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690E LC Excavator Operation and Tests

TECHNICAL MANUAL

690E LC Excavator Operation and Tests

TM1508 12JUL05 (ENGLISH)

For complete service information also see:

690E LC Excavator Repair	TM1509
6068 Engine (Serial No. —559602)	CTM8
6068 Engine (Serial No. 559603—)	CTM104
Alternators and Starting Motors	CTM77
Undercarriage Appraisal Manual	SP326

Worldwide Construction And Forestry Division
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Foreword

This manual is written for an experienced technician. Essential tools required in performing certain service work are identified in this manual and are recommended for use.

Live with safety: Read the safety messages in the introduction of this manual and the cautions presented throughout the text of the manual.

This is the safety-alert symbol. When you see this symbol on the machine or in this manual, be alert to the potential for personal injury.

Technical manuals are divided in two parts: repair and operation and tests. Repair sections tell how to repair the components. Operation and tests sections help you identify the majority of routine failures quickly.

Information is organized in groups for the various components requiring service instruction. At the beginning of each group are summary listings of all applicable essential tools, service equipment and tools, other materials needed to do the job, service parts kits, specifications, wear tolerances, and torque values.

Technical Manuals are concise guides for specific machines. They are on-the-job guides containing only the vital information needed for diagnosis, analysis, testing, and repair.

Fundamental service information is available from other sources covering basic theory of operation, fundamentals of troubleshooting, general maintenance, and basic type of failures and their causes.

DX,TMIFC –19–29SEP98–1/1

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Poor		Fair		Good		Very Good		Excellent	
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Company Name: _____

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THANK YOU!

TX,TM,FAX –19–03JUL01–1/1

Contents

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Section 9000
General Information

Contents

9000
01
1

Follow Safe Procedures

Unsafe work practices are dangerous. Understand service procedure before doing work; do not attempt shortcuts.

TS231 –19–07OCT88

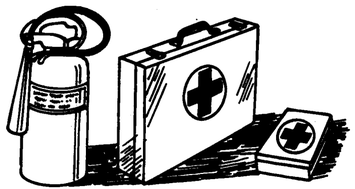
TX,05,FF1611 –19–14JUN90–1/1

Prepare for Emergencies

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



TS291 –UN–23AUG88

DX,FIRE2 –19–03MAR93–1/1

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01
2

Prevent Acid Burns

Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

Avoid the hazard by:

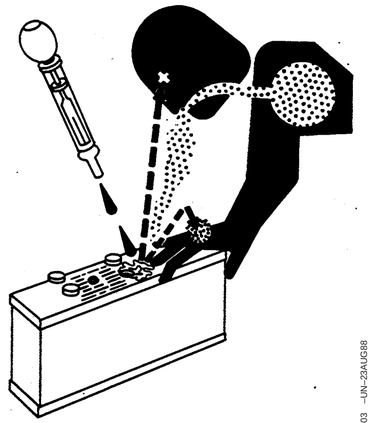
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Use proper jump start procedure.

If you spill acid on yourself:

1. Flush your skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. Flush your eyes with water for 15—30 minutes. Get medical attention immediately.

If acid is swallowed:

1. Do not induce vomiting.
2. Drink large amounts of water or milk, but do not exceed 2 L (2 quarts).
3. Get medical attention immediately.



TS203 –UN–23AUG88

DX,POISON –19–21APR93–1/1

9000
01
3

Handle Chemical Products Safely

Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with John Deere equipment include such items as lubricants, coolants, paints, and adhesives.

A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.

Check the MSDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow procedures and recommended equipment.

(See your John Deere dealer for MSDS's on chemical products used with John Deere equipment.)

TS1132 –UN–26NOV90

DX,MSDS,NA –19–03MAR93–1/1

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 engine before refueling machine. Fill fuel tank outdoors.

TS202 –UN–23AUG88

TX,05,FF1622 –19–14JUN90–1/2

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

Do not store oily rags; they can ignite and burn spontaneously.

TS227 –UN–23AUG88

TX,05,FF1622 –19–14JUN90–2/2

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Avoid High-Pressure Fluids

X9811 –UN–23AUG88

Escaping fluid under pressure can penetrate the skin causing serious injury.

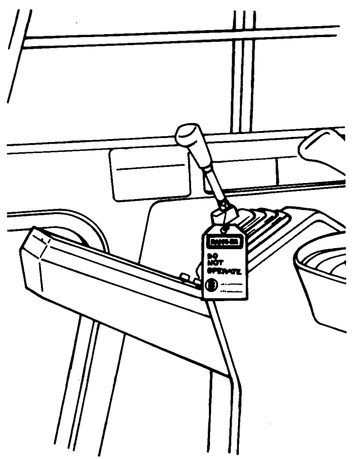
Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

DX,FLUID –19–03MAR93–1/1

Warn Others of Service Work



T72734AP –UN–08JUN90

Unexpected machine movement can cause serious injury.

Before performing any work on the machine, attach a “Do Not Operate” tag on the right control lever.

TX,05,RR,566 –19–23JUL91–1/1

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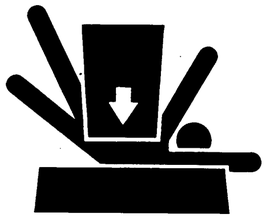
01
5

Support Machine Properly

Always lower the attachment or implement to the ground before you work on the machine. If the work requires that the machine or attachment be lifted, provide secure support for them. If left in a raised position, hydraulically supported devices can settle or leak down.

Do not support the machine on cinder blocks, hollow tiles, or props that may crumble under continuous load. Do not work under a machine that is supported solely by a jack. Follow recommended procedures in this manual.

When implements or attachments are used with a machine, always follow safety precautions listed in the implement or attachment operator's manual.



TS229 –UN–23AUG88

DX,LOWER –19–24FEB00–1/1

Operate Only from Operator's Seat

Avoid possible injury or machine damage. Do not start engine by shorting across starter terminals.

NEVER start engine while standing on ground. Start engine only from operator's seat.

T6607AO –UN–18OCT88

TX,05,FF1615 –19–14JUN90–1/1

Park Machine Safely

Before working on the machine:

- Park machine on a level surface.
- Lower bucket to the ground.
- Turn auto-idle switch off.
- Run engine in light duty "L" mode without load for 2 minutes.
- Set power mode to low idle "I" and turn key switch to OFF to stop engine. Remove key from switch.
- Pull pilot control shut-off lever to locked position.
- Allow engine to cool.

CED,OUTX782,582 –19–18AUG99–1/1

Stay Clear of Moving Parts

Entanglements in moving parts can cause serious injury.

To prevent accidents, use care when working around rotating parts.

T72734S –UN–08JUN90

TX,05,RR,572 –19–12JUN90–1/1

Avoid Power Lines

Serious injury or death can result from contact with electric lines.

Never move any part of the machine or load closer to electric line than 3 m (10 ft) plus twice the line insulator length.

T72734D –UN–08JUN90

TX,05,RR,594 –19–12JUN90–1/1

Use Handholds and Steps

Falling is one of the major causes of personal injury.

When you get on and off the machine, always maintain a three point contact with the steps and handrails and face the machine. Do not use any controls as handholds.

Never jump on or off the machine. Never mount or dismount a moving machine.

Be careful of slippery conditions on platforms, steps, and handrails when leaving the machine.

T6981AN –UN–15JUN89

TX,05,DH832 –19–16MAR92–1/1

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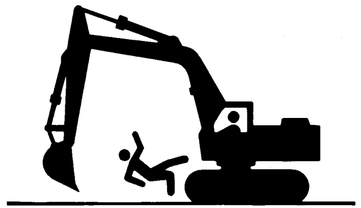
7

Keep Riders Off Machine

Only allow the operator on the machine. Keep riders off.

Riders on machine are subject to injury such as being struck by foreign objects and being thrown off the machine. Riders also obstruct the operator's view resulting in the machine being operated in an unsafe manner.



T7273AH –UN–08JUN90

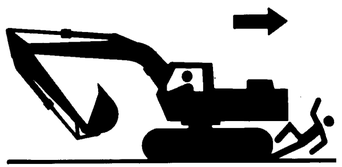
TX,05,RR,560 –19–05OCT90–1/1

Move and Operate Machine Safely

Bystanders can be run over. Know the location of bystanders before moving, swinging, or operating the machine.

Always keep the travel alarm in working condition. It warns people when the machine starts to move.

Use a signal person when moving, swinging, or operating the machine in congested areas. Coordinate hand signals before starting the machine.



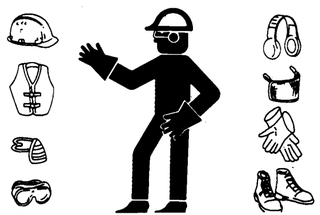
T7273AL –UN–08JUN90

TX,05,FF1806 –19–05OCT90–1/1

Wear Protective Clothing

Wear close fitting clothing and safety equipment appropriate to the job.

Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.



TS206 –UN–23AUG88

DX,WEAR2 –19–03MAR93–1/1

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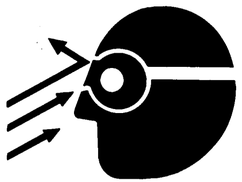
Protect Against Flying Debris

Guard against injury from flying pieces of metal or debris; wear goggles or safety glasses.



T6642DK –UN–18OCT88

TX,05,FF1613 –19–14JUN90–1/1

Protect Against Noise

Prolonged exposure to loud noise can cause impairment or loss of hearing.

Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.

TS207 –UN–23AUG88

DX,NOISE –19–03MAR93–1/1

Illuminate Work Area Safely

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.

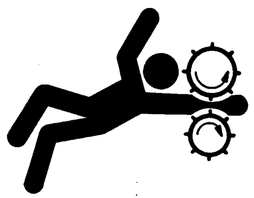
TS223 –UN–23AUG88

DX,LIGHT –19–04JUN90–1/1

Service Machines Safely

Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing, or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



TS228 –UN–23AUG88

DX,LOOSE –19–04JUN90–1/1

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9

Remove Paint Before Welding or Heating

Avoid potentially toxic fumes and dust.

Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

Remove paint before heating:

- Remove paint a minimum of 100 mm (4 in.) from area to be affected by heating. If paint cannot be removed, wear an approved respirator before heating or welding.
- If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.
- If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

Do not use a chlorinated solvent in areas where welding will take place.

Do all work in an area that is well ventilated to carry toxic fumes and dust away.

Dispose of paint and solvent properly.

DX,PAINT –19–24JUL02–1/1

Avoid Heating Near Pressurized Fluid Lines

Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders. Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials. Pressurized lines can accidentally burst when heat goes beyond the immediate flame area.

DX,TORCH –19–10DEC04–1/1

Beware of Exhaust Fumes

Prevent asphyxiation. Engine exhaust fumes can cause sickness or death.

If you must operate in a building, be positive there is adequate ventilation. Either use an exhaust pipe extension to remove the exhaust fumes or open doors and windows to bring enough outside air into the area.

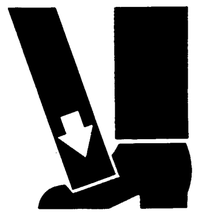
T6458AO –UN–18OCT88

02T,05,J9 –19–07JAN91–1/1

Use Proper Lifting Equipment

Lifting heavy components incorrectly can cause severe injury or machine damage.

Follow recommended procedure for removal and installation of components in the manual.



TS226 –UN–23AUG88

DX,LIFT –19–04JUN90–1/1

Service Cooling System Safely

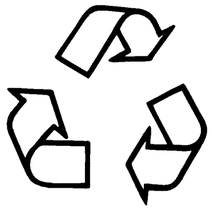
Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off engine. Only remove filler cap when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.

TS281 –UN–23AUG88

DX,RCAP –19–04JUN90–1/1

Dispose of Waste Properly



TS1133 –UN–26NOV90

Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with John Deere equipment include such items as oil, fuel, coolant, brake fluid, filters, and batteries.

Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

Do not pour waste onto the ground, down a drain, or into any water source.

Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.

Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your John Deere dealer.

DX,DRAIN –19–03MAR93–1/1

Work in a Clean Area

Before starting a job, clean the work area. Remove objects that may be a safety hazard to the mechanic or bystanders.

TX,05,FF1624 –19–14JUN90–1/1

Use Tools Properly

TS779 –UN–08NOV89

Use tools appropriate to the work. Makeshift tools, parts, and procedures can create safety hazards.

Use power tools only to loosen threaded tools and fasteners.

For loosening and tightening hardware, use the correct size tools. DO NOT use U.S. measurement tools on metric fasteners. Avoid bodily injury caused by slipping wrenches.

Use only recommended replacement parts. (See Parts Catalog.)

TX,05,FF1614 –19–14JUN90–1/1

Replace Safety Signs

TS201 –UN–23AUG88

Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.

DX,SIGNS1 –19–04JUN90–1/1

Live With Safety

TS231 –19–07OCT88

Before returning machine to customer, make sure machine is functioning properly, especially the safety systems. Install all guards and shields.

DX,LIVE –19–25SEP92–1/1

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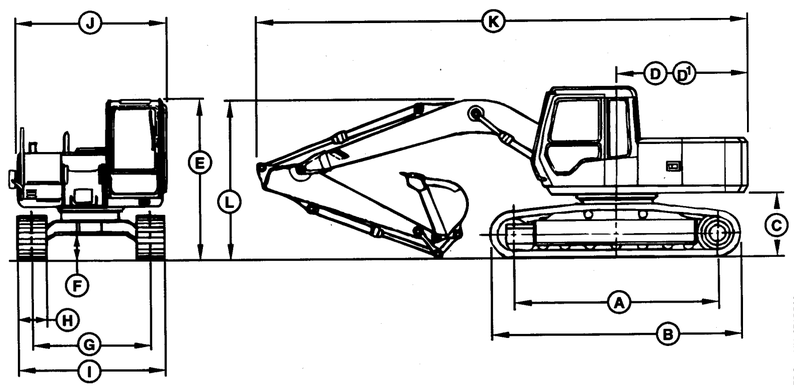
690E LC



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TX,115,FF2461 –19–12MAY93–1/2

NOTE: Specifications and design subject to change without notice. Wherever applicable, specifications are in accordance with PCSA and SAE standards.

A	3607 mm (11 ft 10 in.)
B	4445 mm (14 ft 7 in.)
C	1090 mm (3 ft 7 in.)
D	2630 mm (8 ft 8 in.)
D [1] Swing Radius	2740 mm (9 ft 0 in.)
E	2910 mm (9 ft 6 in.)
F	455 mm (1 ft 6 in.)
G	2380 mm (7 ft 10 in.)
H	650 mm (26 in.) or 750 mm (30 in.) or 800 mm (32 in.)
I With 2380 mm (7 ft 10 in.) undercarriage and With 650 mm (26 in.) shoes With 750 mm (30 in.) shoes With 800 mm (32 in.) shoes	3030 mm (9 ft 11 in.) 3130 mm (10 ft 3 in.) 3180 mm (10 ft 5 in.)
J	2780 mm (9 ft 1 in.)
K With 2200 mm (7 ft 3 in.) arm With 2900 mm (9 ft 6 in.) arm	9480 mm (31 ft 1 in.) 9410 mm (30 ft 10 in.)
L With 2200 mm (7 ft 3 in.) arm	2910 mm (9 ft 6 in.)
With 2900 mm (9 ft 6 in.) arm	2910 mm (9 ft 6 in.)

TX,115,FF2461 –19–12MAY93–2/2

690E LC Long Front Specifications

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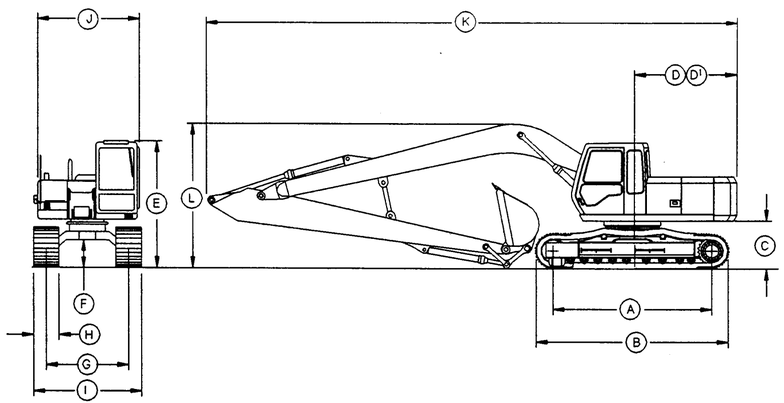
02
3



T7961AE —UN–02APR93

Continued on next page

TX,115,FF3345 –19–11JAN95–1/2

NOTE: Specifications and design subject to change without notice. Wherever applicable, specifications are in accordance with PCSA and SAE Standards. Except where otherwise noted these specifications are based on a unit equipped with 379 kg (835 lb) bucket, 800 mm (32 in.) track shoes, 4.45 m (14 ft 7 in.) undercarriage, full fuel tank, 80 kg (175 lb) operator, and standard equipment.

A	3.66 m (12 ft 0 in.)
B	4.45 m (14 ft 7 in.)
C	1.09 m (3 ft 7 in.)
D	2.63 m (8 ft 8 in.)
D [1] Tailswing Radius	2.74 m (9 ft 0 in.)
E	2.84 m (9 ft 4 in.)
F	455 mm (1 ft 6 in.)
G	2.38 m (7 ft 10 in.)
H	800 mm (32 in.)
I	3.18 m (10 ft 5 in.)
J	2.77 m (9 ft 1 in.)
K	11.86 m (38 ft 11 in.)
L	3.15 m (10 ft 4 in.)
With 100 mm (4 in.) block under bucket linkage pivot [a]	3.25 m (10 ft 8 in.)
[a]Lubrication lines at boom cylinder rod ends may extend 100 mm (4 in.) over maximum machine height. If necessary, lines can be tied down to meet height requirements.	

TX,115,FF3345 –19–11JAN95–2/2

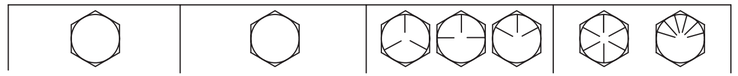
690E LC And 690E LC Long Front Drain And Refill Capacities

	Metric	English
Fuel tank (Serial No. —536413)	322 L	85 gal
Fuel tank (Serial No. 536414—)	303 L	80 gal
Cooling system (Serial No. —559602)	34 L	9 gal
Cooling system (Serial No. 559603—)	41.5 L	11 gal
Engine lubrication, including filter	19 L	20 qt
Hydraulic tank	148 L	39 gal
Swing gear	21.8 kg	48 lb
Propel gearbox (each)	3.9 L	4.1 qt

TX,9000,LG2 –19–27AUG97–1/1

Unified Inch Bolt and Screw Torque Values

TS1671 –UN–01MAY03



Bolt or	SAE Grade 1				SAE Grade 2[a]				SAE Grade 5, 5.1 or 5.2				SAE Grade 8 or 8.2			
Screw	Lubricated[b]		Dry[c]		Lubricated[b]		Dry[c]		Lubricated[b]		Dry[c]		Lubricated[b]		Dry[c]	
Size	N•m	lb-in	N•m	lb-in	N•m	lb-in	N•m	lb-in	N•m	lb-in	N•m	lb-in	N•m	lb-in	N•m	lb-in
1/4	3.7	33	4.7	42	6	53	7.5	66	9.5	84	12	106	13.5	120	17	150
													N•m	lb-ft	N•m	lb-ft
5/16	7.7	68	9.8	86	12	106	15.5	137	19.5	172	25	221	28	20.5	35	26
									N•m	lb-ft	N•m	lb-ft				
3/8	13.5	120	17.5	155	22	194	27	240	35	26	44	32.5	49	36	63	46
			N•m	lb-ft	N•m	lb-ft	N•m	lb-ft								
7/16	22	194	28	20.5	35	26	44	32.5	56	41	70	52	80	59	100	74
	N•m	lb-ft														
1/2	34	25	42	31	53	39	67	49	85	63	110	80	120	88	155	115
9/16	48	35.5	60	45	76	56	95	70	125	92	155	115	175	130	220	165
5/8	67	49	85	63	105	77	135	100	170	125	215	160	240	175	305	225
3/4	120	88	150	110	190	140	240	175	300	220	380	280	425	315	540	400
7/8	190	140	240	175	190	140	240	175	490	360	615	455	690	510	870	640
1	285	210	360	265	285	210	360	265	730	540	920	680	1030	760	1300	960
1-1/8	400	300	510	375	400	300	510	375	910	670	1150	850	1450	1075	1850	1350
1-1/4	570	420	725	535	570	420	725	535	1280	945	1630	1200	2050	1500	2600	1920
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2140	1580	2700	2000	3400	2500
1-1/2	990	730	1250	930	990	730	1250	930	2250	1650	2850	2100	3600	2650	4550	3350

Torque values listed are for general use only, based on the strength of the bolt or screw. DO NOT use these values if a different torque value or tightening procedure is given for a specific application. For plastic insert or crimped steel type lock nuts, for stainless steel fasteners, or for nuts on U-bolts, see the tightening instructions for the specific application. Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Replace fasteners with the same or higher grade. If higher grade fasteners are used, tighten these to the strength of the original. Make sure fastener threads are clean and that you properly start thread engagement. When possible, lubricate plain or zinc plated fasteners other than lock nuts, wheel bolts or wheel nuts, unless different instructions are given for the specific application.

[a]Grade 2 applies for hex cap screws (not hex bolts) up to 6. in (152 mm) long. Grade 1 applies for hex cap screws over 6 in. (152 mm) long, and for all other types of bolts and screws of any length.

[b]"Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or 7/8 in. and larger fasteners with JDM F13C zinc flake coating.

[c]"Dry" means plain or zinc plated without any lubrication, or 1/4 to 3/4 in. fasteners with JDM F13B zinc flake coating.

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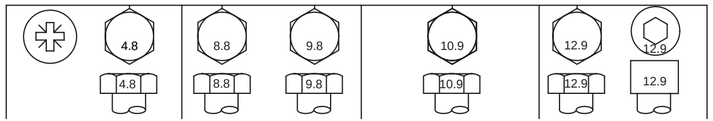
Metric Bolt and Screw Torque Values



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Bolt or	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
Screw	Lubricated[a]		Dry[b]		Lubricated[a]		Dry[b]		Lubricated[a]		Dry[b]		Lubricated[a]		Dry[b]	
Size	N•m	lb-in	N•m	lb-in	N•m	lb-in	N•m	lb-in	N•m	lb-in	N•m	lb-in	N•m	lb-in	N•m	lb-in
M6	4.7	42	6	53	8.9	79	11.3	100	13	115	16.5	146	15.5	137	19.5	172
									N•m	lb-ft	N•m	lb-ft	N•m	lb-ft	N•m	lb-ft
M8	11.5	102	14.5	128	22	194	27.5	243	32	23.5	40	29.5	37	27.5	47	35
			N•m	lb-ft	N•m	lb-ft	N•m	lb-ft								
M10	23	204	29	21	43	32	55	40	63	46	80	59	75	55	95	70
	N•m	lb-ft														
M12	40	29.5	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	46	80	59	120	88	150	110	175	130	220	165	205	150	260	190
M16	100	74	125	92	190	140	240	175	275	200	350	255	320	235	400	300
M18	135	100	170	125	265	195	330	245	375	275	475	350	440	325	560	410
M20	190	140	245	180	375	275	475	350	530	390	675	500	625	460	790	580
M22	265	195	330	245	510	375	650	480	725	535	920	680	850	625	1080	800
M24	330	245	425	315	650	480	820	600	920	680	1150	850	1080	800	1350	1000
M27	490	360	625	460	950	700	1200	885	1350	1000	1700	1250	1580	1160	2000	1475
M30	660	490	850	625	1290	950	1630	1200	1850	1350	2300	1700	2140	1580	2700	2000
M33	900	665	1150	850	1750	1300	2200	1625	2500	1850	3150	2325	2900	2150	3700	2730
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2770	4750	3500

Torque values listed are for general use only, based on the strength of the bolt or screw. DO NOT use these values if a different torque value or tightening procedure is given for a specific application. For stainless steel fasteners or for nuts on U-bolts, see the tightening instructions for the specific application. Tighten plastic insert or crimped steel type lock nuts by turning the nut to the dry torque shown in the chart, unless different instructions are given for the specific application.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class. Replace fasteners with the same or higher property class. If higher property class fasteners are used, tighten these to the strength of the original. Make sure fastener threads are clean and that you properly start thread engagement. When possible, lubricate plain or zinc plated fasteners other than lock nuts, wheel bolts or wheel nuts, unless different instructions are given for the specific application.

[a]"Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or M20 and larger fasteners with JDM F13C zinc flake coating.

[b]"Dry" means plain or zinc plated without any lubrication, or M6 to M18 fasteners with JDM F13B zinc flake coating.

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9000
03
3

Additional Metric Cap Screw Torque Values

CAUTION: Use only metric tools on metric hardware. Other tools may not fit properly. They may slip and cause injury.

Check tightness of cap screws periodically. Torque values listed are for general use only. Do not use these values if a different torque value or tightening procedure is listed for a specific application.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fastener threads are clean and you properly start thread engagement. This will prevent them from failing when tightening.

Tighten cap screws having lock nuts to approximately 50 percent of amount shown in chart.

T6873AA

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T6873AB

T6873AB –UN–18OCT88

T6873AC

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METRIC CAP SCREW TORQUE VALUES[a]

	T-Bolt		H-Bolt		M-Bolt	
Nominal Dia	N•m	lb-ft	N•m	lb-ft	N•m	lb-ft
8	29	21	20	15	10	7
10	63	46	45	33	20	15
12	108	80	88	65	34	25
14	176	130	137	101	54	40
16	265	195	206	152	78	58
18	392	289	294	217	118	87
20	539	398	392	289	167	125
22	735	542	539	398	216	159
24	931	687	686	506	274	202
27	1372	1012	1029	759	392	289
30	1911	1410	1421	1049	539	398
33	2548	1890	1911	1410	735	542
36	3136	2314	2401	1772	931	687

[a]Torque tolerance is ±10%.

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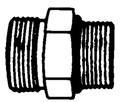
Service Recommendations for O-Ring Boss Fittings

Straight Fitting

1. Inspect O-ring boss seat for dirt or defects.
2. Lubricate O-ring with petroleum jelly. Place electrical tape over threads to protect O-ring. Slide O-ring over tape and into O-ring groove of fitting. Remove tape.
3. Tighten fitting to torque value shown on chart.



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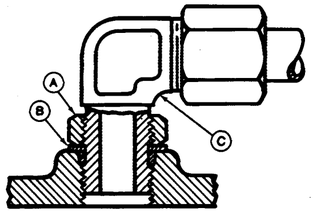
Angle Fitting

1. Back-off lock nut (A) and back-up washer (B) completely to head-end (C) of fitting.
2. Turn fitting into threaded boss until back-up washer contacts face of boss.
3. Turn fitting head-end counterclockwise to proper index (maximum of one turn).

NOTE: Do not allow hoses to twist when tightening fittings.

4. Hold fitting head-end with a wrench and tighten locknut and back-up washer to proper torque value.



T6520AB –UN–18OCT88

STRAIGHT FITTING OR SPECIAL NUT TORQUE CHART		
Thread Size	**N•m**	**lb-ft**
3/8-24 UNF	8	6
7/16-20 UNF	12	9
1/2-20 UNF	16	12
9/16-18 UNF	24	18
3/4-16 UNF	46	34
7/8-14 UNF	62	46
1-1/16-12 UN	102	75
1-3/16-12 UN	122	90
1-5/16-12 UN	142	105
1-5/8-12 UN	190	140
1-7/8-12 UN	217	160
NOTE: Torque tolerance is ± 10%.		

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Product: John Deere 690E LC Excavator Operation And Tests Manual
Full Download: https://www.bobmanualstore.com/downloads/john-deere-690e-lc-excavator-operation-and-tests-manual/

Service Recommendations For Flat Face O-Ring Seal Fittings

1. Inspect the fitting sealing surfaces and O-ring. They must be free of dirt or defects.
2. Lubricate O-rings and install into grove using petroleum jelly to hold in place.
3. Index angle fittings and tighten by hand pressing joint together to insure O-ring remains in place.
4. Tighten fitting or nut to torque value shown on the chart. Do not allow hoses to twist when tightening fittings, use backup wrench on straight hose couplings.

IMPORTANT: Tighten fittings to 150% of listed torque value if indexing is necessary or if fitting is attached to an actuating devise.

Tighten fittings to 50% of listed torque value if used in aluminum housing.

FLAT FACE O-RING SEAL FITTING TORQUE*

Nomial Tube O.D.		Thread Size	Swivel Nut		Bulkhead Nut	
mm	in.	in.	N•m	lb-ft	N•m	lb-ft
6.35	0.250	9/16-18	16	12	12	9
9.52	0.375	11/16-16	24	18	24	18
12.70	0.500	13/16-16	50	37	46	34
15.88	0.625	1-14	69	51	62	46
19.05	0.750	1 3/16-12	102	75	102	75
22.22	0.875	1 3/16-12	102	75	102	75
25.40	1.000	1 7/16-12	142	105	142	105
31.75	1.250	1 11/16-12	190	140	190	140
38.10	1.500	2-12	217	160	217	160

*Torque tolerance is +15 -20% unless otherwise specified.

Stud End O-ring Seal Torque for Straight and Adjustable Fittings*

Thread Size	Straight Hex Size	Locknut Hex Size	Straight Fitting or Locknut Toque	
Inch	Inch	Inch	N•m	lb-ft
3/8-24	5/8	9/16	12	9
7/16-20	5/8	5/8	21	15
1/2-20	3/4	11/16	26	19
9/16-18	3/4	3/4	34	25
3/4-16	7/8	15/16	73	55
7/8-14	1 1/16	1 1/16	104	76
1 1/16-12	1 1/4	1 3/8	176	130
1 3/16-12	1 3/8	1 1/2	230	170
1 5/16-12	1 1/2	1 5/8	285	210

*Torque tolerance is +15 -20% unless otherwise specified.

Sample manual. Download All 764 pages at:
https://www.bobmanualstore.com/downloads/john-deere-690e-lc-excavator-operation-and-tests-manual/