

Document Title: Measurement conversion tables	Function Group: 030	Information Type: Service Information	Date: 2014/3/31
Profile: CEX, EW55B [GB]			

Measurement conversion tables

Length

Unit	cm	m	km	in	ft	yd	mile
cm	1	0.01	0.00001	0.3937	0.03281	0.01094	0.000006
m	100	1	0.001	39.37	3.2808	1.0936	0.00062
km	100000	1000	1	39370.7	3280.8	1093.6	0.62137
in	2.54	0.0254	0.000025	1	0.08333	0.02777	0.000015
ft	30.48	0.3048	0.000304	12	1	0.3333	0.000189
yd	91.44	0.9144	0.000914	36	3	1	0.000568
mile	160930	1609.3	1.6093	63360	5280	1760	1

1 mm = 0.1 cm, 1 mm = 0.001 m

Area

Unit	cm2	m2	km2	a	ft2	yd2	in2
cm2	1	0.0001	-	0.000001	0.001076	0.000012	0.155000
m2	10000	1	0.000001	0.01	10.764	1.1958	1550.000
km2	-	1000000	1	10000	1076400	1195800	-
a	0.01	100	0.0001	1	1076.4	119.58	-
ft2	-	0.092903	-	0.000929	1	0.1111	144.000
yd2	-	0.83613	-	0.008361	9	1	1296.00
in2	6.4516	0.000645	-	-	0.006943	0.000771	1

1 ha = 100 a, 1 mile² = 259 ha = 2.59 km²

Volume

Unit	cm3 = cc	m3	Liter	in3	ft3	yd3
cm3 = m liter	1	0.000001	0.001	0.061024	0.000035	0.000001
m3	1000000	1	1000	61024	35.315	1.30796
Liter	1000	0.001	1	61.024	0.035315	0.001308
in3	16.387	0.000016	0.01638	1	0.000578	0.000021
ft3	28316.8	0.028317	28.317	1728	1	0.03704
yd3	764529.8	0.76453	764.53	46656	27	1

1 gal(US) = 3785.41 cm³ = 231 in³ = 0.83267 gal(US)

Weight

Unit	g	kg	t	oz	lb
g	1	0.001	0.000001	0.03527	0.0022
kg	1000	1	0.001	35.273	2.20459

t	1000000	1000	1	35273	2204.59
oz	28.3495	0.02835	0.000028	1	0.0625
lb	453.592	0.45359	0.000454	16	1
1 tonne(metric) = 1.1023 ton(US) = 0.9842 ton(UK)					

Pressure

Unit	kgf/cm ²	bar	Pa=N/m ²	kPa	lbf/in ²	lbf/ft ²
kgf/cm ²	1	0.98067	98066.5	98.0665	14.2233	2048.16
bar	1.01972	1	100000	100	14.5037	2088.6
Pa=N/m ²	0.00001	0.001	1	0.001	0.00015	0.02086
kPa	0.01020	0.01	1000	1	0.14504	20.886
lbf/in ²	0.07032	0.0689	6894.76	6.89476	1	144
lbf/ft ²	0.00047	0.00047	47.88028	0.04788	0.00694	1
1 kgf/cm ² = 735.56 Torr(mmHg) = 0.96784 atm						

Approximate conversions

SI	Conversion	Non-SI	Conversion	SI
Unit	Factor	Unit	Factor	Unit
Torque				
newton meter (N·m)	x 10.2	= kgf·cm	x 0.8664	= (lbf·in)
newton meter (N·m)	x 0.74	= lb·ft	x 1.36	= N·m
newton meter (N·m)	x 0.102	= kgf·m	x 7.22	= (lbf·ft)
Pressure (Pa = N/m²)				
kilopascal (kPa)	x 4.0	= in. H ₂ O	x 0.249	= kPa
kilopascal (kPa)	x 0.30	= in. Hg	x 3.38	= kPa
kilopascal (kPa)	x 0.145	= psi	x 6.89	= kPa
(bar)	x 14.5	= psi	x 0.069	= (bar)
(kgf/cm ²)	x 14.22	= psi	x 0.070	= (kgf/cm ²)
(newton/mm ²)	x 145.04	= psi	x 0.069	= (bar)
megapascal (MPa)	x 145	= psi	x 0.00689	= MPa
Power (W = J/s)				
kilowatt (kW)	x 1.36	= PS (cv)	x 0.736	= kW
kilowatt (kW)	x 1.34	= HP	x 0.746	= kW
kilowatt (kW)	x 0.948	= Btu/s	x 1.055	= kW
watt (W)	x 0.74	= ft·lb/s	x 1.36	= W
Energy (J = N·m)				
kilojoule (kJ)	x 0.948	= Btu	x 1.055	= kJ
joule (J)	x 0.239	= calorie	x 4.19	= J
Velocity and Acceleration				
meter per sec ² (m/s ²)	x 3.28	= ft/s ²	x 0.305	= m/s ²
meter per sec (m/s)	x 3.28	= ft/s	x 0.305	= m/s
kilometer per hour (km/h)	x 0.62	= mph	x 1.61	= km/h
Horse power/torque				
BHP x 5252 rpm = TQ (lb·ft)			TQ x rpm 5252 = B.H.P.	
Temperature				
°C = (°F - 32) / 1.8		°F = (°C x 1.8) + 32		
Flow Rate				

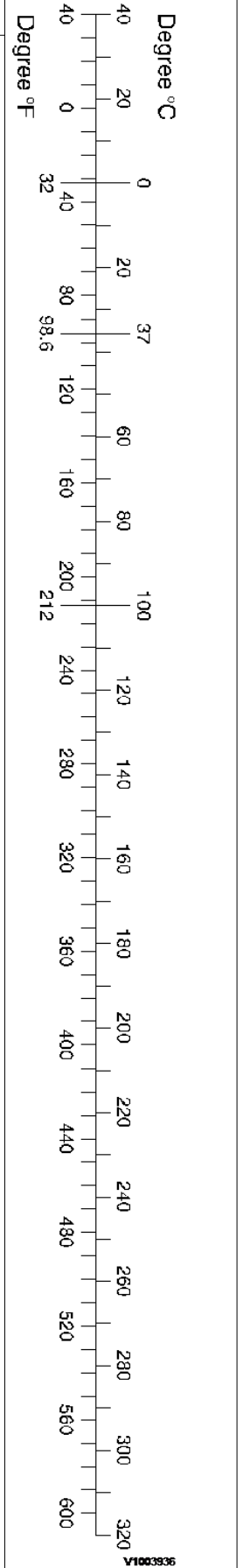
liter/min (dm³/min)

x 0.264

= US gal/min x 3.785

= liter/min

Note: () non-si unit



Document Title: Start switch, specifications	Function Group: 030	Information Type: Service Information	Date: 2014/3/31
Profile: CEX, EW55B [GB]			

Start switch, specifications

Specifications

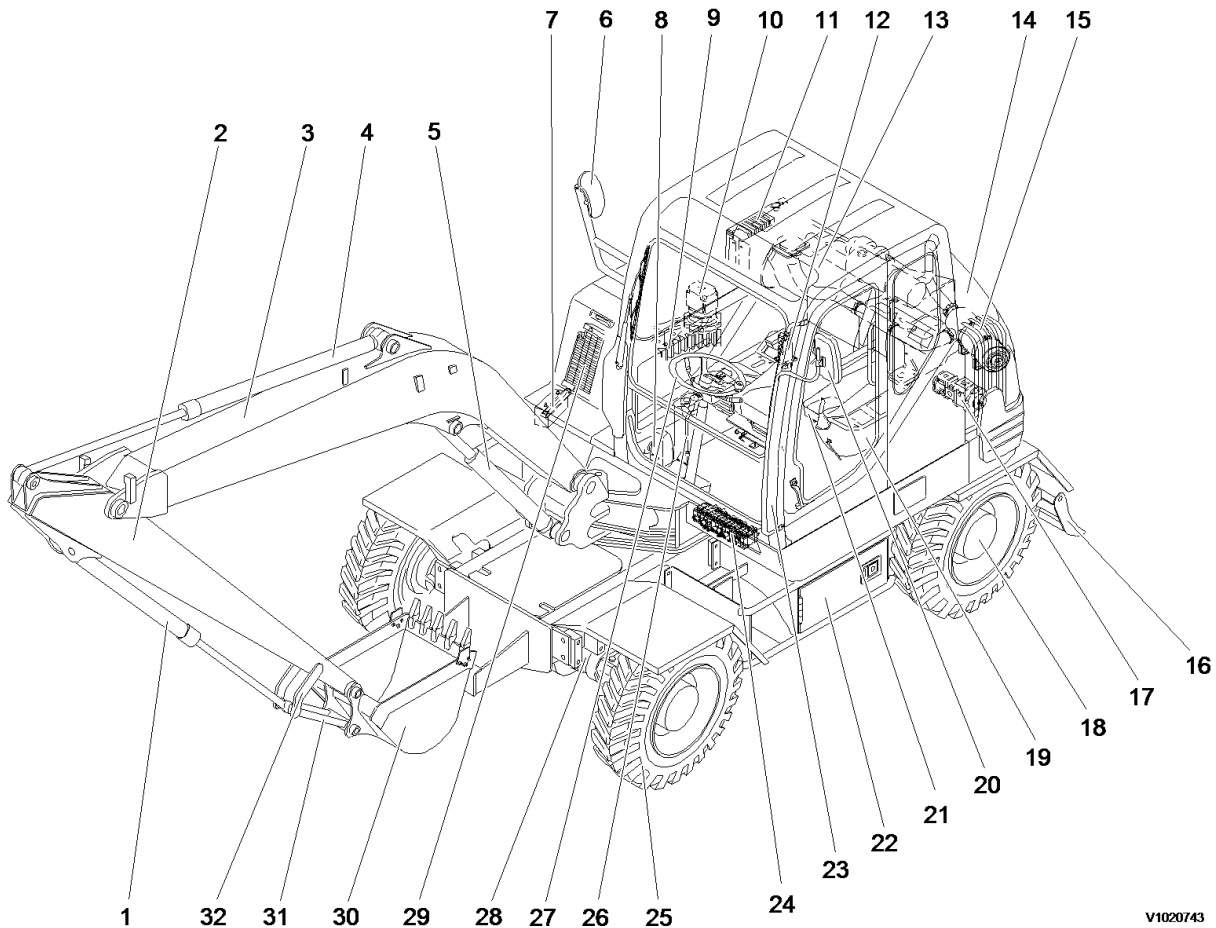
Item	Specifications
Maximum current	B-BR, B-ACC : 30 A B-R1, B-R2 : 60 A B-C : Momentary 75 A, Continuous 22 A
Insulation resistance	1 M Ω or more (500 V megohmmeter)

Wire specifications

NO.	Specifications
2A	B+, AVS 5.0 Y
3	BR, AVS 3.0 R/W
5	ACC, AVS 3.0 R
23	R2, AVS 5.0 W
7	C, AVS 3.0 R/SB
26	R1, AVS 3.0 R/GN

Document Title: Location of components	Function Group: 030	Information Type: Service Information	Date: 2014/3/31
Profile: CEX, EW55B [GB]			

Location of components



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Figure 1
Location of components

1	Bucket cylinder	13	Engine	25	Tire
2	Arm	14	Hood	26	Gear shift lever
3	Boom	15	Air cleaner	27	Steering wheel
4	Arm cylinder	16	Dozer blade	28	Front axle
5	Boom cylinder	17	Hydraulic pump	29	Condensor
6	Right mirror	18	Rear axle	30	Bucket
7	Battery	19	Left control box	31	Link
8	Instrument panel	20	Left mirror	32	Connecting rod
9	Slew ring gear	21	Operator's seat		
10	Slew motor and gearbox	22	Tool box		
11	Radiator and oil cooler	23	Cab		
12	Slew joint	24	Main control valve		

Document Title: Battery disconnect switch, specifications	Function Group: 030	Information Type: Service Information	Date: 2014/3/31
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Battery disconnect switch, specifications

- Operating voltage: DC 6 ~ 36 V

Document Title: Travel selection switch, specifications	Function Group: 030	Information Type: Service Information	Date: 2014/3/31
Profile: CEX, EW55B [GB]			

Travel selection switch, specifications

Specifications

Item	Specifications
Input voltage	DC 12 V, 3 A
Working step	45 °
Output voltage	ON: DC 12 V OFF: 0 V
Type	Rotary

Document Title: Brake valve, specification	Function Group: 030	Information Type: Service Information	Date: 2014/3/31
Profile: CEX, EW55B [GB]			

Brake valve, specification

Specification

Supply pressure	Unit	Specifications
Supply pressure	kgf/cm ² (psi)	150 (2133)
Secondary pressure	kgf/cm ² (psi)	70 ~ 75 (995 ~ 1067)
Operating force	kgf·m (lbf·ft)	17.8 ± 2 (128.5 ± 15)
Operating angle	°	21 ± 1.5
Internal oil leakage	cc/min (cu in/min)	Less than 15 (0.9) at 50 °C (122 °F)
T-port allowable pressure	kgf/cm ² (psi)	3 (42.7) (including peak pressure)

Document Title: Pivot axle lock cylinder, specifications	Function Group: 030	Information Type: Service Information	Date: 2014/3/31
Profile: CEX, EW55B [GB]			

Pivot axle lock cylinder, specifications

Specifications

Item	Unit	Specifications	
Servo hydraulic pressure	kgf / cm2 (psi)	40 (569)	
Operating pressure		420 (5690)	
Peak pressure		450 +5/-0(6400 +71/-0)	
Number of cylinder	EA	2	
Cylinder inner diameter x Bore x Stroke	mm (in)	65 × 65 × 97 (2.55 × 2.55 × 3.8)	
Cylinder length	A (Retracted)	mm (in)	285.5 (11.24)
	B (Extended)		382.5 (15.06)
	C (Maximum stroke)		97 (3.8)

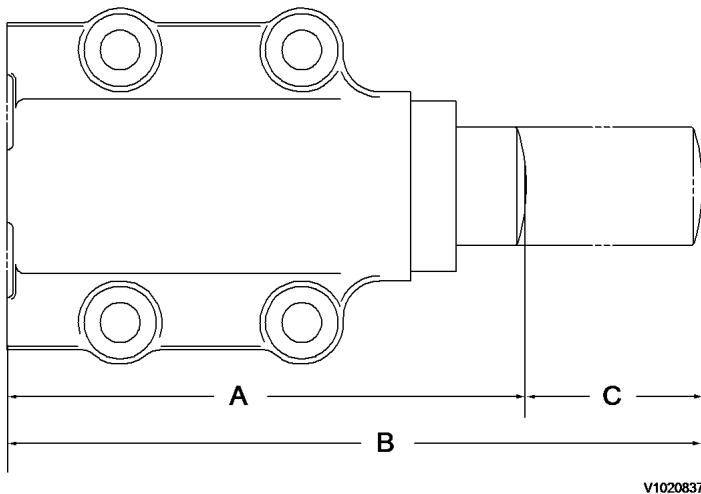


Figure 1
Cylinder length

Document Title: Relief valve, specifications	Function Group: 030	Information Type: Service Information	Date: 2014/3/31
Profile: CEX, EW55B [GB]			

Relief valve, specifications

Specifications



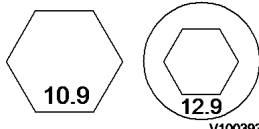
Relief valve		Port		Pressure kgf/cm2(psi)	Remarks
Installation position	Relief		Gauge		
Control valve	Main relief	P1	P1G	210 ± 5/0	Piston pump
		P2	P2G		
		P3	P3G		Gear pump
	Port relief	A2, B2	P1G	240 +5/0	Bucket pump/retract
		A3 (A6), B3	P1G		Boom raise/lower
		A7 (A1), B7 (B1)	P2G		Arm in/out
		A6	P2G		150 +5/0
	B9	P3G	250 +5/0	Dozer blade lower	
Slew motor	Port relief	A10, B10	P3G	190 +5/0	Left slew/right slew
Main pump	Servo hydraulic relief	P4	PPG	33 +5/0	Gear pump (servo hydraulic oil)

Document Title: Standard tightening torques	Function Group: 030	Information Type: Service Information	Date: 2014/3/31
Profile: CEX, EW55B [GB]			

Standard tightening torques

The following charts give the standard tightening torques of screws and nuts. Exceptions are given in each sections of "disassembly and assembly".

Tightening torque (meter)

Classification		4.8T			8.8T			10.9T, 12.9T		
Screw type										
Screw size		Tightening torque			Tightening torque			Tightening torque		
mm	inch	N m	kgf m	lbf ft	N m	kgf m	lbf ft	N m	kgf m	lbf ft
M 4	0.15	1.96 ±0.19	0.2 ±0.02	1.4 ±0.1	-	-	-	3.92 ±0.39	0.4 ±0.04	2.9 ±0.3
M 5	0.19	2.94 ±0.29	0.3 ±0.03	2.2 ±0.2	5.88 ±0.59	0.6 ±0.06	4.3 ±0.4	7.84 ±0.78	0.8 ±0.08	5.8 ±0.6
M 6	0.23	4.90 ±0.49	0.5 ±0.05	3.6 ±0.4	9.8 ±0.98	1.0 ±0.10	7.2 ±0.7	13.72 ±1.37	1.4 ±0.14	10.1 ±1
M 8	0.31	11.76 ±1.17	1.2 ±0.12	8.7 ±0.9	23.541 ±2.35	2.4 ±0.24	17.3 ±1.7	32.36 ±2.94	3.3 ±0.3	23.8 ±2.2
M 10	0.39	22.55 ±2.25	2.3 ±0.23	16.6 ±1.7	48.05 ±4.9	4.9 ±0.5	35.4 ±3.6	63.74 ±6.86	6.5 ±0.7	46.9 ±5.1
M 12	0.46	39.22 ±3.92	4.0 ±0.4	29 ±3	85.32 ±8.83	8.7 ±0.9	62.8 ±6.5	110.81 ±10.78	11.3 ±1.1	81.6 ±7.9
M 14	0.55	62.7 ±5.88	6.4 ±0.6	46 ±4	140.24 ±13.73	14.3 ±1.4	103.2 ±10.1	175.53 ±17.65	17.9 ±1.8	129.2 ±13
M 16	0.62	93.16 ±8.82	9.5 ±0.9	69 ±6	219.67 ±21.57	22.4 ±2.2	161.7 ±15.9	261.83 ±26.47	26.7 ±2.7	192.8 ±19.5
M 18	0.71	132.3 ±13.72	13.5 ±1.4	97 ±10	290.28 ±29.42	29.6 ±3.0	213.7 ±21.7	372.65 ±37.26	38.0 ±3.8	274.4 ±27.4
M 20	0.78	182.40 ±18.63	18.6 ±1.9	134 ±14	430.51 ±43.14	43.9 ±4.4	317.0 ±31.8	511.90 ±50.99	52.2 ±5.2	376.9 ±37.5
M 22	0.87	242.22 ±24.51	24.7 ±2.5	178 ±18	579.57 ±57.85	59.1 ±5.9	426.7 ±42.6	680.58 ±67.66	69.4 ±6.9	501.1 ±49.8
M 24	0.94	314.79 ±31.38	32.1 ±3.2	232 ±23	740.40 ±73.54	75.5 ±7.5	545.1 ±54.2	884.56 ±88.25	90.2 ±9.0	651.2 ±65
M 30	1.17	613.80 ±61.78	62.6 ±6.3	452 ±45	-	-	-	1726.95 ±172.59	176.1 ±17.6	1271.4 ±127.1
M 36	1.40	1061.08 ±105.91	108.2 ±10.8	781 ±78	-	-	-	2984.16 ±298.12	304.3 ±30.4	2197 ±219.5
M 42	1.65	1684.78 ±168.67	171.8 ±17.2	1240 ±124	-	-	-	4738.57 ±473.66	483.2 ±48.3	3488.7 ±348.7
M 45	1.77	2072.15 ±206.92	211.3 ±21.1	1525 ±152	-	-	-	5828.09 ±582.51	594.3 ±59.4	4290.9 ±428.9

Tightening torque (inch)

Classification		4.8T			8.8T			10.9T, 12.9T		
Screw size		Tightening torque			Tightening torque			Tightening torque		
mm	inch	N m	kgf m	lbf ft	N m	kgf m	lbf ft	N m	kgf m	lbf ft
1/4	6.35	9.80 ±0.98	0.6 ±0.06	4.3 ±0.4	23.53 ±2.35	1.0 ±0.1	7.2 ±0.7	16.67 ±1.96	1.7 ±0.2	12.2 ±1.2
5/16	7.94	11.76 ±1.17	1.2 ±0.12	8.7 ±0.8	19.61 ±1.96	2.0 ±0.2	14.4 ±1.4	29.42 ±2.94	3.0 ±0.3	21.7 ±2.2
3/8	9.53	19.61 ±1.96	2.0 ±0.20	14.4 ±1.4	40.20 ±3.92	4.1 ±0.4	29.6 ±2.9	54.91 ±4.90	5.6 ±0.5	40 ±4
7/16	11.11	31.38 ±3.13	3.2 ±0.32	23 ±2	59.82 ±5.88	6.1 ±0.6	44.0 ±4.3	87.27 ±8.82	8.9 ±0.9	64 ±6
1/2	12.70	46.09 ±4.60	4.7 ±0.47	34 ±3	100.02 ±9.80	10.2 ±1.0	73.6 ±7.2	131.40 ±12.74	13.4 ±1.3	97 ±10
9/16	14.29	66.68 ±6.66	6.8 ±0.68	50 ±5	140.23 ±13.72	14.3 ±1.4	103.2 ±10.1	186.32 ±18.63	19.0 ±1.9	137 ±14
5/8	15.88	91.20 ±9.12	9.3 ±0.93	67 ±7	200.05 ±19.61	20.4 ±2.0	147.3 ±14.4	255.95 ±25.49	26.1 ±2.6	190 ±19
3/4	19.05	156.90 ±15.69	16.0 ±1.60	115 ±15	-	-	-	442.28 ±44.12	45.1 ±4.5	325 ±33
7/8	22.22	250.07 ±25.00	25.5 ±2.55	185 ±19	-	-	-	702.15 ±70.60	71.6 ±7.2	520 ±52
1	25.40	372.65 ±37.26	38.0 ±3.80	275 ±27	-	-	-	1048.33 ±104.93	106.9 ±10.7	770 ±77
1 1/8	28.58	530.54 ±53.05	54.1 ±5.41	390 ±39	-	-	-	1492.57 ±149.06	152.2 ±15.2	1100 ±110
1 1/4	31.75	727.65 ±72.76	74.2 ±7.42	535 ±54	-	-	-	2048.61 ±204.95	208.9 ±20.9	1510 ±151
1 3/4	34.93	968.89 ±96.88	98.8 ±9.88	710 ±71	-	-	-	2724.29 ±272.62	277.8 ±27.8	2000 ±200
1 1/2	38.1	1257.21 ±125.72	128.2 ±12.82	925 ± 93	-	-	-	3537.26 ±354.02	360.7 ±36.1	2600 ±260

NOTE!

This torque table does not apply to screws with nylon packings or where nonferrous metal washers are to be used, or which require tightening to a different specified torque, or tightening procedure.

NOTE!

N m (Newton meter): 1 N m ≅ 0.1 kgf m

Tightening torque of split flange screws

Use these torques for split flange screws.

Tightening torque (split flange screws)

Thread diameter of screw (mm)	Width across flats (mm)	Tightening torque		
		N m	kgf m	lbf ft
10	14	65.7 ±6.8	6.7 ±0.7	48.4 ±5
12	17	112 ±9.8	11.5 ±1	83 ±8
16	22	279 ±29	28.5 ±3	206 ±20

Tightening torque for hydraulic plugs with O-ring

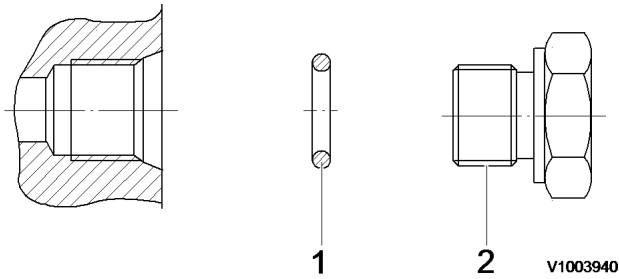


Figure 1
Hydraulic plugs with O-ring

1. O-ring
2. Plug

Pf thread

Tightening torque (hydraulic plugs)

Thread	Plug part No.	Tightening torque N m	Tightening torque kgf m	Tightening torque lbf ft
1/8	9415-11012	24.51 ±1.96	2.5 ±0.2	18 ±1.4
1/4	9415-11022	49.03 ±4.90	5.0 ±0.5	36 ±3.6
3/8	9415-11032	73.54 ±4.90	7.5 ±0.5	54 ±3.6
1/2	9415-11042	107.87 ±9.80	11.0 ±1.0	79 ±7
3/4	9415-11052	176.52 ±9.80	18.0 ±1.0	130 ±7
1	9415-11062	205.94 ±19.61	21.0 ±2.0	152 ±14

Tightening torque for swivel nut fitting with O-ring

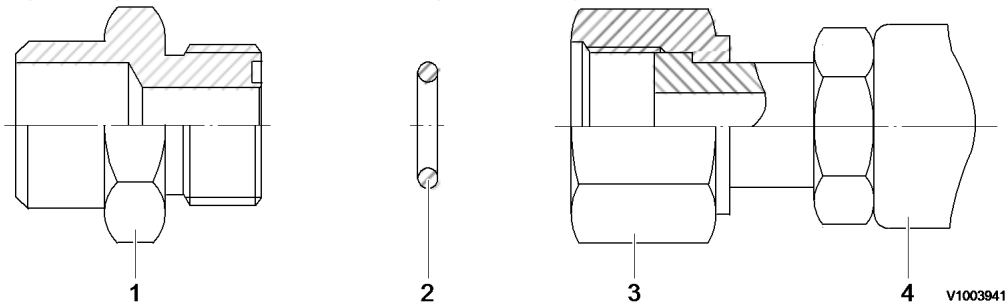


Figure 2
Swivel nut fitting with O-ring

1. Connector
2. O-ring
3. Swivel nut
4. Hose

Tightening torque for swivel nut fitting

Tube outer diameter (in)	Thread size (in)	Tightening torque, N m	Tightening torque, kgf m	Tightening torque, lbf ft
1/2	UN 13/16 – 16	93.16 ±9.31	9.5 ±0.95	69 ±7
3/4	UN 1 3/16 – 12	176.52 ±17.65	18 ±1.8	130 ±13
1	UN 1 7/16 – 12	205.94 ±20.59	21 ±2.1	152 ±15

Document Title: NET 8940-00200 Replace tool for the remote control valve joint	Function Group: 080	Information Type: Service Information	Date: 2014/3/31
Profile: CEX, EW55B [GB]			

NET 8940-00200 Replace tool for the remote control valve joint

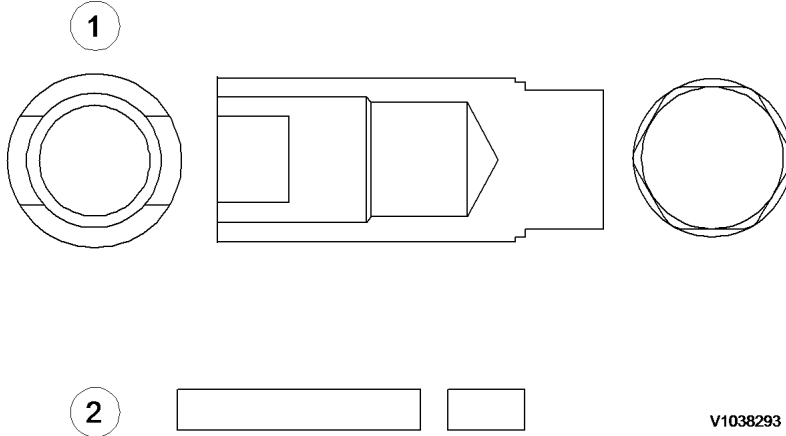
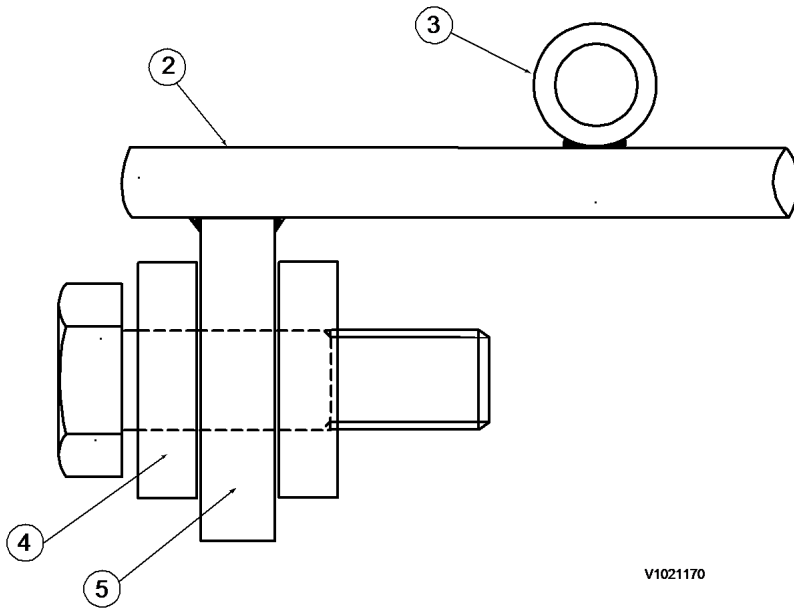


Figure 1
Replace tool for the remote control valve joint

Item	Quantity	Name	Remark
1	1	Socket	SAE 4130 (QT)
2	1	Stop plate	SAE 4130 (QT)

Document Title: E-tools, NET 8940-00350 Replace tool for the swing motor assembly	Function Group: 080	Information Type: Service Information	Date: 2014/3/31
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E-tools, NET 8940-00350 Replace tool for the swing motor assembly



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Figure 1
Replacement tool, slew motor assembly (unit: mm)

Item	Quantity	Name	Remark
1	1	Screw PF3/4 (flat width 36mm)	SAE1045 (QT)
2	1	Round bar – $\varnothing 20$	SAE1045
3	1	Ring – $\varnothing 20 \times \varnothing 20$	SAE1045
4	2	Washer $\varnothing 28 \times \varnothing 40 - 10t$	SAE1045
5	1	Washer $\varnothing 28 \times \varnothing 50 - 20t$	SAE1045

Document Title: NET 8940-00360 Replacement tool for the radiator assembly	Function Group: 080	Information Type: Service Information	Date: 2014/3/31
Profile: CEX, EW55B [GB]			

NET 8940-00360 Replacement tool for the radiator assembly

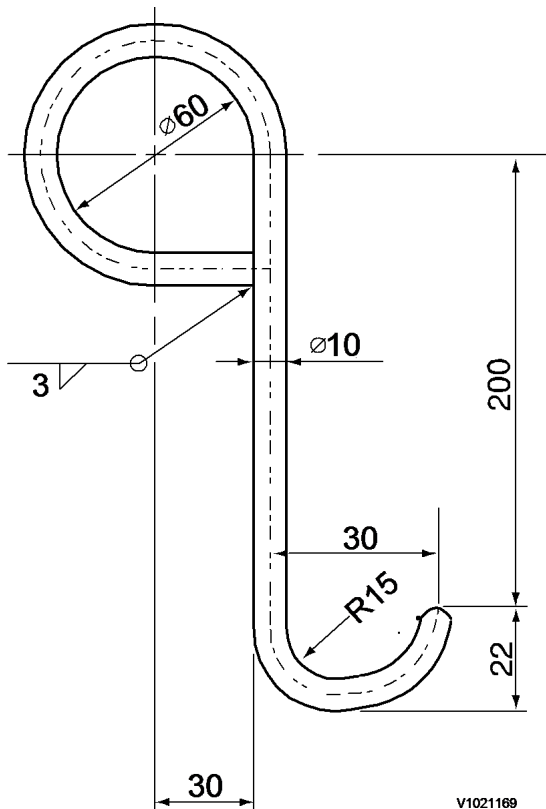


Figure 1
Replacement tool, radiator assembly (unit: mm)

Item	Quantity	Name	Remark
1	2	Lifter	SAE 1040

Document Title: E-tools, NET 8940-00370 Guide pin for track motor and swing ring gear	Function Group: 080	Information Type: Service Information	Date: 2014/3/31
Profile: CEX, EW55B [GB]			

E-tools, NET 8940-00370 Guide pin for track motor and swing ring gear

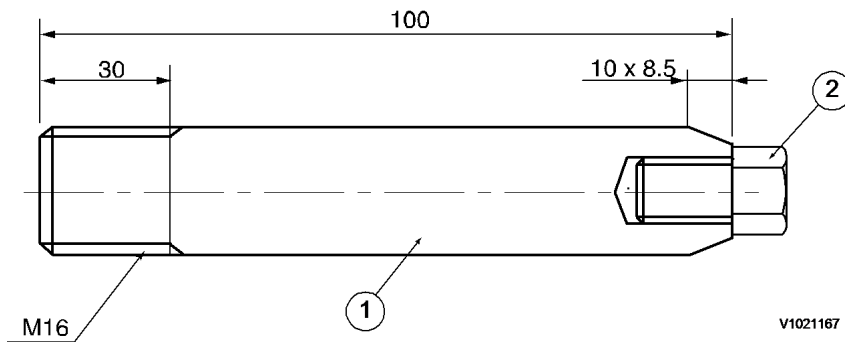


Figure 1
Track motor guide pin (unit: mm)

Item	Quantity	Name	Remark
1	2	Guide bar	SAE 4130 (25 ~ 35 HRC)
2	2	Screw	M8 × 16

Document Title: E-tools, NET 8940-00380 Replacement tool for swing ring gear	Function Group: 080	Information Type: Service Information	Date: 2014/3/31
Profile: CEX, EW55B [GB]			

E-tools, NET 8940-00380 Replacement tool for swing ring gear

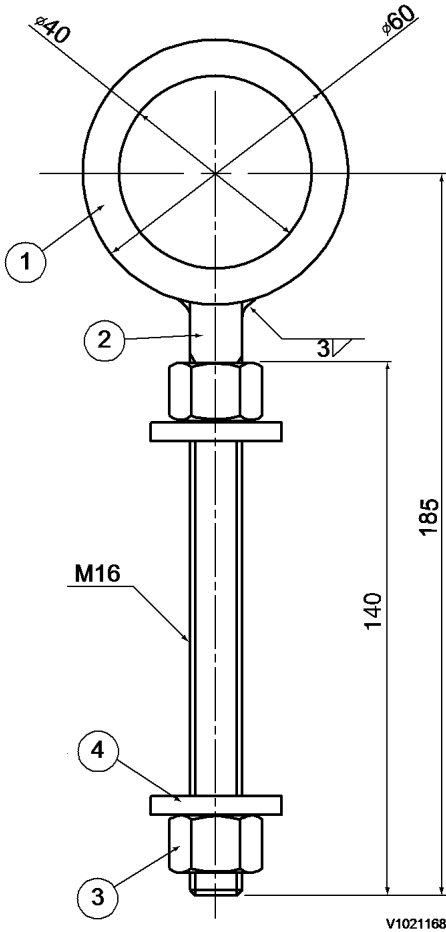


Figure 1
Replacement tool, slew ring gear (unit: mm)

Item	Quantity	Name	Remark
1	2	Ring	SAE1045 (QT)
2	2	Round bar (φ16)	SAE1045 (QT)
3	4	Nut	M16
4	4	Washer (φ16 × φ35 -10t)	

Document Title: General precautions	Function Group: 191	Information Type: Service Information	Date: 2014/3/31
Profile: CEX, EW55B [GB]			

General precautions



WARNING

For safety, observe the following rules.

Safety precautions

- When carrying out any operation or maintenance, have trained and experienced personnel carry out the work.
- When carrying out any operation or maintenance, carefully read the Operation and Maintenance Manual. Read all the precautions given on the decals which are fixed to the machine.

Safety device

- Make sure that all guards and covers are mounted in their proper position. Repair or replace if damaged.
- Pay attention to the method of using any safety locking device or safety belt.

Safety clothes and helmet

- Wear the specified work clothes in the correct manner.
- Use the specified protective gear (helmet, safety glasses, safety shoes, mask, gloves). Guard against injury from flying pieces of metal or debris, wear goggles, gloves and helmet. Always have a trained and experienced welder carry out any welding work. When carrying out welding work, always wear welding gloves, apron, glasses, cap and other clothes suitable for welding work.

Prepare for emergencies

- Know where fire extinguishers are located and how to use them.
- Keep a first aid kit and an eye wash kit near the work area.
- Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.

Handle fluids safely—avoid fires

- Handle fuel with care. It is highly flammable.
- Do not refuel the machine while smoking or when near open flame or sparks. Always stop the engine before refuelling machine. Fill the fuel tank outdoors.
- Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Dispose of fluids properly

- Improperly disposing of fluids can harm the environment and ecology. Before draining any fluids, find out the proper way to dispose of waste from your local environmental agency.
- Catch draining fuel, oil, or other fluids in suitable containers. Do not use food or beverage containers that may mislead someone into drinking from them. Wipe up spills at once.
- Do not pour oil into the ground, down a drain, or into a stream, pond, or lake. Observe relevant environmental protection regulations when disposing of oil, fuel, coolant, brake fluid, filters, batteries, and other harmful waste.

Working in contaminated environment

- Used cab and engine air filters from machines which operate in environments containing asbestos or other dangerous dust must be placed in the tight-fitting bag, before they are deposited in a designated place.

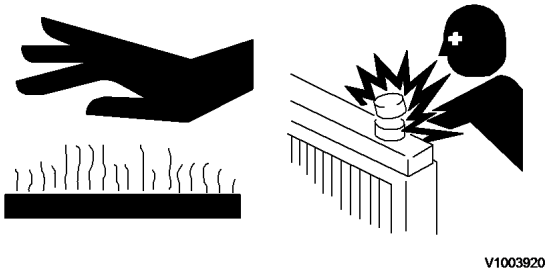
- The machine must be equipped for work within an environment which is contaminated or constitutes a health hazard before the work is initiated. Besides, special local regulations apply for such operations and for servicing a machine which has been used in such environment.

Document Title: Cautions during operation	Function Group: 191	Information Type: Service Information	Date: 2014/3/31
Profile: CEX, EW55B [GB]			

Cautions during operation

Service cooling system safely

- At operating temperature, the engine coolant is hot and under pressure. The radiator and all lines to the heaters and engine contain hot coolant. Any contact can cause severe burns.
- Hot coolant can cause personal injury.
- Check the coolant level only after the engine has been stopped and the radiator pressure cap is cool enough to remove with your bare hand.
- Remove the radiator pressure cap slowly to release pressure.
- Cooling system additive contains alkali that can cause personal injury. Avoid contact with the skin, eyes and mouth.
- Allow cooling system components to cool before draining.

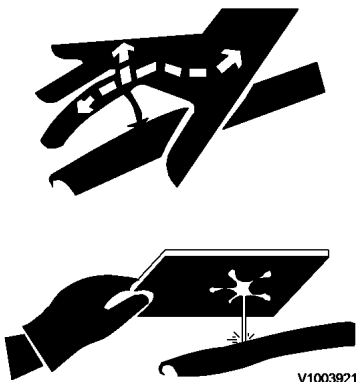


V1003920

Figure 1
Hot coolant can burn you

Avoid high-pressure fluids

- Escaping fluid under pressure can penetrate the skin causing serious injury.
- Avoid the hazard by releasing pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.
- Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks but do not use your bare hand. Protect hands and body from high pressure fluids.
- Be careful not to break, twist or damage the high pressure pipes. A jet spray of high pressure oil can cause electrical fires.



V1003921

Figure 2

Avoid high pressure fluids

Handling of heavy objects

- When raising heavy components, use a hoist or crane.
- Ensure that wire ropes, chains and hooks are free from damage.
- Always use lifting equipment which has ample capacity.
Install the lifting equipment at the correct places.
- Use a hoist or crane and operate slowly to prevent the component hitting any other part.
- When disassembling or assembling, support the machine with blocks, jacks or stands before starting work.
Never use concrete blocks for supports. They can collapse under even light loads.
- Before starting work, lower the blade, ripper, bucket or any other work equipment to the ground.
- Do not work under the equipment when the equipment is not sufficiently supported.

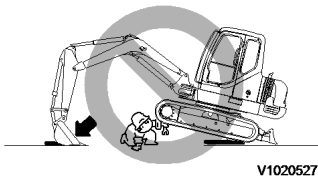
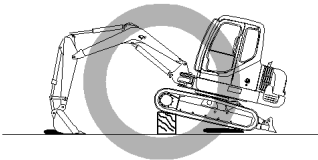


Figure 3
Support the equipment safely

Electrical system

- When welding on the machine or working on the electrical system, ALWAYS turn the master switch STOP position and remove the lead from the battery negative (-) terminal.
- The battery master switch is installed inside the tool box located on the right side of machine.
- When removing components, be careful not to break or damage the wiring.
Damaged wiring can cause electrical fires.
- When working on the battery, wear goggles or safety glasses.
- Sulphuric acid in battery electrolyte is poisonous.
It is strong enough to burn skin and eat holes in clothing and cause blindness if splashed into the eyes.
If you spill acid on your clothes or skin, immediately flush with large quantities of clean water, then get medical attention.
- If splashed into the eyes, flush with water and get medical attention immediately.
- Keep sparks, lighted matches, and open flame away from the top of battery. Battery (hydrogen) gas can explode.

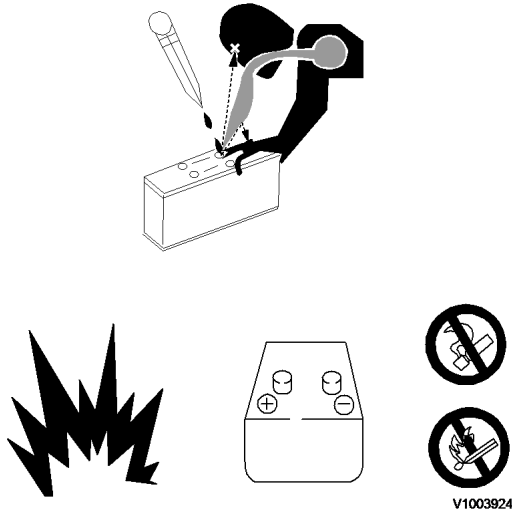


Figure 4
When working on the battery, pay attention

- Battery posts and cables touched by metal objects can short circuit and burn you.
- Keep tools away from posts, wires and terminals.
- Tighten the battery terminals to ensure good contact.
- When disassembling and assembling the battery, make sure that the battery terminals are correctly connected.

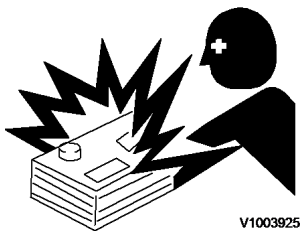


Figure 5
Battery posts and cables can burn you

- If water gets to the electrical system, abnormal operation or failure can result. Do not use water or steam on sensors, connectors and instruments in the cab.

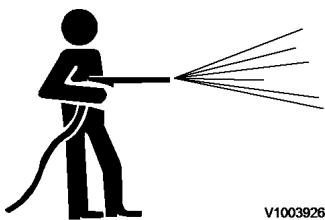


Figure 6
Do not use water or steam in the cab

Cautions during operation

- When removing covers which are under internal pressure or under pressure from a spring, always leave two screws in position on opposite sides. Slowly release the pressure, then slowly loosen the screws.

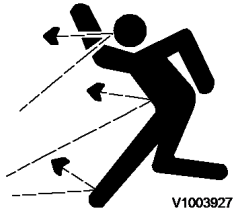


Figure 7

Be careful when opening the grease valve

- High pressure grease in the spring package of the undercarriage can explode and injure you. Be careful when opening the grease valve. Do not loosen the grease valve more than 1 turn until the pressure is released.
- When assembling or installing parts, always use the specified tightening torque.
- When installing protective parts such as guards, or parts which rotate at high speed, be particularly careful to check if they are installed correctly.
- Be sure that your clothes or hair do not contact any rotating components.



Figure 8

Do not contact rotating parts

- When aligning two holes, never insert your fingers or hand. Be careful not to get your fingers pinched in a hole, or between parts or tools.

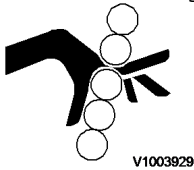


Figure 9

Be careful of your finger (1)



Figure 10

Be careful of your finger (2)

- Never touch rotating parts such as the fan blades or fan belt.

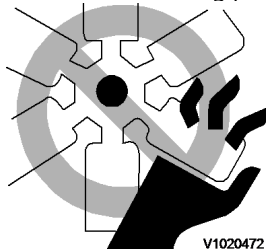
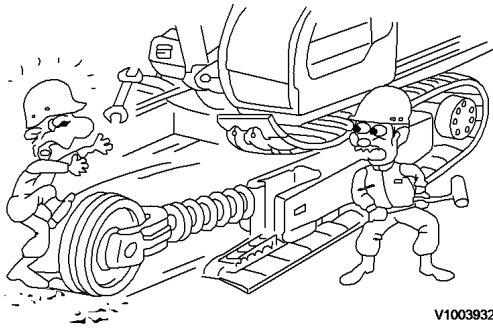


Figure 11

Never touch rotating parts

- Pay attention when removing or installing the tracks of track type machines. When removing the track pin, the track separates suddenly, so never let anyone stand at either end of the track. Always block both ends of the track to prevent any sudden uncontrolled movement.



V1003832

Figure 12
Pay attention when removing or installing the tracks

Document Title: Preparations for work	Function Group: 191	Information Type: Service Information	Date: 2014/3/31
Profile: CEX, EW55B [GB]			

Preparations for work

Warn others of service work

- Unexpected machine movement can cause serious injury.
- Before performing any work on the machine, attach a "Do Not Operate" tag to the right control lever.
- When carrying out any operation with two or more workers, always agree on the operating procedure before starting.



Figure 1
Warn others when carrying out any operation

- Whether a "Do Not Operate" tag is attached or not, sound the travel alarm when the machine starts to move.
- Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.

Use tools properly

- Use a tool only for its designed application.
- Keep all tools in good condition and know the correct way to use them.
- Decide on a place in the repair workshop to keep tools and removed parts.
- Always keep the work area clean and make sure that there is no dirt or oil on the floor.
- Before adding oil or making any repairs, park the machine on hard, level ground and put blocks under the wheels or tracks to prevent the machine from moving.
- Before starting work, lower the blade, ripper, bucket or any other work equipment to the ground. If that is not possible, insert the safety pin or use blocks to prevent the work equipment from falling.



Place the control lockout lever securely to "Locked" position to lock out the control hydraulics before starting the engine or leaving the operator's seat. Unless the control lockout lever is in the "Locked" position, control levers can be operated by careless touch, which could cause serious injury.

Safety locking system

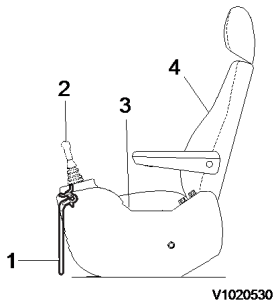


Figure 2
Safety locking system (1)

1. Safety bar
2. Control lever (left)
3. Left console instrument panel
4. Backrest

- Safety bar is in the operating position (A) is for working with the machine. When the safety bar is in this position the engine can not be started.
- When travel mode selector switch is in travel/work mode, traveling is possible in (A) position.
- When travel mode selector switch is in travel mode, traveling is possible in all positions. (A, B, C and D)

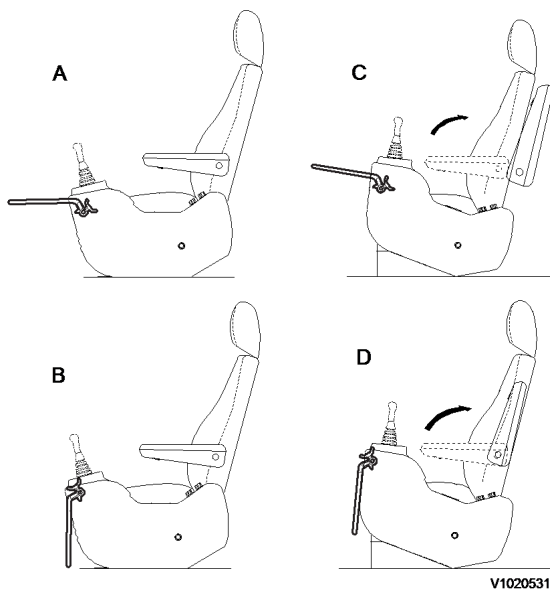


Figure 3
Safety locking system (2)

- A. Operating position (When the safety bar is in this position the engine can not be started)
- B. Locked position (When the safety bar is in this position the engine can be started)
- C. Tilted position
- D. Tilted and locked position

- This system is used for Locking out the attachment, slew and travelling. Place the safety bar located on the left console instrument panel in the "Locked" (B) and "Tilted" (C, D) position to lock out the hydraulic control levers. When the safety bar is in this position the engine can be started. Travelling is possible in (A) position. Tilting function is only for easy entrance on the seat.

Use handholds and steps

- Never jump on or off the machine.

- Remove all mud and oil from the steps of other places used to get on and off the machine.

Document Title: Move and operate machine safely	Function Group: 191	Information Type: Service Information	Date: 2014/3/31
Profile: CEX, EW55B [GB]			

Move and operate machine safely

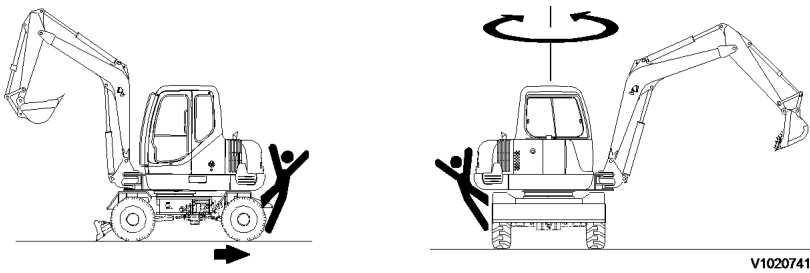


Figure 1

Before moving, slewing or operating the machine check that the area is clear.

- Only allow the operator on the machine. Keep all riders off. Know the location of bystanders before moving, slewing or operating the machine.
- Always keep the travel alarm in working condition.
- Use a signal person when moving, slewing or operating the machine in a congested area.
- Before traveling check the traveling direction. Particularly, for reverse traveling, check that no person is in the area after slewing to the rear side. Use the travel alarm before traveling.

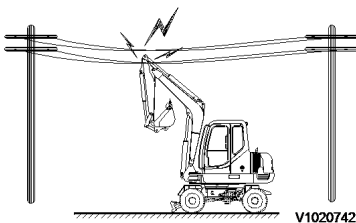


Figure 2

Don't contact electric power lines

- Serious injury or death can result from contact with electric power lines. Never move any part of the machine or load closer to the electric power line than the minimum established safe distance.
- Refer to the Operator's Manual for further details.

Document Title: Recommended lubricants	Function Group: 160	Information Type: Service Information	Date: 2014/3/31
Profile: CEX, EW55B [GB]			

Recommended lubricants

System	Oil grade	Recommended viscosity at varying ambient temperatures									
		°C	-30	-20	-10	0	+10	+20	+30	+40	+50
		°F	-22	-4	+14	+32	+50	+68	+86	+104	+122
Engine	1) Engine oil		SAE 5W/30			SAE 10W/30			*SAE 15W/40		
			SAE 30			SAE 40					
Track reduction gearbox	Gear oil (With EP additive) API GL4 or GL5		*SAE90			SAE140					
Slew ring gear	Gear oil (With EP additive) API GL4 or GL5		*SAE90			SAE140					
Slew ring gear (Bath and Ball)	Grease		Multi purpose EP-grease NLGI 2								
Hydraulic system	Hydraulic oil (Anti-wear hydraulic oil with high viscosity index 160 or more)		ISO VG32 HV			ISO VG46 HV			ISO VG68 HV		
	Bio oil (Based on synthetic ester)		Bio oil VG32			Bio oil VG46					
Pin and bushing	Grease		*ISO-L-XBCFB2								
Fuel tank	Diesel fuel		ASTM D975 No.1			*ASTM D975 No.2					
2) Cooling system	Coolant	Volvo genuine coolant should be used only. *(Water 50 %, antifreeze 50 %)									
	Volvo Coolant VCS	Volvo Coolant VCS should be used only. *(Water 50 %, antifreeze 50 %)									
Air conditioner system	Refrigerant	HFC R134a									
		°C	-30	-20	-10	0	+10	+20	+30	+40	+50
		°F	-22	-4	+14	+32	+50	+68	+86	+104	+122

NOTE!

1) Recommended engine oil grade (VDS-3 or Global DHD-1 + VDS-2 or ACEA-E5 + VDS-2 or API CH-4 + VDS-2)

NOTE!

*: Installed at factory.

- ASTM: American Society of Testing and Material
- SAE: Society of Automotive Engineers

- ISO: International Standardization Organization
- API: American Petroleum Institute

Refill capacities (approximate)

Kind of fluid (Reservoir)	Capacity, liters (gal)	
	Specified	Refill
Engine oil (engine oil pan)	10.1 (2.7)	9.7 (2.5)
Hydraulic oil (hydraulic oil tank)	130 (34)	90 (23.8)
Engine oil (slew gearbox)	1.1 (0.3)	
Gear oil (Transfer gearbox)	3.8 (1.0)	
Diesel fuel (fuel tank)	100 (26.4)	
Grease (slew ring gear)	6.0 (1.6)	
Axle housing (front, rear)	Front housing : 3.9 (1), hub : 0.8 (0.2) Rear housing, hub : 5.2(1.4)	
Coolant (cooling system)	13.3 (3.5)	

- Specified capacity: Total amount of oil including oil for components and oil in piping.
- Refill capacity: Amount of oil needed to refill reservoir during periodic inspection and maintenance.

NOTE!

When fuel sulphur content is less than 0.3%, change engine oil every 250 hours. Change oil according to the following table if fuel sulphur content is above 0.3%.

Fuel sulphur content and change interval

Fuel sulphur content	Change interval of oil in engine oil pan
0.3% to 0.5%	1/2 of regular interval
Above 0.5%	1/4 of regular interval

NOTE!

When starting the engine in an ambient temperature of lower than 0 °C, be sure to use engine oil of SAE 10W, SAE 10W–30 and SAE 15W–40, even though the ambient temperature goes up to 10 °C more or less in the day time.

NOTE!

The fuel should at least meet the legal requirement, and national and international standards for marketed fuels, for example: EN590 (with nationally adapted temperature requirements), ASTM D975 No 1D and 2D, JIS KK 2204.

NOTE!

Use API classification CF or CG as engine oil, and if API classification CD, reduce the engine oil change interval to half.

2) Cooling system

- The cooling system is either filled with Volvo Coolant VCS or Volvo Coolant. To avoid damage to the engine, it is very important to continue to use the same coolant, when filling or changing, as the system is filled with.
- Do not mix different coolants or corrosion protection as this may result in engine damages.
- To distinguish the coolant from each, the cooling system is filled with Volvo Coolant VCS if
 - it is yellow.
 - a decal with the text "Volvo Coolant VCS" is put by the filling point.



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The cooling system is filled with Volvo Coolant if

- it is green.

- the decal mentioned above, is not by the filling point.

- Machine serial number installed at factory:

- Volvo Coolant: ~ 30629

- Volvo Coolant VCS: 30630 ~

NOTE!

See the Operator's manual for detailed information on Volvo Coolant VCS.

Document Title: Periodic maintenance	Function Group: 173	Information Type: Service Information	Date: 2014/3/31
Profile: CEX, EW55B [GB]			

Periodic maintenance

Recommended periodic maintenance must always be performed as stipulated to keep the machine in excellent operating condition to ensure safe operation.

Improper lubrication, maintenance and operation of the machine can be dangerous and cause injury or death to you or other persons on the jobsite.

NOTE!

Refer to the operator's manual for detailed information on periodic maintenance.

Document Title: Coolant, checking anti-freeze resistance	Function Group: 173	Information Type: Service Information	Date: 2014/3/31
Profile: CEX, EW55B [GB]			

Coolant, checking anti-freeze resistance

Op nbr 261-002

[88890105 Refractometer](#)

WARNING

Open the expansion tank cap slowly and carefully. The cooling system operates at high pressure and hot coolant may rush out and cause severe burns.

1. Check the freezing protection with 88890105 Refractometer.
Open the cover on the refractometer and place a few drops of the coolant on the glass surface. Close the cover and read off the value against strong light source.
Read off the value on the ethylene scale. The coolant should be taken from the filling point on the expansion tank.

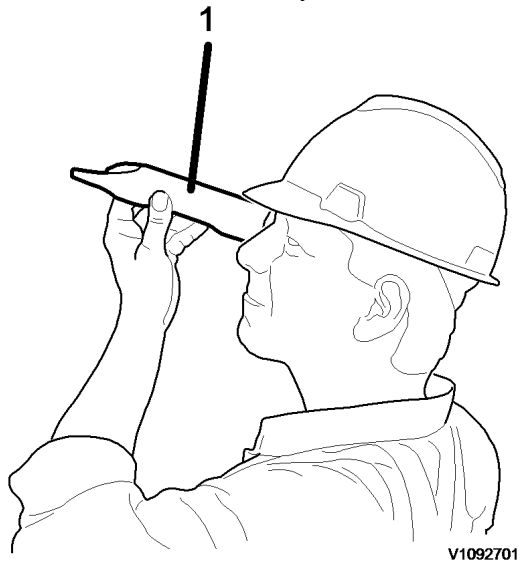
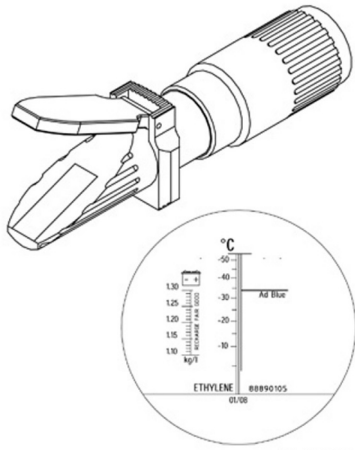


Figure 1

2. The machine is delivered with a coolant mixture for optimal cooling and corrosion characteristics.
That is why the same coolant mixture shall be filled, regardless of ambient temperature conditions. See [160 Coolant](#) and [160 Coolant with freezing and corrosion protection](#).



V1075419

Figure 2

NOTE!

Volvo Construction Equipment concentrated coolant with anti-freeze must not be mixed with other brands of anti-freeze or additives as this type of mixture could have negative effects.

Document Title: Measuring condition	Function Group:	Information Type: Service Information	Date: 2014/3/31
Profile: CEX, EW55B [GB]			

Measuring condition

The purpose of this chapter is to explain how to evaluate the various performances of Volvo Construction Equipment hydraulic excavators.

The tolerances shown are for new machines.

For a machine already in use, certain allowance is permitted according to field conditions.

Unless otherwise specified, measurements should be performed under the following conditions:

- Engine speed: high rpm
- Hydraulic oil temperature: 50 ± 5 °C (122 ± 9 °F)
- Site: firm, level ground
- Bucket load: empty



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