

INCH-POUND

MIL-STD-202-207

18 April 2015

SUPERSEDING

MIL-STD-202G

w/CHANGE 2 (IN PART)

28 June 2013

(see 6.1)

DEPARTMENT OF DEFENSE
TEST METHOD STANDARD
METHOD 207, HIGH IMPACT SHOCK



AMSC N/A

FSC 59GP



FOREWORD

1. This standard is approved for use by all Departments and Agencies of the Department of Defense.
2. This entire standard has been revised. This revision has resulted in many changes to the format, but the most significant one is the splitting the document into test methods. See MIL-STD-202 for the change summary.
3. Comments, suggestions, or questions on this document should be emailed to std202@dla.mil or addressed to: Commander, Defense Logistics Agency, DLA Land and Maritime, ATTN: VAT, P.O. Box 3990, Columbus, OH 43218–3990. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil>.

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METHOD 207
HIGH IMPACT SHOCK

1. SCOPE

1.1 Purpose. This test is performed for the purpose of determining the ability of various parts to withstand shock of the same severity as that produced by underwater explosions, collision impacts, near-miss gunfire, blasts caused by air explosions, and field conditions. Exact simulation of some of the severe shock motions experienced in the field is difficult to reproduce; however, parts that successfully complete the test of this method have been found to possess the necessary ruggedness for this use. The test apparatus utilized in this method is the same as that designated as Shock Testing Machine for Lightweight Equipment in MIL-S-901, Shock Tests, HI (High-Impact), Shipboard Machinery, Equipment and Systems, Requirements for. The purpose of this apparatus is to determine the ability of equipment installed aboard naval ships to withstand shock and still continue to perform its operational function. This test method is limited to testing of parts weighing not more than 300 pounds.

2. APPLICABLE DOCUMENTS

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-S-901	-	Shock Tests, H.I. (High Impact), Shipboard Machinery, Equipment, and Systems, Requirements For
MIL-DTL-1222	-	Studs, Bolts, Screws and Nuts for Applications Where a High Degree Of Reliability Is Required; General Specification For
MIL-I-24768/14	-	Insulation, Plastic, Laminated, Thermosetting, Cotton-Fabric-Base, Phenolic-Resin (FBG)

(Copies of these documents are available online at <http://quicksearch.dla.mil>)

3. DEFINITIONS

This section not applicable to this standard.

4. GENERAL REQUIREMENTS

4.1. Precautions. The apparatus shall be examined periodically for damage. Any hardware that has become defective by being deformed or cracked shall be replaced. Particular attention shall be given to the anvil plate which shall not be bowed more than 1 inch at the center. Proper safeguards shall be taken to protect personnel from objects that may become loosened and act as projectiles as a result of this test. A sound-warning arrangement shall be made, for use in alerting personnel in the vicinity of the test of the impending drop of the hammer.

4.2. Apparatus. The apparatus used in this test method shall be as shown on figure 1 and the associated detail drawings. The parts shall be installed on a mounting fixture which is attached to the anvil plate of the shock-testing apparatus. A 400-pound hammer shall be dropped from a specified height (see 4.6.4) onto a shock pad located on the anvil plate. The shock motion is then transmitted by the anvil plate to the parts attached on the mounting fixture.

4.3. Anvil plate. The test apparatus of this method is so constructed that the anvil plate (see figure 3) can be installed, in sequence, in two positions. By utilizing these two installation positions and separately employing both hammers of the apparatus shock is applied through the three principal mutually perpendicular axes of the part being subjected to test. One position is to locate the anvil in such a manner that it will receive blows through the back of the anvil plate by contact from the horizontal hammer, and blows on the top shock pad of the anvil plate by a drop of the vertical hammer as shown on figure 2. The other position is as shown on figure 1, whereby the end shock pad is contacted by the horizontal hammer.

4.4 Hammers. The test apparatus is equipped with two 400-pound hammers. One hammer renders a blow by a vertical drop. The other hammer applies a force in a horizontal direction. In this manner, and by changing the orientation of the anvil plate, blows may be delivered to the anvil and the parts in three directions.

4.5 Mounting fixtures. Figure 4A, figure 4B, figure 5, and figure 6 show standard mounting fixtures that shall be used when testing parts with this test apparatus. These mounting fixtures simulate platform and panel mountings. The applicable mounting fixture shall be as specified. When one of the standard mounting fixtures shown on figure 4A, figure 4B, figure 5, and figure 6 cannot be used, the individual specification shall specify a mounting fixture or adapter which approximates the actual rigidity encountered in service.

4.6. Procedure.

4.6.1 Mounting method. The specimens shall be installed by their normal mounting means on the mounting fixture in their normal operating position. Bolts for mounting the parts shall conform to type I, type II, or type III, grade 2, of [MIL-DTL-1222](#), Studs, Bolts, Hex Cap Screws, Socket Head Cap Screws and Nuts. Mounting bolts shall be checked for tightness before each blow. Care shall be taken in the mounting procedure to prevent initial stresses being applied to the specimens prior to shock.

4.6.2 Anvil-plate bolts and positioning springs. Due to the severity of the shock applied to the anvil plate by a series of three blows, the anvil-plate bolts shall be checked for tightness before each series of blows. The spacing between stops of the positioning springs (1.5 inches) shall also be corrected before each succession of blows.

4.6.3 Direction of shock. A total of nine blows, three through each of the three principal mutually perpendicular axes for the heights indicated in 4.6.4, shall be delivered to the anvil plate supporting the specimens under test. Direction of the shock shall be, in order, to the back, top, and side. Back and top blows shall be applied with the anvil plate located to receive blows from the horizontal and vertical hammers. Side blows are delivered by the horizontal hammer contacting the end shock pad of the anvil plate (see 4.3).

4.6.4 Height of hammer drops. The hammer shall strike the shock pad on the anvil plate, in sequence, from heights of 1 foot, 3 feet, and 5 feet.

4.6.5 Hammer supports. During the test, the hammer not in use shall be disengaged from the lifting cable and supported so that the hammer and its support are not in contact with the anvil plate.

4.6.6 Electrical load and operating conditions. The electrical load and operating conditions applied to the specimens shall be as specified.

4.6.7 External resilient mountings. Unless otherwise specified, no external resilient mountings associated with the specimen being tested shall be used. Integral mounting devices and external resilient mountings (if specified) associated with the specimen shall remain unblocked during tests.

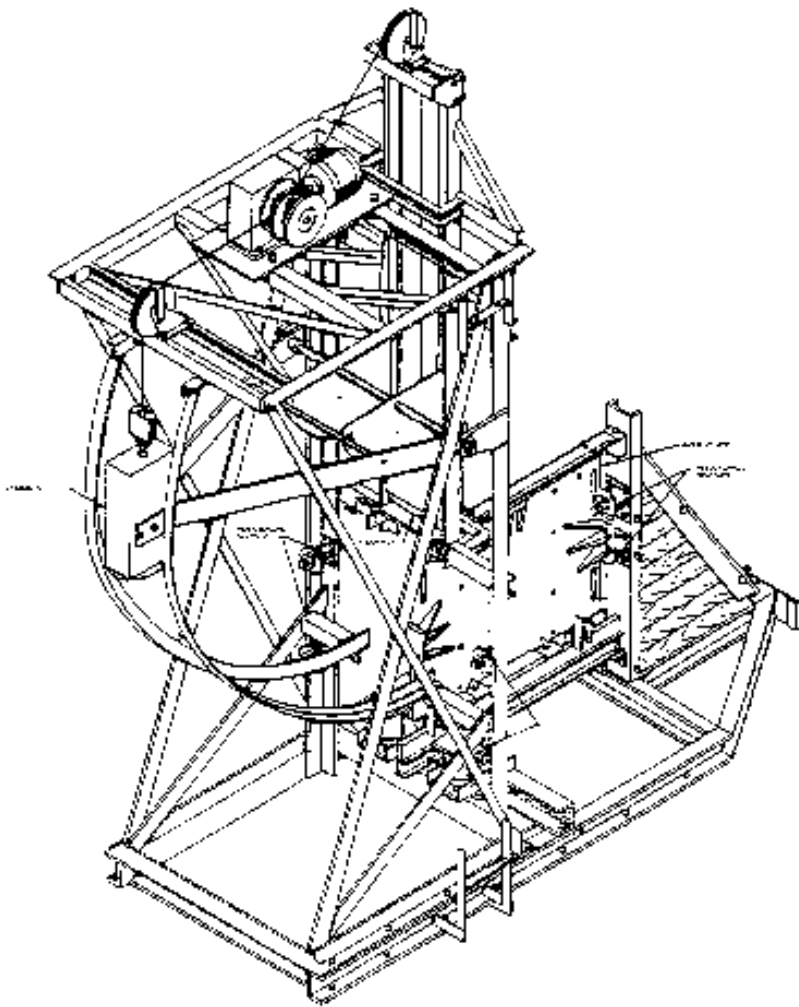


FIGURE 1. High-impact shock-testing apparatus.

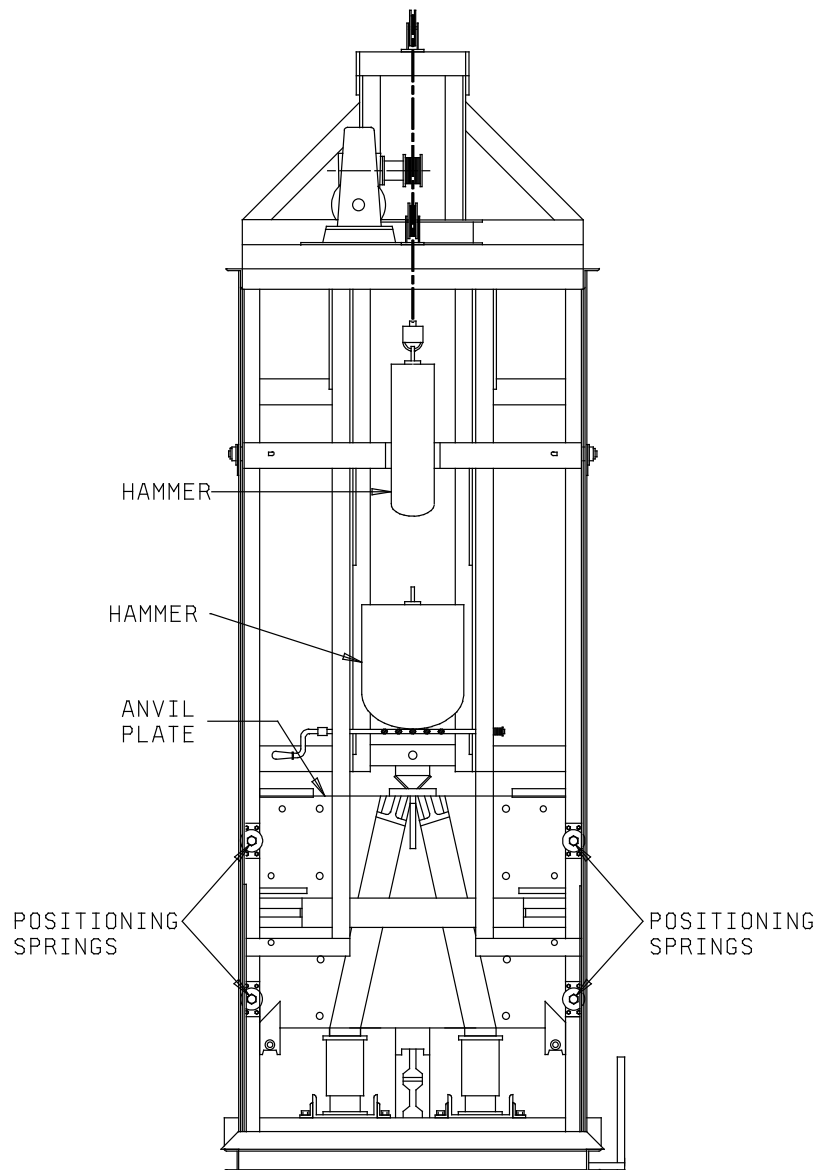
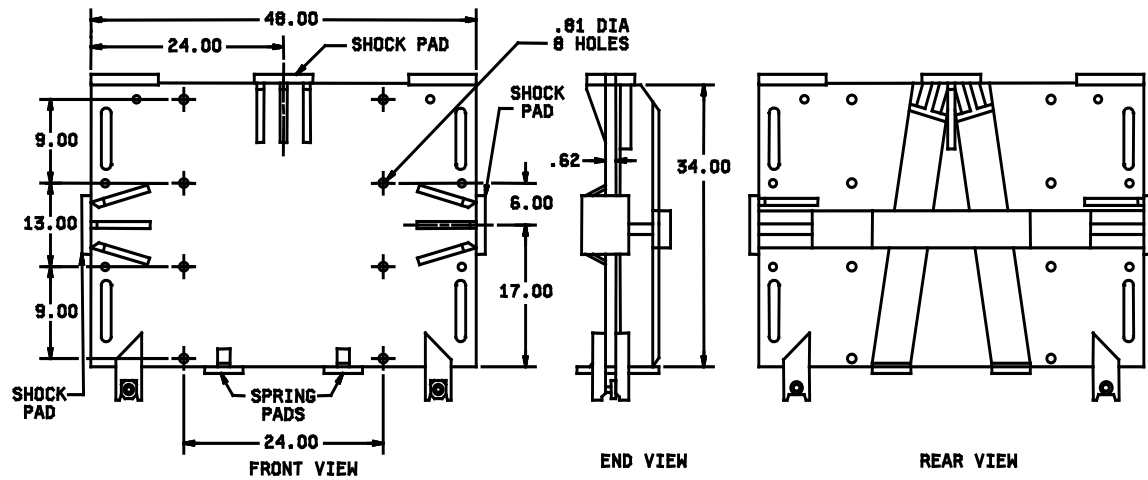


FIGURE 2. High-impact shock-testing apparatus (backview) with anvil plate located for back and top blows.



Inches	mm	Inches	mm
.62	15.75	17.00	431.80
.81	20.57	24.00	609.60
6.00	152.40	34.00	863.60
9.00	228.60	48.00	1,219.20
13.00	330.20		

NOTE: Unless otherwise specified, tolerances are $\pm .06$ (1.52 mm).

FIGURE 3. Anvil plate of shock-testing apparatus.

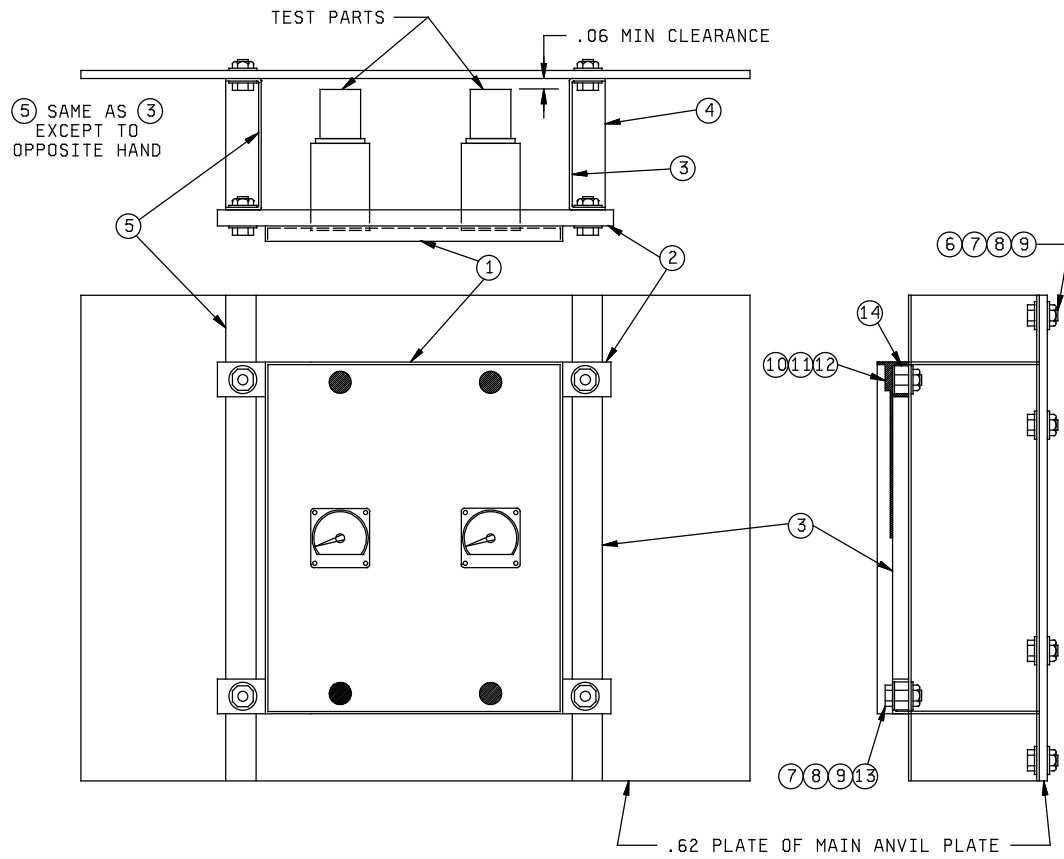


FIGURE 4A. Standard mounting fixtures for electrical-indicating switchboard meters and other panel-mounted parts.

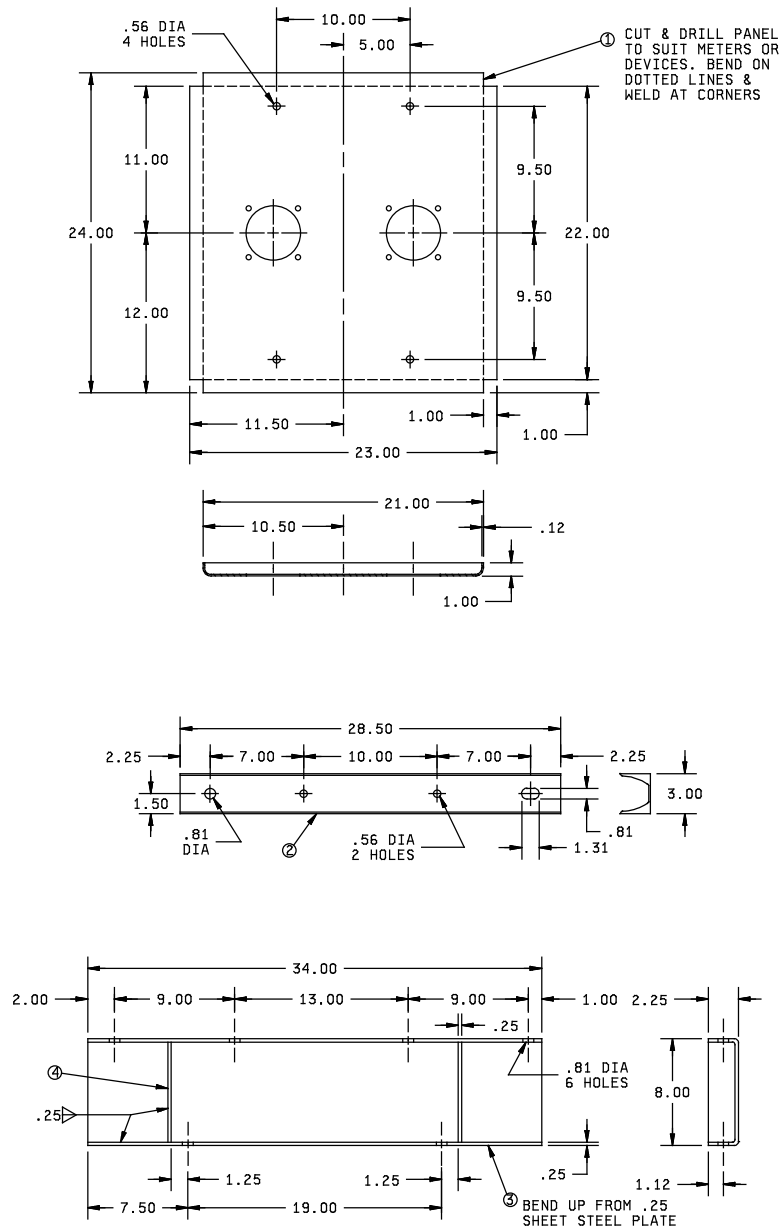


FIGURE 4A. Standard mounting fixtures for electrical-indicating switchboard meters and other panel-mounted parts - Continued.

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Item	Description	Material	Quantity <u>1/</u>
1	Panel	Steel	1
2	Standard channel, 3 x 5 pound	Steel	2
3	Fabricated spacer	Steel	1
4	Spacer stiffener	Steel	4
5	Fabricated spacer	Steel	1
6	Hex head bolt, .750-10UNC-2A x 1.75 lg	Steel	1
7	Hex head nut, .750-10UNC-2B	Steel	12
8	Washer, 2.00 OD x .81 ID	Steel	12
9	Washer, 1.38 OD x .81 ID	Steel	12
10	Hex head bolt, .500-13UNC-2A x 1.00 lg	Steel	4
11	Hex head nut, .500-13UNC-2B	Steel	4
12	Washer, 1.38 OD x .56 ID	Steel	4
13	Hex head bolt, .750-10UNC-2A x 2.50 lg	Steel	4
14	Block, 2.25 x 2.00 x 1.25	Steel	4

1/ Quantities are for one mounting.

Inches	mm	Inches	mm	Inches	mm	Inches	mm
.06	1.52	1.31	33.27	7.00	177.80	12.00	304.80
.12	3.05	1.38	35.05	7.50	190.50	13.00	330.20
.25	6.35	1.50	38.10	8.00	203.20	19.00	482.60
.56	14.22	1.75	44.45	9.00	228.60	21.00	533.40
.62	15.75	2.00	50.80	9.50	241.30	22.00	558.80
.81	20.57	2.25	57.15	10.00	254.00	23.00	584.20
1.00	25.40	2.50	63.50	10.50	266.70	24.00	609.60
1.12	28.45	3.00	76.20	11.00	279.40	28.50	722.90
1.25	31.75	5.00	127.00	11.50	292.10	34.00	863.60

NOTES:

1. Unless otherwise specified, tolerance is $\pm .06$ (1.52 mm).
2. Two identical specimens shall be mounted on the panel provided there is a minimum separation of 3.00 inches (76.20 mm) when the indicated 10.00 inches (254.00 mm) centers are used (total weight not to exceed 40 pounds).
3. In the event that the requirement of note 2 can be met, but is desired to test only one specimen, a counterbalance of approximately the same weight shall be mounted in a corresponding position on the opposite side of the panel. Mounting dimensions for the counterbalance shall be the same as for the specimen.
4. In the event that the requirement of note 2 cannot be met, the specimen shall be mounted centrally on the panel; if the individual specimen weight is in excess of 20 pounds, the panel shall be reinforced as indicated on figure 4B.
5. Specimens too large to be tested on this panel shall utilize the panel indicated on figure 4B.
6. If the depth of the specimen is such that the minimum clearance of 1.00 inch (25.40 mm) cannot be maintained, the specimen shall be turned around so that the front faces the anvil plate.

FIGURE 4A. Standard mounting fixtures for electrical-indicating switchboard meters and other panel-mounted parts - Continued.

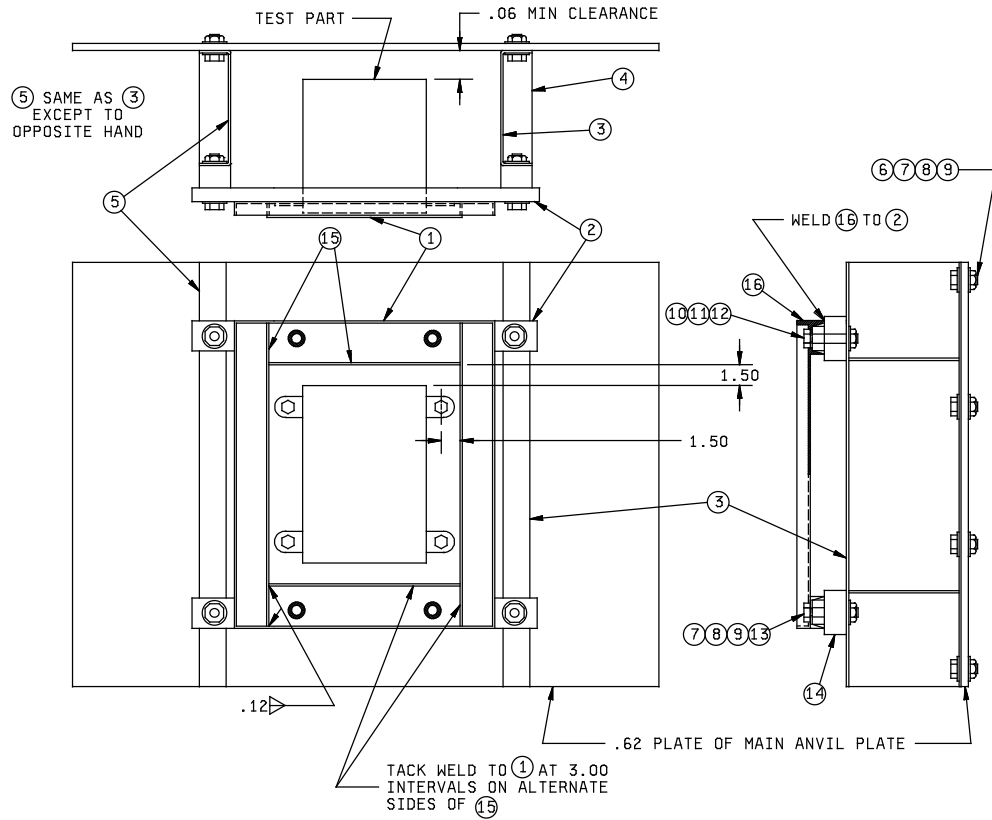


FIGURE 4B. Standard mounting fixtures for electrical-indicating switchboard meters and other panel-mounted parts.

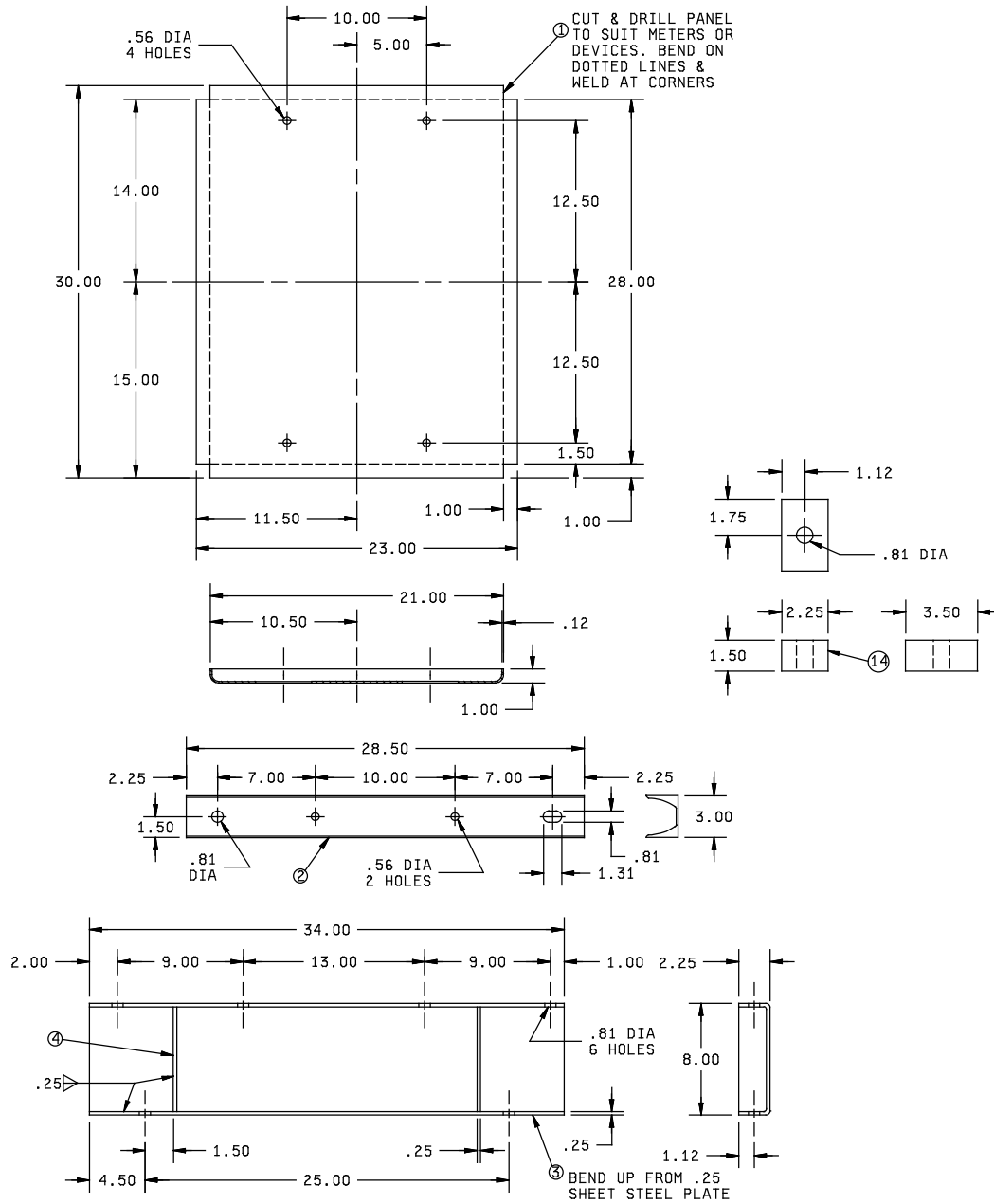


FIGURE 4B. Standard mounting fixtures for electrical-indicating switchboard meters and other panel-mounted parts - Continued.

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Item	Description	Material	Quantity <u>1/</u>
1	Panel	Steel	1
2	Standard channel, 3 x 5 pound	Steel	2
3	Fabricated spacer	Steel	1
4	Spacer stiffener	Steel	4
5	Fabricated spacer	Steel	1
6	Hex head bolt, .750-10UNC-2A x .75 lg	Steel	8
7	Hex head nut, .750-10UNC-2B	Steel	12
8	Washer, 2.00 OD x .18 ID	Steel	12
9	Washer, 1.38 OD x .18 ID	Steel	12
10	Hex head bolt, .500-13UNC-2A x 1.00 lg	Steel	4
11	Hex head nut, .500-13UNC-2B	Steel	4
12	Washer, 1.38 OD x .56 ID	Steel	4
13	Hex head bolt, .750-10UNC-2A x 4.00 lg	Steel	4
14	Spacer block	Steel	4
15	Strap, .12 x 1.00	Steel	4
16	Block, 2.25 x 21.25	Steel	4

1/ Quantities are for one mounting.

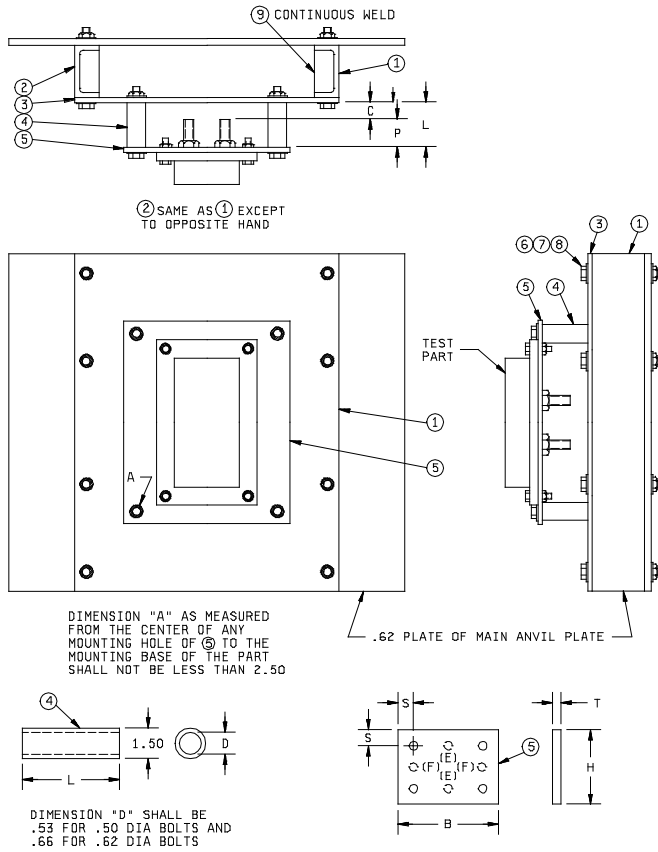
Inches	mm	Inches	mm	Inches	mm	Inches	mm
.06	1.52	1.12	28.45	4.00	101.60	12.50	317.50
.12	3.05	1.31	33.27	4.50	114.30	13.00	330.20
.18	4.57	1.38	35.05	5.00	127.00	14.00	355.60
.25	6.35	1.50	38.10	7.00	177.80	15.00	381.00
.56	14.22	1.75	44.45	8.00	203.20	21.00	533.40
.62	15.75	2.00	50.80	9.00	228.60	21.25	539.75
.75	19.05	2.25	57.15	10.00	254.00	23.00	584.20
.81	20.57	3.00	76.20	10.50	266.70	25.00	635.00
1.00	25.40	3.50	88.90	11.50	292.10	28.00	710.20
						30.00	762.00
						34.00	863.60

NOTES:

1. Unless otherwise specified, tolerance is ± 0.06 (1.52 mm).
2. This panel shall not be used if the panel indicated on figure 4A is applicable.
3. The spacer blocks, item 14, shall be used only when necessary to maintain a minimum clearance of 1.00 inch (25.40 mm) between the specimen and the anvil plate.
4. In the event that the depth of the specimen is such that the minimum clearance of 1.00 inch (25.40 mm) cannot be maintained, the spacer blocks shall be removed and the specimen mounted with the front surface toward the anvil plate.

FIGURE 4B. Standard mounting fixtures for electrical-indicating switchboard meters and other panel-mounted parts - Continued.

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Inches	mm
.18	4.57
.50	12.70
.53	13.46
.62	15.75
.66	16.76
1.00	25.40
1.50	38.10
1.94	49.28
2.00	50.80
2.50	63.50
7.00	177.80
27.00	685.80
34.00	863.60
36.00	914.40

Item	Description	Material	Quantity <u>1/</u>
1	Car building channel, 4 x 13.8 pounds	Steel	1
2	Car building channel, 4 x 13.8 pounds	Steel	1
<u>2/</u> 3	Auxiliary mounting plate, .50 x 27.00 x 34.00	Steel	1
4	Spacer (see table 1)	Steel	
5	Plastic mounting panel (see table 2)	Plastic, laminated, type FBG, in accordance with MIL-I-24768/14	
6	Hex head bolt; .750-10UNC-2A x 7.00 lg	Steel (heat-treated)	8
7	Hex head nut, .750-10UNC-2B	Steel	8
8	Washer, 2.00 OD x .18 ID	Steel	16
9	Pipe spacer, 1.00 standard, 1.94 lg	Steel	8

1/ Quantities are for one mounting.

2/ The size of the auxiliary mounting plate shall be increased to .50 x 36.00 x 34.00 for panels No. 5 and No. 6 listed in table II.

FIGURE 5. Standard mounting fixtures for electrical controller parts (contractors, relays, resistors, etc.).

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Holes (E) are drilled equidistant from corner holes on same center line - panels No. 5 and No. 6 only. Holes (F) are drilled equidistant from corner holes on same center line - panels No. 4 and No. 6 only.

TABLE I. Spacers.

When P (note assembly plan view) is:		L	Remarks
Less than	Greater than		
.75 (19.05)		1.50 (38.10)	
3.25 (82.55)	.75 (19.05)	P + .75	
	3.25 (82.55)	4.00 (101.60)	Cut out .50 inch (12.70 mm) thick auxiliary mounting plate, item 3, to give .75 inch clearance around rear projections.

Selection of panel size: The panel employed shall be the smallest size shown in the above table that will result in a clearance, "A" (note assembly front elevation view), of at least 2.50.

TABLE II. Mounting panels.

Panel number	B	H	T	S	Size of bolts	Bolt-hole diameter	Quantity
1	9.00 (228.60)	12.00 (304.80)	.75 (19.05)	1.00 (25.40)	.500-13UNC-2A	.56 (14.22)	4
2	12.00 (304.80)	16.00 (406.40)	1.00 (25.40)	1.00 (25.40)	.500-13UNC-2A	.56 (14.22)	4
3	16.00 (406.40)	20.00 (508.00)	1.00 (25.40)	1.00 (25.40)	.500-13UNC-2A	.56 (14.22)	4
4	20.00 (508.00)	24.00 (609.60)	1.00 (25.40)	1.00 (25.40)	.500-13UNC-2A	.56 (14.22)	6
5	32.00 (812.80)	24.00 (609.60)	1.00 (25.40)	1.25 (31.75)	.625-11UNC-2A	.69 (17.53)	6
6	36.00 (914.40)	34.00 (863.60)	1.00 (25.40)	1.25 (31.75)	.625-11UNC-2A	.69 (17.53)	8

NOTES:

1. Metric equivalents are in parentheses.
2. Unless otherwise specified, tolerances are ± 0.06 inch (1.52 mm).

FIGURE 5. Standard mounting fixtures for electrical controller parts
(contractors, relays, resistors, etc.) - Continued.

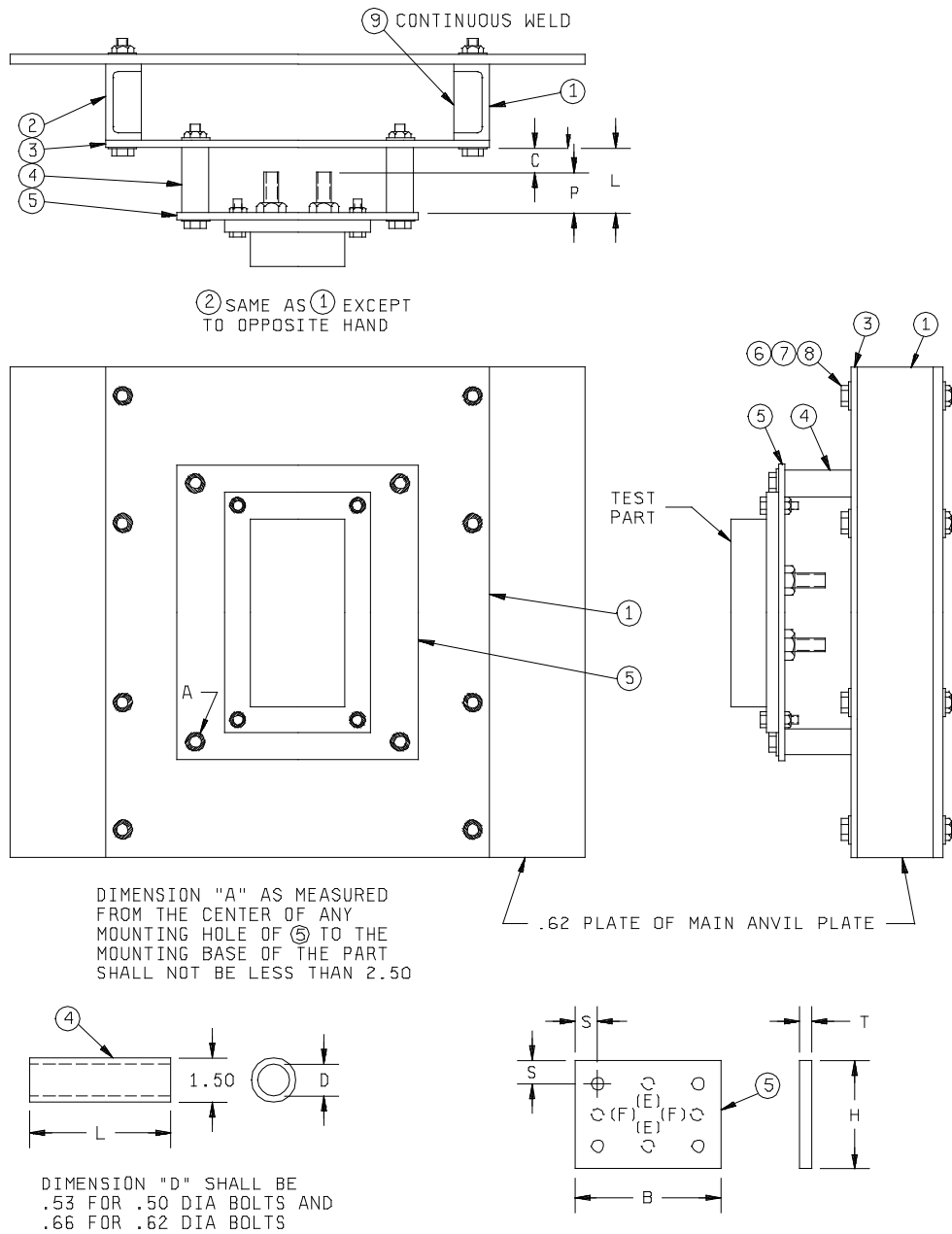


FIGURE 6. Standard mounting fixtures for deck, or platform, mounted parts.

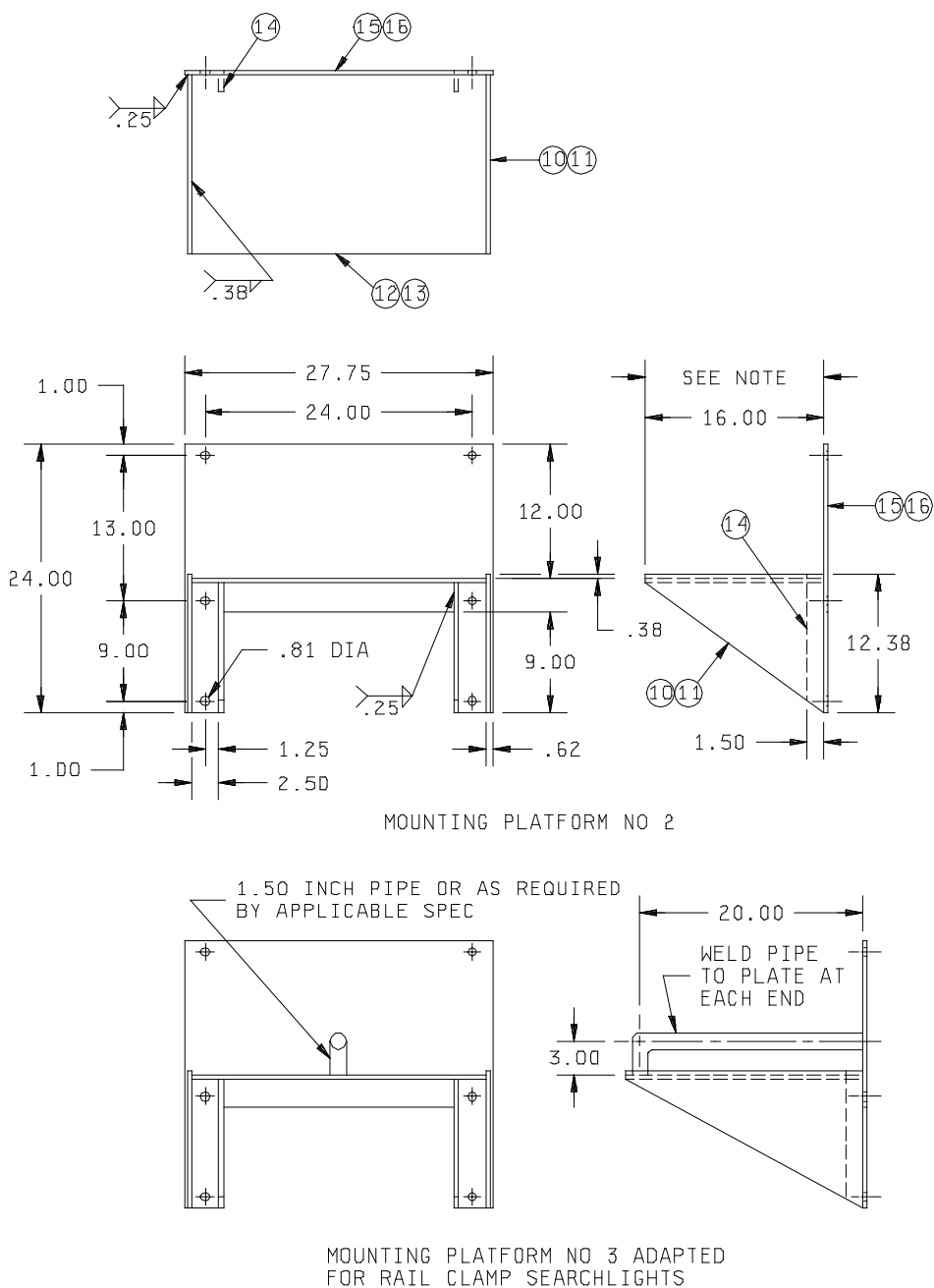


FIGURE 6. Standard mounting-fixtures for deck or platform mounted parts - Continued.

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Item	Description	Material	Quantity <u>1/</u>
1	Car building channel, 4 x 13.8 lb	Steel	1
2	Car building channel, 4 x 13.8 lb	Steel	1
3	Auxiliary mounting plate, .38	Steel	1
4	Horizontal mounting plate, .50	Steel	1
5	Hex head bolt, .750-10UNC-2A x 7.00 lg	Steel (heat-treated)	6
6	Hex head nut, .750-10UNC-2B	Steel (heat treated)	6
7	Washer, 2.00 OD x .18 ID	Steel	12
8	Pipe spacer, 1.00 standard, 2.81 lg	Steel	6
9	Gusset plate, .38	Steel	2
10	Gusset plate, .38	Steel	2
11	Gusset plate, .38	Steel	2
12	Horizontal mounting plate, .50	Steel	1
13	Horizontal mounting plate, .50	Steel	1
14	Stiffener, .38	Steel	4
15	Auxiliary mounting plate, .38	Steel	1
16	Auxiliary mounting plate, .38	Steel	1

1/ Quantities are for three mountings.

Inches	mm	Inches	mm	Inches	mm	Inches	mm
.18	4.57	1.25	31.75	9.00	228.60	20.00	508.00
.25	6.35	1.50	38.10	11.00	279.60	24.00	609.60
.38	9.65	2.00	50.80	12.00	304.80	26.50	673.10
.50	12.70	2.50	63.50	12.38	314.45	27.00	685.80
.62	15.75	2.81	71.73	13.00	330.20	27.75	704.85
.81	20.57	3.00	76.20	15.00	381.00		
1.00	25.40	7.00	177.80	16.00	406.40		

NOTES:

1. Unless otherwise specified, tolerance is $\pm .06$ (1.52 mm).
2. Mounting platform number 3 shall be similar to mounting platform number 2 with the exception of the horizontal mounting plate and the side gusset plates shall be increased to 22.00 inches (558.80 mm).
3. The smallest mounting platform which will satisfactorily accommodate the specimen shall be selected.
4. If the deep gussets interfere with the mounted specimen, the extra bolt holes shall be used in bolting of mounting platform number 1 in the inverted position to the four lower bolt holes of the anvil plate.

FIGURE 6. Standard mounting-fixtures for deck or platform mounted parts - Continued.

5. DETAILED REQUIREMENTS

5.1 Measurements. Monitoring of the specimens during test (e.g., delayed contact opening of relays, momentary stopping of dynamotors, calibration errors in meters) shall be as specified. Upon completion of the required number of blows, electrical and physical measurements shall be made as specified. Allowable tolerances shall be as specified.

5.2. Summary. The following details are to be specified in the individual specification:

- a. Mounting fixtures (see 4.5).
- b. Electrical load on operating conditions, if applicable (see 4.6.6).
- c. External resilient mountings, if required (see 4.6.7).
- d. Monitoring during test, measurements after test, and allowable tolerances, as applicable (see 5.1).

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Supersession data. The main body and 38 parts of this revision of MIL-STD-202 replace superseded MIL-STD-202.

Custodians:

Army - CR
Navy - EC
Air Force - 85
DLA - CC

Preparing activity:

DLA – CC

(Project 59GP-2015-021)

Review activities:

Army - AR, AT, AV, CR4, MI, SM, TE
Navy - AS, OS, SH
Air Force - 19, 99
NSA - NS

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil/>