

HEAVY MAINTENANCE INSTRUCTIONS MASTER CONTROLLER TYPE KC7

CONTENTS

	Page
INTRODUCTION	2-8-2
SCOPE	2-8-2
DESCRIPTION	2-8-2
Operating Handle	2-8-2
Reset Plug Switch	2-8-2
Control Plug Switch	2-8-2
DATA	2-8-2
OPERATION	2-8-2
MAINTENANCE AND REPAIR	2-8-3
REMOVAL FROM THE CAR	2-8-3
DISASSEMBLY	2-8-3
INSPECTION AND REPAIR	2-8-6
ASSEMBLY	2-8-6
TEST	2-8-7
INSTALLATION ON THE CAR	2-8-7
SPECIAL TOOLS	2-8-7

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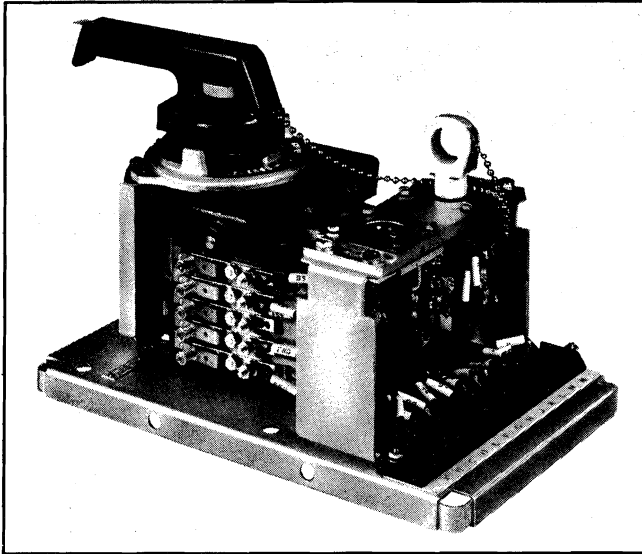


FIG. 8-1. MASTER CONTROLLER 17KC7D2. E-19507

INTRODUCTION

SCOPE

This publication provides operating, maintenance, test and repair procedures for the 17KC7D2 Master Controller.

DESCRIPTION (See Fig. 8-1)

The KC7 master controller is a manually operated switching device which permits the operator to select the direction of movement and speed of the transit car.

The principal parts of the controller are the operating handle, cylinder shaft, cylinder body, finger blocks and fingers.

A reset and control plug switch is provided on the controller. The reset and control plugs must be inserted to complete the circuits to reset the overload relays and for operation of the car.

Operating Handle

The operating handle sets up the circuits to regulate the speed of the car. It also remotely operates the reverser to set up the direction of the traction motor rotation.

The speed of the car is determined by placing and holding the operating handle in one of the four controller running positions.

The traction motor rotation is determined by the direction in which the operating handle is moved from the OFF position. Arrows on the controller notching plate designate direction for FORWARD or REVERSE.

Reset Plug Switch

This switch resets the overload relays. The reset plug must be inserted in the switch on the lead car before and during operation.

Control Plug Switch

This switch connects the controller electrically to the control equipment. The control plug must be inserted in the switch in order to operate the car.

DATA

Number of Fingers	Drop (inches)		Pressure (pounds)	
	Min.	Max.	Min.	Max.
10	3/32	1/8	1 1/4	2

OPERATION

The master controller provides the electrical signals to the propulsion logic and the trainline circuits, which allows the train to operate within the rules of the operating authority.

The master controller handle is removable only in the SAFETY position. In this position, the controller renders the train inoperative by not allowing propulsion signals to be generated.

The controller cannot be advanced to any position until the button on the end of the handle is depressed. The handle is also spring-loaded to return to the SAFETY position. This feature requires that the handle must be held in the position desired.

The "control plug" must be inserted into the hole on the controller in order to make up a cab. The controller in the made-up cab provides a circuit to energize the Emergency Magnet Valves in the brake circuit. This ultimately allows the brakes on the train to be released. The Engineman can operate the train per the authority's operating procedures.

The control plug cannot be removed from the controller for any period to exceed six seconds (time set by relay ORTD). The train will be placed into an Emergency brake condition if the relay ORTD is allowed to drop out.

The controller has another function - reset of the Ground Relay and the Overloads on the A1 and A2 propulsion contactors. The resetting of these devices is a trainline function accomplished by removing the plug from the CONTROL position and inserting into the RESET position. This procedure must be accomplished in less than six seconds, or else the train will go into an Emergency braking mode. If this occurs, the train must come to a complete stop. The procedure to recharge the brake pipe must then be followed.

The controller handle, when placed in the OFF position, will set up the train circuitry in the COAST MODE, no propulsion power and no brakes applied.

The SWITCH position provides minimum acceleration with only one half of the "A" winding power.

The "P1" position provides maximum acceleration with the full "A" winding power.

The "P2" position provides maximum acceleration with the full "A and B" windings power.

The "P3" position provides maximum acceleration with the full "A, B, and C" windings power.

MAINTENANCE AND REPAIR

REMOVAL FROM THE CAR (See Fig. 8-2)

1. Remove the handle and plug from the controller by pulling outward on each device.
2. Remove the cover from the controller by removing the four sets of mounting hardware.
3. Disconnect the external wires from the terminal board points.
4. Remove the controller from the car structure at the operating station by removing the four sets of mounting hardware.
5. Remove the controller to a suitable work area.

DISASSEMBLY (See Fig. 8-3)

1. Remove the plug (36) from the controller plug switch assembly (27), and allow the plug to hang on the chain (16).
2. Remove the handle assembly (1) from the controller by pulling outward on the handle. Place the handle assembly (1) and the plug (36) in a safe place, and protect these devices from mechanical damage.
3. Remove the internal wires connected to the terminal board (9).
4. Remove the four sets of mounting hardware (3, 5) to remove the two plug switch assemblies (27), as they are mounted on their support (23).

5. Remove the four sets of mounting hardware (3, 5) from the support (23) to remove the plug switch assembly (27).

6. Disassemble the contacts from the finger base (21) by removing the mounting hardware (3, 5, 6) to loosen the terminal (32), bracket finger (33) and shunt (31) from the finger base (21). The finger (34) is held into the finger base (21) by a spring (14). Exercise care when removing the bracket finger (33) so the spring (14) is not lost.

7. Remove the wires from the finger block assembly (18).

8. Remove the two sets of mounting hardware (3, 5) from the finger block assembly (18) to remove the assembly from the controller.

9. Remove the finger (34) from the finger block (20), by removing the two sets of mounting hardware (3, 5, 6, 8).

10. Remove the finger base (21) from the finger block (20) by removing all the fingers from the assembly per instructions in 9, above.

11. Remove the shield (24) from the finger block (20) by removing the two sets of mounting hardware (3, 5, 6).

12. Remove the cylinder shaft (22) from the controller by removing the four sets of mounting hardware (3, 5) from the support (23).

13. Lift the entire assembly out of the controller base (11).

14. Remove the sleeve (17) from the link (26) by removing the pin (4). Drive the pin out of the assembly with a punch.

15. Remove the link (26) from the shaft extension (30) by driving the pin (4) out of the assembly.

16. Remove the shaft extension (30) from the shaft (29) by driving the pin (4) out of the assembly. Pull the shaft extension (30) off the shaft (29).

17. Remove the washer (6) and the body cylinder (28) from the shaft (29) by pulling these assemblies off the shaft (29).

18. Remove the spacer (25) from the shaft (29) by driving out the pin (4). Pull the spacer (25) off the shaft (29), and save the washer (6).

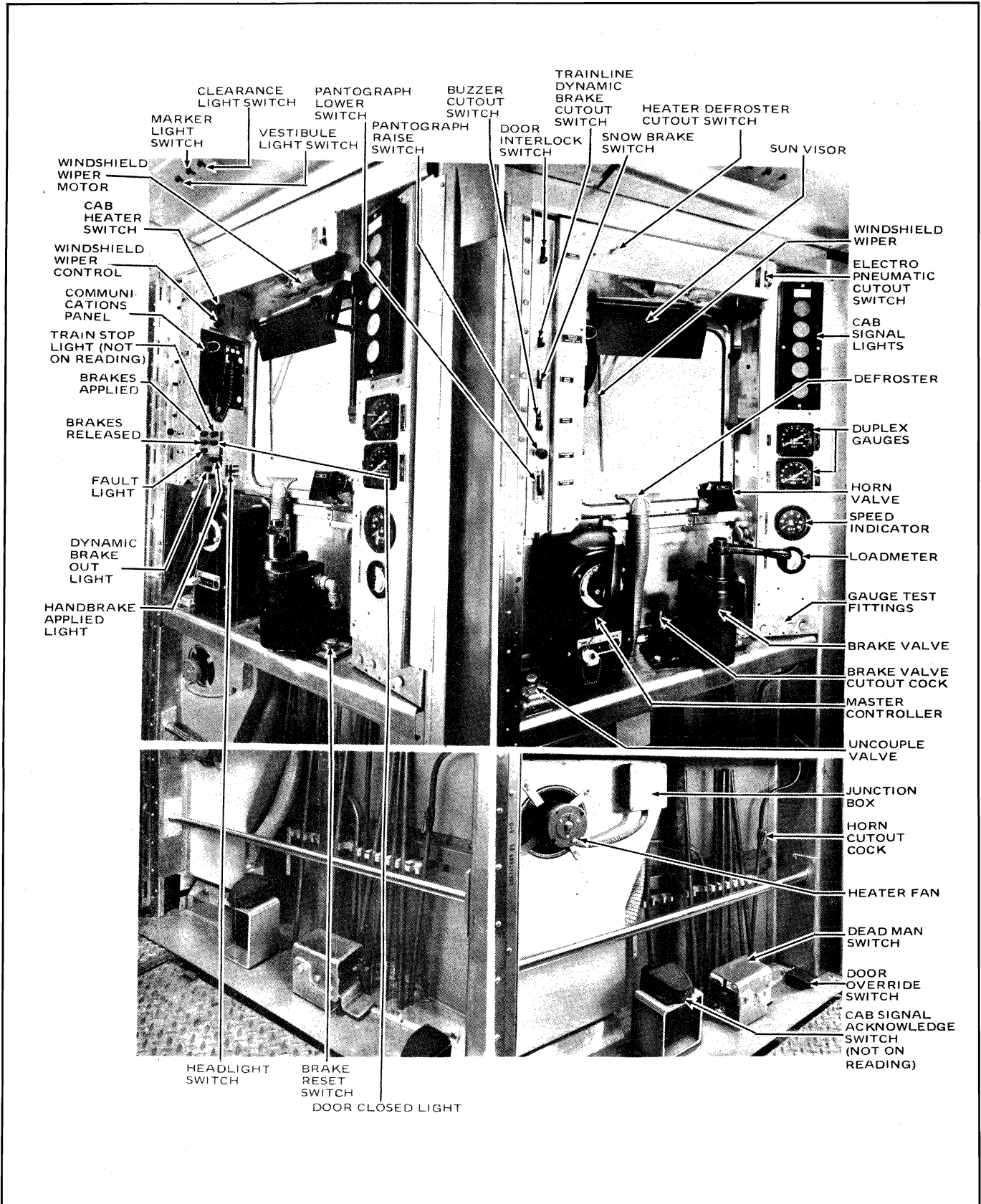


FIG. 8-2. CONTROLLER LOCATION ON THE CAR. E-19241

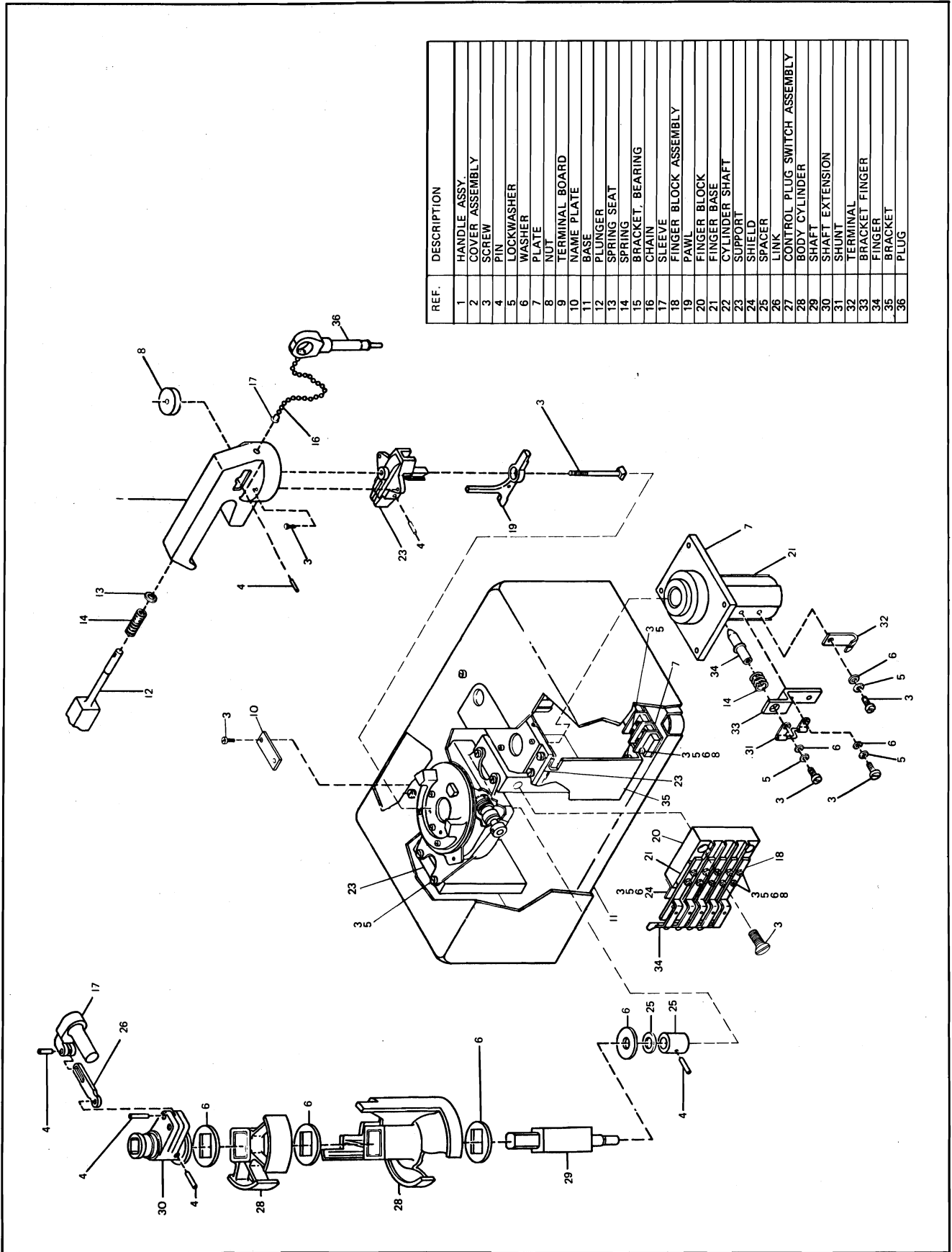


FIG. 8-3. EXPLODED VIEW CONTROLLER 17KC7D2. E-19934

19. Remove the plunger (12) from the handle assembly (1) by removing the pin (4). Hold the plunger into the handle and release the spring pressure slowly. Save the spring (14) and washer (13).

20. Remove the pawl (19) from the support (23) by driving out the pin (4) and removing the screw (3).

21. Remove the support (23) from the handle assembly (1) by removing the two screws (3).

22. Remove the chain (16) from the handle assembly (1) and the plug (36) by removing the sleeve (17).

INSPECTION AND REPAIR

1. Inspect all parts for visible defects. Correct all defects found.

2. Move the operating handle, and be sure it is free from mechanical binding and friction.

3. Be sure good physical and electrical contact is made between the finger contacts and the cylinder shaft contacts in each notch position.

4. Check the terminal strip and finger connections to be sure all connections are secure.

5. Keep all contacts clean and free from dirt or other abrasive materials.

ASSEMBLY (See Fig. 8-3)

1. Install the support (23) into the handle assembly (1), and torque the two screws to 22-27 in.-lb.

2. Install the pawl (19) into the support (23), and fasten in place with the pin (4) and the screw (3).

3. Install the spring (14) and washer (13) onto the plunger (12). Insert into the handle assembly (1). Push on the plunger to compress the spring until the fastening holes are aligned. Fasten in place with the pin (4).

4. Install the chain (16) onto the handle assembly (1) and the plug (36), and fasten in place with the sleeve (17).

5. Install the washer (6) and spacer (25) onto the shaft (29). Align the holes in the spacer (25) and shaft (29), and drive in the pin (4).

6. Install the washer (6) and body cylinder (28) onto the shaft (29). Press the assembly onto the shaft until all parts are seated.

7. Install the shaft extension (30) onto the shaft (29). Align the mounting holes and fasten together with the pin (4).

8. Install the link (26) onto the shaft extension (30). Align the mounting holes and fasten together with the pin (4).

9. Install the sleeve (17) onto the link (26). Align the mounting holes and fasten together with the pin (4).

10. Install the entire shaft assembly into the controller base (11). Lubricate the brass bearing in the base (11) with two drops of lubricating oil equivalent to GE-D6B17B1.

11. Install the cylinder shaft (22) into the base (11), and torque the four sets of mounting hardware to 22-27 in.-lb.

12. Install the shield (24) onto the finger block (20), and torque the two sets of mounting hardware (3, 5, 6) to 14-18 in.-lb.

13. Install the finger base (21) onto the finger block (20). Install the fingers (34) onto the finger block (20), and torque the mounting hardware (3, 5, 6, 8) to 14-17 in.-lb.

14. Install the finger block assembly (18) onto the controller support (23), and torque the two sets of mounting hardware (3, 5) to 22-27 in.-lb.

15. Install the contacts into the finger base (21) by inserting the finger (34) into the finger base (21).

a. Install the spring (14) onto the finger (34).

b. Install the bracket finger (33), the terminal (32) and the shunt (31) onto the finger base (21) and fasten into place with the mounting hardware (3, 5, 6).

Ensure the spring (14) is moving freely and all devices are aligned properly. Torque the mounting hardware to 22-27 in.-lb.

16. Install the plug switch assembly (27) onto the support (23), and torque the four sets of hardware (3, 5) to 22-27 in.-lb.

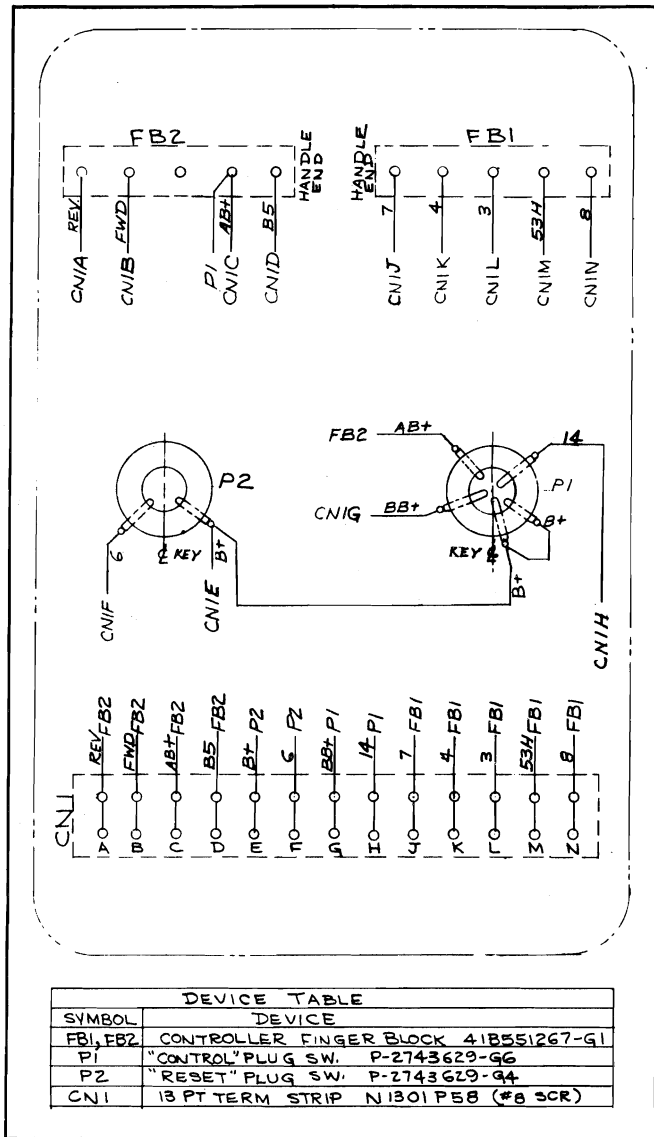


FIG. 8-4. WIRING DIAGRAM INTERNAL CONNECTIONS (41C651041).

17. Install the support (23) with the two plug switch assemblies (27) attached onto the controller brackets (35), and torque the four sets of mounting hardware to 22-27 in.-lb.
18. Wire the controller per the wiring diagram, Fig. 8-4.
19. Install the cover (2) onto the controller, and torque the four sets of mounting hardware to 22-27 in.-lb.
20. Install the handle assembly (1) and the plug (36) onto the controller.

TEST

Depress the handle button and move the handle from SAFETY to P3 REVERSE. Release the handle and note that the handle returns to the SAFETY position.

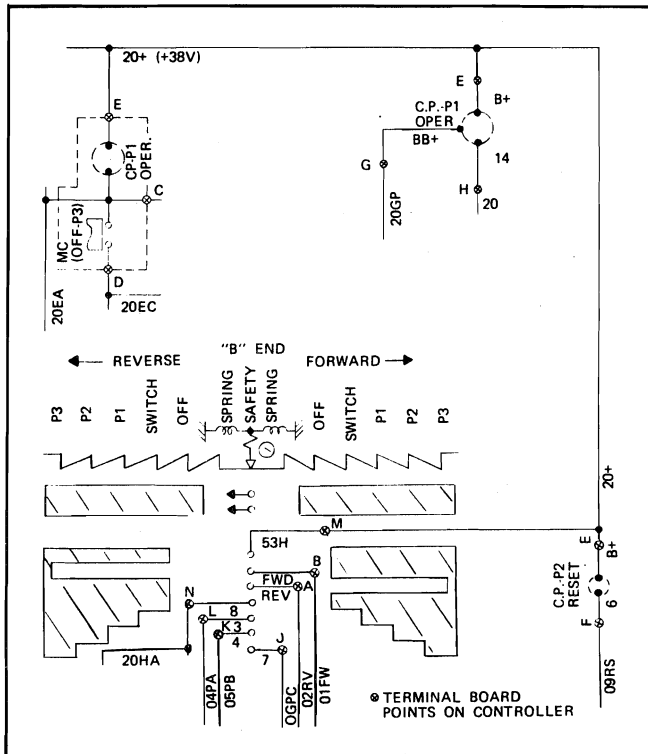


FIG. 8-5. WIRING DIAGRAM EXTERNAL CONNECTIONS. E-19935

Depress the handle button, and move the handle from SAFETY to P3 FORWARD. Release the handle, and note that the handle returns to the SAFETY position.

INSTALLATION ON THE CAR

1. Remove the handle and plug from the controller by pulling outward on each device.
2. Remove the four sets of mounting hardware from the cover, and lift the cover off the controller.
3. Lift the controller onto the four mounting studs. Torque the four sets of mounting hardware to 27-33 in.-lb.
4. Connect the external wires to the terminal board points per the wiring diagram, Fig. 8-5.
5. Install the cover onto the controller, and torque the four sets of mounting hardware to 22-27 in.-lb.
6. Install the handle assembly and the plug into the controller.

SPECIAL TOOLS

None Required.