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NEW YORK, NY 10003**

**DISTRIBUTION ENGINEERING, NETWORK SYSTEMS SECTION**

**SPECIFICATION EO-2134  
REVISION 2  
DECEMBER, 2012**

**CLOSED TRANSITION TRANSFER  
FROM AND TO CON EDISON'S SUPPLY**

**FILE: APPLICATION AND DESIGN  
MANUAL NO. 4**

|                            |                                                                                                       |
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| <b>TARGET AUDIENCE</b>     | <b>ENERGY SERVICES,<br/>ELECTRIC OPERATIONS<br/>REGIONAL ENGINEERING<br/>DISTRIBUTION ENGINEERING</b> |
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## **CLOSED TRANSITION TRANSFER FROM AND TO CON EDISON'S SUPPLY**

### **1.0 PURPOSE**

This specification covers the requirements and characteristics of the closed-transition transfer (CTT) of the customer's load from Con Edison's supply to the customer's alternate source of power supply and vice versa. In a CTT, both incoming and outgoing sources of power are momentarily paralleled together thus permitting the automatic transfer of load from one supply to another supply and vice versa without power interruptions. The momentary time that the power sources are in parallel is called the interconnection time interval, which for the purpose of this specification, it is limited to 250 ms (15 cycles) or less.

### **2.0 AREAS APPLICABLE**

This specification applies to all regions.

### **3.0 APPROVED SYSTEMS**

This specification covers the CTT of customer's load from Con Edison's supply to customer's alternate source of generation, and vice versa, requiring an interconnection time interval of 250 ms (15 cycles) or less to accomplish the transfer, and using either (a) automatic closed-transition transfer switches (CTTS) rated 600VAC class, or (b) circuit breakers rated from 4.16kV up to 33kV. Customers with interconnection time intervals longer than 250 ms shall follow the requirements of Specification EO-2115, ***Handbook of General Requirements for Electrical Service To Dispersed Generation Customers***.

### **4.0 CLOSED-TRANSITION TRANSFER SWITCH**

A CTTS is a device with overlapping main contacts that permit the automatic transfer of load from one supply to another supply and vice versa without power interruptions.

- 4.1 After being manually initiated, the switch logic shall be capable of determining if the voltage and frequency as well as the phase relationship between the two sources, are within acceptable limits. If all conditions are correct, the switch contacts will be allowed to make an overlap (make-before-break) transfer. This temporary parallel operation of both sources avoids the

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momentary interruption of the load that occurs with traditional break-before-make transfer switches.

- 4.2 If the Con Edison supply has failed, a CTTS shall automatically revert to open transition transfer (break-before-make) operation. A CTTS must be capable of automatically transferring a customer load from Con Edison's supply to a stable alternate supply, in the event of failure of the Con Edison's supply, and under manual control returning the load to the Con Edison's supply in a closed transition transfer operation after the Con Edison's supply has been restored and has become stable. Voltage and frequency must be restored to normal for a minimum time interval of five minutes before returning the load to the Con Edison's supply.
- 4.3 If its automatic operation malfunctions, a CTTS must also be capable of manual transfer between sources in an open transition mode of operation.

## **5.0 CTTS CHARACTERISTICS**

- 5.1 Construction, ratings and performance of automatic CTTS shall be in accordance with ANSI/UL 1008, *Automatic Transfer Switches*, Paragraph 19.9 of the March 15, 1989, edition.
- 5.2 The CTTS shall be installed in accordance with all pertinent national, state and local codes and standards.
- 5.3 A CTTS shall be rated up to 600VAC, 30 through to 4,000 amperes, three-phase, load break, with two mechanically held switches along with sensing and control devices and circuits, as shown in Figure No. 1. The customer load is permanently connected between the two main contacts of the switch. The customer's emergency or stand-by generator, and Con Edison supply are connected to stationary contacts at opposite sides of the switches. Blades of all three phases in both main contacts shall move simultaneously when transferring load to either the Con Edison or the customer emergency/stand-by generator supply.
- 5.4 The CTTS shall transfer the load between sources using a maximum parallel time that will not exceed 250 ms.

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- 5.5 The CTTS shall have failure to synchronize and extended parallel time protection to prevent abnormal operation. The protection shall, as a minimum, initiate an alarm, automatically open the emergency or normal main contacts of the CTTS whichever closed last, and lock itself out till is manually reset. It may also be required, at the discretion of Con Edison, to have separate contacts available to shunt trip external circuit breakers.

## **6.0 USE OF CTTS UNDER SPECIAL CONDITIONS**

For those cases when paralleling an emergency/stand-by generator with the Con Edison's distribution system would cause the fault duty to exceed the circuit breaker interrupting rating at Con Edison's area substations, closed-transition transfer will be permitted only if all the following requirements are met:

- 6.1 The interconnection time interval will not exceed 250 ms.
- 6.2 The additional fault current contribution from the emergency/stand-by generator does not cause the Area Substation circuit breakers to go beyond their Close and Latch momentary rating.
- 6.3 The CTTS extended parallel time protection to prevent abnormal operation shall initiate an alarm, automatically open the emergency or normal main contacts of the CTTS whichever closed last, and lock itself out till is manually reset. It shall also have separate contacts available to shunt trip the adjacent circuit breakers located on the Emergency side of the CTTS.
- 6.4 The customer must be a participant in Con Edison's load management program, or
- 6.5 The customer must be a participant in the New York ISO's program for load curtailment, or
- 6.6 Con Edison has classified the customer as being sensitive in nature, e.g., hospitals, nursing homes, airports, military facilities, police and fire stations, emergency services, processing plants, data centers, telecommunication providers, financial institutions, etc. With respect to commercial customers, load will generally be considered to be sensitive if momentary interruption of electrical service results: (a) in the shut-down of a production line in the case of processing plants, or (b) in a significant disruption of service to on-line

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telecommunications customers, or (c) in disruption of on-line bulk financial transactions.

## **7.0 THE BYPASS-ISOLATION SWITCH**

- 7.1 An optional, manually operated, three-phase, double throw, load break before make bypass-isolation switch can be used with each CTTS to provide means of bypassing and isolating the CTTS, thus, permitting its inspection, testing, maintenance and repair (See Figure No. 1) without any interruption of the power to the load.
- 7.2 A mechanical interlock shall be provided between the CTTS and the bypass switch to prevent the operation of the CTTS whenever the bypass switch is used.

## **8.0 SHORT CIRCUIT DUTY**

The CTTS and its bypass-isolation switch, if provided, shall have the ability to withstand the available fault current at the location where the switches are installed

## **9.0 CIRCUIT BREAKERS**

- 9.1 For high tension applications where the utilization voltage is from 4.16kV up to 33kV, CTT shall be accomplished using two or more circuit breakers arranged in such a manner that overlapping circuit breaker contacts permit the automatic transfer of load from one supply to another supply and vice versa without power interruptions. Control wiring and protective relaying shall be provided, and so arranged, as to mimic the operating and performance characteristics of a CTTS. A CTT using circuit breakers shall meet all the special requirements and conditions found in Section 6.0 of this specification.
- 9.2 High Tension customers shall follow the requirements of Specification EO-2022, "General Specification For High Tension Service."

## **10.0 CON EDISON'S APPROVAL OF CUSTOMER'S INSTALLATION**

Before the customer's emergency/stand-by equipment is installed, the customer shall submit to Con Edison, for its approval, the following documents and information:

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- 10.1 A one-line electrical diagram, stamped by a Professional Engineer licensed in the State of New York, showing the proposed installation, including both the existing distribution service, the emergency/stand-by generators and nameplate data, all interconnecting CTT equipment and data, and all protective, instrumentation, and control equipment.
- 10.2 Manufacturer's documentation for the CTTS (illustrating the closed-transition transfer function and the maximum parallel operating time), circuit breakers, and protective devices.
- 10.3 Short circuit studies to show that the CTTS, circuit breakers, etc. are rated to interrupt/withstand the available short circuit currents at the point of interconnection.
- 10.4 A description of the system operating procedures under various conditions like:
  - 10.4.1 Normal operation
  - 10.4.2 Periodic testing of load transfer
  - 10.4.3 Load transfer under Con Edison or ISO programs
  - 10.4.4 Interruption of Con Edison's service
  - 10.4.5 Announced Con Edison voltage reduction
  - 10.4.6 Announced Con Edison outage
- 10.5 A written statement signed by the customer, on the Customer's letterhead, stating that the facilities will be used, operated and maintained in accordance with the requirements of this specification.
- 10.6 The customer shall provide advance written notice to Con Edison of any proposed change in electrical equipment associated with the CTT, and Con Edison shall promptly inform the Customer whether the contemplated changes are acceptable, consistent with the goal of conducting a safe, reliable and efficient closed-transition transfer.

## **11.0 OPERATING AND MAINTENANCE REQUIREMENTS**

- 11.1 The customer must notify Con Edison's District Operator prior to making a

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load transfer from the customer's generation to Con Edison's supply with the understanding that Con Edison has the right to postpone the request for transfer until system conditions are more favorable. It is understood that Con Edison will notify the customer prior to performing any switching on the distribution system that may interrupt normal service to the customer.

- 11.2 The customer must grant Con Edison full access to the generating and transfer equipment, including test records and operating logs. The customer must be able to exhibit, at Con Edison's request, at the time of installation and at any time thereafter, that the equipment functions properly to transfer the load in the specified time interval.
- 11.3 The customer should be aware of the fact that the closed-transition transfer or "soft" transfer imposes additional electrical stress on the distribution system. Con Edison therefore retains the right to limit transfers and inspect the transfer equipment for the sake of safeguarding the reliability and safety of the distribution system that supplies other Con Edison customers in the vicinity.

## 12.0 **ATTACHMENTS**

12.1 Figure 1, *CLOSED TRANSITION TRANSFER SWITCH*

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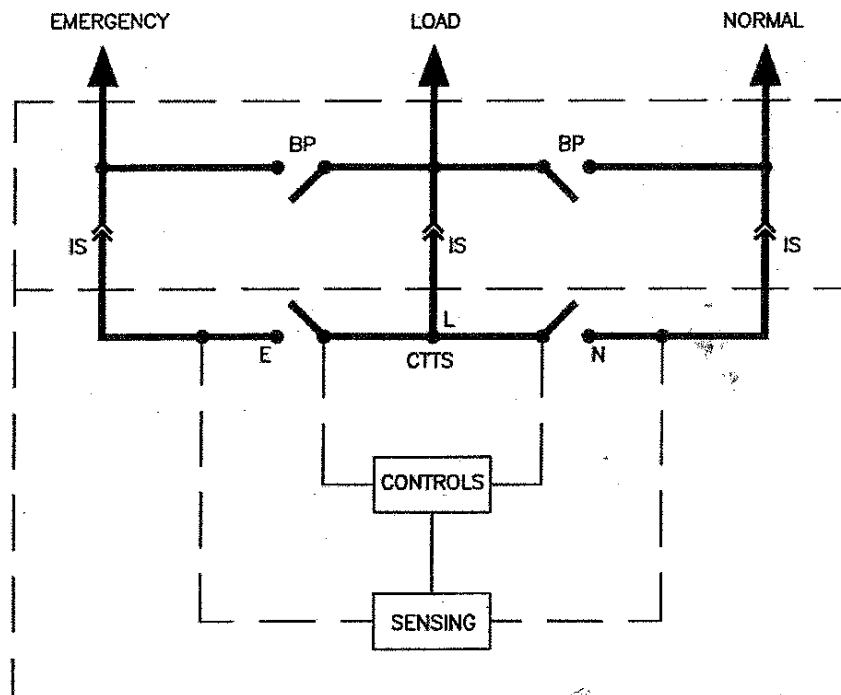
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FIGURE 1  
CLOSED TRANSITION TRANSFER SWITCH



### LEGEND

BP = BYPASS SWITCH  
 CTTS = CLOSED TRANSITION TRANSFER SWITCH  
 IS = ISOLATION SWITCH  
 LOAD = CUSTOMER LOAD  
 NORMAL = CON EDISON SUPPLY  
 EMERGENCY = CUSTOMER EMERGENCY/STAND BY GENERATOR