

SECTION 8

MAINTENANCE & SPECIFICATIONS

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MAINTENANCE 8.1

8.1 Preventative Maintenance Service Schedule

ITEM	SERVICE REQUIRED	8 HOURS	50 HOURS	150 HOURS	400 HOURS	1000 HOURS
Engine Oil	Check level. If necessary add 10W30 API Classification SE / CD oil.					
Radiator (Water cooled only)	Check level. If necessary fill with 50 / 50 mixture of ethylene glycol and water. Check for leaks, dirt build up and bent cooling fins. If necessary, straighten cooling fins and clean radiator with compressed air (40psi [27Kpa] max) or flush with water.					
Hydraulic Oil	Check level. If necessary add 10W30 API Classification SE / CD oil.					
Oil Cooler	Check cooling fins for obstruction. Clean with compressed air or water.					
Air Cleaner	Check air restriction indicator. Replace filter element(s) as required when the air restriction indicator dictates.					
Tires and Wheels	Check tires for pressure and damage. Inflate standard tires to 50 psi (345 Kpa), flotation tires to 40 ~ 45 psi (276 ~ 310 Kpa). Torque wheel nuts to 100 ~ 110 lbs / ft (136 ~ 149 Nm).					
Safety Equipment	Check the following safety equipment for proper operation and condition: Seat belt, restraint bar, hydraulic control locks, parking brake, boom supports, quick-tach locks, side screens, glass, shields and safety treads. Repair or replace as needed.					
Decals	Check for damaged or missing safety and instruction decals. See the Owner's / Operator's manual. Replace decals as required.					
Lubrication	Grease all hinge pin fittings until excess shows.					
50 Hour Service	Perform complete 50 hour service. See Section 8.1.4.					
Preventative Maintenance	It is recommended as a preventative maintenance that the 50 hour service be repeated every 150 hours after the initial 50 hour service. See 8.1.4.					
Engine Fuel Filter	Replace the engine fuel filter. See Section 7.1.					
Hydraulic Reservoir	Change the hydraulic oil and replace the suction element. Replenish reservoir with 10W30 API Classification SE / CD oil. See Section 1.					
Final Drive	Change the final drive lubricating oil. See Section 3					
Engine Cooling System	Drain, flush and replenish the engine coolant. See Section 7.					

Note: For complete engine service details refer to Section 7 of this manual. If further information is required refer to the engine manufacturers service manual.

WARNING

To avoid personal injury, service repairs must be performed by an authorized Thomas dealer.

MAINTENANCE 8.1

8.1.2 SERVICE ACCESS

1. 2A Boom Support

For safety while performing regular service or maintenance work, the loader is equipped with boom support pins. The boom support pins when extended prevent the boom arms from dropping if hydraulic pressure is relieved or the hydraulic controls are accidentally cycled.

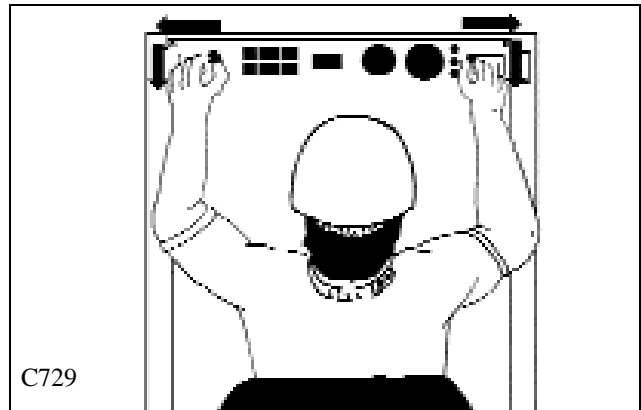
IMPORTANT

Fully retract boom support pins before raising or lowering boom arms.

To operate the boom support, first remove any bucket or attachment from the quick - tach; raise the boom arms to full height. Raise the boom support handle (fig. C729) up and push out toward boom arms to extend the boom support pins (fig. C694) Slowly lower the boom arms down on to the pins.

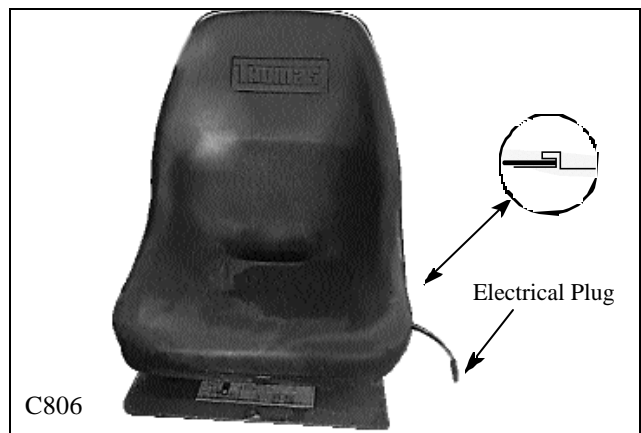
WARNING

To avoid personal injury: Do not leave boom arms up unless the boom supports are engaged.



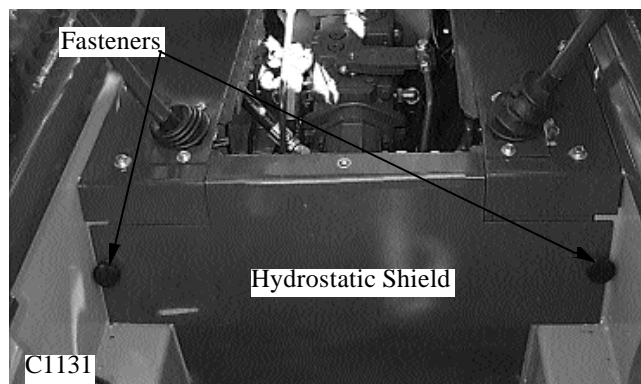
1. 2B Seat Removal

The seat and seat plate can be removed to provide access to the controls, hydraulic and hydrostatic components. To remove the seat assembly, remove the fasteners located at the front of the seat. **BE SURE TO DISCONNECT THE ELECTRICAL PLUG!** Lift the seat assembly out of the machine. When installing the seat, be sure the seat plate is locked in place at the rear (fig. C806).



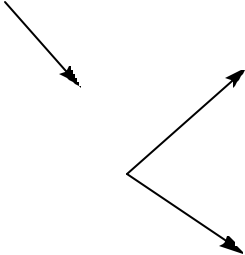
1. 2C Hydrostatic Shield

The hydrostatic shield can be by removing the two (2) fasteners (fig.C2358).

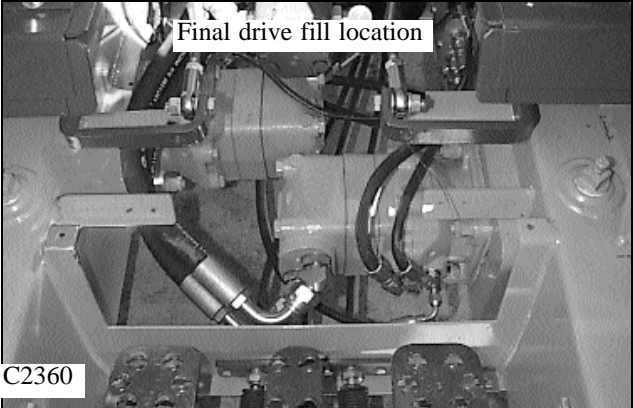
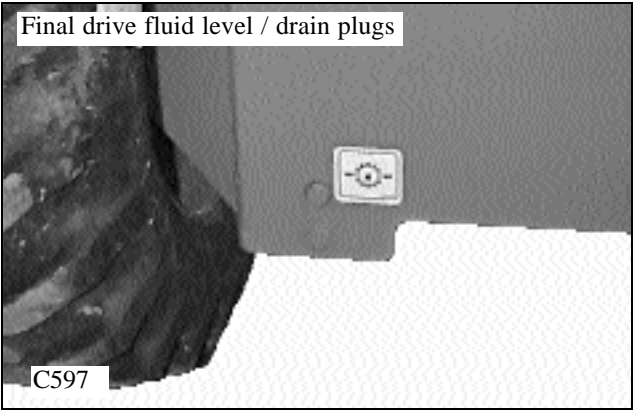


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Battery access panel



C2483

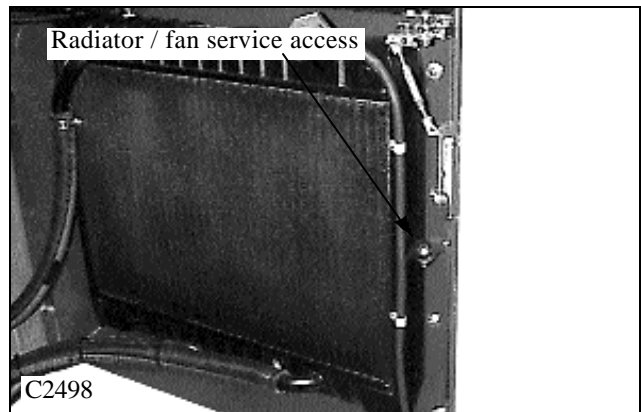


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8.1.2 Service Access

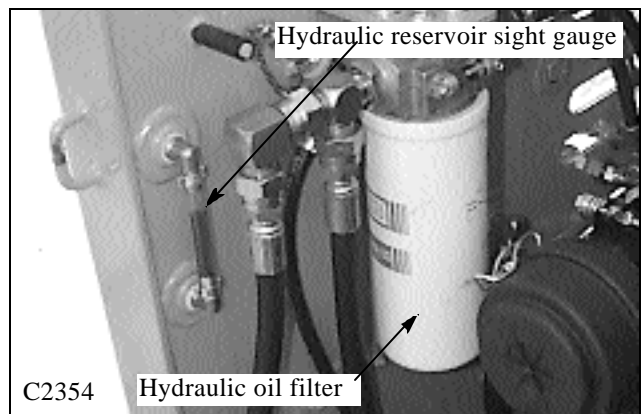
1. 2H Radiator / Cooling Fan

Access to the back side of the radiator and the engine cooling fans is gained by opening the rear door, removing the retaining bolt and swinging the radiator open, away from the door. (fig. C2498). Be sure to check for possible electrical and cooling hose clearance while swinging the radiator from the door.



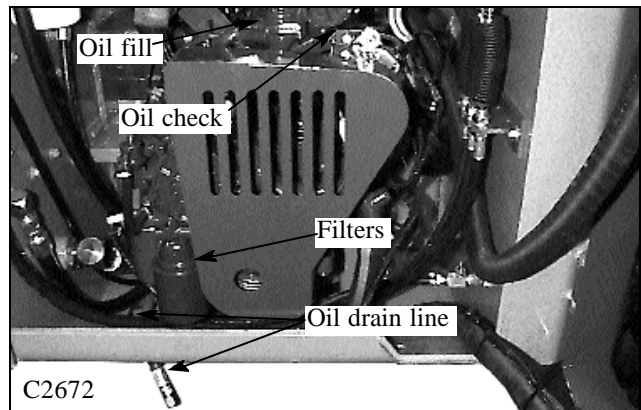
1. 2J Oil Reservoir

The oil reservoir is located at the rear, left side of the loader. It is part of the mainframe structure. The reservoir level is accessed by opening the rear door and visually checking the sight gauge. (fig. C2354). The reservoir fill is located at the top of the reservoir. The hydraulic filter is also located here.



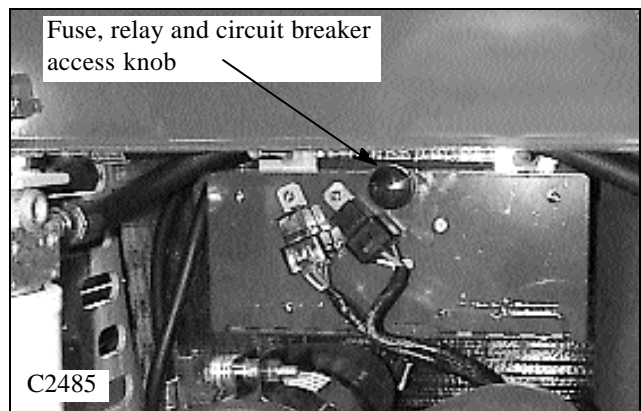
1. 2K Engine

The engine is accessed by opening the rear door and raising the engine compartment cover. (fig. C2672). The oil level dipstick is located next to the alternator assembly. Oil fill is located on top of the engine rocker arm cover. The engine is equipped with a remote line for draining the engine oil. The oil filter and fuel filter are located to the lower left of the engine assembly.



1. 2L Fuse panel

The fuse panel is located in the engine compartment. Open the rear door and raise the engine compartment cover. Open the panel by removing the retaining bolt or knob. A decal is located inside the panel showing proper fuse size and use.



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THOMAS

MAINTENANCE 8.1

8.1.3 DAILY SERVICE CHECK

1.3A Radiator Service

With the engine cool remove the radiator cap and check the coolant level. If adding coolant is required fill with a 50% mixture of ethylene glycol and water for cold weather protection.

The radiator cooling fins must be kept free of debris otherwise overheating of the engine will occur. Inspect the radiator cooling fins for damage or buildup of debris. Repair any damage and if necessary flush the radiator with compressed air to remove debris.

1.3B Hydraulic Oil Level

Check the oil level with the machine on a level surface with the lift arms down and the bucket flat on the ground. Open the rear door and check the oil level sight glass (See Section 1). If oil is apparent the oil level is satisfactory.

If necessary to add oil, remove the reservoir cap located at the top of the oil reservoir and add oil until oil appears in the oil level sight glass.

Use a good quality 10W30 oil which meets the API classification SE/CD only.

1.3C Air Cleaner

The loader is equipped with an air restriction service indicator.

Should the indicator window color change from green to red, the air cleaner system is restricted or clogged. Service the air cleaner system immediately.

Check that all hose clamps are tight and the hose is undamaged. Check the vacuator valve for damage.

1.3D Tires and Wheel Nuts

Inspect tires for wear or damage. Check and inflate tires to correct pressure:

8.50 X 15 . . . 30 -35 P.SI. (207 - 241 KPa)

10.50 x 15 . . . 30 -35 P.SI. (207 - 241 KPa)

To prevent shearing of the wheel studs and rim damage check wheel nuts for proper torque 100 -110 lbs. ft. (136 - 149 N.M.) daily. After changing a rim, check wheel nuts hourly, until the reading stabilizes.

1.3E Safety Equipment

Check all safety equipment for proper operation and condition; seat belt, boom support, seat bar, foot pedal lock, parking brake, quick tach lock, shields and safety treads. Lubricate all linkages, springs and pivot points with a silicone based lubricant. Repair or replace if necessary.

1.3F Decals

Check the condition of all safety and instruction decals. Replace any damaged or missing decals. Refer to the parts book or owners manual for decal locations, description and part numbers.

1.3G Lubrication

There are sixteen grease fittings located in the loader that require lubrication every eight hours. (See Section 6) Lubricate with a good quality multi-purpose lithium based grease. apply grease until excess shows.

Refer to the service schedule for complete service details. the sixteen lubrication points are:

Rear Boom Pivots (2)

Boom Cylinder Bushings (4)

Bucket Cylinder Bushings (4)

Boom Supports (2)

Quick - Tach Pivot and Lock Pins (4)

1.3H Engine Oil Level

To check the oil level, stop the engine with the loader on level ground, open the rear door and remove the dipstick.

Keep the oil level between the full and low mark on the dipstick (See Section 7). Do not fill above the full mark.



MAINTENANCE 8.1

8.1.4 50 HOUR SERVICE CHECK

The following service check is to be performed by your dealer after the first 50 hours of operation.

1 Engine

1.1 Oil Filter:

Change the engine oil filter. Use only original replacement parts. Refer to section 7 for installation details. Change the oil filter every 150 hours thereafter.

1.2 Engine Oil:

Change the engine oil. Use only 10W30 API classification SE/CD oil. Refer to section 7 for procedure. Change engine oil every 150 hours thereafter.

1.3 Coolant Level:

Check that the coolant is to the proper level. The cooling system is filled with a 50% mixture of ethylene glycol and water.

1.4 Radiator for Leakage and Dirt:

If necessary flush the radiator with compressed air and / or water. (40 psi [27 Kpa] max) Dirt buildup on the radiator cooling fins can cause both engine and hydraulic system overheating. Check rubber gasket on radiator to door baffle.

1.5 Fan Belt Tension and Condition:

Check fan belt for cuts or wear, if necessary replace. Check tension and adjust as shown in section 7.

1.6 Fuel System for Leaks:

Make a visual inspection of fuel system for leaks and potential hazards such as fuel line(s) touching exhaust manifold, flywheel, etc. Replace fuel filter every 400 hours.

1.7 Air Intake and Cleaner System:

Follow the manufacturers inspection procedures. Check that the filter indicator is not indicating that filter service is required. Check all hose clamps and check the air inlet outlet hoses for cracks or chaffing.

1.8 Exhaust System:

Visually inspect the exhaust system and ensure all clamps are secure and the manifold bolts/nuts are tight. Check muffler for carbon and soot build up and plugging. If necessary clean or replace.

1.9 Engine Speed:

Check and if necessary adjust engine R.P.M. Maximum no load high idle: 3000 RPM.

2 Hydraulic/Hydrostatic

2.1 Hydraulic Oil Filter:

Change the hydraulic oil filter. Change the hydraulic filter every 150 hours after the initial change. Lubricate the filter cartridge seal with system fluid.

2.2 Hydraulic Oil Level:

If oil is visible in the oil level sight glass the level is satisfactory.

If additional oil is required use only 10W30 API classification SE/CD oil. Fill to the line marked next to the sight gauge.

2.3 Hoses and Pipes:

Make a visual inspection of all hydraulic lines and fittings for leaks, chaffing and tightness. Check that steel lines do not touch one another and clamps are tight.

2.4 Cylinders:

Inspect cylinders for leaks. Extend cylinders and check for rod damage. Check pivot pins and bushings for wear.

2.5 Hydraulic Functions:

Check that the following operate properly: control valve float position, auxiliary hydraulic detent, hydraulic cylinders.

2.6 Pumps & Motors:

Inspect pumps and motors for leaks.

WARNING

To avoid personal injury: never work under raised boom arms without the boom supports properly engaged. Shut off the engine and remove the key to prevent accidental engagement of the engine. Never repair or tighten hydraulic hoses or fittings with the engine running or the system under pressure.

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3 Final Drive

3.1 Oil Level:

Check lubricating oil level. If necessary add 10W30 API classification SE/CD oil.

3.2 Drive Chain Condition:

Check drive chains for any sign of wear or damage. Check lubrication oil in housing for signs of contamination.

3.3 Hydrostatic Motor Mounting Bolts:

Check torque 80 ft. lbs. (108.2 N.M.)

3.4 Axle Bearing End Play:

Axle bearings are pre - loaded and must have no end play. Inspect and adjust if necessary.

4 Controls and Safety Equipment

4.1 Control Levers, Operation and Linkage:

Check that the steering levers operate freely without binding, they return to neutral when released and the machine travels in a straight line with both levers in forward position. Replace worn rod end as required.

4.2 Hydraulic Controls, Operation and Linkage:

Check that the hydraulic controls operate freely without binding. Before leaving the operator's seat, ensure the controls are locked, raise the safety bar and unbuckle the seat belt. Lubricate or replace linkage as required.

4.3 Engine Throttle Control:

Check that the throttle control operates freely without binding or slackening off due to vibration. Check throttle travel to ensure full engagement of high and low engine idle settings.

4.4 Parking Brake:

Check that the parking brake engages and completely disengages. The park brake automatically engages with seat bar up.

4.5 Boom Supports:

Check that the boom supports operate without binding.

4.6 Quick - Tach, Operation & Linkage:

Ensure the quick - tach linkage operates smoothly without binding and the safety locks engage the attachments completely. Check the springs for broken coils.

4.7 Seat Belt:

Check seat belt condition. If necessary replace.

For your safety, the loader is equipped with electrically activated safety devices through the seat and seat belt. See Section 5.

5 Electrical

5.1 Battery:

Maintenance Free.

5.2 Battery Terminals:

Check battery terminals for corrosion. If necessary, clean.

5.3 Operation of Starter:

Engage and disengage the starter several times to ensure it's working properly. To prevent starter damage do not engage for more than 15 seconds. Allow 1 minute between starting attempts for cooling the starter.

5.4 Operation of Electrical Equipment:

Make a complete check of all electrical equipment, gauges, warning devices, pre-heat indicator, work lights, seat switch and belt and all optional equipment to ensure they are operating correctly.

6 Grease / Lubrication

Lubricate the following points with a good quality grease. Numbers marked () indicate the number of fittings at each location.

Rear Boom Pivots (2)

Boom Cylinder Bushings (4)

Bucket Cylinder Bushings (4)

Boom Supports (2)

Quick - Tach Pivot and Lock Pin (4)

7 General

7.1 Tire Pressure:

Check the tire pressure and if necessary inflate to the following pressures: 8.50 x 15 @ 30 - 35 PSI (207 - 241 KPa), 10.50 x 15 @ 30 - 35 PSI (207 - 241 KPa).

7.2 Wheel Nut Torque:

Check and torque wheel nuts to 100 - 110 ft. lbs. (136 - 149 N.M.).

7.3 Condition of ROPS (Cab):

Inspect the condition of the ROPS mounting isolators. Replace isolators if deteriorated. Inspect both the seat and seat belt. Ensure all safety and instruction decals are in place. Inspect sound insulation, side windows and door operation for machines equipped with cab enclosure kits.

7.4 Condition of Shields and Safety Equipment:

Inspect and ensure all shields are in place and securely fastened. Inspect and ensure all safety equipment is working properly. Ensure owners and operators manual, safety manual and all safety and instruction decals are in place. If necessary, replace. If the safety controls are malfunctioning or require adjustment consult your **Thomas** Equipment Dealer for service.

7.5 General Condition:

Make a general inspection of the machine looking for loose or missing parts, oil leaks, etc.



TROUBLESHOOTING 8.2

8. 2A Hydrostatic Drive

Symptom	Cause	Remedy
No power on one side (both directions)	Reservoir low on oil	Replenish with 10W30 API SE/CD oil. Check for hose or fitting leak.
	Disconnected control linkage	Reconnect and adjust linkage.
	Groove pin sheared on pump pintle lever	Replace. Check pintle lever for loose bolt or excessive play.
	High pressure line failure	Replace line. Ensure new line fits without being forced. If necessary stress relieve.
	Drive chain failure Adjust tightener tension.	Replace chain or connection link.
	Motor shaft or key failure Check mounting bolts.	Inspect and repair defective parts. motor
	Excessive internal leakage in and/or motor pump	Inspect and repair defective unit. Flush all lines and tank. Replace filter. Check on type of fluid used and engine RPM.
No power on one side (one direction only)	Defective relief valve	Replace defective valve.
	Damaged ball check	Disassemble and repair.
No power on both sides (also loss of hydraulic power)	Reservoir low on oil	Replenish with 10W30 API SE/CD Check for hose or fitting leaks
	Universal Joint failure between engine and pump	Inspect and repair damaged parts Flush all lines and tank, change filter. Check on type of fluid used and engine RPM
	Damaged ball check	Disassemble and repair
Gradual loss of power as machine warms up	Excessive internal leakage in pump and/or motor	Consult dealer or Thomas Service Dept.

8.2A Hydrostatic Drive

Symptom	Cause	Remedy
System erratic and/or noisy	Air in system due to low oil level in reservoir	Replenish with 10W30 API SE/CD oil.
	Air in system due to leak at suction fitting	Check fittings and tighten.
	Internal pump or motor wear caused by overspeeding	Consult your dealer or Thomas Service Dept.
	Excessive play in linkage or pintle lever	Adjust linkage and tighten or replace pintle lever.
Machine will not travel in a straight line in high range	Control levers binding	Check that shields are not stopping lever from full travel.
		Check for linkage binding at spring mount. Adjust tracking.

8.2B Final Drive Transmission

Symptom	Cause	Remedy
Final drive transmission noisy	No lubricating oil	Check and bring oil to the proper level. Use 10W30 SE/CD engine oil
	Parking brake damaged or out of adjustment	Inspect and adjust or replace damaged parts
	Axles have too much end play	Pre-load axle bearings removing all end play
	Chain loose	Replace the chain

8.2C Park Brake

Symptom	Cause	Remedy
Brake will not hold machine	Brake valve will not release pressure	Verify position of override
	Brake parts damaged or worn	Consult your Dealer or Thomas Service Dept.
	Brakes are disengaged	Engage parking brake
Brake will not release machine	No power to brake valve solenoid	Check fuse, If fine, consult Dealer or Thomas Service Dept.
	No pressure in supply line to brake valve	Consult your Dealer or Thomas service Dept.
	Brakes are engaged	Release brake

TROUBLESHOOTING 8.2

8.2D Hydraulic System

Symptom	Cause	Remedy
Hydraulic action jerky	Reservoir low on oil	Replenish with 10W30 API or 20W50 SE/CD oil.
	Air in hydraulic system	Check for leak between reservoir and pump. Bleed System by extending and retracting lift cylinders several times.
	Anti-cavitation check valve not functioning	Inspect and repair or replace
Boom raises slowly at full engine rpm	Reservoir low on oil	Replenish with 10W30 or 20W50 API SE/CD oil
	Foot pedal linkage binding	Inspect and adjust
	Auxiliary foot pedal engaged	Disengage
	Engine RPM too slow	Check RPM and reset
	Anti-cavitation check valve spring broken	Replace
	Pressure relief valve in control valve faulty	Check pressure if necessary - adjust
	Internal leakage in pump due to wear	Check pump flow and repair or replace as necessary
	Oil bypassing one or both lift cylinder piston seals	Install new piston seal kits
Lift or tilt cylinders will not support a load	External leak between or at control valve and cylinders	Check for leaks and correct
	Control valve spool not centering	Check for sticking foot pedal linkage
		Check for broken or stuck return spring on valve spool
Oil leaking by one or both cylinder piston seals	Install new piston seal kits	
Hydraulic oil overheating	Reservoir low on fluid	Replenish with 10W30 or 20W50 API SE/CD oil
	Oil cooler plugged or dirty (also check engine radiator)	Clean cooling fins

8.2D Hydraulic System

Symptom	Cause	Remedy
Loss of hydraulic power (no flow from gear pump)	Reservoir low on fluid hose or fitting leak.	Replenish with 10W30 or 20W50 API SE/CD oil. Check for leaks.
	Universal Joint between engine and pump failure	Inspect and replace damaged parts. Check for misalignment between engine and pumps.
	Spline coupling failure between front and rear hydrostatic pump	Inspect coupling for sheared splines. Also check pump shaft bearings.
	Hydraulic gear pump not functioning	Inspect and repair.
Loss of hydraulic power (flow from gear pump)	Reservoir low on fluid	Replenish with 10W30 or 20W50 API SE/CD oil
	Foot pedal linkage disconnected or binding	Inspect and adjust.
	Auxiliary foot pedal engaged	Disengage
Hydraulic oil overheating	Relief valve failure in control valve	Check pressure and adjust.
	Auxiliary foot pedal engaged	Disengage
	Engine RPM too slow	Check RPM and adjust
Foot pedals do not operate smoothly	Incorrect temperature sensor	Replace
	Foot pedal linkage out of adjustment	Adjust foot pedal linkages
Foot pedals do not operate smoothly	Foot pedal linkages need lubrication	Lubricate with a silicone based lubricant
	Cable Binding	Check routing for kinks etc.



TROUBLESHOOTING 8.2

8.2E Control Levers

Symptom	Cause	Remedy
Control levers will not center	Linkage out of adjustment	Adjust, check for wear at rod ends, loose counter nuts
	Linkage disconnected	Reconnect, check for wear at rod ends, loose counter nuts
	Centering spring broken	Replace
	Linkage binding	Binding of spring bushing in spring box. Align spring box with linkage. Control levers binding with safety shields or sound insulation Adjust Control lever bearings binding in lever assy. Inspect replace or clean as required
Machine operates erratically	Control lever linkage loose	Inspect linkage for wear at rod ends, loose counter nuts
	Bolt in pintle lever loose or broken	Replace bolt. Ensure bolt clamping lever to pump shaft is tight See troubleshooting hydrostatic system
Machine loses power while turning		See troubleshooting hydrostatic system
Machine will not travel in straight line	Linkage binding	Adjust
	Control lever travel out of adjustment	Adjust
Control levers do not operate smoothly	Internal pump and / or motor leakage	See troubleshooting hydrostatic system
	Control lever linkage out of adjustment	Adjust control lever linkages
	Control lever linkages need lubrication	Lubricate

8.2F Electrical

Symptom	Cause	Remedy
Engine will not crank over	Battery failure	Check battery, charge or replace
	Battery cable failure	Check for loose or corroded connectors. Tighten and clean as required. Use dielectric grease to prevent corrosion. Check continuity of cables and replace if defective
	Starter failure	Repair or replace
	Fuse burnt	Check and replace
	Defective relay	Check relay continuity if defective, replace
	Ignition switch failure	Check continuity and if defective, replace
Engine cranks over, but will not start	Auxiliary hydraulics engaged	Engine will smoke but not run unassisted by starter. Disengage aux. hydraulics
	Defective glow plug relay	Check continuity and if defective, replace
	Defective glow plugs	Check continuity and if defective, replace
	Broken connection or defective wire	Check continuity of the circuit not functioning properly in both engine and ROPS harness.
	No fuel	Check fuel levels and system
Loader starts, but hyd. controls will not release	Electro solenoid not releasing valve spools	Defective solenoid or binding solenoid lock.
		Check continuity of connectors and wire.
Engine will not stop when the key is turned OFF	Defective ignition switch	Check and replace
	Mechanical damage of the governor	Check and repair or replace

TROUBLESHOOTING 8.2

8.2G Diesel Engine

Symptom	Cause	Remedy
Engine does not start	No fuel	Replenish fuel
	Air in the fuel	Vent air
	Water in the fuel	Change fuel and repair or replace fuel system
	Fuel pipe clogged	Clean
	Fuel filter clogged	Clean or change
	Excessively high viscosity of fuel or engine oil at low temperature	Use the specified fuel or engine oil
	Fuel with low octane number	Use the specified fuel
	Fuel leak due to loose injection pipe retaining nut	Tighten nut
	Incorrect injection timing	Adjust
	Fuel cam shaft worn	Replace
	Injection nozzle clogged	Clean
	Injection pump malfunctioning	Repair or replace
	Seizure of crankshaft, camshaft, piston, cylinder liner or bearing	Repair or replace
	Compression leak from cylinder	Replace head gasket, tighten cylinder head bolt, glow plug and nozzle holder
	Improper valve timing	Correct or replace timing gear
Piston ring and liner worn	Replace	
Excessive valve clearance	Adjust	
Starter does not run	Battery discharged	Charge
	Starter malfunctioning	Repair or replace
	Key switch malfunctioning	Repair or replace
	Wiring disconnected	Connect
Engine revolution is not smooth	Fuel filter clogged or dirty	Clean or change
	Air cleaner clogged	Clean or change
	Fuel leak due to loose injection pipe retaining nut	Tighten nut
	Injection pump malfunctioning	Repair or replace
	Incorrect nozzle opening pressure	Adjust
	Injection nozzle stuck or clogged	Repair or replace
	Fuel overflow pipe clogged	Clean
	Governor malfunctioning	Repair
Either white or blue exhaust gas is observed	Excessive engine oil	Reduce to the specified level
	Low grade fuel used	Repair or replace
	Fuel filter clogged	Adjust
	Air cleaner clogged	Adjust top clearance
Either black or dark gray exhaust gas is observed	Overload	Lessen the load
	Low grade fuel used	Use the specified fuel
	fuel filter clogged	Clean or change
	Air cleaner clogged	Clean or change



TROUBLESHOOTING 8.2

8.2G Diesel Engine







Symptom	Cause	Remedy
Excessive lubricant oil consumption	Piston rings gap facing the same direction	Shift gap direction
	Oil ring worn or stuck	Replace
	Piston ring groove worn	Replace
	Valve stem and guide worn	Replace
	Crankshaft bearing and crank pin bearing worn	Replace
Fuel mixed into lubricant oil	Injection pump plunger worn	Replace pump element or pump
	Injection pump broken	Replace
Water mixed into lubricant oil	Head gasket defective	Replace
	Cylinder block or cylinder head flawed	Replace
Low oil pressure	Engine oil insufficient	Replenish
	Oil strainer clogged	Clean
	Relief valve stuck with dirt	Clean
	Relief valve spring weakened or broken	Replace
	Excessive oil clearance of crankshaft bearing	Replace
	Excessive oil clearance of crank pin bearing	Replace
	Excessive oil clearance of rocker arm bearing	Replace
	Oil passage clogged	Clean
	Oil pump defective	Replace
Different type of oil	Use the specified oil type	
High oil pressure	Relief valve defective	Replace
	Engine oil insufficient	Replenish
Engine overheated	Fan belt broken or elongated	Change or adjust
	Cooling water insufficient	Replenish
	Radiator net and radiator fin clogged with dust	Clean
	Inside of radiator corroded	Clean or replace
	Cooling water flow route corroded	Clean or replace
	Radiator cap defective	Replace
	Overload running	Loosen the load
	Head gasket defective	Replace
	Incorrect injection timing	Adjust
Deficient output	Unsuitable fuel used	Use the specified fuel
	Incorrect injection timing	Adjust
	Engine's moving parts seem to be seizing	Repair or replace
	Uneven fuel injection	Repair or replace injection pump
	Deficient nozzle injection	Repair or replace nozzle
	Compression leak	Replace head gasket, tighten cylinder head bolt, glow plug and nozzle holder
Battery quickly discharges	Battery electrolyte insufficient	Replenish distilled water
	Fan belt slips	Adjust belt tension or change
	Wiring disconnected	Connect
	Rectifier defective	Replace
	Alternator defective	Replace
	Battery defective	Change

SPECIAL TOOLS 8.3

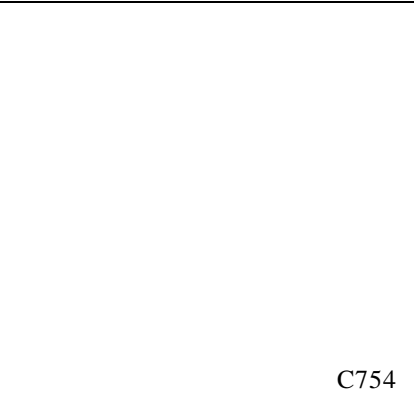
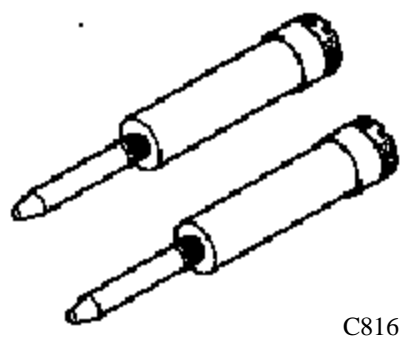
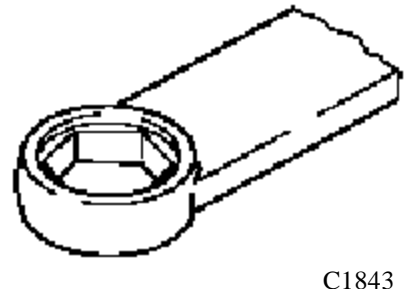
P / N	Illustration	Description	Model
955280		AXLE INSTALLATION TOOL - To install axle in final drive housing.	T103 T135 T133'S'
962201* 955281		SEAL INSTALLATION TOOL - To install axle seal in final drive housing. Quantity - 3 required	*T103S* T103 T135 T133'S'
955283* 957372		AXLE EXTRACTOR TOOLS - To remove axle from final drive housing.	*T103* *T135* T173HL T173HLS' T173HL'S'II T203HD T233HD T243HDS
960986* 955287		SEAL INSTALLATION TOOL - To install axle seal in final drive housing. Quantity - 1	*T83 / 95S* T173 T233
958674		SEAL INSTALLATION TOOL - To install axle seal in final drive housing. Quantity - 2 required.	T173HL T173HLS' T173HL'S'II T203HD T233HD T243HD'S
960997		CHAIN TENSION TOOL - To test chain tension.	T103 T135 T133'S'
U-1288	Universal Tool Kit	1 each. Combination wrench 7/16", 1/2", 9/16", 11/16" 3/4", 1 1/16", 1 1/4". Sockets, 1", 1/2" drive, 7/8", 1/2" drive, tool pouch, allen wrench 5/32" and 1/8"	ALL MODELS



SPECIAL TOOLS 8.3




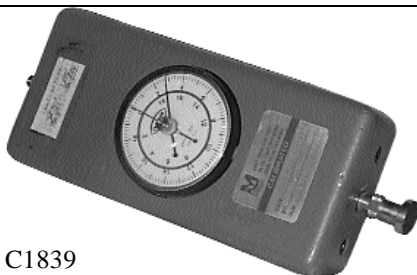


P / N	Illustration	Description	Model
916-30042-01 25197		<p>DRY LINER PULLER - Used for removing and installing the dry liner of the engine.</p> <p>Consists of: 304742 (64mm); 304743 (68mm); 30744 (75mm) 304745 (76mm); 304746 (82mm); 304747 (105mm); Removing Plates; 304748 Installing Plate</p>	Kubota
07909-30202-01 25198		<p>DIESEL ENGINE COMPRESSION TESTER - Used to measure diesel engine compression and diagnosis of need for major overhaul.</p>	Kubota
07916-30820-01 25199		<p>CRANKSHAFT NUT SOCKET - Used to take off and fix the crankshaft nut. (46 mm).</p>	Kubota
07916-30840-01 25200		<p>NOZZLE REMOVER SOCKET - Used to unfasten the screw type nozzle holders.</p>	Kubota
70090-01125-01 25201		<p>NOZZLE DISASSEMBLY SOCKET - Used in place of a vice for disassembly and repair of nozzles.</p>	Kubota
960456		<p>HYDRAULIC FLOW AND PRESSURE GAUGE ASSEMBLY.</p>	All Loaders

SPECIAL TOOLS 8.3

P / N	Illustration	Description	Model
42530	 <p style="text-align: center;">C754</p>	<p>TOOTHED BELT TENSION GAUGE For adjusting the timing belt to proper tension.</p>	<p>DEUTZ T243HDS T245HDS</p>
42531	 <p style="text-align: center;">C816</p>	<p>LOCATING PINS For locating crankshaft and camshaft when changing / adjusting timing belt.</p>	<p>DEUTZ T243HDS T245HDS</p>
42535	 <p style="text-align: center;">C1843</p>	<p>CAMSHAFT DOLLY Used to assist tightening of camshaft pulley bolt.</p>	<p>DEUTZ T243HDS T245HDS</p>



SPECIAL TOOLS 8.3

P/N	Illustration	Description	Model
43979	 <p>C1840</p>	CHAIN PULLER	ALL MODELS
43980	 <p>C1841</p>	SPANNER WRENCH 2'' - 4 3/4'' To repair hydraulic cylinders	ALL MODELS
43981	 <p>C1837</p>	PHOTO SENSOR / WHEEL SPEED TACHOMETER (Dual Function)	ALL MODELS
	 <p>C1839</p>	FORCE GAUGE, PUSH PULL For measuring restraint bar brake cable adjustment. Special order only	T173HLS T173HLS II T243HDS T245HDS
	 <p>C2342</p>	MULTI METER For measuring continuity, voltage, etc.	ALL MODELS
	 <p>C2343</p>	ANGLE FINDER For measuring control angles, U-joint and chassis angles etc.	ALL MODELS

NOTES



THOMAS



SPECIFICATIONS 8.4



C-291

Dimensions: With Standard Tires and Dirt Bucket

A. Overall operating height	134.5" (3416)
B. Height to hinge pin	102.5" (2604)
C. Overall vehicle height	71" (1803)
D. Overall length with bucket	1115" (2621)
E. Dump angle	30°
F. Dump height	81.5" (2070)
G. Reach — fully raised	22.75" (578)
H. Height at 45° dump angle	54.75" (1391)
I. Reach at 45° dump angle	27" (686)
J. Maximum roll back at ground	32°
K. Maximum roll back fully raised	97°
M. Wheel base	33.18" (843)
N. Overall length less bucket	91" (2311)
O. Ground clearance	6.75" (171)
P. Maximum grading angle – bucket	80°
Q. Angle of departure	23°
R. Bucket width	48" (1219)
S. Clearance circle – front – less bucket	41" (1041)
T. Clearance circle – front – with bucket	62.25" (1683)
U. Clearance circle – rear	54" (1372)
V. Overall width – less bucket	47.75" (1213)
W. Tread	38.5" (978)

Operational:

Rated operating capacity	1000 lbs. (454 kg)
Tipping capacity	2100 lbs. (953 kg)
Operating weight	3650 lbs. (1656 kg)
Shipping weight	3150 lbs. (1429 kg)
Travel speed	3000 RPM @
.....	5.8 mph (9.3 km/hr)



SPECIFICATIONS 8.4

Engine

Make and model	Kubota V1305E
Type.....	Vertical , In Line, 4 Cycle
Number of cylinders.....	4
Cylinder bore	76 mm (2.99 inches)
Stroke.....	73.6 mm (2.90 inches)
Displacement	1332cc (.81.5cu. in)
Maximum engine speed (no load)	3000 RPM
Low idle setting.....	1300 RPM
Cooling system	Liquid
Power (ISO 9249 Net Power).....	22.4Kw (30.0 hp) @ 3000 RPM
Torque (ISO 9249 Net Power).....	60.0 N.m. (43.4 lbs / ft.) @ 2000 RPM
Compression ratio.....	22.0: 1
Firing order (viewed from gear case end).....	1 - 3 - 4 - 2
Fuel injection timing	18° - 20° BTDC.
Injector working pressure	1990 - 2133 PSI (140 - 150 Kg _f / cm ²)
Direction of rotation (viewed from flywheel end).....	Counter - clockwise
Valve clearance, (cold).....	.0071 - .0087 in (0 - .18 - 0.22 mm)
Fuel type	Diesel No. 2
Air cleaner	Replaceable dry cartridge with restriction indicator
Engine oil capacity with filter	8. 5 qts. (8 l)
Oil type	10W30API SE,CD
Cooling system capacity.....	3.2 gal. (12 l)
Radiator cap pressure setting.....	12. 8 PSI (88 KPa)
Thermostat rating	Fully open 185°F (85°C)

Hydraulic System

Pump type	Gear, 0.61 cu. in. (11cc)	
Capacity (theoretical)	8.7 GPM (33 L/m)	
Rated RPM	3000	
Rated pressure	2150 (Zero Flow) PSI (148 bar)	
Filtration	10 Micron	
Hydraulic fluid	10W30 API Class, SE/CD	
Control valve (to S / N LC001080)	Parallel type with float on lift and detent on auxiliary	
Control valve (S / N LC001081 onward).....	Series type with float on lift and detent on auxiliary	
Cylinders.	Lift	Tilt.....
Type.....	Double acting	Double acting
Qty per loader	2	2.....
Bore diameter	2.0 in.	2.0 in.
Rod diameter	1.125 in.	1.125 in.
Stroke	26.00 in.	14.875 in.



SPECIFICATIONS 8.4

Hydrostatic Transmission & Final Drive

Pump type Two in line, axial piston pumps
Pump displacement 1.5 cu. in. (25 cm³)
Motor type Geroler
Motor displacement 19.9 cu. in. (326.3 cm³)
System relief setting 3625 PSI (250 bar)
Final drive Roller chain running in oil bath to each axle
Drive chain size ASA 60 HT

Electrical

Alternator60 amp
Battery730 C.C.A
Starter.....12 volt
Circuit breaker rating40 amp

Tires

Standard8.50 x 15 @ 30 - 35 PSI (207 - 241 Kpa)
Flotation10.50 x 15 @ 30 - 35 PSI (207 - 241 KPa)

Fluid Capacities

Fuel tank	43 L (11.3 gal)	Diesel No. 2
Engine lubrication	8 L (8.5 qts.)	10W30 API SE, CD
Final drive transmissions (each)	7 L (1.8 gal.)	10W30 API SE, CD
Hydraulic reservoir	34 L (9 gal.)	10W30 API SE, CD
Engine cooling system	12 L (3.2 gal)	50 / 50 water & ethylene

SOUND POWER LEVEL

LPA Sound level at operators ear. 83 DbA
LWA Adjusted sound level at 10m (32.8ft).96 DbA



SPECIFICATIONS 8.4

Torque Specifications

Loader

Wheel nuts (24)	100 - 110 ft lbs. (136 - 139 Nm)
Motor mount isolators (3)	60 ft / lbs (81.6 Nm)

FOR NON-CRITICAL AND NOT OTHERWISE MENTIONED APPLICATIONS. THE FOLLOWING GENERAL ASSEMBLY TORQUES WILL APPLY:

<i>Bolts & Nuts</i>	<i>Torque ft. lbs (Nm.)</i>		
1/4 - 20	5 - 7 (6.7 - 9.5)	7/16 - 20	40 - 45 (54 - 61)
5/16 - 18	12 - 15 (16 - 20)	1/2 - 13	45 - 50 (61 - 68)
5/16 - 24	12 - 15 (16 - 20)	1/2 - 20	50 - 60 (68 - 81)
3/8 - 16	17 - 22 (23 - 30)	9/16 - 12	60 - 70 (81 - 95)
3/8 - 24	22 - 27 (30 - 37)	9/16 - 18	65 - 75 (88 - 102)
7/16 - 14	30 - 35 (41 - 47)	5/8 - 11	75 - 85 (102 - 115)
		5/8 - 18	100 - 110 (136 - 150)

Hydraulic Fittings: Specifications listed in ft / lbs. Multiply by 1.36 for Nm.			
HOSE SIZE	37° JIC FITTINGS	HOSE SIZE	ORB FITTINGS
1/4	9 to 10	1/4	14 to 16
5/16	15 to 16	5/16	18 to 20
3/8	20 to 22	3/8	24 to 26
1/2	30 to 33	1/2	50 to 60
5/8	40 to 44	5/8	72 to 80
3/4	70 to 77	3/4	125 to 135
7/8	82 to 90	7/8	160 to 180
1	55 to 60	1	200 to 220
1 1/4	120 to 132	1 1/4	210 to 280
1 1/2	131 to 144	1 1/2	270 to 360
2	300 to 330		

The following torque specifications are for steel ORB fittings into aluminum.			
HOSE SIZE	ORB FITTINGS	HOSE SIZE	ORB FITTINGS
1/4	5 to 7	3/4	40 to 45
5/16	8 to 10	7/8	50 to 55
3/8	10 to 12	1	90 to 99
1/2	21 to 24	1 1/4	80 to 90
5/8	27 to 30		

Tandem Pump		
Description	Qty.	Specification
Front Support	1	50 (+/- 2)
Rear Mounting	2	55 (+/- 2)
Trunion Seal Carrier	4	20 (+/- 2)
Trunion Seal Cover	4	20 (+/- 2)
Relief Valve	4	40 (+/- 10)
Charge Relief Cap	1	40 ~ 100
Tandem Section	4	40 (+/- 5)
Gear Pump	2	25 (+/- 2)

Torque Motor		
Description	Qty.	Specification
Valve Housing	4	130
Bearing Housing	8	46.5
Front Cover	8	10.7
Bearing Nut	1	45
Mounting	4	80

Note: Torque specification are in ft /lbs. Multiply by 1.36 for newton meters.



CONVERSION CHART 8.5

Metric to U.S. Formula			
	MULTIPLY	BY	TO OBTAIN
Area:	sq. meter	10.763 91	square foot
	hectare	2.471 05	acre
Force:	newton	0.224 809	ounce force
	newton	2.204 622	pound force
Length:	millimeter	0.039 370	inch
	meter	3.280 840	foot
	kilometer	0.621 371	mile
Mass:	kilogram	2.204 622	pound
Mass/Area:	kilogram/hectare	0.000 486	ton/acre
Mass/Energy:	g/kWh/hr.	0.001 044	lb/whp/hr.
Mass/Volume:	kg/cubic meter	1.685 555	lb/cubic yd.
Power:	kilowatt	1.341 02	horsepower
Pressure:	kilopascal	0.145 038	lb/sq. inch
	bar	14.50385	lb/sq. inch
Temperature:	degree C	$1.8 \times C + 32$	degree F
Torque:	newton meter	8.850 748	ft./inch
	newton meter	0.737 562	lb/foot
Velocity:	kilometer/hr.	0.621 371	miles/hr.
Volume:	cubic centimeter	0.061 024	cubic inch
	cubic meter	35.314 66	cubic feet
	cubic meter	1.307 960	cubic yd.
	milliliter	0.033 814	ounce (US fluid)
	litre	1.056 614	quart (US liquid)
	litre	0.879 877	quart (Imperial)
	litre	0.264 172	gallon (US liquid)
	litre	0.219 969	gallon (Imperial)
Volume/Time:	litre/min.	0.264 172	gallon/min. (US liquid)
	litre/min.	0.219 969	gallon/min. (Imperial)

CONVERSION CHART 8.5

U.S. to Metric Formula			
	MULTIPLY	BY	TO OBTAIN:
Area:	square foot acre	0.092 903 0.404 686	square meter hectare
Force:	ounce force pound force	0.278 014 4.448 222	newton newton
Length:	inch foot mile	25.4 * 0.304 8 * 1.609 344 *	millimeter meter kilometer
Mass:	pound ounce	0.453 592 28.35	kilogram gram
Mass/Area:	ton/acre	2241 702	kilogram/hectare
Mass/Energy:	lb/whr	608.277 4	g/kWhr
Mass/Volume:	lb/cubic yd.	0.593 276	kg/cubic meter
Power:	horsepower	0.745 700	kilowatt
Pressure:	lbs/sq. in. lbs/sq. in. lbs/sq. in.	6.894 757 0.089 0.070 303	kilopascal bar kg/sq. cm
Temperature:	degree F	1.8 F - 32	degree C
Torque:	pound/inch pound/foot	0.112 606 1.355 818	newton meter newton meter
Velocity:	miles/hr.	1.609 344 *	kilometer/hr.
Volume:	cubic inch cubic foot cubic yard ounce (US fluid) quart (US liquid) quart (Imperial) gallon (US) gallons (Imperial)	16.387 08 0.028 317 0.764 556 29.573 53 0.946 353 1.136 523 3.785 412 4.546 082	cubic centimeter cubic meter cubic meter milliliter liter liter liter liter
Volume/Time:	gallon/min.	3.785 412	liter/min.

