

CHAPTER 3

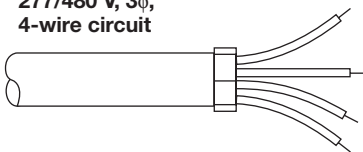
Ampacity, Box Fill, Branch Circuits, Conductors, Enclosures and Raceways

AMPACITY OF LAMP AND EXTENSION CORDS — TYPES S, SJ, SJT, SP, SPT AND ST			
Wire Size (AWG)	Current in Amps		
	4 Conductors	3 Conductors	2 Conductors
18	6	7	10
16	8	10	13
14	12	15	18
12	16	20	25
10	20	25	30
VERTICAL CONDUCTOR SUPPORTS			
Size of Wire (AWG, Circular Mil)	CONDUCTOR TYPE		
	Copper	Aluminum or Copper-Clad Aluminum	
18 through 8	100 feet	100 feet	
6 through 1/0	100 feet	200 feet	
2/0 through 4/0	80 feet	180 feet	
Over 4/0 through 350	60 feet	135 feet	
Over 350 through 500	50 feet	120 feet	
Over 500 through 750	40 feet	95 feet	
Over 750	35 feet	85 feet	
For SI units: one foot = 0.3048 meter.			

CONDUCTOR COLOR CODE																					
<p>Grounded Conductor</p> <ul style="list-style-type: none"> • White • Gray • Three continuous white stripes <p>Ungrounded Conductor</p> <ul style="list-style-type: none"> • Any color other than white, gray, or green <p>Equipment Grounding Conductor</p> <ul style="list-style-type: none"> • Green with one or more yellow stripes • Bare 																					
POWER WIRING COLOR CODE																					
<p>120/240 Volt</p> <table> <tr><td>Black</td><td>Phase 1</td></tr> <tr><td>Red</td><td>Phase 2</td></tr> <tr><td>Blue</td><td>Phase 3</td></tr> <tr><td>Gray, White or with 3 white stripes</td><td>Neutral</td></tr> <tr><td>Green</td><td>Ground</td></tr> </table>	Black	Phase 1	Red	Phase 2	Blue	Phase 3	Gray, White or with 3 white stripes	Neutral	Green	Ground	<p>277/480 Volt</p> <table> <tr><td>Brown</td><td>Phase 1</td></tr> <tr><td>Orange</td><td>Phase 2</td></tr> <tr><td>Yellow</td><td>Phase 3</td></tr> <tr><td>Gray or with 3 white stripes</td><td>Neutral</td></tr> <tr><td>Green with yellow stripe</td><td>Ground</td></tr> </table>	Brown	Phase 1	Orange	Phase 2	Yellow	Phase 3	Gray or with 3 white stripes	Neutral	Green with yellow stripe	Ground
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POWER TRANSFORMER COLOR CODE																					
Wire Color	Transformer Circuit Type																				
Black	If a transformer does not have a tapped primary, both leads are black.																				
Black	If a transformer does have a tapped primary, the black is the common lead.																				
Black and Yellow	Tap for a tapped primary.																				
Black and Red	End for a tapped primary.																				

GROUPED CONDUCTORS

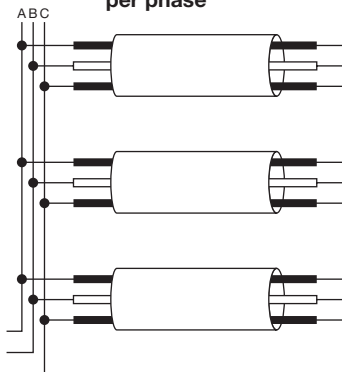
277/480 V, 3 ϕ ,
4-wire circuit



All phase conductors, grounded conductors, and equipment ground conductors shall be grouped together so as not to cause induction heating of metal raceways and enclosures.

PARALLELED CONDUCTORS

Three parallel 4/0
THHN copper conductors
per phase



Requirements:

Same size, minimum
1/0 AWG

Same materials

Same length

Same insulation type

Same attachments

ELECTRICAL CABLE CLASS RATINGS

Electrical cable is rated according to the following parameters: the number of wires, the wire size, the type of insulation and the moisture condition of the environment of the wire. Therefore, an electrical cable designated 10¹/₂ with ground—type UF—600 V-(UL) meets the specifications below:

- The “10” relates to wire size—10 gauge wire.
- 2 defines an electrical cable with two wires.
- The word “ground” indicates the cable has a third wire to be connected to ground.
- The term “type UF” means the insulation type has an acceptable moisture rating and is an underground feeder type cable.
- “600 V” defines the cable as being rated at 600 volts maximum.
- “(UL)” means the cable has certification from Underwriters Laboratory.

CABLE INSULATION MOISTURE RATINGS

Dry	Indoor above ground level; moisture usually not encountered.
Damp	Indoor below ground level (basement); locations are partially protected; moisture level is moderate.
Wet	Locations affected by weather (outside); concrete slabs, underground, etc.; water saturation likely.

CONDUCTOR PREFIX CODES

B	Outer braid	O	Neoprene jacket
F	Fixture wire	R	Rubber covering
FEP	Fluorinated ethylene propylene. Use in dry locations only, hotter than 90° C	S	Appliance cord
H	Load temp up to 75° C	SP	Lamp cord, rubber
HH	Load temp up to 90° C	SPT	Lamp cord, plastic
L	Seamless lead jacket	T	Load temp up to 60° C
M	Machine tool wire	W	Wet use only
N	Resistant to oil and gas	X	Moisture and heat resistant
		-Z	Rated for both wet and dry use (THWN-Z)

CONDUCTOR APPLICATIONS				
Type	Max. Temp	Application	Insulation	Outer Covering
FEP or FEPB	90°C (194°F) 200°C (392°F)	Dry and damp locations Dry locations – Special Apps	Fluorinated ethylene propylene	None or glass braid
MI	90°C (194°F) 250°C (482°F)	Dry and wet locations Special Apps	Magnesium oxide	Copper or alloy steel
MTW	60°C (140°F) 90°C (194°F)	Machine tool wiring – wet locations Machine tool wiring – dry locations	Flame-retardant, moisture, heat, and oil-resistant thermoplastic	None or nylon jacket
PAPER	85°C (185°F)	Underground service conductors	Paper	Lead sheath
PFA	90°C (194°F) 200°C (392°F)	Dry and damp locations Dry locations-Special Apps	Perfluoroalkoxy	None
PFAH	250°C (482°F)	Dry locations only	Perfluoroalkoxy	None
RHH	90°C (194°F)	Dry and damp locations		Moisture resistant, flame-retardant non-metallic
RHW	75°C (167°F)	Dry and wet locations	Flame-retardant, moisture-resistant thermoset	Moisture-resistant, flame-retardant, non-metallic