UL 498M

STANDARD FOR SAFETY

Marine Shore Power Inlets

UL Standard for Safety for Marine Shore Power Inlets, UL 498M

First Edition, Dated July 29, 2020

SUMMARY OF TOPICS

This First Edition of ANSI/UL 498M dated July 29, 2020 covers marine shore power inlets rated at not less than 20 A and not more than 50 A, 250 V maximum. These devices are intended for use with marine shore power cable sets to extend the shore power supply from a shore-installed power outlet to a boat, in accordance with the applicable requirements in the American Boat and Yacht Council (ABYC), E-8-1985, National Fire Protection Association Standard for Pleasure and Commercial Motor Craft, NFPA No. 302-1987, and the United States Coast Guard (USCG) Regulations Title 33, Chapter 1, CFR, Part 183.

The new requirements are substantially in accordance with Proposal(s) on this subject dated March 27, 2020.

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JULY 29, 2020

ANSI/UL 498M-2020

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Standard for Marine Shore Power Inlets

First Edition

July 29, 2020

This ANSI/UL Standard for Safety consists of the First Edition.

The most recent designation of ANSI/UL 498M as an American National Standard (ANSI) occurred on May 28, 2020. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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INTRODUCTION

1 Scope

1.1 These requirements cover marine shore power inlets rated at not less than 20 A and not more than 50 A, 250 V maximum. These devices are intended for use with marine shore power cable sets to extend the shore power supply from a shore-installed power outlet to a boat, in accordance with the applicable requirements in the American Boat and Yacht Council (ABYC), E-8-1985, National Fire Protection Association Standard for Pleasure and Commercial Motor Craft, NFPA No. 302-1987, and the United States Coast Guard (USCG) Regulations Title 33, Chapter 1, CFR, Part 183.

1.2 Shore power inlets shall also comply with the applicable requirements of either UL 498F or UL 498D as identified in Table 1.1, except as modified by these requirements.

Table 1.1
ANSI/NEMA Configuration with Applicable UL Standards

ANSI/NEMA Configuration	Applicable UL Standard
L5-20P	UL 498F
L5-30P	UL 498F
L6-20P	UL 498F
L6-30P	UL 498F
L14-20P	UL 498F
L14-30P	UL 498F
L15-20P	UL 498F
L15-30P	UL 498F
L21-20P	UL 498F
L21-30P	UL 498F
SS1-50P	UL 498D
SS2-50P	UL 498D

2 Components

2.1 A component of a product covered by this Standard shall:

a) Comply with the requirements for that component as specified in this Standard;

b) Be used in accordance with its rating(s) established for the intended conditions of use; and

c) Be used within its established use limitations or conditions of acceptability.

2.2 A component of a product covered by this Standard is not required to comply with a specific component requirement that:

a) Involves a feature or characteristic not required in the application of the component in the product;

b) Is superseded by a requirement in this Standard; or

c) Is separately investigated when forming part of another component, provided the component is used within its established ratings and limitations.

2.3 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

2.4 A component that is also intended to perform other functions such as overcurrent protection, ground-fault circuit-interruption, surge suppression, any other similar functions, or any combination thereof, shall comply additionally with the requirements of the applicable UL standard(s) that cover devices that provide those functions.

3 Units of Measurement

3.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

4 Referenced Publications

4.1 Any undated reference to a code or standard appearing in the requirements of this Standard shall be interpreted as referring to the latest edition of that code or standard.

4.2 The following publications are referenced in this Standard:

ANSI/NEMA WD6, *Wiring Devices – Dimensional Specifications*
ASTM B117, *Standard Practice for Operating Salt Spray (Fog) Apparatus*
CFR, Part 183, *United States Coast Guard (USCG) Regulations Title 33, Chapter 1*
E-8-1985, *American Boat and Yacht Council (ABYC)*
NFPA No. 302-1987, *National Fire Protection Association Standard for Pleasure and Commercial Motor Craft*
UL 498D, *Standard for Attachment Plugs, Cord Connectors and Receptacles with Arcuate (Locking Type) Contacts*
UL 498F, *Standard for Plugs, Socket-Outlets and Couplers with Arcuate (Locking Type) Contacts*
UL 514A, *Standard for Metallic Outlet Boxes*
UL 514C, *Standard for Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers*
UL 514D, *Standard for Cover Plates for Flush-Mounted Wiring Devices*
UL 746C, *Standard for Polymeric Materials – Use in Electrical Equipment Evaluations*

5 Glossary

5.1 For the purpose of this supplement, the following definitions apply.

5.2 FACE COVER – A threaded or hinged cover intended to restrict water from coming in contact with the male blades of a shore power inlet when it is not connected to a shore power cable set.

5.3 SHORE POWER CABLE SET – A length of flexible cord or cable assembled with a locking-type grounding attachment plug as a line fitting and a locking-type grounding cord connector as a load fitting intended to be used to supply shore power to boats that are moored to a dock.

5.4 SHORE POWER INLET – A boat-mounted inlet (motor attachment plug) intended to provide connection for a shore power cable set.

CONSTRUCTION

6 General

6.1 A marine shore power inlet shall comply with the requirements for inlets in this Standard and the requirements for wet-location cover plates in UL 514A, UL 514C, or UL 514D, as applicable, except as modified by the requirements in this supplement.

6.2 A shore power inlet shall employ an ANSI/NEMA WD6: L5-20P, L5-30P, L6-20P, L6-30P, L14-20P, L14-30P, L15-20P, L15-30P, L21-20P, L21-30P, SS1-50P, or SS2-50P configuration.

6.3 A shore power inlet shall be provided with a threaded hub and a threaded or hinged face cover. The hub and the face cover, if threaded, shall have a 2-3/4 – 16, Class 2 thread having at least three full threads. A shore power inlet shall be dimensioned to couple with a shore power cable set load fitting of a corresponding configuration. The face cover shall be positively retained in place on the shore power inlet. See Table 6.1 and Figure 6.1 for the required dimensions.

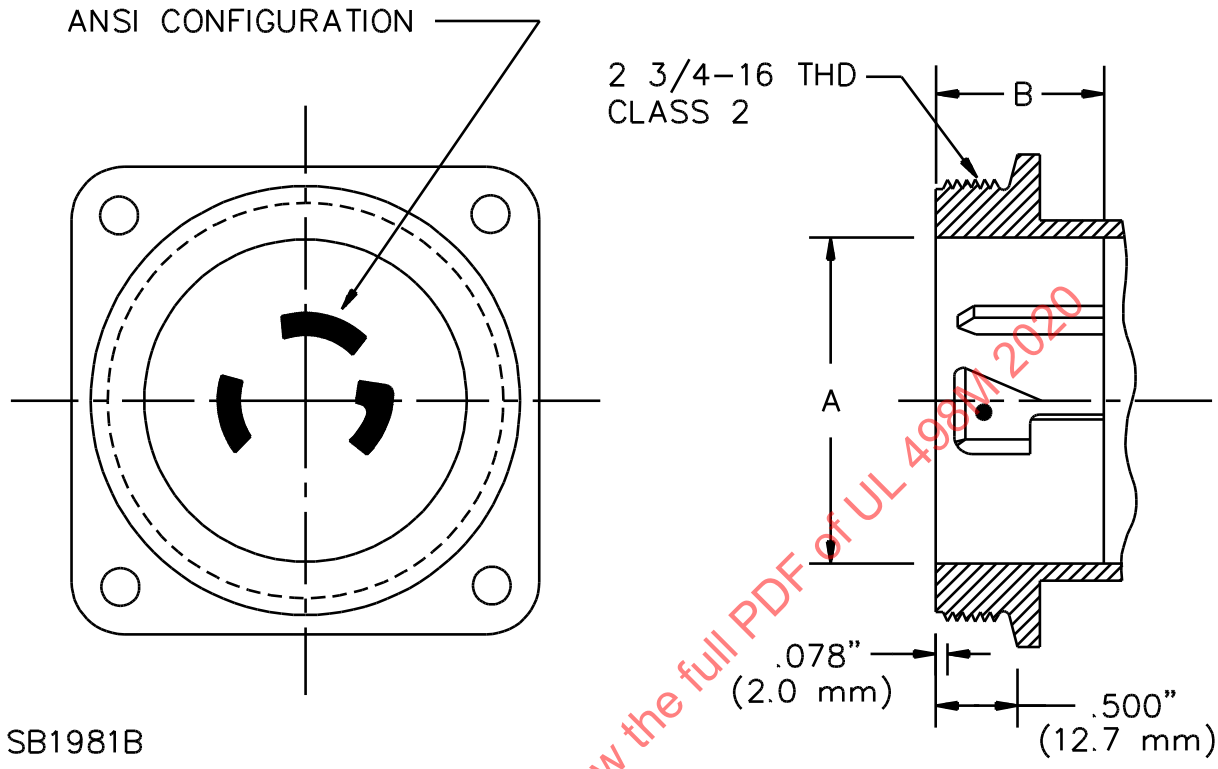
Table 6.1
Dimensions for a Shore Power Inlet as Shown in Figure 6.1

Rating	Shore power inlet inches (mm)		NEMA WD6 designation
	A[a]	B	
20A, 125 V, 1 Phase, 2 Pole, 3 Wire	1.880 (47.75)	0.921[b] (23.39)	L5-20P
30 A, 125 V, 1 Phase, 2 Pole, 3 Wire	1.880 (47.75)	1.000[b] (25.40)	L5-30P
20 A, 250 V, 1 Phase, 2 Pole, 3 Wire	1.880 (47.75)	0.921[b] (23.39)	L6-20P
30 A, 250 V, 1 Phase, 2 Pole, 3 Wire	1.880 (47.75)	1.000[b] (25.40)	L6-30P
20 A, 125/250 V, 1 Phase, 3 Pole, 4 Wire	2.000 (50.80)	0.921[b] (23.39)	L14-20P
30 A, 125/250 V, 1 Phase, 3 Pole, 4 Wire	2.000 (50.80)	1.000[b] (25.40)	L14-30P
20 A, 250 V, 3 Phase, 3 Pole, 4 Wire	2.000 (50.80)	0.921[b] (23.39)	L15-20P
30 A, 250 V, 3 Phase, 3 Pole, 4 Wire	2.000 (50.80)	1.000[b] (25.40)	L15-30P
20 A, 208Y/120 V, 3 Phase, 4 Pole, 5 Wire	2.000 (50.80)	0.921[b] (23.39)	L21-20P
30 A, 208Y/120 V, 3 Phase, 4 Pole, 5 Wire	2.000 (50.80)	1.000[b] (25.40)	L21-30P
50 A, 125 V, 1 Phase, 2 Pole, 3 Wire	2.015 (51.18)	1.163[c] (29.54)	SS1-50P
50 A, 125/250 V, 1 Phase, 3 Pole, 4 Wire	2.015 (51.18)	1.163[c] (29.54)	SS2-50P

[a] Minimum dimension.
[b] Tolerance of minus 0, plus 0.031 inches (plus 0.79 mm).
[c] Maximum dimension.

Figure 6.1

Dimensions of a Shore Power Inlet



6.4 With the face cover in the closed position, the construction of a shore power inlet shall not permit water to enter the inlet and contact the blades or face of the device as determined by the Water-Spray Test, Section 13.

7 Insulating Materials

7.1 An insulating material employed in a shore power inlet shall comply with the Ultraviolet Light Exposure Test and the Water Exposure and Immersion Test in UL 746C.

Exception: A material used only on the blade face or rear housing of the shore power inlet is not required to be subjected to the Ultraviolet Light Exposure Test.

8 Corrosion Resistance

8.1 All current-carrying parts shall be copper alloy. The blades of the shore power inlet shall be provided with a corrosion-resistant plating.

8.2 Noncurrent-carrying metal parts, such as metal strain-relief clamps or hinges that are depended upon to meet the requirements of the standard, shall be galvanically compatible with other metal parts of the shore power inlet, and shall provide corrosion resistance equivalent to that of:

a) Stainless steel alloys 302, 304, 410, or 430, or

b) Bronze alloys with less than 15 percent zinc content.

8.3 If there is any question as to whether the parts are corrosion resistant, the Salt-Spray Test, Section 10, shall be performed.

PERFORMANCE

9 General

9.1 A shore power inlet shall be subjected to the Mechanical Strength Test, Section 12, the Water-Spray Test, Section 13, and the Shock Test, Section 14. If necessary to determine compliance with the corrosion resistance requirements in 8.2, a shore power inlet shall also be subjected to the Salt-Spray Test, Section 10, and the Dielectric Voltage-Withstand Test, Section 11.

10 Salt-Spray Test

10.1 If necessary to determine compliance with the corrosion resistance requirement in 8.2, a shore power inlet shall be exposed to salt spray (fog) as described in 10.2. Following the exposure, the shore power inlet shall comply with the Dielectric Voltage-Withstand Test, Section 11, the Mechanical Strength Test, Section 12, and the Water-Spray Test, Section 13.

10.2 The salt spray exposure is to be conducted for a period of 750 hours in accordance with ASTM B117.

11 Dielectric Voltage-Withstand Test

11.1 After being subjected to the Salt-Spray Test, Section 10, a shore power inlet shall withstand without breakdown the application of a 60 Hz essentially sinusoidal potential of 1250 V applied for one minute between live parts of opposite polarity and between live parts and accessible dead metal parts.

11.2 The test potential is to be supplied from a 500 VA or larger capacity testing transformer whose output is essentially sinusoidal and can be varied. The applied potential is to be increased from zero until the required test voltage is reached and is to be held at that voltage for a period of one minute. The increase in the applied potential is to be at a uniform rate that is as rapid as is consistent with its value being correctly indicated by the voltmeter.

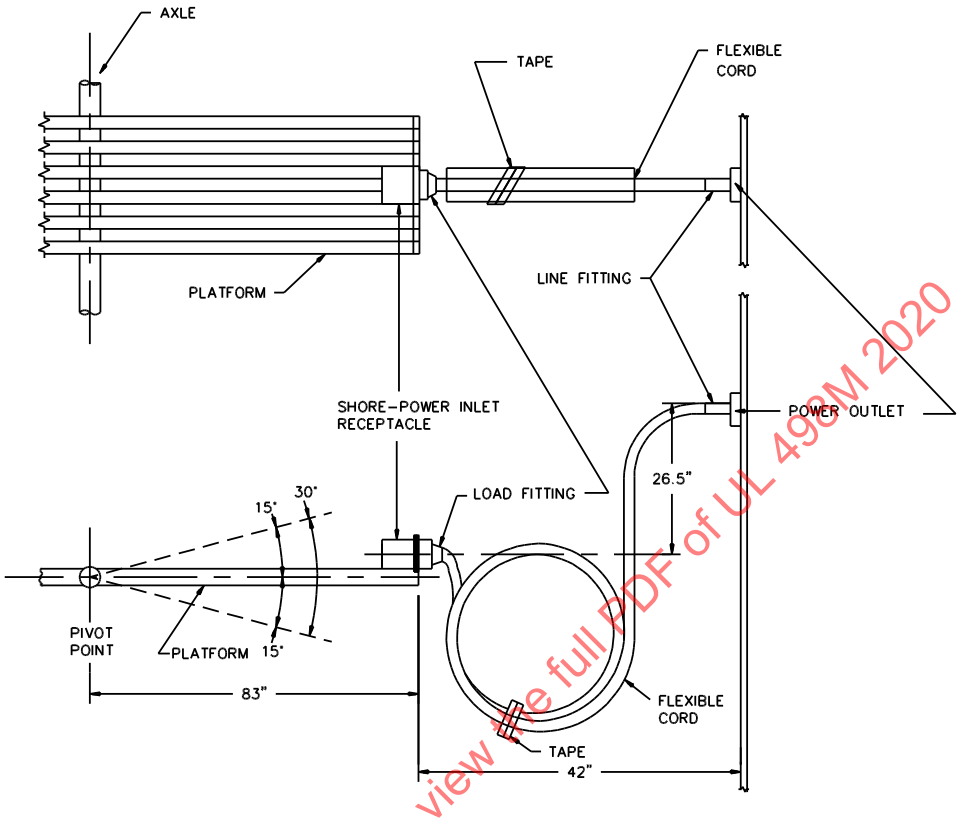
12 Mechanical Strength Test

12.1 As a result of the test described in 12.2 – 12.4, there shall not be any cracking, breaking, or other physical deterioration of the shore power inlet.

12.2 One shore power inlet is to be installed on a platform as shown in Figure 12.1. A 50 feet (15.2 m) shore power cable set is to be connected between the shore power inlet and a fixed end (to simulate its connection to a power inlet) as shown in the figure. The excess cord of the shore power cable set is to be coiled between the shore power inlet and the fixed point and taped at the base of the coil. During the test, the shore power cable set is to be free to move without striking any surface.

Figure 12.1

Mechanical Strength Test Apparatus



inch	26.5	42	83
mm	673	1067	2108

12.3 The platform is to be rotated to cause the mounted power inlet to move back and forth in a vertical direction through an angle of 30 degrees (15 degrees above and below the horizontal) for a total of 1000 cycles at a rate of 15 cycles per minute.

12.4 After completion of the 1000 cycles, the shore power inlet is to be visually examined for damage including cracking of the insulation materials, boots, and covers.

13 Water-Spray Test

13.1 As a result of the test described in 13.2 – 13.4, water shall not contact the current-carrying parts of a shore power inlet.

13.2 One shore power inlet is to be mounted to a vertical wall section with its face cover in the closed position.

13.3 The shore power inlet is then to be sprayed with water for one hour. The water-spray apparatus is to consist of three spray heads mounted in a water-supply pipe rack as illustrated in Figure 13.1. The spray heads are to be constructed in accordance with Figure 13.2. The water-supply pipe rack with spray heads is to be located so that the focal point of the spray is at the face cover of the shore power inlet. The water pressure is to be maintained at 5 lbs./inch^2 (34 kPa) at each spray head.