Bolt Tightening Torque

Hexagon Bolt

1) Thread type: Metric thread
Unified thread
2) Bolt strength: 8.8 (8T) ~ 10.9 (11T)
3) Thread pitch: Metric thread: Coarse pitch thread (C), fine pitch thread (F)
Unified thread: Coarse pitch thread (UNC), fine pitch thread (UNF)

(N-m)

Type	Bolt size			Bolt strength	
	Nominal Dimension	Nominal Dia.	Pitch	8.8 (8T)	10.9 (11T)
Metric thread	M8	8	(C) 1.25	26	38
	M10	10	(C) 1.5	53	76
			(F) 1.25	55	80
	M12	12	(C) 1.75	90	132
			(F) 1.25	96	142
	M14	14	(C) 2.0	142	206
			(F) 1.5	152	221
	M16	16	(C) 2.0	216	314
			(F) 1.5	226	330
	M18	18	(C) 2.5	299	436
			(F) 1.5	324	476
	M20	20	(C) 2.5	417	608
			(F) 1.5	451	662
	M22	22	(C) 2.5	559	814
			(F) 1.5	598	878
	M24	24	(C) 3.0	721	1,030
			(F) 2.0	770	1,128
	M27	27	(C) 3.0	1,030	1,520
			(F) 2.0	1,128	1,618
	M30	30	(C) 3.5	1,422	2,109
			(F) 2.0	1,569	2,256
	M33	33	(C) 3.5	1,912	2,844
			(F) 2.0	2,059	3,040
Unified thread	5/16	05	18 UNC	25	35
	3/8	06	16 UNC	44	65
	7/16	07	14 UNC	71	103
	1/2	08	13 UNC	103	147
	9/16	09	12 UNC	147	216
	5/8	10	11 UNC	201	294
	3/4	12	10 UNC	358	525
	7/8	14	9 UNC	554	809
	1	16	8 UNC	868	1,275

Note: Tighten the bolts according to the above list, unless otherwise specified.

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Deck

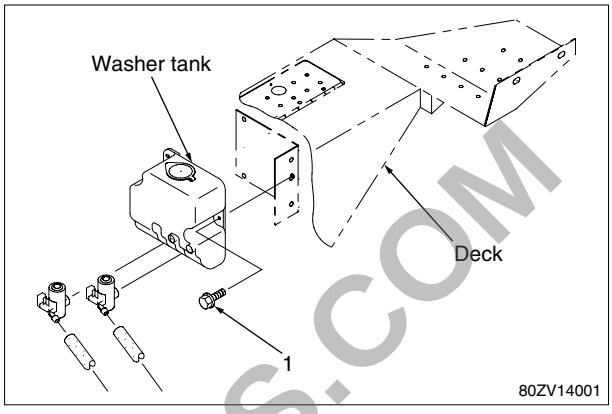
Removing and reinstalling deck

1. Removing deck

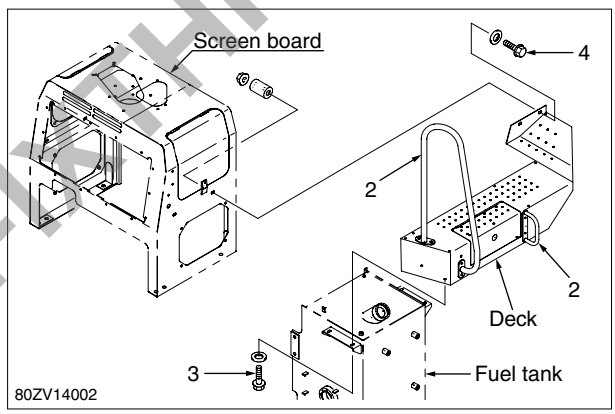
⚠ WARNING

Unexpected movement of machine could cause an accident resulting in injury or death. Be sure to observe the following items before starting deck removal:

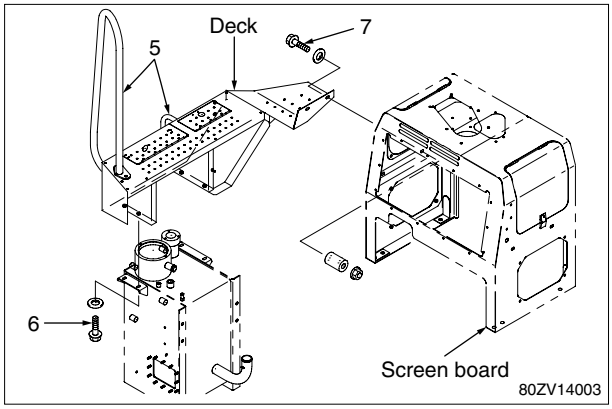
- **Position machine on level ground, and apply parking brake.**
- **Lower bucket to ground, and block tires with chocks, etc. to prevent them from moving.**
- **Remove engine key, and hang a "DO NOT START ENGINE !" tag on steering wheel.**



1) Remove bolt (1) and then remove washer tank.



2) Apply a sling to handrail (2) and deck, then remove bolt (3) (4).
   Torque for assembly:
   : Bolt: 90 N-m (9.2 kgf-m) (66 lb-ft)
   : Deck (with handrail): 45 kg (100 lbs)



3) Apply a sling to handrail (5) and deck, then remove bolt (6) (7).
   Torque for assembly:
   : Bolt: 90 N-m (9.2 kgf-m) (66 lb-ft)
   : Deck (with handrail): 50 kg (110 lbs)

4) Carefully balance the assembly and remove deck together with handrail.

2. Reinstalling deck

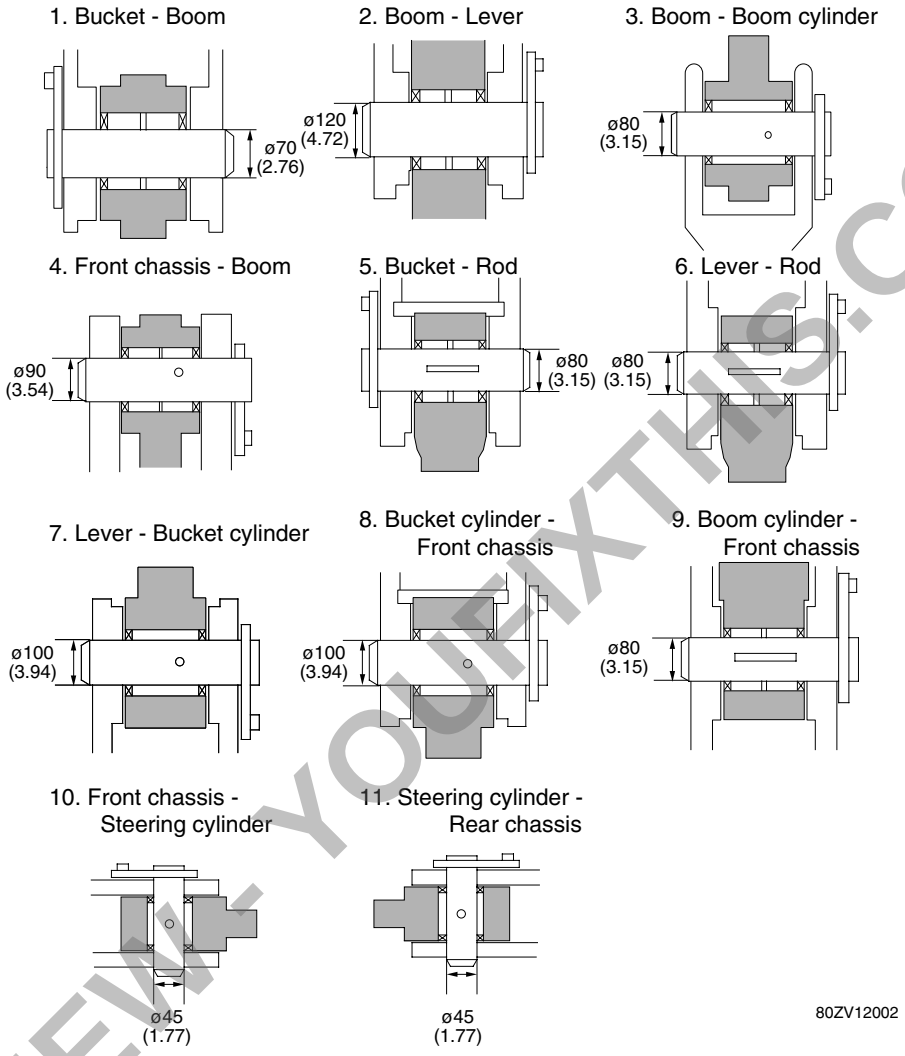
For reinstallation, follow the above procedure in the reversed direction.

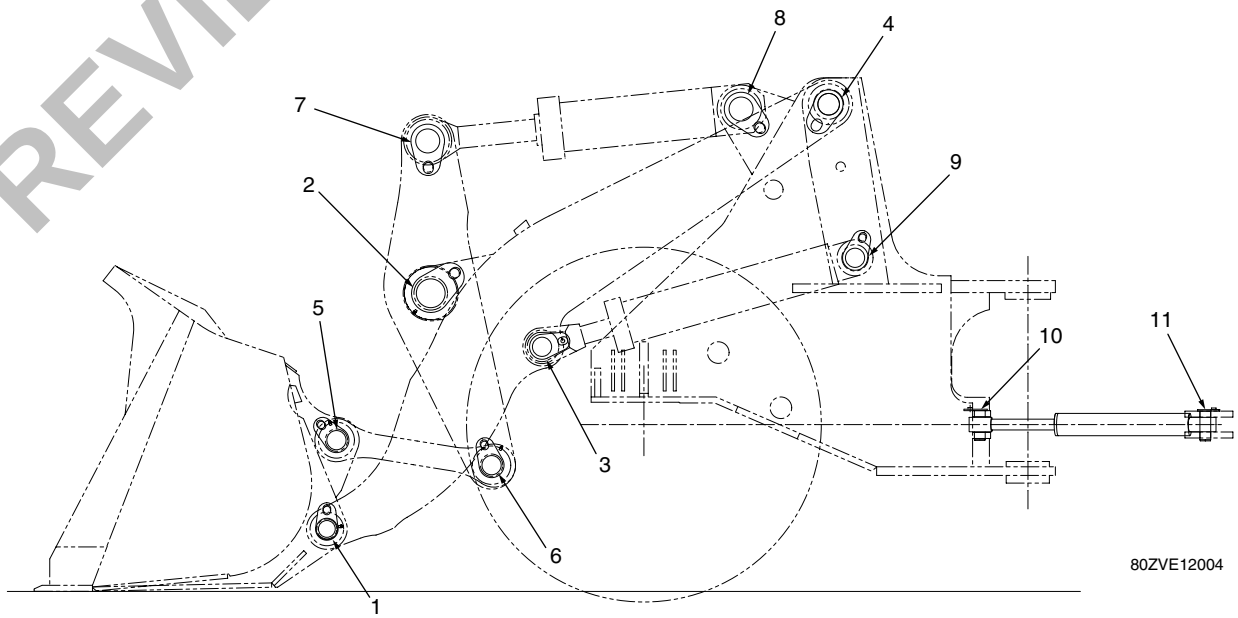
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Linkage

mm(in)



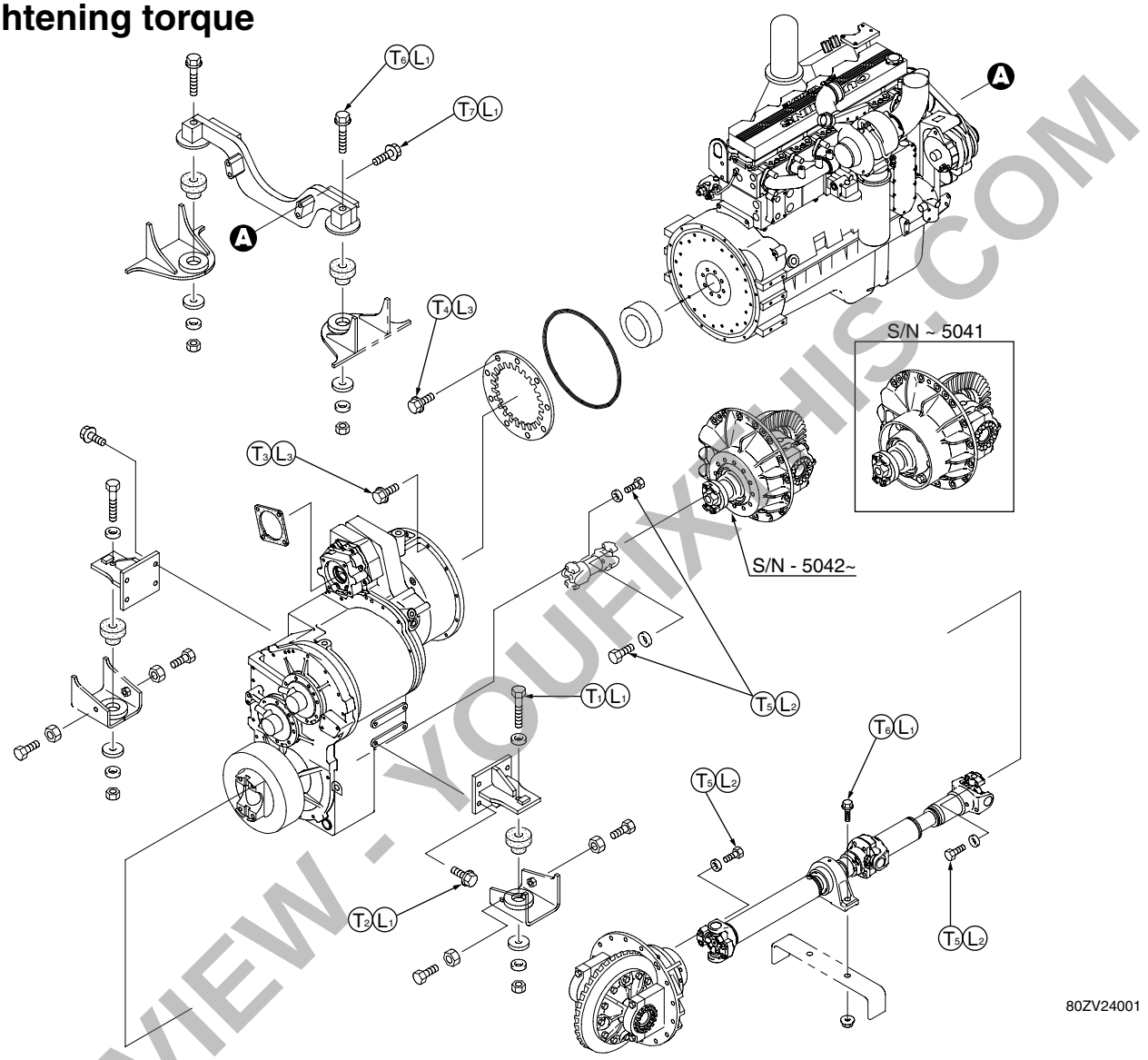


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Power Line

Tightening torque



: Bolt tightening torque

T_1: 417 N-m (42.5 kgf-m) (307 lb-ft)

T_2: 230 N-m (23.5 kgf-m) (170 lb-ft)

T_3: 53 N-m (5.4 kgf-m) (39 lb-ft)

T_4: 67 N-m (6.8 kgf-m) (49 lb-ft)

T_5: 142 N-m (14.5 kgf-m) (105 lb-ft)

T_6: 441 N-m (45.0 kgf-m) (325 lb-ft)

T_7: 94 N-m (9.6 kgf-m) (69 lb-ft)

Always replace drive shaft bolts with new bolts – Never reuse.

L_1: Screw lock agent (Loctite® 262) application

L_2: Screw lock agent (Three Bond 1327) application

L_3: With lubrication oil (Engine oil or gear oil)

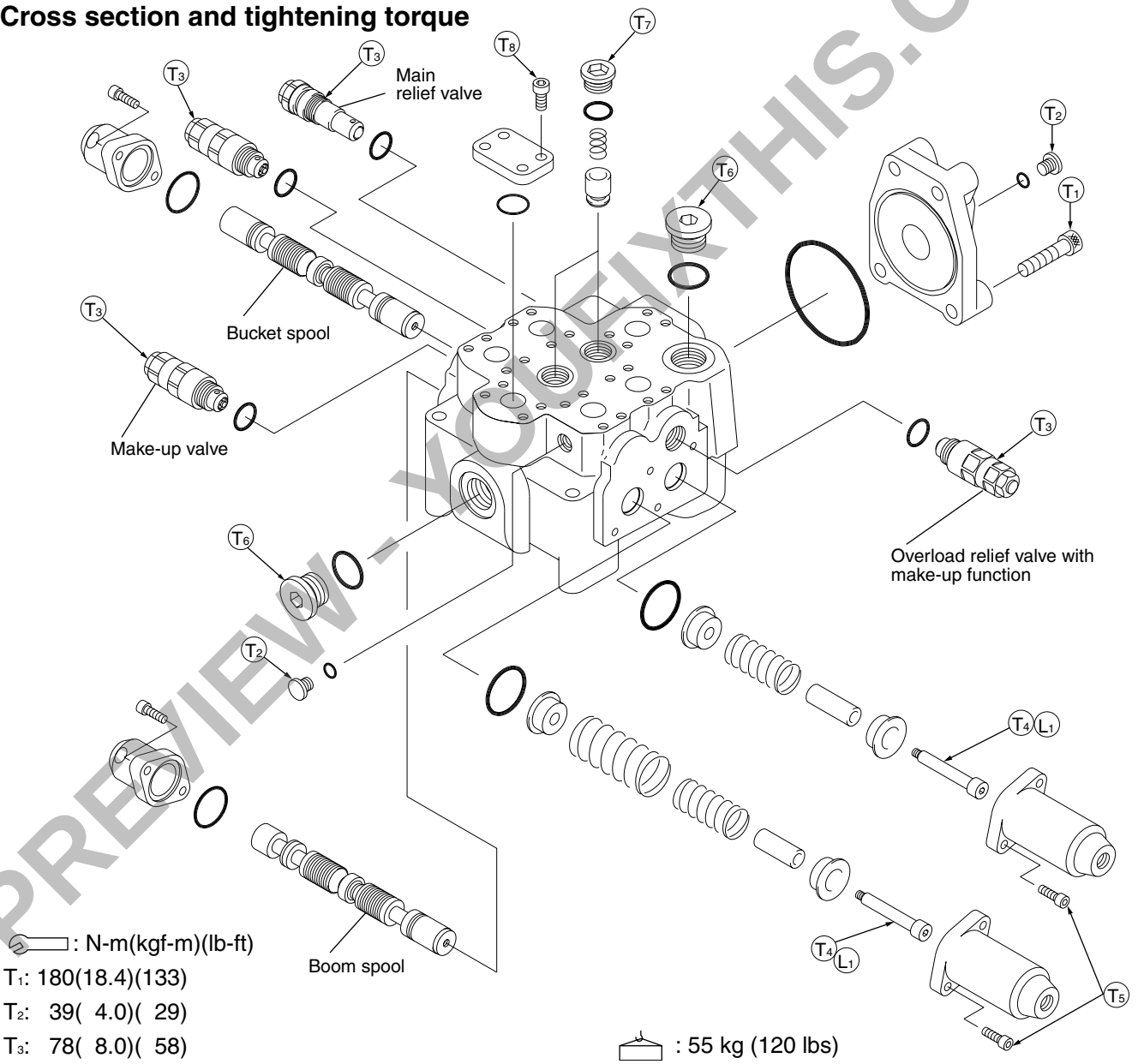
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Disassembling and reassembling multiple control valve

IMPORTANT
Before disassembly or reassembly, read and understand the aforementioned "Cautions regarding disassembly and reassembly of hydraulic parts."

1.Cross section and tightening torque



: N-m(kgf-m)(lb-ft)

T1: 180(18.4)(133)

T2: 39(4.0)(29)

T3: 78(8.0)(58)

T4: 18(1.8)(13)

T5: 34(3.5)(25)

T6: 410(41.8)(302)

T7: 260(26.5)(192)

T8: 65(6.6)(48)

: 55 kg (120 lbs)

85ZV44022

L1: Screw lock agent application
(Three Bond 1327)

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CHASSIS GROUP
Disassembly & Reassembly·····14-1
Service Standard ·····15-1
POWER GROUP
Disassembly & Reassembly·····24-1
Service Standard ·····25-1
TORQUE CONVERTER & TRANSMISSION GROUP
Disassembly & Reassembly·····34-1
Service Standard ·····35-1
HYDRAULIC GROUP
Disassembly & Reassembly·····44-1
Service Standard ·····45-1
BRAKE GROUP
Disassembly & Reassembly·····54-1
Service Standard ·····55-1
OPERATOR STATION GROUP
Disassembly & Reassembly·····74-1
Service Standard ·····75-1

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Safety Precautions

The most important point in providing repair service is safety. To ensure safety, observe the general cautions described below.

●This manual is intended for properly trained and equipped service technicians.

●Any work on the machine must be performed by the trained personnel only.

●Carefully read this manual to thoroughly understand the operation method before you operate or repair the machine.

●Be sure to wear appropriate clothes and protectors, such as safety boots, hard hat and goggles.

●Place the machine on level and solid ground, and place chocks against the wheels to prevent movement.

●Remove the cable from the battery before starting the service work, and attach a "DO NOT OPERATE!" tag to the steering wheel.

●Be sure to release the internal pressure before you remove a pipe, such as the hydraulic oil, air, or engine coolant pipe.

●Be sure to apply the articulation stopper before starting work.

●While supporting the bottom of the chassis using a jack, be sure to support the chassis using the blocks.

●When the boom or bucket is raised or when a unit is lifted by a crane, be sure to place a stand or adequate cribbing under the unit to prevent unexpected dropping.

●Do not start to work in an enclosed area if adequate ventilation is not provided.

●To remove a heavy unit (20kgf (40 lbs) or more), be sure to use a crane or other lifting tool.

●Just after stopping operation, be careful not to directly touch a hot component. You may get burned.

●Contact tire manufacturer's local dealer for tire servicing and changing.

●Always store the tools in good condition, and use them properly.

●Keep the work area clean. Clean up spills immediately.

●Avoid the use of flammable solvents and cleaners.

●When working outdoors keep work areas, ladders, steps, decks and work platforms clear of snow, ice, and mud.

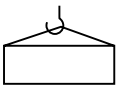
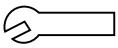
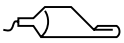
●Use safe work platforms to reach higher areas of the machine.

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Symbols

For safe and effective service work, the following symbols are used for notes and useful information in this manual.

Symbol	Item	Description
	Reference	Shows the condition or procedure that will be useful or efficient in doing service work.
	Weight	Shows the weight of a part or unit. The weight should be considered in selecting wire rope or cable for slinging work or determining the working posture.
	Tightening torque	Shows the tightening torque of a section that should be carefully tightened during assembly work.
	Coating	Shows the type of coating or adhesive and the coating section.
	Oil or water supply	Shows the oil or water supply port and the refill amount.
	Drainage	Shows the oil or water drain port and the drain amount.

IMPORTANT
If the specified conditions are not satisfied or the specified procedure is not observed, there is a strong possibility that the product will be damaged or the performance of the product will be reduced. **The message shows the preventive measures.**

Abbreviation

To save space, abbreviations are used in sentences. To understand the contents of this manual, refer to the following abbreviation list. Additional abbreviations are listed on page 62-6.

E/G .....Engine
T/C .....Torque converter
T/M .....Transmission
SOL .....Solenoid valve
SW .....Switch
F .....Front or Forward
QUAD .....Quick up and down shift
A/M .....Auto/Manual
B .....Battery
R .....Rear or Reverse
RH .....Right hand side
LH .....Left hand side
H .....High
L .....Low
GND .....Ground
OPT .....Option
Assy .....Assembly
1st .....1st speed
2nd .....2nd speed
3rd .....3rd speed
4th .....4th speed
DD .....Dynamic damper
M/C .....Machine
min^{-1} .....RPM

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Air Cleaner

Removing and reinstalling air cleaner

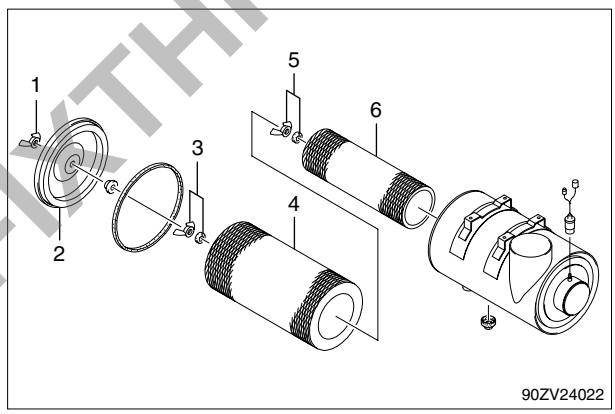
1. Removing air cleaner

⚠ WARNING

Unexpected movement of machine could cause an accident resulting in injury or death. To prevent such an accident, observe the following items:
- Park machine on level ground.
- Apply articulation stopper.
- Block front wheels with chocks to prevent wheels from moving.
- Before starting work, be sure to remove engine key, and hang a "DO NOT START!" tag on steering wheel, or disconnect negative side of battery.

1) Remove cap nut (1), and then remove cover (2).

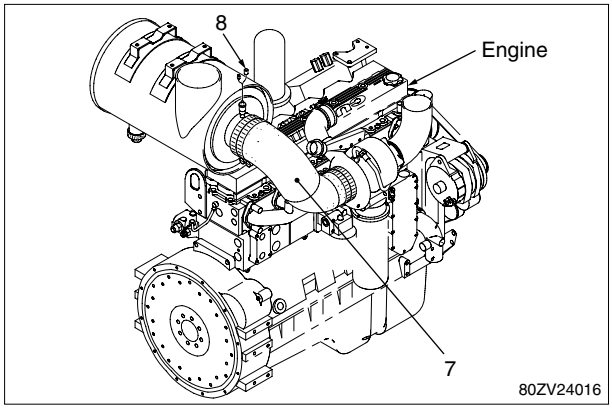
Note: Removing inside elements reduces weight and facilitates air cleaner case removal work.



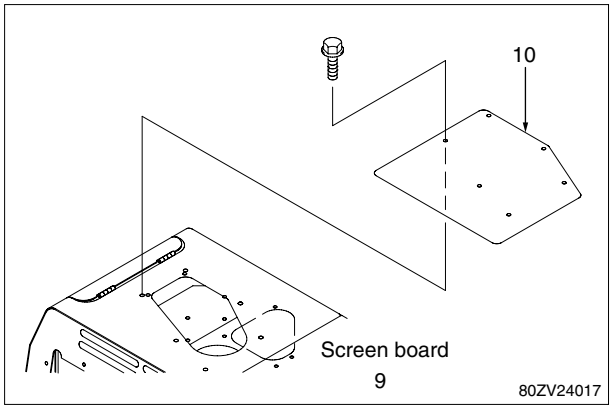
2) Remove wing nut (3), and then remove outer element (4).

3) Remove wing nut (5), and then remove inner element (6).

4) Disconnect air duct (7).
Disconnect indicator wire coupler (8).



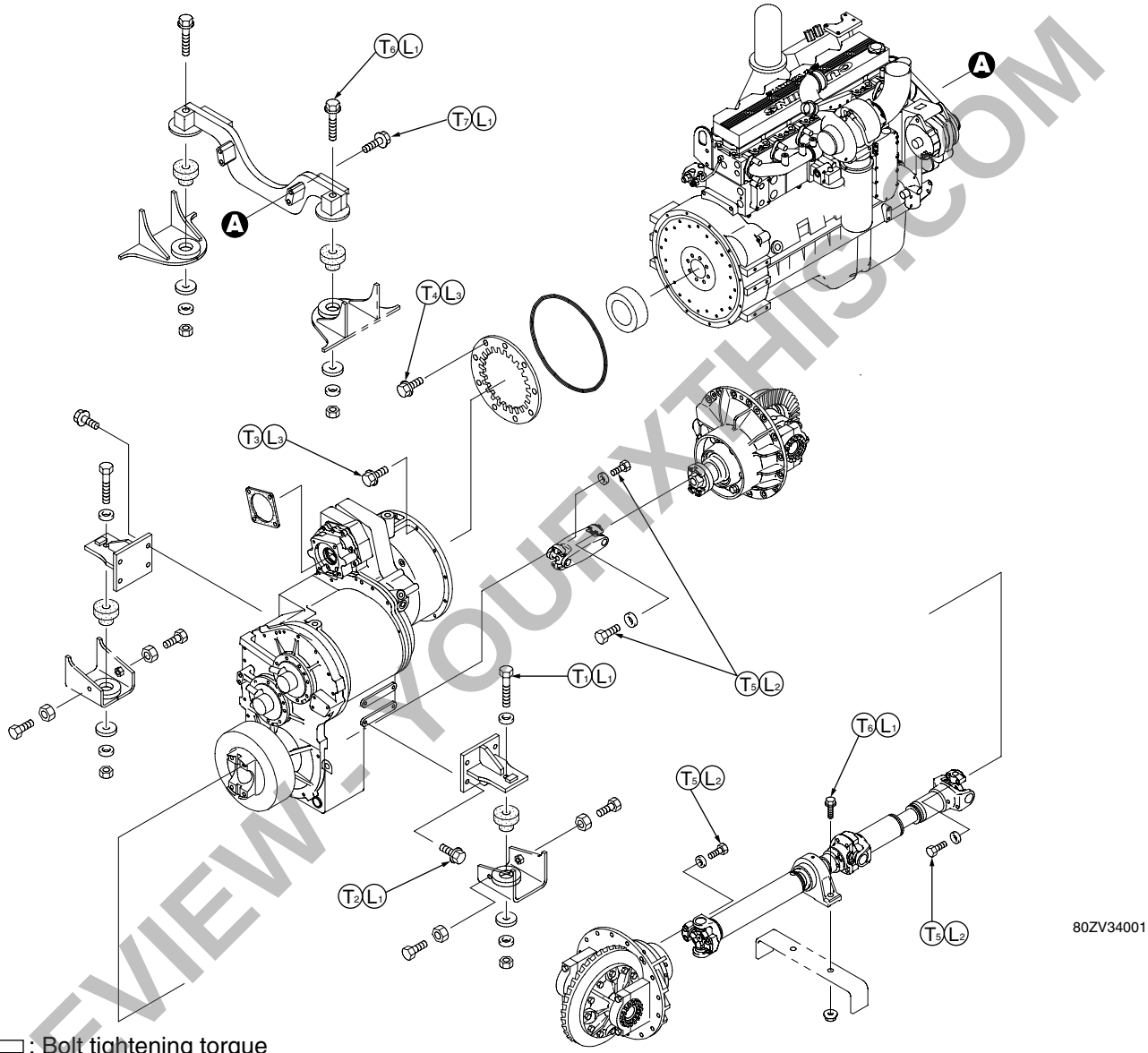
5) Remove cover (10) from top of screen board (9).



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Torque Converter and Transmission Assembly

Tightening torque



: Bolt tightening torque

T_1: 417 N-m (42.5 kgf-m) (307 lb-ft)

T_2: 230 N-m (23.5 kgf-m) (170 lb-ft)

T_3: 53 N-m (5.4 kgf-m) (39 lb-ft)

T_4: 67 N-m (6.8 kgf-m) (49 lb-ft)

T_5: 142 N-m (14.5 kgf-m) (105 lb-ft)

T_6: 441 N-m (45.0 kgf-m) (325 lb-ft)

T_7: 94 N-m (9.6 kgf-m) (69 lb-ft)

L_1: Screw lock agent (Loctite® 262) application

L_2: Screw lock agent (Three Bond 1327) application

L_3: With lubrication oil (Engine oil or gear oil)

Always replace drive shaft bolts with new bolts – Never reuse.

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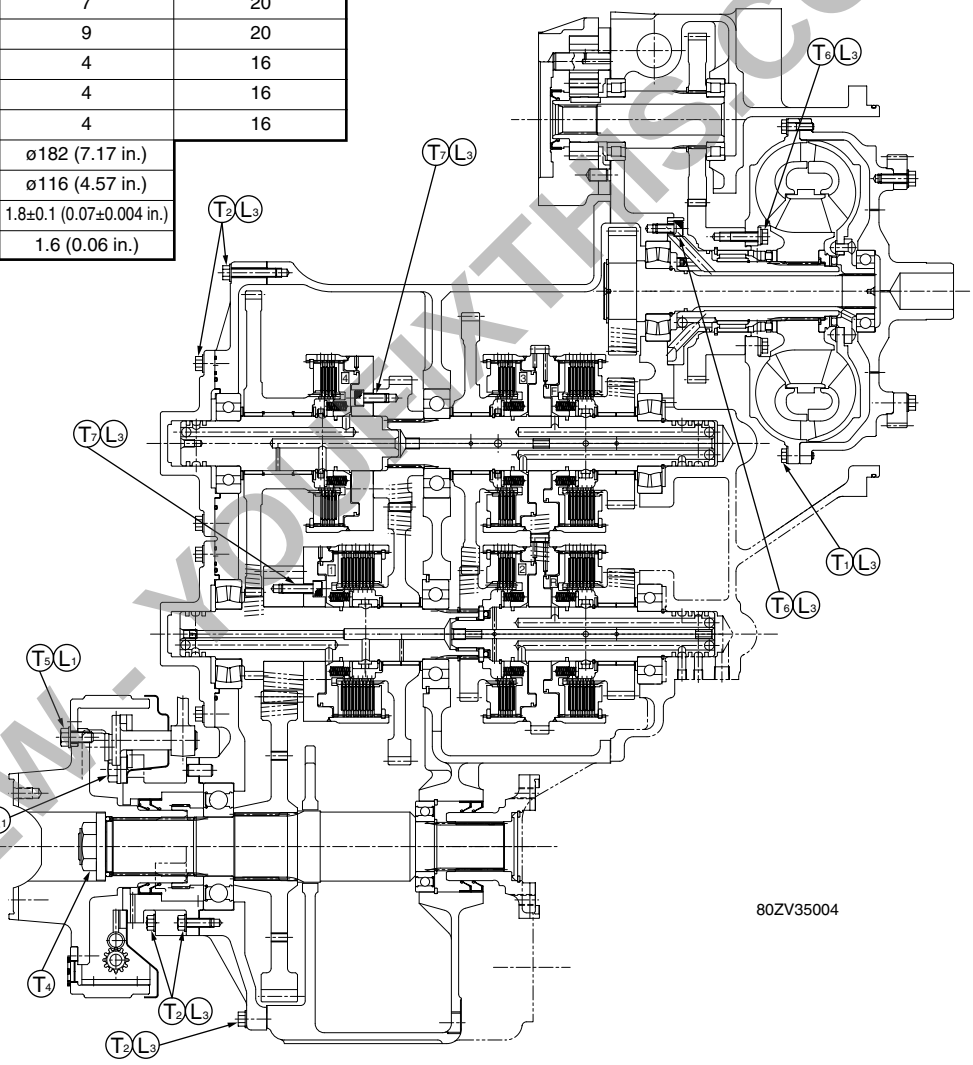
Clutch Plate Thickness / Piston Stroke

Clutch plate

Number of clutch plates.

Note: All the friction plates, steel plates, and return springs are interchangeable for each clutch.

Name of clutch			Friction plate	Steel plate	Return spring
Forward clutch			8	7	20
Reverse clutch			8	7	20
1st speed clutch			10	9	20
2nd speed clutch			5	4	16
3rd speed clutch			5	4	16
4th speed clutch			5	4	16
Dimension (mm) (in.)	Outer dia.		ø167 (6.57 in.)	ø182 (7.17 in.)	
	Inner dia.		ø104.8 (4.13 in.)	ø116 (4.57 in.)	
	Thickness	When new	2.0±0.1 (0.08±0.004 in.)	1.8±0.1 (0.07±0.004 in.)	
		Wear limit	1.8 (0.07 in.)	1.6 (0.06 in.)	



: Bolt tightening torque

T_1: 29 N-m (3.0 kgf-m) (22 lb-ft)

T_2: 53 N-m (5.4 kgf-m) (39 lb-ft)

T_3: 216 N-m (22.0 kgf-m) (159 lb-ft)

T_4: 392 N-m (40.0 kgf-m) (289 lb-ft)
(Molydenum disulfide grease/MOS_2 application)

T_5: 94 N-m (9.6 kgf-m) (69 lb-ft)

T_6: 59 N-m (6 kgf-m) (43 lb-ft)

T_7: 50 N-m (5.1 kgf-m) (37 lb-ft)

L_1: Screw lock agent application (Loctite® 262)

L_3: With lubrication oil (Engine oil or gear oil)

Piston stroke

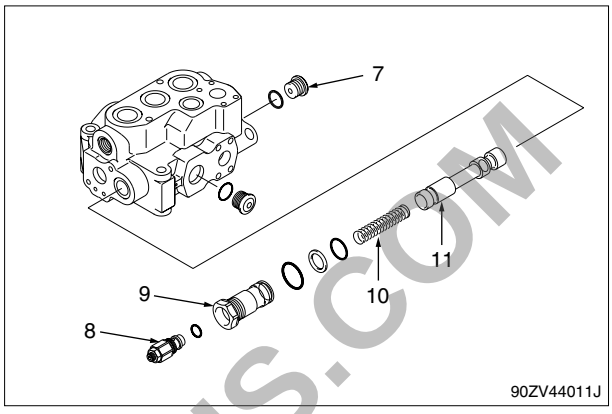
mm (in.)

Clutch	Judgement criteria		Solution
	Standard value	Allowable limit	
Forward clutch	3.8±0.3 (0.15±0.01)	5.0 (0.2)	Replacement
Reverse clutch	4.3±0.3 (0.17±0.01)	5.0 (0.2)	Replacement
1st speed clutch	$3.8^{+0.5}_{-1.0}$ ($0.15^{+0.02}_{-0.04}$)	5.0 (0.2)	Replacement
2nd speed clutch	3.0±1.0 (0.12±0.04)	5.0 (0.2)	Replacement
3rd speed clutch	3.0±1.0 (0.12±0.04)	5.0 (0.2)	Replacement
4th speed clutch	2.95±1.0 (0.12±0.04)	5.0 (0.2)	Replacement

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5) Remove relief valve (8) and plug (9).
Pull out spring (10) and flow control spool (11) from casing.

Note: - Carefully remove plug (9). It may spring out by the spring force.
- Carefully pull out flow control spool (11) so that the casing and flow control spool are not scratched.



Width across flat: #8: 19 mm (0.748 in)
#9: 41 mm (1.614 in)
Torque for assembly:
: #8, 9: 108 N-m (11 kgf-m) (80 lb-ft)

6) Remove plug (7) loosened on paragraph 4).

3.Reassembling steering valve

To reassemble the steering valve, follow the above disassembly procedure in the reversed direction.

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