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**DISTRIBUTION ENGINEERING  
System Design Department**

**EO-2096  
REVISION 0**

**MEDIUM VOLTAGE  
A.C. SERVICE VOLTAGE LIMITS**

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## 1.0 OBJECTIVE

This specification defines customer service acceptable voltage ranges, for medium voltage services. These ranges are modeled to follow *ANSI C84.1-2020 American National Standard for Electric Power Systems and Equipment - Voltage Ratings (60 Hertz)*, when possible.

## 2.0 REGIONS APPLICABLE

This specification applies to all regions.

## 3.0 DEFINITIONS

Point of Common Coupling (PCC) – The physical point at which the ConEdison electrical system connects to the customer’s electrical system. For customers that receive medium voltage from ConEdison, this is frequently a “Customer Manhole”.

Service voltage – Voltage measured at the PCC of a customer.

Utilization voltage - Voltage at the line terminals of equipment being used; these voltages are often lower than the service voltage.

ANSI C84.1 Medium Voltage – Voltages that appear in the “Medium Voltage” section of the “Standard Nominal System Voltages and Voltage Ranges” table in the C84.1 specification. ConEdison specifications often refer to these voltages as “high tension”.

## 4.0 SERVICE VOLTAGE VS. UTILIZATION VOLTAGE

There is a distinct difference between service voltage and utilization voltage. Con Edison is responsible for delivering adequate service voltage at the PCC, and not beyond this point.

Backup generation, backup power sources, Auto Transfer Switches (ATSs), and other equipment must have thresholds set with the understanding that there will be voltage drop between the PCC and points of utilization.

**The voltages listed in section 7.0 are service voltage ranges.**

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## 5.0 VOLTAGE RANGE GUIDANCE

### 5.1. Range A Service Voltage

This is the expected voltage range at the point of common coupling under normal conditions. Variation outside this range should be infrequent.

The Con Edison electric system predominantly operates under normal system conditions. During this normal operation, customers should expect voltage at their service (also referred to as the customer PCC) to be within *Range A* limits.

### 5.2. Range B Service Voltage

This is the expected voltage range at the PCC, when there is an abnormal system condition.

Abnormal system conditions could result in a customer receiving lower or higher voltage than usual. A customer might experience *Range B* voltage when:

- One feeder is out of service (first contingency).
- Voltage regulation issues exist at an area substation.

When practical, utilization equipment should perform acceptably in this range, but not necessarily as well as in *Range A*.

### 5.3. Outside Range B Service Voltage

Voltages that are above and below the *Range A* and *Range B* limits. Efforts will be made to restore voltage into *Range A* or *Range B* as quickly as possible.

Abnormal system conditions could result in a customer receiving lower or higher voltage than usual. A customer might experience *Outside Range B* voltage when:

- Two feeders are out of service (second contingency).
- 5% or 8% network Voltage Reduction

Utilization equipment may not function properly while experiencing *Outside Range B* voltage.

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## 6.0 VOLTAGE REDUCTION

There are times when system operations may need to implement voltage reduction to prevent cascading failures within a stressed network/load area. Voltage reduction (ex. 5% or 8% reduction) may be necessary and might result in customers receiving voltages *Outside of Range B*.

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## 7.0 MEDIUM VOLTAGE SERVICE LIMITS

Nominal System Voltage (ph-ph)	Description	ConEdison Range A Voltage				ConEdison Range B Voltage = 1 <sup>st</sup> cont.			
		Max Service Voltage		Min Service Voltage		Max Service Voltage		Min Service Voltage	
<b>4160</b>	three phase	4370	5.0%	4050	-2.6%	4400	5.8%	3950	-5.0%
<b>13200</b>	three phase	13860	5.0%	12870	-2.5%	13970	5.8%	12540	-5.0%
<b>26400</b>	three phase	27723	5.0%	25744	-2.5%	27945	5.9%	25077	-5.0%
<b>33000</b>	three phase	34655	5.0%	32177	-2.5%	34923	5.8%	31355	-5.0%

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## 8.0 TRANSIENTS AND VOLTAGE SAGS/SWELLS

Short term deviations from the voltage ranges listed are both expected and unavoidable. These transients, sags, and swells in voltage will typically have a duration of a few cycles.

Service voltage should be considered high or low, if it is found to be above or below the Range B limits for an interval of at least five minutes (time for load tap changers to regulate).

Customers with sensitive equipment such as data center equipment, Variable Frequency Drives (VFDs), and life sustaining equipment, are expected to use some form of customer side protection. This protection can range from basic surge protection to fully online Uninterruptable Power Supplies (UPSs).

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