ANSI E1.24 – 2012 (R2017)
Entertainment Technology
Dimensional Requirements for Stage Pin Connectors

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Interest category codes:
CP = custom-market producer
DE = designer
DR = dealer rental company
G = general interest
MP = mass-market producer
U = user

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Foreword

(This foreword is not part of American National Standard E1.24 and contains no requirements.)

This purpose of this Standard is to present the dimensional requirements of stage pin connectors and is intended to provide for the intermateability of these products made by different manufacturers. The original version of this Standard was developed from 1995 through1997 by the Engineering Commission of the United States Institute for Theatre Technology, Inc. (USITT) and was known as USITT S3-1997 – Standard for Stage Pin Connectors. In 2003, USITT transferred maintenance of the S3-1997 to ESTA, an ANSI-accredited standards developer.

ESTA is a non-profit trade association representing the entertainment technology industry. Its members include dealers, manufacturers, manufacturer representatives, service and production companies, scenic houses, designers and consultants. The Association addresses areas of common concern such as technical standards, customer service, equipment quality, business practices, insurance, and credit reporting, and provides a wide variety of services to Members. ESTA's Technical Standards Program (TSP) is accredited by the American National Standards Institute (ANSI) to write American National Standards. This accreditation means that ESTA's Technical Standards Program for standards-making has passed a detailed scrutiny by ANSI to insure that it meets the most stringent requirements for fairness and proper public review of proposed ESTA standards. The accreditation allows ESTA to submit standards for the ANSI public review and comment process, and then publish them as ANSI standards.

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The United States Institute for Theatre Technology, Inc. (USITT) is the Association of Design, Production, and Technology Professionals in the Performing Arts and Entertainment Industry. Founded in 1960, the mission of the Institute is to advance the professions of design and technology in the performing arts by disseminating information, actively promoting the advancement of knowledge and skills and facilitating national and international communication among its members. USITT is the United States Center of OISTAT, the International Organization of Scenographers, Theatre Architects and Technicians.

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1 General

1.1 Scope
This configuration standard covers the dimensional requirements and mechanical requirements related to intermateability for a series of split-pin and sleeve wiring devices known as Pin Connectors or Stage Pin Connectors that are used predominately in the theatre, television and motion picture industries in North America. This is not a safety standard.

1.2 Compliance
Compliance with this Standard is strictly voluntary and the responsibility of the manufacturer. Markings and identification or other claims of compliance do not constitute certification or approval by ESTA.

2 Normative references
NFPA 70 National Electrical Code® (NEC)
National Fire Protection Association
Batterymarch Park
Quincy, MA. 02269

Underwriters Laboratories Standard 498 - Attachment Plugs and Receptacles
Underwriters Laboratories
333 Pfingsten Road
Northbrook, IL 60062-2096

3 Conventions
Throughout this publication, the following shall apply:

3.1 All dimensions are in inches with the SI equivalent following in parenthesis, unless otherwise specified

3.2 Decimal dimensions without tolerances shall be subject to a plus or minus of 0.005-inch tolerance (0.127 millimeters).

3.3 Angular dimensions without tolerances shall be subject to a plus or minus 1 degree tolerance.

3.4 “G” denotes equipment ground.

3.5 “W” denotes neutral (grounded) conductor.

3.6 Leading edges of plug pins shall be free of burrs and sharp edges.

3.7 All sleeves and sleeve tolerances are symmetrically located about center points.

3.8 Female sleeves associated with pins that are 0.062 minimum longer than other pins are engaged prior to the other female sleeves.

3.9 Configurations used on alternating current systems are limited to 50 or 60 Hertz unless otherwise specified.

3.10 Dimensions shown is this standard are for the purposes of intermateability and do not preclude other designs.

3.11 The electrical ratings of the configurations in these standards are AC and DC unless specifically stated AC or DC.

3.12 The "dash" symbol (-) as used in wiring device ratings indicates that the device is suitable for use on any circuit within the range of the ratings

3.13 The "slant" symbol (/) as used in wiring device ratings indicates that two or more voltages are present simultaneously between different terminals.

4 General Requirements

Dimensional requirements and type designations are shown in figures 1 - 5. In order to address the issue of “Pin Float” and compatibility, reference test fixtures are specified in figures 6 - 10.

Unless otherwise marked, attachment plugs and connector bodies are designed to attach to cords or cables sized per Table 400.5(A) of the NEC®. If Table 400.5(A) does not indicate sufficient ampacity, cables are sized per the 60° C columns E and F of Table 400.5(B). Devices suitable for use with 75° C, 90° C or column D cables shall be marked.

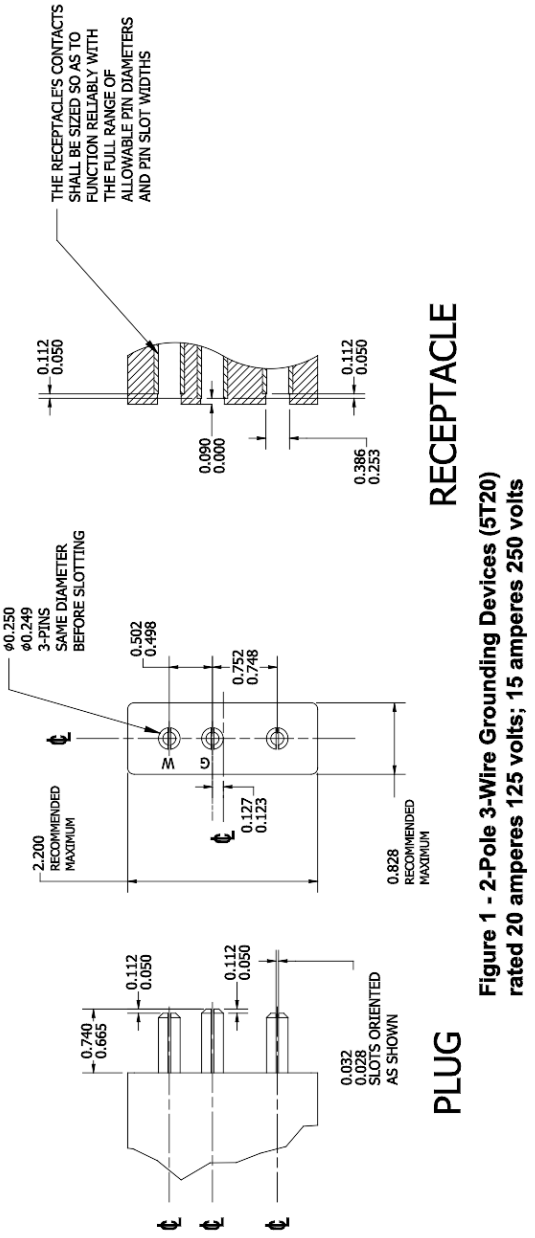


Figure 1 - 2-Pole 3-Wire Grounding Devices (5T20) rated 20 amperes 125 volts; 15 amperes 250 volts

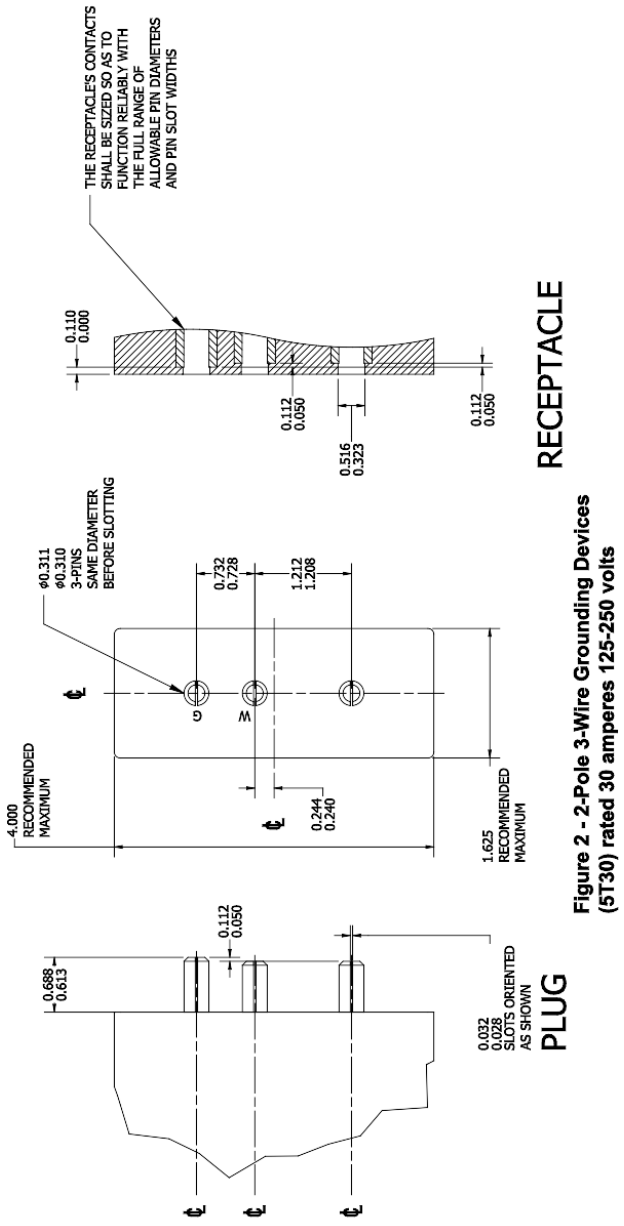


Figure 2 - 2-Pole 3-Wire Grounding Devices (5T30) rated 30 amperes 125 - 250 volts

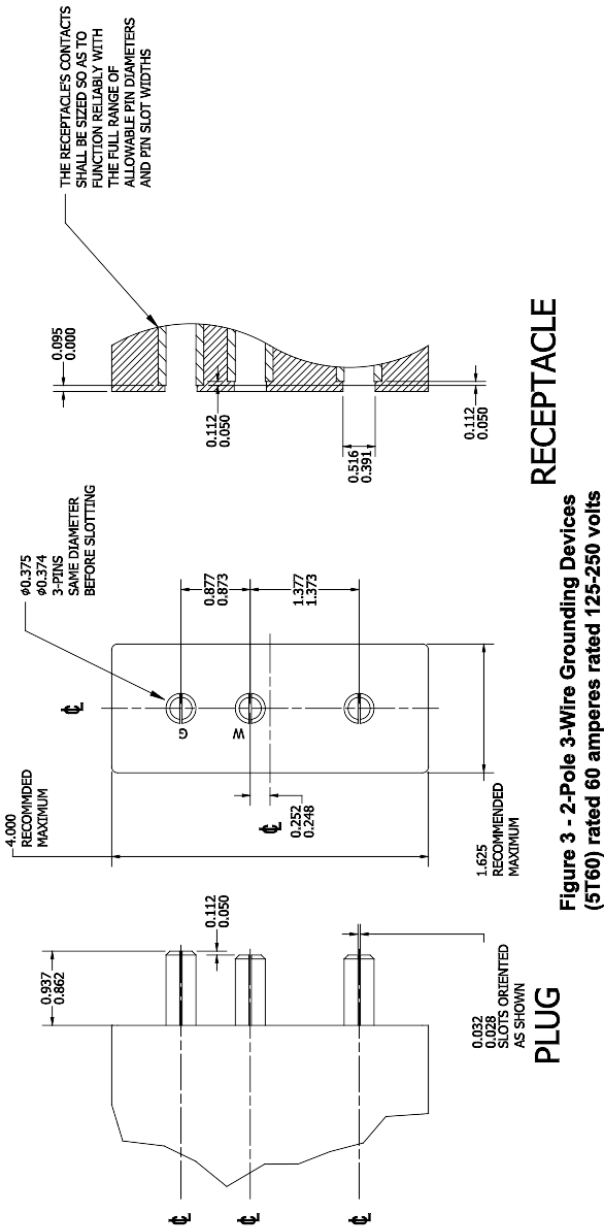


Figure 3 - 2-Pole 3-Wire Grounding Devices (5T60) rated 60 amperes rated 125 - 250 volts

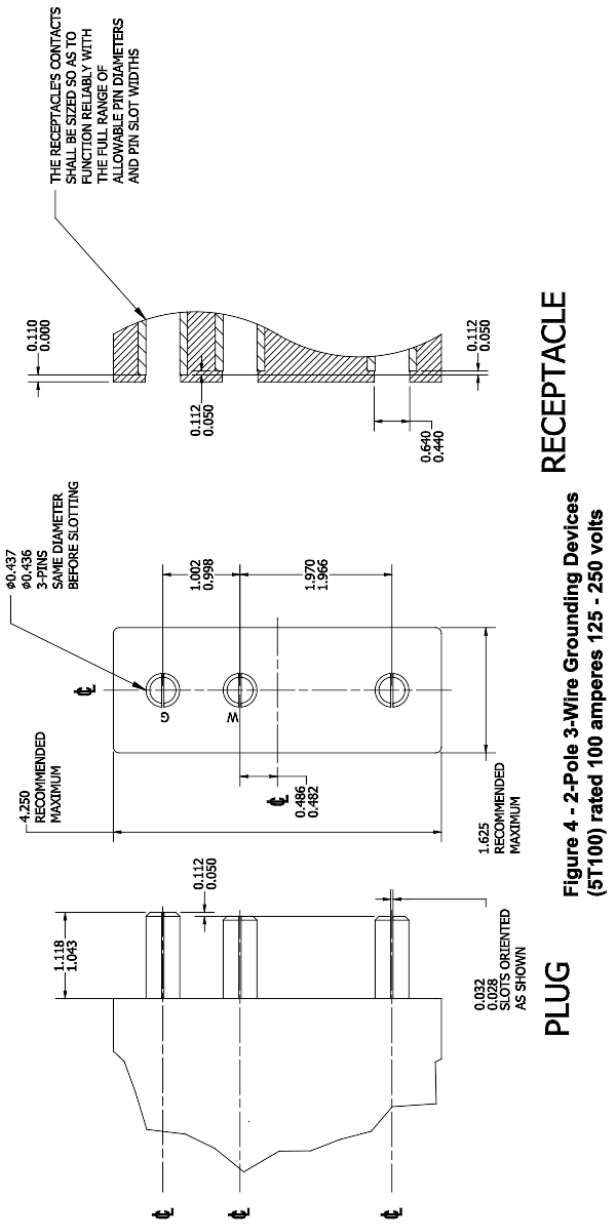


Figure 4 - 2-Pole 3-Wire Grounding Devices (5T100) rated 100 amperes 125 - 250 volts

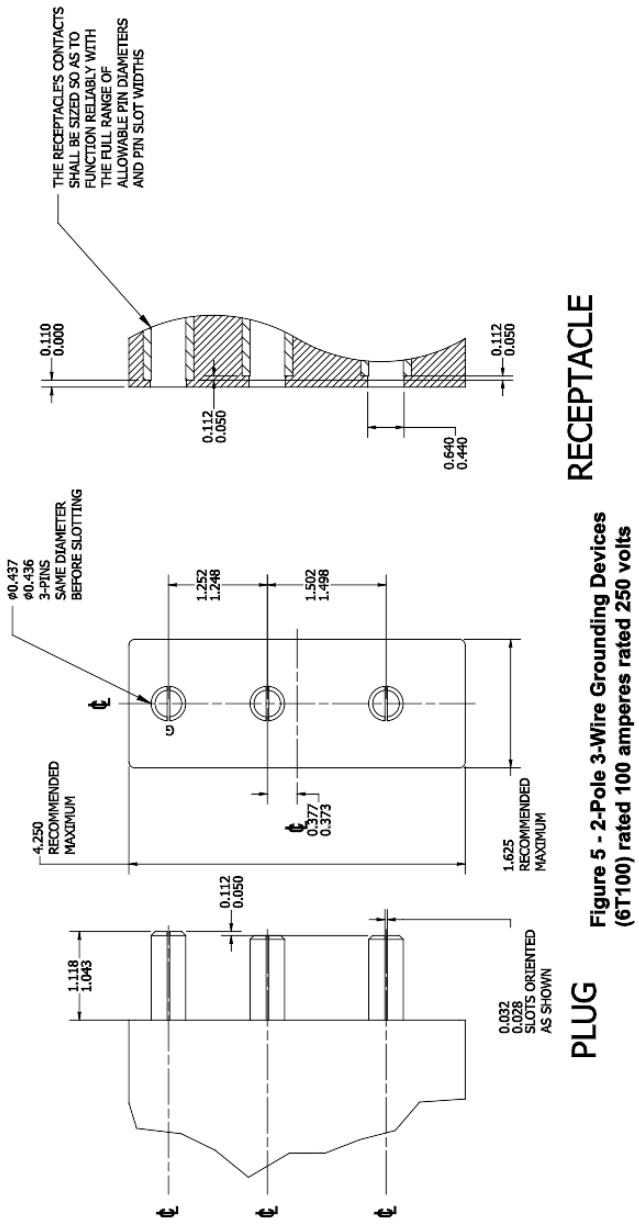


Figure 5 - 2-Pole 3-Wire Grounding Devices (6T100) rated 100 amperes rated 250 volts

4.1 Male pins
All male pins shall be of the split type. Male devices shall be made so as to mate with the female fixture described in figures 6 through 10.

4.2 Female devices
All female devices shall be made so as to mate with the male fixture described in figures 6 through 10.

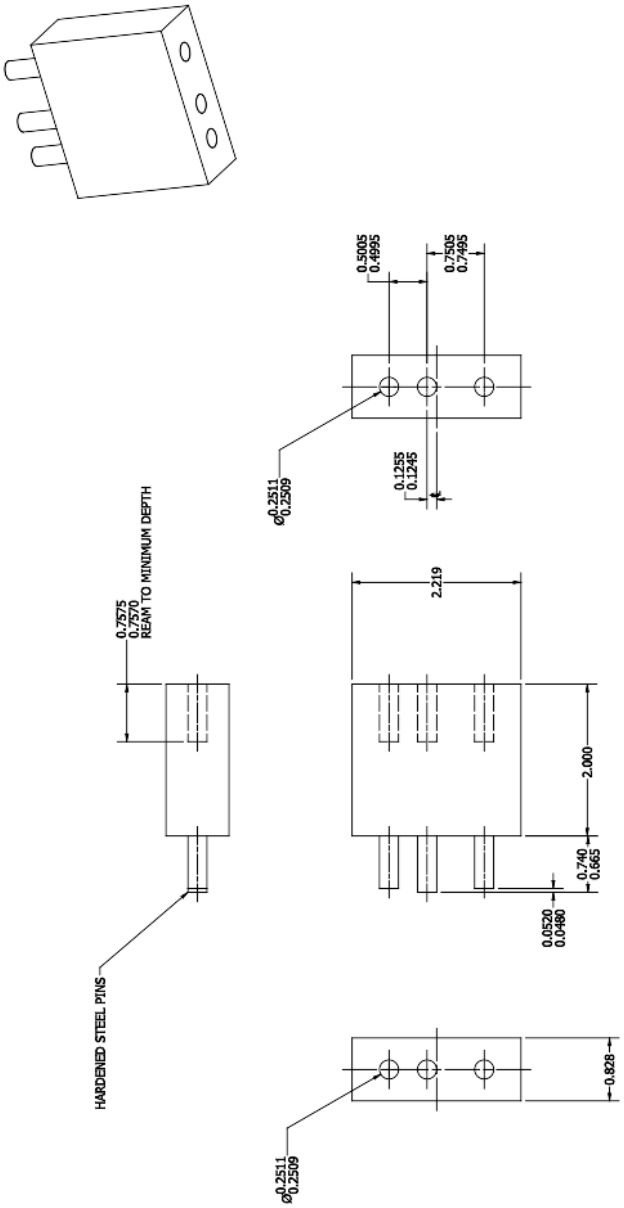


Figure 6 - Pin and sleeve alignment test fixture - 20 ampere devices (5T20)

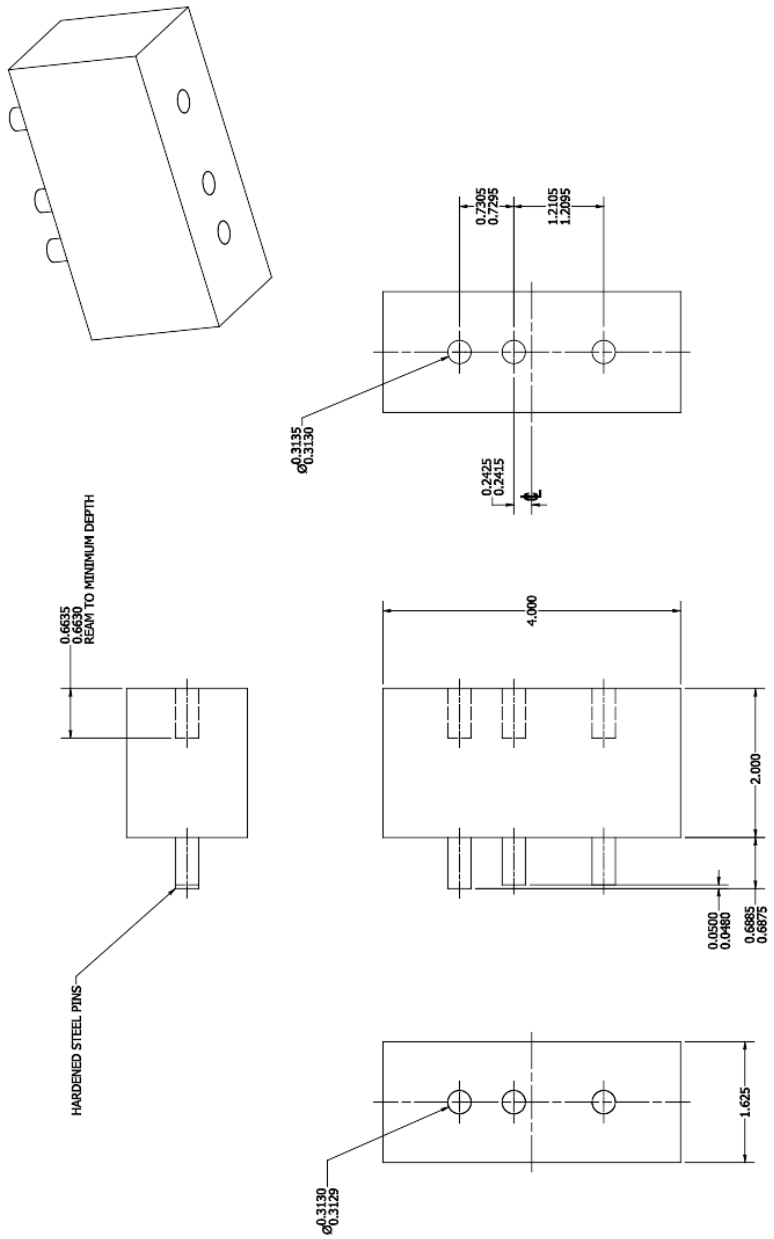


Figure 7 - Pin and sleeve alignment test fixture - 30 ampere device (5T30)

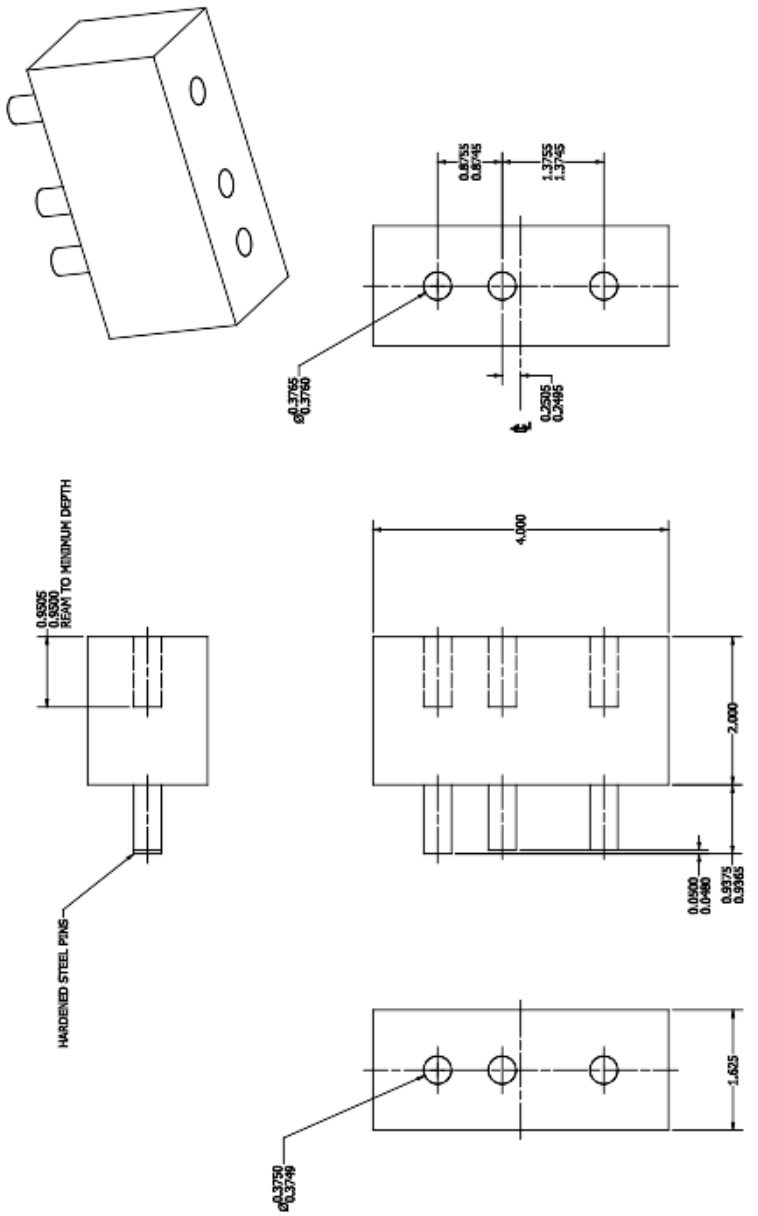


Figure 8 - Pin and sleeve alignment test fixture - 60 ampere device (5T60)

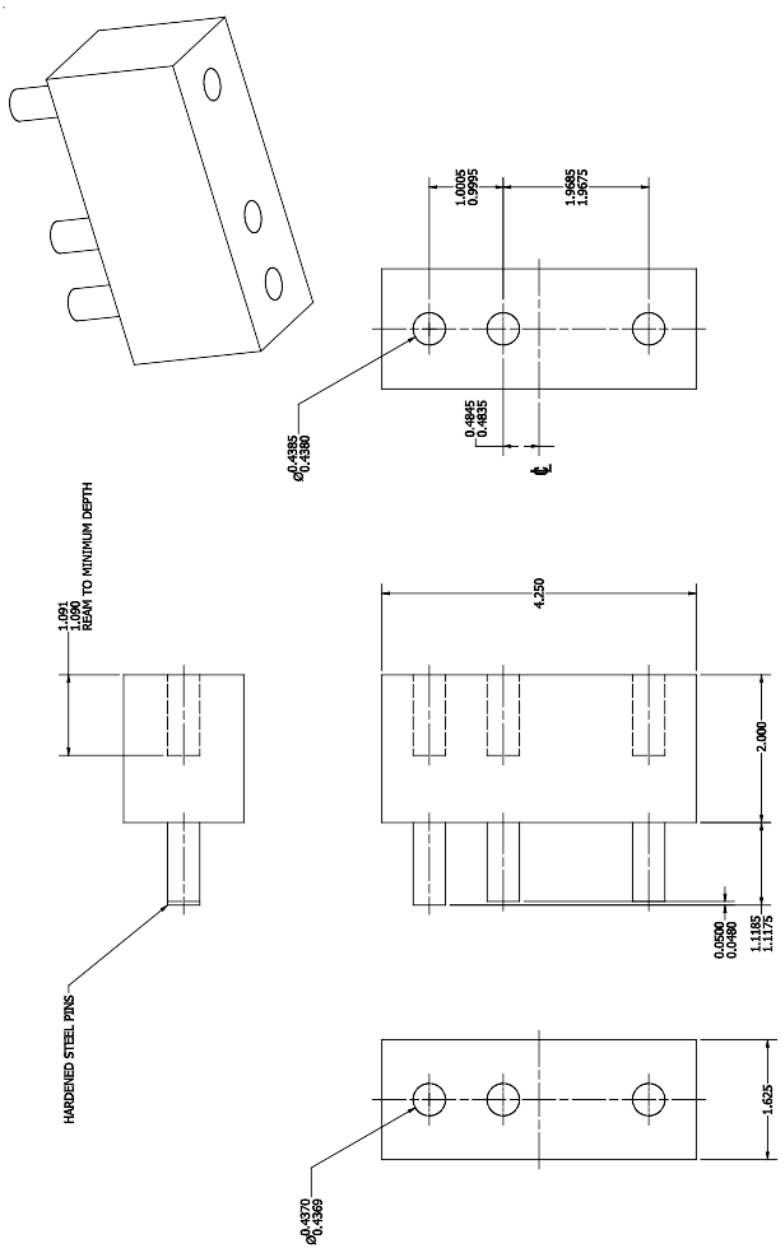


Figure 9 - Pin and sleeve alignment test fixture - 100 ampere device (5T100)

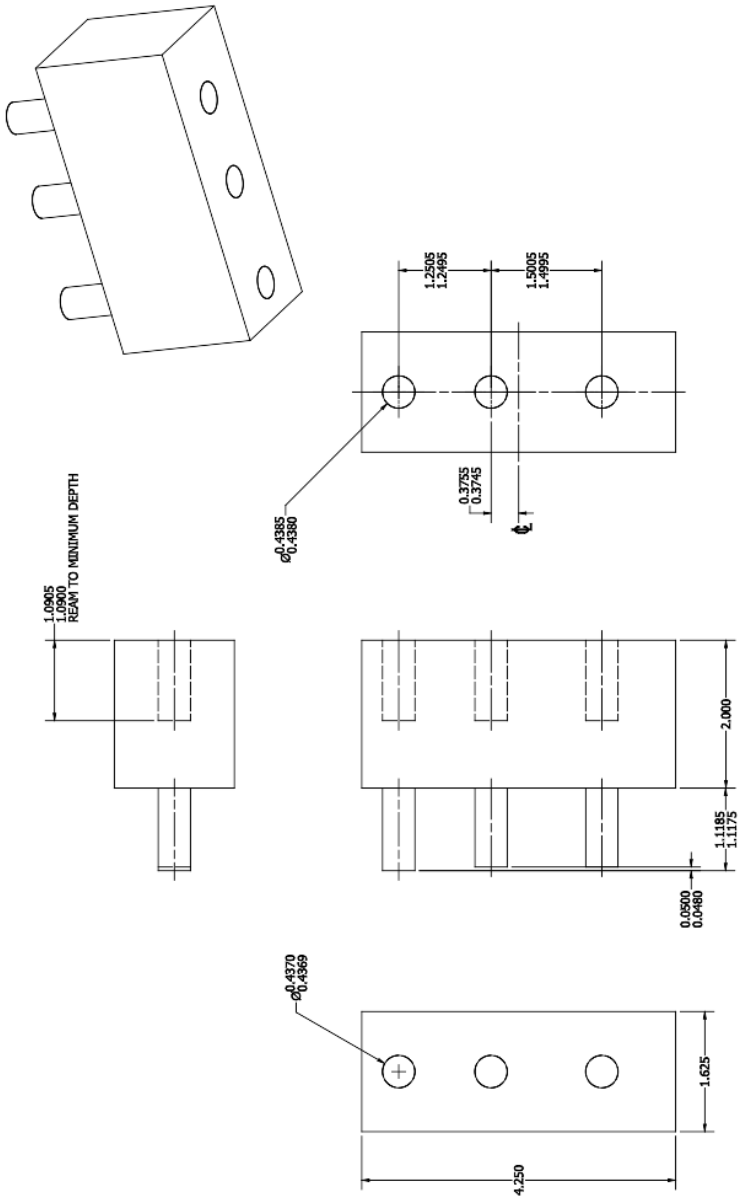


Figure 10 - Pin and sleeve alignment test fixture - 100 ampere device (6T100)

4.3 Grounded terminals

Grounded terminals indicated by the letter "W" on the configuration drawings for field connection of a grounded circuit conductor shall be identified by a metallic coating substantially "white" in color, or marked with "W" or "White" or a "White" marking. Alternately, use of the letter “N” is permitted for this identification.

4.4 Grounding terminals

Grounding terminals indicated by the letter "G" on the configuration drawings for field connection of an equipment grounding conductor shall be identified with a "G", "Green" or a green colored marking. Use of the grounding symbol is permitted.

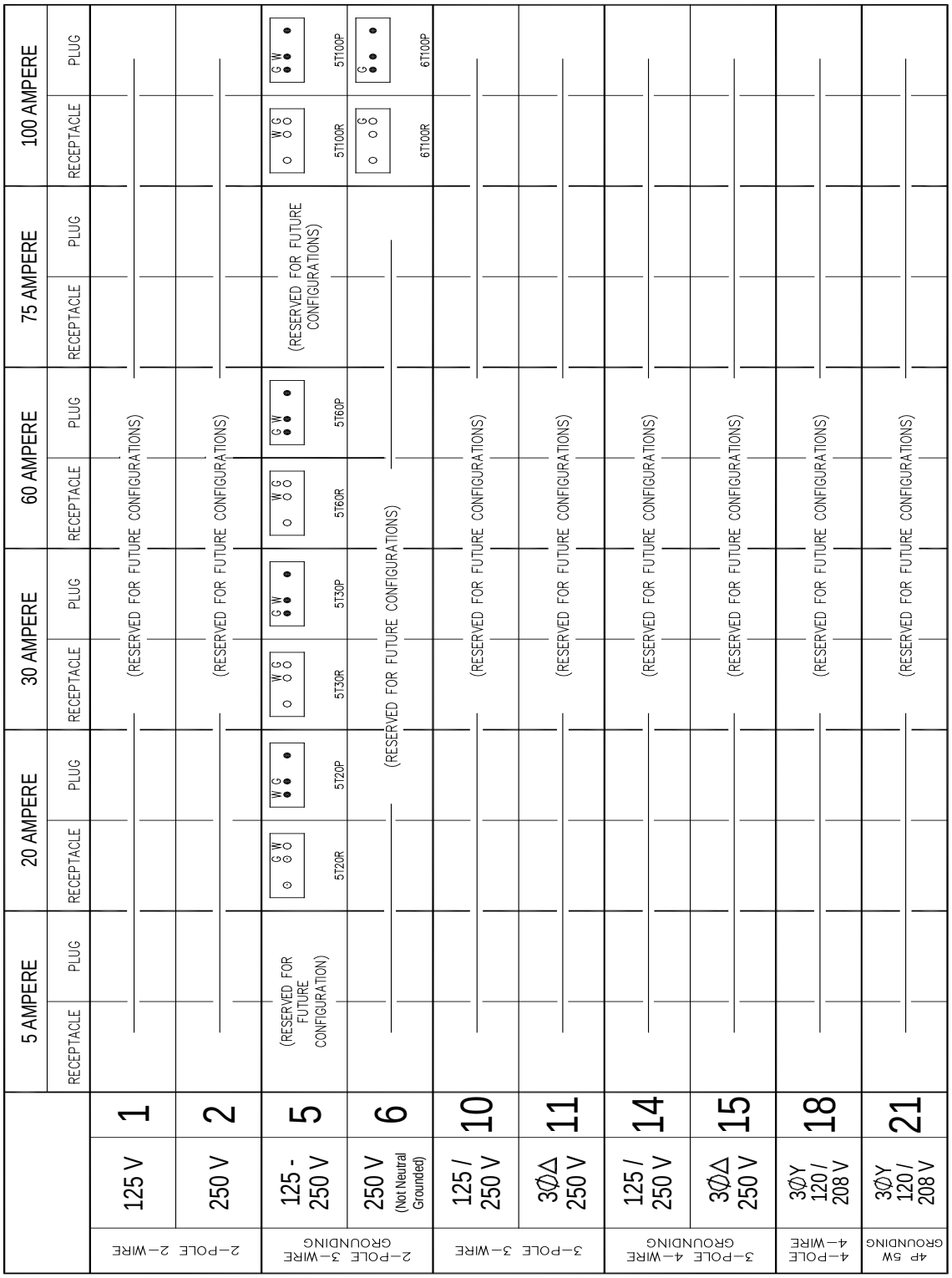
4.5 Other terminals
Other terminals may be marked or unmarked. If marked they shall be marked “H” for grounded neutral systems, or “X” and “Y”. These terminals must be distinguishable from those marked in accordance with 4.3 and 4.4 above.

4.6 Female contact accessibility
Connectors rated 20 amperes or less that meet the Underwriters Laboratories standard 498 (Attachment Plugs and Receptacles) female contact probe test are suitable for use in unrestricted areas. Connectors with ratings greater than 20 amps do not necessarily meet the probe test and must be guarded from the general public.

4.7 Entrance hole for 20 ampere female connector
The dimension for the entrance hole on the 20 ampere female connector is recommended. If the recommended dimension is exceeded on a 20 ampere device, it shall be guarded from the general public and marked, "To be used by Qualified Personnel Only."

4.8 250 volt, 100 ampere connectors (6T100)
250 volt, 100 ampere connectors shall have a yellow cover or body.

Annex A - Pin Connector Chart (Normative)



Pin Connector Chart Notes (Normative):

1) Dimensions in chart are approximate - refer to standard for actual dimensions.

2) Pin diameters:
   20A .... 1/4"
   30A .... 5/16"
   60A .... 3/8"
   100A .... 7/16"

3) Contact functions:
   W or N .... grounded (neutral) conductor
   G .... grounding conductor

4) Type 5 connectors are dual-voltage rated for use only on grounded-neutral systems at either 125V in North America or 250V in other areas of the world. Type 5 connectors shall be used only in line to grounded neutral applications in both their 125 and 250 volt ratings.

5) Type 6 connectors shall not be used on grounded neutral systems.

-- END --