

GENERAL DESCRIPTION

POWER ASSISTED SYSTEM (POWER STEERING)

1. General Description

A: SPECIFICATIONS

| Model | | Non-TURBO | | TURBO |
|---------------------------------------|---|--------------------------------|--|--|
| | | Others | Sedan and OUTBACK | |
| Whole system | Minimum turning radius | m (ft) | 5.1 (16.7) | 5.4 (17.7) |
| | Steering angle (Inside-Outside) | | 36°55' — 31°35' | 34°05' — 29°35' |
| | Steering wheel diameter | mm (in) | 385 (15.16) | |
| | Overall gear ratio (Turns, lock to lock Gear box) | | 3.22 | 3.02 |
| Gearbox | Type | | Rack and pinion, Integral | |
| | Backlash | | 0 (Automatically adjustable) | |
| | Valve (Power steering system) | | Rotary valve | |
| Pump (Power steering system) | Type | | Vane pump | |
| | Oil tank | | Installed on body | |
| | Output | cm ³ (cu in)/rev. | 7.8 (0.476) | 7.2 (0.439) |
| | Relief pressure | kPa (kg/cm ² , psi) | 7,164 — 7,840 (73 — 80, 1,040 — 1,165) | 7,350 — 8,036 (75 — 82, 1,067 — 1,165) |
| | Hydraulic fluid control | | Dropping in response to increased engine revolutions | |
| | Hydraulic fluid | ℓ (US qt, Imp qt) | 1,000 rpm: 7 (7.4, 6.2) 3,000 rpm: 5 (5.3, 4.4) | 7.5 (7.9, 6.6) ^{*1} 7 (7.4, 6.2) ^{*2} |
| | Range of revolution | rpm | 700 — 9,000 | |
| | Revolving direction | | Clockwise | |
| Working fluid (Power steering system) | Name | | ATF DEXRON III | |
| | Capacity | Oil tank | 0.3 (0.3, 0.3) | |
| | | Total | 0.7 (0.7, 0.6) | |

*1: With maximum load.

*2: With no load.

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| | | | | | |
|--|--|---------------------------------|--------------------------------|--|---------------------|
| Steering wheel | Free play | mm (in) | 17 (0.67) | | |
| Turning angle | Inner tire & wheel | TURBO, OUTBACK, Non-TURBO sedan | 34°05'±1.5° | | |
| | | other | 36°55'±1.5° | | |
| | Outer tire & wheel | TURBO, OUTBACK, Non-TURBO sedan | 29°35'±1.5° | | |
| | | other | 31°35'±1.5° | | |
| Steering shaft | Clearance between steering wheel and column cover | mm (in) | 3.0 (0.118) | | |
| Steering gear-box (Power steering system) | Sliding resistance | | N (kgf, lb) | 340 (35, 76) or less | |
| | Rack shaft play in radial direction | Right-turn steering | mm (in) | 0.19 (0.0075) or less | |
| | | Left-turn steering | mm (in) | Horizontal movement: 0.15 (0.0059) or less Vertical movement: 0.3 (0.012) or less | |
| | Input shaft play | In radial direction | mm (in) | 0.18 (0.0071) or less | |
| | | In axial direction | mm (in) | 0.5 (0.020) or less | |
| | Turning resistance | | N (kgf, lb) | Maximum allowable value: 12 (1.2, 2.7) | |
| Oil pump (Power steering system) | Pulley shaft | Radial play | mm (in) | 0.4 (0.016) or less | |
| | | Axial play | Non-TURBO | mm (in) | 0.4 (0.016) or less |
| | | | TURBO | mm (in) | 0.8 (0.031) or less |
| | Pulley | Ditch deflection | mm (in) | 1.0 (0.039) or less | |
| | | Resistance to rotation | N (kgf, lb) | 9.22 (0.94, 2.07) or less | |
| | Regular pressure | | kPa (kg/cm ² , psi) | 981 (10, 142) or less | |
| | Relief pressure | Non-TURBO | kPa (kg/cm ² , psi) | 7,355 (75, 1,067) | |
| | | TURBO | kPa (kg/cm ² , psi) | 7,845 (80, 1,138) | |
| Steering wheel effort (Power steering system) | At standstill with engine idling on a concrete road | N (kgf, lb) | 31.4 (3.2, 7.1) or less | | |
| | At standstill with engine stalled on a concrete road | N (kgf, lb) | 294.2 (30, 66.2) or less | | |

| Recommended power steering fluid | Manufacturer |
|----------------------------------|--------------|
| ATF DEXRON III | B.P. |
| | CALTEX |
| | CASTROL |
| | MOBIL |
| | SHELL |
| | TEXACO |

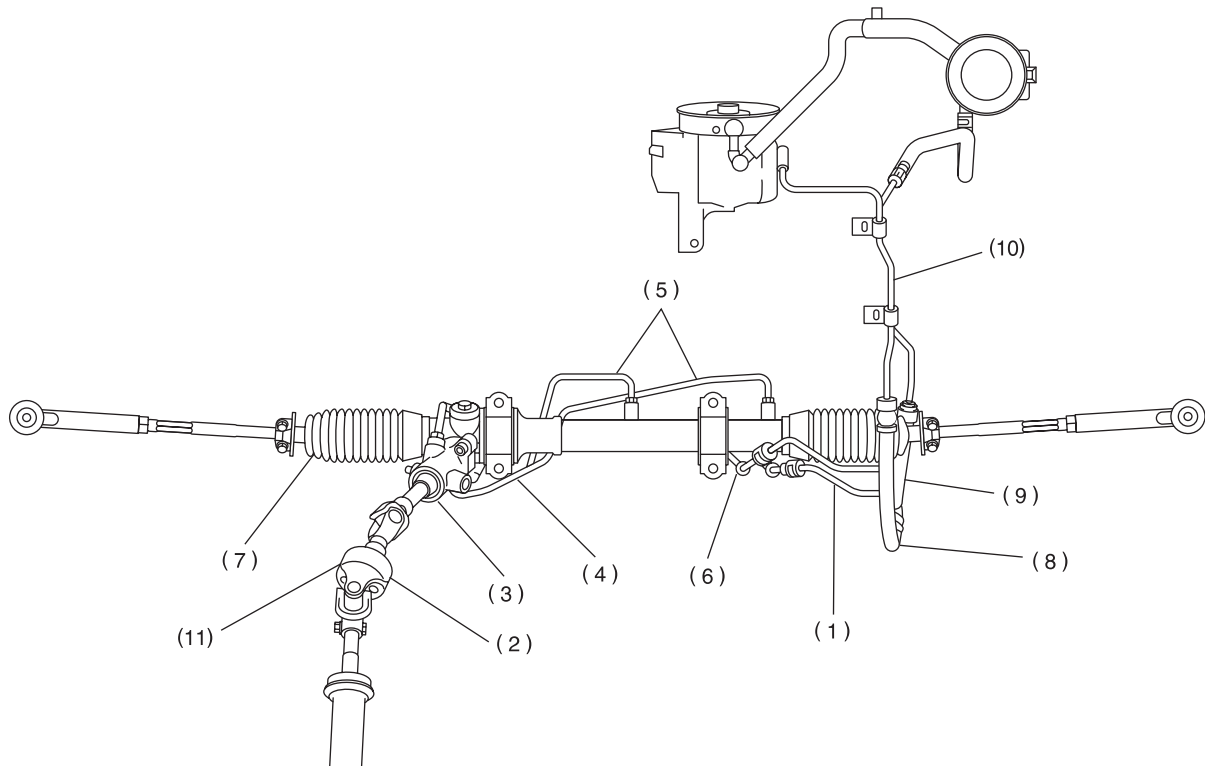
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CAUTION:

This table lists various clearances that must be correctly adjusted to ensure normal vehicle driving without interfering noise, or any other faults.

| Location | Minimum allowance |
|--|-------------------|
| (1) Crossmember — Pipe | 5 mm (0.20 in) |
| (2) DOJ — Shaft or joint | 14 mm (0.55 in) |
| (3) DOJ — Valve housing | 11 mm (0.43 in) |
| (4) Pipe — Pipe | 2 mm (0.08 in) |
| (5) Stabilizer — Pipe | 5 mm (0.20 in) |
| (6) Exhaust pipe — Pipe | 11 mm (0.43 in) |
| (7) Exhaust pipe — Gearbox bolt | 15 mm (0.59 in) |
| (8) Side frame — Hose A and B | 10 mm (0.39 in) |
| (9) Cruise control pump — Hose A and B | 15 mm (0.59 in) |
| (10) Pipe portion of hose A — Pipe portion of hose B | 1.5 mm (0.059 in) |
| (11) AT cooling hose — Joint | 20 mm (0.79 in) |



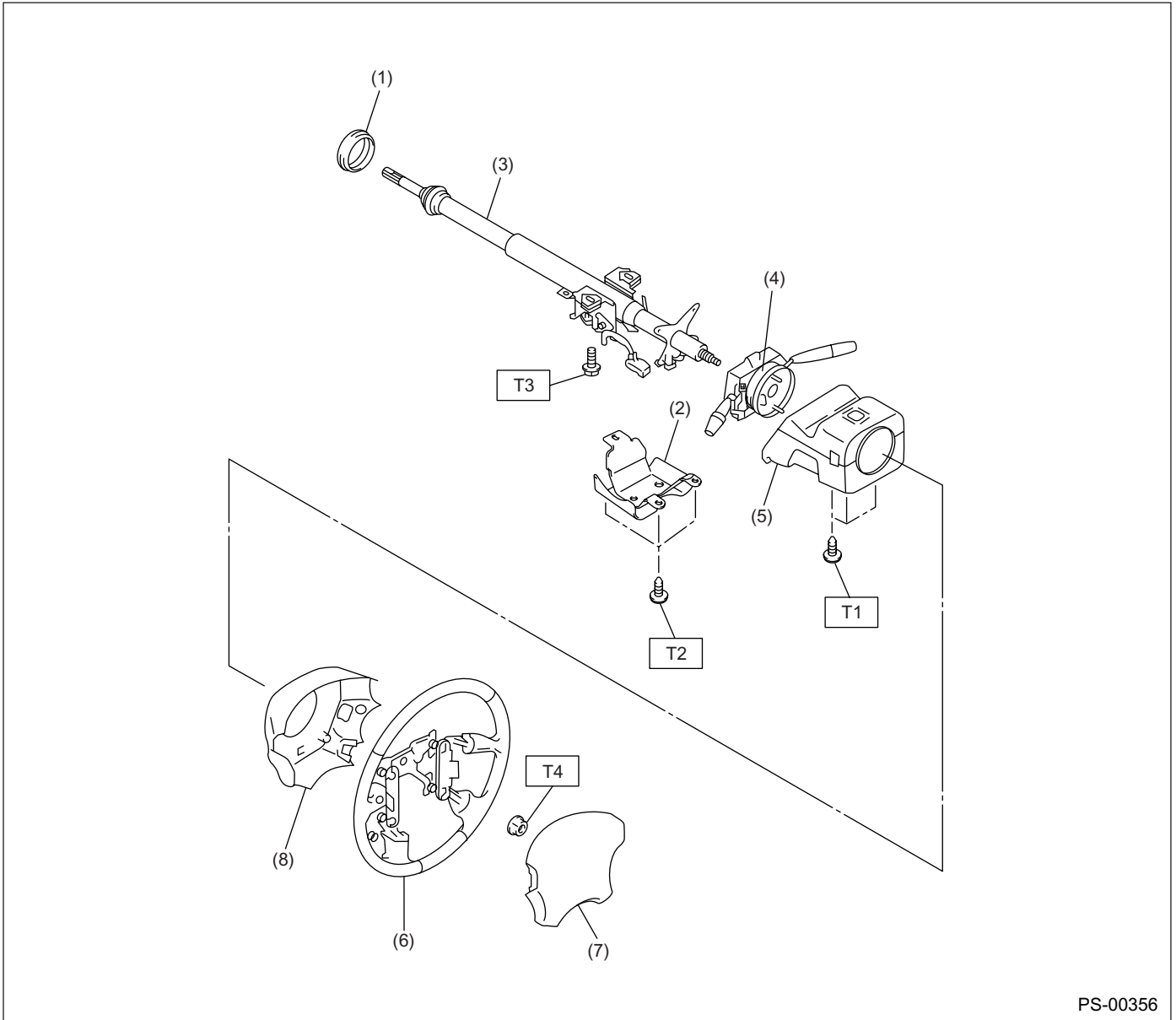
PS-00355

GENERAL DESCRIPTION

POWER ASSISTED SYSTEM (POWER STEERING)

B: COMPONENT

1. STEERING WHEEL AND COLUMN



- | | |
|-----------------------------|--------------------------------|
| (1) Bushing | (6) Steering wheel |
| (2) Knee protector | (7) Airbag module |
| (3) Steering shaft | (8) Lower steering wheel cover |
| (4) Steering roll connector | |
| (5) Column cover | |

Tightening torque: N·m (kgf·m, ft·lb)

T1: 1.2 (0.12, 0.9)

T2: 3.4 (0.35, 2.5)

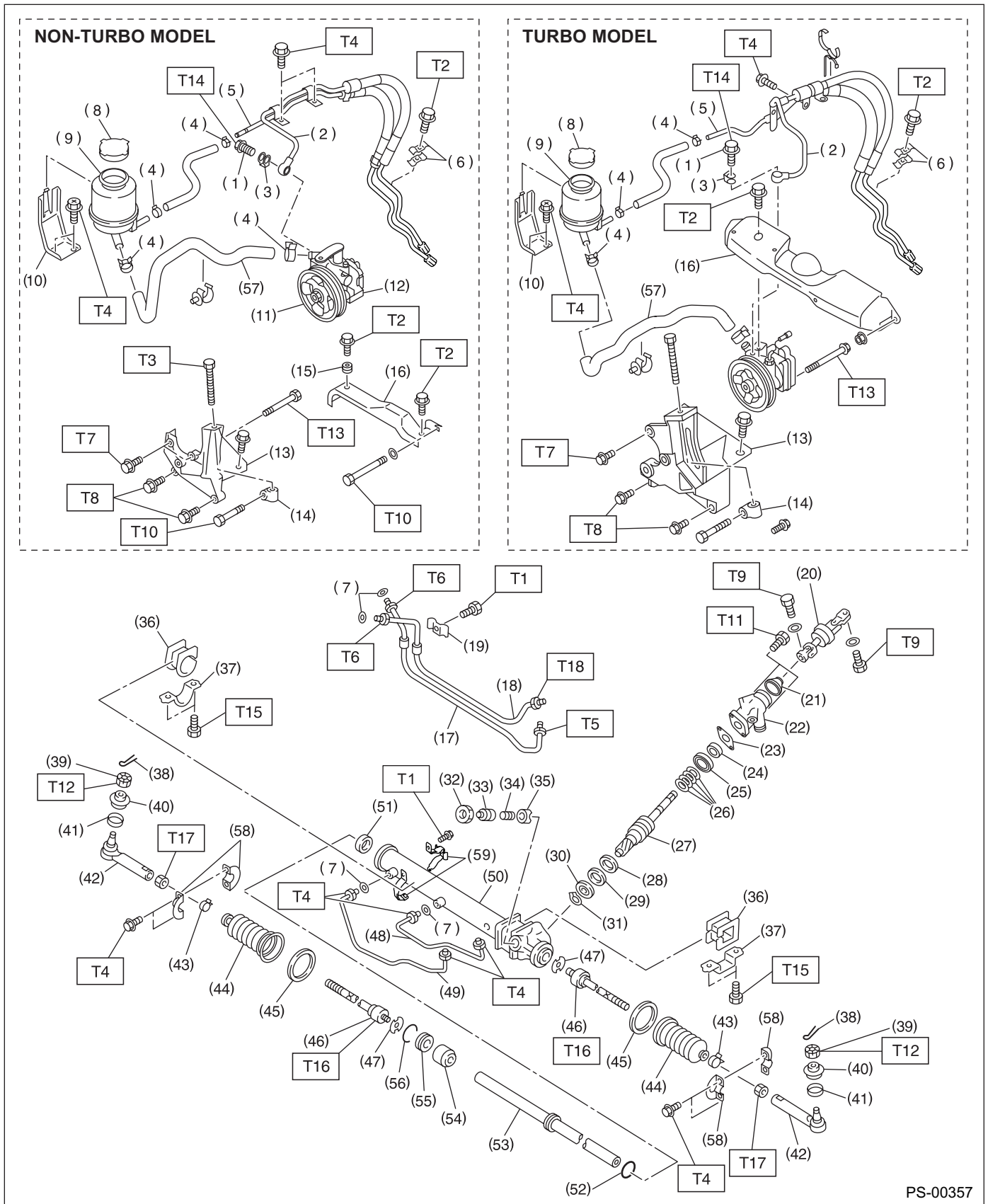
T3: 25 (2.5, 18.1)

T4: 44 (4.5, 32.5)

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2. POWER ASSISTED SYSTEM



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| | | |
|-----------------------------|----------------------------|------------------------|
| (1) Eye bolt | (27) Pinion and valve ASSY | (53) Rack |
| (2) Pipe C | (28) Oil seal | (54) Rack bushing |
| (3) Gasket | (29) Back-up washer | (55) Rack stopper |
| (4) Clip | (30) Ball bearing | (56) Circlip |
| (5) Pipe D | (31) Snap ring | (57) Suction hose |
| (6) Clamp E | (32) Lock nut | (58) Tie-rod end plate |
| (7) O-ring | (33) Adjusting screw | (59) Clamp plate |
| (8) Cap | (34) Spring | |
| (9) Reservoir tank | (35) Sleeve | |
| (10) Reservoir tank bracket | (36) Adapter | |
| (11) Pulley | (37) Clamp | |
| (12) Oil pump | (38) Cotter pin | |
| (13) Bracket | (39) Castle nut | |
| (14) Belt tension nut | (40) Dust cover | |
| (15) Bush | (41) Clip | |
| (16) Belt cover | (42) Tie-rod end | |
| (17) Pipe E | (43) Clip | |
| (18) Pipe F | (44) Boot | |
| (19) Clamp plate | (45) Band | |
| (20) Universal joint | (46) Tie-rod | |
| (21) Dust seal | (47) Lock washer | |
| (22) Valve housing | (48) Pipe B | |
| (23) Gasket | (49) Pipe A | |
| (24) Oil seal | (50) Steering body | |
| (25) Ball bearing | (51) Oil seal | |
| (26) Seal ring | (52) Piston ring | |

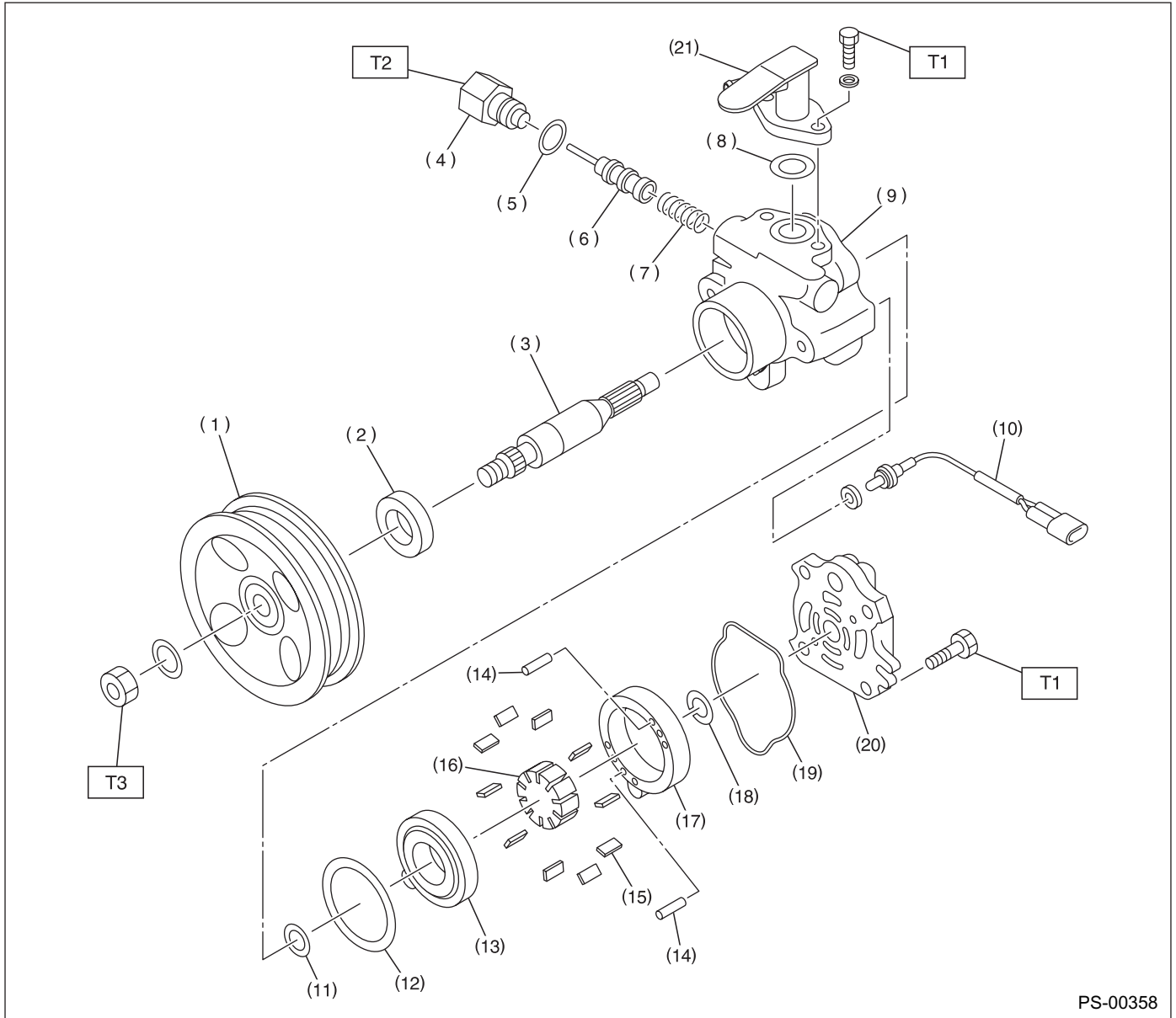
Tightening torque: N·m (kgf-m, ft-lb)**T1: 6 (0.6, 4.3)****T2: 7.4 (0.75, 5.4)****T3: 8 (0.8, 5.8)****T4: 13 (1.3, 9.4)****T5: 15 (1.5, 10.8)****T6: 15 (1.5, 10.8)****T7: 15.7 (1.6, 11.6)****T8: 22 (2.2, 15.9)****T9: 24 (2.4, 17.4)****T10: 25 (2.5, 18.1)****T11: 25 (2.5, 18.1)****T12: 27 (2.75, 19.9)****T13: 37.3 (3.8, 27.5)****T14: 39 (4.0, 28.9)****T15: 59 (6.0, 43)****T16: 78 (8.0, 58)****T17: 83 (8.5, 61.5)****T18: 25 (2.5, 18.1)**

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3. OIL PUMP

NON-TURBO MODEL



PS-00358

- | | | |
|------------------|----------------------|------------------------|
| (1) Pulley | (10) Pressure switch | (19) O-ring |
| (2) Oil seal | (11) O-ring | (20) Rear cover |
| (3) Shaft | (12) O-ring | (21) Suction connector |
| (4) Connector | (13) Pressure plate | |
| (5) O-ring | (14) Straight pin | |
| (6) Spool valve | (15) Vane | |
| (7) Spring | (16) Rotor | |
| (8) O-ring | (17) Cam ring | |
| (9) Front casing | (18) Retaining ring | |

Tightening torque: N·m (kgf·m, ft·lb)

T1: 21 (2.14, 15.5)

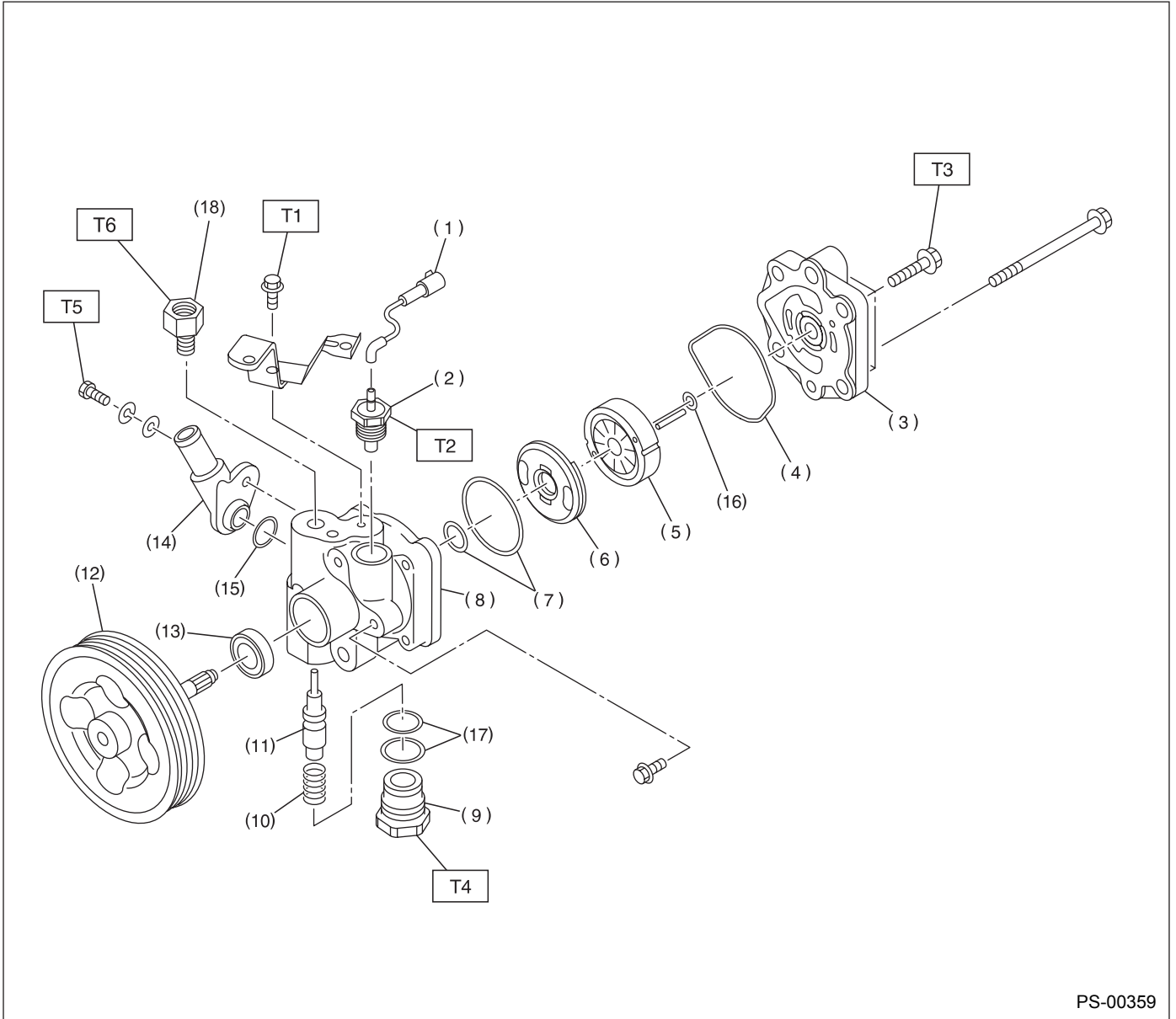
T2: 49 (5.0, 36.2)

T3: 52 (5.3, 38)

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TURBO MODEL



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- | | |
|-------------------------|--------------------------|
| (1) Lead wire | (10) Flow control spring |
| (2) Pump switch | (11) Flow control valve |
| (3) Rear cover | (12) Pulley |
| (4) O-ring | (13) Oil seal |
| (5) Cam | (14) Suction connector |
| (6) Pressure plate | (15) O-ring |
| (7) O-ring | (16) Retaining ring |
| (8) Front casing | (17) O-ring |
| (9) Energy saving valve | (18) Connector |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 9.8 (1.0, 7.2)

T2: 27 (2.75, 19.9)

T3: 27.4 (2.8, 20.3)

T4: 59 (6.0, 43)

T5: 11.8 (1.2, 8.7)

T6: 49 (5.0, 36.2)

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C: CAUTION

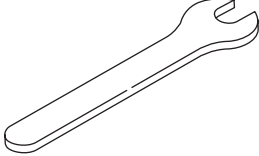
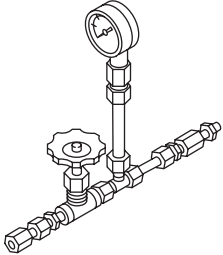
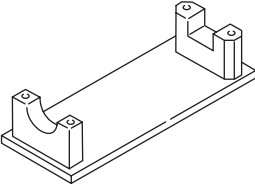
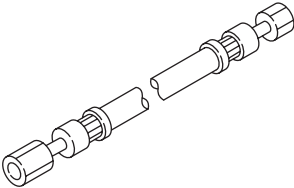
- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- Be careful not to burn your hands, because each part on the vehicle is hot after running.
- Use SUBARU genuine steering fluid, grease etc. or the equivalent. Do not mix steering fluid, grease etc. with that of another grade or from other manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Apply steering fluid onto sliding or revolution surfaces before installation.
- Before installing O-rings or snap rings, apply sufficient amount of steering fluid to avoid damage and deformation.
- Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or shop cloth between the part and the vise.

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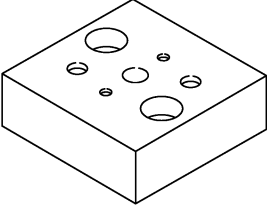
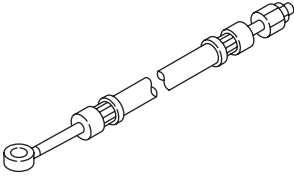
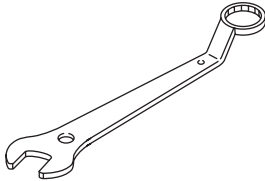
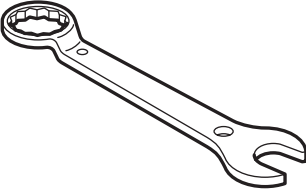
D: PREPARATION TOOL

1. SPECIAL TOOLS

| ILLUSTRATION | TOOL NUMBER | DESCRIPTION | REMARKS |
|---|-------------|----------------|--|
|  ST-925700000 | 925700000 | WRENCH | <ul style="list-style-type: none">• Used for removing and installing tie-rod.• Apply this tool to rack. |
|  ST-925711000 | 925711000 | PRESSURE GAUGE | Used for measuring oil pump pressure. |
|  ST-926200000 | 926200000 | STAND | Used when inspecting characteristic of gearbox assembly and disassembling it. |
|  ST34099AC010 | 34099AC010 | ADAPTER HOSE A | Used with PRESSURE GAUGE (925711000). |

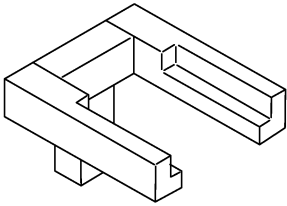
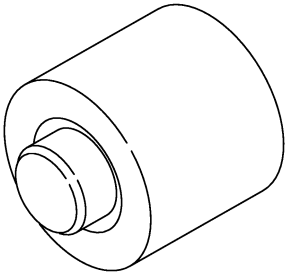
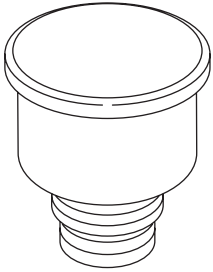
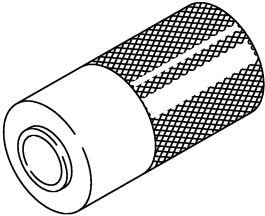
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| ILLUSTRATION | TOOL NUMBER | DESCRIPTION | REMARKS |
|---|-------------|----------------|---|
|  <p style="text-align: center;">ST34099FA100</p> | 34099FA100 | STAND BASE | <ul style="list-style-type: none"> • Used for assembling power steering gearbox. • For LHD model. |
|  <p style="text-align: center;">ST34099AC020</p> | 34099AC020 | ADAPTER HOSE B | Used with PRESSURE GAUGE (925711000). |
|  <p style="text-align: center;">ST-926230000</p> | 926230000 | SPANNER | <ul style="list-style-type: none"> • For the lock nut when adjusting backlash of gearbox. |
|  <p style="text-align: center;">ST34099PA100</p> | 34099PA100 | SPANNER | <ul style="list-style-type: none"> • Measurement of rotating resistance of gearbox assembly. |

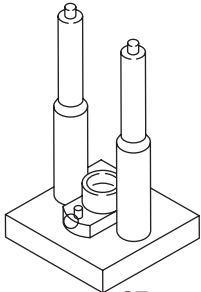
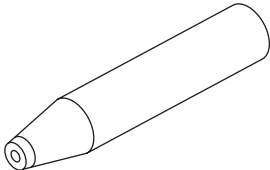
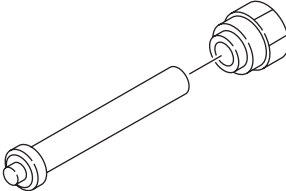
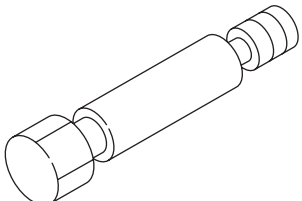
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| ILLUSTRATION | TOOL NUMBER | DESCRIPTION | REMARKS |
|---|-------------|------------------|---|
|  ST34199AE020 | 34199AE020 | MOUNT | <ul style="list-style-type: none">• Used for disassembling oil pump.• For TURBO model. |
|  ST34199AE030 | 34199AE030 | INSTALLER | Used for installing oil seal into oil pump. |
|  ST34199AE040 | 34199AE040 | OIL CHARGE GUIDE | Used for charging power steering oil. |
|  ST-927640000 | 927640000 | INSTALLER B | Used for installing ball bearing into housing. |

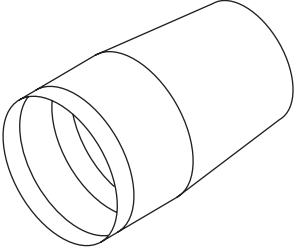
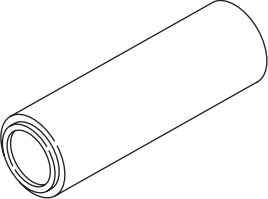
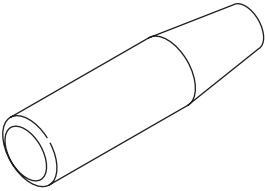
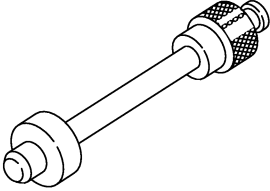
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|---|-------------|-------------------------|--|
|  <p style="text-align: center;">ST-926370000</p> | 926370000 | INSTALLER A | <ul style="list-style-type: none"> • Used for installing valve assembly into valve housing assembly. • Used with STAND BASE (927630000). |
|  <p style="text-align: center;">ST-926390001</p> | 926390001 | COVER & REMOVER ASSY | <ul style="list-style-type: none"> • Used for assembling rack assembly. |
|  <p style="text-align: center;">ST-926420000</p> | 926420000 | PLUG | <p>When oil leaks from pinion side of gearbox assembly, remove pipe B from valve housing, attach this tool and check oil leaking points.</p> |
|  <p style="text-align: center;">ST-926400000</p> | 926400000 | GUIDE | <ul style="list-style-type: none"> • Right side of rack when installing rack bush. • Used with GUIDE (927660000). |

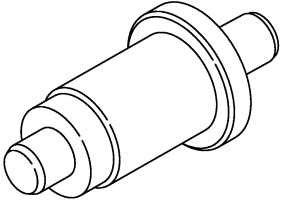
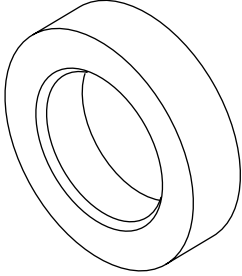
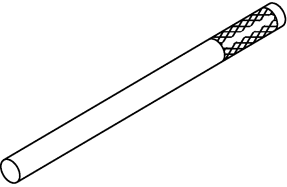
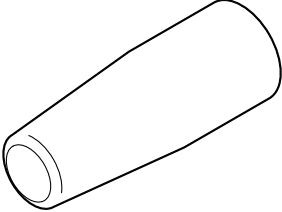
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|---|-------------|-------------|--|
|  <p style="text-align: center;">ST-927660000</p> | 927660000 | GUIDE | <ul style="list-style-type: none"> • Right side of rack when installing rack bush. • Used with GUIDE (926400000). |
|  <p style="text-align: center;">ST-927620000</p> | 927620000 | INSTALLER B | <ul style="list-style-type: none"> • Used for installing oil seal of valve housing. • Used with INSTALLER A (926360000). |
|  <p style="text-align: center;">ST-926360000</p> | 926360000 | INSTALLER A | <ul style="list-style-type: none"> • Used as a guide to install oil seal. • Used with INSTALLER B (927620000). |
|  <p style="text-align: center;">ST34099FA110</p> | 34099FA110 | INSTALLER | Used for installing oil seal. |

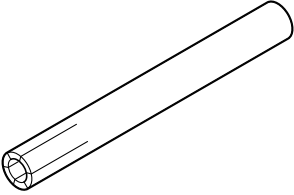
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|---|-------------|----------------------------|--|
|  <p style="text-align: center;">ST34099FA120</p> | 34099FA120 | INSTALLER AND REMOVER SEAL | Used for installing and removing valve housing oil seal. |
|  <p style="text-align: center;">ST34099FA130</p> | 34099FA130 | INSTALLER SEAL | <ul style="list-style-type: none"> • Used for installing valve housing oil seal. • Used with INSTALLER AND REMOVER SEAL (34099FA120). |
|  <p style="text-align: center;">ST34199AE050</p> | 34199AE050 | REMOVER OIL SEAL | Used for removing back-up ring and oil seal. |
|  <p style="text-align: center;">ST34099AC030</p> | 34099AC030 | INSTALLER A | <ul style="list-style-type: none"> • Used for installing retaining ring. • Used with INSTALLER B (34099AC040). • For non-turbo model. |

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|---|-------------|-------------|--|
|  <p>ST34099AC040</p> | 34099AC040 | INSTALLER B | <ul style="list-style-type: none">• Used for installing retaining ring.• Used with INSTALLER A (34099AC030).• For non-turbo model. |

2. GENERAL PURPOSE TOOLS

| TOOL NAME | REMARKS |
|------------------|---|
| Spring scale | Used for measuring tightening torque. |
| Snap ring pliers | Used for removing and installing snap ring. |
| Dial gauge | Used for measuring steering gearbox. |