INSTALLATION INSTRUCTIONS

CM-37 MOTOR CONVERSION KIT

Part No. 37V55

COVERS INSTALLATION OF
STANDARDIZED MOTOR 50V58
IN EARLY-MODEL CM-37 CARRIAGES

Conversion Kit (37V55) consists of a 115 volt motor (Part No. 50V58), a terminal strip (Part No. 87W39), and 9 terminals (three for governor leads, 6 for motor leads). Mounting hardware is not supplied, since the original hardware on the machine can be used to mount the new parts.

Replacement is made as follows:

1. Release the friction brake on the right side of the machine cover by loosening the locknut and unscrewing the setscrew.

2. Unscrew the knob from the gear shift handle.

3. Disconnect the speedometer cable by pulling the cable plug from the socket on the governor housing.

4. Remove the four socket-head screws holding the cover to the machine chassis and lift off the cover. (The cover cannot be removed completely at this time, since it is still connected to the chassis by electric wiring, but these wires are long enough to permit placing the cover on its side on the bench adjacent to the chassis.)

5. Stand the chassis on its left side.

6. Remove from the underside of the chassis the plate which covers the machine terminal strip. This plate is secured by two round-head machine screws.

7. Disconnect all wires from the terminal strip. (Mark the wires for easy replacement.) Then remove the terminal strip by unscrewing the four round-head screws which hold it to the chassis.

8. Install the new terminal strip, first drilling and tapping new holes for the #8-32 screws as required. (Use the new terminal strip as a templet.)

9. Supporting the motor assembly with one hand, remove the four motor-mounting screws from the underside of the chassis.

10. Carefully withdraw the motor assembly, taking care not to lose the small coupling block which links the motor assembly output shaft with the drive shaft in the chassis.

11. Remove the gear reduction unit from the motor assembly by withdrawing the four screws which fasten it to the motor housing. If the unit does not dismount easily, tapping with a rawhide mallet on several sides will help loosen the seal. The gasket inserted between the motor and gear unit should be retained on the gear unit housing.

12. Repack the gear unit with Royco #6-A grease.

13. Dismount the governor from the old motor as follows:

   a. Remove the governor top cover by withdrawing the two fillister-head screws which secure it to the governor, then lift off the control dial.

   b. Remove the top plate by withdrawing the two flat-head screws shown in Fig. 1.

   c. Remove the adjusting-screw bracket and insulator by withdrawing the two fillister-head screws (Fig. 2).
d. Remove the two screws indicated in Fig. 3 and lift off the upper contact plate assembly.

e. Withdraw the side plate cover screw and remove the cover (Fig. 4).

f. As shown in Fig. 5, withdraw the screw and oblong washer to release the lower contact assembly.

g. Lift the insulating block and remove the screw holding the auxiliary contact spring and the black wire terminal.

h. Remove the three screws holding the spider in place as shown in Fig. 6.

i. Remove the spider and lower contact assembly from the governor as shown in Fig. 7.

j. Remove the housing plug shown in Fig. 4. Looking into the housing plug opening, rotate the magnet until the setscrew in the magnet hub is visible through the opening.

k. Using a 1/16 in. hex wrench, loosen, but do not remove, the setscrew.

l. Insert a screwdriver through the housing plug opening and push the magnet out of the housing by prying against the magnet hub. Do not pry against the magnet itself. Remove the magnet spacer from the shaft.

m. Dismount the governor housing by removing the four fillister-head screws and lockwashers which fasten it to the motor housing. These screws are located inside the magnet cavity.

n. Remove the insulating sleeving from the three governor leads on the old motor and slip them onto the corresponding leads on the new motor. The three small terminals supplied should then be soldered to these leads.

14. Assemble the governor on the new motor as follows:

a. Mount the governor housing on the new motor, using the original mounting screws.

b. Slide the magnet spacer, then the magnet onto the motor shaft extension, orienting the magnet so that the magnet setscrew will seat on the flat portion of the motor shaft extension. (Be sure that the magnet is clean and free of metal particles before insertion.) Place one hand on the magnet and the other hand on the output shaft at the opposite end of the motor,
then press the hands toward each other until the magnet hub butts the magnet spacer firmly against the ball bearing in that end of the motor. This will take up any end play present in the armature.

c. Tighten the magnet setscrew by means of the 1/16 in. hex wrench inserted through the housing plug opening, then replace the housing plug.

d. Be sure the spider assembly is clean, then slip the end of the lower contact spring through the end opening of the housing (Fig. 7) and slip the spider assembly into place with the flat surface of the spider frame on top. Be sure the spider is set squarely against the housing, then replace the three screws and lockwashers and tighten them firmly in place (Fig. 6).

e. Lift the insulating block and replace the auxiliary contact spring, then the black wire terminal, fastening them in their notch with the original terminal screw. When the insulating block is in its normal position the contact on the auxiliary contact spring should face upward.

f. As shown in Fig. 5, the lower contact spring fits into the center notch on top of the insulating block. Place the oblong washer on top of the contact spring, then the red wire terminal, then replace the original terminal screw. Do not tighten the screw completely.

g. Replace the upper contact plate assembly and the two screws that hold it in place, attaching the yellow wire terminal under one screw as shown in Fig. 3. Do not tighten the screws completely.

h. Check to see that the contact chains are free of kinks. Line up the upper and lower contacts so that they are directly over one another, and while holding them firmly in contact, tighten the three screws holding the contact assemblies to the insulating block.

i. Press the upper contact plate assembly down until the contacts just meet. When they are in this position, the front end of the upper contact should be about 1/32 in. beyond the lower contact. After the three screws have been tightened, the two contact faces in their normal positions should be about 1/16 in. apart. If the clearance is not correct, bend the upper
contact spring to obtain the proper clearance. Do not bend the lower contact spring.

j. Replace the fiber insulator strip on the insulating block, with the beveled corners of the insulator strip toward the motor.

k. Place the adjusting-screw bracket on top of the insulator strip and replace the two screws, tightening them securely. (Fig. 2).

l. Replace the top plate and screws (Fig. 1).

m. Replace the side plate cover and screw (Fig. 4).

n. Replace the control dial, then the top cover and screws.

15. Assemble the gear reduction unit to the new motor in the same position which it occupied on the old motor.

16. The new assembly is now complete and is ready to be inserted in the machine chassis. This operation must be done carefully, due to the narrow clearances involved. The key which has been machined on the mounting pad of the motor assembly fits a corresponding machined slot in the bed of the chassis. The assembly must be slid slowly into position in the chassis, taking care that the various projections on the assembly do not bind with near-by parts of the machine. Before the assembly is completely seated, the small coupling block must be inserted in position to link the two couplings where the motor assembly output shaft meets the chassis gear shaft. When the assembly is completely seated, it must be held firmly in place, while the chassis is placed on its side and the four motor-mounting screws inserted through the underside of the chassis and tightened.

17. Crimp a solderless terminal onto each of the six motor leads. (These terminals are supplied with the Conversion Kit).

18. Connect the wiring to the terminal strip as shown in Fig. 8.

19. Replace the machine cover and screws.

20. Replace the gear-shift handle knob.

21. Connect the speedometer cable by inserting the cable plug into the socket on the underside of the governor.

22. Test the speedometer calibration by running the carriage at some speed near the middle of its range and measuring the distance travelled
in one minute. If the speedometer reading does not agree with the measured speed, adjust the calibration as follows:

a. Remove the speedometer shield by removing the three screws which hold it in the carriage cover.

b. Lift out the speedometer.

c. With the machine running at the above measured speed, adjust the position of the contact on the calibration resistor to make the meter indicate the correct speed. Do this by loosening the screw in the sliding contact on the resistor (located directly on the back of the meter.) The contact can then be shifted by hand, without fear of electrical shock. This circuit has no connection with any high voltage circuit in the carriage.

d. Tighten the contact screw.

e. Replace the speedometer and its shield, and fasten them in place.

f. Adjustment of the cut-in point for the auxiliary contact is made as follows:

Remove the governor side cover, place the gear shift lever in the neutral position, and turn on the motor. Looking into the open end of the governor housing, rotate the governor control dial and observe the point at which the auxiliary contact cuts in. This will be indicated by a small spark at the contact. The cut-in point will normally occur at a speed somewhere near mid-scale on the speedometer. If the contact does not cut in at the correct location, or if it is desired to shift the cut-in point to avoid interference with a frequently-used cutting speed, this can be done as follows:

Rotate the governor control dial until the speedometer is at the setting at which it is desired to have the auxiliary contact cut in. Remove the governor top cover, control dial, and cover plate. Loosen the auxiliary contact locknut. Using an insulated screwdriver, screw the auxiliary contact in or out until it just makes contact. Tighten the contact locknut. Replace the cover plate, control dial, and the governor covers.

23. Adjust the friction brake to provide a light but firm drag on the carriage when in motion. When properly adjusted, a pull of 5 to 7 pounds will be required to move the machine with the gear shift lever in the NEUTRAL position.

Figure 9 shows a wiring diagram of the converted machine.

A replacement parts picture for the new motor is given in Figure 10.
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