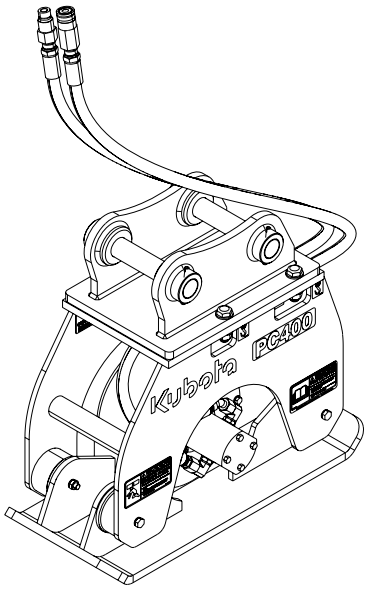
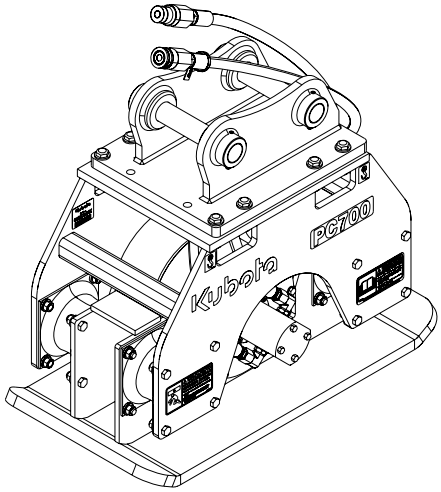
Table of Contents

Plate Compactors

AP-PC400, AP-PC700, & AP-PC1000



78548
AP-PC400



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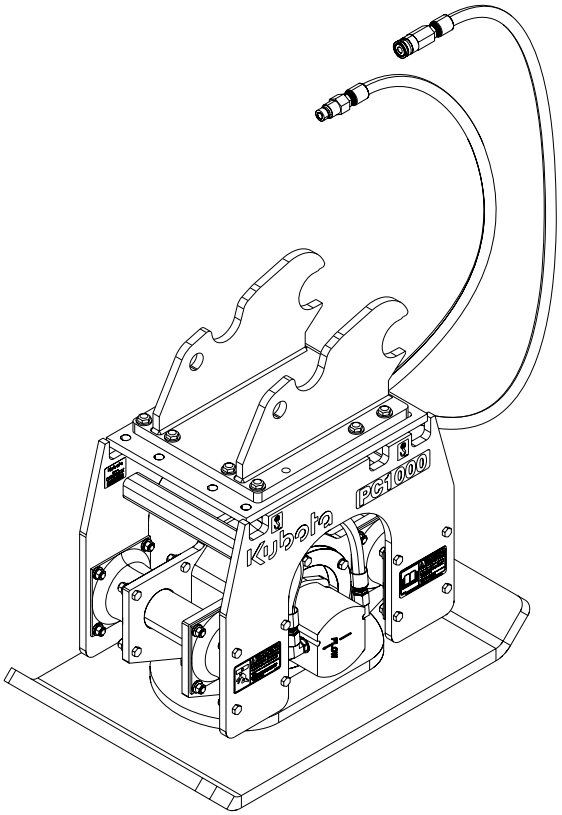


78550
AP-PC1000

317-362MK
Operator's Manual

Kubota®

Read the Operator's Manual entirely. When you see this symbol, the subsequent instructions and warnings are serious - follow without exception. Your life and the lives of others depend on it!

Cover photo may show optional equipment not supplied with standard unit.

For an Operator's Manual and Decal Kit in French Language, please see your Kubota dealer.

Printed 7/26/24

Machine Identification

Record your machine details in the log below. If you replace this manual, be sure to transfer this information to the new manual.

If you, or the dealer, have added Options not originally ordered with the machine, or removed Options that were originally ordered, the weights and measurements are no longer accurate for your machine. Update the record by adding the machine weight and measurements provided in the Specifications & Capacities Section of this manual with the Option(s) weight and measurements.

Warranty

For a complete Plate Compactor warranty claim, please include the first six rows listed below: (Rows 1, 2, 3, 4, 5, & 6). Providing this information will make it easy to handle the warranty clam properly and swiftly.

1	**Plate Compactor Model Number**		
2	**Plate Compactor Serial Number**		
3	**Excavator Model Number**		
4	**Installation Information Warranty Clam Information If Known**		Oil flow: Operating Pressure: Return line pressure:
5	**Service History**		
6	**Warranty Clam Information (Complete when making a warranty clam.)**		Working hours: Application:
7	**Compactor's Height**		
8	**Compactor's Length**		
9	**Compactor's Width**		
10	**Compactor's Weight**		
11	**Delivery Date**		
12	**First Operation**		
13	**Options/Accessories**		

Dealer Contact Information

Dealer Name: _____

Street: _____

City/State: _____

Telephone: _____

Email: _____

California Proposition 65

WARNING: Handling passenger or off-highway motor vehicle parts can expose you to chemicals such as phthalates and lead, which can cause cancer and reproductive harm. To minimize exposure, service the vehicle in a well-ventilated area, wear gloves, and wash your hands. For more information see www.P65Warnings.ca.gov/motor-vehicle-parts.

Continue Table of Contents on next page

Parts Manual QR Locator

The QR (Quick Reference) code on the left will take you to the Parts Manual for this equipment. Download the appropriate app on your smart phone. Scan the QR code and take a picture.

Dealer QR Locator

The QR code to the left will link you to available dealers for Kubota products. Refer to Parts Manual QR Locator on this page for detailed instructions.

Listed below are common practices that may or may not be applicable to the products described in this manual.

Safety at All Times

Careful operation is your best assurance against an accident.

All operators, no matter how much experience they may have, should carefully read this manual and other related manuals before operating the power machine and this attachment.

- ▲ Thoroughly read and understand the “Safety Label” section. Read all instructions noted on them.
- ▲ Do not operate the equipment while under the influence of drugs or alcohol, as they impair your ability to safely and properly operate the equipment.
- ▲ Operator should be familiar with all functions of the excavator and attachment and be able to handle emergencies quickly.
- ▲ Make sure all guards and shields appropriate for the operation are in place and secured before operating the attachment.
- ▲ Keep all bystanders away from equipment and work area.
- ▲ Start excavator from the driver’s seat with steering levers and hydraulic controls in neutral.
- ▲ Operate excavator and controls from the driver’s seat only.
- ▲ Never dismount from a moving excavator or leave excavator unattended with engine running.
- ▲ Do not allow anyone to stand between the attachment and excavator while connecting to the attachment.
- ▲ Keep hands, feet, and clothing away from power-driven parts.
- ▲ While transporting and operating equipment, watch out for objects overhead and along the sides such as fences, trees, buildings, wires, etc.
- ▲ Store attachment in a safe and secure area where children normally do not play. When needed, secure attachment against falling with support blocks.

Look for the Safety Alert Symbol

The SAFETY ALERT SYMBOL indicates there is a potential hazard to personal safety and extra precaution must be taken. When you see this symbol, be alert and carefully read the message that follows it. Hazard control, and accident prevention are dependent upon the awareness, concern, prudence, and proper training of personnel involved in the operation, transport, maintenance, and storage of equipment.

Be Aware of Signal Words

A signal word designates a degree or level of hazard seriousness. They are:

DANGER: Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

WARNING: Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION: Indicates a hazardous situation that, if not avoided, may result in minor or moderate injury.

Be Aware of Special Notices

Special notices are intended to point out important and helpful information that should be followed. They are usually placed inside a box. They are:

IMPORTANT: Indicates that equipment or property damage could result if instructions are not followed.

NOTE: Indicates supplementary explanations that will be helpful when using the equipment.

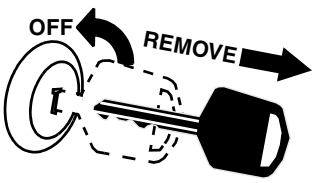
Safety Precautions for Children

Tragedy can occur if the operator is not alert to the presence of children. Children generally are attracted to attachments and their work.

- ▲ Never assume children will remain where you last saw them.
- ▲ Keep children out of the work area and under the watchful eye of a responsible adult.
- ▲ Be alert and shut the attachment and excavator down if children enter the work area.
- ▲ Never carry children on the power machine or attachment. There is not a safe place for them to ride. They may fall off and be run over or interfere with the control of the power machine.
- ▲ Never allow children to operate the power machine, even under adult supervision.
- ▲ Never allow children to play on the power machine or attachment.
- ▲ Use extra caution when backing up. Before the power machine starts to move, look down and behind to make sure the area is clear.

Excavator Shutdown

- ▲ If engaged, disengage hydraulics to the attachment.
- ▲ Park on solid, level ground.
- ▲ Lower attachment and dozer blade until they are on the ground.
- ▲ Idle engine and turn ignition key to ‘STOP’ position to shutoff engine.
- ▲ Move lever lock(s) down to the lock position.
- ▲ Turn ignition key to “RUN” and relieve hydraulic pressure to the hydraulic system by operating hydraulic levers. Refer to Excavator Operator’s Manual.
- ▲ Turn ignition key to “STOP” and remove to prevent unauthorized starting.
- ▲ Face excavator while using approved steps, grab-handles and anti-slip surfaces when stepping on and off the excavator.



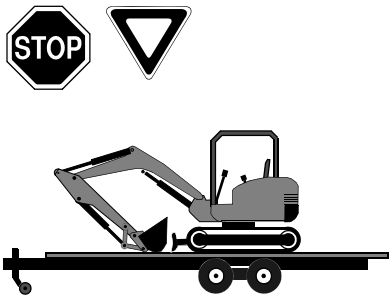
Listed below are common practices that may or may not be applicable to the products described in this manual.

Dig Safe - Avoid Underground Utilities

- ▲ USA: Call 811
  CAN:
  http://www.clickbeforeyoudig.com
- ▲ Always contact your local utility companies (electrical, telephone, gas, water, sewer, and others) before digging so that they may mark the location of any underground services in the area.
- ▲ Be sure to ask how close you can work to the marks they positioned.

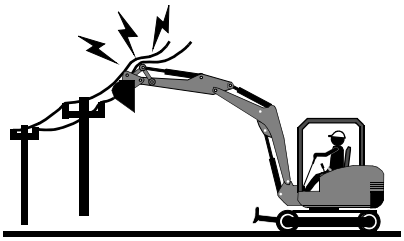
Towing Safely

- ▲ Comply with federal, state, and local laws.
- ▲ Use towing vehicle and trailer of adequate size and capacity. Secure equipment towed on a trailer with chocks, tie downs, and chains.
- ▲ **IMPORTANT:** Do not tow a load that is more than double the weight of the vehicle towing the load.
- ▲ Sudden braking can cause a towed trailer to swerve unexpectedly. Reduce speed if towed trailer is not equipped with brakes.



Transport Safely

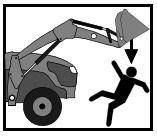
- ▲ Avoid contact with any overhead utility lines or electrically charged conductors.
- ▲ Always drive with attachment on end of excavator arm low to the ground.
- ▲ Follow recommendations in the power machine Operator's Manual when driving uphill or downhill and when parking on an incline.
- ▲ Never travel at a speed which does not allow adequate control of the load, steering, and stopping. Some rough terrains require a slower speed.



Practice Safe Maintenance

- ▲ Understand procedure before doing work. Refer to the Operator's Manual for additional information.
- ▲ Work on a level surface in a clean, dry area that is well-lit.
- ▲ Lower attachment to the ground and follow all shutdown procedures before leaving the operator's seat to perform maintenance.
- ▲ Do not work under any hydraulically supported equipment. It can settle, suddenly leak down, or be lowered accidentally. If it is necessary to work under the equipment, securely support it with stands or suitable blocking beforehand.
- ▲ Use properly grounded electrical outlets and tools.
- ▲ Use correct tools and equipment for the job that are in good condition.
- ▲ Allow equipment to cool before working on it.
- ▲ Disconnect battery ground cable (-) before servicing or adjusting electrical systems or before welding on equipment.
- ▲ Inspect all parts. Make certain that parts are in good condition & installed properly.
- ▲ Replace parts on this attachment with genuine Kubota parts only. Do not alter this attachment in a way which will adversely affect its performance.
- ▲ Do not grease or oil attachment while it is in operation.
- ▲ Remove buildup of grease, oil, or debris.
- ▲ Always make sure any material and waste products from the repair and maintenance of the attachment are properly collected and disposed of.
- ▲ Remove all tools and unused parts from equipment before operation.

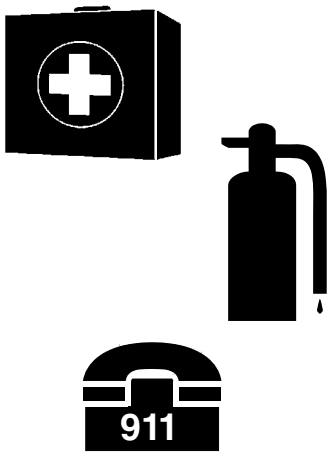





Listed below are common practices that may or may not be applicable to the products described in this manual.

Prepare for Emergencies

- ▲ Be prepared if a fire starts.
- ▲ Keep a first aid kit and fire extinguisher handy.
- ▲ Keep emergency numbers for doctor, ambulance, hospital, and fire department near phone.



Wear Personal Protective Equipment (PPE)

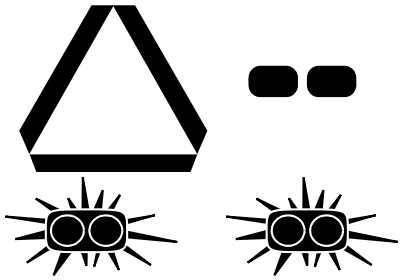
- ▲ Wear protective clothing and equipment appropriate for the job such as safety shoes, safety, glasses, hard hat, dust mask, and ear plugs.
- ▲ Clothing should fit snug without fringes and pull strings to avoid entanglement with moving parts.
- ▲ Prolonged exposure to loud noise can cause hearing impairment or hearing loss. Wear suitable hearing protection such as earmuffs or earplugs.
- ▲ Operating a machine safely requires the operator's full attention. Avoid wearing headphones while operating equipment.

Avoid High Pressure Fluids

- ▲ Escaping fluid under pressure will penetrate the skin or eyes causing serious injury.
- ▲ Relieve all residual pressure before disconnecting hydraulic lines or performing work on the hydraulic system.
- ▲ Make sure all hydraulic fluid connections are properly tightened/torqued and all hydraulic hoses and lines are in good condition before applying pressure to the system.
- ▲ Use a piece of cardboard or wood, NOT BODY PARTS, to check for suspected leaks.
- ▲ Wear protective gloves and safety glasses or goggles when working with hydraulic systems.
- ▲ **DO NOT DELAY.** If an accident occurs, seek immediate emergency medical care or gangrene may result.

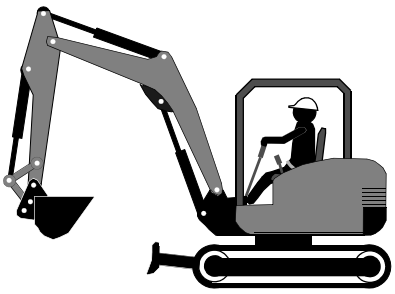
Use Safety Lights and Devices

- ▲ A slow moving power machine can create a hazard when driven on public roads. They are difficult to see, especially at night.
- ▲ Flashing warning lights and turn signals are recommended whenever driving on public roads.
- ▲ For tractors and other agriculture equipment, a Slow Moving Vehicle (SMV) sign is required when traveling on public roads.



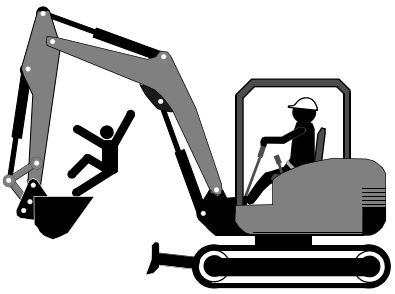
Use Seat Belt and ROPS

- ▲ Kubota recommends the use of a CAB or roll-over-protective-structures (ROPS) and seat belt in almost all power machines. Combination of a CAB or ROPS and seat belt will reduce the risk of serious injury or death if the power machine should be upset.
- ▲ If ROPS is in the locked-up position, fasten seat belt snugly and securely to help protect the operator against serious injury or death from falling and/or machine overturn.



Keep Riders Off Machinery

- ▲ Never carry riders on excavator or attachments.
- ▲ Riders obstruct operator's view and interfere with the control of the power machine.
- ▲ Riders can be struck by objects or thrown from the equipment.
- ▲ Never use excavator or attachment to lift or transport riders.

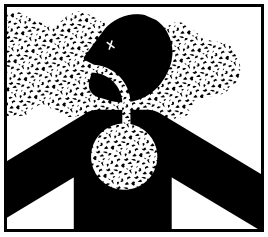


Listed below are common practices that may or may not be applicable to the products described in this manual.

Avoid Crystalline Silica (Quartz) Dust

Because crystalline silica is a basic component of sand and granite, many activities at construction sites produce dust containing crystalline silica. Trenching, sawing, and boring of material containing crystalline silica can produce dust containing crystalline silica particles. This dust can cause serious injury to the lungs (silicosis).

There are guidelines which should be followed if crystalline silica (quartz) is present in the dust.



- ▲ Be aware of and follow OSHA (or other local, State, or Federal) guidelines for exposure to airborne crystalline silica.
- ▲ Know the work operations where exposure to crystalline silica may occur.
- ▲ Participate in air monitoring or training programs offered by the employer.
- ▲ Be aware of and use optional equipment controls such as water sprays, local exhaust ventilation, and enclosed cabs with positive pressure air conditioning if the machine has such equipment. Otherwise respirators shall be worn.
- ▲ Where respirators are required, wear a respirator approved for protection against crystalline silica containing dust. Do not alter respirator in any way. Workers who use tight-fitting respirators can not have beards/ mustaches which interfere with the respirator seal to the face.
- ▲ If possible, change into disposable or washable work clothes at the work site; shower and change into clean clothing before leaving the work site.
- ▲ Do not eat, drink, use tobacco products, or apply cosmetics in areas where there is dust containing crystalline silica.
- ▲ Store food, drink, and personal belongings away from the work area.
- ▲ Wash hands and face before eating, drinking, smoking, or applying cosmetics after leaving the exposure area.

Handle Chemicals Properly

- ▲ Protective clothing should be worn.
- ▲ Handle all chemicals with care.
- ▲ Follow instructions on container label.
- ▲ Agricultural chemicals can be dangerous. Improper use can seriously injure persons, animals, plants, soil, and property.
- ▲ Inhaling smoke from any type of chemical fire can be a serious health hazard.
- ▲ Store or dispose of unused chemicals as specified by the chemical manufacturer.

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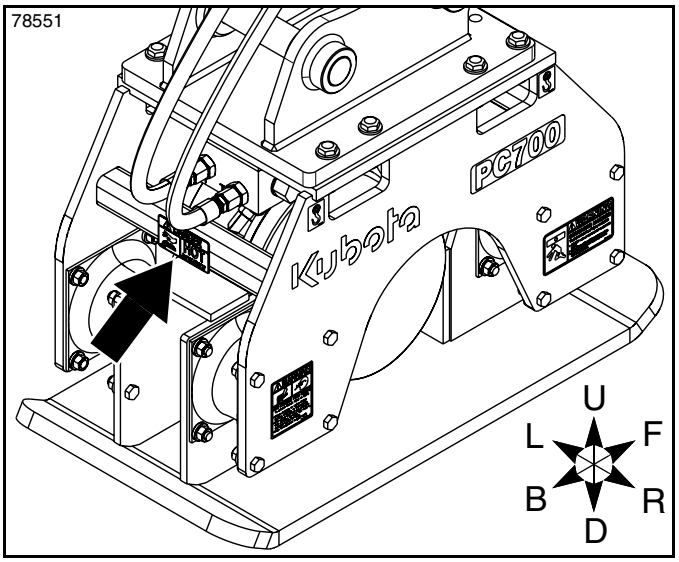
Safety Labels

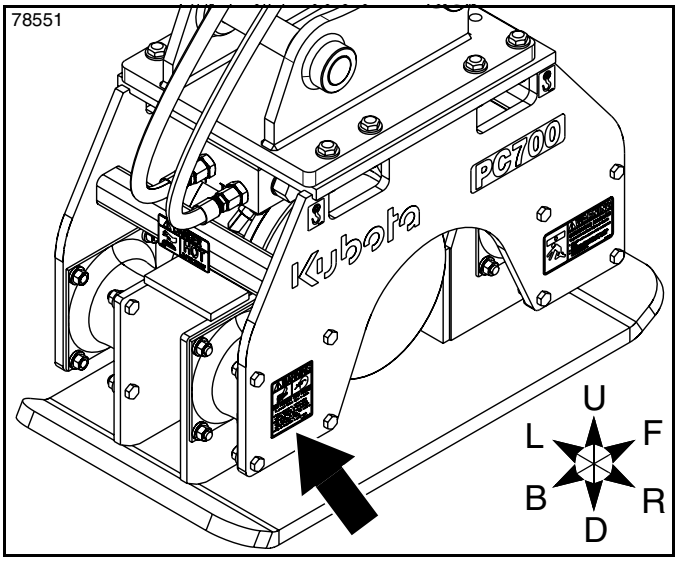
Your Plate Compactor comes equipped with all safety labels in place. They are designed to help you safely operate your attachment. Read and follow their directions.

1. *Keep all safety labels clean and legible.*
2. *Refer to this section for proper label placement. Replace all damaged or missing labels. Order new labels from your nearest Kubota dealer. To find your nearest dealer, visit our dealer locator at www.landpride.com.*
3. *Some new equipment installed during repair requires safety labels to be affixed to the replaced component as specified by Kubota. When ordering new components make sure the correct safety labels are included in the request.*
4. *Refer to this section for proper label placement.*
   To install new labels:
   a. *Clean surface area where label is to be placed.*
   b. *Spray soapy water onto the cleaned area.*
   c. *Peel backing from label and press label firmly onto the surface.*
   d. *Squeeze out air bubbles with edge of a credit card or a similar type of straight edge.*



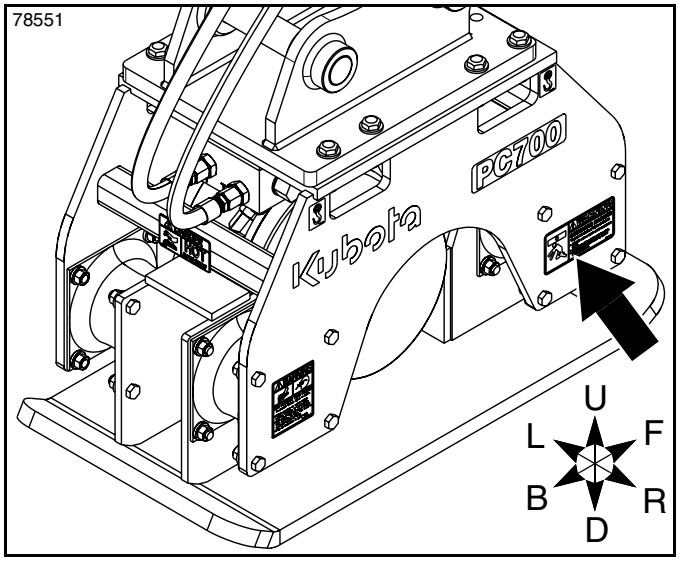
72407

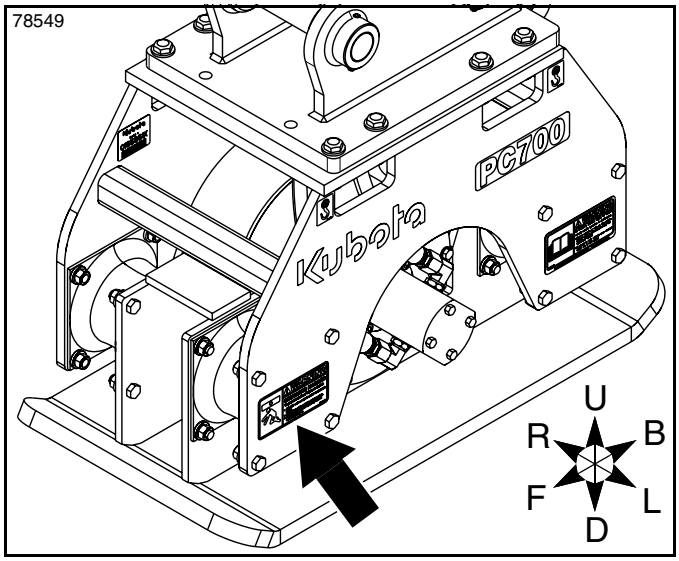
844-001C
Danger: Hot - Burn Hazard
1 Place: On the back side

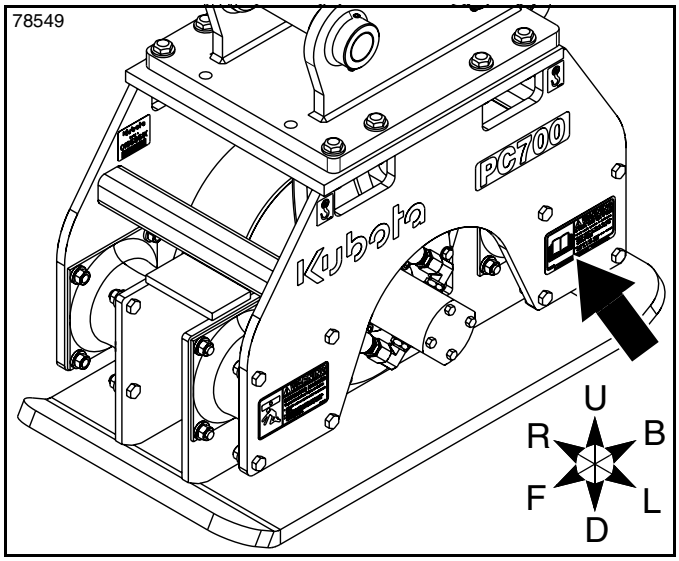


70372

818-339C
Warning: High Pressure Fluid Hazard
1 Place: On the Right side

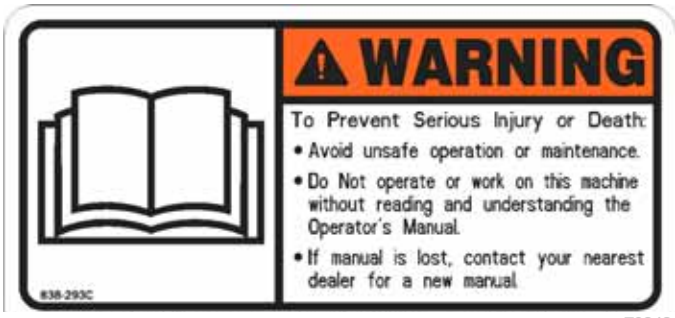






76451

844-341C
Warning: Crushing Hazard
2 Places: On the Right and Left sides



70243

838-293C
Warning: Read Operator's Manual
1 Place: On the Left side

Kubota welcomes you to the growing family of new product owners. This Plate Compactor has been designed with care and built by skilled workers using quality materials. Proper assembly, maintenance, and safe operating practices will help you get years of satisfactory use from this attachment.

Application

Kubota's PC400, PC700, and PC1000 Plate Compactors are designed for use in soil compaction and pile driving. Applications include backfill compaction, base course preparation, finish surface treatment, and embankment buildup, plus it can be used as an effective sheet and/or pile driver. Kubota Plate Compactors are useful tools on construction sites and in rental fleets.

These Plate Compactors are designed to fit on Kubota Excavators. Operators of these compactors will find compacting soil or driving sheets and piles can be accomplished with ease.

Vibration energy is transferred through the sheet or pile to the soil. Soils with 50% or more granular content are "liquefied" by the vibration, which breaks the skin friction, allowing the sheet or pile to penetrate more easily.

For more information, refer to **"Section 4: Soil Compaction Guide"** on page 30.

See **"Specifications & Capacities"** on page 52 and **"Features & Benefits"** on page 54 for additional information and performance enhancing options.

Using This Manual

- This Operator's Manual is designed to help familiarize you with safety, assembly, operation, adjustments, troubleshooting, and maintenance. Read this manual and follow the recommendations to help ensure safe and efficient operation.
- The information contained within this manual was current at the time of printing. Some parts may change slightly to assure you of the best performance.
- To order a new Operator's or Parts Manual, contact your authorized dealer. Manuals can also be downloaded, free-of-charge, from our website at www.landpride.com

Related Publications

Refer to **"Section 4: Soil Compaction Guide"** on page 30. The Compaction Guide contains:

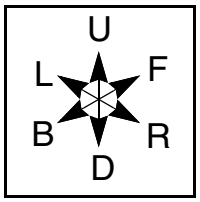
- Background information about soil and soil compaction
- A basic overview of soil compaction using a Vibratory Plate Compactor.
- Performance data derived from field tests of our PC1000 model.
- References and their websites for other reading materials relating to soil compaction on page 41.

Terminology

Right or Left

"Right" or "Left" as used in this manual is determined by the direction the operator faces while sitting looking forward in the operator's seat unless otherwise stated.

Directional Arrows



U = up, D = down, L = left, R = Right, F = front, and B = back

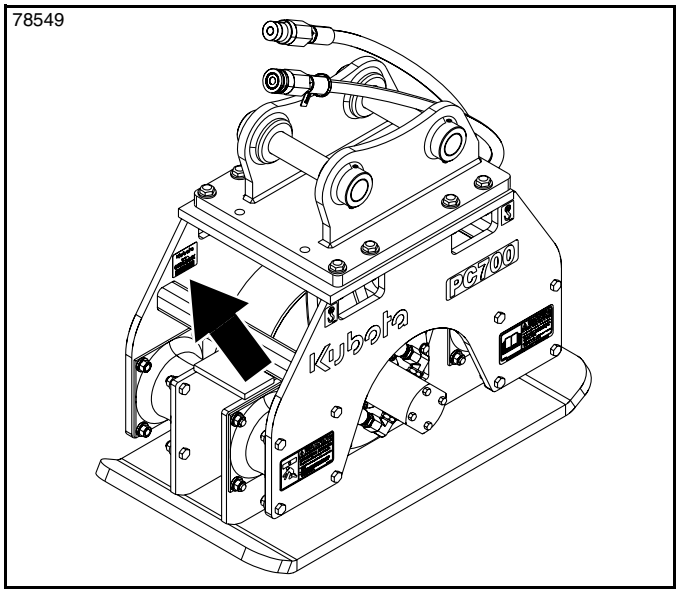
Owner Assistance

The Online Warranty Registration should be completed by the dealer at the time of purchase. This information is necessary to provide you with quality customer service.

The parts on your Plate Compactor should only be replaced with genuine Kubota parts. Contact a Kubota dealer if customer service or repair parts are required. Your Kubota dealer has trained personnel, repair parts, and equipment needed to service this implement.

Serial Number

For quick reference and prompt service, record model, serial number, and excavator model on the inside cover page and again on warranty page 56. Always provide model number and serial number when ordering parts and in all correspondence with your Kubota dealer. For location of your serial number plate, see Figure 1.



Serial Number Plate Location
Figure 1

Installation Inspection

An installation inspection must be carried out after the product has been installed on the excavator. During the installation inspection, certain specifications (operating pressure, oil flow, etc.) are checked to verify they are within the given limits. Refer to **"Section 6: Specifications & Capacities"** on page 52 for limit values.

Further Assistance

Your Kubota dealer wants you to be satisfied with your new attachment. After having carefully read these instructions, you will realize that much of the routine maintenance can be done by yourself. If for any reason you do not understand any part of this manual or are not satisfied with the service received, the following actions are suggested:

1. Discuss the matter with your dealership's service manager making sure that person is aware of any problems you may have and has had the opportunity to assist you.
2. If you are still not satisfied, seek out the owner or general manager of the dealership, explain the question/problem, and request assistance.
3. For further assistance write to:

Kubota by Land Pride Service Department

1525 East North Street
P.O. Box 5060
Salina, KS. 67402-5060

E-mail address
lpservice@landpride.com

Excavator Requirements

The Plate Compactor is designed to attach to excavators with the following minimum requirements:

Hydraulic connections . . . . . .1 - Auxiliary circuit
A secondary relief valve in the auxiliary circuit is required or a suitable add-on kit.

Maximum operating hydraulic pressure
PC400 . . . . . .2,495 psi (17.2 MPa)
PC700 & PC1000 . . . . . .2,000 psi (13.8 MPa)

Hydraulic flow rate[1]
PC400 . . . . . .12.6 to 15.4 gpm (47.7 to 58.3 lpm)
PC700/1000 . . .16.2 to 19.8 gpm (61.3 to 75.0 lpm)

Excavator weight . . . . . .See Warning below

Important Note:

1. Only qualified personnel, having knowledge of the machine's systems, proper testing equipment, and tools should attempt testing and adjustments. If not known, have your nearest power machine dealer perform this test and make required adjustments.

Torque Requirements

Refer to **"Torque Values Chart"** on page 45 for correct torque values.

Compactor - Excavator Match Chart

The power machine's hydraulic flow rates must fall within the Plate Compactor's flow rate. Refer to **"Kubota's Plate Compactor - Excavator Match Chart"** below below.

Refer to **"Section 2: Optional Compactor Mounts"** on page 21 for an illustration of each Plate Compactor mount.

⚠ WARNING

To avoid serious injury or death:

- *Lightweight power machines may need weight added to the rear to maintain steering control and prevent forward and/or side tipping. Consult your power machine Operator's Manual to determine proper weight requirements and maximum limitations.*
- *Consult your power machine Operator's Manual for operating capacity, lifting capacity, and operating specifications. Exceeding rated capacities and specifications can result in loss of control, roll-over or other serious hazard.*
- *Allow only persons to operate this attachment who have fully read and comprehended this manual, and who have been properly trained in the safe operation of this attachment. Serious injury or death can result from failure to read, understand, and follow instructions provided in this manual.*

Kubota's Plate Compactor - Excavator Match Chart

Plate Compactor	Plate Compactor Mounts		Kubota Excavator Model Numbers						
	Type	Part No.	U35	U48	U55	KX030	KX040	KX057	KX080
PC 400	PC Quick Attach	317-360A	X			X	X		
		317-361A		X	X			X	
	PC Pin Grabber	317-454A		X	X			X	
PC 700	PC Quick Attach	317-347A					X		
		317-348A		X	X			X	
		317-406A							X
	PC Pin Grabber	317-441A		X	X			X	
		317-444A							X
PC 1000	PC Quick Attach	317-348A						X	
		317-406A							X
	PC Pin Grabber	317-441A			X			X	
		317-444A							X

Dealer Preparations

This Plate Compactor has been mostly assembled at the factory. Some additional preparations will be necessary to finish assembling the attachment and to attach it to the customer's power machine. Make sure the intended excavator conforms to the **"Excavator Requirements"** on this page.

An understanding of how this attachment works will aid in final assembly and setup. Read and understand the Operator's Manual. Go through the **"Pre-Assembly Checklist"** below. To speed up the assembly task and make the job safer, have all needed parts and equipment readily at hand.

Pre-Assembly Checklist

✔	Check	Reference
☐	Have a forklift or hoist with properly sized chains and safety stands capable of lifting and supporting the equipment on hand.	
☐	Have a minimum of two people available during assembly.	
☐	Make sure all major components and loose parts are shipped with this machine. Refer to this manual if unsure.	Operator's Manual
☐	Double check to make sure all parts, fasteners and pins are installed in the correct location to lessen the chance of using a bolt incorrectly, Refer to the Parts Manual if unsure. **NOTE:** All assembled hardware from the factory has been installed in the correct location. Remember location of a part or fastener if removed. Keep parts separated.	Operator's Manual 317-362MK Parts Manual 317-362PK
☐	Make sure working parts move freely, bolts are tight & cotter pins are spread.	Operator's Manual
☐	Make sure all safety labels are correctly located and legible. Replace all missing and damaged safety labels.	Page 6

Excavator Shutdown Procedure

The following are basic excavator shutdown procedures. Follow these procedures and any additional shutdown procedures provided in your excavator Operator's Manual before dismounting the excavator.

1. If engaged, disengage hydraulics to the attachment.
2. Park on solid, level ground.
3. Lower attachment and dozer blade until they are on the ground.
4. Reduce engine speed to an idle and turn ignition key to "STOP" position to shut the engine off.
5. Turn ignition key to "RUN" position.
6. Move lever lock(s) down to the lock position.
7. Relieve hydraulic pressure to the hydraulic system by operating the control levers. Refer to your excavator Operator's Manual for detailed instructions.
8. Turn ignition key to "STOP" and remove to prevent unauthorized starting.
9. Face excavator while using approved steps, grab-handles and anti-slip surfaces while stepping on and off the excavator.

Lifting the Compactor

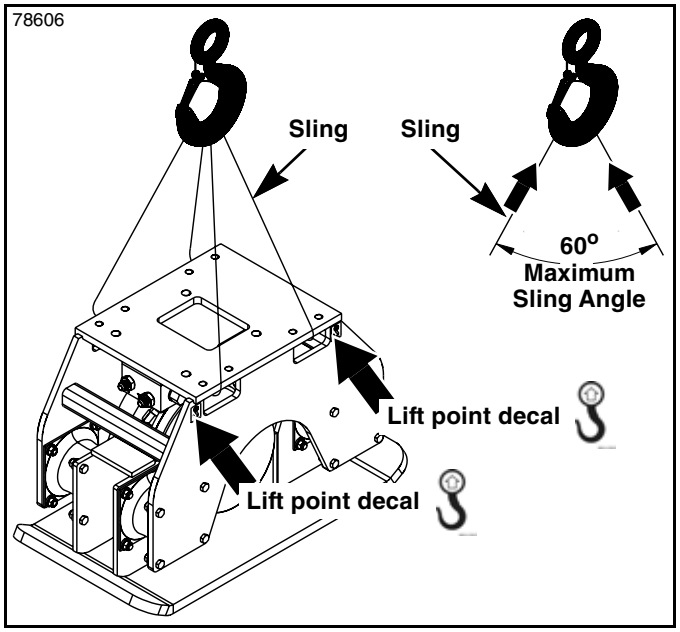
Lift Safety

Below are some common safety instructions concerning lifting operations. The national standards for machines and lifting-tackles must always be strictly observed. Please note that the list below is not all inclusive, you must always ensure the procedure you choose is safe for you and others. Do not lift a load over people. No one shall be under a hoisted load.

⚠ WARNING

To avoid serious injury or death:

- *Lift points indicated on the attachment's frame are only for lifting the attachment. Do not use the attachment to lift other products. Improper lifting can result in falling objects.*
- *Keep all persons away from the load while lowering and raising the unit. A person can be hit, pinched, or crushed by the unit.*
- *Be aware of possible crushing hazards while working with heavy equipment. Use a hoist or other lifting device to lift heavy equipment. Keep bystanders and yourself out from under heavy equipment.*
- *Do not lift people and never allow anyone, including yourself, to ride the hoisted load.*
- *Keep people clear from the lift area.*
- *Avoid side pull on the load. Make sure you take up the slack slowly. Start and stop carefully.*
- *Lift load a few inches/centimeters and verify it is secured and well balanced before proceeding. Check for any loose items.*
- *Never leave a suspended load unattended. Maintain control of the load at all times.*
- *Never lift a load that exceeds the rated capacity of the equipment used to lift the load.*
- *Inspect all lifting equipment before using it. Do not use twisted or damaged equipment. Protect the equipment lifting the load from sharp corners.*
- *Obey all local safety instructions.*



Lift Using Designated Lift Points
Figure 1-1

Lift Instructions

Refer to Figure 1-1:

1. Do not use faulty lifting equipment.
   - Make sure lifting tackle is in good condition, strong, complies with all local regulations, and can safely carry the working weight of the product.
   - Working weight calculations are based on the compactor's weight plus the weight of the mount if attached. Refer to **"Specifications & Capacities"** on page 52 for weights of the compactor and attached mount.
   - Make sure all chains, hooks, slings etc., are in good condition and of correct capacity.
2. Faulty lifting methods are always a risk to yourself, bystanders, and the surrounding area.
   - Use a hoist when lifting components which weigh 50 lb (23 kg) or more.
   - Make sure the operator knows how to use the hoist and sling.
   - Decals on the Plate Compactor identify lift points. Lift points are to be used only for lifting and handling the compactor.
   - Attach a sling to the compactor as shown in Figure 1-1. Maximum sling angle must not exceed 60 degrees.
   - When using hooks, make sure they are positioned correctly.
   - Do not use the Plate Compactor or any of its parts for lifting other objects.

Main Components

Refer to Figure 1-2, Figure 1-3, & Figure 1-4:

A. Top Frame	D. Dynamic Assembly
B. Control Valve	E. Hydraulic Motor
C. Suspension System	

Top Frame (A)

The top frame carries the dynamic assembly (D). An optional mount is bolted to the top frame and mates with the excavator's dipper arm.

Control Valve (B)

All Kubota compactors come standard with a multi-function control valve. Benefits include optimized operation with improved reliability of critical components, such as the motor and bearings.

NOTE: The control valve is preset at the factory and does not require additional adjustments.

The control valve performs the following functions:

- **Flow regulator:** Protects the bearings from excessive loads by limiting oil flow that can overspeed the hydraulic motor.
- **Pressure control:** Protects the motor and other hydraulic components from overpressure. This is factory preset at the maximum operating pressure plus 205 psi (14 bar).
- **Anti-cavitation circuit:** Controls deceleration of the hydraulic motor and eccentric mass. It also protects the motor from damage on circuits not set up with an open return case drain.
- R**eturn line check valve:** Prevents reverse flow to the hydraulic motor. It also provides a nominal back-pressure to ensure proper operation of the auxiliary valves.

Suspension System (C)

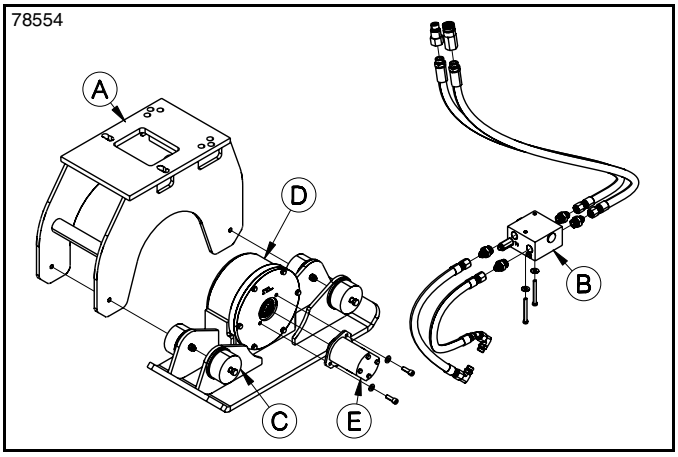
Rubber springs connect the top frame to the dynamic assembly. They isolate the vibratory energy to the compaction plate and away from the excavator and operator.

Dynamic Assembly (D)

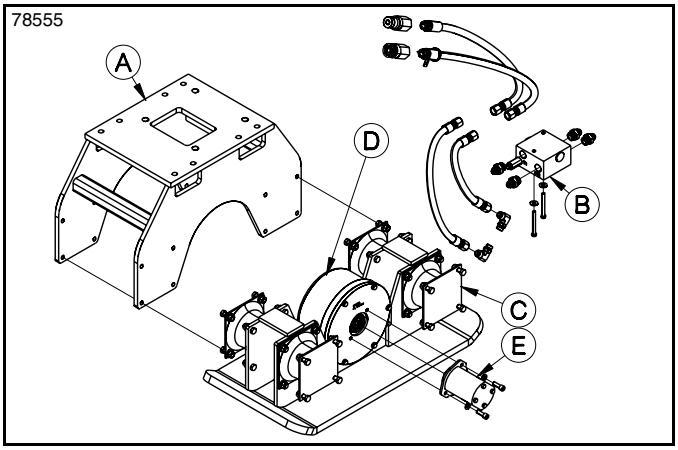
The dynamic assembly includes the suspension system, eccentric mass, bearings, and compaction plate. The offset distance, weight, and rotational speed of the eccentric mass generates the impulse forces that are transferred through the compaction plate to the soil.

Hydraulic Motor (E)

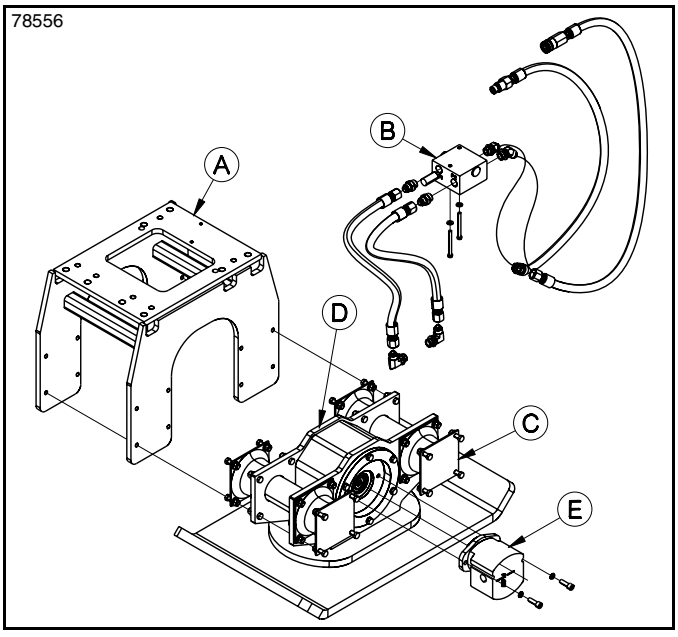
The hydraulic motor powers the rotating eccentric mass. The motor must maintain adequate flow and pressure without loss of power as the excavator applies down-pressure.



PC400 Plate Compactor
Figure 1-2



PC700 Plate Compactor
Figure 1-3



PC1000 Plate Compactor
Figure 1-4

Installation of Optional Mounts

Kubota's optional mounts are designed to attach to a dipper arm on a Kubota excavator and bolt to a compactor's top frame. To identify which mount works with your Kubota excavator and compactor, refer to **"Kubota's Plate Compactor - Excavator Match Chart"** on page 10.

Kubota has provided additional mounting holes in their Plate Compactors to fit a variety of other excavator mounts. If attaching Kubota's compactor to a non-Kubota mount, the customer must first verify that mount will interface with Kubota's Plate Compactor.

Read **"Threaded Fastener Instructions"** on page 44 before attaching the mount to a Plate Compactor.

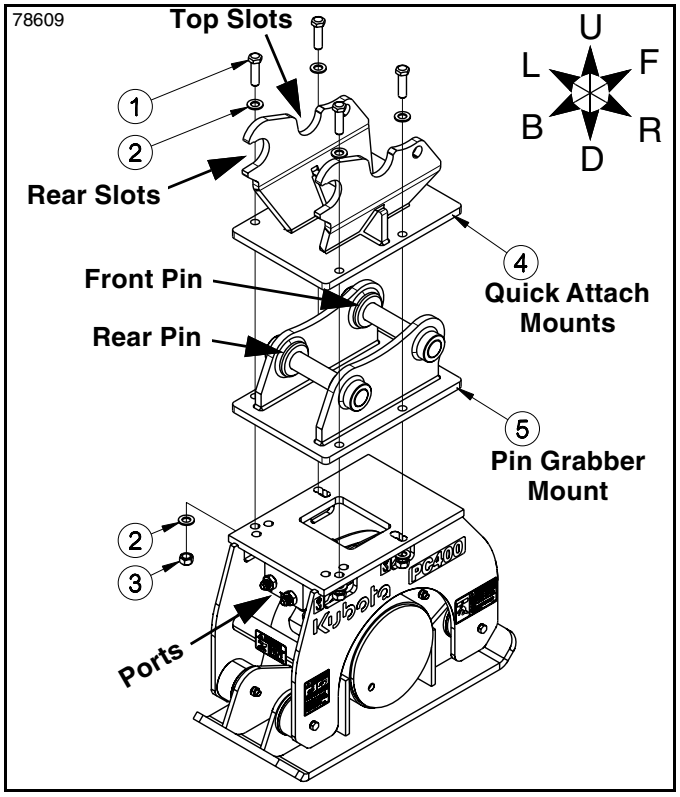
PC400 Mounts

Refer to Figure 1-5:

The following are instructions for attaching a Kubota excavator mount to the PC400 Plate Compactor.

NOTE: Hardware for attaching the mount is supplied with the compactor. Refer to **"Torque Values Chart"** on page 45 for correct torque values.

1. Position mount (#4 or #5) on the compactor with hydraulic ports facing toward the rear as shown.
2. Bolt the selected mount to the top of the compactor with four 3/4"-10 x 2 3/4" GR8 bolts (#1), eight washers (#2), and four locknuts (#3) as shown.
3. Tighten lock nuts (#3) to the correct torque. Refer to **"All Bolts Except Bearing Housing Bolts"** on page 44 for detailed tighten instructions.



Kubota PC400 Mount Attachment
Figure 1-5

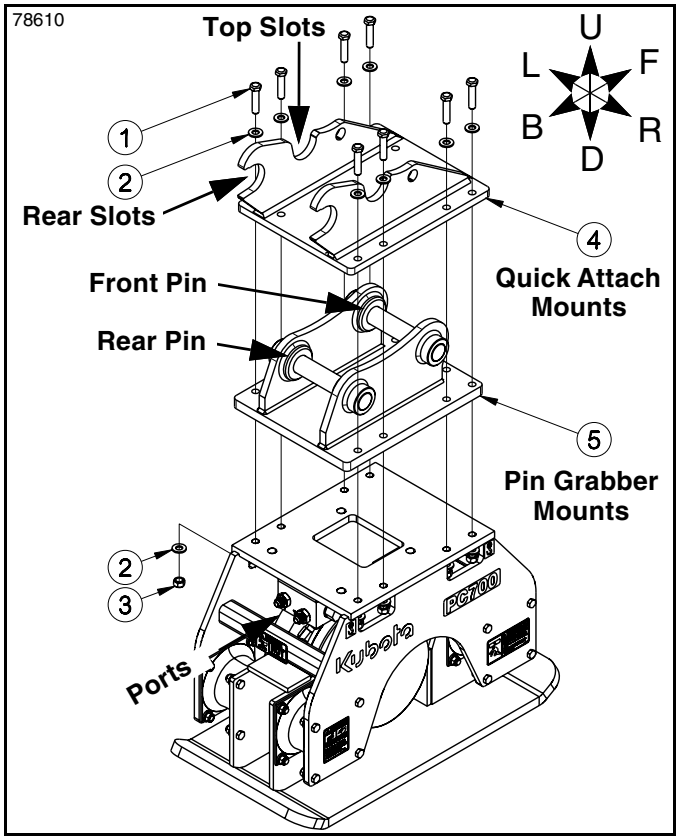
PC700 Mounts

Refer to Figure 1-6:

The following are instructions for attaching a Kubota excavator mount to the PC700 Plate Compactor.

NOTE: Hardware for attaching the mount is supplied with the compactor. Refer to **"Torque Values Chart"** on page 45 for correct torque values.

1. Position mount (#4 or #5) on the compactor with hydraulic ports facing toward the rear as shown.
2. Bolt the selected mount to the top of the compactor with eight 5/8"-11 x 2 3/4" GR8 bolts (#1), sixteen washers (#2), and eight locknuts (#3) as shown.
3. Tighten lock nuts (#3) to the correct torque. Refer to **"All Bolts Except Bearing Housing Bolts"** on page 44 for detailed tighten instructions.



Kubota PC700 Mount Attachment
Figure 1-6

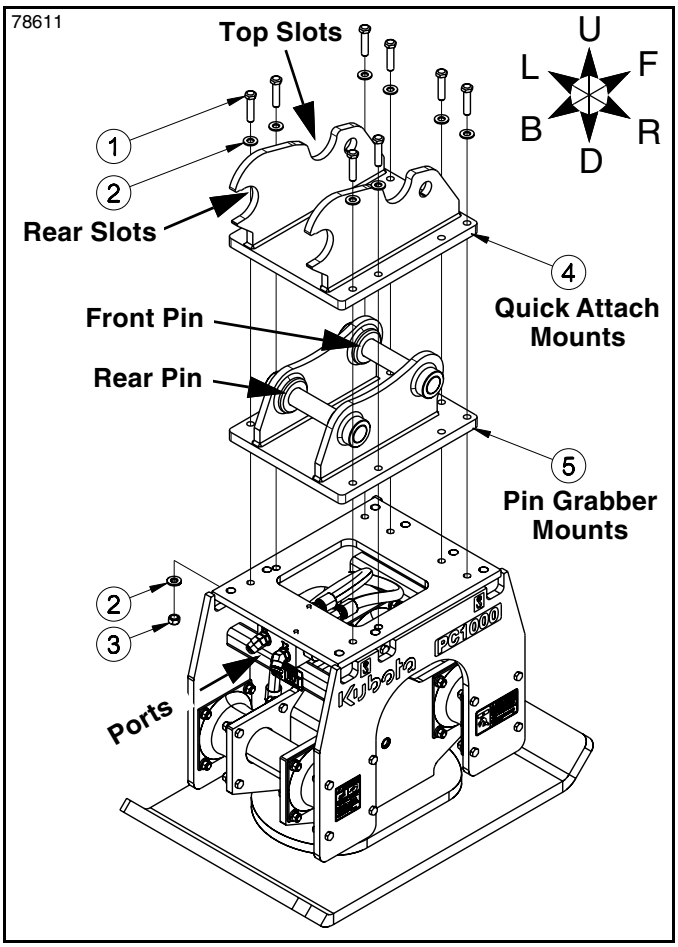
PC1000 Mounts

Refer to Figure 1-7:

The following are instructions for attaching a Kubota excavator mount to the PC1000 Plate Compactor.

NOTE: Hardware for attaching the mount is supplied with the compactor. Refer to **"Torque Values Chart"** on page 45 for correct torque values.

1. Position mount (#4 or #5) on the compactor with hydraulic ports facing toward the rear as shown.
2. Bolt the selected mount to the top of the compactor with eight 5/8"-11 x 2 3/4" GR8 bolts (#1), sixteen washers (#2), and eight locknuts (#3) as shown.
3. Tighten lock nuts (#3) to the correct torque. Refer to **"All Bolts Except Bearing Housing Bolts"** on page 44 for detailed tighten instructions.



Kubota PC1000 Mount Attachment
Figure 1-7

Connect Compactor to Another Machine

Kubota Plate compactors are factory checked to match Kubota excavators. If installing the compactor on another machine, the customer will need to supply a mount that matches that machine's coupler and have a qualified mechanic check the machine's hydraulic pressures and flows to verify they match.

Use hydraulic hoses and connectors that are sized correctly. Using hoses and fittings that are too small will result in overheated oil and early bearing failure.

Connect Compactor to a Kubota Excavator

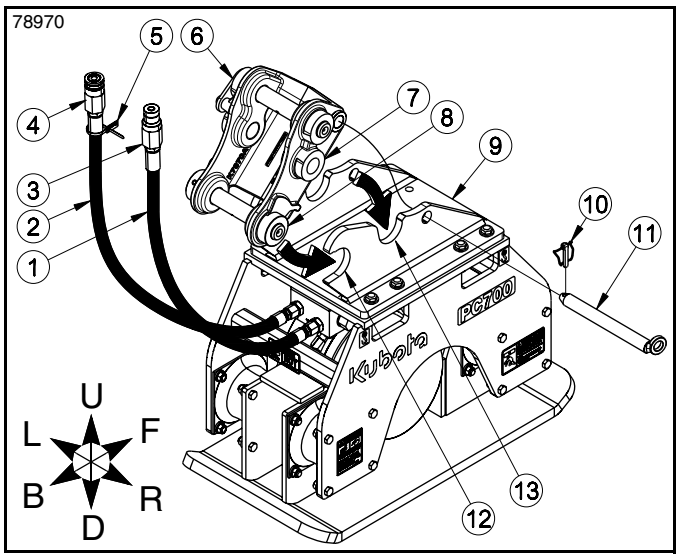
NOTE: The plate compactor cannot be connected directly to the dipper arm. A coupler must be used.

The following instructions describe the basic procedure to attach the compactor to an excavator equipped with a typical Quick Attach Coupler or Pin Grabber coupler. Coupling types will vary. The operator should always follow the instructions in the manuals provided with the excavator and/or coupler.

⚠ WARNING

To avoid serious injury or death:

- *A crushing hazard exists while connecting and disconnecting the attachment. Do not allow anyone to stand between attachment and power machine while approaching or backing away from the attachment. Do not operate controls including lift, extend, and swing while someone is near the power machine and/or attachment.*
- *The attachment must be fully resting on the ground and power machine shut down according to shutdown procedures before anyone can go near the attachment.*
- *Make sure the attachment is properly connected to the coupler on the dipper arm. The coupler must be secured to the attachment with lock pin fully inserted and secured in place with the linchpin. An improperly connected attachment can come loose and fall or being thrown.*
- *You can be injured by flying splinters when driving metal pins in and out. Use a soft-faced hammer or drift to remove or install metal pins. Always wear safety glasses.*
- *Make sure the coupler housings are free of obstructions such as mud, excess dirt, rocks and ice. Coupler engagement and disengagement may be impeded and could potentially create an unsafe connection for the attachment.*
- *Never stand beneath or position any body part beneath an attachment that is being removed or installed.*
- *Never attempt to reposition the attachment on the excavator's arm with the attachment off the ground. A crushing and/or pinch point hazard exists between coupler and attachment. Keep hands and fingers clear.*



Connect Excavator Coupler to Plate Compactor
Figure 1-8

Connect Using a Mechanical QA Coupler

The following instructions are for the Quick Attach Coupler. If using a Pin Grabber Coupler, refer to **"Connect Using a Pin Grabber Coupler"** on page 17.

Refer to Figure 1-8:

IMPORTANT: Do not use an excavator thumb with the Plate Compactor. The thumb can damage the Plate Compactor.

IMPORTANT: The Red Colored Tag (#5) is labeled "Pressure Line". This line must connect to the excavator pressure line.

NOTE: Customer to supply quick attach coupler (#6), lock pin (#11), and linchpin (#10). See your nearest Kubota dealer.

1. Check for and remove all debris in the interior of coupler housing (#6), mount (#9) and pin (#11).
2. Start excavator and place dipper arm in line with attachment. Fully retract curl cylinder.
3. Maneuver dipper arm forward to align and seat rear coupler pucks (#8) with slots (#12).
4. Secure coupler (#6) to mount (#9) as follows:

   If coupler (#6) has hydraulics:

   a. Retract wedge using coupler hydraulic cylinder.

   b. Extend curl cylinder to roll coupler (#6) down until pucks (#7) are with slots (#13).

   c. Extend coupler cylinder to drive its wedge under lock pin (#11).

   d. Check the wedge to make sure it has fully engaged under lock pin (#11).

If coupler (#6) does not have hydraulics:

a. Extend curl cylinder to roll coupler (#6) down until pucks (#7) are with slots (#13).

b. Shut excavator down according to **"Excavator Shutdown Procedure"** on page 11.

c. Insert lock pin (#11) through mount (#9) and quick attach coupler (#6). Secure lock pin with removed linchpin. (#10).

5. Continue with **"Connect Hydraulic Hoses to Excavator"** on page 18.

Connect Using a Pin Grabber Coupler

The following instructions are for the Pin Grabber coupler. If using a Quick Attach Coupler, refer to **"Connect Using a Mechanical QA Coupler"** on page 16.

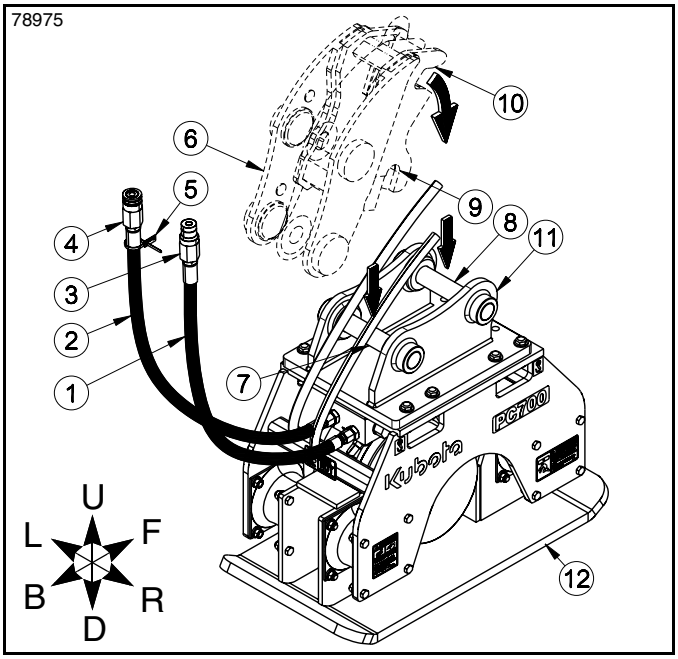
Refer to Figure 1-9:

IMPORTANT: Do not use an excavator thumb with the Plate Compactor. The thumb can damage the Plate Compactor.

IMPORTANT: The Red Colored Tag (#5) is labeled "Pressure Line". This line must connect to the excavator pressure line.

NOTE: Customer to supply Pin Grabber (#6). See your nearest Kubota dealer.

1. Check for and remove all debris in the interior of coupler housing (#6) and mount (#11).
2. Start excavator and place dipper arm in line with the Plate Compactor.
3. Fully extend curl cylinder and hold.
4. Hydraulically unlock pin grabber (#6).
5. Maneuver dipper arm forward and retract curl cylinder to align slots (#9) with pin (#7).
6. Lower slots (#9) over pin (#7) until the pin has fully engaged with the slots.
7. Extend curl cylinder to rotate front of pin grabber (#6) down until pin (#8) has fully engaged with slots (#10).
8. Lift dipper arm up while extending curl cylinder to maintain pressure between vibratory plate (#12) and the ground until the curl cylinder is fully extended and the plate compactor is raised off the ground.
9. Hydraulically lock pin grabber (#6) to mount (#11).
10. Confirm pin grabber (#6) is secured to mount (#11) by retracting curl cylinder and lowering the dipper arm until vibratory plate (#12) is parallel to the ground and only 2 to 3 inches above ground.
11. **"Connect Hydraulic Hoses to Excavator"** on page 18.



Connect Excavator Coupler to Plate Compactor
Figure 1-9

Connect Hydraulic Hoses to Excavator

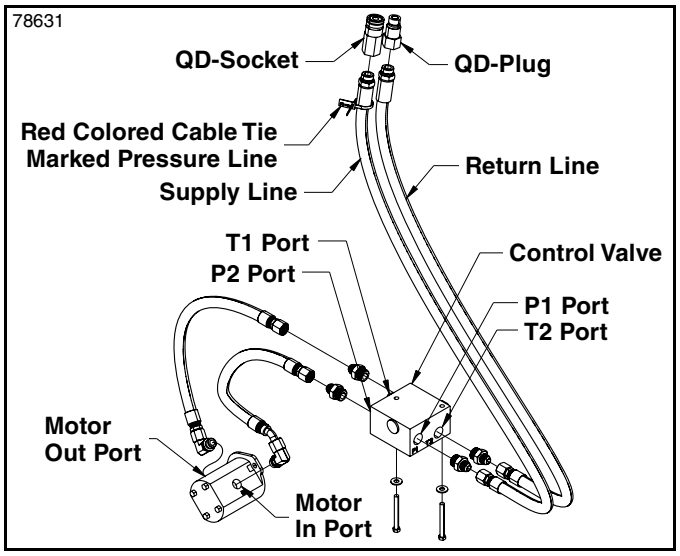
WARNING

To avoid serious injury or death:

- *Shutdown power machine and release all hydraulic pressure to the equipment before connecting or disconnecting hydraulic hoses to or from the power machine.*
- *Hydraulic fluid under high pressure will penetrate the skin or eyes causing serious injury. Wear protective gloves and safety glasses or goggles when working with hydraulics. Use a piece of cardboard or wood, rather than hands, when searching for leaks. If an accident occurs, seek immediate emergency medical care or gangrene may result. DO NOT DELAY.*
- *Make sure hydraulic hoses are properly routed without twists to prevent becoming stretched, pinched, or kinked. A damaged hydraulic hose can burst and leak hydraulic fluid.*

IMPORTANT: Refer to Figure 1-10: The compactor will not operate if the supply and return hoses are crossed. For ease of identification, the supply hose is tagged with a red colored label marked "PRESSURE LINE."

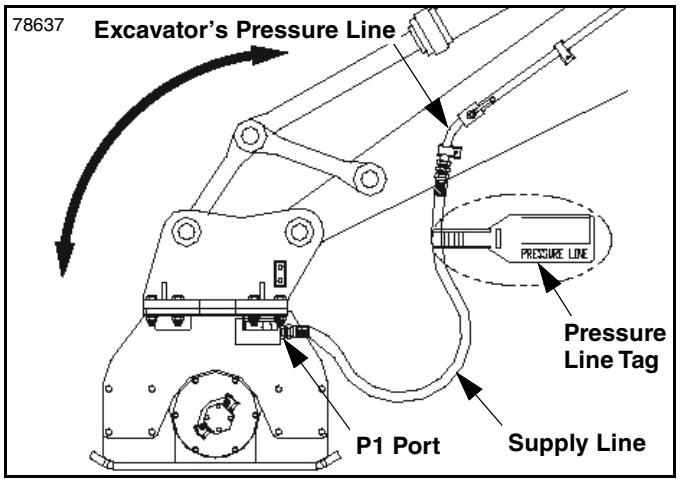
IMPORTANT: Contaminated oil can diminish service life. Prevent contaminating by always cleaning the area around connections prior to opening the hydraulic system.



Connect Supply & Return Lines
Figure 1-10

Refer to Figure 1-10:

1. Connect the supply (IN) and return (OUT) hoses to their designated ports.
   - Supply hose is tagged: Pressure Line
   - Supply hose is connected to valve port P1
   - Return hose is connected to valve port T2



Hose Clearance and Routing Check
Figure 1-11

Refer to Figure 1-11:

2. Raise the compactor off the ground and operate the bucket cylinder to ensure hoses will not be pinched or restricted. See the accompanying Figure 1-11 for hose clearances and routing with unrestricted movement.
3. Make sure the supply line is connected to the compactor's P1 valve port and excavator supply line.
4. Briefly test the compactor for proper operation. Stop and check for hydraulic leaks. Tighten hoses and connections as needed.

Disconnect Plate Compactor

The following instructions describe the basic procedure to disconnect the compactor from an excavator equipped with a typical Quick Attach Coupler or Pin Grabber coupler. Coupling types will vary. The operator should always follow the instructions in the manuals provided with the excavator and/or coupler.

⚠ WARNING

To avoid serious injury or death:

- *Hydraulic fluid can become hot as it flows through components such as hydraulic couplers, hoses, lines, fittings, motors, etc. Wear gloves when working with hydraulic components including while connecting and disconnecting couplers. It is best to allow hydraulic components to cool before touching them.*
- *A crushing hazard exists while connecting and disconnecting the attachment. Do not allow anyone to stand between attachment and power machine while approaching or backing away from the attachment. Do not operate controls including lift, extend, and swing while someone is near the power machine and/or attachment.*
- *The attachment must be fully resting on the ground and power machine shut down according to shutdown procedures before anyone can go near the attachment.*
- *You can be injured by flying splinters when driving metal pins in and out. Use a soft-faced hammer or drift to remove or install metal pins. Always wear safety glasses.*
- *Never attempt to reposition the attachment on the excavator's arm with the attachment off the ground. A crushing and/or pinch point hazard exists between coupler and attachment. Keep hands and fingers clear.*

Disconnect Using a Quick Attach Coupler

If using a Pin Grabber Coupler, refer to **"Disconnect Using a Pin Grabber Coupler"** on page 20. Otherwise, continue with instructions below.

Refer to Figure 1-12:

1. See **"Long Term Storage"** on page 51 when parking the compactor for an extended period and at the end of a working season.
2. Lower compactor with boom and dipper arm until it is resting on the ground.
3. Detach front of coupler (#6) from lock pin (#11) as follows:

   If coupler has hydraulics:

   a. Retract coupler's hydraulic cylinder to disengage wedge from under pin (#11).

   b. Skip to step 4.

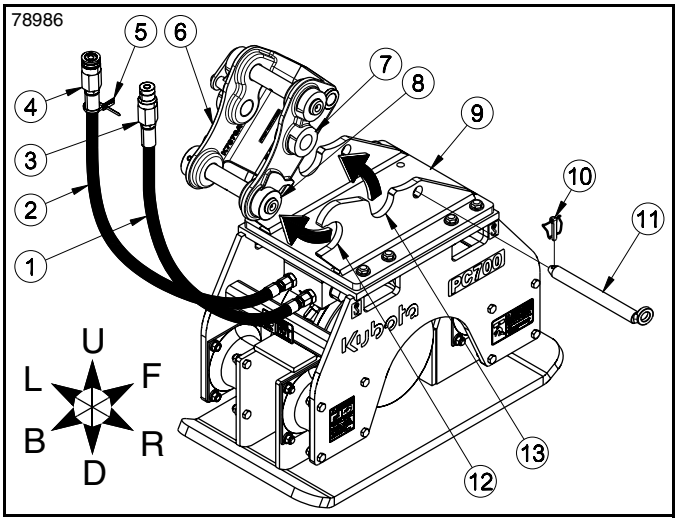
   If coupler does not have hydraulics:

   a. Shut excavator down according to **"Excavator Shutdown Procedure"** on page 11.

   b. Remove linchpin (#10) and lock pin (#11) from coupler (#6). If necessary, use a hammer to tap out lock pin.

   c. Set linchpin and lock pin aside for reuse later.

   d. Return to the excavator to finish disconnecting the Plate Compactor.
4. Retract curl cylinder to roll coupler pucks (#7) out of slots (#13).
5. Maneuver dipper arm rearward to disengage coupler pucks (#8) from slots (#12).
6. Shut excavator down according to **"Excavator Shutdown Procedure"** on page 11
7. Make sure all hydraulic pressures have been relieved. Refer to your excavator Operator's manual for detailed instructions.
8. Disconnect hydraulic hoses (#1 & #2) from the dipper arm.
9. Store hydraulic hoses on the compactor with couplers (#3 & #4) out of the dirt and away from coupler (#6) and mount (#9).
10. If coupler (#6) does not have hydraulics, replace lock pin (#11) in coupler (#6) and secure lock pin with linchpin (#10).
11. Return to the excavator and raise dipper arm with coupler (#6) above mount (#9).
12. Once the Quick Attach Coupler (#6) is raised above mount (#9), slowly back excavator away from the Plate Compactor while making sure not to catch on the compactor.



Disconnect Compactor Using a Quick Attach Coupler
Figure 1-12

Disconnect Using a Pin Grabber Coupler

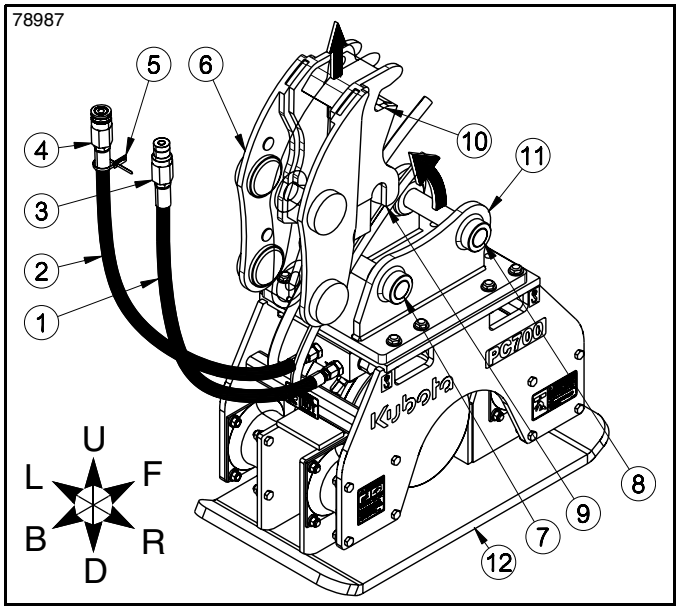
If using a Quick Attach Coupler, refer to **"Disconnect Using a Quick Attach Coupler"** on page 19. Otherwise, continue with instructions below.

Refer to Figure 1-13:

1. Fully extend curl cylinder and raise dipper arm as needed to keep the compactor from dragging on the ground.
2. With curl cylinder fully extended, hydraulically unlock pin grabber (#6).
3. Retract curl cylinder until vibratory plate (#12) is vertical (perpendicular) to the ground.
4. Lower compactor until lower end of vibratory plate (#12) is touching the ground.

NOTE: Pin (#8) will slip out of slot (#10) while rotating the Plate Compactor upright if, at any time in the rotation, vibratory plate (#12) lifts off the ground. Make sure the vibratory plate remains in contact with the ground and pin (#8) is in slot (#10) throughout the rotation.

5. Maneuver dipper arm while retracting curl cylinder to keep vibratory plate (#12) against the ground and slot (#10) over pin (#8). When finished, the Plate Compactor will be rotated upright and resting on the ground with slots (#9 & #10) still over pins (#7 & #8).
6. Continue to retract curl cylinder to lift slot (#10) off of pin (#8).
7. Continue to retract curl cylinder as needed and maneuver dipper arm to lift slot (#9) off of pin (#7).
8. Without stretching hydraulic hoses (#1 & #2), maneuver dipper arm back and down to lower pin grabber (#6) until it is resting on the ground.
9. Shut excavator down according to **"Excavator Shutdown Procedure"** on page 11.
10. Release all hydraulic pressure to the compactor. Refer to your excavator Operator's manual for detailed instructions.
11. Disconnect quick couplers (#3 & #4) from the dipper arm.
12. Coil-up hydraulic hoses (#1 & #2) and lay them on the compactor away from mount (#11). Store couplers (#3 & #4) on a clean surface away from dirt.

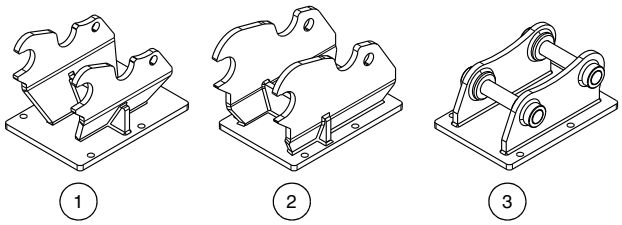


Disconnect Compactor Using a Pin Grabber Coupler
Figure 1-13

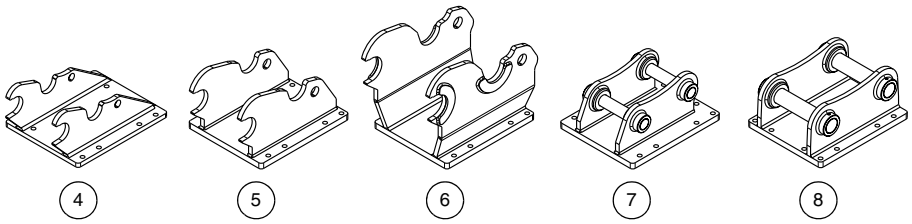
Kubota Plate Compactor Mounts

Refer to Figure 2-1:

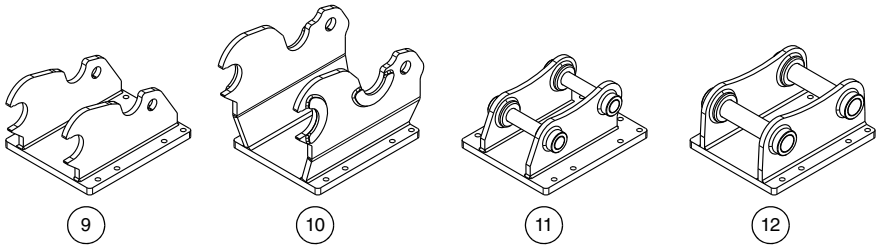
The optional Plate Compactor Mounts illustrated in Figure 2-1 are available for bolting to the PC400, PC700, and PC1000 Plate Compactors. They provide a means to quickly couple the Kubota excavators to the Plate Compactor. Hardware for attaching the quick coupler mount is included with the Plate Compactor.



78612 **PC400 Plate Compactor Mounts**



78613 **PC700 Plate Compactor Mounts**



78614 **PC1000 Plate Compactor Mounts**

Match Kubota Plate Compactor and Mounts with Kubota Excavators[1]

Plate Compactor	Plate Compactor Mounts			Kubota Excavator Model Numbers						
	Item	Part No.	Type	U35	U48	U55	KX030	KX040	KX057	KX080
PC 400	1	317-360A	PC Quick Attach	X			X	X		
	2	317-361A			X	X			X	
	3	317-454A	PC Pin Grabber		X	X			X	
PC 700	4	317-347A	PC Quick Attach					X		
	5	317-348A			X	X			X	
	6	317-406A								X
	7	317-441A	PC Pin Grabber		X	X			X	
	8	317-444A								X
PC 1000	9	317-348A	PC Quick Attach						X	
	10	317-406A								X
	11	317-441A	PC Pin Grabber			X			X	
	12	317-444A								X

Kubota Plate Compactor Mounts
Figure 2-1

Note:

1. The power machine's flow rates must fall within the Plate Compactor's hydraulic flow rate. Refer to table above for match-up of Plate Compactor and Kubota's power machine.

Operating Checklist

Hazard control and accident prevention are dependent upon the awareness, concern, prudence, and proper training involved in the operation, transport, storage, and maintenance of the Plate Compactor. Therefore, it is absolutely essential that no one operates the Plate Compactor unless they have read, fully understood, and are totally familiar with this Operator's Manual and the power machine's Operator's Manual. Make sure the operator has paid particular attention to:

Make the following inspections after attaching the Plate Compactor to the power machine.

1. Inspect safety equipment on the power machine to make sure it is in good working condition.
2. Inspect hydraulic hoses for pinch points. Reposition hoses if needed.
3. Inspect hydraulic hoses for wear, damage and hydraulic leaks. See **"Avoid High Pressure Fluids Hazard"** on page 3. Replace damaged and worn hoses and fittings with genuine Kubota parts.
4. Make sure hydraulic hoses are long enough and properly secured so they do not become stretched or pinched through their full range of motion.
5. Make sure all required maintenance has been completed before operating the Plate Compactor. Refer to **"Section 5: Maintenance"** on page 42.
6. Check initially and periodically for loose bolts and pins. Refer to **"Torque Values Chart"** on page 45.

General Safety Information

DANGER

To avoid serious injury or death:

- *A crushing hazard exists around power equipment. Do not allow anyone near the attachment and/or power machine while connecting and disconnecting the attachment and while operating the excavator and/or attachment.*
- *Always lower attachment until it is resting on the ground before shutting down the excavator and leaving the operator's seat.*
- *Do not allow bystanders to be near the excavator or attachment during operation. A person can become pinched, crushed, entangled, ran over, etc. Shut the attachment and excavator down when a bystander becomes too close.*
- *Do not drive excavator close to ditches, retaining walls, drop-offs, water, etc. Rollover due to a cave-in or mishap could result.*
- *Keep body and extremities, loose clothing, pull strings, etc. away from rotating/moving parts. Always shutdown the attachment and excavator before adjusting or servicing the equipment.*
- *Make sure the excavator has been properly shut down and pressure to the hydraulic system has been relieved before leaving the operator's seat.*
- *Never allow bystanders or yourself to go under the excavator attachment, boom or arm unless they are properly supported with non-concrete supports. Doing so can cause a crushing hazard.*
- *Never bypass or modify a safety device.*
- *Never make contact with overhead electrical power lines. Place an orange warning sign under overhead power lines indicating type of danger above.*
- *Never make contact with utilities such as power lines, gas lines, or other hazards, above or below ground. Always call dig safe 811 (USA) before digging so utility companies can mark the location of underground services in the area. Refer to "Dig Safe" on page 2.*
- *Use a "spotter" when it is hard to see in the direction you are traveling and when placing a load that obstructs your vision. A person or animal could be nearby in a blind spot.*

WARNING

To avoid serious injury or death:

- *Allow only persons to operate this equipment who have fully read and comprehended this manual, and who have been properly trained in the safe operation of this attachment. Serious injury or death can result from the inability to read, understand, and follow instructions provided in this manual.*
- *Always be alert when operating the excavator. Watch front, back and sides for people, animals, and obstructions. Watch for overhead clearances when raising the boom/arm and while traveling.*
- *Always operate the excavator while seated with seat belt properly fastened around the operator. The operator can be pinched, crushed, and/or thrown about if not properly seated.*
- *Always shut the excavator down according to the "Shutdown Procedure" provided in this manual before leaving the operator's station.*
- *Always shutdown the excavator before adjusting, servicing, cleaning, or maintaining the attachment. Follow the appropriate "Shutdown Procedure" provided in this manual, then disconnect the attachment's hydraulic hoses.*
- *Always transport with attachment carried low to protect against rollover, contacting overhead objects such as tree limbs, power lines, etc., and to avoid loss of control.*

- *Avoid driving over an area that has been filled with loose soil. Loose soil can cause the excavator to sink and be unstable. Always compact loose soil before driving over it.*
- *Avoid hitting solid objects with this attachment. Solid objects can damage equipment and throw the operator forward causing loss of control, bodily injury, or death.*
- *Beware of obstacles stationed alongside the excavator. Never swing the boom and attachment into fire hydrants, mailboxes, buildings, vehicles, fences, trees, or other standing obstacles.*
- *Beware of pinch points such as components come in contact with one another or passing by one another. Keep body extremities away from pinch points.*
- *Check attachment fit-up frequently to ensure it is properly connected and secured to the excavator. An improper fit-up can cause the attachment to disconnect and fall or be thrown from the arm.*
- *Check hydraulic hoses and fittings frequently. Brush and other debris can damage hoses and fittings causing hydraulic fluid to escape. Escaping fluid under pressure can penetrate skin. Large leaks can result in loss of control.*
- *Consult your excavator's Operator's Manual for operating capacity, lifting capacity, and operating specifications. Exceeding rated capacities and specifications can result in loss of control, roll-over or other serious hazard.*
- *Do not alter attachment or replace parts on the attachment with other brands. Other brands may not fit properly or meet OEM (Original Equipment Manufacturer) specifications. They can weaken the integrity and impair the safety, function, performance, and life of the attachment. Replace parts only with genuine OEM parts.*
- *Do not operate the attachment on the side of a steep incline. Doing so can result in a rollover.*
- *Do not travel across an incline where equipment could slip or roll-over.*
- *Do not use attachment for anything other than what it was designed to do.*
- *Do not use attachment to lift people or as a work platform. It is not properly designed or guarded for this use.*
- *Dress properly for the job. Do not wear loose fitting clothing or clothing with pull strings. Keep long hair tucked in. Clothing and hair can become entangled in rotating components. Wear footwear that will improve footing on slippery surfaces.*
- *Never carry riders on the attachment or power machine. Riders can obstruct the operator's view, interfere with controls, be pinched by moving components, become entangled in rotating components, struck by objects, thrown about, fall off and be ran over, etc.*
- *Hydraulic fluid can become hot as it flows through components such as hydraulic couplers, hoses, lines, fittings, motors, etc. Wear gloves when working with hydraulic components including while connecting and disconnecting couplers. It is best to allow hydraulic components to cool before touching them.*
- *Hydraulic fluid under high pressure will penetrate the skin or eyes causing serious injury. Wear protective gloves and safety glasses or goggles when working with hydraulics. Use a piece of cardboard or wood, rather than hands, when searching for leaks. If an accident occurs, seek immediate emergency medical care or gangrene may result. DO NOT DELAY.*
- *Keep all steps, hand holds, and controls free of dirt, grease, debris, and oil.*
- *Make sure safety labels are installed in their proper location and are in good condition before operating the attachment. Read and obey all instructions on the labels.*
- *Make sure the attachment is resting on the ground and all hydraulic pressure is relieved before disconnecting hydraulic fittings from the power machine.*
- *Make sure the boom and arm do not make contact with buildings, fences, poles, trees, etc, or bystanders while swinging the cab and/or boom from side to side. Hitting property can damage the excavator and/or property. Hitting bystanders can cause serious injuries or death.*
- *Make sure the coupler housings are free of obstructions such as mud, excess dirt, rocks and ice. Coupler engagement and disengagement may be impeded and could potentially create an unsafe connection for the attachment.*
- *Never attempt to reposition the attachment on the excavator's arm with the attachment off the ground. A crushing and/or pinch point hazard exists between coupler and attachment. Keep hands and fingers clear.*
- *Operate only excavators equipped with a certified Roll-Over Protective Structure (ROPS) and seat belt. Fasten seat belt snugly.*
- *Perform scheduled maintenance. Check for loose hardware, missing parts, broken parts, structural cracks, and excessive wear. Make repairs before putting the attachment back into service.*
- *Always store the attachment in a secure position so it will not fall over.*
- *Do not allow children to play on or around the attachment, including when stored. Children can fall off the attachment or the attachment can fall onto the children.*

IMPORTANT: Do not use excavator thumb with the Plate Compactor. The thumb can damage the Plate Compactor.

Know the Plate Compactor's Compatibility

The Plate Compactor is designed to deliver satisfactory performance when used with a broad range of excavators. In all instances it first must be confirmed through adequate research and testing, that the power machine is suitable to operate the compactor. The technical data, as well as information concerning connecting requirements, can be found in this manual and shall be strictly observed.

Since excavator hydraulic circuits differ and options vary, careful review of the power machine's specifications along with thorough knowledge of the system's operation, including hydraulic and electric, is required. If in doubt and further assistance is required, it is the responsibility of the power machine owner to contact their authorized Kubota dealer.

Know the Plate Compactor's Limits

Do not try to upgrade the Plate Compactor's performance with unapproved modifications. Operating the compactor beyond its design limits can cause damage. Refer to **"Specifications & Capacities"** on page 52.

Inspect the Worksite

DANGER

To avoid serious injury or death:

Do not drive excavator close to ditches, retaining walls, drop-offs, water, etc. Rollover due to a cave-in or mishap could result.

Worksites can be hazardous. Do not work close to banks, trenches, or drop-offs where there is a danger of them collapsing or slipping off the edge. Ground surfaces adjacent to water can be soft. Throughly inspect the work site problem areas as follows:

- Check for potholes, weak ground, hidden rocks, etc. Mark any problem areas that are a potential hazard.
- Check for utilities (electric cables, gas and water pipes, etc.). Mark the positions of cables and pipes.
- Poor visibility can cause accidents and damage. Make sure visibility and lighting in the work area are adequate.

Operating Instructions

Recommended Use

The compactor is designed for use in soil compaction. Applications include backfill compaction, base course preparation, finish surface treatment, and embankment buildup.

The compactor can also be an effective sheet or pile driver. Vibration energy is transferred through the sheet or pile to the soil. Soils with 50% or more granular content are “liquefied” by the vibration, which breaks the skin friction, allowing the sheet or pile to penetrate more easily. For more information, Refer to **“Section 4: Soil Compaction Guide”** on page 30.

Special Conditions of Use

IMPORTANT: The compactor must not be used under water.

The compactor may require modifications, special operating techniques, or increased maintenance if used in conditions that differ from normal compaction work such as:

- Operating in extremely low or high temperatures
- Use of special hydraulic fluids.
- Operating with a power machine other than a Kubota excavator.

Operating Conditions

Hydraulic oil

In general, the hydraulic oil originally intended for the excavator can be used with this Plate Compactor. Refer to **“Hydraulic Fluids”** on page 48.

Operating temperature

IMPORTANT: The temperature of the hydraulic oil must be monitored. Using the correct oil grade and properly maintaining temperature will help ensure correct oil viscosity. Refer to **“Oil Specifications”** on page 49.

The operating temperature range is from 0 °C (32 °F) to 80 °C (176 °F). If you must work in a temperature lower than 0 °C (32 °F), the compactor must be preheated before any operation can begin. Start the operation with low hydraulic flow.

Principles of Operation

The compactor combines three actions that are highly effective in the compaction of granular type soils:

1. **Vibration:**
   The vibratory action is generated by the hydraulic motor that drives the out-of-balance, eccentric mass at a high rpm. Granular soils are extremely responsive to consolidation by vibration. Soil particles are set in motion and settle under their own weight. The air surrounding these particles is forced out, allowing the particles to pack closely together.
2. **Impulse force:**
   Generated by the centrifugal force of the rotating eccentric mass. When properly controlled, this also gives an impact force.
3. **Down force:**
   A pressing force exerted by the excavator against the compactor springs.

Vibration, impulse force, and down force are transferred through the attached compaction plate to the soil. For more information, refer to **“Section 4: Soil Compaction Guide”** on page 30.

Pre-operation Inspection

WARNING

To avoid serious injury or death:

Repair or replace any damaged components prior to operation. Do not operate the compactor until all faults are corrected.

IMPORTANT: Operating the Plate Compactor beyond its performance limits will cause equipment damage. The Plate Compactor is designed to provide optimum performance with reliable service life at the flow and oil pressure specified. If your power machine and compactor are not Kubota matched, have your power machine’s hydraulic circuit tested before using the compactor. To know if you have a Kubota match, refer to **“Kubota’s Plate Compactor - Excavator Match Chart”** on page 10.

For safe and proper operation, perform a thorough daily inspection of the equipment before use:

1. Ensure the compactor is securely attached to the excavator. Check mounting pins and hardware for wear or damage.
2. Remove any excess dirt and debris that accumulate on the compactor as this may decrease performance.
3. Inspect components for tightness, wear, cracks, leaks, illegible labels, etc. For detailed instructions, refer to **“Daily Maintenance”** on page 43.

Operating Techniques

Always practice proper operating techniques.

- Do not allow the top frame to contact the base plate. Spring mount and frame damage may result. Stretch the spring mounts no more than approximately one-half (1/2) their width.
- Do not use the compactor to lift or push materials. Damage to spring mounts and other components may result.
- Do not operate the compactor underwater. Bearing damage may result.
- Do not operate the compactor without the compaction plate attached. A dynamic imbalance may result in equipment damage.
- At temperatures below 0°C (32 °F), operate the compactor for a few minutes without down force to allow the spring mounts to warm.
- Do not operate the compactor with hydraulic oil temperature above 176 °F (80°C).

Operating the Compactor

⚠ WARNING

To avoid serious injury or death:

- *Flying debris hazard. Injury from flying debris. Do not operate the compactor with workers in close proximity of the work zone. Clear all personnel from the work area before the compactor is operated. Personal protection equipment, including safety eyewear, must be worn when operating or servicing this equipment.*
- *Noise hazard. Risk of hearing impairment or loss. Hearing protection must be worn by all personnel exposed to prolonged high noise levels.*
- *Falling hazard. Injury from falls into open excavations. Ground vibrations may collapse trench walls. Excavations must be shored to meet federal, state and local guidelines. Erect barriers around open excavations to control entry into established work zone.*

IMPORTANT: Do not use the excavator thumb with the Plate Compactor. The thumb can damage the Plate Compactor.

NOTE: Before starting compaction work, it is recommended to perform compaction measurement tests with the material to be compacted to determine specific output rates and degrees of compaction. For more information on measuring compaction, Refer to **"Section 4: Soil Compaction Guide"** on page 30.

1. Clear all personnel from the work area.
2. Position excavator in line with the direction of work.
3. Position the compactor parallel to the work surface and within view of the operator. The compaction plate must be in full contact with the work surface for maximum effectiveness.
4. Activate the compactor with the switch located in the operator's cab.
5. Use the excavator to push down against the springs of the compactor. In addition to transferring the vibratory energy more effectively to the soil, this adds static pressure to assist in compaction.

IMPORTANT: Over-stretching the rubber springs will contribute to early spring failure. Stretch the spring mounts no more than approximately one-half (1/2) their width.

6. Maintain down pressure as the material compacts. For larger areas, decrease the boom down-force and slide the compactor over the material with a repetitive, back and forth motion. The initial pass is continued until compaction is no longer apparent, typically 5 to 15 seconds.

IMPORTANT: Run the compactor until maximum density is achieved. Avoid unnecessary run time that can lead to loosening of soil previously compacted.

7. Repeat compacted lifts as necessary until a finished surface is achieved. Optimum compaction is usually obtained with two passes. The duration of the initial pass is dependent on depth and material. The second pass may require additional fill material and compactor repositioning to achieve finished grade.
8. After compaction is complete, re-position the compactor and/or excavator to continue working.

NOTE: Exposure to abrasions, over-stretching, and heat build-up from prolonged operating cycles all contribute to a shorter spring life. Stop operating the compactor while repositioning it to help minimize heat-aging of the rubber.

Factors Affecting Compaction Results

The rate of compaction to 95% (Modified Proctor test) will vary due to the type and condition of material being compacted, the configuration of the area to be compacted, the type of compaction equipment being used, and the operator's technique.

Other factors that will produce different results include:

- Compaction is affected by material type. Soils with 50% or more granular content are the most responsive to compaction through vibratory action.
- Moisture content is also critical to achieving maximum compacted densities of fill material. Fill materials may need conditioning prior to compaction. For information on measuring compaction, Refer to **"Section 4: Soil Compaction Guide"** on page 30.

The suggested operation technique for vibratory plate compactors that follows should be considered as a starting point and general guideline.

Lift Heights

The lift height or depth of the soil layer being compacted affects the degree of compaction that can be achieved and the amount of time required to reach the specified compaction level (specified percentage of Proctor).

Soil densities are reduced at the bottom of excessively high lifts. If the lift is too thick, it will either take too long to reach the desired level of compaction or the desired soil density will be unattainable. Try different lifts to determine the maximum and most effective lift that can be used and still achieve the required soil density.

Soil may also be over-compacted. This wastes time, causes "cracking" of the compacted layer, and creates unnecessary wear on the compaction equipment as excessive impact force is transferred back into the compactor. Overworking the soil also pulls moisture to the surface. This may cause the moisture content to shift from the optimum range and affect compaction results.

Field Operating Procedures

Each compaction operation has its own challenges. To meet those challenges safely and efficiently, it is important to know the basic operating procedures:

- Machine positioning
- Compaction pattern
- Duration of compaction
- Down-force to apply
- Making the finishing pass

The following topics are designed to inform the operator how to perform these basic operating procedures in different situations.

General

Position the compaction plate on an area to be compacted. Apply enough down-force with the boom to stretch the rubber spring mounts on the compactor approximately one-half their width. This is necessary to adequately transfer the compaction energy to the soil. Activate the compactor. As soil density increases, the vibrating energy is transmitted deeper into the material.

During compaction, lower the boom to "follow" the material and maintain the one-half-width rubber spring deflection. Keep the compaction plate in full view of the operator. Hold the compaction plate parallel to the work surface and maintain full contact with the material being compacted.

Continue to apply the compaction plate to the same area until refusal (until further compaction is no longer apparent). Depending on the type of material, the size of the compactor and the height of the lift, it may take approximately 10 to 15 seconds. This gives the material adequate time to respond to the energy being applied.

When the entire area has been compacted once, make a second pass. Apply the compaction plate to one area at a time again until further compaction is no longer apparent.

Finally, make a light finish pass to smooth out high spots and establish the final grade. While the compactor is vibrating, make a "troweling" motion with the compaction plate, keeping it in contact with the compacted surface while swinging the power machine's boom.

Confined Areas

Position and keep the compaction plate over the area to be compacted. If part of the compaction plate rests on undisturbed material, the undisturbed material will prevent the compaction plate from thoroughly compacting the material in the excavation.

Trenches

When compacting trenches, straddle the trench with the power machine and position it in line with the direction of work. Keep the compaction plate entirely over the fill material, as described above under **"Confined Areas".**

An efficient technique for compacting pipe trenches is to slope the backfill. With this technique, the compaction operation can follow closely behind the pipe placement operation. With the power machine on the compact material, begin by compacting fill material into a corner, against a manhole, or against already compact material. Then place fill material to create a slope in the trench from the pipe, or trench bottom, to a grade level at approximately 45 degrees. Compact the fill material starting at the bottom and working up the slope. The resulting compacted backfill provides a stable slope against collapse. Repeat this process with another layer of fill moving forward along the trench.

Embankments

Begin at the bottom of the embankment, holding the compaction plate in line with the desired slope of the embankment. When a complete pass has been made along the base of the embankment, begin working up the slope. Continue making passes along the edge of the already compacted material until the top of the embankment is reached. Smaller lifts may be necessary to avoid non-compacted fill material from sliding down the embankment.

10	12	11
7	9	8
4	6	5
1	3	2

Compaction Sequence
Figure 3-1

Open Areas

Refer to Figure 3-1:

When compacting open areas too large to cover without moving the power machine onto the compacting area, start at the edge of excavation (area 1) and compact the back-filled material within reach of the boom before moving the power machine to the next area to compact (area 2). Continue to compact ahead of the advance of the power machine, compacting completely around the edge of the area. Then work toward the center of the area, continuing to compact along the edge of the remaining non-compacted material until the entire area has been compacted. See ***Figure 3-1*** for an open-area compaction sequence.

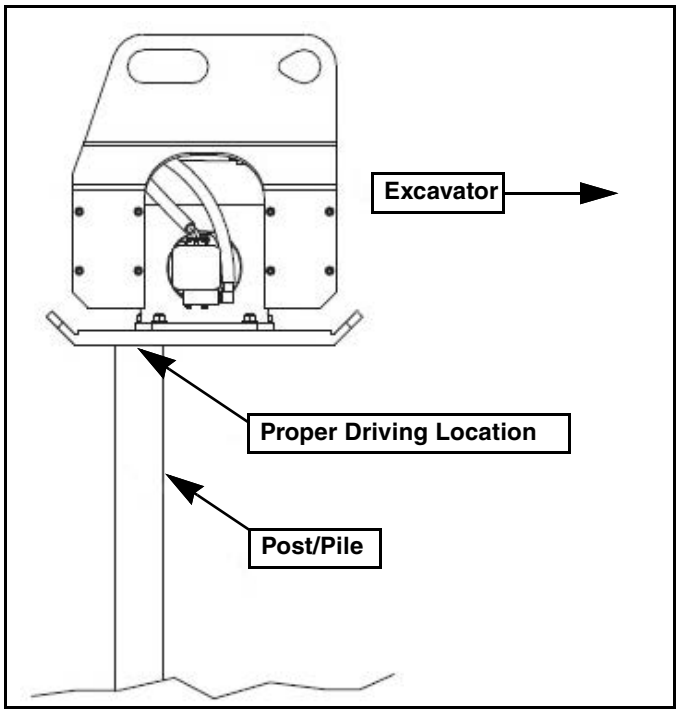
Precautions During Operation

General construction safety precautions must be observed, such as locating existing underground service and utility lines, establishing pedestrian barriers, and utilizing proper personal safety equipment including safety glasses and ear protection for all personnel in the immediate area.

NOTE: The operator must read the operator's manual provided with the equipment and follow all operating instructions while operating the compactor.

Damage to the compactor and the power machine may result if the compactor's compaction plate is not evenly positioned on the material to be compacted. Unequal deflection of the rubber mounting springs may allow the metal components of the dynamic assembly to impact the mounting frame, possibly damaging the components of the compactor and transferring harmful vibrations into the power machine's boom. Eventual damage to the rubber springs will also occur.

Investigate any unusual noises, excessive vibrations or erratic operation and remedy the cause(s) prior to continuing. Refer to **"Section 8: Troubleshooting"** on page 55 for possible causes.



Post and Pile Driving Technique
Figure 3-2

Other Plate Compactor Applications

Plate Compactors may be used for certain other operations in addition to soil compaction.

Post/Pile Driving

IMPORTANT: When using the Plate compactor for post or pile driving, it is recommended that the power machine have in place a polycarbonate door or guard between the operator and the attachment.

Plate Compactors may be used to drive and extract load bearing pilings, posts, and sheet piling. Timber posts, steel sheet piles, and “H” or “I” beams can be driven into many different soil conditions including clay, sand, and rocky soils. Successful installations in lengths of up to 60 feet have been reported. Results are dependent on compactor model, post/pile material, and soil conditions.

Driving Technique

Refer to Figure 3-2:

When driving posts and piles, the best results are achieved when the compactor is in contact with the post/pile and down pressure is applied. Position the compactor with the front 1/4 to 1/3 of the compaction plate in contact with the post/pile. The compactor is most effective when positioned perpendicular to the post/pile. Limit the down pressure to avoid over stretching the spring mounts or contacting the upper frame with the compaction plate.

A deep rumbling sound will result when the compactor is operating effectively. For hard soil conditions, it may be necessary to use the front edge of the compaction plate. This increases the vibration amplitude, but it also makes positioning more difficult. While a small amount of “slapping” is acceptable, excessive “slapping” can result in excessive vibrations and cause damage to the compactor, power machine, and/or post/pile.

Brackets or guides may be welded onto the bottom of the compactor's compaction plate to assist the operator with proper engagement. Contact your local dealer for more information.

A compactor can also be used to extract a post/pile. In this application, a mechanical stop must be added to the compactor to prevent over-stretching the spring mounts as the post/pile is pulled upward.

This Guide

This guide contains background information about soil, soil compaction, and basic soil compaction equipment. It also contains general information about the operation of machine-mounted vibratory compactors and drivers, as well as performance data for our compactor models derived from field tests.

NOTE: The compaction measuring methods described in this guide are specific to North American practices and examples only. You should follow the approved or recommended local or country-specific methods for measuring compaction in your area.

Definitions

A list of terms used throughout this section and their definitions are listed on page 31. Refer back to them when needed.

Terms	Definitions
ASHTO	American Association of State Highway Transportation Officials.
Ampl	Total vertical distance from the neutral position that the vibrating drum or plate is displaced.
ASTM	American Society for Testing and Materials.
Backfill	Material used to refill an excavation.
Bank yards	Measure of soil volume in its original position before digging.
Binder	Fines that fill voids in soil or hold gravel together when dry.
Centrifugal force	Unbalanced impulse force generated by an eccentric weight rotating at a given speed.
Clay	Soil composed of microscopic platelets of rock.
Cohesion	A property that causes soil particles to stick together and resist compaction.
Compacted yards	A measure of soils or rock after it is placed and compacted in a fill.
Compactability	Property of soil that allows it to deform under load.
Density	The ratio of the weight of a quantity of soil to its volume, expressed as lb/ft3, for example.
Elasticity	A property of soil that allows it to compress or deform when a force is applied, but return to its almost original configuration when the force is removed.
Expansive Soil	A soil that swells when wetted and shrinks when dried.
Fines	Minute clay or silt particles in soil.
Frequency	Rotational speed of the eccentric shaft in a vibratory compactor, expressed as number of vibrations per minute.
Granular material	Soil with sandy or gritty particles that are coarser than cohesive (clay) soil particles and do not tend to cohere to each other.
Gravel	Loose, rounded fragments of rock varying from 2 to 76 mm (0.08 to 3.0 inches).
Gumbo	Soil material in a plastic sticky state, with a soapy or waxy appearance.
Humus	Organic portion of soil formed by decaying plant or animal matter.
Lift	A layer of soil or other material before or after compaction.
Liquid limit	The water content at which soil passes from a plastic to a liquid state.
Loam	A soft, easily worked soil consisting of clay, silt, sand and decayed vegetable material.
Operating weight	Weight of the compacting device, including all fluids and attachments (same as Working weight).
Optimum moisture content	The amount of moisture in a soil required to achieve the greatest dry density of that soil through compaction. Expressed as a percent.
Pass	A single series of applications of the compacting device across the surface to be compacted.
Permeability	The ability of water to freely pass through soil.
Plasticity	The ability of soil (such as clay) to retain its shape when rolled into a fine strand.
Proctor test	A standardized laboratory test method for determining the maximum density of soil that is used to establish field compaction specifications, commonly expressed as “% Proctor.”
Proctor test, modified	A variation of the Proctor laboratory test for high-shear strength soils.
Pumping	A “spongy” condition in compacted soil where excess moisture prevents soil particles from settling firmly together, although the soil may be at or near its maximum density.
Sand	A loose granular material composed of mineral particles smaller than gravel, but larger than silt.
Shear resistance	The resistance of soil particles to sliding against one another when compacting force is applied, resulting from interference (friction) and cohesion.
Silt	Soil composed of particles between 0.005 and 0.050 mm in diameter.
Soil	Loose material in the upper layer of the earth's crust composed variously of mineral, vegetable and animal particles.
Working weight	See Operating weight.

Know Your Soil

Soil Types

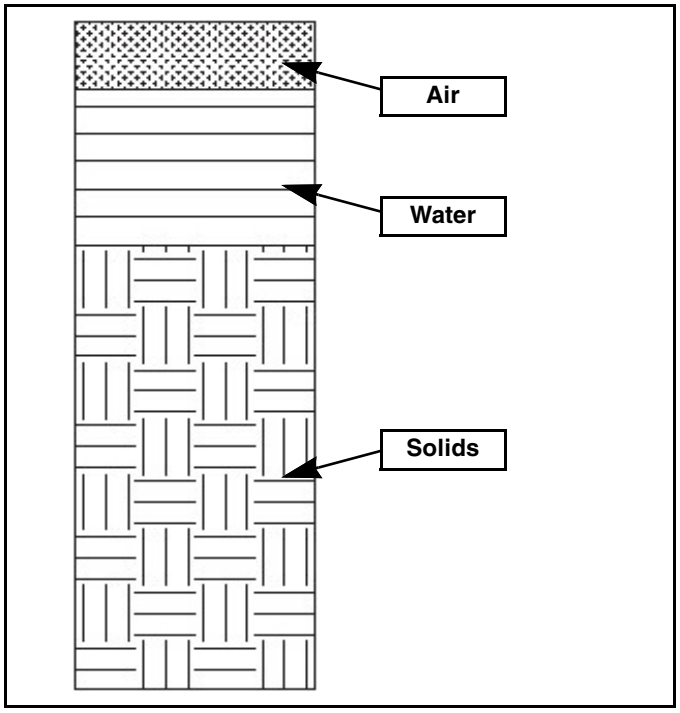
Refer to Figure 4-1:

Many soils are a mixture of organic, granular and cohesive soils. Loam is a common example of this. Spaces between the particles may be occupied by air or moisture. The particles vary in size, shape, and composition. Soils are commonly classified by grain sizes, measured by passing the soil through a series of screens or sieves with different mesh sizes. Soils fall into three general categories: organic, granular, and clay or cohesive.

1. Organic soils (peat) contain large concentrations of vegetable and animal material (humus) in various stages of decomposition. Organic soils are not suitable for compaction and the support of rigid construction. Therefore, organic soils are outside the scope of this guide.
2. Granular soils are typically comprised of sand and gravel particles, with 20% or more granular content. The particles range in sieve size from 0.08 mm (0.003 in, sand) to 25.4 mm (1.0 in, medium gravel). Relatively large spaces between the “lumpy” grains allow water to readily drain through the soil.
3. Clay or cohesive soils contain particles of typically very small, flat “platelets” ranging in sieve size from 0.001 to 0.05 mm (0.00004 to 0.002 in), with less than 20% granular content. The platelets pack tightly together, held by molecular attraction, making clay soils very dense. Drainage through clay is poor.

Recognizing Soil Types

1. Granular soils may be distinguished from clay or cohesive soils by visual examination and feel.
2. Granular soils have visible grains of sand and gravel. They feel gritty when rubbed between the fingers. They readily mix with water. The particles settle (or the water drains out) when mixing stops. When wet, there is little or no plasticity (the soil will not retain its shape when molded). When dry, there is little or no cohesive strength (the soil crumbles easily).
3. Clay soils have no particles that are visible to the naked eye. They feel smooth and slippery when rubbed between the fingers. They will not readily mix with water. When wet, the surface is slick and greasy and can readily be molded. If clay is rolled into a slender 'rod' shape, it will retain that shape when the rod is held by one end. When dry, clay soils have high strength, crumble with difficulty, and are slow to saturate with water.



Idealized Soil Diagram
Figure 4-1

Achieving Compaction

Refer to Figure 4-2:

Compaction is the process of mechanically increasing the density or unit weight (kg/m^3 or lb/ft^3) of soil by packing the soil particles closer together to force out air.

When soil is disturbed by excavation, soil particles become separated by air pockets causing the soil volume to increase and soil density to greatly decrease. While all disturbed soils will settle (become more dense) with time, mechanical compaction reduces the time for this to occur.

Soil must be as dense as possible to maximize its load carrying capability, provide stability, and minimize subsequent settling that can result in cracking or displacement of, for example, supported structures, paved surfaces, or pipelines. Compaction also reduces subsequent water seepage, swelling, and contraction.

Compaction is achieved through the application of mechanical force to layers or “lifts” of the disturbed soil. This force overcomes friction between the soil particles and causes the particles to move closer together. Compaction falls into two major categories: static and dynamic.

Static Compaction

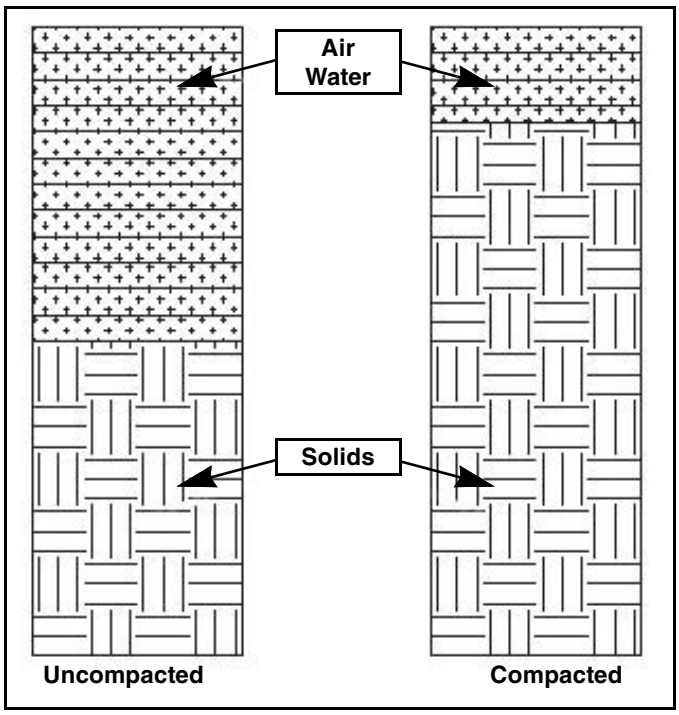
Static compaction is simply the application of extreme force to the disturbed material, causing it to compress until it is capable of supporting the applied force. Static forces include kneading and compression, and are typically applied by non-vibratory (sheepsfoot and smooth) rollers. Static compaction is typically limited to the soil and material near the surface and is most effective for thin layers of non-granular materials and asphalt.

Dynamic Compaction

Dynamic compaction achieves the desired result by introducing waves of motion in the soil that set the soil particles in motion. This causes the soil particles to reorient and fill vacant spaces, thus making the soil denser. Dynamic forces include impact and vibration, and are applied by a variety of hand-guided and machine-mounted devices that generate stress waves that are transferred to the soil.

Impact compaction equipment (also known as rammers and tampers) generates a lower-frequency, longer-stroke (compared to vibratory) motion. This motion is used to break soil “clumps” into smaller pieces and push the pieces closer together. Impact compaction is more effective for soils with less than 50% granular content, such as clay soils.

Vibration compaction equipment generates a higher frequency, smaller stroke motion. This motion, or stress wave, is transferred to the soil by direct contact. The stress wave causes the soil particles to move and vibrate, which effectively liquefies the soil and allows the soil particles to fill voids between them. The result is a denser, more compact soil. Vibration compaction is most effective for soils with 50% or more granular content.



Idealized Uncompacted and Compacted Soil Comparison
Figure 4-2

Soil	Permeability	Foundation Support	Pavement Sub-grade	Expansive	Compaction Difficulty
Gravel	Very High	Very high	Excellent	No	Very Easy
Sand	Medium	Good	Good	No	Easy
Silt	Medium Low	Poor	Poor	Some	Some
Clay	Very low	Moderate	Poor	Common	Very Difficult
Organic	Low	Very Poor	Very poor	Some	Very Difficult

Soil/Substrate Type and Compaction

Soil properties that affect the ability of soil to be compacted and also suggest the best compaction force for the job include shear resistance, elasticity, cohesion, permeability, and volume change (swelling or shrinkage).

Shear Resistance

Shear resistance is the resistance of soil particles to movement under applied compaction force resulting from friction between the particles. The greater the friction force and the greater the contact area between particles, the more difficult it is to compact the soil. This explains why clay soils are more difficult to compact than granular soils.

Elasticity

Elasticity is the property of a soil mass that causes it to return to its original form after deformation (that is, after a load is applied and removed). 'Spongy' organic soils have a high degree of elasticity, which makes them unsatisfactory as a base for surfaces such as roads that experience cyclical loads. Cyclical loads can lead to flexing and cracking of the paved surface if poorly supported.

Cohesion

Cohesion is the property of soil particles that causes them to stick to one another. It is stronger in clay soils than in granular soils.

Permeability

Permeability is a characteristic of soil that allows water to flow through it as a result of gravity. Permeability has a major effect on a soil's gumbo. Refer to **“Moisture Content and Compaction”** on page 35.

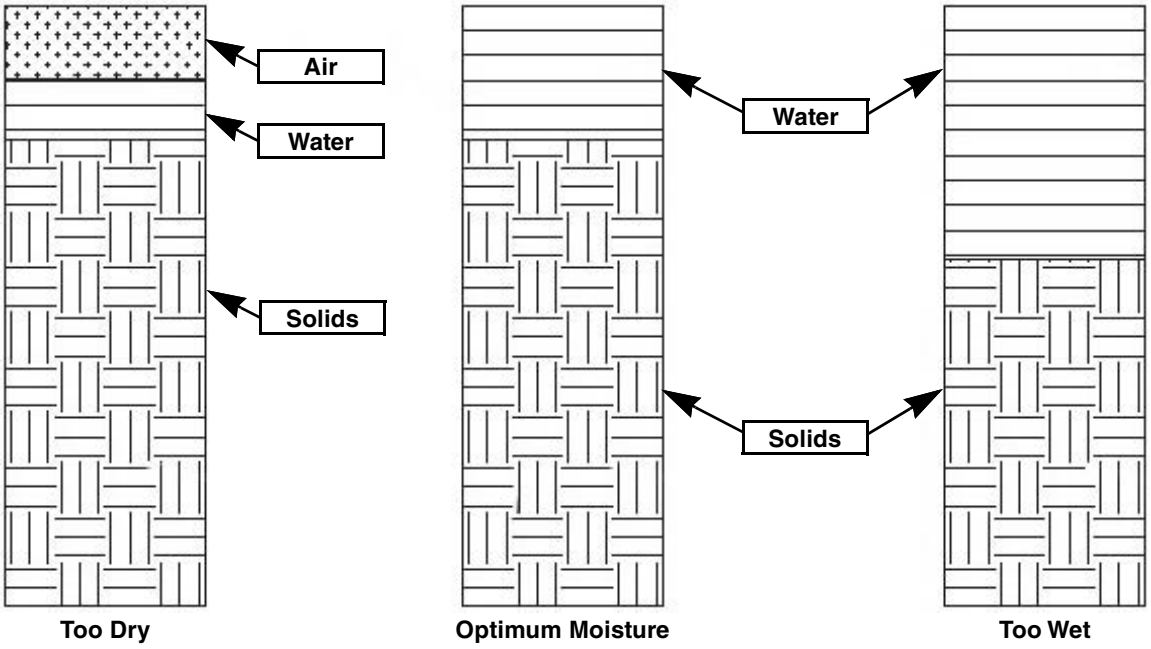
Volume Change

Volume change as a result of changes in moisture content is a critical consideration when soils are used as sub-grades for roads. Volume change is generally not a great concern in relation to compaction, except for clay soils where compaction does have a marked influence. With clay soils, the greater the density, the greater the potential volume change as a result of swelling. Swelling also has a negative effect on load bearing capacity.

Particles in The Soil

Another characteristic of soil that affects its compact-ability is the presence or absence of “binder” materials. Binder materials refer to small particles, or “fines”, that fill voids between larger particles and hold gravel together when dry. A soil that consists of a wide range of particle sizes, with the smaller particles filling the voids, forms a dense mass that compacts well.

See table above for typical soil behavioral characteristics.



Idealized Soil Moisture Comparison
Figure 4-3

Moisture Content and Compaction

Refer to Figure 4-3:

Moisture content is the amount of water in a soil, expressed as a percent of the total weight of the soil. Achieving and maintaining the optimum moisture content is very important for proper compaction. Optimum moisture content is defined as the percentage of moisture that results in the highest density (fewest air voids) of the compacted material after the water is removed.

Without water, soil particles will not stick together. Water also acts as a lubricant, allowing the particles to slide together and fill air voids during compaction.

While every soil responds differently, soils with a moisture content near the optimum are more effectively compacted and result in greater compaction densities.

However, if too much water is added, soil density decreases (soil becomes spongy). This is because the water displaces soil particles, expanding the volume of the soil and transforming it into a plastic state with little or no load bearing ability. This is also called pumping. Refer to **"Field Density Compared to a Lab Standard"** on page 36.

Moisture content has less effect on the compactability of heavy clays than on slightly plastic, clayey sands and silty sands. However, if heavy clay is compacted more than 2% above the optimum moisture contact, it becomes too fluid and difficult to work. Poorly graded soils (with an uneven concentration of particle sizes) are also relatively unaffected by changes in moisture.

On the other hand, granular soils with better grading and higher densities react sharply to slight changes in moisture, resulting in sizable changes in dry density.

Measure Compaction

Field Density Compared to a Lab Standard

Field compaction (density) measurements are based on comparisons with the results of standardized laboratory tests. The Proctor test, a standardized laboratory test widely used in the USA, was developed in the 1930's. The original Proctor test was eventually modified to make it more suitable for evaluating soils capable of supporting heavier loads. These tests led to AASHTO (American Association of State Highway and Transportation Officials), ASTM (American Society for Testing and Materials), and other tests that are widely used to determine the optimum soil density and moisture content for a soil sample.

In the standardized laboratory tests, soil taken from the job site is divided into portions. Each portion is mixed with a different amount of water to produce a range of samples, each with a different moisture content.

Each sample is then placed in a graduated cylindrical container (with a known volume). A specified weight or hammer is dropped on successive layers of the soil from a specified height, for a predetermined number of blows. The compacted volume is recorded and the compacted material is weighed to establish a “wet” density.

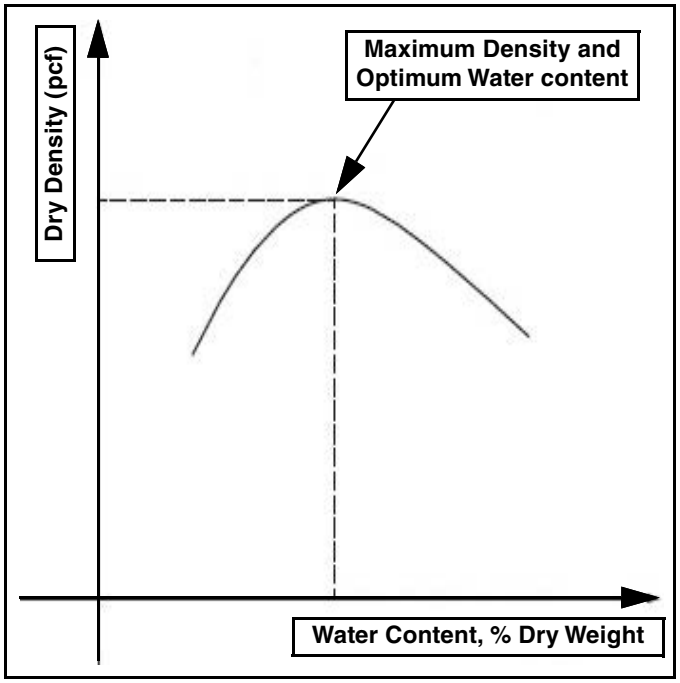
The material is then oven dried and reweighed to determine what the water content was at the time of compaction and a “dry” density is determined. The dry density for each sample is plotted against the moisture content at which it was attained.

Refer to Figure 4-4: A curve is then drawn through the points to determine the moisture content at which the greatest compacted density will be obtained. This density is referred to as “100% of Proctor”.

Once this laboratory value is established, the field compaction objectives can be specified as a percentage of Proctor. For example, a compaction specification of “95% of modified Proctor” means that the field compacted soil density should be 95% of the value established by the modified Proctor laboratory test.

Percent of Proctor = Field Density Measurement / Max Laboratory Density Measurement

The density of a compacted sample taken from the field site is measured and compared to the laboratory reading to see if the specification has been met. Refer to **“Field Measurement Methods”** on page 37.



Maximum Density and Optimum Moisture Diagram
Figure 4-4

Field Measurement Methods

Refer to Figure 4-5:

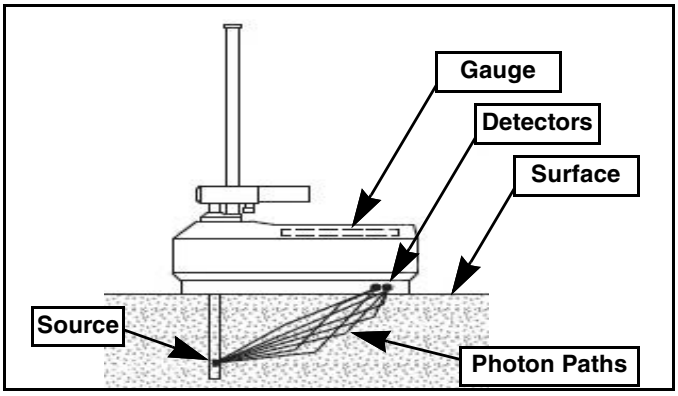
There are several traditional soil density field tests, including the Sand Cone Test, the Balloon Test, and the Shelby Tube test. However, most soil density field tests done today are performed with a nuclear density gauge. This device quickly and accurately determines soil density and moisture content. See the illustration for an operational diagram of a nuclear density gauge.

In traditional field tests, a sample of the compacted material is removed and the volume of the cavity created by the sample is measured.

The sample material is weighed and its wet, compacted density is calculated. It is then dried and again weighed to determine the dry density. The original moisture content and dry density are then located on the Proctor curve to determine if the material has been compacted to the percentage of Proctor specified.

In the nuclear density gauge test, the Proctor density and optimum moisture content are programmed into the nuclear density gauge. A detector probe is inserted into the soil to the desired depth. Gamma rays are emitted from the probe. Some gamma rays are absorbed by the soil and water in the compacted material. The denser the soil and the greater the water content, the more rays that are absorbed.

Those rays not absorbed by the compacted material are sensed by a detector/counter in the nuclear density gauge. The denser the soil, the lower the count. The nuclear gauge provides readouts of radiation counts, wet and dry densities, moisture content and (by comparison with the programmed Proctor values) percent of Proctor.



Nuclear Density Gauge Operational Diagram
Figure 4-5

Operating Method

Plate compactors are mounted on power machines with hydraulic booms. Inside the dynamic assembly is an eccentric mass that is supported on bearings. The mass is rotated by a hydraulic motor, which is powered by the machine's hydraulic system.

The eccentric weight in the Plate Compactor develops a low impact force per blow, but delivers many blows (2000-6000) per minute. This force is transferred through the base plate into the soil being compacted. The soil near the base plate begins to vibrate and rearrange, making the soil particles come closer together. This eliminates voids between the particles and forces out air that was trapped in the voids.

The down-force applied through the boom provides a pre-load force to effectively transfer the vibrating energy into the soil and to follow the material as it compacts. The actual compaction effect of the down-force is minimal compared to the vibrating and rearranging of the soil particles.

Determining Dynamic Compaction Force

The dynamic compacting force generated by a Plate compactor is a function of the amplitude of the motion and the frequency at which the plate changes directions.

The amplitude is the maximum movement of the vibrating body in one direction from its at-rest or neutral position. The apparent amplitude, or the height the machine lifts the plate off the ground between blows, increases as the material becomes more dense and compacted.

The frequency is the rotational speed of the eccentric shaft driving the counter weight.

When combined with the mass of the compactor, these two factors result in an "impulse force" or "centrifugal force," indicating the compaction force of the Plate Compactor specified in pounds or newtons.

The working or operating weight of the Plate Compactor and the down-force applied by the boom provides a pre-load force to properly transmit energy into the soil.

Compaction Methods and Soil/ Substrate Types

Certain methods of compaction are best suited to specific soil conditions and situations. The compactor operator must be aware of the type of soil being compacted and be prepared to adjust the compaction technique to achieve the desired results.

In cases where the soil is a mixture of types (granular, clay), select the best method for the type of material that represents the largest percentage of the material to be compacted. In some situations, testing may be needed to determine the best technique.

Granular Soils

Where particles move freely against one another, such as sand and gravel, vibration will cause the particles to move and settle. Vibratory compacting is well suited for granular soils. The particles respond to different vibration frequencies. As the size of the particles increases, heavier equipment with lower frequencies and higher compaction forces (amplitudes) should be used.

Clay and other Cohesive Soils

Where the soil particles stick together, a high impact force is required to rearrange the particles and force the air out. Compactors that generate squeezing and kneading forces, such as rammers, tampers, and rollers, are well suited for cohesive soils. When using vibratory compactors, reduce lift heights to achieve the best results.

Sand and Clay Mixture

Compaction equipment is less effective in semi-cohesive soils that require increased compaction force, when compared to granular soils. As with clays and other cohesive soils, when using vibratory equipment, reduce lift heights and increase the amount of compaction time to achieve desired results.

Confined Versus Unconfined Areas

In confined areas, all types of compactors are generally effective with granular soils. In unconfined areas, compactors tend to push the soil aside rather than compacting it. However, vibratory compactors that settle the soil tend to be more effective than rammers and tampers. Confinement, or lack of it, has less effect on the compactability of clay soils.

Preparing an Area For Compaction

Proper pre-conditioning of the soil is extremely important to achieve optimum results.

If compaction is being done to specification, first conduct a Proctor or other standardized test to determine the maximum density and optimum moisture content. Refer to **"Measure Compaction"** on page 36. Just prior to compaction, determine the moisture content of the backfill material.

If the moisture content is too high relative to the optimum, as determined by the Proctor test, spread the material out and allow it to dry, or blend it uniformly with other dry material. If it is too low relative to the optimum, add water. Typically, plus or minus 2% is acceptable, but this range depends on the governing compaction specification.

Term	Definitions
V_{water}	Volume of water in gallons. $0.0012 \times D_{target} \times V_{soil} \times (W_{target} - W_{actual})$
D_{target}	Target soil density in pounds per cubic foot.
V_{soil}	Volume of soil to condition in cubic feet.
W_{target}	Target moisture content in percent.
W_{actual}	Actual moisture content in percent.

When the soil is properly conditioned, backfill the excavated area evenly with suitable equipment and in the appropriate lift heights, depending on the type of material, the depth of the excavation, and the compaction equipment being used.

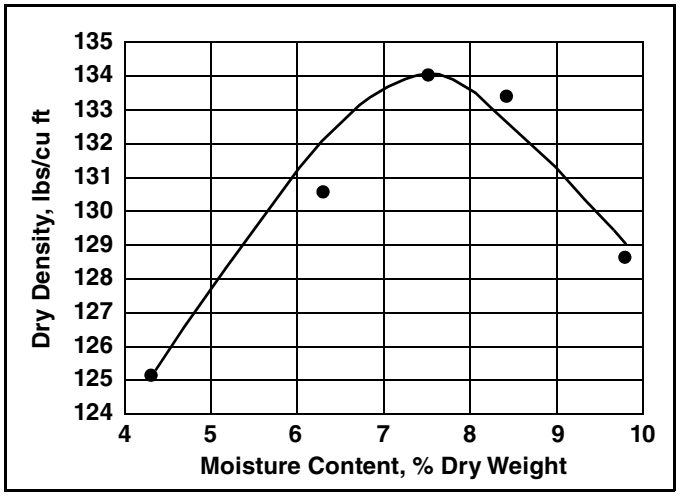
Data Gathering Procedure

NOTE: The operator must read the operator's manual provided with the equipment and follow all operating instructions while operating the compactor.

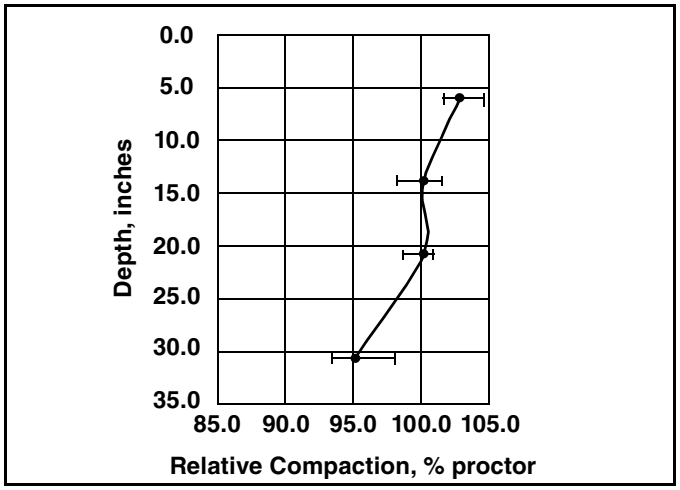
Data presented here for vibratory compactors was gathered at the Construction Products test facility in Marblehead, Ohio.

1. A pit was excavated and the excavated material was discarded.
2. Provision was made to remove any water that might accumulate in the pit from rain or other sources.
3. **Refer to Figure 4-6:** A supply of ODOT #411 (Ohio Department of Transportation) graded limestone aggregate was obtained and subjected to a standardized Proctor test (ASTM D698-00a METHOD C) by a certified construction materials testing firm to establish maximum density and optimum moisture content. Refer to **"Measure Compaction"** on page 36.
   - Test results indicated highest density weight for #411 aggregate is 134 lbs/cu ft at 7.5% moisture.
   - 100% Proctor = 134 lbs/ft^3 (2,146 kg/m^3).
4. Prior to compaction, the moisture content of #411 aggregate was measured and adjusted to bring it within 2% of the optimum (7.5%) moisture content.
5. Measurement of the average depth of the empty pit was taken.
6. The pit was then filled with the prepared aggregate in various lift heights.
7. A measurement of the surface level of the non-compacted material was taken to determine the average height of the lift.
8. The material was then compacted with the Plate Compactor test model.
9. The surface level of the compacted lift was measured to determine the average compacted height of the lift.
10. Measurements were taken and recorded at four points at a prescribed depth below the surface with a nuclear density gauge by a certified construction materials testing firm to establish the density, moisture content, and percentage of Proctor of the compacted material.
11. A layer of compacted material approximately equal to the length of the nuclear density gauge probe was carefully removed.
12. Steps 10 and 11 were repeated until the desired depth was reached or density readings fell below 95% of Proctor.
13. **Refer to Figure 4-7:** Data was summarized and plotted for the PC1000 model Plate compactor.

Compactor Performance Data



ODOT #411 Proctor Test Results
Optimum Dry Density Verses Moisture Content
Figure 4-6



Compaction Results Model 1000
with 1 x 30" Lift of #411 Stone
Figure 4-7

References and Further Reading

Other reading materials relating to soil compaction can be found on the web as follows:

- American Society of Testing and Materials, D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort

  Website: www.astm.org

- "Construction and Materials Specifications", Ohio Department of Transportation (ODOT), Office of Construction Administration

  Website: https://www.transportation.ohio.gov/wps/portal/gov/odot/working/publications/spec-book

- Model 3430 Manual of Operation and Instruction, Troxler Electronic Laboratories, Inc.

  Website: www.troxlerlabs.com

- Chapter 8, Soil Compaction, FM 5-410 Military Soils Engineering, U.S. Army Corp of Engineers

  Website: https://armypubs.army.mil/

General Maintenance

Proper servicing and adjustments are key to the long life of any equipment. With careful inspection and routine maintenance, you can avoid costly downtime and repair.

Handle the parts carefully and remember to cover any cleaned and dried parts with a clean, lint-free cloth. Do not use anything other than purpose-designed materials for cleaning hydraulic parts. Never use water, paint thinners or carbon tetrachloride.

Components, gaskets and seals in the hydraulic system should be oiled with clean hydraulic oil before assembly.

DANGER

To avoid serious injury or death:

- *Always shut excavator down using "Excavator Shutdown Procedure" on page 11 before dismounting the power excavator and/or allowing anyone to come near the excavator and attachment.*
- *Always secure equipment with solid, non-concrete supports before working under it. Never go under equipment supported by concrete blocks or hydraulics. Concrete can break, hydraulic lines can burst, and/or hydraulic controls can be actuated even when power to the hydraulics is off.*
- *All guards and shields must be installed and in good working condition while operating the attachment.*

WARNING

To avoid serious injury or death:

- *Perform service in safe work areas. Never service the compactor in the trench.*
- *Personal protective equipment, including safety eye-wear, must be worn while operating or servicing this equipment.*
- *Make sure all controls are all in neutral position or park before starting the power machine.*
- *Hydraulic flow to the equipment must be disengaged and the power machine must be shutdown according to the shutdown procedures provided in this manual before anyone is allowed to clean or service the equipment.*
- *Keep all persons away from the attachment while lowering and raising the unit. A person can be hit, pinched, or crushed by the unit.*
- *Allow only persons to perform maintenance on this attachment who have been properly trained in the safe operation of this attachment.*
- *Always lower attachment and dozer blade to the ground, shut engine off, remove switch key, and lock control levers before dismounting the excavator.*
- *Do not alter attachment or replace parts on the attachment with other brands. Other brands may not fit properly or meet OEM (Original Equipment Manufacturer) specifications. They can weaken the integrity and impair the safety, function, performance, and life of the attachment. Replace parts only with genuine OEM parts.*
- *Perform scheduled maintenance. Check for loose hardware, missing parts, broken parts, structural cracks, and excessive wear. Make repairs before putting the implement back into service.*
- *Make sure safety labels are installed in their proper location and are in good condition before operating the attachment. Read and obey all instructions on the labels.*

IMPORTANT: Do not make alterations to the Plate Compactor without written authorization from Kubota. Contact your local dealer for advice before modifying the Plate Compactor.

Wash Compactor

IMPORTANT: Plug pressure and return hydraulic lines before washing the compactor. Otherwise, dirt could get in and cause damage to the components.

Dirt, mud, rock powder, etc. can become attached to the Plate Compactor. Wash the outside of the compactor with a steam washer before sending it to the workshop. Dirt on the unit can cause difficulties with disassembly and assembly.

Clean surfaces on the compactor:

- In extreme humidity conditions
- When muddy
- When reduced performance is observed

Maintenance Schedule

The compactor requires a minimum of maintenance when properly installed, operated, and maintained.

The maintenance schedule below specifies how often and what items need to be inspected in order to maintain the safety, reliability, and performance of the compactor.

Intervals are based on standard (normal) operating conditions. If operating conditions become harsh and extreme, the intervals must be increased accordingly. Some examples of harsh and extreme conditions are:

- Operating with hydraulic fluid that has accumulated a higher than normal percentage of water content.
- Operating in extremely high temperatures.
- Operating at high elevations.
- Operating in extended continuous use.
- Operating in very dusty conditions.

NOTES: While the frequency of inspections and maintenance depend primarily on amount of use, other factors such as extreme dusty conditions require increased cleaning frequencies. Refer to **"Wash Compactor"** on page 42.

Use the routine maintenance schedule below. Shorten interval lengths to adjust for extreme conditions.

Plate Compactor Maintenance Schedule					
	Hours[2]				
Items	10[3]	50	250	N/A[4]	Notes[5]
Visual Inspection[1]	X				A,B
Check fastener torques		X			C,B
Bearing re-lubrication				X	D
Measure oil pressure			X		E

Notes:

1. The method described for daily inspections is identified as a "walk around". All external components must be looked at for any visible signs of wear, damage, loose, missing or unsecured fasteners, fluid leaks, and cracks in welds.
2. The hours given refer to the excavator hours with the compactor installed.
3. Refer to **"Daily Maintenance"** on this page.
4. N/A = Non-applicable
5. Refer to notes A through E below:
   - A. Refer to the **"Daily Maintenance"** check list while performing the visual inspection.
   - B. As recommended unless a change in performance is observed.
   - C. After first 50 hours of use.
   - D. Bearings are lubricated for life and sealed. No re-lubrication is necessary or possible.
   - E. Recommended as a check only by qualified personnel. See your local excavator dealer.

Initial Maintenance

Check all bolts and pins after using the Plate Compactor for several hours to ensure they are tight and secured. Tighten all loose hardware as indicated in the **"Torque Values Chart"** on page 45.

Replace worn, damaged, or illegible safety labels by obtaining new labels from your Kubota dealer.

Daily Maintenance

Check the following every 10 hours:

NOTES: Visual Inspect fasteners every 10 hours. Tighten lose fasteners. Replace missing and damaged fasteners. Make sure to replace fasteners with same size, type, and grade. Follow proper sequential torquing procedures.

1. Check for and remove any debris on the Plate Compactor that can decrease its performance.
2. Visually check all bolts and pins every 10 hours to ensure they are tight and secured. Replace any missing or damaged hardware. Tighten all loose hardware using proper sequential torquing procedures. Refer to **"Threaded Fastener Instructions"** provided on pages 44 & 45.
3. Check components for excess wear and damage. Replace components as needed.
4. Check spring mounts for cracks or separation from end plates. Replace spring mounts as needed.
5. Check motor, valve, and seals for oil leaks. Repair or replace any component that is leaking.
6. Check hydraulic hoses and fittings for oil leaks. Tighten fittings as needed. Replace hoses and fittings if any of the following conditions are present:
   - Fittings with a leak that cannot be eliminated through proper tightening techniques.
   - Displaced end fittings on hydraulic hose ends.
   - Damaged or deteriorated hoses.
   - Outer coverings are chafed or cut.
   - Wires in the hoses are exposed.
   - Outer coverings are ballooning.
   - Flexible part of the hoses are kinked.
   - Outer covers have embedded armoring.
7. Check for and replace all worn, damaged, or illegible safety labels with new labels from your Kubota dealer.

Special Maintenance Intervals

The service intervals are considerably shorter when working conditions are not normal. For examples of unusual working conditions, refer to **"Special Conditions of Use"** on page 25. Consult your local dealer for the correct service intervals.

Threaded Fastener Instructions

Due to vibration and shock loads experienced by the compactor, all threaded fasteners must be checked frequently for loose, broken or missing bolts. Keep threaded fasteners tight and replace missing or damaged fasteners with new fasteners. Replacement fasteners must be of the same type and grade. Follow tightening procedures and bolt torques. Not following these instructions when tightening fasteners can have serious consequences.

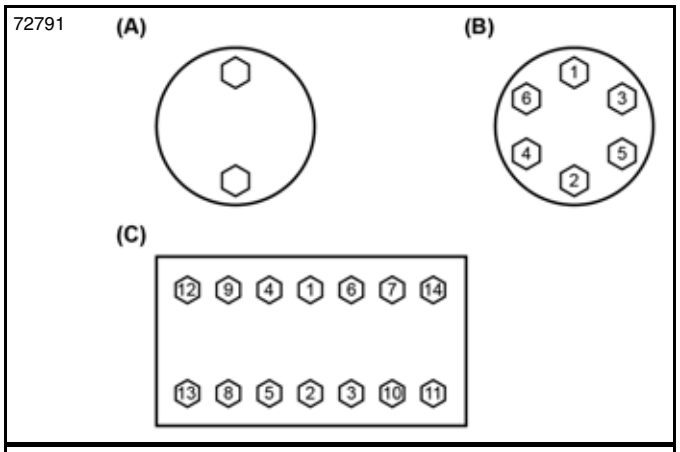
Special Instructions for All Fastners

Refer to Figure 5-2 & Figure 5-3 on page 45:

NOTES:

- All threads must be free of damage and foreign debris.
- Surfaces to be bolted together must be clean and flat.
- Do not apply thread lock compound to the bolt threads unless instructed to do so.

1. Clean threaded fasteners and surfaces to be bolted together. Replace fasteners with damaged threads.
2. Lightly lubricate bolt threads.
3. A hardened washer must be used under the head of a bolt in a blind hole.
4. When a nut and bolt are used together, a hardened washer must be used under the fastener being rotated. Make sure the opposite end (non-rotating end) does not rotate while tightening the hardware.
5. Refer to **"Torque Values Chart"** on page 45 when tightening a fastener.



(A) Top to bottom alternately
(B) Diagonally across starting from the center
(C) Diagonally across the center

Tightening Sequence
Figure 5-1

Bearing Housing Bolts

Refer to Figure 5-1, Figure 5-2, & Figure 5-3 on pages 44 & 45.

1. Bolts (#5) should be systematically tightened in a crisscross pattern starting from the most rigid part of the component.
2. Tighten bolts (#5) in the crisscross pattern sequence shown in Figure 5-1, pattern (B) until 1/3 of the specified torque is reached.
3. Tighten bolts (#5) again in the same crisscross pattern until 2/3 of the specified torque is reached.
4. Tighten bolts (#5) one more time in the same crisscross pattern to their full torque value.

All Bolts Except Bearing Housing Bolts

Refer to Figure 5-1, Figure 5-2, & Figure 5-3 on pages 44 & 45.

1. Install all bolts (#1, #2, #3, & #4) finger-tight to their positions.
2. When there is only one bolt fastening an object, tighten the bolt to its full torque value.
3. When there are two or more bolts fastening an object, tighten bolts as follows:
   a. Tighten bolts in a crisscross pattern sequence until 1/3 of their specified torque value is reached.
   b. Tighten bolts again in the crisscross pattern until 2/3 of their specified torque is reached.
   c. Tighten bolts one more time in the crisscross pattern to their full torque value.
4. Bolt (#4) is used to attach an optional mount to the compactor's top frame. Refer to **"Installation of Optional Mounts"** on page 14.

Torque Values Chart

Bolts Included With Plate Compactor Models				SAE Bolt Head Identification			Metric Bolt Head Identification		
				Bolt Size (inches)	SAE Grade 8		Bolt Size (Metric)	8.8 Class 8.8	
PC400	PC700	PC1000	Special Notes	in-tpi [1]	N · m [2]	ft-lb [3]	mm x pitch [4]	N · m	ft-lb
X	X	X		**3/8"**	47	35			
X	X	X		**7/16"**	88	65			
		X		**1/2" - 20**	74	55			
X	X	X		**1/2" - 13**	115	85			
		X	Socket head bolts	**1/2"**	129	95			
		X	Only bearing housing mounting bolts	**5/8"**	230	170			
	X	X	All except bearing housing bolts	**5/8"**	257	190			
X		X		**3/4"**	366	270			
		X		**7/8"**	542	400			

[1] in-tpi = nominal thread diameter in inches-threads per inch

[2] N· m = newton-meters

[3] ft-lb= foot pounds

[4] mm x pitch = nominal thread diameter in millimeters x thread pitch

Torque tolerance + 0%, -15% of torque values. Unless otherwise specified use torque values listed above.

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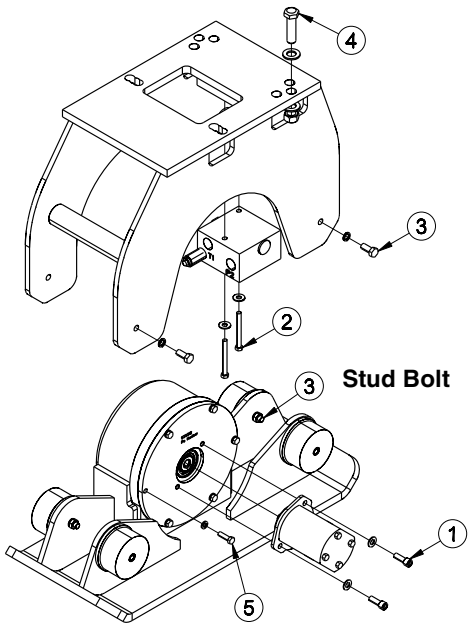

Item #	Model No.	Bolt Description
1	PC400	Hex socket bolt .... 7/16" x 1 1/4"
2	PC400	Hex bolt ..... 3/8" x 3 3/4"
3	PC400	Hex bolt ..... 1/2" x 1 1/8" Stud bolt ..... 1/2" x 1 1/4"
4	PC400	Hex bolt ..... 3/4" x 2 3/4"
5	PC400	Hex bolt ..... 3/8" x 1 1/4"

PC400 Bolt Location
Figure 5-2

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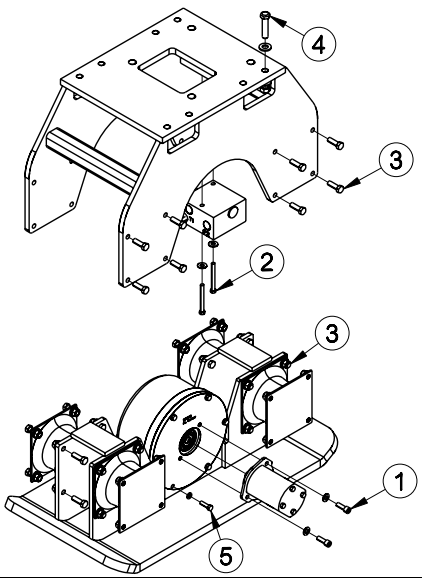

Item #	Model No.	Bolt Description
1	PC700 PC1000	Hex socket bolt .... 7/16" x 1 1/4" Hex socket bolt ..... 1/2" x 1 1/2"
2	PC700/1000	Hex bolt ..... 3/8" x 3 3/4"
3	PC700 PC1000	Hex bolt ..... 1/2" x 1 1/2" Hex bolt ..... 1/2" x 1 3/4"
4	PC700/1000	Hex bolt ..... 5/8" x 2 3/4"
5	PC700 PC1000	Hex bolt ..... 3/8" x 1 1/4" Hex bolt ..... 1/2" x 1 1/2"

PC700 & PC1000 Bolt Location
Figure 5-3

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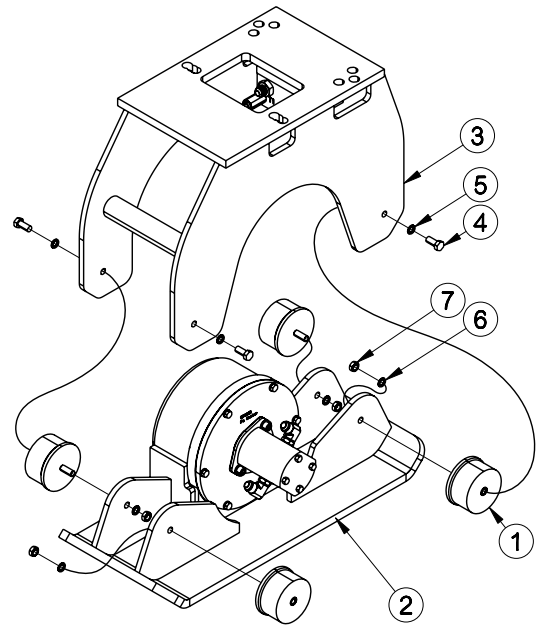

	Hex Bolt #4	Nord-lock Washers #5 & #6
PC400	1/2" x 1 1/8"	1/2"

Spring Mounts for PC400
Figure 5-4

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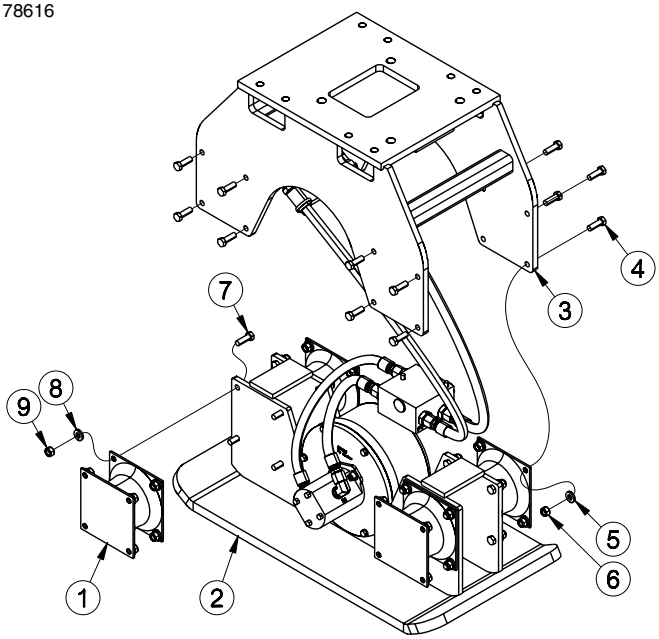

	Hex Bolt #4 & #7	Flat Washer #8
PC700	1/2" x 1 1/2"	1/2"
PC1000	1/2" x 1 3/4"	1/2"

Spring Mounts for PC700/1000 (PC700 Shown)
Figure 5-5

Spring Mount Maintenance

Refer to Figure 5-4 & Figure 5-5:

Spring mounts (#1) age over time and will require periodic replacing. The number of hours springs are operated is the main cause of them breaking down. Other factors such as extreme environmental conditions, extra high forces, and direct sunlight can result in the springs breaking down prematurely. When not in use, it is best to store the Plate Compactor inside away from the sun and harsh weather conditions.

WARNING

To avoid serious injury or death:

- *Use approved lifting equipment when lifting heavy components. Make sure the load is stabilized and supported properly before preforming any maintenance.*
- *Crushing injury. Do not place hands or fingers between the mounting frame and compaction plate during removal and installation of the mounting frame.*
- *Ensure all loads are adequately supported before performing any service work.*

IMPORTANT: Do not apply thread lock compound to the bolt threads unless instructed to do so.

Remove Expired Springs

Refer to Figure 5-4 & Figure 5-5:

1. Position the compactor on a flat, stable surface.
2. Use a hoist or lifting device to support top frame (#3).
3. Remove top frame (#3) as follows:

   PC400: Remove bolts (#4) and Nord-lock washers (#5).

   PC700/1000: Remove locknuts (#6), flat washers (#5), and bolts (#4).
4. Lift top frame (#3) off of dynamic assembly (#2).
5. Remove spring mount (#1) as follows:

   PC400: Remove locknut (#7), Nord-lock washer (#6), and spring mount (#1).

   PC700 & PC1000: Remove locknuts (#9), washers (#8), bolts (#7), and spring mount (#1).
6. Discard removed hardware and spring mount.
7. Replace spring and hardware with new components. Refer to **"Install New Springs"** on page 47.

Install New Springs

Refer to Figure 5-4 & Figure 5-5 on page 46:

1. Complete steps 1-7 under **"Remove Expired Springs"** on page 46.

IMPORTANT: Flat washers (#8) must be located on the rubber side of PC700/1000 spring mount (#1).

2. Before completing steps 3-6 below, review **"Threaded Fastener Instructions"**, **"Special Instructions for All Fastners"** and **"All Bolts Except Bearing Housing Bolts"** on page 44.
3. Install spring mount (#1) as follows:

   PC400: Attach spring mount (#1) to dynamic assembly (#2) with Nord-lock washers (#6) and locknuts (#7). Tighten locknuts to the correct torque.

   PC700 & PC1000: Attach new spring mount (#1) to dynamic assembly (#2) with bolts (#7), washers (#8), and locknuts (#9). Use an alignment bar to assist aligning bolt holes.

   Draw locknuts (#9) up snug and then tighten locknuts in a crisscross pattern. Refer to **"All Bolts Except Bearing Housing Bolts"** on page 44.
4. Repeat step 3 above until all expired springs are replaced.
5. Position top frame (#3) in-line with springs (#1). Use an alignment bar to assist aligning bolt holes.

IMPORTANT: Flat washers (#5) must be located on the rubber side of PC700/1000 spring mount (#1).

6. Attach top frame (#3) as follows:

   PC400: Attach top frame (#3) to spring mounts (#1) with Nord-lock washers (#5) and bolts (#4). Tighten bolts to the correct torque.

   PC700 & PC1000: Attach top frame (#3) to spring mounts (#1) with bolts (#4), washers (#5), and locknuts (#6). Flat washers (#5) must be located on the rubber side of spring mount (#1). Use an alignment bar to assist aligning bolt holes.

   Draw lock nuts (#6) up snug and then tighten locknuts to the correct torque in a crisscross pattern. Refer to **"All Bolts Except Bearing Housing Bolts"** on page 44.

Hydraulic System Maintenance

WARNING

To avoid serious injury or death:

- *Hydraulic fluid under high pressure will penetrate the skin or eyes causing serious injury. Wear protective gloves and safety glasses or goggles when working with hydraulics. Use a piece of cardboard or wood, rather than hands, when searching for leaks. If an accident occurs, seek immediate emergency medical care or gangrene may result. DO NOT DELAY.*
- *Pressurized system. When releasing pressure in the hydraulic system, ensure the load cannot fall or make unexpected movements.*
- *Regularly inspect hoses for damage. Replacement hoses must be the same type and pressure rating.*

This product is a precision-made hydraulic machine. Therefore, great care and cleanliness should be taken when handling any of the hydraulic components. Dirt is the hydraulic system's worst enemy.

One of the most important things you can do to prevent hydraulic problems is to ensure your excavator's hydraulic reservoir is full of hydraulic oil and remains free of dirt and other contaminants. Replace the excavator's hydraulic filter element at the prescribed intervals.

Review the Plate Compactor's **"Maintenance Schedule"** on page 43. It may specify certain operating conditions that require special maintenance and adjustments.

Handle parts carefully and remember to cover any cleaned and dried parts with a clean, lint-free cloth. Do not use anything other than purpose-designed materials for cleaning hydraulic parts. Never use water, paint thinners, or carbon tetrachloride.

Components, gaskets, and seals in the hydraulic system should be coated with clean hydraulic oil before assembly.

Use a clean, lint-free cloth to wipe hose ends clean before attaching them to your excavator.

Check daily for signs of damaged or worn hydraulic hoses, fittings and cylinders before each use of the excavator. Replace hydraulic components that have any of the following conditions present:

- Leaky end fittings that will not stop after properly tightening them using proper tightening techniques.
- Outer hose covering is cut or abraded.
- Wires inside the hydraulic hose are exposed.
- Outer coverings of the hoses are ballooning.
- Hydraulic hose is permanently kinked.
- Outer hose covering has foreign embedded material.

Replace damaged or deteriorated components as needed. Order only genuine Kubota parts from your local Kubota dealer. These simple maintenances will go a long way to prevent occurrences of hydraulic control valve, motor, and cylinder problems.

Hydraulic Fluids

In general, the hydraulic oil originally intended for the excavator can be used with this product. However, the compactor heats oil to a higher temperature than does usual excavation work. Therefore, the oil temperature must be monitored.

If the temperature of the hydraulic oil exceeds 176 °F (80 °C), an auxiliary oil cooler is needed. The oil viscosity must be between 1000-20 cSt while the product is being used.

When the product is used continuously, the temperature of the hydraulic oil normalizes at a certain level depending on conditions and the excavator. The temperature in the return tank must not exceed the maximum temperature allowed.

The product must not be started if the ambient temperature is below freezing and the oil is overly thick. The machine must be moved to bring the oil temperature above 32 °F (0 °C) before work can start (viscosity 1000 cSt or 131 °E).

Poor maintenance of hydraulic oil accounts for a high percentage of hydraulic equipment breakdowns. This is especially true when the excavator is equipped with hydraulic demolition products, since these are used in dusty, severe working conditions.

In compaction work, the hydraulic oil and return oil filter changing intervals are more frequent than when performing standard excavation work (= 0% product work). The changing interval for the suction oil filter remains the same.

Service Bulletin		
Product work	**Oil change**	**Return filter change**
0%	1,000 hrs	500 hrs
20%	800 hrs	300 hrs
40%	400 hrs	300 hrs
60%	300 hrs	100 hrs
More than 80%	200 hrs	100 hrs

Oil Specifications

The table below shows hydraulic oils recommended for Plate Compactor use. The most suitable oil is selected in such a way that the temperature of the hydraulic oil, in continuous use, is in the ideal area on the chart, and the hydraulic system is used to its best advantage.

Oil Specifications	Units	Oil Temperature											Viscosity
	°F °C	-4 20	14 -10	32 0	50 10	68 20	86 30	104 40	122 50	140 60	158 70	176 80	at +40 °C cSt (°E)
Multi-grade hydraulic oils (VI > 130)													
ISO VG 32							■	■	□				32,0 (4.32)
ISO VG 46							□	■	■	□			46,0 (6,15)
ISO VG 68								□	■	■	□		68,0 (9,0)
ISO VG 100									□	■	■	□	100 (13,2)
Single grade Hydraulic oils (VI < 120)													
ISO VG 32							■	□					32,0 (4.32)
ISO VG 46							□	■	■	□			46,0 (6,15)
ISO VG 68								□	■	■	□		68,0 (9,0)
ISO VG 100									□	■	■	□	100 (13,2)
Engine oils (SAE classification)													
10W							□	■	□				43,0 (5,75)
20W-20								□	■	□			58,0 (7,7
30									□	■	■	□	85,0 (11.2)
10W-30								□	■	■	□		75,0 (9,85)
15W-40									□	■	■	□	109 (14,3)

VI = Viscosity index
□ Permitted oil temperature
■ Recommended oil temperature

Oil Viscosity Problems

Problems due to incorrect hydraulic oil viscosity in the excavator:

Oil Too Thick

- Difficult start up
- Stiff operation
- Danger of cavitation
- Sticky valves
- Filter bypass opens, impurities in the oil are not removed

Oil too thin

- Efficiency losses (internal leaks)
- Damage to gaskets and seals, leaks
- Accelerated wearing of parts, because of decreased lubrication efficiency
- Danger of cavitation

NOTE: We strongly recommend the use of different hydraulic oils in the summer and winter, if there is an average temperature difference of more than 95 °F (35 °C). The correct hydraulic oil viscosity is thus ensured.

Special Oils

In some cases, special oils (for example biological oils and nonflammable oils) can be used with the Plate Compactor. Observe the following aspects when considering the use of special oils:

- The viscosity range in the special oil must be in the given range (1000-20 cSt).
- The lubrication properties must be sufficient.
- The corrosion resistance properties must be Comparable.

NOTE: Although a special oil could be used in the excavator, always check its suitability with the Plate Compactor. Contact the oil manufacturer or your local dealer for more information about special oils.

Oil Cooler

The excavator's hydraulic system must be able to maintain a temperature within an acceptable level during the Plate Compactor operation. This is due to:

- Seals, wipers, membranes and other parts manufactured from the corresponding materials can normally stand temperatures up to 176 °F (80 °C).
- The higher the temperature is, the less viscous the oil gets, thus losing its capability to lubricate.

A standard excavator, with a proper circuit, meets the requirements of the necessary cooling capacity. If the oil temperature tends to be too high during Plate Compactor operation, the following must be checked:

- The Plate Compactor circuit pressure relief valve should not be opened unnecessarily.
- The Plate Compactor circuit pressure drops must be reasonable; that is, less than 145 psi (10 bar) in the hydraulic line.
- There should be no internal leakages in the Plate Compactor or excavator hydraulic pumps, valves, cylinders, motors, etc.

If all of the above-mentioned items are in order, and the temperature of the hydraulic oil still tends to be too high, extra cooling capacity is needed. Contact the excavator manufacturer or your local dealer for details.

Oil Filter

The purpose of the oil filter is to remove impurities from the hydraulic oil. Air and water are also impurities in oil. Not all impurities can be seen with the naked eye.

Impurities enter the hydraulic system:

- During hydraulic oil changes and refilling.
- When components are repaired or serviced.
- When the Plate Compactor's hydraulic lines are being connected to an excavator.
- Due to component wear.

Normally, the excavator's main oil filters are used as the attachment's return line filters. Contact the excavator manufacturer or your local dealer regarding instructions on when to change the oil filter.

To work well with the Plate Compactor, the excavator's oil filter must fulfill the following specifications:

- The oil filter must allow maximum particle size of 25 microns (0.025 mm).
- The oil filter material must be man-made fiber cloth or very fine gauge metallic mesh to withstand pressure fluctuations.
- The oil filter must have a nominal flow capacity of at least twice the Plate Compactor's maximum flow.

In general, oil companies guarantee new oils to have a maximum particle size of 40 microns. Therefore, filter the oil to 25 microns (0.025 mm) when filling the excavator's hydraulic reservoir.

NOTES: Component damage is only a symptom. The trouble itself will not be cured by removing the symptom. After any component damage due to impurities in the oil, the entire hydraulic system must be cleaned.

Dismantle, clean, and reassemble the hydraulic system; and change the hydraulic oil in the system.

The damage caused by hydraulic oil impurities in the excavator and attachment circuits include:

Shortened working life of pumps and other components caused by:

- Rapid wear of parts.
- Cavitation.
- Wear of cylinders and gaskets.
- Reduced attachment efficiency
- Accelerated wear of moving parts and seals.
- Oil leakage.

Shortened working life and reduced lubricating capability of oil caused by:

- Overheated oil.
- Deteriorated oil quality.
- Electrochemical changes in hydraulic oil.

Shortened working life of control valves caused by:

- Binding spools.
- Rapid wear of parts.
- Blocking of small holes.

Long Term Storage

Clean, inspect, service, and make necessary repairs to the attachment when storing it for long periods and at the end of the season. This will help to ensure the unit is ready for field use the next time you connect to it.

1. Clean off any dirt and grease that may have accumulated on the Plate Compactor and then wash the surface thoroughly with a garden hose.
2. Inspect the Plate Compactor for parts out of adjustment, loose, damaged or worn.
   - Inspect all bolts and pins to ensure they are tight and secured. Replace any missing hardware. Tighten all loose hardware.
   - Inspect components for excess wear and damage. Replace components as needed.
   - Inspect spring mounts for cracks and/or separation from the spring end plates.
   - Inspect hydraulic hoses, fittings, seals, valve, and motor for oil leaks. Tighten fittings when possible. Repair or replace all damaged equipment.
   - Inspect safety labels. Replace all worn, damaged, or illegible labels by obtaining new labels from your Kubota dealer.
3. Repaint parts where paint is worn or scratched to prevent rust. Ask your Kubota dealer for touch-up paint. Paint is available in aerosol can, quarts, and gallon sizes. See chart below.

Touch-Up Paint

Part No.	Part Description
821-070C	GLOSS BLACK ENAMEL SPRAY CAN
821-070CTU	GLOSS BLACK ENAMEL BOTTLE & BRUSH
821-070CQT	GLOSS BLACK ENAMEL QUART
821-070CGL	GLOSS BLACK ENAMEL GALLON

4. Protect against damage during periods of non-use. Observe the following storage preparations.
   - Do not drain oil unless fluid degradation warrants change. Keep the compactor motor full of oil to protect internal components.
   - Seal hydraulic connections to protect against contamination.
   - Store in an upright position on a level, solid surface that is in a clean, dry location.
   - Support top frame with blocks placed under the spring mounts to minimize permanent sag in the springs.
   - Protect rubber components such as spring mounts and hoses from exposure to direct sunlight to reduce aging effects.
   - Avoid wet or damp conditions to minimize rust.

AP-PC400, AP-PC700, & AP-PC1000

Specifications & Capacities				
	Units	**PC400**	**PC700**	**PC1000**
Impulse force	lbf (N)	4000 (17,793)	6400 (28,470)	8000 (35,586)
Cycles	rpm	2000	2000	2000
Motor Oil flow[1] (Minimum-Maximum)	gal/min (l/min)	12.6-15.4 (47.7-58.3)	16.2-19.8 (61.3-75.0)	16.2-19.8 (61.3-75.0)
Motor operating pressure (Maximum)	psi (bar)	2,495 (172)	2000 (138)	2000 (138)
Oil pressure at no load	psi (bar)	290-510 (20-35)	290-510 (20-35)	290-510 (20-35)
Auxiliary circuit relief pressure (Dynamic[2])	psi (bar)	Max Operating + 405 (28)	Max Operating + 435 (30)	Max Operating + 405 (28)
Auxiliary circuit relief pressure (Static[3])	psi (bar)	Max Operating + 655 (45)	Max Operating + 655 (45)	Max Operating + 655 (45)
Compact Plate size	inch (cm)	13 x 25 (33 x 64)	18 x 27 (46 x 69)	24 x28 (61 x 71)
Compaction area	ft^2 (m^2)	2.3 (.21)	3.4 (0.3)	4.7 (.43)
Standard working weight[5]	lb (kg)	500 (227)	750 (340)	1120 (508)
Excavator weight range[6]	ton (metric ton)	1.5-6 (1.6-5.4)	4-10 (3.6-9)	7-15 (6-14)

Notes:

1. Proper pairing of motor (and valve) with the excavator's oil flow is critical to reach target soil density and machine efficiency. Optimal motor speed (RPM) is attained only when the excavator's hydraulic circuit provides sufficient oil flow at a pressure equal to at least the dynamic relief pressure.
2. Verify that the excavator's main relief is set to the value established by the manufacturer. Its value must be greater than the dynamic relief setting provided in the specifications.
3. At no time is oil pressure permitted to exceed 3000 psi (207 bar) at the compactor.
4. Return line pressure (measured at the compactor) in excess of 150 psi (10 bar) will negatively impact service life of motor.
5. Weight of compactor with typical mounting bracket.
6. Values listed are guidelines. Mount only to excavators having adequate load-carrying capabilities. Always consult the specifications of the equipment manufacturer for the load / lift chart.

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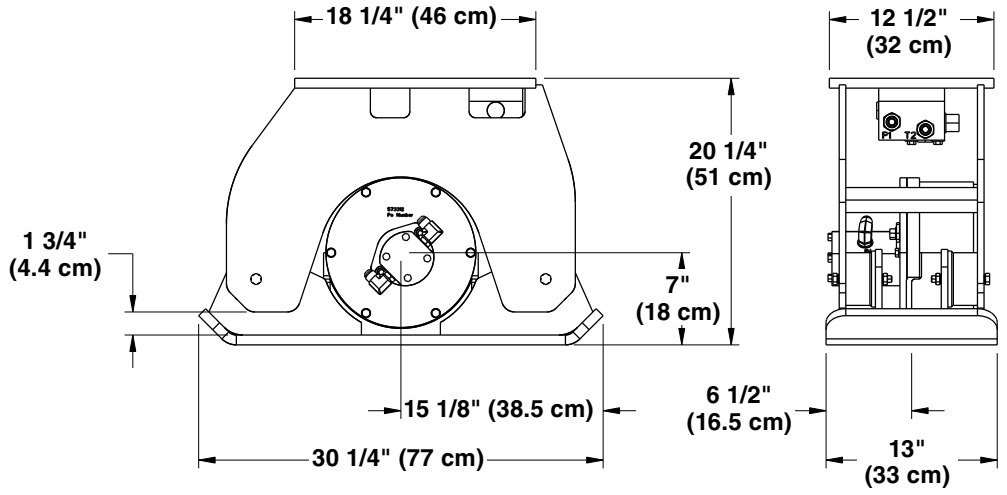

------ PC400 ------

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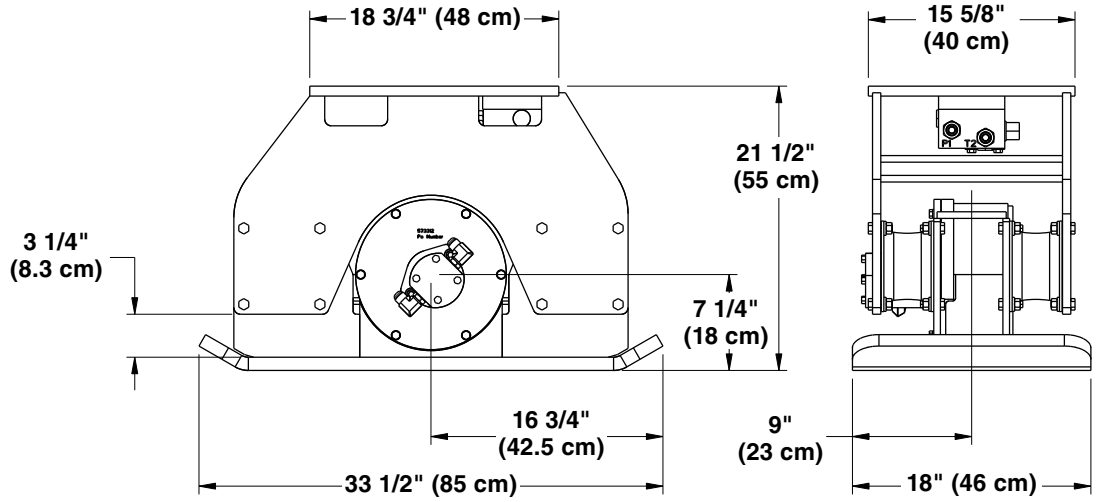

------ PC700 ------

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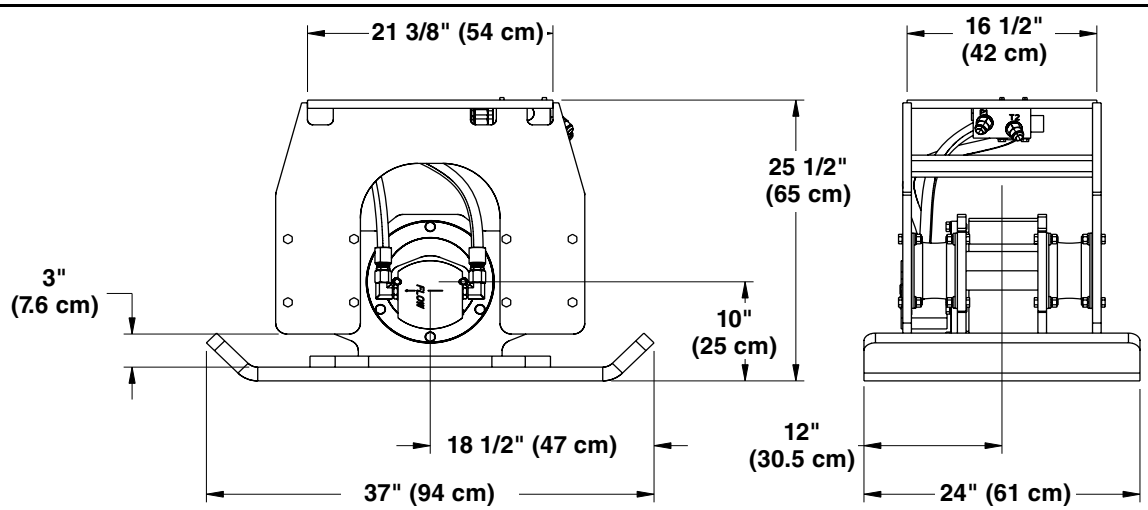

------ PC1000 ------

AP-PC400, AP-PC700, & AP-PC1000

Features	Benefits
Larger eccentric with mass further away from the shaft centerline	Helps to increase impulse and compaction force.
Sealed bearings	Provides maintenance-free lubrication.
Four function valve	Controls flow, pressure, regeneration, and oil flow direction.
Tough coat hoses	Prevents cuts and extends wear life of the hydraulic hoses.

Troubleshooting Chart

CP400, CP700, and CP1000		
Problem	**Cause**	**Solution**
Plate Compactor does not operate	Insufficient oil pressure or flow.	Have your local dealer test the power machine hydraulic supply system and make any required corrections.
	Failed bearings.	Have your Kubota Dealer inspect and replace the bearings.
	Broken motor shaft or worn splines.	Inspect and replace worn parts.
Plate Compactor operates erratically	Erratic oil pressure or flow.	Check hydraulic supply system. Correct as required.
	One or more spring mounts are weak or broken.	Inspect and replace failed mount. Refer to **"Spring Mount Maintenance"** on page 46.
There is Excessive noise or vibration during operation.	One or both bearing are worn out or broken.	Have your Kubota Dealer Inspect bearings for wear and breakage. Replace bearings when worn-out or broken.
	Loose and/or missing bolts.	Inspect and tighten all loose bolts. Replace all missing bolts.
Operation stalls under load	The power machine pressure relief setting is too low.	Have your local dealer test the power machine hydraulic supply system and make any required corrections to the presser relief setting.
	One or both bearing are worn out or broken.	Have your Kubota Dealer Inspect bearings for wear and breakage. Replace bearings when worn-out or broken.
	Motor seals and/or motor components are worn excessively.	Have your Kubota Dealer Inspect and replace seals if they leak oil. Replace motor if it is worn excessively.
Plate Compactor is operating smoothly, but at a reduced speed	Hydraulic oil flow is too low.	Have your local dealer test the power machine hydraulic supply system and make any required corrections to the presser relief setting.
		Check Plate Compactor motor and/or valve. One or both may need to be replaced. Refer to Parts Manual 317-362pk.
		Check excavator output. If motor or flow regulator valve was replaced, check to make sure motor and valve are properly matched.

Warranty

Land Pride warrants to the original purchaser that this Land Pride product will be free from defects in material and workmanship beginning on the date of purchase by the end user according to the following schedule when used as intended and under normal service and conditions for personal use.

Overall Unit: One year Parts and Labor

Hydraulic Motor: Two years Parts and Labor

This Warranty is limited to the repair or replacement of any defective part by Land Pride and the installation by the dealer of any such replacement part, and does not cover common wear items such as blades, belts, tines, etc. Land Pride reserves the right to inspect any equipment or parts which are claimed to have been defective in material or workmanship.

This Warranty does not apply to any part or product which in Land Pride's judgment shall have been misused or damaged by accident or lack of normal maintenance or care, or which has been repaired or altered in a way which adversely affects its performance or reliability, or which has been used for a purpose for which the product is not designed. Misuse also specifically includes failure to properly maintain oil levels, grease points and driveline shafts.

Claims under this Warranty should be made to the dealer which originally sold the product and all warranty adjustments must be made through an authorized Kubota dealer. Kubota reserves the right to make changes in materials or design of the product at any time without notice.

This Warranty shall not be interpreted to render Land Pride liable for damages of any kind, direct, consequential, or contingent to property. Furthermore, Land Pride shall not be liable for damages resulting from any cause beyond its reasonable control. This Warranty does not extend to loss of crops, any expense or loss for labor, supplies, rental machinery or for any other reason.

No other warranty of any kind whatsoever, express or implied, is made with respect to this sale; and all implied warranties of merchantability and fitness for a particular purpose which exceed the obligations set forth in this written warranty are hereby disclaimed and excluded from this sale.

This Warranty is not valid unless registered with Land Pride within 30 days from the date of original purchase. Registration is done by your dealer.

IMPORTANT: The Online Warranty Registration should be completed by the dealer at the time of purchase. This information is necessary to provide you with quality customer service.

A complete warranty claim should include at least the following information. Providing this information makes it easy to handle the warranty claim properly and swiftly. Refer to inside cover page for detailed information.

Model Number _____ **Oil Flow** _____ **Work Hours** _____

Serial Number _____ **Operating Pressure** _____ **Service History** _____

Excavator Model _____ **Return Line Pressure** _____ **Application** _____

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