

Trouble Shooting Guide for Hubbell Systems

NOTE: Hubbell Special Products discontinued operations in 2008, so there is a very limited number of repair parts available for motor repair. In some ways, this makes diagnosis easier (that's me, always looking for the bright spot). You can still get the capacitor and limit switches here, and now – finally – we have the gear sets available. I note those below as we go through the typical symptoms. But with a few exceptions, **if your Hubbell system is having problems, you replace either the hand control or the motor assembly** (or both, if you want to order them together and save over the single piece prices, or if the plug on your hand control cord is anything but the four-prong connector we show on our part [#4210](#)).

The problem:

1. Nothing about the chair will work, and the motor makes no noise whatsoever.

The most common problem is that the chair is not connected to the electrical supply or the electrical supply is not working due to a breaker, a fuse problem, or a loose wall outlet in the home. Make sure there is electrical current at the outlet and that the chair is connected to the outlet. Try plugging a working lamp into the outlet the chair is plugged into; if the lamp lights up, then wiggle the lamp plug in the outlet a little to make sure the lamp doesn't go out because of a short in the wall receptacle, and that the chair is connected to the outlet (don't roll your eyes at how stupid this sounds – you don't want to know the number of miles I have driven to a call, only to find that the

chair wasn't plugged in, or that the wall plug was loose and not making contact...).

If a Hubbell motor is getting power, and the hand control is good, it normally will do something; it will buzz, click, or hum, or make some sort of noise... If the motor makes no noise whatsoever when you push the hand control, then we need to check it for output power and if power is there, we'll check the hand control.

a) Checking the motor for output power:

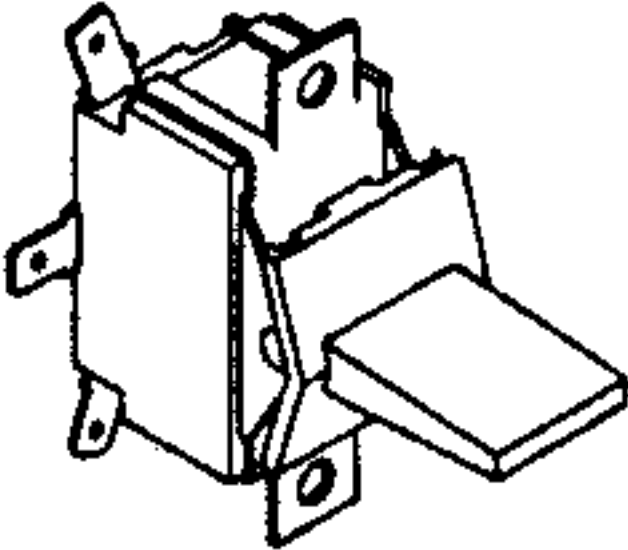
- Unplug the hand control from the motor cord, but leave the motor plugged into the wall..
- Using your multimeter set on AC volts, put a meter lead into one of the connections on the motor cord, and the other lead into one of the other connectors. If you don't get 120 volts there, keep swapping the leads in different holes until you get a 120 volt reading (I can't tell you specifically which set of holes will give the 120 volt reading, as not all Hubbell motors are wired the same.)
- If you don't get 120 volts in some combination, then the problem is in the motor somewhere. It could be as simple as a broken or shorted wire, or as complicated as a bad motor winding. If you get 120 volts on your meter in one or more checks, then we check the hand control for a bad switch or bad wiring.

b) Checking the hand control:

- Make sure the hand control is not plugged into the motor.
- Take the hand control apart; most controls have screws in the housing that you can unscrew. A few older ones have a "snap

together” housing that you can pry apart with a small screwdriver; still other older controls have housings that are glued together so that you can’t take them apart (in that case, replace the complete hand control).

Check the switch:



If you have a meter:

- Remove the screws from the back of the hand control and take the hand control apart, exposing the switch.
- Set meter to OHMS setting.
- Pull the wire (usually red but not always) off the middle tab on the switch.
- Put your RED meter lead on the middle tab on the switch.
- Put your BLACK meter lead on one of the other outer tabs.
- Press the switch in each direction; a low reading in one of the directions (and only one) means the switch is operating properly

- Now, move the BLACK lead to the other outer tab and do the same test as # 6
- If you get a low reading on both tests, then the switch is OK. If not, the replace the switch.

If you don't have a meter, you can do the following steps.

HOWEVER, THE FOLLOWING TEST SHOULD ONLY BE ATTEMPTED BY QUALIFIED PERSONS FAMILIAR WITH ELECTRICITY AND COMFORTABLE WORKING AROUND LIVE POWER. THIS TEST IS SIMILAR TO CHANGING A WALL RECEPTACLE WHILE THE POWER IS STILL ON; IF YOU WOULD NOT FEEL COMFORTABLE DOING THAT, DON'T DO THIS TEST!

- Remove the screws from the back of the hand control and take the hand control apart, exposing the switch.
- Make sure the chair is plugged into the wall and all wiring is hooked up.
- Take an insulated screwdriver (plastic, rubber or wooden handle) and touch the middle connector on the switch to one of the outside connectors (we call this shorting the switch); this should make the chair run in one direction.
- Then, take the insulated screwdriver (plastic, rubber or wooden handle) and touch the middle connector on the switch to the other outside connector; this should make the chair run in the other direction.
- If the chair runs in each direction with this test, then replace the switch; if the chair still won't run both ways, then the problem is NOT in the switch, so ordering a switch would do NO good (also, if you order a switch and hook the wires to it, then we

can't take it back as it would leave marks on the tabs and would look like it was used...).

If the switch passes this test, then we need to check the continuity of the hand control wiring.

c) Check the hand control wiring:

- Make sure the hand control is not plugged into the motor.
- Set meter to the OHMS setting.
- Put one lead on one of the wires of the switch, and the other lead on the same color wire at the end of the cord; a low reading means that wire is OK. While the wires are connected, move the hand control cord around a little to see if the reading changes (which would indicate a short in that wire)
- Do the same test in 3 above to the other two wires.

Any one of the wire tests that don't give you a reading on your meter means that the hand control should be replaced.

2. Chair is in the full lifted position and will not go down, or in the fully reclined position and will not come up.

Sometimes, the chair will go up but not back, or back but not up. The user then keeps pushing the button on the way that it will go until the motor is fully extended, then the limit switch cuts the motor off, then it won't go either direction. The most common cause of this is a **defective switch or hand control**; if the motor will run either direction, and it won't even try to run the other way, the motor is hardly ever the problem.

SOLUTION: Replace either the switch (if replaceable) or the hand control (after making sure that the chair is not connected to the electrical outlet). Just follow the steps in symptom 1 above to check the switch and/or the hand control.

3. After the chair has run through several cycles of up and down the motor fails to work.

Normally, this means the thermal limit switch has overheated. This is a normal occurrence since this switch is designed to keep the motor from overheating to insure the life of the motor.

SOLUTION: Let the chair sit for 10 to 15 minutes, then the chair will begin to operate normally.

Note: This is one of the most frequent calls we receive from both dealers and consumers. For instance, the grandchildren want to try out this new chair and they run it up and down, up and down, then the chair quits and we receive the call that their chair has just quit working (grandchildren are very good for our business...).

4. Chair will not lift or recline with a person sitting in the chair, but will lift and recline with no one in the chair.

PROBLEM: The most common cause for this is that the motor gears that are beginning to strip; they “hold” and work as long as the motor doesn’t have to strain to work, but as weight is added to the chair, the gears fail. Another not so common cause for this is a bad capacitor, or a weak capacitor; check to see if the motor is abnormally hot (a good motor gets rather warm in normal operation, but if the motor

housing gets “hot enough to fry an egg”, that’s a sign of a weak capacitor.

SOLUTION: If the motor is abnormally hot, you can try replacing the capacitor. Again, before making any repairs to the motor or electrical components, make sure the chair is not connected to electrical power. Also, before touching the wires on the capacitor, take an insulated screwdriver (plastic, rubber or wooden handle) and touch the 2 connectors together while holding the insulated end of the screwdriver; sometimes, capacitors hold a “charge” in them even after the electrical current is unplugged. If the motor is not abnormally hot, and you hear a grinding noise from the motor with weight on the chair, most likely the problem is in the motor gears (see question # 5 below).

5. Can hear the motor running, but there is no movement to the chair, or the chair runs a few seconds and stops again.

This could be caused by two different items.

- A. The gears might possibly be faulty in the motor (most common).
- B. The motor push tube nut threads might be defective (less common).

To test this out, you can do this: first, lie the chair on its side, run the motor, and notice if the steel worm gear inside the round push tube is turning (you may have to take the motor out of the chair and hook the hand control back up to see this better; take the plastic cover off the outside of the round push tube (so you can see the worm screw better), hold the motor’s push tube down on an old piece of carpet to give some resistance, then run the hand control up and down. If the

worm gear does not turn when running the motor, then most likely you will have defective gears, or a shear pin defective in the gears. If the worm gear is turning, then the gears are most likely good, but the nylon nut in the outer tube is defective.

SOLUTION: If the gears are defective (which is normally the case), you can either replace the gear set, or replace the motor assembly. For anyone who has done tool and die or plastic fabrication work, you know that the molds for making the gears are very expensive, and two molds had to be made for this, doubling the cost. That extra expense is being passed on to us in each set of gears that is made; that's why the cost is so high (before you call and ask...). Gear installation instructions are farther down in this section, right after the motor timing and installation instructions. If you are working on a lift chair, you may want to weigh the cost of a set of gears against the price of a new motor with a six month warranty – the choice is entirely up to you. Our MS-1000 replacement motor is being used by one of the major chair manufacturers and is a perfect fit for the Hubbell MC-42.

6. When being lifted, chair seems to sway from side to side. This is usually in rhythm with the motor.

Normally, this is caused by a bent or warped worm gear in the motor

SOLUTION: Replace the motor; since Hubbell went bankrupt, the worm gear isn't available anymore.

NOTE: This problem usually occurs when the chair has been dropped after moving. I have also seen this happen if the grandkids have used the chair as a jumping platform (oh, to be young again...).

7. Chair does not sit level on the floor.

Usually a leveling guide is missing underneath the chair.

SOLUTION: Replace the missing glide, or if you want to try out your “backyard engineering” skills, put a shim on the low side under the chair.

8. Foot rest seems to be hanging on floor or is sitting unlevel when the chair is in a closed position.

Normally, that means the recline hardware is bent or broken. There is a scissor mechanism on each side of the chair, attached to the footrest and the sides of the chair. The easiest way to tell what’s wrong is to turn the chair over on its side, and run the chair through a cycle and watch the mechanism move (you may have to put the chair on telephone books, etc. so it won’t push itself across the floor when it is running). If the mechanism is bent, it will be obvious by watching it try to move.

SOLUTION: Replace the scissor mechanism. We recommend replacing both sides of scissor mechanisms, even if only one side is bent or broken. We would need to know the manufacturer of the chair, and the serial # to see if the mechanisms are available.

9. The motor in the chair seems to want to continue running after the chair has completed a lift or recline cycle. If you continue to engage the switch, the motor wants to continue to run.

Oftentimes, this will cause the motor to “bind” itself, so you have to take the push tube loose and manually screw the tube in and out to free up the motor. This is not a common problem, but it usually means one of the limit switches is defective.

SOLUTION: Replace the defective limit switch (after making sure chair is not connected to the electrical outlet).

10) The chair doesn't raise up or recline as far back as it used to, and in the other direction the chair bottoms out but the motor is still humming like it wants to run.

The motor timing is off; it “doesn't know when it's supposed to stop”.

SOLUTION: Retime the motor. This often happens when changing a defective motor or if the timing gears are beginning to strip. Motor timing and installation instructions are below.

11) You bought a new hand control from us, but your chair has an older motor plug that doesn't have a four-prong connector and you need to know how to install it.

The instructions below are slightly different, depending if you have a three-prong connector that looks much like the standard four-prong connector (round pins, with the two outside prongs having a flat spot so you can't plug it in wrong). If you have one of the older connectors (four-prong with flat pins, connector with orange terminals, or even a six-prong square connector, etc.), you will need to hard wire the hand control to your motor:

a) Three-prong connector:

If you ordered the #4210 with a three-prong connector, we included the connector you need along with the plastic housings that hold it into place. However, because different manufacturers used different wiring methods back when these three-prong connectors were in use, we couldn't insert the wires in the connector because we don't know what configuration is on your motor. To do this, do the following steps:

- Plug your motor to an electrical outlet.
- Using your meter set on AC VOLTS, determine which of the wires on your motor plug is the hot, or "common" wire; this will be the one with the voltage reading. The other two wires are directional wires (up and down).
- Unplug the motor from the wall outlet.
- Gently put the wire that goes to the middle wire on the switch on the new hand control to that common wire on the motor plug (on our new controls, that is the white wire, but that doesn't mean that it goes to the white wire on your motor). Then put the other two wires to the other two connectors on the motor plug.
- Keeping the wires separated so they will not touch each other or yourself, plug the motor back into the electrical outlet and try the hand control to see if the motor runs as it is supposed to; if not, unplug the motor, reverse the last two wires you put in and try it again.
- When you know that you have the wires in the correct position on the plug, then firmly push the wires into the connector until they snap into place, hook the white plastic housings onto the plug, and screw the housings together with the two screws provided.

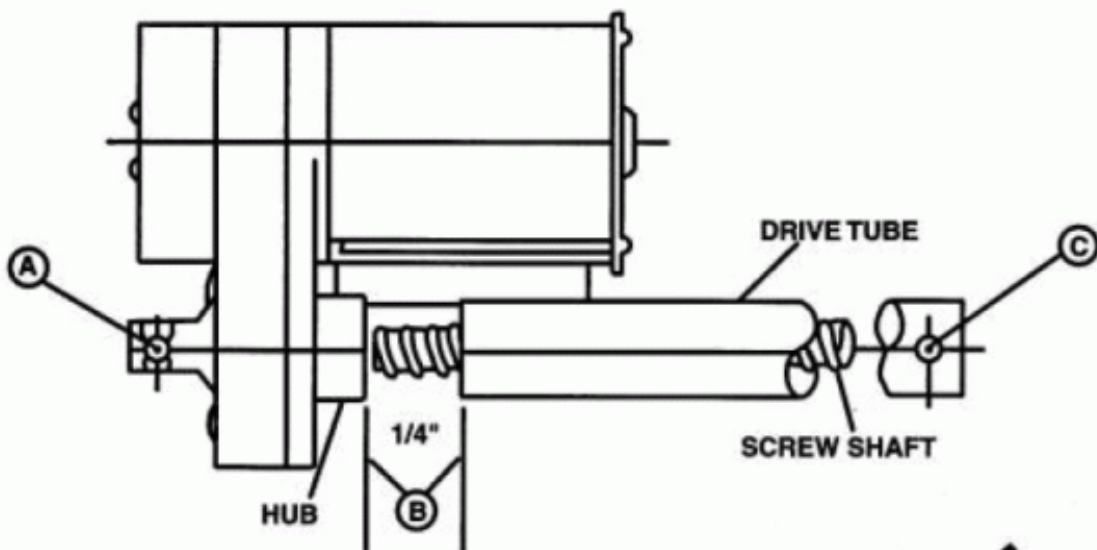
b) Hard wiring the new hand control to the motor:

Older Hubbell motors used a variety of connectors to fasten the hand controls onto the motors; If you have one of the older connectors mentioned above, then you will need to “hard wire” the hand control to your motor.

1. Plug your motor to an electrical outlet.
2. Using your meter set on AC VOLTS, determine which of the wires on your motor plug is the hot, or “common” wire; this will be the one with the voltage reading. The other two wires are directional wires (up and down).
3. Unplug the motor from the wall outlet.
4. Cut the plug off the motor where it would connect to the hand control, and strip about 3/8” of the insulation off the wires.
5. Cut the plug off the end of the new hand control and strip about 3/8” of the insulation off those wires.
6. Attach the wire that goes to the middle wire on the switch on the new hand control to that common wire on the motor plug (on our new controls, that is the white wire, but that doesn't mean that it goes to the white wire on your motor). Then attach the other two wires to the other two connectors on the motor plug.
7. Keeping the wires separated so they will not touch each other or yourself, plug the motor back into the electrical outlet and try the hand control to see if the motor runs as it is supposed to; if not, unplug the motor, reverse the last two wires you put in and try it again.

8. When you know that you have the wires in the correct position, be sure the motor is unplugged, then use crimp connectors to attach the wires together as they are positioned.
9. Use electrical tape to tape up all the wires together to better protect them from damage.

MOTOR TIMING & INSTALLATION INSTRUCTIONS



The motor is a powerful electrical mechanism with up to 1000 lb torque; Injury or damage may occur if not properly handled and installed. We have trained personnel who can assist you, so please don't hesitate to call if you have any trouble reinstalling the motor.

Motors are equipped with limit switches which allow the motor tube to run in and out only so far before stopping; we "time" the motor so these switches will operate correctly.

- 1) Lay the chair on its side.
- 2) If the motor is still on the chair, take the clevis pin out of the end of the push tube (C) (see illustration below) where it goes through the chair bracket.
- 3) Connect the motor base (A) (if not already connected) to the base of the chair.
- 4) Plug in the motor, push the down button on the hand control, and let the motor run until it stops (note: **do not** have your hand on the push tube (C) while the motor is running at this step- just let it “free-wheel” until it stops running. Some new motors are factory set in this position already, so the motor might not run when the down button is pushed; if so you can push the up button to make sure the motor has power, then the down button to get it in the right position.
- 5) Hand screw the push tube (C) down toward the motor housing until it bottoms out (you will have to feel for it bottoming out, as the dust cover is covering that space). Then turn it back out one and one half turns; this will allow the 1/4” to 3/8” space (B) between the bottom of the tube and the hub of the motor that we need (if you like, you can take the dust cover off so you can measure the distance, but usually one to one and one half turns will give the proper clearance).
- 6) At this point, **grab hold of the push tube** (C) with one hand and push the up button on the hand control with the other hand; the push tube should start going out from the hub. Take the tube out as far as is needed to align the tube with the connection on the chair. Put the pin back in at the end of the tube (note: only run the motor up or down to align the components – do not screw the tube in or out to do the alignment). This will fully connect the motor.

7) Turn the chair back over and run it all the way up to make sure the limit switch turns the motor off when it is in the fully lifted position; then run the chair all the way down to the fully reclined position and see if the limit switch cuts it off there. If the motor tries to keep running when the chair is all the way up or all the way reclined, the timing is still off; repeat the steps above or call for assistance.

Please Note: Listed below are the instructions for replacing the gears or push tube. Push tubes are now available for **lift chair motors only**. If you are working on a Hubbell motor for a treadmill, dental chair, treadmill, etc, then these gear removal instructions should still help, but stroke tubes for these applications are not available.

GEAR REMOVAL & INSTALLATION INSTRUCTIONS

This is not a hard job to do (especially if you have done it a few hundred times...), but it is one of the *messier* jobs you will do – I suggest wearing latex gloves and old clothes...

To Remove Gears:

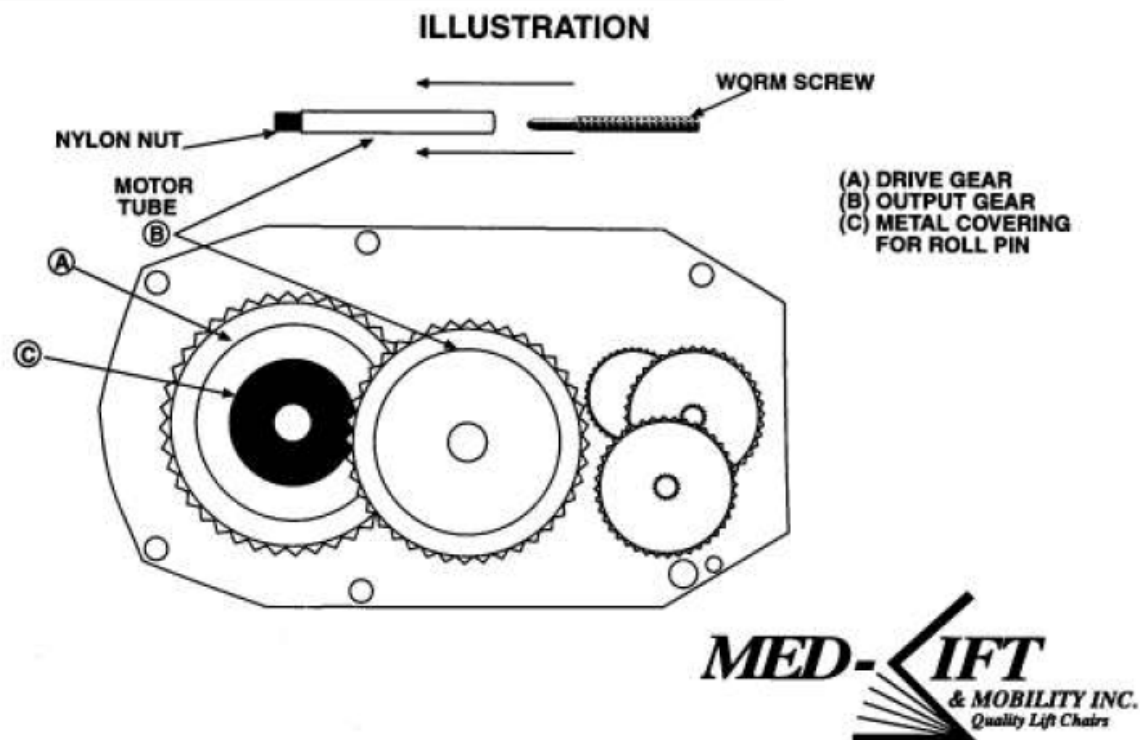
1. Remove the motor from the lift chair by pulling two clevis pins; one pin is located at the base of the motor and the other pin is located at the end of the screw tube.
2. Sit the motor on a workbench or similar surface. Cover the surface of the bench with newspapers, old sheets, etc to catch the grease that will invariably get all over everything...
3. Remove the two screws from the outside of the round electrical cover that sits on top of the gear housing.

4. Remove the six screws that hold the gear housing cover to the motor base.
5. Carefully fold the gear housing cover back over the top of the motor (there are wires that go through the cover, so you won't be able to take it completely off the motor). CAUTION: Fold the cover back very carefully to keep from knocking the small timing gears (right side of picture below) out of position (if you do knock them off, call me and I will explain how they go back).
6. Remove the output gear (B) (see illustration below).
7. Remove the washers and bearings that are on the shaft end of the drive gear (A); NOTE: Pay attention to how the washers and bearings come off, so you can reinstall them the same way going back. Also, look inside the housing cover – one or more of the washers and bearings may be imbedded in the grease there.
8. Remove the round metal covering from around the roll pin (C); you may need to use a small blade screwdriver to work the covering from around the drive gear – sometimes, they are on tight (I get calls all the time from people saying that “their motor doesn't have a roll pin”, because they don't have the metal cover off...)
9. Use a 5/16” punch to knock out the roll pin in the drive gear (A); you may have to have someone hold the worm gear while you tap the roll pin out, so the gear and tube won't turn.
10. Tap – gently – on the end of the worm gear until the drive gear (A) comes completely off.

To Reassemble Gears:

Reverse the top ten steps. NOTE: It is OK to reuse the original roll pin (it doesn't have much torque on it, so there is little danger of breakage); also, it's also acceptable to reuse the old grease (the stuff that keeps trying to get on your clothes and work area... the factory uses plenty of grease when they assemble motors) around the new gears; just put it on like it was around the old gears. If you would rather not do that, any standard gear grease from an auto parts house would work fine.

STROKE TUBE REMOVAL & INSTALLATION



When replacing the round push tube, the gears must be pulled off and the worm gear taken completely away from the motor.

The tube must have the steel worm gear started through from the unthreaded end (see illustration).