INERTIA ENGINEERING

HIGH VOLTAGE SWITCHGEAR & AUTOMATION EQUIPMENT

SECTION 2
Overhead Distribution Switches

NEXT

CAT. NO: 040930G
May, 2008

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(800) 791-9997

OVERHEAD DISTRIBUTION SWITCHES

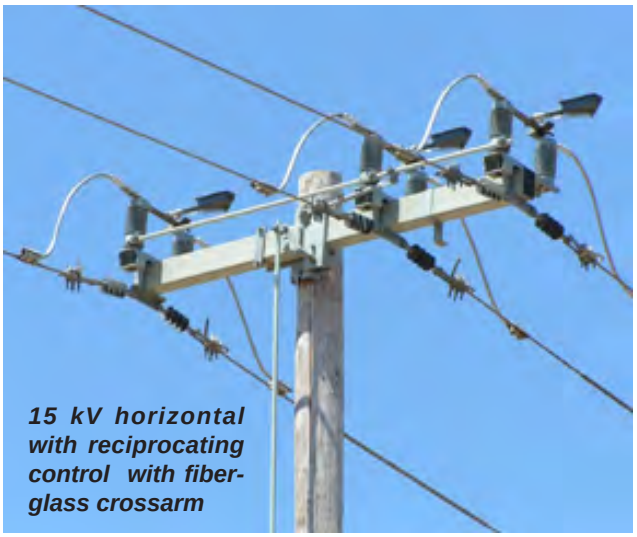
CAT011113-12

LineBOSS™

15 kV-35 kV Sidebreak Type, Unitized GOAB Switch

The LineBOSS™ Sidebreak switch is the most robust, yet elegant sidebreak switch in the market today. Every LineBOSS™ component brings meaningful operator benefits for years to come. Features such as 1/4 inch steel phase base, stainless steel to brass bearings, silver plated copper reverse loop contacts and busbar blades mean efficient and smooth operation over a very long life; even in hostile environments where dust, humidity, corrosives and other industrial or natural contaminants play havoc with most. You'll be amazed with how much switch you can buy for the money. The LBS distribution switch is RUS accepted.

Inertia- moving power with passion and innovation!



15 kV horizontal with reciprocating control with fiberglass crossarm

SPECIFICATIONS

Switch Ratings:

Voltage Class: 15.5 kV, 25.8 kV & 38 kV

Continuous Current Class: 600, 900, 1200 Amps

Fault Close: 15 kA rms-asym: 5 X manual operation
20 kA rms-asym: 3 X manual operation
30 kA rms-asym: 2 X manual operation

Momentary current: 600 A: 40,000 A rms 10 cycles
25,000 A rms 3 seconds
900 A: 51,000 A rms 10 cycles
32,000 A rms 3 seconds
1200 A: 70,000 A rms 10 cycles
44,000 A rms 3 seconds

Ice breaking: 3/4" (manual operation)

Mechanical: 5000 cycles (open/close)

Tested in accordance with IEEE Std. C37.34-1994 ANSI/IEEE Std. 37.71-1984 and IEC Std. 265-1,1983.

Loadbreak Devices:

Arc Horns
Quickbreak Whip Attachments
Arc Chute Load Break
AmpRupter Load Break
AmpVac Load Break

*See data sheet "Air-break Disconnect Switch Attachment Selection Information" for loadbreak descriptions and specifications

ACCC Designation DO6
Loadability factor 1.22 at 25 Deg. C.

Crossarm Ratings:

Crossarm Material		Dead End Loading
Galvanized Steel	(standard duty)	2000 lbs/phase
Galvanized Steel	(heavy duty)	6000 lbs/phase
Aluminum	(standard duty)	1500 lbs/phase
Aluminum	(heavy duty)	3000 lbs/phase
Fiberglass	(standard duty)	1000 lbs/phase
Fiberglass	(heavy duty)	2500 lbs/phase

All materials: equal loading, each side of switch is 12000 lbs. max. Ratings shown are for 25 kV switch

STANDARD FEATURES

- Resilient, higher BIL silicone rubber insulators
- Reverse loop silver plated copper jaw contacts
- Maintenance free stainless steel/brass bearings
- Unitized construction: aluminum, steel or fiberglass
- Factory adjusted, ready to mount
- Meets all applicable NEMA and ANSI standards
- All ferrous components are hot dip galvanized
- Tinned copper terminal pads

STANDARD CONFIGURATIONS

- Horizontal (upright)
- Horizontal (underarm)
- Horizontal (center mount)
- Riser
- Vertical (tiered outboard)
- Delta (pole top)
- Vertical (phase over phase)

See opposite side of this page for illustrations and selection.

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LineBOSS™ Selection Guide (15 kV-38 kV)

LineBOSS™ Unitized Sidebreak Line Switch → **L 1 6 S L S H 1 1 2 3**

Voltage Class:
15.5 kV = 1
25.8 kV = 2
38.0 kV = 3

Current Rating:
600 A (ANSI: 30°C rise) = 6
900 A (IEEE only) = 6
900 A (ANSI: 30°C rise) = 9
1200 A (ANSI: 30°C rise) = 1

Insulator Type
Silicone Rubber (3.0" BC) = S
Porcelain (3.0" BC) ..... = P
Increase insulator creepage
+1 voltage class = add 1 after S, P
+2 voltage classes = add 2 after S, P

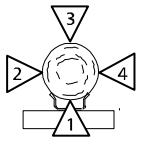
Interrupter Type
NO interrupter ..... = X
Arc Whip, Quick-break = Q
Arc Chute loadbreak = H
Loadbreak, Amprupter = L
Vacuum bottle, AmpVac = V

Crossarm Type
Galv. Steel = S ("SX" for heavy duty arm)
Aluminum = A ("AX" for heavy duty arm)
Fiberglass = F ("FX" for heavy duty arm)
No Xarm = X
Customer specified loading (call factory)

Cntrl. Rod Length (10' sect.)
30 feet (standard) = 3
specify alternate = ___
Insulated section = B
(equal to switch BIL)

Control Rod Type
Reciprocating
1" galvanized pipe = 4
¾" galvanized pipe = 3
1" round fiberglass = 2
1 ¾" square fiberglass = 1
Torsional
1½" galvanized pipe = 6

Control Location
Specify the quadrant by number, where the control is to be located



Mounting Configurations
Horizontal Upright = H
Vertical (Phase over phase) = V
Vertical (tiered outboard) = B
Delta (pole top) ..... = D
Riser ..... = R
Underarm Horizontal = U
For GO 95 clearances add G ("HG", "UG" etc)

Control Mechanism
Reciprocating handle = 1
Torsional handle = 2
Add "C" for counterclockwise
Hookstick bellcrank = 3
None (Motorized Operator) = X

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Note: Consult the factory for any options not listed, including; arrestors, sensors, support brackets etc. A Fax-back form can be found on the next page. Copy, fill-out and fax it back with your requirements.

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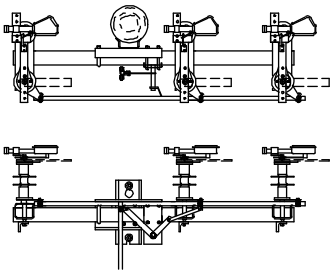
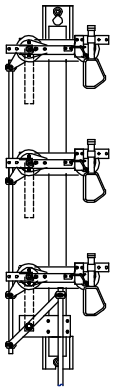
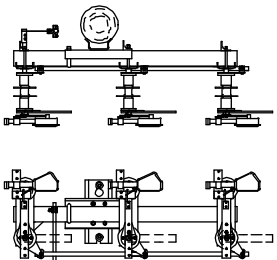
LineBOSS™ Standard Configurations



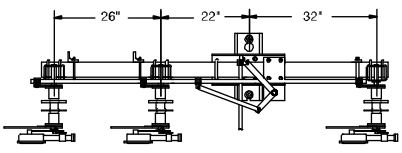
HORIZONTAL



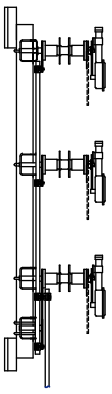
VERTICAL (phase over phase)

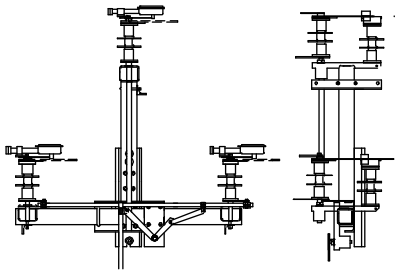


RISER

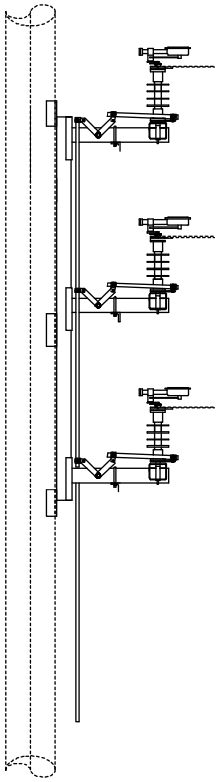


UNDERARM HORIZONTAL
(GO95 clearance)





DELTA (Pole top)



VERTICAL (tiered outboard)

LineBOSS™

Distribution Switch Fax-Back Form for Price Quotations

(209) 931-8186

Company Name _____ Contact Name _____

Address 1 _____ Telephone Number _____

Address 2 _____ Facsimile Number _____

City _____ State Zip code _____ E-mail address _____

Make copies of this form to transmit your switch requirements. If you have your own standard's drawing, please fill out the customer information and send it with this fax form.

Step1. Voltage Class _____kV Continuous current rating①: _____A Momentary current_____kA

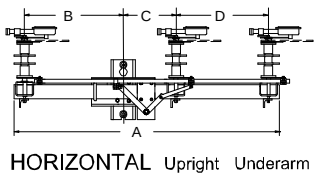
Step 2. Insulator type (circle one): Silicone Porcelain One BIL class higher?_____

Step 3. Interrupter type (circle one): None ArcHorn ArcWhip ArcChute AmpRupter AmpVac

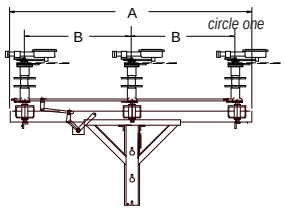
Step 4. Crossarm type (circle one): Galvanized steel Fiberglass Aluminum

Step 5. Select the configuration (circle one) and specify spacing dimensions, if necessary:

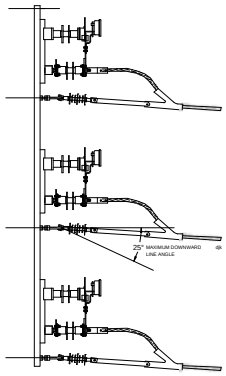
"A" _____ "B" _____ "C" _____ "D" _____ "E"_____



HORIZONTAL Upright Underarm

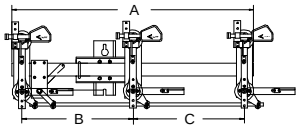


HORIZONTAL, Center mount

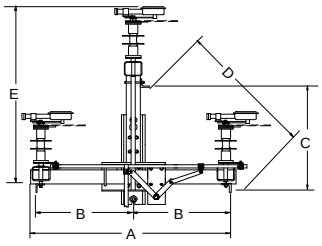


TAP SWITCH

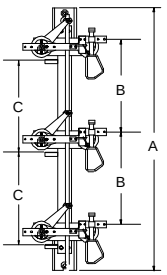
1-Way 2-Way 3-Way



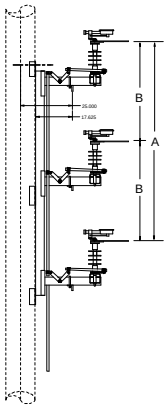
RISER



DELTA, Triangular/Pole top

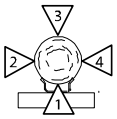


VERTICAL
Phase-over-phase



VERTICAL
Tiered outboard

Step 6. Select the control mechanism : ☐ Reciprocating (⇧⇩) ☐ Torsional (↻) Clockwise or Counterclockwise
☐ Hookstick *to open; viewed looking down on the handle*

Step 7. Select control location: 

☐ Specified location; quadrant _____

① LineBOSS switches are ANSI rated switches. The LineBOSS Lx6xxxxx is rated 600 Amps continuous current per the ANSI C37.30 temperature rise test requirements, and for 900 Amp continuous current per the IEEE 1247 temperature rise test requirements. The LineBOSS Lx9xxxxx is rated 900 Amps continuous current per the ANSI C37.30 temperature rise test requirements. The LineBOSS Lx1xxxxx is rated 1200 Amps continuous current per the ANSI C37.30 temperature rise test requirements. Momentary current ratings (10 cycle) are: Lx6xxxx 600 A (ANSI C37.30) = 40 kA
Lx9xxxx 900 A (ANSI C37.30) = 51 kA
Lx1xxxx 1200 A (ANSI C37.30) = 70 kA

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Step 8. Select control rod (circle one): Galvanized pipe: ¾" 1" 1½" other_____
Fiberglass: 1" round 1¾" square other_____

Step 9. Select control rod length (circle one): 30 ft. 40 ft. other_____

Step 10. Select additional accessories and modifications (check off and write in)

- ☐ "Interrupter Latched" indicator reflective flags (as viewed from directly under the crossarm; Yellow flags indicate CAUTION, an open or improperly closed switch i.e. interrupter not latched)
- ☐ Provision for Neutral (4-wire)
- ☐ Pole mounting bands; Specify _____
- ☐ Substation mounting: Specify base mounting dimensions or furnish drawing.
- ☐ Surge Arrestor brackets ☐ set of 3 arrestor brackets ☐ set of 6 arrestor brackets
- ☐ Extension links: ☐ set of 6; each 6" long ☐ set of 6; each 14" long
- ☐ Terminals: ☐ Terminal paddle for fired wedge connectors _____(specify size)
  - ☐ Terminals, 2-hole copper NEMA pad #2-500 kcmil (600 & 900 A switch) Specify:_____
  - ☐ Terminals, 4-hole copper NEMA pad 500-750 kcmil (1200 A switch) Specify: _____
  - ☐ Terminals, other; _____(specify size)
- ☐ Sensor Brackets; 1 set of 3 brackets
- ☐ Current/Voltage Sensors: 3 each of . . . . ☐ Current ☐ Voltage ☐ Current/Voltage
- ☐ Fiberglass section in pipe control rod: ☐ 1" round fiberglass ☐ 1¾" square fiberglass
- ☐ Station post insulator in control rod section
- ☐ Intermediate control rod guides ☐ Oval-eye Nuts ☐ Swing-arm type
- ☐ Bonded handle ☐ Grounding connector on crossarm _____ AWG range
- ☐ Key Interlock - single key for circuit switching safety ("locked open")
- ☐ Crossarm Braces ☐ Galvanized Steel ☐ Fiberglass
- ☐ Lifting Points ☐ Single ☐ Double

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LineBOSS™

Air-break Disconnect Switch Attachment Selection Information

AmpRupter™

LineBOSS™ Selection Guide suffix "L"

The Inertia AmpRupter utilizes expulsion tube interrupter technology to break current loads up to 900 amps at 27 kV. It is used for load-break, loop break, line charging and cable charging switching operations. The AmpRupter was tested to IEEE 1247-1998 IEEE Standard for Interrupting Switches for Alternating Current Rated Above 1000 Volts. The mechanical life of the AmpRupter is 2,500 operations. The electrical life of the AmpRupter is dependant on the amount of load interrupted.

AmpRupter load interruption occurs as the switch blade leaves the contact clip; making contact with the catch arm. At this point, current is shunted through the actuator arm, through the contacts to the load side. As the blade continues towards its open position, the internal spring powered mechanism trips; breaking the internal contacts. This action evolves a pressurized non-conductive gas that extinguishes the arc. This process occurs within one half cycle (first zero crossing), and will not "chop" the current upon circuit interruption. The speed of the AmpRupter mechanism is not dependent on the switch operating speed, insuring that the load breaking capabilities are consistent regardless of switch opening speed. The AmpRupter automatically resets for the next operation. The AmpRupter is not in the current path during the switch closing operation, and has no fault closing capabilities. The AmpRupter is in the current path **during the switch opening operation only**.

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AmpVac™

LineBOSS™ Selection Guide suffix "V"

The AmpVac is an enclosed vacuum bottle interrupter where no gases are vented to the atmosphere. The AmpVac interrupter has much higher interruption capabilities than other load break devices. Single contact AmpVac interrupters break loads up to 1500 amps at 35 kV. Single vacuum bottle interrupters may be used at increased voltages for parallel or loop switching applications as long as the peak recovery voltage does not exceed 38 kV. The mechanical and electrical life of the AmpVac is 5000 operations at full load. The AmpRupter was tested to IEEE 1247-1998 .

V2 (2-gap vacuum Interrupter)
V3 (3-gap vacuum Interrupter)

LineBOSS™ 46 kV - 69 kV Selection Guide suffix "V2"& "V3"

The V2 and V3 vacuum Interrupters are two-gap and three-gap load-breaking devices, that utilize vacuum bottle technology. V2 vacuum interrupters, with two vacuum bottles in series, can break loads up to 2000 Amps at 48 kV. V3 vacuum interrupters, with three vacuum bottles in series, can break loads up to 2000 Amps at 69 kV. Vacuum bottle interrupters are not in the current path during the switch closing operation, and have no fault closing capabilities. The mechanical and electrical life of the V3, 3-Gap vacuum interrupter is 5000 operations at full load.

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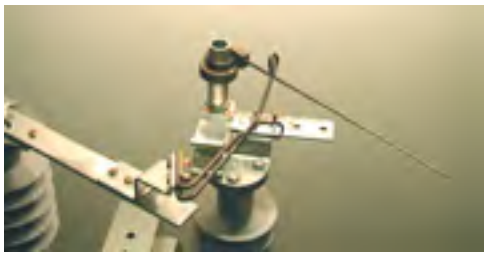
ArcChute (Delrin "Clapper")

LineBOSS™ Selection Guide suffix "H"

The ArcChute Interrupter is a minimal load-breaking device that utilizes air break technology. The arc is quenched as the two Delrin arc chute plates close and the arc whip breaks away establishing the required metal-to-metal open gap. Arc Chute interrupters are widely used for line charging and magnetizing current interrupting. Full loadbreak and parallel breaking currents up to 150 amps at 21kV or 20 amps at 34.5kV are common applications. Arc Chute interrupters are only in the current path during the opening process and have an average life of 150 operations.



ArcWhip

LineBOSS™ Selection Guide suffix "Q"

The ArcWhip has a small interrupting rating of between 10 and 20 amps. ArcWhips can clear arcs from residual energy stored in capacitor banks, transformers or conductors. ArcWhips are only in the current path during switch opening operations, and have an average life of 150 open operations.

ArcHorn (not an interrupter)

LineBOSS™ Selection Guide suffix "A"

The Arc Horn is not an interrupter and has no ratings. It is used as an arc deflecting mechanism to save the life of switch blades and contact clips. The ArcHorn, also known as "sacrificial arcing horn", is the first point of contact during switch closing operations. The initial making current during a closing operation creates small arcs; pitting the arc horns. This "sacrificial" mechanism helps prevent degradation of the main contacts. The Arc Horn is used to redirect the arc resulting from residual or stored charge left after a down-line circuit is opened. Arc Horns will not prevent damage from the inadvertent opening of a loaded switch.

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Vacuum Bottle Interrupter Applications:

Type of Switching	AmpVac, 1-Gap Vacuum Interrupter					V2, 2-Gap		V3, 3-Gap	
	15.5 kV	25.8 kV	38.0 kV*	48.3 kV*	72.5 kV *	38.0 kV	48.3 kV	48.3 kV	72.5 kV
Loadbreak, 70% PF	1500 A	1500 A	1500 A	1500 A	1500 A	2000 A	2000 A	2000 A	2000 A
Parallel Break < 30% PF	1500 A	1500 A	1500 A	1500 A	1500 A	2000 A	2000 A	2000 A	2000 A
Cable Charging	1500 A	950 A	100 A	7 A**	3 A**	600 A	450 A	600 A	70 A
Magnetizing	1500 A	1000 A	300 A	7 A**	3 A**	700 A	700 A	800 A	600 A
Capacitor Bank,(grnd. neut.)	1500 A	950 A	100 A	7 A**	3 A**	600 A	700 A	800 A	600 A

* Recovery voltage between source and load must be less than 38 kV, immediately.
** Higher current rating available with use of a voltage limiter; Consult the factory for details.

Interrupter Attachment Device Applications:

Type of Switching	ArcHorn	ArcWhip	ArcChute	AmpRupter™
Loadbreak, >70% PF	NA	NA	15kV : 150 A 21 kV :100 A 35 kV : 20 A	15 kV : 900 A 23 kV : 900 A 34 kV : 600 A
Parallel Break (Loop) < 30% Power Factor	NA	NA`	15kV : 150 A 21 kV : 100 A 35 kV : 20 A	5 kV : 900 A
Cable Charging	NA	up to 72.5 kV : 15 A	up to 72.5 kV : 15 A	27 kV : 26 A
Line Charging	NA	up to 72.5 kV : 3500 kVA	up to 72.5 kV : 3500 kVA	23 kV : 6.2 A
Magnetizing	NA	NA	NA	27 kV : 2.7 A

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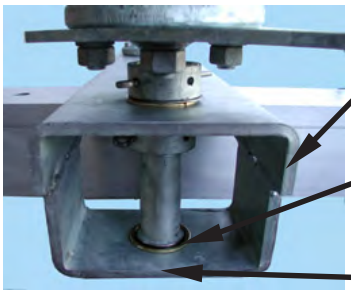
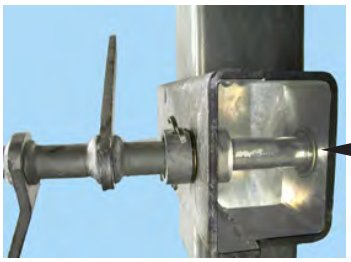
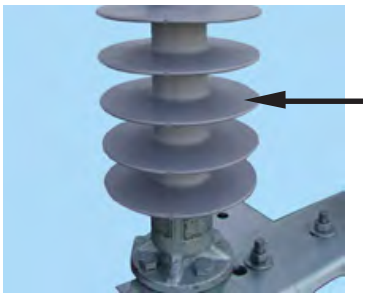
LineBOSS™

15 kV - 35 kV, 600 - 1200 Amp Sidebreak Style Switch Features and Benefits

Specify these Inertia LBS features for longer service-life switches.

FEATURE	BENEFITS
 **1/4" hot-rolled steel phase base**	Many manufacturers use 7 gauge (3/16") steel bases that can flex during normal operation, causing blade-to-clip misalignment.
Stainless steel-brass bearings on rotating stacks	Some rotating insulator spindles and bearings are supported solely on the 3/16" thick phase base surface. The spindle and its bearing should be supported at both the phase base surface and the end of the spindle opposite the blade. A 1/4" thick base supporting the rotating stack at two points assures a robust construction that maintains the blade to contact alignment throughout the life of the switch.
Rotating insulator shaft support	Some rotating insulator spindles are made of zinc chromate plated steel which can rust. Others use cast aluminum which is inexpensive, but has poor wear characteristics and does not have the strength of steel. Switches can come out of contact adjustment if a spindle bearing fails. The added benefit of stainless steel and brass ensures a long reliable switch life.
 **Stainless steel/ brass bearings in the bellcrank**	Bearings in the bellcrank reduce the force required to operate the switch and eliminate corrosion due to plated metal-to-metal wear.
 **ANSI TR2xx series, 3" bolt circle station post insulators are provided in silicone or porcelain.**	These insulators have superior mechanical characteristics over 2¼" BC insulators. Silicone insulators have additional BIL, leakage and weatherabilty ratings over either porcelain or epoxy insulators.
 **Busbar grade copper contact components.**	Busbar grade copper contact components are structurally superior with greater conductivity than cast contact material. Cast aluminum and copper bronze contact castings are 34-36% conductive and often contain unseen surface irregularities and voids that create 'hot spots'. Busbar grade C110 copper is 99% conductive and is many times smoother to provide better terminal connection surfaces and is not subject to unseen porosity. With this contact system, the LineBOSS has achieved the highest momentary and fault close ratings in the industry. Momentary: to 70 kA for 10 cycles and 44 kA for 3 seconds. Fault close: 30 kA (2X)
 **Formed inter-phase rod clamps with two-bolt clamping.**	Often, switch manufacturers use cast clamps to connect the interphase rod to the rotating stacks. This clamping method has one fixed side and only one open side to pinch the interphase rod. The interphase rod clamp is the device that assures uniform operation of the three switch phases. Any slippage results in an improperly adjusted switch, with not all phases fully closed into the contacts. The LineBOSS uses formed two-piece clamps to compress the interphase rod surface with significantly more distributed pressure. This helps to maintain uniform operation of all three phases throughout the life of the switch.

Insulator Type (25 kV example)	Load Ratings: Cantilever	Load Ratings: Torsion	B.I.L. Rating Peak
3" BC silicone	1,200 lbs.	6,000 lbs.	165 kV
3" BC porcelain	2,000 lbs.	7,000 lbs.	150 kV
2¼" BC porcelain	1,000 lbs.	3,000 lbs.	150 kV
2¼" BC epoxy	1,200 lbs.	5,000 lbs.	150 kV

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INERTIA Engineering & Machine Works, Inc.
6665 Hardaway Road • Stockton, CA 95215
Tel: 800-791-9997
Fax: 209-931-8186
E-mail: sales@inertiaworks.com

LineBOSS™

SPECIFICATION ELEMENTS
15 kV, 25 kV & 35 kV, 600, 900 & 1200 A switches

Specification Elements

Part Description:

GANG OPERATED LOADBREAK OVERHEAD SWITCHES (vertical, horizontal, riser, delta (pole top), twin circuit or horizontal underarm).

1. Nominal voltage: (15 kV, 25 kV or 35 kV)
2. Insulators: Silicone rubber station post; BIL rating (15 kV: 130 kV, 25 kV: 175 kV, 35 kV: 240 kV)
3. Switch bearings: Stainless steel to brass on all rotating insulators and switch operating shafts.
4. Loadbreak shall be capable of: 900 A load breaking, 25 A cable charging, 900 A parallel switching.
5. Contacts: Copper busbar blade and reverse loop contacts are to be silver-plated, N.E.M.A. terminal pads shall be tin-plated copper busbar with a sur face finish of 32 minimum.
6. The switch shall provide means to attach line current/voltage sensors.
7. All ferrous components shall be hot dip galvanized.
8. Loadbreak shall be self-resetting; where the trip ping speed of the loadbreak shall be independent of switch operating speed. No component of the loadbreak shall make contact with the closing switch blade prior to main switch contact engagement. All actuating mechanism components of the loadbreak device must be stainless steel or non-corrosive parts.
9. Switch base (crossarm) is to be: (hot dip galvanized steel, fiberglass or aluminum) see LineBOSS™ switch selection guide for dead-end loading specifications. Specify pole clearance spacing i.e. 24", GO95.
10. Operating rod: specify type and length of control rod, and if an insulated section is required (see LineBOSS selection guide).
11. The gang operated sidebreak style switch shall be capable of seamless automation with a torsional or reciprocating motor operator as dictated by the switch type. It shall be available with the motorized switch operator replacing the manual handle.
12. Testing performed in accordance with standards: IEEE C37.32-1996, ANSI/IEEE C37.71-1984 and IEC 265-1,1983 as applicable for 12 kV, 21 kV or 34.5 kV (system voltage).

Switch Ratings

Voltage Class: 15.5 kV, 25.8 kV and 38.0 kV

Current Class: 600, 900 and 1200 A continuous

Fault Close: 15 kA rms-asym: 5 X Manual Operation
20 kA rms-asym: 3 X Manual Operation
30 kA rms-asym: 2 X Manual Operation

Momentary current: 600 A: 40,000 A-rms 10 cycles
25,000 A-rms 3 seconds
900 A: 51,000 A-rms 10 cycles
32,000 A-rms 3 seconds
1200 A: 70,000 A-rms 10 cycles
44,000 A-rms 3 seconds

Ice breaking: ¾" (manual operation)

Mechanical: 5000 Open/Close cycles

ACCC Designation DO6
Loadability factor 1.22 at 25 Deg. C.
(not applicable to loadbreak devices)

Loadbreak Device Ratings

AmpVac Loadbreak:	12 kV through 35 kV
Load Current:	1500 A-rms
Parallel Current:	1500 A-rms
Cable Charging:	600 A-rms
Magnetizing Current:	600 A-rms

AmpRupter Loadbreak:		
Load Current:	900 A-rms	@ 23 kV
Parallel Current:	900 A-rms	@ 5 kV
Cable Charging:	26 A-rms	@ 27 kV
Magnetizing Current:	2.7 A-rms	@ 27 kV

Arc Chute Loadbreak:	@ 15 kV	21 kV	35 kV
Load Current:	150 A	100 A	20 A
Parallel Current:	150 A	100 A	20 A
Cable charging:	15 A	15 A	15 A
Magnetizing Current:	NA	NA	NA

Quick Break Whip Ratings:

Voltage (nominal)	Cable Charging	Line Charging
15 kV - 35 kV	15 A-rms	3500 kVA

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INERTIA Engineering & Machine Works, Inc.
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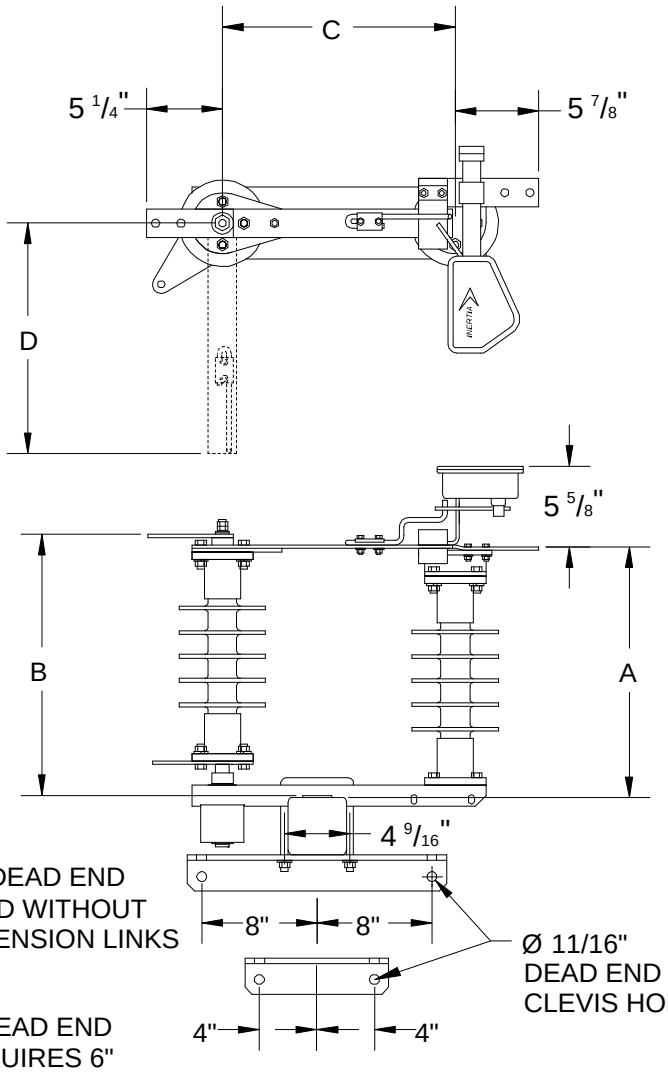
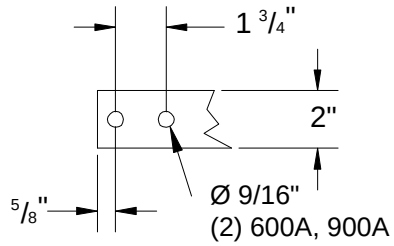


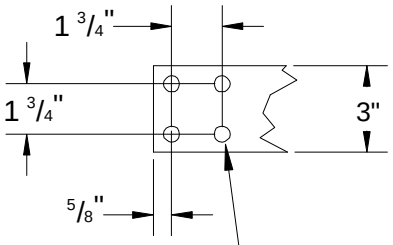
18" DEAD END
USED WITHOUT
EXTENSION LINKS

8" DEAD END
REQUIRES 6"
OR 14" EXTENSION
LINKS

Ø 11/16"
DEAD END
CLEVIS HOLES (4)



Ø 9/16"
(2) 600A, 900A
NEMA PADS



Ø9/16
(4) 1200A
NEMA PADS

DIM	NOMINAL VOLTAGE RATING		
	15 kV	25 kV	35 kV
A	13 1/2"	17 1/2"	21 1/2"
B	14 1/4"	18 1/4"	22 1/4"
C	13 3/16"	16 3/16"	22 3/16"
D	13"	16"	22"

SWITCH RATINGS

Voltage Class:	15 kV nom. (15.5 kV max.) 110 kV BIL 25 kV nom. (25.8 kV max.) 150 kV BIL 35 kV nom. (38.0 kV max.) 200 kV BIL
Current Class:	600, 900 and 1200 Amps, continuous
Momentary Current Rating:	
600 A Continuous:	40,000 Amps, 10 cycles 25,000 Amps, 3 seconds
900 A Continuous:	51,000 Amps, 10 cycles 32,000 Amps, 3 seconds
1200 A Continuous:	70,000 Amps, 10 cycles 44,000 Amps, 3 seconds

This drawing is for illustrative purposes only and therefore; may, or may not reflect the current revision of this drawing. Please request the current revision from the factory.

INERTIA ENGINEERING	Material:		Description: LBS, 15 kV - 35 kV SINGLE PHASE, Dim.
	Finish		
	Scale:	None	Drawing No: 9225M
	Drawn by:		Revision: 0
	Date:	09/28/01	

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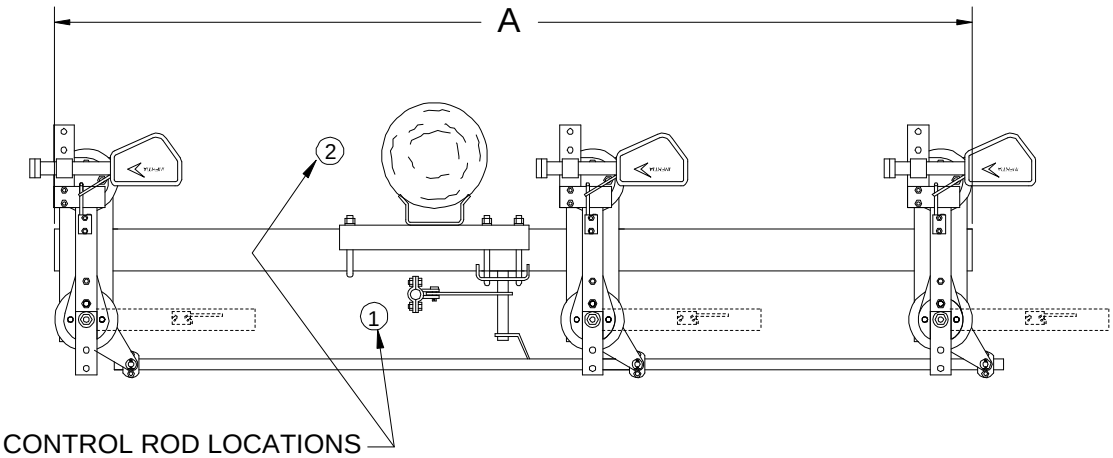

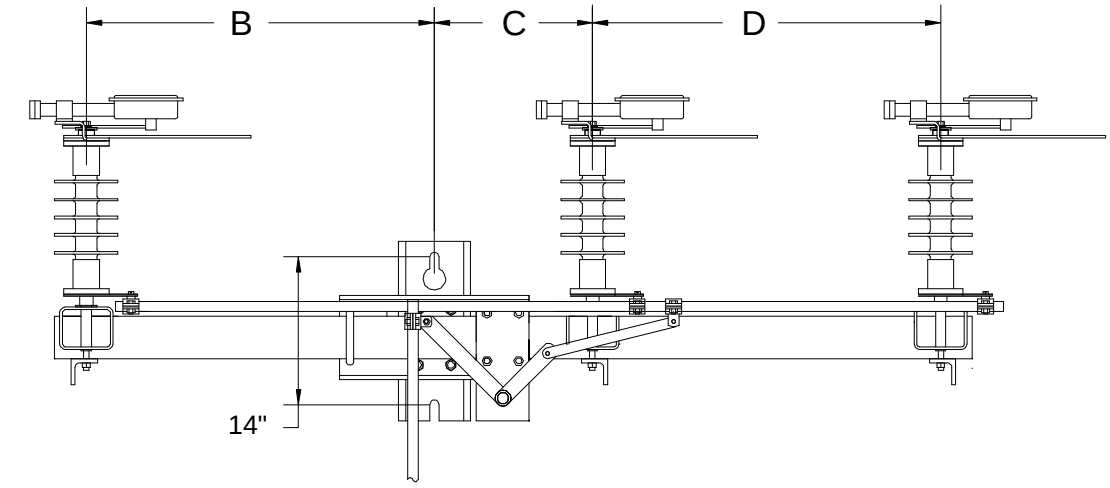

DIM	NOMINAL VOLTAGE RATING		
	15 kV	25 kV	35 kV
A	76"	87"	120"
B	26"	30"	50 1/2"
C	18"	18"	21"
D	26"	33"	45"

SWITCH RATINGS

Voltage Class: 15 kV nom. (15.5 kV max.) 110 kV BIL
25 kV nom. (25.8 kV max.) 150 kV BIL
35 kV nom. (38.0 kV max.) 200 kV BIL

Current Class: 600, 900 and 1200 Amps, continuous

Momentary Current Rating:

600 A Continuous:	40,000 Amps, 10 cycles 25,000 Amps, 3 seconds
900 A Continuous:	51,000 Amps, 10 cycles 32,000 Amps, 3 seconds
1200 A Continuous:	70,000 Amps, 10 cycles 44,000 Amps, 3 seconds

This drawing is for illustrative purposes only and therefore; may, or may not reflect the current revision of this drawing. Please request the current revision from the factory.

INERTIA ENGINEERING	Material:		Description: LBS, 15 - 35 kV HORIZONTAL, Dimensions
	Finish		
	Scale:	None	Drawing No: 9226M / Revision: 1
	Drawn by:		
	Date:	09/28/01	

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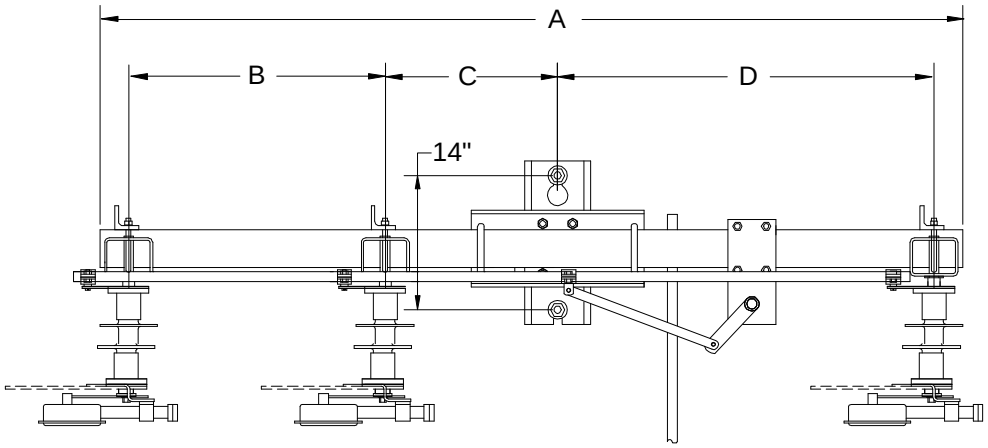
UNDERARM CONSTRUCTION REDUCES WILDLIFE CAUSED OUTAGES AND PROVIDES A CLEAR VIEW OF SWITCH CONTACTS TO WORKMEN.

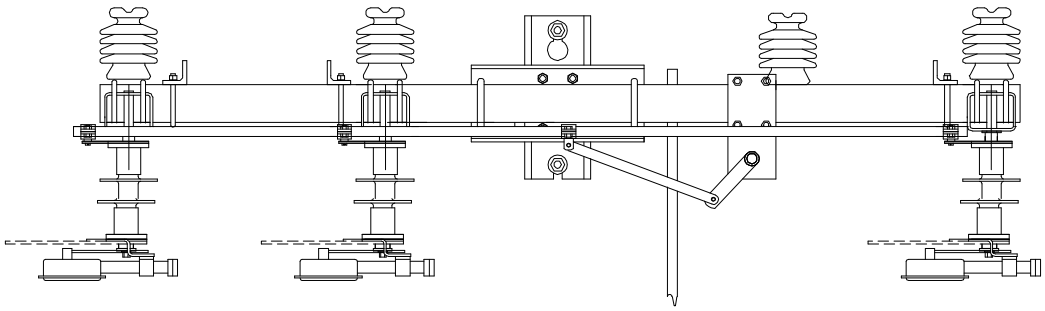


THREE WIRE SWITCH DIMENSIONS.

NOMINAL KV RATING			
DIM	15	25	35
A	90"	96"	126"
B	27"	33"	48"
C	18"	18"	18"
D	39"	39"	54"

SWITCH RATINGS

Voltage Class:	15 kV nom. (15.5 kV max.) 110 kV BIL 25 kV nom. (25.8 kV max.) 150 kV BIL 35 kV nom. (38.0 kV max.) 200 kV BIL
Current Class:	600, 900 and 1200 Amps, continuous
Momentary Current Rating:	
600 A Continuous:	40,000 Amps, 10 cycles 25,000 Amps, 3 seconds
900 A Continuous:	51,000 Amps, 10 cycles 32,000 Amps, 3 seconds
1200 A Continuous:	70,000 Amps, 10 cycles 44,000 Amps, 3 seconds



UNDERARM SWITCH CONSTRUCTION APPLICATIONS:

TANGENT
ANGLE
TANGENT RISER
DEADEND RISER
ALLEY ARM

FOUR WIRE TANGENT
FOUR WIRE ANGLE
FOUR WIRE TANGENT RISER
FOUR WIRE DEADEND RISER
FOUR WIRE ALLEY ARM

CONTACT THE FACTORY FOR CONTROL TYPES AND SWITCH DIMENSIONAL INFORMATION

This drawing is for illustrative purposes only and therefore; may, or may not reflect the current revision of this drawing. Please request the current revision from the factory.

INERTIA ENGINEERING	Material:		Description: LBS, 15 - 35 kV HORIZONTAL, Underarm Dimensions.
	Finish		
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	Drawn by:		
	Date:	09/28/01	

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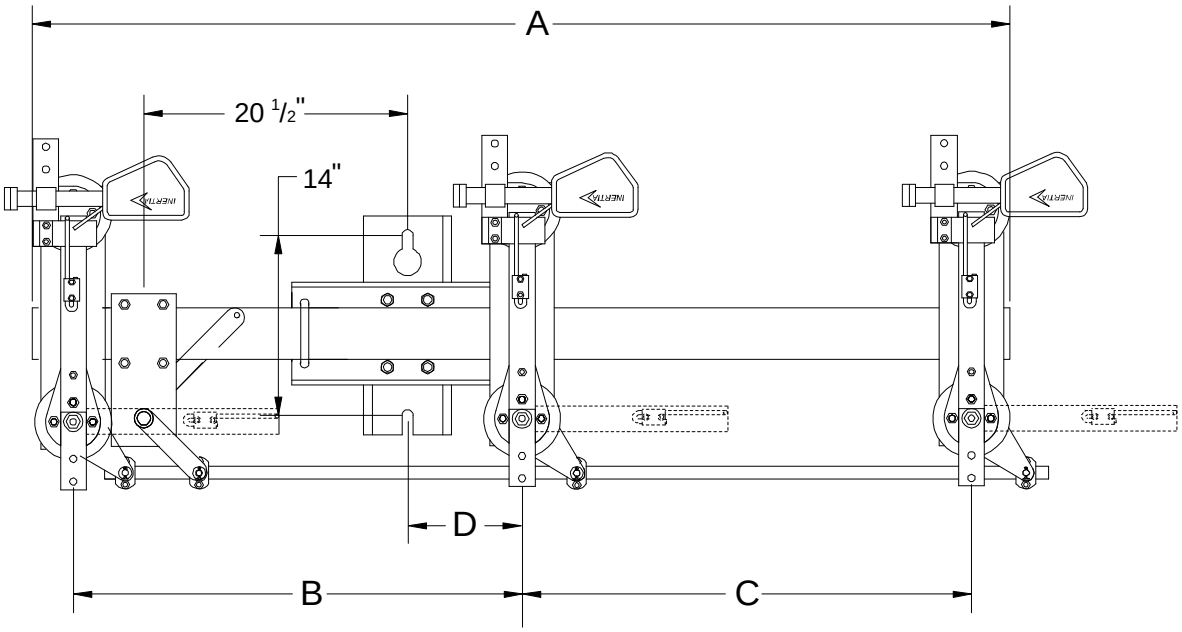

DIM	NOMINAL VOLTAGE RATING		
	15 kV	25 kV	35 kV
A	76"	87"	102"
B	33 1/2"	48"	48"
C	35"	33"	48"
D	8"	8"	8"

SWITCH RATINGS

Voltage Class: 15 kV nom. (15.5 kV max.) 110 kV BIL
25 kV nom. (25.8 kV max.) 150 kV BIL
35 kV nom. (38.0 kV max.) 200 kV BIL

Current Class: 600, 900 and 1200 Amps, continuous

Momentary Current Rating:

600 A Continuous:	40,000 Amps, 10 cycles 25,000 Amps, 3 seconds
900 A Continuous:	51,000 Amps, 10 cycles 32,000 Amps, 3 seconds
1200 A Continuous:	70,000 Amps, 10 cycles 44,000 Amps, 3 seconds

This drawing is for illustrative purposes only and therefore; may, or may not reflect the current revision of this drawing. Please request the current revision from the factory.

INERTIA ENGINEERING	Material:		Description: LBS, 15 kV - 35 kV RISER, Dimensions
	Finish		
	Scale:	None	Drawing No: 9185M / Revision: 2
	Drawn by:		
	Date:	07/06/06	

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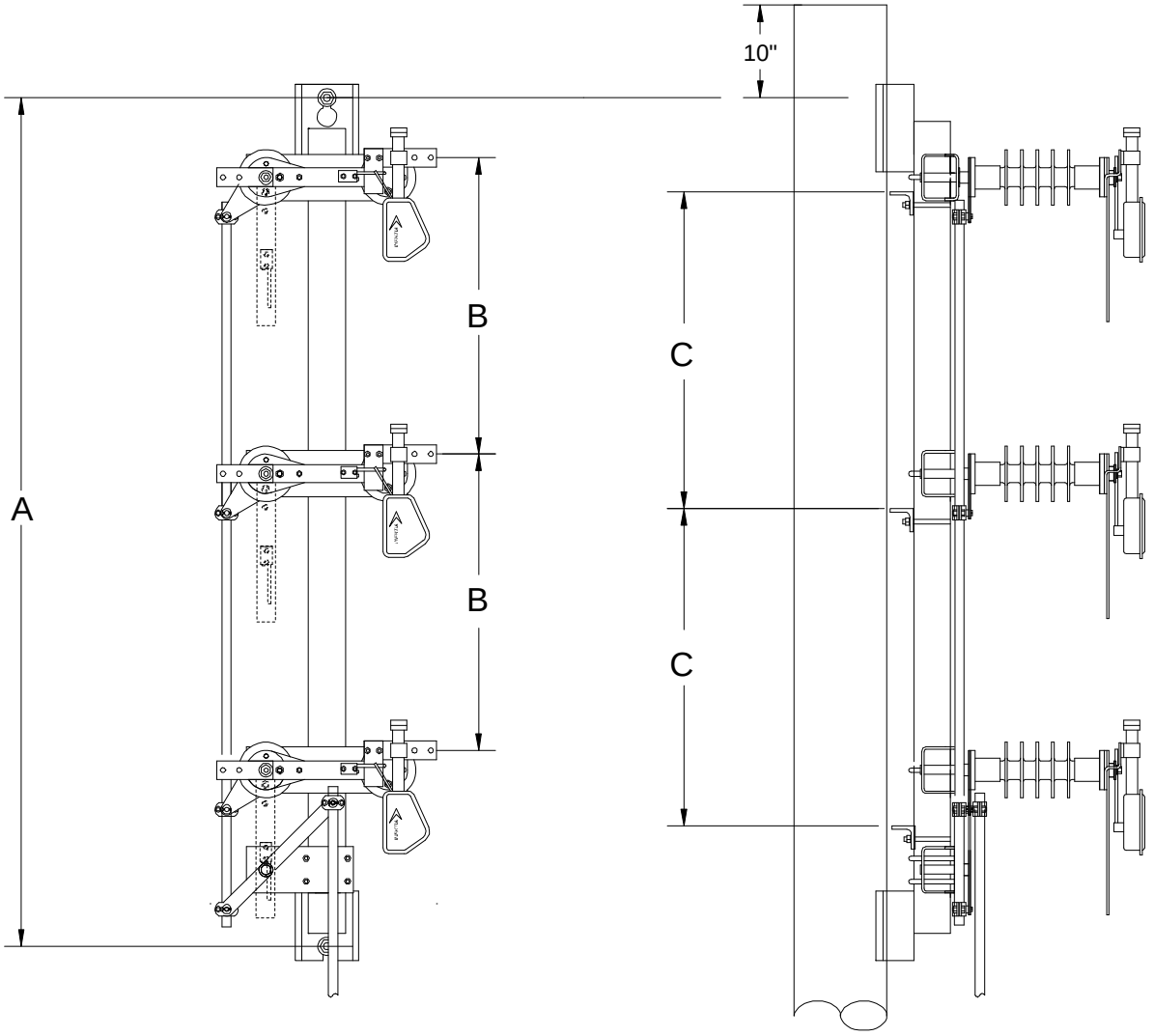

DIM	NOMINAL VOLTAGE RATING		
	15 kV	25 kV	35 kV
A	81"	92"	125"
B	26 1/4"	32"	48 1/2"
C	28 1/2"	34 1/4"	50 3/4"

SWITCH RATINGS

Voltage Class:	15 kV nom. (15.5 kV max.) 110 kV BIL 25 kV nom. (25.8 kV max.) 150 kV BIL 35 kV nom. (38.0 kV max.) 200 kV BIL
Current Class:	600, 900 and 1200 Amps, continuous
Momentary Current Rating:	
600 A Continuous:	40,000 Amps, 10 cycles 25,000 Amps, 3 seconds
900 A Continuous:	51,000 Amps, 10 cycles 32,000 Amps, 3 seconds
1200 A Continuous:	70,000 Amps, 10 cycles 44,000 Amps, 3 seconds

This drawing is for illustrative purposes only and therefore; may, or may not reflect the current revision of this drawing. Please request the current revision from the factory.

INERTIA ENGINEERING	Material:		Description: LBS, 15 kV - 35 kV, VERTICAL, (Phase-over-phase) Dimensions
	Finish		
	Scale:	None	Drawing No: 9184M
	Drawn by:		Revision: 01
	Date:	03/06/01	

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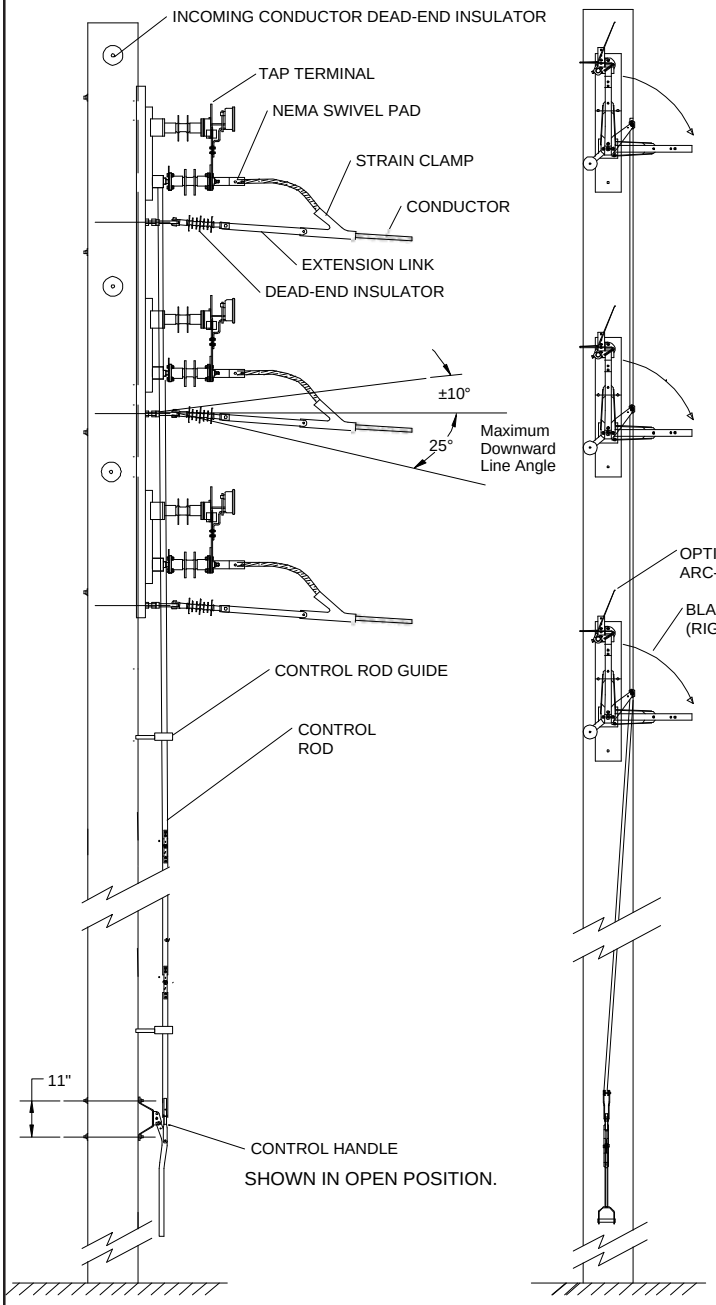
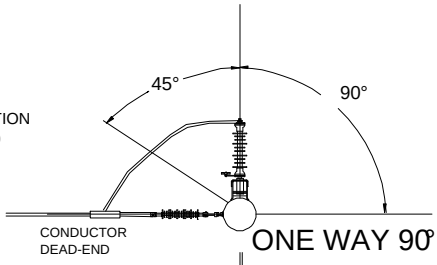


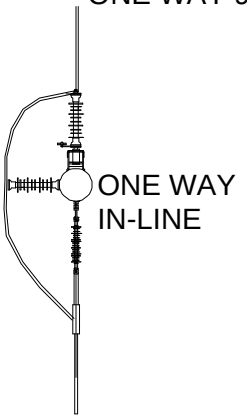
LineBOSS™ TAP SWITCH Configurations

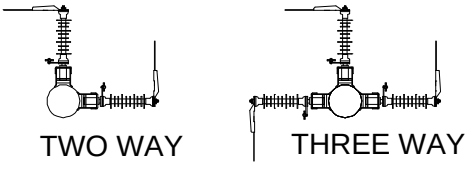
THE VERTICALLY MOUNTED TAP SWITCH IS A GANG OPERATED POLE MOUNTED SWITCH WHICH CAN BE USED IN VARIOUS CONSTRUCTION APPLICATIONS. RIGHT HAND (SHOWN) AND LEFT HAND OPERATING MODELS ARE ADAPTABLE TO EXTREME HORIZONTAL AND VERTICAL LINE ANGLES. TIN PLATED COPPER BUSS "TEES" AND BOLTED CONDUCTOR CLAMPS ARE AVAILABLE FOR CONNECTING TWO AND THREE-WAY SWITCH CONFIGURATIONS.

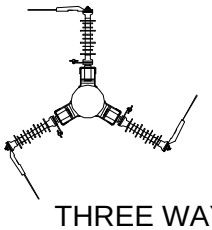
Switch dead-end conductor can dead-end to the pole at up to 45°on this side.

Switch dead-end conductor can dead-end to the pole at up to 90°on this side.









SWITCH RATINGS	
Voltage Class:	15 kV nom. (15.5 kV max.) 110 kV BIL 25 kV nom. (25.8 kV max.) 150 kV BIL 35 kV nom. (38.0 kV max.) 200 kV BIL
Current Class:	600, 900 and 1200 Amps, continuous
Momentary Current Rating:	
600 A Continuous:	40,000 Amps, 10 cycles 25,000 Amps, 3 seconds
900 A Continuous:	51,000 Amps, 10 cycles 32,000 Amps, 3 seconds
1200 A Continuous:	70,000 Amps, 10 cycles 44,000 Amps, 3 seconds

This drawing is for illustrative purposes only and therefore; may, or may not reflect the current revision of this drawing. Please request the current revision from the factory.

INERTIA ENGINEERING™	Material:		Description: LBS 15-35 kV, LineBOSS™ Tap Switches Dimensions
	Finish		
	Scale:	None	Drawing No: 9239M / Revision: 0
	Drawn by:		
	Date:	11/29/01	

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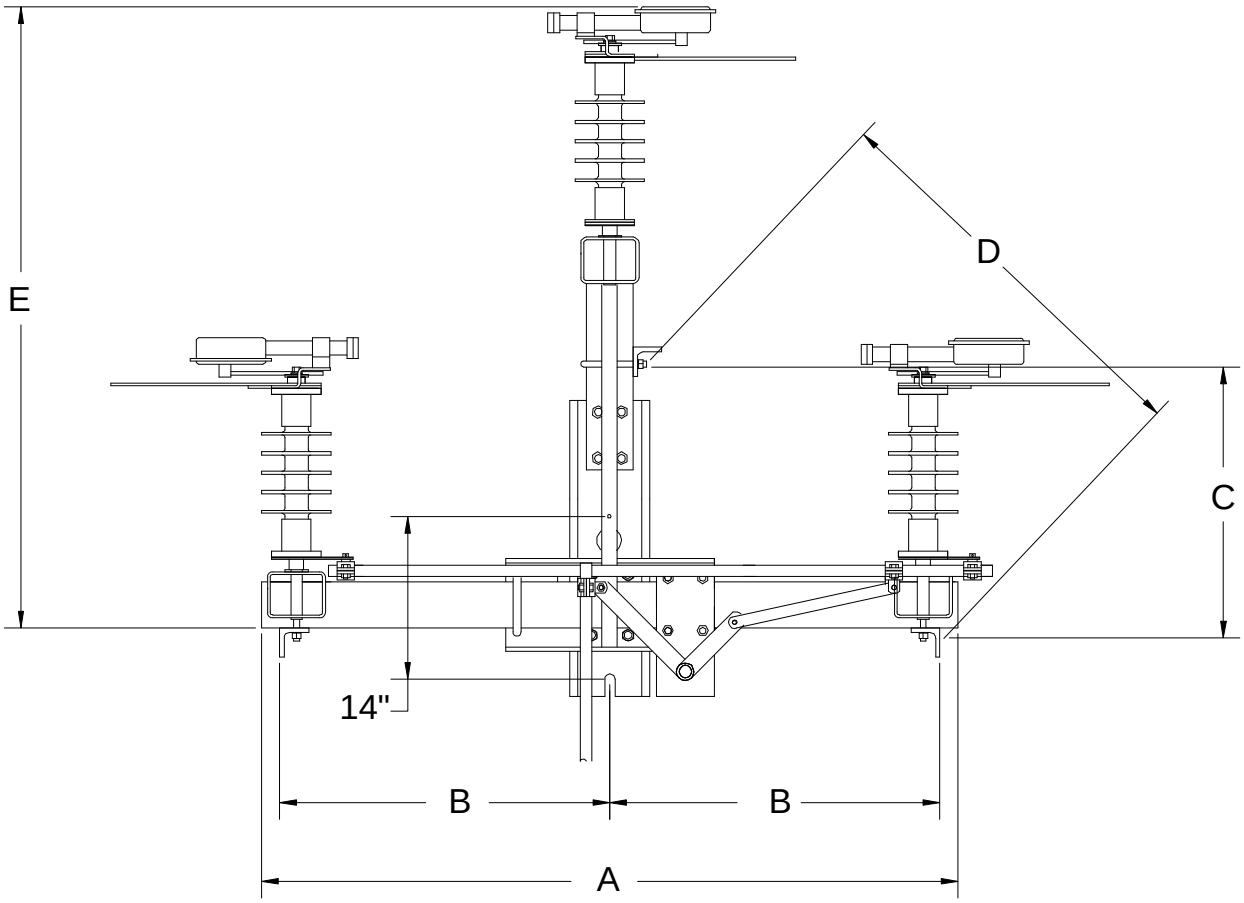

DIM	NOMINAL VOLTAGE RATING		
	15 kV	25 kV	35 kV
A	60"	60"	76"
B	30"	32"	36"
C	24"	24"	24"
D	35"	35"	41"
E	49"	53"	57"

SWITCH RATINGS

Voltage Class: 15 kV nom. (15.5 kV max.) 110 kV BIL
25 kV nom. (25.8 kV max.) 150 kV BIL
35 kV nom. (38.0 kV max.) 200 kV BIL

Current Class: 600, 900 and 1200 Amps, continuous

Momentary Current Rating:

600 A Continuous:	40,000 Amps, 10 cycles 25,000 Amps, 3 seconds
900 A Continuous:	51,000 Amps, 10 cycles 32,000 Amps, 3 seconds
1200 A Continuous:	70,000 Amps, 10 cycles 44,000 Amps, 3 seconds

This drawing is for illustrative purposes only and therefore; may, or may not reflect the current revision of this drawing. Please request the current revision from the factory.

INERTIA ENGINEERING	Material:		Description: LBS, 15kV-35 kV Delta (pole top) Dimensions
	Finish		
	Scale:	None	Drawing No: 9227M / Revision: 0
	Drawn by:		
	Date:	09/28/01	

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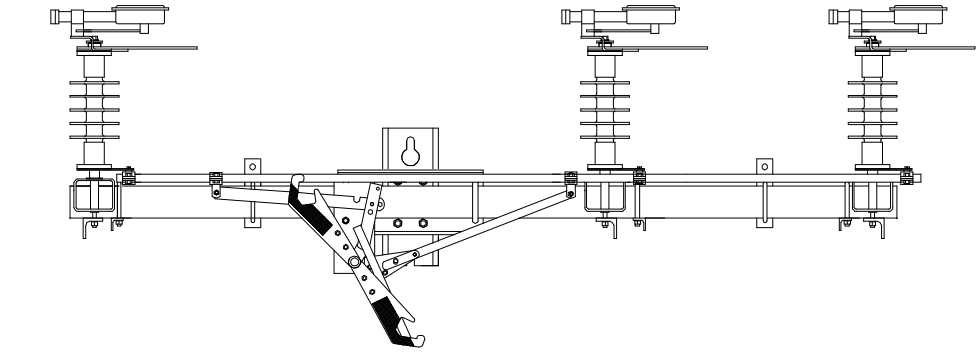

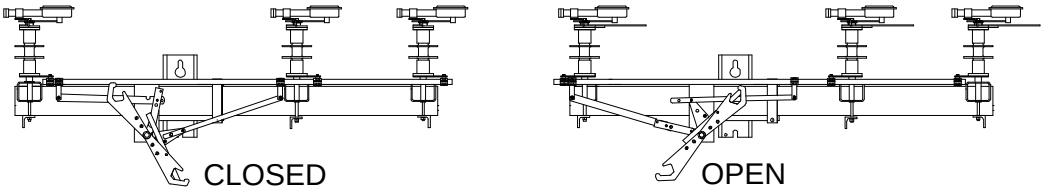

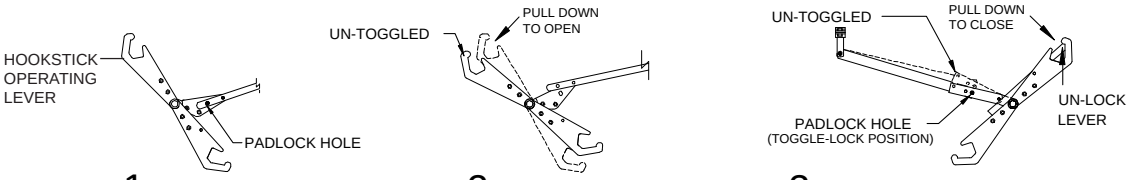

1 Switch Closed & Toggle Locked

2 Switch Closed & Un-toggled

3 Switch Open Toggle-locked & Un-toggled

MOUNT IT! WIRE IT! OPERATE IT!

- **Fast, Easy Installation**

The Inertia hookstick operated switch eliminates the need for a control rod, so there is no need for any field adjustment of the switch. Compression of the blades into the clips and interrupter timing are factory set. Without lower controls; pole clutter is reduced.

- **Versatile**

Hookstick operating mechanisms are available on Horizontal, Underarm horizontal, Riser, Vertical (phase over phase) and Delta (triangular) configurations.

- **Safe Operation**

The Inertia Hookstick safety features include:

1.) Hookstick mechanism is located below the xarm, away from hot parts.
2.) No springs that could be effected by ice.
3.) The switch bellcrank has built-in toggle-over in both the open and closed positions, which in conjunction to the lock-out bar feature, prevents inadvert ent operation of the switch from either position by perching wildlife.
4.) For night and inclement weather operation, the “hook” positions are high -lighted with a high visibility, yellow reflective surface.

- **Easy Operation**

The Inertia Hookstick bellcrank and rotating stacks have stainless steel-to-brass shaft bearings. Consider the savings in restrictive losses when the control rods, guides and handle are no longer a factor! This makes the Inertia Hookstick operated switch the easiest switch to operate. High leverage cam action ensures properly closed switch and reduced operating force.

This drawing is for illustrative purposes only and therefore; may, or may not reflect the current revision of this drawing. Please request the current revision from the factory.

INERTIA ENGINEERING	Material:		Description: Hook-stick Operated Switches, Crossarm mounted
	Finish		
	Scale:	None	Drawing No: 9298M / Revision: 0
	Drawn by:		
	Date:	10/02/06	

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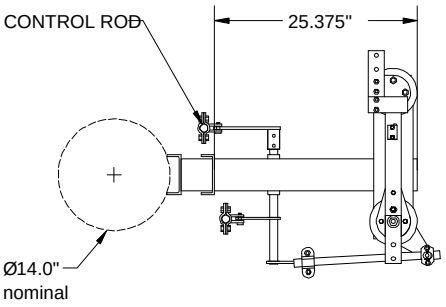
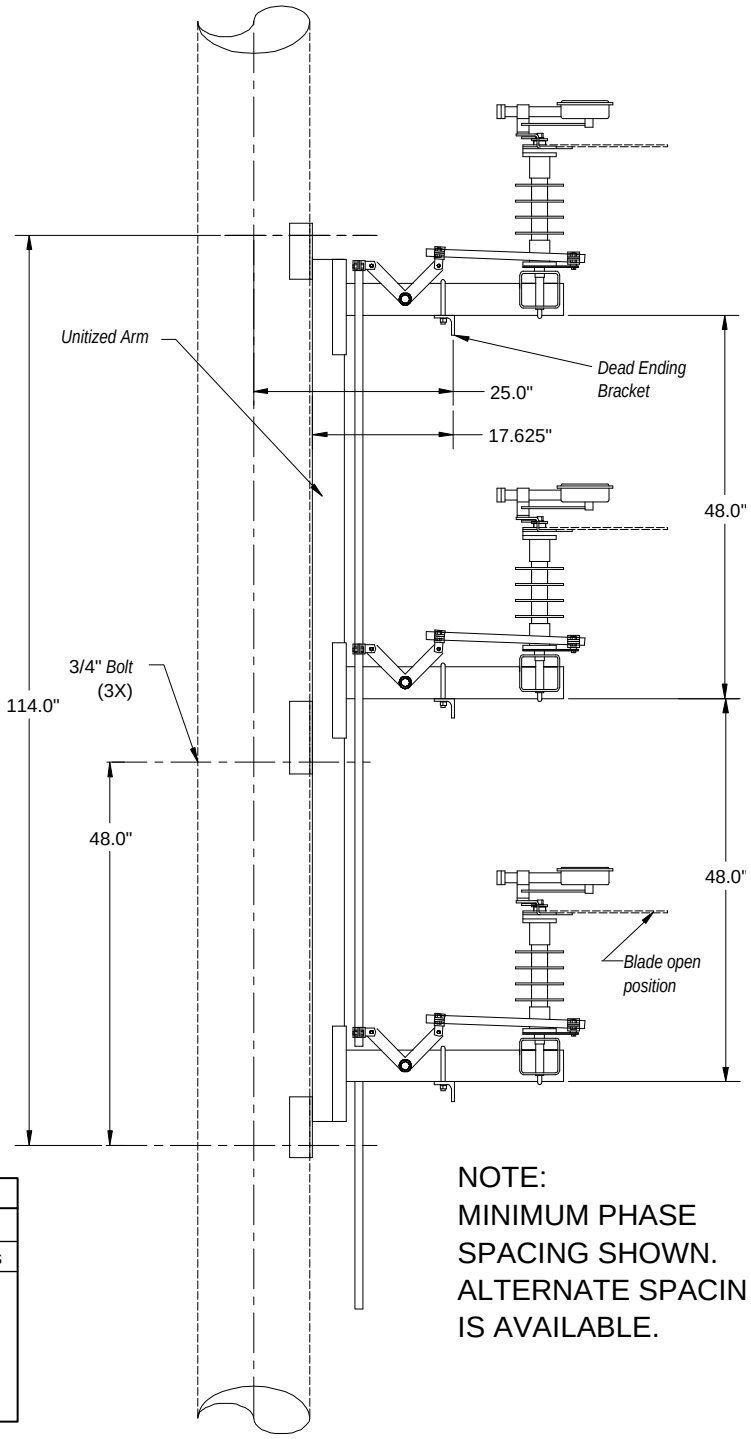


BOTTOM PHASE
TOP VIEW



SWITCH RATINGS	
Voltage Class25 kV nom(25.8 kV max.)150 kV BIL	
Current Class: 600, 900 and 1200 Amps, continuous	
Momentary Current Rating:	
600 A Continuous:	40,000 Amps, 10 cycles 25,000 Amps, 3 seconds
900 A Continuous:	51,000 Amps, 10 cycles 32,000 Amps, 3 seconds
1200 A Continuous:	70,000 Amps, 10 cycles 44,000 Amps, 3 seconds

NOTE:
MINIMUM PHASE
SPACING SHOWN.
ALTERNATE SPACIN
IS AVAILABLE.

This drawing is for illustrative purposes only and therefore; may, or may not reflect the current revision of this drawing. Please request the current revision from the factory.

INERTIA ENGINEERING	Material:		Description: 25 kV Tiered Outboard, Armless Unitized LineBoss Sidebreak GOAB Switch
	Finish		
	Scale:	None	Drawing No: 9374M / Revision: 0
	Drawn by:		
	Date:	05/21/04	

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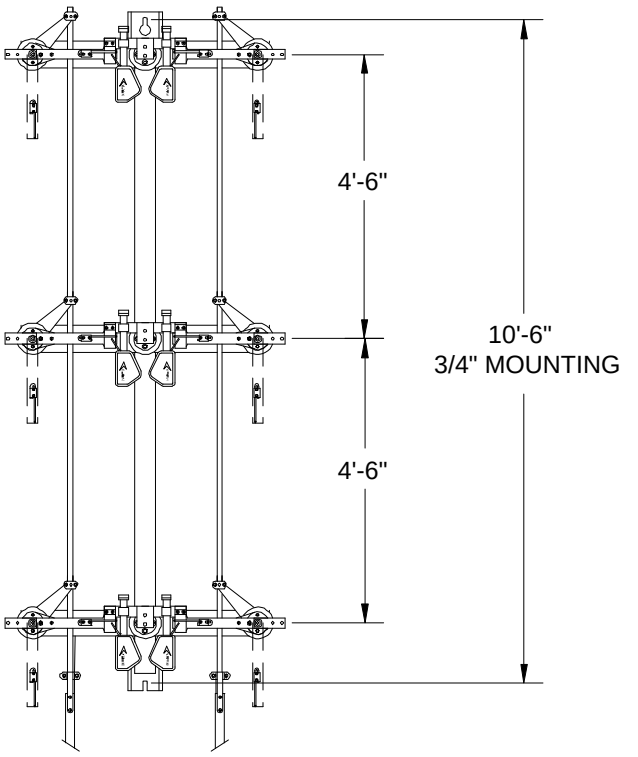

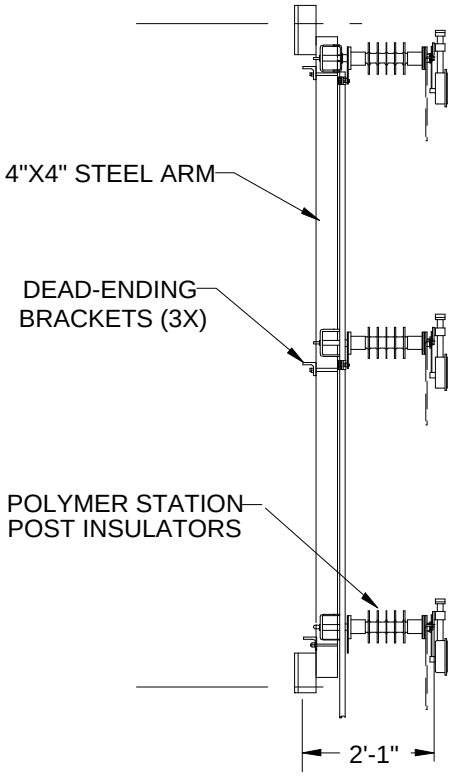

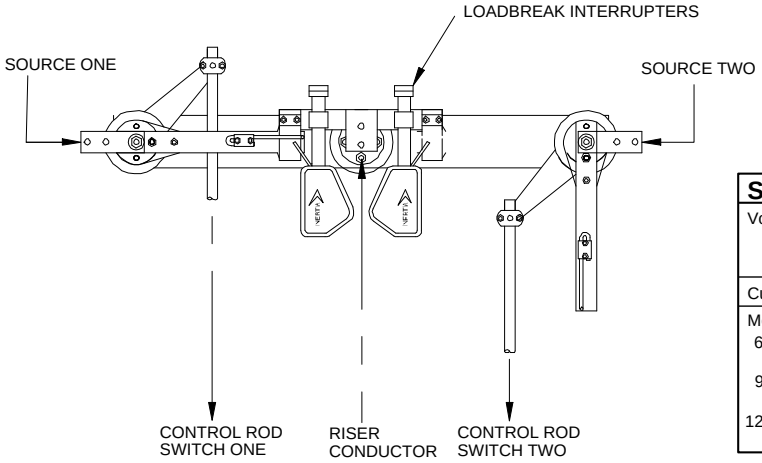

SWITCH RATINGS	
Voltage Class:	15 kV nom. (15.5 kV max.) 110 kV BIL 25 kV nom. (25.8 kV max.) 150 kV BIL 35 kV nom. (38.0 kV max.) 200 kV BIL
Current Class:	600, 900 and 1200 Amps, continuous
Momentary Current Rating:	
600 A Continuous:	40,000 Amps, 10 cycles 25,000 Amps, 3 seconds
900 A Continuous:	51,000 Amps, 10 cycles 32,000 Amps, 3 seconds
1200 A Continuous:	70,000 Amps, 10 cycles 44,000 Amps, 3 seconds

This drawing is for illustrative purposes only and therefore; may, or may not reflect the current revision of this drawing. Please request the current revision from the factory.

INERTIA ENGINEERING	Material:		Description: 25 kV Twin Loadbreak, Tap Riser Switch
	Finish		
	Scale:	None	Drawing No: 9382M
	Drawn by:		Revision: 0
	Date:	04/13/04	

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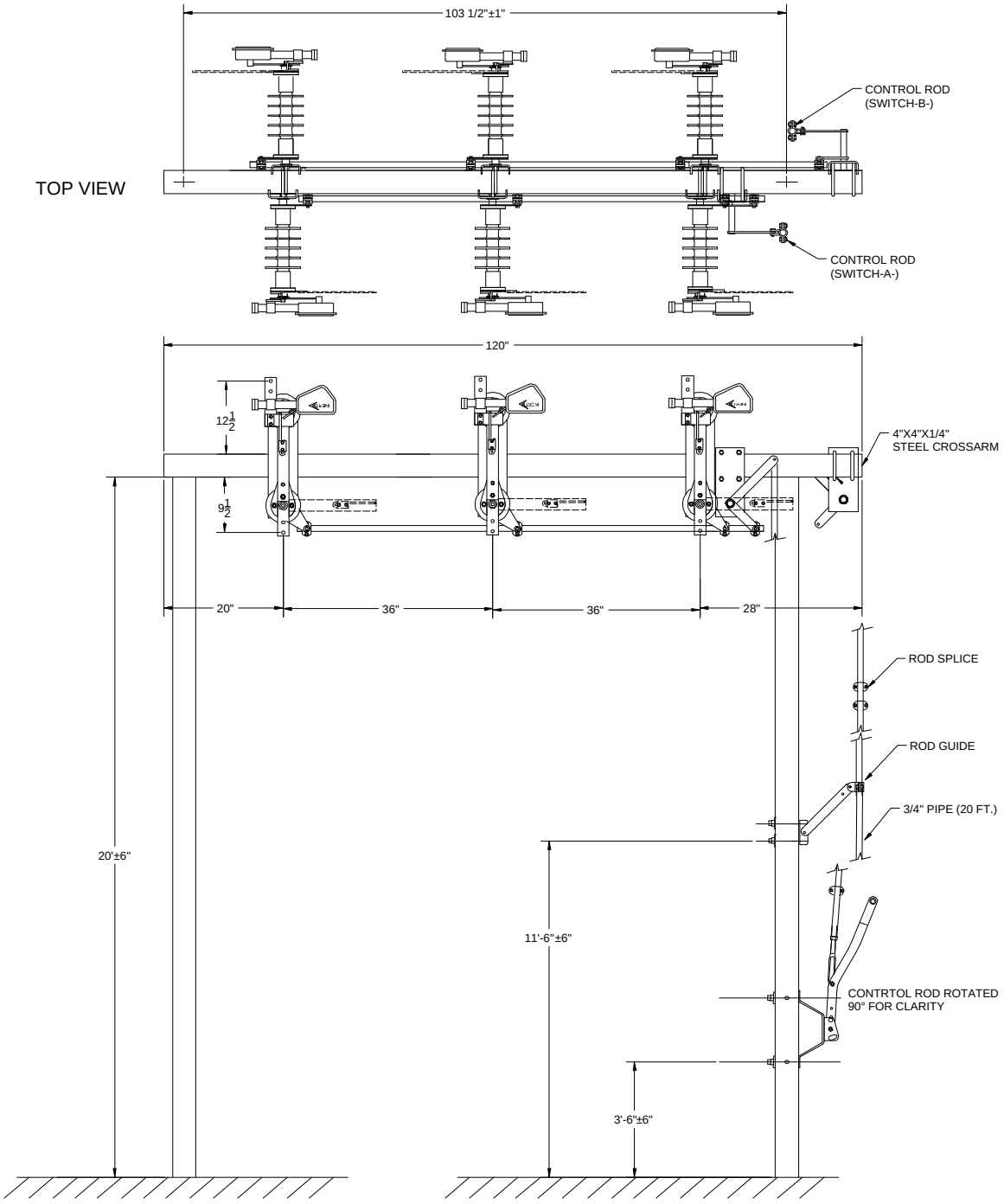

SWITCH RATINGS	
Voltage Class:	15 kV nom.(15.5 kV max.) 110 kV BIL 25 kV nom.(25.8 kV max.) 150 kV BIL 35 kV nom.(38.0 kV max.) 200 kV BIL
Current Class:	600, 900 and 1200 Amps, continuous
Momentary Current Rating:	
600 A Continuous:	40,000 Amps, 10 cycles 25,000 Amps, 3 seconds
900 A Continuous:	51,000 Amps, 10 cycles 32,000 Amps, 3 seconds
1200 A Continuous:	70,000 Amps, 10 cycles 44,000 Amps, 3 seconds

This drawing is for illustrative purposes only and therefore; may, or may not reflect the current revision of this drawing. Please request the current revision from the factory.

INERTIA ENGINEERING	Material:		Description: 25 kV, H-Frame, Twin Riser Tap Switch, Substation Mounted
	Finish		
	Scale:	None	Drawing No: 9228M / Revision: 1
	Drawn by:		
	Date:	10/10/01	

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