Weight Driven Clock Movement Instructions & Trouble Shooting Guide

Product #0150X, 3260X, 3262X

Introduction

Congratulations on your purchase of a Woodcraft clock movement! The last step of building your clock is installing the movement. In this section, referred to in the instructions that come with your movement as “the manual”, you’ll find step-by-step instructions written in an easy to follow outline form with corresponding diagrams.

The manual also includes a table of contents, diagrams of movements and helpful suggestions about working with your clock. Don’t be confused if the movements and components shown do not always correspond exactly to your own. The principles or adjustments illustrated apply to all types of weight driven movements sold by Woodcraft.

The comprehensive troubleshooting guide, referred to as “the guide”, is an excellent source for any questions which may arise as you proceed and for general reference after your movement has been installed.

All references to the left side or right side in the manual and guide, are to be interpreted with you facing the front (handshaft side) of the movement unless otherwise specifically stated.

You will find your project easier if you follow these guidelines:

1. Read the manual from start to finish and study the illustrations to get an overview of the project before you start working.
2. Examine your movement and components carefully so you will be well acquainted with them, their functions and special features.
3. Read each step completely before taking any action. Then return to the first step and follow the directions given, completing the task described before going on to the next.
4. Instructions or information in bold print are critical to ensure proper set up and avoid damage not covered by the warranty.

Handy Hints

When handling exposed brass parts, use soft cotton gloves or cloth to prevent tarnishing caused by the natural acid on your hands.

Dust and dirt are the primary enemies of any clock movement.
1. Unpack and Check the Movement
   Tools: Knife
   1. Cut open the box and remove top packing.
   2. Unpack all accessories and check your parts with the list that accompanies your movement. This is a general list for chiming movements.

   Chain Movement Accessories
   - 3 Weight Shells
   - 6 Weight Shell Caps
   - 3 Weight Shell Threaded Rods
   - 3 Weight Shell Nuts
   - 3 Weight Shell Hooks
   - 3 Weights
   - 1 Pendulum Stick and Bob
   - 1 Pair of Hands
   - 1 Pendulum Leader (May be attached to Movement)
   - 3 Chains, Hooks and Ends (May be attached to Movement)
   - 1 Hand Nut
   - 2 Hold Down Screws and Plates

   3. Lift the movement out of the box holding it by the pillar posts, rear mounting brackets, or front and rear plates. See Figure 1.

2. Install the Seatboard
   NOTE: The case hood should be removed for movement installation.
   1. A movement seatboard is usually constructed with 3/4" thick wood. The purpose of the seatboard is to support the movement, dial, weights, and pendulum without interfering with the ability of these parts to interact. Figures 2, 3, and 4 illustrate varieties of seatboards you may use. Seatboards can be made to work with only one type of movement as in Figure 2, or designed to accommodate a number of different movements as shown in Figures 3 and 4.

3. Prepare the Movement for Installation (Chain Movements Only)
   1. If the chains are not already attached to the movement turn the sprocket to determine direction of rotation. Place a few links over the sprocket and turn it by hand until the chain can be pulled around. Pull the chain until the two ends hang evenly.

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**Fig. 1**

**Fig. 2**

**Fig. 3**
4. Install the Movement In the Case

**TOOLS:** Screwdriver, Drill, Bits

1. Place the movement on the seatboard, centered left to right.
2. CHAIN MOVEMENTS: Center the chain in the slot. Fasten the holdown screws and plates finger tight. See Figure 5.
3. Attaching Moon Dials (for Tempus Fugit Dial skip to #10)
   a. Slide the moon dial gear onto the handshaft with collet and set screw toward the movement. See Figure 6.
   b. Attach the moon dial by inserting the four posts on the back of the dial into the predrilled holes in the front plate of the movement and secure with taper pins as in Figure 7.
   c. If front shut offs are used, loosen the extensions and align them with the slots in the dial. Refer to Illustration pages at the beginning of the manual for identifying parts.
   d. If front shut off is not used, remove extensions or be sure they face the rear.
   e. Slide the moon dial gear forward until the gear teeth mesh with the moon disc drive gear teeth. See Figure 6.
   f. Tighten the set screw. Make sure the moon dial gear does not rub the back of the dial.
4. Slide the hood onto the case and reach in through the waist door to center the assembled movement, dial and seatboard behind the dial frame. The moon dial should slide forward until it just touches the rear of the dial frame.
5. Carefully remove the hood. Mark the position of the seatboard screw holes.
6. Remove the movement/seat/board assembly and drill pilot holes for the seatboard mounting screws.
7. Replace the movement/seat/board assembly and secure the seatboard to the seatboard supports with screws.
8. Remove the protective plastic covering from the moon dial arch and hemispheres. Slide the hood back onto the clock case. Don’t attach!
9. Check to make sure the moon dial is centered in the dial frame. Loosen the movement hold down screws and adjust if necessary. Retighten the hold down screws.
10. Mounting Tempus Fugit Dial Without Attached Mounting Posts
    a. Attach the dial mount board to the case dial mounting posts as in Figure 8.
    b. Install the movement/seatboard assembly as previously outlined. Be sure selector lever(s) extension(s) point toward the rear of the case.
    c. Slide the movement/seatboard assembly so the handshaft protrudes through the dial mount board.
    d. Position the dial so the handshaft is centered in its hole. When the handshaft hole is centered on the handshaft of the movement, this should also center the dial in the dial frame of the hood.
    e. Use a ruler to be sure the dial is square in reference to the sides of the dial mount board. Attach the dial with #1 screws.
    f. Slide the movement forward until the handshaft extends about \( \frac{1}{2} \)” through the dial. This will allow adequate clearance for the hands to operate.
    g. Secure the seatboard to the case.
5. Position and Install Chime Block

Attach the Hood Back

**Note**: As a general rule, mount the chime block so that the hammers strike the rods 1" to 1 1/2" below the casting. Center the block between the two groups of hammers. The exact position of the chime will vary depending on your specific chime block.

1. Measure the distance (A) from the inside of the hood back to the closest chime hammer. Refer to Figure 9 and the illustration pages at the beginning of the manual to help identify chime hammers.
2. Measure the distance (B) from the mounting surface of the chime block to the closest chime rod. See Figure 10.
3. Subtract distance (B) from distance (A) to determine how far the chime block should be positioned from the hood back. EXAMPLE: If distance (A) is 3" and (B) is 2", then you need a 1" spacer.
4. Construct a chime mount assembly as in Figure 10A or use two spacers as in Figure 10. If the distance between the chime block and the hood back is less than 3/4" use Figure 10, if greater than 3/4" use Figure 10A.
5. Adjusting the chime hammers.

**Note**: Beneath each chime hammer is a flat steel spring called a chime leaf spring. This spring regulates the amount of lift given each hammer as it strikes. If a chime hammer is simply pushed forward to bring it closer to the chime rod it will distort the chime leaf spring and cause excessive lift on the hammer.

Excessive lift on one or two hammers will cause erratic chime function at best, and **will most often stop the chime entirely after a period of time**.

- First lift the hammer back (as if it were going to strike) and **hold it back** while making any adjustments. Let the hammer fall forward after each adjustment to note progress, then lift the hammer back again if further adjustment is needed. Adjusting in this manner protects the chime leaf spring from damage.
b. To line up a hammer with a chime rod lift the hammer back and move the head sharply to one side, then let it fall forward as above.

c. The hammers, at rest, should be about $\frac{1}{8}''$ from the chime rods.

To move a hammer closer to a rod: Lift the hammer back, and while holding it back tug upward on the hammer head. Let it fall forward and note progress.

To move a hammer away from a rod: Lift the hammer back and push the hammer head down toward it’s base. Let the hammer fall forward to note progress.

**NOTE:** The above steps will not work with straight hammers. To adjust straight hammers observe steps a and b above and simply bend the brass hammer rod by hand as required.

6. The hour strike hammers can be adjusted as a unit by loosening the thumb screw and positioning the hammers $\frac{1}{6}''$ to $\frac{3}{6}''$ away from the chime rods. Refer to the illustrations in the definitions section to help identify parts and locations.

### 6. Level and Stabilize Case

**Tools:** Circular level

**IMPORTANT:** This procedure must be accomplished prior to hanging the pendulum and weights.

1. Place a circular level on the seatboard beside the movement.

2. Adjust the leveling feet to make the clock as level as possible—both side to side and front to back. Tip the case forward or backward slightly to relieve some of the weight from the foot being adjusted.

3. On wall to wall carpeting extend leveling feet about half their length before proceeding. This will ensure that the case molding does not rest on the carpet.

4. Stand in front of the clock and grasp the molding under the hood. Tip the case slowly toward you onto its front feet, then slowly rock it back onto its rear feet. If it dips to one side as weight is transferred, slow the clock down.

5. Adjust the leveling feet to make the clock as level as possible—both side to side and front to back. Tip the case forward or backward slightly to relieve some of the weight from the foot being adjusted.

6. No assembly is necessary to hang a lyre pendulum, simply remove the pendulum from the box and hang it on the pendulum leader.

7. Turning the rating nut to the right will raise the pendulum bob and speed up the clock. Turning the nut to the left will lower the bob and slow the clock down.

### 7. Assemble and Hang the Weights

**TOOLS:** Cotton gloves, Tape, Cardboard

1. While assembling the weights wear gloves or handle all the brass with a soft cloth. While the three weight shells are equal in size, the weights themselves are made up of one long weight and two short weights. You should have 3 weight shells, 6 end caps, 3 hooks, 3 end nuts, 3 weights, and 3 threaded rods.

Install the long weight first. Using a padded surface lay the weight shell on its side and slide the weight in. Thread one of the end nuts onto one of the threaded rods then slide one of the end caps, lip side up, onto the threaded rod. Carefully slide the assembled threaded rod through the shell/weight assembly until the shell seats inside the cap. Slide a second cap, lip side down, onto the threaded rod and secure the assembly with one of the hooks. Do not over tighten the hook or the brass end caps will distort. Repeat this procedure for the remaining shell/weight assemblies.

2. Wearing gloves or handling with a soft cloth, hang the assembled weights onto the chain hooks according to your movements instructions, usually with the heaviest weight on the right (chime side).

### 8. Assemble Pendulum

**Tools:** Pliers

1. Unpack the pendulum bob and place it brass side down on a soft towel.

2. Locate the wooden pendulum stick. If necessary screw the threaded rod into the lower end of the stick. The open portion of the hook at the top of the pendulum stick should face up.

3. Remove the rating nut and slide the threaded rod and pendulum stick into the bob. The threaded rod should extend to $\frac{1}{8}''$ of the opening where the rod engages the rating nut. If the tongue of the bob stick opening is too tight use flat nose pliers to gently bend the tongue and relieve some of the pressure.

4. Place the flanged portion of the rating nut into the hole and turn until about $\frac{3}{8}''$ of the threaded rod shows as in Figure 11.

5. Hang the pendulum onto the leader, ensuring the suspension spring, leader, and pendulum hang plumb.

6. No assembly is necessary to hang a lyre pendulum, simply remove the pendulum from the box and hang it on the pendulum leader.

7. Turning the rating nut to the right will raise the pendulum bob and speed up the clock. Turning the nut to the left will lower the bob and slow the clock down.

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**Fig. 11**

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9. Installing the Hands

**TOOLS:** Pliers or Square Awl

1. Start the clock by moving the pendulum three inches to the left or right and releasing it. As the pendulum swing slows, the verge will set its own beat. (This applies only to movements with automatic beat feature).

2. With the clock running properly, dial and hood in place, position the minute hand onto its shaft and turn slowly through the quarter hours. **Stop to let the chimes ring at each quarter.** If the chimes begin before or after the quarter hour marks, remove the hand and either grasp the bushing with pliers, or insert a square awl (the square handle or tang end of a file may be used) into the square hole. Turn the minute hand on its bushing the approximate amount the hand missed the quarter mark and reinstall the hand. Adjust the hand until the chimes are activated as close as possible to the quarter hour mark. See Figure 12.

3. Using the minute hand, turn through the quarter hours, as above, until the hour strikes. Remove the minute hand and slip the hour hand onto its shaft pointing to the hour struck. Be sure the hour hand slides all the way onto its shaft and does not rub the dial or numerals. If it seems too tight, remove some material from inside hour hand round bushing with a round tapered file. With the hour hand in place, reinstall the minute hand and secure with the round nut provided.

4. To set the time, you may either turn the minute hand forward stopping at each quarter hour to allow the chime to finish, or turn the minute hand backwards to the correct time. This will cause the chimes to be out of sequence, but the movement will self-correct over a period of two hours.

10. Set the Moon Dial

1. Turn the moon disc by hand until the moon is centered under the arch of the dial. **CAUTION: Do not use force when moving the moon disc. The gears may be locked while the moon is being mechanically advanced.** If this is the case, wait a few hours and try again.

2. Check your calendar, if a full moon will occur in a few days, ratchet the moon disc to the left the number of days until the full moon. If the full moon has passed, ratchet the disc to the right the number of days since the full moon.

11. Operation and Maintenance

1. Chain driven clocks are wound by pulling down on the loose end of each chain while lifting gently on the weight. All three weights should be raised to within 1" of the seatboard.

2. Stop the pendulum if you are leaving home for more than a week. Problems sometimes occur when the clock is allowed to run all the way down.

3. Your clock is a precision instrument, but it will remain so only with regular upkeep. This movement has been factory oiled. It is important that it be oiled every nine months to a year. **NEVER USE SEWING MACHINE OIL OR SPRAY LUBRICANTS.** See the Oiling Instructions section of the troubleshooting guide on page 9.
Troubleshooting Guide
The guide on the pages 7 - 9 will help you solve many of the problems you may encounter when installing your movement. Troubleshooting begins with removing the hood from your clock case and consulting this guide to identify your problem.

It’s organized into four major problem areas. After finding your problem, turn to the subject indicated. Common causes for the problems are listed with their respective solutions. Try the solutions in the order in which they are listed. After making the adjustment, let the clock run for a while (even overnight) so you can observe it and check for improvement. If there is none, proceed to the next solution (or cause if just one solution is offered) until your clock is functioning properly.

Use this “testing time” for observing and getting to know your clock—it’s a fascinating mechanism. Don’t be discouraged or surprised if it takes a few days to get the clock working correctly. Most clockmakers and technicians test and observe a clock in the same way, often taking a week for more to make needed adjustments. If after trying all suggested adjustments and/or solutions your clock still is not functioning correctly you can call our Technical Service Department at 1-800-535-4486.

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1. Clock Doesn’t Start or Run Continuously
   A. Hands Rub
      1. Be sure the hour hand fits all the way onto the handshaft, and that it doesn’t rub the dial. If the hour hand is too tight, remove it and use a round file or broach (reamer) to remove excess material from the round bushing. Replace the hands.
   2. Be sure the minute hand doesn’t catch the hour hand or rub the glass on the front of the clock. If necessary, gently bend the hands apart and away from obstruction and/or adjust the fit of the movement as in Step 9 (page 6) in the manual.
   3. Be sure the second hand does not interfere with the hour hand or rub the dial. It could also be rubbing the edge of the hole in the dial. If so, file the hole to allow clearance.

   B. Case Unstable
      1. Before checking an unstable case and movement, remove pendulum and weights. See Step 6 (page 5) in the manual. Remember, your clock may settle unevenly on wall to wall carpeting. Level and stabilize case as required.

   C. Seatboard Interferes
      1. File or cut away the area of obstruction.

   D. Dial Interferes
      1. Remove hands and dial from the movement and start the pendulum. If the clock runs WITHOUT the dial, the problem is the dial or the dial fit, not the movement.
         a. Be sure the moon dial gear doesn’t rub against the back of the dial. Be sure the second hand doesn’t rub the hour hand or the edge of the hole in the dial.
         b. Remove the dial from the movement and the moon dial gear to be sure it turns freely and doesn’t jam the moon disc.

   E. Pendulum Leader Out of Position
      1. After checking and correcting the crutch position, adjust leader position. Leader hook must rest on the suspension spring. See Illustrations at the beginning of the manual.

   F. Crutch Bent
      1. Gently bend crutch to straighten it so pendulum leader hangs vertically as shown. Do Not move crutch from side to side while bending it. See Illustrations at the beginning of the manual.

   G. Weights Oscillate
      1. Stabilize the clock as in Step 6 (page 5) in the manual.

   H. Suspension Spring Needs Replacement or Adjustment
      1. Damaged, bent or broken suspension springs must be replaced. Remove pendulum and thumb screw or remove tapered pin with pliers. Remove old spring and install new one. Realign screw or pin to the hole in the suspension post. See illustrations at the beginning of the manual.
      2. Loose - if the suspension spring is too loose, it will wobble and...
cause the clock to stop. Tighten by turning suspension spring thumb screw with your fingers. The top of the spring should be free to move from front to back but not from side to side.

I. Weights Wrong
   1. Weigh the weights to ensure they meet the specifications required for your movement. Rehang weights as specified in your movement instructions.

J. Pendulum Moves in zig-zag or Circular Motion
   2. Check for crutch allowing excessive play and leader being out of center as in Part II-B and C in the guide.
   3. Make sure the pendulum leader sits squarely on suspension spring pin. If the leader can’t be adjusted to fit onto the suspension spring, replace the leader.
   4. Make sure the pendulum hooks securely onto the leader. If the pendulum hook can’t be adjusted onto the leader (see Step 8, page 5, in the manual) replace the pendulum.
   5. Be sure the pendulum bob is snug on the pendulum, as in Step 8 (page 5) in the manual.

2. Clock Doesn’t Keep Correct Time
   A. Pendulum Length Wrong
      1. See Step 8 (page 5) in the manual.
      2. Measure the pendulum length from the center of the pendulum bob to the center of the handshaft.
      2a. Check this measurement with that given in the movement information in the catalog.

   B. Crutch Allows Excessive Play
      1. If crutch pin wiggles in the round opening of the crutch, slightly bend the crutch so the pin rests in the slot below the round opening of the leader.

   C. Leader Not Centered in the Crutch
      1. Carefully bend the crutch so that the leader hangs near the center of the crutch slit.

3. Quarter Hour Chime Doesn’t Work Correctly
   Note: Be sure the shut-off lever is in the “on” position.
   A. Minute Hand Doesn’t Set Off Chime Mechanism
      1. WARNING: We do not recommend trying this procedure unless you are familiar with clock repair. Turn the minute hand past the next quarter hour or until you hear a click. Then, activate the chime mechanism manually by lifting the chime lever out of the stop pin disc (refer to Illustrations at the beginning of the manual). Slowly turn the handshaft nut clockwise. Stop at each quarter hour to let the clock chime. If you can’t activate the mechanism, move to cause B.

   Hermie Movements - If the flirt pin slides past the quarter hour cam, use needle nose pliers to bend the brass flirt arm back so that the pin follows the quarter hour cam. Refer to Illustration pages at the beginning of the manual.

   B. Minute Hand Doesn’t Set Off Chime Mechanism and the Mechanism Can’t be Activated Manually
      1. If a hammer is caught on a chime rod or overlapping another hammer, move hammers until free, making sure to align them with the chime rods or tubes as instructed in Step 5-5 (page 4) in the manual.
      2. Weigh weights and rehang as specified in your movement instructions.

   C. Hammers Begin to Move But Run Slowly or Stop
      1. Weigh weights and rehang as specified in your movement instructions.
      2. See oiling instructions on page 9.

   D. Chime Not Synchronized With the Time
      1. Turn minute hand to next quarter hour. Let it chime. Repeat process until full hour chime begins to operate. Be sure the minute hand points the 12 o’clock position. If chime continues to malfunction, refer to Section 3-A, B, and C above.

   E. Hour Strike Plays Wrong Number on the Hour
      1. Refer to Step 9 (page 6).

4. Hour Strike Doesn’t Work Correctly
   Note: Hour strike won’t work if quarter hour chime sequence isn’t completed. Be sure shut-off lever is in the “on” position.

   A. Movement Needs Oiling
      1. See oiling instructions on page 9.

   B. Weights Incorrect
      1. Weigh weights and rehang as specified in your movement instructions.

   C. Hammers Out of Position
      1. Refer to Step 5 (page 4) in the manual.

   D. Hour Strike Plays Wrong Number on the Hour
      1. Refer to Section 3-E (above).
      2. If rack falls against the moon dial gear loosen the set screw on the moon dial gear and slide the gear toward the dial. See Step 4 (page 3) in the manual.

   E. Hammers Begin to Move but Run Slowly or Stop
      1. Weigh weights and rehang as specified in your movement instructions.
      2. Oil movement. See oiling instructions on page 9.
F. Hammers Don’t Move

1. If a hammer is caught on a chime rod or overlapping another hammer, move the hammer until free making sure to align them with the rods or tubes as instructed in Step 5 (page 4) in the manual.

Oil this way:
(refer to Figures 13 and 14 on page 6)

1. Start with one drop of oil at each pivot point.
2. Check to see that a “globule” or “bulb” of oil is formed between the wheel arbor and the plate of the movement when the arbor is pushed against the plate.
3. If a globule of oil cannot be seen, another drop of oil should be added. Normally this will be plenty of lubricant and no further applications would be needed, until next year.
4. Place oil at all points marked by an arrow on Figure 13.

Remember:

1. Oil once per year.
2. Use a recommended lubricant, we recommend Etsynthia Clock 859.
3. Keep oil sealed at all times when not in use.
4. Clean the tip of the oiler often.
5. Place one drop of oil in all “oil sinks” of pivot holes.
6. Place a “smear” of oil at all points where metal meets and rubs against metal. A smear of oil is a much smaller amount than a drop.

7. Too much oil is detrimental to the mechanism because:
   a. Oil attracts dirt. Lots of oil attracts lots of dirt. Oil and dirt together form a grinding compound which will cause wear to bearing surfaces.
   b. If there is so much oil that it runs out of the oil sink, all of the oil will be drawn away from the bearing surface, leaving the bearing surface dry. A dry bearing will wear very quickly.
8. Too little oil is detrimental to the mechanism because it will quickly dry into a gummy substance which will retard and eventually stop the clock.

Oiling Instructions

Your clock is a precision instrument, but it will remain so only with regular upkeep. This movement has been factory oiled. It is important that it be oiled every nine months to a year. We recommend that your movement be thoroughly cleaned, examined, and lubricated by a qualified clock repair facility every 3 to 5 years. This is especially important if you live near salt water or in areas that are dusty. Clock movements which are not properly maintained for the conditions in which they are used will require costly repair work, and no claim can be made for satisfactory service unless these instructions are adhered to. NEVER USE SEWING MACHINE OIL OR SPRAY LUBRICANTS.

Your movement should be removed from the clock case for oiling. When you have the movement out, examine it carefully for any sign of wear. Worn bushing holes, bent or deformed shafts, broken gear teeth, and other obvious problems should be repaired by a qualified technician. To oil your movement, place it oriented as it would be in your clock case on a flat surface. By using either the eye of a very fine embroidery needle or an oilier made especially for clock works, deposit a small drop of oil on each pivot point on the front and back plates of the movement. Under no circumstances allow the oil to run out of the pivot and down the plates. If this happens, clean the oil off with lint free cloth and reapply to the pivot. Any oil that runs down the plate will pull the rest of the oil with it, and you will very soon again have a dry pivot. OVER OILING IS AS DANGEROUS AS UNDER OILING. It is best to start in one area and to progress in a logical sequence either across or up and down the plates to avoid missing any pivot points. When a pivot point is concealed from the outside of the plates, it will be necessary to reach that point from the inside. Apply a small amount of oil to the verge and to the escapement wheel, again bearing in mind that an excess quantity will do more harm than good. Apply oil to the strike shaft and to the points of the star wheel that activates the strike motion. A drop of oil should be placed between each hammer on the chime shaft. On spring driven movements a few drops of oil should be placed in the hole of the spring barrels. Because oil acts as a magnet for dust, it is important to NEVER OIL ANY OF THE GEARS OR PINIONS.

Lubrication is not necessary due to the design and function of gears and pinions.

Your clock movement is well made and sturdy, but in all handling be careful to avoid causing any damage. Be especially cautious with those components that protrude or are attached on the outside of the plates.