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Residential Controls – Surface-Type Controls for Electric Storage Water Heaters

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Foreword

This Standards Publication defines the basic elements of construction and mounting considered to be necessary for the application of electric storage water heater controls. It has been developed in the public interest and is designed to promote a better understanding between the manufacturer and the user by providing for interchangeability through industry standardization.

This Standards Publication is designated NEMA Standard unless otherwise indicated.

These standards are periodically reviewed by the Residential Controls Section of NEMA for any revisions necessary to keep them up-to-date with advancing technology.

Proposed or recommended revisions should be submitted to:

Vice President, Engineering Department
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1300 North 17th Street
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NEMA Standards Publication No. DC 5-2002 supersedes DC 5-1989 (R1996).

This Standards Publication was developed by the Residential Controls Section. Section approval of the standard does not necessarily imply that all section members voted for its approval or participated in its development. At the time it was approved, the group was composed of the following members:

Apcom Inc.—Franklin, TN
Emerson Electric Company, White-Rodgers Division—St. Louis, MO
First Technology—Standish, ME
GE Industrial Systems—Morrison, IL
Honeywell, Inc.—Golden Valley, MN
Johnson Controls, Inc.—Milwaukee, WI
Texas Instruments, Inc.—Attleboro, MA
Therm-O-Disc—Mansfield, OH

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Section 1
GENERAL

1.1 SCOPE

This Standards Publication applies to surface-type control thermostats and temperature-limiting controls for electric storage water heaters.

1.2 REFERENCES

The following publications are adopted in whole or in part as indicated, by reference in this Standards Publication, and are available from the organizations below.

1.2.1 Normative References

The following normative documents contain provisions, which through reference in this text, constitute provisions of this Standards Publication. By reference herein these publications are adopted, in whole or in part as indicated, in this Standards Publication.

American National Standards Institute (ANSI)
11 West 42nd Street
New York, NY 10036

ANSI/UL 174-1996	*Household Electric Storage-Tank Water Heater*
ANSI/UL 873-1994	*Temperature-Indicating and Regulating Equipment*
ANSI/UL 1453-1995	*Electric Booster and Commercial Storage Tank Water Heaters*

Canadian Standards Association (CSA)
178 Rexdale Boulevard
Toronto, Ontario, M9W 1R3, Canada

CSA C22.2 No.110-1994 (R1999)	*Construction and Test of Electric Storage-Tank Water Heaters*

1.3 DEFINITIONS

surface-type temperature-limiting control: A fixed setting control that is designed to limit by energy cut-off the temperature of the water within a water heater in response to the external temperature of the tank.

surface-type temperature-regulating thermostat: An adjustable control that is designed to control the temperature of the water within a water heater in response to the external temperature of the tank.

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Section 2
CLASSIFICATIONS

2.1 CLASSIFICATIONS

Controls within the scope of this Standards Publication shall be classified as follows:

Type A – Thermostat: single pole single throw; opens on temperature rise at scale setting.

Type B – Thermostat: two pole opposite throw (two circuit); one pole opens and one pole closes on temperature rise at scale setting.

Type C – Thermostat: single pole double throw; one throw opens and one throw closes on temperature rise at scale setting.

Type D – Temperature-limiting control: two pole single throw; both poles open on temperature rise at marked setting; must be manually reset; resettable at a temperature not lower than 120°F (48.9°C).

Type E – Temperature-limiting control: one pole single throw; opens on temperature rise at marked setting; must be manually reset; resettable at a temperature not lower than 120°F (48.9°C).

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Section 3
CONSTRUCTION

3.1 DIMENSIONS

To meet the requirements of 3.2 and 3.3, the general configuration for the bases of Type A, B, and C controls shall be in accordance with the dimensions as shown in Figure 3-1.

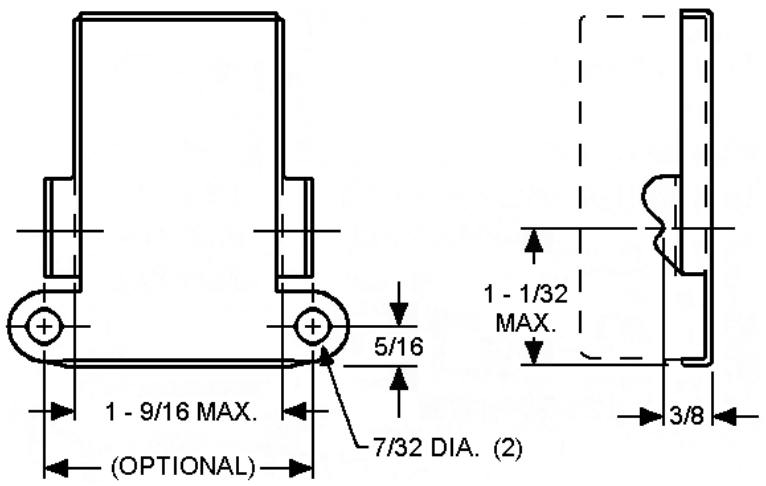

Figure 3-1
CONTROL BASE
(Typical outline of control base to illustrate required dimensions)

3.2 MOUNTING METHOD

Means shall be provided to permit mounting the control either directly on the water heater tank or on a flat metal pad attached to the tank.

3.3 MOUNTING MEANS

Means shall be provided to enable Type A, B, and C controls to be secured to the water heater tank either by screws or by mounting such as shown in Figure 3-2.

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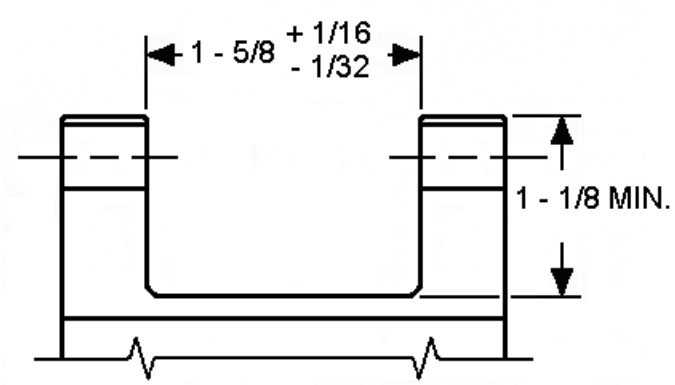

Figure 3-2
DIMENSIONS FOR MOUNTING BRACKET TABS

The projection of the thermostat shall be contained within the cavity of the mounting bracket base, as shown by the dotted line envelope in Figure 3-1.

Type D and E controls may be combined with the regulating control.

3.4 TERMINAL MARKINGS

Terminal markings shall be as follows:

Type of Controls	Switch Action	Terminal Marketing	Switch Schematic
A	Contacts open on temperature rise	1 and 2	1 o/ o 2
B	Contacts open on temperature rise	1 and 2	1 o/ o 2
	Contacts close on temperature rise	3 and 4	o o 3 4
C	Contacts open on temperature rise	1 and 2	o 2
	Contacts close on temperature rise	1 and 4	1 o/ o…o 4
D	Contacts open on temperature rise	1 and 2	1 o o 2
	Contacts open on temperature rise	3 and 4	3 o o 4
E	Contacts close on temperature rise	1 and 2	1 o o 2

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Section 4
PERFORMANCE AND RATINGS

4.1 PERFORMANCE AND RATINGS

Controls shall comply with ANSI/UL 174, ANSI/UL 873, ANSI/UL 1453, and CSA C22.2 No.110.

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