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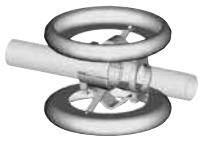
COUPLERS



TEE CONNECTORS

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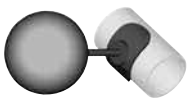

Blue highlighted items are industry standard and most frequently ordered.

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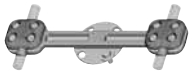
CABLE SPACERS (Two Conductor)



CABLE SPACERS (Three Conductor)

BIFURCATING TERMINAL

TRIFURCATING CONNECTORS

Blue highlighted items are industry standard and most frequently ordered.

INTRODUCTION

Connectors for use in EHV Substations must meet essentially the same electrical and mechanical requirements as those for other power connectors. However, operation at extra high voltages imposes an important additional requirement. They must not produce corona discharges that interfere with radio reception and cause energy loss.

Corona forms when the voltage gradient at the surface of a conducting material exceeds a critical value and ionizes the surrounding air. For conductors, the four basic factors that determine surface voltage gradient are distance from ground, conductor diameter, phase spacing and voltage.

In A.C. circuits, there are two basic kinds of corona. Negative corona forms during the negative half cycle, and positive corona during the positive half cycle. Negative corona generally appears as a glow on conventional conductors at about 20 kV rms/cm. Its amplitude is relatively low and causes no significant radio interference. Positive corona appears as a plume at above 30 kV rms/cm. Its amplitude is about 50 times higher than that for negative corona and is the major cause of radio interference.

BURNDY® EHV Connectors are designed so that under fair weather operating conditions, the voltage gradient at the connector surface will be at a level that will not cause corona and the resultant radio interference. (RIV)

BURNDY® DESIGN CRITERIA

Cable Connectors

For reasons of economy, EHV systems using stranded conductor are generally designed to operate at voltage gradients close to the negative corona onset level. It is essential, therefore, that connectors provide corona-free performance superior to that of the cable. So our design criterion calls for the voltage at which corona extinguishes from the connector to be higher than the voltage at which it extinguishes from the cable. This criterion is met by eliminating all projections and by providing smooth contours on all surfaces. On compression elements, the ends are especially critical. Carefully designed tapers are provided to keep the voltage gradient at a level lower than that on the conductor. Of course, it is still necessary during installation to smooth crimped elements.

On accessories, like spacers for bundled lines, the critical areas are those at the edges of the bundle. The bundle itself generally shields those parts that fall within it. Many projections that would cause corona on a single conductor line are quiet when they fall within the shielding influence of a bundle. However, those parts that fall at the edges are carefully finished at the factory to insure corona-free operation.

Tubular Bus Connectors

Station designers choose tubular bus sizes on the basis of mechanical rather than electrical requirements. For instance, stations that only need 4" IPS to meet electrical and corona requirements often have 6" IPS as main buses. The resultant voltage gradient on these buses is very low, perhaps only 10 kV rms/cm, well below the corona onset level.

It is impractical, therefore, to require that connectors operate quieter than the bus regardless of voltage. Under some circumstances, it might be impossible to meet such criteria. In most cases, it would be prohibitively expensive to do so.

Of course, theoretically optimum connectors could be designed for each application, based on the design voltage gradient for individual stations. However, in most cases even differences as great as that between 345 and 500 kV don't have a meaningful impact on connector costs. So, from a practical point of view, it is feasible to design most connectors for 500 kV operation. This makes it more convenient for station designers to select and order connectors.

Bus connectors are designed to provide corona-free performance under conditions of actual operation. This is done by calculating the voltage gradient on the surface of the bus at 500 kV, using the phase spacing and ground distance typical for this voltage. Connectors are then designed to operate corona free when the voltage gradient on the bus is 10% above this value.

The exceptions to this rule are the flexible expansion connectors. Those designed for 345 kV are self-shielding. Those for 500 kV have separate shielding rings. Experimental work on self-shielding 500 kV expansion connectors indicates that the margin of safety is too small to justify recommending them for this voltage.

CONTROLLING CORONA

Since corona is caused when the voltage gradient at the surface of a conducting material reaches a level that causes the surrounding air to break down, then obviously, the way to prevent corona is to keep the gradient below this critical level.

From the point of view of the connector designer, this can be accomplished in three ways:

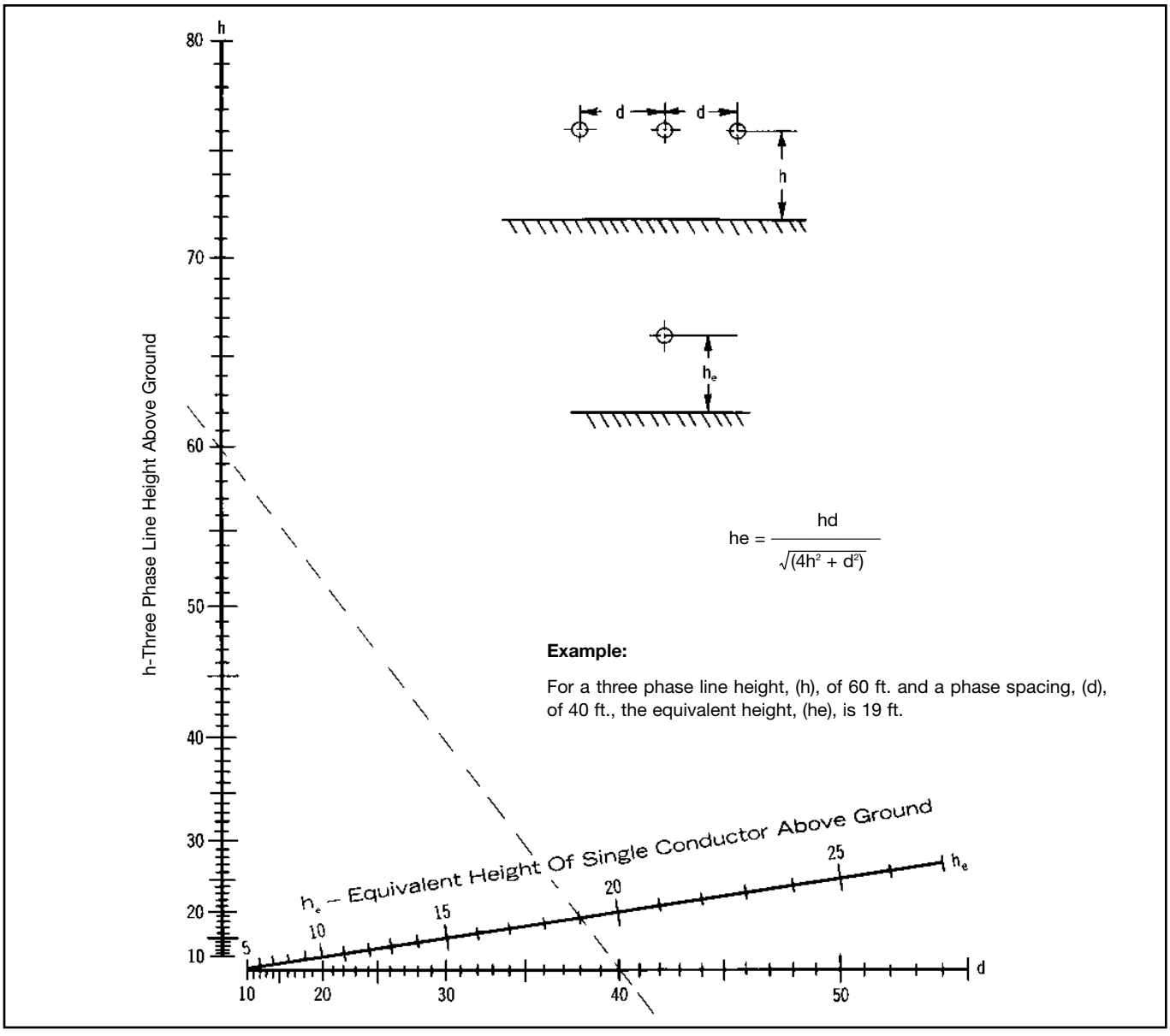
1. By providing generous radii on all outside surfaces to keep the voltage stresses to a minimum.
2. By providing shielding rings.
3. By placing the connector within the shielding influence of some part of the bus structure.

Since it is impossible for the connector designer to know the exact configuration of every bus system where the connectors might be used, the third approach is not practical. So, for purposes of developing a standard line, we concentrate on the first two.

Whenever possible, connectors are designed to be self-shielding. This approach leads to less costly and less obstrusive designs. Only in the case of complicated connector configurations do BURNDY® EHV designs use corona rings. Examples of such applications are disconnectable equipment taps, expansion couplers and equipment terminals which often have configurations that preclude the use of self-shielding designs.

NOMOGRAM FOR DETERMINING THE EQUIVALENT

HEIGHT (he) OF A THREE PHASE LINE



$$he = \frac{hd}{\sqrt{(4h^2 + d^2)}}$$

Example:

For a three phase line height, (h), of 60 ft. and a phase spacing, (d), of 40 ft., the equivalent height, (he), is 19 ft.

Nomogram for determining the equivalent height of a single conductor line having the same average voltage of gradient as the CENTER conductor of a horizontally spaced three phase line, with the same line to ground voltage and the same conductor size. All dimensions measured in the same units.

The use of the laboratory is based on the fact that it is the surface voltage gradient that causes corona. Although most systems consist of 3 phase conductors and a ground plane, it is a rather simple matter to duplicate in the laboratory the conductor surface voltage gradient as it exists on any of these phase conductors with a single conductor and a ground plane.

The following formula and nomograms give this three phase to single phase equivalency. Because this conversion is possible, all EHV testing is done single phase; and there is no necessity for 3 phase testing with its high cost in terms of equipment and space.

Since voltage gradient is the significant factor, the single phase test does not have to be done at the full voltage of an operation system. By setting up the test closer to the ground plane, the operation voltage gradient can be obtained with a lower test voltage. There is a limit, however, below which the height cannot be lowered lest corona onset and flashover occur simultaneously. Generally, the minimum test height should be about 10 times the diameter of the test conductor.

GRADIENT CALIBRATOR

Normally, the conductor surface voltage gradient at the extinction of corona in the laboratory is calculated using the accompanying equations. However, for test setups involving unusual conductor configurations, the conductor gradient cannot be readily calculated. In these cases, a gradient calibrator may be used. This is a small sphere mounted on the conductor. It has previously been calibrated for each conductor size to establish the surface voltage gradient that starts positive corona on the sphere. With it tests can be duplicated in any number of laboratories. The applied voltages and ground distances could all be different. But the voltage gradient on the surface of the conductor when the corona occurs on the sphere will always be the same. The calibrator provides a convenient bench mark for measuring the corona performance of connectors.

In use, the sphere is mounted on the conductor in a connector test setup. The voltage is raised until there is a corona on the sphere. We already know from previous calibration what the voltage gradient on the surface of the conductor is at this point.

The sphere is removed and the voltage raised until there is a corona on the connector. Since the voltage gradient increases directly with increases in applied voltage, the gradient on the conductor at this point can be readily calculated.

It is important to note that the significant parameter is the voltage gradient on the surface of the conductor. It is not necessary to know the gradient on the connector. The conductor gradient in any given substation is controlled by its design parameters and may be calculated using the following formulae and nomograms. Once the gradient is known, it is unnecessary to have any other information to design connectors. As long as connectors are corona-free at a conductor voltage gradient higher than that planned for the conductor, the connector will be corona-free under fair weather operating conditions.

There may on occasion be unusual situations where choice of *conductor*, station geometry or clearance problems cause the need for connectors of special design. Where this is the case, BURNDY® is prepared to design corona-free devices to operate under such conditions.

Formula for Determining The Voltage Gradient

Notations Used

h = line to ground distance (cm)
r = radius of the individual conductor (cm)
s = conductor spacing in the bundle (cm)
d = phase to phase spacing of the line (cm)
V = line to ground voltage (kV)
E_a = average gradient at the surface of the conductor (kV/cm)
E_m = maximum gradient on the surface of a single conductor
h_e = equivalent single phase line to ground distance (cm)
r_e = equivalent single conductor radius (cm) of bundled conductors
n = number of conductors in the bundle

$$E_a = \frac{V}{r \ln \frac{2h}{r}} \qquad E_m = \frac{h}{h - r} E_a$$

The maximum gradient (E_m) occurs on the side facing the ground plane.

The center conductor has a gradient about 5% higher than the outside conductors. The gradient on the center phase may be calculated using the formula for the single conductor.
Single phase system and substituting (h_e) from the following formula or attached nomograms for the height above ground (h). For the center phase:

$$E_a = \frac{V}{r \ln \frac{2h_e}{r}} \qquad h_e = \frac{hd}{\sqrt{(4h^2 + d^2)}}$$

It should be noted that h_e is somewhat smaller than $\frac{d}{2}$

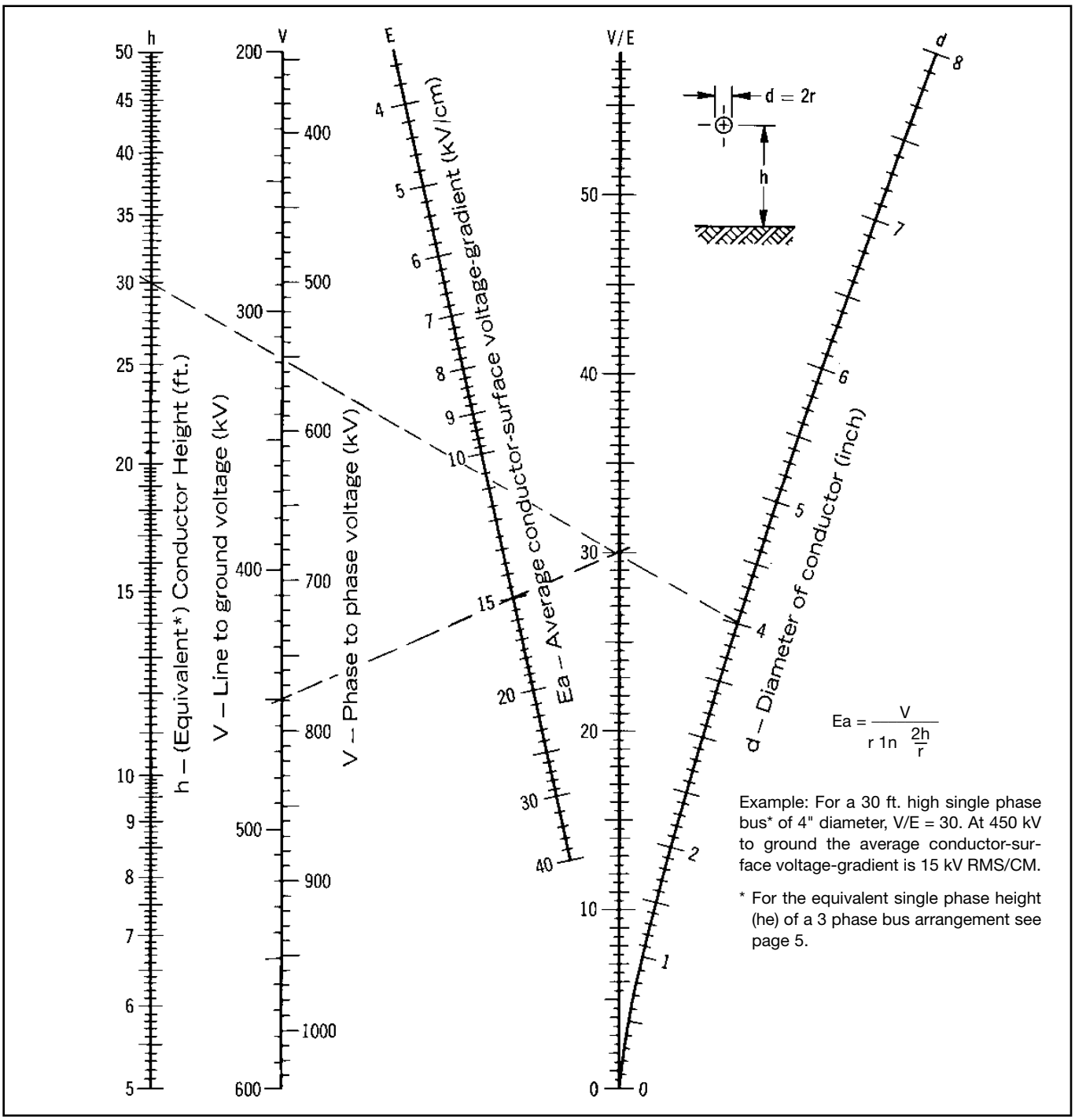
$$E_a = \frac{V}{n\, r \ln \frac{2h}{r_e}} \qquad \text{in which } r_e = r\left(\beta \frac{s}{r}\right)^{\frac{n-1}{n}}$$

The value of "β" is unity for 1-, 2-, and 3- conductor bundles and 1.12 for 4- conductor bundles.

Bundled Conductor - Three Phase
This case may be reduced to the single bundled conductor case by replacing h with h_e in the equation. The definition of h_e is identical to that given for the single conductor — three phase situation.

Fig. 1

NOMOGRAM FOR FINDING THE AVERAGE CONDUCTOR-SURFACE VOLTAGE-GRADIENT FROM LINE DIMENSIONS AND VOLTAGE.



M-7

Blue highlighted items are industry standard and most frequently ordered.

RADIO INTERFERENCE VOLTAGE

There is serious question as to whether measurement of RIV on connectors makes a meaningful contribution to quieter station operation.

Under test conditions, there is generally no significant indication on the radio noise meter until the onset of visible positive corona. At this point, the RIV reading goes into the hundreds of thousands of microvolts. The effect of this phenomenon is to provide a visibly discernable point at which RIV will become excessive. It eliminates the necessity to make, record and plot RIV measurements. Where there is no corona, there is no RIV. So our test criterion calling for no visible corona insures that there will be no radio interference generated by the connector under operating conditions.

EFFECT OF CONDUCTOR SIZE ON TESTING

Conductor diameter has a significant effect on potential corona problems. The larger the diameter, the lower the surface voltage gradient for a given test voltage. This means that smaller conductors produce corona at lower voltages than larger ones.

Many connector designs have the same basic configuration for various conductor sizes. The only difference being the size of the attaching elements. This is particularly true for many of the welded type connectors. Where this is the case, it is often sufficient to test the connector only on the smallest conductor, since it yields the lowest corona extinction voltage. When there is any doubt, each size is tested.

CONTAMINATION

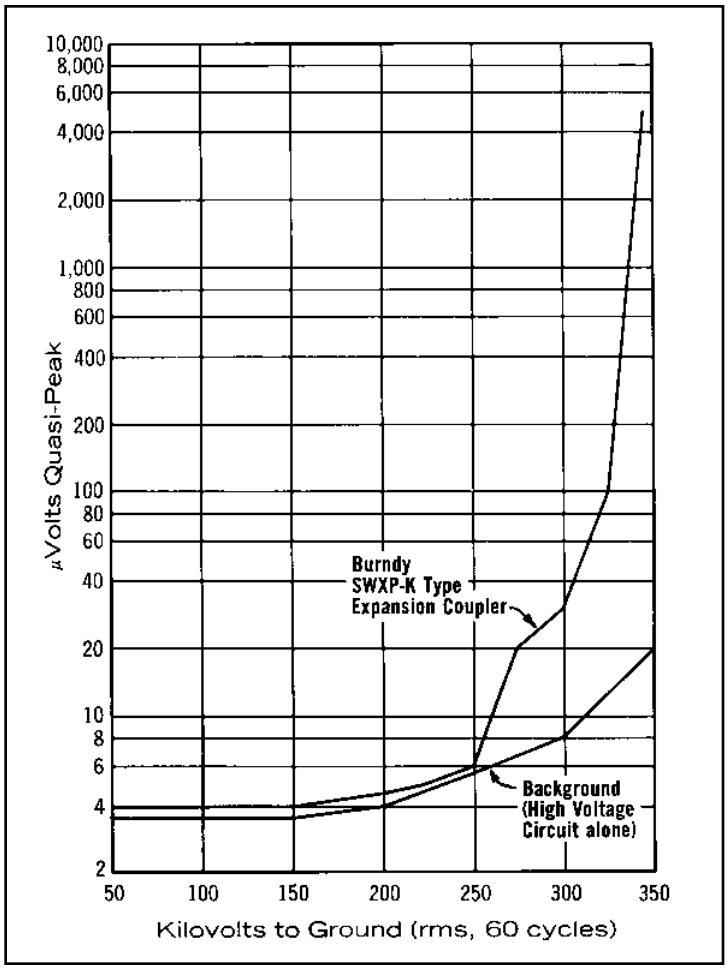
Much work has been done to establish the relationship between the corona onset voltage for contaminated as compared to clean hardware. Experiments in the BURNDY® laboratory indicate that this value can be reduced to half of the voltage for clean hardware. However, the relationship varies with the kind of contamination, atmospheric condition and type of connector.

There have been a number of attempts to produce artifical contamination and atmospheres in laboratories. However, there is as yet no clearly established relationship between the corona performance of hardware contaminated in the laboratory. Until such a relationship is established, the only testing that provides comparable data is on clean hardware under fair weather conditions.

CONCLUSION

For more than 80 years, BURNDY® has been designing connectors for the industry's most critical applications. Connectors for EHV are an outgrowth of this tradition. Whether your need is for catalog items or special designs, you can count on electrical, mechanical and corona-free performance, commensurate with the application.

TYPICAL CURVE



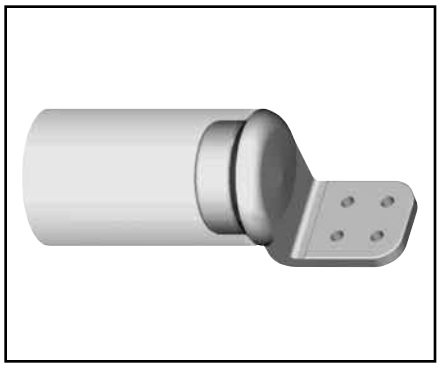
WELDED TERMINAL CONNECTOR

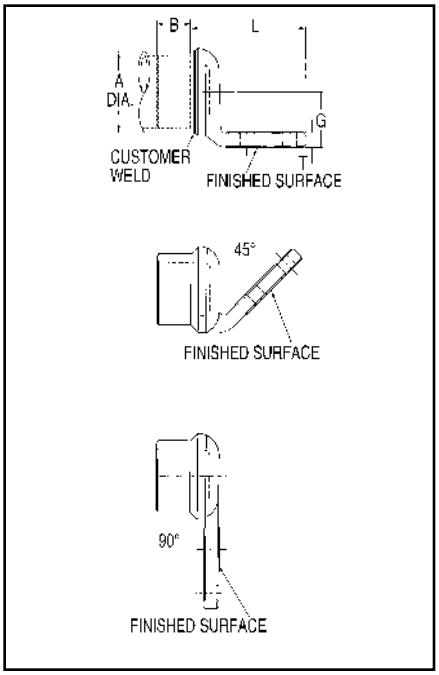
SWA-A-N

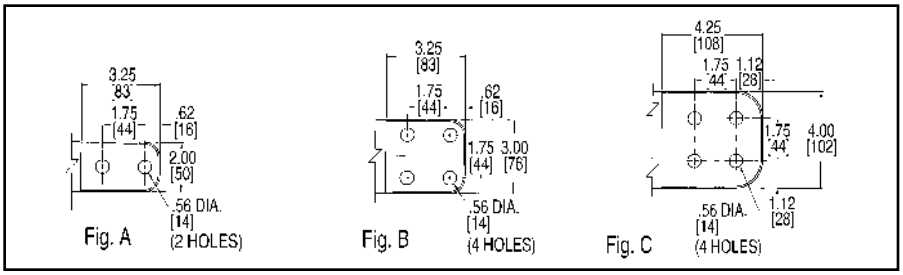
Weld type
Application: Bus to Two or Four Hole Pad (offset terminal)

EHV RATED: UP TO 550 kV when used with Shielding Caps

Material: Cast 356 Aluminum Alloy







Catalog Numbers		Accommodates "A"					
IPS (Sch. 40)	EHPS (Sch. 80)	Dia. Alum. Tube	Fig.	B	G	L	T
SWA18A-2N	SWA58A-2N	2″ (2.375 Dia.)	A	1.25 [32]	1.72 [44]	5.88 [149]	.50 [13]
SWA18A-34N	SWA58A-34N		B	1.25 [32]	1.72 [44]	5.88 [149]	.50 [13]
SWA18A-44N	SWA58A-44N		C	1.25 [32]	1.72 [44]	6.95 [177]	.50 [13]
SWA19A-2N	SWA59A-2N	2-1/2″ (2.875 Dia.)	A	1.50 [38]	1.97 [50]	6.36 [162]	.56 [14]
SWA19A-34N	SWA59A-34N		B	1.50 [38]	1.97 [50]	6.36 [162]	.56 [14]
SWA19A-44N	SWA59A-44N		C	1.50 [38]	1.97 [50]	7.40 [188]	.56 [14]
SWA20A-2N	SWA90A-2N	3″ (3.500 Dia.)	A	1.75 [44]	2.34 [59]	6.41 [163]	.62 [16]
SWA20A-34N	SWA90A-34N		B	1.75 [44]	2.34 [59]	6.41 [163]	.62 [16]
SWA20A-44N	SWA90A-44N		C	1.75 [44]	2.34 [59]	7.46 [189]	.62 [16]
SWA21A-34N	SWA91A-34N	3-1/2″ (4.000 Dia.)	B	1.75 [44]	2.59 [66]	6.40 [163]	.62 [16]
SWA21A-44N	SWA91A-44N		C	1.75 [44]	2.59 [66]	7.47 [190]	.62 [16]
SWA22A-44N	SWA92A-44N	4″ (4.500 Dia.)	C	2.00 [51]	2.84 [72]	7.51 [191]	.75 [19]
SWA23A-44N	SWA93A-44N	4-1/2″ (5.000 Dia.)	C	2.00 [51]	3.09 [78]	7.77 [197]	.75 [19]
SWA24A-34N	SWA94A-34N	5″ (5.563 Dia.)	B	2.00 [51]	3.38 [86]	6.80 [173]	.75 [19]
SWA24A-44N	SWA94-44N		C	2.00 [51]	3.38 [86]	7.82 [199]	.75 [19]
SWA86A-44N	SWA96A-44N	6″ (6.625 Dia.)	C	2.50 [64]	4.00 [102]	7.90 [201]	1.00 [25]

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. Conductor smaller than 3 inch bus size not recommended for 550 kV.
3. DOES NOT INCLUDE SHIELDING CAPS. For EHV applications, shielding caps are required. Order separately (type STS) shown on page 32 or ADD SUFFIX "STS" to catalog number (example: SWA22A44NSTS), includes one shielding cap.
4. One surface of pad finished. For finished pad on both sides add SUFFIX "Q" to the catalog. number (example: SWA22A-44NQ).
5. For 45 or 90 degree angle add SUFFIX "45" or "90" to catalog number (example: SWA22A44N90).
6. For six hole NEMA pad contact factory.

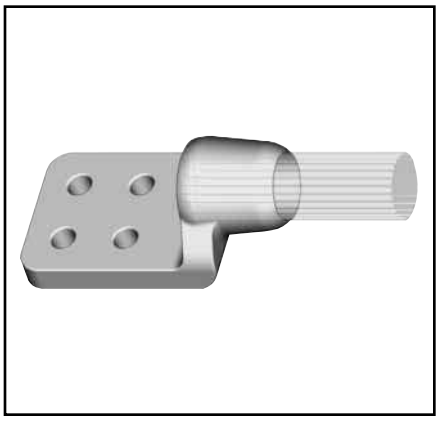
WELDED TERMINAL CONNECTOR

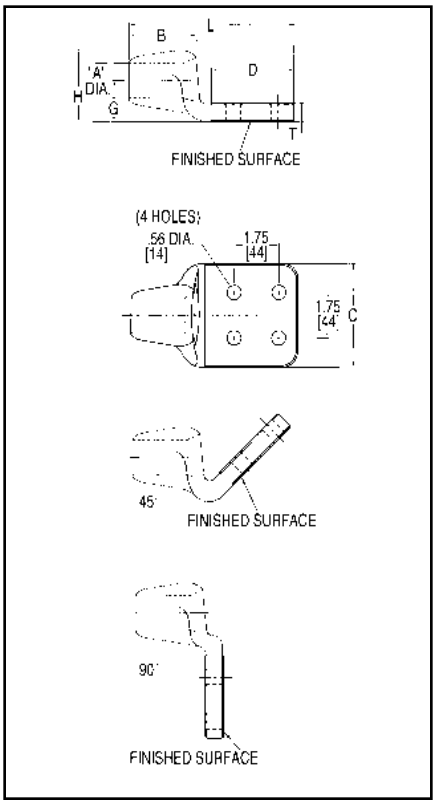
SWA-A-N for Cable

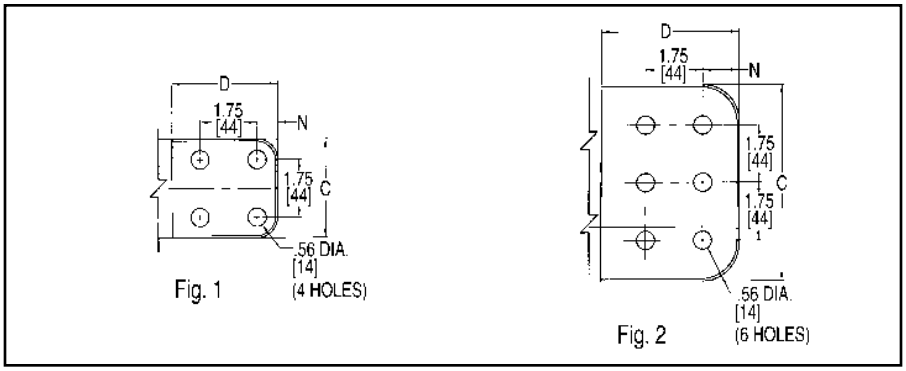
Weld type
Application: Cable to Two or Four Hole Pad (offset terminal)

EHV RATED: UP TO 550 kV when used with shielding caps

Material: Cast 356 Aluminum Alloy







Catalog Numbers	Accommodates "A" Dia.		Str.	Max. Dia.	Max. Dia.	Fig. No.	B	C	D	G	H	L	N	T
	Alum. Cable	Acsr Cable												
SWA44R-44N	700 kcmil thru 874.5 kcmil	605 kcmil thru 874.5 kcmil	26-7 30-19	.961 [24]	1.085 [28]	1	1.50 [38]	4.00 [102]	4.25 [108]	1.12 [28]	2.00 [51]	6.25 [159]	1.12 [28]	.50 [13]
SWA48A-44N	2000 kcmil thru 2250 kcmil	2167 kcmil	72-7	1.606 [41]	1.740 [44]	1	2.62 [67]	4.00 [102]	4.25 [108]	1.83 [47]	3.18 [81]	7.50 [191]	1.12 [28]	.82 [21]
SWA54R-44N	1400 kcmil thru 1600 kcmil	1272 kcmil thru 1510.5 kcmil	45-7	1.341 [34]	1.470 [37]	1	2.00 [51]	4.00 [102]	4.25 [108]	1.38 [35]	2.56 [65]	6.56 [167]	1.12 [28]	.56 [14]
SWA58R-44N	1700 kcmil thru 1900 kcmil	1510.5 kcmil thru 1780 kcmil	54-49 54-19	1.471 [37]	1.605 [41]	1	2.50 [64]	4.00 [102]	4.25 [108]	1.58 [40]	2.83 [72]	7.25 [184]	1.12 [28]	.69 [18]
SWA444A-44N	900 kcmil thru 1100 kcmil	795 kcmil thru 954 kcmil	54-7	1.086 [28]	1.210 [31]	1	1.75 [44]	4.00 [102]	4.25 [108]	1.21 [31]	2.19 [56]	6.56 [167]	1.12 [28]	.50 [13]
SWA454A-4N	1113 kcmil thru 1351.1 kcmil	1033.5 kcmil thru 1192.5 kcmil	45-7 54-19	1.211 [31]	1.340 [34]	1	2.00 [51]	3.00 [76]	3.00 [76]	1.22 [31]	2.31 [59]	5.44 [138]	.62 [57]	.50 [13]
SWA486A-4N	2300 kcmil thru 2500 kcmil	2156 kcmil thru 2300 kcmil	84-19 96-19	1.741 [44]	1.875 [48]	1	2.62 [67]	3.00 [76]	3.00 [76]	1.84 [47]	3.31 [84]	6.12 [156]	.62 [57]	1.12 [28]
SWA486A-44N	2300 kcmil thru 2500 kcmil	2156 kcmil thru 2300 kcmil	84-19 96-19	1.741 [44]	1.875 [48]	1	2.62 [67]	4.00 [102]	4.25 [108]	1.84 [47]	3.31 [84]	7.50 [191]	1.12 [28]	1.12 [28]
SWA486A-66N	2300 kcmil thru 2500 kcmil	2156 kcmil thru 2300 kcmil	84-19 96-19	1.741 [44]	1.875 [48]	2	2.62 [67]	6.00 [152]	4.25 [108]	1.84 [47]	3.31 [84]	7.50 [191]	1.12 [28]	1.12 [28]
SWA493R-4N	3000 kcmil	——	127 169	1.876 [48]	2.05 [52]	1	3.00 [76]	3.00 [76]	3.00 [76]	2.12 [54]	3.75 [92]	6.75 [172]	.62 [16]	1.00 [25]

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. DOES NOT INCLUDE SHIELDING CAPS. For EHV applications, shielding caps are required. Order separately (type) shown on page 32 or ADD SUFFIX "STS" to catalog number (example: SWA54R-44NSTS), includes one shielding cap.
3. One surface of pad finished. For finished pad on both sides add SUFFIX "Q" to the catalog number (example: SWA22A-44NQ).
4. For 45 or 90 degree angle add SUFFIX "45" or "90" to catalog number (example: SWA54R-44N90).

Blue highlighted items are industry standard and most frequently ordered.

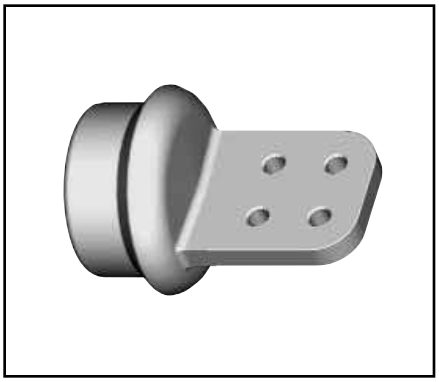
WELDED TERMINAL CONNECTOR

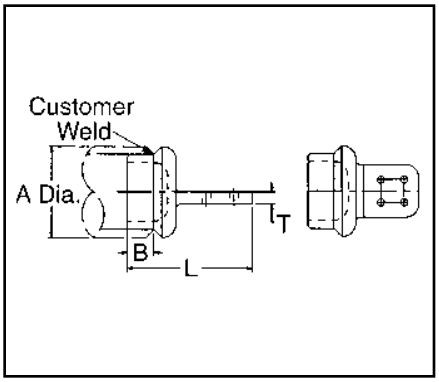
SWAC-A-N

Weld type
Application: Bus to Two or Four Hole Pad (center formed)

EHV RATED: UP TO 550 kV when used with Shielding Caps

Material: Cast 356 Aluminum Alloy





Catalog Number		Conductor		Fig.	Dimensions In./[mm]		
IPS (Sch. 40)	EHPS (Sch. 80)	IPS	A	No.	B	L	T
SWAC18A-2N	SWAC58A-2N	2″	2.38 [60]	1	1.25 [32]	5.80 [147]	.50 [13]
SWAC18A-34N	SWAC58A-34N			2	1.25 [32]	5.80 [147]	.50 [13]
SWAC18A-44N	SWAC58A-44N			3	1.25 [32]	6.86 [174]	.50 [13]
SWAC19A-2N	SWAC59A-2N	2-1/2″	2.88 [73]	1	1.50 [38]	6.23 [158]	.56 [14]
SWAC19A-34N	SWAC59A-34N			2	1.50 [38]	6.23 [158]	.56 [14]
SWAC19A-44N	SWAC59A-44N			3	1.50 [38]	7.29 [185]	.56 [14]
SWAC20A-2N	SWAC90A-2N	3″	3.50 [89]	1	1.75 [44]	6.30 [160]	.62 [16]
SWAC20A-34N	SWAC90A-34N			2	1.75 [44]	6.30 [160]	.62 [16]
SWAC20A-44N	SWAC90A-44N			3	1.75 [44]	7.36 [187]	.62 [16]
SWAC21A-34N	SWAC91A-34N	3-1/2″	4.00 [102]	2	1.75 [44]	6.30 [160]	.62 [16]
SWAC21A-44N	SWAC91A-44N			3	1.75 [44]	7.36 [187]	.62 [16]
SWAC22A-34N	SWAC92A-34N	4″	4.50 [114]	2	2.00 [51]	6.40 [163]	.75 [14]
SWAC22A-44N	SWAC92A-44N			3	2.00 [51]	7.40 [188]	.75 [19]
SWAC23A-34N	SWAC93A-34N	4-1/2″	5.00 [127]	2	2.00 [51]	6.23 [158]	.56 [19]
SWAC24A-34N	SWAC94A-34N	5″	5.56 [141]	2	2.00 [51]	6.68 [170]	.75 [19]
SWAC24A-44N	SWAC94A-44N			3	2.00 [51]	7.72 [196]	.75 [19]
SWAC86A-44N	SWAC96A-44N	6″	6.62 [168]	3	2.50 [64]	7.75 [197]	1.00 [25]

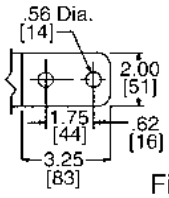


Fig. 1

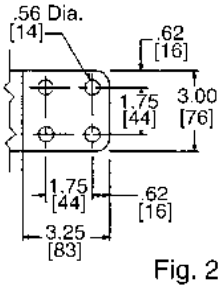


Fig. 2

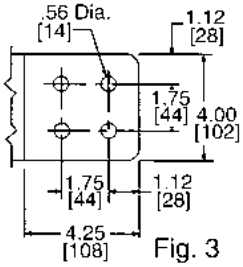


Fig. 3

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. Conductor smaller than 3 inch bus size not recommended for 550 kV.
3. DOES NOT INCLUDE SHIELDING CAPS. For EHV applications, shielding caps are required. Order separately (Type STS) shown on page 32 or ADD SUFFIX "STS" to Catalog Number (example: SWAC22A44NSTS), includes two shielding caps.
4. Pad surface finished on both sides of tongue.
5. For six hole NEMA pad contact factory.

Blue highlighted items are industry standard and most frequently ordered.

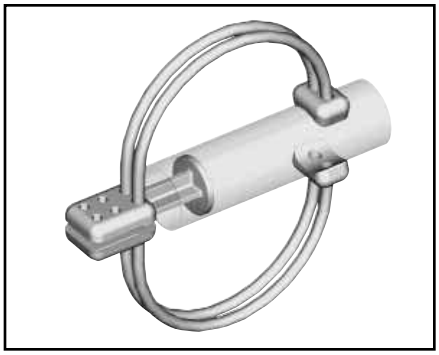
WELDED EXPANSION TERMINAL CONNECTOR

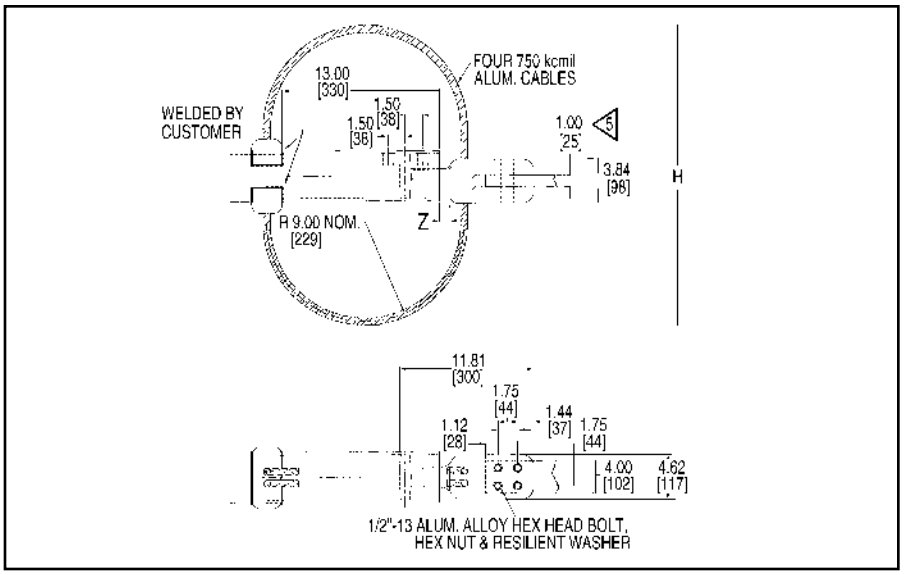
SWXA-A-NK

Welded type
Application: Bus to Four Hole Pad (Expansion Terminal with Corona protection)

EHV RATED: SELF-SHIELDING UP TO 345 kV

Material: Cast 356 Aluminum Alloy
Straps: Aluminum Cables
Rings: Aluminum Alloy Cable
Hardware:
Ring mounting: Aluminum
Base mounting: Galvanized Steel





Catalog Number	Accommodates "A" Dia. Alum. Tube	H	Hardware Length
SWXA20A-4NK8	3″ IPS (3.500 Dia.) Sch 40	26.38 [670]	1/2″–13 × 2-3/4″ LG.
SWXA22A-4NK8	4″ IPS (5.500 Dia.) Sch 40	27.00 [686]	
SWXA24A-4NK8	5″ IPS (5.563 Dia.) Sch 40	28.06 [713]	
SWXA86A-4NK8	6″ IPS (6.625 Dia.) Sch 40	29.12 [740]	
SWXA92A-4NK8	4″ IPS (4.500 Dia.) Sch 80	27.00 [686]	
SWXA94A-4NK8	5″ IPS (5.563 Dia.) Sch 80	28.06 [713]	
SWXA96A-4NK8	6″ IPS (6.625 Dia.) Sch 80	29.12 [740]	

NOTES:
1. Table is based on 90/ft. max BUS run.
2. Dimensions in brackets [ ] are in millimeters.
3. Shielding caps not required.
4. One side of pad finished. On Centerline of tubing. For finish pad on both sides add SUFFIX "Q" to catalog number (example: SWXA22A4NK8Q).

5 Accommodates maximum pad thickness of 1.00″.

Installation Data	
Bus Temp F°	3″ Total Movement Z
–20	3.50
–10	3.36
0	3.23
10	3.09
20	2.95
30	2.82
40	2.68
50	2.54
60	2.41
70	2.27
80	2.14
90	2.00 ← NOMINAL POSITION
100	1.86
110	1.73
120	1.59
130	1.45
140	1.32
150	1.18
160	1.04
170	.91
180	.77
190	.64
200	.50

Blue highlighted items are industry standard and most frequently ordered.

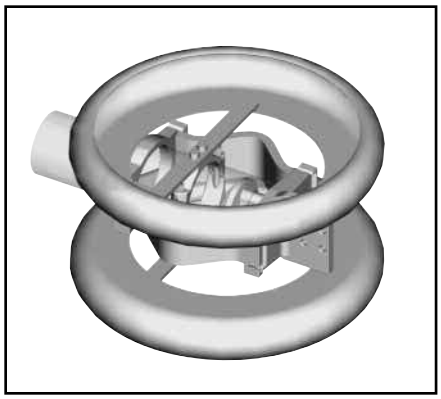
WELDED EXPANSION TERMINAL CONNECTOR

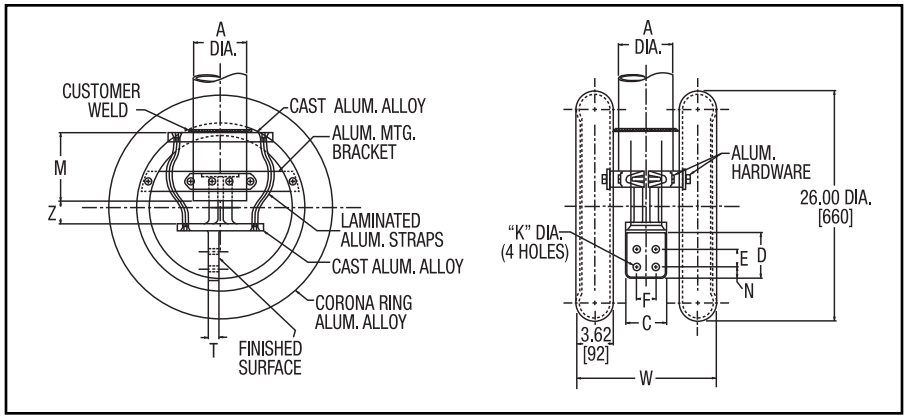
SWXA-A-N

Welded type
Application: Bus to four or six hole pad (Expansion Terminal with Corona Rings)

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Cast 356 Aluminum Alloy
Straps: Laminated Aluminum
Rings: Aluminum Alloy
Hardware:
Ring mounting: Aluminum
Base mounting: Galvanized Steel





Catalog Number	Accommodates "A" Dia. Alum. Tube	C	D	E	F	K	M	N	T	W Ref.	Total Movement	Installation Data: Bus. Temp. of	Installation Data: Z
SWXA20A-44N	3″ (3.500 Dia.) Sch 40	4.00 [101]	4.25 [108]	1.75 [44]	1.75 [44]	.56 [14]	7.87 [200]	.62 [16]	.75 [19]	13.18 [335]	2.00 [51]	–20	2.50
												–10	2.61
SWXA22A-44N	4″ (4.500 Dia.) Sch 40	4.00 [101]	4.25 [108]	1.75 [44]	1.75 [44]	.56 [14]	9.56 [243]	.62 [16]	.86 [22]	13.87 [352]		0	2.32
												10	2.21
SWXA24A-44N	5″ (5.563 Dia.) Sch 40	4.00 [101]	4.25 [108]	1.75 [44]	1.75 [44]	.56 [14]	10.77 [274]	.62 [16]	.81 [21]	14.50 [368]		20	2.14
												30	2.01
SWXA86A-44N	6″ (6.625 Dia.) Sch 40	4.00 [101]	4.25 [108]	1.75 [44]	1.75 [44]	.56 [14]	11.63 [295]	1.12 [28]	1.00 [25]	15.50 [394]		40	1.95
												50	1.86
SWXA92A-44N	4″ (4.500 Dia.) Sch 80	4.00 [101]	4.25 [108]	1.75 [44]	1.75 [44]	.56 [14]	9.56 [243]	.62 [16]	.86 [22]	13.87 [352]		60	1.77
												70	1.68
SWXA94A-44N	5″ (5.563 Dia.) Sch 80	4.00 [101]	4.25 [108]	1.75 [44]	1.75 [44]	.56 [14]	10.77 [274]	1.12 [28]	.86 [22]	14.50 [368]		80	1.57
												90	1.50
												100	1.41
												110	1.32
												120	1.23
												130	1.14
												140	1.04
												150	.95
												160	.86
												170	.77
												180	.68
												190	.59
												200	.50

NOTES:
1. Table is based on 60/ft. max BUS run.
2. Dimensions in brackets [ ] are in millimeters.
3. Shielding caps not required.
4. One side of pad finished. On Centerline of tubing. For finish pad on both sides add SUFFIX "Q" to catalog number (example: SWXA22A4NQ).
5. For six hole NEMA pad change the suffix to 66N (example: SWXA22A66N).

M-13

Blue highlighted items are industry standard and most frequently ordered.

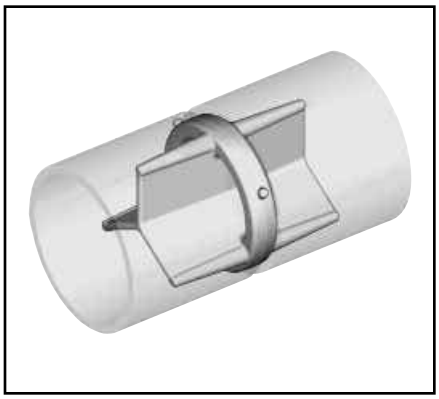
WELDED RIGID COUPLER

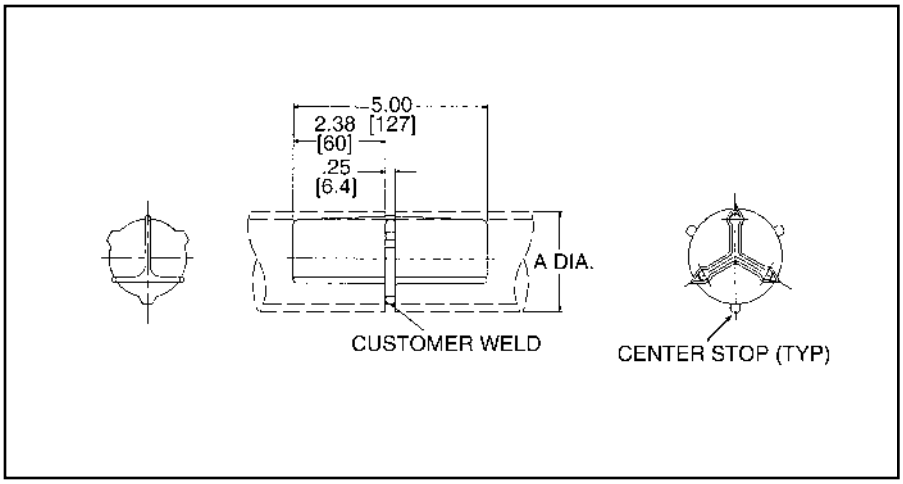
WSLB-A

Weld type
Application: Bus to Bus Coupler

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Cast 356 Aluminum Alloy





Catalog Number		OD	Conductor Aluminum Tubing Size
Sch. 40	Sch. 80		
WSLB15A	**WSLB55A**	1.32 [34]	1″
WSLB16A	**WSLB56A**	1.66 [42]	1-1/4″
WSLB17A	**WSLB57A**	1.90 [48]	1-1/2″
WSLB18A	**WSLB58A**	2.38 [60]	2″
WSLB19A	**WSLB59A**	2.88 [73]	2-1/2″
WSLB20A	**WSLB90A**	3.50 [89]	3″
WSLB21A	**WSLB91A**	4.00 [102]	3-1/2″
WSLB22A	**WSLB92A**	4.50 [114]	4″
WSLB24A	**WSLB94A**	5.56 [141]	5″
WSLB86A	**WSLB96A**	6.62 [168]	6″

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. Conductors smaller than 3 inch bus size are not recommended for 550 kV.

Blue highlighted items are industry standard and most frequently ordered.

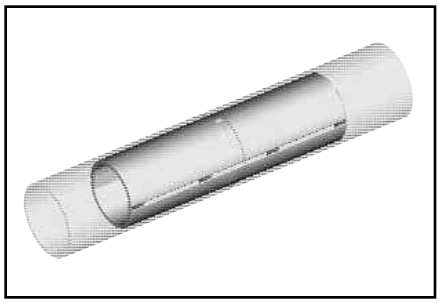
WELDED RIGID COUPLER

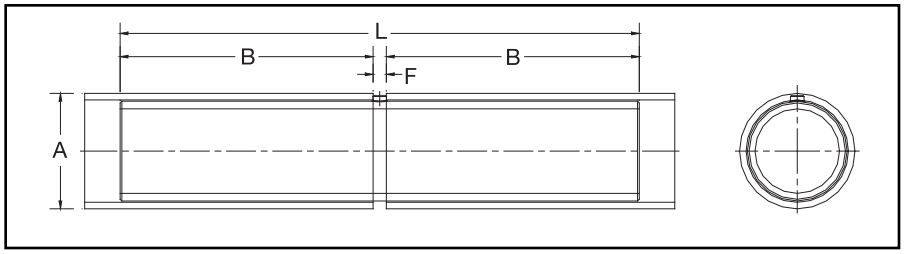
WS-A

Weld type
Application: Bus to Bus Coupler

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Cast 356 Aluminum Alloy





Catalog Number	Conductor (IPS) "A" Schedule 40	Conductor (EHPS) "A" Schedule 80	Dimensions Inches/[mm]		
			B	F	L
WS14A	3/4″ (1.050 Dia.)	—	2.13 [54.1]	.23 [5.8]	4.50 [114.3]
WS15A	1″ (Dia.)	—	2.13 [54.1]	.23 [5.8]	4.50 [114.3]
WS16A	1-1/4″ (1.660 Dia.)	—	3.60 [91.4]	.28 [7.1]	7.50 [190.5]
WS17A	1-1/2″ (1.900 Dia.)	—	4.36 [110.7]	.29 [7.4]	9.00 [228.6]
WS18A	2″ (2.375 Dia.)	—	5.88 [149.4]	.31 [7.9]	12.00 [304.8]
WS19A	2-1/2″ (2.875)	—	7.31 [185.7]	.39 [9.9]	15.00 [381.0]
WS20A	3″ (3.500 Dia.)	—	8.81 [223.8]	.44 [11.2]	18.00 [457.2]
WS21A	3-1/2″ (4.000 Dia.)	—	8.75 [222.3]	.47 [11.9]	18.00 [457.2]
WS22A	4″ (4.500 Dia.)	—	8.75 [222.3]	.47 [11.9]	18.00 [457.2]
WS24A	5″ (5.563 Dia.)	—	8.75 [222.3]	.50 [12.7]	18.00 [457.2]
WS86A	6″ (6.625 Dia.)	—	8.75 [222.3]	.56 [14.2]	18.00 [457.2]
WS58A	—	2″ (2.375 Dia.)	5.88 [149.4]	.31 [7.9]	12.00 [304.8]
WS59A	—	2-1/2″ (2.875)	7.31 [185.7]	.39 [9.9]	15.00 [381.0]
WS90A	—	3″ (3.500 Dia.)	8.81 [223.8]	.44 [11.2]	18.00 [457.2]
WS91A	—	3-1/2″ (4.000 Dia.)	8.75 [222.3]	.47 [11.9]	18.00 [457.2]
WS92A	—	4″ (4.500 Dia.)	8.75 [222.3]	.47 [11.9]	18.00 [457.2]
WS94A	—	5″ (5.563 Dia.)	8.75 [222.3]	.50 [12.7]	18.00 [457.2]
WS96A	—	6″ (6.625 Dia.)	8.75 [222.3]	.56 [14.2]	18.00 457.2]

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. Conductor smaller than 3 inch bus size not recommended for 550 kV.

Blue highlighted items are industry standard and most frequently ordered.

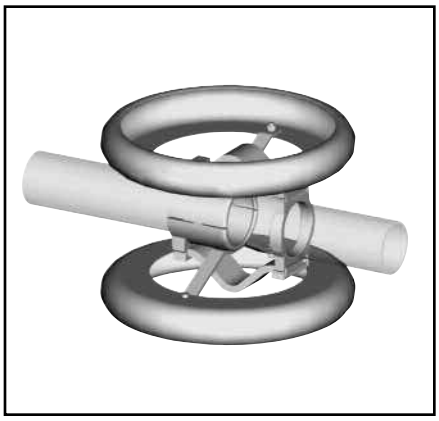
WELDED EXPANSION COUPLER

SWXP-A-A

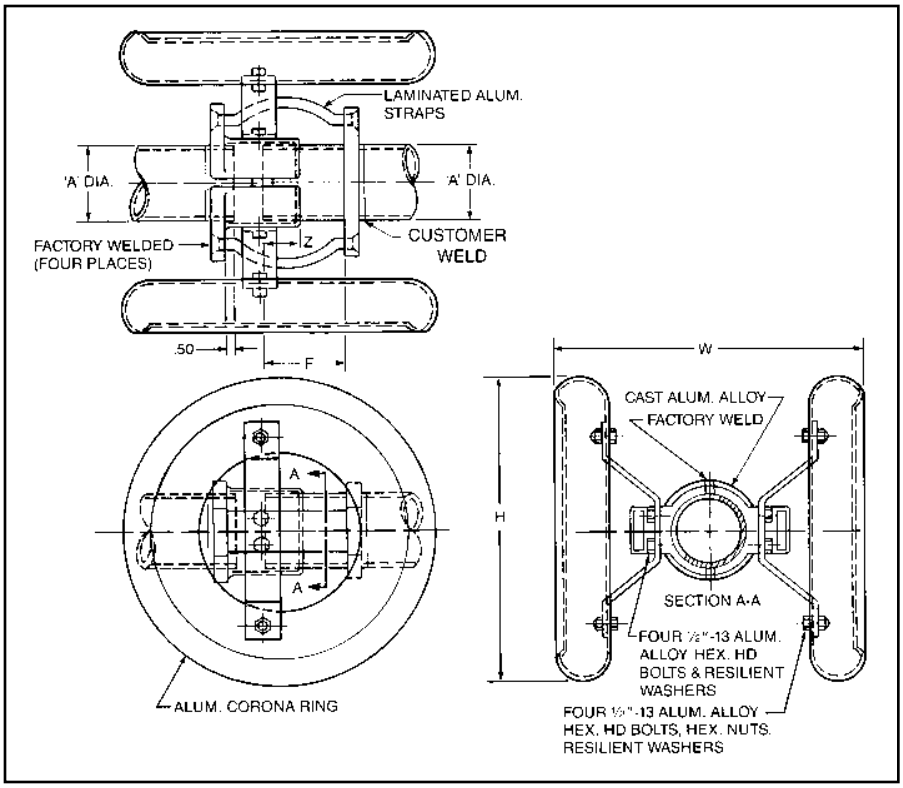
Weld type
Application: Bus to Bus Expansion

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Cast 356 Aluminum Alloy
Hardware: Aluminum Alloy
Corona Rings: Aluminum Alloy
Straps: Laminated Aluminum Strap



Installation Data	
Bus Temp F°	3″ Total Movement Z
–20	.50
–10	.64
0	.77
10	.91
20	1.04
30	1.18
40	1.32
50	1.45
60	1.59
70	1.73
80	1.86
90	2.00 ← NOMINAL POSITION
100	2.14
110	2.27
120	2.41
130	2.54
140	2.68
150	2.82
160	2.95
170	3.09
180	3.23
190	3.36
200	3.50



Catalog Number		"A" Dia.				Total ①
Sch. 40	Sch. 80	Alum. Tube	F	H	W	Movement
SWXP20A20A	SWXP90A90A	3″ (3.50 Dia.) [89]	5.25 [133]	22.00 [559]	17.05 [433]	3.00 [76]
SWXP22A22A	SWXP92A92A	4″ (4.50 Dia.) [114]	6.38 [162]	22.00 [559]	18.89 [480]	4.00 [102]
SWXP24A24A	SWXP94A94A	5″ (5.56 Dia.) [141]	7.88 [200]	26.00 [660]	19.25 [489]	4.00 [102]
SWXP86A86A	SWXP96A96A	6″ (6.63 Dia.) [168]	8.88 [226]	26.00 [660]	20.31 [516]	4.00 [102]

NOTES:
① Maximum movement per end equals one-half of total movement specified in table. Table is based on 90 ft. bus run (total) or 45 ft. per end.
2. Dimensions in brackets [ ] are in millimeters.
3. Conductors smaller than 3 inch not recommended for 550 kV.

Blue highlighted items are industry standard and most frequently ordered.

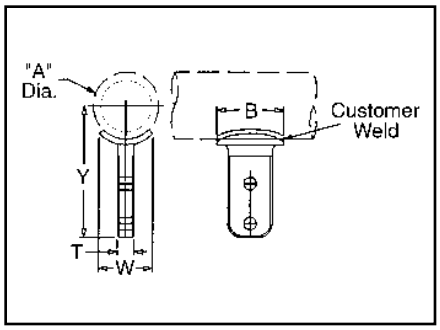
WELDED T-CONNECTOR

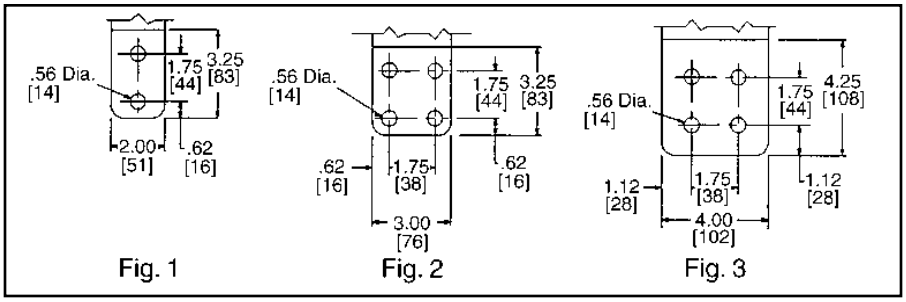
SWAB-A-N

Weld type
Application: Bus to Pad

EHV RATED: UP TO 550 kV when used with Shielding Caps

Material: Cast 356 Aluminum Alloy





Catalog Number	Complete Range Aluminum Tube	Figure Number	Dimensions – Inches/[mm]					
			B	T	W	Aluminum IPS Pipe Nominal	A	Y
SWAB19A-2N	1″ to 2-1/2″	1	3.00 [76]	.38 [10]	1.32 [34]	1″	1.32 [34]	4.45 [113]
						1-1/4″	1.66 [42]	4.67 [119]
						1-1/2″	1.90 [48]	4.80 [122]
SWAB19A-34N		2	4.00 [102]	.50 [13]		2″	2.38 [60]	5.08 [129]
						2-1/2″	2.88 [73]	5.32 [135]
SWAB22A-2N	2-1/2″ to 4″	1	3.00 [76]	.75 [19]	2.40 [61]	2-1/2″	2.88 [73]	5.25 [133]
						3″	3.50 [89]	5.62 [143]
SWAB22A-34N		2	4.00 [102]			3-1/2″	4.00 [102]	5.92 [150]
SWAB22A-44N		3	4.50 [114]			4″	4.50 [114]	6.21 [158]
SWAB86A-2N	3″ to 6″	1	3.00 [76]	1.00 [25]	2.62 [67]	3″	3.50 [89]	5.58 [142]
						3-1/2″	4.00 [102]	6.08 [154]
						4″	4.50 [114]	6.36 [162]
						4-1/2″	5.00 [127]	6.36 [162]
SWAB86A-34N		2	4.00 [102]			5″	5.56 [141]	6.67 [169]
SWAB86A-44N		3	4.50 [114]			6″	6.62 [168]	7.24 [184]

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. Conductor smaller than 3 inch bus size not recommended for 550 kV.
3. DOES NOT INCLUDE SHIELDING CAPS. For EHV applications, shielding caps are required. Order separately (Type STS) shown on page 32 or ADD SUFFIX "STS" to Catalog Number (example: SWAB22A44NSTS), includes two shielding caps.
4. Pad surface finished on both sides of tongue.
5. For six hole NEMA pad contact factory.

Blue highlighted items are industry standard and most frequently ordered.

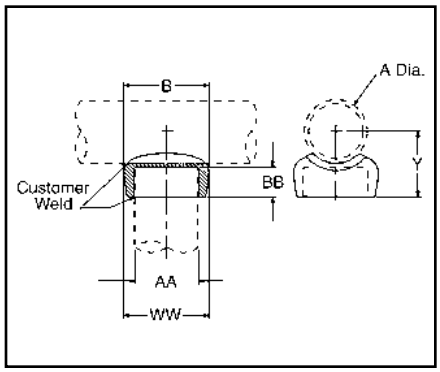
WELDED T-CONNECTOR

SWT-A-A

Weld type
Application: Bus to Bus
T-Connector

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Cast 356 Aluminum Alloy



Catalog Number	Run 'A' Aluminum Tube	Tap 'AA' Aluminum Tube		Run Data		Dimensions Inches/[mm]				
		Tube	AA	Nom. Tube	A	B	BB	W	WW	Y
SWT17A17A	1-1/2″	1/2″	1.90 [48]	1-1/2″	1.90 [48]	3.19 [81]	1.00 [25]	2.64 [67]	2.52 [64]	2.16 [55]
SWT19A19A	2-1/2″	2-1/2″	2.88 [27]	2-1/2″	2.88 [73]	4.00 [54]	1.38 [35]	3.78 [96]	3.78 [96]	3.02 [37]
SWT21A14A	2″ To 3-1/2″	3/4″	1.05 [28]	2″	2.38 [60.4]	2.12 [54]	.75 [19]	1.75 [44]	1.64 [42]	2.13 [54]
				2-1/2″	2.88 [73]					2.47 [42]
				3″	3.50 [89]					2.84 [72]
				3-1/2″	4.00 [102]					3.12 [51]
SWT21A15A		1″	1.32 [34]	2″	2.38 [60.4]	2.38 [60.4]	.75 [19]	2.28 [60]	1.88 [48]	2.12 [54]
				2-1/2″	288 [73]					2.50 [64]
				3″	3.50 [89]					2.87 [73]
				3-1/2″	4.00 [102]					3.16 [80]
SWT21A16A		1-1/4″	1.66 [42]	2″	2.38 [60.4]	2.69 [68]	1.00 [25]	2.36 [60]	2.26 [57]	2.38 [60]
				2-1/2″	2.88 [73]					2.76 [70]
				3″	3.50 [89]					3.14 [80]
				3-1/2″	4.00 [102]					3.42 [87]

(Table continued on next page)

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. Conductor smaller than 3 inch bus size not recommended for 550 kV.

Blue highlighted items are industry standard and most frequently ordered.

WELDED T-CONNECTOR

(Continued)

SWT-A-A

Catalog Number	Run 'A' Aluminum Tube	Tap 'AA' Aluminum Tube		Run Data		Dimensions Inches/[mm]				
		Tube	AA	Nom. Tube	A	B	BB	W	WW	Y
SWT21A17A	2″ to 3-1/2″	1-1/2″	1.90 [48]	2″	2.38 [60.4]	3.19 [81]	1.00 [25]	2.62 [67]	2.52 [64]	2.35 [60]
				2-1/2″	2.88 [73]					2.75 [70]
				3″	3.50 [89]					3.14 [80]
				3-1/2″	4.00 [102]					3.43 [87]
SWT21A18A	2″ to 3-1/2″	2″	2.38 [60.4]	2″	2.38 [60.4]	4.00 [102]	1.00 [25]	3.33 [84]	3.00 [76]	2.40 [61]
				2-1/2″	2.88 [73]					2.71 [69]
				3″	3.50 [90]					3.07 [78]
				3-1/2″	4.00 [102]					3.34 [85]
SWT21A19A	2-1/2″ to 3-1/2”	2-1/2″	2.88 [73]	2-1/2″	2.88 [73]	4.00 [102]	1.38 [35]	3.78 [96]	3.68 [93]	3.02 [77]
				3″	3.50 [90]					3.40 [86]
				3-1/2″	4.00 [102]					3.70 [94]
SWT21A20A	2″ to 3-1/2″	3″	3.50 [90]	3″	3.50 [102]	4.56 [116]	1.38 [35]	4.52 [115]	4.34 [110]	3.33 [87]
				3-1/2″	4.00 [102]	4.56 [116]	1.38 [35]	4.52 [115]	4.34 [110]	3.70 [55]
SWT22A18A	4″	2″	2.38 [60.4]	4″	4.50 [114]	4.00 [102]	1.00 [13]	3.50 [102]	3.00 [76]	3.45 [87]
SWT22A19A		2-1/2″	2.88 [73]			4.00 [102]	1.38 [35]	4.80 [122]	3.70 [94]	3.83 [97]
SWT22A20A		3″	3.50 [102]			4.56 [116]	1.38 [35]	4.50 [114]	4.38 [64]	3.83 [97]
SWT22A21A		3-1/2″	4.00 [102]			5.50 [140]	4.38 [25]	5.00 [127]	4.88 [124]	3.87 [98]
SWT22A22A		4″	4.50 [114]			6.00 [152]	1.38 [35]	5.60 [142]	5.46 [139]	3.89 [99]
SWT24A20A	5″	3″	3.50 [48]	5″	5.56 [141]	4.72 [120]	1.38 [35]	4.30 [109]	4.40 [112]	4.33 [110]
SWT24A21A		3-1/2″	4.00 [102]			5.50 [140]	1.38 [35]	5.00 [127]	4.86 [123]	4.41 [112]
SWT24A22A		4″	4.50 [114]			6.00 [152]	1.38 [35]	5.60 [142]	5.46 [139]	4.41 [112]
SWT24A24A		5″	5.56 [141]			7.38 [187]	1.62 [41]	6.84 [174]	6.64 [169]	4.66 [118]
SWT86A20A	6″	3″	3.50 [90]	6″	6.62 [168]	4.56 [116]	1.88 [48]	5.00 [127]	4.40 [112]	4.89 [124]
SWT86A21A		3-1/2″	4.00 [102]			5.50 [140]	1.38 [35]	5.50 [140]	4.40 [112]	4.94 [125]
SWT86A22A		4″	4.50 [114]			6.00 [152]	1.38 [35]	6.66 [169]	5.50 [140]	4.75 [121]
SWT86A24A		5″	5.56 [141]			7.38 [187]	1.62 [41]	6.84 [174]	6.66 [169]	5.17 [131]
SWT86A86A		6″	6.62 [168]			8.00 [203]	1.62 [41]	8.00 [203]	7.82 [199]	5.00 [127]

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. Conductor smaller than 3 inch bus size not recommended for 550 kV.

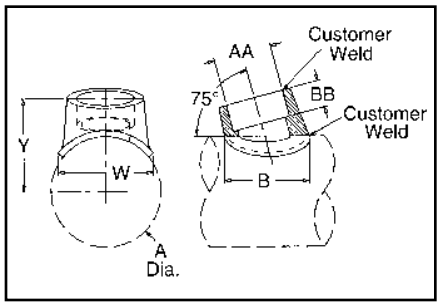
WELDED T-CONNECTOR

SWT-A-A-75

Weld type
Application: Bus "A" Frame Connector (75°)

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Cast 356 Aluminum Alloy



Catalog Number	Aluminum Tube				Dimensions In./[mm]			
	Run		Tap					
	Nominal	A	Nominal	AA	B	BB	W	Y
SWT18A16A-75	2″	2.38 [60.4]	1-1/4″	1.66 [42]	2.69 [68]	1.00 [25]	2.36 [60]	2.57 [65]
SWT18A17A-75			1-1/2″	1.90 [48]	3.19 [81]	1.00 [25]	2.60 [66]	2.60 [66]
SWT19A16A-75	2-1/2″	2.88 [73]	1-1/4″	1.66 [42]	2.69 [68]	1.00 [25]	2.72 [69]	2.83 [72]
SWT19A17A-75			1-1/2″	1.90 [48]	3.19 [81]	1.00 [25]	2.60 [66]	2.87 [73]
SWT19A18A-75			2″	2.38 [60]	4.00 [102]	1.00 [25]	3.10 [79]	2.92 [74]
SWT20A17A-75	3″	3.50 [89]	1-1/2″	1.90 [48]	3.19 [81]	1.00 [25]	2.48 [63]	3.17 [81]
SWT20A18A-75			2″	2.38 [60]	4.00 [102]	1.00 [25]	3.10 [79]	3.23 [82]
SWT20A19A-75			2-1/2″	2.88 [73]	4.00 [102]	1.38 [35]	3.80 [97]	3.65 [93]
SWT21A16A-75	3-1/2″	4.00 [102]	1-1/4″	1.66 [42]	2.69 [68]	1.00 [25]	2.80 [71]	3.37 [86]
SWT21A17A-75			1-1/2″	1.90 [48]	3.19 [68]	1.00 [25]	3.00 [76]	3.41 [87]
SWT21A18A-75			2″	2.38 [42]	4.00 [68]	1.00 [25]	3.50 [89]	3.47 [88]
SWT21A19A-75			2-1/2″	2.88 [73]	4.00 [68]	1.38 [35]	3.78 [96]	3.89 [99]
SWT22A18A-75	4″	4.50 [114]	2″	2.38 [60]	4.12 [105]	1.00 [25]	3.75 [95]	3.71 [94]
SWT22A19A-75			2-1/2″	2.88 [73]	4.00 [102]	1.38 [35]	4.20 [107]	4.16 [106]
SWT22A20A-75			3″	3.50 [89]	4.56 [116]	1.38 [35]	4.50 [114]	4.24 [108]
SWT24A18A-75	5″	5.56 [141]	2″	2.38 [60]	4.00 [102]	1.00 [25]	3.60 [91]	4.26 [108]
SWT24A19A-75			2-1/2″	2.88 [73]	4.00 [102]	1.38 [35]	4.90 [124]	4.76 [121]
SWT24A20A-75			3″	3.50 [89]	4.56 [116]	1.38 [35]	4.98 [126]	4.77 [121.2]
SWT86A20A-75	6″	6.62 [168]	3″	3.50 [89]	4.56 [116]	1.38 [35]	5.08 [129]	5.31 [135]
SWT86A21A-75			3-1/2″	4.00 [102]	5.50 [140]	1.38 [35]	5.47 [139]	5.43 [138]
SWT86A22A-75			4″	4.50 [114]	6.00 [152]	1.38 [35]	6.06 [154]	5.47 [139]

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. Conductor smaller than 3 inch bus size not recommended for 550 kV.

Blue highlighted items are industry standard and most frequently ordered.

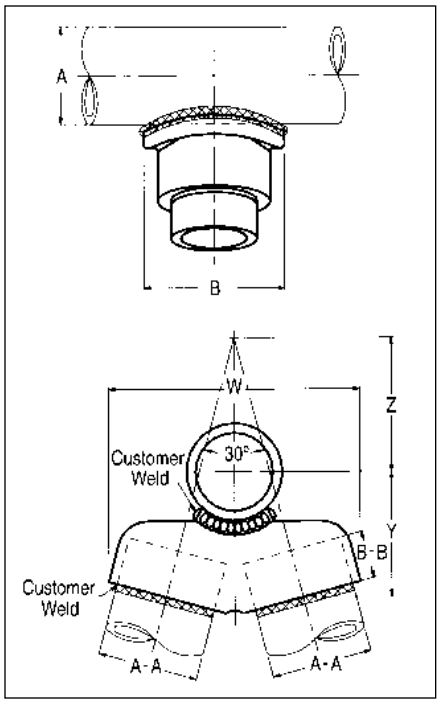
WELDED V-CONNECTOR

SWAT-A-A-30

Weld type
Application: Bus "A" Frame Connector (30°)

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Cast 356 Aluminum Alloy



Catalog Number	Aluminum I.P.S. Run "A"	Aluminum I.P.S. Tap "A-A"	B	B-B	W	Y	Z
SWAT18A16A-30	2″ (2.375 Dia.)	1-1/4″ (1.660 Dia.)	3.25 [83]	1.00 [25]	4.81 [122]	3.19 [81]	1.76 [45]
SWAT18A17A-30		1-1/2″ (1.900 Dia.)	3.50 [89]	1.00 [25]	5.25 [133]	3.00 [76]	2.34 [59]
SWAT18A18A-30		2″ (2.375 Dia.)	4.00 [102]	1.00 [25]	6.38 [160]	3.12 [71]	3.46 [88]
SWAT19A16A-30	2-1/2″ (2.875 Dia.)	1-1/4″ (2.375 Dia.)	3.25 [83]	1.00 [25]	4.82 [122]	3.31 [84]	1.74 [44]
SWAT19A17A-30		1-1/2″ (1.900 Dia.)	3.50 [89]	1.00 [25]	5.25 [132]	3.28 [83]	2.00 [51]
SWAT19A18A-30		2″ (2.375 Dia.)	4.00 [102]	1.00 [25]	6.19 [157]	3.19 [81]	3.04 [77]
SWAT20A17A-30	3″ (3.500 Dia.)	1-1/2″ (1.900 Dia.)	3.50 [89]	1.00 [25]	5.12 [130]	3.44 [87]	1.87 [47]
SWAT20A18A-30		2″ (2.375 Dia.)	4.00 [102]	1.00 [25]	6.25 [159]	3.50 [89]	2.71 [69]
SWAT2019A-30		2-1/2″ (2.875 Dia.)	4.38 [111]	1.38 [35]	7.19 [183]	3.88 [99]	3.41 [87]
SWAT21A16A-30	3-1/2″ (4.000 Dia.)	1-1/4″ (2.375 Dia.)	3.25 [83]	1.00 [25]	5.06 [129]	3.34 [85]	2.07 [53]
SWAT21A17A-30		1-1/2″ (1.900 Dia.)	3.50 [89]	1.00 [25]	5.25 [132]	3.44 [87]	1.97 [50]
SWAT21A18A-30		2″ (2.375 Dia.)	4.00 [102]	1.00 [25]	6.31 [160]	3.16 [80]	2.68 [68]
SWAT21A19A-30		2-1/2″ (2.0875 Dia.)	4.38 [111]	1.38 [35]	7.38 [187]	4.00 [102]	3.09 [78]
SWAT21A20A-30		3″ (3.500 Dia.)	5.00 [127]	1.38 [35]	8.38 [213]	4.12 [105]	4.21 [107]
SWT22A18A-30	4″ (4.500 Dia.)	2″ (2.375 Dia.)	4.00 [102]	1.00 [25]	6.50 [165]	3.81 [97]	2.82 [72]
SWT22A19A-30		2-1/2″ (2.875 Dia.)	4.38 [111]	1.38 [35]	7.41 [188]	4.09 [104]	3.13 [80]
SWAT22A20A-30		3″ (3.500 Dia.)	5.12 [130]	1.38 [1.38]	8.62 [219]	4.28 [109]	4.05 [103]
SWAT24A18A-30	5″ (5.563 Dia.)	2″ (2.375 Dia.)	4.00 [102]	1.00 [25]	6.50 [165]	3.81 [97]	3.06 [78]
SWAT24A19A-30		2-1/2″ (2.875 Dia.)	4.38 [111]	1.38 [35]	7.38 [187]	4.47 [114]	2.87 [73]
SWAT24A20A-30		3″ (3.500 Dia.)	2.12 [130]	1.38 [35]	8.62 [219]	4.62 [117]	3.76 [96]
SWAT86A20A-30	6″ (6.625 Dia.)	3″ (3.500 Dia.)	5.12 [130]	1.38 [35]	8.69 [221]	4.81 [122]	3.57 [91]
SWAT86A21A-30		3-1/2″ (4.000 Dia.)	5.88 [149]	1.38 [35]	9.69 [246]	5.19 [132]	4.11 [104]
SWAT86A22A-30		4″ (4.500 Dia.)	6.25 [159]	1.38 [35]	10.62 [270]	5.00 [127]	5.15 [131]

NOTES:
1. Dimensions in brackets [ ] are in millimeters
2. Conductor smaller than 3 inch bus size not recommended for 550 kV.

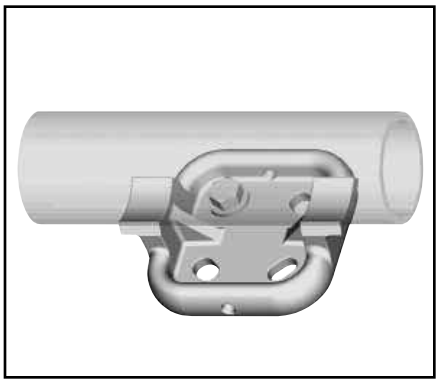
WELDED RIGID BUS SUPPORT

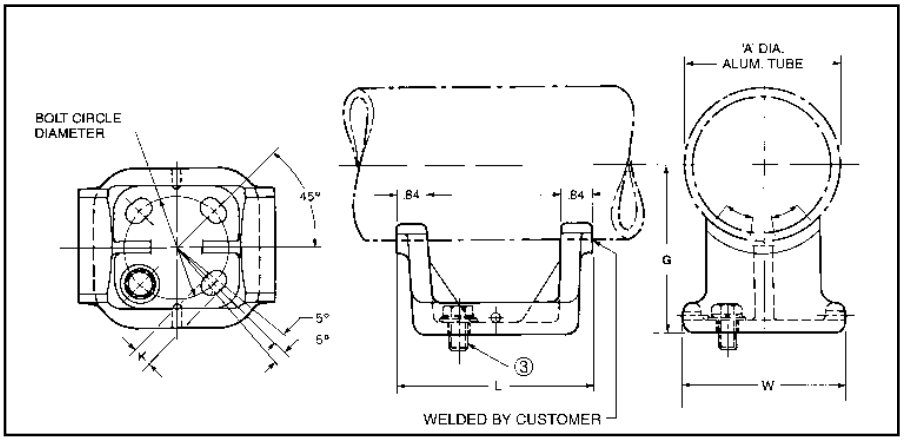
SWOH-A

Weld type
Application: Fixed Bus Support to Insulator

EHV RATED: SELF-SHIELDING UP TO 550 kV— When used on Corona free Post Insulators

Material: Cast 356 Aluminum Alloy





Catalog Number	"A" Dia. Alum. Tube	Bolt Circle Dia.	G	K	L	W
SWOH18A-3	2" (2.375 Dia.) [60]	3.00 [76]	2.75 [70]	.56 [14]	5.60 [142]	4.96 [126]
SWOH18A-5		5.00 [127]		.69 [18]	7.48 [190]	6.76 [172]
SWOH19A-3	2-1/2" (2.875 Dia.) [73]	3.00 [76]	3.12 [79]	.56 [14]	6.06 [154]	5.19 [132]
SWOH19A-5		5.00 [127]		.69 [18]	7.62 [194]	6.80 [173]
SWOH20A-3	3" (3.500 Dia.) [89]	3.00 [76]	3.00 [76]	.56 [14]	5.78 [147]	4.96 [126]
SWOH20A-5		5.00 [127]		.69 [18]	7.20 [183]	6.29 [160]
SWOH21A-3	3-1/2" (4.000 Dia.) [102]	3.00 [76]	4.00 [102]	.56 [14]	5.80 [147]	4.96 [126]
SWOH21A-5		5.00 [127]		.69 [18]	7.58 [193]	6.76 [172]
SWOH22A-3	4" (4.500 Dia.) [114]	3.00 [76]	4.50 [114]	.56 [14]	5.82 [148]	4.96 [126]
SWOH22A-5		5.00 [127]		.69 [18]	7.68 [195]	6.57 [167]
SWOH24A-5	5" (5.563 Dia.) [141]	5.00 [127]	5.00 [127]	.69 [18]	7.68 [195]	6.57 [167]
SWOH86A-5	6" (6.625 Dia.) [168]	5.00 [127]	5.50 [140]	.69 [18]	7.68 [195]	6.57 [167]

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. "G" dimension conforms to NEMA standards.
③ Cap mounting (galvanized steel) hardware supplied as standard. For Base Mounting hardware add SUFFIX "B" to catalog number (example: SWOH22A-5B).
4. Conductors smaller than 3 inch bus size not recommended for 550 kV.

Blue highlighted items are industry standard and most frequently ordered.

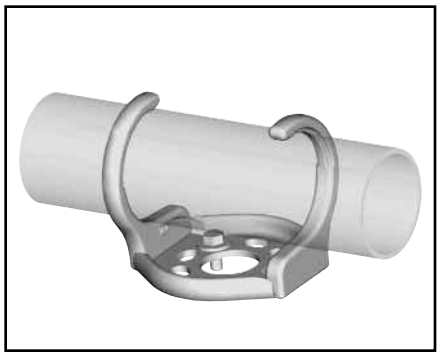
WELDED RIGID OR SLIP FIT BUS SUPPORT

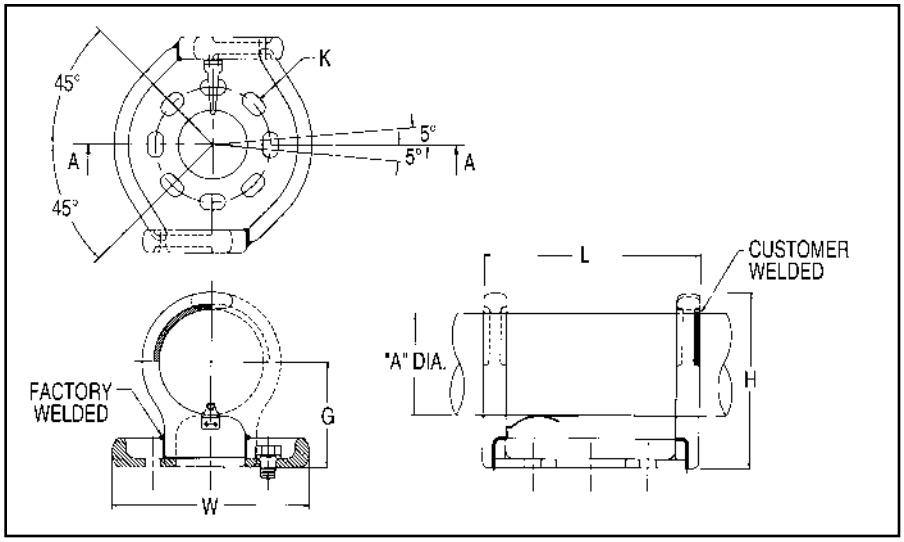
SWHRH-A

Welded type
Application: Fixed or Slip Fit Bus Support to Insulator.

EHV RATED: SELF-SHIELDING UP TO 550 kV— When used on corona free Post Insulators.

Material: Cast 356 Aluminum Alloy





Catalog Number	Catalog Number	Aluminum Conductor				3″ Bolt Circle			5″ Bolt Circle		
3″ Bolt Circle	5″ Bolt Circle	IPS/EHPS	"A" Dia.	G	H	K	L	W	K	L	W
SWHRH18A-3CH	SWHRH18A-5CH	2″	2.38 [60]	2.75 [70]	4.58 [116]	.56 × .75 [14 × 19]	7.76 [197]	6.26 [159]	.69 × .88 [18 × 22]	9.37 [238]	8.61 [219]
SWHRH19A-3CH	SWHRH19A-5CH	2-1/2″	2.88 [73]	3.12 [79]	5.21 [132]						
SWHRH20A-3CH	SWHRH20A-5CH	3″	3.50 [89]	3.62 [92]	6.15 [156]						
SWHRH21A-3CH	SWHRH21A-5CH	3-1/2″	4.00 [102]	4.00 [102]	6.77 [172]						
SWHRH22A-3CH	SWHRH22A-5CH	4″	4.50 [114]	4.50 [114]	7.52 [191]						
SWHRH24A-3CH	SWHRH24A-5CH	5″	5.56 [141]	5.00 [127]	8.68 [220]						
SWHRH86A-3CH	SWHRH86A-5CH	6″	6.63 [168]	5.50 [140]	9.71 [247]			8.61 [219]			

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. G dimension conforms to NEMA standards.
3. Cap mounting (galvanized steel) hardware supplied as standard. For Base mounting hardware add SUFFIX "B'" to catalog number (example: SWHRH22A-5B).
4. Conductors smaller than 3 inch bus size not recommended for 550 kV.

Blue highlighted items are industry standard and most frequently ordered.

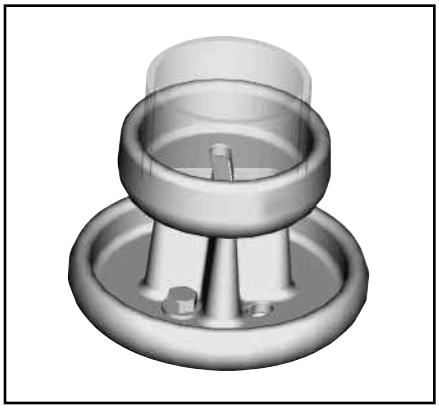
WELDED VERTICAL BUS SUPPORT

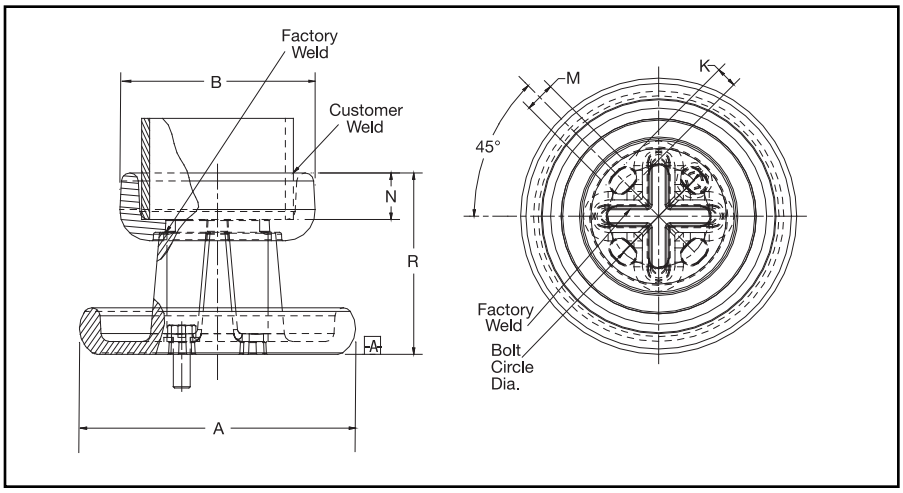
SWVH-A

Weld type
Application: Bus to insulator (Vertical Position)

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Cast 356 Aluminum Alloy
Hardware: Galvanized Steel





Catalog No.	Accommodates	Bolt Circle Dia.	"A" Dia.	"B" Dia.	"K" & "M" Slot	N	R
SWVH19A-5	2-1/2″ IPS (2.88 Dia.) [73] Alum. Tube	5″	8.19 [208]	4.16 [106]	.69 × 1.12 [18] [28]	1.38 [35]	5.38 [137]
SWVH19A-7		7″	10.25 [260]		.81 × 1.44 [21] [37]		
SWVH20A-5	3″ IPS (3.50 Dia.) [89] Alum. Tube	5″	8.19 [208]	4.79 [122]	.69 × 1.12 [18] [28]		
SWVH20A-7		7″	10.25 [260]		.81 × 1.44 [21] [37]		
SWVH22A-5	4″ IPS (4.50 Dia.) [114] Alum. Tube	5″	8.19 [208]	5.79 [147]	.69 × 1.12 [18] [28]		
SWVH22A-7		7″	10.25 [260]		.81 × 1.44 [21] [37]		
SWVH24A-5	5″ IPS (5.56 Dia.) [141] Alum. Tube	5″	8.19 [208]	6.87 [175]	.69 × 1.12 [18] [28]		
SWVH24A-7		7″	10.25 [260]		.81 × 1.44 [21] [37]		
SWVH86A-5	6″ IPS (6.63 Dia.) [168] Alum. Tube	5″	8.19 [208]	7.93 [201]	.69 × 1.12 [18] [28]		
SWVH86A-7		7″	10.25 [260]		.81 × 1.44 [21] [37]		

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. Cap mounting hardware supplied. For base mounted hardware add SUFFIX "B" to catalog number (example: SWVH22A5B).
3. Conductors smaller than 3 inch not recommended for 550 kV.

Blue highlighted items are industry standard and most frequently ordered.

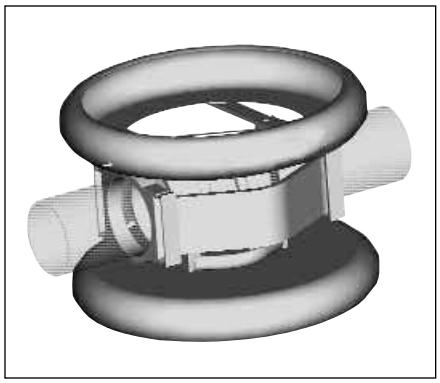
WELDED EXPANSION BUS SUPPORT COUPLER

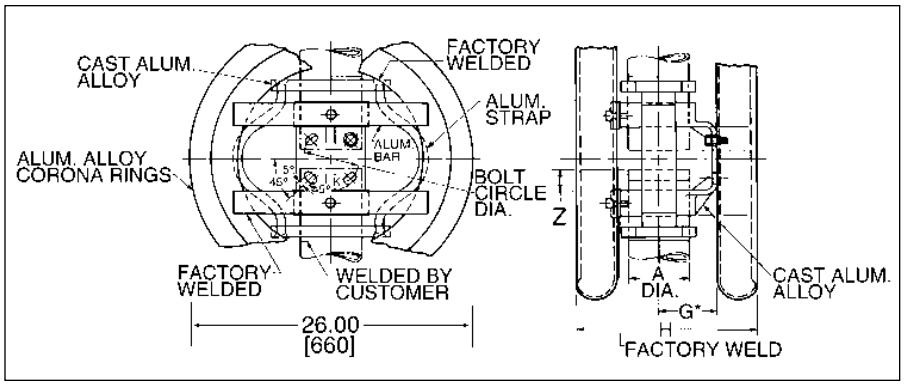
SWXHP-A

Weld type
Application: Bus to Bus Expansion
Coupler to Insulator

EHV RATED: SELF-SHIELDING up to 550 kV

Material: Cast 356 Aluminum Alloy
Corona Rings: Aluminum Alloy
Straps: Laminated Aluminum Strap





Catalog Number		"A" Dia.	Bolt				Total ①
Sch 40	Sch 80	Alum. Tube	Circle Dia.	G*	K	H	Movement
SWXHP19A-5	SWXHP59A-5	2-1/2" (2.88 Dia.) [73]	5.00 [127]	3.12 [79]	.69 [18]	12.77 [324]	3.00 [76]
SWXHP20A-5	SWXHP90A-5	3" (3.50 Dia.) [89]	5.00 [127]	3.62 [92]	.69 [18]	13.62 [346]	3.00 [76]
SWXHP21A-5	SWXHP91A-5	3-1/2" (4.00 Dia.) [102]	5.00 [127]	4.00 [102]	.69 [18]	14.25 [362]	3.00 [76]
SWXHP22A-5	SWXHP92A-5	4" (4.50 Dia.) [114]	5.00 [127]	4.50 [114]	.69 [18]	14.90 [378]	4.00 [102]
SWXHP24A-5	SWXHP94A-5	5" (5.56 Dia.) [141]	5.00 [127]	5.25 [133]	.69 [18]	16.31 [414]	4.00 [102]
SWXHP86A-5	SWXHP96A-5	6" (6.63 Dia.) [168]	5.00 [127]	5.50 [140]	.69 [18]	17.34 [440]	4.00 [102]

NOTES:

*Conforms to NEMA standards.
① Maximum movement per end equals one-half of total movement specified in table.
2. Dimensions in brackets [ ] are in millimeters.
3. Cap mounting hardware supplied (Galvanized Steel). For base mounted hardware add SUFFIX "B" to catalog number (example: SWXHP20A5B).
4. Conductors smaller than 3 inch not recommended for 550 kV.
5. Bus support couplers are supplied without bus end plugs. If end plugs are required, add SUFFIX "EP" to catalog number (example: SWXHP20A5EP).
⑥ Table is based on 80 ft. max. bus run (total) or 40 ft. per end.
⑦ Table is based on 110 ft. max. bus run (total) or 55 ft. per end.

Installation Data		
Bus Temp F°	3" Total Movement Z ⑥	4" Total Movement Z ⑦
–20	.75	.75
–10	.82	.84
0	.89	.83
10	.95	1.02
20	1.02	1.11
30	1.09	1.20
40	1.16	1.29
50	1.23	1.39
60	1.30	1.48
70	1.36	1.57
80	1.43	1.66
90	1.50	1.75 ← NOMINAL POSITION
100	1.57	1.84
110	1.64	1.93
120	1.70	2.02
130	1.77	2.11
140	1.84	2.20
150	1.91	2.29
160	1.98	2.39
170	2.05	2.48
180	2.11	2.57
190	2.18	2.66
200	2.25	2.75

Blue highlighted items are industry standard and most frequently ordered.

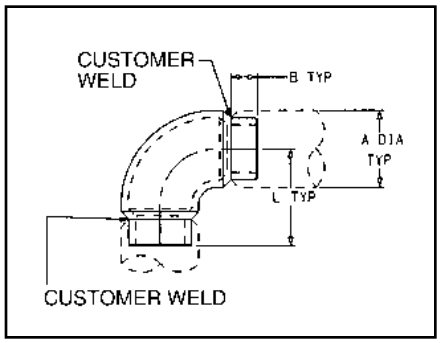
WELDED 90° ELBOW

SWL-A

Weld type
Application: Bus to Bus Elbow, 90°

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Cast 356 Aluminum Alloy



Catalog Number		Conductor Aluminum Tubing Size	Dimensions In./[mm]		
Sch. 40	Sch. 80		A Dia.	B	L
SWL18A	SWL58A	2″	2.38 [60.4]	1.00 [25]	3.50 [89]
SWL19A	SWL59A	2-1/2″	2.88 [73]	1.38 [35]	3.88 [99]
SWL20A	SWL90A	3″	3.50 [89]		4.68 [119]
SWL21A	SWL91A	3-1/2″	4.00 [102]		5.12 [130]
SWL22A	SWL92A	4″	4.50 [114]		5.63 [143]
SWL24A	SWL93A	5″	5.56 [141]	1.62 [41]	6.16 [156]
SWL86A	SWL96A	6″	6.63 [168]		6.16 [156]

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. Conductor smaller than 3 inch bus size not recommended for 550 kV
3. For 45° angle ADD SUFFIX "45" to catalog number (example: SWL22A-45).

Blue highlighted items are industry standard and most frequently ordered.

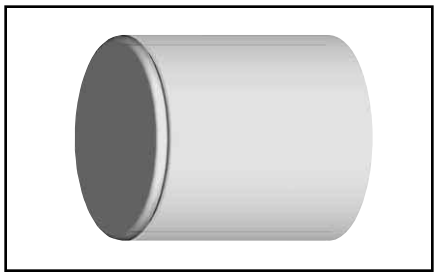
WELDED END PLUG

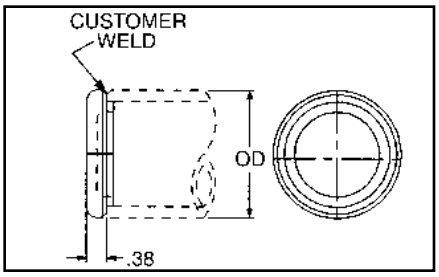
WLB-A

Weld type
Application: Bus to End Cap, used with shielded bus support/expansion couplers

EHV RATED: UP TO 550 kV when used with shielded bus and expansion connectors

Material: Cast 356 Aluminum Alloy





Catalog Number		O.D.	Conductor Aluminum Tubing Size
Sch. 40	Sch. 80		
WLB15A	**WLB55A**	1.32 [34]	1″
WLB16A	**WLB56A**	1.66 [42]	1-1/4″
WLB17A	**WLB57A**	1.90 [48]	1-1/2″
WLB18A	**WLB58A**	2.38 [60]	2″
WLB19A	**WLB59A**	2.88 [73]	2-1/2″
WLB20A	**WLB90A**	3.50 [89]	3″
WLB21A	**WLB91A**	4.00 [102]	3-1/2″
WLB22A	**WLB92A**	4.50 [114]	4″
WLB24A	**WLB94A**	5.56 [141]	5″
WLB86A	**WLB96A**	6.62 [168]	6″

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. Conductor smaller than 3 inch bus size not recommended for 550 kV.

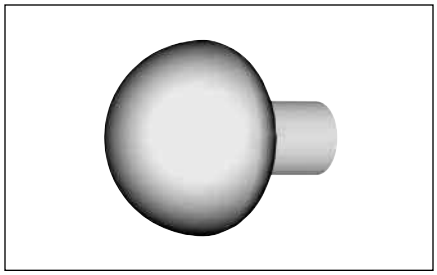
WELDED CORONA BELL

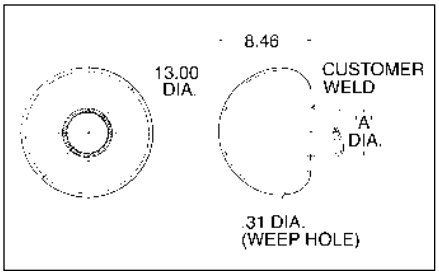
SCB-A

Weld type
Application: Bus to Corona Bell

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Aluminum Alloy





Catalog Number	Accommodates 'A' Dia. Aluminum Tube
SCB19A	2-1/2″ (2.875 Dia.)
SCB20A	3″ (3.500 Dia.)
SCB21A	3-1/2″ (4.000 Dia.)
SCB22A	4″ (4.500 Dia.)
SCB24A	5″ (5.563 Dia.)
SCB86A	6″ (6.625 Dia.)

NOTES:
1. For bolted design contact factory.
2. Dimensions in brackets [ ] are in millimeters.
3. Conductor smaller than 3 inch bus size not recommended for 550 kV.

Blue highlighted items are industry standard and most frequently ordered.

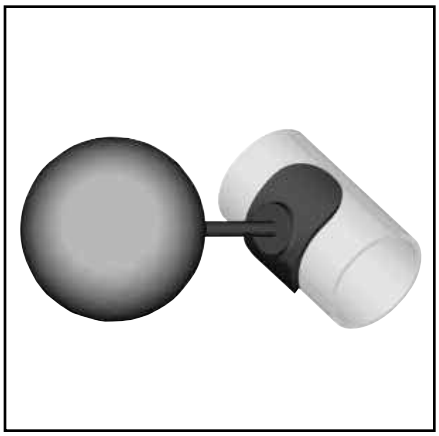
WELDED GROUND STUD

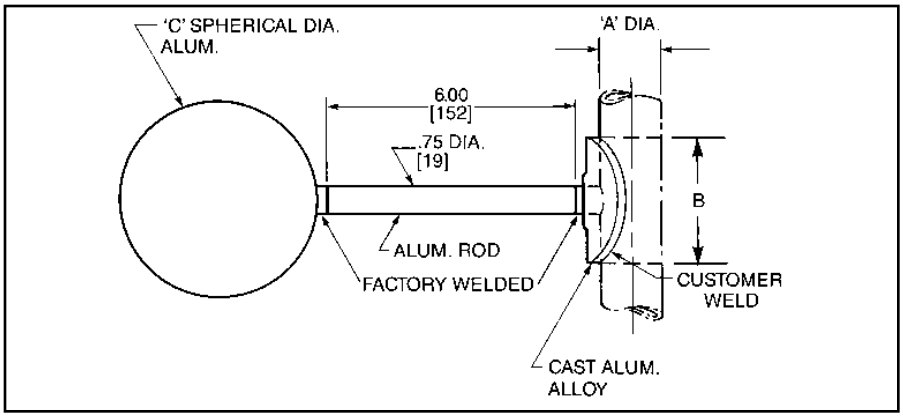
SWCB-A

Weld type
Application: Bus to corona sphere

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Cast 356 Aluminum Alloy
Corona Sphere: Aluminum Alloy





Catalog Number	'A' Dia. Aluminum Tube	'C' Dia.	B
SWCB19A	2-1/2″ I.P.S. (2.875 Dia.) [73]	9.00 [229]	1.50 [38]
SWCB20A	3″ I.P.S. (3.500 Dia.) [89]		3.00 [76]
SWCB22A	4″ I.P.S. (4.500 Dia.) [114]		4.00 [102]
SWCB24A	5″ I.P.S. (5.563 Dia.) [141]		
SWCB86A	6″ I.P.S. (6.625 Dia.) [168]		

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. Conductor smaller than 3 inch bus size not recommended for 550 kV.

TERMINAL PAD CAP

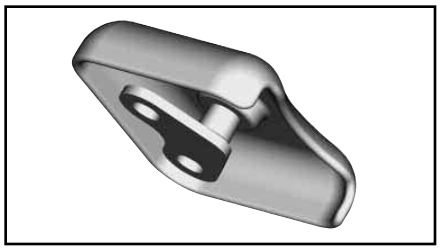
(Two Piece)

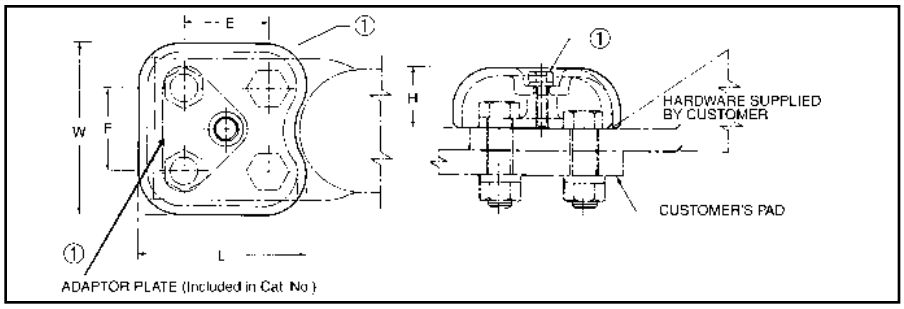
STS-A-N

Bolted type
Application: Pad shielding

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Cast 356 Aluminum Alloy
Hardware: 1/4″–20 × 3-3/4″ LG Stainless Steel Hex Hd. Bolt and Split Lockwasher





Catalog Number ①	E	F	H	L	W	Maximum Shielded Area
STS33A-4N	1.75 [44]	1.75 [44]	1.25 [32]	3.48 [88]	3.62 [92]	3 × 3 [76] × [76]
STS43A-4N	1.75 [44]	1.75 [44]	1.31 [33]	3.36 [85]	4.50 [114]	4.00 × 3.12 [102 × 79]
STS44A-4N ②	1.75 [44]	1.75 [44]	1.25 [32]	4.50 [114]	4.62 [117]	4 × 4 [102 × 102]

① Catalog number includes one pad cap, one adapter plate, and stainless steel adaptor hardware.

② Used with YNA451R-T and YNA451R-T15 through YNA594R-T and YNA594R-T15 compresseion terminals.

TERMINAL PAD CAP

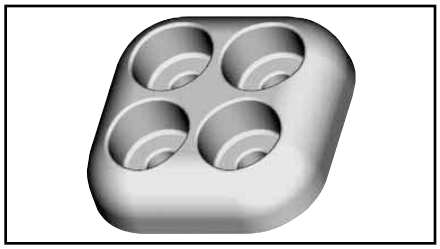
(One Piece)

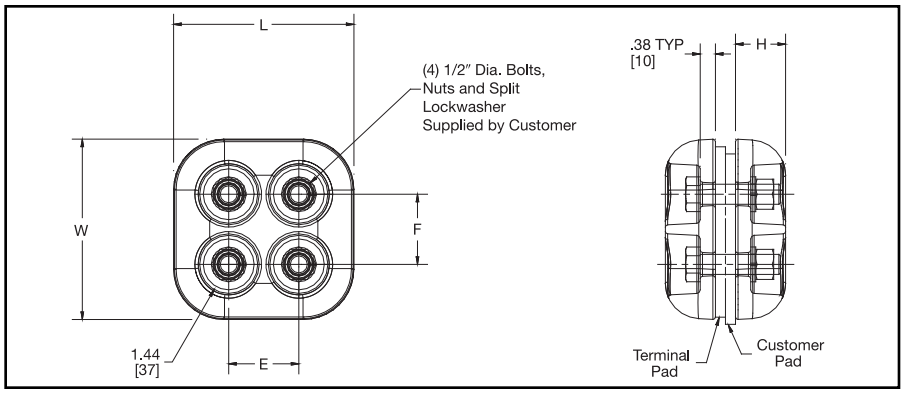
STS-A-NCG

Bolted type
Application: Pad shielding

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Cast 356 Aluminum Alloy





Catalog Number	E	F	H	J Dia.	L	W	Maximum Shielded Area
STS44A-4NCG2	1.75 [44]	1.75 [44]	1.25 [32]	1/2–13	4.50 [114]	4.50 [114]	4 × 4
STS46A-6NCG1	1.75 [44]	1.75 [44]	1.25 [32]	1/2–13	4.50 [114]	6.50 [165]	6 × 4

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. Catalog number is for one shielding cap only. If more than one is required, specifiy total quantity.

BOLTED BUNDLED CABLE SPACER

S2GBP-A (Spacer)
S2GBPA-A (Terminal Tap)
SH2GBP-A (Bus Support)

Bolted type
Applications: Cable to Cable spacer (Two Cables), Cable spacer with four hole pad, and Cable spacer to insulator.

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Cast 356 Aluminum Alloy
Hardware: Aluminum Alloy


Fig. 1

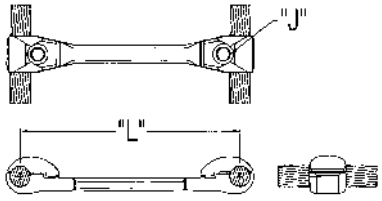


Fig. 1

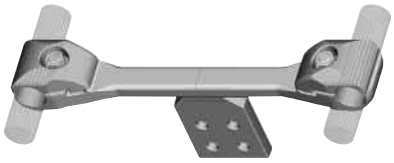


Fig. 2

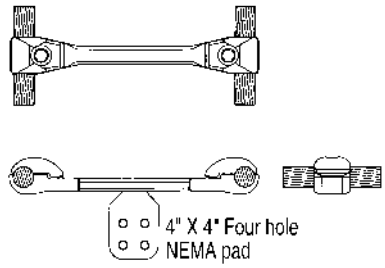


Fig. 2

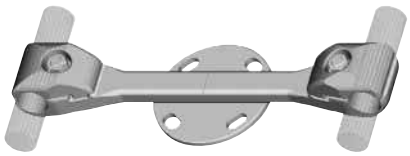


Fig. 3

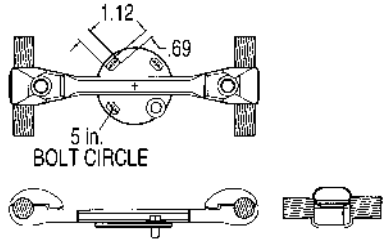


Fig. 3

M-30

Catalog Number			Cable Range		Cable Dia.			
Fig. 1	Fig. 2	Fig. 3	AAC	ACSR	Min.	Max.	"L"	"J" Dia.
S2GBP41A	S2GBPA41A	SH2GBP41A5	795 kcmil 37 Str. (1.026 Dia.) 874.5 kcmil 61 Str. (1.077 Dia.)	715 kcmil 24/7 Str. (1.036 Dia.) 715.5 kcmil 26/7 Str. (1.051 Dia.)	1.026 [26]	1.092 [28]	18.00 [457]	5/8"–11 X 1-1/2" LG. Alum. Alloy
S2GBP41A12	S2GBPA41A12	SH2GBP41A512					12.00 [305]	
S2GBP44A	S2GBPA44A	SH2GBP44A5	954 kcmil 61 Str. (1.126 Dia.)	795 kcmil 24/7 Str. (1.092 Dia.) 795 kcmil 54/7 Str. (1.093 Dia.)	1.092 [28]	1.165 [30]	18.00 [457]	5/8"–11 X 1-3/4" LG. Alum. Alloy
S2GBP44A12	S2GBPA44A12	SH2GBP44A512					12.00 [305]	
S2GBP445A	S2GBPA445A	SH2GBP445A5	1033.5 kcmil 37 Str. (1.170 Dia.) 1113 kcmil 61 Str. (1.216 Dia.)	954 kcmil 45/7 Str. (1.165 Dia.) 1033.5 kcmil 45/7 Str. (1.213 Dia.)	1.165 [30]	1.246 [32]	18.00 [457]	
S2GBP445A12	S2GBPA445A12	SH2GBP445A512					12.00 [305]	
S2GBP45A	S2GBPA45A	SH2GBP45A5	1192 kcmil 61 Str. (1.258 Dia.) 1272 kcmil 61 Str. (1.300 Dia.)	1033.5 kcmil 54/7 Str. (1.246 Dia.) 1192.5 kcmil 54/19 Str. (1.333 Dia.)	1.246 [32]	1.382 [35]	18.00 [457]	
S2GBP45A12	S2GBPA45A12	SH2GBP45A512					12.00 [305]	

(Table continued on next page)

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. For stainless steel hardware add SUFFIX "SS" to catalog number (example: S2GBP41ASS).
3. For variations in cable spacing contact factory.
4. For pad rotated 90° on S2GBPA-A add suffix R90 to the catalog number (example: S2GBPA44AR90).
5. For Bolt Circles other than 5 inch on type SH2GBP-A contact factory.
6. **S2GBPA-A connectors rated 550 kV when used with type "STS" Shielding Caps. Ordered separately, refer to page 32.**

Blue highlighted items are industry standard and most frequently ordered.

BOLTED BUNDLED CABLE SPACER

(Continued)

S2GBP-A (Spacer)
S2GBPA-A (Terminal Tap)
SH2GBP-A (Bus Support)

Catalog Number			Cable Range		Cable Dia.			
Fig. 1	Fig. 2	Fig. 3	AAC	ACSR	Min.	Max.	"L"	"J" Dia.
S2GBP46A	S2GBPA46A	SH2GBP46A5	1590 kcmil 61 Str. (1.453 Dia.) 1600 kcmil 127 Str. (1.454 Dia.)	1272 kcmil 54/19 Str. (1.382 Dia.) 1431 kcmil 54/19 Str. (1.465 Dia.)	1.382 [35]	1.504 [38]	18.00 [457]	5/8"–11 X 1-3/4" LG. Alum. Alloy
S2GBP46A12	S2GBPA46A12	SH2GBP46A512					12.00 [305]	
S2GBP48A	S2GBPA48A	SH2GBP48A5	1750 kcmil 127 Str. (1.526 Dia.) 2000 kcmil 91 Str. (1.630 Dia.)	1590 kcmil 45/7 Str. (1.502 Dia.) 1750 kcmil 84/19 Str. (1.602 Dia.)	1.504 [38]	1.632 [41]	18.00 [457]	5/8"–11 X 2" LG. Alum. Alloy
S2GBP48A12	S2GBPA48A12	SH2GBP48A512					12.00 [305]	
S2GBP483A	S2GBPA483A	SH2GBP483A5	2000 kcmil 91 Str. (1.630 Dia.) 2250 kcmil 91 Str. (1.729 Dia.)	1890 kcmil 84/19 Str. (1.650 Dia.) 2167 kcmil 72/7 Str. (1.737 Dia.)	1.632 [41]	1.737 [44]	18.00 [457]	
S2GBP483A12	S2GBPA483A12	SH2GBP483A512					12.00 [305]	
S2GBP486A	S2GBPA486A	SH2GBP486A5	2300 kcmil 61 Str. (1.750 Dia.) 2500 kcmil 127 Str. (1.823 Dia.)	2167 kcmil 72/7 Str. (1.737 Dia.) 2156 kcmil 84/19 Str. (1.762 Dia.)	1.737 [44]	1.824 [46]	18.00 [457]	
S2GBP486A12	S2GBPA486A12	SH2GBP486A512					12.00 [305]	

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. For stainless steel hardware add SUFFIX "SS" to catalog number (example: S2GBP41ASS).
3. For variations in cable spacing contact factory.
4. For pad rotated 90° onS2GBPA-A add suffix R90 to the catalog number (example: S2GBPA44AR90).
5. For Bolt Circles other than 5 inch on type SH2GBP-A contact factory.
6. **S2GBPA-A connectors rated 550 kV when used with type "STS" Shielding Caps. Ordered separately, refer to page 32.**

BOLTED BUNDLED CABLE SPACER (Two Bolt Clamping)

S2GBP-AB2 (Spacer)
S2GBPA-AB2 (Terminal Tap)
SH2GBP-A-B2 (Bus Support)

Bolted type
Applications: Cable to Cable spacer (Two Cables), Cable spacer with four hole pad, and Cable spacer to insulator.

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Cast 356 Aluminum Alloy
Hardware: Aluminum Alloy

Fig. 1

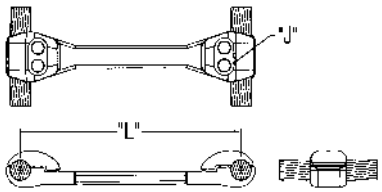


Fig. 1

Fig. 2

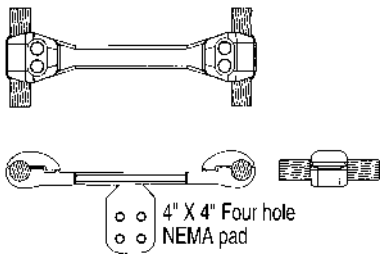


Fig. 2

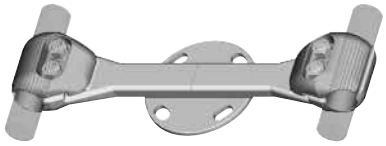


Fig. 3

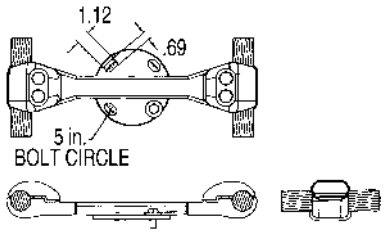


Fig. 3

Catalog Number			Cable Range		Cable Dia.			
Fig. 1	Fig. 2	Fig. 3	AAC	ACSR	Min.	Max.	"L"	"J" Dia.
S2GBP41AB2	S2GBPA41AB2	SH2GBP41A5B2	795 kcmil 37 Str. (1.026 Dia.) 874.5 kcmil 61 Str. (1.077 Dia.)	715 kcmil 24/7 Str. (1.036 Dia.) 715.5 kcmil 26/7 Str. (1.051 Dia.)	1.026 [26]	1.092 [28]	18.00 [457]	5/8"–11 X 1-1/2" LG. Alum. Alloy
S2GBP41A12B2	S2GBPA41A12B2	SH2GBP41A512B2					12.00 [305]	
S2GBP44AB2	S2GBPA44AB2	SH2GBP44A5B2	954 kcmil 61 Str. (1.126 Dia.)	795 kcmil 24/7 Str. (1.092 Dia.) 795 kcmil 54/7 Str. (1.093 Dia.)	1.092 [28]	1.165 [30]	18.00 [457]	5/8"–11 X 1-3/4" LG. Alum. Alloy
S2GBP44A12B2	S2GBPA44A12B2	SH2GBP44A512B2					12.00 [305]	
S2GBP445AB2	S2GBPA445AB2	SH2GBP445A5B2	1033.5 kcmil 37 Str. (1.170 Dia.) 1113 kcmil 61 Str. (1.216 Dia.)	954 kcmil 45/7 Str. (1.165 Dia.) 1033.5 kcmil 45/7 Str. (1.213 Dia.)	1.165 [30]	1.246 [32]	18.00 [457]	
S2GBP445A12B2	S2GBPA445A12B2	SH2GBP445A512B2					12.00 [305]	
S2GBP45AB2	S2GBPA45AB2	SH2GBP45A5B2	1192 kcmil 61 Str. (1.258 Dia.) 1272 kcmil 61 Str. (1.300 Dia.)	1033.5 kcmil 54/7 Str. (1.246 Dia.) 1192.5 kcmil 54/19 Str. (1.333 Dia.)	1.246 [32]	1.382 [35]	18.00 [457]	
S2GBP45A12B2	S2GBPA45A12B2	SH2GBP45A512B2					12.00 [305]	

(Table continued on next page)

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. For stainless steel hardware add SUFFIX "SS" to catalog number (example: S2GBP41AB2SS).
3. For variations in cable spacing contact factory.
4. For pad rotated 90° on S2GBPA-AB2 add suffix R90 to the catalog number (example: S2GBPA44AB2R90).
5. For Bolt Circles other than 5 inch on type SH2GBP-A-B2 contact factory.
6. **S2GBPA-B2 connectors rated 550 kV when used with type "STS" Shielding Caps. Ordered separately, refer to page 32.**

BOLTED BUNDLED CABLE SPACER

(Continued)

(Two Bolt Clamping)

S2GBP-AB2 (Spacer)
S2GBPA-AB2 (Terminal Tap)
SH2GBP-A-B2 (Bus Support)

Catalog Number			Cable Range		Cable Dia.			
Fig. 1	Fig. 2	Fig. 3	AAC	ACSR	Min.	Max.	"L"	"J" Dia.
S2GBP46AB2	S2GBPA46AB2	SH2GBP46A5B2	1590 kcmil 61 Str. (1.453 Dia.) 1600 kcmil 127 Str. (1.454 Dia.)	1272 kcmil 54/19 Str. (1.382 Dia.) 1431 kcmil 54/19 Str. (1.465 Dia.)	1.382 [35]	1.504 [38]	18.00 [457]	5/8"–11 X 1-3/4" LG. Alum. Alloy
S2GBP46A12B2	S2GBPA46A12B2	SH2GBP46A512B2					12.00 [305]	
S2GBP48AB2	S2GBPA48AB2	SH2GBP48A5B2	1750 kcmil 127 Str. (1.526 Dia.) 2000 kcmil 91 Str. (1.630 Dia.)	1590 kcmil 45/7 Str. (1.502 Dia.) 1750 kcmil 84/19 Str. (1.602 Dia.)	1.504 [38]	1.632 [41]	18.00 [457]	
S2GBP48A12B2	S2GBPA48A12B2	SH2GBP48A512B2					12.00 [305]	
S2GBP483AB2	S2GBPA483AB2	SH2GBP483A5B2	2000 kcmil 91 Str. (1.630 Dia.) 2250 kcmil 91 Str. (1.729 Dia.)	1890 kcmil 84/19 Str. (1.650 Dia.) 2167 kcmil 72/7 Str. (1.737 Dia.)	1.632 [41]	1.737 [44]	18.00 [457]	5/8"–11 X 2" LG. Alum. Alloy
S2GBP483A12B2	S2GBPA483A12B2	SH2GBP483A512B2					12.00 [305]	
S2GBP486AB2	S2GBPA486AB2	SH2GBP486A5B2	2300 kcmil 61 Str. (1.750 Dia.) 2500 kcmil 127 Str. (1.823 Dia.)	2167 kcmil 72/7 Str. (1.737 Dia.) 2156 kcmil 84/19 Str. (1.762 Dia.)	1.737 [44]	1.824 [46]	18.00 [457]	
S2GBP486A12B2	S2GBPA486A12B2	SH2GBP486A512B2					12.00 [305]	

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. For stainless steel hardware add SUFFIX "SS" to catalog number (example: S2GBP41AB2SS).
3. For variations in cable spacing contact factory.
4. For pad rotated 90° on S2GBPA-AB2 add suffix R90 to the catalog number (example: S2GBPA44AB2R90).
5. For Bolt Circles other than 5 inch on type SH2GBP-A-B2 contact factory.
6. **S2GBPA-B2 connectors rated 550 kV when used with type "STS" Shielding Caps. Ordered separately, refer to page 32.**

Blue highlighted items are industry standard and most frequently ordered.

BOLTED BUNDLED CABLE SPACER (Four Bolt Clamping)

S2GBP-AB4 (Spacer)
S2GBPA-AB4 (Terminal Tap)
SH2GBP-A-B4 (Bus Support)

Bolted type
Applications: Cable to Cable spacer (Two Cables), Cable spacers with four hole pad, and Cable spacer to bus support insulator.

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Cast 356 Aluminum Alloy
Hardware: Aluminum Alloy


Fig. 1

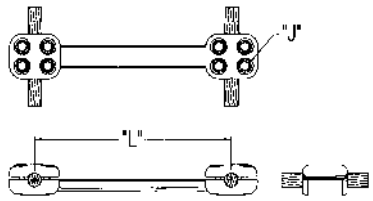


Fig. 1

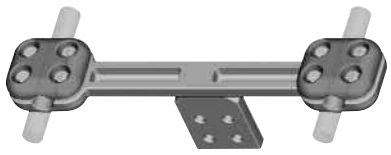


Fig. 2

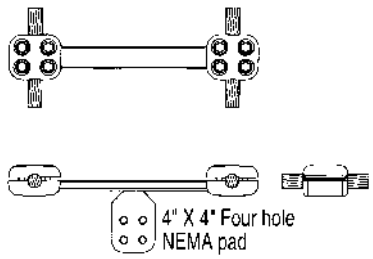


Fig. 2

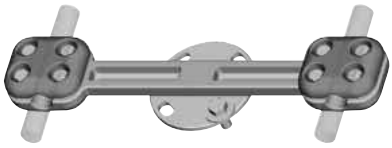


Fig. 3

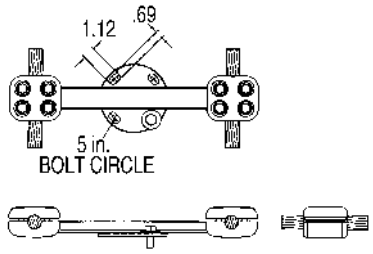


Fig. 3

Catalog Number			Cable Range		Cable Dia.			
Fig. 1	Fig. 2	Fig. 3	AAC	ACSR	Min.	Max.	"L"	"J" Dia.
S2GBP41AB4	S2GBPA41AB4	SH2GBP41A5B4	795 kcmil 37 Str. (1.026 Dia.) 874.5 kcmil 61 Str. (1.077 Dia.)	715 kcmil 24/7 Str. (1.036 Dia.) 715.5 kcmil 26/7 Str. (1.051 Dia.)	1.026 [26]	1.092 [28]	18.00 [457]	5/8"–11 X 1-1/2" LG. Alum. Alloy
S2GBP41A12B4	S2GBPA41A12B4	SH2GBP41A512B4					12.00 [305]	
S2GBP44AB4	S2GBPA44AB4	SH2GBP44A5B4	954 kcmil 61 Str. (1.126 Dia.)	795 kcmil 24/7 Str. (1.092 Dia.) 795 kcmil 54/7 Str. (1.093 Dia.)	1.092 [28]	1.165 [30]	18.00 [457]	5/8"–11 X 1-3/4" LG. Alum. Alloy
S2GBP44A12B4	S2GBPA44A12B4	SH2GBP44A512B4					12.00 [305]	
S2GBP445AB4	S2GBPA445AB4	SH2GBP445A5B4	1033.5 kcmil 37 Str. (1.170 Dia.) 1113 kcmil 61 Str. (1.216 Dia.)	954 kcmil 45/7 Str. (1.165 Dia.) 1033.5 kcmil 45/7 Str. (1.213 Dia.)	1.165 [30]	1.246 [32]	18.00 [457]	
S2GBP445A12B4	S2GBPA445A12B4	SH2GBP445A512B4					12.00 [305]	
S2GBP45AB4	S2GBPA45AB4	SH2GBP45A5B4	1192 kcmil 61 Str. (1.258 Dia.) 1272 kcmil 61 Str. (1.300 Dia.)	1033.5 kcmil 54/7 Str. (1.246 Dia.) 1192.5 kcmil 54/19 Str. (1.333 Dia.)	1.246 [32]	1.382 [35]	18.00 [457]	
S2GBP45A12B4	S2GBPA45A12B4	SH2GBP45A512B4					12.00 [305]	

(Table continued on next page)

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. For stainless steel hardware add SUFFIX "SS" to catalog number (example: S2GBP41AB4SS).
3. For variations in cable spacing contact factory.
4. For pad rotated 90° on S2GBPA-AB4 add suffix R90 to the catalog number (example: S2GBPA44AB4R90).
5. For Bolt Circles other than 5 inch on type SH2GBP-A-B2 contact factory.
6. **S2GBPA-B4 connectors rated 550 kV when used with type "STS" Shielding Caps. Ordered separately, refer to page 32.**

BOLTED BUNDLED CABLE SPACER

(Continued)

(Four Bolt Clamping)

S2GBP-AB4 (Spacer)
S2GBPA-AB4 (Terminal Tap)
SH2GBP-A-B4 (Bus Support)

Catalog Number			Cable Range		Cable Dia.			
Fig. 1	Fig. 2	Fig. 3	AAC	ACSR	Min.	Max.	"L"	"J" Dia.
S2GBP46AB4	S2GBPA46AB4	SH2GBP46A5B4	1590 kcmil 61 Str. (1.453 Dia.) 1600 kcmil 127 Str. (1.454 Dia.)	1272 kcmil 54/19 Str. (1.382 Dia.) 1431 kcmil 54/19 Str. (1.465 Dia.)	1.382 [35]	1.504 [38]	18.00 [457]	5/8"–11 X 1-3/4" LG. Alum. Alloy
S2GBP46A12B4	S2GBPA46A12B4	SH2GBP46A512B4					12.00 [305]	
S2GBP48AB4	S2GBPA48AB4	SH2GBP48A5B4	1750 kcmil 127 Str. (1.526 Dia.) 2000 kcmil 91 Str. (1.630 Dia.)	1590 kcmil 45/7 Str. (1.502 Dia.) 1750 kcmil 84/19 Str. (1.602 Dia.)	1.504 [38]	1.632 [41]	18.00 [457]	5/8"–11 X 2" LG. Alum. Alloy
S2GBP48A12B4	S2GBPA48A12B4	SH2GBP48A512B4					12.00 [305]	
S2GBP483AB4	S2GBPA483AB4	SH2GBP483A5B4	2000 kcmil 91 Str. (1.630 Dia.) 2250 kcmil 91 Str. (1.729 Dia.)	1890 kcmil 84/19 Str. (1.650 Dia.) 2167 kcmil 72/7 Str. (1.737 Dia.)	1.632 [41]	1.737 [44]	18.00 [457]	
S2GBP483A12B4	S2GBPA483A12B4	SH2GBP483A512B4					12.00 [305]	
S2GBP486AB4	S2GBPA486AB4	SH2GBP486A5B4	2300 kcmil 61 Str. (1.750 Dia.) 2500 kcmil 127 Str. (1.823 Dia.)	2167 kcmil 72/7 Str. (1.737 Dia.) 2156 kcmil 84/19 Str. (1.762 Dia.)	1.737 [44]	1.824 [46]	18.00 [457]	
S2GBP486A12B4	S2GBPA486A12B4	SH2GBP486A512B4					12.00 [305]	

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. For stainless steel hardware add SUFFIX "SS" to catalog number (example: S2GBP41AB4SS).
3. For variations in cable spacing contact factory.
4. For pad rotated 90° on S2GBPA-AB4 add suffix R90 to the catalog number (example: S2GBPA44AB4R90).
5. For Bolt Circles other than 5 inch on type SH2GBP-A-B2 contact factory.
6. **S2GBPA-B4 connectors rated 550 kV when used with type "STS" Shielding Caps. Ordered separately, refer to page 32.**

Blue highlighted items are industry standard and most frequently ordered.

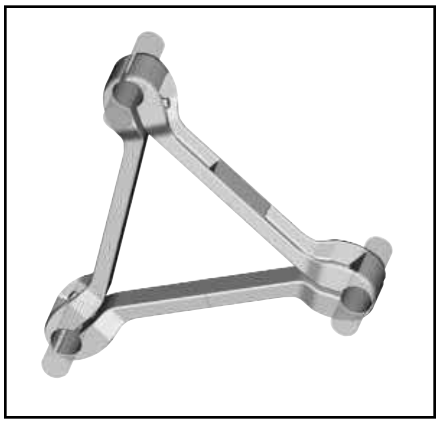
BOLTED BUNDLED CABLE SPACER (Three Conductor)

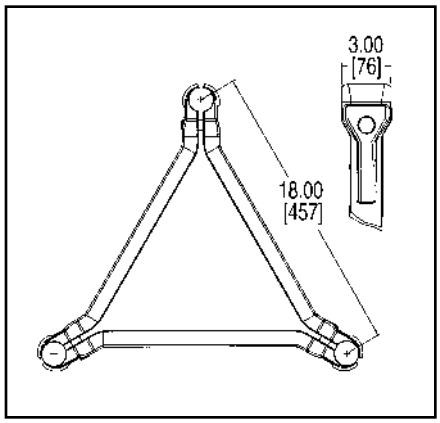
S3GBP-A

Bolted type
Application: Cable to Cable Spacer (three cables)

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Cast 356 Aluminum Alloy
Hardware: Aluminum Alloy





Catalog Number	Cable Range		Cable Dia.		"J" Dia.
	AAC	ACSR	Min.	Max.	
S3GBP41A	795 kcmil 37 Str. (1.026 Dia.) 874.5 kcmil 61 Str. (1.077 Dia.)	715 kcmil 24/7 Str. (1.036 Dia.) 715.5 kcmil 26/7 Str. (1.051 Dia.)	1.026 [26]	1.092 [28]	5/8'-11 × 1-1/2" LG. Alum. Alloy
S3GBP44A	954 kcmil 61 Str. (1.126 Dia.)	795 kcmil 24/7 Str. (1.092 Dia.) 795 kcmil 54/7 Str. (1.093 Dia.)	1.092 [28]	1.165 [30]	5/8"-11 × 1-3/4" LG. Alum. Alloy
S3GBP445A	1033.5 kcmil 37 Str. (1.170 Dia.) 1113 kcmil 61 Str. (1.216 Dia.)	954 kcmil 45/7 Str. (1.165 Dia.) 1033.5 kcmil 45/7 Str. (1.213 Dia.)	1.165 [30]	1.246 [32]	
S3GBP45A	1192 kcmil 61 Str. (1.258 Dia.) 1272 kcmil 61 Str. (1.300 Dia.)	1033.5 kcmil 54/7 Str. (1.246 Dia.) 1192.5 kcmil 54/19 Str. (1.333 Dia.)	1.246 [32]	1.382 [35]	
S3GBP46A	1590 kcmil 61 Str. (1.453 Dia.) 1600 kcmil 127 Str. (1.454 Dia.)	1272 kcmil 54/19 Str. (1.382 Dia.) 1431 kcmil 54/19 Str. (1.465 Dia.)	1.382 [35]	1.504 [38]	
S3GBP48A	1750 kcmil 127 Str. (1.526 Dia.) 2000 kcmil 91 Str. (1.630 Dia.)	1590 kcmil 45/7 Str. (1.502 Dia.) 1750 kcmil 84/19 Str. (1.602 Dia.)	1.504 [38]	1.632 [41]	5/8"-11 × 2" LG. Alum Alloy
S3GBP483A	2000 kcmil 91 Str. (1.630 Dia.) 2250 kcmil 91 Str. (1.729 Dia.)	1890 kcmil 84/19 Str. (1.650 Dia.) 2167 kcmil 72/7 Str. (1.737 Dia.)	1.632 [41]	1.737 [44]	
S3GBP486A	2300 kcmil 61 Str. (1.750 Dia.) 2500 kcmil 127 Str. (1.823 Dia.)	2167 kcmil 72/7 Str. (1.737 Dia.) 2156 kcmil 84/19 Str. (1.762 Dia.)	1.737 [44]	1.824 [46]	

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. For stainless steel hardware add SUFFIX "SS" to catalog number (example: S3GBP48ASS).
3. For variations in cable spacing contact factory.
4. For four hole straight pad tap or 90° version or bus support three bundled cable spacer, contact the factory.

Blue highlighted items are industry standard and most frequently ordered.

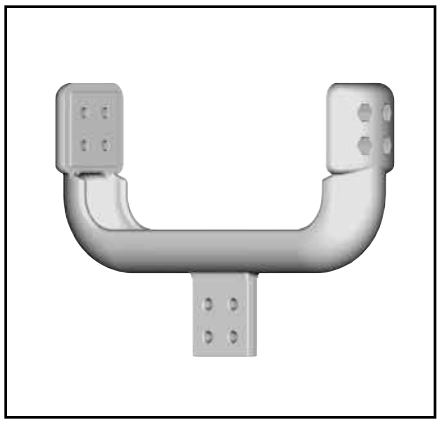
BIFURCATING TERMINAL CONNECTOR

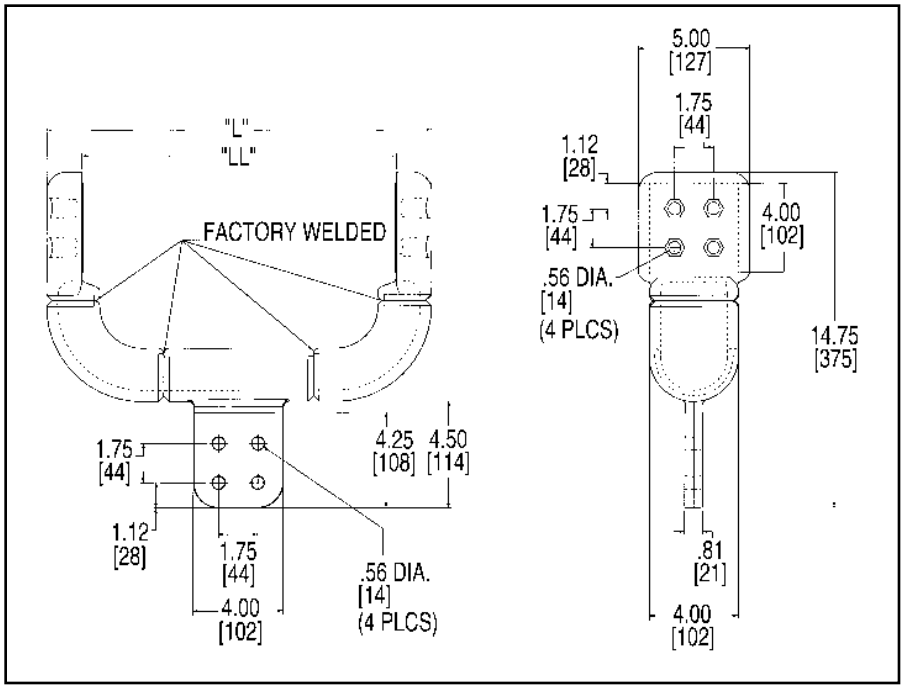
SF2A-NL-EX

Bolted type
Application: Four to Six Hole NEMA Pad to Two Four Hole NEMA Recessed Pads
Bifurcating Terminal

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Cast 356 Aluminum Alloy





Catalog Number	"L"	"LL"
SF2A44NL12EX	17.21 [437]	13.97 [355]
SF2A44NL18EX	21.51 [546]	18.27 [464]

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. One surface of pad finished. For finished pad on both sides add SUFFIX "Q" to the catalog number (example: SF2A44NL12EXQ).
3. Shielding caps are not required when terminals are installed within the recessed Housing. Hardware ordered separately.
4. **Shielding caps are required when installing to center (non recessed) four hole NEMA Pad.** Reference STS type shielding caps on page 32.
5. For six hole NEMA pad add "66" to catalog number (example: SF2A66NL12EX).

Blue highlighted items are industry standard and most frequently ordered.

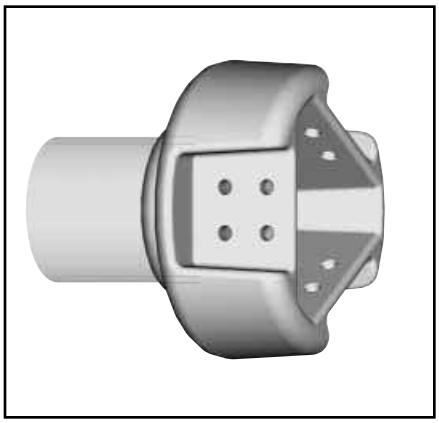
TRIFURCATING COUPLER CONNECTOR

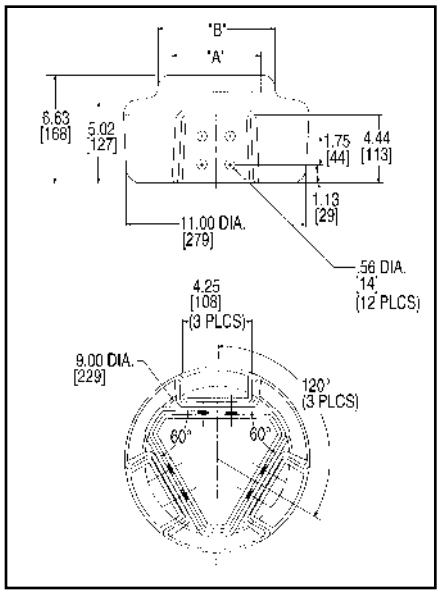
SW3A-A44N8

Weld type
Application: Bus to Trifurcating Terminals

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Cast 356 Aluminum Alloy





Catalog Number	Accommodates		
	Alum. Tubing Size	"A" Dia.	"B" Dia.
SW3A20A44N8	3″ [76]	3.56 [90]	5.06 [129]
SW3A22A44N8	4″ [101]	4.57 [116]	6.09 [155]
SW3A24A44N8	5″ [127]	5.65 [144]	7.16 [182]
SW3A86A44N8	6″ [152]	6.72 [171]	8.00 [203]

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. Shielding caps are not required when terminals are installed within the recessed housing. Hardware ordered separately.

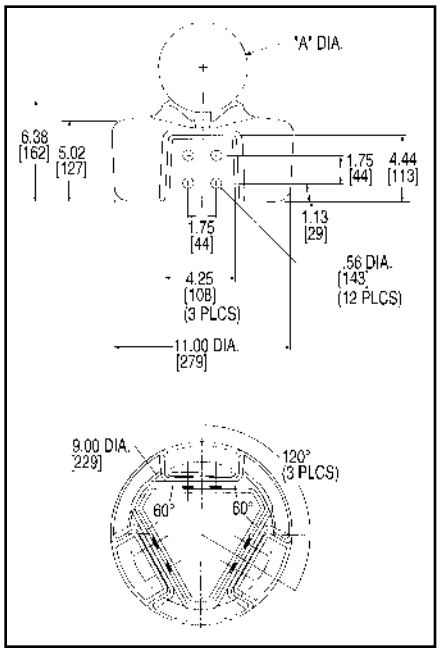
TRIFURCATING TEE CONNECTOR

SW3AB-A44N8

Weld type
Application: Bus to Trifurcating Terminals

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Cast 356 Aluminum Alloy



Catalog Number	Accommodates	
	Alum. Tubing Size	"A" Dia.
SW3AB20A44N8	3″ [76]	3.50 [89]
SW3AB22A44N8	4″ [101]	4.50 [114]
SW3AB24A44N8	5″ [127]	5.56 [141]
SW3AB86A44N8	6″ [152]	6.62 [168]

NOTES:
1. Dimensions in brackets [ ] are in millimeters.
2. Shielding caps are not required when terminals are installed within the recessed housing. Hardware ordered separately.

Blue highlighted items are industry standard and most frequently ordered.

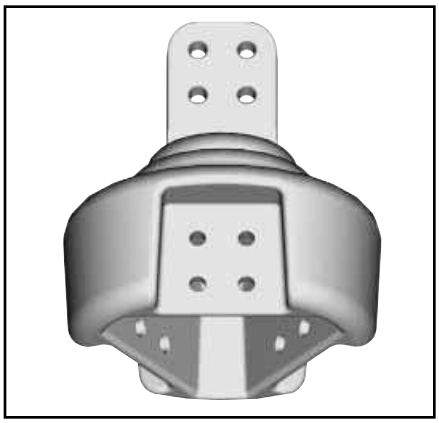
TRIFURCATING TERMINAL CONNECTOR

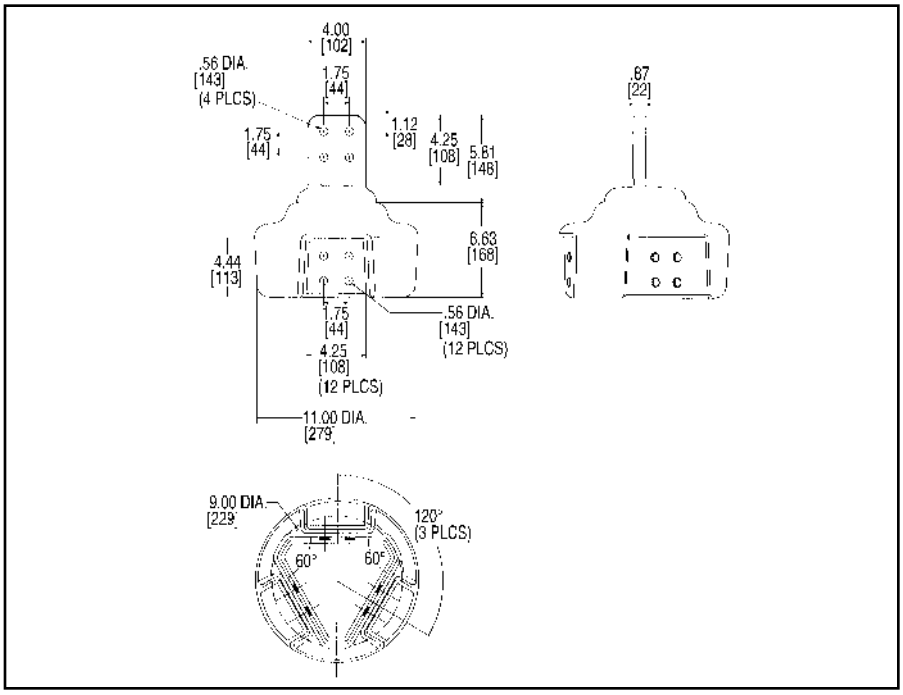
SF3A44N8

Bolted type
Application: Pad-to-Pad
Trifurcating Terminal

EHV RATED: SELF-SHIELDING UP TO 550 kV

Material: Cast 356 Aluminum Alloy





NOTES:

1. Dimensions in brackets [ ] are in millimeters.
2. One surface of pad finished. For finished pad on both sides add SUFFIX 'Q' to the catalog number (example: SF3A44N8Q).
3. Shielding caps are not required when terminals are installed within the recessed housing. Hardware ordered separately. For terminals not installed within the recessed housing shielding caps are required. Reference STS shielding caps page 32. Ordered separately.
4. For six hole NEMA external (non-recessed) pad order SF3A44N866N.