



**Pad-Mounted and
Submersible Transformers
Customer Reference Specification
6-17-163**

0000-000-ST-6017
Custom ID: DCS 6-17
Revision: 02
Effective Date: 1/30/2017
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6-17-163 – Customer Reference Specification

**Customer Installed Transformer Vault;
Vault Arrangement and Grounding Details
30 KVA to 2500 KVA Capacity**

THIS CUSTOMER REFERENCE SPECIFICATION (CRS) IS PART OF THE
RULES FOR ELECTRIC METER AND SERVICE INSTALLATION (REMSI) WEBSITE.



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This specification defines the customer’s responsibilities and PPL’s requirements for underground service from a transformer vault located within the customer’s building or a walk-in enclosure as described in Rule 9 and Sheet 38 of the “Rules For Electric Meter and Service Installations” book.

All details of this specification and those listed below shall be strictly followed. **Any** deviations **must** be approved by a PPL engineer. Unapproved deviations are usually costly for the customer to correct and can result in delays or possible refusal to connect service.

This specification was prepared for new construction only. Based on operating, maintenance, and safety criteria, a PPL engineer will make the determination to accept or reject an existing installation that does not conform to this specification.

The customer shall comply with all applicable industry standards. By installing its equipment, PPL does not assume responsibility for customer’s equipment and/or facilities, nor does PPL’s installation of its equipment infer that customer’s equipment and/or facilities comply with applicable industry standards.

Other Associated Specifications:

A-168735Customer-Installed Duct Systems

6-18-115Installation Instructions for Customer-Installed Conduit Systems on PPL Terminal Poles

A-190556Customer Low-Voltage Switchboards, Arrangements, and Clearances

Introduction

PPL expects the customer to construct its vault in accordance with “National Electrical Code” requirements enacted by the authority having jurisdiction. The customer must have the vault inspected by an electrical inspection agency, whose cut-in cards are accepted by PPL before PPL will connect the electric service. PPL does not “approve” the vault construction, but will accept or reject the completed vault based on the electrical inspection agency report and the customer’s compliance with the applicable PPL specifications.



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General Instructions:

1. Location Plan

Prior to the start of vault construction, the customer must provide PPL with a detailed floor plan or plot plan showing the location of the proposed vault or walk-in enclosure, switchgear room, metering location, and conduit entrance location. The vault entrance must be located where it is readily accessible for inspection and maintenance by PPL without involving a second party.

2. Door Opening

The door must lead directly to an outside area and be large enough to remove or replace the largest transformer installed. The vault door must be equipped with a hasp suitable for a PPL padlock with 3/8 inch shackle and a panic release arranged so that the door can be readily and quickly opened from the inside. The customer must place safety signs on the outside of the door in a conspicuous location warning unqualified persons not to enter:

For example:

“DANGER”
HAZARDOUS VOLTAGE INSIDE
QUALIFIED PERSONNEL ONLY
FOR YOUR SAFETY
-----KEEP OUT-----
CALL PPL UTILITIES IF DOOR NOT LOCKED

These safety signs must be chosen and located in accordance with ANSI Z535.

3. Vault Lighting

The customer is responsible for all lighting equipment in the vault. A minimum of two light fixtures are required; normally ceiling mounted above the transformers. Locate the light switch adjacent to the entrance door.

4. Ventilation

The vault ventilation system must be adequate to dispose of the transformer full load heat losses without creating a temperature rise which is in excess of the transformer rating. A vault ventilated by natural circulation of air must have roughly half the total required vent area located in the wall near to the floor and the remaining half located near the roof—or all the required vent area can be located in or near the roof.

The clear vent area must be at least 3 square inches net per kVA transformer capacity. Net clear area is defined as space not occupied by screens, grating bars, louvers, etc.

For example: Up to 750 kVA requires 15.6 sq. ft.²

Up to 1000 kVA requires 31.3 sq. ft.

Up to 2500 kVA requires 52.1 sq. ft.

²Value is based on name plate rating only; overloaded transformers will require additional ventilation.



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Ventilation openings must be designed or located such that sticks, wires, rods, etc., cannot be inserted and come in contact with live parts. Provisions for additional ventilation should be made if transformer capacity will be increased at a future time.

5. Door Sill

To conform with the “National Electrical Code”, the customer must install a door sill or curb of sufficient height to confine within the vault, the oil from the largest transformer. The sill or curb must be at least 4 inches high.

6. Drainage

The customer is responsible to provide drainage if the vault is located in an outside area or where water seepage is a potential problem. An oil sensor device must be installed on any equipment that automatically pumps water from the unattended vault.

7. Vault Size

The vault must be sufficiently large to provide safe access and working space for operating and maintaining all electrical equipment. The vault should be sized to provide for possible load growth.

- A. 9 ft x 15 ft x 10 ft high for up to 750 kVA
- B. 14 ft x 19 ft x 10 ft high for up to 1500 kVA
- C. 20 ft x 30 ft x 11 ft high for up to 2500 kVA

8. Safety Barrier

The customer is required to provide a removable safety barrier to alert qualified personnel before they enter within reaching distance of live parts.

9. Grounding

The customer must provide and install the following grounding devices and connections:

- A. One 8-foot ground rod located in the vault floor (see sketch),
- B. #2 copper connection to the outside case of the service bus duct or cable tray.
- C. #4/0 copper connection from the ground rod to the ground and neutral bus (see sketch).

10. Service Bus

The customer must install the service bus duct and provide the proper type and number of connectors as shown in Table 1. The height and spacing of the bus bars must be approved by a PPL engineer.

If a cable tray is used, the customer’s cables must be terminated on copper bus bars suspended from the ceiling above the transformers. The customer must provide connectors per Table 1.

If an increase in load is anticipated, additional bus connectors or larger connectors may be required.



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Table 1 Required Quantity and Size Secondary Connectors

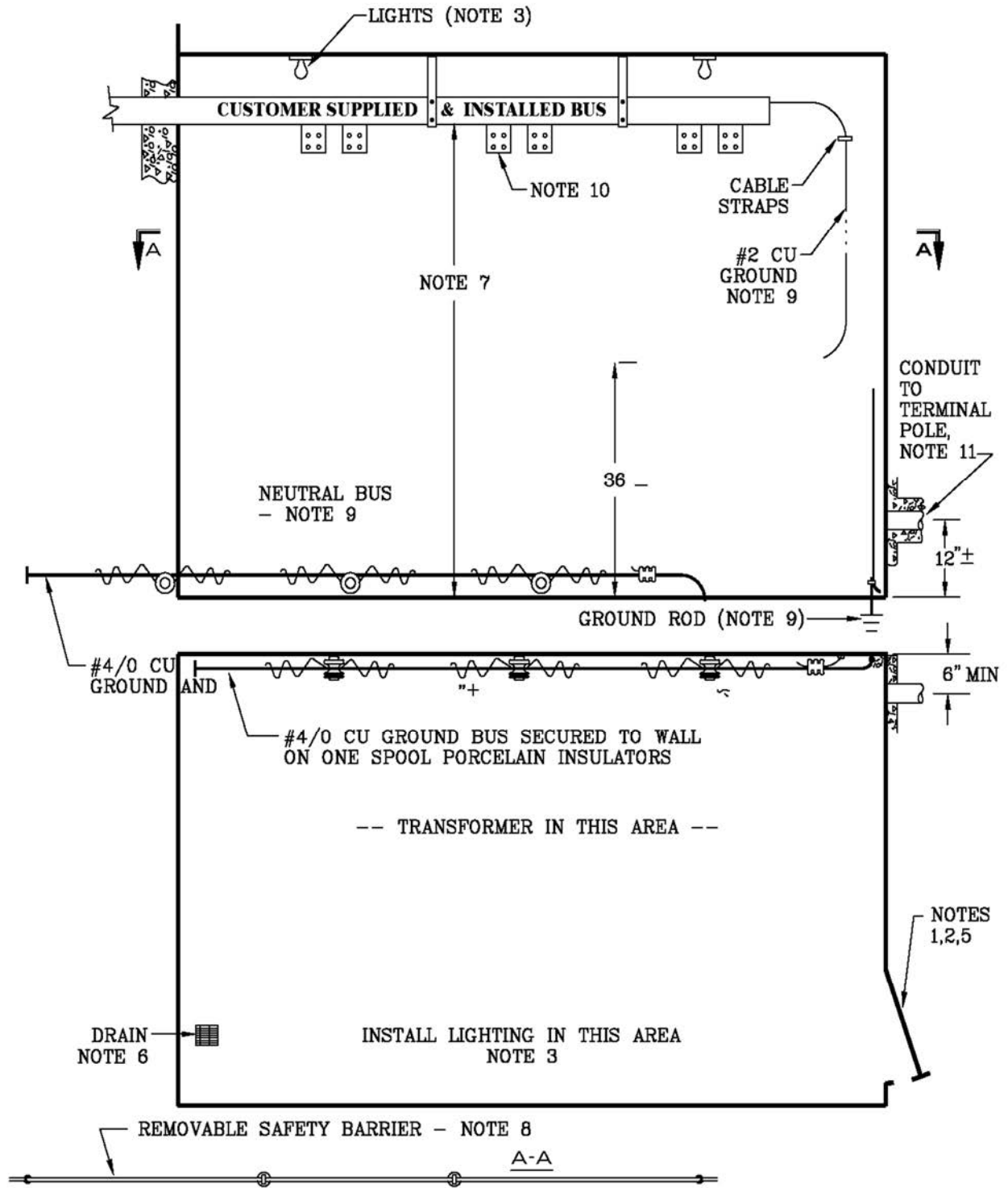
Transformer Size Total kVA Of Three Units	240/120 Volt 4W Delta Service		480 Volt 3W Delta Service		208/120 Volt 4W Wye Service		480/277 Volt 4W Wye Service	
	Phase	Neutral	Phase	Neutral	Phase	Neutral	Phase	Neutral
30	6-1/0	1-1/0	--	--	3-1/0	3-1/0	--	--
45	6-1/0	1-1/0	--	--	3-1/0	3-1/0	--	--
75	6-1/0	1-1/0	6-1/0	--	3-4/0	3-4/0	--	--
150	6-4/0	1-4/0	6-1/0	--	3-350	3-350	3-4/0	3-4/0
300	6-500	1-350	6-4/0	--	6-500	6-500	3-350	3-350
500	12-350	1-350	6-350	--	9-500	9-500	3-750	3-750
750	12-750	1-750	6-750	--	12-750	12-750	6-500	6-500
1000	18-500	2-350	12-350	--	15-750	15-750	6-750	6-750
1500	24-750	2-750	12-750	--	15-1000 Copper	15-1000 Copper	9-750	9-750
2500	--	--	18-750	--	--	--	--	--

11. Conduit

The customer furnished and installs the primary cable entrance conduit (or conduits if a spare is desired) in accordance with PPL specifications A-168735 and 6-18-115. If steel conduit is used, grounding bushings are required. All PVC conduits must have bell-ends installed where the conduit enters the vault or manhole.

12. Fire Protection System

To conform with the “National Electrical Code”, the vault must be constructed of materials which have a minimum fire resistance of 3 hours—typically 6-inch thick reinforced concrete. Fire protection systems utilizing automatic sprinklers, water spray, carbon dioxide, or halon are **NOT** permitted.



6-17-163-A