

WARNING!
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Did you know
Hydraulics is a branch of science and engineering concerned with the use of liquids to perform mechanical tasks.




Hydraulic machinery are machines and tools which use fluid power to do simple work. Heavy equipment is a common example. Excavators, cranes, wood loader, hydraulic grab, fire engine and bulldozer all make use of this principle.



Typically, the fluid used in a hydraulic system is an incompressible liquid such as water or oil. Pressure is applied by a piston to the fluid in a rigid vessel, causing the fluid to press on another piston that delivers energy to a load. If the areas of the two pistons are different, then the force applied to the first piston will be different from the force exerted by the second piston. This creates a mechanical advantage, which is the number of times a machine multiplies your effort force.




In hydraulic machine, high-pressure liquid — called hydraulic fluid — is transmitted throughout the machine to various hydraulic motors and hydraulic cylinders. The fluid is controlled directly or automatically by control valves and distributed through hoses and tubes.


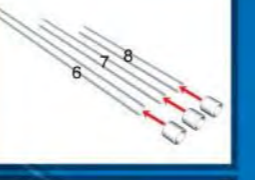
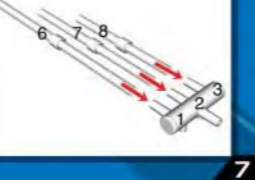
- Components:**
- | | |
|-----------------------|-------------------------|
| 1. 1 Frame | 12. 1 Handle |
| 2. 2 Upper boom parts | 13. 1 Flow divider |
| 3. 2 Main boom parts | 14. 8 Tube rings |
| 4. 2 Cab parts | 15. 1 Hand pump |
| 5. Soft tube | 16. 2 Boom stand parts |
| 6. Soft tube | 17. 2 Hand pump covers |
| 7. Soft tube | 18. 2 Bucket connectors |
| 8. Soft tube | 19. 3 Pump holders |
| 9. 3 Mini pumps | 20. 20 Caps |
| 10. 2 Tracks | 21. 4 Wheels |
| 11. 1 Bucket | 22. 4 Pins |
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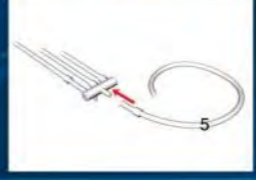
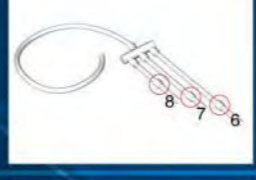

- Assemble your Hydraulic Excavator**
1. Attach the wheels (21) to the frame (1) using the pins (22).
 2. Cover the wheels (10) with the tracks (10).
 3. Combine the upper boom parts (2).
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4. Attach the bucket (11) to the upper boom.
 5. Attach the bucket connectors (18) to the pins of the upper boom.
 6. Combine the main boom parts (3) with the upper boom.
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7. Attach the boom stand parts (17) to the main boom.
 8. Install the boom by inserting the boom stand to the corresponding slots on the frame.
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9. Install a pump holder (19) to each mini pump.
 10. Fill the mini pump by dipping its head into a cup of water and lift the plunger.
 11. Point the mini pump upwards.
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12. Expel the water from the mini pump by pushing the plunger all the way to the top. The tip of the mini pump should still be filled with water. Repeat steps 9-12 for all three mini pumps.
 13. Install a tube ring (14) to each of the three shorter soft tubes (6,7,8).
 14. Attach the three tubes (6,7,8) to the flow divider (13) output marked "1", "2", "3" respectively. Secure the tubes by sliding the tube ring to the interconnection.
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15. Attach a tube ring to the remaining soft tube (5) and connect it to the input tube of the flow divider. Secure it with the tube ring.
 16. Attach a tube ring to the soft tubes (6,7,8).
 17. Connect a mini pump to the two longer soft tubes as shown.
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18. Combine the handle (12) and the hand pump (15).
 19. Press the handle of the hand pump to the lowest position and dip it into a cup of water.
 20. Fill the hand pump with water by pulling the handle to the top.
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21. Install a tube ring to the free end of the long soft tube (5). Connect the hand pump to the soft tube.
 22. Press the handle of the hand pump to fill the open soft tube (8) with water.
 23. Connect a mini pump to the shortest soft tube (8). Make sure no air is trapped inside the tube or the mini pump. Secure the connection with the tube ring.
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24. Detach the hand pump from the soft tube.
 25. Dip the pump into a cup of water again.
 26. Fill the hand pump with water by pulling the handle to the top.
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27. Connect the hand pump to the soft tube.
 28. Detach the middle mini pump from the soft tube.
 29. Press the handle of the hand pump to fill the middle soft tube (7) with water.
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30. Attach the mini pump back to the soft tube. Make sure no air is trapped inside the tube or the mini pump. Secure the connection with the tube ring. Detach the hand pump from the soft tube.
 31. Dip the pump into a cup of water again.
 32. Pull the handle to fill it with water.
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- 


33. Connect the hand pump to the soft tube.
 34. Detach the mini pump from the longer soft tube (6).
 35. Press the handle of the hand pump to fill the open soft tube (6) with water.
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36. Attach the mini pump back to the soft tube. Make sure no air is trapped inside the tube or the mini pump. Secure the connection with the tube ring. Detach the hand pump from the soft tube.
 37. Dip the pump into a cup of water again.
 38. Pull the handle to fill it with water.
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39. Connect the hand pump to the soft tube and secure it with the tube ring at the interconnection.
 40. Attach the hand pump covers (16) to the hand pump.
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41. Install the flow divider onto the frame as shown.
 42. Attach the hand pump to the frame.
 43. Install the mini pumps to the boom by aligning the holes of the pump holders to the pins of the boom and boom stand as shown. The plungers should also be clipped to the corresponding pin on the boom.
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44. Install the caps (20) as shown.
 45. Combine the cab parts (4).
 46. Install the cab onto the frame.
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47. Done! Push and pull the handle of the hand pump and note how the plunger of each mini pump control the movement of the boom of the excavator!
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Note: If the unit is unused for some time, the mini pumps may be "stuck" and it becomes hard to push or pull the handle of the hand pump. In such case you can manually and carefully stretch the moving parts several times to reduce the friction inside the mini pumps. It will resume normal function afterwards.

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In hydraulic machine, high-pressure liquid — called hydraulic fluid — is transmitted throughout the machine to various hydraulic motors and hydraulic cylinders. The fluid is controlled directly or automatically by control valves and distributed through hoses and tubes.


- Components:**
- | | |
|-----------------|------------------------|
| 1. 1 Frame | 12. 1 Flow divider |
| 2. 2 Boom parts | 13. 6 Tube rings |
| 3. 2 Links | 14. 1 Hand pump |
| 4. 2 Cab parts | 15. 2 Hand pump covers |
| 5. Soft tube | 16. 2 Boom stand parts |
| 6. Soft tube | 17. 1 Bucket connector |
| 7. Soft tube | 18. 2 Pump holders |
| 8. 2 Mini pumps | 19. 16 Caps |
| 9. 2 Tracks | 20. 4 Wheels |
| 10. 1 Bucket | 21. 4 Pins |
| 11. 1 Handle | |
- 

Assemble your Hydraulic Bulldozer


1. Attach the wheels (20) to the frame (1) using the pins (21).




2. Cover the wheels with the tracks (9).




3. Combine the boom parts (2).




4. Attach the bucket connector (17) to the boom using the links (3).




5. Cover the joints with the caps (19).




6. Attach the bucket (10) to the boom and bucket connector.




7. Cover the joints with the caps (19).




8. Attach the boom stand parts (16) to each side of the boom.




9. Install the boom by inserting the boom stand to the corresponding slots on the frame.




10. Install a pump holder (18) to a mini pump (8).




11. Fill the mini pump by dipping its head into a cup of water and lift the plunger.




12. Point the mini pump upwards.



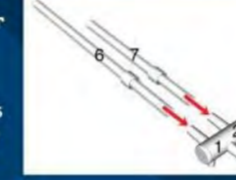
13. Expel the water from the mini pump by pushing the plunger all the way to the top. The tip of the mini pump should still be filled with water. Repeat steps 10-13 for the other mini pump.




14. Install a tube ring (13) to each of the two shorter soft tubes (6,7).




15. Attach the two tubes (6,7) to the flow divider (12) branch marked "1" and "2" respectively. Note the order of the tubes. Secure the tubes by sliding the tube ring to the interconnection.



16. Attach a tube ring to the remaining soft tube (5) and connect it to the input tube of the flow divider. Secure it with the tube ring.




17. Attach a tube ring to the soft tubes (6,7).




18. Connect a mini pump to the longer soft tube as shown.




19. Combine the handle (11) and the hand pump (14).




20. Press the handle of the hand pump to the lowest position and dip it into a cup of water.




21. Fill the hand pump with water by pulling the handle to the top.




22. Install a tube ring to the free end of the long soft tube (5). Connect the hand pump to the soft tube.



23. Press the handle of the hand pump to fill the shorter soft tube (7) with water.



24. Connect a mini pump to the shorter soft tube (7). Make sure no air is trapped inside the tube or the mini pump. Secure the connection with the tube ring.



25. Detach the hand pump from the soft tube.



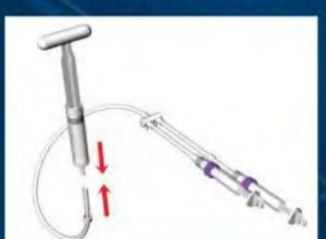
26. Dip the pump to a cup of water again.




27. Fill the hand pump with water by pulling the handle to the top.




28. Connect the hand pump to the soft tube.




29. Detach the mini pump from the longer soft tube.




30. Press the handle of the hand pump to fill the longer soft tube with water.




31. Attach the mini pump back to the soft tube. Make sure no air is trapped inside the tube or the mini pump. Secure the connection with the tube ring. Detach the hand pump from the soft tube.




32. Dip the pump to a cup of water again.




33. Pull the handle to fill it with water.



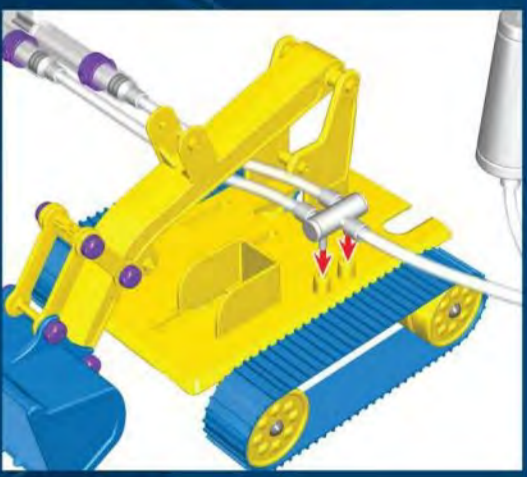
34. Connect the hand pump to the soft tube and secure it with the tube ring at the interconnection.



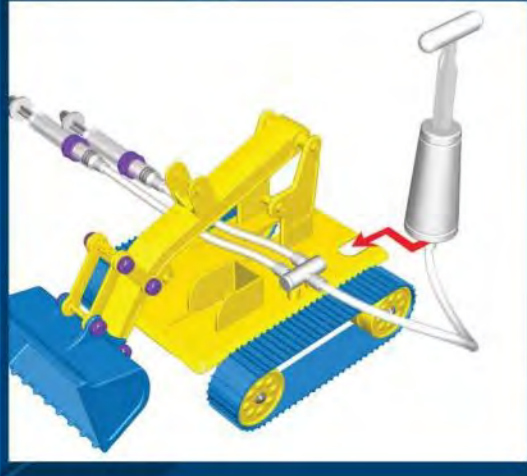
35. Attach the hand pump covers (15) to the hand pump.




36. Install the flow divider onto the frame as shown.




37. Attach the hand pump to the frame.



38. Install the mini pump with the shorter tube to the underside of the boom by aligning the holes of the pump holder to the pins of the boom stand as shown. The plunger should also be clipped to the corresponding pin on the backside of the boom.




39. Install the mini pump with the longer tube to the top side of the boom by aligning the holes of the pump holder to the pins of the boom. The plunger should be clipped to the corresponding pin of the bucket connector (17).




40. Install the remaining caps (19).



41. Combine the cab parts (4).



42. Install the cab onto the frame.



43. Done! Push and pull the handle of the hand pump and note how the plunger of each mini pump controls the movement of the boom and the bucket!



Note: If the unit is unused for some time, the mini pumps may be "stuck" and it becomes hard to push or pull the handle of the hand pump. In such case you can manually and carefully stretch the moving parts several times to reduce the friction inside the mini pumps. It will resume normal function afterwards.

