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MERICAN NATIONAL STANDARD

American National Standard

ANSI C12.9-1993 (R-1999)

American National Standard

for
Test Switches for
Transformer-Rated Meters

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
1300 NORTH 17TH STREET, SUITE 1847, ROSSLYN, VA 22209
(703) 841-3200 FAX: (703) 841-3300

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ANSI C12.9-1993 (R-1999)
(Revision of ANSI C12.9-1987)

American National Standard

for Test Switches for Transformer-Rated Meters

Accredited Standards Committee on Electricity Metering, C12

Accredited by the:

American National Standards Institute

Secretariat:

National Electrical Manufacturers Association

Reaffirmed: September 21, 1999
American National Standards Institute

Abstract: This standard is intended to encompass the dimensions and functions of meter test switches used with transformer-rated watthour meters in conjunction with instrument transformers.

Keywords: current switch, meter test switch, test jack, test plug, transformer-rated meter, voltage switch

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Foreword

(This introduction is not a part of ANSI C12.9-1993 (R-1999), American National Standard Requirements for Test Switches for Transformer-Rated Meters.)

This standard was developed by subcommittee 15 and ballotted by the Accredited Standards Committee on Electricity Metering, C12, for full consensus approval as an American National Standard. This revised version supersedes ANSI C12.9-1987.

This standard covers the dimensions and functions of meter test switches for transformer-rated watthour meters when used in conjunction with instrument transformers.

Suggestions for improvements of this standard will be welcomed. They should be in the form of a proposed change of text, together with appropriate supporting comments.

Comments on standards and requests for interpretations should be addressed to:

Secretary, NEMA
1300 N. 17th Street, Rosslyn, VA 22209

At the time this standard was completed, Subcommittee 15 of ANSI Committee C12, which developed and revised this standard, had the following membership:

F. A. Marta, *Chair*

W. Bachman	T. C. Drew	C. R. Green
J. H. Gagnon	J. W. Young	R. Breschini
S. Glasgow	R. Green	T. C. Vahlstrom
D. M. Nguyen	R. Shaw	

At the time this standard was completed, the American National Standards Committee C12 had the following membership:

Nile Oldham, *Chair* **Khaled Masri**, *Secretary*

American Public Power Association	Cruz R. Gomez
Measurement Canada	Avygdor Moise (Alternate) Vuoung Nguyen
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AMERICAN NATIONAL STANDARD **C12.9-1993 (R1999)**

for test switches for transformer-rated meters

1 Scope

This standard is intended to encompass the dimensions and functions of meter test switches used with transformer-rated watthour meters in conjunction with instrument transformers.

2 Definitions

2.1 short circuiting switch: A single-pole double-throw (make-before-break) transfer switch used to transfer current away from the meter.

2.2 test jack: A spring-jaw receptacle in the current element of a test switch that provides a bipolar test connection in the metering current circuit without interruption of the current circuit.

2.3 test jack switch: A single-pole, single-throw disconnect switch used in conjunction with a test jack to provide a parallel current path during normal operating conditions.

2.4 test plug: A bipolar mating plug to a test jack for inserting instrumentation into the metering current circuit.

2.5 voltage switch: A single-pole single-throw switch used to open or close a voltage circuit.

3 Standard ratings

3.1 Current

The current rating shall be 20 A minimum.

3.2 Voltage

The voltage rating shall be 300 V or 600 V.

4 General requirements

4.1 Material and workmanship

The test switch and its components shall be substantially constructed of suitable material in a workmanlike manner.

4.2 Nameplates

Nameplates are not required on these test switches, but a manufacturer's identifying marking (such as catalog number, trademark, etc.) shall be stamped, printed, affixed, or cast in a convenient place on each test switch. When required, a warning label indicating hidden internal jumpers should be affixed.

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4.3 Movable parts

Movable conducting parts such as blade hinges shall be held in place by locknuts or pins or their equivalent, arranged so that a firm and secure connection will be maintained at any position of the switch blade.

4.4 Number of poles

Standard test switches shall include the following forms:

a) Four pole
b) Seven pole
c) Ten pole

4.5 Alternate switch arrangements

Test switches may have various switch pole arrangements and spacings, some of which are shown in Figures 1 through 3.

4.6 Provision for test plugs

Each double-pole, short-circuiting current switch shall be designed to permit the insertion of a test plug. The test-jack switch can be either in the left-hand or the right-hand position.

4.7 Insulating barriers

Where needed, suitable insulating barriers shall be installed between the voltage switches and between potential switches as indicated in Figures 1 through 3. Barriers may be an integral part of the base, a separate part fastened to the base, or an integral part of each individual switch section.

4.8 Wiring terminals and test clips

4.8.1 Wiring terminals

Test switches shall be provided with suitable wiring terminals for the connection of AWG No. 14 to AWG No. 8 secondary conductors.

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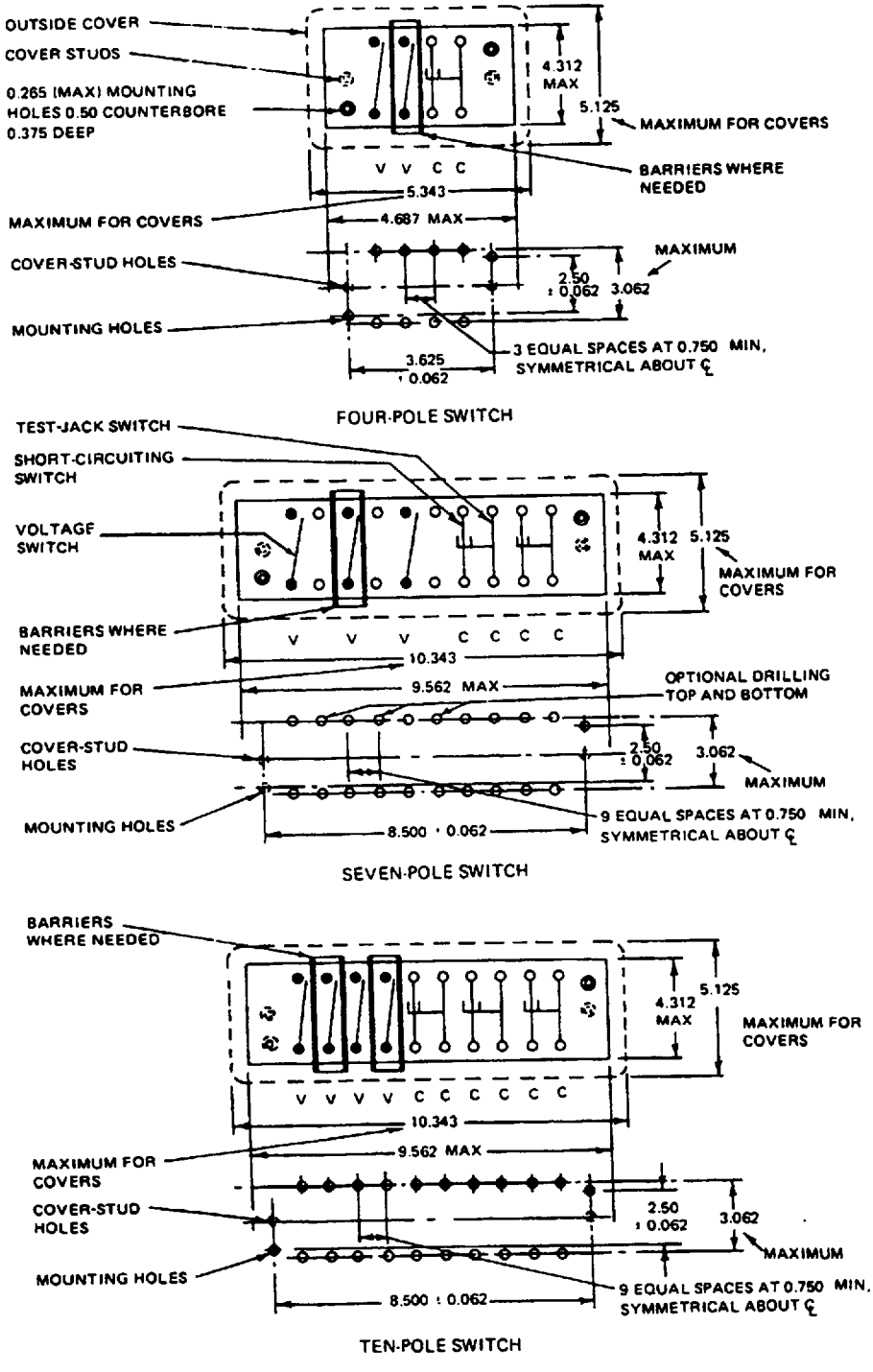


Figure 1 – Alternative arrangements and dimensions for four-, seven-, and ten-pole switches

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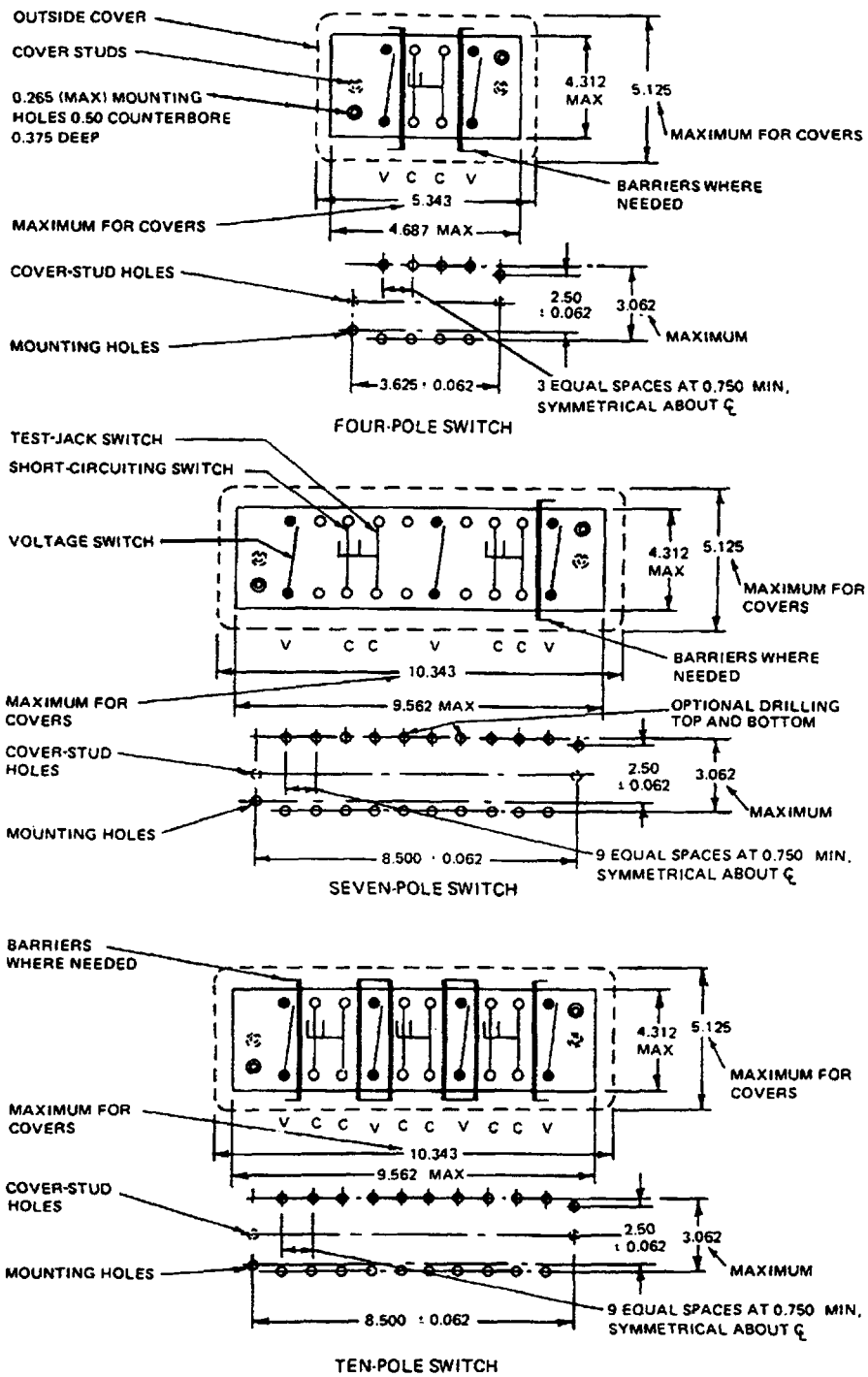
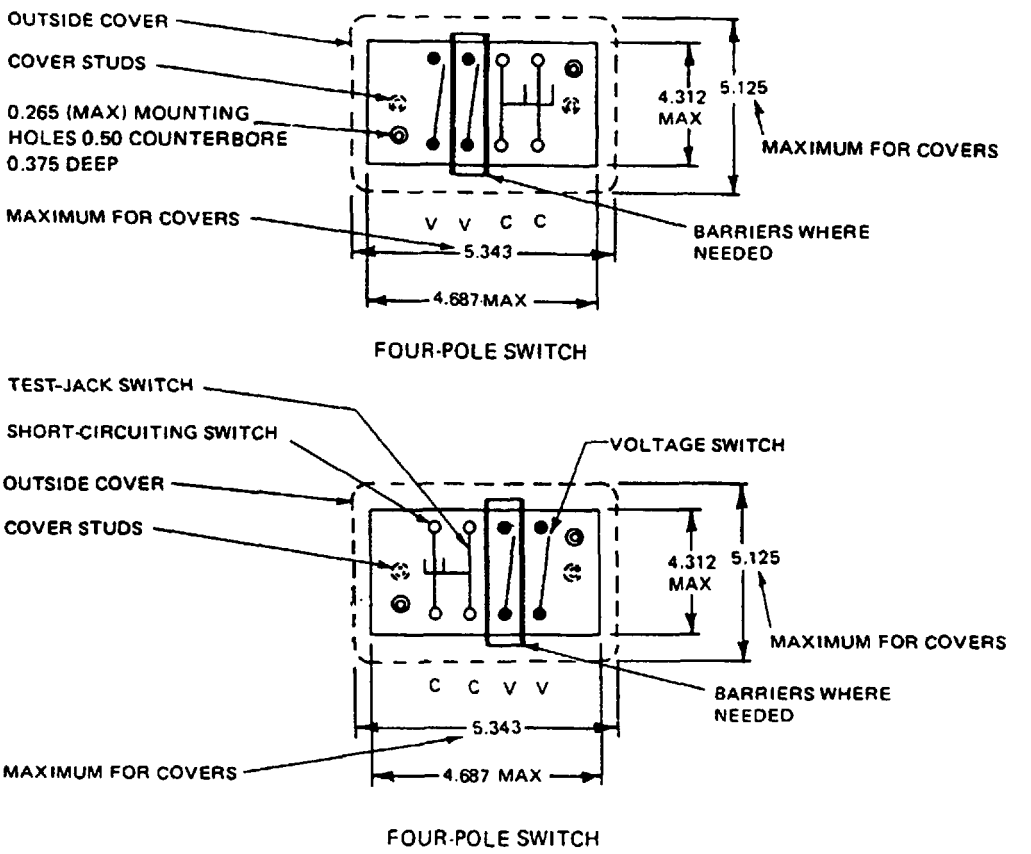


Figure 2 – Alternative arrangements and dimensions for four-, seven-, and ten-pole switches

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V — Voltage
C — Current

Figure 3 – Alternate arrangements and dimensions for four-pole switches, also applicable for seven- and ten-pole switches

4.8.2 Test clips

Facilities for attaching test clips shall be provided on the terminals or on the wire binding screws.

4.9 Mounting holes

Mounting holes (two minimum) shall be of the dimensions shown in Figures 1 through 3.

4.10 Cover

4.10.1 General

An insulated cover shall be available for the test switches and held in place by cover studs. The cover may be made of glass, metal, or plastic, but shall not exceed the maximum dimensions shown in Figures 1 through 3. When the cover is in place, all switches shall be in a closed position.

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4.10.2 Cover holes

The diameter of the cover-stud holes shall be 0.281 in. located as shown in Figures 1 through 3.

4.10.3 Cover studs

Removable cover studs with suitable provisions for sealing shall be available for use in each instrument-transformer-meter test switch in the positions indicated in Figures 1 through 3. The diameter of these studs shall not exceed 0.25 in. Standard instrument-transformer-meter test switches shall be provided either with or without cover studs.

4.11 Acceptable spacings

The minimum acceptable spacings shall be as indicated in Table 1.

Table 1 – Minimum acceptable spacings

Voltage between parts involved (V)	Minimum spacings from live parts to			
	Parts of opposite polarity*		Grounded metal**	
	Over surface (in.)	Through air (in.)	Over surface (in.)	Through air (in.)
0-300***	0.750*	0.375*	0.500	0.375
301-600	1.250*	0.750	1.000	0.500

* To be acceptable at other than wiring terminals, through-air and over-surface spacings of 0.375 in. between parts of opposite polarity shall withstand a special dielectric strength test at 6 000 V, 60 Hz, for 1 min.

** To be acceptable at other than wiring terminals, through-air and over-surface spacings of 0.375 in. between current-carrying parts and cast-metal enclosure or grounded metal, where indentation or deformation of the overall enclosure will not affect spacings, shall withstand a special dielectric strength test at 6 000 V, 60 Hz, for 1 min.

*** 300 V spacings apply to a 600 V test switch, if the phase-to-neutral voltage does not exceed 300 V for spacings: (1) from neutral to phase-voltage parts, and (2) from neutral to grounded metal.

4.12 Barriers

Barriers, or other insulation material suitable for the purpose, shall be added where the spacings between the parts through the air or over the surface, or both, would otherwise be less than the required values.

4.13 Dimensions

All drawings are dimensioned in inches. To convert to the metric system in millimeters, multiply the dimensions in inches by 25.4. The resulting metric dimensions shall be rounded to the nearest 0.02 mm.

5 Performance

a) Compliance of a test switch with these requirements shall be determined by subjecting a representative sample to the tests mentioned.

b) A test switch shall be capable of carrying its rated current continuously without any part showing a temperature rise of more than 30°C. Alternating current shall be employed for the temperature test at an ambient temperature of 25 ± 5°C (77 ± 9°F). Temperature

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readings are to be obtained by means of thermometers or thermocouples. A temperature is considered to be constant when three successive readings, taken at 15 min. intervals, indicate no change ± 1°C.

c) The test switch is to be mounted as in actual service whenever practical. An optional mounting with a standard test switch cover and with wire openings sealed with cotton is also acceptable.

d) The current switches are to be wired in series using AWG No. 8 aluminum or AWG No. 10 copper wire (preferably solid wire with an eye loop for connection to the stud). The length of the wire should be in accordance with Figure 4.

e) The temperature measurement, as a minimum, shall be taken at two points on each current position. One point is at the middle of the blade, and the other is at the side of the contact jaw.

f) The following sequence of tests shall be performed:
   1) Apply rated current until temperatures become constant (see item b). No temperature shall exceed 30°C above ambient.
   2) After temperatures have become constant, apply 150% of rated current. Operate each switch for 18 cycles at a rate of six cycles per min. The enclosure or cover described in item c) may be either left open or removed for this test.
   3) Reduce the current to zero and allow the test switch to cool for 2 h or until it reaches ambient temperature.
   4) Repeat step 1.

g) A switch is considered to have successfully completed the above tests when no constant temperature reading in the tests per item f, steps 1 or 4 has exceeded 30°C above ambient and the difference between corresponding readings taken in the tests per item f, steps 1 and 4 does not exceed 7°C.

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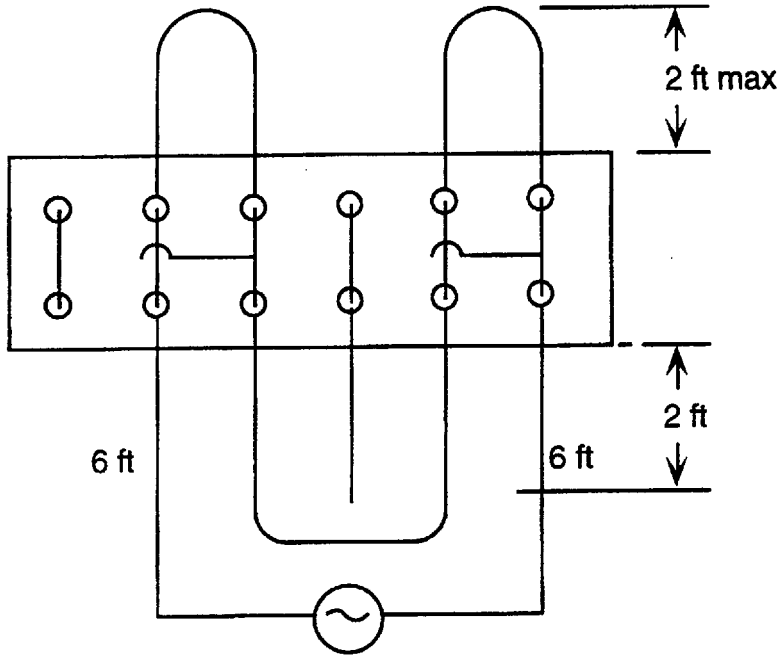


Figure 4 – Performance test wiring diagram

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