

Section N

General Technical Data

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Technical Data

Industry Standards – Wiring Device Standards

Standards of many types developed by and for our industry form a vital consideration in the design of our products.

The following pages in this section briefly describe the functions of the organizations producing the standards which influence the safety and design of wiring devices.

The American Boat & Yacht Council (ABYC)

The American Boat & Yacht Council (ABYC) publishes “Standards and Recommended Practices For Small Craft” covering boats, engines, marine products and accessories, including, but not limited to, ship-to-shore electrical power connections, etc. ABYC is not a testing or approval agency.

The Canadian Standards Association (CSA)

The Canadian Standards Association performs a function for manufacturers similar to that performed in the USA by Underwriters Laboratories Inc. (UL).

CSA develops standards for electrical products which parallel UL standards in many aspects but are not always identical. CSA tests products and grants paying clients “Certification” that their products meet CSA standards.

The International Electrotechnical Commission (IEC)

The International Electrotechnical Commission is a world-wide standards organization having 43 member countries. The United States is active in many areas of the IEC and the standards it develops. Sponsorship of the U.S. effort on the IEC is by the American National Standards Institute (ANSI), coordinated by the United States National Committee of the IEC (USNC).

The IEC produces many standards covering all aspects of the electrical and electronic industry. IEC standards are accepted in whole or in part by many countries around the world.

The National Electrical Code (NEC)

A document which basically describes recommended safe practice for the installation of all types of electrical equipment. The NEC is not a “legal document” unless it is so designated by a municipality as its own statute for safe electrical installations. It is revised and published every three years.

The NEC is “national” only in the fact that it is the only document of which all or part is accepted by all states as an electrical guide. It is the only document of its kind written with national input

supplied by twenty “panels” of advisors containing several hundred experts in the electrical field from all parts of the country. The sponsoring agency of the NEC is the National Fire Protection Association (NFPA).

The National Electrical Manufacturers Association (NEMA)

An organization of manufacturers of electrical equipment, including, but not limited to, wiring devices, wire and cable, conduit, load centers, pressure wire connectors, circuit breakers, fuses, etc.

NEMA is the “voice” of the electrical industry, and through it standards for electrical products are formulated. Generally these standards promote interchangeability between products of one manufacturer with like products made by another manufacturer. In some cases, standards relating to product “performance” are also formulated by NEMA but these are the exception rather than the rule.

NEMA standards are certainly not compulsory, but generally they are accepted by those manufacturers that help to write them as a way of making their products more saleable and acceptable.

NEMA standards are utilized by many consumers in writing specifications for the materials they purchase.

Underwriters Laboratories Inc. (UL)

A non-profit corporation, operating as a testing facility and a developer of safety standards.

By its own definition, Underwriters Laboratories Inc. defines itself as follows: “Underwriters Laboratories Inc. founded in 1894, is chartered as a not-for-profit organization without capital stock, under the laws of the state of Delaware to establish, maintain, and operate laboratories for the examination and testing of devices, systems and materials to determine their relation to hazards to life and property.”

UL tests products for paying “clients” and if the product submitted passes the requirements of the UL standard for which it is submitted, a UL “Listing” is granted which allows the manufacturer to use the UL manifest or “Label” on its products. It is important to remember that UL is not an approval agency. It approves nothing, but merely lists a product as meeting minimum standards for safety.

The Underwriters “Listing” mark on a product is generally accepted by the public and government agencies as evidence of a “safe” product, not necessarily a “quality” product.

Technical Data Certification Agencies and Markings

Understanding Certification Marks: Certification marks vary significantly with respect to testing required to achieve a particular mark. In some cases, (i.e.: Specification Grade), no outside certification agency is involved. The manufacturer decides which of his products he wishes to be so identified. The following table for 15 and 20A Straight Blade receptacles demonstrates these wide differences. The understanding of these marks permits the user/specifier to make more meaningful product selections.

Understanding Product Certification Marks – 15 & 20 Amp Straight Blade Receptacles
Products that carry certification mark must meet the specific testing standards indicated.

Certification Mark	UL 498	CSA, C22.2 No. 42 M	UL 498 Hospital Grade	CSA, C22.2 No. 42 M Hosp. Grade	DESC W-C 596F	Certification Agency
Spec. Grade*	No Testing Required – An Advertisement/Trade Term					Manufacturer Only
	X					Underwriters Laboratories Inc. Recognized Component for OEM Use
	X					Underwriters Laboratories Inc.
		X				Canadian Standards Association
 • Hospital Grade	X		X			Underwriters Laboratories Inc.
 • Hospital Grade		X		X		Canadian Standards Association
 Fed.Spec.	X				X	Underwriters Laboratories Inc. & Defense Electronic Supply Center
 Fed.Spec. • Hospital Grade	X		X		X	Underwriters Laboratories Inc. & Defense Electronic Supply Center

*Includes such variations as Premium Spec. Grade, Super Spec. Grade, etc.

Cross Reference Notice:

Recognize that cross reference guides supplied by some manufacturers should be used only to determine compatible devices (rating and configuration). It does not in any way deal with performance levels (which will vary widely by manufacturer). Common catalog numbers are often used for convenience of selection. The use of the same catalog number is solely the discretion of the manufacturer. It in no way implies compliance to any standard or testing criteria.

Technical Data Associations, Organizations and Standards

For convenience, the following listings define common acronyms for a variety of organizations.

Standards Development Organizations: Organizations primarily involved in the development and/or promulgation of standards.

NFPA	National Fire Protection Agency
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical & Electronics Engineers, Inc.
ANSI	American National Standards Institute
CANENA	Consejo de Armonizacion de Normas Electrotecnicas de Norte America
SAE	Society of Automotive Engineers
ISA	Instrument Society of America
SME	Society of Manufacturing Engineers
ISO	International Standards Organization



Installation Codes

NEC	National Electrical Code
NOM-01	Normas Oficiales Mexicanas -01 (Mexican Electrical Code)
CEC Part I	Canadian Electrical Code



Industry Associations: Associations of companies or individuals for the purpose of standardization, trade, and professional development, etc.

NMDA	National Marine Distributor Association
NEMA	National Electrical Manufacturers Association
ABYC	American Boat and Yacht Council
EIA/TIA	Electronics Industry Association/Telecommunications Industry Association
NAED	National Association of Electrical Distributors
NAW	National Association of Wholesalers
BICSI	Building Industry Consulting Services International
IBI	Intelligent Building Institute
EPRI	Electric Power Research Institute
NEMRA	National Electrical Manufacturers Representatives Association
IAEI	International Association of Electrical Inspectors
IFMA	International Facilities Management Association
BOMA	Building Owner Management Association
SEMI	Semi Conductor Equipment and Material International
CEMRA	Canadian Electrical Manufacturers Representative Association
NMRA	National Marine Representative Association
EF-C	Electro-Federation-Canada
NECA	National Electrical Contractors Association
IECA	Independent Electrical Contractors Association
ECOC	Electrical Contractors of Canada
CANAME	Camara Nacional de Manufacturas Electricas



Technical Data

Codes and Standards Organizations

Addresses

For convenience, the following listings define common acronyms for a variety of organizations.

Certification Agencies: Primarily involved in certification of products or manufacturers to standards developed by the certification agency or by others.

UL	Underwriters Laboratories Inc.
CSA	Canadian Standards Association
ANCE	National Association of Normalization and Certification of the Electrical Sector
TUV	TUV Rheinland of N.A., Inc.
VDE	Verband Deutscher Elektrotechniker
BSI	British Standards Institute
FM	Factory Mutual
NRTL	Nationally Recognized (by OSHA) Testing Laboratory



Note:  Hubbell products are in the process of being certified in Mexico. Many have already been certified. Consult with the factory for specific data.

Government Agencies

OSHA	Occupational Safety and Health Administration
FCC	Federal Communications Commission
DESC	Defense Electronic Supply Center
IAPA	Independent Accident & Protection Association (Canada)

Copies of standards referred to on the preceding pages may be purchased from the following:

Underwriters Laboratories Inc. (UL)

1285 Walt Whitman Road
Melville, NY 11747

333 Pfingston Road
Northbrook, IL 60062

1655 Scott Boulevard
Santa Clara, CA 95050

The Canadian Standards Association (CSA)

Standards Division
178 Rexdale Boulevard
Rexdale, Ontario
CANADA, M9W1R3

The American National Standards Institute (ANSI)

1430 Broadway
New York, NY 10018

National Electrical Manufacturers Association (NEMA)

2101 L Street, NW
Suite 300
Washington, DC 20037

National Fire Protection Association (NFPA)

Batterymarch Park
Quincy, MA 02269

The International Electro-technical Commission (IEC)

Copies of IEC standards may be obtained from the American National Standards Institute (ANSI) at the above address.

American Boat & Yacht Council, Inc. (ABYC)

P.O. Box 806
Amityville, NY 11701

Asociacion Nacional de Normalizacion y Certificacion del Sector Electrico A.C. (NOM – ANCE)

Insurgentes Sur 664 3^{ER} Piso
Col. Del Valle
03100 Mexico D.F.
Phone: 011 525 227-1110
Fax: 011 525 227-1177

Occupational Safety and Health Administration (OSHA)

200 Constitution Avenue N.W.
Rm. 3647
Washington, D.C. 20210

Technical Data

Elements of the IP Code and Their Meanings

IP Suitability Rating

IP suitability ratings are a system for classifying the degree of protection provided by enclosures of electrical equipment. The higher the number, the greater the degree of protection; they apply **ONLY** to properly installed equipment. The numerals stand for the following:

1. First Numeral: degree of protection for persons against access to hazardous parts inside the enclosure and/or against the ingress of solid foreign objects.
2. Second Numeral: degree of protection of equipment inside enclosures against damage from the ingress of water.

IP67 SUITABILITY

Example: IP67 = Ingress Protection/Dust-Tight/Temporary Immersion

Meaning for the Protection of Equipment		
Code Letters	First Number	Second Number
<div style="border: 1px solid black; padding: 5px; width: 100%;">Ingress Protection</div>	<div style="border: 1px solid black; padding: 5px; width: 100%;">Against Ingress of Solid Foreign Objects</div>	<div style="border: 1px solid black; padding: 5px; width: 100%;">Against Ingress of Water with Harmful Effects</div>
<div style="border: 1px solid black; padding: 5px; width: 100%;">IP</div>	<div style="border: 1px solid black; padding: 5px; width: 100%;"> 0 – Non-protected 1 – \geq 50 mm diameter 2 – \geq 12.5 mm diameter 3 – \geq 2.5 mm diameter 4 – \geq 1.0 mm 5 – Dust-protected 6 – Dust-tight </div>	<div style="border: 1px solid black; padding: 5px; width: 100%;"> 0 – Non-protected 1 – Vertically dripping 2 – Dripping (15° Tilted) 3 – Spraying 4 – Splashing 5 – Jetting 6 – Power jetting 7 – Temporary immersion 8 – Continuous immersion </div>

Note: \geq denotes Greater than or equal to.

Technical Data
Horsepower Ratings
 For NEMA Configuration

Horsepower Ratings for NEMA Configurations - Plugs and Receptacles Only

NEMA Config.	AC HP Rating ¹	NEMA Config.	AC HP Rating ¹
1-15	0.5	L1-15	0.5
2-15	1.5	L2-20	2*
2-20	2*	L5-15	0.5
2-30	2*	L5-20	1
5-15	0.5	L5-30	2
5-20	1	L6-15	1.5*
5-30	2	L6-20	2*
5-50	2	L6-30	2*
6-15	1.5*	L7-15	2
6-20	2*	L7-20	2
6-30	2*	L7-30	3
6-50	3	L8-20	3
7-15	2	L8-30	5
7-20	2	L10-20	2 L-L
7-30	3		1 L-N
7-50	5	L10-30	2 L-L
10-20	2 L-L		2 L-N
	1 L-N	L11-15	2
10-30	2 L-L	L11-20	3
	2 L-N	L11-30	3
10-50	3 L-L	L12-20	5
	2 L-N	L12-30	10
11-15	2	L14-20	2 L-L
11-20	3		1 L-N
11-30	3	L14-30	2 L-L
11-50	7.5		2 L-N
14-15	1.5 L-L	L15-20	3
	0.5 L-N	L15-30	3
14-20	2 L-L	L16-20	5
	1 L-N	L16-30	10
14-30	2 L-L	L18-20	2
	2 L-N	L18-30	3
14-50	3 L-L	L19-20	5
	2 L-N	L19-30	10
14-60	3 L-L	L21-20	2
	2 L-N	L21-30	3
15-15	2	L22-20	5
15-20	3	L22-30	10
15-30	3		
15-50	7.5		
15-60	10		
18-15	2		
18-20	2		
18-30	3		
18-50	7.5		
18-60	7.5		

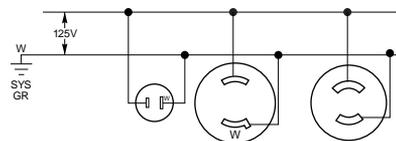
¹The phase to phase horsepower ratings are noted "L-L." The phase to neutral ratings are identified "L-N."

*Also suitable for 208V.

Technical Data Circuit Wiring Diagrams

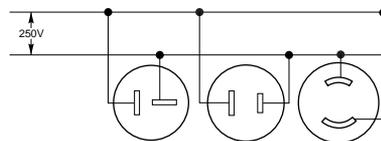
Wiring Diagrams for NEMA Configurations (Configurations shown are for female devices)

125V – 2P, 2W



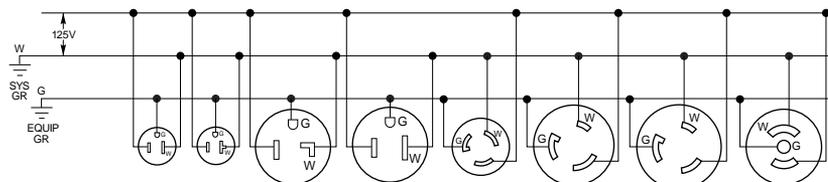
ANSI/NEMA WD-6 1-15R L1-15R ML1-R

250V – 2P, 2W



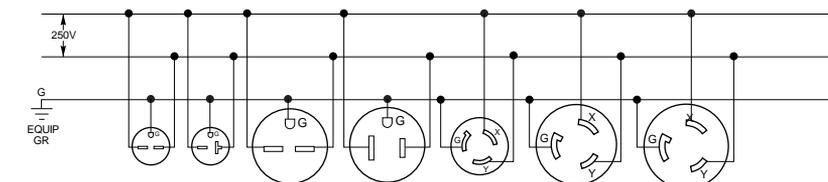
ANSI/NEMA WD-6 2-20R 2-30R L2-20R

125V – 2P, 3W – Grounding



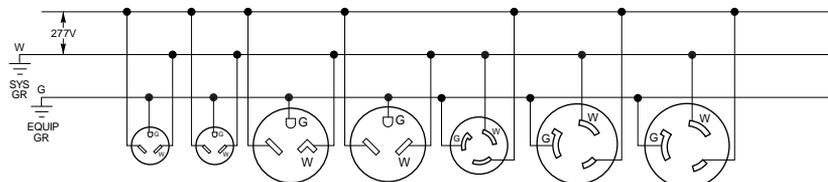
ANSI/NEMA WD-6 5-15R 5-20R 5-30R 5-50R L5-15R L5-20R L5-30R ML2-R

250V – 2P, 3W – Grounding



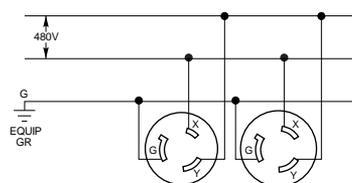
ANSI/NEMA WD-6 6-15R 6-20R 6-30R 6-50R L6-15R L6-20R L6-30R

277V AC – 2P, 3W – Grounding



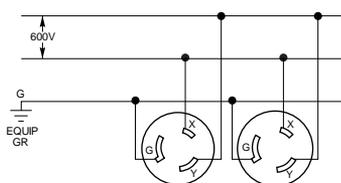
ANSI/NEMA WD-6 7-15R 7-20R 7-30R 7-50R L7-15R L7-20R L7-30R

480V AC – 2P, 3W – Grounding



ANSI/NEMA WD-6 L8-20R L8-30R

600V AC – 2P, 3W – Grounding



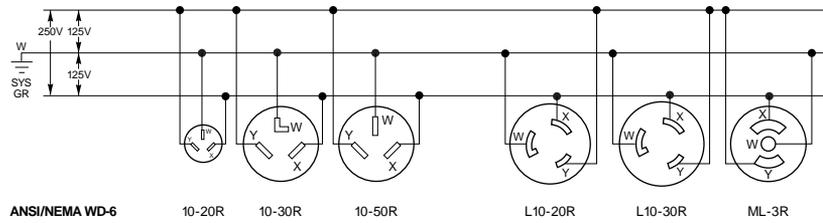
ANSI/NEMA WD-6 L9-20R L9-30R

Note: The above diagrams are intended to show device terminal identification only.

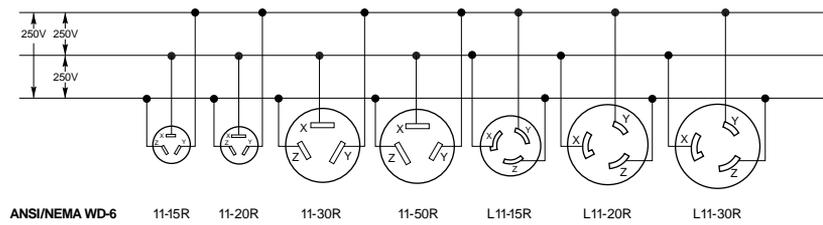
Technical Data Circuit Wiring Diagrams

Wiring Diagrams for NEMA Configurations (Configurations shown are for female devices)

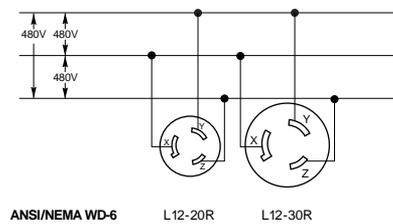
125/250V – 3P, 3W



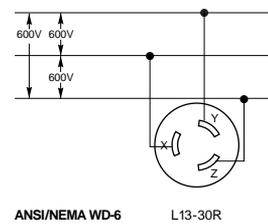
3Ø 250V – 3P, 3W



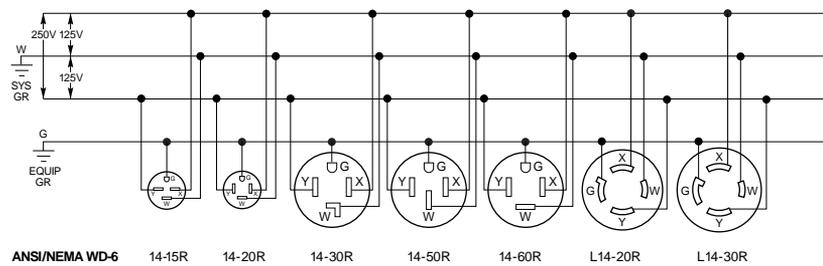
3Ø 480V – 3P, 3W



3Ø 600V – 3P, 3W



125/250V – 3P, 4W – Grounding

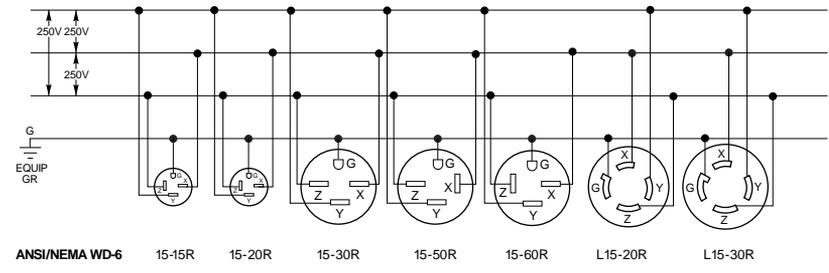


Note: The above diagrams are intended to show device terminal identification only.

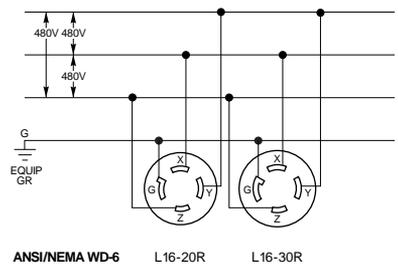
Technical Data Circuit Wiring Diagrams

Wiring Diagrams for NEMA Configurations
(Configurations shown are for female devices)

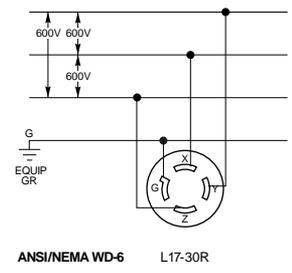
3Ø 250V – 3P, 4W – Grounding



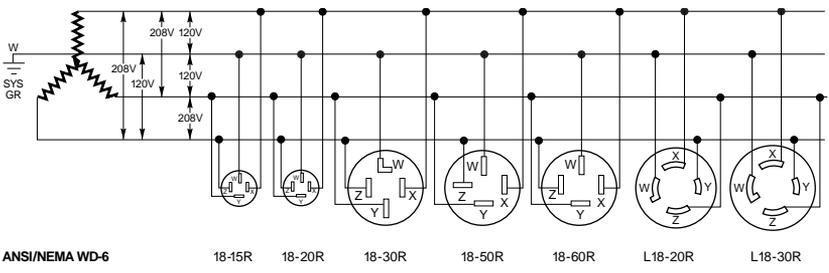
3Ø 480V – 3P, 4W – Grounding



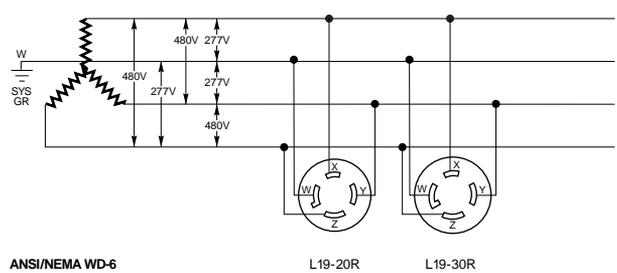
3Ø 600V – 3P, 4W – Grounding



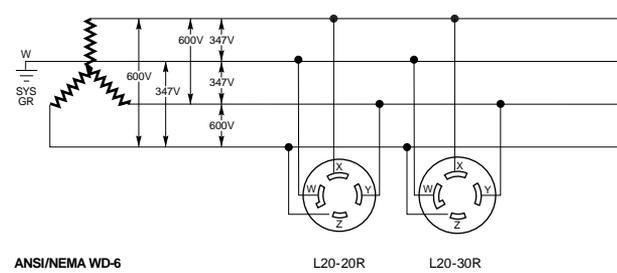
3ØY 120/208V – 4P, 4W



3ØY 277/480V – 4P, 4W



3ØY 347/600V – 4P, 4W



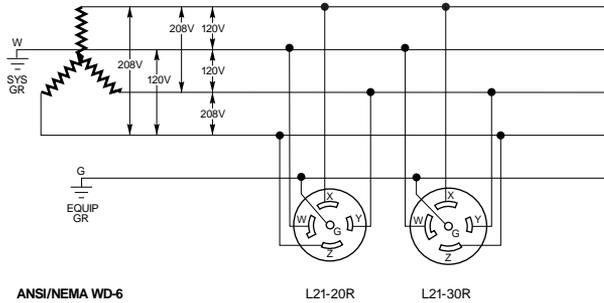
Note: The above diagrams are intended to show device terminal identification only.

Technical Data

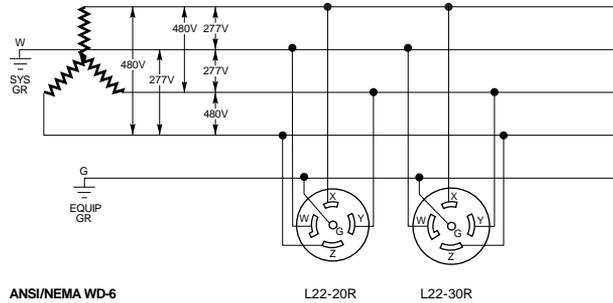
Circuit Wiring Diagrams

Wiring Diagrams for NEMA Configurations
(Configurations shown are for female devices)

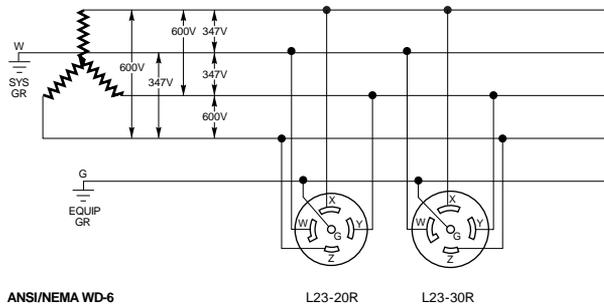
3ØY 120/208V – 4P, 5W – Grounding



3ØY 277/480V – 4P, 5W – Grounding



3ØY 347/600V – 4P, 5W – Grounding



Note: The above diagrams are intended to show device Terminal Identification only.

Technical Data

Diameter Ranges of Jacketed Cord

In Accordance with Standard UL62

Diameter Ranges of Jacketed Cord

Acceptable range in inches (mm) of the average overall diameter of round, jacketed heater cords and nonretractile vacuum cleaner and service cords.

Type of Cord	AWG Size	2 Conductor	3 Conductor	4 Conductor	5 Conductor
SV, SVO, SVT, SVTO	18	.22-.26" (5.6-6.6)	.23-.27" (5.8-6.9)	—	—
		<hr/>			
SJ, SJO, SJT, SJTO	18	.28-.32" (7.1-8.1)	.30-.34" (7.6-8.6)	.33-.37" (8.4-9.4)	—
	16	.31-.34" (7.9-8.6)	.33-.36" (8.4-9.1)	.35-.40" (8.9-10.2)	—
	14	.34-.38" (8.6-9.7)	.36-.40" (9.1-10.2)	.39-.44" (9.9-11.2)	—
	12	.41-.46" (10.4-11.7)	.43-.48" (10.9-12.2)	.47-.52" (11.9-13.2)	—
	10	.54-.61" (13.7-15.5)	.57-.64" (14.5-16.3)	.63-.70" (16.0-17.8)	—
S, SO, ST, STO	18	.34-.39" (8.6-9.9)	.36-.40" (9.1-10.2)	.39-.43" (9.9-10.9)	.46-.51" (11.68-13.0)
	16	.37-.41" (9.4-10.4)	.39-.43" (9.9-10.9)	.41-.46" (10.4-11.7)	.49-.55" (12.4-14.0)
	14	.50-.55" (12.7-14.0)	.52-.58" (13.2-14.7)	.56-.62" (14.2-15.7)	.63-.71" (16.0-18.0)
	12	.57-.63" (14.5-16.0)	.59-.66" (15.0-16.8)	.64-.71" (16.3-18.0)	.70-.77" (17.8-19.6)
	10	.62-.69" (15.7-17.5)	.65-.72" (16.5-18.3)	.70-.78" (17.8-19.8)	.76-.84" (19.3-21.3)
	8	.78-.88" (19.8-22.4)	.83-.93" (21.1-23.6)	.93-1.05" (23.6-26.7)	1.00-1.15" (25.4-29.2)
	6	.92-1.05" (23.4-26.7)	.97-1.10" (24.6-27.9)	1.05-1.20" (26.7-30.5)	1.18-1.33" (30.0-33.8)
	4	1.06-1.21" (26.9-30.7)	1.13-1.28" (28.7-32.5)	1.25-1.45" (31.8-36.8)	—
2	1.21-1.40" (30.7-35.6)	1.30-1.50" (33.0-38.1)	1.45-1.65" (36.8-41.9)	—	

Technical Data

Electrical Symbols and Abbreviations

In Accordance with American National Standards Institute

General Outlets

Ceiling Wall

○	○	Outlet
Ⓟ	Ⓟ	Blanked outlet
Ⓣ		Deep cord
ⓔ	ⓔ	Electrical outlet: for use only when circle used alone might be confused with columns, plumbing symbols, etc.
ⓕ	ⓕ	Fan outlet
ⓙ	ⓙ	Junction box
Ⓛ	Ⓛ	Lamp holder
Ⓛ _{ps}	Ⓛ _{ps}	Lamp holder with pull switch
Ⓢ	Ⓢ	Pull switch
Ⓥ	Ⓥ	Outlet for vapor discharge lamp
ⓧ	ⓧ	Exit light outlet
Ⓢ	Ⓢ	Clock outlet (specify voltage)

Convenience Outlets

Ⓢ		Duplex convenience outlet
Ⓢ _s		Convenience outlet other than duplex 1-single, 3-triplex, etc.
Ⓢ _{wp}		Weatherproof convenience outlet
Ⓢ _r		Range outlet
Ⓢ _s		Switch and convenience outlet
Ⓢ _r		Radio and convenience outlet
Ⓢ _{sp}		Special purpose outlet (Des. in Spec.)
Ⓢ _f		Floor outlet

Switch Outlets

S	Single pole switch
S ₂	Double pole switch
S ₃	Three way switch
S ₄	Four way switch
S _D	Automatic door switch
S _E	Electrolier switch
S _K	Key operated switch
S _P	Switch and pilot lamp
S _{CB}	Circuit breaker
S _{WCB}	Weatherproof circuit breaker
S _{MC}	Momentary contact switch
S _{RC}	Remote control switch
S _{WP}	Weatherproof switch
S _F	Fused switch
S _{WF}	Weatherproof fused switch

Special Outlets

Any standard symbol as given above with the addition of a lower case subscript letter may be used to designate some special variation of standard equipment of particular interest in a specific set of architectural plans.

○ _{b.c.etc.}	When used they must be listed in the Key of Symbols on each drawing and if necessary further described in the specifications.
Ⓢ _{b.c.etc.}	
Ⓢ _{b.c.etc.}	

Panels, Circuits and Miscellaneous

■	Lighting panel
▨	Power panel
—	Branch circuit; concealed in ceiling or wall
---	Branch circuit; concealed in floor
.....	Branch circuit; exposed
→→	Home run to panel board. Indicated number of circuits by number of arrows. <i>Note: Any circuit without further designation indicates a two-wire circuit. For a greater number of wires indicate as follows: ## (3 wires) ### (4 wires), etc.</i>
—	Feeders <i>Note: Use heavy lines and designate by number of corresponding to listing in feeder schedule.</i>
Ⓢ	Underfloor duct and junction box. Triple system <i>Note: For double or single systems eliminate one or two lines. This symbol is equally adaptable to auxiliary system layouts.</i>
Ⓢ	Generator
Ⓢ	Motor
Ⓢ	Instrument
Ⓢ	Power transformer (or draw to scale)
Ⓢ	Controller
Ⓢ	Isolating switch

Auxiliary Systems

Ⓢ	Push Button	Ⓢ	Buzzer
Ⓢ	Bell	Ⓢ	Annunciator
Ⓢ	Outside telephone		
Ⓢ	Interconnecting telephone		
Ⓢ	Telephone switchboard		
Ⓢ	Bell ringing transformer		
Ⓢ	Electric door opener		
Ⓢ	Fire alarm bell	Ⓢ	Fire alarm station
Ⓢ	City fire alarm station		
Ⓢ	Fire alarm central station		
Ⓢ	Automatic fire alarm device		
Ⓢ	Watchman's station		
Ⓢ	Watchman's central station		
Ⓢ	Horn		
Ⓢ	Nurse's signal plug	Ⓢ	Maid's signal plug
Ⓢ	Radio outlet		
Ⓢ	Signal central section		
Ⓢ	Interconnection box	Ⓢ	Battery
---	Auxiliary system circuits.		

Note: Any line without further designation indicates a 2-wire system. For a greater number of wires designate with numerals in manner similar to --- 12-No. 18 W-3'4"C, or designate by number corresponding to listing in schedule.

Ⓢ _{b.c.}	Special auxiliary outlets Subscript letters refer to notes on plans or detailed description in specifications.
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These symbols have been prepared by the American National Standards Association Sectional Committee on Graphical Symbols and Abbreviations for Use of Drawings.

Technical Data

Electrical Wiring Device Terms

Glossary

Adapter – An accessory used for interconnecting non-mating devices or converting an existing device to a new or modified use.

Cord Connector – A portable receptacle which is attached to, or provided with, means for attachment to a flexible cord and which is not intended for fixed mounting.

Flanged Inlet – A plug which is intended for flush mounting on an appliance or equipment and which serves to connect utilization equipment to a cord connector.

Flanged Receptacle – A receptacle which is intended for flush mounting on an appliance or on equipment which is intended to establish electrical connection with an inserted plug.

Fluorescent Starter – A device rated in watts having a voltage-sensitive switch and a capacitor whose function is to provide a high-voltage pulse to start a fluorescent lamp.

Lampholder – A device with contacts that establishes mechanical and electrical connection to an inserted lamp.

Plug – A device with male contacts which, when inserted into a receptacle, establishes connection between the conductors of the attached flexible cord and the conductors connected to the receptacle.

Receptacle – A device with female contacts which is primarily installed at a structure or in a piece of equipment and which is intended to establish electrical connection with an inserted plug.

Switch – A device for making, breaking, or changing the connections in an electric circuit.

Wall Plate – A plate designed to enclose a device box, with or without a device installed in the box.

Adapter Variations

Cube Tap – An adapter that converts one receptacle opening to multiple openings.

Current Tap – An adapter consisting of a medium-base lampholder extension, with or without integral switch, having one or two receptacle openings.

Duplex – An adapter that provides two female receptacle openings when plugged into a single receptacle opening.

Grounding – An adapter that converts a two-wire receptacle opening to a two-pole, three-wire

grounding receptacle opening.

Lampholder – A threaded adapter that converts the thread size of the lampholder in which it is inserted, permitting the lampholder to accept an incandescent lamp bulb of a different size.

Molded On – An adapter that is factory molded to a length of flexible cord.

Multiple – An adapter that is attached to the power cord for equipment that provides an additional receptacle opening at the top of the adapter.

Series – An adapter wired in series to a flexible cord containing an in-line switch which is used to control electrical equipment plugged into the adapter.

“W” Type – Same as “Y” type, except having three cord connectors arranged in the form of the letter “W.”

“Y” Type – An adapter in the form of a letter “Y,” having two cord connectors on one end and a male plug on the other end.

Cord Connector Variations

Angle – A connector that allows the attached flexible cord to exit at right angles to the connector face.

Corrosion Resistant – A connector constructed of special materials and/or suitably plated to withstand corrosive environments.

Dust Proof – A connector so constructed or protected that dust will not interfere with its operation.

Explosion Proof – A connector so constructed as to meet the requirements of hazardous (classified) locations as defined by the National Electrical code, NFPA-70.

Hospital Grade – A connector designed to meet additional performance requirements of high abuse areas often found in hospital locations. Such connectors are tested to “Hospital Grade” requirements of Underwriters Laboratories Inc. Standard UL 498.

Hospital Only – A connector which is listed by Underwriters Laboratories Inc for use in health care facilities.

Locking – A connector designed to lock an inserted plug in place when the plug is rotated in a clockwise direction. The plug can then only be removed when turned in a counter-clockwise direction.

Cord Connector Variations (continued)

Midget – A connector with a body diameter smaller than that of connectors of similar rating.

Molded On – A connector that is factory molded to a length of flexible cord.

Pin and Sleeve – A connector with round pin or sleeve type contacts.

Straight Blade (Non-locking) – A connector into which mating plugs are inserted at a right angle to the plane of the connector face.

Weatherproof – A connector so constructed or protected that exposure to weather will not interfere with the successful operation of the connector.

Flanged Inlet Variations

Corrosion Resistant – An inlet constructed of special materials and/or suitably plated to withstand corrosive environments.

Flush-Mounted – An inlet intended to be installed flush with the surface of a panel or on equipment.

Locking – An inlet designed to lock an inserted connector in place when the connector is rotated in a clockwise direction. The connector can then only be removed when turned in a counterclockwise direction.

Midget – An inlet with a body diameter smaller than those of inlets of a similar rating.

Pin and Sleeve – An inlet with round pin contacts intended to mate with a connector having hollow cylindrical female contacts.

Straight Blade (Non-locking) – An inlet into which mating connectors are inserted at a right angle to the plane of the inlet face.

Surface-Mounted – An inlet intended to be installed on the surface of a panel or on equipment.

Watertight – An inlet so constructed that moisture will not enter under specified test conditions.

Weatherproof – An inlet so constructed as to protect it from the normal effects of weather encountered in an outdoor location.

Flanged Receptacle Variations

Corrosion Resistant – A receptacle constructed of special materials and/or suitably plated to withstand corrosive environments.

Flush-Mounted – A receptacle intended to be installed flush with the surface of the structure or equipment in which it is mounted.

Locking – A receptacle designed to hold an inserted plug in place after the plug is rotated in a clockwise direction. Removal of the plug requires turning in a counterclockwise direction.

Midget – A receptacle with a body diameter smaller than those of a similar rating.

Pin and Sleeve – A receptacle with hollow cylindrical female contacts intended to mate with a plug having round pin contacts

Straight Blade – A receptacle whose contacts will accept the straight rectangular blades of a straight-blade plug.

Surface-Mounted – A receptacle intended to be installed on the surface for the structure or equipment in which it is mounted.

Watertight – A receptacle so constructed or that moisture will not enter under specified test conditions.

Weatherproof – A receptacle so constructed or protected that exposure to weather will not interfere with its successful operation.

Fluorescent Starter Variations

Automatic Reset – A fluorescent starter that automatically restarts a new replacement lamp after the circuit is energized.

Direct Current – A thermal type of fluorescent starter for use on a direct current (D.C.) circuit.

Glow Discharge – A fluorescent starter that starts a lamp very rapidly and will continue to try to start a failed lamp, resulting in the lamp flickering until the lamp is replaced.

Manual Reset – A fluorescent starter that automatically deactivates a failed lamp to eliminate flickering. A reset button is provided on the starter to activate the circuit after lamp replacement.

Technical Data

Electrical Wiring Device Terms

Glossary

Lampholder Variations

Bayonet – A lampholder for low-voltage incandescent lamps having an unthreaded metal shell with two diametrically opposite keyways that cooperate with similarly located projections on a mating lamp bulb. Pushing down on the bulb and turning it clockwise in the socket locks the bulb in place.

Bi-Pin Medium – A fluorescent lampholder having two contacts, used in pairs, with type T-8 tubular fluorescent lamps that are approximately 1" in diameter, having two contacts at each end.

Bi-Pin Miniature – Similar to medium Bi-Pin lampholder except for use with Type T-5 tubular fluorescent lamps that are $\frac{5}{8}$ " in diameter.

Slimline – Single Pin – A fluorescent lampholder having a single pin contact and accepting fluorescent lamps of the T-8 or T-12 types, 1" or 1 $\frac{1}{2}$ " in diameter, and in a smaller version, the T-6 type, $\frac{3}{4}$ " in diameter.

Candelabra – A small screw-base threaded lampholder accepting a bulb approximately $\frac{1}{2}$ " in diameter commonly used in night lights, indicator lights and Christmas tree bulbs.

Circline – A four-contact, double-ended lampholder for use with tubular, circular, fluorescent lamps.

Dimmer – A lampholder of the standard Edison base type containing a light-dimming mechanism actuated by a projecting turn knob, which also serves to turn the light on or off.

Double Contact Recessed – A lampholder having two "PAD" type recessed contacts and used with high-output fluorescent lamps.

Edison Base – A lampholder having a threaded internal shell approximately 1" in diameter which accepts lamp bulbs of the size commonly used for domestic illuminating.

Electrolier – A lampholder of the Edison base type, having a smaller outside diameter than those in general use.

Incandescent – Lampholders of the threaded screw shell types for use with standard sizes of incandescent bulbs, having threaded bases.

Intermediate – A lampholder with a threaded screw shell accepting intermediate size incandescent lamps with threaded bases that are approximately $1\frac{3}{32}$ " in diameter. Most often used in decorative lighting such as candle sconces, etc.

Key – A lampholder with a flat or round "key" projecting from its side, which when turned operates an internal switching mechanism.

Lumiline – A special type of "disc" contact lampholder that only fits tubular incandescent lamps of the "lumiline" type. Commonly used in bathroom fixtures, store display case fixtures, etc.

Medium Base (Edison) – The most common type of screw-in lampholder found in everyday lighting fixtures, table lamps, and accepting incandescent bulbs with screw bases approximately 1" in diameter.

Miniature – The smallest screw-in type lampholder accepting incandescent lamp bulbs of approximately $\frac{3}{8}$ " diameter commonly used in games, flashlights and the smallest Christmas tree bulbs.

Mogul – The largest screw-in type of lampholder accepting incandescent lamp bulbs having screw bases approximately 1 $\frac{1}{2}$ " in diameter. Used in street lighting fixtures and industrial high bay fixtures.

Pull Chain – An incandescent lampholder containing a switching mechanism that is actuated by pulling downward on a beaded chain.

Push Through – A lampholder having an insulated projection through its sides, which when pushed from either side, turns the lamp on or off.

Snap-In – A special type of incandescent lampholder supplied with assembled side spring clips which snap into a hole cut in a flat panel, securing the lampholder in place without additional fastening means.

Surface – A lampholder of any type intended for mounting on a flat or plane surface.

Plug Variations

Angle – A plug that allows the attached flexible cord to exit at a right angle to the plug face.

Corrosion Resistant – A plug constructed of special materials and/or suitably plated to withstand corrosive environments.

Explosion Proof – A plug so constructed as to meet requirements of hazardous (classified) locations of National Electrical code, NFPA-70.

Fused – A plug designed to accept fuses in the line contact(s) for protection of attached equipment.

Technical Data

Electrical Wiring Device Terms

Glossary

Plug Variations (continued)

Hospital Grade – A plug constructed to meet performance requirements of high abuse areas found in hospital locations, tested to “Hospital Grade” requirements of Underwriters Laboratories Standard UL 498.

Hospital Use Only – A locking type plug which is listed by Underwriters Laboratories for use in health care facilities.

Locking – A plug designed to lock in place when the plug is rotated in a clockwise direction. The plug can then only be removed when turned in a counterclockwise direction.

Midget – A plug with a body diameter smaller than those of plugs of a similar rating.

Molded On – A plug that is factory molded to a length of flexible cord.

Non-Locking – A plug providing no locking function when inserted in a connector.

Pin and Sleeve – A plug with round pin contacts.

Straight Blade – A plug providing no locking feature when it is inserted at a right angle to the plane of the mating device face.

Weatherproof – A plug constructed or protected so that exposure to weather will not interfere with successful operation.

Receptacle Variations

AL/CU – A marking designation used on certain receptacles to indicate their suitability for connection to either aluminum or copper conductors.

Clock Hanger – A single receptacle generally recessed behind a special cover plate having a hook or other means for supporting a wall-hung clock.

CO/ALR – A marking designation used on certain receptacles and switches to indicate their suitability for connection to either aluminum or copper conductors.

Corrosion Resistant – A receptacle constructed of special materials and/or suitably plated to withstand corrosive environments.

Display – A receptacle with its cover plate intended for mounting flush with the surface of a raised floor or wall.

Duplex – Two receptacles in a common housing or mounting means which accepts two plugs.

Dust Proof – A receptacle so constructed or protected that dust will not interfere with its operation.

Explosion Proof – A receptacle so constructed as to meet requirements of hazardous (classified) locations of the National Electrical Code, NFPA-70.

Fan Hanger – A single receptacle furnished with a cover plate and having a stud or other means for supporting a wall hung fan.

GFCI (Ground Fault Circuit Interrupter) – A receptacle integral with a circuit-interrupting device that detects leakage current to ground on the load side, activating a circuit-interrupting device.

Hospital Grade – A receptacle constructed to meet performance requirements of high abuse areas found in hospital locations, and tested to “Hospital Grade” requirements of Underwriters Laboratories Standard UL 498.

Hospital Use Only – A locking type receptacle designated as “Hospital Use Only”, which is listed by Underwriters Laboratories for use in health care facilities.

Interchangeable – A receptacle or combination of receptacles, each individually housed and having common mounting dimensions and intended for field installation on a single or multiple opening mounting strap.

Isolated Ground – A grounding type receptacle in which the equipment ground contact and terminal is electrically isolated from the receptacle mounting means.

Lighted (Illuminated) – A receptacle that, when connected to an electrical circuit, is illuminated in the area of the receptacle face.

Locking – a receptacle designed to lock an inserted plug in place when the plug is rotated in a clockwise direction. The plug can then only be removed when turned in a counterclockwise direction.

Pin and Sleeve – A receptacle with round pin or sleeve type contacts.

Safety (“Tamper-proof”) – A receptacle which by its construction limits improper access to its energized contacts (N.E.C.).

Single – A receptacle which accepts one plug.

Technical Data

Electrical Wiring Device Terms

Glossary

Receptacle Variations (continued)

Snap-In – A type of receptacle equipped with external side springs which permit it to be snapped into a hole in a flat panel and secure it in place without added screws or other fasteners.

Split Circuit – A duplex receptacle that can be wired for switch control or two separate circuits.

Straight Blade – A receptacle into which mating plugs are inserted at a right angle to the plane of the receptacle face.

Surface-Mounted – A receptacle to be installed on the surface of a panel or equipment.

Surge Suppression – A receptacle containing electronic components which limit peak receptacle voltage to a predetermined value.

Triplex – A receptacle in a common housing or mounting means which accepts three plugs.

Weatherproof – A receptacle so constructed or protected that exposure to weather will not interfere with its successful operation.

Switch Variations

AC/DC – A switch marked for use on either alternating current (AC) circuits or Direct Current (DC) circuits.

AC Only – A switch marked for use on alternating current (AC) circuits only.

Dimmer – A switch with electronic components that permit control of lighting intensity.

Door – A momentary contact switch normally installed in a doorjamb. The switch is activated when the door is opened or closed.

Double Pole, Single Throw – A switch that makes or breaks the connection of two circuit conductors in a single branch circuit.

Double Pole, Double Throw – A switch that makes or breaks the connection of two conductors to two separate circuits.

Feed Through – An “inline” switch that can be attached in any location in a length of flexible cord or cable to control utilization equipment.

Flush Mounted – A switch intended to be installed flush with the surface of a panel or on equipment.

Four-way – A switch installed between pairs of three-way switches to control one electrical load from three or more locations.

Horsepower Rated – A special use switch having a marked horsepower rating for control of motor loads.

Interchangeable – A switch or combination of switches, each individually housed and having common mounting dimensions, and intended for field installation on a single or multiple-opening mounting strap.

Lighted Handle – A switch with an integral lamp in the actuator which lights when the switch is in the “OFF” position.

Locking – A switch equipped with a mechanism requiring a key to operate the switching function.

Low Voltage – A switch intended for use on circuits of 50 volts or less.

“L” Rated – A “special use” switch for the control of Tungsten Filament Lamps on AC circuits only, identified with the letter “L.”

Maintained Contact – A switch which, when the actuator is moved to the “ON” position, makes and retains circuit contact until the actuator is manually moved to the “OFF” position.

Manual Motor Controller – A switch without overload protection used for the operation of small AC or DC motors.

Mercury – A type of switch construction employing liquid mercury as the contact means for making and breaking an electrical circuit.

Momentary Contact – A switch which establishes circuit contact only as long as the switch is held in the “ON” position, after which it returns itself to the “OFF” position, breaking the circuit. (Such a switch may also be furnished to break circuit contact upon actuation.)

Pendant – A type of switch intended for installation at the end of a length of portable cord or cable.

Pilot Light – A switch with an integral lamp in the actuator which lights when the switch is in the “ON” position.

Technical Data

Electrical Wiring Device Terms

Glossary

Switch Variations (continued)

- Pull** – A switch with an actuator mechanism operated by a downward or outward pull.
- Push Button** – A switch with a mechanism that is operated by depressing a button.
- Rocker** – A switch with a mechanism that is operated by a rocker actuator that pivots on its center.
- Rotary** – A switch having an actuating member that when turned in a clockwise direction completes the switch circuit and breaks the switch circuit when turned in the same or opposite direction.
- Single Pole, Double Throw** – A switch that makes or breaks the connection of a single conductor with either two other single conductors.
- Single Pole, Single Throw** – A switch that makes or breaks the connection of a single conductor in a single branch circuit.
- Slide** – A switch having a sliding actuating member which when operated, makes or breaks the switch contact mechanism.
- Surface-Mounted** – A switch having its own completed exterior enclosure intended for mounting on a flat or plane surface.
- Three Position Center “OFF”** – A two circuit switch of either the maintained or momentary type, in which the “OFF” position is indicated by the centered position of the actuator.
- Three Way** – A switch used in pairs to control one electrical load from two locations.
- Time Delay** – A switch containing a mechanism which automatically turns the switch “OFF” at a predetermined time interval.
- Timer** – A switch containing an auxiliary timing device that can be set or adjusted to turn off an electrical load at a preset time.
- Toggle** – A switch having a lever type actuating member which makes or breaks the switch contact mechanism when its position is changed.
- “T” Rated** – An AC/DC switch suitable for the control of tungsten filament lamps on direct or alternating current, identified with the letter “T.”

Wall Plate Variations

- Combination** – A multiple-gang wall plate with openings in each gang for different devices.
- Deep** – A wall plate that provides greater clearance for device mounting straps than standard wall plates.
- Flush** – A wall plate designed to mount flush with the wall surface or the plane surface of electrical equipment.
- Modular** – Individual section wall plates with different openings that can be field assembled into a combination multi-gang plate.
- Multi-Gang** – A wall plate that has two or more gangs.
- Narrow** – A cover plate designed for flush mounting on narrow partitions having a width dimension of two inches or less.
- Oversize (Intermediate)** – A wall plate with length and width dimensions greater than standard wall plates.
- Tandem** – A wall plate in which individual gangs are arranged vertically one above the other.
- Weatherproof (Cover Closed)** – A cover, UL listed, in accordance with specific test standards for use in wet and damp locations with the cover closed.
- Weatherproof (Cover Open)** – A cover, UL listed, in accordance with specific test standards for use in wet and damp locations with the cover open or closed.

Surge Suppression Terms

- Suppressed Voltage** – The amount of voltage allowed to pass through a surge suppression device to the equipment connected to the device.
- Suppressed Voltage Rating** – Determined by UL when specific current and voltage is applied to a surge suppression device. For permanent devices UL tests at 3000A, 6000V while portable devices are tested at 500A, 6000V.
- Joule Rating** – The short duration peak energy rating of a surge suppression device. The higher the joule rating the longer the expected life of the device.
- Peak Current** – The short duration peak current rating of a surge suppression device.

Technical Data

Decimal Equivalents

Decimal Equivalents

Inches	Inches	Inches	Millimeters	Inches	Inches	Inches	Millimeters
	$\frac{1}{64}$	.015625	.3969		$\frac{33}{64}$	.515625	13.0969
$\frac{1}{32}$		.03125	.7938	$\frac{17}{32}$		.53125	13.4938
	$\frac{3}{64}$	.046875	1.1906		$\frac{35}{64}$	.546875	13.8906
$\frac{1}{16}$		.0625	1.5875	$\frac{9}{16}$		.5625	14.2875
	$\frac{5}{64}$	.078125	1.9844		$\frac{37}{64}$	.578125	14.6844
$\frac{3}{32}$		.09375	2.3813	$\frac{19}{32}$		.59375	15.0813
	$\frac{7}{64}$	.109375	2.7781		$\frac{39}{64}$	.609375	15.4781
$\frac{1}{8}$		.1250	3.1750	$\frac{5}{8}$		.6250	15.8750
	$\frac{9}{64}$	.140625	3.5719		$\frac{41}{64}$	.640625	16.2719
$\frac{5}{32}$		.15625	3.9688	$\frac{21}{32}$		.65625	16.6688
	$\frac{11}{64}$	.171875	4.3656		$\frac{43}{64}$	.671875	17.0656
$\frac{3}{16}$		.1875	4.7625	$\frac{11}{16}$		.6875	17.4625
	$\frac{13}{64}$	.203125	5.1594		$\frac{45}{64}$	.703125	17.8594
$\frac{7}{32}$		.21875	5.5563	$\frac{23}{32}$		.71875	18.2563
	$\frac{15}{64}$	.234375	5.9531		$\frac{47}{64}$	.734375	18.6531
$\frac{1}{4}$		.2500	6.3500	$\frac{3}{4}$		.7500	19.0500
	$\frac{17}{64}$	.265625	6.7469		$\frac{49}{64}$	.765625	19.4469
$\frac{9}{32}$		.28125	7.1438	$\frac{25}{32}$		.78125	19.8438
	$\frac{19}{64}$	.296875	7.5406		$\frac{51}{64}$	.796875	20.2406
$\frac{5}{16}$		.3125	7.9375	$\frac{13}{16}$		.8125	20.6375
	$\frac{21}{64}$	.328125	8.3344		$\frac{53}{64}$	.828125	21.0344
$\frac{11}{32}$		.34375	8.7313	$\frac{27}{32}$		.84375	21.4313
	$\frac{23}{64}$	.359375	9.1281		$\frac{55}{64}$	.859375	21.8281
$\frac{3}{8}$		.3750	9.5250	$\frac{7}{8}$		.8750	22.2250
	$\frac{25}{64}$	.390625	9.9219		$\frac{57}{64}$	.890625	22.6219
$\frac{13}{32}$		.40625	10.3188	$\frac{29}{32}$		.90625	23.0188
	$\frac{27}{64}$	.421875	10.7156		$\frac{59}{64}$	.921875	23.4156
$\frac{7}{16}$		.4375	11.1125	$\frac{15}{16}$		.9375	23.8125
	$\frac{29}{64}$	.453125	11.5094		$\frac{61}{64}$	.953125	24.2094
$\frac{15}{32}$		.46875	11.9063	$\frac{31}{32}$		.96875	24.6063
	$\frac{31}{64}$	.484375	12.3031		$\frac{63}{64}$	.984375	25.0031
$\frac{1}{2}$		.5000	12.7000	1		1.0000	25.4000

Technical Data

Enclosure Types for Non-Hazardous Locations

National Electrical Manufacturers Association

NEMA Standards Publication No. 250-1991
Enclosures for Electrical Equipment (1000 Volts maximum)

Type Designation	Intended Use and Description
	An enclosure is a surrounding case constructed to provide a degree of protection to personnel against incidental contact with the enclosed equipment and to provide a degree of protection to enclosed equipment against specified environmental conditions.
Type 1	Enclosures are intended for indoor use primarily to provide a degree of protection against limited amounts of falling dirt.
Type 2	Enclosures are intended for indoor use primarily to provide a degree of protection against limited amounts of falling water and dirt.
Type 3	Enclosures are intended for outdoor use primarily to provide a degree of protection against rain, sleet, windblown dust, and damage from external ice formation.
Type 3R	Enclosures are intended for outdoor use primarily to provide a degree of protection against rain, sleet, and damage from external ice formation.
Type 3S	Enclosures are intended for outdoor use primarily to provide a degree of protection against rain, sleet, windblown dust, and to provide for operation of external mechanisms when ice laden.

Underwriters Laboratories Inc.

UL50
Standard for Enclosures For Electrical Equipment (10th Edition)

Type Designation	Intended Use and Description
	Enclosure - A surrounding case constructed to provide a degree of protection against incidental contact with the enclosed equipment and to provide a degree of protection to the enclosed equipment against specified environmental conditions. A complete enclosure shall be provided for all live parts that may be housed in it. The enclosure shall be tight and, unless designed for a specific installation, such as a cast metal junction or pull box intended to be installed in poured concrete, shall be provided with means for mounting.
Type 1	Indoor use primarily to provide a degree of protection against limited amounts of falling dirt.
Type 2	Indoor use primarily to provide a degree of protection against limited amounts of falling water and dirt.
Type 3	Outdoor use primarily to provide a degree of protection against rain, sleet, windblown dust and damage from external ice formation.
Type 3R	Outdoor use primarily to provide a degree of protection against rain, sleet, and damage from external ice formation.
Type 3S	Outdoor use primarily to provide a degree of protection against rain, sleet, windblown dust, and to provide for operation of external mechanisms when ice laden.

Canadian Standards Association

CAN/CSA C22.2 No. 94-M91
Special Purpose Enclosures

Type Designation	Intended Use and Description
	Enclosures...provide a degree of protection against accidental contact with the enclosed equipment, and to the enclosed equipment, against specified environmental conditions.
	No CSA equivalent.
Type 2	An enclosure for indoor use, constructed so as to provide a degree of protection against dripping and light splashing of noncorrosive liquids, and falling dirt.
Type 3	An enclosure for either indoor or outdoor use, constructed so as to provide a degree of protection against rain, snow, and windblown dust; undamaged by the external formation of ice on the enclosure.
Type 3R	An enclosure for either indoor or outdoor use, constructed so as to provide a degree of protection against rain and snow, undamaged by the external formation of ice on the enclosure.
Type 3S	An enclosure for either indoor or outdoor use, constructed so as to provide a degree of protection against rain, snow, and windblown dust, the external mechanism(s) remain operable while ice covered.

Technical Data

Enclosure Types for Non-Hazardous Locations

National Electrical Manufacturers Association

NEMA Standards Publication No. 250-1991
Enclosures for Electrical Equipment (1000 Volts maximum)

Type Designation	Intended use and Description
Type 4	Enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against windblown dust and rain, splashing water, hose-directed water, and damage from external ice formation.
Type 4X	Enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water, hose-directed water, and damage from external ice formation.
Type 5	Enclosures are intended for indoor use primarily to provide a degree of protection against settling airborne dust, falling dirt, and dripping noncorrosive liquids.
Type 6	Enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against hose-directed water, the entry of water during occasional temporary submersion at a limited depth, and damage from external ice formation.
Type 6P	Enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against hose-directed water, the entry of water during prolonged submersion at a limited depth, and damage from external ice formation.

Underwriters Laboratories Inc.

UL50
Standard for Enclosures for Electrical Equipment (10th Edition)

Type Designation	Intended use and Description
Type 4	Indoor or outdoor use primarily to provide a degree of protection against windblown dust and rain, splashing water, hose-directed water, and damage from external ice formation.
Type 4X	Indoor or outdoor use primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water, hose-directed water and damage from external ice formation.
Type 5	Indoor use primarily to provide a degree of protection against settling airborne dust, falling dirt, and dripping noncorrosive liquids.
Type 6	Indoor or outdoor use primarily to provide a degree of protection against hose-directed water, the entry of water during occasional temporary submersion at a limited depth, and damage from external ice formation.
Type 6P	Indoor or outdoor use primarily to provide a degree of protection against hose-directed water, the entry of water during prolonged submersion at a limited depth, and damage from external ice formation.

Canadian Standards Association

CAN/CSA C22.2 No. 94-M91
Special Purpose Enclosures

Type Designation	Intended use and Description
Type 4	An enclosure for either indoor or outdoor use, constructed so as to provide a degree of protection against rain, snow, windblown dust, splashing and hose-directed water; undamaged by the external formation of ice on the enclosure.
Type 4X	An enclosure for either indoor or outdoor use, constructed so as to provide a degree of protection against rain, snow, windblown dust, splashing and hose-directed water, undamaged by the external formation of ice on the enclosure; resists corrosion.
Type 5	An enclosure for indoor use, constructed so as to provide a degree of protection against dripping and light splashing of noncorrosive liquids and setting dust, lint, fibers, and flyings.
Type 6	An enclosure for either indoor or outdoor use, constructed so as to provide a degree of protection against the entry of water during occasional temporary submersion at a limited depth; undamaged by the external formation of ice on the enclosure.
Type 6P	An enclosure for either indoor or outdoor use, constructed so as to provide a degree of protection against the entry of water during prolonged submersion at a limited depth; undamaged by the external formation of ice on the enclosure; resists extended corrosion.

Technical Data

Enclosure Types for Non-Hazardous Locations

National Electrical Manufacturers Association

NEMA Standards Publication No. 250-1991
Enclosures for Electrical Equipment (1000 Volts maximum)

Type Designation	Intended Use and Description
Type 12	Enclosures are intended for indoor use primarily to provide a degree of protection against circulating dust, falling dirt, and dripping noncorrosive liquids.
Type 12K	Enclosures with knockouts are intended for indoor use primarily to provide a degree of protection against circulating dust, falling dirt, and dripping noncorrosive liquids.
Type 13	Enclosures are intended for indoor use primarily to provide a degree of protection against dust, spraying of water, oil, and noncorrosive coolants.

Underwriters Laboratories Inc.

UL50
Standard for Enclosures for Electrical Equipment (10th Edition)

Type Designation	Intended Use and Description
Type 12	Indoor use primarily to provide a degree of protection against circulating dust, falling dirt, and dripping noncorrosive liquids.
Type 12K	Indoor use primarily to provide a degree of protection against circulating dust, falling dirt, and dripping noncorrosive liquids.
Type 13	Indoor use primarily to provide a degree of protection against dust, spraying of water, oil, and noncorrosive coolant.

Canadian Standards Association

CAN/CSA C22.2 No. 94-M91
Special Purpose Enclosures

Type Designation	Intended Use and Description
Type 12	An enclosure for indoor use, constructed so as to provide a degree of protection against circulating dust, lint, fibers, and flyings; dripping and light splashing of noncorrosive liquids; not provided with knockouts.
Type 12K	An enclosure for indoor use, constructed so as to provide a degree of protection against circulating dust, lint, fibers, and flyings; dripping and light splashing of noncorrosive liquids; and provided with knockouts.
Type 13	An enclosure for indoor use, constructed so as to provide a degree of protection against circulating dust, lint, fibers, and flyings; seepage and spraying of noncorrosive liquids including oils and coolants.



Technical Data

NEMA and IEC Classifications

Enclosures

Comparison Between NEMA Enclosure Type Numbers and IEC Enclosure Classification Designations

IEC Publication 529 Classification of Degrees of Protection Provided by Enclosures provides a system for specifying the enclosures of electrical equipment on the basis of the degree of protection provided by the enclosure. IEC 529 does not specify degrees of protection against mechanical damage of equipment, risk of explosions, or conditions such as moisture (produced for example by condensation), corrosive vapors, fungus, or vermin. NEMA Standards Publication 250 does test for environmental condition such as corrosion, rust, icing, oil, and coolants. For this reason, and because the tests and evaluations for other characteristics are not identical, the IEC Enclosure Classification Designations cannot be exactly equated with NEMA Enclosure Type Numbers.

The IEC designation consists of the letters IP followed by two numerals. The first characteristic numeral indicates the degree of protection provided by the enclosure with respect to persons and solid foreign objects entering the enclosure. The second characteristic numeral indicates the degree of protection provided by the enclosure with respect to the harmful ingress of water.

Table A-1 provides an equivalent conversion from NEMA Enclosure Type Numbers to IEC Enclosure Classification Designations. The NEMA Types meet or exceed the test requirements for the associated IEC Classifications; for this reason Table A-1 cannot be used to convert from IEC Classifications to NEMA Types.

Table A-1

Conversion of NEMA Type Numbers to IEC Classification Designations
(Cannot be used to convert IEC classification designations to NEMA type numbers)

NEMA Enclosure Type Number	IEC Enclosure Classification Designation
1	IP10
2	IP11
3	IP54
3R	IP14
3S	IP54
4 and 4X	IP56
5	IP52
6 and 6P	IP67
12 and 12K	IP52
13	IP54

Reference page N-6 for explanation of "IP" suitability ratings.