



REQUIRED ELECTRICAL CIRCUITS, OUTLETS AND THEIR ROUGH-INS

CIRCUITS

The newest type of circuit protection available is the arc fault breaker. Arc fault breakers are designed to protect against some electrical fires caused by arcing faults - a bad power cord on an appliance, wire punctured by a picture frame hook, poorly installed switches or receptacles, anything that can cause an arc and thus a fire hazard. AFCI's have been a code requirement for wiring in residential bedrooms since 2002. Verify the circuit requirements for smoke alarms with local code officials.

GFCI's, or ground fault circuit interrupters, are designed to prevent electrical shock by constantly monitoring the difference in potential between hot and neutral and disconnecting power when it senses small amounts of current going to ground. GFCI protection can be from a ground fault circuit breaker or a GFCI receptacle, the latter being the most popular today. The devices have feed-thru capability, and up to 5 standard receptacles can be protected "downstream" by one unit. Required circuits for GFCI's are: bathroom receptacles, outdoor outlets, garages, crawlspaces and unfinished basements, any receptacles within 6' of a kitchen, laundry or bar sink, outside storage buildings and barns.

At least 2 circuits must be used to supply power to the outlets of the kitchen. These circuits must be rated 20 amps. Nothing but appliance outlets can be served by these circuits; no light fixtures, range hoods, garbage disposals, etc., etc.

The laundry room is to be serviced with a 20 amp receptacle circuit as well as dedicated circuits for the washer and dryer. Receptacles in this circuit must be situated within 6' of any work area in the laundry room. These outlets are not required to be GFCI protected unless within 6' of the laundry sink.

Each fixed appliance should be serviced by a circuit that is calculated to handle the load of that appliance.

General lighting circuits will include the receptacle outlets other than those for specific use which have already been discussed. It may be desirable not to mix lighting circuits and outlets so when a breaker is tripped from plugging in too many devices you won't be left in the dark.

OUTLETS

In most rooms of a house, receptacle outlets should be installed in any wall space 2 feet wide or more and so that at no point along the floor line in any wall space is there more than 6 feet measured horizontally from an outlet in that space. Fixed room dividers such as freestanding bar type counters or railings shall be

included in the 6 foot measurement. Any hallway 10 feet or longer measured along the centerline of the hallway without passing through a doorway must have at least one receptacle outlet. Finished basements must also meet these requirements.

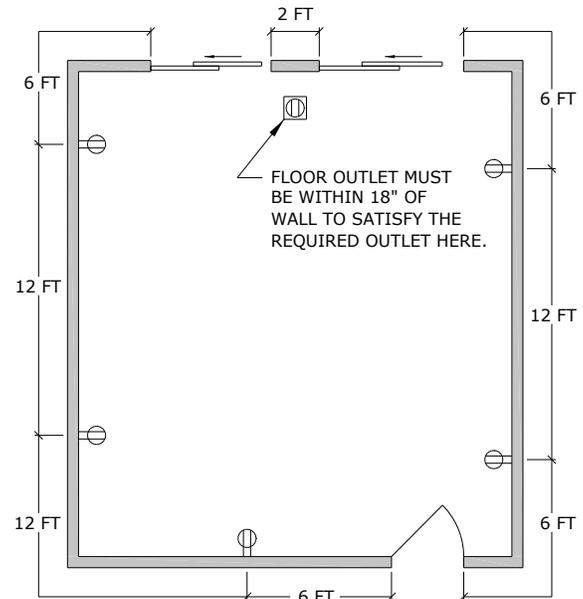


Figure 1: GENERAL USE RECEPTACLE DISTRIBUTION

In kitchen and dining areas, a receptacle outlet shall be installed at each wall counter that is 12 inches or wider. Receptacle outlets shall be installed so that no point along the wall line is more than 24 inches measured horizontally from a receptacle outlet in that space. Receptacle outlets serving the countertop shall be located above the counter top, but not more than 20 inches above the countertop.

At least one receptacle shall be installed at each island or peninsular counter space with a long dimension of 24 inches or greater and a short dimension of 12 inches or greater. Where the island or peninsular counter does not have a flat top across its entire surface (it has backsplashes, dividers, etc.), the receptacle must be located above the counter. Where the island or peninsular counter does have a flat top across its entire surface, the receptacle may be located no more than 12 inches below the counter where the countertop extends no more than 6 inches beyond its support base. Where rangetop or sink is installed in an island counter and the width of the counter behind the rangetop or sink is less than 12 inches, the rangetop or sink is considered to divide the island into two counter spaces and two receptacles are required.

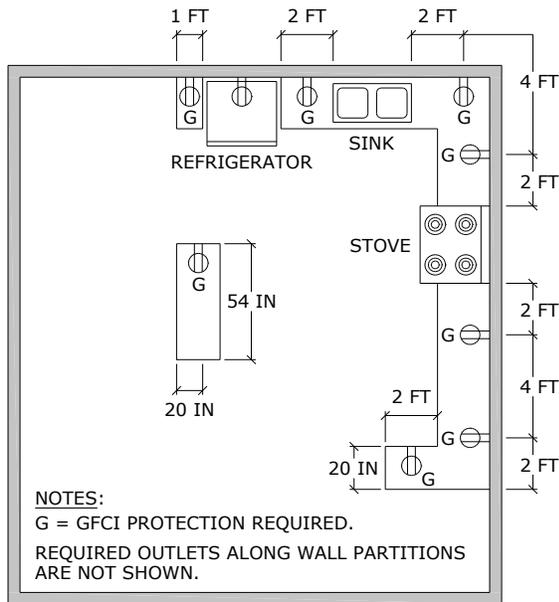


Figure 2: COUNTERTOP RECEPTACLES

At least one dedicated 20-ampere circuit is required to supply receptacles in each bathroom (all shall be GFCI protected). At least one receptacle shall be installed within 3 feet of the outside edge of a sink basin located on a wall or partition adjacent to the basin.

A GFCI protected receptacle outlet shall be installed at the front and back of the house. This receptacle shall be accessible at grade level and not more than 6-and-one-half feet above grade. Usually, these receptacles are wired on the same circuit in order to better utilize the GFCI device.

Basements and attached garages must be wired with at least one receptacle outlet each and must be GFCI protected (if the basement is "unfinished"). We recommend a much more complete job than this for it will never be easier or more economical than right now to make the system as convenient as you will eventually want it.

Single receptacle outlets in unfinished basements and garages that are supplied by a dedicated branch circuit that are located and identified for specific use by a cord and plug connected appliance such as a refrigerator or freezer are not required to be GFCI protected.

At least one receptacle outlet should be installed in any area that has equipment that requires servicing including outdoor hot tubs and other equipment. At least one receptacle outlet shall be installed at the house's heating, air conditioning, and refrigeration

equipment. These receptacles shall be accessible at the same level and within 25 feet of the equipment.

A light fixture outlet that is controlled by a wall switch should be installed in each habitable room. Hallways, stairways, attached garages, and at outdoor entrances should have fixture outlets that are switched on by a wall switch. Habitable rooms, other than kitchen and bathrooms, can have at least one receptacle outlet that is controlled by a wall switch in lieu of the standard fixture outlet. Even more convenient is the split circuit where the tie bar between the top and bottom plugs of all the duplex receptacles in the room are removed so that the top plugs remain hot all the time and the bottom ones can be switched at the wall. This requires using a 3 conductor with ground wire and deep switch and receptacle boxes, but is well worth the small additional cost.

At least one lighting fixture should be installed in any area that is used for storage or that has equipment that requires servicing. Areas of this type are attics, crawl spaces, utility rooms, and basements.

When lighting is desired for clothes closets, the fixture type must be a surface-mounted or recessed incandescent fixture (completely enclosed lamp) or fluorescent fixture. Incandescent shall be at least 18" from combustible storage and fluorescent shall be at least 6" from combustible storage.

ROUGH-INS

Wall receptacles are usually mounted 12 inches off the floor. This seems to be a convenient height for using the plug and won't interfere with the installation of most types of coving materials.

Kitchen receptacles install above the backsplash of counter tops. This makes the correct height about 43 inches from the bottom of the box to the floor.

Light switches are normally mounted 48" above the floor while wall thermostats are roughed in at 60" off the floor, making them less vulnerable to tampering by small children.

The wall receptacle outlets in bathrooms are positioned near the wash basin at a height of about 36 inches. This will clear the backsplash of most vanity tops and yet not interfere with mounting the medicine cabinet at a correct height.

Light fixture outlets are usually centered in the room. Special lighting outlets, such as over stairways, should be carefully positioned to provide the most shadow-free illumination. It is best to consider your lighting plan prior to wiring to insure that the fixture locations and switching options meet your needs.