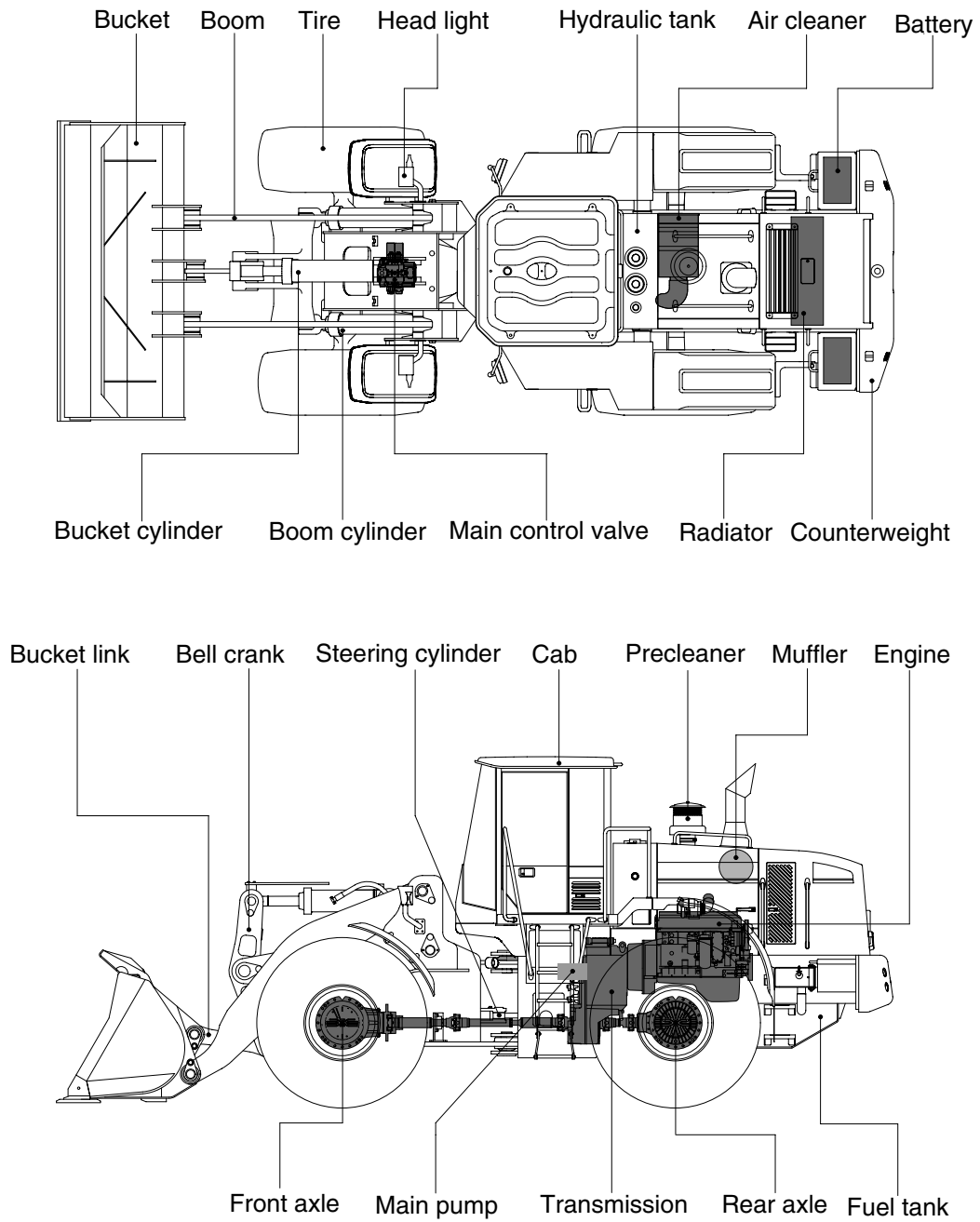


## GROUP 2 SPECIFICATION

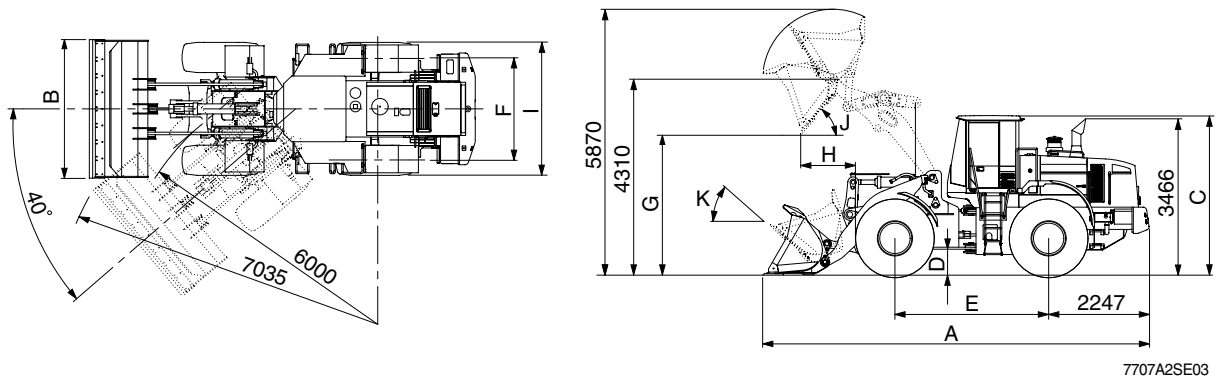
### 1. MAJOR COMPONENT



7707A2SE01

## 2. SPECIFICATIONS

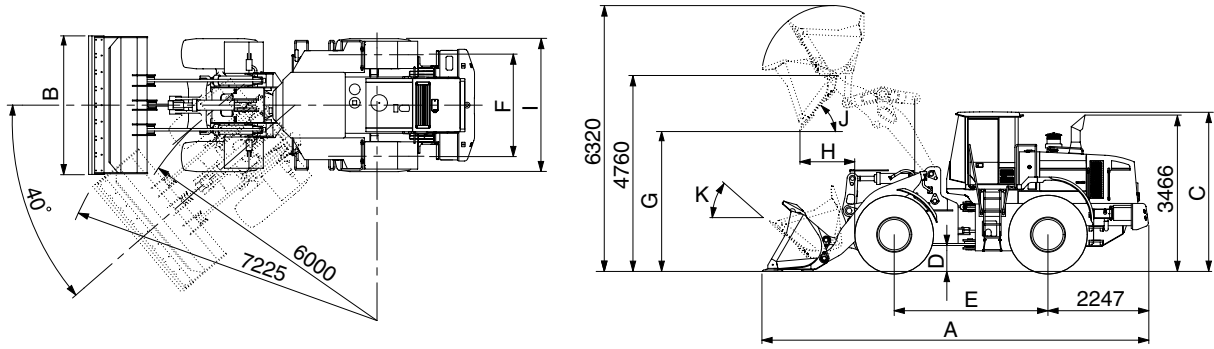
### 1) WITH BOLT-ON CUTTING EDGE TYPE BUCKET(HL770-7A)



7707A2SE03

Description		Unit	Specification	
Operating weight		kg(lb)	23100(50930)	
Bucket capacity	Struck	m <sup>3</sup> (yd <sup>3</sup> )	3.45(4.51)	
	Heaped		4.0(5.2)	
Overall length	A	mm(ft-in)	8635(28' 4")	
Overall width	B		3100(10' 2")	
Overall height	C		3550(11' 8")	
Ground clearance	D		480( 1' 7")	
Wheelbase	E		3440(11' 3")	
Tread	F		2300( 7' 7")	
Dump clearance at 45°	G		3117(10' 3")	
Dump reach(Full lift)	H		1254( 4' 1")	
Width over tires	I		2975( 9' 9")	
Dump angle	J		Degree (°)	48
Roll back angle(Carry position)	K			49
Cycle time	Lift(With load)	sec	5.5	
	Dump(With load)		1.5	
	Lower(Empty)		3.0	
Maximum travel speed		km/hr(mph)	37.2	
Braking distance		m(ft-in)	12(39' 4")	
Minimum turning radius(Center of outside tire)			6(19' 8")	
Gradability		Degree (°)	30	
Travel speed	Forward	km/hr(mph)	First gear	7.4(4.6)
			Second gear	12.2(7.6)
			Third gear	26.0(16.2)
			Fourth gear	37.2(23.2)
	Reverse		First gear	7.4(4.6)
			Second gear	12.2(7.6)
Third gear		26.0(16.2)		

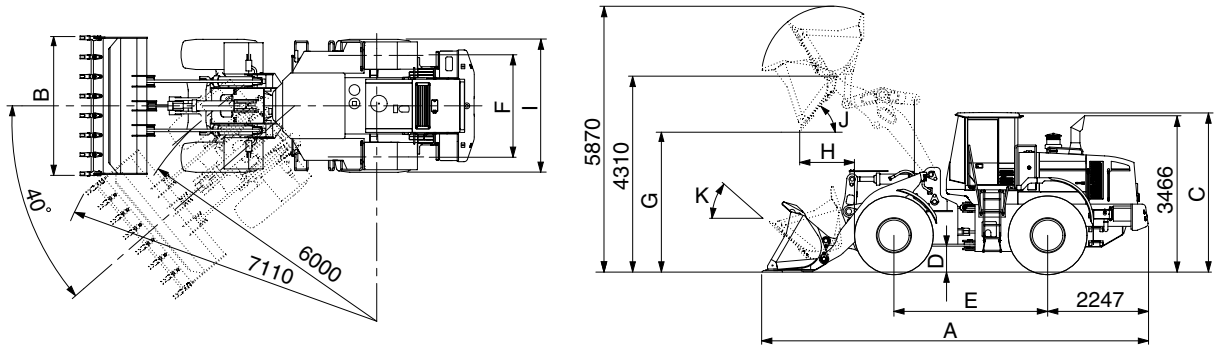
**WITH BOLT-ON CUTTING EDGE TYPE BUCKET(HL770XTD-7A)**



7707A2SE05

Description		Unit	Specification	
Operating weight		kg(lb)	23850(52580)	
Bucket capacity	Struck	m <sup>3</sup> (yd <sup>3</sup> )	3.45(4.51)	
	Heaped		4.0(5.2)	
Overall length	A	mm(ft-in)	9100(29'10")	
Overall width	B		3100(10' 2")	
Overall height	C		3550(11' 8")	
Ground clearance	D		480( 1' 7")	
Wheelbase	E		3440(11' 3")	
Tread	F		2300( 7' 7")	
Dump clearance at 45°	G		3570(11' 9")	
Dump reach(Full lift)	H		1260( 4' 2")	
Width over tires	I		2975( 9' 9")	
Dump angle	J		Degree (°)	48
Roll back angle(Carry position)	K			50
Cycle time	Lift(With load)	sec	5.5	
	Dump(With load)		1.5	
	Lower(Empty)		3.0	
Maximum travel speed		km/hr(mph)	37.2	
Braking distance		m(ft-in)	12(39' 4")	
Minimum turning radius(Center of outside tire)			6(19' 8")	
Gradability		Degree (°)	30	
Travel speed	Forward	km/hr(mph)	First gear	7.4(4.6)
			Second gear	12.2(7.6)
			Third gear	26.0(16.2)
			Fourth gear	37.2(23.2)
	Reverse		First gear	7.4(4.6)
			Second gear	12.2(7.6)
Third gear		26.0(16.2)		

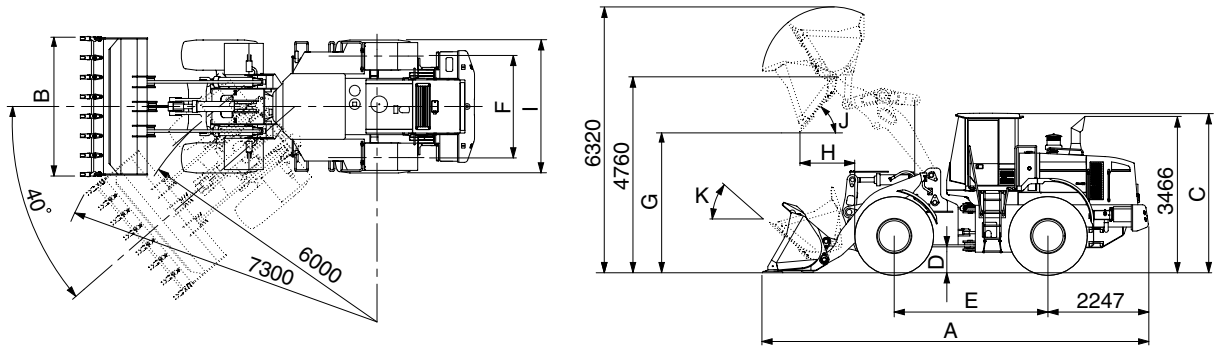
## 2) WITH TOOTH TYPE BUCKET(HL770-7A)



7707A2SE04

Description		Unit	Specification	
Operating weight		kg(lb)	23100(50930)	
Bucket capacity	Struck	m <sup>3</sup> (yd <sup>3</sup> )	3.4(4.5)	
	Heaped		3.9(5.1)	
Overall length	A	mm(ft-in)	8750(28' 9")	
Overall width	B		3150(10' 4")	
Overall height	C		3550(11' 8")	
Ground clearance	D		480( 1' 7")	
Wheelbase	E		3440(11' 3")	
Tread	F		2300( 7' 7")	
Dump clearance at 45°	G		3000( 9' 10")	
Dump reach(Full lift)	H		1340( 4' 5")	
Width over tires	I		2975( 9' 9")	
Dump angle	J		Degree (°)	48
Roll back angle(Carry position)	K			49
Cycle time	Lift(With load)	sec	5.5	
	Dump(With load)		1.5	
	Lower(Empty)		3.0	
Maximum travel speed		km/hr(mph)	37.2	
Braking distance		m(ft-in)	12(39' 4")	
Minimum turning radius(Center of outside tire)			6(19' 8")	
Gradability		Degree (°)	30	
Travel speed	Forward	km/hr(mph)	First gear	
			Second gear	
			Third gear	
			Fourth gear	
	Reverse		First gear	
			Second gear	
Third gear				

**WITH TOOTH TYPE BUCKET(HL770XTD-7A)**



7707A2SE06

Description		Unit	Specification	
Operating weight		kg(lb)	23550(51920)	
Bucket capacity	Struck	m <sup>3</sup> (yd <sup>3</sup> )	3.4(4.5)	
	Heaped		3.9(5.1)	
Overall length	A	mm(ft-in)	9250(30' 4")	
Overall width	B		3150(10' 4")	
Overall height	C		3550(11' 8")	
Ground clearance	D		480( 1' 7")	
Wheelbase	E		3440(11' 3")	
Tread	F		2300( 7' 7")	
Dump clearance at 45°	G		3445(11' 4")	
Dump reach(Full lift)	H		1350( 4' 5")	
Width over tires	I		2975( 9' 9")	
Dump angle	J		Degree (°)	48
Roll back angle(Carry position)	K			50
Cycle time	Lift(With load)	sec	5.5	
	Dump(With load)		1.5	
	Lower(Empty)		3.0	
Maximum travel speed		km/hr(mph)	37.2	
Braking distance		m(ft-in)	12(39' 4")	
Minimum turning radius(Center of outside tire)			6(19' 8")	
Gradability		Degree (°)	30	
Travel speed	Forward	km/hr(mph)	First gear	7.4(4.6)
			Second gear	12.2(7.6)
			Third gear	26.0(16.2)
			Fourth gear	37.2(23.2)
	Reverse		First gear	7.4(4.6)
			Second gear	12.2(7.6)
Third gear		26.0(16.2)		

### 3. WEIGHT

Item		kg	lb
Front frame assembly		2146	4730
Rear frame assembly		2462	5430
Front fender(LH & RH)		30	66
Counterweight		1400	3087
Additional counterweight(HL770XTD-7A)		505	1113
Cab assembly		1020	2250
Engine assembly		738	1630
Transmission assembly		753	1660
Drive shaft(Front)		44	97
Drive shaft(Center)		46	101
Drive shaft(Rear)		27	60
Front axle(Include differential)		1350	2976
Rear axle(Include differential)		957	2110
Tire(26.5-25 20PR, L3)		394	869
Hydraulic tank assembly		265	584
Fuel tank assembly		435	960
Main pump assembly		39	86
Fan & brake pump assembly		24	53
Main control valve		94	207
Flow amplifier		29	64
Boom assembly	HL770-7A	1620	3570
	HL770XTD-7A	1805	3980
Bell crank assembly		497	1096
Bucket link		70	154
4.0m <sup>3</sup> bucket, with bolt on cutting edge		2070	4564
3.9m <sup>3</sup> bucket, with tooth		2000	4409
3.9m <sup>3</sup> bucket, without tooth and cutting edge		1790	3946
Boom cylinder assembly		225	496
Bucket cylinder assembly		235	518
Steering cylinder assembly		44	97
Seat		40	88
Battery		55	121

#### 4. SPECIFICATION FOR MAJOR COMPONENTS

##### 1) ENGINE

Item	Specification
Model	Cummins QSL
Type	4-cycle turbocharged, charge air cooled diesel engine
Control type	Electronic control
Cooling method	Water cooling
Number of cylinders and arrangement	6 cylinders, in-line
Firing order	1-5-3-6-2-4
Combustion chamber type	Direct injection type
Cylinder bore × stroke	114 × 145mm(4.49" × 5.71")
Piston displacement	8900
Compression ratio	17.8
Rated gross horse power	284ps at 2000rpm
Maximum gross torque at 1400rpm	148kgf · m(1070lbf · ft)
Engine oil quantity	23 l (6.1 U.S. gal)
Wet weight	738kg(1627lb)
High idling speed	2200 ± 50rpm
Low idling speed	800 ± 50rpm
Rated fuel consumption	178g/ps · hr
Starting motor	Nippondenso(24V-7.5kW)
Alternator	Delco Remy 22SI(24V-70Amp)
Battery	2 × 12V × 200Ah

## 2) MAIN PUMP

Item	Specification	
	Steering	Loader
Type	Fixed displacement double vane pump	
Capacity	137.5cc/rev	79.3cc/rev
Maximum operating pressure	210kgf/cm <sup>2</sup> (2990psi)	
Rated oil quantity	270 l /min(71.3U.S.gpm)	155 l /min(40.9 U.S.gpm)
Rated speed	2000rpm	

## 3) FAN + BRAKE PUMP

Item	Specification	
	Fan	Brake
Type	Fixed displacement tandem gear pump	
Capacity	22.9cc/rev	11.9cc/rev
Maximum operating pressure	125kgf/cm <sup>2</sup> (1780psi)	150kgf/cm <sup>2</sup> (2130psi)
Rated oil quantity	51 l /min(13.5U.S.gpm)	26 l /min(6.9 U.S.gpm)
Rated speed	2000rpm	

## 4) MAIN CONTROL VALVE

Item	Specification
Type	2 spool
Operating method	Hydraulic pilot assist
Main relief valve pressure	210kgf/cm <sup>2</sup> (2990psi)
Overload relief valve pressure	240kgf/cm <sup>2</sup> (3420psi)

## 5) REMOTE CONTROL VALVE

Item	Specification	
Type	Pressure reducing type	
Operating	Minimum	5.8kgf/cm <sup>2</sup> (82.5psi)
	Maximum	19kgf/cm <sup>2</sup> (270psi)
Single operation stroke	Lever	70mm(2.8in)



## 6) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	∅ 180 × ∅ 100 × 765mm
Bucket cylinder	Bore dia × Rod dia × Stroke	∅ 200 × ∅ 100 × 570mm
Steering cylinder	Bore dia × Rod dia × Stroke	∅ 100 × ∅ 50 × 480mm

## 7) DYNAMIC POWER TRANSMISSION DEVICES

Item		Specification	
Transmission	Model	ZF 4WG260-IV	
	Type	Converter	Single-stage, single-phase
		Transmission	Full-automatic power shift
	Gear shift	Forward fourth gear, reverse third gear	
	Adjustment	Electrical single lever type, kick-down system	
Axle	Drive devices	4-wheel drive	
	Front	Front fixed location	
	Rear	Oscillation $\pm 13^\circ$ of center pin-loaded	
	Tires	26.5-25, 20PR(L3)	
Wheels	Travel	Four-wheel, wet-disc type, full hydraulic	
Brakes	Parking	Spring applied, hydraulic released brake on front axle	
	Type	Full hydraulic, articulated	
Steering	Steering angle	$40^\circ$ to both right and left angle, respectively	

## 5. TIGHTENING TORQUE

The torques given are standard figures. Any figures specifically described in this manual has priority.

No.		Items	Size	kgf · m	lbf · ft
1	Engine	Engine mounting bolt, nut(Rubber, 2EA)	M24×3.0	100 ± 15	723± 108
2		Engine mounling bolt(Bracket, 8EA)	M12×1.75	10.7 ± 2.1	77.4± 15.2
3		Engine mounting bolt(Fly wheel housing,12EA)	7/16-14UNC	4.6 ± 0.7	33.3± 5.1
4		Radiator mounting bolt	M16×2.0	29.7± 4.5	215± 32.5
5		Fuel tank mounting bolt, nut	M16×2.0	29.7 ± 4.5	215± 32.5
6	Hydraulic system	Main pump housing mounting bolt	M16×2.0	29.7 ± 4.5	215± 32.5
7		Brake pump housing mounting bolt	M10×1.5	6.9 ± 1.4	49.9± 10.1
8		Main control valve mounting bolt	M12×1.75	12.8 ± 3.0	92.6± 21.7
9		Steering unit mounting bolt	M10×1.5	6.9 ± 1.4	49.9± 10.1
10		Flow amplifier mounting bolt	M10×1.5	6.9 ± 1.4	49.9± 10.1
11		Brake valve mounting bolt	M8×1.25	2.5 ± 0.5	18.1± 3.6
12		Cut-off valve mounting bolt	M12×1.75	12.3 ± 2	89.0± 14
13		Remote control lever mounting bolt	M6×1.0	1.1±0.2	8.0± 1.4
14		Pilot supply unit mounting bolt	M8×1.25	2.5 ± 0.5	18.1± 3.6
15		Safety valve	M8×1.25	2.5 ± 0.5	8.1± 3.6
16	Hydraulic oil tank mounting bolt	M20×2.5	69 ± 9.0	499 ± 65	
17	Power train system	Transmission bolt, nut(Rubber, 4EA)	M24×3.0	100 ± 15	723 ± 108
18		Transmission bolt(Bracket, front side)	M16×2.0	19.4 ± 3.0	140± 21.7
19		Transmission bolt(Bracket, rear side)	M20×2.5	46.3 ± 7.0	335± 50.6
20		Front axle mounting bolt, nut	M30×2.0(VOLVO axle) M33×2.0(ZF axle)	199 ± 29.9	1439±216
21		Rear axle support mounting bolt, nut	M36×3.0	308 ± 46.2	2228±334
22		Tire mounting nut	M22×1.5	79 ± 2.5	571± 18
23		Drive shaft joint mounting bolt, nut	1/2-20UNF	15 ± 2.0	108± 14.5
24	Others	Counterweight mounting bolt	M30×3.5	199 ± 29.9	1439±216
25		Additional counterweight mounting bolt	M24×3.0	100 ± 15	723 ± 108
26		Operator's seat mounting bolt	M8×1.25	3.4 ± 0.8	24.6± 5
27		ROPS Cab mounting bolt(4EA)	M27×2.0	125 ± 15	904 ± 108

## 6. TORQUE CHART

Use following table for unspecified torque.

### 1) BOLT AND NUT

#### (1) Coarse thread

Bolt size	8T		10T	
	kgf · m	lbf · ft	kgf · m	lbf · ft
M 6 × 1.0	0.85 ~ 1.25	6.15 ~ 9.04	1.14 ~ 1.74	8.2 ~ 12.6
M 8 × 1.25	2.0 ~ 3.0	14.5 ~ 21.7	2.73 ~ 4.12	19.7 ~ 29.8
M10 × 1.5	4.0 ~ 6.0	28.9 ~ 43.4	5.5 ~ 8.3	39.8 ~ 60
M12 × 1.75	7.4 ~ 11.2	53.5 ~ 79.5	9.8 ~ 15.8	71 ~ 114
M14 × 2.0	12.2 ~ 16.6	88.2 ~ 120	16.7 ~ 22.5	121 ~ 167
M16 × 2.0	18.6 ~ 25.2	135 ~ 182	25.2 ~ 34.2	182 ~ 247
M18 × 2.5	25.8 ~ 35.0	187 ~ 253	35.1 ~ 47.5	254 ~ 343
M20 × 2.5	36.2 ~ 49.0	262 ~ 354	49.2 ~ 66.6	356 ~ 482
M22 × 2.5	48.3 ~ 63.3	350 ~ 457	65.8 ~ 98.0	476 ~ 709
M24 × 3.0	62.5 ~ 84.5	452 ~ 611	85.0 ~ 115	615 ~ 832
M30 × 3.5	124 ~ 168	898 ~ 1214	169 ~ 229	1223 ~ 1655
M36 × 4.0	174 ~ 236	1261 ~ 1703	250 ~ 310	1808 ~ 2242

#### (2) Fine thread

Bolt size	8T		10T	
	kgf · m	lbf · ft	kgf · m	lbf · ft
M 8 × 1.0	2.17 ~ 3.37	15.7 ~ 24.3	3.04 ~ 4.44	22.0 ~ 32.0
M10 × 1.25	4.46 ~ 6.66	32.3 ~ 48.2	5.93 ~ 8.93	42.9 ~ 64.6
M12 × 1.25	7.78 ~ 11.58	76.3 ~ 83.7	10.6 ~ 16.0	76.6 ~ 115
M14 × 1.5	13.3 ~ 18.1	96.2 ~ 130	17.9 ~ 24.1	130 ~ 174
M16 × 1.5	19.9 ~ 26.9	144 ~ 194	26.6 ~ 36.0	193 ~ 260
M18 × 1.5	28.6 ~ 43.6	207 ~ 315	38.4 ~ 52.0	278 ~ 376
M20 × 1.5	40.0 ~ 54.0	289 ~ 390	53.4 ~ 72.2	386 ~ 522
M22 × 1.5	52.7 ~ 71.3	381 ~ 515	70.7 ~ 95.7	512 ~ 692
M24 × 2.0	67.9 ~ 91.9	491 ~ 664	90.9 ~ 123	658 ~ 890
M30 × 2.0	137 ~ 185	990 ~ 1338	182 ~ 248	1314 ~ 1795
M36 × 3.0	192 ~ 260	1389 ~ 1879	262 ~ 354	1893 ~ 2561

## 2) PIPE AND HOSE(FLARE TYPE)

Thread size	Width across flat(mm)	kgf · m	lbf · ft
1/4"	19	4	28.9
3/8"	22	5	36.2
1/2"	27	9.5	68.7
3/4"	36	18	130
1"	41	21	152
1-1/4"	50	35	253

## 3) PIPE AND HOSE(ORFS TYPE)

Thread size	Width across flat(mm)	kgf · m	lbf · ft
9/16-18	19	4	28.9
11/16-16	22	5	36.2
13/16-16	27	9.5	68.7
1-3/16-12	36	18	130
1-7/16-12	41	21	152
1-11/16-12	50	35	253

## 4) FITTING

Thread size	Width across flat(mm)	kgf · m	lbf · ft
1/4"	19	4	28.9
3/8"	22	5	36.2
1/2"	27	9.5	68.7
3/4"	36	18	130
1"	41	21	152
1-1/4"	50	35	253

## 7. RECOMMENDED LUBRICANTS

Use only oils listed below or equivalent.

Do not mix different brand oil.

Service point	Kind of fluid	Capacity l (U.S. gal)	Ambient temperature °C( °F)						
			-20 (-4)	-10 (14)	0 (32)	10 (50)	20 (68)	30 (86)	40 (104)
Engine oil pan	Engine oil	23(6.1)	SAE 30						
			SAE 10W						
			SAE 10W-30						
			SAE 15W-40						
Transmission	Oil	50(13.2)	SAE 10W-30						
			SAE 15W-40						
VOLVO axle	Gear oil	Front : 78(20.6) Rear : 53(14.0)	SAE 80W-90LS/API GL-5						
ZF axle	UTTO	Front : 51(13.5) Rear : 43(11.4)	*Refer to below list						
Hydraulic tank	Hydraulic oil	Tank: 200(52.8)  System: 320(85)	ISO VG 32						
			ISO VG 46						
			ISO VG 68						
Fuel tank	Diesel fuel	430(114)	ASTM D975 NO. 1						
			ASTM D975 NO. 2						
Fitting (Grease nipple)	Grease	As required	NLGI NO. 1						
			NLGI NO. 2						
Radiator	Mixture of antifreeze and water 50 : 50	56(14.8)	Ethylene glycol base permanent type						

- SAE : Society of Automotive Engineers
- API : American Petroleum Institute
- ISO : International Organization for Standardization
- NLGI : National Lubricating Grease Institute
- ASTM : American Society of Testing and Material
- UTTO : Universal Tractor Transmission Oil

\* Recommended oil list

- BP TERRAC SUPER TRANSMISSION 10W-30
- CASTROL AGRI TRANS PLUS 10W-30
- MOBILFLUID 426
- SHELL DONAX TD 10W-30
- TOTAL DYNATRANS MPV