
TECHNICAL ARTICLE

The 2020 NEC® and its impact on residential construction



The 2020 NEC delivers changes that have a significant impact on residential construction — primarily in the areas of arc fault circuit interrupter (AFCI), ground fault circuit interrupter (GFCI) and dual function circuit interrupter (DFCI) protection, surge protection and emergency outdoor disconnect.

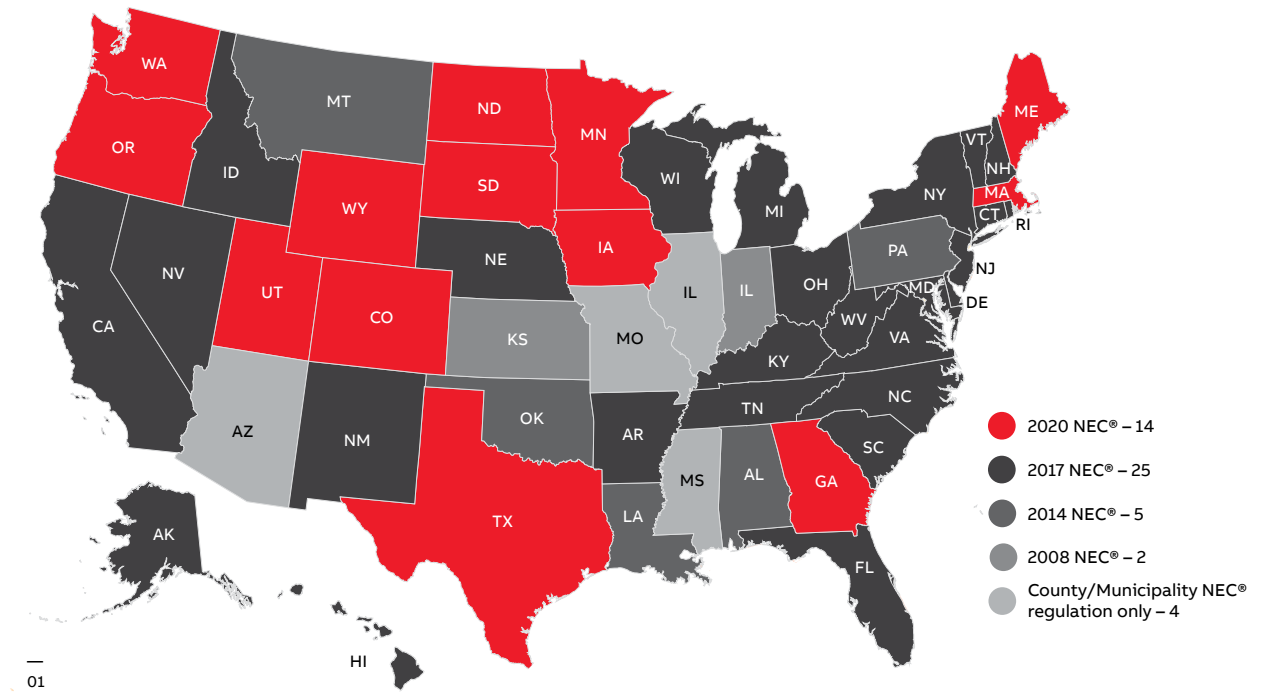
2020 NEC adoption by state

Every three years, the National Fire Protection Association updates the National Electrical Code® (NEC), or NFPA 70®, which is part of the National Fire Code. ABB has the expertise, products and solutions to help you comply with this code change.

Because the code is not a federal law, it is being adopted at different rates depending on the state. As of October 1, 2021, a total of 14 states have already adopted the 2020 NEC — Colorado, Georgia, Indiana, Iowa, Maine, Massachusetts, Minnesota, North Dakota, Oregon, South Dakota, Texas, Utah, Washington and Wyoming.

In addition, 10 states are in the process of adopting it — California, Connecticut, Idaho, Nebraska, New Hampshire, New Mexico, North Carolina, Ohio, Rhode Island and Vermont.

Furthermore, local authorities having jurisdiction (AHJs) and governing bodies may impose additional requirements or deviations, so it is important to confirm requirements with the local jurisdiction.



GFCI protection expands to 250 V outlets

The 2020 NEC requires ground fault circuit interrupter (GFCI) protection of all 125 to 250 volt receptacles in kitchens, bathrooms, laundry areas, finished or unfinished basements, garages and anywhere within six feet of a sink, as well as outdoor outlets 150 volts or less to ground and up to 50 amps.

The 2017 NEC required GFCI protection only for 125 volt, 15 and 20 amp receptacle outlets inside dwellings.

The 2020 NEC inclusion of outlets up to 250 volts and elimination of any mention of amperage rating extends GFCI protection requirements to ranges, electric clothes dryers, dishwashers, sump pumps, pool motors and equipment that requires servicing, such as HVAC and refrigeration units.

This change in the NEC is intended to provide greater safety from electrical shock for both residents and servicing technicians.

To meet the requirement for GFCI protection in all the newly required locations, ground fault (GF) circuit breakers should be installed in the load center panel. Dual function (DF) circuit breakers that offer both ground fault and arc fault protection — helping to prevent both electric shock and fire hazards — are also available for this purpose and meet the 2020 NEC requirements. ABB offers a wide range of GFCI breakers, both one- and two-pole, from 15 to 50 amps.

Surge protection for all dwelling unit services

New for 2020, NEC Article 242 requires all dwelling unit services to be provided with surge protection. The surge protection device (SPD) must be either an integral part of service equipment or located immediately adjacent to service equipment unless it is located at each level of downstream distribution. Either a listed Type 1 or Type 2 SPD will satisfy the requirement, which applies to service equipment being upgraded or replaced in addition to new construction.

This change in the NEC is intended to provide greater protection from power surge damage for residents' electronic devices, such as televisions, computers and other equipment.

When considering SPDs, bear in mind that Type 1 SPDs offer the highest ratings and can be installed on either the line side or load side of the load center. Type 2 SPDs must only be used on the load side.

The ABB THQLSURGE SPD installs directly into the load center like a breaker and offers the protection needed to meet the 2020 NEC requirement for surge protection.

Outdoor emergency disconnect for one- and two-family dwellings

The 2020 NEC now requires a readily accessible, clearly identified disconnect on the exterior of single-family homes and duplexes. This disconnect must have a short circuit current rating (SCCR) greater than or equal to the available fault current and can take the form of a service disconnect, a meter disconnect or other listed disconnect switch or circuit breaker that is suitable for use as service equipment.

This change to the NEC makes it easier for fire fighters and other emergency responders to disconnect electrical service to the dwelling in case of fire, gas leak, flood or other emergency.

To meet this requirement, it's necessary to choose a safety disconnect in an outdoor-rated enclosure, such as NEMA Type 3R or 4X, that meets the SCCR requirements for the dwelling. ABB has a robust offering of safety switches, disconnects and enclosed circuit breakers to meet the need of any application.

A few bumps in the road

One issue frequently experienced in states that have adopted the 2020 NEC thus far is a high level of nuisance tripping of HVAC equipment protected by GFCI. Investigation into this problem indicates that nuisance tripping is much more prevalent in HVAC equipment using variable speed motors. A solution is likely to involve modification to the design of GFCI devices, necessitating a change to the UL 943 standard covering those devices — a process will probably take several years to complete. In the meantime, many states are rolling back the 2020 NEC requirement for GFCI protection for HVAC equipment until the situation is resolved.

Another issue that has arisen is misapplication of GF, AF and DF breakers — in other words, failing to use the correct type of breaker to suit the application. It's critical to use the right type of breaker to comply with code requirements and help protect people and property.

01 Arc fault (AFCI) breakers — Help prevent the arc faults that can result in electrical fires. Required by 2020 NEC for use in:

- Family room
- Dining room
- Living room
- Bedroom
- Sunroom
- Library
- Den
- Office hallways
- Closets
- Recreation room
- Kitchen (except where otherwise noted)

02 Ground fault (GFCI) breakers — Help protect people from electric shock. Required by 2020 NEC for use in or with:

- Bathroom
- Garage
- Porch
- Pool area
- Clothes dryer
- Stove/oven/range
- Outdoors

03 Dual function (DFCI) breakers — Provide both ground fault and arc fault protection. Required by 2020 NEC in or with:

- Kitchen counter
- Dishwasher
- Clothes washer
- Laundry room or area

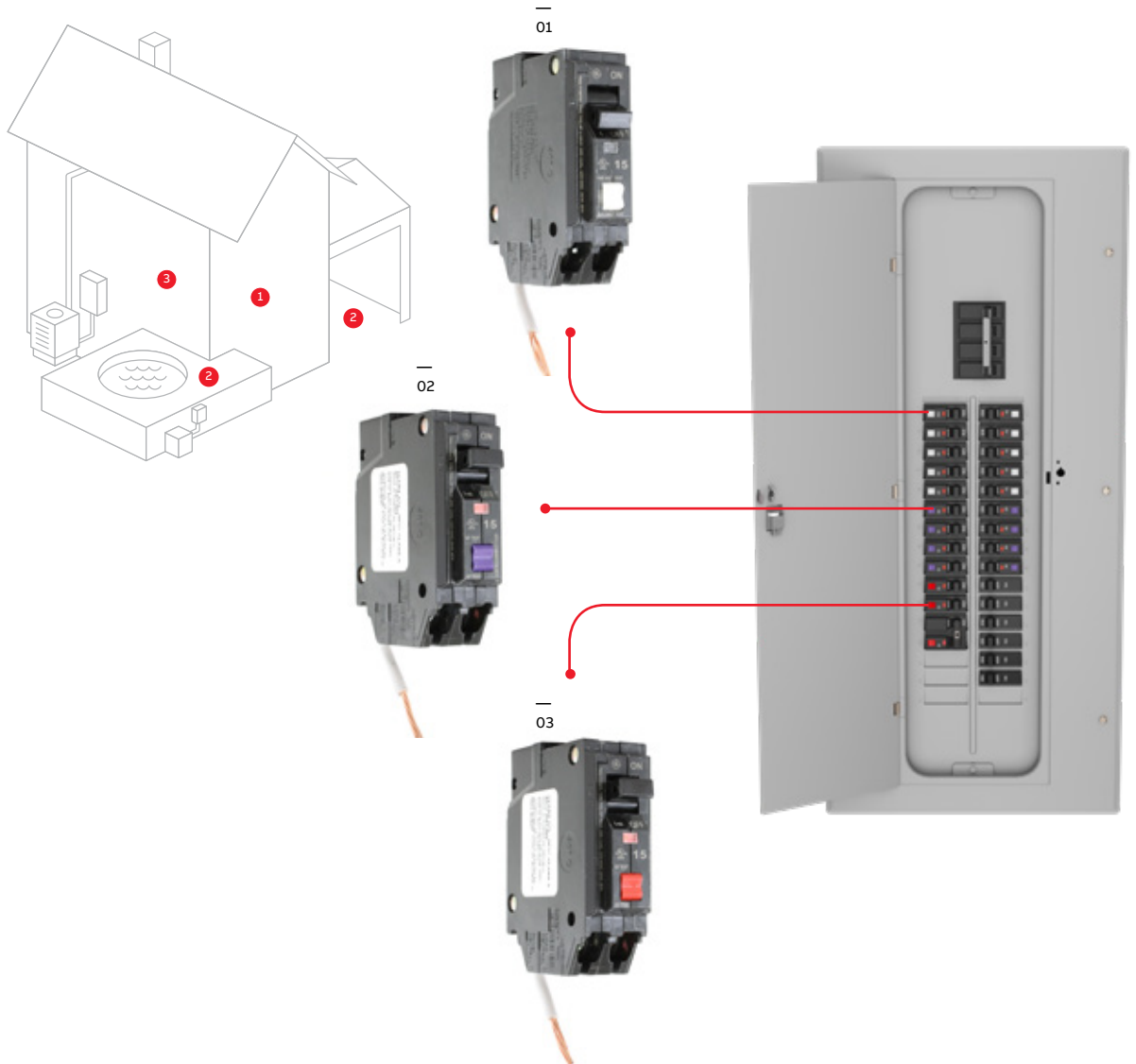


ABB can help

ABB offers a full range of ground fault, arc fault and dual function circuit breakers, Type 1 and Type 2 SPDs, safety disconnect switches and enclosed circuit breakers, as well as the technical expertise to consult with you on your residential construction challenges. At ABB, we know code changes can be confusing, but we're here to help guide you through any questions you may have, and we're prepared with products and solutions to help you meet the 2020 NEC.

To learn more, visit
<https://electrification.us.abb.com/industries/residential>.



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