INSTALLATION

1. INSTALL CHAIN TENSIONER SLIPPER

2. INSTALL NO. 1 CHAIN TENSIONER ASSEMBLY
   (a) While turning the stopper plate of the tensioner clockwise, push in the plunger of the tensioner as shown in the illustration.
   (b) While turning the stopper plate of the tensioner counterclockwise, insert a bar of \( \phi 35 \text{ mm} \) (0.138 in.) into the holes in the stopper plate and tensioner to fix the stopper plate.
   (c) Install the chain tensioner with the 2 bolts.
      Torque: 10 N*m (102 kgf*cm, 7.4 ft.*lbf)

3. INSTALL CHAIN SUB-ASSEMBLY
   (a) Set the No. 1 cylinder to TDC/ compression.
      (1) Align the timing marks of the camshaft timing gears and bearing caps.
      (2) Using the crankshaft pulley set bolt, turn the crankshaft to align the crankshaft set key with the timing line of the cylinder block.
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1GR-FE ENGINE MECHANICAL – TIMING-chain

(b) Align the yellow mark link with the timing mark of the crankshaft timing link.

(c) Align the orange mark links with the timing marks of the camshaft timing gears, and install the chain.

4. INSTALL NO. 2 CHAIN VIBRATION DAMPER
(a) Install the 2 No. 2 chain vibration dampers.

5. INSTALL IDLE SPROCKET ASSEMBLY
(a) Apply a light coat of engine oil to rotating surface of the No. 1 idle gear shaft.

(b) Temporarily install the No. 1 idle gear shaft together with the No. 2 idle gear shaft with the knock pin of the No. 1 idle gear shaft and the knock pin groove of the cylinder block are aligned.

NOTICE:
Orient the idle gear shafts correctly.

(c) Using a 10 mm hexagon wrench, tighten the No. 2 idle gear shaft.

Torque: 60 N*m (612 kgf*cm, 44 ft.*lb)

(d) Remove the bar from the chain tensioner.

6. INSTALL TIMING GEAR CASE OR TIMING CHAIN CASE OIL SEAL (See page EM-163)

7. INSTALL TIMING CHAIN OR BELT COVER SUB-ASSEMBLY
(a) Remove any old packing (FIPG) material.

HINT:
Do not drop any oil on the contact surfaces of the timing chain cover, cylinder head and cylinder block.

(b) Install a new O-ring onto the bank 2 cylinder head as shown in the illustration.
(c) Apply continuous beads of seal packing (diameter 3 to 4 mm (0.12 to 0.16 in.)) to the 4 locations shown in the illustration.

**Seal packing:**
Toyota Genuine Seal Packing Black, Three Bond 1207B or the equivalent

(d) Keep the seal surface between the cylinder block and the cylinder head shown in the illustration free of oil before installing the chain cover.

(e) Apply continuous beads of seal packing (diameter 3 to 4 mm (0.12 to 0.16 in.)) to the timing chain cover as shown in the illustration.

**Seal packing:**
Water pump part:
Toyota Genuine Seal Packing 1282B, Three Bond 1282B or the equivalent
Other parts:
Toyota Genuine Seal Packing Black, Three Bond 1207B or the equivalent

**NOTICE:**
- Install the timing chain cover within 3 minutes of applying the seal packing. The timing chain cover bolts and nuts must be tightened within 15 minutes of the installation. Otherwise the seal packing must be removed and reapplied.
- Do not apply seal packing to portion A shown in the illustration.

(f) Align the key way of the oil pump drive rotor with the rectangular portion of the crankshaft timing gear, and slide the timing chain cover into place.
(g) Install the timing chain cover with the 24 bolts and 2 nuts. Tighten the bolts and nuts uniformly in several steps.

*Torque: 23 N*m (235 kgf*cm, 17 ft.*lbf)*

**NOTICE:**
Pay attention not to wrap the chain and slipper over the timing chain cover seal line.
Each bolt length is as follows

<table>
<thead>
<tr>
<th>Bolt</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>25 mm (0.98 in.)</td>
</tr>
<tr>
<td>B</td>
<td>55 mm (2.17 in.)</td>
</tr>
</tbody>
</table>

8. INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY LH (See page EM-57)
9. INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY (See page EM-58)
10. INSTALL WATER INLET (See page CO-9)
11. INSTALL VVT SENSOR (See page ES-417)
12. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY (See page ES-415)
13. INSTALL IGNITION COIL ASSEMBLY (See page IG-8)
14. INSTALL INTAKE AIR SURGE TANK (See page FU-17)
15. INSTALL NO. 2 SURGE TANK STAY (See page FU-19)
16. INSTALL NO. 1 SURGE TANK STAY (See page FU-19)
17. INSTALL OIL BAFFLE PLATE (See page FU-19)
18. INSTALL THROTTLE BODY BRACKET (See page FU-19)
19. INSTALL AIR CLEANER ASSEMBLY (See page ES-431)
20. INSTALL OIL PAN SUB-ASSEMBLY
   (a) Remove any old packing (FIPG) material.
   **HINT:**
   Do not drop any oil on the contact surfaces of the cylinder block, rear oil seal and oil pan.
   (b) Install a new O-ring onto the oil pump.
(c) Apply a continuous bead of seal packing (diameter 3 to 4 mm (0.12 to 0.16 in.)) to the oil pan as shown in the illustration.

Seal packing:
Toyota Genuine Seal Packing Black, Three Bond 1207B or the equivalent

NOTICE:
Install the oil pan within 3 minutes of applying the seal packing. Tighten the oil pan bolts and nuts within 15 minutes of installing the oil pan. Otherwise, the seal packing must be removed and reapplied.

(d) Install the oil pan with the 17 bolts and 2 nuts, and tighten the bolts and nuts uniformly in several steps.

Torque:
- 10 mm (0.39 in.) head
  - 10 N·m (102 kgf·cm, 7.4 ft.*lbf)
  - 12 mm (0.47 in.) head
  - 21 N·m (214 kgf·cm, 16 ft.*lbf)
- Nut
  - 21 N·m (1,214 kgf·cm, 16 ft.*lbf)

HINT:
Each bolt length is as follows:

<table>
<thead>
<tr>
<th>Bolt</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>25 mm (0.98 in.)</td>
</tr>
<tr>
<td>B</td>
<td>45 mm (1.77 in.)</td>
</tr>
<tr>
<td>C</td>
<td>14 mm (0.55 in.)</td>
</tr>
</tbody>
</table>

(e) Install the 4 housing bolts.
Torque: 37 N·m (377 kgf·cm, 27 ft.*lbf)

(f) Install the flywheel housing under cover.

21. INSTALL OIL STRAINER SUB-ASSEMBLY
(a) Install a new gasket and the oil strainer with the 2 nuts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.*lbf)

22. INSTALL NO. 2 OIL PAN SUB-ASSEMBLY
(a) Remove any old packing (FIPG) material.
HINT:
Do not drop any oil on the contact surfaces of the oil pan and No. 2 oil pan.
(b) Apply a continuous bead of seal packing (diameter 3 to 4 mm (0.12 to 0.16 in.)) as shown in the illustration.

Seal packing:
- Toyota Genuine Seal Packing Black, Three Bond 1207B or the equivalent

**NOTICE:**
Install the No. 2 oil pan within 3 minutes of applying the seal packing. Tighten the No. 2 oil pan bolts and nuts within 15 minutes of installing the No. 2 oil pan. Otherwise, the seal packing must be removed and reapplied.

(c) Install the No. 2 oil pan with the 10 bolts and 2 nuts. Tighten the bolts and nuts uniformly in several steps.

**Torque:**
- Bolt: 9.0 N·m (92 kgf·cm, 80 in.*lbf)
- Nut: 10 N·m (102 kgf·cm, 7.4 in.*lbf)

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23. **INSTALL CRANKSHAFT PULLEY**
(a) Using SST, install the pulley set bolt.

SST 09213-54015 (91651-60855), 09330-00021

**Torque:** 250 N·m (2,549 kgf·cm, 184 ft.*lbf)

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24. **INSTALL NO. 1 IDLER PULLEY SUB-ASSEMBLY**
(a) Install the idler pulley with the bolt.

**Torque:** 39 N·m (398 kgf·cm, 29 ft.*lbf)

**HINT:**
DOUBLE is marked on the No. 1 idler pulley to distinguish it from the No. 2 idler pulley.
25. INSTALL NO. 2 IDLER PULLEY SUB-ASSEMBLY
   (a) Install the 2 No. 2 idler pulleys with the 2 bolts.
   Torque: 54 N*m (551 kgf*cm, 40 ft.*lbf)

26. INSTALL VANE PUMP ASSEMBLY
   (a) Install the vane pump with the 2 bolts.
   Torque: 43 N*m (438 kgf*cm, 32 ft.*lbf)
   NOTICE:
   Do not hit the pulley with other parts when installing the vane pump.
   (b) Connect the power steering pressure switch connector.

27. INSTALL OIL LEVEL GAUGE GUIDE
   (a) Install a new O-ring onto the oil level gauge guide.
   (b) Apply a light coat of engine oil to the O-ring.
   (c) Push the oil level gauge guide end into the guide hole in the oil pan.
   (d) Install the oil level gauge guide with the bolt.
   Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)
   (e) Install the oil level gauge guide.

28. INSTALL V-RIBBED BELT TENSIONER ASSEMBLY
   NOTICE:
   The bolt in position A is not reusable.
   HINT:
   Each bolt length is as follows:

<table>
<thead>
<tr>
<th>Position</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>70 mm (2.76 in.)</td>
</tr>
<tr>
<td>B, C, D and E</td>
<td>33 mm (1.30 in.)</td>
</tr>
</tbody>
</table>

   (a) Use a new bolt in position A.
   (b) Finger-tighten the bolts in positions A and E and install the bracket.
   (c) Tighten the bolts in positions A and E.
   Torque: 36 N*m (267 kgf*cm, 27 ft.*lbf)
   (d) Tighten the bolts in positions B, C and D.
   Torque: 36 N*m (267 kgf*cm, 27 ft.*lbf)

29. INSTALL COOLER COMPRESSOR ASSEMBLY (See page ES-421)

30. INSTALL GENERATOR ASSEMBLY
    Refer to the procedures up to "INSTALL GENERATOR ASSEMBLY“ (See page CH-17)
31. INSTALL FAN
   Refer to the procedures up to "INSTALL FAN PULLEY" (See page CO-17).

32. INSTALL FRONT DIFFERENTIAL CARRIER ASSEMBLY (for 4WD)
   Refer to the procedures up to "INSTALL FRONT DIFFERENTIAL CARRIER ASSEMBLY" (See page DF-42).

33. INSTALL POWER STEERING LINK ASSEMBLY (for 2WD)
   Refer to the procedures up to "INSTALL POWER STEERING LINK ASSEMBLY" (See page PS-30).

34. INSTALL POWER STEERING LINK ASSEMBLY (for 4WD)
   Refer to the procedures up to "INSTALL POWER STEERING LINK ASSEMBLY" (See page PS-49).

35. INSTALL BATTERY

36. ADD ENGINE COOLANT (See page CO-3)

37. ADD ENGINE OIL (See page LU-5)

38. ADD POWER STEERING FLUID

39. BLEED POWER STEERING FLUID (See page PS-2)

40. ADD DIFFERENTIAL OIL (for 4WD)

41. INSPECT DIFFERENTIAL OIL (for 4WD) (See page DF-3)

42. CHECK FOR ENGINE COOLANT LEAKAGE (See page CO-4)

43. CHECK FOR ENGINE OIL LEAKAGE

44. CHECK FOR POWER STEERING FLUID LEAKAGE

45. CHECK FOR DIFFERENTIAL OIL LEAKAGE

46. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT (See page SP-2)