

The **PCC**

Handy
Reference
Leaftlet

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THE P.C.C. HANDY REFERENCE LEAFLET

The P.C.C. car is so called because the design was sponsored by many street railway companies whose presidents organized themselves into the "Presidents Conference Committee" for the development of a streamlined modern streetcar. The general design is more or less standard in many cities of the U.S. and Canada. In Chicago certain adaptations were made to render it suitable for two-man operation on our heavier lines.

This booklet is devoted to troubles most often encountered on the types of P.C.C. cars operated by CTA. It is not intended as a substitute for the trouble truck, but it will be useful while you wait for the truck, or when no truck is immediately available.

Part One is devoted to our latest P.C.C. cars, commonly known as Surface-Liners. (4052 - 4411 and 7035 - 7274).

Part Two is devoted to the early (1936) front entrance P.C.C. cars. (4002 - 4051 and 7002 - 7034).

The cars discussed in Part One are similar to each other in most respects, and so are those discussed in Part Two. Nevertheless, some differences do exist, even among cars of the same type.

Make sure you are following instructions for the particular car you are operating. Car numbers head the paragraphs when special instructions are necessary.

W. A. HALL

Sup't. of Transportation
Surface Division



CHICAGO TRANSIT AUTHORITY

PART ONE

1946 - 1947 P.C.C. SURFACE-LINERS

Sec. I. PRE-PULL OUT CHECKS

4052 - 4411

7035 - 7274

1. Check hinged parts, see that skirts over track shoes are down, and battery compartment doors and rear windows are closed.
2. See that BACK-UP controller cover is locked.
3. Check operation of M.G. set, both by sound and by observing voltmeter. Voltmeter hand must be in white or green section.
4. Check AUX. BRAKE RESET. Release brakes by operating switch and be sure that red light on dash goes out, indicating release.
5. Check satisfactory operation of all doors.

Be sure that treadle door switch in motorman's fuse cabinet is "ON". It SHOULD be on whenever the cabinet door is closed but do not depend on this. Sometimes the bracket on the inside of door may be loose or out of alignment.

6. Make coasting and motor brake test. Apply a little power, then coast to make sure that car rolls freely. Then stop car by depressing service brake handle slightly to test motor brakes.

7. Check sander and sand supply.
8. Check lights, both interior and exterior.
9. Check fender.
10. Check signs, both route and destination.
11. Check buzzers and signal bells.

WHEN YOUR CAR WILL NOT OPERATE

Turn on body lamps to see if there is power on the line. Check whether pole may have left the wire or is on a circuit breaker.

If you find power source O.K., notify dispatcher of your trouble and location and proceed with the following checks while waiting for Trouble Truck:

Sec. II. BRAKE TROUBLE

1. DRUM BRAKES WILL NOT RELEASE.

Operate drum-dynamic brake handle a few times to make sure that you have it all the way up. RESET SWITCH WILL NOT WORK WHILE EITHER POWER OR BRAKE HANDLE IS DOWN. Operate reset (#9) switch. If brake indicator light remains lit and car will not move, brake actuator trouble is indicated.

REMEDY: See that center door is closed and start car by depressing power handle and holding Emergency Power switch forward. Occasionally when this is done, car will again operate normally after Emergency Power has been used for a short distance. **DO NOT USE EMERGENCY POWER FOR MORE THAN 50 FEET.**

Conductor's emergency switch should also be applied and released a time or two, it may have been applied accidentally. After this test is completed, it will be necessary to use reset switch before proceeding.

When drum brakes cannot be released by use of reset switch, it is possible to release them manually. The procedure varies according to which series your particular car belongs, but in all cases you start by raising the skirts over the track shoes.

4062 - 4371 Back off actuators 10 full turns (counter clockwise). This will permit car to roll freely so that it can be moved on emergency power. Bear in mind that you will now have no drum brakes and track brakes must be used for holding the car. Operate cautiously and **CHANGE CARS** at the first opportunity.

4052 - 4061 Proceed as instructed above except that actuators must be backed off only 7 turns. To
7035 - 7114 back them off more than 7 turns will re-apply the brakes.

4372 - 4411 On these cars the actuator nuts are replaced
7035 - 7274 by a latch. Raise skirts over track shoes and release latches to release sticking drum brakes. Bear in mind that you will now have no drum brakes and track brakes must be used for holding the car. Operate cautiously and **CHANGE CARS** at the first opportunity.

2. NO DYNAMIC BRAKES

Should you observe that the red lamp on the motorman's desk lights up AS SOON as dynamic brake handle is depressed, instead of the moment at which the stop is completed, it indicates that dynamic brakes are not working and you are operating on drum brakes alone. A car in this condition must not continue in service as the drum brakes were not designed for heavy or continuous operation.

REMEDY: If you are sure that M.G. set is operating, car may be pulled in or taken to nearest point at which a **CAR CHANGE** can be made. Passengers should not be carried and speed should be slow and cautious.
USE TRACK BRAKES.

3. NO DYNAMIC OR DRUM BRAKES ON REAR CONTROLLER

This is caused by brake handle not being locked down at front end of car.

REMEDY: When removing reverser handle, make sure that brake handle is locked down.

4. BRAKES WILL NOT RELEASE FROM REAR CONTROLLER

This is caused by drum brakes being tripped and not reset.

REMEDY: When removing the handle from front reverser make sure that car is in regular operating position with red brake indicator light out before depressing brake handle to remove reverse lever. DO NOT DEPRESS BEYOND NORMAL SERVICE BRAKE POSITION.

5. TRACK BRAKES WILL NOT RELEASE

REMEDY: Make sure your track brake handle is all the way UP. There have been cases where a broken spring has permitted this handle to drop and apply track brakes. Hold or tie handle up if necessary, and remove car from service.

Sec. III. MOTOR TROUBLE

(All P.C.C. Cars)

IF LINE BREAKER BLOWS 3 TIMES IN CLOSE SUC- CESSION ON LEVEL TRACK

- a. Pull trolley pole and wait for motor generator set to stop.
- b. Cut out motor 1 & 2 and try applying power. If line breaker continues to blow then -
- c. Pull pole again, put motors 1 & 2 back in circuit and cut out 3 & 4.

- d. Discharge passengers and operate carefully to station on one pair of motors. REMEMBER THAT DYNAMIC BRAKING IS NOT AVAILABLE WHEN EITHER SET OF MOTORS IS CUT OUT. RUN SLOWLY, COAST AS MUCH AS POSSIBLE, AND USE ONLY TRACK BRAKES.

Sec. IV. MOTOR GENERATOR SET TROUBLE

IF MOTOR GENERATOR STOPS RUNNING

It may be discovered by -

- a. Lack of customary noise or vibration.
- b. Voltmeter on motorman's desk reading zero.
- c. Smoke coming into car.

The motor generator may stop running due to accidentally turning off #2 switch in the motorman's gang switch or because fuse is blown. Operate #2 switch a few times to be sure it is on. Blowing of either fuse #10 (25 amp. 600 volt), or #5, (30 amp. 32 volt), will kill the motor generator set.

REMEDY: If lights burn (indicating that main auxiliary fuse is O.K.), PULL POLE and replace fuse #10. If this does not remedy trouble PULL POLE again and replace fuse #5. If set still does not start, see if car will move on Emergency Power. If car will move freely, you may cut out either set of motors and move car NOT MORE THAN 100 YARDS with the M.G. set not running. If you cannot clear the line with a run of 100 Yards or less, you will have to be towed or pushed.

If you have a dead car caused by conditions other than M.G. set not running, pull pole, turn on M.G. set, reset and tow.

(See Towing Cars, Sec. VIII, Item 13.)

WHEN BEING TOWED OR PUSHED, USE DRAWBARS.
ALL MOTORS MUST BE CUT OUT AND REVERSER SET

IN THE DIRECTION OF TRAVEL. DRUM BRAKES MUST BE RELEASED IN ACCORDANCE WITH INSTRUCTIONS IN SEC. II, ITEM 1.

Sec.V. TROUBLE INDICATED BY VOLTMETER

IF VOLTMETER POINTER IS IN RED SECTION OF SCALE

It indicates that trouble has developed in the motor generator set or battery control circuits.

Normally the pointer should be in the white section of the scale. If the pointer should be in the red section of the scale above the white, car may remain in service until day's work is completed, but be sure and report the matter on the SIGN IN sheet.

If voltmeter reading is below 30, try changing the 60 amp. 32 volt M.G. fuse in the motor cut out switch compartment. If this does not restore normal reading, passengers should not be carried. If M.G. set IS running, car may be moved slowly to first clearance point and call placed for Trouble Truck. If M.G. set is NOT running, be governed by instructions in Section IV.

Sec. VI. DOOR TROUBLE

1. ALL DOORS INOPERATIVE

(together with locked drum brakes on 4062 to 4171).

This condition indicates that fuse #3 (in front panel) may be blown.

REMEDY: Replace with an O.K. fuse.

2. IF CENTER TREADLE DOOR WILL NOT OPERATE NORMALLY

Check to see that switch #5 in conductor's gang switch

has not been turned off. If this is O.K., it may be that one or both treadles are dead.

REMEDY: Operate door manually by use of switch #6 in conductor's gang switch. **CHANGE CARS.**

3. IF DOOR CLOSSES NORMALLY BUT CAR HAS NO POWER

REMEDY: Throw door cut-out switch in motorman's fuse cabinet to "OFF". Occasionally after car has been started in this way, the door cut-out switch can be turned on again and car will operate O.K. If not, you may continue operation with door cut-out switch "OFF". Door of fuse cabinet must remain open to insure switch staying "OFF".

Under these conditions the treadle door becomes a manually operated door, controlled by switches 5 and 6 in the conductor's gang switch. This is an emergency condition and conductor must be sure that passengers are clear of door and that it is closed before motorman is given starting signal. On cars 4062 to 4171 the single rear door and treadle door do not operate when door cut-out button is in off position. **CHANGE CARS** at first opportunity.

Sec. VII. EMERGENCY POWER

1. WHEN CAR WILL NOT MOVE and trolley is on a live wire, interior lights burning, motor generator running, center door closed, auxiliary brake re-set O.K., red indicator light out and door cut-out switch in the off position:

Depress controller power handle, push emergency power switch forward and hold it forward. If car starts up and rolls **FREELY**, emergency power may be used to first clearance point. **IF CAR DOES NOT ROLL FREELY** **EMERGENCY POWER MAY NOT BE USED FOR OVER 50 FEET.**

2. WHEN CAR WILL NOT MOVE and trolley is on a live wire, center door closed, motor generator running BRAKE INDICATOR LIGHTS ARE LIT AND CANNOT BE TURNED OFF WHEN BRAKE HANDLE IS ALL THE WAY UP AND AUXILIARY RESET USED:

Depress controller power handle, push and hold emergency power switch button forward. If car starts up and rolls freely, emergency power may be used to the first clearance point. IF CAR DOES NOT ROLL FREELY, EMERGENCY POWER MAY NOT BE USED FOR OVER 50 FEET.

TEST WHETHER OR NOT CAR IS ROLLING FREELY THIS WAY: Apply a touch of emergency power, release, and observe whether car continues to drift. If it does not drift easily, it is NOT rolling freely and emergency power should not be used for more than 50 feet.

Sec. VIII. MISCELLANEOUS

1. STICKING POWER HANDLE

This condition may be caused by reverse lever not being in the proper position. Make sure that your reverser is set properly.

2. IF POWER DOES NOT SHUT OFF

Make sure your power handle is fully released.

If handle is all the way up and power still does not shut off, the power supply may be controlled until the nearest carhouse is reached by operating the brake handle. (Full release will apply power; any depression of handle will cut off power.)

3. SPINNING WHEELS

Avoid spinning wheels. It results in excessive heating of wheels causing damage to sandwiches. If wheels have

a tendency to spin, feed controller slowly and apply a little sand.

4. CONDUCTOR'S EMERGENCY SWITCH

When an emergency of which motorman is not aware occurs, don't depend on three bells. **PULL UP YOUR EMERGENCY SWITCH.** This cuts off power, applies spring drum brake and track brake, and rings warning buzzer. On cars 4052 to 4411 and 7035 to 7114, auxiliary reset must be used to release brakes after emergency brake handle has been returned to its normal (down) position.

5. FARE REGISTER INOPERATIVE

- a. Register lock on top of stanchion may have dropped down into the mechanism.

REMEDY: Pull lock up and wedge with rubber band.

- b. Register may have been placed on stanchion when register pedal was down.

REMEDY: Remove register and replace with pedal up.

6. LIGHTS

Conserve power and help the repair department in maintaining lights. Don't burn lights except when they are necessary, either interior lights or headlights.

7. FUSES AND FUSE LOCATIONS

4062 - 4371 All fuses except those for the track brakes and the generator side of the motor-generator set are located in the front end fuse panel, clearly identified and proper amperage indicated. The track brake and generator side of motor-generator set fuses are located in the motor cut-out switch compartment at center of car.

4052 - 4061	Fuses on these cars are divided between front cabinet panel and a second panel located on the right side of the car, just rear of the center door. All fuses are clearly identified and their proper amperage indicated.
4372 - 4411	
7035 - 7274	

Protect yourself from burns. Before changing 32 volt fuses, shut off all switches. Before changing 600 volt fuses, pull trolley pole.

8. FUSES WHICH BLOW MOST COMMONLY, AND THEIR EFFECT ON CAR OPERATION

- #5 (32 volt fuse) Kills all controls and causes motor-generator to stop.
- #10 (600 volt fuse) Causes motor-generator to stop.
- #3 (32 volt fuse) Causes failure of all doors, (and on 4062 to 4171, locked drum brakes.)
- #6 (32 volt fuse) Causes failure of drum brakes. Makes reset inoperative.

9. NEVER USE A FUSE OF HIGHER AMPERAGE THAN THAT INDICATED ON DOOR PANELS DIRECTLY OPPOSITE FUSE BLOWN.

10. IF YOU HAVE OCCASION TO CHANGE ANY FUSE, REPORT THE FACT ON THE SIGN-IN SHEET. DO NOT LEAVE BLOWN FUSES WHERE SOMEONE MAY LATER MISTAKE THEM FOR O.K. FUSES. Place them on motorman's desk so that repair department can test and replace with new fuses in the spare fuse rack.

11. RUNNING THROUGH WATER

Water splashed into the lining of the drum brakes and into motors causes frequent and serious trouble. Avoid splashing by reducing speed through all puddles.

12. DRAWBARS

For pushing or towing SURFACE-LINER P.C.C. cars, 2 drawbars must be used. These drawbars are stored in the battery compartment. Cars must not be pushed

without use of drawbars.

13. TOWING CARS

Pull the trolley pole on the car which is being pushed or towed unless it is necessary to have lights in the car. Care must be taken not to split the train at electric switches. When necessary to take an electric switch ALWAYS pull the pole on the car being towed as it passes under the electric switch pan, even though you may be using the pole in order to have lights elsewhere.

14. TROLLEY POLES

Instead of wheels, the trolley poles on SURFACE-LINERS are equipped with carbon shoes which slide along the wire. This shoe is soft, fractures easily, and in event of pole leaving wire, car must be stopped immediately. Extreme care should be used when operating in reverse, particularly under any special work. Rope should be held taut and car backed slowly and carefully.

OPERATING PRECAUTIONS

1. Start the car only on the Conductor's signal- the rear doors are not interlocked with the power.
2. Apply power smoothly and steadily- avoid pumping the power handle.
3. Remember your passengers. Brake no faster than required.
4. When it is necessary to use sand, apply the sand before the brakes.
5. Use the BACK-UP controller at the rear of the car whenever backing.
6. Always operate slowly when backing up.
7. Never use a ribbon fuse in emergency.
8. Never touch the trolley pole or base unless you are on the wooden catwalk.
9. Shut off the M.G. set if power fails or pole breaks.
10. Never sweep dust or moisture on floor or center step well with M.G. set running.

PART TWO

1936 (Front Entrance) P.C.C. CARS

Sec. IX. PRE-PULL OUT CHECKS

4002 - 4051
7002 - 7034

1. Check to see that battery compartment doors and rear windows are closed.
2. Be sure motor generator switch is "ON" and that M.G. set is running.
3. Be sure air compressor cuts in and shuts off properly. (Pressure should be between 80 and 90 lbs.)
4. Check volt meter. (Should read between 32 and 37 volts.)
5. Check operation of all doors. Check door cut-out button. It must be in "ON" position for normal operation and car should be tested with rear or center doors open to see if switch is O.K.
6. Make coasting and brake test. Apply a little power, then coast to make sure that car rolls freely. Then stop car by depressing service brake handle slightly to test motor and air brakes.
7. Check sander and sand supply.
8. Check lights, both interior and exterior.
9. Check buzzers and signal bells.

10. Check fender.

11. Check signs, destination and route.

Sec. X. WHEN YOUR CAR WILL NOT OPERATE

1. Turn on interior lights to see if there is power on the line, check whether pole may have left the wire or is on a circuit breaker.

If you find power source is O.K. notify dispatcher of your trouble and location and proceed with the following checks while waiting for the trouble truck.

2. Check motor-generator switch to be sure it is on and that M.G. set is running.

If set is not running replace motor-generator (30 amp.) fuse. **PULL POLE WHILE CHANGING FUSE.**

3. Check brake handle; be sure it is all the way up.

4. Check volt meter (should be 32 to 37) and air gauge (should be above 50.) Control circuit of 7000 series is air operated, and compressor is operated by a belt from the generator set. If generator is running and air pressure drops too low to operate controls it will be necessary to be pushed or towed to some point of clearance. Use drawbars for either pushing or pulling cars.

5. Check door cut-out button. If car will not operate with cut-out button "ON" it can usually be operated with the cut-out button "OFF". **IT WILL THEN BE NECESSARY TO USE BELL SIGNALS IN STARTING CAR UNTIL IT IS CHANGED OFF.** Leave cabinet door open as reminder that door cut-out switch is in "OFF" position.

6. Check motor cut-out switches under conductor's seat. Both switches must be **ALL** the way down to insure

all motors being in.

7. Check conductor's emergency switch. (Must be down).

8. When line breaker blows 3 times in succession on level track, try cutting out one pair of motors. If breaker still blows place first pair back in service and cut out remaining pair. **SHUT OFF M.G. SET WHEN CUTTING OUT OR CUTTING IN MOTORS.** (Cut out switches are under conductor's seat. UP for OUT. DOWN for IN). Pull car in.

9. If car still will not operate, after above procedure, get pushed or pulled to some point of clearance. **BOTH MOTORS MUST BE CUT OUT WHEN BEING PULLED OR PUSHED.** Reverser should be set in direction car is to travel. Use drawbars for pushing as well as pulling cars.

10. **CAUTION. DO NOT OPERATE CAR WITHOUT MOTOR-GENERATOR SET RUNNING UNLESS YOU CAN CLEAR THE LINE BY RUNNING NOT MORE THAN 2 BLOCKS.** Make it a habit to glance at your voltmeter frequently, the reading should be between 32 and 37. On some cars the M.G. set operates so quietly that it might stop without being noticed. This can be determined by observing voltmeter, if M.G. set has stopped the reading will be below 30.

If car is to be moved at all on battery power alone take the following precautions:

Cut out one set of motors to reduce the flow of power through resistance, thereby minimizing resistance overheating and reducing chances of setting car floor on fire.

Allow car to coast as much as possible. Remember that your dynamic brake is already gone and that your air will soon be gone also, since compressor is no longer operating. The track brake is the only remaining brake.

If you cannot clear the line with a run of 2 blocks or less get pushed or pulled in.

(On the 7000 type car, air is required to operate the power controls under the car, therefore the failure of controls will closely follow the failure of the M.G. set and the air compressor.)

Sec. XI. A LOCKED AIR COMPRESSOR

A mechanically locked air compressor may be detected by falling air pressure, noise and vibration at the left-center of the car and the odor of burning rubber coming into the interior of the car. Since the air compressor operates in conjunction with the motor-generator set, the only way to shut off a locked air compressor is to shut off the M.G. set. Proceed as instructed in Sec. X, item 10.

Sec. XII. FROZEN AIR

Frozen air lines may sometimes render door engines inoperative or very sluggish. In this case CHANGE CARS, operating with door cut-out button on "OFF" position if necessary, until the point of change is reached. Passengers should not be carried.

Sec. XIII. MISCELLANEOUS

1. DOORS

If doors fail to operate check screw type 15 amp. door-register fuse under conductor's seat. This fuse will blow if register is defective. Doors will then be balanced, making it necessary to shut off door cut-out button to move car. If a new fuse can be obtained, car can be put back into service IF

REGISTER IS NOT USED. MANY TIMES THIS FUSE HAS MERELY WORKED LOOSE. TIGHTEN IT AND SEE IF CAR WILL NOT OPERATE NORMALLY.

If any of the doors stick in a partly opened position it is usually due to a bolt dropping down from the swivel at the top of the doors. Bolt should either be tightened with a dime or, if stripped, can be removed. Report on the SIGN IN sheet.

2. WHEELS

A rubber cushion, referred to as a "sandwich" is used on the steel wheels of this equipment. If car feels like it has a flat wheel or like it was being derailed it denotes that one of the sandwiches has become loose or dropped down and car should be pulled in as soon as possible. Operate slowly and cautiously, after cutting out the set of motors on faulty wheel or truck. A loose or faulty sandwich can be detected earlier by a creaking noise in the wheel.

3. DRAWBARS

This P.C.C. car has the draw-bar at the left rear end under the skirt. For pulling or pushing these cars, two drawbars of this type must be used. The two bars must be joined by use of a coupler which is stored in the battery compartment of these cars. DO NOT PUSH OR PULL CARS WITHOUT USING DRAWBARS.

4. TROLLEY POLES

Instead of wheels, the trolley poles on P.C.C. cars are equipped with carbon shoes which slide along the wire. This shoe is soft, fractures easily, and in event of pole jumping wire, car must be stopped immediately. Extreme care should be used in reversing car, especially under any special work. Rope should be held taut and car backed slowly and carefully.

OPERATING PRECAUTIONS

1. **MOTORMEN:** When operating with door cut-out "OFF", Be sure to wait for Conductor's signal before starting car.
2. Apply power smoothly and steadily - avoid pumping the power handle.
3. Remember your passengers. Brake no faster than is necessary.
4. When it is necessary to use sand, apply sand before brakes.
5. Always operate slowly when backing up.
6. Never use a ribbon fuse in emergency.
7. Never touch the trolley pole or base unless you are on the wooden catwalk.
8. Shut off the M.G. set if power fails or pole breaks.

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MAKE YOUR *Sign In* COMPLETE

Report...

★ EVERY DEFECT ON EVERY CAR YOU USE EVERY DAY.

★ ANY FUSE THAT YOU MAY HAVE REPLACED.

★ ANY REPAIRS WHICH YOU OR A TROUBLE TRUCK CREW MAY MAKE.

★ ANYTHING UNUSUAL IN YOUR CAR'S OPERATION, EVEN IF YOU CAN'T IDENTIFY THE TROUBLE.



CHICAGO TRANSIT AUTHORITY