



PREFORMED LINE PRODUCTS
The connection you can count on.



THERMOLIGN® Products for ACFR® Conductor



 COMMUNICATIONS  ENERGY  SPECIAL INDUSTRIES  SOLAR

 **THERMOLIGN®**



PREFORMED LINE PRODUCTS

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History of THERMOLIGN[®] Hardware at PLP

Preformed Line Products has been involved with the design, testing and production of hardware and accessories for High Temperature Low Sag Conductors (HTLS) since 1999.

PLP registered the brand name THERMOLIGN to represent products that are intended for use on new HTLS conductor technologies that have maximum continuous operating temperatures ranging from 180° C to 250° C.

THERMOLIGN products have been designed and thoroughly tested both in the laboratory and in the field to meet the unique requirements of high temperature operation while still providing a service life of 40 to 50 years.

Since 1947, PLP has been recognized as a leader in providing innovative solutions to protect overhead line conductors from wind and ice related forces and dynamic stresses. The unique nature of the materials used in the core of many of the HTLS conductors require the extra protection provided by the THERMOLIGN hardware designs.

Both in the U.S. World Headquarters and subsidiaries throughout the world, PLP has experienced engineering personnel and world class laboratory facilities to assure that the THERMOLIGN products meet industry specifications and the special requirements for high temperature operation.





DESCRIPTION OF ACFR NAME

ACFR 121/17 - FA - TT

Aluminium Shape

- T : 1 layer Trapezoidal
- TT : 2 layer Trapezoidal
- TTT : 3 layer Trapezoidal
- R : 1 layer Round
- RR : 2 layer Round
- RRR : 3 layer Round

Aluminium Material

- FA : Fully annealed (1350-O)
- HD : Hard Drawn (1350-H19)
- T1 : AT1 (AT1/TAL)
- T3 : AT3 (AT3/ZTAL, UTAL)

Aluminium Cross-Sectional Area (mm²) / Core Area (mm²)

THERMOLIGN® Products for ACFR® Conductors

ACFR Designation	ACFR 121/17-FA-TT	ACFR 99/17-T3-RR	ACFR 149/17-FA-TT	ACFR 121/28-T3-RR	ACFR 213/28-FA-TT	ACFR 220/28-T1-TT	ACFR 244/37-T3-TT
Conductor Dia. (mm)	14.00	14.15	15.30	15.89	18.29	18.32	19.60
Conductor Dia. (in)	0.551	0.557	0.602	0.626	0.720	0.721	0.772
"ARMOR-GRIP® Suspension For line angles between 0° & 30°"	AGS-5103	AGS-5104	AGS-5106	AGS-5108	AGS-5112	AGS-5112	AGS-5115
"ARMOR-GRIP® Suspension: (EHV) 345kV and above"	NA	NA	NA	NA	NA	NA	NA
"ARMOR-GRIP® Suspension: Double For line angles between 30° & 60°"	AGS-5804	AGS-5805	AGS-5808	AGS-5809	AGS-5813	AGS-5813	AGS-5816
"ARMOR-GRIP® Suspension: Double (EHV) 345kV and above"	NA	NA	NA	NA	NA	NA	NA
ARMOR-GRIP® Support	AGS-5203	AGS-5204	AGS-5207	AGS-5208	AGS-5212	AGS-5212	AGS-5215
CUSHION-GRIP™ Suspension	CGS-1095HT	CGS-1095HT	CGS-1095HT	CGS-1096HT	CGS-1096HT	CGS-1096HT	CGS-1096HT
CUSHION-GRIP™ Support	CGS-2100HT	CGS-2100HT	CGS-2100HT	CGS-2101HT	CGS-2101HT	CGS-2101HT	CGS-2101HT
CUSHION-GRIP™ Twin Spacer, 18" Spacing	NA	NA	NA	NA	CGTS-0102HT	CGTS-0102HT	CGTS-0103HT
CUSHION-GRIP Spacer Damper (Tri Bundle)	NA	NA	NA	NA	CGSDB-34519HT	CGSDB-34519HT	CGSDB-34520HT
CUSHION-GRIP™ Spacer Damper (Quad Bundle)	NA	NA	NA	NA	CGSDB-44519HT	CGSDB-44519HT	CGSDB-44520HT
"VORTX™ Vibration Damper (for placement on AGS or AGS Support Rods)"	VSD-2025	VSD2025	VSD-2025	VSD-2032	VSD-2532	VSD-2532	VSD-2532
"VORTX™ Vibration Damper (for placement on Protector Rods)"	VSD-2025	VSD-2025	VSD-2025	VSD-2025	VSD-2532	VSD-2532	VD-2532
Protector Rods (230kV and lower)	PR-0141	PR-0141	PR-0142	PR-0144	PR-0148	PR-0146	PR-0148
Protector Rods (EHV)	NA	NA	NA	NA	NA	NA	NA
Compression Splice for ACFR Conductor	3280110	3280098	3280122	3280146	Contact PLP	3280302	3280470
Compression Deadend for ACFR Conductor	3280108	3280096	3280120	3280144	Contact PLP	3280300	3280468
Armor Rods	AR-0124	AR-0123	AR-0126	AR-0126	AR-0130	AR-0130	AR-0131
Armor Rods (EHV) 345kV and above	NA	NA	NA	NA	NA	NA	NA
Conductor Splice	LS-0134	LS-0134	LS-0136	LS-0137	LS-0140	LS-0140	LS-0142
Conductor Splice (EHV)	NA	NA	NA	NA	NA	NA	NA

THERMOLIGN® Products for ACFR® Conductors

ACFR Designation	ACFR 267/37-FA-TT	ACFR 281/37-FA-TT	ACFR 312/37-FA-TT	ACFR 325/37-FA-TT	ACFR 302/37-FA-RR	ACFR 400/71-HD-TT
Conductor Dia. (mm)	20.75	21.00	22.36	22.42	23.80	25.60
Conductor Dia. (in)	0.817	0.827	0.880	0.883	0.937	1.008
"ARMOR-GRIP® Suspension For line angles between 0° & 30°"	AGS-5116	AGS-5117	AGS-5119	AGSS-5119	AGS-5122	AGS-5126
"ARMOR-GRIP® Suspension: (EHV) 345kV and above"	NA	NA	NA	NA	AGS-5501	AGS-5505
"ARMOR-GRIP® Suspension: Double For line angles between 30° & 60°"	AGS-5818	AGS-5818	AGS-5820	AGS-5820	AGS-5823	AGS-5827
"ARMOR-GRIP® Suspension: Double (EHV) 345kV and above"	NA	NA	NA	NA	AGS-5856	AGS-5860
ARMOR-GRIP® Support	AGS-5217	AGS-5217	AGS-5219	AGS-5219	AGS-5222	AGS-5226
CUSHION-GRIP™ Suspension	CGS-1096HT	CGS-1096HT	CGS-1097HT	CGS-1096HT	CGS-1097HT	CGS-1097HT
CUSHION-GRIP™ Support	CGS-2101HT	CGS-2101HT	CGS-2102HT	CGS-2101HT	CGS-2102HT	CGS-2102HT
CUSHION-GRIP™ Twin Spacer, 18" Spacing	CGTS-0104HT	CGTS-0104HT	CGTS-0106HT	CGTS-0106HT	CGTS-0107HT	CGTS-0109HT
CUSHION-GRIP Spacer Damper (Tri Bundle)	CGSDB-34521HT	CGSDB-34521HT	CGSDB-34523HT	CGSDB-34523HT	CGSDB-34524HT	CGSDB-34526HT
CUSHION-GRIP™ Spacer Damper (Quad Bundle)	CGSDB-44521HT	CGSDB-44521HT	CGSDB-44523HT	CGSDB-44523HT	CGSDB-44524HT	CGSDB-44526HT
"VORTX™ Vibration Damper (for placement on AGS or AGS Support Rods)"	VSD-2540	VSD-2540	VSD-3540	VSD-3540	VSD-3540	VSD-4050
"VORTX™ Vibration Damper (for placement on Protector Rods)"	VSD-2532	VSD-2532	VS-3532	VSD-3532	VSD-3540	VSD-4050
Protector Rods (230kV and lower)	PR-0150	PR-0150	PR-0150	PR-0150	PR-0151	PR-0152
Protector Rods (EHV)	NA	NA	NA	NA	PR-0151E	PR-0152E
Compression Splice for ACFR Conductor	3280482	3280578	3222769	3280734	3280914	3280998
Compression Deadend for ACFR Conductor	3280480	3280576	3222761	3280732	3280912	3280996
Armor Rods	AR-0133	AR-0133	AR-0134	AR-0134	AR-0136	AR-0137
Armor Rods (EHV) 345kV and above	NA	NA	NA	NA	NA	AR-0500
Conductor Splice	LS-0143	LS-0144	LS-0146	LS-0145	LS-0147	LS-0149
Conductor Splice (EHV)	NA	NA	NA	NA	NA	NA

THERMOLIGN® Products for ACFR® Conductors

ACFR Designation	ACFR 470/56-FA-TT	ACFR 492/56-FA-TT	ACFR 540/56-FA-TTT	ACFR 679/56-FA-TTT	ACFR 665/71-FA-TTT
Conductor Dia. (mm)	27.00	28.14	29.21	31.77	31.90
Conductor Dia. (in)	1.063	1.108	1.150	1.251	1.256
*ARMOR-GRIP® Suspension For line angles between 0° & 30°"	AGS-5128	AGS-5130	AGS-5132	AGS-5136	AGS-5136
*ARMOR-GRIP® Suspension: (EHV) 345kV and above"	AGS-5507	AGS-5509	AGS-5511	AGS-5515	AGS-5515
*ARMOR-GRIP® Suspension: Double For line angles between 30° & 60°"	AGS-5829	AGS-5832	AGS-5833	AGS-5837	AGS-5837
*ARMOR-GRIP® Suspension: Double (EHV) 345kV and above"	AGS-5862	AGS-5865	AGS-5866	AGS-5870	AGS-5870
ARMOR-GRIP® Support	AGS-5228	AGS-5231	AGS-5232	AGS-5236	AGS-5236
CUSHION-GRIP™ Suspension	CGS-1097HT	CGS-1097HT	CGS-1097HT	CGS-1098HT	CGS-1098HT
CUSHION-GRIP™ Support	CGS-2102HT	CGS-2102HT	CGS-2102HT	CGS-2103HT	CGS-2103HT
CUSHION-GRIP™ Twin Spacer, 18" Spacing	CGTS-0110HT	CGTS-0112HT	CGTS-0113HT	CGTS-0115HT	CGTS-0115HT
CUSHION-GRIP™ Spacer Damper (Tri Bundle)	CGSDB-34527HT	CGSDB-34529HT	CGSDB-34530HT	CGSDB-34532HT	CGSDB-34532HT
CUSHION-GRIP™ Spacer Damper (Quad Bundle)	CGSDB-44527HT	CGSDB-44529HT	CGSDB-44530HT	CGSDB-44532HT	CGSDB-44532HT
*VORTX™ Vibration Damper (for placement on AGS or AGS Support Rods)"	VSD-4050	VSD-4050	VSD-4050	VSD-4061	VSD-4061
*VORTX™ Vibration Damper (for placement on Protector Rods)"	VSD-4050	VSD-4050	VSD-4050	VSD-4050	VSD-4050
Protector Rods (230kV and lower)	PR-0154	PR-0156	PR-0156	PR-0158	PR-0158
Protector Rods (EHV)	PR-0154E	PR-0156E	PR-0156E	PR-0158E	PR-0158E
Compression Splice for ACFR Conductor	3281130	3281298	3222780	3281730	3281754
Compression Deadend for ACFR Conductor	3281128	3281296	3222772	3281728	3281752
Armor Rods	AR-0139	AR-0141	AR-0142	AR-0144	AR-0144
Armor Rods (EHV) 345kV and above	AR-0502	AR-0504	AR-0505	AR-0507	AR-0507
Conductor Splice	LS-0150	LS-0151	LS-0152	LS-0154	LS-0154
Conductor Splice (EHV)	NA	LSMS4854	LSMS6275	LSMS8338	LSMS8338

Compression Dead-end Jumper for ACFR Conductors

ACFR Dead-ends



Catalog Number	ACFR Code Name	Diameter	
		(mm)	(in)
3280108	ACFR 127/17-FA-TT	14.00	0.551
3280096	ACFR 99/17-T3-RR	14.15	0.557
3280120	ACFR 149/17-FA-TT	15.30	0.602
3280144	ACFR 121/28-T3-RR	15.89	0.626
3280300	ACFR 220/28-T1-TT	18.32	0.721
3280468	ACFR 244/37-T3-TT	19.60	0.772
3280480	ACFR 267/37-FA-TT	20.75	0.817
3280576	ACFR 281/37-FA-TT	21.00	0.827
3222761	ACFR 312/37-FA-TT	22.36	0.880
3280732	ACFR 325/37-FA-TT	22.42	0.883
3280912	ACFR 302/37-FA-RR	23.80	0.937
3280996	ACFR 400/71-HD-TT	25.60	1.008
3281128	ACFR 470/56-FA-TT	27.00	1.063
3281296	ACFR 492/56-FA-TT	28.14	1.108
3222772	ACFR 540/56-FA-TTT	29.21	1.150
3281728	ACFR 679/56-FA-TTT	31.77	1.251
3281752	ACFR 665/71-FA-TTT	31.90	1.256

Compression Splices for ACFR Conductors

ACFR Conductors

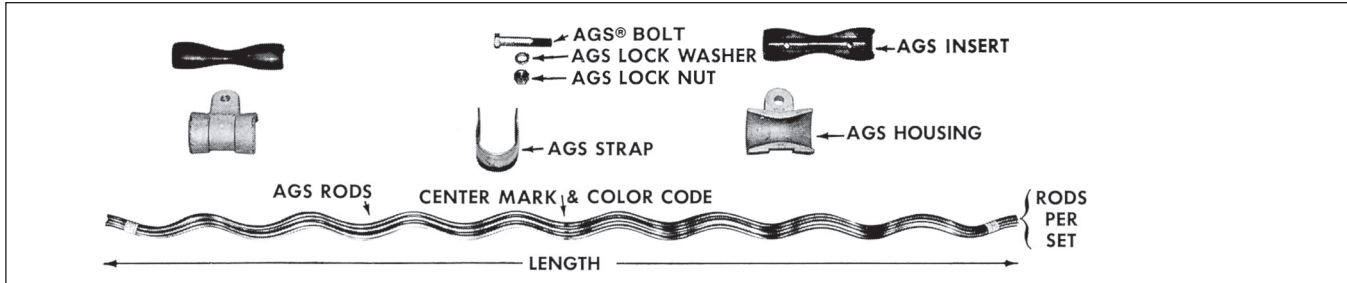


Catalog Number	ACFR Code Name	Diameter	
		(mm)	(in)
3280110	ACFR 127/17-FA-TT	14.00	0.551
3280098	ACFR 99/17-T3-RR	14.15	0.557
3280122	ACFR 149/17-FA-TT	15.30	0.602
3280146	ACFR 121/28-T3-RR	15.89	0.626
3280302	ACFR 220/28-T1-TT	18.32	0.721
3280470	ACFR 244/37-T3-TT	19.60	0.772
3280482	ACFR 267/37-FA-TT	20.75	0.817
3280578	ACFR 281/37-FA-TT	21.00	0.827
3222769	ACFR 312/37-FA-TT	22.36	0.880
3280734	ACFR 325/37-FA-TT	22.42	0.883
3280914	ACFR 302/37-FA-RR	23.80	0.937
3280998	ACFR 400/71-HD-TT	25.60	1.008
3281130	ACFR 470/56-FA-TT	27.00	1.063
3281298	ACFR 492/56-FA-TT	28.14	1.108
3222780	ACFR 540/56-FA-TTT	29.21	1.150
3281730	ACFR 679/56-FA-TTT	31.77	1.251
3281754	ACFR 665/71-FA-TTT	31.90	1.256

AGS-200 Suspension

NOMENCLATURE

Thermal Rating (Continuous) 200°C



AGS® Bolt, Washer, Lock Nut: Galvanized Steel.

AGS Strap: High-Strength Aluminum Alloy.

AGS Insert: An elastomer specifically formulated for resistance to ozone attack, weathering, extreme high and low temperature variations, and compression set. An aluminum alloy reinforcement is molded into the elastomer.



AGS Housing: High-Strength Aluminum Alloy Casting.

AGS Rods: Aluminum Alloy
Standard Armor Rods have dimensions which are different from AGS Rods and cannot be substituted.

Ball End Rod: Rod has a Ball End for non-EHV application. PARROT-BILL® ends are supplied for EHV application (345kV and above).

GENERAL RECOMMENDATIONS

The AGS-200 Suspension has passed the “Sequential Mechanical Testing of Conductor Designs with Composite Cores”, and has more than 60 years of proven performance. The unique design utilizing elastomer inserts and rods greatly reduces static and dynamic stresses on the conductor at supporting structures.

VERTICAL ULTIMATE STRENGTH. Refer to dimensional tables in this section.

SLIP LOAD. When initially installed, the AGS-200 Suspension Unit has a slip load of approximately 20% of the conductor RBS and approximately 10% of the EHS strands rated breaking strength (RBS) during unbalanced load conditions, but significantly higher loads can be expected after the unit has been in service for a period of time.

THERMAL RATING. The AGS-200 Suspension is designed for 200° C continuous conductor temperature.

LINE ANGLE. The maximum recommended line angle for a single support AGS-200 Unit is 30°. For angles between 30° and 60°, the AGS-200 Suspension: Double is recommended.

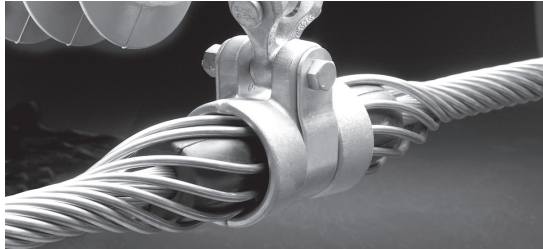
AGS-200 Suspension

DESIGN MODIFICATIONS

AGS-200 Suspension: PARROT-BILL® Ends

To meet the corona onset and RIV requirements for most extra-high-voltage applications (345kV and above), PARROT-BILL Ends are to be used instead of the standard ball-end rods.

For use on ACFR® Conductor

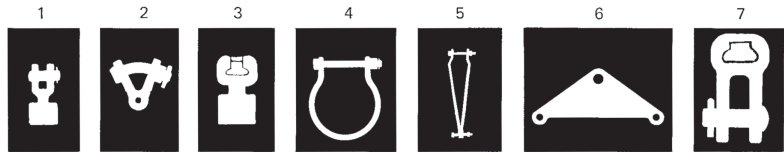


AGS HARDWARE and FITTINGS

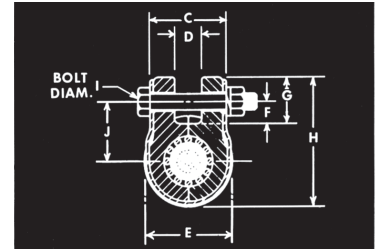
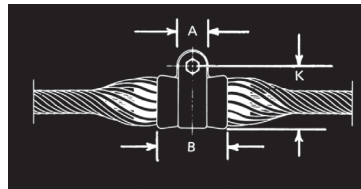
PLP offers a complete line of fittings designed for use with the AGS-200 Suspension. See this section for details.



Shown below is the Clevis Eye (1), Y Clevis Eye (2), Socket Eye (3), Hold-Down Weight Shackle (4), Vertical Bundling Link Assembly (5), Yoke Plate (6), and Socket Clevis (7).



DIMENSIONAL TABLES



Conductor Range Min Max in (mm)	Dimension Inches (mm)											Vertical Ultimate Strength Pounds (kN)
	A	B	C	D	E	F	G	H	I	J	K	
0.543 - 0.645 (13.8 - 16.4)	1-3/4 (44.5)	3-1/2 (88.9)	2-5/32 (53.2)	21/32 (16.7)	21/32 (16.7)	2-5/8 (66.7)	1-1/32 (29.2)	4-3/16 (106.4)	5/8 (15.9)	1-15/16 (49.2)	3-1/4 (82.6)	10,000 (44.5)
0.646 - 0.750 (16.4 - 19.1)	1-3/4 (44.5)	3-3/4 (95.3)	2-1/4 (57.2)	3/4 (19.1)	2-13/16 (71.4)	1 (25.4)	1-7/8 (47.6)	4-7/16 (112.7)	5/8 (15.9)	2-5/32 (54.8)	3-9/16 (90.5)	15,000 (66.7)
0.751 - 0.907 (19.1 - 23.0)	2 (50.8)	4-17/32 (115.1)	2-11/16 (68.3)	7/8 (22.2)	3-5/16 (84.1)	1 (25.4)	2 (50.8)	5 (127.0)	5/8 (15.9)	2-11/32 (59.5)	4 (101.6)	20,000 (89.0)
0.908 - 1.005 (23.1 - 25.5)	2 (50.8)	5 (127.0)	2-15/16 (74.6)	7/8 (22.2)	3-11/16 (93.7)	1 (25.4)	2 (50.8)	5-3/8 (136.5)	5/8 (15.9)	2-17/32 (64.3)	4-3/8 (111.1)	20,000 (89.0)
1.006 - 1.208 (25.6 - 30.7)	2-1/4 (57.2)	5-1/2 (139.7)	3-1/2 (88.9)	1-3/16 (30.2)	4-5/32 (105.6)	1 (25.4)	2-1/8 (54.0)	5-29/32 (150.0)	5/8 (15.9)	2-45/64 (68.7)	4-25/32 (121.4)	25,000 (111.2)
1.209 - 1.355 (30.7 - 34.4)	2-1/4 (57.2)	6 (152.4)	3-5/8 (92.1)	1-1/4 (31.8)	4-13/16 (122.2)	1-1/4 (31.8)	2-3/8 (60.3)	6-11/16 (169.9)	3/4 (19.1)	3-5/32 (80.2)	5-9/16 (141.3)	25,000 (111.2)
1.356 - 1.557 (34.4 - 39.5)	2-1/4 (57.2)	6-1/2 (165.1)	4-1/8 (104.8)	1-3/8 (34.9)	5-1/16 (128.6)	1-1/8 (28.6)	2-1/4 (57.2)	6-5/8 (168.3)	3/4 (19.1)	2-31/32 (75.4)	5-1/2 (139.7)	25,000 (111.2)
1.558 - 1.882 (39.6 - 47.8)	2-1/2 (63.5)	7 (177.8)	4-11/16 (119.1)	2-1/4 (57.2)	5-19/32 (142.1)	1-1/8 (28.6)	2-3/8 (60.3)	7-1/4 (184.2)	3/4 (19.1)	3-3/16 (81.0)	6 (152.4)	25,000 (111.2)
1.883 - 2.233 (47.8 - 56.7)	2-1/2 (63.5)	7-1/2 (190.5)	5-7/32 (132.6)	2-13/32 (61.1)	6-1/16 (154.0)	1-3/16 (27.8)	2-7/16 (61.9)	7-25/32 (197.6)	3/4 (19.1)	3-1/2 (88.9)	6-17/32 (165.9)	30,000 (133.4) (2)

EXPLANATORY NOTE:

AGS-200 Rod length and diameter for individual sizes can be taken from the catalog number tables.



AGS-200 Suspension

Catalog Number		Conductor Diameter Range in (mm)		AGS® Rods				Hardware Sets Per Carton	AGS Rods & Hardware Wt/Lbs. (kg) Per Carton	Color Code
Standard	EHV (345kV & Above)			Length in (m)	Rod Diameter in (mm)	Rods Per Set	Sets Per Carton			
		Min	Max							
AGS-5107	N/A	0.607 (15.4)	0.619 (15.7)	46 (1.17)	0.182 (4.6)	11	18	18	56 (25.4)	Purple
AGS-5108	N/A	0.620 (15.7)	0.645 (16.4)	50 (1.27)	0.182 (4.6)	12	18	18	61 (27.7)	Red
AGS-5109	N/A	0.646 (16.4)	0.673 (17.1)	54 (1.37)	0.204 (5.2)	11	15	15	60 (27.2)	Blue
AGS-5110	N/A	0.674 (17.1)	0.690 (17.5)	54 (1.37)	0.204 (5.2)	11	15	15	61 (27.7)	Green
AGS-5111	N/A	0.691 (17.6)	0.710 (18.0)	54 (1.37)	0.204 (5.2)	12	15	15	64 (29.0)	Yellow
AGS-5112	N/A	0.711 (18.1)	0.731 (18.6)	55 (1.40)	0.204 (5.2)	12	15	15	65 (29.5)	Black
AGS-5113	N/A	0.732 (18.6)	0.750 (19.1)	56 (1.42)	0.204 (5.2)	12	15	15	66 (29.9)	White
AGS-5114	N/A	0.751 (19.1)	0.768 (19.5)	60 (1.52)	0.250 (6.4)	10	12	12	68 (30.8)	Brown
AGS-5115	N/A	0.769 (19.5)	0.795 (20.2)	60 (1.52)	0.250 (6.4)	11	12	12	68 (30.8)	Orange
AGS-5116	N/A	0.796 (20.2)	0.824 (20.9)	61 (1.55)	0.250 (6.4)	11	12	12	73 (33.1)	Purple
AGS-5117	N/A	0.825 (21.0)	0.845 (21.5)	64 (1.63)	0.250 (6.4)	11	12	12	76 (34.5)	Red
AGS-5118	N/A	0.846 (21.5)	0.870 (22.1)	64 (1.63)	0.25 (6.4)	11	12	12	76 (34.5)	Blue
AGS-5122	AGS-5501	0.921 (23.4)	0.937 (23.8)	66 (1.68)	0.25 (6.4)	12	9	9	81 (36.7)	Black
AGS-5125	AGS-5504	0.987 (25.1)	1.005 (25.5)	69 (1.75)	0.25 (6.4)	13	9	9	87 (39.5)	Orange
AGS-5130	AGS-5509	1.091 (27.7)	1.118 (28.4)	82 (2.08)	0.31 (7.9)	12	6	6	78 (35.4)	Yellow
AGS-5134	AGS-5513	1.176 (29.9)	1.208 (30.7)	82 (2.08)	0.31 (7.9)	12	6	6	79 (35.8)	Orange
AGS-5139	AGS-5518	1.315 (33.4)	1.355 (34.4)	88 (2.24)	0.365 (9.3)	12	3	3	58 (26.3)	Yellow
AGS-5144	AGS-5523	1.478 (37.5)	1.516 (38.5)	88 (2.24)	0.365 (9.3)	13	3	3	64 (29.0)	Purple
AGS-5147	AGS-5526	1.580 (40.1)	1.612 (40.9)	100 (2.54)	0.365 (9.3)	14	3	3	78 (35.4)	Green
AGS-5152	AGS-5531	1.753 (44.5)	1.790 (45.5)	100 (2.54)	0.365 (9.3)	15	3	3	83 (37.6)	Orange

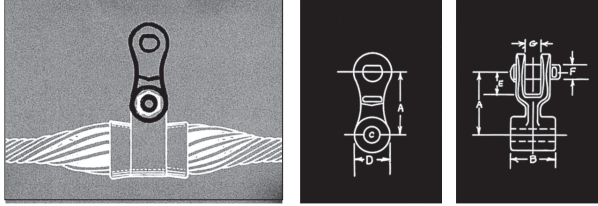
Note: Add SE to catalog number to add Socket Eye (SE-xxxx)

Add YC to catalog number to add Y-Clevis Eye (YC-xxxx)

Add CE to catalog number to add Clevis Eye (CE-xxxx)

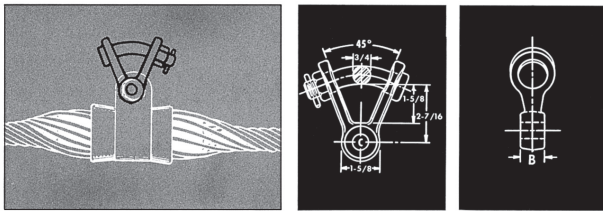
AGS-200 Suspension: Fittings

CLEVIS EYE



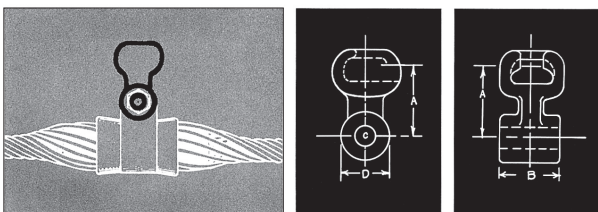
Catalog Number	Conductor Diameter Range		General Dimensions						Vertical Ultimate Strength Pounds (kN)	Wt. Per 100 Units Pounds (kg)	
	Min in (mm)	Max in (mm)	A in (mm)	B in (mm)	C in (mm)	D in (mm)	E in (mm)	F in (mm)			G in (mm)
CE-5259	0.272 - 0.750 (6.9 - 19.1)		3-1/8 (79.4)	1/2 (12.7)	11/16 (17.5)	1-1/2 (38.1)	1-1/2 (38.1)	5/8 (15.9)	13/16 (20.6)	15,000 (66.7)	104 (47.2)
CE-5261	0.751 - 1.005 (19.1 - 25.5)		3-1/8 (79.4)	3/4 (19.1)	11/16 (17.5)	1-1/2 (38.1)	1-1/2 (38.1)	5/8 (15.9)	13/16 (20.6)	20,000 (89.0)	104 (47.2)
CE-5105	1.006 - 1.557 (25.6 - 39.5)		3-1/8 (79.4)	1-1/16 (27.0)	13/16 (20.6)	1-1/2 (38.1)	1-1/2 (38.1)	5/8 (15.9)	13/16 (20.6)	25,000 (111.2)	178 (80.7)
CE-5106	1.558 - 2.233 (39.6 - 56.7)		3-1/8 (79.4)	2-1/8 (54.0)	13/16 (20.6)	1-1/2 (38.1)	1-1/2 (38.1)	5/8 (15.9)	13/16 (20.6)	25,000 (111.2)	178 (80.7)

Y CLEVIS EYE



Catalog Number	Conductor Diameter Range		General Dimensions		Vertical Ultimate Strength Pounds (kN)
	Min in (mm)	Max in (mm)	B in. (mm)	C in. (mm)	
YC-5206	0.272 - 0.750 (6.9 - 19.1)		5/8 (15.9)	11/16 (17.5)	15,000 (66.7)
YC-5207	0.751 - 1.005 (19.1 - 25.5)		3/4 (19.1)	11/16 (17.5)	20,000 (89.0)
YC-5209	1.006 - 1.557 (25.6 - 39.5)		1-1/16 (27.0)	13/16 (20.6)	25,000 (111.2)
YC-5211	1.558 - 2.233 (39.6 - 56.7)		2-1/8 (54.0)	13/16 (20.6)	25,000 (111.2)

SOCKET EYE

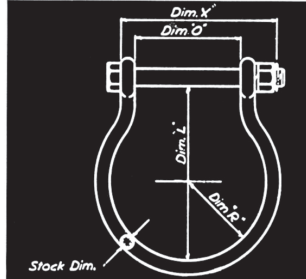
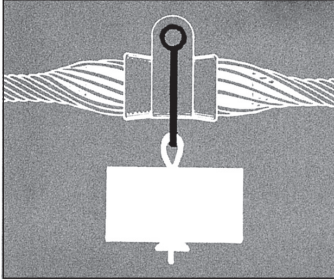


Catalog Number	Conductor Diameter Range		General Dimensions				Vertical Ultimate Strength Pounds (kN)	Wt. Per 100 Units Pounds (kg)
	Min in (mm)	Max in (mm)	A in (mm)	B in (mm)	C in (mm)	D in (mm)		
SE-5150	0.272 - 0.750 (6.9 - 19.1)		2-5/16 (58.7)	1/2 (12.7)	11/16 (17.5)	1-1/2 (38.1)	15,000 (66.7)	165 (74.8)
SE-5152	0.751 - 1.005 (19.1 - 25.5)		2-5/16 (58.7)	3/4 (19.1)	11/16 (17.5)	1-1/2 (38.1)	25,000 (111.2)	165 (74.8)
SE-5154	1.006 - 1.557 (25.6 - 39.5)		2-5/16 (58.7)	1-1/16 (27.0)	13/16 (20.6)	1-1/2 (38.1)	25,000 (111.2)	178 (80.7)
SE-5155	1.558 - 2.233 (39.6 - 56.7)		2-5/16 (58.7)	2-1/8 (54.0)	13/16 (20.6)	1-1/2 (38.1)	30,000 (133.4)	178 (80.7)



AGS-200 Suspension: Fittings

Hold Down Weight Shackles*



Hughes Brothers, Inc.

ORDERING INSTRUCTIONS

For: Hold-Down Weight Shackles

Order directly from: **Hughes Brothers, Inc.**
 210 North 13th Street
 P.O. Box 191
 Seward, Nebraska 68424
 Telephone: (402) 643-2991

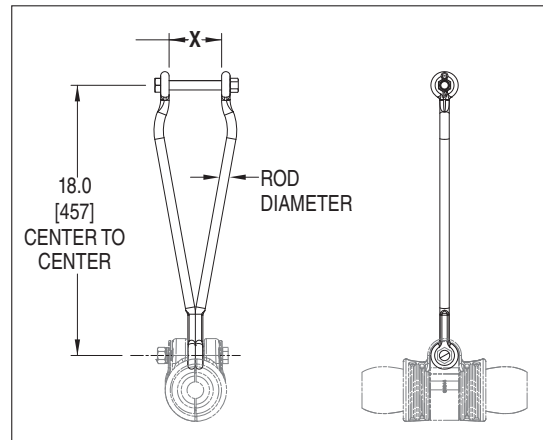
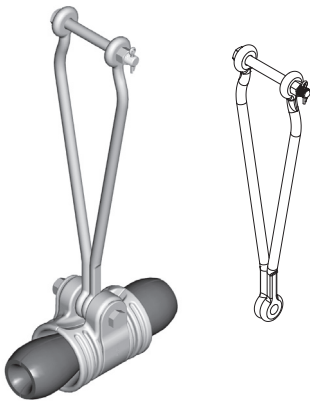
Price and delivery information available from Hughes Brothers, Inc., upon request.

ARMOR-GRIP® Suspension Conductor Range in (mm)	Hughes Brothers Stock No. †	Bolt Diameter in (mm)	Stock Dim. in (mm)	Dim. "X" in (mm)	Dim. "O" in (mm)	Dim. "L" in (mm)	Dim. "R" in (mm)	Maximum Hold Down Weight Lbs. (kg)
0.482 - 0.750 (12.2 - 19.1)	1888.2	5/8 (15.9)	1/2 (12.7)	4-3/8 (111.1)	2-3/8 (60.3)	4-7/8 (123.8)	1-7/8 (47.6)	300 (136.1)
0.751 - 0.907 (19.1 - 23.0)	1888.3	5/8 (15.9)	1/2 (12.7)	4-3/4 (130.2)	2-3/4 (69.9)	5-3/8 (136.5)	2-3/8 (60.3)	300 (136.1)
0.908 - 1.005 (23.1 - 25.6)	1888.4	5/8 (15.9)	1/2 (12.7)	5-1/8 (130.2)	3-1/8 (79.4)	5-1/2 (139.7)	2-1/2 (63.5)	300 (136.1)
1.006 - 1.208 (25.6 - 30.7)	1888.5	5/8 (15.9)	1/2 (12.7)	5-3/4 (146.1)	3-3/4 (95.3)	6-1/8 (155.6)	2-3/4 (69.9)	300 (136.1)
1.209 - 1.355 (30.7 - 34.4)	1888.6	3/4 (19.1)	5/8 (15.9)	6 (152.4)	3-3/4 (95.3)	6-1/4 (158.8)	3 (76.2)	800 (362.8)
1.356 - 1.557 (34.4 - 39.5)	1888.7	3/4 (19.1)	5/8 (15.9)	6-1/2 (165.1)	4-1/4 (108.0)	6-1/2 (165.1)	3 (76.2)	800 (362.8)
1.558 - 1.828 (39.6 - 46.4)	1888.8	3/4 (19.1)	5/8 (15.9)	7-1/8 (181.0)	4-7/8 (123.8)	7-1/4 (184.2)	3-1/4 (82.6)	800 (362.8)

† Each assembly consists of a shackle body and hex-head bolt, lockwasher, nut, and Cotter Key.

* SPECIAL PRODUCT sold by Hughes Brothers, Inc., Seward, Nebraska.

Vertical Bundling Link



X = This dimension is sized appropriately for the corresponding AGS unit. Dimensions of the AGS unit can be found on page 1-3.

Catalog Number	Conductor Diameter Range Min Max in (mm)	Rod Diameter in (mm)	Bolt Diameter in (mm)	Center to Center in (mm)	Rated Strength (per Sub-Conductor)
VBL-04	0.751 - 0.907 (19.0 - 23.0)	5/8 (15.8)	5/8 (15.8)	18 (457)	20,000#
VBL-05	0.908 - 1.005 (23.0 - 25.5)	5/8 (15.8)	5/8 (15.8)	18 (457)	20,000#
VBL-06	1.006 - 1.208 (25.5 - 30.6)	5/8 (15.8)	5/8 (15.8)	18 (457)	25,000#
VBL-07	1.209 - 1.355 (30.6 - 34.4)	3/4 (19.0)	3/4 (19.0)	18 (457)	30,000#
VBL-08	1.356 - 1.557 (34.4 - 39.5)	3/4 (19.0)	3/4 (19.0)	18 (457)	30,000#
VBL-09	1.558 - 1.882 (39.5 - 47.8)	3/4 (19.0)	3/4 (19.0)	18 (457)	30,000#
VBL-10	1.883 - 2.233 (47.8 - 56.7)	3/4 (19.0)	3/4 (19.0)	18 (457)	30,000#

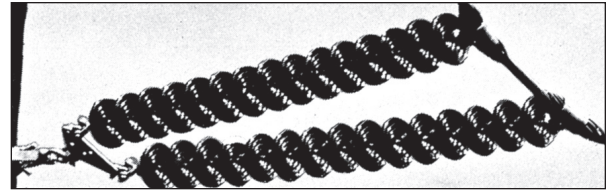
Also available in 12" vertical sparing. Add -12 to catalog number (example: VBL-06-12).

Each assembly consists of two links, one bolt for top AGS, one lock washer and one locknut.

AGS-200 Suspension: Double

For Line Angles Between 30° and 60°

For use on ACFR® Conductor



Catalog Number		Conductor Diameter Range Min Max in (mm)	AGS® Rods				Hardware Sets Per Carton	Rod & Hardware Wt./Lbs. (kg) Per Carton	Color Code
Standard	EHV (345kV and above)		Length in (m)	Rod in (mm)	Rods Per Set	Sets Per Carton			
AGS-5808	N/A	0.607 - 0.619 (15.4 - 15.7)	58 (1.5)	0.182 (4.6)	11	18	36	92 (41.7)	Purple
AGS-5809	N/A	0.620 - 0.645 (15.7 - 16.4)	66 (1.7)	0.182 (4.6)	12	18	36	92 (41.7)	Red
AGS-5810	N/A	0.646 - 0.673 (16.4 - 17.1)	72 (1.8)	0.204 (5.2)	11	15	30	98 (44.5)	Blue
AGS-5811	N/A	0.674 - 0.690 (17.1 - 17.5)	72 (1.8)	0.204 (5.2)	11	15	30	100 (45.4)	Green
AGS-5812	N/A	0.691 - 0.710 (17.6 - 18.1)	72 (1.8)	0.204 (5.2)	12	15	30	105 (47.6)	Yellow
AGS-5813	N/A	0.711 - 0.731 (18.1 - 18.6)	72 (1.8)	0.204 (5.2)	12	15	30	105 (47.6)	Black
AGS-5814	N/A	0.732 - 0.750 (18.6 - 19.1)	72 (1.8)	0.204 (5.2)	10	12	30	105 (47.6)	White
AGS-5815	N/A	0.751 - 0.768 (19.1 - 19.5)	78 (2.0)	0.25 (6.4)	11	12	24	110 (49.9)	Brown
AGS-5816	N/A	0.769 - 0.795 (19.5 - 20.2)	78 (2.0)	0.25 (6.4)	11	12	24	110 (49.9)	Orange
AGS-5817	N/A	0.796 - 0.824 (20.2 - 20.9)	78 (2.0)	0.25 (6.4)	11	12	24	114 (51.7)	Purple
AGS-5818	N/A	0.825 - 0.845 (21.0 - 21.5)	82 (2.1)	0.25 (6.4)	11	12	24	119 (53.4)	Red
AGS-5819	N/A	0.846 - 0.870 (21.5 - 22.1)	82 (2.1)	0.25 (6.4)	11	12	24	119 (53.4)	Blue
AGS-5820	N/A	0.871 - 0.893 (22.1 - 22.7)	82 (2.1)	0.25 (6.4)	11	12	24	126 (57.2)	Green
AGS-5821	N/A	0.894 - 0.907 (22.7 - 23.0)	82 (2.1)	0.25 (6.4)	12	12	24	126 (57.2)	Green
AGS-5822	N/A	0.908 - 0.920 (23.1 - 23.4)	90 (2.3)	0.25 (6.4)	12	9	18	133 (60.3)	Yellow
AGS-5823	AGS-5856	0.921 - 0.937 (23.4 - 23.8)	90 (2.3)	0.25 (6.4)	12	9	18	110 (49.9)	Black
AGS-5824	N/A	0.938 - 0.962 (23.8 - 24.4)	90 (2.3)	0.25 (6.4)	12	9	18	110 (49.9)	White
AGS-5825	N/A	0.963 - 0.986 (24.4 - 25.0)	90 (2.3)	0.25 (6.4)	13	9	18	115 (52.2)	Brown
AGS-5826	AGS-5859	0.987 - 1.005 (25.1 - 25.5)	90 (2.3)	0.25 (6.4)	13	9	18	114 (51.7)	Orange
AGS-5827	N/A	1.006 - 1.022 (25.6 - 26.0)	108 (2.7)	0.31 (7.9)	11	6	12	117 (53.1)	Purple
AGS-5828	N/A	1.023 - 1.040 (26.0 - 26.4)	108 (2.7)	0.31 (7.9)	11	6	12	117 (53.1)	Red
AGS-5829	N/A	1.041 - 1.074 (26.4 - 27.3)	108 (2.7)	0.31 (7.9)	11	6	12	117 (53.1)	Blue

Thermal Rating

The AGS-200 Suspension: Double is designed for 200°C continuous conductor temperature.

AGS-200 Suspension: Double



For Line Angles Between 30° and 60°

For use on ACSR® Conductor

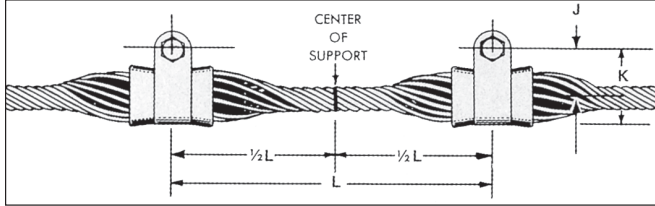
Catalog Number		Conductor Diameter Range Min Max in (mm)	AGS® Rods				Hardware Sets Per Carton	Rod & Hardware Wt./Lbs. (kg) Per Carton	Color Code
Standard	EHV (345kV and above)		Length in (m)	Rod in (mm)	Rods Per Set	Sets Per Carton			
AGS-5830	N/A	1.075 - 1.090 (27.3 - 27.7)	108 (2.7)	0.31 (7.9)	12	6	12	122 (55.3)	Green
AGS-5831	AGS-5864	1.091 - 1.118 (27.7 - 28.4)	108 (2.7)	0.31 (7.9)	12	6	12	119 (53.4)	Yellow
AGS-5832	N/A	1.119 - 1.136 (28.4 - 28.9)	108 (2.7)	0.31 (7.9)	12	6	12	123 (55.8)	Black
AGS-5833	N/A	1.137 - 1.152 (28.9 - 29.3)	108 (2.7)	0.31 (7.9)	12	6	12	123 (55.8)	White
AGS-5834	N/A	1.153 - 1.175 (28.9 - 29.3)	108 (2.7)	0.31 (7.9)	12	6	12	123 (55.8)	Brown
AGS-5835	AGS-5868	1.176 - 1.208 (29.9 - 30.7)	108 (2.7)	0.31 (7.9)	12	6	12	119 (53.4)	Orange
AGS-5836	N/A	1.209 - 1.226 (30.7 - 31.1)	117 (3.0)	0.37 (9.3)	11	3	6	86 (39.0)	Purple
AGS-5837	N/A	1.227 - 1.259 (31.2 - 32.0)	117 (3.0)	0.37 (9.3)	11	3	6	86 (39.0)	Red
AGS-5838	N/A	1.260 - 1.286 (32.0 - 32.7)	117 (3.0)	0.37 (9.3)	12	3	6	90 (40.8)	Blue
AGS-5839	N/A	1.287 - 1.314 (32.7 - 33.4)	117 (3.0)	0.37 (9.3)	12	3	6	90 (40.8)	Green
AGS-5840	AGS-5873	1.315 - 1.355 (33.4 - 34.4)	117 (3.0)	0.37 (9.3)	12	3	6	126 (57.16)	Yellow
AGS-5841	N/A	1.356 - 1.394 (34.4 - 35.4)	120 (3.0)	0.37 (9.3)	12	3	6	96 (43.5)	Black
AGS-5842	N/A	1.395 - 1.416 (35.4 - 36.0)	120 (3.0)	0.37 (9.3)	13	3	6	100 (45.4)	White
AGS-5843	N/A	1.417 - 1.442 (36.0 - 36.6)	120 (3.0)	0.37 (9.3)	13	3	6	100 (45.4)	Brown
AGS-5844	N/A	1.443 - 1.477 (36.7 - 37.5)	120 (3.0)	0.37 (9.3)	13	3	6	100 (45.4)	Orange
AGS-5845	AGS-5878	1.478 - 1.516 (37.5 - 38.5)	120 (3.0)	0.37 (9.3)	13	3	6	100 (45.4)	Purple
AGS-5846	N/A	1.517 - 1.557 (38.5 - 39.5)	120 (3.0)	0.37 (9.3)	13	3	6	100 (45.4)	Red
AGS-5847	N/A	1.558 - 1.579 (39.6 - 40.1)	137 (3.5)	0.37 (9.3)	14	3	6	125 (56.7)	Blue
AGS-5848	AGS-5881	1.580 - 1.612 (40.1 - 40.9)	137 (3.5)	0.37 (9.3)	14	3	6	125 (56.7)	Green
AGS-5849	N/A	1.613 - 1.650 (41.0 - 41.9)	137 (3.5)	0.37 (9.3)	14	3	6	126 (57.2)	Yellow
AGS-5850	N/A	1.651 - 1.688 (41.9 - 42.9)	137 (3.5)	0.37 (9.3)	15	3	6	131 (59.4)	Black
AGS-5851	N/A	1.689 - 1.711 (42.9 - 43.5)	137 (3.5)	0.37 (9.3)	15	3	6	131 (59.4)	White
AGS-5852	N/A	1.712 - 1.752 (43.5 - 44.5)	137 (3.5)	0.37 (9.3)	15	3	6	131 (59.4)	Brown
AGS-5853	AGS-5886	1.753 - 1.790 (44.5 - 45.5)	137 (3.5)	0.37 (9.3)	15	3	6	131 (59.4)	Orange
AGS-5854	N/A	1.791 - 1.828 (43.5 - 44.5)	137 (3.5)	0.37 (9.3)	15	3	6	131 (59.4)	Purple

Thermal Rating

The AGS-200 Suspension: Double is designed for 200°C continuous conductor temperature.

AGS-200 Suspension: Double

DIMENSIONAL TABLES

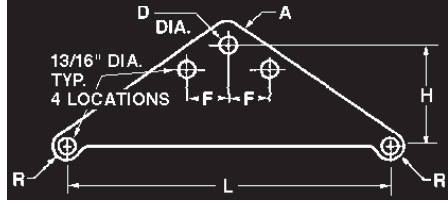
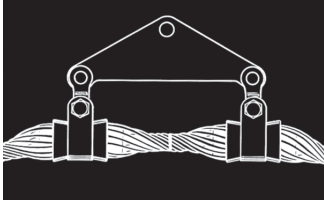


Conductor Range in. (mm)	Dimensions			Vertical Ultimate Strength Pounds/ (kN)
	J in (mm)	K in (mm)	L in (mm)	
0.543 - 0.619 (16.4 - 19.1)	1-15/16 (25.4)	3-1/4 (76.2)	12 (304.8)	20,000 (88.9)
0.620 - 0.645 (16.4 - 19.1)	1-15/16 (25.4)	3-1/4 (76.2)	18 (457.2)	20,000 (88.9)
0.646 - 0.750 (16.4 - 19.1)	2-5/32 (54.8)	3-9/16 (90.5)	18 (457.2)	30,000 (133.4)
0.751 - 0.907 (19.1 - 23.0)	2-11/32 (59.5)	4 (101.6)	18 (457.2)	40,000 (177.9)
0.908 - 1.005 (23.1 - 25.5)	2-17/32 (64.3)	4-3/8 (111.1)	22 (558.8)	40,000 (177.9)
1.006 - 1.208 (25.6 - 30.7)	2-45/64 (68.7)	4-25/32 (121.4)	26 (660.4)	50,000 (222.4)
1.209 - 1.355 (30.7 - 34.4)	3-5/32 (80.2)	5-9/16 (141.3)	29 (736.6)	50,000 (222.4)
1.356 - 1.557 (34.4 - 39.5)	2-31/32 (75.4)	5-1/2 (139.7)	32 (812.8)	50,000 (222.4)
1.558 - 1.882 (39.6 - 47.8)	3-3/16 (81.0)	6 (152.4)	37 (939.8)	50,000 (222.4)
1.883 - 2.233 (47.8 - 56.6)	3-1/2 (88.9)	6-17/32 (152.4)	42 (1066.8)	60,000 (266.8)



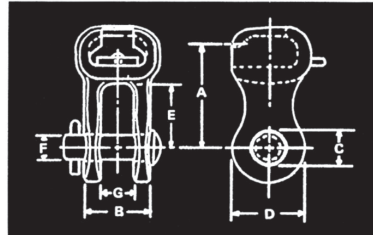
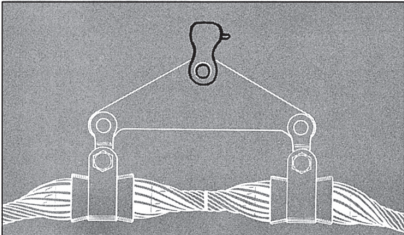
AGS-200 Suspension: Double

Yoke Plate



Catalog Number	Dimensions						Plate Thickness in (mm)	Ultimate Strength Pounds (kN)
	L in (mm)	H in (mm)	D in (mm)	R in (mm)	A in (mm)	F in (mm)		
YP-5907	12 (304.8)	4 (101.6)	13/16 (20.6)	13/16 (20.6)	1 (25.4)	NONE	1/2 (2.7)	30,000 (133.4)
YP-5908	18 (457.2)	6-1/4 (158.8)	1 (25.4)	15/16 (23.8)	1-1/4 (31.8)	3-1/2 (88.9)	5/8 (15.9)	40,000 (177.9)
YP-5909	22 (558.8)	7-1/4 (184.2)	1 (25.4)	15/16 (23.8)	1-1/4 (31.8)	4-3/16 (106.4)	5/8 (15.9)	40,000 (177.9)
YP-5910	26 (660.4)	8-1/2 (215.9)	1 (25.4)	15/16 (23.8)	1-1/4 (31.8)	4-15/16 (125.4)	3/4 (19.1)	50,000 (222.4)
YP-5911	29 (736.6)	9-1/2 (241.3)	1 (25.4)	15/16 (23.8)	1-1/4 (31.8)	5-1/2 (139.7)	3/4 (19.1)	50,000 (222.4)
YP-5912	32 (812.8)	10-1/2 (266.7)	1 (25.4)	15/16 (23.8)	1-1/4 (31.8)	6-1/8 (155.6)	3/4 (19.1)	50,000 (222.4)
YP-5913	37 (939.8)	11-3/4 (298.5)	1 (25.4)	15/16 (23.8)	1-1/4 (31.8)	7-1/16 (179.4)	3/4 (19.1)	50,000 (222.4)

Socket Clevis

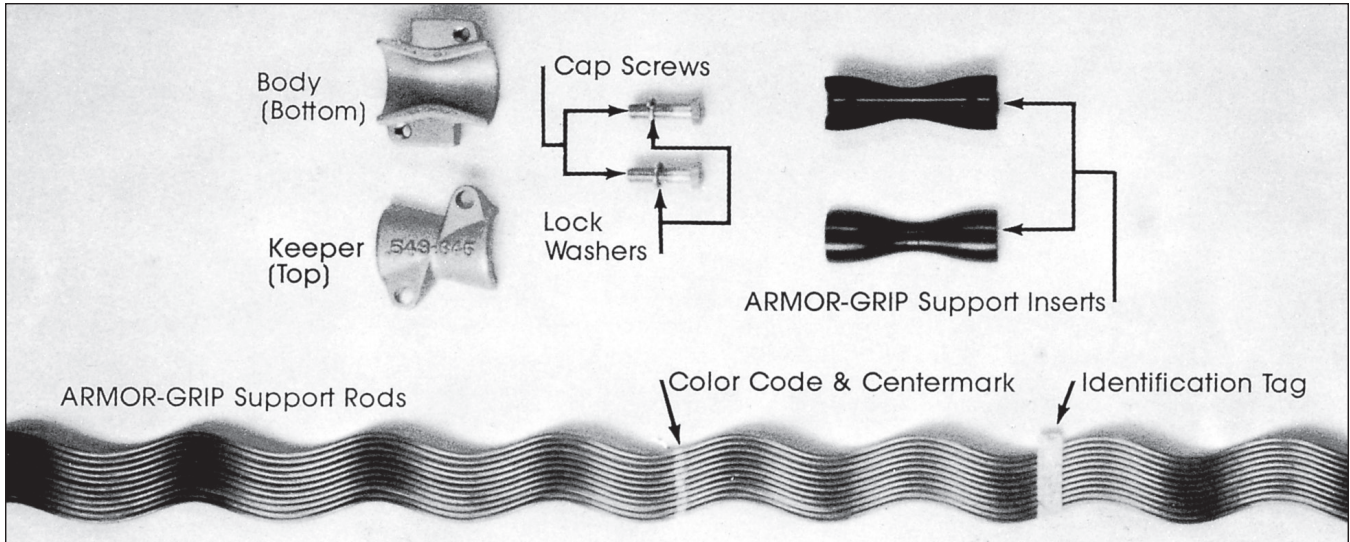


Catalog Number	General Dimensions							Ultimate Strength Pounds (kN)	For Use with Specific Strength Insulators Pounds (kN)
	A in (mm)	B in (mm)	C in (mm)	D in (mm)	E in (mm)	F in (mm)	G in (mm)		
SC-5194	2-5/8 (66.7)	1-9/16 (39.7)	11/16 (17.5)	1-3/4 (44.5)	1-5/8 (41.3)	5/8 (15.9)	13/16 (20.6)	30,000 (133.4)	15,000 - 30,000 (66.7 - 133.4)
SC-5329	3-1/4 (82.6)	-	-	2-3/16 (55.6)	2-1/16 (52.4)	7/8 (22.2)	1-1/8 (28.6)	50,000 (222.4)	36,000 - 50,000 (160.1 - 222.4)

AGS-200 Support

NOMENCLATURE

Thermal Rating (Continuous) 200°C



AGS-200 Support Keeper: Aluminum alloy casting. Comprises the top half of the AGS-200 Support housing unit. The conductor range is cast on the outside of the Keeper.

AGS-200 Support Body: Ductile iron casting. Comprises the bottom half of the AGS-200 Support housing unit. The conductor range is cast into the inside of the body.

AGS-200 Cap Screws and Lock Washers: Galvanized steel.

AGS-200 Support Inserts: An elastomer specifically formulated for resistance to ozone attack, weathering, extreme high and low temperature variations, and compression set. An aluminum alloy reinforcement is molded into the elastomer. The conductor range is molded into the inside of each insert.



AGS-200 Support Rods: Aluminum alloy for aluminum based conductor diameter range .482" to 1.828". Standard rod ends are supplied for sub-EHV applications and PARROT-BILL® rod ends are supplied for EHV applications.

Color Code: Identifies conductor diameter range.

Center Mark: Identifies starting location and center of rods during installation.

Identification Tag: Identifies rod material, conductor type and diameter range.

Special Note about Conductor Range: Each AGS-200 Support housing unit has a wide conductor range and is an overlapping design that incorporates several different pairs of inserts and sets of rods. Each pair of inserts has a narrow conductor range and will accommodate a few different sets of rods. Each set of rods has a very narrow conductor range and is designed for use only on the size conductor listed on the ID tag.



AGS-200 Support

GENERAL RECOMMENDATIONS

AGS-200 Support is intended for use on ACFR® conductors and is designed to be used with clamp-top horizontal and vertical line post insulators.

The AGS-200 Support is designed to reduce static and dynamic stress at the support point, so that the conductor is better able to withstand the effects of vibration than with armor-clamp attachments. It also helps protect the conductor against flashover in the support area.

While AGS-200 Support provides improved protection against vibration fatigue of the conductor, on some lines vibration may be so severe that the use of vibration dampers may be necessary. Utilities that have experienced vibration or expect to should consider adding dampers. Consult PLP for general guidelines and recommendations concerning vibration and dampers.

Unbalanced Loading. The AGS-200 Support will withstand an unbalanced load of approximately 10 to 20% of the conductor RBS before initial slip occurs. Slightly higher unbalanced loads will be obtained after the unit has been in service for a period of time.

Mechanical Strength. The AGS-200 Support will withstand a pull-off load from the trunnion pins of the insulator cap of 5,000 lbs. applied in any direction. This includes the vertical up direction so that the unit will withstand an uplift load. Since the bore of the unit is symmetrical throughout the entire 360° range, a radial conductor load may be applied safely in any direction.

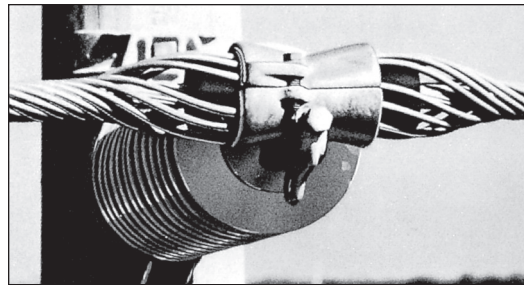
Line Angles. A maximum line angle of 30° may be turned using a single AGS-200 Support, and a maximum of 60° using a Double-Support unit.

AGS-200 Support Double: A special AGS-200 Support is available for applications utilizing a double support. The minimum distance between the double support points is listed on the next page. Contact PLP for an engineering recommendation and additional information when considering use of the Double-Support unit.

Loading Consideration. In the work of line design, the cantilever strength of the insulator may be the governing factor, rather than the strength rating of the AGS-200 Support for unbalanced loading, mechanical strength, and turning angles.

Unusual Line Conditions. The AGS-200 Support may be rotated vertically on the trunnion pins a maximum of 15° before the bottom of the unit interferes with the insulator cap. This should be considered for those terrain conditions, such as a steep side hill, which might result in the unit being installed at an angle from the horizontal.

For use on ACFR® Conductor



Catalog Number	Conductor Diameter Range Min Max in (mm)	AGS® Rods				AGS Hardware Sets Per Carton	AGS Rods & Hardware Wt./Lbs. (kg) Per Carton	Color Code
		Length in (m)	Rod Diameter in (mm)	Rods Per Set	Sets Per Carton			
AGS-5207	0.607 - 0.619 (15.4 - 15.7)	34 (0.86)	0.182 (4.6)	11	18	18	55 (24.9)	Purple
AGS-5208	0.62 - 0.645 (15.7 - 16.4)	38 (0.97)	0.182 (4.6)	12	18	18	58 (26.3)	Red
AGS-5209	0.646 - 0.673 (16.4 - 17.1)	41 (1.04)	0.204 (5.2)	11	15	15	61 (27.7)	Blue
AGS-5210	0.674 - 0.69 (17.1 - 17.5)	41 (1.04)	0.204 (5.2)	11	15	15	61 (27.7)	Green
AGS-5211	0.691 - 0.71 (17.6 - 18.0)	41 (1.04)	0.204 (5.2)	12	15	15	63 (28.6)	Yellow
AGS-5212	0.711 - 0.731 (18.1 - 18.6)	41 (1.04)	0.204 (5.2)	12	15	15	63 (28.6)	Black
AGS-5213	0.732 - 0.775 (18.6 - 19.1)	41 (1.04)	0.204 (5.2)	12	15	15	63 (28.6)	White
AGS-5214	0.751 - 0.768 (19.1 - 19.5)	45 (1.14)	0.25 (6.4)	10	12	12	65 (29.5)	Brown
AGS-5215	0.769 - 0.795 (19.5 - 20.2)	45 (1.14)	0.25 (6.4)	11	12	12	68 (30.8)	Orange
AGS-5216	0.796 - 0.824 (20.2 - 20.9)	45 (1.14)	0.25 (6.4)	11	12	12	68 (30.8)	Purple
AGS-5217	0.825 - 0.845 (21.0 - 21.5)	48 (1.22)	0.25 (6.4)	11	12	12	70 (31.8)	Red
AGS-5218	0.846 - 0.87 (21.5 - 22.1)	48 (1.22)	0.25 (6.4)	11	12	12	70 (31.7)	Blue

Right-hand lay standard

EXPLANATORY NOTES:

- (1) Reference general dimensional information for physical dimensions other than length.
- (3) AGS weights listed are approximate and include packaging.
- (4) An AGS-200 Support unit is comprised of a set of rods with a matched hardware assembly. The rods and assemblies are packaged in separate but corresponding cartons.

AGS-200 Support

For use on ACSR, All-Aluminum, Aluminum Alloy, AWAC® Compacted All-Aluminum Compacted ACSR, ACSS (AW & TW) and ACFR® for Continuous Operating Temperatures up to 200° C

Catalog Number	Conductor Diameter Range Min Max in (mm)	AGS® Rods				AGS Hardware Sets Per Carton	AGS Rods & Hardware Wt./Lbs. (kg) Per Carton	Color Code
		Length in (m)	Rod Diameter in (mm)	Rods Per Set	Sets Per Carton			
AGS-5219	0.871 - 0.893 (22.1 - 22.7)	48 (1.22)	0.25 (6.4)	12	12	12	73 (33.1)	Green
AGS-5220	0.894 - 0.907 (22.7 - 23.0)	48 (1.22)	0.25 (6.4)	12	12	12	73 (33.1)	Green
AGS-5221	0.908 - 0.92 (23.1 - 23.4)	53 (1.35)	0.25 (6.4)	12	9	9	66 (29.9)	Yellow
AGS-5222	0.921 - 0.937 (23.4 - 23.8)	53 (1.35)	0.25 (6.4)	12	9	9	66 (29.9)	Black
AGS-5223	0.938 - 0.962 (23.8 - 24.4)	53 (1.35)	0.25 (6.4)	12	9	9	66 (29.9)	White
AGS-5224	0.963 - 0.986 (24.5 - 25.0)	53 (1.35)	0.25 (6.4)	13	9	9	68 (30.8)	Brown
AGS-5225	0.921 - 0.937 (23.4 - 23.8)	53 (1.35)	0.25 (6.4)	13	9	9	68 (30.8)	Orange
AGS-5226	1.006 - 1.022 (25.6 - 26.0)	62 (1.57)	0.31 (7.9)	11	6	6	64 (29.0)	Purple
AGS-5227	1.023 - 1.04 (26.0 - 26.4)	62 (1.57)	0.31 (7.9)	11	6	6	64 (29.0)	Red
AGS-5228	1.041 - 1.074 (26.4 - 27.3)	62 (1.57)	0.31 (7.9)	11	6	6	64 (29.0)	Blue
AGS-5229	1.075 - 1.09 (27.3 - 27.7)	62 (1.57)	0.31 (7.9)	12	6	6	67 (30.4)	Green
AGS-5230	1.091 - 1.11 (27.7 - 28.4)	62 (1.57)	0.31 (7.9)	12	6	6	67 (30.4)	Yellow
AGS-5231	1.119 - 1.136 (28.4 - 28.9)	62 (1.57)	0.31 (7.9)	12	6	6	67 (30.4)	Black
AGS-5232	1.137 - 1.152 (28.9 - 29.3)	62 (1.57)	0.31 (7.9)	12	6	6	67 (30.4)	White
AGS-5233	1.153 - 1.175 (29.3 - 29.8)	62 (1.57)	0.31 (7.9)	12	6	6	67 (30.4)	Brown
AGS-5234	1.176 - 1.208 (29.9 - 30.7)	62 (1.57)	0.31 (7.9)	12	6	6	67 (30.4)	Orange
AGS-5235	1.209 - 1.226 (30.7 - 31.1)	71 (1.80)	0.365 (9.3)	11	3	3	47 (21.3)	Purple
AGS-5236	1.227 - 1.259 (31.2 - 32.0)	71 (1.80)	0.365 (9.3)	11	3	3	47 (21.3)	Red
AGS-5237	1.26 - 1.286 (31.2 - 32.0)	71 (1.80)	0.365 (9.3)	12	3	3	49 (22.2)	Blue
AGS-5238	1.287 - 1.314 (32.7 - 33.4)	71 (1.80)	0.365 (9.3)	12	3	3	49 (22.2)	Green
AGS-5239	1.315 - 1.355 (33.4 - 34.4)	71 (1.80)	0.365 (9.3)	12	3	3	49 (22.2)	Yellow
AGS-5240	1.356 - 1.394 (34.4 - 35.4)	78 (1.98)	0.365 (9.3)	12	3	3	51 (23.1)	Black
AGS-5241	1.395 - 1.416 (35.4 - 36.0)	78 (1.98)	0.365 (9.3)	13	3	3	54 (24.5)	White
AGS-5242	1.417 (- 1.442 (36.0 - 36.6)	78 (1.98)	0.365 (9.3)	13	3	3	54 (24.5)	Brown
AGS-5243	1.443 - 1.477 (36.7 - 37.5)	78 (1.98)	0.365 (9.3)	13	3	3	54 (24.5)	Orange
AGS-5244	1.478 - 1.516 (37.5 - 38.5)	78 (1.98)	0.365 (9.3)	13	3	3	54 (24.5)	Purple
AGS-5245	1.517 - 1.557 (38.5 - 39.5)	78 (1.98)	0.365 (9.3)	13	3	3	54 (24.5)	Red
AGS-5246	1.558 - 1.579 (39.6 - 40.1)	90 (2.29)	0.365 (9.3)	14	3	3	61 (27.7)	Blue
AGS-5247	1.58 - 1.579 (40.1 - 40.9)	90 (2.29)	0.365 (9.3)	14	3	3	61 (27.7)	Green
AGS-5248	1.613 - 1.65 (41.0 - 41.9)	90 (2.29)	0.365 (9.3)	14	3	3	61 (27.7)	Yellow
AGS-5249	1.651 - 1.688 (41.9 - 42.9)	90 (2.29)	0.365 (9.3)	15	3	3	64 (29.0)	Black
AGS-5250	1.689 - 1.711 (42.9 - 43.5)	90 (2.29)	0.365 (9.3)	15	3	3	64 (29.0)	White
AGS-5251	1.712 - 1.752 (43.5 - 44.5)	90 (2.29)	0.365 (9.3)	15	3	3	64 (29.0)	Brown
AGS-5252	1.753 - 1.79 (44.5 - 45.5)	90 (2.29)	0.365 (9.3)	15	3	3	64 (29.0)	Orange
AGS-5253	1.791 - 1.828 (45.5 - 46.4)	90 (2.29)	0.365 (9.3)	15	3	3	64 (29.0)	Purple

Right-hand lay standard

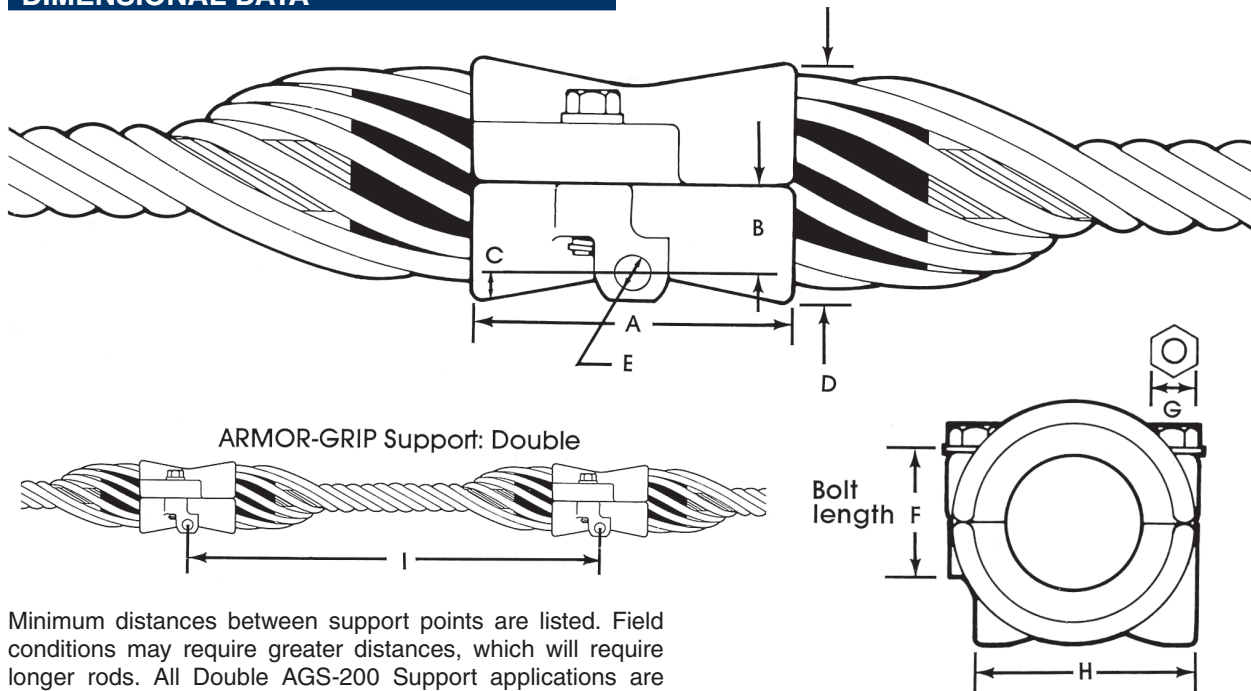
EXPLANATORY NOTES:

- (1) Reference general dimensional information for physical dimensions other than length.
- (3) AGS weights listed are approximate and include packaging.
- (4) An AGS-200 Support unit is comprised of a set of rods with a matched hardware assembly. The rods and assemblies are packaged in separate but corresponding cartons.



AGS-200 Support: Double

DIMENSIONAL DATA

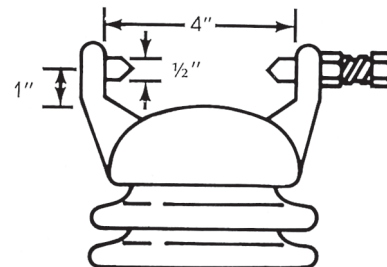


Minimum distances between support points are listed. Field conditions may require greater distances, which will require longer rods. All Double AGS-200 Support applications are supplied and engineered on a special order basis to insure proper rod length and performance.

Conductor Diameter Range Min Max in (mm)	Dimensions in (mm)									
	A	B	C	D	E	F	G	H	I	
.646 - .750 (16.4 - 19.5)	3-3/4 (95.3)	5/8 (15.9)	53/64 (21.0)	2-3/4 (69.9)	19/32 (15.1)	2 (50.8)	3/4 (19.1)	3-7/8 (98.4)	18 (457.2)	
.751 - .907 (19.5 - 23.0)	4-1/2 (95.3)	3/4 (19.1)	27/32 (21.4)	3-13/64 (81.4)	19/32 (15.1)	2-1/4 (57.2)	3/4 (19.1)	3-7/8 (98.4)	18 (457.2)	
.908 - 1.005 (23.0 - 25.5)	5 (127.0)	1-1/8 (28.6)	21/32 (16.7)	3-19/32 (91.3)	19/32 (15.1)	2-1/4 (57.2)	3/4 (19.1)	3-7/8 (98.4)	22 (558.8)	
1.006 - 1.208 (25.5 - 30.7)	5-1/2 (139.7)	1-5/16 (33.3)	13/16 (20.6)	4-3/16 (106.4)	19/32 (15.1)	2-1/4 (57.2)	3/4 (19.1)	3-7/8 (98.4)	26 (660.4)	
1.209 - 1.355 (30.7 - 34.4)	6 (152.4)	1-1/2 (38.1)	13/16 (20.6)	4-5/8 (117.5)	19/32 (15.1)	2-1/4 (57.2)	3/4 (19.1)	3-7/8 (98.4)	29 (736.6)	
1.356 - 1.557 (34.4 - 39.5)	6-1/2 (165.1)	1-5/8 (41.3)	29/32 (23.0)	5-7/64 (129.8)	19/32 (15.1)	2-1/4 (57.2)	3/4 (19.1)	3-7/8 (98.4)	32 (812.8)	
1.558 - 1.828 (39.5 - 46.4)	7 (177.8)	1-15/16 (49.2)	49/64 (19.4)	5-13/32 (137.3)	19/32 (15.1)	2-1/4 (57.2)	3/4 (19.1)	3-7/8 (98.4)	37 (939.8)	

CLAMP TOP TRUNNION

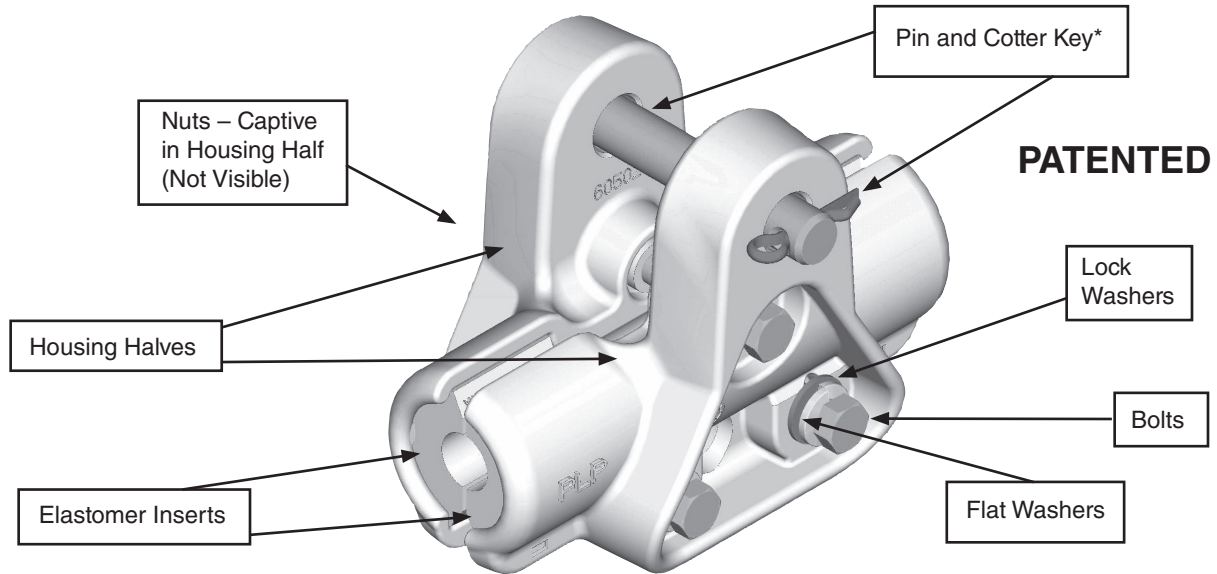
To insure proper fit and service life, it is recommended that only line post insulators with clamp top trunnion caps that conform to ANSI standards be used. See the illustration on the right for nominal cap dimensions that illustrate ANSI standards that have been established outlining the permissible dimensions and tolerances for trunnion caps. Consult the insulator manufacturer when in doubt about insulator standards.



The above dimensions are approximates for design information. Consult ANSI specification C29.7-1977 for exact dimensions.

CGS-200 Suspension

NOMENCLATURE



GENERAL RECOMMENDATIONS

Features and Benefits:

- The CGS-200 Suspension is shipped assembled with no loose parts. All fasteners are factory installed to eliminate lost hardware in the field.
- Labor Savings – To install the CGS-200 Suspension, simply spread the body halves, place over the conductor, and tighten bolts.
- Integral Cushions – minimize conductor bending stresses at critical entry locations.
- Compatible with standard attachment hardware.
- Designed for EHV applications – corona free in bundled 345kV applications.
- Easy Hot Stick application – Lower captive fasteners act as hinge to facilitate hot stick application.

VERTICAL ULTIMATE LOAD. The vertical ultimate load of the CGS-200 Suspension is listed in the table on the next page.

SLIP LOAD. When initially installed, the CGS-200 Suspension has a slip load that ranges between 10% to 15% of the conductor's rated breaking strength (RBS).

LINE ANGLE. The maximum recommended line angle for a CGS-200 Suspension is 30° as a single suspension and 60° in a double configuration utilizing a yoke plate.

*Can be supplied with a bolt/nut/cotter in place of the suspension pin and cotter.

Thermal Rating (Continuous) 200°C



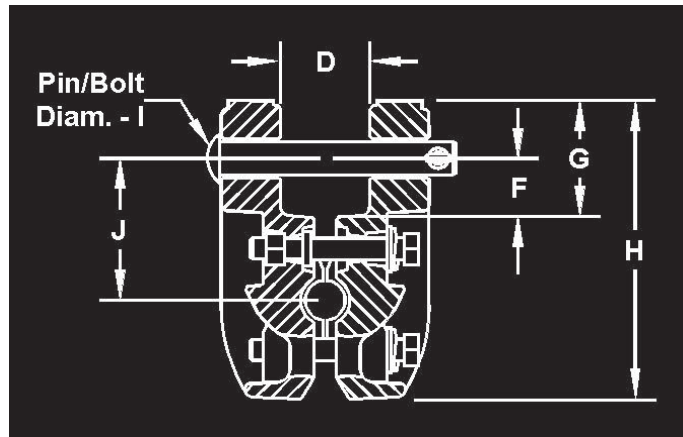
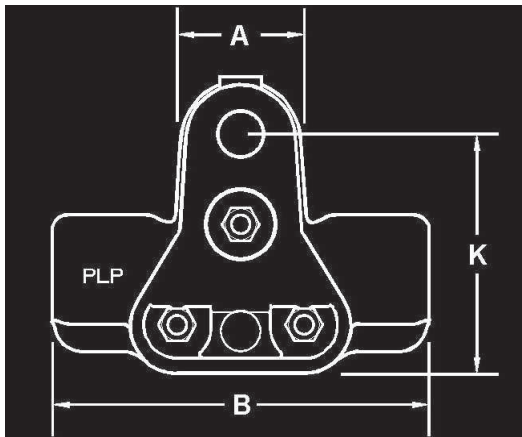
CGS-200 Suspension

Catalog Number	Conductor Diameter Range in (mm)		Weight pounds (kg)	Carton Quantity	Vertical Ultimate Load pounds (kN)
	Min	Max			
CGS-1096HT	0.609 - 0.883 (15.5 - 22.4)		4 (1.8)	3	25,000 (111.2)
CGS-1097HT	0.884 - 1.196 (22.5 - 30.4)		5.5 (2.5)		
CGS-1098HT	1.197 - 1.545 (30.4 - 39.2)		6.7 (3.0)		
CGS-1120HT	1.546 - 1.569 (39.2 - 39.8)		9.5 (4.3)	3	30,000 (133.4)
CGS-1121HT	1.570 - 1.639 (39.8 - 41.6)				
CGS-1122HT	1.640 - 1.707 (41.7 - 43.3)				
CGS-1123HT	1.708 - 1.770 (43.4 - 45.0)				
CGS-1124HT	1.772 - 1.833 (45.0 - 46.5)				
CGS-1125HT	1.834 - 1.892 (46.6 - 48.0)				
CGS-1126HT	1.893 - 1.948 (48.1 - 49.5)				
CGS-1127HT	1.949 - 2.001 (49.5 - 50.8)				
CGS-1128HT	2.002 - 2.052 (50.8 - 52.1)				

Notes:

Add CE, YC or SE to catalog number to include Clevis-Eye, Y-Clevis or Socket-Eye (Example: CGS-1097HTSE for Socket-Eye). For blot, nut and cotter in place of pin, add BNK to catalog number (Example: CGS-1087HTBNK)

DIMENSIONAL TABLES



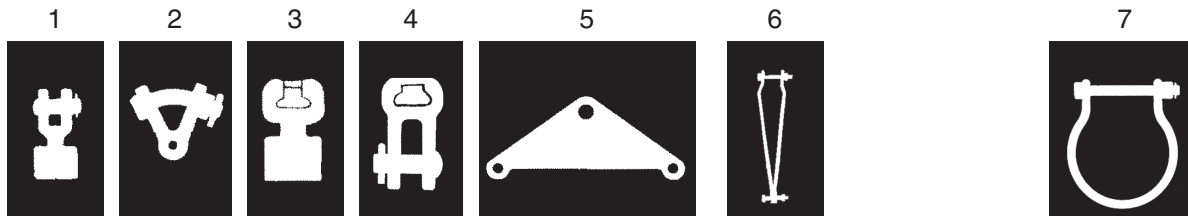
Catalog Number	Dimensions in (mm)									
	A	B	D		F	G	H	I	J	K
			Min	Max						
CGS-1096HT	2.25 (57)	6.85 (174)	1.15 (29.2)	1.70 (43.2)	1.00 (25.4)	2.00 (51)	5.30 (135)	5/8 (15.9)	2.60 (66)	4.30 (109)
CGS-1097HT	2.25 (57)	7.55 (192)	1.15 (29.2)	1.70 (43.2)	1.00 (25.4)	2.00 (51)	6.00 (152)	5/8 (15.9)	2.70 (69)	4.95 (126)
CGS-1098HT	2.25 (57)	8.60 (218)	1.15 (29.2)	1.70 (43.2)	1.00 (25.4)	2.00 (51)	6.25 (159)	5/8 (15.9)	2.90 (74)	5.20 (132)
CGS-1121HT	2.50 (63.5)	9.20 (234)	1.25 (32.8)	1.80 (45.7)	1.25 (32.8)	2.50 (63.5)	7.60 (193)	5/8 (15.9)	3.50 (89)	6.35 (161.3)
CGS-1123HT										

See diagram above for CGS dimensions for assistance in choosing the appropriate mating hardware part numbers.

CGS-200 Suspension Fittings

CGS HARDWARE & FITTINGS

Shown below are the Clevis Eye (1), Y-Clevis Eye (2), Socket Eye (3), Socket Clevis (4), Yoke Plate (5), Vertical Bundle Links (6), and Hold-Down Shackles (7) that are designed for use with the CGS-200 Suspension. See section 1-11 for product details.



- 1
CE-5105
CE-5259 (for CGS-1095)
CE-5107 (for CGS-1096, 1097, 1098)
- 2
YC-5209
YC-5206 (for CGS-1095)
- 3
SE-5152 (for CGS-1095)

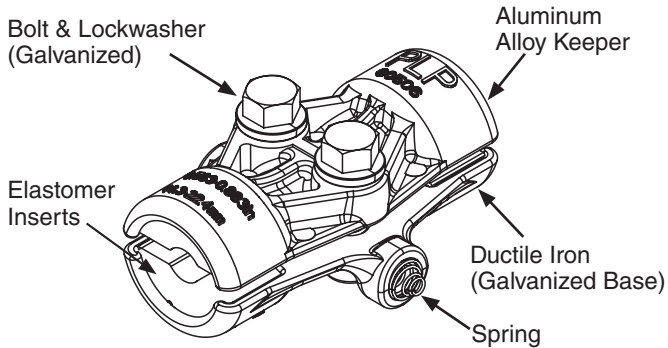
SE-5156 (for use with CGS-1096, 1097, 1098)

SE-5157 (for CGS-1120 – 1128)
- 4
SC-5194
- 5
YP-5907
- 6
VBL-MS-11244 (12")
VBL-MS-11302 (18")

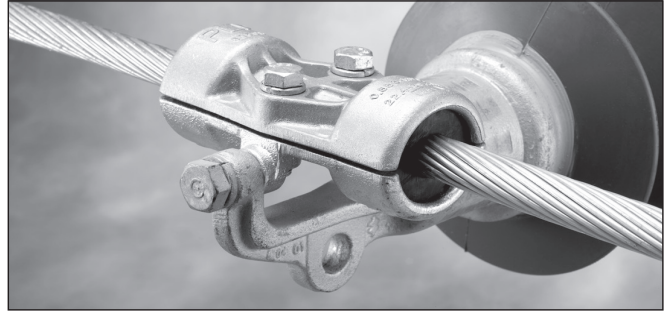
Conductor Range in (mm)	Hughes Brothers	Hubbell
0.609" – 1.196" (15.5 - 30.4)	1888.5	88016 – 2000
1.197" – 1.545" (30.4 - 39.2)	1888.8	88018 – 2000
1.546" – 2.052" (39.3 - 52.1)	1888.8	N/A

CGS-200 Support

NOMENCLATURE



Jumper Loop Applications



GENERAL RECOMMENDATIONS

The CGS-200 Support is intended for use on ACFR® conductors, and is designed to reduce the static and dynamic stresses at the support point, so that the conductor is protected against the effects of oscillations. The conductor is cushioned by field proven, integral elastomer inserts, which guard against abrasion, wear and fatigue.

Features and Benefits:

- The CGS-200 Support is shipped assembled. All fasteners are captivated in the keeper.
- Labor Savings – To install the CGS-200 Support simply install the base, place the keeper over the conductor, and tighten bolts.
- Integral Cushions – minimize conductor bending stresses at critical entry locations.

Thermal Rating (Continuous) 200°C

VERTICAL ULTIMATE LOAD. The CGS-200 Support will withstand a pulloff load from the trunnion pins of the insulator cap of 5,000 lbs., applied in any direction. This includes the vertical up direction (uplift).

SLIP LOAD. When initially installed, the CGS-200 Support has a slip load that ranges between 10% to 15% of the conductor's rated breaking strength (RBS).

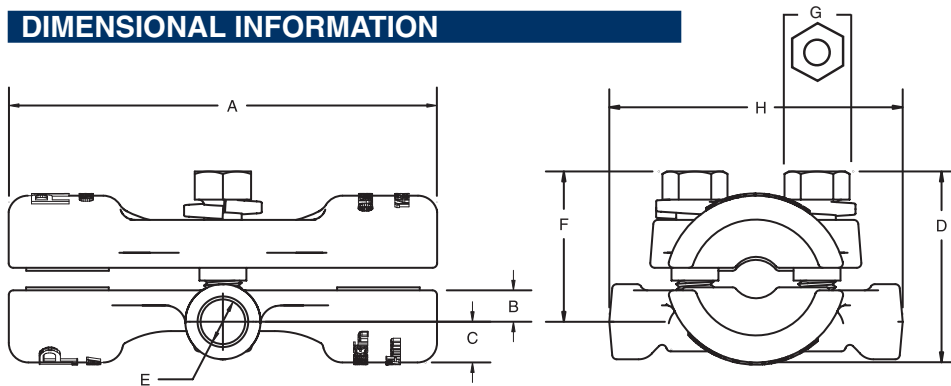
LINE ANGLE. The maximum recommended line angle for a CGS-200 Support is 30°.

ORDERING INFORMATION

Catalog Number	Conductor Range		Nominal Conductor Sizes	Weight/ Unit Pounds (Kg)	Standard Carton Quantity
	Min in (mm)	Max in (mm)			
CGS-2101HT	.564" (14.3)	.883" (22.4)	226 Kcmil to 477 Kcmil	2.40 (1.1)	3
CGS-2102HT	.884" (22.4)	1.196" (30.4)	556 Kcmil to 954 Kcmil	3.50 (1.6)	3
CGS-2103HT	1.197" (30.4)	1.504" (38.2)	954 Kcmil to 1590 Kcmil	5.00 (2.3)	3

CGS-200 Support

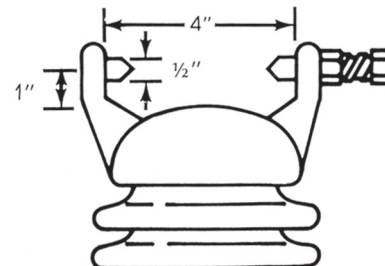
DIMENSIONAL INFORMATION



Catalog Number	Dimensions							
	A in (mm)	B in (mm)	C in (mm)	D in (mm)	E in (mm)	F in (mm)	G in (mm)	H in (mm)
CGS-2101HT	5.7 (144.8)	0.45 (11.4)	0.55 (14.0)	2.4 (61.0)	0.595 (15.1)	2 (50.8)	3/4 (19.1)	3-7/8 (98.4)
CGS-2102HT	6.4 (162.6)	0.75 (19.1)	0.55 (14.0)	3 (76.2)	0.595 (15.1)	2 (50.8)	3/4 (19.1)	3-7/8 (98.4)
CGS-2103HT	6.5 (165.1)	0.75 (19.1)	0.88 (22.4)	3.4 (86.4)	0.595 (15.1)	2.4 (61.0)	3/4 (19.1)	3-7/8 (98.4)

CLAMP TOP TRUNNION

To insure proper fit and service life, it is recommended that only line post insulators with clamp top trunnion caps that conform to ANSI standards be used. See the illustration on the right for nominal cap dimensions that illustrate ANSI standards that have been established outlining the permissible dimensions and tolerances for trunnion caps. Consult the insulator manufacturer when in doubt about insulator standards.

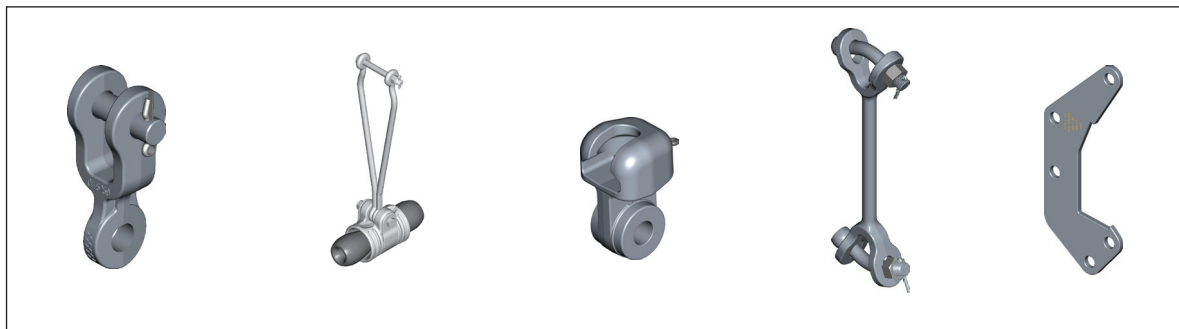
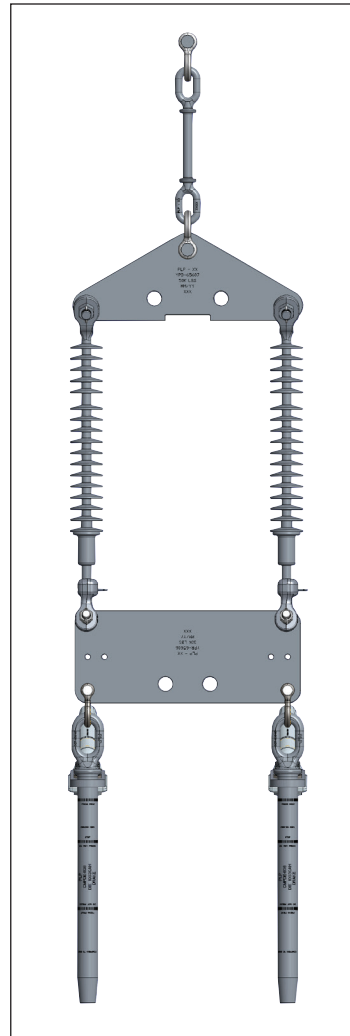
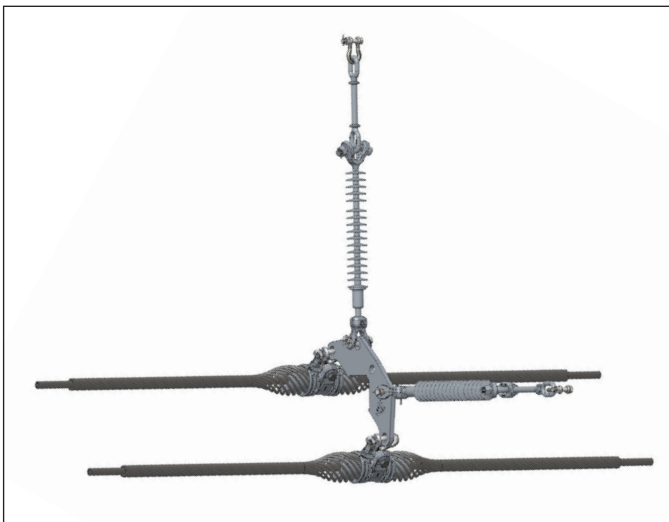


The above dimensions are approximates for design information. Consult ANSI specification C29.7-1977 for exact dimensions.

Transmission Line String Hardware

GENERAL INFORMATION

Preformed Line Products manufactures string hardware components for a variety of suspension and dead-end applications. PLP provides all standard transmission line components for attachments to the tower, insulator and suspension unit, for a variety of load ratings and requirements. Please contact your local Preformed Line Products office for information about products in your country.





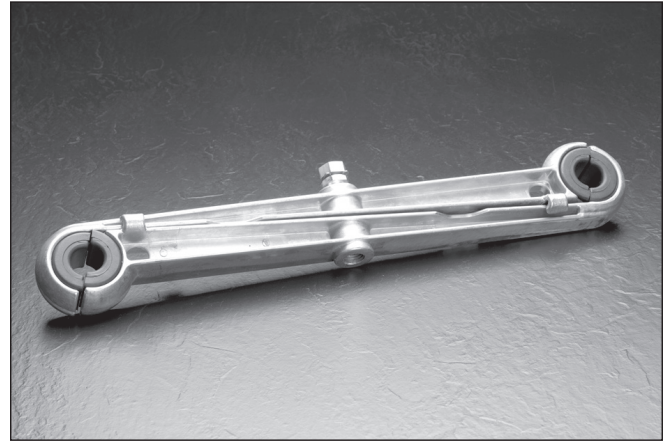
Twin Spacer – 200

GENERAL INFORMATION

The Twin Spacer – 200 is simple to install and is shipped fully assembled (no loose parts).

The break-away bolt provides a clear indication that the proper installation torque has been achieved (no special tools required).

Conductor Spacing is 18 inches (457 mm), but is also available in 13 inch (330 mm) spacing.



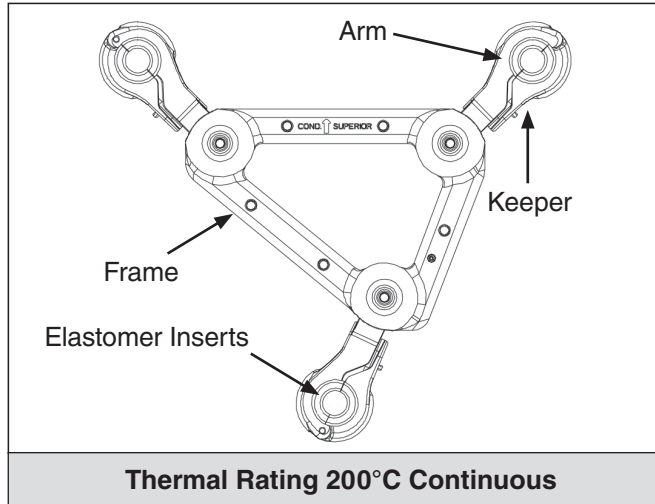
**Thermal Rating
200°C Continuous**

Catalog Number	Conductor Diameter Range	
	Min in (mm)	Max in (mm)
CGTS-0101HT	0.673 (17.1)	0.713 (18.1)
CGTS-0102HT	0.714 (18.1)	0.752 (19.1)
CGTS-0103HT	0.753 (19.1)	0.791 (20.1)
CGTS-0104HT	0.792 (20.1)	0.831 (21.1)
CGTS-0105HT	0.832 (21.1)	0.87 (22.1)
CGTS-0106HT	0.871 (22.1)	0.909 (23.1)
CGTS-0107HT	0.91 (23.1)	0.949 (24.1)
CGTS-0108HT	0.95 (24.1)	0.988 (25.1)
CGTS-0109HT	0.989 (25.1)	1.028 (26.1)
CGTS-0110HT	1.029 (26.1)	1.067 (27.1)
CGTS-0111HT	1.068 (27.1)	1.106 (28.1)
CGTS-0112HT	1.107 (28.1)	1.146 (29.1)
CGTS-0113HT	1.147 (29.1)	1.185 (30.1)
CGTS-0114HT	1.186 (30.1)	1.224 (31.1)
CGTS-0115HT	1.225 (31.1)	1.264 (32.1)
CGTS-0116HT	1.265 (32.1)	1.303 (33.1)
CGTS-0117HT	1.304 (33.1)	1.345 (34.2)
CGTS-0118HT	1.346 (34.2)	1.382 (35.1)
CGTS-0119HT	1.383 (35.1)	1.421 (36.1)
CGTS-0120HT	1.422 (36.1)	1.461 (37.1)
CGTS-0121HT	1.462 (37.1)	1.5 (38.1)
CGTS-0122HT	1.501 (38.1)	1.539 (39.1)
CGTS-0123HT	1.54 (39.1)	1.579 (40.1)
CGTS-0124HT	1.58 (40.1)	1.618 (41.1)
CGTS-0125HT	1.619 (41.1)	1.657 (42.1)
CGTS-0126HT	1.658 (42.1)	1.697 (43.1)
CGTS-0127HT	1.698 (43.1)	1.736 (44.1)
CGTS-0128HT	1.737 (44.1)	1.776 (45.1)
CGTS-0129HT	1.777 (45.1)	1.821 (46.3)

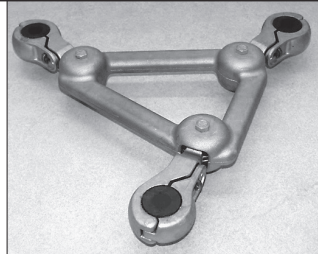
For 13 inch spacing add -13 to catalog number
(Example: CGTS - 0112 - 13)

Spacer Damper – 200

NOMENCLATURE



Thermal Rating 200°C Continuous



ORDERING INFORMATION

For standard 18" (457mm) sub-conductor spacing the catalog numbers are:

CGSDB-X45YZHT

Where X is 3 for Tri, 4 for Quad, 6 for Hex, and YZ is taken from the conductor range table below.

Example:

CGSDB-34529HT is a High Temperature Spacer Damper for a Tri Bundle of conductors within a diameter range of 1.107" to 1.146" (28-29 mm).

YZ	Conductor Range in (mm)
18	0.673-0.713 (17-18)
19	0.714-0.752 (18-19)
20	0.753-0.791 (19-20)
21	0.792-0.831 (20-21)
22	0.832-0.870 (21-22)
23	0.871-0.909 (22-23)
24	0.910-0.949 (23-24)
25	0.950-0.988 (24-25)
26	0.989-1.028 (25-26)
27	1.029-1.067 (26-27)
28	1.068-1.106 (27-28)
29	1.107-1.146 (28-29)
30	1.147-1.185 (29-30)
31	1.186-1.224 (30-31)

GENERAL INFORMATION

The Spacer Dampers – 200 for Tri and Quad feature elastomer damping elements engineered to absorb maximum energy. This design provides the greatest possible resistance to conductor fatigue by eliminating the need for additional vibration dampers.

UNIQUE DESIGNS

The Spacer Damper – 200 design was developed in cooperation with the Engineering Team at PLP-Brazil to meet the demanding requirements of IEC Specification 61854, while maintaining a light overall weight and exceptional performance.

PATENTED DAMPING ELEMENTS

The Spacer Damper – 200 design employs unique damping elements which are captured in a way which assures the elastomer is always in compression, providing maximum service life.

FIELD PROVEN

The Spacer Damper – 200 has been used extensively throughout Europe and Brazil since its introduction in the early 1990s, and the U.S. since 2004.

CLAMP FASTENER ASSURES PROPER INSTALLATION

A high strength 1/4 turn fastener is employed in the elastomer lined conductor clamp to insure proper installation. This design provides consistent compression of the elastomer liners without relying on specific bolt torque values or bolts with break-away heads.

If clamps with bolts or breakaway bolts are preferred, consult PLP for catalog numbers.

PLACEMENT IS THE KEY TO PERFORMANCE

PLP's extensive experience and laboratory and field testing allow it to provide you with placement recommendations that will minimize the motion of conductor bundles and maximize the longevity of the Spacer Damper.

Catalog Number
00071004
Description
CGSD-200 Spacer Damper installation tool

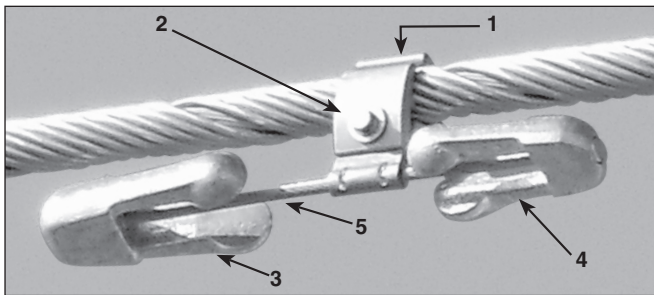


YZ	Conductor Range in (mm)
32	1.225-1.264 (31-32)
33	1.265-1.303 (32-33)
34	1.304-1.345 (33-34)
35	1.346-1.382 (34-35)
36	1.383-1.421 (35-36)
37	1.422-1.461 (36-37)
38	1.462-1.500 (37-38)
39	1.501-1.539 (38-39)
40	1.540-1.579 (39-40)
41	1.580-1.618 (40-41)
42	1.619-1.657 (41-42)
43	1.658-1.697 (42-43)
44	1.698-1.736 (43-44)
45	1.737-1.776 (44-45)
46	1.777-1.821 (45-46)

Contact PLP for other sub-conductor spacings and configurations.



Vibration Damper



250°C when applied over AGS Rods or Protector Rods

Vibration Dampers meet the requirements of IEC-61897.

Vibration Dampers meet EHV corona requirements up to 500kV (Triple & Quad Bundle).

NOMENCLATURE

- 1. Clamp & Keeper:** The Clamp has an extruded hook shaped profile to hang onto the cable or conductor while tightening the keeper. Together, the aluminum keeper and clamp capture the conductor to hold the damper assembly firmly onto the conductor or cable. Product identification, installation torque, and lot number are permanently etched on the clamp.
- 2. Bolt, Washer, and Lock Washer:** The bolt, washer and lock washer are used to fasten the keeper to the clamp and secure the entire damper assembly to the cable or conductor. The materials used are galvanized steel. An optional break-away bolt version is available.
- 3. Large Damper Weight:** The Vibration damper design shown above has two weight sizes – this provides up to 4 resonant response frequencies (two for the large weight and two for the small weight) for more effective protection. The weight is a galvanized ductile iron casting.

Damper	Configuration	Corona Rating kV
VSD20	Single	200
VSD25	Single	200
VSD35	Single	260
	Twin	345
VSD40	Single	230
	Twin	345
	Tri	400
	Tri	400
	Quad	400
VSD50	Single	330
VSD55	Twin	400
	Twin	550

4. Small Damper Weight: The small weight provides damping at higher frequencies. The weight is a galvanized ductile iron casting.

5. Messenger: The messenger is made of formed hard steel wires that are galvanized for corrosion resistance.

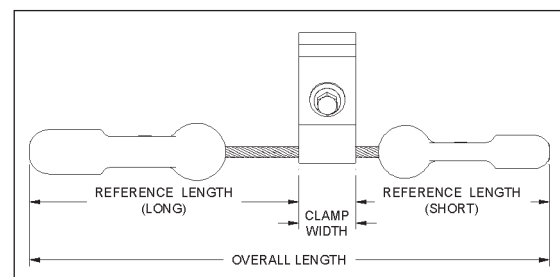
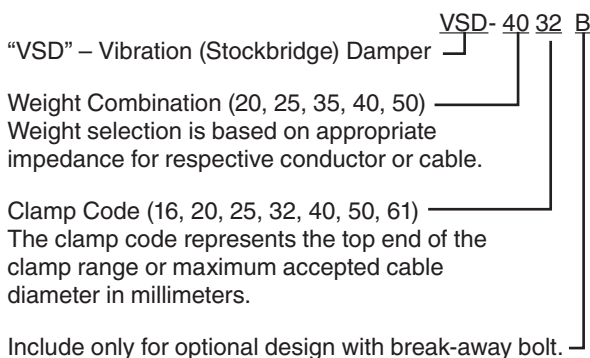
GENERAL RECOMMENDATIONS

INTENDED USE: Vibration Dampers provide reduction of aeolian vibration amplitude and the associated dynamic stresses on the ACFR® conductor at the supporting hardware.

APPLICATION: For most applications, the Vibration Damper is placed on the AGS-200 Suspension Rods. In cases of Dead-end to Dead-end spans or for very long spans, it may be necessary to position the damper on the conductor. For these situations, it is recommended that Protector Rods be applied to the conductor before installing the damper.

Placement: The VORTX placement software uses the results of extensive laboratory testing and the standing wave loop geometry for critical wind velocities to “optimize” the quantity and placement of dampers for the specific line and terrain conditions. Use the link www.plpvortex.com to get an input sheet to provide PLP with the data required to provide a complete placement recommendation.

Vibration DAMPER Catalog Number code:



VSD20 Through VSD50 Series

Vibration Damper

Vibration Damper Details									
Catalog Number	Clamp Range		Overall Length in (mm)	Reference Length Long in (mm)	Clamp Width in (mm)	Bolt Size in (mm)	Install Torque		Assembled Weight Lb (kg)
	Min in (mm)	Max in (mm)					Ft-lb	N-m	
VSD-2032	0.983 (25.0)	1.261 (32.0)	15.1 (384)	6.9 (175)	2.200 (55.9)	M12 x 70	40	54	4.4 (2.0)
VSD-2532	0.983 (25.0)	1.261 (32.0)	12.9 (327)	6.4 (161)	2.200 (55.9)	M12 x 70	40	54	5.4 (2.5)
VSD-2540	1.261 (32.0)	1.579 (40.1)	13.1 (332)	6.4 (161)	2.380 (60.5)	M12 x 70	40	54	5.7 (2.6)
VSD-3540	1.261 (32.0)	1.579 (40.1)	15.1 (384)	7.0 (179)	2.380 (60.5)	M12 x 70	40	54	7.9 (3.6)
VSD-4040	1.261 (32.0)	1.579 (40.1)	20.4 (519)	10.5 (267)	2.380 (60.5)	M12 x 70	40	54	11.1 (5.0)
VSD-4050	1.579 (40.1)	1.970 (50.0)	20.6 (523)	10.5 (267)	2.500 (63.5)	M12 x 70	40	54	11.4 (5.2)
VSD-4061	1.970 (50.0)	2.403 (61.0)	21.1 (535)	10.5 (267)	3.000 (76.2)	M12 x 75	40	54	12.1 (5.5)
VSD-5061	1.970 (50.0)	2.403 (61.0)	24.5 (622)	12.1 (307)	3.000 (76.2)	M12 x 75	40	54	12.5 (5.7)

NOTE: Add a "B" to the catalog number for the break-away bolt option (example VSD-4050B)

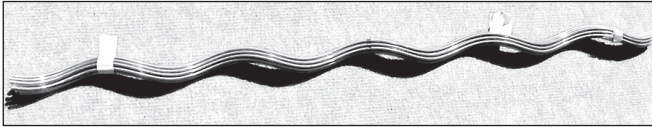
Weight Combination for Conductor and Shield Wire Sizes				
Weight Combination Code Number*	ACCR, ACFR, and ACSS Range		Galvanized Steel and Alumoweld Range	
	Min in (mm)	Max in (mm)	Min in (mm)	Max in (mm)
20	0.473 (12.0)	0.720 (18.2)	.401 (10.2)	.486 (12.3)
25	0.721 (18.3)	0.857 (21.8)	.487 (12.4)	.650 (16.5)
35	0.859 (21.9)	0.983 (24.9)	N/A	N/A
40	0.984 (25.0)	1.335 (33.9)	N/A	N/A
50	1.261 (32.1)	1.762 (44.7)	N/A	N/A
55	1.602 (40.7)	1.929 (49)	N/A	N/A

*Final selection for weight combination at merging ranges are determined from conductor type and tension.
VSD55 designed for twin bundle 500kV AC Applications and EHV DC. Contact PLP Technical support for final recommendation.

Bolt Size and Torque Information						
Clamp Code	Clamp Range		Bolt Thread Size	Wrench Size in (mm)	Torque	
	Min in (mm)	Max in (mm)			N-m	Ft-Lb
20	.612 (15.5)	.786 (20.0)	M12	3/4 (19)	41	30
25	.786 (20.0)	.983 (25.0)	M12	3/4 (19)	41	30
32	.983 (25.0)	1.261 (32.0)	M12	3/4 (19)	54	40
40	1.261 (32.0)	1.579 (40.1)	M12	3/4 (19)	54	40
50	1.579 (40.1)	1.970 (50.0)	M12	3/4 (19)	54	40
61	1.970 (50.0)	2.422 (61.5)	M12	3/4 (19)	54	40

Vibration Damper

PROTECTOR RODS



Thermal Rating (Continuous) 250°C

PROTECTOR RODS FOR Vibration DAMPER

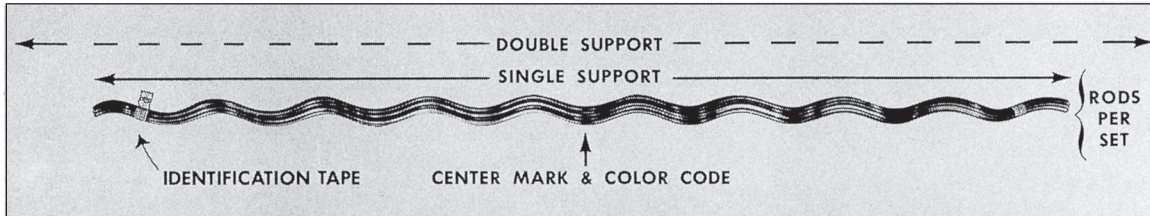
Protector Rods are required under the Vibration Damper for applications (Dead-end to Dead-end spans and longer spans) where the placement would be off of the AGS-200 Suspension rods.

Catalog Number	Number EHV	Conductor Diameter Range in (mm)		Rod Diameter in (mm)	Rods Per Set	Color Code	Units Per Carton	Carton Weight pounds (kg)
		Min	Max					
PR-0142	N/A	0.586 - 0.618 (14.9 - 15.6)		0.146 (3.7)	13	Orange	50	21 (9.5)
PR-0144	N/A	0.619 - 0.667 (15.7 - 16.9)		0.146 (3.7)	14	Purple	50	21 (9.5)
PR-0146	N/A	0.668 - 0.722 (17.0 - 18.3)		0.146 (3.7)	15	Red	50	29 (13.2)
PR-0148	N/A	0.723 - 0.816 (18.4 - 20.3)		0.146 (3.7)	16	Black	50	29 (13.2)
PR-0150	N/A	0.817 - 0.898 (20.8 - 22.7)		0.146 (3.7)	17	White	50	31 (14.1)
PR-0151	N/A	0.899 - 0.954 (22.8 - 24.2)		0.167 (4.2)	17	Yellow	50	47 (21.3)
PR-0152	N/A	0.955 - 1.019 (24.2 - 25.8)		0.182 (4.6)	16	Brown	25	29 (13.2)
PR-0154	N/A	1.020 - 1.064 (25.9 - 27.0)		0.182 (4.6)	17	Blue	25	29 (13.2)
PR-0155	N/A	1.065 - 1.098 (27.1 - 27.8)		0.204 (5.2)	16	Green	25	36 (16.3)
PR-0156	PR-0156E	1.099 - 1.181 (27.9 - 29.9)		0.25 (6.4)	14	Orange	25	48 (21.8)
PR-0158	PR-0158E	1.182 - 1.298 (30.0 - 32.9)		0.25 (6.4)	15	Purple	25	51 (23.1)
PR-0160	PR-0160E	1.299 - 1.415 (33.0 - 35.9)		0.25 (6.4)	16	Blue	20	44 (20.0)
PR-0162	PR-0162E	1.416 - 1.543 (36.0 - 39.2)		0.25 (6.4)	17	Yellow	20	48 (21.8)
PR-0163	PR-0163E	1.544 - 1.685 (39.2 - 42.8)		0.25 (6.4)	19	Brown	15	40 (18.1)
PR-0164	PR-0164E	1.686 - 1.840 (42.8 - 46.7)		0.25 (6.4)	20	Blue	15	42 (19.0)



Armor Rods

NOMENCLATURE



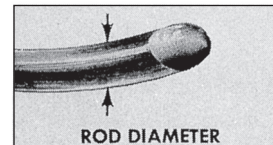
Rod Diameter: Added to conductor O.D., assists in arriving at applied overall diameter.

Rods Per Set: Indicate the proper number of rods for each application.

Center Mark: Establishes recommended alignment of rods during application.

Color Code and Length: Assist in identification of conductor size, corresponding to tabular information appearing on catalog page.

Identification Tape: Shows catalog number, nominal sizes.



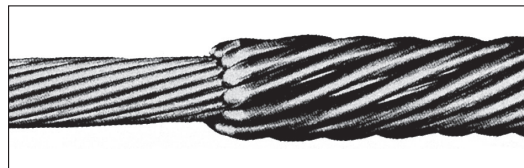
**Thermal Rating (Continuous)
ACFR® Repair 200°C**

GENERAL RECOMMENDATIONS

Armor Rods are used to fully restore electrical conductivity and mechanical strength to a partially damaged ACFR® conductor. The damage must be limited to the aluminum strands and the number of broken or cracked strands must not exceed the “maximum number” listed in the table below. The strands can be broken or cracked in any of the layers as long as the total is less than or equal to the “maximum number” listed.

EHV versions with PARROT-BILL rod ends are available for larger diameter conductors typically used for application at 345kV and above.

Armor Rods: PARROT-BILL® Ends

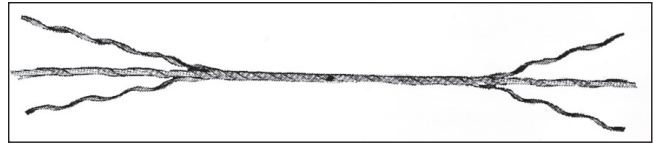


For use on ACFR® Conductor

Catalog Number		Conductor Diameter Range in (mm)		Maximum Damaged Strands	Length in (m)	Rod Diameter in (mm)	Rods Per Set	Color Code	Units Per Carton	Carton Weight lbs (kg)
Standard	EHV (345 kV and above)	Min	Max							
AR-0130	N/A	0.704 - 0.740 (17.9 - 18.8)		5	72 (1.83)	0.204 (5.2)	12	Green	18	54 (24.5)
AR-0131	N/A	0.741 - 0.782 (18.8 - 19.9)		5	72 (1.83)	0.204 (5.2)	13	Orange	18	59 (26.8)
AR-0134	N/A	0.846 - 0.907 (21.5 - 23.0)		5	78 (1.98)	0.25 (6.4)	12	Blue	15	74 (33.6)
AR-0135	N/A	0.908 - 0.929 (23.1 - 23.6)		5	80 (2.03)	0.25 (6.4)	13	Green	12	66 (29.9)
AR-0137	AR-0500	0.977 - 1.016 (24.8 - 25.8)		5	92 (2.34)	0.31 (7.9)	11	Yellow	9	50 (22.7)
AR-0141	AR-0504	1.099 - 1.139 (27.9 - 28.9)		5	100 (2.54)	0.31 (7.9)	12	Orange	6	62 (28.1)
AR-0143	AR-0506	1.162 - 1.208 (29.5 - 30.7)		7	100 (2.54)	0.31 (7.9)	13	Red	6	69 (31.3)
AR-0146	AR-0509	1.328 - 1.39 (33.7 - 35.3)		7	100 (2.54)	0.365 (9.3)	13	Yellow	3	45 (20.4)
AR-0163	AR-0511	1.441 - 1.508 (36.6 - 38.3)		7	100 (2.54)	0.436 (11.1)	12	Blue	3	58 (26.3)
AR-0165	AR-0513	1.579 - 1.651 (40.1 - 41.9)		9	100 (2.54)	0.436 (11.1)	13	Orange	3	60 (27.2)
AR-0167	AR-0516	1.729 - 1.809 (43.9 - 45.9)		9	100 (2.54)	0.436 (11.1)	14	Red	3	64 (29.0)

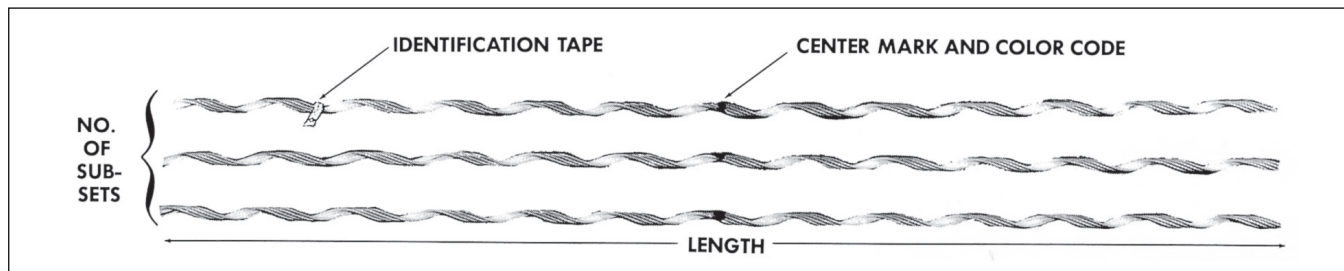
Conductor Splices

For use on ACFR® Conductor



Catalog Number		Conductor Diameter Range in (mm)		Length in (m)	Rod Diameter in (mm)	No. of Subsets	Color Code	Units Per Carton	Carton Weight lbs (kg)
Standard	EHV (345 kV and above)	Min	Max						
LS-0140	N/A	0.701 - 0.729 (17.8 - 18.5)		77 (1.96)	0.25 (6.4)	3	Green	15	62 (28.1)
LS-0141	N/A	0.730 - 0.760 (18.6 - 22.5)		79 (2.01)	0.25 (6.4)	3	Black	15	64 (29.0)
LS-0145	N/A	0.851 - 0.886 (21.6 - 22.5)		99 (2.51)	0.25 (6.4)	4	Orange	3	23 (10.4)
LS-0146	N/A	0.887 - 0.929 (22.5 - 23.6)		105 (2.67)	0.31 (7.9)	3	Orange	3	31 (14.1)
LS-0148	N/A	0.969 - 1.008 (24.6 - 25.6)		111 (2.82)	0.31 (7.9)	4	Yellow	3	37 (16.8)
LS-0151	LSMS4854	1.092 - 1.136 (27.7 - 28.9)		137 (3.48)	0.365 (9.3)	4	Purple	3	59 (26.8)
LS-0153	LSMS7955	1.184 - 1.232 (30.1 - 28.9)		143 (3.63)	0.365 (9.3)	4	Blue	3	63 (28.6)
LS-0155	LSMS7956	1.300 - 1.353 (33.0 - 34.4)		165 (4.19)	0.436 (11.1)	4	Yellow	3	101 (45.8)
LS-0158	LSMS14203	1.468 - 1.528 (37.3 - 38.8)		178 (4.52)	0.436 (11.1)	4	White	3	103 (46.7)
LS-0160	LSMS11411	1.592 - 1.657 (40.4 - 42.1)		193 (4.90)	0.468 (11.9)	4	Purple	3	128 (58.0)
LSMS10726	LSMS10726	1.724 - 1.788 (43.8 - 45.4)		207 (5.26)	0.496 (12.6)	4	Pink	1	86 (39.0)

NOMENCLATURE



Sub-Sets: Individual rods assembled and gritted into groups (subsets), corresponding to tabular information appearing on catalog page.

Center Mark: Establishes recommended alignment of rods during application.

Color Code and Length: Assist in identification of conductor size, corresponding to tabular information appearing on catalog page.

Identification Tape: Shows catalog number, nominal sizes.

GENERAL RECOMMENDATIONS

Conductor Splices can be used on ACFR® conductor to repair damage to the Aluminum strands that exceeds the maximum number that can be repaired by Armor Rods.

Conductor Splices are capable of restoring the electrical conductivity of the conductor even if all of the aluminum strands have been broken or cracked. The composite core must be intact (undamaged).

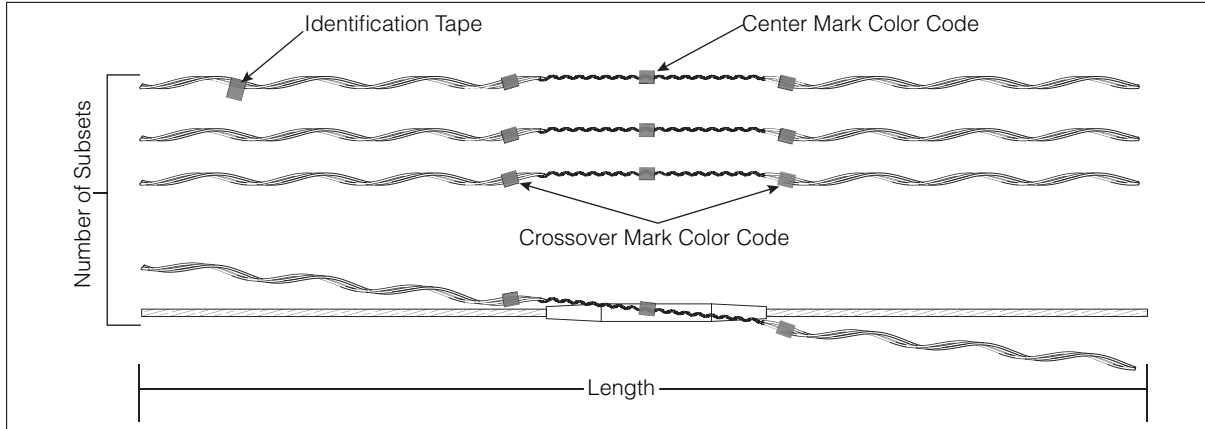
EHV (345kV and above) versions of the conductor splices with PARROT-BILL rod ends are available for the larger conductors typically used for higher line voltages.

**Thermal Rating
200°C Continuous**

Splice/Dead-end Shunt

NOMENCLATURE

Thermal Rating (Continuous)
250°C



Subsets:

Individual rods assembled and gritted into groups (subsets), corresponding to tabular information appearing on catalog page.

Center Mark:

Establishes proper alignment of subsets centered on affected splice.

Color Code and Length:

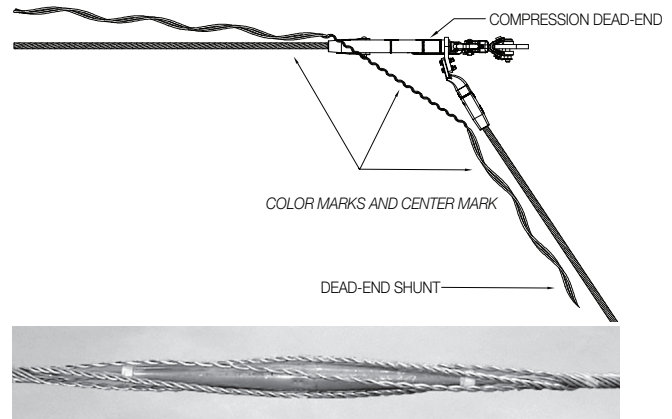
Assists in identification of conductor size, corresponding to tabular information appearing on catalog page.

Identification Tape:

Shows catalog number, nominal sizes.

Application/Crossover Mark:

Indicates location where subsets wrap/apply on the conductor on either side of the splice.



GENERAL RECOMMENDATIONS

The Splice Shunt is designed to restore electrical conductivity and a portion of the mechanical strength to compression splices. The Dead-end Shunt restores electrical conductivity between the conductor in the span and the jumper loop. In addition to using

a Shunt for repair of faulty compression fittings, it can be used to reinforce and reduce the temperature of existing compression fittings for increasing the capacity (uprating) of a line.

Catalog Number	Conductor Diameter Range in (mm)		Wire Size in (mm)	Rods per Set (sub-set)	Length in (m)	Maximum Splice Length in (m)	Color Code	EHV
	Min	Max						
SDES-0001	0.701 - 0.729	(17.8 - 18.5)	0.25 (6.4)	10 (2-2-3-3)	108 (2.74)	20 (0.51)	Green	
SDES-0002	0.730 - 0.760	(18.6 - 19.3)	0.25 (6.4)	10 (2-2-2-2-2)	123 (3.12)	30 (0.76)	Black	
SDES-0006	0.851 - 0.886	(21.6 - 22.5)	0.25 (6.4)	12 (3-3-3-3)	138 (3.51)	32 (0.81)	Black	
SDES-0008	0.918 - 0.968	(23.3 - 24.6)	0.31 (7.9)	11 (2-2-2-2-3)	148 (3.76)	32 (0.81)	White	
SDES-0009	0.969 - 1.008	(24.6 - 25.6)	0.31 (7.9)	11 (2-3-3-3)	151 (3.84)	34 (0.86)	Yellow	
SDES-0012	1.092 - 1.136	(27.7 - 28.9)	0.365 (9.3)	11 (2-2-2-2-3)	183 (4.65)	40 (1.02)	Green	Y
SDES-0014	1.184 - 1.232	(30.1 - 31.3)	0.436 (11.1)	10 (2-2-3-3)	216 (5.49)	42 (1.07)	Blue	Y
SDES-0016	1.30 - 1.35	(33.0 - 34.4)	0.436 (11.1)	11 (2-3-3-3)	220 (5.59)	45 (1.14)	Yellow	Y
SDES-0019	1.468 - 1.528	(37.2 - 38.8)	0.436 (11.1)	12 (3-3-3-3)	228 (5.79)	45 (1.14)	White	Y
SDES-0021	1.592 - 1.657	(40.4 - 42.1)	0.468 (11.9)	12 (3-3-3-3)	261 (6.63)	45 (1.14)	Purple	Y
SDES-0022	1.740 - 1.810	(44.1 - 45.9)	0.365 (9.3)	16 (2-2-3-3-3-3)	250 (6.35)	45 (1.14)	Purple	Y



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