Power-Duct™ non-segregated phase bus duct

Answers for energy.
Power-Duct™ non-segregated phase bus duct

Introduction
Siemens Power-Duct™ non-segregated phase bus duct is a metal-enclosed, non-segregated phase bus designed specifically for 600 V, 5 kV or 15 kV applications customized to your project specifications.

Siemens offers both traditional bus duct and narrow chassis bus duct, that are capable of meeting most medium-voltage requirements with a small, lightweight design that lends itself to user-friendly installation.

Siemens Power-Duct non-segregated phase bus duct is intended for applications requiring greater dependability, such as connections among rotating equipment, transformers, switchgear and motor control centers.

Siemens manufactures the bus duct while building your other electrical equipment to help integration with said components while maintaining your project schedule. With dimensional drawings, Siemens can deliver bus duct in weeks rather than months.

Features and options
Standard features include:
- 11-gauge steel or 1/8" aluminum construction
- Removable covers
- Siemens engineered medium-voltage bus bar supports
- Polyester powder coat paint system
- 99 percent plus conductivity copper bars
- Built to ANSI standards
- UL Listed:
  - 600 V, up to 4,000 A
  - 5 kV, up to 3,000 A.

Options available include:
- Aluminum or stainless steel housing
- Special paint colors available upon request.
Description and application

Description

The non-segregated phase bus duct is an assembly of bus conductors without inter-phase barriers. All of the associated connections, joints and insulating supports are contained within a metal enclosure.

Siemens Power-Duct™ non-segregated phase bus duct is designed for 600 V, 5 kV and 15 kV service in accordance with ANSI/IEEE C37.23. Continuous current ratings available include 1,200 A to 3,000 A for 5 kV through 15 kV and 1,200 A to 4,000 A for 600 V.

All conductors are separated and isolated from each other by insulating bus supports.

Every conductor for 2.4 kV and above is insulated with an epoxy coating to reduce corona and electrical tracking.

Multiple enclosure sizes are available to meet your specific requirements. Low-voltage application dimensions available:

- 14” (356 mm) x 21” (533 mm)
  (1,200 A-3,000 A)

- 16” (406 mm) x 31” (787 mm)
  (4,000 A).

Medium-voltage application dimensions available:

- 12” (305 mm) x 24” (610 mm)
  (1,200 A ND (narrow design))

- 16” (406 mm) x 33” (838 mm)
  (1,200 A-3,000 A).

Application

Siemens Power-Duct non-segregated phase bus duct can be used for connections from transformers to switchgear assemblies in unit substations, switchgear assemblies to rotating apparatus, tie connections between switchgear assemblies and any other application where circuits require greater strength and dependability than power cables.
Benefits

Construction
The indoor metal enclosures are made from 11-gauge steel or aluminum. The outdoor metal enclosures are made from 11-gauge steel. Stainless steel housing is also available as an option.

Enclosures are finished with a baked-on polyester powder coat paint that results in a uniform thickness and gloss, able to withstand harsh environments. The standard color is ANSI-61 gray. Special colors are available upon request.

All enclosures have removable covers secured with bolts for easy access to the joints. Flexible joints are supplied in all straight bus runs at intervals of approximately 50’ (15.2 m) to allow for expansion when conductors are energized and carrying rated current.

Bus runs can be terminated with flexible shunts, potheads, porcelain bushings or conductor stub ends for connection to riser bars in switchgear assemblies.

Easy installation
The standard length of a bus section is 120” (3,048 mm) or less. Compact dimensions and lightweight construction make the installation user-friendly. Hanging rods can be spaced approximately every 4’ (1.2 m) for indoor bus runs. Supporting frames can be spaced every 8’ (2.4 m) for outdoor runs.

Conductors
All conductors are 99 percent plus conductivity copper bars. Silver-plated joint surfaces (tin-plated optional) ensure maximum conductivity while minimizing hot spots. Joints are made by bolting splice plates to either side of the bus bar. Each joint is covered by an easily removable insulating boot when conductors are insulated.

Seismic ratings
Siemens Power-Duct™ non-segregated phase bus duct meets IBC seismic requirements and California Code Title 24. Complete guidelines for proper supports are provided on each seismic specified order.

Temperature
Siemens Power-Duct non-segregated phase bus duct can carry rated current continuously without exceeding a conductor temperature rise of 65 °C above an ambient temperature of 40 °C, as required by ANSI/IEEE C37.23.

Tests
Siemens designs of non-segregated phase bus duct have been tested to ANSI/IEEE C37.23 and witnessed by UL Laboratories, Inc. Certification of momentary current testing impulse testing and heat rise available upon request.
Ratings

Short-circuit rating (momentary) (ANSI/IEEE C37.23 6.2.3)

Duration 167 milliseconds:
- 600 V 1,200 A-3,000 A: 85 kA
- 600 V 3,200 A-4,000 A: 100 kA.

Short-time rating (ANSI/IEEE C37.23 6.2.4)

Duration one second:
- 600 V 1,200 A-3,000 A: 65 kA, 1 sec
- 600 V 3,200 A-4,000 A: 75 kA, 1 sec.

Duration two seconds:
- 5 kV 1,200 A narrow design: 25 kA, 2 sec
- 5 kV 1,200 A-3,000 A: 50 kA, 2 sec
- 15 kV 1,200 A-3,000 A: 50 kA, 2 sec.

Continuous current (ANSI/IEEE C37.23 6.2.2):
- 65 °C temperature rise
- Maximum 105 °C at 40 °C ambient.

Bus bar insulation:
- Rated maximum voltage.

Impulse withstand BIL (ANSI/IEEE C37.23 6.2.1.2):
- 600 V class: none
- 5 kV class: 60 kV
- 15 kV class: 95 kV.

Weather resistance (ANSI/IEEE C37.23 6.2.5):
- ANSI/IEEE C37.20.2 rain test.
### Table 1: Technical ratings (asymmetrical)

<table>
<thead>
<tr>
<th></th>
<th>600 V²</th>
<th>5 kV²</th>
<th>15 kV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Continuous current A</td>
<td>Short-time kA</td>
<td>Continuous current A</td>
</tr>
<tr>
<td>1,200</td>
<td>1,600</td>
<td>2,000</td>
<td>3,000</td>
</tr>
<tr>
<td>3,200</td>
<td>4,000</td>
<td>75</td>
<td>1,200</td>
</tr>
</tbody>
</table>

#### Footnotes:
1 Narrow design is offered for medium-voltage products (up to 5 kV) 30” (762 mm) wide or less.
2 UL Listed.

### Table 2: Weight in lbs (kg) per foot

<table>
<thead>
<tr>
<th>Amperes (A)</th>
<th>600 V</th>
<th>5 kV</th>
<th>15 kV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without neutral</td>
<td>With neutral</td>
<td>Amperes</td>
<td>All</td>
</tr>
<tr>
<td>1,200 A</td>
<td>66 (30)</td>
<td>70 (32)</td>
<td>1,200 A at 40 kA</td>
</tr>
<tr>
<td>1,600 A</td>
<td>78 (35)</td>
<td>86 (39)</td>
<td>1,200 A at 78 kA</td>
</tr>
<tr>
<td>2,000 A</td>
<td>92 (42)</td>
<td>108 (49)</td>
<td>2,000 A</td>
</tr>
<tr>
<td>3,200 A</td>
<td>100 (45)</td>
<td>120 (54)</td>
<td>3,000 A</td>
</tr>
<tr>
<td>4,000 A</td>
<td>127 (58)</td>
<td>157 (71)</td>
<td>----</td>
</tr>
</tbody>
</table>

### Table 3: Standard construction

<table>
<thead>
<tr>
<th>Rating</th>
<th>Amperes (A)</th>
<th>Bottom</th>
<th>Sides</th>
<th>Top</th>
<th>Conductors</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>600 V</td>
<td>1,200 A</td>
<td>Steel</td>
<td>Steel</td>
<td>Steel</td>
<td>One 1/4” x 4 cu</td>
<td>1/2” GPO-3 sheet</td>
</tr>
<tr>
<td>600 V</td>
<td>1,600 A</td>
<td>Steel</td>
<td>Steel</td>
<td>Steel</td>
<td>Two 1/4” x 4 cu</td>
<td>1/2” GPO-3 sheet</td>
</tr>
<tr>
<td>600 V</td>
<td>2,000 A</td>
<td>Steel</td>
<td>Steel</td>
<td>Steel</td>
<td>Two 1/2” x 4 cu</td>
<td>1/2” GPO-3 sheet</td>
</tr>
<tr>
<td>600 V</td>
<td>3,200 A</td>
<td>Aluminum</td>
<td>Aluminum</td>
<td>Aluminum</td>
<td>Two 1/2” x 6 cu</td>
<td>1/2” GPO-3 sheet</td>
</tr>
<tr>
<td>600 V</td>
<td>4,000 A</td>
<td>Aluminum</td>
<td>Aluminum</td>
<td>Aluminum</td>
<td>Two 5/8” x 6 cu</td>
<td>1/2” GPO-3 sheet</td>
</tr>
<tr>
<td>5 kV</td>
<td>1,200 A ND</td>
<td>Steel</td>
<td>Steel</td>
<td>Steel</td>
<td>One 1/2” x 4 cu</td>
<td>Molded</td>
</tr>
<tr>
<td>5 kV</td>
<td>1,200 A</td>
<td>Steel</td>
<td>Steel</td>
<td>Steel</td>
<td>One 1/4” x 6 cu</td>
<td>Molded</td>
</tr>
<tr>
<td>5 kV</td>
<td>2,000 A</td>
<td>Steel</td>
<td>Steel</td>
<td>Steel</td>
<td>One 1/2” x 6 cu</td>
<td>Molded</td>
</tr>
<tr>
<td>5 kV</td>
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<td>Molded</td>
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<tr>
<td>15 kV</td>
<td>1,200 A</td>
<td>Steel</td>
<td>Steel</td>
<td>Steel</td>
<td>One 1/4” x 6 cu</td>
<td>Molded</td>
</tr>
<tr>
<td>15 kV</td>
<td>2,000 A</td>
<td>Steel</td>
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<td>3,000 A</td>
<td>Aluminum</td>
<td>Aluminum</td>
<td>Aluminum</td>
<td>Two 1/2” x 6 cu</td>
<td>Molded</td>
</tr>
</tbody>
</table>
Specification

Bus
1. The conductors shall be 99 percent plus conductivity copper with silver-plated joints capable of carrying rated current continuously without exceeding a temperature rise of 65 °C based on a 40 °C ambient temperature.
2. The copper bars shall be mounted on track-resistant material. For 2.4 kV service and above, the copper bars shall be insulated with an epoxy coating.
3. Conductors shall be braced to withstand fault currents as indicated on contract drawings.
4. Typical joints shall be insulated with removable boots and jointed by double splice plates. Atypical joints may use tape or heat-shrink tubing to insulate when insulation is required.
5. A 0.25” x 2.0” bare copper ground bus shall be supplied and bolted to each metal enclosure to provide continuous electrical ground when adjacent enclosures are connected together to minimize the possibility of circulating currents.

Enclosures
1. All enclosures shall be 11-gauge steel, aluminum or stainless steel.
2. Enclosures shall have bolted, removable covers.

Wiring/terminations
1. Manufacturer shall provide an external two-hole ground pad at each end for ground connections or connect the ground bus in the enclosure to the ground bus in the terminating equipment.

Finish
1. The exterior finish of the enclosure shall consist of one coat of ANSI-61 gray baked-on, polyester powder paint. The paint will be applied electrostatically to pre-cleaned, phosphatized steel. The finish will have corrosion resistance of 600 hours to five percent salt spray.

Miscellaneous
1. Expansion joints, equipment terminations, wall flanges and vapor barriers shall be provided as indicated on contract drawing.
2. Space heaters shall be applied either to the entire bus or the outdoor section of the bus according to manufacturer recommendations. The 250 V or 500 V rated heaters shall be applied at 120 V or 240 V for longer life.
3. The heaters shall be controlled by [thermostat] [continually energized].
4. The heater connections shall [be wired for connections to terminal blocks in terminating equipment] [provide junction box with terminal strip for purchaser’s AC connection].
5. Indoor enclosures shall be designed to be a combination of [hung from overhead by hangers] [supported from below by structural supports] [trapeze supports].
6. Outdoor enclosures shall be supported from below by structural steel.
7. Manufacturer shall supply mounting provisions and supply all necessary information to the contractor for supporting equipment design.
8. All overhead hanger rods and bottom steel supports shall be supplied and installed by the contractor as required by the manufacturer.