STANDARD OPERATING DESIGNATIONS FOR TRANSMISSION AND SUBTRANSMISSION BUSSES - DISCONNECTS - CIRCUIT BREAKERS

Distribution Restricted: This document may contain Critical Energy Infrastructure Information.

Introduction

To simplify operating procedures it is essential that all transmission and subtransmission switchrack equipment designations be standardized. The following are the rules for labeling and numbering various switchrack equipment.

Refer to System Operating Bulletin (SOB) No. 123 for the standard designations of transmission and subtransmission lines.

Attachments

There are diagrams attached to this bulletin to enhance the understanding and application of the labeling and numbering of switchrack equipment.

Signs and Lettering

All switchrack signs and circuit breaker labeling shall be of adequate size, to be readable by operating personnel at normal working distance identifying the name, voltage, switching device or equipment.

All subtransmission voltage circuit breakers shall be labeled on both sides of the circuit breaker, using one of the following designation methods:

- Circuit Breaker Number
- Circuit Name
- Circuit Breaker Number and Circuit Name

All transmission voltage circuit breakers shall be labeled with the circuit breaker number on both sides of the circuit breaker.

Ground disconnect signs shall be red with white lettering.

Subtransmission Switchrack Numbering Method

Subtransmission Voltages 161 kV and Below

The number assigned to station switchrack equipment designates the voltage, geographical location, switchrack position numbers and switching device.

Numbering assignments are based on the ultimate switchrack design.

First Digit

Double Bus and Breaker-And-A Half, the number one (1) is assigned to the North or East Bus.

Breaker-And-A-Half, Tie Breakers, the number two (2) is assigned.

Double Bus and Breaker-And-A-Half, the number three (3) is assigned to the South or West Bus.

In a Breaker-And-A-Half bus configuration the Tie Breaker position shall always be designated with the first number being (2), even if there is no circuit breaker provided in that position to the opposite bus.

Second Digit(s)

The rack position number(s) follows the bus voltage identification number. This shall be a single digit if the ultimate switchrack design is nine (9) positions or less, and two digits if the ultimate switchrack design is ten (10) or more positions.

Example: Ultimate switchrack design nine (9) positions, rack position number 2, is designated as 2.

Example: Ultimate switchrack design ten (10) or more positions, rack position number 2, is designated as 02.

Third Digit

The switching device designation number follows the rack position number.

All bus disconnects to North or East bus circuit breakers end with the number one (1) and line or bank disconnects end with the number three (3).

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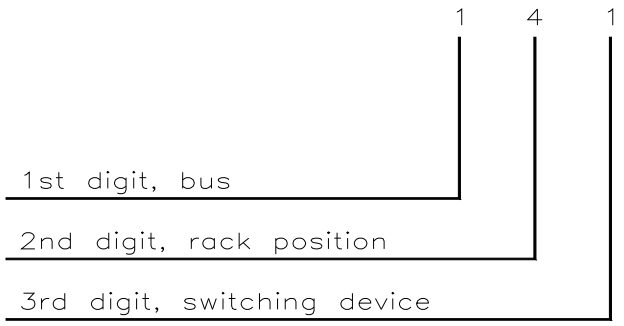
Subtransmission Switchrack Numbering Method (Continued)

All bus disconnects to South or West bus circuit breakers end with the number three (3) and line or bank disconnects end with the number one (1).

In a Breaker-And-A-Half bus configuration the disconnects on North or East side of the Tie Breaker, end with the number one (1) and the disconnects on the South or West side of the Tie Breaker, end with the number three (3).

All circuit breaker designations end with the number two (2).

Example: Ultimate switchrack design nine positions or less. Number assigned to North or East bus disconnects in rack position four (4) is:



Subtransmission Switchrack Designation Method

Bus sections shall be designated by letter "A", "B", "C", “D”, etc.

Busses divided by sectionalizing disconnects shall designate the disconnects by the sections it divides.

Example: North Bus 66 kV "AB" section disconnects.

Subtransmission bus section circuit breakers shall be designated according to the bus, voltage and bus sections the circuit breaker separates, i.e.: South Bus 66 kV "AB" section CB.

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Subtransmission Switchrack Designation Method (Continued)

Subtransmission busses are not named when a line, bank or generator is directly connected to the bus and no disconnects are provided to isolate the line, bank or generator from the bus.

Subtransmission "Ring Bus" arrangements shall identify the circuit breakers with two digit numbers. The preferred numerical designation for "Ring Bus" circuit breakers are, 22, 44, 77, and 88. Should there be more than four circuit breakers, it is recommended that numbers 11 and 99 be used. Avoid using numbers that correspond to any operating voltage in that subtransmission system.

Subtransmission Switchrack Designation Standards

Refer to the attached diagrams for the standard designations of the following subtransmission switching devices.

- Circuit Breakers
- Bypass Disconnects
- Capacitors, Circuit Switchers and Disconnects
- Reactor Disconnects and Switcher
- Bus Paralleling Circuit Breaker and Disconnects
- Bus Tie Circuit Breaker and Disconnects
- Bus Section Breaker and Disconnects
- Hydro Division switchracks having "Upper" and "Lower" busses with no bus side disconnects to circuit breakers

220 kV Switchrack Numbering Method

Transmission 220 kV

The numbers assigned to station switchrack equipment designates the voltage, geographical location, switchrack position number and switching device. Numbering assignments are based on the ultimate switchrack design.

First Digit

Double Bus and Breaker-And-A-Half, the number four (4) is assigned to the North or East Bus.

Breaker-And-A-Half, Tie Breakers, the number five (5) is assigned.

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220 kV Switchrack Numbering Method (Continued)

Double Bus and Breaker-And-A-Half, the number six (6) is assigned to the South or West Bus.

The Tie Breaker position shall always be designated with the first number being five (5), even if there is no circuit breaker provided in that position to the opposite bus.

Second Digit(s)

The rack position number follows the bus voltage identification number. This shall be a single digit if the ultimate switchrack design is nine (9) positions or less, and two digits if the ultimate switchrack design is ten (10) or more positions.

Example: Ultimate switchrack design nine (9) positions, rack position number 5, is designated as 5.

Example: Ultimate switchrack design ten (10) or more positions, rack position number 5, is designated as 05.

Third Digit

The switching device designation number follows the rack position number.

All bus disconnects to North or East bus circuit breakers end with the number one (1) and line or bank disconnects end with the number three (3).

All bus disconnects to South or West bus circuit breakers end with the number three (3) and line or bank disconnects end with the number one (1).

In a Breaker-And-A-Half bus configuration the disconnects on the North or East side of the Tie Breaker, end with the number one (1) and the disconnects on the South or West side of the Tie Breaker, end with the number three (3).

All circuit breaker designations end with the number two (2).

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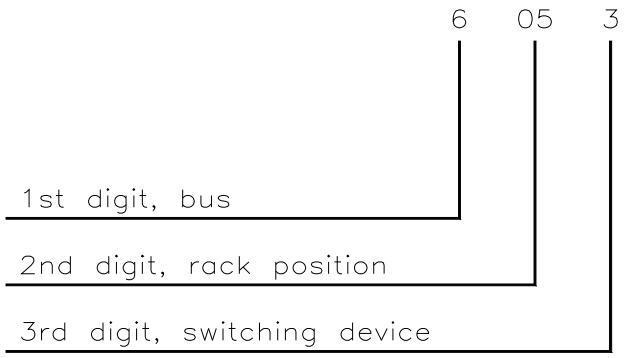
220 kV Switchrack Numbering Method (Continued)

Example: Ultimate switchrack design ten (10) or more positions. Number assigned to South or West bus disconnects in rack position five (5) is:



220 kV Switchrack Designation Method

Bus sections shall be designated by letter "A", "B", "C", "D" etc.

Busses divided by sectionalizing disconnects shall designate the disconnects by the sections it divides.

Example: North Bus 220 kV "AB" section disconnects.

Bus section circuit breakers shall be designated by the appropriate voltage/bus number and rack position number, followed by the circuit breaker designator (2).

Example: CB 4112: The number 4 identifies the voltage and bus, the number 11, identifies the rack position number and the number 2 is a circuit breaker.

Disconnects to the Bus Section circuit breaker shall be designated by the bus section they are connected to, followed by the Bus Section circuit breaker designation.

Example: "A" section disconnects to Circuit Breaker 4112.

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220 kV Switchrack Designation Method (Continued)

Transmission busses are not named when a line, bank or generator are directly connected to the bus and no disconnects are provided to isolate the line, bank or generator from the bus.

Transmission substation "Ring Bus" arrangements shall identify the circuit breakers with two digit numbers. The preferred numerical designation for "Ring Bus" circuit breakers are, 22, 44, 77, and 88. Should there be more than four circuit breakers, it is recommended that numbers 11 and 99 be used. Avoid using numbers that correspond to any operating voltage in that subtransmission system.

220 kV Switchrack Designation Standards

Some Hydro Division switchracks identify busses as "Upper" and "Lower", in this case the Upper bus shall be considered "North" and the Lower bus the "South".

Refer to the attached diagrams for the standard designation of 220 kV switching devices.

500 kV Switchrack Numbering Method

Transmission 500 kV

The numbers assigned to station switchrack equipment designates the voltage, geographical location, switchrack position number and switching device. Numbering assignments are based on the ultimate switchrack design.

First Digit

Double Bus and Breaker-And-A-Half, the number seven (7) is assigned to the North or East Bus.

Breaker-And-A-Half, Tie Breakers, the number eight (8) is assigned.

Double bus and Breaker-And A Half, the number nine (9) is assigned to the South or West bus.

The Tie Breaker position shall always be designated with the first number being eight (8), even if there is no circuit breaker provided in that position to the opposite bus.

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500 kV Switchrack Numbering Method (Continued)

Second Digit(s)

The rack position number follows the bus voltage identification number. This shall be a single digit, if the ultimate switchrack design is nine (9) rack positions or less, and two digits, if the ultimate switchrack design is ten (10) or more positions.

Example: Ultimate switchrack design nine (9) positions, rack position number 3, is designated as 3.

Example: Ultimate switchrack design ten (10) positions or more, rack position number 3, is designated as 03.

Third Digit

The switching device designation number follows the rack position number.

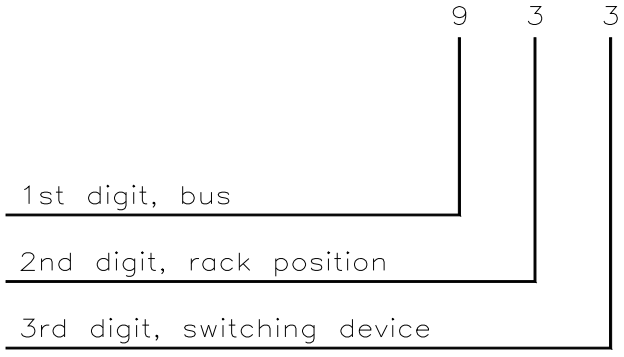
All disconnects to the North or East Bus side of a circuit breaker, end with the number one (1) and line or bank disconnects end with the number three (3).

All disconnects to the South or West Bus side of a circuit breaker, end with the number three (3) and line or bank disconnects end with the number one (1).

In a Breaker-And-A-Half bus configuration the disconnects on the North or East side of the Tie Breaker, end with the number one (1) and the disconnects on the South or West side of the Tie Breaker, end with the number three (3).

All circuit breaker designations end with the number two (2).

Example: Ultimate switchrack design nine positions or less. Number assigned to South or West bus disconnects in position three (3) is:



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500 kV Switchrack Designation Standards

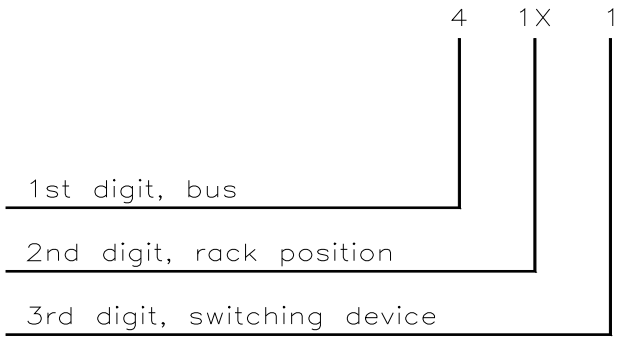
Refer to the attached diagrams for the numbering of the following 500 kV switching devices:

- o Series Capacitor line, station and bypass disconnects
- o Line Reactor disconnects and Switchers
- o Disconnects connecting a Bank, Line, or Generator to a bus where no circuit breaker is provided

Switchrack Extensions

All switchrack position numbers shall conform to the ultimate switchrack design specifications. Bus extensions where the switchrack numbering sequence is broken, for whatever reason, shall be identified with **an alpha character included** in the switchrack position number.

Example: 41X1 or 42W1:



Extending a designed nine (9) position switchrack, one position, in sequence, to a ten (10) position switchrack, shall require renumbering all the existing operating equipment in the switchrack.

Extending a designed nine (9) position switchrack, one position, out of sequence, shall not require renumbering all the existing operating equipment in the switchrack.

Gas Insulated Switchracks		Refer to attached diagrams for the designations of switching devices in gas insulated switchracks.
Special Conditions	*	Special conditions or unusual configuration designations shall be made by the area Grid Operations Manager with concurrence by the Grid Control Center.

Please cancel and destroy System Operating Bulletin No. 84, dated February 1, 1992.

T. J. Botello
Manager,
Grid Control

*Revisions
BCA: 8/22/06

SYSTEM OPERATING BULLETING NO. 84

STANDARD OPERATING DESIGNATIONS FOR TRANSMISSION AND SUBTRANSMISSION BUSSES - DISCONNECTS - CIRCUIT BREAKERS

Revised: September 19, 2006

Changes to this SOB are noted by placement of an asterisk (*) by the title of the section where changes have been made.

Updated revision date.

Corrected Grid Ops Manager and Grid Control Center in the *"Special Conditions"* section.