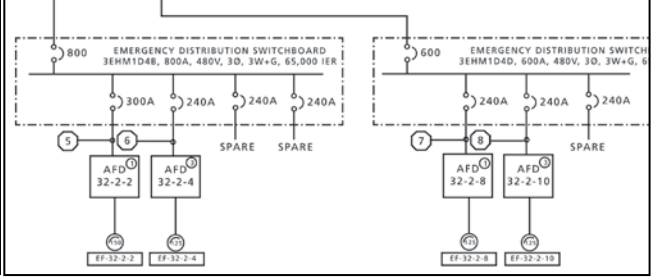
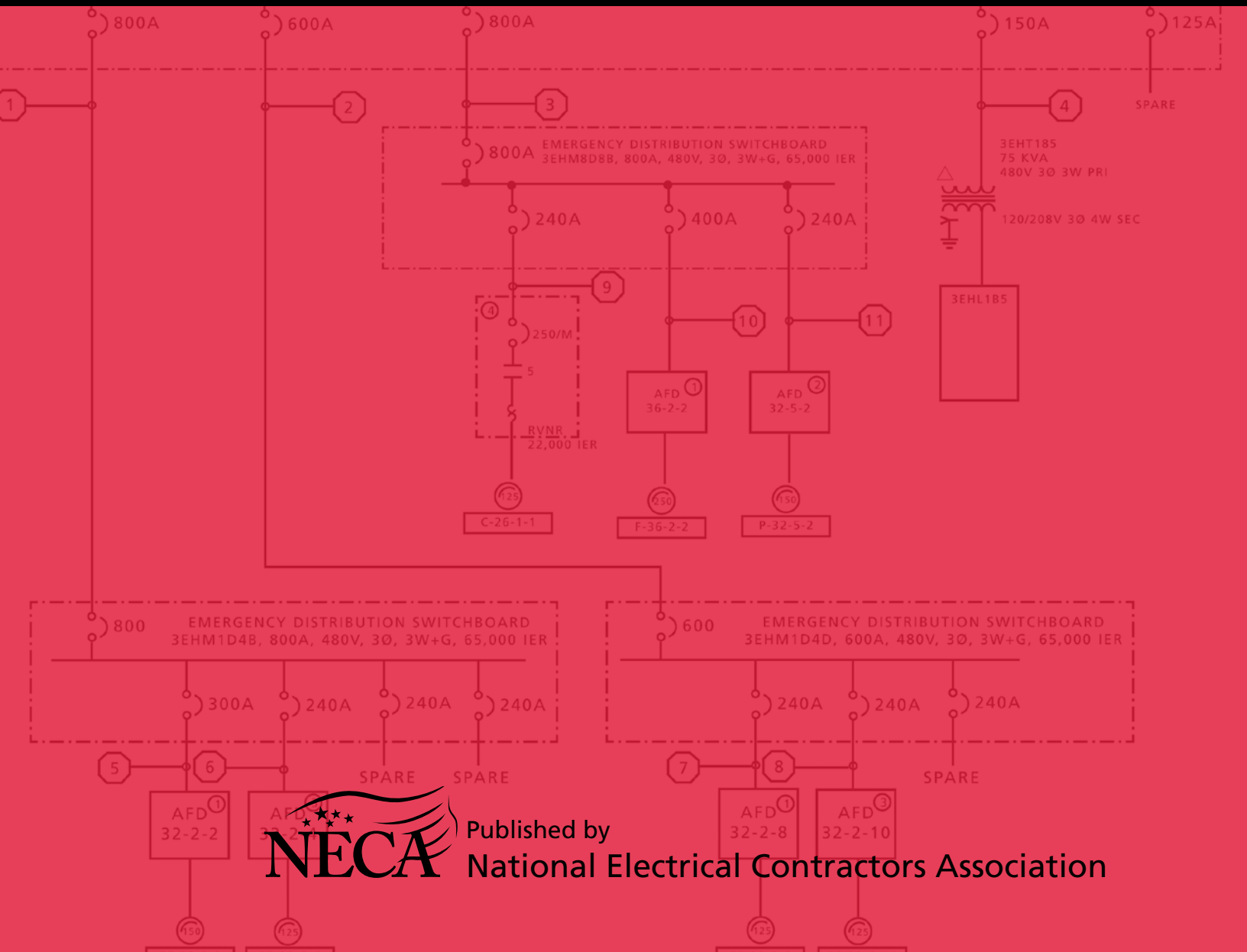
NEIS



NECA 100-2013

Symbols for Electrical Construction Drawings

AN AMERICAN NATIONAL STANDARD



Published by
National Electrical Contractors Association

NECA 100-2013

Symbols for Electrical Construction Drawings

An American National Standard

NEIS®

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National Electrical
Contractors Association

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NECA 100-1999	03-1999
NECA 100-2006	09-2006
NECA 100-2013	03-2013

Table of Contents

Click here to download a .zip file of symbols for AutoCad.

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(This foreword is not a part of the standard)

Foreword

National Electrical Installation Standards™ *(NEIS*®*)* are designed to improve communication among specifiers, purchasers, and suppliers of electrical construction services. They define a minimum baseline of quality and workmanship for installing electrical products and systems. *NEIS* are intended to be referenced in contract documents for electrical construction projects.

Use of *NEIS* is voluntary, and the National Electrical Contractors Association assumes no obligation or liability to users of this publication. Existence of a standard shall not preclude any member or nonmember of either organization from specifying or using alternate construction methods permitted by applicable regulations.

This publication is intended to comply with the edition of the National Electrical Code (NEC) in effect at the time of publication. Because they are quality standards, *NEIS* may in some cases go beyond the minimum safety requirements of the NEC. It is the responsibility of users of this publication to comply with state and local electrical codes when installing electrical products and systems.

Suggestions for revisions and improvements to this standard are welcome. They should be addressed to:

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1. Scope

This publication describes graphic symbols used to represent electrical wiring and equipment on construction drawings. In this publication, the term "electrical" is used to include electrical, electronic, and communications systems covered by the National Electrical Code (NFPA 70). This publication also summarizes recommended drawing practices for electrical construction drawings.

1.1 Symbols Included

This standard is limited to North American symbols for electrical wiring and equipment.

1.2 Symbols Not Included

Symbols from publications of the International Electrotechnical Commission (IEC) are not included in this standard.

Symbols for equipment and systems not covered by the NEC are not included in this standard.

1.3 Regulatory and Other Requirements

a) All information in this publication is intended to conform to the National Electrical Code (ANSI/ NFPA 70).

b) General requirements for installing electrical products and systems are described in NECA 1, *Standard for Good Workmanship in Electrical Construction* (ANSI). Other *National Electrical Installation Standards* provide additional guidance for installing particular types of electrical products and systems. A complete list of *NEIS* is provided in Annex C.

2. Purpose of Symbols

Symbols are a shorthand way of showing the locations, types, and sizes or ratings of electrical wiring and equipment, and the interrelationships between these items. It should be emphasized that drawings need to be supplemented with specifications in order to establish the details of the electrical systems.

Table 1: Symbol Groups

Group	*Descrption*
1.0	Wiring Methods
1.1	Raceways—Indicators
1.2	Raceways—Boxes and Busways
2.0	Luminaire (Lighting Fixtures)
2.1	Luminaire Fixtures—Basic Modifiers Mounting
2.2	Luminaire Fixtures—Basic Modifiers Orientation
2.3	Luminaire Fixtures—Basic Modifiers Emergency
2.4	Luminaire Fixtures—Extended Fixtures
3.0	Outlets and Receptacles
4.0	Switches and Sensors
5.0	Motors—Controls
5.1	Motorized & HVAC Equipment
6.0	Security
7.0	Fire Alarm Communications & Panels
7.1	Fire Alarm Indicators
7.2	Fire Alarm Sensors
8.0	Distribution Equipment
9.0	Communications—Teledata
9.1	Communications—Audio/Visual
9.2	Communications—Equipment
10.0	Site Work
11.0	Schematic Fault Circuit Interrupter, Personal Protection
11.1	One-Line Diagram Symbols—Switchboard Meters
11.2	Schematic and One-Line Diagram Symbols—Switches
12.0	Miscellaneous
13.0	Abbreviations
14.0	Nurse Call System

2.1 Organization of this Standard

This standard contains symbols commonly and primarily used on electrical construction drawings. Related symbols are organized into different groups, and each symbol within a group has its own unique identifying number. The group and symbol numbers are not significant except as a convenient way to identify individual symbols. See Table 1 for groups.

2.2 Alternate Fire Safety Symbols

The fire protection industry has developed and published symbols, not all of which are currently in widespread use on electrical construction drawings. They are shown for reference in Annex A.

2.3 References

This publication does not include every known North American symbol for electrical equipment shown on construction drawings. Some older symbols are either becoming obsolete over time or have been superseded by newer symbols (which are shown in this publication). Some electrical symbols are not widely used on construction drawings, but usually on wiring schematics and other types of more specialized drawings. Other drawing symbol standards and publications are listed for reference in Annex C.

3. Drafting Practices for Electrical Construction Drawings

3.1 Symbol Design and Presentation

a) The symbols in this standard are widely understood by those in the electrical design and construction field. Other symbols may also be used, provided that a suitable explanation of their meaning is included on the drawing where that symbol is used, or on a symbol legend sheet.

b) The orientation of a symbol on a drawing does not alter the meaning of the symbol.

c) Every symbol making up part of an electrical circuit must begin with and end with another symbol. When a circuit continues on a different drawing, the end of the circuitry symbol must be appropriately noted on both drawings. This circuitry continued notice is necessary for both vertical and horizontal circuits.

d) Circuitry symbols may cross one another at any angle.

e) The angle at which a circuitry symbol meets another symbol has no particular significance unless otherwise noted. Circuits normally meet one another at a junction box, pull box, or piece of electrical utilization or communications equipment.

f) Future circuits and future equipment should be indicated by dashed lines and clearly marked as future circuits or future equipment on every drawing where applicable.

g) Luminaire symbols should be drawn whenever possible in their appropriate proportions, orientation, and shape. Where a luminaire symbol drawn to scale is too small to reproduce clearly, the symbol may be enlarged to an appropriate size while maintaining proportion and orientation.

3.2 General Drafting Practices

a) Electrical systems should be shown on plans separate from the architectural, structural, mechanical, and other systems. For clarity, it is recommended that the electrical symbols be drawn darker than the background drawing showing the building structure and/or other systems.

b) Different electrical systems such as power distribution, luminaire, voice/data, fire alarm, and security/ access control should be shown on separate plans if combining them on the same drawings would reduce clarity.

c) Electrical plans are generally drawn to scale. However, graphic symbols indicate only the approximate locations of electrical equipment. Provide dimensions, details, elevations, and sections where accurate locations of outlets, lighting fixtures, and other equipment are required.

d) Electrical wiring required for other systems such as HVAC, manufacturing equipment, data processing systems, etc, should be shown on the electrical drawings where practical, if the installation is included in the electrical contract.

3.3 CADD Practices

The following drafting practices are recommended when using computer-aided design and drafting (CADD) systems to prepare electrical construction drawings.

a) All CADD electrical construction drawings should be created at full scale, (25mm = 25mm [1" = 1"]),

and should be plotted at an appropriate scale on uniform sheets of sufficient size and separate from architectural, structural, mechanical or other drawings. Within a single drawing set, the drawing scale should be the same on as many drawings as possible.

b) All electronic files should include no more than one floor level of a building per electronic file. In no case should two different floors of any building be included in one electronic file.

c) Architectural, structural or mechanical items on the electrical construction drawings should be plotted with lighter weight lines than the electrical items.

d) Electronic files should use blocks (or cells) for all symbology. Blocks (or cells) should use a uniform scale. Non-uniformly scaled blocks and nested blocks should not be used. Instead of exploding blocks to achieve a desired graphic effect, create different variations of an existing block to accomplish the graphic symbol appearance needed.

e) No entities should reside on layer 0. This layer is used for referencing of blocks and blocks only.

f) All entities should be placed on layers related to their disciplines as defined by the *CAD Layer Guidelines* published by the American Institute of Architects. These include Electrical, Plumbing, HVAC, Architectural, Structural, Civil/Site, Mechanical, Process Piping, and Telecommunications/Data. The purpose of using different layers is to rationally develop designs using shared drawings. Therefore, it is suggested that the AIA layer naming convention be followed. Ordering information for *CAD Layer Guidelines* is shown in Annex C.

3.4 Electrical Construction Drawing Set

A typical set of electrical construction drawings includes the following:

a) Plan for each floor, roof, surrounding site, and other area with electrical installations.

b) Site plan(s) showing incoming utility services and substations; exterior transformers; feeders, trunk lines and backbone cables between buildings; and site lighting.

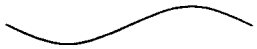
c) Symbol list and abbreviation list.

d) Schedule(s) of lighting fixtures, mechanical equipment connections, transformers, etc. as appropriate. Typical schedules are shown in Annex B.

e) Riser and/or one-line diagram(s) for power distribution and other systems, as appropriate. Typical riser and one-line diagrams are shown in Annex B.

Contents for Symbol Groups

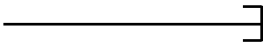
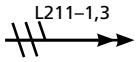
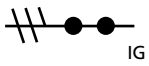
1.0 Raceways

Number	Preferred Symbol	Description
1.001	———	Conduit concealed in finished areas, exposed in unfinished areas.
1.002	- - - - - - - - - -	Conduit concealed in or under floor slab.
1.003		Non-rigid raceway system.
1.004	——— NE ———	Normal/emergency circuit.
1.005	——— EB ———	Emergency battery system wiring, minimum 10 AWG.
1.006	——— HT ———	Heat trace.
1.007	- - - - - - - - P - - - - - - - -	Underfloor power raceway.
1.008	- - - - - - - - T - - - - - - - -	Underfloor telecommunications raceway.
1.009	- - - - - - - - PT - - - - - - - -	Underfloor raceway for power and telecommunications.
1.010	- - - - - - - - S - - - - - - - -	Underfloor signal raceway.
1.011	- - - - - - - - PTD - - - - - - - -	Underfloor raceway for power, telephone, and data.
1.012	- - - - - - - - UCP - - - - - - - -	Undercarpet flat conductor cable (FCC) wiring system, power.
1.013	- - - - - - - - UCT - - - - - - - -	Undercarpet flat conductor cable (FCC) wiring system, telephone

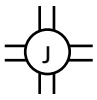
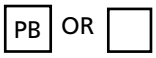
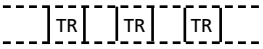
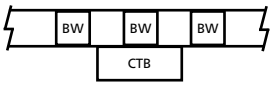
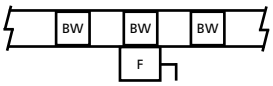
1.0 Raceways

Number	Preferred Symbol	Description
1.014	-------- UCD -------	Undercarpet flat conductor cable (FCC) wiring system, data.

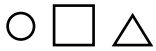
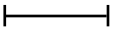
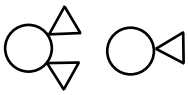
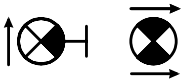
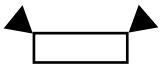
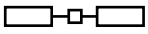
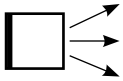
1.1 Raceways—Indicators

Number	Preferred Symbol	Description
1.101		Conduit stub. Terminate with bushing or cap if underground.
1.102		Conduit turning up.
1.103		Conduit turning down.
1.104	SZ 2C,4#1&1#6GND. OR SZ 53cm,4#1&1#6GND.	Indicates trade size 2 or 53 mm conduit with (4) 1 AWG and (1) 6 AWG ground.
1.105	(2)SZ 2C,4#1&1#6GND. OR (2)SZ 53cm,4#1&1#6GND.	Indicates (2) trade size 2 or 53 mm conduits with (4) 1 AWG and (1) 6 AWG ground conductors in each conduit.
1.106		Homerun to panelboard. Number of arrows indicates number of circuits. (Example: Homerun to panel L211 CKTS. #1 and #3.)
1.107		Flexible connection to equipment.
1.108		Direct connection to equipment.
1.109		Branch circuit, full hashes indicate ungrounded-"hot" (or switch-leg) circuit conductors. Half hashes indicates grounded neutral circuit conductors. (No hashes indicates 1 hot and 1 neutral.) Dots indicate grounding conductors. Equipment bond size U.N.O. "IG" indicates an isolated grounding conductor.

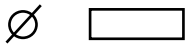
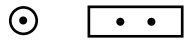
1.2 Raceways—Boxes and Busways

Number	Preferred Symbol	Description
1.201		Underfloor raceway system junction box, flush floor mounted.
1.202		Power pole with devices indicated in the specifications and on the drawing, "P" indicates type, "2" indicates circuit.
1.203		Telecom pole with devices indicated in the specifications and on the drawings, "T" indicates type.
1.204		Telecom/Power pole with devices indicated in the specifications and on the drawings, "TP" indicates type, "2" indicates power circuit.
1.205		Pull box—size as indicated or required.
1.206		Cabletray size as indicated.
1.207		Cabletray size as indicated, concealed.
1.208		Busway with cable tap box, rating and type as indicated on drawings.
1.209		Busway with plug-in device as indicated, shown with fused disconnect.
1.210		Busway feeding up.
1.211		Busway feeding down.
1.212		Busway expansion joint.
1.213		Wireway, size as indicated or required.

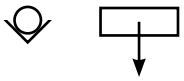
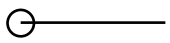
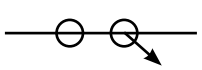
2.0 Luminaires (Lighting Fixtures)

Number	Preferred Symbol	Description
2.001		Luminaire: (drawn to approximate shape and to scale or large enough for clarity).
2.002		Luminaire strip type (length drawn to scale).
2.003		Fluorescent strip luminaire.
2.004		Fixture—double or single head spotlight.
2.005		Exit luminaire fixture. Arrows and exit face as indicated on drawings (mounting heights to be determined by job specifications).
2.006		Light track. Length as indicated on the drawings, with number of fixtures as indicated on drawings, and as indicated in the fixture schedule.
2.007		Emergency battery remote luminaire heads.
2.008		Emergency battery unit with luminaire heads.
2.009		Single luminaire pole mounted site luminaire fixture.
2.010		Twin luminaire pole mounted site luminaire fixture.
2.011		Roadway luminaire—cobra head.
2.012		Bollard type site luminaire.
2.013		Outdoor wallpack.

2.1 Luminaire Fixtures—Basic Modifiers Mounting

Number	Preferred Symbol	Description
2.100		Surface mounted fixture.
		Recessed fixture.
		Wall mounted fixture.
		Suspended, pendant, chain, stem or cable hung fixture.
		Pole mounted with arm.
		Pole mounted on top.
		In-ground or floor mounted. (Box around symbol.)

2.2 Luminaire Fixtures—Basic Modifiers Orientation

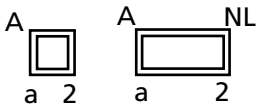
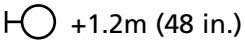
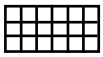
2.200		Accent/directional arrow, with or without tail. (Drawn from photometric center in direction of optics or photometric orientation.)
		Directional aiming line. (Drawn from photometric center and may be extended to actual aiming point if required.)
		Track mounted; length, luminaire types and quantities as shown. (Track length drawn to scale.)

2.3 Luminaire Fixtures—Emergency

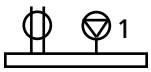
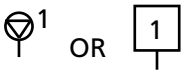
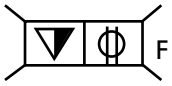
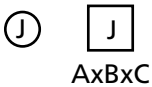
Number	Preferred Symbol	Description
2.300		Luminaire providing emergency illumination. (Filled in.)

NOTE: Modifiers are shown with specific base symbols for clarity. Each modifier can be used with any of the base symbols.

2.4 Luminaire Fixtures—Extended Modifiers

2.401		Standard designations for all luminaire fixtures. "A" = Fixture type, refer to fixture schedule "NL" = Unswitched night light "2" = Circuit number "a" = Switch control
2.402		Mounting height.
2.403		Louvers.
2.404		Recessed, emergency fixture.

3.0 Outlets and Receptacles

Number	Preferred Symbol	Description
3.001		Floor duplex receptacle. F=flush MTD. S=surface MTD.
3.002		Duplex convenience receptacle. 20A 125V.
3.003	EP–2 CKT.1 	Duplex convenience receptacle on e mergency/standby circuit. Specify panelboard and circuit.
3.004		Single convenience receptacle.
3.005	EP–2 CKT.3 	Single convenience receptacle on emergency/standby circuit. Specify panelboard and circuit.
3.006		Double duplex convenience receptacle.
3.007	EP–2 CKT.5 	Double duplex convenience receptacle on emergency/standby circuit. Specify panelboard and circuit.
3.008		Multi-outlet assembly with outlets on centers as indicated on the drawings and in the specifications, mounted 150 mm (6 in.) above counter or at height as directed, A - indicates type.
3.009		Multioutlet assembly, devices as indicated.
3.010		Special receptacle - typical notation: 1— indicates example "1" = __A, ___/___V., _ Pole, _ Wire, _ NEMA __-__ "2" = __A, ___/___V., _ Pole, _ Wire, _ NEMA __-__ "3" = __A, ___/___V., _ Pole, _ Wire, _ NEMA __-__
3.011		Clock hanger outlet recessed mounted 2.5m (8') AFF or 200 mm (8 in.) below ceiling as appropriate and as directed.
3.012		Flush mounted floor box, adjustable, with both power and voice/data receptacles.
3.013		Junction box. "AxBxC" indicates dimensions of junction box in either inches or centimeters.

3.0 Outlets and Receptacles

Number	Preferred Symbol	Description
3.014		Duples receptacle ceiling mounted 20A 125V.
3.015		Double duplex receptacle—ceiling mounted.

Receptacles And Outlets

Typical Outlet Notations:

"a" = Switched outlet, "a"—indicates switch control.

"B" = Pedestal mounted on bench top.

"BF" = Below floor.

"C" = Mounted 150mm (6 in.) above counter of 1.0 m (42 in.) AFF. Coordinate exact mounting height with architectural drawings.

"CLG" = Ceiling mounted.

"D" = Dedicated device on individual branch circuit.

"E" = Emergency.

"EXIST." = Existing device/equipment.

"F" = Flush floor box with fire/smoke rated penetration.

"GFCI" = Ground fault circuit interupter, personal protection.

"GFPE" = Ground fault protection of equipment.

"H" = Horizontally mounted.

"IG" = Isolated ground receptacle with separate green ground conductor to isolated ground bus in panel.

"M" = Modular furniture service—provide flexible connection, coordinate exact location with furniture plans.

"PED" = Pedestal mounted with two hour fire/smoke rated penetration.

"PT" = Poke thru with two hour fire/smoke rated penetration.

"S" = Surface mounted floor box.

"SP" = Surge protection receptacle.

"T" = Tamper resistant safety receptacle.

"TL" = Twist-lock.

"W" = Wall mounted device at 1.2m (48 in.) AFF unless otherwise indicated.

"WP" = Weatherproof receptacle with "NRTL" listed coverplate for wet location with plug installed. MTD. 1.2m (48 in.) AFF unless otherwise indicated.

+XX = Dimensioned height.

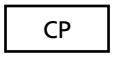
4.0 Switches and Sensors

Number	Preferred Symbol	Description
4.001	$ or S	Single pole switch.
4.002	$$_2$$ or S_2	Double pole switch.
4.003	$$_3$$ or S_3	Three way switch.
4.004	$$_4$$ or S_4	Four way switch.
4.005	$$_a$$ or S_a	Switch control (lower case letter).
4.006	$$_{CB}$$ or S_{CB}	Circuit breaker switch.
4.007	$$_{DT}$$ or S_{DT}	Single pole/double throw switch.
4.008	$$_G$$ or S_G	Glow switch toggle, glows in off position.
4.009	$$_H$$ or S_H	Horizontally mounted—with on position to the left.
4.010	$$_K$$ or S_K	Key operated switch.
4.011	$$_{KP}$$ or S_{KP}	Key operated switch with pilot light on when switch is on.
4.012	$$_{LV}$$ or S_{LV}	Low voltage switch.
4.013	$$_{LM}$$ or S_{LM}	Low voltage master switch.

4.0 Switches and Sensors

Number	Preferred Symbol	Description
4.014	$\$_{MC}$ or S_{MC}	Momentary contact switch.
4.015	$\$_{P}$ or S_{P}	Switch with pilot light on when switch is on.
4.016	$\$_{T}$ or S_{T}	Timer switch.
4.017	$\$_{WP}$ or S_{WP}	Weatherproof single pole switch.
4.018		Dimmer switch. Rated 1000W, unless otherwise indicated. "LV" = low voltage "FL" = fluorescent.
4.019		Occupancy sensor, wall mounted with off—auto override switch.
4.020		Occupancy sensor—ceiling mounted, "P"—indicates multiple switches wired in parallel.
4.021	$\$_{PROJ}$ or S_{PROJ}	Motorized projection screen raise/lower switch.

5.0 Motorized and HVAC Equipment—Controls

Number	Preferred Symbol	Description
5.001		Disconnect switch, unfused type, size as indicated on drawings. "xxA" indicates amperage.
5.002		Disconnect switch, fused type, size as indicated on drawings. "xxAF" indicates frame size. "xxAT" indicates trip size.
5.003		Enclosed circuit breaker, size as indicated. "xxAF" indicates frame size. "xxAT" indicates trip size.
5.004		Magnetic contactor, size as indicated on drawings.
5.005		Adjustable speed drive.
5.006		Motor starter switch.
5.007		Magnetic motor starter. "RV" indicates reduced voltage. Starter size as indicated.
5.008		Combination magnetic starter and disconnect switch. Starter size and fuse rating as indicated.
5.009		Automatic temperature control panel.
5.010		Equipment control panel.
5.011		Relay.
5.012		Toggle disconnect switch.
5.013		Thermal motor switch with handle guard and padlock capability. "P"—indicates pilot light.

5.0 Motorized and HVAC Equipment—Controls

Number	Preferred Symbol	Description
5.014		Emergency power shunt trip.
5.015		Pushbutton.
5.016		On/off pushbutton station.
5.017		Three function pushbutton switch (up/down/stop).
5.018		Aquastat.
5.019		Firestat.
5.020		Humidistat.
5.021		Line voltage thermostat.
5.022		Low voltage thermostat.
5.023		Thermostat.
5.024		Solenoid valve.
5.025		Time switch.
5.026		Air flow switch.

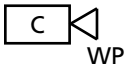
5.0 Motorized and HVAC Equipment—Controls

Number	Preferred Symbol	Description
5.027	EP	Electric/pneumatic switch.
5.028	HOA	Hand/off/automatic selector switch.
5.029	FS	Flow switch.
5.030	IC	Irrigation control.
5.031	LS	Limit switch.
5.032	PE	Pneumatic/electric switch.
5.033	PC	Photo cell or photo control.
5.034	PS	Pressure switch.

5.1 Motorized and HVAC Equipment

Number	Preferred Symbol	Description
5.101		Capacitor.
5.102		Motor "3"—indicates horsepower.
5.103		Motorized damper.
5.104		Baseboard heater.
5.105		Baseboard heater with box.
5.106		Resistance heater.
5.107		Unit type heater.
5.108		Ceiling fan.
5.109		Paddle fan.
5.110		Wall fan.
5.111		Water heater.

6.0 Security

Number	Preferred Symbol	Description
6.001		CCVT camera. "WP" indicates weather-proof exterior camera.
6.002		CCTV Coaxial cable outlet and power outlet.
6.003		CCTV monitor outlet.
6.004		Doorbell.
6.005		Door buzzer.
6.006		Door chime.
6.007		Electric door opener.
6.008		Electric door strike.
6.009		Intercom unit—flush MTD.
6.010		Master intercom and directory unit.
6.011		Motion detector.
6.012		Security door alarm magnetic lock.
6.013		Security card reader. "WP" indicates weather-proof.

6.0 Security

Number	Preferred Symbol	Description
6.014	SCP	Security control panel.
6.015	DC	Security door contacts.
6.016	●	Security exit push button.
6.017	K	Security keypad.
6.018	ID	Infra-red detector.
6.019	UD	Ultrasonic detector.
6.020	DA	Door alarm.
6.021	P	Panic bar.

7.0 Fire Alarm Communications and Panels

Number	Preferred Symbol	Description
7.001		Fire alarm master box.
7.002		Fire fighter's phone.
7.003	FT	Coded transmitter.
7.004	DK	Drill key switch.
7.005		Key repository (knox box).
7.006	FAA	Annunciator panel.
7.007	FACP	Fire alarm control panel.
7.008	EVAC	Voice evacuation panel.
7.009	FATC	Fire alarm terminal cabinet.
7.010	BATT	Battery pack and charger.
7.011	ASFP	Air sampling control/detector panel with associated air sampling piping network.
7.012	TPR	Transponder.
7.013	IAM	Individual addressable module.

7.0 Fire Alarm Communications and Panels

Number	Preferred Symbol	Description
7.014	ZAM	Zone adapter module.
7.015	CZAM	Control zone adapter module.
7.016	MZAM	Monitor zone adapter module.
7.017	SYN	Synchronized module.
7.018	KHS	Kitchen hood system.

7.1 Fire Alarm Indicators

Number	Preferred Symbol	Description
7.101		Control relay.
7.102		Door holder.
7.103		Horn and strobe.
7.104		Mini horn and strobe.
7.105		Horn unit only.
7.106		Strobe unit only.
7.107		Bell and strobe.
7.108		Buzzer and strobe.
7.109		Chime and strobe.
7.110		Speaker and strobe.
7.111		LED pilot light.
7.112		Indicating beacon. “WP” indicates weather-proof.
7.113		Speaker—ceiling mounted.

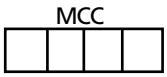
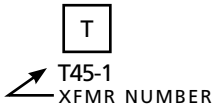
7.2 Fire Alarm Sensors

Number	Preferred Symbol	Description
7.201	F	Manual pull station.
7.202	S	Smoke detector.
7.203	S D	Duct smoke detector with two auxiliary contacts.
7.204	RTS	Remote station for duct mounted smoke detectors.
7.205	S A	Area type smoke detector used at duct work opening.
7.206	S E	Elevator recall with auxiliary contacts.
7.207	S SC	Self-contained smoke detector—single station type.
7.208	S V	Smoke detector—visual and audible signal.
7.209	B R	Beam smoke detector "S"—indicates sending unit "R"—indicates receiver.
7.210	C	Carbon monoxide detector. Line voltage with battery backup.
7.211	F	Flame detector.
7.212	H	Automatic heat detector (135°F rate of rise).
7.213	H F	Automatic heat detector. "F"—indicates fixed temperature 190°F.

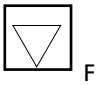
7.2 Fire Alarm Sensors

Number	Preferred Symbol	Description
7.214		Hydrogen detector.
7.215		Motor operated fire/smoke duct damper.
7.216		Water flow switch.
7.217		Low pressure switch.
7.218		Tamper switch.
7.219		Post indicator valve.
7.220		End-of-line resistor.

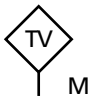
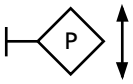
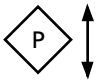
8.0 Power Distribution Equipment

Number	Preferred Symbol	Description
8.001		Lighting or power panel, recessed.
8.002		Lighting or power panel, surface.
8.003		Distribution panel.
		Lighting or power panel on normal/generator feeder.
8.005		Distribution panel on normal/generator feeder.
8.006		Motor control center.
8.007		Dry type transformer, refer to transformer schedule, "T45"—indicates transformer type floor mounted. Unless otherwise indicated, "W"—indicates wall, "S"—indicates suspended. "R"—indicates K rating.
8.008		Transformer—pad mount.
8.009		Current transformer cabinet.
8.010		Generator. Size as noted.
8.011		Meter—single.
8.012		Meter and socket.
8.013		Transfer switch. "TS"=manual transfer switch. "ATS"=automatic transfer switch.

9.0 Communications—Teledata

Number	Preferred Symbol	Description
9.001		Data outlet.
9.002		Data outlet floor type. "F" indicates flush mounted. "S" indicates surface mounted.
9.003		Telephone/data outlet.
9.004		Telephone/data outlet floor type. "F" indicates flush mounted. "S" indicates surface mounted.
9.005		Telephone outlet.
9.006		Telephone outlet—wall mounted.
9.007		Telephone outlet floor type. "F" indicates flush mounted. "S" indicates surface mounted.

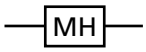
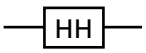
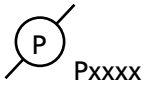
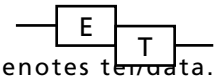
9.1 Communications—Audio/Visual

Number	Preferred Symbol	Description
9.101		Call in switch.
9.102		Cable antenna system outlet. (CATV)
9.103		Master antenna system outlet. (MATV)
9.104		Microphone outlet—floor mounted.
9.105		Microphone outlet—wall mounted.
9.106		Speaker—ceiling mounted.
9.107		Speaker—wall mounted.
9.108		Speaker horn.
9.109		Speaker bi-directional paging—wall mounted.
9.110		Speaker bi-directional paging—ceiling mounted.
9.111		Intercom unit—flush mounted.
9.112		Master intercom and directory unit.
9.113		Volume control.

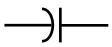
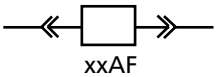
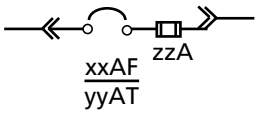
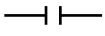
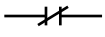
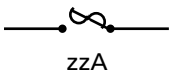
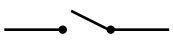
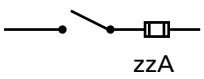
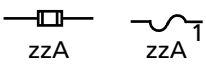
9.2 Communications—Equipment

Number	Preferred Symbol	Description
9.201		Equipment cabinet.
9.202		Equipment rack—wall mounted.
9.203		Equipment rack—free standing.
9.204 ing.		Terminal cabinet with 19mm (3/4 in.) plywood back-
9.205		Plywood backboard.

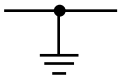
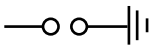
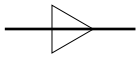
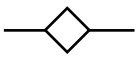
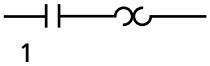
10.0 Site Work

Number	Preferred Symbol	Description
10.001	--------UF--------	Underground feeder.
10.002	--------UT --------	Underground telephone.
10.003	--------UFA--------	Underground fire alarm.
10.004	--------UTV--------	Underground television (CATV).
10.005	——— E ———	Above ground pole mounted electrical.
10.006	——— T ———	Above ground pole mounted telephone.
10.007	——— F ———	Above ground pole mounted fire alarm.
10.008	——— TV ———	Above ground pole mounted television (CATV).
10.009		Manhole.
10.010		Handhole.
10.011		Utility pole. "Pxxxx" indicates pole number.
10.012	 denotes tel/data.	Combination pre-fabricated manholes for power and tel/data systems. "E" = denotes power, "T" =
10.013		"J" hook.

11.0 Schematic and One-line Diagram Symbols

Number	Preferred Symbol	Description
11.001		Capacitor.
11.002		Circuit breaker (open). "xxAF" indicates frame size. "yyAT" indicates trip size.
11.003		Circuit breaker (enclosed). "xxAF indicates frame size. "yyAT" indicates trip size.
11.004		Primary draw out type circuit breaker. "xxAF" indicates frame size. "yyAT" indicates trip size.
11.005		Low voltage draw out type circuit breaker. "xxAF" indicates frame size. "yyAT" indicates trip size.
11.006		Low voltage draw out type circuit breaker with current limiting fuses. "xxAF" indicates frame size. "yyAT" indicates trip size. "zzA" indicates fuse rating.
11.007		Contact, normally open (NO) ("TC"—with timed closing).
11.008		Contact, normally closed (NC). ("TO"—with timed opening).
11.009		Current transformer cabinet.
11.010		Fused cutout. "zzA" indicates fuse rating.
11.011		Disconnect switch unfused.
11.012		Disconnect switch air break with fuse. "zzA" indicates fused rating.
	 11.013	Fuse. "zzA" indicates fuse rating.

11.0 Schematic and One-line Diagram Symbols

Number	Preferred Symbol	Description
11.014		Overload relay.
11.015		Grounding connection—system and or equipment.
11.016		Kirk key interlock system. "2"—indicates related kirk keys.
11.017		Lightning arrester and grounding to protect all phases.
11.018		Motor and label. "3" denotes horsepower.
11.019		Motor operator for circuit breakers or switches.
11.020		Network protector.
11.021		Panelboard.
11.022		Pothead.
11.023		Stress cone.
11.024		Resistor.
11.025		Shunt trip.
11.026		Magnetic starter with NEMA size indicated.

11.0 Schematic and One-line Diagram Symbols

Number	Preferred Symbol	Description
11.027	GFCI	Ground fault circuit interrupter, personnel protection.
11.028	G xxx KW xxxV-xø GENERATOR	Generator.
11.029	xxx KVA xxxV xø xW PRI T_x xxxY/xxxV xø xW SEC	Transformer, dry type. Unless otherwise indicated.
11.030	(3)	Potential transformer. "3"—indicates quantity.
11.031	(3) 400-5A	Current transformer. "3"—indicates quantity, "400-5A" indicates ratio.
11.032		3-phase, 3-wire delta connection.
11.033		Corner grounded delta.
11.034		3-phase, 4-wire wye connection (grounded neutral).
11.035	AFD ③ xx-x-x	Adjustable frequency drive. 3 references detail number.
11.036	XX' xxxV BUSDUCT	Busduct or busway.
11.037	XX' xxxV WIREWAY	Wireway.

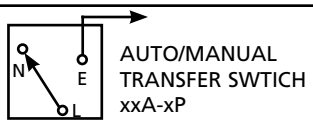
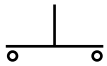
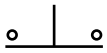
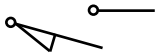
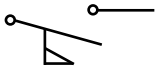
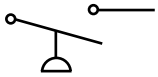
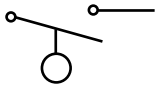
11.1 One-line Diagram Symbols—Switchboard Meters

Number	Preferred Symbol	Description
11.101	CM	Customer meter.
11.102	TWM	Totalizing watt hour meter.
11.103	VAR	Varmeter.
11.104	A	Ammeter.
11.105	AS	Ammeter phase switch.
11.106	D	Demand meter.
11.107	GD	Ground detector.
11.108	P	Synchroscope.
11.109	PF	Power factor meter.
11.110	Hz	Frequency meter.
11.111	V	Voltmeter.
11.112	VA	Volt-ammeter.
11.113	VS	Voltmeter phase switch.

11.1 One-line Diagram Symbols—Switchboard Meters

Number	Preferred Symbol	Description
11.114		Wattmeter.
11.115		Watthour meter.

11.2 Schematic and One-line Diagram Symbols—Switches

Number	Preferred Symbol	Description
11.201		Transfer switch.
11.202		Push button (start).
11.203		Push button (stop).
11.204		Limit switch.
11.205		Flow switch.
11.206		Pressure switch.
11.207		Float switch.
11.208		Pilot light. Letter indicates color. Example: R=red.
11.209		Solenoid.

12.0 Miscellaneous

Number	Preferred Symbol	Description
12.001	— G —	Ground bar. Length to be noted.
12.002	AC / 2	Mechanical equipment tag number, refer to mechanical equipment schedule.
12.003	K2	Equipment tag number, refer to equipment schedule, "K"—indicates kitchen, "C"—indicates computer.
12.004	B	Note symbol, refer to note as indicated.
12.005	1	Feeder number, refer to "feeder schedule".
12.006	A	Typical/similar room or area layout symbol. "A"—indicates layout type.
12.007	A / E–2 CKT/ P21–5,7	Typical layout symbol—refer to layout type. "A" on drawing E-2, circuits to be used are as indicated.
12.008	2 / E–4 DESCRIPTION SCALE: N.T.S.	Detail header, indicating detail No. 2 on drawing E-4.
12.009	B / E–2	Section identifier, indicating section "B" on drawing E-2. Left or right arrow.
12.010	2 / E–4	Detail identifier, indicating detail No. 2 on drawing E-4.

13.0 Abbreviations

Abbreviation	Description
1P	One pole
2P	Two pole
3P	Three pole
4P	Four pole
1P1W	One pole, one wire
1P2W	One pole, two wire
2P2W	Two pole, two wire
2P3W	Two pole, three wire
3P2W	Three pole, two wire
3P3W	Three pole, three wire
3P4W	Three pole, four wire
4P4W	Four pole, four wire
A	Ampere
AC	Alternating current
AF	AMP frame
AFCI	Arc-fault circuit interrupter
AFF	Above finished floor
AFG	Above finished grade
AHU	Air handling unit
AIC	Ampere interrupting capacity
AL	Aluminum
AS	AMP switch
AT	AMP trip
ARCH	Architect
ATS	Automatic transfer switch
AUD	Audiometer box connection
AUX	Auxiliary
A/V	Audio visual
AWG	American wire gauge
BLDG	Building
C	Conduit (Generic term for raceway. Provide as specified.)
CAM	Camera
CAT	Catalog
CATV	Cable television
CB	Circuit breaker
CKT	Circuit
COL	Column
C.T.	Current transformer
CU	Copper
℄	Centerline
DC	Direct Current
△	Delta
DET	Detector
DISC	Disconnect
DIST	Distribution
DN	Down
DWG	Drawing
DT	Dusttight(*)
E	Wired on emergency circuit
EA	Each
EC	Electrical contractor
EF	Exhaust fan
ELEC	Electric(al)
EMER	Emergency
EMT	Electric metallic tubing
ENCL	Enclosure
EOL	End of line
EPO	Emergency power off
EQUIP	Equipment
EWC	Electric water cooler
EWH	Electric water heater
EXIST.	Existing
F	Flush
FA	Fire alarm
FBO	Furnished by others
FC	Fire protection contractor
FCU	Fan coil unit
FDN	Foundation
FIXT	Fixture
FLA	Full load amps
FLEX	Flexible
FLR	Floor
FMC	Flexible metallic conduit
FRE	Fiberglass reinforced epoxy conduit
FURN	Furniture
GC	General contractor
GEN	Generator
GFCI	Ground fault circuit interrupter
GFPE	Ground fault protection equipment
GND	Grounded
GRC	Galvanized rigid conduit
HGT	Height
HP	Horsepower
HV	High voltage
HVAC	Heating, ventilating and air conditioning
HW	Hot water
Hz	Hertz (cycle per second)
IAM	Individual addressable module

13.0 Abbreviations

Abbreviation	Description
IC	Intercommunication
ID	Identification
IG	Isolated ground
IMC	Intermediate metal conduit
IPS	Interruptible power supply
IR	Passive infrared
JB	Junction box
KCMIL	Thousand circular mils
K/O	Knock-out
KVA	Kilovolt ampere
KVAR	Kilovolt ampere reactive
KW	Kilowatt
LFMC	Liquidtight flexible metallic conduit
LFNC	Liquidtight flexible nonmetallic conduit
LP	Lighting panelboard
LS	Limit switch
LTG	Lighting
LV	Low voltage
MAINT	Maintained
MAU	Make-up air unit
MAX	Maximum
MC	Metal clad cable
MCB	Main circuit breaker
MCC	Motor control center
MD	Motorized damper
MDP	Main distribution panel
MISC	Miscellaneous
MFR	Manufacturer
MLO	Main lugs only
MOD	Motor operated disconnect switch
MTD	Mounted
MTG	Mounting
MTS	Manual transfer switch
N	North
N/A	Not applicable
NC	Normally closed
NEC	National Electrical Code
NF	Non-fused
NIC	Not in contract
NL	Night light
NM	Nonmetallic sheathed cable
NO	Normally open
NRTL	Nationally recognized testing lab
#	Number
NTS	Not to scale
O2	Oxygen
OHD	Overhead door operator
P	Pole
PB	Pull box
PC	Plumbing system contractor
PE	Primary service
PH ø	Phase
PNL	Panel(board)
PIV	Post indicating valve
PP	Power panel
PR	Pair
PRI	Primary
PT	Potential transformer
PVC	Polyvinyl chloride conduit
PWR	Power
RE	Remove existing
REC	Recessed
RECP	Receptacle
REF	Roof exhaust fan
RL	Relocate existing
RM	Room
RMC	Rigid metal conduit
RT	Raintight(*)
RTU	Rooftop unit
RSC	Rigid steel conduit
S	Surface mounted
SCH	Schedule
SD	Smoke damper
SE	Secondary electric service
SEC	Secondary
SIG	Signal
SN	Solid neutral
SP	Spare
SPKR	Speaker
SPL	Splice
SS	Stainless steel
STP	Shielded twisted pair
STL	Carbon steel
SUSP	Suspended
SW	Switch
SWBD	Switchboard

(*) It is recommended that the appropriate NEMA designation be used in place of this abbreviation.

13.0 Abbreviations

Abbreviation	Description
SWGR	Switchgear
TC	Telephone cabinet
TCI	Telecommunications cabling installer
TCP	Temperature control panel
TEL/DATA	Telephone/data
TEL	Telephone
TEMP	Temporary
TERM	Terminal(s)
TV	Television
TYP	Typical
UC	Under counter
UG	Underground
UH	Unit heater
U.O.I.	Unless otherwise indicated
UPS	Uninterruptible power source
UTIL	Utility

Abbreviation	Description
UTP	Unshielded twisted pair
V	Volt
VT	Vaportight(*)
Y	Wye
W	Watt
W/	With
WH	Watthour
WP	Weatherproof
WP	Weatherproof
WT	Watertight(*)
XFMR	Transformer
XP	Explosion proof(*)
ZAM	Zone adapter module
+72	Mounting units to centerline above finished floor or grade

14.0 Nurse Call System

Number	Preferred Symbol	Description
14.001	NCA	Nurse call annunicator.
14.002	E	Emergency pull cord station.
14.003		Dome light with tone.
14.004	NC	Nurse call—patient station. "A" = denotes connection to remote annunicator in emergency room. "PC" = denotes patient pull station. "SA" = denotes staff assist station.
14.005	DS	Duty station.
14.006	SS	Staff station.
14.007	NCC	Nurse call system central cabinet.

(Annexes are not a part of the standard)

Annex A: Alternate Fire Safety Symbols

Not all of the following fire safety symbols are in common use on electrical construction drawings at this time. They are reprinted here for reference with permission from NFPA 170-2012, *Fire Safety Symbols* (ANSI). This excerpt does not represent the official position of the National Fire Protection Association, which is represented only by the standard in its entirety. The following symbols are copyright ©2013, National Fire Protection Association, Quincy, MA.

5-5 Symbols for Control Panels

505.1 Control Panel  Basic shape.

(a) FCP — Fire Alarm Control Panel

(b) FSA — Fire System Annunciator

(c) FSA — Fire Alarm Transponder or Transmitter

(d) ESR — Elevator Status/Recall

(e) FAC — Fire Alarm Communicator

(f) HCP — Halon Control Panel

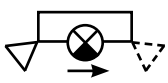
(g) HVA — Control panel for heating, ventilation, air conditioning, exhaust stairwell pressurization or similar equipment.

5-6 Symbols Related to Means of Egress

5-6.1 Emergency Light, Battery-Powered  Number of lamps on unit to be indicated. Indicate if light head(s) [lamp(s)] is remote from battery.

5-6.2 Illuminated Exit Sign, Single Face  Indicate direction of flow for the face.

5-6.3 Illuminated Exit Sign, Double Face  Indicate direction of flow for each face.

5-6.4 Combined Battery-Powered Emergency Light and Illuminated Exit Sign  Number of lamps on unit to be indicated. Indicate if light head(s) [lamp(s)] is remote from battery. Indicate direction of flow for the face.

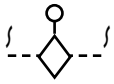
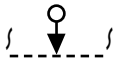
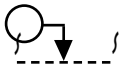
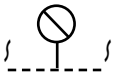
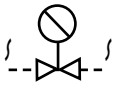
Fire Safety Symbols

5-7 Symbols for Fire Alarms, Detection, and Related Equipment

5-7.1 Signal Initiating Devices and Switches.

	Referent (Synonym)	Symbol	Comments
5-7.1.1	Manual Stations		Basic shape
			(a)  Halon
			(b)  Carbon Dioxide
			(c)  Dry Chemical
			(d)  Foam
			(e)  Wet Chemical
			(f)  Pull Station
5-7.1.1.1*	Fire Service or Emergency Telephone Station		(a)  Accessible
			(b)  Jack
			(c)  Hand-set
5-7.1.1.2	Abort Switch		
5-7.1.2	Automatic Detection and Supervisory Devices		Basic shape
5-7.1.1.1†	Heat Detector (Thermal Detector)		(a)  Combination—Rate of Rise and Fixed Temperature
			(b)  Rate Compensation
			(c)  Fixed Temperature
			(d)  Rate of Rise Only

† Symbol orientation not to be changed.

	Referent (Synonym)	Symbol	Comments
5-7.1.2.2†	Smoke Detector		(a)  Photoelectric Products of Combustion Detector
			(b)  Ionization Products of Combustion Detector
			(c)  Beam Transmitter
			(d)  Beam Receiver
5-7.1.2.3	Smoke Detector in Duct		
5-7.1.2.4	Gas Detector		
5-7.1.2.5†	Flame Detector (Flicker Detector)		Indicate ultraviolet, infrared, or visible radiation-type detector.
5-7.1.2.6	Flow Detector/Switch		
5-7.1.2.7†	Pressure Detector/Switch		Specify type—water, low air, high air, etc.
5-7.1.2.8†	Level Detector/Switch		
5-7.1.2.9	Tamper Detector		Alternate term—tamper switch.
5-7.1.2.10	Valve with Tamper Detector/Switch		
5-7.2	**Indicating Appliances**		
5-7.2.1	Speaker/Horn (Flicker Detector)		(a)  Mini-Horn
5-7.2.2	Bell (Gong)		
5-7.2.3	Water Motor Alarm (Water Motor Gong)		Shield optional.

† Symbol orientation not to be changed.

	Referent (Synonym)	Symbol	Comments
5-7.2.4	Horn with Light	(a) 	Horn with light as separate assembly.
		(b) 	Horn with light as one assembly.
5-7.2.5†	Light (Lamp, Signal Light, Indicator Lamp, Strobe)		
5-7.3	**Related Equipment**		
5-7.3.1	Door Holder		

† Symbol orientation not to be changed.

Annex B: Typical Risers, One-line Diagrams, and Schedules

This annex provides examples of typical schedules, riser diagrams, and one-line diagrams that are included in electrical construction drawings. A given set of drawings will not necessarily include every typical example included here. This annex includes the following:

Panel Schedule

Panel: _____ Voltage: _____ Phase: _____ Wires: _____ Mains: _____

Mount: _____ Enclosure: _____ Location: _____

Load Name	Load (VA)	Bkr. Frame	Trip	Ckt. No.	A	B	C	Ckt. No.	Trip	Bkr. Frame	Load (VA)	Load Name
				1				2				
				3				4				
				5				6				
				7				8				
				9				10				
				11				12				
				13				14				
				15				16				
				17				18				
				19				20				
				21				22				
				23				24				
				25				26				
				27				28				
				29				30				
				31				32				
				33				34				
				35				36				
				37				38				
				39				40				
				41				42				

Phase A:_____ Phase B:_____ Phase C: _____ Total VA: _____

Mfg./Type: _____ Modifications: _____ Amps RMS. Sym.: _____

Lighting Fixture Schedule

Type	Manufacturer	Catalog No.	Description	Mounting	Lamps

Transformer Schedule

Designation	Manufacturer	Catalog Number	KVA	ø	PRI. Volts	PRI. Conductor Size/No.	Sec. Volts	Sec. Conductor Size/No.	Ground Conductor Size/No.	Mounting

Mechanical Equipment Schedule

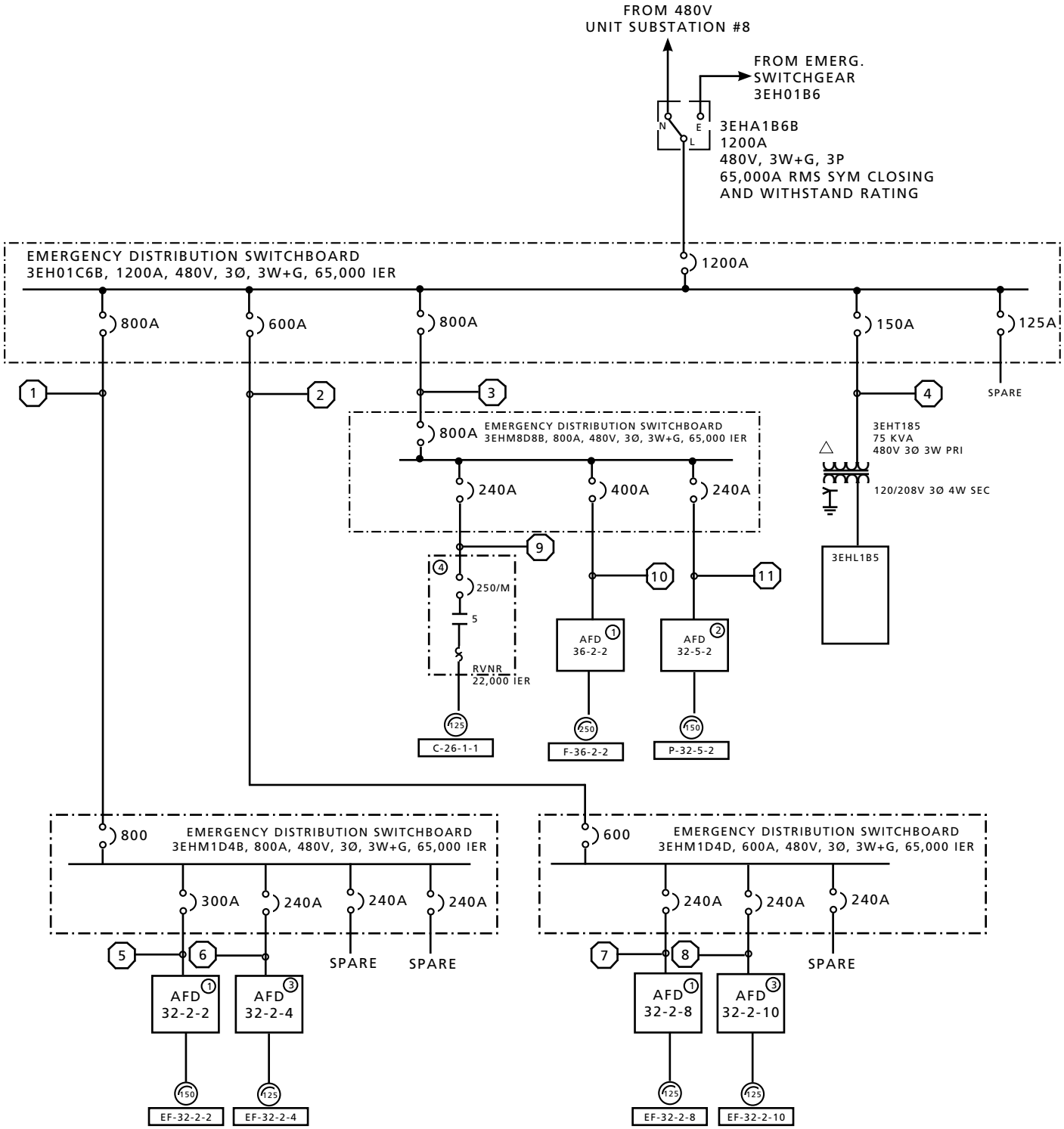
Designation	Description	Quantity	Volt	ø	FLA	HP	KVA	Min. Wire Size/Type	Max. Fuse Size	Min. CCT Amps	Remarks/ Disconnect Type

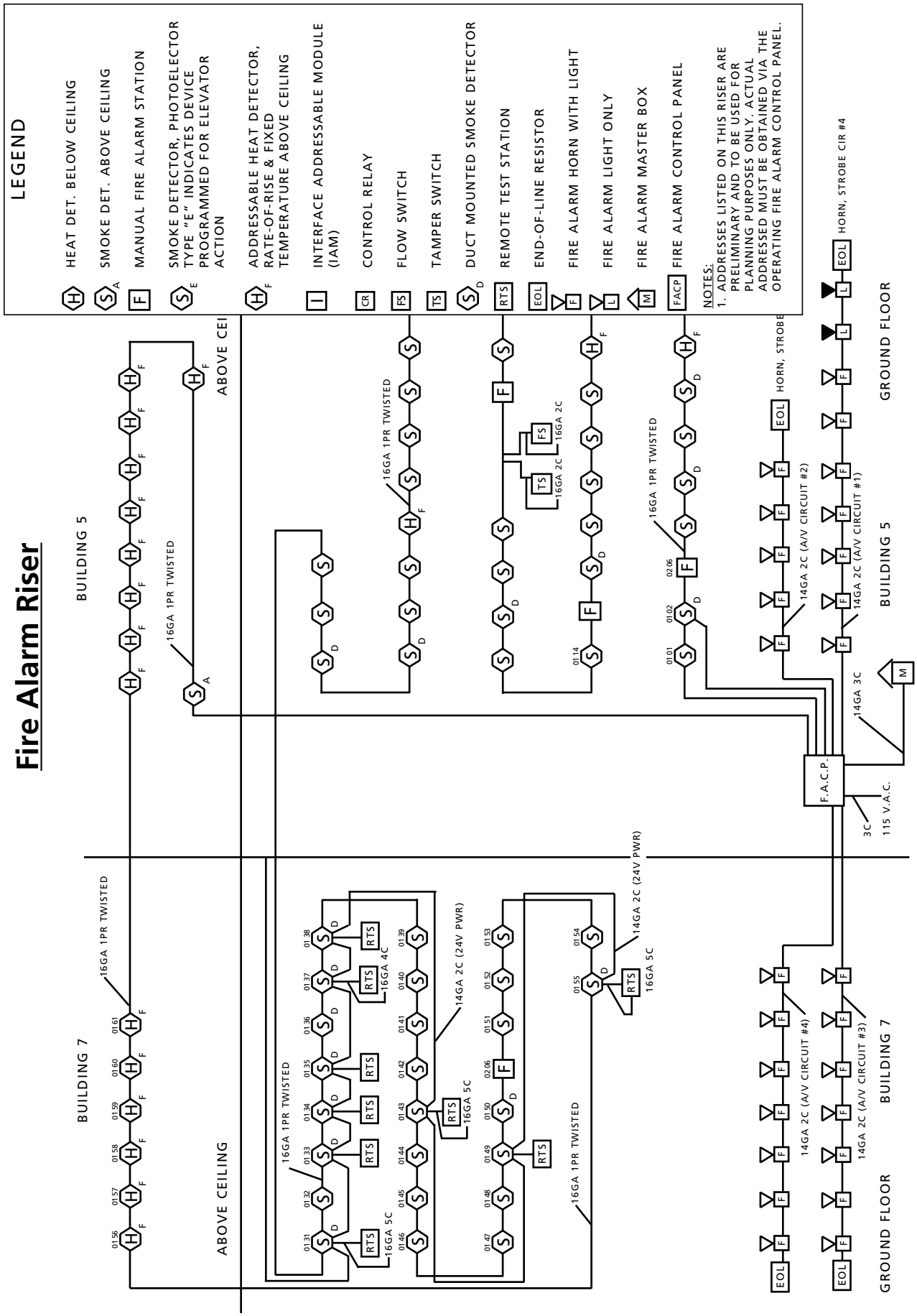
Feeder Schedule

#

No.	No. Runs	No. Wires/Size	Insul.	CU/AL	Conduit	Origin	Termination

Electrical One-Line Diagram




Fire Alarm Riser
LEGEND
HEAT DET. BELOW CEILING
SMOKE DET. ABOVE CEILING
MANUAL FIRE ALARM STATION
SMOKE DETECTOR, PHOTOELECTOR TYPE "E" INDICATES DEVICE PROGRAMMED FOR ELEVATOR ACTION
ADDRESSABLE HEAT DETECTOR, RATE-OF-RISE & FIXED TEMPERATURE ABOVE CEILING
INTERFACE ADDRESSABLE MODULE (IAM)
CONTROL RELAY
FLOW SWITCH
TAMPER SWITCH
DUCT MOUNTED SMOKE DETECTOR
REMOTE TEST STATION
END-OF-LINE RESISTOR
FIRE ALARM HORN WITH LIGHT
FIRE ALARM LIGHT ONLY
FIRE ALARM MASTER BOX
FIRE ALARM CONTROL PANEL
NOTES:
1. ADDRESSES LISTED ON THIS RISER ARE PRELIMINARY AND TO BE USED FOR PLANNING PURPOSES ONLY. ACTUAL ADDRESSED MUST BE OBTAINED VIA THE OPERATING FIRE ALARM CONTROL PANEL.
BUILDING 5
BUILDING 7
ABOVE CEILING
ABOVE CEI
16GA 1PR TWISTED
14GA 2C (24V PWR)
16GA 5C
16GA 4C
16GA 2C
14GA 3C
3C
115 V.A.C.
F.A.C.P.
HORN, STROBE
HORN, STROBE CIR #4
14GA 2C (A/V CIRCUIT #1)
14GA 2C (A/V CIRCUIT #2)
14GA 2C (A/V CIRCUIT #3)
14GA 2C (A/V CIRCUIT #4)
GROUND FLOOR
BUILDING 5
BUILDING 7
GROUND FLOOR

Annex C: Reference Standards

This annex includes standards referenced this publication, as well as other electrical symbol references that are not specifically referred to in NECA 100.

American Institute of Architects (AIA)
1735 New York Avenue, NW
Washington, DC 20006
(202) 626-7300
(202) 626-7587 fax
www.aiaonline.com

CAD Layer Guidelines

American Society for Testing and Materials (ASTM)
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959
(610) 832-9500
(610) 832-9555 fax
www.astm.org

ASTM F967-2011, *Standard Practice for Security Engineer Symbols*

Institute of Electrical and Electronics Engineers (IEEE)
445 Hoes Lane
PO Box 1331
Piscataway, NJ 08855-1331
(800) 678-4333
(732) 981-9667 fax
www.ieee.org

ANSI/IEEE 91-1991, *Standard Graphic Symbols for Logic Functions*

ANSI/IEEE 280-1997, *Letter Symbols for Quantities Used in Electrical Science and Electrical Engineering*

ANSI/IEEE 315-1975 (R1994), *Standard Graphic Symbols for Electrical and Electronics Diagrams*

ANSI/IEEE 991-1986 (R1994), *Standard for Logic Circuit Diagrams*

Illuminating Engineering Society of North America (IESNA)
120 Wall Street, Floor 17
New York, NY 10005-4001
(212) 248-5000
(212) 248-5017 fax
www.iesna.org

ANSI/IESNA DG-3-2000, *Application of Luminaire Symbols on Lighting Design Drawings*

National Fire Protection Association (NFPA)
P.O. Box 9101
One Batterymarch Park
Quincy, MA 02269-9101
(617) 770-3000
(617) 770-3500 fax
www.nfpa.org

NFPA 70-2011, *National Electrical Code* (ANSI)

NFPA 170-2012, *Fire Safety Symbols* (ANSI)

Security Industry Association (SIA)
635 Slaters Lane, Suite 110
Alexandria, VA 22314
(703) 683-2075
(703) 683-2469 fax
www.siaonline.org

Architectural Graphics Standard—CAP Security Symbols Release 2.0

Current *NEIS* Published by NECA:

National Electrical Contractors Association
3 Bethesda Metro Center, Suite 1100
Bethesda, MD 20814
(301) 657-3110 tel
(301) 215-4500 fax
www.neca-neis.org

NECA 1-2010, *Standard for Good Workmanship in Electrical Construction* (ANSI)

NECA 90-2009, *Recommended Practice for Commissioning Building Electrical Systems* (ANSI)

NECA 100-2013, *Symbols for Electrical Construction Drawings* (ANSI)

NECA 101-2006, *Standard for Installing Steel Conduits (Rigid, IMC, EMT)* (ANSI)

NECA 102-2004, *Standard for Installing Aluminum Rigid Metal Conduit* (ANSI)

NECA/AA 104-2006, *Recommended Practice for Installing Aluminum Building Wire and Cable* (ANSI)

NECA/NEMA 105-2007, *Recommended Practice for Installing Metal Cable Tray Systems* (ANSI)

NECA 111-2003, *Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC)* (ANSI)

NECA/NACMA 120-2012, *Standard for Installing Armored Cable (AC) and Metal-Clad Cable (MC)* (ANSI)

NECA 130-2010, *Standard for Installing and Maintaining Wiring Devices* (ANSI)

NECA 169-2010, *Standard for Installing and Maintaining Arc-Fault Circuit Interrupters (AFCIs) and Ground-Fault Circuit Interrupters (GFCIs)* (ANSI)

NECA 200-2010, *Recommended Practice for Installing and Maintaining Temporary Electric Power at Construction Sites* (ANSI)

NECA 202-2006, *Standard for Installing and Maintaining Industrial Heat Tracing Systems* (ANSI)

NECA 230-2010, *Standard for Selecting, Installing, and Maintaining Electric Motors and Motor Controllers* (ANSI)

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Index # NECA 100-13 | 5C-6/13