

# **CP-3 SELF-CONTAINED PROFESSIONAL FREE EXIT AND HOME AUTOMATION SYSTEM**

*(Three-Wire & Five-Wire Models)*



## **INSTALLATION/OPERATION MANUAL**



Manufactured by:

 **Preferred Technologies Group**  
[www.cartell.com](http://www.cartell.com)

***Please Note:***  
**After power-up, it takes at least two minutes for the CP-3 to be functional.**

### **The CP-3 Comes in a Three-Wire and Five-Wire Model!**

**You can use the 3-Wire model if:**

- DC power is available for auxiliary devices. That means the same power available for remotes, radios and keypads is used to supply power for the free exit function.
- The gate operator trips to ground for free exit open
- Only one input is required for free exit

**You need to use the 5-Wire model if:**

- There are two inputs for the free exit function and the terminals are not designated which is free exit and which is ground
- The only power available for free exit is AC or direct battery hook-up
- The CP-3 is being integrated with home automation or security systems

For more explanation, see page 4 of this manual.

Please consult the manual of the gate operator purchased or ask the distributor from whom you bought the gate operator before deciding which model of the CP-3 will suit your needs.

**WARNING!**

The CP-3 is only a trigger. It cannot act as a safety nor does it include a safety. To use with a gate operator, an external safety must be added.

**TABLE OF CONTENTS**

This Table of Contents is clickable. Point and Click!



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**TABLE OF CONTENTS**

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Introduction.....	4
CP-3 Three-Wire versus CP-3 Five-Wire .....	4
Bench Testing and Field Testing .....	4
Location of CP-3.....	4
Installation of CP-3 .....	5
Alternative Installations for Gate Operators.....	6
Power Hook-Up .....	6
Relay Hook-Up .....	7
Connecting to Home Automation or Security System .....	7
Earth Ground .....	7
Splicing Instructions.....	7
Warranty Information .....	Back Cover
Returning Merchandise .....	Back Cover
Technical Specifications .....	Back Cover

**WARNING!**

A child on a bicycle, tricycle or other moving steel playing equipment; horses, ATV's, golf carts, lawn mowers and other small vehicles may trip the CP-3 and cause the automatic gate to open.  
See "ALTERNATIVE INSTALLATIONS" on p. 6 for further information.

# CP-3 SELF-CONTAINED FREE-EXIT & HOME AUTOMATION SYSTEM MANUAL

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## **INTRODUCTION**

[Back to Table of Contents](#)



The CP-3 system is an electronic vehicle detection device based on electromagnetic induction. It is designed to provide a trigger for free exit and home automation. The sensor probe and control electronics are integrated within the same enclosure, with an attached cable, eliminating an external control board.

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## **CP-3 THREE-WIRE VERSUS CP-3 FIVE-WIRE**

[Back to Table of Contents](#)

The CP-3 comes in two models: three-wire and five-wire.

The three-wire CP-3 should be used with a gate operator that has DC power available for auxiliary devices and uses a trip-to-ground for the free exit function (e.g. solar powered operators). This three-wire model has a N.O. contact internally connected to GROUND (System Common). When the BLACK wire (Trip common) of the CP-3 is connected to the free exit input of the gate operator, a 2-3 second trigger to ground is provided when the CP-3 senses a vehicle.

The five-wire CP-3 should be used if the gate operator offers DC or AC voltage and requires a floating contact (N.O. or N.C.). Two free exit terminals are required on the gate operator board. If a N.O. relay is required by the operator, the BLUE and BLACK wires of the CP-3 should be used, causing a short between the two wires for 2-3 seconds when the CP-3 senses a vehicle. If a N.C. relay is required by the operator, the GREEN and BLACK wires of the CP-3 should be used, causing an open between the two wires for 2-3 seconds when the CP-3 senses a vehicle.

The three-wire CP-3 can never be used in the five-wire position. However, the five-wire CP-3 can be used in place of the three-wire when the BLUE wire of the CP-3 is connected to the free exit terminal on the gate operator and the BLACK wire of the CP-3 is connected to the System Common of the gate operator and either the GREEN wire or BLUE wire is disregarded (see above).

Please consult the manual of the gate operator purchased or ask the distributor from whom you bought the gate operator before deciding which model of the CP-3 will suit your needs.

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## **BENCH TESTING AND FIELD TESTING**

[Back to Table of Contents](#)

**Note: After power-up, it takes at least two minutes for the CP-3 to be functional.**

The system should be bench tested before taken to the field. In the field, the CP-3 should be connected to the gate operator and tested by swinging a piece of steel over it before burial.

On the bench, make measurements with a multimeter (without touching the meter leads) as follows:

Three-Wire:

Connect one side of the meter to shield and the other side to the BLACK wire. It should measure millions of ohms. With the meter still connected to the wires, trigger the CP-3 by swinging a piece of steel over it. When it triggers, the meter reading should drop for 2-3 seconds and then rise again to its previous reading.

Five-Wire:

Normally Open: connect one side of the meter to the BLACK (TRIP COMMON) wire and the other side of the meter to the BLUE (N.O.) wire. It should measure millions of ohms. With the meter still connected to the wires, trigger the CP-3 by swinging a piece of steel over it. When it triggers, the meter reading should drop for 2-3 seconds and then rise again to its previous reading.

Normally Closed: connect one side of the meter to the BLACK (TRIP COMMON) wire and the other side of the meter to the GREEN (N.C.) wire. It should measure very low ohms. With the meter still connected to the wires, trigger the CP-3 by swinging a piece of steel over it. When it triggers, the meter reading should rise considerably for 2-3 seconds and then drop again to its previous reading.

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## **LOCATION OF CP-3**

[Back to Table of Contents](#)

See Figure 1 on page 5.

Used with a gate operator, the CP-3 should be installed at least 75 feet before the gate. The CP-3 can cover a 12 foot wide driveway (including width of car traveling 5 M.P.H.) from the dirt beside the driveway.

For wider driveways (up to 24 feet), bury the CP-3 under the driveway in its center, making sure to ground it (see “Earth Ground,” p. 7). When two probes are used, one on each side of the driveway, together they will cover a 17 foot wide driveway.

The CP-3 may be placed parallel, perpendicular, horizontal or vertical to the driveway surface; however, its most sensitive position is parallel to the flow of traffic. The system can be buried below the ground or mounted above ground. When mounting above ground, the CP-3 must be grounded (see “Earth Ground,” p. 7). It should be installed horizontally to the ground and no higher than two feet.

When above ground, run the cable in non-magnetic conduit or PVC pipe for mechanical protection. Stationary steel near the CP-3 will not affect its operation. It may also be installed under the steel reinforcing grid of a concrete roadway without affecting its operation (be sure to ground it, see “Earth Ground,” p. 7).

Install the CP-3:

- At least 6-10 feet away from a buried power or telephone line or invisible dog fence
- At least 10 feet away from a natural gas line
- At least 20 feet away from a power pole with a transformer
- At least 200 feet away from high power substation power lines
- At least 100 feet back from railroad traffic
- At least 50 feet back from traffic traveling over 35 MPH
- At least 35 feet back from traffic traveling under 35 MPH

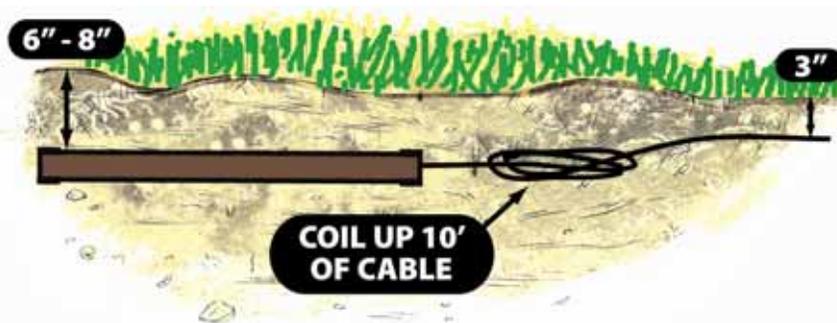


Figure 2

## OVERHEAD VIEW OF DRIVEWAYS

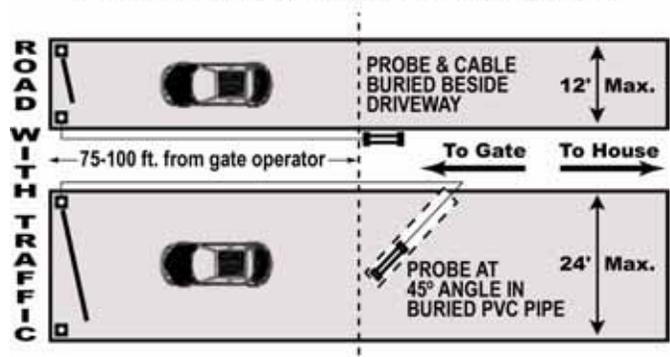


Figure 1

## INSTALLATION OF CP-3

[Back to Table of Contents](#)

See Figure 2.

Bury the CP-3 sensor probe 6-8 inches below the surface and beside the driveway. Bury the CP-3 at a slightly downward angle. Dig down an additional 10-12 inches, line with gravel, and bury an additional 10 feet of coiled-up cable. This eliminates the unlikely possibility of water traveling into the CP-3 via the cable and provides additional cable for future maintenance or relocation.

Bury cable 3 inches deep in cultured grass using a trencher or lawn edger (use an abrasive concrete saw in frozen ground). In field grass or uncultured grass, bury cable 6-10 inches deep. Be sure to push the wire to the bottom of the slice and tamp the sliced area. When running above ground, place the cable in non-magnetic conduit or PVC pipe for protection. If run overhead, attach to a steel cable with plastic ties every 6-10 feet. Connect to power as described on page 6, “Power Hook-Up.”

**NOTE:** The cable CAN be buried in the same trench as power, telephone and water lines, if codes permit, but **not** in the same conduit. Refer to local and national electrical codes.

When installing the CP-3 in concrete or pavement, bore a 1" diameter hole VERTICALLY and 24 inches deep. Make a 1/4 inch wide slice in the pavement from the bored hole to the side of the driveway and patch over the cable. Be sure to ground it (see "Earth Ground," p. 7).

When installing the CP-3 in or under a dirt or gravel driveway, first bury a 1 inch schedule 80 PVC pipe in the center of the driveway, 6-8 inches deep, and diagonally at a 45 degree angle (see Figure 1 on page 5). Slide the CP-3 and cable in the pipe to the center of the driveway. This could be used in a driveway up to 24 feet wide. When installing in new construction, bury the 1 inch PVC pipe under the driveway as described above. Pour cement, or asphalt the drive. Insert the CP-3 and cable after landscaping is complete to prevent possible damage to cable. Be sure to ground it (see "Earth Ground," p. 7).

When pulling the cable through conduit or PVC pipe, it is important that every inch of cable be liberally lubricated and pull only 100 feet or less at one time. The cable is coated with polyurethane for splicing purposes and has extremely high traction. When pulling cable not lubricated it can inconspicuously snap the wire inside the rubber casing.

Extreme care must be taken when unrolling CP-3 cable. To unroll it, put your arm through the center of the roll, remove the tape, and unravel the roll one wrap at a time. Unwrap the roll entirely before trenching.

**ALTERNATIVE INSTALLATIONS FOR GATE OPERATORS**

[Back to Table of Contents](#)

If children on tricycles and horses with steel shoes trip the CP-3, simply bury the CP-3 probe two feet deep and parallel with the driveway. This reduces the possibility of small objects tripping the CP-3 and opening the gate.

If you do not want smaller, slower vehicles (e.g. bicycles, golf carts, ATV's, etc.) to trip the CP-3 and open a gate, then do the following (Note: this is only possible with the five-wire model):

1. Space two CP-3 Five-Wire probes at least 10 linear feet apart.
2. Bury them one foot deep and parallel with the driveway.
3. Run the cable of each probe back to the gate operator.
4. At the gate operator, connect the RED wires from each CP-3 to (+) power (if DC), and the braided SHIELD wires from each CP-3 to (-) power (if DC). (If AC, polarity is not an issue.) Solder the BLACK wire of one probe to the BLACK wire of the second probe. Tape with electrical tape. Do not hook these to anything.
5. If a N.O. contact is needed—and two terminals are used for the free exit function on the operator—place a BLUE wire from one CP-3 to the first terminal and the BLUE wire from the second CP-3 to the second terminal. If there is only one free exit terminal on the operator, connect the BLUE wire from one CP-3 to that terminal. Twist the BLUE wire from the second CP-3 to the braided SHIELD wires and connect to (-) power.
6. If a N.C. contact is needed, follow the instructions of #5 above, substituting the GREEN wires for the BLUE.
7. Power both probes from the same source (DC or AC).

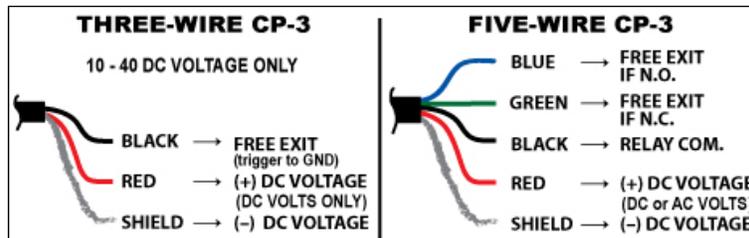


Figure 3

**POWER HOOK-UP**

[Back to Table of Contents](#)

See Figure 3.

On DC hook-up, connect the RED wire to Positive Power (+); connect SHIELD wire to Negative Power (-).  
 On AC, hook-up between the RED wire and the SHIELD wire.

See Figure 3 on page 6.

CP-3 Three-Wire:

Connect the BLACK wire to the Free Exit Terminal (trigger to GROUND).

CP-3 Five-Wire:

If the gate operator requires a N.O. contact that closes in order to trip the free exit system, connect the BLUE wire to one Free Exit terminal and the BLACK wire to the second Free Exit terminal.

If the gate operator requires a N.C. contact that opens in order to trip the free exit system, connect the GREEN wire to one Free Exit terminal and the BLACK wire to the second Free Exit terminal.

Refer to your gate operator manual for more information.

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**CONNECTING TO HOME AUTOMATION OR SECURITY SYSTEM**

You must use the CP-3 five wire model for this application.

For power hook-up, connect the RED wire to Positive Power (+); connect the SHIELD wire to Negative Power (-).

For relay hook-up with a system that requires a N.O. contact that closes in order to trip, connect the BLUE wire to one side of the ZONE INPUT and connect the BLACK wire to the other side of the ZONE INPUT. At your system's panel, place a resistor between the terminals in series (see your H.A. or security system's manual for resistor size).

For relay hook-up with a system that requires a N.C. contact that opens in order to trip, connect the GREEN wire to one side of the ZONE INPUT and connect the BLACK wire to the other side of the ZONE INPUT. At your system's panel, place a resistor between the terminals in parallel (see your H.A. or security system's manual for resistor size).

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**EARTH-GROUND**

A proper earth-ground is essential for the system's lightning protection and EMF shielding. Normally, burying the CP-3 copper probe is sufficient to meet the grounding requirements.

However, in areas where there is a poor earth ground, the probe is inserted in a PVC pipe, or the probe is mounted above ground, the grounding strap that is part of the CP-3 should be soldered and clamped to an eight foot copper or copper-clad ground rod driven deeply into the ground (DO NOT use a galvanized ground rod). Extra wire can be added to the grounding strap if needed.

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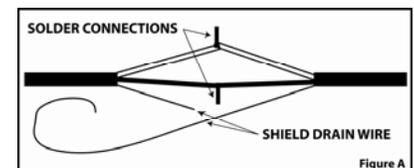
**SPLICING INSTRUCTIONS**

The cable supplied with your system is coated with polyurethane because it will bond with epoxy and make a sealed splice. If you purchase your own cable, make sure it is polyurethane coated or it will not splice. Improper cable splices will cause false alarms and failures. To insure a proper splice, follow the instructions below.

Two items are necessary when splicing, both available from Preferred Technologies Group: First, a two-wire or four-wire shielded direct burial cable (unshielded cable and PVC jacketed cable will not give proper splices). Second, an underground splice kit (made by 3M, part #82-F1; Preferred's part number is CA-1). Follow these instructions:

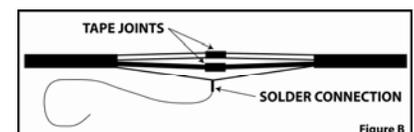
1. See Figure A.

Strip the outer jacket on one cable back 10 inches and cut the RED and BLACK leads (and GREEN and BLUE, if applicable) to 3 inches, leaving the SHIELD drain wire the full 10 inch length. Strip the outer jacket off the mating cable back 3 inches and strip the jacket of the RED and BLACK lead (and GREEN and BLUE, if applicable) of both cables back 1/2 inch. Twist the BLACK to BLACK and RED to RED (and GREEN to GREEN and BLUE to BLUE, if applicable) and solder the connections.



2. See Figure B.

Trim the RED and BLACK (and GREEN and BLUE, if applicable) joints and tape for proper insulation. Twist the 3 inch SHIELD drain wire to the 10 inch



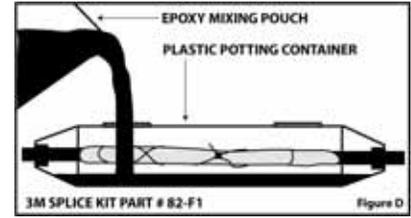
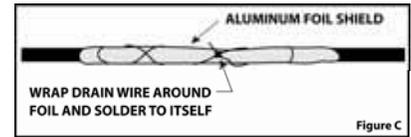
SHIELD drain wire and solder the connection. DO NOT cut off the excess SHIELD drain wire.

3. See Figure C.

Wrap aluminum foil around splice area (to properly shield it). Wrap the 10 inch SHIELD drain wire tightly around the outside of the foil and solder it to itself in order to hold it in place. This procedure insures that any signal to the splice SHIELD will drain to ground and thus prevent false alarms.

4. See Figure D.

Place an underground splice kit potting container around the spliced cable and epoxy, following the kit instructions carefully.



## **LIMITED FIVE YEAR WARRANTY**

[Back to Table of Contents](#)

All Cartell products are warranted against defects in material and workmanship for five years. This warranty does not cover defects caused by, but not limited to: acts of God, improper installation, abuse, fire and water damage, electrical surges, and damage to cable caused by slicing, pulling, tangling, or improper splicing. For more information, visit [www.cartell.com](http://www.cartell.com).

## **RETURNING MERCHANDISE**

[Back to Table of Contents](#)

Before returning products for repair, please consult the dealer who installed your Cartell system. Dealer, please call Preferred Technologies Group at (800) 223-4743 to troubleshoot the system over the phone and to receive a Return Merchandise Authorization (R.M.A.) number. Write the R.M.A. number on the return shipping box and any correspondence included with the defective product.

## **TECHNICAL SPECIFICATIONS**

[Back to Table of Contents](#)

POWER REQUIRED:	6 - 31 VAC or 10 - 40 VDC
STANDBY CURRENT:	150 Microamps ( $\mu$ A) maximum
ALARM CURRENT:	25-30 Milliamps (mA) maximum
RELAY CONTACTS:	3 Wire: SPST, Trip to GROUND 5 Wire: SPDT, floating, N.O. or N.C. (Form C)
RELAY CONTACT RATING:	1 amp/24 VDC (1 mA at 5 VDC min. load)
RELAY TIME:	2 - 3 seconds
TEMPERATURE RANGE:	-25° F. to + 125° F.
DIMENSIONS:	20 in. long x 3/4 in. diameter
WEIGHT:	5 lbs. with 100 ft. cable



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