Southern States

Replacement Parts Bulletin
For Line Backer™ Circuit Switchers

Do you have Line Backer™ circuit switchers on your system?
Have they given you problems? Do they still?
Don't know where to turn for help?

If you answered yes to any of these questions then Southern States has the solutions that you are looking for. We provide a full range of parts for retrofits/upgrades/refurbishments of existing Line Backers™ as well as field service support, if desired, during the installation of these parts and the adjustment of your Line Backer™.

In 1997, Southern States licensed the horizontal circuit switcher design from Siemens and can provide new components, utilizing the latest technology, which will upgrade your existing Line Backer™ into a modern, fully functional, reliable circuit switcher. While solutions offered by other manufacturers involve extensive rework of the installation, often including replacement of the existing support structure and its foundations, Southern States parts are physically interchangeable with your existing equipment allowing you to reuse what does not need replacement. Line Backers™ manufactured before November, 1983 have none of the design improvements detailed in the following pages, making them strong candidates for a complete upgrade or outright replacement with new horizontal circuit switchers, reusing the support structure and foundations of the existing Line Backer™.

So, if your system has one or more Westinghouse, Siemens, or Siemens-Allis type MFB, CP, CPS, or CPS-VB Line Backer™ circuit switchers contact Southern States and let us put our parts and service support to work for you.

As with all Southern States products, the furnished parts come with our standard 5-year warranty.

Publication No. SDPS028-030309 • Printed in USA March, 2009 •

PRODUCT HISTORY

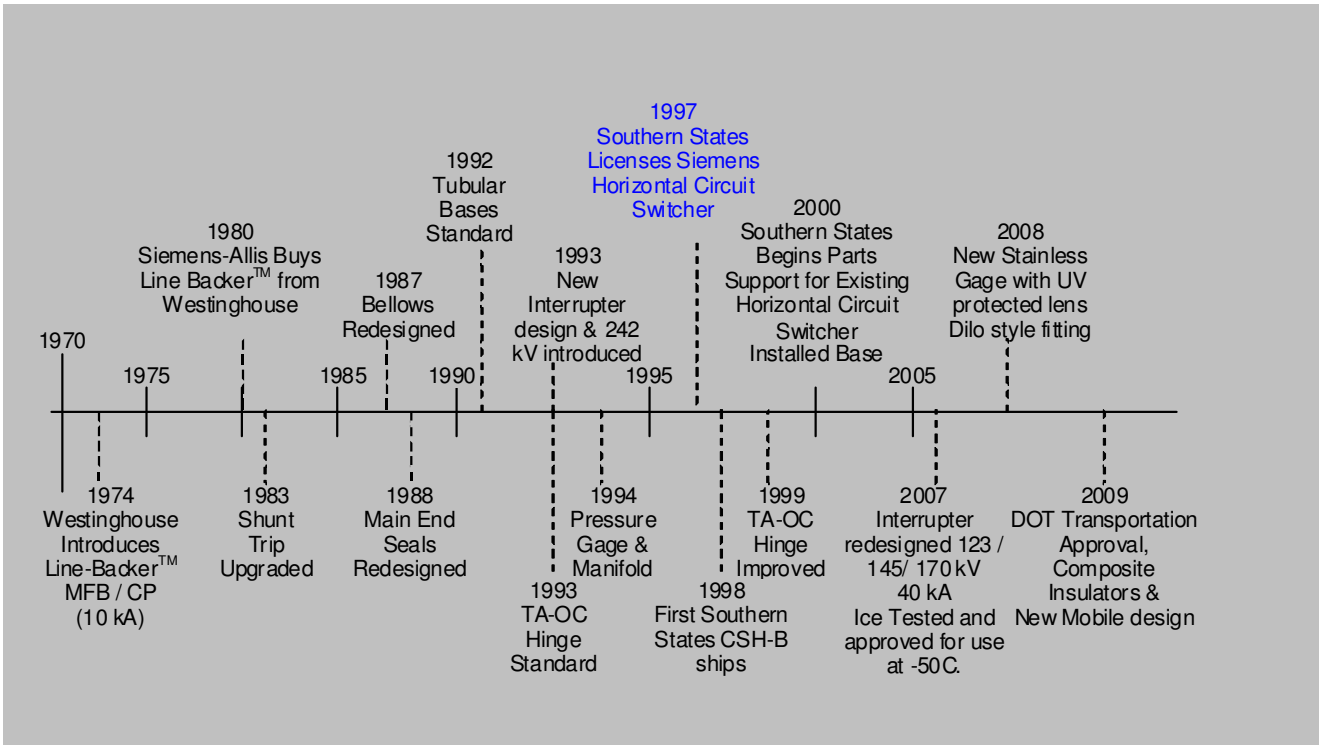

Figure 1 – Horizontal Circuit Switcher Timeline

Manufacturer	TYPE	
	Horizontal Non-Blade	Horizontal w/ Blade
Westinghouse	CP	MFB
Siemens-Allis	CP	MFB
Siemens	CP, CPS	MFB, CPS-VB
Southern States	CSH	CSH-B

Westinghouse introduced the MFB and CP Line Backer™ line of circuit switchers to the market in 1974. In 1980, Siemens-Allis purchased the Line Backer™ product line from Westinghouse, continuing to offer the MFB and CP. They later introduced the CPS and CPS-VB circuit switchers with higher interrupting ratings. Product quality problems drove Siemens to make major design changes, which resulted in a totally re-engineered product by the mid-90's.

Southern States Enters The Circuit Switcher Market In 1998

In 1997, Southern States recognized the market potential for a high quality horizontal circuit switcher and decided to purchase the license to the Siemens design. In 1998, after focusing on various design and manufacturing improvements, Southern States introduced the CSH and CSH-B circuit switchers. These products share a physical resemblance to the original Line Backer™, but that is where the similarity ends.

The information contained herein explains upgrade and replacement opportunities for utilities that own Line Backers™ or any other manufacturer's horizontal circuit switcher.

Publication No. SDPS028-030309 • Printed in USA March, 2009 • © 2009 Southern States, LLC

SHUNT TRIPS

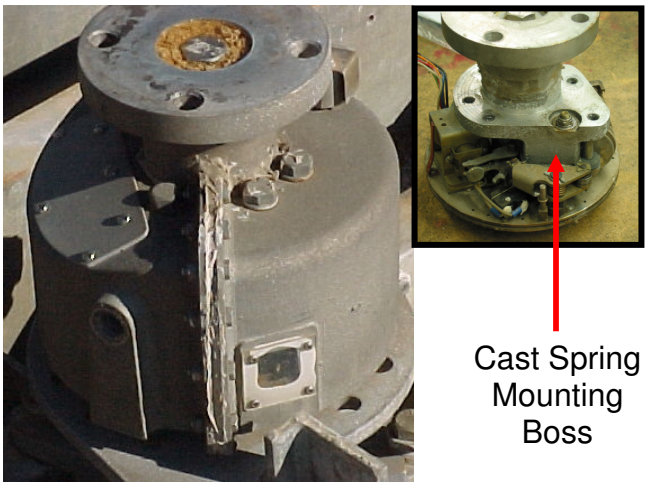

Figure 2 – Pre-November 1983 Shunt Trip Design

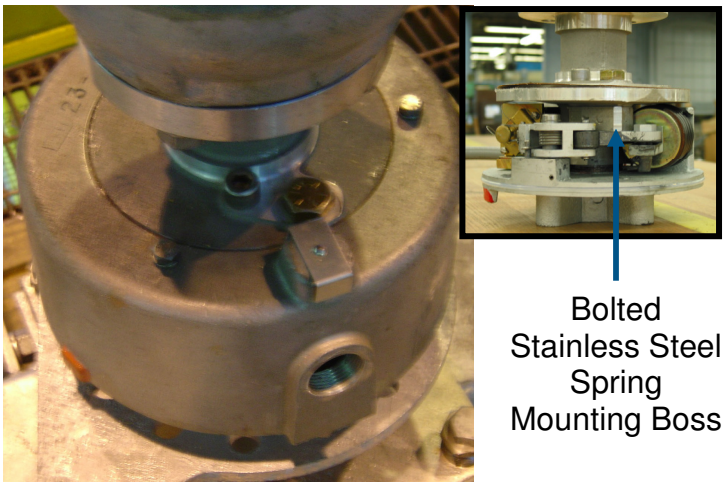

Figure 3 – Current Shunt Trip Design

Identified Problems:

- Over time the seals for the two-piece casting (Figure 2) allowed moisture to enter the shunt trip resulting in component corrosion and electrical shorts. This led to nuisance operations or the disabling of the desired high speed tripping capability of the interrupter.
- The pre-November 1983 shunt trip design utilized a cast spring mounting boss (Figure 2). Multiple operations and corrosion caused by exposure to moisture can cause a fatigue crack in the boss that propagates throughout the casting, disabling the shunt trip.

Recommended Actions:

- Replace your existing shunt trip with the current design (See Figure 3.) that is a bolt-for-bolt replacement.

Note:

If your circuit switcher has the original shunt trip design and you have not done any other upgrades then your circuit switcher is susceptible to all of the potential issues mentioned in this service bulletin.

Replacement Parts:

Part Description	Part Number
Shunt Trip Assembly – 125 VDC	08125854
Shunt Trip Coil Only – 125 VDC	08125836
Shunt Trip Assembly – 48 VDC	08125855
Shunt Trip Coil Only – 48 VDC	08125837

Publication No. SDPS028-030309 • Printed in USA March, 2009 • © 2009 Southern States, LLC

INTERRUPTER / DRIVER

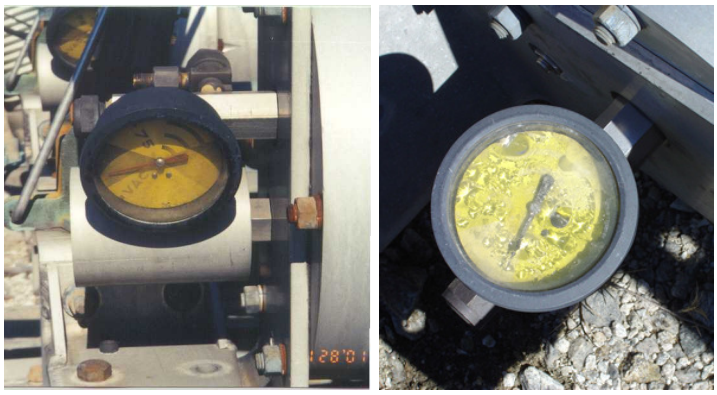

Figure 4 – Old style gauges and manifold

Figure 5 – Gauge and manifold design furnished from 1994-2008 (shown at as installed pressure)

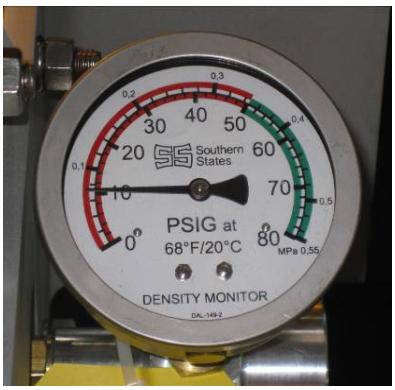

Figure 6 – Gauge and manifold design furnished from 2008 to present (shown at as shipped pressure)

Identified Problems:

- Leaking from the bellows, flat gasket seals, gauge, rupture disk, or the epoxy that seals the manifold and its components to each other and to the interrupter may cause insufficient SF_6 gas pressure, resulting in the inability to clear system faults.
- Mechanical failure can occur inside the interrupter disabling its fault protection capability.
- The UV rays of the sun cause fading of the old style pressure gauge face making it impossible to verify the SF_6 level inside the interrupter (See Figure 4.).

What Interrupter Do I Have?

The best way to determine what interrupter is on your circuit switcher is from the data on the nameplate of each circuit switcher base. A visual inspection of the pressure gauge can also identify your interrupter. Interrupters with a black pressure gauge (See Figure 4.) are the oldest and have the most problems. Interrupters with the newest gauge (See Figure 6.) have all of the design improvements. The gauge shown in Figure 6 was implemented in 2008 and is a temperature compensated density gauge. The non-temperature compensated pressure gauge shown in Figure 5 was used from 1994 to 2008, and the interrupters it was used on have proven to be highly reliable.

Publication No. SDPS028-030309 • Printed in USA March, 2009 • © 2009 Southern States, LLC

INTERRUPTER / DRIVER

Recommended Actions:

Upgrade your interrupter/driver with a bolt-for-bolt replacement that increases the performance and reliability of your circuit switcher.

- As a bolt-for-bolt replacement, the new interrupter/driver will have the same pad height and physical length as the existing unit allowing you to increase your fault interrupting capability without replacing the entire circuit switcher.
- The internal parts of the interrupter have been fully upgraded, increasing mechanical performance and reliability.
- Flat gaskets have been replaced by compression o-rings as the main end seals.
- The new gauge and manifold uses compression o-rings instead of epoxy to provide a significantly better gas seal.

Replacement Parts:

Part Description	Part Number
Porcelain Housed Interrupter/Driver – 350 kV BIL – 20 kA Interrupting Capacity	08126562
Porcelain Housed Interrupter/Driver – 350 kV BIL / 550 kV BIL – 31.5 kA Interrupting Capacity	08129373
Composite/Polymer Housed Interrupter/Driver – 350 kV BIL / 550 kV BIL – 31.5 kA Interrupting Capacity	08129028
Porcelain Housed Interrupter/Driver – 550 kV BIL – 20 kA Interrupting Capacity	08126260
Porcelain Housed Interrupter/Driver – 550 kV BIL – 20 kA Interrupting Capacity, with Bypass Switch Provision	08126388
Porcelain Housed Interrupter/Driver – 650 kV BIL / 750 kV BIL – 20 kA Interrupting Capacity	08126261
Porcelain Housed Interrupter/Driver – 650 kV BIL / 750 kV BIL – 40 kA Interrupting Capacity	08129374
Composite/Polymer Housed Interrupter/Driver – 650 kV BIL / 750 kV BIL – 40 kA Interrupting Capacity	08129029
Porcelain Housed Interrupter/Driver – 650 kV BIL / 750 kV BIL – 20 kA Interrupting Capacity, with Bypass Switch Provision	08126468
Porcelain Housed Interrupter/Driver – 900 kV BIL – 20 kA Interrupting Capacity	08126262
Composite/Polymer Housed Interrupter/Driver – 900 kV BIL – 20 kA Interrupting Capacity	08129030

Notes: The 350 kV BIL and the 550 kV BIL interrupter/drivers are the same length. The only difference between these designs occurs on the 20 kA interrupting capacity porcelain housed interrupter/driver. The 350 kV BIL version, part number 08126562, has no external corona ring on the pressure gauge end of the interrupter but the 550 kV BIL version, part number 08126260, does. Due to an internal interrupter redesign neither the 350 kV BIL / 550 kV BIL porcelain housed 31.5 kA interrupting capacity interrupter/driver, part number 08129373, nor the 350 kV BIL / 550 kV BIL composite/polymer housed 31.5 kA interrupter/driver, part number 08129028, require the external corona ring on the pressure gauge end of the interrupter.

Publication No. SDPS028-030309 • Printed in USA March, 2009 •

HINGE / BLADE

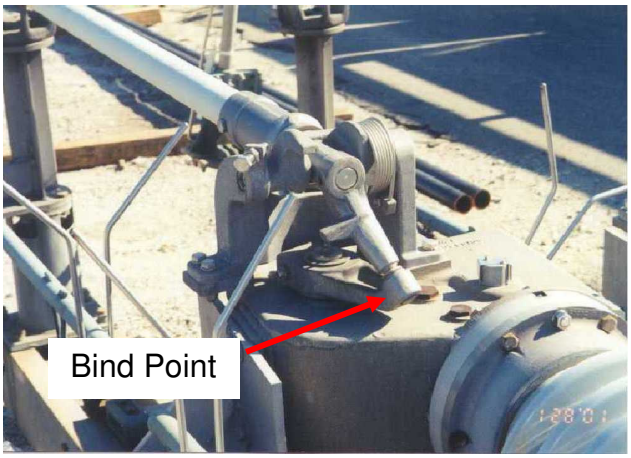

Figure 7 – "Dog leg" style hinge

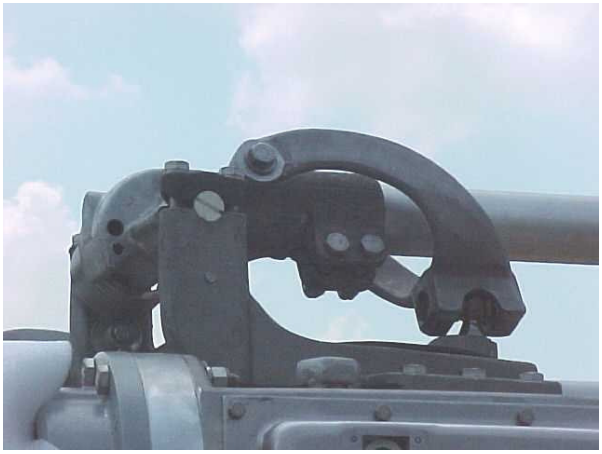

Figure 8 – TA-OC style hinge

Identified Problems:

- A geometric dead spot exists in the "dog leg" style hinge (See Figure 77.). If the blade stops in the dead spot or seizes in any position, one or more hinge components may fail. The potential for failure is magnified because the aluminum pivot is vulnerable to oxidation which causes the hinge to seize, resulting in a component failure.

How Do I Determine If My Hinge Has Problems?

All MFB and CPS-VB units manufactured before January 1993 have a "dog leg" style hinge. All units manufactured after January 1993 have a TA-OC style hinge (see Figure 8).

- If your blade jumps or bounces as it closes then a problem definitely exists.
- All "dog leg" style hinges on MFB and CPS-VB Line Backer™ circuit switchers have a geometric dead spot so an upgrade is advisable.

Recommended Actions:

Upgrade to a TA-OC style hinge that has 30+ years of demonstrated reliable performance in the field. Since 1999, the TA-OC style hinge's cross sectional area has been increased for improved performance under iced conditions. Due to the differences in hinge configuration an upgrade must also include a new blade, as the "dog leg" style hinge's blade is too short to work with the TA-OC style hinge.

Replacement Parts:

Part Description	Part Number
Hinge Assembly – 38 kV	08125927
Hinge Assembly – 48.3 kV	08125927
Hinge Assembly – 72.5 kV	08125927
Hinge Assembly – 123 kV	08125928
Hinge Assembly – 145 kV	08125929
Hinge Assembly – 170 kV	08125930
Hinge Assembly – 245 kV	08125931

Part Description	Part Number
Blade Assembly – 38 kV	08127394
Blade Assembly – 48.3 kV	08126886
Blade Assembly – 72.5 kV	08124622
Blade Assembly – 123 kV	08124621
Blade Assembly – 145 kV	08124620
Blade Assembly – 170 kV	08124619
Blade Assembly – 245 kV	08124618

Publication No. SDPS028-030309 • Printed in USA March, 2009 • © 2009 Southern States, LLC

MOTOR OPERATOR

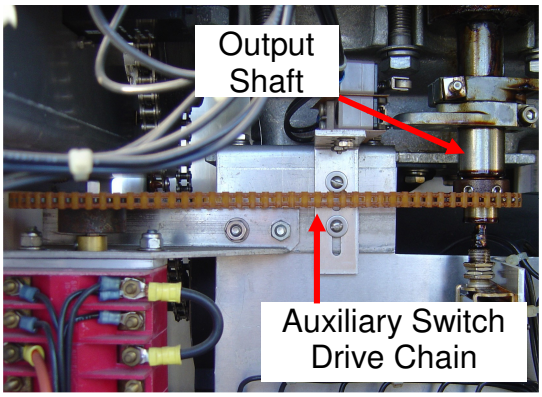

Figure 9 – Shows the output shaft and the nylon auxiliary switch drive chain for the auxiliary contacts

Identified Problems:

- If you have a three-door CM-4, CM-4A, or CM-4AL motor operator then under normal operating conditions grease can seep down the output shaft and into the reversing contactor, potentially causing an uncommanded operation of the circuit switcher. The CM-4AE, a two-door motor operator, does not have this problem because its reversing contactor has been relocated to a different position.
- The nylon auxiliary chain furnished in older CM-4, CM-4A, and CM-4AL motor operators will degrade and break, preventing the auxiliary contacts from changing state and making it impossible to determine from a remote location if the circuit switcher is closed or open.

How Do I Determine If My Motor Operator Has A Problem?

- Check to see if you have a nylon auxiliary switch drive chain. If so, inspect your auxiliary switch drive chain to determine if it is brittle or has any “stripped” bushings.
- Next inspect for the presence of liquefied grease on the motor operator drive shaft.

Recommended Actions:

- If you have a nylon drive chain an immediate replacement with our stainless steel drive chain is strongly recommended regardless of condition.
- Replacement of your motor operator with the CM-4AE motor operator is recommended if you are experiencing grease leakage.

Replacement Parts:

Part Description	Part Number
Auxiliary Switch Chain	01980794
Auxiliary Switch Chain Connecting Link	01980795
Electric Motor	
- 48 VDC	01470077
- 125 VDC	01470076
Dynamic Brake Resistor	
- 48 VDC	01490776
- 125 VDC	01490774
Reversing Contactor	
- 48 VDC	01490751
- 125 VDC	01490752

Publication No. SDPS028-030309 • Printed in USA March, 2009 •

BOLT-FOR-BOLT

Figure 10 – A competitor's circuit switcher being removed from its support structure

Figure 5 – The Southern States CSH-B circuit switcher that replaced the competitor's unit and reused the existing structure and foundations

Would you like to upgrade your existing circuit switcher without having to replace the support structure and its foundations?

Southern States can upgrade an existing installation's fault interrupting capability to 20 kA, 31.5 kA, or 40 kA by custom engineering our type CSH and CSH-B horizontal circuit switchers to adapt to virtually any support structure and phase spacing regardless of original circuit switcher manufacturer. Reusing the existing support structure and foundations will save on the first cost and total installed cost of your circuit switcher upgrade by reducing outage time and installation time.

If you have existing type MFB, CP, CPS, or CPS-VB Line Backer™ circuit switchers Southern States can replace your entire circuit switcher with a type CSH or CSH-B circuit switcher that will have physical dimensions identical to your existing unit for a true bolt-for-bolt replacement. There will be no required reworking of the bus or relocating of conductors.

Publication No. SDPS028-030309 • Printed in USA March, 2009 •

MOBILE CIRCUIT SWITCHER UPGRADE

Figure 12 – A mobile substation which previously had a 10 kA interrupting capacity type MFB Line Backer™ circuit switcher on it but which now has a 20 kA interrupting capacity type CSH-B circuit switcher on it. The existing racking mechanism was reused.

Would you like to upgrade your existing mobile substation circuit switcher without having to replace the existing racking mechanism or would you like to upgrade your existing mobile substation circuit switcher to have composite/polymer housed interrupters in lieu of its present porcelain housed interrupters?

If your existing mobile substation has a circuit switcher design other than the type MFB, CP, CPS, or CPS-VB Line Backer™ circuit switcher Southern States can upgrade the interrupting capacity of the existing mobile substation circuit switcher from either 4 kA or 8 kA to 20 kA, 31.5 kA, or 40 kA by custom engineering our type CSH and CSH-B horizontal circuit switchers to adapt to the existing racking mechanism the present mobile substation circuit switcher uses. Reusing the existing racking mechanism significantly reduces the cost and complexity of upgrading the interrupting capacity of your mobile substation circuit switcher.

If your existing mobile substation has a type MFB, CP, CPS, or CPS-VB Line Backer™ circuit switcher Southern States can either replace your entire circuit switcher with our type CSH or CSH-B circuit switcher that will have physical dimensions identical to your existing unit for a true bolt-for-bolt replacement or can provide replacement interrupter/drivers to increase the interrupting capacity from 10 kA, 13 kA, or 16 kA to 20 kA, 31.5 kA, or 40 kA.

If your existing mobile substation has a type MFB, CP, CPS, or CPS-VB Line Backer™ circuit switcher or a Southern States type CSH or CSH-B circuit switcher Southern States can replace their porcelain housed interrupter/drivers with composite/polymer housed interrupter drivers rated 31.5 kA interrupting capacity for the 350 kV BIL / 550 kV BIL interrupter/drivers, rated 40 kA interrupting capacity for the 650 kV BIL / 750 kV BIL interrupter/drivers, and rated 20 kA interrupting capacity for the 900 kV BIL interrupter/drivers.

Publication No. SDPS028-030309 • Printed in USA March, 2009 •

PARTS, SERVICE, AND SUPPORT

For Service or Support fill out the appropriate information below and fax to Southern States.

COMPANY NAME: _____

CONTACT PERSON: _____

E-mail address: _____

Phone: _____

Fax: _____

Date of transmittal: _____

Type Circuit Switcher: _____ kV Rating: _____

Blade BIL Rating: _____ Interrupter BIL Rating: _____

Continuous Current Rating: _____ Fault Interrupting Rating: _____

S.O. #: _____ Manufacture Date: _____

Type Circuit Switcher: _____ kV Rating: _____

Blade BIL Rating: _____ Interrupter BIL Rating: _____

Continuous Current Rating: _____ Fault Interrupting Rating: _____

S.O. #: _____ Manufacture Date: _____

Additional notes: _____

_____

_____

Southern States

The Quality Name in High Voltage Switching

Southern States, LLC
30 Georgia Avenue
Hampton, GA 30228
e-mail: support@southernstatesLLC.com
phone: 770-946-4562
fax: 770-946-8106
website: www.southernstatesLLC.com

24/7 emergency support line: 770-946-4565

Publication No. SDPS028-030309 • Printed in USA March, 2009 •