level for jet pump	90 cm (35 in)
	Bilge pump type	Automatic siphon type
	Reverse system	Reverse bucket type
ELECTRICAL	Ignition system	Computer-controlled digital transistorized
	Starting system	Electric starter motor
	Charging system	Triple phase output alternator
	Regulator/rectifier	SCR shorted, triple phase full-wave rectification

LUBRICATION SYSTEM SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Engine oil capacity	ARX1200T3/ T3D	After draining	4.2 liters (4.4 US qt, 3.7 Imp qt)	–
		After draining/filter change	4.3 liters (4.5 US qt, 3.8 Imp qt)	–
		After disassembly	5.3 liters (5.6 US qt, 4.7 Imp qt)	–
	ARX1200N3	After draining	4.0 liters (4.2 US qt, 3.5 Imp qt)	–
		After draining/filter change	4.1 liters (4.3 US qt, 3.6 Imp qt)	–
		After disassembly	5.0 liters (5.3 US qt, 4.4 Imp qt)	–
Recommended engine oil			Pro Honda GN4, HP4 (without molybdenum additives) or HP4M (with molybdenum additives) 4-stroke oil or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA or MB Viscosity: SAE 10W-40	–
Oil pressure		At low oil pressure switch	294 kPa (3.0 kgf/cm^2, 43 psi) at 3,000 rpm/(80°C/176°F)	–
Oil pump rotor		Tip clearance	0.15 (0.006)	0.20 (0.008)
		Body clearance	0.15 – 0.22 (0.006 – 0.009)	0.35 (0.014)
		Side clearance	0.04 – 0.09 (0.002 – 0.004)	0.12 (0.005)

FUEL SYSTEM (Programmed Fuel Injection) SPECIFICATIONS

ITEM		SPECIFICATIONS
Throttle body identification number	ARX1200T3/T3D	GQ9AA
	ARX1200N3	GQ99A
Idle speed		1,200 ± 100 rpm
Throttle lever free play		2 – 6 mm (1/16 – 1/4 in)
Intake air temperature sensor resistance (at 20°C/68°F)		1 – 4 kΩ
Engine oil temperature sensor resistance (at 20°C/68°F)		2.3 – 2.8 kΩ
Engine coolant temperature sensor resistance (at 20°C/68°F)		2.3 – 2.8 kΩ
Fuel injector resistance (at 20°C/68°F)		11.1 – 12.3 Ω
Camshaft position sensor peak voltage (at 20°C/68°F)		0.7 V minimum
Ignition pulse generator peak voltage (at 20°C/68°F)		0.7 V minimum
Manifold absolute pressure at idle	ARX1200T3/T3D	20 – 27 kPa (150 – 200 mmHg)
	ARX1200N3	27 – 33 kPa (200 – 250 mmHg)
Fuel pressure at idle		294 kPa (3.0 kgf/cm^2, 43 psi)
Fuel pump flow (at 12V)		260 cm^3 (8.8 US oz, 9.2 Imp oz) minimum/10 seconds

CYLINDER HEAD/VALVE SPECIFICATIONS: '04 model

Unit: mm (in)

ITEM				STANDARD	SERVICE LIMIT
Cylinder compression		ARX1200T3		1,177 kPa (12.0 kgf/cm^2, 171 psi) at 350 rpm	–
		ARX1200N3		1,275 kPa (13.0 kgf/cm^2, 185 psi) at 350 rpm	–
Valve clearance			IN	0.16 ± 0.03 (0.006 ± 0.001)	–
			EX	0.26 ± 0.03 (0.010 ± 0.001)	–
Camshaft	Cam lobe height	ARX1200T3	IN	37.68 – 37.84 (1.483 – 1.490)	37.38 (1.472)
			EX	37.78 – 37.94 (1.487 – 1.494)	37.48 (1.476)
		ARX1200N3	IN	38.58 – 38.74 (1.519 – 1.525)	38.28 (1.507)
			EX	38.38 – 38.54 (1.511 – 1.517)	38.08 (1.499)
	Runout			–	0.05 (0.002)
	Oil clearance			0.020 – 0.062 (0.0008 – 0.0024)	0.09 (0.004)
Valve lifter	Valve lifter O.D.			25.978 – 25.993 (1.0228 – 1.0233)	25.97 (1.022)
	Valve lifter bore I.D.			26.010 – 26.026 (1.0240 – 1.0246)	26.04 (1.025)
Valve, valve guide	Valve stem O.D.		IN	4.975 – 4.990 (0.1959 – 0.1965)	4.965 (0.1955)
			EX	4.960 – 4.975 (0.1953 – 0.1959)	4.950 (0.1949)
	Valve guide I.D.		IN/EX	5.000 – 5.012 (0.1969 – 0.1973)	5.040 (0.1984)
	Stem-to-guide clearance		IN	0.010 – 0.037 (0.0004 – 0.0015)	–
			EX	0.025 – 0.052 (0.0010 – 0.0020)	–
	Valve guide projection above cylinder head		IN/EX	16.3 – 16.5 (0.64 – 0.65)	–
	Valve seat width		IN/EX	0.90 –1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length		ARX1200T3	IN/EX	43.5 (1.71)	41.5 (1.63)
		ARX1200N3	IN/EX	40.6 (1.60)	38.6 (1.52)
Cylinder head warpage				–	0.10 (0.004)

CYLINDER HEAD/VALVE SPECIFICATIONS: After '04

Unit: mm (in)

ITEM				STANDARD	SERVICE LIMIT
Cylinder compression		ARX1200T3/T3D		1,177 kPa (12.0 kgf/cm^2, 171 psi) at 350 rpm	–
		ARX1200N3		1,275 kPa (13.0 kgf/cm^2, 185 psi) at 350 rpm	–
Valve clearance			IN	0.16 ± 0.03 (0.006 ± 0.001)	–
			EX	0.26 ± 0.03 (0.010 ± 0.001)	–
Camshaft	Cam lobe height	ARX1200T3/T3D	IN	37.68 – 37.84 (1.483 – 1.490)	37.38 (1.472)
			EX	37.78 – 37.94 (1.487 – 1.494)	37.48 (1.476)
		ARX1200N3	IN	38.58 – 38.74 (1.519 – 1.525)	38.28 (1.507)
			EX	38.38 – 38.54 (1.511 – 1.517)	38.08 (1.499)
	Runout			–	0.05 (0.002)
	Oil clearance			0.020 – 0.062 (0.0008 – 0.0024)	0.09 (0.004)
Valve lifter	Valve lifter O.D.			25.978 – 25.993 (1.0228 – 1.0233)	25.97 (1.022)
	Valve lifter bore I.D.			26.010 – 26.026 (1.0240 – 1.0246)	26.04 (1.025)
Valve, valve guide	Valve stem O.D.		IN	4.975 – 4.990 (0.1959 – 0.1965)	4.965 (0.1955)
			EX	4.960 – 4.975 (0.1953 – 0.1959)	4.950 (0.1949)
	Valve guide I.D.		IN/EX	5.000 – 5.012 (0.1969 – 0.1973)	5.040 (0.1984)
	Stem-to-guide clearance		IN	0.010 – 0.037 (0.0004 – 0.0015)	–
			EX	0.025 – 0.052 (0.0010 – 0.0020)	–
	Valve guide projection above cylinder head		IN/EX	16.3 – 16.5 (0.64 – 0.65)	–
	Valve seat width		IN/EX	0.90 –1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length	ARX1200T3/T3D		IN/EX	43.5 (1.71)	41.5 (1.63)
	ARX1200 N3	Outer	IN/EX	40.6 (1.60)	38.6 (1.52)
		Inner	IN/EX	37.4 (1.47)	35.4 (1.39)
Cylinder head warpage				–	0.10 (0.004)

ALTERNATOR/STARTER CLUTCH SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter driven gear boss O.D.	51.699 – 51.718 (2.0354 – 2.0361)	51.684 (2.0348)

CRANKSHAFT/BALANCER (ARX1200T3/T3D)/PISTON SPECIFICATIONS

ARX1200T3/T3D:

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod side clearance		0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)
	Crankpin bearing oil clearance		0.026 – 0.050 (0.0010 – 0.0020)	0.06 (0.002)
	Main journal oil clearance		0.018 – 0.036 (0.0007 – 0.0014)	0.045 (0.0018)
	Balancer oil clearance		0.011 – 0.053 (0.0004 – 0.0020)	0.065 (0.0026)
	Runout		–	0.3 (0.01)
Piston, piston rings	Piston O.D. at 4 (0.2) from bottom		78.970 – 78.990 (3.1090 – 3.1098)	78.90 (3.106)
	Piston pin hole I.D.		22.002 – 22.008 (0.8662 – 0.8665)	22.03 (0.867)
	Piston pin O.D.		21.994 – 22.000 (0.8659 – 0.8661)	21.984 (0.8655)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	–
	Piston ring end gap	Top	0.175 – 0.325 (0.0069 – 0.0128)	0.48 (0.019)
		Second	0.40 – 0.55 (0.016 – 0.022)	0.7 (0.03)
		Oil (side rail)	0.2 – 0.8 (0.01 – 0.03)	1.0 (0.04)
	Piston ring-to-ring groove clearance	Top	0.030 – 0.070 (0.0012 – 0.0028)	0.08 (0.003)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.06 (0.002)
Cylinder	I.D.		79.000 – 79.015 (3.1102 – 3.1108)	79.10 (3.114)
	Out-of-round		–	0.10 (0.004)
	Taper		–	0.10 (0.004)
	Warpage		–	0.05 (0.002)
Cylinder-to-piston clearance			0.010 – 0.045 (0.0004 – 0.0018)	–
Connecting rod small end I.D.			22.030 – 22.051 (0.8673 – 0.8681)	22.061 (0.8685)
Connecting rod-to-piston pin clearance			0.030 – 0.057 (0.0012 – 0.0022)	–

ARX1200N3:

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod side clearance		0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)
	Crankpin bearing oil clearance		0.026 – 0.050 (0.0010 – 0.0020)	0.06 (0.002)
	Main journal oil clearance		0.018 – 0.036 (0.0007 – 0.0014)	0.045 (0.0018)
	Runout		–	0.3 (0.01)
Piston, piston rings	Piston O.D. at 4 (0.2) from bottom		78.970 – 78.990 (3.1090 – 3.1098)	78.90 (3.106)
	Piston pin hole I.D.		19.002 – 19.008 (0.7481 – 0.7483)	19.03 (0.749)
	Piston pin O.D.		18.994 – 19.000 (0.7478 – 0.7480)	18.984 (0.7474)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	–
	Piston ring end gap	Top	0.20 – 0.35 (0.008 – 0.014)	0.5 (0.02)
		Second	0.40 – 0.55 (0.016 – 0.022)	0.7 (0.03)
		Oil (side rail)	0.2 – 0.8 (0.01 – 0.03)	1.0 (0.04)
	Piston ring-to-ring groove clearance	Top	0.030 – 0.065 (0.0012 – 0.0026)	0.08 (0.003)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.06 (0.002)
Cylinder	I.D.		79.000 – 79.015 (3.1102 – 3.1108)	79.10 (3.114)
	Out-of-round		–	0.10 (0.004)
	Taper		–	0.10 (0.004)
	Warpage		–	0.05 (0.002)
Cylinder-to-piston clearance			0.010 – 0.045 (0.0004 – 0.0018)	–
Connecting rod small end I.D.			19.030 – 19.051 (0.7492 – 0.7500)	19.061 (0.7504)
Connecting rod-to-piston pin clearance			0.030 – 0.057 (0.0012 – 0.0022)	–

PROPULSION SYSTEM SPECIFICATIONS: '04 model

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Impeller	Material	Stainless steel	–
	Number of blades	3	–
	O.D.	154.6 (6.09)	–
Water jet stator I.D. (impeller housing area)		155.4 (6.12)	–
Impeller clearance		0.3 – 0.5 (0.01 – 0.02)	0.9 (0.04)
Drive shaft runout		–	0.2 (0.01)

PROPULSION SYSTEM SPECIFICATIONS: After '04

ARX1200T3/T3D:

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Impeller	Material	Stainless steel	–
	Number of blades	3	–
	O.D.	154.6 (6.09)	–
Water jet stator I.D. (impeller housing area)		155.4 (6.12)	–
Impeller clearance		0.3 – 0.5 (0.01 – 0.02)	0.9 (0.04)
Drive shaft runout		–	0.2 (0.01)

ARX1200N3:

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Impeller	Material	Stainless steel	–
	Number of blades	3	–
	O.D.	146.7 (5.78)	–
Impeller housing I.D.		147 (5.8)	–
Impeller clearance		0.3 – 0.5 (0.01 – 0.02)	0.9 (0.04)
Drive shaft runout		–	0.2 (0.01)

BATTERY/CHARGING SYSTEM SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12 V – 18 Ah
	Current leakage		2 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.8 A/5 – 10 h
		Quick	9.0 A/1.0 h
Alternator	Capacity		308 W/5,000 rpm
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω

IGNITION SYSTEM SPECIFICATIONS: ’04 model

ITEM		SPECIFICATIONS
Spark plug (Iridium)		IMR9D-9H (NGK)
Spark plug gap		0.80 – 0.90 mm (0.031 – 0.035 in)
Ignition coil signal peak voltage		0.7 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)	ARX1200T3	9° BTDC at idle
	ARX1200N3	12° BTDC at idle

IGNITION SYSTEM SPECIFICATIONS: After ’04

ITEM		SPECIFICATIONS
Spark plug (Iridium)		IMR9D-9H (NGK)
Spark plug gap		0.80 – 0.90 mm (0.031 – 0.035 in)
Ignition coil signal peak voltage		0.7 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)	ARX1200T3/ T3D	9° BTDC at idle
	ARX1200N3	10° BTDC at idle

ELECTRIC STARTER SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.0 – 13.0 (0.47 – 0.51)	6.5 (0.26)

METER/SWITCHES SPECIFICATIONS

ITEM		SPECIFICATIONS
Bulb	Warning indicator	LED
Fuse	Main fuse	30 A
	Sub fuse	7.5 A X 3, 5 A X 2
Tachometer peak voltage		10.5 V minimum

STANDARD TORQUE VALUES

FASTENER TYPE	TORQUE FASTENER TYPE	N·m (kgf·m, lbf·ft)	TORQUE N·m (kgf·m, lbf·ft)
5 mm hex bolt and nut	4.9 (0.5, 3.6)	5 mm screw	3.9 (0.4, 2.9)
6 mm hex bolt and nut	9.8 (1.0, 7)	6 mm screw	8.8 (0.9, 6.5)
8 mm hex bolt and nut	22 (2.2, 16)	6 mm flange bolt	9.8 (1.0, 7)
10 mm hex bolt and nut	34 (3.5, 25)	(8 mm head, small flange)	
12 mm hex bolt and nut	54 (5.5, 40)	6 mm flange bolt	12 (1.2, 9)
		(8 mm head, large flange)	
		6 mm flange bolt	12 (1.2, 9)
		(10 mm head) and nut	
		8 mm flange bolt and nut	26 (2.7, 20)
		10 mm flange bolt and nut	39 (4.0, 29)

- Torque specifications listed below are for main fasteners.
- Other fasteners should be tightened to standard torque values listed above.

ENGINE & BODY TORQUE VALUES: '04 model

NOTE:

1. Apply locking agent to the threads.
2. Apply engine oil to the threads and seating surface.
3. Apply molybdenum oil solution to the threads and seating surface.
4. Apply molybdenum disulfide grease to the threads.
5. Apply multi-purpose grease to the threads.
6. Apply sealant to the threads.
7. Left-hand threads.
8. Self-lock nut.
9. Stake.
10. ALOC bolt: replace with a new one.
11. Apply silicone sealant to the threads.

ENGINE

MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Spark plug	4	10	12 (1.2, 9)	
Engine oil filter cartridge	1	20	26 (2.7, 20)	NOTE 2
Anode (turbocharger: ARX1200T3)	1	8	1.0 (0.1, 0.7)	NOTE 1
Anode cap (turbocharger: ARX1200T3)	1	18	49 (5.0, 36)	
Anode cap (oil tank cover)	1	36	18 (1.8, 13)	NOTE 5

LUBRICATION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Oil pump driven joint bolt	1	6	12 (1.2, 9)	NOTE 1
Oil pump/front crankcase cover (7 mm bolt)	1	7	18 (1.8, 13)	
Front crankcase cover bolt (6 x 45 mm)	5	6	18 (1.8, 13)	
Oil cooler bolt	4	6	12 (1.2, 9)	
Oil tank cover (7 mm bolt)	3	7	18 (1.8, 13)	
Low oil pressure switch	1	PT 1/8	12 (1.2, 9)	NOTE 6
High oil pressure switch	1	12	22 (2.2, 16)	
Oil filter boss (oil tank side)	1	20	18 (1.8, 13)	NOTE 1
Water hose joint bolt (front crankcase cover)	2	6	12 (1.2, 9)	NOTE 1
18 mm sealing bolt (front crankcase cover)	1	18	29 (3.0, 22)	NOTE 1

FUEL SYSTEM (Programmed Fuel Injection)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Engine coolant temperature (ECT) sensor	1	12	18 (1.8, 13)	
Engine oil temperature sensor	1	12	18 (1.8, 13)	
Knock sensor	1	12	31 (3.2, 23)	NOTE 6
Intake air temperature (IAT) sensor (ARX1200T3)	1	12	22 (2.2, 16)	

CYLINDER HEAD/VALVE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder head bolt	10	10	69 (7.0, 51)	NOTE 3
Cam chain tensioner cap nut	1	6	12 (1.2, 9)	
Cam chain tensioner lifter socket bolt	2	6	9.8 (1.0, 7)	
Cam sprocket bolt	4	7	20 (2.0, 14)	NOTE 1
Camshaft holder bolt	20	6	12 (1.2, 9)	NOTE 2
Head cover breather plate bolt	6	6	12 (1.2, 9)	NOTE 1
Cylinder head cover bolt	6	6	9.8 (1.0, 7)	

ALTERNATOR/STARTER CLUTCH

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Alternator stator socket bolt	4	6	12 (1.2, 9)	
Alternator wire clamp socket bolt	1	6	9.8 (1.0, 7)	
Starter clutch torx bolt	6	6	16 (1.6, 12)	NOTE 1
Flywheel bolt	1	12	137 (14.0, 76)	NOTE 2, 7, 10
Balancer driven gear bolt (ARX1200T3 only)	2	8	27 (2.8, 20)	NOTE 1

CRANKSHAFT/BALANCER (ARX1200T3)/PISTON

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Connecting rod bearing cap nut	8	8	41 (4.2, 30)	NOTE 2
Drive coupler bolt	1	10	69 (7.0, 51)	NOTE 2
Drive coupler boss	1	24	29 (3.0, 22)	
Crankcase bolt	14	9	37 (3.8, 27)	NOTE 2
	10	8	25 (2.5, 18)	
Oil pan oil strainer bolt	10	6	13 (1.3, 9)	NOTE 1
Turbocharger oil feed pipe oil filter bolt (lower crankcase: ARX1200T3 only)	1	12	32 (3.3, 24)	
Turbocharger oil feed pipe setting bolt (upper crankcase: ARX1200T3 only)	1	6	14 (1.4, 10)	
Turbocharger oil return pipe joint bolt (oil pan and lower crankcase: ARX1200T3 only)	2	6	14 (1.4, 10)	
Engine oil temperature sensor adaptor	1	12	22 (2.2, 16)	
Intercooler stay bolt (ARX1200T3 only)	2	8	25 (2.6, 19)	
Turbocharger oil feed pipe joint (lower crankcase: ARX1200T3)	1	20	49 (5.0, 36)	NOTE 1
20 mm sealing bolt (lower crankcase: ARX1200N3)	1	20	49 (5.0, 36)	NOTE 1
45 mm sealing cap (upper crankcase)	1	45	18 (1.8, 13)	NOTE 5

EXHAUST SYSTEM/TURBOCHARGER (ARX1200T3)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Oil return pipe oil bolt (rear of turbocharger: ARX1200T3 only)	1	12	27 (2.8, 20)	
Oil feed pipe oil orifice bolt (upper of turbocharger: ARX1200T3 only)	1	10	20 (2.0, 14)	
Water hose joint bolt (turbocharger: ARX1200T3 only)	4	6	12 (1.2, 9)	NOTE 1
Turbocharger stud bolt (ARX1200T3 only)	4	8	–	See page 13-9

ELECTRIC STARTER

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Intercooler stay bolt (ARX1200T3 only)	2	8	25 (2.6, 19)	

BODY

HULL/HOOD/BODY PANELS

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Sponson bolt	8	6	16 (1.6, 12)	NOTE 1
Side cover bolt	9	5	3.9 (0.4, 2.9)	
Front hood bolt	4	6	9.8 (1.0, 7)	
Hood liner bolt	2	6	9.8 (1.0, 7)	
Hood hinge mounting nut	3	6	9.8 (1.0, 7)	NOTE 1
Hood catch nut	2	6	9.8 (1.0, 7)	NOTE 8
Post cover bolt	9	6	9.8 (1.0, 7)	
Hood catch stud nut	1	10	39 (4.0, 29)	NOTE 8
Side panel socket bolt	10	6	6.9 (0.7, 5.1)	
Passenger grab rail socket bolt	8	6	6.9 (0.7, 5.1)	
Coupler cover bolt	1	6	9.8 (1.0, 7)	
Seat catch stud nut (front and rear)	2	10	39 (4.0, 29)	NOTE 8
Seat catch bolt (front and rear)	4	6	5.9 (0.6, 4.3)	
Rearview mirror nut	4	8	9.8 (1.0, 7)	NOTE 1
Bow eye nut	2	3/8-16UNC	22 (2.2, 16)	NOTE 1
Tow hook nut	2	3/8-16UNC	22 (2.2, 16)	NOTE 1
Pilot water nozzle	1	12	2.0 (0.2, 1.4)	NOTE 11

FUEL SYSTEM (Programmed Fuel Injection)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Fuel pump lock nut	1	–	93 (9.5, 69)	
Fuel tank breather port	1	12	2.0 (0.2, 1.4)	
Fuel feed/return hose clip bolt (oil tank)	1	6	6.9 (0.7, 5.1)	NOTE 1
Throttle cable setting nut	1	8	8.8 (0.9, 6.5)	
Wastegate solenoid valve bolt (ARX1200T3 only)	1	5	3.9 (0.4, 2.9)	
Airbox mounting bolt	1	6	7.8 (0.8, 5.8)	
Crankcase breather hose joint bolt (ARX1200T3 only)	1	6	7.8 (0.8, 5.8)	
Airbox connecting tube band screw (duct side: ARX1200T3 only)	1	–	6.9 (0.7, 5.1)	
Air funnel screw (ARX1200N3 only)	7	5	3.9 (0.4, 2.9)	
Airbox cover screw (ARX1200N3 only)	9	5	3.9 (0.4, 2.9)	
MAP sensor screw (ARX1200N3)	1	4	2.9 (0.3, 2.2)	

ENGINE MOUNTING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Engine mounting bolt (with rubber mount)	8	8	22 (2.2, 16)	
Engine mounting bolt	4	12	50 (5.1, 37)	NOTE 2

EXHAUST SYSTEM/TURBOCHARGER (ARX1200T3)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Exhaust water chamber bolt	4	6	16 (1.6, 12)	NOTE 1

PROPULSION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Grease nipple joint	1	10	9.8 (1.0, 7)	
Grease nipple	1	6	3.9 (0.4, 2.9)	
Bearing housing mounting nut	3	8	22 (2.2, 16)	
Driven coupler bolt	1	10	49 (5.0, 36)	NOTE 2
Thrust plate bolt	4	10	39 (4.0, 29)	NOTE 1
Cooling water cap	1	42	44 (4.5, 33)	NOTE 1, 9
Impeller	1	16	127 (13.0, 94)	NOTE 4
Stator cap socket bolt	3	5	3.9 (0.4, 2.9)	NOTE 1
Jet pump mounting bolt	4	8	22 (2.2, 16)	NOTE 1
Water jet nozzle bolt	4	8	22 (2.2, 16)	NOTE 1
Intake grate bolt	4	8	25 (2.6, 19)	NOTE 1
Ride plate bolt	4	8	25 (2.6, 19)	NOTE 1

STEERING/REVERSE SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Handlebar holder bolt	4	8	22 (22, 16)	
Left handlebar switch housing screw	2	5	2.0 (0.2, 1.4)	
Throttle lever pivot bolt	1	5	3.9 (0.4, 2.9)	NOTE 1
Throttle lever holder screw	2	6	2.9 (0.3, 2.2)	
Steering shaft holder nut	4	8	26 (2.7, 20)	NOTE 8
Steering limit switch bracket bolt	2	6	4.9 (0.5, 3.6)	NOTE 1
Steering shaft retainer nut	3	6	6.9 (0.7, 5.1)	NOTE 1
Steering shaft cable arm nut	2	6	6.9 (0.7, 5.1)	NOTE 1, 8
Steering cable holder bolt	2	6	9.8 (1.0, 7)	NOTE 1
Steering cable setting nut (thrust plate)	1	24	13 (1.3, 9)	
Steering nozzle pivot bolt	2	8	22 (2.2, 16)	NOTE 1
Steering cable joint bolt (cable arm and steering nozzle)	2	6	9.8 (1.0, 7)	
Steering cable joint nut (cable arm and steering nozzle)	2	6	9.8 (1.0, 7)	NOTE 8
Steering cable joint lock nut (cable ends)	2	5	3.9 (0.4, 2.9)	
Reverse lever pivot nut	1	6	9.8 (1.0, 7)	NOTE 1
Reverse lever guide bolt	1	6	9.8 (1.0, 7)	NOTE 1
Reverse lever plate nut	5	6	9.8 (1.0, 7)	NOTE 1
Reverse cable setting cap screw (deck)	2	5	3.9 (0.4, 2.9)	
Reverse cable setting nut (thrust plate)	1	24	13 (1.3, 9)	
Reverse cable joint lock nut (cable ends)	2	5	3.9 (0.4, 2.9)	
Reverse bucket arm pivot bolt	1	8	22 (2.2, 16)	NOTE 1
Reverse bucket catch bolt (bucket arm)	1	6	9.8 (1.0, 7)	NOTE 1
Reverse cable joint stud (bucket arm)	1	6	9.8 (1.0, 7)	NOTE 1
Reverse bucket pivot bolt	2	8	22 (2.2, 16)	NOTE 1
Reverse bucket guide nut	1	6	9.8 (1.0, 7)	NOTE 8

ELECTRIC STARTER

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Starter relay switch box cover	6	5	1.0 (0.1, 0.7)	

METER/SWITCHES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Off-throttle steering limit switch nut	1	20	2.9 (0.3, 2.2)	
Speed sensor wire setting nut	1	3/8-18 NPT	4.9 (0.5, 3.6)	

OTHERS

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Starter relay switch box mounting screw	2	4	1.0 (0.1, 0.7)	
Engine control module (ECM) stay bolts	4	6	9.8 (1.0, 7)	NOTE 1

ENGINE & BODY TORQUE VALUES: After '04

NOTE:
1. Apply locking agent to the threads.
2. Apply engine oil to the threads and seating surface.
3. Apply molybdenum oil solution to the threads and seating surface.
4. Apply molybdenum disulfide grease to the threads.
5. Apply multi-purpose grease to the threads.
6. Apply sealant to the threads.
7. Left-hand threads.
8. Self-lock nut.
9. Stake.
10. ALOC bolt: replace with a new one.
11. Apply silicone sealant to the threads.
12. Apply water resistant molybdenum disulfide grease to the threads.

ENGINE

MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Spark plug	4	10	12 (1.2, 9)	
Engine oil filter cartridge	1	20	26 (2.7, 20)	NOTE 2
Anode (turbocharger: ARX1200T3/T3D)	1	8	1.0 (0.1, 0.7)	NOTE 1
Anode cap (turbocharger: ARX1200T3/T3D)	1	18	49 (5.0, 36)	
Anode cap (oil tank cover)	1	36	18 (1.8, 13)	NOTE 5

LUBRICATION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Oil pump driven joint bolt	1	6	12 (1.2, 9)	NOTE 1
Oil pump/front crankcase cover (7 mm bolt)	1	7	18 (1.8, 13)	
Front crankcase cover bolt (6 x 45 mm)	5	6	18 (1.8, 13)	
Oil cooler bolt	4	6	12 (1.2, 9)	
Oil tank cover (7 mm bolt)	3	7	18 (1.8, 13)	
Low oil pressure switch	1	PT 1/8	12 (1.2, 9)	NOTE 6
High oil pressure switch	1	12	22 (2.2, 16)	
Oil filter boss (oil tank side)	1	20	18 (1.8, 13)	NOTE 1
Water hose joint bolt (front crankcase cover)	2	6	12 (1.2, 9)	NOTE 1
18 mm sealing bolt (front crankcase cover)	1	18	29 (3.0, 22)	NOTE 1

FUEL SYSTEM (Programmed Fuel Injection)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Engine coolant temperature (ECT) sensor	1	12	18 (1.8, 13)	
Engine oil temperature sensor	1	12	18 (1.8, 13)	
Knock sensor	1	12	31 (3.2, 23)	NOTE 6
Intake air temperature (IAT) sensor (ARX1200T3/T3D)	1	12	22 (2.2, 16)	

CYLINDER HEAD/VALVE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder head bolt	10	10	69 (7.0, 51)	NOTE 3
Cam chain tensioner cap nut	1	6	12 (1.2, 9)	
Cam chain tensioner lifter socket bolt	2	6	9.8 (1.0, 7)	
Cam sprocket bolt	4	7	20 (2.0, 14)	NOTE 1
Camshaft holder bolt	20	6	12 (1.2, 9)	NOTE 2
Head cover breather plate bolt	6	6	12 (1.2, 9)	NOTE 1
Cylinder head cover bolt	6	6	9.8 (1.0, 7)	

ALTERNATOR/STARTER CLUTCH

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Alternator stator socket bolt	4	6	12 (1.2, 9)	
Alternator wire clamp socket bolt	1	6	9.8 (1.0, 7)	
Starter clutch torx bolt	6	6	16 (1.6, 12)	NOTE 1
Flywheel bolt	1	12	137 (14.0, 76)	NOTE 2, 7, 10
Balancer driven gear bolt (ARX1200T3/T3D only)	2	8	27 (2.8, 20)	NOTE 1

CRANKSHAFT/BALANCER (ARX1200T3/T3D)/PISTON

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Connecting rod bearing cap nut	8	8	41 (4.2, 30)	NOTE 2
Drive coupler bolt	1	10	69 (7.0, 51)	NOTE 2
Drive coupler boss	1	24	29 (3.0, 22)	
Crankcase bolt	14	9	37 (3.8, 27)	NOTE 2
	10	8	25 (2.5, 18)	
Oil pan oil strainer bolt	10	6	13 (1.3, 9)	NOTE 1
Turbocharger oil feed pipe oil filter bolt (lower crankcase: ARX1200T3/T3D only)	1	12	32 (3.3, 24)	
Turbocharger oil feed pipe setting bolt (upper crankcase: ARX1200T3/T3D only)	1	6	14 (1.4, 10)	
Turbocharger oil return pipe joint bolt (oil pan and lower crankcase: ARX1200T3/T3D only)	2	6	14 (1.4, 10)	
Engine oil temperature sensor adaptor	1	12	22 (2.2, 16)	
Intercooler stay bolt (ARX1200T3/T3D only)	2	8	25 (2.6, 19)	
Turbocharger oil feed pipe joint (lower crankcase: ARX1200T3/T3D)	1	20	49 (5.0, 36)	NOTE 1
20 mm sealing bolt (lower crankcase: ARX1200N3)	1	20	49 (5.0, 36)	NOTE 1
45 mm sealing cap (upper crankcase)	1	45	18 (1.8, 13)	NOTE 5

EXHAUST SYSTEM/TURBOCHARGER (ARX1200T3/3D)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Oil return pipe oil bolt (rear of turbocharger: ARX1200T3/T3D only)	1	12	27 (2.8, 20)	
Oil feed pipe oil orifice bolt (upper of turbocharger: ARX1200T3/T3D only)	1	10	20 (2.0, 14)	
Water hose joint bolt (turbocharger: ARX1200T3/T3D only)	4	6	12 (1.2, 9)	NOTE 1
Turbocharger stud bolt (ARX1200T3/T3D only)	4	8	–	See page 13-9

ELECTRIC STARTER

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Intercooler stay bolt (ARX1200T3/T3D only)	2	8	25 (2.6, 19)	

BODY

HULL/HOOD/BODY PANELS

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Sponson bolt	8	6	16 (1.6, 12)	NOTE 1
Side cover bolt	9	5	3.9 (0.4, 2.9)	
Front hood bolt	4	6	9.8 (1.0, 7)	
Hood liner bolt	2	6	9.8 (1.0, 7)	
Hood hinge mounting nut	3	6	9.8 (1.0, 7)	NOTE 1
Hood catch nut	2	6	9.8 (1.0, 7)	NOTE 8
Post cover bolt	9	6	9.8 (1.0, 7)	
Hood catch stud nut	1	10	39 (4.0, 29)	NOTE 8
Side panel socket bolt	10	6	6.9 (0.7, 5.1)	
Passenger grab rail socket bolt	8	6	6.9 (0.7, 5.1)	
Coupler cover bolt	1	6	9.8 (1.0, 7)	
Seat catch stud nut (front and rear)	2	10	39 (4.0, 29)	NOTE 8
Seat catch bolt (front and rear)	4	6	5.9 (0.6, 4.3)	
Rearview mirror nut	4	8	9.8 (1.0, 7)	NOTE 1
Bow eye nut	2	3/8-16UNC	22 (2.2, 16)	NOTE 1
Tow hook nut	2	3/8-16UNC	22 (2.2, 16)	NOTE 1
Stern eyelet nut	4	8	12 (1.2, 9)	NOTE 1
Pilot water nozzle	1	12	2.0 (0.2, 1.4)	NOTE 11
Boarding step pipe nut (ARX1200T3D only)	2	1/4-20UNC	9 (0.9, 6.6)	NOTE 1
Boarding step bracket bolt (ARX1200T3D only)	4	8	25 (2.6, 19)	NOTE 10

FUEL SYSTEM (Programmed Fuel Injection)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Fuel pump lock nut	1	–	93 (9.5, 69)	
Fuel tank breather port	1	12	2.0 (0.2, 1.4)	
Fuel feed/return hose clip bolt (oil tank)	1	6	6.9 (0.7, 5.1)	NOTE 1
Throttle cable setting nut	1	8	8.8 (0.9, 6.5)	
Wastegate solenoid valve bolt (ARX1200T3/T3D only)	1	5	3.9 (0.4, 2.9)	
Airbox mounting bolt	1	6	7.8 (0.8, 5.8)	
Crankcase breather hose joint bolt (ARX1200T3/ T3D only)	1	6	7.8 (0.8, 5.8)	
Airbox connecting tube band screw (duct side: ARX1200T3/T3D only)	1	–	6.9 (0.7, 5.1)	
Air funnel screw (ARX1200N3 only)	7	5	3.9 (0.4, 2.9)	
Airbox cover screw (ARX1200N3 only)	9	5	3.9 (0.4, 2.9)	
MAP sensor screw (ARX1200N3)	1	4	2.9 (0.3, 2.2)	

ENGINE MOUNTING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Engine mounting bolt (with rubber mount)	8	8	22 (2.2, 16)	
Engine mounting bolt	4	12	50 (5.1, 37)	NOTE 2

EXHAUST SYSTEM/TURBOCHARGER (ARX1200T3/T3D)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Exhaust water chamber bolt	4	6	16 (1.6, 12)	NOTE 1

PROPULSION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Grease nipple joint	1	10	9.8 (1.0, 7)	
Grease nipple	1	6	3.9 (0.4, 2.9)	
Bearing housing mounting nut	3	8	22 (2.2, 16)	
Driven coupler bolt	1	10	49 (5.0, 36)	NOTE 2
Thrust plate bolt	4	10	39 (4.0, 29)	NOTE 1
Cooling water cap	1	42	44 (4.5, 33)	NOTE 1, 9
Impeller	1	16	127 (13.0, 94)	NOTE 12
Impeller housing bolt (ARX1200N3 only)	2	5	3.9 (0.4, 2.9)	NOTE 1
Stator cap socket bolt (ARX1200T3/T3D)	3	5	3.9 (0.4, 2.9)	NOTE 1
Stator cap socket bolt (ARX1200N3)	4	5	3.9 (0.4, 2.9)	NOTE 1
Jet pump mounting bolt	4	8	22 (2.2, 16)	NOTE 1
Water jet nozzle bolt	4	8	22 (2.2, 16)	NOTE 1
Intake grate bolt	4	8	25 (2.6, 19)	NOTE 1
Ride plate bolt	4	8	25 (2.6, 19)	NOTE 1

STEERING/REVERSE SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Handlebar holder bolt	4	8	22 (22, 16)	
Left handlebar switch housing screw	2	5	2.0 (0.2, 1.4)	
Throttle lever pivot bolt	1	5	3.9 (0.4, 2.9)	NOTE 1
Throttle lever holder screw	2	6	2.9 (0.3, 2.2)	
Steering shaft holder nut	4	8	26 (2.7, 20)	NOTE 8
Steering limit switch bracket bolt	2	6	4.9 (0.5, 3.6)	NOTE 1
Steering shaft retainer nut	3	6	6.9 (0.7, 5.1)	NOTE 1
Steering shaft cable arm nut	2	6	6.9 (0.7, 5.1)	NOTE 1, 8
Steering cable holder bolt	2	6	9.8 (1.0, 7)	NOTE 1
Steering cable setting nut (thrust plate)	1	24	13 (1.3, 9)	
Steering nozzle pivot bolt	2	8	22 (2.2, 16)	NOTE 1
Steering cable joint bolt (cable arm and steering nozzle)	2	6	9.8 (1.0, 7)	
Steering cable joint nut (cable arm and steering nozzle)	2	6	9.8 (1.0, 7)	NOTE 8
Steering cable joint lock nut (cable ends)	2	5	3.9 (0.4, 2.9)	
Reverse lever pivot nut	1	6	9.8 (1.0, 7)	NOTE 1
Reverse lever guide bolt	1	6	9.8 (1.0, 7)	NOTE 1
Reverse lever plate nut	5	6	9.8 (1.0, 7)	NOTE 1
Reverse cable setting cap screw (deck)	2	5	3.9 (0.4, 2.9)	
Reverse cable setting nut (thrust plate)	1	24	13 (1.3, 9)	
Reverse cable joint lock nut (cable ends)	2	5	3.9 (0.4, 2.9)	
Reverse bucket arm pivot bolt	1	8	22 (2.2, 16)	NOTE 1
Reverse bucket catch bolt (bucket arm)	1	6	9.8 (1.0, 7)	NOTE 1
Reverse cable joint stud (bucket arm)	1	6	9.8 (1.0, 7)	NOTE 1
Reverse bucket pivot bolt	2	8	22 (2.2, 16)	NOTE 1
Reverse bucket guide nut	1	6	9.8 (1.0, 7)	NOTE 8

ELECTRIC STARTER

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Starter relay switch box cover	6	5	1.0 (0.1, 0.7)	

METER/SWITCHES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Off-throttle steering limit switch nut	1	20	2.9 (0.3, 2.2)	
Speed sensor wire setting nut	1	3/8-18 NPT	4.9 (0.5, 3.6)	

OTHERS

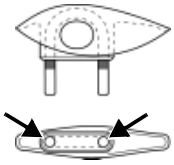
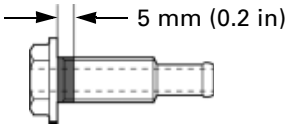
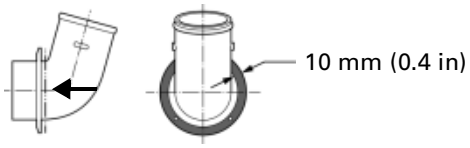
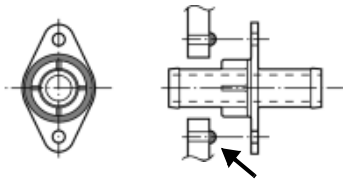
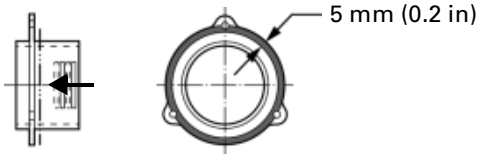
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Starter relay switch box mounting screw	2	4	1.0 (0.1, 0.7)	
Engine control module (ECM) stay bolts	4	6	9.8 (1.0, 7)	NOTE 1

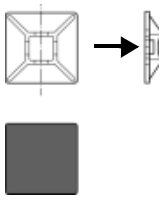
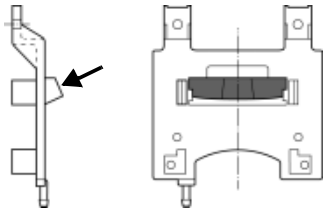
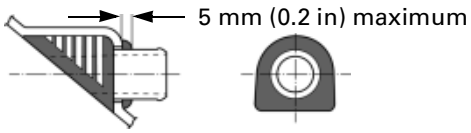
LUBRICATION & SEAL POINTS: '04 model

ENGINE

LOCATION	MATERIAL	REMARKS
Crankcase mating surface Oil pan mating surface Low oil pressure switch threads Knock sensor threads	Sealant	See page 12-24 See page 6-6
Crankcase mating surface (front crankcase cover side) Cylinder head semi-circular area edges Front crankcase cover wire grommet seating areas	Silicone sealant	See page 6-14 See page 10-28 See page 6-14
Valve stem sliding surface Valve lifter outer surface Cylinder head bolt threads and seating surface Camshaft cam lobes, journals and thrust surfaces Starter reduction gear shaft outer surface Piston pin outer surface Crankshaft main journal bearing sliding surface Balancer journal bearing sliding surface (ARX1200T3 only) Crankpin bearing sliding surface	Molybdenum disulfide oil (a mixture of engine oil and molybdenum disulfide grease in a ratio of 1:1)	
Oil filter cartridge threads Drive coupler bolt threads and seating surface Piston and piston ring sliding surface Connecting rod bearing cap nut threads and seating surface Camshaft holder bolt threads and seating surface Starter sprag clutch contacting surfaces Flywheel bolt threads and seating surface Crankcase 9 mm bolt threads and seating surface Each gear tooth and rotating surface Each bearing rotating area Each O-ring Other rotating and sliding areas	Engine oil	
Anode cap threads (oil tank) 45 mm sealing cap threads (upper crankcase) Each oil seal lip	Multi-purpose grease	
18 mm sealing bolt threads (front crankcase cover) 20 mm sealing bolt (lower crankcase: ARX1200N3) Turbocharger oil feed pipe joint threads (lower crankcase: ARX1200T3) Manifold surface temperature (MST) switch retainer bolt threads Engine oil temperature sensor adaptor threads Oil pump driven joint bolt threads Balancer driven gear bolt threads (ARX1200T3 only) Oil pan oil strainer bolt threads Cylinder head cover breather plate bolt threads Anode threads (turbocharger: ARX1200T3 only) Anode tightening screw threads Water hose joint bolt threads (front crankcase cover and turbocharger) Cam sprocket bolt threads Starter clutch socket bolt threads Oil filter boss threads (oil tank side)	Locking agent	Coat 6.5 mm from tip Coat 6.5 mm from tip Coat 6.5 mm from tip Coat 6.5 mm from tip Coat 6.5 mm from tip Coat 6.5 mm from tip Coat 6.5 mm from tip Coat 6.5 mm from tip Coat 6.5 mm from tip Coat 6.5 mm from tip Coat 6.5 mm from tip
Manifold surface temperature (MST) switch outer surface	SHIN-ETSU KS613 grease	1.4 cm^3 (page 8-114)

BODY

LOCATION	MATERIAL	REMARKS
Bow eye stud bolt seating areas 	Silicone sealant	
Pilot water nozzle threads and seating surface 		Apply 2 g (0.1 oz)
Exhaust outlet seating surface 		Apply 18 g (0.6 oz)
Water outlet joint seating surface and screw holes 		Apply 4 g (0.1 oz)
Air vent adaptor seating surface (deck) 		Apply 9 g (0.3 oz)
Front hood hinge mounting area		See page 3-10
Drain plug base screw holes		See page 3-12
Intake grate rear side fitting area		See page 14-31
Ride plate front end fitting area		See page 14-31
Thrust plate seating surface		See page 14-34
Steering shaft holder seating surface		See page 15-8

LOCATION	MATERIAL	REMARKS
Cable retaining base seating surface 	Equal mixture of two component urethane based adhesives (LOAD 7542 or equivalent)	Apply 0.5 g (0.02 oz)
Starter relay switch box base bottom 		Apply 5 g (0.2 oz)
Drive shaft guide seating surface 		Does not overflow to end surface.
Intake lip fitting area		See page 14-33
Thrust plate bolt washer seating surface		See page 14-33
Fuel tank mounting rubber and stopper rubber seating surface		See page 8-84
Sponson bolt threads Hood hinge mounting nut threads Rearview mirror nut threads Bow eye nut threads Tow hook nut threads Fuel feed/return hose clip bolt threads (oil tank) Throttle lever pivot bolt threads Steering cable holder bolt threads Steering nozzle pivot bolt threads Reverse lever pivot nut threads Reverse lever guide bolt threads Reverse lever plate nut threads Reverse bucket arm pivot bolt Reverse bucket catch bolt threads (bucket arm) Reverse cable joint stud threads (bucket arm) Reverse bucket pivot bolt threads Reverse bucket guide bolt threads Exhaust water chamber bolt threads Thrust plate bolt threads Cooling water cap threads Stator cap socket bolt threads Jet pump mounting bolt threads Water jet nozzle bolt threads Intake grate bolt threads Ride plate bolt threads	Locking agent	
Driven coupler bolt threads and seating surface	Engine oil	
Impeller shaft collar O-ring (A) Impeller shaft threads Impeller splines Impeller seal lips Driven coupler splines	Molybdenum disulfide grease	Fill up 2 g (0.1 oz)

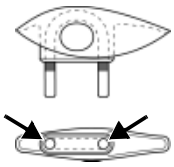
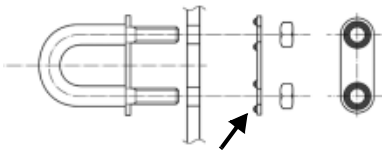
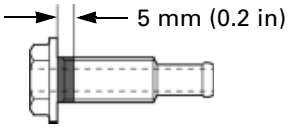
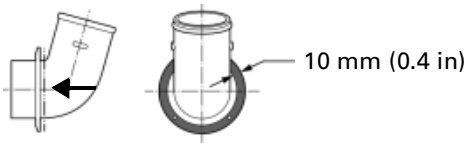
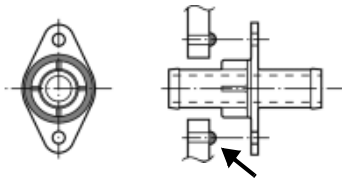
LOCATION	MATERIAL	REMARKS
Impeller shaft bearing rotating area Impeller shaft water seal lips Water jet stator inside (between bearings) Impeller shaft O-ring (B) Stator cap O-ring Stator cap inside	Water resistant grease #0	 Fill up 60 g (2.1 oz) Fill up 60 g (2.1 oz)
Drive shaft bearing housing oil seal lips Drive shaft bearing rotating area Drive shaft bearing housing (between bearings) Drive shaft bearing housing grease nipple	Water resistant grease #2	 See page 4-20
Front hood hinge pivot Off-throttle steering limit switch lever sliding area and pivot Throttle cable (throttle drum rolling area) Steering shaft sliding surfaces Steering shaft retainer sliding area Steering cable joint pivot (each end) Steering nozzle pivots Reverse lever pivot and guide groove Reverse cable joint pivot (each end) Reverse bucket arm pivot and bushings Reverse bucket pivots	Water resistant molybde-num disulfide grease	 Apply 0.5 g (0.02 oz) See page 15-14
Steering cable Reverse cable Throttle cable (throttle lever side)	Silicone grease	

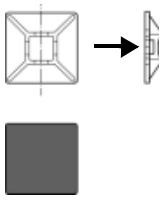
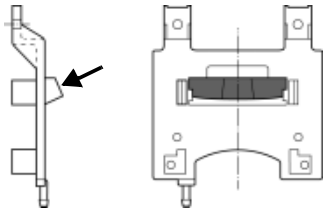
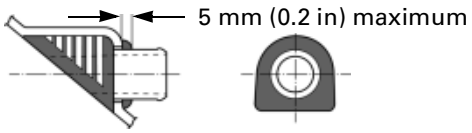
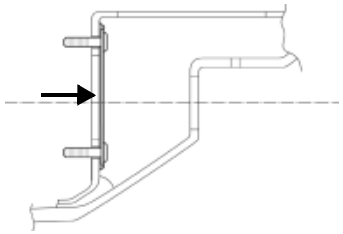
LUBRICATION & SEAL POINTS: After '04

ENGINE

LOCATION	MATERIAL	REMARKS
Crankcase mating surface Oil pan mating surface Low oil pressure switch threads Knock sensor threads	Sealant	See page 12-24 See page 6-6
Crankcase mating surface (front crankcase cover side) Cylinder head semi-circular area edges Front crankcase cover wire grommet seating areas	Silicone sealant	See page 6-14 See page 10-28 See page 6-14
Valve stem sliding surface Valve lifter outer surface Cylinder head bolt threads and seating surface Camshaft cam lobes, journals and thrust surfaces Starter reduction gear shaft outer surface Piston pin outer surface Crankshaft main journal bearing sliding surface Balancer journal bearing sliding surface (ARX1200T3/T3D only) Crankpin bearing sliding surface	Molybdenum disulfide oil (a mixture of engine oil and molybdenum disulfide grease in a ratio of 1:1)	
Oil filter cartridge threads Drive coupler bolt threads and seating surface Piston and piston ring sliding surface Connecting rod bearing cap nut threads and seating surface Camshaft holder bolt threads and seating surface Starter sprag clutch contacting surfaces Flywheel bolt threads and seating surface Crankcase 9 mm bolt threads and seating surface Each gear tooth and rotating surface Each bearing rotating area Each O-ring Other rotating and sliding areas	Engine oil	
Anode cap threads (oil tank) 45 mm sealing cap threads (upper crankcase) Each oil seal lip	Multi-purpose grease	
18 mm sealing bolt threads (front crankcase cover) 20 mm sealing bolt (lower crankcase: ARX1200N3) Turbocharger oil feed pipe joint threads (lower crankcase: ARX1200T3/T3D) Manifold surface temperature (MST) switch retainer bolt threads Engine oil temperature sensor adaptor threads Oil pump driven joint bolt threads Balancer driven gear bolt threads (ARX1200T3/T3D only) Oil pan oil strainer bolt threads Cylinder head cover breather plate bolt threads Anode threads (turbocharger: ARX1200T3/T3D only) Anode tightening screw threads Water hose joint bolt threads (front crankcase cover and turbocharger) Cam sprocket bolt threads Starter clutch socket bolt threads Oil filter boss threads (oil tank side)	Locking agent	Coat 6.5 mm from tip Coat 6.5 mm from tip Coat 6.5 mm from tip Coat 6.5 mm from tip Coat 6.5 mm from tip Coat 6.5 mm from tip Coat 6.5 mm from tip Coat 6.5 mm from tip Coat 6.5 mm from tip Coat 6.5 mm from tip
Manifold surface temperature (MST) switch outer surface	SHIN-ETSU KS613 grease	1.4 cm^3 (page 8-114)

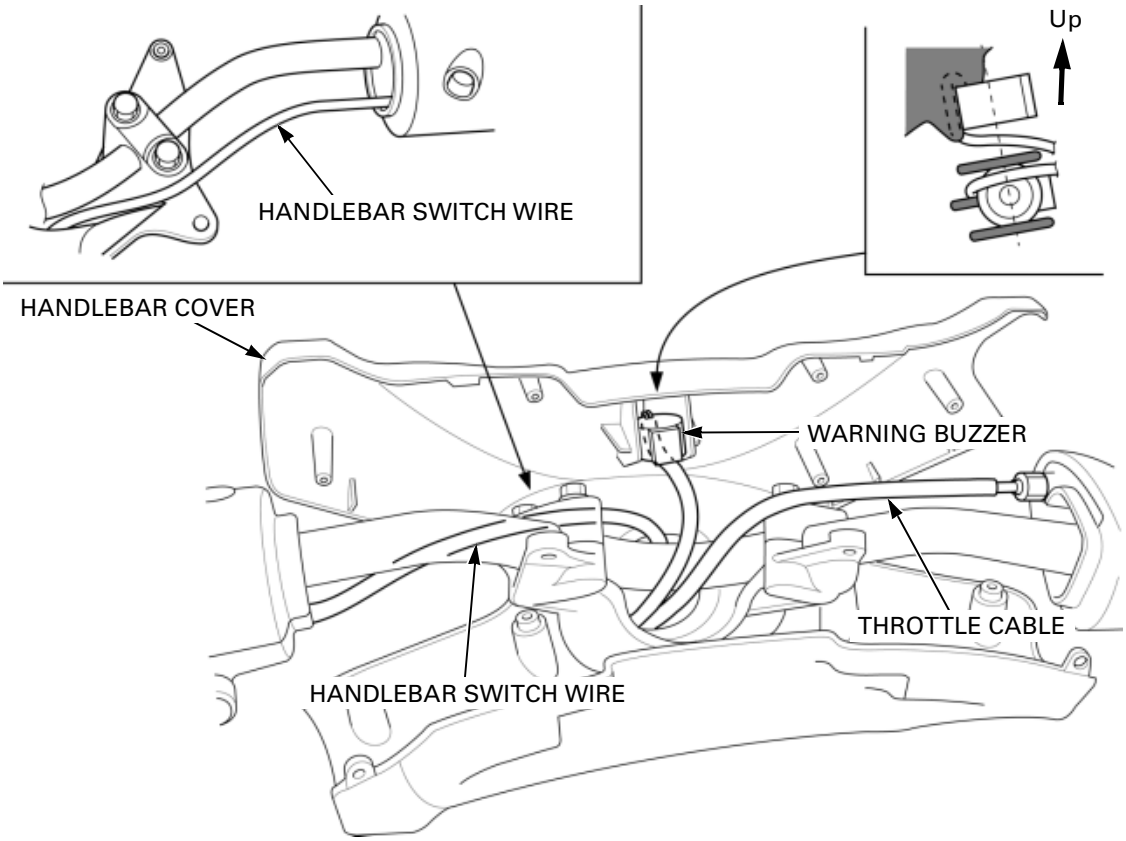
BODY

LOCATION	MATERIAL	REMARKS
Bow eye stud bolt seating areas 	Silicone sealant	
Stern eyelet plate seating surfaces (stud holes) 		Apply 2 g (0.1 oz)
Pilot water nozzle threads and seating surface 		Apply 2 g (0.1 oz)
Exhaust outlet seating surface 		Apply 18 g (0.6 oz)
Water outlet joint seating surface and screw holes 		Apply 4 g (0.1 oz)
Front hood hinge mounting area		See page 3-10
Drain plug base screw holes		See page 3-12
Intake grate rear side fitting area		See page 14-31
Ride plate front end fitting area		See page 14-31
Thrust plate seating surface		See page 14-34
Steering shaft holder seating surface		See page 15-8

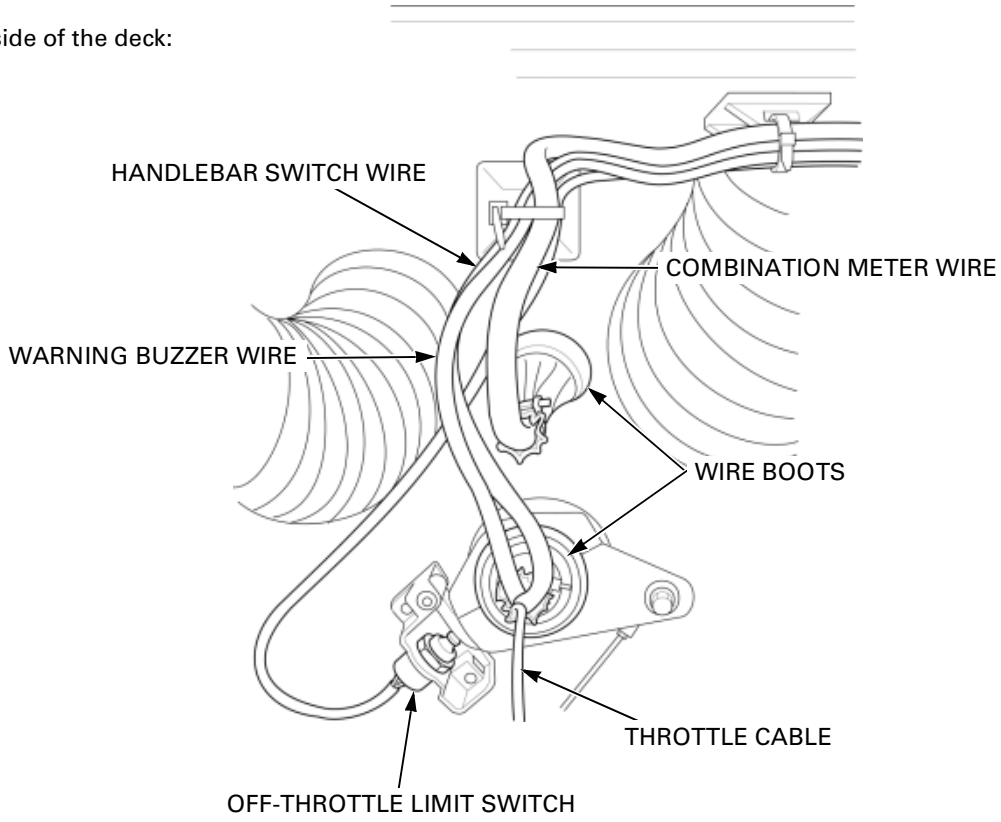
LOCATION	MATERIAL	REMARKS
Cable retaining base seating surface 	Equal mixture of two component urethane based adhesives (LOAD 7542 or equivalent)	Apply 0.5 g (0.02 oz)
Starter relay switch box base bottom 		Apply 5 g (0.2 oz)
Drive shaft guide seating surface 		Does not overflow to end surface.
Drive shaft bearing housing holder seating surface 		Apply 2 – 3 g (0.07 – 0.11 oz) Does not stuck out from stud bolt areas. Wipe off any overflow adhesive from inside diameter area of holder plate.
Intake lip fitting area		See page 14-33
Thrust plate bolt washer seating surface		See page 14-33
Fuel tank mounting rubber and stopper rubber seating surface		See page 8-84
Sponson bolt threads Hood hinge mounting nut threads Rearview mirror nut threads Bow eye nut threads Tow hook nut threads Stern eyelet nut threads Boarding step pipe nut threads (ARX1200T3D only) Boarding step bracket bolt threads (ARX1200T3D only) Fuel feed/return hose clip bolt threads (oil tank) Throttle lever pivot bolt threads Steering cable holder bolt threads Steering nozzle pivot bolt threads Reverse lever pivot nut threads Reverse lever guide bolt threads Reverse lever plate nut threads Reverse bucket arm pivot bolt Reverse bucket catch bolt threads (bucket arm) Reverse cable joint stud threads (bucket arm) Reverse bucket pivot bolt threads Reverse bucket guide bolt threads Exhaust water chamber bolt threads	Locking agent	

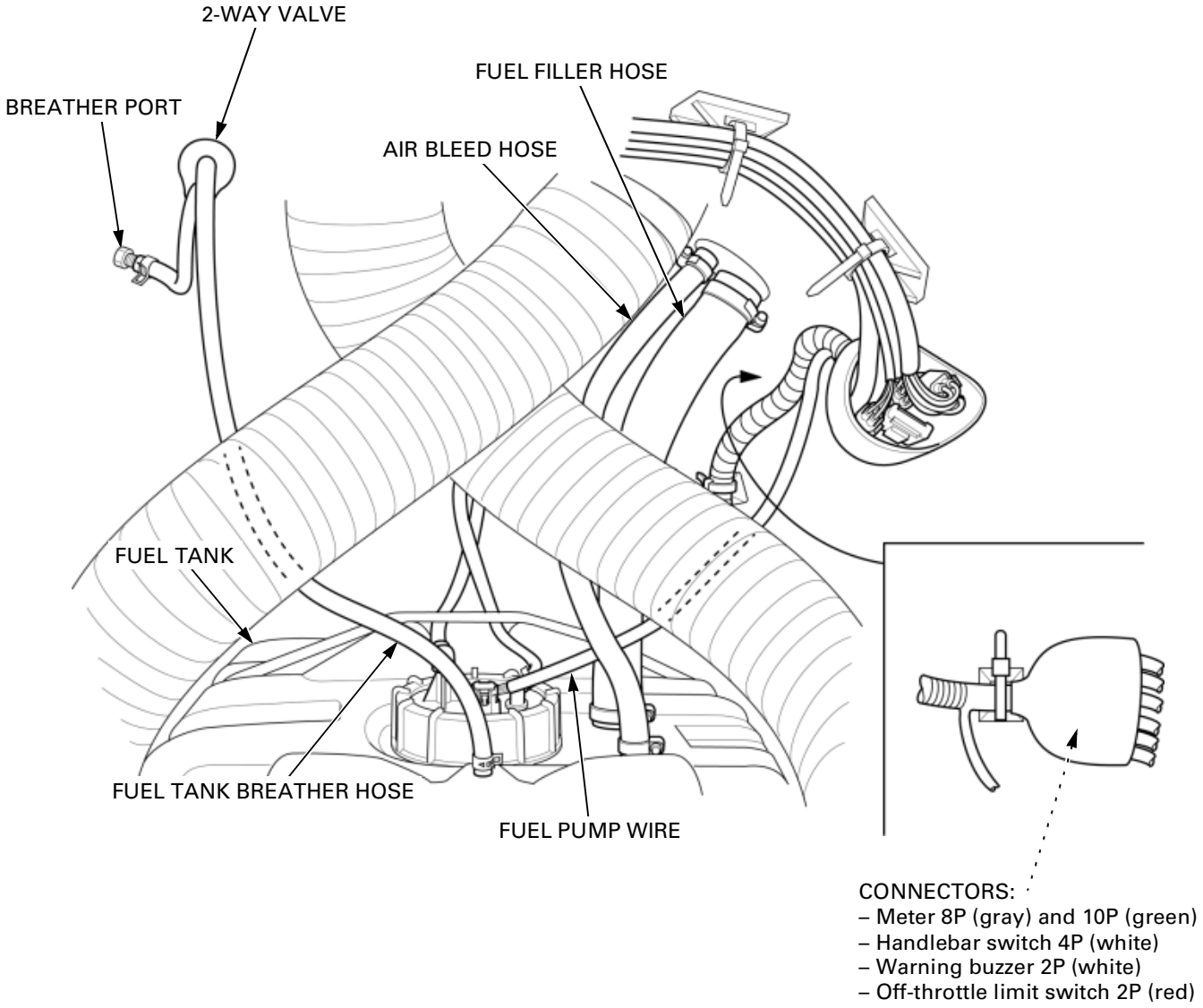
LOCATION	MATERIAL	REMARKS
Thrust plate bolt threads Cooling water cap threads Impeller housing bolt threads (ARX1200N3 only) Stator cap socket bolt threads Jet pump mounting bolt threads Water jet nozzle bolt threads Intake grate bolt threads Ride plate bolt threads	Locking agent	
Driven coupler bolt threads and seating surface Impeller shaft O-ring (B)	Engine oil	
Impeller shaft bearing rotating area Impeller shaft water seal lips Water jet stator inside (between bearings) Stator cap O-ring Stator cap inside	Water resistant grease #0	ARX1200T3/T3D only ARX1200T3/T3D only: Fill up 60 g (2.1 oz) ARX1200T3/T3D: 60 g (2.1 oz) ARX1200N3: 40 g (1.4 oz)
Drive shaft bearing housing oil seal lips Drive shaft bearing rotating area Drive shaft bearing housing (between bearings) Drive shaft bearing housing grease nipple	Water resistant grease #2	 See page 4-20
Front hood hinge pivot Off-throttle steering limit switch lever sliding area and pivot Throttle cable (throttle drum rolling area) Driven coupler splines Impeller shaft collar O-ring (A) Impeller shaft threads Impeller splines Impeller seal lips Steering shaft sliding surfaces Steering shaft retainer sliding area Steering cable joint pivot (each end) Steering nozzle pivots Reverse lever pivot and guide groove Reverse cable joint pivot (each end) Reverse bucket arm pivot and bushings Reverse bucket pivots	Water resistant molybdenum disulfide grease	 Apply 0.5 g (0.02 oz) Fill up 2 g (0.1 oz) See page 15-14
Steering cable Reverse cable Throttle cable (throttle lever side)	Silicone grease	

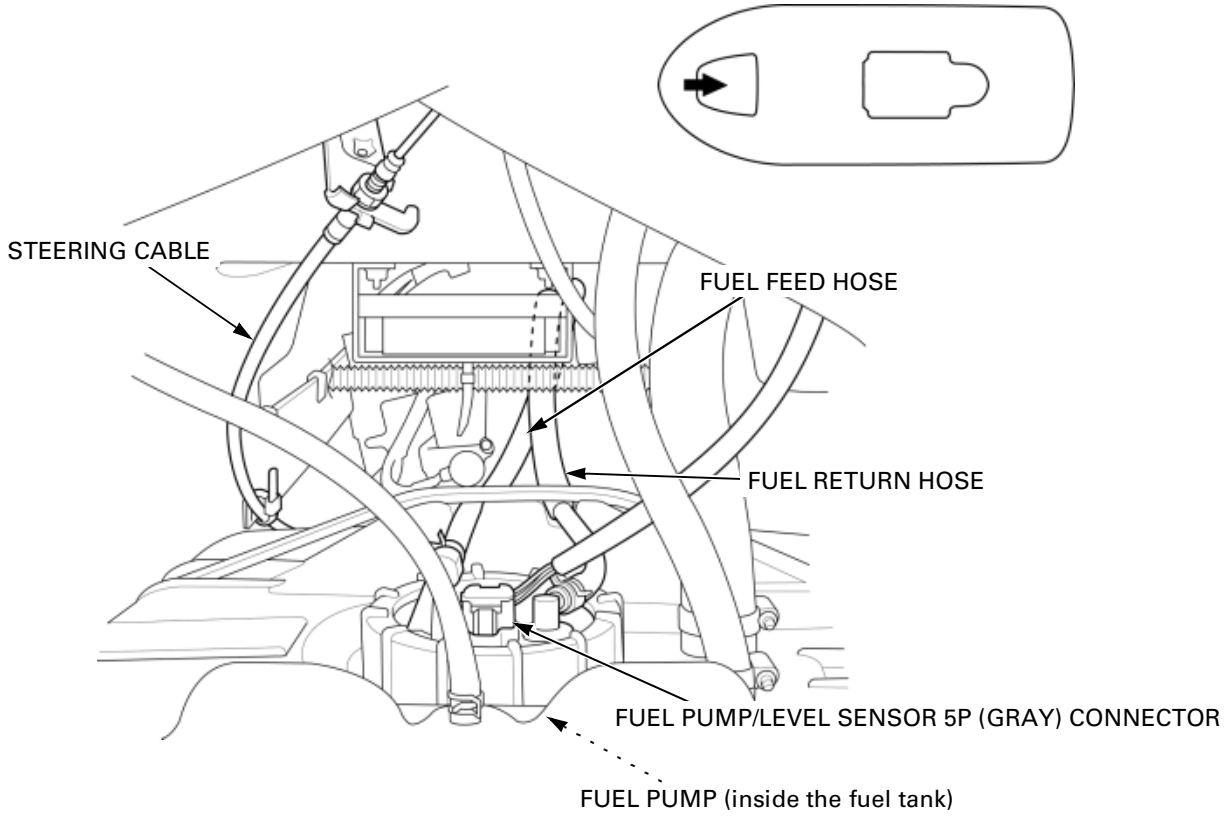
CABLE & HARNESS ROUTING: ARX1200T3/T3D

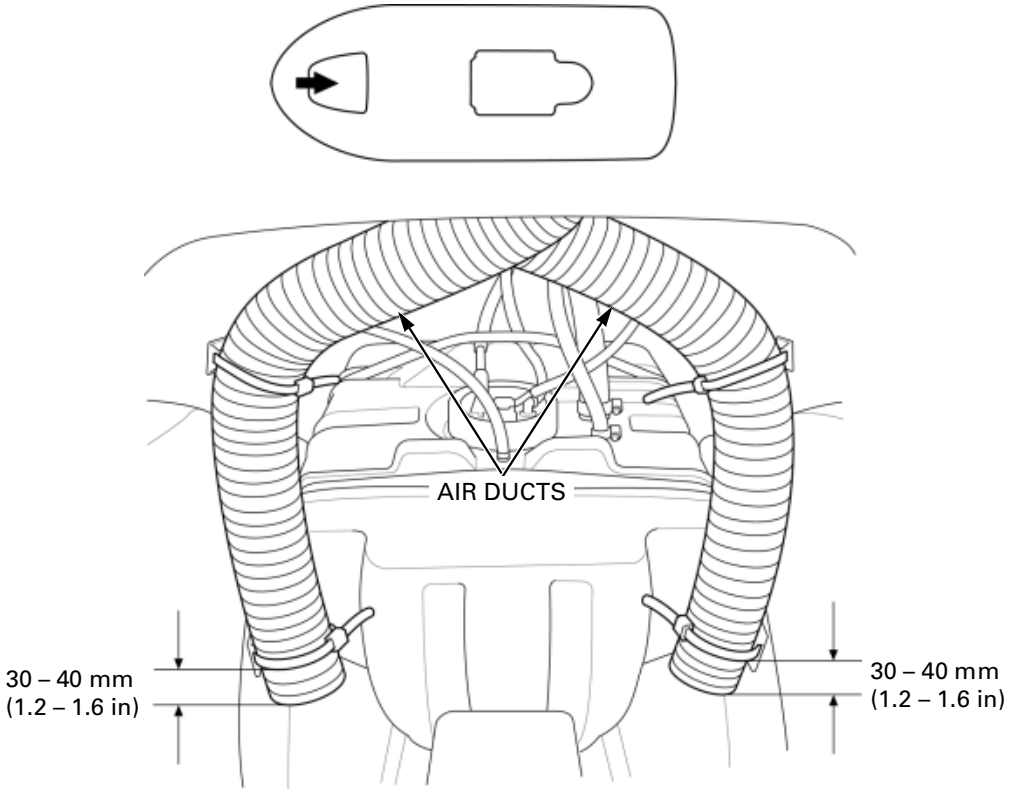


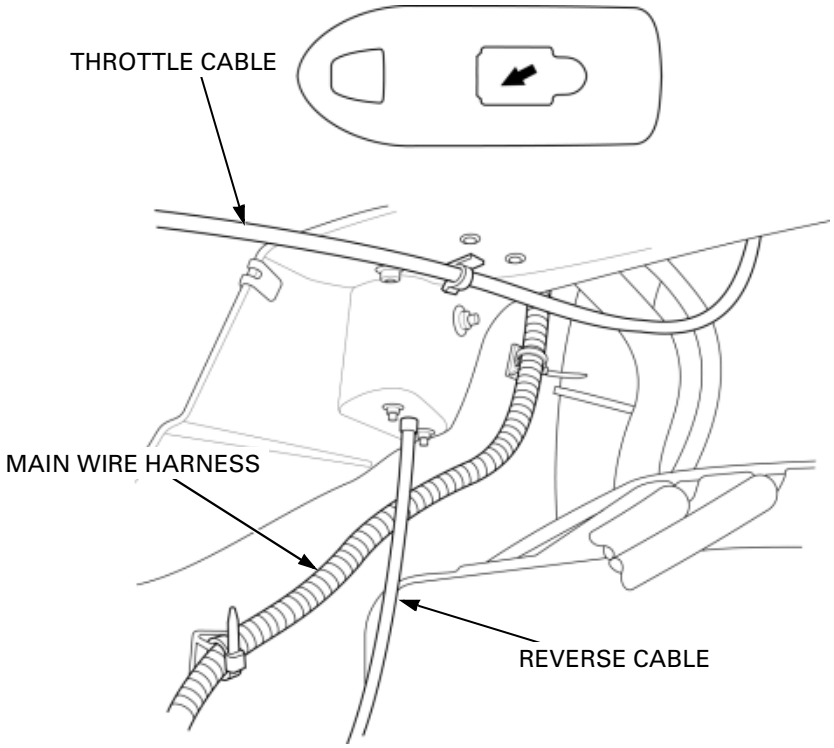
Reverse side of the deck:

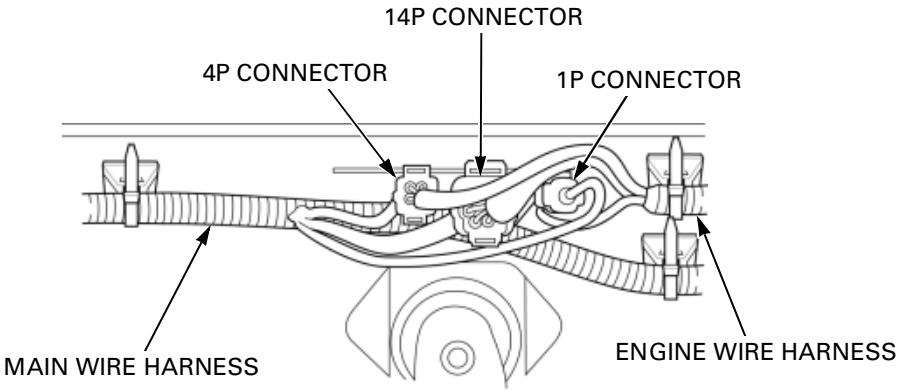


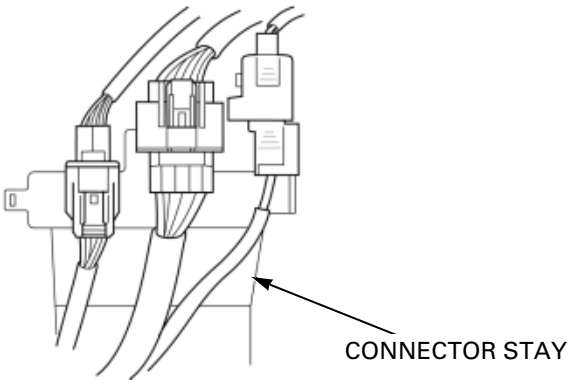

2-WAY VALVE
BREATHER PORT
FUEL FILLER HOSE
AIR BLEED HOSE
FUEL TANK
FUEL TANK BREATHER HOSE
FUEL PUMP WIRE
CONNECTORS:
– Meter 8P (gray) and 10P (green)
– Handlebar switch 4P (white)
– Warning buzzer 2P (white)
– Off-throttle limit switch 2P (red)

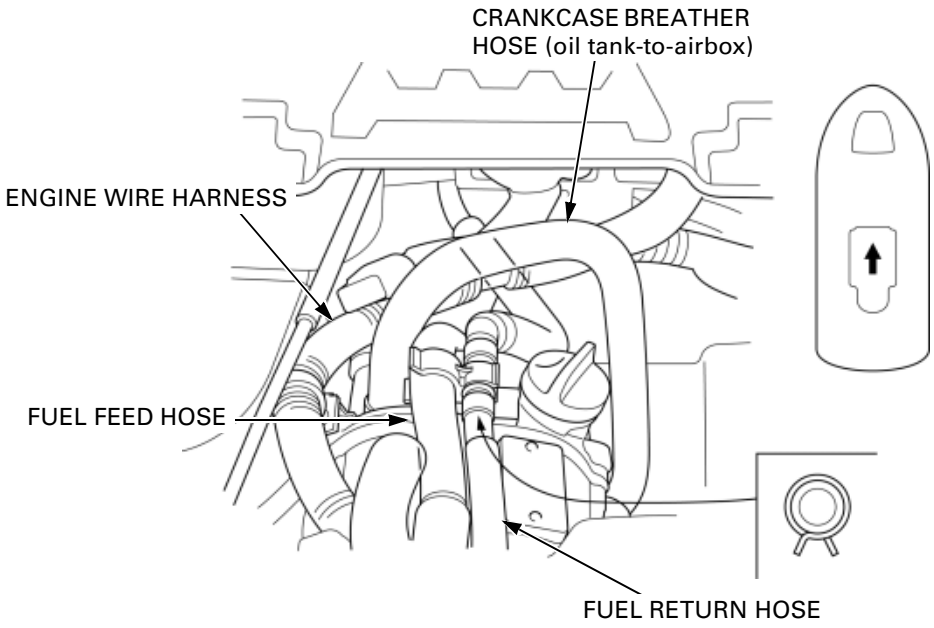

STEERING CABLE
FUEL FEED HOSE
FUEL RETURN HOSE
FUEL PUMP/LEVEL SENSOR 5P (GRAY) CONNECTOR
FUEL PUMP (inside the fuel tank)

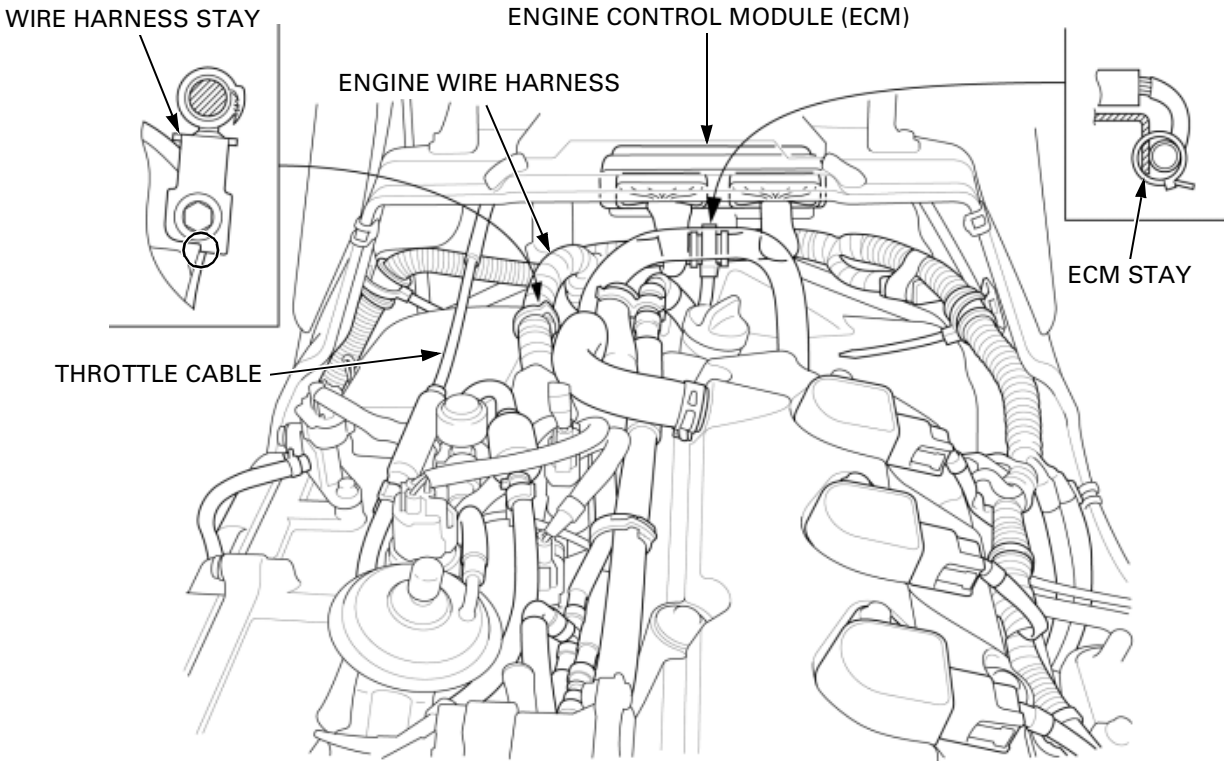

AIR DUCTS
30 – 40 mm
(1.2 – 1.6 in)
30 – 40 mm
(1.2 – 1.6 in)


THROTTLE CABLE
MAIN WIRE HARNESS
REVERSE CABLE

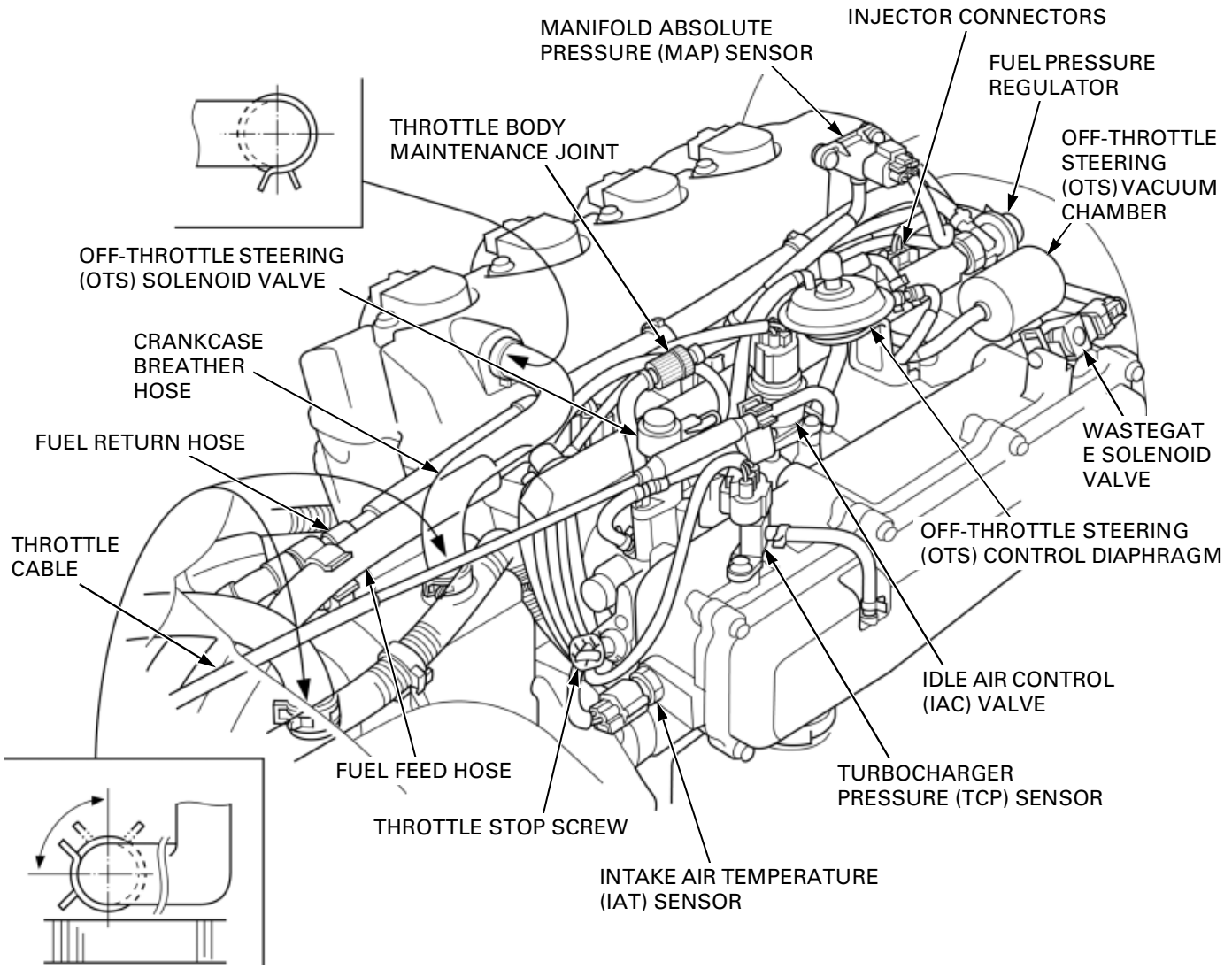

14P CONNECTOR
4P CONNECTOR
1P CONNECTOR
MAIN WIRE HARNESS
ENGINE WIRE HARNESS

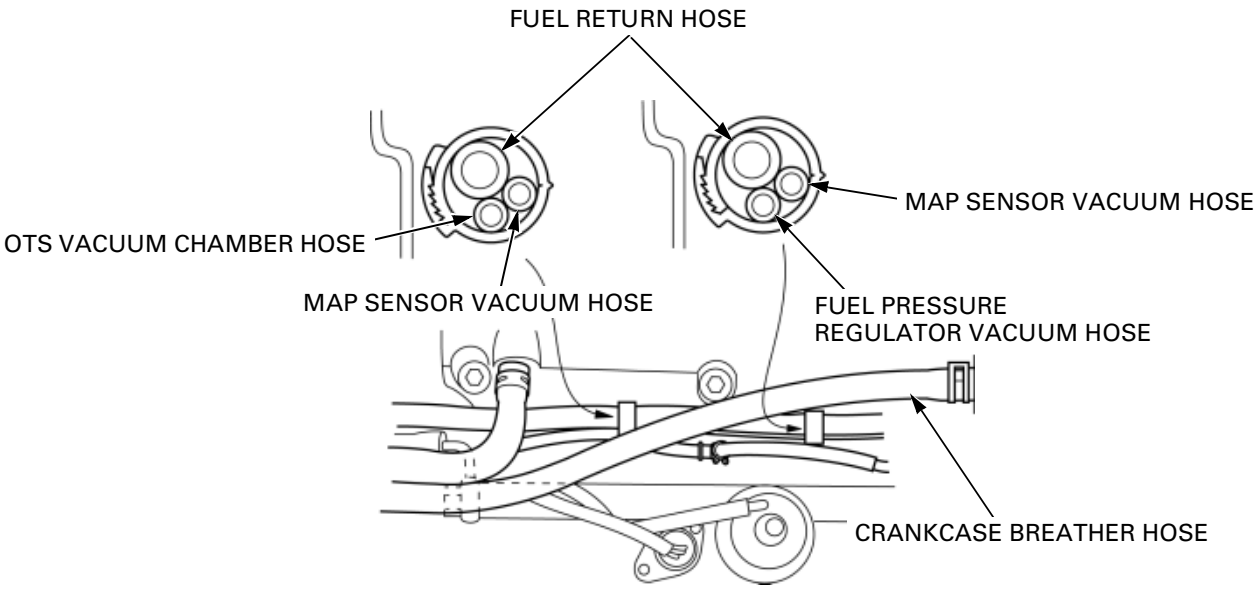

CONNECTOR STAY

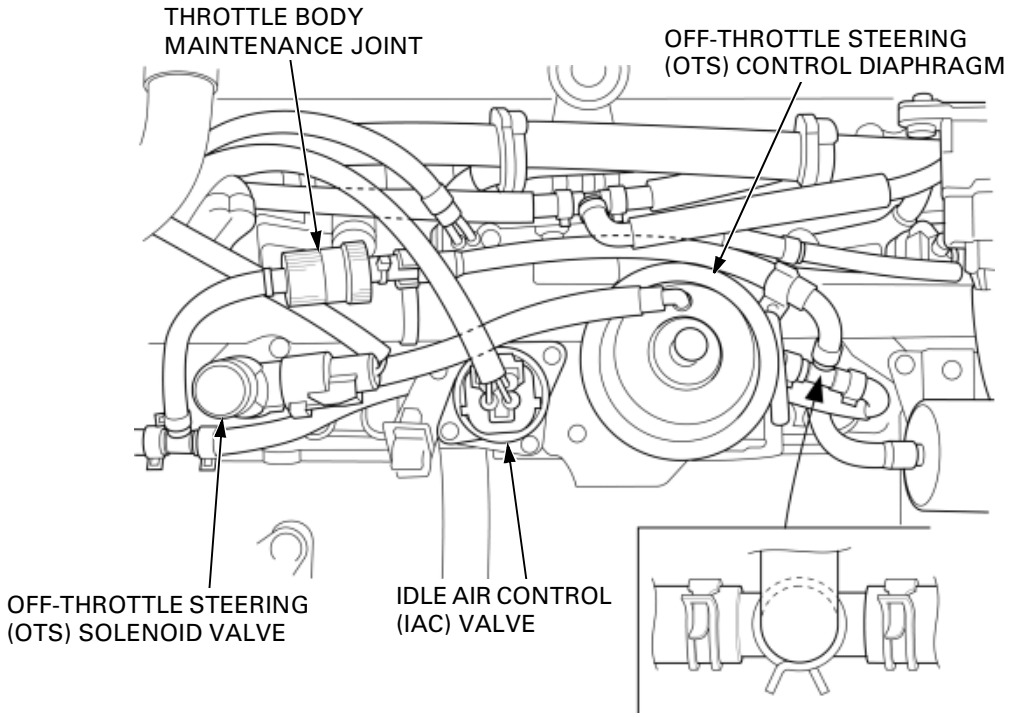

CRANKCASE BREATHER HOSE (oil tank-to-airbox)
ENGINE WIRE HARNESS
FUEL FEED HOSE
FUEL RETURN HOSE

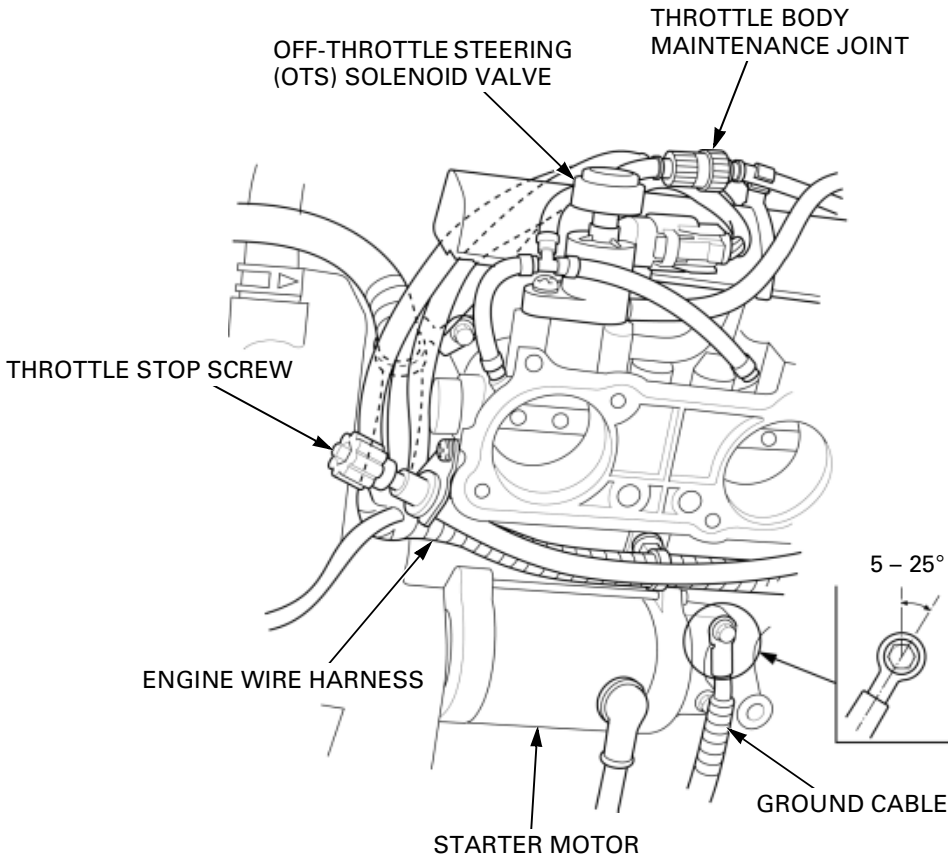

WIRE HARNESS STAY
ENGINE CONTROL MODULE (ECM)
ENGINE WIRE HARNESS
ECM STAY
THROTTLE CABLE

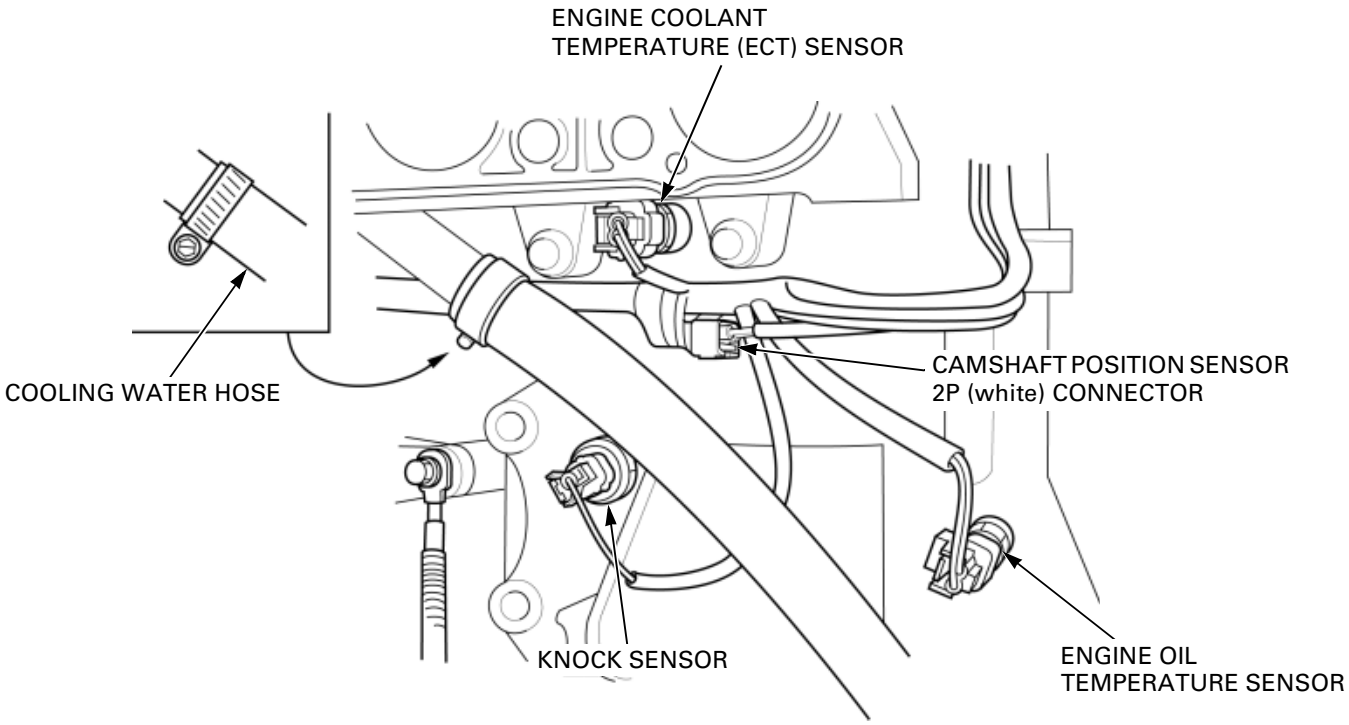
ARX1200T3/T3D

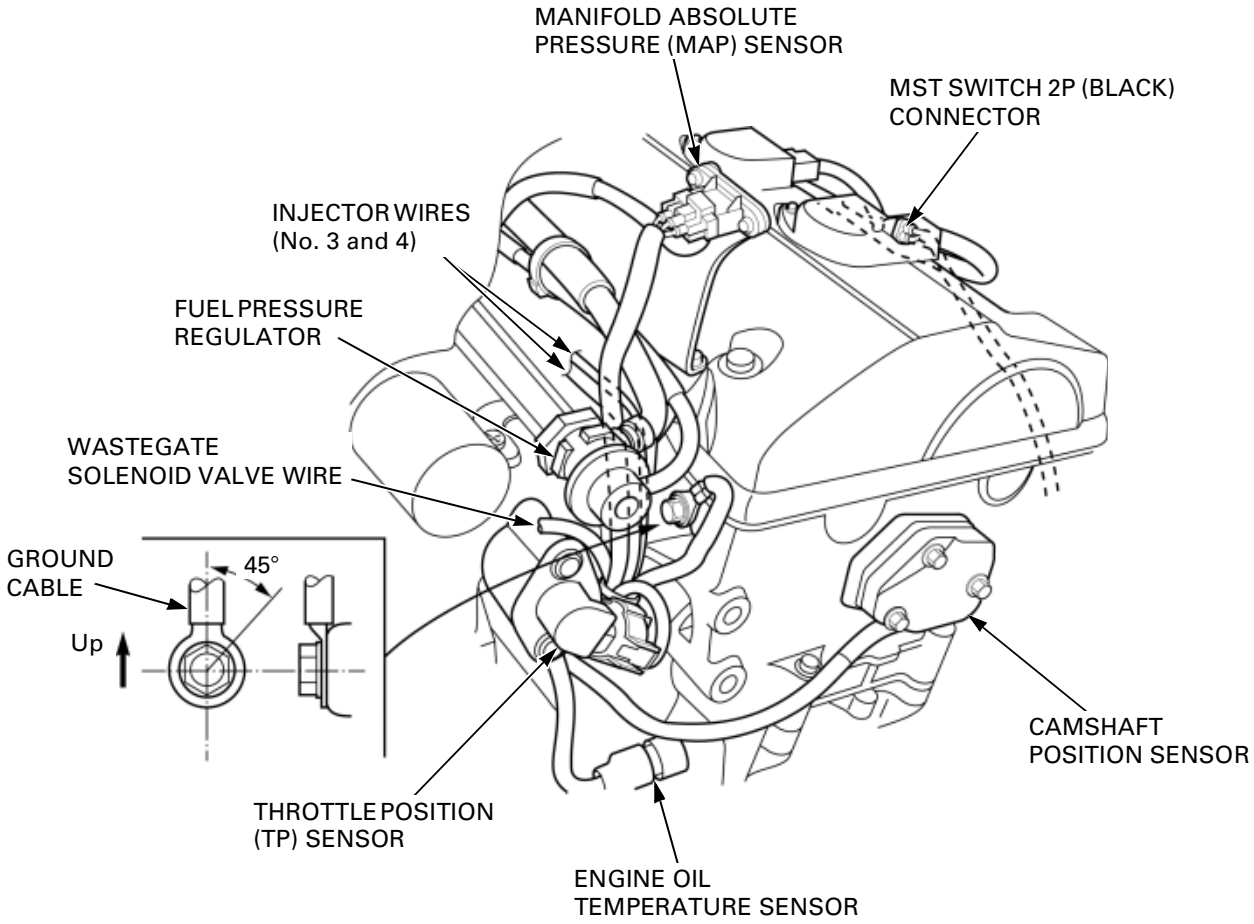


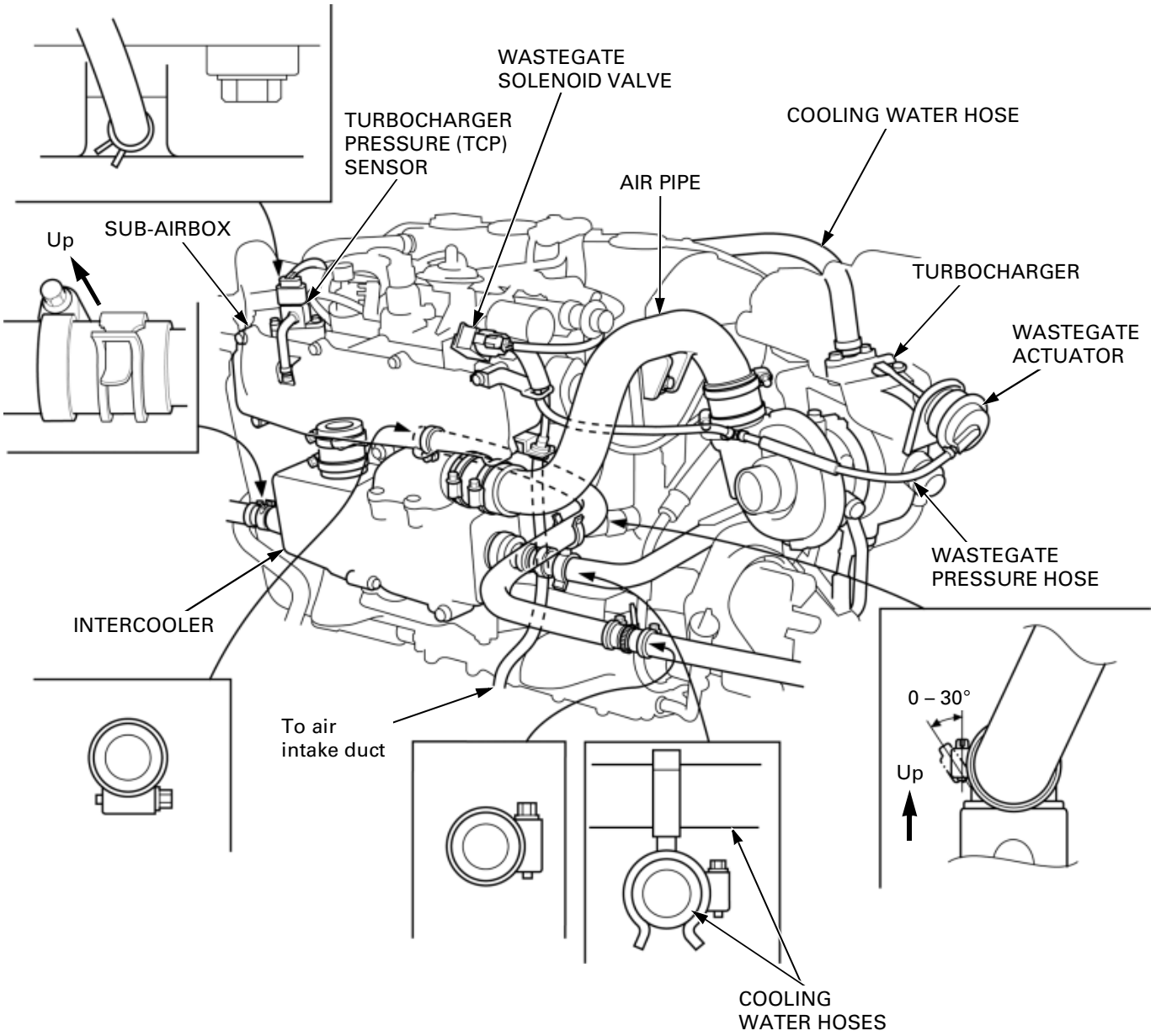


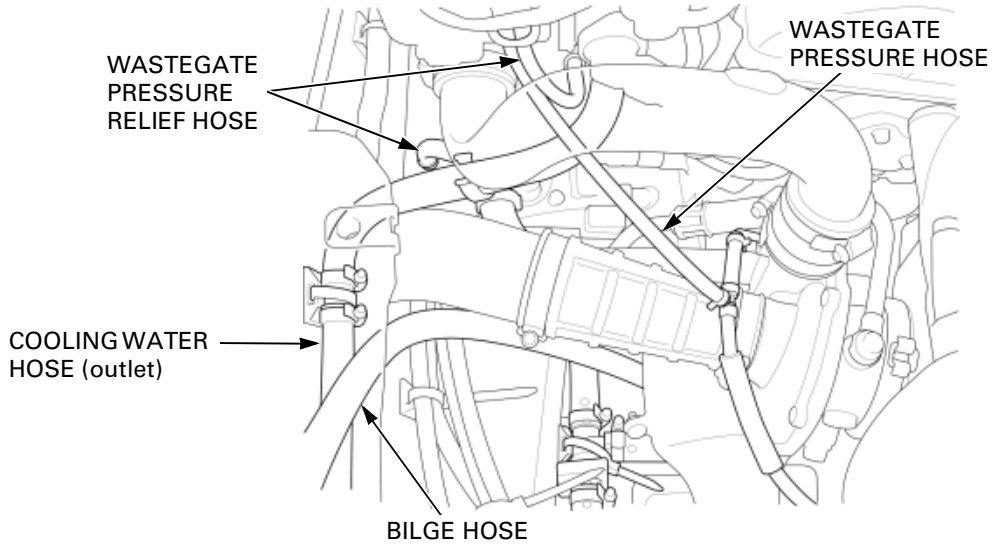

THROTTLE BODY
MAINTENANCE JOINT
OFF-THROTTLE STEERING
(OTS) CONTROL DIAPHRAGM
OFF-THROTTLE STEERING
(OTS) SOLENOID VALVE
IDLE AIR CONTROL
(IAC) VALVE


OFF-THROTTLE STEERING
(OTS) SOLENOID VALVE
THROTTLE BODY
MAINTENANCE JOINT
THROTTLE STOP SCREW
5 – 25°
ENGINE WIRE HARNESS
GROUND CABLE
STARTER MOTOR

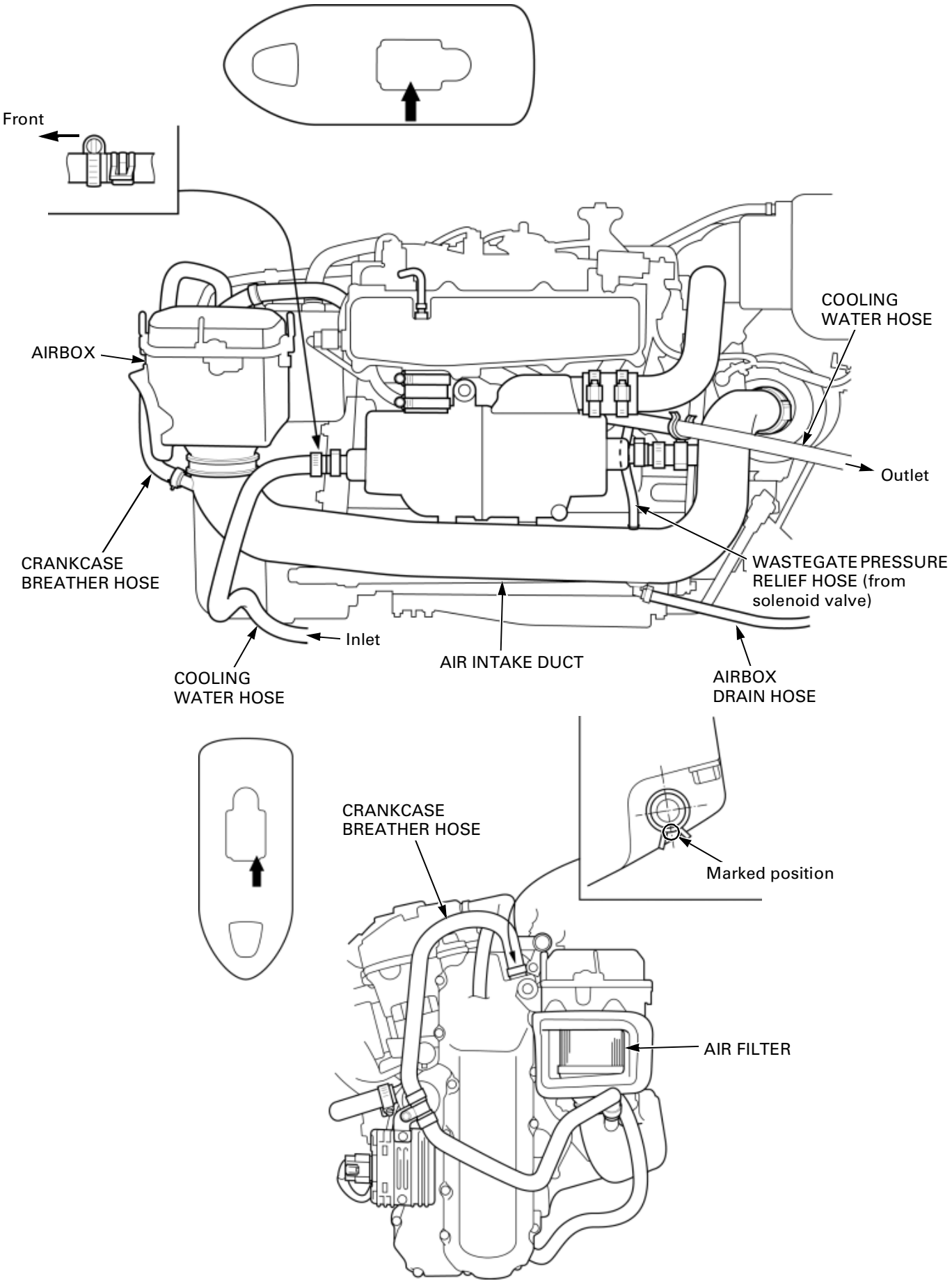

ENGINE COOLANT
TEMPERATURE (ECT) SENSOR
COOLING WATER HOSE
CAMSHAFT POSITION SENSOR
2P (white) CONNECTOR
KNOCK SENSOR
ENGINE OIL
TEMPERATURE SENSOR

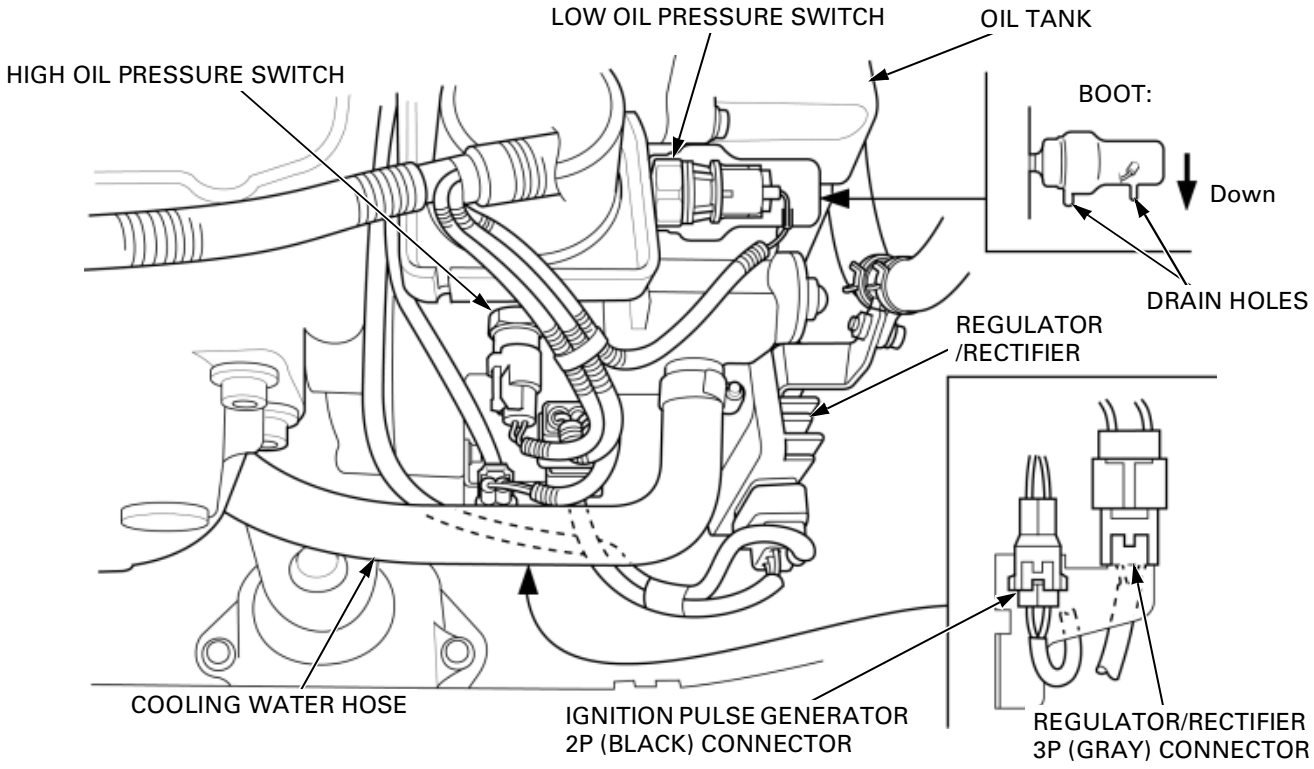

MANIFOLD ABSOLUTE
PRESSURE (MAP) SENSOR
MST SWITCH 2P (BLACK)
CONNECTOR
INJECTOR WIRES
(No. 3 and 4)
FUEL PRESSURE
REGULATOR
WASTEGATE
SOLENOID VALVE WIRE
GROUND
CABLE
45°
Up
CAMSHAFT
POSITION SENSOR
THROTTLE POSITION
(TP) SENSOR
ENGINE OIL
TEMPERATURE SENSOR

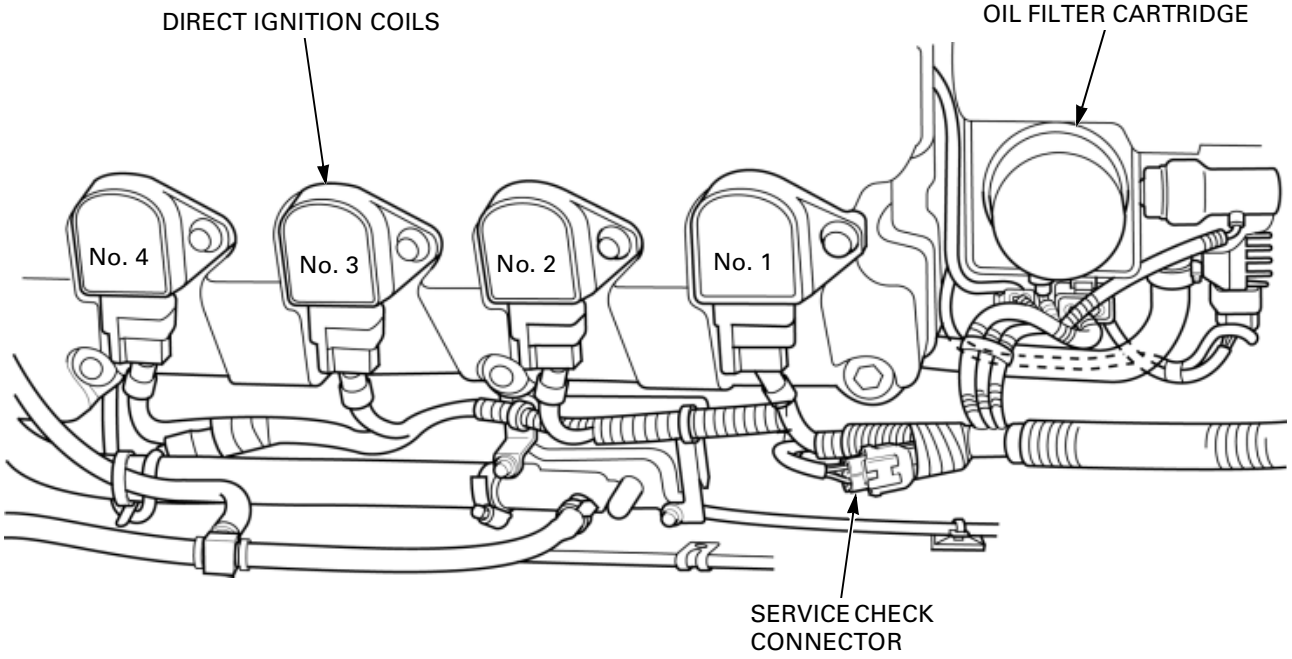

WASTEGATE SOLENOID VALVE
TURBOCHARGER PRESSURE (TCP) SENSOR
COOLING WATER HOSE
AIR PIPE
SUB-AIRBOX
Up
TURBOCHARGER
WASTEGATE ACTUATOR
WASTEGATE PRESSURE HOSE
INTERCOOLER
To air intake duct
0 – 30°
Up
COOLING WATER HOSES

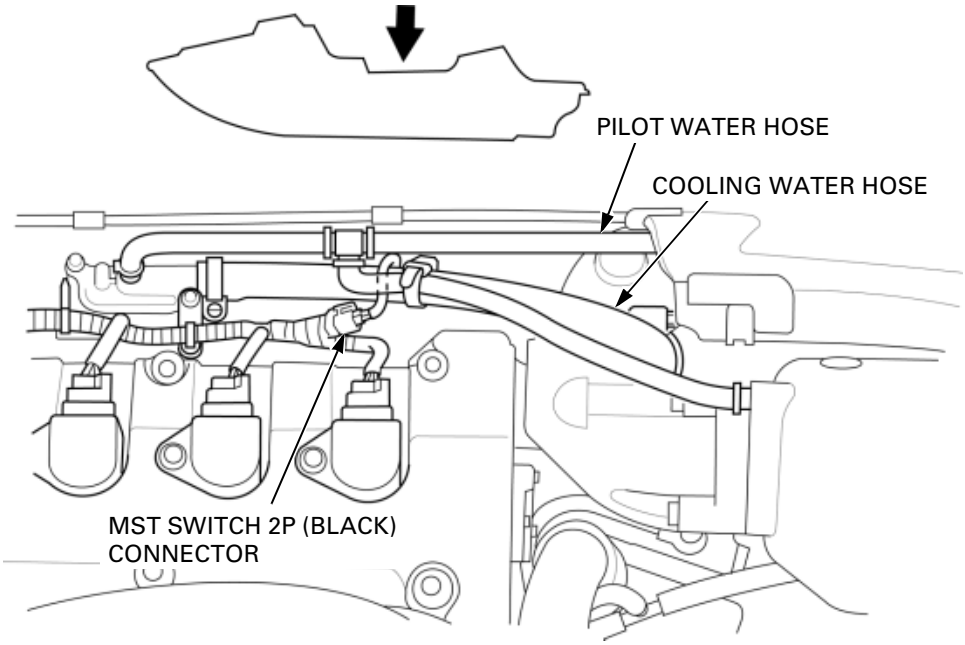

WASTEGATE PRESSURE HOSE
WASTEGATE PRESSURE RELIEF HOSE
COOLING WATER HOSE (outlet)
BILGE HOSE

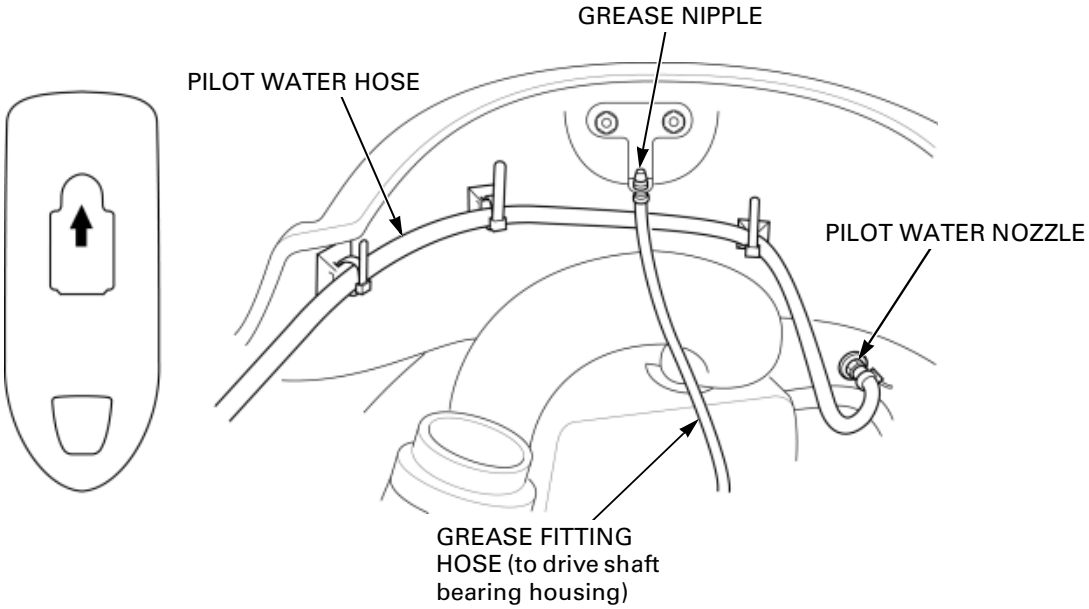
ARX1200T3/T3D

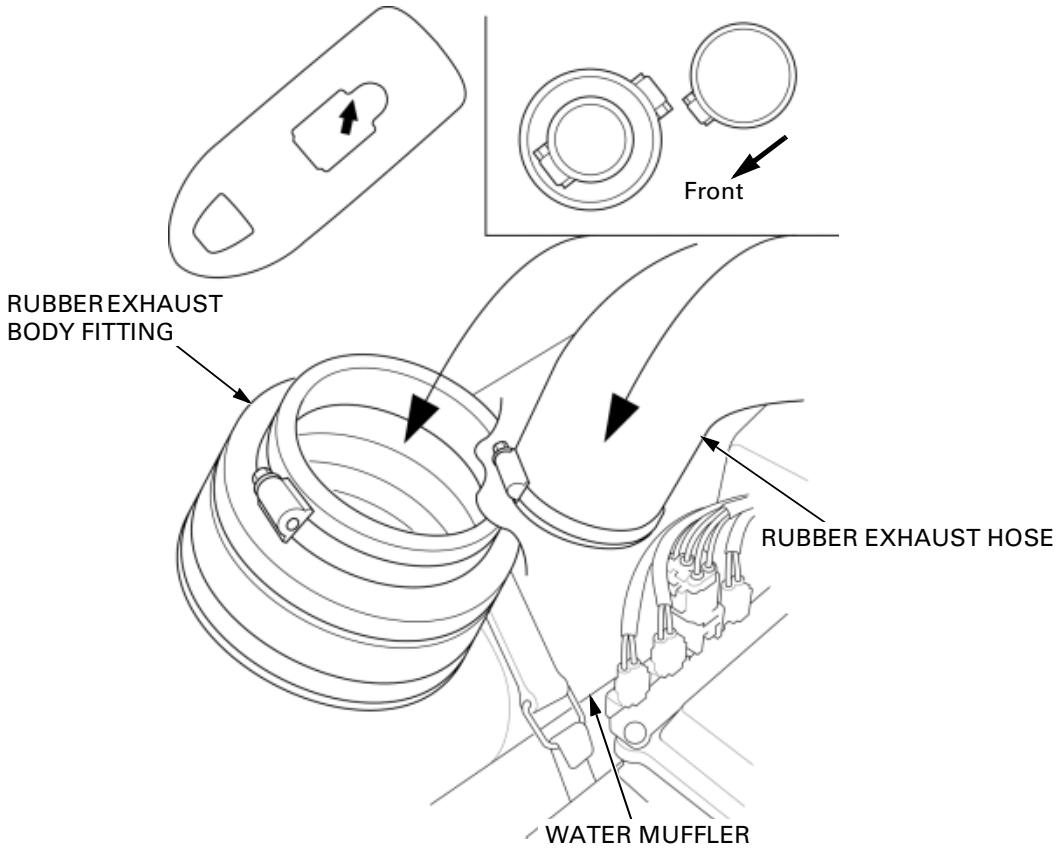


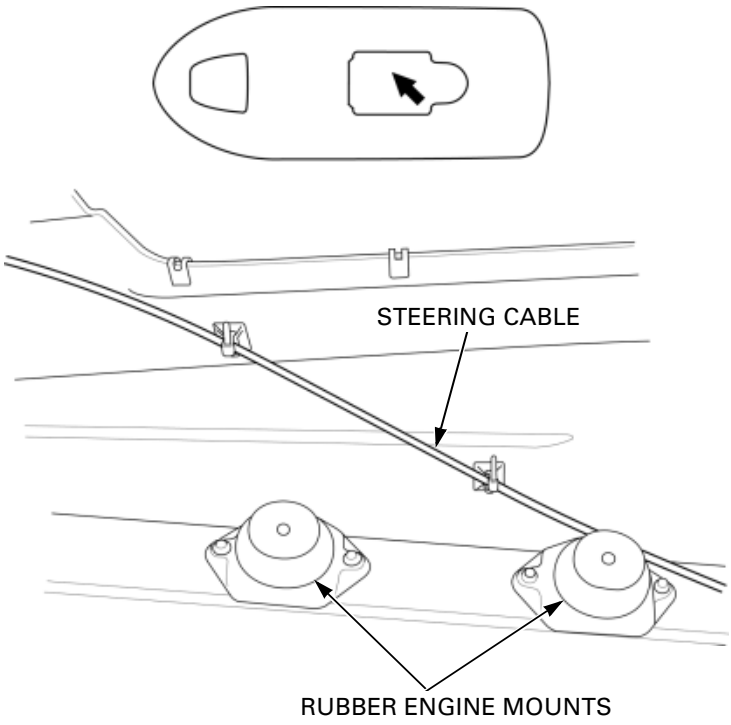

LOW OIL PRESSURE SWITCH
OIL TANK
HIGH OIL PRESSURE SWITCH
BOOT:
Down
DRAIN HOLES
REGULATOR
/RECTIFIER
COOLING WATER HOSE
IGNITION PULSE GENERATOR
2P (BLACK) CONNECTOR
REGULATOR/RECTIFIER
3P (GRAY) CONNECTOR

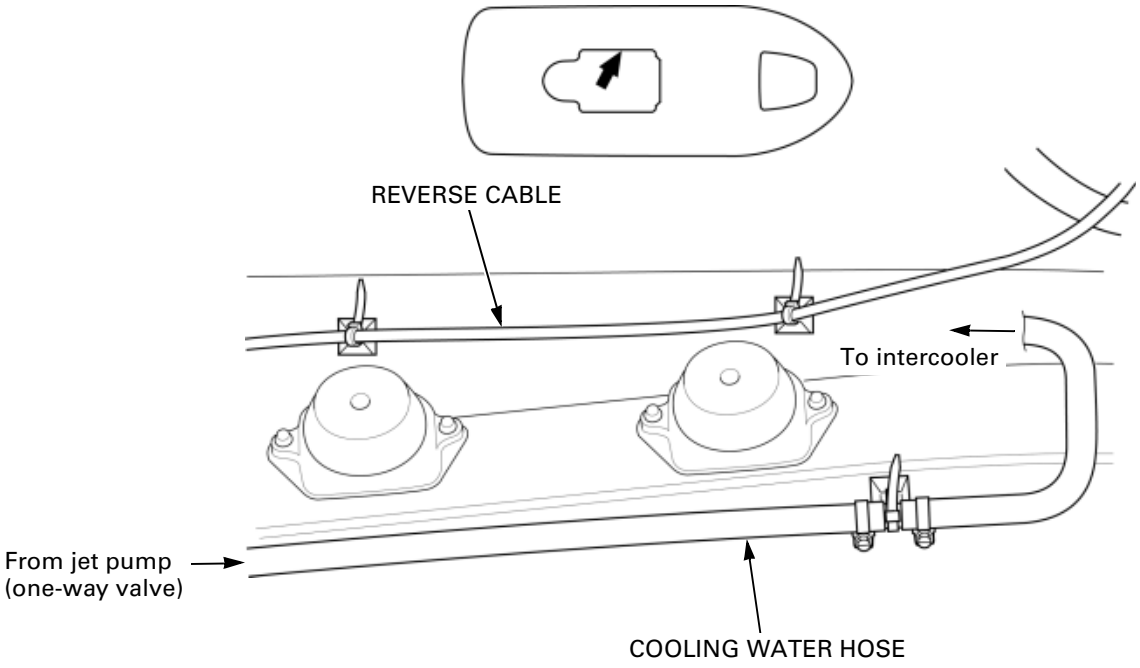

DIRECT IGNITION COILS
OIL FILTER CARTRIDGE
No. 4
No. 3
No. 2
No. 1
SERVICE CHECK
CONNECTOR

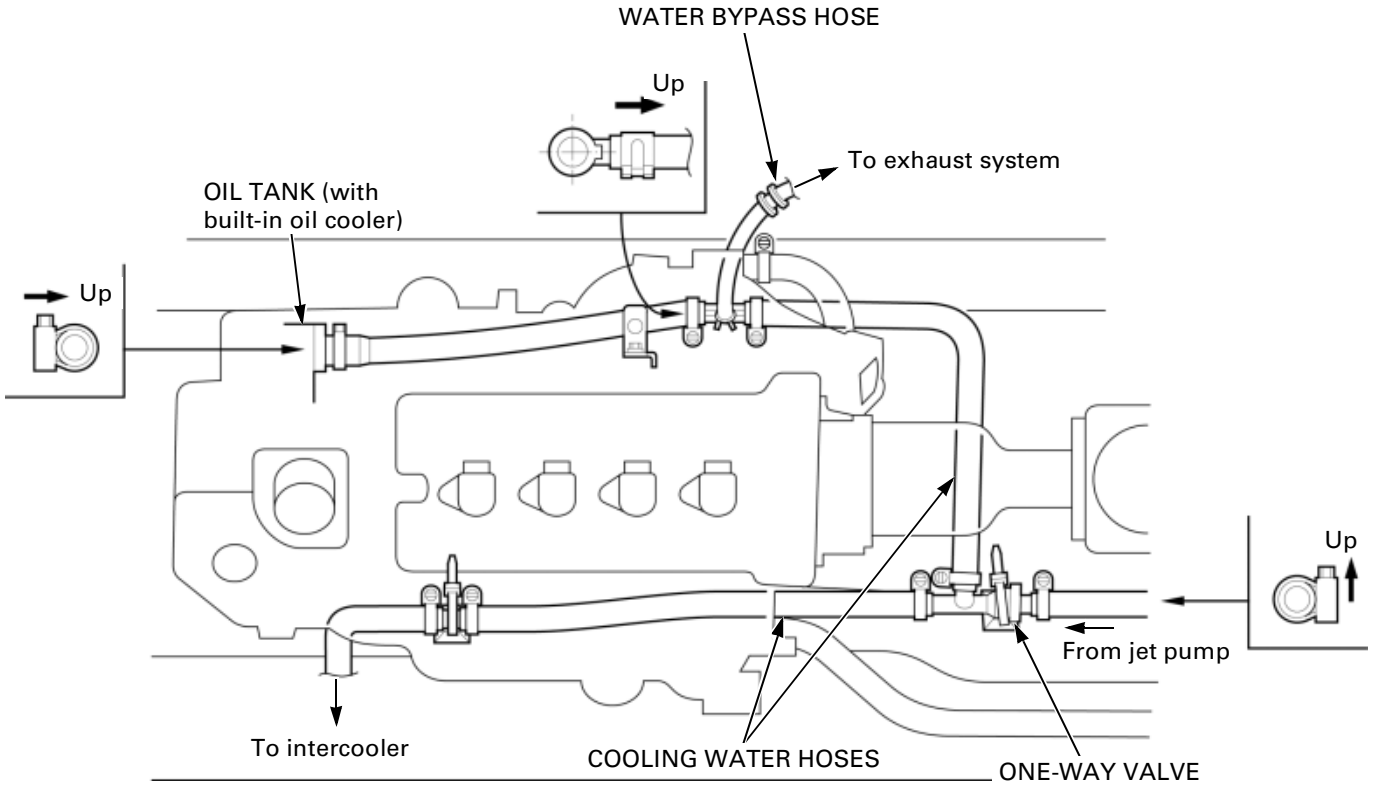

PILOT WATER HOSE
COOLING WATER HOSE
MST SWITCH 2P (BLACK)
CONNECTOR

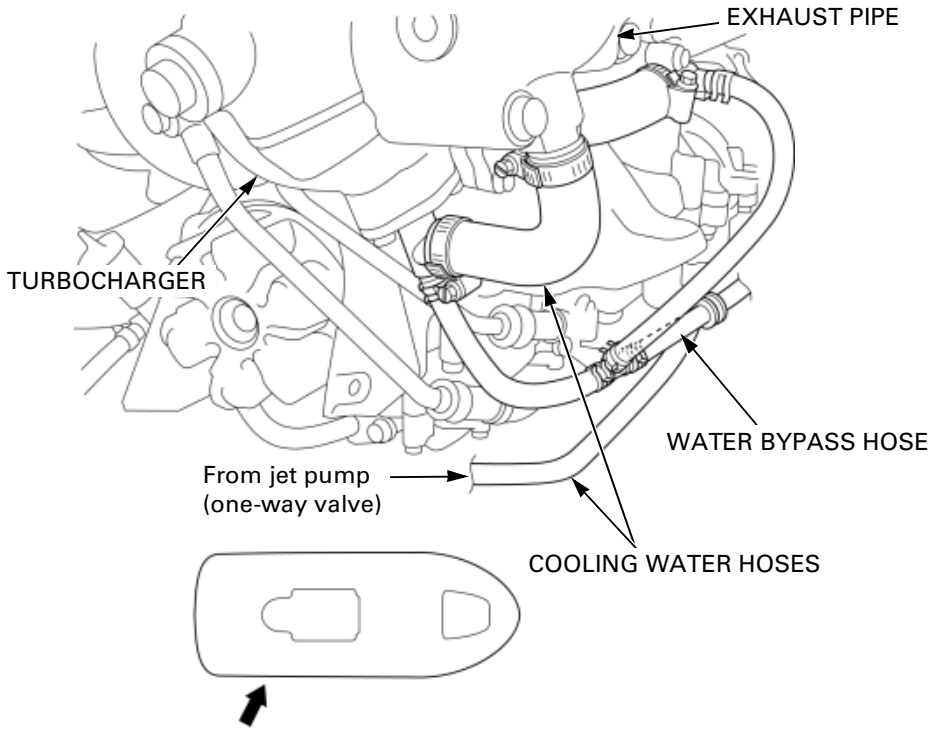

GREASE NIPPLE
PILOT WATER HOSE
PILOT WATER NOZZLE
GREASE FITTING
HOSE (to drive shaft
bearing housing)

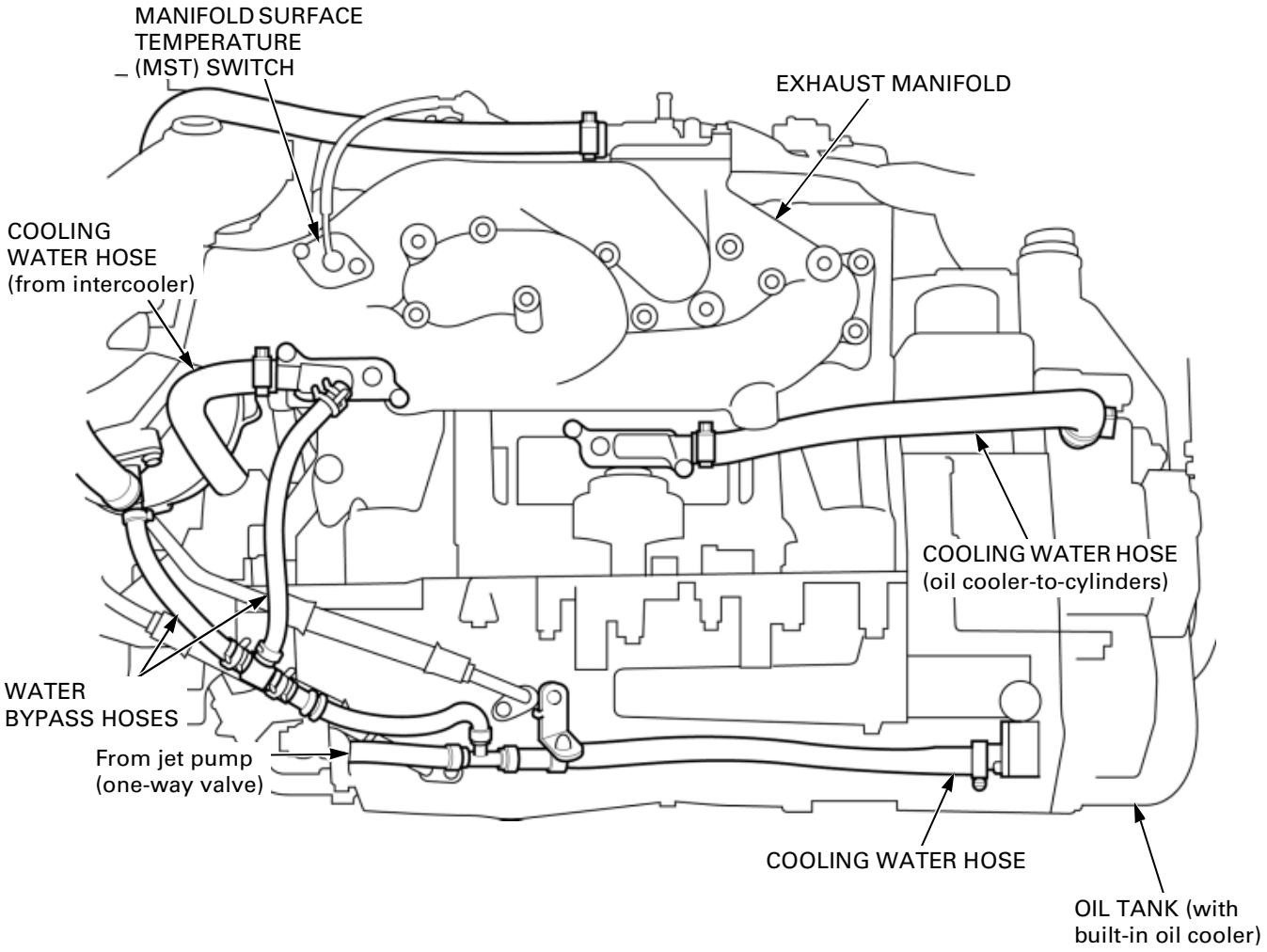

Front
RUBBER EXHAUST
BODY FITTING
RUBBER EXHAUST HOSE
WATER MUFFLER

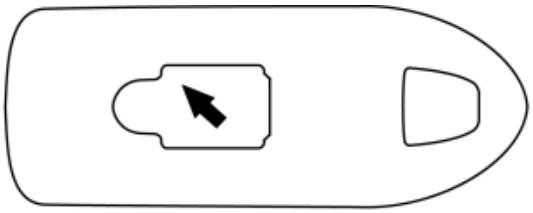

STEERING CABLE
RUBBER ENGINE MOUNTS

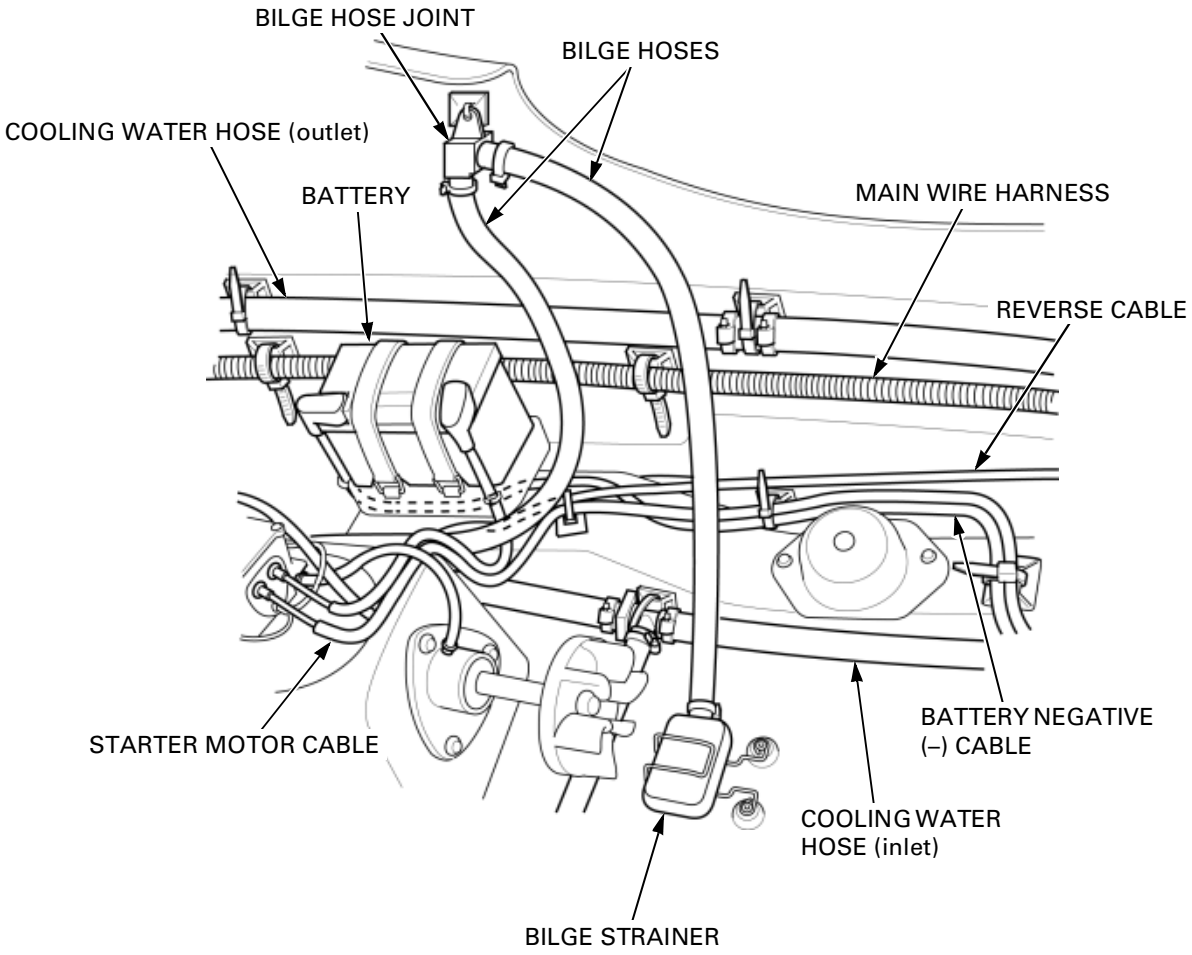

REVERSE CABLE
To intercooler
From jet pump
(one-way valve)
COOLING WATER HOSE

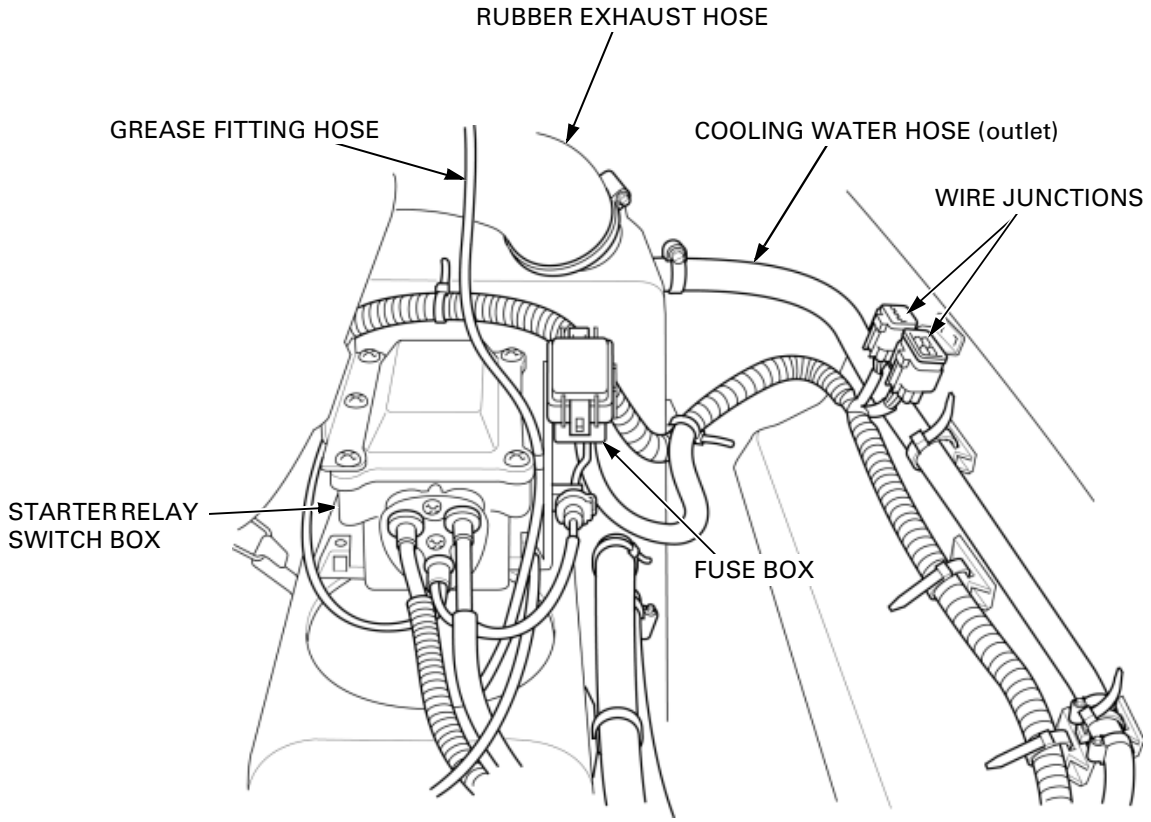

WATER BYPASS HOSE
Up
To exhaust system
OIL TANK (with
built-in oil cooler)
Up
Up
From jet pump
To intercooler
COOLING WATER HOSES
ONE-WAY VALVE

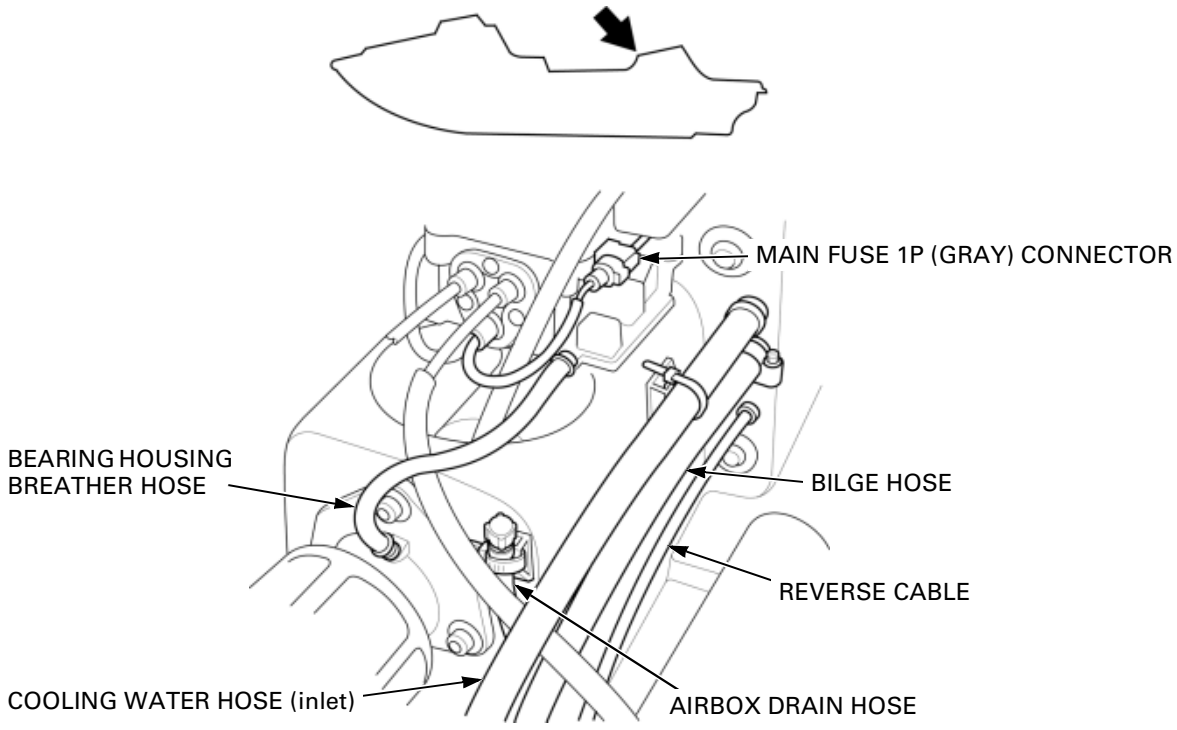

EXHAUST PIPE
TURBOCHARGER
WATER BYPASS HOSE
From jet pump
(one-way valve)
COOLING WATER HOSES

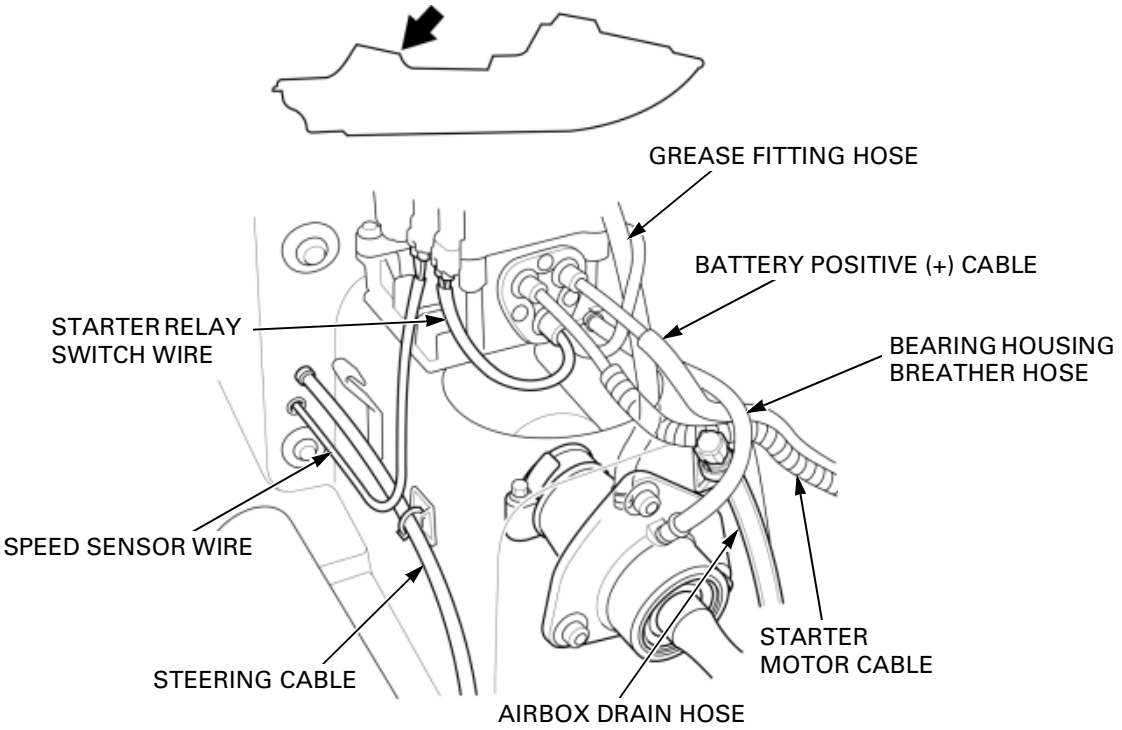

MANIFOLD SURFACE TEMPERATURE (MST) SWITCH
EXHAUST MANIFOLD
COOLING WATER HOSE (from intercooler)
COOLING WATER HOSE (oil cooler-to-cylinders)
WATER BYPASS HOSES
From jet pump (one-way valve)
COOLING WATER HOSE
OIL TANK (with built-in oil cooler)

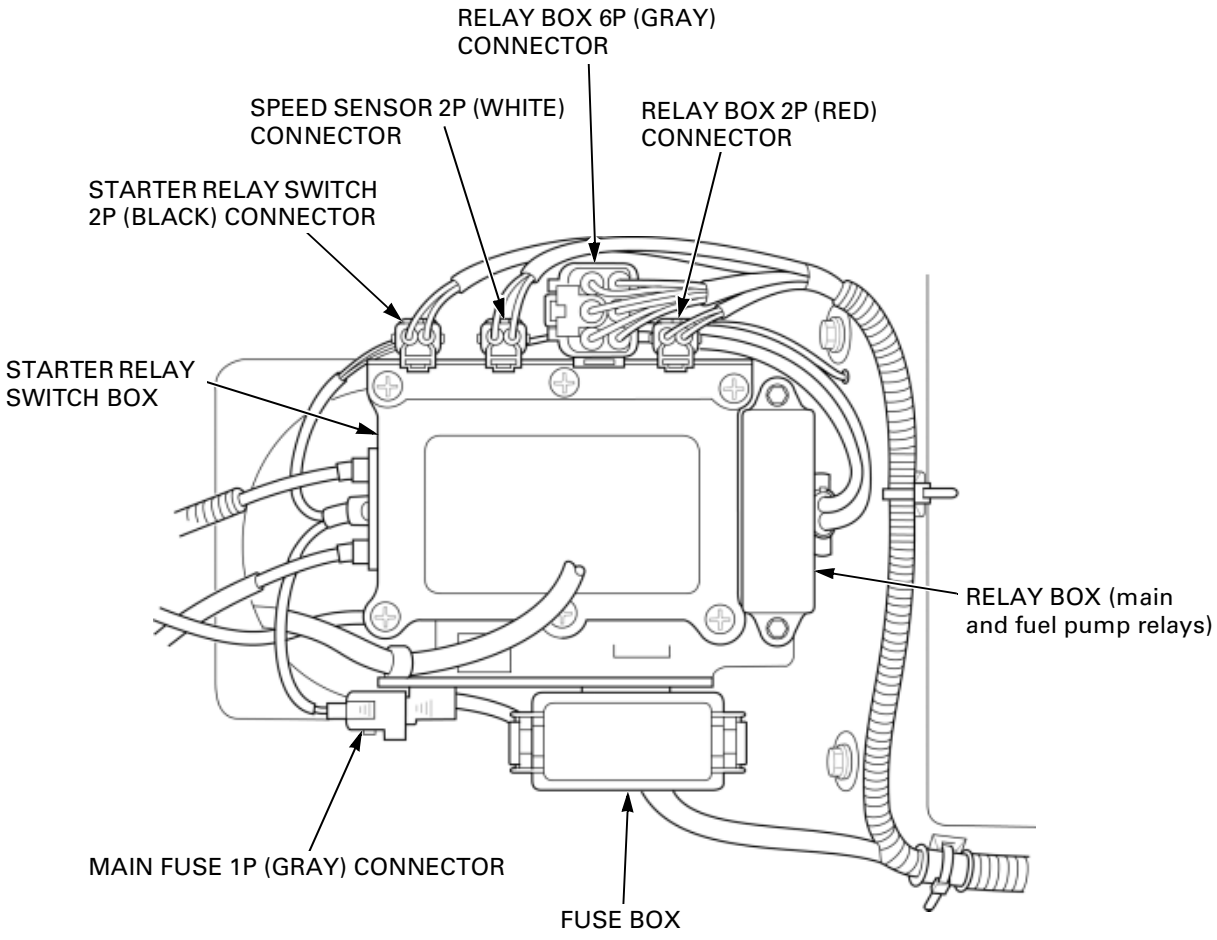


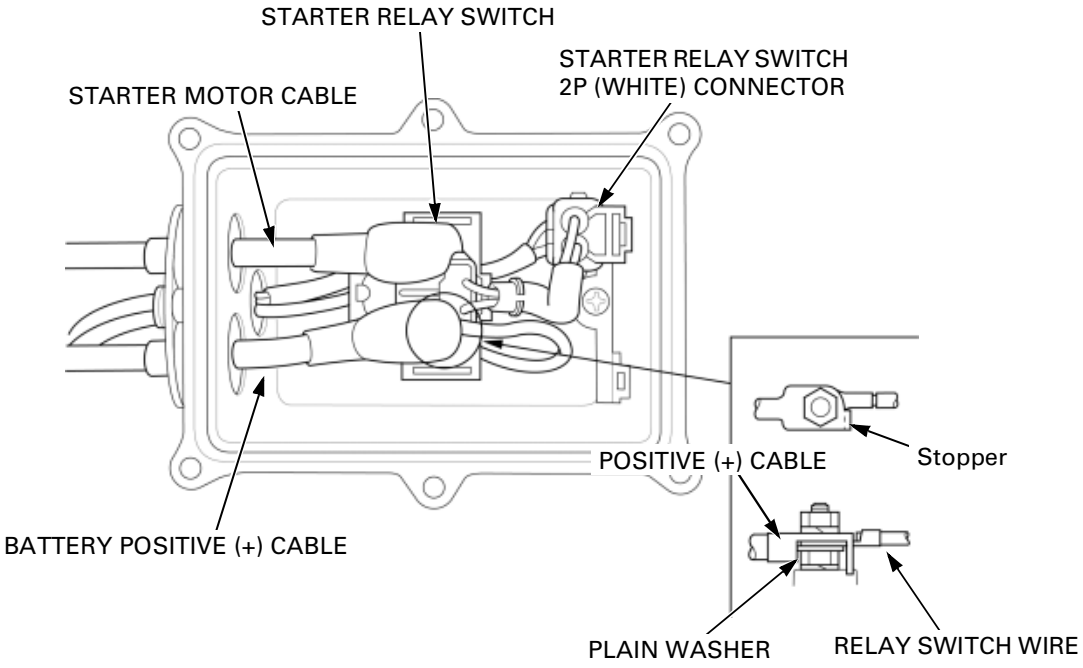

BILGE HOSE JOINT
BILGE HOSES
COOLING WATER HOSE (outlet)
BATTERY
MAIN WIRE HARNESS
REVERSE CABLE
BATTERY NEGATIVE (–) CABLE
STARTER MOTOR CABLE
COOLING WATER HOSE (inlet)
BILGE STRAINER

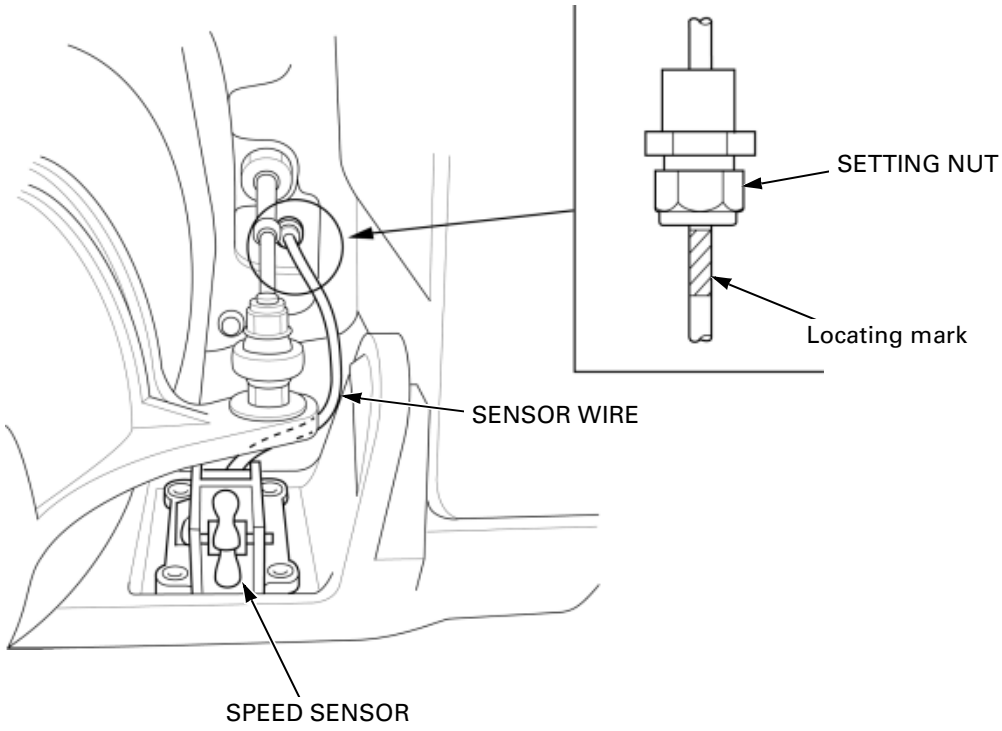

RUBBER EXHAUST HOSE
GREASE FITTING HOSE
COOLING WATER HOSE (outlet)
WIRE JUNCTIONS
STARTER RELAY SWITCH BOX
FUSE BOX

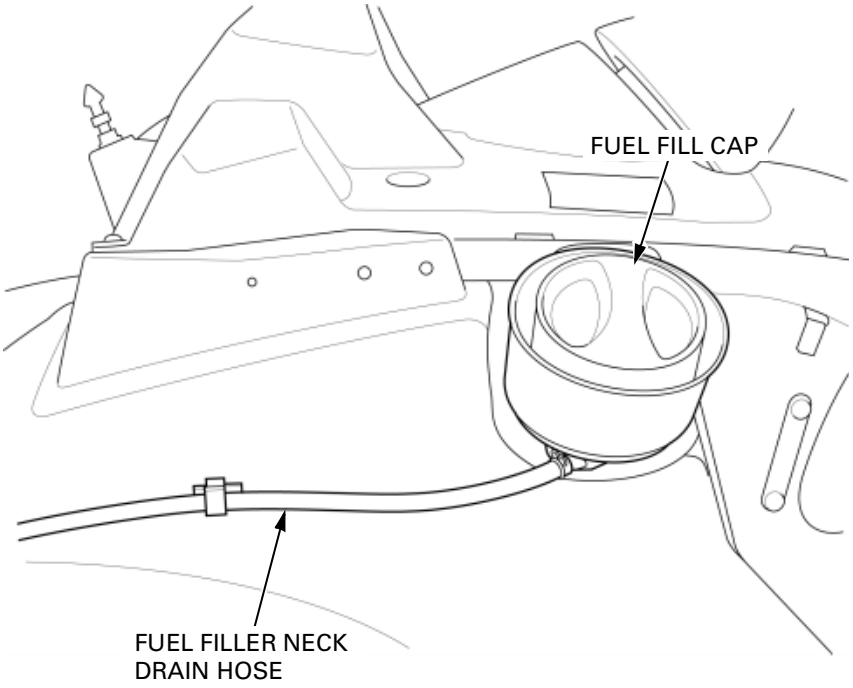

MAIN FUSE 1P (GRAY) CONNECTOR
BEARING HOUSING BREATHER HOSE
BILGE HOSE
REVERSE CABLE
COOLING WATER HOSE (inlet)
AIRBOX DRAIN HOSE


GREASE FITTING HOSE
BATTERY POSITIVE (+) CABLE
STARTER RELAY SWITCH WIRE
BEARING HOUSING BREATHER HOSE
SPEED SENSOR WIRE
STEERING CABLE
STARTER MOTOR CABLE
AIRBOX DRAIN HOSE

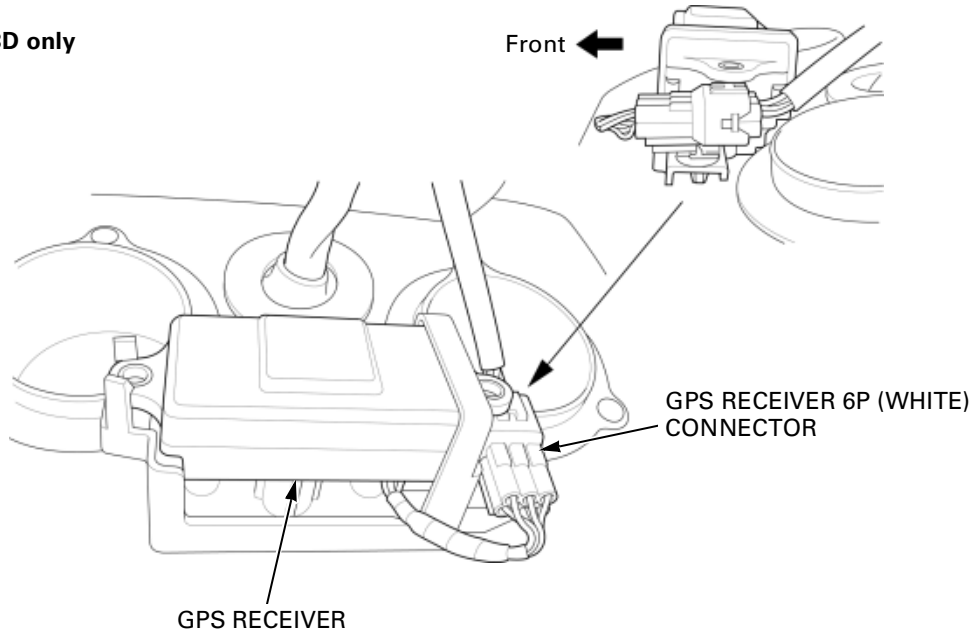

RELAY BOX 6P (GRAY) CONNECTOR
SPEED SENSOR 2P (WHITE) CONNECTOR
RELAY BOX 2P (RED) CONNECTOR
STARTER RELAY SWITCH 2P (BLACK) CONNECTOR
STARTER RELAY SWITCH BOX
RELAY BOX (main and fuel pump relays)
MAIN FUSE 1P (GRAY) CONNECTOR
FUSE BOX


STARTER RELAY SWITCH
STARTER RELAY SWITCH
2P (WHITE) CONNECTOR
STARTER MOTOR CABLE
POSITIVE (+) CABLE
Stopper
BATTERY POSITIVE (+) CABLE
PLAIN WASHER
RELAY SWITCH WIRE

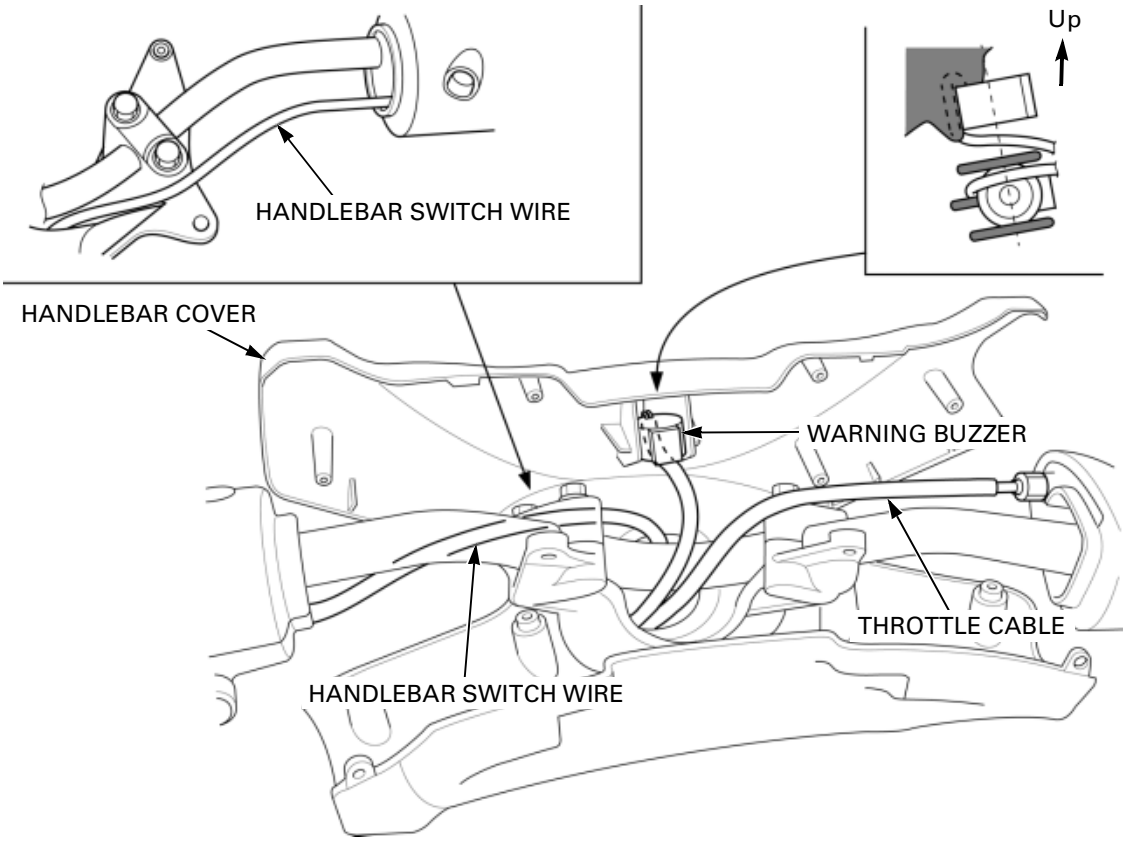

SETTING NUT
Locating mark
SENSOR WIRE
SPEED SENSOR



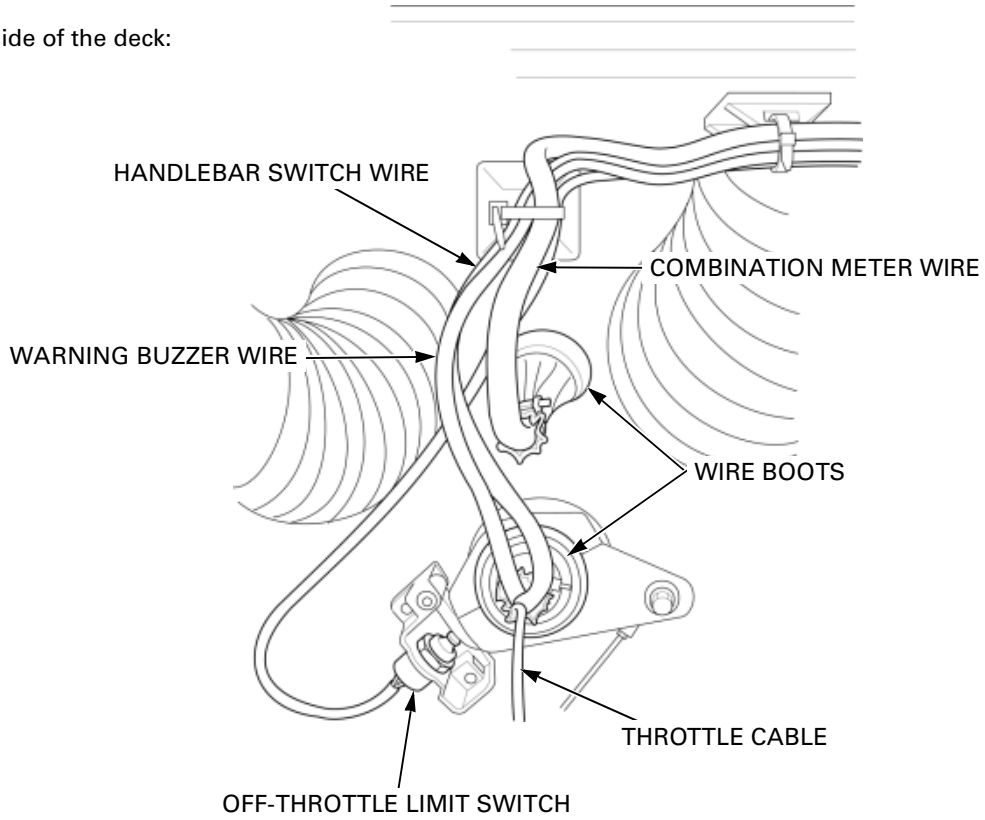
ARX1200T3D only

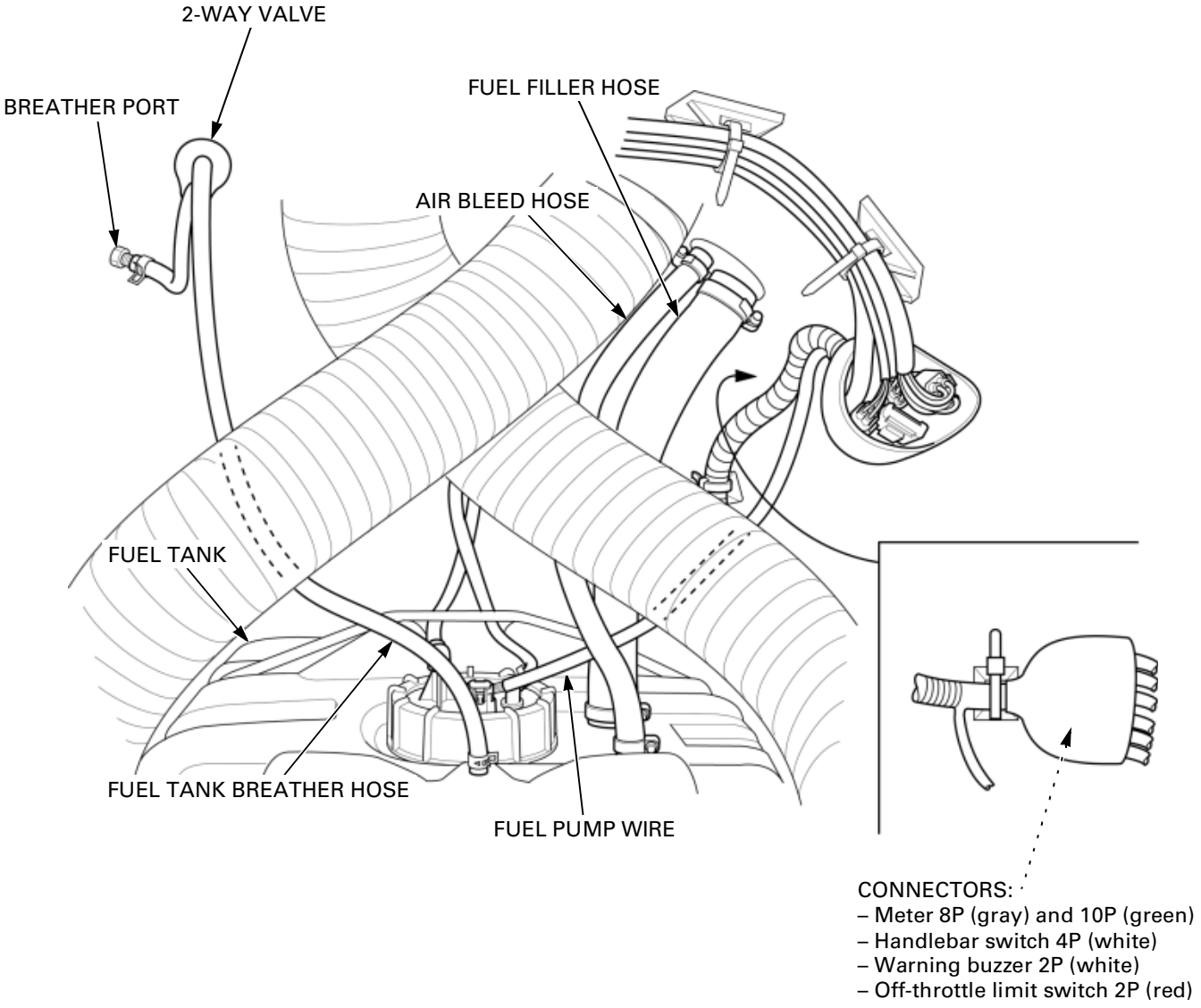


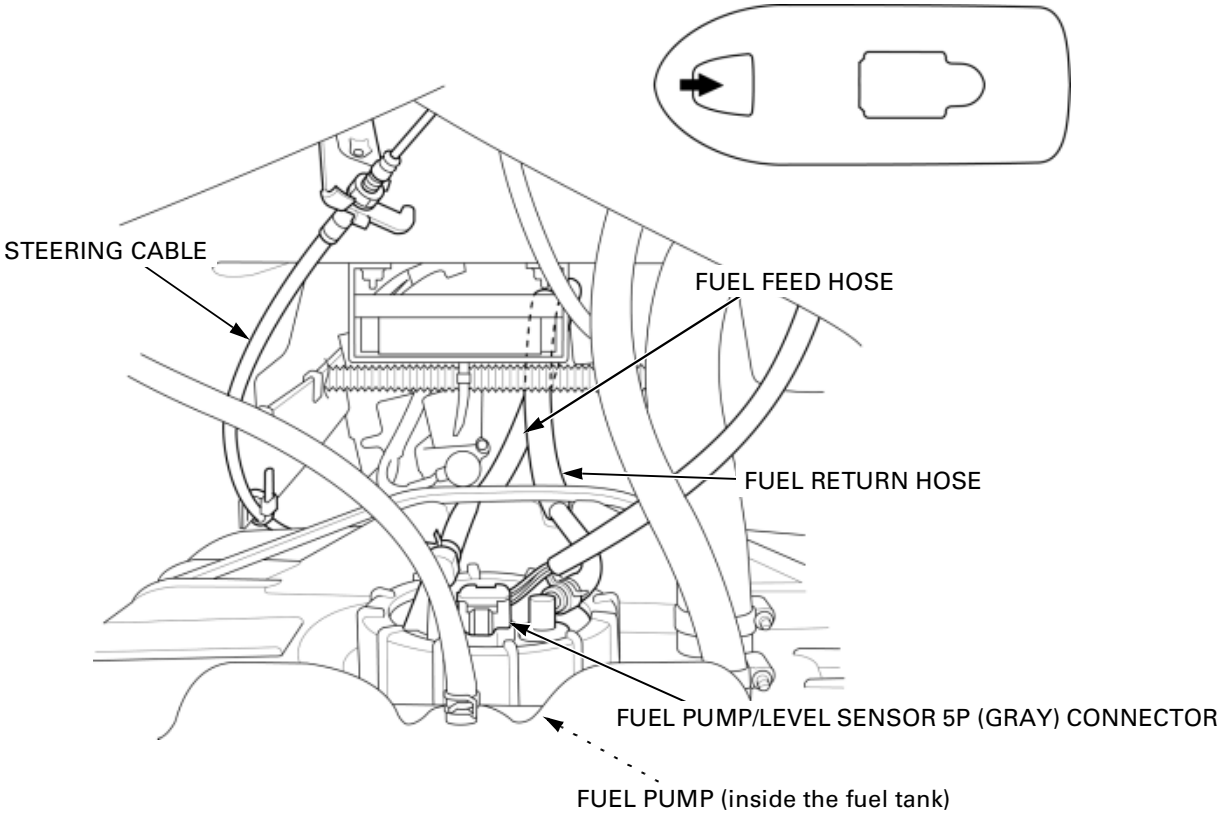
CABLE & HARNESS ROUTING: ARX1200N3

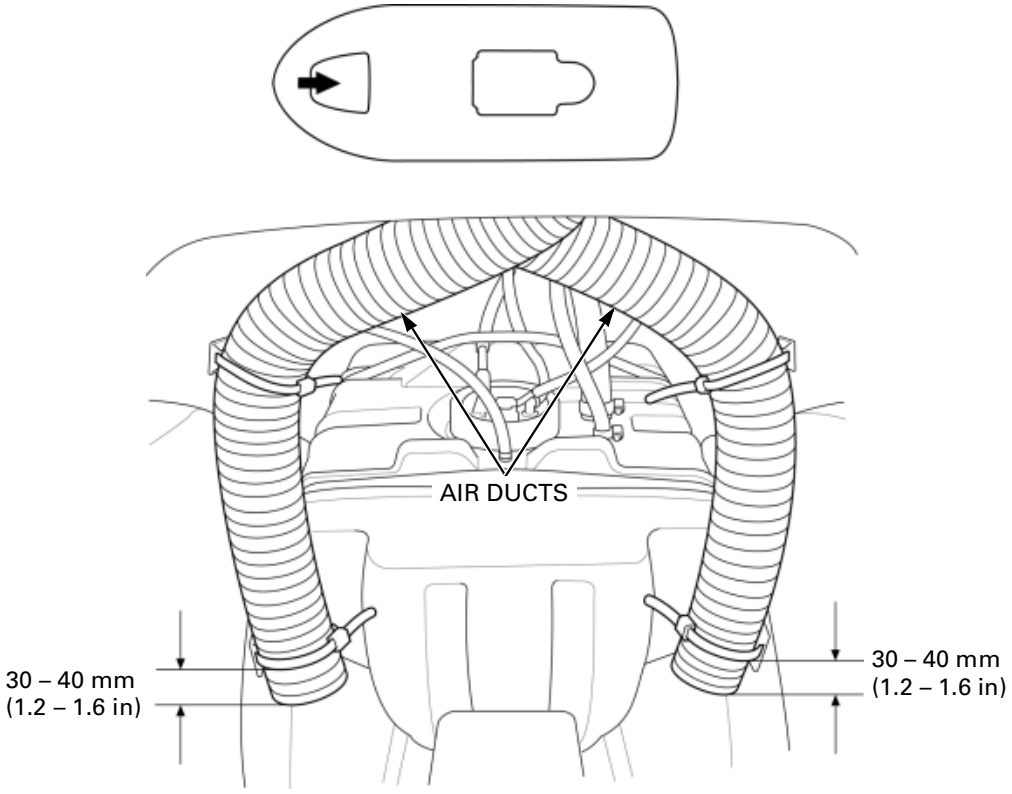


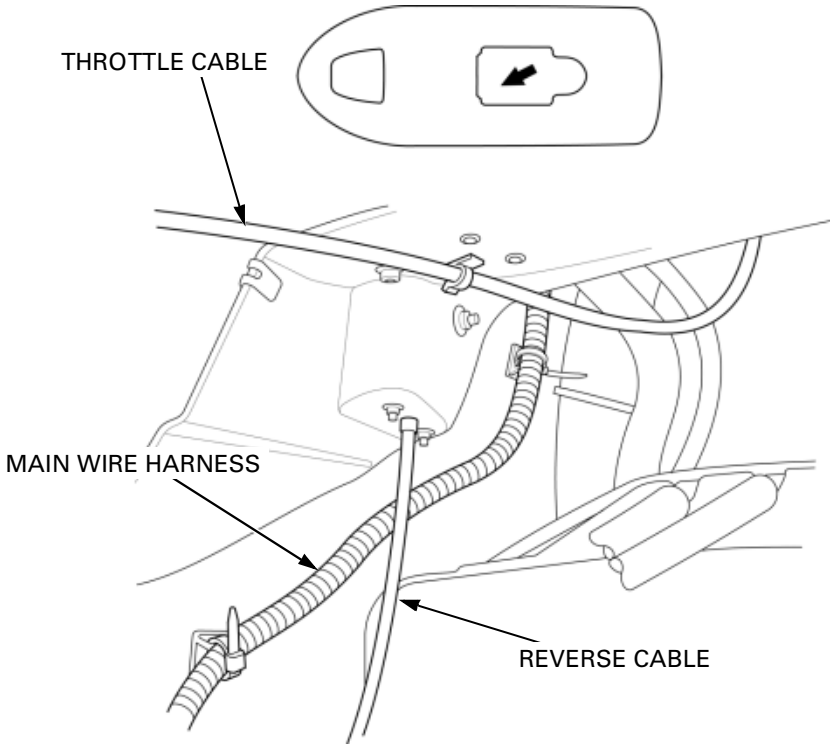
Reverse side of the deck:

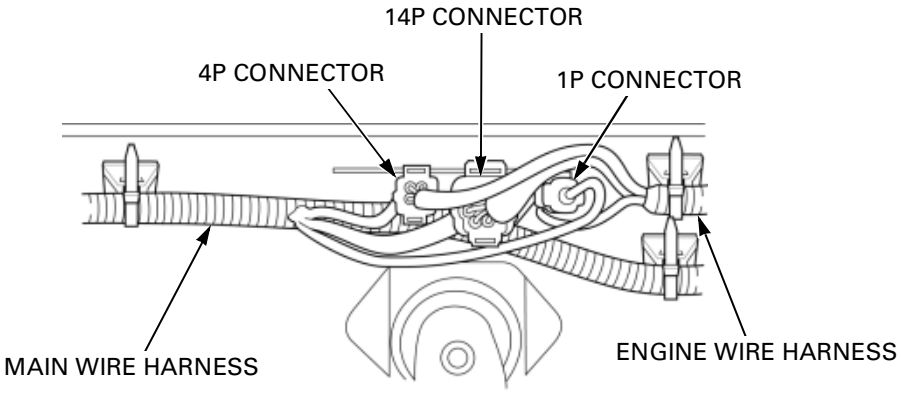


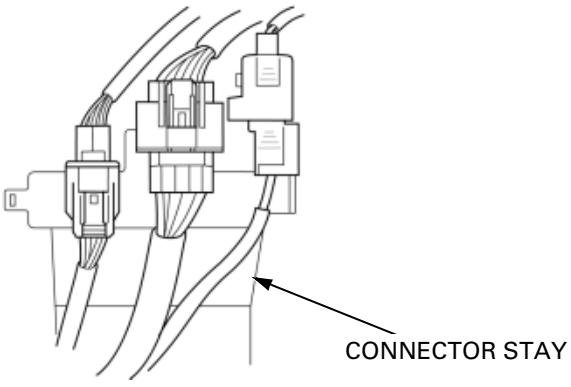

2-WAY VALVE
BREATHER PORT
FUEL FILLER HOSE
AIR BLEED HOSE
FUEL TANK
FUEL TANK BREATHER HOSE
FUEL PUMP WIRE
CONNECTORS:
– Meter 8P (gray) and 10P (green)
– Handlebar switch 4P (white)
– Warning buzzer 2P (white)
– Off-throttle limit switch 2P (red)

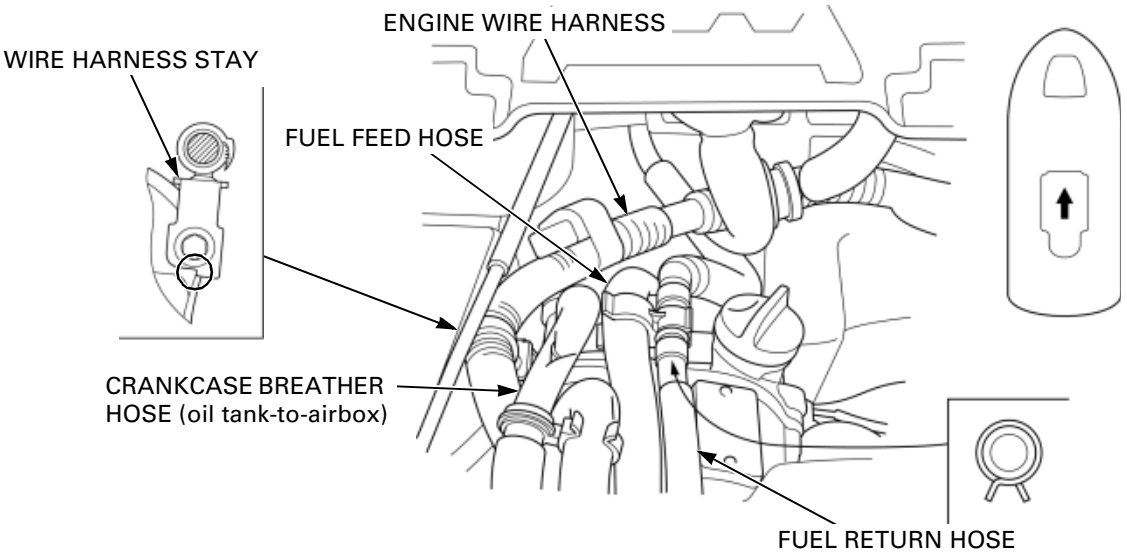

STEERING CABLE
FUEL FEED HOSE
FUEL RETURN HOSE
FUEL PUMP/LEVEL SENSOR 5P (GRAY) CONNECTOR
FUEL PUMP (inside the fuel tank)

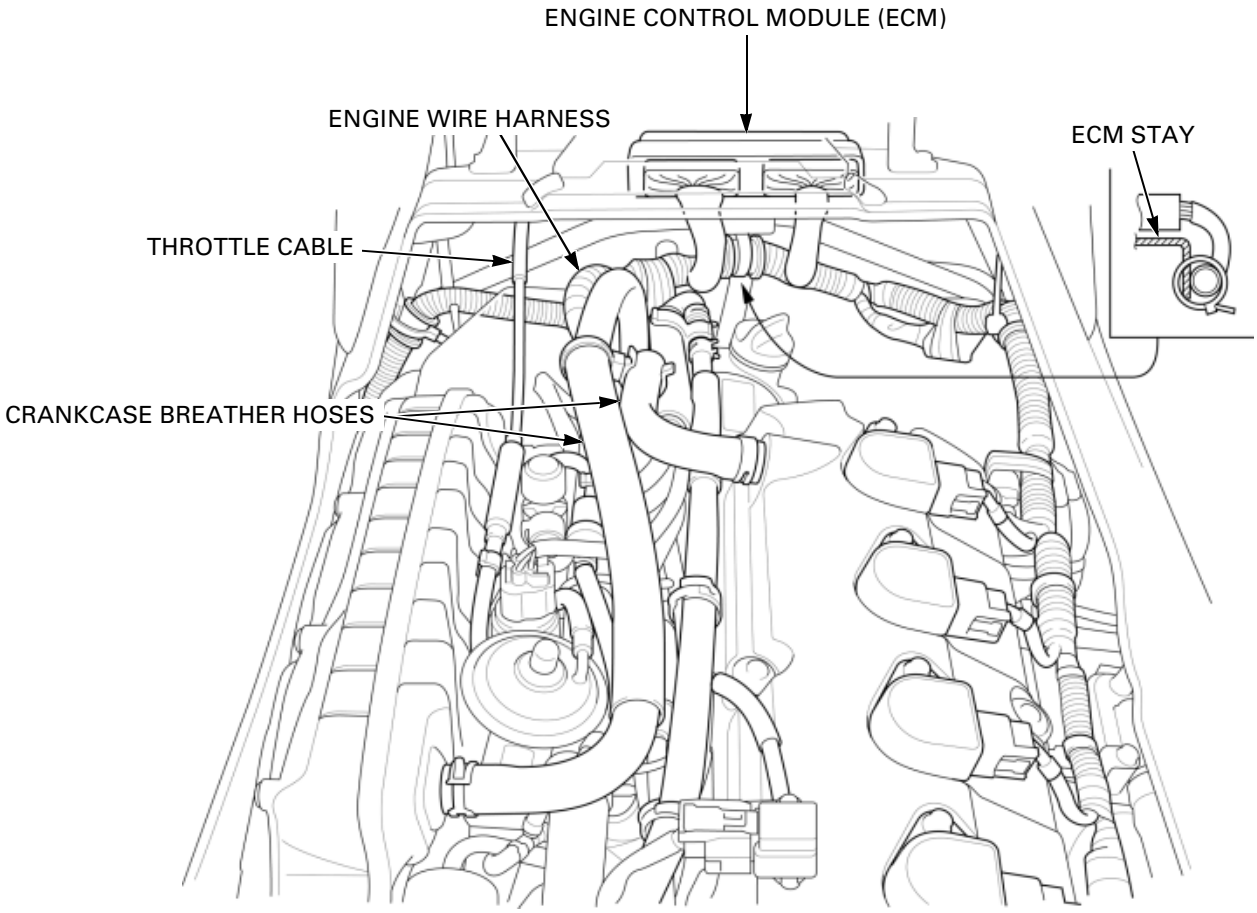

AIR DUCTS
30 – 40 mm
(1.2 – 1.6 in)
30 – 40 mm
(1.2 – 1.6 in)

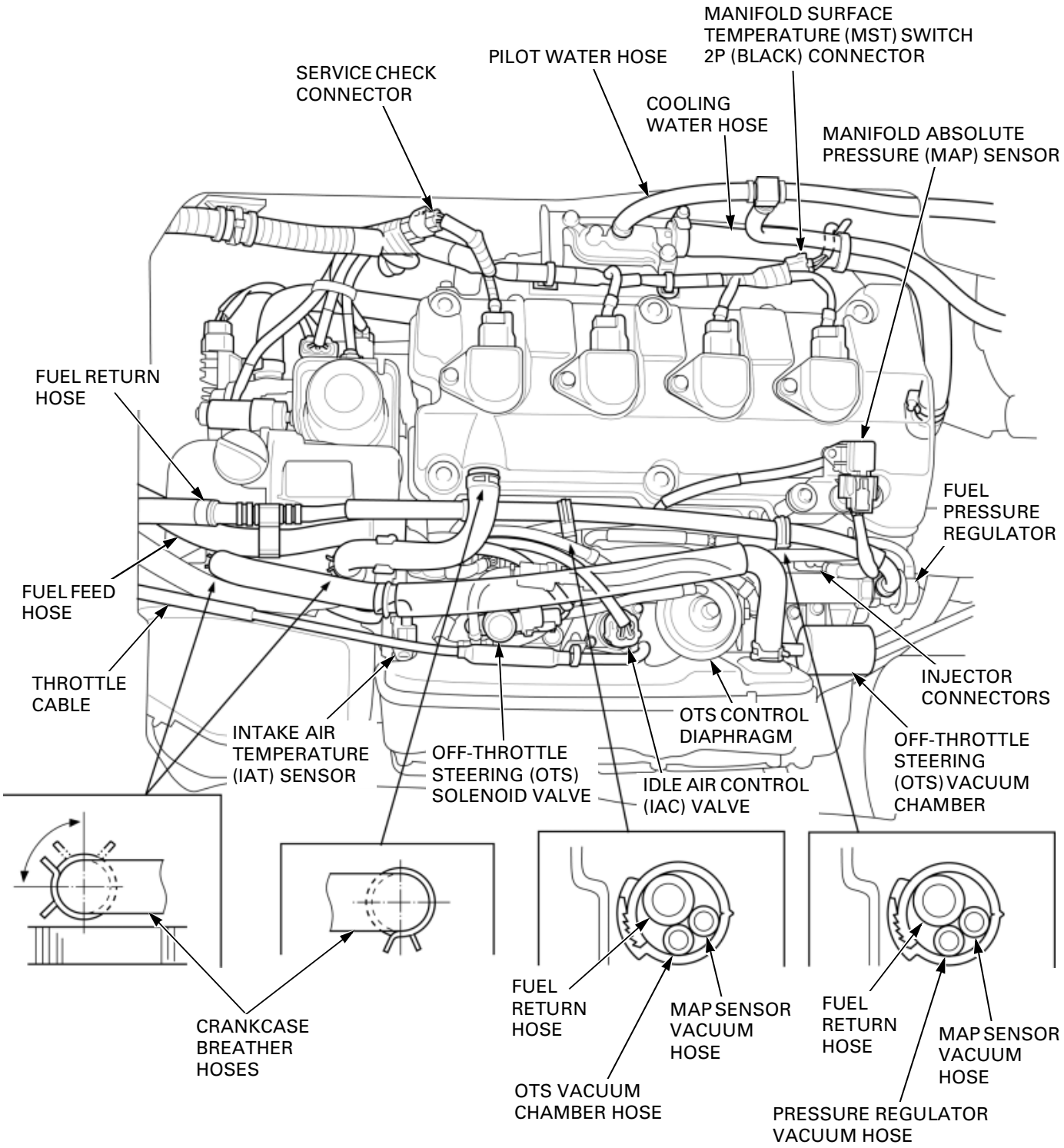

THROTTLE CABLE
MAIN WIRE HARNESS
REVERSE CABLE


14P CONNECTOR
4P CONNECTOR
1P CONNECTOR
MAIN WIRE HARNESS
ENGINE WIRE HARNESS

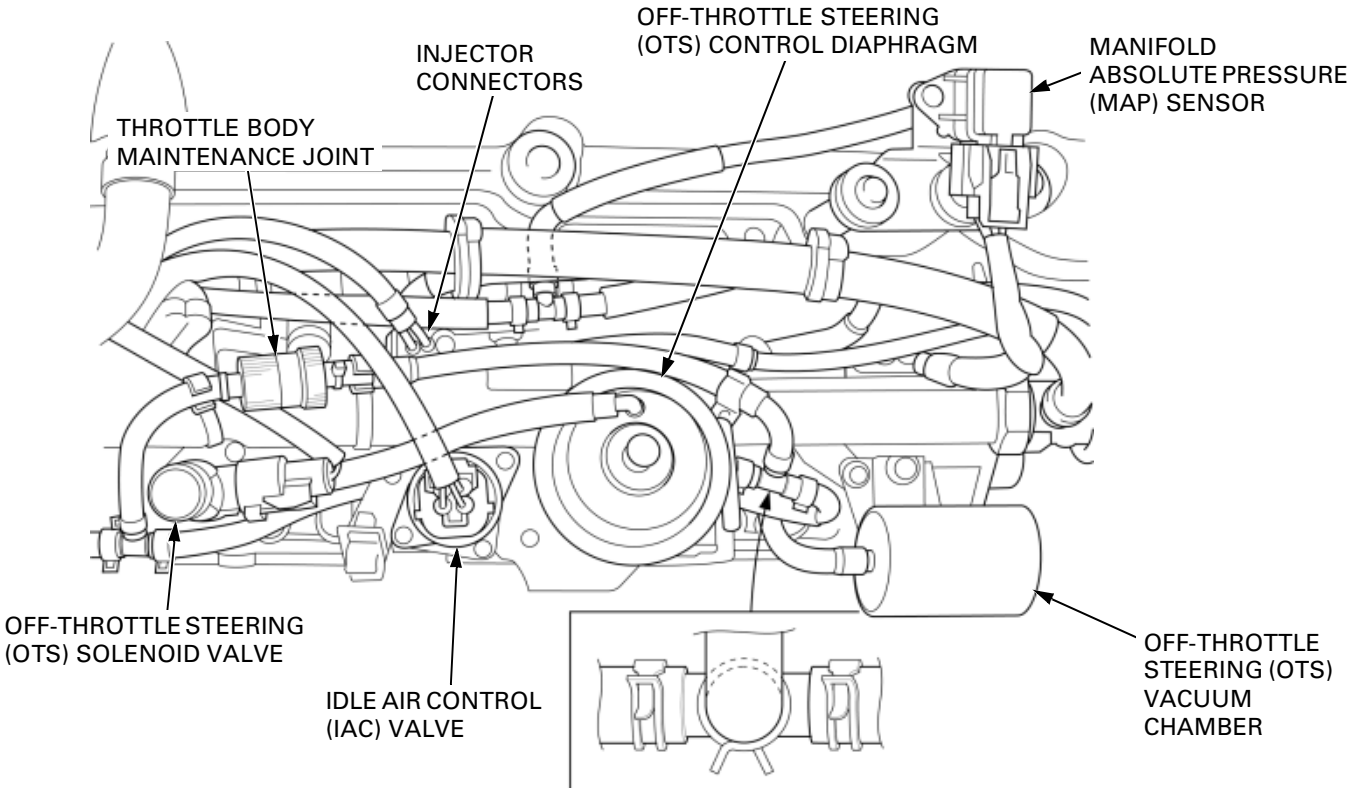

CONNECTOR STAY

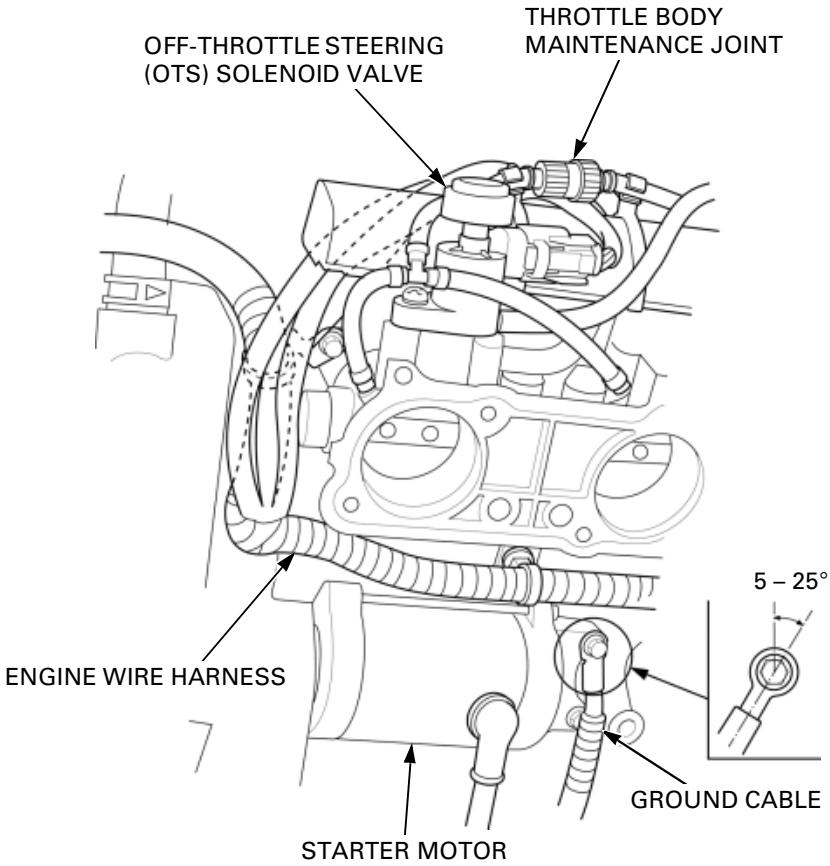

ENGINE WIRE HARNESS
WIRE HARNESS STAY
FUEL FEED HOSE
CRANKCASE BREATHER HOSE (oil tank-to-airbox)
FUEL RETURN HOSE

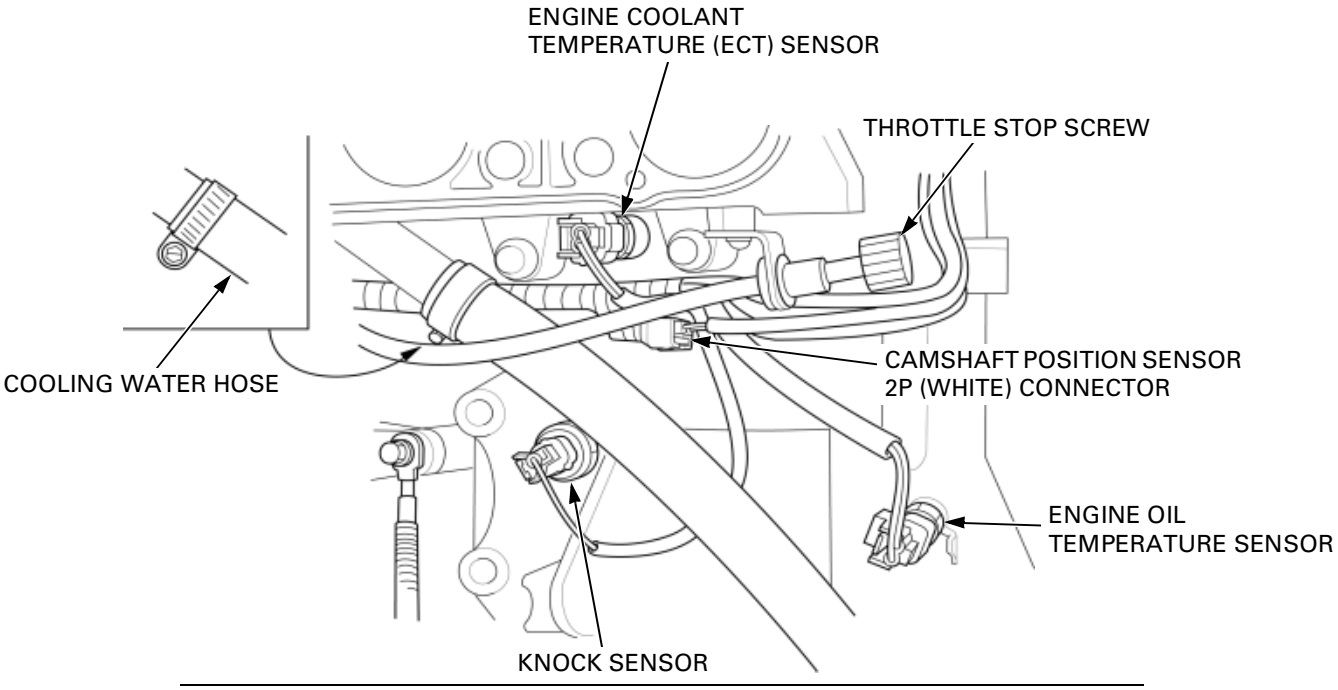

ENGINE CONTROL MODULE (ECM)
ENGINE WIRE HARNESS
ECM STAY
THROTTLE CABLE
CRANKCASE BREATHER HOSES

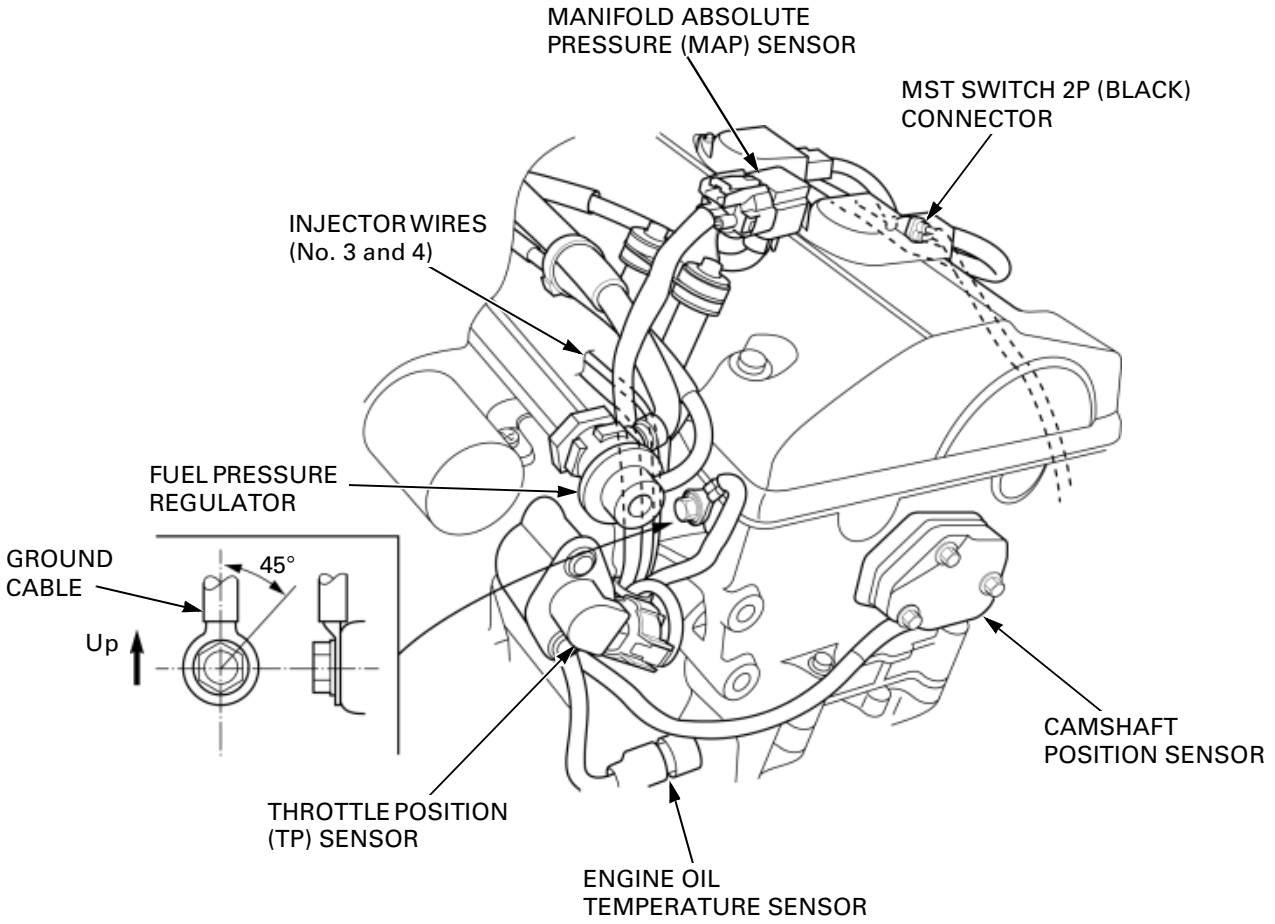

MANIFOLD SURFACE TEMPERATURE (MST) SWITCH 2P (BLACK) CONNECTOR
PILOT WATER HOSE
SERVICE CHECK CONNECTOR
COOLING WATER HOSE
MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
FUEL RETURN HOSE
FUEL PRESSURE REGULATOR
FUEL FEED HOSE
THROTTLE CABLE
INJECTOR CONNECTORS
OTS CONTROL DIAPHRAGM
INTAKE AIR TEMPERATURE (IAT) SENSOR
OFF-THROTTLE STEERING (OTS) SOLENOID VALVE
IDLE AIR CONTROL (IAC) VALVE
OFF-THROTTLE STEERING (OTS) VACUUM CHAMBER
FUEL RETURN HOSE
MAP SENSOR VACUUM HOSE
FUEL RETURN HOSE
MAP SENSOR VACUUM HOSE
CRANKCASE BREATHER HOSES
OTS VACUUM CHAMBER HOSE
PRESSURE REGULATOR VACUUM HOSE

ARX1200N3

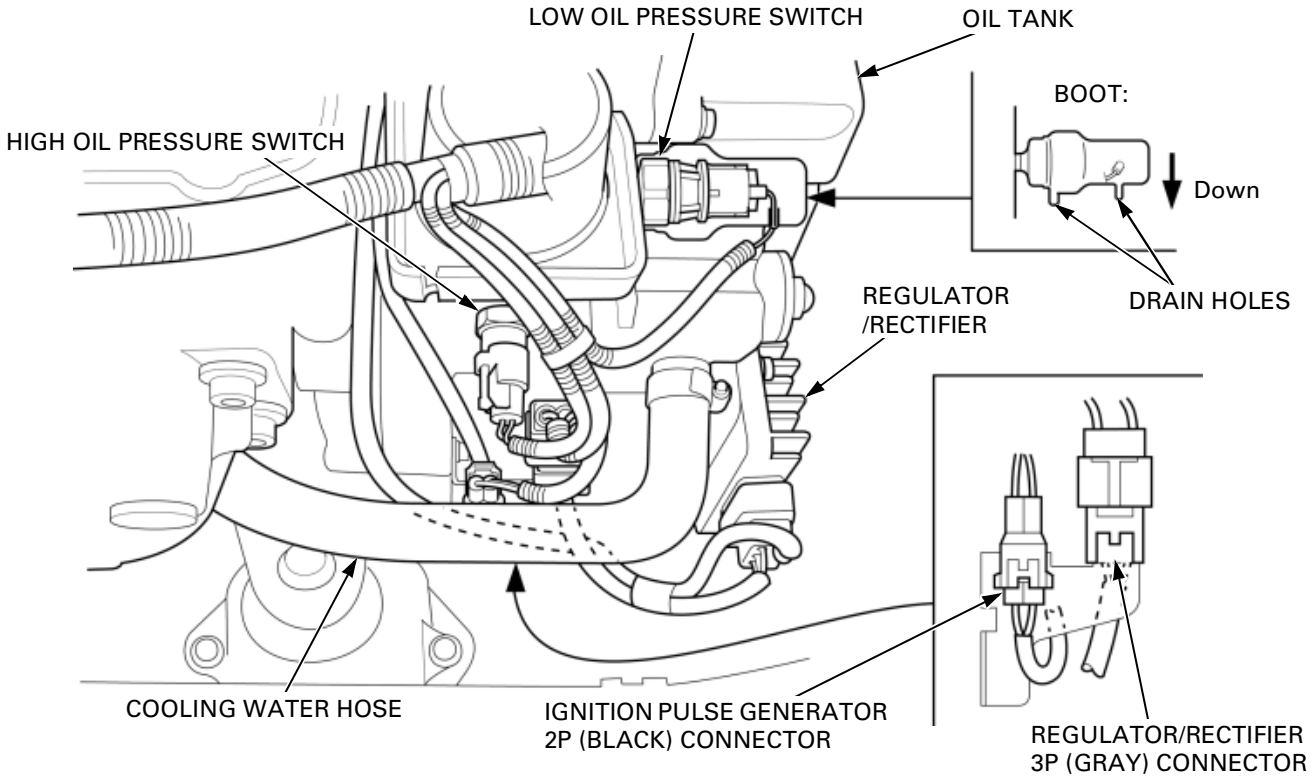

OFF-THROTTLE STEERING
(OTS) CONTROL DIAPHRAGM
INJECTOR
CONNECTORS
MANIFOLD
ABSOLUTE PRESSURE
(MAP) SENSOR
THROTTLE BODY
MAINTENANCE JOINT
OFF-THROTTLE STEERING
(OTS) SOLENOID VALVE
IDLE AIR CONTROL
(IAC) VALVE
OFF-THROTTLE
STEERING (OTS)
VACUUM
CHAMBER

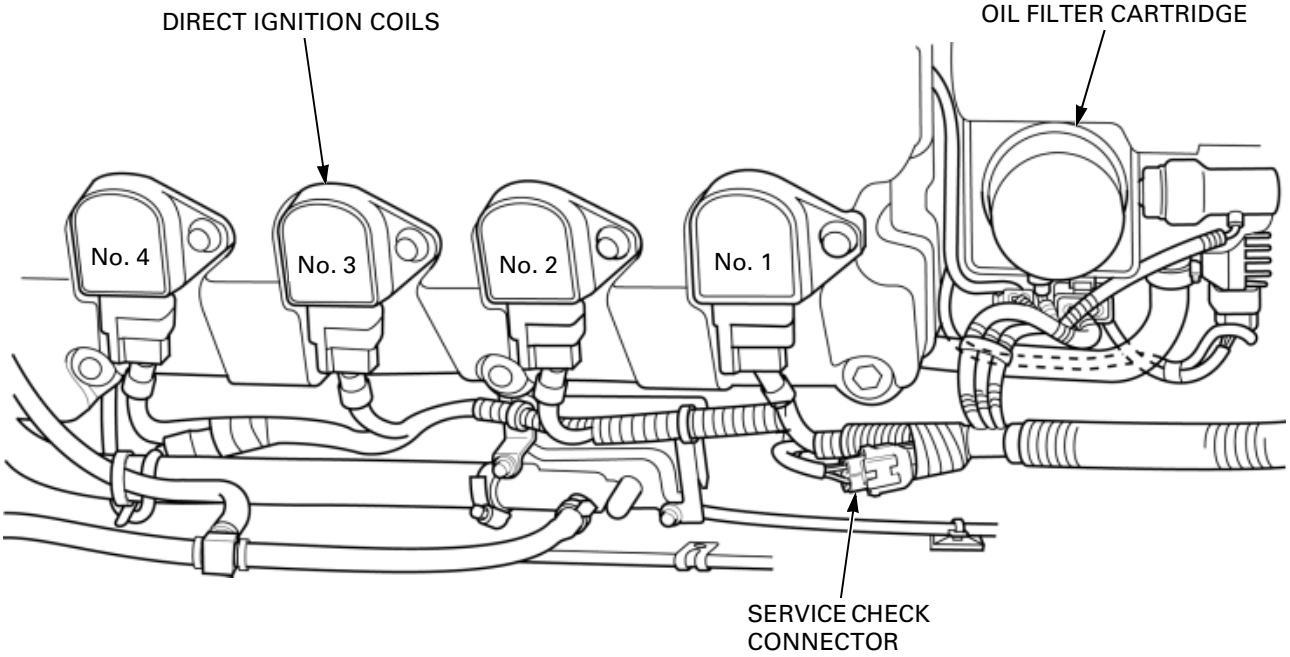

OFF-THROTTLE STEERING
(OTS) SOLENOID VALVE
THROTTLE BODY
MAINTENANCE JOINT
5 – 25°
ENGINE WIRE HARNESS
GROUND CABLE
STARTER MOTOR

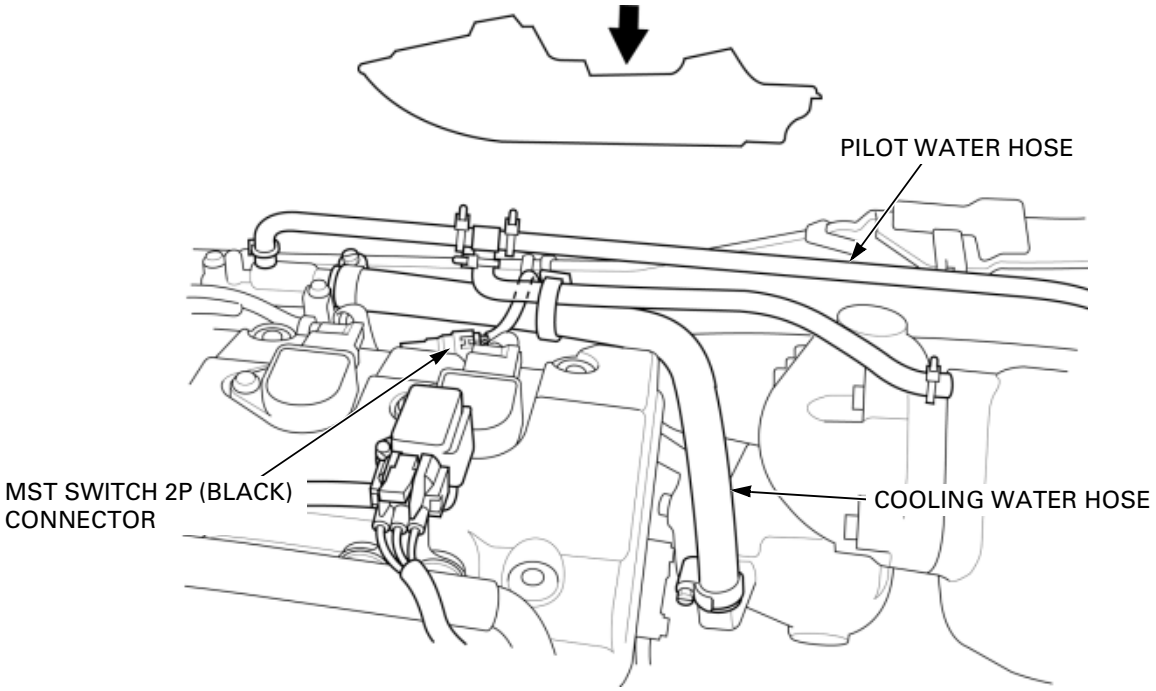

ENGINE COOLANT
TEMPERATURE (ECT) SENSOR
THROTTLE STOP SCREW
COOLING WATER HOSE
CAMSHAFT POSITION SENSOR
2P (WHITE) CONNECTOR
ENGINE OIL
TEMPERATURE SENSOR
KNOCK SENSOR

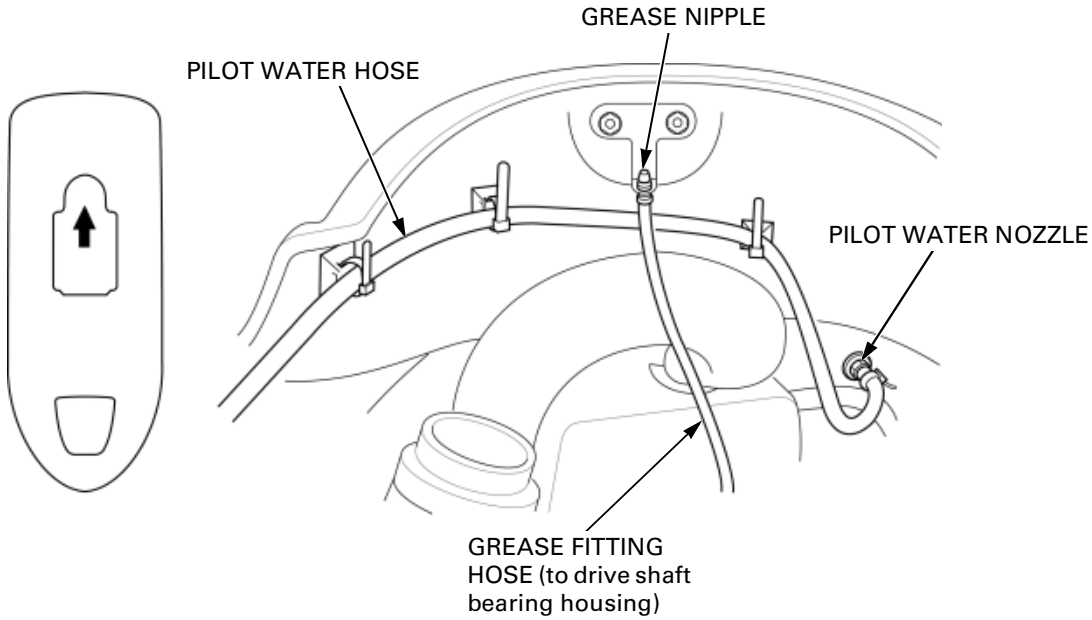

MANIFOLD ABSOLUTE
PRESSURE (MAP) SENSOR
MST SWITCH 2P (BLACK)
CONNECTOR
INJECTOR WIRES
(No. 3 and 4)
FUEL PRESSURE
REGULATOR
GROUND
CABLE
45°
Up
CAMSHAFT
POSITION SENSOR
THROTTLE POSITION
(TP) SENSOR
ENGINE OIL
TEMPERATURE SENSOR

ARX1200N3

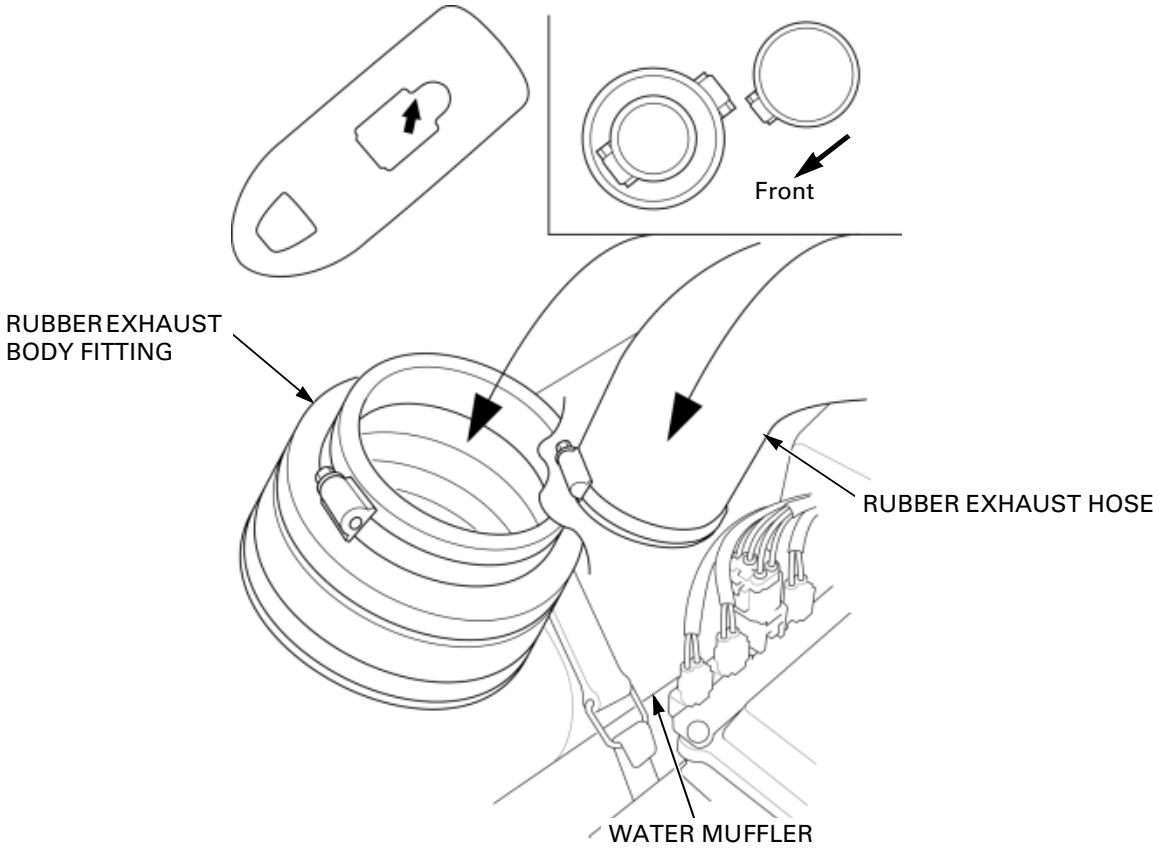

LOW OIL PRESSURE SWITCH
OIL TANK
BOOT:
HIGH OIL PRESSURE SWITCH
Down
DRAIN HOLES
REGULATOR
/RECTIFIER
COOLING WATER HOSE
IGNITION PULSE GENERATOR
2P (BLACK) CONNECTOR
REGULATOR/RECTIFIER
3P (GRAY) CONNECTOR

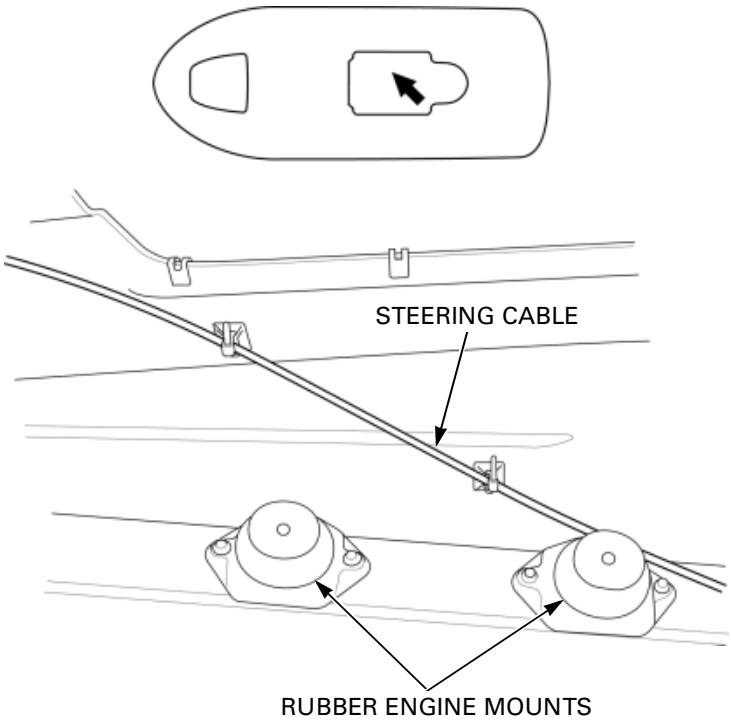

DIRECT IGNITION COILS
OIL FILTER CARTRIDGE
No. 4
No. 3
No. 2
No. 1
SERVICE CHECK
CONNECTOR

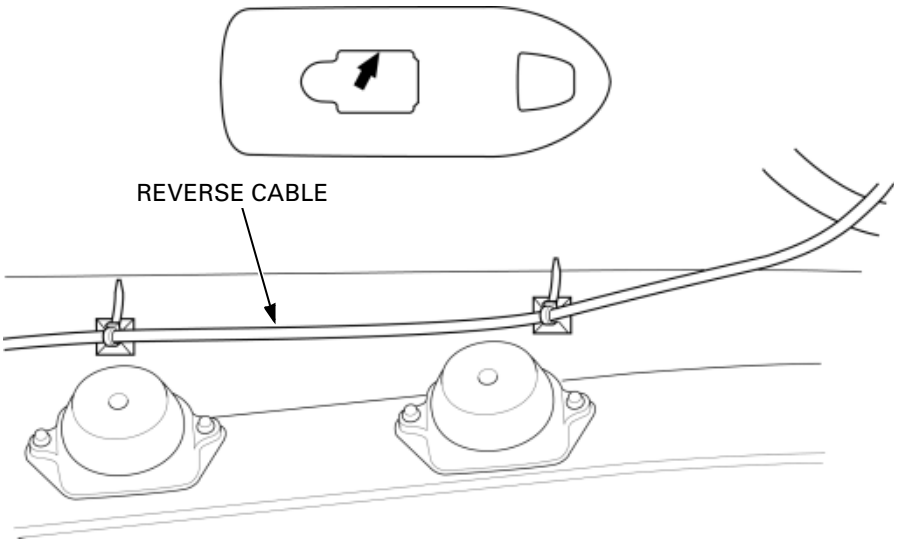

PILOT WATER HOSE
MST SWITCH 2P (BLACK) CONNECTOR
COOLING WATER HOSE


GREASE NIPPLE
PILOT WATER HOSE
PILOT WATER NOZZLE
GREASE FITTING HOSE (to drive shaft bearing housing)

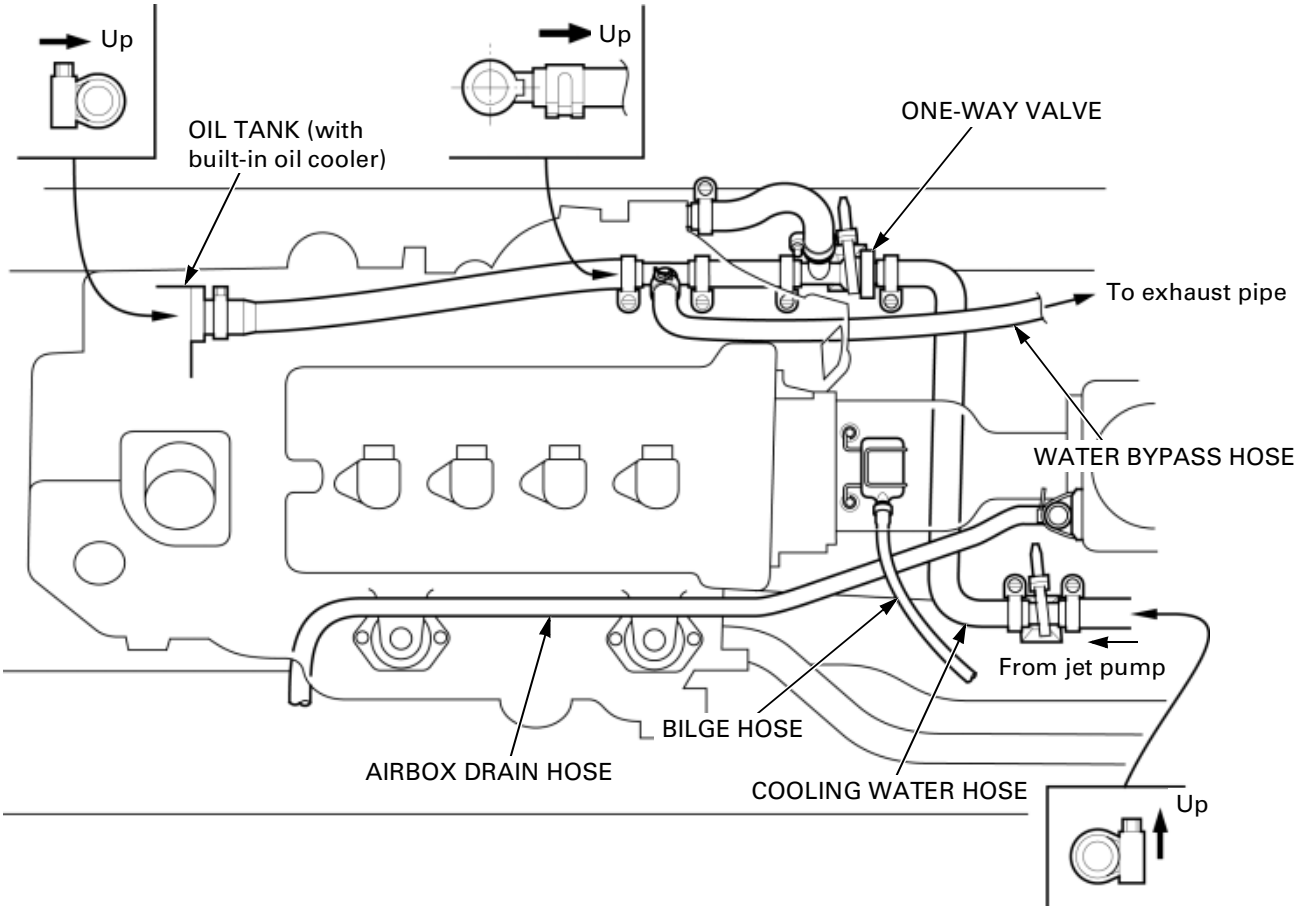
ARX1200N3

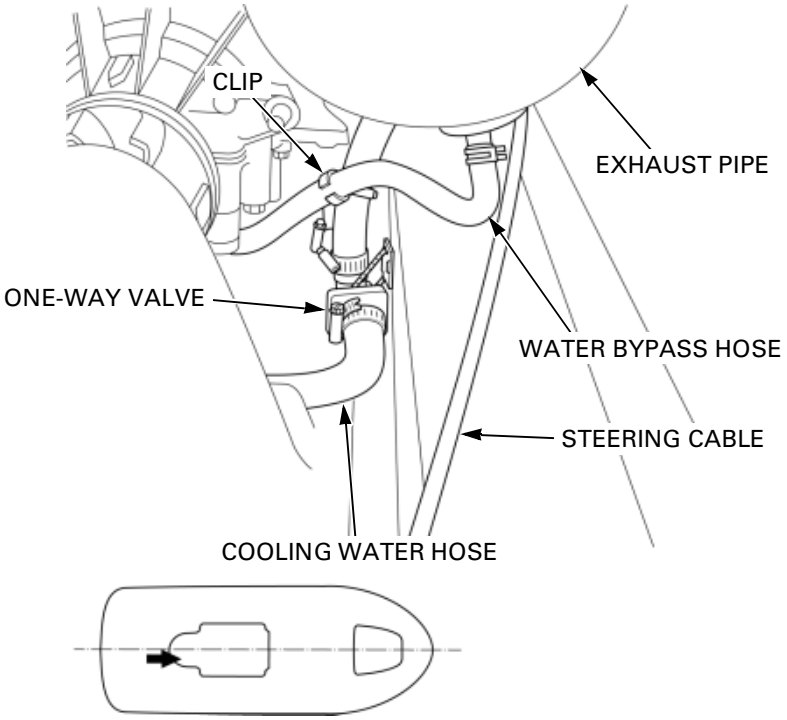

Front
RUBBER EXHAUST
BODY FITTING
RUBBER EXHAUST HOSE
WATER MUFFLER

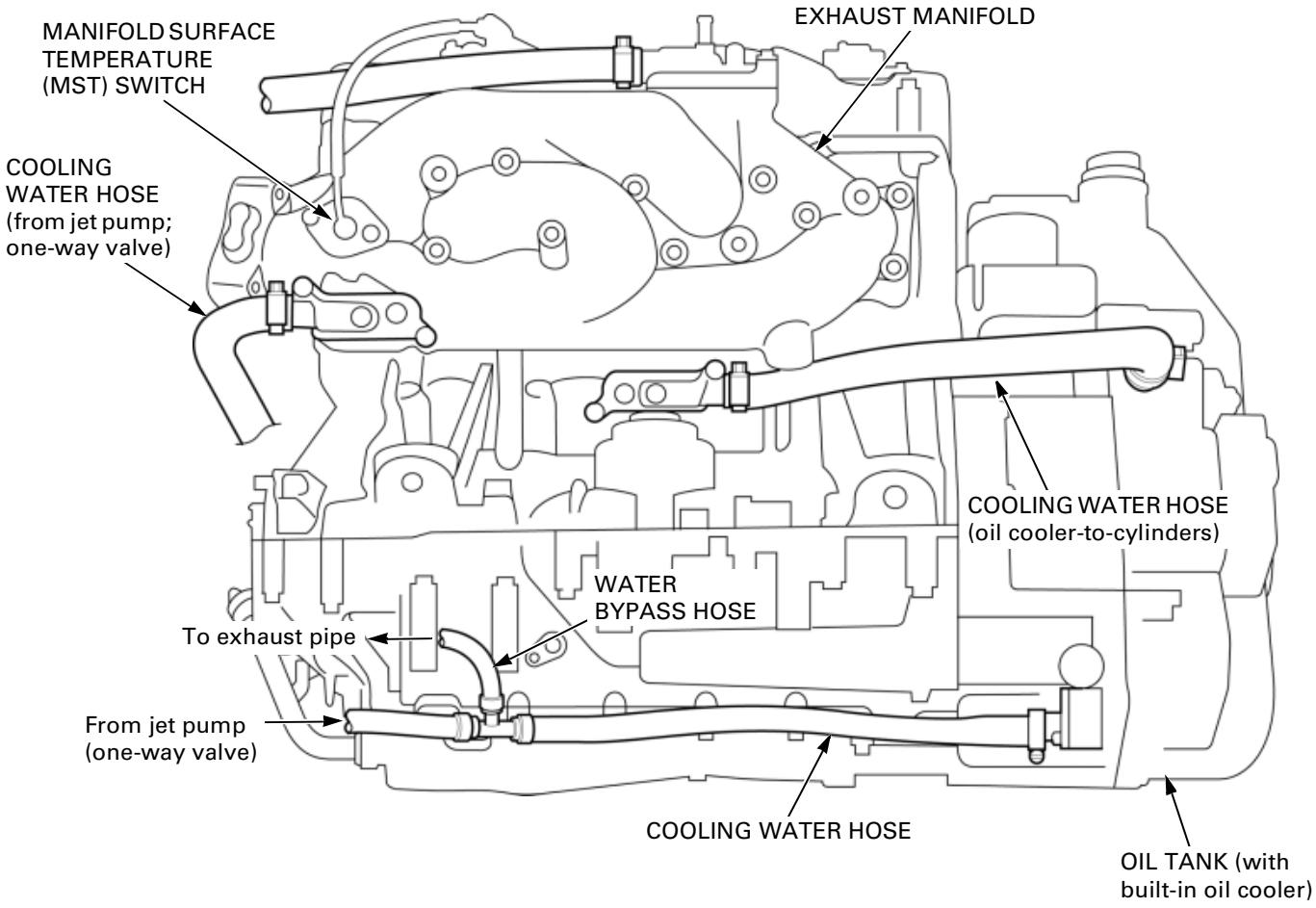

STEERING CABLE
RUBBER ENGINE MOUNTS

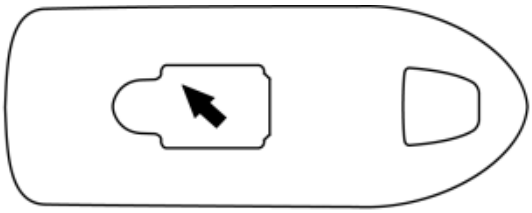

REVERSE CABLE

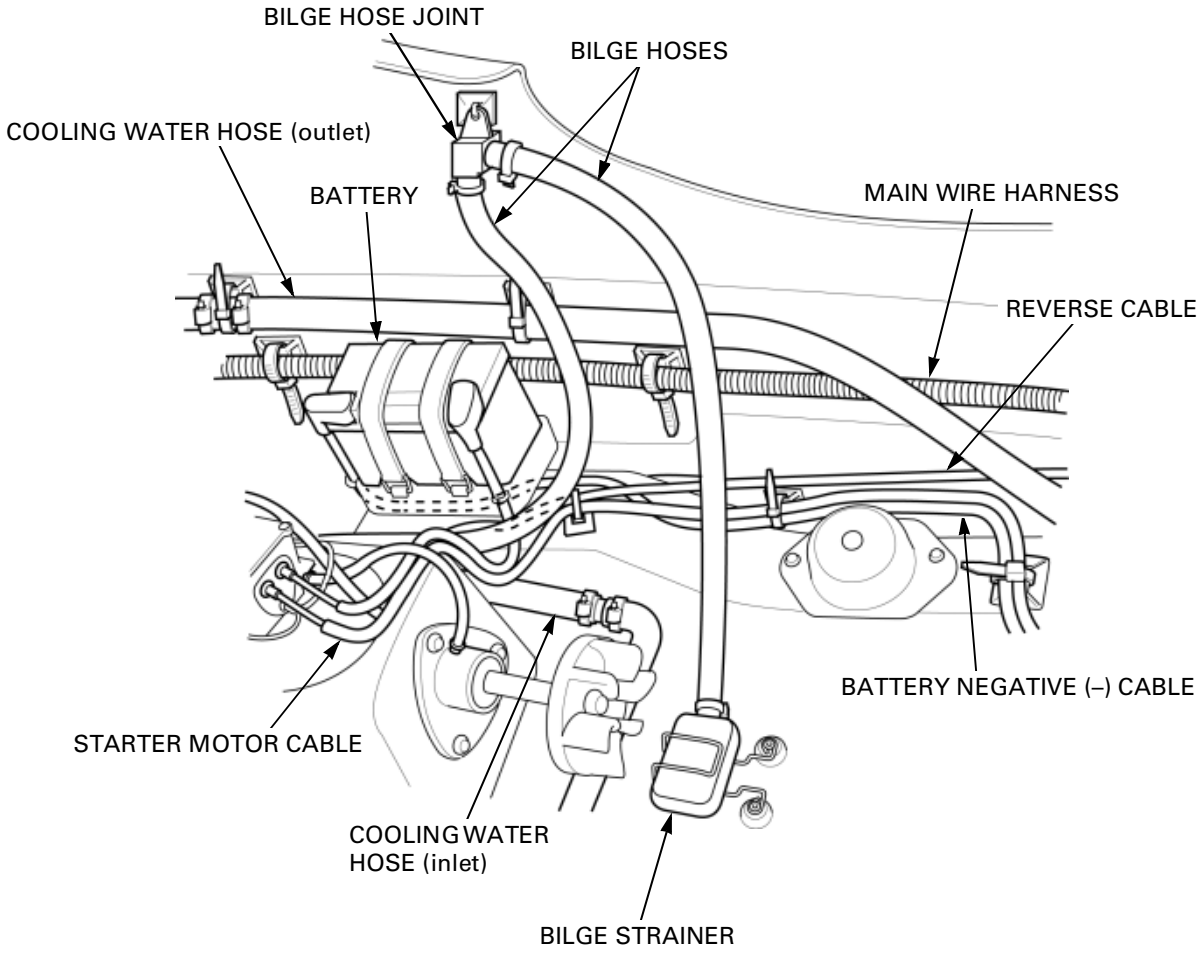
ARX1200N3

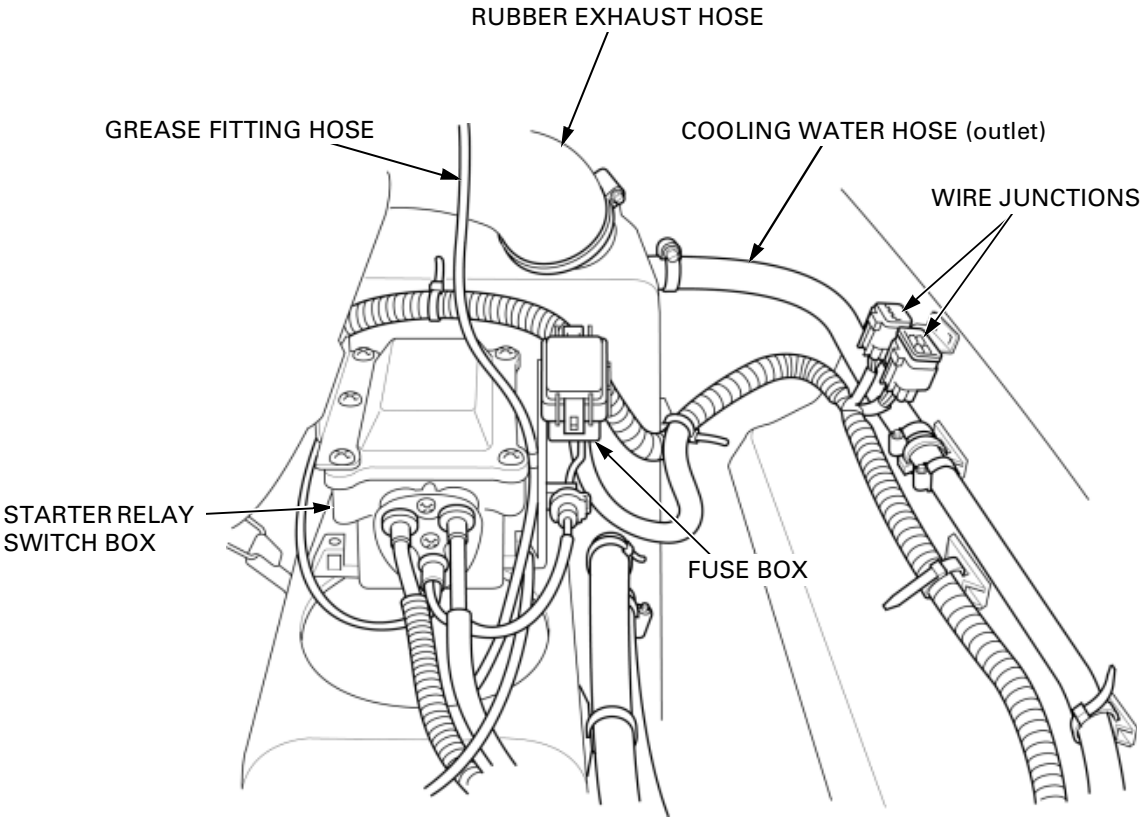

Up
Up
OIL TANK (with built-in oil cooler)
ONE-WAY VALVE
To exhaust pipe
WATER BYPASS HOSE
From jet pump
BILGE HOSE
AIRBOX DRAIN HOSE
COOLING WATER HOSE
Up

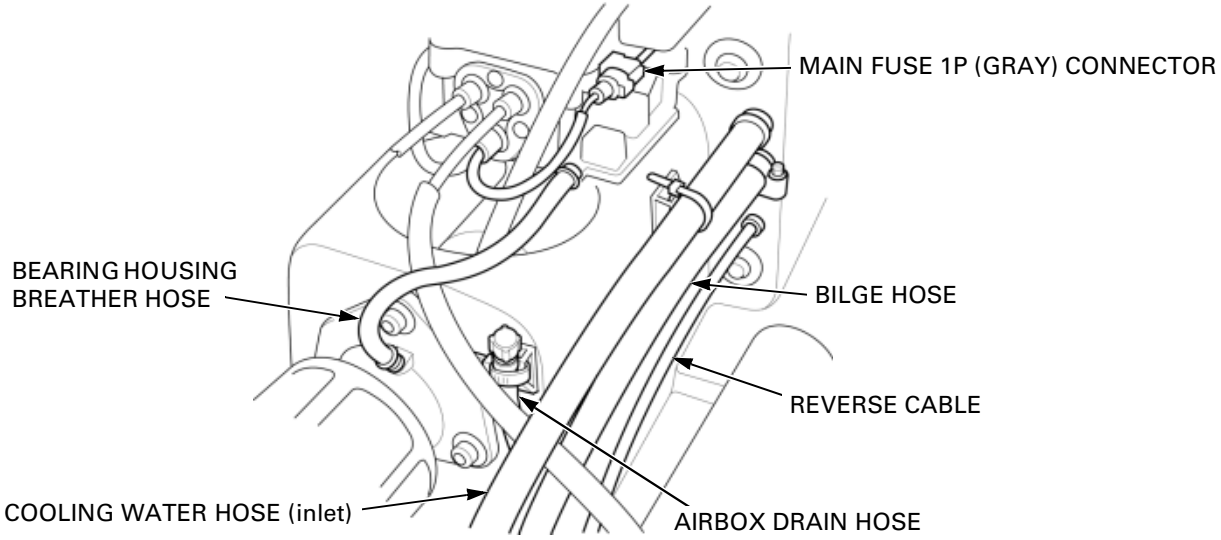

CLIP
EXHAUST PIPE
ONE-WAY VALVE
WATER BYPASS HOSE
STEERING CABLE
COOLING WATER HOSE

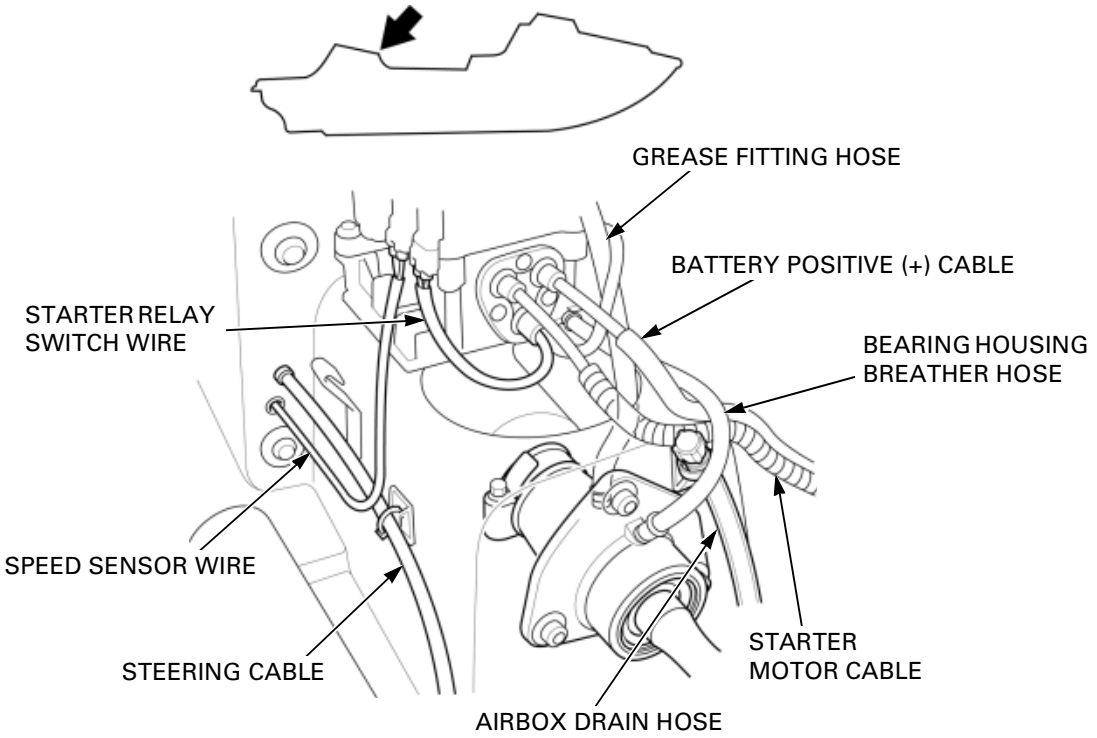

MANIFOLD SURFACE TEMPERATURE (MST) SWITCH
EXHAUST MANIFOLD
COOLING WATER HOSE (from jet pump; one-way valve)
COOLING WATER HOSE (oil cooler-to-cylinders)
WATER BYPASS HOSE
To exhaust pipe
From jet pump (one-way valve)
COOLING WATER HOSE
OIL TANK (with built-in oil cooler)

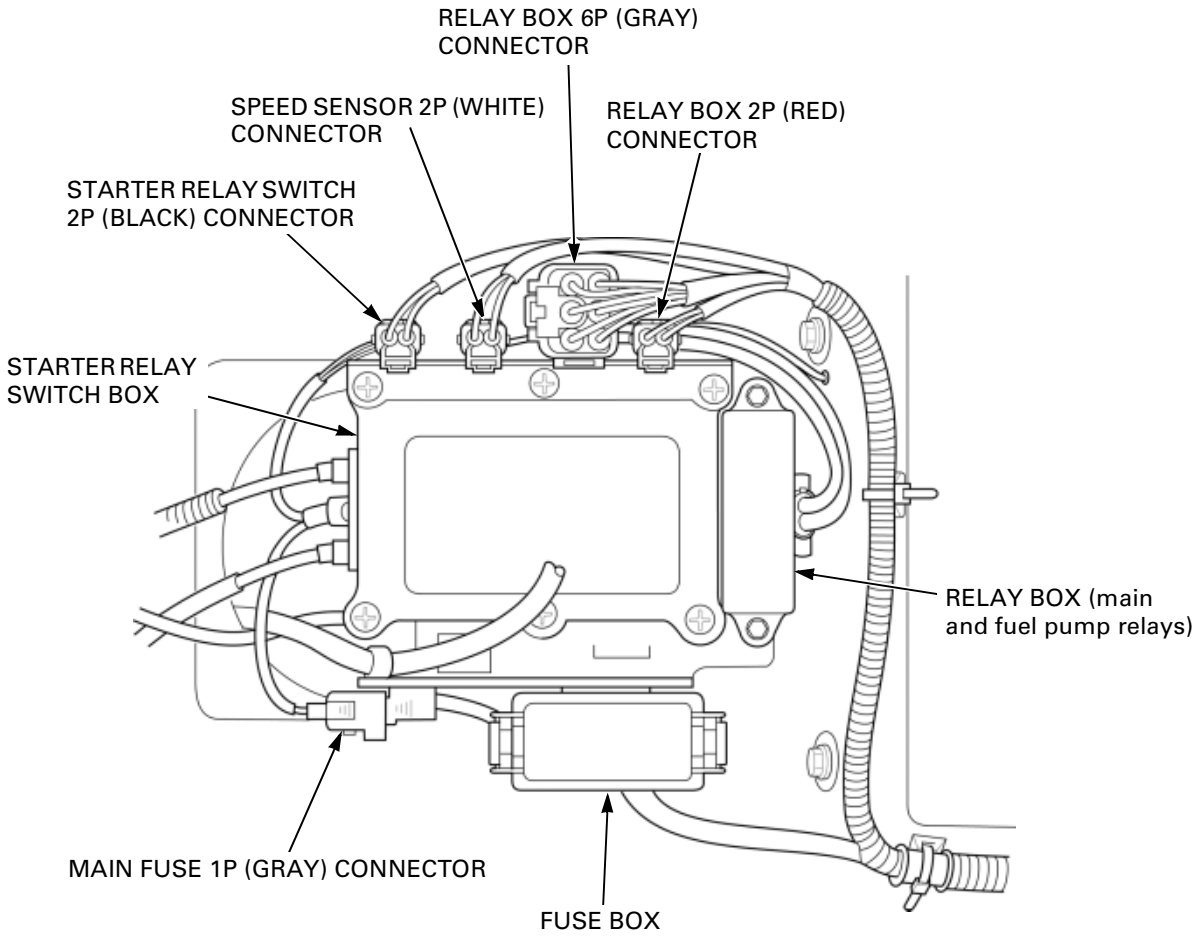


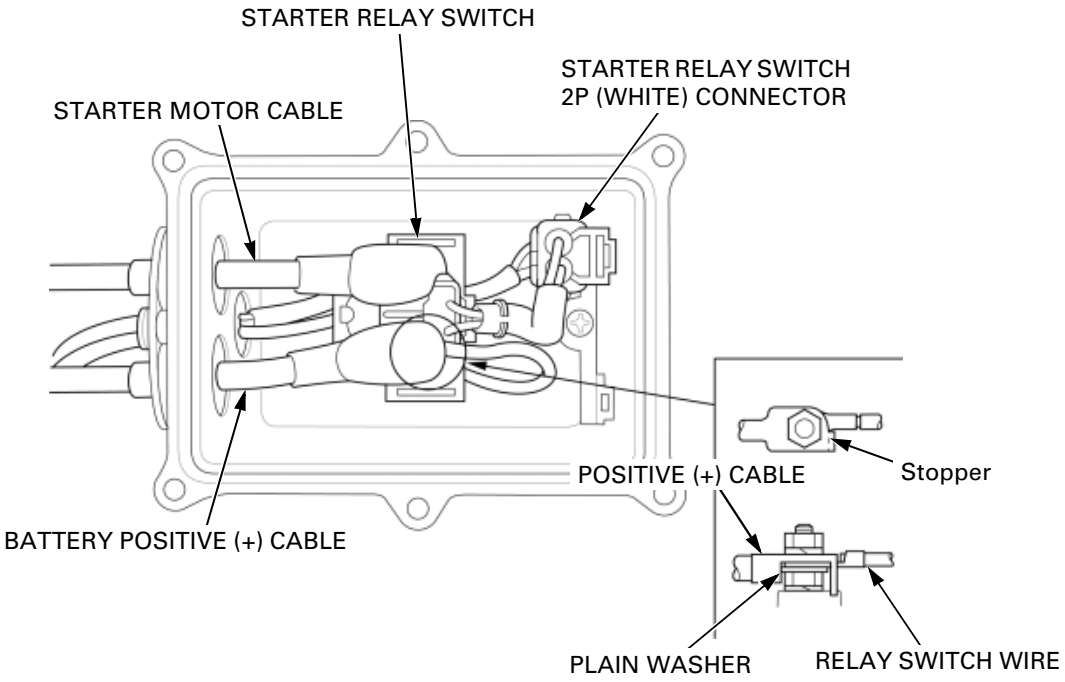

BILGE HOSE JOINT
BILGE HOSES
COOLING WATER HOSE (outlet)
BATTERY
MAIN WIRE HARNESS
REVERSE CABLE
BATTERY NEGATIVE (–) CABLE
STARTER MOTOR CABLE
COOLING WATER HOSE (inlet)
BILGE STRAINER

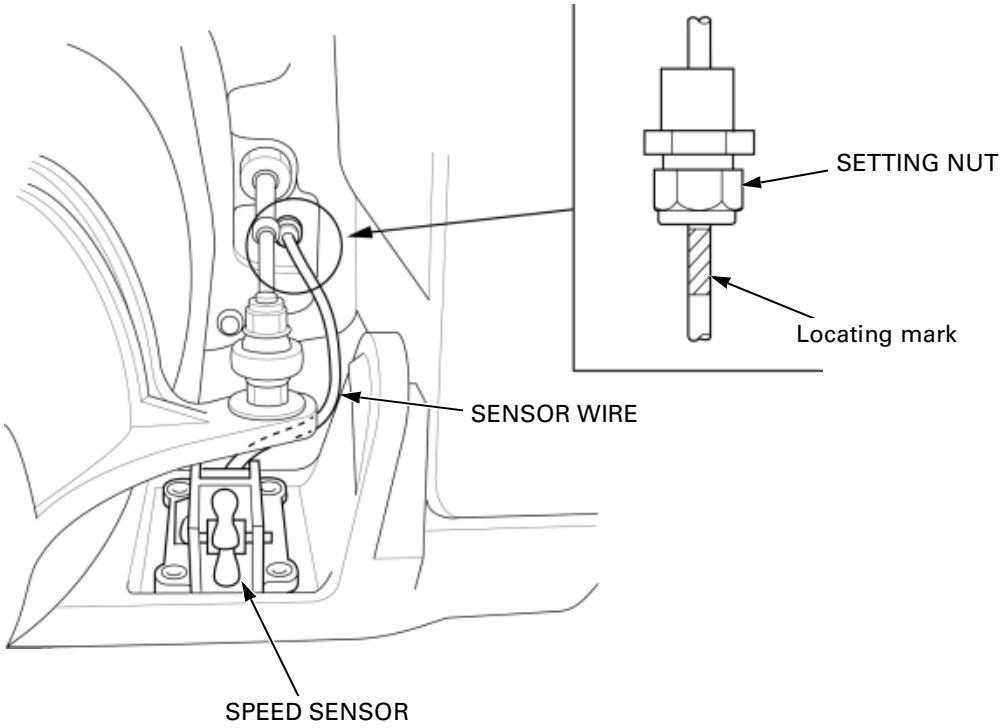

RUBBER EXHAUST HOSE
GREASE FITTING HOSE
COOLING WATER HOSE (outlet)
WIRE JUNCTIONS
STARTER RELAY SWITCH BOX
FUSE BOX

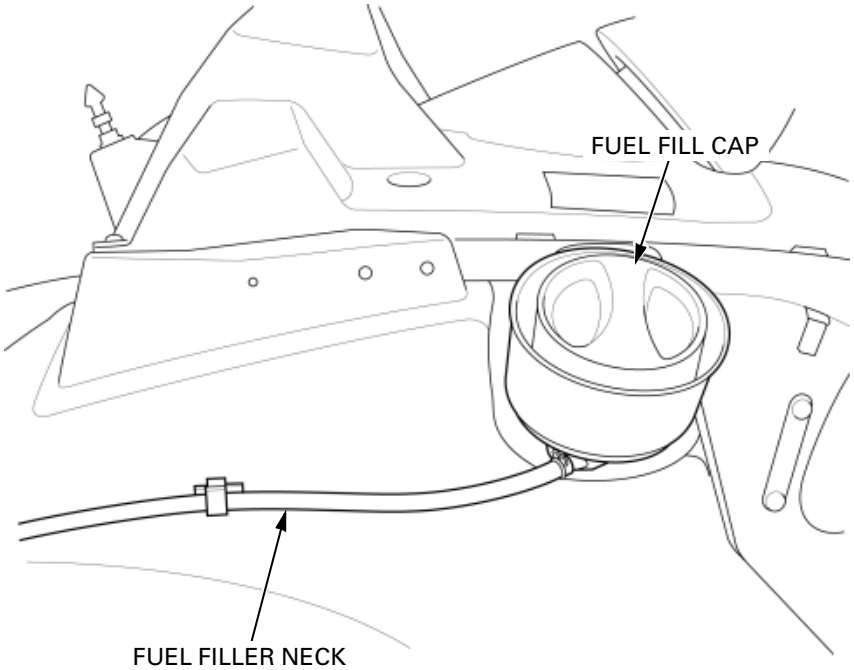

MAIN FUSE 1P (GRAY) CONNECTOR
BEARING HOUSING BREATHER HOSE
BILGE HOSE
REVERSE CABLE
COOLING WATER HOSE (inlet)
AIRBOX DRAIN HOSE


GREASE FITTING HOSE
BATTERY POSITIVE (+) CABLE
STARTER RELAY SWITCH WIRE
BEARING HOUSING BREATHER HOSE
SPEED SENSOR WIRE
STEERING CABLE
STARTER MOTOR CABLE
AIRBOX DRAIN HOSE


RELAY BOX 6P (GRAY) CONNECTOR
SPEED SENSOR 2P (WHITE) CONNECTOR
RELAY BOX 2P (RED) CONNECTOR
STARTER RELAY SWITCH 2P (BLACK) CONNECTOR
STARTER RELAY SWITCH BOX
RELAY BOX (main and fuel pump relays)
MAIN FUSE 1P (GRAY) CONNECTOR
FUSE BOX


STARTER RELAY SWITCH
STARTER RELAY SWITCH
2P (WHITE) CONNECTOR
STARTER MOTOR CABLE
POSITIVE (+) CABLE
Stopper
BATTERY POSITIVE (+) CABLE
PLAIN WASHER
RELAY SWITCH WIRE


SETTING NUT
Locating mark
SENSOR WIRE
SPEED SENSOR


FUEL FILL CAP
FUEL FILLER NECK
DRAIN HOSE

EMISSION CONTROL SYSTEMS

SOURCE OF EMISSIONS

The combustion process produces carbon monoxide, oxides of nitrogen and hydrocarbons. Control of oxides of nitrogen and hydrocarbons is very important because, under certain conditions, they react to form photochemical smog when subjected to sunlight. Carbon monoxide does not react in the same way, but is toxic.

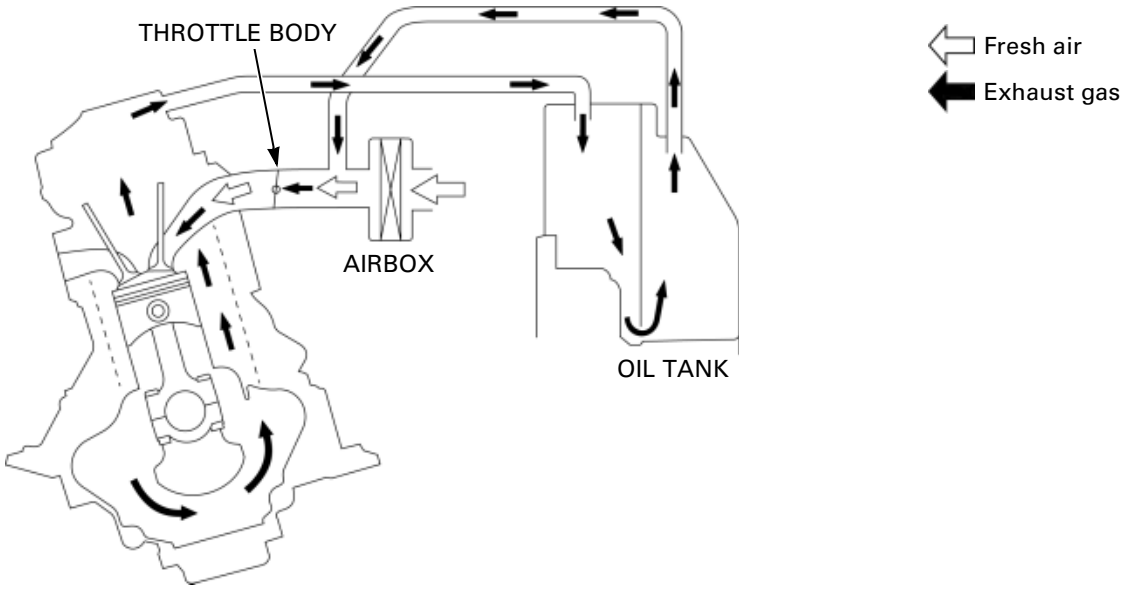
Honda Motor Co., Ltd. utilizes lean injection settings as well as other systems, to reduce carbon monoxide, oxides of nitrogen and hydrocarbons.

CRANKCASE EMISSION CONTROL SYSTEM

The engine is equipped with a closed crankcase system to prevent discharging crankcase emissions into the atmosphere.

Blow-by gas is returned to the combustion chamber through the oil tank, airbox, and throttle body.

ARX1200N3:



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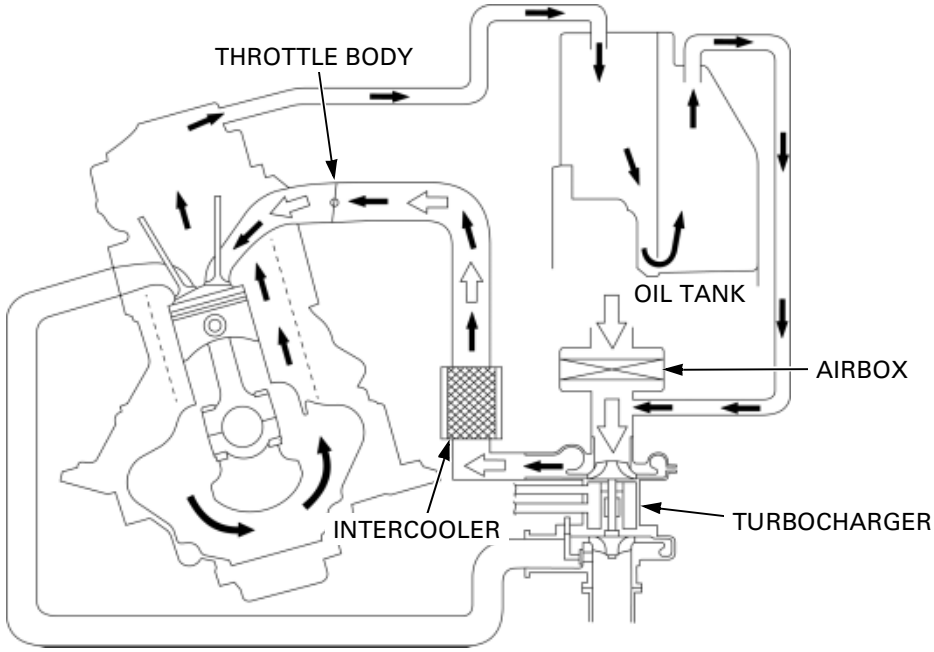
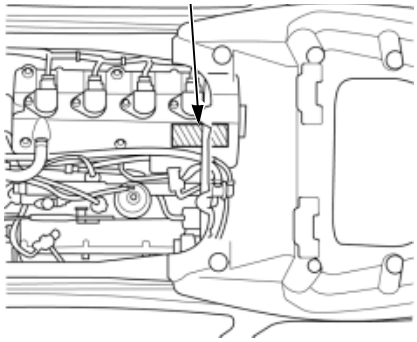


EMISSION CONTROL INFORMATION LABEL

An Emission Control Information Label is located on the cylinder head cover as shown. It gives basic tune-up specifications.

EMISSION CONTROL INFORMATION LABEL



2. TECHNICAL FEATURES

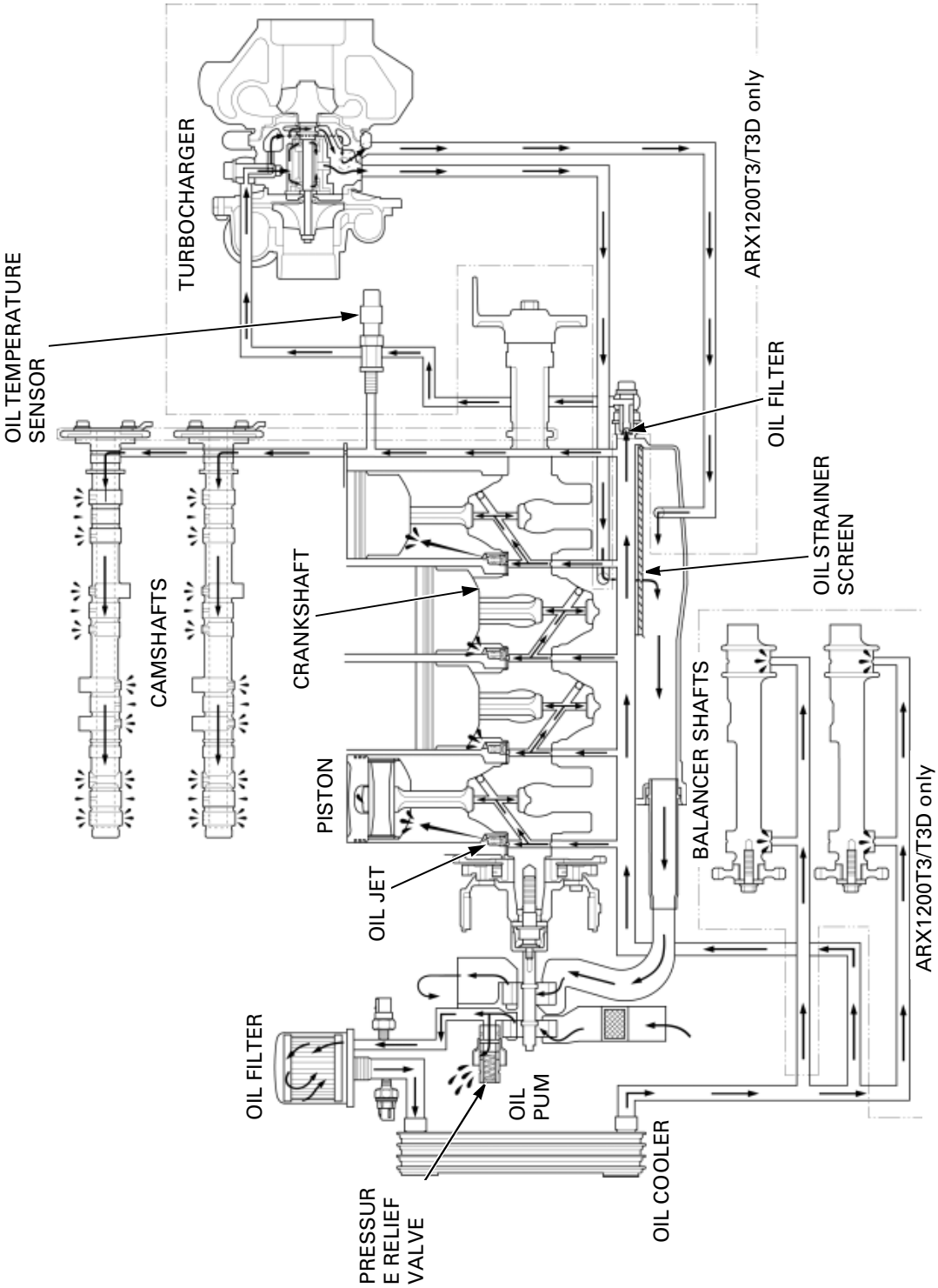
DRY-SUMP SYSTEMS (ENGINE LUBRICATION)

This dry sump system consists of an external oil tank on the front of the engine, and a dual rotor oil pump (scavenge and feed) located within the oil tank.

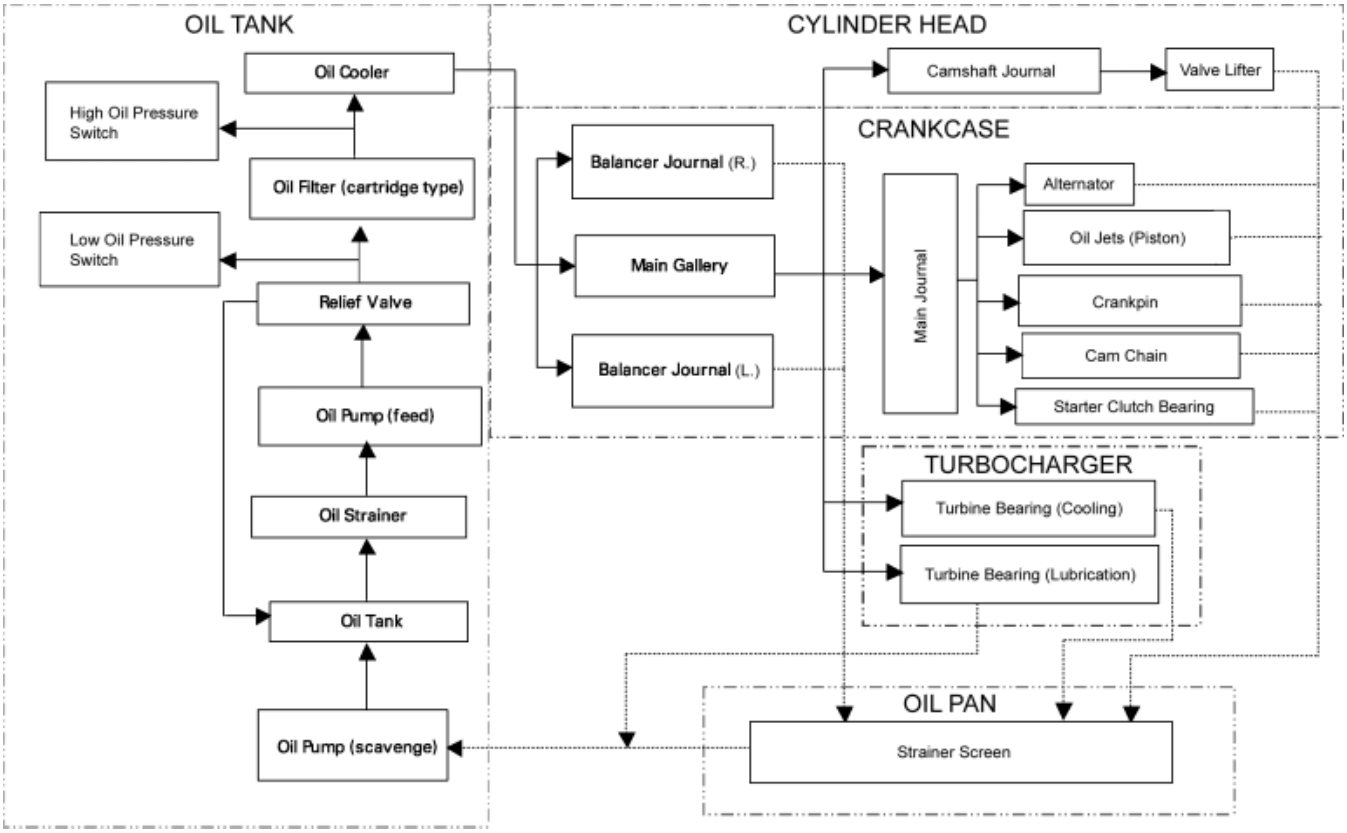
The feed pump draws oil from the oil tank and supplies it to various engine components. The scavenge pump transfers oil from the sump to the oil tank.

This engine can be positioned lower than conventional engines, because the oil is not stored in the lower portion of the crankcase.

This dry sump design incorporates an oil cooler that lowers the oil temperature.

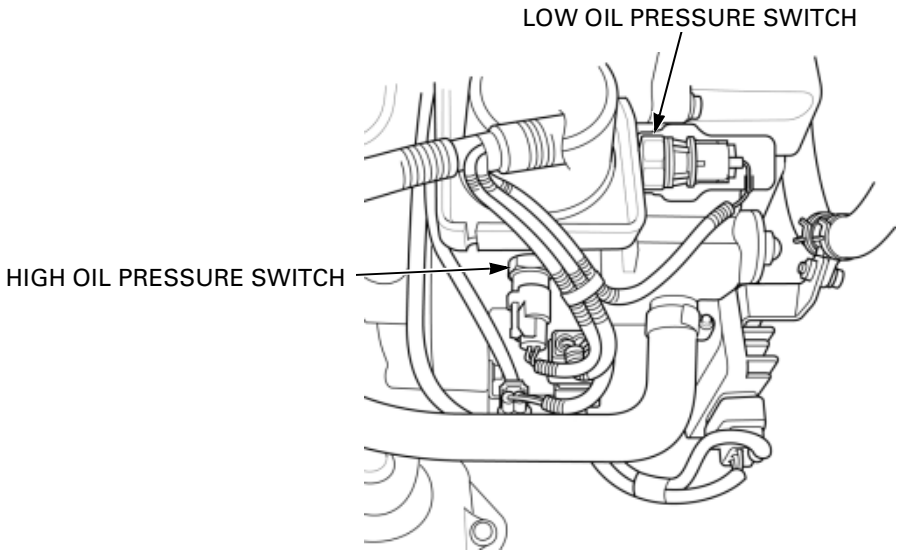


OIL MANAGEMENT SYSTEM DRAWING



OIL PRESSURE SWITCH

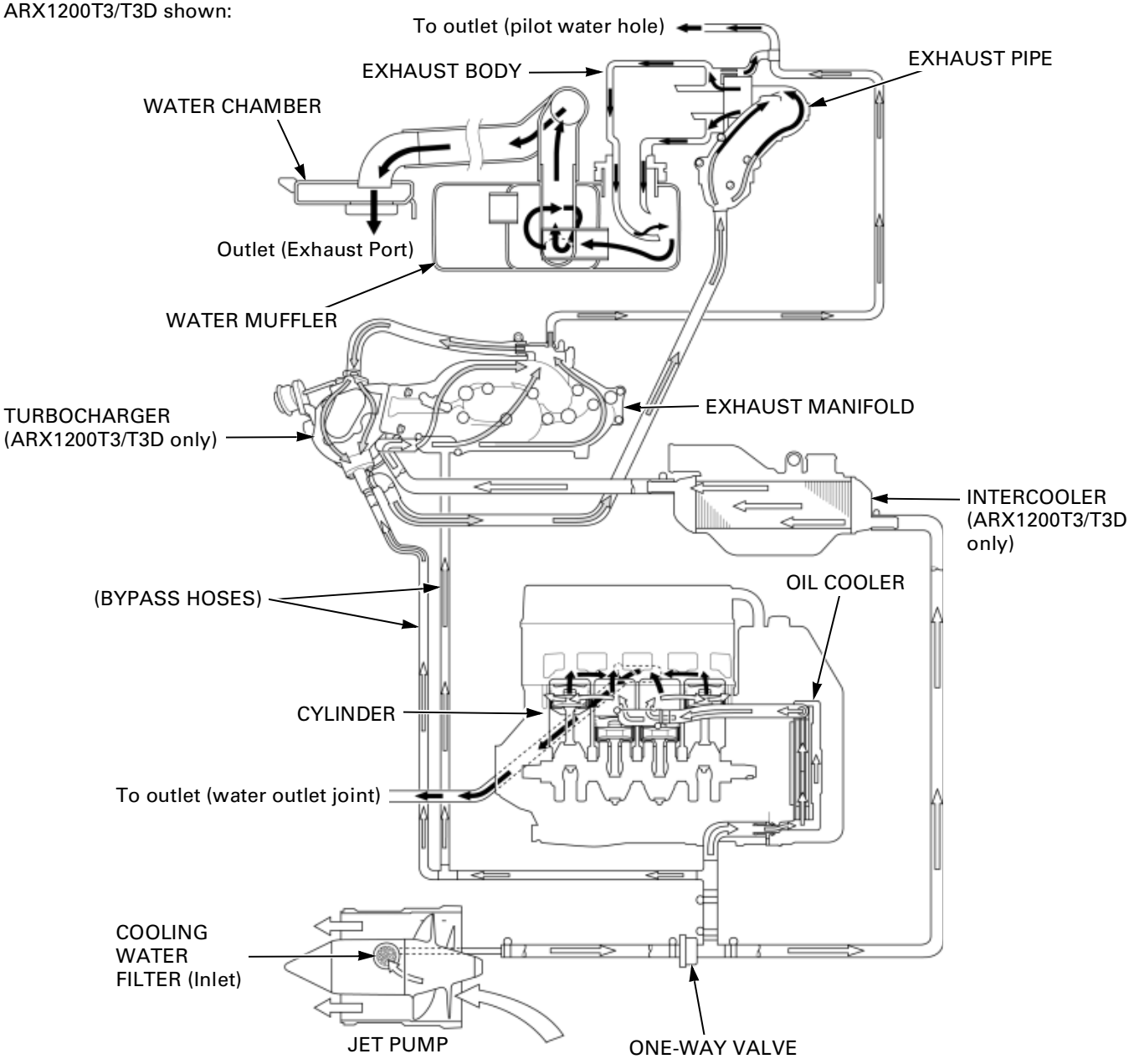
The watercraft incorporates a fail-safe function in the event that the engine oil pressure drops. If the high oil pressure switch detects an engine oil pressure below 216 kPa (2.2 kg/cm^2, 31 psi), the engine control module lights the oil pressure warning light and limits the engine speed to 3,000 rpm to prevent engine damage. However, if the low oil pressure switch detects an engine oil pressure below 20 kPa (0.2, kg/cm^2, 3 psi), the fail-safe function stops the engine.

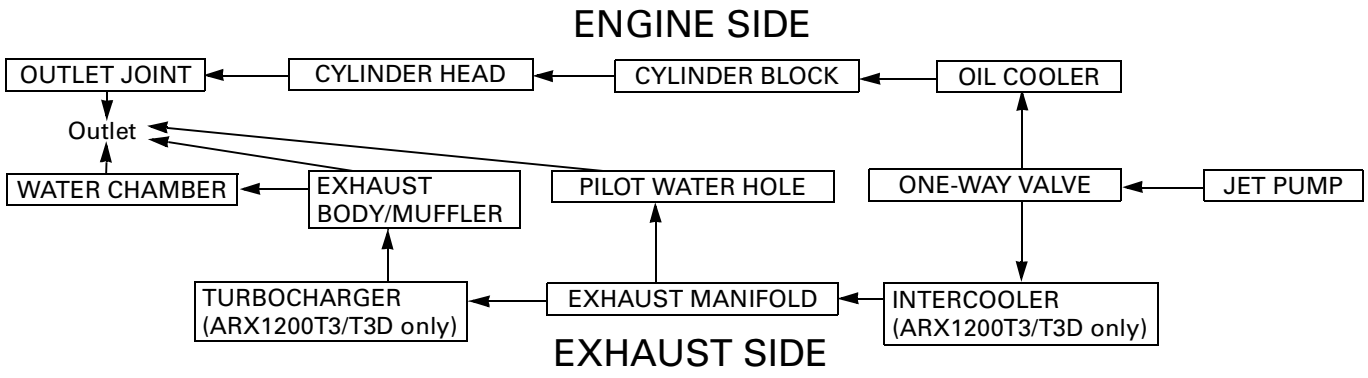


COOLING SYSTEM

SYSTEM FLOW PATTERN

ARX1200T3/T3D shown:



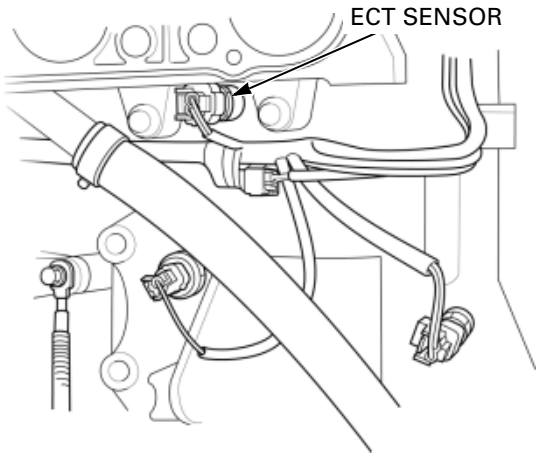


OVERHEAT WARNING LAMP

The watercraft incorporates a fail-safe function in the event that the engine overheats. If the engine coolant temperature (ECT) sensor detects an engine temperature above 85°C (185°F), the fail-safe function allows the engine to continue to operate. However, if the manifold surface temperature (MST) switch and/or the ECT sensor detects an engine temperature above 95°C (203°F), the fail-safe function stops the engine.

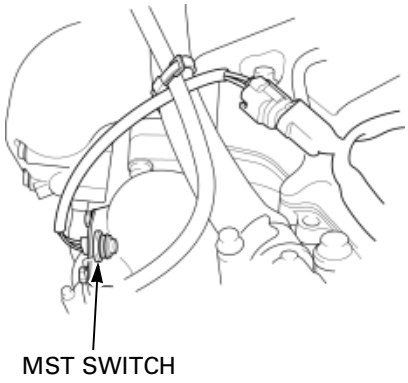
ECT SENSOR OPERATION

1. If the ECT sensor detects an engine temperature above 85°C (185°F), the engine control module (ECM) will limit the engine speed to 3,000 rpm to prevent engine damage. Failure code #47 will be stored in the ECM.
2. If the ECT sensor detects an engine temperature above 95°C (203°F), the ECM stops the engine. Failure code #47 will be stored in the ECM.



MST SWITCH OPERATION

1. If the MST switch detects an engine temperature above 150°C (302°F), the ECM stops the engine. Failure code #46 will be stored in the ECM.

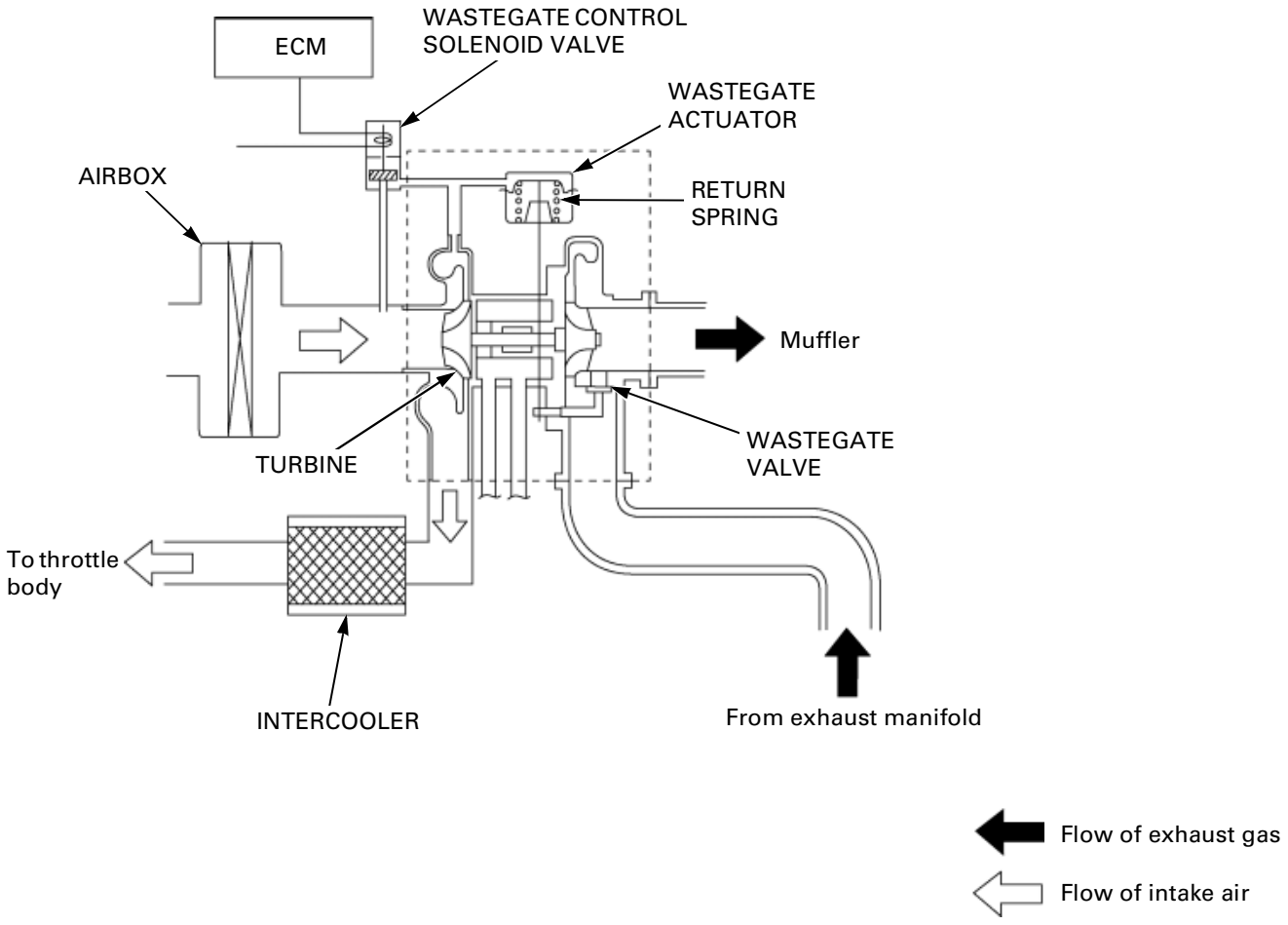


TURBOCHARGER (ARX1200T3/T3D)

The turbocharger uses ceramic ball bearings on the turbine shaft. Compared to a turbocharger that uses floating bushing type bearings, the ceramic bearings result in lower friction, and provide faster acceleration of the turbine shaft. The ceramic bearings also excel in terms of durability and reliability. An intercooler is used to lower the temperature of the intake air from the turbocharger compressor.

OPERATION

1. Exhaust gas pressure causes the turbine to spin. As the turbine spins the intake air is compressed by the compressor impeller that is mounted on the turbine shaft. This compressed intake air is then fed to the intercooler.
2. The cooled intake air is regulated by the throttle valves and then enters the cylinders.
3. Intake boost pressure is regulated by a wastegate which, when open directs exhaust gas away from the turbocharger exhaust turbine. An actuator opens the wastegate. The wastegate actuator consists of a diaphragm, return spring, and valve. The wastegate valve is held closed by the spring up to the maximum boost pressure. As increased pressure from the compressor is applied to the diaphragm, it overcomes the spring pressure and opens the wastegate valve. The boost pressure is also controlled by the duty control cycle of the wastegate solenoid valve, which operates from ECM signals.
4. To increase boost pressure, the wastegate control solenoid valve opens. By allowing the pressurized air from the compressor to leak to the air intake, the pressure on the wastegate actuator is reduced. As the wastegate closes, the exhaust gas on the turbine is increased, causing the turbine to spin at a higher speed and the intake air pressure to rise.
5. To decrease boost pressure, the wastegate control solenoid valve closes. The intake air pressure, which is pressurized by the compressor impeller, is applied to the wastegate actuator. The pressure on the actuator overcomes the return spring force and opens the wastegate. As the wastegate opens, the gas that acts upon the turbine is reduced, causing the turbine to spin at a lower speed and the intake air pressure to decrease.



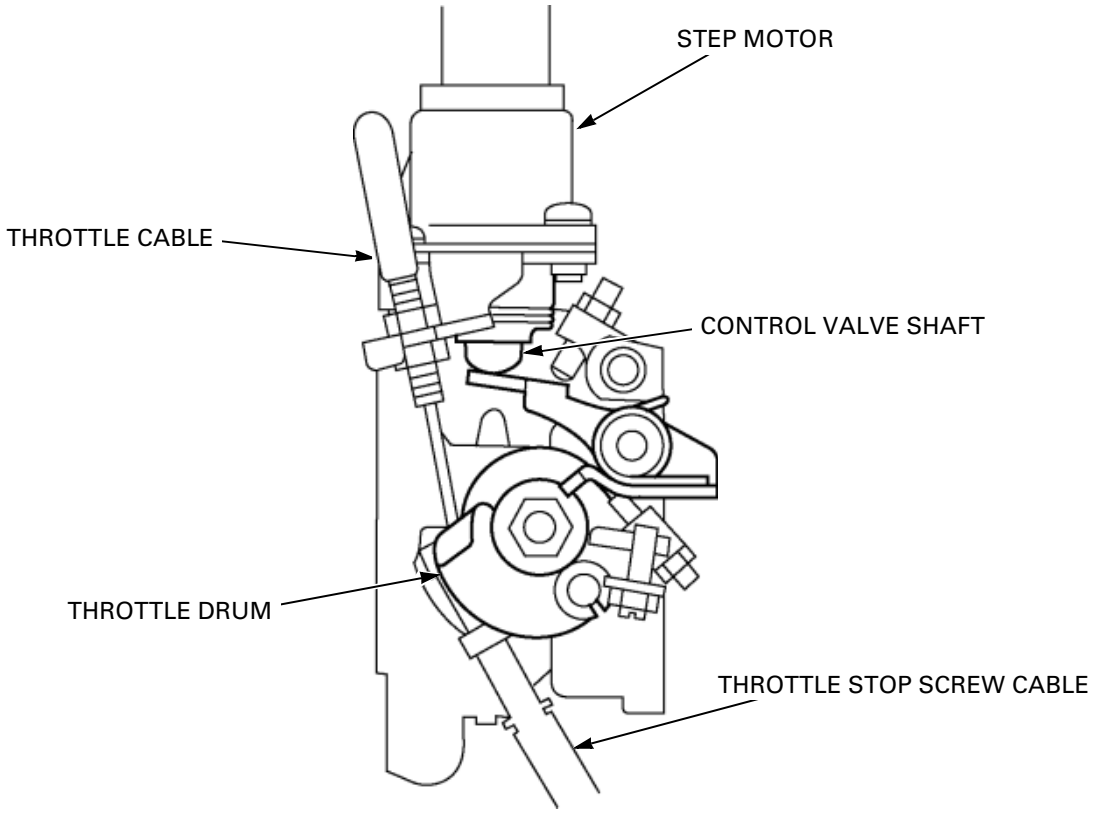
IDLE AIR CONTROL VALVE (IACV)

The fast idle system is fully automatic and is controlled by a stepper motor.

The stepper motor controls engine idle speed by extending the control valve shaft. Fluctuation of the idle speed is controlled by varying the opening of the throttle valves.

OPERATION

1. When the engine oil temperature is low, the control valve shaft is extended by the stepper motor. At this time the throttle valves open and the engine speed increases.
2. When the engine is running and the engine oil temperature rises, the control valve shaft retracts. At this time the throttle valves close and the engine speed gradually lowers, until idle speed is maintained.

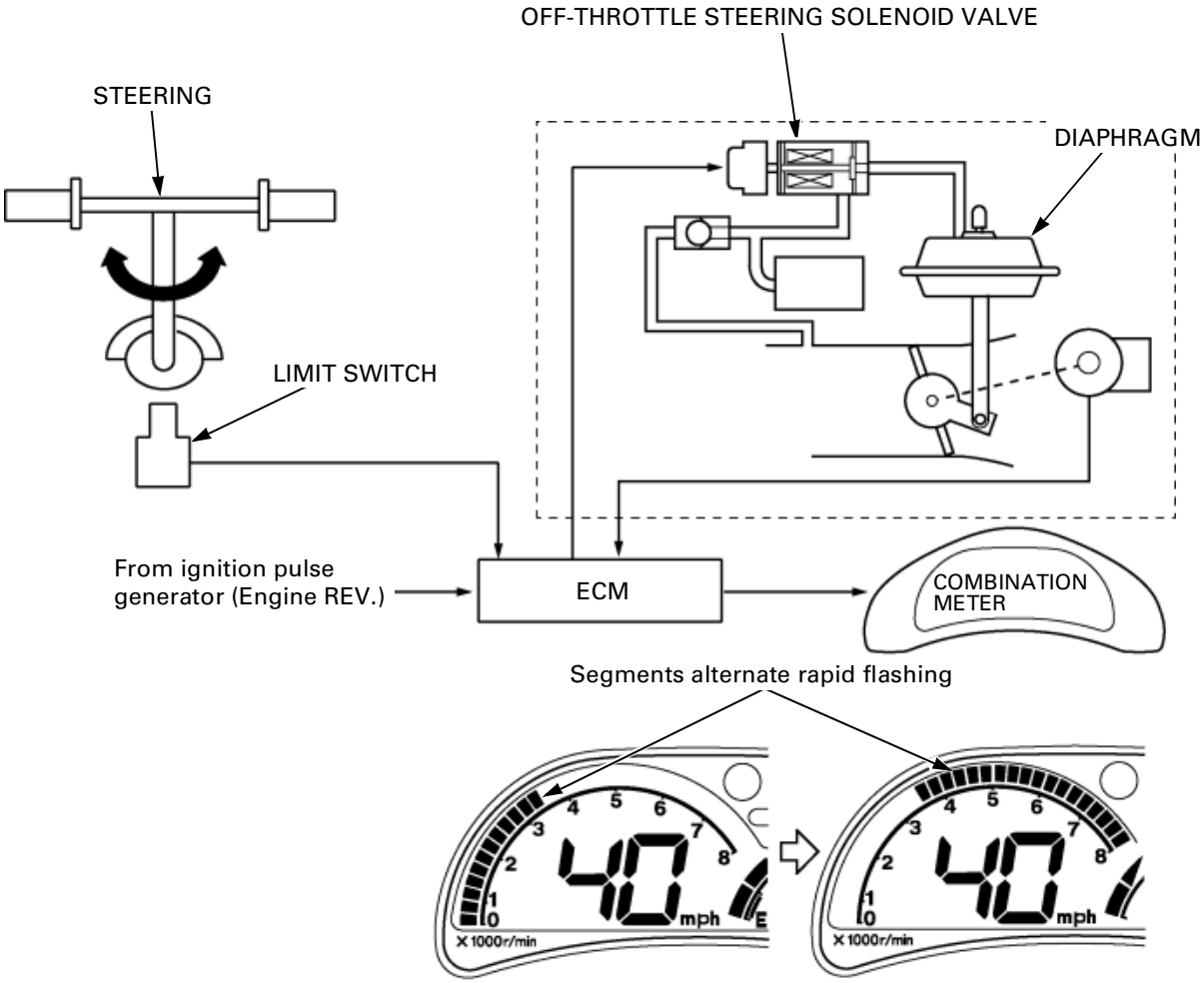


OFF-THROTTLE STEERING (OTS)

When the throttle is closed (i.e., released), resulting in no thrust at the jet pump, the watercraft cannot be steered.
When an obstruction in the water is encountered (e.g., another watercraft, rocks), the proper evasive maneuver is to continually engage the throttle and turn to avoid the hazard.
To a novice operator, the concept of actually accelerating when coming upon an obstruction in the water seems counter-intuitive. Most watercraft riders, when confronted with a hazard, will instinctively release the throttle in an attempt to avoid a collision. However, as mentioned above, this will result in no thrust at the jet pump, and no ability to steer the craft.
The OTS is designed to provide some turning thrust when the rider lets go of the throttle when trying to avoid hazards.

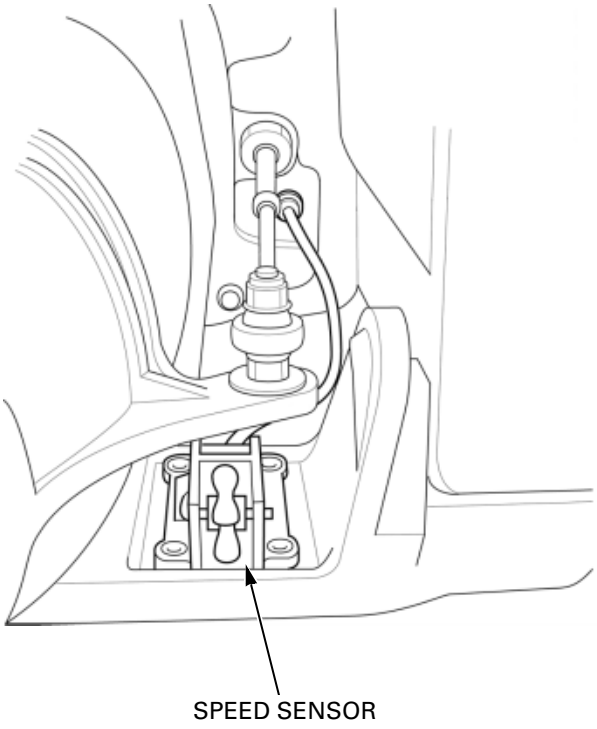
OPERATION

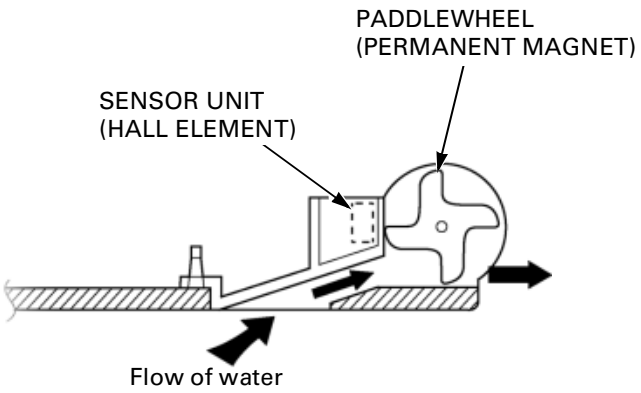
1. The ECM will initiate the OTS after the engine speed is kept above 4,000 rpm for a few seconds, and then the throttle is suddenly released.
2. The limit switch, which is located below the steering shaft retainer on the inside of the hull, is switched on when the handlebar is turned fully to the right or left, causing a signal to be sent from the switch to the ECM.
3. The ECM then sends a signal to the OTS solenoid valve.
4. The OTS solenoid valve opens.
5. The OTS control diaphragm is actuated by vacuum pressure of the intake manifold.
6. The throttle valves are opened by the rod connected to the vacuum actuator.
7. The ECM sends the signal to the combination meter, causing the tachometer segments to flash rapidly and alternately.



SPEED SENSOR

The speed sensor is located on the upper right side of the ride plate. The speed sensor detects log speed as water flows through the paddlewheel. The sensor consists of a permanent magnet and sensor unit (Hall element), and is connected to the combination meter via a lead. When one of the paddles passes across the sensor unit, voltage pulses are generated at the sensor. The voltage pulses are sent as signals to the combination meter, which converts the signals to log speed. The frequency of the signals increases proportionally to the rotating speed of the paddlewheel.

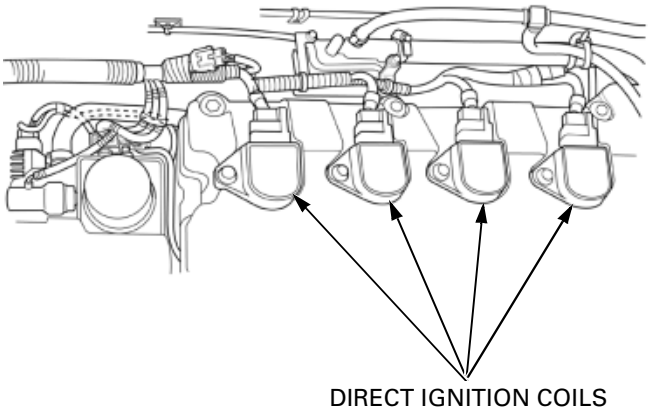


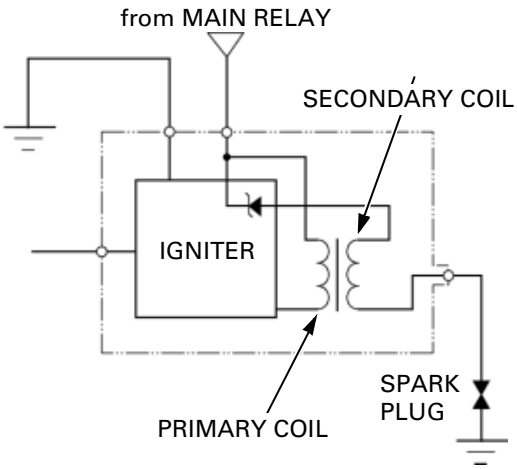


DIRECT IGNITION COIL

The direct ignition coils are integrated units of both the ignition coils and spark plugs caps. The ignition coils are equipped with igniters. The ignition coil signal voltage from the ECM is converted to high voltage in the ignition coils.

The use of direct ignition coils allows for less weight, fewer parts for the ignition system, and improved serviceability and reliability.

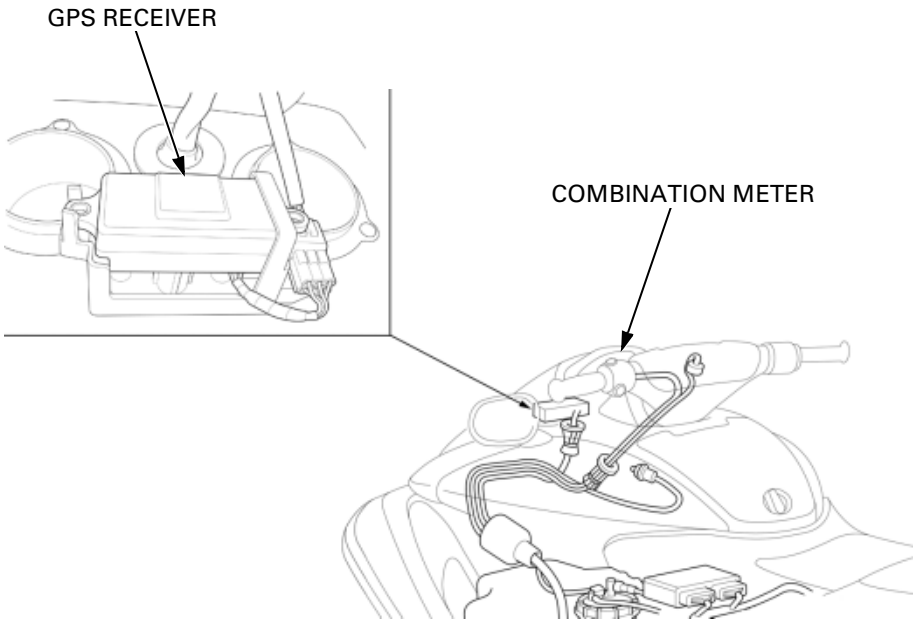




GPS NAVIGATION METER (ARX1200T3D)

GENERAL DESCRIPTION

The ARX1200T3D is equipped with the navigation system, compass and automatic time correction by the Global Positioning System (GPS) technology.



Global Positioning System (GPS)

The GPS is a worldwide radio-navigation system formed from a constellation of about 24 satellites and their ground stations. The GPS uses these satellites as reference points to calculate positions accurate to a matter of meters. The basis of GPS is “triangulation” from satellites. To triangulate, a GPS receiver measures distance using the travel time of radio signals.

The GPS is operated by the United States government, which is solely responsible for the accuracy and maintenance.

The accuracy of position fixes can be affected by the periodic adjustments to the GPS satellites made by the United States government and is subject to change in accordance with the Department of Defense civil GPS user policy and the Federal Radio navigation Plan.

Accuracy can also be affected by poor satellite geometry or a receiving environment for the GPS signal such as structures, geographical features (the GPS will not work indoors or in heavily wooded areas) or electromagnetic environment around the watercraft.

STRUCTURE/FUNCTION

The GPS for the ARX1200T3D consists of the combination meter and the GPS receiver.

The GPS receiver continuously computes the latitude and longitude and transfers the positioning data to the combination meter. The combination meter recognizes the exact current watercraft position, and indicates the travel direction and the direction to the waypoint.

If the GPS receiver can not track more than three satellites, the GPS can not measure for the proper position and the navigation system and compass will not function properly.
The satellite status indicates the amount of information received from GPS satellites in one of three possible categories:

Display	Status	
	Not Usable	The system is signaling (flashing antenna mark) that the position fix is not available.
	2D Navigation	The system has determined latitude and longitude, but is unable to determine altitude. 2D Navigation is not as accurate as 3D Navigation.
	3D Navigation	The system has determined latitude, longitude and altitude. The receiver is ready to provide navigational information.

The GPS receiver continuously repeats calculation of the latitude, longitude and altitude when the safety lanyard clip is fitted to the base of the engine stop switch. As a result, the start-up time of the positioning after the safety lanyard clip is fitted varies depending on when the safety lanyard clip was removed, if the battery was removed and the distance the watercraft was transported with the safety lanyard clip removed. There are three different times as follows;

- Hot start
  When the safety lanyard clip is fitted to the base of the engine stop switch within 2 hours after it was removed, the position fix will complete in about 25 seconds.
- Warm start
  When the safety lanyard clip is fitted to the base of the engine stop switch more than 2 hours after it was removed, the position fix will complete in about 2 minutes.
- Cold start
  The position fix will complete within about 8 minutes in the following situations;
  – When the safety lanyard clip is fitted to the base of the engine stop switch more than 1 month after it was removed
  – When the watercraft is transported for more than 100 km (62 miles) with the safety lanyard clip removed
  – When the battery is disconnected

NOTE:

- Regarding "Hot start" and "Warm start"; in the case that the position fix was not completed (all the 3 segments of the signal strength indicator without being displayed) before removing the safety lanyard clip, the start-up time becomes same as "Cold start".

If the combination meter detects the communication error with the GPS receiver, "GPS" indicator will blink and all indications related GPS will light off.

NAVIGATION SYSTEM

This system indicates the direction toward the waypoint and direct-path distance.

COMPASS

The compass indicates the watercraft heading. As the direction of travel is calculated by using the previous and present positioning data, the safety lanyard clip must be fitted and the watercraft must be moving at least 1 mph for the compass to function.

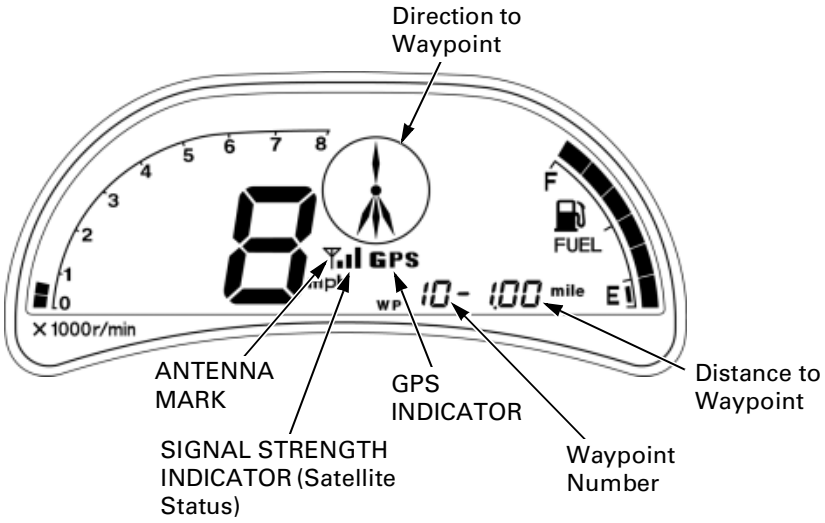
AUTOMATIC CLOCK ADJUSTMENT

The digital clock in theARX1200T3D combination meter has a function of automatic adjustment when satellite status is 3D Navigation.

In the state of GPS time acquisition, the digital clock of display will be adjusted by adjusting the last digit of minute on the basic of UT (Universal Time, formerly referred to as Greenwich Mean Time).

The automatic clock adjustment mechanism works only when the correction range extends ±5 minutes, and the adjustment mechanism will not work when the range exceeds 5 minutes or when the watercraft moves across the time difference zone.

GPS MODE DISPLAY



MEMO

3. HULL/HOOD/BODY PANELS

SERVICE INFORMATION

GENERAL

NOTICE

Never clean fiberglass and plastic components with strong chemicals or cleaning detergents. These products will damage the gel-coat finish.

- This section covers removal and installation of the body covers.
- The bodywork is made up of two basic materials: the hull and deck are FRP with a Gel coat finish and the hood, mirrors and upper covers are made of plastic.
- Honda strongly recommends that any body damage (e.g., cuts, scratches, holes) be repaired by a qualified boat repair facility.
- After washing the watercraft, consider using a commercially-available spray cleaner/polish or quality fiberglass marine polish wax to finish the job. Use only a non-abrasive polish or wax made specifically for marine watercraft. Apply the polish or wax to the hull and deck according to the instructions on the container.

TORQUE VALUES

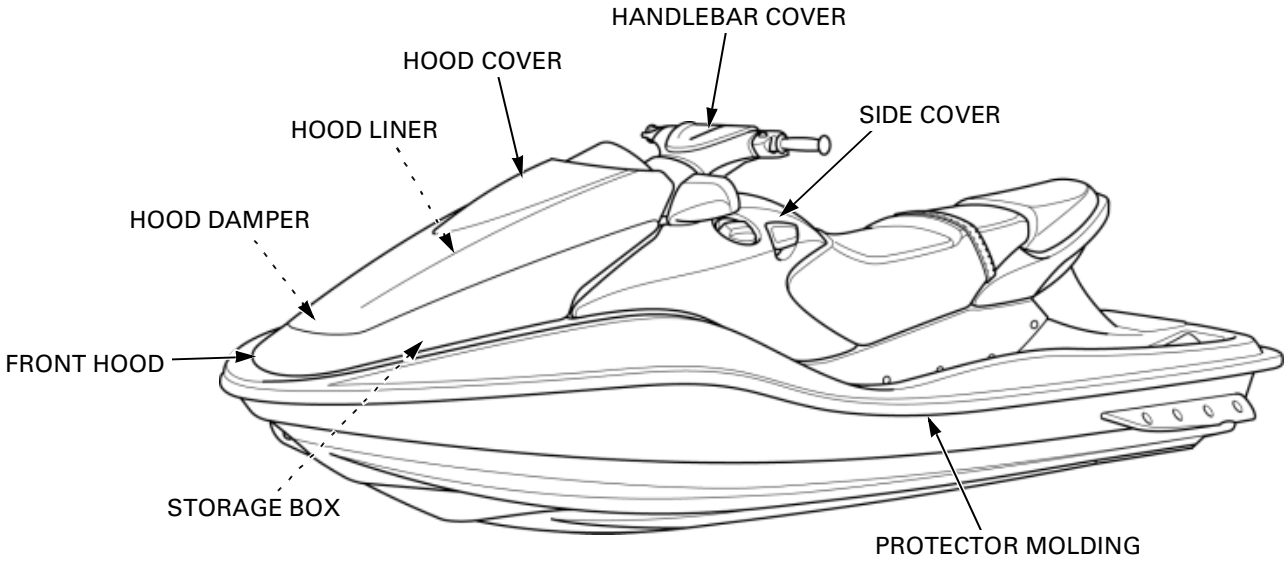
Sponson bolt	16 N·m (1.6 kgf·m, 12 lbf·ft)	Apply locking agent to the threads
Side cover bolt	3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)	
Front hood bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Hood liner bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Hood hinge mounting nut	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads
Hood catch nut	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	Self-lock nut
Post cover bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Hood catch stud nut	39 N·m (4.0 kgf·m, 2.9 lbf·ft)	Self-lock nut
Side panel socket bolt	6.9 N·m (0.7 kgf·m, 5.1 lbf·ft)	
Passenger grab rail socket bolt	6.9 N·m (0.7 kgf·m, 5.1 lbf·ft)	
Coupler cover bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Seat catch stud nut (front and rear)	39 N·m (4.0 kgf·m, 2.9 lbf·ft)	Self-lock nut
Seat catch bolt (front and rear)	5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Rearview mirror nut	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads
Bow eye nut	22 N·m (2.2 kgf·m, 16 lbf·ft)	Apply locking agent to the threads
Tow hook nut	22 N·m (2.2 kgf·m, 16 lbf·ft)	Apply locking agent to the threads
Stern eyelet nut	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads
Pilot water nozzle	2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)	Apply silicone sealant to the threads
Boarding step pipe nut (ARX1200T3D only)	9 N·m (0.9 kgf·m, 6.6 lbf·ft)	Apply locking agent to the threads
Boarding step bracket bolt (ARX1200T3D only)	25 N·m (2.6 kgf·m, 1.9 lbf·ft)	ALOC bolt: replace with a new one

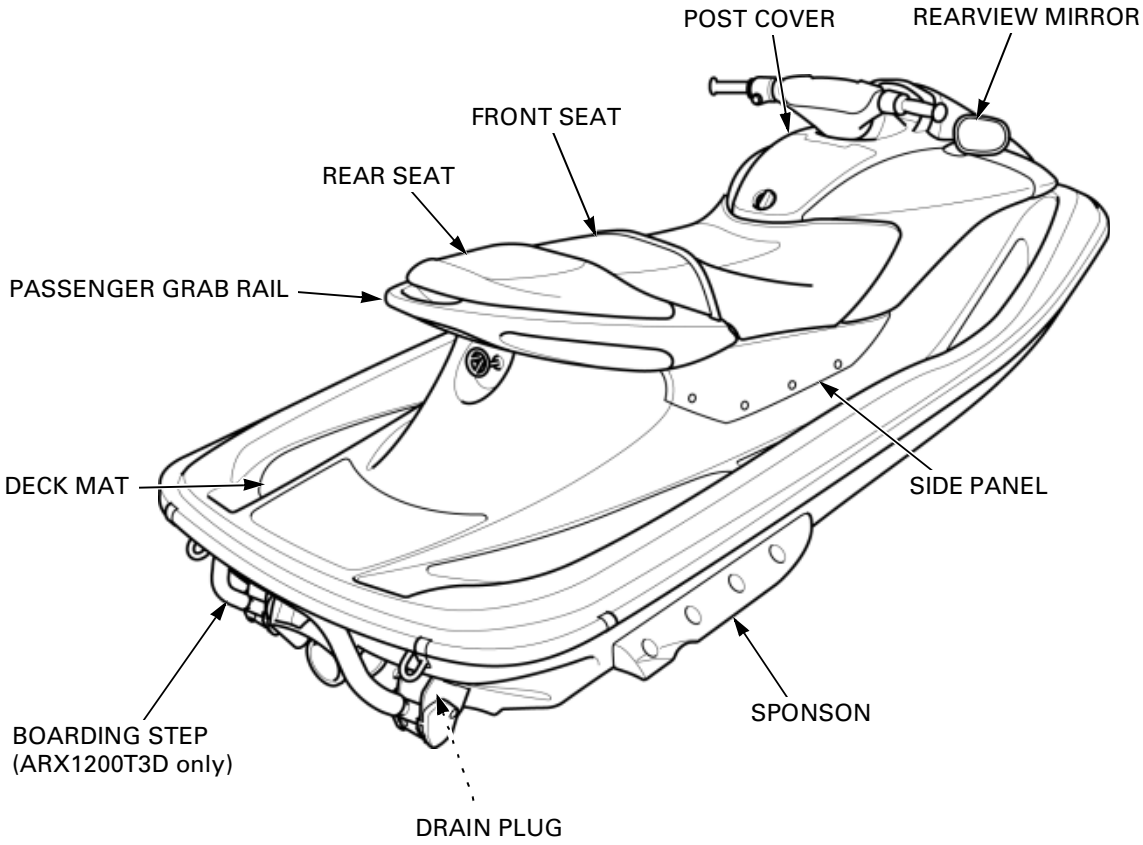
TROUBLESHOOTING

Any water getting into hull

- Cracked hull
- Faulty bilge drain plug
- Faulty drive shaft bearing housing (page 14-25)

BODY PANEL LOCATIONS





SEAT

REMOVAL

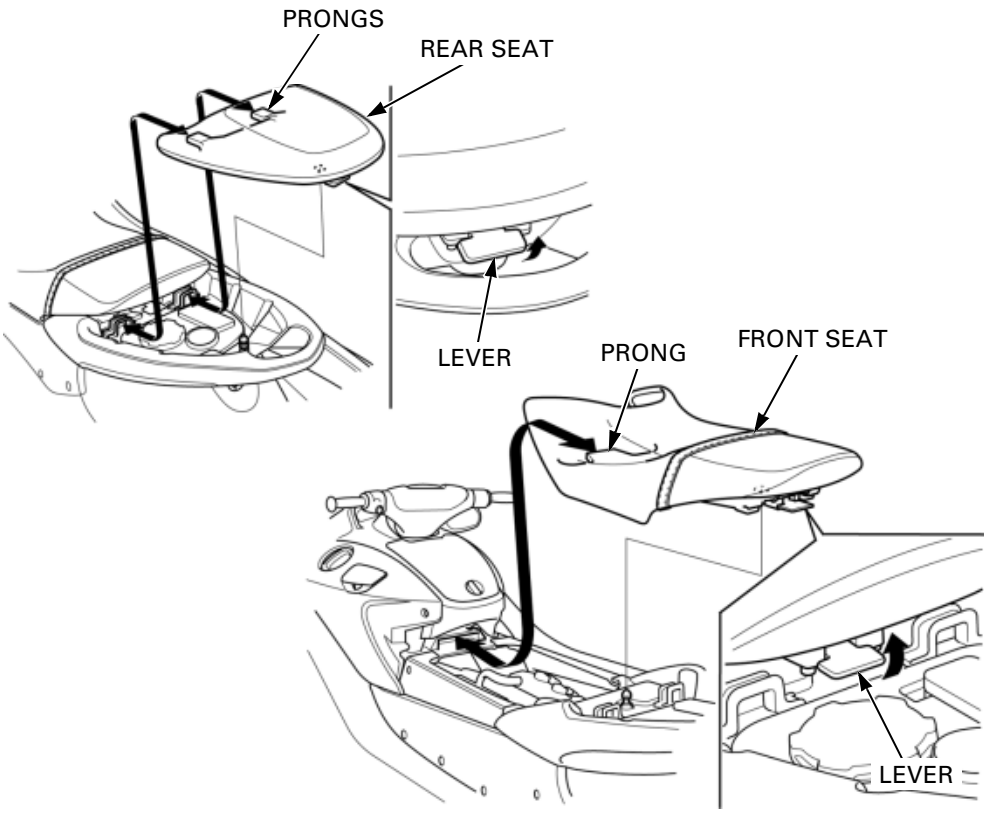
Unlock the rear seat by raising its release lever.
Pull the seat back and remove it.

Remove the front seat in the same manner as the rear.

INSTALLATION

Install the front seat by inserting the prong into the retainer, then press down to lock it.

Install the rear seat in the same manner as the front.



PASSENGER GRAB RAIL

Remove the seats (page 3-4).

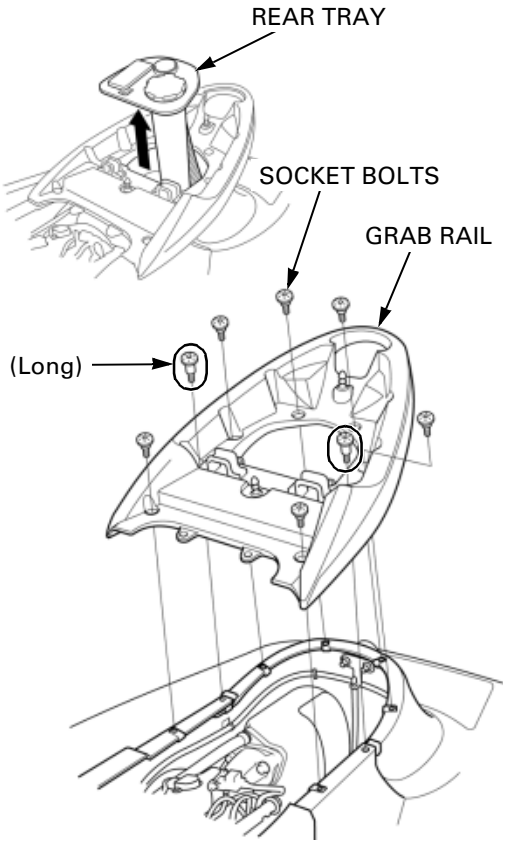
Take care not to drop the clip nuts into the hull.

Remove the following:
– rear tray assembly
– eight socket bolts
– passenger grab rail

Installation is in the reverse order of removal.

NOTE:
- Make sure the seals on the seating area of the rear tray and grab rail are in good condition.

TORQUE: 6.9 N·m (0.7 kgf·m, 5.1 lbf·ft)



SIDE PANEL

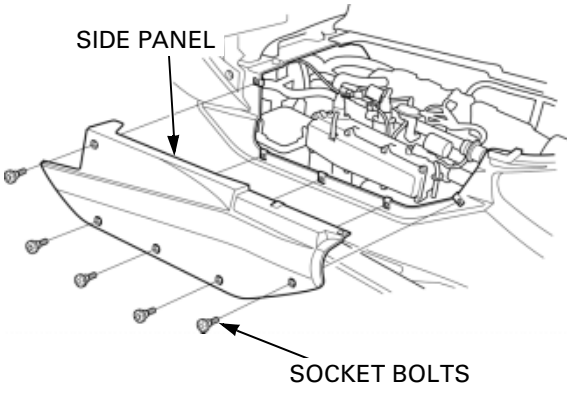
Take care not to drop the clip nuts into the hull.

Remove the following:
– passenger grab rail (page 3-5)
– five socket bolts
– side panel

Installation is in the reverse order of removal.

NOTE:
- Make sure the seals on the side panel and deck are in good condition.

TORQUE: 6.9 N·m (0.7 kgf·m, 5.1 lbf·ft)



SIDE COVER

Remove the following:
– seats (page 3-4)
– storage box (page 3-8)
– left rearview mirror (page 3-8; left side cover only)

Left side cover only:

Pull the reverse lever up while pressing the lock lever. Remove the three tapping screws (6 mm screw and two 5 mm screws) and the reverse lever grip.

Take care not to drop the cover nuts and bolts into the hull.

Remove the following fasteners:
– two nuts
– five bolts and washers (left side cover)
four bolt and washers (right side cover)

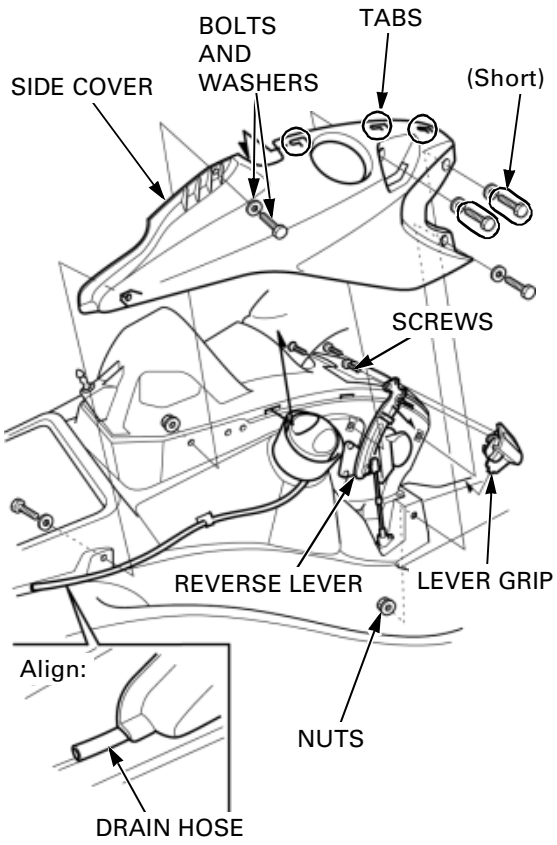
Be careful not to scratch the left side cover surface with the reverse lever.

Release the three tabs by sliding the cover rearward and remove the side cover (from the reverse lever; left side cover only).

Installation is in the reverse order of removal.

NOTE:
- When installing the left side cover, align the fuel drain hose with the guide groove on the cover.

TORQUE:
Cover bolt: 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)



POST COVER

Remove the following:
– side covers (page 3-6)
– steering shaft (page 15-6)

Disconnect the meter 10P (green) and 8P (gray) connectors.
Release the boot band and remove the meter wire boot off the deck.

Disconnect the reverse cable by removing the E-clip from the cable joint.

Be careful not to drop the cover nuts into the hull.

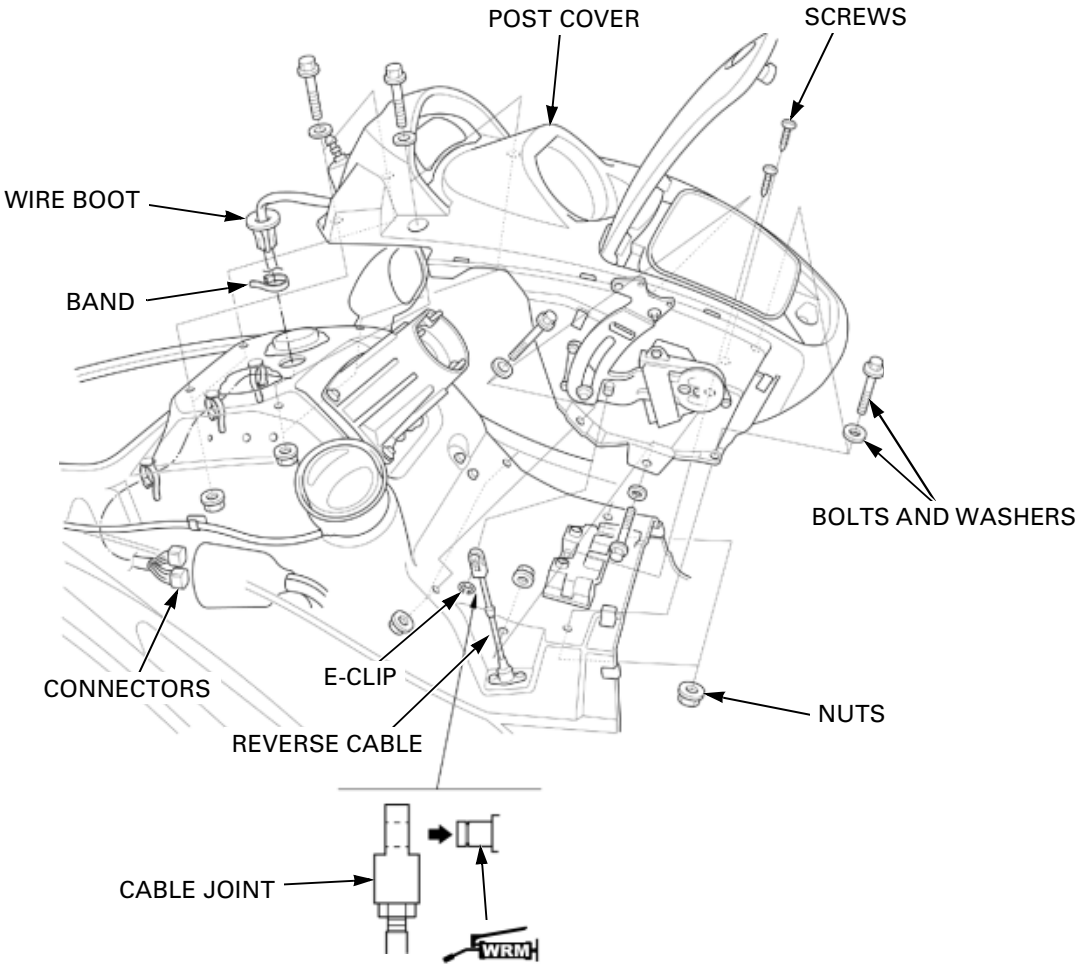
Remove the following fasteners and the post cover:
– two tapping screws (open glove box lid)
– nine nuts (reverse side of deck)
– nine bolts and washers (post cover side)

Refer to page 15-12 for reverse lever removal and installation.

Installation is in the reverse order of removal.

TORQUE: Bolt: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

NOTE:
- Apply water resistant molybdenum disulfide grease to the cable joint pivot. For reverse lever and cable lubrication, see page 4-20.



STORAGE BOX

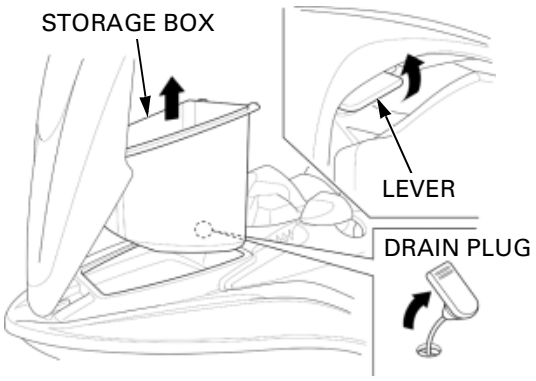
Raise the release lever to unlock the front hood and open it.

Remove the storage box from the deck.
If there is any water in the storage box, release the drain plug to drain.

Installation is in the reverse order of removal.

NOTE:

- Make sure the storage box seal is in good condition.



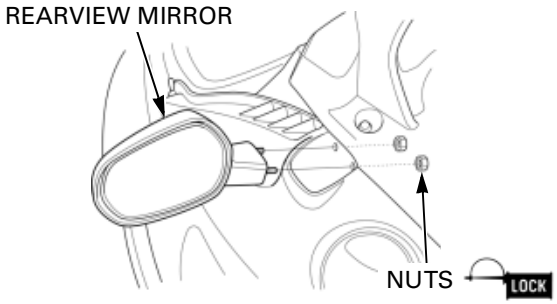
REARVIEW MIRROR

Remove the storage box (page 3-8).

LEFT MIRROR

Take care not to drop the nuts into the hull.

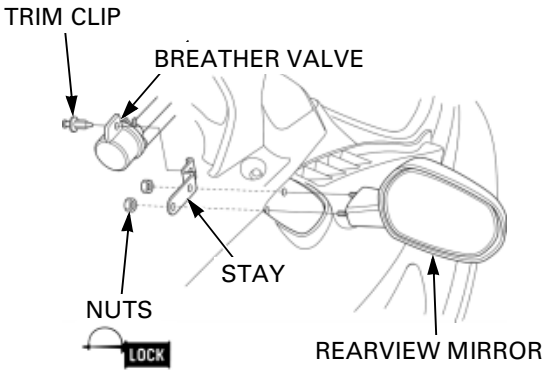
Remove the following:
– two nuts
– left rearview mirror



RIGHT MIRROR

Take care not to drop the trim clip and nuts into the hull.

Remove the following:
– trim clip (release by pushing the center pin) and fuel tank breather valve
– two nuts and valve stay
– right rearview mirror



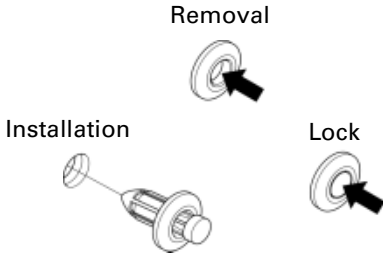
Apply locking agent to the mirror nut threads.

Installation is in the reverse order of removal.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

NOTE:

- Before installing the trim clip, raise the center pin by pushing the pin tip back. Install each trim clip and lock it by pushing the center pin flush.

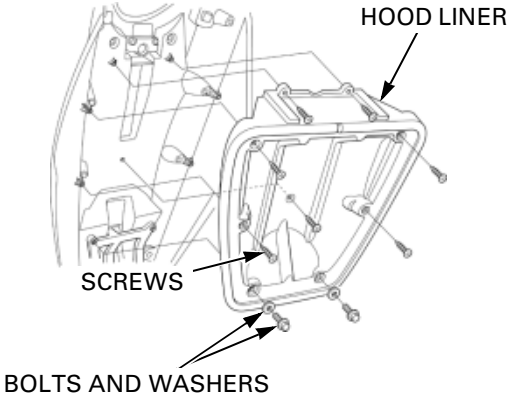


FRONT HOOD

Open the front hood.

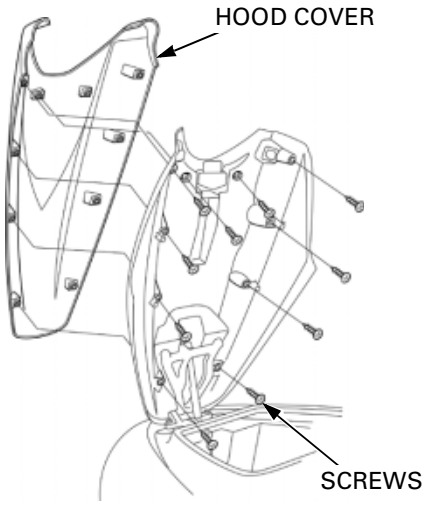
HOOD LINER

Remove the following:
- seven tapping screws
- two bolts and washers
- hood liner



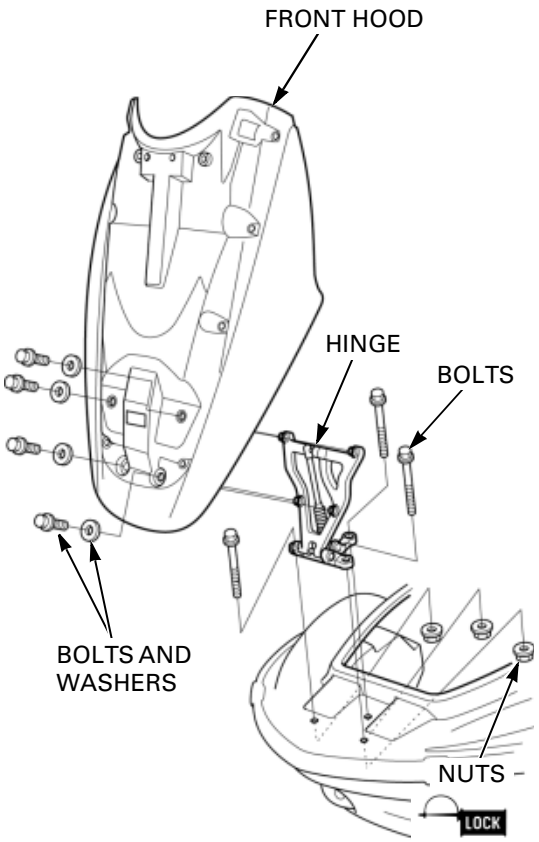
HOOD COVER

Remove the following:
- ten tapping screws
- hood cover



FRONT HOOD

Remove the following:
– four bolts and washers
– front hood



HOOD HINGE

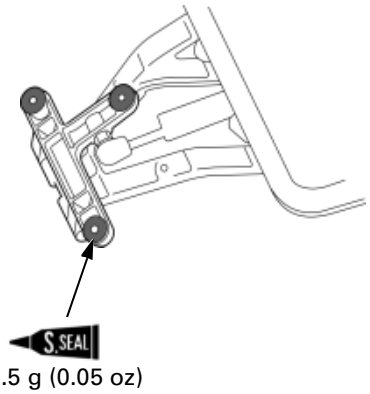
Remove the following:
– storage box (page 3-8)
– three nuts (being careful not to drop them)
– three bolts
– hood hinge assembly

Apply locking agent to the threads of the three hinge nuts.

Installation is in the reverse order of removal.

TORQUE: Nut: 9.8 N·m (1.0 kgf·m, 7 lbf·ft))

NOTE:
- When installing the hood hinge, apply 1.5 g (0.05 oz) of silicone sealant to the hinge mounting areas.



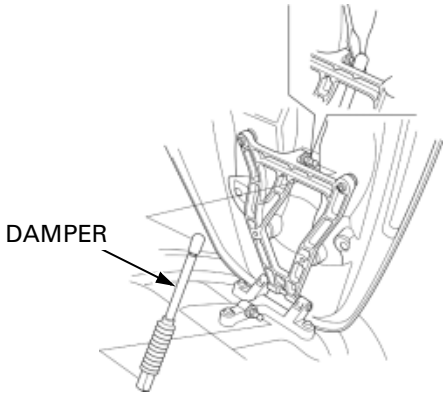
1.5 g (0.05 oz)

HOOD DAMPER REPLACEMENT

Remove the hood liner (page 3-9).

Remove the hood damper off the hood hinge by prying it with a flat blade screwdriver.

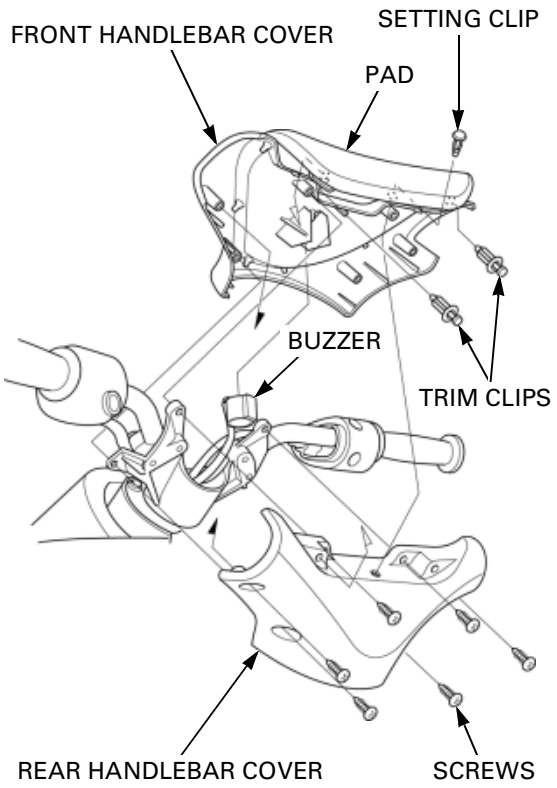
Installation is in the reverse order of removal.



HANDLEBAR COVER

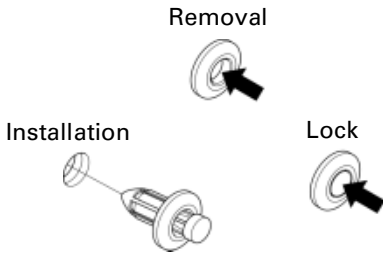
Do not break the handlebar cushion.

Remove the following:
– two trim clips (release by pushing the center pin)
– setting clip
– six tapping screws
– front handlebar cover assembly
– warning buzzer (from the front handlebar cover)
– rear handlebar cover



Installation is in the reverse order of removal.

NOTE:
- When installing the front handlebar cover, set the warning buzzer in the cover properly (page 1-31 or 1-52).
- Before installing the trim clip, raise the center pin by pushing the pin tip back. Install each trim clip and lock it by pushing the center pin flush.



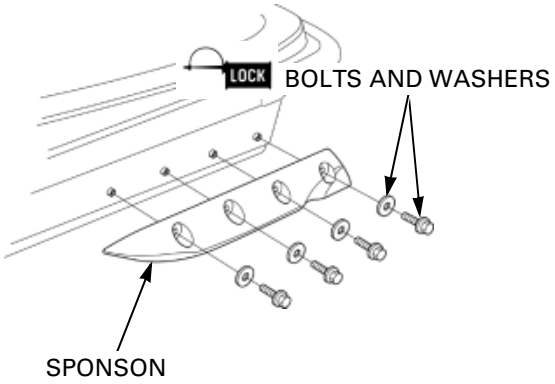
SPONSON

Remove the following:
– four bolts and washers
– sponson

Apply locking agent to the bolt threads.

Installation is in the reverse order of removal.

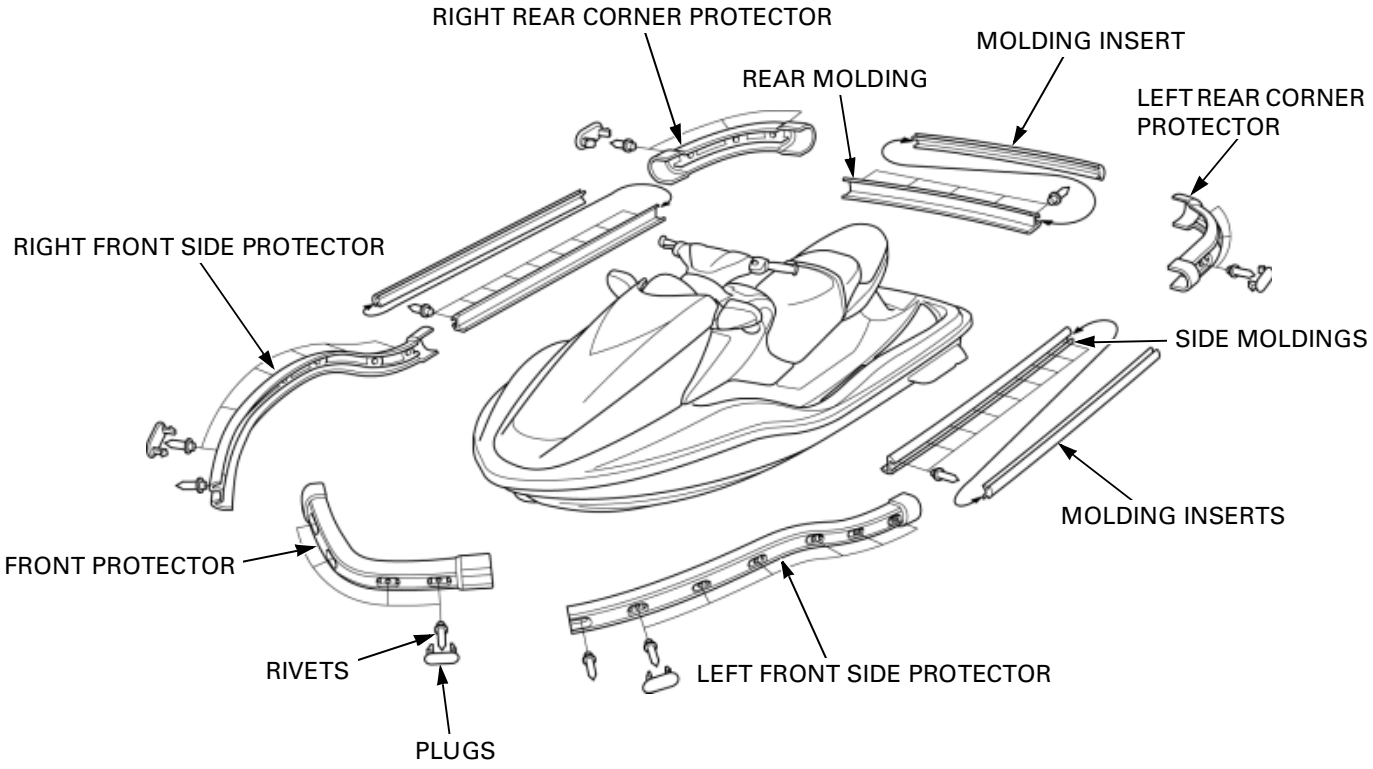
TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)



PROTECTOR MOLDING

Remove the following:
- plugs
- rivets
- protectors (front, front sides and rear corners)
- inserts
- rivets
- moldings (side and rear)

Installation is in the reverse order of removal.



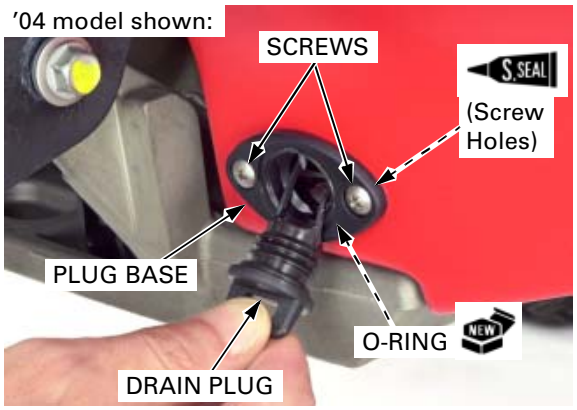
DRAIN PLUG BASE

Remove the following:
- drain plug
- screws
- drain plug assembly
- O-ring

Apply silicone sealant to the screw holes in the plug base.

Install the drain plug base with a new O-ring and tighten the two screws.
Install the drain plug.

'04 model shown:



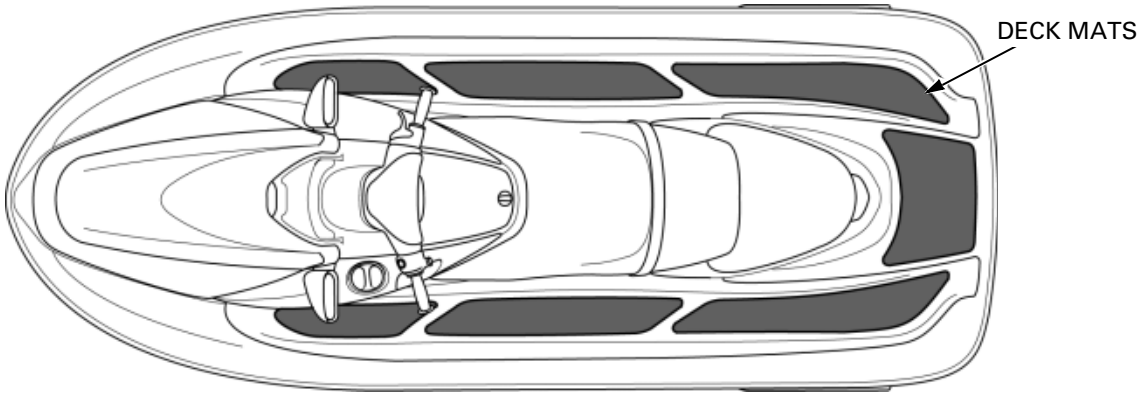
DECK MAT REPLACEMENT

Remove the deck mat and any adhesive from the deck thoroughly, being careful not to damage the deck surface.

NOTE:

- Before installing the mat, wash the area where a new mat is to be placed with mild soap and warm water and degrease it.
- When installing a new mat, do not touch the adhesive surface of the mat with your bare hands.

Remove half of the mat adhesive protective film and install each deck mat in position as shown. Start installing the mat from the center and remove the other half of the film so it is completely installed on the deck. Press mat firmly to remove any bubbles.



COUPLER COVER

ARX1200T3/T3D:

Remove the rear tray (page 3-5).

COVER B:
Remove the two trim clips (release by pushing the center pin).
Release the groove from the tab and rotate the coupler cover B counterclockwise to remove it.

COVER A:
Remove the passenger grab rail (page 3-5).
Remove the coupler cover bolt and washer.
Release the grommet in the coupler cover A from the crankcase and remove it while pulling the water hose aside.

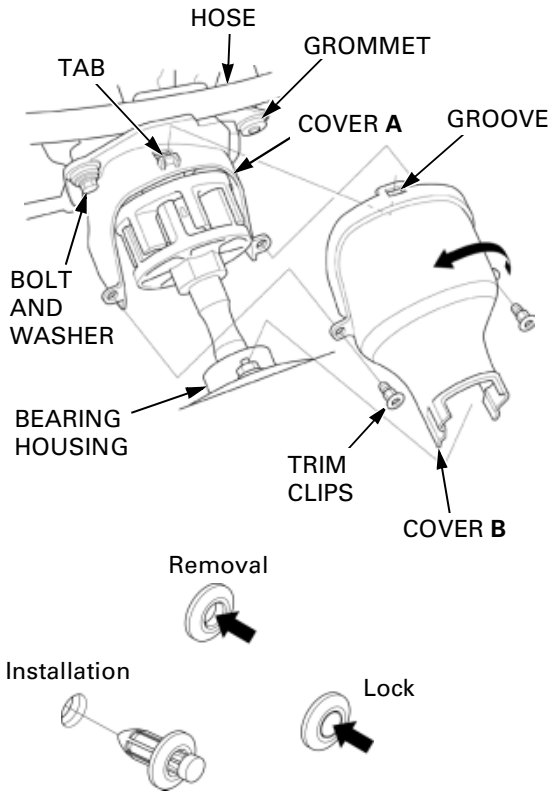
Align the hose groove on the cover with the water hose properly.

Install the coupler covers in the reverse order of removal.

TORQUE: Coupler cover bolt:
9.8 N·m (1.0 kgf·m, 7 lbf·ft)

NOTE:

- Before installing the trim clip, raise the center pin by pushing the pin tip back. Install each trim clip and lock it by pushing the center pin flush.



ARX1200N3:

Remove the rear tray (page 3-5).

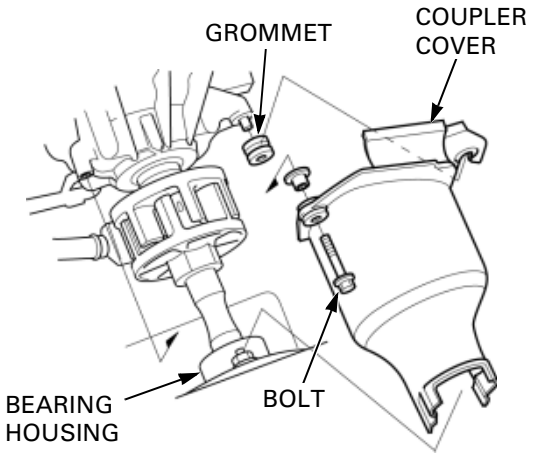
Remove the cover bolt.

Take care not to lose the mounting grommet.

Raise the front right side of the coupler cover and release it off the grommet on the crankcase. Remove the coupler cover from the drive shaft bearing housing.

Install the coupler cover in the reverse order of removal.

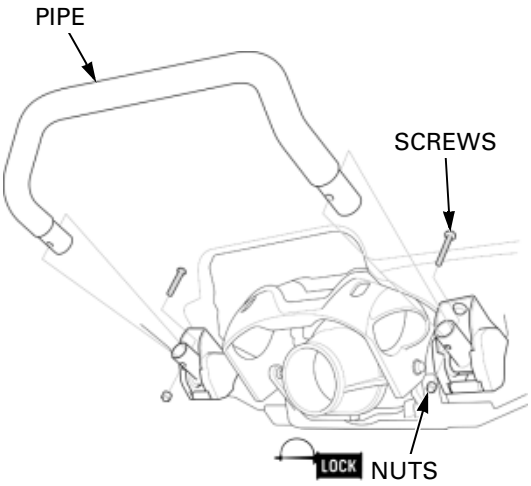
TORQUE: Coupler cover bolt:
9.8 N·m (1.0 kgf·m, 7 lbf·ft)



BOARDING STEP (ARX1200T3D)

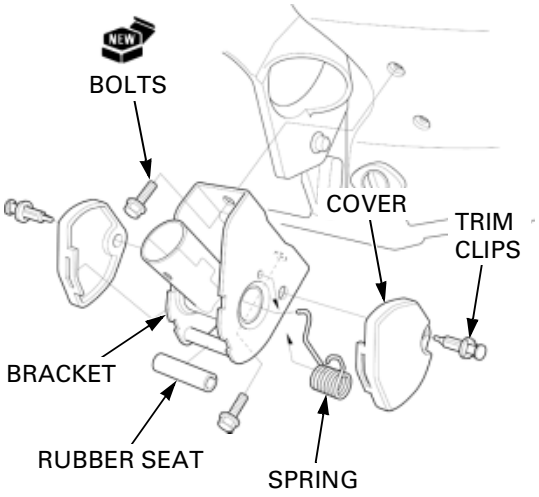
Remove the two cap nuts and screws.

Remove the boarding step pipe from the brackets.



Remove the two bolts and each step bracket.

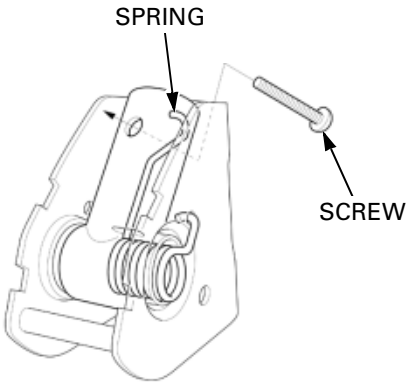
Remove the following from the bracket:
– trim clips (release by pulling the center pin up using snap ring pliers or a flat blade screwdriver)
– bracket covers
– return spring
– rubber seat



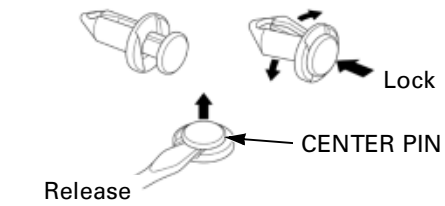
Installation is in the reverse order of removal.

NOTE:
- Always replace the bracket bolts with new ones. Apply locking agent to the pipe screw threads.
- Install the return spring in the direction as shown. When installing the screw, insert on the left side of the spring end.
- When installing the trim clip, carefully align the clip holes to avoid damaging the clip. Install the trim clip and lock it by pushing securely.

TORQUE: Bracket bolt: 25 N·m (2.6 kgf·m, 19 lbf·ft)
Pipe screw: 9 N·m (0.9 kgf·m, 6.6 lbf·ft)



Remove and install



MEMO

SERVICE INFORMATION

GENERAL

- Gasoline is extremely flammable and is explosive under certain conditions.
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where the gasoline is stored can cause a fire or explosion.
- The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.

SPECIFICATIONS

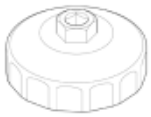
ITEM			SPECIFICATIONS
Throttle lever free play			2 – 6 mm (1/16 – 1/4 in)
Spark plug			IMR9D-9H (NGK)
Spark plug gap			0.80 – 0.90 mm (0.031 – 0.035 in)
Valve clearance		IN	0.16 ± 0.03 mm (0.006 ± 0.001 mm)
		EX	0.26 ± 0.03 mm (0.010 ± 0.001 mm)
Engine oil capacity	ARX1200T3/ T3D	After draining	4.2 liters (4.4 US qt, 3.7 Imp qt)
		After draining/oil filter change	4.3 liters (4.5 US qt, 3.8 Imp qt)
		After disassembly	5.3 liters (5.6 US qt, 4.7 Imp qt)
	ARX1200N3	After draining	4.0 liters (4.2 US qt, 3.5 Imp qt)
		After draining/oil filter change	4.1 liters (4.3 US qt, 3.6 Imp qt)
		After disassembly	5.0 liters (5.3 US qt, 4.4 Imp qt)
Recommended engine oil			Pro Honda GN4, HP4 (without molybdenum additives) or HP4M (with molybdenum additives) 4-stroke oil or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA or MB Viscosity: SAE 10W-40
Engine idle speed			1,200 ± 100 rpm
Impeller clearance			Standard: 0.3 – 0.5 mm (0.01 – 0.02 in), Service limit: 0.9 mm (0.04 in)

TORQUE VALUES

Spark plug	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Engine oil filter cartridge	26 N·m (2.7 kgf·m, 20 lbf·ft)	Apply engine oil to the threads and seating surface
Anode (turbocharger: ARX1200T3/T3D)	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)	Apply locking agent to the threads
Anode cap (turbocharger: ARX1200T3/ T3D)	49 N·m (5.0 kgf·m, 36 lbf·ft)	
Anode cap (oil tank cover)	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply multi-purpose grease to the threads
Cable joint nut	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	Self-lock nut.
Cable joint lock nut	3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)	

TOOL

Oil filter wrench
07HAA-PJ70101



or 07AAA-PLCA100

MAINTENANCE SCHEDULE

ARX1200T3/T3D:

Perform the Pre-ride inspection in the Owner's Manual at each scheduled maintenance period.

The following items require some mechanical knowledge. Certain items (particularly those marked * and **) may require more technical information and tools. Consult an authorized Honda dealer.

		ITEMS / FREQUENCY	WHICHEVER COMES FIRST	INITIAL MAINTE-NANCE	REGULAR MAINTENACE INTERVAL		REFER TO PAGE
			MONTH	–	6	12	
			HOURS	10	100	200	
EMMISION RELATED ITEMS	*	FUEL TANK/FUEL LINE	Inspect		O	O	4-5
	*	THROTTLE CABLE	Inspect/Lubricate		O	O	4-5
		THROTTLE BODY	Inspect/Lubricate	O	O	O	4-6
		SPARK PLUG	Inspect/Replace			O	4-7
	**	VALVE CLEARANCE	Inspect/Adjust	Every 200 hours			4-8
	*	AIR FILTER	Replace			O	4-11
		ENGINE OIL	Replace	Every 50 hours or every year			4-12
		ENGINE OIL FILTER	Replace			O	4-14
	*	ENGINE IDLE SPEED	Adjust	O	O	O	4-15
		COOLING SYSTEM	Inspect	O	O	O	4-15
NON-EMISSION RELATED ITEMS	*	IMPELLER	Inspect		O	O	4-16
		RUBBER COUPLING	Inspect	O	O	O	4-17
		TURBOCHARGER	Lubricate	O	O	O	4-17
	*	ANODE – Turbocharger	Inspect/Replace			O	4-17
		ANODE – Exhaust Manifold, Oil Cooler and Cylinder Head	Inspect/Replace	Every 400 hours			4-18
		BILGE STRAINER	Clean		O	O	4-19
		DRAIN PLUG	Inspect/Replace			O	4-19
	**	BEARING HOUSING	Grease/Inspect		O	O	4-20
	*	REVERSE SYSTEM	Inspect/Adjust/Lubricate		O	O	4-20
	*	NUTS, BOLTS, FASTENERS	Inspect	O	O	O	4-22
	*	STEERING SYSTEM	Inspect/Adjust/Lubricate	O	O	O	4-22

* Should be serviced by an authorized Honda dealer, unless the owner has proper tools and service data and is mechanically qualified.

** In the interest of safety, we recommended these items be serviced only by an authorized Honda dealer.

NOTE:
Some items will need more frequent service if the PWC is ridden in salt water or at full throttle. Consult an authorized Honda PWC dealer for recommendations applicable to your individual needs and use.

ARX1200N3:

Perform the Pre-ride inspection in the Owner's Manual at each scheduled maintenance period.

The following items require some mechanical knowledge. Certain items (particularly those marked * and **) may require more technical information and tools. Consult an authorized Honda dealer.

		ITEMS / FREQUENCY	WHICHEVER COMES FIRST	INITIAL MAINTE-NANCE	REGULAR MAINTENACE INTERVAL		REFER TO PAGE
			MONTH	–	6	12	
			HOURS	10	100	200	
EMMISION RELATED ITEMS	*	FUEL TANK/FUEL LINE	Inspect		O	O	4-5
	*	THROTTLE CABLE	Inspect/Lubricate		O	O	4-5
		THROTTLE BODY	Inspect/Lubricate	O	O	O	4-6
		SPARK PLUG	Inspect/Replace			O	4-7
	**	VALVE CLEARANCE	Inspect/Adjust	Every 200 hours			4-8
	*	AIR FILTER	Replace			O	4-11
		ENGINE OIL	Replace	Every 50 hours or every year			4-12
		ENGINE OIL FILTER	Replace			O	4-14
	*	ENGINE IDLE SPEED	Adjust	O	O	O	4-15
		COOLING SYSTEM	Inspect	O	O	O	4-15
NON-EMISSION RELATED ITEMS	*	IMPELLER	Inspect		O	O	4-16
		RUBBER COUPLING	Inspect	O	O	O	4-17
	*	ANODE (Exhaust Manifold, Oil Cooler and Cylinder Head)	Inspect/Replace	Every 400 hours			4-17
		BILGE STRAINER	Clean		O	O	4-19
		DRAIN PLUG	Inspect/Replace			O	4-19
	**	BEARING HOUSING	Grease/Inspect		O	O	4-20
	*	REVERSE SYSTEM	Inspect/Adjust/Lubri-cate		O	O	4-20
	*	NUTS, BOLTS, FASTENERS	Inspect	O	O	O	4-22
	*	STEERING SYSTEM	Inspect/Adjust/Lubri-cate	O	O	O	4-22

* Should be serviced by an authorized Honda dealer, unless the owner has proper tools and service data and is mechanically qualified.

** In the interest of safety, we recommended these items be serviced only by an authorized Honda dealer.

NOTE:
Some items will need more frequent service if the PWC is ridden in salt water or at full throttle. Consult an authorized Honda PWC dealer for recommendations applicable to your individual needs and use.

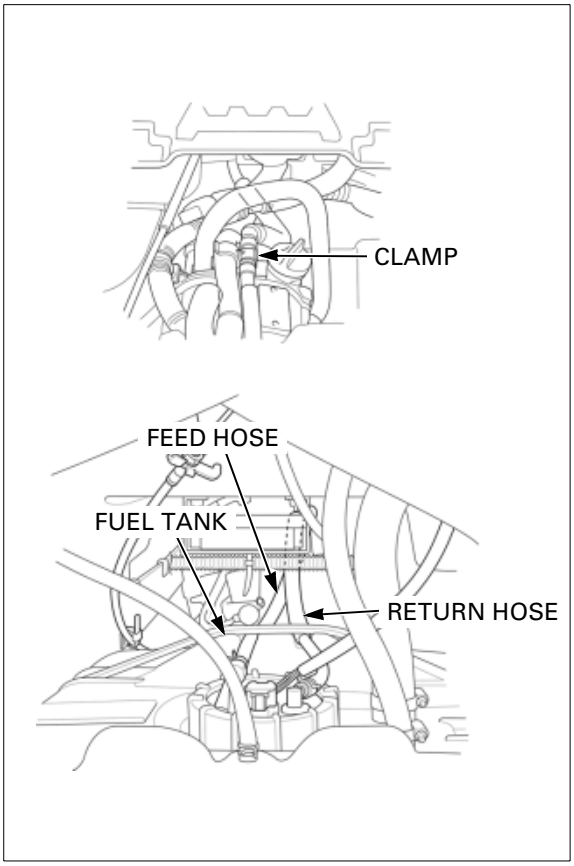
FUEL TANK/FUEL LINE

Remove the following:
– seats (page 3-4)
– storage box (page 3-8)

Check the fuel feed and return hoses for deterioration, damage or leakage and make sure the hoses are secured with the hose clamp properly.
Also, check that the clamp is installed on the oil tank securely.

Check the fuel tank for cracks or leakage and that the tank is installed securely with the straps.

Replace if necessary.



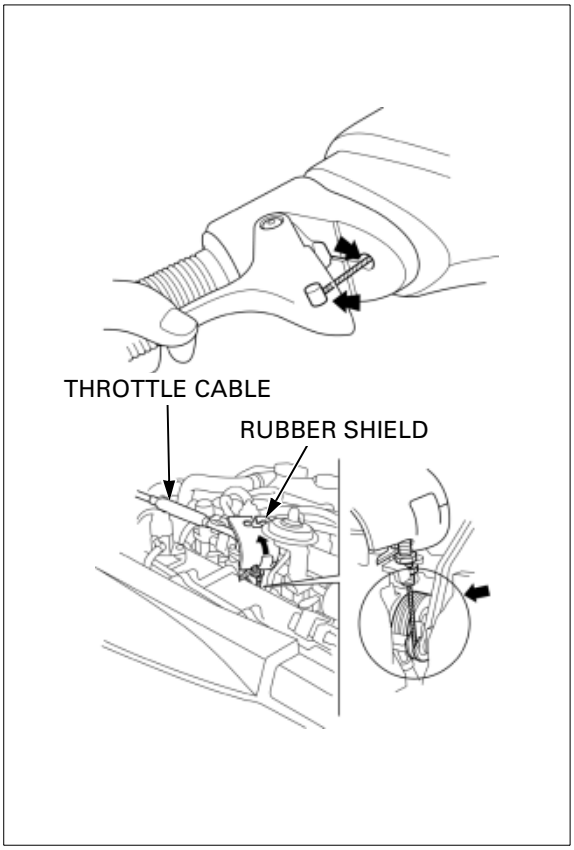
THROTTLE CABLE

Remove the seats (page 3-4).

Check the throttle lever for smooth operation. Check that the throttle opens and automatically closes in all steering positions. Check for any deterioration or damage to the throttle cable.

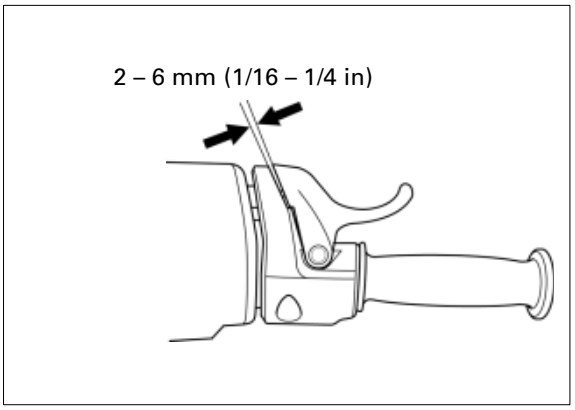
Apply a water-displacement corrosion-proof lubricant (without Teflon or molybdenum additives, such as CRC 6-56 or an equivalent) to the throttle cable upper end.
Release the rubber shield, and apply a water-displacement corrosion-proof lubricant (without Teflon or molybdenum additives, such as CRC 6-56 or an equivalent) to the throttle cable lower end (throttle drum rolling area) and to the throttle screw tip.

With the engine idling, turn the handlebar all the way to the right and left to ensure that the idle speed does not change. If idle speed increases, check the throttle lever free play and the throttle cable connection.



Measure the throttle lever free play at the tip of the throttle lever.

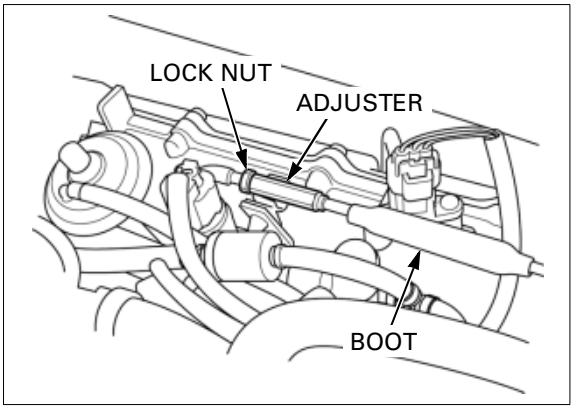
FREE PLAY: 2 – 6 mm (1/16 – 1/4 in)



Adjust the free play as follows:

Remove the seats (page 3-4).
Slide the cable boot off the adjuster. Loosen the lock nut, turn the adjuster as required and tighten the lock nut.
Install the boot properly.

Recheck the throttle operation and install the seats (page 3-4).

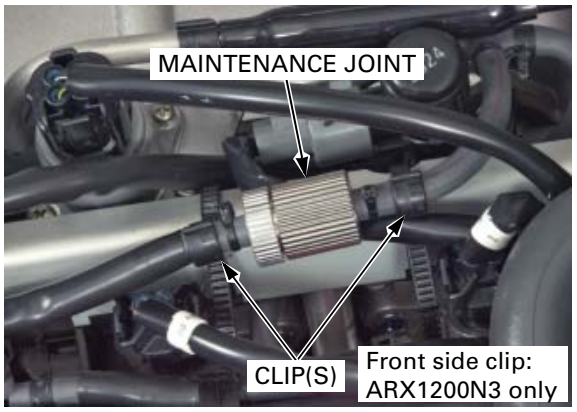


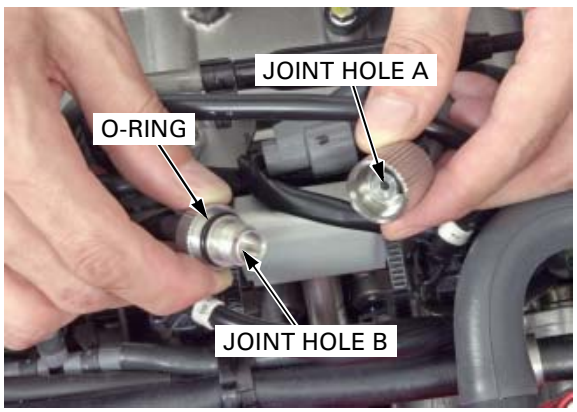
THROTTLE BODY

Remove the seats (page 3-4).

To lubricate and rustproof the inside of the throttle body, proceed as follows after confirming that the engine is stopped and cool.

1. Remove the joint hoses from the clip(s) and disconnect the maintenance joint.
2. Insert the spray nozzle of a water-displacement corrosion-proof lubricant (without Teflon or molybdenum additives, such as CRC 6-56 or an equivalent) into joint hole A.
3. Open the throttle fully.
4. Spray the lubricant into joint hole A for 3 seconds.
5. Operate the throttle lever slowly, from fully ON to fully OFF, 3 times.
6. Repeat the step 2 – 5 again.
7. Perform the same lubrication procedure for joint hole B.
8. Spray the lubricant to the maintenance joint threads and the O-ring.
9. Reconnect the maintenance joint and make sure it tightened securely. Install the joint hoses into the clip(s) properly.





SPARK PLUG

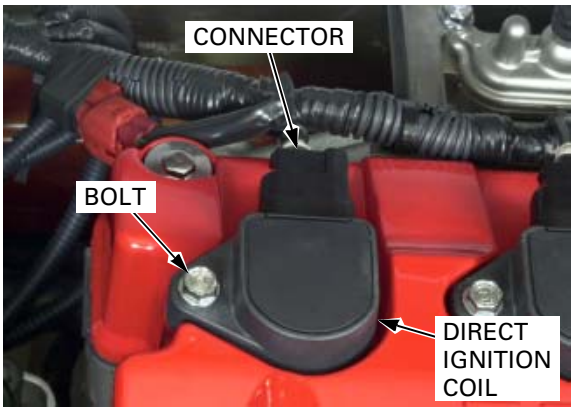
NOTE:

- This watercraft uses direct type ignition coils. The spark plug cap and ignition coil are integrated.

Remove the seats (page 3-4).

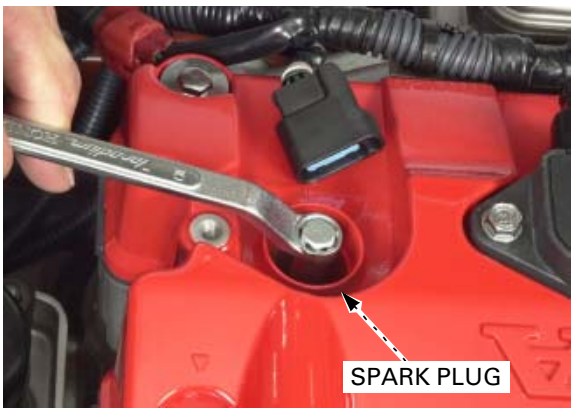
Wipe off any water around the connectors. Wet Connectors can damage the electrical system.

Disconnect the ignition coil connectors.
Remove the bolts and the direct ignition coils.



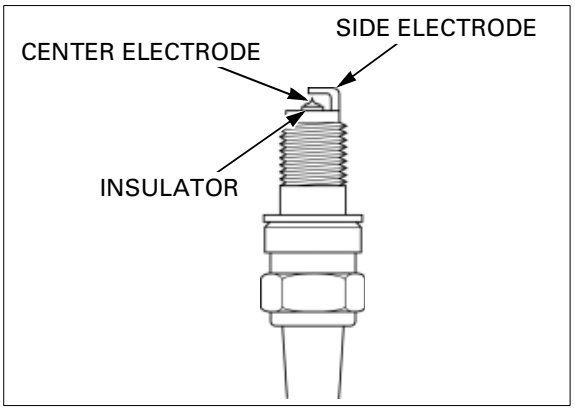
Clean around the spark plug bases with compressed air before removing the plugs, and be sure that no debris is allowed to enter the combustion chamber.

Remove the spark plugs.

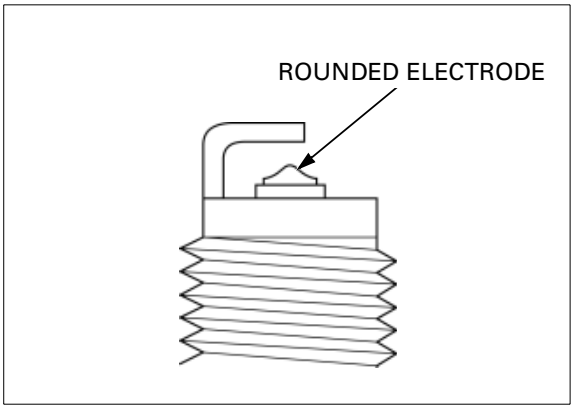


The spark plugs are equipped with iridium type center electrodes. Do not clean the electrodes.

Check the insulator for cracks or damage, and the electrodes for wear, fouling or discoloration.
Replace the plug if necessary.



Replace the plug if the center electrode is rounded as shown.

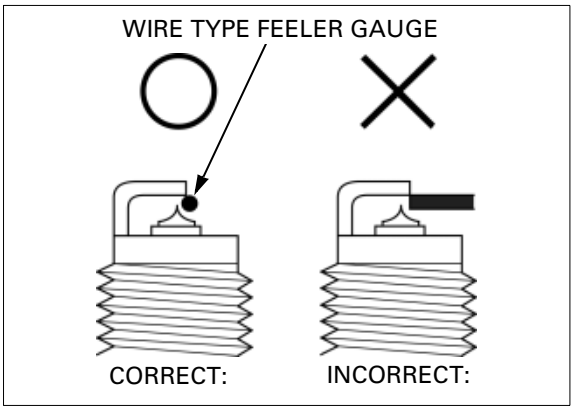


Always use the specified spark plugs on this watercraft.

SPECIFIED SPARK PLUG: IMR9D-9H (NGK)

To prevent damaging the iridium coating of the center electrode, use a wire type feeler gauge to check the spark plug gap.

Measure the spark plug between the center and side electrodes with a wire-type feeler gauge.
Make sure the 1.0 mm (0.04 in) wire-type feeler gauge cannot be inserted into the gap.



Do not adjust the spark plug gap. If the gap is out of specification, replace the plug with a new one.

If the gauge can be inserted into the gap, replace the plug with a new one.

Screw the spark plug in the cylinder head by hand to prevent cross-threading.
Tighten the spark plug to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the removed parts in the reverse order of removal.

NOTE:

- Before installing the ignition coil, clean the plug hole (coil seating area) and sealing rubber on the ignition coil, and make sure the sealing rubber is in good condition.
- Do not allow water into the ignition coil connectors.

VALVE CLEARANCE

INSPECTION

NOTE:

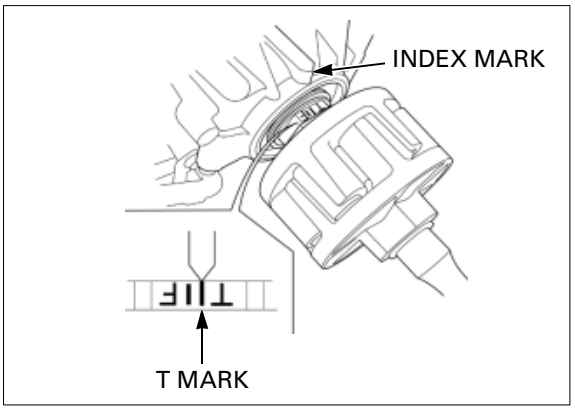
- Inspect and adjust the valve clearance while the engine is cold (below 35°C, 95°F).

Remove the following:
– spark plugs (page 4-7)
– cylinder head cover (page 10-7).
– ARX1200T3/T3D: coupler covers; B and A (page 3-14)
ARX1200N3: coupler cover (page 3-14)

Failure to loosen the cam chain tensioner will result in inaccurate valve clearance measurements.

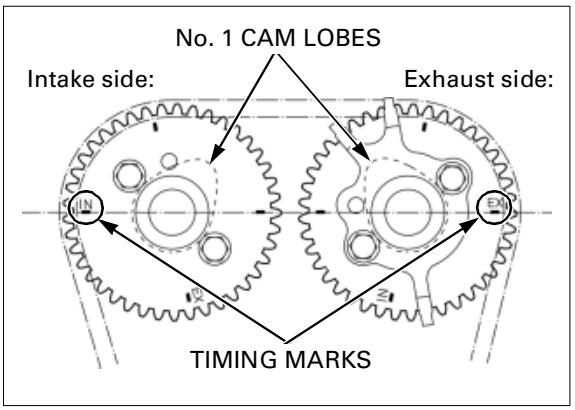
Loosen the cam chain tensioner (page 10-8).

Rotate the crankshaft counterclockwise (viewed from rear side) and align the "T" mark on the drive coupler boss with the index mark (arrow) on the crankcase.



The timing marks ("IN" for intake and "EX" for exhaust) on the cam sprockets must be flush with the cylinder head surface and facing outward as shown.

If the timing marks are facing inward, rotate the crankshaft counterclockwise 360° (one full turn) and align the "T" mark with the index mark.

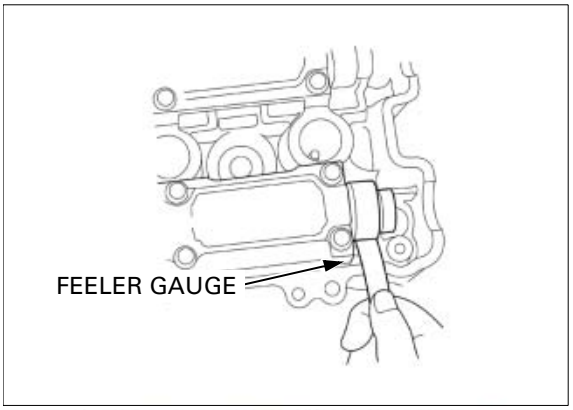


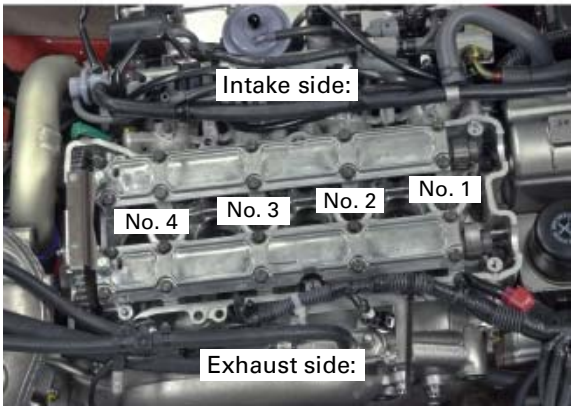
Record each valve clearance for reference in shim selection if adjustment is required.

Check each valve clearance in the sequence as follows.

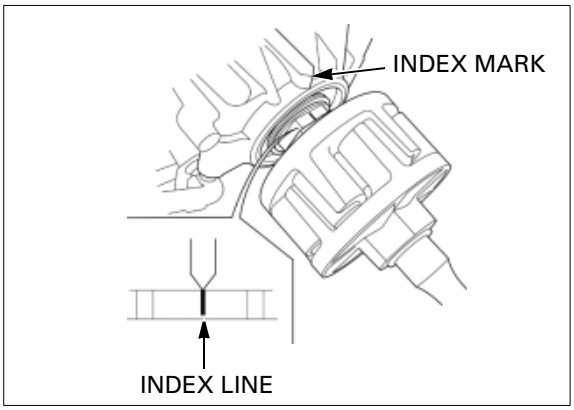
VALVE CLEARANCE:
IN: 0.16 ± 0.03 mm (0.006 ± 0.001 in)
EX: 0.26 ± 0.03 mm (0.010 ± 0.001 in)

1. Measure the No. 1 and No. 3 cylinder exhaust valve clearances by inserting a feeler gauge between the valve lifter and cam lobe.

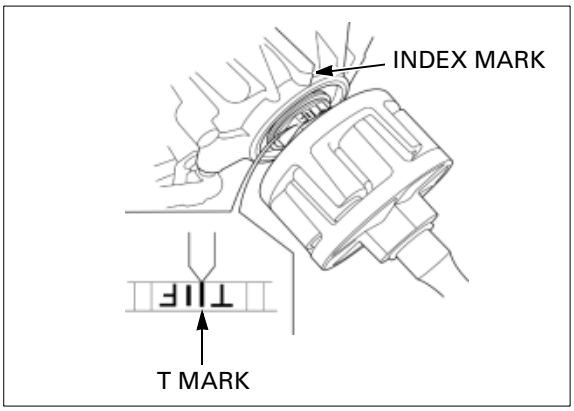




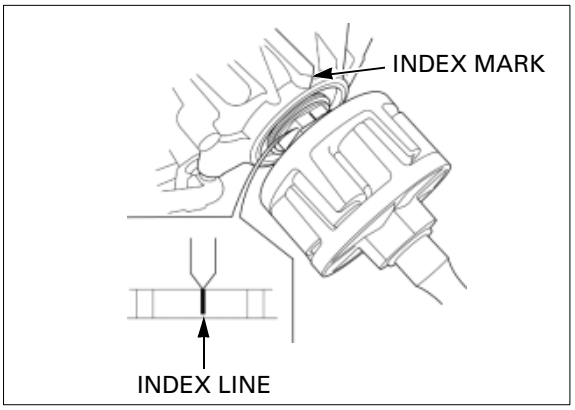
2. Rotate the crankshaft counterclockwise 1/2 of a turn (180°) from the previous position and align the index line on the drive coupler boss with the index mark (arrow).
   Measure the No. 1 and No. 3 cylinder intake valve clearances.



3. Rotate the crankshaft counterclockwise 1/2 of a turn (180°) from the previous position and align the "T" mark with the index mark (arrow). The timing marks "IN" and "EX" on the cam sprockets are flush with the cylinder head surface and facing inward.
   Measure the No. 2 and No. 4 cylinder exhaust valve clearances.



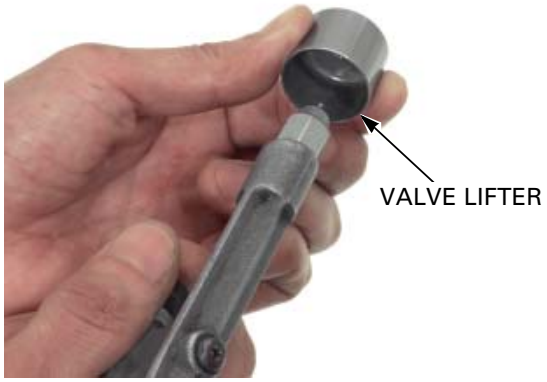
4. Rotate the crankshaft counterclockwise 1/2 of a turn (180°) from the previous position and align the index line on the drive coupler boss with the index mark (arrow).
   Measure the No. 2 and No. 4 cylinder intake valve clearances.



ADJUSTMENT

Remove the valve lifters and shims (page 10-8).

Clean the valve shim contact area in the valve lifter with compressed air.



Measure the shim thickness and record it.

NOTE:

- Sixty-five different shim thicknesses are available from 1.200 mm to 2.800 mm in intervals of 0.025 mm.

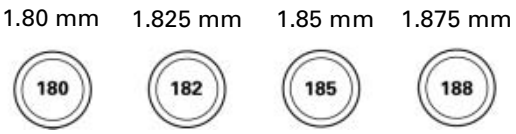
Calculate the new shim thickness using the equation below.

A = (B – C) + D

A: New shim thickness
B: Recorded valve clearance
C: Specified valve clearance
D: Old shim thickness

NOTE:

- Make sure of the correct shim thickness by measuring the shim with a micrometer.
- Reface the valve seat if carbon deposits result in a calculated dimension of over 2.800 mm.

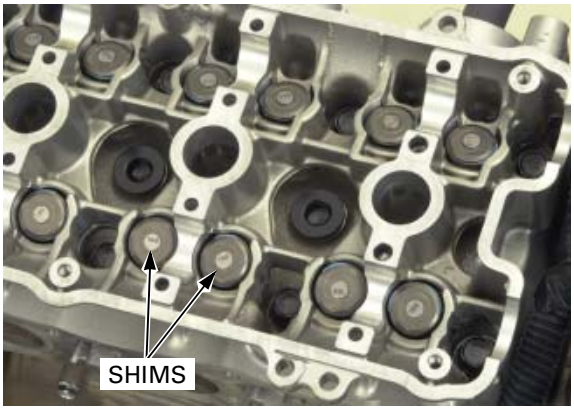


Install the newly selected shims on the valve retainers.

Install the valve lifters and camshafts (page 10-25).

Rotate the camshafts by rotating the crankshaft counterclockwise several times.
Recheck the valve clearances.

Remove the following:
– cylinder head cover (page 10-7).
– spark plugs (page 4-7)
– ARX1200T3/T3D: coupler covers; A and B (page 3-14)
  ARX1200N3: coupler cover (page 3-14)



AIR FILTER

ARX1200T3/T3D:

Remove the seats (page 3-4).

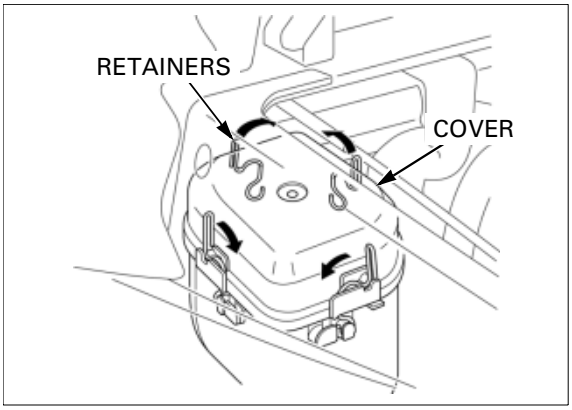
Release the four retainers and remove the airbox cover.

Replace the air filter in accordance with the maintenance schedule or any time it is excessively dirty or damaged.

Install a new air filter into the housing base properly.

Be sure the rubber seal in the cover is in good condition and install the airbox cover.
Secure the cover with the retainers

Install the seats (page 3-4).



ARX1200N3:

Remove the seats (page 3-4).

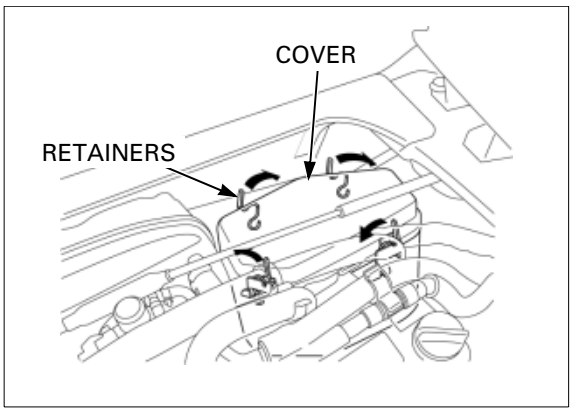
Release the four retainers and remove the airbox cover.

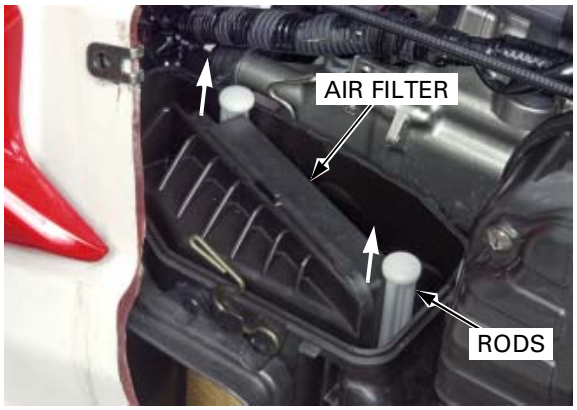
Pull the holder rods up to release the air filter.
Replace the air filter in accordance with the maintenance schedule or any time it is excessively dirty or damaged.

Install a new air filter into the housing properly, and push the holder rods to secure it.

Be sure the rubber seal in the cover is in good condition and install the airbox cover.
Secure the cover with the retainers

Install the seats (page 3-4).





ENGINE OIL

This watercraft's engine uses a dry sump. Follow the following procedures to determine if the proper amount of oil is in the engine.

LEVEL CHECK

Secure the watercraft on a stand or trailer and keep it level.

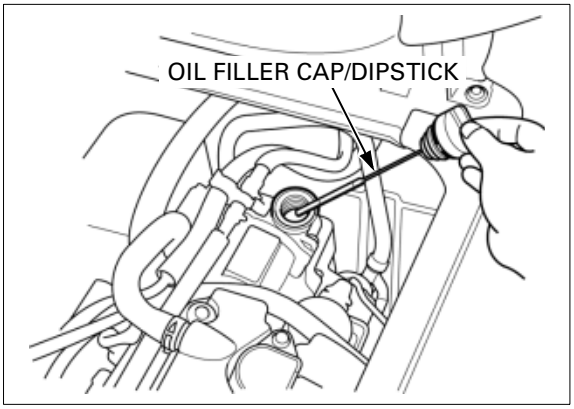
Remove the rear tray (page 3-5).

Before checking the engine oil level:

Remove the filler cap/dipstick from the oil tank and wipe it clean.

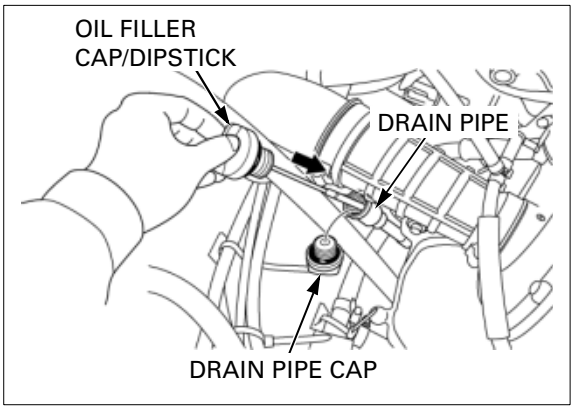
Insert the filler cap/dipstick until it seats, but do not screw it in.
Remove the dipstick and check the oil level.

- If the oil appears on the dipstick, install the filler cap/dipstick and proceed to the Oil Level Check Procedure (page 4-13).
- If there is no oil on the dipstick, perform the following procedure.



Remove the oil drain pipe cap and insert the filler cap/dipstick into the oil drain pipe until it seats, then remove it and check the oil level.

– If oil appears on the dipstick, install the filler cap/dipstick and drain pipe cap, and proceed to the Oil Level Check Procedure.
– If there is no oil on the dipstick, do not start the engine. Reinstall the drain pipe cap and tighten it.
  Add the recommended engine oil into the oil tank through the filler hole until oil is on the dipstick. Do not over fill.
  Install the filler cap/dipstick and proceed to the Oil Level Check Procedure.



Make sure the filler cap/dipstick and drain pipe cap are tightened securely.

Oil Level Check Procedure

Start the engine according to the flushing procedure (page 5-2).

NOTICE

- *Avoid running the engine without water flow for more than 15 seconds to prevent severe engine and exhaust system damage.*
- *Start the engine before turning on the water to prevent flow through the exhaust pipe back into the engine where it could cause severe damage.*

Let the engine idle for 5 minutes. If the air temperature is below 10°C (50°F), let the engine idle for an additional 5 minutes (a total of 10 minutes).
Turn off the water and rev the engine to clear water out of the exhaust system.

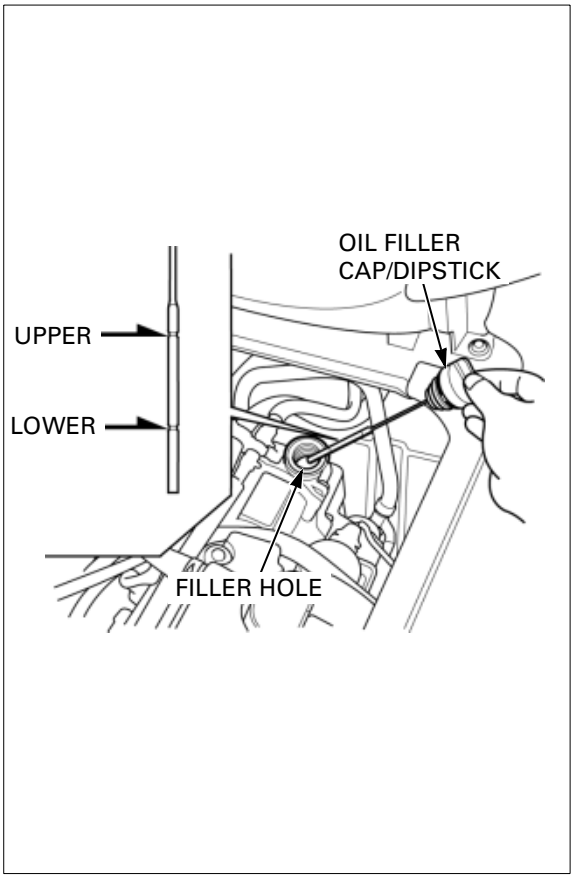
NOTICE

Avoid running the engine without water flow for more than 15 seconds to prevent severe engine and exhaust system damage.

Stop the engine and wait a few minutes.
Remove the filler cap/dipstick, and wipe it clean.
Insert the dipstick into the filler hole in the oil tank until it seats, but do not screw it in.

The engine contains a sufficient amount of oil if the oil level is between the upper and lower level marks on the dipstick.

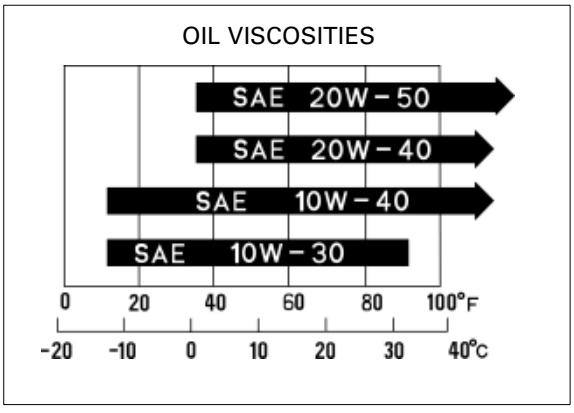
If the oil level is near or below the lower level mark, add the recommended engine oil through the filler hole, until the oil level reaches the upper level mark.



RECOMMENDED ENGINE OIL:
Pro Honda GN4, HP4 (without molybdenum additives) or HP4M (with molybdenum additives) 4-stroke oil or equivalent motor oil
API service classification: SG or Higher
JASO T 903 standard: MA or MB
Viscosity: SAE 10W-40

NOTE:

- Other viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range.



Reinstall the filler cap/dipstick and check for any oil leaks.

OIL CHANGE

NOTE:

- Change the oil with the engine warm to assure complete draining.

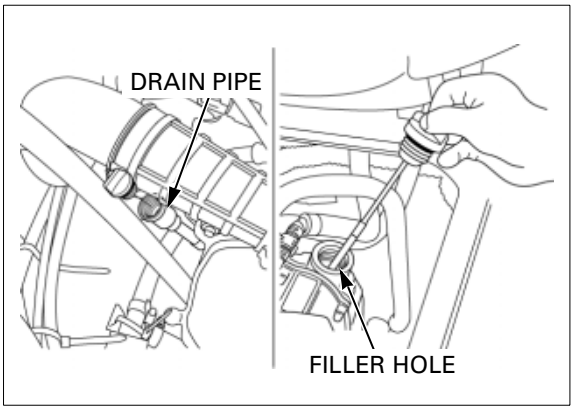
Secure the watercraft on a stand or trailer.

Remove the rear tray (page 3-5).

Warm up the engine for a few minutes according to the flushing procedure (page 5-2).
Turn off the water and stop the engine.

Remove the oil filler cap/dipstick and the drain pipe cap.
Pump out the engine oil with a commercially available Fluid Evacuator from the oil filler hole and drain pipe, to drain the oil tank and oil pan.

After draining the oil completely, install the drain pipe cap and pour the recommended oil (page 4-13) into the oil tank through the filler hole.



OIL CAPACITY:
ARX1200T3/T3D (turbocharger model):
4.2 liters (4.4 US qt, 3.7 Imp qt) at draining
4.3 liters (4.5 US qt, 3.8 Imp qt) at draining/filter change
5.3 liters (5.6 US qt, 4.7 Imp qt) at disassembly
ARX1200N3:
4.0 liters (4.2 US qt, 3.5 Imp qt) at draining
4.1 liters (4.3 US qt, 3.6 Imp qt) at draining/filter change
5.0 liters (5.3 US qt, 4.4 Imp qt) at disassembly

Install the filler cap/dipstick.

Check the oil level (page 4-12).

ENGINE OIL FILTER

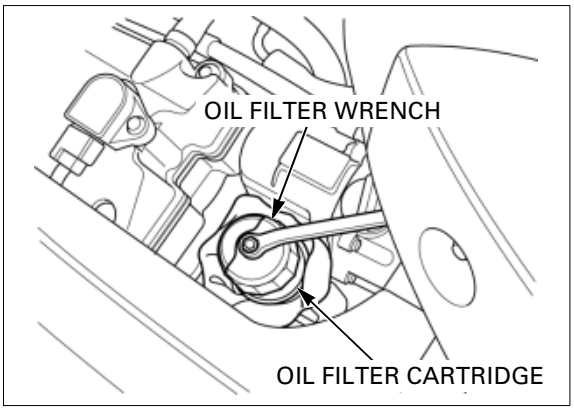
Drain the engine oil (page 4-14).

Place a shop towel around the oil filter cartridge to avoid spilling the engine oil.
Remove the oil filter cartridge and discard it.

TOOL:

Oil filter wrench	**07HAA-PJ70101 or 07AAA-PLCA100**

Clean any oil from the cartridge seating surface of the engine and the oil filter tray.



Apply engine oil to the O-ring and threads of a new oil filter cartridge and install the filter using the filter wrench.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

Fill the oil tank with the recommended oil (page 4-14).

ENGINE IDLE SPEED

NOTE:

- Inspect and adjust the idle speed after all other engine maintenance items have been performed and are within specifications.
- The engine must be warm for accurate adjustment. Five minutes of idling is sufficient. If the air temperature is below 10°C (50°F), let the engine idle for an additional 5 minutes (a total of 10 minutes).

ARX1200T3/T3D:
ARX1200N3:

Remove the seats (page 3-4).
Remove the rear tray (page 3-5).

Refer to the tachometer manufacturer's operating instructions for proper use.

Connect a tachometer.

Warm up the engine with the watercraft in the water and check the idle speed.
Adjust the idle speed by turning the throttle stop screw as required.

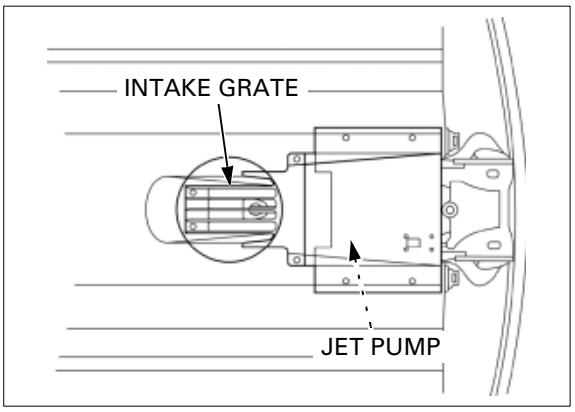
IDLE SPEED: 1,200 ± 100 rpm

ARX1200T3/T3D:

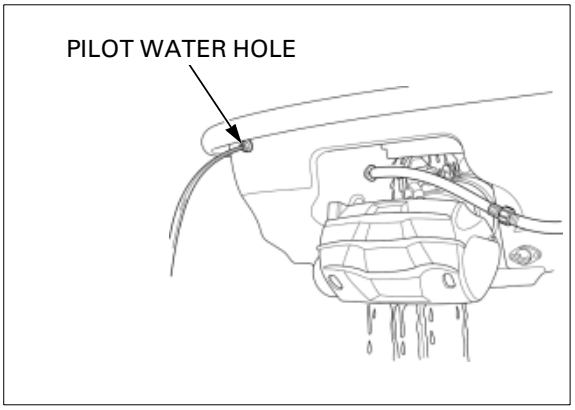
ARX1200N3:

COOLING SYSTEM

Check the intake grate (water intake area) for obstructions or foreign matter.



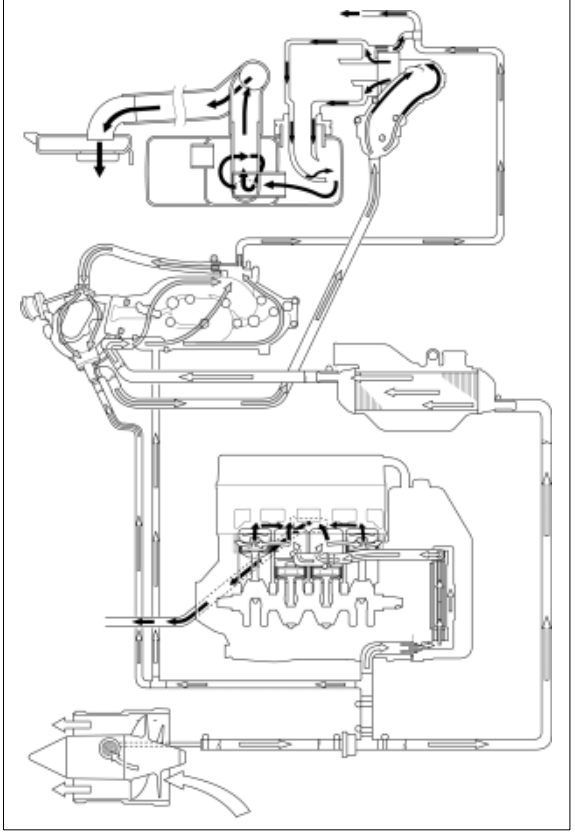
Flush the system (page 5-2) and check for clogs in the water passages.
A sufficient amount of water should flow out from the pilot water hole.



Remove the side panels (page 3-5).

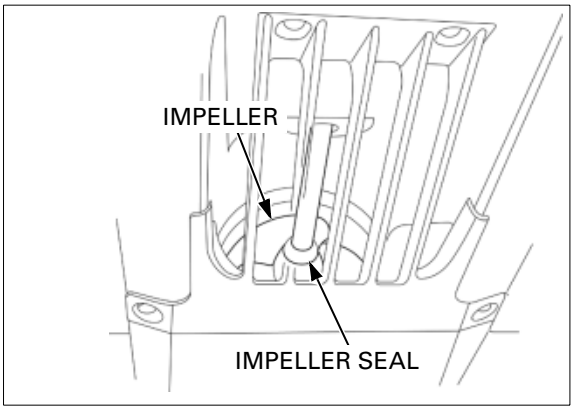
Check for water leakage from the water hoses and hose joints.
Check the water hoses for cracks or deterioration.
Check that all hose clamps are tight.

Turbocharger model (ARX1200T3/T3D) shown:



IMPELLER

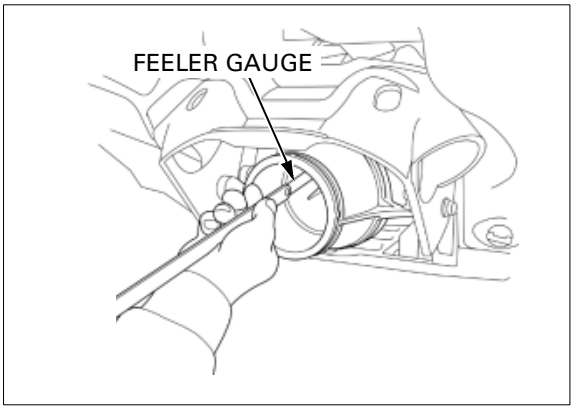
Check the impeller for deep scratches, pitting or nicks by looking from both the water outlet and inlet sides.
Check the jet stator inner wall for scratches.
Check the impeller seal for cracks or damage.



Measure the clearance between each impeller blade and the jet stator, using a feeler gauge 12-inches long.

STANDARD: 0.3 – 0.5 mm (0.01 – 0.02 in)
SERVICE LIMIT: 0.9 mm (0.04 in)

Impeller clearance is critical for proper performance. If the clearance is out of specification, disassemble and inspect the impeller and impeller housing area (page 14-10).

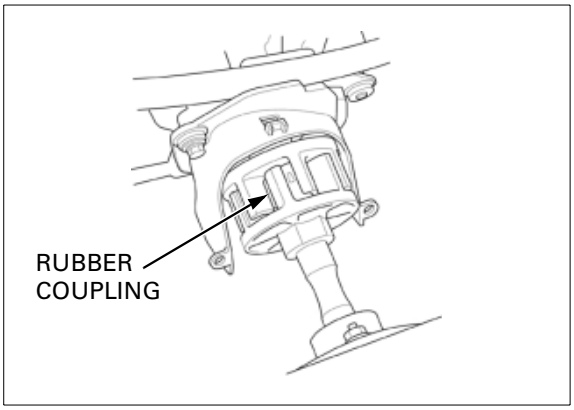


RUBBER COUPLING

ARX1200T3/T3D: Remove the coupler cover B (page 3-14).
ARX1200N3: Remove the coupler cover (page 3-14).

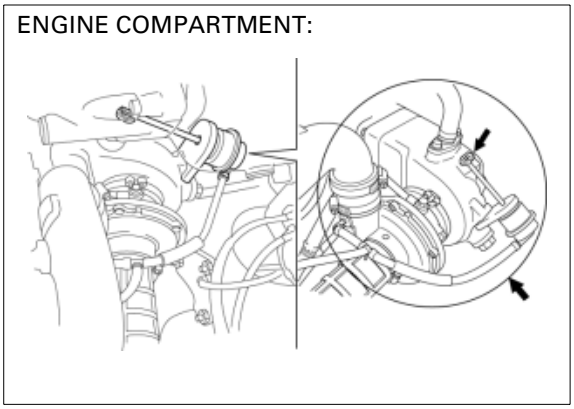
Check the rubber coupling for cracks, damage or deterioration.

Install the coupler cover in the reverse order of removal (page 3-14).



TURBOCHARGER (ARX1200T3/T3D)

Lubricate and rustproof the turbocharger (especially wastegate link) with a water-displacement corrosion-proof lubricant (without Teflon or molybdenum additives, such as CRC 6-56 or an equivalent) as shown in the illustration after confirming the engine is cool.



ANODE

NOTE:
- On all models, the anodes are located in the exhaust manifold, oil cooler (in oil tank) and cylinder head. The ARX1200T3/T3D model has an additional anode located in the turbocharger.

Turbocharger (ARX1200T3/T3D):

Remove the rear tray (page 3-5).

Remove the anode cap from the turbocharger. Remove the O-ring.

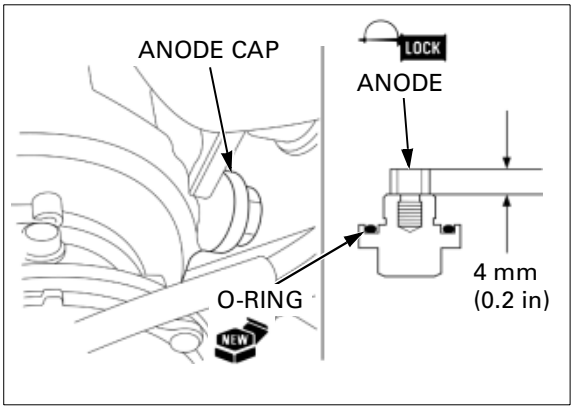
Check the anode for excessive wear.
Measure the anode height. If it is smaller than 4 mm (0.2 in), replace with a new one.

Remove the anode.
Apply locking agent to the threads of a new anode and tighten it.

TORQUE: 0.1 N·m (0.1 kgf·m, 0.7 lbf·ft)

Install the anode cap with a new O-ring and tighten it.

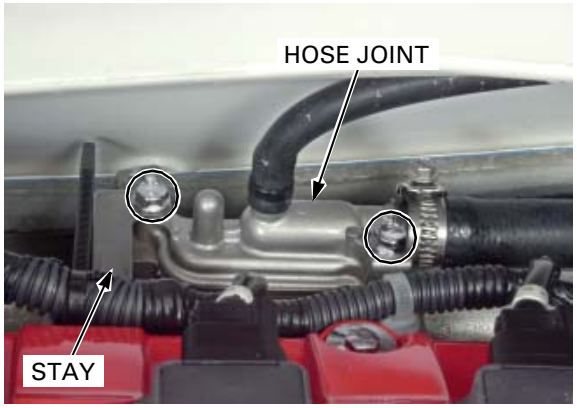
TORQUE: 49 N·m (5.0 kgf·m, 36 lbf·ft)



Exhaust manifold/Oil cooler/Cylinder head:

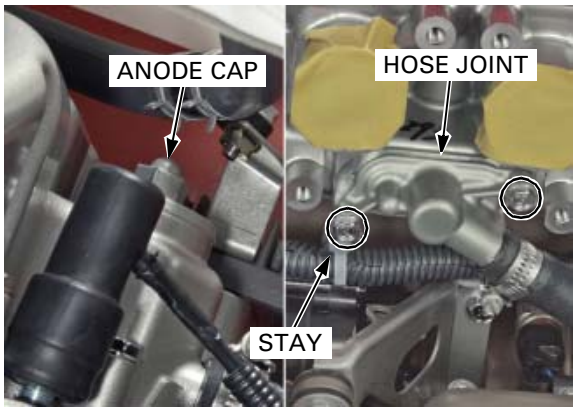
Remove the following and inspect each anode:

At exhaust manifold:
- seats (page 3-4)
- two bolts and stay
- water hose joint



At oil tank:
- anode cap

At cylinder head:
- throttle body (page 8-94)
- two bolts and stay
- water hose joint



Check the anode retaining screw to be sure it is tight.
Check the anode for excessive wear.
If the anode O.D. is worn to the screw head, replace with a new one.

Remove the screw and anode.

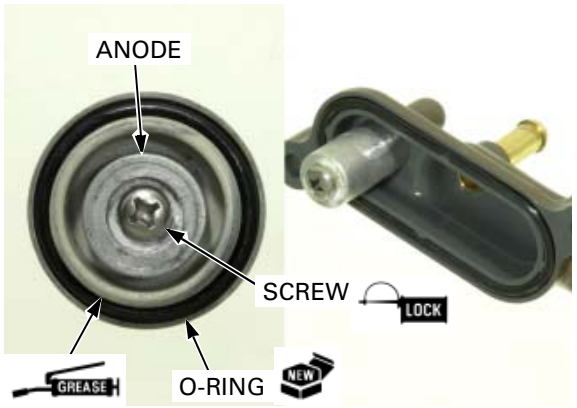
Apply locking agent to the retaining screw threads and install a new anode with the screw.

Replace the O-ring with a new one.

Install the removed parts in the reverse order of removal.

Apply multi-purpose grease to the cap threads.

TORQUE: Anode cap: 18 N·m (1.8 kgf·m, 13 lbf·ft)



BILGE STRAINER

Remove the following:
– passenger grab rail (page 3-5)
– ARX1200T3/T3D: coupler cover B (page 3-14)
ARX1200N3: coupler cover (page 3-14)

Remove the bilge strainer out of the strainer holder while sliding it forward.

Flush the strainer and hose thoroughly with fresh water to clean it.
Check the strainer for cracks or other damage.
Check the hoses for cracks, deterioration or loose connections. Also check that they are not kinked or pinched.

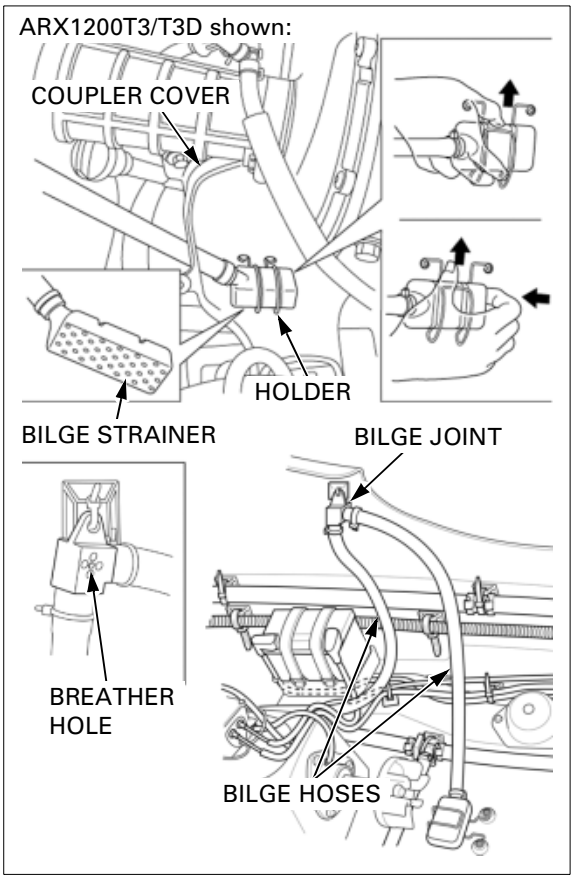
Do not clear the breather hole with a needle or a piece of wire.

Clean the breather hole in the bilge joint with compressed air.

Clean the inner surface of hull if there is foreign material.

Align the grooves in the strainer with the holder properly.

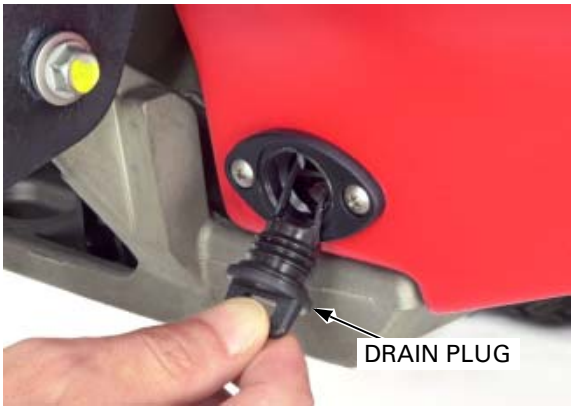
Install the removed parts in the reverse order of removal.



DRAIN PLUG

Check the bilge drain plugs for cracks or damage and the mounting screws are tightened securely.

Clean the O-ring and threads to remove any dirt or sand and check them for wear or damage.

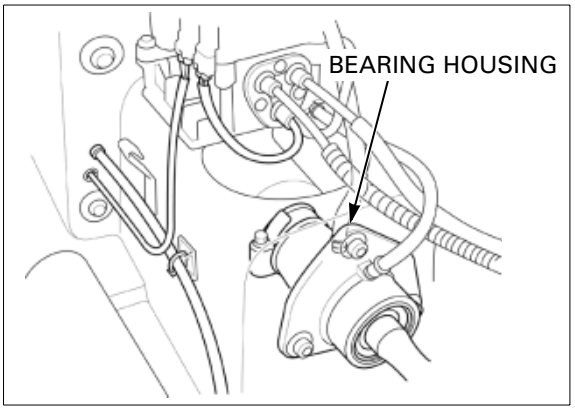


BEARING HOUSING

ARX1200T3/T3D: Remove the coupler cover B (page 3-14).
ARX1200N3: Remove the coupler cover (page 3-14).

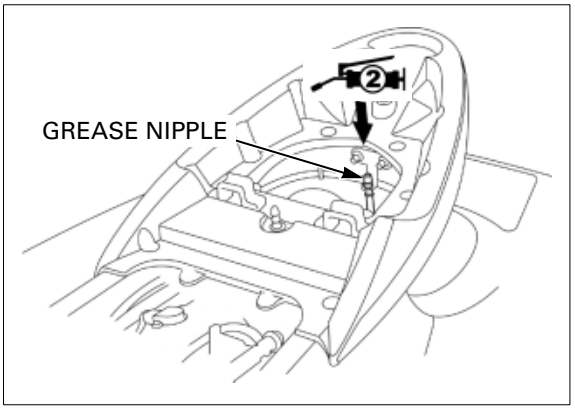
Remove the watercraft from the water immediately if there is any water entering the hull.

Check the boot and support areas of the bearing housing for cracks or deterioration.
Check for water leakage from the bearing housing (e.g., drive shaft seals) with the watercraft in the water.



Fill slowly and carefully, as high pressure can damage the hose and the joints.

Using a grease gun, fill the bearing housing with 2 – 3 g of water resistant grease #2 through the grease nipple (fill with 12 g if the bearing housing was disassembled).

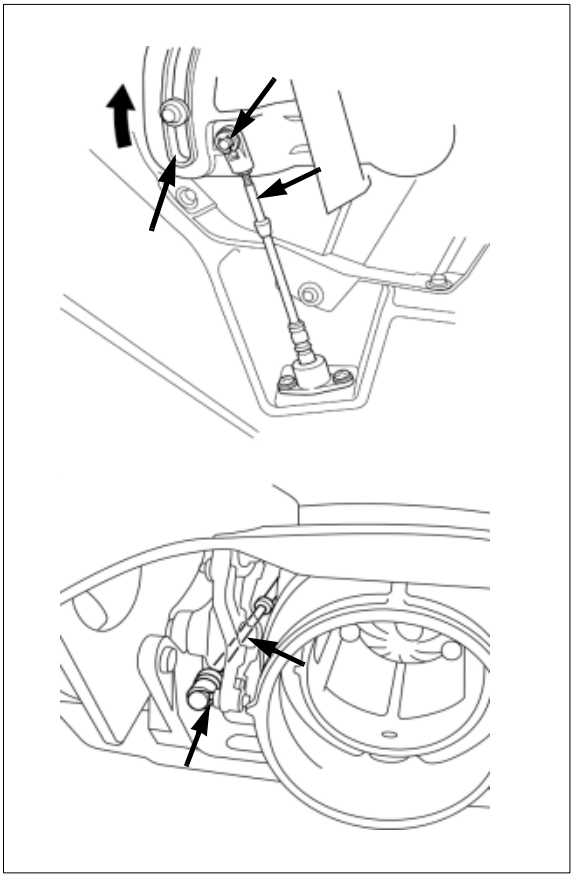


REVERSE SYSTEM

CABLE LUBRICATION

Remove the left side cover (page 3-6).

Operate the reverse lever so the inner cable is exposed from the outer cable. Then, apply a water-displacement corrosion-proof lubricant (without Teflon or molybdenum additives, such as CRC 6-56 or an equivalent) to the inner cable.
Apply a water-displacement corrosion-proof lubricant to each cable joint pivot and the guide groove in the reverse lever.



INSPECTION AND ADJUSTMENT

Operate the reverse lever and check the movement of the reverse bucket.
If the reverse bucket moves tightly or binds, inspect around the reverse bucket linkage (page 15-13).

Pull the reverse lever up to set the reverse bucket down.
Check to make sure the upper bucket catch (spring) should catch the guide collar of the bucket as shown.

Adjust the reverse bucket position as follows.

Lower the reverse lever to move the reverse bucket up.
Loosen the cable joint lock nut and disconnect the reverse cable from the bucket arm by sliding the outer sleeve of the cable joint.

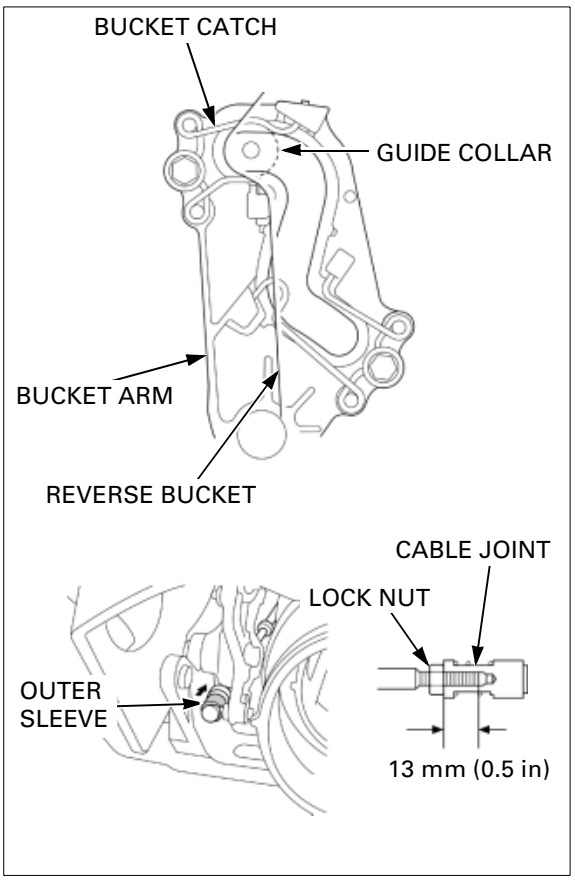
The cable joint must be screwed in at least 13 mm (0.5 in).

Turn the cable joint as required (turn in; the clearance between reverse arm and guide collar is decreased) and connect the reverse cable.

After adjustment, tighten the lock nut.

TORQUE: 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)

Operate the reverse lever and recheck the bucket position.



If the proper bucket position cannot be obtained, perform the adjustment at the reverse lever side.

Remove the left side cover (page 3-6).

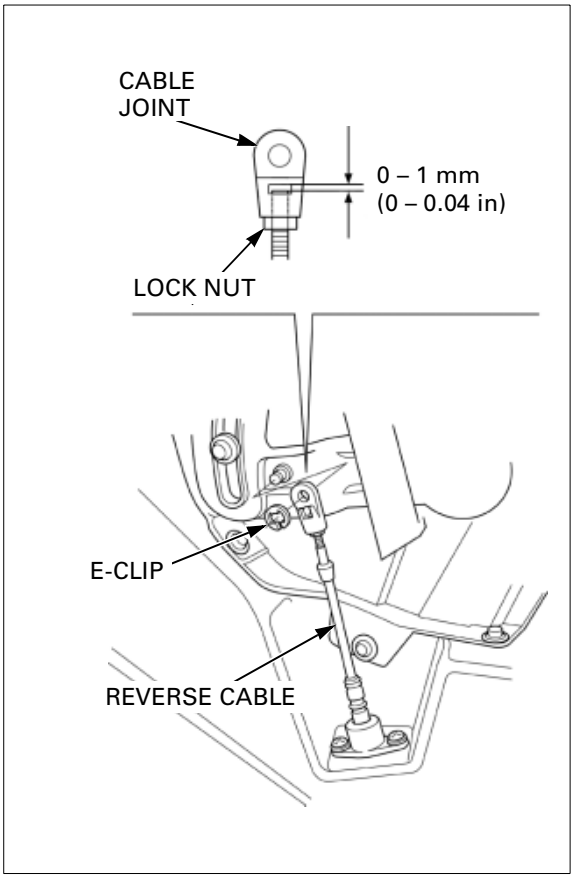
Loosen the cable joint lock nut.
Remove the E-clip and disconnect the reverse cable from the reverse lever.

The cable joint must be screwed in so the clearance between the cable end and joint hole is less than 1 mm (0.04 in).

Turn the cable joint as required and connect the reverse cable.

After adjustment, secure the cable with the E-clip and tighten the lock nut.

TORQUE: 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)



NUTS, BOLTS, FASTENERS

Check that all body nuts and bolts are tightened to the correct torque (page 1-16).
Check that all straps, hose clamps and cable stays are in place and properly secured.

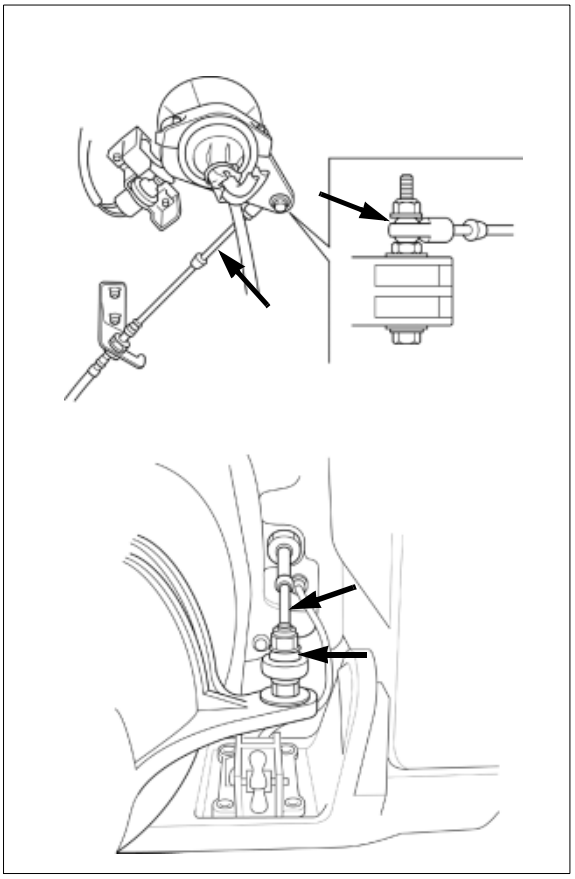
STEERING SYSTEM

CABLE LUBRICATION

Remove the storage box (page 3-8).

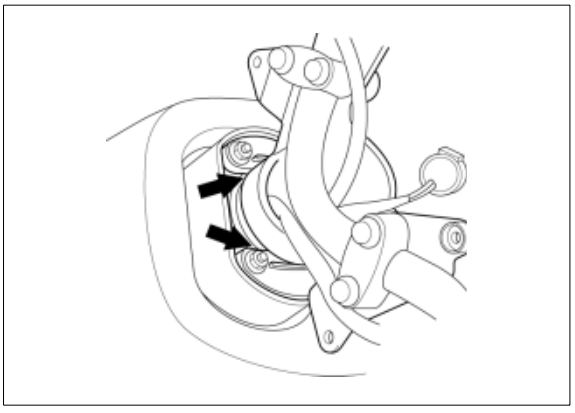
Lower the reverse lever to turn the reverse bucket up.

Turn the handlebar so the steering inner cable is exposed from the outer cable. Then, apply a water-displacement corrosion-proof lubricant (without Teflon or molybdenum additives, such as CRC 6-56 or an equivalent) to the inner cable.
Apply a water-displacement corrosion-proof lubricant to each cable joint pivot.



Remove the handlebar covers (page 3-11).

Apply a water-displacement corrosion-proof lubricant (without Teflon or molybdenum additives, such as CRC 6-56 or an equivalent) to the sliding area (groove) in the steering shaft.



INSPECTION AND ADJUSTMENT

Check that the handlebar moves freely from side-to-side.
If the handlebar moves unevenly, binds, or has vertical movement, inspect around the steering shaft (page 15-6).

Position the handlebar straight ahead.

Check that the steering nozzle is centered by measuring the distance between the edges of the steering nozzle (projection) and jet nozzle (rib). Measure on both the left and right sides of the nozzle as shown.

Adjust the steering alignment as follows.

Loosen the cable joint lock nut and disconnect the steering cable from the nozzle by removing the joint nut and washer.

The cable joint must be screwed in at least 8 mm (0.3 in).

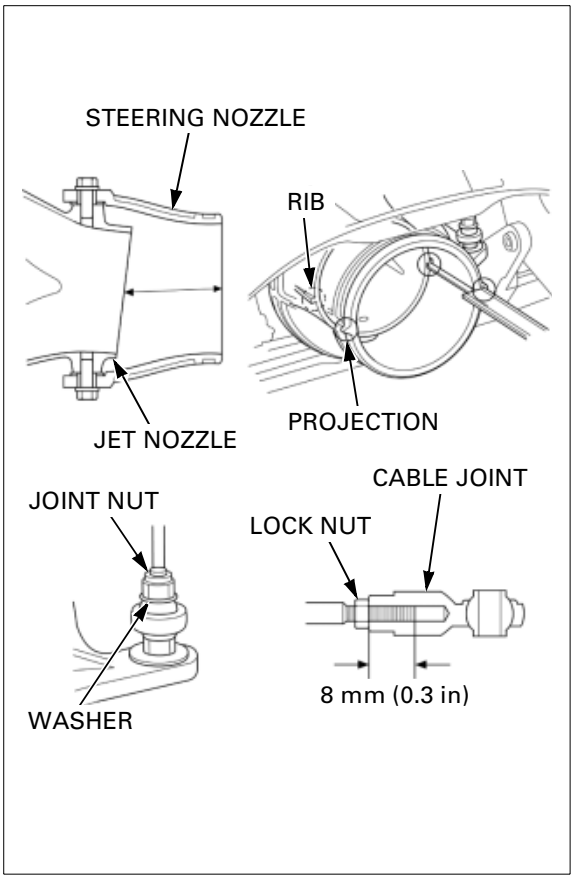
Turn the cable joint as required and connect the steering cable with the joint nut and washer.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

After adjustment, tighten the lock nut.

TORQUE: 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)

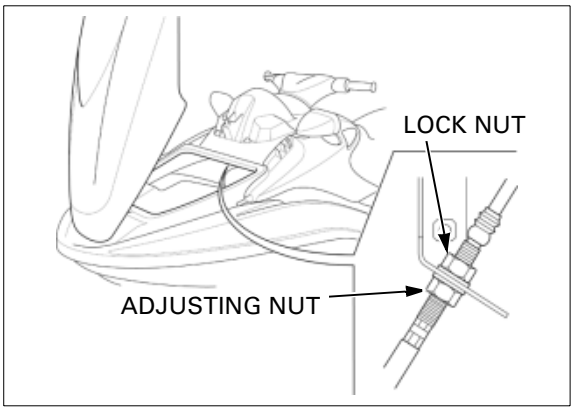
Turn the handlebar from side-to-side and recheck the steering alignment.



If the alignment cannot be obtained, perform the adjustment at the steering shaft side.

Open the front hood and remove the storage box (page 3-8).

Loosen the lock nut at the cable holder. Turn the adjusting nut as required and tighten the lock nut securely.



MEMO

5. FLUSHING AND STORAGE

SERVICE INFORMATION

GENERAL

IMPORTANT SAFETY PRECAUTIONS

- Flushing must be performed in a well ventilated area. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.
- Keep hands, feet, and loose clothing away from the jet pump when running the engine. Never touch any electrical parts.
- Do not turn over the engine when cleaning the jet pump area. Remove the safety lanyard and disconnect the negative battery cable to prevent accidental engine starting.

THE IMPORTANCE OF FLUSHING

- Flushing the cooling system with fresh water is essential to neutralize corroding effects of salt or other chemical products present in water. The flushing water will help to flush out any sand, salt, shells or other particles in water jackets (engine, exhaust components, turbocharger) and/or hoses.
- Clean the watercraft thoroughly and flush the cooling system with only fresh water after each use, or before storage. Also, use the flushing procedure to provide engine cooling when running the engine out of the water for service purposes.
- A flush connector fitting (water outlet joint) is located near the reverse bucket to attach a garden hose for flushing.

NOTICE

Failure to properly flush the cooling system after riding will severely damage the engine and/or exhaust system.

FLUSHING PROCEDURE

It is extremely important to perform the following procedure when flushing. If you do not follow this procedure, water will flow into the exhaust and possibly enter the cylinder head and engine, resulting in damage, contamination, or hard starting. Flush for approximately 5 minutes.

1. Connect a garden hose to the flush connector fitting. DO NOT TURN ON THE WATER!
2. Start the engine.
3. Turn on the water to begin flushing.
4. Turn off the water to end flushing.
5. Stop the engine.

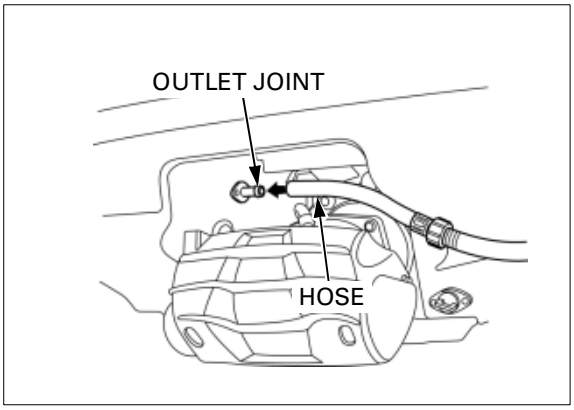
THE IMPORTANCE OF PROPER STORAGE

- A watercraft that is not properly prepared prior to storage, may result in component damage or corrosion.
- During the winter, or whenever the watercraft will not be in use for an extended period, proper storage is essential. Proper storage consists of checking the entire watercraft for damage or broken parts; lubricating parts to ensure that they do not become rusted; and, in general, preparing the watercraft so that when the time comes to use it again, it will be in top condition.
- If the watercraft will be stored outside, cover it with an appropriate cover.

COOLING SYSTEM FLUSHING

Secure the watercraft on a stand or trailer and check that the stern is not higher than the bow.

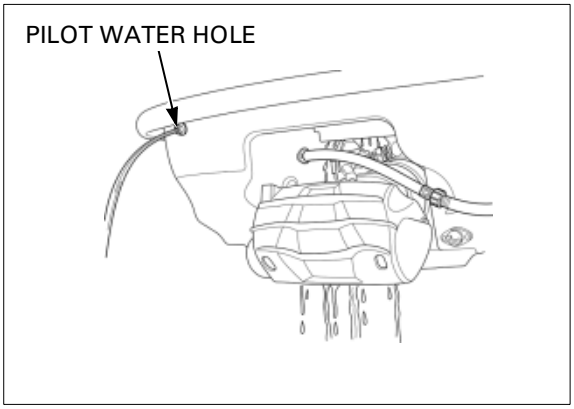
1. Pull the reverse lever up to lower the reverse bucket.
   Connect a garden hose to the water outlet joint (Do not turn on the water).



NOTICE

Always start the engine before turning on the water to prevent water entering the exhaust and engine where it could cause severe damage.

2. Start the engine and immediately (within 15 seconds) turn on the water.



NOTICE

Do not run the engine without cooling water supply for more than 15 seconds to prevent severe engine and exhaust damage.

If the engine stops during this procedure, immediately turn off the water, and resume the work from step 2.

3. Make sure the water flows out of the pilot water hole.
   Let the engine idle for about 5 minutes while the water continues to flow.
   If water does not flow out of the pilot water hole, immediately turn off the water and then the engine. Then, troubleshoot for possible problems.
4. Turn off the water, leaving the engine idling.
   Allow about 15 seconds to rev the engine (below 4,000 rpm) to clear the water out of the exhaust system. Stop the engine.
   Disconnect the garden hose.

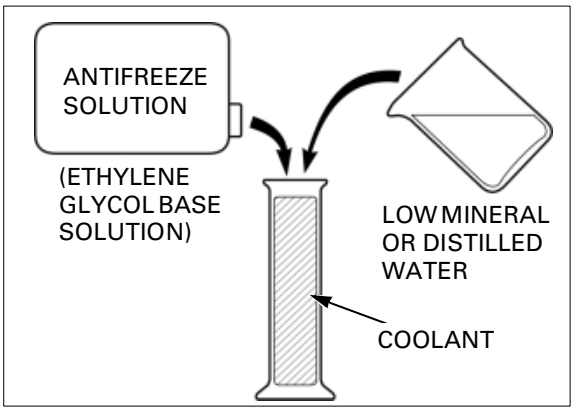
STORAGE

PREPARATION FOR STORAGE

1. Flush the cooling system (page 5-3).
2. Remove the bilge drain plugs to drain any water. Raise the bow (front) of the watercraft about 1 foot to allow complete draining.
3. When storing the watercraft in an area where the temperature drops below freezing, perform the following.

Mix only distilled low mineral water with the antifreeze.

– Prepare 5 liters (1.3 US gal, 1.1 Imp gal) of coolant (1:1 mixture of antifreeze and distilled water).



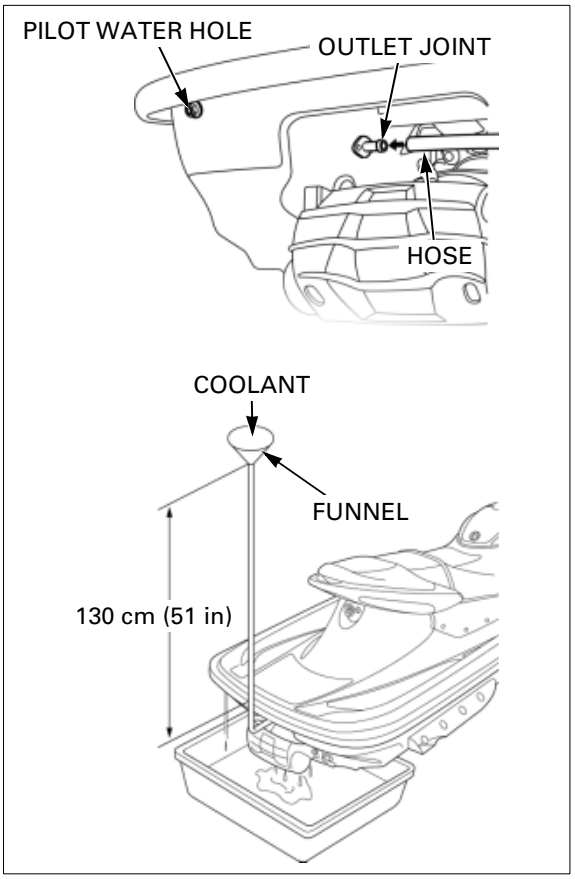
– Connect a garden hose to the water outlet joint and attach a funnel into the hose end.

Place a container under the rear of the vehicle to catch the coolant. Dispose of used coolant according to local regulations.

– Hold the funnel approximately 130 cm (51 in) above the deck and pour 5 liters of the coolant into the funnel to fill the engine and exhaust system.

– The coolant should come out of the pilot water hole.

– Remove the hose and funnel.



4. To prevent rusting the inlet valves, proceed as follows after confirming the engine is cool.

– Remove the seats (page 3-4).
Remove the maintenance joint hose from the clip and disconnect the maintenance joint.

NOTICE

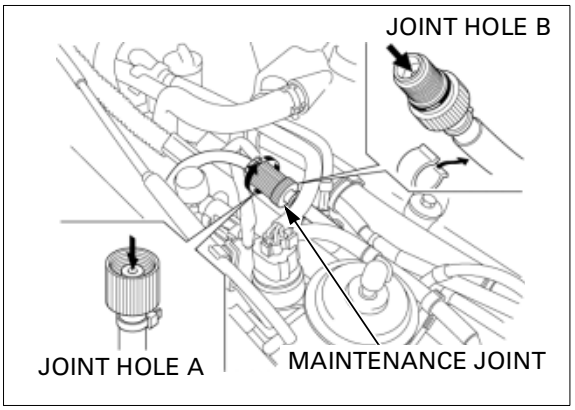
Avoid running the engine without water flow for more than 15 seconds to prevent severe engine and exhaust system damage.

– Start the engine at idle speed (without pulling the throttle lever) and spray a water-displacement corrosion-proof lubricant (without Teflon or molybdenum additives, such as CRC 6-56 or an equivalent) into the joint hole A for 5 seconds.

– Then immediately stop the engine.

– Perform the same procedure for joint hole B.

– Reconnect the maintenance joint and make sure it tightened securely. Install the joint hose into the clip.



5. To prevent the cylinders from rusting, perform the following:

– Remove all the spark plugs (page 4-7).

– Disconnect all the injector connectors.

– Pour a tablespoon (15 – 20 cc) of clean engine oil into each cylinder through the spark plug holes and cover the spark plug holes with a shop towel.

To stop the warning beeper, press and hold any of the SET, MODE, ID SET and ID No. buttons for a 2 seconds.

– Fit the safety lanyard clip to the base of the engine stop switch.
Push the starter switch several times to crank the engine and distribute the oil.

– Remove the safety lanyard clip.

6. Spray a water-displacement corrosion-proof lubricant (without Teflon or molybdenum additives, such as CRC 6-56 or an equivalent) into the throttle body (page 4-6).

For battery storage and charging information, see page 16-3.

7. Remove the battery (page 16-5).

8. Drain the fuel tank, using a commercially available Fluid Evacuator.

9. Remove the drain plugs, and clean the outside of the engine and bilge. Rinse and drain thoroughly.

   Use a shop towel to dry the vehicle and then spray a water-displacement corrosion-proof lubricant (without Teflon or molybdenum additives, such as CRC 6-56 or an equivalent).

ARX1200T3/T3D only:

   Also rinse and dry the turbocharger, and spray it with the same lubricant (page 4-17).

NOTICE

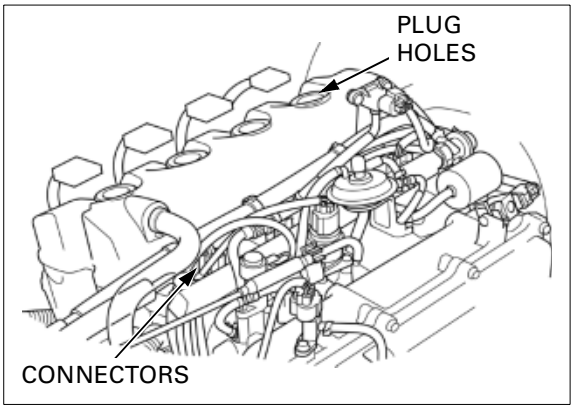
Never clean the fiberglass and plastic parts with a strong detergent or degreasing agent. These products will damage the gel-coat finish.

10. Wash the exterior of the watercraft and rinse thoroughly.

    Apply a fiberglass marine wax to the hull and deck.

11. Lubricate the control cables (page 4-5, 4-20 and 4-22).

12. Store the watercraft in an unheated area, with low humidity, away from sunlight, and with a minimum of daily temperature variation.



REMOVAL FROM STORAGE

NOTE:

- Before starting the engine, remove the seats and storage box to ventilate the engine compartment.

1. Lubricate the control cables and check the following for smooth operation.

– throttle lever (page 4-5)
– handlebar and steering nozzle (page 4-22)
– reverse lever and reverse bucket (page 4-20)

2. Lubricate the following engine components.

– throttle body (page 4-6)
– turbocharger (ARX1200T3/T3D: wastegate link; page 4-17)

3. Check all the hoses for loose connections or damage (page 4-5 and 4-16).

Make sure that the battery is in good condition.

4. Install the battery (page 16-5).
5. Fill the fuel tank.
6. Flush the cooling system and check the engine operation (page 5-3).
   Also check for water, oil and exhaust leakage.
7. If the watercraft has been stored for more than 4 months, change the engine oil (page 4-12).
8. Check the bilge drain plugs (page 4-19).
9. Check the fire extinguisher is not beyond its expiration date and charge or replace, if necessary.

Install the body panels and seats (page 3-3).

IF THE WATERCRAFT IS SUBMERGED

If the watercraft is submerged or flooded with water, act quickly to avoid severe damage.

URGENT PROCEDURE AFTER REMOVING WATERCRAFT FROM THE WATER

The watercraft must be serviced immediately using the following procedure. If not, it will cause severe engine damage.

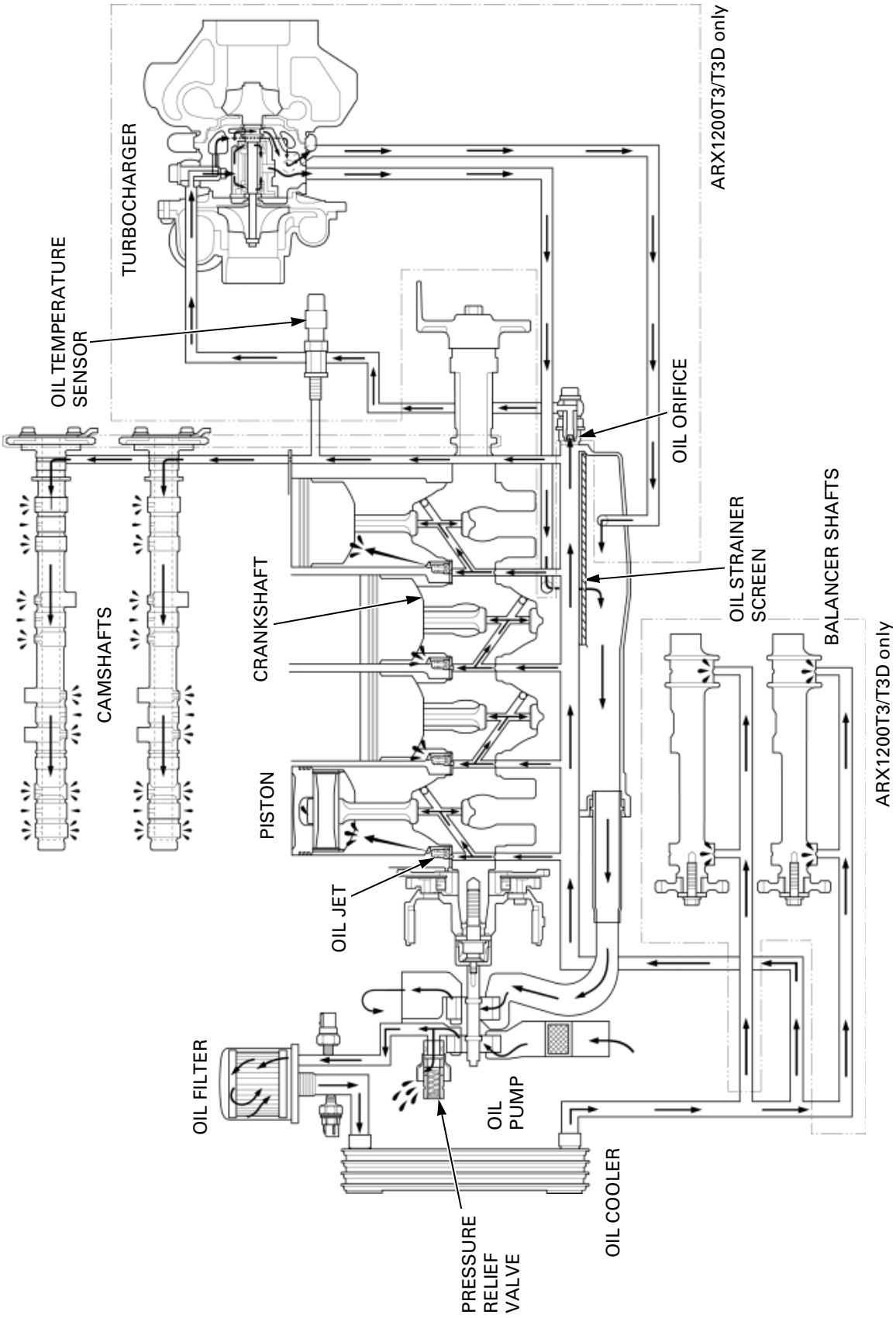
1. Remove the bilge drain plugs to drain the water out of the engine compartment.
2. Remove all the spark plugs and insert shop towels into the spark plug holes.
3. Disconnect all the injector connectors.
4. Open the throttle fully. Press the starter switch to crank the engine for 15 seconds.
5. Continue this procedure until the water stops coming out.
6. Remove the shop towels and pour a tablespoon of clean engine oil into each cylinder through the spark plug hole.
7. Cover the spark plug holes with a shop towel.
8. Push the starter switch several times to crank the engine and distribute the oil.

PROCEDURE FOR DEALER AFTER REMOVING WATERCRAFT FROM THE WATER

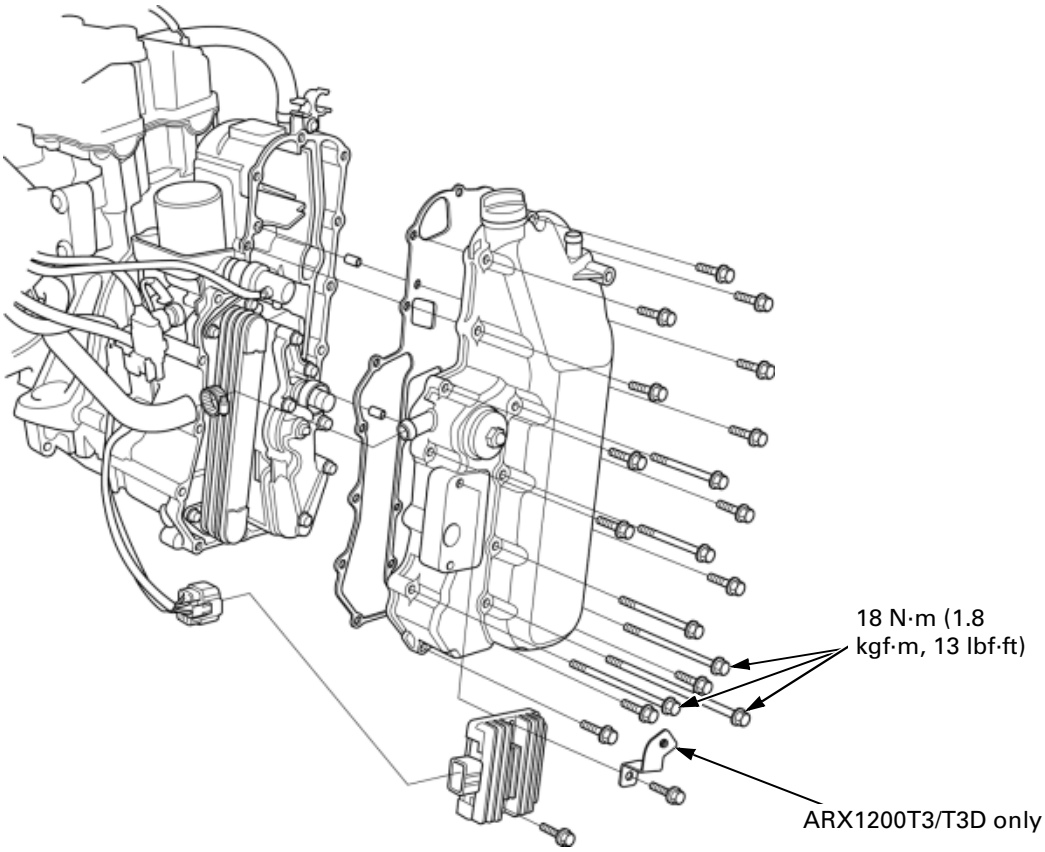
1. Remove the engine and overhaul it.
2. Replace the turbocharger assembly.
3. Inspect the battery.
4. Drain the water muffler.
5. Inspect the fuel tank for water entry and clean it.
6. Clean the inner surface of the hull thoroughly.
7. Inspect the operation of the throttle valve, steering and reverse system.
8. Lubricate all the control cables.
9. Inspect all the electrical system.

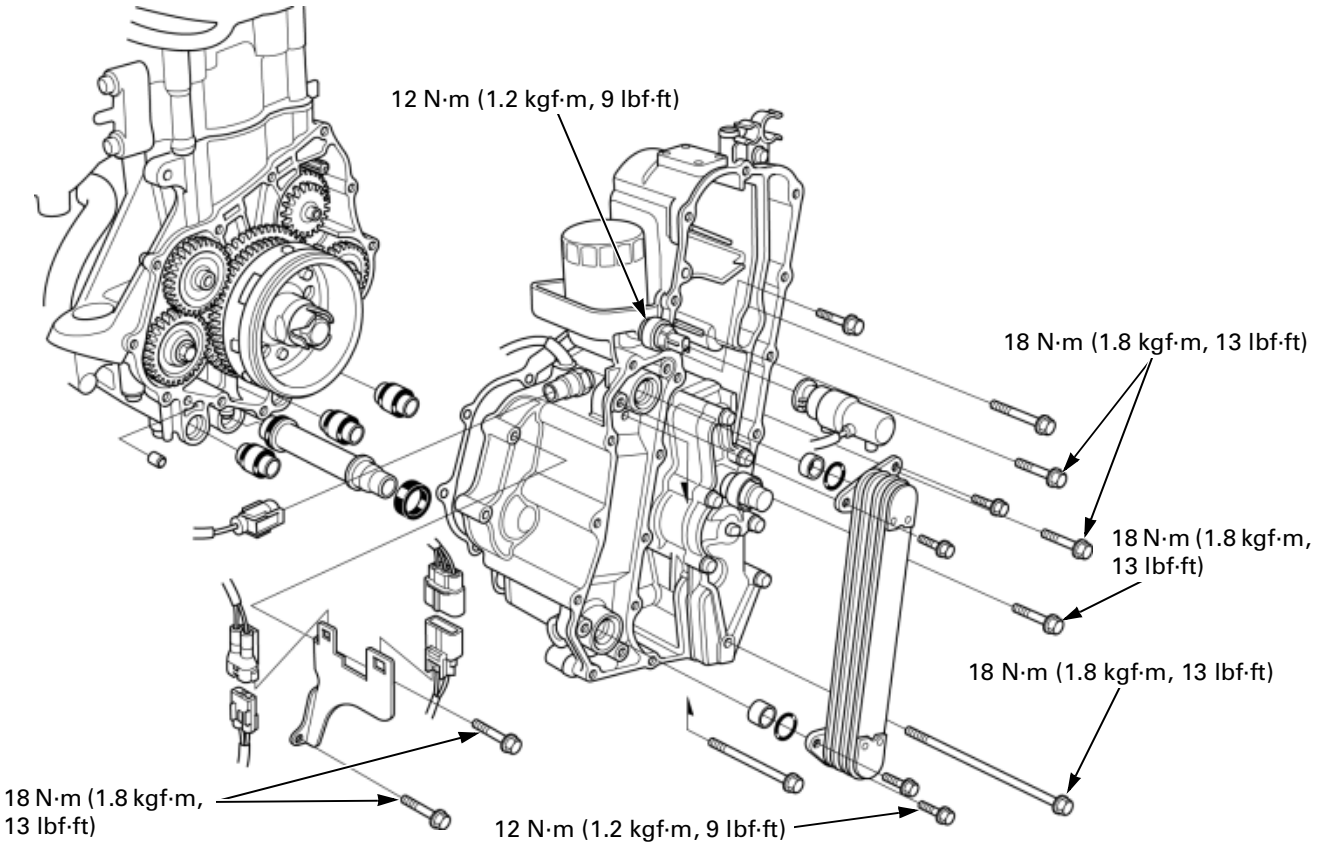
6. LUBRICATION SYSTEM

LUBRICATION SYSTEM DIAGRAM



SYSTEM COMPONENTS





SERVICE INFORMATION

GENERAL

⚠CAUTION

Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.

- This section covers service of the oil tank, oil pump and oil cooler.
- The service procedures in this section must be performed with the engine removed.
- For oil level check, oil change and filter replacement, refer to section 4 (page 4-12).
- If the high oil pressure switch detects an engine oil pressure below 216 kPa (2.2 kg/cm^2, 31 psi), the ECM lights the oil pressure warning light and limits the engine speed to 3,000 rpm to prevent the engine damage. However, if the low oil pressure switch detects an engine oil pressure below 20 kPa (0.2, kg/cm^2, 3 psi), the fail-safe function stops the engine.

SPECIFICATIONS

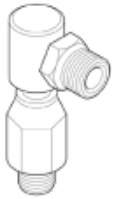
Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Engine oil capacity	ARX1200T3/ T3D	After draining	4.2 liter (4.4 US qt, 3.7 Imp qt)	–
		After draining/filter change	4.3 liter (4.5 US qt, 3.8 Imp qt)	–
		After disassembly	5.3 liter (5.6 US qt, 4.7 Imp qt)	–
	ARX1200N3	After draining	4.0 liter (4.2 US qt, 3.5 Imp qt)	–
		After draining/filter change	4.1 liters (4.3 US qt, 3.6 Imp qt)	–
		After disassembly	5.0 liter (5.3 US qt, 4.4 Imp qt)	–
Recommended engine oil			Pro Honda GN4, HP4 (without molybdenum additives) or HP4M (with molybdenum additives) 4-stroke oil or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA or MB Viscosity: SAE 10W-40	–
Oil pressure		At low oil pressure switch	294 kPa (3.0 kgf/cm^2, 43 psi) at 3,000 rpm/(80°C/176°F)	–
Oil pump rotor		Tip clearance	0.15 (0.006)	0.20 (0.008)
		Body clearance	0.15 – 0.22 (0.006 – 0.009)	0.35 (0.014)
		Side clearance	0.04 – 0.09 (0.002 – 0.004)	0.12 (0.005)

TORQUE VALUES

Low oil pressure switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply sealant to the threads.
Oil tank cover 7 mm bolt	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Oil cooler bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front crankcase cover bolt (6 x 45 mm)	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Oil pump/front crankcase cover 7 mm bolt	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Oil pump driven joint bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.

TOOLS

Oil pressure gauge set 07506-3000000  or equivalent commercially available in U.S.A. (Snap-on, MT37A)*	Oil pressure gauge attachment 07510-MA70000  or equivalent commercially available in U.S.A. (Snap-on, AT77AH)*

*Available through the Motorcycle Tool and Equipment Program; to order call 888-424-6857.

TROUBLESHOOTING

Oil level too low
- Oil consumption
- External oil leak
- Worn piston rings
- Improperly installed piston rings
- Worn cylinders
- Worn stem seals
- Worn valve guide

Low oil pressure
- Oil level low
- Clogged oil strainer or filter
- Faulty oil pump
- Internal oil leak
- Incorrect oil being used

No oil pressure
- Oil level too low
- Oil pressure relief valve stuck open
- Broken oil pump drive or driven joints
- Damaged oil pump
- Internal oil leak

High oil pressure
- Oil pressure relief valve stuck closed
- Clogged gallery or passage
- Incorrect oil being used

Oil contamination
- Oil or filter not changed often enough
- Worn piston rings
- Worn valve guide or stem seal

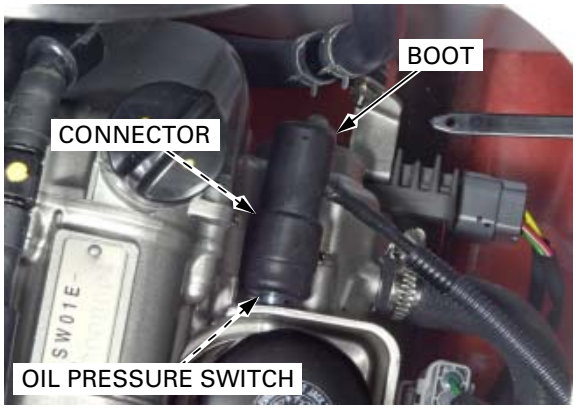
Oil emulsification
- Blown cylinder head gasket
- Leaky coolant passage
- Entry of water

OIL PRESSURE INSPECTION

Remove the seats (page 3-4).

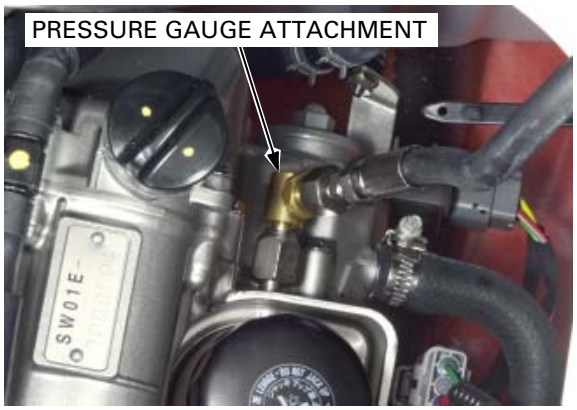
If the engine is cold, the oil pressure reading will be abnormally high.
Start the engine according to the flushing procedure (page 5-2).
Let the engine idle for 5 minutes. If the air temperature is below 10°C (50°F), let the engine idle for an additional 5 minutes (a total of 10 minutes).
Turn off the water, rev the engine for about 15 seconds to clear water out of the exhaust system, and pull the safety lanyard clip off of the engine stop switch.

Check the oil level and add the recommended engine oil if necessary (page 4-12).



Slide the boot off the low oil pressure switch.
Disconnect the low oil pressure switch connector.

Remove the low oil pressure switch and connect an oil pressure gauge attachment and gauge to the oil pressure switch hole.



TOOLS:

Oil pressure gauge set	**07506-3000000 or equivalent commercially available in U.S.A. (Snap–on, MT37A)**
Oil pressure gauge attachment	**07510-MA70000 or equivalent commercially available in U.S.A. (Snap–on, AT77AH)**

Start the engine according to the flushing procedure (page 5-2).
Increase the engine speed to 3,000 rpm and read the oil pressure.

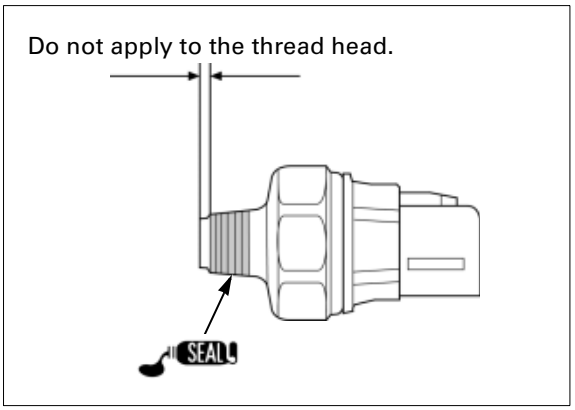
OIL PRESSURE:
294 kPa (3.0 kgf/cm, 43 psi) at 3,000 rpm

Turn off the water, rev the engine for about 15 seconds, and pull the safety lanyard clip off of the engine stop switch.

Remove the special tools.

Apply sealant to the low oil pressure switch threads as shown.
Install and tighten the low oil pressure switch.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Connect the low oil pressure switch connector.
Slide the boot over the low oil pressure switch with the drain holes facing down.

Start the engine according to the flushing procedure (page 5-2).
Check that the oil pressure indicator turns off after 1 or 2 seconds.
If the oil pressure indicator stays on, stop the engine immediately and determine the cause (page 19-16).

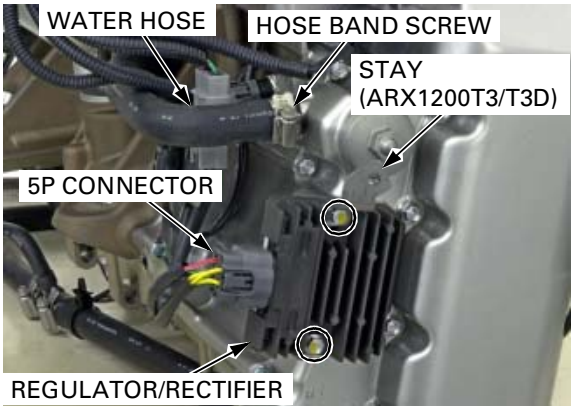
Install the seats (page 3-4).

OIL TANK COVER REMOVAL

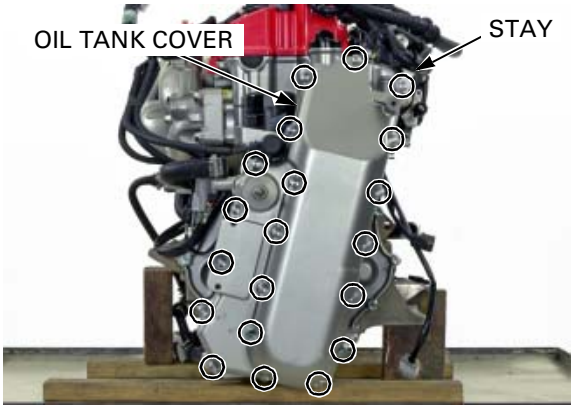
Remove the engine (page 9-5).
Drain the engine oil (page 4-14).

Disconnect the 5P connector.
Remove the two bolts, breather hose stay (ARX1200T3/T3D only) and the regulator/rectifier from the oil tank cover.

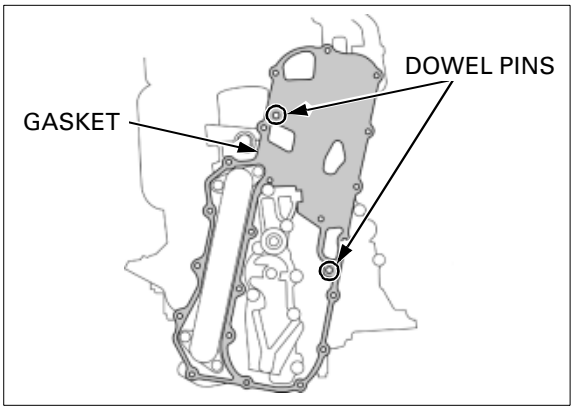
Loosen the hose band screw and disconnect the water hose from the oil tank cover.



Remove the wire harness from the wire clamp.
Remove the 20 bolts and the oil tank cover.



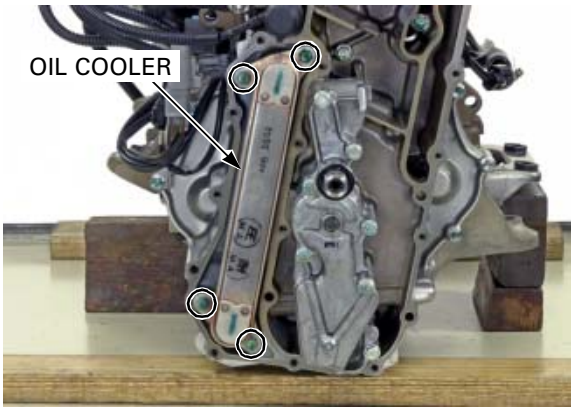
Remove the oil tank cover gasket and two dowel pins.



OIL COOLER

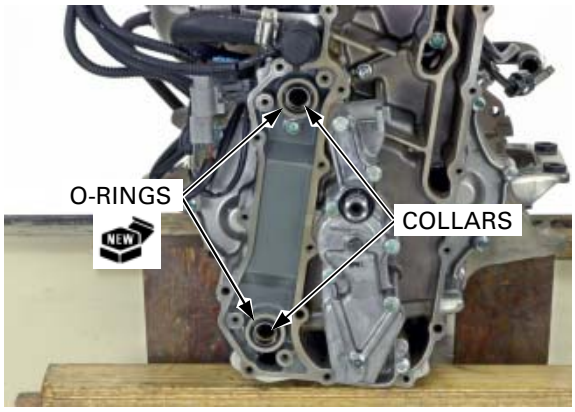
REMOVAL

Remove the four bolts and the oil cooler.
Remove the oil joint collars and O-rings.



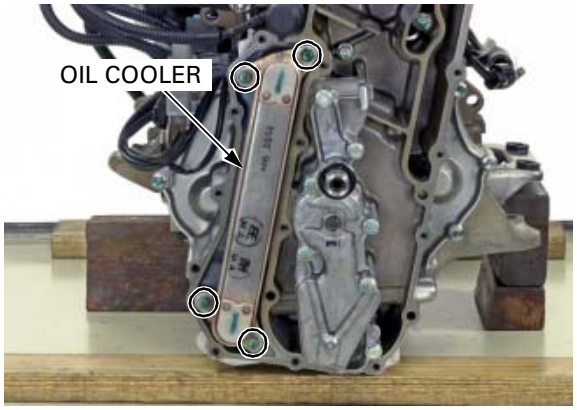
INSTALLATION

Install the oil joint collars.
Coat new O-rings with oil and install them onto the oil joint collars.



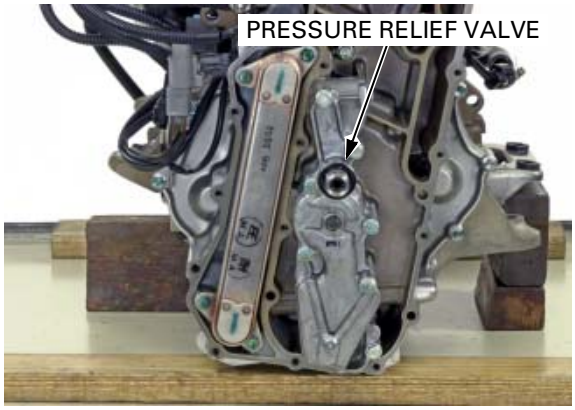
Install the oil cooler and tighten the four bolts.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



PRESSURE RELIEF VALVE

Remove the pressure relief valve and O-ring.

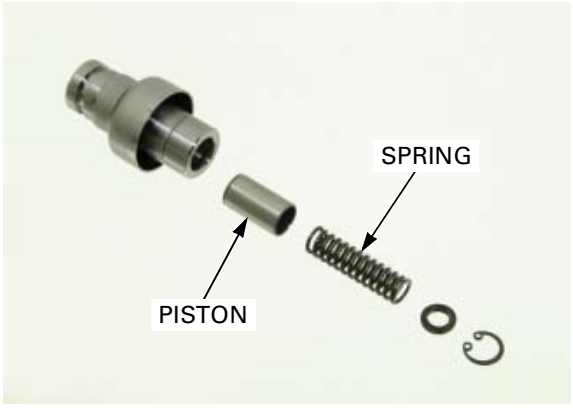


Check the operation of the pressure relief valve by pushing on the piston.

Remove the snap ring and disassemble the relief valve.

Inspect the piston for wear, unsmooth movement or damage.
Inspect the spring for fatigue or damage.

Assemble the relief valve in the reverse order of disassembly.



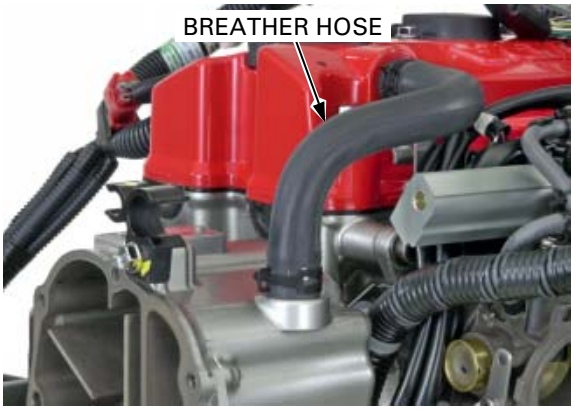
Apply oil to a new O-ring and install it onto the relief valve.
Install the relief valve into the oil pump cover.

FRONT CRANKCASE COVER REMOVAL

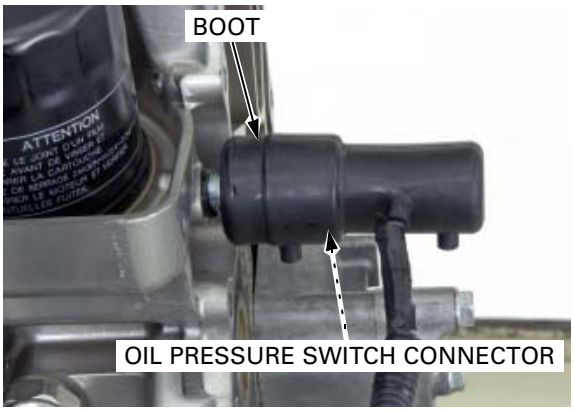
Remove the following:

- oil tank cover (page 6-7)
- oil cooler (page 6-7)
- pressure relief valve (page 6-8)

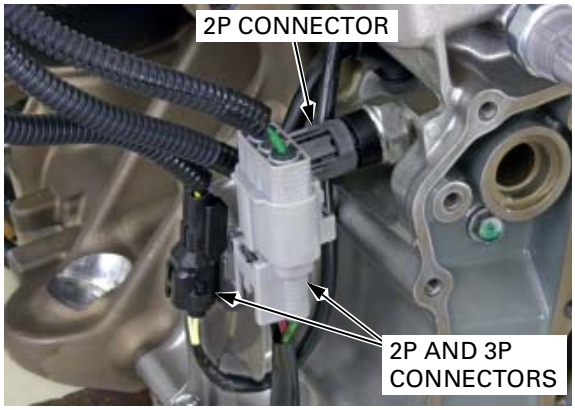
Disconnect the crankcase breather hose from the front crankcase cover.



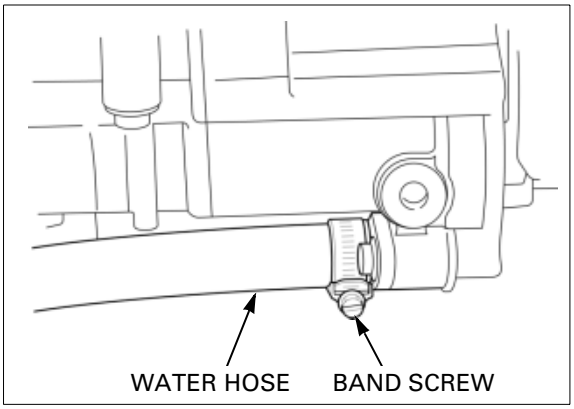
Slide the boot off the low oil pressure switch.
Disconnect the low oil pressure switch connector.



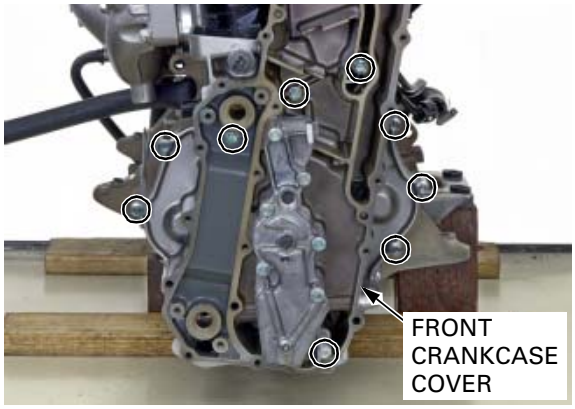
Remove the regulator/rectifier 3P and ignition pulse generator 2P connectors from the stay and disconnect them.
Disconnect the high oil pressure switch 2P connector.



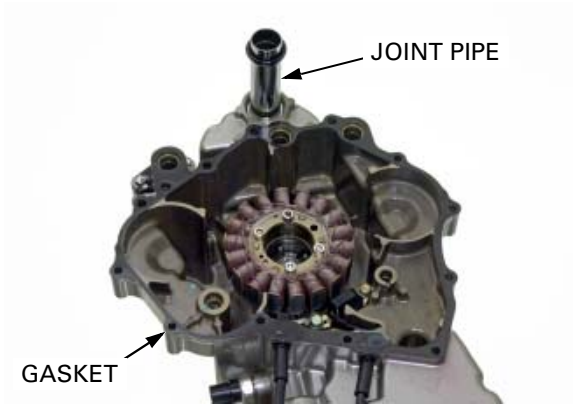
Loosen the hose band screw and disconnect the water hose from the front crankcase cover.



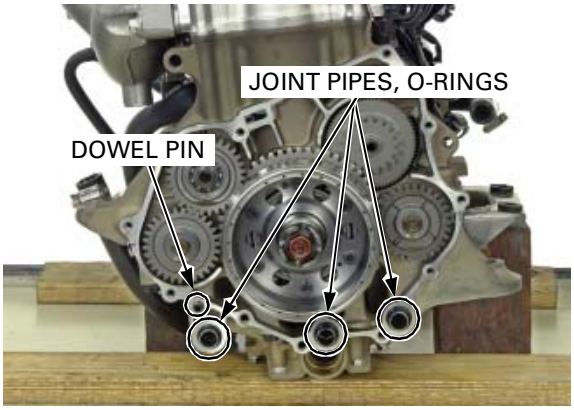
Remove the nine bolts, connector stay and the front crankcase cover.



Remove the gasket and oil joint pipe.
Remove the O-ring and seal ring from the joint pipe.



Remove the dowel pin, joint collars and O-rings.

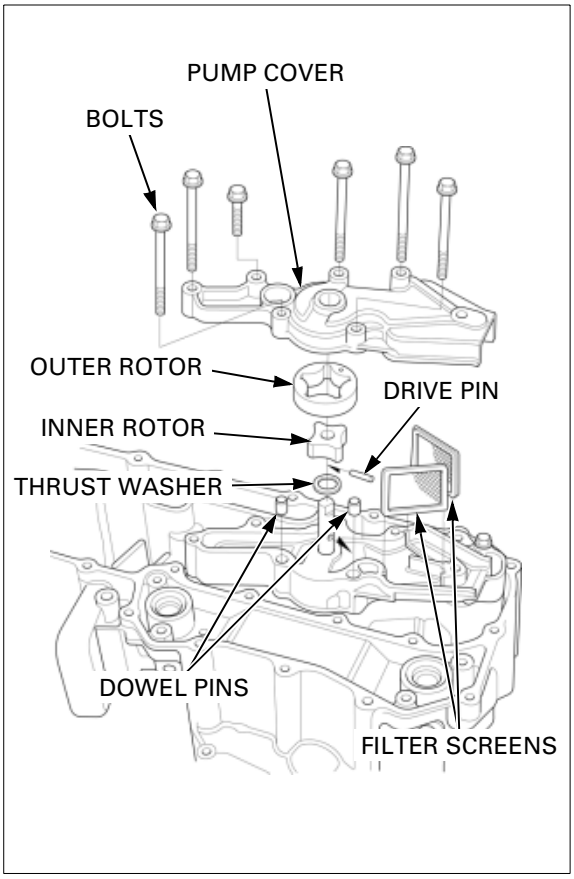


OIL PUMP

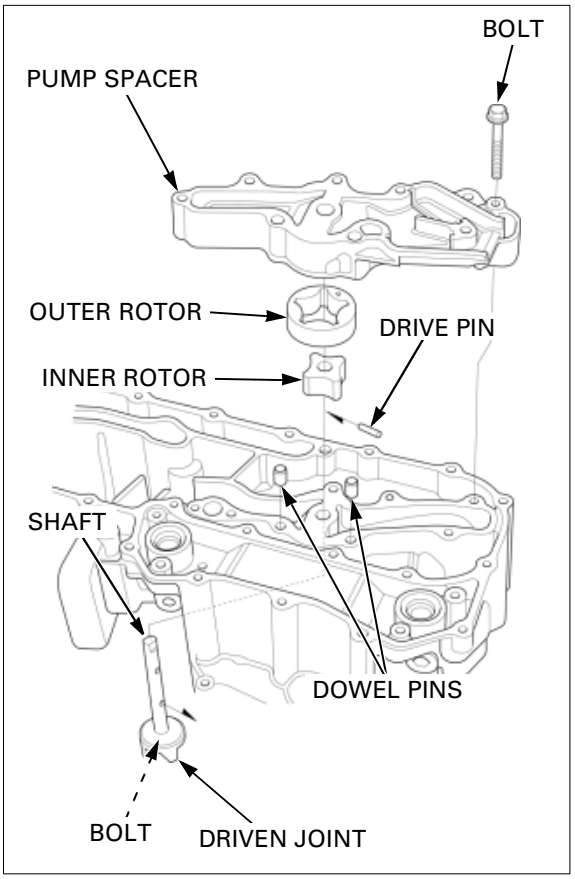
DISASSEMBLY

Remove the front crankcase cover (page 6-9).

Remove the following:
- six bolts
- oil pump cover
- two oil filter screens
- two dowel pins
- outer and inner rotors
- drive pin
- thrust washer



– bolt
– oil pump spacer
– two dowel pins
– outer and inner rotors
– drive pin
– oil pump shaft
– bolt and oil pump driven joint from the shaft if necessary



INSPECTION

Install the outer and inner rotors into the oil pump cover and spacer.

Measure the pump body clearance.

SERVICE LIMIT: 0.35 mm (0.014 in)

Measure the side clearance using a straight edge and feeler gauge.

SERVICE LIMIT: 0.12 mm (0.005 in)

Install the oil pump shaft and drive pin.

Measure the rotor tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)

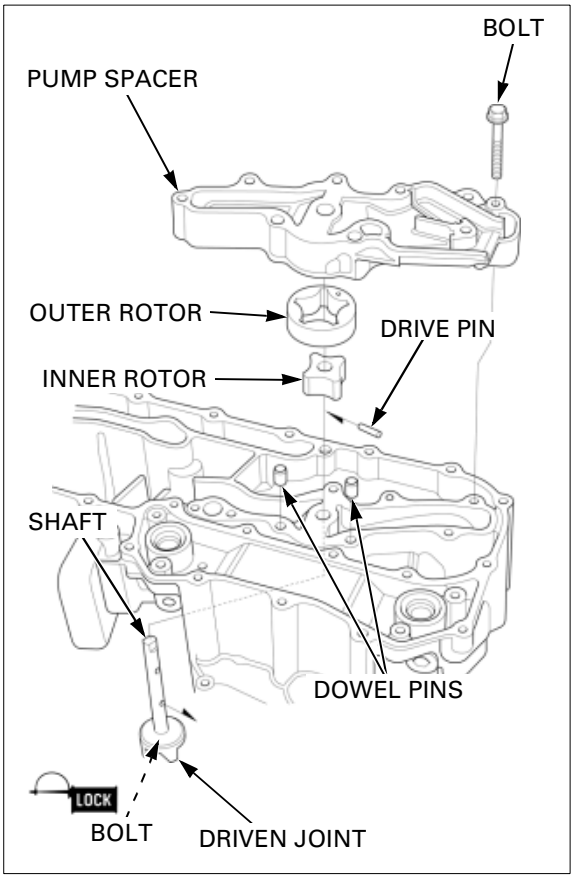
ASSEMBLY

When the oil pump drive joint is removed from the oil pump shaft, install as follows:
Apply locking agent to the driven joint bolt threads.
Install the driven joint onto the oil pump shaft and tighten the bolt.

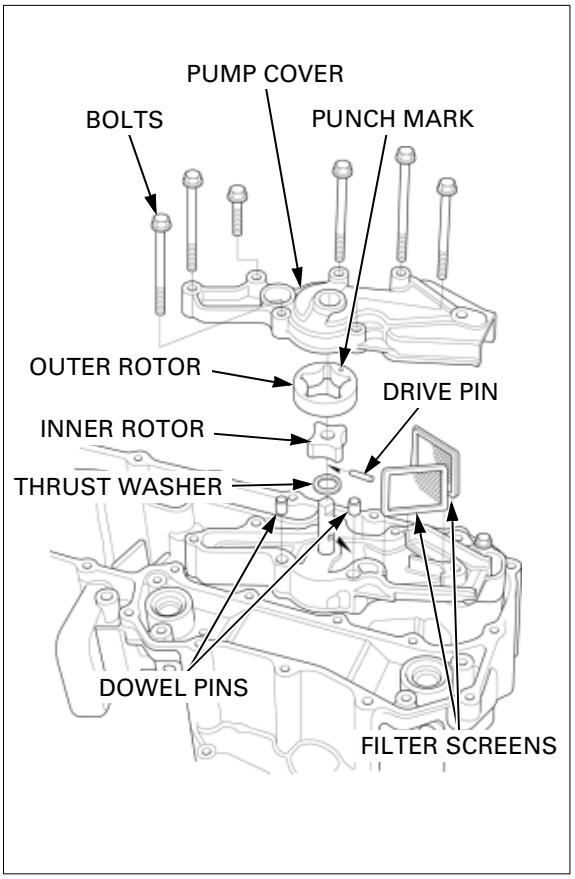
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Apply a light coat of clean engine oil to all parts.

Install the following:
- oil pump shaft
- drive pin
- inner rotor while aligning its grooves with the drive pin
- outer rotor with the punch mark facing out
- two dowel pins
- oil pump spacer
- bolt

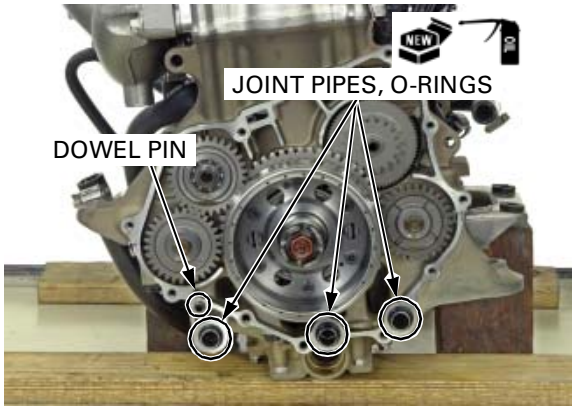


– thrust washer
– drive pin
– inner rotor while aligning its grooves with the drive pin
– outer rotor with the punch mark facing out
– two dowel pins
– two oil filter screens with the thinner side facing out
– oil pump cover
– six bolts
– front crankcase cover (page 6-14)

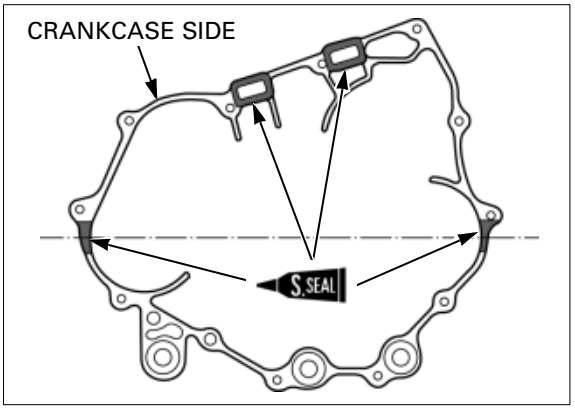


FRONT CRANKCASE COVER INSTALLATION

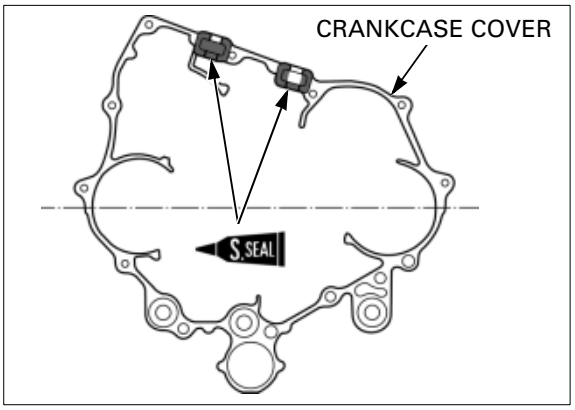
Install the dowel pin.
Coat new O-rings with oil and install them onto the oil joint collars.



Apply silicone sealant to the crankcase as shown.

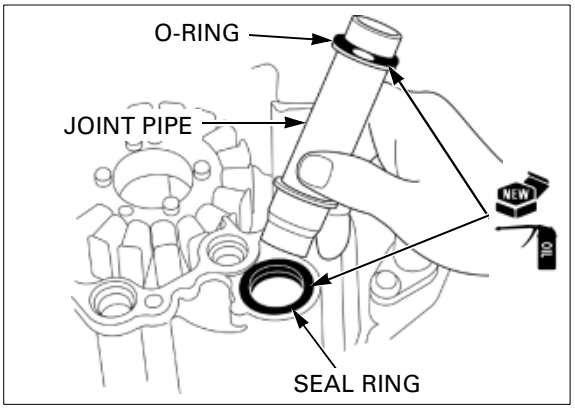


Apply silicone sealant to the front crankcase cover as shown.



Install a new gasket onto the crankcase.

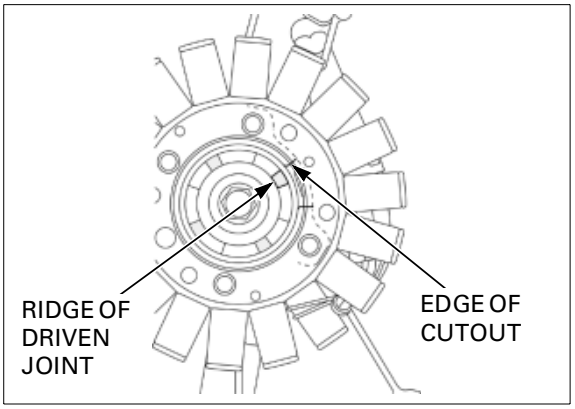
Coat a new seal ring with oil and install it into the front crankcase cover.
Coat a new O-ring with oil and install it onto the oil joint pipe.
Install the oil joint pipe into the front crankcase cover.



Align the ridge of the driven joint with the edge of the cutout in the front crankcase cover as shown.

If the ridges of the oil pump drive and driven joints contact, rotate the oil pump shaft.

Install the front crankcase cover onto the crankcase, being careful not to damage the oil pump drive and driven joints.

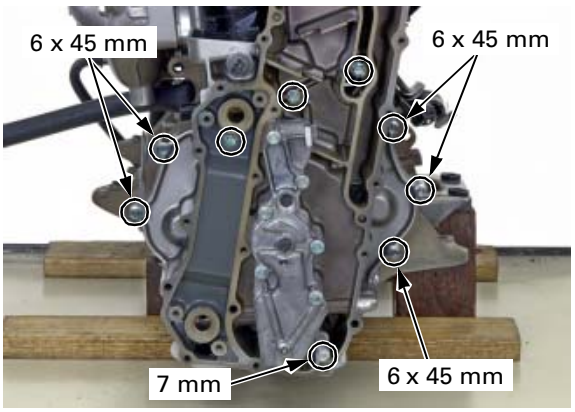


Install the connector stay and nine bolts.
Tighten the bolts to the specified torque.

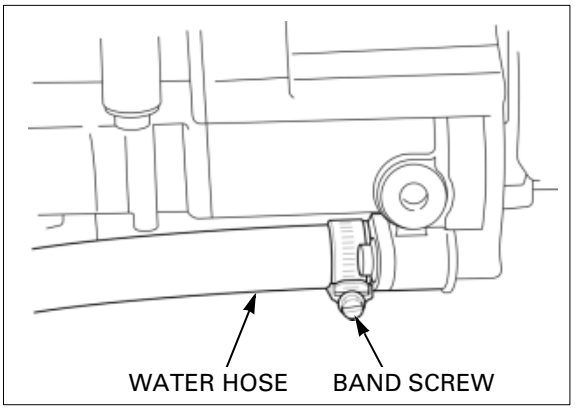
TORQUE:

6 x 45 mm bolts:	**18 N·m (1.8 kgf·m, 13 lbf·ft)**
7 mm bolt:	**18 N·m (1.8 kgf·m, 13 lbf·ft)**

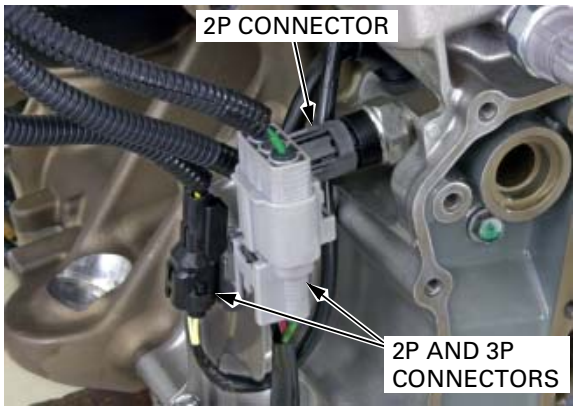
Install the pressure relief valve (page 6-9).
Install the oil cooler (page 6-8).



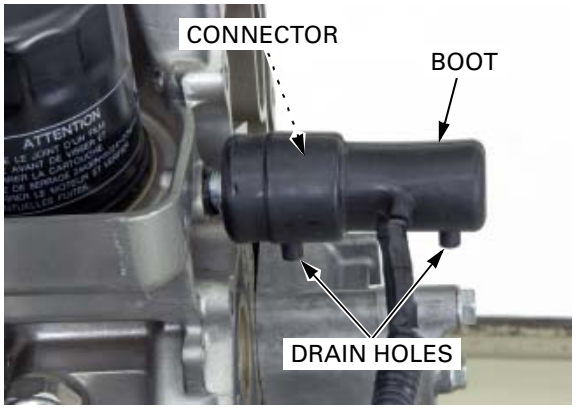
Connect water hose to the front crankcase cover and tighten the hose band screw securely.



Connect the regulator/rectifier 3P and ignition pulse generator 2P connectors and install them onto the connector stay.
Connect the high oil pressure switch 2P connector.

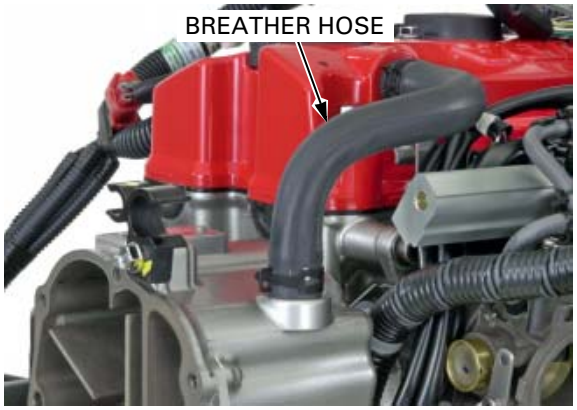


Connect the low oil pressure switch connector.
Install the boot over the low oil pressure switch with the drain holes facing down.



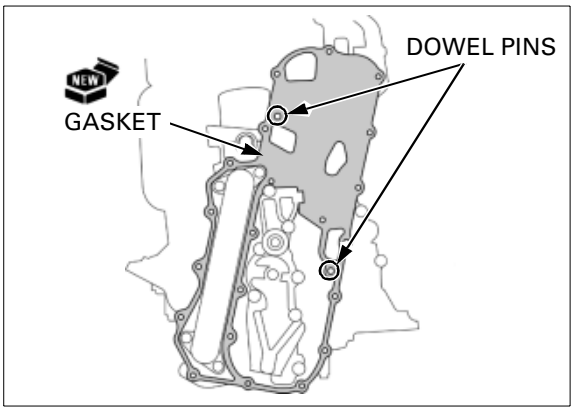
Connect the crankcase breather hose to the front crankcase cover.

Install the oil tank cover (page 6-17).



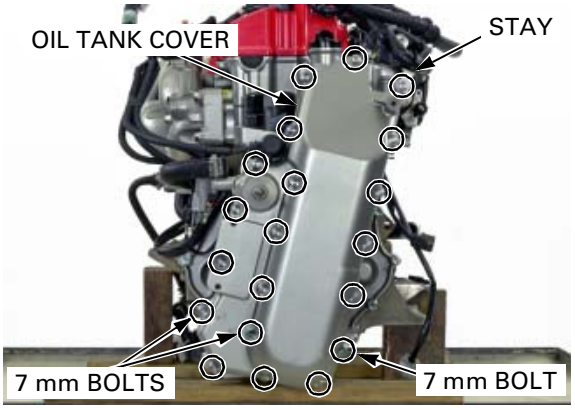
OIL TANK COVER INSTALLATION

Install the two dowel pins and a new oil tank cover gasket.



Install the oil tank cover, wire clamp stay and 20 bolts
Tighten the bolts in a crisscross pattern in several steps.

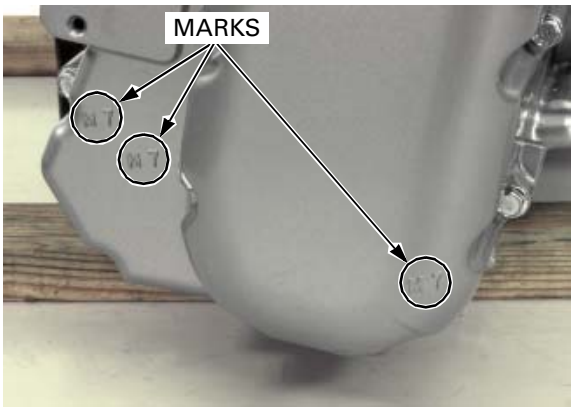
TORQUE: 7 mm bolt: 18 N·m (1.8 kgf·m, 13 lbf·ft)



NOTE:

- The 7-mm bolt positions are indicated by marks "M7" on the oil tank cover.

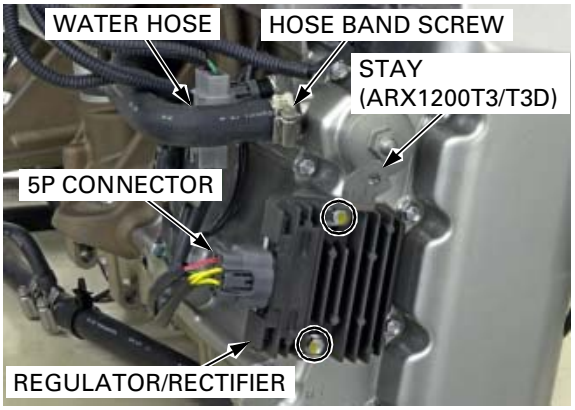
Install the wire harness onto the wire clamp.



Connect the water hose to the oil tank cover and tighten the hose band screw securely.

Install the regulator/rectifier with the stay (ARX1200T3/T3D only) onto the oil tank cover and tighten the two bolts securely.
Connect the 5P connector.

Install the engine (page 9-9).
Fill the engine with the recommended engine oil (page 4-14).

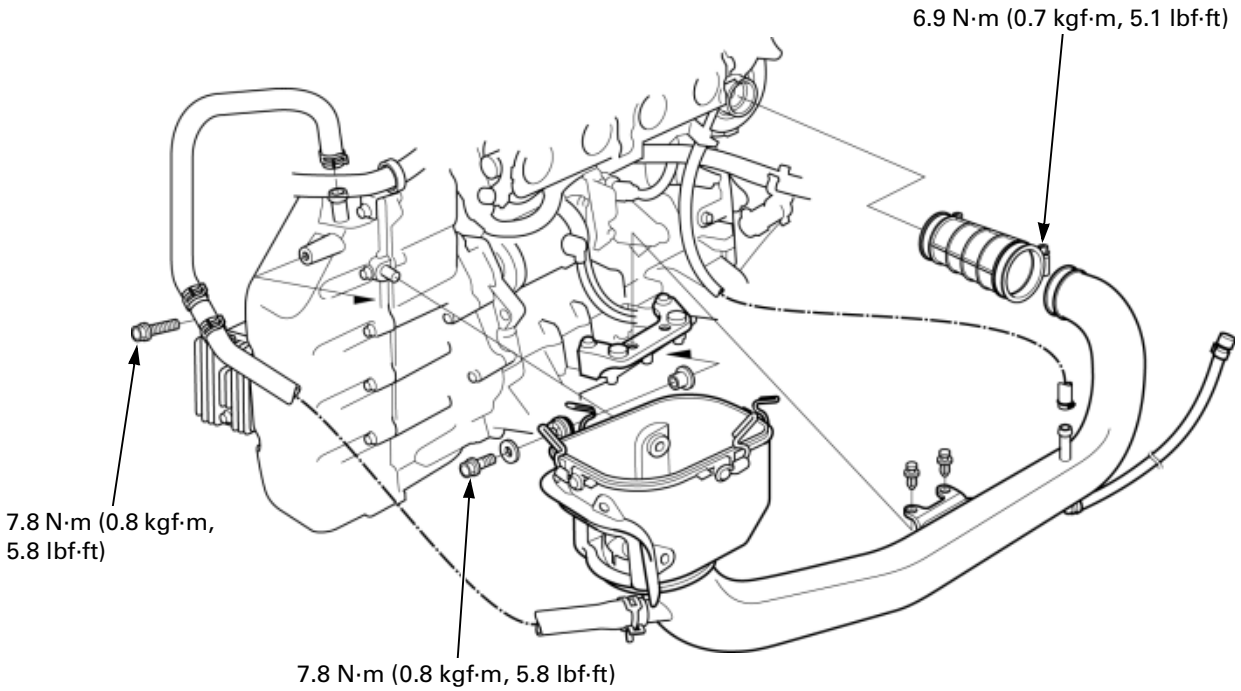


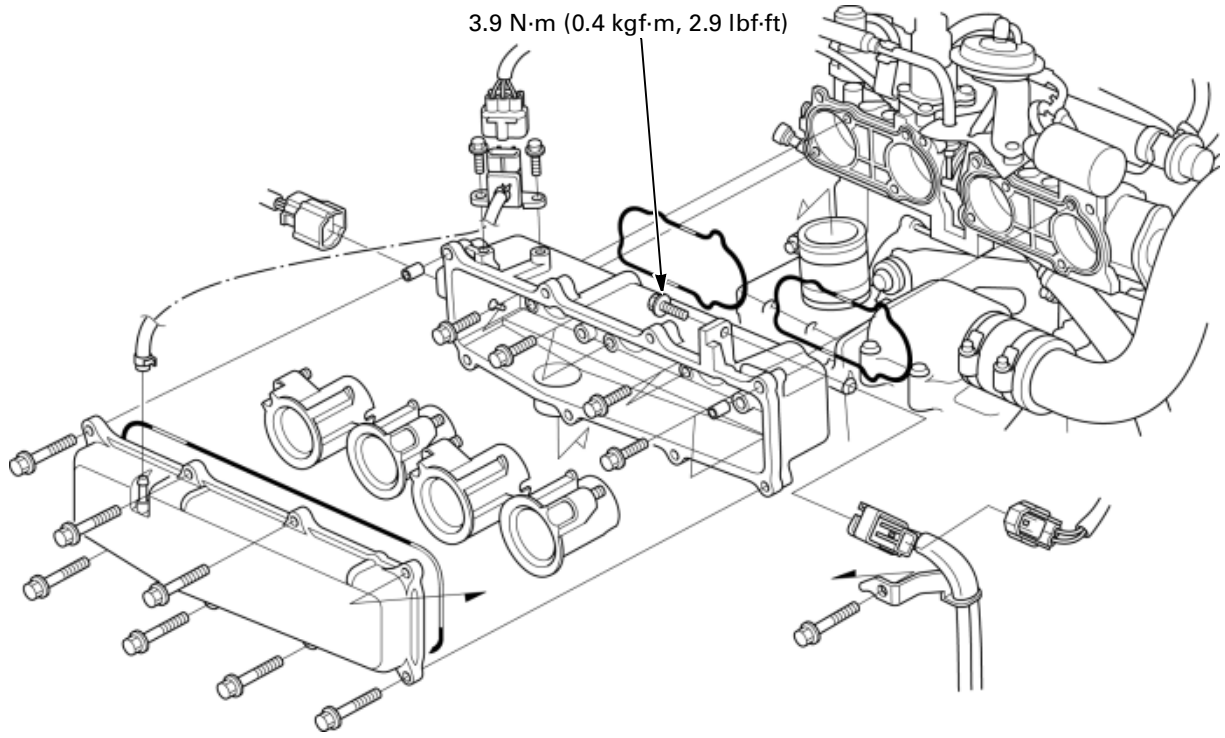
MEMO

7. COOLING SYSTEM

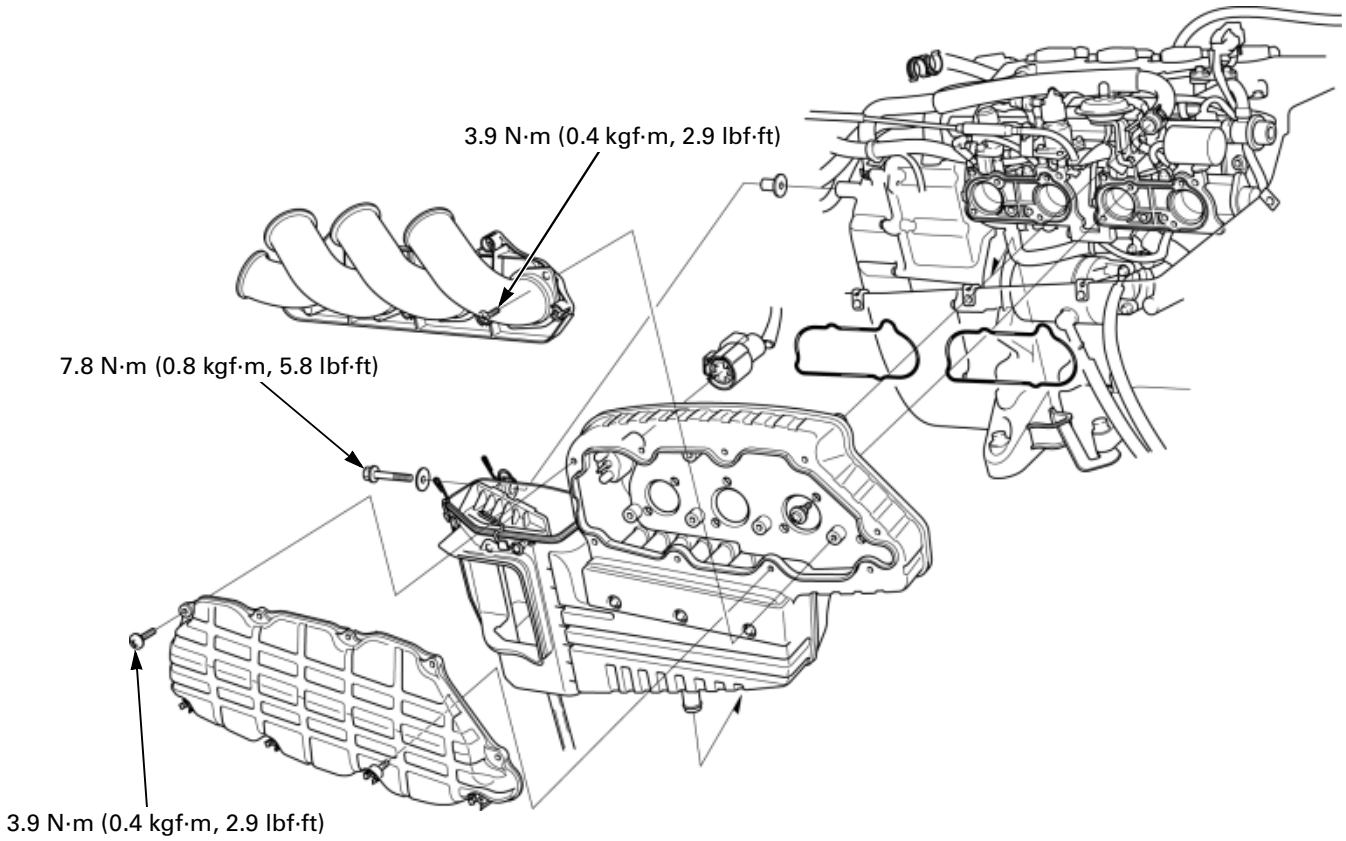
SYSTEM COMPONENTS

ARX1200T3/T3D (AIRBOX & SUB-AIRBOX)

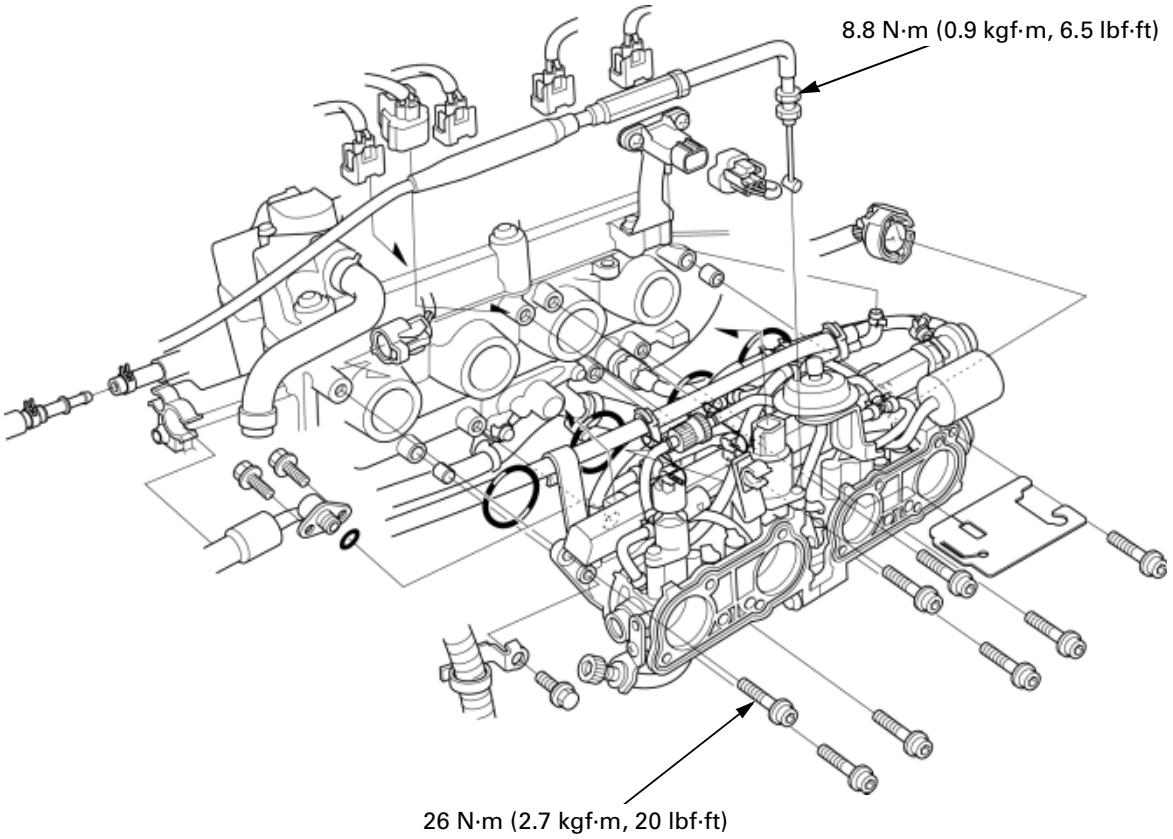




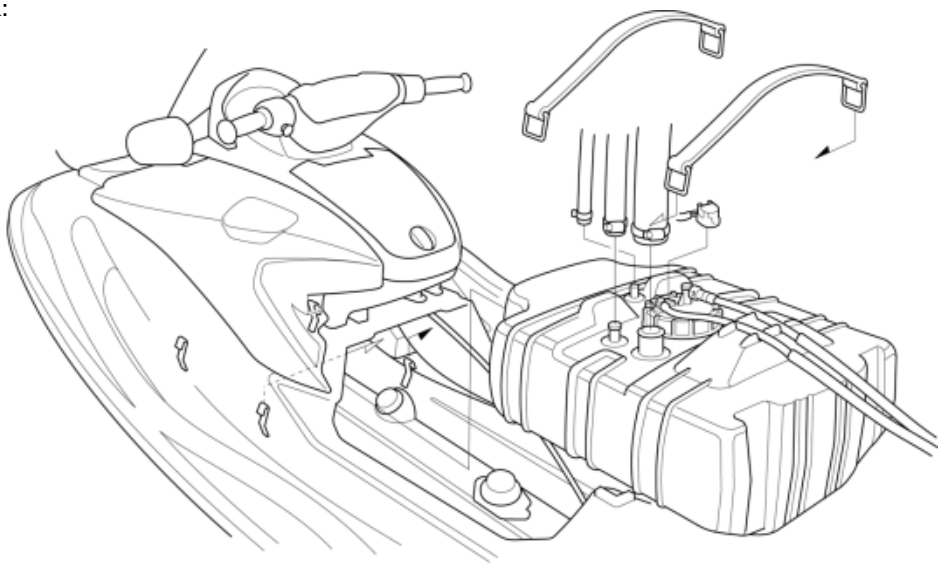
ARX1200N3 (AIRBOX)



THROTTLE BODY (ARX1200T3/T3D shown):



FUEL TANK:



SERVICE INFORMATION

GENERAL

- Be sure to release the fuel pressure while the engine is off.
- Bending or twisting the control cables will impair smooth operation and could cause the cables to stick or bind, resulting in loss of vehicle control.
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- Do not apply commercially available carburetor cleaners to the inside of the throttle bore.
- Do not snap the throttle valve from full open to full close after the throttle cable has been removed, it may cause incorrect idle operation.
- Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed.
- Do not apply excessive force to the fuel rail on the throttle body while removing or installing the throttle body.
- Do not damage the throttle body. A damaged throttle body may cause incorrect throttle and idle valve synchronization.
- Prevent dirt and debris from entering the throttle bore, fuel hose and return hose, clean them using compressed air.
- The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.
- The programmed fuel injection system is equipped with the Self-Diagnostic System described on page 8-10. If the malfunction indicator lamp (MIL) blinks, follow the Self-Diagnostic Procedures to remedy the problem.
- When checking the PGM-FI, always follow the steps in the troubleshooting flow chart (page 8-17 or page 8-48).
- The PGM-FI system is provided with a fail-safe function to secure a minimum running capability even when there is no trouble in the system. When any abnormality is detected by the self-diagnosis function, running capability is secured by using the preset value in advance in the simulated program MAP. It must be remembered, however, that when any abnormality is detected in the four injectors, the ignition pulse generator and/or camshaft position sensor, the fail safe function stops the engine to protect it.
- A faulty PGM-FI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- When disassembling the fuel system parts, note the location of the O-rings. Replace them with new ones upon reassembly.
- Before disconnecting the fuel feed hose, open the fuel fill cap to release the pressure in the fuel tank and release the fuel pressure by loosening the fuel feed hose joint nut at the fuel rail.
- Always replace the sealing washers when the fuel feed hose joint nut is removed or loosened.
- Use a digital tester for PGM-FI system inspection.

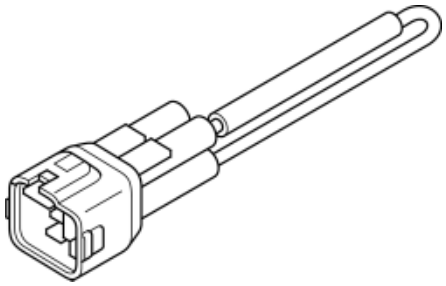
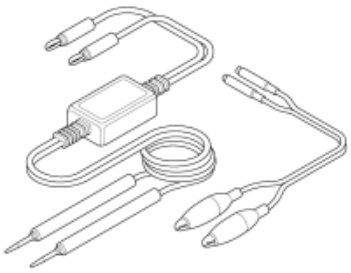
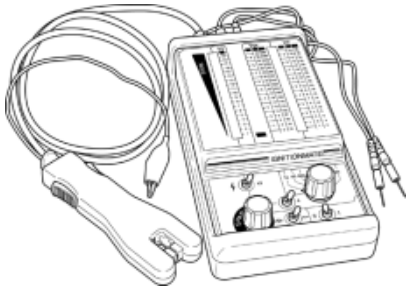
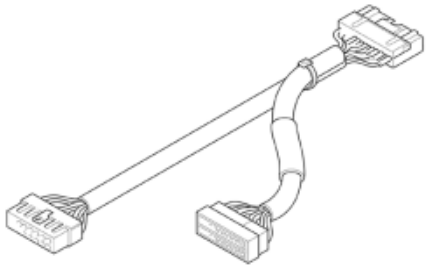
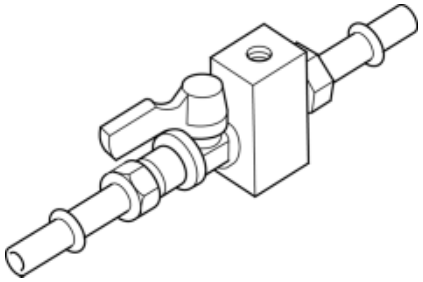
SPECIFICATIONS

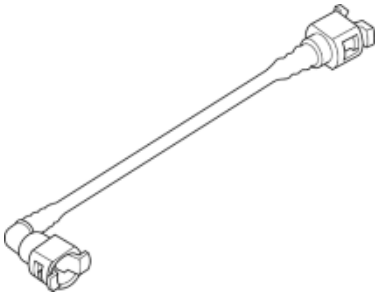
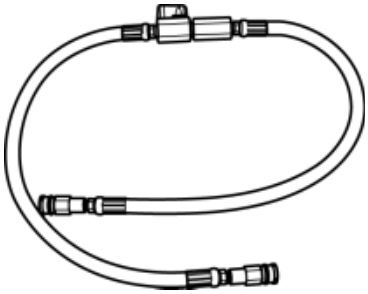
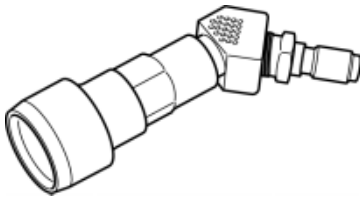
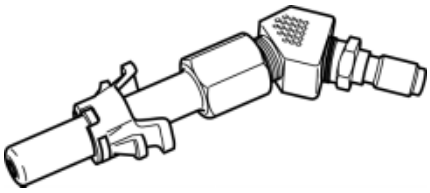
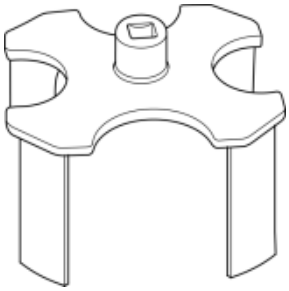
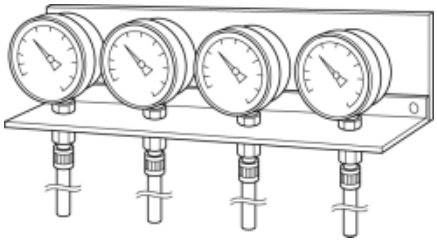
ITEM		SPECIFICATIONS
Throttle body identification number	ARX1200T3/T3D	GQ9AA
	ARX1200N3	GQ99A
Idle speed		1,200 ± 100 rpm
Throttle lever free play		2 – 6 mm (1/16 – 1/4 in)
Intake air temperature sensor resistance (at 20°C/68°F)		1 – 4 kΩ
Engine oil temperature sensor resistance (at 20°C/68°F)		2.3 – 2.8 kΩ
Engine coolant temperature sensor resistance (at 20°C/68°F)		2.3 – 2.8 kΩ
Fuel injector resistance (at 20°C/68°F)		11.1 – 12.3 Ω
Camshaft position sensor peak voltage (at 20°C/68°F)		0.7 V minimum
Ignition pulse generator peak voltage (at 20°C/68°F)		0.7 V minimum
Manifold absolute pressure at idle	ARX1200T3/T3D	20 – 27 kPa (150 – 200 mmHg)
	ARX1200N3	27 – 33 kPa (200 – 250 mmHg)
Fuel pressure at idle		294 kPa (3.0 kgf/cm^2, 43 psi)
Fuel pump flow (at 12V)		260 cm^3 (8.8 US oz, 9.2 Imp oz) minimum/10 seconds

TORQUE VALUES

ECT sensor	18 N·m (1.8 kgf·m, 13 lbf·ft)
Engine oil temperature sensor	18 N·m (1.8 kgf·m, 13 lbf·ft)
Knock sensor	31 N·m (3.2 kgf·m, 23 lbf·ft) Apply sealant to the threads.
IAT sensor (ARX1200T3/T3D)	22 N·m (2.2 kgf·m, 16 lbf·ft)
MAP sensor screw (ARX1200N3)	2.9 N·m (0.3 kgf·m, 2.2 lbf·ft)
Fuel pump lock nut	93 N·m (9.5 kgf·m, 69 lbf·ft)
Throttle cable setting nut	8.8 N·m (0.9 kgf·m, 6.5 lbf·ft)
Wastegate solenoid valve bolt (ARX1200T3/T3D only)	3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)
Airbox mounting bolt	7.8 N·m (0.8 kgf·m, 5.8 lbf·ft)
Airbox connecting tube band screw (duct side: ARX1200T3/T3D only)	6.9 N·m (0.7 kgf·m, 5.1 lbf·ft)
Crankcase breather hose joint bolt	7.8 N·m (0.8 kgf·m, 5.8 lbf·ft)
Air funnel screw (ARX1200N3 only)	3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)
Airbox cover screw (ARX1200N3 only)	3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)
Intake manifold mounting bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)
Pressure regulator nut	27 N·m (2.8 kgf·m, 20 lbf·ft)

TOOLS

SCS service connector 070PZ-ZY30100 	Peak voltage adaptor 07HGJ-0020100  (not available in U.S.A.) with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)	IgnitionMate peak voltage tester MTP07-0286 (U.S.A. only)* 
ECM test harness 070MZ-0010100 (two required) 	Fuel pressure gauge, 0 – 100 psi 07406-0040003  or 07406-004000B or 07406-004000A (U.S.A. only)	Pressure gauge manifold 07ZAJ-S5A0110  not available in U.S.A.

Pressure gauge hose 07ZAJ-S5A0120  not available in U.S.A.	Pressure manifold hose 07AMF-HW3A100 (U.S.A. only) 	Female adapter - orange 07AMF-HW3A200 (U.S.A. only) 
Male adaptor - orange 07AMF-HW3A300 (U.S.A. only) 	Fuel sender wrench 07XAA-001010A  or 07AAA-S0XA100 (U.S.A. only)	Vacuum gauge set 07LMJ-001000B  or 07LMJ-001000A

*Available through the Motorcycle Tool and Equipment Program; to order call 888-424-6857.

TROUBLESHOOTING

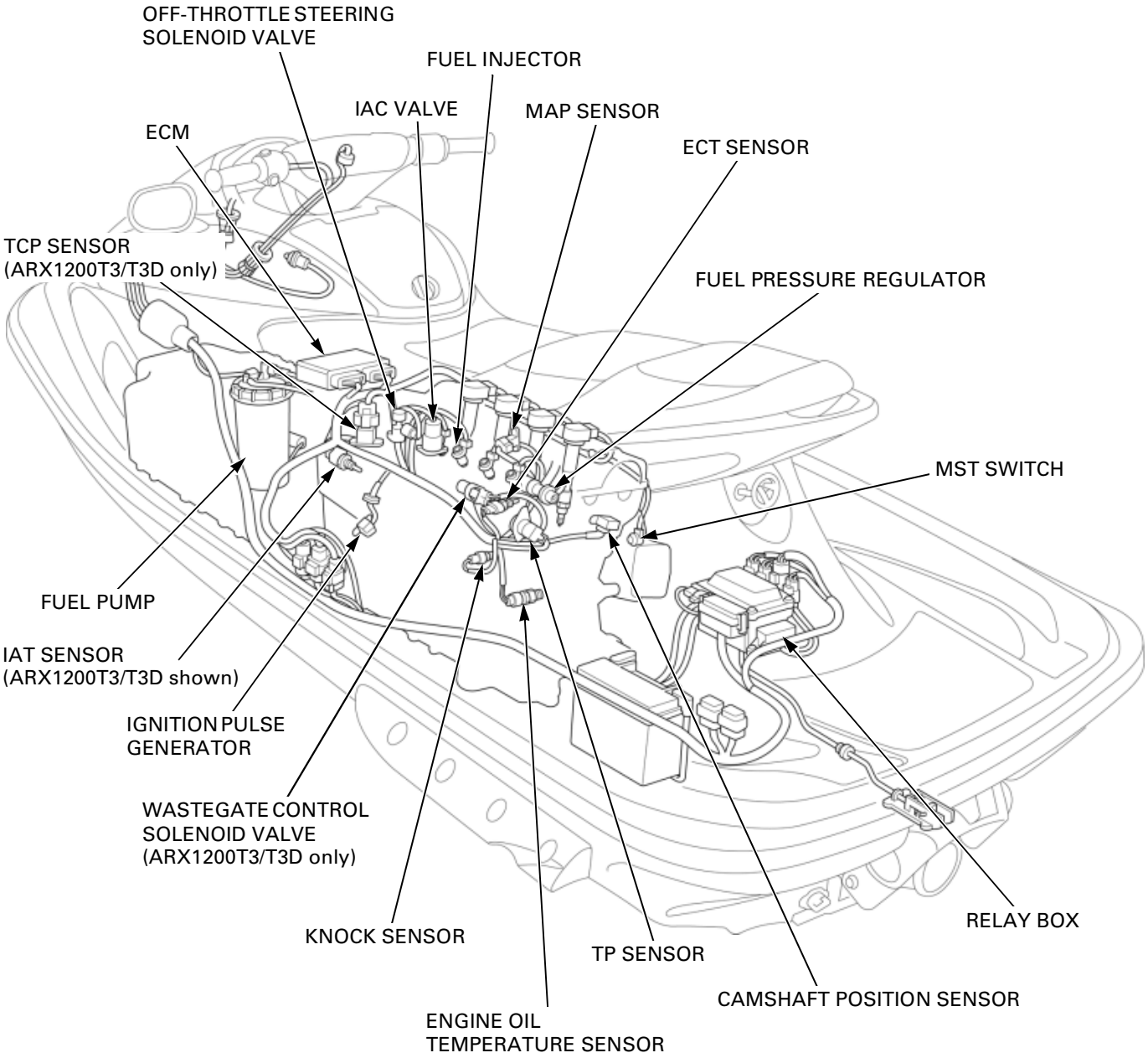
Engine cranks but will not start
- Intake air leak
- Fuel contaminated/deteriorated
- Pinched or clogged fuel hose
- Faulty fuel pump
- Clogged fuel injector filter
- Sticking fuel injector needle
- Faulty fuel pump operating system

Engine stalls, hard to start, or idles rough
- Intake air leak
- Fuel contaminated/deteriorated
- Pinched or clogged fuel hose
- Idle speed misadjusted
- Starter valve synchronization misadjusted

Backfiring or misfiring during acceleration
- Ignition system malfunction

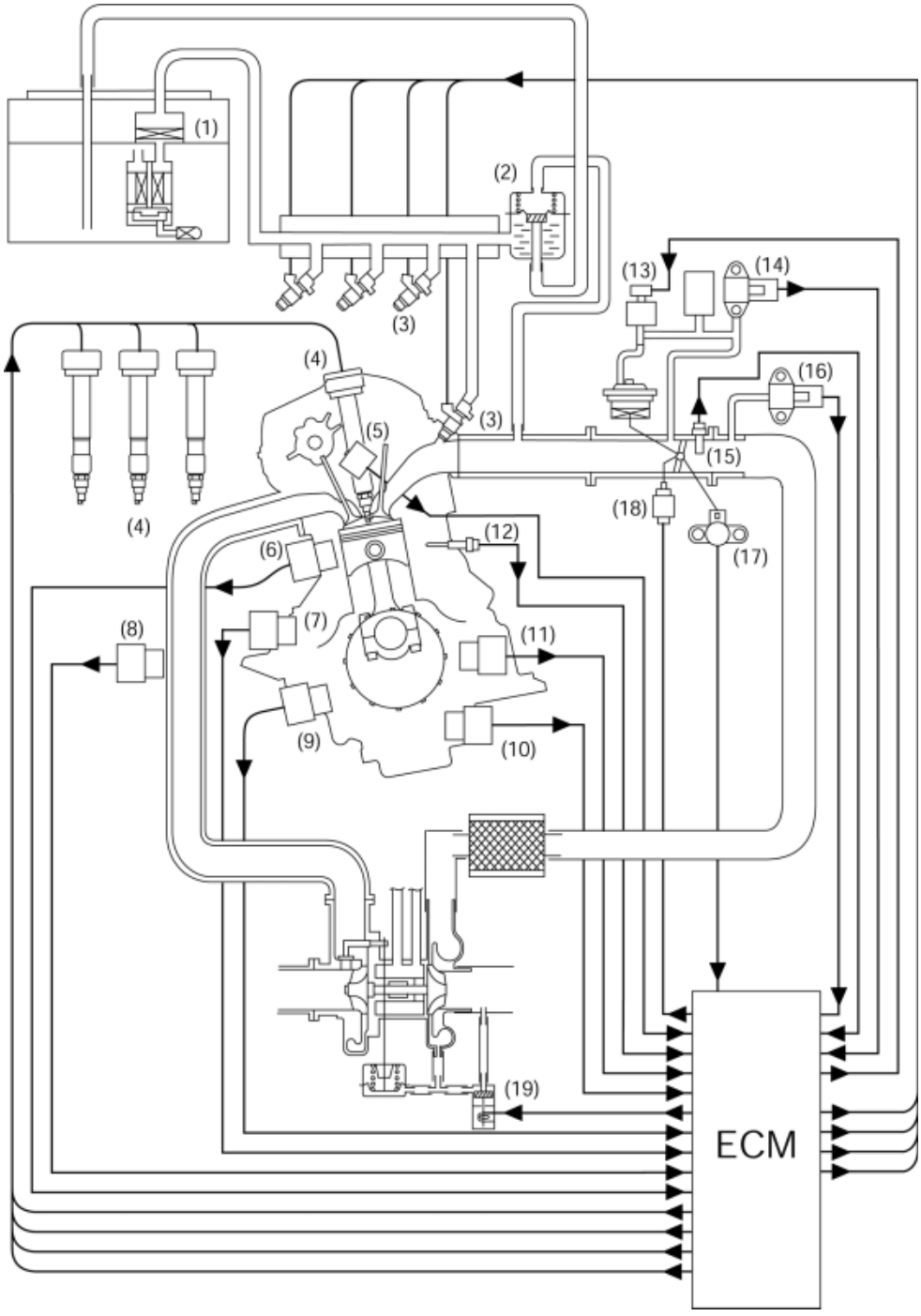
Poor performance (driveability) and poor fuel economy
- Pinched or clogged fuel hose
- Faulty pressure regulator

COMPONENT LOCATION



FULL NAME	ABBREVIATIONS
Manifold Absolute Pressure sensor	MAP sensor
Engine Coolant Temperature sensor	ECT sensor
Engine Control Module	ECM
Idle Air Control valve	IAC valve
Intake Air Temperature sensor	IAT sensor
Manifold Surface Temperature switch	MST switch
Throttle Position sensor	TP sensor
Turbo Charged Pressure sensor	TCP sensor

SYSTEM DIAGRAM



(1) Fuel pump
(2) Fuel pressure regulator
(3) Fuel injectors
(4) Direct ignition coils
(5) Camshaft position sensor
(6) Knock sensor
(7) Low oil pressure switch
(8) MST switch
(9) High oil pressure switch
(10) Engine oil temperature sensor
(11) Ignition pulse generator
(12) ECT sensor
(13) Off-throttle steering solenoid valve
(14) MAP sensor
(15) IAT sensor
(16) TCP sensor (ARX1200T3/T3D only)
(17) TP sensor
(18) IAC valve
(19) Wastegate control solenoid valve (ARX1200T3/T3D only)

PGM-FI (Programmed Fuel Injection) SYSTEM

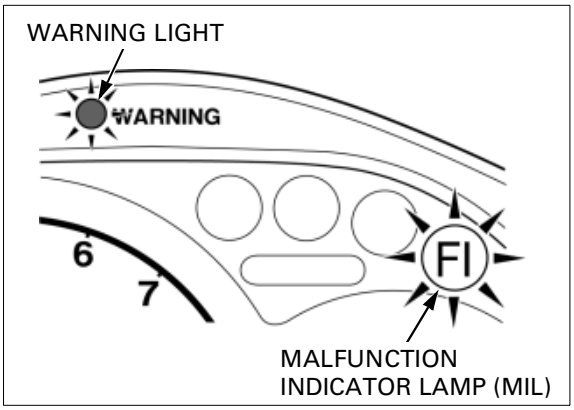
SELF-DIAGNOSTIC PROCEDURE

Fit the safety lanyard clip to the base of the engine stop switch.

If the warning light and PGM-FI malfunction indicator lamp (MIL) do not blink, the PGM-FI system has no problem.

If the engine will not start and the MIL does not blink, crank the starter for more than ten seconds. Check the MIL for blinking.

If the MIL and warning light blink, and the warning buzzer sounds, the PGM-FI system has a problem.

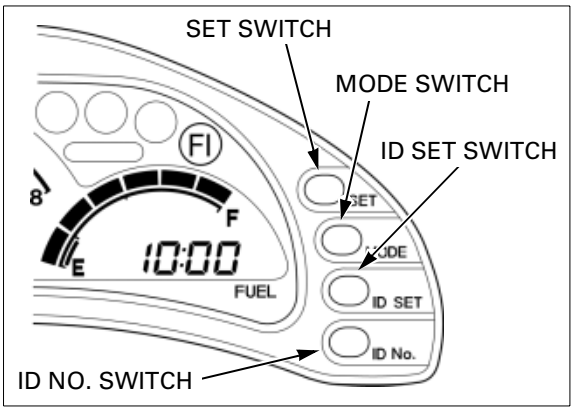


Push the SET, MODE, ID SET or ID NO. switch for more than 2 seconds to stop the warning buzzer.

Confirm the problem either way as follows:

- Push the SET and MODE switches simultaneously for more than 5 seconds and read how many times the MIL and warning light blink. Determine the cause of the problem (page 8-14).
- Read the diagnosis trouble code (DTC) with the Honda Diagnosis System (HDS) Pocket Tester. Determine the cause of the problem (page 8-44).

To read the ECM memory of the MIL code or DTC, perform the following:

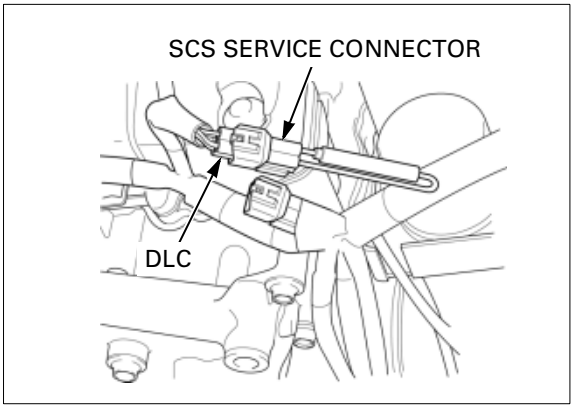


MIL CODE

Remove the seats (page 3-4).

Pull the safety lanyard clip off of the engine stop switch.
Remove the dummy connector from the data link connector (DLC).
Short the DLC terminals using the special tool.

SCS service connector 070PZ-ZY30100

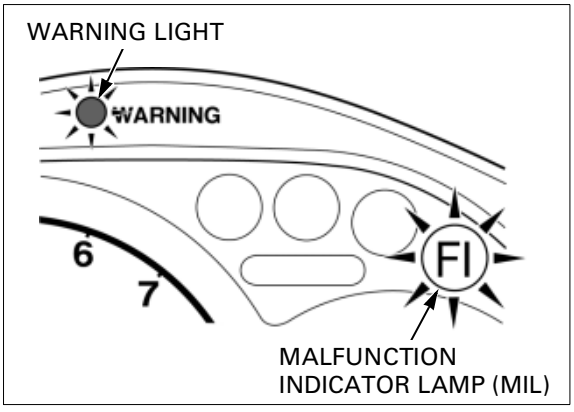


Fit the safety lanyard clip to the base of the engine stop switch.
Push the SET and MODE switches simultaneously for more than 5 seconds to blink the failure code.

If the ECM has no problem data in its memory, the MIL and warning light will come on and stay on.

If the ECM has problem data in its memory, the MIL and warning light will start blinking.

Read and record how many times the MIL and warning light blink and determine the cause of the problem (page 8-14).



DTC (with HDS pocket tester)

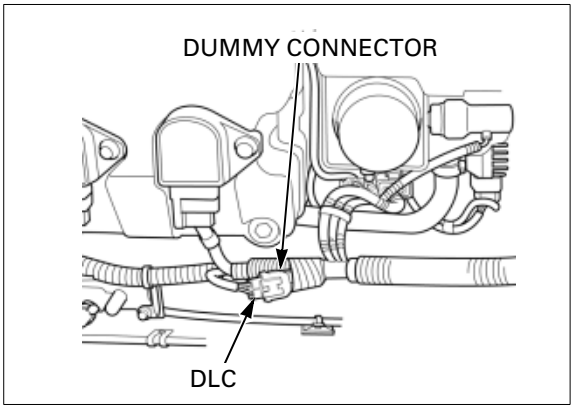
Remove the seats (page 3-4).

Pull the safety lanyard clip off of the engine stop switch.
Remove the dummy connector from the data link connector (DLC).
Connect the HDS Pocket Tester to the DLC.

Fit the safety lanyard clip to the base of the engine stop switch.
Read the DTC and determine the cause of the problem (page 8-44).
Also check the freeze data.

NOTE:

- Refer to the user's manual of the HDS Pocket Tester for tester operation.



SELF-DIAGNOSTIC MEMORY RESET PROCEDURE

Procedure with SCS service connector

1. Remove the seats (page 3-4).
2. Short the data link connector (DLC) terminals using a special tool.

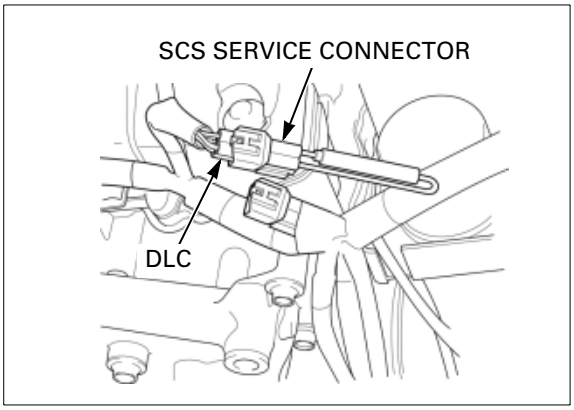
SCS service connector 070PZ-ZY30100

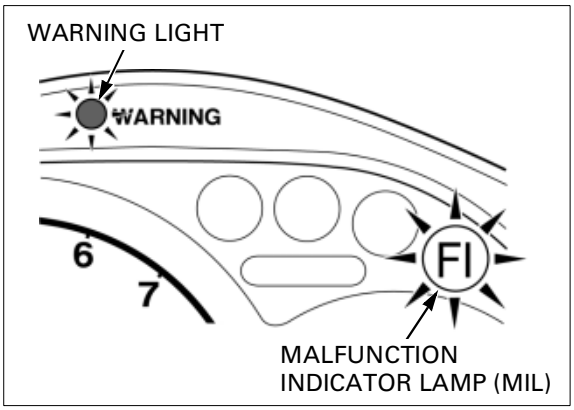
3. Fit the safety lanyard clip to the base of the engine stop switch
4. Remove the special tool from the DLC.
5. The MIL and warning light lights about 5 seconds.
   While the MIL and warning light lights, connect the DLC terminals again with the special tool.
   The self-diagnostic memory is erased, if the MIL and warning light goes off and starts blinking.

NOTE:

- The data link connector (DLC) must be jumped while the MIL and warning light lights. If not, the MIL and warning light will not start blinking.
- Note that the self-diagnostic memory cannot be erased if you pull the safety lanyard clip off of the engine stop switch before the MIL and warning light starts blinking.

If the MIL and warning light blinks 33 times, the diagnostic memory has not been erased.





Procedure with HDS pocket tester

Reset the diagnostic memory in the ECM using the HDS Pocket Tester.

NOTE:

- Refer to the user's manual of the HDS Pocket Tester for tester operation.

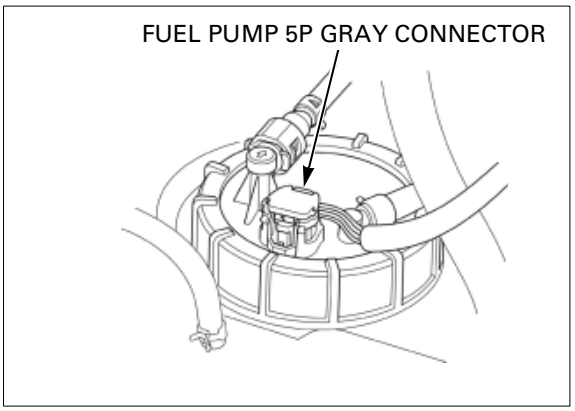
PEAK VOLTAGE INSPECTION PROCEDURE

NOTE:

- Use this procedure for the ignition pulse generator and camshaft position sensor inspection.
- Check cylinder compression and check that all the spark plugs are installed correctly.
- Use a commercially available digital multimeter with an impedance of 10 MΩ/DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.

Remove the storage box (page 3-8).

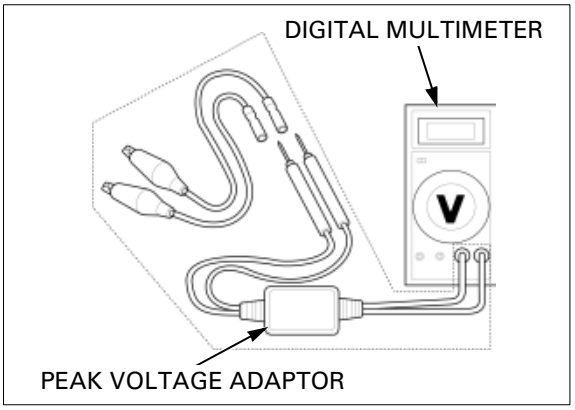
Disconnect the fuel pump 5P gray connector.



Connect the peak voltage adaptor to the digital multimeter.

TOOLS:

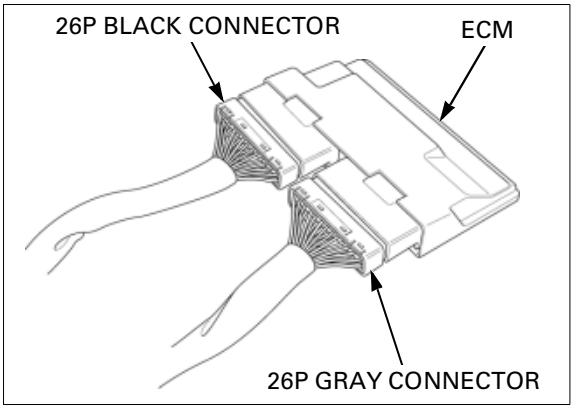
IgnitionMate peak voltage tester (U.S.A. only)	**MTP07-0286 or 07HGJ–0020100 (not available in U.S.A.)**
Peak voltage adaptor with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)	



TEST HARNESS CONNECTION

Remove the seats (page 3-4).

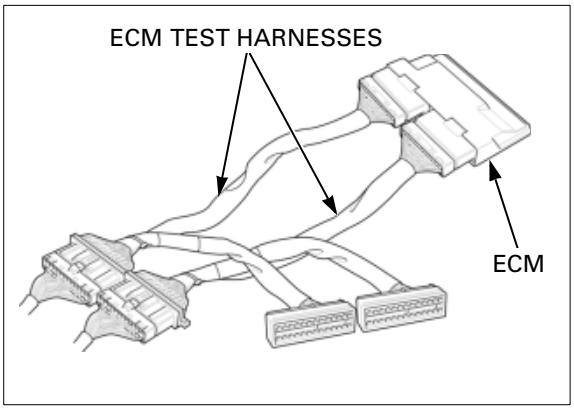
Disconnect the ECM 26P gray and black connectors from the ECM.



Connect the ECM test harnesses to the ECM and ECM connectors.

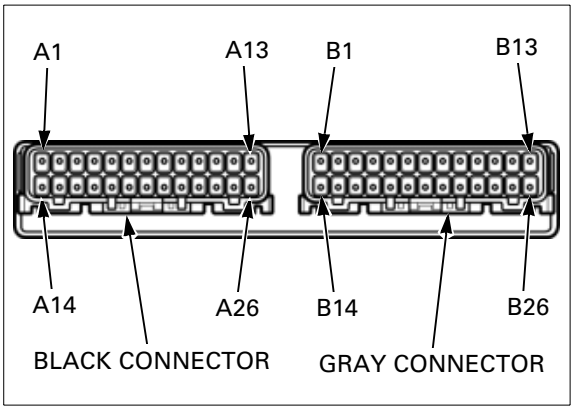
TOOLS:

ECM test harness	**070MZ-0010100 (two required)**

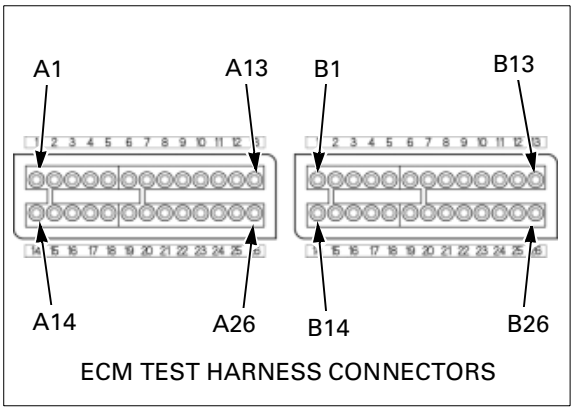


TEST HARNESS TERMINAL LAYOUT

The ECM connector terminals are numbered as shown.



The ECM test harness connector terminals are the same layout as for the ECM connector terminals as shown.



MIL CODE INDEX

- The PGM-FI malfunction indicator lamp (MIL) denotes the failure codes (the number of blinks from 0 to 47). The MIL has two types of blinks, a long blink and short blink. The long blink lasts for 1.3 seconds, the short blink lasts for 0.5 seconds. When two long blinks occur, and five short blinks, that problem code is 25 (two long blinks = 20 blinks, five short blinks = 5 blinks). Then, go to the flow chart and see problem code 25.
- When the Engine Control Module (ECM) stores some failure codes, the MIL shows the failure codes in the order from the lowest number to highest number. For example, when the MIL blinks once, then blinks seven times, two failures have occurred. Follow the flow chart for failure codes 1 and 7.

MIL	Function Failure	Causes	Symptoms	Refer to
No blinks	ECM malfunction	• Faulty ECM	• Engine does not start	8-114
No blinks	ECM power/ ground circuits malfunction	• Open circuit in the power input wire of the ECM • Faulty main relay • Open circuit in the main relay related wires • Faulty engine stop switch • Open circuit in the engine stop switch related wires • Blown sub-fuse D (7.5 A) • Blown main fuse (30 A)	• Engine does not start	8-115
No blinks	MIL circuit malfunction	• Open circuit in MIL wire	• Engine operates normally	–
Stays lit	Data link circuit malfunction	• Short circuit in the data link connector brown and green/ black wire terminals • Faulty ECM • Short circuit in the data link connector brown wire	• Engine operates normally	–
Blinking	MIL circuit malfunction	• Short circuit in the MIL wire	• Engine operates normally	–
1 blink	MAP sensor circuit malfunction	• Loose or poorly connected MAP sensor connector • Open or short circuit in the MAP sensor wire • Faulty MAP sensor	• Engine operates normally	8-17
2 blinks	MAP sensor performance problem	• Loose or poorly connected MAP sensor vacuum hose • Faulty MAP sensor	• Engine operates normally	8-21
7 blinks	ECT sensor circuit malfunction	• Loose or poorly connected ECT sensor connector • Open or short circuit in the ECT sensor wire • Faulty ECT sensor	• Hard start at a low temperature (ECM controls using preset value; coolant temperature: 90°C/ 194°F) • Engine operates below 3,000 rpm	8-22
8 blinks	TP sensor circuit malfunction	• Loose or poorly connected TP sensor connector • Open or short circuit in the TP sensor wire • Faulty TP sensor	• Poor engine response when operating the throttle quickly (ECM controls using preset value; throttle opening: 0°)	8-24
9 blinks	IAT sensor circuit malfunction	• Loose or poorly connected IAT sensor connector • Open or short circuit in the IAT sensor wire • Faulty IAT sensor	• Engine operates below 3,000 rpm (ECM controls using preset value; intake air temperature: 25°C/ 77°F)	8-26
12 blinks	No. 1 injector circuit malfunction	• Loose or poorly connected No. 1 injector connector • Open or short circuit in the No. 1 injector wire • Faulty No. 1 injector	• Engine operates below 3,000 rpm	8-29
13 blinks	No. 2 injector circuit malfunction	• Loose or poorly connected No. 2 injector connector • Open or short circuit in the No. 2 injector wire • Faulty No. 2 injector	• Engine operates below 3,000 rpm	8-30

MIL	Function Failure	Causes	Symptoms	Refer to
14 blinks	No. 3 injector circuit malfunction	• Loose or poorly connected No. 3 injector connector • Open or short circuit in the No. 3 injector wire • Faulty No. 3 injector	• Engine operates below 3,000 rpm	8-30
15 blinks	No. 4 injector circuit malfunction	• Loose or poorly connected No. 4 injector connector • Open or short circuit in the No. 4 injector wire • Faulty No. 4 injector	• Engine operates below 3,000 rpm	8-30
18 blinks	Camshaft position sensor no signal	• Loose or poorly connected camshaft position sensor connector • Open or short circuit in the camshaft position sensor wire • Faulty camshaft position sensor	• Engine does not start	8-31
19 blinks	Ignition pulse generator no signal	• Loose or poorly connected ignition pulse generator connector • Open or short circuit in the ignition pulse generator wire • Faulty ignition pulse generator	• Engine does not start	8-32
25 blinks	Knock sensor circuit malfunction	• Loose or poorly connected knock sensor connector • Open or short circuit in the knock sensor wire • Faulty knock sensor	• Engine operates below 3,000 rpm	8-33
29 blinks	IAC valve circuit malfunction	• Loose or poorly connected IAC valve connector • Open or short circuit in the IAC valve wire • Faulty IAC valve	• Engine stalls, hard to start, rough idling	8-34
33 blinks	ECM E^2-PROM malfunction	• Faulty ECM	• Engine operates normally • ECM does not hold the self-diagnosis data	8-35
42 blinks	TCP sensor circuit malfunction	• Loose or poorly connected TCP sensor connector • Open or short circuit in the TCP sensor wire • Faulty TCP sensor	• Engine operates below 3,000 rpm	8-36
43 blinks	TCP sensor performance problem	• Loose or poorly connected TCP sensor vacuum hose • Faulty TCP sensor	• Engine operates below 3,000 rpm	8-38
44 blinks	Engine oil temperature sensor circuit malfunction	• Loose or poorly connected engine oil temperature sensor connector • Open or short circuit in the engine oil temperature sensor wire • Faulty engine oil temperature sensor	• Hard start at a low temperature (ECM controls using preset value; engine oil temperature: 90°C/194°F) • Engine operates below 3,000 rpm	8-39

MIL	Function Failure	Causes	Symptoms	Refer to
45 blinks	TCP sensor system malfunction	• Loose or poorly connected wastegate solenoid control valve connector • Open or short circuit in the wastegate solenoid control valve wire • Faulty wastegate solenoid control valve • Loose or poorly connected wastegate solenoid control valve hose • Clogged wastegate actuator pressure hose • Faulty wastegate actuator • Faulty TCP sensor	• Engine operates below 3,000 rpm	8-40
46 blinks	MST switch circuit malfunction	• Faulty cooling system • Loose or poorly connected MST switch connector • Open or short circuit in the MST switch wire • Faulty MST switch	• Engine does not start	8-42
47 blinks	High engine coolant temperature	• Faulty cooling system • Loose or poorly connected ECT sensor connector • Open or short circuit in the ECT sensor wire • Faulty ECT sensor	• Engine operates below 3,000 rpm when the coolant temperature is 85 – 95°C (185 – 203°F) • Engine does not start when the coolant temperature is above 95°C (203°F)	8-43

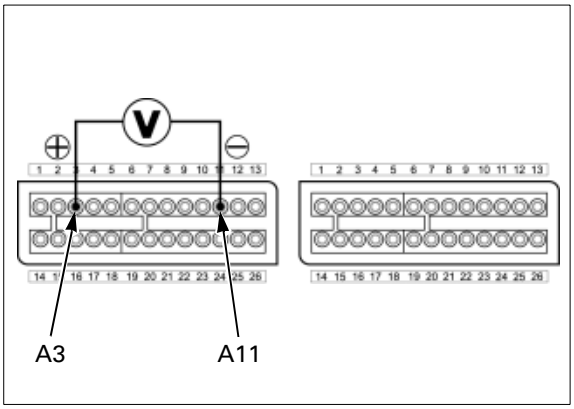
MIL TROUBLESHOOTING

MIL 1 BLINK (MAP SENSOR)

- Before starting the troubleshooting, check the MAP sensor connector for loose contacts or corroded terminals, and recheck if the MIL is blinking.

1. MAP Sensor Output Voltage Inspection

Pull the safety lanyard clip off of the engine stop switch.
Connect the ECM test harness to the ECM connectors (page 8-12).
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the test harness connector terminals.



Connection: A3 (+) – A11 (–)
Standard: 2.1 – 2.5 V (1,013 hPa/760 mmHg)

Is the voltage within 2.1 – 2.5 V?

YES – • Intermittent failure.
• Loose or poorly connected ECM connectors.

NO – • About 5 V
GO TO STEP 2.
• About 0 V
GO TO STEP 3.

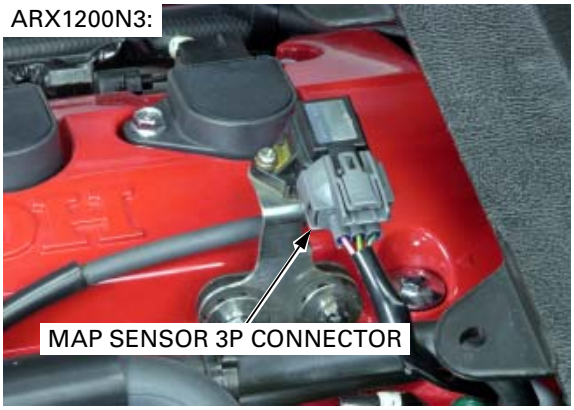
2. MAP Sensor Output Line Inspection

Pull the safety lanyard clip off of the engine stop switch.

Disconnect the MAP sensor 3P connector.

ARX1200T3/T3D:

ARX1200N3:



Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the wire harness side connector terminals.

Connection: Light green/black (+) – Green/yellow (–)

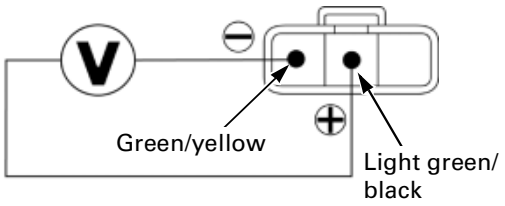
Is the voltage within 4.75 – 5.25 V?

YES – Faulty MAP sensor

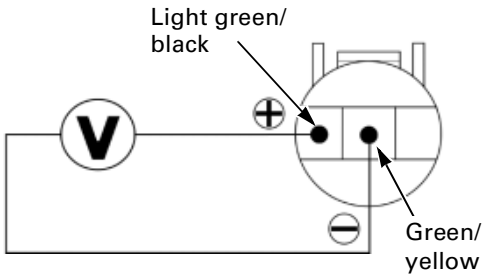
NO –
- Open circuit in the Light green/black wire.
- Open circuit in the Green/yellow wire.

ARX1200T3/T3D:

MAP SENSOR 3P BLACK CONNECTOR
(viewed from the terminal side)



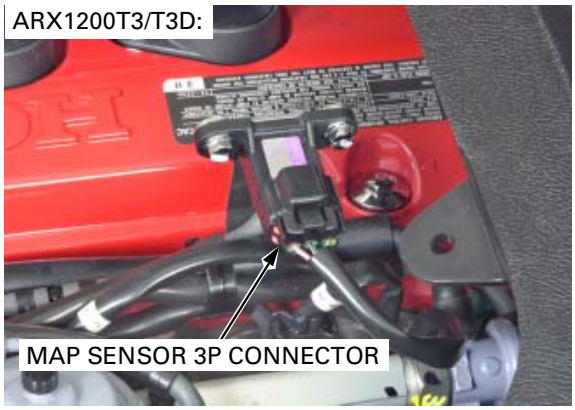
ARX1200N3:



3. MAP Sensor Input Voltage Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the MAP sensor 3P connector.

ARX1200T3/T3D:



ARX1200N3:

Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the wire harness side connector terminals.

Connection: Pink (+) – Ground (–)

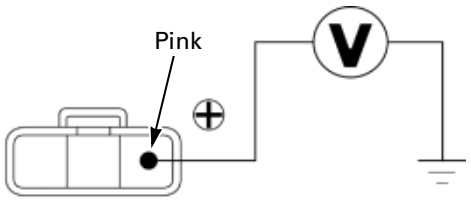
Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 4.

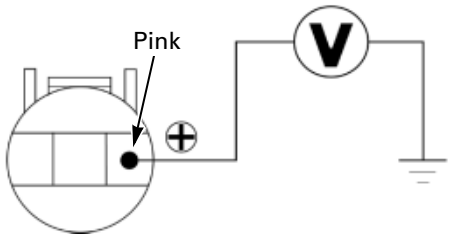
NO – GO TO STEP 5.

ARX1200T3/T3D:

MAP SENSOR 3P BLACK CONNECTOR
(viewed from the terminal side)



ARX1200N3:



4. MAP Sensor Output Line Short Circuit Inspection

Pull the safety lanyard clip off of the engine stop switch.
Check for continuity between the wire harness side connector terminal and ground.

Connection: Light green/black – Ground

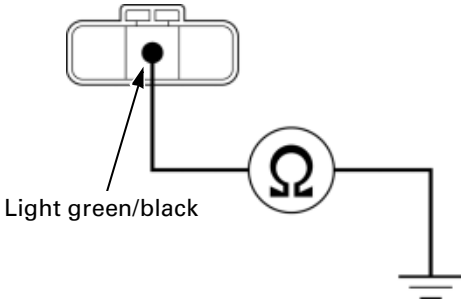
Is there continuity?

YES – Short circuit in the Light green/black wire.

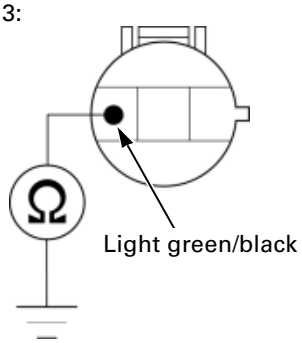
NO – Faulty MAP sensor.

ARX1200T3/T3D:

MAP SENSOR 3P BLACK CONNECTOR
(viewed from the terminal side)



ARX1200N3:



5. MAP Sensor Input Line Inspection

Pull the safety lanyard clip off of the engine stop switch.
Check for continuity between the MAP sensor 3P connector terminal and test harness connector terminal.

Connection: Pink – B13

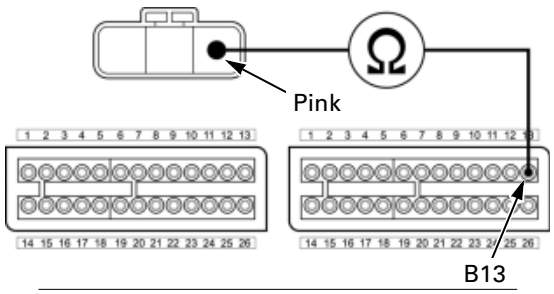
Is there continuity?

YES – Replace the ECM with a known good one, and recheck.

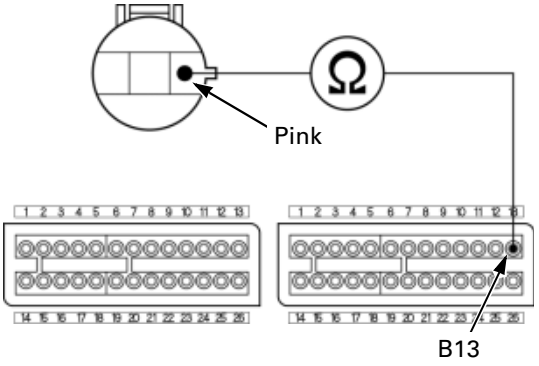
NO – Open circuit in the Pink wire.

ARX1200T3/T3D:

MAP SENSOR 3P BLACK CONNECTOR (viewed from the terminal side)



ARX1200N3:



MIL 2 BLINKS (MAP SENSOR)

- Before starting the troubleshooting, check the MAP sensor connector for loose contacts or corroded terminals, and recheck if the MIL is blinking.

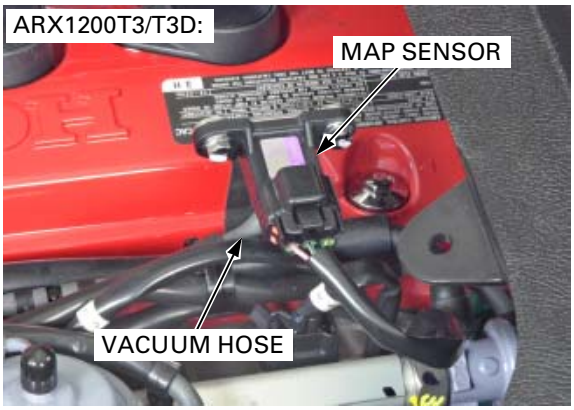
1. MAP Sensor Hose Inspection

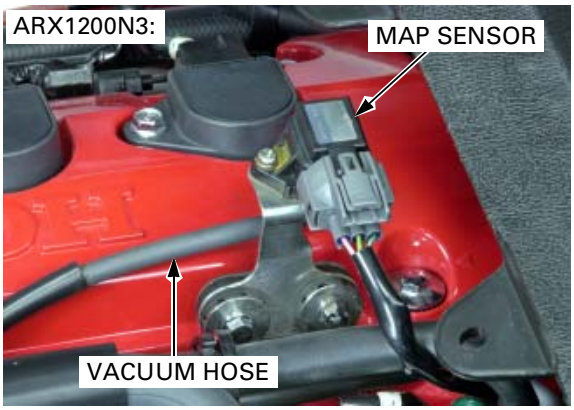
Pull the safety lanyard clip off of the engine stop switch.
Check the MAP sensor vacuum hose.

Is the MAP sensor vacuum hose connected securely?

YES – GO TO STEP 2.

NO – Connect the MAP sensor vacuum hose securely.





2. MAP Sensor Output Voltage Inspection

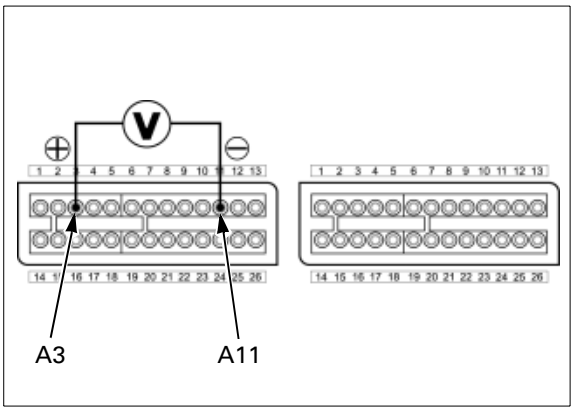
Connect the ECM test harness to the ECM connectors (page 8-12).
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the ECM test harness connector terminals.

Connection: A3 (+) – A11 (–)
Standard: 2.1 – 2.5 V (1,013 hPa/760 mmHg)

Is the voltage within 2.1 – 2.5 V?

YES – GO TO STEP 3.

No – Faulty MAP sensor.



3. MAP Sensor Output Voltage Inspection At Idle

Start the engine.
Measure the voltage between the ECM test harness connector terminals.

Connection: A3 (+) – A11 (–)
Standard: 2.1 V maximum

Is the voltage less than 2.7 V?

YES – Replace the ECM with a known good one, and recheck.

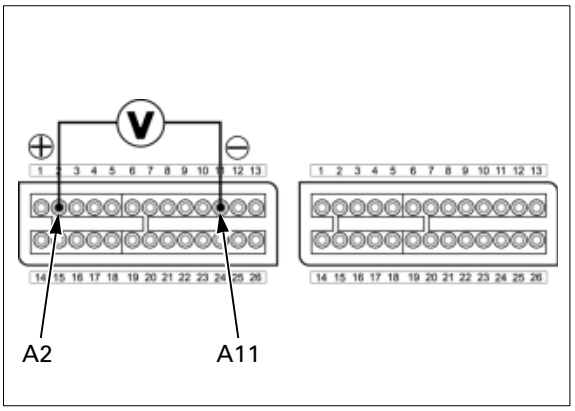
NO – Faulty MAP sensor.

MIL 7 BLINKS (ECT SENSOR)

- Before starting the troubleshooting, check the ECT sensor connector for loose contacts or corroded terminals, and recheck if the MIL is blinking.

1. ECT Sensor Output Voltage Inspection

Pull the safety lanyard clip off of the engine stop switch.
Connect the ECM test harness to the ECM connectors (page 8-12).
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the test harness connector terminals.



Connection: A2 (+) – A11 (–)
Standard: 2.7 – 3.1 V (20°C/68°F)

Is the voltage within 2.7 – 3.1 V?

YES – • Intermittent failure.
• Loose or poorly connected ECM connectors.

NO – GO TO STEP 2.

2. ECT Sensor Input Voltage Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the ECT sensor 2P blue connector.

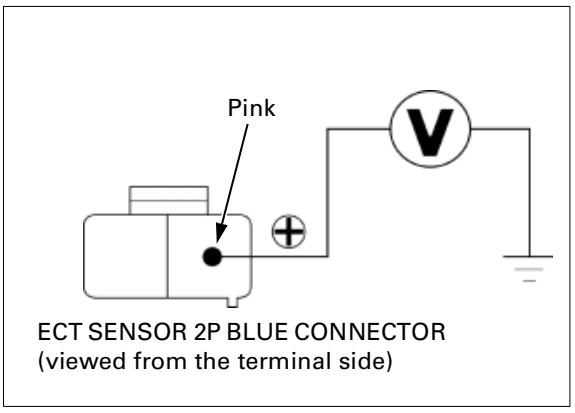
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the wire harness side connector terminals.

Connection: Pink (+) – Ground (–)

Is the voltage within 4.75 – 5.25V?

YES – GO TO STEP 3.

NO – GO TO STEP 4.



ECT SENSOR 2P BLUE CONNECTOR
(viewed from the terminal side)

3. ECT Sensor Resistance Inspection

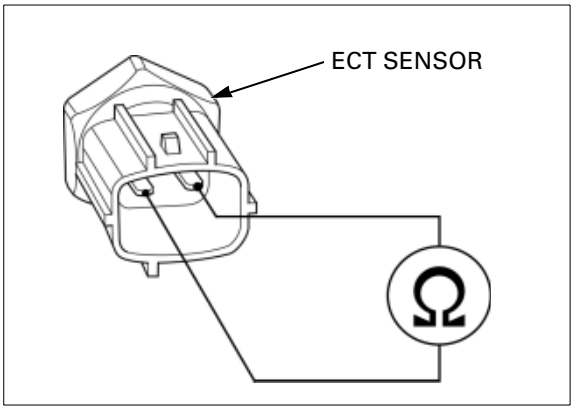
Pull the safety lanyard clip off of the engine stop switch.
Measure the ECT sensor resistance between the sensor connector terminals.

Standard: 2.3 – 2.6 kΩ (20°C/68°F)

Is the resistance within 2.3 – 2.6 kΩ (20°C/68°F)?

YES – Open circuit in the Green/yellow wire.

NO – Faulty ECT sensor.



4. ECT Sensor Output Line Open Circuit Inspection

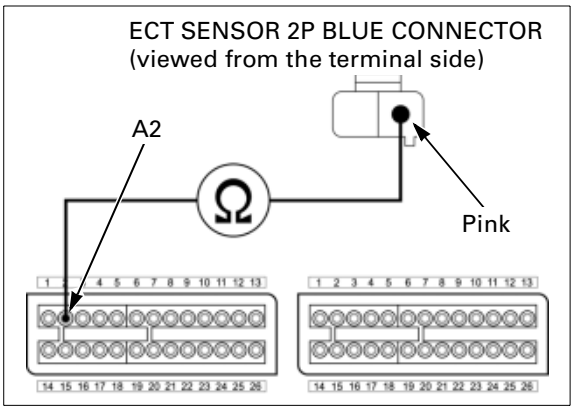
Pull the safety lanyard clip off of the engine stop switch.
Check for continuity between the ECT sensor 2P connector terminal and ECM test harness connector terminal.

Connection: Pink – A2

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in the Pink wire.



5. ECT Sensor Output Line Short Circuit Inspection

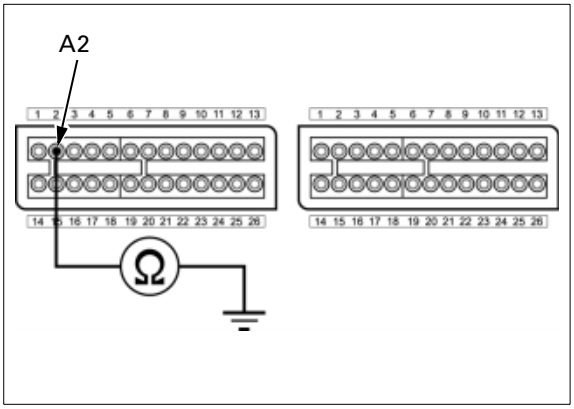
Check for continuity between the ECM test harness connector terminal and ground.

Connection: A2 – Ground

Is there continuity?

YES – Short circuit in the Pink wire.

NO – Replace the ECM with a known good one and recheck.



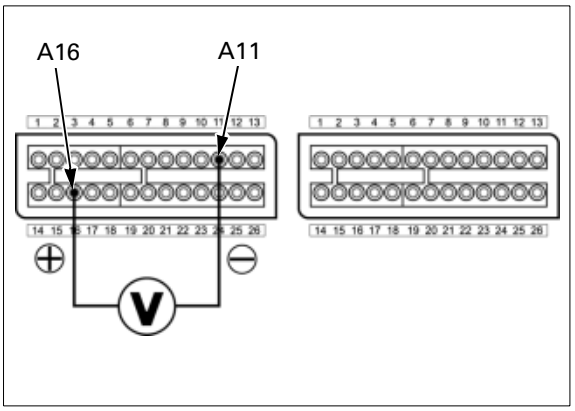
MIL 8 BLINKS (TP SENSOR)

- Before starting the troubleshooting, check the TP sensor connector for loose contacts or corroded terminals, and recheck if the MIL is blinking.

1. TP Sensor Output Voltage

Pull the safety lanyard clip off of the engine stop switch.
Connect the ECM test harness to the ECM connectors (page 8-12).
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the test harness connector terminals.

Connection: A16 (+) – A11 (–)
Standard: 0.4 – 0.6 V (throttle fully closed)
4.2 – 4.8 V (throttle fully opened)



NOTE:

- A voltage marked refers to the value when the input voltage reading (page 8-24) shows 5 V.
  If the reading shows other than 5 V, derive a voltage range at the test pin box as follows:
  In the case of the ECM input voltage of 4.75 V:
  0.4 x 4.75/5.0 = 0.38 V
  0.6 x 4.75/5.0 = 0.57 V
  Thus, the solution is "0.38 – 0.57 V" with the throttle fully closed.
  Replace this calculation using 4.2 and 4.8 to get the resulting range for the throttle fully open.

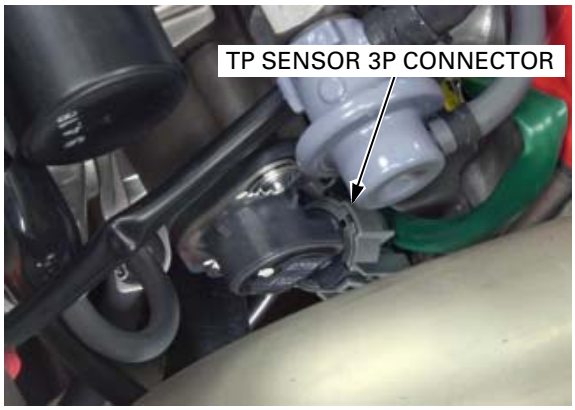
Is there standard voltage?

YES – • Intermittent failure.
• Loose or poorly connected ECM connectors.

NO – GO TO STEP 2.

2. TP Sensor Input Voltage Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the TP sensor 3P connector.



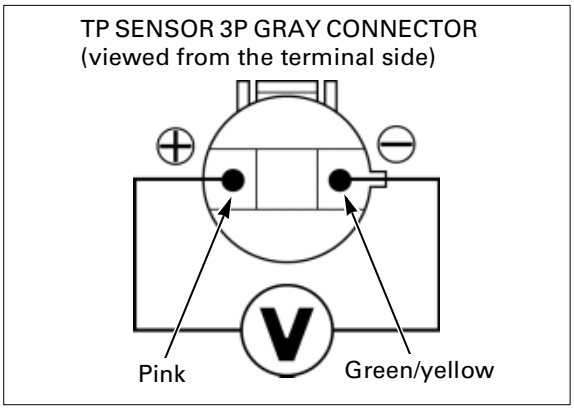
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the wire harness side connector terminals.

Connection: Pink (+) – Green/yellow (–)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 4.

NO – GO TO STEP 3.



3. ECM Output Voltage Inspection

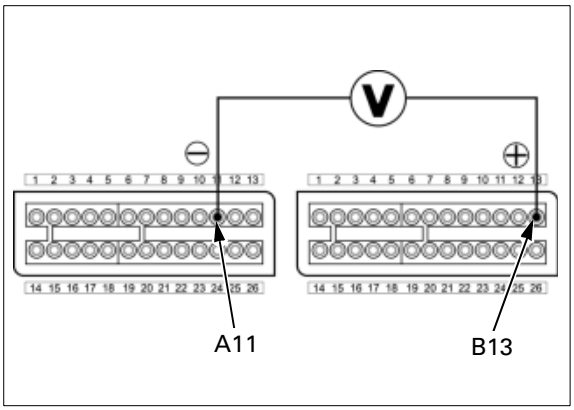
Measure the voltage between the test harness connector terminals.

Connection: B13 (+) – A11 (–)

Is the voltage within 4.75 – 5.25 V?

YES – • Open circuit in the Pink wire.
• Open circuit in the Green/yellow wire.

NO – Replace the ECM with a known good one, and recheck.



4. TP Sensor Output Line Open Circuit Inspection

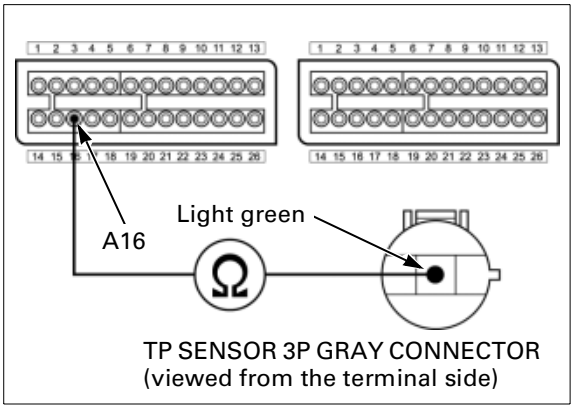
Turn the ignition switch to "OFF".
Check for continuity between the TP sensor 3P connector terminal and test harness connector terminal.

Connection: Light green – A16

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in the Light green wire.



5. TP Sensor Output Line Short Circuit Inspection

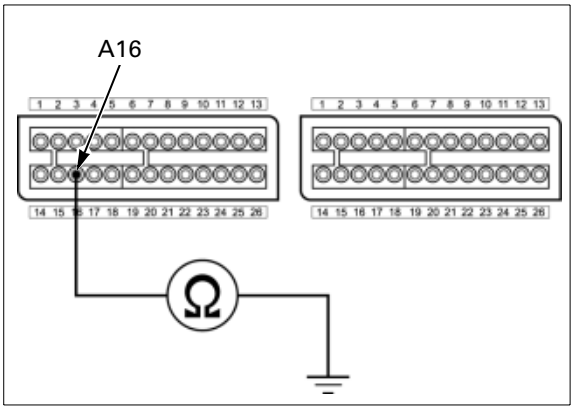
Check for continuity between the test harness connector terminal and ground.

Connection: A16 – Ground

Is there continuity?

YES – Short circuit in the Light green wire.

NO – Faulty TP sensor.

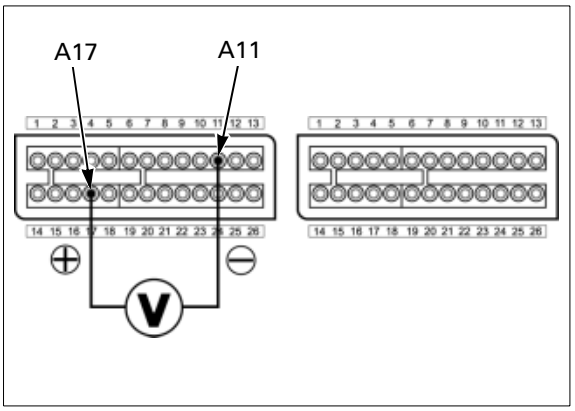


MIL 9 BLINKS (IAT SENSOR)

- Before starting the troubleshooting, check the IAT sensor connector for loose contacts or corroded terminals, and recheck if the MIL is blinking.

1. IAT Sensor Output Voltage Inspection

Pull the safety lanyard clip off of the engine stop switch.
Connect the ECM test harness to the ECM connectors (page 8-12).
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the test harness connector terminals.



Connection: A17 (+) – A11 (–)
Standard: 2.7 – 3.1 V (20°C/68°F)

Is the voltage within 2.7 – 3.1 V?

YES – • Intermittent failure.
• Loose or poor contact on the ECM connectors.

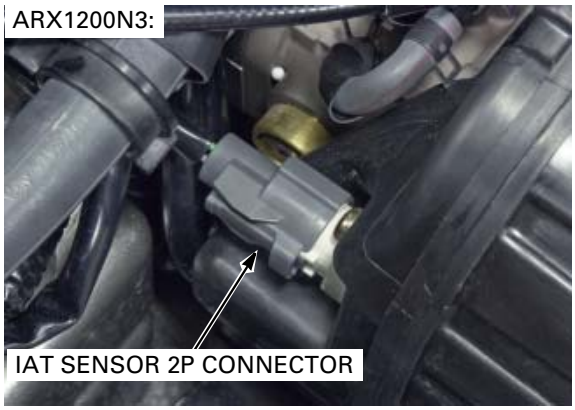
NO – GO TO STEP 2.

2. IAT Sensor Input Voltage Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the IAT sensor 2P connector.

ARX1200T3/T3D:

ARX1200N3:



Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the wire harness side connector terminals.

Connection: Gray (+) – Ground (–)

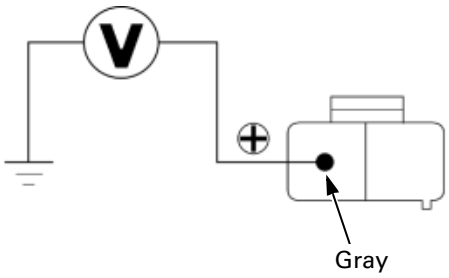
Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 3.

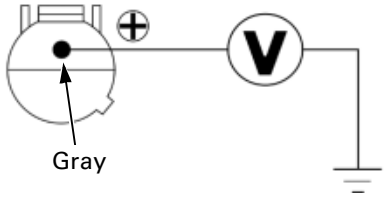
NO – GO TO STEP 4.

ARX1200T3/T3D:

IAT SENSOR 2P BLACK CONNECTOR
(viewed from the terminal side)



ARX1200N3:



3. IAT Sensor Resistance Inspection

Pull the safety lanyard clip off of the engine stop switch.
Measure the IAT sensor resistance between the sensor connector terminals.

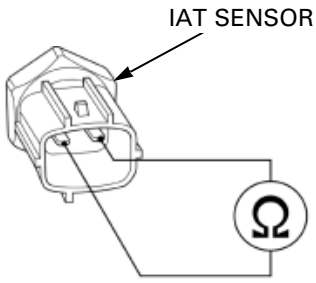
Standard: 1 – 4 kΩ (20°C/68°F)

Is the resistance within 1 – 4 kΩ (20°C/68°F)?

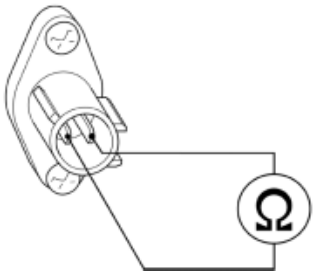
YES – Open circuit in the Green/yellow wire.

NO – Faulty IAT sensor.

ARX1200T3/T3D:



ARX1200N3:



4. IAT Sensor Output Line Open Circuit Inspection

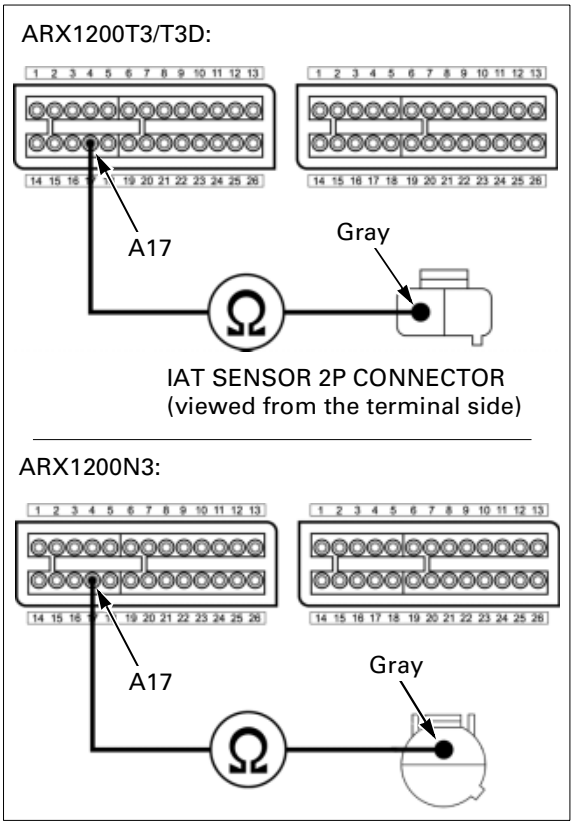
Pull the safety lanyard clip off of the engine stop switch.
Check for continuity between the IAT sensor 2P connector terminal and test harness connector terminal.

Connection: Gray – A17

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in the Gray wire.



5. IAT Sensor Output Line Short Circuit Inspection

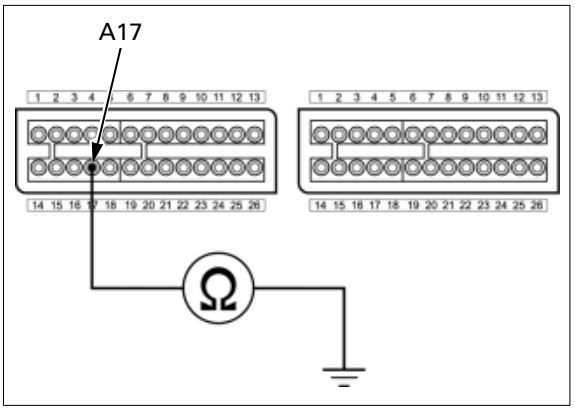
Check for continuity between the test harness connector terminal and ground.

Connection: A17 – Ground

Is there continuity?

YES – Short circuit in the Gray wire.

NO – Faulty IAT sensor.



MIL 12 BLINKS (No. 1 INJECTOR)

MIL	INJECTOR	POWER INPUT LINE	SIGNAL LINE	SIGNAL AT ECM
12	No. 1	Black/red	White/red	B4
13	No. 2	Black/red	White/blue	B17
14	No. 3	Black/red	White/green	B5
15	No. 4	Black/red	White/black	B18

1. Injector Circuit Resistance Inspection

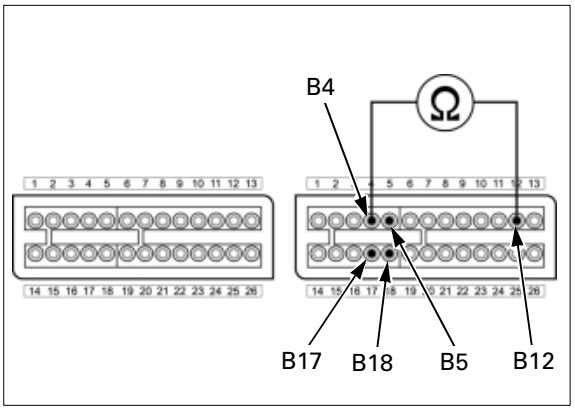
Pull the safety lanyard clip off of the engine stop switch.
Connect the ECM test harness to the ECM connectors (page 8-12).
Check for continuity between the test harness connector terminals.

Connection: B12 – SIGNAL LINE

Is there continuity?

YES – GO TO STEP 4.

NO – GO TO STEP 2.



2. Injector Resistance Inspection

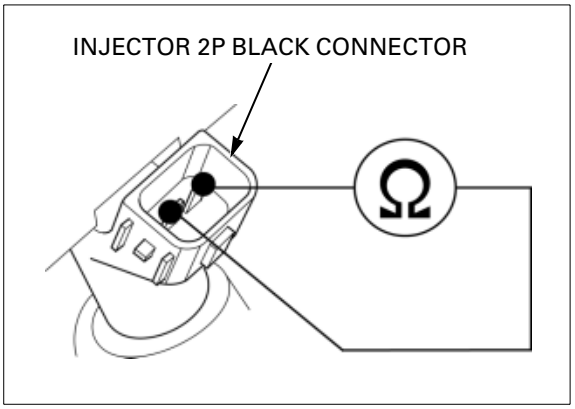
Disconnect the No. 1 injector 2P connector.

Measure the resistance between the No. 1 injector 2P connector terminals.

Is the resistance within 11.1 – 12.3 Ω (20°C/68°F)?

YES – GO TO STEP 3.

NO – Faulty injector.



3. **Injector Input Voltage Inspection**

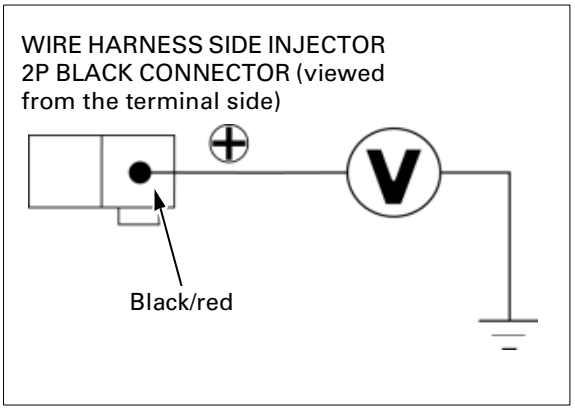
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the wire harness side connector terminal of the No. 1 injector and ground.

Connection: Black/red (+) – Ground (–)

Is there battery voltage?

YES – Open circuit in the SIGNAL LINE wire.

NO – Open circuit in the Black/red wire.



4. **Injector Signal Line Short Circuit Inspection**

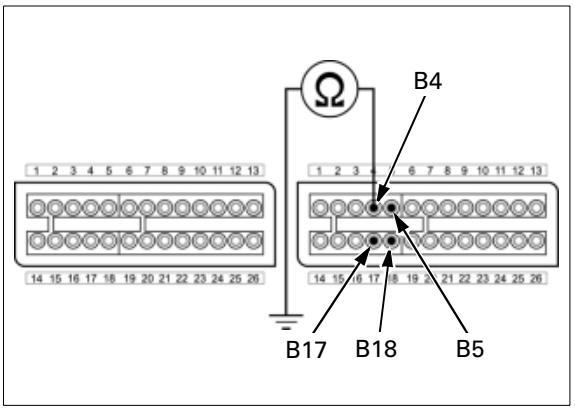
Check for continuity between the ECM 26P gray connector terminals and ground.

Connection: SIGNAL LINE – Ground

Is there continuity?

YES – Short circuit in the SIGNAL LINE wire.

NO – Replace the ECM with a known good one and recheck.



MIL 13 BLINKS (No. 2 INJECTOR)

(page 8-29)

MIL 14 BLINKS (No. 3 INJECTOR)

(page 8-29)

MIL 15 BLINKS (No. 4 INJECTOR)

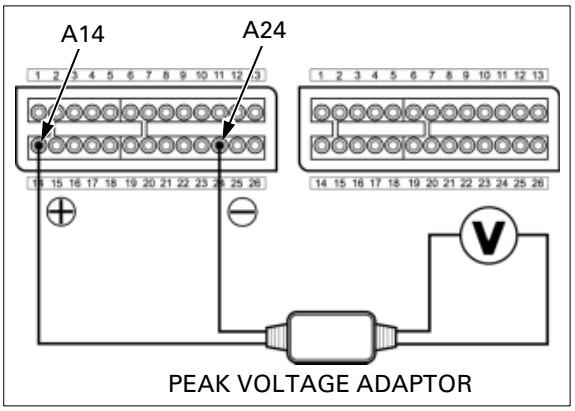
(page 8-29)

MIL 18 BLINKS (CAMSHAFT POSITION SENSOR)

- Before starting the troubleshooting, check the camshaft position sensor connector for loose contacts or corroded terminals, and recheck if the MIL is blinking.

1. Camshaft Position Sensor Peak Voltage Inspection at ECM

Pull the safety lanyard clip off of the engine stop switch.
Connect the peak voltage adaptor to the digital multimeter (page 8-12).
Connect the ECM test harness to the ECM connectors (page 8-12).
Fit the safety lanyard clip to the base of the engine stop switch.
Crank the engine with the starter motor, and measure the camshaft position sensor peak voltage between the test harness connector terminals.



Connection: A14 (+) – A24 (–)

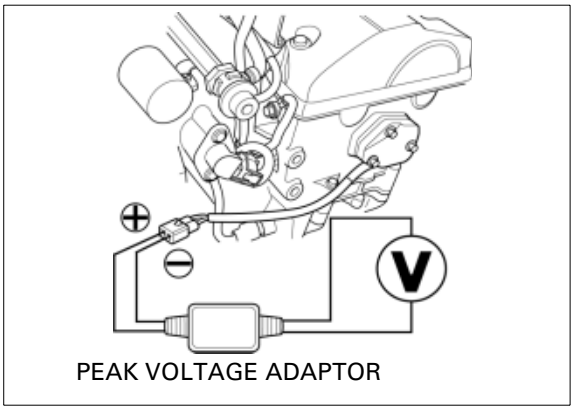
Is the voltage more than 0.7 V?

YES – • Intermittent failure.
• Loose or poorly connected ECM connector.

NO – GO TO STEP 2.

2. Camshaft Position Sensor Peak Voltage Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the camshaft position sensor 2P connector.
Fit the safety lanyard clip to the base of the engine stop switch.
Crank the engine with the starter motor, and measure the camshaft position sensor peak voltage at the camshaft position sensor 2P connector.



Connection: Gray (+) – White/yellow (–)

Is the voltage more than 0.7 V?

YES – Open or short circuit in the Gray or White/yellow wire.

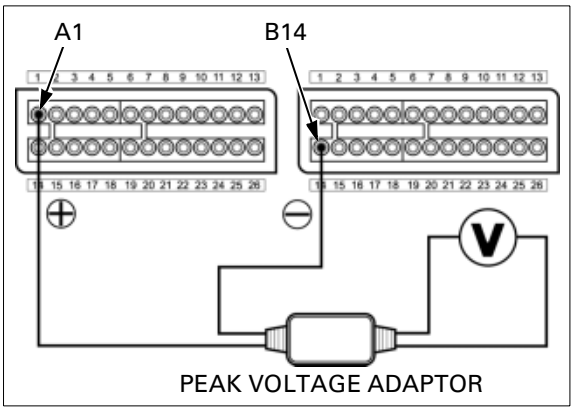
NO – Faulty camshaft position sensor.

MIL 19 BLINKS (IGNITION PULSE GENERATOR)

- Before starting the troubleshooting, check the ignition pulse generator connector for loose contacts or corroded terminals, and recheck if the MIL is blinking.

1. Ignition Pulse Generator Peak Voltage Inspection at ECM

Pull the safety lanyard clip off of the engine stop switch.
Connect the peak voltage adaptor to the digital multimeter (page 8-12).
Connect the ECM test harness to the ECM connectors (page 8-12).
Fit the safety lanyard clip to the base of the engine stop switch.
Crank the engine with the starter motor, and measure the ignition pulse generator peak voltage between the test harness connector terminals.



Connection: A1 (+) – B14 (–)

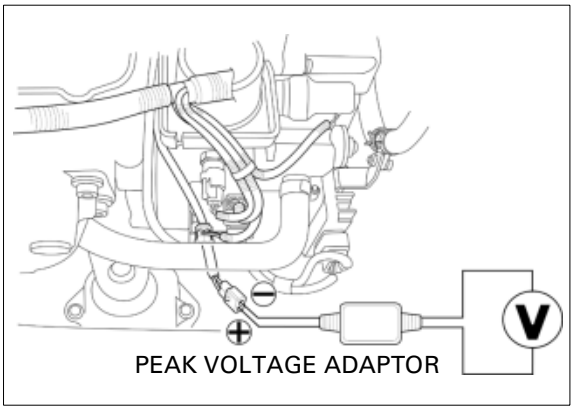
Is the voltage more than 0.7 V?

YES – • Intermittent failure.
• Loose or poorly connected ECM connectors.

NO – GO TO STEP 2.

2. Ignition Pulse Generator Peak Voltage Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the ignition pulse generator 2P red connector.
Fit the safety lanyard clip to the base of the engine stop switch.
Crank the engine with the starter motor, and measure the ignition pulse generator peak voltage at the ignition pulse generator 2P red connector.



Connection: Yellow (+) – White/yellow (–)

Is the voltage more than 0.7 V?

YES – Open or short circuit in the Yellow or White/yellow wire.

NO – Faulty ignition pulse generator.

MIL 25 BLINKS (KNOCK SENSOR)

- Before starting the troubleshooting, check the knock sensor connector for loose contacts or corroded terminals, and recheck if the MIL is blinking.

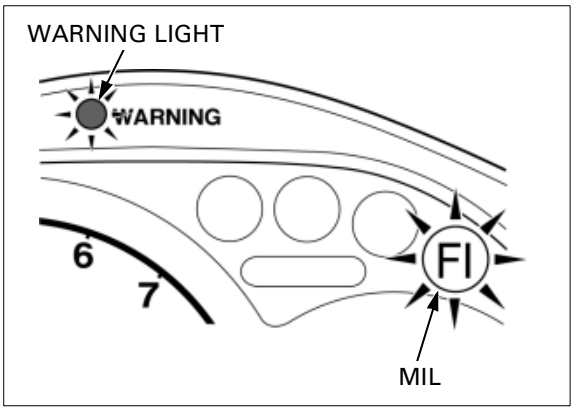
1. Knock Sensor Connection Inspection

Reset the self-diagnosis memory data (page 8-11).
Start the engine and hold the engine speed above 2,500 rpm for 10 seconds or more.
Check the MIL and PGM-FI indicator.

Is the MIL blinking?

YES – GO TO STEP 2.

NO – Temporary failure.



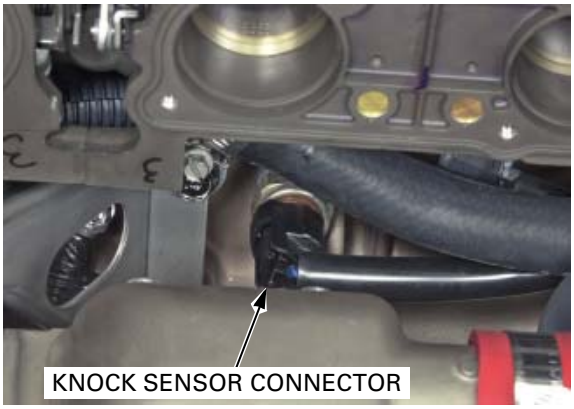
2. Knock Sensor Short Circuit Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the ECM 26P black connector.
Disconnect the knock sensor 1P black connector.
Check for continuity between the knock sensor 1P connector terminal and ground.

Is there continuity?

YES – Short circuit in the Red/blue wire.

NO – GO TO STEP 3.



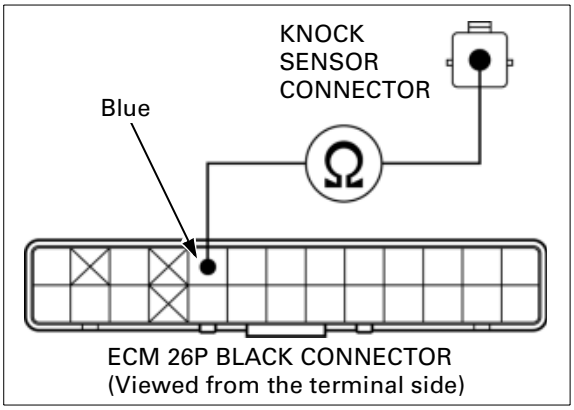
3. Knock Sensor Open Circuit Inspection

Check the blue wire for continuity between the knock sensor 1P connector terminal and ECM 26P black connector terminal.

Is there continuity?

YES – Replace the knock sensor and recheck. If the MIL is still blinking, replace the ECM and recheck.

NO – Open circuit in the Blue wire.



MIL 29 BLINKS (IAC VALVE)

- Before starting the troubleshooting, check the IAC valve connector for loose contacts or corroded terminals, and recheck if the MIL is blinking.

1. IAC Valve Resistance Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the IAC valve 4P black connector.
Measure the resistance between the IAC valve side connector terminals.

Connection: Black/White – Black/yellow
Brown/White – Brown/yellow

Is the resistance 30 – 70 Ω?

YES – GO TO STEP 2.

NO – Faulty IAC valve.

2. IAC Valve Line Short Circuit Inspection

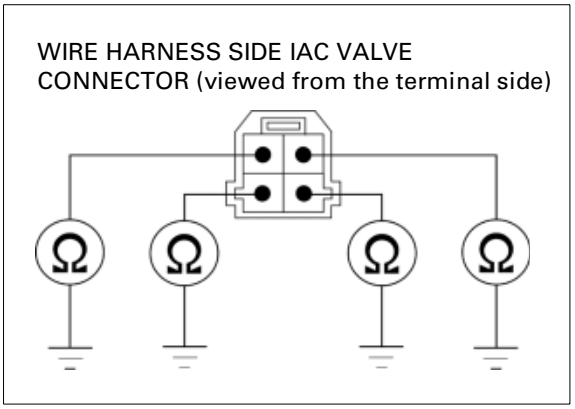
Disconnect the ECM 22P black connector.
Check for continuity between the wire harness side IAC valve connector terminal and ground.

Connection: Black/white – Ground
Black/yellow – Ground
Brown/white – Ground
Brown/yellow – Ground

Is there continuity?

YES – Short circuit in the Black/white, Black/yellow, Brown/white and/or Brown/yellow wire.

NO – GO TO STEP 3.



3. IAC Valve Line Open Circuit Inspection

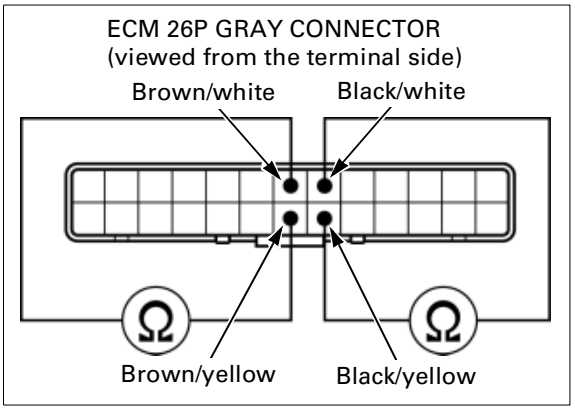
Connect the IAC valve 4P connector.
Measure the resistance between the ECM 26P gray connector terminals.

Connection: Black/white – Black/yellow
Brown/white – Brown/yellow

Is the resistance 30 – 70 Ω?

YES – Replace the ECM with a new one and recheck.

NO – Open circuit in the Black/white, Black/yellow, Brown/white and/or Brown/yellow wire.



MIL 33 BLINKS (E^2-PROM)

1. **Recheck MIL Blinks 1**

   Reset the self-diagnosis memory data (page 8-11).
   Fit the safety lanyard clip to the base of the engine stop switch.
   Check that the MIL blinks.

   Does the MIL blink 33 times?

   YES – Replace the ECM with a known good one and recheck.

   NO – GO TO STEP 2.

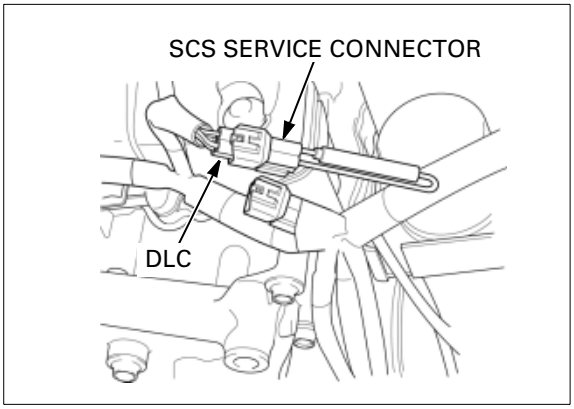
2. **Recheck MIL Blinks 2**

   Pull the safety lanyard clip off of the engine stop switch.
   Short the data link connector (DLC) with the SCS service connector (070PZ-ZY30100).
   Fit the safety lanyard clip to the base of the engine stop switch.
   Check that the MIL blinks.

   Does the MIL blink 33 times?

   YES – GO TO STEP 3.

   NO – Intermittent failure.



3. **Recheck MIL Blinks 3**

   Reset the self-diagnosis memory data (page 8-11).
   Fit the safety lanyard clip to the base of the engine stop switch.
   Check that the MIL blinks.

   Does the MIL blink 33 times?

   YES – Replace the ECM with a known good one and recheck.

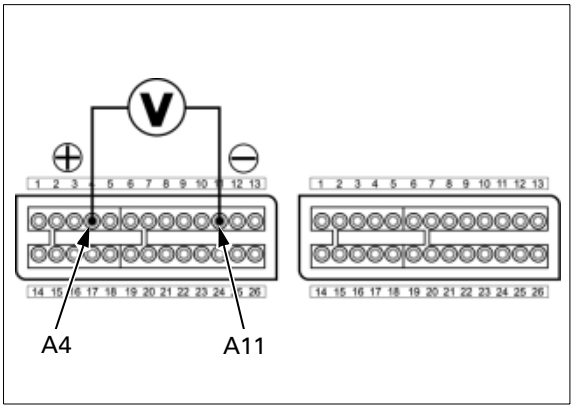
   NO – Intermittent failure.

MIL 42 BLINKS (TCP SENSOR) (ARX1200T3/T3D only)

- Before starting the troubleshooting, check the TCP sensor connector for loose contacts or corroded terminals, and recheck if the MIL is blinking.

1. TCP Sensor Output Voltage Inspection

Pull the safety lanyard clip off of the engine stop switch.
Connect the ECM test harness to the ECM connectors (page 8-12).
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the test harness connector terminals.



Connection: A4 (+) – A11 (–)
Standard: 2.1 – 2.5 V (1,013 hPa/760 mmHg)

Is the voltage within 2.1 – 2.5 V?

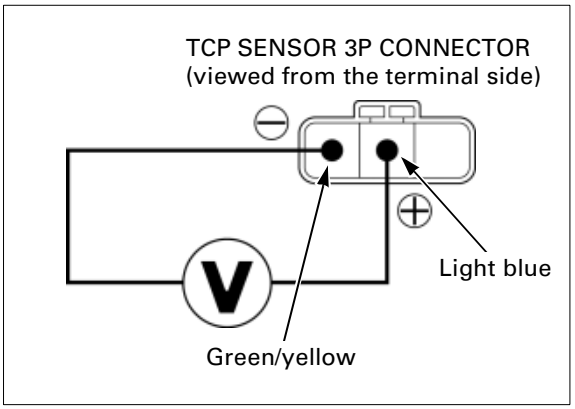
YES – • Intermittent failure.
• Loose or poorly connected ECM connectors.

NO – • About 5 V
GO TO STEP 2.
• About 0 V
GO TO STEP 3.

2. TCP Sensor Output Line Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the TCP sensor 3P gray connector.

Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the wire harness side connector terminals.



Connection: Light blue (+) – Green/yellow (–)

Is the voltage within 4.75 – 5.25V?

YES – Faulty TCP sensor.

NO – • Open circuit in the Light blue wire.
• Open circuit in the Green/yellow wire.

3. TCP Sensor Input Voltage Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the TCP sensor 3P gray connector.

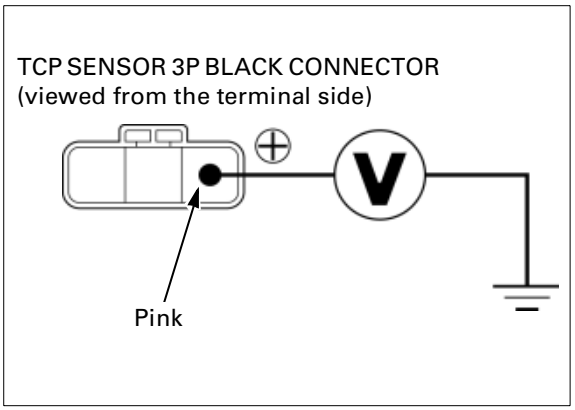
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the wire harness side connector terminals.

Connection: Pink (+) – Ground (–)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 4.

NO – GO TO STEP 5.



4. TCP Sensor Output Line Short Circuit Inspection

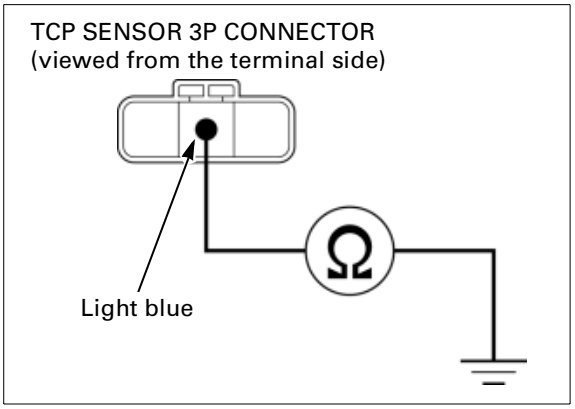
Pull the safety lanyard clip off of the engine stop switch.
Check for continuity between the wire harness side connector terminal and ground.

Connection: Light blue – Ground

Is there continuity?

YES – Short circuit in the Light blue wire.

NO – Faulty TCP sensor.



5. TCP Sensor Input Line Open Circuit Inspection

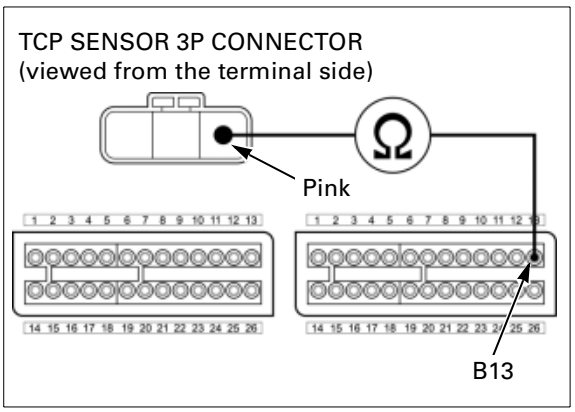
Pull the safety lanyard clip off of the engine stop switch.
Check for continuity between the MAP sensor 3P connector terminal and test harness connector terminal.

Connection: Pink – B13

Is there continuity?

YES – Replace the ECM with a known good one and recheck.

NO – Open circuit in the Pink wire.



MIL 43 BLINKS (TCP SENSOR) (ARX1200T3/T3D only)

- Before starting the troubleshooting, check the TCP sensor connector for loose contacts or corroded terminals, and recheck if the MIL is blinking.

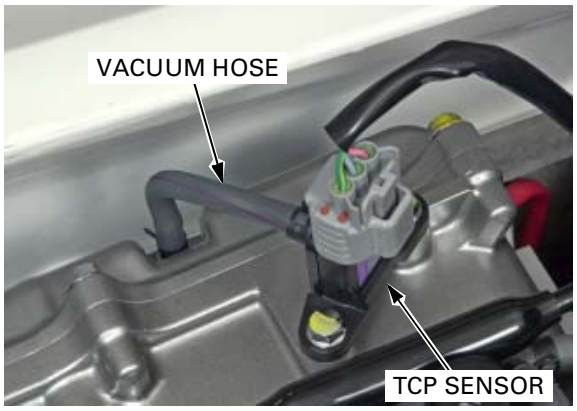
1. TCP Sensor Hose Inspection

Pull the safety lanyard clip off of the engine stop switch.
Check the TCP sensor vacuum hose.

Is the TCP sensor vacuum hose connected securely?

YES – GO TO STEP 2.

NO – Connect the TCP sensor vacuum hose securely.



2. TCP Sensor Output Voltage Inspection

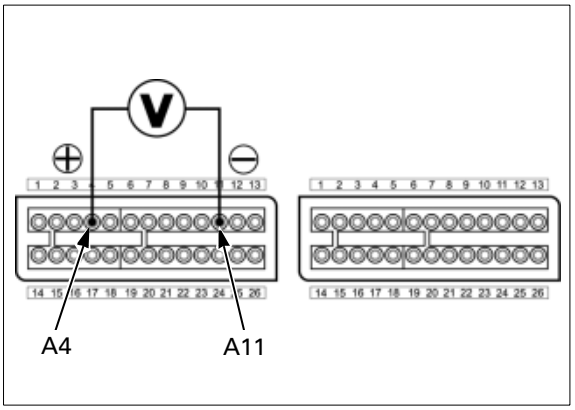
Connect the ECM test harness to the ECM connectors (page 8-12).
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the ECM test harness connector terminals.

Connection: A4 (+) – A11 (–)
Standard: 2.1 – 2.5 V (1,013 hPa/760 mmHg)

Is the voltage within 2.1 – 2.5 V?

YES – GO TO STEP 3.

NO – Faulty TCP sensor.



3. TCP Sensor Output Voltage Inspection At Idle

Start the engine.
Measure the voltage between the ECM test harness connector terminals.

Connection: A4 (+) – A11 (–)
Standard: 2.1 V maximum

Is the voltage less than 2.7 V?

YES – Replace the ECM with a known good one, and recheck.

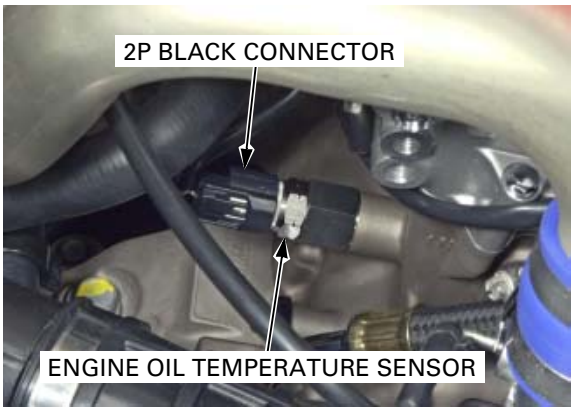
NO – Faulty TCP sensor.

MIL 44 BLINKS (ENGINE OIL TEMPERATURE SENSOR)

- Before starting the troubleshooting, check the engine oil temperature sensor connector for loose contacts or corroded terminals, and recheck if the MIL is blinking.

1. Engine Oil Temperature Sensor Resistance Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the engine oil temperature sensor 2P black connector.

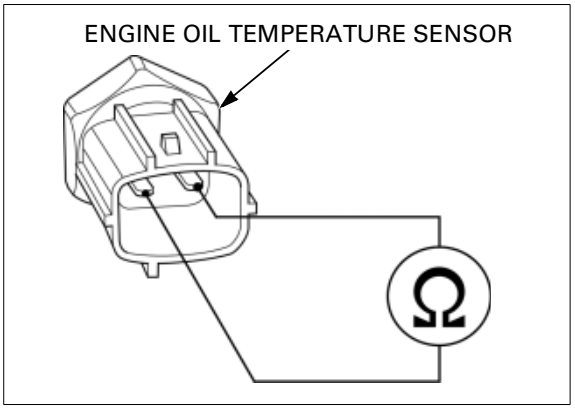


Measure the engine oil temperature sensor resistance between the sensor connector terminals.

Is the resistance within 2.3 – 2.6 kΩ (20°C/68°F)?

YES – GO TO STEP 2.

NO – Faulty engine oil temperature sensor.



2. Engine Oil Temperature Sensor Signal Line Inspection

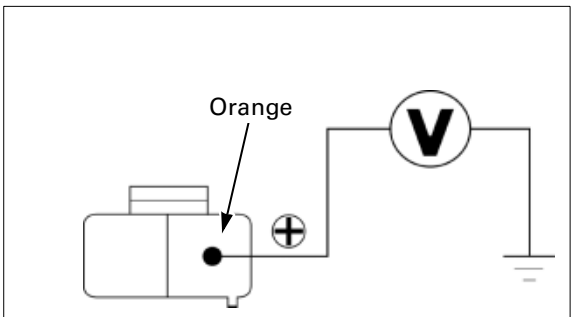
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the wire harness side connector terminal and ground.

Connection: Orange (+) – Ground (–)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 3.

NO – • Open or short circuit in the Orange wire.
• Loose or poorly connected ECM black connector.



ENGINE OIL TEMPERATURE SENSOR 2P BLACK CONNECTOR (viewed from the terminal side)

3. **Engine Oil Temperature Sensor Ground Line Inspection**

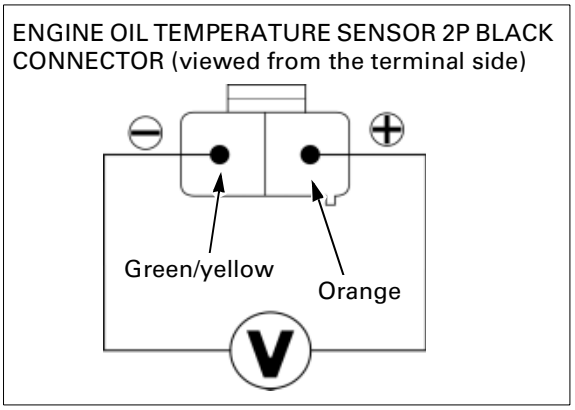
Measure the voltage between the wire harness side connector terminals.

Connection: Orange (+) – Green/yellow (–)

Is the voltage within 4.75 – 5.25 V?

YES – Replace the ECM with a new one, and inspect again.

NO – • Open circuit in the Green/yellow wire.
• Loose or poorly connected ECM gray connector.



MIL 45 BLINKS (TCP SENSOR) (ARX1200T3/T3D only)

- Before starting the troubleshooting, check the TCP sensor connector for loose contacts or corroded terminals, and recheck if the MIL is blinking.

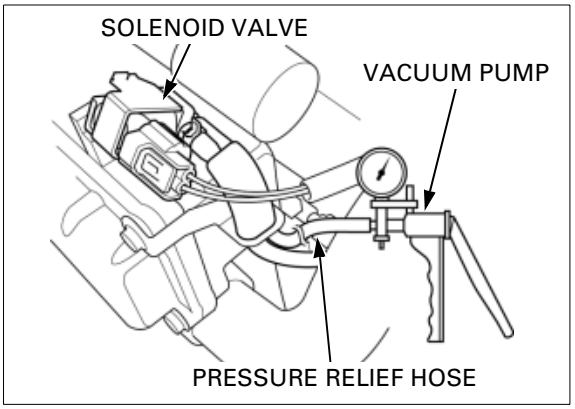
1. **Wastegate Control Solenoid Valve Inspection**

Connect the vacuum pump to the pressure relief hose of the wastegate control solenoid valve.
Apply vacuum to the solenoid valve.

Is the vacuum maintained?

YES – GO TO STEP 2.

NO – Faulty wastegate control solenoid valve.



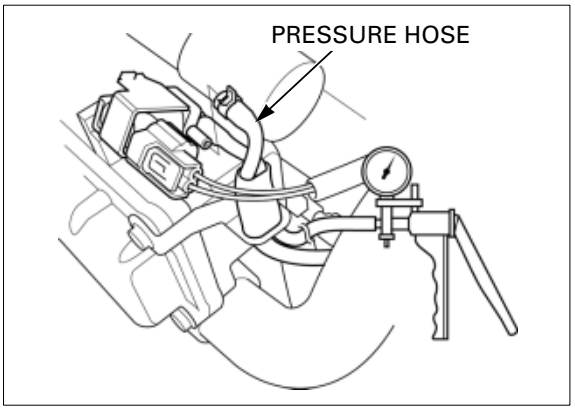
2. **Wastegate Control Solenoid Valve Signal Line Inspection**

Disconnect the pressure hose from the wastegate control solenoid valve.
Fit the safety lanyard clip to the base of the engine stop switch and check the vacuum pump.

Is the vacuum maintained?

YES – GO TO STEP 4.

NO – GO TO STEP 3.



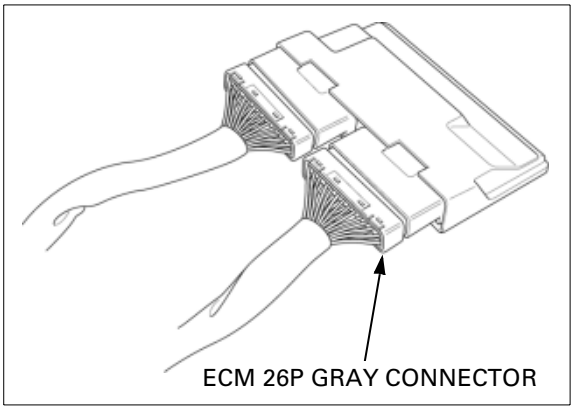
3. Wastegate Control Solenoid Valve Signal Line Inspection

Pull the safety lanyard clip off the engine stop switch.
Disconnect the ECM 26P gray connector.
Apply vacuum to the wastegate control solenoid valve.
Fit the safety lanyard clip to the base of the engine stop switch and check the vacuum pump.

Is the vacuum maintained?

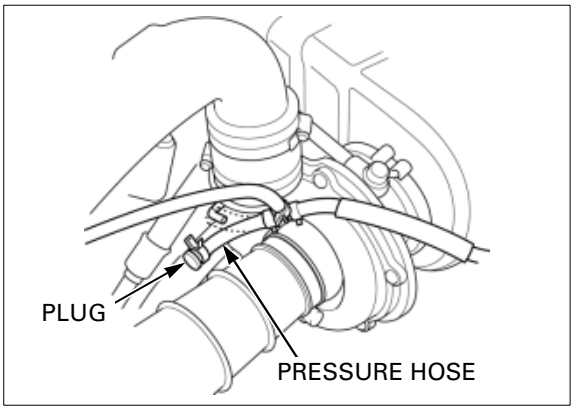
YES – GO TO STEP 5.

NO – Short circuit in the Blue/Green wire.



4. Wastegate Actuator Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the pressure hose from the turbocharger and plug it.



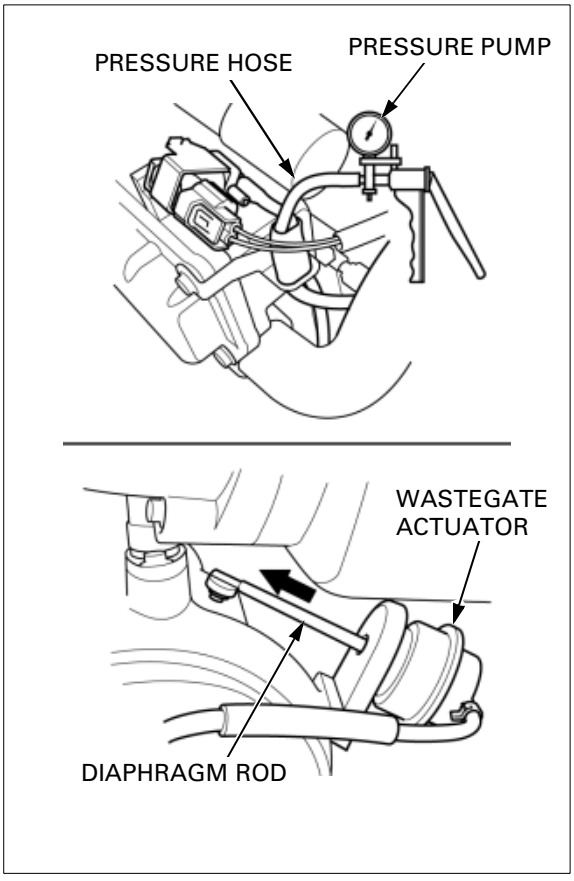
Do not apply 100 kPa (1.02 kg/cm², 14.5 psi) of air pressure to the actuator.

Connect the pressure gauge to the pressure hose of the wastegate control solenoid valve.
Apply 60 kPa (0.61 kg/cm², 8.7 psi) of air pressure to the wastegate actuator.

Does the actuator rod move and hold its position?

YES – GO TO STEP 5.

NO – • Faulty wastegate actuator.
• Pinched or damaged pressure hose.



5. TCP Sensor Inspection

Connect the pressure hose to the wastegate control solenoid valve.
Remove the plug from the pressure hose.
Connect the ECM 26P gray connector.
Replace the TCP sensor with a known-good one.
Start the engine according to the flushing procedure (page 5-3) and increase the engine speed above 3,000 rpm.
Check the MIL and PGM-FI indicator.

Are the MIL and PGM-FI indicator blinking?

YES – Replace the ECM with a known good one, and recheck.

NO – Replace the original TCP sensor with a new one.

MIL 46 BLINKS (MST SWITCH)

- Before starting the troubleshooting, check the MST switch connector for loose contacts or corroded terminals, and recheck if the MIL is blinking.

1. MST Switch Signal Line Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the MST switch 2P connector.

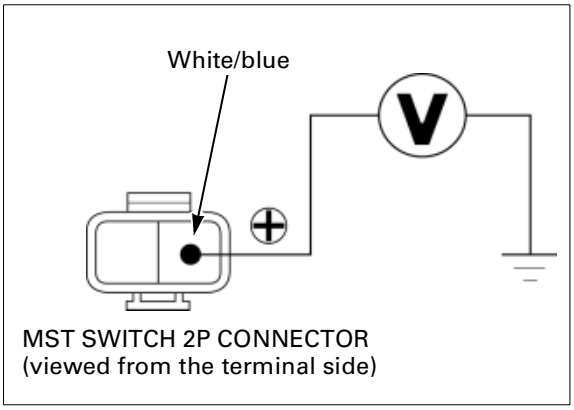
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the wire harness side connector terminal and ground.

Connection: White/blue (+) – Ground (–)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 2.

NO – • Open or short circuit in the White/blue wire.
• Loose or poorly connected ECM 26P black connector.



MST SWITCH 2P CONNECTOR
(viewed from the terminal side)

2. **MST Switch Ground Line Inspection**

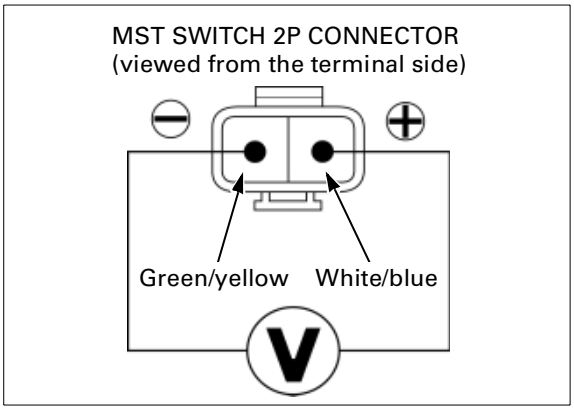
   Measure the voltage between the wire harness side connector terminals.

   Connection: White/Blue (+) – Green/yellow (–)

   Is the voltage within 4.75 – 5.25 V?

   YES – GO TO STEP 3.

   NO – Open circuit in the Green/yellow wire.



3. **MST Switch Inspection**

   Check the MST switch (page 8-114).

   Is it normal?

   YES – GO TO STEP 4.

   NO – Faulty MST switch.

4. **Cooling System Inspection**

   Check the cooling system (page 7-5).

   Is the system in good condition?

   YES – Replace the ECM with a known good one, and recheck.

   NO – Faulty cooling system.

MIL 47 BLINKS (ECT SENSOR)

- Before starting the troubleshooting, check the ECT sensor connector for loose contacts or corroded terminals, and recheck if the MIL is blinking.

1. **Cooling System Inspection**

   Check the cooling system (page 7-5).

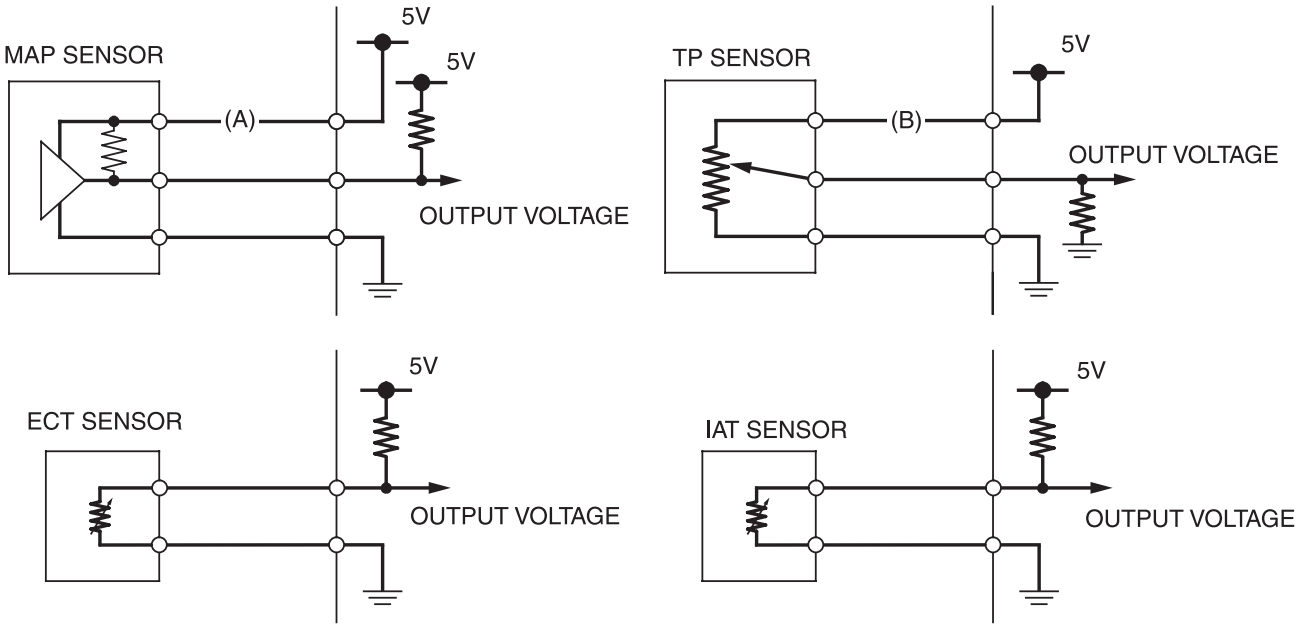
   Is the system in good condition?

   YES – Replace the ECM with a known good one, and recheck.

   NO – Faulty cooling system.

DTC INDEX

- The Diagnostic Trouble Codes (DTC) are based upon Malfunction Indicator Lamp (MIL) codes and are displayed as hyphenated numbers. The digits in front of the hyphen are equal to an MIL code and indicate the Function Failure. The digit behind the hyphen details the symptom. For example, in the case of the TP sensor, the ECM stores two levels of information, a function failure and a detail of the symptom:
  (08 – 1) = TP sensor voltage – *lower* than the specified value
  or
  (08 – 2) = TP sensor voltage – *higher* than the specified value.
- The MAP, ECT, TP and IAT sensor diagnosis will be made according to the voltage output of the affected sensor.
  If the failure occurs, the ECM determines the Function Failure, compares the sensor voltage output to the standard value, and then outputs the corresponding DTC to the HDS Pocket Tester.
  For example:
  – If the input voltage line (A) on the MAP sensor is opened, the ECM detects the output voltage is about 5 V, then the DTC 1-2 (MAP sensor circuit high voltage) will be displayed.
  – If the input voltage line (B) on the TP sensor is opened, the ECM detects the output voltage is 0 V, then the DTC 8-1 (TP sensor circuit low voltage) will be displayed.



DTC	Function Failure	Causes	Symptoms	Refer to
–	ECM malfunction	• Faulty ECM	• Engine does not start	8-114
–	ECM power/ ground circuits malfunction	• Open circuit in the power input wire of the ECM • Faulty main relay • Open circuit in the main relay related wires • Faulty engine stop switch • Open circuit in the engine stop switch related wires • Blown sub-fuse D (7.5 A) • Blown main fuse (30 A)	• Engine does not start	8-115
–	MIL circuit malfunction	• Open circuit in MIL wire	• Engine operates normally	–
–	Data link circuit malfunction	• Short circuit in the data link connector brown and green/black wire terminals • Faulty ECM • Short circuit in the data link connector brown wire	• Engine operates normally	–
–	MIL circuit malfunction	• Short circuit in the MIL wire	• Engine operates normally	–
1-1	MAP sensor circuit low voltage	• Short circuit in the MAP sensor wire • Faulty MAP sensor	• Engine operates normally	8-48
1-2	MAP sensor circuit high voltage	• Loose or poorly connected MAP sensor connector • Open circuit in the MAP sensor wire • Faulty MAP sensor	• Engine operates normally	8-51
2-1	MAP sensor performance problem	• Loose or poorly connected MAP sensor vacuum hose • Faulty MAP sensor	• Engine operates normally	8-54
7-1	ECT sensor circuit low voltage	• Short circuit in the ECT sensor wire • Faulty ECT sensor	• Hard start at a low temperature (ECM controls using preset value; coolant temperature: 90°C/ 194°F) • Engine operates below 3,000 rpm	8-55
7-2	ECT sensor circuit high voltage	• Loose or poorly connected ECT sensor connector • Open circuit in the ECT sensor wire • Faulty ECT sensor	• Hard start at a low temperature (ECM controls using preset value; coolant temperature: 90°C/ 194°F) • Engine operates below 3,000 rpm	8-55
8-1	TP sensor circuit low voltage	• Short circuit in the TP sensor wire • Faulty TP sensor	• Poor engine response when operating the throttle quickly (ECM controls using preset value; throttle opening: 0°)	8-56
8-2	TP sensor circuit high voltage	• Loose or poorly connected TP sensor connector • Open circuit in the TP sensor wire • Faulty TP sensor	• Poor engine response when operating the throttle quickly (ECM controls using preset value; throttle opening: 0°)	8-59
9-1	IAT sensor circuit low voltage	• Short circuit in the IAT sensor wire • Faulty IAT sensor	• Engine operates below 3,000 rpm (ECM controls using preset value; intake air temperature: 25°C/ 77°F)	8-60

DTC	Function Failure	Causes	Symptoms	Refer to
9-2	IAT sensor circuit high voltage	• Loose or poorly connected IAT sensor connector • Open circuit in the IAT sensor wire • Faulty IAT sensor	• Engine operates below 3,000 rpm (ECM controls using preset value; intake air temperature: 25°C/ 77°F)	8-61
12-1	No. 1 injector circuit malfunction	• Loose or poorly connected No. 1 injector connector • Open or short circuit in the No. 1 injector wire • Faulty No. 1 injector	• Engine operates below 3,000 rpm	8-63
13-1	No. 2 injector circuit malfunction	• Loose or poorly connected No. 2 injector connector • Open or short circuit in the No. 2 injector wire • Faulty No. 2 injector	• Engine operates below 3,000 rpm	8-64
14-1	No. 3 injector circuit malfunction	• Loose or poorly connected No. 3 injector connector • Open or short circuit in the No. 3 injector wire • Faulty No. 3 injector	• Engine operates below 3,000 rpm	8-64
15-1	No. 4 injector circuit malfunction	• Loose or poorly connected No. 4 injector connector • Open or short circuit in the No. 4 injector wire • Faulty No. 4 injector	• Engine operates below 3,000 rpm	8-64
18-1	Camshaft position sensor no signal	• Loose or poorly connected camshaft position sensor connector • Open or short circuit in the camshaft position sensor wire • Faulty camshaft position sensor	• Engine does not start	8-65
19-1	Ignition pulse generator no signal	• Loose or poorly connected ignition pulse generator connector • Open or short circuit in the ignition pulse generator wire • Faulty ignition pulse generator	• Engine does not start	8-66
25-1	Knock sensor circuit malfunction	• Loose or poorly connected knock sensor connector • Open or short circuit in the knock sensor wire • Faulty knock sensor	• Engine operates below 3,000 rpm	8-67
29-1	IAC valve circuit malfunction	• Loose or poorly connected IAC valve connector • Open or short circuit in the IAC valve wire • Faulty IAC valve	• Engine stalls, hard to start, rough idling	8-68
33-2	ECM E^2-PROM malfunction	• Faulty ECM	• Engine operates normally • ECM does not hold the self-diagnosis data	8-68
42-1	TCP sensor circuit low voltage	• Short circuit in the TCP sensor wire • Faulty TCP sensor	• Engine operates below 3,000 rpm	8-69
42-2	TCP sensor circuit high voltage	• Loose or poorly connected TCP sensor connector • Open circuit in the TCP sensor wire • Faulty TCP sensor	• Engine operates below 3,000 rpm	8-70
43-1	TCP sensor performance problem	• Loose or poorly connected TCP sensor vacuum hose • Faulty TCP sensor	• Engine operates below 3,000 rpm	8-72
44-1	Engine oil temperature sensor circuit low voltage	• Short circuit in the engine oil temperature sensor wire • Faulty engine oil temperature sensor	• Hard start at a low temperature (ECM controls using preset value; engine oil temperature: 90°C/194°F) • Engine operates below 3,000 rpm	8-73

DTC	Function Failure	Causes	Symptoms	Refer to
44-2	Engine oil temperature sensor circuit high voltage	• Loose or poorly connected engine oil temperature sensor connector • Open circuit in the engine oil temperature sensor wire • Faulty engine oil temperature sensor	• Hard start at a low temperature (ECM controls using preset value; engine oil temperature: 90°C/194°F) • Engine operates below 3,000 rpm	8-74
45-1	TCP sensor system malfunction	• Loose or poorly connected wastegate solenoid control valve connector • Open or short circuit in the wastegate solenoid control valve wire • Faulty wastegate solenoid control valve • Loose or poorly connected wastegate solenoid control valve hose • Clogged wastegate actuator pressure hose • Faulty wastegate actuator • Faulty TCP sensor	• Engine operates below 3,000 rpm	8-75
46-1	MST switch circuit malfunction	• Faulty cooling system • Loose or poorly connected MST switch connector • Open or short circuit in the MST switch wire • Faulty MST switch	• Engine does not start	8-77
47-1	High engine coolant temperature	• Faulty cooling system • Loose or poorly connected ECT sensor connector • Open or short circuit in the ECT sensor wire • Faulty ECT sensor	• Engine operates below 3,000 rpm when the coolant temperature is 85 – 95°C (185 – 203°F) • Engine does not start when the coolant temperature is above 95°C (203°F)	8-78

DTC TROUBLESHOOTING

DTC 1-1 (MAP SENSOR LOW VOLTAGE)

1. **MAP Sensor System Inspection**

   Fit the safety lanyard clip to the base of the engine stop switch.
   Check the MAP sensor with the HDS.

   Is about 0 V indicated?

   YES – GO TO STEP 2.

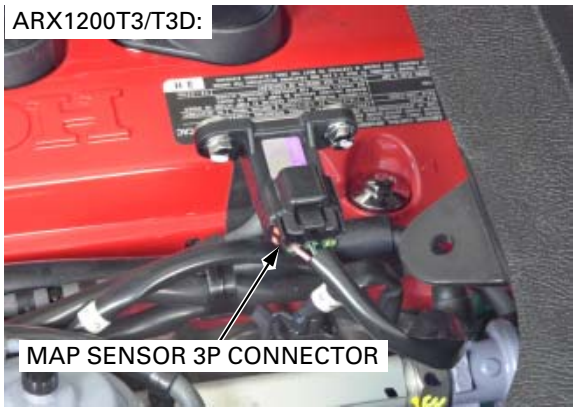
   NO – Intermittent failure.

2. **MAP Sensor Input Voltage Inspection**

   Pull the safety lanyard clip off of the engine stop switch.

   Disconnect the MAP sensor 3P connector.

ARX1200T3/T3D:



ARX1200N3:

Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the wire harness side connector terminals.

Connection: Pink (+) – Ground (–)

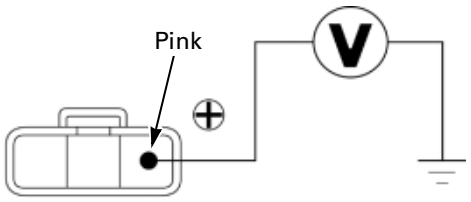
Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 4.

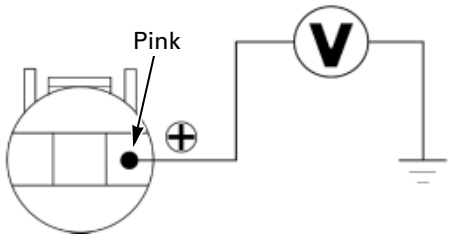
NO – GO TO STEP 3.

ARX1200T3/T3D:

MAP SENSOR 3P BLACK CONNECTOR
(viewed from the terminal side)



ARX1200N3:



3. MAP Sensor Input Line Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the ECM 26P gray connector.
Check the pink wire for continuity between the MAP sensor 3P connector terminal and ECM connector terminal.

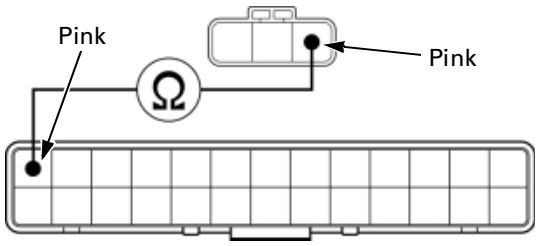
Is there continuity?

YES – Replace the ECM with a known good one, and recheck.

NO – Open circuit in the Pink wire.

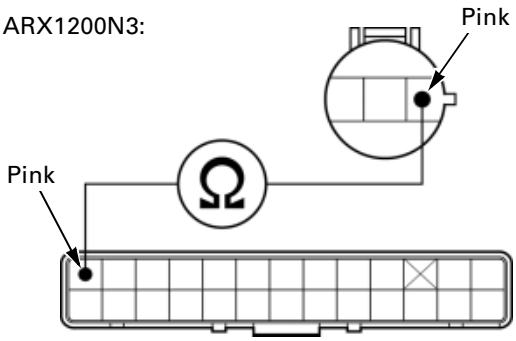
ARX1200T3/T3D:

MAP SENSOR 3P
BLACK CONNECTOR



ECM 26P GRAY CONNECTOR
(viewed from the terminal side)

ARX1200N3:



4. **MAP Sensor Output Line Short Circuit Inspection**

Pull the safety lanyard clip off of the engine stop switch.
Check for continuity between the wire harness side connector terminal and ground.

Connection: Light green/black – Ground

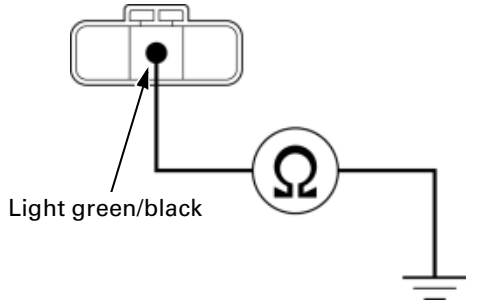
Is there continuity?

YES – Short circuit in the Light green/black wire.

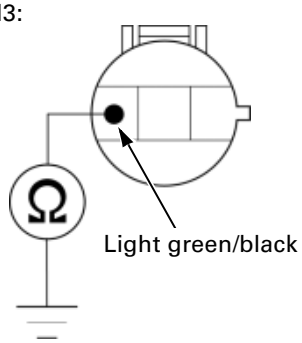
NO – GO TO STEP 5.

ARX1200T3/T3D:

MAP SENSOR 3P BLACK CONNECTOR
(viewed from the terminal side)



ARX1200N3:



5. **MAP Sensor Inspection**

Replace the MAP sensor with a new one (page 8-108).
Reset the diagnostic memory in the ECM (page 8-11).
Fit the safety lanyard clip to the base of the engine stop switch.
Check the MAP sensor with the HDS.

Is DTC 1-1 indicated?

YES – Replace the ECM with a known good one, and recheck.

NO – Faulty original MAP sensor.

DTC 1-2 (MAP SENSOR HIGH VOLTAGE)

- Before starting the troubleshooting, check the MAP sensor connector for loose contacts or corroded terminals, and recheck the DTC.

1. MAP Sensor System Inspection 1

Fit the safety lanyard clip to the base of the engine stop switch.
Check the MAP sensor with the HDS.

Is about 5 V indicated?

YES – GO TO STEP 2.

NO – • Intermittent failure.
• Loose or poorly connected ECM connector.

2. MAP Sensor System Inspection 2

Pull the safety lanyard clip off of the engine stop switch.

Disconnect the MAP sensor 3P connector.

ARX1200T3/T3D:

ARX1200N3:

Connect the wire harness side connector terminals with a jumper wire.

Connection: Light green/black – Green/yellow

Fit the safety lanyard clip to the base of the engine stop switch.
Check the MAP sensor with the HDS.

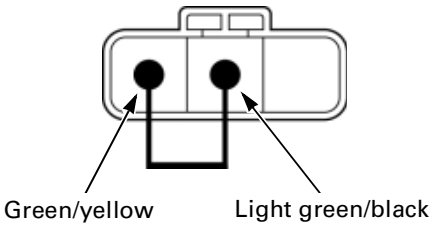
Is about 0 V indicated?

YES – Faulty MAP sensor.

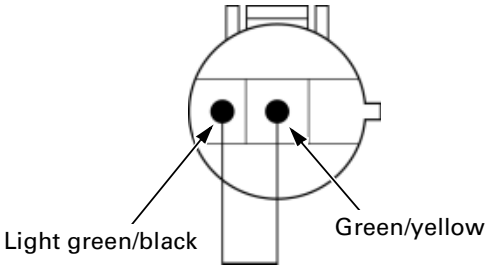
NO – GO TO STEP 3.

ARX1200T3/T3D:

MAP SENSOR 3P BLACK CONNECTOR
(viewed from the terminal side)



ARX1200N3:



3. MAP Sensor Input Voltage Inspection

Pull the safety lanyard clip off of the engine stop switch.
Remove the jumper wire.
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the wire harness side connector terminals.

Connection: Pink (+) – Green/yellow (–)

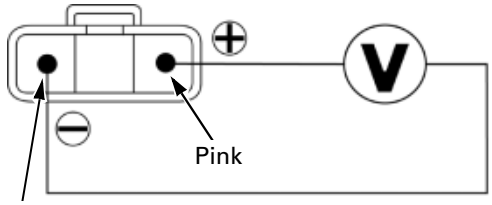
Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 4.

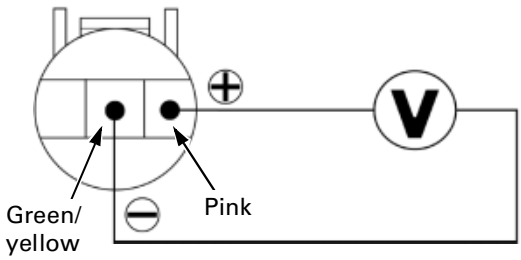
NO – Open circuit in the Green/yellow wire.

ARX1200T3/T3D:

MAP SENSOR 3P BLACK CONNECTOR
(viewed from the terminal side)



ARX1200N3:



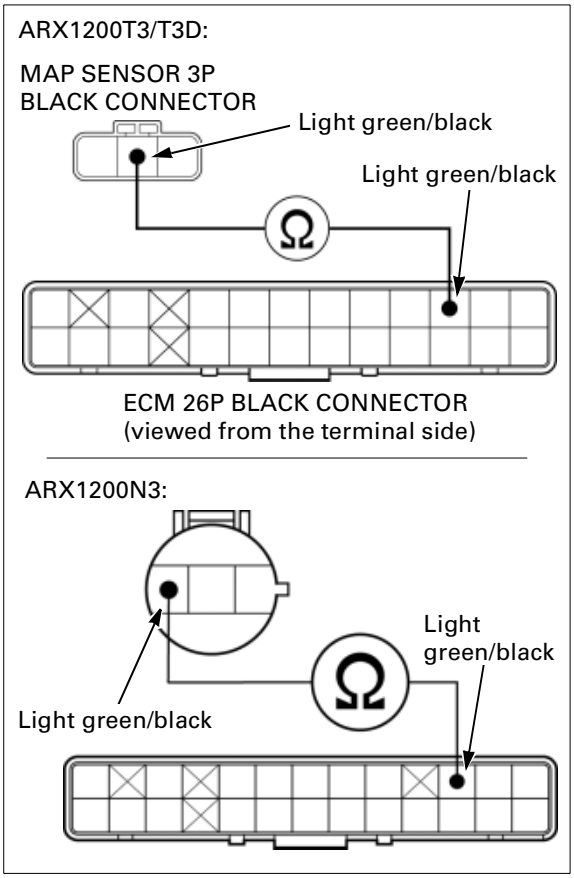
4. MAP Sensor Output Line Open Circuit Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the ECM 26P black connector.
Check the Light green/black for continuity between the MAP sensor 3P connector terminal and ECM connector terminal.

Is there continuity?

YES – Replace the ECM with a known good one, and recheck.

NO – Open circuit in the Light green/black wire.



DTC 2-1 (MAP SENSOR)

- Before starting the troubleshooting, check the MAP sensor connector for loose contacts or corroded terminals, and recheck the DTC.

1. **MAP Sensor System Inspection**

   Fit the safety lanyard clip to the base of the engine stop switch.
   Start the engine and check the MAP sensor with the HDS at idle speed.

   Is 1.6 V indicated?

   YES – Intermittent failure.

   NO – GO TO STEP 2.

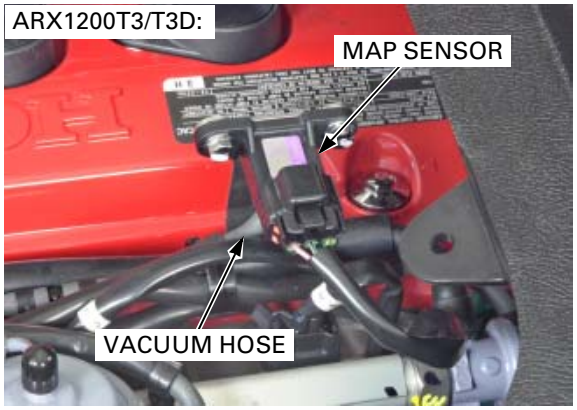
2. **Manifold Absolute Pressure Test**

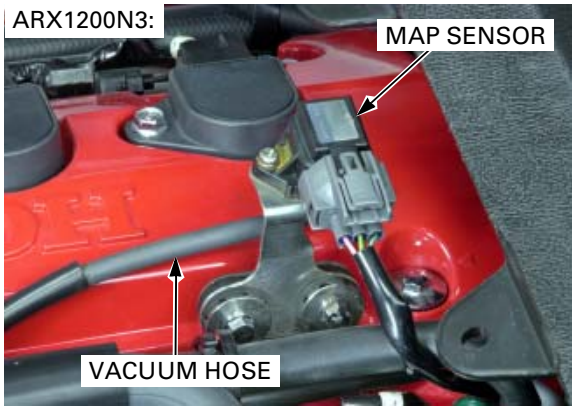
   Pull the safety lanyard clip off of the engine stop switch.
   Check the MAP sensor vacuum hose.

   Is the MAP sensor vacuum hose connected securely?

   YES – GO TO STEP 3.

   NO – Connect the MAP sensor vacuum hose securely.





3. **MAP Sensor System Inspection**

   Replace the MAP sensor with a new one (page 8-108).
   Fit the safety lanyard clip to the base of the engine stop switch.
   Start the engine and check the MAP sensor with the HDS at idle speed.

   Is 1.6 V indicated?

   YES – Faulty original MAP sensor.

   NO – Replace the ECM with a known good one, and recheck.

DTC 7-1 (ECT SENSOR LOW VOLTAGE)

1. **ECT Sensor System Inspection**

   Fit the safety lanyard clip to the base of the engine stop switch.
   Check the ECT sensor with the HDS.

   Is about 0 V indicated?

   YES – GO TO STEP 2.

   NO – Intermittent failure.

2. **ECT Sensor Inspection**

   Pull the safety lanyard clip off of the engine stop switch.
   Disconnect the ECT sensor 2P blue connector.
   Fit the safety lanyard clip to the base of the engine stop switch.
   Check the ECT sensor with the HDS.

   Is about 0 V indicated?

   YES – GO TO STEP 3.

   NO – Faulty ECT sensor.

3. **ECT Sensor Output Line Short Circuit Inspection**

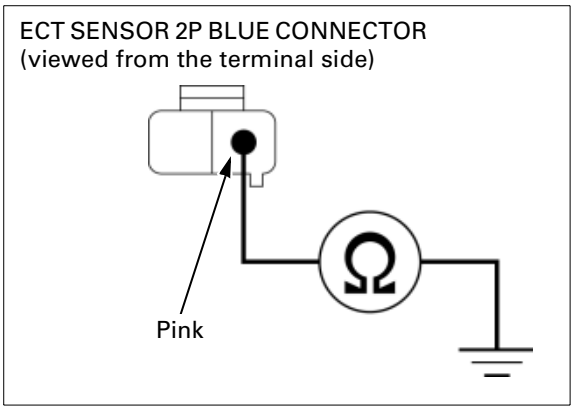
   Pull the safety lanyard clip off of the engine stop switch.
   Disconnect the ECM 26P black connector.
   Check for continuity between the wire harness side ECT sensor connector terminal and ground.

   Connection: Pink – Ground

   Is there continuity?

   YES – Short circuit in the Pink wire.

   NO – Replace the ECM with a new one, and recheck.



DTC 7-2 (ECT SENSOR HIGH VOLTAGE)

- Before starting the troubleshooting, check the ECT sensor connector for loose contacts or corroded terminals, and recheck the DTC.

1. **ECT Sensor System Inspection**

   Pull the safety lanyard clip off of the engine stop switch.
   Check the ECT sensor with the HDS.

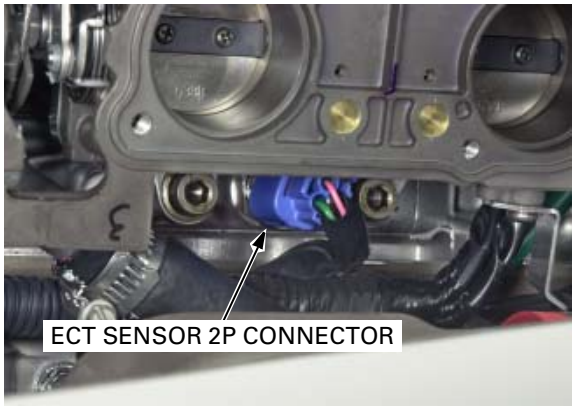
   Is about 5 V indicated?

   YES – GO TO STEP 2.

   NO – • Intermittent failure.
   • Loose or poorly connected ECT sensor 2P blue connector.

2. ECT Sensor Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the ECT sensor 2P blue connector.

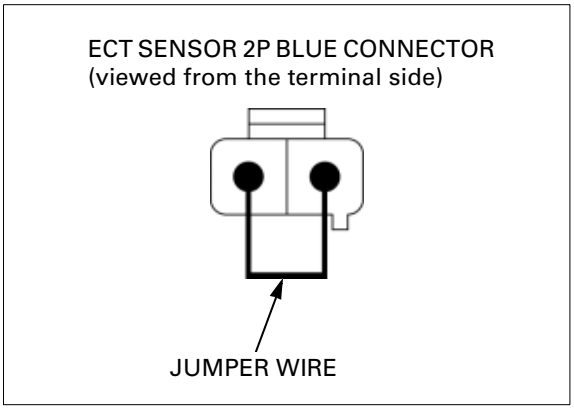


Connect the wire harness side connector terminals with a jumper wire.
Fit the safety lanyard clip to the base of the engine stop switch.
Check the ECT sensor with the HDS.

Is about 0 V indicated?

YES – Faulty ECT sensor.

NO – GO TO STEP 3.



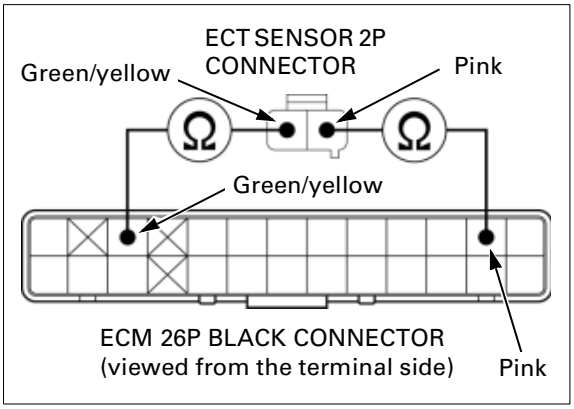
3. ECT Sensor Line Open Circuit Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the ECM 26P black connector.
Check the Pink and Green/yellow wires for continuity between the ECT sensor 2P connector terminals and ECM 26P black connector terminals.

Is there continuity?

YES – Replace the ECM with a new one, and recheck.

NO – • Open circuit in the Pink wire.
• Open circuit in the Green/yellow wire.



DTC 8-1 (TP SENSOR LOW VOLTAGE)

- Before starting the inspection, check the TP sensor connector for loose contacts or corroded terminals, and recheck the DTC.

1. TP Sensor System Inspection

Pull the safety lanyard clip off of the engine stop switch.
Check the TP sensor with the HDS with the throttle fully closed.

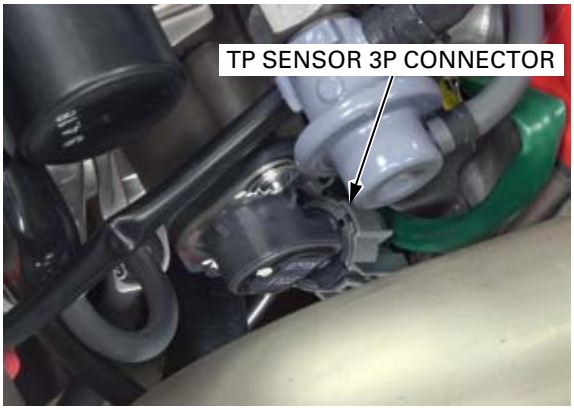
Is about 0.5 V indicated?

YES – • Intermittent failure.
• Loose or poorly connected TP sensor connector.

NO – GO TO STEP 2.

2. TP Sensor Input Voltage Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the TP sensor 3P connector.



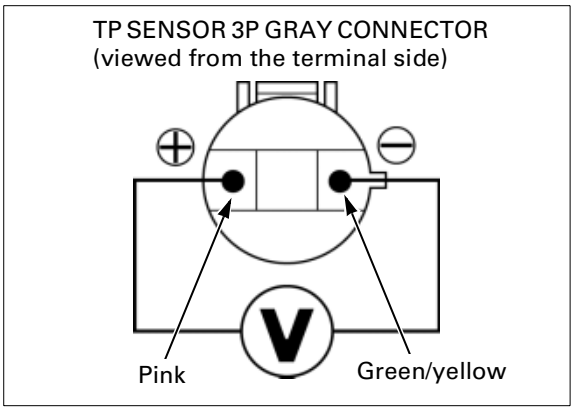
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the wire harness side connector terminals.

Connection: Pink (+) – Green/yellow (–)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 4.

NO – GO TO STEP 3.



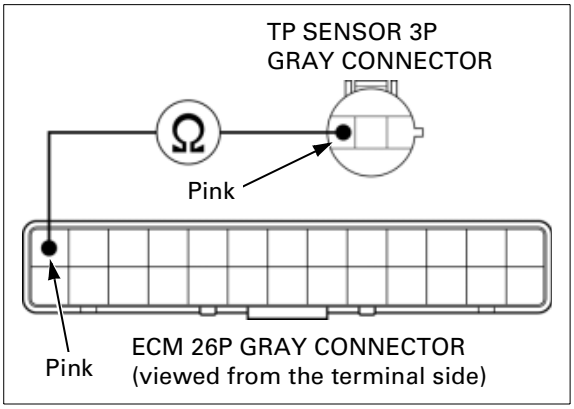
3. TP Sensor Input Line Open Circuit Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the ECM 26P gray connector.
Check Pink wire for continuity between the TP sensor 3P connector terminal and the ECM connector terminal.

Is there continuity?

YES – Replace the ECM with a new one, and recheck.

NO – Open circuit in the Pink wire.



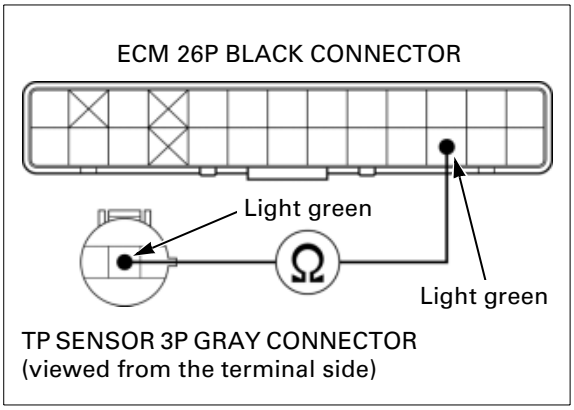
4. TP Sensor Output Line Open Circuit Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the ECM 26P black connector.
Check Light green wire for continuity between the TP sensor 3P connector terminal and the ECM connector terminal.

Is there continuity?

YES – GO TO STEP 5.

NO – Open circuit in the Light green wire.



5. TP Sensor Output Line Short Circuit Inspection

Check for continuity between the TP sensor 3P connector terminal of the wire harness side and ground.

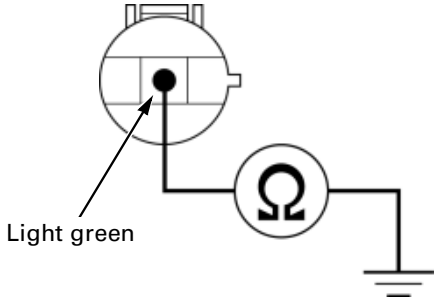
Connection: Light green – Ground

Is there continuity?

YES – Short circuit in the Light green wire.

NO – GO TO STEP 6.

TP SENSOR 3P GRAY CONNECTOR
(viewed from the terminal side)



6. TP Sensor Inspection

Replace the TP sensor with a new one.
Turn the ignition switch ON.

Reset the diagnostic memory in the ECM (page 8-11).
Check the TP sensor with the HDS.

Is DTC 8-1 indicated?

YES – Replace the ECM with a known good one, and recheck.

NO – Faulty original TP sensor.

DTC 8-2 (TP SENSOR HIGH VOLTAGE)

1. **TP Sensor System Inspection**

   Pull the safety lanyard clip off of the engine stop switch.
   Check the TP sensor with the HDS with the throttle fully closed.

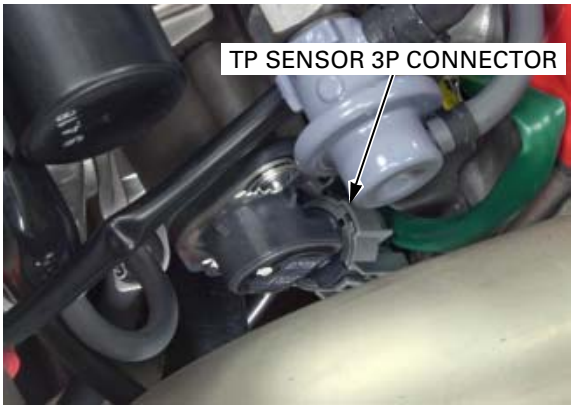
   Is about 5 V indicated?

   YES – GO TO STEP 2.

   NO – Intermittent failure.

2. **TP Sensor Resistance Inspection**

   Pull the safety lanyard clip off of the engine stop switch.
   Disconnect the TP sensor 3P connector.



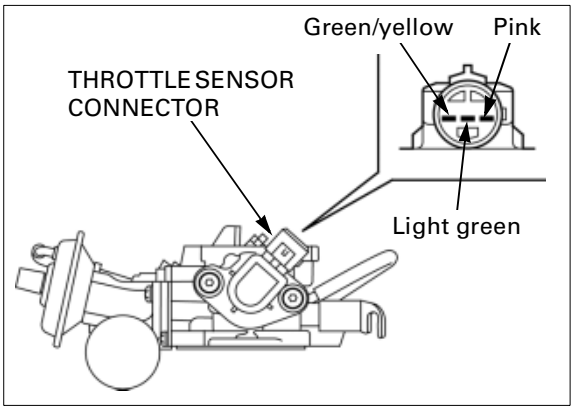
   Measure the TP sensor resistance between the sensor connector terminals.

   Connection: Pink – Green/yellow
   Standard: 4 – 6 kΩ (20°C/68°F)

   Is the resistance within 4 – 6 kΩ?

   YES – GO TO STEP 3.

   NO – Faulty TP sensor.



3. **TP Sensor Input Voltage Inspection**

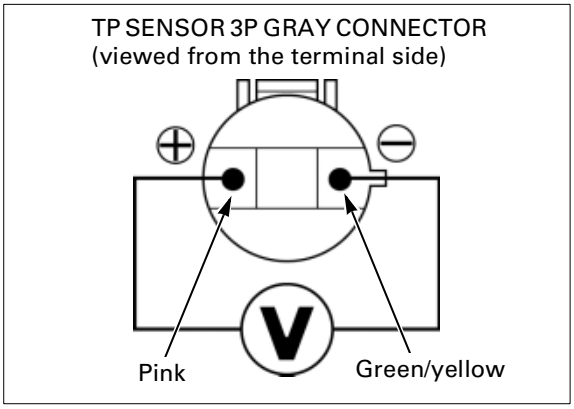
   Fit the safety lanyard clip to the base of the engine stop switch.
   Measure the voltage between the wire harness side connector terminals.

   Connection: Pink (+) – Green/yellow (–)

   Is the voltage within 4.75 – 5.25 V?

   YES – Replace the ECM with a known good one, and recheck.

   NO – Open circuit in Green/yellow wire.



DTC 9-1 (IAT SENSOR LOW VOLTAGE)

1. **IAT Sensor System Inspection**

   Pull the safety lanyard clip off of the engine stop switch.
   Check the IAT sensor with the HDS.

   Is about 0 V indicated?

   YES – GO TO STEP 2.

   NO – Intermittent failure.

2. **IAT Sensor Inspection**

   Pull the safety lanyard clip off of the engine stop switch.
   Disconnect the IAT sensor 2P connector.
   Fit the safety lanyard clip to the base of the engine stop switch.
   Check the IAT sensor with the HDS.

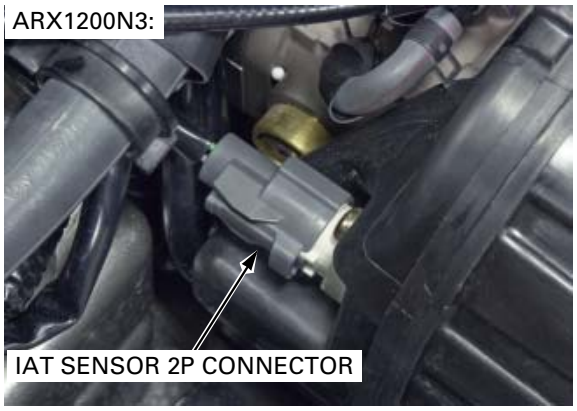
   Is about 0 V indicated?

   YES – GO TO STEP 3.

   NO – Faulty IAT sensor.

ARX1200T3/T3D:

ARX1200N3:



3. **IAT Sensor Output Line Short Circuit Inspection**

   Pull the safety lanyard clip off of the engine stop switch.
   Disconnect the ECM 26P black connector.
   Check for continuity between the IAT sensor connector terminal and ground.

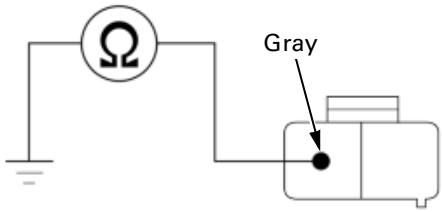
   Connection: Gray – Ground

   Is there continuity?

   YES – Short circuit in Gray wire.

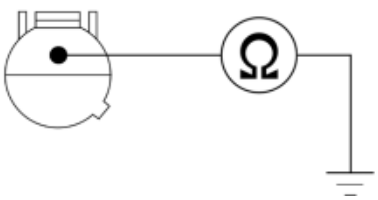
   NO – Replace the ECM with a known good one, and recheck.

ARX1200T3/T3D:



IAT SENSOR 2P CONNECTOR
(viewed from the terminal side)

ARX1200N3:



DTC 9-2 (IAT SENSOR HIGH VOLTAGE)

- Before starting the troubleshooting, check the IAT sensor connector for loose contacts or corroded terminals, and recheck the DTC.

1. IAT Sensor System Inspection

Fit the safety lanyard clip to the base of the engine stop switch.
Check the IAT sensor with the HDS.

Is about 5 V indicated?

YES – GO TO STEP 2.

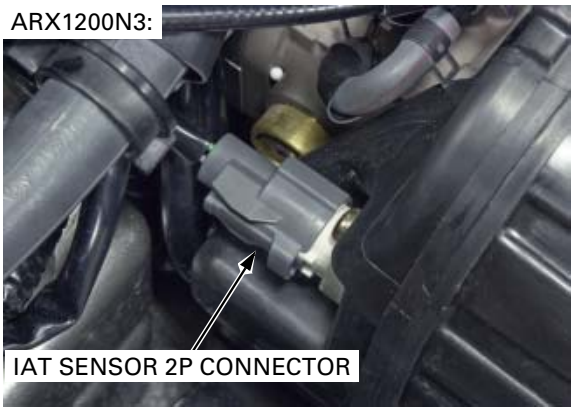
NO – • Intermittent failure.
• Loose or poorly connected IAT sensor connector.

2. IAT Sensor Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the IAT sensor 2P connector.

ARX1200T3/T3D:

ARX1200N3:

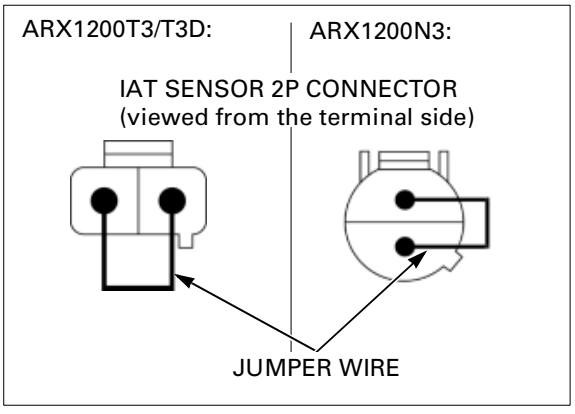


Connect the IAT sensor terminals with a jumper wire.
Fit the safety lanyard clip to the base of the engine stop switch.
Check the IAT sensor with the HDS.

Is about 5 V indicated?

YES – GO TO STEP 3.

NO – Faulty IAT sensor.



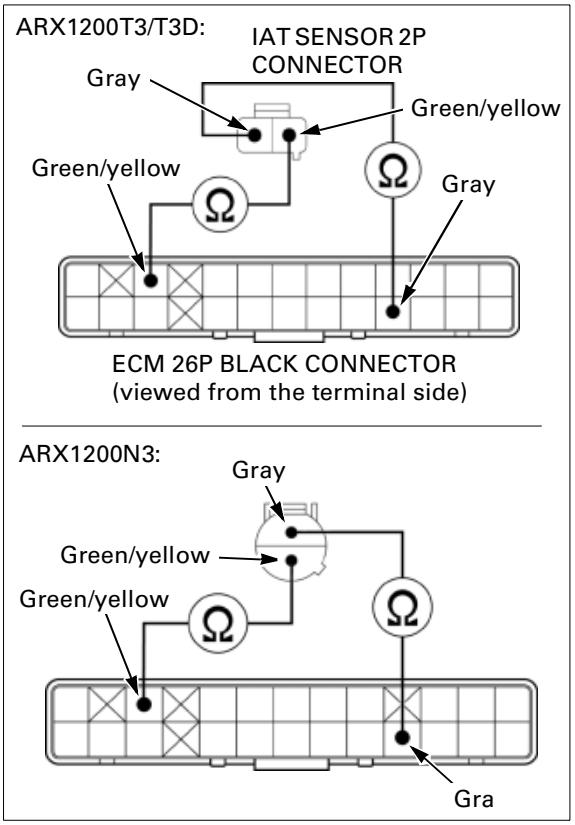
3. IAT Sensor Line Open Circuit Inspection

Disconnect the ECM 26P black connector.
Check the Gray and Green/yellow wires for continuity between the IAT sensor 2P connector terminals and ECM 26P black connector terminals.

Is there continuity?

YES – Replace the ECM with a known good one, and recheck.

NO – • Open circuit in Gray wire.
• Open circuit in Green/yellow wire.



DTC 12-1 (No. 1 INJECTOR)

- Before starting the troubleshooting, check the injector connector for loose contacts or corroded terminals, and recheck the DTC.

MIL	INJECTOR	POWER INPUT LINE	SIGNAL LINE
12	No. 1	Black/red	White/red
13	No. 2	Black/red	White/blue
14	No. 3	Black/red	White/green
15	No. 4	Black/red	White/black

1. Injector System Inspection

Reset the diagnostic memory in the ECM (page 8-11).
Start the engine and check the injector with the HDS.

Is the DTC 12-1 indicated?

YES – GO TO STEP 2.

NO – • Intermittent failure.
• Loose or poorly connected injector connector.

2. Injector Circuit Resistance Inspection

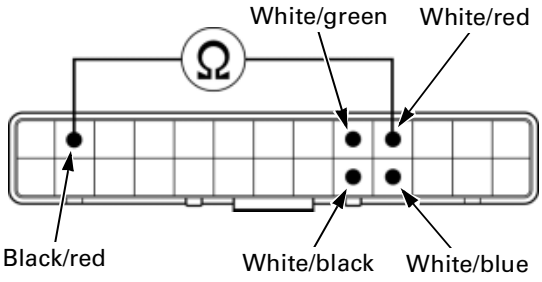
Pull the safety lanyard clip off of the engine stop switch.
Disconnect the ECM 26P gray connector.
Check for continuity between the wire harness side connector terminals.

Connection: Black/red – SIGNAL LINE

Is there continuity?

YES – GO TO STEP 5.

NO – GO TO STEP 3.



ECM 26P GRAY CONNECTOR
(viewed from the terminal side)

3. Injector Resistance Inspection

Disconnect the No. 1 injector 2P connector.

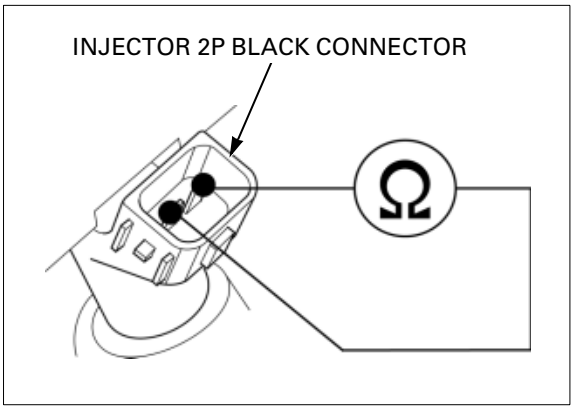
ARX1200T3/T3D shown:

Measure the resistance between the No. 1 injector 2P connector terminals.

Is the resistance within 11.1 – 12.3 Ω (20°C/68°F)?

YES – GO TO STEP 4.

NO – Faulty injector.



4. Injector Input Voltage Inspection

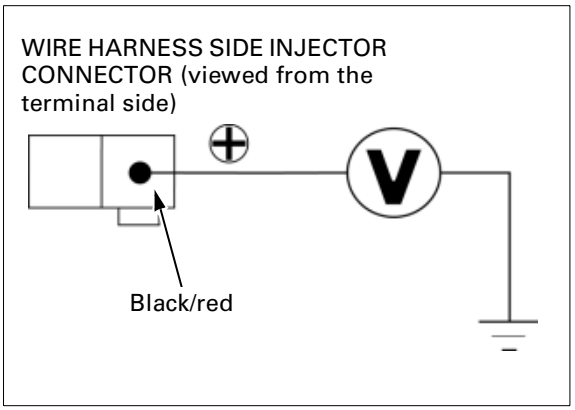
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the wire harness side connector terminal of the No. 1 injector and ground.

Connection: Black/red (+) – Ground (–)

Is there battery voltage?

YES – Open circuit in the SIGNAL LINE wire.

NO – Open circuit in the Black/red wire.



5. Injector Signal Line Short Circuit Inspection

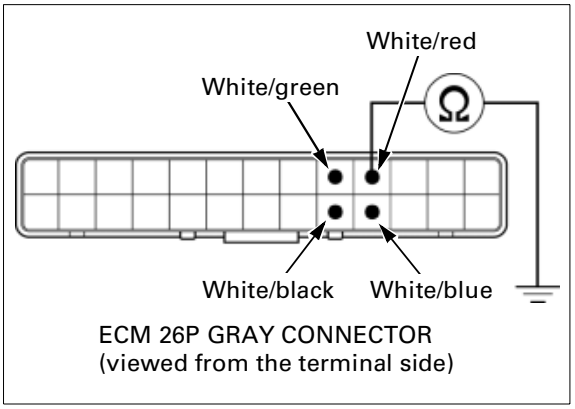
Check for continuity between the ECM 26P gray connector terminal and ground.

Connection: SIGNAL LINE – Ground

Is there continuity?

YES – • Short circuit in the SIGNAL LINE wire.
• Faulty injector.

NO – Replace the ECM with a known good one, and recheck.



DTC 13-1 (No. 2 INJECTOR)

(page 8-63)

DTC 14-1 (No. 3 INJECTOR)

(page 8-63)

DTC 15-1 (No. 4 INJECTOR)

(page 8-63)

DTC 18-1 (CAMSHAFT POSITION SENSOR)

- Before starting the troubleshooting, check the camshaft position sensor connector for loose contacts or corroded terminals, and recheck the DTC.

1. Camshaft Position Sensor Peak Voltage Inspection

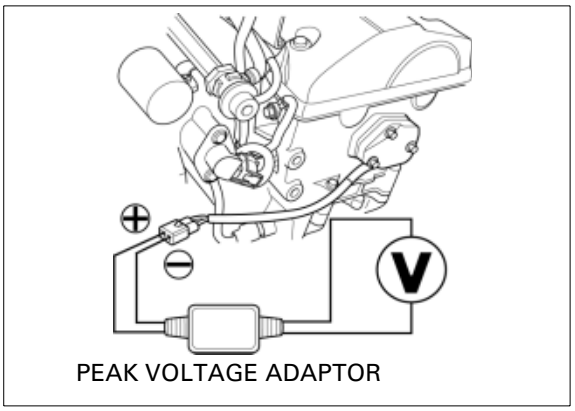
Pull the safety lanyard clip off of the engine stop switch.
Disconnect the camshaft position sensor 2P connector.
Fit the safety lanyard clip to the base of the engine stop switch.
Crank the engine with the starter motor, and measure the camshaft position sensor peak voltage between the camshaft position sensor connector terminals.

Connection: Gray (+) – White/yellow (–)

Is the voltage more than 0.7 V?

YES – GO TO STEP 2.

NO – Faulty camshaft position sensor.



PEAK VOLTAGE ADAPTOR

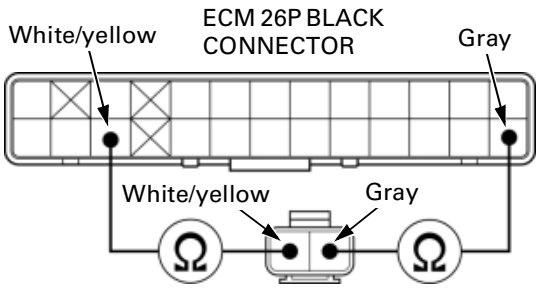
2. Camshaft Position Sensor Circuit Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the ECM 26P black connector.
Check the Gray and White/yellow wires for continuity between the camshaft position sensor connector terminals and ECM connector terminals.

Is there continuity?

YES – Replace the ECM with a known good one, and recheck.

NO – • Open circuit in the Gray wire.
• Open circuit in the White/yellow wire.



CAMSHAFT POSITION SENSOR CONNECTOR (viewed from the terminal side)

DTC 19-1 (IGNITION PULSE GENERATOR)

- Before starting the troubleshooting, check the ignition pulse generator connector for loose contacts or corroded terminals, and recheck the DTC.

1. Ignition Pulse Generator Peak Voltage Inspection

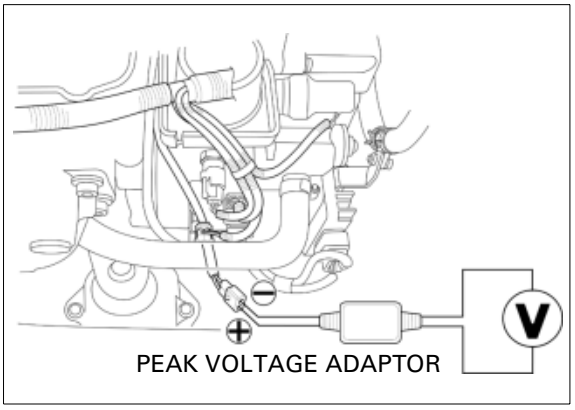
Pull the safety lanyard clip off of the engine stop switch.
Disconnect the ignition pulse generator 2P red connector.
Fit the safety lanyard clip to the base of the engine stop switch.
Crank the engine with the starter motor, and measure the ignition pulse generator peak voltage between the ignition pulse generator connector terminals

Connection: Yellow (+) – White/yellow (–)

Is the voltage more than 0.7 V?

YES – GO TO STEP 2.

NO – Faulty ignition pulse generator.



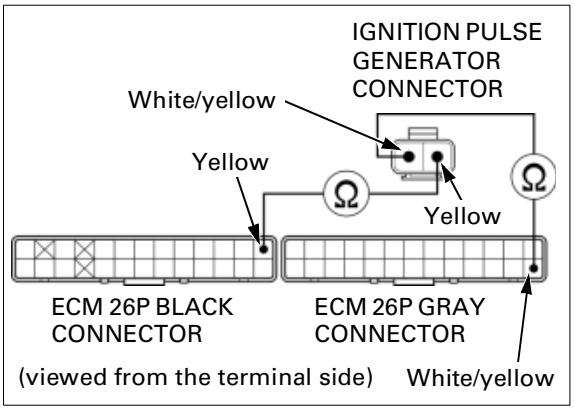
2. Ignition Pulse Generator Circuit Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the ECM 26P connectors.
Check the Yellow and White/yellow wires for continuity between the ignition pulse generator connector terminals and ECM connector terminals.

Is there continuity?

YES – Replace the ECM with a known good one, and recheck.

NO – • Open circuit in the Yellow wire.
• Open circuit in the White/yellow wire.



DTC 25-1 (KNOCK SENSOR)

- Before starting the troubleshooting, check the knock sensor connector for loose contacts or corroded terminals, and recheck the DTC.

1. Knock Sensor System Inspection

Reset the diagnostic memory in the ECM (page 8-11).
Start the engine and hold the engine speed above 2,500 rpm for 10 seconds or more.
Check the knock sensor with the HDS.

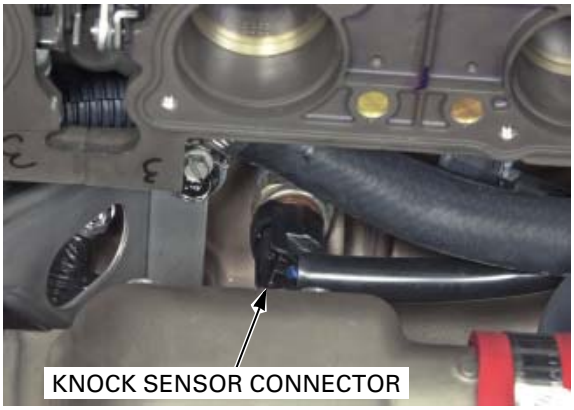
Is DTC 25-1 indicated?

YES – GO TO STEP 2.

NO – • Intermittent failure.
• Loose or poorly connected knock sensor connector.

2. Knock Sensor Short Circuit Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the ECM 26P black connector.
Disconnect the knock sensor 1P black connector.
Check for continuity between the knock sensor 1P connector terminal and ground.



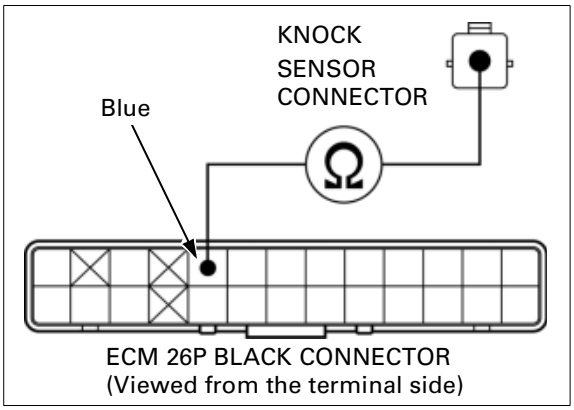
Is there continuity?

YES – Short circuit in the Blue wire.

NO – GO TO STEP 3.

3. Knock Sensor Open Circuit Inspection

Check the blue wire for continuity between the knock sensor 1P connector terminal and ECM 26P black connector terminal.



Is there continuity?

YES – Replace the knock sensor and recheck. If the MIL is still blinking, replace the ECM and recheck.

NO – Open circuit in the Blue wire.

DTC 29-1 (IAC VALVE)

- Before starting the troubleshooting, check the IAC valve connector for loose contacts or corroded terminals, and recheck the DTC.

1. IAC Valve Resistance Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the IAC valve 4P black connector.
Measure the resistance between the IAC valve side connector terminals.

Connection: Black/white – Black/yellow
Brown/white – Brown/yellow

Is the resistance 30 – 70 Ω?

YES – GO TO STEP 2.

NO – Faulty IAC valve.

2. IAC Valve Line Short Circuit Inspection

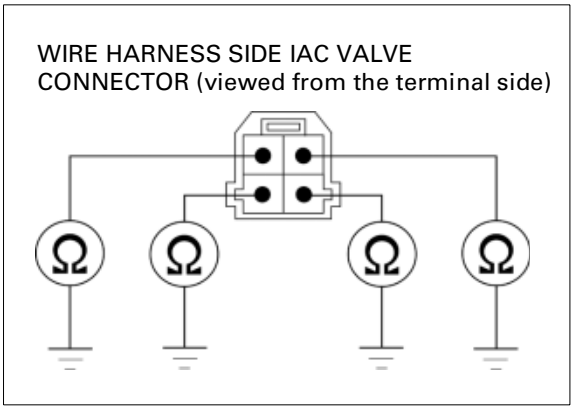
Disconnect the ECM 22P black connector.
Check for continuity between the wire harness side IAC valve connector terminal and ground.

Connection: Black/white – Ground
Black/yellow – Ground
Brown/white – Ground
Brown/yellow – Ground

Is there continuity?

YES – Short circuit in the Black/white, Black/yellow, Brown/white and/or Brown/yellow wire.

NO – GO TO STEP 3.



3. IAC Valve Line Open Circuit Inspection

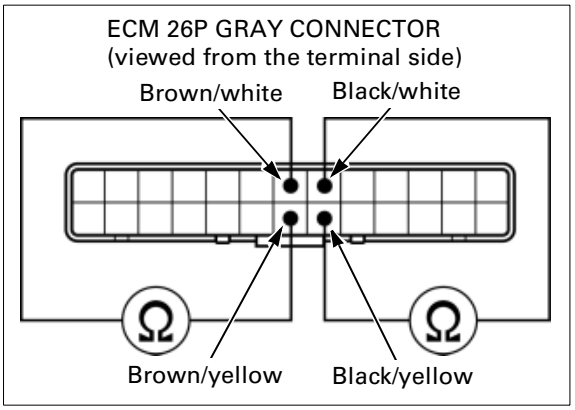
Connect the IAC valve 4P connector.
Measure the resistance between the ECM 26P gray connector terminals.

Connection: Black/white – Black/yellow
Brown/white – Brown/yellow

Is the resistance 30 – 70 Ω?

YES – Replace the ECM with a new one and recheck.

NO – Open circuit in the Black/white, Black/yellow, Brown/white and/or Brown/yellow wire.



DTC 33-2 (E²-PROM)

1. Recheck DTC

Reset the diagnostic memory in the ECM (page 8-11).
Fit the safety lanyard clip to the base of the engine stop switch.
Recheck the ECM E²-PROM with the HDS.

Is the DTC 33-2 indicated?

YES – Replace the ECM with a known good one, and recheck.

NO – Intermittent failure

DTC 42-1 (TCP SENSOR LOW VOLTAGE) (ARX1200T3/T3D only)

1. **TCP Sensor System Inspection**

   Fit the safety lanyard clip to the base of the engine stop switch.
   Check the TCP sensor with the HDS.

   Is about 0 V indicated?

   YES – GO TO STEP 2.

   NO – Intermittent failure.

2. **TCP Sensor Input Voltage Inspection**

   Pull the safety lanyard clip off of the engine stop switch.
   Disconnect the TCP sensor 3P gray connector.

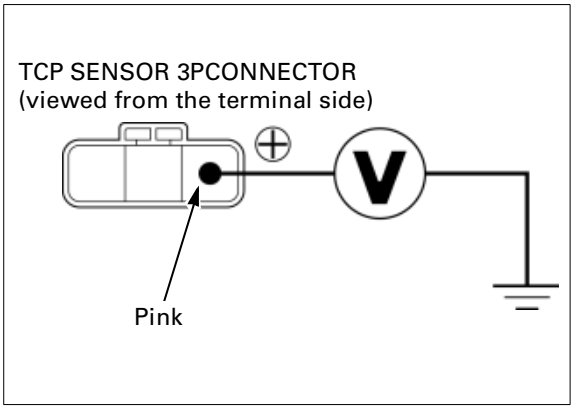
   Fit the safety lanyard clip to the base of the engine stop switch.
   Measure the voltage between the wire harness side connector terminals.

   Connection: Pink (+) – Ground (–)

   Is the voltage within 4.75 – 5.25 V?

   YES – GO TO STEP 4.

   NO – GO TO STEP 3.



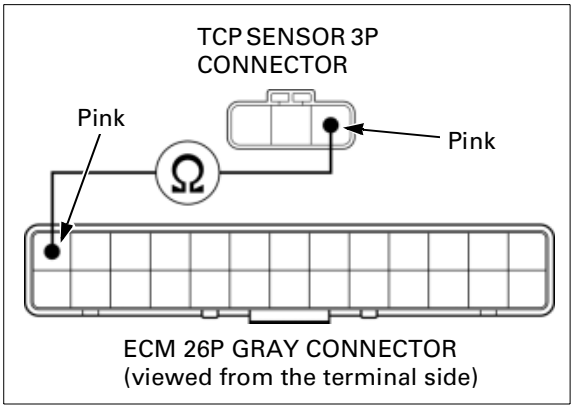
3. **TCP Sensor Input Line Inspection**

   Pull the safety lanyard clip off of the engine stop switch.
   Disconnect the ECM 26P gray connector.
   Check the pink wire for continuity between the TCP sensor 3P connector terminal and ECM connector terminal.

   Is there continuity?

   YES – Replace the ECM with a known good one, and recheck.

   NO – Open circuit in the Pink wire.



4. **TCP Sensor Output Line Short Circuit Inspection**

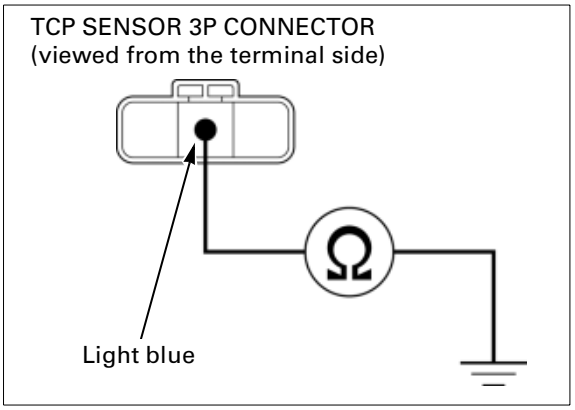
   Pull the safety lanyard clip off of the engine stop switch.
   Check for continuity between the wire harness side TCP sensor connector terminal and ground.

   Connection: Light blue – Ground

   Is there continuity?

   YES – Short circuit in the Light blue wire.

   NO – GO TO STEP 5.



5. **TCP Sensor Inspection**

   Replace the TCP sensor with a new one (page 8-108).
   Reset the diagnostic memory in the ECM (page 8-11).
   Fit the safety lanyard clip to the base of the engine stop switch.
   Check the TCP sensor with the HDS.

   Is DTC 42-1 indicated?

   YES – Replace the ECM with a known good one, and recheck.

   NO – Faulty original TCP sensor.

DTC 42-2 (TCP SENSOR HIGH VOLTAGE) (ARX1200T3/T3D only)

- Before starting the troubleshooting, check the TCP sensor connector for loose contacts or corroded terminals, and recheck the DTC.

1. **TCP Sensor System Inspection 1**

   Fit the safety lanyard clip to the base of the engine stop switch.
   Check the TCP sensor with the HDS.

   Is about 5 V indicated?

   YES – GO TO STEP 2.

   NO –
   - Intermittent failure.
   - Loose or poorly connected ECM connector.

2. **TCP Sensor System Inspection 2**

   Pull the safety lanyard clip off of the engine stop switch.
   Disconnect the TCP sensor 3P gray connector.

Connect the wire harness side connector terminals with a jumper wire.

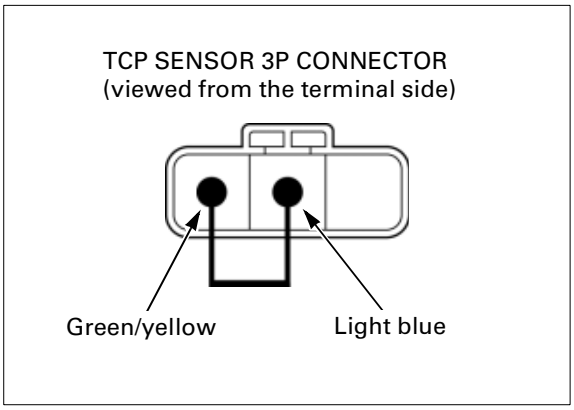
Connection: Light blue – Green/yellow

Fit the safety lanyard clip to the base of the engine stop switch.
Check the TCP sensor with the HDS.

Is about 0 V indicated?

YES – Faulty TCP sensor.

NO – GO TO STEP 3.



3. TCP Sensor Input Voltage Inspection

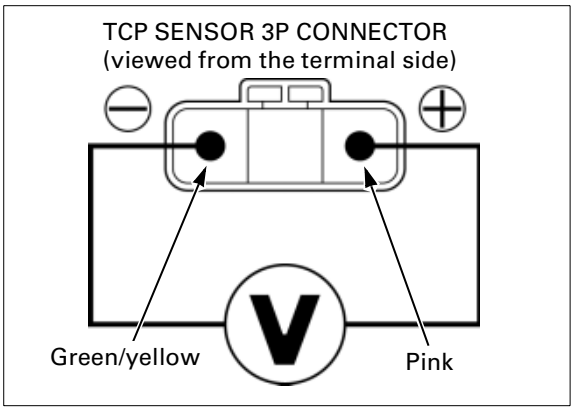
Pull the safety lanyard clip off of the engine stop switch.
Remove the jumper wire.
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the wire harness side TCP sensor connector terminals.

Connection: Pink (+) – Green/yellow (–)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 4.

NO – Open circuit in the Green/yellow wire.



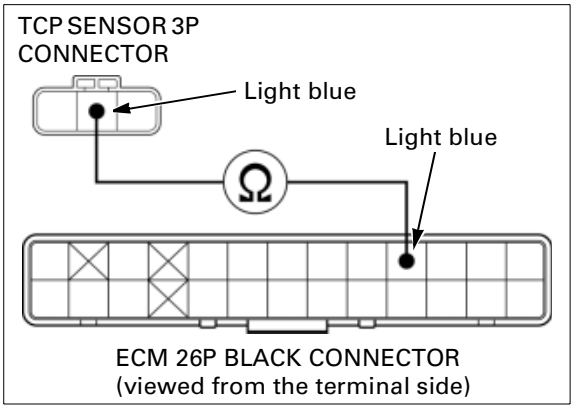
4. TCP Sensor Output Line Open Circuit Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the ECM 26P black connector.
Check the Light blue for continuity between the TCP sensor 3P connector terminal and ECM connector terminal.

Is there continuity?

YES – Replace the ECM with a known good one, and recheck.

NO – Open circuit in the Light blue wire.



DTC 43-1 (TCP SENSOR) (ARX1200T3/T3D only)

- Before starting the troubleshooting, check the TCP sensor connector for loose contacts or corroded terminals, and recheck the DTC.

1. **TCP Sensor System Inspection**

   Fit the safety lanyard clip to the base of the engine stop switch.
   Start the engine and check the TCP sensor with the HDS at idle speed.

   Is 1.6 V indicated?

   YES – Intermittent failure.

   NO – GO TO STEP 2.

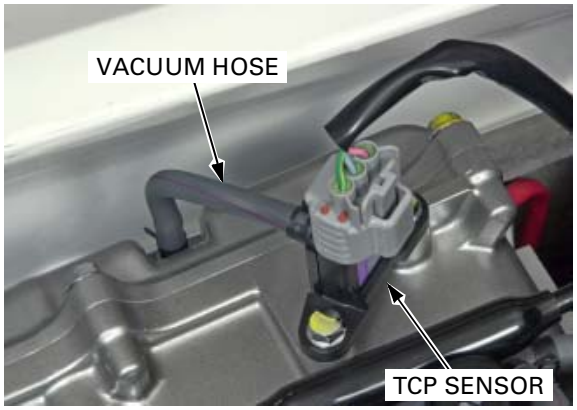
2. **Turbo Charged Pressure Test**

   Pull the safety lanyard clip off of the engine stop switch.
   Check the TCP sensor vacuum hose.

   Is the TCP sensor vacuum hose connected securely?

   YES – GO TO STEP 3.

   NO – Connect the TCP sensor vacuum hose securely.



3. **TCP Sensor System Inspection**

   Replace the TCP sensor with a new one (page 8-108).
   Fit the safety lanyard clip to the base of the engine stop switch.
   Start the engine and check the TCP sensor with the HDS at idle speed.

   Is 1.6 V indicated?

   YES – Faulty original TCP sensor.

   NO – Replace the ECM with a known good one, and recheck.

DTC 44-1 (ENGINE OIL TEMPERATURE SENSOR LOW VOLTAGE)

1. **Engine Oil Temperature Sensor System Inspection**

   Fit the safety lanyard clip to the base of the engine stop switch.
   Check the engine oil temperature sensor with the HDS.

   Is about 0 V indicated?

   YES – GO TO STEP 2.

   NO – Intermittent failure.

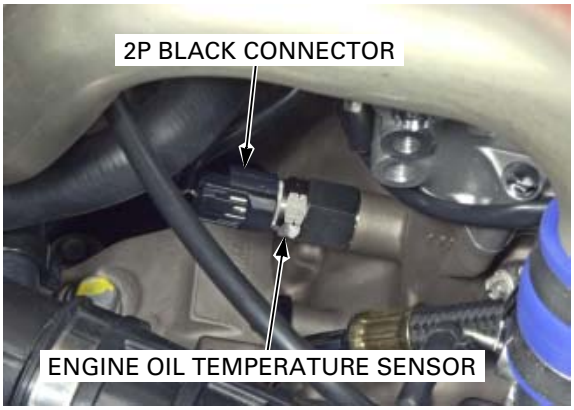
2. **Engine Oil Temperature Sensor Inspection**

   Pull the safety lanyard clip off of the engine stop switch.
   Disconnect the engine oil temperature sensor 2P black connector.
   Fit the safety lanyard clip to the base of the engine stop switch.
   Check the engine oil temperature sensor with the HDS.

   Is about 0 V indicated?

   YES – GO TO STEP 3.

   NO – Faulty engine oil temperature sensor.



3. **Engine Oil Temperature Sensor Output Line Short Circuit Inspection**

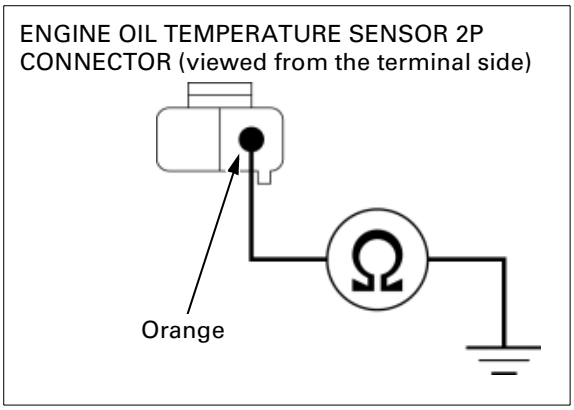
   Pull the safety lanyard clip off of the engine stop switch.
   Disconnect the ECM 26P black connector.
   Check for continuity between the wire harness side engine oil temperature sensor connector terminal and ground.

   Connection: Orange – Ground

   Is there continuity?

   YES – Short circuit in the Orange wire.

   NO – Replace the ECM with a new one, and recheck.



DTC 44-2 (ENGINE OIL TEMPERATURE SENSOR HIGH VOLTAGE)

- Before starting the troubleshooting, check the engine oil temperature sensor connector for loose contacts or corroded terminals, and recheck the DTC.

1. **Engine Oil Temperature Sensor System Inspection**

   Pull the safety lanyard clip off of the engine stop switch.
   Check the engine oil temperature sensor with the HDS.

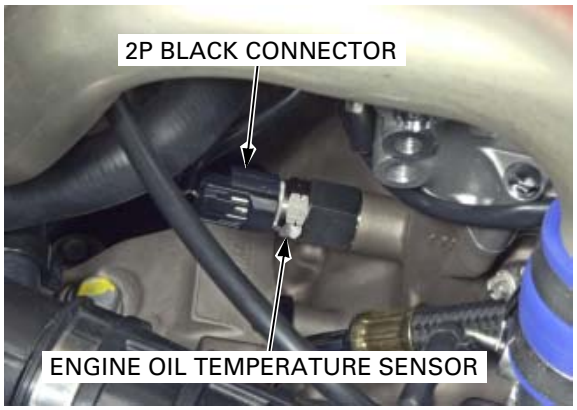
   Is about 5 V indicated?

   YES – GO TO STEP 2.

   NO – • Intermittent failure.
   • Loose or poorly connected engine oil temperature sensor 2P connector.

2. **Engine Oil Temperature Sensor Inspection**

   Pull the safety lanyard clip off of the engine stop switch.
   Disconnect the engine oil temperature sensor 2P black connector.



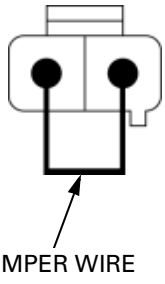
   Connect the wire harness side connector terminals with a jumper wire.
   Fit the safety lanyard clip to the base of the engine stop switch.
   Check the engine oil temperature sensor with the HDS.

   Is about 0 V indicated?

   YES – Faulty engine oil temperature sensor.

   NO – GO TO STEP 3.

ENGINE OIL TEMPERATURE SENSOR CONNECTOR (viewed from the terminal side)



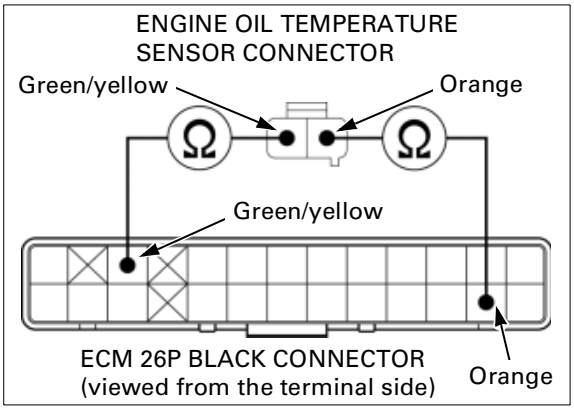
3. Engine Oil Temperature Sensor Line Open Circuit Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the ECM 26P black connector.
Check the Orange and Green/yellow wires for continuity between the engine oil temperature sensor connector terminals and ECM 26P black connector terminals.

Is there continuity?

YES – Replace the ECM with a new one, and recheck.

NO – • Open circuit in the Orange wire.
• Open circuit in the Green/yellow wire.



DTC 45-1 (TCP SENSOR) (ARX1200T3/T3D only)

- Before starting the troubleshooting, check the TCP sensor connector for loose contacts or corroded terminals, and recheck the DTC.

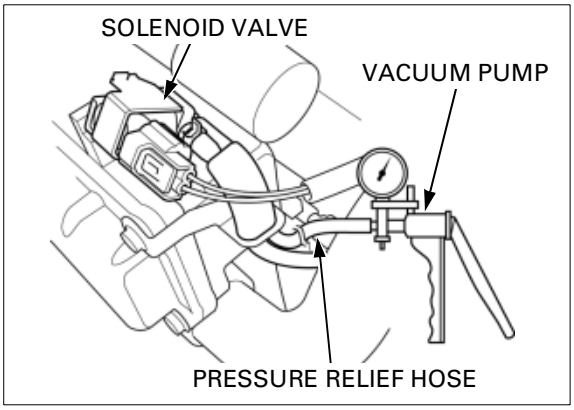
1. Wastegate Control Solenoid Valve Inspection

Connect the vacuum pump to the pressure relief hose of the wastegate control solenoid valve.
Apply vacuum to the solenoid valve.

Is the vacuum maintained?

YES – GO TO STEP 2.

NO – Faulty wastegate control solenoid valve.



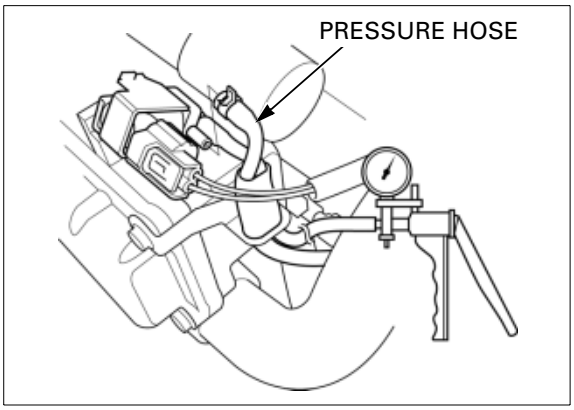
2. Wastegate Control Solenoid Valve Signal Line Inspection

Disconnect the pressure hose from the wastegate control solenoid valve.
Fit the safety lanyard clip to the base of the engine stop switch and check the vacuum pump.

Is the vacuum maintained?

YES – GO TO STEP 4.

NO – GO TO STEP 3.



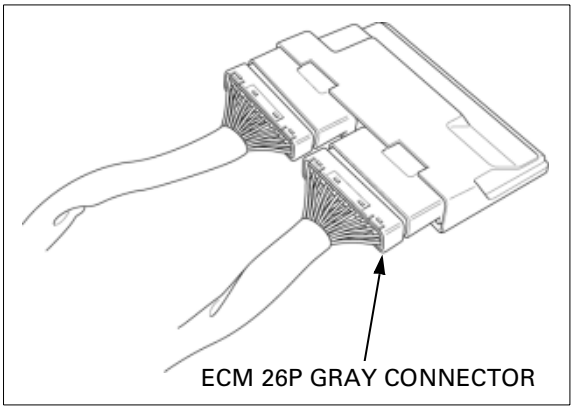
3. Wastegate Control Solenoid Valve Signal Line Inspection

Pull the safety lanyard clip off the engine stop switch.
Disconnect the ECM 26P gray connector.
Apply vacuum to the wastegate control solenoid valve.
Fit the safety lanyard clip to the base of the engine stop switch and check the vacuum pump.

Is the vacuum maintained?

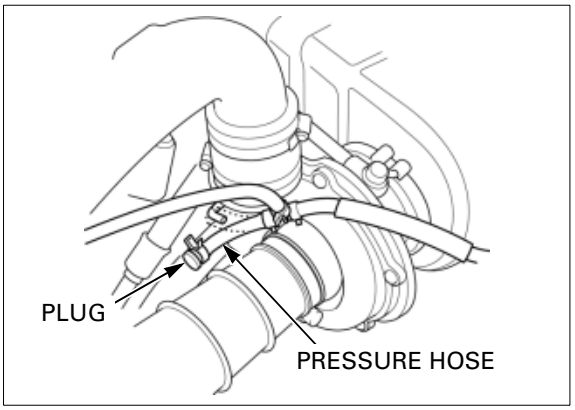
YES – GO TO STEP 5.

NO – Short circuit in the Blue/green wire.



4. Wastegate Actuator Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the pressure hose from the turbocharger and plug it.



Connect the pressure gauge to the pressure hose of the wastegate control solenoid valve.

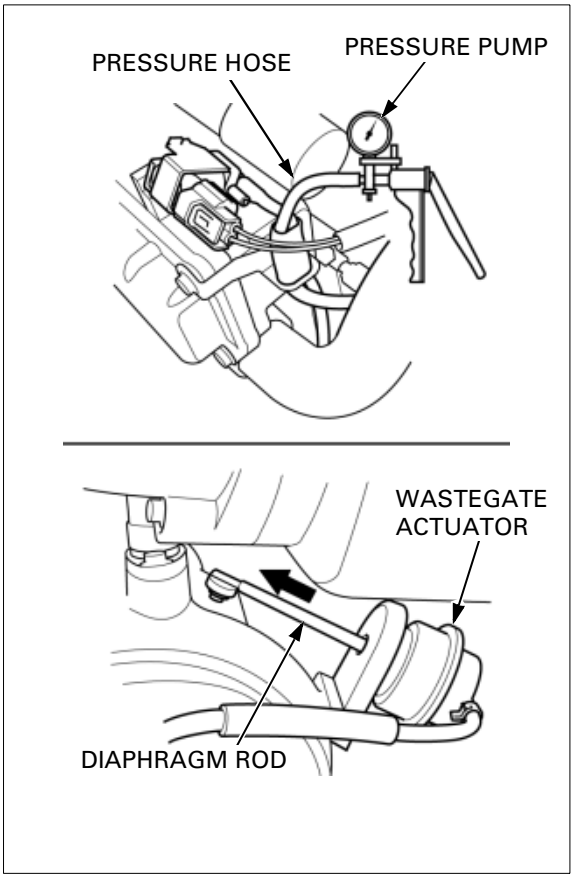
Do not apply 100 kPa (1.02 kg/cm², 14.5 psi) of air pressure to the actuator.

Apply 60 kPa (0.61 kg/cm², 8.7 psi) of air pressure to the wastegate actuator.

Does the actuator rod move and hold its position?

YES – GO TO STEP 5.

NO – • Faulty wastegate actuator.
• Pinched or damaged pressure hose.



5. TCP Sensor Inspection

Connect the pressure hose to the wastegate control solenoid valve.
Remove the plug from the pressure hose.
Connect the ECM 26P gray connector.
Replace the TCP sensor with a known-good one.
Reset the diagnostic memory in the ECM (page 8-11).
Start the engine according to the flushing procedure (page 5-3) and increase the engine speed above 3,000 rpm.
Check the TCP sensor with the HDS.

Is DTC 45-1 indicated?

YES – Replace the ECM with a new one, and inspect again.

NO – Replace the original TCP sensor with a new one.

DTC 46-1 (MST SWITCH)

- Before starting the troubleshooting, check the MST switch connector for loose contacts or corroded terminals, and recheck the DTC.

1. MST Switch Signal Line Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the MST switch 2P connector.

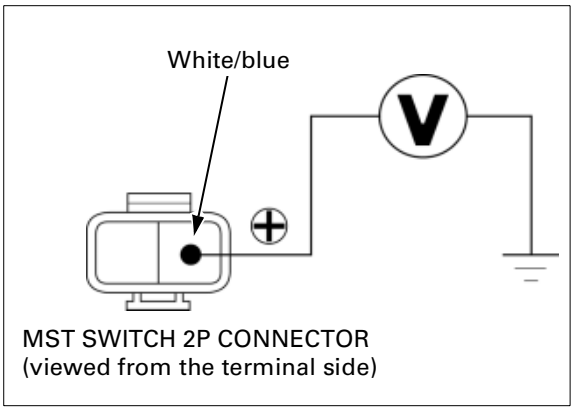
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the wire harness side connector terminal and ground.

Connection: White/blue (+) – Ground (–)

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 2.

NO – • Open or short circuit in the White/blue wire.
• Loose or poorly connected ECM 26P black connector.



MST SWITCH 2P CONNECTOR
(viewed from the terminal side)

2. **MST Switch Ground Line Inspection**

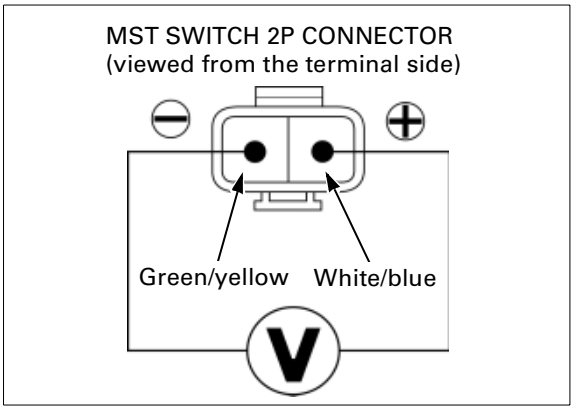
   Measure the voltage between the wire harness side connector terminals.

   Connection: White/blue (+) – Green/yellow (–)

   Is the voltage within 4.75 – 5.25 V?

   YES – GO TO STEP 3.

   NO – Open circuit in the Green/yellow wire.



3. **MST Switch Inspection**

   Check the MST switch (page 8-114).

   Is it normal?

   YES – GO TO STEP 4.

   NO – Faulty MST switch.

4. **Cooling System Inspection**

   Check the cooling system (page 7-5).

   Is the system in good condition?

   YES – Replace the ECM with a known good one, and recheck.

   NO – Faulty cooling system.

DTC 47-1 (ECT SENSOR)

- Before starting the troubleshooting, check the ECT sensor connector for loose contacts or corroded terminals, and recheck the DTC.

1. **Cooling System Inspection**

   Check the cooling system (page 7-5).

   Is the system in good condition?

   YES – Replace the ECM with a known good one, and recheck.

   NO – Faulty cooling system.

FUEL LINE INSPECTION

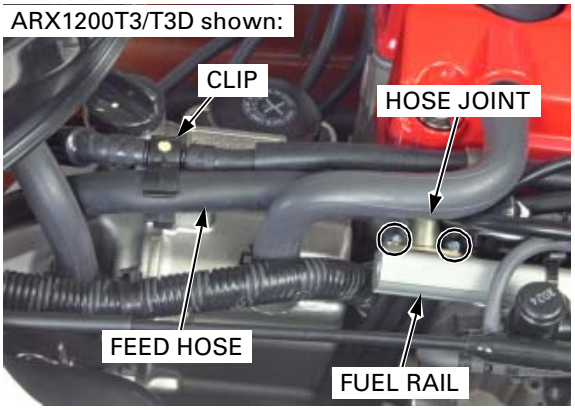
FUEL PRESSURE RELEASE

Before disconnecting the fuel feed hose, open the fuel fill cap to release the pressure in the fuel tank and release the fuel pressure by disconnecting the fuel feed hose at the fuel rail.

Remove the seats (page 3-4).

Remove the fuel feed hose from the clip.

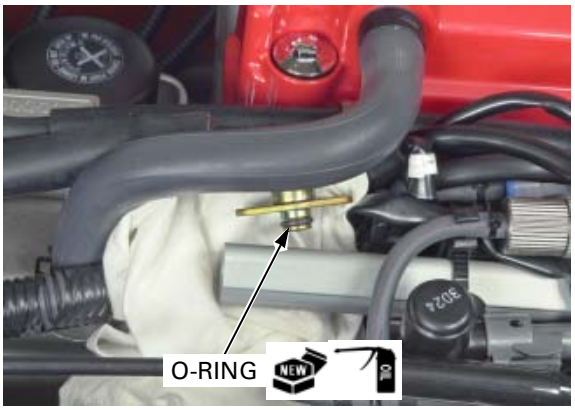
Remove the two fuel feed hose joint bolts.
Cover the fuel feed hose joint with a rag or shop towel.
Slowly remove the hose joint from the fuel rail while releasing the fuel pressure and catch the remaining fuel using a approved gasoline container.



Coat a new O-ring with oil and install it into the fuel feed hose joint groove.
Install the hose joint into the fuel rail.
Install and tighten the hose joint bolts.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the feed hose onto the clamp.

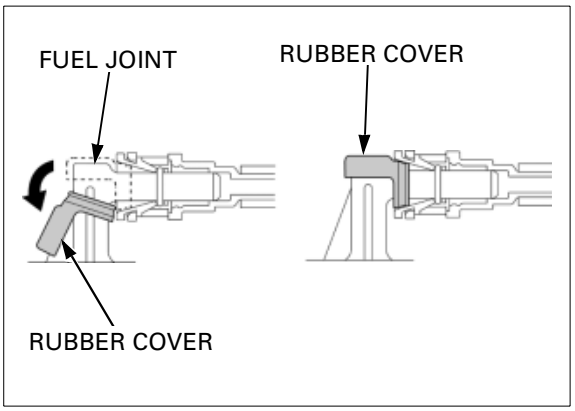


QUICK-CONNECT FITTING

REMOVAL

Remove the storage box (page 3-8).
Relieve the fuel pressure (page 8-79).

Clean the fitting if necessary.
Take the rubber cover off of the fuel joint.

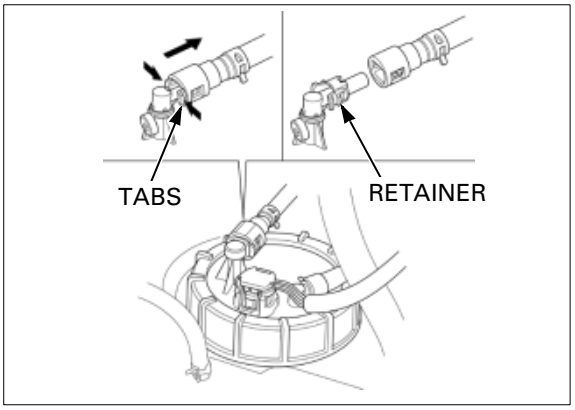


Hold the connector with one hand and press down the retainer tabs with the other hand, then pull the connector off.

NOTE:

- Be careful not to damage the joint pipe or other parts. Do not use tools.
- If the connector does not move, keep the retainer tabs pressed down, and alternately pull and push the connector until it comes off easily.
- Do not remove the retainer from the joint pipe; once removed, the retainer must be replaced with a new one.

Remove the rubber cover from the joint pipe.



INSTALLATION

Check the joint pipe contact area for dirt, and clean if necessary.

Insert a new retainer into the connector if the retainer is damaged, or after
– replacing the fuel pump.
– replacing the fuel feed hose.
– removing the retainer from the joint pipe.

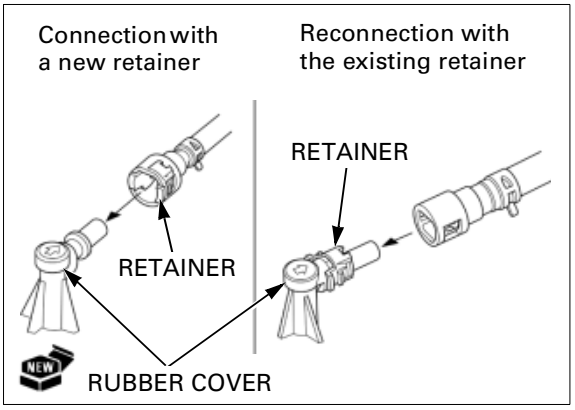
When using a new retainer, remove the old retainer from the joint pipe and install the new retainer into the connector, aligning the pawls with the connector grooves.

Install a new rubber cover onto the fuel joint properly as shown.

Press the connector onto the joint pipe until both retainer pawls lock with a clicking sound.

NOTE:
- If it is hard to connect, put a small amount of new engine oil on the joint pipe end.

Make sure the connection is secure and the pawls are firmly locked into place.



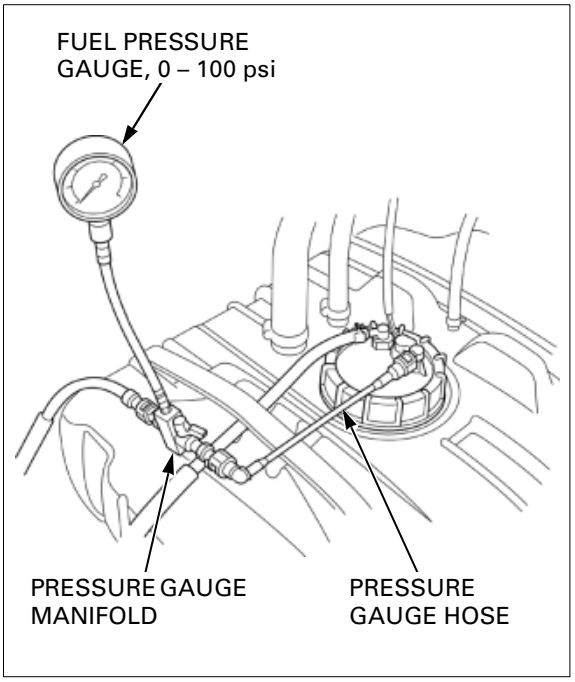
FUEL PRESSURE INSPECTION

Release the fuel pressure (page 8-79).

Connect the fuel pressure gauge, pressure gauge manifold and pressure gauge hose to the fuel pump and fuel feed hose.

TOOLS:

Fuel pressure gauge, 0 – 100 psi	**07406–0040003 or 07406-004000B or 07406-004000A (U.S.A. only)**
Pressure gauge manifold	**07ZAJ-S5A0110 (not available in U.S.A.)**
Pressure gauge hose	**07ZAJ-S5A0120 (not available in U.S.A.)**
	or
Fuel pressure gauge, 0 – 100 psi	**07406–0040003 or 07406-004000B or 07406-004000A (U.S.A. only)**
Pressure manifold hose	**07AMF-HW3A100 (U.S.A. only)**
Adapter, female - orange	**07AMF-HW3A200 (U.S.A. only)**
Adapter, male - orange	**07AMF-HW3A300 (U.S.A. only)**



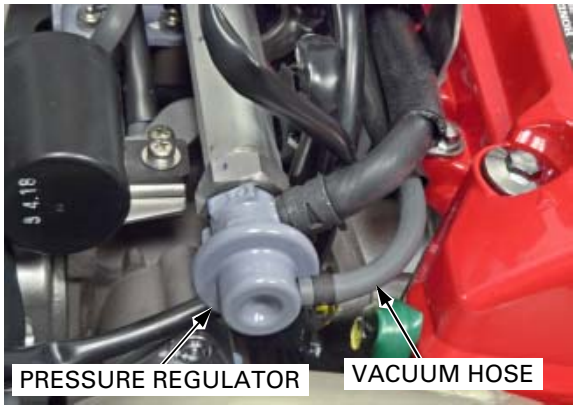
Remove the rear tray (page 3-5).

Disconnect the vacuum hose from the pressure regulator and plug the vacuum hose.

Start the engine according to the flushing procedure (page 5-2), let it idle and read the fuel pressure.

STANDARD: 294 kPa (3.0 kgf/cm², 43 psi)

If the fuel pressure is higher than the specified pressure, inspect the following:
– pinched or clogged fuel return hose
– pressure regulator
– fuel pump (page 8-82)



If the fuel pressure is lower than the specified pressure, inspect the following:
– fuel line leaking
– pressure regulator
– fuel pump (page 8-82)

Remove the fuel pressure gauge and attachment, and connect the fuel feed hose to the fuel rail (page 8-80).

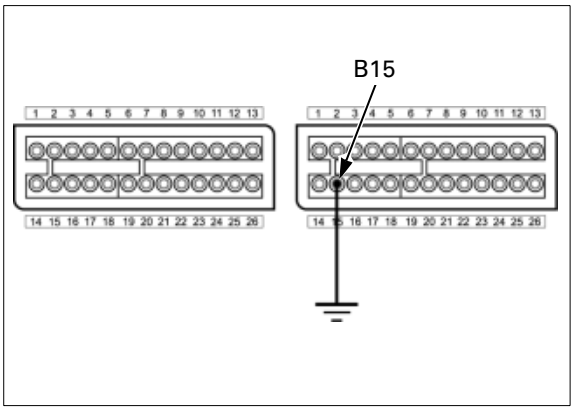
Connect the vacuum hose to the pressure regulator.

Install the storage box (page 3-8).
Install the rear tray (page 3-5).

FUEL FLOW INSPECTION

Connect the ECM test harness to the ECM 26P gray connector (page 8-12).

Ground the B15 terminal of the test harness connector with a jumper wire.

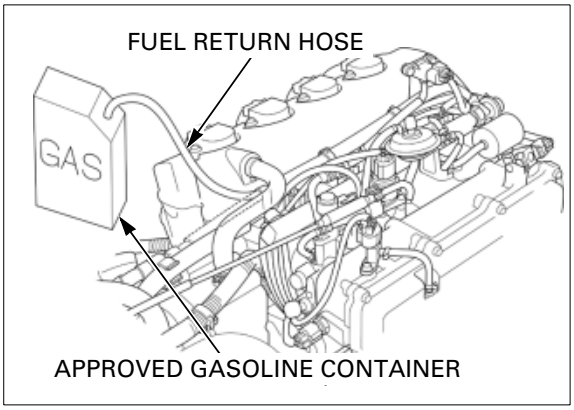


Disconnect the fuel return hose from the fuel hose joint on the oil tank.

Place the return hose end into an approved gasoline container.

Fit the safety lanyard clip to the base of the engine stop switch for 10 seconds and remove it.
Measure the amount of fuel flow.

Amount of fuel flow:
260 cm³ (8.8 US oz, 9.2 Imp oz) minimum/ 10 seconds



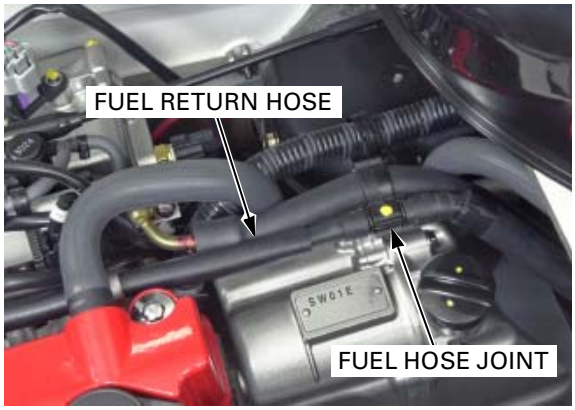
If the fuel flow is less than the specified amount, inspect the following:
– pinched or clogged fuel feed hose and/or fuel return hose
– pressure regulator
– fuel pump (page 8-82)

Connect the fuel return hose to the fuel hose joint on the oil tank.

Remove the jumper wire and test harness, and connect the ECM 22P gray connector.

Fit the safety lanyard clip to the base of the engine stop switch and check that there is no fuel leakage.

Install the seats (page 3-4).



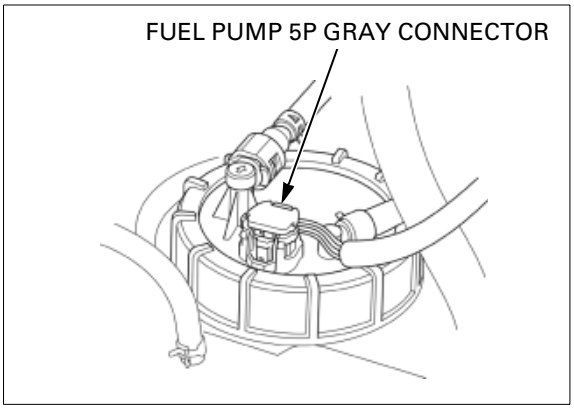
FUEL PUMP

INSPECTION

Remove the storage box (page 3-8).

Fit the safety lanyard clip to the base of the engine stop switch and confirm that the fuel pump operates for a few seconds.
If the fuel pump does not operate, inspect as follows:

Remove the safety lanyard clip from the engine stop switch.
Disconnect the fuel pump 5P gray connector.



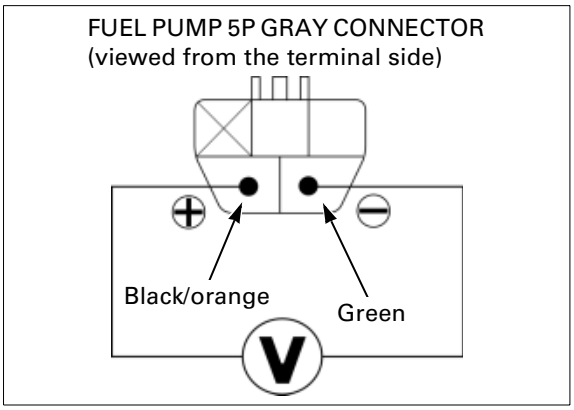
Connect the voltmeter to the wire harness side connector terminals.

Connection: Black/orange (+) – Green (–)

Fit the safety lanyard clip to the base of the engine stop switch and measure the voltage.
There should be battery voltage for a few seconds.

If there is battery voltage, replace the fuel pump.

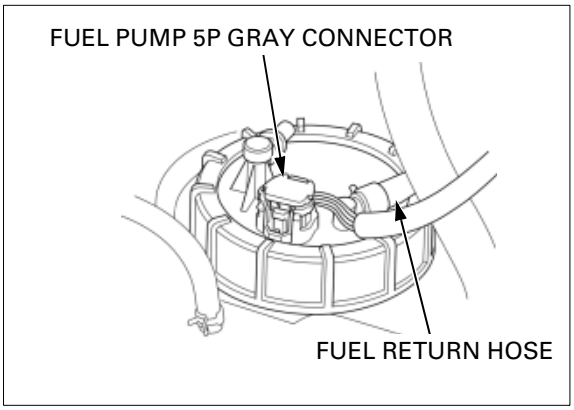
If there is no voltage, inspect the following:
- open circuit in the Black/orange wire between the fuel pump and fuel pump relay
- open circuit in the Green wire between the fuel pump and fuel ground terminal
- loose or poor contact of the related connector
- fuel pump relay and its circuits (page 8-106)



REMOVAL

Disconnect the quick connect fitting from the fuel pump (page 8-79).

Disconnect the 6P gray connector and fuel return hose from the fuel pump.
Cover the fuel hose ends.

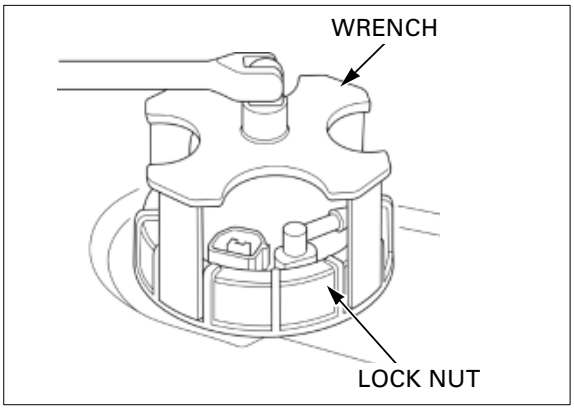


Loosen the fuel pump lock nut, using the special tool.

TOOL:

Fuel sender wrench	**07XAA-001010A or 07AAA-S0XA100 (U.S.A. only)**

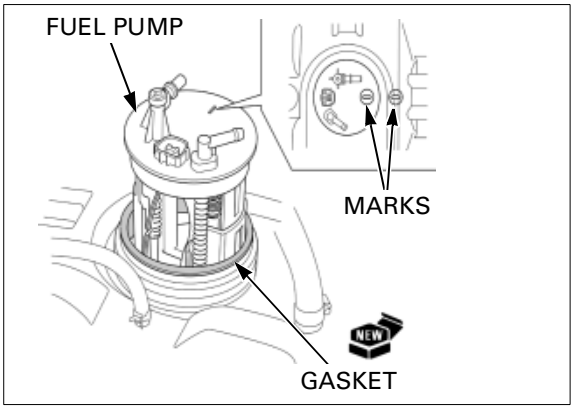
Remove the lock nut and fuel pump assembly from the fuel tank, being careful not to bend the float rod. Remove the base gasket from the fuel pump.



INSTALLATION

Install a new base gasket onto the fuel tank.

Align the marks on the fuel pump and fuel tank, and install the fuel pump assembly into the fuel tank, being careful not to damage or pinch the base gasket.

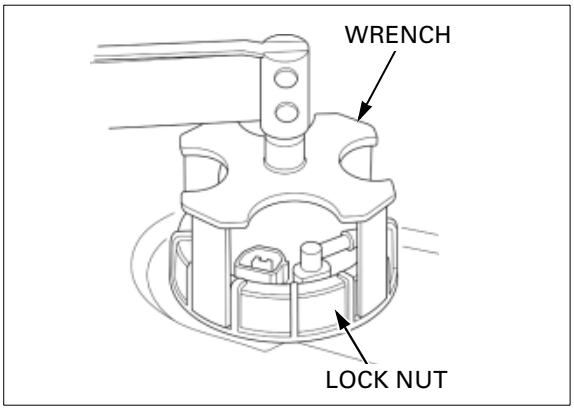


Install and tighten the fuel pump lock nut using the special tool.

TOOL:

Fuel sender wrench	**07XAA-001010A or 07AAA-S0XA100 (U.S.A. only)**

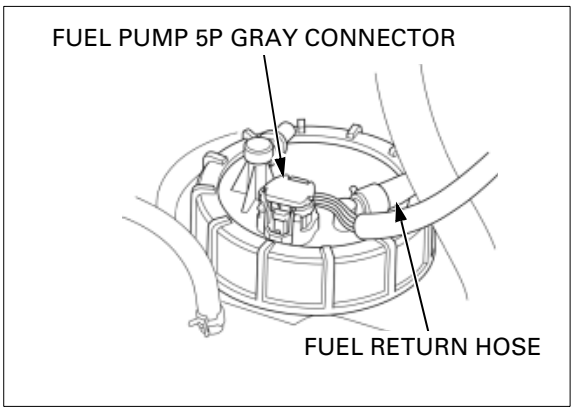
TORQUE: 93 N·m (9.5 kgf·m, 69 lbf·ft)



Connect the fuel return hose and 6P gray connector to the fuel pump.

Connect the quick-connect fitting to the fuel pump (page 8-80).

Install the storage box (page 3-8).
Install the seats (page 3-4).



FUEL TANK

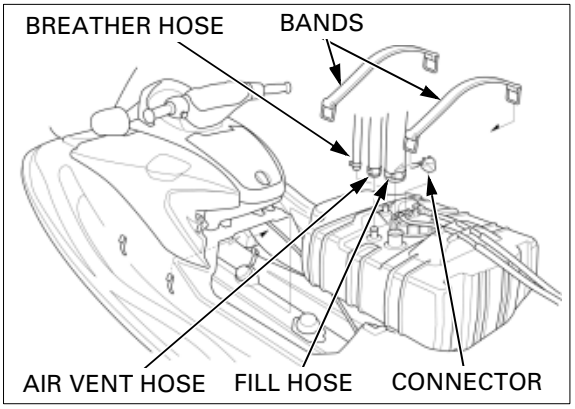
REMOVAL

Remove the storage box (page 3-8).
Remove the engine (page 9-5).

Disconnect the following from the fuel tank:
– fuel pump 6P gray connector
– breather hose
– air vent hose
– fuel fill hose

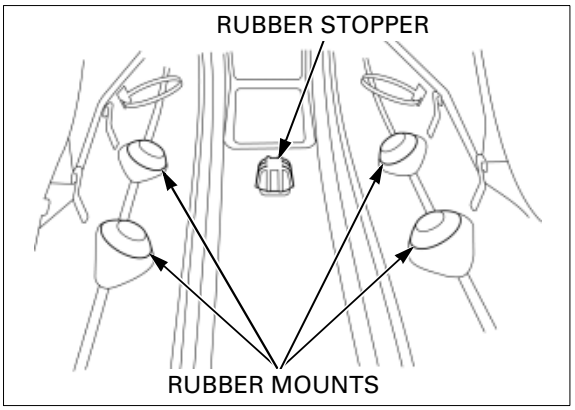
Cover the hose joints of the fuel tank and fuel hose ends.

Remove the holder bands and the fuel tank.

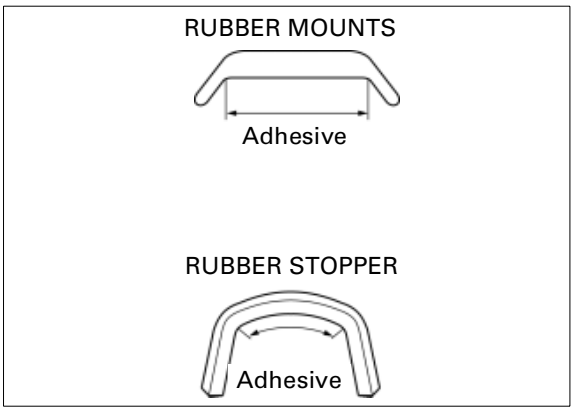


INSTALLATION

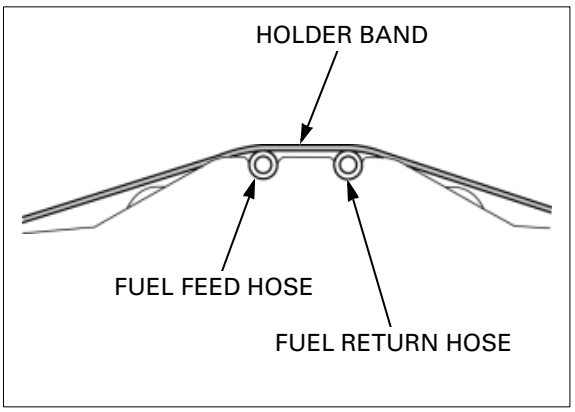
Check the rubber mounts and rubber stopper for cracks, deterioration or damage.



When installing new rubber mounts or rubber stopper, apply LOAD 7542 or equivalent (equal mix two component urethane based adhesive) to the area as shown.

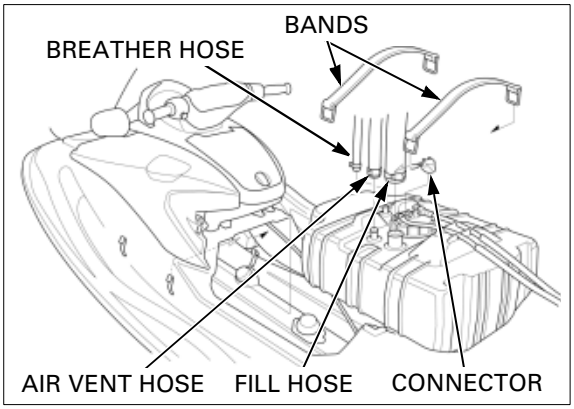


Install the fuel tank in place.
Route the fuel feed hose and return hose in the grooves of the fuel tank as shown and secure the fuel tank with the holder bands.



Connect the following to the fuel tank:
– fuel fill hose
– air vent hose
– breather hose
– fuel pump 6P gray connector

Install the engine (page 9-9).
Install the storage box (page 3-8).

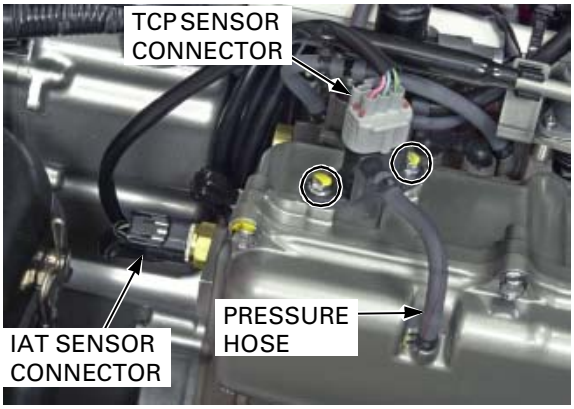


SUB-AIRBOX (ARX1200T3/T3D)

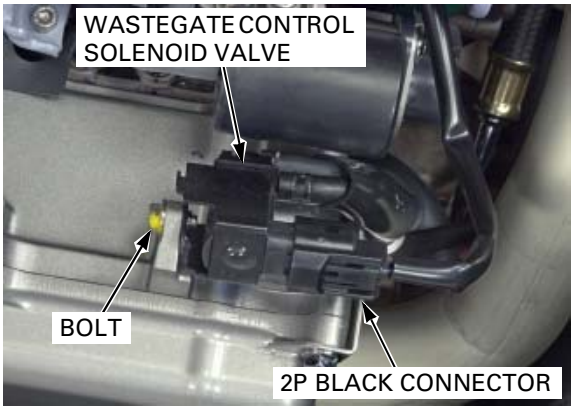
REMOVAL

Remove the left side panel (page 3-5).

Disconnect the IAT sensor 2P black connector and TCP sensor 3P gray connector.
Disconnect the TCP sensor pressure hose from the sub-airbox cover.
Remove the two bolts and the TCP sensor from the sub-airbox.

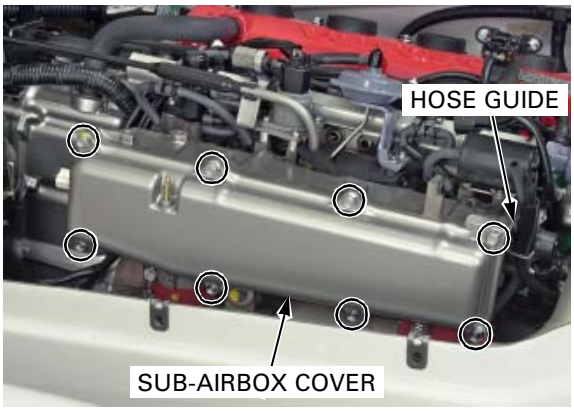


Disconnect the wastegate control solenoid valve 2P black connector.
Remove the bolt attaching the wastegate control solenoid valve.



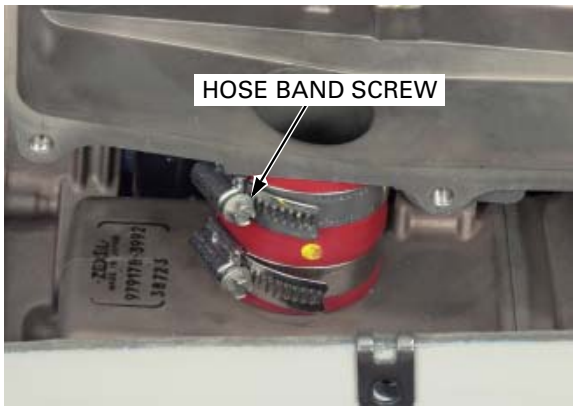
Remove the eight bolts, hose guide and sub-airbox cover.

Remove the two dowel pins and O-ring.



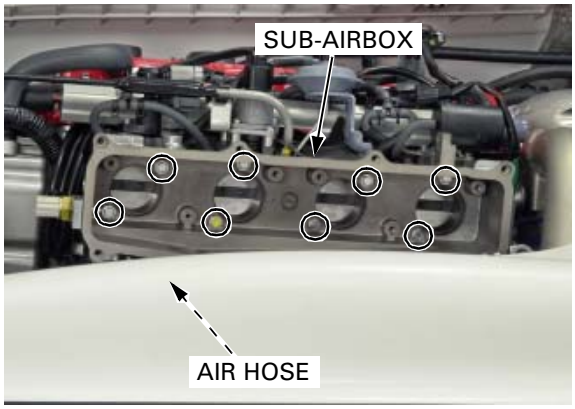
Loosen the six screws and remove the two air funnels from the sub-airbox.

Loosen the hose band screw.

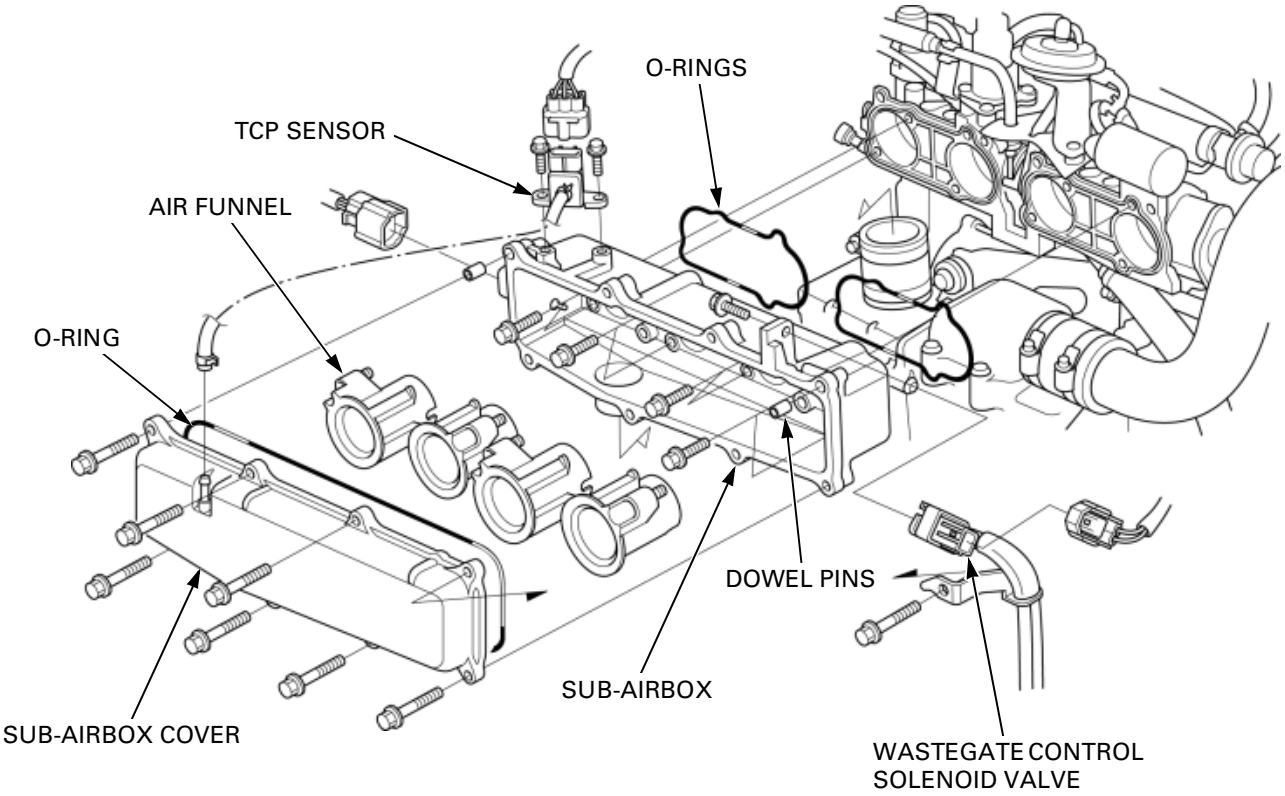


Remove the eight bolts, disconnect the air hose and remove the sub-airbox.

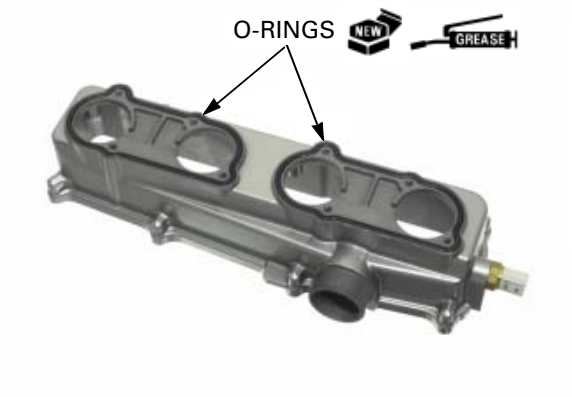
Remove the two O-rings.



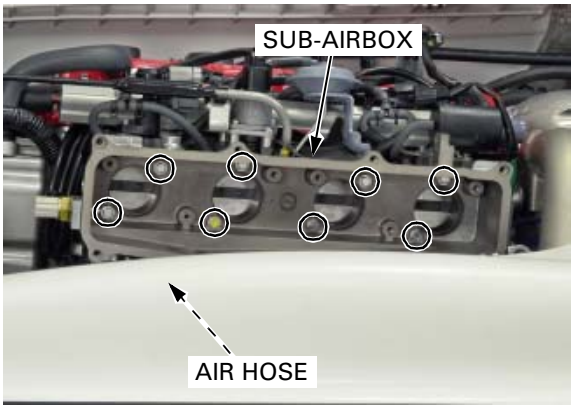
INSTALLATION



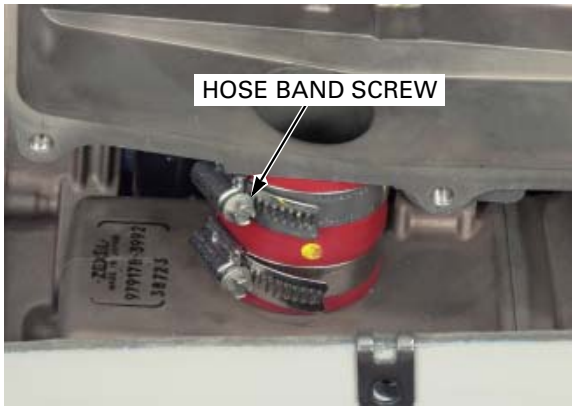
Coat new O-rings with grease and install them into the sub-airbox grooves.



Connect the air hose to the sub-airbox, install the sub-airbox onto the throttle body and tighten the eight bolts.



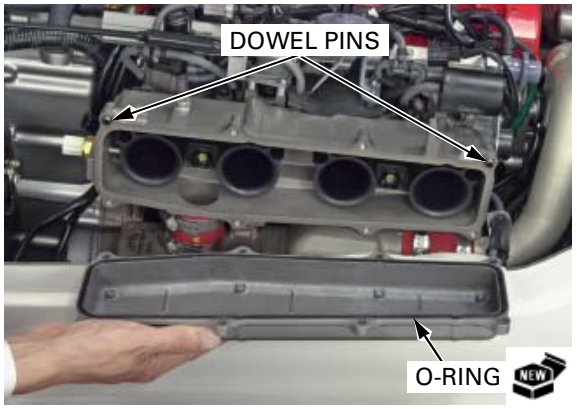
Tighten the air hose band screw.



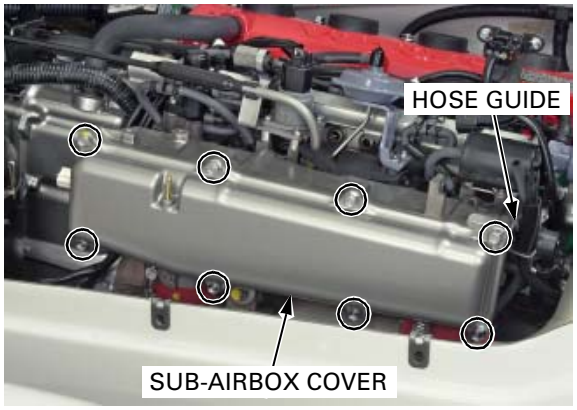
Install the two air funnels onto the sub-airbox and tighten the six screws.

Install a new O-ring into the sub-airbox cover groove.

Install the two dowel pins into the sub-airbox.



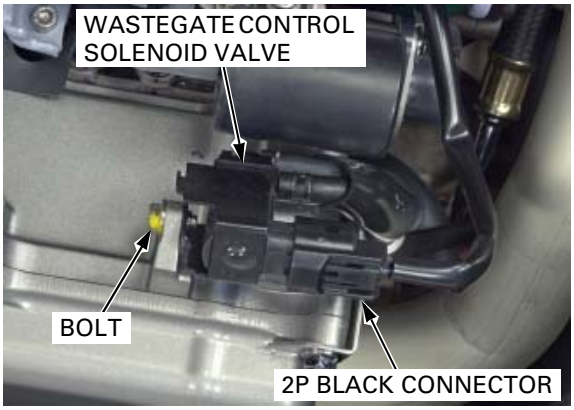
Install the sub-airbox cover, hose guide and eight bolts, and tighten the bolts.



Install the wastegate control solenoid valve onto the sub-airbox and tighten the bolt.

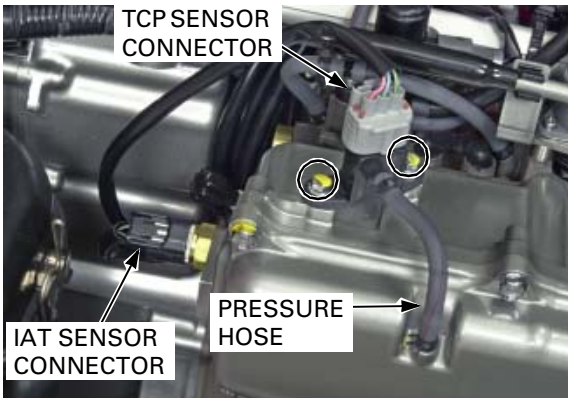
TORQUE: 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)

Connect the wastegate control solenoid valve 2P black connector.



Install the TCP sensor onto the sub-airbox and tighten the two screws.
Connect the TCP sensor pressure hose to the sub-airbox cover.
Connect the TCP sensor 3P gray connector and IAT sensor 2P black connector.

Install the left side panel (page 3-5).



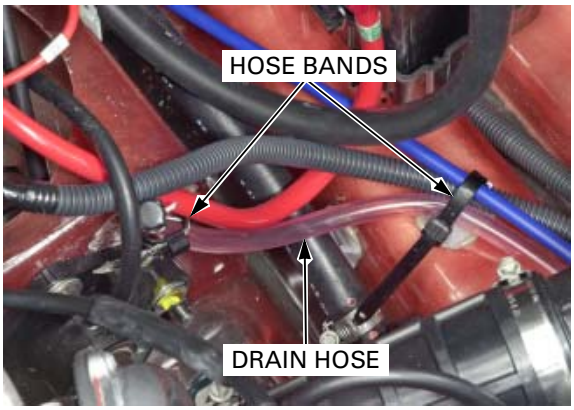
AIRBOX: ARX1200T3/T3D

REMOVAL

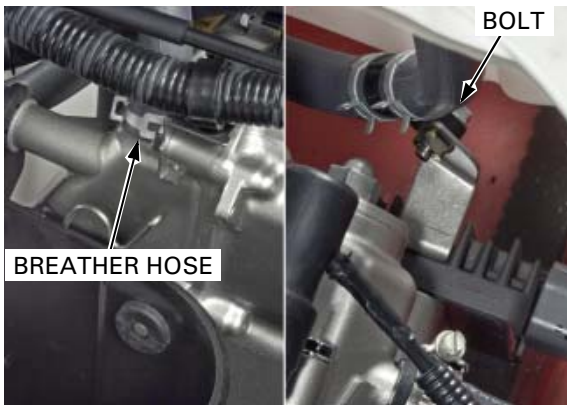
Remove the following:

– intercooler (page 13-12)
– air filter (page 4-11)

Release the two hose bands securing the drain hose of the airbox.



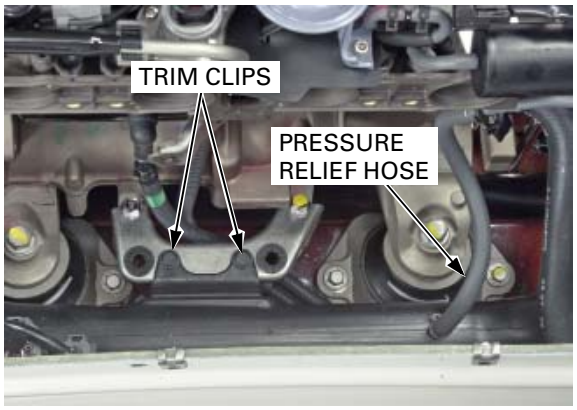
Disconnect the crankcase breather hose from the oil tank and remove the hose retaining bolt.



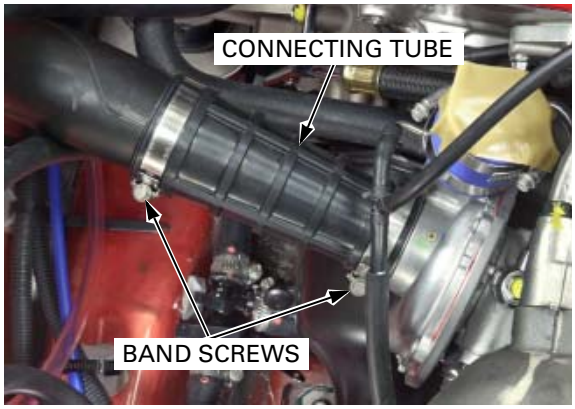
Remove the mounting bolt, washer and the airbox from the oil tank.

Disconnect the pressure relief hose of the wastegate control solenoid valve from the connecting duct.

Remove the two trim clips attaching the connecting duct to the intercooler mounting stay.

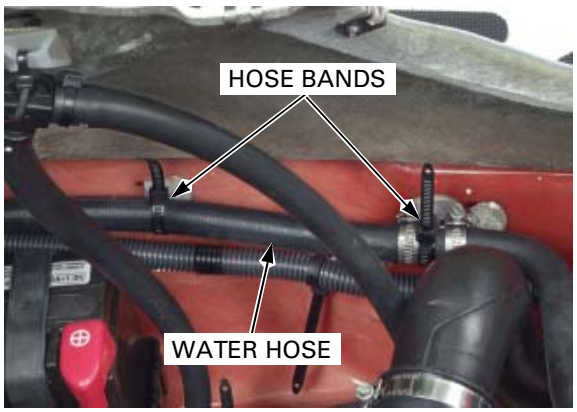


Loosen the band screws and remove the connecting tube from the turbocharger and duct.

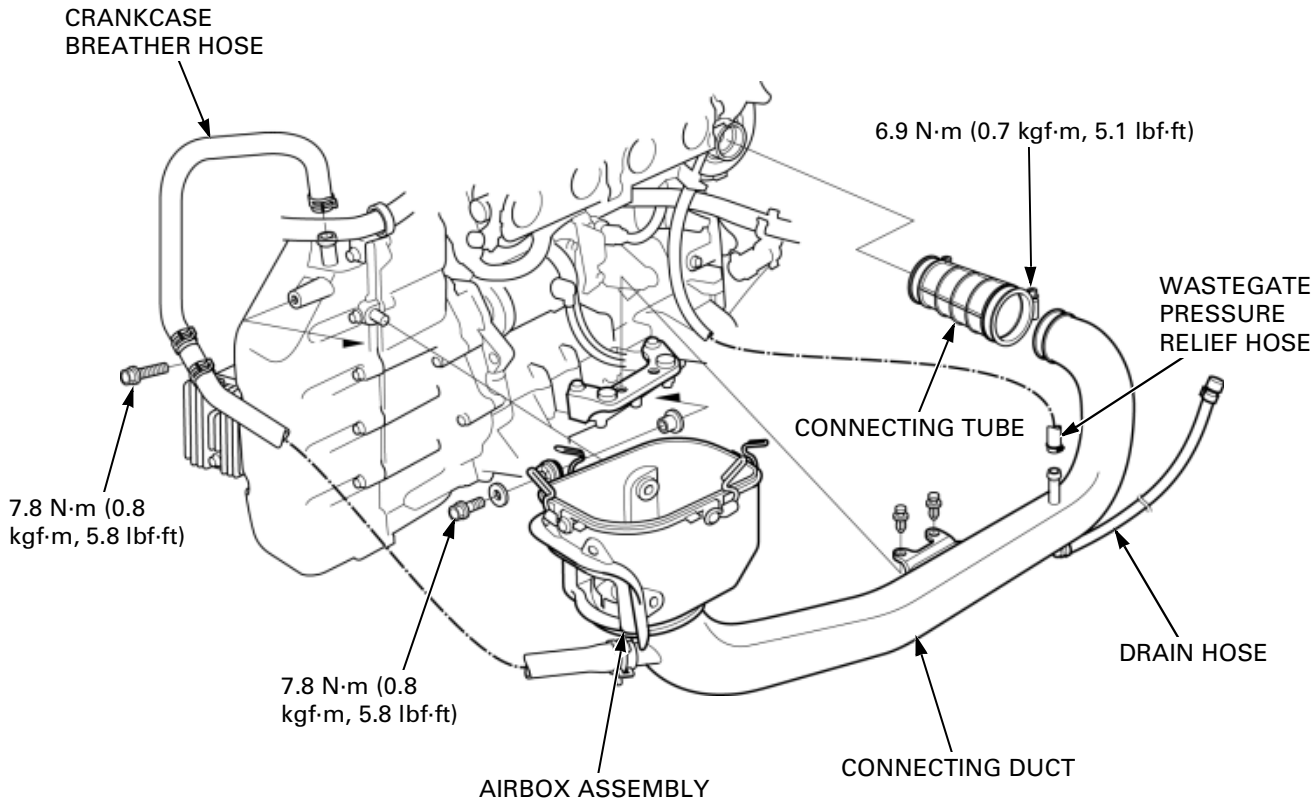


Release the hose bands securing the cooling water hose to avoid interfering it during removal.

Remove the airbox assembly from the hull while pulling the water hose aside.



INSTALLATION



Route the hoses properly (page 1-31 or 1-52).

Install the airbox assembly in the reverse order of removal.

NOTE:

- Align the airbox grommet with the locating pin on the oil tank.

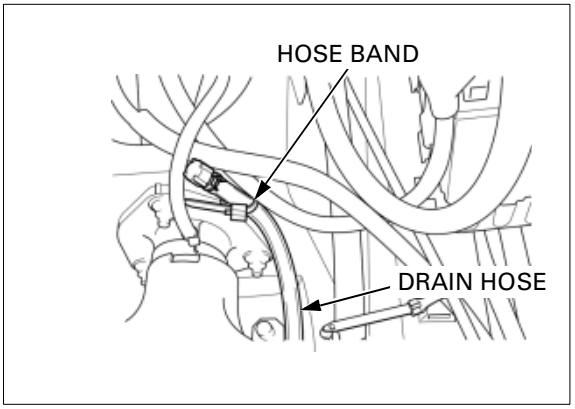
TORQUE:
Mounting bolt: 7.8 N·m (0.8 kgf·m, 5.8 lbf·ft)
Tube band screw (duct side):
6.9 N·m (0.7 kgf·m, 5.1 lbf·ft)
Hose joint bolt: 7.8 N·m (0.8 kgf·m, 5.8 lbf·ft)

AIRBOX: ARX1200N3

REMOVAL

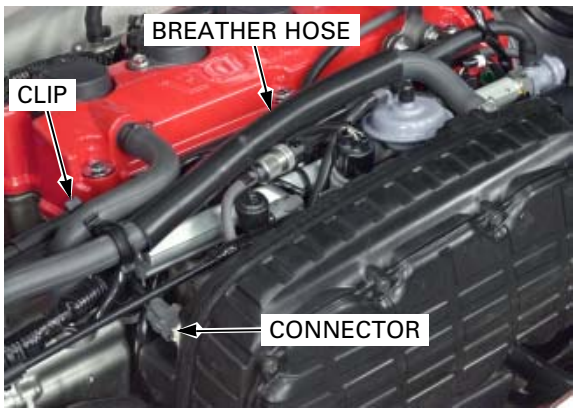
Remove the following:
– left side panel (page 3-5)
– air filter (page 4-12)

Release the hose band securing the drain hose of the airbox.



Remove the hose clip and disconnect the crankcase breather hose.

Disconnect the IAT sensor connector.



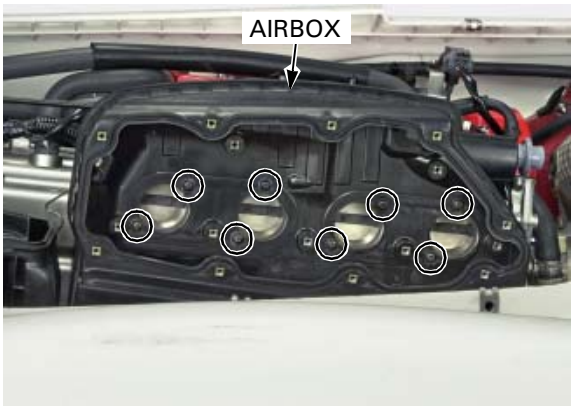
Remove the following:
– nine screws (remove the five upper screws and loosen the four lower screws)
– airbox cover

– seven screws (loosen)
– air funnel assembly

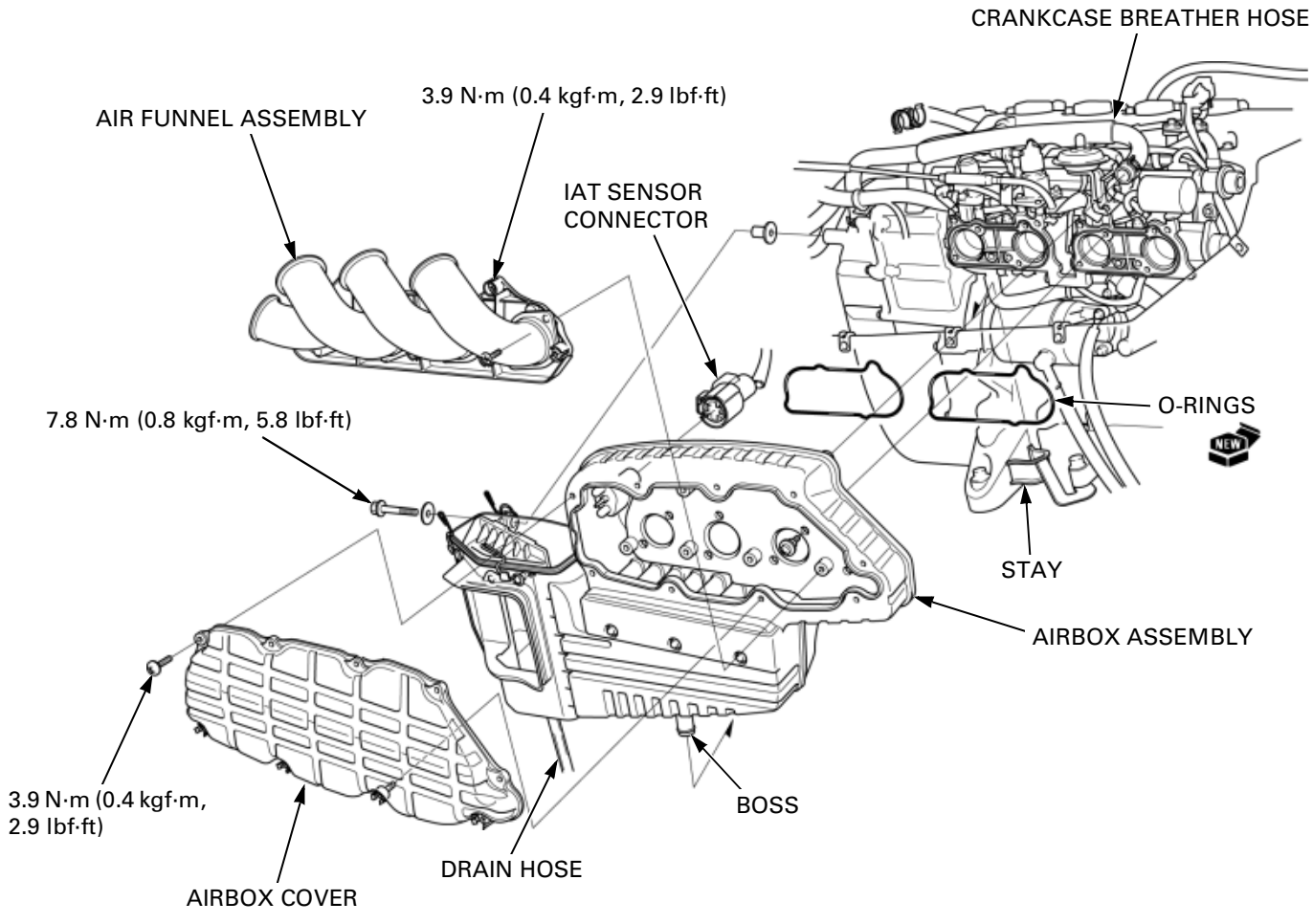
– eight screws
– mounting bolt and washer

Move the airbox forward slightly to release the mounting boss on the bottom of it from the stay and remove the airbox assembly.

Remove the O-rings.



INSTALLATION



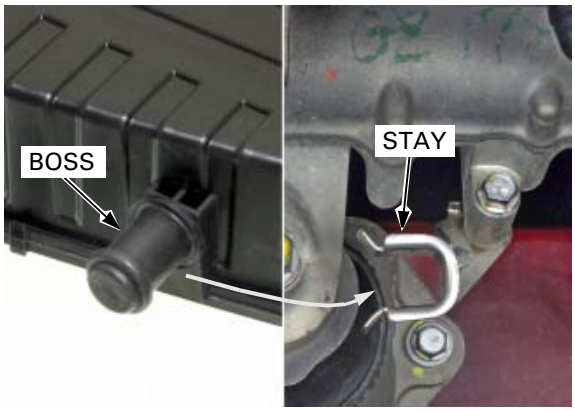
Route the drain hose properly (page 1-31 or 1-52).

Insert the airbox into the hull.
Set the airbox properly by aligning the mounting boss with the stay.

Always replace the O-rings with new ones.

Install the removed parts in the reverse order of removal.

TORQUE:
Mounting bolt: 7.8 N·m (0.8 kgf·m, 5.8 lbf·ft)
Air funnel screw: 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)
Cover screw: 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)



THROTTLE BODY/INTAKE MANIFOLD

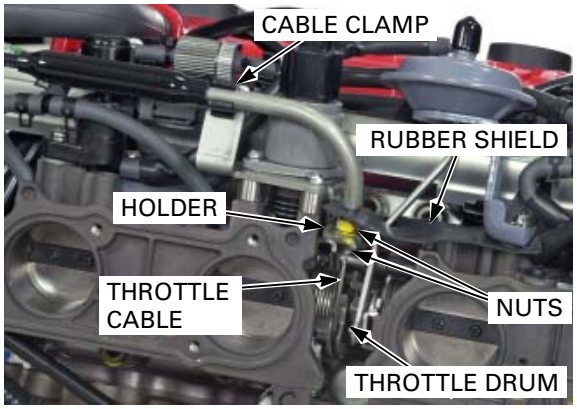
REMOVAL

ARX1200T3/T3D: Remove the sub-airbox (page 8-85).
ARX1200N3: Remove the airbox (page 8-92).

Release the rubber shield.
Loosen the cable setting nuts and remove the throttle cable from the cable holder.
Disconnect the throttle cable end from the throttle drum.

NOTICE

Do not snap the throttle valve from full open to full closed after the throttle cable has been removed. It may damage the throttle bores and cause incorrect idle operation.

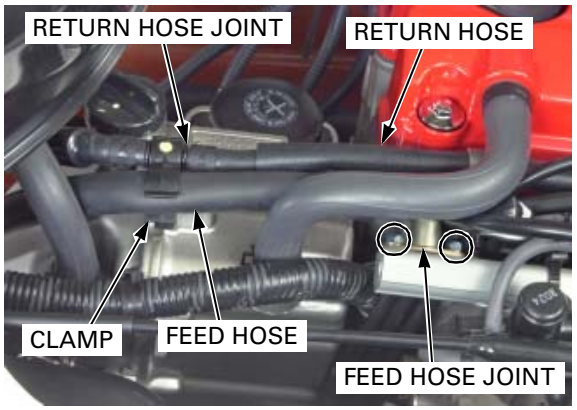


Remove the throttle cable from the clamp.

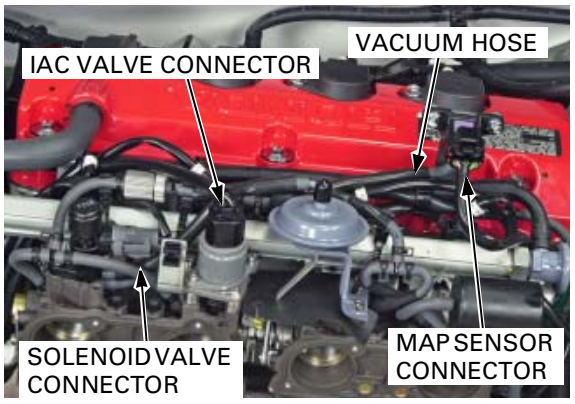
Relieve the fuel pressure (page 8-79).

Disconnect the fuel return hose from the return hose joint.

Remove the fuel feed hose from the clamp.
Remove the two bolts, feed hose joint and O-ring from the fuel rail.

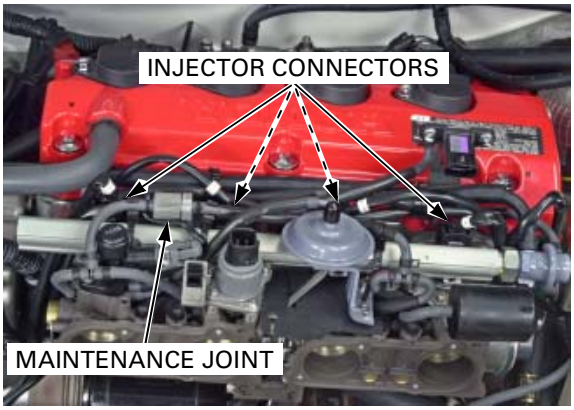


Disconnect the following:
– MAP sensor 2P black connector
– vacuum hose from the MAP sensor
– IAC valve 4P black connector
– off-throttle steering solenoid valve 3P black connector



– four fuel injector 2P black connectors

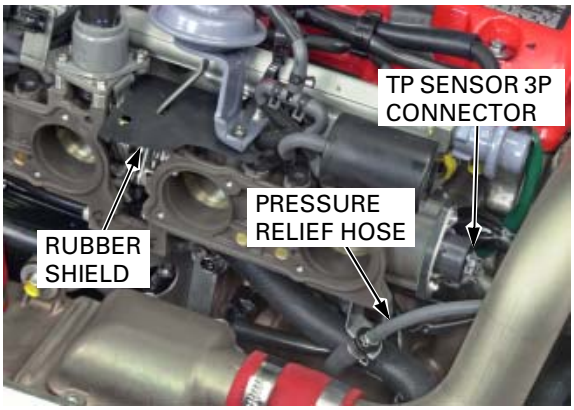
Remove the maintenance joint hoses from the clips (ARX1200T3/T3D: 2 clips/ARX1200N3: 3 clips).



Disconnect the TP sensor 3P gray connector.

Remove the rubber shield.

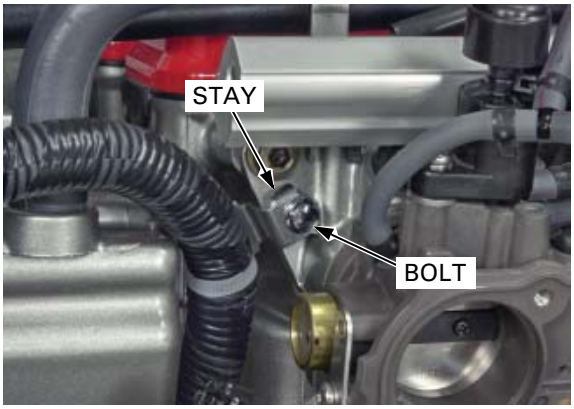
Remove the pressure relief hose of the wastegate control solenoid valve from the stay on the throttle body.

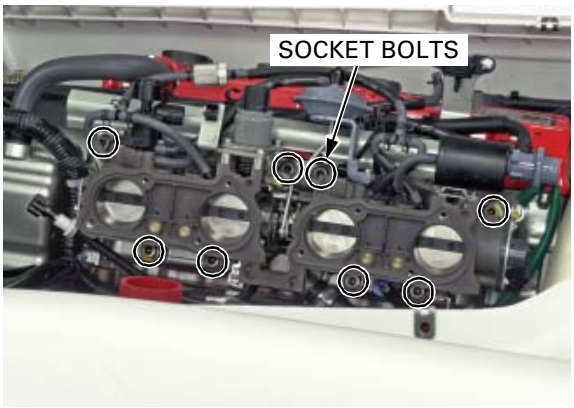


Remove the wire band stay bolt.
Remove the eight socket bolts and the throttle body/intake manifold assembly.

Remove the two dowel pins and four O-rings.

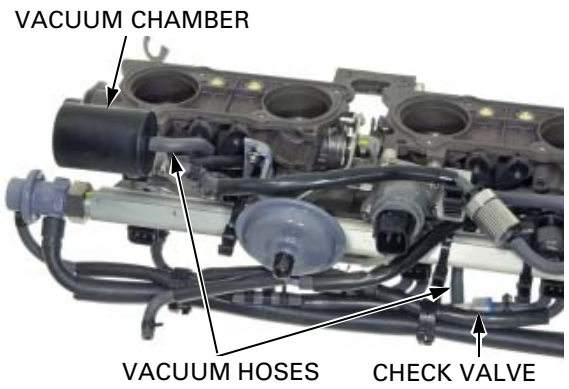
Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the engine.





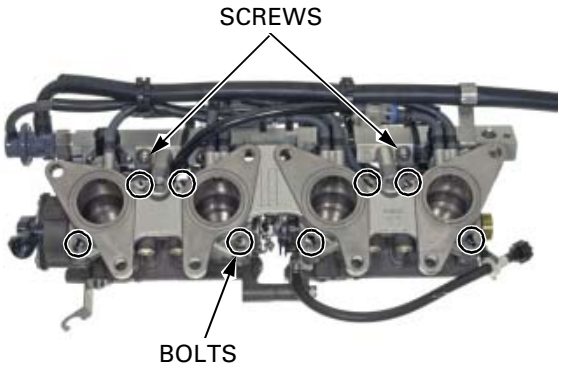
SEPARATION

Disconnect the vacuum hoses from the vacuum chamber and check valve.



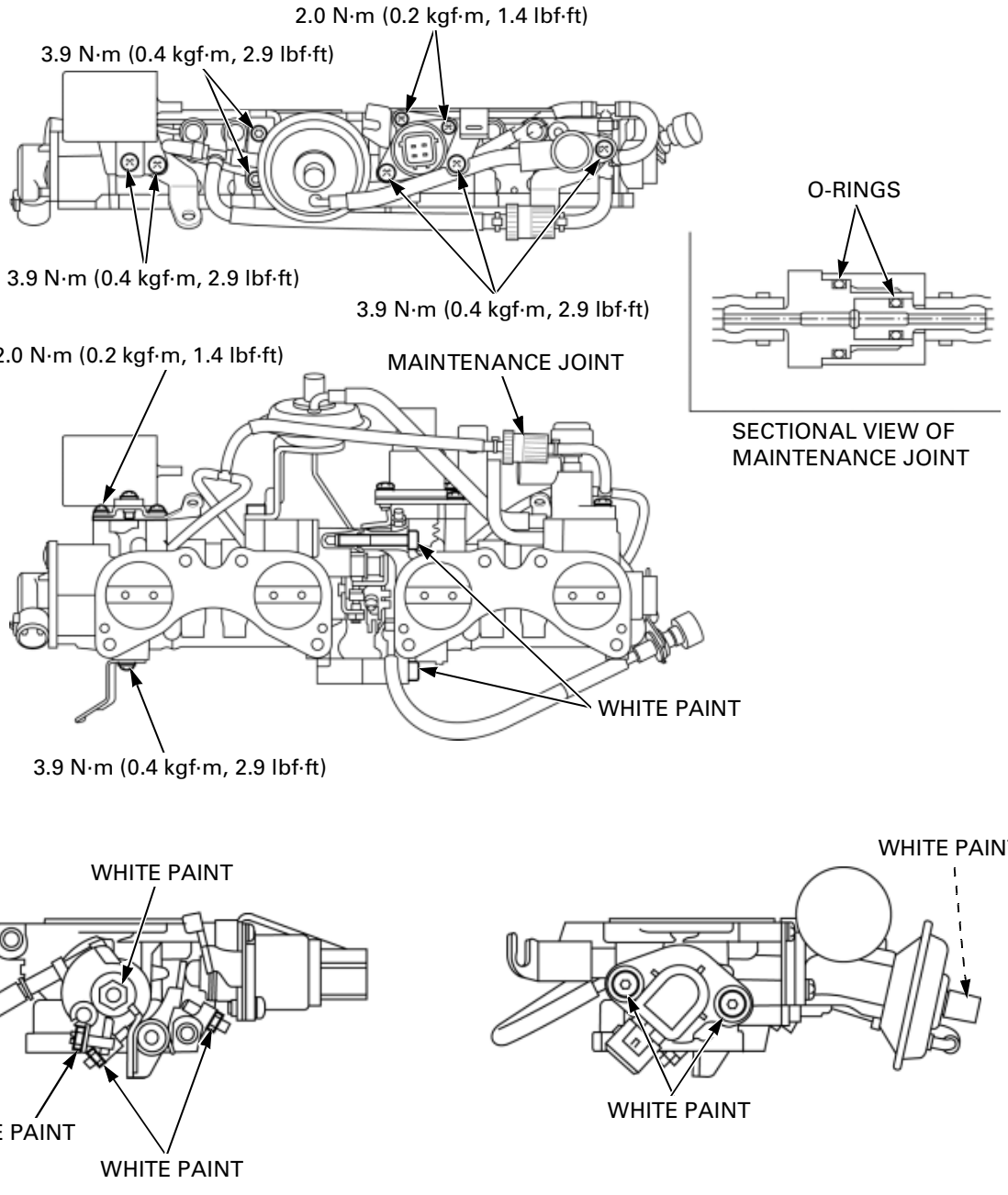
Remove the two screws.
Remove the eight bolts and separate the intake manifold from the throttle body.

Remove the two dowel pins and four O-rings.

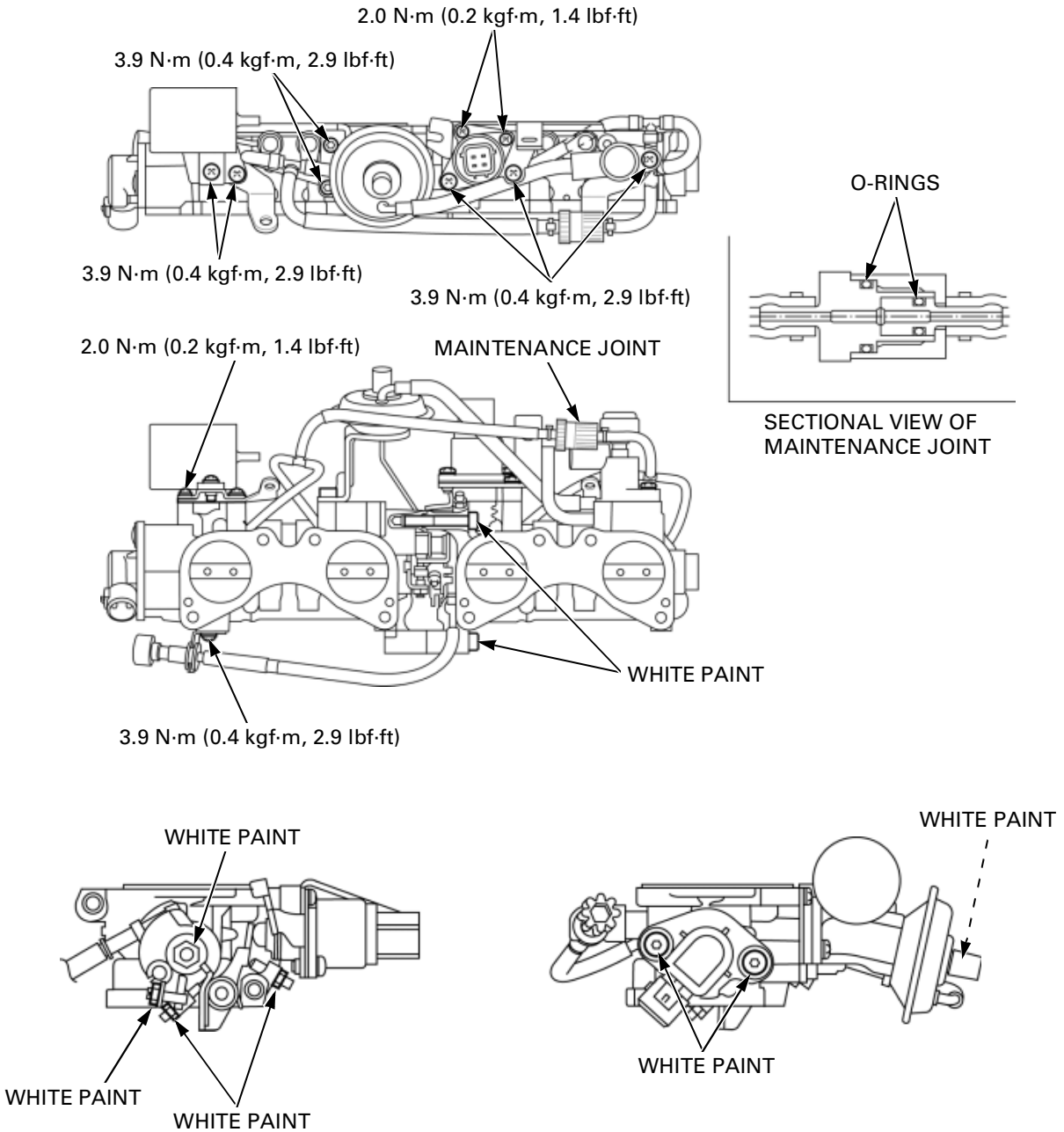


- Do not loosen or tighten the white painted bolts, nuts and screws on the throttle body. Loosening or tightening them can cause throttle and idle valve synchronization failure.
- Tighten the bolts and screws of the throttle body to the specified torque. The parts of the throttle body not shown in this manual should not be disassembled.

ARX1200T3/T3D



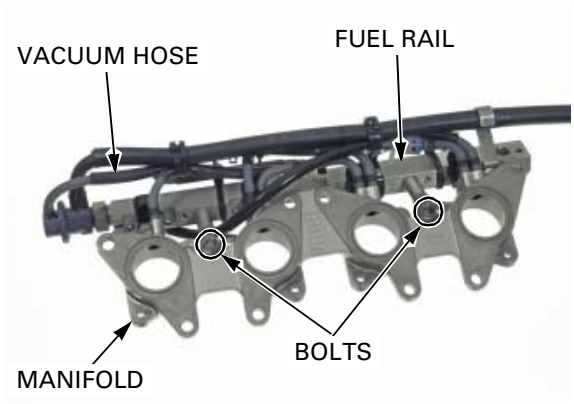
ARX1200N3


2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)
3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)
3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)
3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)
O-RINGS
SECTIONAL VIEW OF MAINTENANCE JOINT
2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)
MAINTENANCE JOINT
WHITE PAINT
3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)
WHITE PAINT
WHITE PAINT
WHITE PAINT
WHITE PAINT
WHITE PAINT

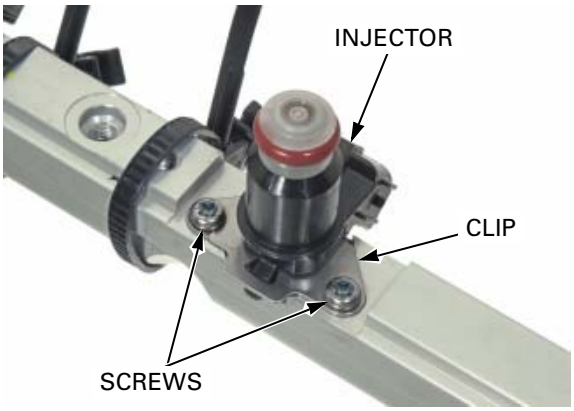
INJECTOR REPLACEMENT

Disconnect the vacuum hose from the pressure regulator.

Remove the two bolts and fuel rail from the intake manifold. Remove the joint collars.



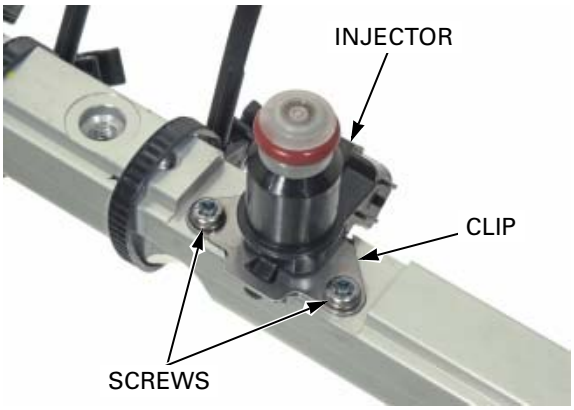
Remove the two screws, injector clip and injector from the fuel rail.



Apply engine oil to the O-rings of a new injector.

Install the injector into the fuel rail, aligning the lug with the groove in the fuel rail.
Install the injector clip and tighten the two screws.

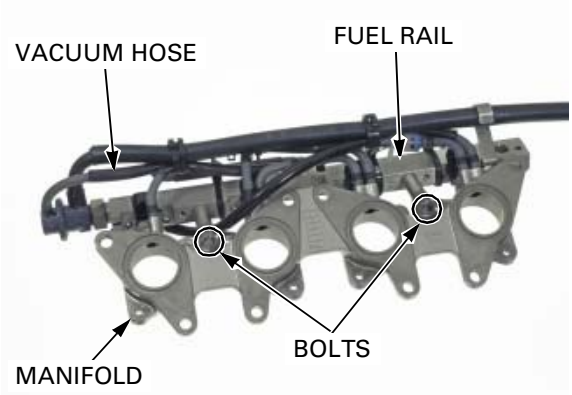
TORQUE: 2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)



Install the fuel rail while inserting the injectors into the intake manifold, and tighten the two bolts.

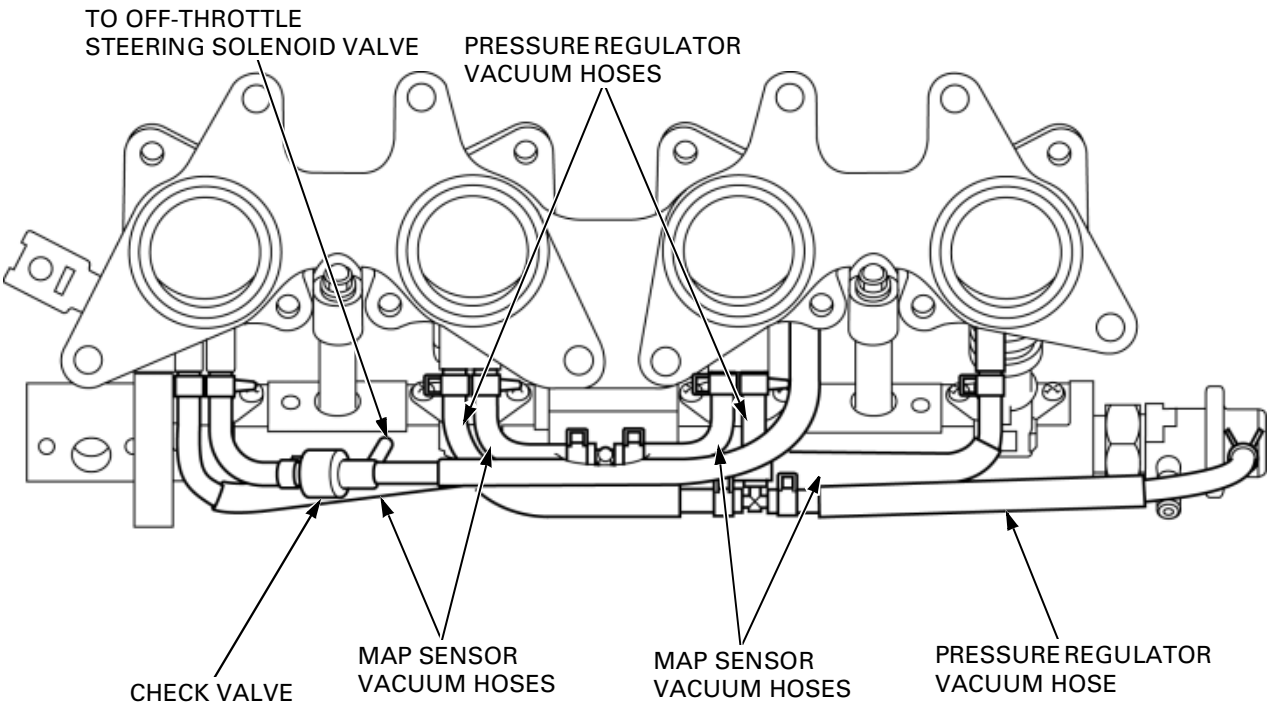
TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

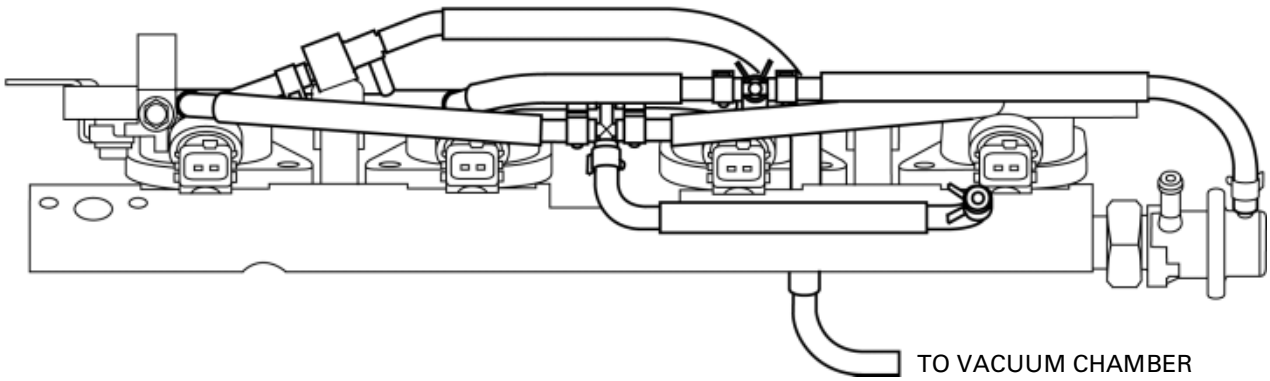
Connect the vacuum hose to the pressure regulator.



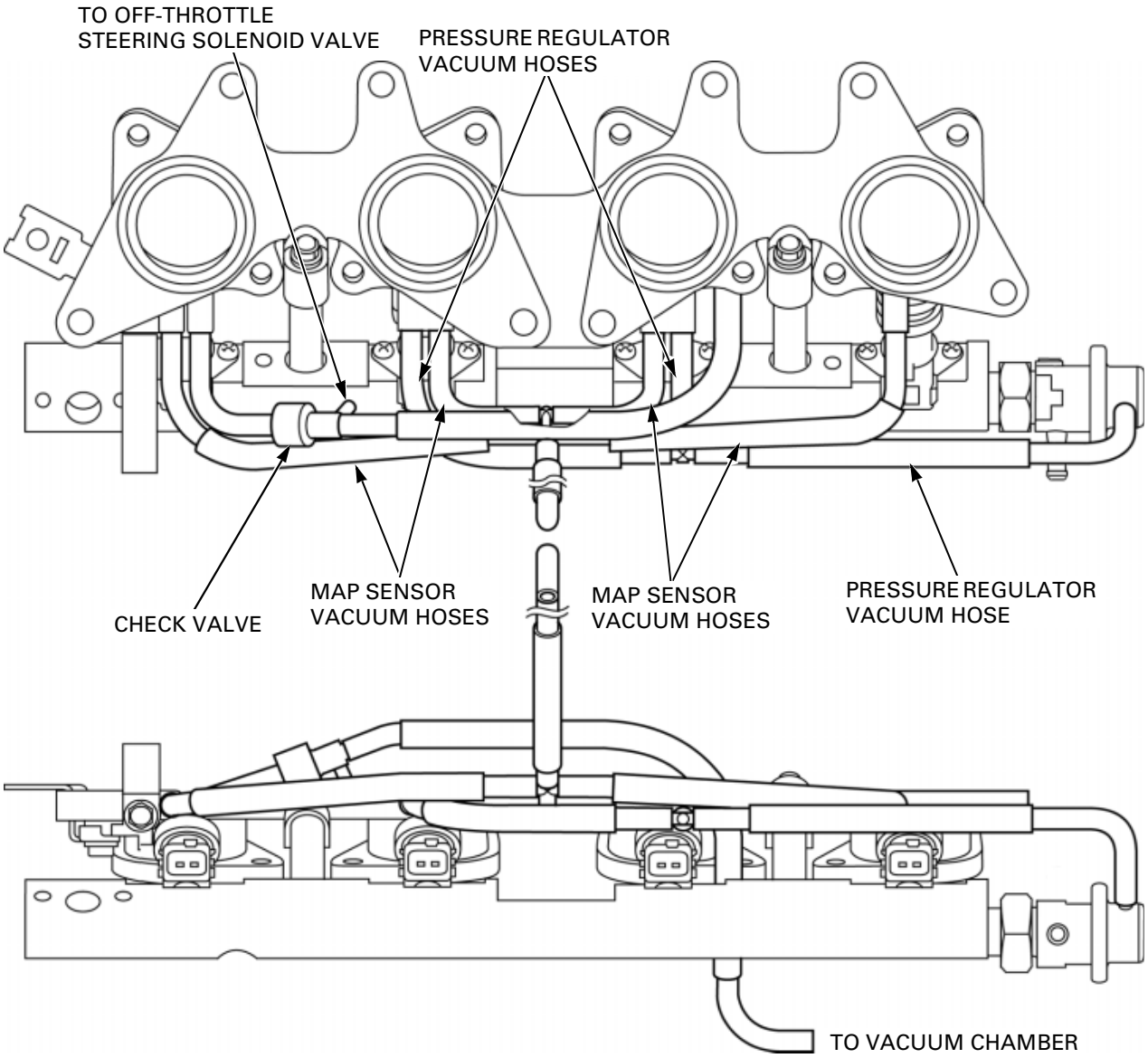
INTAKE MANIFOLD VACUUM HOSE ROUTING

ARX1200T3/T3D:



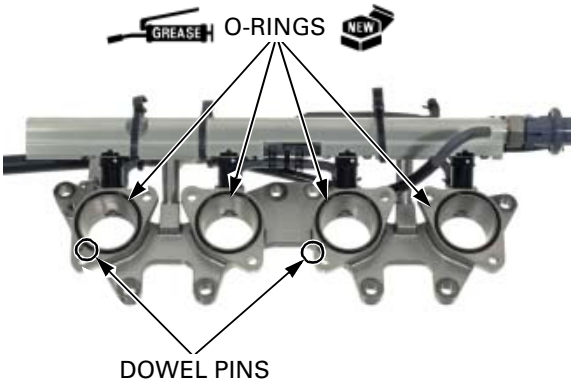


ARX1200N3:



ASSEMBLY

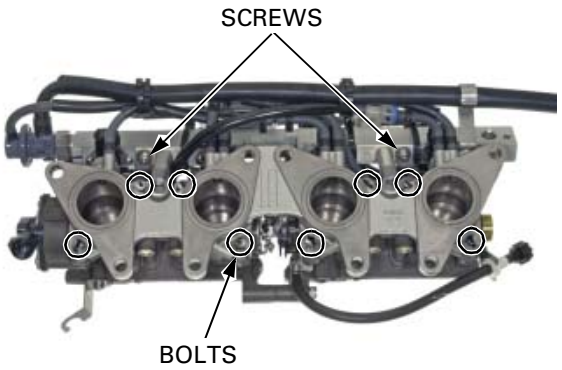
Install the two dowel pins.
Coat four new O-rings with grease and install them onto the intake manifold.



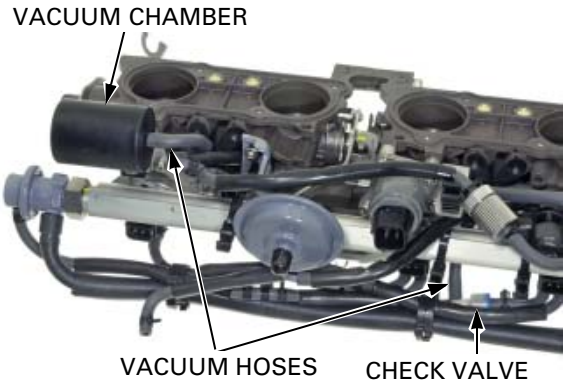
Assemble the intake manifold and throttle body, and tighten the eight bolts.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Install and tighten the two screws.

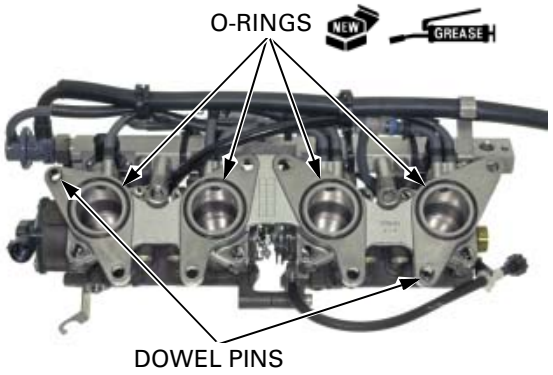


Connect the vacuum hoses to the check valve and vacuum chamber.



INSTALLATION

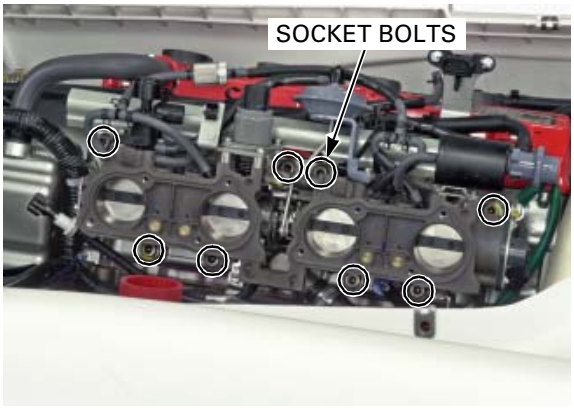
Install the two dowel pins.
Coat four new O-rings with grease and install them into the intake manifold grooves.

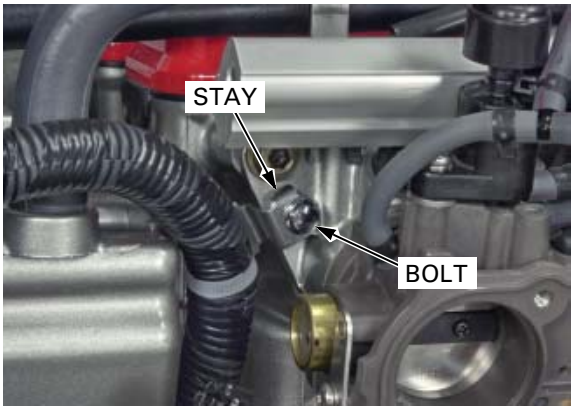


Install the throttle body/intake manifold assembly onto the cylinder head.
Install the eight socket bolts and tighten them.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

Install the wire band stay and tighten the bolt.

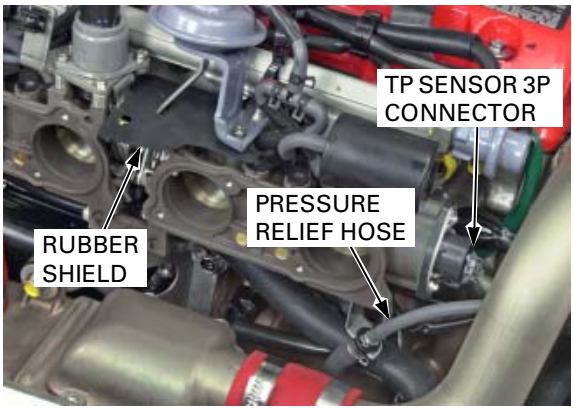




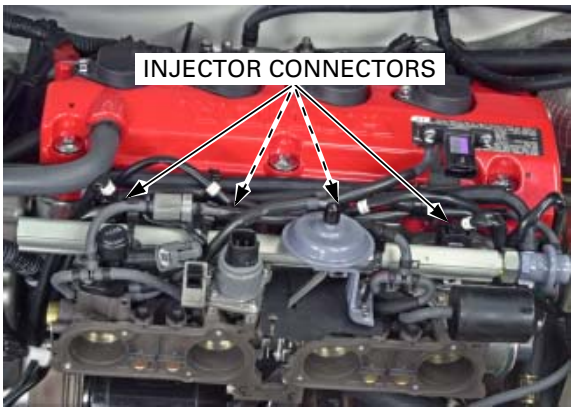
Install the pressure relief hose into the stay.

Connect the TP sensor 3P gray connector.

Install the rubber shield.

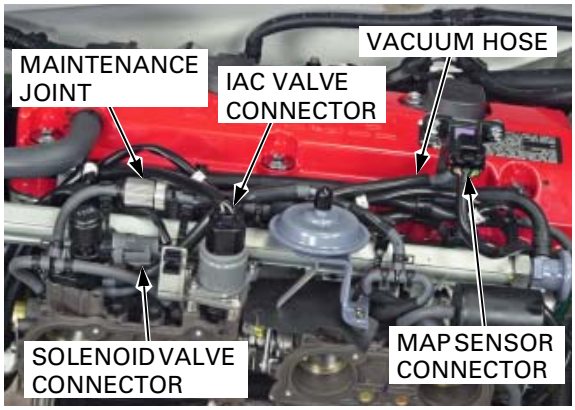


Connect the following:
– four fuel injector 2P black connectors

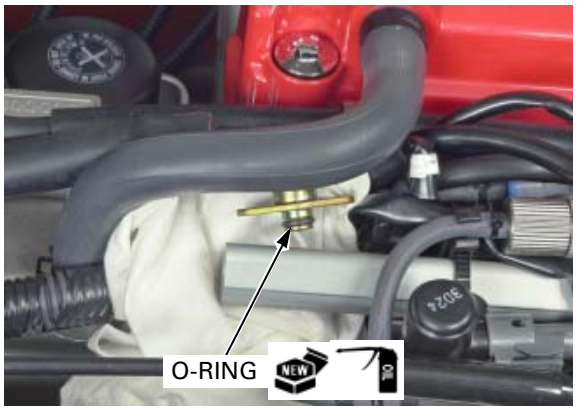


– off-throttle steering solenoid valve 2P gray connector
– IAC valve 4P black connector
– vacuum hose to the MAP sensor
– MAP sensor 3P black connector

Install the maintenance joint hose into the clips (ARX1200T3/T3D: 2 clips/ARX1200N3: 3 clips).



Coat a new O-ring with oil and install it into the fuel feed hose joint groove.

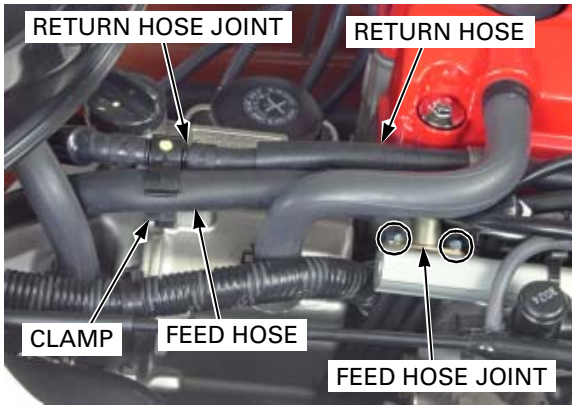


Install the hose joint into the fuel rail.
Install and tighten the hose joint bolts.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Install the feed hose onto the clamp.

Connect the fuel return hose to the return hose joint.

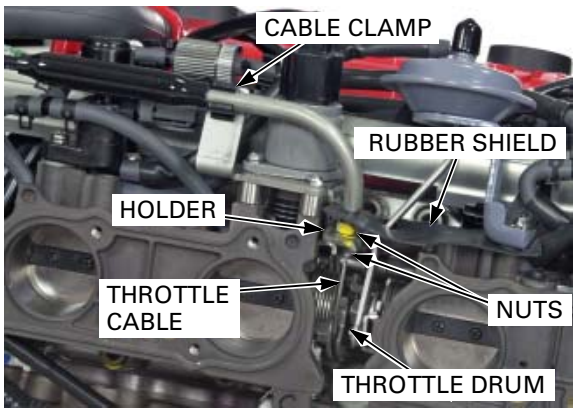


Install the throttle cable into the cable clamp.

Connect the throttle cable end to the throttle drum.
Install the throttle cable into the cable holder and secure it with the setting nuts.

TORQUE: 8.8 N·m (0.9 kgf·m, 6.5 lbf·ft)

Place the rubber shield properly.



ARX1200T3/T3D: Install the sub-airbox (page 8-87).
ARX1200N3: Install the airbox (page 8-93).

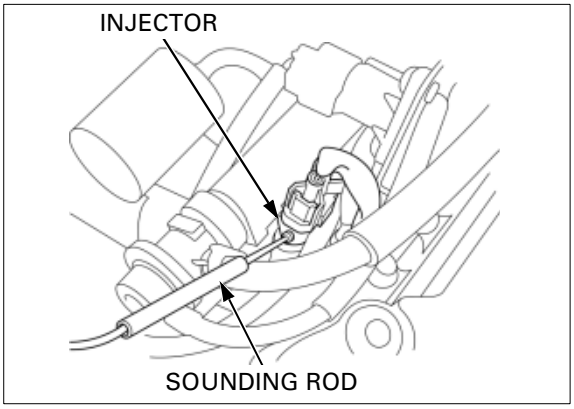
Adjust and lubricate the throttle cable (page 4-5).

INJECTOR

INSPECTION

Start the engine and let it idle.
Confirm proper injector operation with a sounding rod or stethoscope.

If the injector does not operate, remove the throttle body/intake manifold assembly (page 8-94), separate the intake manifold from the throttle body (page 8-96) and replace the injector (page 8-99).



PRESSURE REGULATOR

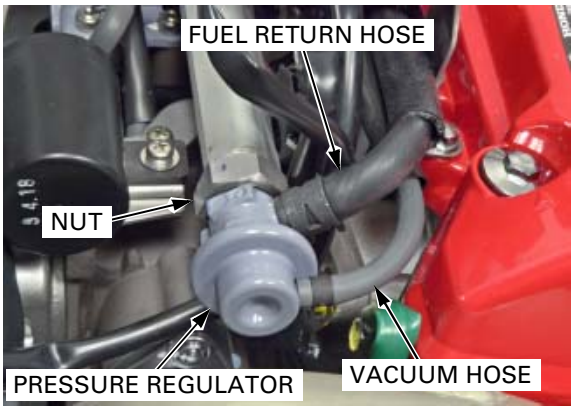
REPLACEMENT

NOTICE

Do not apply excessive force to the fuel rail. Excessive force will break the fuel rail and cause a fuel leak.

Remove the passenger grab rail (page 3-5).
Release the fuel pressure (page 8-79).

Disconnect the fuel return hose and vacuum hose from the pressure regulator.
Hold the fuel rail with an adjustable wrench and loosen the pressure regulator nut.
Remove the pressure regulator and joint pipe.



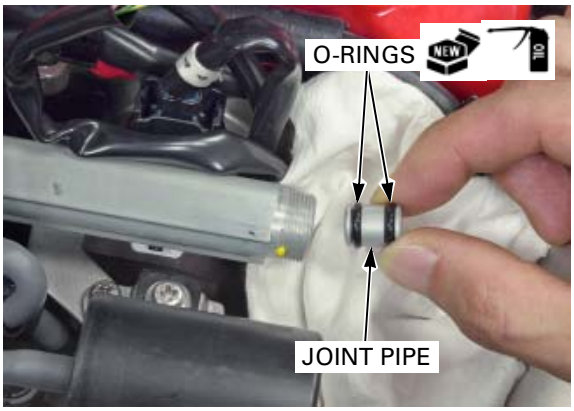
Coat new O-rings with oil and install them onto the joint pipe.
Install the joint pipe into the fuel rail.

Install the pressure regulator onto the fuel rail.
Hold the fuel rail with an adjustable wrench and tighten the pressure regulator nut.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)

Connect the vacuum hose and fuel return hose to the pressure regulator.

Install the passenger grab rail (page 3-5).

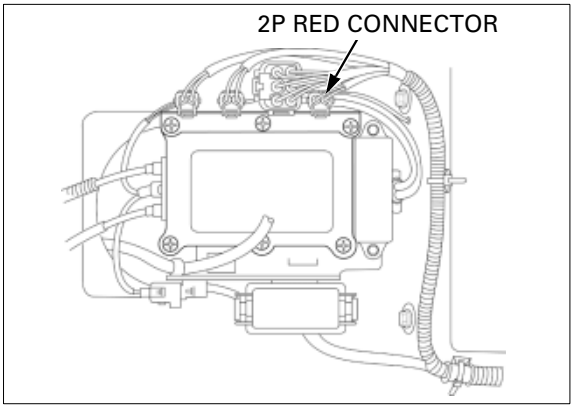


FUEL PUMP RELAY

INSPECTION

Remove the passenger grab rail (page 3-5).

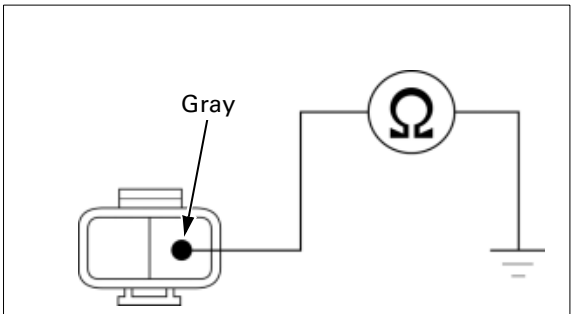
Disconnect the relay box 2P red connector.
Check the connector for loose contacts or corroded terminals.



SIGNAL LINE

Check for continuity between the Gray wire terminal of the wire harness side connector and ground.

- There should be no continuity with the safety lanyard clip removed.
  If there is continuity, check for a short circuit in the Gray wire between the relay box and ECM.
- Fit the safety lanyard clip to the base of the engine stop switch.
  There should be continuity for a few seconds.
  If there is no continuity, check for an open circuit in the Gray wire between the relay box and ECM.

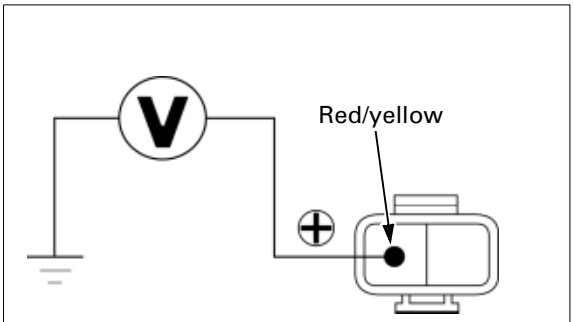


WIRE HARNESS SIDE 2P CONNECTOR
(viewed from the terminal side)

RELAY COIL POWER INPUT LINE

Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the Red/yellow wire terminal of the wire harness side connector and ground.
There should be battery voltage.

If there is no voltage, check the following:
– open circuit in the Red/yellow wire between the relay box and fuse box
– sub-fuse C (7.5 A)
– open circuit in the Red/black wire between the relay box and fuse box
– main relay and its circuit (page 19-19)



WIRE HARNESS SIDE 2P CONNECTOR
(viewed from the terminal side)

FUNCTION TEST

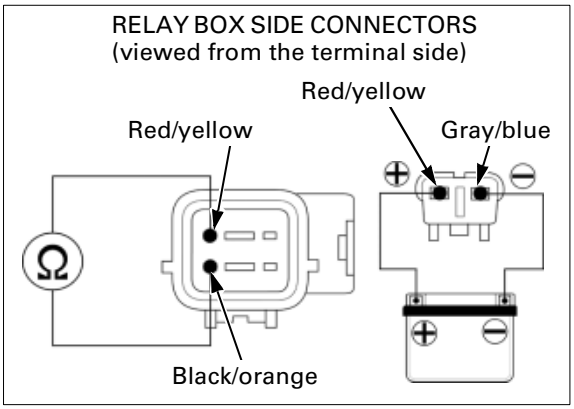
With the safety lanyard clip removed, disconnect the relay box 6P connector.
Connect an ohmmeter to the relay box side 6P connector terminals.

CONNECTION: Red/yellow – Black/orange

Connect a fully charged 12V battery to the relay box side 2P connector terminals.

CONNECTION: Red/yellow (+) – Gray/blue (–)

There should be continuity while the 12V battery is connected to the relay box connector terminals and there should be no continuity when the battery is disconnected.



MAP/TCP SENSOR

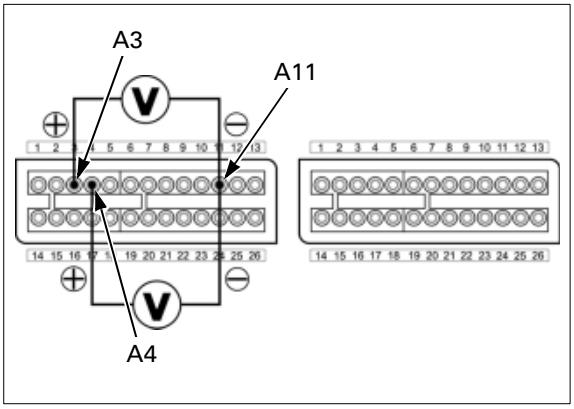
OUTPUT VOLTAGE INSPECTION

Connect the test harness to the ECM (page 8-12).

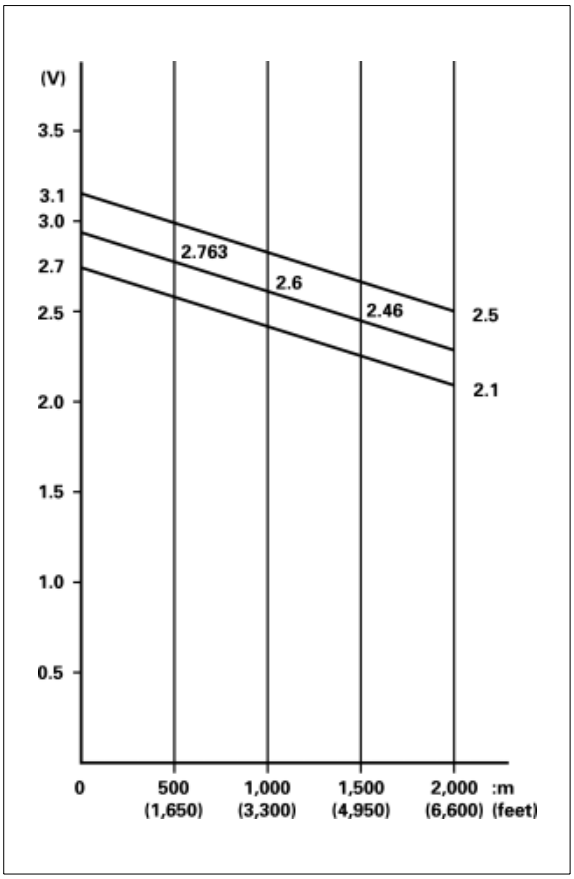
Measure the voltage between the test harness connector terminals.

Connection: MAP: A3 (+) – A11 (–)
TCP (ARX1200T3/T3D): A4 (+) – A11 (–)

STANDARD: 2.7 – 3.1 V (1,013 hPa/760 mmHg)



The sensor output voltage (above) is measured under the standard atmosphere (1 atm = 1,030 hPa/760 mmHg).
The sensor output voltage is changed by altitude as shown in the chart, because it varies in accordance with the atmospheric pressure.



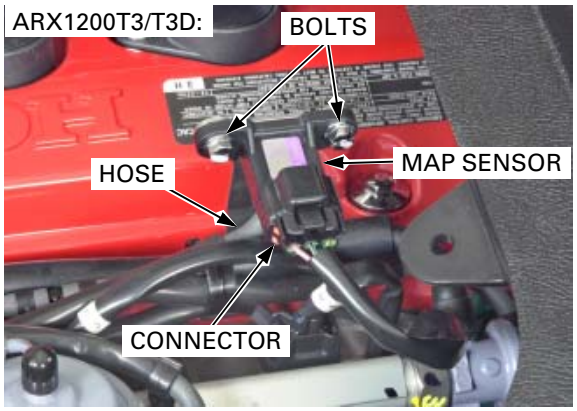
MAP SENSOR REPLACEMENT

ARX1200T3/T3D

Remove the seats (page 3-4).

Disconnect the vacuum hose and 3P black connector from the MAP sensor.
Remove the two bolts and the MAP sensor from the stay.

Installation is in the reverse order of removal.



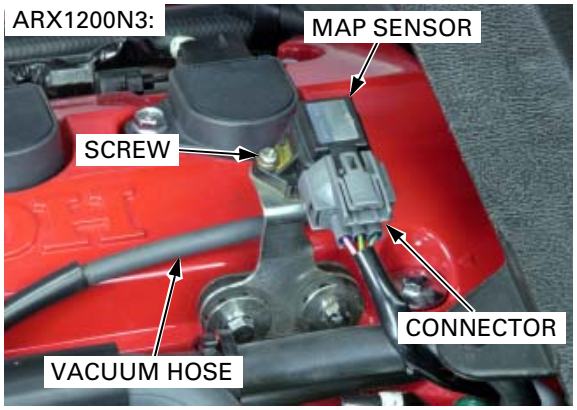
ARX1200N3

Remove the seats (page 3-4).

Disconnect the vacuum hose and 3P black connector from the MAP sensor.
Remove the screw and the MAP sensor from the stay.

Installation is in the reverse order of removal.

TORQUE: Screw: 2.9 N·m (0.3 kgf·m, 2.2 lbf·ft)

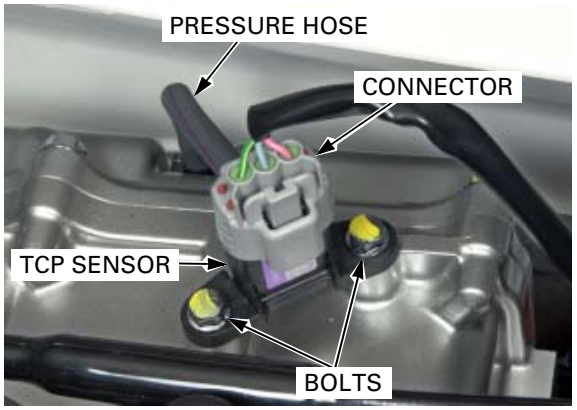


TCP SENSOR REPLACEMENT (ARX1200T3/T3D only)

Remove the seats (page 3-4).

Disconnect the pressure hose and 3P gray connector from the TCP sensor.
Remove the two bolts and TCP sensor from the sub-airbox.

Installation is in the reverse order of removal.



ECT SENSOR

REPLACEMENT

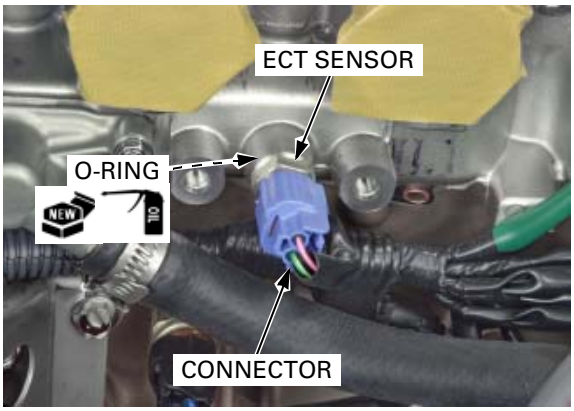
ARX1200T3/T3D: Remove the intercooler (page 13-12).
ARX1200N3: Remove the airbox (page 8-92).

Disconnect the ECT sensor 2P blue connector.
Remove the ECT sensor and O-ring from the cylinder head.

Coat a new O-ring with oil and install it onto a new ECT sensor.
Install and tighten the ECT sensor.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Connect the ECT sensor 2P connector.



IAT SENSOR

REPLACEMENT

ARX1200T3/T3D

Remove the seats (page 3-4).

Disconnect the IAT sensor 2P connector.
Remove the IAT sensor and O-ring from the sub-airbox.

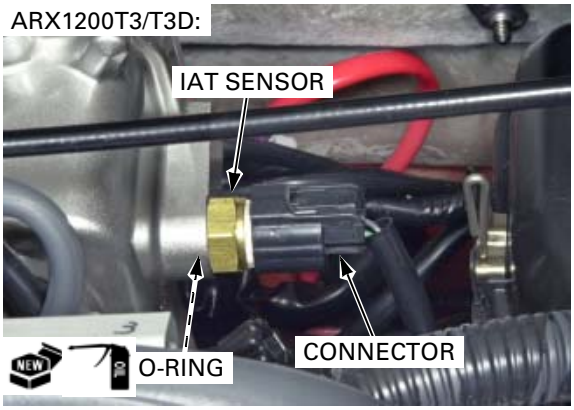
Coat a new O-ring with oil and install it onto a new IAT sensor.
Install and tighten the IAT sensor.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Connect the IAT sensor 2P connector.

Install the seats (page 3-4).

ARX1200T3/T3D:



ARX1200N3

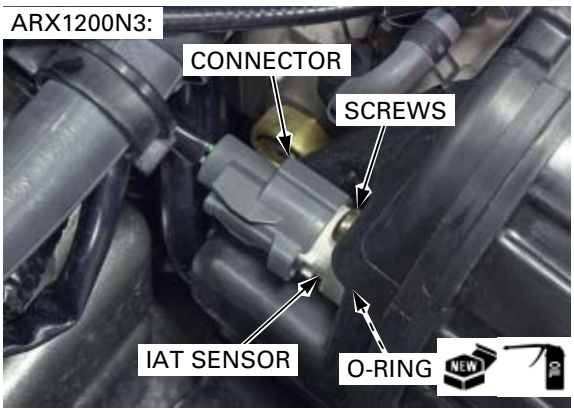
Remove the right side panel (page 3-5).

Disconnect the IAT sensor 2P connector.
Remove the two screws, IAT sensor and O-ring from the airbox.

Coat a new O-ring with oil and install it onto a new IAT sensor.
Install the IAT sensor and tighten the two screws.
Connect the IAT sensor 2P connector.

Install the side panel (page 3-5).

ARX1200N3:



CAMSHAFT POSITION SENSOR

REMOVAL

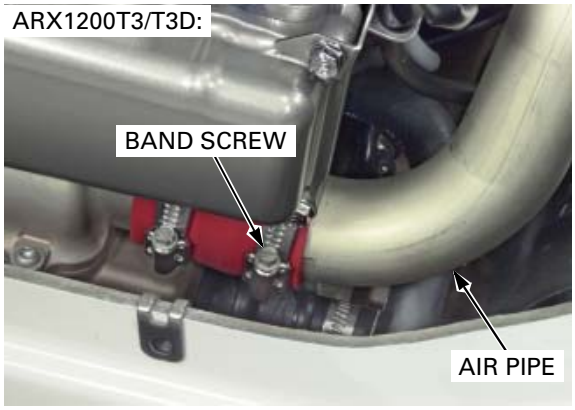
Remove the left side panel (page 3-5).

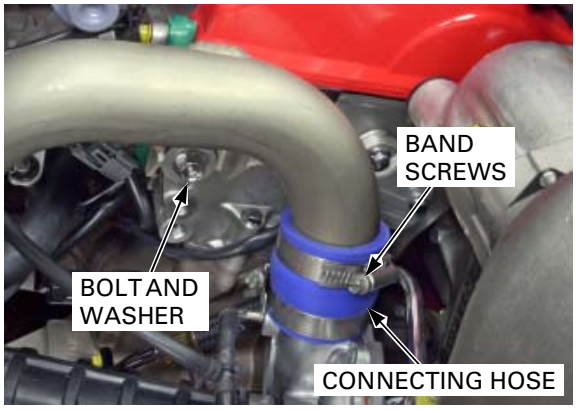
ARX1200T3/T3D: Loosen the connecting hose band screw at the intercooler.

Remove the bolt and washer.

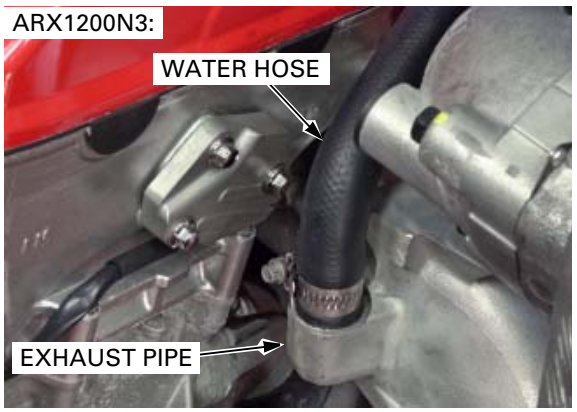
Loosen the connecting hose band screw at the turbocharger.

Remove the air pipe from the connecting hoses. Loosen the hose band screw and remove the connecting hose from the turbocharger.

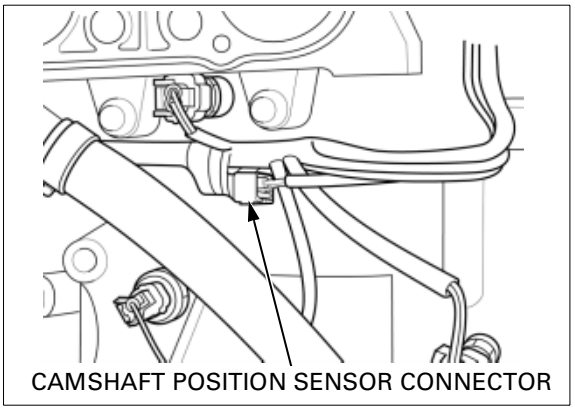




ARX1200N3: Loosen the hose clamp and disconnect the water hose from the exhaust pipe.

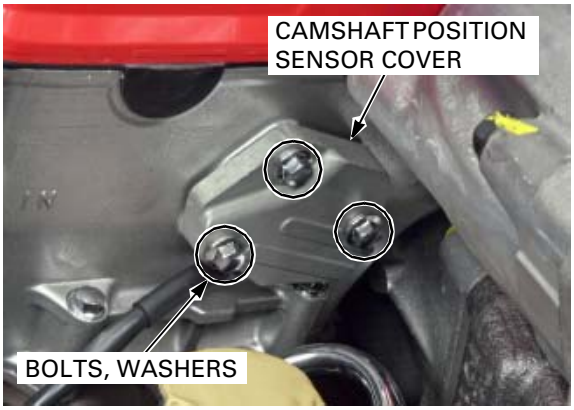


Disconnect the camshaft position sensor 2P connector.

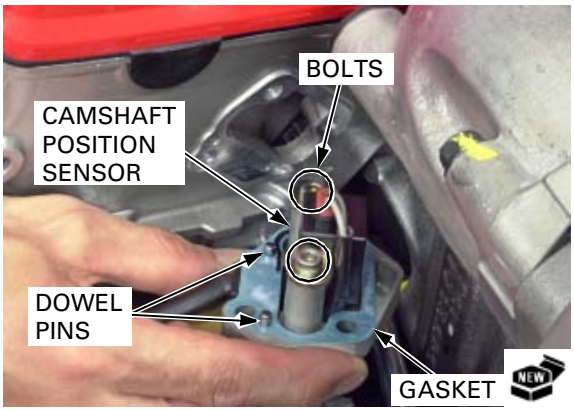


Cover the air outlet port of the turbocharger with a clean cloth or tape to prevent the bolts and washer from falling into the turbocharger (ARX1200T3/T3D).

Remove the three bolts, washers and camshaft position sensor cover from the cylinder head.



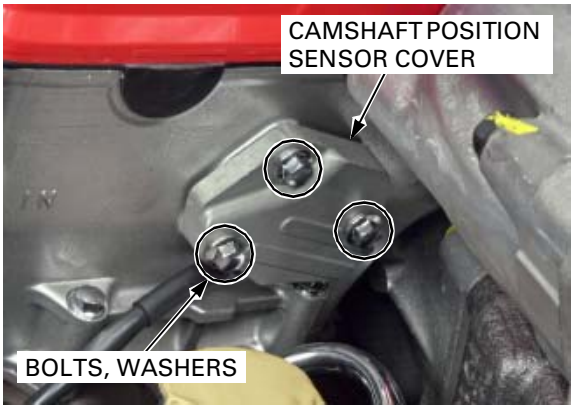
Remove the gasket.
Remove the two socket bolts and camshaft position sensor from the cover.



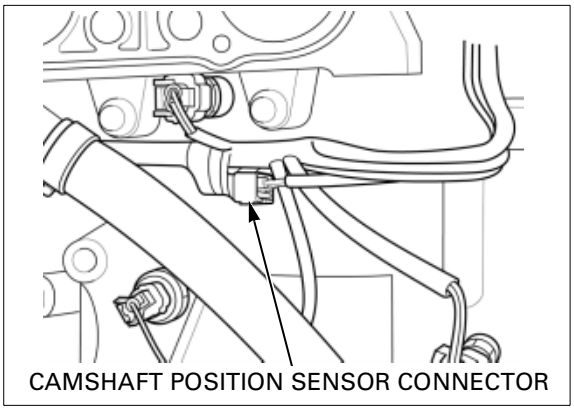
INSTALLATION

Install the camshaft position sensor onto the cover and tighten the two socket bolts.
Install a new gasket onto the camshaft position sensor cover.
Install the camshaft position sensor cover, aligning the dowel pins with the hole in the cylinder head.

Install the three bolts and washers and tighten the bolts.



Connect the camshaft position sensor 2P connector.

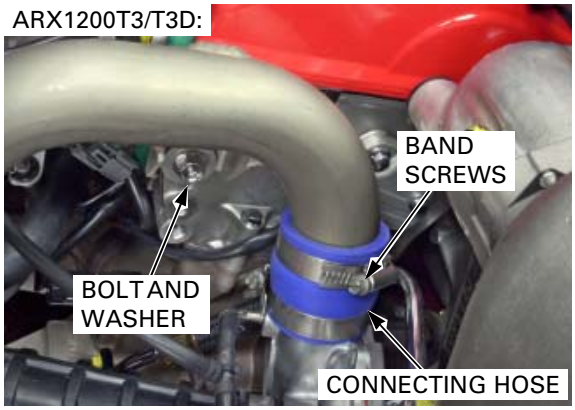


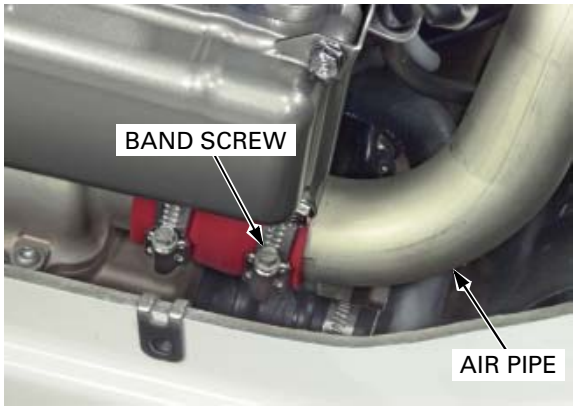
ARX1200T3/T3D: Install the connecting hose onto the turbocharger and tighten the hose band screw.

Install the air pipe into the connecting hoses.
Install the bolt and washer, and tighten the bolt.

Tighten the hose band screws.

ARX1200T3/T3D:





ARX1200N3: Connect the water hose and tighten the hose clamp.

ARX1200N3:

Remove the side panel (page 3-5).

KNOCK SENSOR

REPLACEMENT

ARX1200T3/T3D: Remove the intercooler (page 13-12).
ARX1200N3: Remove the airbox (page 8-92).

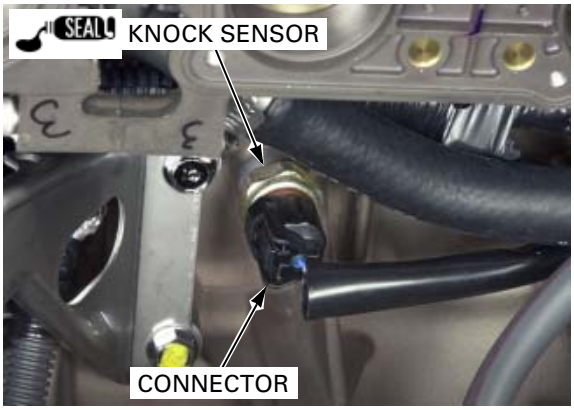
Disconnect the knock sensor connector.
Remove the knock sensor from the cylinder.

Apply sealant to the threads of a new knock sensor.
Install and tighten the knock sensor.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

Connect the knock sensor connector.

Install the intercooler (ARX1200T3/T3D: page 13-12) or airbox (ARX1200N3: page 8-93).



ENGINE OIL TEMPERATURE SENSOR

REPLACEMENT

Remove the passenger grab rail (page 3-5).

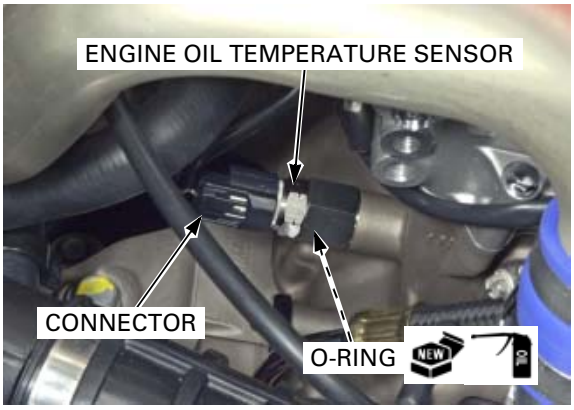
Disconnect the engine oil temperature sensor 2P connector.
Remove the engine oil temperature sensor from the crankcase.
Remove the O-ring.

Coat a new O-ring with oil and install it onto a new engine oil temperature sensor.
Install and tighten the engine oil temperature sensor.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Connect the engine oil temperature sensor 2P connector.

Install the passenger grab rail (page 3-5).



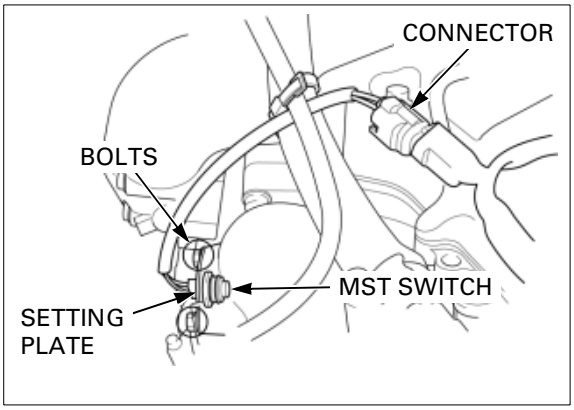
MST SWITCH

REMOVAL

Remove the right side panel (page 3-5).

Disconnect the MST switch 2P connector.

Remove the two bolts, setting plate and MST switch from the exhaust manifold.



INSPECTION

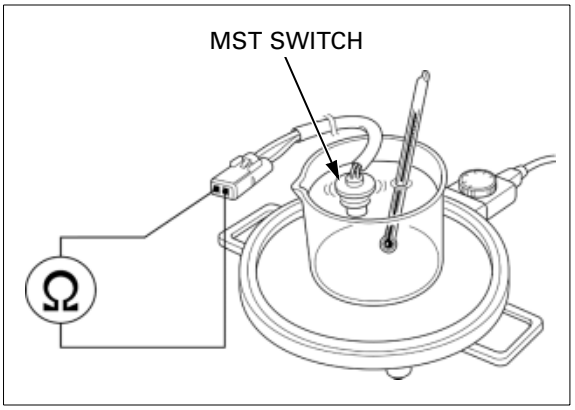
Keep all flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.

Soak the MST switch in a pan of oil on an electric heating element and check for continuity between the connector terminals as the oil heats up.

There should be continuity when the oil temperature reaches 150 ± 5°C (302 ± 9°F).

NOTE:

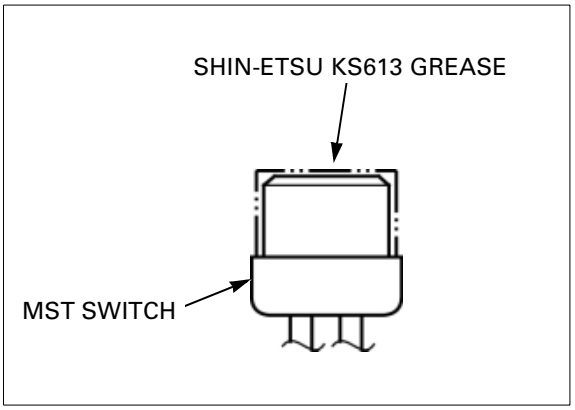
- Do not let the thermometer or MST switch touch the pan.



INSTALLATION

Only use the specified grease. This grease is a special thermally conductive silicone grease.

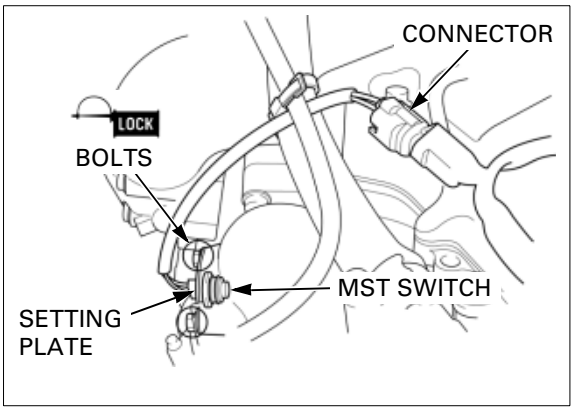
Apply SHIN-ETSU KS613 grease (1.4 cm^3) to the outer surface of a new MST switch as shown.



Apply locking agent to the bolt threads.
Install the MST switch, setting plate and bolts, and tighten the bolts.

Connect the MST switch 2P connector.

Install the right side panel (page 3-5).



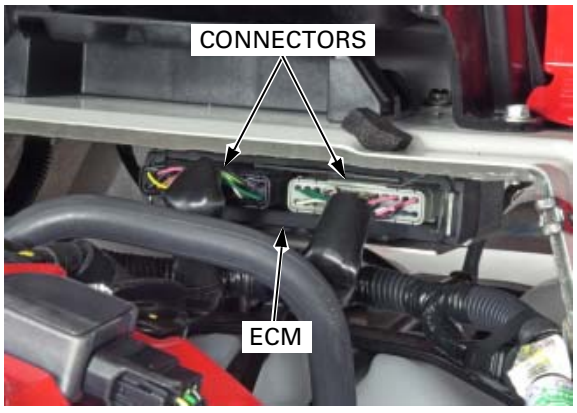
ENGINE CONTROL MODULE (ECM)

REMOVAL/INSTALLATION

Remove the seats (page 3-4).

Disconnect the ECM connectors and remove the ECM from the stay.

Install the ECM in the reverse order of removal.

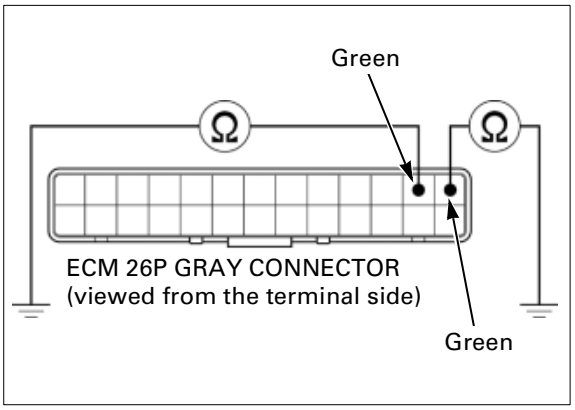


POWER/GROUND LINE INSPECTION

Disconnect the ECM 26P gray connector.

GROUND LINE

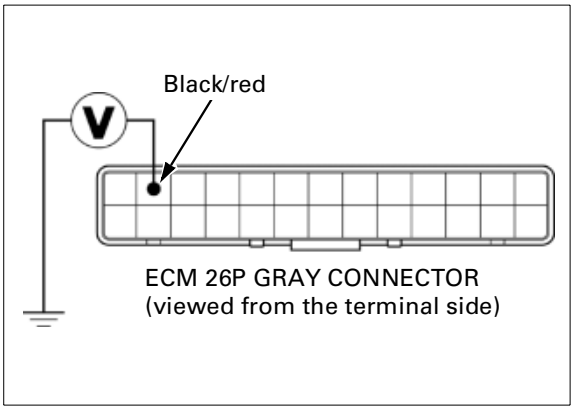
Check for continuity between the Green wire terminals and ground.
There should be continuity at all times.
If there is no continuity, check for an open circuit in the Green wire.



POWER INPUT LINE

Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the Black/red wire terminal (+) and ground (–).
There should be battery voltage.

If there is no voltage, check the following:
– open circuit in the Black/red wire between the ECM and fuse box
– sub-fuse D (7.5 A)
– open circuit in the Red/black wire between the fuse box and relay box
– main relay and its circuits

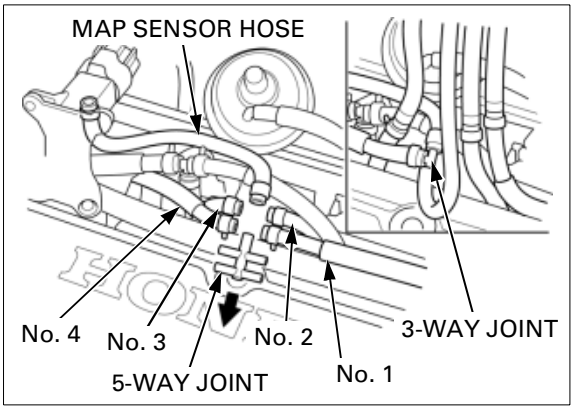


AIR SCREW ADJUSTMENT

ARX1200T3/T3D: Remove the seats (page 3-4).
ARX1200N3: Remove the rear tray (page 3-5).

Start the engine according to the flushing procedure (page 5-2) and let it idle for 5 minutes to warm it up. If the air temperature is below 10°C (50°F), let it idle for an additional 5 minutes (a total of 10 minutes). Turn off the water and stop the engine.

Disconnect the vacuum hoses from the 5-way joint. Connect the No. 4 cylinder vacuum hose and MAP sensor vacuum hose with a 3-way joint.
Connect the vacuum gauge to the No. 1, No. 2 and No. 3 cylinder vacuum hose and 3-way joint.



Start the engine according to the flushing procedure (page 5-2) and adjust the idle speed by turning the throttle stop screw.

IDLE SPEED: 1,200 ± 100 rpm

ARX1200T3/T3D:

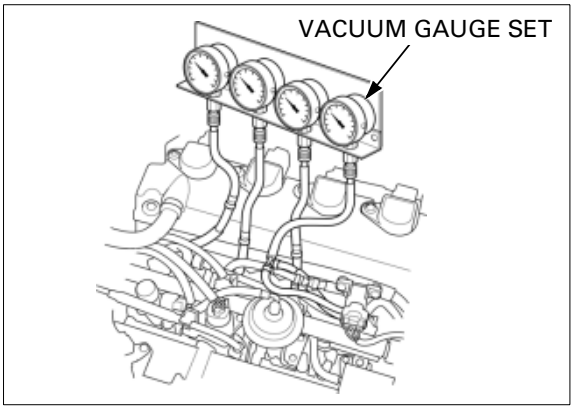
ARX1200N3:

Check the vacuum pressure difference in each intake manifold.

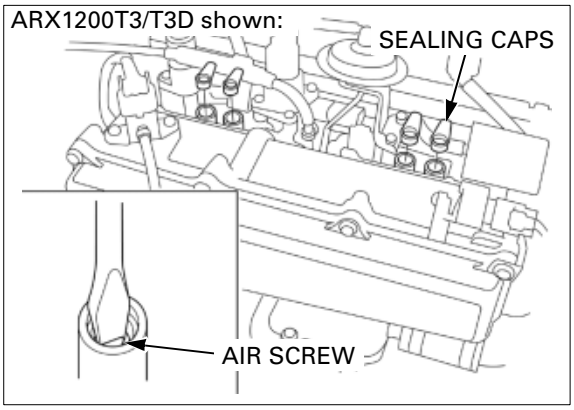
VACUUM PRESSURE DIFFERENCE: 20 mmHg (0.8 inHg)

TOOL:

Vacuum gauge set	**07LMJ-001000B or 07LMJ-001000A**



If the vacuum pressure difference does not fall within specification, remove the sealing caps of the air screws from the throttle body.

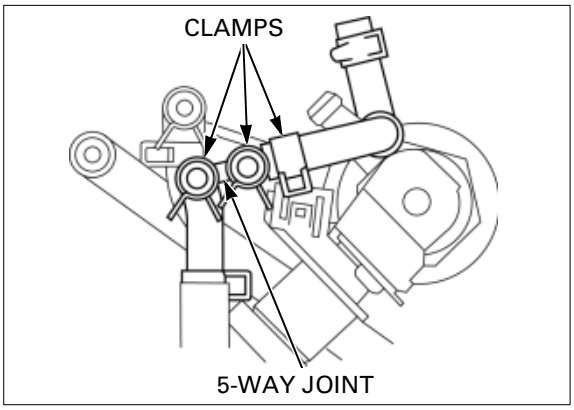


1. Tighten all the screws in, and then turn them out 1-1/4 of a turn.
2. Adjust the idle speed to 1,200 rpm using the throttle stop screw.
   The cylinder with the lowest pressure is the standard.
3. Adjust the pressure on the other cylinders using the air screws, until each pressure is the same as the standard cylinder.
4. If the pressure equals the standard cylinder, within two turns of the air screw, go to step 7.
   If the air screw is turned out more than two turns, and the pressure still does not equal the standard cylinder, this cylinder is now the standard.
5. Fully turn in the new standard cylinder air screw, and then turn it out two turns.
6. Tighten the other air screws all the way in and unscrew them until the pressures equal the standard cylinder.
   If any air screw is turned out more than two turns, go back to step 4, and begin again.
7. Adjust the idle speed to 1,200 rpm using the throttle stop screw.

Turn off the water, rev the engine for about 15 seconds and remove the safety lanyard clip off of the engine stop switch.

Note the clamp installation direction on the vacuum hoses.

Remove the vacuum gauge and 3-way joint, and connect the vacuum hoses and the 5-way joint.
Install the sealing caps.

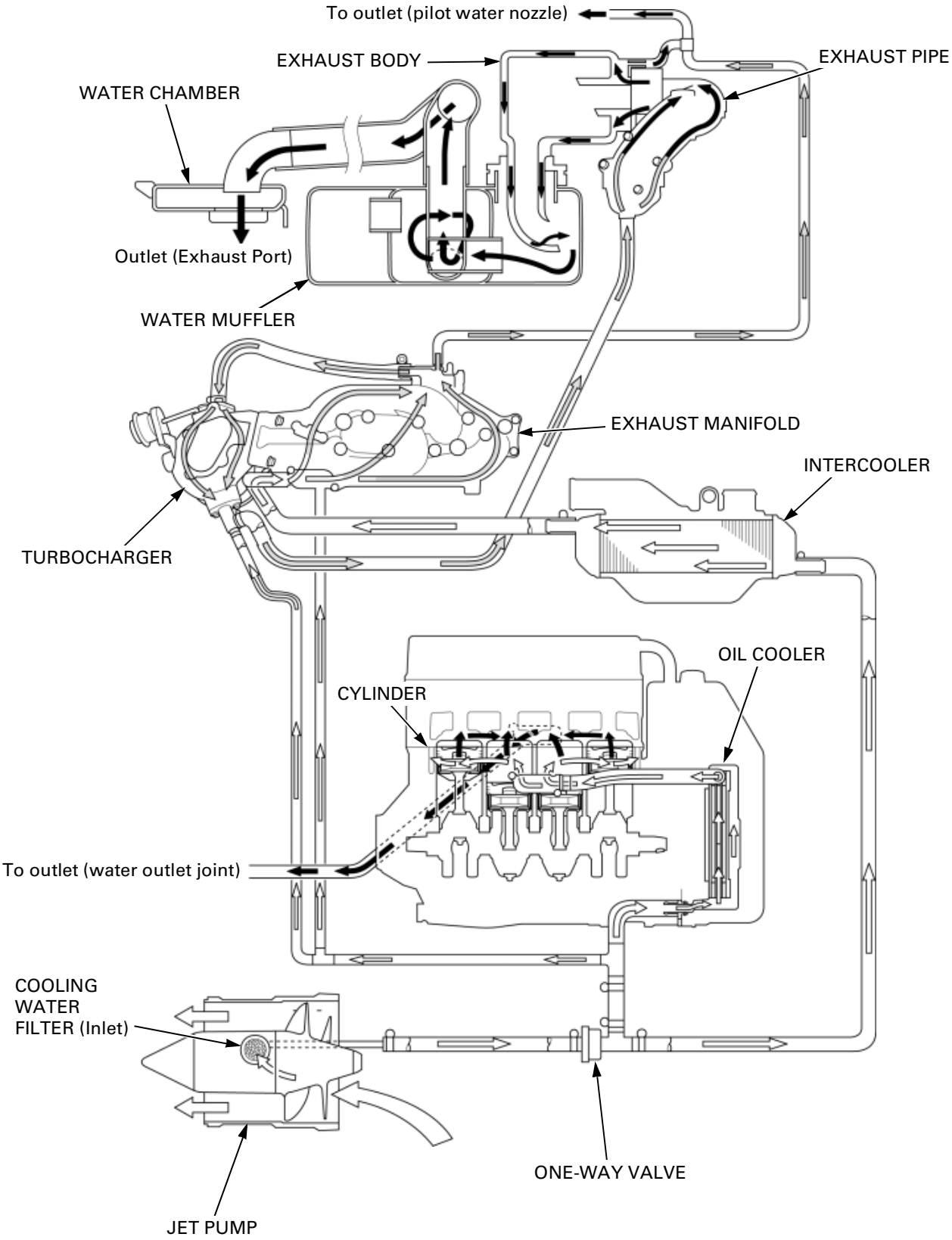


Install the seats (page 3-4).

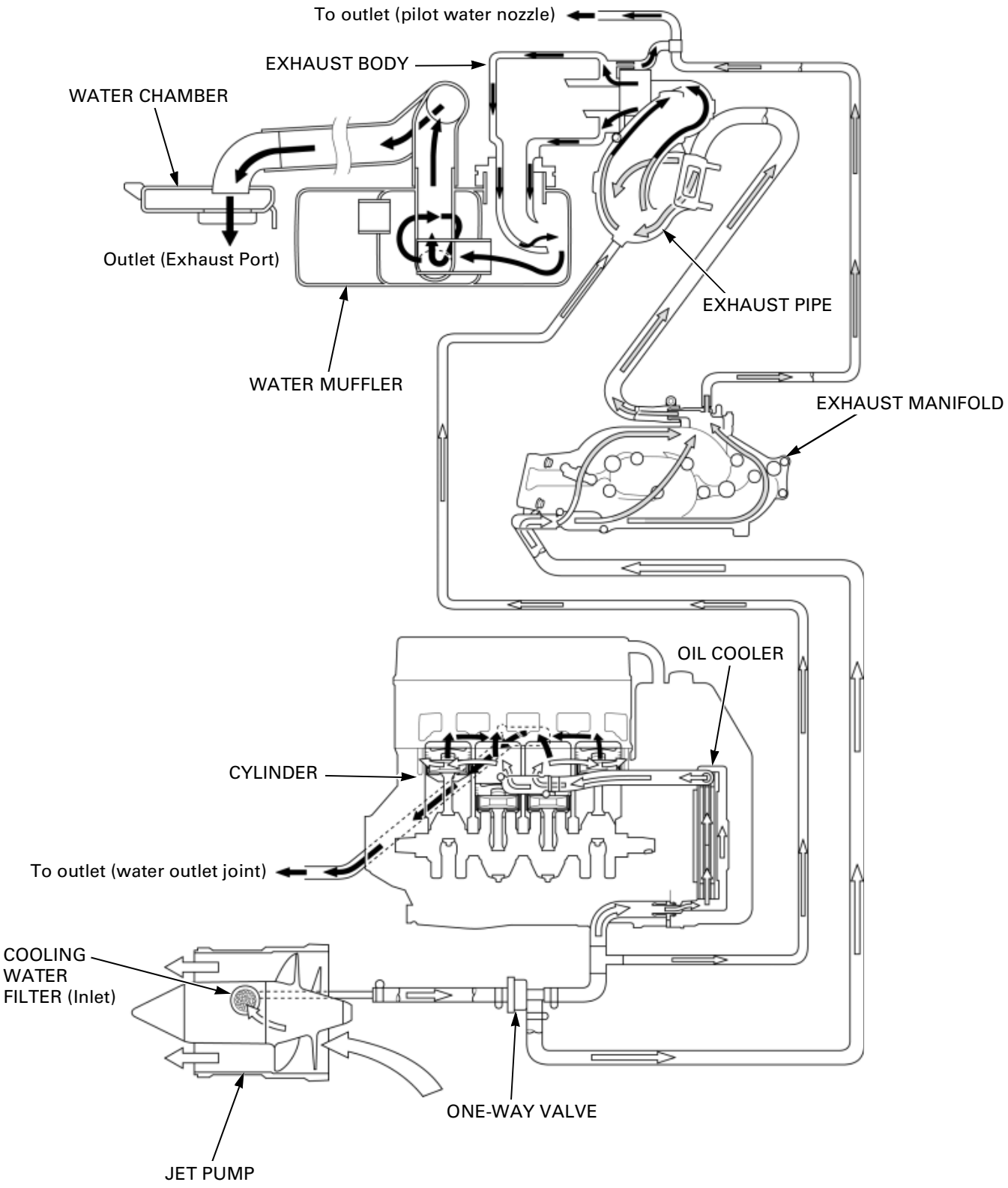
MEMO

SYSTEM FLOW PATTERN

ARX1200T3/T3D:



ARX1200N3:


To outlet (pilot water nozzle)
EXHAUST BODY
WATER CHAMBER
Outlet (Exhaust Port)
EXHAUST PIPE
WATER MUFFLER
EXHAUST MANIFOLD
OIL COOLER
CYLINDER
To outlet (water outlet joint)
COOLING WATER FILTER (Inlet)
ONE-WAY VALVE
JET PUMP

SERVICE INFORMATION

GENERAL

NOTICE

Flush the engine with fresh water only.

- This watercraft uses lake or ocean water to cool the exhaust system and engine.
- Primary cooling is from water, secondary cooling is from oil. The engine is a dry-sump.
- Towing the watercraft over 16 km/h (10 mph) can result in water being forcefully ingested through the main cooling pickup causing severe engine damage. When towing the watercraft, you should tow under 16 km/h (10 mph) for safety and to avoid water ingestion.
- A sacrificial zinc anode is located inside the cooling water passage and protects the engine from harmful galvanic corrosion. Refer to 4-17 for inspection.

TROUBLESHOOTING

SUMMARY OF TROUBLESHOOTING FOR OVERHEATING

This watercraft controls the engine as follows, in the event it overheats.

- If the cooling water temperature is above 85°C (185°F), the engine control module (ECM) will limit the engine speed to 3,000 rpm to prevent engine damage. If the engine coolant temperature (ECT) sensor detects a water temperature above 95°C (203°F), the engine will shut off (failure code #47).
- If the manifold surface temperature switch detects the engine is overheating, the ECM will shut off the engine (failure code #46).

If there are failure codes in the system, first diagnose the PGM-FI system (page 8-10).

BEFORE BEGINNING TROUBLESHOOTING

Ask the user about the following condition:

1. Check whether the intake grate (water intake area) had been clogged (page 4-15).
   (Temporary failure if it had been clogged)
2. Ask which of the following symptoms appeared when the engine overheated.
   – The warning buzzer sounded and the engine stopped immediately (page 7-5).
   – The warning buzzer sounded and the engine speed did not rise above approx. 3,000 rpm (page 7-6).
   – The warning buzzer sounded and the engine speed did not rise above approx. 3,000 rpm, then the engine stopped (page 7-8).

THE WARNING BUZZER SOUNDED AND THE ENGINE STOPPED IMMEDIATELY (EXHAUST COOLING SYSTEM)

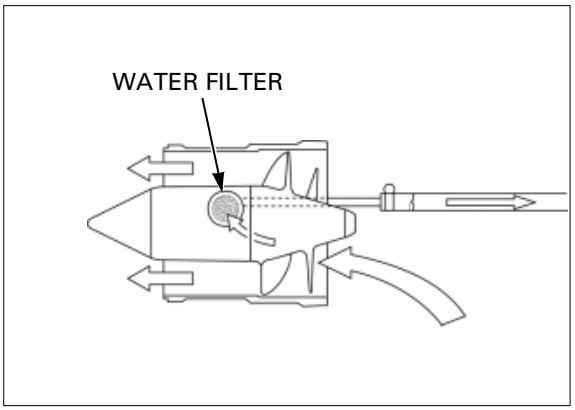
1. Cooling water filter

Remove the jet nozzle (page 14-8) and check the water filter.

Is the water filter clogged?

YES – Clean the water filter.

NO – GO TO STEP 2.



2. Cooling water hose damage check

Remove the side panels (page 3-5).
Flush the system (page 5-2).

Is there any damage in the water hoses or is the water hose disconnected?

YES – Repair the damage.

NO – GO TO STEP 3.

3. **Pilot water nozzle (flushing check)**

   Flush the system and check the pilot water hole (page 4-15).

   Is the water running from the water nozzle?

   NO – The system is clogged between the one-way valve and exhaust manifold.

   YES – GO TO STEP 4.

4. **Pilot water nozzle (check with the watercraft in the water)**

   Start the engine on the water.

   Is the water running from the water nozzle?

   NO – The system is clogged or the water hose is disconnected between the jet pump and one-way valve.

   YES – GO TO STEP 5.

5. **Test-run**

   Test run the watercraft in the water.

   Does the engine stop as soon as the warning buzzer sounds?

   YES – GO TO STEP 6.

   NO – GO TO STEP 7.

6. **One-way valve**

   Check the one-way valve (page 7-9).

   Is the one-way valve normal?

   NO – Replace the one-way valve.

   YES – GO TO STEP 7.

7. **Cooling water passage (inlet section)**

   Check for clogs between the jet pump and one-way valve.

   Is the system clogged between the jet pump and one-way valve?

   NO – Clean or replace the faulty part.

   YES – Check the engine cooling system (page 7-6).

THE WARNING BUZZER SOUNDED AND THE ENGINE SPEED DID NOT RISE ABOVE APPROX. 3,000 rpm (ENGINE COOLING SYSTEM)

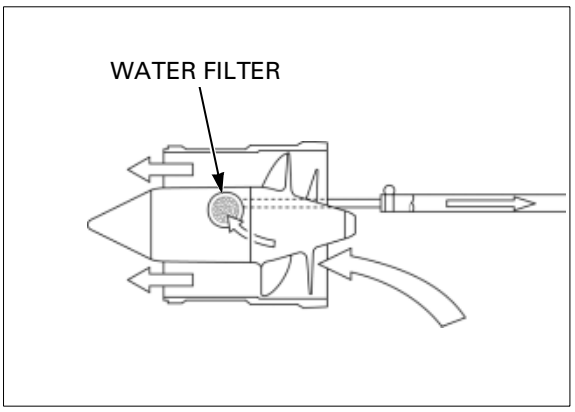
1. **Cooling water filter**

   Remove the jet nozzle (page 14-8) and check the water filter.

   Is the water filter clogged?

   YES – Clean the water filter.

   NO – GO TO STEP 2.



2. **Cooling water hose damage check**

   Remove the side panels (page 3-5).
   Flush the system (page 5-2).

   Is there any damage in the water hoses or is the water hose disconnected?

   YES – Repair the damage.

   NO – GO TO STEP 3.

3. **Pilot water nozzle (flushing check)**

   Flush the system and check the pilot water hole (page 4-15).

   Is water running from the water nozzle?

   NO – • ARX1200T3/T3D: GO TO STEP 4.
   • ARX1200N3: GO TO STEP 5.

   YES – GO TO STEP 6.

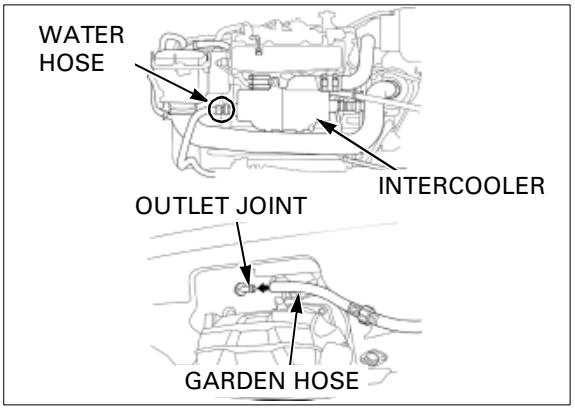
4. **Check for clogs in the engine cooling system (ARX1200T3/T3D)**

   Disconnect the water hose of the inlet side of the intercooler.
   Connect a garden hose to the water outlet joint and turn on the water.

   Is the water spraying forcibly out from the water hose?

   YES – The water passage in the engine is clogged.

   NO – GO TO STEP 6.



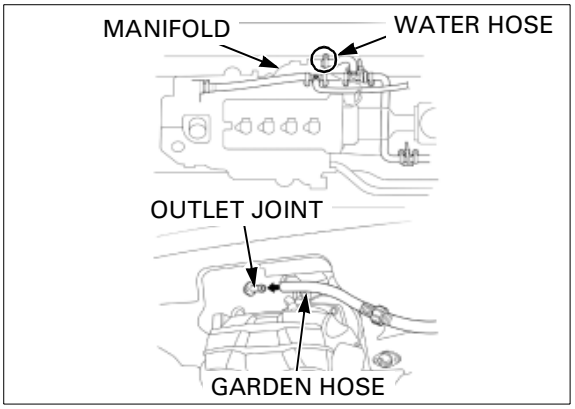
5. **Check for clogs in the engine cooling system (ARX1200N3)**

   Disconnect the water hose of the inlet side of the exhaust manifold.
   Connect a garden hose to the water outlet joint and turn on the water.

   Is the water spraying forcibly out from the water hose?

   YES – The water passage in the engine is clogged.

   NO – GO TO STEP 6.



6. **One-way valve**

   Check the one-way valve (page 7-9).

   Is the one-way valve normal?

   NO – Replace the one-way valve.

   YES – GO TO STEP 7.

7. **Cooling water passage (inlet section)**

   Check for clogs between the jet pump and one-way valve.

   Is the system clogged between the jet pump and one-way valve?

   NO – Clean or replace the faulty part.

   YES – Check the exhaust cooling system (page 7-5).

THE WARNING BUZZER SOUNDED AND THE ENGINE SPEED DID NOT RISE ABOVE APPROX. 3,000 rpm, THEN THE ENGINE STOPPED

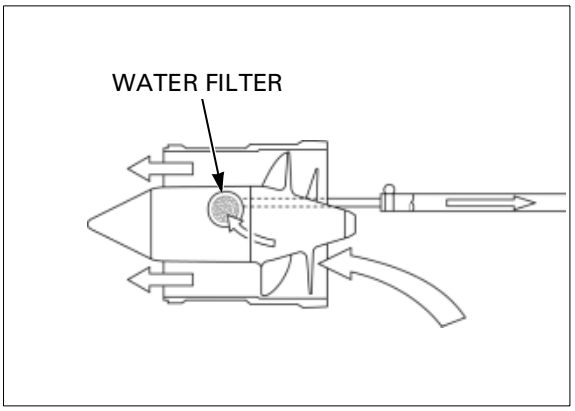
1. **Cooling water filter**

   Remove the jet nozzle (page 14-8) and check the water filter.

   Is the water filter clogged?

   YES – Clean the water filter.

   NO – GO TO STEP 2.



2. **Engine cooling system check**

   Perform the engine cooling system check (page 7-6).

   Is the system normal?

   YES – Correct the faulty part.

   NO – GO TO STEP 3.

3. **Exhaust cooling system check**

   Perform the exhaust cooling system check (page 7-5).

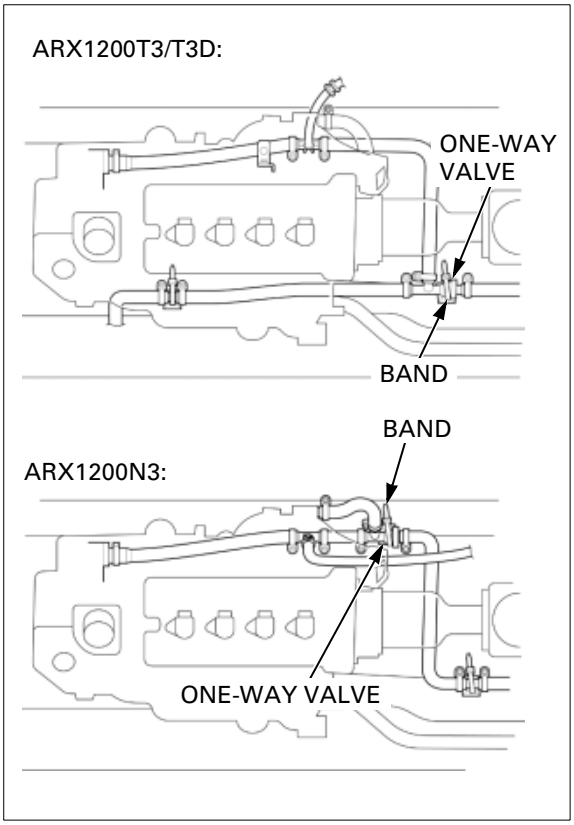
   Is the system normal?

   NO – Correct the faulty part

ONE-WAY VALVE CHECK

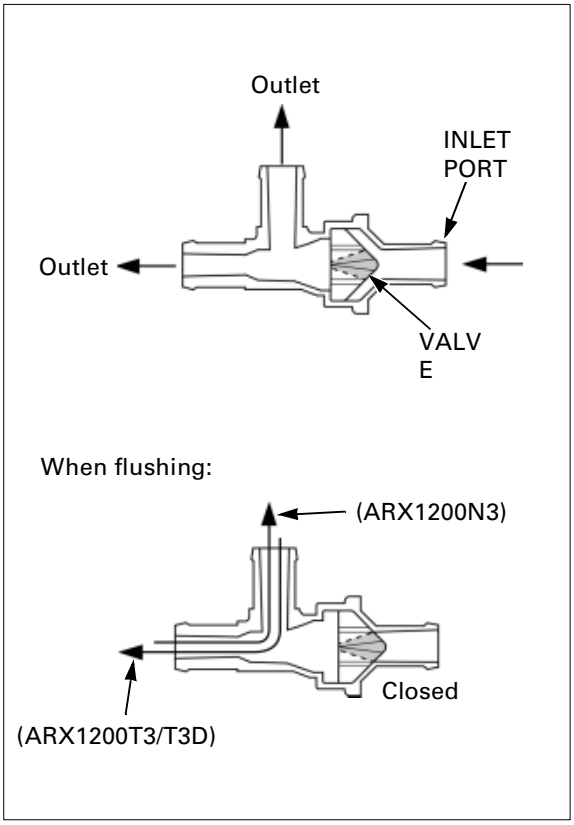
Remove the left side panel (page 3-5).

Remove the band and disconnect the water hoses from the one-way valve to remove it.



Shake the one-way valve. It should make a clicking or rattling sound.

Apply pressurized water to the inlet port of the one-way valve. Water should flow through the one-way valve and out the outlet ports that goes to the engine and exhaust system.
Apply pressurized water to the outlet ports. Water should not flow from the inlet port.



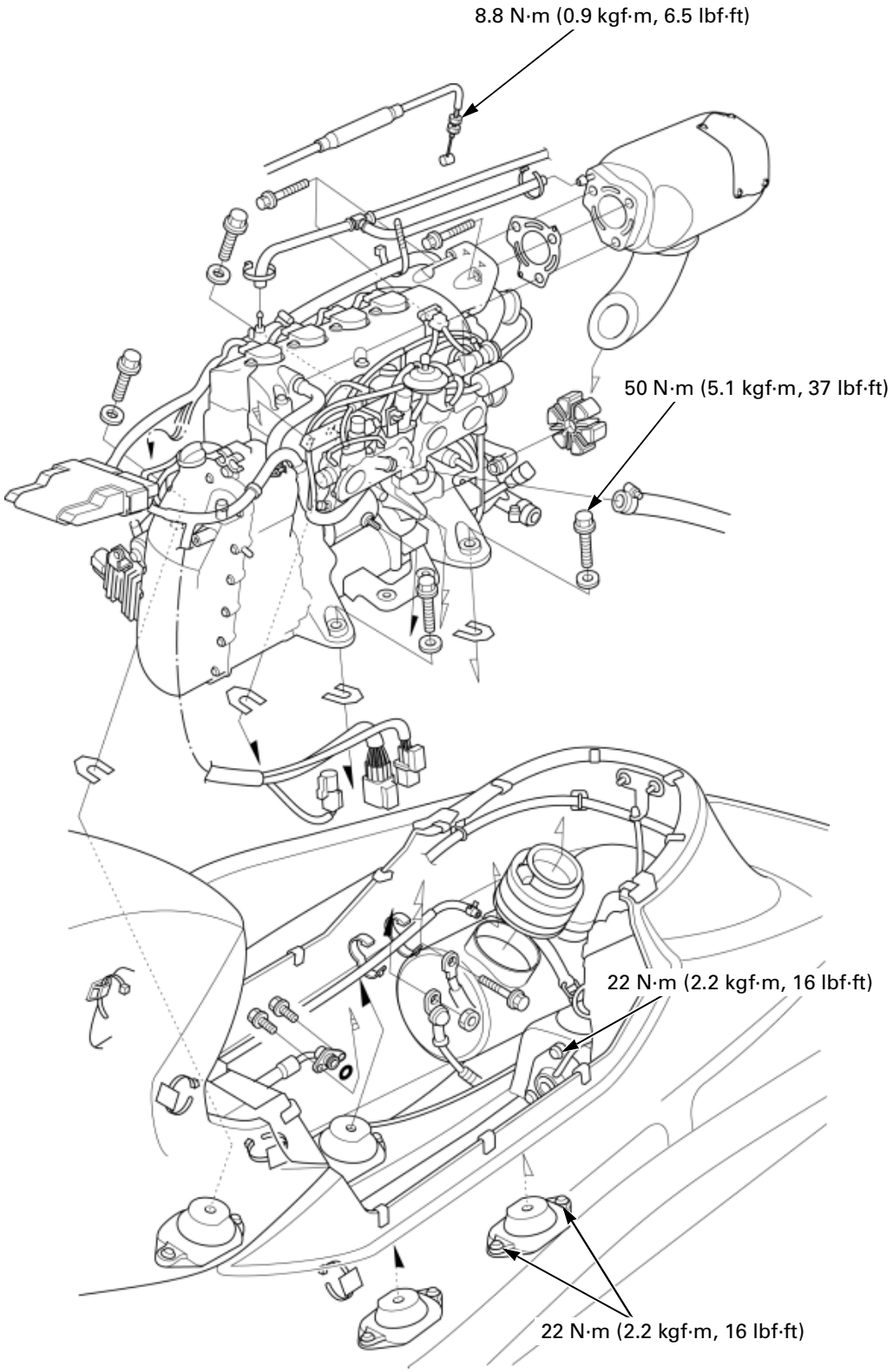
MEMO

8. FUEL SYSTEM (Programmed Fuel Injection)

9. ENGINE REMOVAL/INSTALLATION

SYSTEM COMPONENTS

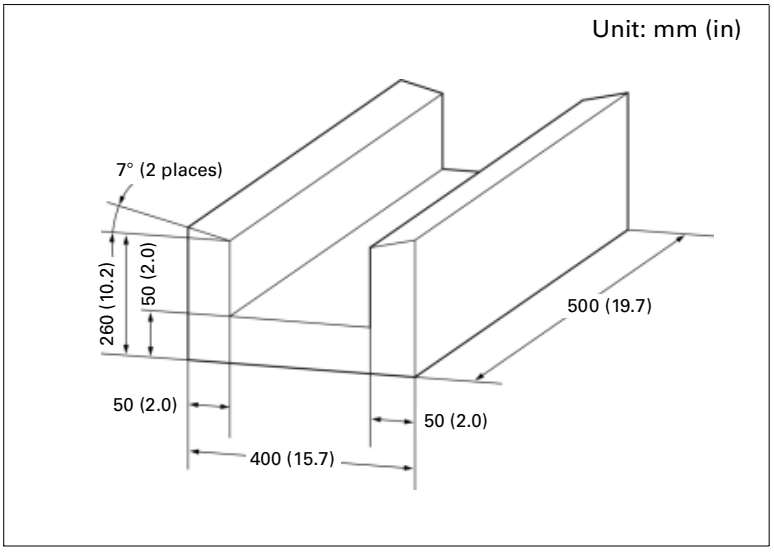
ARX1200T3/T3D shown:



SERVICE INFORMATION

GENERAL

- Whenever the engine is removed from the watercraft, engine-to-jet pump alignment must be checked with the special tools.
- The following components require engine removal for service.
  - oil pump (page 6-2)
  - alternator/starter clutch (page 11-2)
  - crankshaft/piston/cylinder (page 12-2)
  - exhaust manifold (page 13-2)
- When removing and installing the engine, take care not to damage the deck, cables and hoses.
- The engine-to-jet pump alignment is necessary to eliminate possible vibration and/or damage to components.
- Tighten the engine mounting bolts after adjusting the engine-to-jet pump alignment.
- The following illustration is for a suggested engine stand, for after removing the engine.



SPECIFICATIONS

Unit: mm (in)

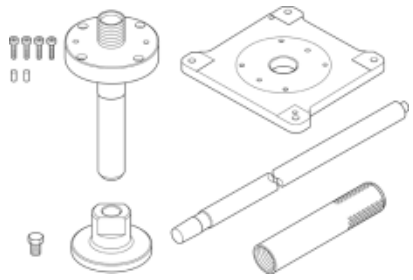
ITEM			SPECIFICATIONS
Engine dry weight		ARX1200T3/T3D	100 kg (220 lbs)
		ARX1200N3	80 kg (176 lbs)
Engine oil capacity	ARX1200T3/ T3D	After draining	4.2 liters (4.4 US qt, 3.7 Imp qt)
		After draining/filter change	4.3 liters (4.5 US qt, 3.8 Imp qt)
		After disassembly	5.3 liters (5.6 US qt, 4.7 Imp qt)
	ARX1200N3	After draining	4.0 liters (4.2 US qt, 3.5 Imp qt)
		After draining/filter change	4.1 liters (4.3 US qt, 3.6 Imp qt)
		After disassembly	5.0 liters (5.3 US qt, 4.4 Imp qt)

TORQUE VALUES

Engine mounting bolt (with rubber mount)	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Engine mounting bolt	50 N·m (5.1 kgf·m, 37 lbf·ft)	Apply engine oil to the threads and seating surface.
Bearing housing mounting nut	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Throttle cable setting nut	8.8 N·m (0.9 kgf·m, 6.5 lbf·ft)	

TOOL

Alignment tool set
070MJ-HW1A100*



(Newly designed tools)

*Available through the AHM Tool Loan Program; 888-424-6857.

TROUBLESHOOTING

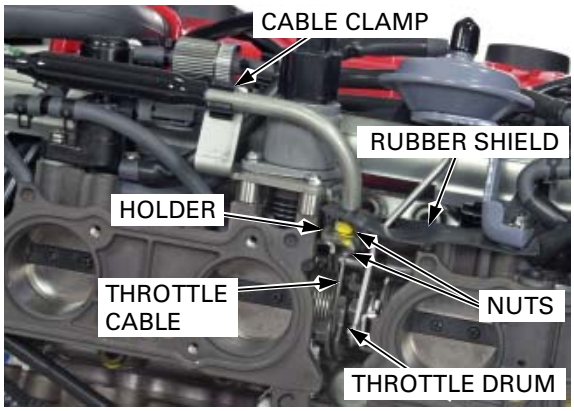
Engine vibration

- Improper engine-to-jet pump alignment
- Improper balancer timing (page 12-4)
- Excessive crankshaft runout (page 12-4)

ENGINE REMOVAL

Remove the following:
– exhaust body (page 13-5)
– rubber coupling (page 14-25)
– starter motor (page 18-6)
– airbox (ARX1200T3/T3D: page 8-89)

Release the rubber shield.
Loosen the cable setting nut and remove the throttle cable from the cable holder.
Remove the throttle cable off the cable clamp and disconnect it from the throttle drum.



NOTICE

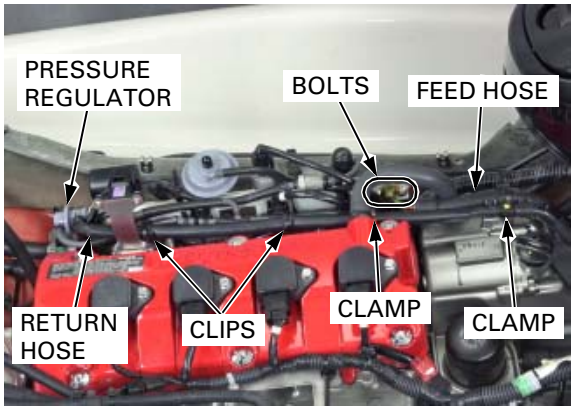
Do not snap the throttle valve from full open to full closed after the throttle cable has been removed. It may damage the throttle bores and cause incorrect idle operation.

Open the fuel fill cap to release the pressure from the fuel tank. Install the fill cap.

Cover the joint nut with a rag or shop towel.

Slowly loosen the joint bolts of the fuel feed hose and catch the fuel using an approved gasoline container.

Remove the joint bolts and fuel feed hose.



NOTICE

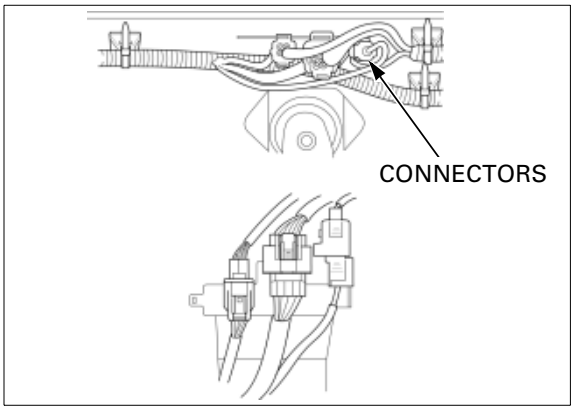
Always replace the O-ring with a new one when the fuel feed hose joint bolts are removed or loosened.

Disconnect the fuel return hose from the pressure regulator.

Remove the hoses from the clamps and clips.

Wipe off any water around the connectors. Getting wet can damage the electrical system.

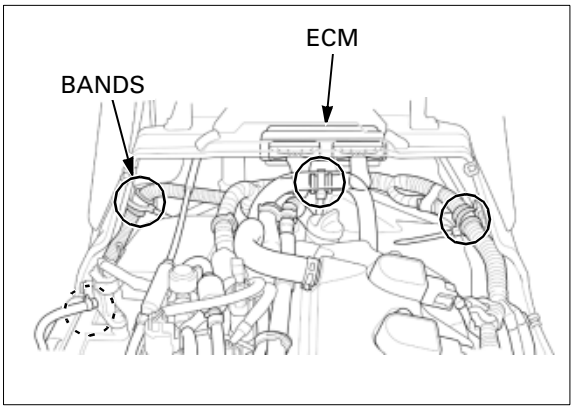
Remove the following from the stay on the hull and disconnect them:
– 1P (gray) connector
– 14P (gray) connector
– 4P (gray) connector



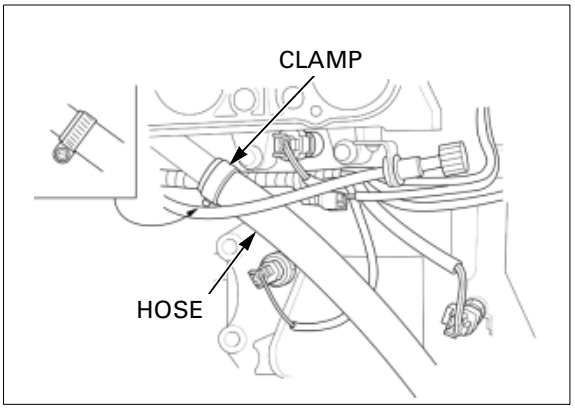
Release the engine wire harness from the four wire bands.

Do not disconnect the ECM connectors to avoid any water entering the connectors.

Remove the engine control module (ECM) from the stay and secure it onto the cylinder head cover with a piece of wire.

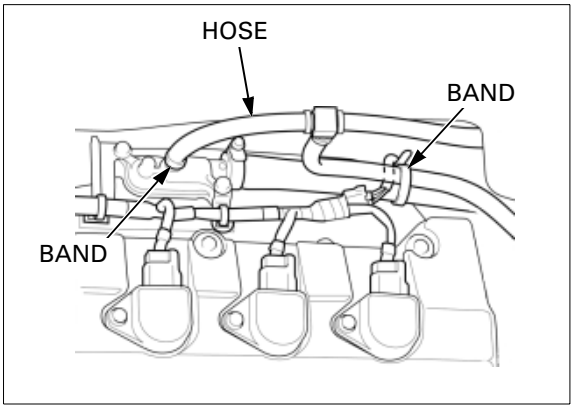


Loosen the hose clamp and disconnect the water hose from the cylinder head.



Remove the hose band from the water hoses.

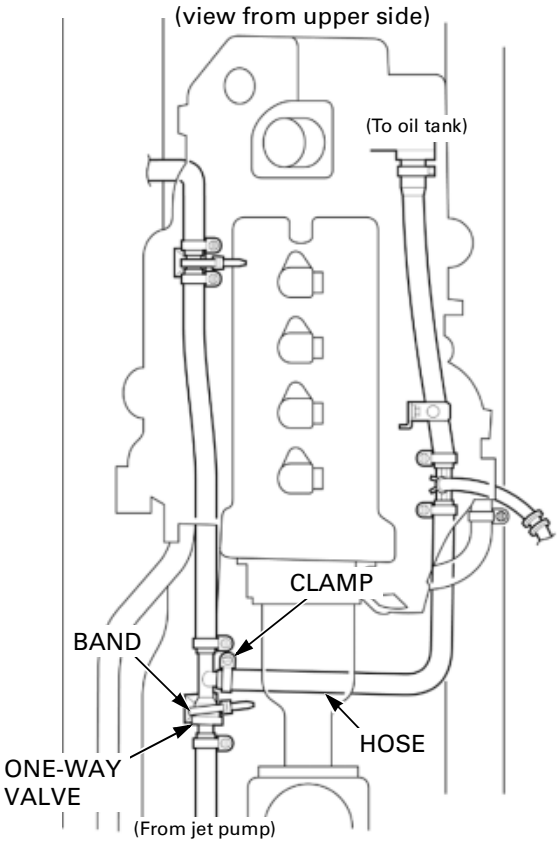
Cut the hose band and disconnect the water hose from the hose joint on the exhaust manifold.



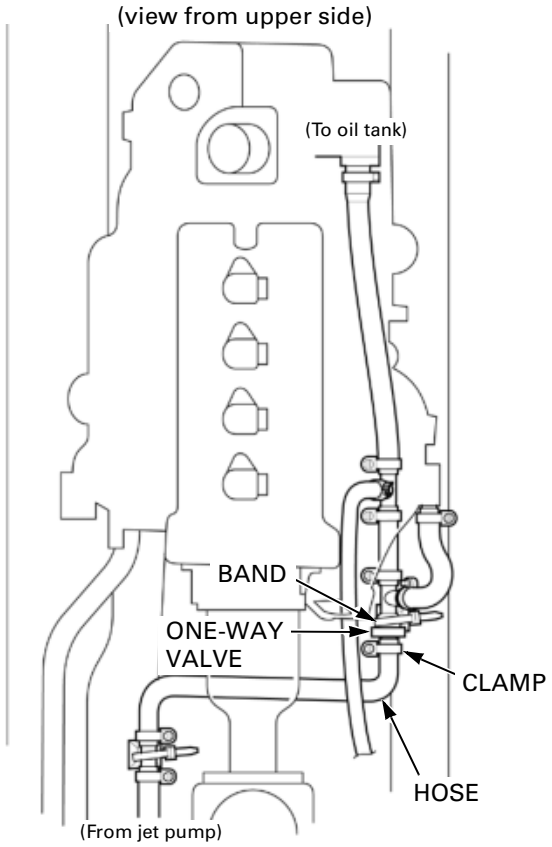
Remove the band securing the one-way valve.

Loosen the hose clamp and disconnect the water hose (jet pump-to-oil tank hose) from the one-way valve.

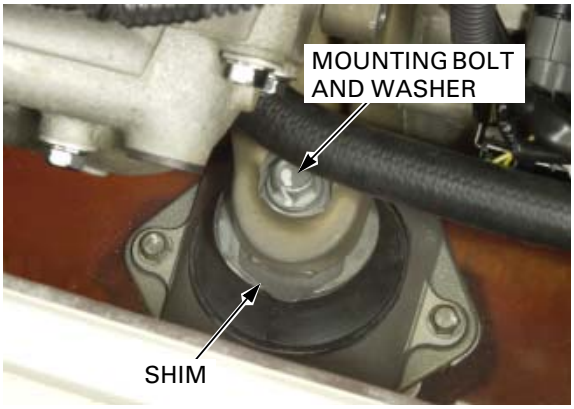
ARX1200T3/T3D:



ARX1200N3:



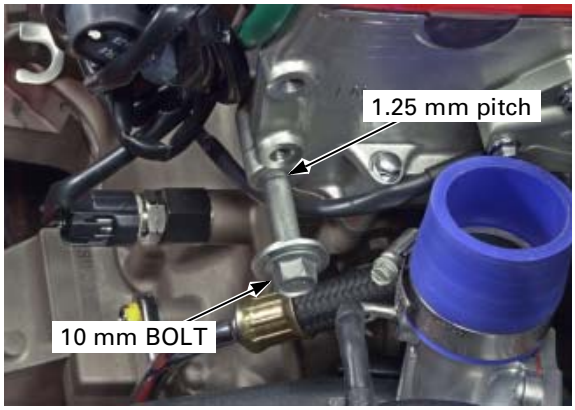
Remove the four engine mounting bolts and washers.



Prepare a 10-mm bolt of 1.25 mm pitch, and 10-mm nut and bolt for use of engine lifting.

Take care not to pinch the hose and wire by the sling when lifting the engine.

Install the 10-mm bolt (1.25 mm pitch) into the hole in the rear left side of the cylinder head (this hole has threads), and the 10-mm bolt and nut into the hole in the front right side of the crankcase.
Hook a sling to the lifting bolts. Using a chain hoist or other suitable equipment, slightly lift the engine to ease the remaining component removal.

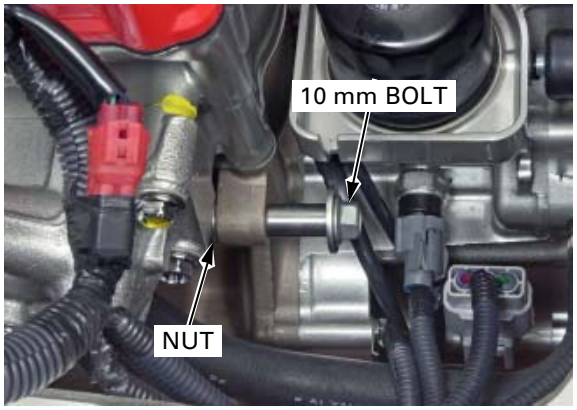


Record the location and number of shims for installation reference.

Remove the shims between the engine and rubber mounts.

Be careful not to damage the deck when removing the engine.

Make sure the removed hoses, wires and cables do not interfere with the engine components to avoid damaging them.
Lift the engine then tilt it so that it can be removed from the deck opening and lift it out of the hull.



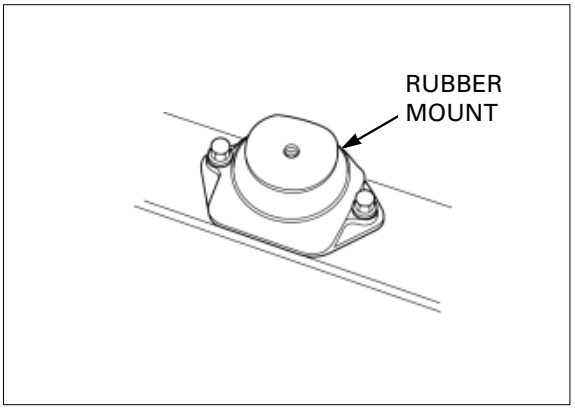
RUBBER ENGINE MOUNT INSPECTION

NOTE:

- The mounting rubber replacement is performed after installing the engine into the hull (page 9-10).

Do not remove the rubber mounts at this time.

Check the rubber mounts for deterioration, cracks or other damage.



ENGINE INSTALLATION

NOTE:

- Whenever removing the engine from the watercraft, engine-to-jet pump alignment must be performed at installation.
- Route the wires, cables and hoses properly page 1-31 or 1-52).

Remove the drive shaft (page 14-26).

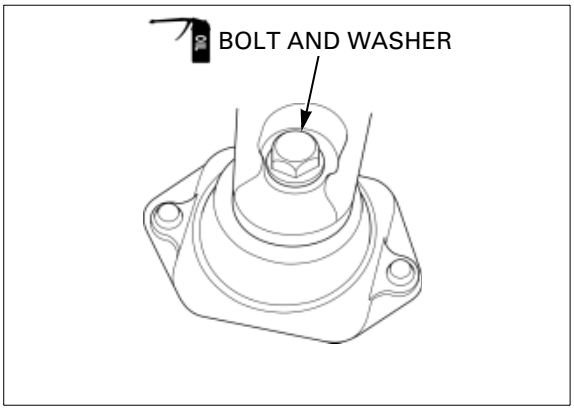
Place the engine into the body, being careful not to damage the deck.

Carefully align the mounting bolt holes in the engine and rubber mounts.

Adjust the height of the hoist and lower the engine and set it onto the rubber mounts (but do not remove the sling and hoist yet).

Tighten the mounting bolts to the specified torque after adjusting the engine-to-jet pump alignment.

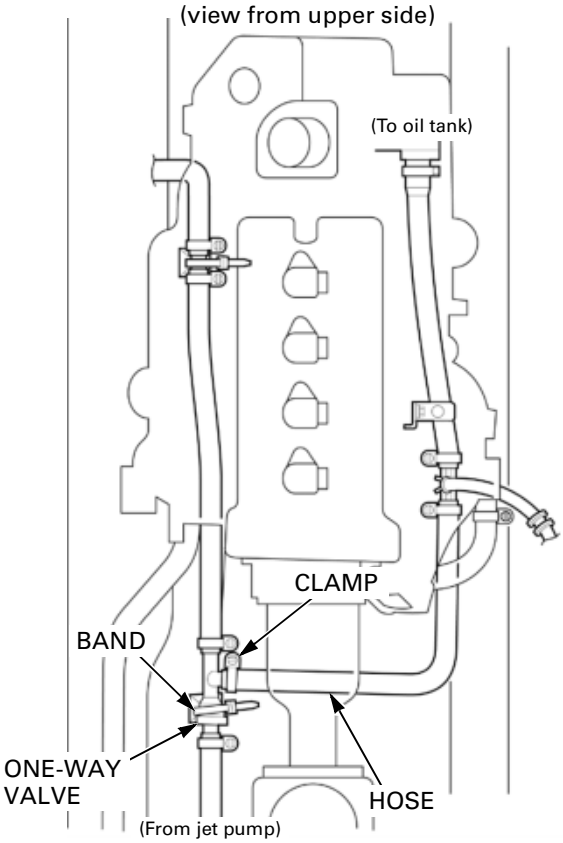
Apply engine oil to the threads and seating surfaces of the mounting bolts.
Install the four mounting bolts with the washers and temporarily tighten them.



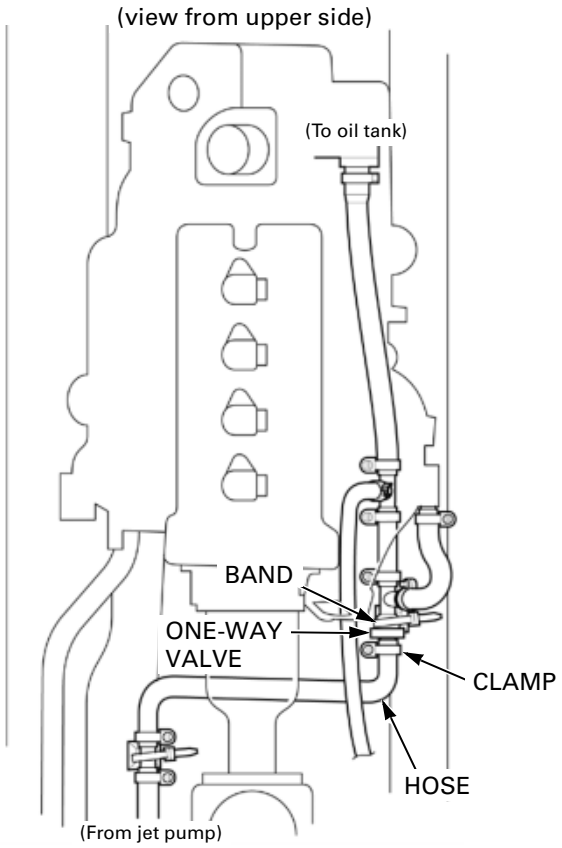
Connect the water hose to the one-way valve and tighten the hose clamp securely.
Secure the one-way valve with the band.

If you plan to replace a rubber mount, use the following procedure (page 9-10).
If a rubber mount is not replaced, go to "engine-to-jet pump alignment" (page 9-11).

ARX1200T3/T3D:



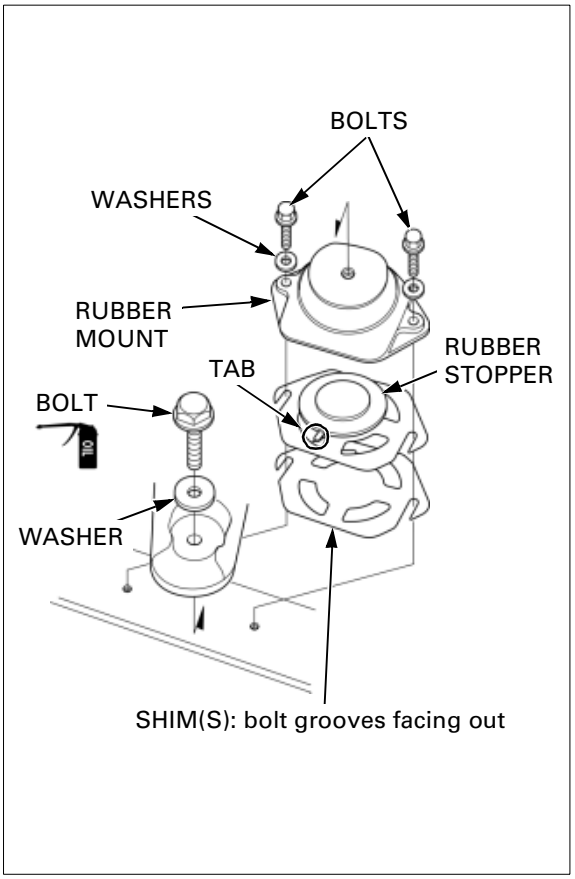
ARX1200N3:



RUBBER ENGINE MOUNT REPLACEMENT

Remove the engine mounting bolt and two rubber mount bolts with the washers.

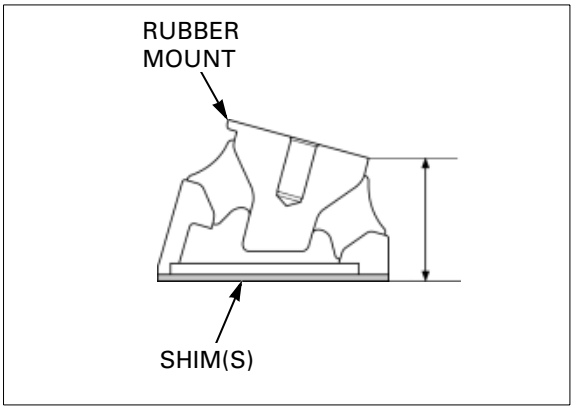
Slide the rubber mount aside and remove the following:
– rubber mount
– rubber mount shim(s)
– rubber stopper (from rubber mount)



Measure the height of the removed rubber mount and a new rubber mount with the removed shim(s) at the point as shown, and record them.

Select the shim(s) so that a new rubber mount height is equal to the old rubber mount height.

NOTE:
- The rubber mount shims are available in four different thicknesses (0.3, 0.5, 1.0 and 1.5 mm).



Replace the rubber mount and rubber stopper as a set.

Install a new rubber stopper onto a new rubber mount with the stepped side facing in by aligning the tab with the groove in the rubber mount.

Clean the seating areas of the engine and hull.

Apply engine oil to the bolt threads and seating surfaces.

Install the rubber mount with the shim(s).
Carefully align the bolt holes and install the bolts with the washers. Tighten the rubber mount bolts to the specified torque alternately, then the engine mounting bolt temporarily.

TORQUE: Rubber mount bolt:
22 N·m (2.2 kgf·m, 16 lbf·ft)

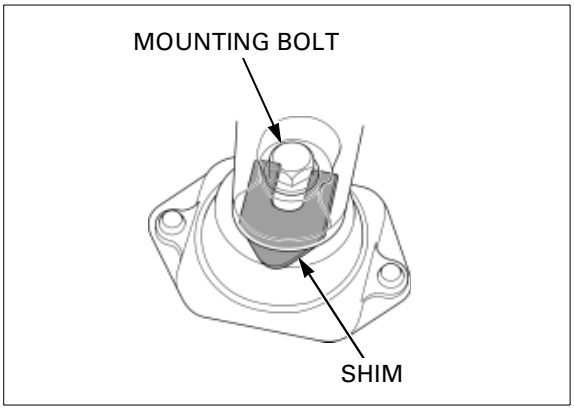
Perform the above procedure for each rubber mount, if necessary.

After replacement, adjust the engine-to-jet pump alignment (page 9-11).

ENGINE-TO-JET PUMP ALIGNMENT

Loosen all the engine mounting bolts.

Lift the engine slightly and install the engine mounting shims into the clearances between the rubber mounts and engine supports in their original locations.



SPECIAL TOOL INSTALLATION

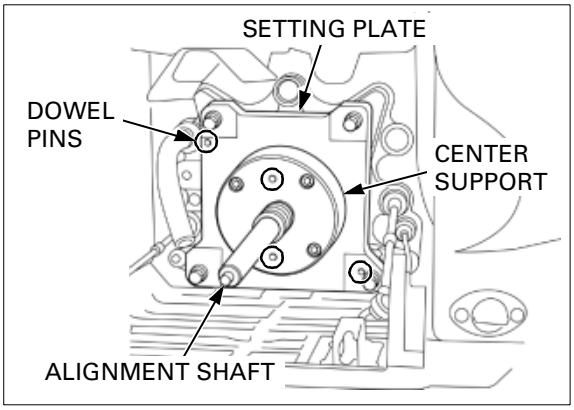
Check the engine-to-jet pump alignment using the following special tools.

TOOLS:

Alignment tool set	**070MJ-HW1A100**
– stopper collar	**070MJ-HW1A140**
– setting plate	**070MJ-HW1A130**
– center support and shaft	**070MJ-HW1A120**
– coupler attachment	**070MJ-HW1A110**

Install the two dowel pins into the thrust plate.

Install the setting plate onto the thrust plate with the jet pump mounting bolts, and the center support into the setting plate with the two dowel pins and four socket bolts (including special tool) as shown. Tighten all the bolts securely.



Loosen the mounting nuts of the bearing housing before installing the alignment shaft.

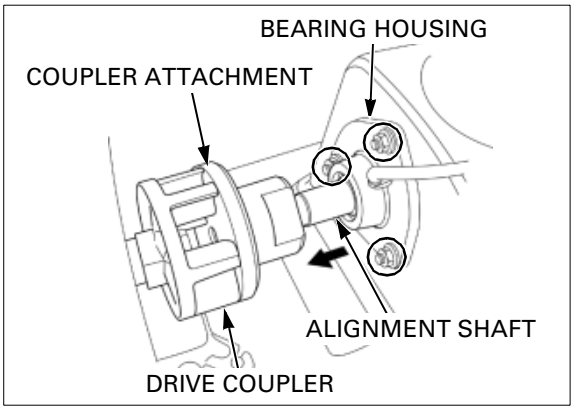
Insert the alignment shaft into the bearing housing through the center support while turning it slowly, being careful not to damage the seals in the bearing housing.

Do not damage the drive coupler when installing the coupler attachment over it.

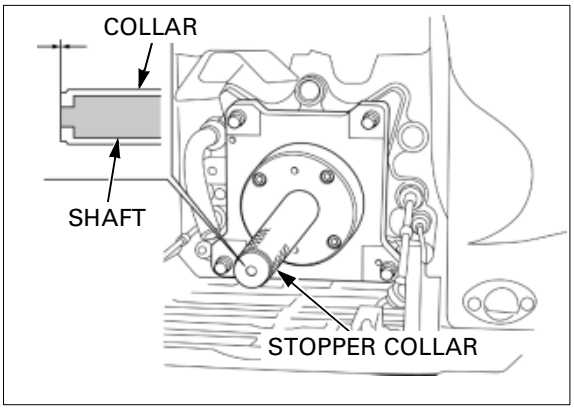
Install the coupler attachment over the alignment shaft and attach the coupler attachment onto the drive coupler by pushing the alignment shaft.

Tighten the bearing housing mounting nuts.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

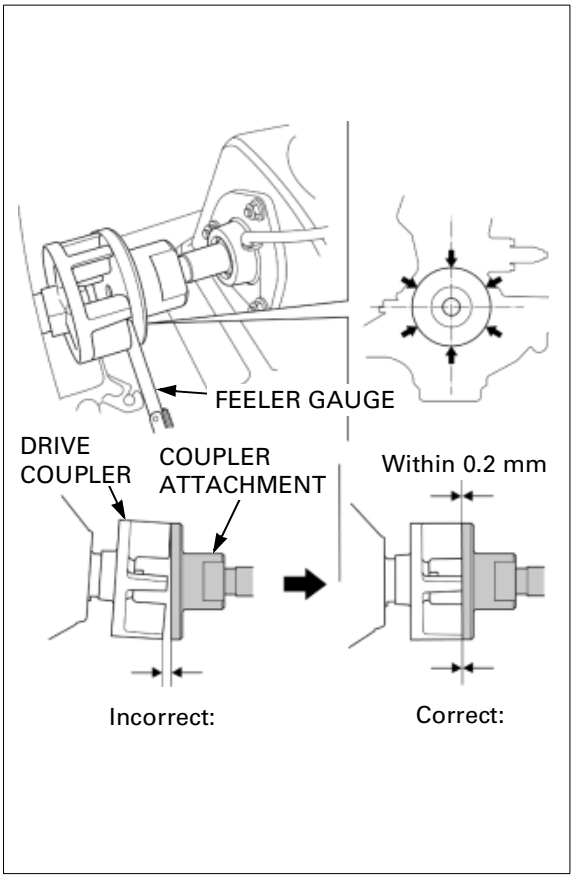


Install the stopper collar and tighten it by hand until it is fully seated to secure the alignment shaft. Be sure the alignment shaft end is flush with the stopper collar.



PARALLEL ALIGNMENT

Measure the clearance between the drive coupler and coupler attachment at each coupler blade by inserting a feeler gauge, and make sure the coupler is fully seated on the attachment evenly (the maximum reading of the clearance is within 0.2 mm).

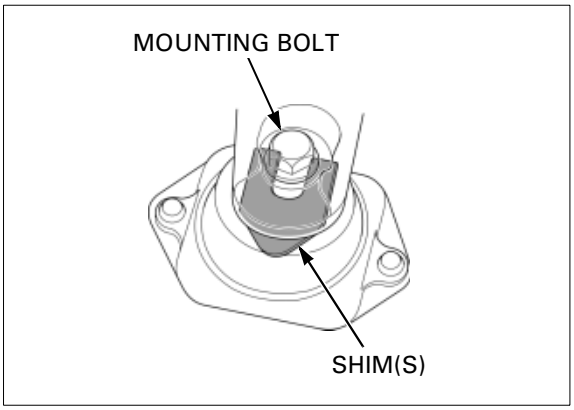


If the clearance in measurements exceeds the limit value, adjust the engine angle using the shim(s) or by sliding the engine to correct the alignment of the engine direction (parallelism).

NOTE:

- The engine mounting shims are available in four different thicknesses (0.3, 0.5, 1.0 and 1.5 mm).

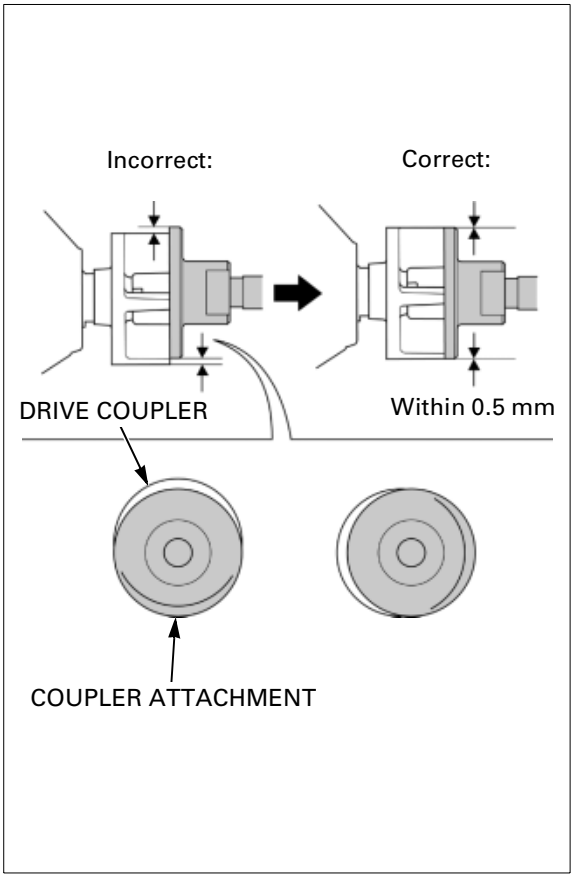
After adjustment, check the concentric alignment (page 9-13).



CONCENTRIC ALIGNMENT

Make sure that the side surfaces of the coupler blade are flush with the attachment side surface.

If they are not flush, adjust the engine position using the shim(s) or by sliding the engine so the alignment is within 0.5 mm.



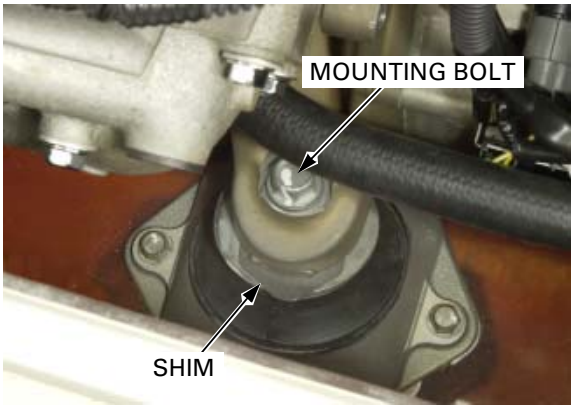
Slowly tighten to avoid misalignment.

After the alignment procedure is completed, tighten the mounting bolts in a crisscross pattern in several steps.

TORQUE: 50 N·m (5.1 kgf·m, 37 lbf·ft)

Recheck the engine-to-jet pump alignment after tightening.

Release the hoist and remove the special tools.

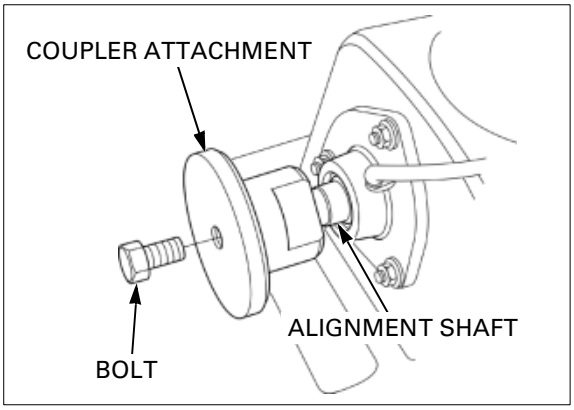


SPECIAL TOOL REMOVAL

Remove the stopper collar and slide the alignment shaft. Install the releasing bolt (including special tool) and tighten it to remove the coupler attachment.

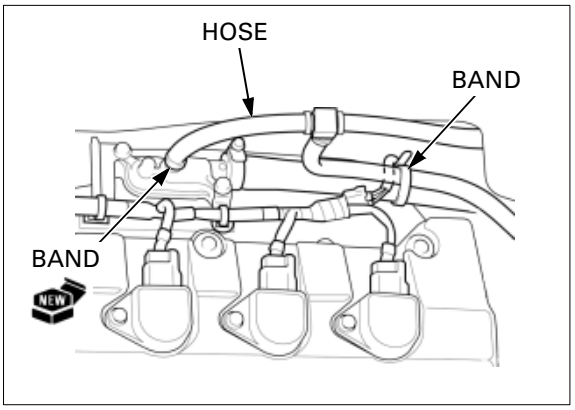
Remove the tool attaching bolts and the remaining tools.

Install the drive shaft (page 14-30).

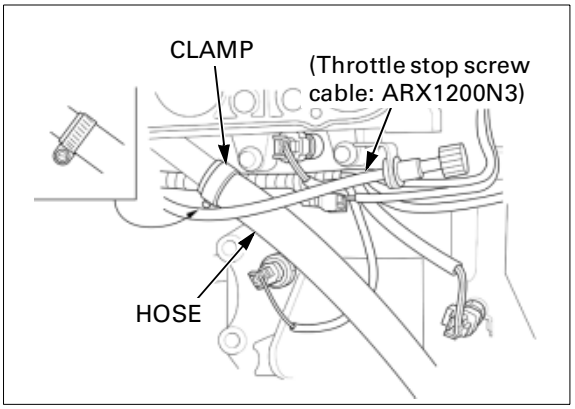


Connect the water hose to the exhaust manifold and secure it with a new hose band. Cut off any excess band.

Install the hose band and secure the water hoses together.

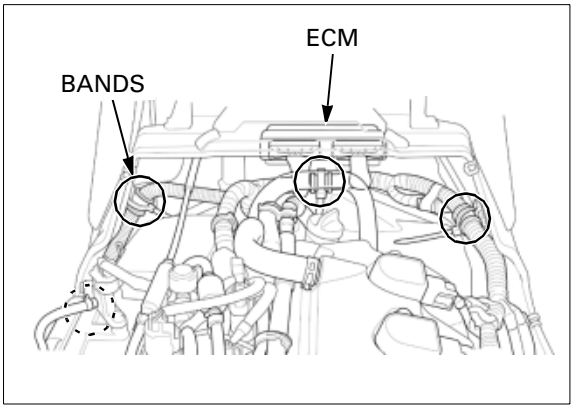


Connect the water hose to the cylinder head and tighten the hose clamp.



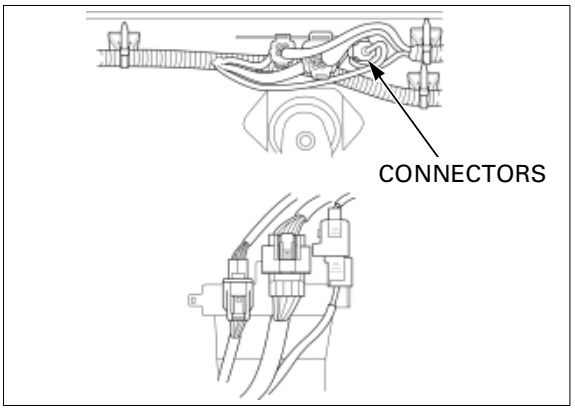
Install the engine control module (ECM) into the stay.

Secure the wire harness with the wire bands.



Do not get water into the connectors.

Connect the following connectors and install them onto the stay on the hull:
- 1P (gray) connector
- 14P (gray) connector
- 4P (gray) connector



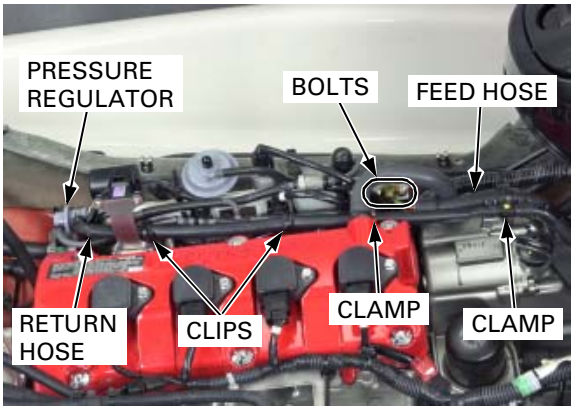
Connect the fuel return hose to the pressure regulator.

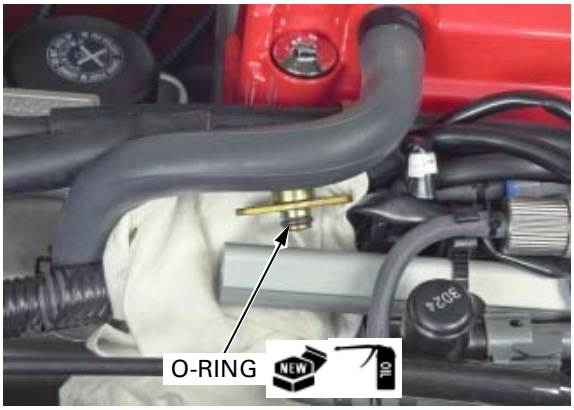
Coat a new O-ring with engine oil and install it into the feed hose joint groove.
Connect the fuel feed hose to the fuel rail with the joint bolts and tighten the them.

NOTICE

Always replace the O-ring with a new one when the fuel feed hose joint bolt is removed or loosened.

Secure the hoses with the clamps and clips properly.





Connect the throttle cable to the throttle drum and install it into the cable holder. Tighten the cable setting nut.

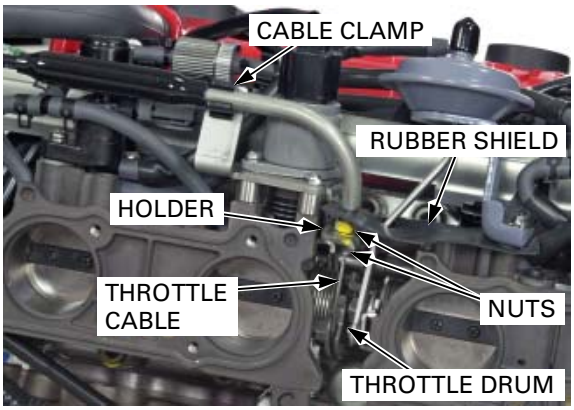
TORQUE: 8.8 N·m (0.9 kgf·m, 6.5 lbf·ft)

Install the throttle cable into the clamp and set the rubber shield properly.

Check the throttle lever operation and adjust the free play (page 4-5).

Install the following:
– starter motor (page 18-11)
– airbox (ARX1200T3/T3D: page 8-91)
– exhaust body (page 13-5)

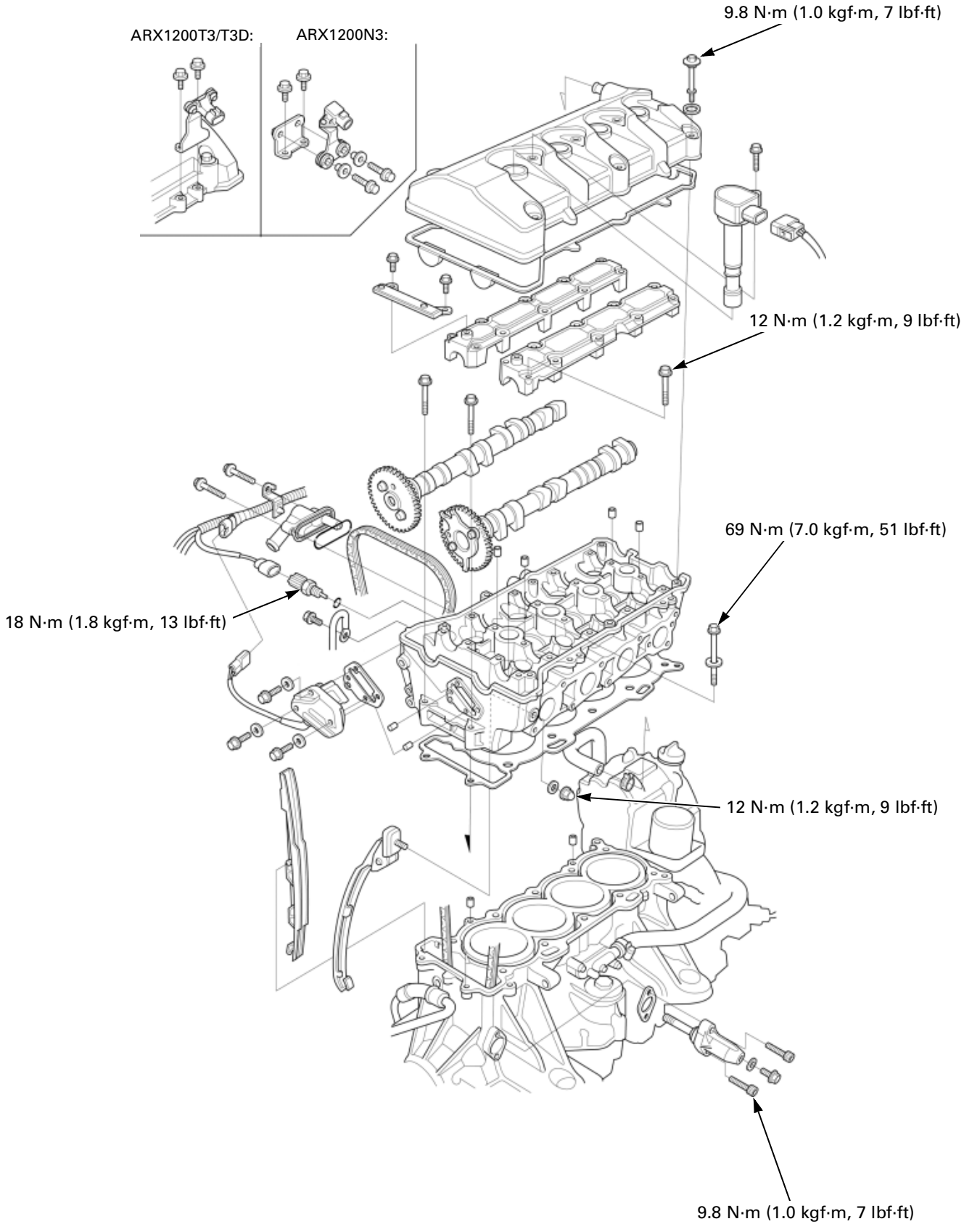
Fill the oil tank with the recommended oil (page 4-12).



MEMO

10. CYLINDER HEAD/VALVE

SYSTEM COMPONENTS



SERVICE INFORMATION

GENERAL

- This section covers service of the camshafts, cylinder head and valves. The camshafts can be serviced with the engine installed in the hull. To service the cylinder head components, the engine must be removed.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft lubricating oil is fed through oil passages in the cylinder head. Clean the oil passages before assembling the cylinder head.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head.

SPECIFICATIONS

'04 model:

Unit: mm (in)

ITEM				STANDARD	SERVICE LIMIT
Cylinder compression		ARX1200T3		1,177 kPa (12.0 kgf/cm^2, 171 psi) at 350 rpm	–
		ARX1200N3		1,275 kPa (13.0 kgf/cm^2, 185 psi) at 350 rpm	–
Valve clearance			IN	0.16 ± 0.03 (0.006 ± 0.001)	–
			EX	0.26 ± 0.03 (0.010 ± 0.001)	–
Camshaft	Cam lobe height	ARX1200T3	IN	37.68 – 37.84 (1.483 – 1.490)	37.38 (1.472)
			EX	37.78 – 37.94 (1.487 – 1.494)	37.48 (1.476)
		ARX1200N3	IN	38.58 – 38.74 (1.519 – 1.525)	38.28 (1.507)
			EX	38.38 – 38.54 (1.511 – 1.517)	38.08 (1.499)
	Runout			–	0.05 (0.002)
	Oil clearance			0.020 – 0.062 (0.0008 – 0.0024)	0.09 (0.004)
Valve lifter	Valve lifter O.D.			25.978 – 25.993 (1.0228 – 1.0233)	25.97 (1.022)
	Valve lifter bore I.D.			26.010 – 26.026 (1.0240 – 1.0246)	26.04 (1.025)
Valve, valve guide	Valve stem O.D.		IN	4.975 – 4.990 (0.1959 – 0.1965)	4.965 (0.1955)
			EX	4.960 – 4.975 (0.1953 – 0.1959)	4.950 (0.1949)
	Valve guide I.D.		IN/EX	5.000 – 5.012 (0.1969 – 0.1973)	5.040 (0.1984)
	Stem-to-guide clearance		IN	0.010 – 0.037 (0.0004 – 0.0015)	–
			EX	0.025 – 0.052 (0.0010 – 0.0020)	–
	Valve guide projection above cylinder head		IN/EX	16.3 – 16.5 (0.64 – 0.65)	–
	Valve seat width		IN/EX	0.90 –1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length		ARX1200T3	IN/EX	43.5 (1.71)	41.5 (1.63)
		ARX1200N3	IN/EX	40.6 (1.60)	38.6 (1.52)
Cylinder head warpage				–	0.10 (0.004)

After '04:

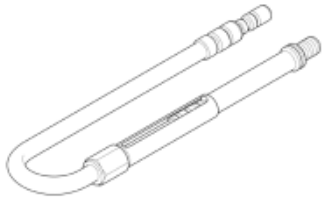
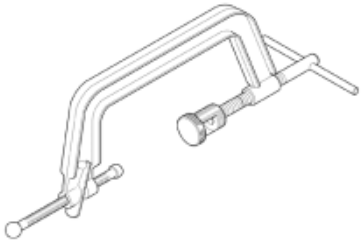
Unit: mm (in)

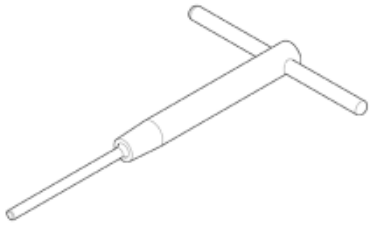
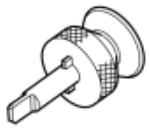
ITEM				STANDARD	SERVICE LIMIT
Cylinder compression		ARX1200T3/T3D		1,177 kPa (12.0 kgf/cm^2, 171 psi) at 350 rpm	–
		ARX1200N3		1,275 kPa (13.0 kgf/cm^2, 185 psi) at 350 rpm	–
Valve clearance			IN	0.16 ± 0.03 (0.006 ± 0.001)	–
			EX	0.26 ± 0.03 (0.010 ± 0.001)	–
Camshaft	Cam lobe height	ARX1200T3/T3D	IN	37.68 – 37.84 (1.483 – 1.490)	37.38 (1.472)
			EX	37.78 – 37.94 (1.487 – 1.494)	37.48 (1.476)
		ARX1200N3	IN	38.58 – 38.74 (1.519 – 1.525)	38.28 (1.507)
			EX	38.38 – 38.54 (1.511 – 1.517)	38.08 (1.499)
	Runout			–	0.05 (0.002)
	Oil clearance			0.020 – 0.062 (0.0008 – 0.0024)	0.09 (0.004)
Valve lifter	Valve lifter O.D.			25.978 – 25.993 (1.0228 – 1.0233)	25.97 (1.022)
	Valve lifter bore I.D.			26.010 – 26.026 (1.0240 – 1.0246)	26.04 (1.025)
Valve, valve guide	Valve stem O.D.		IN	4.975 – 4.990 (0.1959 – 0.1965)	4.965 (0.1955)
			EX	4.960 – 4.975 (0.1953 – 0.1959)	4.950 (0.1949)
	Valve guide I.D.		IN/EX	5.000 – 5.012 (0.1969 – 0.1973)	5.040 (0.1984)
	Stem-to-guide clearance		IN	0.010 – 0.037 (0.0004 – 0.0015)	–
			EX	0.025 – 0.052 (0.0010 – 0.0020)	–
	Valve guide projection above cylinder head		IN/EX	16.3 – 16.5 (0.64 – 0.65)	–
	Valve seat width		IN/EX	0.90 –1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length	ARX1200T3/T3D		IN/EX	43.5 (1.71)	41.5 (1.63)
	ARX1200 N3	Outer	IN/EX	40.6 (1.60)	38.6 (1.52)
		Inner	IN/EX	37.4 (1.47)	35.4 (1.39)
Cylinder head warpage				–	0.10 (0.004)

TORQUE VALUES

Cylinder head bolt (10 mm)	69 N·m (7.0 kgf·m, 51 lbf·ft)	Apply engine oil to the threads and seating surface.
Spark plug	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Cam chain tensioner cap nut	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Engine coolant temperature (ECT) sensor	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Cam chain tensioner lifter socket bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Cam sprocket bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	Apply locking agent to the threads.
Camshaft holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply engine oil to the threads and seating surface.
Head cover breather plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Cylinder head cover bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	

TOOLS

Compression gauge attachment 07RMJ-MY50100  or equivalent commercially available in U.S.A. (Snap-on, EEPV308A)*	Valve spring compressor 07757-0010000 	Spring compressor attachment 07959-KM30101 
Tappet hole protector 07HMG-MR70002  For an alternative tool, see page 10-13.	Valve guide driver, 5 mm 07942-MA60000 	Valve guide reamer, 5 mm 07984-MA60001  or 07984-MA6000D or 07984-MA6000C (U.S.A. only)
Valve seat cutter, 33 mm (45° IN) 07780-0010800  or equivalent commercially available in U.S.A. (Neway 122)*	Valve seat cutter, 29 mm (45° EX) 07780-0010300  or equivalent commercially available in U.S.A. (Neway 122)*	Flat cutter, 33 mm (32° IN) 07780-0012900  or equivalent commercially available in U.S.A. (Neway 123)*
Flat cutter, 30 mm (32° EX) 07780-0012200  or equivalent commercially available in U.S.A. (Neway 123)*	Interior cutter, 34 mm (60° IN) 07780-0014700  or equivalent commercially available in U.S.A. (Neway 111)*	Interior cutter, 30 mm (60° EX) 07780-0014000  or equivalent commercially available in U.S.A. (Neway 111)*

Cutter holder, 5 mm 07781-0010400  or equivalent commercially available in U.S.A. (Neway pilot, 100-5.0 mm)*	Cam chain tensioner holder 07ZMG-MCAA400 

* Available through the Motorcycle Tool and Equipment Program; to order call 888-424-6857.

TROUBLESHOOTING

Engine top-end problems usually affect engine performance. These can be diagnosed by a compression test, or by tracing top-end noise with a sounding rod or stethoscope.

Compression too low, hard starting or poor performance at low speed
- Valves
  - Incorrect valve adjustment
  - Burned or bent valve
  - Incorrect valve timing
  - Broken valve spring
  - Uneven valve seating
- Cylinder head
  - Leaking or damaged cylinder head gasket
  - Warped or cracked cylinder head
  - Loose spark plug
- Cylinder/piston problem (page 12-6)

Compression too high
- Excessive carbon build-up on piston head or combustion chamber

Excessive smoke
- Worn valve stem or valve guide
- Damaged stem seal
- Cylinder/piston problem (page 12-6)

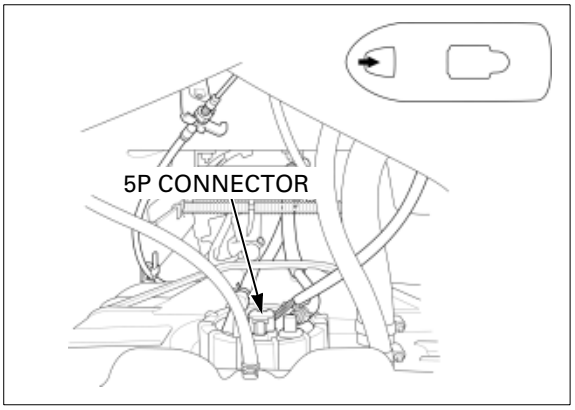
Excessive noise
- Incorrect valve adjustment
- Sticking valve or broken valve spring
- Worn or damaged camshaft
- Worn or damaged valve lifter
- Worn cam chain
- Worn or damaged cam chain tensioner
- Worn cam sprocket teeth
- Cylinder/piston problem (page 12-6)

Rough idle
- Low cylinder compression

CYLINDER COMPRESSION

Start the engine according to the flushing procedure (page 5-2) and warm it up for several minutes at idle.
Turn off the water and stop the engine.

Remove all the direct ignition coils and spark plugs (page 4-7).
Remove the storage box (page 3-8) and disconnect the fuel pump 5P (gray) connector.



Install the compression gauge into the spark plug hole.

TOOL:

Compression gauge attachment	**07RMJ-MY50100 or equivalent commercially available in U.S.A. (Snap-on, EEPV308A)**

To avoid discharging the battery, do not operate the starter motor for more than 7 seconds.

Open the throttle all the way and crank the engine with the starter motor until the gauge reading stops rising. The maximum reading is usually reached within 4 – 7 seconds.

COMPRESSION PRESSURE:
ARX1200T3/T3D:
1,177 kPa (12.0 kgf/cm^2, 171 psi) at 350 rpm
ARX1200N3:
1,275 kPa (13.0 kgf/cm^2, 185 psi) at 350 rpm

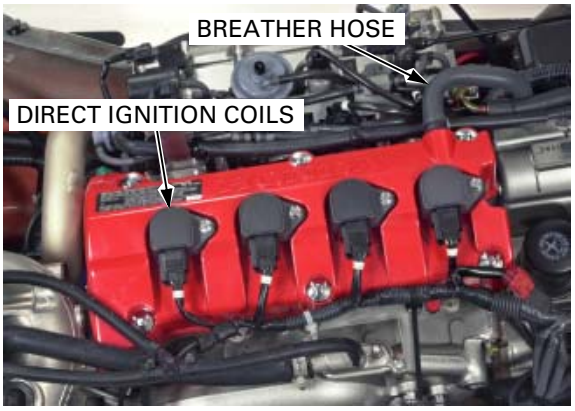
Low compression can be caused by:
– blown cylinder head gasket
– improper valve adjustment
– valve leakage
– worn piston ring or cylinder

High compression can be caused by:
– carbon deposits in combustion chamber or on piston head

CYLINDER HEAD COVER REMOVAL

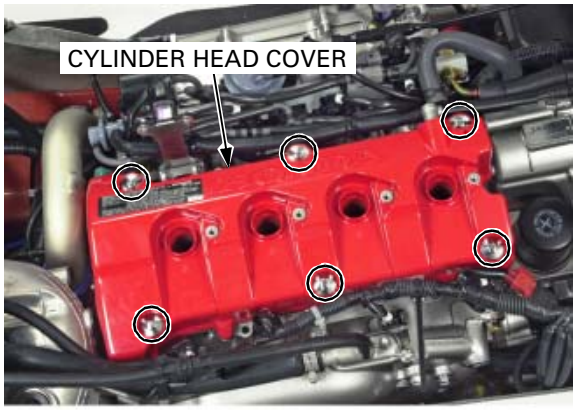
Remove the following:
– side panels (page 3-5)
– ignition coils (page 4-7)

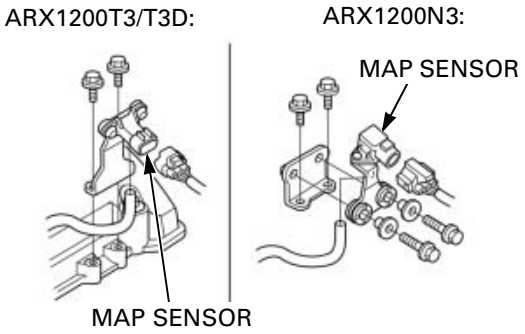
Remove the following from the head cover:
– crankcase breather hose



– two bolts and MAP (manifold absolute pressure) sensor
– six head cover bolts and special washers

Remove the cylinder head cover.





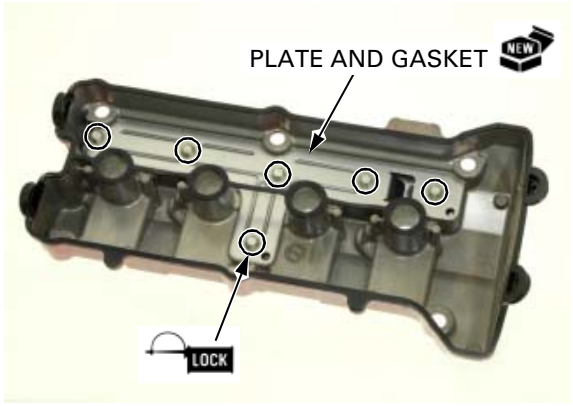
BREATHER PLATE REMOVAL/ INSTALLATION

Remove the following:
– six bolts
– breather plate
– gasket

Clean the inner surface of the head cover.

Apply locking agent to the bolt threads.
Install the breather plate with a new plate gasket and tighten the six bolts.

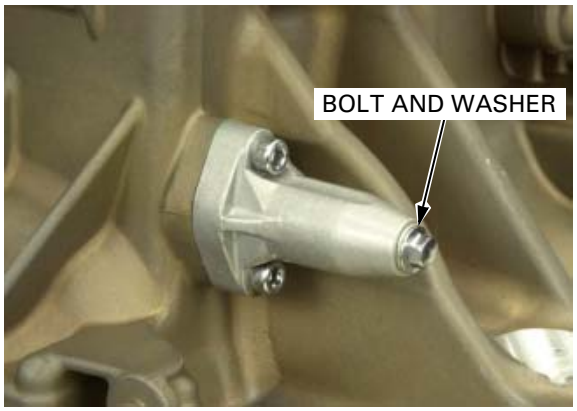
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



CAMSHAFT REMOVAL

Remove the following:
– cylinder head cover (page 10-7)
– spark plugs (page 4-7)
– ARX1200T3/T3D: coupler covers; B and A (page 3-14)
  ARX1200N3: coupler cover (page 3-14)

Remove the tensioner lifter sealing bolt and sealing washer located on the right rear side of the upper crankcase, being careful not to drop them.



Turn the cam chain tensioner lifter shaft clockwise fully and secure it with the special tool to loosen the tensioner lifter.

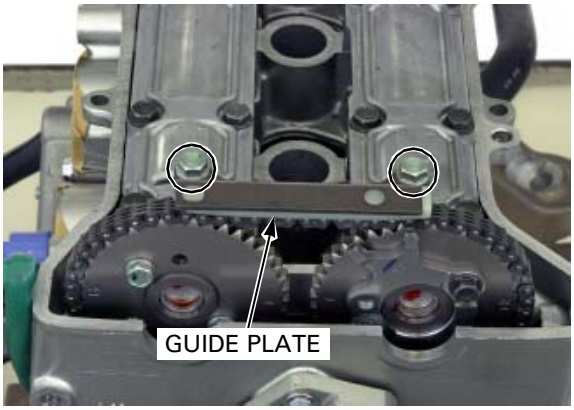
TOOL:
Cam chain tensioner holder 07ZMG-MCAA400

The camshaft can be removed with the cam sprocket installed.

Loosen the cam sprocket bolts.

Rotate the crankshaft counterclockwise (viewed from rear side) so the timing marks ("IN" for intake and "EX" for exhaust) on the cam sprockets are flush with the cylinder head surface and facing outward as shown.

Remove the two bolts and cam chain guide plate.



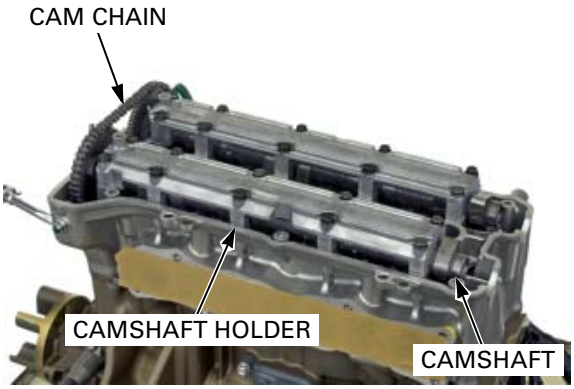
Loosen the camshaft holder bolts in a crisscross pattern in several steps from outside to inside to prevent damage the camshaft holders and camshafts.
Remove the camshaft holders.

Suspend the cam chain with a piece of wire to prevent the chain from falling into the crankcase.

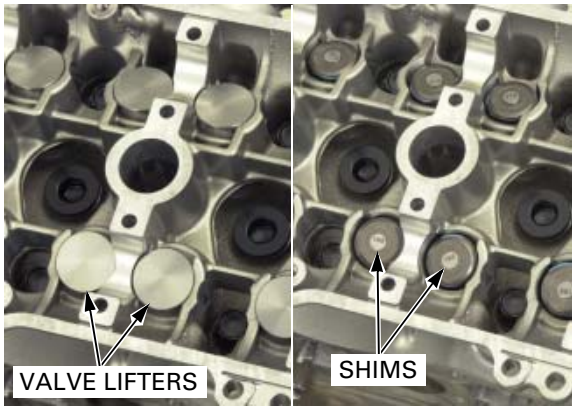
Release the cam chain off the cam sprocket to remove each camshaft.

NOTE:

- Do not forcibly remove the dowel pins from the camshaft holder.



Remove the valve lifters and shims.



NOTE:

- Be careful not to damage the valve lifter bore.
- Shims may stick to the inside of the valve lifter. Do not allow the shims to fall into the crankcase.
- Mark all valve lifters and shims to ensure correct reassembly in their original locations.
- The valve lifter can be easily removed with a valve lapping tool or magnet.
- The shims can be easily removed with tweezers or a magnet.

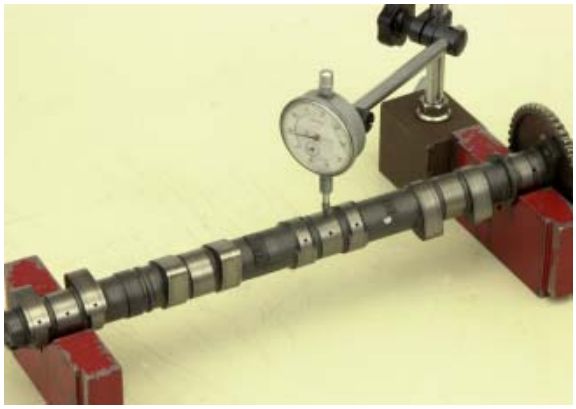
INSPECTION

CAMSHAFT

Check the cam and journal surfaces of the camshaft for scoring, scratches or evidence of insufficient lubrication.
Check the oil holes in the camshaft for clogs.

Measure the camshaft runout using a dial indicator.

SERVICE LIMIT: 0.05 mm (0.002 in)



Measure each cam lobe height using a micrometer.

SERVICE LIMITS:
ARX1200T3/T3D:
IN: 37.38 mm (1.472 in)
EX: 37.48 mm (1.476 in)
ARX1200N3:
IN: 38.28 mm (1.507 in)
EX: 38.08 mm (1.499 in)

CAMSHAFT JOURNAL

Check the camshaft journal surfaces of the camshaft holders and cylinder head for scoring, scratches or evidence of insufficient lubrication.

CAM CHAIN GUIDE PLATE

Check the guide plate for excessive wear or damage.

CAM CHAIN TENSIONER LIFTER

Remove the two socket bolts and the cam chain tensioner lifter.

Check the lifter operation as follows.
The tensioner shaft should not go into the body when it is pushed.
When it is turned clockwise with the stopper tool or a screwdriver, the tensioner shaft should be pulled into the body. The shaft spring out of the body as soon as the stopper tool is released.

TOOL:
Cam chain tensioner holder 07ZMG-MCAA400

CAMSHAFT OIL CLEARANCE

NOTE:
- Do not rotate the camshaft during inspection.

The camshafts have the identification marks; –IN: intake –EX: exhaust

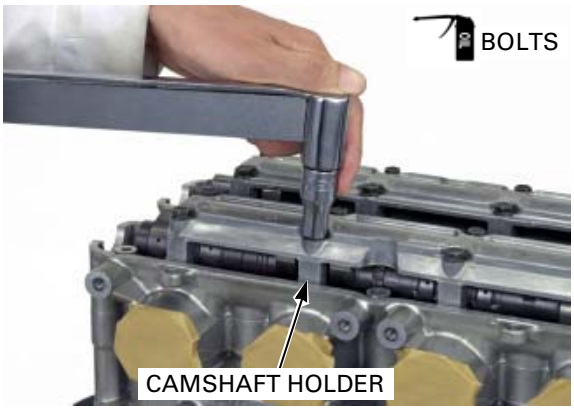
Wipe any oil from the journals of the camshafts, cylinder head and camshaft holders.
Put the camshaft onto the cylinder head and lay a strip of plastigauge lengthwise on each camshaft journal avoiding the oil hole.

Carefully install the camshaft holders onto the camshafts.
Apply engine oil to the threads and seating surfaces of the camshaft holder bolts, and install them into the camshaft holders.

Each camshaft holder has the number "1" thru. "10".

Tighten the holder bolts in several steps according to the numerical order cast on the camshaft holder.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Remove the camshaft holders and measure the compressed plastigauge at its widest point on the camshaft to determine the oil clearance.

SERVICE LIMIT: 0.09 mm (0.004 in)

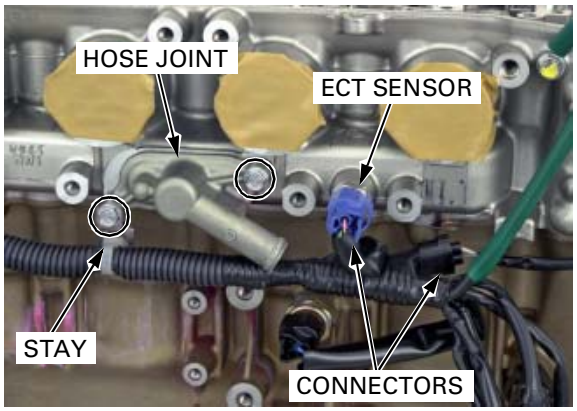
If the oil clearance exceeds the service limit, replace the camshaft and recheck the oil clearance.
Replace the cylinder head and camshaft holders as a set if the oil clearance still exceeds the service limit.

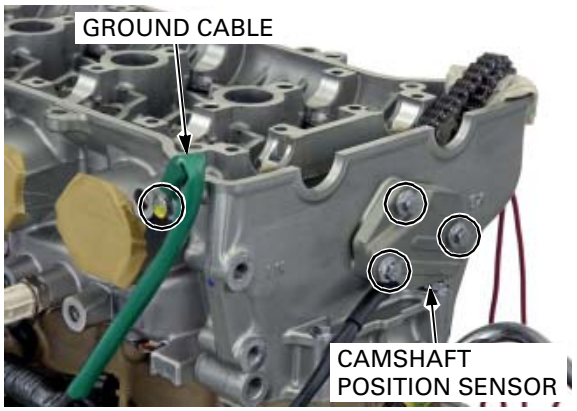
CYLINDER HEAD REMOVAL

Remove the following:
– camshafts (page 10-8)
– throttle body (page 8-94)
– exhaust manifold (page 13-11)

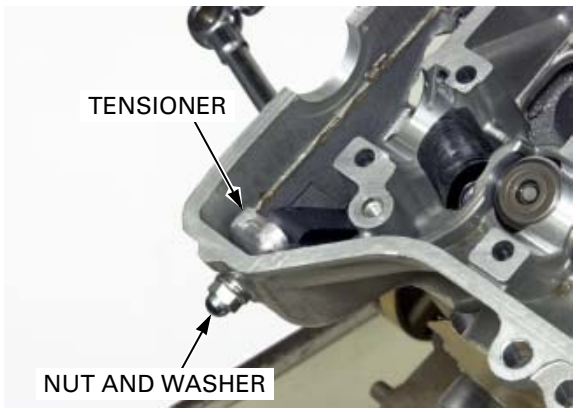
Remove the following from the cylinder head:
– engine coolant temperature (ECT) sensor 2P connector
– camshaft position sensor 2P connector
– bolt and harness stay
– bolt and ground cable

Remove the following when the cylinder head is ready to be disassembled:
– bolt and water hose joint
– ECT sensor
– three bolts, washers and camshaft position sensor assembly



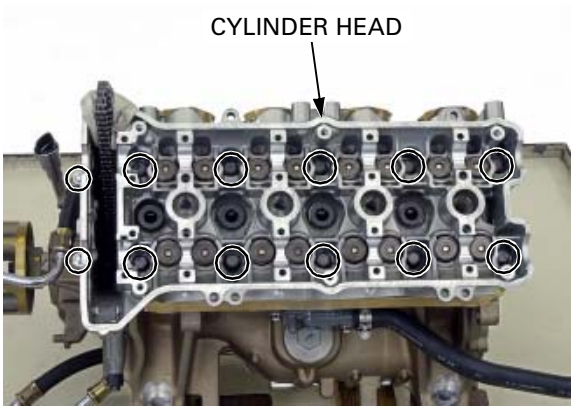


Remove the cap nut and sealing washer, and the cam chain tensioner.



Remove the two 6-mm cylinder head bolts.
Loosen the ten 10-mm bolts in a crisscross pattern in several steps, and remove them.

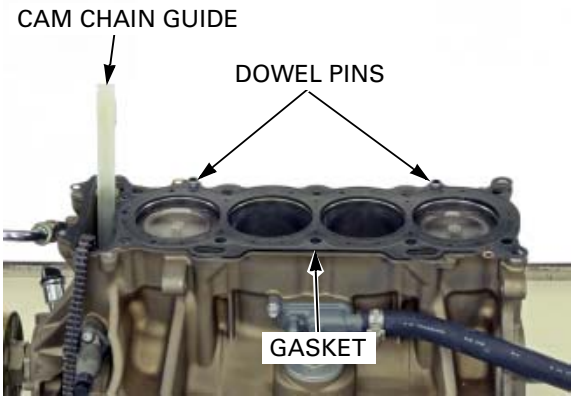
Remove the cylinder head.



Remove the gasket, dowel pins and cam chain guide.

NOTE:

- For cam chain removal, refer to "CRANKSHAFT" on page 12-10.

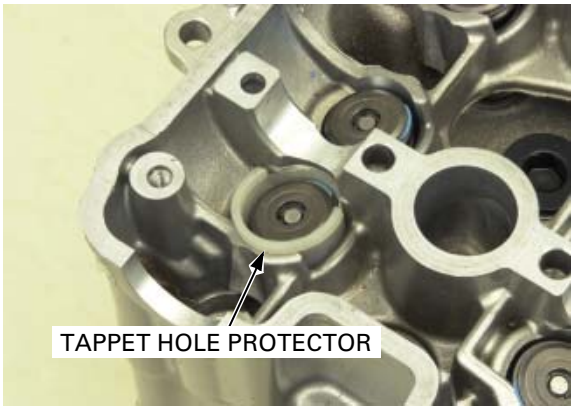


CYLINDER HEAD DISASSEMBLY

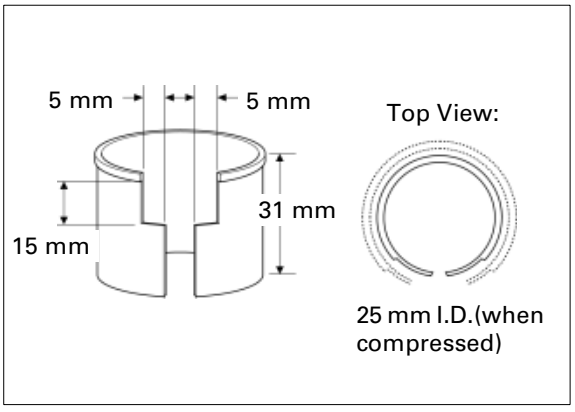
If the tappet hole protector is not available, refer to the next step for an alternative tool.

Install the tappet hole protector into the valve lifter bore.

TOOL:
Tappet hole protector **07HMG-MR70002**



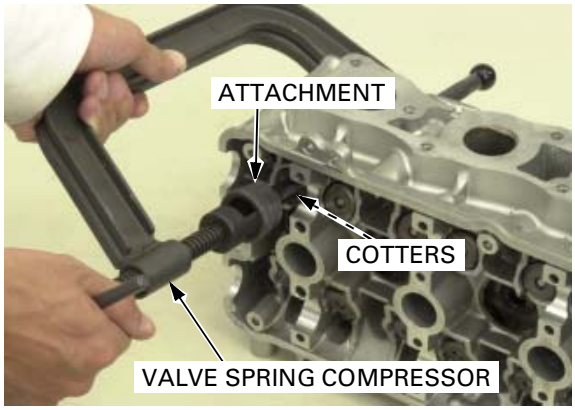
An alternative tappet hole protector can easily be made from a plastic 35 mm film container as shown.



Remove the valve spring cotters using the special tools as shown.

TOOLS:

Valve spring compressor	**07757-0010000**
Spring compressor attachment	**07959-KM30101**



NOTICE

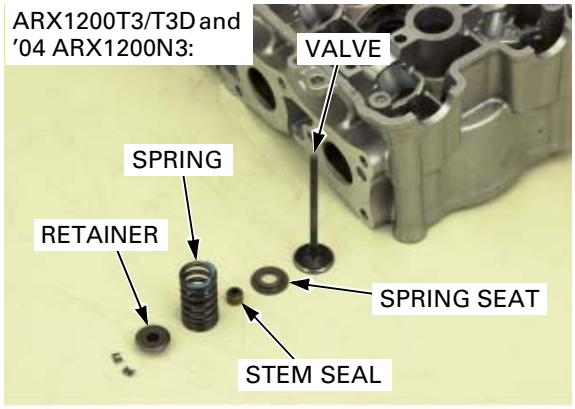
To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.

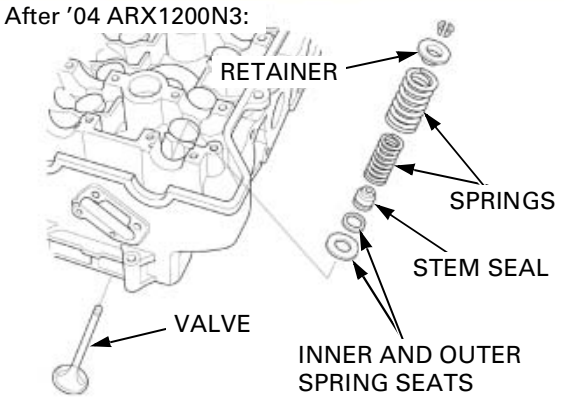
Mark all parts during disassembly so they can be placed back in their original locations.

Remove the following:

ARX1200T3/T3D and '04 ARX1200N3:
- spring retainer
- valve spring
- valve
- stem seal
- spring seat

After '04 ARX1200N3:
- spring retainer
- outer and inner valve springs
- valve
- stem seal
- inner spring seat
- outer spring seat





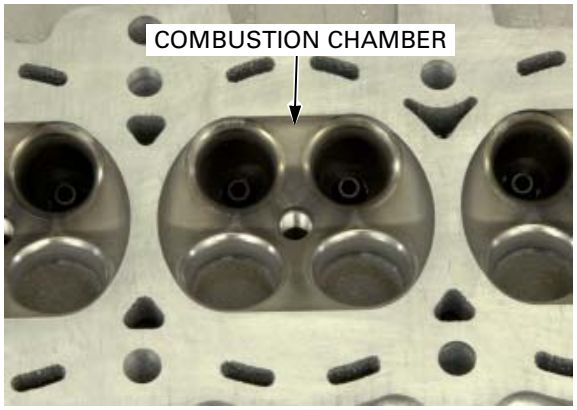
INSPECTION

CYLINDER HEAD

Be careful not to damage the gasket surface.

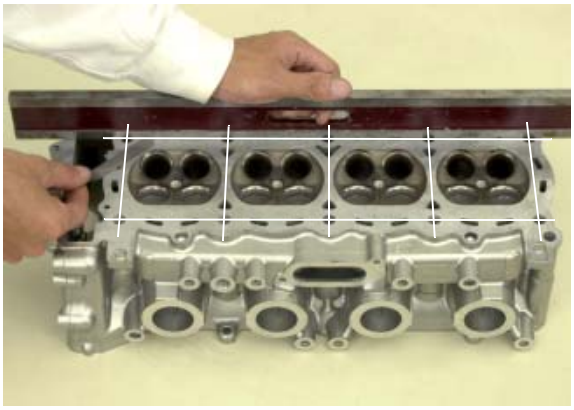
Remove carbon deposits from the combustion chamber.

Check the spark plug hole and valve areas for cracks.



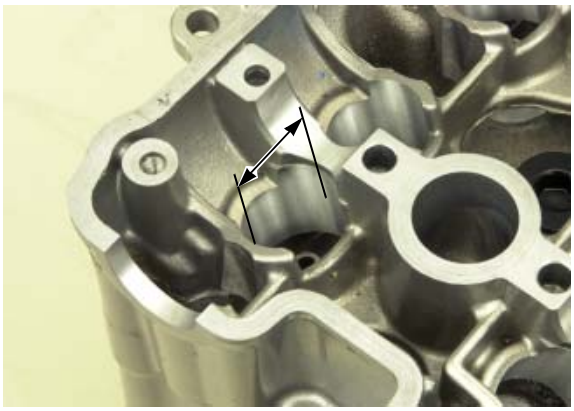
Check the cylinder head for warpage with a straight edge and feeler gauge.

SERVICE LIMIT: 0.10 mm (0.004 in)



Check the valve lifter bore for scoring, scratches or abnormal wear.
Measure each valve lifter bore I.D.

SERVICE LIMIT: 26.04 mm (1.025 in)



VALVE LIFTER

Check the valve lifter for scoring, scratches or abnormal wear.
Measure each valve lifter O.D.

SERVICE LIMIT: 25.97 mm (1.022 in)

VALVE SPRING

Measure each valve spring free length.

SERVICE LIMIT:
'04 model:
ARX1200T3: IN/EX: 41.5 mm (1.63 in)
ARX1200N3: IN/EX: 38.6 mm (1.52 in)
After '04:
ARX1200T3/T3D: IN/EX: 41.5 mm (1.63 in)
ARX1200N3: Outer: IN/EX: 38.6 mm (1.52 in)
Inner: IN/EX: 35.4 mm (1.39 in)

VALVE/VALVE GUIDE

Check that the valve moves smoothly in the guide.
Check the valve for bends, burns or abnormal wear.
Measure each valve stem O.D. and record it.

SERVICE LIMITS:
IN: 4.965 mm (0.1955 in)
EX: 4.950 mm (0.1949 in)

Ream the guides to remove any carbon deposits before measuring the guide.
Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

TOOL:

Valve guide reamer, 5 mm	**07984-MA60001 or 07984-MA6000D or 07984-MA6000C (U.S.A. only)**

Measure each valve guide I.D. and record it.

SERVICE LIMIT: IN/EX: 5.040 mm (0.1984 in)

Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

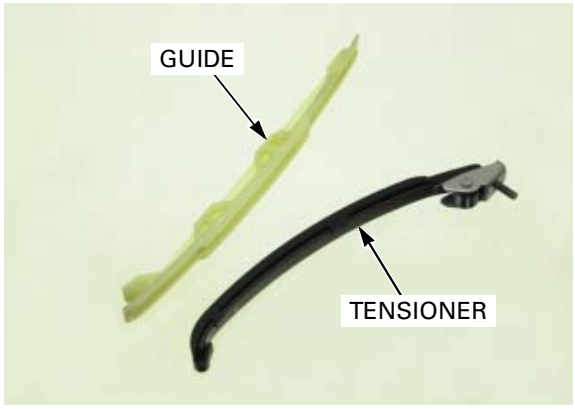
STANDARDS:
IN: 0.010 – 0.037 mm (0.0004 – 0.0015 in)
EX: 0.025 – 0.052 mm (0.0010 – 0.0020 in)

Inspect and reface the valve seats whenever the valve guides are replaced *(page 10-17).*

If the stem-to-guide clearance is out of the specification, determine if a new guide with standard dimensions would bring the clearance within tolerance.
If a new guide will work, replace any guides as necessary and ream to fit.
If the stem-to-guide clearance is out of the standard dimensions with a new guide, also replace the valve.

CAM CHAIN TENSIONER/GUIDE

Check the cam chain tensioner and guide for excessive wear or damage and replace them if necessary.



VALVE GUIDE REPLACEMENT

Mark new valve guides at the specified height indicated below, using a marker.
Chill new valve guides in a freezer for about 1 hour.

Be sure to wear heavy gloves to avoid burns when handling the heated cylinder head.

Heat the cylinder head to 130 – 140°C (275 – 290°F) with a hot plate or oven. Use temperature indicator sticks, available from welding supply stores, to be sure the cylinder head is heated to the proper temperature

NOTICE

Using a torch to heat the cylinder head may cause warpage.

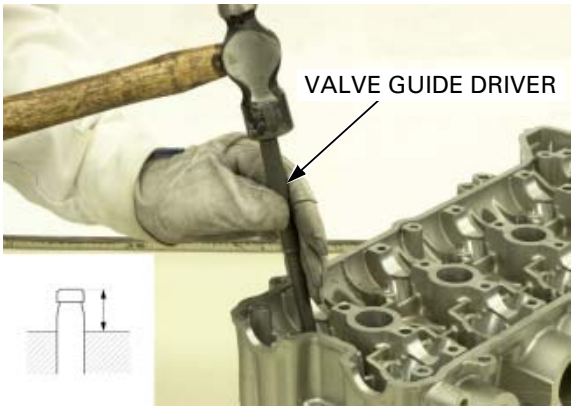
Support the cylinder head and drive the valve guides out of the cylinder head from the combustion chamber side.

TOOL:
Valve guide driver, 5 mm **07942-MA60000**

Remove the guides from the freezer.
While the cylinder head is still heated, drive new valve guides into the cylinder head from the camshaft side until the exposed height is at the specified value (at the mark).

TOOL:
Valve guide driver, 5 mm **07942-MA60000**

VALVE GUIDE PROJECTION:
IN/EX: 16.3 – 16.5 mm (0.64 – 0.65 in)

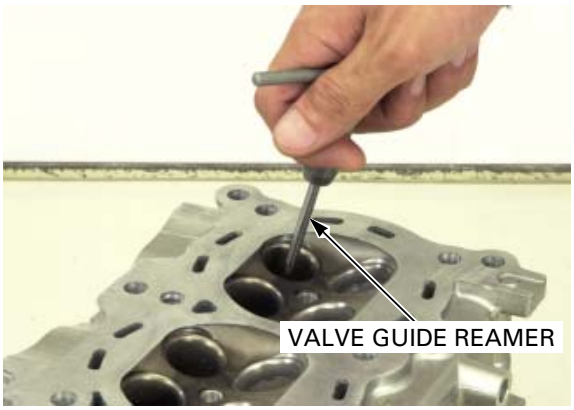


Let the cylinder head cool to room temperature.

Use cutting oil on the reamer during this operation. Take care not to tilt or learn the reamer in the guide while reaming.

Ream the new valve guides.
Insert the reamer from the combustion chamber side of the cylinder head and always rotate the reamer clockwise.

TOOL:
Valve guide reamer, 5 mm **07984-MA60001 or 07984-MA6000D or 07984-MA6000C (U.S.A. only)**

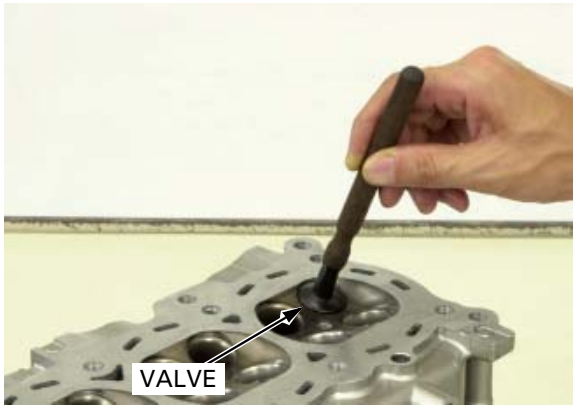


Clean the cylinder head thoroughly to remove any metal particles after reaming and reface the valve seats (page 10-19).

VALVE SEAT INSPECTION/REFACING

Clean all intake and exhaust valves thoroughly to remove carbon deposits.

Apply a light coat of Prussian Blue to the valve seat. Tap the valve against the valve seat several times without rotating the valve, to check for proper valve seat contact.

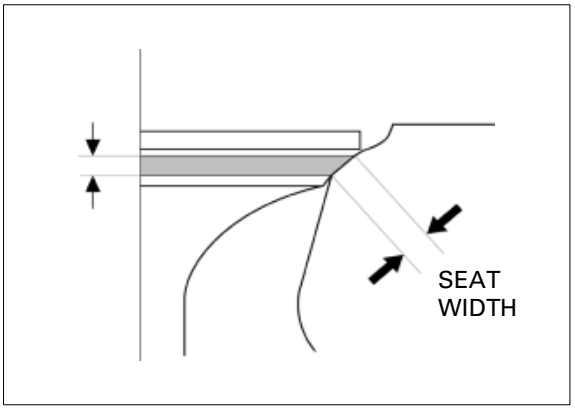


The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.

Remove the valve and inspect the valve seat face. The valve seat contact should be within the specified width and even all around the circumference.

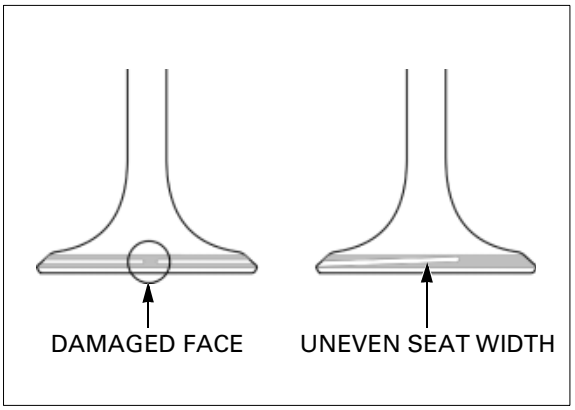
STANDARD: 0.90 – 1.10 mm (0.035 – 0.043 in)
SERVICE LIMIT: 1.5 mm (0.06 in)

If the seat width is not within specification, reface the valve seat (page 10-19).

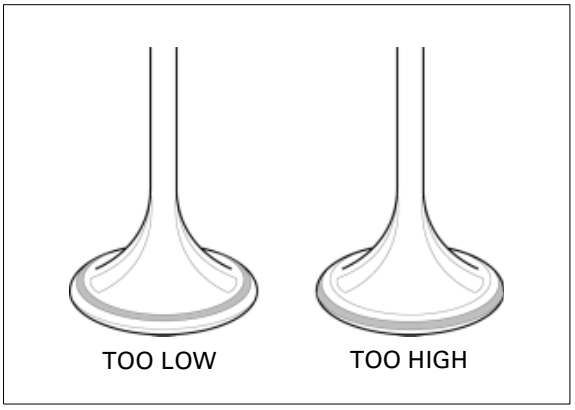


Inspect the valve seat face for:

- Damaged face:
  – Replace the valve and reface the valve seat.
- Uneven seat width:
  – Replace the valve and reface the valve seat.



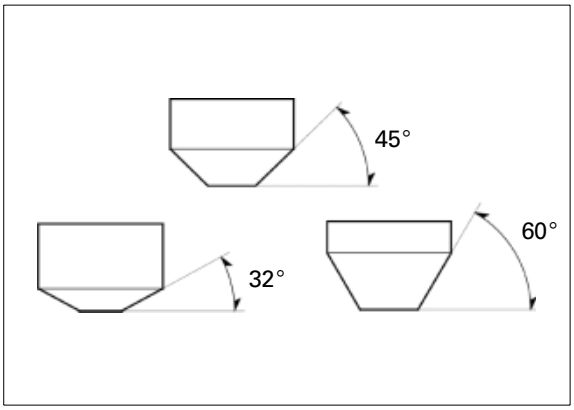
- Contact area (too low or too high)
  – Reface the valve seat.



REFACING

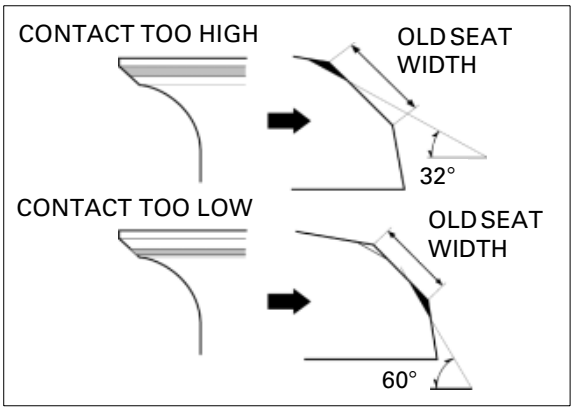
Follow the refacing manufacturer's operating instructions.

Valve seat cutters/grinders or equivalent valve seat refacing equipment are recommended to correct worn valve seats.



If the contact area is too high on the valve, the seat must be lowered using a 32° flat cutter.

If the contact area is too low on the valve, the seat must be raised using a 60° interior cutter.



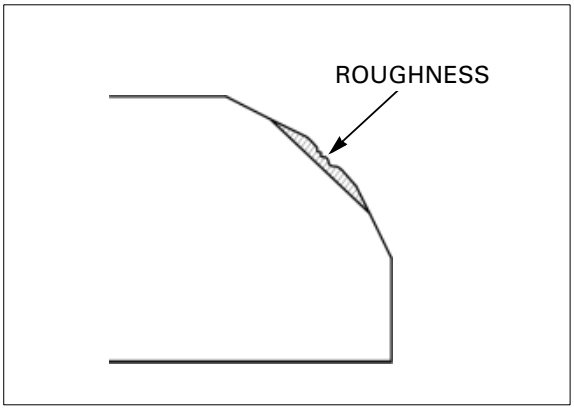
Reface the seat with a 45° cutter whenever a valve guide is replaced.

Use a 45° seat cutter to remove any roughness or irregularities from the seat.

TOOLS:

Seat cutter, 33 mm (IN)	**07780-0010800**
Seat cutter, 29 mm (EX)	**07780-0010300**
Cutter holder, 5 mm	**07781-0010400**

or equivalent commercially available in U.S.A.
(Neway 122, intake and exhaust)
(Neway pilot, 100-5.0 mm)

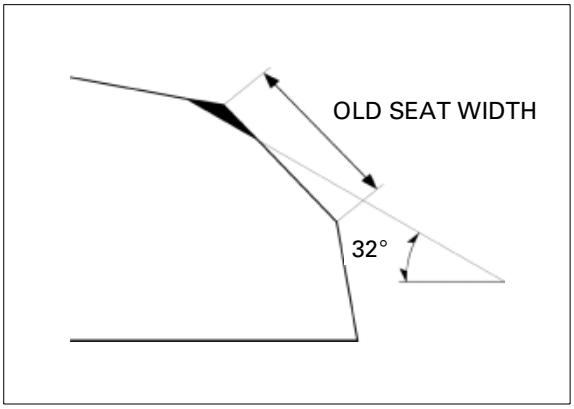


Use a 32° flat cutter to remove the top 1/4 of the existing valve seat material.

TOOLS:

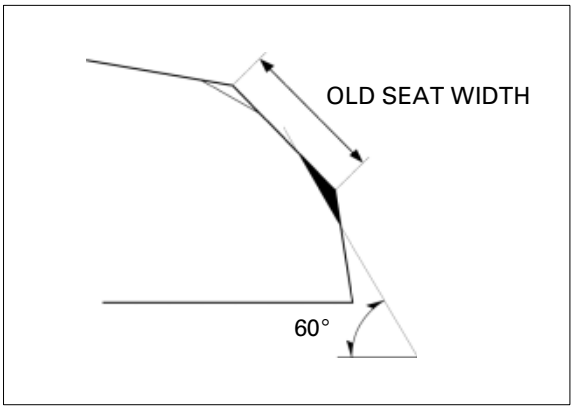
Flat cutter, 33 mm (IN)	**07780-0012900**
Flat cutter, 30 mm (EX)	**07780-0012200**
Cutter holder, 5 mm	**07781-0010400**

or equivalent commercially available in U.S.A.
(Neway 123, intake and exhaust)
(Neway pilot, 100-5.0 mm)

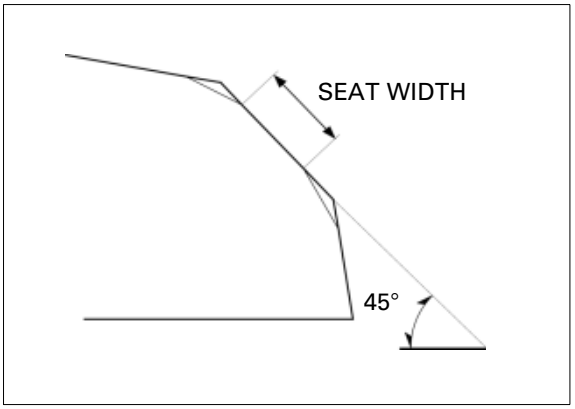


Use a 60° interior cutter to remove the bottom 1/4 of the existing valve seat material.

TOOLS:
Interior cutter, 34 mm (IN) 07780-0014700
Interior cutter, 30 mm (EX) 07780-0014000
Cutter holder, 5 mm 07781-0010400
or equivalent commercially available in U.S.A.
(Neway 111, intake and exhaust)
(Neway pilot, 100-5.0 mm)



Using a 45° seat cutter, cut the seat to the proper width.
Make sure all pitting and irregularities are removed. Refinish if necessary.

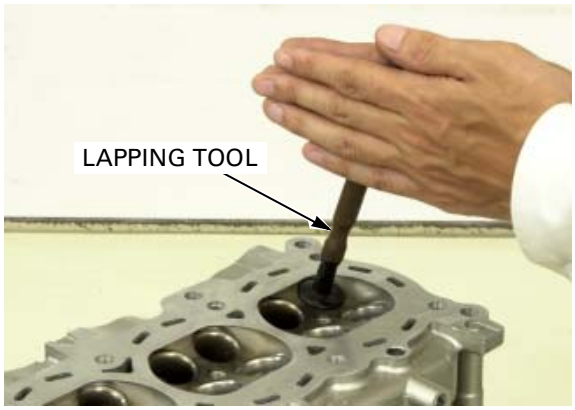


After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

NOTE:

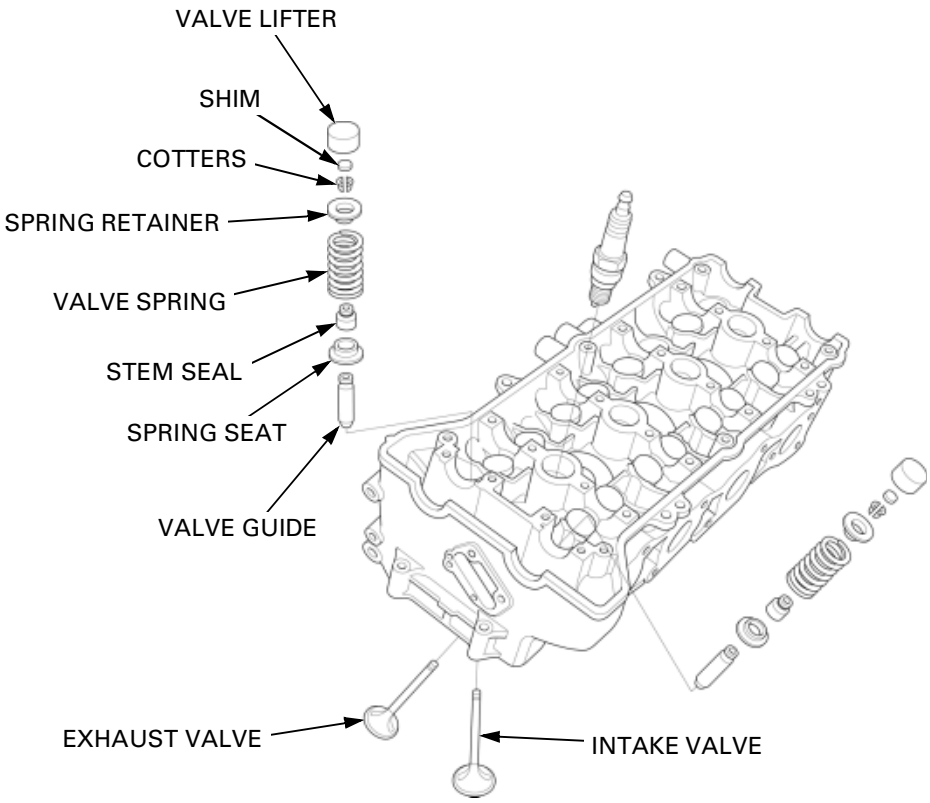
- Excessive lapping pressure may deform or damage the seat.
- Change the angle of the lapping tool frequently to prevent uneven seat wear.
- Do not allow lapping compound to enter the guides.

After lapping, wash any residual compound off the cylinder head and valve and recheck the seat contact.

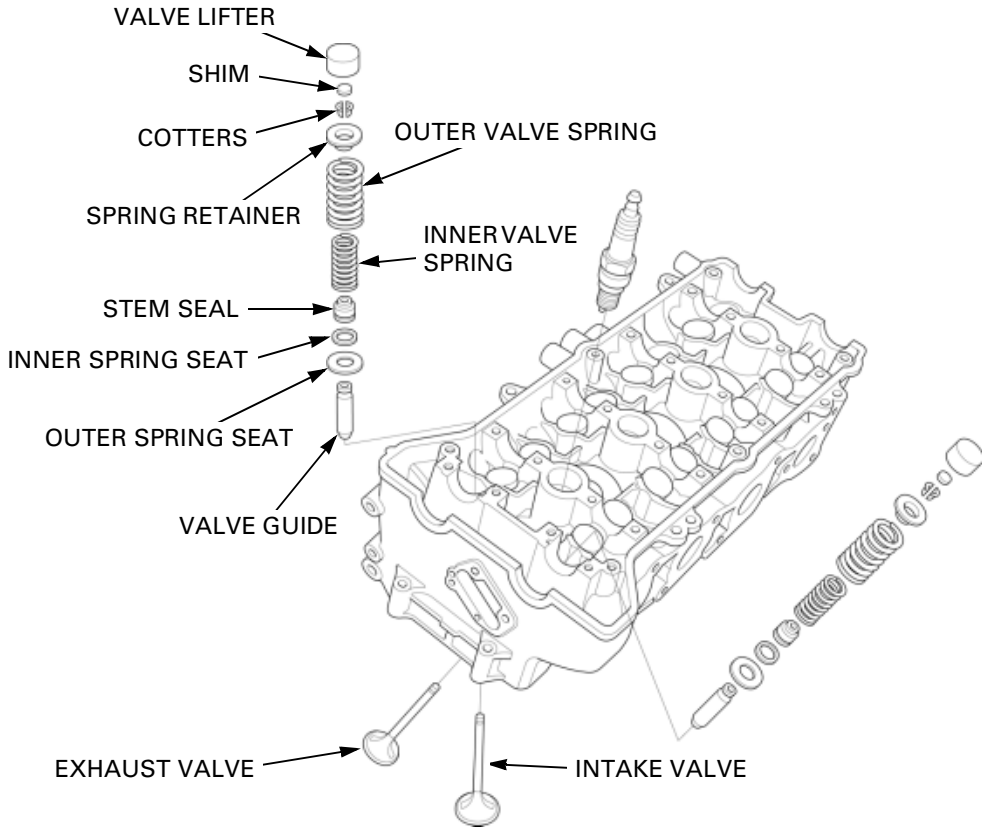


CYLINDER HEAD ASSEMBLY

ARX1200T3/T3D and '04 ARX1200N3:



After '04 ARX1200N3:

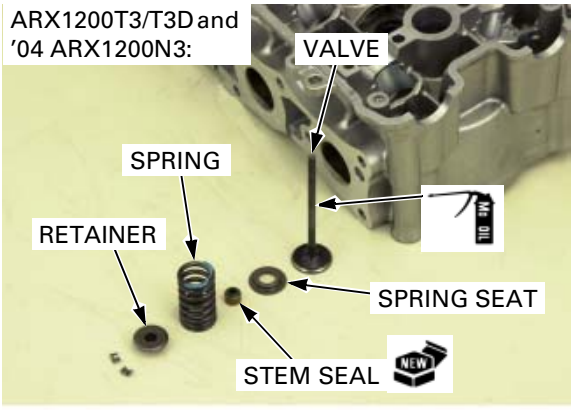


Blow out all oil passages in the cylinder head with compressed air.

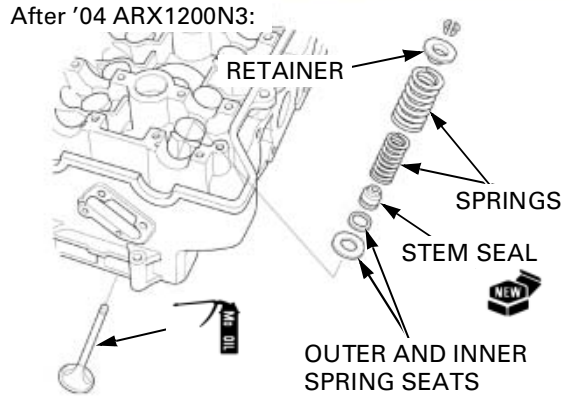
Install the spring seats and new stem seals.

Lubricate the valve stem sliding surface with molybdenum oil solution.
Insert the valve into the valve guide while turning it slowly to avoid damage to the stem seal.

ARX1200T3/T3D and '04 ARX1200N3:



After '04 ARX1200N3:



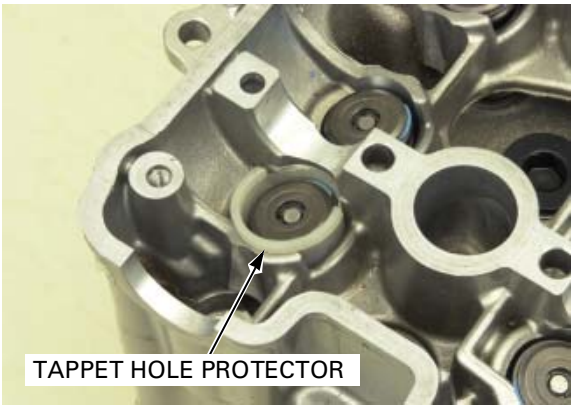
Install the valve springs with the tightly wound coils facing the combustion chamber.

Install the valve spring retainer.

Refer to page 10-13 for an alternative tappet hole protector, if the special tool is not available.

Install the tappet hole protector into the valve lifter bore.

TOOL:
Tappet hole protector **07HMG-MR70002**



Grease the cotters to ease installation.

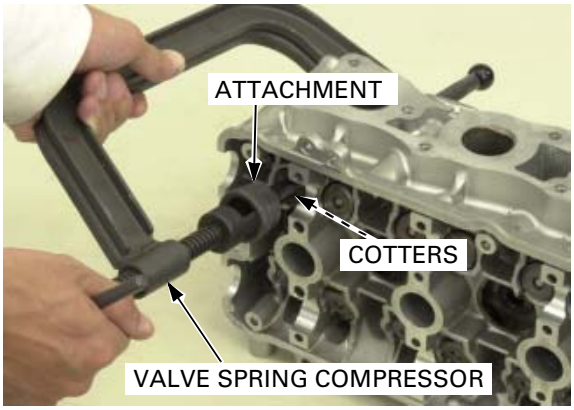
Install the cotters using the valve spring compressor.

NOTICE

To prevent loss of tension, do not compress the valve spring more than necessary.

TOOLS:

Valve spring compressor	**07757-0010000**
Spring compressor attachment	**07959-KM30101**



Support the cylinder head so the valve head will not contact anything that may cause damage.

Tap the valve stems gently with two plastic hammers as shown to seat the cotters firmly.

CYLINDER HEAD INSTALLATION

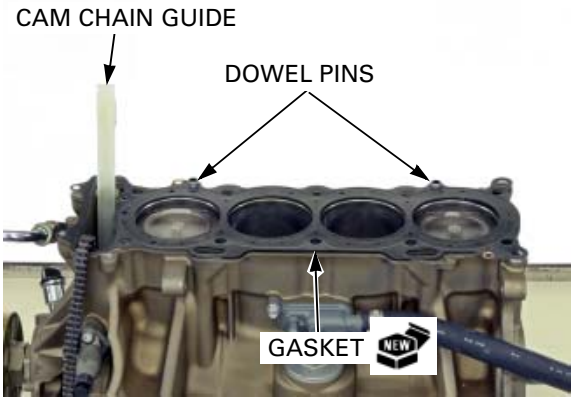
NOTE:

- Route the wires properly (page 1-31 or 1-52).

Clean the mating surface of the cylinder and cylinder head.

Install the cam chain guide by aligning the guide end with the crankcase groove, and the projections with the cylinder grooves.

Install the two dowel pins and a new gasket.

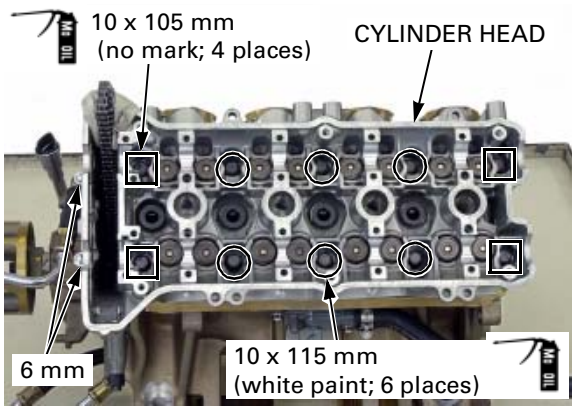


Install the cylinder head onto the cylinder.

Apply molybdenum oil solution to the threads and seating surfaces of the 10-mm cylinder head bolts and install them.
Tighten the 10-mm bolts in a crisscross pattern in several steps.

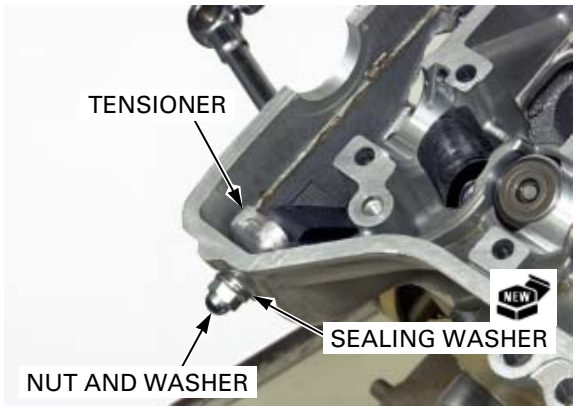
TORQUE: 69 N·m (7.0 kgf·m, 51 lbf·ft)

Install the 6-mm cylinder head bolts and tighten them.



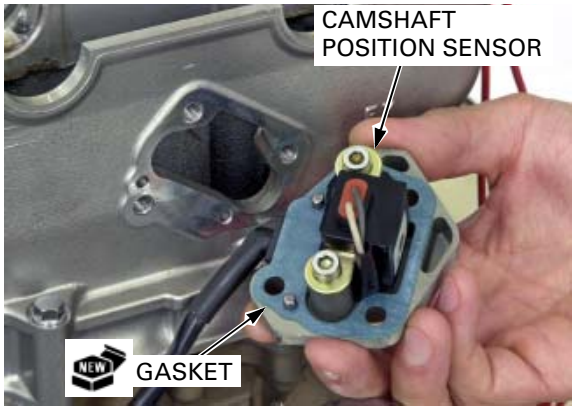
Install the cam chain tensioner into the cylinder head.
Install the cap nut with a new sealing washer.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

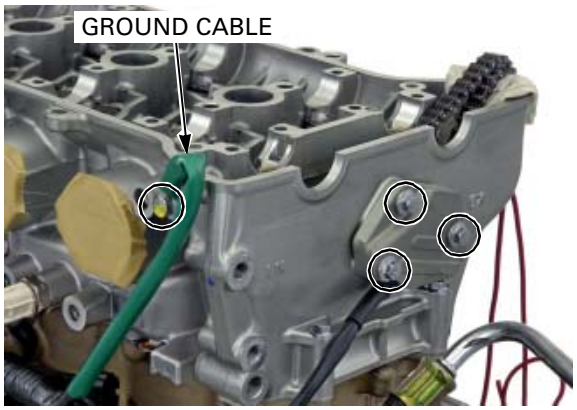


Place the cam chain through the camshaft position sensor.

Install the camshaft position sensor assembly with a new gasket. Install the three bolts with the washers and tighten them.

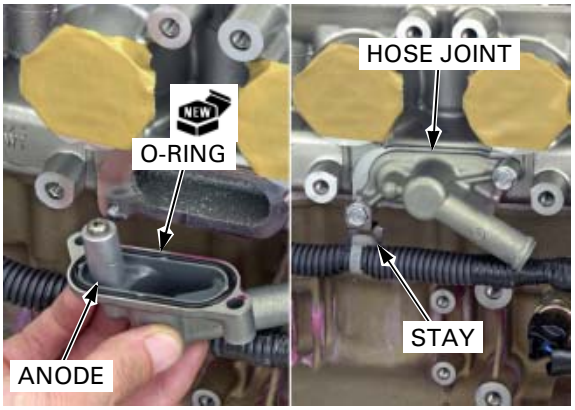


Connect the ground cable to the cylinder head and tighten the bolt.



Before installing the water hose joint, check the anode (page 4-17).

Install a new O-ring into the hose joint groove. Install the water hose joint with the bolts and stay, and tighten them.

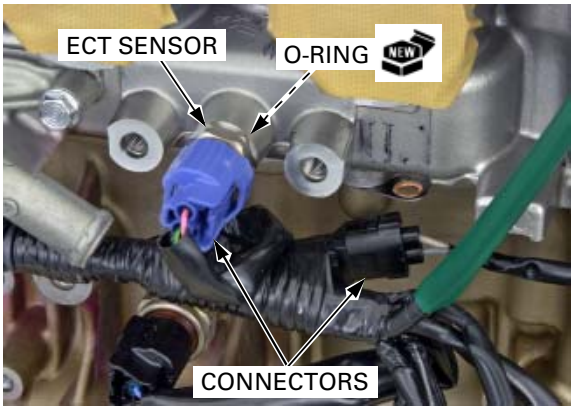


Install the ECT sensor with a new O-ring.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Connect the ECT sensor and camshaft position sensor 2P connectors.

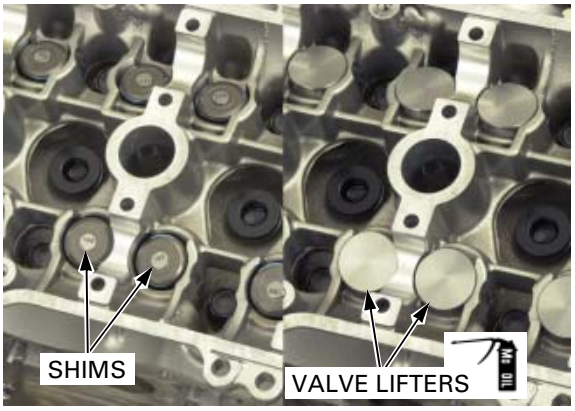
Install the following:
– camshafts (page 10-8)
– exhaust manifold (page 13-11)
– throttle body (page 8-102)



CAMSHAFT INSTALLATION

Install the valve shims in their original locations.

Coat the outer surface of the valve lifters with molybdenum oil solution.
Install the valve lifters in their original lifter bores, being careful not to damage the sliding surfaces of the lifters and bores.

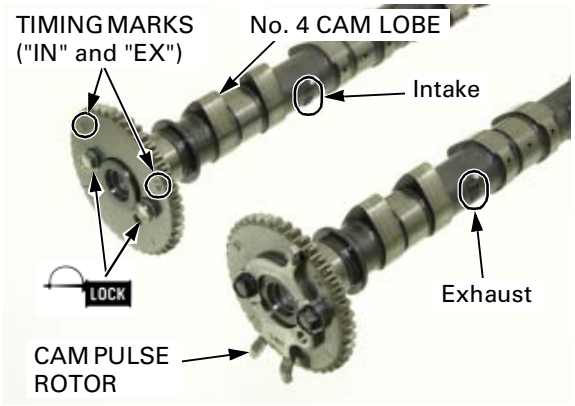


Install the cam sprockets onto each camshaft so the No. 4 cam lobe is positioned between the "IN" and "EX" timing marks on the cam sprocket, and align the bolt holes.

The camshafts have the identification marks;
– IN: intake
– EX: exhaust

Install the cam pulse rotor onto the sprocket on the exhaust camshaft by aligning the locating pin with the hole.

Apply locking agent to the threads of the sprocket bolts and install them (intake: 7 x 10 mm/exhaust: 7 x 13 mm).

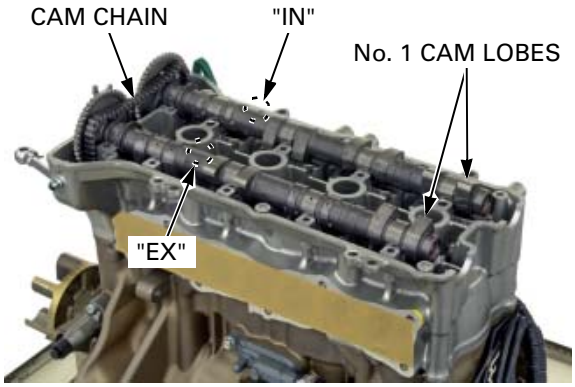


Take care not to jam the cam chain at the crankshaft when turning.

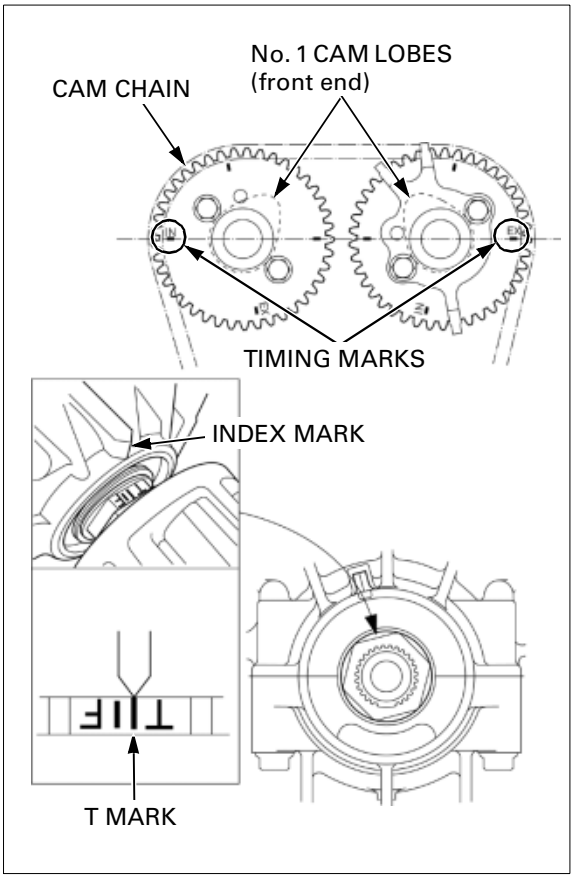
Turn the crankshaft counterclockwise (viewed from rear side) and align the "T" mark on the drive coupler boss with the index mark (arrow) on the crankcase.

The "IN" mark is on the intake side and the "EX" mark is on the exhaust side.

Install the camshafts onto the cylinder head through the cam chain so the No. 1 cam lobes are facing up and inward diagonally.

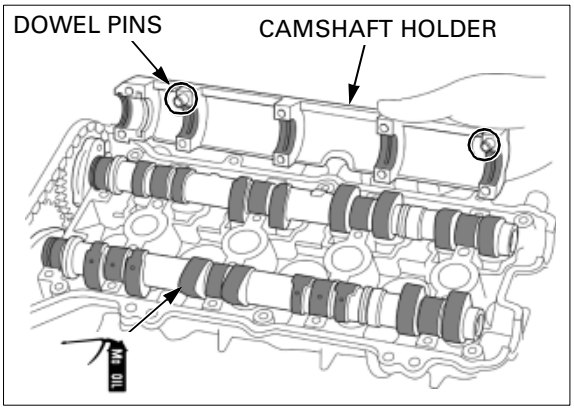


Carefully install the cam chain over the cam sprockets so the timing marks ("IN" for intake and "EX" for exhaust) on the cam sprockets are flush with the cylinder head surface and face outward as shown.



Apply molybdenum oil solution to the camshaft journals, cam lobes and thrust surfaces.

Install the dowel pins and the intake and exhaust camshaft holders.



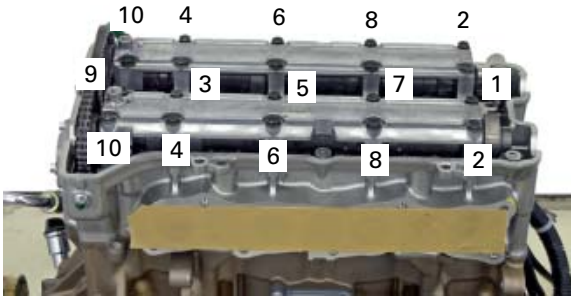
Apply engine oil to the threads and seating surfaces of the camshaft holder bolts, and install them.

:BOLTS

Each camshaft holder has the number "1" thru "10".

Tighten the holder bolts in several steps according to the numerical order cast on the camshaft holder.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

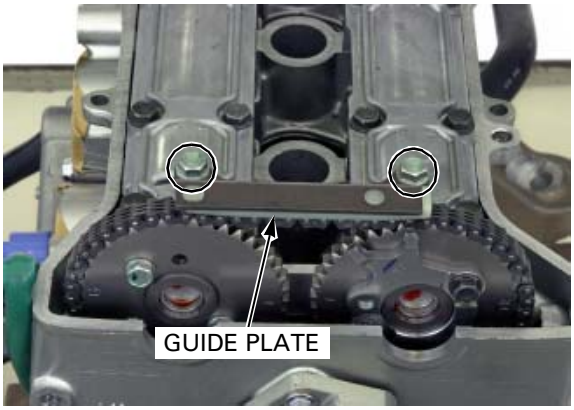


Tighten the sprocket bolts while holding the crankshaft if they were removed.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)

Turn the crankshaft counterclockwise one turn and tighten the other sprocket bolts to the same torque.

Apply locking agent to the guide plate bolt threads. Install the cam chain guide plate and tighten the two bolts.



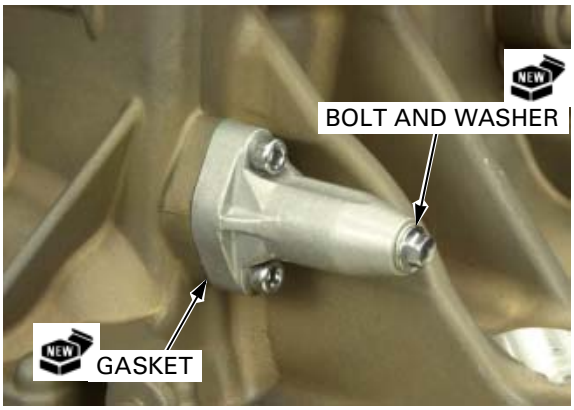
Install the cam chain tensioner lifter with a new gasket if it was removed. Tighten the two socket bolts.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Remove the stopper tool (tensioner holder) from the tensioner lifter.

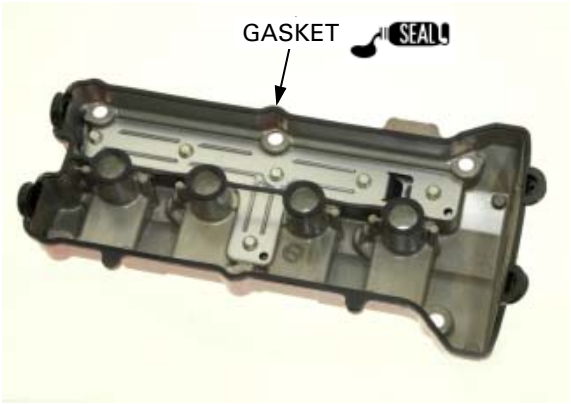
Install the sealing bolt with a new sealing washer and tighten it.

Install the following:
- cylinder head cover (page 10-28)
- spark plugs (page 4-7)
- ARX1200T3/T3D: coupler covers; A and B (page 3-14)
  ARX1200N3: coupler cover (page 3-14)

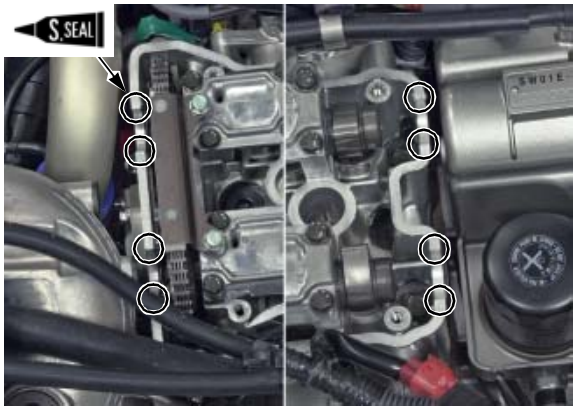


CYLINDER HEAD COVER INSTALLATION

Apply sealant to the head cover side of the gasket. Install the gasket in the head cover groove.



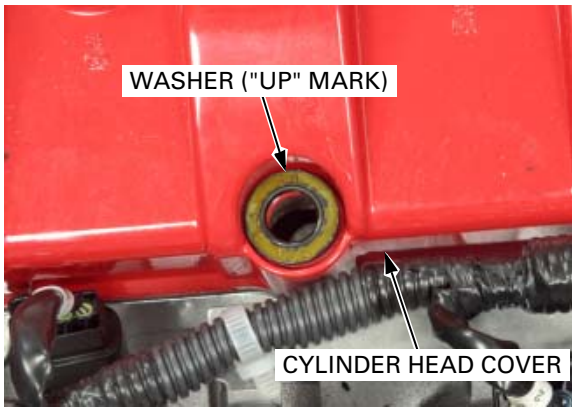
Apply silicone sealant to the semi-circular area edges (8 places) of the cylinder head.



Install the head cover onto the cylinder head, aligning the semi-circular areas of the gasket and cylinder head carefully.

The "UP" mark of the washer is facing the bolt head.

Install the cover bolts with the special washers by aligning them with the bolt hole in the cylinder head.

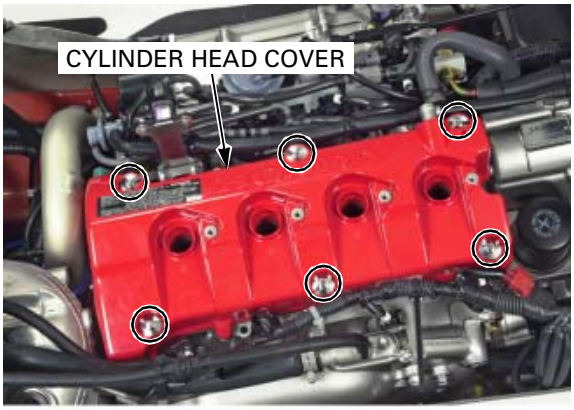


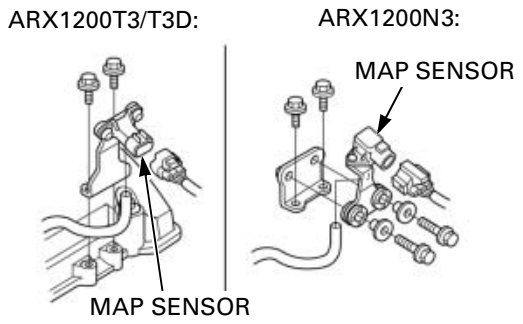
First tighten the two bolts, indicated by the triangular marks, to the specified torque.

Tighten the six cover bolts in several steps.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

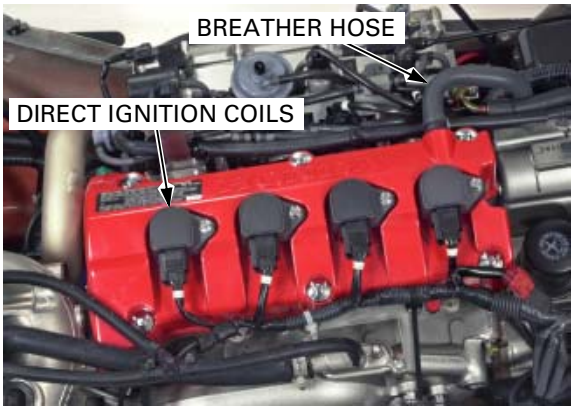
Install the MAP sensor and tighten the two bolts.





Connect the crankcase breather hose.

Install the following:
– ignition coils (page 4-7)
– side panels (page 3-5)

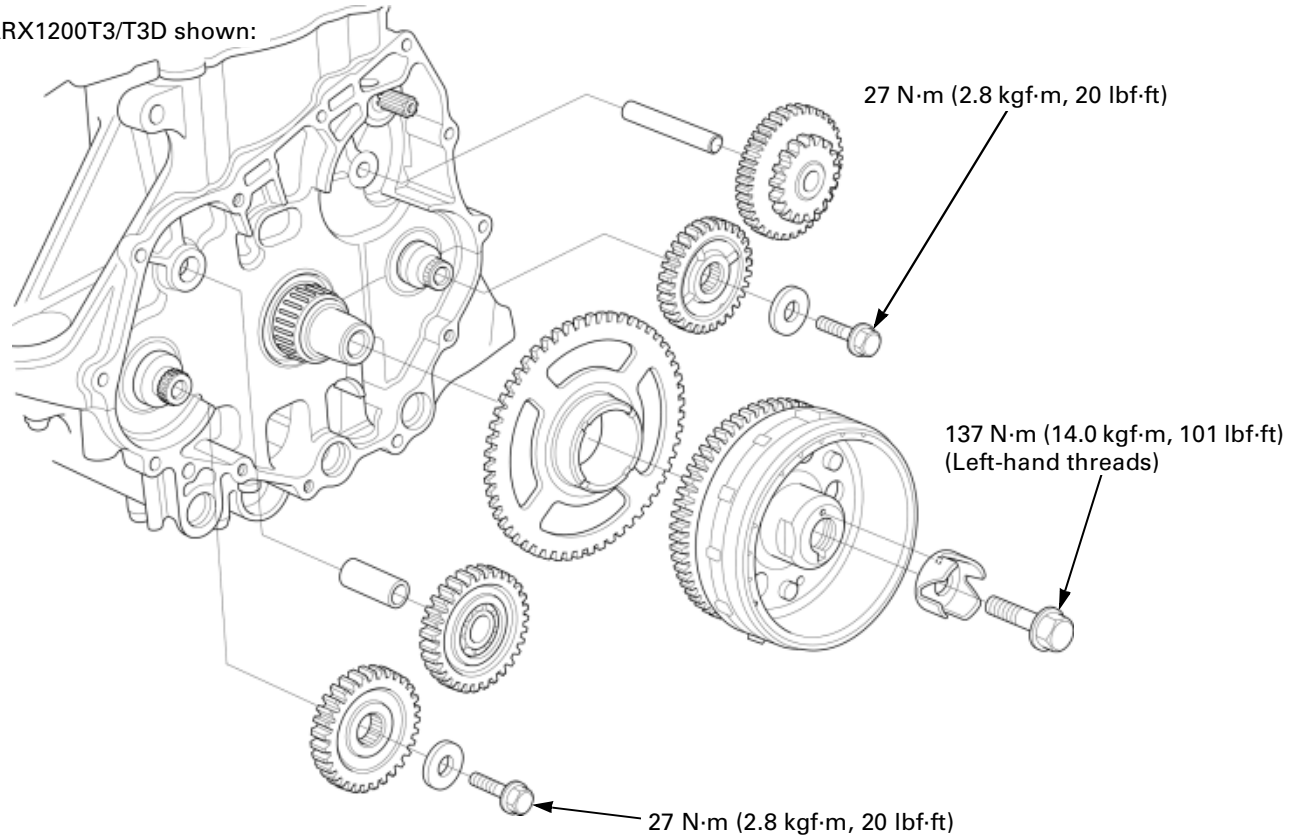


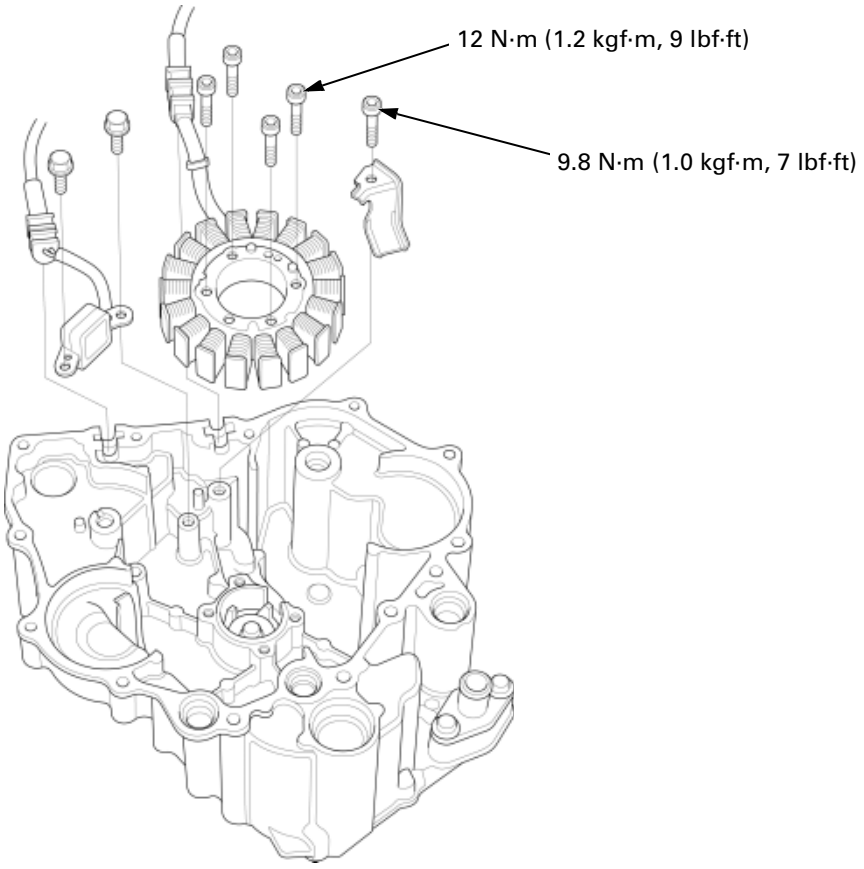
MEMO

11. ALTERNATOR/STARTER CLUTCH

SYSTEM COMPONENTS

ARX1200T3/T3D shown:





SERVICE INFORMATION

GENERAL

- This section covers service of the alternator stator, flywheel and starter clutch.
- The service procedures in this section must be performed with the engine removed.
- Refer to page 16-8 for alternator stator inspection.
- Refer to page 18-6 for starter motor servicing.

SPECIFICATIONS

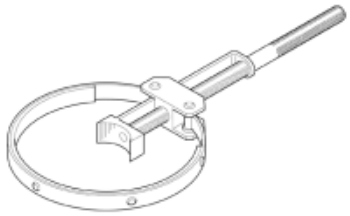
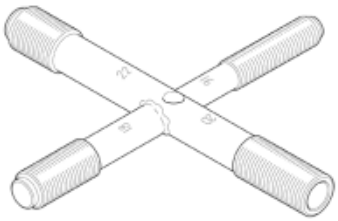
Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter driven gear boss O.D.	51.699 – 51.718 (2.0354 – 2.0361)	51.684 (2.0348)

TORQUE VALUES

Alternator stator torx bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Alternator wire clamp socket bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Starter clutch outer socket bolt	16 N·m (1.6 kgf·m, 12 lbf·ft)	Apply locking agent to the threads.
Flywheel bolt	137 N·m (14.0 kgf·m, 101 lbf·ft)	Apply oil to the threads and seating surface; left-hand threads, replace with a new one.
Balancer driven gear bolt (ARX1200T3/T3D only)	27 N·m (2.8 kgf·m, 20 lbf·ft)	Apply locking agent to the threads.

TOOLS

Flywheel holder 07725-0040000  or equivalent commercially available in U.S.A.	Rotor puller 07733-0020001  or 07933-3950000 (U.S.A. only)	Gear holder, 2.5 07724-0010100  or 07724-001A100 (U.S.A. only)

TROUBLESHOOTING

Engine does not turn

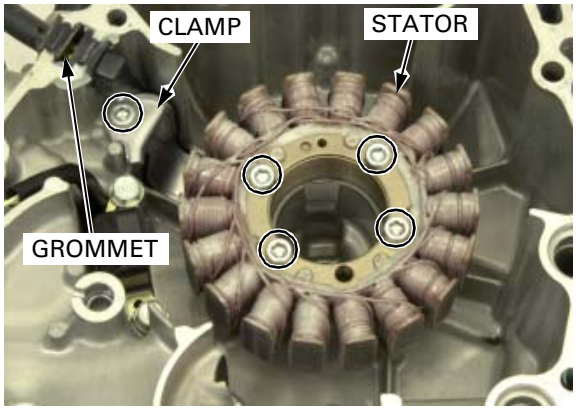
- Faulty starter clutch
- Damaged reduction gear/shaft

ALTERNATOR STATOR

REMOVAL

Remove the front crankcase cover (page 6-9).

Remove the socket bolt and wire clamp.
Remove the alternator stator wire grommet from the crankcase cover.
Remove the four socket bolts and alternator stator from the crankcase cover.



INSTALLATION

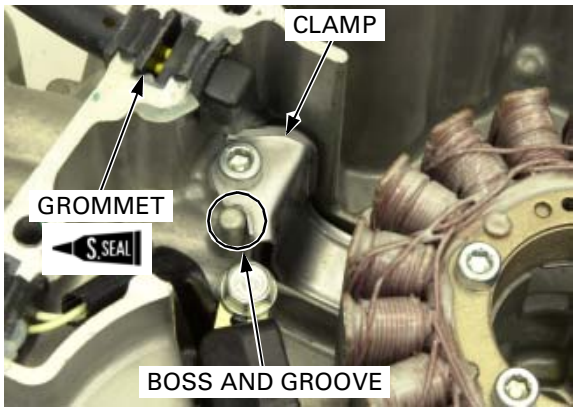
Install the alternator stator onto the crankcase cover and tighten the four socket bolts.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Apply silicone sealant to the wire grommet seating surface and install the grommet into the crankcase cover groove.
Install the wire clamp, aligning the groove with the boss of the crankcase cover, and tighten the socket bolt.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Install the front crankcase cover (page 6-14).



IGNITION PULSE GENERATOR

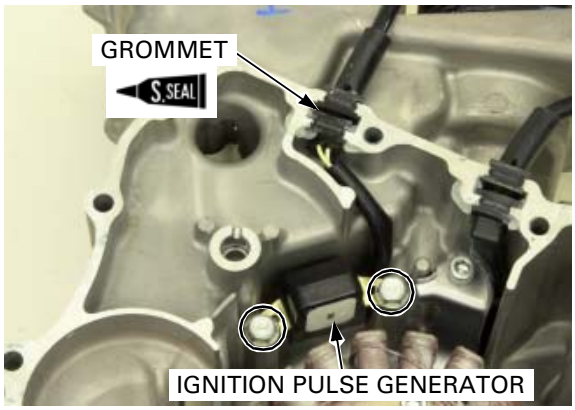
REMOVAL/INSTALLATION

Remove the front crankcase cover (page 6-9).

Remove the pulse generator wire grommet from the crankcase cover.
Remove the two bolts and ignition pulse generator from the crankcase cover.

Install the ignition pulse generator onto the crankcase cover and tighten the two bolts.
Apply silicone sealant to the wire grommet seating surface and install the grommet into the crankcase cover groove.

Install the front crankcase cover (page 6-14).



FLYWHEEL REMOVAL

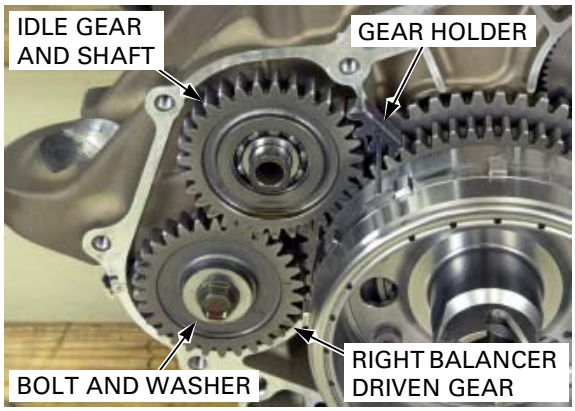
Remove the front crankcase cover (page 6-9).

ARX1200T3/T3D only:
Install the gear holder between the balancer drive and idle gears and loosen the right balancer driven gear bolt.

TOOL:

Gear holder, 2.5	**07724-0010100 or 07724-001A100 (U.S.A. only)**

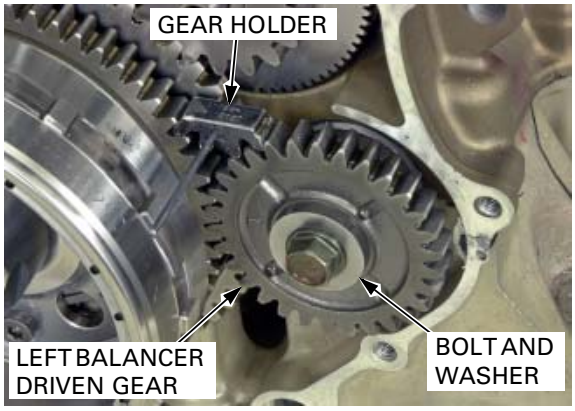
Remove the idle gear and shaft.
Remove the bolt, washer and balancer driven gear.



ARX1200T3/T3D only:
Install the gear holder between the balancer drive and driven gears and loosen the left balancer driven gear bolt.

TOOL:

Gear holder, 2.5	**07724-0010100 or 07724-001A100 (U.S.A. only)**



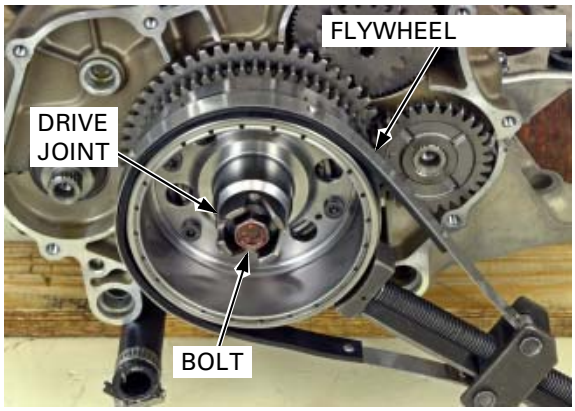
The flywheel bolt has left-hand threads.

Hold the flywheel with the flywheel holder, being careful not to damage the reluctors on the flywheel, and loosen the flywheel bolt.

TOOL:

Flywheel holder	**07725-0040000 or equivalent commercially available in U.S.A.**

Remove the flywheel bolt and oil pump drive joint.

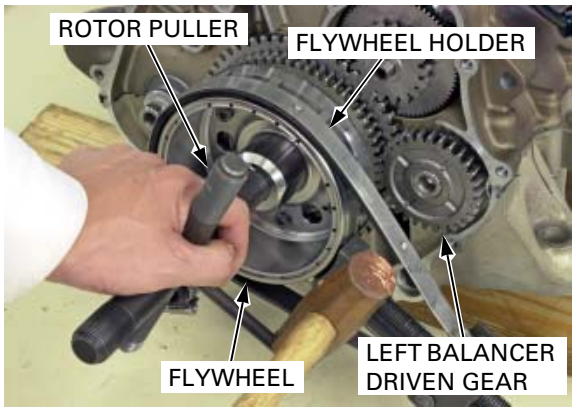


Remove the flywheel using the rotor puller while holding the flywheel with the flywheel holder.

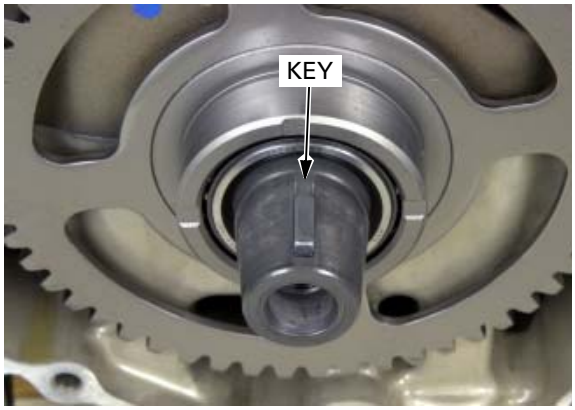
TOOL:

Flywheel holder	**07725-0040000 or equivalent commercially available in U.S.A.**
Rotor puller	**07733-0020001 or 07933-3950000**

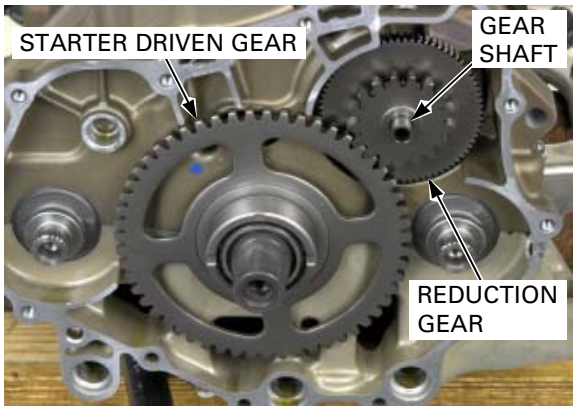
ARX1200T3/T3D only: Remove the left balancer driven gear.



Remove the following:
– woodruff key



– starter driven gear
– starter reduction gear and shaft



STARTER CLUTCH

INSPECTION

Install the starter driven gear into the starter clutch while turning it clockwise.
Check the operation of the one-way clutch by turning the driven gear.
You should be able to turn the driven gear clockwise smoothly, but the gear should not turn counterclockwise.

DISASSEMBLY

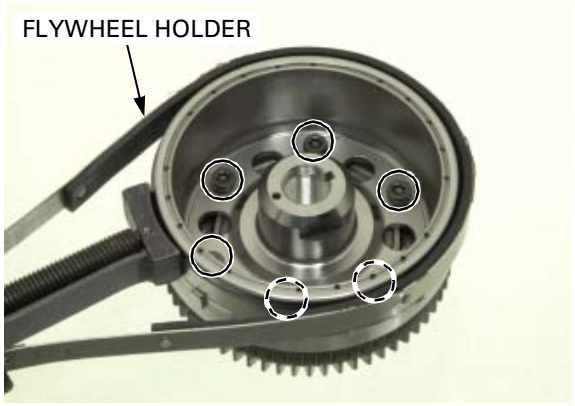
Remove the starter driven gear by turning it clockwise.

Hold the flywheel with the flywheel holder, being careful not to damage the reluctors on the flywheel, and remove the six starter clutch torx bolts (T30).

TOOL:

Flywheel holder	**07725-0040000 or equivalent commercially available in U.S.A.**

Remove the starter clutch assembly from the flywheel.
Remove the sprag clutch from the balancer drive gear (starter clutch outer).

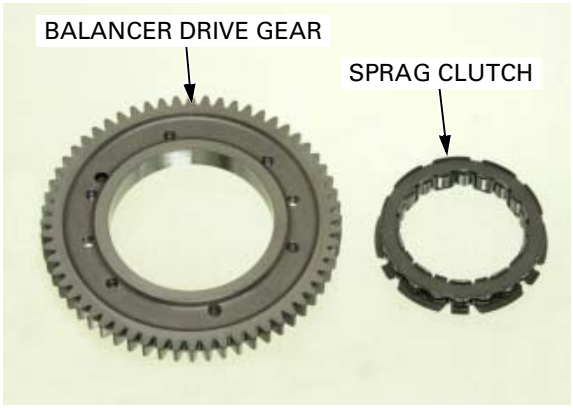


Check the starter driven gear for abnormal wear or damage.

Measure the starter driven gear boss O.D.

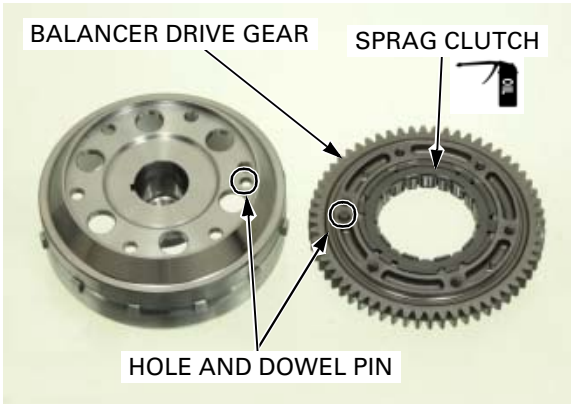
SERVICE LIMIT: 51.684 mm (2.0348 in)

Check the balancer drive gear and sprag clutch for abnormal wear or damage.



ASSEMBLY

Apply engine oil to the sprag clutch contacting surfaces.
Install the sprag clutch into the balancer drive with the flange side facing the flywheel.
Install the starter clutch assembly, aligning the dowel pin with the hole in the flywheel.

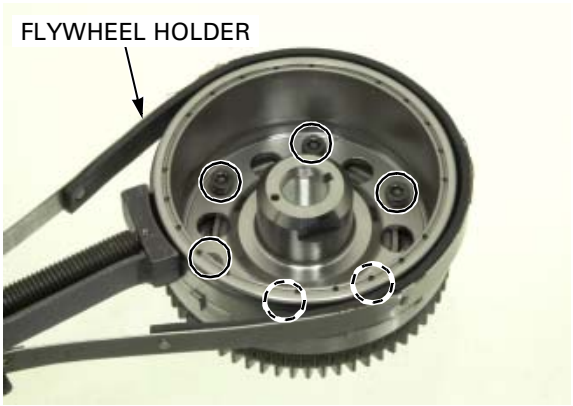


Apply locking agent to the starter clutch torx bolt threads and install the bolts.
Hold the flywheel with the flywheel holder, being careful not to damage the reluctors on the flywheel, and tighten the bolts.

TOOL:

Flywheel holder	**07725-0040000 or equivalent commercially available in U.S.A.**

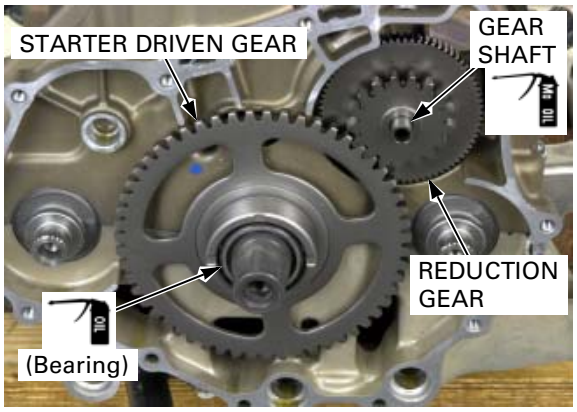
TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)



FLYWHEEL INSTALLATION

ARX1200T3/T3D only: Remove the coupler cover A (page 3-14).

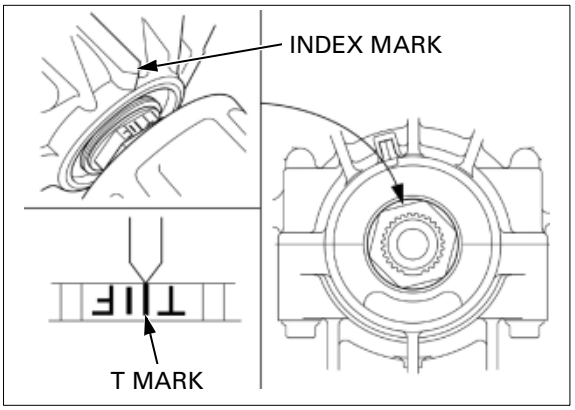
Apply molybdenum oil solution to the starter reduction gear shaft, and install the reduction gear and shaft.
Apply engine oil to the needle bearing on the crankshaft and install the starter driven gear.



Clean any oil from the tapered portions of the crankshaft and flywheel.

Install the woodruff key in the crankshaft key groove.

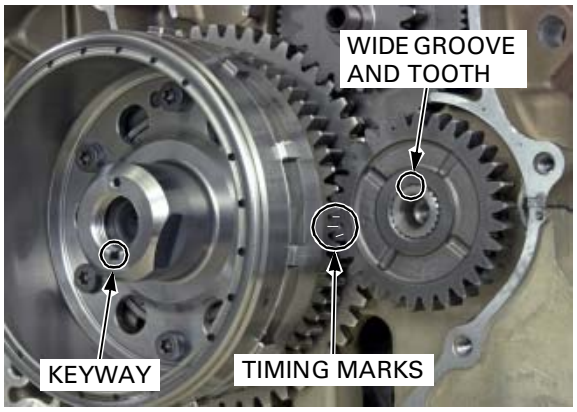
Turn the crankshaft counterclockwise and align the "T" mark on the drive coupler with the index mark.



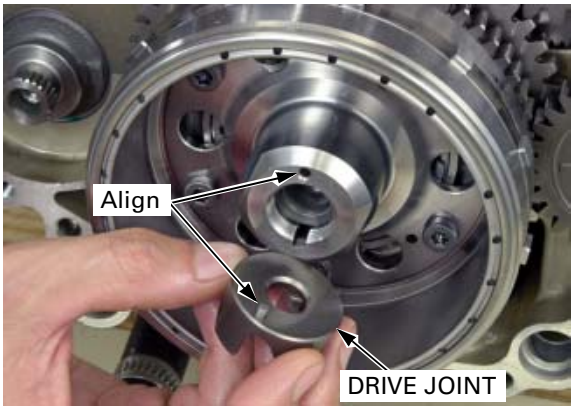
ARX1200T3/T3D: Install the left balancer driven gear by aligning the wide groove with the tooth on the balancer.
Install the flywheel while aligning the keyway with the woodruff key, then mesh the balancer drive and driven gears with the timing marks aligned as shown.

Apply locking agent to the driven gear bolt threads and install the bolt with the washer.

ARX1200N3: Install the flywheel while aligning the keyway with the woodruff key.



Apply engine oil to the threads and seating surface of a new flywheel bolt.
Install the oil pump drive joint by aligning the dowel pin with the hole in the flywheel.



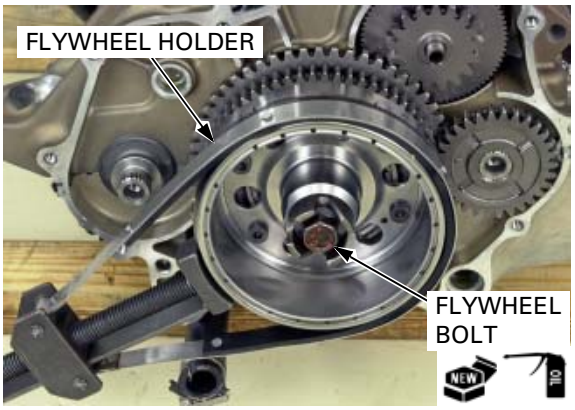
The flywheel bolt has left-hand threads.

Install the flywheel bolt.
Hold the flywheel with the flywheel holder, being careful not to damage the reluctors on the flywheel, and tighten the bolt.

TOOL:

Flywheel holder	**07725-0040000 or equivalent commercially available in U.S.A.**

TORQUE: 137 N·m (14.0 kgf·m, 101 lbf·ft)

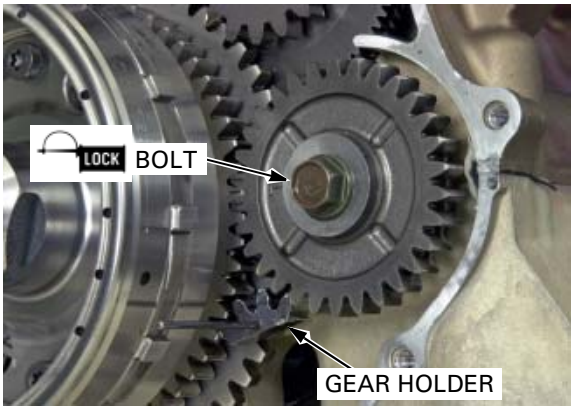


ARX1200T3/T3D only:
Install the gear holder between the balancer drive and driven gears, and tighten the left balancer driven gear bolt.

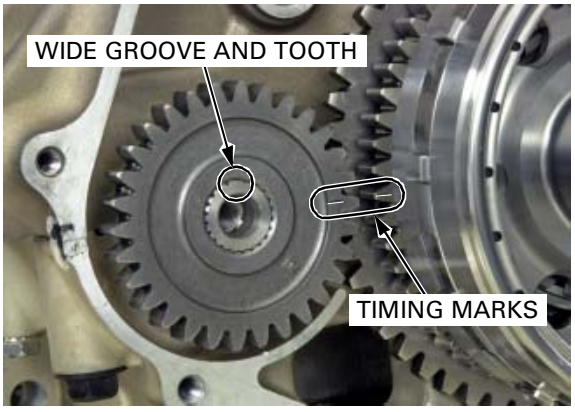
TOOL:

Gear holder, 2.5	**07724-0010100 or 07724-001A100 (U.S.A. only)**

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)



ARX1200T3/T3D only:
Install the right balancer driven gear by aligning the wide groove with the wide tooth on the balancer, while aligning the timing marks on the balancer drive and driven gears as shown.



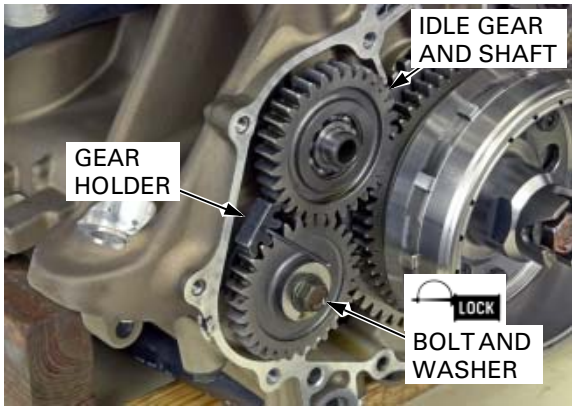
ARX1200T3/T3D only:
Apply locking agent to the driven gear bolt threads and install the bolt with the washer.
Install the idle gear and shaft.

Install the gear holder between the balancer idle and driven gears, and tighten the right balancer driven gear bolt.

TOOL:

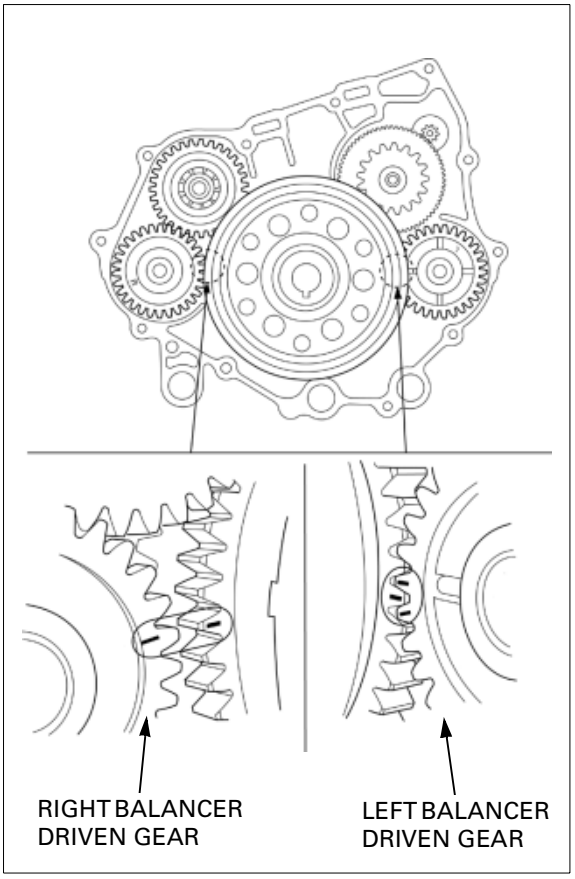
Gear holder, 2.5	**07724-0010100 or 07724-001A100 (U.S.A. only)**

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)



ARX1200T3/T3D only:
Make sure the balancer timing marks are aligned properly as shown when the "T" mark on the drive coupler is aligned with the index mark.

Install the coupler cover A (page 3-14).

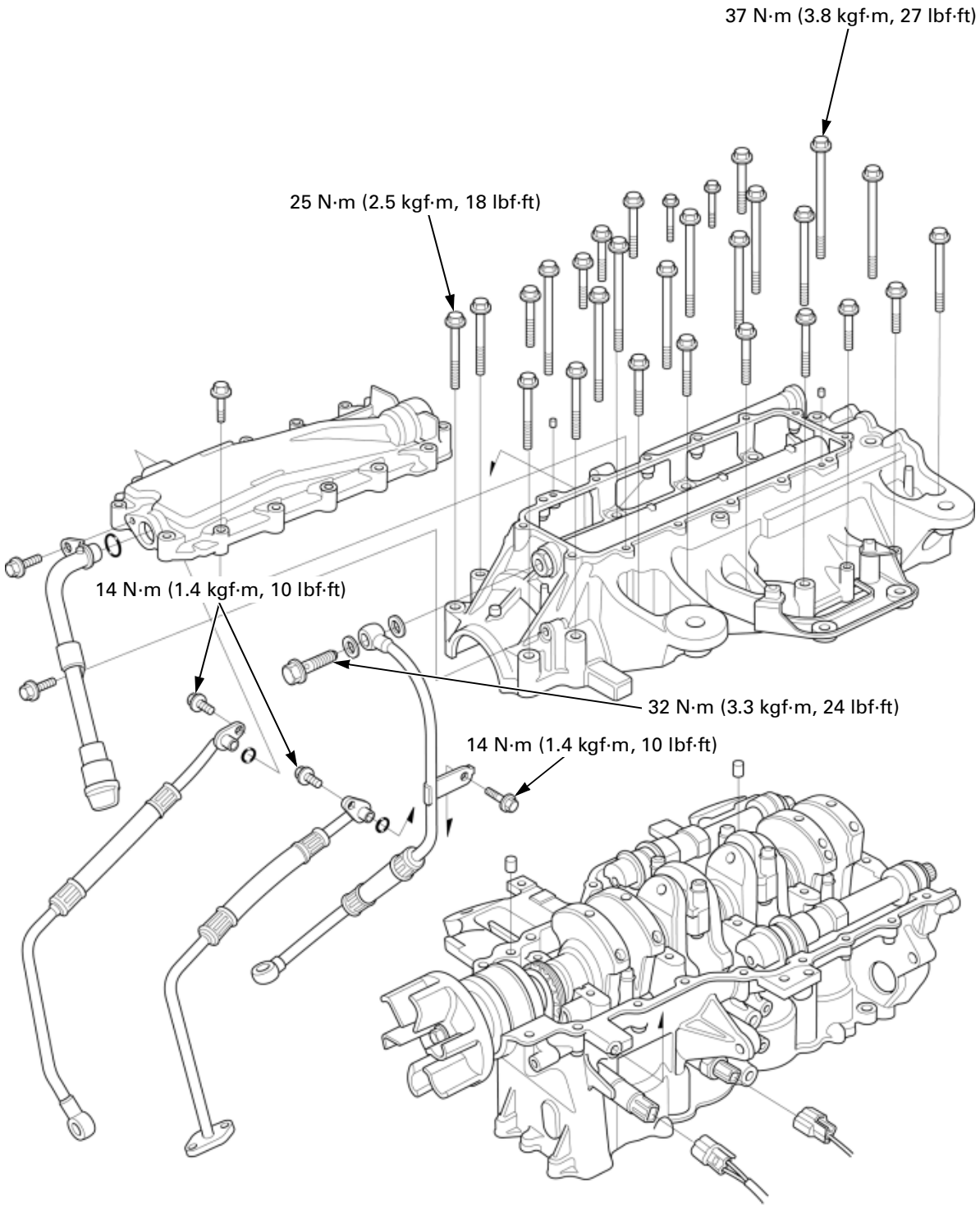


Install the front crankcase cover (page 6-14).

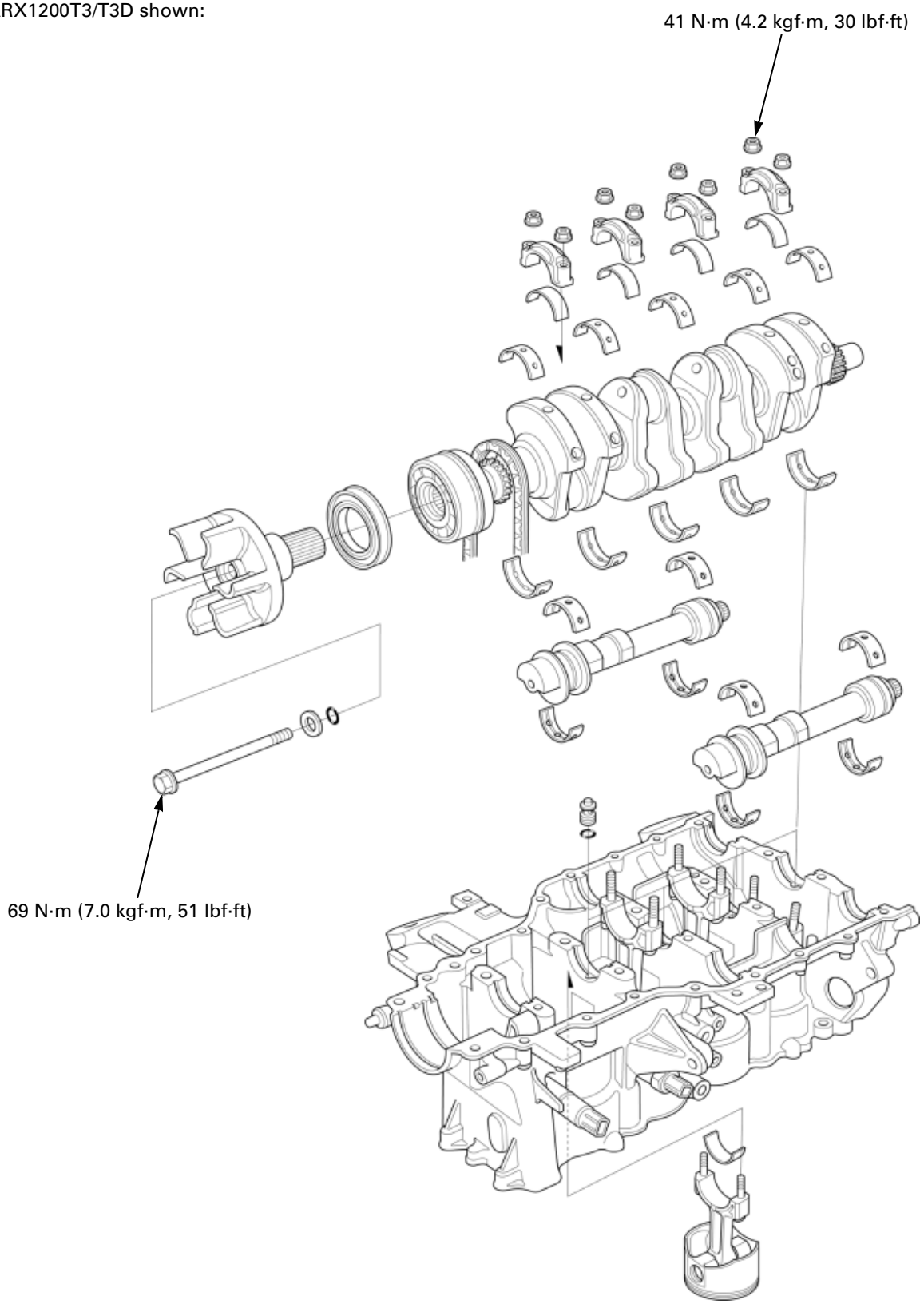
12. CRANKSHAFT/BALANCER (ARX1200T3/T3D)/PISTON

SYSTEM COMPONENTS

ARX1200T3/T3D shown:



ARX1200T3/T3D shown:



SERVICE INFORMATION

GENERAL

- This section covers service of the crankcase, crankshaft, balancer and pistons/connecting rods. The balancer gear service (ARX1200T3/T3D only) is included in section 10.
- Be careful not to damage the crankcase mating surfaces when servicing.
- Prior to assembling the crankcase halves and oil pan, apply sealant to their mating surfaces. Wipe off excess sealant thoroughly.
- Mark and store the connecting rods, bearing caps, pistons and bearing inserts to be sure of their correct locations for reassembly.
- The crankpin and main journal bearing inserts are select fit and are identified by color codes. Select replacement bearings from the code tables. After selecting new bearings, recheck the oil clearance with plastigauge. Incorrect oil clearance can cause major engine damage.
- Clean the oil jets in the upper crankcase with compressed air before installing the crankshaft.

SPECIFICATIONS

ARX1200T3/T3D: Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod side clearance		0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)
	Crankpin bearing oil clearance		0.026 – 0.050 (0.0010 – 0.0020)	0.06 (0.002)
	Main journal oil clearance		0.018 – 0.036 (0.0007 – 0.0014)	0.045 (0.0018)
	Balancer oil clearance		0.011 – 0.053 (0.0004 – 0.0020)	0.065 (0.0026)
	Runout		–	0.3 (0.01)
Piston, piston rings	Piston O.D. at 4 (0.2) from bottom		78.970 – 78.990 (3.1090 – 3.1098)	78.90 (3.106)
	Piston pin hole I.D.		22.002 – 22.008 (0.8662 – 0.8665)	22.03 (0.867)
	Piston pin O.D.		21.994 – 22.000 (0.8659 – 0.8661)	21.984 (0.8655)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	–
	Piston ring end gap	Top	0.175 – 0.325 (0.0069 – 0.0128)	0.48 (0.019)
		Second	0.40 – 0.55 (0.016 – 0.022)	0.7 (0.03)
		Oil (side rail)	0.2 – 0.8 (0.01 – 0.03)	1.0 (0.04)
	Piston ring-to-ring groove clearance	Top	0.030 – 0.070 (0.0012 – 0.0028)	0.08 (0.003)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.06 (0.002)
Cylinder	I.D.		79.000 – 79.015 (3.1102 – 3.1108)	79.10 (3.114)
	Out-of-round		–	0.10 (0.004)
	Taper		–	0.10 (0.004)
	Warpage		–	0.05 (0.002)
Cylinder-to-piston clearance			0.010 – 0.045 (0.0004 – 0.0018)	–
Connecting rod small end I.D.			22.030 – 22.051 (0.8673 – 0.8681)	22.061 (0.8685)
Connecting rod-to-piston pin clearance			0.030 – 0.057 (0.0012 – 0.0022)	–

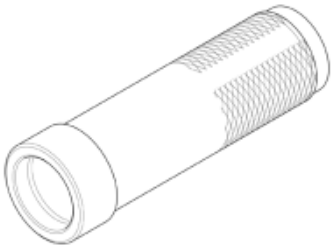
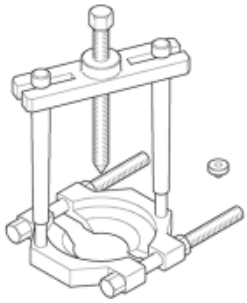
ARX1200N3: Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod side clearance		0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)
	Crankpin bearing oil clearance		0.026 – 0.050 (0.0010 – 0.0020)	0.06 (0.002)
	Main journal oil clearance		0.018 – 0.036 (0.0007 – 0.0014)	0.045 (0.0018)
	Runout		–	0.3 (0.01)
Piston, piston rings	Piston O.D. at 4 (0.2) from bottom		78.970 – 78.990 (3.1090 – 3.1098)	78.90 (3.106)
	Piston pin hole I.D.		19.002 – 19.008 (0.7481 – 0.7483)	19.03 (0.749)
	Piston pin O.D.		18.994 – 19.000 (0.7478 – 0.7480)	18.984 (0.7474)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	–
	Piston ring end gap	Top	0.20 – 0.35 (0.008 – 0.014)	0.5 (0.02)
		Second	0.40 – 0.55 (0.016 – 0.022)	0.7 (0.03)
		Oil (side rail)	0.2 – 0.8 (0.01 – 0.03)	1.0 (0.04)
	Piston ring-to-ring groove clearance	Top	0.030 – 0.065 (0.0012 – 0.0026)	0.08 (0.003)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.06 (0.002)
Cylinder	I.D.		79.000 – 79.015 (3.1102 – 3.1108)	79.10 (3.114)
	Out-of-round		–	0.10 (0.004)
	Taper		–	0.10 (0.004)
	Warpage		–	0.05 (0.002)
Cylinder-to-piston clearance			0.010 – 0.045 (0.0004 – 0.0018)	–
Connecting rod small end I.D.			19.030 – 19.051 (0.7492 – 0.7500)	19.061 (0.7504)
Connecting rod-to-piston pin clearance			0.030 – 0.057 (0.0012 – 0.0022)	–

TORQUE VALUES

Connecting rod bearing cap nut	41 N·m (4.2 kgf·m, 30 lbf·ft)	Apply engine oil to the threads and seating surface.
Crankcase bolt (9 mm)	37 N·m (3.8 kgf·m, 27 lbf·ft)	Apply engine oil to the threads and seating surface.
(8 mm)	25 N·m (2.5 kgf·m, 18 lbf·ft)	
Drive coupler bolt	69 N·m (7.0 kgf·m, 51 lbf·ft)	Apply engine oil to the threads and seating surface.
Drive coupler boss	29 N·m (3.0 kgf·m, 22 lbf·ft)	
Oil pan oil strainer bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Turbocharger oil feed pipe oil filter bolt (lower crankcase: ARX1200T3/T3D only)	32 N·m (3.3 kgf·m, 24 lbf·ft)	
Turbocharger oil feed pipe setting bolt (upper crankcase: ARX1200T3/T3D only)	14 N·m (1.4 kgf·m, 10 lbf·ft)	
Turbocharger oil return pipe joint bolt (oil pan and lower crankcase: ARX1200T3/T3D only)	14 N·m (1.4 kgf·m, 10 lbf·ft)	
Intercooler stay bolt (ARX1200T3/T3D only)	25 N·m (2.6 kgf·m, 19 lbf·ft)	
Knock sensor	31 N·m (3.2 kgf·m, 23 lbf·ft)	Apply sealant to the threads.
Engine oil temperature sensor	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Engine oil temperature sensor adaptor	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Turbocharger oil feed pipe joint (lower crankcase: ARX1200T3/T3D)	49 N·m (5.0 kgf·m, 36 lbf·ft)	Apply locking agent to the threads.
20 mm sealing bolt (lower crankcase: ARX1200N3)	49 N·m (5.0 kgf·m, 36 lbf·ft)	Apply locking agent to the threads.
45 mm sealing cap (upper crankcase)	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply multi-purpose grease to the threads.

TOOLS

Driver, 40 mm I.D. 07746-0030100 	Attachment, 30 mm I.D. 07746-0030300 	Attachment, 35 mm I.D. 07746-0030400 
Shaft protector 07931-1870000 	Universal bearing puller 07631-0010000  or equivalent commercially available in U.S.A.	

TROUBLESHOOTING

Compression too low, hard starting or poor performance at low speed
- Leaking cylinder head gasket
- Worn, stuck or broken piston ring
- Worn or damaged cylinder and piston

Compression too high, overheating or knocking
- Excessive carbon built-up on piston head or combustion chamber

Excessive smoke
- Worn cylinder, piston or piston ring
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

Abnormal noise
- Worn piston pin or piston pin hole
- Worn connecting rod small end
- Worn cylinder, piston or piston rings
- Worn main journal bearings
- Worn crankpin bearings

Engine vibration
- Excessive crankshaft runout
- Improper balancer timing (page 11-8)
- Improper engine-to-jet pump alignment 9-11

CRANKCASE SEPARATION

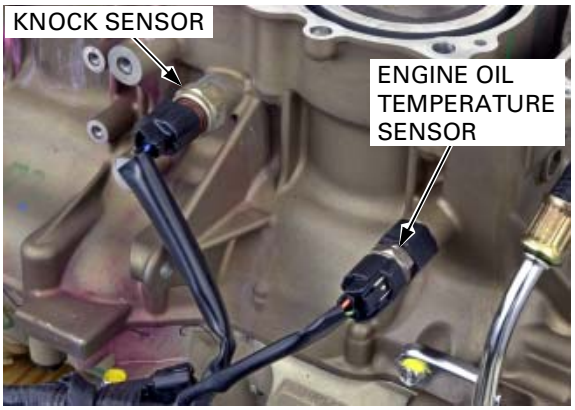
Remove the following:
– engine page 9-5
– cylinder head (page 10-12)
– flywheel and balancer gears (page 11-5)

NOTICE

Take care not to damage the cam chain when placing the engine with the upper side down.

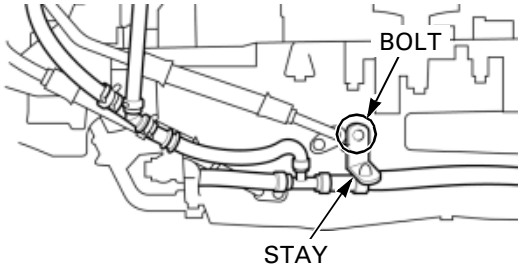
Remove the following from the crankcase:

– sensor connectors
– knock sensor
– engine oil temperature sensor
– O-ring



ARX1200T3/T3D only:
– bolt and water hose stay

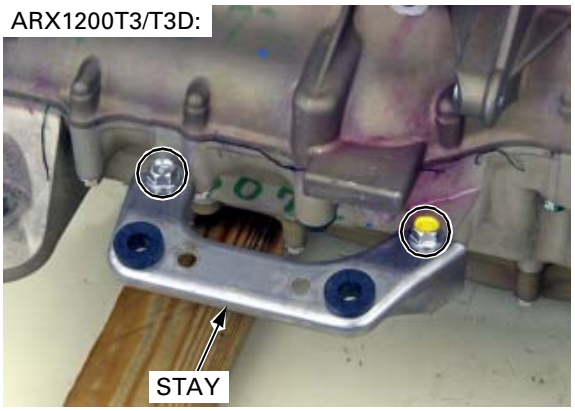
ARX1200T3/T3D:



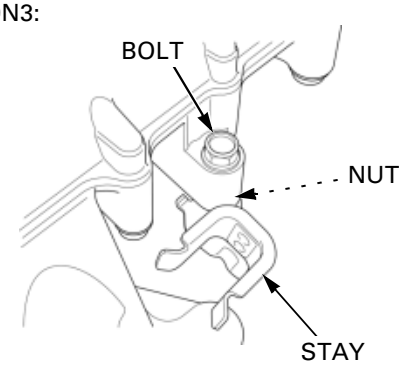
ARX1200T3/T3D:
– two flange bolts and intercooler stay

ARX1200N3:
– nut, bolt and airbox stay

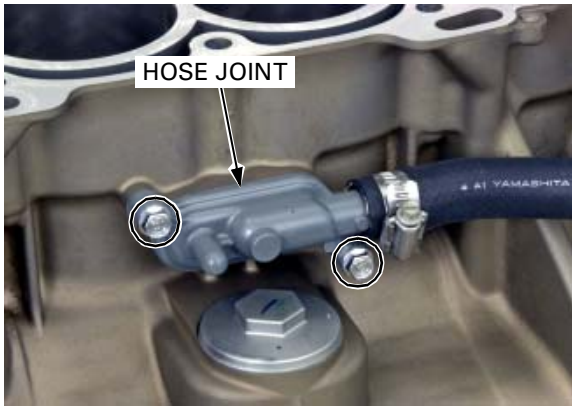
ARX1200T3/T3D:



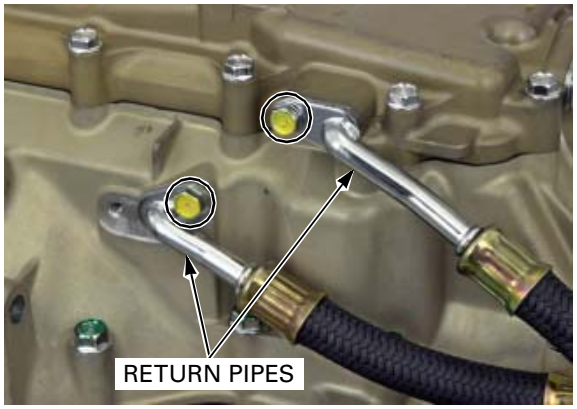
ARX1200N3:



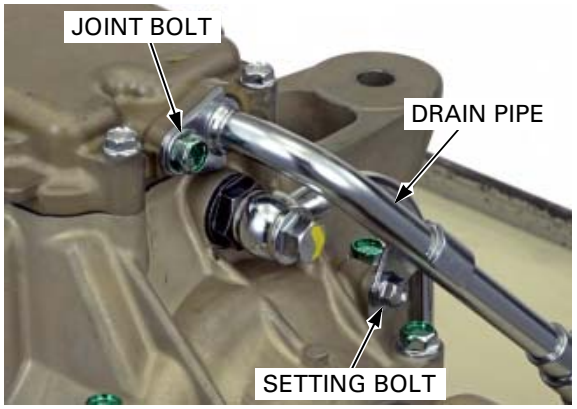
– two bolts and water hose joint
– O-ring



ARX1200T3/T3D only:
– joint bolts
– oil return pipes
– O-rings

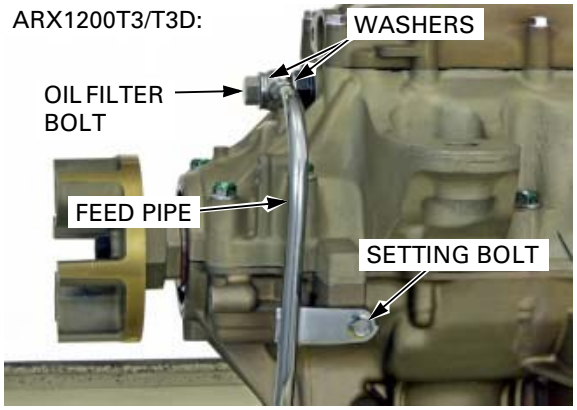


– joint bolt and setting bolt
– oil drain pipe
– O-ring

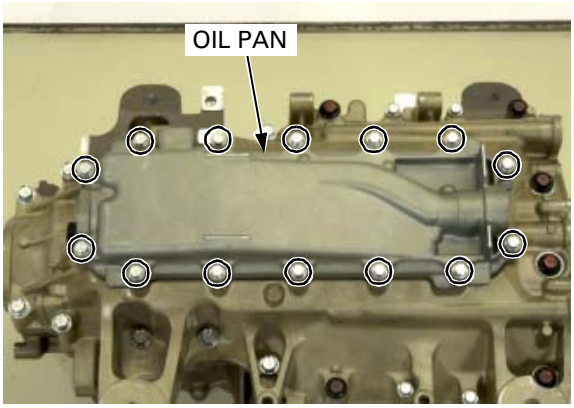


ARX1200T3/T3D only:
– oil filter bolt and sealing washers
– setting bolt
– oil feed pipe

ARX1200T3/T3D:

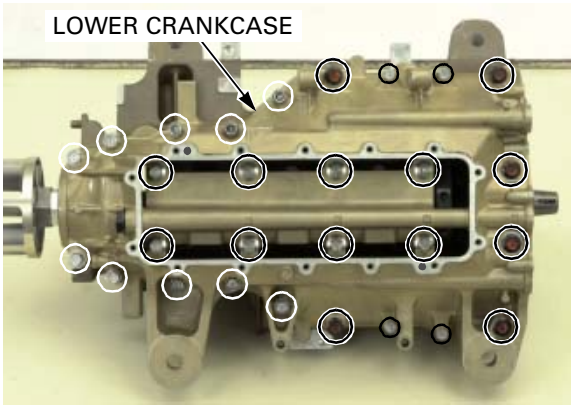


– 14 bolts
– oil pan
– two dowel pins



Loosen in a crisscross pattern in several steps.

– crankcase bolts
(four 6-mm bolts, ten 8-mm bolts and fourteen 9-mm bolts)
– lower crankcase

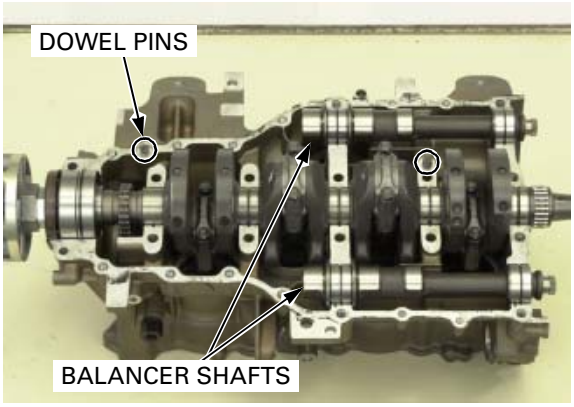


– two dowel pins

ARX1200T3/T3D only:

– balancer shafts

Clean any sealant from the crankcase and oil pan mating surfaces.



OIL STRAINER CLEANING

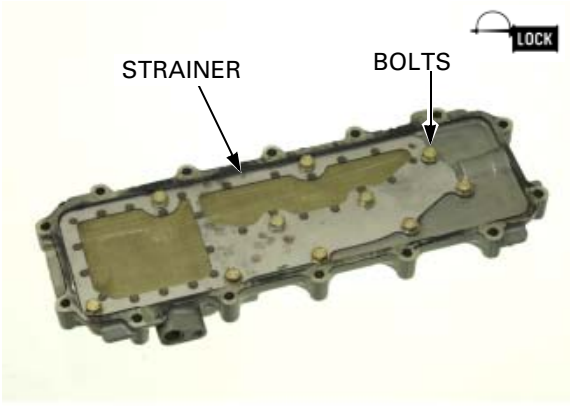
Remove the bolts, oil strainer and gasket.

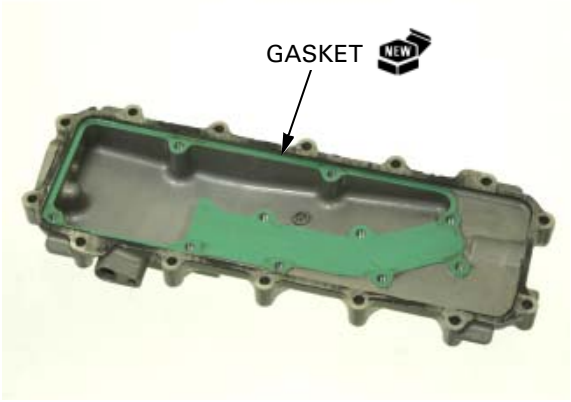
Wash the strainer screen thoroughly in high flash-point solvent until all accumulated dirt has been removed. Also clean the inner surface of the oil pan. Dry the screen with compressed air, or leave it in a well-ventilated place until the solvent has evaporated.

Before installing the oil strainer, it should be examined closely for damage.

Apply locking agent to the strainer bolt threads.
Install the oil strainer with a new gasket and tighten the ten bolts.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)





CRANKSHAFT

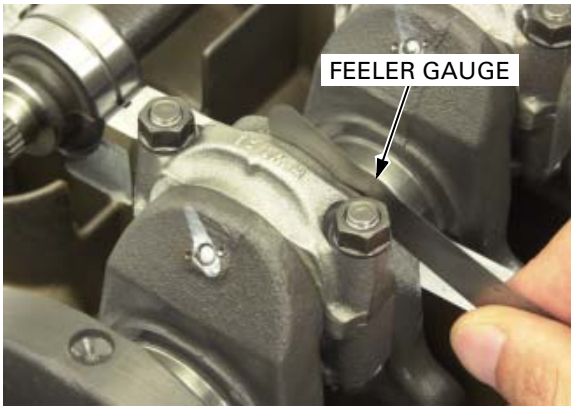
Separate the crankcase halves (page 12-7).

SIDE CLEARANCE INSPECTION

Measure the connecting rod side clearance.

SERVICE LIMIT: 0.30 mm (0.012 in)

If the clearance exceeds the service limit, replace the connecting rod.
Recheck and if still out of specification, replace the crankshaft.



REMOVAL

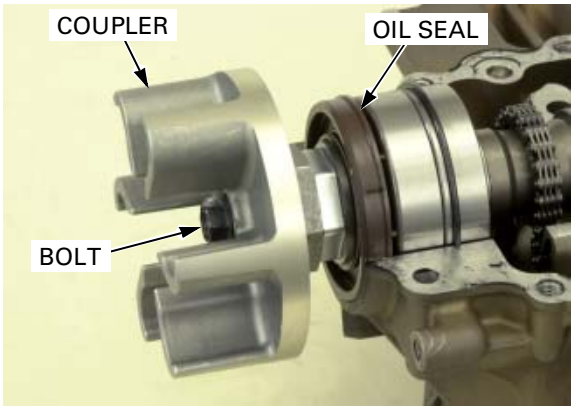
Be careful not to damage the crankpin, main journal and bearing inserts.

NOTE:

- Mark the balancer shafts, bearing caps and bearings as you remove them to indicate the correct cylinder for reassembly.

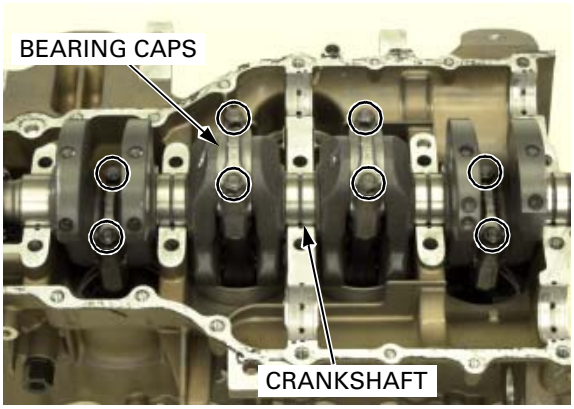
Loosen the coupler bolt while holding the coupler boss securely and remove it with the O-ring and washer. Remove the drive coupler.

Remove the oil seal.



Remove the connecting rod bearing cap nuts and bearing caps.
Tap the side of the cap lightly if the bearing cap is hard to remove.

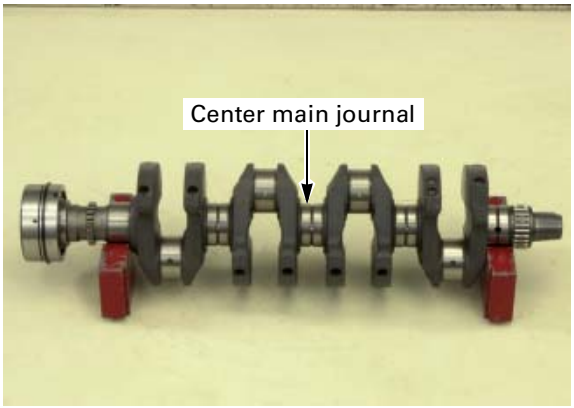
Remove the crankshaft and the cam chain.



INSPECTION

Hold both ends of the crankshaft.
Set a dial gauge on the center main journal of the crankshaft.
Rotate the crankshaft two revolutions and read the runout.

SERVICE LIMIT: 0.3 mm (0.01 in)



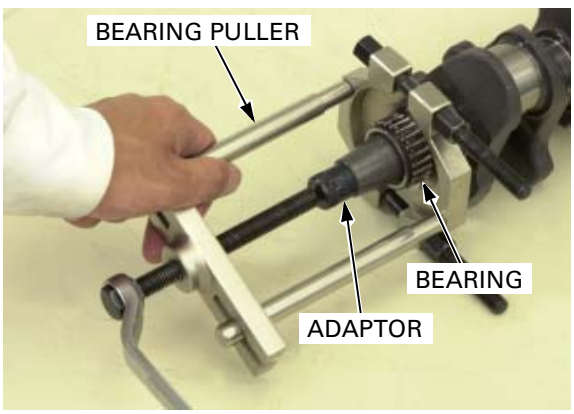
STARTER CLUTCH BEARING REPLACEMENT

To protect the crankshaft main journal from the bearing puller claws, cover the mainshaft journal properly; worn main journal bearings are usable protectors.

Remove the needle bearing with the bearing puller.

TOOLS:

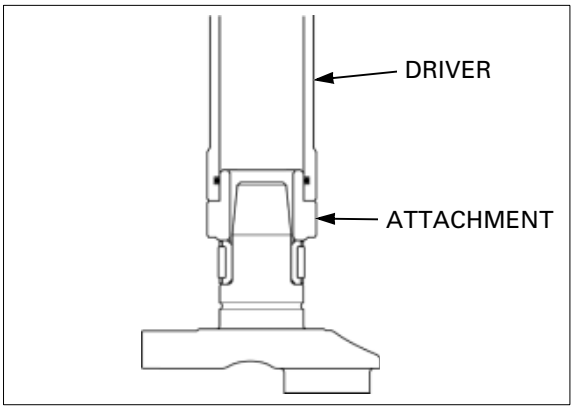
Universal bearing puller	**07631-0010000 or equivalent commercially available in U.S.A.**
Shaft protector	**07931-1870000**



Press a new bearing onto the crankshaft until it is fully seated.

TOOLS:

Driver, 40 mm I.D.	**07746-0030100**
Attachment, 30 mm I.D.	**07746-0030300**



CRANKSHAFT BALL BEARING REPLACEMENT

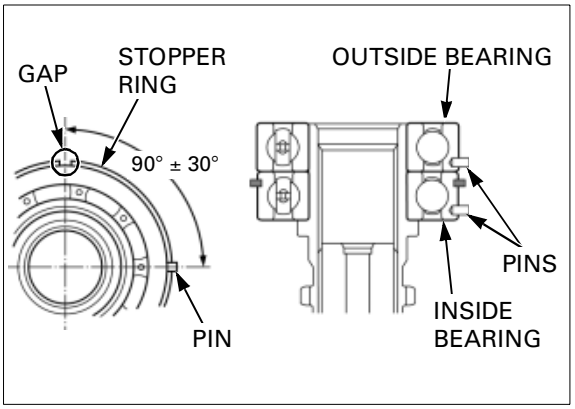
Hold the inside bearing and press the crankshaft out of the ball bearings.

Install the stopper ring into the groove in a new inside bearing so its end gap is in position as shown.

Press new bearings onto the crankshaft with the locating pin side facing down until it is fully seated, using the special tools.

TOOLS:

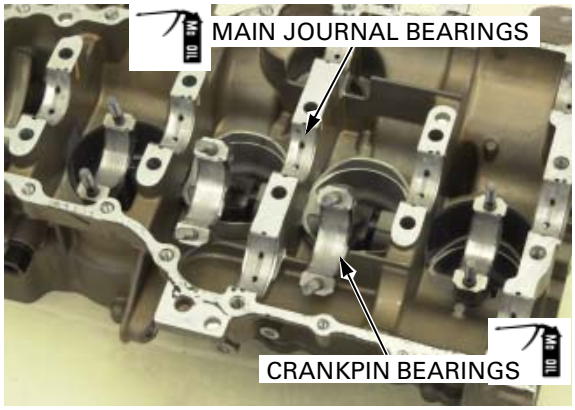
Driver, 40 mm I.D.	**07746-0030100**
Attachment, 35 mm I.D.	**07746-0030400**



INSTALLATION

Do not get the molybdenum oil solution on the connecting rod bolts and bearing cap nuts. The oil may prevent the cap nuts from being torqued properly.

Apply molybdenum oil solution to the main journal bearing sliding surfaces on the upper crankcase and the crankpin bearing sliding surfaces on the connecting rods.

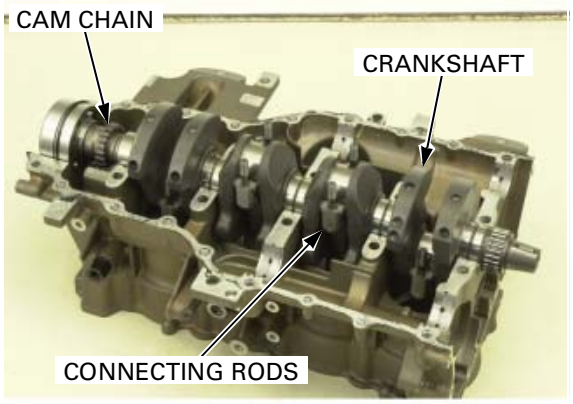


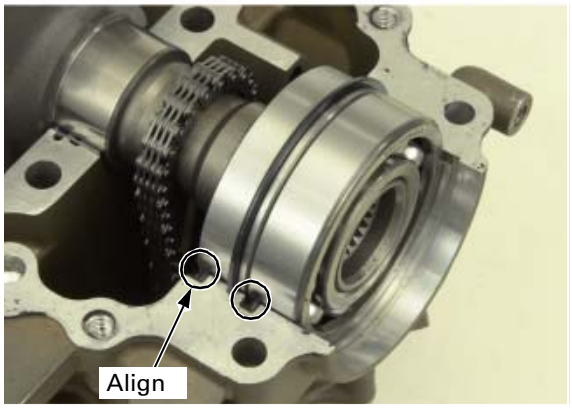
Lower all the pistons to top dead center to avoid damaging the crankpin by the connecting rod bolts.

Install the cam chain over the timing sprocket on the crankshaft.

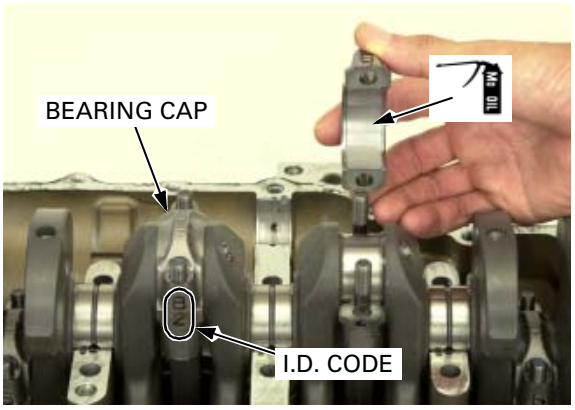
Align the locating pins on the bearings with the grooves in the crankcase.

Carefully install the crankshaft onto the upper crankcase.
Set the connecting rods onto the crankpins.



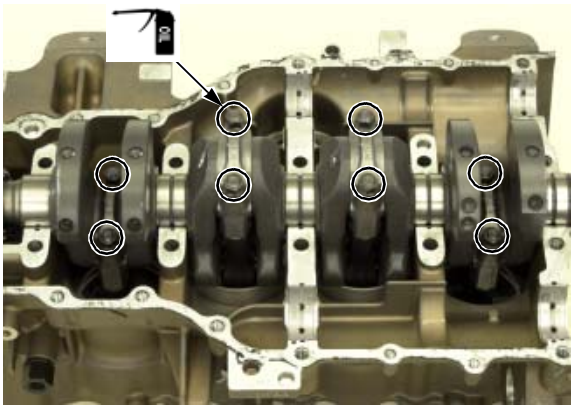


Apply molybdenum oil solution to the crankpin bearing sliding surfaces on the bearing caps.
Install the bearing caps by aligning the I.D. code on the connecting rod and bearing cap.
Be sure each part is installed in its original position, as noted during removal.



Apply engine oil to the bearing cap nut threads and seating surfaces and install the cap nuts.
Tighten the nuts in several steps alternately.

TORQUE: 41 N·m (4.2 kgf·m, 30 lbf·ft)



Apply multi-purpose grease to the lips of a new oil seal. Install the oil seal, aligning its rib with the crankcase groove.

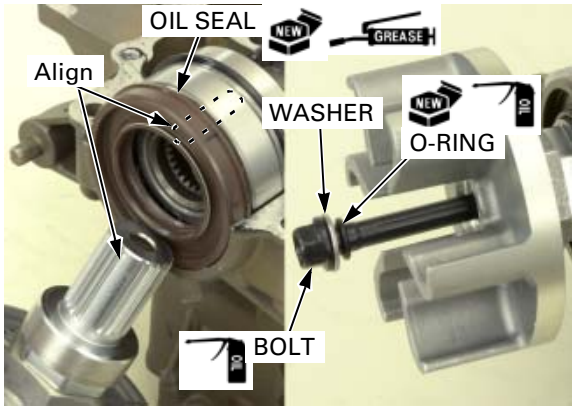
Install the drive coupler by aligning the wide tooth with the wide groove in the crankshaft.

Apply engine oil to the coupler bolt threads and seating surface and coat a new O-ring with engine oil.
Install the coupler bolt with the washer and O-ring.

Tighten the coupler bolt while holding the coupler boss securely.

TORQUE: 69 N·m (7.0 kgf·m, 51 lbf·ft)

Install the balancer shafts and assemble the crankcase halves (page 12-23).



MAIN JOURNAL AND BALANCER (ARX1200T3/T3D) BEARING

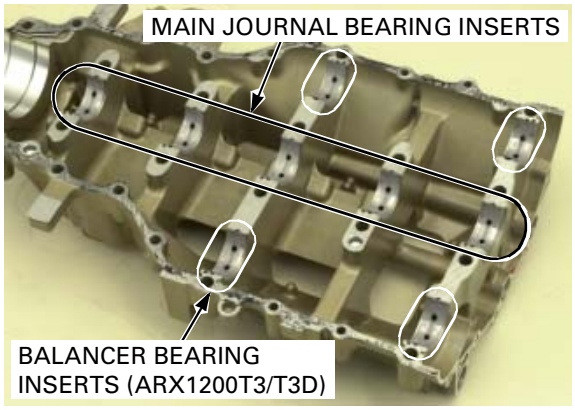
NOTICE

Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

Remove the crankshaft (page 12-11).

BEARING INSPECTION

Check the bearing inserts on the upper and lower crankcase for unusual wear or peeling.
Check the bearing tabs for damage.

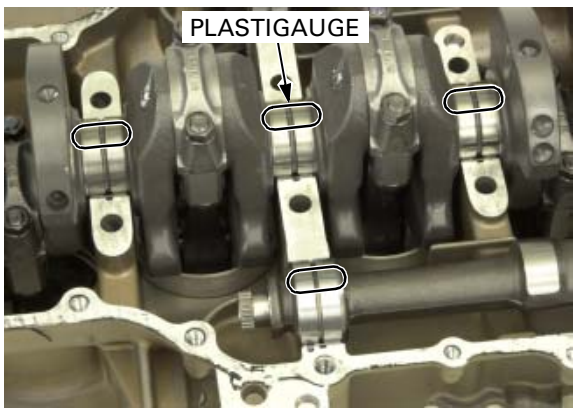


OIL CLEARANCE INSPECTION

NOTE:

- Do not rotate the crankshaft and balancer shafts (ARX1200T3/T3D only) during inspection.

Clean off any oil from the bearing inserts and journals.
Install the crankshaft onto the upper crankcase.
Put a strip of plastigauge lengthwise on each journal avoiding the oil holes.

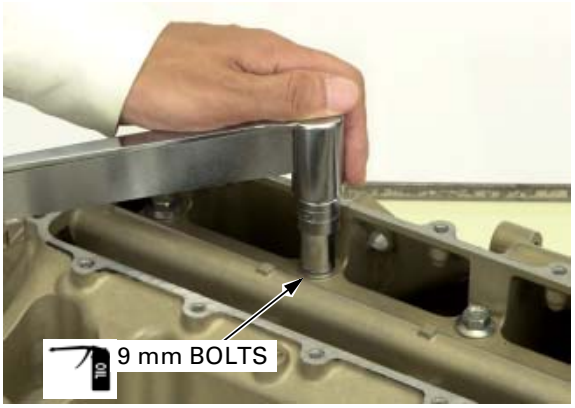


Install the dowel pins.
Carefully install the lower crankcase onto the upper crankcase.
Apply engine oil to the threads and seating surfaces of the 14 main journal 9mm bolts and install them.

The crankcase has the numbers "1" thru "14".

Tighten the 9-mm bolts in several steps according to the numerical order cast on the crankcase.

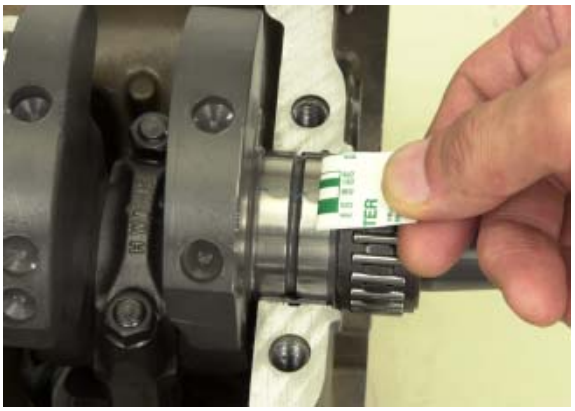
TORQUE: 37 N·m (3.8 kgf·m, 27 lbf·ft)



Remove the bolts and lower crankcase.
Measure the compressed plastigauge at its widest point on each journal to determine the oil clearance.

SERVICE LIMITS:
Main journal: 0.045 mm (0.0018 in)
Balancer: 0.065 mm (0.0026 in)

If the main journal bearing clearance exceeds the service limit, select the correct replacement bearings.



ARX1200T3/T3D:

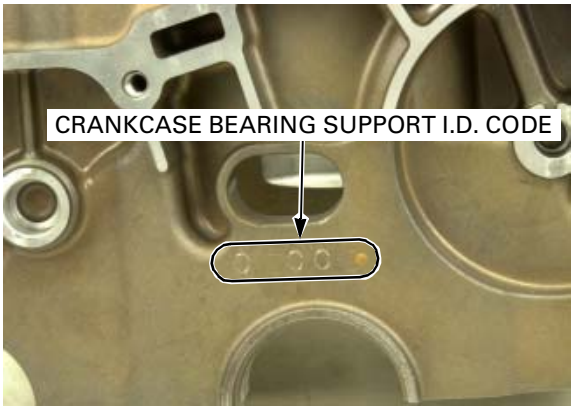
NOTE:

- If the balancer journal bearing clearance exceeds the service limit, install new bearing inserts C; green (page 12-16) (they are the same as the main journal bearing inserts).

MAIN JOURNAL BEARING SELECTION

Letters (A, B or C) on the front side of the upper crankcase are the codes for the bearing support I.D.s from front to rear.

Record the crankcase bearing support I.D. code letters.



Numbers (1, 2 or 3) on the crank weight are the codes for the main journal O.D.s in the sequence from the front journal (from left to right).

Record the corresponding main journal O.D. code numbers.

Cross reference the main journal and bearing support codes to determine the replacement bearing color code.

Bearing support I.D. Main journal O.D.	A	B	C
1	Pink (E)	Yellow (D)	Green (C)
2	Yellow (D)	Green (C)	Brown (B)
3	Green (C)	Brown (B)	Black (A)

BEARING THICKNESS:

A (Black) Thick
B (Brown): ↑
C (Green): **Middle**
D (Yellow) ↓
E (Pink) Thin

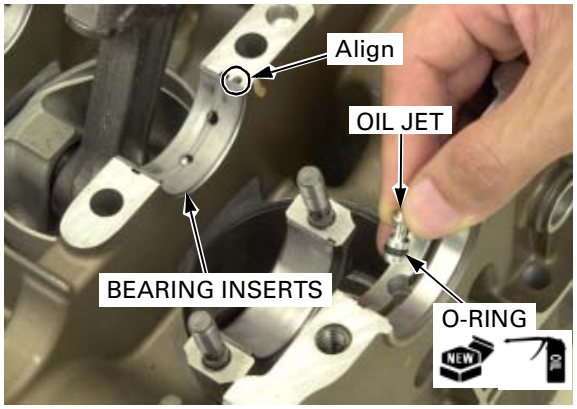
Incorrect clearance can cause severe engine damage.

After selecting new bearings, recheck the oil clearance with plastigauge.

BEARING INSTALLATION

Before installing the main bearing inserts, remove the oil jets from the upper crankcase and blow out each oil jet with compressed air.
Coat new O-rings with engine oil and install them into the oil jet grooves. Install the oil jets into the crankcase.

Clean the bearing outer surfaces and crankcase bearing supports.
Install the balancer (ARX1200T3/T3D) and main journal bearing inserts onto the crankcase bearing supports, aligning each tab with each groove.



CRANKPIN BEARING

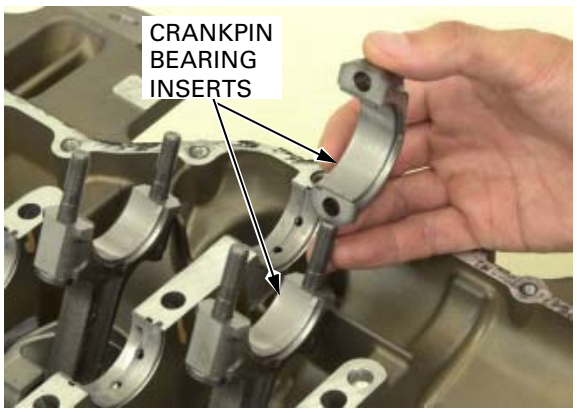
NOTICE

Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

Remove the crankshaft (page 12-11).

BEARING INSPECTION

Check the bearing inserts for unusual wear or peeling.
Check the bearing tabs for damage.

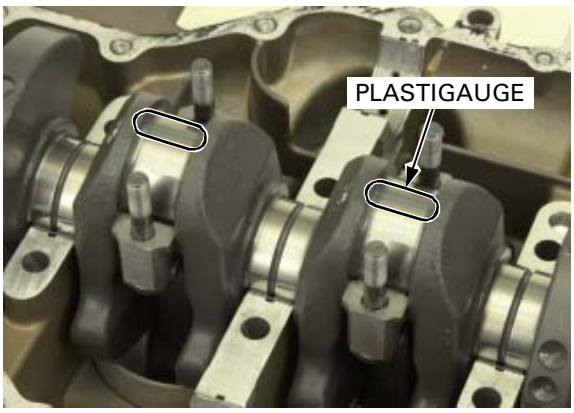


OIL CLEARANCE INSPECTION

NOTE:

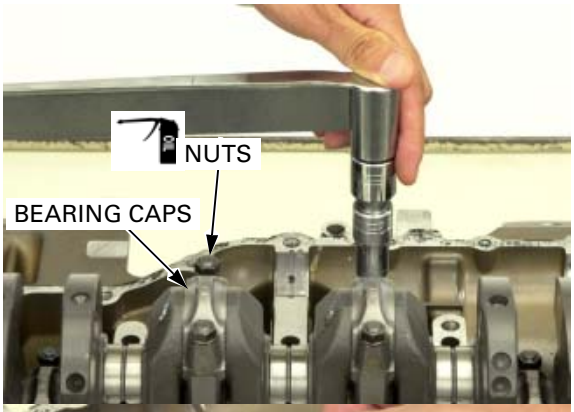
- Do not rotate the crankshaft during inspection.

Clean off any oil from the bearing inserts and crankpin.
Carefully install the crankshaft onto the upper crankcase.
Set the connecting rods onto the crankpin.
Put a strip of plastigauge lengthwise on the crankpin, avoiding the oil holes.



Carefully install each bearing cap in its original position by aligning the I.D. code.
Apply engine oil to the bearing cap nut threads and seating surfaces and install them.
Tighten the cap nuts in several steps alternately.

TORQUE: 41 N·m (4.2 kgf·m, 30 lbf·ft)



Remove the nuts and bearing caps.
Measure the compressed plastigauge at its widest point on the crankpin to determine the oil clearance.

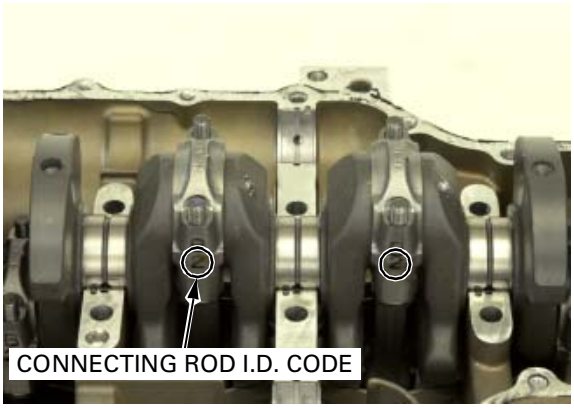
SERVICE LIMIT: 0.06 mm (0.002 in)

If the oil clearance exceeds the service limit, select the correct replacement bearings.

BEARING SELECTION

Numbers (1 or 2) on the connecting rods are the codes for the connecting rod I.D.

Record the connecting rod I.D. code numbers.



Letters (A or B) on the crank weight are the codes for the crankpin O.D.s in the sequence from the No. 1 (front) journal (from left to right).

Record the crankpin O.D. code letters.

Cross reference the connecting rod and crankpin codes to determine the replacement bearing color code.

Connecting rod I.D. code / Crankpin O.D. code	1	2
A	Yellow (C)	Green (B)
B	Green (B)	Brown (A)

BEARING THICKNESS:

A (Brown) **Thick**

B (Green): ↕

C (Yellow) **Thin**

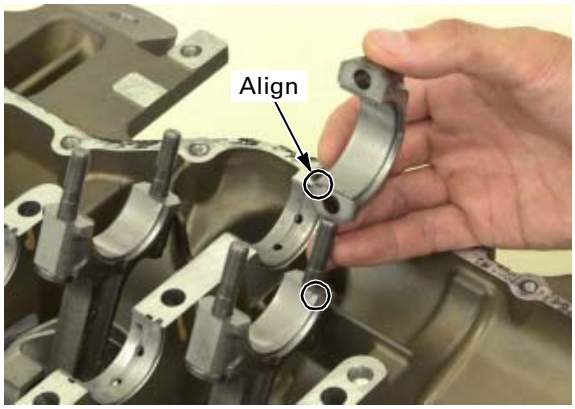
Incorrect clearance can cause severe engine damage.

After selecting new bearings, recheck the oil clearance with plastigauge.

BEARING INSTALLATION

Clean the bearing outer surfaces, bearing cap and connecting rod.

Install the crankpin bearing inserts onto the bearing cap and connecting rod, aligning each tab with each groove.



PISTON/CYLINDER

NOTICE

Be careful not to damage the main journal and crankpin bearing inserts.

NOTE:

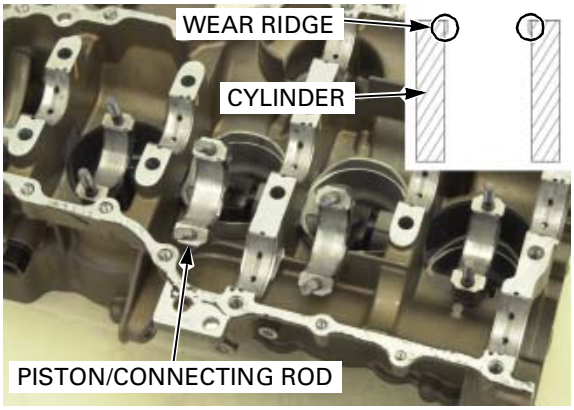
- Mark all the parts as you remove them to indicate the correct cylinder for reassembly.

PISTON REMOVAL

Remove the crankshaft (page 12-11).

Any ridge on the upper side of the cylinder must be removed with an automotive type ridge reamer before removing the pistons

Push each piston/connecting rod out through the top of the cylinder.



Remove the piston pin clip with pliers.
Push the piston pin out of the piston and connecting rod, and remove the piston.

PISTON RING REMOVAL

Do not damage the piston ring by spreading the ends too far.

Spread each piston ring and remove it by lifting up at a point opposite the gap.

Never use a wire brush; it will scratch the grooves.

Clean carbon deposits from the piston ring grooves with a ring that will be discarded.

PISTON INSPECTION

Inspect the piston rings for movement by rotating the rings. The rings should be able to move in their grooves without catching.

Push the ring until the outer surface of the piston ring is nearly flush with the piston and measure the ring-to-groove clearance.

SERVICE LIMITS:

Top:	**0.08 mm (0.003 in)**
Second:	**0.06 mm (0.002 in)**

Insert each piston ring into the bottom of the cylinder squarely using the piston.
Measure the piston ring end gap.

SERVICE LIMITS:

Top:	**ARX1200T3/T3D: 0.48 mm (0.019 in)**
	ARX1200N3: 0.5 mm (0.02 in)
Second:	**0.7 mm (0.03 in)**
Oil (side rail):	**1.0 mm (0.04 in)**

Measure the piston pin O.D. at the piston and connecting rod sliding areas.

SERVICE LIMIT:
ARX1200T3/T3D: 21.984 mm (0.8655 in)
ARX1200N3: 18.984 mm (0.7474 in)

Measure the piston pin hole I.D.

SERVICE LIMIT:
ARX1200T3/T3D: 22.03 mm (0.867 in)
ARX1200N3: 19.03 mm (0.749 in)

Calculate the piston-to-piston pin clearance.

STANDARD: 0.002 – 0.014 mm (0.0001 – 0.0006 in)

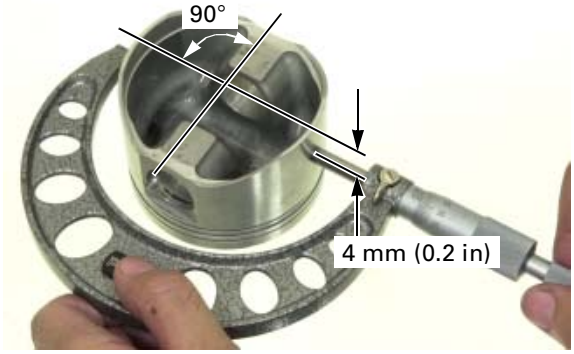
Measure the connecting rod small end I.D.

SERVICE LIMIT:
ARX1200T3/T3D: 22.061 mm (0.8685 in)
ARX1200N3: 19.061 mm (0.7504 in)

Calculate the connecting rod-to-piston pin clearance.

STANDARD: 0.030 – 0.057 mm (0.0012 – 0.0022 in)

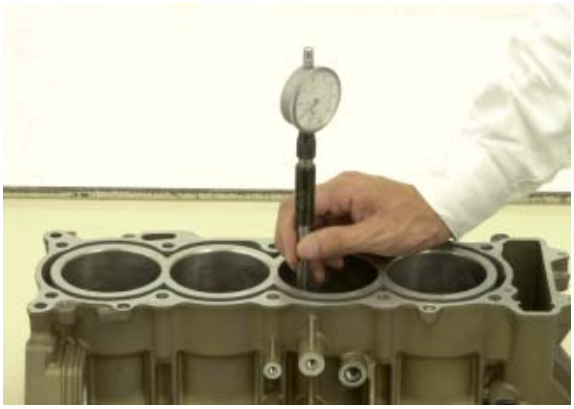
Measure the piston O.D. at a point 4 mm (0.2 in) from the bottom and 90° to the piston pin hole.



SERVICE LIMIT: 78.90 mm (3.106 in)

CYLINDER INSPECTION

Inspect the cylinder bore for scratches or wear. Measure the cylinder I.D. at three levels in an X and Y axis. Take the maximum reading to determine the cylinder wear.

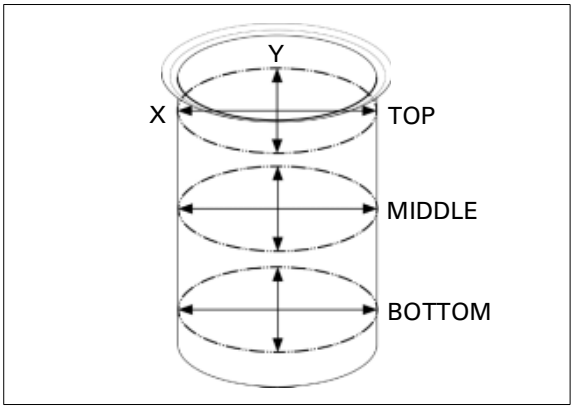


SERVICE LIMIT: 79.10 mm (3.114 in)

Calculate the cylinder-to-piston clearance.

STANDARD: 0.010 – 0.045 mm (0.0004 – 0.0018 in)

Calculate the cylinder taper and out-of-round at three levels in an X and Y axis. Take the maximum reading to determine the taper and out-of-round.



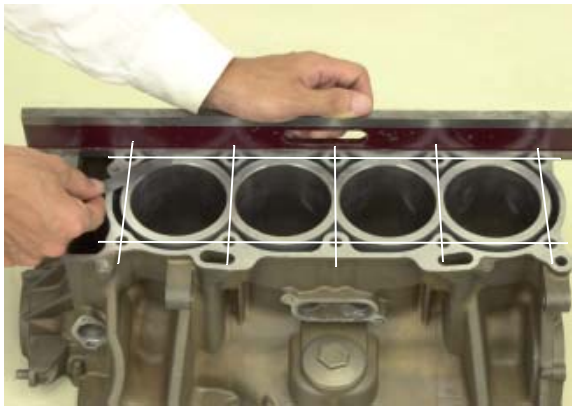
SERVICE LIMITS:
Taper: 0.10 mm (0.004 in)
Out-of-round: 0.10 mm (0.004 in)

The cylinder must be rebored and an oversize piston (0.50 mm) fitted if the service limits are exceeded.

The cylinder must be rebored so the clearance is 0.010 – 0.045 mm (0.0004 – 0.0018 in).

Check the top of the cylinder for warpage with a straight edge and feeler gauge.

SERVICE LIMIT: 0.05 mm (0.002 in)



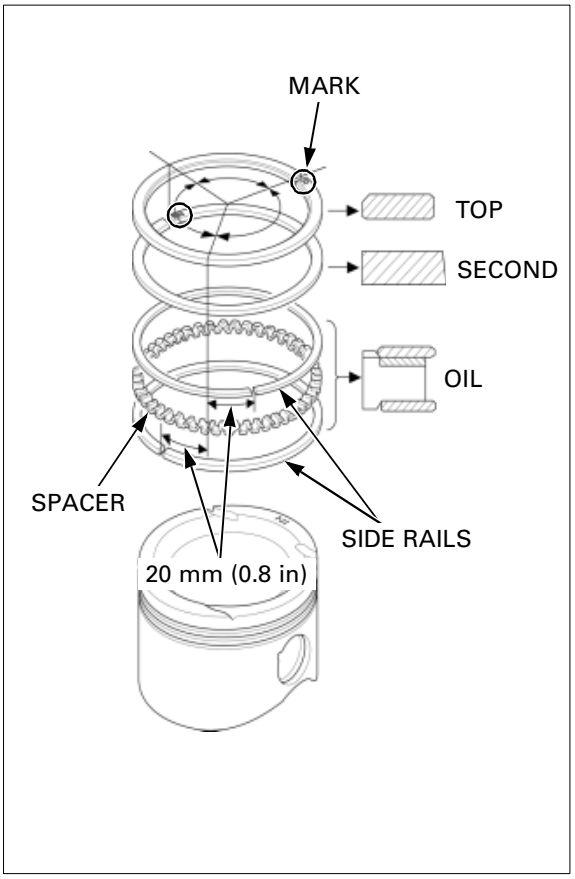
PISTON RING INSTALLATION

Carefully install the piston rings into the piston ring grooves with the markings facing up.

NOTE:

- Be careful not to damage the piston and rings during installation.
- To install the oil ring, install the spacer first, then install the side rails.

Stagger the piston ring end gaps 120° apart from each other.
Stagger the side rail end gaps as shown.

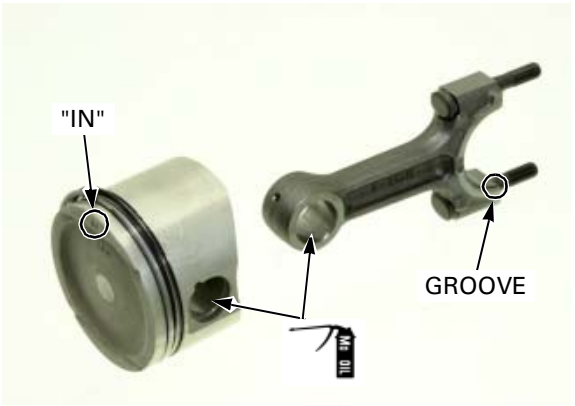


PISTON INSTALLATION

Apply molybdenum oil solution to the pin outer surface.

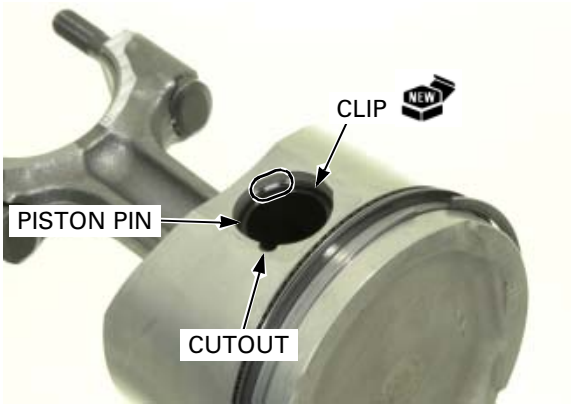
Install the piston so the "IN" mark faces away from the bearing groove of the connecting rod.

Install the piston pin into the piston and connecting rod.



Install new piston pin clips into the grooves in the piston pin hole.

- Make sure the piston pin clips are seated securely.
- Do not align the piston pin clip end gap with the piston cutout.

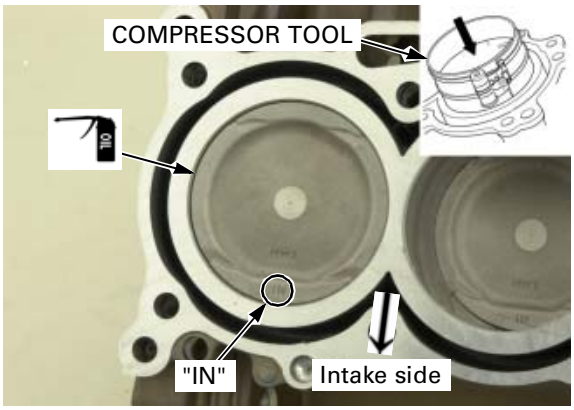


Apply engine oil to the piston and piston rings.

Be careful not to damage the piston rings and the cylinder wall with the connecting rod.

Install the piston/connecting rod into the cylinder with the "IN" mark facing toward the intake side, using a commercially available piston ring compressor tool.

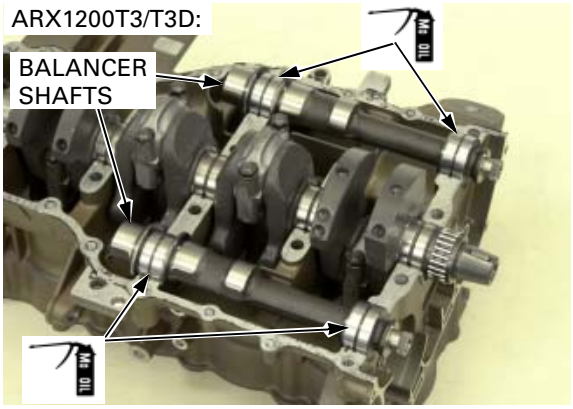
Install the crankshaft (page 12-12).



CRANKCASE ASSEMBLY

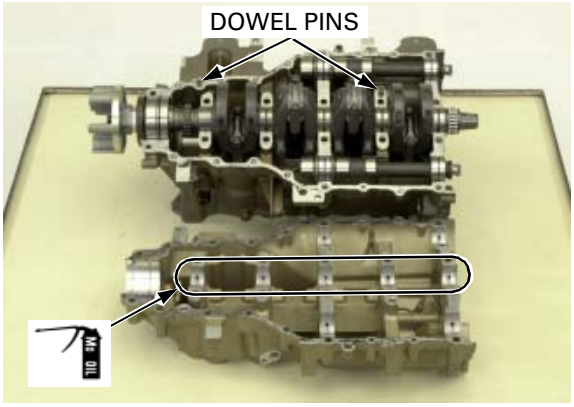
ARX1200T3/T3D only:

Apply molybdenum oil solution to the balancer bearing surfaces and install the balancer shafts with the weight side facing up.

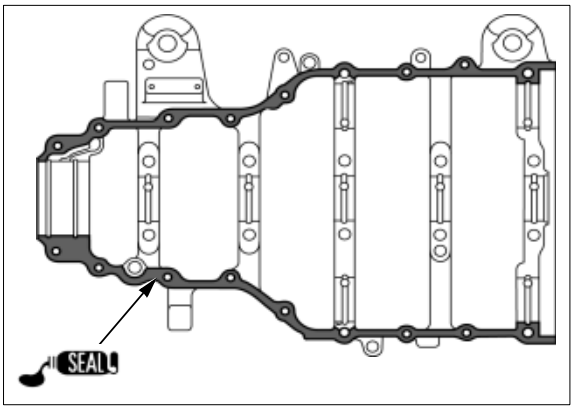


Install the two dowel pins.

Apply molybdenum oil solution to the main journal bearing surfaces on the lower crankcase.



Apply sealant to the crankcase mating surfaces as shown.



Before installing, make sure to set the cam chain over the timing sprocket properly.

Install the lower crankcase onto the upper crankcase.

Apply engine oil to the threads and seating surface of the crankcase 9-mm bolts and install all the crankcase bolts (four 6mm bolts, ten 8-mm bolts and fourteen 9-mm bolts).

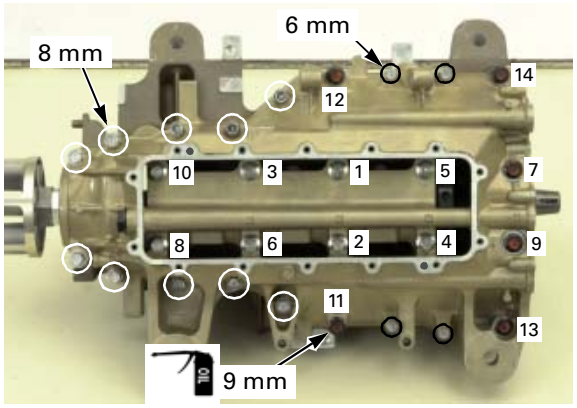
The crankcase has the numbers "1" thru "14".

Tighten the 9-mm bolts in several steps according to the numerical order cast on the crankcase.

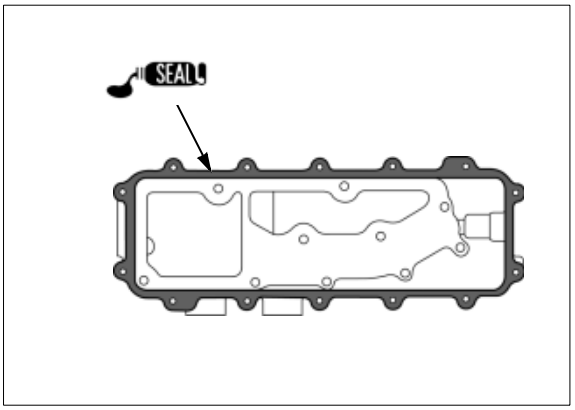
TORQUE: 37 N·m (3.8 kgf·m, 27 lbf·ft)

Tighten the 8-mm and 6-mm bolts in a crisscross pattern in several steps.

TORQUE: 8 mm bolt: 25 N·m (2.5 kgf·m, 18 lbf·ft)

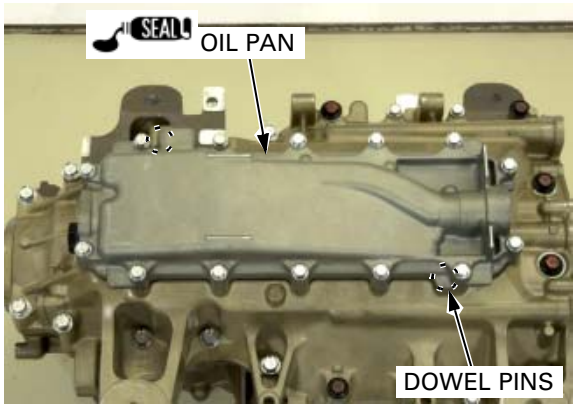


Apply sealant to the oil pan mating surface.



Install the two dowel pins.

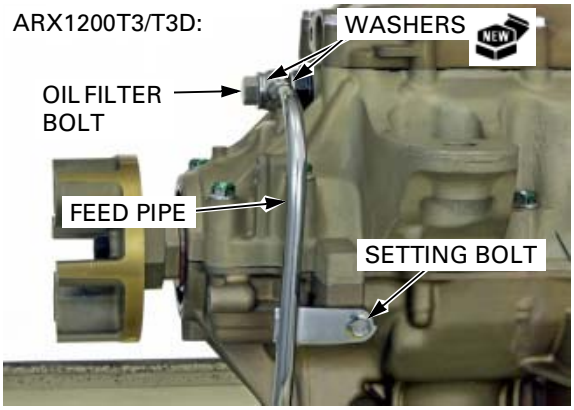
Install the oil pan with the 14 bolts and tighten them in a crisscross pattern in several steps.



ARX1200T3/T3D only: Before installing the oil feed pipe, blow the oil filter bolt with compressed air from the oil holes in the side surface of the bolt to clean it.

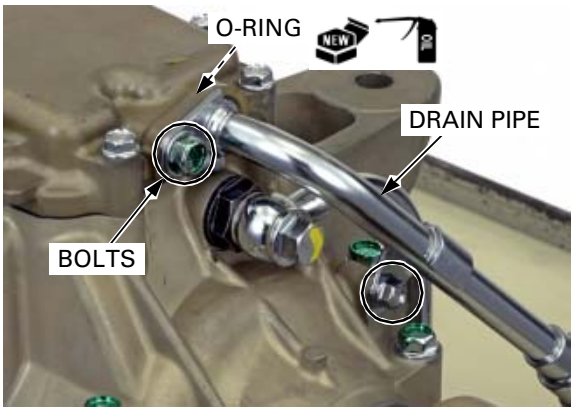
Install the oil feed pipe to the crankcase with the oil filter bolt, new sealing washers and the setting bolt.

TORQUE:
Filter bolt: 32 N·m (3.3 kgf·m, 24 lbf·ft)
Setting bolt: 14 N·m (1.4 kgf·m, 10 lbf·ft)



Coat a new O-ring with engine oil and install it onto the oil drain pipe.

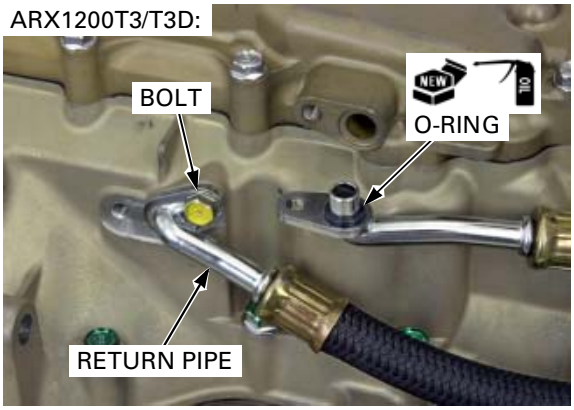
Install the drain pipe with the two bolts and tighten them.



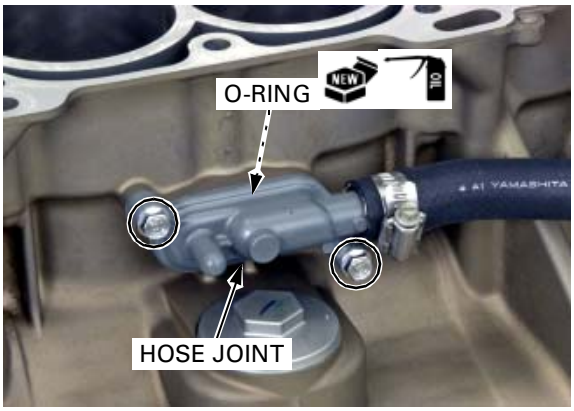
ARX1200T3/T3D only: Coat new O-rings with engine oil and install them onto the oil return pipes.

Install each return pipe with the joint bolt as shown.

TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)



Install a new O-ring into the hose joint groove. Install the hose joint and tighten the two bolts.

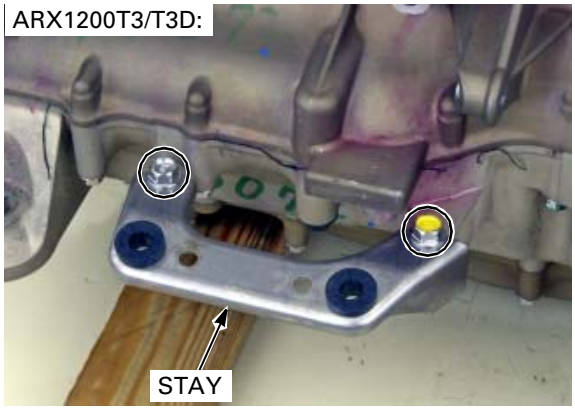


ARX1200T3/T3D: Install the intercooler stay with the two bolts.

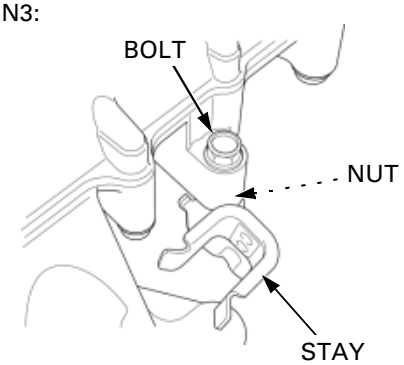
TORQUE: 25 N·m (2.6 kgf·m, 19 lbf·ft)

ARX1200N3: Install the airbox stay with the bolt and nut.

ARX1200T3/T3D:

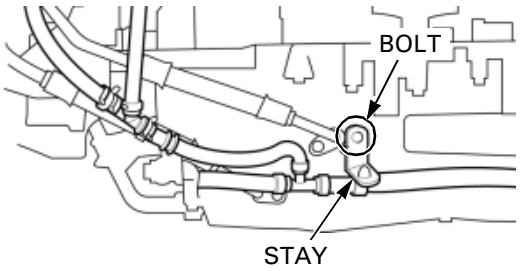


ARX1200N3:



ARX1200T3/T3D only: Install the water hose stay with the bolt.

ARX1200T3/T3D:



Apply sealant to the threads of the knock sensor and install it.

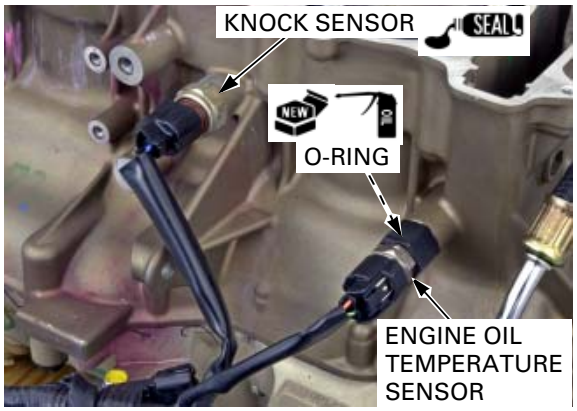
TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

Coat a new O-ring with engine oil and install it onto the engine oil temperature sensor. Install the temperature sensor.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Connect the sensor connectors.

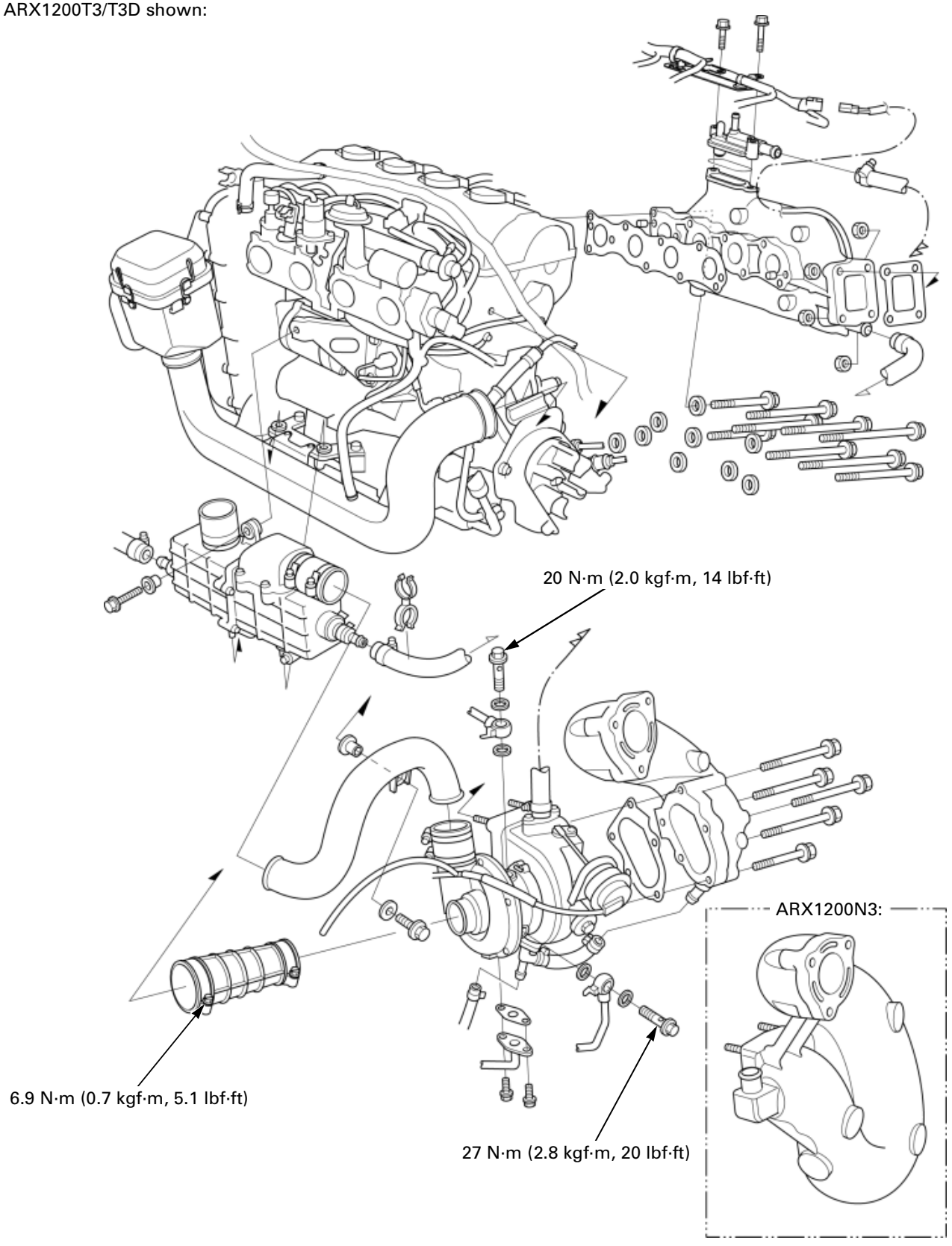
Install the following:
- flywheel and balancer gears (page 11-8)
- cylinder head (page 10-23)
- engine (page 9-9)

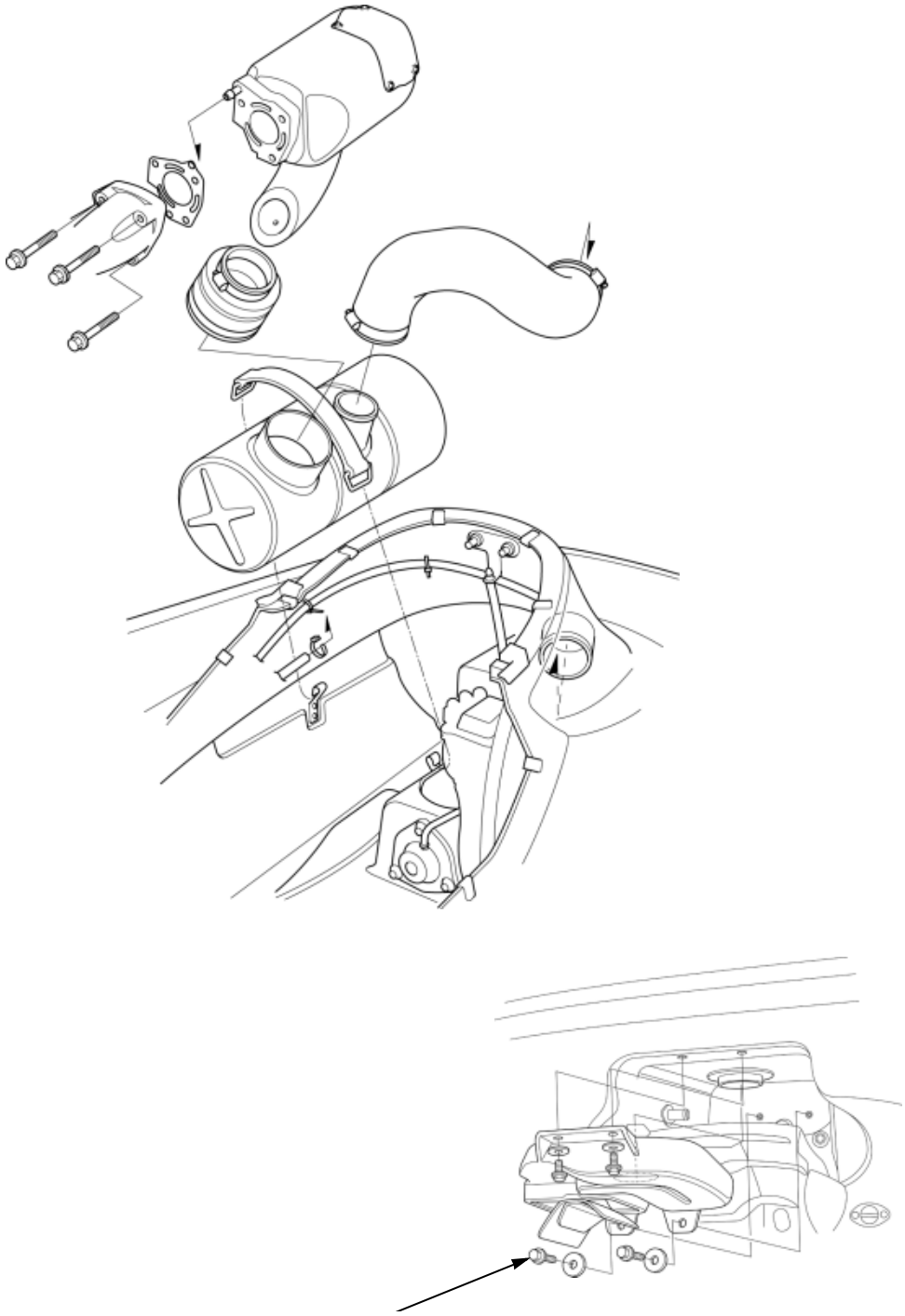


13. EXHAUST SYSTEM/TURBOCHARGER (ARX1200T3/T3D)

SYSTEM COMPONENTS

ARX1200T3/T3D shown:




16 N·m (1.6 kgf·m, 12 lbf·ft)

SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the exhaust system and turbocharger (ARX1200T3/T3D only). These components can be serviced with the engine installed in the hull. However, the engine must be removed to service the exhaust manifold.
- When the turbocharger pressure is abnormal, the malfunction indicator lamp (MIL) and PGM-FI indicator blinks. For this inspection, refer to page 8-10.
- Always replace the gasket when removing the exhaust system components.
- Always inspect the exhaust system for leaks after installation.
- Do not dissemble the turbocharger (including the wastegate control solenoid valve). Replace the turbocharger as an assembly if it is faulty.

TORQUE VALUES

Oil return pipe oil bolt (rear of turbocharger: ARX1200T3/T3D only)	27 N·m (2.8 kgf·m, 20 lbf·ft)
Oil feed pipe oil orifice bolt (upper of turbocharger: ARX1200T3/T3D only)	20 N·m (2.0 kgf·m, 14 lbf·ft)
Airbox connecting tube band screw (duct side: ARX1200T3/T3D only)	6.9 N·m (0.7 kgf·m, 5.1 lbf·ft)
Exhaust water chamber bolt	16 N·m (1.6 kgf·m, 12 lbf·ft) Apply locking agent to the threads.
Water hose joint bolt (turbocharger: ARX1200T3/T3D only)	12 N·m (1.2 kgf·m, 9 lbf·ft) Apply locking agent to the threads.

TROUBLESHOOTING

Excessive exhaust noise

- Exhaust component cracked
- Exhaust gas and water leaks

Poor performance

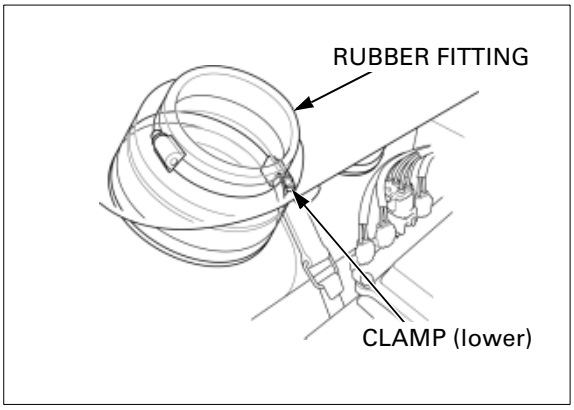
- Exhaust component cracked
- Exhaust gas and water leaks
- Cooling water passage restricted
- Worn or damaged turbocharger wastegate valve (ARX1200T3/T3D)
- Seized turbocharger rotor (ARX1200T3/T3D)
- Faulty turbocharger wastegate actuator (ARX1200T3/T3D)

EXHAUST BODY

REMOVAL

Remove the left and right side panels (page 3-5).

Loosen the lower side clamp on the exhaust body rubber fitting.



Cut the hose band and disconnect the water hose from the exhaust body.

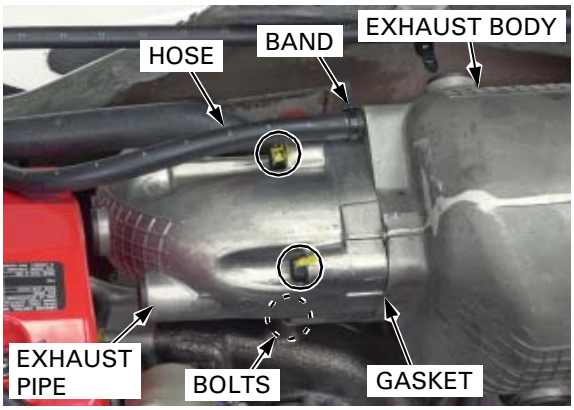
Remove the three bolts and the gasket.

Be careful not to damage the mating surface of the exhaust pipe and body.

Remove the exhaust body from the water muffler.

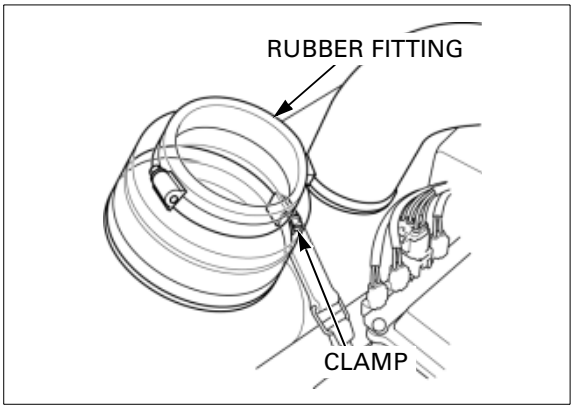
Remove the rubber fitting from the exhaust body by loosening the clamp.

Inspect the exhaust body (page 13-11).



INSTALLATION

Install the rubber fitting over the water muffler inlet port until it is fully seated and tighten the clamp.

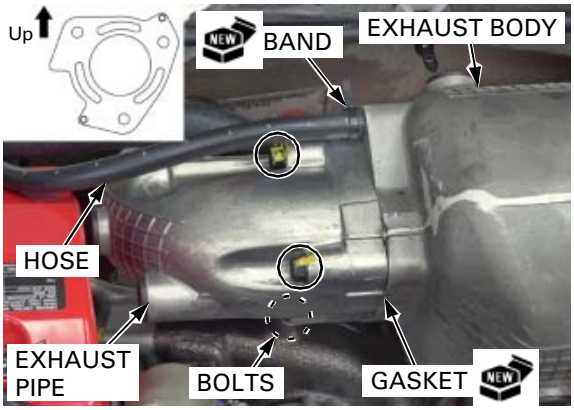


Clean the mating surfaces of the exhaust pipe and body.

Be careful not to damage the mating surface of the exhaust pipe and body.

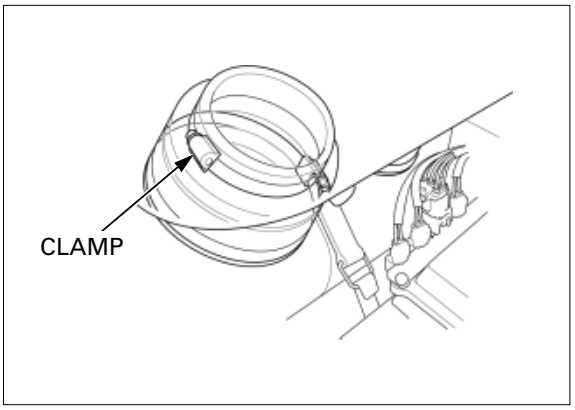
Install the exhaust body into the rubber fitting on the muffler with a new gasket and bolts.
Make sure the rubber fitting end is fully seated to the exhaust body. Tighten the three bolts securely.

Connect the water hose and secure it with a new hose band. Cut off any excess of the band.



Tighten the upper side clamp on the rubber fitting.

Install the side panels (page 3-5).



EXHAUST PIPE/TURBOCHARGER (ARX1200T3/T3D)

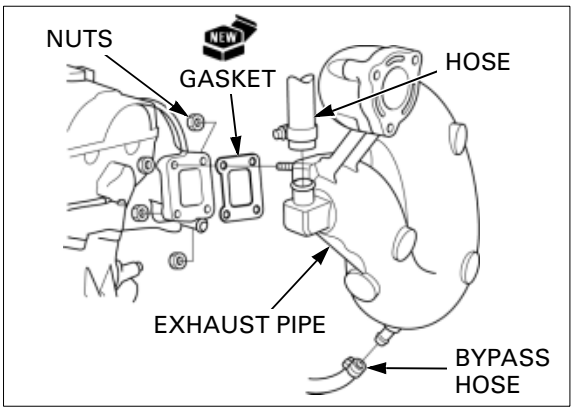
EXHAUST PIPE REMOVAL/INSTALLATION

ARX1200N3

Remove the exhaust body (page 13-5).

Remove the following:
– water hose (loosen hose clamp)
– water bypass hose
– four nuts
– exhaust pipe
– gasket

Inspect the exhaust pipe (page 13-11).



Always replace the gasket with a new one.

Installation is in the reverse order of removal.

NOTE:
- Before installing, be sure that no foreign material enters into the exhaust pipe.
- Clean the mating surfaces thoroughly.

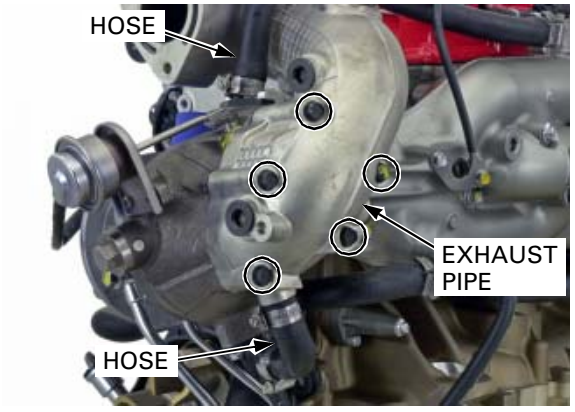
ARX1200T3/T3D

Remove the exhaust body (page 13-5).

Be careful not to damage the mating surfaces.

Remove the following:
– water hoses (loosen hose clamp)
– five bolts
– exhaust pipe
– gasket

Inspect the exhaust pipe (page 13-11).



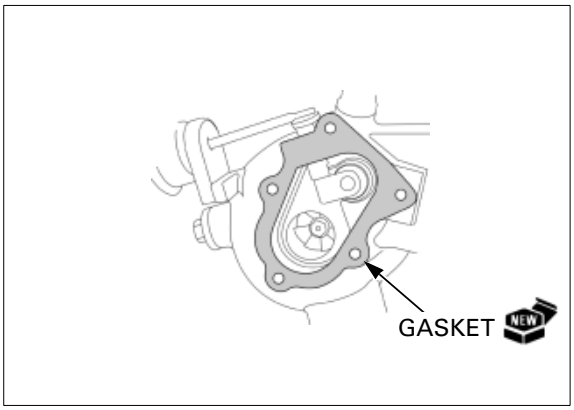
NOTE:
- After removing the exhaust pipe, do not allow any foreign material into the turbocharger.
- Do not touch the turbine wheel in the turbocharger.

Always replace the gasket with a new one.

Installation is in the reverse order of removal.

NOTE:

- Before installing, be sure that no foreign material enters into the exhaust pipe.
- Clean the mating surfaces thoroughly.



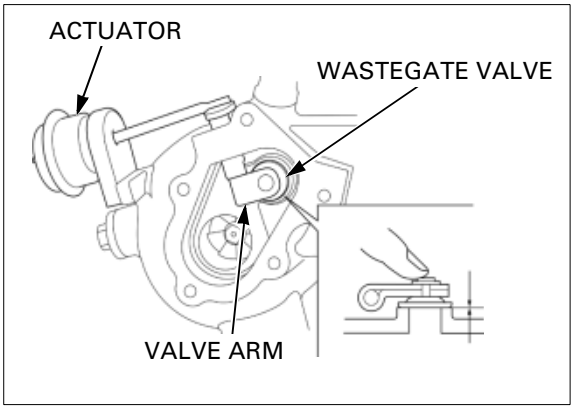
Replace the turbocharger as an assembly.

WASTEGATE VALVE INSPECTION (ARX1200T3/T3D)

Refer to page 8-41 for wastegate actuator operation check.

Do not remove the actuator from the turbocharger.

Check the wastegate valve for proper seating, without play in the valve and valve arm.



Do not disassemble the turbocharger.

TURBOCHARGER REMOVAL/ INSTALLATION (ARX1200T3/T3D)

NOTE:

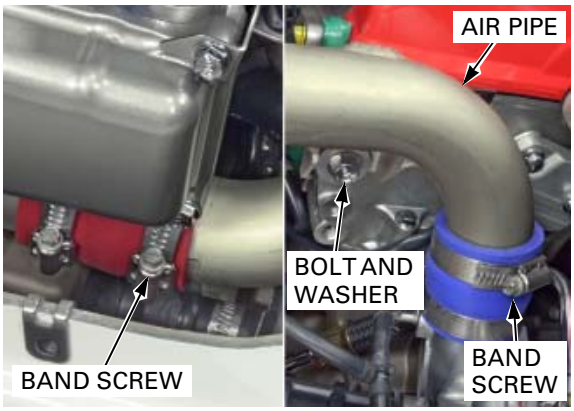
- Do not touch the turbine wheel in the turbocharger.
- Do not hang the turbocharger by the actuator rod.
- Be careful not to drop the turbocharger. The turbocharger may be damaged if dropped.
- Cover the intake and outlet ports with a piece of tape to prevent any foreign material from entering into the turbocharger.

Remove the exhaust pipe (page 13-6).

Loosen the connecting hose band screws at the intercooler and turbocharger.

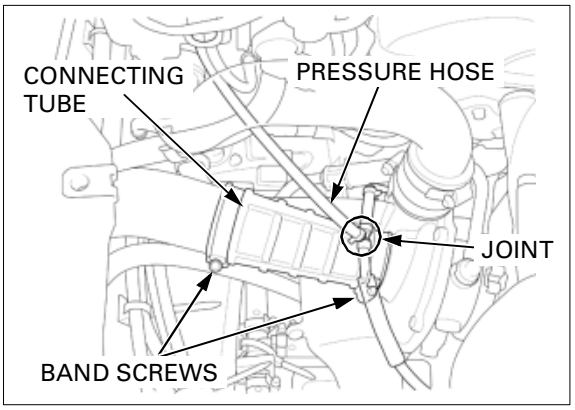
Remove the bolt and washer.

Remove the air pipe from the connecting hoses.

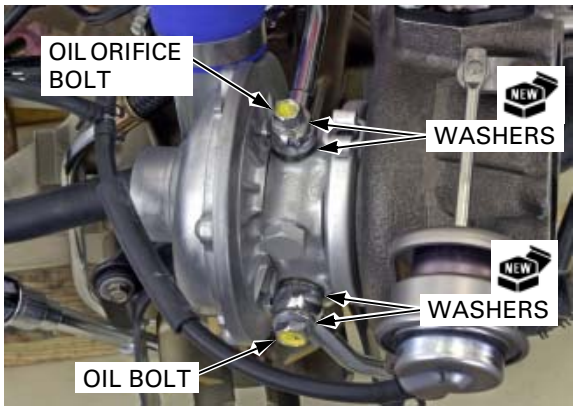


Disconnect the wastegate pressure hose from the 3-way joint.

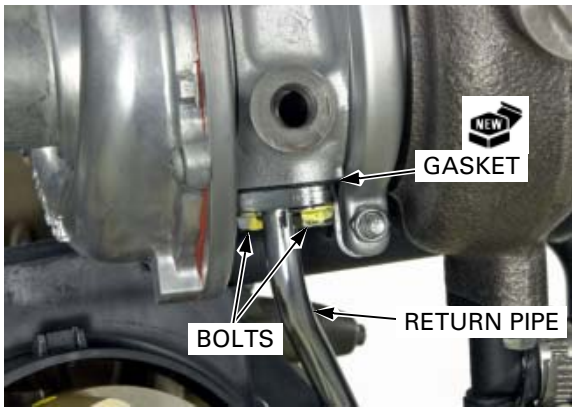
Loosen the band screws and remove the connecting tube from the turbocharger and duct.



Disconnect the oil pipes by removing the following:
- oil orifice bolt
- sealing washers
- oil feed pipe
- oil bolt
- sealing washers
- oil (cooling) return pipe



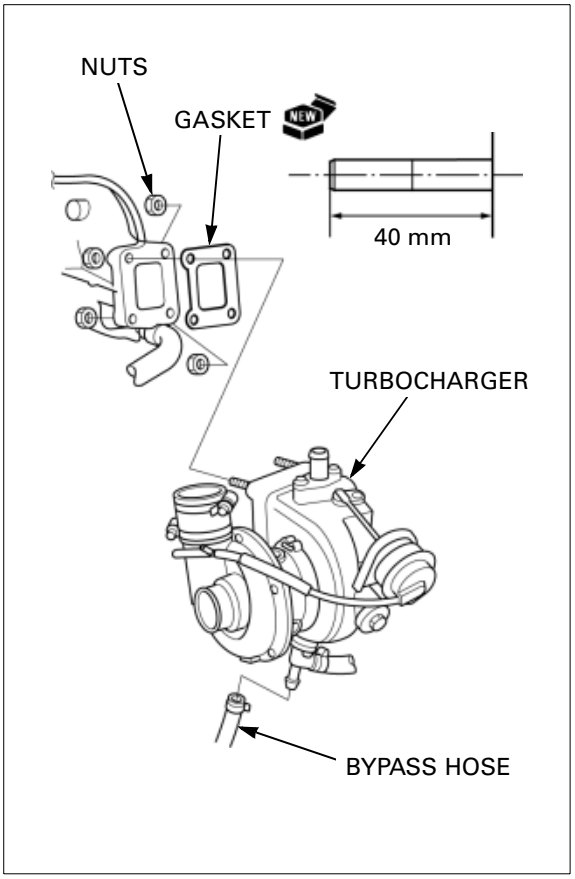
- two joint bolts
- oil (lubrication) return pipe
- gasket



Be careful not to damage the mating surfaces.

Remove the following:
– water bypass hose
– four mounting nuts
– turbocharger
– gasket

If the stud bolts are loose, tighten them. Be sure to verify that the distance from the top of the stud to the housing surface is 40 mm (1.6 in).



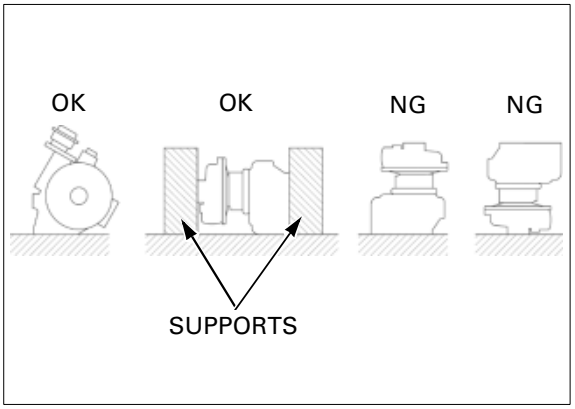
NOTICE

After removing the turbocharger, place it vertically. Do not place it left or right side down.

Always replace the gaskets and sealing washers with new ones.

Installation is in the reverse order of removal.

NOTE:
- Clean the mating surfaces thoroughly.
- Pour a small amount of clean engine oil into the turbocharger through the oil inlet hole.



TORQUE:
Oil bolt: 27 N·m (2.8 kgf·m, 20 lbf·ft)
Orife bolt: 20 N·m (2.0 kgf·m, 14 lbf·ft)
Connecting tube band screw (duct side): 6.9 N·m (0.7 kgf·m, 5.1 lbf·ft)

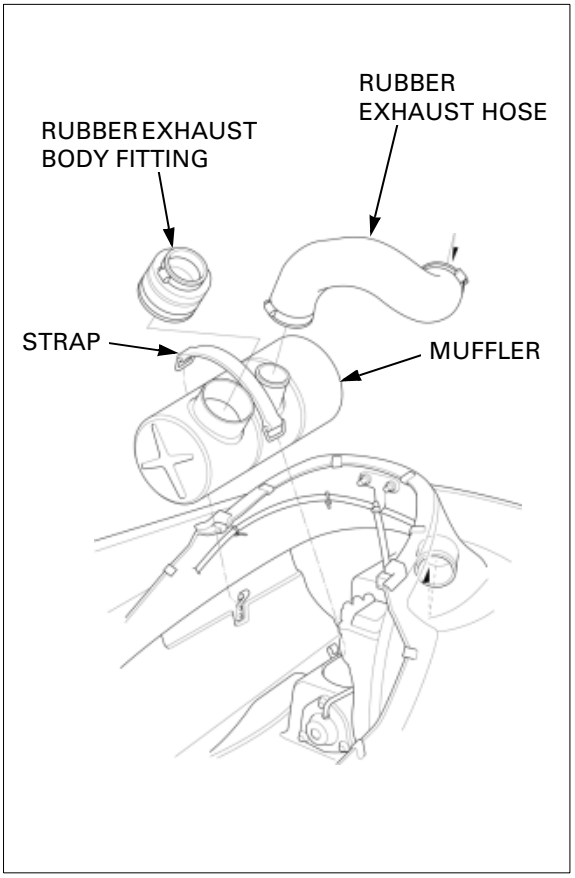
WATER MUFFLER

REMOVAL/INSTALLATION

Remove the turbocharger (page 13-7).

Remove the following:
– rubber exhaust hose (loosen two clamps)
– strap
– water muffler (by sliding it forward)

Installation is in the reverse order of removal.



INSPECTION

Drain any water out of the muffler.
Check the rubber exhaust body fitting and muffler for damage caused by excessive heat.

WATER CHAMBER

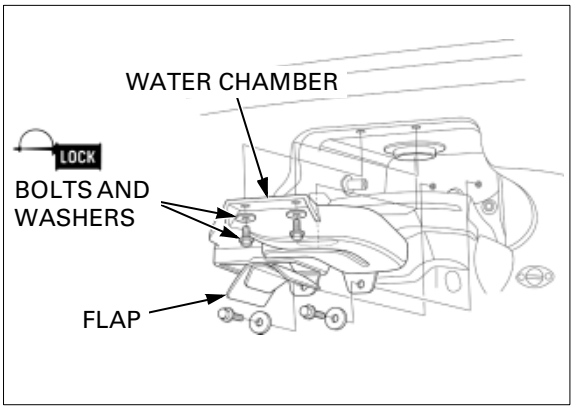
REMOVAL/INSTALLATION

Remove the following:
– four bolts and washers
– water chamber

Installation is in the reverse order of removal.

Apply locking agent to the bolt threads.

TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)



INSPECTION

Check the flaps for cracks, deformation or other damage.

EXHAUST MANIFOLD

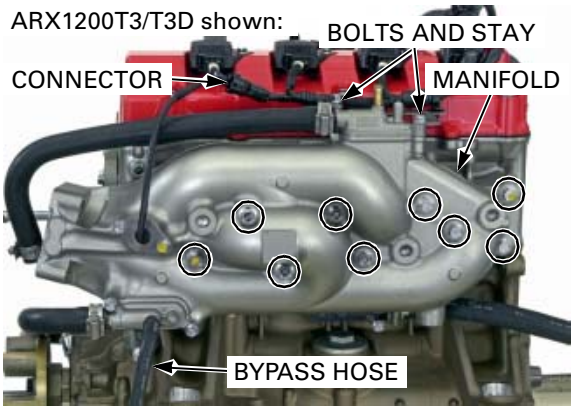
REMOVAL/INSTALLATION

Remove the engine (page 9-2).

ARX1200T3/T3D: Remove the exhaust pipe/turbocharger (page 13-6).
ARX1200N3: Remove the exhaust pipe (page 13-6).

Remove the following:

- manifold surface temperature (MST) switch 2P connector
- two bolts and harness stay
- ARX1200T3/T3D: water bypass hose
  ARX1200N3: water hose
- nine mounting bolts
- exhaust manifold
- gasket
- dowel pins



Always replace the gasket with a new one.

Installation is in the reverse order of removal.

NOTE:
- Before installing, be sure that any foreign material is allowed in the exhaust manifold.
- Clean the mating surfaces thoroughly.

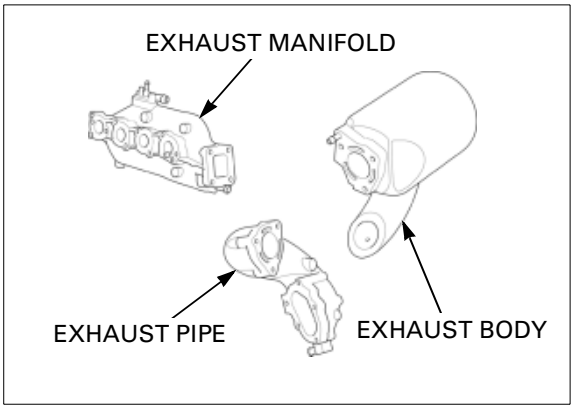
Inspect the exhaust manifold (page 13-11).

EXHAUST COMPONENT CLEANING AND INSPECTION

Remove the carbon deposits from the exhaust components to clean them.

Flush the water passages in the exhaust body, pipe and manifold with pressurized fresh water to remove any foreign material.

Check the water passages for corrosion.
Check the mating surfaces for nicks or other damage.

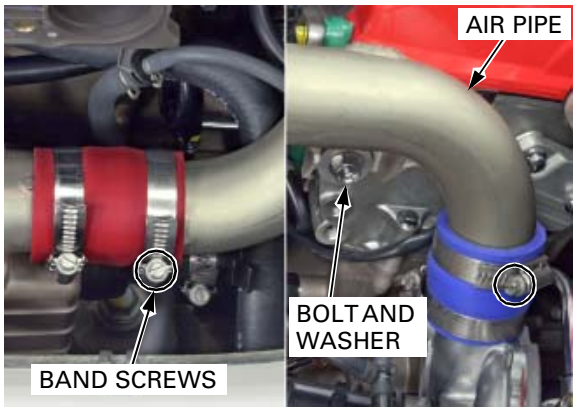


INTERCOOLER (ARX1200T3/T3D)

REMOVAL/INSTALLATION

Remove the sub-airbox (page 8-85).

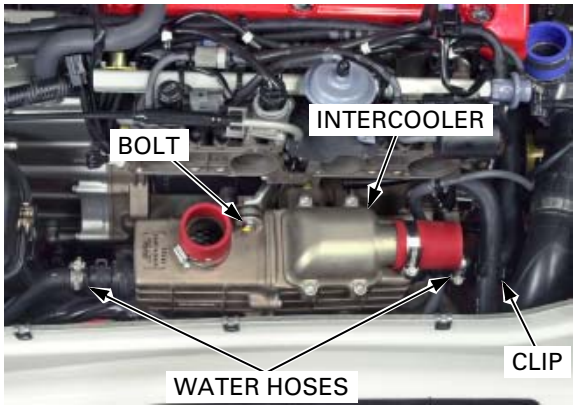
Loosen the band screws.
Remove the bolt and washer, and the air pipe.



Remove the hose clip.

Loosen the hose clamps and disconnect each water hose from both ends of the intercooler.

Remove the mounting bolt. Raise the intercooler to remove it off the grommets in the stay.

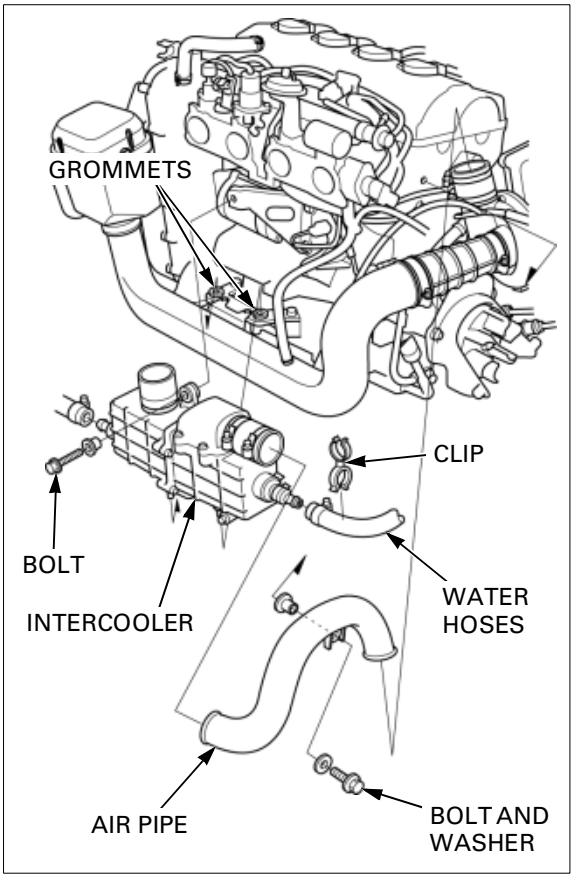


Align the mounting bosses on the intercooler with the grommets securely.

Installation is in the reverse order of removal.

CLEANING

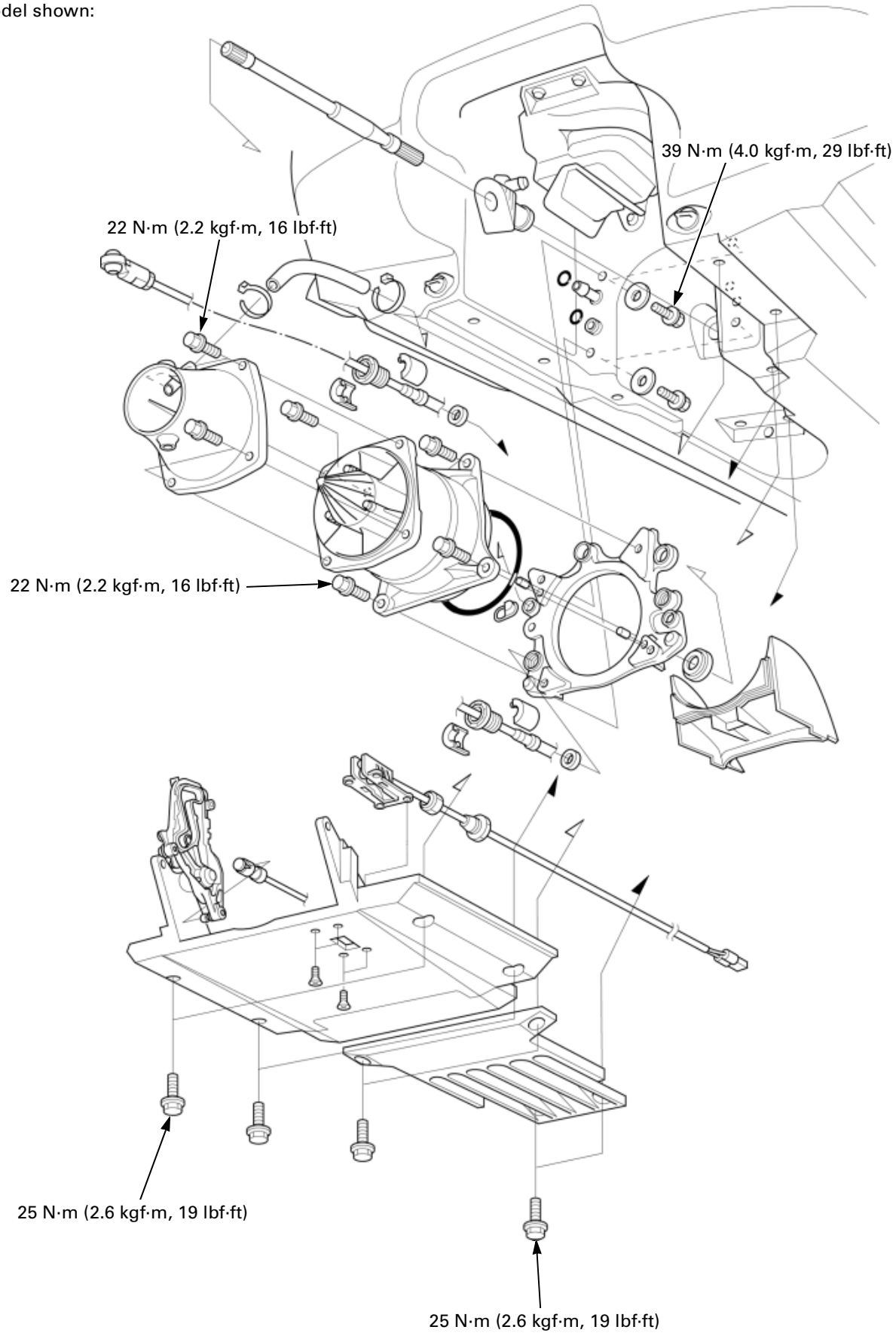
Flush the intercooler with pressurized fresh water to remove any foreign material.

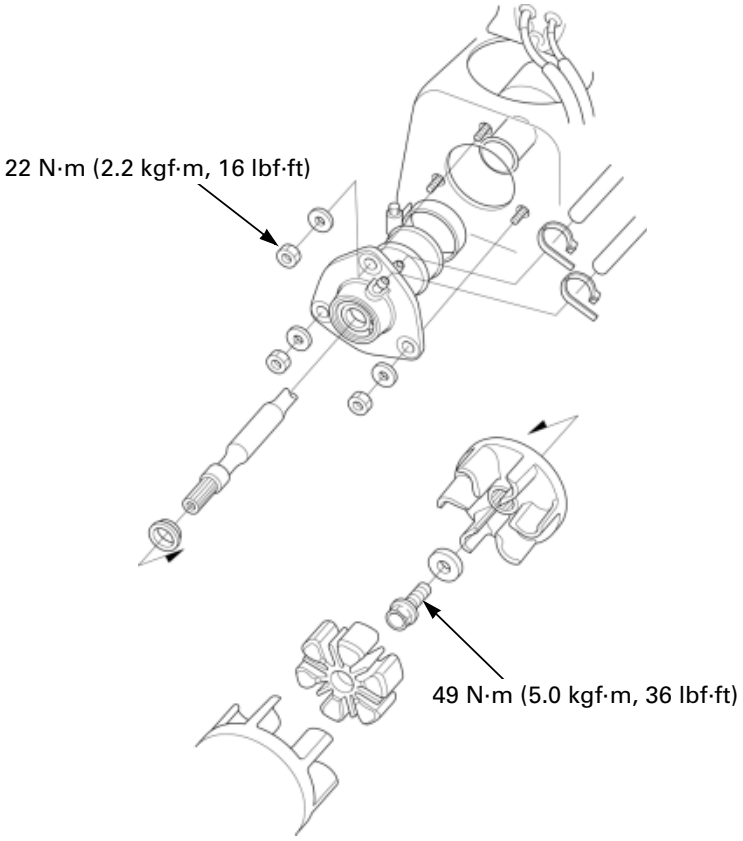


14. PROPULSION SYSTEM

SYSTEM COMPONENTS

'04 model shown:




22 N·m (2.2 kgf·m, 16 lbf·ft)
49 N·m (5.0 kgf·m, 36 lbf·ft)

SERVICE INFORMATION

GENERAL

- Remove the safety lanyard and disconnect the negative battery cable to prevent accidental engine starting when working on the propulsion system.
- Keep hands, feet, and loose clothing away from the jet pump when running the engine.
- ARX1200T3,/T3D and '04 ARX1200N3: The pump is a 3-blades impeller with a six vein mixed-flow pump.
  After '04 ARX1200N3: The pump is a 3-blades impeller with a seven vein mixed-flow pump.
- Be sure to inspect the drive shaft seals at the recommended intervals to guard against driveline damage and leaks.
- Everytime the drive shaft bearing holder or thrust plate is removed, check the engine-to-jet pump alignment using the special tool. The alignment is necessary to eliminate possible vibration and/or damage to components.
- Always inspect the impeller for signs of cavitation or other damage; replace if necessary.
- Refer to the following table for impeller information.

'04 model:

Model	Material	Mark
ARX1200T3	Stainless steel	HW1-670
ARX1200N3	Stainless steel	HW2-670

After '04:

Model	Material	Mark
ARX1200T3	Stainless steel	HW1-670
ARX1200T3D	Stainless steel	HW1-670
ARX1200N3	Stainless steel	HW2-730

SPECIFICATIONS

'04 model:

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Impeller	Material	Stainless steel	–
	Number of blades	3	–
	O.D.	154.6 (6.09)	–
Water jet stator I.D. (impeller housing area)		155.4 (6.12)	–
Impeller clearance		0.3 – 0.5 (0.01 – 0.02)	0.9 (0.04)
Drive shaft runout		–	0.2 (0.01)

After '04:

ARX1200T3/T3D

Unit: mm (in

ITEM		STANDARD	SERVICE LIMIT
Impeller	Material	Stainless steel	–
	Number of blades	3	–
	O.D.	154.6 (6.09)	–
Water jet stator I.D. (impeller housing area)		155.4 (6.12)	–
Impeller clearance		0.3 – 0.5 (0.01 – 0.02)	0.9 (0.04)
Drive shaft runout		–	0.2 (0.01)

ARX1200N3

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Impeller	Material	Stainless steel	–
	Number of blades	3	–
	O.D.	146.7 (5.78)	–
Impeller housing I.D.		147 (5.8)	–
Impeller clearance		0.3 – 0.5 (0.01 – 0.02)	0.9 (0.04)
Drive shaft runout		–	0.2 (0.01)

TORQUE VALUES

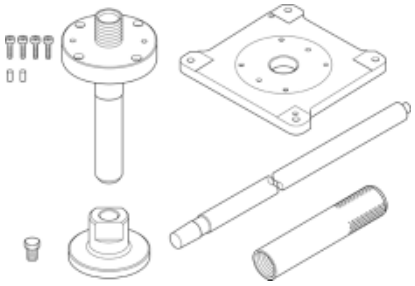
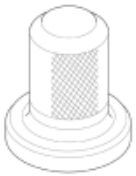
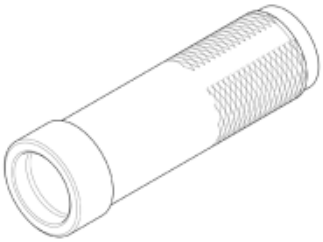
'04 model:

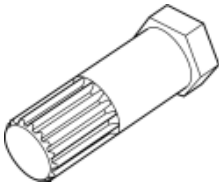
Grease nipple joint	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Grease nipple	3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)	
Bearing housing mounting nut	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Driven coupler bolt	49 N·m (5.0 kgf·m, 36 lbf·ft)	Apply engine oil to the threads and seating surface.
Thrust plate bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)	Apply locking agent to the threads.
Cooling water cap	44 N·m (4.5 kgf·m, 33 lbf·ft)	Apply locking agent to the threads, stake.
Impeller	127 N·m (13.0 kgf·m, 94 lbf·ft)	Apply molybdenum disulfide grease to the threads.
Stator cap socket bolt	3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)	Apply locking agent to the threads.
Jet pump mounting bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	Apply locking agent to the threads.
Water jet nozzle bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	Apply locking agent to the threads.
Intake grate	25 N·m (2.6 kgf·m, 19 lbf·ft)	Apply locking agent to the threads.
Ride plate	25 N·m (2.6 kgf·m, 19 lbf·ft)	Apply locking agent to the threads.

After '04:

Grease nipple joint	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Grease nipple	3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)	
Bearing housing mounting nut	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Driven coupler bolt	49 N·m (5.0 kgf·m, 36 lbf·ft)	Apply engine oil to the threads and seating surface.
Thrust plate bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)	Apply locking agent to the threads.
Cooling water cap	44 N·m (4.5 kgf·m, 33 lbf·ft)	Apply locking agent to the threads, stake.
Impeller	127 N·m (13.0 kgf·m, 94 lbf·ft)	Apply water resistant molybdenum disulfide grease to the threads.
Impeller housing bolt (ARX1200N3 only)	3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)	Apply locking agent to the threads.
Stator cap socket bolt	3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)	Apply locking agent to the threads.
Jet pump mounting bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	Apply locking agent to the threads.
Water jet nozzle bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	Apply locking agent to the threads.
Intake grate	25 N·m (2.6 kgf·m, 19 lbf·ft)	Apply locking agent to the threads.
Ride plate	25 N·m (2.6 kgf·m, 19 lbf·ft)	Apply locking agent to the threads.

TOOLS

Alignment tool set 070MJ-HW1A100*  (Newly designed tool)	Driver, 60 mm O.D. 070MD-HW10100 ('04 model and After '04 ARX1200T3/T3D)  (Newly designed tool) Alternative tool: 070MD-HW1A100 (U.S.A. only)	Driver, 40 mm I.D. 07746-0030100 (After '04 ARX1200N3) 
Bearing remover, 25 mm 07936-ZV10100  Alternative tool: 07936-ZV1A100 (U.S.A. only)	Remover handle 07936-3710100 	Remover weight 07741-0010201  Alternative tool: 07936-3710200 or 07936-371020A
Driver 07749-0010000 	Attachment, 28 x 30 mm 07946-1870100 ('04 model and After '04 ARX1200T3/T3D) 	Attachment, 32 x 35 mm 07746-0010100 
Attachment, 37 x 40 mm 07746-0010200 	Attachment, 40 x 42 mm 07746-0010900 (After '04 ARX1200N3) 	Attachment, 42 x 47 mm 07746-0010300 

Attachment, 20 mm I.D. 07746-0020400 (After '04 ARX1200N3) 	Pilot, 25 mm 07746-0040600 	Pilot, 30 mm 07746-0040700 ('04 model and After '04 ARX1200T3/T3D) 
Impeller wrench Solas WR001 or equivalent 		

*Available through the AHM Tool Loan Program; 888-424-6857.

TROUBLESHOOTING

Abnormal noise from propulsion system
- Weeds/debris caught in intake grate or impeller
- Damaged or deflected drive shaft
- Worn or damaged bearings in jet pump or bearing housing
- Damaged drive shaft bearing housing
- Improper engine-to-jet pump alignment (page 9-11)
- Broken engine mounts (page 9-8)

Poor performance though engine runs properly
- Water intake area obstructed
- Excessive impeller clearance
- Impeller or water jet stator damaged

Engine runs too fast
- Jet pump cavitation
  - Damaged leading or trailing edge of impeller
  - Faulty sealing of intake grate or jet pump support
- Foreign material caught on impeller

Engine turns slowly when starting engine
- Restriction in jet pump
- Seizure in jet pump

Engine overheats
- Restricted jet pump water intake (water filter)

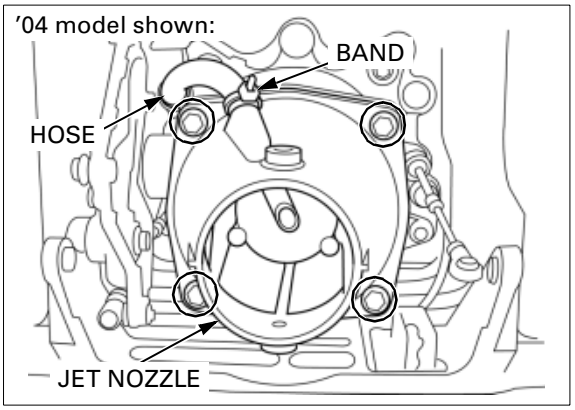
JET PUMP REMOVAL

NOTE:

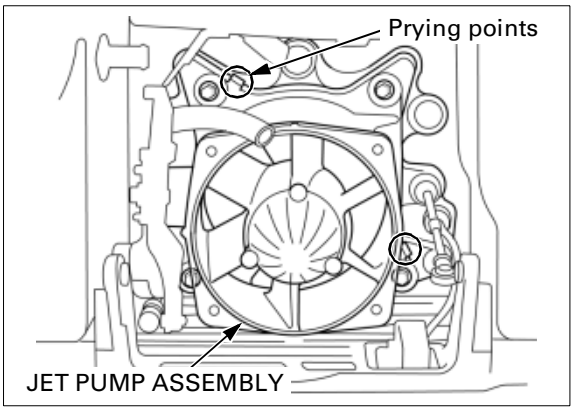
- Remove the safety lanyard and disconnect the negative battery cable to prevent accidental engine starting when working on the propulsion system.
- Keep hands, feet, and loose clothing away from the jet pump when running the engine.

Remove the reverse bucket and steering nozzle (page 15-13).

Remove the following:
– hose band
– bilge hose
– four bolts
– water jet nozzle

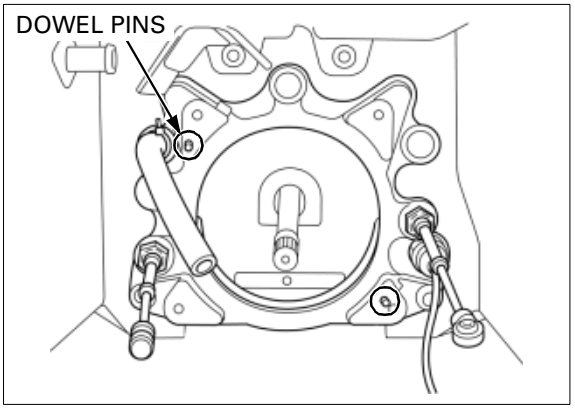


– four bolts
– jet pump assembly (being careful not to damage the speed sensor located on the ride plate)

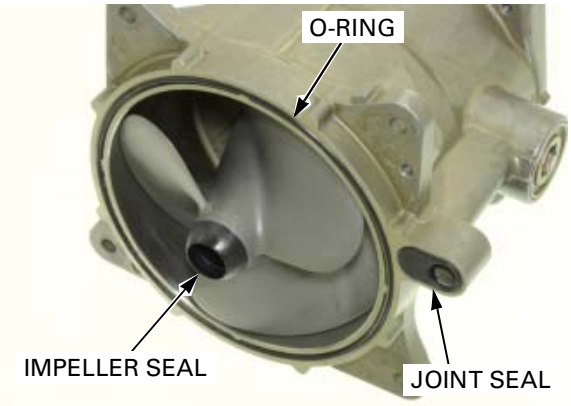


– two dowel pins

For thrust plate removal/installation, refer to page 14-33.



– O-ring
– joint seal
– impeller seal

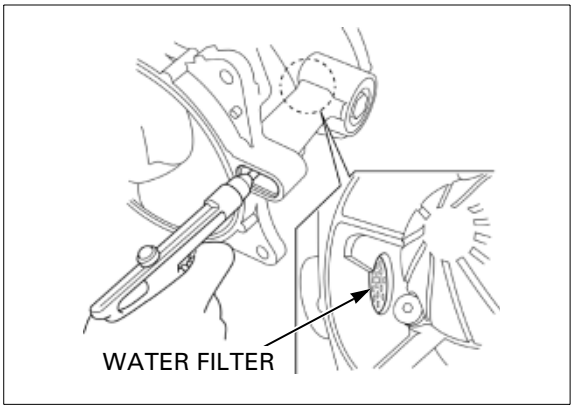


Check the cooling water filter for clogs.

Remove foreign material out of the water filter with a piece of wire from inside of the water jet stator. Apply compressed air through the cooling water passage to clean the filter.

NOTICE

Do not remove the water cap to clean the filter. If the cap is removed, it will be damaged.



If foreign material cannot be removed, replace the water jet stator.

See page 14-24 for installation procedure of the water filter and cap, when the water jet stator is replaced.

Refer to following page for disassembly and inspection:
– '04 model; page 14-10
– After '04 ARX1200T3/T3D; page 14-10
– After '04 ARX1200N3; page 14-12

JET PUMP DISASSEMBLY/ INSPECTION

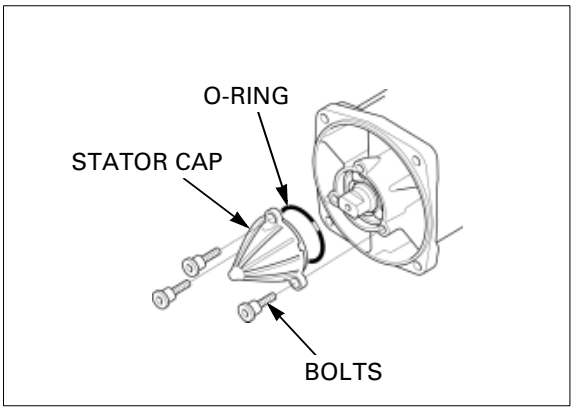
'04 model and After '04 ARX1200T3/ T3D

IMPELLER

Remove the three socket bolts and the stator cap.

Remove any grease from the bearing and stator cap.

Remove the O-ring.



Hold the impeller shaft of the jet pump assembly in a vise.

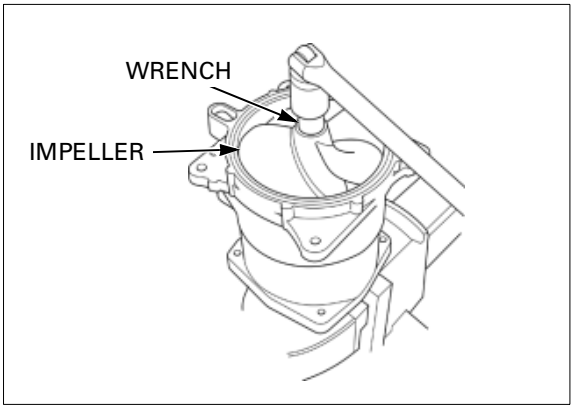
Never use an impact wrench. Take care not to interfere the impeller with the water jet stator.

Loosen the impeller by turning it counterclockwise using a commercially available impeller wrench.

TOOL:

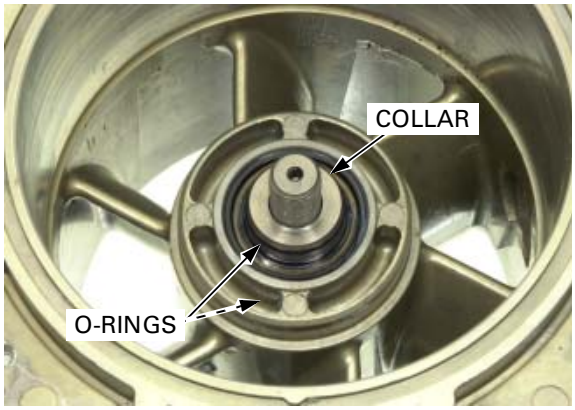
Impeller wrench	**Solas WR001 or equivalent**

Remove the jet pump assembly from a vise.
Remove the impeller by turning the impeller shaft.



Remove the impeller shaft collar and the O-ring A (upper O-ring).

Remove the O-ring B (lower O-ring) from the impeller shaft.



Minor nicks and gouges in the impeller blade can be removed with abrasive paper by filing it carefully. Smooth leading edges are especially important to avoid cavitation.

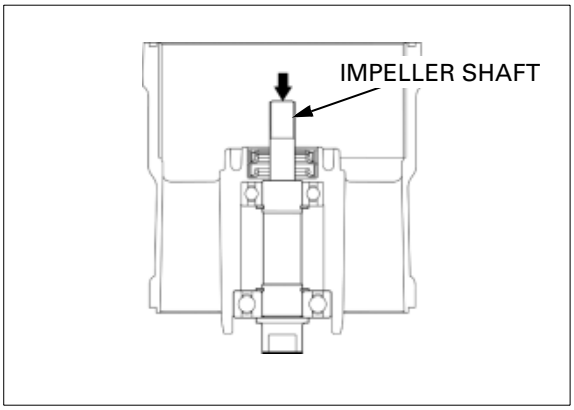
Check the impeller blades for deep scratches, pitting or nicks.
Check the splines for wear or deformation. Also check the drive shaft condition.

Check the jet stator inner wall for deep scratches or irregular surface.

BEARING AND WATER SEAL

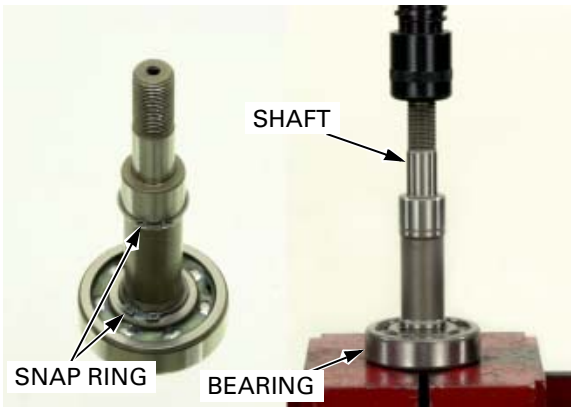
Turn the impeller shaft and check the bearing condition.
The bearing should turn smoothly and quietly. Also check that the outer and inner races of the bearing fit tightly.

Press the impeller shaft out of the water jet stator with a hydraulic press.



Remove the snap rings from the impeller shaft.

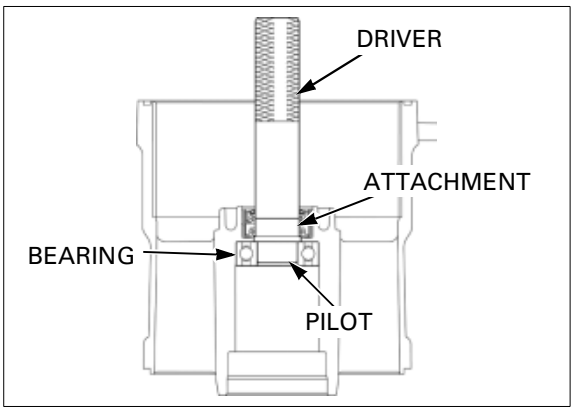
Press the impeller shaft out of the outside bearing.



Press the inside bearing out of the water jet stator with a hydraulic press.

TOOLS:

Driver	**07749-0010000**
Attachment, 28 x 30 mm	**07946-1870100**
Pilot, 25 mm	**07746-0040600**

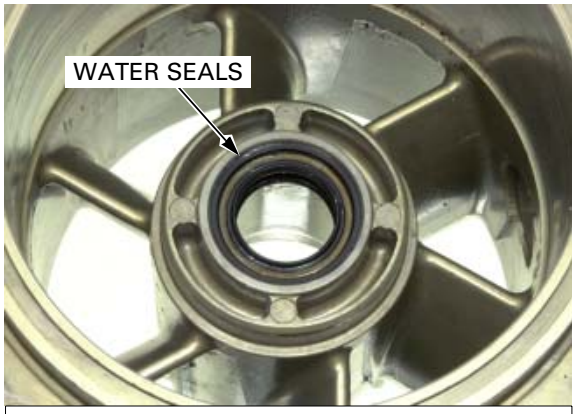


Do not damage the seal bore in the jet stator.

Remove the water seals using the special tools.

TOOLS:

Driver	**07749-0010000**
Attachment, 37 x 40 mm	**07746-0010200**
Pilot, 30 mm	**07746-0040700**



Refer to following page for assembly:
– ’04 model; page 14-15
– After ’04 ARX1200T3/T3D; page 14-18

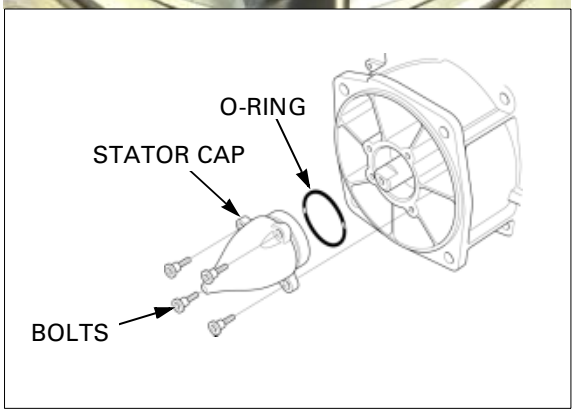
After ’04 ARX1200N3

IMPELLER

Remove the four socket bolts and the stator cap.

Remove any grease from the bearing and stator cap.

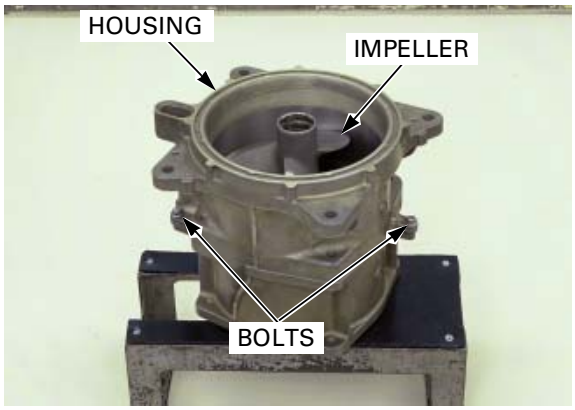
Remove the O-ring.



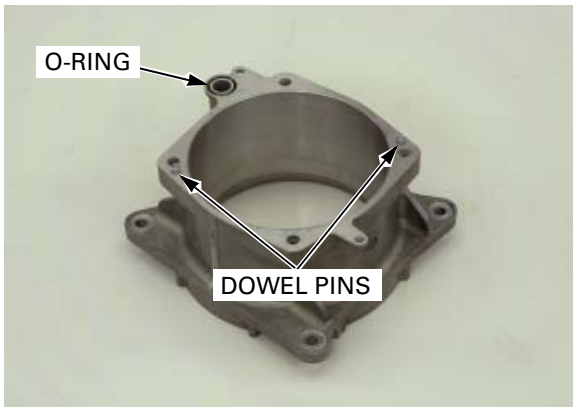
Place the jet pump assembly with the impeller facing up.

Take care not to interfere the housing with the impeller to avoid scratching them.

Remove the two bolts and impeller housing.



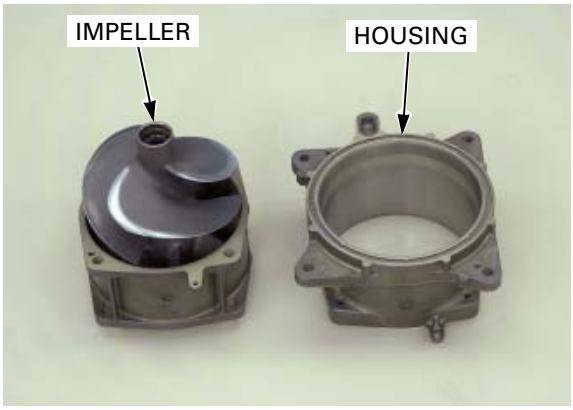
Remove the two dowel pins and the O-ring.



Minor nicks and gouges in the impeller blade can be removed with abrasive paper by filing it carefully. Smooth leading edges are especially important to avoid cavitation.

Check the impeller blades for deep scratches, pitting or nicks.
Check the splines for wear or deformation. Also check the drive shaft condition.

Check the jet stator and impeller housing inner wall for deep scratches or irregular surface.



Hold the impeller shaft of the jet pump assembly in a vise.

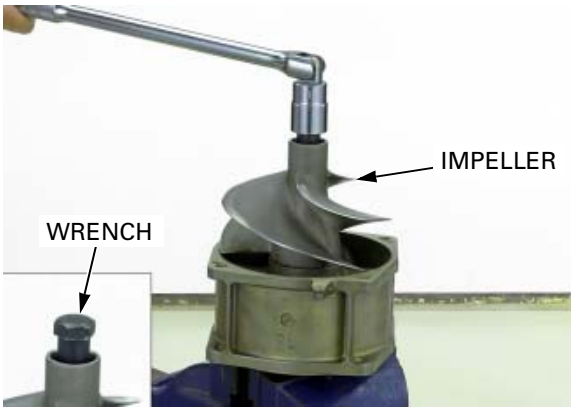
Never use an impact wrench. Keep hands away from the impeller blades.

Loosen the impeller by turning it counterclockwise using a commercially available impeller wrench.

TOOL:

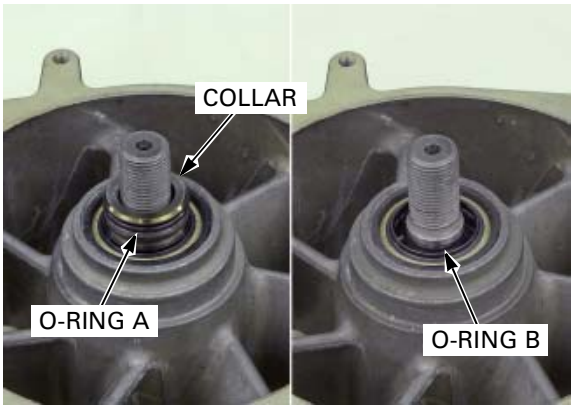
Impeller wrench	**Solas WR001 or equivalent**

Remove the jet pump assembly from a vise.
Remove the impeller by turning the impeller shaft.



Remove the impeller shaft collar and the O-ring A.

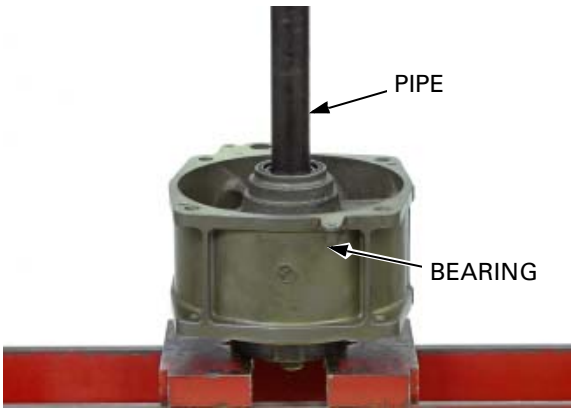
Remove the O-ring B from the impeller shaft.



BEARING AND WATER SEAL

Turn the impeller shaft and check the bearing condition.
The bearing should turn smoothly and quietly. Also check that the outer and inner races of the bearing fit tightly.

Press the bearing out of the water jet stator with a hydraulic press, using a 19 mm I.D. pipe or a 19-mm long socket wrench.



Remove the stopper ring from the impeller shaft.

Press the impeller shaft out of the bearing.

Remove the shaft collar by tapping it.

Do not damage the seal bore in the jet stator.

Remove the water seals.

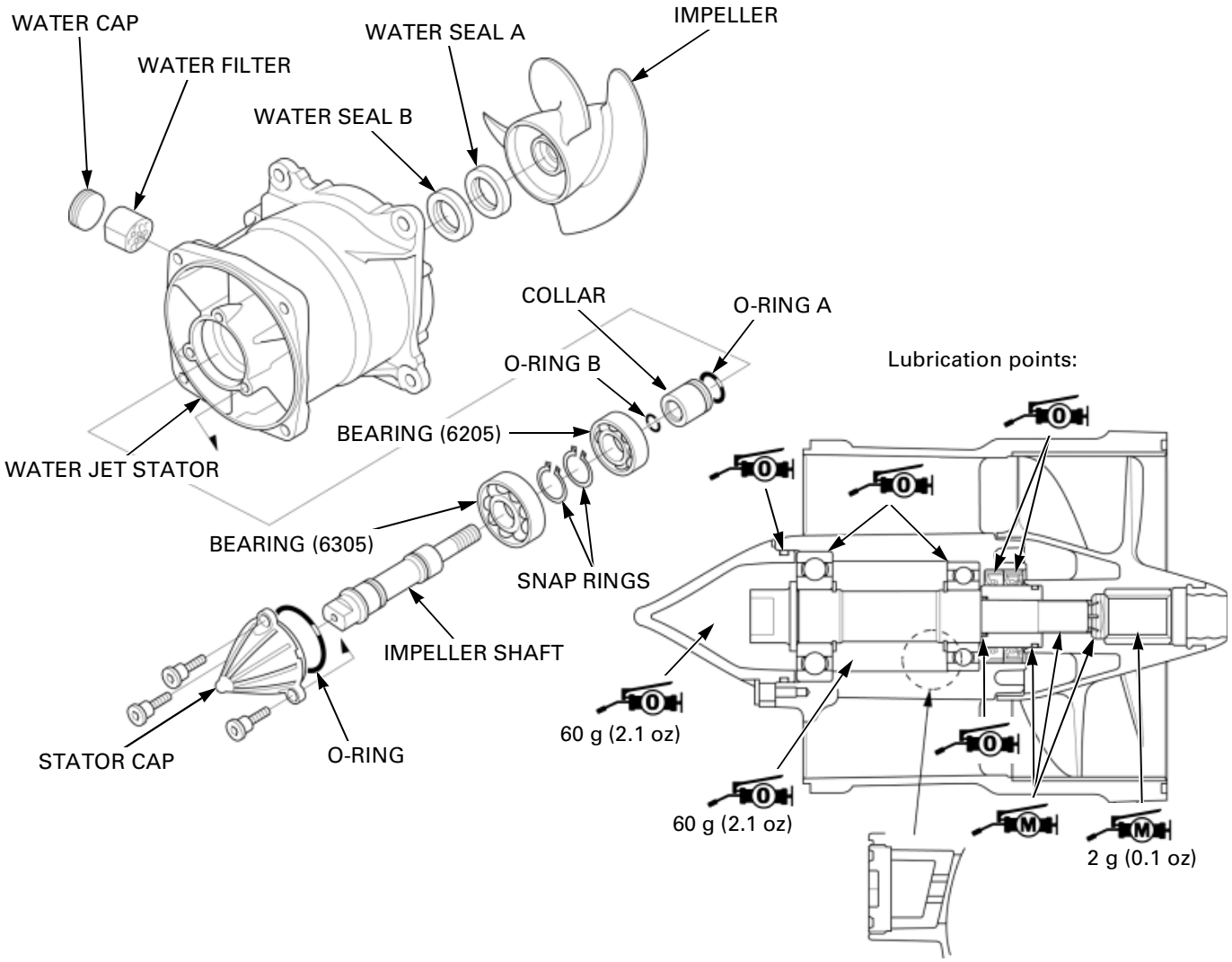
TOOLS:

Driver	**07749-0010000**
Attachment, 32 x 35 mm	**07746-0010100**
Pilot, 25 mm	**07746-0040600**

Refer to page 14-21 for assembly.

JET PUMP ASSEMBLY

'04 model

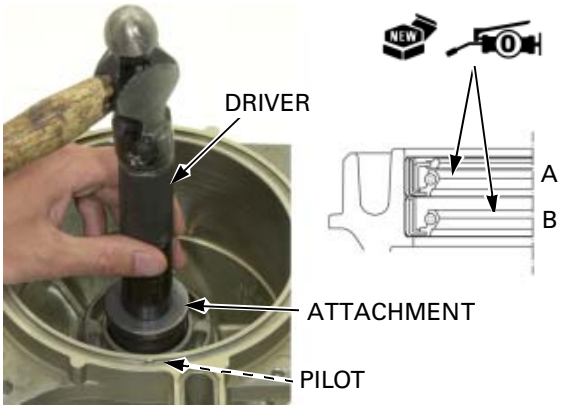


Apply water resistant grease #0 to the lips of new water seals.

Install water seal B into the jet stator with the flat surface facing down until it is fully seated, then install water seal A in the same manner as above.

TOOLS:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 30 mm	**07746-0040700**



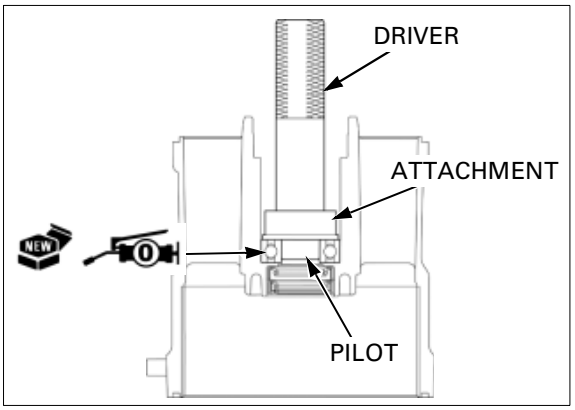
The bearing mark should face away from the shaft threads.

Press a new inside bearing (6205) with the marking facing up until it is fully seated.

TOOLS:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 25 mm	**07746-0040600**

Pack the bearing cavity with water resistant grease #0.

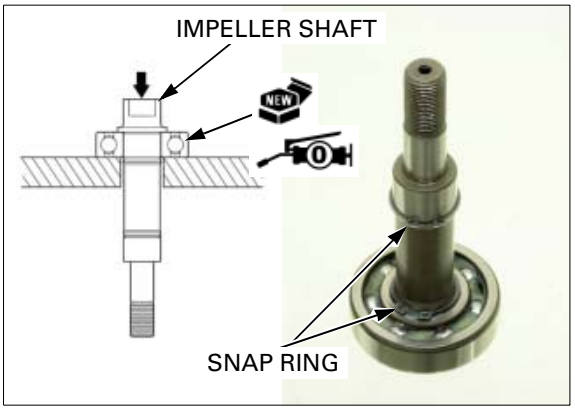


Hold the inner race with the marking facing up.

Press the impeller shaft into a new outside bearing (6305) squarely until it is fully seated.

Install the snap rings so the chamfered (rolled) edge faces each bearing.

Pack the bearing cavity with water resistant grease #0.

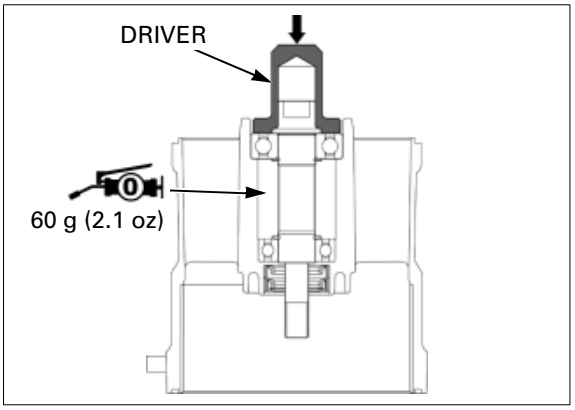


Apply 60 g (2.1 oz) of water resistant grease #0 around the impeller shaft (between the inside and outside bearings).

Press the impeller shaft/bearing assembly into the jet stator until it is fully seated.

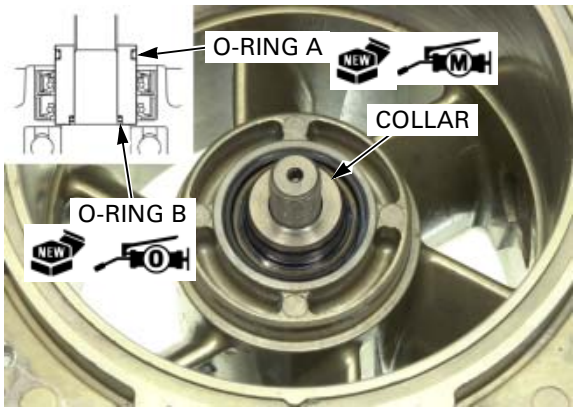
TOOL:

Driver, 60 mm O.D.	**070MD-HW10100 or 070MD-HW1A100 (U.S.A. only)**



Coat a new O-ring B with water resistant grease #0 and install it onto the impeller shaft until it is fully seated.

Coat a new O-ring A with molybdenum disulfide grease and install it into the groove in the impeller shaft collar.
Install the collar into the water seal.



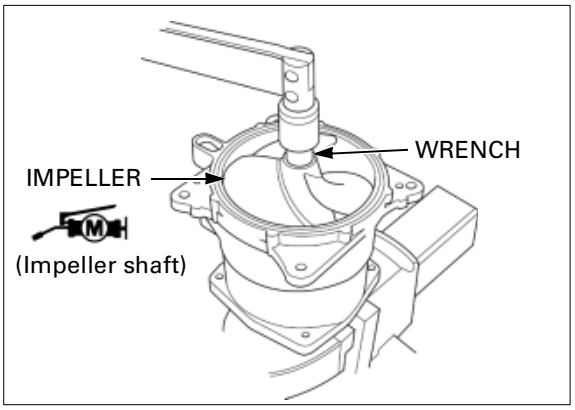
Apply molybdenum disulfide grease to the threads of the impeller shaft.
Install the impeller by turning the impeller shaft, being careful not to interfere the impeller with the jet stator wall.

Hold the impeller shaft of the jet pump assembly in a vise.
Tighten the impeller using a commercially available impeller wrench.

TOOL:

Impeller wrench	**Solas WR001 or equivalent**

TORQUE: 127 N·m (13.0 kgf·m, 94 lbf·ft)

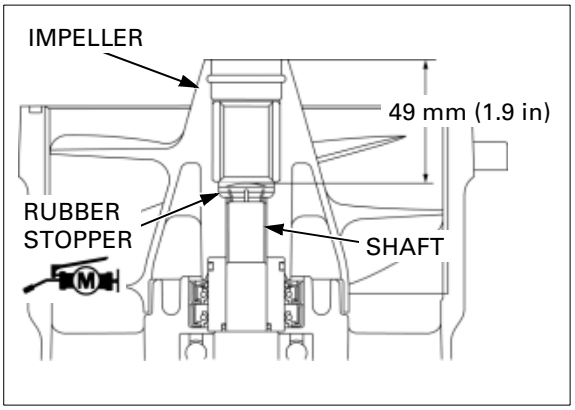


If the impeller was replaced, coat a new rubber stopper with molybdenum disulfide grease and install it into the impeller securely.

Measure the distance between the impeller end and rubber stopper.

If the distance is smaller than 49 mm (1.9 in), it indicates that air and grease are sealed between the rubber stopper and impeller shaft. Press the rubber stopper to extrude them, using a 10 – 12 mm O.D. shaft.

Make sure that the impeller rotates smoothly without binding.

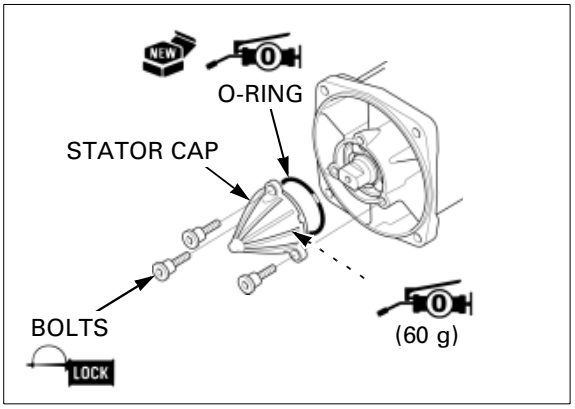


Be careful not to pinch the O-ring.

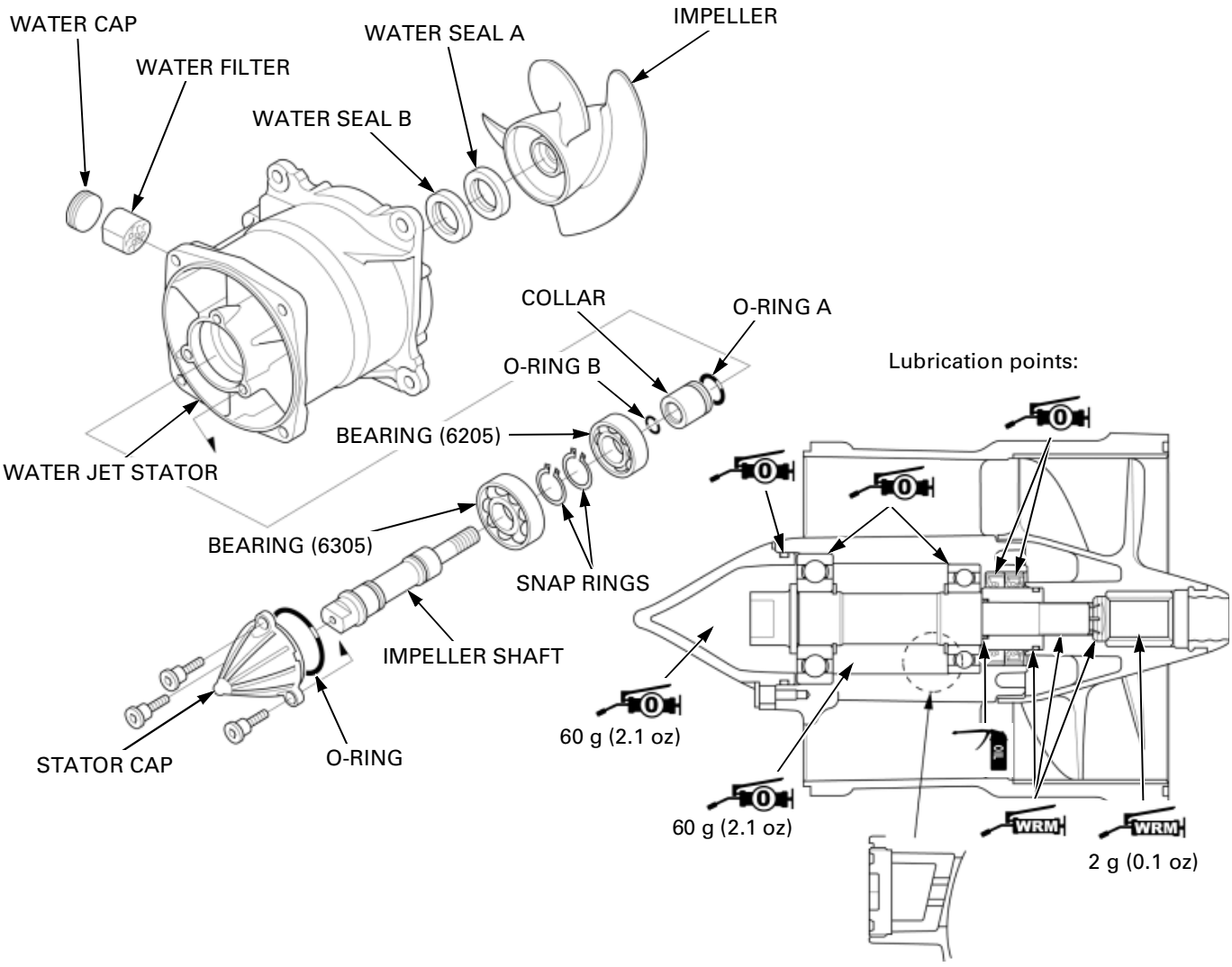
Coat a new O-ring with water resistant grease #0 and install it into the stator cap groove.

Pack the stator cap with 60 g (2.1 oz) of water resistant grease #0 and install the stator cap.
Apply locking agent to the threads of the stator cap bolt and tighten them.

TORQUE: 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)



After '04 ARX1200T3/T3D

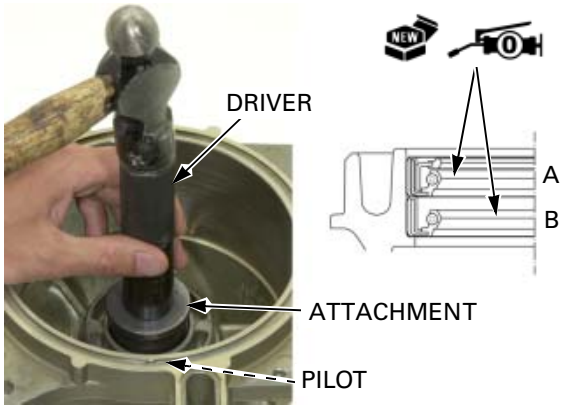


Apply water resistant grease #0 to the lips of new water seals.

Install water seal B into the jet stator with the flat surface facing down until it is fully seated, then install water seal A in the same manner as above.

TOOLS:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 30 mm	**07746-0040700**



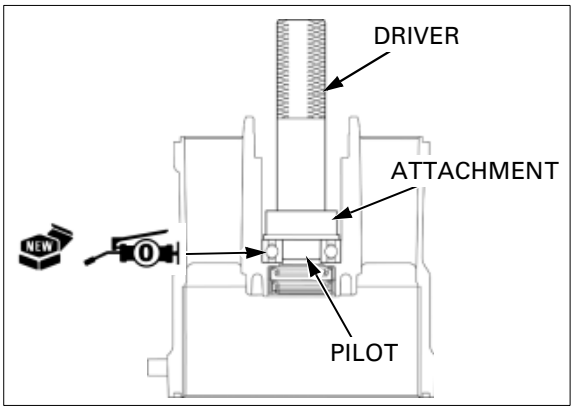
The bearing mark should face away from the shaft threads.

Press a new inside bearing (6205) with the marking facing up until it is fully seated.

TOOLS:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 25 mm	**07746-0040600**

Pack the bearing cavity with water resistant grease #0.

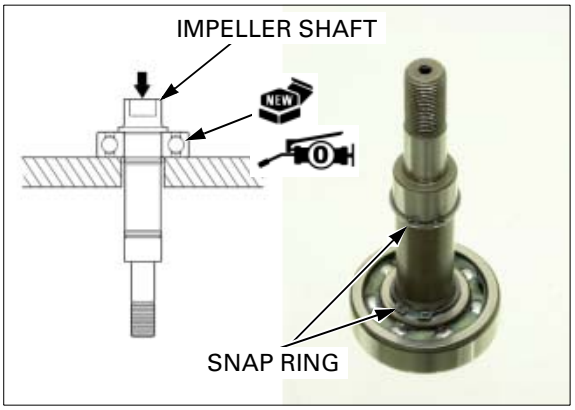


Hold the inner race with the marking facing up.

Press the impeller shaft into a new outside bearing (6305) squarely until it is fully seated.

Install the snap rings so the chamfered (rolled) edge faces each bearing.

Pack the bearing cavity with water resistant grease #0.

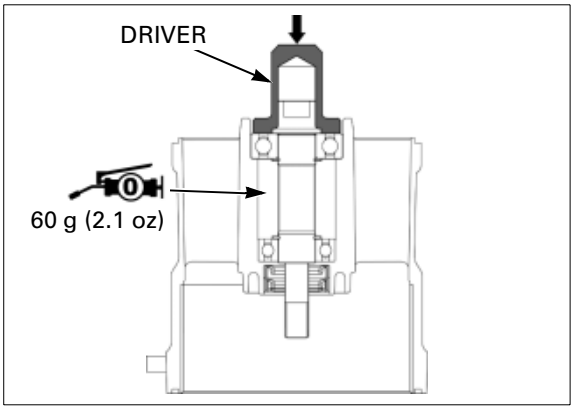


Apply 60 g (2.1 oz) of water resistant grease #0 around the impeller shaft (between the inside and outside bearings).

Press the impeller shaft/bearing assembly into the jet stator until it is fully seated.

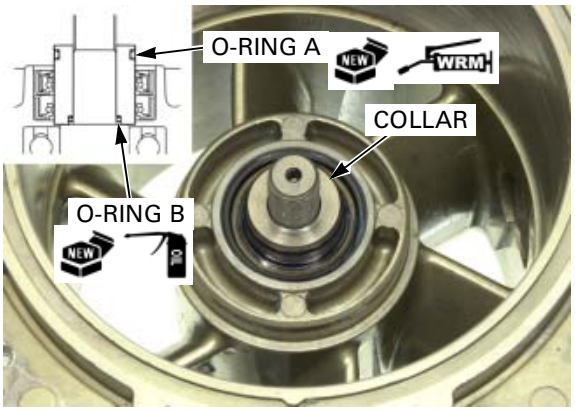
TOOL:

Driver, 60 mm O.D.	**070MD-HW10100 or 070MD-HW1A100 (U.S.A. only)**



Coat a new O-ring B with engine oil and install it onto the impeller shaft until it is fully seated.

Coat a new O-ring A with water resistant molybdenum disulfide grease and install it into the groove in the impeller shaft collar.
Install the collar into the water seal.



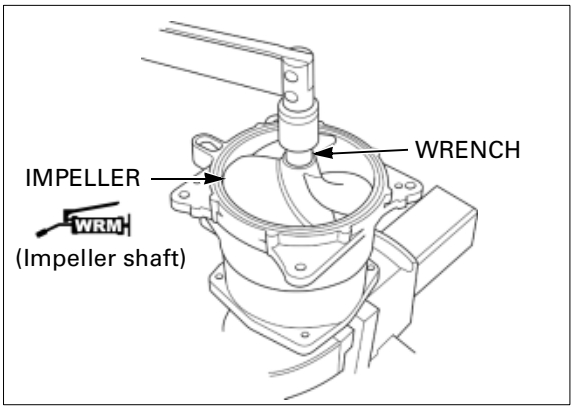
Coat the entire threads of the impeller shaft with thin layer of water resistant molybdenum disulfide grease.
Install the impeller by turning the impeller shaft, being careful not to interfere the impeller with the jet stator wall.

Hold the impeller shaft of the jet pump assembly in a vise.
Tighten the impeller using a commercially available impeller wrench.

TOOL:

Impeller wrench	**Solas WR001 or equivalent**

TORQUE: 127 N·m (13.0 kgf·m, 94 lbf·ft)

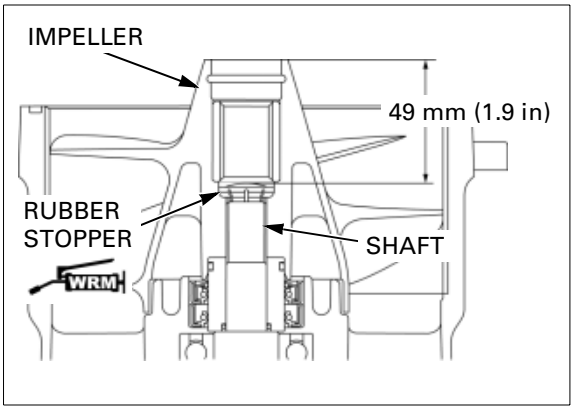


If the impeller was replaced, coat a new rubber stopper with water resistant molybdenum disulfide grease and install it into the impeller securely.

Measure the distance between the impeller end and rubber stopper.

If the distance is smaller than 49 mm (1.9 in), it indicates that air and grease are sealed between the rubber stopper and impeller shaft. Press the rubber stopper to extrude them, using a 10 – 12 mm O.D. shaft.

Make sure that the impeller rotates smoothly without binding.

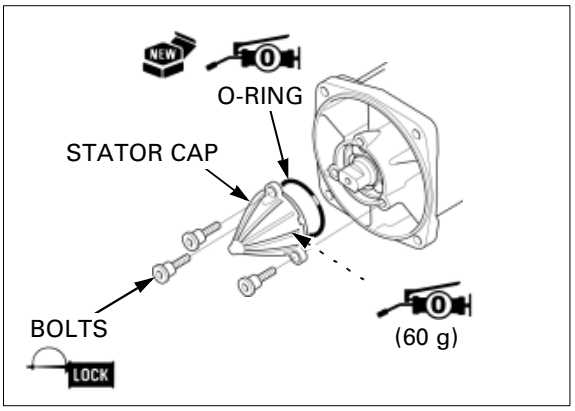


Be careful not to pinch the O-ring.

Coat a new O-ring with water resistant grease #0 and install it into the stator cap groove.

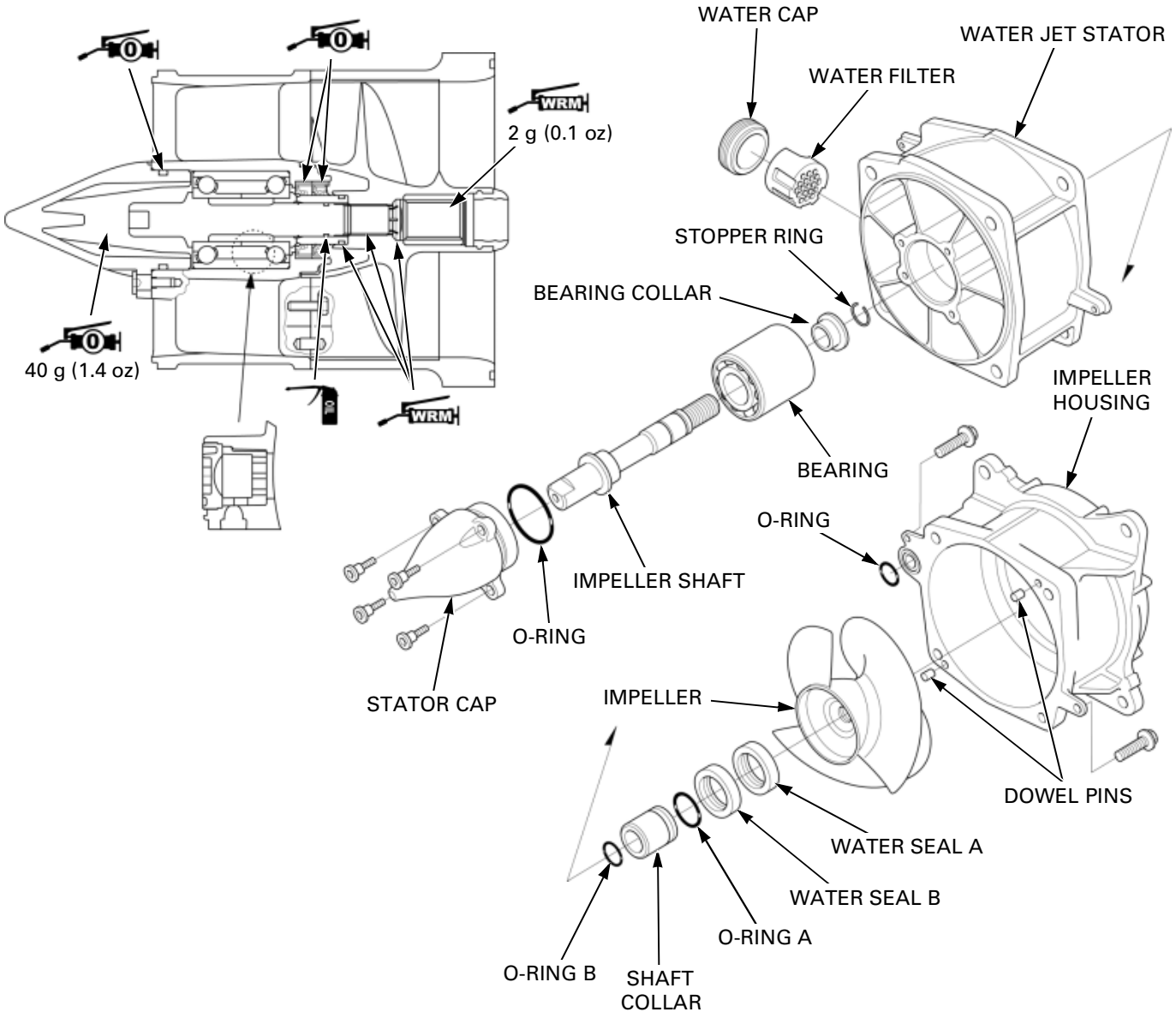
Pack the stator cap with 60 g (2.1 oz) of water resistant grease #0 and install the stator cap, aligning the bolt holes.
Apply locking agent to the threads of the stator cap bolt and tighten them.

TORQUE: 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)



After '04 ARX1200N3

Lubrication points:

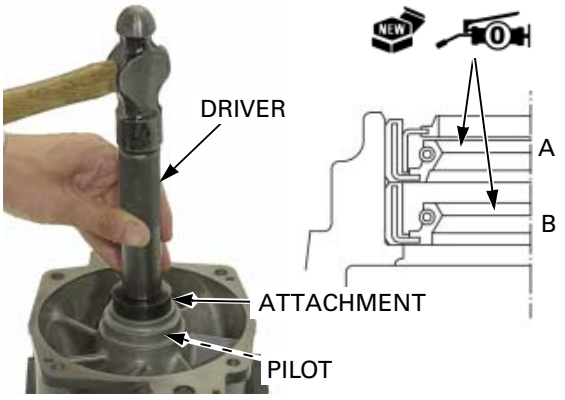


Apply water resistant grease #0 to the lips of new water seals.

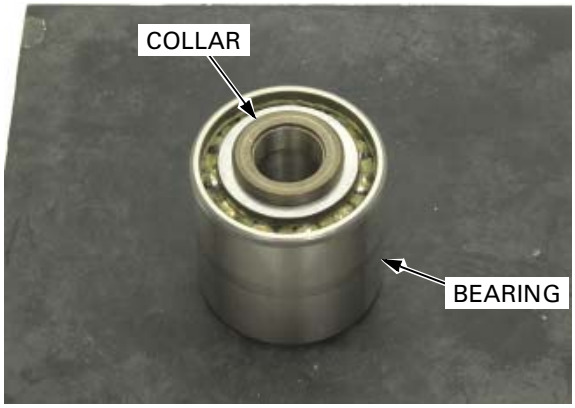
Install water seal B into the jet stator with the flat surface facing down until it is fully seated, then install water seal A in the same manner as above.

TOOLS:

Driver	**07749-0010000**
Attachment, 40 x 42 mm	**07746-0010900**
Pilot, 25 mm	**07746-0040600**



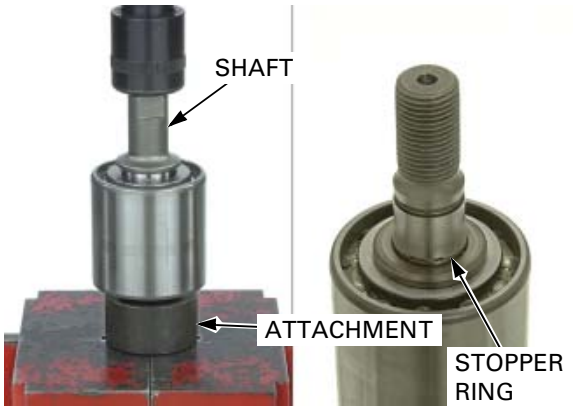
Drive the bearing collar in a new bearing while supporting the bearing inner race.



Press the impeller shaft into the bearing squarely until it is fully seated while supporting the bearing collar (inner race).

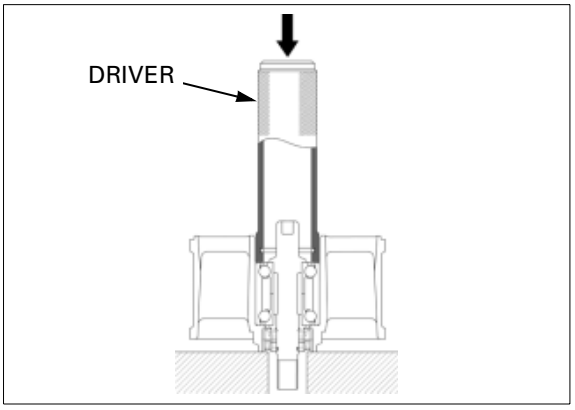
TOOL:
Attachment, 20 mm I.D. 07746-0020400

Install the stopper ring into the groove in the impeller shaft.



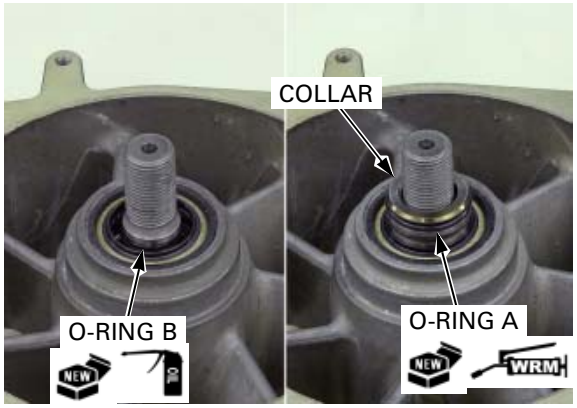
Press the impeller shaft/bearing assembly into the jet stator until it is fully seated.

TOOL:
Driver, 40 mm I.D. 07746-0030100



Coat a new O-ring B with engine oil and install it into the groove in the impeller shaft.

Coat a new O-ring A with water resistant molybdenum disulfide grease and install it into the groove in the impeller shaft collar.
Install the collar into the water seal.



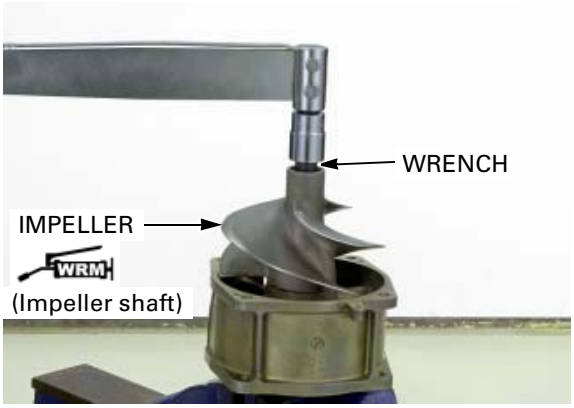
Coat the entire threads of the impeller shaft with thin layer of water resistant molybdenum disulfide grease.
Install the impeller by turning the impeller shaft.

Hold the impeller shaft of the jet pump assembly in a vise.
Tighten the impeller using a commercially available impeller wrench.

TOOL:

Impeller wrench	**Solas WR001 or equivalent**

TORQUE: 127 N·m (13.0 kgf·m, 94 lbf·ft)

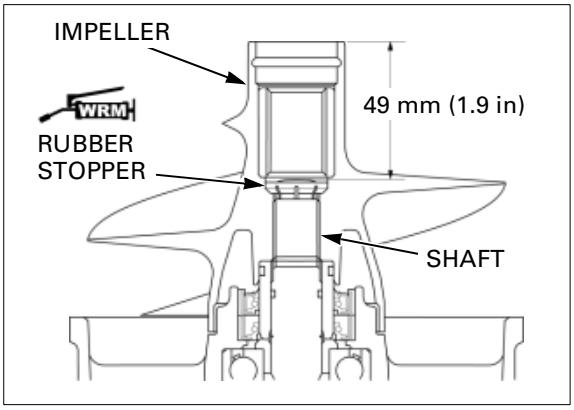


If the impeller was replaced, coat a new rubber stopper with water resistant molybdenum disulfide grease and install it into the impeller securely.

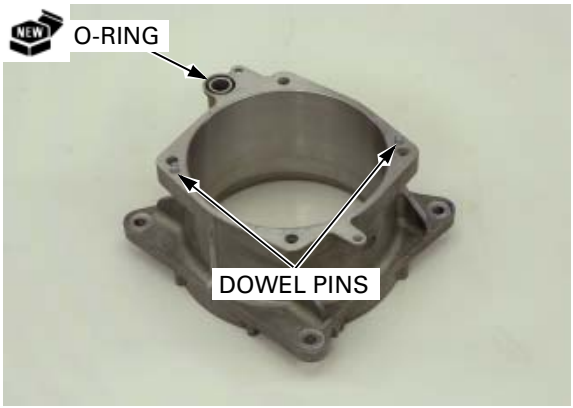
Measure the distance between the impeller end and rubber stopper.

If the distance is smaller than 49 mm (1.9 in), it indicates that air and grease are sealed between the rubber stopper and impeller shaft. Press the rubber stopper to extrude them, using a 10 – 12 mm O.D. shaft.

Make sure that the impeller rotates smoothly without binding.



Install a new O-ring and the two dowel pins into impeller housing.

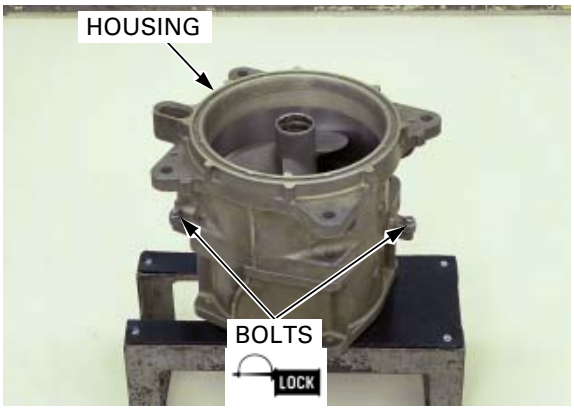


Apply locking agent to the housing bolt threads.

Take care not to interfere the housing with the impeller to avoid scratching them.

Install the impeller housing onto the jet stator. Install the two housing bolts and tighten them.

TORQUE: 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)

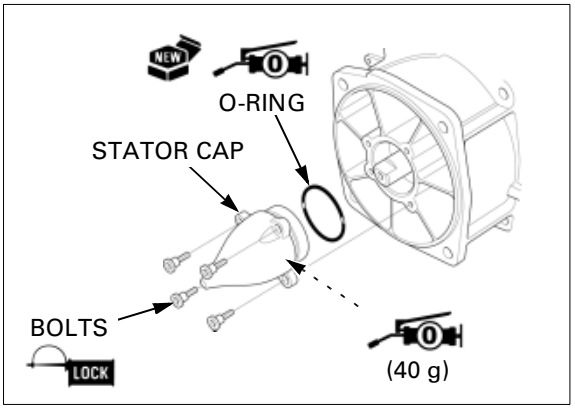


Be careful not to pinch the O-ring.

Coat a new O-ring with water resistant grease #0 and install it into the stator cap groove.

Pack the stator cap with 40 g (1.4 oz) of water resistant grease #0 and install the stator cap, aligning the bolt holes.
Apply locking agent to the threads of the stator cap bolt and tighten them.

TORQUE: 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)

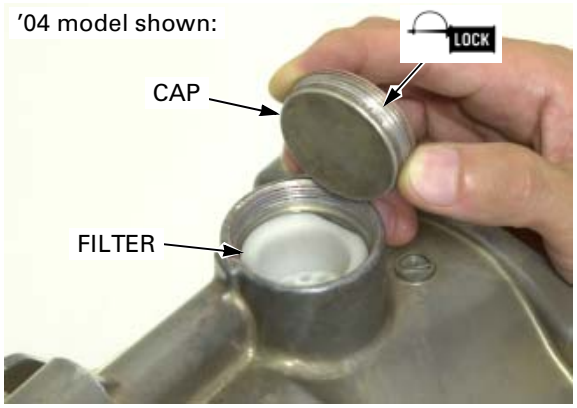


JET PUMP INSTALLATION

When the water jet stator is replaced, install a new water filter and a new cap as follows:

Install the water filter by aligning the flat surfaces.
Apply locking agent to the threads of the water cap.
Install and tighten the cap.

TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)



Stake the water cap into the groove.

'04 model:

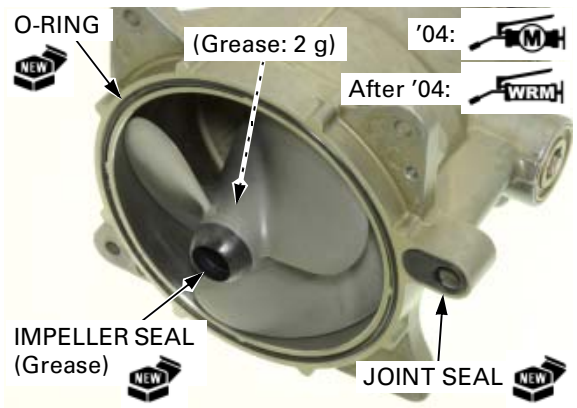
Apply 2 g (0.1 oz) of molybdenum disulfide grease to the impeller splines.
Apply molybdenum disulfide grease to the lips of a new impeller seal and install it into the impeller securely.

After '04:

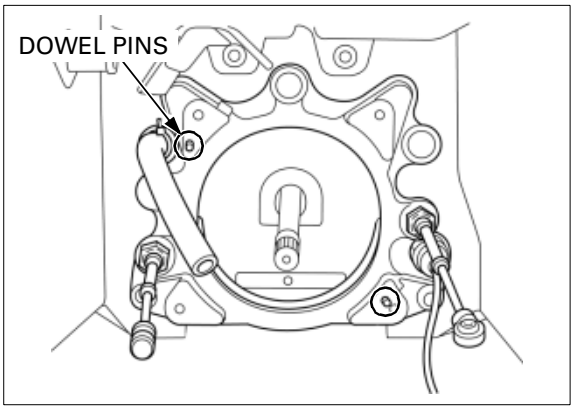
Apply 2 g (0.1 oz) of water resistant molybdenum disulfide grease to the impeller splines.
Apply water resistant molybdenum disulfide grease to the lips of a new impeller seal and install it into the impeller securely.

Install with the hole of the joint seal facing out as shown.

Install a new joint seal and a new O-ring.



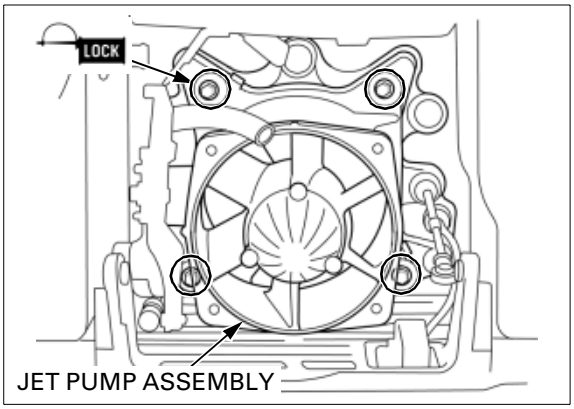
Install the two dowel pins into the thrust plate.



Apply locking agent to the threads of the jet pump mounting bolts.

Carefully align the shaft hole in the impeller with the drive shaft, install the jet pump assembly onto the thrust plate.
Install the four mounting bolts and tighten them in a crisscross pattern in several steps.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

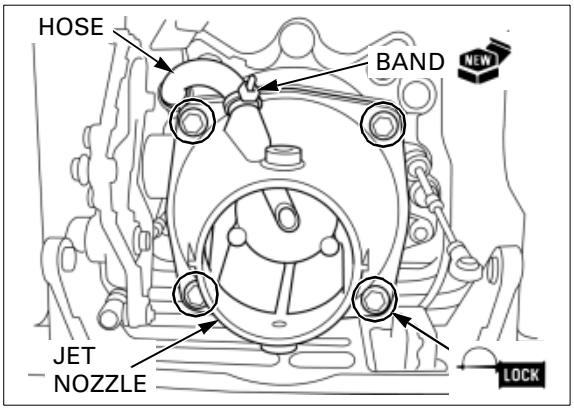


Apply locking agent to the threads of the jet nozzle bolts.
Install the water jet nozzle with the four bolts.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Connect the bilge hose and secure it with a new hose band. Cut off any excess band.

Install the steering nozzle and reverse bucket (page 15-15).

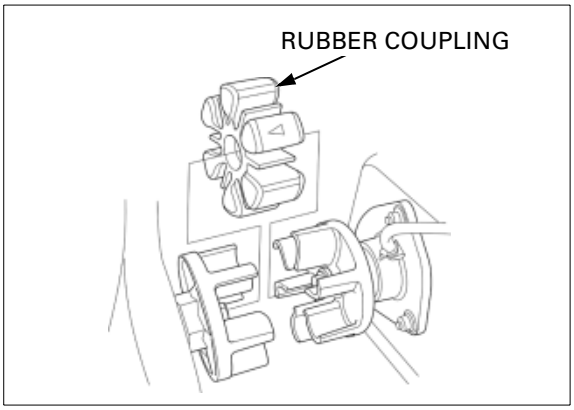


DRIVE SHAFT/BEARING HOUSING

DRIVE SHAFT REMOVAL

Remove the following
- jet pump (page 14-8)
- left side panel (page 3-5)
- coupler cover B (ARX1200T3/T3D; page 3-14)
  coupler cover (ARX1200N3; page 3-14)

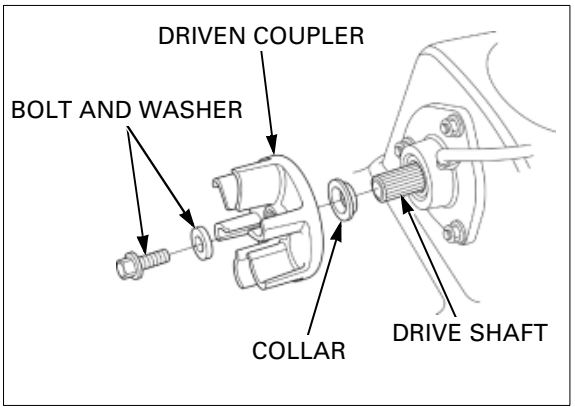
Pull the drive shaft rearward and remove the rubber coupling.



Hold the rear hex portion of the driven coupler using a 41mm wrench.

Hold the driven coupler and loosen the coupler bolt.

Remove the following:
– bolt and washer
– driven coupler
– shaft collar
– drive shaft

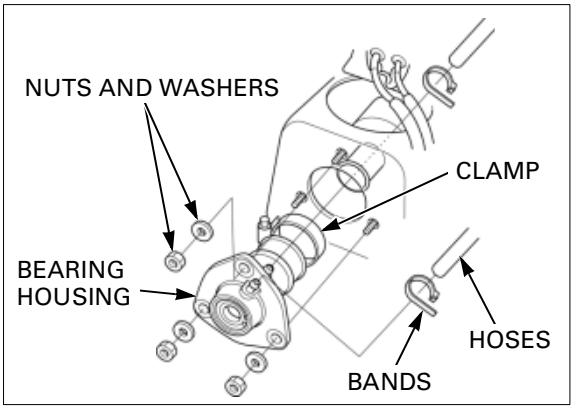


BEARING HOUSING REMOVAL

When installing, the special tools is required to align the housing position (page 14-29).

Remove the following from the bearing housing:
– hose band and grease fitting hose
– hose band and breather hose
– three nuts and washers

Loosen the boot clamp and remove the bearing housing.



INSPECTION

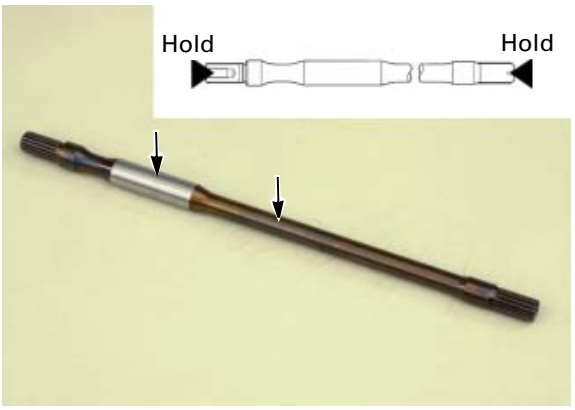
Check the boot area of the bearing housing for cracks or other damage.

Check the rubber coupling for deformation, cracks or other damage.

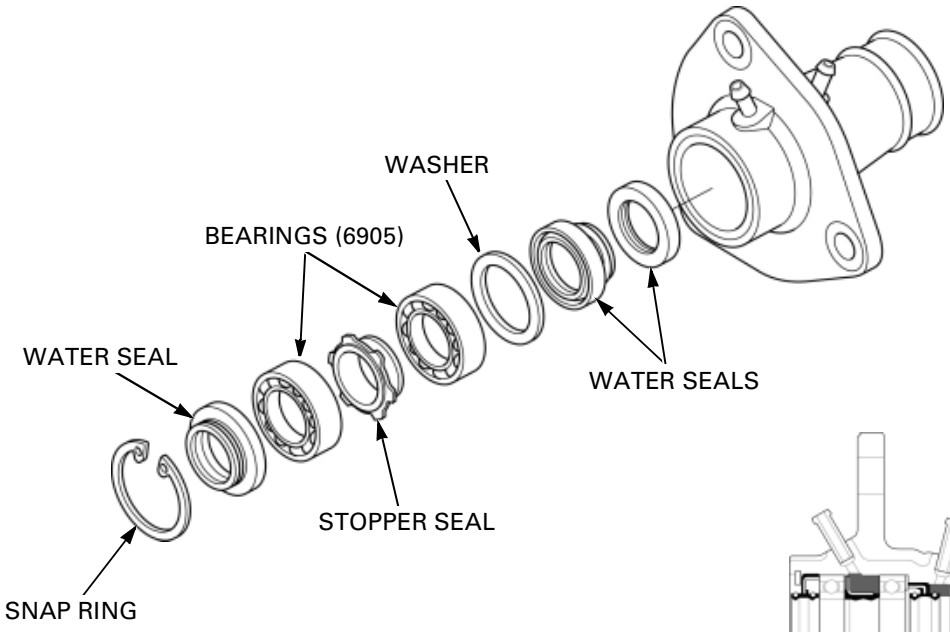
Check the splines of the drive shaft for wear or deformation. Also check the driven coupler and impeller condition.
Check the polished area for irregular surface.

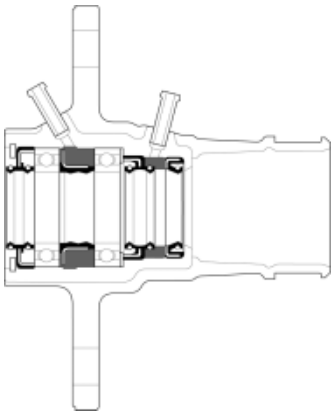
Set the drive shaft in an inspection stand and measure the shaft runout with a dial indicator at each point of the shaft center and polished area.

SERVICE LIMIT: 0.2 mm (0.01 in)



BEARING AND SEAL REPLACEMENT





Remove the snap ring and the water seal.

Remove the outside bearing from the bearing holder using the special tools.

TOOLS:

Bearing remover, 25 mm	**07936-ZV10100** **07936-ZV1A100** **(U.S.A. only)**
Remover handle	**07936-3710100**
Remover weight	**07741-0010201 or** **07936-3710200 or** **07936-371020A** **(U.S.A. only)**

Remove the stopper seal.
Remove the inside bearing using the same tools.
Remove the washer.

Remove the water seals from the bearing holder using the special tools.

TOOLS:

Bearing remover, 25 mm	**07936-ZV10100**
	07936-ZV1A100
	(U.S.A. only)
Remover handle	**07936-3710100**
Remover weight	**07741-0010201 or**
	07936-3710200 or
	07936-371020A
	(U.S.A. only)

Clean the inner surface of the bearing holder thoroughly.

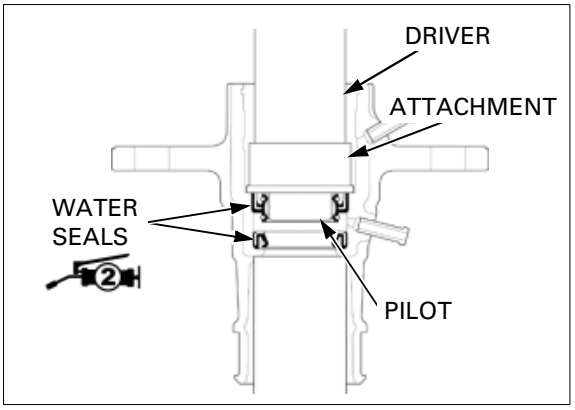
Apply water resistant grease #2 to the lips of new water seals.

Hold the housing bottom using a 35 mm (1.4 in) O.D. collar.

Install the water seal (bottom) with the flat surface facing up until it is fully seated.

TOOLS:

Driver	**07749-0010000**
Attachment, 32 x 35 mm	**07746-0010100**
Pilot, 25 mm	**07746-0040600**



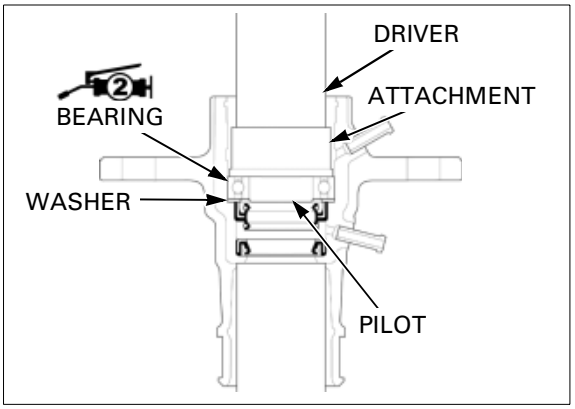
Install the water seal (upper) with the flat surface facing down as shown.

TOOLS:

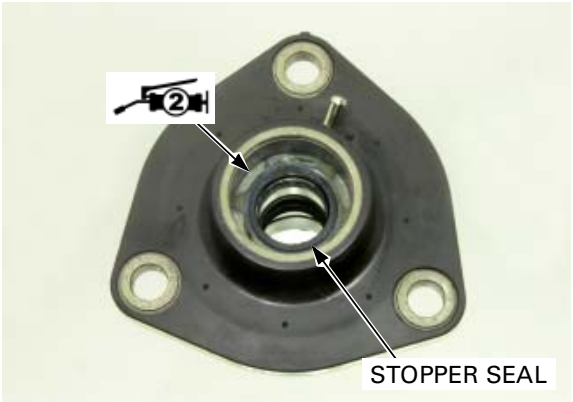
Driver	**07749-0010000**
Attachment, 37 x 40 mm	**07746-0010200**
Pilot, 25 mm	**07746-0040600**

Install the washer.

Pack the cavities of new bearings with water resistant grease #2.
Press the inside bearing with the marking facing up until it is fully seated, using the above tools.



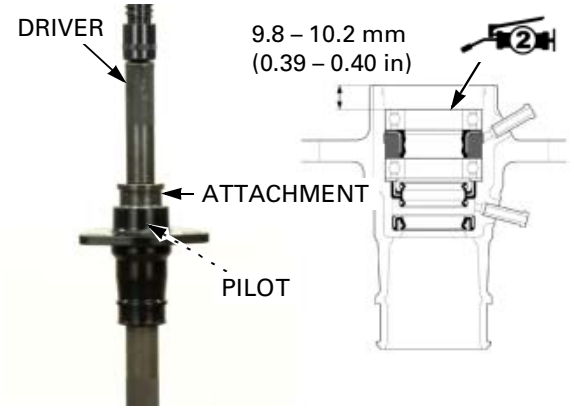
Apply water resistant grease #2 over the inside bearing so the grease is packed between the bearings after installing the outside bearing and install a new stopper seal.



Press the outside bearing with the marking facing up until the depth from the bearing holder end is 9.8 – 10.2 mm (0.39 – 0.40 in).

TOOLS:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 25 mm	**07746-0040600**



Install a new water seal with the groove side facing the bearing until it is fully seated.
Apply water resistant grease #2 to the seal lips.

Install the snap ring into the housing groove with the chamfered (rolled) edge facing the water seal properly.

Wipe off any excess grease from the bearing and stopper seal.

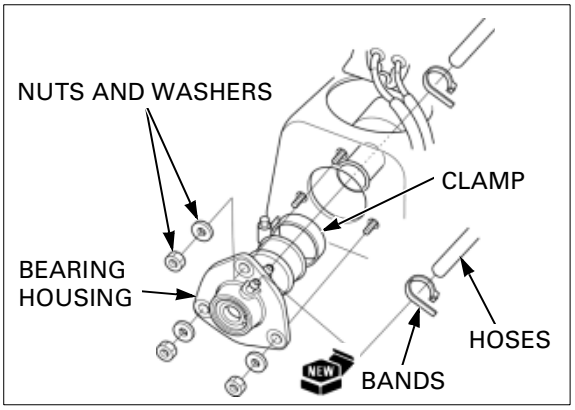
BEARING HOUSING INSTALLATION

Set the clamp over the housing boot in the direction as shown and install the bearing housing over the drive shaft guide and onto the stud bolts.

Tighten the nuts when aligning the bearing housing position.

Install the three nuts with the washers (but do not tighten them yet).

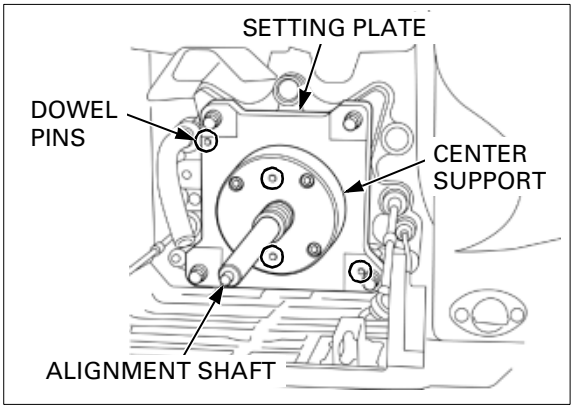
Connect the grease fitting and breather hoses, and secure them with new hose bands. Cut off any excess bands.



Align the bearing housing position using the special tools as follows.

TOOLS:

Alignment tool set	**070MJ-HW1A100**
– stopper collar (no use)	**070MJ-HW1A140**
– setting plate	**070MJ-HW1A130**
– center support and shaft	**070MJ-HW1A120**
– coupler attachment (no use)	**070MJ-HW1A110**



Install the two dowel pins into the thrust plate.

Install the setting plate onto the thrust plate with the jet pump mounting bolts, and the center support into the setting plate with the two dowel pins and four socket bolts (including special tool) as shown. Tighten all the bolts securely.

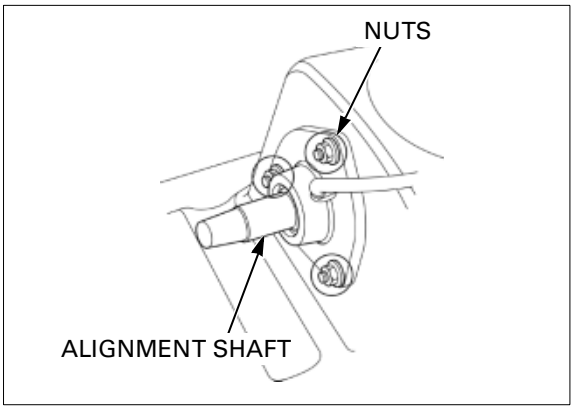
Insert the alignment shaft into the bearing housing through the center support while turning it slowly, being careful not to damage the seals in the bearing housing.

Tighten the bearing housing mounting nuts.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Tighten the boot clamp securely in the position as shown (page 14-29).

Remove the special tools.



DRIVE SHAFT INSTALLATION

'04 model:

Insert the drive shaft into the bearing holder slowly, being careful not to damage the seals in the bearing holder.
Install the shaft collar onto the drive shaft.

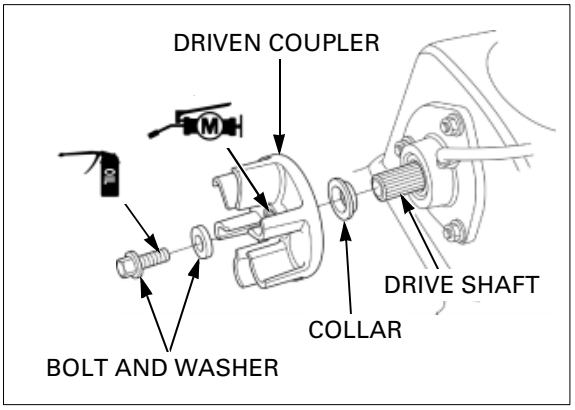
Apply molybdenum disulfide grease to the splines of the driven coupler and install it onto the drive shaft.

Apply engine oil to the threads of the coupler bolt and install it with the washer.

Hold the rear hex portion of the driven coupler using a 41mm wrench.

Tighten the coupler bolt to the specified torque by holding the coupler boss.

TORQUE: 49 N·m (5.0 kgf·m, 36 lbf·ft)



After '04:

Insert the drive shaft into the bearing holder slowly, being careful not to damage the seals in the bearing holder.
Install the shaft collar onto the drive shaft.

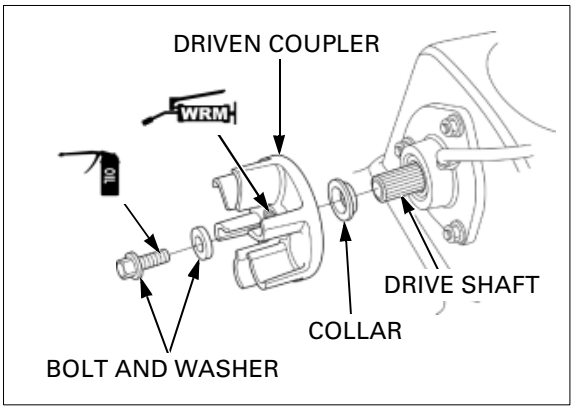
Apply water resistant molybdenum disulfide grease to the splines of the driven coupler and install it onto the drive shaft.

Apply engine oil to the threads of the coupler bolt and install it with the washer.

Hold the rear hex portion of the driven coupler using a 41mm wrench.

Tighten the coupler bolt to the specified torque by holding the coupler boss.

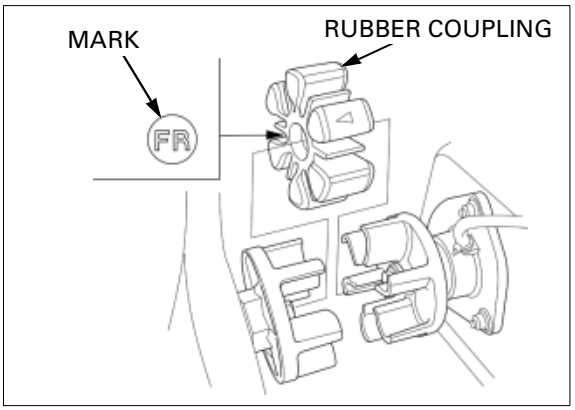
TORQUE: 49 N·m (5.0 kgf·m, 36 lbf·ft)



Install the rubber coupling onto the driven coupler with the "FR" mark facing the engine side.
Engage the driven coupler with the drive coupler by sliding the drive shaft.

Fill in the bearing housing with grease if the bearing housing was disassembled (page 4-20).

Install the following:
- coupler cover (page 3-14)
- jet pump (page 14-24)
- side panel (page 3-5)



RIDE PLATE/INTAKE GRATE

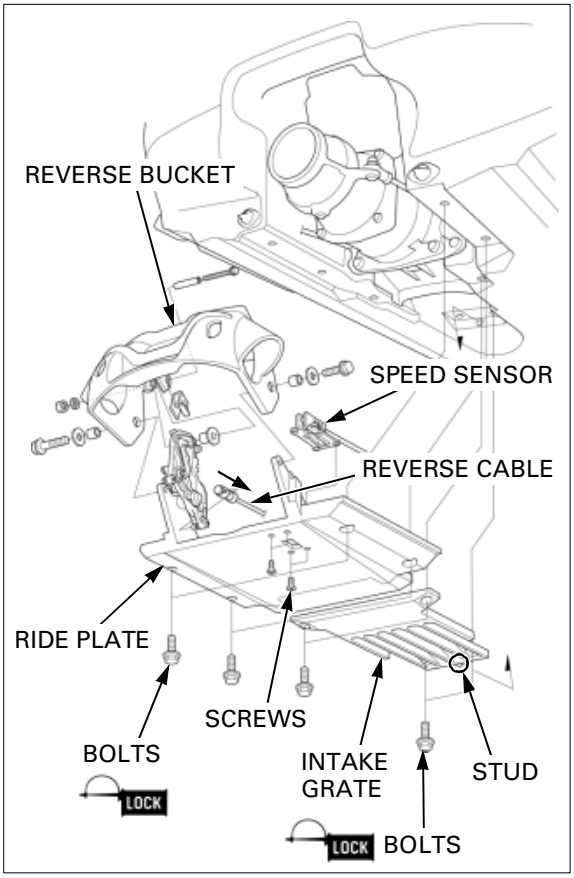
REMOVAL

Remove the reverse bucket (page 15-13).

Slide the outer sleeve of the cable joint forward and disconnect the reverse cable from the reverse bucket arm.

Remove the four screws, and the speed sensor.

Remove the following:
– four bolts
– ride plate (for bucket arm removal and installation, refer to page 15-14)
– four bolts
– intake grate



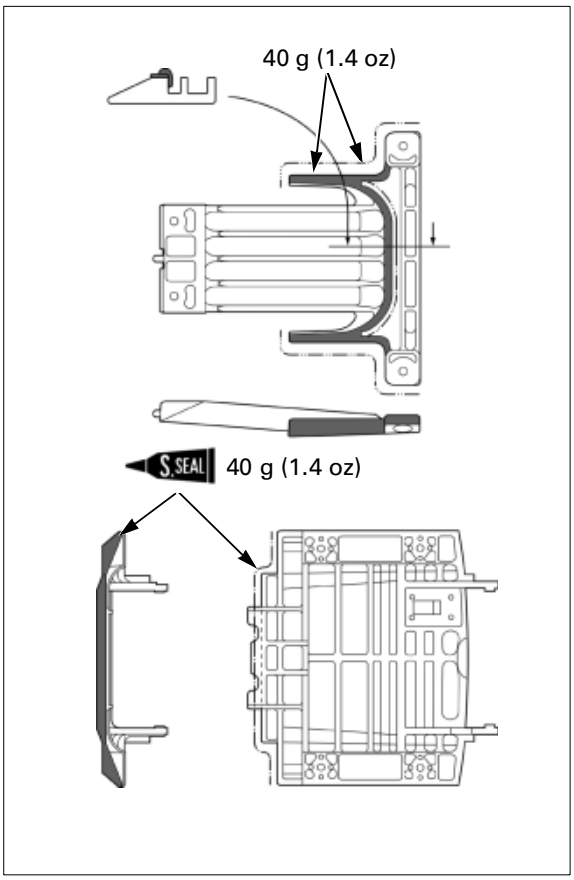
INSTALLATION

Strip off any old sealant thoroughly from the intake grate and ride plate when reusing them.

Apply 40 g (1.4 oz) of silicone sealant to the fitting area of the intake grate, and 40 g (1.4 oz) of silicone sealant to the fitting area of the ride plate as shown. Apply locking agent to the threads of the 8-mm bolts.

Install the intake grate with the four bolts by aligning its stud with the hole.
Install the ride plate with the four bolts by aligning its front edge with the clearance between the intake grate and intake lip.
Tighten the bolts in a crisscross pattern in several steps.

TORQUE: 25 N·m (2.6 kgf·m, 19 lbf·ft)

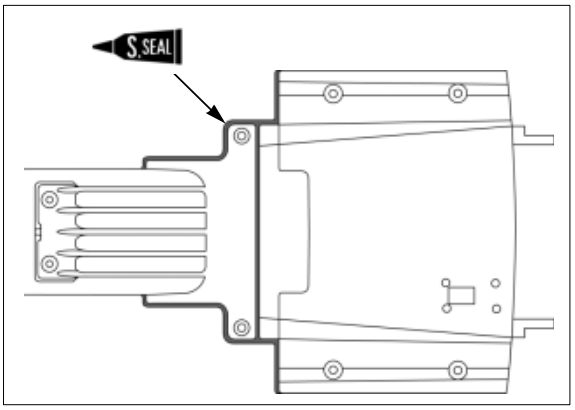


Fill the mating area with silicone sealant.

Wipe off any overflow sealant so that the mating area is smooth surface.

Install the speed sensor and tighten the four screws securely.

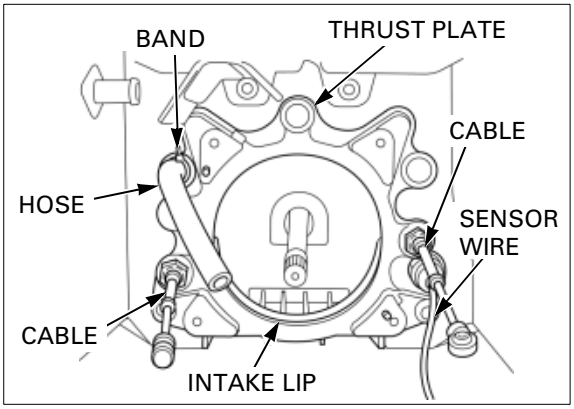
Install the following:
– reverse cable to bucket arm (apply water resistant grease to joint area)
– reverse bucket (page 15-15)



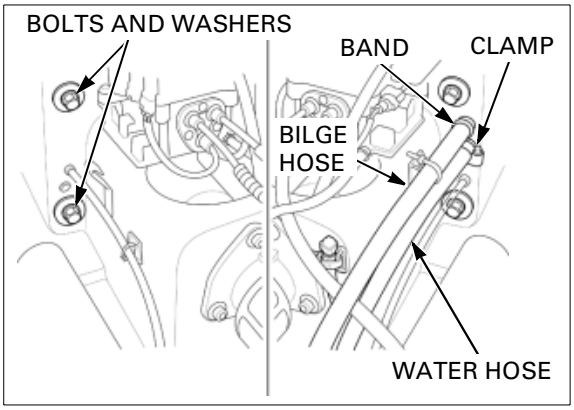
THRUST PLATE/INTAKE LIP

REMOVAL

Remove the following:
- ride plate (page 14-31)
- jet pump (page 14-8)
- side panels (page 3-5)
- speed sensor (page 19-11)
- steering cable setting nut and lock collars (page 15-16)
- reverse cable setting nut and lock collars (page 15-17)
- hose band and bilge hose



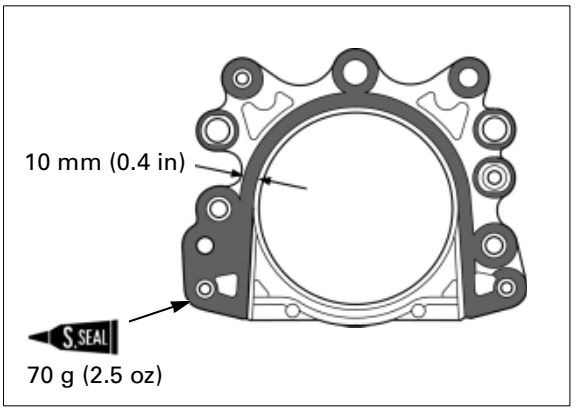
- hose band and bilge hose
- cooling water hose (by loosening the hose clamp)
- four bolts and washers
- thrust plate (being careful not to bend steering and reverse cables)
- bilge hose joint and O-ring
- water hose joint and O-ring
- intake grate (page 14-31)
- intake lip



INSTALLATION

Install the intake lip after installing the thrust plate.

Strip off any old sealant thoroughly from the thrust plate when reusing it.
Apply 70 g (2.5 oz) of silicone sealant to the mating surface of the thrust plate as shown.



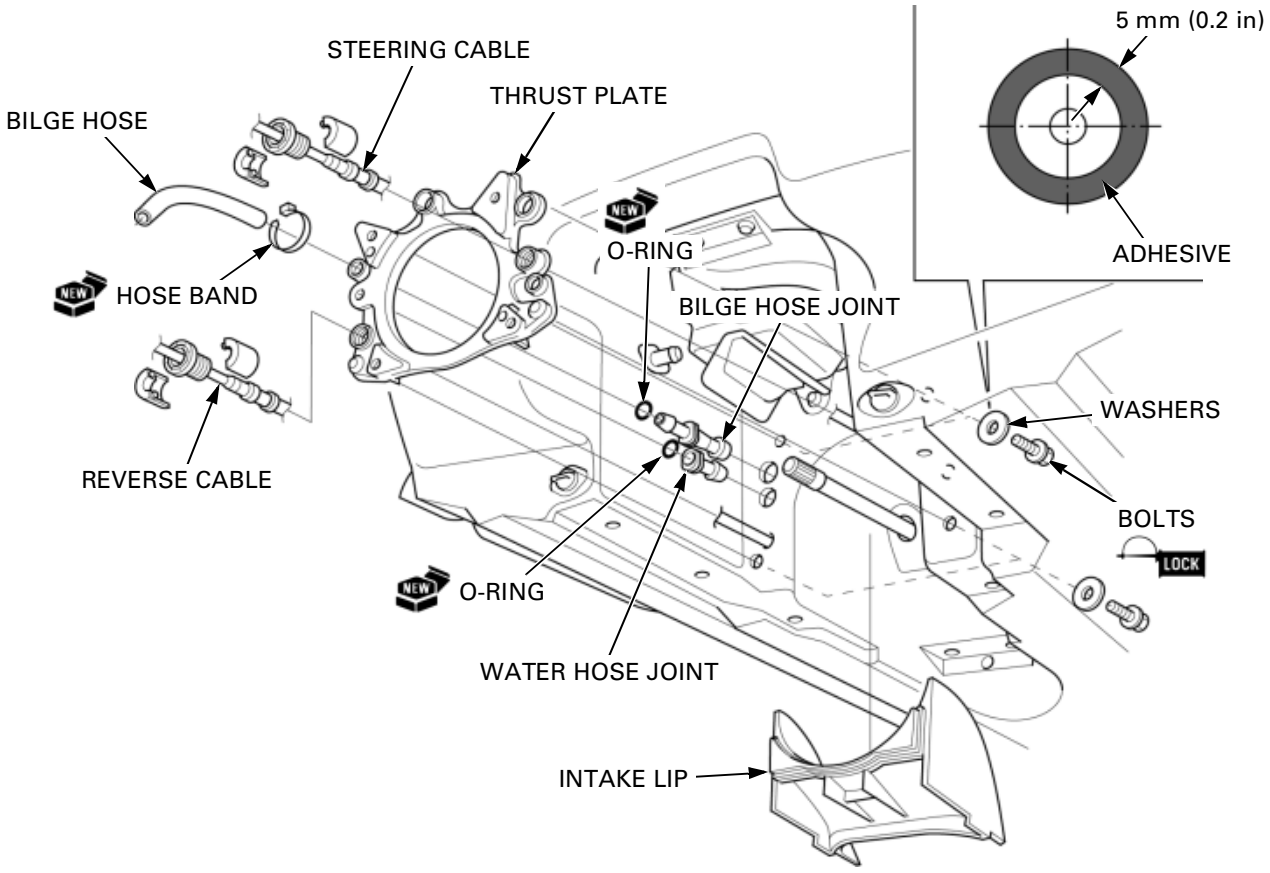
Install new O-rings into the hose joint grooves.
Install the water hose and bilge hose joints onto the hull.

Install the thrust plate through the steering and reverse cables, being careful not to damage them.

Install the washers onto the thrust plate bolts, and apply locking agent to the bolt threads and LORD 7542 or equivalent (1:1 mix of two urethane based adhesives) to the seating surfaces of the washers.
Install the bolts and tighten them in a crisscross pattern in several steps.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

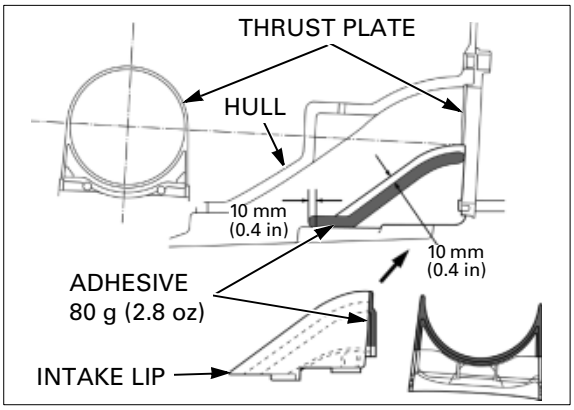
Align the engine-to-jet pump (page 9-11).



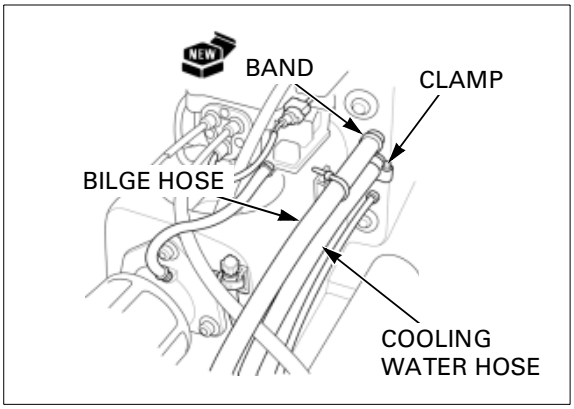
Apply 80 g (2.8 oz) of LORD 7452 adhesive or equivalent to the intake lip and the hull as shown.

Install the intake lip onto the thrust plate and hull securely. Then check to be sure that adhesive overflows from the whole mating area.

Wipe off any overflow adhesive so that the mating area is smooth (remove any overflow adhesive on the intake grate installing surface).



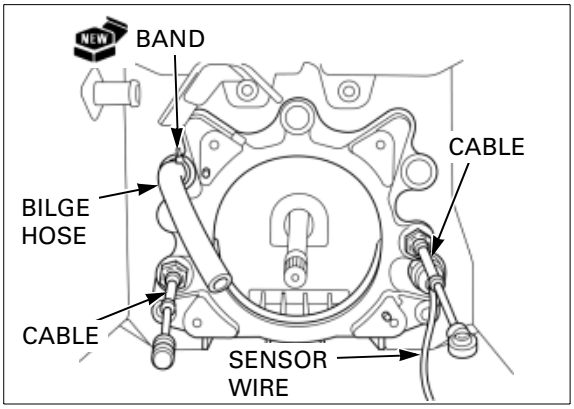
Connect the cooling water hose and tighten the hose clamp in the direction as shown.
Connect the bilge hose and secure it with a new hose band. Cut off any excess band.



Install the bilge hose and secure it with a new hose band. Cut off any excess band.

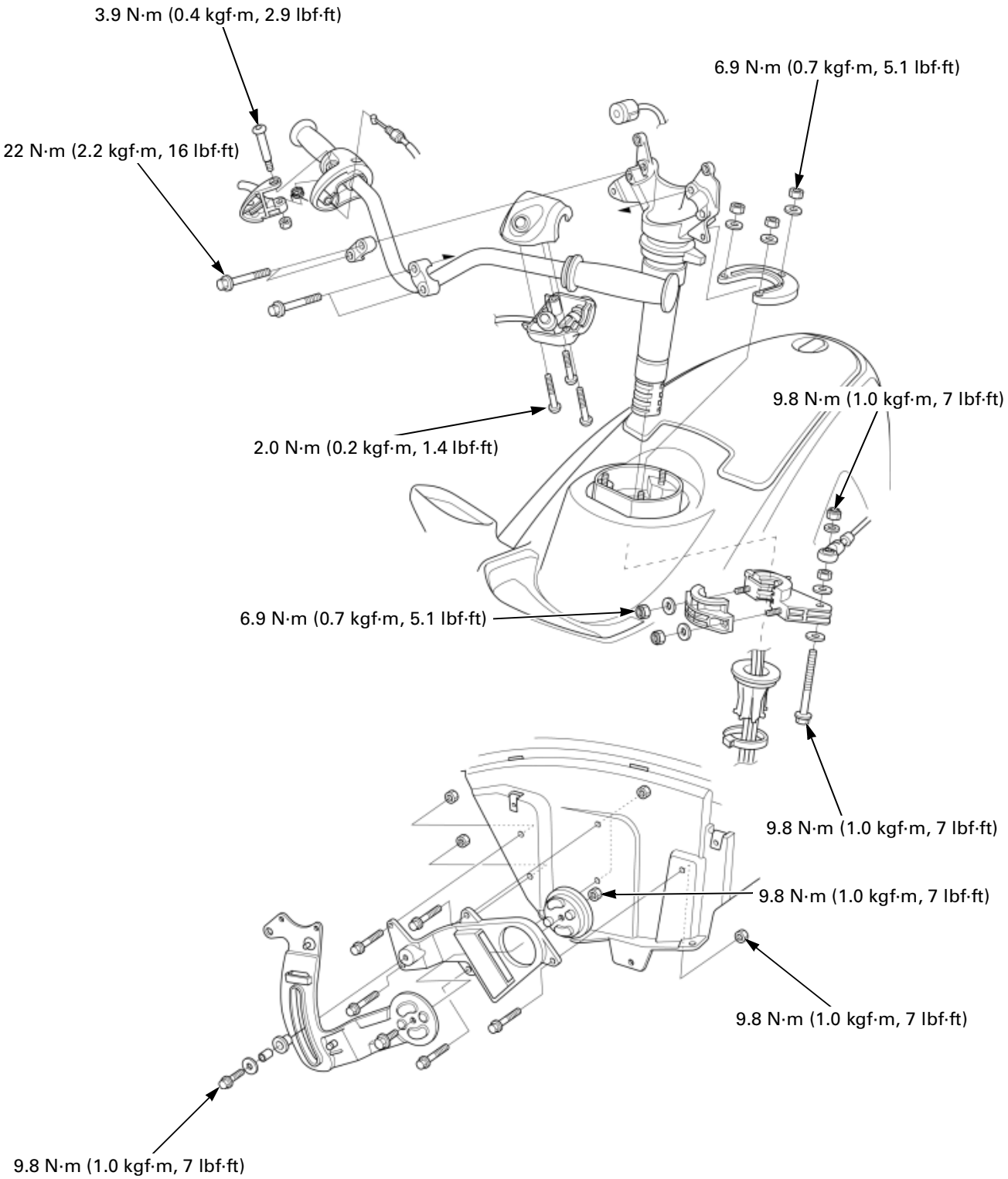
Secure the steering and reverse cables to the thrust plate (page 15-16 and 15-17).
Install the speed sensor wire (page 19-11).

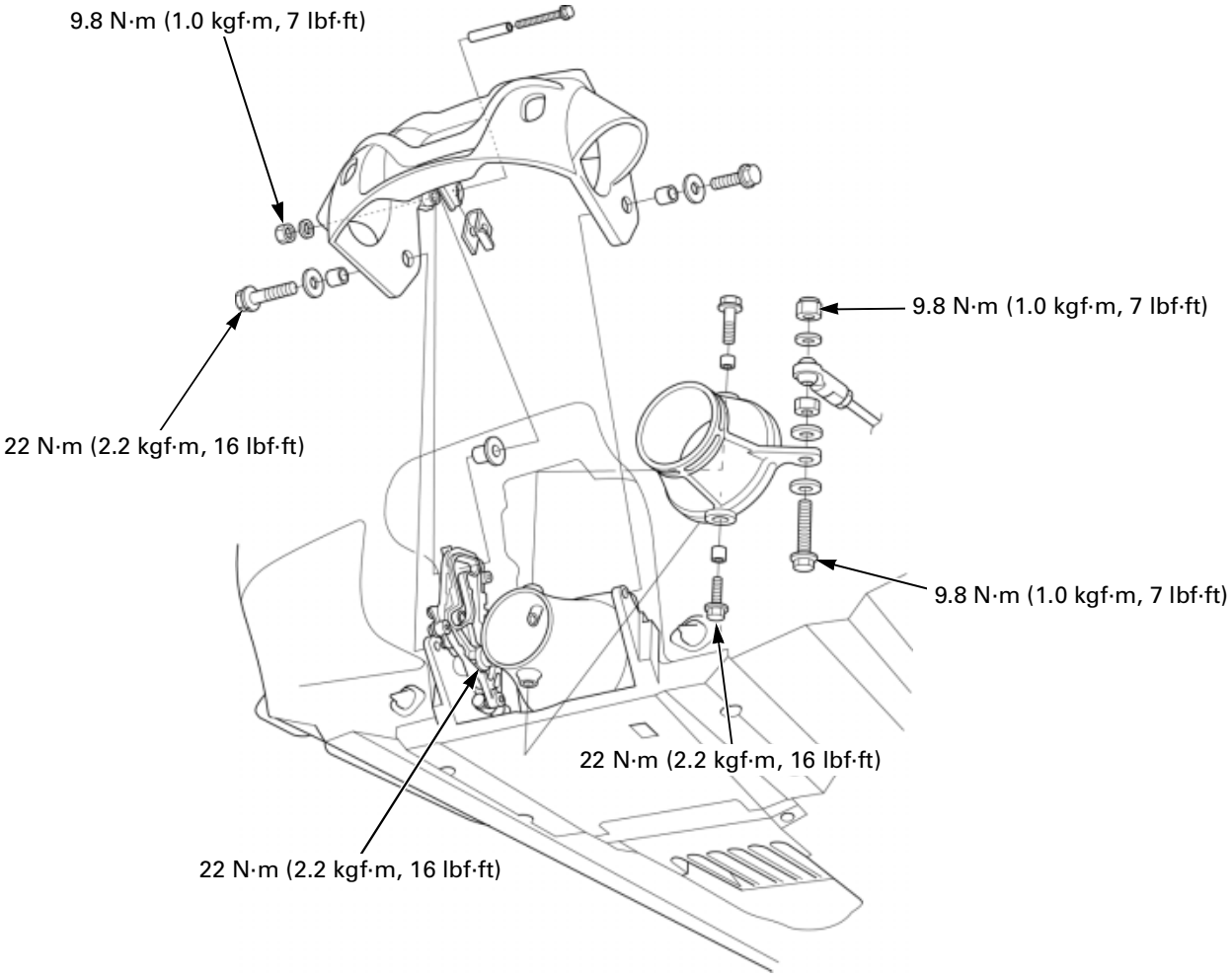
Install the following:
– jet pump (page 14-24)
– intake grate and ride plate (page 14-31)
– side panels (page 3-5)



15. STEERING/REVERSE SYSTEM

SYSTEM COMPONENTS




9.8 N·m (1.0 kgf·m, 7 lbf·ft)
22 N·m (2.2 kgf·m, 16 lbf·ft)
9.8 N·m (1.0 kgf·m, 7 lbf·ft)
9.8 N·m (1.0 kgf·m, 7 lbf·ft)
22 N·m (2.2 kgf·m, 16 lbf·ft)
22 N·m (2.2 kgf·m, 16 lbf·ft)

SERVICE INFORMATION

GENERAL

- This section covers service of control components of the steering and reverse system.
- This watercraft is equipped with an off-throttle steering (OTS) system. This system allows the vehicle to be turned when the throttle is not applied. Refer to page 2-8 for this system.
- Make sure all the steering and reverse controls are lubricated at the specified intervals (page 4-3).
- Refer to page 4-20 and 4-22 for steering and reverse cable adjustment and lubrication.
- After servicing the steering components, start the engine and turn the handlebar to the left and right several times. If the idle speed fluctuates, check for steering component interference with the throttle cable.

TORQUE VALUES

Handlebar holder bolt	22 N·m (22 kgf·m, 16 lbf·ft)	
Left handlebar switch housing screw	2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Throttle lever pivot bolt	3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)	Apply locking agent to the threads.
Throttle lever holder screw	2.9 N·m (0.3 kgf·m, 2.2 lbf·ft)	
Steering shaft holder nut	26 N·m (2.7 kgf·m, 20 lbf·ft)	Self-lock nut.
Steering limit switch bracket bolt	4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)	Apply locking agent to the threads.
Steering shaft retainer nut	6.9 N·m (0.7 kgf·m, 5.1 lbf·ft)	Apply locking agent to the threads.
Steering shaft cable arm nut	6.9 N·m (0.7 kgf·m, 5.1 lbf·ft)	Apply locking agent to the threads/Self-lock nut.
Steering cable holder bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads.
Steering cable setting nut (thrust plate)	13 N·m (1.3 kgf·m, 9 lbf·ft)	
Steering nozzle pivot bolt	22 N·m (2.2 kgf·m 16 lbf·ft)	Apply locking agent to the threads.
Steering cable joint bolt (cable arm and steering nozzle)	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Steering cable joint nut (cable arm and steering nozzle)	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	Self-lock nut.
Steering cable joint lock nut (cable ends)	3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)	
Reverse lever pivot bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads.
Reverse lever guide bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads.
Reverse lever plate nut	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads.
Reverse cable setting cap nut (deck)	3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)	
Reverse cable setting nut (thrust plate)	13 N·m (1.3 kgf·m, 9 lbf·ft)	
Reverse cable joint lock nut (cable ends)	3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)	
Reverse bucket arm pivot bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	Apply locking agent to the threads.
Reverse bucket catch bolt (bucket arm)	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads.
Reverse cable joint stud (bucket arm)	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads.
Reverse bucket pivot bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	Apply locking agent to the threads.
Reverse bucket guide nut	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	Self-lock nut.

TROUBLESHOOTING

Poor steering control

- Steering cable improperly adjusted
- Steering cable damaged or improperly routed
- Steering nozzle pivot cracked or damaged
- No lubricant on steering components

Poor reverse lever and bucket operation

- Reverse cable improperly adjusted
- Reverse cable damaged or improperly routed
- Reverse bucket pivot cracked or damaged
- Reverse bucket arm or bucket catch damaged
- No lubricant on reverse control components

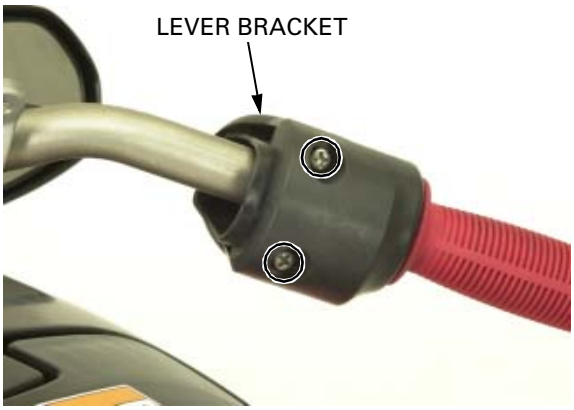
HANDLEBAR

REMOVAL

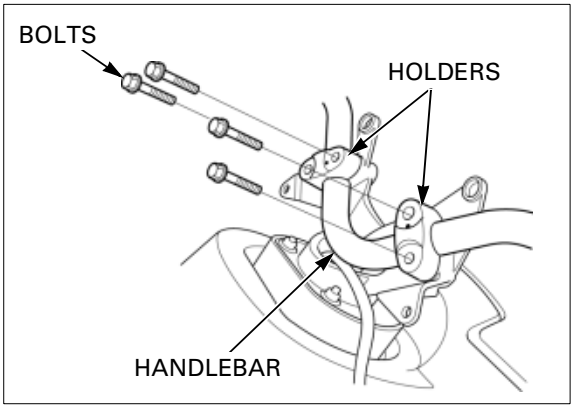
Remove the handlebar cover (page 3-11).

Remove the following:
– three screws
– switch housings

– two screws
– throttle lever bracket and bracket holder



– four bolts
– handlebar holders
– handlebar

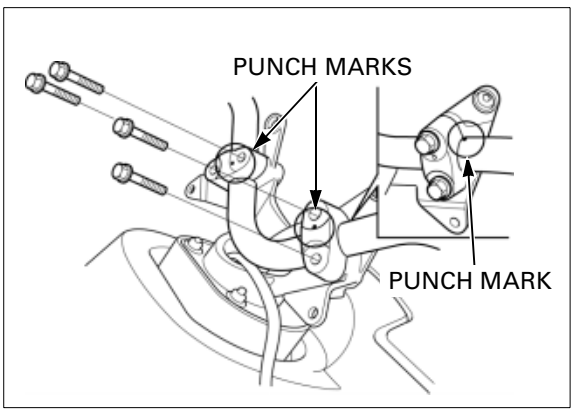


INSTALLATION

Align the punch mark on the handlebar with the left holder edge.

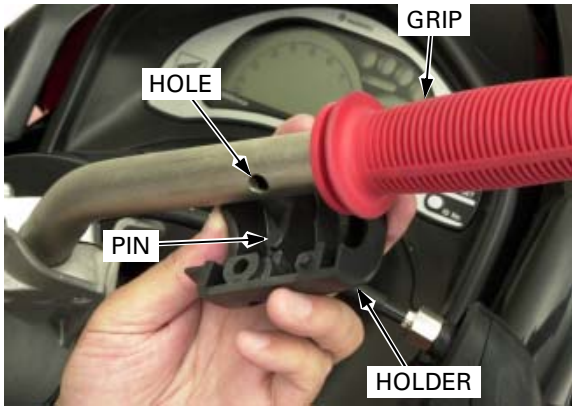
Place the handlebar onto the holders of the steering shaft. Install the handlebar holders and bolts with the punch marks on the holders facing up. Tighten the upper bolts first, then tighten the lower bolts.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Install the throttle lever bracket and holder by aligning the locating pin on the holder with the hole in the handlebar.
Tighten the upper screw first, then the lower screw.

TORQUE: 2.9 N·m (0.3 kgf·m, 2.2 lbf·ft)



Install the switch housings by aligning the locating pin with the hole in the handlebar.
Tighten the forward screws first, then the rear screw.

TORQUE: 2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)

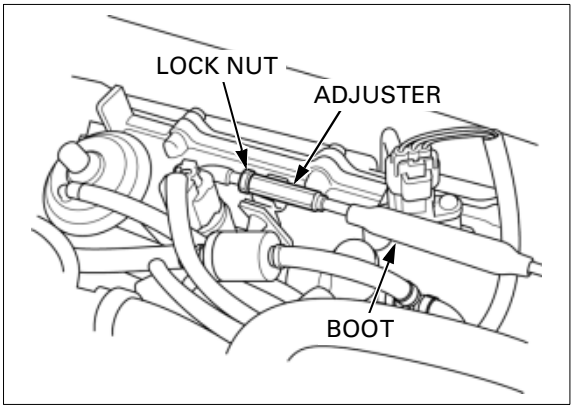
Install the handlebar cover (page 3-11).

STEERING SHAFT

STEERING SHAFT REMOVAL

Remove the following:
- handlebar cover (page 3-11)
- seats (page 3-4)
- storage box (page 3-8)

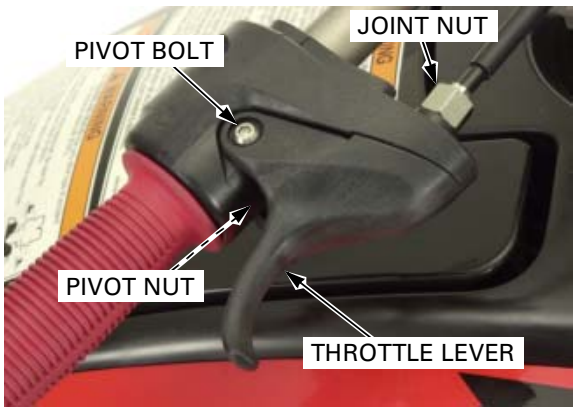
Slide the cable boot off the adjuster. Loosen the lock nut and turn the adjuster to loosen the throttle cable.



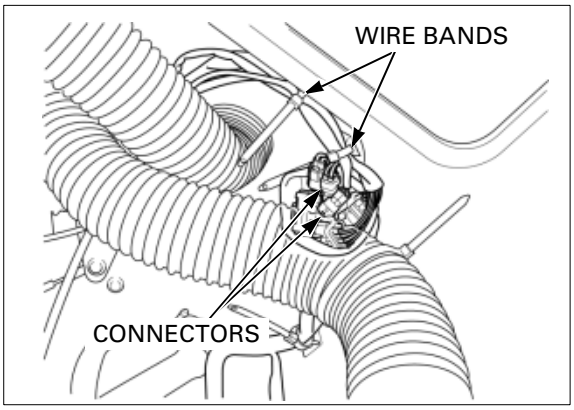
Take care not to bend the return spring.

Remove the pivot bolt and nut.
Release the throttle lever off the lever bracket while sliding its upper pivot forward carefully and remove the return spring.
Disconnect the throttle cable to remove the throttle lever.

Loosen the cable joint nut and remove the throttle cable from the lever bracket.

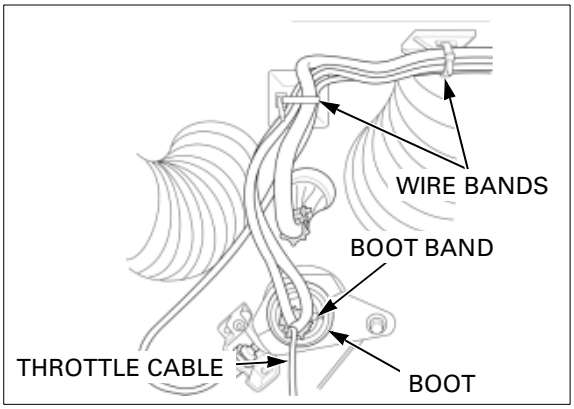


Release the four wire bands located on the reverse side of the deck.
Disconnect the warning buzzer 2P (white) and handlebar switch 4P (white) connectors.



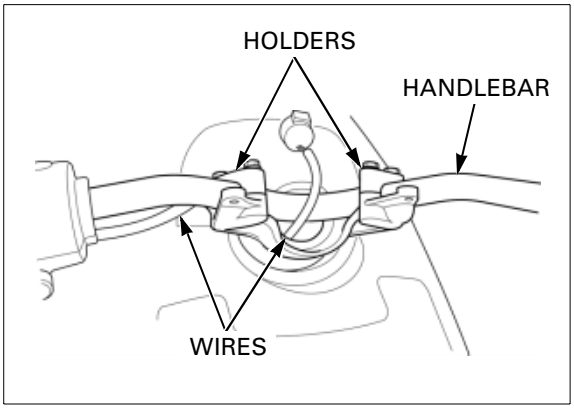
Remove the boot band and the wire boot off the steering shaft.

Pull the throttle cable to remove it from the steering shaft, being careful not to bend it.
Remove the wire boot from the cable and wires.



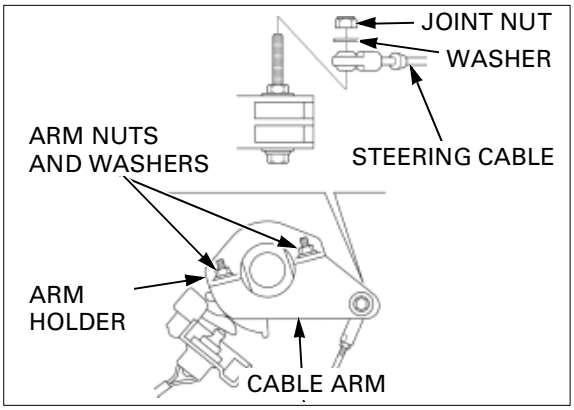
Pull the buzzer and handlebar switch wires out of the steering shaft.

Remove the following:
– holder bolts
– handlebar holders
– handlebar assembly



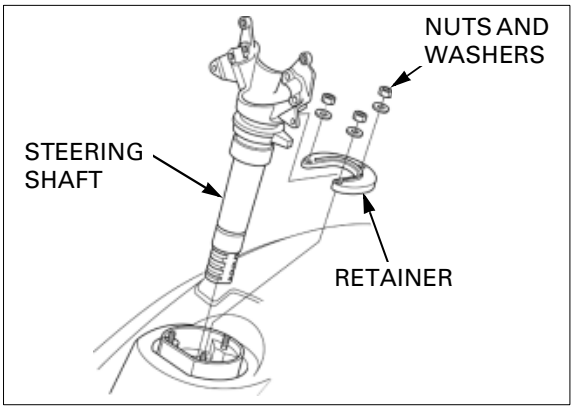
Take care not to drop the nuts and washers.

– cable joint nut (loosen)
– two cable arm nuts and washers
– cable arm holder
– steering cable arm (from steering shaft)
– cable joint nut and washer
– steering cable (to remove the cable arm)



– three retainer nuts and washers
– steering shaft
– shaft retainer

Check the sliding areas of the steering shaft and shaft holder for scoring, abnormal wear or evidence of insufficient lubrication.



STEERING SHAFT HOLDER REMOVAL/INSTALLATION

Remove the post cover (page 3-7).

Remove the following:
– two switch bracket bolts and washers
– off-throttle steering limit switch assembly
– two bracket nuts (being careful not to lose them)

Take care not to drop the holder nuts and washers.

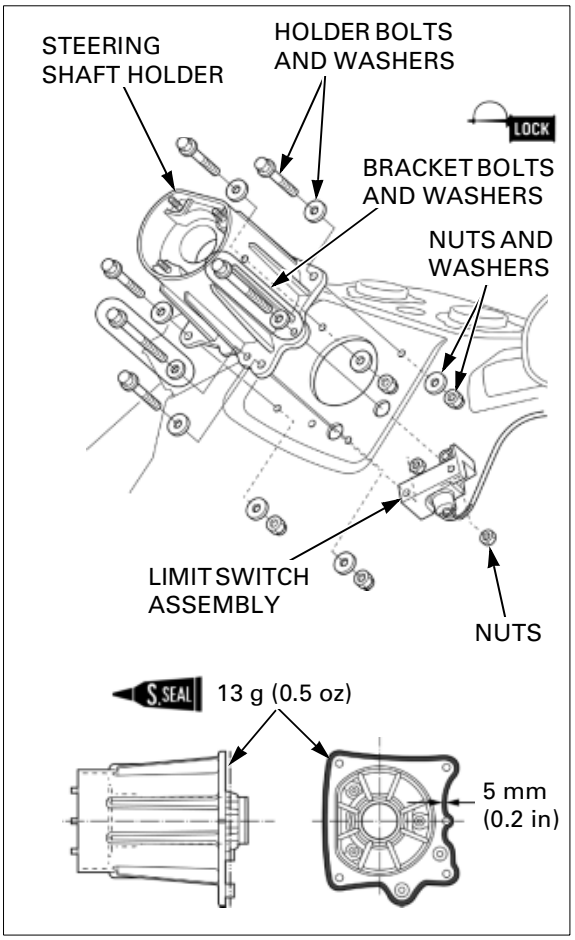
– four nuts and washers (reverse side of deck)
– four bolts and washers (shaft holder side)
– steering shaft holder

Installation is in the reverse order of removal.

NOTE:
- Strip off any old sealant thoroughly from the thrust plate when reusing it.
  Apply 13 g (0.5 oz) of silicone sealant to the mating surface of the shaft holder as shown.
- Apply locking agent to the bracket bolt threads.

TORQUE: Shaft holder: 26 N·m (2.7 kgf·m, 20 lbf·ft)
Bracket: 4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)

Install the post cover (page 3-7).

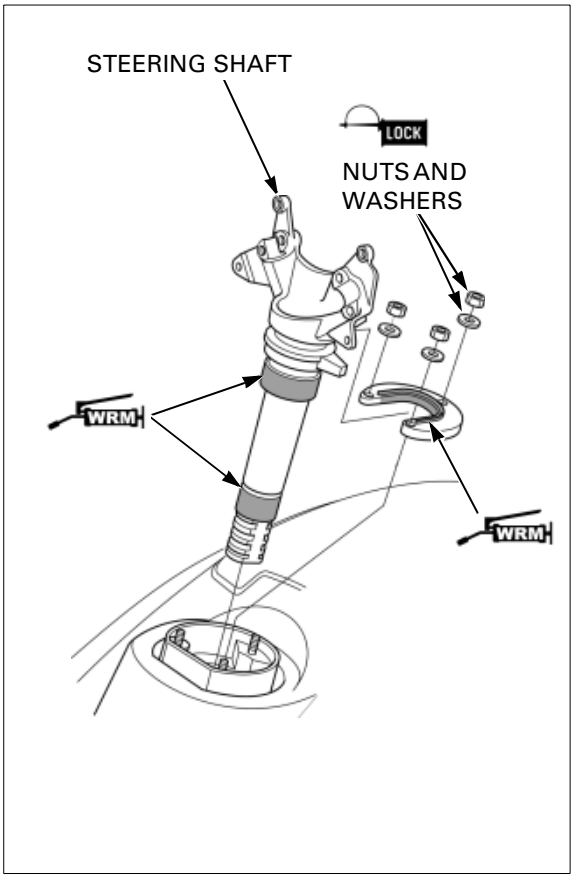


STEERING SHAFT INSTALLATION

Apply water resistant molybdenum disulfide grease to the sliding surfaces of the steering shaft and to the sliding area of the shaft retainer.

Install the three washers onto the stud bolts.
Set the shaft retainer into the shaft groove and install the steering shaft.
Apply locking agent to the threads of the retainer nuts. Install the three nuts with the washers and tighten them.

TORQUE: 6.9 N·m (0.7 kgf·m, 5.1 lbf·ft)

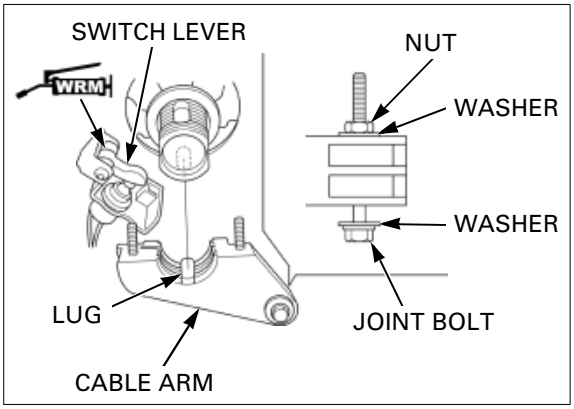


Tighten the joint bolt after connecting the steering cable.

Loosely install the following onto the cable arm as shown to get the clearance when connecting the steering cable:
– joint bolt
– washers
– nut

Apply water resistant molybdenum disulfide grease to the limit switch lever pivot.

Position the steering shaft straight ahead.
Install the cable arm by aligning its lug with the groove in the steering shaft while holding the limit switch lever.



Make sure to set the switch lever onto the guide rail of the cable arm properly.
Apply locking agent to the arm nut threads, and install the cable arm holder, washers and nuts.
Tighten the nuts alternately.

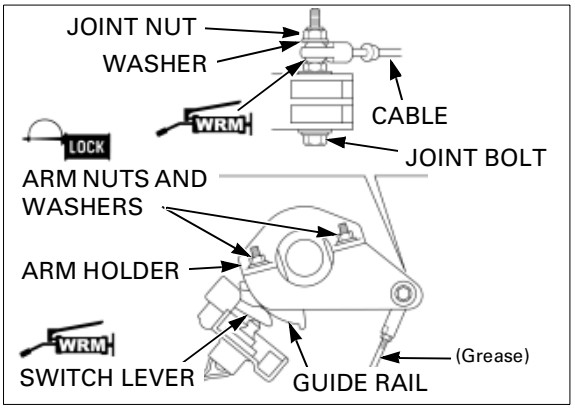
TORQUE: 6.9 N·m (0.7 kgf·m, 5.1 lbf·ft)

Apply water resistant molybdenum disulfide grease to the steering cable joint pivot.
Connect the steering cable to the joint bolt and install the washer and joint nut.
Tighten the joint bolt, then the joint nut.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Apply a water-displacement corrosion-proof lubricant (without Teflon or molybdenum additives, such as CRC 6-56 or an equivalent) to the steering cable inner and water resistant grease to the limit switch lever sliding area (guide rail).

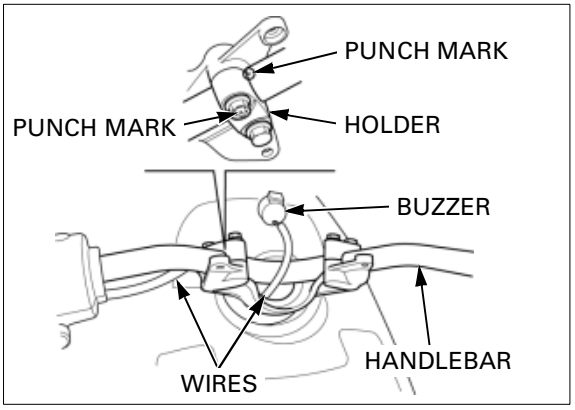
Make sure the steering shaft moves smoothly, without play or binding.



Place the handlebar onto the holders of the steering shaft while inserting the handlebar switch wire into the steering shaft and align the punch mark on the handlebar with the left holder.
Install the handlebar holders and bolts with the punch marks on the holders facing up. Tighten the upper bolts first, then tighten the lower bolts.

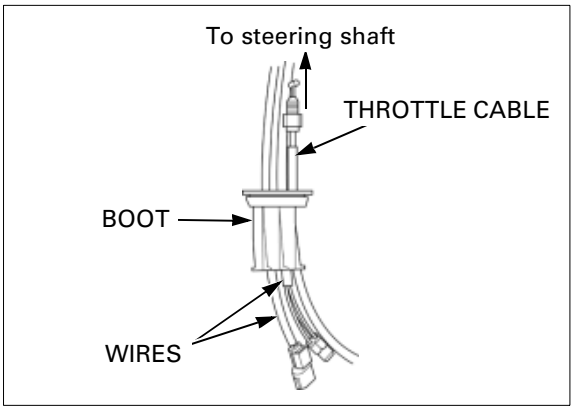
TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Insert the wire of the warning buzzer into the steering shaft.

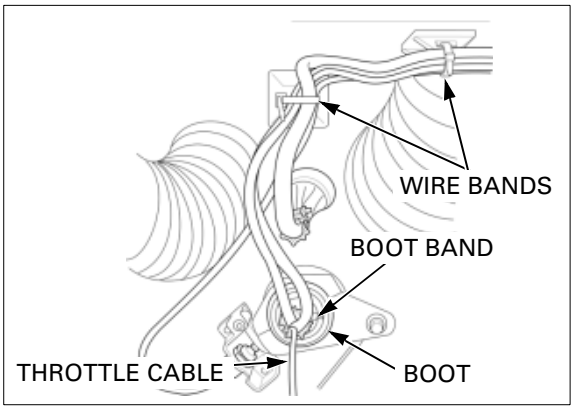


Route the throttle cable properly (page 1-31 or 1-52).

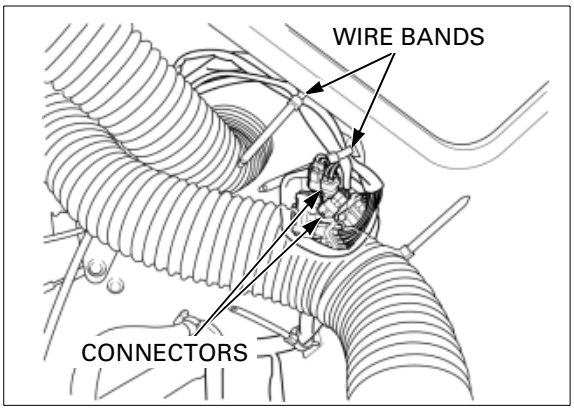
Set the wire boot onto the wires of the handlebar switch and buzzer, and insert the throttle cable into the boot and the steering shaft as shown.



Install the wire boot over the steering shaft groove properly and secure it with the boot band.



Connect the warning buzzer 2P (white) and handlebar switch 4P (white) connectors.
Secure the wires the wire bands properly (page 1-31 or 1-52).



Install the joint nut of the throttle cable into the lever bracket.

Apply a water-displacement corrosion-proof lubricant (without Teflon or molybdenum additives, such as CRC 6-56 or an equivalent) to the throttle cable end and connect the cable to the throttle lever.

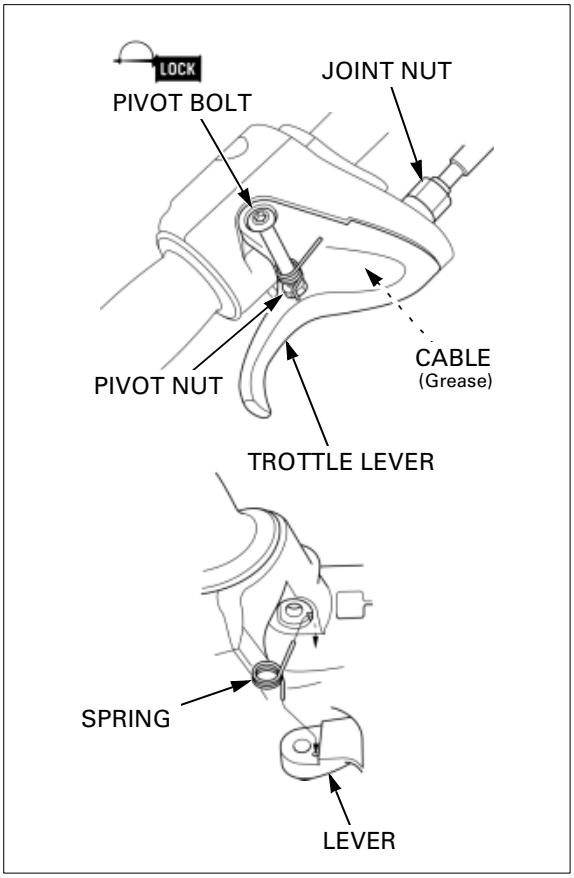
Set the return spring onto the lever bracket by inserting the long end into the setting hole. Carefully align the short end of the spring with the setting hole in the lever, then install the throttle lever onto the bracket.

Apply locking agent to the threads of the lever pivot bolt, and install the pivot bolt and nut.
Make sure the throttle lever operates smoothly without binding and tighten the pivot bolt.

TORQUE: 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)

Adjust the following:
– throttle lever free play (page 4-6)
– steering alignment (page 4-23)

Install the following:
– storage box (page 3-8)
– seats (page 3-4)
– handlebar cover (page 3-11)

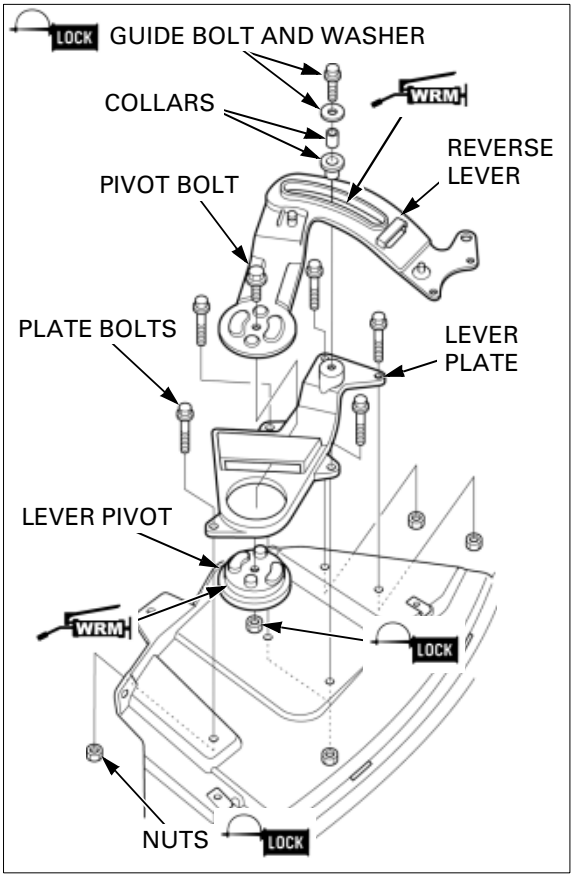


REVERSE LEVER

REMOVAL/INSTALLATION

Remove the post cover (page 3-7).

Remove the following:
– five nuts
– five bolts
– reverse lever/plate assembly
– guide bolt and washer
– collars
– pivot nut and bolt
– lever pivot
– reverse lever from



Installation is in the reverse order of removal.

NOTE:
- Apply water resistant molybdenum disulfide grease to the sliding surface of the lever pivot and the guide groove in the reverse lever.
- Apply locking agent to all the nuts and guide bolt threads.

TORQUE: All nuts and guide bolt:
9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Perform the reverse cable adjustment if necessary (page 4-21).

Make sure the reverse lever and reverse bucket operates properly.

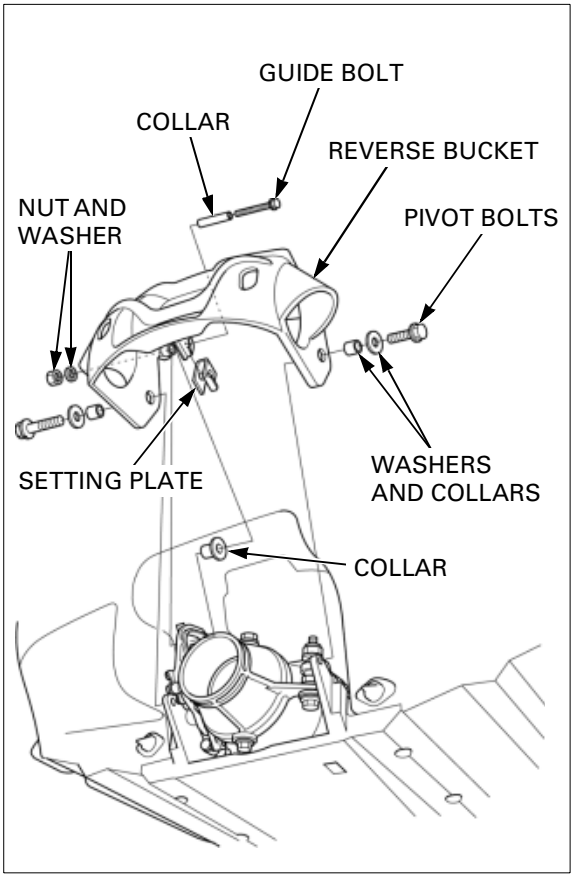
REVERSE BUCKET/STEERING NOZZLE

REVERSE BUCKET REMOVAL

Pull the reverse lever up to lower the reverse bucket.

Remove the following:
- guide nut and washer
- guide bolt and collar
- guide collar and setting plate
- pivot bolts, washers and collars
- reverse bucket

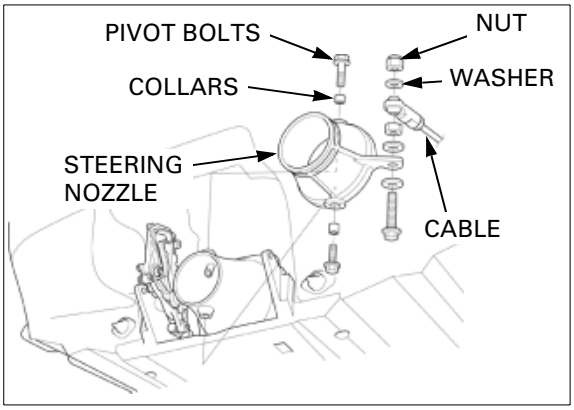
Check the bucket pivots for cracks or other damage. Check the reverse arm groove, bucket catch (spring) and reverse cable for damage.



STEERING NOZZLE REMOVAL

Remove the following:
- cable joint nut and washer
- steering cable
- pivot bolt and collars
- steering nozzle

Check the steering nozzle pivots for cracks or other damage.
Check the steering cable for damage.



BUCKET ARM REMOVAL/ INSTALLATION

Remove the following:
- reverse bucket (page 15-13)
- bucket catch bolts and washers
- bucket catches
- reverse cable (sliding cable joint outer sleeve forward and disconnect it)
- pivot bolt, washer and collar
- reverse bucket arm
- pivot bushings

Apply water resistant molybdenum disulfide grease to the bucket arm pivot and bushings.
Install the pivot bushings.

Apply locking agent to the pivot bolt threads.
Install the bucket arm with the pivot bolt, washer and collar, and tighten it.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

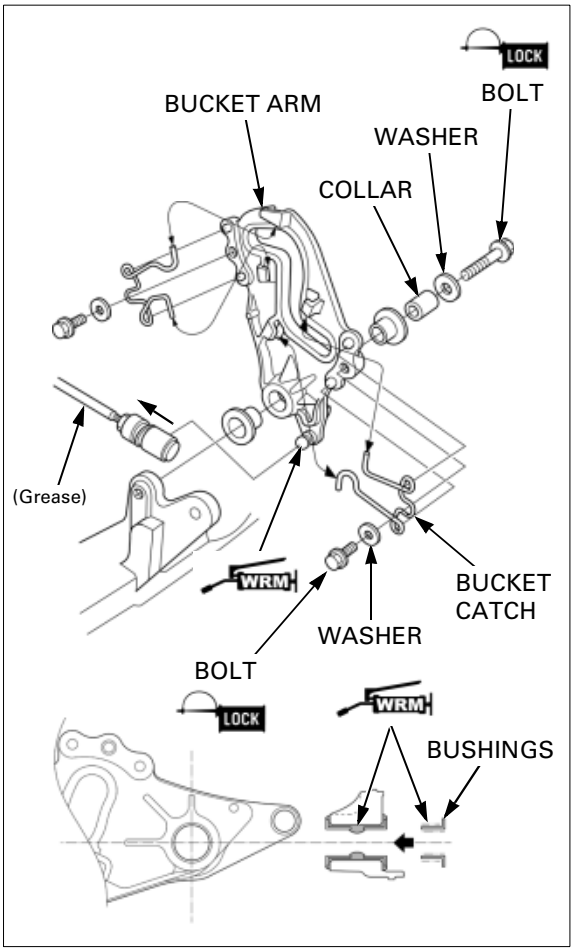
Apply water resistant molybdenum disulfide grease to the reverse cable joint pivot.
Connect the reverse cable to the bucket arm.

Install each bucket catch into the grooves and onto the pins on the bucket arm.
Apply locking agent to the threads of the bucket catch bolts. Install each catch bolt with the washer and tighten them.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Pull the reverse cable fully and apply a water-displacement corrosion-proof lubricant (without Teflon or molybdenum additives, such as CRC 6-56 or an equivalent) to the reverse cable inner.

Install the reverse bucket (page 15-15).



STEERING NOZZLE INSTALLATION

Apply water resistant molybdenum disulfide grease to the steering nozzle pivots.
Apply locking agent to the threads of the steering nozzle pivot bolts.
Install the steering nozzle with the pivot bolts and collars, and tighten them.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

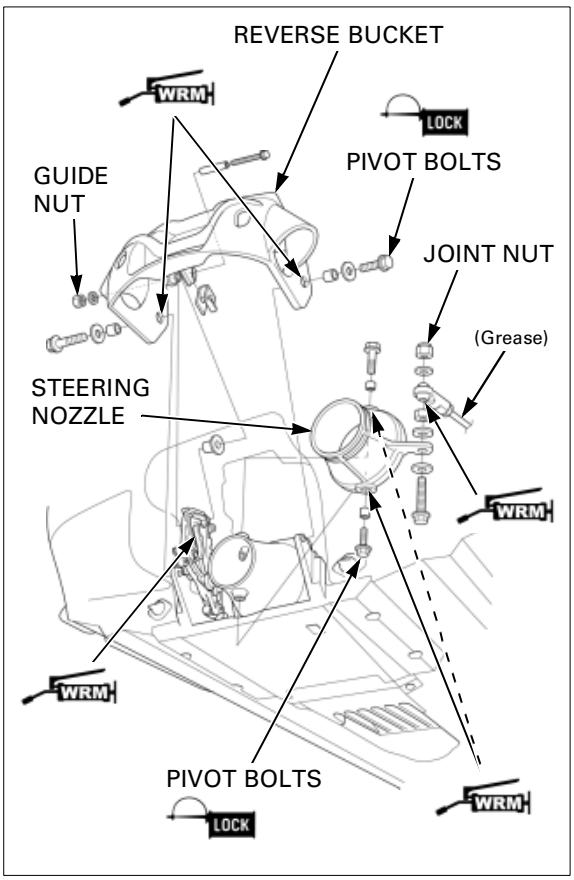
Apply water resistant molybdenum disulfide grease to the steering cable joint pivot.
Connect the steering cable onto the joint bolt on the steering nozzle.
Install the joint nut with the washer and tighten it.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Turn the steering nozzle to the left fully (so the inner cable is exposed from the outer cable) and apply a water-displacement corrosion-proof lubricant (without Teflon or molybdenum additives, such as CRC 6-56 or an equivalent) to the cable inner.

Perform the steering cable adjustment if necessary (page 4-23).

Make sure the steering nozzle and handlebar moves smoothly.



REVERSE BUCKET INSTALLATION

Pull the reverse lever up to set the bucket arm to the reverse position.
Apply water resistant molybdenum disulfide grease to the reverse bucket pivots and the reverse arm guide groove.
Apply locking agent to the threads of the bucket pivot bolts.
Install the reverse bucket with the pivot bolts, washers and collars, and tighten them.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Install the setting plate over the bucket guide stay with the tab facing to the right.
Place the guide collar into the bucket arm, then insert the long collar through the bucket and arm.
Install the guide bolt, washer and nut, and tighten the nut.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Lower the reverse lever to raise the reverse bucket.
Apply a water-displacement corrosion-proof lubricant (without Teflon or molybdenum additives, such as CRC 6-56 or an equivalent) to the reverse cable inner.

Perform the reverse cable adjustment if necessary (page 4-21).

Make sure the reverse bucket and reverse lever operates properly.

CABLE REPLACEMENT

STEERING CABLE

REMOVAL

Remove the following:
– side panels (page 3-5)
– jet pump (page 14-8)
– storage box (page 3-8)

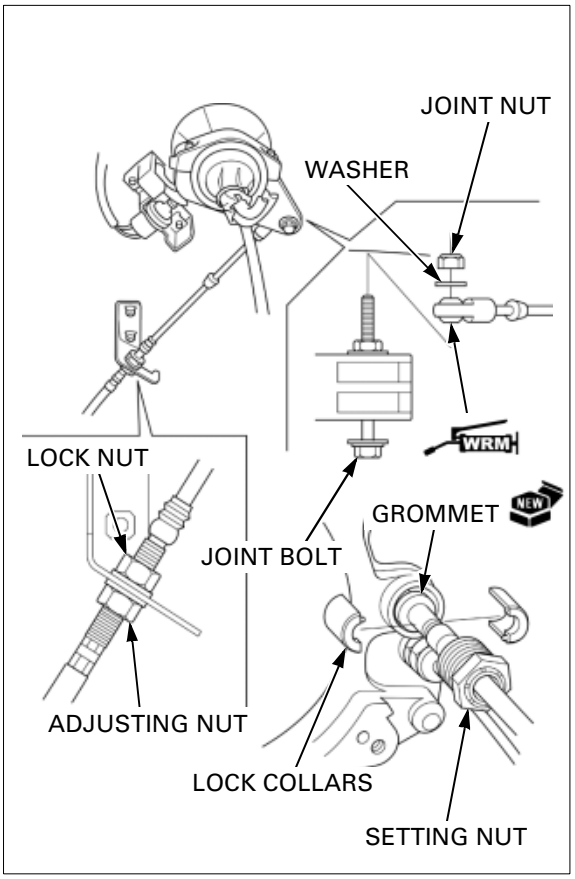
Take care not to drop the nut and washer.

Remove the cable joint nut and washer.
Loosen the cable joint bolt on the cable arm to get the clearance for cable removal.
Disconnect the steering cable from the joint bolt.

Loosen the cable lock nut and remove the steering cable from the cable holder.

Loosen the cable setting nut and remove the lock collars and grommet.

Remove the cable bands and the steering cable out of the body.



INSTALLATION

NOTE:
- Make sure each cable joint of the cable ends is screwed in at least 8 mm (0.3 in).

Route a new steering cable properly and insert it into the thrust plate (page 1-31 or 1-52).

Install a new grommet and lock collars onto the steering cable as shown.
Secure the cable with the setting nut.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)

Install the steering cable onto the cable holder and temporarily tighten its lock nut.

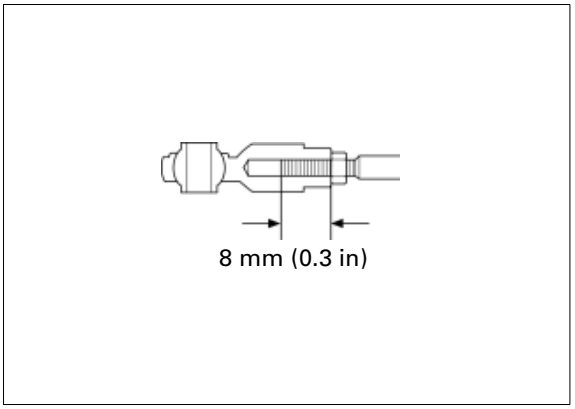
Apply water resistant molybdenum disulfide grease to the cable joint pivot of the steering shaft side.
Connect the steering cable to the joint bolt and install the washer and joint nut.
Tighten the joint bolt, then tighten the joint nut.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Install the jet pump (page 14-24).

Adjust the steering alignment and lubricate the steering cable (page 4-22).

Install the following:
– storage box (page 3-8)
– side panels (page 3-5)



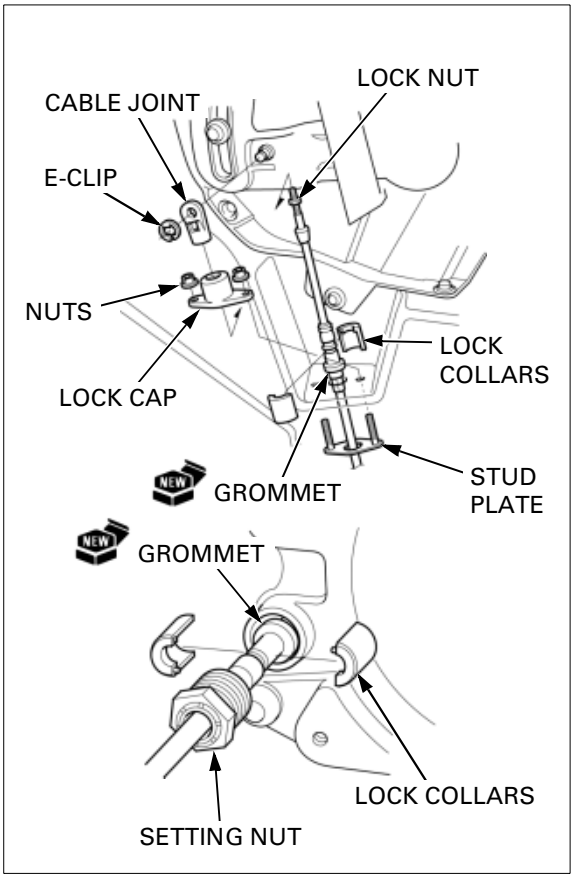
REVERSE CABLE

REMOVAL

Remove the following:
– left side cover (page 3-6)
– side panels (page 3-5)
– jet pump (page 14-8)
– E-clip
– cable joint (by loosening the lock nut)
– two nuts
– cable lock cap
– lock collars
– grommet

Loosen the cable setting nut and remove the lock collars and grommet.

Remove the cable bands and the reverse cable with the stud plate (securing the lock cap) out of the body.



INSTALLATION

NOTE:
- Make sure the cable joint on the rear end is screwed in at least 13 mm (0.5 in), and the cable joint on the front end is screwed in so that the clearance between the cable end and joint hole is less than 1 mm (0.04 in).

Install the stud plate over the cable.

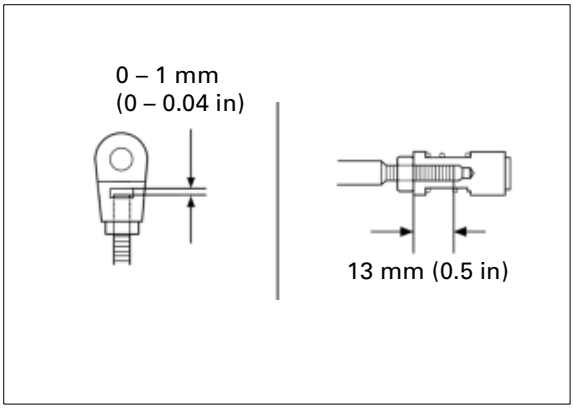
Route a new reverse cable properly and insert it into the thrust plate and deck (page 1-31 or 1-52).

Install a new grommet and the lock collars onto the reverse cable of the reverse bucket side as shown. Secure the cable with the setting nut.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)

Install a new grommet and the lock collars onto the reverse cable of the reverse lever side as shown. Install the setting cap over the cable and secure it with the stud plate and nuts.

TORQUE: 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)



Install the cable joint onto the reverse cable end.

Install the jet pump (page 14-24).

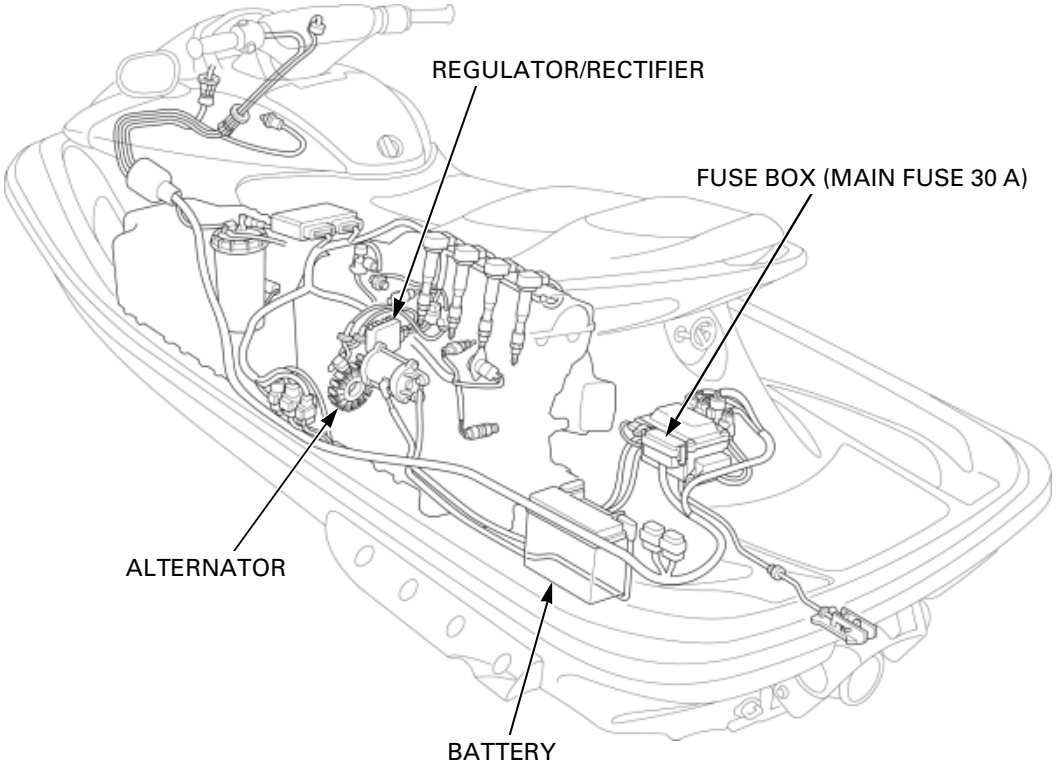
Adjust the reverse cable and lubricate it (page 4-20).

Install the following:
– side panels (page 3-5)
– left side cover (page 3-6)

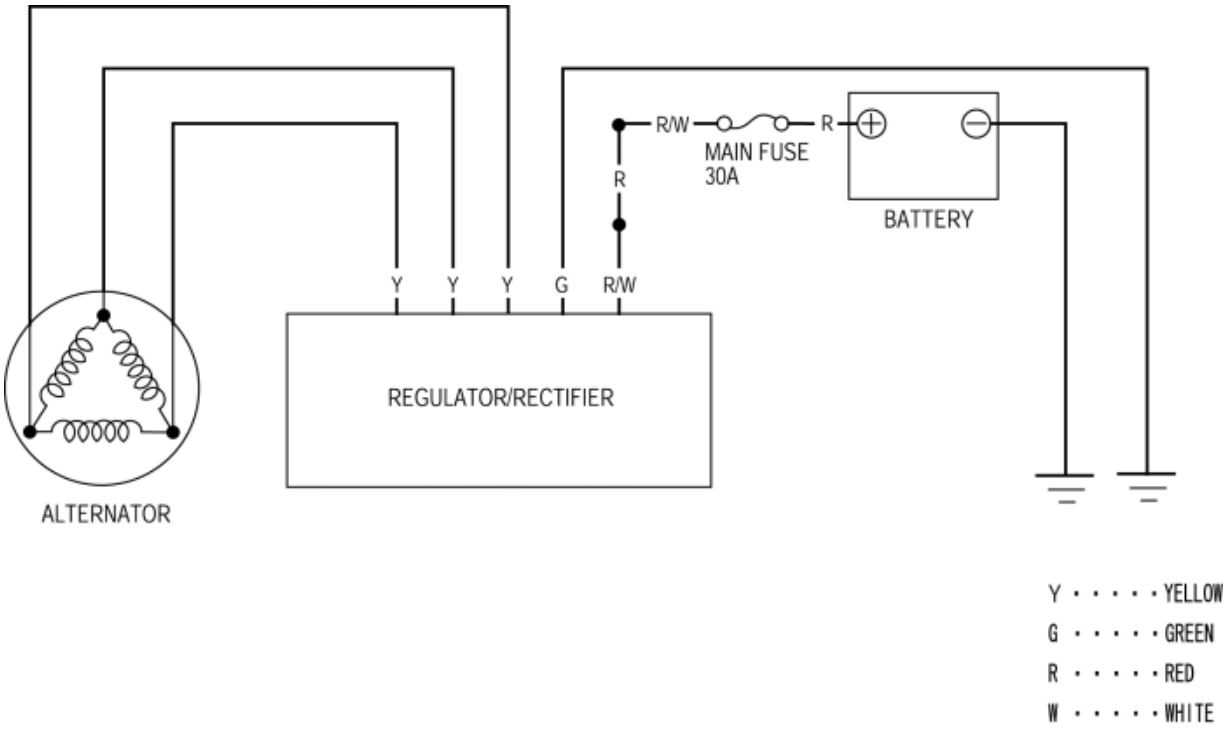
MEMO

16. BATTERY/CHARGING SYSTEM

COMPONENT LOCATION



SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

⚠ WARNING

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
  – If electrolyte gets on your skin, flush with water.
  – If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous.
  – If swallowed, drink large quantities of water or milk and call your local Poison Control Center or a physician immediately.

- Always remove the safety lanyard clip from the engine stop switch before disconnecting any electrical component.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the safety lanyard clip is fitted to the engine stop switch and current is present.
- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry space.
- For a battery remaining in a stored watercraft, disconnect the negative battery cable from the battery terminal.
- The battery sealing caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.
- The maintenance free battery must be replaced when it reaches the end of its service life.
- The battery can be damaged if overcharged or undercharged, or if left to discharge for a long period. These same conditions contribute to shortening the life span of the battery. Even under normal use, the performance of the battery deteriorates after 2–3 years.
- Battery voltage may recover after battery charging, but under heavy load, battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load.
- The battery will self-discharge when the watercraft is not in use. For this reason, charge the battery every 2 weeks to prevent sulfation from occurring.
- Filling a new battery with electrolyte will produce some voltage, but in order to achieve its maximum performance, always charge the battery. Also, the battery life is lengthened when it is initially charged.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 16-4).

BATTERY CHARGING

- This model comes with a maintenance free (MF) battery. Remember the following about MF batteries.
  – Use only the electrolyte that comes with the battery.
  – Use all of the electrolyte.
  – Seal the battery properly.
  – Never open the seals after installation.
- For battery charging, do not exceed the charging current and time specified on the battery. Use of excessive current or extending the charging time may damage the battery.

BATTERY TESTING

Refer to the instruction of the Operation Manual for the recommended battery tester. The recommended battery tester puts a "load" on the battery so the actual battery condition of the load can be measured.

Recommended battery tester: BM-210-AH (U.S.A. only), BM-210, BATTERY MATE or equivalent

SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12 V – 18 Ah
	Current leakage		2 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.8 A/5 – 10 h
		Quick	9.0 A/1.0 h
Alternator	Capacity		308 W/5,000 rpm
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω

TROUBLESHOOTING

BATTERY IS DAMAGED OR WEAK

1. **BATTERY TEST**

   Remove the battery (page 16-5)

   Check the battery condition using the recommended battery tester.

   RECOMMENDED BATTERY TESTER: BM-210-AH (U.S.A. only), BM-210, BATTERY MATE or equivalent

   Is the battery in good condition?

   NO – Faulty battery

   YES – GO TO STEP 2.

2. **CURRENT LEAKAGE TEST**

   Install the battery (page 16-5).

   Check the battery current leakage test (Leak test; page 16-7).

   Is the current leakage below 2.0 mA?

   YES – GO TO STEP 4.

   NO – GO TO STEP 3.

3. **CURRENT LEAKAGE TEST WITHOUT REGULATOR/RECTIFIRE CONNECTOR**

   Disconnect the regulator/rectifier connector and recheck the battery current leakage.

   Is the current leakage below 2.0 mA?

   YES – Faulty regulator/rectifier

   NO –
   - Shorted wire harness
   - Faulty engine stop switch

4. **CHARGING VOLTAGE INSPECTION**

   Measure and record the battery voltage using a digital multimeter (page 16-5).

   Start the engine.

   Measure the charging voltage (page 16-8).

   Compare the measurements to the results of the following calculation.

   STANDARD: Measured battery Voltage < Measured charging voltage < 15.5 V

   Is the measured charging voltage within the standard voltage?

   YES – Faulty battery

   NO – GO TO STEP 5.

5. **REGULATOR/RECTIFIER SYSTEM INSPECTION**

   Check the voltage and resistance at the regulator/rectifier connector (page 16-8).

   Are the measurements correct?

   YES – Faulty regulator/rectifier

   NO –
   - Open circuit in related wire
   - Loose or poor contacts of related terminal
   - Shorted wire harness

BATTERY

REMOVAL/INSTALLATION

Remove the passenger grab rail (page 3-5).

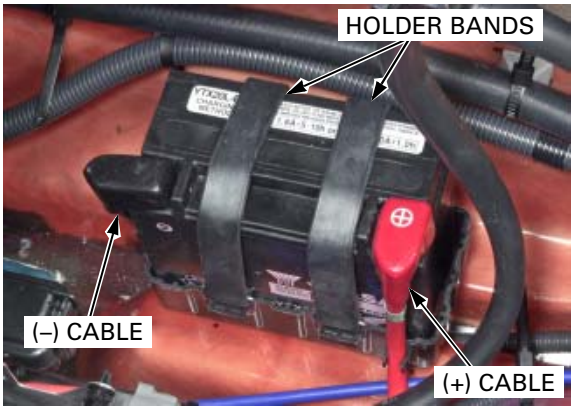
Remove the battery holder bands.

Disconnect the negative (–) cable and then the positive (+) cable, and remove the battery.

Connect the positive terminal first and then the negative cable.

Install the battery in the reverse order of removal.

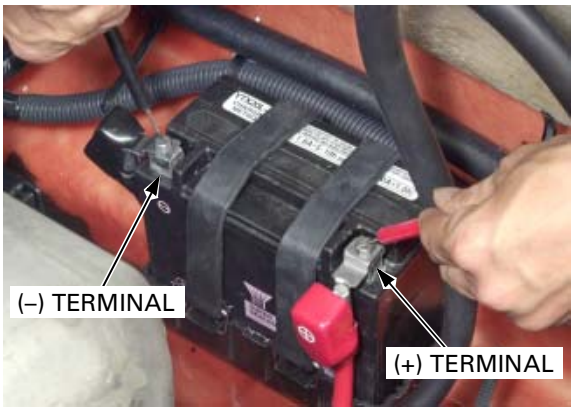
After installing the battery, coat the terminals with clean dielectric grease.



VOLTAGE INSPECTION

Measure the battery voltage using a digital multimeter.

VOLTAGE:
Fully charged: 13.0 – 13.2 V
Under charged: Below 12.3 V



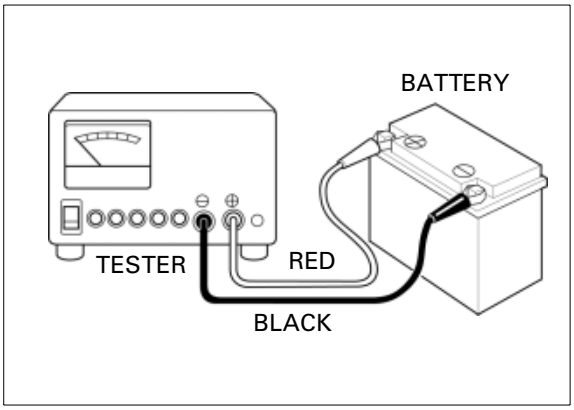
BATTERY TESTING

Remove the battery (page 16-5).

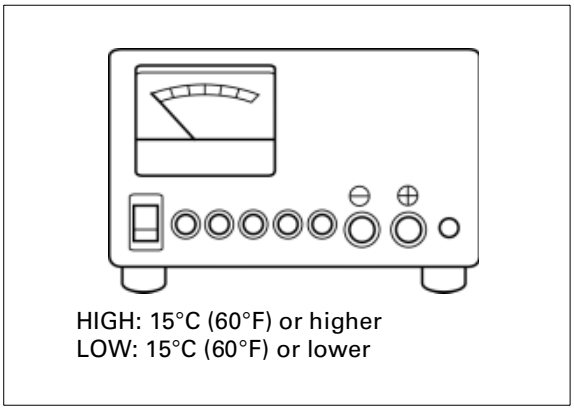
For accurate test results, be sure the tester's cables and clamps are in good working condition and that a secure connection is made at the battery.

Securely connect the tester's positive (+) cable first, then connect the negative (–) cable.

TOOL:
Battery tester **BM-210-AH (U.S.A. only), BM-210, BATTERY MATE or equivalent**

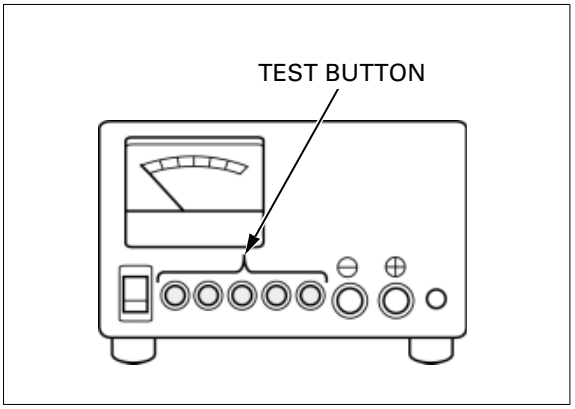


Set the temperature switch to "HIGH" or "LOW" depending on the ambient temperature.



For the first check, DO NOT charge the battery before testing; test it in an "as is" condition.

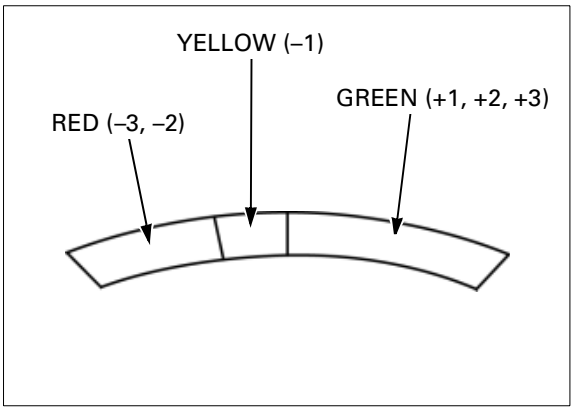
Push in the appropriate test button for 3 seconds and read the condition of the battery on the meter.



NOTICE

- *To avoid damaging the tester, only test batteries with an amperage rating of less than 30 Ah.*
- *Tester damage can result from overheating when:*
  - *The test button is pushed for more than 3 seconds.*
  - *The tester is used without being allowed to cool for at least 1 minute when testing more than one battery.*
  - *More than ten consecutive tests are performed without allowing at least a 30-minute cool-down period.*

The result of a test on the meter scale is relative to the amp. hour rating of the battery. Any battery reading in the green zone is OK. Batteries should only be charged if they register in the YELLOW or RED zone.



BATTERY CHARGING

Remove the battery (page 16-5).

NOTE:

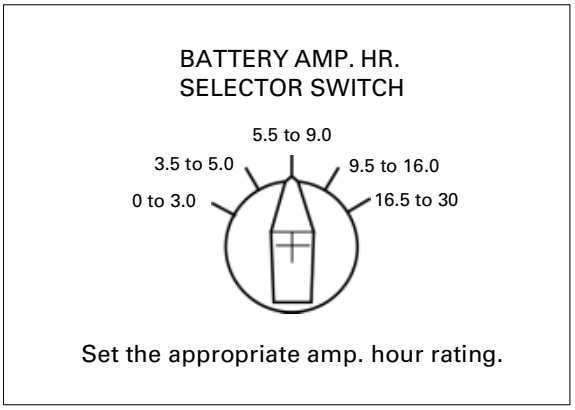
- Make sure the area around the charger is well ventilated, clear of flammable materials, and free from heat, humidity, water and dust.
- Clean the battery terminals and position the battery as far away from the charger as the leads will permit.
- Do not place batteries below the charger – gases from the battery may corrode and damage the charger.
- Do not place batteries on top of the charger. Be sure the air vents are not blocked.

1. Turn the "POWER" switch to "OFF".

Turn the power ON/OFF at the charger, not at the battery terminal.

2. Set the "BATTERY AMP. HR. SELECTOR SWITCH" for the size of the battery being charged.

TOOLS:
Christie battery charger: MC1012/2 (U.S.A. only)

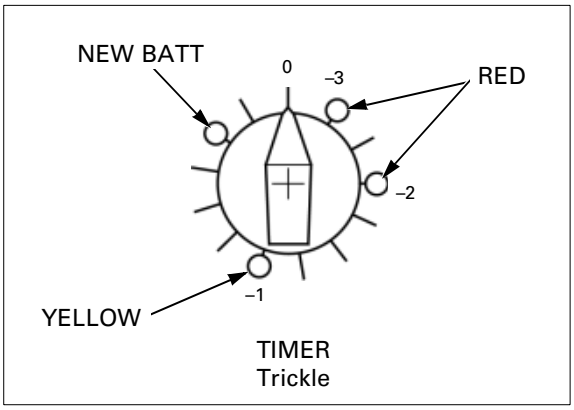


Set the appropriate amp. hour rating.

3. Set the "TIMER" to the position indicated by the Honda Battery Tester; RED –3, RED –2 or YELLOW –1. If you are charging a new battery, set the switch to the NEW BATT position.
4. Attach the clamps to the battery terminals: red to positive, black to negative.

   Connecting the cables with the POWER switch turned to "ON" can produce a spark which could ignite or explode the battery.

   Connect the battery cables only when the "POWER" switch is turned to "OFF".



5. Turn the "POWER" switch to "ON".
6. When the timer reaches the "Trickle" position, the charging cycle is complete. Turn the "POWER" witch to "OFF" and disconnect the clamps.

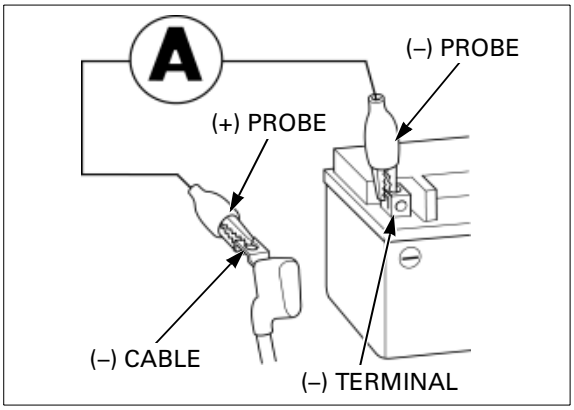
   The charger will automatically switch to the "Trickle" mode after the set charging time has elapsed.
7. Let the battery cool for at least 10 minutes or until gassing subsides after charging.
8. Retest the battery using the Honda Battery Tester and recharge if necessary using the above steps.

CHARGING SYSTEM INSPECTION

CURRENT LEAKAGE INSPECTION

Remove the passenger grab rail (page 3-5).
ARX1200T3/T3D only: Remove the air box (page 8-89).

With the safety lanyard clip removed, disconnect the negative (–) cable from the battery.
Connect the ammeter (+) probe to the negative (–) cable and the ammeter (–) probe to the battery (–) terminal.
With the safety lanyard clip removed, check for current leakage.



NOTE:

- Wait for 10 seconds after removing the safety lanyard clip, when checking the current leakage.
- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow the fuse in the tester.
- While measuring current, do not turn the ignition on. A sudden surge of current may blow the fuse in the tester.

SPECIFIED CURRENT LEAKAGE: 2 mA max.

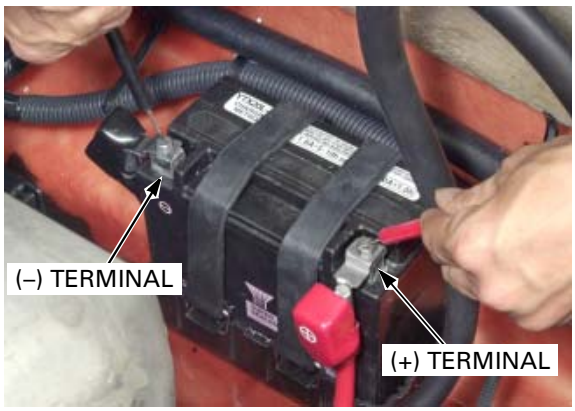
If current leakage exceeds the specified value, a shorted circuit is likely.
Locate the short by disconnecting connections one by one and measuring the current.

CHARGING VOLTAGE INSPECTION

Remove the passenger grab rail (page 3-5).

Be sure the battery is in good condition before performing this test.

Warm up the engine to normal operating temperature.
Connect the multimeter between the battery positive (+) and negative (–) terminals.



NOTICE

- *To prevent a short, make absolutely certain which are the positive* (+) and negative (–) *terminals or cables.*
- *Do not disconnect the battery or any cable in the charging system without first pulling the safety lanyard clip out of the engine stop switch. Failure to follow this precaution can damage the tester or electrical components.*

Measure the voltage on the multimeter when the engine runs at 5,000 rpm.

STANDARD: Measured BV < Measured CV < 15.5 V
BV = Battery voltage (page 16-5)
CV = Charging voltage

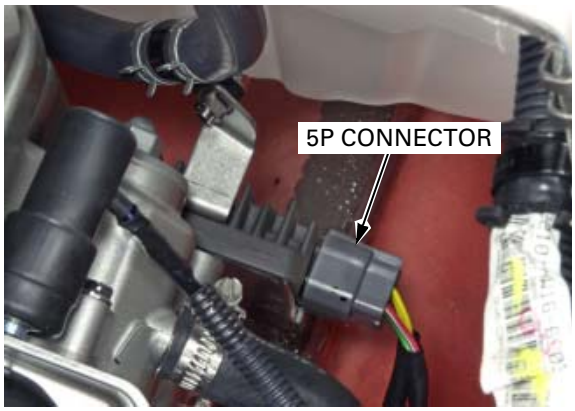
REGULATOR/RECTIFIER

SYSTEM INSPECTION

Remove the seats (page 3-4).

Disconnect the regulator/rectifier 5P connector, and check it for loose contacts or corroded terminals.

If the charging voltage reading (page 16-8) is out of the specification, check the following at the wire harness side connector:



Item	Terminal	Specification
Battery charging line	Red/White (+) and ground (-)	Battery voltage should register
Charging coil line	Yellow and Yellow	0.1 – 1.0 Ω at (20°C/68°F)
Ground line	Green and ground	Continuity should exist

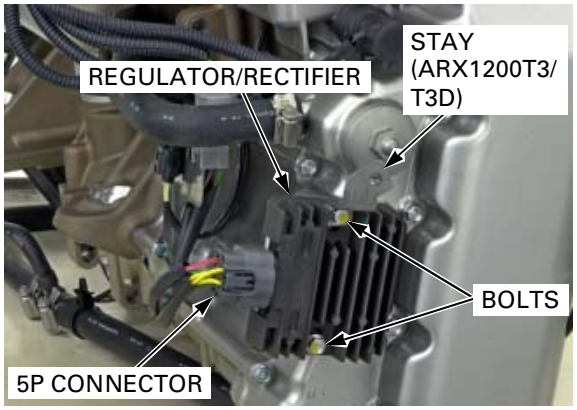
If all lines are normal and there are no loose connections at the regulator/rectifier connector, replace the regulator/rectifier unit.

REMOVAL/INSTALLATION

Remove the seats (page 3-4).

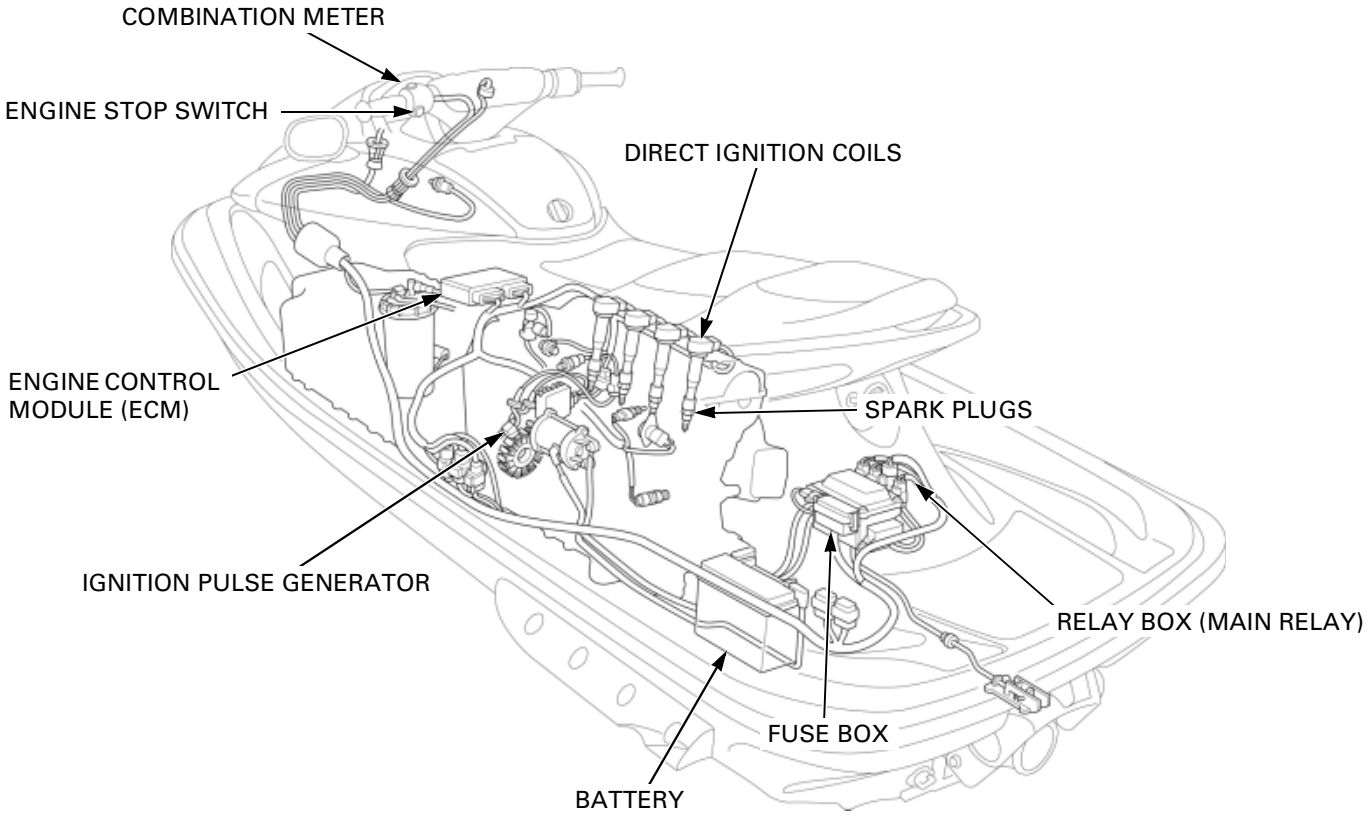
Disconnect the alternator 5P connector.
Remove the two bolts, hose stay (ARX1200T3/T3D only) and regulator/rectifier from the oil tank cover.

Install the regulator/rectifier in the reverse order of removal.

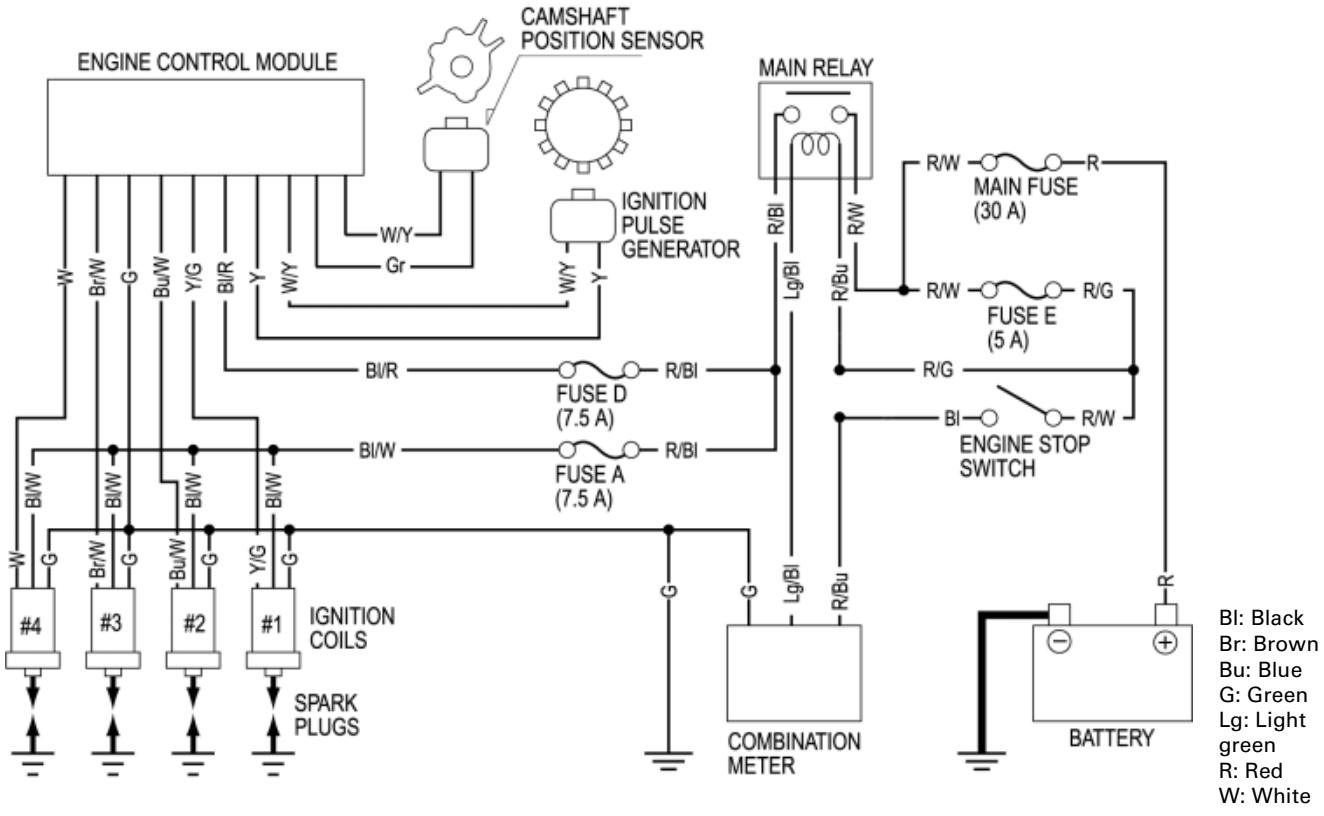


17. IGNITION SYSTEM

COMPONENT LOCATION



SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the safety lanyard clip is fitted to the base of the engine stop switch and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting table on page 17-5.
- This watercraft's Ignition Control Module (ICM) is built into the Engine Control Module (ECM).
- The transistorized ignition system uses an electrically controlled ignition timing system. No adjustments can be made to the ignition timing.
- The ECM may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the ECM. Always pull the safety lanyard clip off of the engine stop switch before servicing.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding.
- Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plugs.
- Direct ignition coils (ignition coil and spark plug cap are integrated), are adopted in this watercraft. Also, the ignition coils are equipped with ignitors. The ignition coil signal voltage from the ECM is converted to high voltage in the ignition coil.
- Refer to page 4-7 for spark plug inspection.
- Refer to page 11-4 for ignition pulse generator removal/installation.
- Refer to page page 19-4 for combination meter inspection and page page 19-19 for main relay inspection.

SPECIFICATIONS

'04 model:

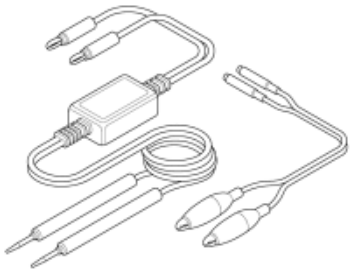
ITEM		SPECIFICATIONS
Spark plug (Iridium)		IMR9D-9H (NGK)
Spark plug gap		0.80 – 0.90 mm (0.031 – 0.035 in)
Ignition coil signal peak voltage		0.7 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)	ARX1200T3	9° BTDC at idle
	ARX1200N3	12° BTDC at idle

After '04:

ITEM		SPECIFICATIONS
Spark plug (Iridium)		IMR9D-9H (NGK)
Spark plug gap		0.80 – 0.90 mm (0.031 – 0.035 in)
Ignition coil signal peak voltage		0.7 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)	ARX1200T3/ T3D	9° BTDC at idle
	ARX1200N3	10° BTDC at idle

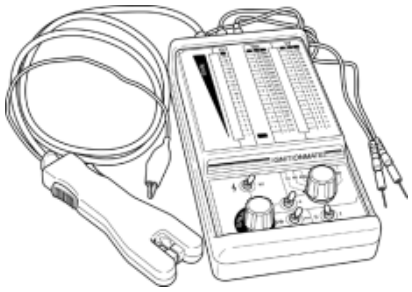
TOOLS

Peak voltage adaptor
07HGJ-0020100



(not available in U.S.A.) with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

IgnitionMate peak voltage tester
MTP07-0286 (U.S.A. only)*



* Available through the Motorcycle Tool and Equipment Program; to order call 888-424-6857.

TROUBLESHOOTING

- Inspect the following before diagnosing the system.
  – Faulty spark plug
  – Loose spark plug cap or spark plug wire connection
  – Water got into the direct ignition coil (leaking the ignition coil secondary voltage)
- If there is no spark at a cylinder, temporarily exchange the direct ignition coil with a known-good one and perform the spark test. If there is spark, the exchanged direct ignition coil is faulty.

No spark at all plugs

Unusual condition		Probable cause (Check in numerical order)
Direct ignition coil signal voltage	No peak voltage	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too slow (battery is undercharged). 3. The sampling timing of the tester and measured pulse were not synchronized. (System is normal if the measured voltage is over the standard voltage at least once.) 4. Open or short circuit in the direct ignition coil signal wire (No. 1: Yellow/green, No. 2: Blue/white, No. 3: Brown/white, No. 4: White). 5. Faulty peak voltage adaptor. 6. Faulty ignition pulse generator. (Measure peak voltage.) 7. Faulty ECM (when No. 1 through 6 are normal).
	Peak voltage is normal, but no spark at plug	1. Open circuit in the direct ignition coil power input (Black/white) wire. 2. Open circuit in the direct ignition coil ground (Green) wire.
Ignition pulse generator	Low peak voltage	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too slow (battery under charged). 3. The sampling timing of the tester and measured pulse were not synchronized. (System is normal if the measured voltage is over the standard voltage at least once.) 4. Faulty ignition pulse generator (when No. 1 through 3 are normal).
	No peak voltage	1. Faulty peak voltage adaptor. 2. Faulty ignition pulse generator.

IGNITION SYSTEM INSPECTION

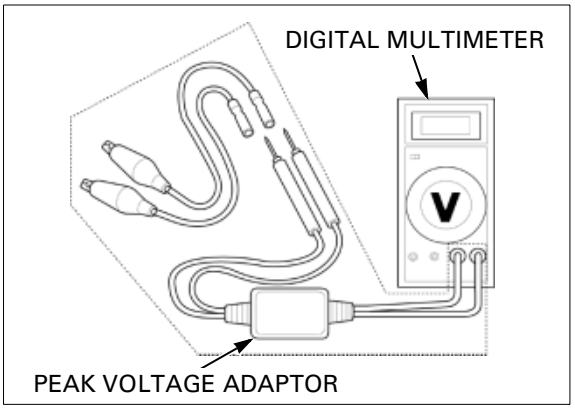
NOTE:

- If there is no spark at any plug, check all connections for loose or poor contact before measuring each peak voltage.
- Use a commercially available digital multimeter with an impedance of 10 MΩ/DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.

Connect the peak voltage tester or peak voltage adaptor to the digital multimeter.

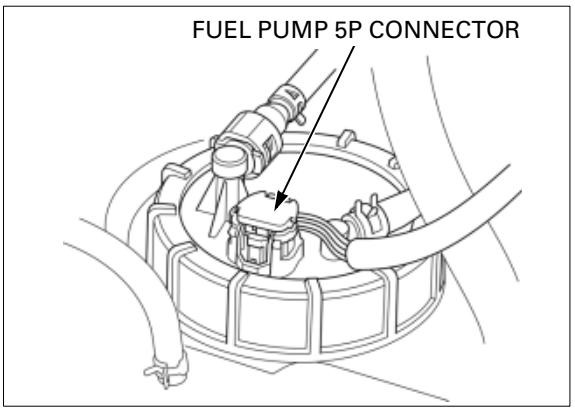
TOOLS:

IgnitionMate peak voltage tester	**MTP07-0286 (U.S.A. only) or**
Peak voltage adaptor with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)	**07HGJ-0020100 (not available in U.S.A.)**



Remove the storage box (page 3-8).

Disconnect the fuel pump 5P connector.



IGNITION COIL SIGNAL PEAK VOLTAGE

NOTE:

- Check that the cylinder compression is normal for each cylinder and the spark plugs are installed correctly in each cylinder head.

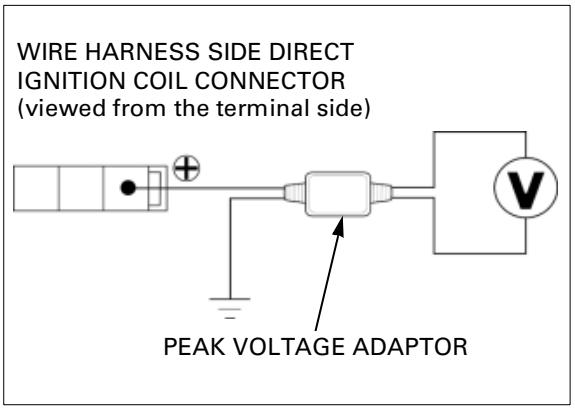
Remove the seats (page 3-4).

Disconnect the direct ignition coil 3P connector.

Connect the peak voltage tester or adaptor probes to the wire harness side connector terminal and ground.

CONNECTION:

No.1 coil:
Yellow/green wire terminal (+) – Ground (–)
No.2 coil:
Blue/white wire terminal (+) – Ground (–)
No.3 coil:
Brown/white wire terminal (+) – Ground (–)
No.4 coil:
White wire terminal (+) – Body ground (–)



Fit the safety lanyard clip to the base of the engine stop switch.
Crank the engine with the starter motor and measure the ignition coil signal peak voltage.

PEAK VOLTAGE: 0.7 V minimum

NOTE:

- Although measured values are different for each ignition coil, they are normal as long as voltage is higher than the specified value.

If the peak voltage is lower than the specified value, follow the checks described in the troubleshooting table on page 17-5.

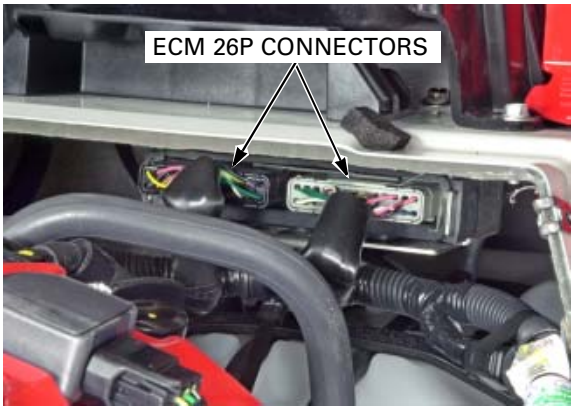
IGNITION PULSE GENERATOR PEAK VOLTAGE

NOTE:

- Check that the cylinder compression is normal for each cylinder and the spark plug is installed correctly in each cylinder head.

Remove the seats (page 3-4).

Disconnect the ECM 26P connectors.



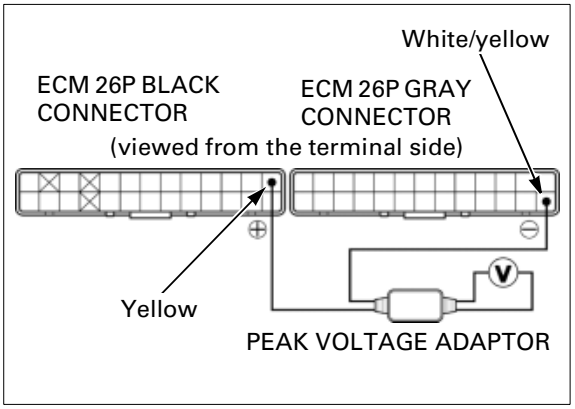
Connect the peak voltage tester or peak voltage adaptor probes to the wire harness side connector terminals.

CONNECTION: Yellow (+) – White/yellow (–)

Crank the engine with the starter motor and read the peak voltage.

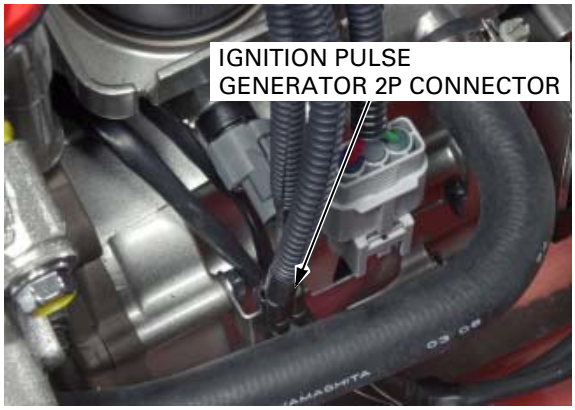
PEAK VOLTAGE: 0.7 V minimum

If the peak voltage measured at the ECM connector is abnormal, measure the peak voltage at the ignition pulse generator connector.



Disconnect the ignition pulse generator 2P black connector and connect the peak voltage tester or adaptor probes to the connector terminals of the ignition pulse generator side.
In the same manner as at the ECM connector, measure the peak voltage and compare it to the voltage measured at the ECM connector.

- If the peak voltage measured at the ECM is abnormal and the one measured at the ignition pulse generator is normal, the wire harness has an open or short circuit, or loose connection.
- If both peak voltages are abnormal, check each item in the troubleshooting table on page 17-5. If all items are normal, the ignition pulse generator is faulty.



IGNITION COIL

POWER/GROUND LINE INSPECTION

NOTE:

- If the ignition coil signal voltage is normal but there is no spark at the plug, perform this inspection.

Remove the seats (page 3-4).

Disconnect the direct ignition coil 3P connector.

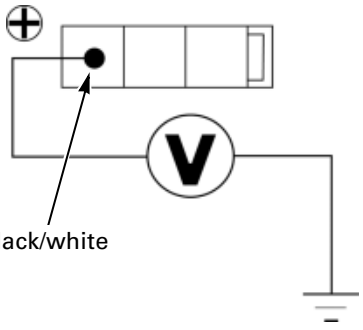
POWER INPUT LINE

Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the Black/white wire terminal (+) of the wire harness side ignition coil connector and ground (–).
There should be battery voltage.

If there is no voltage, check the following:

– open circuit in the Black/white wire between the direct ignition coil and fuse box
– blown sub-fuse A (7.5 A)
– open circuit in the Red/black wire between the fuse box and junction connector
– Loose or poor contact of the related connectors

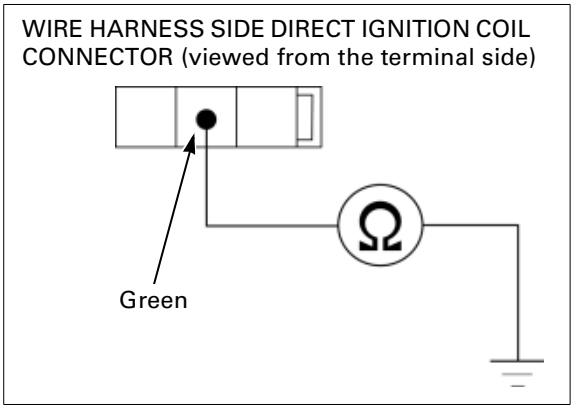
WIRE HARNESS SIDE DIRECT IGNITION COIL CONNECTOR (viewed from the terminal side)



GROUND LINE

Check for continuity between the Green wire terminal of the wire harness side ignition coil connector and ground.
There should be continuity at all times.

If there is no continuity, repair the open circuit in the Green wire between the ignition coil and ground terminal.



IGNITION TIMING

Remove the following:
- passenger grab rail (page 3-5)
- ARX1200T3/T3D: coupler covers; B and A (page 3-14)
  ARX1200N3: coupler cover (page 3-14)

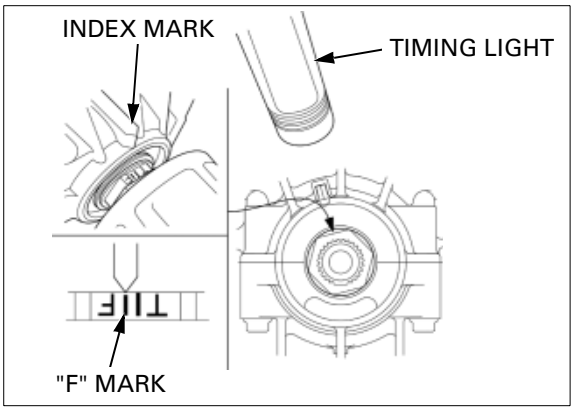
Start the engine according to the flushing procedure (page 5-2) and let it idle for 5 minutes to warm it up. If the air temperature is below 10°C (50°F), let it idle for an additional 5 minutes (a total of 10 minutes).
Turn off the water and stop the engine.

Read the manufacturer's instructions for timing light operation.

Connect the timing light to the No. 1 direct ignition coil wire.

Start the engine, let it idle and check the ignition timing.

The timing is correct if the "F" mark on the drive coupler aligns with the index mark.

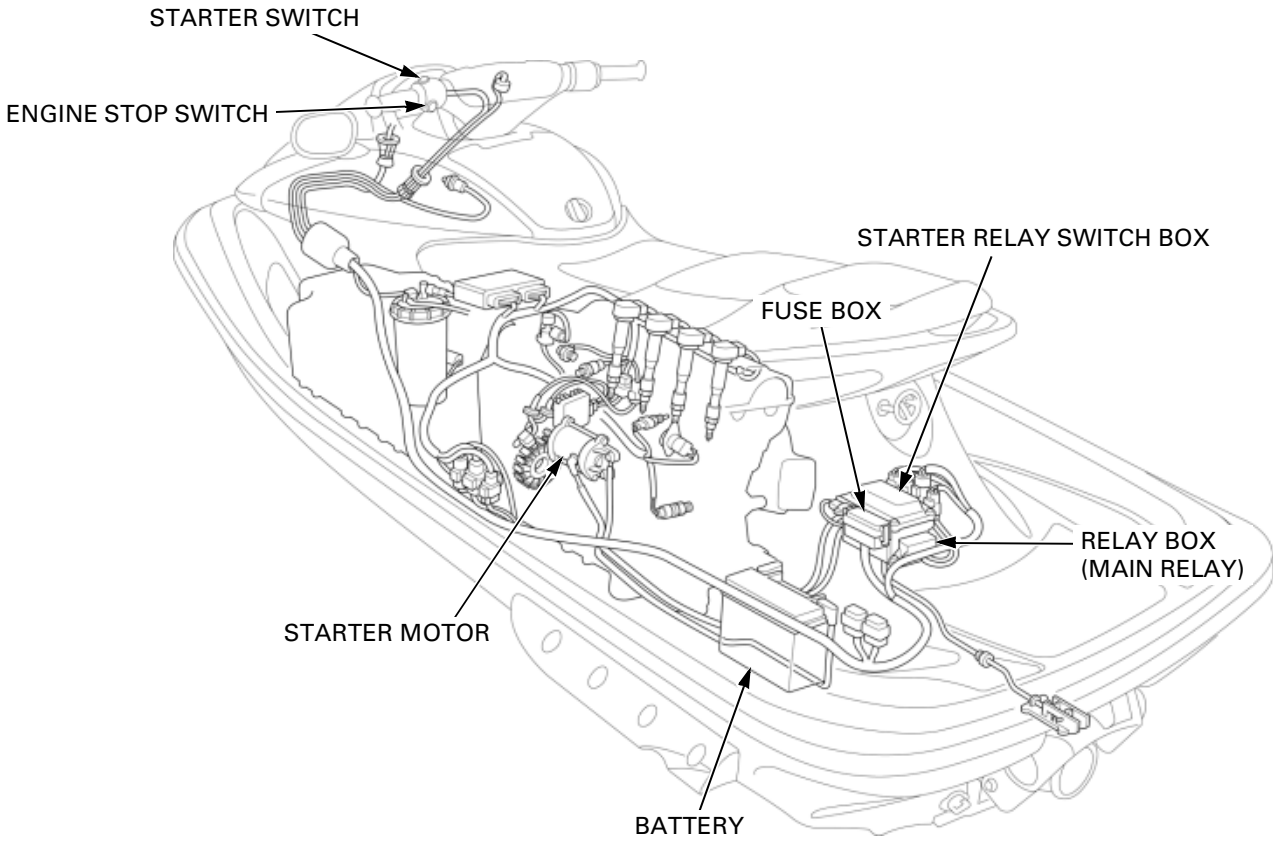


Remove the timing light.

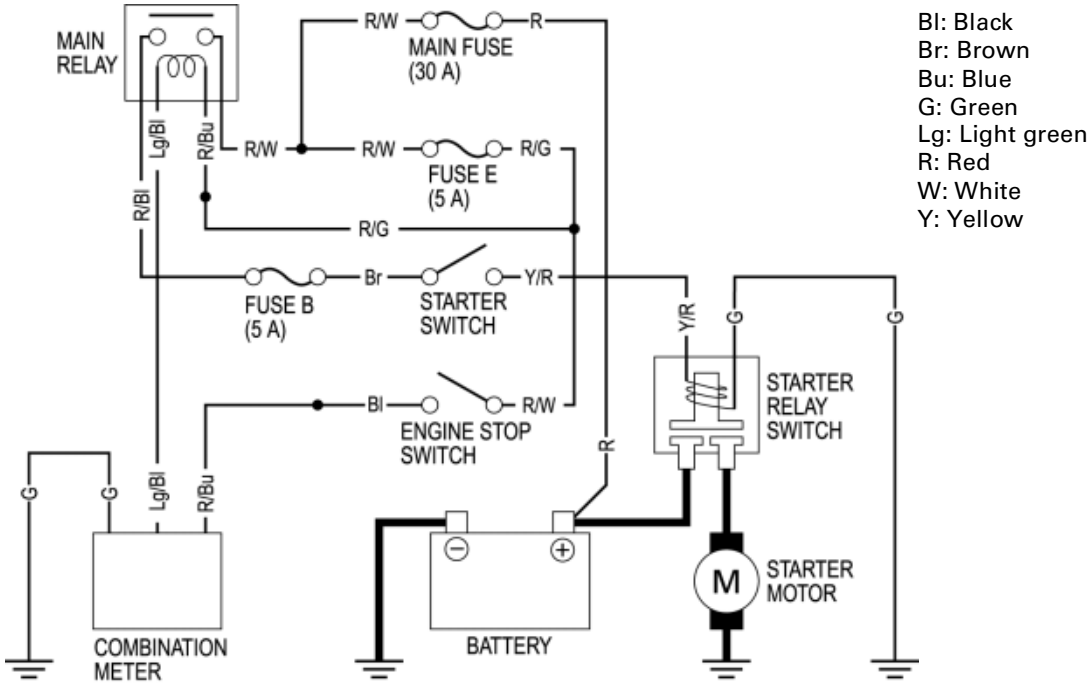
Install the coupler cover(s) (page 3-14).
Install the passenger grab rail (page 3-5).

18. ELECTRIC STARTER

COMPONENT LOCATION



SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

- Always remove the safety lanyard clip from the engine stop switch before servicing the starter motor. The motor could suddenly start, causing serious injury.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 18-4).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- If the current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.
- Refer to page 11-6 for the starter clutch servicing.
- Refer to page 19-18 for engine stop switch and starter switch inspection.
- Refer to page 19-19 for main relay inspection.
- Refer to page 19-4 for combination meter information.

SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.0 – 13.0 (0.47 – 0.51)	6.5 (0.26)

TORQUE VALUES

Intercooler stay bolt (ARX1200T3/T3D only)	25 N·m (2.6 kgf·m, 19 lbf·ft)
Starter relay switch box cover	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)

TROUBLESHOOTING

Starter motor does not turn

1. **Fuse Inspection**

   Check for blown main fuse (30 A) or sub-fuse E (5 A).

   Is the fuse blown?

   YES – Replace the fuse.

   NO – GO TO STEP 2.

2. **Battery Inspection**

   Check that the battery is fully charged and in good condition.

   Is the battery in good condition?

   YES – Charge the battery (page 16-6).

   NO – GO TO STEP 3.

3. **Starter Relay Switch Operation Inspection**

   Check the operation of the starter relay switch (page 18-12).

   Does the starter relay switch click?

   YES – GO TO STEP 4.

   NO – GO TO STEP 5.

4. **Starter Motor Inspection**

   Remove the safety lanyard switch from the engine stop switch.
   Apply battery voltage to the starter motor directly.

   Does the starter motor turn?

   YES –
   - Poorly connected starter motor cable
   - Faulty starter relay switch

   NO – Faulty starter motor (page 18-6)

5. **Relay Coil Ground Line Inspection**

   Remove the safety lanyard switch from the engine stop switch.
   Check the ground line of the starter relay switch (page 18-12).

   Is the ground line normal?

   YES – GO TO STEP 6.

   NO – Open circuit in the Green wire

6. **Relay Coil Power Input Line Inspection**

   Check the power input line of the starter relay switch (page 18-13).

   Is the power input line normal?

   YES – GO TO STEP 7.

   NO –
   - Faulty engine stop switch (page 19-18)
   - Faulty starter switch (page 19-18)
   - Blown sub-fuse B (5 A)
   - Faulty main relay or its circuits (page 19-19)
   - Loose or poor contact of the related connector
   - Open circuit in the wire harness

7. **Starter Relay Switch Inspection**

   Check the function of the starter relay switch (page 18-13).

   Does the starter relay switch function properly?

   YES – Loose or poor contact starter relay switch connector

   NO – Faulty starter relay switch

Starter motor turns engine slowly
- Low battery voltage
- Poorly connected battery cable
- Poorly connected starter motor cable
- Faulty starter motor
- Poorly connected ground cable terminal

Starter motor turns, but engine does not turn
- Faulty starter clutch
- Damaged starter gear train

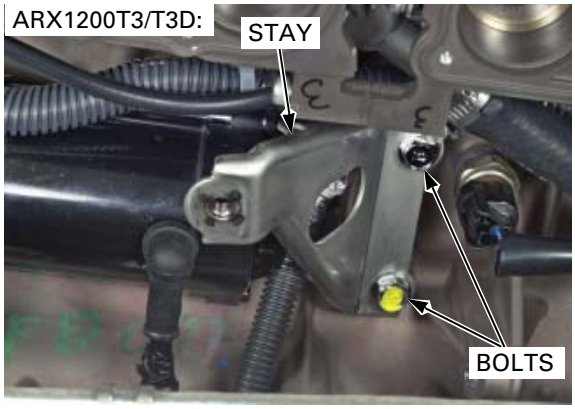
Starter relay switch clicks, but engine does not turn over
- Crankshaft does not turn due to engine problems
- Faulty starter clutch
- Faulty starter gear train

STARTER MOTOR

REMOVAL

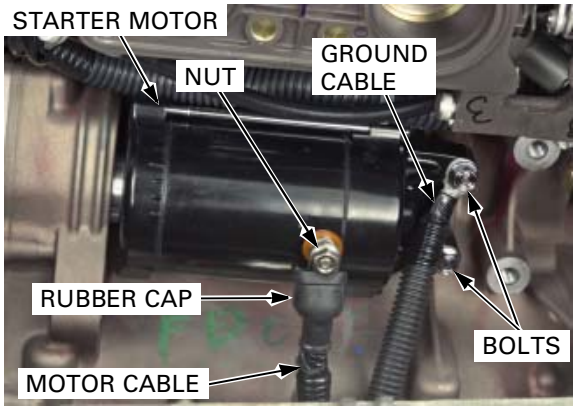
ARX1200T3/T3D: Remove the intercooler (page 13-12).
ARX1200N3: Remove the airbox (page 8-92).

ARX1200T3/T3D only: Remove the two bolt and the intercooler stay.



Slide the rubber cap off the starter motor cable terminal.
Remove the nut and the starter motor cable from the starter motor.
Remove the starter motor mounting bolts and ground cable.
Pull the starter motor out of the crankcase.

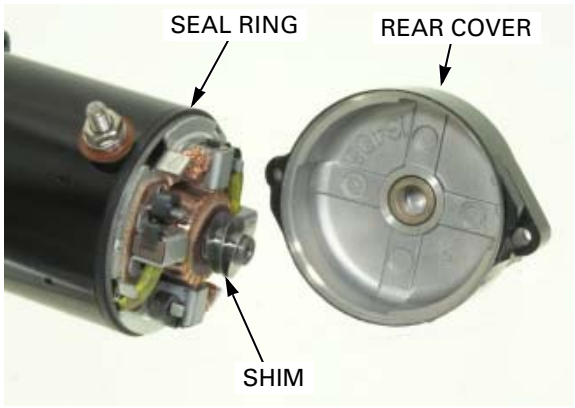
Remove the O-ring from the starter motor.



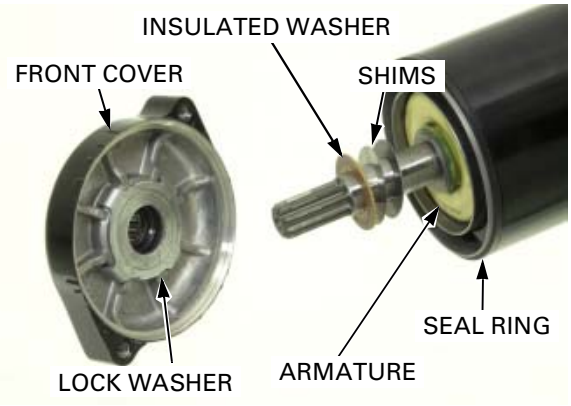
DISASSEMBLY

Remove the following:
– starter motor case bolts

Record the location and number of shims.
– rear cover
– seal ring
– shims



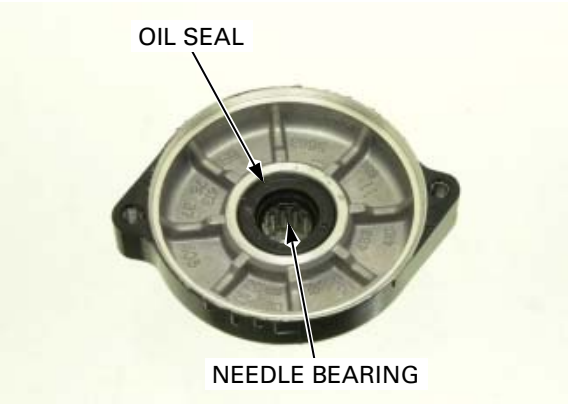
– front cover
– seal ring
– lock washer
– insulated washer
– shims
– armature



INSPECTION

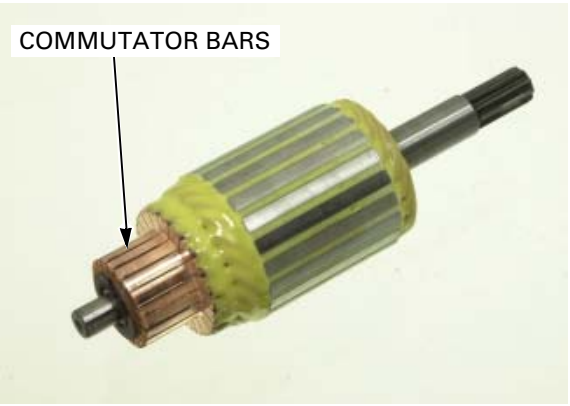
Check the bushing in the rear cover for wear or damage.

Check the oil seal and needle bearing in the front cover for deterioration, wear or damage.



Do not use emery or sand paper on the commutator.

Check the commutator bars of the armature for discoloration.



Check for continuity between pairs of commutator bars.
There should be continuity.

Check for continuity between each commutator bar and the armature shaft.
There should be no continuity.

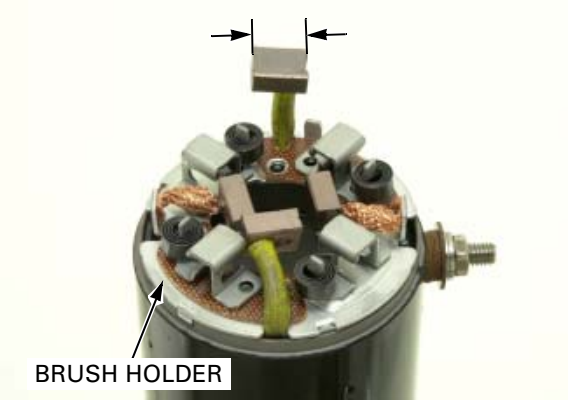
Check for continuity between the insulated brush and cable terminal.
There should be continuity.

Check for continuity between the cable terminal and motor case.
There should be no continuity.

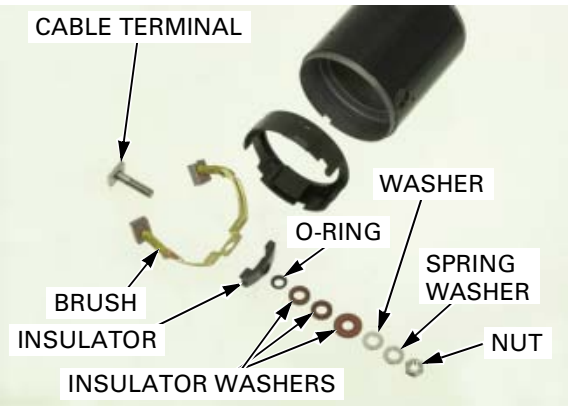
Inspect the brushes for damage and measure the brush length.

SERVICE LIMIT: 6.5 mm (0.26 in)

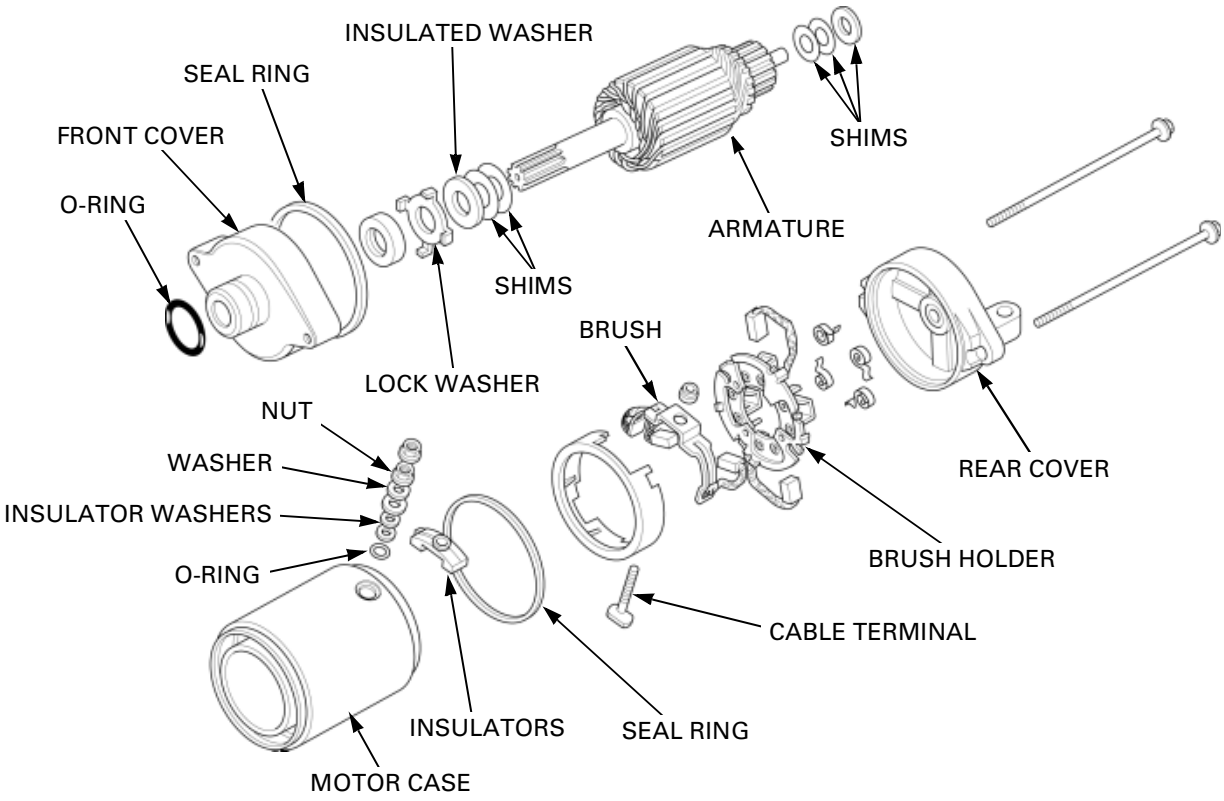
Remove the brush holder.



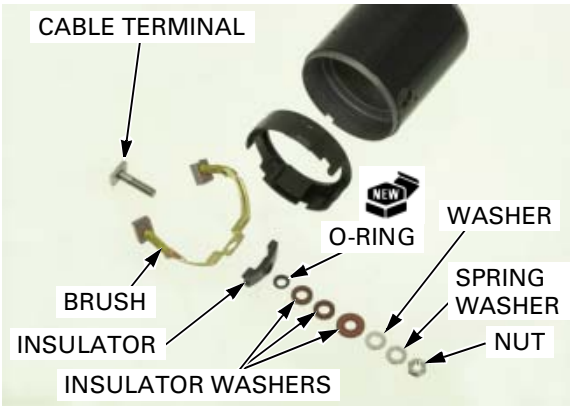
Remove the following:
- nut
- spring washer and washer
- insulator washers
- O-ring
- cable terminal
- insulated brush
- insulator



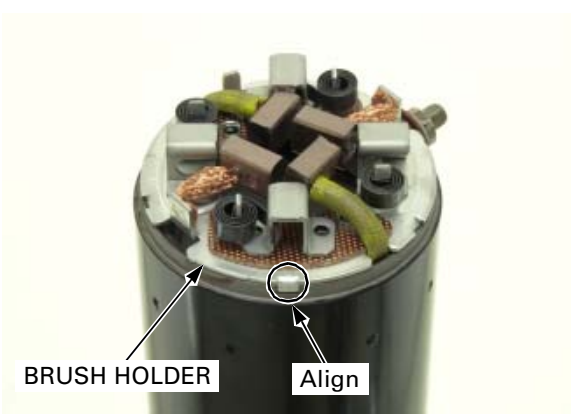
ASSEMBLY



Install the following:
– insulator
– insulated brush
– cable terminal
– new O-ring
– insulator washers
– spring washer and washer
– nut



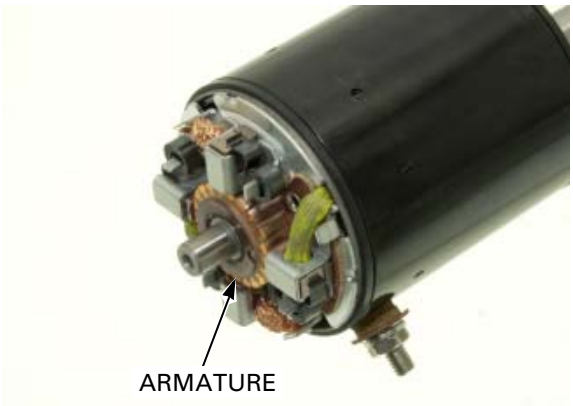
Install the brush holder, aligning the holder tab with the case groove, and the holder grooves with the insulated brush wires.



Push and hold the brushes inside the brush holder, and install the armature through the motor case and brush holder.
When installing the armature into the motor case, hold the armature tightly to keep the magnet of the case from pulling the armature against it.

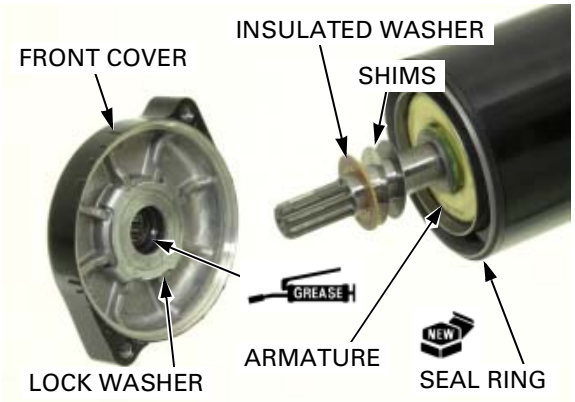
NOTICE

The coil may be damaged if the magnet pulls the armature against the case.



Install the shims properly as noted during removal.

Install the shims and insulated washer onto the armature shaft.
Install a new seal ring onto the motor case.
Apply grease to the oil seal lip and needle bearing in the front cover.
Install the lock washer onto the front cover.
Install the front cover.



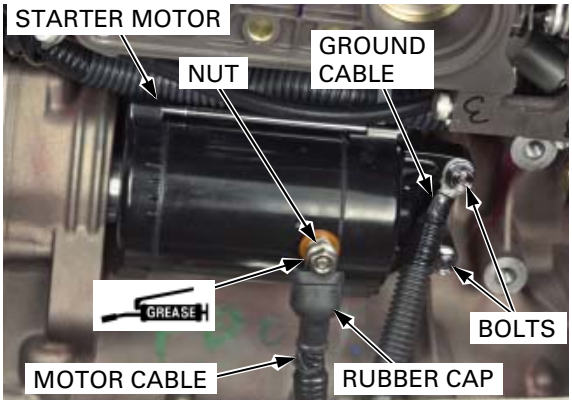
Install the same number of shims in the same location as noted during disassembly.
Install a new seal ring onto the motor case.
Apply a thin coat of grease to the armature shaft end.
Install the rear cover, aligning its groove with the brush holder tab.

Install and tighten the motor case bolts.

INSTALLATION

Coat a new O-ring with oil and install it into the starter motor groove.

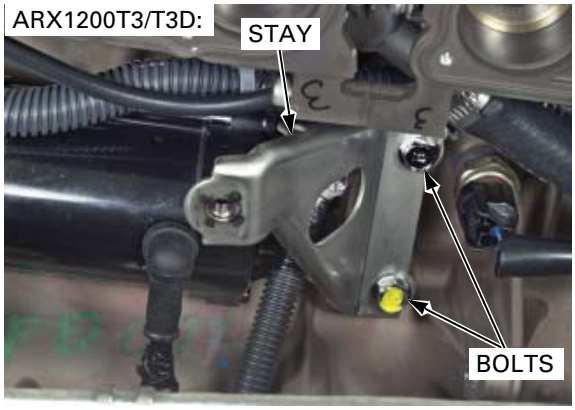
Install the starter motor into the crankcase.
Install the ground cable and mounting bolts, and tighten the bolts securely.
Connect the starter motor cable.
Install and tighten the terminal nut.
Apply grease to the starter motor cable terminal.
Install the rubber cap securely.



ARX1200T3/T3D only: Install the intercooler stay and tighten the two bolts.

TORQUE: 25 N·m (2.6 kgf·m, 19 lbf·ft)

ARX1200T3/T3D: Install the intercooler (page 13-12).
ARX1200N3: Install the airbox (page 8-93).



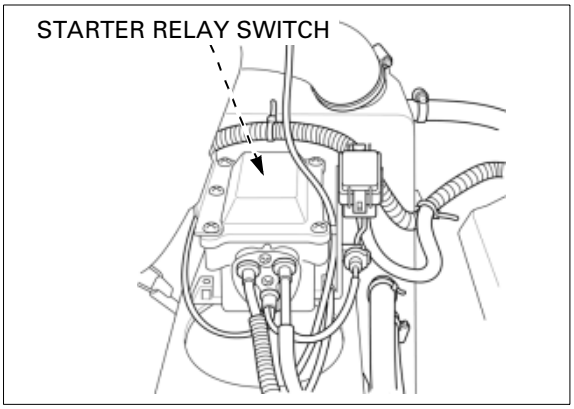
STARTER RELAY SWITCH

INSPECTION

Remove the passenger grab rail (page 3-5).

OPERATION

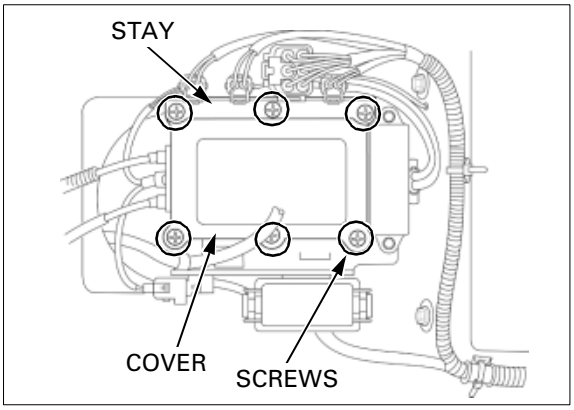
Fit the safety lanyard clip to the base of the engine stop switch.
Depress the starter switch.
The coil is normal if the starter relay switch clicks.
If you don't hear the switch click, inspect the relay switch and its circuits using the procedures below.



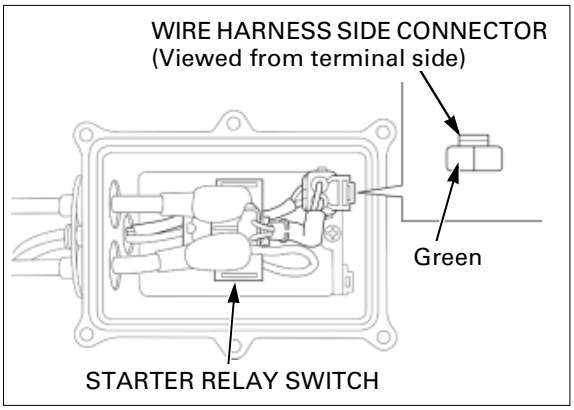
GROUND LINE

Remove the safety lanyard clip from the engine stop switch.

Remove the six screws, connector stay and starter relay switch box cover.



Disconnect the starter relay switch 2P connector.
Check for continuity between the Green wire terminal of the wire harness side connector and ground.
There should be continuity at all times.

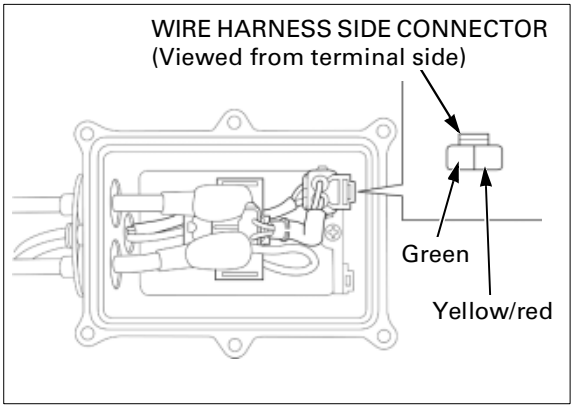


POWER INPUT LINE

Disconnect the starter relay switch 2P connector.
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the wire harness side connector terminal (+) and ground (–).

CONNECTION: Yellow/red (+) – Green (–)

There should be battery voltage when the starter switch is depressed.



FUNCTION

Remove the safety lanyard clip from the engine stop switch.
Disconnect the battery and starter motor cables from the starter relay switch.
Connect an ohmmeter to the starter relay switch cable terminals.
Connect a fully charged 12-V battery to the starter relay switch connector terminals.

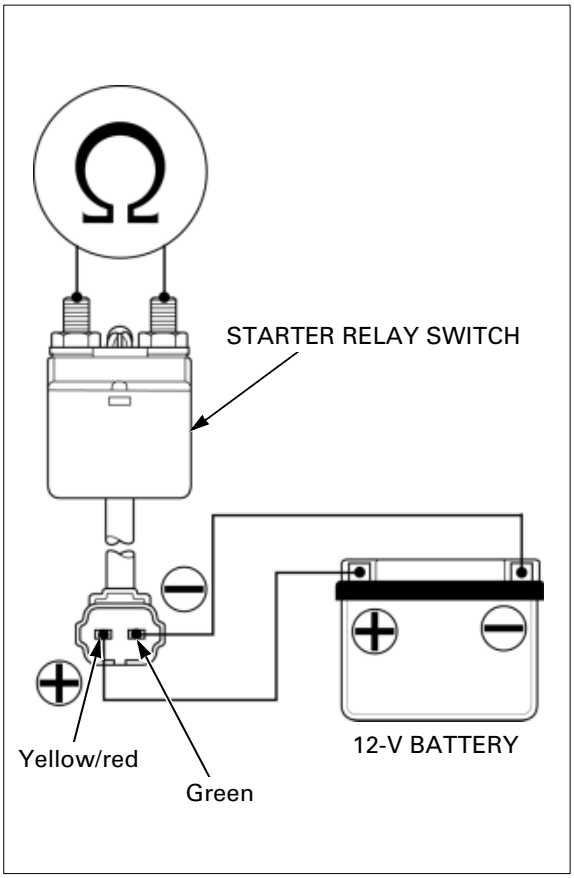
CONNECTION: Yellow/red (+) – Green (–)

There should be continuity while the 12-V battery is connected to the starter relay switch connector terminals and there should be no continuity when the battery is disconnected.

After inspection, connect the battery cable, starter motor cable and starter relay switch connector.
Install the starter relay switch box cover, connector stay and tighten the six screws.

TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)

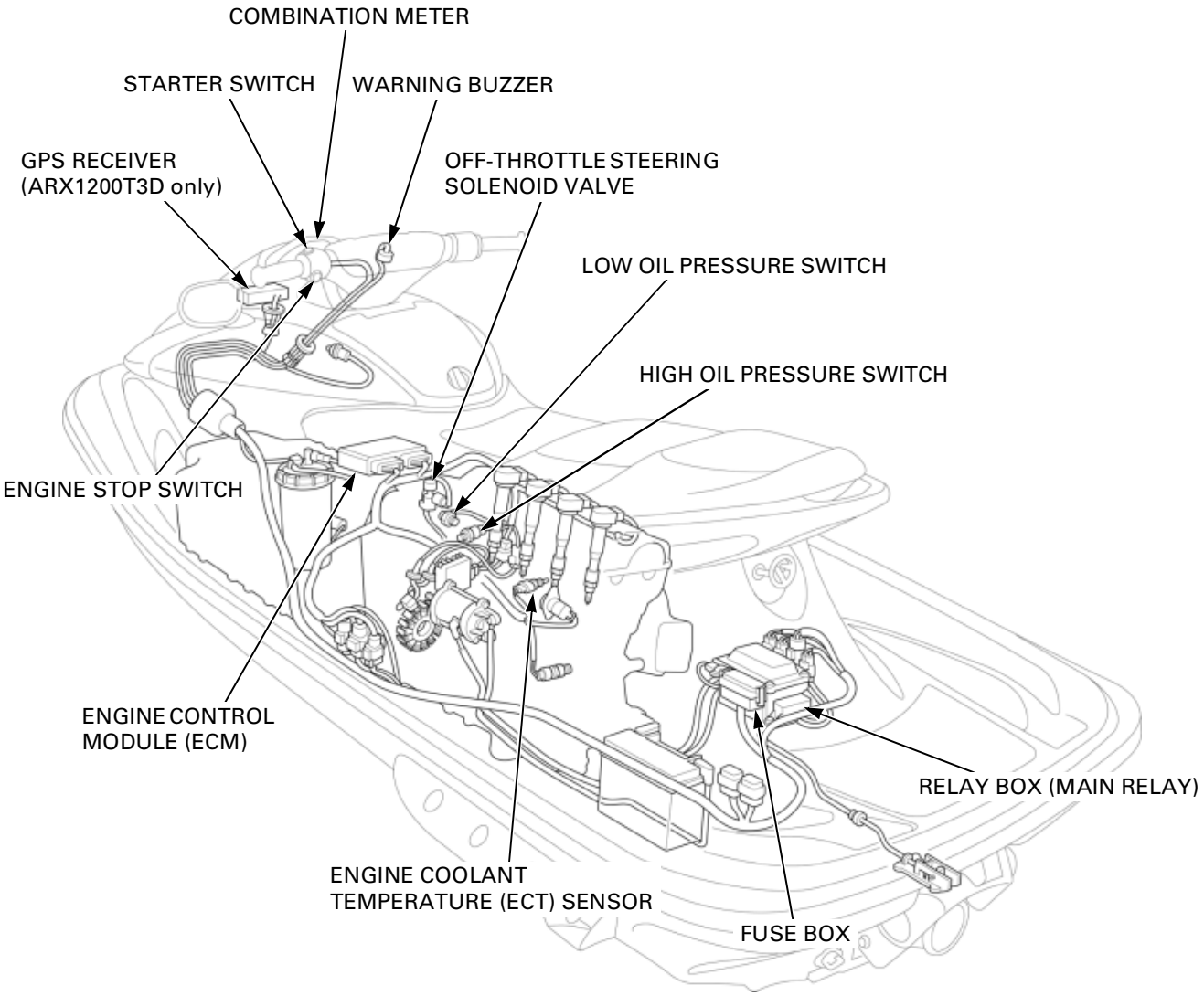
Install the passenger grab rail (page 3-5).



MEMO

19. METER/SWITCHES

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- Use an electric heating element to heat the coolant mixture for the engine coolant temperature sensor inspection. Keep flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the watercraft.
- The following color codes are used throughout this section.

Bu = Blue	G = Green	Lg = Light Green	R = Red
Bl = Black	Gr = Gray	O = Orange	W = White
Br = Brown	Lb = Light Blue	P = Pink	Y = Yellow

SPECIFICATIONS

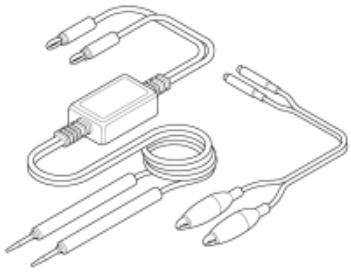
ITEM		SPECIFICATIONS
Bulb	Warning indicator	LED
Fuse	Main fuse	30 A
	Sub fuse	7.5 A X 3, 5 A X 2
Tachometer peak voltage		10.5 V minimum

TORQUE VALUE

Off-throttle steering limit switch nut 2.9 N·m (0.3 kgf·m, 2.2 lbf·ft)
Speed sensor wire setting nut 4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)

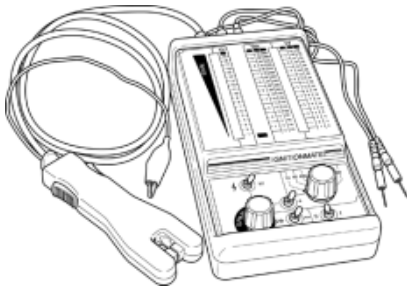
TOOLS

Peak voltage adaptor
07HGJ-0020100



(not available in U.S.A.) with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

IgnitionMate peak voltage tester
MTP07-0286 (U.S.A. only)*



* Available through the Motorcycle Tool and Equipment Program; to order call 888-424-6857.

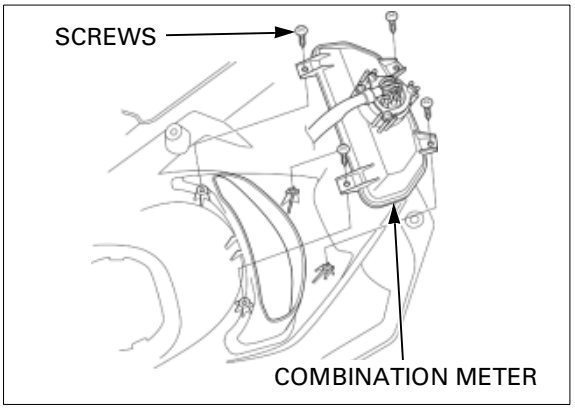
COMBINATION METER

REMOVAL/INSTALLATION

Remove the post cover page 3-7.

Remove the four screws and the combination meter from the post cover.

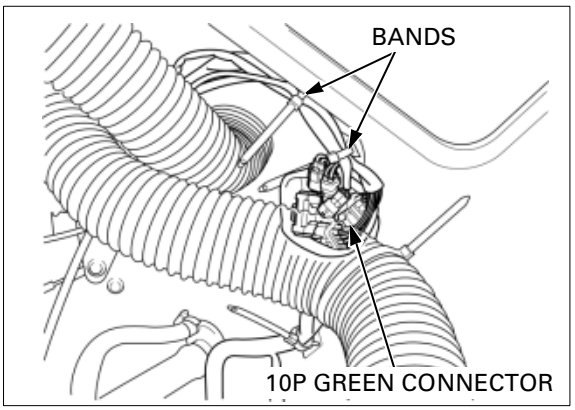
Install the combination meter in the reverse order of removal.



POWER/GROUND LINE INSPECTION

Remove the storage box page 3-8.

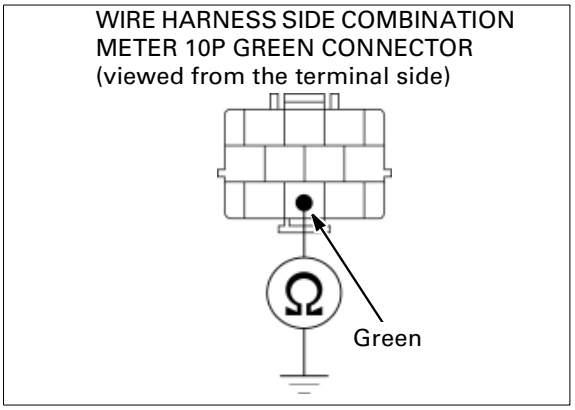
Release the wire bands.
Disconnect the combination meter 10P green connector.
Check the following at the wire harness side connector terminals:



GROUND LINE

Check for continuity between the Green wire terminal and engine ground.
There should be continuity at all times.

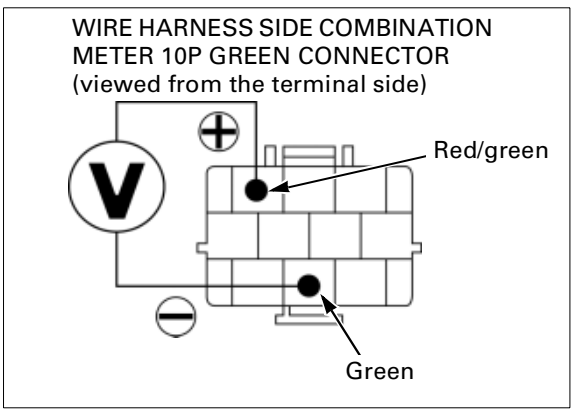
If there is no continuity, repair the open circuit in the Green wire.



BACK-UP VOLTAGE LINE

Measure the voltage between the Red/green (+) and Green (–) wire terminals.
There should be battery voltage at all times.

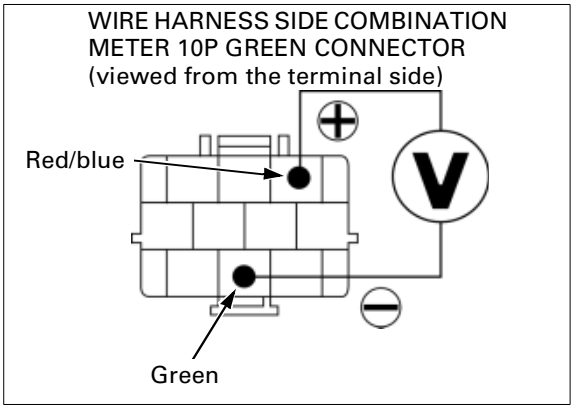
If there is no voltage, check the following:
- open circuit in the Red/green wire between the combination meter connector and sub-fuse E
- blown sub-fuse E (5 A)
- open circuit in the Red/white wire between sub-fuse E and main fuse
- blown main fuse (30 A)
- open circuit in the Red wire between the main fuse and battery



POWER INPUT LINE

Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the Red/blue (+) and Green (–) wire terminals.
There should be battery voltage.

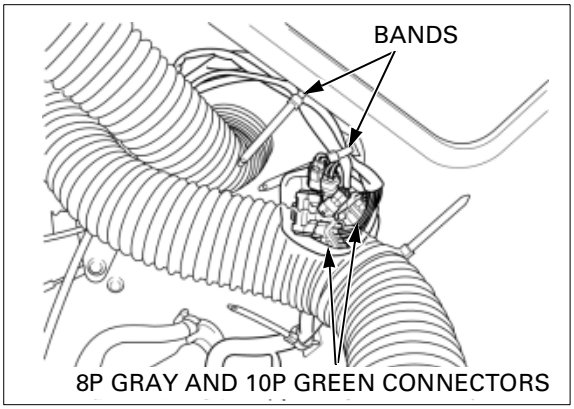
If there is no voltage, check the following:
– open circuit in the Red/blue wire between the combination meter connector and engine stop switch
– faulty engine stop switch (page 19-18)
– open circuit in the Red/green wire between the engine stop switch and junction connector



OUTPUT CIRCUIT INSPECTION

Remove the storage box page 3-8.

Release the wire bands.
Disconnect the combination meter 8P gray and 10P green connector.
Check the following at the wire harness side connector terminals:

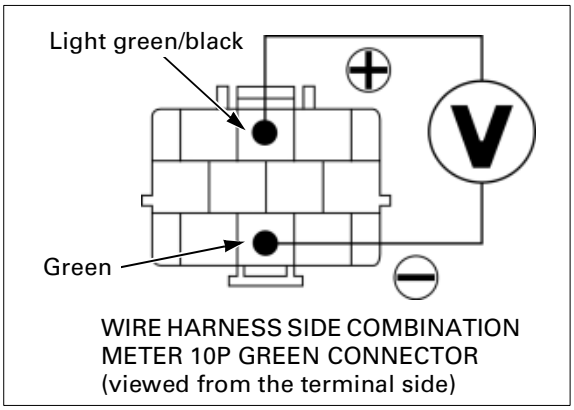


MAIN RELAY

Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the Light green/black (+) and Green (–) wire terminals.
There should be battery voltage.

If there is no voltage, check the power input line (page 19-5).

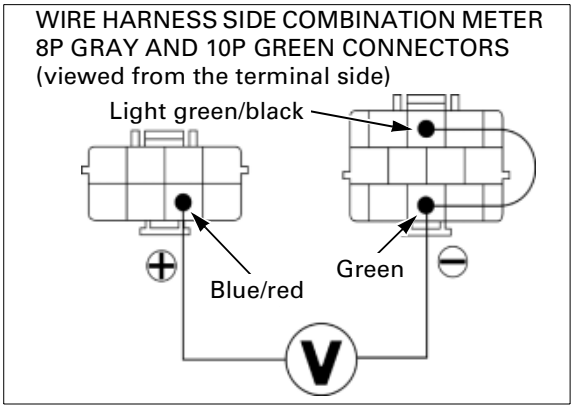
If the power input line is normal, check the following:
– open circuit in the Light green/black wire between the combination meter and main relay
– faulty main relay (page 19-19)
– open circuit in the Red/blue wire between the main relay and junction connector



LIMIT MODE

Connect the Light green/black and Green wire terminals of the 10P green connector with a jumper wire.
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the Blue/red (+) wire terminal of the 8P gray connector and Green (–) wire terminal of the 10P green connector.
There should be approximately 5 V.

If there is no voltage, check for an open circuit in the Blue/red wire between the combination meter and ECM.



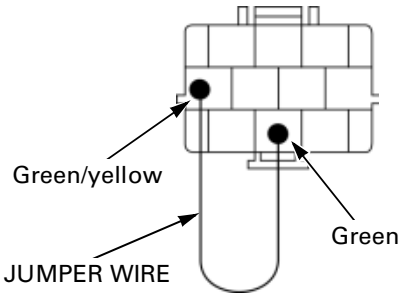
WARNING BUZZER

Fit the safety lanyard clip to the base of the engine stop switch.
Connect the Green/yellow and Green wire terminals of the 10P green connector with a jumper wire.
The warning buzzer should sound.

If the warning buzzer does not sound, check the power input line (page 19-5).

If the power input line is normal, check the following:
– open circuit in the Green/yellow wire between the combination meter and warning buzzer
– faulty warning buzzer
– open circuit in the Red/blue wire between the warning buzzer and junction connector

WIRE HARNESS SIDE COMBINATION METER 10P GREEN CONNECTOR
(viewed from the terminal side)

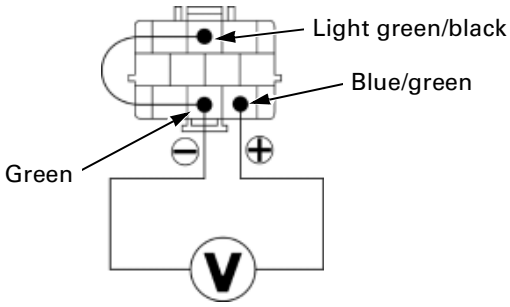


ECM LOCK

Connect the Light green/black and Green wire terminals of the 10P green connector with a jumper wire.
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the Blue/green (+) and Green (–) wire terminals.
There should be approximately 5 V.

If there is no voltage, check for an open circuit in the Blue/green wire between the combination meter and ECM.

WIRE HARNESS SIDE COMBINATION METER 10P GREEN CONNECTOR
(viewed from the terminal side)

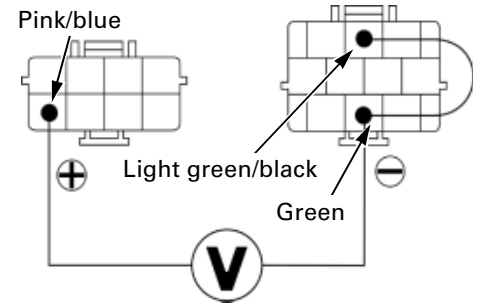


DIAGNOSTIC SWITCH

Connect the Light green/black and Green wire terminals of the 10P green connector with a jumper wire.
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the Pink/blue (+) wire terminal of the 8P gray connector and Green (–) wire terminal of the 10P green connector.
There should be approximately 5 V.

If there is no voltage, check for an open circuit in the Pink/blue wire between the combination meter and ECM.

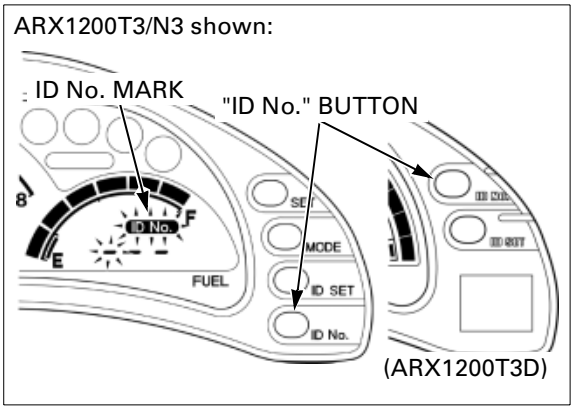
WIRE HARNESS SIDE COMBINATION METER 8P GRAY AND 10P GREEN CONNECTORS
(viewed from the terminal side)



ID NUMBER WRITING PROCEDURES

To create a ID number

1. Fit the safety lanyard clip to the base of the engine stop switch to turn on the display.
2. Press and hold the "ID No." button for at least 2 seconds.
   The warning buzzer sounds once, and the ID No. mark and the first digit of the ID number come on and start blinking.

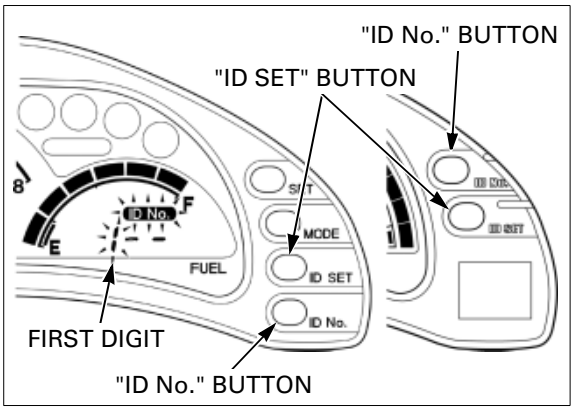


3. Push the "ID No." button until the first digit of the desired ID number is displayed.

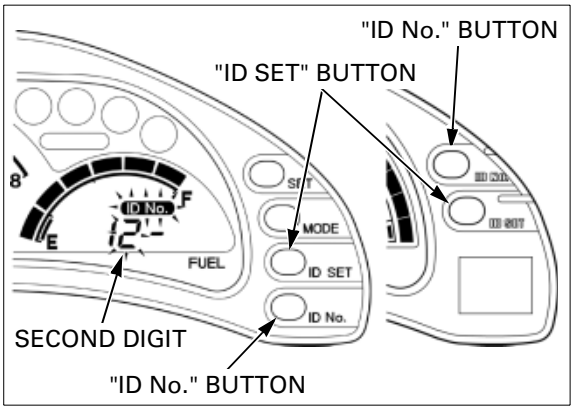
NOTE:

- To advance the number, press and hold the "ID No." button.

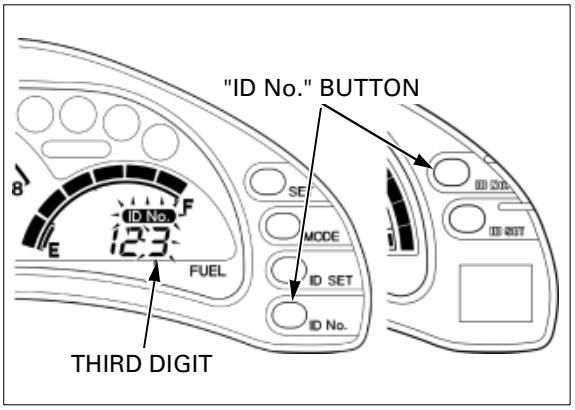
4. Push the "ID SET" button.
   The second digit of the ID number starts blinking.



5. Push the "ID No." button until the second digit of the desired ID number is displayed.
6. Push the "ID SET" button.
   The third digit of the ID number starts blinking.

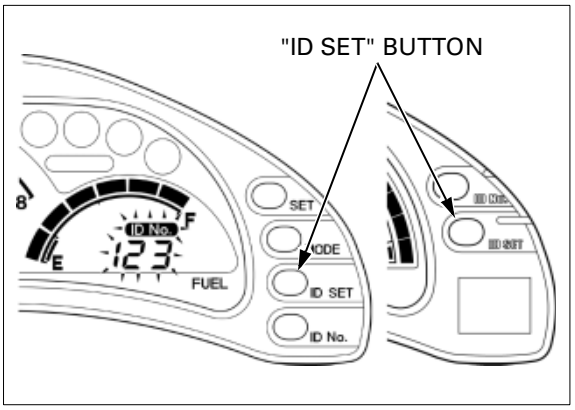


7. Push the "ID No." button until the third digit of the desired ID number is displayed.



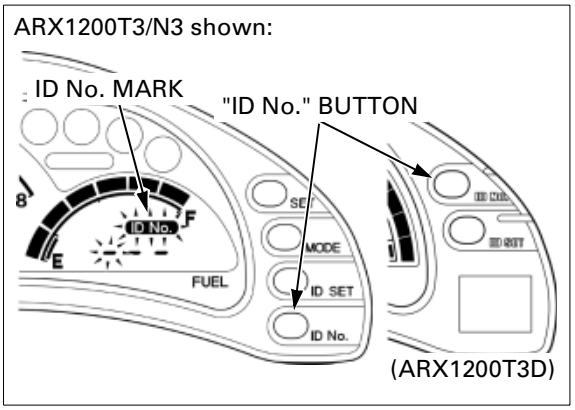
8. Push the "ID SET" button.
   The 3 digits of the registered ID number start blinking.
9. Push and hold the "ID SET" button for at least 2 seconds.
   The warning buzzer sounds once, the entered ID numbers are displayed for 2 seconds and the display returns to normal.

NOTE:
- "000" cannot be registered.

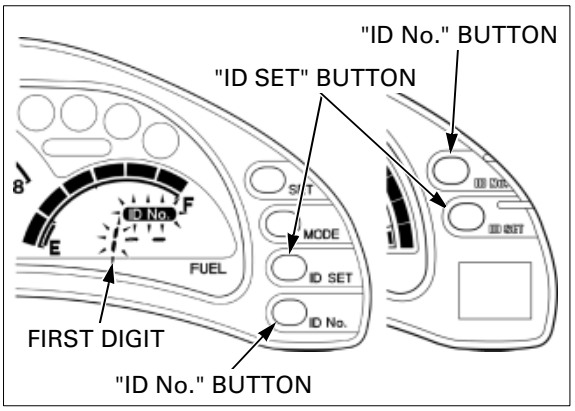


To change the ID number

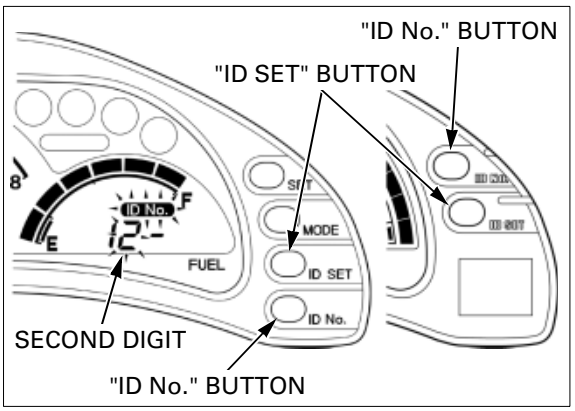
1. Fit the safety lanyard clip to the base of the engine stop switch to turn on the display.
2. Press and hold the "ID No." button for at least 2 seconds.
   The ID No. mark and the first digit of the ID number come on and start blinking.



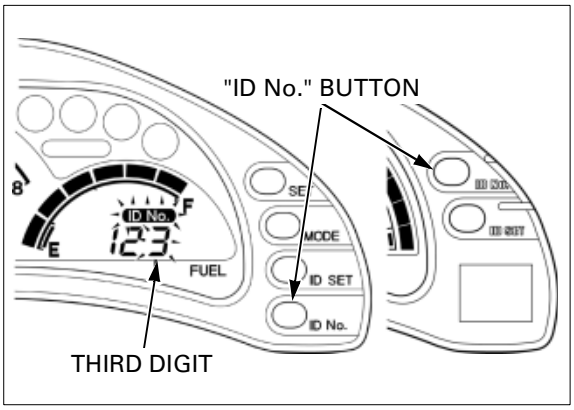
3. Push the "ID No." button until the first digit of the registered ID number is displayed.
4. Push the "ID SET" button.
   The second digit of the ID number starts blinking.



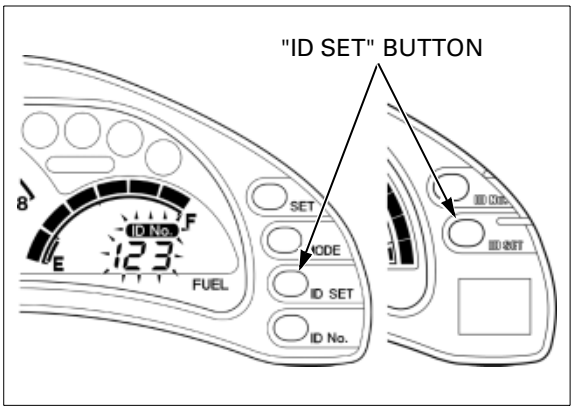
5. Push the "ID No." button until the second digit of the registered ID number is displayed.
6. Push the "ID SET" button.
   The third digit of the ID number starts blinking.



7. Push the "ID No." button until the third digit of the registered ID number is displayed.



8. Push the "ID SET" button.
   The 3 digits of the registered ID number start blinking.

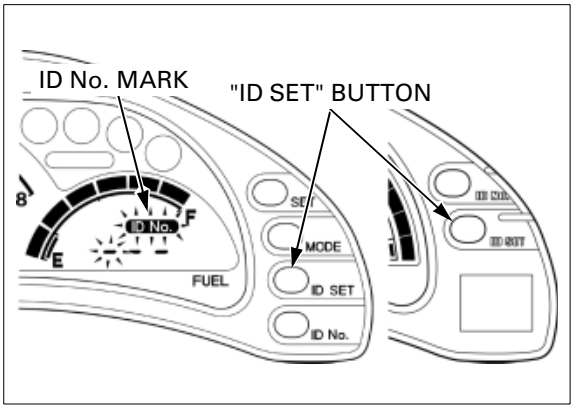


9. Push and hold the "ID SET" button for at least 2 seconds.
   The warning buzzer sounds once and the first digit of the ID number starts blinking.

NOTE:

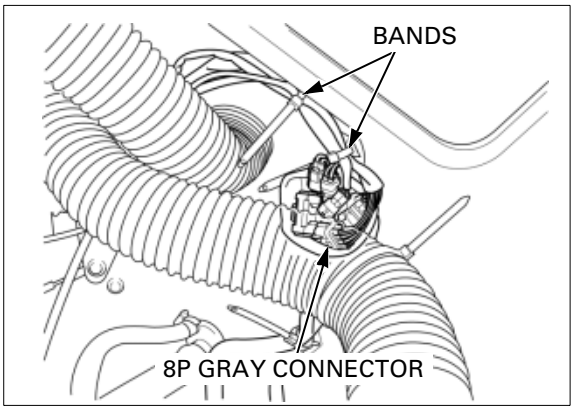
- If the incorrect ID number is entered, the warning buzzer sounds for 5 seconds.

10. Follow steps 3 to 9 in "To create an ID number" (page 19-7).

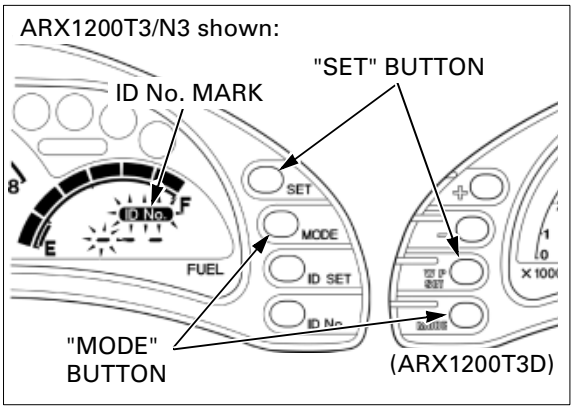


To unlock the system if the customer forgets the entered ID number

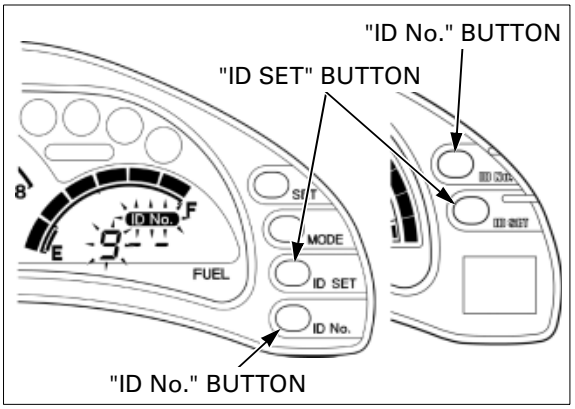
1. Remove the storage box page 3-8.
2. Release the wire bands. Disconnect the combination meter 8P gray connector.



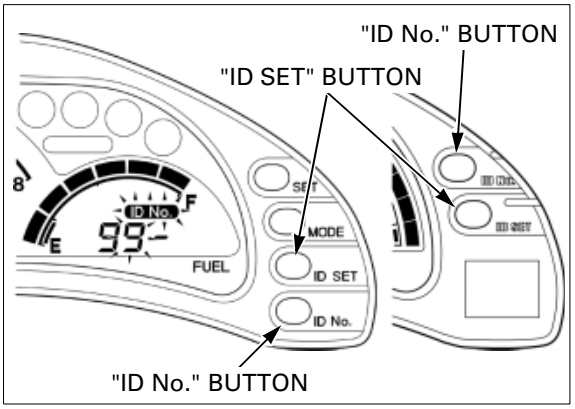
3. With the "MODE" and "SET" buttons pushed, fit the safety lanyard clip to the base of the engine stop switch and hold the "MODE" and "SET" buttons for at least 5 seconds.
   The ID No. mark and the first digit of the ID number come on and start blinking, and the warning buzzer beeps.



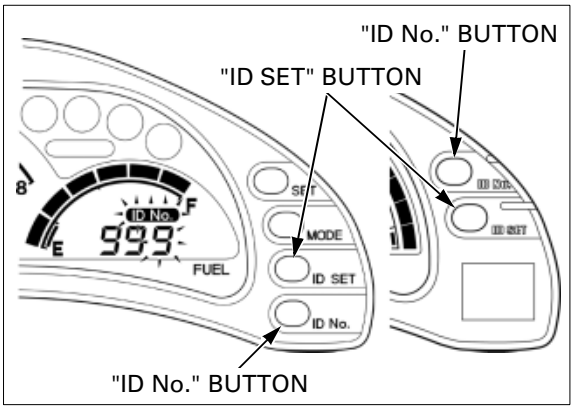
4. Push the "ID No." button until "9" is displayed.
5. Push the "ID SET" button.
   The second digit of the ID number starts blinking.



6. Push the "ID No." button until "9" is displayed.
7. Push the "ID SET" button.
   The third digit of the ID number starts blinking.



8. Push the "ID No." button until "9" is displayed.
9. Push the "ID SET" button.
   The combination meter turns off.
10. Pull the safety lanyard clip off of the engine stop switch.
    Connect the combination meter 8P connector and install the storage box page 3-8.
    Fit the safety lanyard clip to the base of the engine stop switch.
    The system is unlocked.



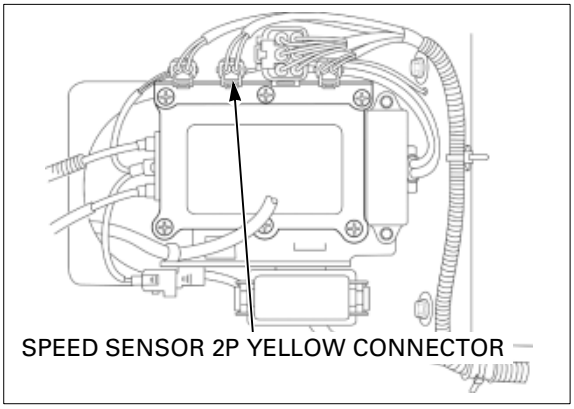
SPEEDOMETER/SPEED SENSOR

SYSTEM INSPECTION

Remove the passenger grab rail page 3-5.

Disconnect the speed sensor 2P yellow connector.
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the Blue/white (+) and Black/orange (–) wire terminals of the wire harness side connector.
There should be battery voltage.

- If there is no voltage, check the Blue/white and Black/orange wires. If the wires are OK, replace the combination meter.
- If there is battery voltage, replace the speed sensor with a known-good one and check the speedometer operation.



SPEED SENSOR REMOVAL/ INSTALLATION

Remove the jet pump (page 14-8).

Disconnect the speed sensor 2P yellow connector.

Be careful not to damage the sensor connector when removing it through the wire holder hole.

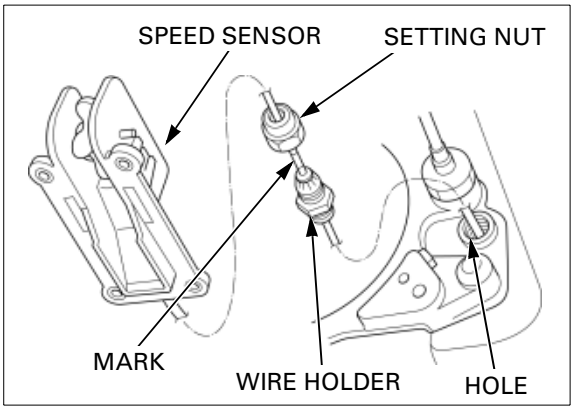
Remove the wire setting nut, wire holder and the speed sensor.

Insert the speed sensor 2P connector through the wire holder hole.
Install the wire holder into the hole and tighten it.
Align the locating mark on the wire with the wire holder end, install the wire setting nut and tighten it.

TORQUE: 4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)

Connect the speed sensor 2P connector.

Install the jet pump page 14-24.

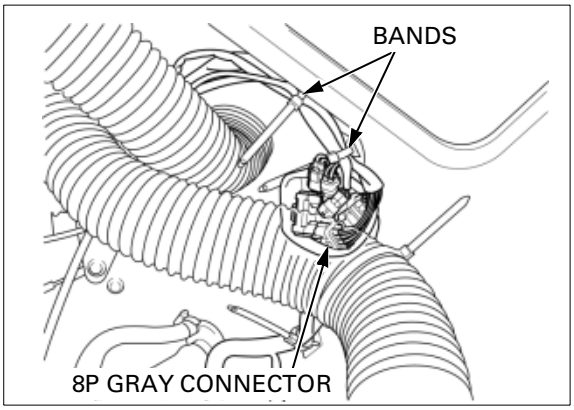


TACHOMETER

SYSTEM INSPECTION

Remove the storage box page 3-8.

Release the wire bands.
Disconnect the combination meter 8P gray connector.



Connect the peak voltage adaptor to the Pink (+) wire terminal and engine ground (–).

TOOLS:

IgnitionMate peak voltage tester	**MTP07-0286 (U.S.A. only) or**
Peak voltage adaptor with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)	**07HGJ-0020100 (not available in U.S.A.)**

CONNECTION: Pink (+) – engine ground (–)

Start the engine and measure the tachometer input peak voltage.

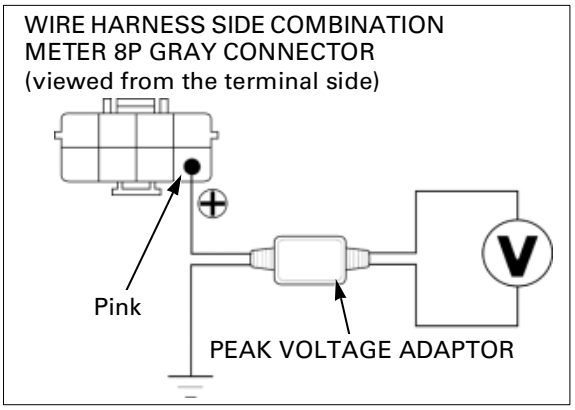
PEAK VOLTAGE: 10.5 V minimum

If the measured value is more than 10.5 V, replace the combination meter.

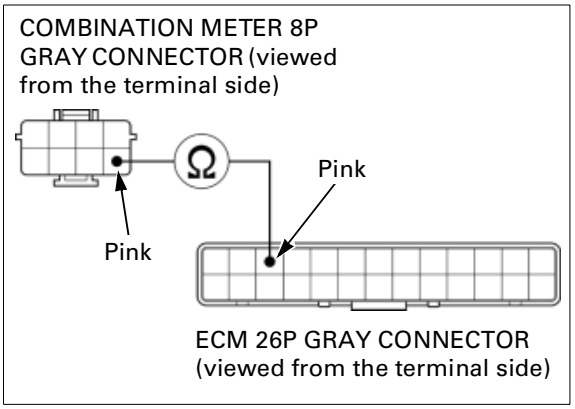
If the measured value is below 10.5 V, replace the ECM.

If there is no voltage, check as follows:

1. Remove the seats (page 3-4).
2. Disconnect the ECM 26P gray connector.



3. Check for an open or short circuit in the Pink wire between the combination meter 8P connector and ECM 26P gray connector.
   If the Pink wire is OK, replace the ECM.

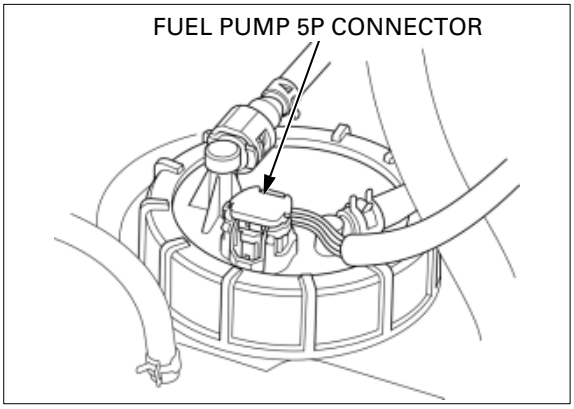


FUEL GAUGE/FUEL LEVEL SENSOR

SYSTEM INSPECTION

Remove the storage box page 3-8.

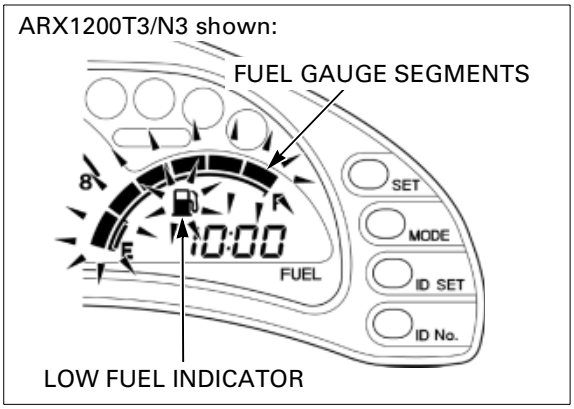
Disconnect the fuel pump 5P connector.



Fit the safety lanyard clip to the base of the engine stop switch and check the fuel gauge.
All segments and low fuel indicator should blink and the warning buzzer should beep.

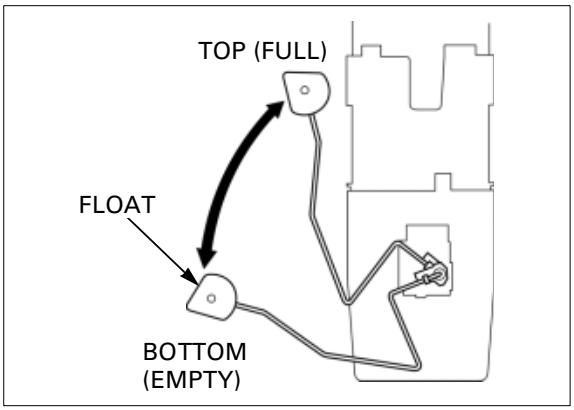
Pull the safety lanyard clip off of the engine stop switch.
Connect the Gray/white and Gray/black wire terminal of the 5P connector with a jumper wire.
Fit the safety lanyard clip to the base of the engine stop switch and check the fuel gauge.
All segments and low fuel indicator should blink and the warning buzzer should beep.

If the fuel gauge, low fuel indicator and warning buzzer do not function properly, replace the combination meter (page 19-4).



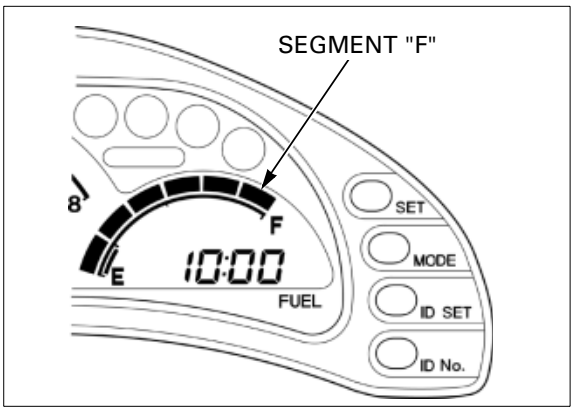
Remove the fuel pump assembly page 8-82.

Connect the fuel pump 5P connector.
With the fuel level sensor float at the top (FULL) position, fit the safety lanyard clip to the base of the engine stop switch and check the fuel gauge.



All segments up to segment "F" should come on.

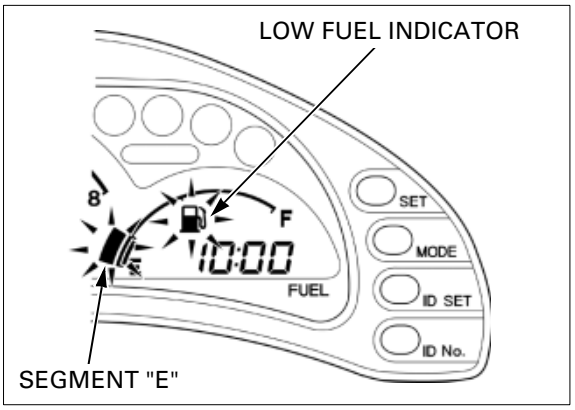
Pull the safety lanyard clip off of the engine stop switch to turn off the combination meter.



Move the float to the bottom (EMPTY) position, fit the safety lanyard clip to the base of the engine stop switch and check the fuel gauge.
Segment "E" and the low fuel indicator should blink and the warning buzzer should beep.

If the fuel gauge, low fuel indicator and warning buzzer do not function properly, check the fuel level sensor (page 19-14).
If the fuel level sensor is OK, replace the combination meter.

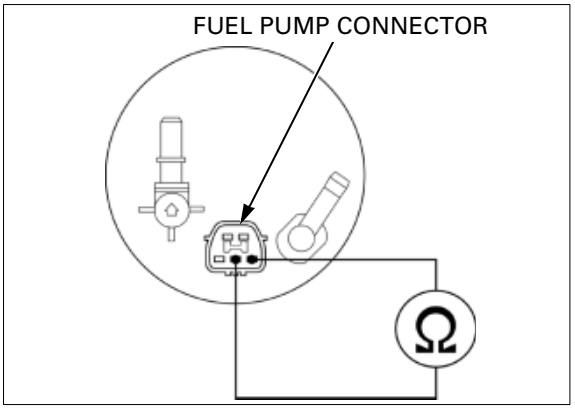
If all segments blink and the warning buzzer beeps during inspection, check for an open or short circuit in the Gray/white and Gray/black wires.



FUEL LEVEL SENSOR INSPECTION

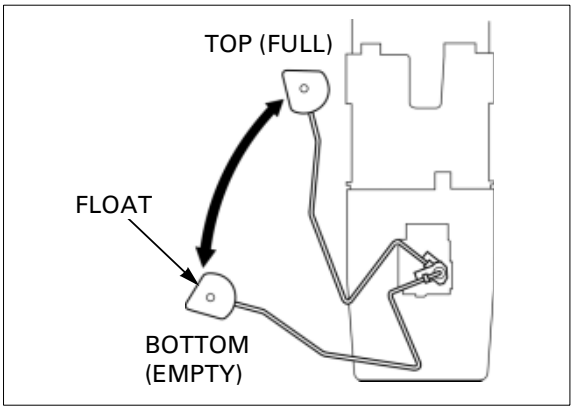
Remove the fuel pump assembly page 8-82.

Connect the ohmmeter to the fuel level sensor terminals of the fuel pump connector as shown.



Measure the fuel level sensor resistance with the float at the top (FULL) and bottom (EMPTY) positions.

FLOAT POSITION	RESISTANCE (20°C/68°)
TOP (FULL)	11 – 13 Ω
TOP (FULL)	130 – 132 Ω



INDICATORS

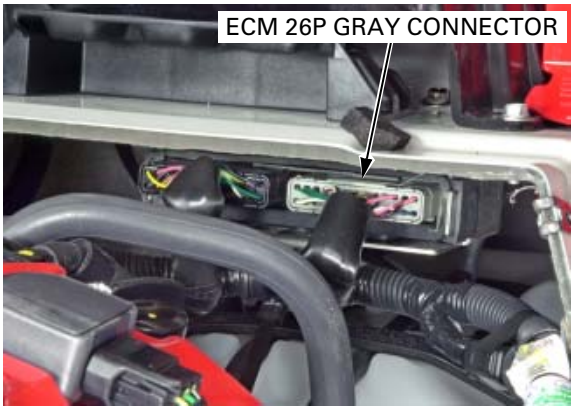
INSPECTION

NOTE:

- The charging system indicator blinks and the warning buzzer beeps when the charging system stops charging the battery (the battery voltage is 11.8 V) while the engine is running.

Remove the seats (page 3-4).

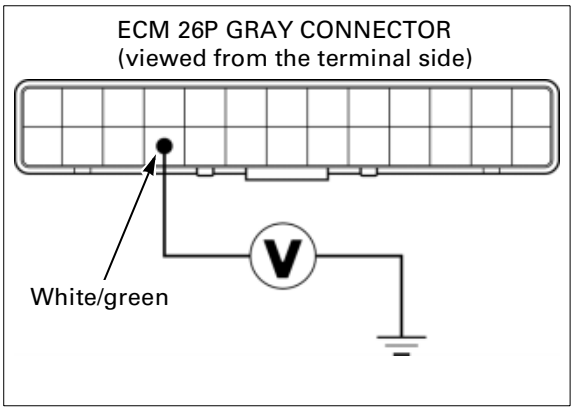
Disconnect the ECM 26P gray connector.



ENGINE COOLING WATER TEMPERATURE INDICATOR

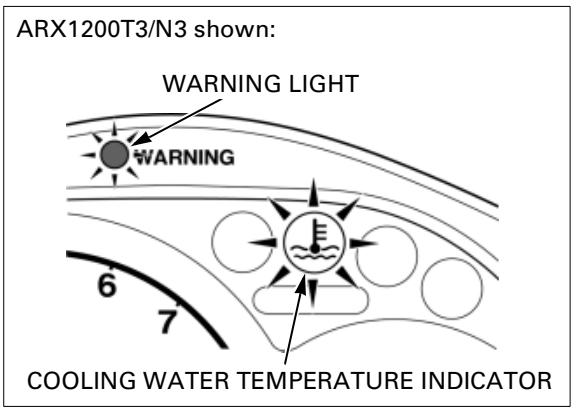
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the White/green wire terminal (+) of the ECM 26P gray connector and ground (–).
There should be approximately 5 V.

If there is no voltage, check an open circuit in the White/green wire.



Ground the White/green wire terminal with a jumper wire.
The warning light and cooling water temperature indicator should blink and the warning buzzer should beep.

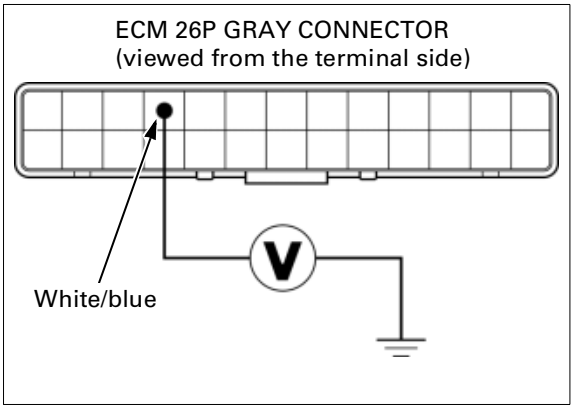
If the warning light and indicator do not blink and the buzzer does not beep, replace the combination meter.



ENGINE OIL PRESSURE INDICATOR

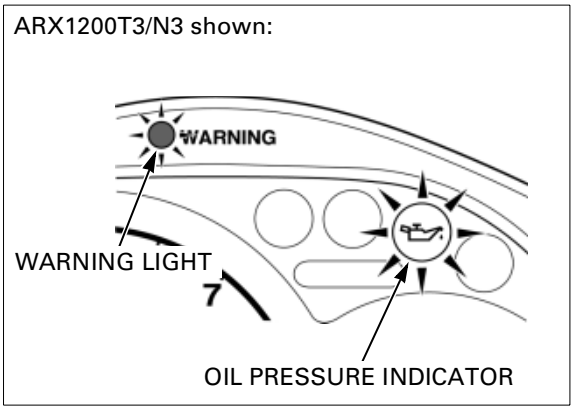
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the White/blue wire terminal (+) of the ECM 26P gray connector and ground (–).
There should be approximately 5 V.

If there is no voltage, check an open circuit in the White/blue wire.



Ground the White/blue wire terminal with a jumper wire.
The warning light and oil pressure indicator should blink and the warning buzzer should beep.

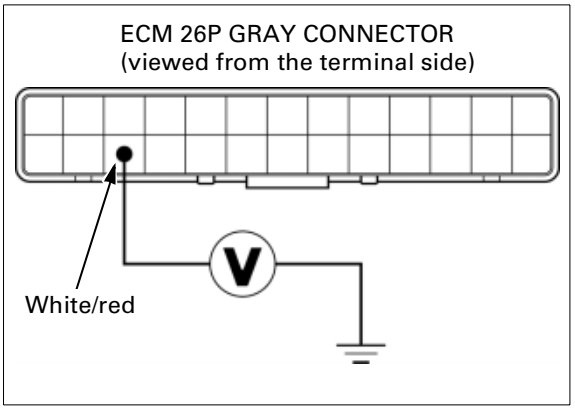
If the warning light and indicator do not blink and the buzzer does not beep, replace the combination meter.



PGM-FI INDICATOR

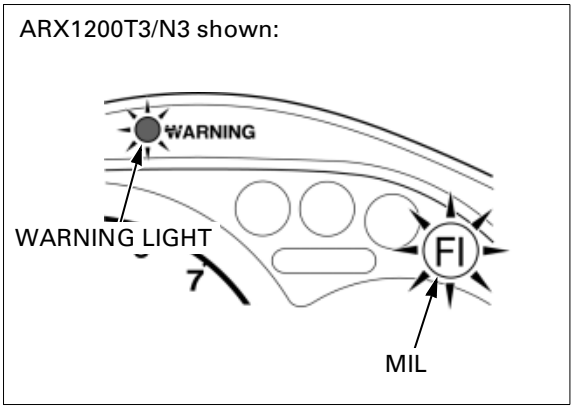
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the White/red wire terminal (+) of the ECM 26P gray connector and ground (–).
There should be approximately 5 V.

If there is no voltage, check an open circuit in the White/red wire.



Ground the White/red wire terminal with a jumper wire.
The warning light and Malfunction Indicator Lamp (MIL) should blink and the warning buzzer should beep.

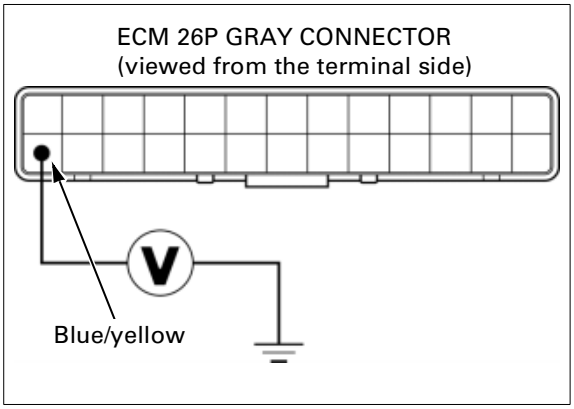
If the warning light and MIL do not blink and the buzzer does not beep, replace the combination meter.



LIMIT MODE INDICATOR

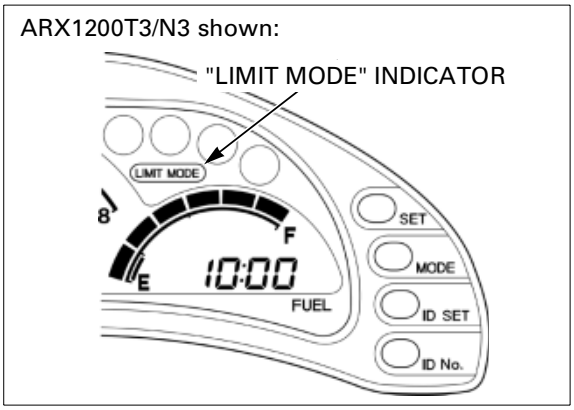
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the Blue/yellow wire terminal (+) of the ECM 26P gray connector and ground (–).
There should be approximately 5 V.

If there is no voltage, check an open circuit in the Blue/yellow wire.



Ground the Blue/yellow wire terminal with a jumper wire.
The "LIMIT MODE" indicator should come on.

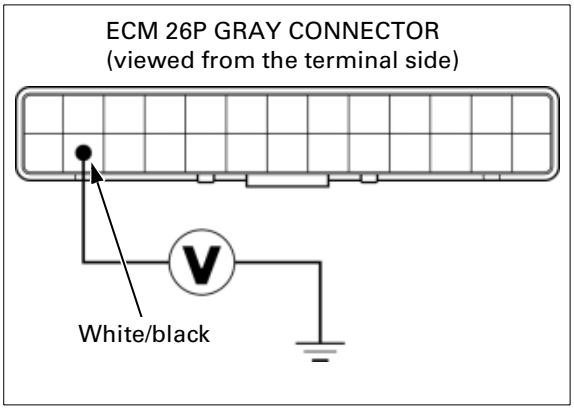
If the "LIMIT MODE" indicator does not come on, replace the combination meter.



OFF-THROTTLE STEERING INDICATOR

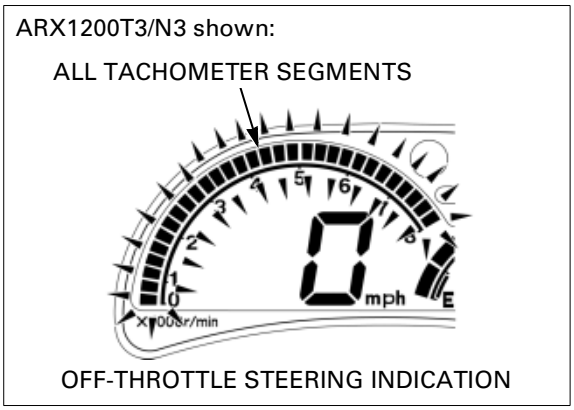
Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the White/black wire terminal (+) of the ECM 26P gray connector and ground (–).
There should be approximately 5 V.

If there is no voltage, check an open circuit in the White/black wire.



Ground the White/black wire terminal with a jumper wire.
All tachometer segments should blink.

If all tachometer segments do not blink, replace the combination meter.

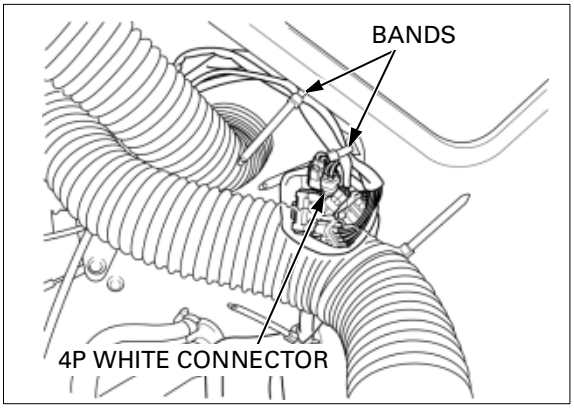


HANDLEBAR SWITCH

INSPECTION

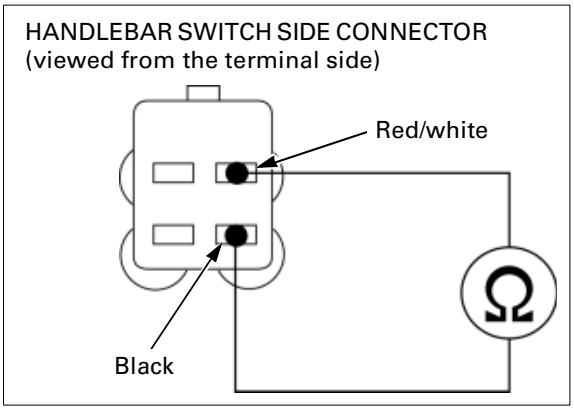
Remove the storage box page 3-8.

Release the wire bands.
Disconnect the handlebar switch connector.



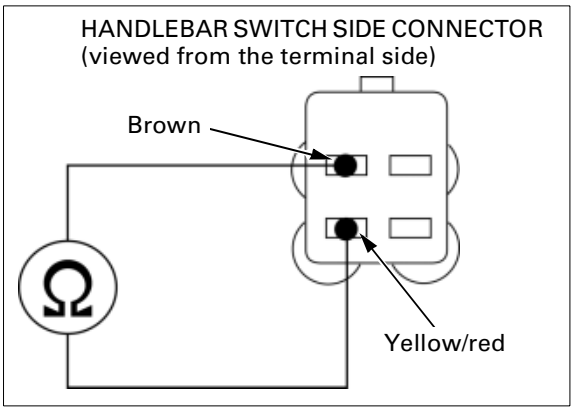
ENGINE STOP SWITCH

Fit the safety lanyard clip to the base of the engine stop switch.
Check for continuity between the Black and Red/white wire terminals of the handlebar switch side connector.
There should be continuity with the engine stop switch released and should be no continuity with the switch pushed.



STARTER SWITCH

Check for continuity between the Brown and Yellow/red wire terminals of the handlebar switch side connector.
There should be continuity with the starter switch pushed and should be no continuity with the switch released.

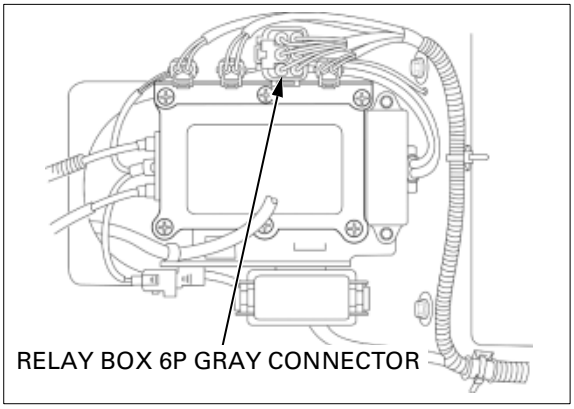


MAIN RELAY

INSPECTION

Remove the passenger grab rail page 3-5.

Disconnect the relay box 6P gray connector.
Check the connector for loose contacts or corroded terminals.



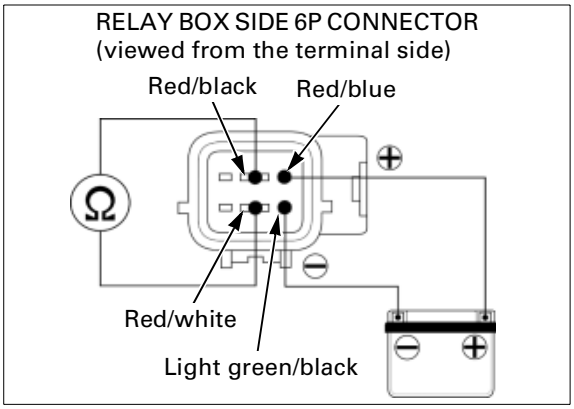
Connect an ohmmeter to the relay box side 6P connector terminals.

CONNECTION: Red/white – Red/black

Connect a fully charged 12V battery to the relay box side 6P connector terminals.

CONNECTION: Red/blue (+) – Light green/black (–)

There should be continuity while the 12V battery is connected to the relay box connector terminals and there should be no continuity when the battery is disconnected.



OFF-THROTTLE STEERING SYSTEM

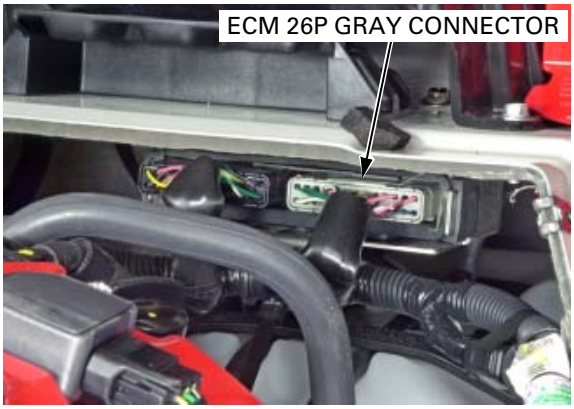
NOTE:

- The off-throttle steering system is activated when the following conditions are sensed by the ECM.
  – engine speed is above 4,000 rpm
  – throttle lever is suddenly released
  – handlebar is turned fully to the right or left

OFF-THROTTLE STEERING SOLENOID VALVE

Remove the seats (page 3-4).

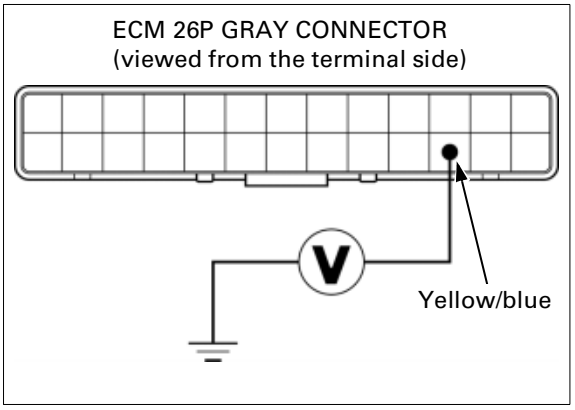
Disconnect the ECM 26P gray connector.



CIRCUIT INSPECTION

Fit the safety lanyard clip to the base of the engine stop switch.
Measure the voltage between the Yellow/blue wire terminal (+) of the wire harness side connector and ground (–).
There should be battery voltage.

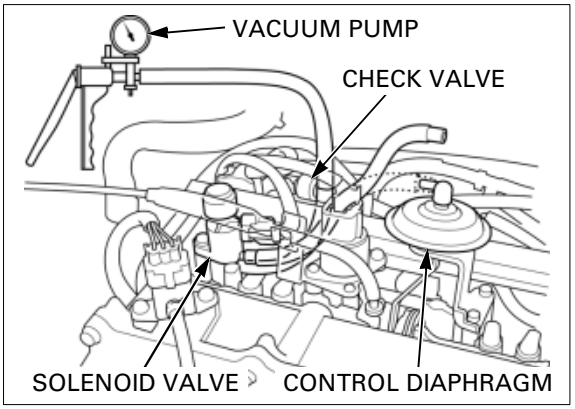
If there is no voltage, check the following:
– open or short circuit in the Yellow/blue wire between the ECM and off-throttle steering solenoid valve
– faulty off-throttle solenoid valve
– open circuit in the Black/red wire between the off-throttle steering solenoid valve and junction connector



FUNCTION TEST

Disconnect the vacuum hose from the check valve and connect the vacuum pump to the hose.
Disconnect the vacuum hose from the off-throttle steering control diaphragm.
Apply vacuum to the solenoid valve.
The vacuum should be maintained.

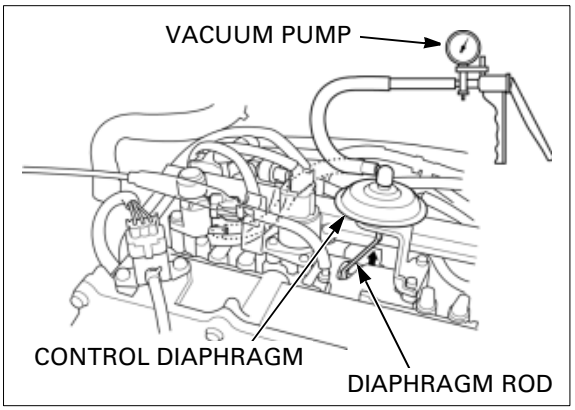
Ground the Yellow/blue wire terminal of the ECM 26P gray connector.
Fit the safety lanyard clip to the base of the engine stop switch.
The vacuum should be released.



OFF-THROTTLE STEERING CONTROL DIAPHRAGM

Remove the seats page 3-4.

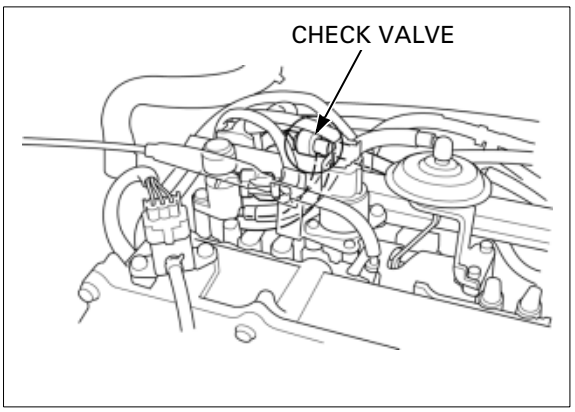
Disconnect the vacuum hose from the off-throttle control diaphragm and connect the vacuum pump to the hose.
Apply vacuum to the control diaphragm.
The diaphragm rod should be pulled up and the vacuum should be maintained.



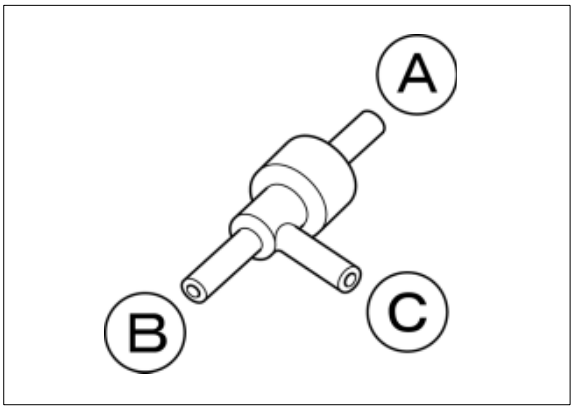
CHECK VALVE

Remove the seats page 3-4.

Remove the check valve by disconnecting the three vacuum hoses.



Check the air flow through the check valve.
Air should flow from hose fittings B and C to hose fitting A.
Air should not flow from hose fitting A to hose fittings B and C.



LIMIT SWITCH

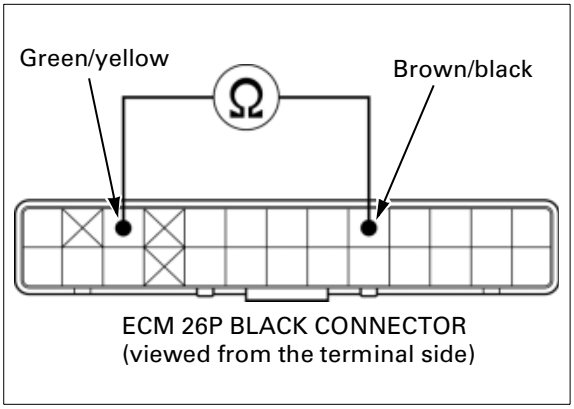
SYSTEM INSPECTION

Remove the left side panel page 3-5.

Disconnect the ECM 26P black connector.

Check for continuity between the Brown/black and Green/yellow wire terminals of the 26P black connector.
There should be continuity when the handlebar is turned fully to the right or left.

If there is no continuity, check the limit switch (page 19-21).
If the switch is OK, check for an open circuit in the Brown/black, Green/white and Green/yellow wires between the ECM and limit switch.



LIMIT SWITCH INSPECTION

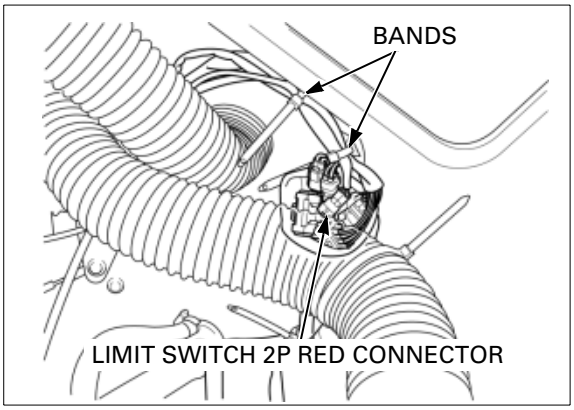
Remove the storage box page 3-8.

Release the wire bands.
Disconnect the limit switch 2P red connector.
Check for continuity between the switch side connector terminals.
There should be continuity when the handlebar is turned fully to the right or left.

REPLACEMENT

Remove the storage box page 3-8.

Loosen the four wire bands and remove the limit switch wire from the bands.
Disconnect the limit switch 2P red connector.



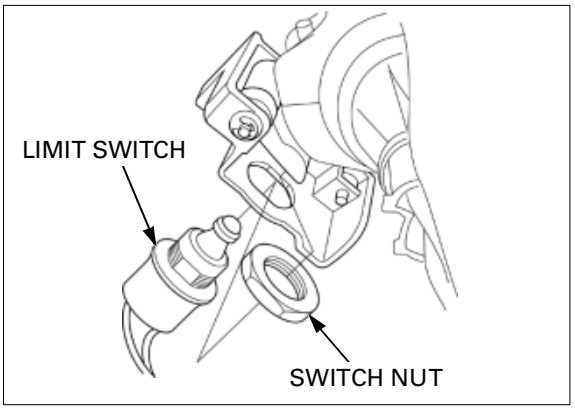
Remove the switch nut and the limit switch from the holder on the steering column.

Install a new limit switch onto the holder by aligning the flats.
Install and tighten the switch nut.

TORQUE: 2.9 N·m (0.3 kgf·m, 2.2 lbf·ft)

Route the limit switch wire into the wire bands and connect the 2P connector.

Install the storage box page 3-8.

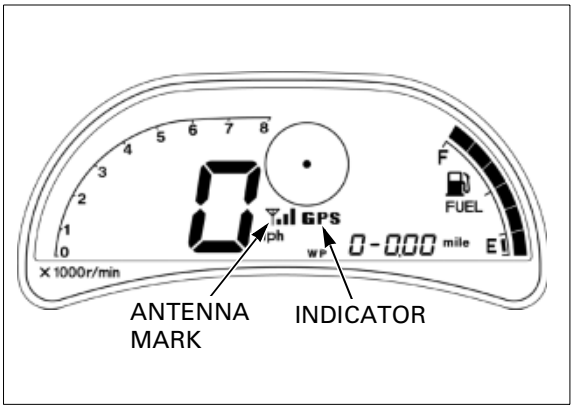


GPS RECEIVER (ARX1200T3D)

INSPECTION

If the GPS indicator is blinking and the antenna mark and navigation segments do not indicate at all, check the system by following the troubleshooting "GPS INDICATOR BLINKS" (page 19-23).

If the GPS start-up time is too long every time the safety lanyard clip is fitted despite a hot start condition, check the system by following the troubleshooting "GPS START-UP TIME IS TOO LONG" (page 19-24).



NOTE:

- Refer to page 2-12 "Technical Feature" for condition detail of the start-up time.

START-UP TIME

The start-up time of the positioning varies as follows:

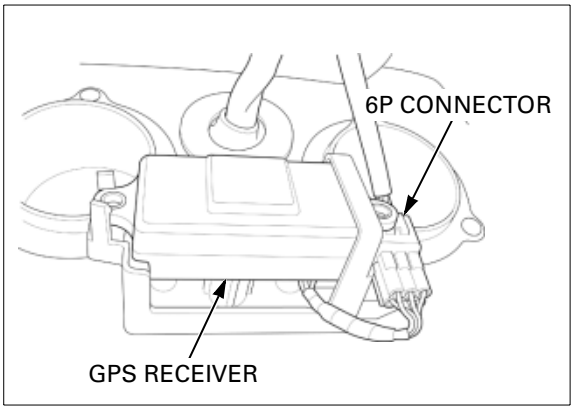
- Hot start
  When the safety lanyard clip is fitted to the base of the engine stop switch within 2 hours after it was removed, the position fix will be completed in about 25 seconds.
- Warm start
  When the safety lanyard clip is fitted to the base of the engine stop switch more than 2 hours after it was removed, the position fix will be completed in about 2 minutes.
- Cold start
  The position fix will be completed within about 8 minutes in the following situations;
  – When the safety lanyard clip is fitted to the base of the engine stop switch more than 1 month after it was removed
  – When the watercraft is transported for more than 100 km (62 miles) with the safety lanyard clip removed
  – When the battery is disconnected

GPS TROUBLESHOOTING

GPS INDICATOR BLINKS (COMMUNICATION ERROR)

1. GPS Receiver Connector Check

Remove the post cover without disconnecting the meter connectors (page 3-7).
Pull the safety lanyard clip off of the engine stop switch.
Remove the GPS receiver 6P connector from the stay and disconnect it.
Check for loose connection or poor contact of the 6P connector.
Connect the 6P connector.
Fit the safety lanyard clip to the base of the engine stop switch, wait for 8 minutes and check the GPS indicator.



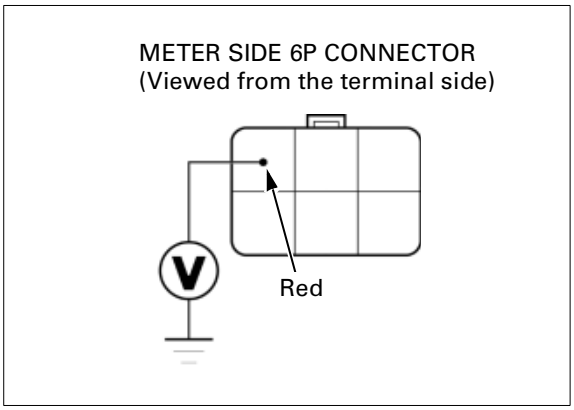
Is the GPS indicator still blinking?

YES – GO TO STEP 2.

NO – No problem (Temporary failure).

2. GPS Receiver Input Voltage Line Inspection

Pull the safety lanyard clip off of the engine stop switch.
Disconnect the GPS receiver 6P connector.
Measure the voltage between the meter side connector terminal and ground with the safety lanyard switch fitted.



Connection: Pink (+) – Ground (–)

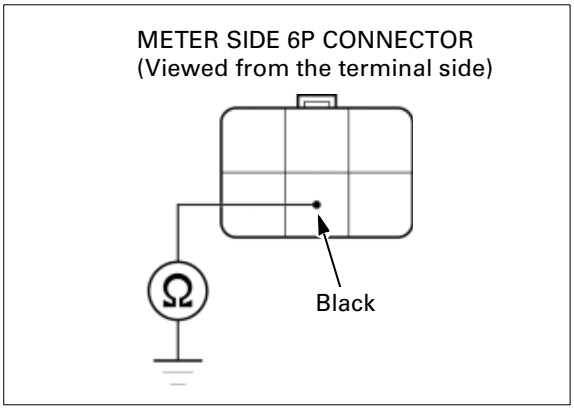
Is there about 5 V?

YES – GO TO STEP 3.

NO – • Open or short circuit in the Pink wire.
• Inspect the power input line of the combination meter (page 19-4).

3. GPS Receiver Ground Line Inspection

Pull the safety lanyard clip off of the engine stop switch.
Check for continuity between the meter side connector terminal and ground.



Connection: Green/yellow – Ground

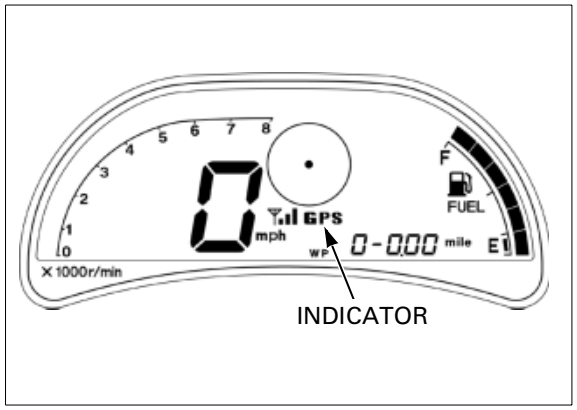
Is there continuity?

YES – GO TO STEP 4.

NO – • Open circuit in the Green/yellow wire
• Inspect the ground line of the combination meter (page 19-4).

4. GPS Receiver Replacement

Replace the GPS receiver with a known good one.
Fit the safety lanyard clip to the base of the engine stop switch, wait for 8 minutes and recheck the GPS indicator.



Is the GPS indicator still blinking?

YES – Faulty combination meter.

NO – Faulty original GPS receiver.

GPS START-UP TIME IS TOO LONG

1. Recheck with the GPS System Reset

Disconnect the battery negative (–) cable and reconnect it (page 16-5).
Fit the safety lanyard clip to the base of the engine stop switch, wait until the GPS system starts-up and pull the safety lanyard clip off. After the combination meter is off (approximately 10 seconds later), re-fit the safety lanyard.

Does the GPS start-up within 30 seconds?

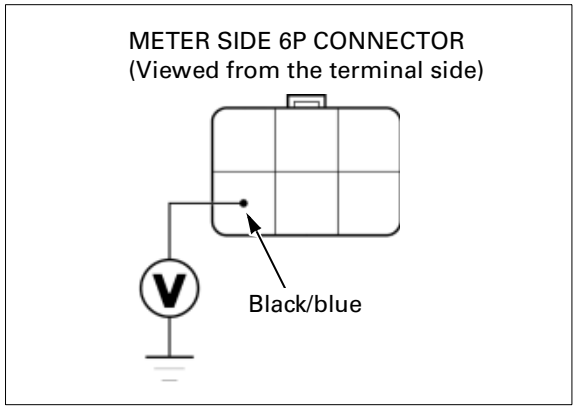
YES – No problem (Temporary failure).

NO – GO TO STEP 2.

2. GPS Receiver Back-up Voltage Inspection

Remove the post cover without disconnecting the meter connectors (page 3-7).
Pull the safety lanyard clip off of the engine stop switch.
Remove the GPS receiver 6P connector from the stay and disconnect it.
Measure the voltage between the meter side connector terminal and ground.

Connection: Black/blue (+) – Ground (–)



Is there battery voltage?

YES – Faulty GPS receiver.

NO –
- Open or short circuit in the Black/blue wire.
- Inspect the back-up voltage line of the combination meter (page 19-4).

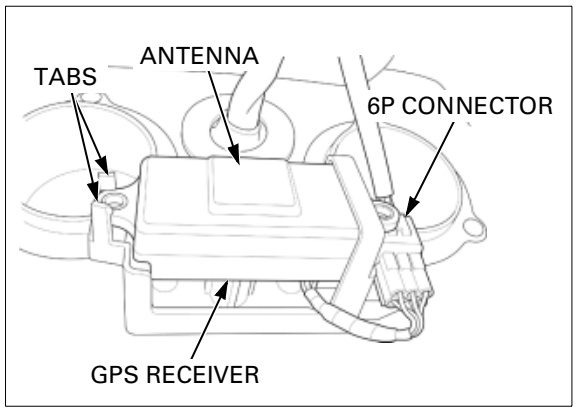
REMOVAL/INSTALLATION

Remove the post cover (page 3-7).

Remove the receiver 6P connector from the stay and disconnect it.
Release the tabs and remove the GPS receiver from the receiver holder.

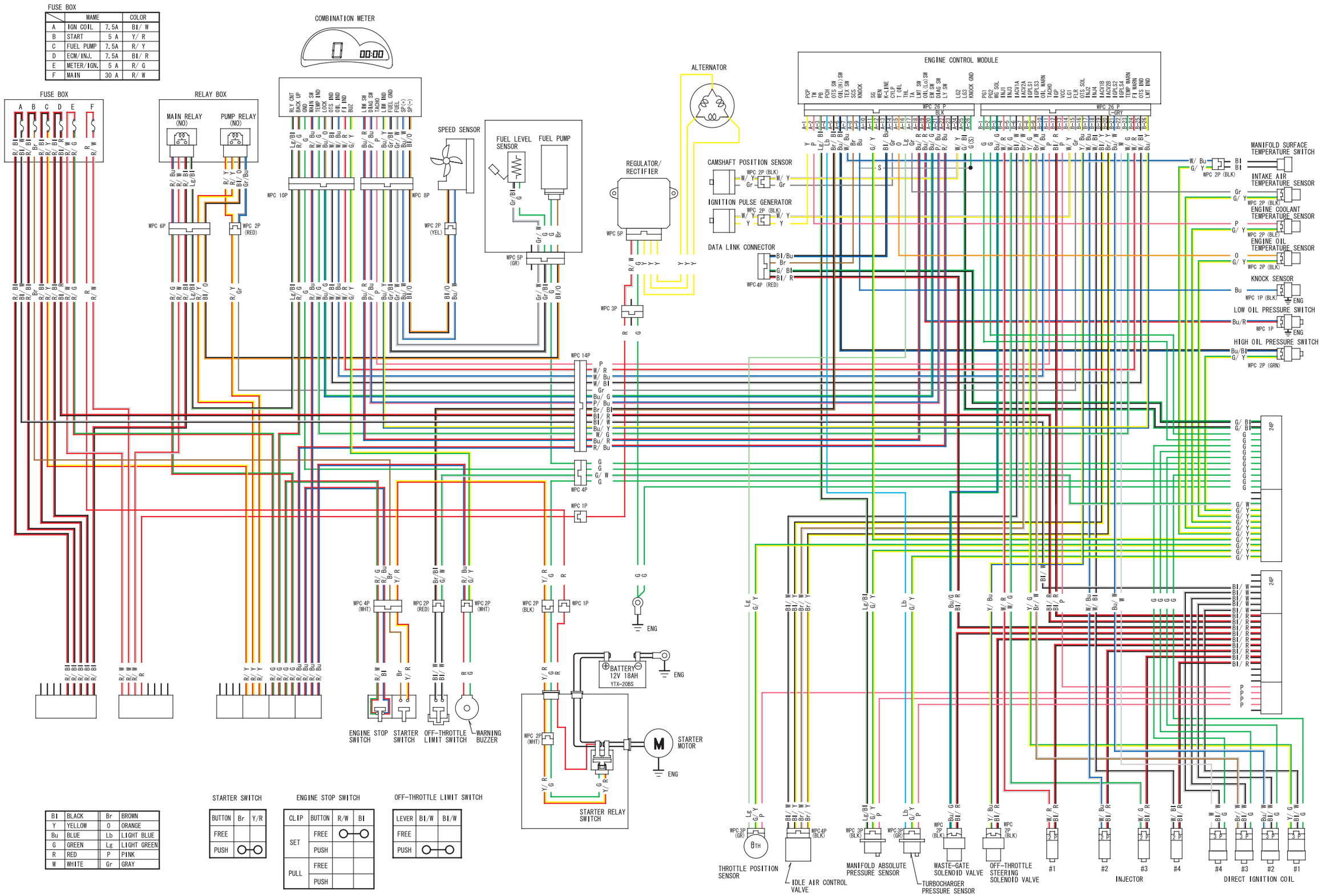
Install the receiver with the antenna side facing up.

Installation is in the reverse order of removal.

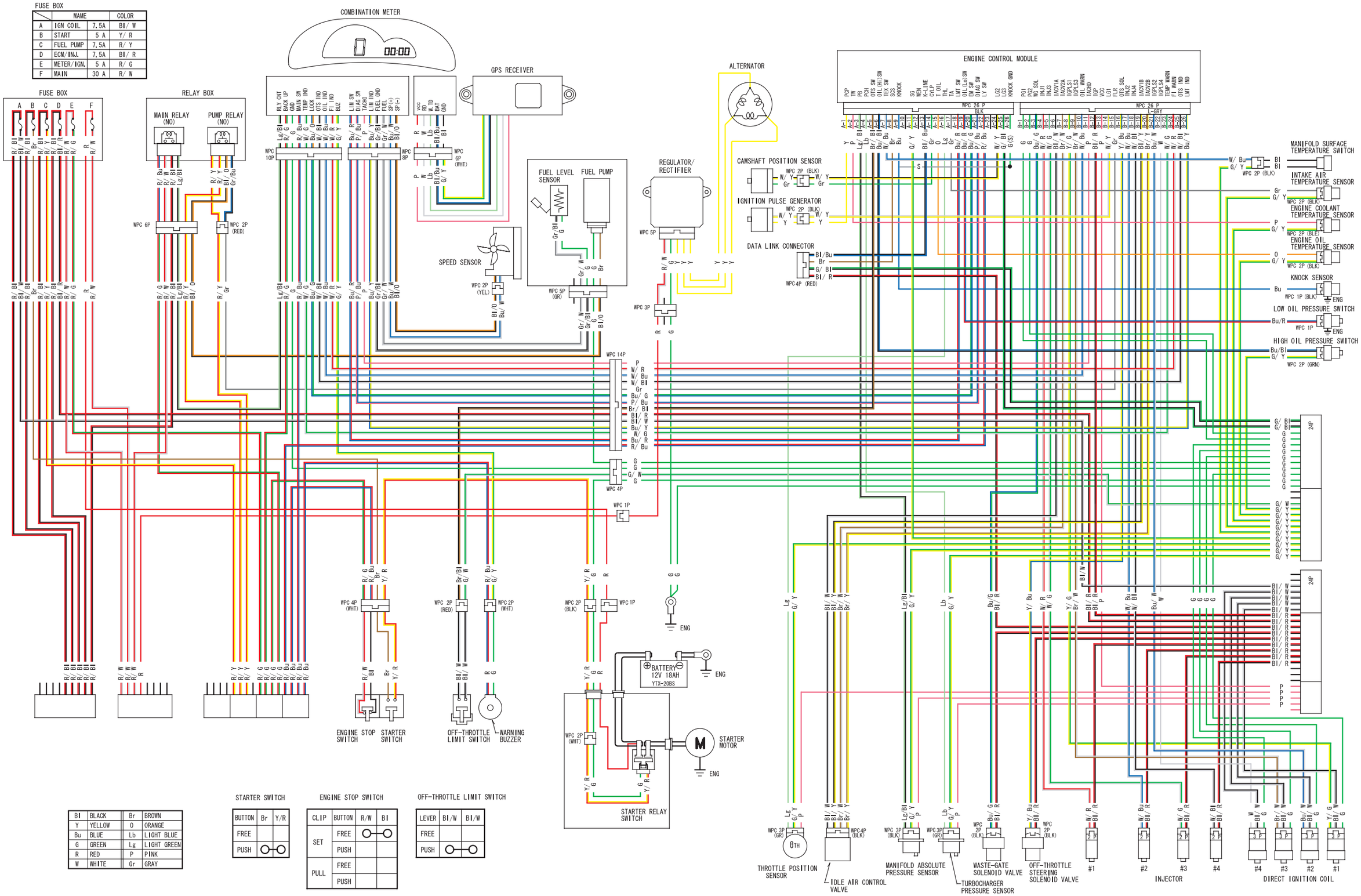


20. WIRING DIAGRAMS

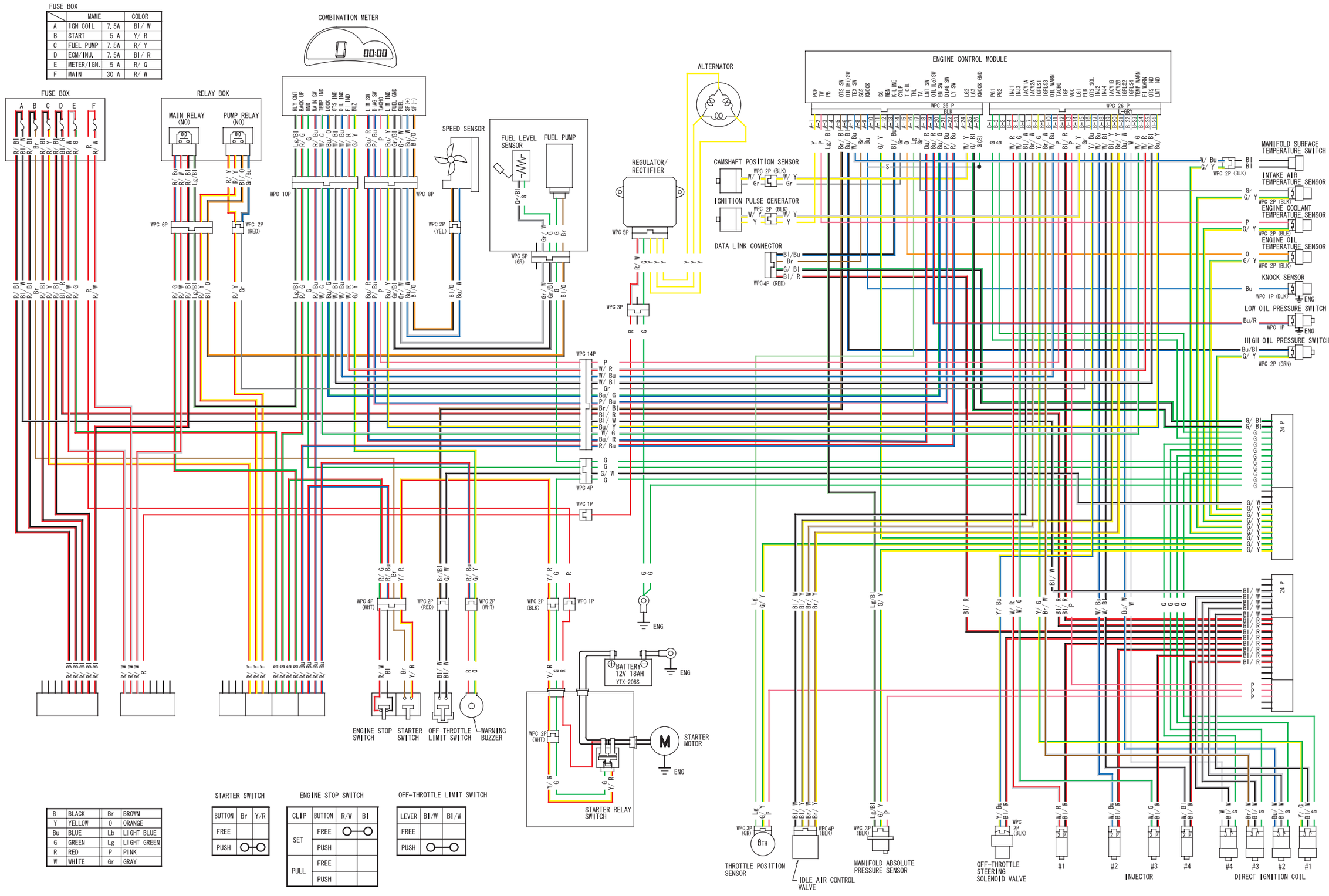
ARX1200T3


FUSE BOX
NAME
IGN COIL 7.5A BI/W
START 5A Y/R
FUEL PUMP 7.5A R/Y
ECM/INJ. 7.5A BI/R
METER/IGN. 5A R/G
MAIN 30A R/W
COMBINATION METER
RELAY BOX
MAIN RELAY (NO)
PUMP RELAY (NO)
SPEED SENSOR
FUEL LEVEL SENSOR
FUEL PUMP
ALTERNATOR
REGULATOR/ RECTIFIER
ENGINE CONTROL MODULE
CAMSHAFT POSITION SENSOR
IGNITION PULSE GENERATOR
DATA LINK CONNECTOR
MANIFOLD SURFACE TEMPERATURE SWITCH
INTAKE AIR TEMPERATURE SENSOR
ENGINE COOLANT TEMPERATURE SENSOR
ENGINE OIL TEMPERATURE SENSOR
KNOCK SENSOR
LOW OIL PRESSURE SWITCH
HIGH OIL PRESSURE SWITCH
ENGINE STOP SWITCH
STARTER SWITCH
OFF-THROTTLE LIMIT SWITCH
WARNING BUZZER
BATTERY 12V 18AH YTX-20BS
STARTER MOTOR
STARTER RELAY SWITCH
THROTTLE POSITION SENSOR
IDLE AIR CONTROL VALVE
MANIFOLD ABSOLUTE PRESSURE SENSOR
TURBOCHARGER PRESSURE SENSOR
WASTE-GATE SOLENOID VALVE
OFF-THROTTLE STEERING SOLENOID VALVE
INJECTOR
DIRECT IGNITION COIL
BI BLACK
Y YELLOW
Bu BLUE
G GREEN
R RED
W WHITE
Br BROWN
O ORANGE
Lb LIGHT BLUE
Lg LIGHT GREEN
P PINK
Gr GRAY

ARX1200T3D


FUSE BOX
NAME
COLOR
A IGN COIL 7.5A BI/ W
B START 5 A Y/ R
C FUEL PUMP 7.5A R/ Y
D ECM/INJ. 7.5A BI/ R
E METER/IGN. 5 A R/ G
F MAIN 30 A R/ W
COMBINATION METER
00:00
GPS RECEIVER
ALTERNATOR
ENGINE CONTROL MODULE
RELAY BOX
MAIN RELAY (NO)
PUMP RELAY (NO)
FUEL LEVEL SENSOR
FUEL PUMP
REGULATOR/ RECTIFIER
SPEED SENSOR
CAMSHAFT POSITION SENSOR
IGNITION PULSE GENERATOR
DATA LINK CONNECTOR
MANIFOLD SURFACE TEMPERATURE SWITCH
INTAKE AIR TEMPERATURE SENSOR
ENGINE COOLANT TEMPERATURE SENSOR
ENGINE OIL TEMPERATURE SENSOR
KNOCK SENSOR
LOW OIL PRESSURE SWITCH
HIGH OIL PRESSURE SWITCH
BATTERY 12V 18AH YTX-20BS
STARTER MOTOR
STARTER RELAY SWITCH
ENGINE STOP SWITCH
STARTER SWITCH
OFF-THROTTLE LIMIT SWITCH
WARNING BUZZER
THROTTLE POSITION SENSOR
IDLE AIR CONTROL VALVE
MANIFOLD ABSOLUTE PRESSURE SENSOR
TURBOCHARGER PRESSURE SENSOR
WASTE-GATE SOLENOID VALVE
OFF-THROTTLE STEERING SOLENOID VALVE
INJECTOR
DIRECT IGNITION COIL
BI BLACK
Y YELLOW
Bu BLUE
G GREEN
R RED
W WHITE
Br BROWN
O ORANGE
Lb LIGHT BLUE
Lg LIGHT GREEN
P PINK
Gr GRAY
STARTER SWITCH
BUTTON Br Y/R
FREE
PUSH
ENGINE STOP SWITCH
CLIP BUTTON R/W BI
SET FREE
PUSH
PULL FREE
PUSH
OFF-THROTTLE LIMIT SWITCH
LEVER BI/W BI/W
FREE
PUSH

ARX1200N3


FUSE BOX
NAME
A IGN COIL 7.5A Bl/W
B START 5A Y/R
C FUEL PUMP 7.5A R/Y
D ECM/INJ. 7.5A Bl/R
E METER/IGN. 5A R/G
F MAIN 30A R/W
COMBINATION METER
00:00
ENGINE CONTROL MODULE
WPC 26P BLK
WPC 26P GRY
ALTERNATOR
REGULATOR/ RECTIFIER
WPC 5P
WPC 3P
WPC 14P
WPC 4P
WPC 1P
SPEED SENSOR
WPC 2P (YEL)
FUEL LEVEL SENSOR
FUEL PUMP
WPC 5P (GR)
CAMSHAFT POSITION SENSOR
WPC 2P (BLK)
IGNITION PULSE GENERATOR
WPC 2P (BLK)
DATA LINK CONNECTOR
WPC4P (RED)
MANIFOLD SURFACE TEMPERATURE SWITCH
WPC 2P (BLK)
INTAKE AIR TEMPERATURE SENSOR
WPC 2P (BLK)
ENGINE COOLANT TEMPERATURE SENSOR
WPC 2P (BLE)
ENGINE OIL TEMPERATURE SENSOR
WPC 2P (BLK)
KNOCK SENSOR
WPC 1P (BLK)
LOW OIL PRESSURE SWITCH
WPC 1P
HIGH OIL PRESSURE SWITCH
WPC 2P (GRN)
24P
24P
RELAY BOX
MAIN RELAY (NO)
PUMP RELAY (NO)
WPC 6P
WPC 2P (RED)
WPC 10P
WPC 8P
WPC 2P (WHT)
WPC 4P (WHT)
WPC 2P (BLK)
ENGINE STOP SWITCH
STARTER SWITCH
OFF-THROTTLE LIMIT SWITCH
WARNING BUZZER
BATTERY 12V 18AH YTX-20BS
STARTER MOTOR
STARTER RELAY SWITCH
ENG
THROTTLE POSITION SENSOR
IDLE AIR CONTROL VALVE
MANIFOLD ABSOLUTE PRESSURE SENSOR
OFF-THROTTLE STEERING SOLENOID VALVE
INJECTOR
DIRECT IGNITION COIL
#1
#2
#3
#4
STARTER SWITCH
BUTTON Br Y/R
FREE
PUSH
ENGINE STOP SWITCH
CLIP BUTTON R/W Bl
SET FREE
PUSH
PULL FREE
PUSH
OFF-THROTTLE LIMIT SWITCH
LEVER Bl/W Bl/W
FREE
PUSH
Bl BLACK
Y YELLOW
Bu BLUE
G GREEN
R RED
W WHITE
Br BROWN
O ORANGE
Lb LIGHT BLUE
Lg LIGHT GREEN
P PINK
Gr GRAY

MEMO

21. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START

1. **Spark Plug**

   Remove and inspect the spark plugs.

   Are the spark plugs wet?

   YES – • Incorrect spark plug heat range
   • Incorrect spark plug gap
   • Air intake duct or air box obstructed

   NO – GO TO STEP 2.

2. **Spark Test**

   Perform spark test.

   Is there a weak spark or no spark?

   YES – • Faulty spark plug
   • Fouled spark plug
   • Loose or disconnected ignition system wires
   • Faulty ignition coil
   • Faulty ignition pulse generator
   • Faulty engine control module (ECM)

   NO – GO TO STEP 3.

3. **Fuel Injection System**

   Check the fuel injection system.

   Is the fuel injection system normal?

   NO – Faulty fuel injection system

   YES – GO TO STEP 4.

4. **Engine Starting Condition**

   Start the engine by following the normal procedure.

   Does the engine start and then stop?

   Yes – • Intake air leak
   • Faulty idle air control valve
   • Improper ignition timing (Faulty ECM or ignition pulse generator)
   • Contaminated fuel

   NO – GO TO STEP 5.

5. **Cylinder Compression**

   Test cylinder compression.

   Is the compression low?

   YES – • Valve clearance too small
   • Valve stuck open
   • Worn cylinder and piston rings
   • Damaged cylinder head gasket
   • Seized valve
   • Improper valve timing

ENGINE LACKS POWER

1. **Engine Speed**

   Accelerate lightly.

   Does the engine speed increase?

   NO – • Air intake duct or air box obstructed
   • Restricted fuel flow
   • Clogged exhaust system
   • Restricted fuel tank breather line

   YES – GO TO STEP 2.

2. **Engine Knocking**

   Accelerate or run at high speed.

Is there knocking?

YES – • Use of poor quality fuel
• Worn piston and cylinder
• Excessive carbon build-up in combustion chamber
• Ignition timing too advance (Faulty ECM)

NO – GO TO STEP 3.

3. **Spark Plug**

Remove and inspect the spark plugs.

Are the spark plugs fouled or discolored?

YES – • Plug not serviced frequently enough
• Incorrect spark plug heat range

NO – GO TO STEP 4.

4. **Engine Oil**

Check the oil level and condition.

Is the oil level okay and free of contaminants?

NO – • Oil level too high
• Oil level too low
• Contaminated oil

YES – GO TO STEP 5.

5. **Ignition Timing**

Check the ignition timing.

Is the ignition timing correct?

NO – • Faulty engine control module (ECM)
• Faulty ignition pulse generator

YES – GO TO STEP 6.

6. **Cylinder Compression**

Test cylinder compression.

Is the compression low?

YES – • Valve clearance too small
• Valve stuck open
• Worn cylinder and piston rings
• Damaged cylinder head gasket
• Seized valve
• Improper valve timing

NO – GO TO STEP 7.

7. **Fuel Injection System**

Check the fuel injection system.

Is the fuel injection system normal?

NO – Faulty fuel injection system

YES – GO TO STEP 8.

8. **Engine Lubrication**

Remove cylinder head cover and inspect lubrication.

Is the valve train lubricated properly?

NO – Clogged oil passage

YES – GO TO STEP 9.

9. **Engine Over-heating**

Test ride and check the engine condition

Is the engine over-heating?

YES – • Use of poor quality fuel
• Excessive carbon build-up in combustion chamber
• Loose or damaged water hose or clamp

- Restricted cooling water passage in engine
- Clogged water passage and filter in jet pump
- Damaged impeller or water jet stator

NO – GO TO STEP 10. (ARX1200T3/T3D)

10. **Turbocharger**

Check the turbocharger condition.

Is the turbocharger normal?

NO – • Faulty turbocharger

POOR PERFORMANCE AT LOW AND IDLE SPEED

1. **Intake Air**

Check for intake air leak.

Is there leaking?

YES – • Loose air intake system fasteners
• Damaged air intake system O-ring

NO – • GO TO STEP 2.

2. **Spark Test**

Perform spark test.

Is there weak or intermittent spark?

YES – • Faulty spark plug
• Fouled spark plug
• Loose or disconnected ignition system wires
• Faulty ignition coil
• Faulty ignition pulse generator
• Faulty engine control module (ECM)

NO – GO TO STEP 3.

3. **Ignition Timing**

Check the ignition timing.

Is the ignition timing correct?

NO – • Faulty engine control module (ECM)
• Faulty ignition pulse generator

YES – GO TO STEP 4.

4. **Fuel Injection System**

Check the fuel injection system.

Is the fuel injection system normal?

NO – Faulty fuel injection system

POOR PERFORMANCE AT HIGH SPEED

1. **Ignition Timing**

Check the ignition timing.

Is the ignition timing correct?

NO – • Faulty engine control module (ECM)
• Faulty ignition pulse generator

YES – GO TO STEP 2.

2. **Fuel Injection System**

Check the fuel injection system.

Is the fuel injection system normal?

NO – Faulty fuel injection system

YES – GO TO STEP 3.

3. **Valve Timing**

   Check the valve timing.

   Is the valve timing correct?

   NO – Camshafts not installed properly

   YES – GO TO STEP 4.

4. **Valve Spring**

   Check the valve springs.

   Are the valve springs fatigued?

   YES – Faulty valve spring

MEMO

22. INDEX