Westinghouse

Non-Segregated Phase Medium Voltage Bus

15 Kv, 95 Kv BIL
5 Kv, 60 Kv BIL

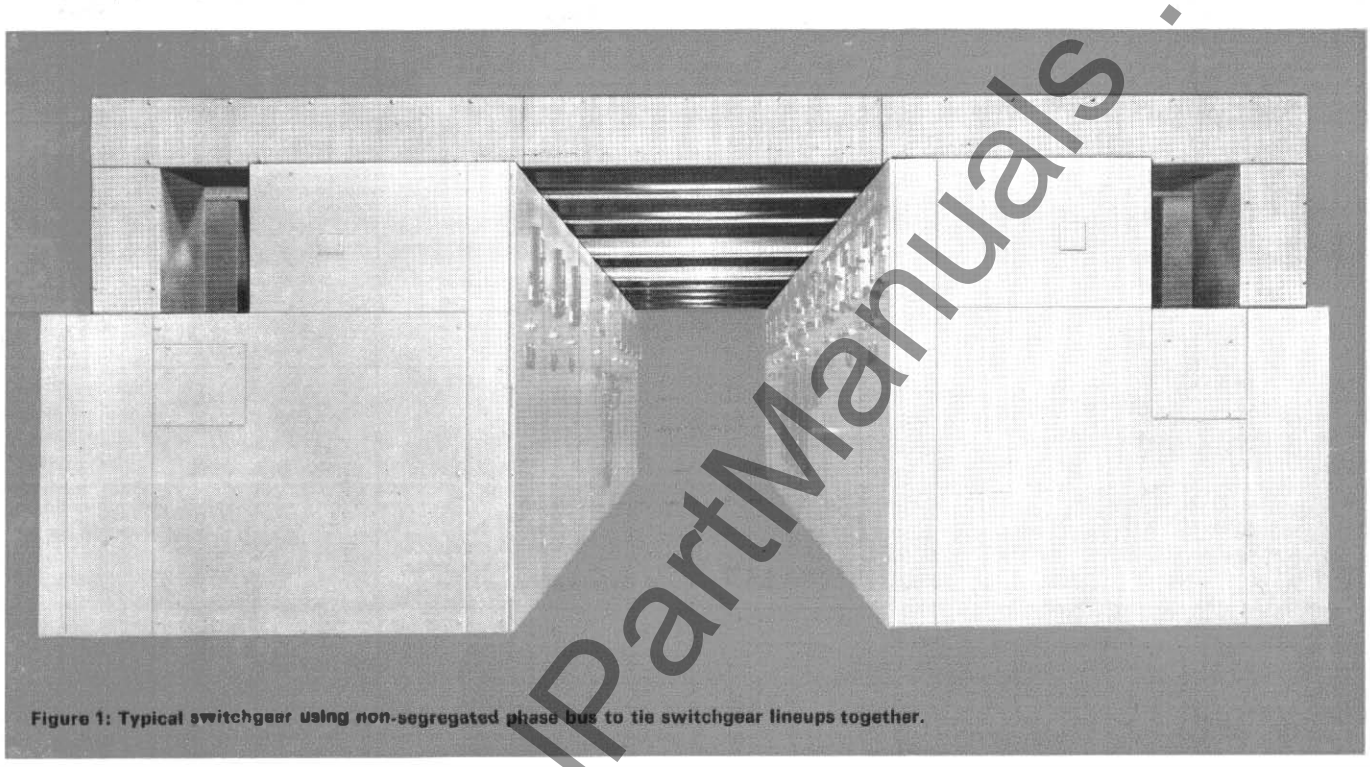

Figure 1: Typical switchgear using non-segregated phase bus to tie switchgear lineups together.

Application

Non-segregated phase bus runs are designed for use on circuits whose importance requires greater reliability than power cables provide. Typical of such applications are the connections from transformers to switchgear assemblies in unit substations, connections from switchgear assemblies to rotating apparatus, and tie connections between switchgear assemblies. Non-segregated phase bus is an assembly of bus conductors with associated connection joints and insulating supports confined within a metal enclosure without interphase barriers. The conductors are adequately separated and insulated from each other and ground by glass polyester bus supports. Each conductor is insulated with flame retardant, epoxy impregnated, high dielectric strength insulation.

Ratings Available

The metal enclosed bus runs are designed for 5 kv service or for 15 kv service. The busses may have a continuous current carrying capacity of 1200, 2000, 3000, 4000 or 5000 amperes.

Advantages

Ease of Installation

Because of its compact dimensions and relatively light weight, non-segregated phase bus is easily installed. The inherent rigidity of the design permits hanging rods to be spaced approximately every four feet for indoor bus runs, and allows supporting frames to be spaced approximately every eight feet for outdoor bus runs. Standard length of bus run sections is eight feet or less.

Short Circuit Force Withstand Ability

All non-segregated phase bus runs, regardless of current or voltage rating, are designed to mechanically withstand the forces generated by short-circuit currents up to 60,000 amperes, and 80,000 ampere momentary is also available. At 15 kv, this short-circuit current is equivalent to a short circuit kva rating of 1,000,000 kva.

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New Information
E, D, C/1942/DB

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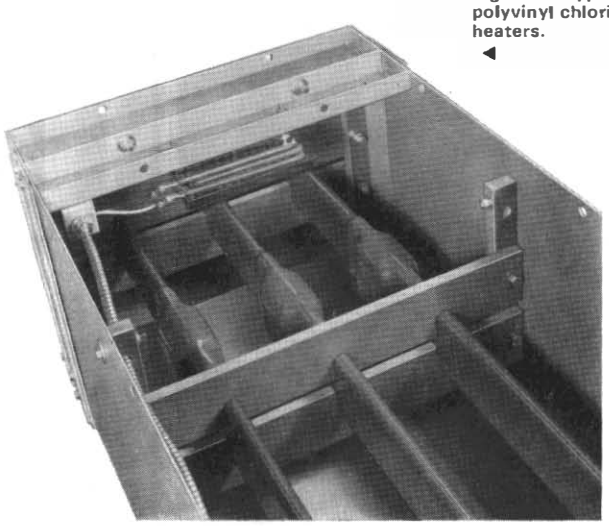

Figure 2: Typical 3-conductor bus. Note polyvinyl chloride joint covers and space heaters.

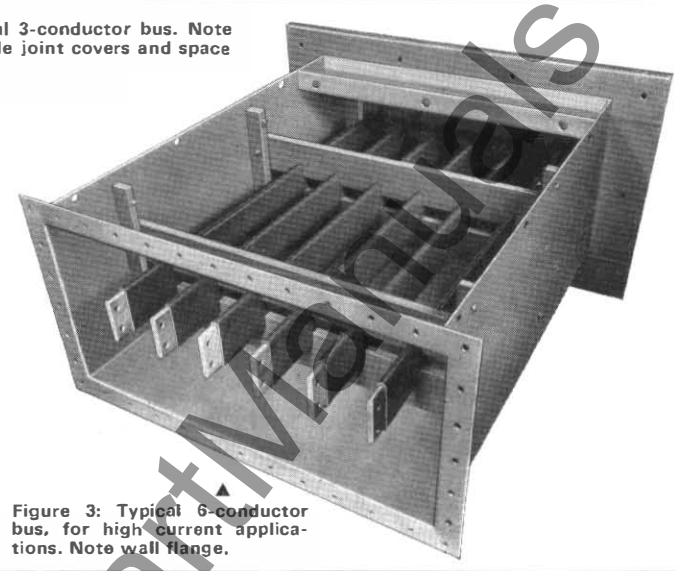

Figure 3: Typical 6-conductor bus, for high current applications. Note wall flange.

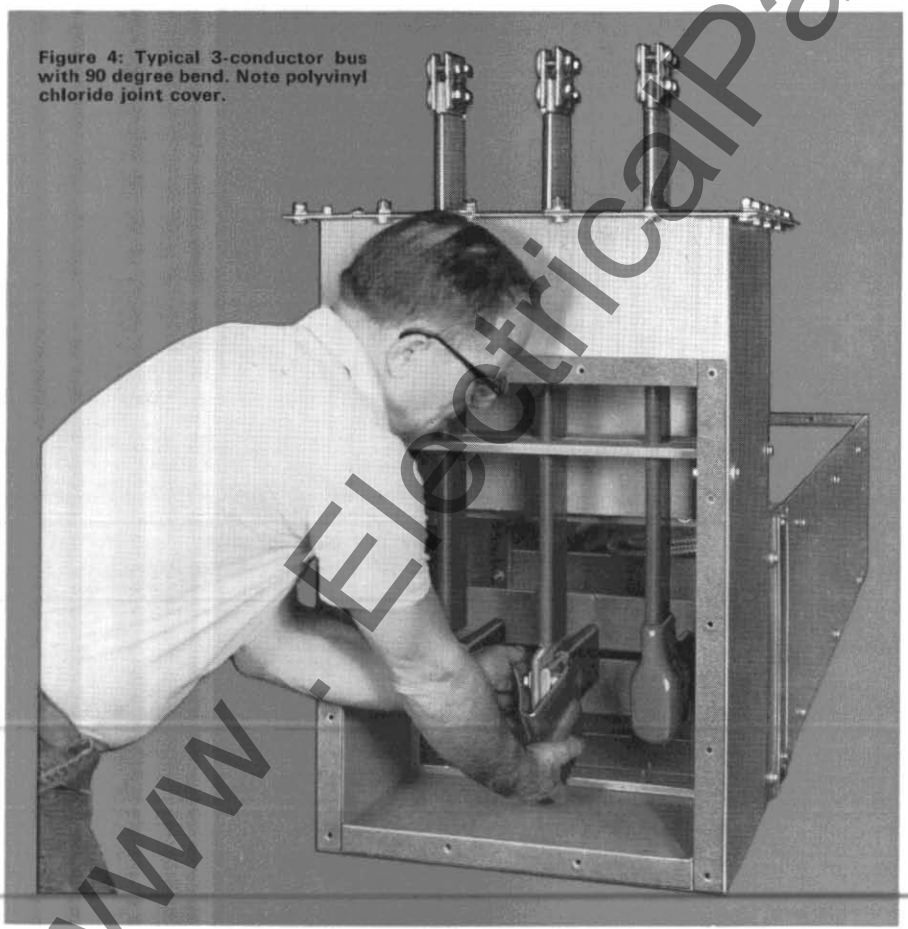

Figure 4: Typical 3-conductor bus with 90 degree bend. Note polyvinyl chloride joint cover.

Construction

The metal enclosures are formed from #11 AWG sheet steel. The metal enclosures are welded for maximum rigidity, with all removable covers secured with bolts for ease of access when making joints and subsequent inspection.

The steel enclosures are thoroughly cleaned after fabrication, are then phosphatized and immediately given a priming coat of rust-resisting paint. The interior surfaces are finished with light gray, ASA #61. The exterior surfaces of the indoor enclosures are finished with light gray, ASA #61. The exterior surfaces of the outdoor enclosures are finished in dark gray, weatherproof paint, ASA #24. Colors other than these standard colors are available upon request.

Expansion joints are supplied in all straight bus runs at approximately 50 feet intervals to allow for the expected expansion when the conductors are energized and are carrying rated current.

A variety of terminations is available to accommodate most termination requirements. Bus runs can be terminated with flexible shunts, potheads, porcelain bushings, or conductor stub ends for connection to riser bars in switchgear assemblies.

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Conductors

All conductors are of high strength aluminum, silver plated for maximum conductivity at the joints. Bus runs, rated 2000 amperes and below, use one conductor per phase, while the higher ratings use two conductors per phase.

Bus joints are made by solidly bolting the bus bars together with splice plates on each side. All joint surfaces are silver plated to insure maximum conductivity through the joint. After bolting, each joint is covered by a die-molded flame retardant polyvinyl chloride joint cover secured with nylon hardware, providing full insulation for the bus conductors. These covers are easily removable for inspection of the joints at any future time, without destruction of the cover. These joint covers have been extensively tested to insure that they meet the requirements of ASA Standard C37.20.

Temperature Rise

The busses will be capable of carrying rated current continuously without exceeding a conductor temperature rise of 65°C above an outside ambient temperature of 40°C, as required by ASA Standard C37.20-1965.

Tests

The design of non-segregated bus runs has been tested in the Westinghouse High Power Laboratory at East Pittsburgh. Certified tests of momentary current testing, impulse testing and heat runs are available upon request.

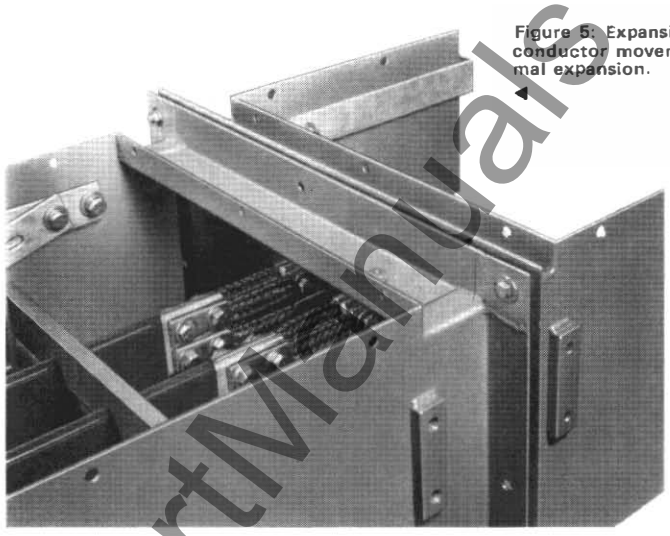
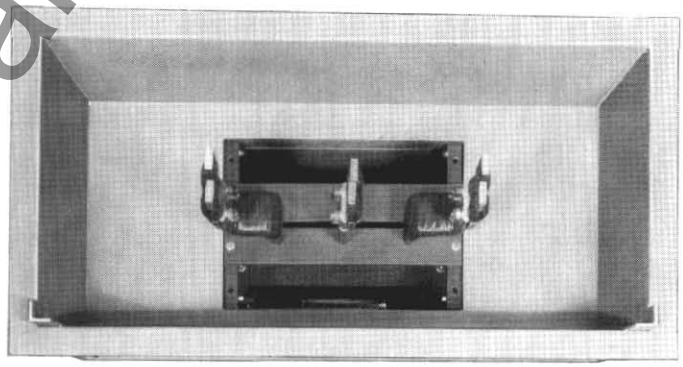
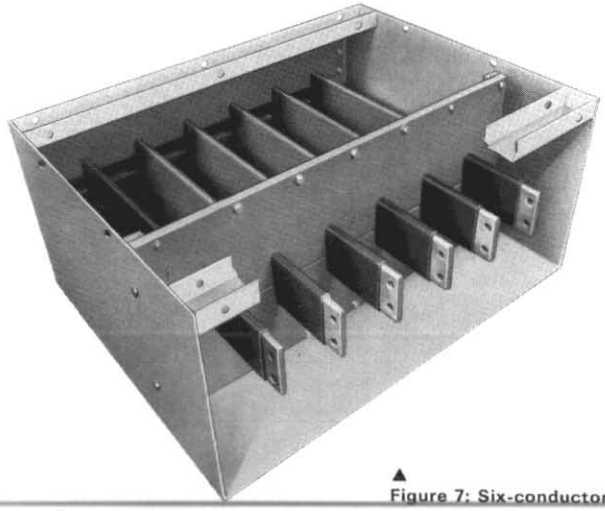


Figure 5: Expansion joint to allow conductor movement due to thermal expansion.



▲ Figure 6: Typical termination facility for connection to power transformer.



▲ Figure 7: Six-conductor bus with vapor barrier.

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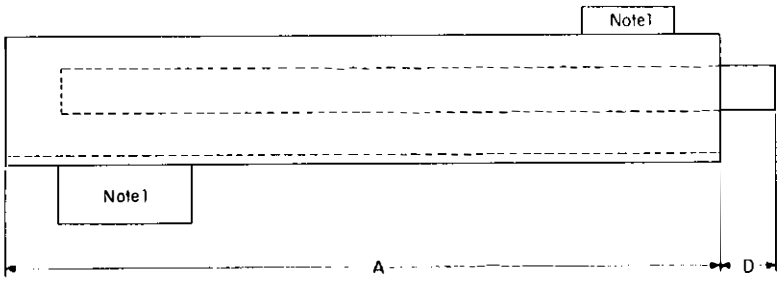
Dimensions (In Inches).



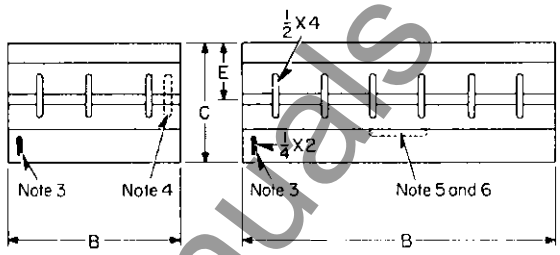


Figure 1 Figure 2

Ampere Rating	See Notes	Fig.	Type of Conductor	Dimensions A	B	C	D	E	Weight Per Ft.
1200	4, 7	1	Aluminum	As Required, 8' Max.	20	15.38	7.25	7.12	65 Lbs.
2000	4, 7	1	Aluminum		20	17.38	7.25	8.12	85 Lbs.
3000	5, 7	2	Aluminum		35.75	15.38	7.25	7.12	110 Lbs.
4000	5, 7	2	Aluminum		35.75	17.38	7.25	8.12	135 Lbs.
5000	6, 7	2	Copper		35.75	17.38	7.25	8.12	180 Lbs.

Note 1: Heaters and ventilators for outdoor bus runs and indoor as required by customer conditions.
Note 2: Hanger rods to be ⅜" diameter rods located 24" from each end of each bus length.
Note 3: Position for uninsulated neutral, if required.
Note 4: For insulated neutral, dimension B is 26".
Note 5: For insulated neutral, dimension C is 19".
Note 6: For insulated neutral, dimension C is 21".
Note 7: For covers on top (available on indoor only), dimensions B and C increase approximately .25 inch, and dimension E becomes 8.50 for 1200, 3000 and 4000 amperes, 9.50 for 2000 and 5000 amperes.

Westinghouse Electric Corporation
Switchgear Division, East Pittsburgh, Pa.
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