

General Description

POWER ASSISTED SYSTEM (POWER STEERING)

1. General Description

A: SPECIFICATION

1. HYDRAULIC TYPE

Model			STI model
Whole system	Minimum turning radius: m (ft)		5.6 (18.4)
	Steering angle	Inner wheel	36.3°±1.5°
		Outer wheel	32.0°±1.5°
	Steering wheel diameter: mm (in)		369 (14.53)
	Lock-to-lock revolution number		2.5
Gearbox	Type		Rack & pinion type Integral type
	Backlash		0 (automatic adjusting)
	Valve type		Rotary valve
Power steering pump	Type		Vane pump
	Oil tank		Installed on body
	Specific discharge rate: cm ³ (cu in)/rev.		8.5 (0.519)
	Relief pressure: kPa (kgf/cm ² , psi)		8,300 — 9,000 (85 — 92, 1,203 — 1,305)
	Hydraulic fluid control		Engine speed sensitive
	Operation flow rate: L (US qt, Imp qt)		1,000 rpm: 7.5 (7.9, 6.6) 3,000 rpm: 7.3 (7.7, 6.4)
	Revolution speed range: rpm		560 — 9,600
	Direction of rotation		Clockwise
Power steering fluid	Description		SUBARU ATF or ATF DEXRON III
	Capacity: L (US qt, Imp qt)		Oil tank: 0.2 (0.2, 0.2)
			Whole system: 0.7 (0.7, 0.6)

Steering wheel

Free play:	mm (in)	17 (0.67)
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Column assembly - steering

Clearance: Between steering wheel and cover assembly - column	mm (in)	4 — 6 (0.16 — 0.24)
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Steering gearbox

Sliding resistance:		N (kgf, lbf)	343 (35, 77) or less Difference between right and left sliding resistance: 20% or less
Rack shaft play in radial direction: mm (in)	Right-turn steering		0.4 (0.016) or less
	Left-turn steering		Play in the horizontal direction: 0.6 (0.024) or less Play in the vertical direction: 0.4 (0.016) or less
Input shaft play: mm (in)	In radial direction		0.26 (0.0102) or less
	In axial direction		Without play
Rotational resistance:		N (kgf, lbf)	Maximum allowable value: 21 (2.14, 4.7) or less Difference between right and left rotating resistance: 20% or less

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Power steering oil pump

Pulley shaft	Lateral play: mm (in)	0.2 (0.008) or less
	Axial play: mm (in)	0.9 (0.035) or less
Pulley	Groove runout: mm (in)	1.0 (0.039) or less
	Rotational resistance: N (kgf, lbf)	9.22 (0.94, 2.07) or less
Regular pressure (unloaded): kPa (kgf/cm ² , psi)		981 (10, 142) or less

Steering effort (with power steering assist)

At standstill on paved road with engine idling:	N (kgf, lbf)	31 (3.16, 7.0) or less
At standstill on paved road with engine stalled:	N (kgf, lbf)	294.2 (29.9, 66.2) or less

Recommended power steering fluid

SUBARU ATF or ATF DEXRON III

2. ELECTRIC TYPE

Model			WRX model
Whole system	Minimum turning radius: m (ft)		5.4 (17.72)
	Steering angle	Inner wheel	37.5°±1.5°
		Outer wheel	32.9°±1.5°
	Steering wheel diameter: mm (in)		369 (14.53)
	Lock-to-lock revolution number		2.8
Gearbox	Type		Rack & pinion type
	Backlash		0 (automatic adjusting)
Motor (Temperature 20°C (68°F))	Rated voltage: V		12
	Rated torque: N·m (kgf-m, ft-lb)		5.3 (0.54, 3.91)
	Rated revolution speed: rpm		960
	Rated current: A		84
	Rated output: W		537

Steering wheel

Free play:	mm (in)	17 (0.67) or less
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Column assembly - steering

Clearance: Between steering wheel and cover assembly - column	mm (in)	4 — 6 (0.16 — 0.24)
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Steering gearbox

Sliding resistance: N (kgf, lbf)		360 (37, 81) or less Difference between right and left sliding resistance: 20% or less
Rack shaft play in radial direction: mm (in)	Right-turn steering	Play in the horizontal direction: 0.6 (0.024) or less Play in the vertical direction: 0.4 (0.016) or less
	Left-turn steering	0.4 (0.016) or less
Input shaft play: mm (in)	In radial direction	0.18 (0.0071) or less
	In axial direction	0.27 (0.0106) or less
Rotational resistance: N (kgf, lbf)		Maximum allowable value: 18 (1.8, 4.0) or less Difference between right and left sliding resistance: 20% or less

Steering effort (with power steering assist)

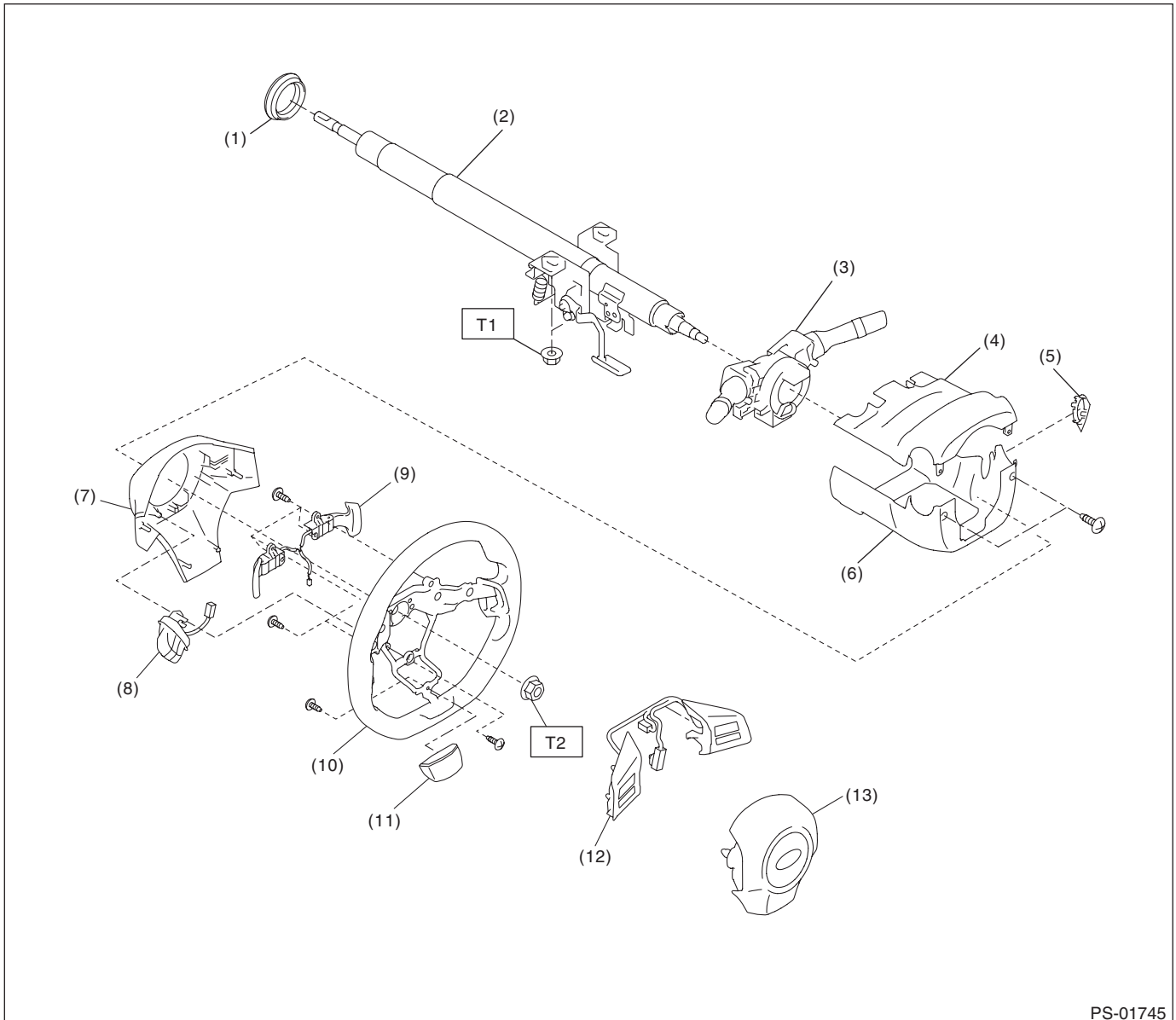
At standstill on paved road with engine idling:	N (kgf, lbf)	31 (3.2, 7.0) or less
At standstill on paved road with engine stalled:	N (kgf, lbf)	294.2 (30, 66.2) or less

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B: COMPONENT

1. STEERING WHEEL AND COLUMN



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|--|---|--------------------|
| (1) Bushing | (7) Cover - steering wheel LWR | (13) Airbag module |
| (2) Column ASSY - steering | (8) MID switch (multi-information display switch) | |
| (3) Switch ASSY - combination | (9) Paddle shift | |
| (4) Cover ASSY - column UPR | (10) Steering wheel | |
| (5) Cap - key cylinder (model with keyless access) | (11) Cover - spoke | |
| (6) Cover ASSY - column LWR | (12) Satellite switch | |

Tightening torque: N·m (kgf-m, ft-lb)

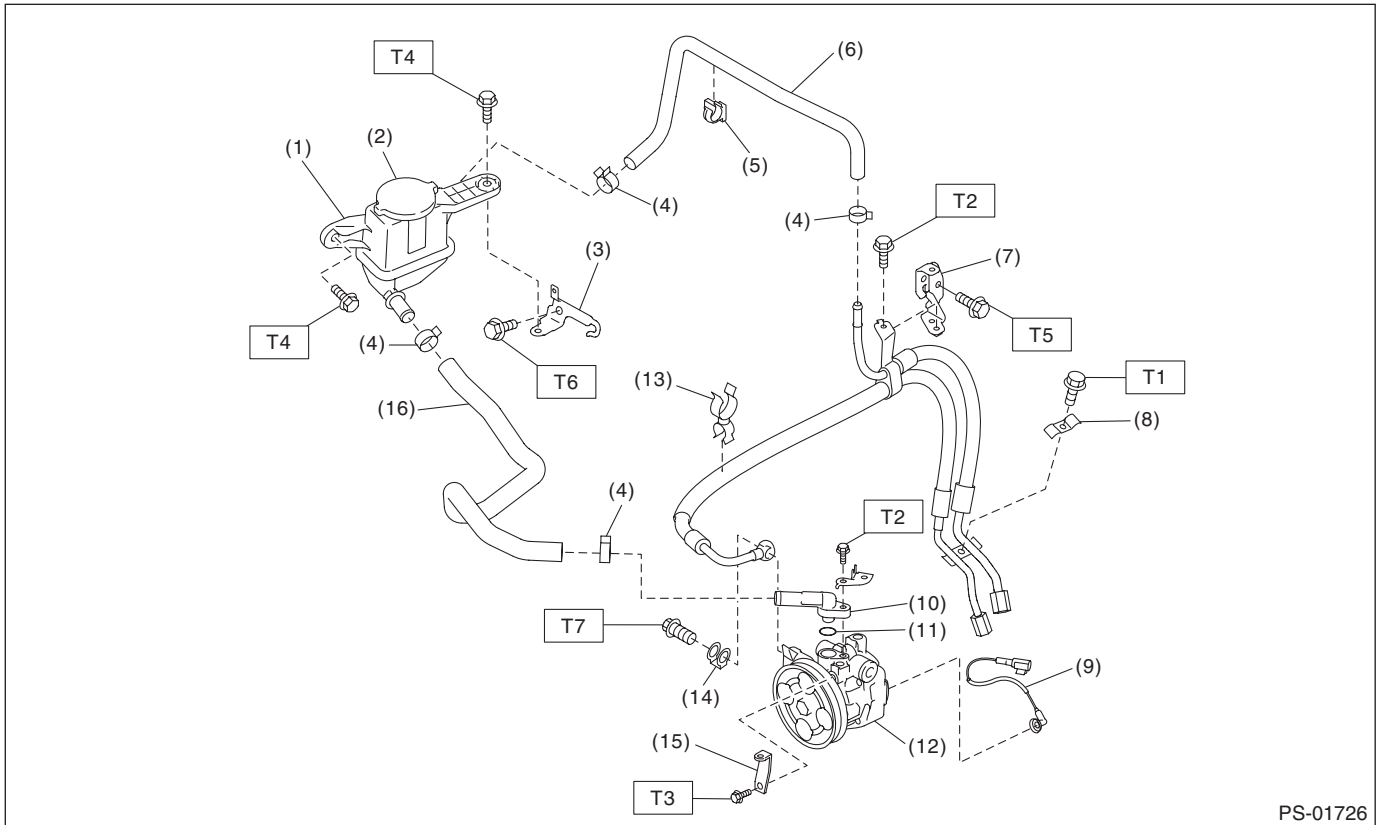
T1: 20 (2.0, 14.8)

T2: 39 (4.0, 28.8)

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2. HOSE AND TANK



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|----------------------|---------------------------|
| (1) Reservoir tank | (10) Suction connector |
| (2) Cap | (11) O-ring |
| (3) Tank bracket | (12) Oil pump |
| (4) Clip | (13) Clip |
| (5) Hose clip | (14) Eyebolt gasket |
| (6) Return hose | (15) Bracket - belt cover |
| (7) Bracket - hose | (16) Hose - suction |
| (8) Clamp E | |
| (9) Switch - harness | |

Tightening torque: N·m (kgf·m, ft·lb)

T1: 7.5 (0.8, 5.5)

T2: 10 (1.0, 7.4)

T3: 11 (1.1, 8.1)

T4: 13 (1.3, 9.6)

T5: 18 (1.8, 13.3)

T6: 33 (3.4, 24.3)

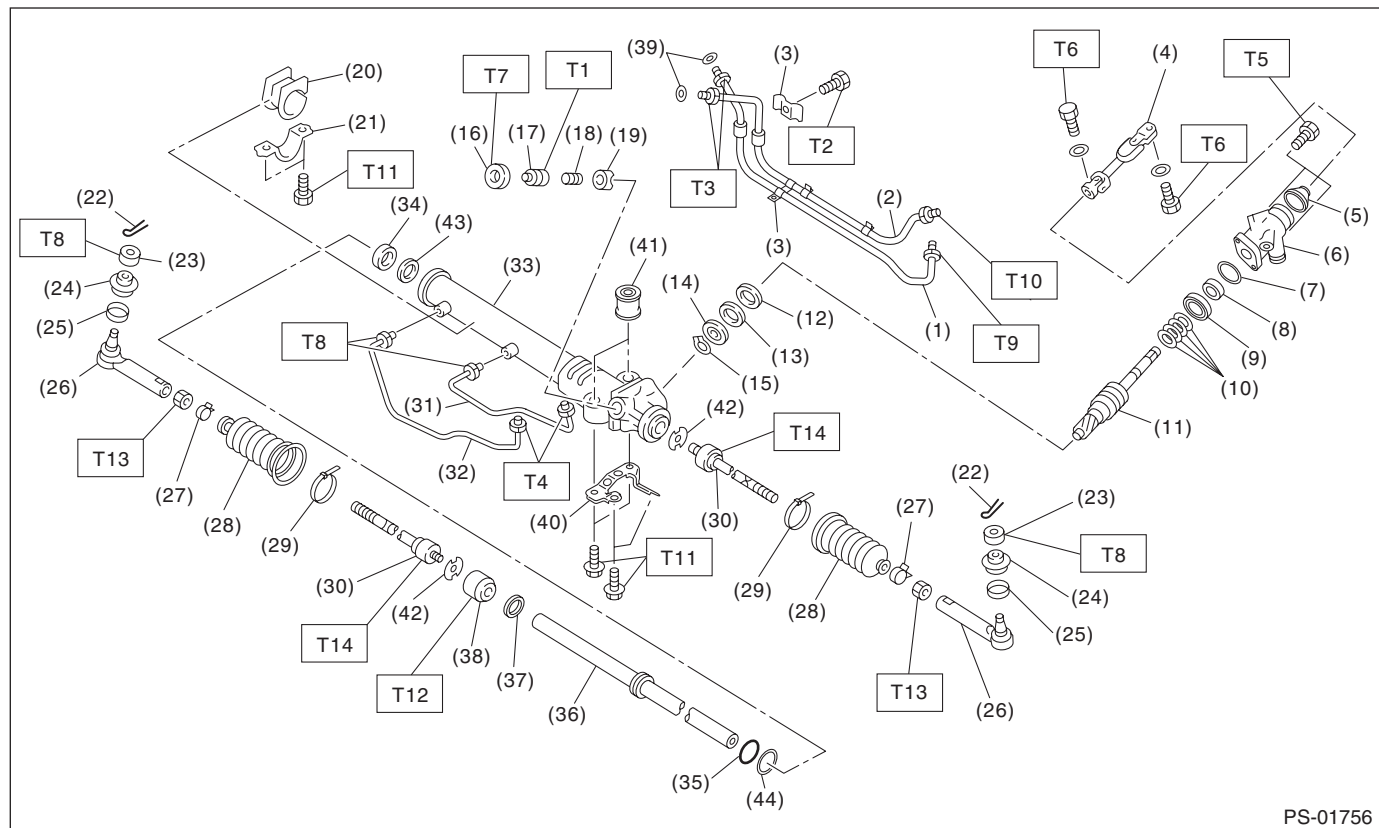
T7: 40 (4.1, 29.5)

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3. STEERING GEARBOX

- Hydraulic type



PS-01756

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|--------------------------|-----------------------|
| (1) Feed pipe | (21) Clamp |
| (2) Return pipe | (22) Cotter pin |
| (3) Clamp plate | (23) Castle nut |
| (4) Universal joint | (24) Dust cover |
| (5) Dust seal | (25) Clip |
| (6) Valve housing | (26) Tie-rod end |
| (7) O-ring | (27) Clip |
| (8) Oil seal | (28) Boot |
| (9) Bushing | (29) Band |
| (10) Seal ring | (30) Tie-rod |
| (11) Pinion & valve ASSY | (31) Pipe B |
| (12) Oil seal | (32) Pipe A |
| (13) Back-up washer | (33) Steering body |
| (14) Ball bearing | (34) Oil seal |
| (15) Snap ring | (35) Piston seal ring |
| (16) Lock nut | (36) Rack |
| (17) Adjusting screw | (37) Oil seal |
| (18) Spring | (38) Holder |
| (19) Sleeve | (39) O-ring |
| (20) Adapter | (40) Stiffener |

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|-------------------|
| (41) Bushing |
| (42) Lock washer |
| (43) Back-up ring |
| (44) O-ring |

Tightening torque: N-m (kgf-m, ft-lb)

T1: Tighten to 5.9 (0.6, 4.4), and loosen by 5 degrees.

T2: 9 (0.9, 6.6)

T3: 15 (1.5, 11.1)

T4: 17 (1.7, 12.5)

T5: 20 (2.0, 14.8)

T6: 24 (2.4, 17.7)

T7: 25 (2.5, 18.4)

T8: 27 (2.8, 19.9)

T9: 37 (3.8, 27.3)

T10: 29 (3.0, 21.4)

T11: 60 (6.1, 44.3)

T12: 70 (7.1, 51.6)

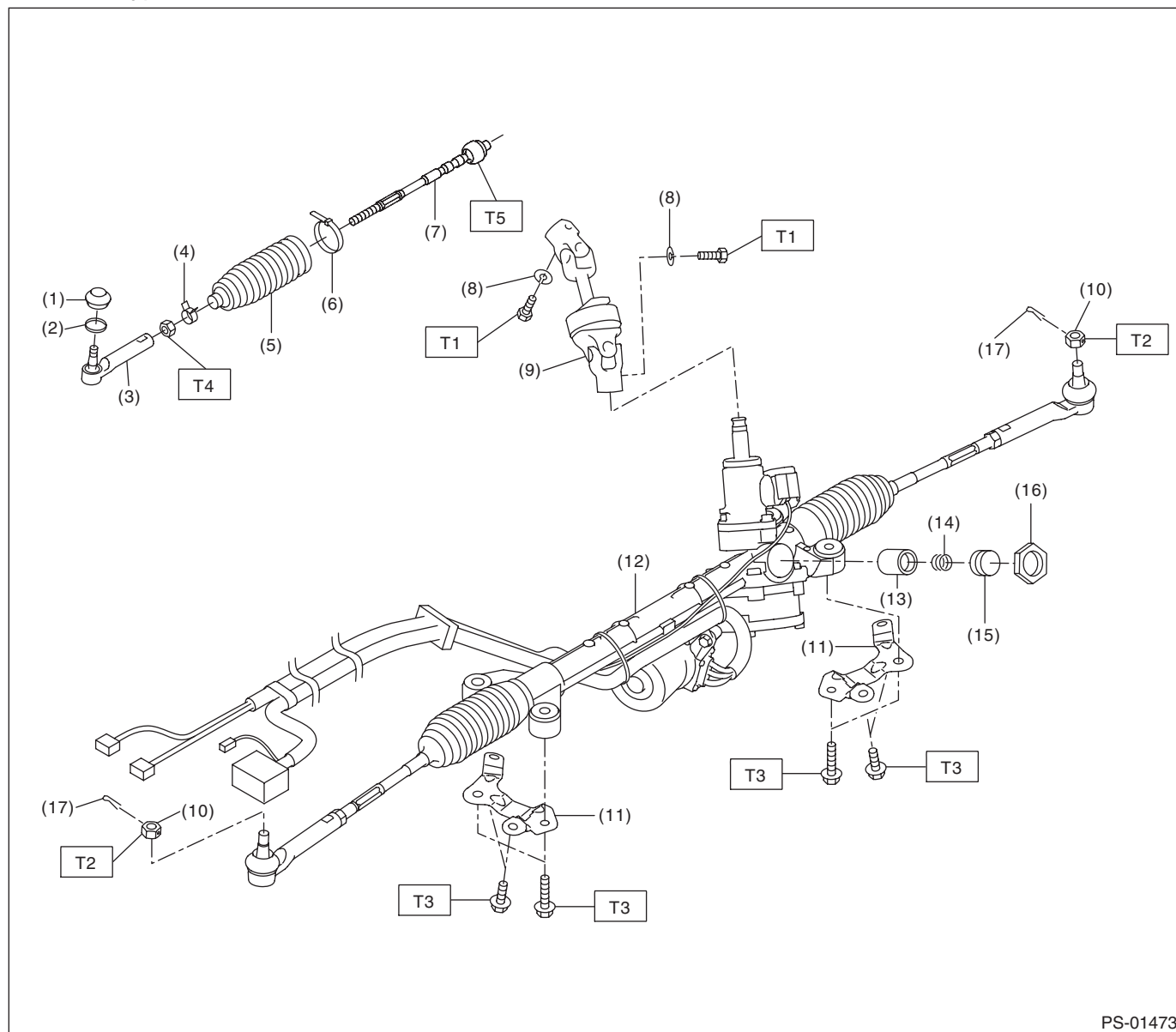
T13: 85 (8.7, 62.7)

T14: 93 (9.5, 68.6)

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- Electric type



- (1) Dust seal
- (2) Clip - boot tie-rod end
- (3) Tie-rod end
- (4) Clip - boot tie-rod
- (5) Boot - steering gearbox
- (6) Band - boot
- (7) Tie-rod
- (8) Spring washer

- (9) Universal joint ASSY - steering
- (10) Castle nut
- (11) Stiffener
- (12) Steering gearbox ASSY
- (13) Pad - pressure
- (14) Spring - gearbox
- (15) Adjusting screw
- (16) Lock nut

- (17) Cotter pin

Tightening torque: N·m (kgf-m, ft-lb)

T1: 24 (2.4, 17.7)

T2: 27 (2.8, 19.9)

T3: 60 (6.1, 44.3)

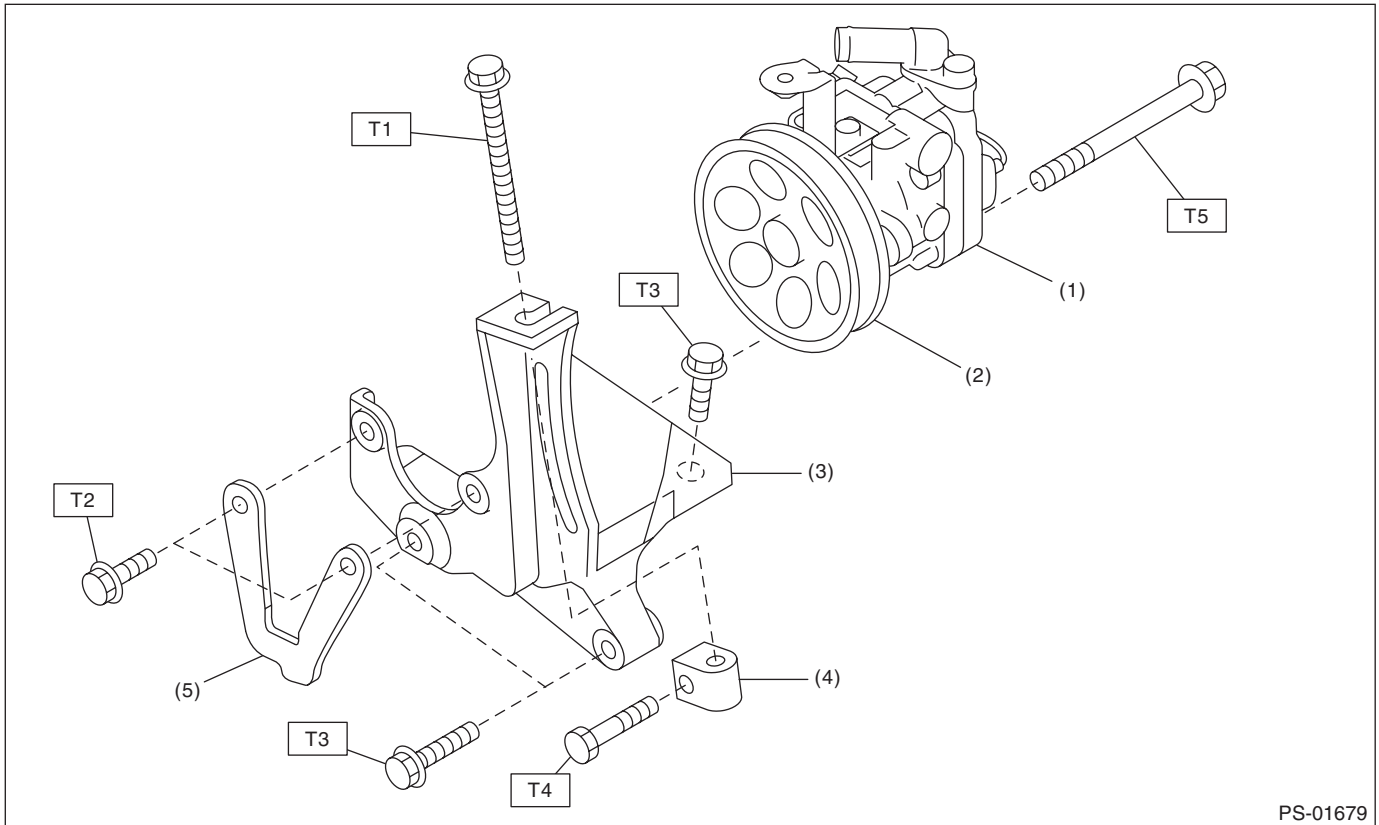
T4: 85 (8.7, 62.7)

T5: 90 (9.2, 66.4)

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4. OIL PUMP



- (1) Oil pump
- (2) Pulley
- (3) Bracket
- (4) Belt tension nut
- (5) Washer plate

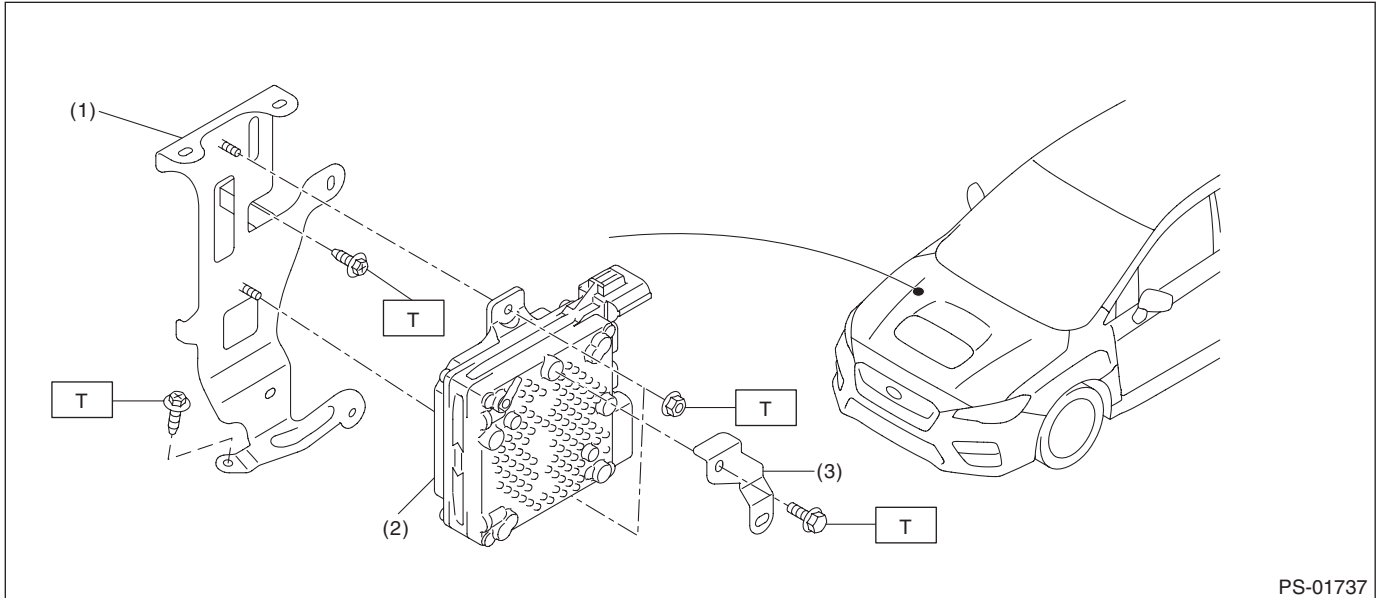
Tightening torque: N·m (kgf·m, ft·lb)

- T1: 8 (0.8, 5.9)**
 - T2: 16 (1.6, 11.8)**
 - T3: 22 (2.2, 16.2)**
 - T4: 25 (2.5, 18.4)**
 - T5: 48 (4.9, 35.4)**
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5. ELECTRIC POWER STEERING CONTROL MODULE



- (1) Bracket - control module (3) Harness bracket
(2) Power steering control module

Tightening torque: N·m (kgf-m, ft-lb)

T: 7.5 (0.8, 5.5)

C: CAUTION

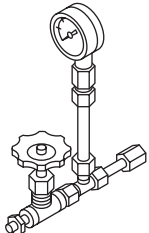
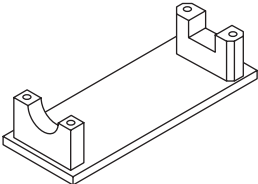
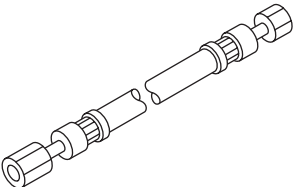
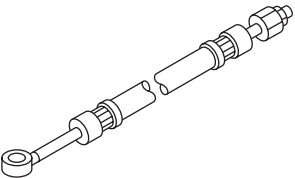
- When performing any work, always wear work clothes, a work cap and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Some vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
- Use SUBARU genuine grease, the recommended or equivalent. Do not mix grease etc. of different grades or manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Do not secure a part in a vise directly. Place cushioning materials such as wood blocks, aluminum plates, or waste cloth between the part and the vise.
- When removing, installing or replacing the VDCCM&H/U, VDCCM&H/U bracket, steering wheel or steering angle sensor (steering roll connector), perform "VDC sensor midpoint setting mode" of the VDC. <Ref. to VDC-16, VDC SENSOR MIDPOINT SETTING MODE, ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

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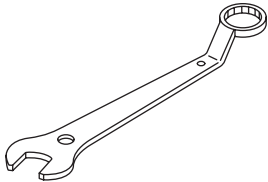
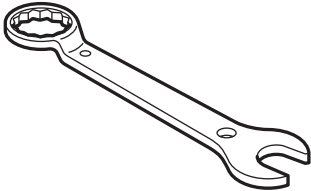
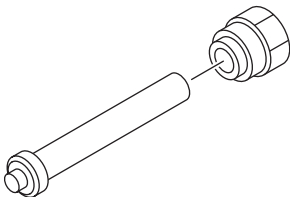
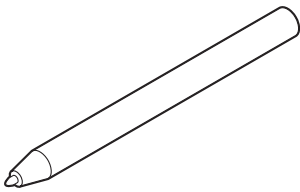
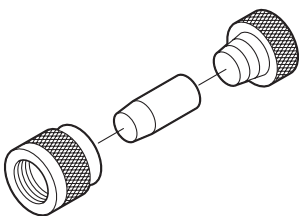
D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-925711000	925711000	PRESSURE GAUGE	Used for measuring oil pressure.
 ST-926200000	926200000	STAND	<ul style="list-style-type: none"> Used when inspecting characteristic of gear-box assembly and disassembling it. Used together with BOSS D (34199AG000).
 ST34099AC010	34099AC010	ADAPTER HOSE A	Used together with PRESSURE GAUGE (925711000).
 ST34099AC020	34099AC020	ADAPTER HOSE B	Used together with PRESSURE GAUGE (925711000).

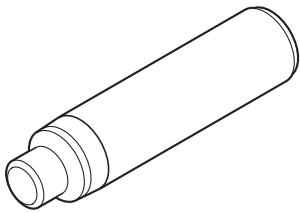
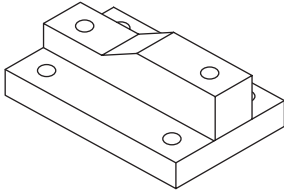
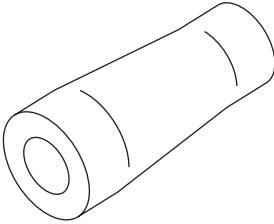
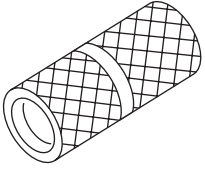
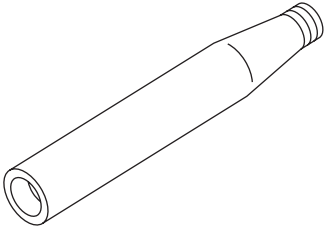
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-926230000	926230000	SPANNER	For the lock nut when adjusting backlash of gearbox.
 ST34099PA100	34099PA100	SPANNER	Used when measuring the rotational resistance of gearbox assembly.
 ST-926420000	926420000	PLUG	When fluid leaks from pinion side of gearbox assembly, remove pipe B from valve housing, attach this tool and check fluid leaking points.
 ST34099FA060	34099FA060	PUNCH HOLDER	Used for crimping.
 ST34199FE040	34199FE040	INSTALLER A, B, C	<ul style="list-style-type: none"> • Used for installing the oil seal to the rack assembly. • INSTALLER A: 34199FE070 • INSTALLER B: 34199FE080 • INSTALLER C: 34199FE090

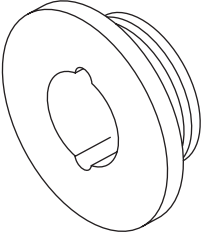
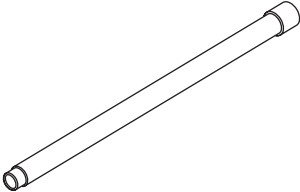
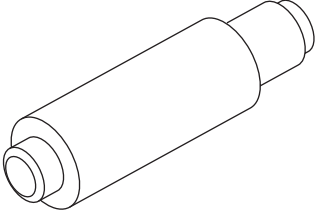
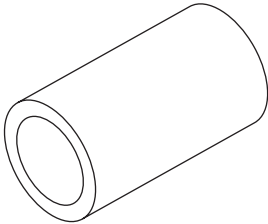
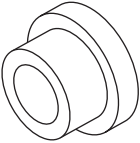
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST34199XA030</p>	34199XA030	INSTALLER & REMOVER	Used for removing and installing the rack oil seal (outer and inner).
 <p style="text-align: center;">ST34199AG000</p>	34199AG000	BOSS D	<ul style="list-style-type: none"> • Used when inspecting characteristic of gear-box assembly and disassembling it. • Used together with STAND (926200000).
 <p style="text-align: center;">ST34199AG040</p>	34199AG040	GUIDE	Used for installing seal ring of rack.
 <p style="text-align: center;">ST34199AG070</p>	34199AG070	FORMER	Used for forming seal ring of pinion.
 <p style="text-align: center;">ST34199AG020</p>	34199AG020	GUIDE	Used for installing seal ring of pinion.

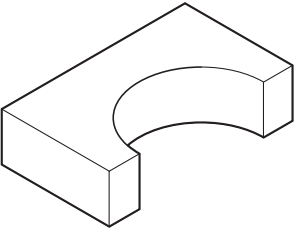
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 ST34199AG060	34199AG060	GUIDE G (26)	<ul style="list-style-type: none"> Used for forming seal ring of rack. Used together with FORMER PISTON (34199AG080).
 ST34099PA010	34099PA010	OIL SEAL REMOVER	Used for removing oil seal.
 ST34199AG090	34199AG090	INSTALLER & REMOVER	<ul style="list-style-type: none"> Used for installing oil seal of valve housing. Used for installing ball bearing of valve housing. Used for removing oil seal and ball bearing from valve housing.
 ST34199AG080	34199AG080	FORMER PISTON	<ul style="list-style-type: none"> Used for forming seal ring of rack. Used together with GUIDE G (26) (34199AG060).
 ST34199AG010	34199AG010	INSTALLER	Used for pressing-fit oil seal of gearbox cylinder.

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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST34199FE020	34199FE020	BASE	Used for crimping.

2. GENERAL TOOL

TOOL NAME	REMARKS
Steering wheel puller	Used for removing the steering wheel.
Circuit tester	Used for measuring voltage and resistance.