

ELECTRIC SWITCHBOARDS 0-600 VOLTS

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2.0 SCOPE

This Standard provides specific dimensions and details of service and meter equipment which is assembled by the manufacturer in free-standing, self-supporting switchboard construction, and which is **not covered** by the **basic requirements** in the “Electric Metering - General” Section, NVE Standard GM0001M.


3.0 GENERAL METERING REQUIREMENTS

Important information pertaining to all metering installations is contained in GM0001M. ***This section should be reviewed before proceeding with the purchase of equipment or installation of wiring.***

4.0 SWITCHBOARDS - GENERAL

Prior to manufacturer, the customer shall submit 2 copies of the drawings of the proposed switchboard, its location, and pad design to NVE. The address is:

NV Energy
Electric Metering Dept. (R90EM)
Team Leader
P.O. Box 10100
Reno, Nevada 89520-0400

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Additionally, the customer shall consult NVE for specific information on the following:

- a. Service voltage, current rating, and fault duty.
- b. Meter panel requirements for applicable rate schedule
- c. Service termination location
- d. Switchboard and/or meter location(s)
- e. Size and number of service conductors and conduits per phase.
- f. The rating of the metering current transformers will not necessarily be the same as the current rating of the service switch. **Fault duty rating will exceed given fault duty.**

All compartments containing unmetred conductors shall be sealable. When a raceway or conduit for meter secondary wiring is necessary, such raceway or conduit shall be sealable.


Service entrance conductors must enter the metering transformer compartment from one end and exit from the opposite end.

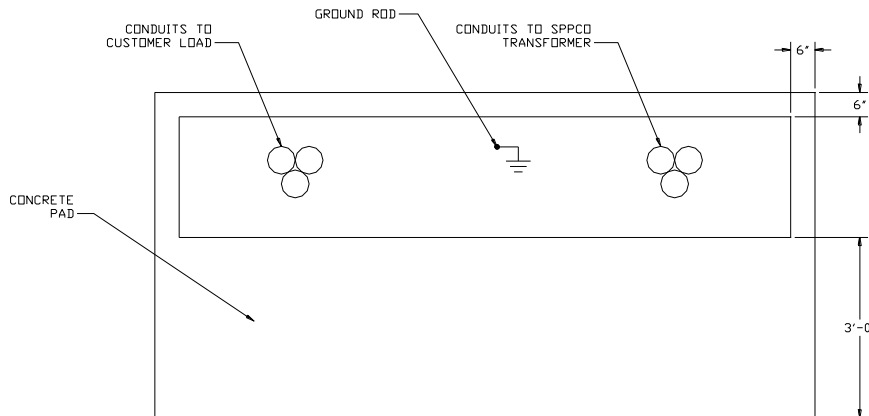
Service entrance transformers, and test switches will be furnished and installed by NVE. Secondary wiring from metering transformers to meters will be installed by NVE. Any required conduits or raceways shall be furnished and installed by the customer.

Where meters remote from the switchboard location are required, meter secondary wiring from current transformers to meter sockets will not exceed 50 feet. Conduit for secondary wiring will be supplied by the customer. Minimum size of the conduit will be 1-1/2". There will be **no more than two (2) sweeping 90° elbows** in one run. **L.B.'s or similar fittings will not be allowed.** Contractor shall contact NVE before installing secondary wire conduit. Provisions for safety sockets for these remote meters should be as described on NVE Standards Drawing, CM0001M.

When self-contained meter sockets are installed in switchboards, they are to be wired by the switchboard manufacturer.

Manufactured freestanding outdoor switchboards shall be installed in accordance with **NEC, Article 408**. Freestanding switchboards shall be securely fastened to a concrete pad to prevent possible movement of the switchboard. The concrete pad provided shall be of sufficient size to extend 6" beyond the sides and back of the switchboard with a 36" working space extended in front. The 6" thick pad shall be 6" x 6" wide mesh reinforced and have a 5/8" x 8' ground rod conveniently provided to facilitate equipment grounding. The following example provides typical pad dimensions:

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NOTES:

1. 45° chamfer all corners.
2. 8" subbase compacted to 90% of the relative density at optimum moisture content and graded level to finish grade.
3. Refer to PE0009U for clearances and protection requirements.
4. Refer to CB0003U for cable and conduit selection.

5.0 SWITCHBOARD SERVICE SECTION

5.1 Standard Switchboard Service Section - General


A service section is defined as the section of a customer’s switchboard provided specifically for terminating the service, and housing the metering transformers (if required), revenue meters, test facilities, and service switch or breaker.

Taps may be taken from main service entrance conductors where more than one meter installation is necessary:

- a. When required on an overhead service, taps shall be made in a sealable compartment above and separate from the current transformer compartment.
- b. When required on an underground service, taps shall be made in the underground service termination pull section or pull box, provided suitable approved terminations are made on bus conductors and positioned so that incoming service entrance conductors and their connections shall not encroach into NVE's pulling area nor interfere with NVE’s pull and termination of its service conductors.

In cases where more than one meter is to be installed, there will ordinarily be a separate service section for each meter installation and its associated service switch.

For services with self-contained meters (not using current transformers) it may be practicable to put two or more meters and switches in the same service section.

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When two or more switchboard service sections are supplied from one set of service conductors, the supply conductors serving these switchboards shall be terminated ahead of and outside of the metering transformer compartments in a separate sealable enclosure. The supply conductors are to be arranged so they are readily accessible and may be worked upon without disturbing the metering transformers and associated secondary wiring.

The general arrangement of a standard switchboard service section is shown on Page 10. The standard section utilizes a hinged meter panel located in front of the metering transformer compartment. Hinged meter panels must be sealable and easily removable with the hinges readily interchangeable from the right or left side on the job site. Hinged panels approved for socket meters are shown on Page 15. **Hinged meter panels must have handles and open a minimum of 90° with meters and test switches mounted to permit safe and ready access to the instrument transformers.** When hinged panels are recessed, the section shall have additional width to meet this requirement. A recessed panel requires utility approval as a specially engineered section.

Switchboards to be used outdoors shall be of weatherproof construction in accordance with NEC, Article 408. Indoor switchboards used outdoors shall be enclosed in a permanent rain tight enclosure. Plywood or wood enclosures are unacceptable.

5.2 Specially Engineered Service Section


Switchboard design which does not conform to the standard switchboard is considered specially engineered, and includes installations:

- a. Over 4,000 amperes
- b. When the service breaker is too large for the standard service section
- c. When multiple metering sections are used
- d. When recessed meter panels are used

When a specially engineered service section is necessary, two drawings of the proposed section shall be submitted to NVE (See Section 4.0 for address) for approval prior to manufacturer and bidding. Such drawings shall indicate the contractor’s and the customer’s name and address.


The general arrangement of specially engineered switchboard service sections should follow, as nearly as practicable, that of the Standard Section, and the following general requirements shall be observed:

- a. Socket meters used with current transformers shall normally be mounted on hinged panels. Self-contained meters shall be mounted on hinged panels.
- b. When a hinged meter panel is located behind a door, a clear space of at least 11 inches between the meter panel and the door is required as well as 90° opening with meter and test switches in place. If needed, additional section width shall be provided to meet the requirements.
- c. A clear space in back of a meter panel shall be provided for the secondary wiring. For hinged meter panels, the minimum dimensions between the meter panel and the nearest bus as shown

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on Pages 17 through 22 are adequate to provide this clearance. For non-hinged meter panels, a clear space of at least four inches to any barrier or obstruction shall be provided.

- d. Minimum clearance between meters shall also be maintained as shown on Page 26.
- e. A minimum of four inches of clear space is required directly below the bottom slot of the meter test switch to permit safe connection of test leads.
- f. Sockets installed on switchboards shall be as specified in NVE Standard GM0001M.
- g. Not more than two meters shall be mounted on any removable meter panel.
- h. Panels which provide access to instrument transformers or a service terminating pull section shall not be larger than required for good accessibility. Removable panels shall be equipped with lifting handles (rated for lifting 75#) mounted slightly above the panel center and shall not be heavier than can be conveniently lifted by one man.
- i. The front edge of the current transformer bus bars shall all be located in the same vertical plane.
- j. A removable bus section and suitable transformer support shall be provided to permit installation of window-type current transformers for installations over 1,000 amperes.
- k. Busses shall be adequately supported in the metering transformer compartment to withstand the mechanical stresses of short circuit. The bus supports shall not interfere with installation or removal of current transformers. Current transformers shall not be used to support the busses; the busses shall be entirely self-supporting.
- l. The busses and current transformer mountings shall be designed so that each of the current transformers may be withdrawn from its mounting position directly through the access panel without disturbing any other current transformer. When multi-leaf busses are used, the busses shall be oriented so that they appear “edge wise” when viewed from the access panel.
- m. The general arrangement and spacing of current transformers and the methods of mounting current transformers shall conform in so far as practicable to the illustrations on Pages 17 through 22 (single leaf bus) and Pages 23 through 28 (multi-leaf bus).
- n. For underground connection of specially engineered service sections, See Page 11.
- o. Switchboard to be used outdoors shall be of weatherproof construction. Indoor switchboards used outdoors shall be enclosed in a permanent rain tight enclosure. **Plywood or wood enclosures are unacceptable.**

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6.0 SERVICE ENTRANCE LOCATION

In the standard and specially engineered switchboard service section, all service or supply conductors shall enter the service sections through one end and exit through the opposite end of the metering transformer compartment. This stipulation applies to either overhead or underground service or if two or more adjoining service sections are connected together. Direction of feed shall be vertical through the metering compartment as shown on Page 10.

7.0 UNDERGROUND SERVICE PULL SECTION

When an underground service is to be installed by NVE, provisions for service termination shall be as shown on Pages 8, 9, and 11.

| Details of metering transformer compartments are shown on Pages 17 through 22.

Covers for metering transformer compartments shall be made of code gauge metal; if non-hinged panels are used as covers, they shall be provided with lifting handles and be attached with sealable studs and wing nuts or by other approved means.


Copper or EUSERC approved plated aluminum bus bar shall be used on both the line and load sides of all current transformers. When aluminum bus is used, it must be stamped with approved plating process designation at service termination and transformer mounting points.

When NVE requests links and supports for through-type current transformers, the bus and removable links must be a compatible material.

The current transformers supplied by NVE for metering shall not be utilized for any other purpose.

The ends of the current transformers bus stubs shall be located so the current transformers can be connected without removing adjacent panels.

The current transformer bus stub supports in the metering transformer compartment shall be sufficiently rigid to maintain alignment of the bus.

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8.0 METER SWITCH SEQUENCE

Meters and metering equipment shall normally be located ahead, or on the supply side of the customer’s main switch fuse or circuit breaker. Exception to this normal sequence is permissible only when required by electrical codes.

9.0 SERVICE TERMINATIONS

For overhead services, the customer shall furnish lugs and connect the cable to line and load sides of the bus stubs in the current transformer compartment.

For underground services, NVE will terminate its service conductors on lug landings at the current transformer bus stubs only when the service is a single-meter installation and the switchboard is rated 400 amperes or less.

NVE will terminate its service conductors on lug landings in the pull section, as shown in Figure 1 on Page 8, when the service is multiple metering or the switchboard is rated above 400 amperes.

- a. On switchboards rated 401-800 amperes, the customer shall install conductors from the service termination lug landings to the line side of the current transformer compartment.
- b. On switchboards rated above 800 amperes or with multiple meters, bus bars shall extend from the service termination lug landing into the current transformer compartment.


10.0 METER PANELS

The hinged meter panels shown on Page 15 are designed to accommodate only transformer-rated socket meters and are the only panels accepted by the electric metering operations.

The non-hinged meter panels shall not be used in front of a current transformer section.

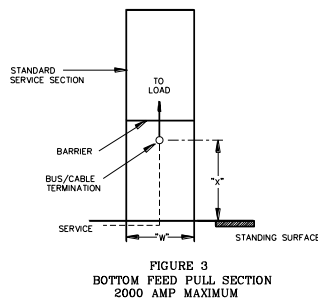
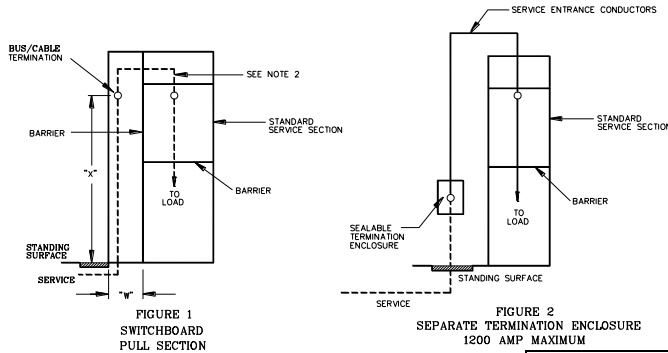
Page 27 shows spacing’s for various combinations of multiple meters. Self-contained meters shall not be mounted on hinged panels.

See Page 15 for dimensions of Service Section where only a Watt-hour meter is required. See Page 26 for dimensions of Service Section where multiple meters and separate recorder are required.

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10.1 UNDERGROUND SERVICE TERMINATION

Not more than two meters shall be mounted on any removable meter panel. Meter panels and filler panels shall be equipped with stops to prevent inward swinging beyond the front surface of the switchboard.



SWITCHBOARD RATING (AMPERES)	MINIMUM ACCESS OPENING DIMENSION "W"	TERMINATION HEIGHT "X"
	4-WIRE	
BELOW 400	12"	42" MIN. - 72" MAX.
400 - 800	24"	
801 - 1200	30"	
1201 - 2000	35"	60" MIN. - 72" MAX.
2001 - 3000	42"	
3001 - 4000	44"	
ABOVE 4000	CONSULT NVE	

NOTES:

1. A switchboard pull section (Fig. 1), a separate pull box (Fig. 2), or a bottom feed service section shall be provided for underground service.
2. When the service section is served from a pull section, the bus or cable conductors shall enter through the side or back in the sealable section above the current transformer compartment as shown in Fig. 1, or shall enter by means of horizontal cross bussing in back of metering compartment.
3. Bus bars, with provisions for termination lugs as shown on Page 12 are required from the pull section into the service section, when the main switch is rated above 800 amperes, or when multiple metering is to be supplied.
4. Bus bars or cables may extend from the pull section landing lugs into the service section for 401 to 800 ampere installations.
5. The minimum width of the pull section shall be as specified in Table 1.
6. Side or rear entry of the service cable into the pull section may require a greater dimension than that shown in Table 1. Consult NVE.
7. NVE will provide the terminating lugs.
8. All pull and terminating sections shall have full front access. Cover panels shall be removable, sealable, provided with two lifting handles, and limited to a maximum size of 9 square feet in area.

10.2 SERVICE TERMINATION IN A PULL SECTION WHICH IS ABOVE GROUND

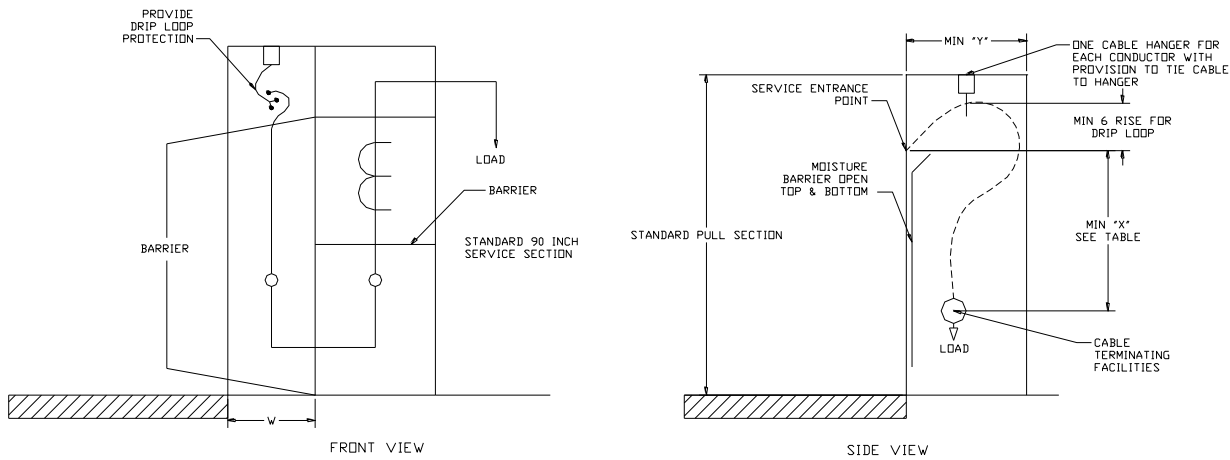


FIGURE 1 PULL SECTION WITH A HIGH BACK SERVICE ENTRY

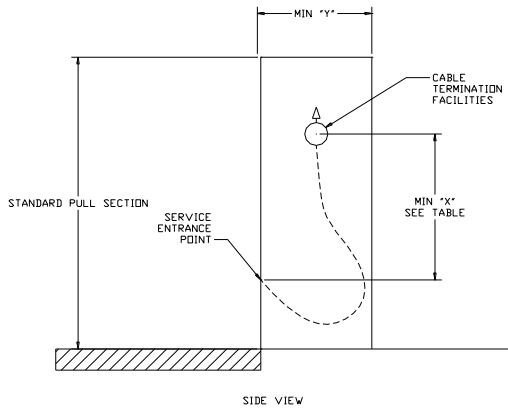



FIGURE 2 PULL SECTION LOW BACK SERVICE ENTRY

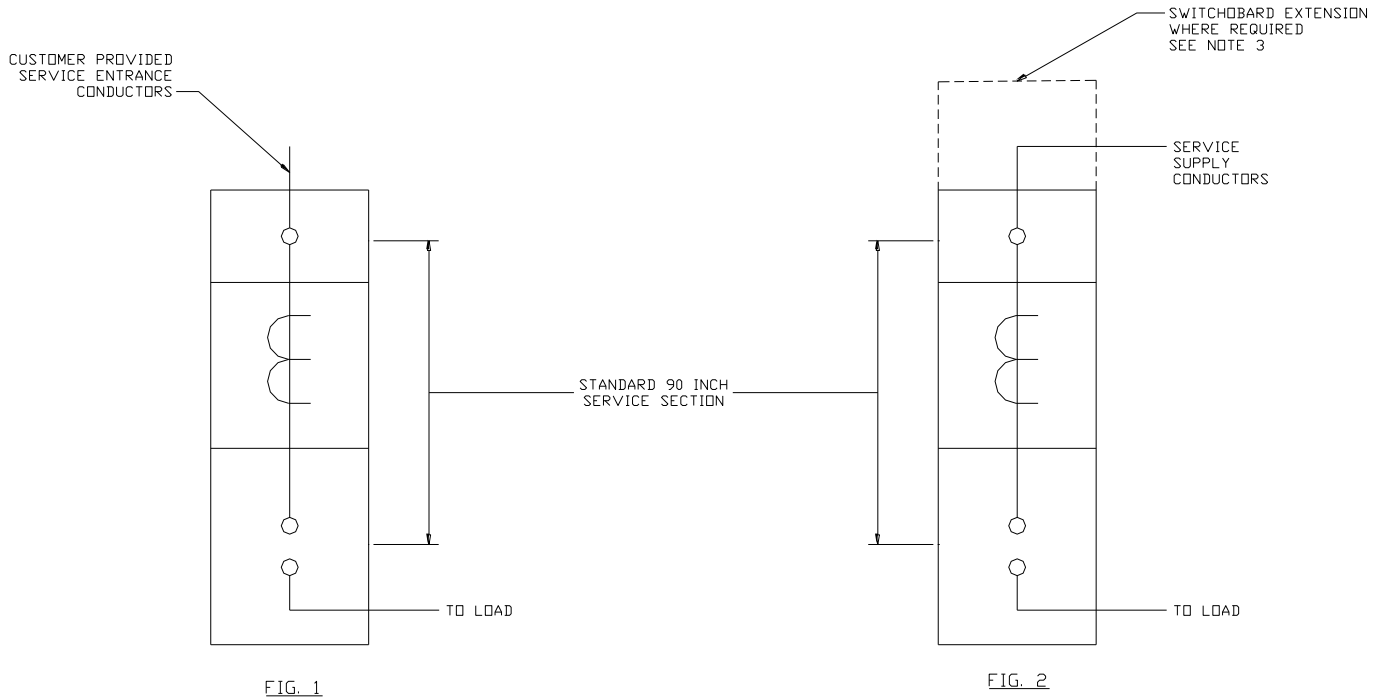
TABLE 2 - MINIMUM PULL SECTION DIMENSIONS			
SWITCHBOARD RATING (AMPERES)	MINIMUM ACCESS OPENING DIMENSION "W"	"Y" DEPTH	PULL SPACE "X"
	4-WIRE		
BELOW 400	12"	25"	30"
400 - 800	24"	25"	42"
801 - 1200	30"	25"	
1201 - 2000	35"	30"	
2001 - 3000	42"	36"	48"
3001 - 4000	44"	36"	48"
ABOVE 4000	CONSULT NVE		

NOTES:

1. Consult NVE for the service entrance point.
2. An underground service may enter the back of a switchboard pull section as illustrated when the pull space has the required "X" dimension above or below the cable terminating facilities, and the pull section has the required "Y" depth. See Table 2.
3. For side entry, the "W" dimension of the pull section shall not be less than the "Y" dimension shown in Table 2.


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10.3 OVERHEAD SERVICE TERMINATION



NOTES:

1. **Must meet NEC, Article 384 requirements.**
2. The service entrance conductors, Fig. 1, either cable or bus bar are furnished and installed by the customer in the following manner:
 - a. When switchboards are served through bus bar, the bus bars shall enter through the top, or at the side or back in the upper 10" section.
 - b. When switchboards are served with cable, the cables shall enter through the top of the board only as shown in Fig. 1.
3. When NVE or customer requires incoming conduits from the side or rear for the service conductors, an extension as shown in Fig. 2, or other special designed termination may be required.
4. **The direction of feed is from top to bottom.** Load conductors shall leave below the metering compartment barrier, and may not be routed back through the current transformer compartment in order to exit the service section.
5. Service entrance conductors shall be connected to the bussing in the service section with lugs approved for the type conductors used.

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10.4 SERVICE TERMINATING FACILITIES IN PULL SECTIONS 0-600 VOLTS

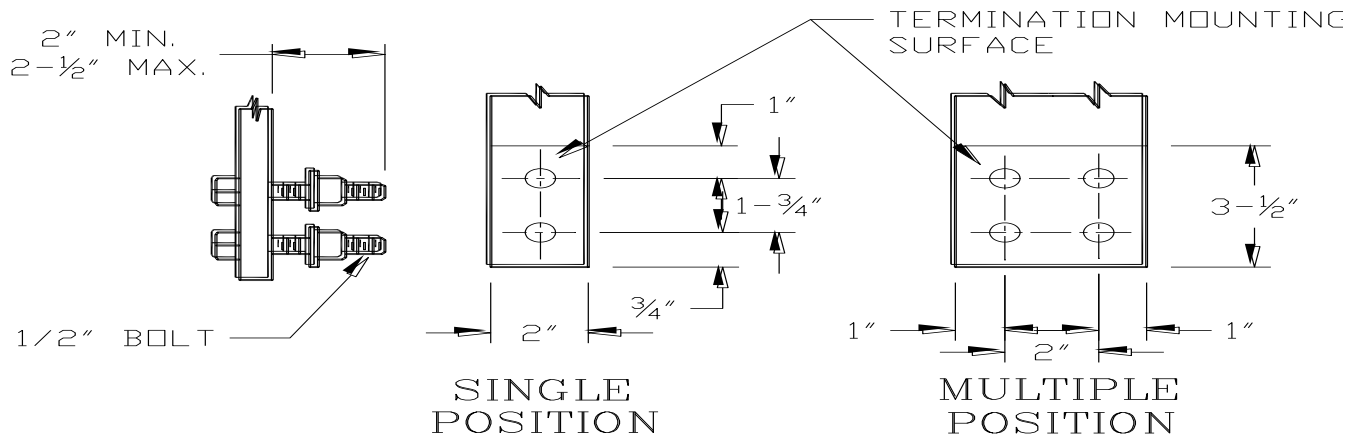


FIG. 1
TERMINATING BOLT AND DRILLING DETAIL
OF TERMINATING FACILITIES

NOTES:

1. One landing position is required for each 400 amperes of service ampacity up to 4000 amperes. Each landing position shall consist of two 1/2-inch steel bolts spaced on 1-3/4 inches vertical centers and extending from 2 inches to 2-1/2 inches from the mounting surface. When multiple positions are required, provide a minimum of 2 inches of horizontal spacing between positions.
2. Terminating bolts shall be provided with nuts, flat washers and a pressure maintaining spring washer, and all parts must be plated to prevent corrosion. Terminating bolts shall not be used for the dual purpose of service termination and of securing the terminating facilities in place.
3. Terminating bolts must be secured in place. "Secured in place" shall mean that the stud will not turn, back out or loosen in any manner when tightening or loosening terminal nuts (including cross threaded situations).
4. In the terminal mounting area, which is defined as the area of the terminating facilities as shown in Fig. 1, a clear space "barrel of proximity" of 1-1/2" minimum is required around any terminating facility including its bolts and bolt heads, any other bus, any other terminating facility or any grounded surface, except:
 - (1) the minimum clearance to the back of the pull section or to the front pull section cover may be 1".
 - (2) the minimum clearance to any fully insulated horizontal bus behind the terminating facility may be 1".
 - (3) the neutral terminating facility may have a minimum clearance of 1" from any grounded surface.

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5. Each terminating facility must have at least 8" of unobstructed space in front of the entire mounting surface. This space must be accessible from the front of the pull section as viewed through the access panel opening.
6. Minimum distance from the lowest bolt of the terminating facility (where service cable enters bottom of pull section) is 28" for services not exceeding 800 amperes and 36" for services not exceeding 1200 amperes. Consult NVE Metering Department for services exceeding 1200 amperes.
7. Terminating facilities shall be secured to prevent bus misalignment when cables are installed.

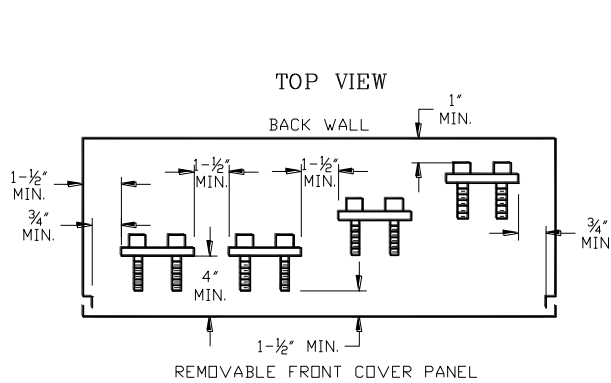


FIG. 2
SPACING REQUIREMENTS FOR TERMINATING FACILITIES
(SIDE BY SIDE OR STAGGERED)

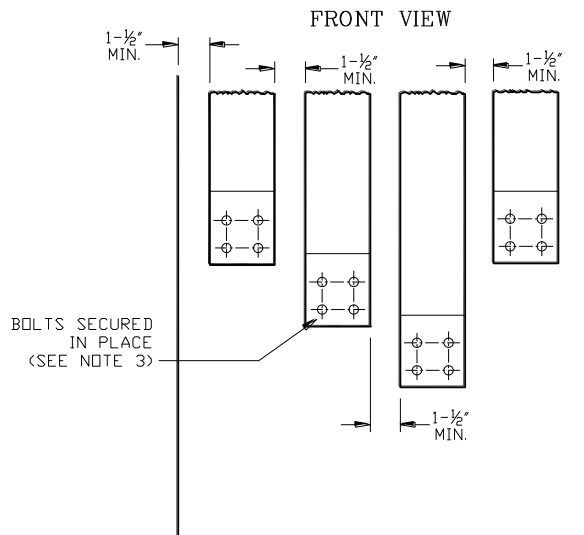


FIG. 4
SPACING REQUIREMENTS FOR TOP TO BOTTOM
STAGGER OF TERMINATING FACILITIES

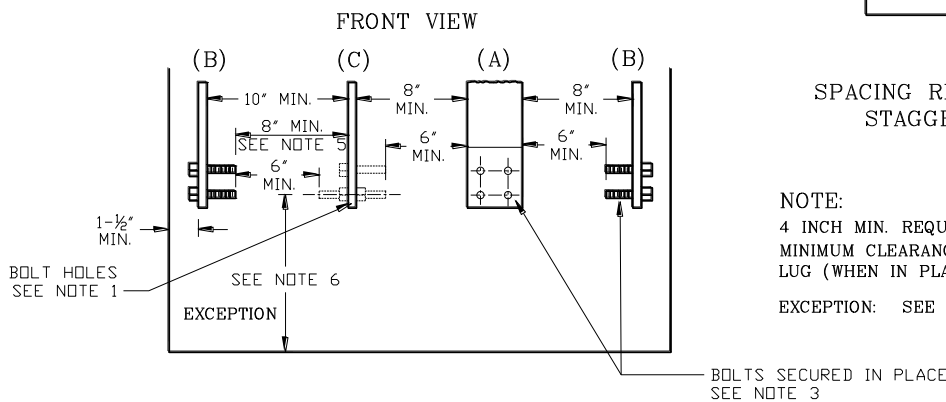



FIG. 3
SPACING REQUIREMENTS FOR TERMINATING FACILITIES
ACCESSIBLE FROM (A) FRONT ONLY, (B) ONE SIDE ONLY,
OR (C) FROM EITHER SIDE. (SEE NOTES 3 AND 4)

NOTE:
4 INCH MIN. REQUIRED [ASSURE 1 INCH
MINIMUM CLEARANCE FROM BODY OF TERMINATING
LUG (WHEN IN PLACE) TO FRONT PANEL]
EXCEPTION: SEE NOTES 4 AND 5

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10.5 4 WIRE - NEW CONSTRUCTION

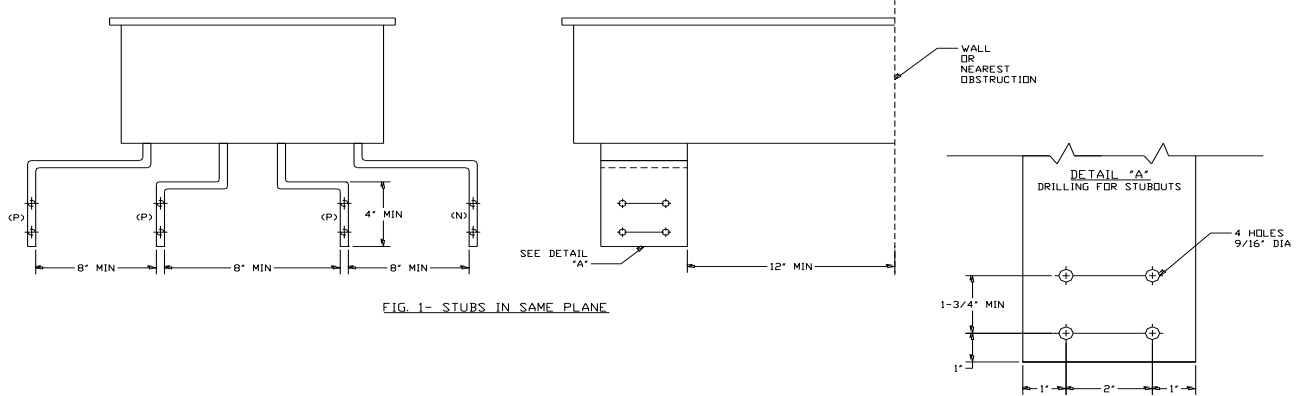


FIG. 1- STUBS IN SAME PLANE

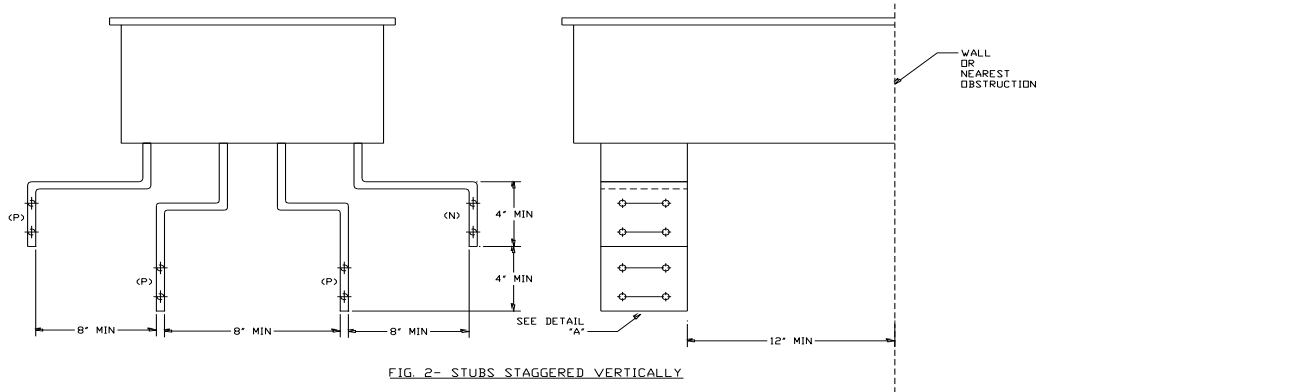


FIG. 2- STUBS STAGGERED VERTICALLY

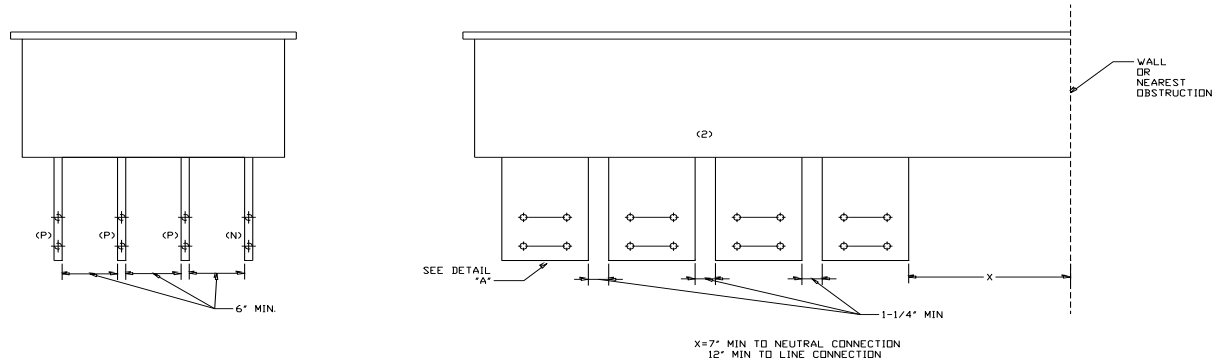
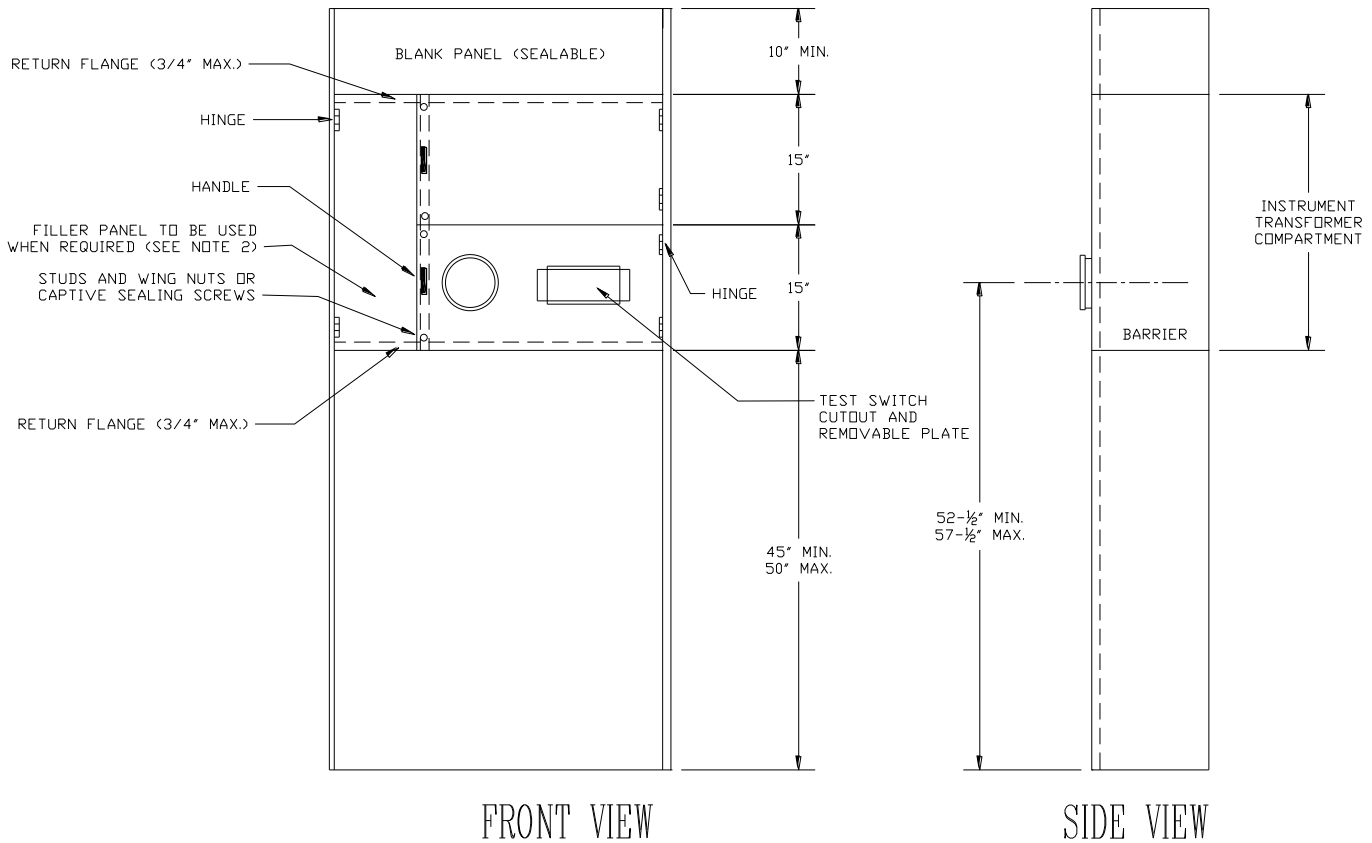


FIG. 3- STUBS STAGGERED HORIZONTALLY

NOTES:

1. NVE will utilize 1200 Amp flex braid for connections between bus and transformer.
2. One Nema 2 hole landing spade for each 400 amps of buss capacity.
3. Neutral shall be permanently marked by the manufacturer.
4. Contact NVE Planning Representative prior to ordering bus duct for exact location of neutral position.
5. See NVE Standard, VB0100U.


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INSTRUMENT TRANSFORMER COMPARTMENT

NOTES:

1. Instrument transformer compartments shall be bussed with rectangular bus bar.
2. Filler panels shall be used where switchboard width exceeds meter panel width.
3. The grounding connection shall be made in the main switch or breaker compartment.
4. Meter panels shall be constructed of 12 gauge steel (minimum) and shall be reversible, sealable, hinged, and interchangeable.
5. When only one meter panel is furnished, it shall be mounted in the lower position.
6. Hinges shall be readily interchangeable, right or left, on the job site.
7. Width of meter panels may in some cases require the service section to be wider than the minimum allowable width of transformer compartment.
8. Meter panels and filler panels shall be equipped with stops to prevent inward swinging beyond the front surface of the switchboard.
9. A non-metallic barrier should be secured to the front and the back of the switchboard between the sealed and unsealed sections.

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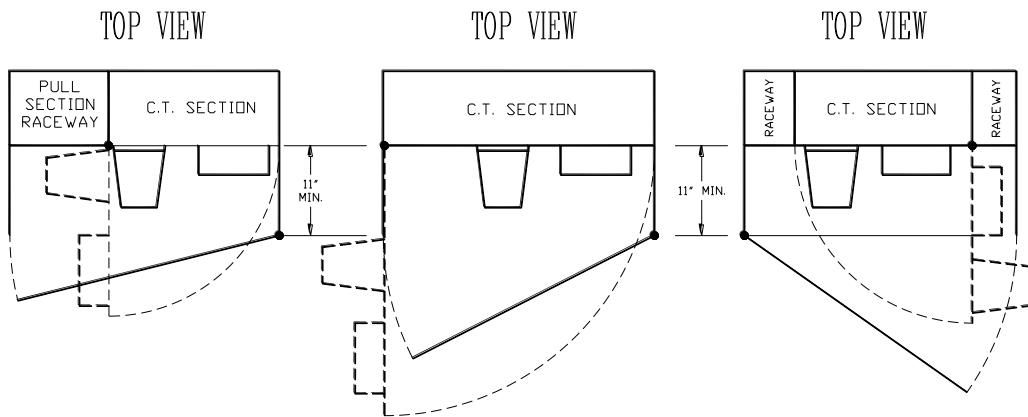
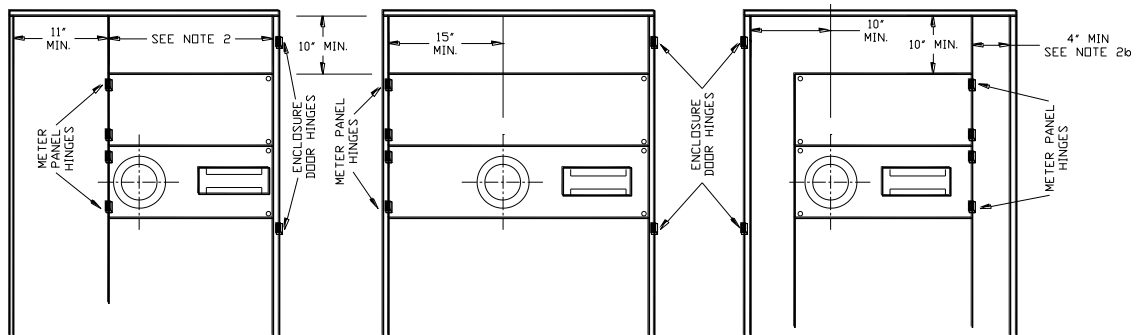


FIG. 1

FIG. 2

FIG. 3



FRONT VIEW

FRONT VIEW

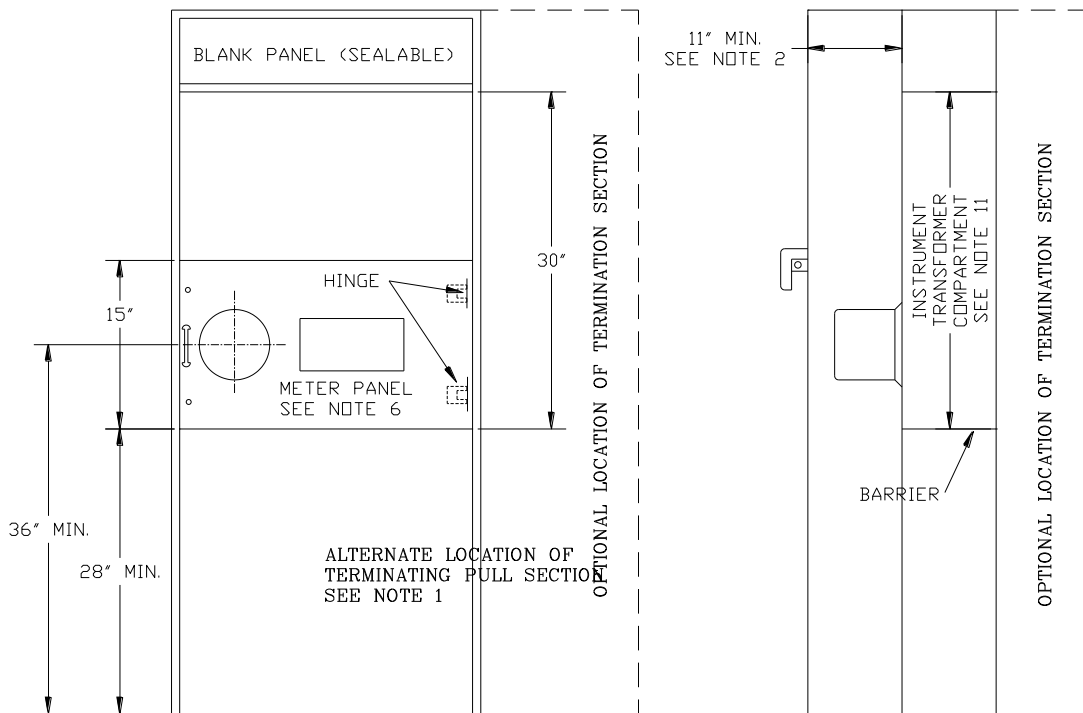
FRONT VIEW

RAIN TIGHT SWITCHBOARDS WITH ENCLOSED METER PANELS

NOTES:


1. Hinged meter panels shall be capable of being opened 90° with meter and test facilities in place.
2. For hinged meter panel design see Pages 26 and 27.
 - a. For Page 25 use Figures 1, 2, or 3 designs as illustrated.
 - b. For Page 26, use Figure 1 design as illustrated on Figure 3, design with the 4 inch min., raceway dimension increased to 11 inch min.
3. The edge of the meter socket or test switch slots shall be 1 inch plus the depth of the recess from the hinged side.
4. For enclosure locking provisions, see NVE Standard, GM0001M.

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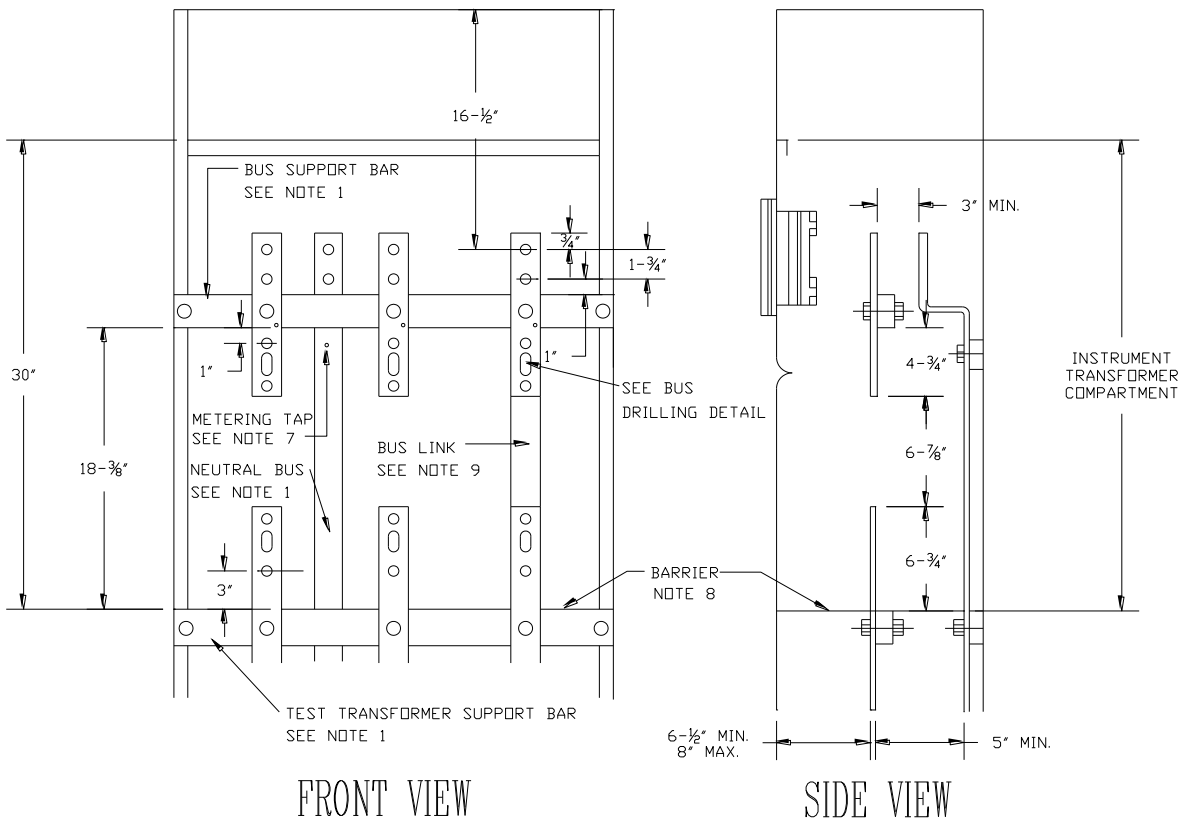
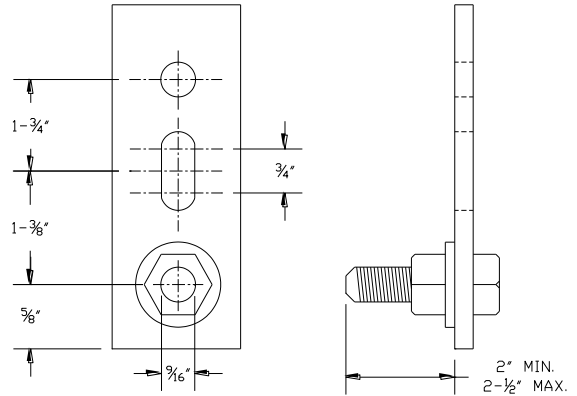
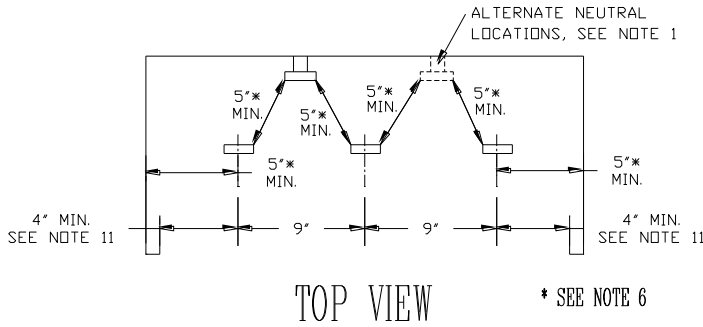



NOTES:

1. Terminating Pull Section shall be located beside or behind the instrument transformer compartment.
2. Refer to Page 15 for door and hinge details on meter panel enclosure.
3. Instrument transformer compartments shall be bussed with rectangular bus bar.
4. Filler panels shall be used where switchboard width exceeds maximum allowable meter panel width. See Page 14.
5. The grounding connection shall be made in the main switch or breaker compartment.
6. Meter panels shall be constructed of 12 gauge steel (minimum) and shall be reversible, sealable, hinged and interchangeable.
7. When only one meter panel is required, it shall be mounted in the lower position.
8. Hinges shall be readily interchangeable, right or left, on the job site.
9. Width of meter panels may in some cases require the service section to be wider than the minimum allowable width of instrument transformer compartment.
10. Meter panels and filler panels shall be equipped with stops to prevent inward swinging beyond the front surface of the switchboard.
11. For instrument transformer compartment requirements and minimum dimensions, refer to the following pages:
 0 to 1000 amperes, see Pages 17-18.
 1001 to 3000 amperes, see Pages 19-20.
 3001 amperes and above, see Pages 21-22.
 Any questions, consult NVE - Electric Metering.

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**THREE PHASE FOUR WIRE
0 TO 1000 AMPERES**



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NOTES:

1. Bus arrangements and supports shall be provided as shown, except the neutral bus may be located at either side or on either side wall. Bus supports shall be constructed of a continuous bar of insulating material and shall be rigid to prevent misalignment of the bus units with cables in place.
2. The bus units may be supplied from the top or bottom and shall be anchored to prevent turning. Bus units shall be constructed of rectangular bus and when laminated shall have no space between laminations. Bus dimensions shall be provided as follows:
 Minimum: 1/4" x 2"
 Maximum: 3/4" x 2".
3. Bus unit shall be provided with a fixed stud as shown for mounting CT's. Each shall:
 - a. Consist of a 1/2" steel bolt and shall be provided with a spring washer and nut.
 - b. Be secured in place. "Secured in place" shall mean that the stud will not turn, back-out, or loosen in any manner when tightening or loosening the associated nuts.
4. When the compartment is supplied from horizontal cross-bussing, the bussing shall pass through the compartment or in the sealed area above the compartment.
5. Except for conductors supplying the instrument-transformer compartment, no other conductors or devices shall be installed in, or routed through, the compartment or the sealed area above the compartment.
6. A clear unobstructed work space shall be provided around the current-transformer bus units from the barrier to the upper support bar.
7. Taps for attachment of meter wiring shall be provided as follows:
 - a. One tap on each upper and lower phase bus unit with a #10-32 UNC screw and washer provided for each phase bus in either the upper or lower position.
 - b. One tap on the neutral bus as shown.
8. The barrier shall be constructed of a rigid insulating material resistant to electrical "ARC" tracking, and shall be secured in place with a maximum deflection of 1/2" from an applied force of 25 pounds downward.
9. A removable link shall be installed in the right side phase bus when the service is to be used for three phase three wire service.
10. The power leg bus for a four-wire delta service shall be identified by an outer finish that is orange in color or by tagging or other effective means.
11. Dimension measured to inside edge of the compartment access opening.
12. Each bus shall have a connector that will accept stranded conductors having the ampere capacity of the main switch or breaker. When main switch is over 400 amperes and for all underground services, see Page 24.

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THREE PHASE FOUR WIRE
1001 TO 3000 AMPERES

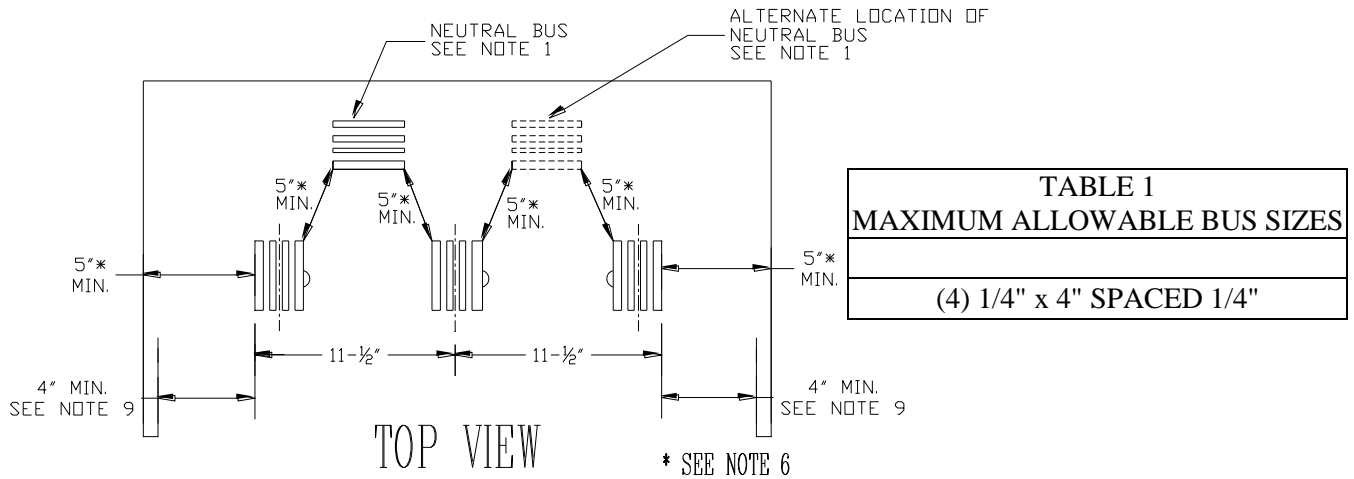
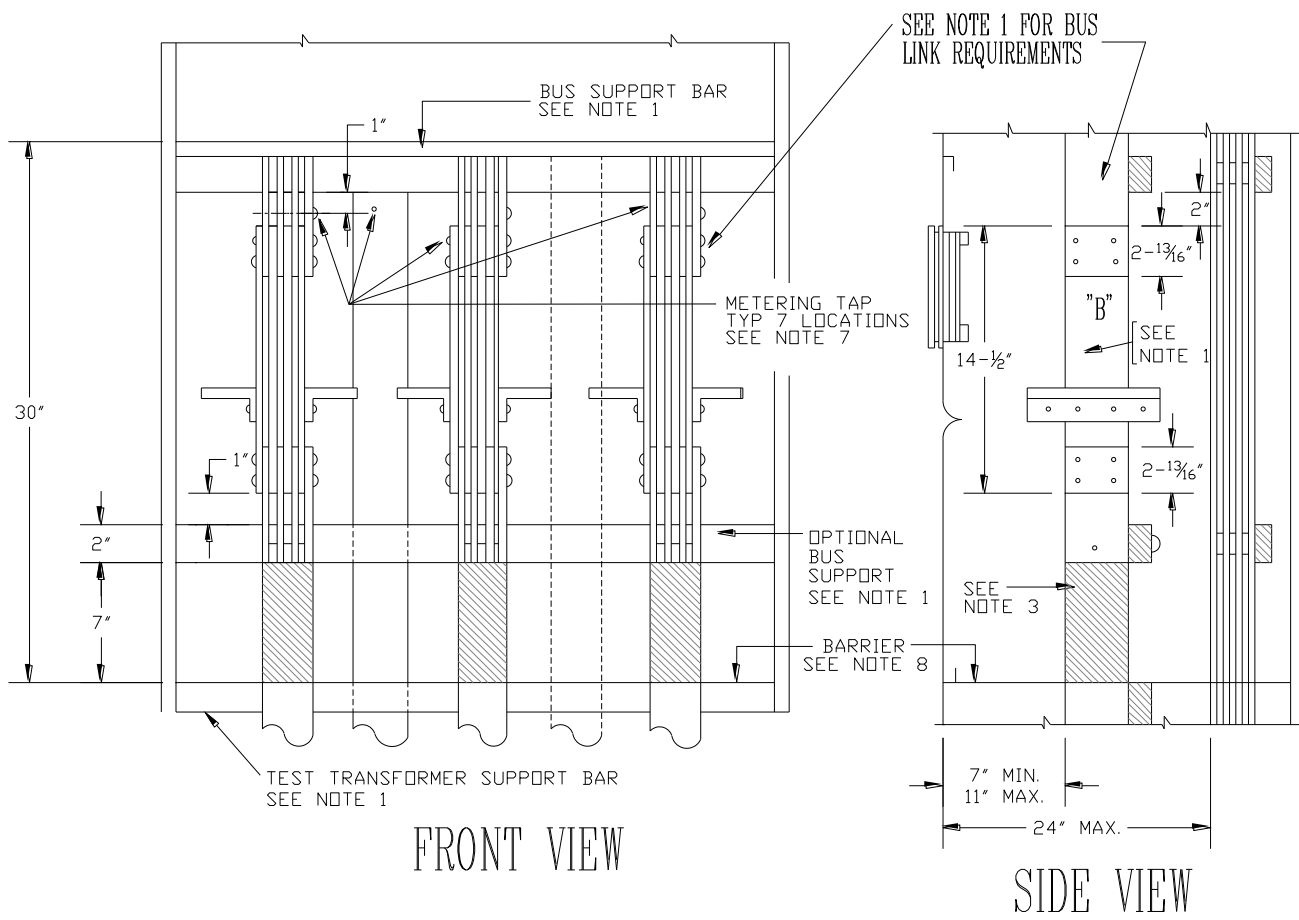


TABLE 1 MAXIMUM ALLOWABLE BUS SIZES
(4) 1/4" x 4" SPACED 1/4"



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NOTES:

1. Bus arrangements and supports shall be provided as shown, except the neutral bus may be located at either side or on the side wall. Bus units shall be anchored so that busses will remain in position when section "B" is removed. For details of removable section "B" and the insulated CT support for 4" bus, see Page 23.
2. Direction of feed shall be vertical and no other conductors shall pass through this compartment. A neutral bus bar extension shall be provided in the instrument transformer compartment above the lower current transformer bus support when the service section phase busses are supplied from horizontal cross bussing.
3. Bus units shall be insulated as shown and the insulating material shall be rated for the serving voltage. Round bus corners as necessary to prevent damage to insulation.
4. Transformer compartment shall be on the supply side of the main switch or breaker.
5. For underground service installed by NVE, the busses shall extend into the pull section as per Page 9.
6. The maximum permissible bus unit shall be as noted in Table 1.
7. Taps for attachment of meter wiring shall be provided as follows:
 - a. One tap on each upper and lower phase bus unit with a #10-32 UNC screw and washer provided for each phase bus in either the upper or lower position.
 - b. One tap on the neutral bus as shown.
8. Clearance to the side of the compartment shall be increased by the amount by which the corner angle exceeds one inch.
9. Dimension measured to inside edge of the compartment access opening.
10. Barrier shall be insulating non-tracking material and have a minimum of 24 vent holes of 3/8" diameter.
11. The barrier should not be less than 45" and shall not be more than 50" above the standing surface.

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THREE PHASE FOUR WIRE
3001 AMPERES AND LARGER

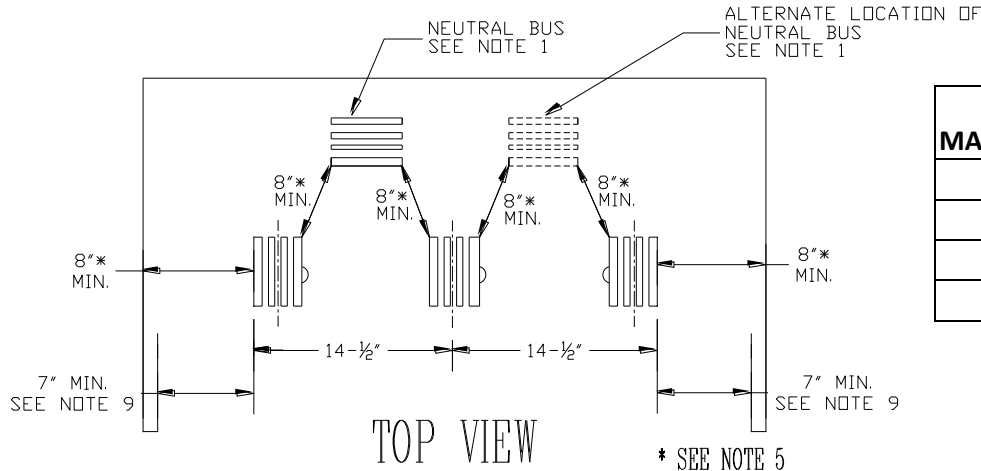
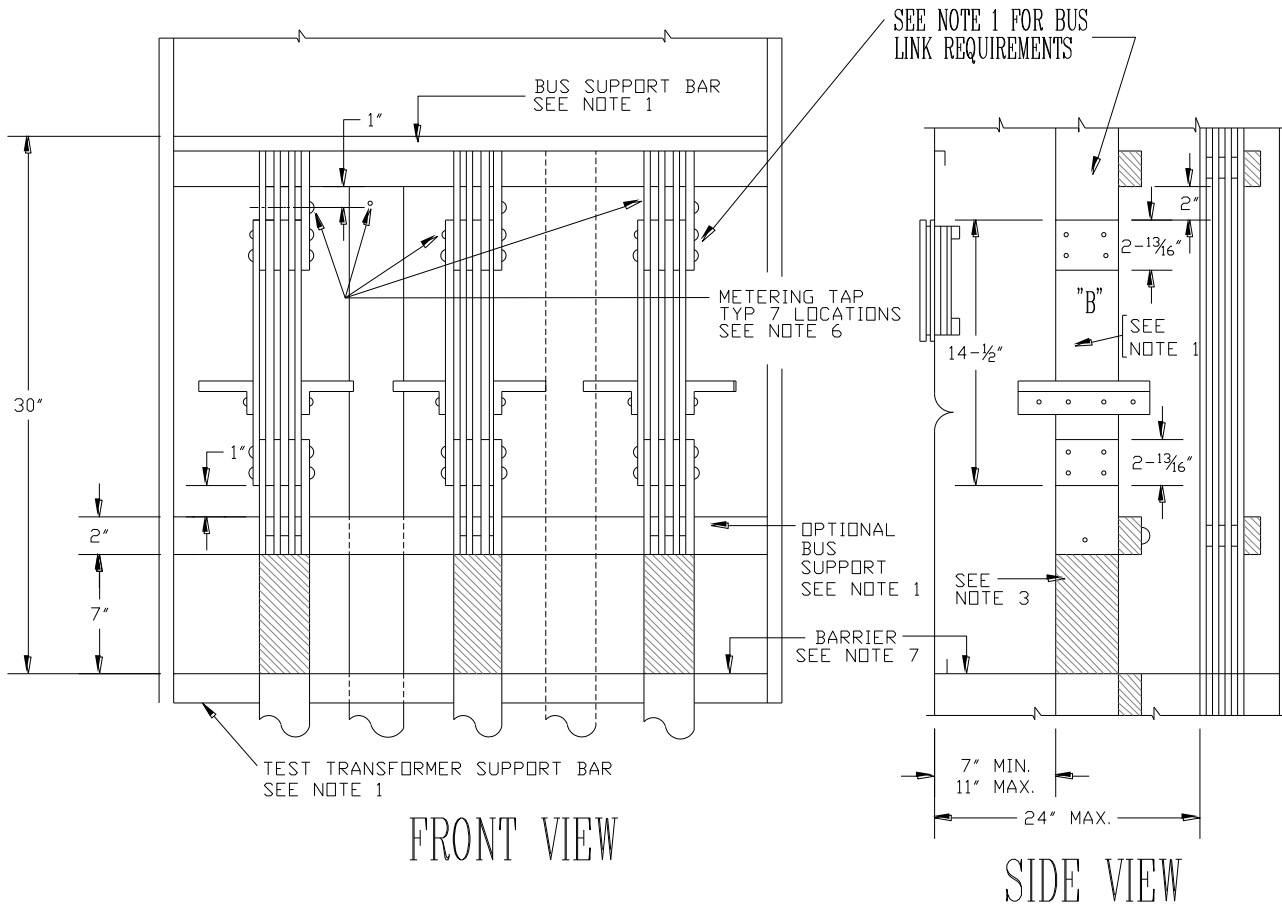



TABLE 1 MAXIMUM ALLOWABLE BUS SIZES	
(4)	1/4" x 4" SPACED 1/4"
(6)	1/4" x 5" SPACED 3/8"
(4)	3/8" x 5" SPACED 3/8"
(5)	3/8" x 5" SPACED 3/8"



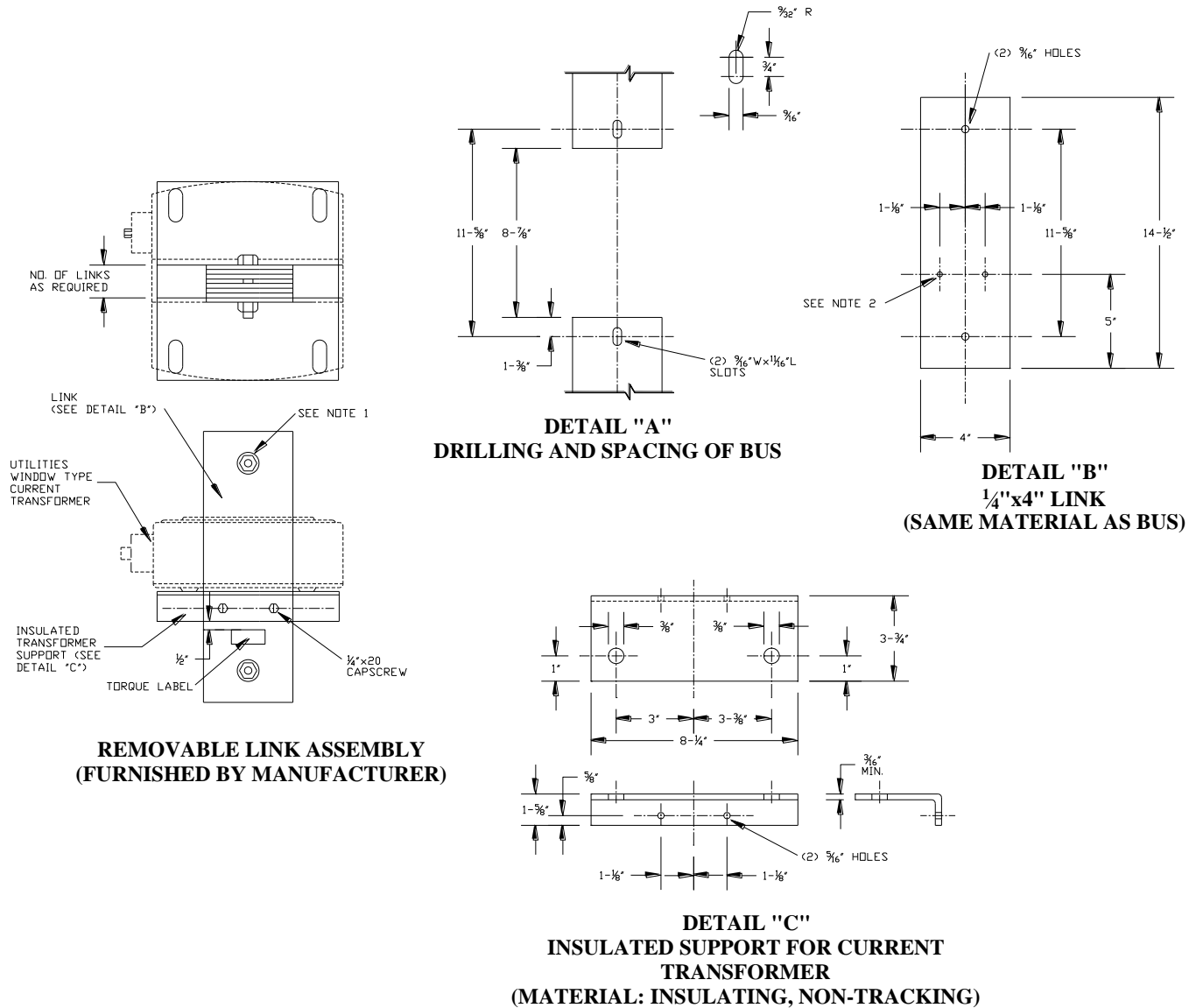
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NOTES:

1. Bus arrangements and supports shall be provided as shown, except the neutral bus may be located at either side or on the side wall. Bus units shall be anchored so that busses will remain in position when section "B" is removed. For details of removable section "B" and the insulated CT support for 4" bus, see Page 23. For 5" bus, see Page 24. Consult NVE for use of bus larger than 5".
2. Direction of feed shall be vertical and no other conductors shall pass through this compartment. A neutral bus bar extension shall be provided in the instrument transformer compartment above the lower current transformer bus support when the service section phase busses are supplied from horizontal cross bussing.
3. Bus units shall be insulated as shown and the insulating material shall be rated for the serving voltage. Round bus corners as necessary to prevent damage to insulation.
4. Transformer compartment shall be on the supply side of the main switch or breaker.
5. For underground service installed by NVE, the busses shall extend into the pull section as per Page 9.
6. The maximum permissible bus unit shall be as noted in Table 1.
7. Taps for attachment of meter wiring shall be provided as follows:
 - a. One tap on each upper and lower phase bus unit with a #10-32 UNC screw and washer provided for each phase bus in either the upper or lower position.
 - b. One tap on the neutral bus as shown.
8. Clearance to the side of the compartment shall be increased by the amount by which the corner angle exceeds one inch.
9. Dimension measured to inside edge of the compartment access opening.
10. Barrier shall be insulating non-tracking material and have a minimum of 24 vent holes of 3/8" diameter.
11. The barrier should not be less than 45" and shall not be more than 50" above the standing surface.
12. Return flanges for lower and upper meter panel support shall not project more than 3/4" up or down from adjacent switchboard panels.


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**REMOVABLE LINK & CT SUPPORT
4" BUS - 3001 AMPS AND LARGER**

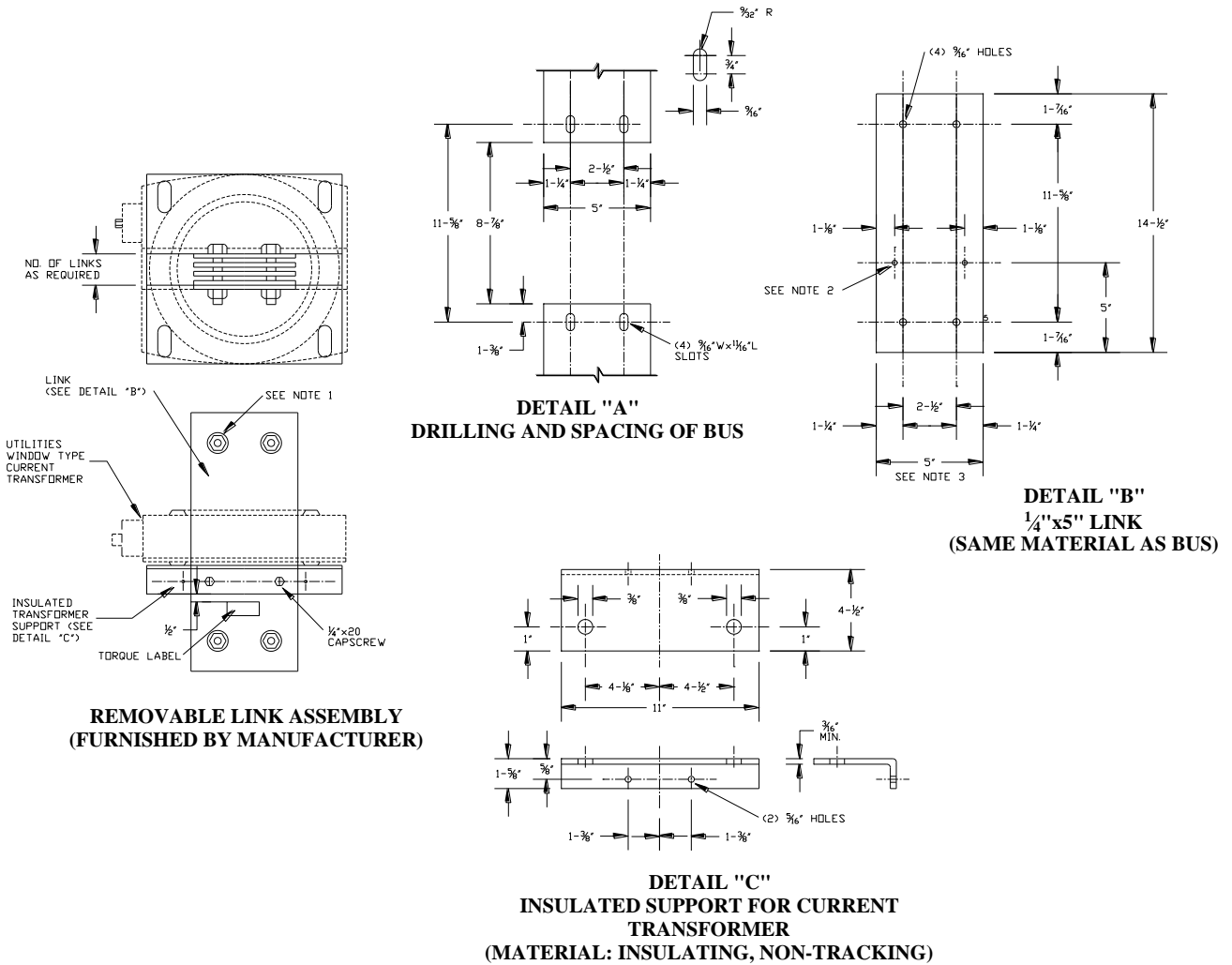


NOTES:

1. Manufacturer to secure the removable bus link to the upper and lower CT bus units using 1/2-inch hex head bolts, nuts (as shown) with a spring washer and a nut.
2. Drill and tap two holes as shown on the outer bus units for 1/4-inch x 20 UNC cap-screws.

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**REMOVABLE LINK & CT SUPPORT
5" BUS 1001 - 3000 AMPS**

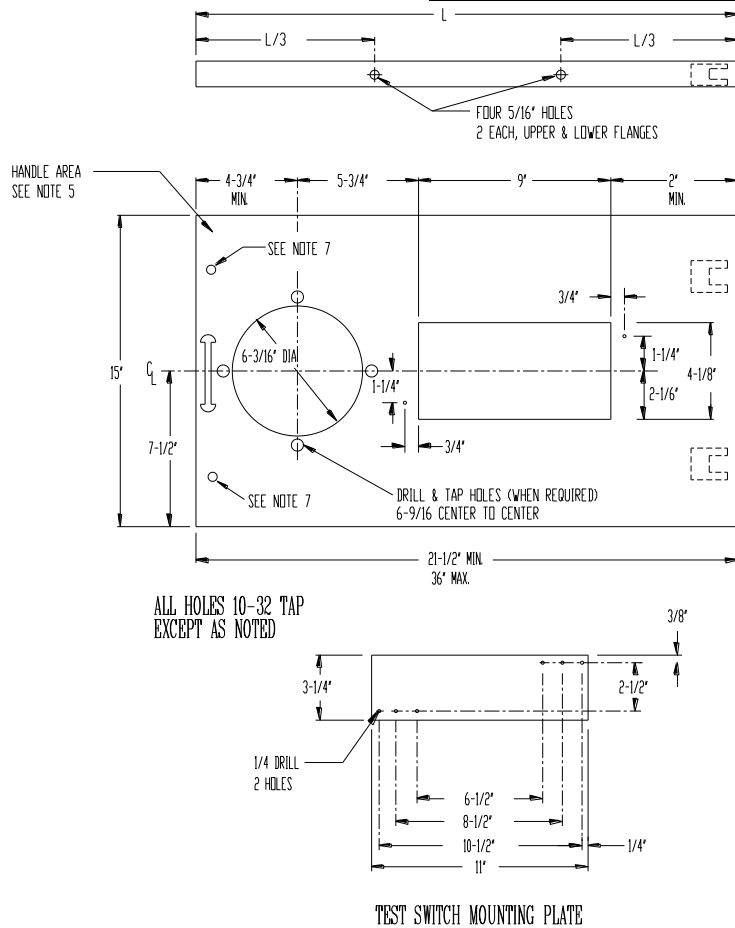


NOTES:

1. Manufacturer to secure the removable bus link to the upper and lower CT bus units using 1/2-inch hex-head bolts, nuts (as shown) with a spring washer and a nut.
2. Drill and tap two holes as shown on the outer bus units for 1/4-inch x 20 UNC cap-screws.
3. Consult NVE for use of bus bars larger than 5 inches.


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SOCKET METER PANEL

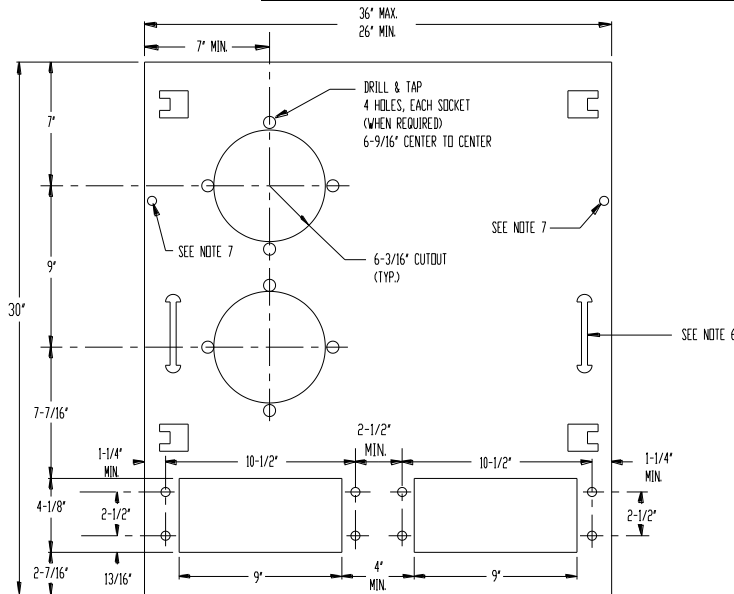


NOTES:

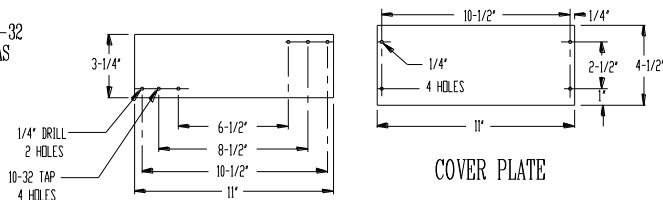
1. The switchboard manufacturer shall drill, tap and slot the panel as shown for secondary test switches and shall furnish and install sockets complete with sealing rings.
2. Meter sockets installed on hinged panels shall be designed for back connection.
3. Meter panels shall be constructed of 12 gauge steel (minimum) and shall be hinged, reversible, sealable and interchangeable.
4. Hinges must support a 25-pound load applied at unsupported end with one-eighth inch maximum sag when open.
5. A handle shall be attached at the unsupported end of the meter panel with a minimum radial clearance of 1 inch from the meter socket or removable plate section.
6. Hinges shall be readily interchangeable, right or left, on the job site.
7. All securing screws and sealing screws on panel shall be captive. Studs and wing nuts shall be sealable when used.
8. Meter panels shall be capable of being opened 90° with meter and test facilities in place.
9. Removable plate shall be secured to rear of panel by screws of such length so as not to protrude through face of panel.

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SOCKET METER & RECORDER PANEL




ALL HOLES 10-32
TAP EXCEPT AS
NOTED



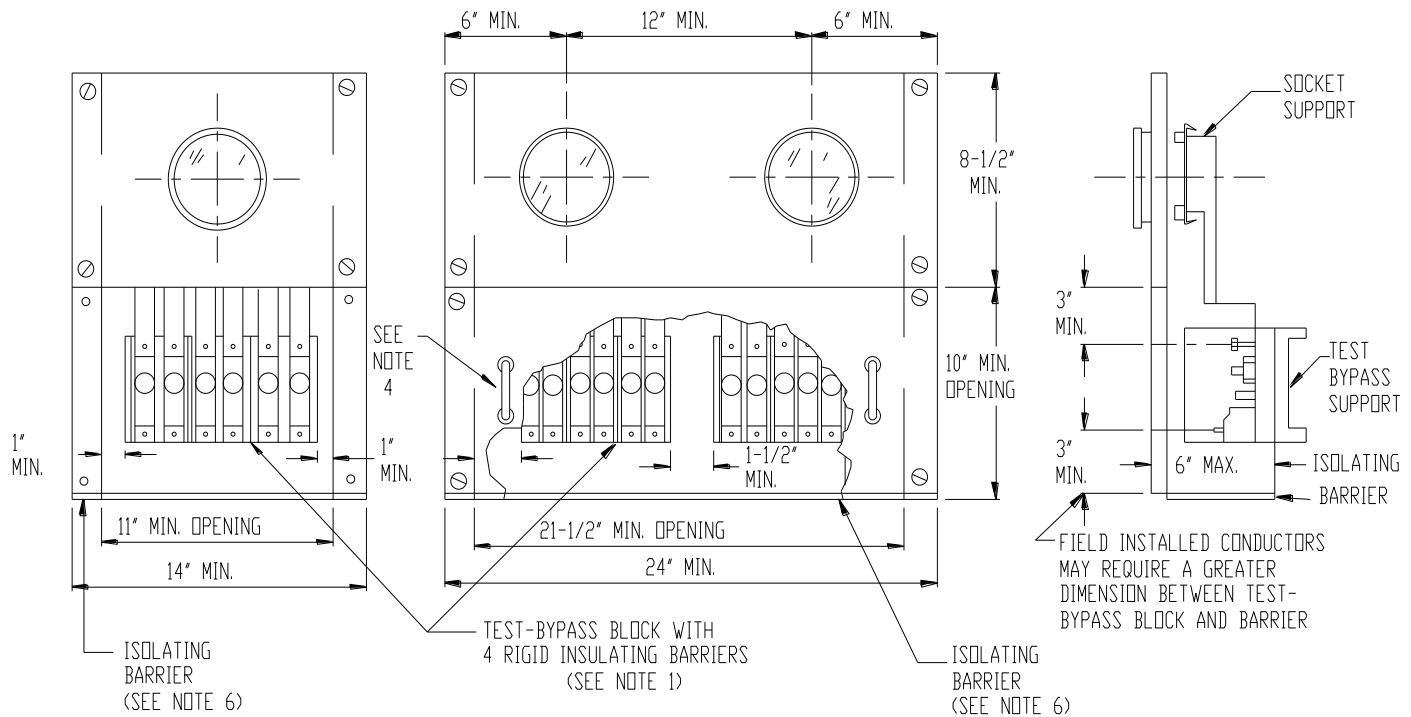
TEST SWITCH MOUNTING PLATE

NOTES:

1. The switchboard manufacturer shall drill, tap and slot the panel as shown and shall furnish and install sockets complete with sealing rings. All holes #10-32 UNC tap except as noted.
2. Removable plates shall be painted and attached to panel.
3. Meter panels shall be constructed of 12 gauge steel (minimum) and shall be hinged and sealable.
4. Hinges shall be readily interchangeable, right or left, on the job site. When clevis type or removable pin type hinges are used, provision shall be made so that pin can be removed from the top.
5. Hinges must support a 25-pound load applied at unsupported end with one-eighth inch maximum sag when open.
6. Panel shall have a handle attached to both sides.
7. All securing screws and sealing screws on panel shall be captive. Stud and wing nuts shall be sealable when used.
8. Hinged meter panel shall not be hinged to a filler panel.
9. Hinged meter panel shall be capable of being opened 90° with meter and test facilities in place. For recessed or enclosed meter panels, refer to Page 15.
10. Meter sockets installed on hinged panels shall be designed for back connection.
11. For panel widths less than 26", consult NVE.


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SELF CONTAINED METERS (0-200 AMP)



NOTES:

1. Test-bypass blocks with rigid insulating barriers shall be furnished, installed, and wired or bussed to the meter socket by the manufacturer. Test-bypass blocks and barriers shall conform to NVE Standards dwg. CM0001M, Pages 5-6, requirements and physical arrangements shall conform to NVE Standards dwg. CM0001M, Page 10. Connection sequence is line-load, from left to right for each phase.
2. Metered conductors shall not pass through adjacent metering compartments except in enclosed wire ways.
3. Meter panels shall be removable with a maximum of two meters per panel.
4. Test-bypass block cover panels shall be sealable and fitted with a lifting handle. All panels exceeding 16 inches in width shall require two lifting handles.
5. When a neutral is required for metering or testing, an insulated neutral terminal shall be provided behind each test-bypass cover panel. The terminal shall be readily accessible when the cover panel is removed and shall be individually connected to the neutral bus with a minimum size #8 AWG copper wire.
6. Factory installed full-width insulating barrier shall be located at the bottom of each test-bypass compartment.
7. For 3 phase, 4 wire, connect 7th jaw to body of neutral lug with #8 copper wire.

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- 8. Meter panels shall be removable but shall be non-removable when meter is in place. Meter socket is to be supported independent of and attached to meter panel.
- 9. Separate line and load conductors shall be installed by the contractor or manufacturer for each meter socket.
- 10. Each line and load position shall be clearly identified by 3/4 inch minimum block lettering labeling.
- 11. All securing screws shall be captive. All panels shall be sealable.

11.0 METER SOCKETS

SEE NVE STANDARD GM0001M, FOR TABULATION OF NVE METER SOCKET REQUIREMENTS.

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