

HOW TO USE THIS MANUAL

GENERAL INFORMATION

0106E-06

1. GENERAL DESCRIPTION

- (a) This manual is made in accordance with SAE J2008.
- (b) Generally repair operations can be separated in the following 3 main processes:
 - 1. Diagnosis
 - 2. Removing and Installing, Replacing, Disassembling, Installing and Checking, Adjusting
 - 3. Final Inspection
- (c) This manual explains "Removing and Installing, Replacing, Disassembling, Installing and Checking, Adjusting", but "Final Inspection" is omitted.
- (d) The following essential operations are not written in this manual, however these operations must be done in the practical situation.
 - (1) Operation with a jack or lift
 - (2) Cleaning of a removed part when necessary
 - (3) Visual check

2. INDEX

- (a) An alphabetical INDEX is provided as a section on the end of the book to guide you to the item to be repaired.

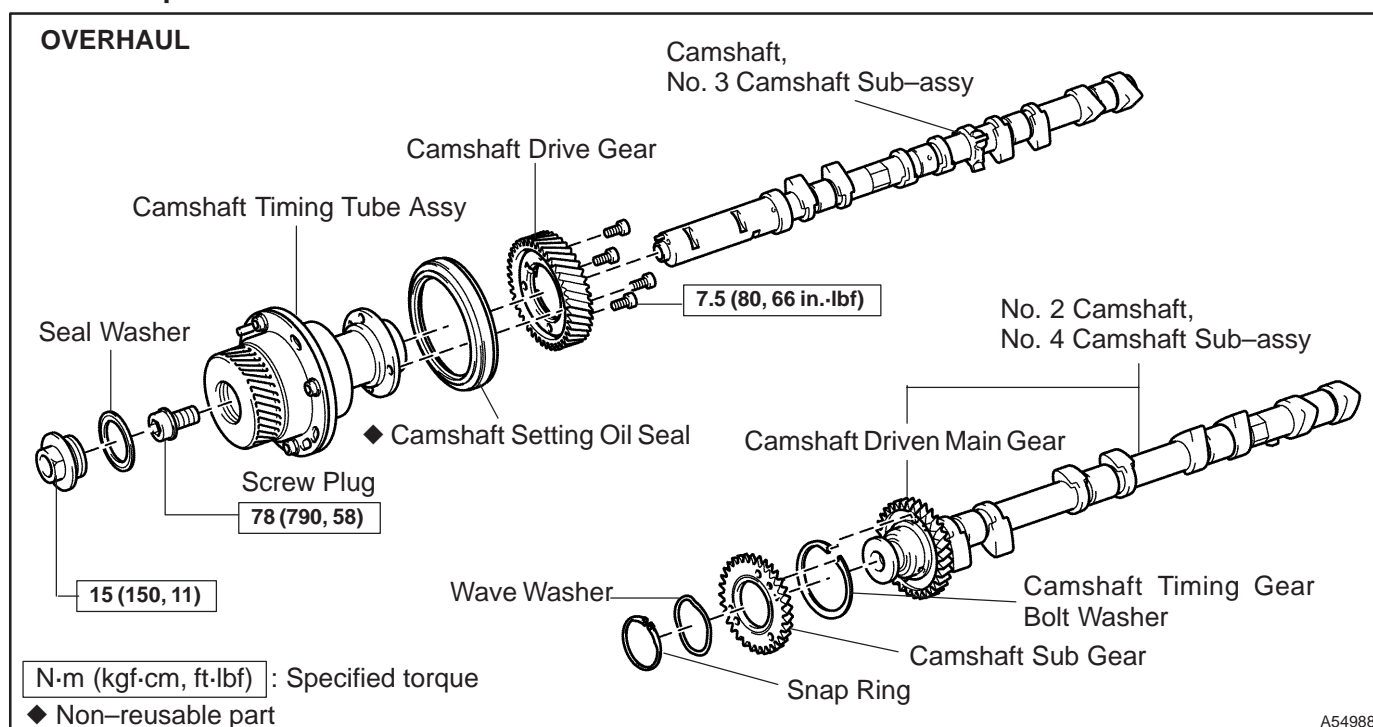
3. PREPARATION

- (a) Use of special service tools (SST) and special service materials (SSM) may be required, depending on the repairing condition. Be sure to use SST and SSM when they are required and follow the working procedure properly. A list of SST and SSM is in the Preparation section of this manual.

4. REPAIR PROCEDURES

- (a) Component drawing is placed as the section or title when necessary.
- (b) Illustrations of the parts catalog are placed as the "disassembled parts drawing" so that it enables you to understand the fitting condition of the components.
- (c) Non-reusable parts, grease applied parts, precoated parts and tightening torque are specified in the components drawing.

Example:



REPAIR INSTRUCTION

010BM-01

PRECAUTION

1. TO PREVENT FROM ENTERING FOREIGN SUBSTANCES.

- (a) When foreign substances such as dust, grain of sand or metallic dust enter inside of engine, it often causes functional failure of the engine.
 - (1) Precaution before disassembly.
 - Remove adequately all sand and mud adhere to the outside of engine .
 - (2) Precaution at reassembly.
 - Protect disassembled parts from dust by using vinyl sheet to cover.

2. TO PREVENT SCRATCHES ON THE PARTS.

- (a) The existence of scratches on the contact and revolving surfaces often causes oil leak and seizure.
 - (1) Precautions at disassembly and reassembly.
 - When disassemble the contact surface of the parts, use plastic hammer striking lightly. (Do not pry out by screwdriver).
 - When fix the parts to the vise, do not directly catch it in the vise. Fix the parts through aluminum bar.

3. TO CLEAN AND WASH THE PARTS.

- (a) Each parts needs to be well cleaned, washed, and dried by air, and apply specified oil before reassembly.
 - (1) Cleaning and washing by alkaline solvent is prohibited:
 - Parts made of aluminum and rubber. (ex. cylinder head cover gasket etc.)
 - (2) Cleaning and washing by flushing oil (ex. kerosene, white gasoline etc.) is prohibited:
 - Parts made of rubber. (ex. cylinder head cover gasket etc.)

4. POSITION AND DIRECTION OF EACH PARTS.

- (a) Each parts needs to be reassembled as the same position and direction as it disassembled.
 - (1) Precautions at disassembly and reassembly.
 - Follow the directions when the manual designates to mark the matchmark and/or direction mark.
 - Disassembled parts needs to be put in order as disassembled, not to change position and/or direction.
 - Follow the directions when the manual instructs the position and direction.

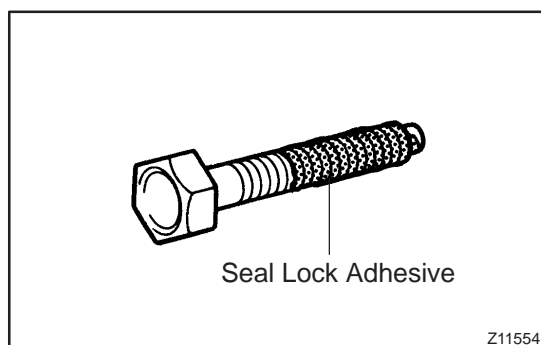
5. INSTALL ENGINE ASSEMBLY TO OVERHAUL STAND WHEN OVERHAUL THE ENGINE.

6. PUT THE DISASSEMBLED PARTS IN ORDER AS THEY DISASSEMBLED.

7. APPLY ENGINE OIL TO THE SLIDING AND ROTATING SURFACES.

8. NON-REUSABLE PARTS SUCH AS GASKET AND SEAL NEEDS TO BE CHANGED TO THE NEW PARTS.

9. BASIC REPAIR HINT



(a) Precoated Parts:

- (1) Precoated parts are bolts, nuts, etc. that are coated with a seal lock adhesive at the factory.
- (2) If a precoated part is retightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.
- (3) When reusing precoated parts, clean off the old adhesive and dry with compressed air. Then apply the specified seal lock adhesive to the bolt, nut or threads.

TERMS

ABBREVIATIONS USED IN THIS MANUAL

010B9-02

Abbreviations	Meaning
ABS	Anti-Lock Brake System
AC	Alternating Current
ACC	Accessory
ACIS	Acoustic Control Induction System
ACSD	Automatic Cold Start Device
A.D.D.	Automatic Disconnecting Differential
A/F	Air-Fuel Ratio
AHC	Active Height Control Suspension
ALR	Automatic Locking Retractor
ALT	Alternator
AMP	Amplifier
ANT	Antenna
APPROX.	Approximately
ASSY	Assembly
A/T, ATM	Automatic Transmission (Transaxle)
ATF	Automatic Transmission Fluid
AUTO	Automatic
AUX	Auxiliary
AVG	Average
AVS	Adaptive Variable Suspension
B+	Battery Voltage
BA	Brake Assist
BACS	Boost Altitude Compensation System
BAT	Battery
BDC	Bottom Dead Center
B/L	Bi-Level
B/S	Bore-Stroke Ratio
BTDC	Before Top Dead Center
BVSV	Bimetallic Vacuum Switching Valve
Calif.	California
CB	Circuit Breaker
CCo	Catalytic Converter For Oxidation
CD	Compact Disc
CF	Cornering Force
CG	Center Of Gravity
CH	Channel
COMB.	Combination
CPE	Coupe
CPS	Combustion Pressure Sensor
CPU	Central Processing Unit
CRS	Child Restraint System
CTR	Center
C/V	Check Valve
CV	Control Valve
CW	Curb Weight
DC	Direct Current
DEF	Defogger
DFL	Deflector

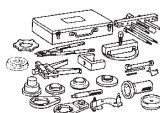
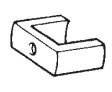
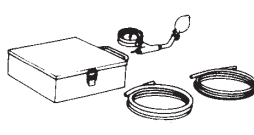

GLOSSARY OF SAE AND TOYOTA TERMS

This glossary lists all SAE–J1930 terms and abbreviations used in this manual in compliance with SAE recommendations, as well as their TOYOTA equivalents.

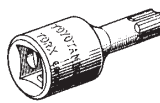
SAE ABBREVIATIONS	SAE TERMS	TOYOTA TERMS ()—ABBREVIATIONS
A/C	Air Conditioning	Air Conditioner
ACL	Air Cleaner	Air Cleaner, A/CL
AIR	Secondary Air Injection	Air Injection (AI)
AP	Accelerator Pedal	—
B+	Battery Positive Voltage	+B, Battery Voltage
BARO	Barometric Pressure	HAC
CAC	Charge Air Cooler	Intercooler
CARB	Carburetor	Carburetor
CFI	Continuous Fuel Injection	—
CKP	Crankshaft Position	Crank Angle
CL	Closed Loop	Closed Loop
CMP	Camshaft Position	Cam Angle
CPP	Clutch Pedal Position	—
CTOX	Continuous Trap Oxidizer	—
CTP	Closed Throttle Position	LL ON, Idle ON
DFI	Direct Fuel Injection (Diesel)	Direct Injection (DI)
DI	Distributor Ignition	—
DLC1 DLC2 DLC3	Data Link Connector 1 Data Link Connector 2 Data Link Connector 3	1: Check Connector 2: Total Diagnosis Communication Link (TDCL) 3: OBD II Diagnostic Connector
DTC	Diagnostic Trouble Code	Diagnostic Code
DTM	Diagnostic Test Mode	—
ECL	Engine Control Level	—
ECM	Engine Control Module	Engine ECU (Electronic Control Unit)
ECT	Engine Coolant Temperature	Coolant Temperature, Water Temperature (THW)
EEPROM	Electrically Erasable Programmable Read Only Memory	Electrically Erasable Programmable Read Only Memory (EEPROM), Erasable Programmable Read Only Memory (EPROM)
EFE	Early Fuel Evaporation	Cold Mixture Heater (CMH), Heat Control Valve (HCV)
EGR	Exhaust Gas Recirculation	Exhaust Gas Recirculation (EGR)
EI	Electronic Ignition	TOYOTA Distributorless Ignition (TDI)
EM	Engine Modification	Engine Modification (EM)
EPROM	Erasable Programmable Read Only Memory	Programmable Read Only Memory (PROM)
EVAP	Evaporative Emission	Evaporative Emission Control (EVAP)
FC	Fan Control	—
FEEPROM	Flash Electrically Erasable Programmable Read Only Memory	—
FEPROM	Flash Erasable Programmable Read Only Memory	—
FF	Flexible Fuel	—
FP	Fuel Pump	Fuel Pump
GEN	Generator	Alternator
GND	Ground	Ground (GND)

INTAKE PREPARATION SST

0214R-01

	09350-32014 TOYOTA Automatic Transmission Tool Set	TURBOCHARGER ASSEMBLY(1CD-FTV)
	(09351-32070) No.2 Piston Spring Compressor	TURBOCHARGER ASSEMBLY(1CD-FTV)
	09992-00242 Turbocharger Pressure Gauge	TURBOCHARGER ASSEMBLY(1CD-FTV)
	09992-00600 Crank Type Spindle	TURBOCHARGER ASSEMBLY(1CD-FTV)

Recommended Tools

	09042-00010 Torx Socket T30	TURBOCHARGER ASSEMBLY(1CD-FTV)
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SSM

	08826-00080 Seal Packing Black or equivalent (FIPG)	TURBOCHARGER ASSEMBLY(1CD-FTV)
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Equipment

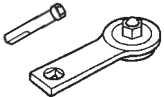

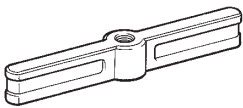
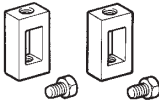
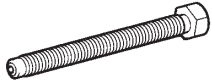
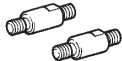
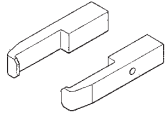
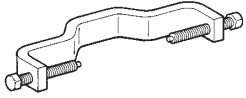
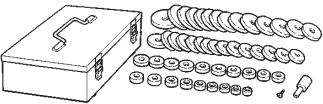

Dial indicator	
Torque wrench	
Protractor	
Steel square	

STARTING & CHARGING

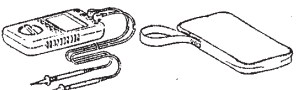
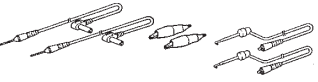
PREPARATION

SST

0214U-01

	09820-63020 Alternator Pulley Wrench Set	GENERATOR ASSY(130A)(1CD-FTV)
	09950-40011 Puller B Set	GENERATOR ASSY(130A)(1CD-FTV)
	(09951-04020) Hanger 200	GENERATOR ASSY(130A)(1CD-FTV)
	(09952-04010) Slide Arm	GENERATOR ASSY(130A)(1CD-FTV)
	(09953-04020) Center Bolt 150	GENERATOR ASSY(130A)(1CD-FTV)
	(09954-04010) Arm 25	GENERATOR ASSY(130A)(1CD-FTV)
	(09955-04071) Claw No.7	GENERATOR ASSY(130A)(1CD-FTV)
	(09958-04011) Holder	GENERATOR ASSY(130A)(1CD-FTV)
	09950-60010 Replacer Set	STARTER ASSY(2.0KW)(1CD-FTV)
	(09951-00340) Replacer 34	STARTER ASSY(2.0KW)(1CD-FTV)

Recommended Tools

	09082-00040 TOYOTA Electrical Tester	STARTER ASSY(1.4KW)(1CD-FTV) STARTER ASSY(2.2KW)(1CD-FTV) GENERATOR ASSY(130A)(1CD-FTV)
	(09083-00150) Test Lead Set	STARTER ASSY(1.4KW)(1CD-FTV) STARTER ASSY(2.2KW)(1CD-FTV) GENERATOR ASSY(90A)(1CD-FTV) GENERATOR ASSY(130A)(1CD-FTV)

SPECIFIED TORQUE FOR STANDARD BOLTS

Class	Diameter mm	Pitch mm	Specified torque					
			Hexagon head bolt			Hexagon flange bolt		
			N·m	kgf·cm	ft·lbf	N·m	kgf·cm	ft·lbf
4T	6	1	5	55	48 in.·lbf	6	60	52 in.·lbf
	8	1.25	12.5	130	9	14	145	10
	10	1.25	26	260	19	29	290	21
	12	1.25	47	480	35	53	540	39
	14	1.5	74	760	55	84	850	61
	16	1.5	115	1,150	83	–	–	–
5T	6	1	6.5	65	56 in.·lbf	7.5	75	65 in.·lbf
	8	1.25	15.5	160	12	17.5	175	13
	10	1.25	32	330	24	36	360	26
	12	1.25	59	600	43	65	670	48
	14	1.5	91	930	67	100	1,050	76
	16	1.5	140	1,400	101	–	–	–
6T	6	1	8	80	69 in.·lbf	9	90	78 in.·lbf
	8	1.25	19	195	14	21	210	15
	10	1.25	39	400	29	44	440	32
	12	1.25	71	730	53	80	810	59
	14	1.5	110	1,100	80	125	1,250	90
	16	1.5	170	1,750	127	–	–	–
7T	6	1	10.5	110	8	12	120	9
	8	1.25	25	260	19	28	290	21
	10	1.25	52	530	38	58	590	43
	12	1.25	95	970	70	105	1,050	76
	14	1.5	145	1,500	108	165	1,700	123
	16	1.5	230	2,300	166	–	–	–
8T	8	1.25	29	300	22	33	330	24
	10	1.25	61	620	45	68	690	50
	12	1.25	110	1,100	80	120	1,250	90
9T	8	1.25	34	340	25	37	380	27
	10	1.25	70	710	51	78	790	57
	12	1.25	125	1,300	94	140	1,450	105
10T	8	1.25	38	390	28	42	430	31
	10	1.25	78	800	58	88	890	64
	12	1.25	140	1,450	105	155	1,600	116
11T	8	1.25	42	430	31	47	480	35
	10	1.25	87	890	64	97	990	72
	12	1.25	155	1,600	116	175	1,800	130

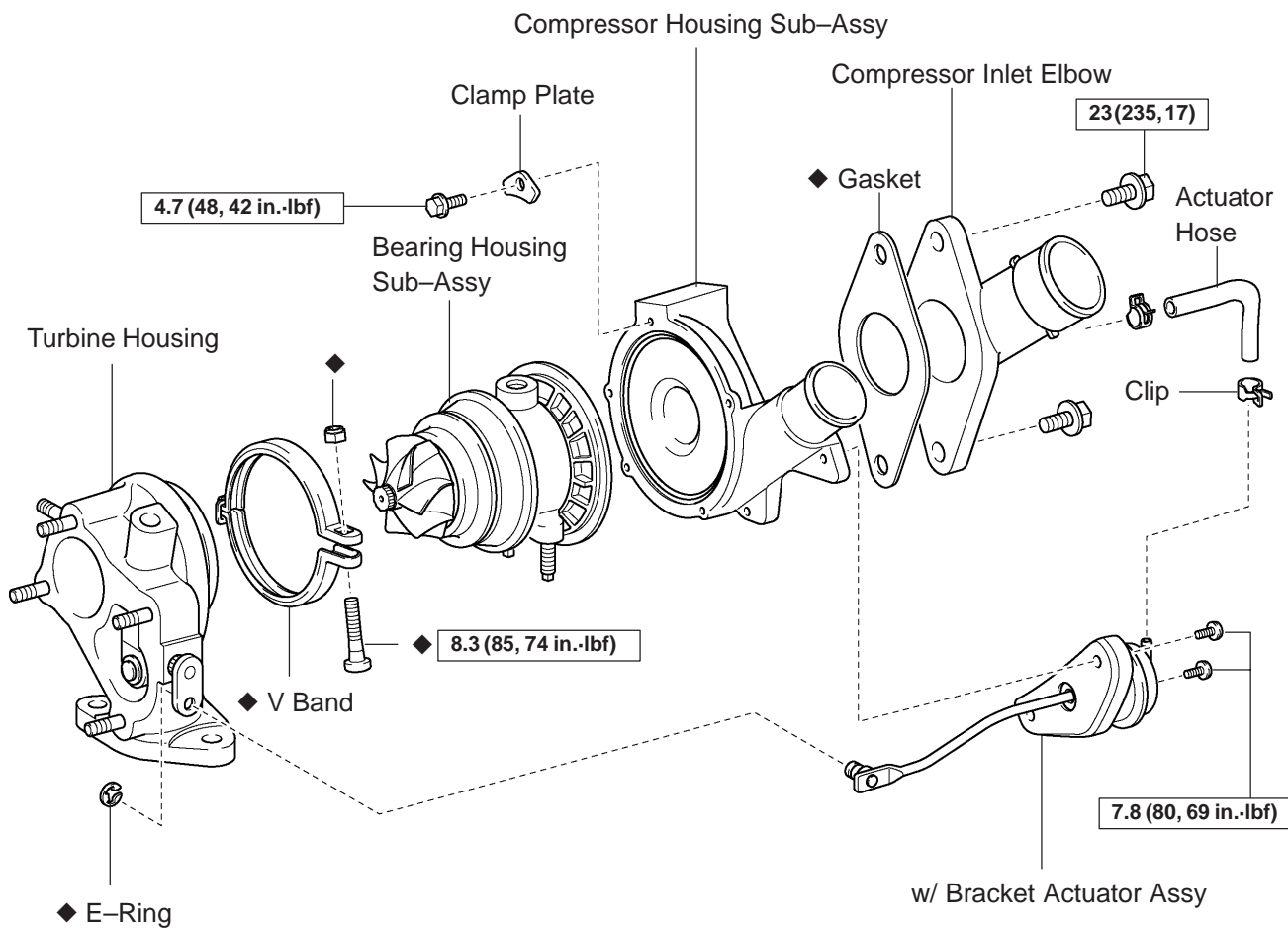
TORQUE SPECIFICATION

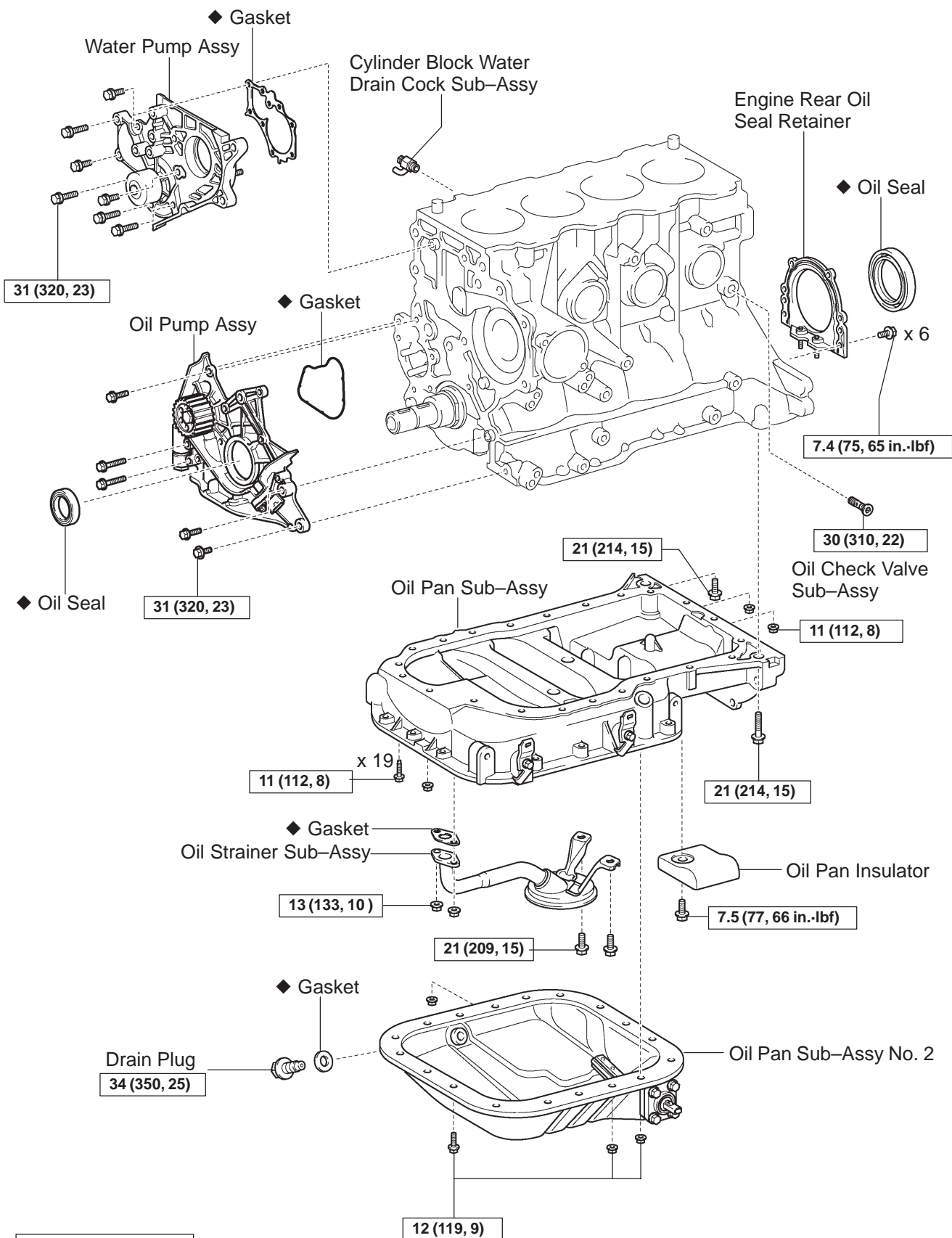
Part Tightened		N·m	kgf·cm	ft·lbf
Cylinder block water drain cock x Cylinder block		29	291	21
Oil check valve x Cylinder block		30	310	22
Oil pump x Cylinder block		31	320	23
Oil pan x Cylinder block	For 10 mm head bolt and nut	11	112	8.0
	For 12 mm head bolt	21	210	15
	For 14 mm head bolt	42	429	31
Oil strainer x Cylinder block	For bolt	21	210	15
	For nut	13	135	10
Oil pan No.2 x Cylinder block		12	120	9.0
Cylinder head x Cylinder block	1st	45	460	33
	2nd	Turn 90°	Turn 90°	Turn 90°
	3rd	Turn 90°	Turn 90°	Turn 90°
	4th	Turn 90°	Turn 90°	Turn 90°
Camshaft bearing cap x Cylinder head		20	204	15
Water pump x Cylinder block		31	320	23
Camshaft oil seal retainer x Cylinder head		8.8	90	78 in.·lbf
Timing belt idler Sub assy No.2 x Oil pump		47	475	34
Timing belt idler No. 1 x Cylinder head		35	350	25
Camshaft timing pulley x Camshaft		88	899	65
Nozzle holder clamp x Cylinder head		27	275	20
Nozzle leakage pipe x Cylinder head	Hollow screw	18	184	13
	Union bolt	22	224	16
Over flow screw x Plug		9.8	100	7.0
Check valve x Cylinder head		21	214	15
Cylinder head cover x Cylinder head		13	135	10
Taper screw plug No.1 x Cylinder head		25	255	18
Cylinder head stud bolt (See Page 14-23)	Bolt A	8.8	90	78 in.·lbf
	Bolt B	12	120	9.0
	Bolt C	8.8	90	78 in.·lbf
Connecting rod cap x Connecting rod	1st	30	306	22
	2nd	Turn 90°	Turn 90°	Turn 90°
Crankshaft bearing cap x Cylinder block		115	1,173	85
Cylinder block oil orifice x Cylinder block		9.0	92	78 in.·lbf
Oil nozzle No.1 x Cylinder block		7.4	76	67 in.·lbf

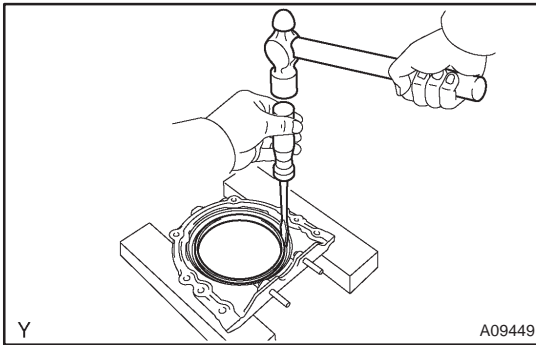
TURBOCHARGER ASSEMBLY (1CD-FTV)

COMPONENTS

13034-01

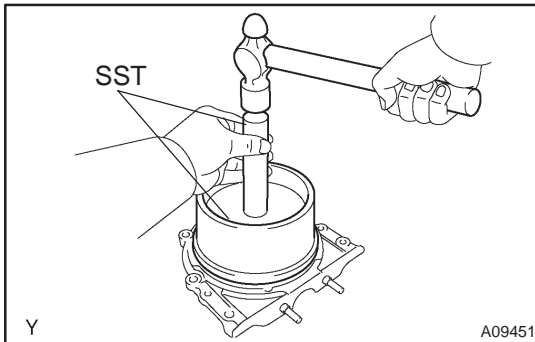






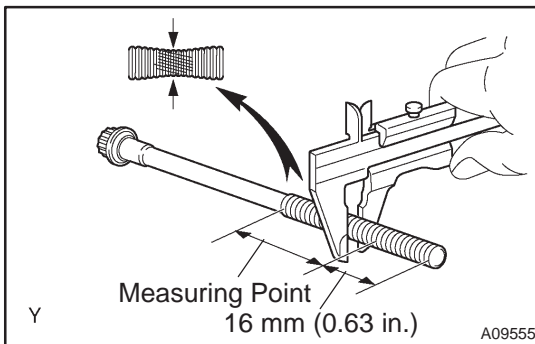
27. REMOVE ENGINE REAR OIL SEAL

- (a) Using a screwdriver and a hammer, tap out the oil seal.



28. INSTALL ENGINE REAR OIL SEAL

- (a) Using SST and a hammer, tap in a new oil seal until its surface is flush with the rear oil seal retainer edge.
SST 09223-15030, 09950-70010 (09951-07100)



29. INSPECT CYLINDER HEAD SET BOLT

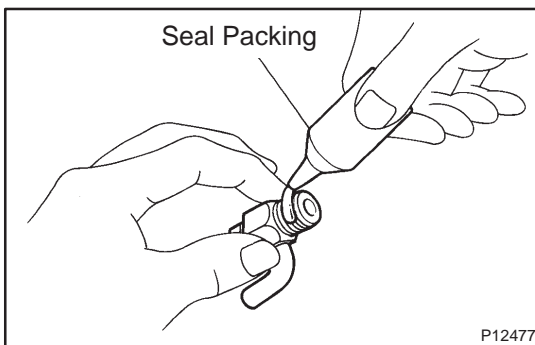
- (a) Using vernier calipers, measure the tension portion diameter of the bolt.

Standard outside diameter:

10.75 – 11.00 mm (0.4232 – 0.4331 in.)

Minimum outside diameter: 10.40 mm (0.4094 in.)

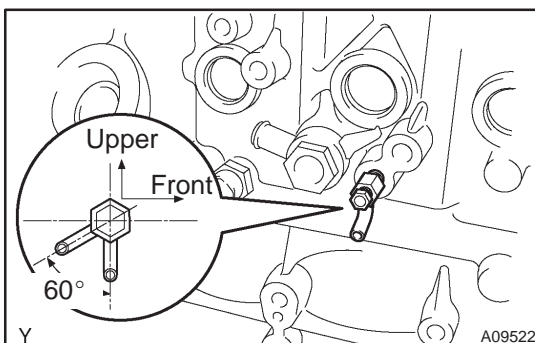
If the diameter is less than minimum, replace the bolt.



30. INSTALL CYLINDER BLOCK WATER DRAIN COCK SUB-ASSY

- (a) Apply seal packing 2 or 3 threads.

Seal packing: Part No. 08826-00100 or equivalent



- (b) Install the drain union.

Torque: 29 N·m (291 kgf·cm, 21 ft·lbf)

HINT:

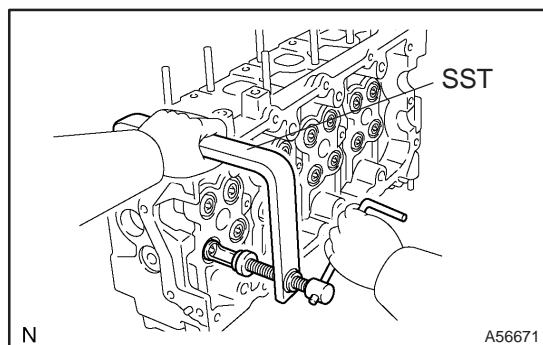
After applying the specified torque, if the drain pipe of the drain union is not at the position shown in the illustration, rotate the drain union further clockwise and make the drain pipe face downward.

OVERHAUL

1. REMOVE VALVE LIFTER

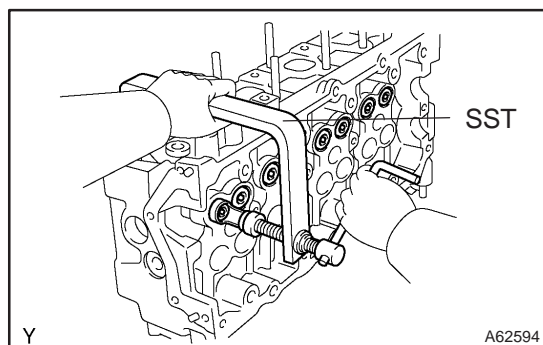
HINT:

Arrange the valve lifters in the correct order.



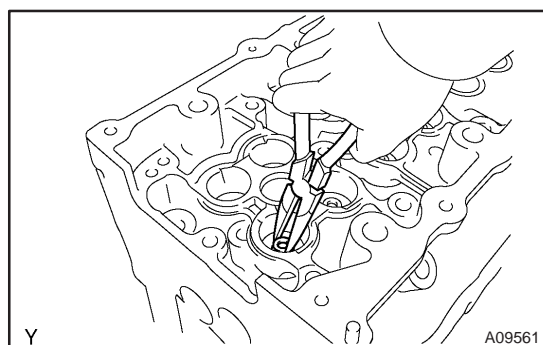
2. REMOVE INTAKE VALVE

- (a) Using SST, compress the valve spring and remove the 2 keepers.
SST 09202-70020 (09202-00010)
- (b) Remove the spring retainer, valve spring and valve.



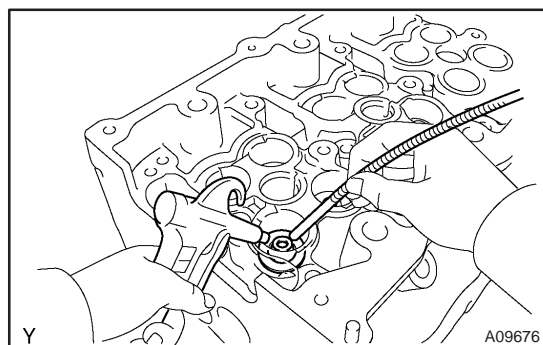
3. REMOVE EXHAUST VALVE

- (a) Using SST, compress the valve spring and remove the 2 keepers.
SST 09202-70020 (09202-00010)
- (b) Remove the spring retainer, valve spring and valve.



4. REMOVE VALVE STEM OIL O SEAL OR RING

- (a) Using needle-nose pliers, remove the oil seal.



5. REMOVE VALVE SPRING SEAT PLATE WASHER

- (a) Using compressed air and a magnetic finger, remove the spring seat by blowing air.

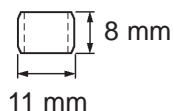
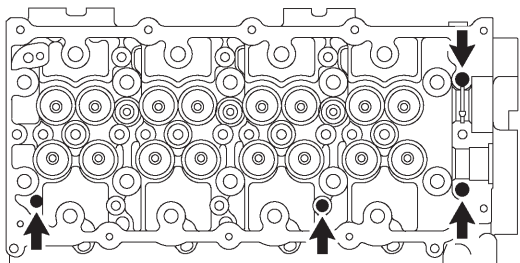
HINT:

Arrange the valves, valve springs, spring seats and spring retainers in the correct order.

28. INSTALL RING PIN

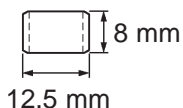
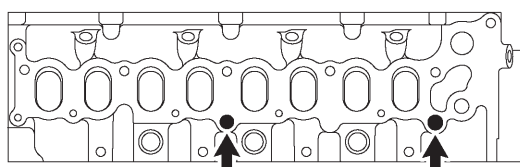
- (a) Using a plastic-faced hammer, tap in new ring pins to the specified protrusion height.

Upper Side:



Protrusion Height: 3 mm

Intake Side:



Protrusion Height: 3 mm

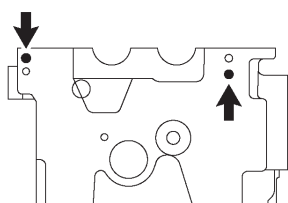
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29. INSTALL STRAIGHT PIN

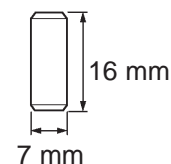
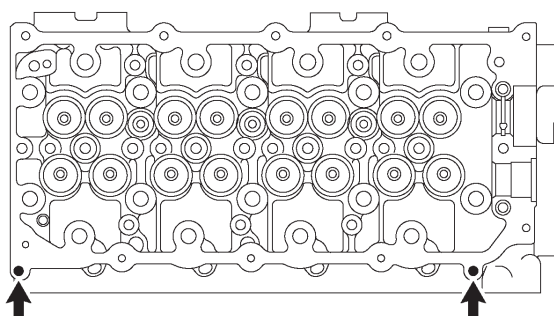
- (a) Using a plastic-faced hammer, tap in the straight pin.

Front Side:



Protrusion Height: 6 mm

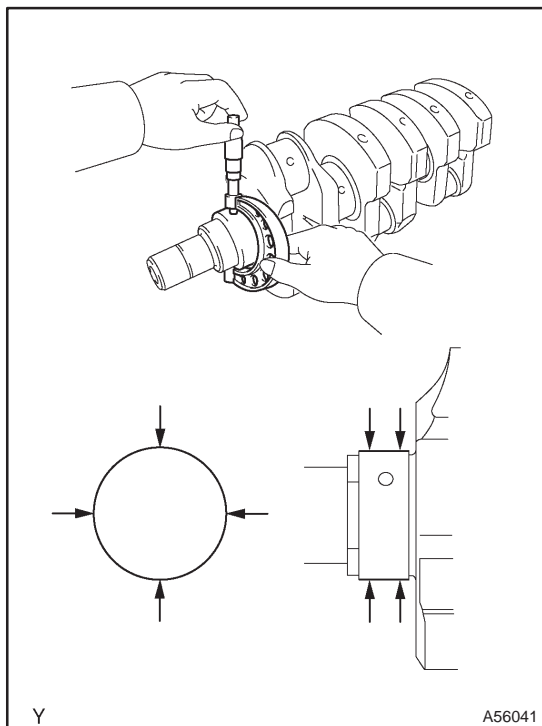
Upper Side:



Protrusion Height: 11 mm

N

A56682



- (c) Using a micrometer, measure the diameter of each main journal and crank pin.

Main journal diameter:

56.992 – 57.010 mm (2.2438 – 2.2445 in.)

Crank pin diameter:

50.482 – 50.500 mm (1.9875 – 1.9882 in.)

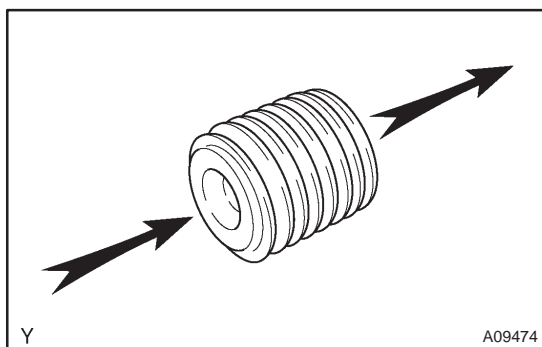
If the diameter is not as specified, replace the crankshaft.

- (d) Check each main journal and crank pin for taper and out-of-round as shown.

Maximum taper and out-of-round:

0.01 mm (0.0004 in.)

If the taper and out-of-round is greater than maximum, replace the crankshaft.

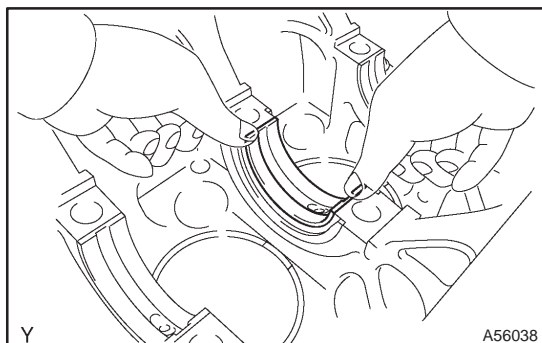


19. INSPECT CYLINDER BLOCK OIL ORIFICE

- (a) Check the oil orifice for clogging.
If necessary, replace the oil orifice.

20. INSPECT CRANKSHAFT OIL CLEARANCE

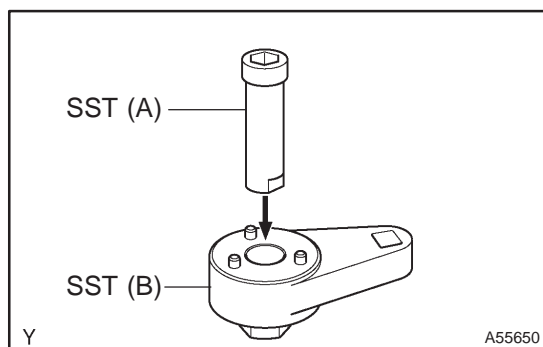
- (a) Clean each main journal and bearing.



- (b) Install the bearing on the cylinder block and bearing cap.
HINT:

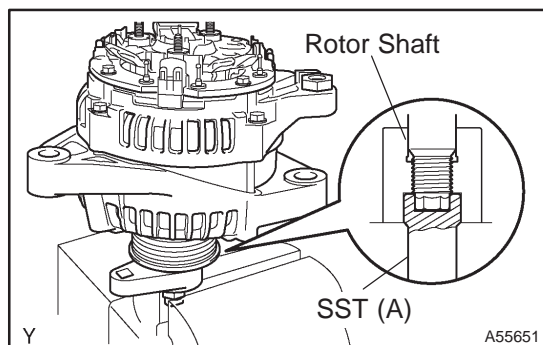
Upper bearings have an oil groove and oil holes; lower bearings do not.

- (1) Align the bearing claw with the claw groove of the cylinder block, and push in the 5 upper bearings.



7. INSTALL GENERATOR W/CLUTCH PULLEY

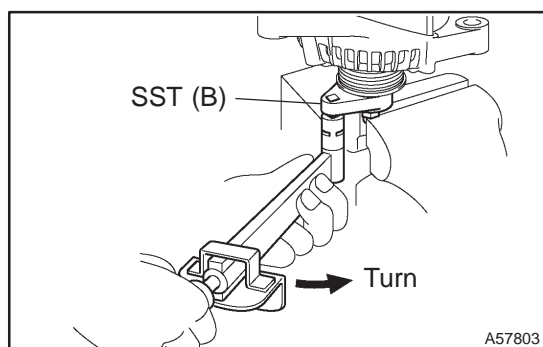
- Temporarily install the pulley to the rotor shaft.
- Set SST (A) and (B).
SST 09820-63020



- Mount SST (A) in a vise.
- Set the alternator to SST.

NOTICE:

At this time, make sure that the alternator and SST are perpendicular to one another.



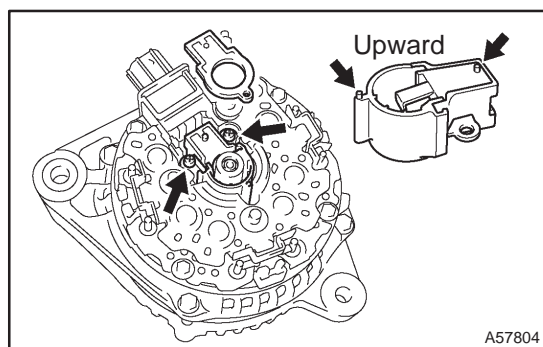
- Insert the 3 tabs of SST (B) into the 3 holes on the pulley.
- To torque the pulley, turn SST (B) in the direction shown in the illustration.

Torque: 111 N·m (1132 kgf·cm, 82 ft·lbf) for using SST

HINT:

Use a torque wrench with a fulcrum length of 50 cm (19.69 in.).

- Remove the alternator from SST.
- Install a new alternator pulley cap.



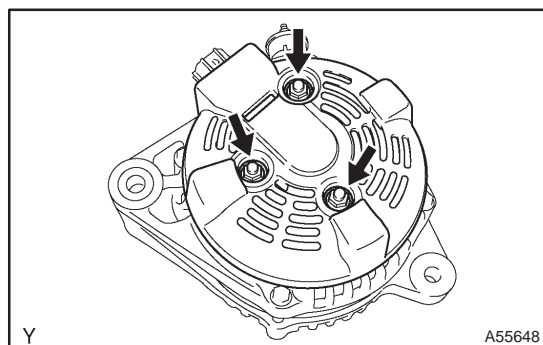
8. INSTALL GENERATOR BRUSH HOLDER ASSY

- Place the front seal plate to the coil assembly.
- Install the brush holder with the 2 screws.
Torque: 1.8 N·m (18 kgf·cm, 16 in·lbf)

NOTICE:

Be careful of the holder installation direction.

- Place the plate seal on the brush holder.



- Install the rear end cover with the 3 nuts.
Torque: 4.6 N·m (47 kgf·cm, 41 in·lbf)