ME2503, ME3003, ME3503 & ME3703

Compact Excavator

OPERATOR'S MANUAL

Revision G - 12/11

PART #909773

Model 2503 Specifications

Engine

	SN Before AD00001	SN AD00001 — AD00728
Model	Kubota D1403	Yanmar 3 TNE 88-SNS
Type	Water-cooled 3-cylinder diesel engine	
Capacity	85 cu. in. (1393 cc)	100 cu. in. (1642 cc)
Horsepower in DIN	24 hp (18 kW)	26 hp (19.1 kW)
Revolutions per minute	2200 rpm	
Battery	12V/71Ah	
Diesel Tank	11 gal. (41 L)	
Motor Oil[a]	7.4 qts. (7 L)	7.1 qts. (6.7 L)
Coolant Capacity	2.9 qts. (2.7 L)	6.7 qts. (6.3 L)

a. Capacities shown are approximate; use only oil level check to determine correct oil level.

Hydraulic System

Pump	Double axial-piston pump and gear pump
Pump Capacity	7 gpm (26.4 L/min) + 7 gpm (26.4 L/min) + 4.7 gpm (17.6 L/min)
Operating Pressure (working and driving)	3,481 psi (240 bar) and 3,481 psi (240 bar)
Operating Pressure (swing unit)	2,901 psi (200 bar)
Hydraulic Fluid Cooler	Standard
Hydraulic Reservoir (system capacity)	7 gal. (27 L)

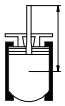
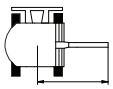
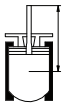
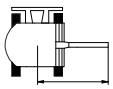
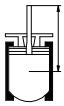
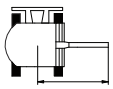
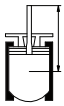
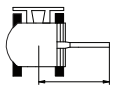
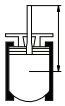
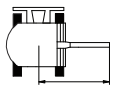
Undercarriage and Swing System

Travel Speed	
Low Speed	1.4 mph (2.2 km/h)
High Speed	2.7 mph (4.3 km/h)
Ground Clearance	10.75” (270 mm)
Swing Speed	9 rpm
Gradability	30° (58%)
Rubber Track Width	10” (250 mm)
Number of Track Rollers	3 per side
Average Ground Pressure	5 psi (0.33 kg/cm^2)

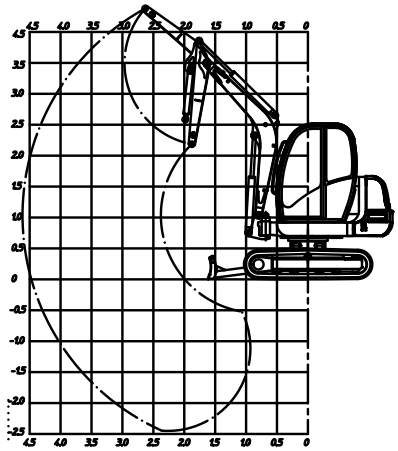
Dozer Blade

Width	54” (1370 mm)
Height	13.25” (340 mm)
Maximum Lift Above Ground	15.25” (390 mm)
Maximum Depth Below Ground	16.25” (415 mm)

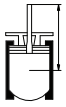
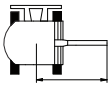
Model 3503 Load Diagram

A			14'9" (4.5 m)		11'6" (3.5 m)		8'2" (2.5 m)		4'11" (1.5 m)	
B										
	Pounds (Kilograms)		Pounds (Kilograms)		Pounds (Kilograms)		Pounds (Kilograms)		Pounds (Kilograms)	
9'10" (3.0 m)	1764* (800*)	882 (400)			1642* (745*)	1135 (515)				
6'7" (2.0 m)	1852* (840*)	717 (325)			1918* (870*)	1058 (480)	2447* (1110*)	1819 (825)		
3'3" (1.0 m)	1962* (890*)	639 (290)	1984* (900*)		2425* (1100*)	992 (450)	3957* (1795*)	1620 (735)		
0 (0 m)	2105* (955*)	661 (300)	2105* (955*)		2866* (1300*)	937 (425)	4696* (2130*)	1477 (670)		
-3'3" (-1.0 m)	2304* (1045*)	750 (340)			2888* (1310*)	926 (420)	4630* (2100*)	1466 (665)	9259* (4200*)	3770 (1710)
-6'7" (-2.0 m)	2535* (1150*)	1058 (480)					3748* (1700*)	1565 (710)	7275* (3300*)	3869 (1755)

All table values are for a machine in a horizontal position on firm ground without a bucket.



Maximum permissible load on dipper arm	
A	Overhang from the center of the turntable
B	Height of load fixing point
*	Lifting capacity hydraulically limited

	Dozer blade support in drive direction
	Dozer blade support 90° to drive direction

If equipped with a bucket or other implements, lift capacity or tilt load is reduced by bucket or implement weight.

Calculation basis: according to ISO 10567.

The excavator's lift capacity is restricted by the settings of the pressure relief valves and the hydraulic system's stabilizing features.

Neither 75% of the static tilt load nor 87% of the hydraulic lift capacity is exceeded.

Do not use the machine to lift or transport people. Never carry riders. Do not allow others to ride on the machine or attachments, because they could fall or cause an accident.

Unless necessary for servicing the engine, the engine hood must not be opened while the engine is running.

Engine exhaust gases can cause unconsciousness and fatalities. Ensure adequate ventilation before starting the engine in an enclosed area.

Operators should also be aware of any open windows, doors or ductwork into which exhaust gases may be carried, exposing others to danger.

Do not overload the machine. See "Load Diagrams", starting on page 1-13, for load limits.

If the machine becomes damaged or malfunctions, stop the machine immediately and lock and tag it. Repair the damage or malfunction before using the machine.

Never jump off the machine. Always leave the machine using the steps and hand-holds. Never get on or off a moving machine.

Exposure to Crystalline Silica

Exposure to crystalline silica (found in sand, soil and rocks) has been associated with silicosis, a debilitating and often fatal lung disease. A Hazard Review (Pub. No. 2002-129) by the U.S. National Institute for Occupational Safety and Health (NIOSH) indicates that a significant risk (at least 1 in 100) of chronic silicosis for workers exposed to inhaled crystalline silica over a working lifetime. NIOSH recommends an exposure limit of 0.05 mg/m3 as a time-weighted average for up to a 10-hr workday during a 40-hr workweek. NIOSH also recommends substituting less hazardous materials when feasible, using respiratory protection, and regular medical examinations for exposed workers.

Parking the Machine

When shutting down the machine for the day, plan ahead so that the excavator will be on a firm, level surface away from traffic and away from high-walls, cliff edges and any area of potential water accumulation or runoff. If parking on an incline is unavoidable, block the crawler tracks to prevent movement. Lower the bucket and dozer blade to the ground. There should be no possibility of unintended or accidental machine movement.

After the machine has been parked properly, shut down the machine according to the "Mandatory Safety Shutdown Procedure" on page 2-2.

Travel Controls May Produce Reversed Travel Operations

Before starting the machine, always check to see which end of the track frame is under the operator's cab. In the normal travel configuration, travel motors are at the rear of the machine, under the engine, and with the dozer blade to the front.

If the operator rotates the swing frame 180º, travel motors will be underneath the operator's cab, and operating travel will be reversed.

Use caution in reverse travel and swing frame rotation.

Use a signal person in high traffic areas and whenever the operator's view is not clear, such as when traveling in reverse.

Additional Travel Precautions

Swing frame control levers should not be operated while traveling.

Do not change selected travel mode (FAST/SLOW) while traveling.

Fold in work equipment so that the outer end of the boom is as close to the machine as possible, and is as low as possible (8"—12" [200 mm—300 mm]) to the ground.

Never travel over obstacles or slopes that will cause the machine to tilt severely. Travel around any slope or obstacle that would cause a tilt greater than 10º.

Snow, Ice and Cold Temperature Operation Precautions

In cold weather, avoid sudden travel movements and stay away from even very slight slopes. The machine can slide sideways on icy slopes.

Snow accumulation can hide potential hazards. Use care while operating and while using the machine to clear snow.

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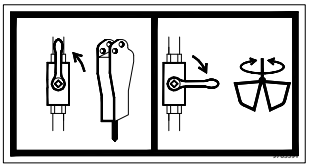

Flow Control Selector Valve Decal

Located inside the control valve compartment.

Indicates restricted-flow and full-flow auxiliary hydraulics selector valve positions.

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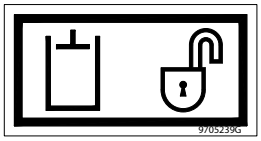
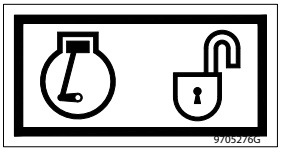


Hydraulic Valve Cover Latch Decal

Located on the right side of the kick plate under the operator's seat.

Pull the handle to open the hydraulic valve cover latch.

9



Engine Cover Latch Decal

Located on the right side of the kick plate under the operator's seat.

Pull the handle to open the engine cover latch.

Forward Travel

Push both travel control levers or pedals forward. The farther these are moved, the faster the machine will travel. See Figure 3-6.

Reverse Travel

Pull both travel control levers or pedals back. The farther these are moved, the faster the machine will travel. See Figure 3-6.

Turning During Travel

Move one control lever or pedal farther than the other one. To turn left while moving forward, move the right control lever farther forward; to turn right while moving forward, move the left control lever farther forward. See Figure 3-6.

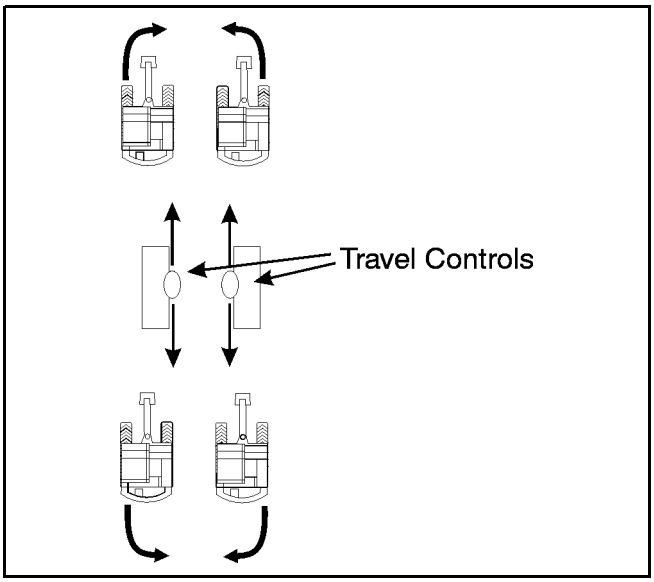


Figure 3-6 Travel Controls

Spin Turn

Move the levers in opposite directions to spin the machine on its axis. To spin turn left, move the right control lever forward while pulling the left control lever to the rear; to spin turn right, move the left control lever forward while pulling the right control lever to the rear. See Figure 3-6.

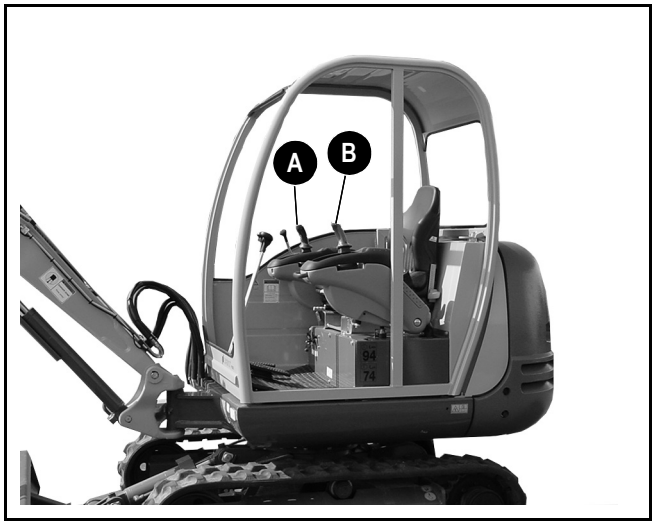


Figure 3-7 Operator's Seat and Joystick Controls

ISO/SAE Selector Valve

Underneath the floor mat is the SAE/ISO-pattern joystick controls. This machine has been set at the factory for SAE-pattern standard operation. If the machine does not function according to the decals and instructions in this manual, move the selector valve to the other position. See Figure 3-8.

Figure 3-8 SAE/ISO Control Selector Valve

4. Allow engine to warm up at idle speed for approximately 10 - 15 minutes to fully warm up all systems.

Cold Weather Engine Starting Procedure

Note: *For easier cold weather starting, install an in-block or tank-type engine heater, which will keep engine block and oil warm.*

Note: *Be sure engine oil is correct type and viscosity for the ambient (air) temperature.*

Note: *Be sure battery is fully charged.*

1. Follow all steps in Engine Start Procedure, above.
2. Advance the throttle to 1/4 engine speed for a faster warm up.
3. As the engine warms up, move the throttle lever to the idle position.

Excavating

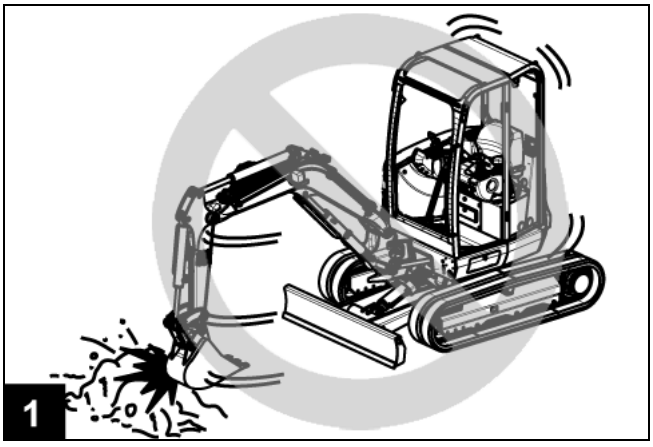
The following section applies to an excavator with a standard bucket, which is used mainly for digging into the ground to loosen, excavate and load loose or solid material.

IMPORTANT

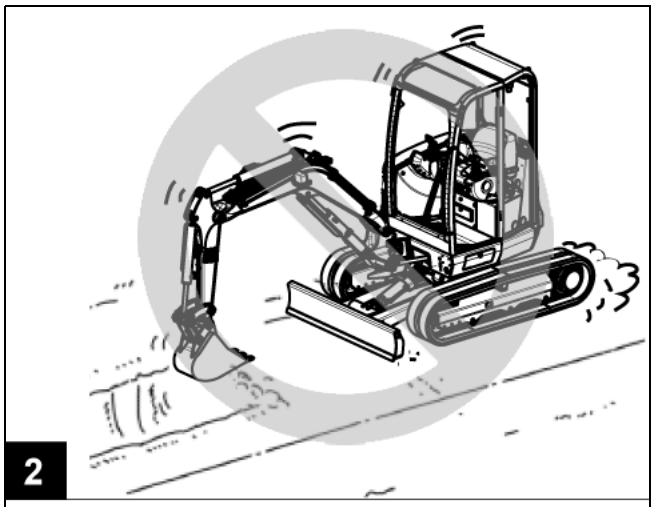
Never use the excavator bucket to perform actions other than digging, grading, loading and excavating. Damage to the excavator could result.

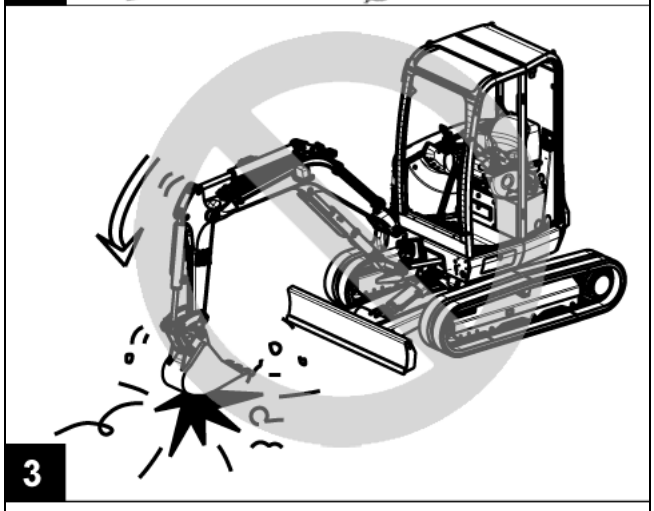
- **Do not use the swiveling force of the excavator so the bucket serves as a hammer or battering ram (1).**
- **Do not lower the bucket into the ground while rotating the upper carriage or driving the excavator (2).**
- **Do not use the falling force of the dipper arm so the bucket serves as a hammer or pile-driver (3).**
- **Do not cause the excavator to tip, bounce or fall to amplify digging or excavating (4) force.**

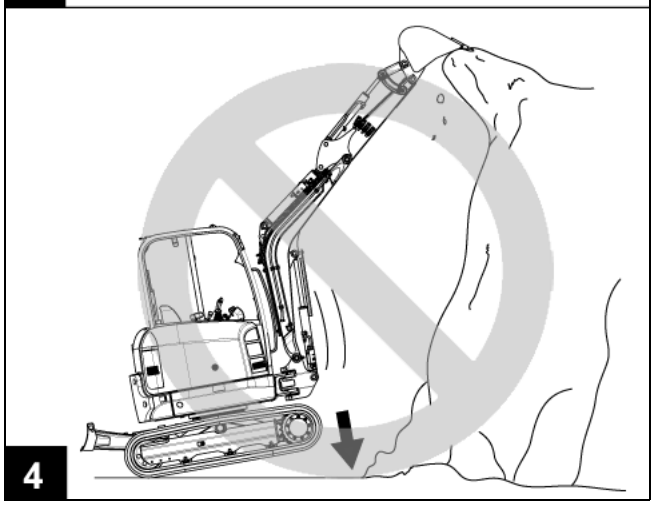
- Use caution when retracting the bucket to prepare for driving or transport. Hitting the bucket into the dozer blade might damage either attachment, especially the bucket teeth.
- The dozer blade is intended for grading only; using it as a battering ram risks serious damage to the blade, its cylinder and connections.



- When excavating, lower the dozer blade to the ground to aid machine stability. It is best to position the dozer blade on the same side as the excavation, but position the blade on the opposite side of the excavation if the situation prevents the former.







Swing Gear Ring

Service Activity	Daily	Weekly	Every 50 Hours	Every 125-250 Hours	Every 500 Hours	Every 1000 Hours	Annually
Check gear ring					x		
Check bearing system		x					x

Cab Heating System

Service Activity	Daily	Weekly	Every 50 Hours	Every 125-250 Hours	Every 500 Hours	Every 1000 Hours	Annually
Check fan			x				
Check system function			x				
Check heating system for leaks			x				
Check seals			x				

Bucket, Boom and Dozer Blade

Service Activity	Daily	Weekly	Every 50 Hours	Every 125-250 Hours	Every 500 Hours	Every 1000 Hours	Annually
Lubricate daily service points	x						
Lubricate weekly service points		x					
Check bucket teeth for wear	x						
Check hydraulic fittings for leaks	x						
Check hydraulic cylinder under load						x	
Check bearing play				x			

CHECKING AND ADJUSTING V-BELT TENSION

1. Position the machine on a level surface.
2. Lower the bucket and dozer blade to the ground. Move the joysticks in all directions to verify the hydraulic system is de-pressurized.
3. Shut off the engine. Remove the ignition key and take it with you. Lock out the controls by raising left control console. Wait for the engine to cool down.
4. Pull the engine cover latch handle (located under the right side of the operator's seat) and raise the engine cover.
5. Carefully inspect the V-belt (1, Figure 4-10) for damage. If the V-belt (1) is damaged, have it replaced by your dealer.
6. Press on the center of a span on the V-belt to check deflection. The belt deflection should be no more than 5/16" (8 mm).
7. If deflection is more than 5/16" (8 mm):
   a. Loosen adjustment bolt (2) and rotate the alternator (3) in the direction of the arrow until V-belt tension is correct.
   b. Tighten adjustment bolt (2) and re-check V-belt tension.

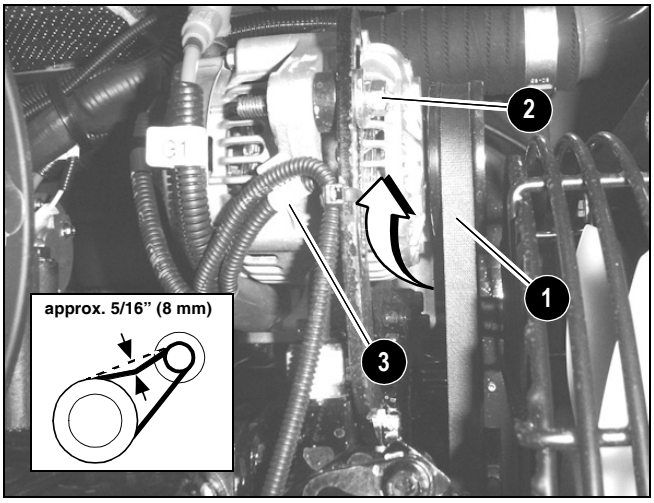


Figure 4-10 Checking & Adjusting V-belt Tension

ELECTRICAL SYSTEM

⚠ WARNING

Inspect and check the machine's electrical equipment at regular intervals. Defects, such as loose connections or scorched cables much be repaired before using the machine.

Work on the machine's electrical system must be done only by a trained technician.

Fuses

On machines with serial numbers AD00001 and up, The fuse panel (1, Figure 4-11) is located below and to the right of the operators seat, in the kick panel. On machines with serial numbers before AD00001, the fuse panel (1, Figure 4-11) is located on the right-hand console, toward the rear, below the switches.

To replace a fuse, remove the panel cover and pull the old fuse from the socket. Install a new fuse of the same rating and re-install the fuse panel cover.

Refer to "Fuse Panel" on page 1-8 for fuse identification and assignments.

IMPORTANT

Blown fuses indicate electrical system malfunctions. Determine what caused the fuse to blow and repair the problem before replacing the fuse.

CAB/CANOPY REMOVAL/ REPLACEMENT

⚠ WARNING

- **Always tighten cab lock-down hardware before driving or using the machine.**
- **Always close the cab door before lifting the cab/canopy.**
- **Stay clear from underneath the cab when it is lifted.**

Cab/Canopy Removal Procedure

1. Position the machine to allow for removal of the cab/canopy by a lifting device of sufficient capacity.
2. Follow "Mandatory Safety Shutdown Procedure" on page 2-2.
3. Disconnect cab/canopy wiring at plug (B, Figure 4-23) (X28), located next to the seat at the right rear of the cab/canopy.
4. On cabs, disconnect the windshield washer hose (C) from the windshield washer reservoir tank.located at the front right inside the engine compartment.
5. Remove fasteners (E) at the rear corners of the cab/canopy.
6. Lift the front corners of the floor mat and remove fasteners (F) at the front corners of the cab/canopy.

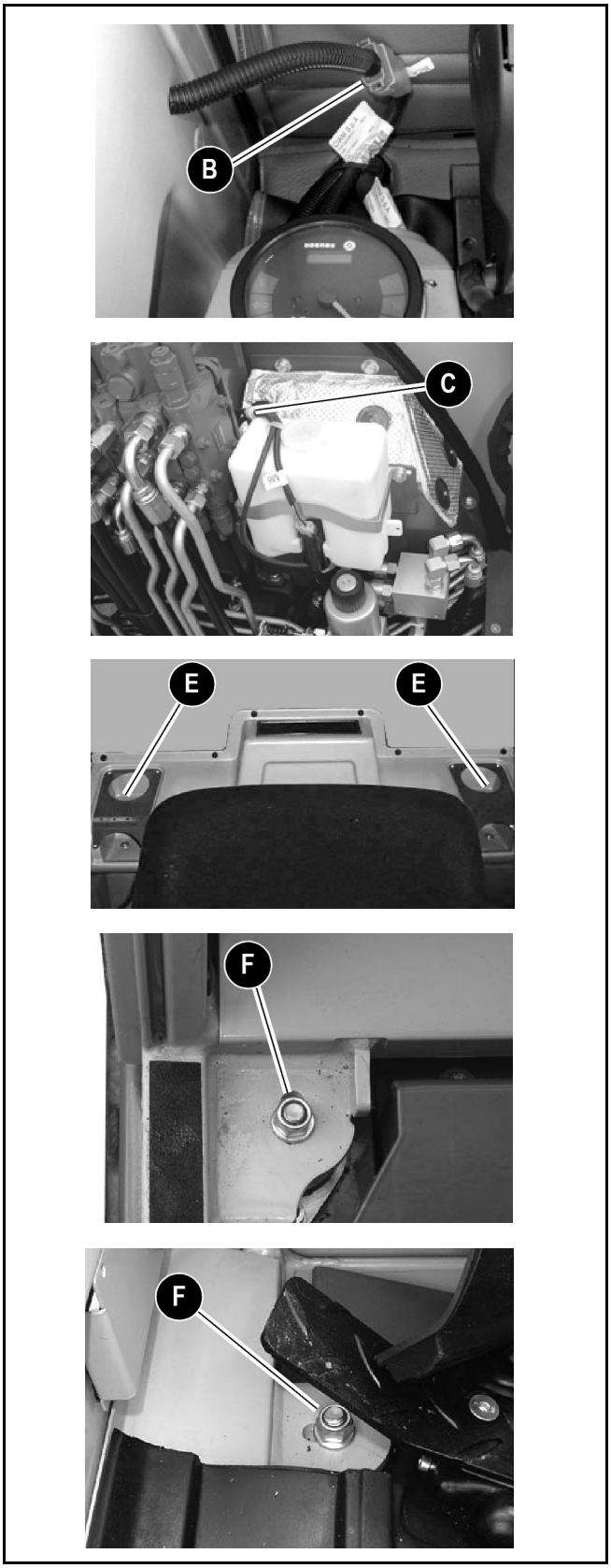


Figure 4-23 Cab/Canopy Removal/Installation