

# MEASURING CABLE REPLACEMENT AND TIMING BELT REPLACEMENT INSTRUCTIONS FOR PT5 SERIES



For Models

PT5A, PT5AV, PT5DC, PT5E, PT5MA

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Created 2/25/99 C:/data/PT5man

# MEASURING CABLE REPLACEMENT

1. Remove the two allen wrench bolts on the sensor endplate (the endplate closest to the electrical connector). Remove the endplate and set aside.
2. Remove the sensor housing and set aside.
3. Remove the bolts holding the sensor assembly to the sensor plate and set aside.
4. Remove the sensor assembly and set aside.
5. Determine exact position of the gear on the main shaft. With a small allen wrench, loosen the set screw and remove the gear.
6. Determine exact position of belt pulleys on both the main and cable guide shafts. With a small allen wrench, loosen the set screws and remove both pulleys and the belt.

## CAUTION

From this point, proceed with caution. The spring can be dangerous while it has tension. The spring, if allowed to, can suddenly uncoil itself by shooting out of the housing. The spring is sharp and can cause injuries. **ALWAYS HOLD THE REMAINING SECTIONS TOGETHER TO KEEP THE SPRING CONTAINED.** Be cautious through the next several steps.

**IF THE CABLE HAS NOT BROKEN AND/OR THERE IS STILL SPRING TENSION, PLEASE CONTINUE**

**IF THE CABLE HAS BROKEN, THE SPOOL HAS UNWOUND, AND THERE IS NO SPRING TENSION SKIP TO STEP 10**

7. While holding the sections together, remove the two hex spacers at the corners of the sensor plate and set aside.
8. Remove the two large allen bolts from the spring endplate and set aside. The spring housing will try to spin, so take necessary precautions to prevent sudden spinning.
9. Carefully release spring tension by allowing spring housing to rotate slowly until all tension is released. The best way to do this while keeping the spring contained is to hold the spool housing in one hand while pressing on the spring end plate with the palm of the other hand. This will allow “controlled slippage” of the spring housing to release the tension. Skip to step 12.
10. Remove the two hex spacers at the corners of the sensor plate and set aside.

11. Remove the two large allen bolts from the spring endplate and set aside.
12. Pull the spring housing out just far enough to get a flathead screwdriver in the gap between the spring housing and spring plate (plate closest to the spool).
13. Use the screwdriver to slide the innermost coil off the spring arbor. Make sure you slide the spring away from the spring side plate towards the endplate. If you pry to the side the spring will be damaged. The spring is brass color and the arbor is aluminum, so keep sliding until you can see the aluminum arbor. Slide the spring all the way off the arbor.
14. Pull off spring housing, including the spring and endplate as one assembly.
15. Examine the spring for any cracks or breaks. If cracks or breaks in the spring can be seen the spring will have to be replaced. Contact Celesco for replacement spring.
16. Set spring assembly aside.
17. Note position and exact orientation of the spring arbor (esp. the notch in the spring arbor on the main shaft. Spring arbors may be oriented differently for different models).
18. Loosen spring arbor set screw with an allen wrench, remove arbor from main shaft and set aside.
19. Remove plate, spring side, and set aside.
20. Remove plate, sensor side, and set aside.
21. Slide spool out of housing for easy access.
22. Remove cable guide assembly.
23. Position cable guide on the lead screw. For 100" units or less, position spring edge of cable guide  $\frac{1}{4}$ " from spring end of threads on the leadscrew. For 125" unit, place spring edge of cable guide all the way on the edge of the threads.
24. Feed bare end of new cable in through slot in spool housing, cable guide, and small hole in the spool.
25. Crimp cable close to the end and trim off any excess cable.
26. Place cable guide assembly and spool back in spool housing such that the cable guide and cable hole in the spool are on the spring side.

27. Replace plate, spring side, making sure the cable guide lead screw inserts into its machined hole.
28. Replace the sensor side plate, making sure the cable guide lead screw passes through its machined hole.
29. Replace phenolic disk on spring plate
30. Replace spring arbor on main shaft on spring side and tighten the allen screw.
31. Remove endplate from spring housing so spring can be seen from both sides (the spring will stay in the housing). The outside end of the spring is looped around a peg and has to be pried off.
32. Replace the spring housing on the transducer.
33. Slide the inside spring end into the slot in the spring arbor.
34. Replace the phenolic disk on the endplate side of the spring.
35. Replace the spring endplate, making sure the peg inserts into the loop in the outside end of the spring.
36. Attach the end of the cable to an external fixed point. Hold the transducer so the spring housing is in your right hand.
37. Turn the spring housing several times with your right hand. Make sure you turn the housing clockwise if looking at the spring side endplate. This action will load tension on the spring.
38. Move the transducer toward the cable end to allow the cable to be wound onto the spool. Maintain tension on the cable at all times.
39. Repeat steps 36 and 37 until all cable has been wound into the transducer.
40. Slowly release any remaining tension on the spring by allowing the spring housing to rotate until no tension remains.
41. Load tension on the spring by rotating the spring housing clockwise when looking at the spring endplate. Rotate the spring housing:  
2-1/2 to 3 turns for ranges of 75" or under.  
3 full turns for 100" units.  
3-1/2 turns for 125" units.

**BE CAUTIOUS WHILE THE SPRING IS UNDER TENSION**

42. Make sure the feet are oriented correctly to the cable exit and replace the two large allen bolts.
43. Replace the two hex spacers on the threads of the two large allen bolts.
44. Loop the timing belt around the main shaft pulley and cable guide pulley.
45. Replace both pulleys in their original positions and tighten the set screws, making sure the screw contacts the flat area of the shaft.
46. Fully extend and retract the cable to ensure smooth travel.
47. Replace gear on main shaft at its previously determined position and tighten set screw. Make sure the screw contact the flat area of the shaft.
48. Replace sensor mounting assembly but do not tighten the screws completely.
49. Check position of the main shaft gear and cable guide gear relative to each other to make sure they line up.
- 50. If unit is a PT5E, skip to step 54. If unit is a PT5A, PT5DC, PT5MA continue with step 51.**
51. Connect a 10 VDC power supply to the potentiometer terminals so +10VDC is connected to CCW and -10VDC is connected to CW.
52. Connect a voltage meter to potentiometer terminals so positive lead is connected to S and negative lead is connected to CW.
53. Adjust potentiometer so output is between 0.04 and 0.1 VDC
54. Position sensor assembly such that gear teeth mesh but are not forced into each other.
55. Tighten sensor assembly mounting screws.
56. Fully extend and retract cable to ensure smooth travel.
57. Replace sensor housing, making sure gasket is seated correctly.
58. Replace sensor end plate, making sure gasket is seated correctly
59. Replace the two large allen wrench bolts, making sure both gaskets stay seated and straight.

# BELT REPLACEMENT

1. Remove the two allen wrench bolts on the sensor endplate (the endplate closest to the electrical connector).
2. Remove the endplate and set aside. If unit is a PT5MA or PT5DC, be careful not to pull on the wires running between the circuit board and the potentiometer.
3. Remove the sensor housing and set aside.
4. Cut off and/or remove the old timing belt.
5. Remove the screws holding the sensor assembly to the sensor plate and remove the sensor assembly.
6. With a small allen wrench, loosen the set screw holding the belt pulley to the cable guide shaft (the pulley closest to the corner of the transducer).
7. Remove the pulley from the cable guide shaft after determining its exact position.
8. Determine exact position of main shaft gear, loosen the set (the gear that's obstructing the pulley on the main shaft) and loosen the set screw with a small allen wrench.
9. Remove the main gear and set aside.
10. Loosen the set screws on the main shaft pulley so the pulley can slide.
11. With the cable fully extended, position cable guide on the threaded shaft so that there is approximately 0.050 inches (1 or 2 mm) clearance between it and the spring side plate.
12. Install a new timing belt on the pulley on the main shaft.
13. Loop the other end of the belt around the cable guide pulley and replace the pulley on the cable guide shaft at its previously determined position. Slide the main shaft pulley around as needed.
14. Return both pulleys to their original positions and tighten the set screws. Make sure the screw contacts the flat area of the shaft.
15. Fully extend and retract the cable to ensure smooth travel.
16. Replace gear on main shaft at its previously determined position and tighten set screw. Make sure the screw contacts the flat area of the shaft.

17. Replace sensor mounting assembly but do not tighten screws completely.
18. Check position of the gears relative to each other to make sure they're lined up. If not, adjust the main gear so they line up.
- 19. If unit is a PT5E, skip to step 23. If unit is a PT5A, PT5DC, PT5MA continue with step 20.**
20. Connect a 10 VDC power supply to the potentiometer terminals so +10VDC is connected to CCW and -10VDC is connected to CW.
21. Connect a voltage meter to potentiometer terminals so positive lead is connected to S and negative lead is connected to CW.
22. Adjust potentiometer so output is between 0.04 and 0.1 VDC
23. Position the sensor assembly such that the gear teeth mesh but the gears are not forced into each other.
24. Tighten sensor mounting screws.
25. Fully extend and retract cable to ensure smooth travel.
26. Replace sensor housing. Make sure gasket is seated correctly.
27. Replace sensor end plate. Make sure gasket is seated correctly.
28. Replace the two bolts holding the endplate and sensor housing, making sure both gaskets stay seated and straight.