



Dual Generator Specifications and Requirements

BULLETIN

Abstract:

Summary description of process, policy or role described in this document.

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1. Summary

This bulletin outlines changes to the Facilities: Power and Grounding Standard with regard to the use and deployment of a dual generator solution in all Comcast facilities.

The rationale for this change is explained below.

1.1 Design Intent

The use of dual redundant generators is intended to provide two fully rated units capable of supporting the entire critical load. This entails changes to the following practices:

- The installation of an MTS (manual transfer switch) and PGC (portable generator connection) is no longer required or preferred.
- The use of a portable generator during the preventive maintenance of a generator is no longer required when dual generators are deployed.

The total volume of fuel between both generators must be considered when permitting fuel storage.

Environmental air quality permitting will be limited to one generator as under normal conditions only one generator will operate at time.

Comment [NP1]: Under what header might we roll these requirements?

1.2 Pre-requisites

List of processes, configurations, information and conditions that must be exist prior to implementing the practices described in this document.



2. Detailed Requirements

The following sections outline the updated requirements resulting from the change to a dual generator environment.

NOTE: All section references below relate to specific requirement changes from the [Facilities: Power and Grounding Standard](#).

2.1 Automatic Transfer Switch (ATS)

This section documents all functional and performance requirements for Automatic Transfer Switches to be used in dual generator deployments.

- 2.1.1 The existing UTG ATS must be upgraded to an isolation by-pass when dual generators are deployed
- 2.1.2 Utility-to-Generator (UTG) transfer switch shall be isolation by-pass and meet all the requirements for ATSs in the Power and Grounding Standard
- 2.1.3 Generator-to-Generator (GTG) transfer switches shall be isolation by-pass and meet all the requirements for ATSs in the standard
- 2.1.4 Requirement is for NEMA1 cabinet configuration for interior (i.e. climate controlled) installation, unless a written waiver is obtained from Corporate Engineering
 - If the cabinet must be installed outside, the cabinet must be equipped with redundant heaters in order to prevent condensation (NOTE: This arrangement will require power connection to GTG)
 - If the cabinet is mounted on a vault, the vault holes must be fully sealed, cables must be grommeted, and pipe must be sealed
- 2.1.5 UTG and GTG shall be configured as follows:
 - Source one generator to GTG
 - Source two generator to GTG
 - GTG to UTG
 - UTG to load

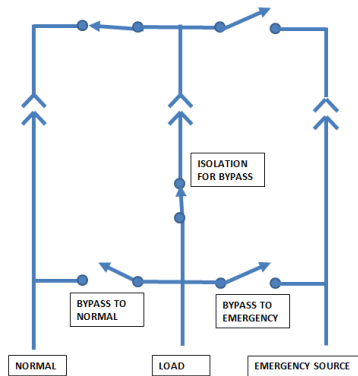


Figure 2-1: Normal Position

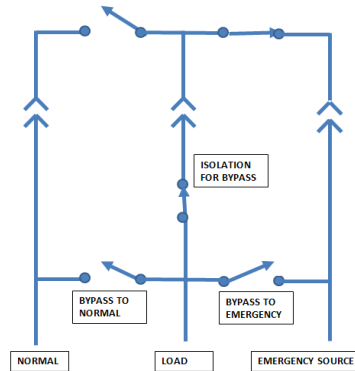


Figure 2-2: Emergency Position

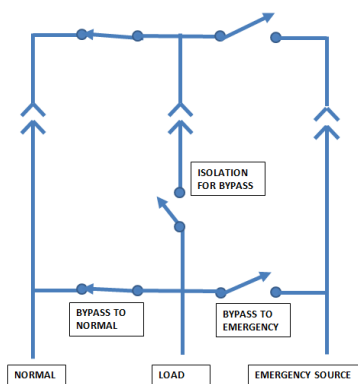


Figure 2-3: Bypass to Normal Position

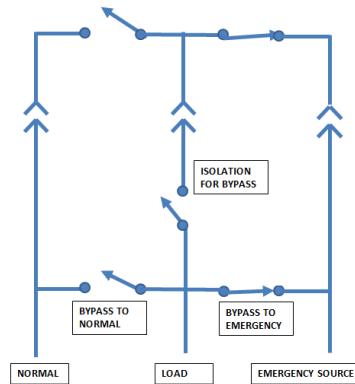


Figure 2-4: Bypass to Emergency Position

- 2.1.6 The ATS system shall be configured to prevent both generators from running at the same time during generator exercises
- o During emergency operations, the ATS system may be configured to allow both generators to run simultaneously for 5 minutes in order to provide failover coverage should the primary generator fail to provide power to the site
 - o Specific emergency operations routines may be adapted to comply with relevant local regulations and authorities; it is the responsibility of local engineering and management to know and understand applicable local regulations
- 2.1.7 Delay transfer time source transition a minimum of 5 seconds (to a maximum of 15 seconds) to ensure safe transfer of highly inductive loads between two non-synchronised power sources (from P&G, Section 5.4.4.5)

2.2 Exerciser



- 2.2.1 Weekly exercise shall be performed weekly, in either of the following ways:
 - On the same day, sequentially (i.e. not simultaneously), with each generator running for 15 minutes; or
 - On alternating days within the same week, with each generator running for 15 minutes
- 2.2.2 The weekly exercise shall be performed without load, for 15 minutes (per manufacturer's specifications)
 - NOTE: If a local market chooses to perform monthly generator testing under site load, this testing shall fulfill the weekly generator exercise requirement for compliance
- 2.2.3 Specific exerciser routines may be adapted to comply with relevant local regulations and authorities; it is the responsibility of local engineering and management to know and understand applicable local regulations

2.3 Generators

2.3.1 Generator Starting Systems (Ref. Section 5.4.1.2)

Redundant generator starting systems are not required in a dual generator scenario.

2.3.2 Fuel Supply

When deploying dual generators, the fuel supply can be reduced by half (Ref. Section 5.4.2):

- 36 hours for Critical (i.e. "A") Facilities
- 24 hours for Secondary (i.e. "B") Facilities

SME recommendation: Dual tank, with automatic transfer method with appropriate physical isolation safeguards

Comment [NP2]: NEED EXECUTIVE INPUT. This was a very contentious topic.

- 2.3.3 Fuel capacity shall be sized to 100% load capacity of the generator, per the prescribed runtime requirements outlined in Section 2.3.1
- 2.3.4 Where parts are significantly similar and available, consideration shall be given to match second generator to existing house generator to allow for part-swapping in the event of a failure
- 2.3.5 System Separation
 - All common elements providing service to/from each generator must maintain a strict physical (10ft) separation, excluding the direct connection to the GTG and the exterior ground connection
 - Start circuits and block heater cannot share the same conduit, and shall be fed from separate AC panels
- 2.3.6 Start Circuit
 - Start circuits must be auto feature not manual
 - Latching relay (toggles between both start circuits) must be of a failsafe design, allowing no single point of failure



2.4 DC Power

2.4.1 Battery reserve (Ref. Section 4.2.1.3)

When deploying dual generators, the battery run time can be reduced to two hours.

2.4.2 Battery cabling size (Ref. Section 4.3.1.9)

When deploying dual generators, and reducing battery run time you must compensate for the increase in current draw by increasing the size and quantity of battery cables to the plant. Ampacity rating of battery intercell connectors and disconnects must also conform to the 1-hour rating.

Battery cabling shall be sized to the greater of:

- 1-hour (reduced from 2-hour in single generator scenario) discharge rate for ampacity; or
- 2-hour (reduced from 5-hour) discharge rate for the voltage drop

2.5 Layout

Adequate separation between generators and ATSs in the emergency power system shall be maintained to avoid a failure in one component incapacitating another. Specifically:

2.5.1 The spacing between UTG ATS and either generator shall be a minimum of 10 feet

2.5.2 The spacing between GTG ATS and either generator shall be a minimum of 10 feet

2.5.3 The spacing between redundant generators shall be a minimum of 10 feet

2.5.4 Spacing between redundant generators and other unrelated generators on site shall be a minimum of 10 feet

2.5.5 Spacing between the generators or the ATSs and the utility transformer shall be a minimum of 10 feet

2.5.6 Exception: When adequate space is limited, the distance between any of the components above may be reduced to a minimum of code and manufacturer required working clearance (generally 3'-4') when a proper fire wall is constructed along the entire length and height of the component.

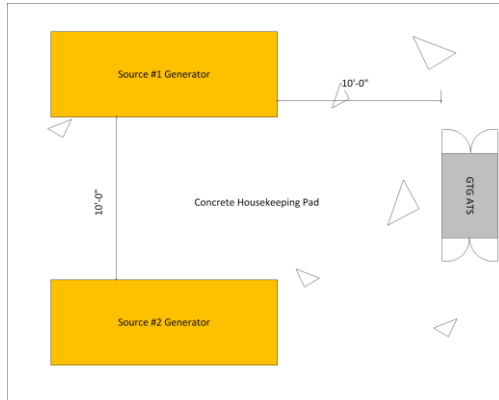


Figure 2-5: Minimum required distances

2.5.7 Fire wall shall be engineered and constructed to provide appropriate support of the fire wall and to be compliant with local code requirements

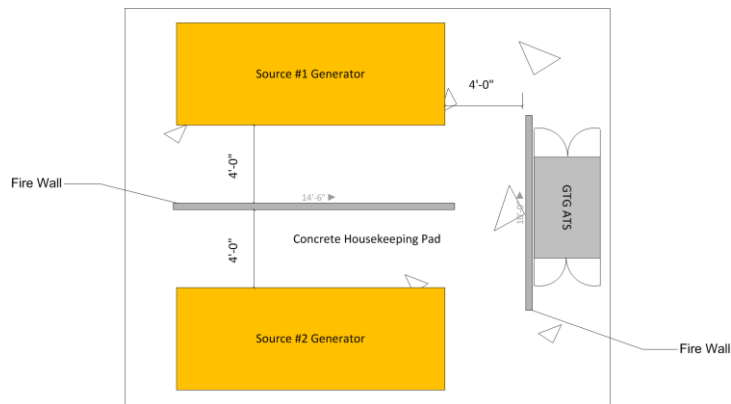


Figure 2-6: Minimum distances in space-constrained environments

