



PLANNING, PROPERTY
AND DEVELOPMENT
DEPARTMENT

ELECTRICAL INSTALLATIONS

**A homeowner guide to the Winnipeg
Electrical By-law requirements for a Single
Family Dwelling, Detached Garage or Shed**



January 2018

General Information 3

Circuits & Receptacles..... 5

Recreation Rooms & Additions..... 9

Smoke & Carbon Monoxide Alarms..... 11

Garages & Sheds..... 12

Electrical Service Changes..... 16

Specific Wiring Methods..... 20

Note:

This booklet has been written to:

1. Provide an outline of some of the more common electrical regulations applicable to electrical installations done by the home owner; and
2. Provide information on the extent to which the electrical work must be completed prior to requesting an inspection.

The applicable sections of this booklet should be reviewed prior to commencing the project. Please note that this booklet is not intended to cover all of the electrical regulations for wiring. For complete electrical requirements please refer to the City of Winnipeg Electrical By-law.

Every effort has been made to ensure the accuracy of information contained in this publication. However, in the event of a discrepancy between this publication and the governing City of Winnipeg By-law, the By-law will take precedence.

Work Requiring an Electrical Permit

An electrical permit must be obtained from the City of Winnipeg Planning, Property and Development Department at 31 - 30 Fort Street, prior to the construction, alteration, repair, or extension of any electrical installation.

Electrical Permit Applicant

An electrical permit may be issued to:

- a) a person who holds an Electrical Contractor's License from the City of Winnipeg authorizing that person to carry out business or trade in the City of Winnipeg; **OR**
- b) the owner of a detached single family dwelling who is also the occupant. The owner must actually do the work. The permit would be issued to the owner provided the Manager of Development and Inspections is confident the work will be performed competently.

Information Required for an Electrical Permit Application

To obtain an electrical permit, the applicant must present a wiring diagram for the proposed installation indicating the location of receptacles, lights, switches and all other electrical equipment to be installed. The wiring plan submitted should be comparable to the typical wiring plans shown on pages 8 and 9. It is not necessary to show any existing wiring that will not be altered.

Permit Expiration

The permit will expire if active work is not commenced within six (6) months from the date of issuance and completed within three (3) years from the date of issuance. In addition, the Manager of Development & Inspections may cancel any electrical permit if, in his opinion, the privileges granted by that permit are being misused.

Responsibility for Work Performed Under this Permit

The permit applicant assumes full responsibility for electrical work indicated on the permit and must ensure that the work conforms to all requirements of the Electrical By-Law.

Number of Inspections Required for Lower Level Development, Additions, and other Similar Applications

The wiring in areas such as lower level development, additions, and other similar installations, is normally allotted two inspections. The first inspection is made prior to covering any of the electrical installation with insulation or wall board.

The second inspection is made on completion of the work. Where additional inspections are found to be necessary an additional inspection fee may be levied.

First Inspection - rough-in

Before calling for the first inspection, the following work is to be completed:

1. All the wiring for lights, switches, and receptacles are to be installed in the walls, secured to the structural members and terminated in the outlet boxes.
2. All connections, joints, and bonding in the outlet boxes must be completed, leaving unconnected only the conductors required for the connection of the light, receptacle or switch (see FIGURE 12 Typical Outlet Box Installation” on page 22).
3. At least one receptacle, light, and switch is to be connected to the wiring.
4. The wiring and connection of the 3-way switches required for the stairway lighting are to be completed.
5. If recessed lighting fixtures are to be installed, at least one fixture is to be completed.
6. The conductors are to be run into the electrical panel with the bonding (bare) conductor terminated under the bond screw and the neutral wire connected to the neutral terminal. The wires must **not** be connected to the circuit breaker until the wiring is complete.
7. Once the rough-in is complete you need to schedule an inspection by emailing ppd-housing@winnipeg.ca or by calling 204-986-5300.

Final Inspection

For the final inspection, the electrical installation is to be fully completed in that all the light fixtures, receptacles, smoke/CO alarms, switches and cover plates are to be installed and connected to the normal power supply. The electrical circuits in the panel must be clearly identified on the panel directory. You can arrange your final inspection by emailing ppd-housing@winnipeg.ca or by calling 204-986-5300.

Electrical Installation Requirements for Finished Rooms

See FIGURES 1 and 2 on pages 9 and 10 for typical electrical plans for main floors and lower level development.

1. A maximum of 12 outlets (lights and receptacles) may be connected to each 15 Amp branch circuit.
2. The maximum number of conductors permitted in an outlet box is shown in TABLE 1.

TABLE 1 - Maximum Number of Conductors Allowed in Outlet Boxes

Box Dimensions (inches)		Maximum number of conductors permitted		
		#14	#12	#10
Device	3 X 2 X 1 1/2	5	4	3
	3 X 2 X 2	6	5	4
	3 X 2 X 2 1/4	6	5	4
	3 X 2 X 2 1/2	8	7	5
	3 X 2 X 3	10	8	6
Octagon Boxes	4 X 1 1/2	10	8	6
	4 X 2 1/8	14	12	9

- 1) The bare bonding conductors in cables are not counted.
- 2) 2 conductors must be deducted from the number shown in the table for each switch or receptacle to be installed.
- 3) One conductor must be deducted for each pair of wire connectors in the
- 4) A “device” box typically contains a receptacle or switch.

EXAMPLE: A 3”x 2”x 2” box allows 6 #14 conductors. If a receptacle is to be installed, 2 conductors must be deducted from the number shown in Table 1 ($6 - 2 = 4$). Note that now only 4 conductors are allowed in the 3”x 2”x 2” box with a receptacle. Therefore, one 2 conductor cable may enter the outlet box and one 2 conductor cable may leave the outlet box.

Receptacles (general)

1. Receptacles must be located so that no point on the wall is more than 1.8 m (6') horizontally from a receptacle (measured along the floor line). Walls longer than 900 mm (36") require receptacles spaced not more than 3.6 m (12') apart.

Do not count wall space occupied by:

- a) Doorways and the area occupied by doors when fully opened
 - b) Windows that extend to the floor, and
 - c) Other permanent installations that would limit the use of the wall space (fireplaces, clothes closets, etc.). These receptacles are normally installed 300-400 mm (12"-16") above finished floor.
2. Item 1 is not applicable in washrooms, bathrooms, hallways, laundry rooms or closets but must be installed in basement walls that are finished with drywall, paneling, etc. to within 450 mm (18") of the basement floor.
 3. At least one receptacle, supplied by a separate branch circuit, must be provided in each utility room and also in each unfinished basement area.
 4. Where a complete piped system for a cord-connected central vacuum system is installed, a receptacle supplied by a separate branch circuit must be provided.
 5. One single receptacle, labelled "SUMP PUMP ONLY", supplied by a separate branch circuit, must be provided for a sump pump
 6. All 15 and 20 amp receptacles must be the tamper-resistant (TR) type unless they are dedicated for stationary appliances and rendered inaccessible or located more than 2 m (6'-6") above the floor.
 7. All 15 and 20 Amp receptacle circuits must be protected by a combination arc fault circuit interrupter (AFCI) with the exception of branch circuits supplying receptacles in bathrooms & washrooms, a refrigerator, or kitchen counters and branch circuits provided solely for:
 - a) Single receptacles for sump pumps and receptacles in detached garages or other out-buildings
 - b) Outdoor receptacles*

Lighting (general)

1. A switch controlling a lighting fixture or a receptacle must be installed for every room. If only one half of a duplex receptacle is switched, it will also qualify as one of the receptacles required in Receptacles Item 1.
2. The maximum rating of circuit breaker permitted for any circuit supplying light fixtures is 15 Amps.

3. Every stairway must be lighted. A light fixture which illuminates a stair having 4 or more risers must be controlled by 3-way switches at the top and bottom of the stairs. If the lower level is not finished, the light fixture is permitted to be controlled by a single switch located at the head of the stairs and provisions for 3-way switching must be installed.

Bathrooms & Washrooms

1. A receptacle must be installed within 1 m (39") of each wash basin located in a bathroom or washroom.
2. Receptacles and switches installed in bathrooms must be located at least 1 m (39") from a bathtub or shower stall.
3. Receptacles installed within 1.5 m (5') of a wash basin, bathtub or shower stall must be protected by a Class A type ground fault circuit interrupter (GFCI).
4. If there is no central exhaust or HRV, bathrooms & washrooms must have an electrically wired mechanical exhaust fan venting directly to the outdoors.
5. Electrical equipment associated with "jetted" (ie: hydromassage) bathtubs must be protected with a GFCI.

Kitchens

1. Kitchen counter receptacles must be located on the wall behind the counter work surface so that no point along the wall is more than 900 mm (3') from a receptacle. This generally requires that receptacles be spaced 1.8 m (6') apart.
2. Sinks, built-in equipment and isolated work surfaces less than 300 mm (12") long at the wall, need not be included when calculating the spacing of counter receptacles.
3. At least one receptacle must be provided at each permanently fixed island counter and on each peninsular counter space that is 300 mm x 600 mm (12"- 24") or larger. An island counter is considered to be permanently fixed unless it is mounted on wheels.
4. Kitchen counter receptacles must be either 15 Amp split type as illustrated in Figure 20 on page 26, or 20 Amp T-slot.
5. A receptacle, supplied by a separate branch circuit, must be installed for a refrigerator. An outlet for a recessed clock may also be connected to this circuit.
6. Receptacles installed within 1.5 m (5') of sinks must be protected by a GFCI.

Outdoor/Garage Receptacles

1. All receptacles located outdoors and within 2.5 m (8') of ground or grade level must be protected by a GFCI.
2. At least one receptacle, supplied by a separate branch circuit, must be provided outdoors for the use of electric appliances.
3. At least one receptacle, supplied by a separate branch circuit, must be provided for each driveway.
4. At least one light fixture must be provided in a garage.
5. At least one receptacle must be provided for each car space in a garage or carport. At least one separate branch circuit must be provided for the receptacle(s) except that the garage/ carport lighting and garage door opener(s) may also be connected to this circuit.

SYMBOL LEGEND (for Figures 1 and 2)













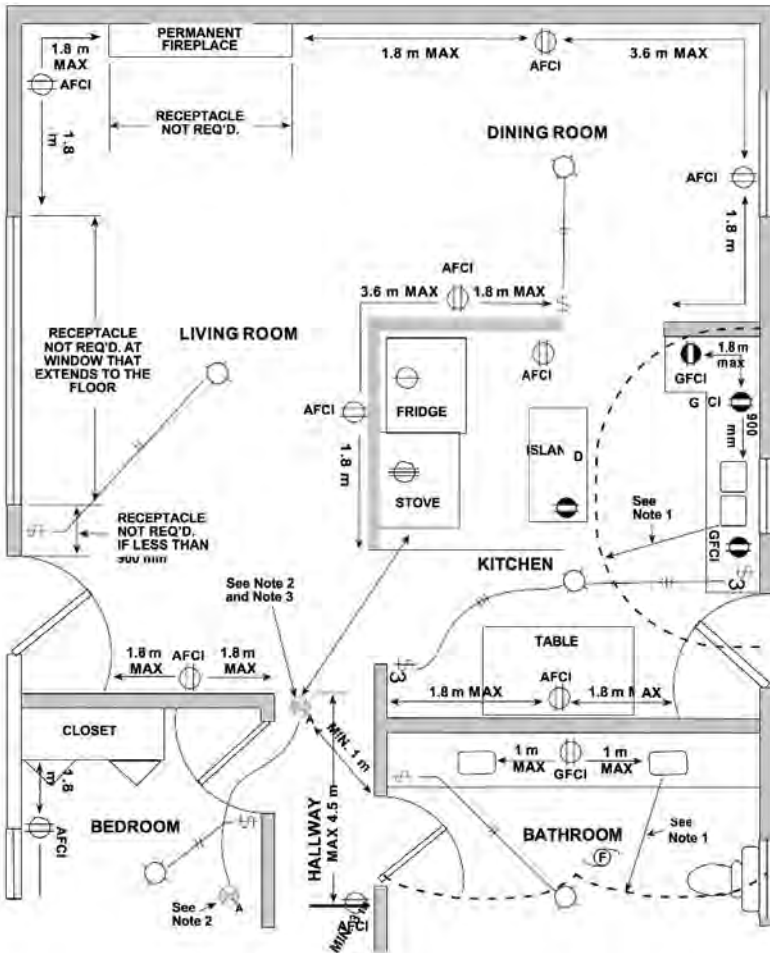
- | | | |
|---|--|--|
|  Lighting Outlet |  15A split receptacle or 20A T-slot |  120V Smoke Alarm |
|  Single Pole Switch |  Single receptacle |  Exhaust Fan |
|  3-Way Switch |  Dryer Receptacle |  Three Conductor |
|  Duplex Receptacle |  Range Receptacle |  Two Conductor |

FIGURE 1 - Wiring Plan For Typical Main Floor

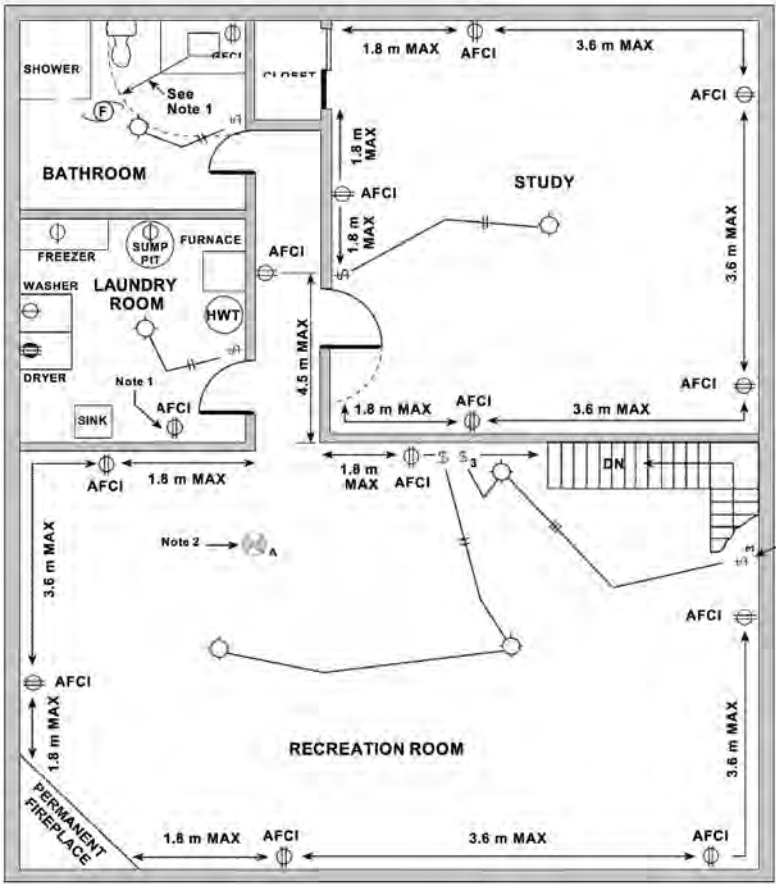


Note 1: Receptacles within 1.5 m of sinks must be GFCI protected.

Note 2: All smoke/CO alarms shall be interconnected with each other.

Note 3: If combination smoke/CO alarm is installed, it must be within 5 m (16') of each bedroom door.

FIGURE 2 - Wiring Plan for Typical Rec-Room



Note 1: Receptacles within 1.5 m (5') of sinks must be GFCI protected.

Note 2: All smoke/CO alarms to be interconnected with each other.

Smoke Alarms

A smoke alarm detects smoke from a fire and warns the occupants with an audible alarm. Smoke alarms conforming to CAN/ULC-S531, “Smoke Alarms” must be installed in each dwelling. They must be installed on or near the ceiling. Sufficient smoke alarms must be installed so that there is at least one smoke alarm:

1. On each storey, including basements, and
2. Inside each sleeping room, and
3. In a location between sleeping rooms and the exit but where there is a hallway that serves the sleeping rooms, it should be installed there.

Smoke alarms shall not be located less than 1 m from the centre of doorways to bathrooms or laundry rooms and not less than 3 m (10') from a fixed cooking appliance.

Installers should refer to the manufacturer's installation guidelines included with the smoke alarm.

Smoke alarms with battery backup must be permanently connected to a 120V electric lighting circuit and must have no disconnect switch between the overcurrent device (breaker or fuse) and the smoke alarm. The circuit must not be protected by a ground fault or an arc-fault circuit interrupter (GFCI or AFCI). All smoke alarms must be wired so that the activation of one alarm will cause all alarms within the dwelling to sound.

Carbon Monoxide Alarms

Where a dwelling contains a fuel burning appliance (eg.: furnace, fireplace, wood stove, gas appliance, etc.) or has an attached garage, a carbon monoxide alarm is required to be installed so that each bedroom is protected by a carbon monoxide alarm either inside the bedroom or, if outside, within 5 m of the bedroom door, measured following corridors and doorways. Carbon monoxide alarms that are supplied by a 120V circuit must have no disconnect switch between the overcurrent device (breaker or fuse) and the carbon monoxide alarm. Carbon monoxide alarms must be interconnected to the smoke alarms.

Detached Garages and Carports

A light fixture must be provided for a garage and at least one duplex receptacle, supplied by a separate 15 amp branch circuit, must be provided for each car space in a garage.

Garage light fixtures and a garage door opener may also be connected to this circuit. Also, at least one duplex receptacle, supplied by a separate 15 amp branch circuit, must be provided for each driveway. All conductors run between the house and any outbuildings such as detached garages, must be run underground.

Panelboard in a Garage

A panelboard is not required in a garage however, if one is to be installed, the ampacities (current rating) of the larger conductor sizes that may be required to supply this panelboard are listed in TABLE 2.

Panelboards in garages must be surface mounted with 6 mil poly vapour barrier installed behind it.

Concern for Overhead Power Supply Conductors

If you plan to build a garage, carport or storage shed beneath overhead power supply conductors, you must first contact the Hydro utility to ensure that 1 m (39") clearance can be maintained between the building roof and the overhead conductors.

Contact your local Manitoba Hydro District Operating Centre at the phone number listed on your Manitoba Hydro bill.

TABLE 2 - Typical Copper Conductor Ampacities and Over-Current Protection

NMWU Conductor Type FOR DIRECT EARTH BURIAL			NMD-90 Conductor Type FOR INDOOR USE ONLY		
Wire Size (AWG)	Ampacity (60°C)	Breaker or Fuse Size	Wire Size (AWG)	Ampacity (75°C)	Breaker or Fuse Size
14	15	15 AMP	14	20	15 AMP
12	20	20 AMP	12	25	20 AMP
10	30	30 AMP	10	35	30 AMP
8	40	40 AMP	8	50	40 AMP
4	70	60 AMP	6	65	60 AMP
1	110	100 AMP	3	100	100 AMP
1/10	125	125 AMP			

For ampacities of other types of conductors, reference

Outdoor Receptacles

Receptacles located outdoors must be protected with an approved GFCI device and must have approved weather proof or wet location coverplates.

Readiness for Inspection

Underground wiring: For wiring to buildings, such as detached garages and sheds, the underground conductors between the house and the garage or shed must be installed in a trench. If mechanical protection is used it must be in position. The trench may be backfilled in the centre, provided the ends of the trench are left open for inspection purposes.

Interior wiring: Before the walls or ceiling of the garage or shed are insulated or covered with wallboard or other material, an inspection of the rough wiring is required.

The telephone number for inspection scheduling is indicated on your electrical permit.

Inspections can be scheduled by emailing ppd-housing@winnipeg.ca or by calling 204-986-5300

Minimum Installation Depths for Underground Conductors

The required minimum installation depths for underground wiring are listed in TABLE 3. For a typical underground wiring plan please see FIGURE 3.

Shared Trench

The trench for direct buried power conductors can be used for other conductors or services but, a minimum horizontal separation of not less than 300 mm (12") must be provided as follows:

- a) between the direct buried power conductors and any gas line, water line or sewer line, and
- b) between the direct buried power conductors and any cable TV or communication cable not having a metal sheath.

TABLE 3 - Wiring Plan For Underground Cable to Detached Garage or Shed

Method	Non-Vehicular Area		Vehicular Area	
	No Mechanical Protection	With Mechanical Protection ⁽¹⁾	No Mechanical Protection	With Mechanical Protection ⁽¹⁾
Conductors or cable without metal sheath or armour such as NMWU	600 mm (24")	450 mm (18")	900 mm (36")	750 mm (30")
Conductors or cable with metal sheath or armour	450 mm (18")	300 mm (12")	600 mm (24")	450 mm (18")
Raceway ⁽²⁾ such as ridged metal or rigid PVC conduit	450 mm (18")	300 mm ⁽³⁾ (12")	600 mm (24")	450 mm ⁽³⁾ (18")

- 1) Mechanical protection must consist of 2" nominal preserved wood planking or polyethylene pipe.
- 2) Conductors or cables installed in underground conduits must be approved for wet locations e.g. TW, RW, NMW, or NMWU.
- 3) Raceways installed at a depth of 300 mm (12") in non-vehicular areas and at 450 mm (18") vehicular areas must have mechanical protection described in 1) above.

NOTICE:

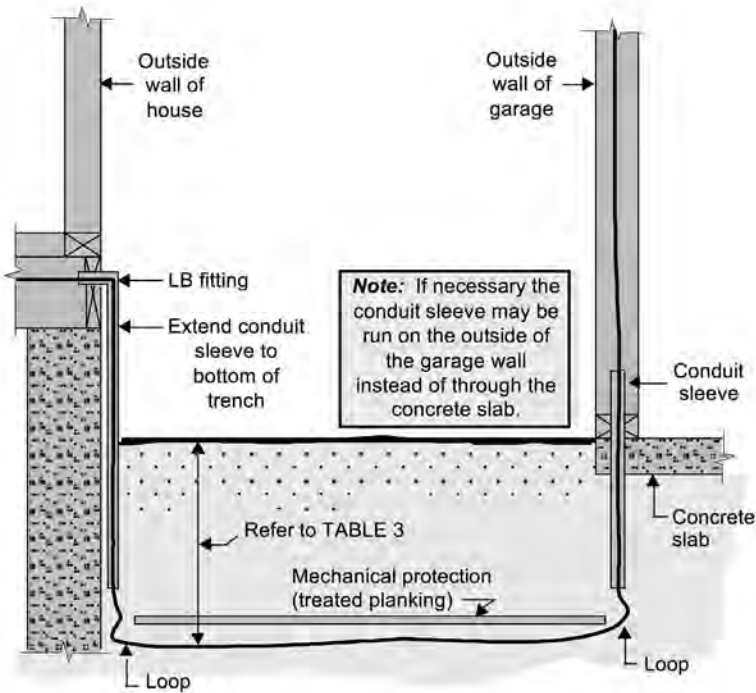
Precautions should be taken to avoid gas service lines from being enclosed in or under buildings as per CSA Z184 Gas Pipelines Systems Standards. Additionally, care should be taken when excavating to avoid disturbing other underground service lines including telephone cables and electrical power cables.

Before proceeding with construction or any underground excavation, please contact:

www.clickbeforeyoudigmb.com/ for gas and hydro lines
MTS at 1-800-837-6448 for telephone lines

Shaw Cable at 1-866-DIG-SHAW (344-7429)

Figure 3 - Wiring Plan for Underground Cable to Detached Garage or Shed



This is a diagram of an acceptable installation of NMWU underground cable between the house and a detached garage or shed. Note that the cable, when installed at a depth of 450 mm (18"), must be protected in the ground by planking at least 50 mm (2") nominal thickness which is treated with a wood preservative other than creosote. As an alternative, the conductors may be protected by running it in a length of polyethylene water pipe from the house to the garage. Where the conductors emerge from the trench, they must be protected against mechanical damage by a piece of rigid metal conduit or rigid PVC conduit. The cable loops at each end of the trench are to prevent damage from ground movement. These loops should be installed whenever a cable emerges from a conduit into direct contact with the earth.

Service Change

Before proceeding with any electrical service change, it is imperative that you contact Manitoba Hydro to obtain an acceptable service point and to confirm the acceptability of your proposed meter location. Having determined the service point, the installation of the service must comply with the applicable requirements of the Winnipeg Electrical By-law.

Manitoba Hydro will normally limit metering installations to one meter of the same voltage and service characteristic per residential customer/tenant area.

Arranging for Electrical Power Disconnect, Inspections and Power Reconnect for a Service Change

Prior to commencing any work, contact Manitoba Hydro to arrange to have the electrical power disconnected. Note that they will not reconnect the new service until it has been inspected by the City of Winnipeg electrical inspector.

Therefore, you are encouraged to schedule an inspection for the time you expect to be finished. An electrical service inspection can be prearranged by emailing ppd-housing@winnipeg.ca or by calling 204-986-5300 between 8:30 am and 4:00 pm, Monday through Friday.

Service Inspection

To be ready for an electrical service inspection, the following work must be completed:

1. The meter socket and service conduit must be completed, secured, and adequately braced.
2. All service conductors must be installed and properly terminated.
3. The ground conductor must ground all of the service entrance equipment, the neutral bar in the service and the service conduit (if metal), and continue to the street side of the water meter or other acceptable grounding electrode.
4. At least one branch circuit from the old service must be connected to the new panel so the inspector can determine if this is being done in a proper manner.

Minimum Electrical Installation Requirements for Electrical Service Changes and/or New Installations

1. The typical requirements for an overhead or underground residential service are:
 - a) 100 Amps:

Copper: 27 mm (1") EMT or PVC conduit containing:

 - two #3 R90 copper conductors; and
 - one #6 bare copper neutral

Aluminum: 27 mm (1") EMT or 35 mm (1-1/4") PVC conduit containing:

 - two #1 R90 aluminum conductors; and
 - one #6 bare copper neutral
 - b) 200 Amps:

Copper: 35 mm (1-1/4") EMT or 41 mm (1-1/2") PVC conduit containing:

 - two #3/0 R90 copper conductors; and
 - one #4 bare copper neutral

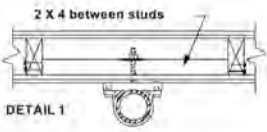
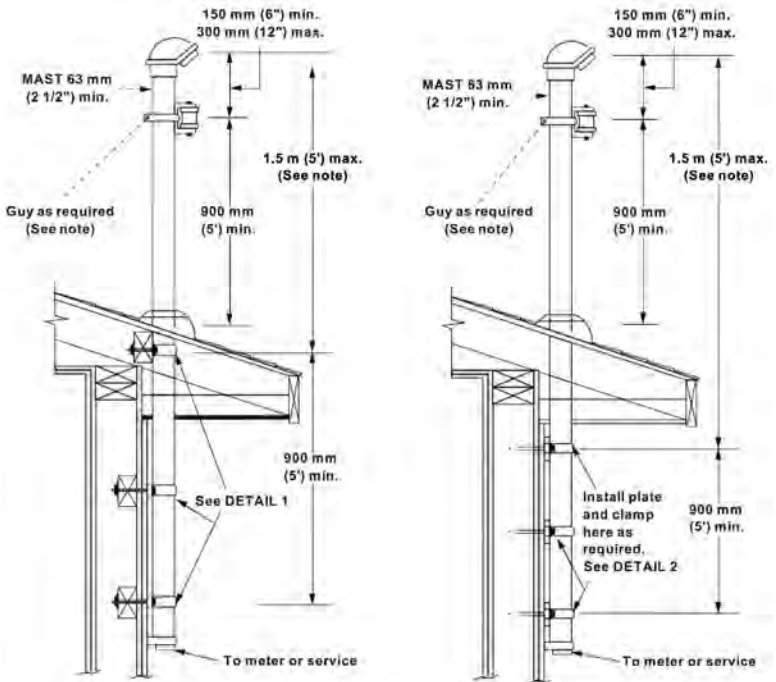
Aluminum: 53 mm (2") EMT or PVC conduit containing:

 - two #250 kcmil R90 aluminum conductors; and
 - one #4 bare copper neutral
2. Both 100 Amp and 200 Amp residential services require one #6 copper grounding conductor connected to a suitable grounding electrode, i.e. the street side of the water meter.
3. The service head height must not be less than 3.5 m (11'-6") nor more than 9 m (29') above grade.
4. The meter base must be located not less than 1.2 m (4') nor more than 1.8 m (6') to centre above finished grade or deck. See FIGURE 5.

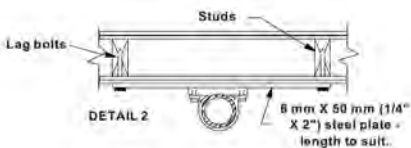
NOTE:

- 1) The service conduit must not enter the top of the service box unless drained outdoors in an approved manner.
- 2) Where the service conduit enters the building, the LB fitting must be filled with a compound that does not absorb moisture to prevent condensation.
- 3) To meet the minimum height requirements, a service mast may be required on single storey buildings.
- 4) See FIGURES 4 & 5 for typical service mast and meter installation methods.

FIGURE 4 - Typical Service MAST Installation



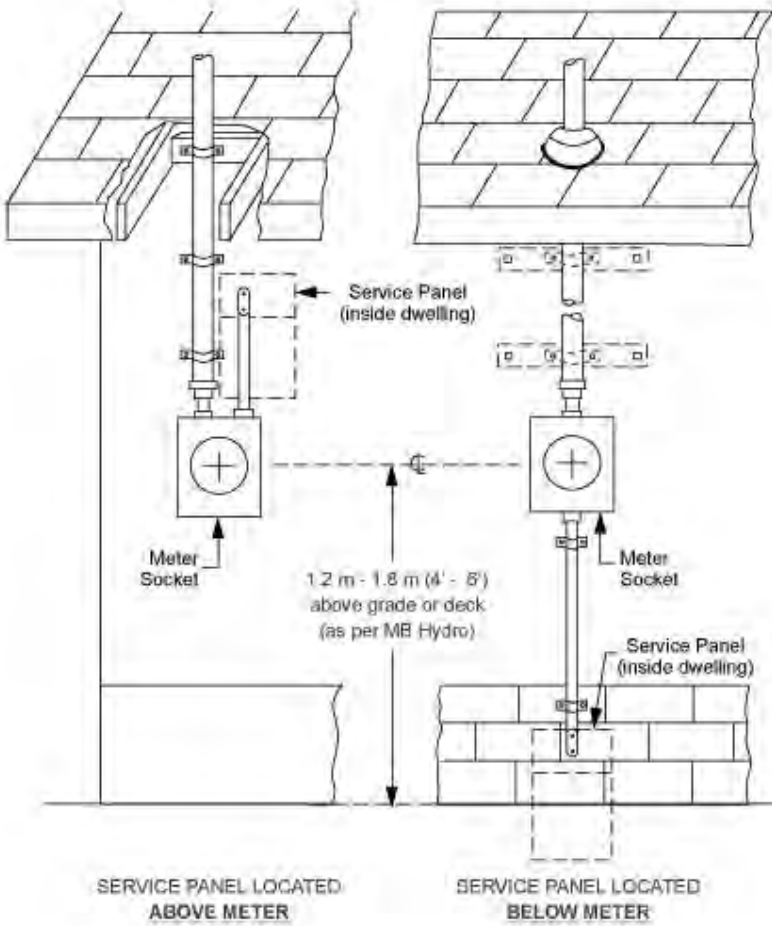
NEW DWELLING



EXISTING DWELLING

Note:
 Maximum unguyed projection above top clamp not to exceed 1.5 m (5') where required.

FIGURE 5 - Typical Service METER Installation



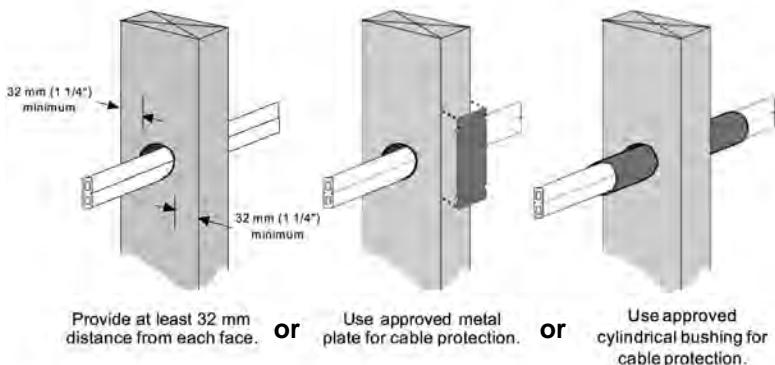
NOTE:

The following information is provided to assist you in avoiding some of the more common errors which are made in interior wiring. Please recognize that this information is not intended to cover all of the applicable electrical regulations of the City. More detail regarding these regulations may be determined by referencing the City of Winnipeg Electrical By-law.

Installation of Wiring in Structural Members such as Studs in a Wall

Cable running through stud members must be kept at least 32 mm (1 1/4") from any face of the stud which can be nailed upon. If this distance cannot be maintained, an approved protection plate or cylindrical bushing is required in the area where the wiring passes through the stud. (See FIGURE 6).

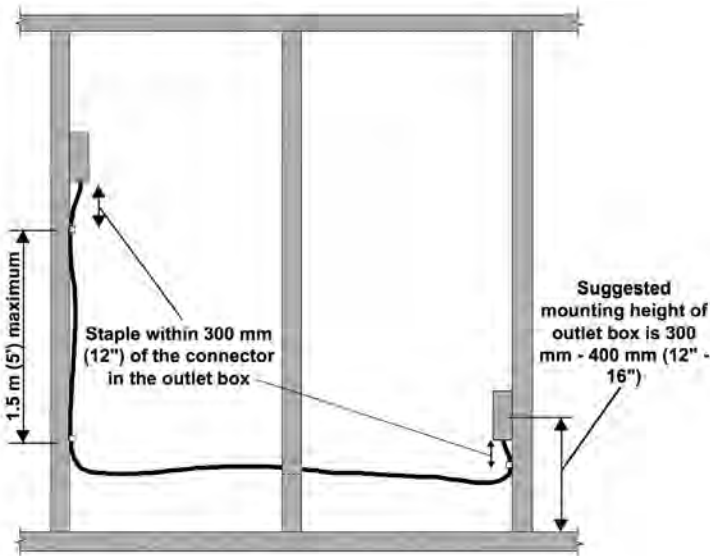
FIGURE 6 - Cable Protection in Stud Walls



Cable Support

The cable must be secured within 300 mm (12") of the outlet box and approximately every 1.5 m (5') throughout the run. See FIGURE 7.

FIGURE 7 - Cable Support in Stud Walls



Requirements for Installing Outlet Boxes

Mounting nails or screws can pass through or project into the interior of an outlet box only if the nails or screws are located within 6 mm (1/4") of the back or ends of the box. In addition, the nails or screws must not interfere with conductors or connectors. See FIGURE 12.

Openings placed through vapour barriers for the installation of outlet boxes must be effectively sealed to maintain the integrity of the vapour barrier. This can be done through the use of an approved poly/vapour outlet box or with an ordinary outlet box as shown in the following section.

Recommended Practice for Installing the Vapour Barrier behind Outlet Boxes on Exterior Walls

For a proper installation of outlet boxes with vapour barrier protection, the following steps should be followed:

- STEP 1:** Cut a 600 x 600 mm (24" X 24") piece of 6 mil poly and place against framing prior to attaching the outlet box. See FIGURE 8.
- STEP 2:** Attach the outlet box over the centre of the poly film square allowing approximately 200 mm (8") of film to extend past the front of the framing.
- STEP 3:** Puncture the film below the box and install the electrical wire through the film and into the box.

STEP 4: Seal the puncture by taping the film to the wire. See FIGURE 9. **STEP 5:** Tuck the poly film into the box. This will completely enclose the box in a poly film bag. See FIGURE 10.

STEP 6: Apply poly film vapour barrier on the warm side of the entire insulated area which will cover the outlet boxes.

STEP 7: Make a small hole in the covering vapour barrier opposite the box and pull the poly film out of the box through the hole, leaving the front of the box accessible for installation of devices. Fold the film away from the box, on top of the vapour barrier, and tape in place. See FIGURE 11. If a lap of at least 140 mm (16") is not achieved on all sides, an approved vapour barrier tape should be used to seal the joint.

CAUTION!

This method is not recommended where high temperature or ventilated, recessed fixtures are to be installed

OUTLET BOX VAPOUR BARRIER INSTALLATION

FIGURE 8

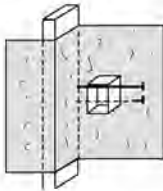


FIGURE 9

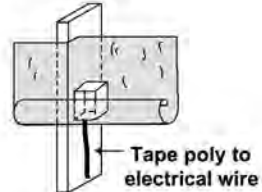


FIGURE 10

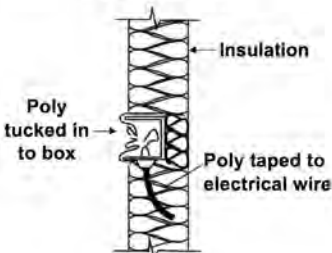


FIGURE 11

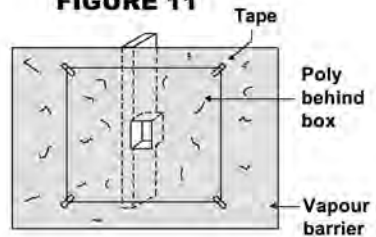
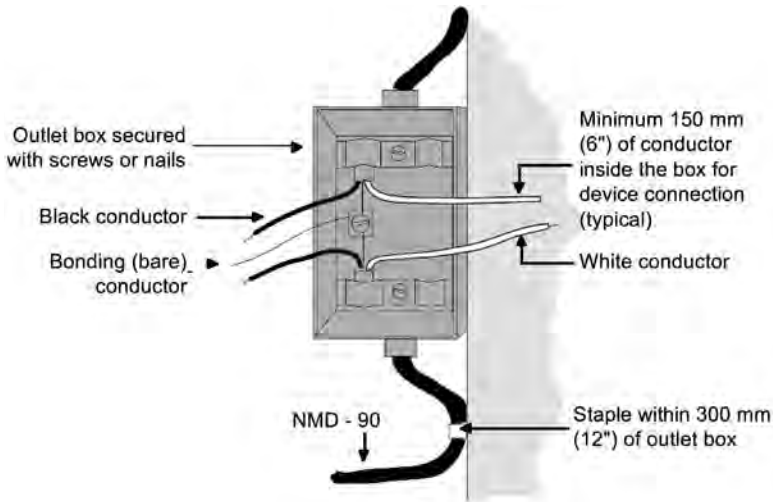


FIGURE 12 - Typical Outlet Box Installation



Requirements for Connecting Light Fixtures and Switches

For fixtures with screw terminals, the black or “hot” wire must be terminated under the brass coloured screw terminal and the white or neutral conductor must be terminated under the nickel plated screw terminal. For light fixtures in general, you must ensure that the white conductor is connected to the fixture screw shell. See FIGURES 13 and 14.

Controlling a Light from Two Different Locations (eg. Top and Bottom of Stairs)

For this type of lighting control, it is necessary to install “three-way” switches (See FIGURE 15). These switches are easily identified by their three terminal screws. Note that in FIGURE 15, the screw terminal on each three-way switch, to which the black wire is connected, will have a different colour than the other two screw terminals.

Installation Procedure for Recessed Light Fixtures

Recessed fixtures must NOT be installed in an insulated ceiling unless specifically approved and marked for such use. In addition, recessed fixtures marked as suitable for installation on a non-combustible surface may only be installed on non-combustible surfaces.

Refer to manufacturer’s installation recommendations for minimum clearances to thermal insulation and combustible materials.

FIGURE 13 - Light Switch Control Method.

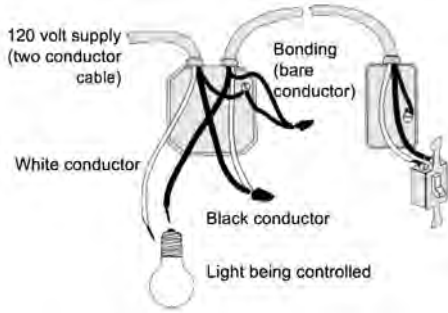


FIGURE 14 - Light Switch Control Method.

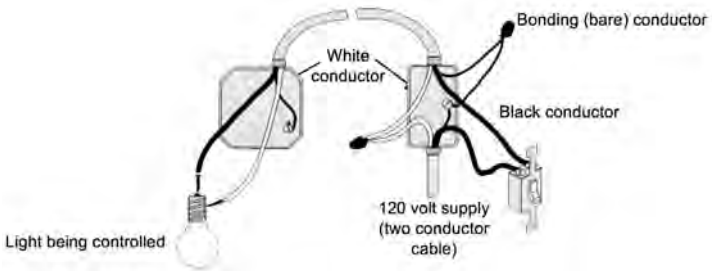
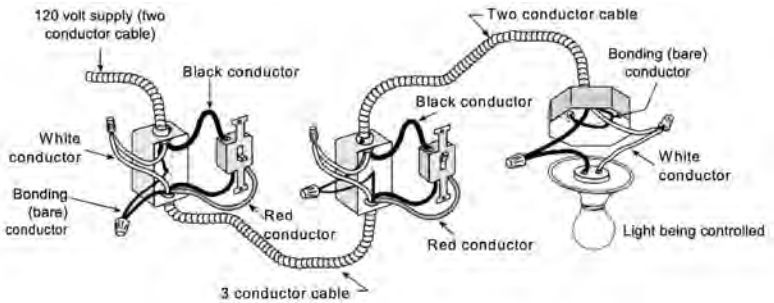
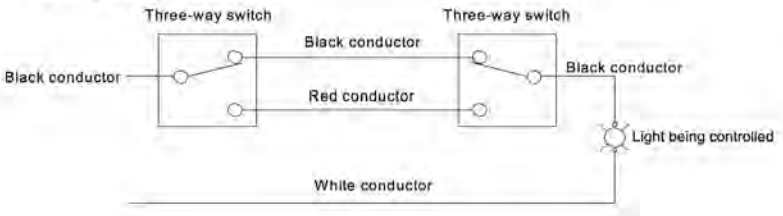


FIGURE 15 - "Three Way" Switch Wiring



Wiring Diagram



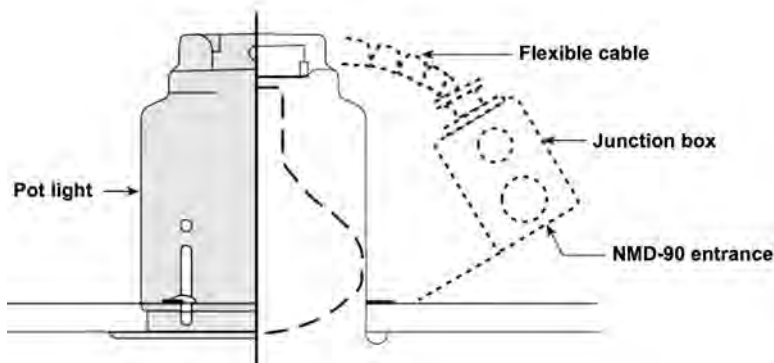
Recessed fixtures will be required to be installed in insulated ceilings with approved vapour barriers. For insulated ceilings in new construction, vapour barrier boxes must be supported on all four sides.

Recessed fixtures normally come in 2 different types:

The **first type** is the pre-wired fixture which comes complete with the flexible cable from the fixture to a junction box mounted on the side of the fixture frame. This type of fixture is the most convenient fixture to use as it only requires the branch circuit conductors to be brought into and terminated in the side mounted junction box (See FIGURE 16).

The **second type** of recessed fixture is much less expensive yet requires more work by the installer. The fixture will come with high temperature conductors. These conductors must not be cut off but run through a flexible metal conduit 450 mm - 2 m (18" - 78") in length in their entirety and terminated in a junction box located not less than 300 mm (12") from the lighting fixture. This junction box must be accessible for maintenance. If access is through the opening for mounting the fixture, then the opening must not be less than a circle of 180 sq. cm (28 sq. in.), with no dimension less than 15 cm (6"), and the outlet box must be mounted within 350 mm (14") of the opening. For fixtures having lesser dimensions than that listed here, the junction box must be made accessible through a ceiling opening not less than a square or rectangle of 400 sq. cm (62 sq. in.), with no dimension less than 200 mm (8").

FIGURE 16 - Pre-Wired Fixture



Connecting Duplex Receptacles

When connecting duplex receptacles please note that all receptacles are polarized. See FIGURE 17. That is, the black or **hot wire** must be connected to the brass coloured screw terminal. The white or neutral conductor must be connected to the nickel plated screw terminal. The bonding (bare) conductor for the circuit must terminate under the bonding screw in the outlet box and then must be carried out and be terminated under the green bonding screw on the receptacle.

Where existing receptacles in dwellings do not have a bonding means, a bonding conductor must be provided or the circuit must be protected by a GFCI.

Split Receptacles

A split receptacle is a duplex receptacle which is supplied by a multi-wire branch circuit (See FIGURE 18). Split receptacles are typically installed along the wall of kitchen counter work surfaces, island counters, and peninsular counters where ground fault protection is not required (ie. not within 1.5 m (5') of sinks).

For a kitchen counter, not more than two split receptacles may be connected to a multi-(three) wire circuit.

FIGURE 17 - Duplex Receptacle Connections

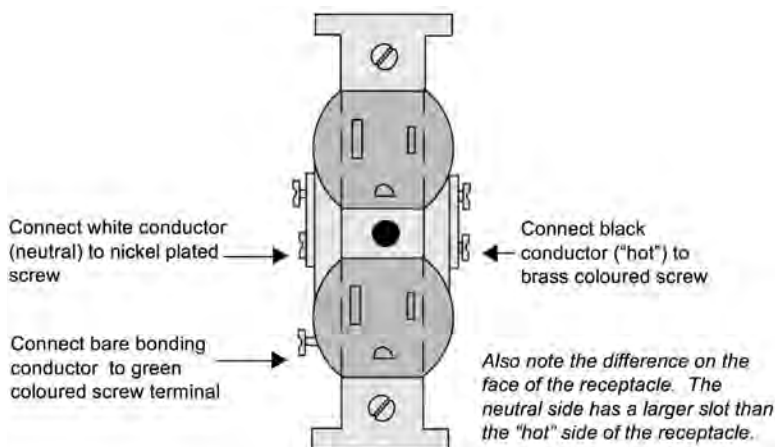
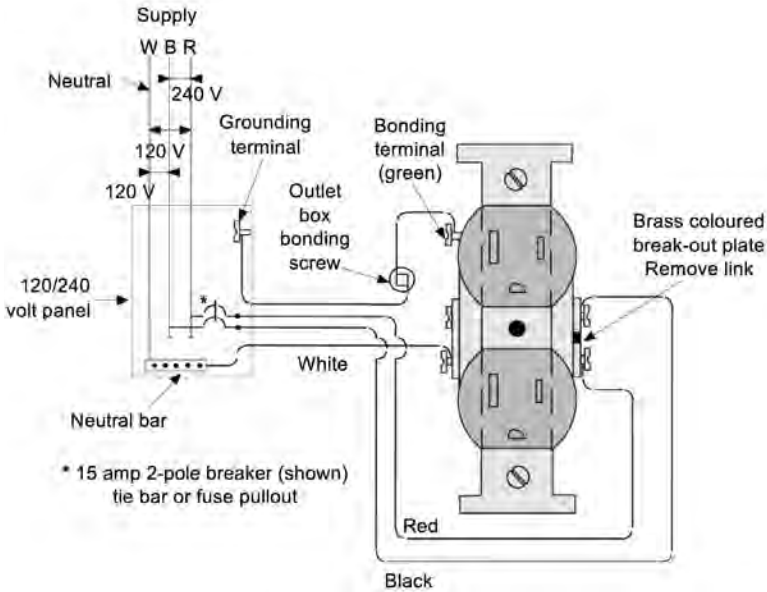


FIGURE 18 - Split Receptacle Wiring Diagram



240 Volt Electric Baseboard Heaters

TABLE 4 illustrates the maximum permitted electric heating load that may be connected to a single 240 volt circuit.

TABLE 4 - Maximum Permitted 240 Volt Electric Baseboard Heating Load

Maximum connected heating load - not more than:	Minimum wire size NMD-90 copper cable	Breaker size
2,880 Watts	#14 AWG	15 Amp, 2 pole
3,840 Watts	#14 AWG	20 Amp, 2 pole
4,800 Watts	#14 AWG	25 Amp, 2 pole
5,760 Watts	#12 AWG	30 Amp, 2 pole

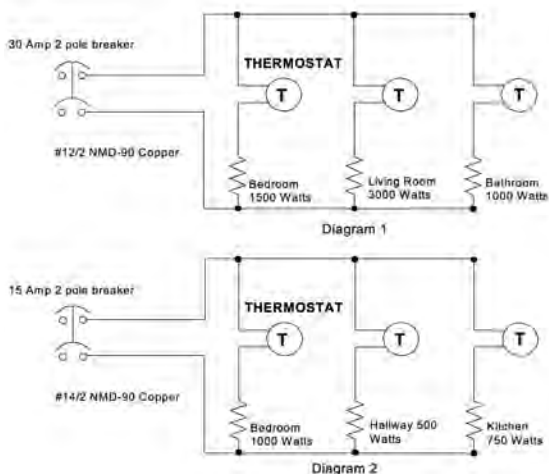
Fuses and Breakers Supplying 240 Volt Electric Heat

The maximum rating permitted for a fuse or breaker is 30 Amps. Where a breaker is used it must be of the two pole type. The use of two single pole breakers with interlocked handles is not permitted in this case. Where fuses are used, they must be contained in a “dead front fused pull-out”. This device consists of a removable block which holds both fuses of the 240 Volt circuit.

Thermostats

Thermostats must be installed to control the baseboard heater(s) in each heated area or room. Thermostats may either be wall mounted or built into the baseboard heater. Thermostats located in bathrooms must be at least 1 m (39”) from a tub or shower. Thermostats can be located not less than 500 mm (19 1/2”) from a tub or shower but must be GFCI protected.

FIGURE 19 - Typical 240 Volt Electric Heating Wiring Diagrams



EXAMPLE: In diagram 1 of FIGURE 19, the connected heating load is 5,500 Watts. Referring to TABLE 4, a 30 Amp, 2 pole breaker and #12 AWG conductors would be required. In diagram 2 of FIGURE 19, the load is 2,250 Watts therefore, the minimum wire size is #14 AWG connected to a 15 Amp, 2 pole breaker.

Note to FIGURE 19:

Diagrams 1 and 2 above are examples only and should not be used to determine heating requirements for any particular room.

The circuit supplying electric baseboard heating must not be used for any other purpose. This guide does not cover the installation of other types of electric heat such as electric furnaces, radiant heat panels, etc.

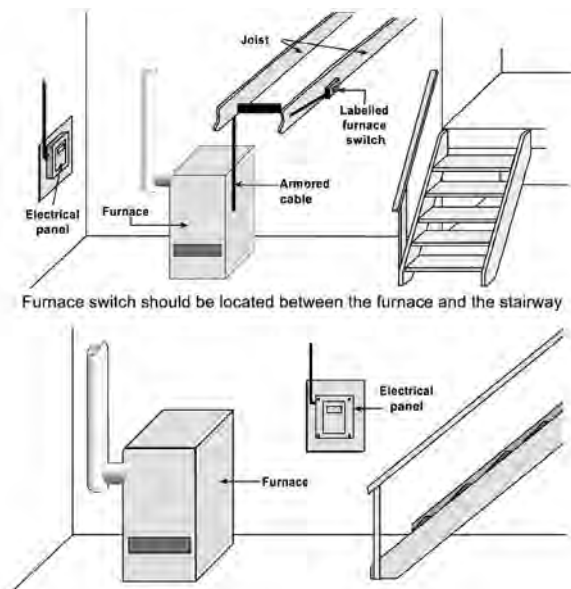
Location/Relocation of a Furnace Switch

The furnace switch must be labelled to indicate the equipment it controls. The furnace switch must be located in such a place so that a person does not have to pass the furnace to gain access to the switch, as indicated in FIGURE 20.

Electric furnaces must be provided with a single disconnect which opens all ungrounded conductors simultaneously, to be located within sight of and within 9 m (29') of the central unit and controller, or a closet or alcove containing the central unit and controller. The disconnect switch for a gas furnace must be within sight of the furnace and readily accessible.

Note that the above switch location requirements must be maintained; existing compliant installations must not be compromised by building renovations.

FIGURE 20 - Furnace Switch Location

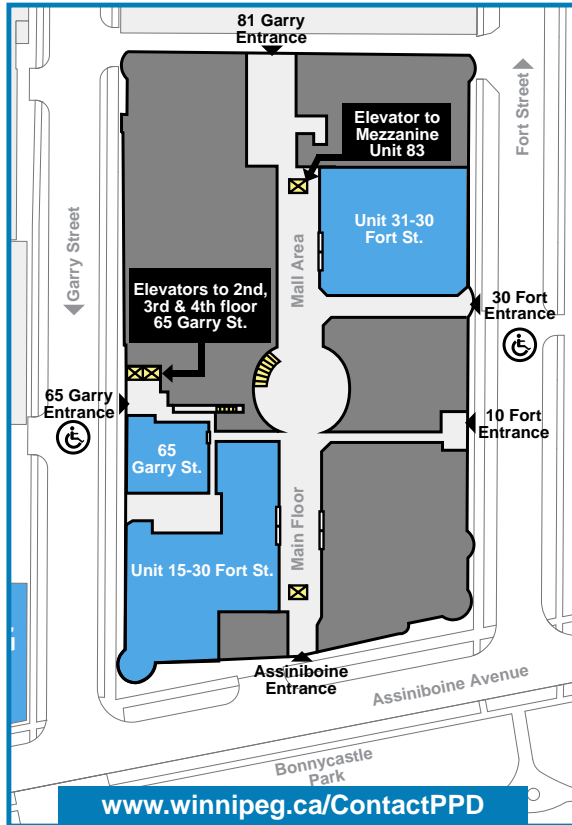


Where the panel board is located between the stairway and furnace, the furnace circuit breaker can serve as the furnace disconnect.

In-Person Customer Service Hours:

Tuesday to Friday 8:30 am to 4:30 pm - All Zoning, Permits and Plan Examination services are available at Unit 31 – 30 Fort Street.

Mondays 8:30 am to 4:30 pm are reserved for telephone inquiries and completed application drop-offs. This enables Zoning and Permits staff to process building and development applications received throughout the week.



Planning, Property & Development Department
83 - 30 Fort Street Winnipeg, Manitoba R3C 4X7

www.winnipeg.ca/ppd



**For more information on the
regulations for electrical installations:**

Housing Inspections Branch
PPD-Housing@Winnipeg.ca
Phone: 204-986-5300
Fax: 204-942-2008

**Zoning and Permits Branch
& Plan Examination Branch**
Phone: 204-986-5140
Fax: 204-986-6347

or



Planning, Property and Development
Department Unit 31 - 30 Fort Street
Winnipeg, Manitoba
R3C 4X7
www.winnipeg.ca/ppd