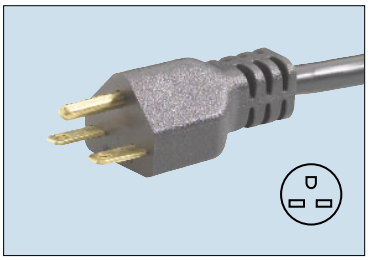
Connections
connect to the global marketplace

Decoding North American Plugs

Problem:

Your equipment, which runs on 15A/230V, is sold in North America. Which plug pattern do you specify for 230V mains connections? Doesn't North America run on 115 volts?

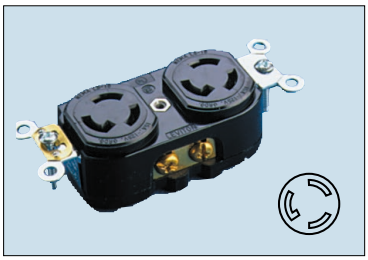
The pin patterns are modeled after the NEMA (National Electrical Manufacturers Association) standards. The NEMA patterns vary the blade and pin configuration with each change made in the rating. A 5-15 pattern will be different from a 5-20, which is different from a 6-20 pattern. This eliminates the mating of an inlet and outlet of different ratings, causing a potentially dangerous electrical situation.



NEMA 6-15 power cord. (Part number 86224570)

NEMA Pattern and Numbering System

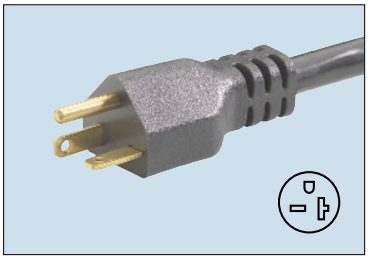
The NEMA pattern and numbering system is made up of four main identifiers. The first identifier can be a blank space or have the letter L. This determines whether it is a straight or locking blade device. In the case of a 5-15 plug, the plug is a straight blade device. There is no identifier for straight blade devices. If there were an L prior to the number, such as L5-15, it would mean the plug is a locking plug.



NEMA L-5-15R duplex receptacle. (Part number 88031220)

The second identifier is a number. The first number in a NEMA listing determines the voltage rating. A 5 represents a voltage rating of 125VAC, while a 6 identifies a rating of 250VAC. The rating given is the highest voltage allowed for use with the device by the standard.

The third identifier is a number and identifies the amperage rating of the device. In the case of a NEMA 5-15, the amperage rating is 15A. The amperage rating, like the voltage rating, is the highest amperage allowed for use with the device by the standard.



NEMA 6-20 power cord. (Part number 86224600)

The fourth identifier is a letter. This identifier determines whether the device is a plug, P,

Continued on page 2

Table 1 — NEMA Nomenclature

NEMA x5-15P

- **P** indicates plug or receptacle
  - P is plug
  - R is receptacle or socket
- **15** indicates the current rating and standard values are:
  - 15 amps
  - 20 amps
  - 30 amps
- **5** indicates the voltage*
  - 2 indicates 115 VAC, ungrounded for Class II connections
  - 5 indicates 125 VAC, grounded for Class I connections
  - 6 indicates 250 VAC, grounded for Class I connections
  - 7 indicates 277 VAC, grounded for Class I connections
  - 8 indicates 480 VAC, grounded for Class I connections
  - 9 indicates 600 VAC, grounded for Class I connections
  - 14 indicates 125/250 VAC, single phase, four wire, three pole
  - 15 indicates 250 VAC, three phase, four wire, three pole
  - 16 indicates 480 VAC, three phase, four wire, three pole
  - 17 indicates 600 VAC, three phase, four wire, three pole
  - 21 indicates 120/208 VAC, three phase, five wire, four pole
  - 22 indicates 277/480 VAC, three phase, five wire, four pole
  - 23 indicates 347/600 VAC, three phase, five wire, four pole
- **x** is the position occupied by L for locking devices. If no letter is present, device is non-locking, straight blade.

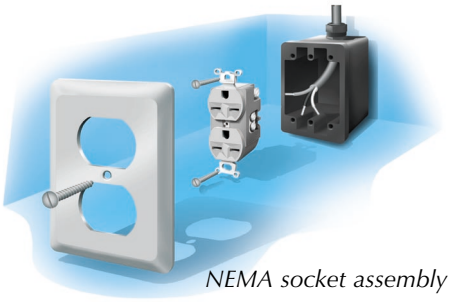
*excludes for Class II connections

Connections: Helping You Design for Export Markets

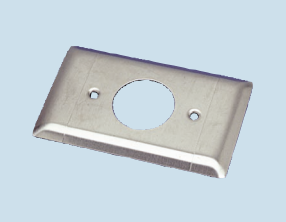
Connections is published quarterly by Interpower Corporation and is available in either a print or an electronic version. Each edition addresses one or more topics related to electrical power systems component selection. *Connections* is designed for the equipment designer who wants to design one product for sale globally. Past editions of *Connections* will be available on www.interpower.com as long as they are technically up-to-date.

North American Socket Installation

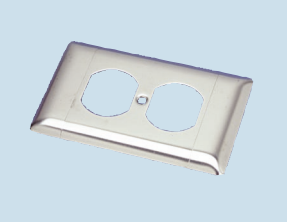
Electrical boxes are normally installed in North American construction directly on structural wood or steel framing members. Wiring is installed to the boxes and then fire retardant wallboard is attached to the framing. After the wall has been finished and painted, the electrical outlet or switch is installed.



NEMA socket assembly



Single receptacle plate. (Part number 88031020)



Duplex receptacle plate. (Part number 88030060)

Non-metalic plug box. (Part number 88030050)

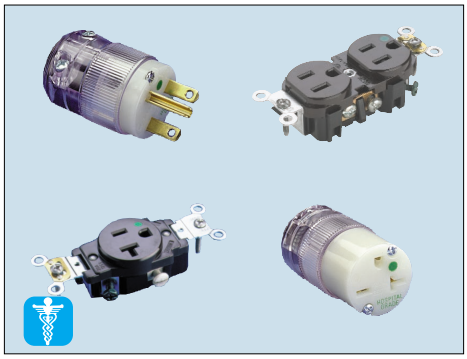
Decoding North American pin system, cont.

Continued from page 1

or a receptacle/outlet, R. Thus, an L5-15P is a locking 125V, 15A, plug. A 5-20R is a straight blade, 125V, 20A, receptacle or outlet. In the case of the equipment in our problem, we would need a NEMA 6-15 configuration.

Hospital Grade NEMA

Hospital grade plugs and receptacles follow the same NEMA configurations, however they are only available in the straight blade versions. Each is marked with the green dot signifying that it has a hospital-grade rating per the National Electric Code, UL 498 & 817. North American hospital-grade plugs may be colored/opaque or clear and may be molded-on or rewireable.



Various Interpower hospital-grade products found at www.interpower.com

For more information on the numerous NEMA configurations visit our web site at www.interpower.com.

Industry notes:

NEMA 5-20/6-15/6-20

Interpower Corporation carries a wide range of rewireable and molded North American Plugs and Sockets. Versions of the NEMA 5-20, 6-15, and 6-20 molded directly onto cable are available from stock in standard lengths.

United Kingdom/Ireland Power Cords

Interpower UK/Ireland plug

Three new Interpower United Kingdom/Ireland BS 1363 style power cords have been added to the family. The United Kingdom/Ireland power cords are for equipment rated from 3 to 13A with service at 250VAC. They are ASTA approved and available with a 3, 5, 10, or 13A BS 1362 fuse.

Interpower Molds 8 Angles of the NEMA 5-15P

Eight NEMA angles

Sometimes due to tight quarters you need a power cord or cordset to come out of the wall at a specific angle. Interpower Corporation now offers eight angles of the NEMA 5-15P, with standard lengths in stock. Visit www.interpower.com for more information.

For higher amperages, see the High Power Pin and Sleeve Devices and Assemblies at www.interpower.com/highpower. These IEC 60309 devices are used in North America from 20A–100A in 3 to 5 pin configurations.

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North American NEMA Configurations

Use this chart to determine which general purpose NEMA plug or receptacle is needed for specific applications.

The most common plug/socket combination is the NEMA 5-15, which is commonly used in residential, office, retail, and many factory locations. (The ungrounded NEMA 1-15P is also widely used for Class II equipment.) All other grounded plugs (for Class I) combined, represent only about 10% of total usage. The next most commonly specified plug/socket combination are the NEMA 5-20, 6-15 and 6-20 configurations. These are occasionally used on large computers, office copiers and some test applications.

Locking single phase plug/socket combinations are preferred when the current rating exceeds 20A and when the power connection must be secured physically. Example applications in which a physical locking mechanism is usually specified include: lighting circuits and other machinery in which cords are dropped from the ceiling to the fixture or appliance; computers (servers) and their uninterruptible power supplies which are not normally disconnected frequently, and many types of machinery.

Information obtained from ANSI/NEMA WD-6 standard. Face and pin sizes not necessarily to scale. For reference only.

	2 pole 2-wire		2 pole 3-wire grounding			
	125V	250V	125V	250V	125V	250V
15A Receptacle	 1-15R		 5-15R	 6-15R	 L5-15R	 L6-15R
Plug	 1-15P	 2-15P	 5-15P	 6-15P	 L5-15P	 L6-15P
20A Receptacle		 2-20R	 5-20R	 6-20R	 L5-20R	 L6-20R
Plug	 1-20P	 2-20P	 5-20P	 6-20P	 L5-20P	 L6-20P
30A Receptacle		 2-30R	 5-30R	 6-30R	 L5-30R	 L6-30R
Plug	 1-30P	 2-30P	 5-30P	 6-30P	 L5-30P	 L6-30P

G=ground; W=neutral

Plugs and receptacles by rating

Rating Amps	Volts	NEMA Configuration (socket view)		Style	Plug	In-line Connector	Receptacle Single	Receptacle Duplex	Dust-Resistant Inlet	Flanged Inlet	Flanged Outlet
15A	**125VAC**		5-15	Straight blade	**88030100**	**88030110**	**88031010**	**88030070**	**88031100**	**88031040**	**88031030**
			5-15	Straight blade, **Hospital**	**88030270**	**88030280**	**88030290**	**88030890**	—	—	—
			L5-15	Locking	**88030240**	**88030250**	**88031210**	**88031220**	**88031140**	**88030480**	**88030490**
15A	**250VAC**		6-15	Straight blade	**88030200**	**88030210**	**88030610**	**88030590**	**88031110**	**88030440**	**88030450**
			6-15	Straight blade, **Hospital**	**88030370**	**88030380**	—	**88030830**	—	—	—
			L6-15	Locking	**88030220**	**88030230**	**88030630**	**88030640**	**88031150**	**88030650**	**88030660**
20A	**125VAC**		5-20	Straight blade	**88030120**	**88030130**	**88030080**	**88030430**	**88031120**	**88030460**	**88030330**
			5-20	Straight blade, **Hospital**	**88030390**	**88030400**	**88030580**	**88030940**	—	—	—
			L5-20	Locking	**88030140**	**88030150**	**88030300**	—	—	**88030500**	**88030510**
20A	**250VAC**		6-20	Straight blade	**88030180**	**88030190**	**88030620**	**88030600**	**88031130**	**88030470**	**88030030**
			6-20	Straight blade, **Hospital**	**88030410**	**88030420**	—	—	—	—	—
			L6-20	Locking	**88030160**	**88030170**	**88031080**	—	—	**88030090**	**88030530**
30A	**125VAC**		L5-30	Locking	**88031070**	**88031160**	**88031170**	—	—	**88030540**	**88030550**
30A	**250VAC**		L6-30	Locking	**88030310**	**88030320**	**88031180**	—	—	**88030560**	**88030040**

North American Rewireable Plugs and Connectors

Plug	
Part Number	**88030100**
NEMA Type	5-15P
Color	Black, White
Rating	15A/125VAC
Approvals	

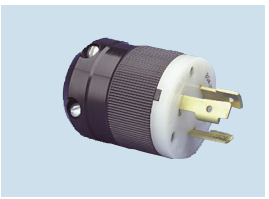
Connector	
Part Number	**88030110**
NEMA Type	5-15R
Color	Black, White
Rating	15A/125VAC
Approvals	

Plug	
Part Number	**88030120**
NEMA Type	5-20P
Color	Black, White
Rating	20A/125VAC
Approvals	

Connector	
Part Number	**88030130**
NEMA Type	5-20R
Color	Black, White
Rating	20A/125VAC
Approvals	

Plug	
Part Number	**88030240**
NEMA Type	L5-15P
Color	Black, White
Rating	15A/125VAC
Approvals	

Connector	
Part Number	**88030250**
NEMA Type	L5-15R
Color	Black, White
Rating	15A/125VAC
Approvals	



Plug	
Part Number	**88030140**
NEMA Type	L5-20P
Color	Black, White
Rating	20A/125VAC
Approvals	

Connector	
Part Number	**88030150**
NEMA Type	L5-20R
Color	Black, White
Rating	20A/125VAC
Approvals	

Plug	
Part Number	**88030200**
NEMA Type	6-15P
Color	Black, White
Rating	15A/250VAC
Approvals	

Connector	
Part Number	**88030210**
NEMA Type	6-15R
Color	Black, White
Rating	15A/250VAC
Approvals	

Plug	
Part Number	**88030180**
NEMA Type	6-20P
Color	Black, White
Rating	20A/250VAC
Approvals	

Connector	
Part Number	**88030190**
NEMA Type	6-20R
Color	Black, White
Rating	20A/250VAC
Approvals	

Plug	
Part Number	**88030220**
NEMA Type	L6-15P
Color	Black, White
Rating	15A/250VAC
Approvals	

Connector	
Part Number	**88030230**
NEMA Type	L6-15R
Color	Black, White
Rating	15A/250VAC
Approvals	

Plug	
Part Number	**88030160**
NEMA Type	L6-20P
Color	Black, White
Rating	20A/250VAC
Approvals	

Connector	
Part Number	**88030170**
NEMA Type	L6-20R
Color	Black, White
Rating	20A/250VAC
Approvals	

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Plug	
Part Number	**88031070**
NEMA Type	L5-30P
Color	Black, White
Rating	30A/125VAC
Approvals	

Connector	
Part Number	**88031160**
NEMA Type	L5-30R
Color	Black, White
Rating	30A/125VAC
Approvals	

Plug	
Part Number	**88030310**
NEMA Type	L6-30P
Color	Black, White
Rating	30A/250VAC
Approvals	

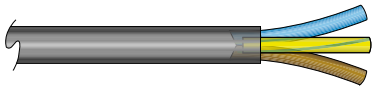
Connector	
Part Number	**88030320**
NEMA Type	L6-30R
Color	Black, White
Rating	30A/250VAC
Approvals	

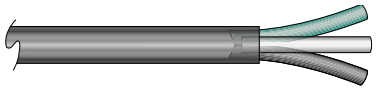
North American Fillerless Cable

The North American cable below is fillerless and available with BW, BWG, BWG/Y, or BBG/Y* color coded conductors. The advantage of fillerless cable is the elimination of paper fillers. This eliminates the need to remove the filler when the cable is terminated, saving time and eliminating the possibility of assembler injury. Note, fillerless cable is smaller in diameter than conventional cable with similar ratings. Fillerless cable is available from stock in white, black, gray, tan, yellow, and orange. Call (800) 662-2290 for other colors available by special order.

3-Wire PVC (Thermoplastic) Jacket

UL listed, CSA certified
Color coding of conductors: see footnote



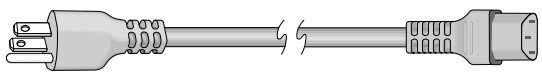


Part Number	Conductor Size	Cable Type	Color Code	Max. Rating	Temp. Rating	Jacket Color	Approx. Stranding	≈Circular Mil Area	Approx. O.D. (nom.) (mm)
86030100	3 x 18AWG	SJT	BWG*	10A/300V	60°C	Black	16/30 gauge	1600	7.8
86030220	3 x 18AWG	SJT	BWG*	10A/300V	105°C	Black	16/30 gauge	1600	7.8
86030230	3 x 18AWG	SJT	BBG/Y*	10A/300V	105°C	Black	16/30 gauge	1600	7.8
86030130	3 x 18AWG	SVT	BWG*	10A/300V	105°C	Black	41/34 gauge	1608	6.2
86030160	3 x 18AWG	SJT	BBG/Y*	10A/300V	-35° to 60°C	Black	16/30 gauge	1600	7.8
86030190	3 x 18AWG	SVT	BBG/Y*	10A/300V	-35° to 60°C	Black	41/34 gauge	1608	6.2
86030210	3 x 18AWG	SJTO	BWG*	10A/300V	-35° to 60°C	Black	16/30 gauge	1600	7.8
86030110	3 x 16AWG	SJT	BWG*	13A/300V	-35° to 60°C	Black	26/30 gauge	2613	8.5
86030170	3 x 16AWG	SJT	BBG/Y*	13A/300V	-35° to 60°C	Black	26/30 gauge	2613	8.5
86030290	3 x 16AWG	SJT	BWG*	13A/300V	-35° to 105°C	Black	26/30 gauge	2613	8.5
86030120	3 x 14AWG	SJT	BWG*	18A/300V	60°C	Black	41/30 gauge	4121	9.4
86030180	3 x 14AWG	SJT	BBG/Y*	18A/300V	-35° to 60°C	Black	41/30 gauge	4121	9.4
86030280	3 x 12AWG	SJT	BWG*	25A/300V	60°C	Black	65/30 gauge	6500	11.1
86030310	3 x 12AWG	SJT	BBG/Y*	25A/300V	60°C	Black	65/30 gauge	6500	11.1
86030400	3 x 12AWG	SJT	BWG*	25A/300V	105°C	Black	65/30 gauge	6500	11.1
86030430	3 x 10AWG	SJT	BWG*	30A/300V	60°C	Black	105/30 gauge	10500	15.0

* Wiring Code: BBG/Y: brown (line), blue (neutral), green/yellow (ground); BWG: black (line), white (neutral), green (ground); G: green (ground; BWG/Y: Black (line), white (neutral), green/yellow (ground)

For use at 10–13A

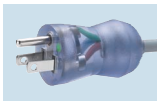
Custom lengths and colors available. For plug and connector specifications, see www.interpower.com.

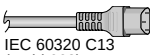


Part Number	Ratings and Description				Cable Specifications				Accessories
NEMA 5-15 cord with IEC 60320 C13 connector (mold 002)	Length (Metric • English)	Current/ Voltage Rating	Max. Temp.	Color	Conductor Size	Descript.	Approx. Stranding	Nominal O.D.(mm)	Recommended Connector Lock
70405020234	2.34m • 7'8"	**10A/125VAC**	60°C	black	**3 x 18AWG**	**SVT**	41/34	6.2	85910071
70401020244	2.44m • 8'	10A/125VAC	60°C	black	3 x 18AWG	SJT	16/30	7.8	85910071
70401020305	3.05m • 10'	10A/125VAC	60°C	black	3 x 18AWG	SJT	16/30	7.8	85910071
70403020244	2.44m • 8'	13A/125VAC	60°C	black	3 x 16AWG	SJT	26/30	8.5	85910071
70403020305	3.05m • 10'	13A/125VAC	60°C	black	3 x 16AWG	SJT	26/30	8.5	85910071

For use at 10–13A

Custom lengths and colors available. For plug and connector specifications, see www.interpower.com.



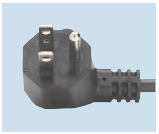
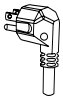
Part Number	Connector Style	Ratings and Description				Cable Specifications					Accessories
Clear NEMA 5-15 cords		Length (Metric • English)	Current/ Voltage Rating	Max. Temp.	Cable Color	Conductor Size	Descript.	Wiring	Approx. Stranding	Nominal O.D.(mm)	Recommended Connector Lock
86610301	 IEC 60320 C13 (mold 002)	3.05m • 10'	**10A/125VAC**	60°C	gray	**3 x 18AWG**	**SJT**	—	16/30	7.8mm	85910071
86610610		3.05m • 10'	10A/125VAC	60°C	black	3 x 18AWG	SJT	—	16/30	7.8mm	85910071
86610910		3.66m • 12'	**13A/125VAC**	60°C	black	**3 x 16AWG**	SJT	—	26/30	8.5mm	85910071

NEMA 5-15 angles

The ground pin is down in all illustrations below. Part numbers are 2.5m cordsets with straight IEC 60320 C13 connectors. Also available with angled connectors and custom colors and lengths. For plug and connector specifications, see www.interpower.com.

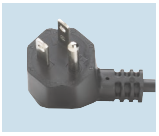
Photo 3/4 View Back

Mold 039A

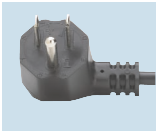

Part Number: **86410100** — 2.5m

Mold 039B



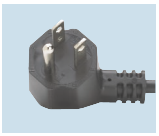
Part Number: **86420100** — 2.5m

Mold 039C



Part Number: **86430100** — 2.5m

Mold 039D



Part Number: **86440100** — 2.5m

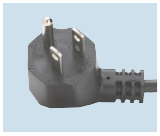
Photo 3/4 View Back

Mold 039E



Part Number: **86450100** — 2.5m

Mold 039F



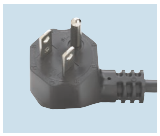
Part Number: **86460100** — 2.5m

Mold 039G



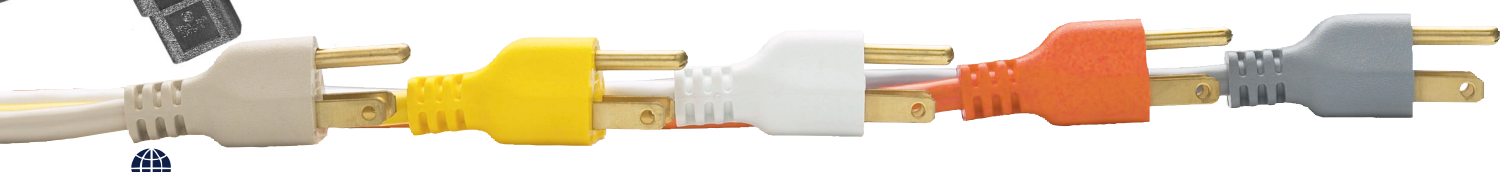
Part Number: **86470100** — 2.5m

Mold 039H



Part Number: **86480100** — 2.5m

- Clear and custom colors
- Other lengths and cable types
- Made in our Iowa factories
- No minimum order quantities
- Same day shipments
- 100% of cords are tested



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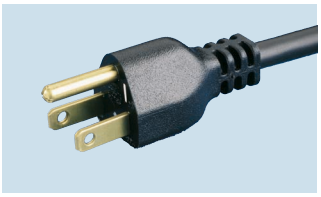
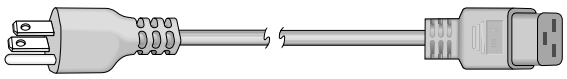


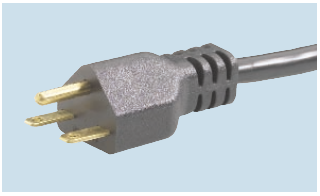
NEMA 5-15

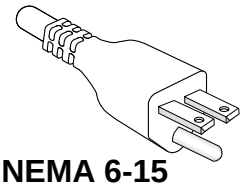
For use at 15A

Custom lengths and colors available. For plug and connector specifications, see www.interpower.com.



Part Number	Ratings and Description				Cable Specifications				Accessories
Large NEMA 5-15 cord–IEC 60320 C19 connector (mold 011)	Length (Metric • English)	Current/ Voltage Rating	Max. Temp.	Color	Conductor Size	Descript.	Approx. Stranding	Nominal O.D.(mm)	Recommended Connector Lock
71804110250	2.5m • 8'2"	**15A/125VAC**	60°C	black	**3 x 14AWG**	**SJT**	41/30	9.4mm	85910051

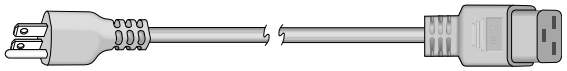




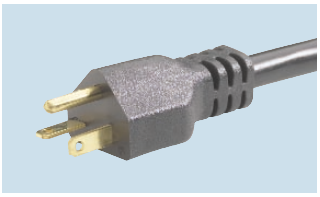
NEMA 6-15

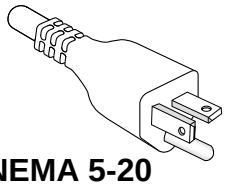
For use at 15A

Custom lengths and colors available. For plug and connector specifications, see www.interpower.com.



Part Number	Ratings and Description				Cable Specifications				Accessories
NEMA 6-15 cord–IEC 60320 C19 connector (mold 011)	Length (Metric • English)	Current/ Voltage Rating	Max. Temp.	Color	Conductor Size	Descript.	Approx. Stranding	Nominal O.D.(mm)	Recommended Connector Lock
86226060	2.5m • 8'2"	**15A/250VAC**	60°C	black	**3 x 14AWG**	**SJT**	41/30	9.4mm	85910051

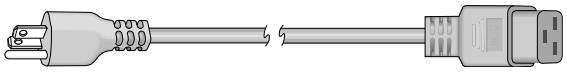




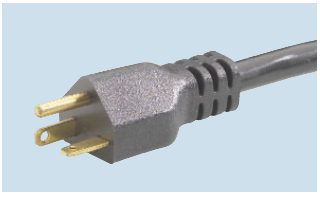
NEMA 5-20

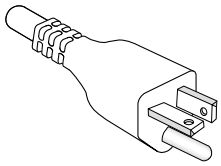
For use at 20A

Custom lengths and colors available. For plug and connector specifications, see www.interpower.com.



Part Number	Ratings and Description				Cable Specifications				Accessories
NEMA 5-20 cord–IEC 60320 C19 connector (mold 011)	Length (Metric • English)	Current/ Voltage Rating	Max. Temp.	Color	Conductor Size	Descript.	Approx. Stranding	Nominal O.D.(mm)	Recommended Connector Lock
86226020	2.5m • 8'2"	**20A/125VAC**	60°C	black	**3 x 12AWG**	**SJT**	65/30	11.1mm	85910051

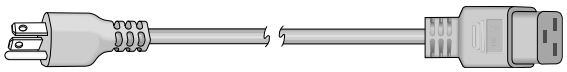




NEMA 6-20

For use at 20A

Custom lengths and colors available. For plug and connector specifications, see www.interpower.com.



Part Number	Ratings and Description				Cable Specifications				Accessories
NEMA 6-20 cord–IEC 60320 C19 connector (mold 011)	Length (Metric • English)	Current/ Voltage Rating	Max. Temp.	Color	Conductor Size	Descript.	Approx. Stranding	Nominal O.D.(mm)	Recommended Connector Lock
86226100	2.5m • 8'2"	**20A/250VAC**	60°C	black	**3 x 12AWG**	**SJT**	65/30	11.1mm	85910051

The next issue of *Connections* will feature North American cable nomenclature with specification recommendations.

- No minimum order requirement
- Same day shipment available for stock item orders received by 6:00 p.m. Central Time
- Most items available from stock
- 100% of Interpower cords are tested
- Free evaluation samples
- Assembly services available
- Free technical support available
- Most of our cords are made in the USA!

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