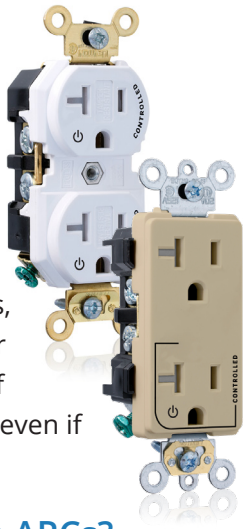
Automatic Receptacle Control Building Official Compliance & Inspection Guide

Automatic Receptacle Controls Overview



"Automatic receptacle controls" (ARCs), sometimes called "plug load controls", save energy by turning off receptacles when building spaces become unoccupied. Some loads that can be shut off by ARCs are task lighting, desk fans, monitors, printers, space heaters, audio/video and other equipment. When not in use, most of this equipment will consume energy even if in standby or sleep modes.

What Energy Codes Require ARCs?

Most commercial energy codes now require automatic receptacle controls to be installed.

Energy Code	Code Section
IECC - 2021	C405.11
ASHRAE 90.1 – 2010-22	8.4.2
Part 6 Title 24 – 2013-22	130.5(d)
Washington St EC - 2018	C405.10

Key Requirements

1. At least 50% of all receptacles in the following commercial spaces shall have ARCs:
   - *Enclosed offices*
   - *Conference rooms*
   - *Copy/print rooms*
   - *Breakrooms*
   - *Classrooms*
   - *Individual workstations (office cubicles)*
2. At least 25% of branch circuit wiring installed for modular furniture not shown on construction documents must have ARCs.
3. Split-wired duplex receptacles shall be provided with one controlled receptacle (top receptacle in the IECC) or a controlled receptacle shall be located within a maximum distance from an uncontrolled receptacle as follows:

Energy Code	Max Distance
IECC - 2021	**12"***
ASHRAE 90.1 – 2010-22	**Not Specified**
Part 6 Title 24 – 2013-22	**72"**

** Up to 72" in single station modular furniture between controlled and uncontrolled receptacles (IECC only).*

4. The controlled receptacle shall be permanently marked with word "controlled" and the power symbol according to NEC Section 406.3(F).
5. When being replaced, automatically controlled receptacles shall be replaced with equivalently controlled receptacles in accordance with NEC Section 406.4(D)(7).
6. ARCs shall operate by one of the following three methods:
   a. *Scheduled shut off using a time-of-day control device with independent schedules for each 5,000 square foot area and a maximum 2 hour override manual switch.*
   b. *Occupancy sensor off within 20 minutes of occupants leaving a space. May share occupancy sensor control with lighting.*
   c. *Automated signal from another system, such as a security or building automation system which can shut off controlled receptacles within 20 minutes of occupants leaving a space.*
7. Controlled plug-in devices and relocatable power taps DO NOT comply as they are not permanently installed.
8. Exceptions:
   a. *Equipment requiring continuous operation (24 hours per day, 365 days per year)*
   b. *Where it would endanger safety or security*

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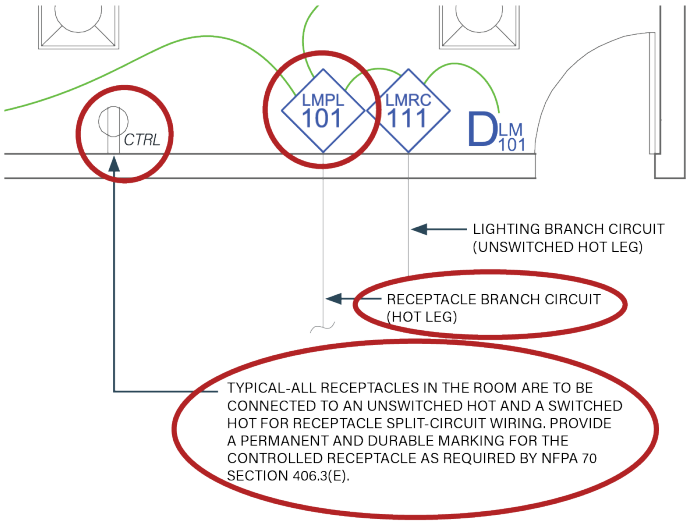
Construction Plan Review

- Construction plans would typically indicate branch circuit control for ARCs.
- Controlled receptacles often display a symbol indicating they are controlled receptacles. They may have the acronym “CTRL” or similar marking on the power plan as well as notations and devices demonstrating ARCs equipment installation, as shown in the below diagram.



- Control devices such as a time-switch, a relay or contactor cabinet, occupancy sensor power pack/ room controller would indicate or show wiring to controlled receptacles.
- The COMcheck report and inspection checklist would show the requirement will be met or what exceptions are applied to the project.

COM*check* Software Version COMcheckWeb

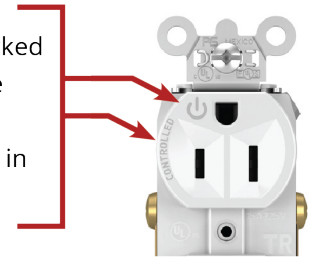
Inspection Checklist

Energy Code: 90.1 (2019) Standard

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
8.4.2 [EL10]²	At least 50% of all 125 volt 15- and 20-Amp receptacles are controlled by an automatic control device.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

How to Inspect Installation in the Field

- Controlled receptacles marked with power symbol and the word “Controlled” per NEC Section 406.3(F). Variations in device markings may exist.



- Inspect for circuit wiring for one of the following methods:
  1. Branch circuit wiring to controlled receptacles will route through a time-switch or time schedule-controlled relay/ contactor.
  2. Circuit wiring to controlled receptacles will route through an occupancy sensor controller, or power pack.
  3. Wirelessly controlled receptacles will have wiring like a normal branch circuit from a breaker panel. Multiple controlled receptacles may be connected downstream and controlled from the wirelessly controlled receptacle.
- Compliance may be demonstrated by one controlled and one uncontrolled receptacle in a duplex outlet (“split-wired receptacle”). Or, a controlled receptacle directly adjacent to or within code required distance from an uncontrolled receptacle.
- Controlled receptacles should turn power off when a space is unoccupied for more than 20 minutes or turn off power when the time-switch or time scheduling device turns them off.

References & Additional Reading

- *NEMA BI 50002-2022*, National Electrical Manufacturers Association, 2022 (key reference)
- *Decision Guides for Plug and Process Load Controls,* US Department of Energy Better Buildings, December 2015
- *A Plug Load Monitoring and Control Technology for Office Buildings,* San Diego Gas & Electric, ET15SDG7011, August 2016