



THE CITY OF  
**CALGARY**

DEVELOPMENT & BUILDING APPROVALS

# HOMEOWNER PERMITS AND ELECTRICAL WIRING GUIDE

Revised 5/20 gSck 20##

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# APPLICATION FOR HOMEOWNER PERMITS

*This pamphlet is only a guide.*

*It describes methods of installation that have been tried and tested and which have been successful over a number of years.*

*Other methods of wiring a home can be used but the installation must meet the requirements of the Canadian Electric Code.*

## Who is Eligible

The owner of a single-family dwelling who:

- lives in the house, owns the property, and
- will do the wiring himself or herself.

### **Homeowners need at least a basic knowledge of electric wiring**

*The Electrical Inspection Section strongly recommends that Homeowners without a basic knowledge of electric wiring hire a qualified electrical contractor (who is responsible for obtaining the permit).*

Due to the hazards involved, homeowners who are not certified electricians cannot do the following work:

- installing the pool grounding and connecting the electrical equipment for permanently installed swimming pools; OR
- installing or making changes to the main electrical service.

### **Permit Expiry Conditions**

*If work within the scope of this permit has not commenced within 180 days of the date of issue, or if the work is suspended or abandoned for a period of 180 days prior to completion, this permit may be expired.*

*No further work is to commence unless you have first obtained a new permit. Should you require a time extension for this permit, you must make written application to Building Regulations prior to permit expiry.*

*Additional inspection fees will be charged, in accordance with the Electrical Installation and Inspection Bylaw, and billed to the permit holder.*

*The permit fee is non-refundable and entitles the permit holder to two inspections only.*

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## Permit Requirements

1. Permits are issued for single family dwellings if you own & reside in the premises.
2. Row Housing (separate entrances & separate services); a letter from the Condo Board is required before a permit can be issued.
3. Homeowner Permits will not be issued for apartment style condos (common hallways and heating systems).

60"J qo gqy pgt'Rgto ku'ctg'gpvkrgf "vq"VY Q'lpur gev'kpu'qprn'0'

.....70"K'c'j kf 'lpur gev'kqp'ku'tgs vkt gf . 'c'pgy "J qo gqy pgt'Rgto k'y kn'dg'tgs vkt gf 0'

## When Permits Cannot Be Issued

.....Homeowner Electric Permits cannot be issued if:

- "proof of ownership of the house is not presented; or
- " the home will be used for rental purposes.
- the wiring has been concealed (walls drywalled).

## When Permits Can Be Cancelled

.....Homeowner Electric Permits can be cancelled if, at the discretion of the Safety Codes Officer (Electrical Inspector), the installation could be hazardous to life or property.

.....The homeowner will then be responsible to hire a qualified licensed electrical contractor to complete the electrical installation and the electrical contractor will obtain a separate electrical permit to do the work.

## Requesting Inspections

.....Please notify 311 for **ALL** inspection phases of construction.

- Roughing inspection must be performed on a homeowners permit.

### How to request an inspection

- *Phone 311 between 8:00 AM and 2:00 PM to make your inspection request.*
- *Call for inspection at least one working day in advance.*
- *Arrange for access to the premises for the Safety Codes Officer.*
- *Our offices are open Monday to Friday with all statutory holidays excluded.*
- *Appointments or specific times are not possible.*

The number and kinds of inspection vary according to the work you are doing but may include the following:

### 1. **Underground Inspection**

- Call for this inspection once the underground installation is complete.
- Do **not** backfill until the Safety Codes Officer (Electrical Inspector) has accepted the installation.
- **FOR GARAGES**, please coordinate the underground and rough wiring inspections if possible.
- Electrical wiring in the trench is required to be buried to a min depth of 18".

### 2. **Rough Wiring Inspection**

This inspection requires:

- All electrical boxes to be secured in place, flush with the finished wall or ceiling.
- All wiring to be installed in the electrical boxes and secured to the building structure (see diagrams).
- All grounding conductors to be terminated in electrical boxes and splices completed (see diagrams).
- All recessed lighting fixtures (unless fixtures are "retrofit" type) shall be installed and wiring terminated in fixture junction boxes.

**Please note: Do not secure plugs, switches, and lights to outlet boxes on first inspection.** If you wish to terminate the devices and surface mount light fixtures to the wires for this inspection, do not fasten to the electrical boxes. For heavy or large light fixtures that require additional support, please leave off until the final inspection.

- Do not install insulation or vapour barrier (if it is required) until the Electrical Inspector has accepted the installation.
- Wiring may be installed in the panel (turn the main breaker off before removing the panel-board cover). Ensure the cables installed are isolated from the energized equipment inside the panelboard and the covers are re-installed **BEFORE** turning the main breaker back on.

### 3. **Correction Inspection**

The deficiencies noted by the Electrical Safety Codes Officer need to be corrected **AND** re-inspected prior to the construction project proceeding (unless instructions are otherwise give by the Electrical Safety Codes Officer).

### 4. **Final Inspection**

- **CAUTION:** Before entering the electrical panel be sure the main switch is **OFF**.
- All devices should be connected and secured to outlet boxes.
- All branch circuits should be installed in the panel and terminated on the circuit breakers.

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## Cautionary Notes

- When developing the basement or renovating existing areas, do not design the development so that panelboards are placed in clothes closets, bathrooms, stairways or any other area where moisture or location may present a hazard. (These areas are not acceptable and may result in the electrical contractor relocating the panelboard under a separate permit.)
- Ensure that a minimum one m (39 inches) clearance is maintained from the face of the panelboard.
- The addition of sub panelboards to existing main service panelboards WITHOUT a main breaker is not acceptable and may result in the electrical contractor relocating the panelboard under a separate permit.
- Ensure that circuits are not left in an energized state during construction when children or persons requiring constant care are present unless all light fixtures, devices and cover plates have been installed.

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## General Rules for Non-Metallic Sheathed Cables

1. Use only copper conductors.
2. Use 14 AWG copper wire for general purpose wiring (lights and receptacles).
3. Provide over-current protection of 15 amperes for general purpose wiring (lights and receptacles).
4. Install a maximum of 12 outlets on a general purpose circuit (lights and receptacles).
5. Run cable as a loop system in continuous lengths between outlet boxes, junction boxes and panel boxes. Make joints, splices and taps in the outlet boxes.
6. Where cables pass through a hole in a joist or stud, bore the hole 32 mm (1.25 inches) back from the face of the stud or joist or protect the wires from driven nails by using metal plates.
7. Secure wires every 1.5 m (five feet) when run on the sides of joists or studs and 300 mm (12 inches) from each outlet box.
8. Protect wires that are exposed within 1.5 m (five feet) of the floor.
9. Keep cables a minimum of 25 mm (one inch) from heating ducts.
10. Where cables run through or along metallic studs, joists, sheathing or cladding, ensure that the cables are:
  - protected from mechanical damage both during and after installation
  - protected by an insulation insert secured to the opening in the stud, and
  - isolated from the stud by an insulating material support to the member
11. Protect cables from mechanical damage and from driven nails and screws when they are installed behind baseboards or horizontally behind cupboards
12. Sub-panels may be added to existing service panelboards provided the main service panel has a main disconnecting device
13. Where communication cables are to be installed in joists or studs, maintain a minimum separation of 50 mm (two inches) from any power non-metallic sheathed cable.

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## Outlet Boxes

14. Set outlet boxes flush with the finished wall or ceiling and secure them to studs or joists.
15. Ground all outlet boxes. (See diagram on page 11.)
16. Ensure all junction boxes are accessible after installation.
17. Leave at least 150 mm (6 inches) of wire out of each outlet box for joints and connection of equipment.
18. Surround the outlet boxes with a moisture resistant barrier when the wall or ceiling requires a vapour barrier.
  - The maximum number of conductors permitted in outlet boxes are:

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Common Types	Dimensions	Capacity ml (cu-in)	#14	General Usage
Octagonal	4 x 1 1/2	245 (15)	8	light or junction
Square	4 x 1 1/2	344 (21)	12	junction
Rectangular	3 x 2 x 1 1/2	131 (8)	3	switch or plug
	3 x 2 x 2	163 (10)	4	switch or plug
	3 x 2 x 2 1/2	204 (12.5)	5	switch or plug
	3 x 2 x 3	245 (15)	7	switch or plug

**Note:**

*When a dimmer switch, a timer, or a GFCI receptacle is used in an outlet box, reduce the number of permitted conductors by three.*

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## Light Fixtures

19. Install 3-way switches according to diagram on page 12.
20. Light fixtures that are installed in closets shall be totally enclosed.

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## Lighting

21. Three-way switching is required on stairway lighting when a stairway has four or more risers AND is leading to a finished area or to an outside entrance. Refer to page 12 for a simple three-way switching wiring diagram.
22. Switches cannot be located within 500 mm from bathtub or shower. Switches located within 1 m of a bathtub or shower shall be protected by a ground circuit interrupter of the class A type.

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## Smoke Alarms

23.
  - (a) Install smoke alarms on each floor level, including basements.
  - (b) Install smoke alarms within five m (16 feet) of bedrooms.
  - (c) Smoke alarms are to be powered from a branch circuit containing lighting. Smoke alarms are not to be installed on a ground fault circuit interrupter or AFCI part of the circuit.
  - (d) When more than one smoke detector is being installed, interconnect the smoke detectors with 14/3 NMD-90 cable and connect according to manufacturer's instructions.
  - (e) Install carbon monoxide alarm from lighting circuit.

**Note:**

*The Alberta Building Code permits only wired-in smoke and carbon monoxide alarms. (Alberta Building Code – Article 9.10.18.3).*

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## Garages

24. Install the underground wiring to a garage according to the Table and Sketch on page 10.
25. Provide at least one separate circuit to the garage and one duplex receptacle for each car space. The lighting may come off this circuit.
26. Using the same trench for gas sub-service lines and electrical power conductors is permitted.

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## Electric Dryer

27. Provide a 30 Amp circuit breaker with a 2-pole common trip.
28. Use #10 copper wire (NMD-90).
29. Use a 30 Amp receptacle rated 125/250 volt (14-30 R).

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## Electric Range

30. Provide a 40 Amp circuit breaker with a 2 pole common trip.
31. Use #8 copper wire (NMD-90).
32. Use a 50 Amp receptacle rated 125/250 volt (14-50 R).

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## Receptacles (General)

33. Install duplex receptacles in the walls of every finished room or area so that no point along the floor line of any usable wall space is more than 1.8 m (6 feet) horizontally from a receptacle. The usable wall space includes a wall space of 900 mm (3 feet) or more in width but doesn't include doorways, windows that extend to the floor, fireplaces or other permanent installations that would limit the use of the wall space.
34. Ground all receptacles (See Sketches).
35. Connect the receptacles so that the silver terminal screw (or the screw identified as "white") on the receptacle is connected to the white circuit wire; the brass terminal screw (or the screw identified as "black" or "hot") on the receptacle is connected to the black (or red) circuit wire.
36. Connect only one wire under each terminal screw. Do not use the terminal screws and the "quick connect".
37. Receptacles shall be of the **tamper resistant** type (except for receptacles dedicated to microwaves, refrigerators, freezers, kitchen counters, or receptacles in attics or crawl spaces).

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## Receptacles Located in Sleeping Areas

38. Arc Fault Circuit Interrupters (AFCI) are required on new circuits feeding receptacles in sleeping facilities of a dwelling unit.

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## Kitchen Receptacles

39. (a) Provide a sufficient number of receptacles (15A split or 20A T-slot) along the wall behind counter work surfaces (excluding sinks, built-in equipment, and isolated work surfaces less than 300 mm long at the wall line) so that no point along the wall line is more than 900 mm from a receptacle measured horizontally along the wall line.
- (b) Receptacles within 1.5 m of sinks (wash basins complete with drain pipe) shall be protected by a ground fault circuit interrupter.
- (c) Provide at least one receptacle (15A split or 20A T-slot) installed at each permanently fixed island counter space with a dimension of 600 mm or greater and a short dimension of 300 mm or greater.
- (d) Provide at least one receptacle (15A split or 20A T-slot) installed at each peninsula counter space with a long dimension of 600 mm or greater and a short dimension of 300 mm or greater.
- (e) Refrigerators, dishwashers and microwave ovens require separate circuits.



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## Reasons for Tamper Resistant Receptacles

40. There are a significant number of electrical shock incidents that occur when children insert conductive objects into electrical receptacles. Most of these incidents take place in living areas of the home. Tamper resistant receptacles are designed to prevent contact with live electrical contacts when an object, other than a plug, is inserted into one of the receptacle slots.

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## Dining Area Forming Part of a Kitchen

41. Put at least one receptacle on a separate circuit in the area.

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## Laundry Room or Area

42. Install a separate circuit and include at least one receptacle for the washing machine and another one in a convenient location.

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## Utility Room or Area

43. Install at least one receptacle on a separate circuit for the utility room.
44. Install one receptacle in each undeveloped area.

**NOTE:** *Built-in vacuum motors require a receptacle on a separate circuit located adjacent to the unit.*

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## Bathrooms and Washrooms

45. Install one duplex receptacle, protected by a Class A Ground Fault Circuit Interrupter (GFCI) within one m (39 inches) of the wash basin. This receptacle must be located at least one m (39 inches) from a bathtub or shower stall. Measure this distance between the receptacle and the inside edge of the bathtub or shower without piercing a wall, partition or similar obstacle.

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## Outdoor

46. Provide at least one receptacle on a separate circuit. Receptacles located on the dwelling including attached carports and attached garages are to be protected by a ground fault circuit interrupter.
47. All receptacles (except for automobile heater receptacles) installed outdoors and within 2.5 m of finished grade shall be protected by a ground fault circuit

# TAMPER RESISTANT RECEPTACLES

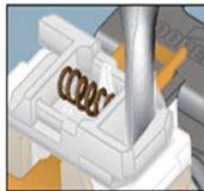
## RULE 26-712(g) AND (h) AND NEW APPENDIX B NOTE



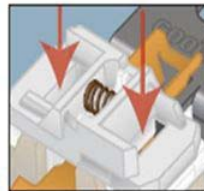
## RULE 26-712(g) AND (h) AND NEW APPENDIX B NOTE



Shutters restrict access in closed position.



Insertion of object in any one side will not open shutters.

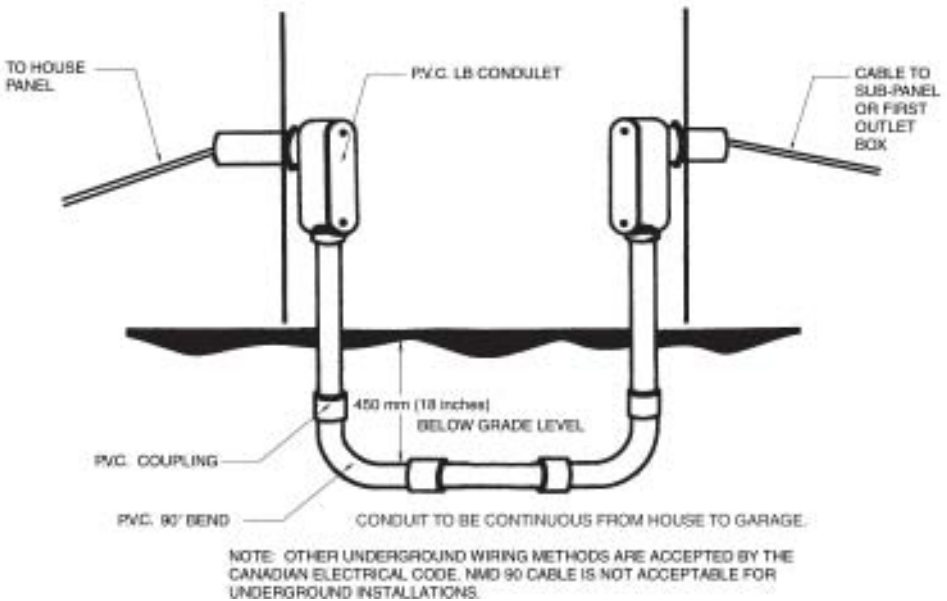


Insertion of two-bladed plug or grounding plug will open shutters.



## UNDERGROUND WIRING TO GARAGE

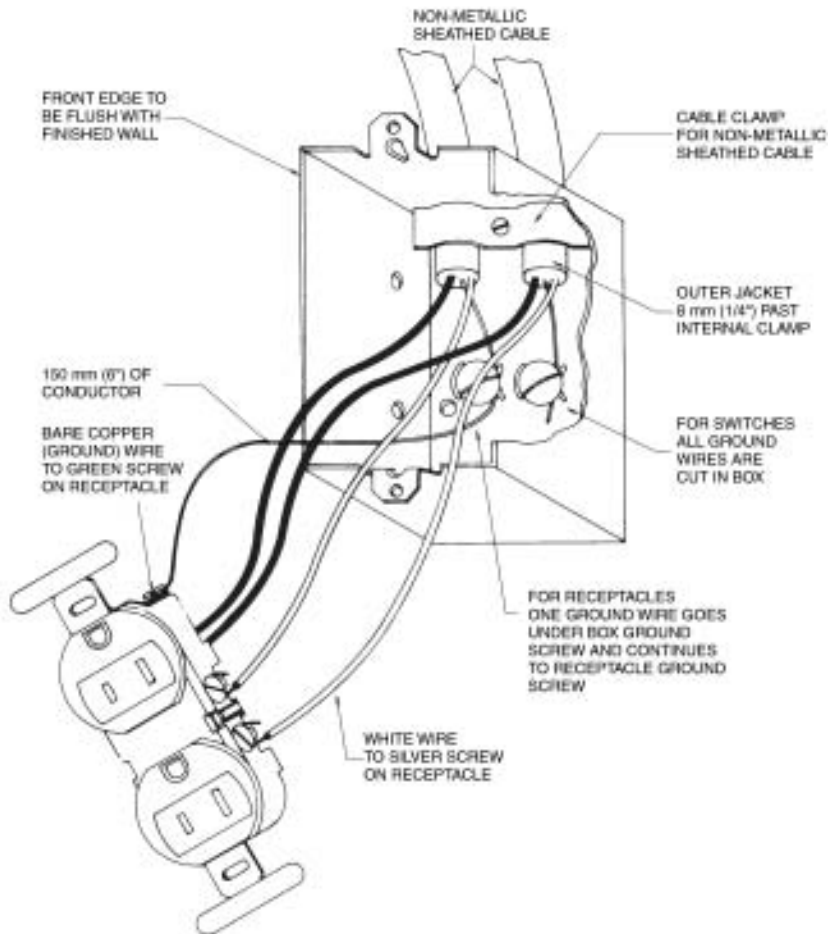
BREAKER SIZE (HOUSE)	TYPE OF CIRCUIT (GARAGE)	SIZE OF CABLE	SIZE OF CONDUIT AND FITTINGS
15 Amps 1 Pole	Single Circuit	2-14 NMWU	3/4" P.V.C.
15 Amps 2 Pole	Double Circuit	3-14 NMWU	3/4" P.V.C.
30 Amps 2 Pole	} Feeder Circuit for Sub-panel in Garage	3-10 NMWU	1" P.V.C.
40 Amps 2 Pole		3-8 NMWU	1-1/4" P.V.C.
60 Amps 2 Pole		3-6 NMWU	1-1/2" P.V.C.



**NOTE: DO NOT BACKFILL THE TRENCH PRIOR TO THE FIRST INSPECTION.**

- No separation is required between gas and electrical lines in some trenches.
- Underground conduit to be buried to a depth of 18" deep.

## TYPICAL OUTLET BOX



Note: See item 18 - Outlet Boxes - Vapour Barriers



# TYPICAL OCTAGON BOX FOR LIGHT FIXTURE INSTALLATION

