RESIDENTIAL SOLUTIONS

Residential Electronic Circuit Interrupters



by ABB



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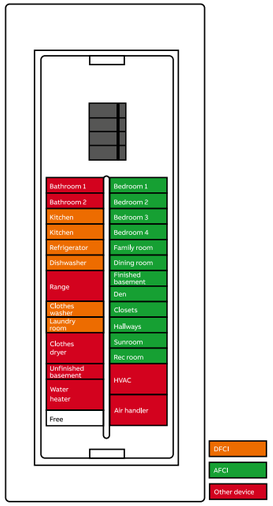
Dual Function Circuit Interrupter (DFCI)

Provides ground fault and arc fault circuit protection in one unit

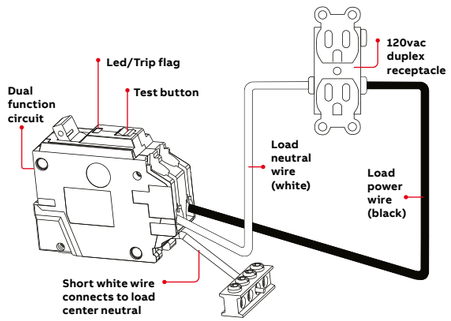
The 2014 National Electric Code has mandated Ground Fault and Arc Fault circuit protection on many 15 and 20 amp kitchen and laundry circuits. GE's Dual Function Circuit Interrupter (DFCI) offers both Ground Fault and Combination Arc Fault (GFCI and AFCI) protection in a simple to apply and cost-effective package.

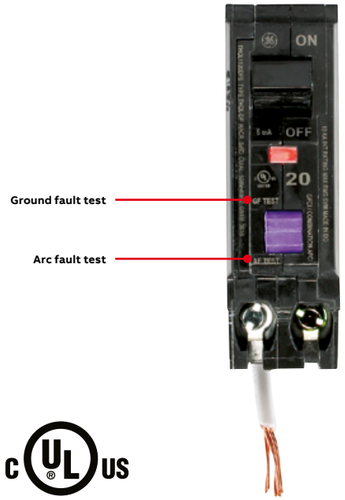
Dual function circuit interrupters utilize both GFCI and AFCI detection technology.

- GFCI protection guards against ground faults, and is an effective means of preventing electrical shocks. GFCI circuit breakers accomplish this by detecting when current is "leaking" somewhere outside its intended path. If your body provides the path to ground for this "leakage" you could be burned, shocked or even electrocuted.
- AFCI protection guards against damage or fires that can result from arcing and sparking. Arc Faults can arise from deteriorated wires, poor connections and breaches in wire insulation. With more than 67,000 home fires claiming more than 485 lives and injuring 2,300 victims annually, the added safety provided by AFCI protection is an important step forward in reducing this risk.



Wiring diagram





Features

Our DFCI has useful features for assisting you or your electrician in troubleshooting a trip. Should the DFCI trip, the LED inside the trip flag window will indicate the last known trip condition when the breaker is reenergized as shown in the chart below.

Push to Test

GE's two position push to test allows verification of the AFCI and GFCI protection independently. It's also a good way to practice observing the LED indications covered below.

Specifications

- Combination Arc Fault Circuit Interrupter
- Class A 5mA Ground Fault Circuit Interrupter
- 120VAC, 60 Hz
- Wire Range #14-8 AWG
- UL Listed Arc Fault Circuit Interrupters No. 1699
- UL Listed Ground Fault Circuit Interrupters No. 493
- UL Listed Molded Case Circuit Breakers No. 489

LED Color Pattern	Last known trip condition
Orange	Overload
Orange-Red	Ground fault
Orange-Yellow	Arc fault

Catalog Number Plug-in	Amps	Poles	Volt	Interrupting Rating AIC	Standard Pack
Long Pig Tail					
THQL1115DF	15	1	120 Vac	10k	10
THQL1120DF	20				
THHQL1115DF	15			22k	
THHQL1120DF	20				
Short Pig Tail					
THQL1115DFS	15	1	120 Vac	10k	10
THQL1120DFS	20				



Combination Arc Fault Circuit Interrupter (AFCI)

Provides arc fault protection

Electrical fires in homes break out more then 67,000 times each year in the U.S. alone. Many result from arc faults. Arc faults are unintended electrical arcs that may ignite combustible materials in the home. Four types of arc faults may occur: line-to-line, line-to-ground, line-to-neutral, or a series arc fault, which is arcing over a gap within a single wire.

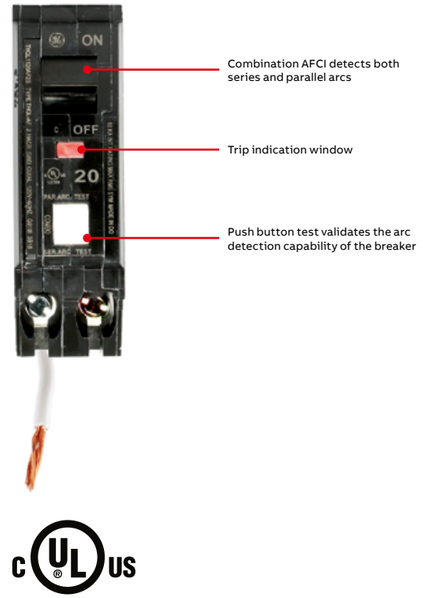
Arc Faults may arise from a number of situations

- Damaged wires
- Wires pinched to grounded metal box
- Worn electrical insulation
- Corroded connections
- Loose electrical connections
- Shorted wires
- Wires or cords in contact with vibrating metal
- Overheated or stressed electrical cords and wires
- Misapplied/damaged appliances

GE Combination AFCIs help protect against all types of arc faults

An arc fault circuit interrupter (AFCI) detects arc faults and de-energizes the circuit before a fire can start. GE Combination AFCIs offer multiple kinds of protection.

- Parallel protection – Combination AFCIs can detect and interrupt parallel arc faults (line-to-line, line-to-ground, line-to-neutral, or a series arc fault).
- Series Protection – A series arc fault is the unintended flow of electricity over a gap within a single wire. These arc faults were not detectable until advanced technology allowed the development of the Combination AFCI breaker.
- Overload protection.
- Short circuit protection.



These combination AFCIs electronically identify unique current and voltage characteristics of all arc faults and de-energize the entire circuit when one occurs.

- GE is one of the few companies to offer **AFCI in a 1 inch standard breaker** package freeing up valuable wire space.
- **Fulfills 2008 National Electric Code (and later)** requirements for all dwelling units.
- **2 position Push button test** validates the arc detection capability of the breaker (Series and Parallel).
- **Protects the entire circuit** with an easy plug-in breaker design.
- **Combination AFCIs** are able to detect series and parallel arcs at a very low current level.

Specifications

- 1 pole
- 15A or 20A
- 10kAIC or 22kAIC
- 120/240 VAC
- Wire Range #14-8 AWG CU / #12-8 AWG AL
- UL listed Arc Fault Circuit Interrupters No. 1699
- UL Listed Molded Case Circuit Breakers No. 489

Catalog Number	Amps	Pole	Volt	Interrupting Rating AIC	Standard Pack
Long Pig Tail					
THQL1115AF2	15	1	120/240 Vac	10k	10
THQL1120AF2	20				
THHQL1115AF2	15			22k	
THHQL1120AF2	20				
Short Pig Tail					
THQL1115AF2S	15	1	120/240 Vac	10k	10
THQL1120AF2S	20				

The GE AFCI Advantage

Multi-wire circuits, shared neutrals, and mixed neutrals = No Problem!

New construction applications
Other manufacturers often use some form of Ground Fault measurement to aid in the detection of Arc Fault signatures. The only way for them to have a shared neutral solution is to create a two pole breaker with one neutral input shared by both poles of the breaker.

- Purchasing a 2 pole AFCI breaker that is specific to the shared application is generally quite a bit more expensive than two 1 pole breakers.
- Installers must inventory a completely different breaker catalog number and plan the number of shared neutrals runs.
- Installers must keep track of the neutrals as they would with a standard 1 pole installation.

GE's simple solution uses (2) 1 pole breakers tied together with a handle tie.
- The handle tie is the only added expense – quite small.
- You don't have to carry a separate catalog number – just use two of the standard 1 pole breakers.
- GE's AFCI does not monitor the neutral at all.
- Only the pigtail on the breaker has to be connected to energize the breaker – as with our competition.

See application guidelines

Retrofit applications
GE sets itself apart in its ability to ignore mixed and shared neutrals commonly found in existing installations.

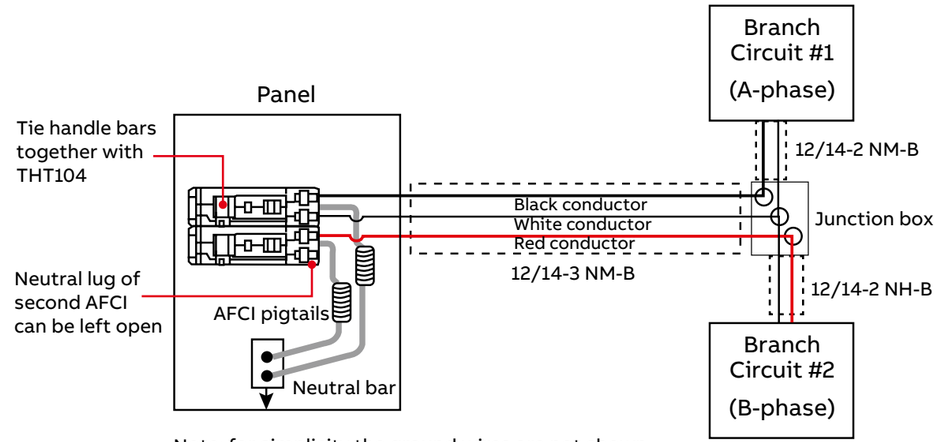
The risk of having shared or non-isolated neutrals in retrofit situation is very high and will cause breakers that use a ground fault scheme in their AFCI detection to nuisance trip.

Disadvantaged breakers that use a ground fault scheme in their AFCI detection:
- The circuit's neutral must come back to the specific breaker from which the hot leg originated.
- The neutral cannot be combined with other neutrals downstream.
- If the above conditions are not met the AFCI will trip as a result of its ground fault detection.
- All circuits with the above conditions must be cleaned up to achieve AFCI protection.

The GE solution is a one pole AFCI breaker – Period!
- Install the GE AFCI as you would any traditional circuit breaker.
- The GE AFCI does not need to monitor the neutral to provide full protection.
- The GE AFCI will not trip if the neutral for the protected circuit is combined downstream with neutrals of other circuits.

The GE solution is the superior alternative when compared to receptacle options as well.
- The entire circuit is AFCI protected regardless of the length of the home run.
- Contractors and homeowners need not worry about:
  - Accessibility issues either code driven or due to the location of the receptacles.
  - Trip reset procedures are always conducted at the load center – reducing callbacks when customers cannot figure out where to reset a trip device.

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Wiring diagram



Note: for simplicity the ground wires are not shown

Ground Fault Circuit Interrupter with Self-Test (GFCI)

Provides ground fault protection



The National Electrical Code requires GFCI protection of receptacles located outdoors, in bathrooms, garages and spa areas. This applies not only to new construction, but also to existing homes. When an electrical outlet is replaced in a location that requires ground-fault protection, the new outlet must be GFCI protected, according to the NEC.

The GFCI circuit interrupter provides protection against overloads, short circuits and ground faults. It detects very low levels of electrical current leakage (ground faults), and acts quickly to shut off power, preventing serious shock.

What is a Ground Fault?
Normally, the electrical current traveling to an electrical appliance is equal to the current traveling from that appliance. However, an imbalance in that flow indicates a current leak — also referred to as a "ground fault," because the leaking current is escaping to the ground.

If the leaking current is traveling through a person, that person could be injured, burned, severely shocked or electrocuted. For example, when a hair dryer is dropped into a sink full of water, some of the electrical current leaks out of the appliance and into the water. This current leak could be enough to kill someone who comes in contact with the water, but not be large enough to trip a non-ground fault circuit interrupter. (Standard circuit breakers only guard against over-loads and short circuits. They are not designed to protect people from electrical shocks.)



Why GE Ground Fault Circuit Interrupters with Self-Test?
Self-test functionality is a UL requirement on all GFCI devices that began in June of 2015. This variant of the GFCI ensures its ground fault circuitry is functioning properly by automatically running diagnostic testing on a periodic basis. Should a problem be detected, the circuit breaker will trip and will need to be replaced.

When installed in a home's load center, the GE GFCI Self-Test does everything a circuit breaker does and it helps protect people against dangerous electrical shock caused by ground faults. Whenever it detects a ground fault, it almost instantaneously shuts off power, helping to prevent an electrical shock.

Specifications
- Class A 5mA Ground Fault
- Circuit Interrupter
- 1 or 2 pole
- 15A, 20A, 25A, 30A, 40A, or 50A
- 10kAIC
- 120 Vac or 120/240 Vac
- Wire Range #14-8 AWG CU / #12-8 AWG AL
- UL Listed Molded Case Circuit Breakers No. 489

Catalog Number	Amps	Poles	Volt	Interrupting Rating AIC	Standard Pack
Long Pig Tail					
THQL1115GFT	15	1	120 Vac	22k	10
THQL1120GFT	20				
THQL1125GFT	25				
THQL1130GFT	30				
THQL2115GFT	15	2	120/240 Vac	22k	10
THQL2120GFT	20				
THQL2125GFT	25				
THQL2130GFT	30				
THQL2140GFT	40[1]				5
THQL2150GFT	50[1]				
Short Pig Tail					
THQL1115GFTS	15	1	120 Vac	22k	10
THQL1120GFTS	20				

[1]These units are UL and CSA rated

Accessories		
Description	**Breaker Type**	**Product Number**
THQP Padlocking Handle Lock	THQP	TQPPL
THQL Padlocking Handle Lock	THQL	THP100
THQL AF, GF, DF Padlocking Handle Lock	THQL AF, GF, DF	THP100E
TQD Padlocking Handle Lock	TQD	TQDPLD1

Snap on handle lock
Padlock not included

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