Power Capacitors
Catalog Data
CA230001EN

Effective April 2015
Supersedes October 2014

COOPER POWER SERIES

Pole-mounted capacitor racks with single-phase capacitor units

General

Eaton's Cooper Power™ series products offer a comprehensive capacitor rack solution, which allows users to select features to meet their applications needs. The capacitor rack package offers customers system benefits such as:

- Improved Power Factor
- System capacity release
- Reduced losses
- Improved power flow
- Cost savings

The pole-mounted capacitor rack frame is manufactured from high strength 6061-T6 aluminum alloy to reduce weight and allow for easier handling and installation. Stainless steel or galvanized steel frames are available on request. Capacitor rack frames for 15 kV class systems are available with 95 kV and 110 kV BIL insulation levels and accommodate three, six, nine or twelve single-phase capacitor units. Capacitor rack frames for 25 kV and 35 kV class systems are available with 125 kV and 150 kV BIL insulation levels and accommodate three, six, nine or twelve single-phase capacitor units.

Capacitor racks accommodate 50, 100, 150, 200, 300, 400, 500 and 600 kVar single or double bushing capacitor units in single row assemblies. Single-phase capacitor units can be connected in grounded-wye, ungrounded-wye or delta configurations depending on system parameters.

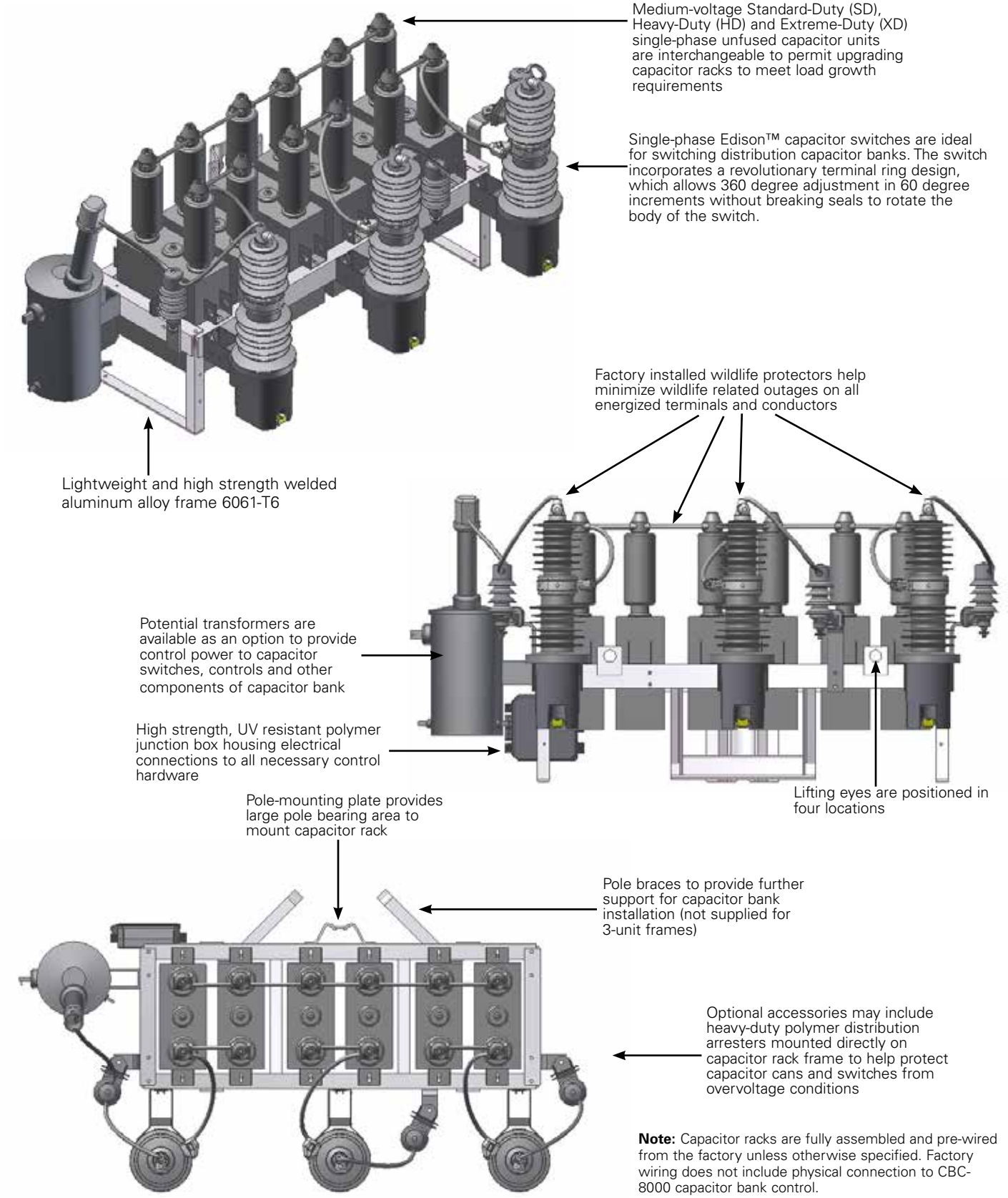
Capacitor racks are available in fixed or switched configurations to meet load flow requirements. Remote capacitor switching is provided through Eaton's Cooper Power series Patent-Pending Edison™ vacuum capacitor switch and the field-proven NR/NRV oil switch manufactured by our Power Reliability-Capacitor Factory located in Greenwood, S.C.

The Edison capacitor switch incorporates superior insulating materials capable of withstanding severe electrical-mechanical conditions and is uniquely suited for demands of capacitor switching. The switch can be used with any industry capacitor control such as the Eaton's Cooper Power series CBC-8000 control to provide Integrated Volt/VAR Control (IVVC), leading to overall cost savings for utilities. Capacitor switches are available through 38 kV grounded-wye applications.

Capacitor racks are completely pre-assembled from the factory with all high voltage wiring, accessories and terminal bushings provided with wildlife protection to improve overall performance.

Powering Business Worldwide

Pole-mounted racks with single-phase capacitor units



Note: Capacitor racks are fully assembled and pre-wired from the factory unless otherwise specified. Factory wiring does not include physical connection to CBC-8000 capacitor bank control.

Figure 1. Diagram

Capacitor Rack Ordering Information

Eaton offers several options to customize overhead capacitor racks to meet reactive power requirements for distribution networks. In order to simplify the ordering process follow the list of instructions provided below while entering information in the Capacitor Rack Specification Spreadsheet available on-line with the catalog literature at www.cooperpower.com. The selection process includes the following required information:

1. System parameters and capacitor connection (Page 3, Tables 1-4)
2. Capacitor rack BIL and configuration (Pages 4-5, Table 6)
3. Capacitor unit requirements (Page 6, Table 7)
4. Capacitor switch requirements (Pages 7-9)
   - Single-phase Edison capacitor switch (Page 7, Table 8)
   - Single-phase NR/NRV oil switch (Page 8, Table 9)
   - Three-phase VCS-3 vacuum switch (Page 9, Table 10)
5. CBC-8000 controller and control strategy (Pages 10-11, Table 11)
6. Accessories:
   - Junction box (Pages 11-12, Table 12)
   - Control power transformer (Page 13, Table 14)
   - MOV surge arrester (Page 13, Table 14)
   - Neutral sensor (Page 13, Table 15)
   - Line Post Sensor (Page 13, Table 16)
   - Interchangeable cutout (Page 14, Table 17)
   - Edison links (Page 14, Table 18)
   - Kearney™ links (Page 14, Table 19)
   - Reactors (Page 14, Table 20)

Table 1. Capacitor Applications for Medium Voltage Unfused Capacitor Units

Capacitor Rating		Circuit Application
Voltage (kV L-G)	**BIL (kV)**	**Capacitors Connected Wye (kV L-L)**
2400	95	4160
2770	95	4800
4160	95	7200
4800	95	8320
6640	95	11500
7200	95	12470
7620	95	13200
7960	95	13800
8320	95	14400
9960	95	17250
11400	95	19740
	125	19740
	150	19740
12470	95	21600
	125	21600
	150	21600
13280	95	22900
	125	22900
	150	22900
13800	95	23900
	125	23900
	150	23900
14400	95	24900
	125	24900
	150	24900
15125	150	26200
19920	150	34500

Specify System Parameters and Capacitor Connection

Table 2. System Voltage for Capacitors Connected Wye (V L-L)

4160
4800
7200
8320
11500
12470
13200
13800
17250
21600
22900
23900
24900
34500

Table 3. System Frequency for Capacitor Rack (Hz)

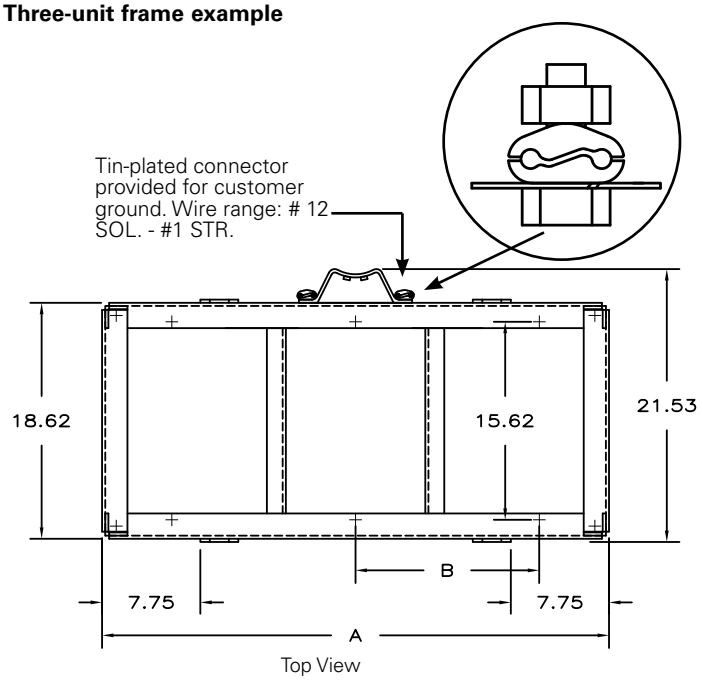
50
60

Table 4. Type of Capacitor Rack Connection

Grounded-Wye
Ungrounded-Wye
Delta

Capacitor rack frame

Three-unit frame example



Mounting frame description

The pole-mounted capacitor rack frame is manufactured from high strength 6061-T6 aluminum alloy. The frames are designed to support all necessary equipment for fixed or switched capacitor rack installations. Optional reinforced aluminum frames or steel frames are available depending on the application requirements.

Grounding

BIL (kV)	B (in.)	A (in.)
95	9.0	29.0
150	14.5	40.0

Frames are supplied with tin-plated parallel groove connectors to provide a ground connection point for capacitor rack equipment and system ground depending on circuit configuration.

Mounting bracket

The pole-mounting bracket shown under Side View has been designed for optimum strength with a large pole bearing area to mount the capacitor racks. Each capacitor rack frame includes four integral lifting eyes, which are welded to the frame allowing for equally distributed weight during installation.

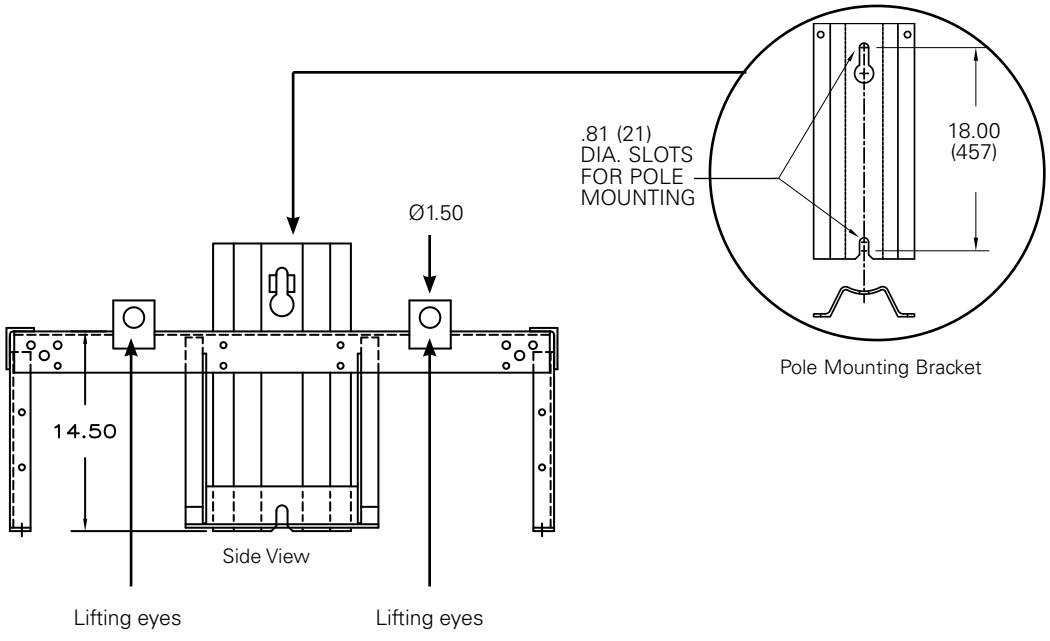


Figure 2. Capacitor rack frame.

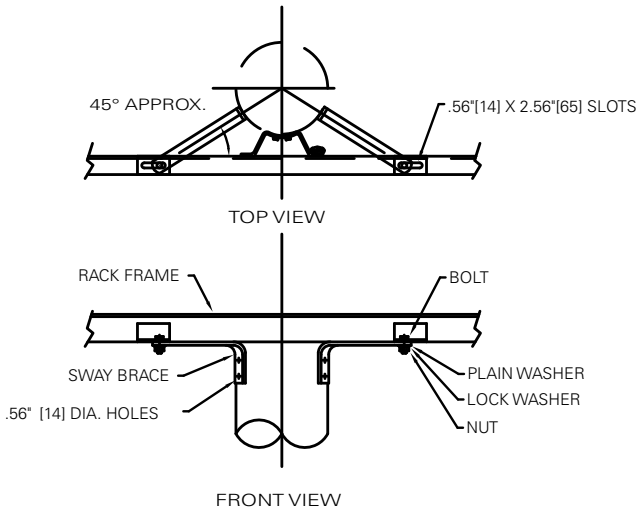


Figure 3. Pole brace installation.

Pole Braces

Pole braces are supplied for six (6) unit frames or greater. The pole brace kit assembly as shown under Pole Brace Installation includes the following components if ordered separately:

Refer to *Service Information S230-20-1 Pole-Mounted Single-Phase Capacitor Bank Installation, Operation, and Maintenance Instructions* for proper assembly instruction of pole braces and associated hardware.

Table 5. Pole Brace Components

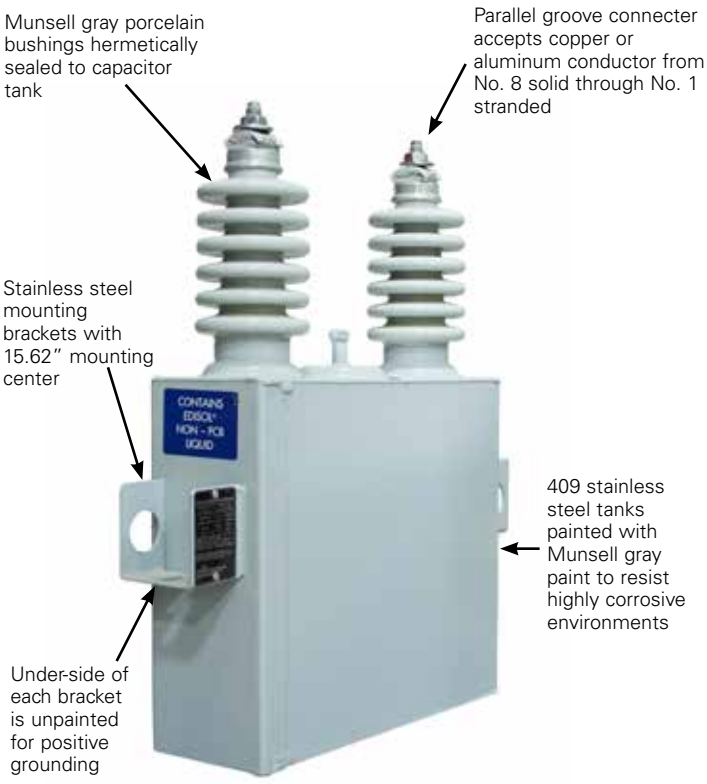
Catalog Number	Description	Quantity
CCR177X1	Sway Brace	2
700115150150AGW	0.5"-13 x 1.5" SS Hex Bolt	2
880215113050AGW	0.5"-13 SS Hex Nut	2
900315053125A	0.5" SS Washer	2
900815050000AGW	0.5" SS Split LW	2

Table 6. Capacitor Rack Frame Technical Data

Frame	Aluminum alloy 6061-T6 with four (4) integral lifting eyes (standard), Galvanized steel (optional)
System Voltage	2,400 V to 34,500 V
Insulation Level (BIL)	95/110 kV, 125/150 kV and 200 kV
Frequency	50 or 60 Hz
Capacitor Rack Connection	Grounded Wye, ungrounded Wye or Delta
Capacitor Units Installed	3, 6, 9, or 12
Available Spaces	3, 6, 9, or 12
Mounting Hardware	Bracket one (1), pole braces two (2) and associated hardware

* Pole braces are not supplied with 3-unit capacitor racks.

Medium voltage, unfused, single-phase capacitor units



Capacitor unit description

Medium-voltage capacitor units are available in a wide range of designs to meet application requirements. Standard-Duty (SD) capacitor units are designed and tested in accordance with IEEE Std 18™-2002 standard. Heavy-Duty (HD) and Extreme-Duty (XD) meet or exceed the requirements of IEEE Std 18™-2012 standard. Tank rupture curves are defined through 10 kA for Standard-Duty and Heavy-Duty capacitor units and 15 kA for Extreme-Duty units. Capacitor units are completely pre-wired at the factory and include wildlife protectors for high voltage terminals and wiring. Contact factory for non-standard kVar designs or special requirements not covered in the catalog section.

Table 7. Single-Phase Capacitor Unit Technical Data

Capacitor Unit Rating	2,400 V* through 22,800 V (Refer to Table 1 or Catalog Section 230-10)
Capacitor kVar	50**, 100, 150, 200, 300, 400, 500, and 600 kVar
Number of Bushings	Single, double
Capacitor Arrangement (Single Bushing)	Pole-Side, Non-Pole-Side
Insulation Level (BIL)	95/110 kV†, 125/150 kV†† and 200 kV
Frequency	50 or 60 Hz
Temperature Range	-40 °C to +55 °C (-50 °C available)
Dielectric Fluid	Proprietary Edisol™ VI
Discharge Resistors	Discharge to 50 V within five (5) minutes (standard), other discharge criteria available
Dielectric Losses	0.05 watt/kVar
Design Standards	IEEE®, IEC, CSA®, ABNT

* Capacitor ratings 2,400 V and 2,770 V are only available with our Extreme-Duty (XD) product offering.

** 50 kvar capacitor units are only available with our Extreme-Duty (XD) product offering.

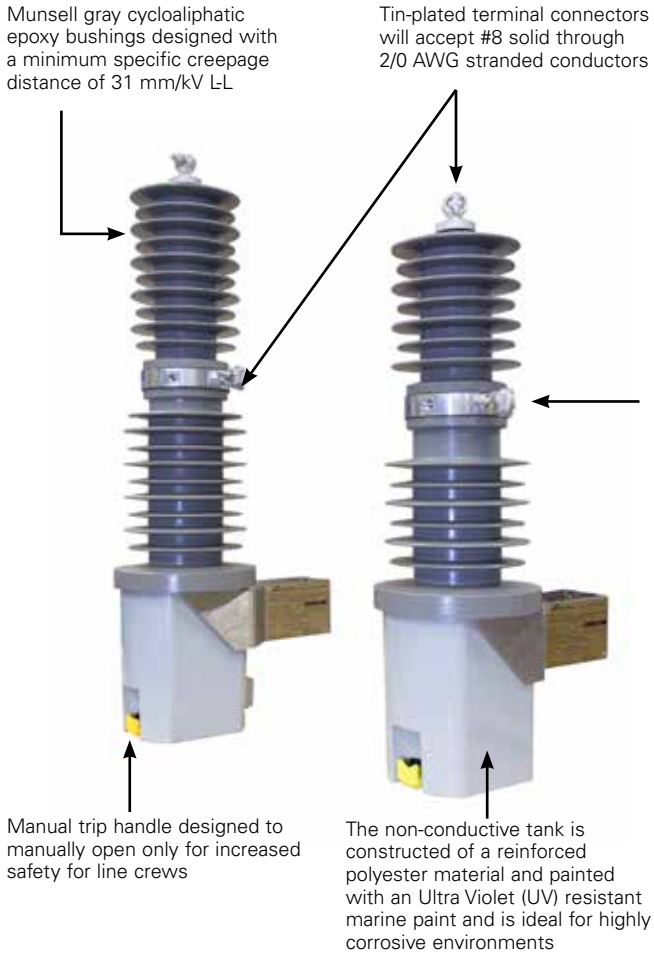
† Bushings used with 95 kV BIL capacitors are capable of meeting 110 kV BIL.

†† Bushings used with 125 kV BIL capacitors are capable of meeting 150 kV BIL.

Supporting Documentation

Description	Reference Document
Capacitor Unit Catalog Section	230-10
Capacitor Unit Instruction Sheet	S230-10-1
Tank Rupture Curves for SD and HD Capacitor Units	R230-91-1
Tank Rupture Curves for XD Capacitor Units	R230-91-2

Edison™ single-phase capacitor switch



Edison capacitor switch description

The single-phase Edison™ capacitor switch line is ideal for difficult capacitive current switching duty of distribution capacitor banks. The Edison family includes 15 kV and 25 kV class switches that are available for system applications up to 38 kV. This solid dielectric vacuum switch with robust, permanent magnet solenoid mechanism has been designed in accordance with IEEE Std C37.66™-2005 standard.

Capacitor switches are supplied with wildlife protectors to protect high voltage terminals from incidental contact while energized. Wildlife protectors have been re-designed to provide improved coverage for energized terminals. Refer to catalog section 230-50 for dimensional information. Terminal connections and control wiring are pre-wired from the factory unless otherwise specified. The Edison capacitor switch is manufactured by our Power Reliability Capacitor factory in Greenwood, SC.

Table 8. Edison Single-Phase Capacitor Switch Technical Data

Capacitor Switch Rating (ungrounded banks)	15.6 kV & 25.0 kV
Capacitor Switch Rating (solidly grounded banks)	27.0 kV & 38 kV
Continuous Current Rating	200 A (Capacitive & Inductive)
Open Contact Insulation Level (BIL)	95 kV & 125 kV (15.6 kV); 125 kV (25.0 kV)
Line-to-Ground Insulation Level (BIL)	95 & 125 kV (15.6 kV); 125 & 150 kV (25.0 kV)
Control Voltage	120/240 Vac, 125 Vdc
Open/Close Time	<100 msec
Frequency	50/60 Hz
Temperature Range	-40 °C to +60 °C
Factory-Wired Receptacle	5-Pin/3-Wire Control (Std.), Form A, B & C*
Power Requirements	1.0 kVA
Mounting	Pole-side, Non-Pole-side (Std.)
Mechanical Operations	50,000†
Design Standards	IEEE®

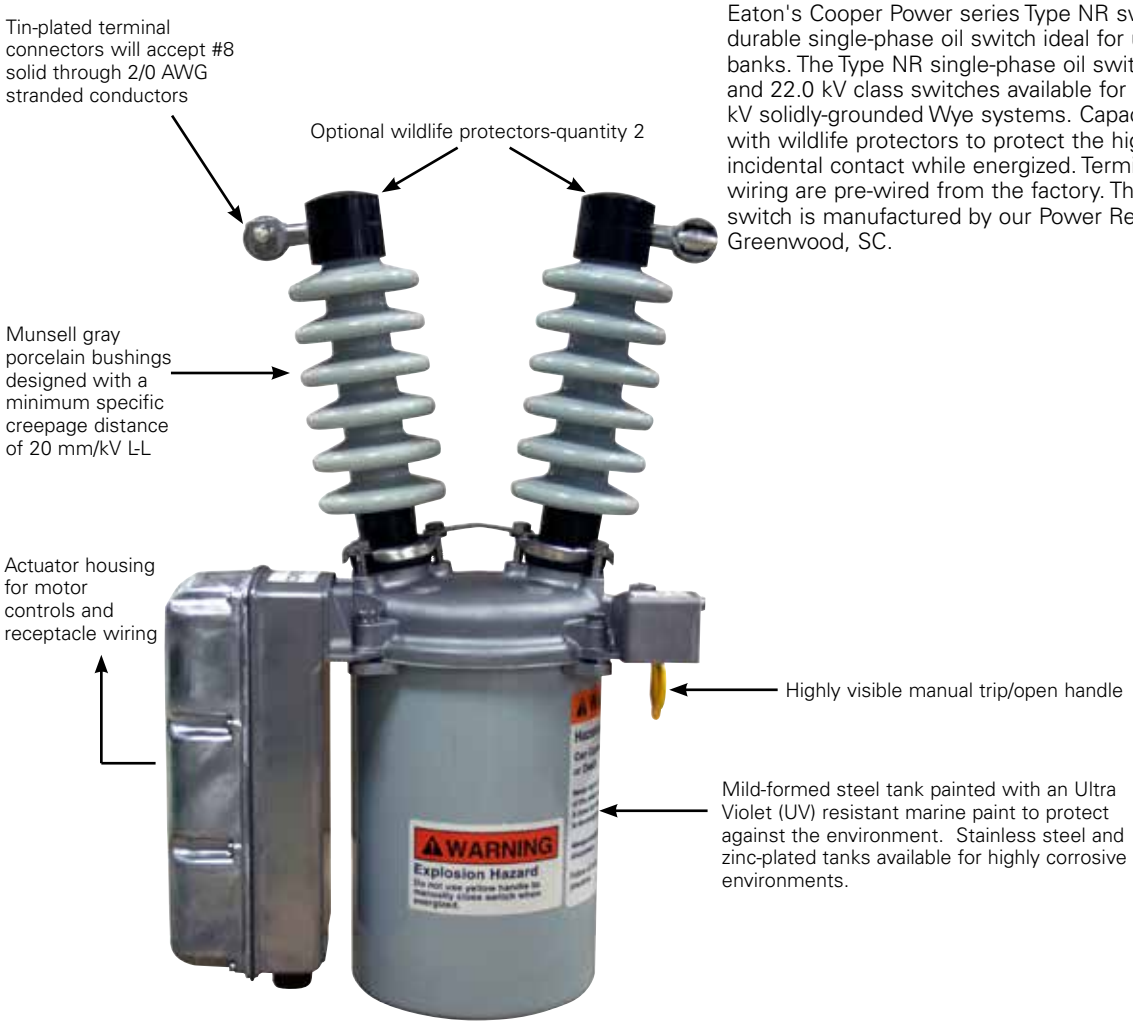
* Refer to Installation and Operation Instruction sheet S230-50-1 for receptacle pin orientation and control wiring diagrams. Contact factory for non-standard receptacle configurations.

† The durability of the Edison™ capacitor switch was demonstrated by completing a minimum of 50,000 operations after performing the Operating Duty Test in accordance with IEEE Std C37.66™-2005 standard.

Supporting Documentation

Description	Reference Document
Catalog Section	230-50
Instruction Sheet	S230-50-1
Summary Test Report	CP1308

NR/NRV single-phase capacitor switch



NR/NRV capacitor switch description

Eaton's Cooper Power series Type NR switch is a field proven and durable single-phase oil switch ideal for use with overhead capacitor banks. The Type NR single-phase oil switch family includes 15 kV and 22.0 kV class switches available for system application up to 38 kV solidly-grounded Wye systems. Capacitor switches are supplied with wildlife protectors to protect the high voltage terminals from incidental contact while energized. Terminal connections and control wiring are pre-wired from the factory. The NR/NRV single-phase oil switch is manufactured by our Power Reliability Capacitor factory in Greenwood, SC.

Table 9. NR/NRV Single-Phase Capacitor Switch Technical Data

Capacitor Switch Rating (ungrounded banks)	15.0 kV & 22.0 kV*
Capacitor Switch Rating (grounded banks)	24.9 kV & 34.5 kV*
Continuous Current Rating	200 A (15.0 kV); 60 A (22.0 kV)
Line-to-Ground Insulation Level (BIL)	95 & 125 kV (15.0 kV); 125 (22.0 kV)
Control Voltage	120/240 Vac
Open/Close Time	4.0s/0.5s
Frequency	50/60 Hz
Temperature Range	-40 °C to +40 °C
Factory-Wired Receptacle	5-Pin/3-Wire Control (Std.), Form A, B & C**
Power Requirements	0.5 kVA
Mounting	Pole-side, Non-Pole-side (Std.)
Mechanical Operations	1,200†
Design Standards	IEEE®

* Refer to catalog section 230-60 for NR & NRV maximum 3-phase kVar switching capability.

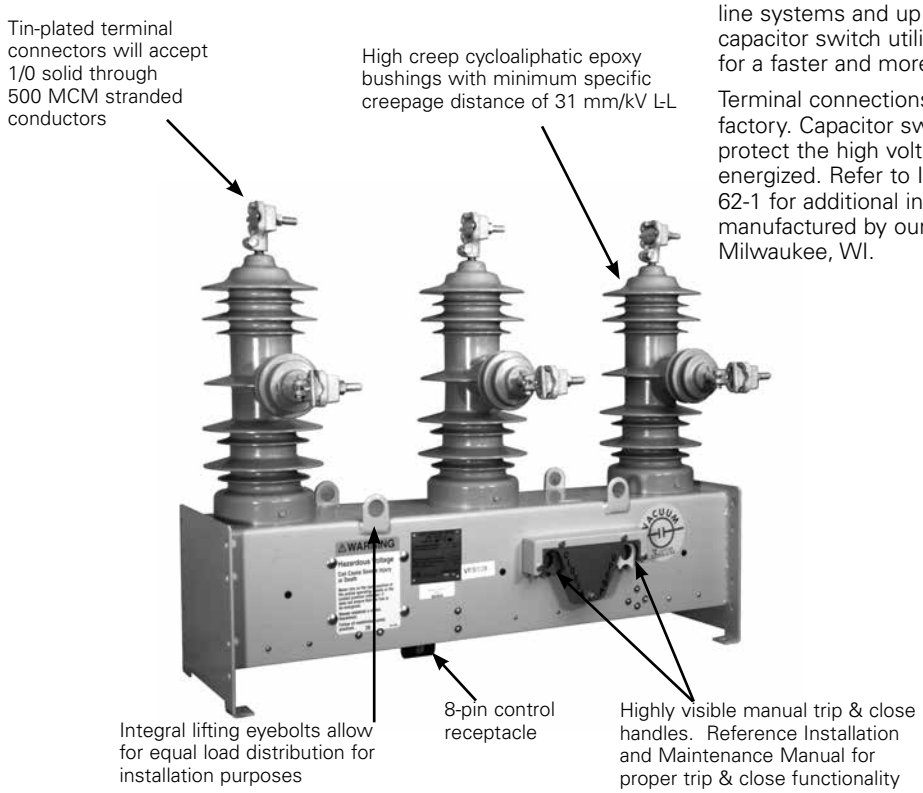
** Refer to Installation and Operation Instruction sheet S230-60-1 for receptacle pin orientation and control wiring diagrams. Contact factory for non-standard receptacle configurations.

† Eaton recommends the switch be inspected and serviced every 1200 operations or three years, whichever comes first. In no case should the service interval, between periodic maintenance and inspection, extend beyond 1200 operations.

Supporting Documentation

Description	Reference Document
Catalog Section	230-60
Instruction Sheet	S230-60-1

VCS-3 three-phase capacitor switch



VCS-3 capacitor switch description

Eaton's Cooper Power series VCS-3 capacitor switch is a field proven three-phase vacuum interrupting system capable of switching three-phase grounded capacitor banks up to 7,200 kVar for 14.4 kV line-to-line systems and up to 12,000 kVar for 24.9 kV line-to-line. The VCS-3 capacitor switch utilizes a magnetic actuator operating mechanism for a faster and more efficient latching action.

Terminal connections and control wiring are pre-wired from the factory. Capacitor switches are supplied with wildlife protectors to protect the high voltage terminals from incidental contact while energized. Refer to Installation and Maintenance Manual S260-62-1 for additional information. The three-phase VCS-3 switch is manufactured by our Power Reliability Switchgear factory in South Milwaukee, WI.

Table 10. VCS-3 Three-Phase Capacitor Switch Technical Data

Capacitor Switch Rating (ungrounded banks)	15.5 kV & 29.2 kV*
Capacitor Switch Rating (grounded banks)	24.9 kV & 34.5 kV*
Continuous Current Rating	200 A/400 A (15.0 kV & 27 kV)
Line-to-Ground Insulation Level (BIL)	110 kV (15.0 kV); 125 (22.0 kV)
Control Voltage	120/240 Vac, 24 Vdc, 48 Vdc, 125 Vdc
Frequency	50/60 Hz
Open/Close Time	60 ms
Power Requirements	150 Watts
Temperature Range	-40 °C to +55 °C
Factory-Wired Receptacle	8-Pin/4-Wire Control (Std.) (8 wires total)**
Power Requirements	0.5 kVA
Mounting	Non-Pole-side, Pole Mounting Hanger††
Mechanical Operations	10,000†
Design Standards	IEEE Std C37.66™-1988 standard

* Refer to Installation and Operations Instructions S260-62-1 for VCS3-15 kV & 27 kV maximum 3-phase kVar switching capability.

** Refer to Installation and Operation Instruction sheet S230-60-1 for receptacle pin orientation and control wiring diagrams. Contact factory for non-standard receptacle configurations.

† The VCS-3 switch has been designed with a minimum mechanical life of 10,000 operations. The VCS-3 switch requires routine inspection to check for physical damage and verify proper operation.

†† Refer to Maintenance Manual S260-62-1 for dimensional information.

Supporting Documentation

Description	Reference Document
Installation and Operation Instructions	S260-62-1
Certified Engineering Test Report	Available Upon Request

CBC-8000 capacitor bank control

CBC-8000 capacitor bank control description

The CBC-8000 capacitor bank control is a state-of-the-art control system specifically designed to operate distribution capacitor racks. This versatile, full integrated capacitor control may be programmed for site-ready control strategies such as:

- Remote operation
- Voltage
- VAR
- Time schedule
- Temperature
- Current
- Line current or voltage inputs

The CBC-8000 capacitor bank control includes a USB data port for on-site PC access to programming and data retrieval running ProView™ NXG software. The CBC-8000 capacitor bank control is DNP3 Level 2 compliant and easily integrates with cellular modems, radios, radio networks and SCADA to enhance efficiency and power quality. The control is furnished with a 14-pin control cable pre-wired from the factory to the capacitor rack junction box. The capacitor control is shipped in individual packaging to prevent damage during transit. Refer to catalog section 1160-80 for further information, including available mounting options.

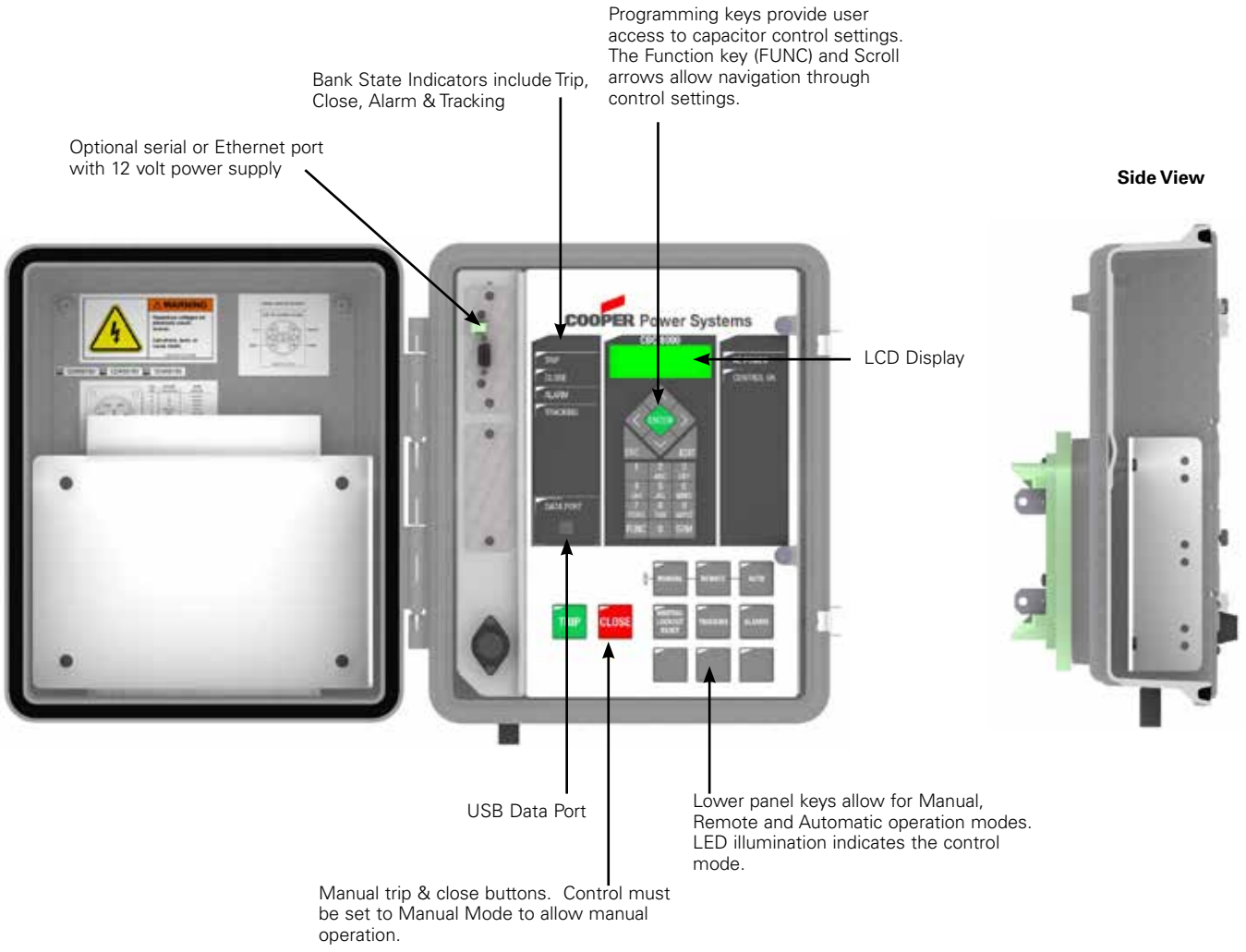


Table 11. CBC-8000 Capacitor Bank Control Technical Data

Capacitor Control Model	CBC-8000
Control Mode	Automatic, Manual, Remote
Control Strategy	Voltage, VAR, Schedule, Temp, Current, Line Inputs
Communications	Stand Alone (no comm.), Ethernet-IP Stack, Ethernet-
	IP Stack with Power over Ethernet (PoE), RS232 Serial
	Port, On-site configuration using USB Interface
Control Voltage	120/240 Vac
Frequency	50/60 Hz
Temperature Range	-40 °C to +85 °C
Mounting Options	Pole bracket, Meter socket* (4-jaw, 6-jaw)
Control Cable Lengths	None, Varying Lengths (35" std.)
Analog Input Configuration	None, 7 Pin DIN, 14 Pin DIN†, 5 Pin Din, Custom**
Control Accessories	Neutral Current Sensor, Serial Comm. Card, Ethernet Comm. Card
Optional Current Sensors††	Lindsey® Manufacturing, Fisher Pierce®, Piedmont™ Line Post Sensors
Design Standards	IEEE®, IEC, NEMA® 4X, IP 45 (Enclosure)

* Refer to catalog section 1160-80 for available meter socket mounting options.

** Refer to catalog section 1160-80 for available receptacle pin orientation. Contact factory for non-standard receptacle configurations.

† Accommodates 3-phase sensing.

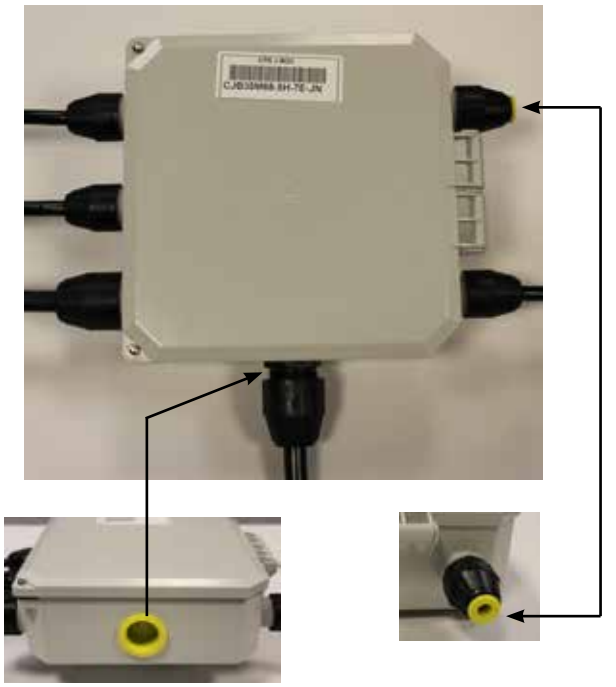
†† The CBC-8000 sensor inputs only accept voltage. The range is 0-10 volts.

Supporting Documentation

Description	Reference Document
CBC-8000 Capacitor Bank Control Installation and Operation Instructions	S1160-80-1
CBC-8000 Capacitor Bank ProView NXG Application Software Programming Guide	S1160-80-2
CBC-8000 Capacitor Bank Control Communications	S1160-80-3
Communications Point Data Base for Serial and Ethernet Communications Protocol DNP3	R1160-90-1
Guide Form Specification	G1160-80-1
Integrated Volt/VAR Capacitor Bank Control	B1160-12066
Catalog Ordering Guide	1160-80

Capacitor rack accessories

Junction box



Plug inserts provided when cables are supplied by others

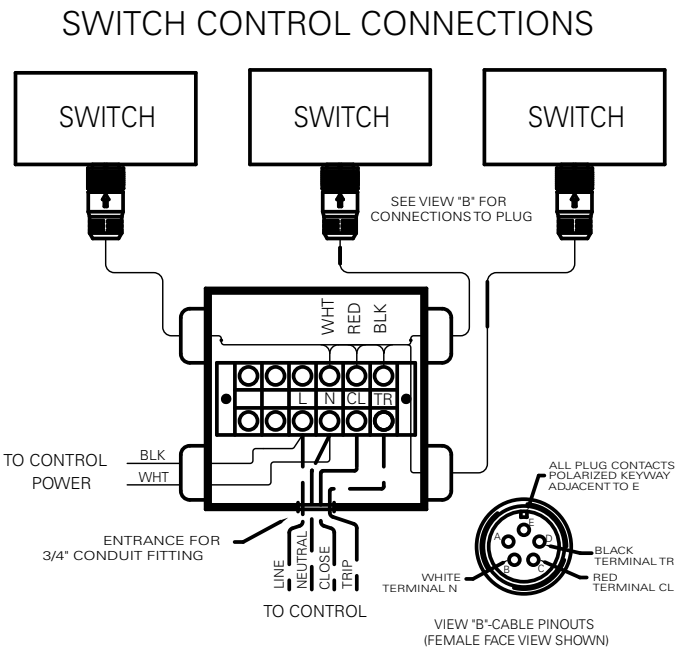


Figure 4. J-Box switched control connections.

Junction Box Technical Data

Junction Box*	High Impact, Ultra-Violet (UV) resistance Polymer, Stainless Steel, Aluminum, and Painted Formed Steel NEMA® ratings - 3R, 4, 4X
Accessory Wiring Options	Hard-Wired, Quick Disconnects
Terminal Block Assembly	6 point, 9 point, 12 point, 15 point, other**
Receptacles & Conductor Cables Determined by capacitor switch control preference	Capacitor Switch (Reference page 13 for standard control cable configuration): None 5-pin/3-conductor cable w/receptacle (standard) 5-pin/5-conductor cable w/receptacle, Form A, N/O contacts 5-pin/5-conductor cable w/receptacle, Form B, N/C contacts 6-pin/6-conductor cable w/receptacle, Form C, N/O & N/C contacts 8-pin/8-conductor cable with (2) NO contacts (VCS-3 only) Other
Determined by capacitor control mounting preference	Capacitor Control Cable & Mounting Options: None 4-jaw meter socket, 4-wire control cable with varying lengths (20-50')† 6-jaw meter socket, 6-wire control cable with varying lengths (20-50')† Pole-mount, 7-wire control cable with varying lengths (20-50') † Other†
CPT supplied when control power for capacitor switches is required	Control Power Transformer (CPT): None Hardwired from J-Box to CPT, 2-conductor cable Hardwired from J-Box with 5-pin mating plug connection to CPT, 2-conductor cable
	Current Sensors (Neutral & Line Post): Lindsey® Manufacturing, Fisher Pierce®, Piedmont™ Line Post Sensors††
Entrance Fittings	Entrance Bushing w/Cable‡, Optional Bushing Plug Insert, Plug w/o Bushing

* Contact factory for non-standard wiring and receptacle configurations for J-Box or when J-Box is ordered separately.

** Contact factory for non-standard terminal block configurations. The standard J-Box will accommodate up to 9 point terminal blocks.

† Refer to catalog section 1160-80 for available meter socket and pole mounting options. Contact factory for non-standard control cable lengths. Standard cable length is 35'.

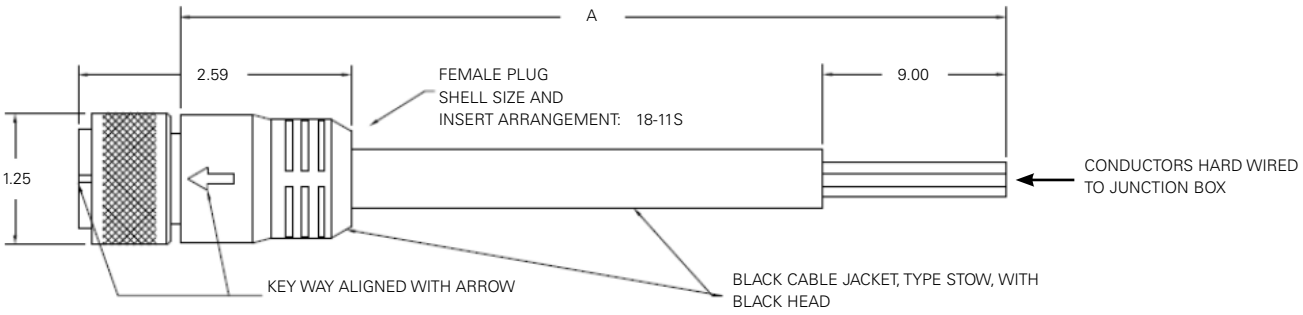
†† Contact factory for available neutral and line post current sensor options.

‡ Dimensions of cable entrance bushings are determined by cable diameters. Switch cables are #16 AWG and PT cables are #12 AWG.

Capacitor switch and CPT control cable configuration

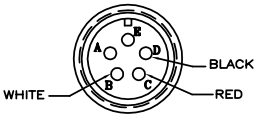
5-pin/3-conductor standard for capacitor switch

5-pin/2-conductor standard for CPT

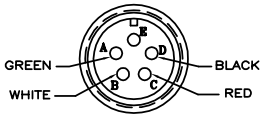


Receptacle pin orientation

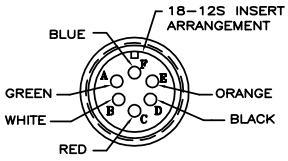
(Capacitor switch and CPT)



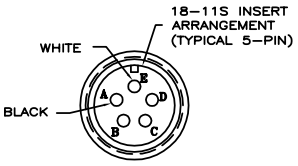
Capacitor Switch
5-pin/3-conductor (standard)



Capacitor Switch
Form A (NO contacts) or
Form B (NC contacts)
5-pin/5-conductor



Capacitor Switch
Form C (NO contacts/NC contacts)
6-pin/6-conductor



Control Power Transformer (CPT)
5-pin/2-conductor

Control power transformer

Control Power Transformer Technical Data

Primary Voltage (kV L-G)	2,400 to 19,920*
kVa	0.5, 1.0, 1.5, 3.0, other**
Primary Bushings	1, 2
Primary Bushing (BIL)	95, 110, 125, 150, other**
Control Voltage (V)	115, 120, 220, 230, 240, 480, other**
Design Standards	IEEE®

* Refer to CPT primary voltage options on page 19.

** Contact factory for non-standard kVa, BIL, and control voltage options.

Mid-Central CPT shown courtesy of Mid-Central Electric, Inc.

Neutral sensor

Neutral Sensor Technical Data

Rated Insulation	600 Vac
Design	Hinged*
Rated Frequency	50/60 Hz
Rated Output	0.25 V to 5 Vac
Current	5-200 A (0.75"x 0.75" window)**
Impedance	200 ohms
Weight	<1 lb.
Signal Cable	Twisted pair B/W, 18 AWG, 35 ft. †
Accuracy	+/- 0.3%

* Sensor clamps over capacitor rack neutral/ground connection to detect neutral current.

** Contact factory for more technical details and available options.

† Must be hard-wired to junction box on capacitor rack by end user.

UltraSIL™ distribution-class surge arrester

UltraSIL™ Distribution-Class Surge Arrester Technical Data

Arrester Housing	Silicone Rubber
Arrester Type	Metal Oxide Varistor (MOV)
Arrester Rating	3, 6, 9, 10, 12, 15, 18, 21, 24, 27, 30, 36
Arrester Type	Heavy-Duty, Riser Pole
Wildlife Protectors	Standard, Line Terminal and Ground Terminal Wildlife Guards
Mounting	Rack frame, NEMA® X-ARM
Isolator	Dot Compliant
Design Standard	IEEE®, IEC

Supporting Documentation

Description	Reference Document
IEEE Catalog Section	CA235005EN
Instruction Sheet	S235-35-1
Certified Test Report	Bulletin 95062

Line post sensor

Line Post Sensor Technical Data

Rating (kV L-L)	15, 25, 35 kV
Rating (kV L-G)	9.5, 15, 22 kV
Design	Single-Phase, Three-phase*
BIL (kV)	95 kV, 130 kV, 160 kV
Rated Frequency (Hz)	50/60 Hz
Rated Output (A)	600 A: 10 V, 6 V Output**
Leakage Distance (in.)	11, 17, 25
Current (A)	2-1200 A
Impedance	2.1 kohms
Weight (lbs.)	13, 19, 28
Signal Cable	3 conductor, 18 AWG, (Std. 20 ft.)
Accuracy	+/- 1.0%

* Contact factory for information regarding three-phase independent voltage and current sensing with optional neutral sensor including available mounting options.

** Contact factory for more available rated output options.

Fisher Pierce® Line Post Sensor shown courtesy of Thomas & Betts®

Open distribution cutout

Open Distribution Cutout Technical Data

Cutout Type	Type L, Load Break
Housing Material	Silicone Rubber, Porcelain
Rating (kV)	15.5 kV, 27 kV
BIL (kV)	95/110, 125, 150
Rated Current (A)	100 A, 200 A*
Rated Frequency	50/60 Hz
Current Limiting	ELF™ †, Tandem ELF
Mounting	NEMA® X-ARM
Design Standard	IEEE®

* Fuse links rated 100 A or less are not recommended for use in 200 A fuse holders.

† Full-range current-limiting fuse recommended for use in high fault current applications.

Supporting Documentation

Description	Reference Document
Open Distribution Cutout Catalog Section	327-30
Instruction Sheet	S327-30-1
Certified Test Report	CP-9618
ELF Catalog	240-66
Tandem ELF Catalog	240-67

Edison fuse link

Edison Fuse Link Technical Data

Design	Single Element, Dual Element
Fuse Material	Tin, Silver*
Fuse Type	K, T, S, H, N, D
Current Rating (A)	1 A through 200 A*
Button Head	Removable, Non-Removable†
Design Standard	ANSI®, NEMA®

* Refer to catalog section for available fuse current ratings.

† Recommended when available for application.

Supporting Documentation

Description	Reference Document
Catalog Section	CA132008EN
TCC Curves	Reference information supplied in catalog

Refer to Group Capacitor Fusing recommendations available on-line at www.eaton.com/cooperpowerseries.

Kearney fuse link

Kearney Fuse Link Technical Data

Design	Single Element, Dual Element
Fuse Material	Tin
Fuse Type	K, N, QA, T, KS, X
Current Rating (A)	1/3 A through 200 A*
Button Head	Removable, Non-Removable †
Design Standard	ANSI®, NEMA®

* Refer to catalog section for available Fuse current ratings.

† Recommended when available for application.

Supporting Documentation

Description	Reference Document
Catalog Section	327-40
TCC Curves	Reference information supplied in catalog

Refer to Group Capacitor Fusing recommendations available on-line at www.eaton.com/cooperpowerseries.

Reactors

Reactor Technical Data

Voltage Class	15 kV
Inductance (uH)	20 uH
Units in parallel	1, 2
Continuous Current Rating (60 Hz)	160 A
Rated Frequency (Hz)	50/60 Hz
Weight (lbs.)	6 lbs.
Mounting	Cross Arm*

* Manufacturer supplies mounting hardware to install reactors on cross-arm above capacitor rack installation. Installation on capacitor bushing or capacitor switch bushing not recommended.

Trench® Capacitor Reactor, Model VRX1000 shown courtesy of TRENCH Group

Table 12. Modular Capacitor Rack Numbering System

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
O	C	D	B	2	7	E	F	2	2	H	M	1	R	8

* Contact factory for further information regarding Engineered-to-Order or customer specific catalog numbers using non-standard components including CBC-8000 Capacitor Controller.

Catalog Number Digits (1-3)

Digit 1:	
O	**Overhead Distribution Capacitor Rack**

Digit 2:	Connection	Rack Size	Units Installed
C	GRD Wye	3	3
D	GRD Wye	6	3
E	GRD Wye	6	6
F	GRD Wye	9	3
G	GRD Wye	9	6
H	GRD Wye	9	9
2	UNGRD Wye	3	3
3	UNGRD Wye	6	3
4	UNGRD Wye	6	6
5	UNGRD Wye	9	3
6	UNGRD Wye	9	6
7	UNGRD Wye	9	9
N	Delta	3	3
P	Delta	6	3
Q	Delta	6	6
S	Delta	9	3
T	Delta	9	6
U	Delta	9	9

Contact factory for rack sizes greater than 9 spaces

Digit 3:	Frequency	Unit kVar
A	60	50
B	60	100
C	60	150
D	60	200
E	60	300
F	60	400
G	60	500
1	50	50
2	50	100
3	50	150
4	50	200
5	50	300
6	50	400
7	50	500

Table 12. Modular Capacitor Rack Numbering System (continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
O	C	D	B	2	7	E	F	2	2	H	M	1	R	8

Catalog Number Digits (4-7)

Digit 4:	Capacitor Unit Insulation (kV BIL)
B	95
C	110
D	125
E	150
F	200

Digits 5 and 6:		Capacitor Unit Voltage
2	2	2400
2	3	2770
2	4	4160
2	5	4800
2	6	6640
2	7	7200
2	8	7620
2	9	7960
2	A	9960
3	C	11400
2	B	12470
2	C	13280
2	D	13800
2	E	14400
2	F	19920
2	G	21600
4	C	22130
4	F	22800

Digit 7:	Bushings	Location	Creep (in.)
A	Single	Pole-Side	12
C	Single	Pole-Side	22
D	Single	Pole-Side	32
E	Single	Opposite Pole-Side	12
G	Single	Opposite Pole-Side	22
H	Single	Opposite Pole-Side	32
J	Double	N/A	12
L	Double	N/A	22
M	Double	N/A	32

Table 12. Modular Capacitor Rack Numbering System (continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
O	C	D	B	2	7	E	F	2	2	H	M	1	R	8

Catalog Number Digits (8-9)

Digits 8 and 9:		Capacitor Switch Configuration					
Rack With Switch*		**Capacitor Switch Type**	**Rating (kV)**	**L-G BIL (kV)**	**Control Voltage (Vac)**	**Aux Contacts**	**Receptacle**
0	0	Fixed Capacitor Rack					
0	1	Switch Mounting Provisions-Pole-Side					
3	1	Switch Mounting Provisions-Opposite Pole-Side					
2	3	NR	14.4	95	120	None	5-pin/3-cond
2	J	NR	14.4	95	240	None	5-pin/3-cond
3	H	NRV	20.0	125	120	None	5-pin/3-cond
3	R	NRV	20.0	125	240	None	5-pin/3-cond
F	2	ECS	15.6	95	120	None	5-pin/3-cond
F	3	ECS	15.6	95	120	AUX-A	5-pin/5-cond
F	4	ECS	15.6	95	120	AUX-B	5-pin/5-cond
F	5	ECS	15.6	95	120	AUX-C	6-pin/6-cond
F	6	ECS	15.6	125	120	None	5-pin/3-cond
F	7	ECS	15.6	125	120	AUX-A	5-pin/5-cond
F	8	ECS	15.6	125	120	AUX-B	5-pin/5-cond
F	9	ECS	15.6	125	120	AUX-C	6-pin/6-cond
F	A	ECS	25.0	125	120	None	5-pin/3-cond
F	B	ECS	25.0	125	120	AUX-A	5-pin/5-cond
F	C	ECS	25.0	125	120	AUX-B	5-pin/5-cond
F	D	ECS	25.0	125	120	AUX-C	6-pin/6-cond
F	E	ECS	25.0	150	120	None	5-pin/3-cond
F	F	ECS	25.0	150	120	AUX-A	5-pin/5-cond
F	G	ECS	25.0	150	120	AUX-B	5-pin/5-cond
F	H	ECS	25.0	150	120	AUX-C	6-pin/6-cond
F	J	ECS	15.6	95	240	None	5-pin/3-cond
F	N	ECS	15.6	125	240	None	5-pin/3-cond
F	S	ECS	25.0	125	240	None	5-pin/3-cond
F	W	ECS	25.0	150	240	None	5-pin/3-cond

* Capacitor switches are installed opposite pole-side as standard. Contact factory for pole-pole-side installations.

Wildlife protectors are supplied as standard on all capacitor racks.

Contact factory for more available options.

Table 12. Modular Capacitor Rack Numbering System (continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
O	C	D	B	2	7	E	F	2	2	H	M	1	R	8

Catalog Number Digits (10-12)

Digits 10 and 11: **Control Power Transformer (CPT)**

Rack With CPT*		Primary Voltage (kV L-G)	kVa	Primary Bushings	Primary Bushing BIL (kV)	Secondary Bushings	Control Voltage (Vac)
0	0	No CPT					
0	1	Provisions for CPT					
3	5	2400	0.5	1	95	1	120
D	8	2400	1.0	1	95	1	120
6	A	4800	0.5	1	95	1	120
D	Z	4800	1.0	1	95	1	120
2	5	7200	0.5	1	95	1	120
2	4	7200	0.5	2	95	2	120
2	H	7200	1.0	1	95	1	120
4	W	7200	1.5	1	95	1	120
2	6	7620	0.5	1	95	1	120
2	X	7620	1.0	1	95	1	120
6	H	7620	1.0	1	95	2	120
2	7	7960	1.0	1	95	1	120
2	R	12500	1.0	1	95	1	120
6	C	12500	1.0	2	95	1	120
3	P	12500	1.0	2	95	2	120
D	K	12500	1.0	2	125	2	120
3	6	13800	0.5	1	125	1	120
6	3	13800	1.0	2	95	2	120
2	K	14400	1.0	1	125	1	120
D	Y	14400	1.0	1	150	1	120
E	Q	14400	1.0	1	125	2	120
2	V	19900	1.0	1	125	1	120
4	V	19900	1.0	1	150	1	120
D	7	19900	1.0	1	150	2	120

* CPT supplied with internal weak link fuse. Contact factory for more available options including 240 Vac control voltage..

Digit 12:	Junction Box
0	No Junction Box
1	Standard Junction Box
3	Std. J-Box with 30' of 5-conductor cable
4	Std. J-Box with 35' of 5-conductor cable
J	Std. J-Box with 30' of 6-conductor cable with 6-Jaw Meter Socket (Refer to CBC-8000 mounting option 3)
K	Std. J-Box with 35' of 6-conductor cable with 6-Jaw Meter Socket (Refer to CBC-8000 mounting option 3)
M	Std. J-Box with 30' of Cable with 7-Pin Mating Plug (Refer to CBC-8000 mounting option 8)
N	Std. J-Box with 35' of Cable with 7-Pin Mating Plug (Refer to CBC-8000 mounting option 8)

Contact factory for more available options.

Table 12. Modular Capacitor Rack Numbering System (continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
O	C	D	B	2	7	E	F	2	2	H	M	1	R	8

Catalog Number Digits (13-15)

Digit 13:	Arrester Mounting
0	Arrester Mounting not Supplied
1	Arrester Mounted on Capacitor Frame

Digit 14:	Arrester Rating Rating	MCOV
0	No Arrester	
1	Arrester Provisions	
N	3	2.55
P	6	5.1
Q	9	7.65
R	10	8.4
S	12	10.2
T	15	12.7
U	18	15.3
V	21	17
W	24	19
X	27	22
Y	30	24.4
Z	36	29

Digit 15:	Special Options
1	Stenciling
2	Shorting Wire
8	Crating Required

Dimensional information

Rack configurations, dimensions, kvar capacities, and weights

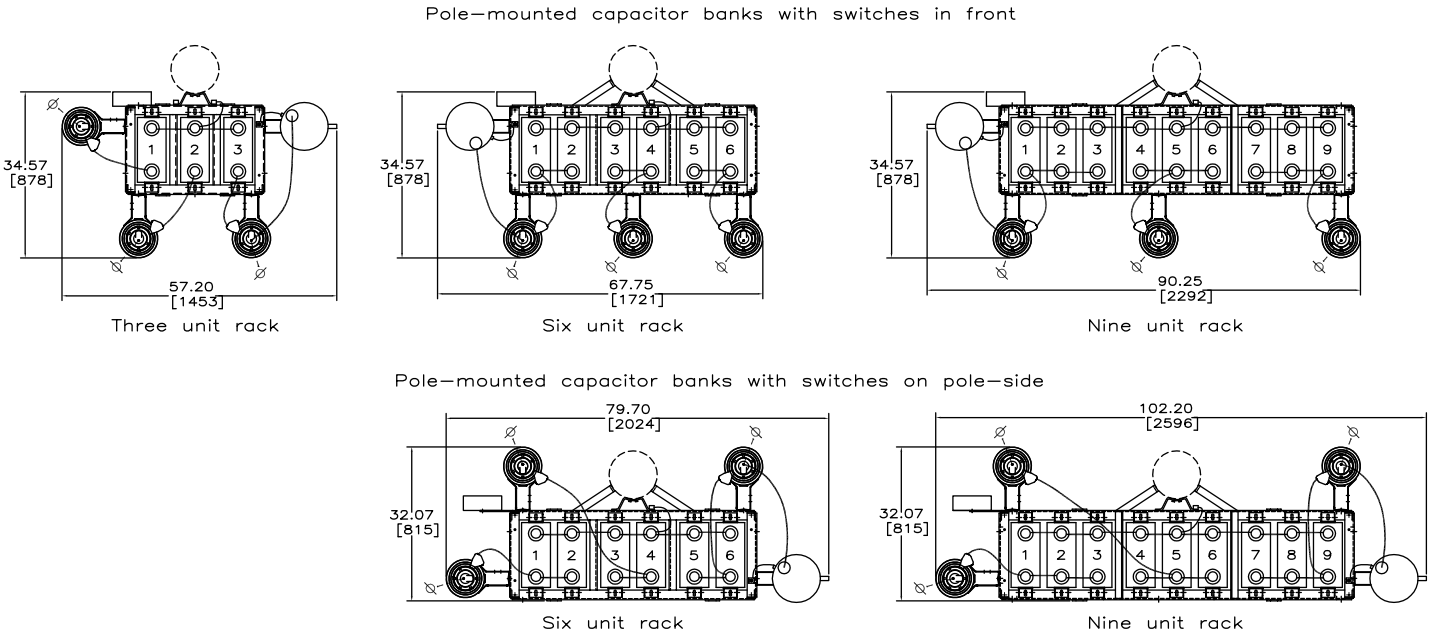


Figure 5. Capacitor rack assemblies 95 kV BIL with 50, 100, 150, 200, 300, 400, 500, or 600 kvar units

Notes:

1. Drawings show location of Edison capacitor switches on switched racks.
2. Ground connector accommodates .080-.355 diameter wire (No. 12 solid–No. 1 stranded AWG).
3. Edison capacitor switch's switched terminals accommodate No. 8–No. 2/0 copper or aluminum in horizontal or vertical position.
4. Pole mounting bolts are 18 in. on centers.

Table 13. 95 kV BIL Capacitor Rack Assembly Weights

kvar (Units)	Number of Capacitor Units lbs (kG)		
	3	6	9
50	346 (157)	430 (195)	513 (232)
100	376 (170)	490 (222)	603 273)
150	400 (181)	538 (244)	675 (306)
200	424 (192)	586 (265)	747 (338)
300	466 (211)	670 (303)	873 (395)
400	502 (227)	742 (336)	981 (444)
500	568 (257)	874 (396)	1179 (534)
600	622 (282)	982 (445)	1341 (607)

* Approximate weights are representative of switched capacitor rack configurations with 2-bushing capacitor units, Control Power Transformer (CPT) and accessories. Contact factory for exact weights of capacitor rack assemblies.

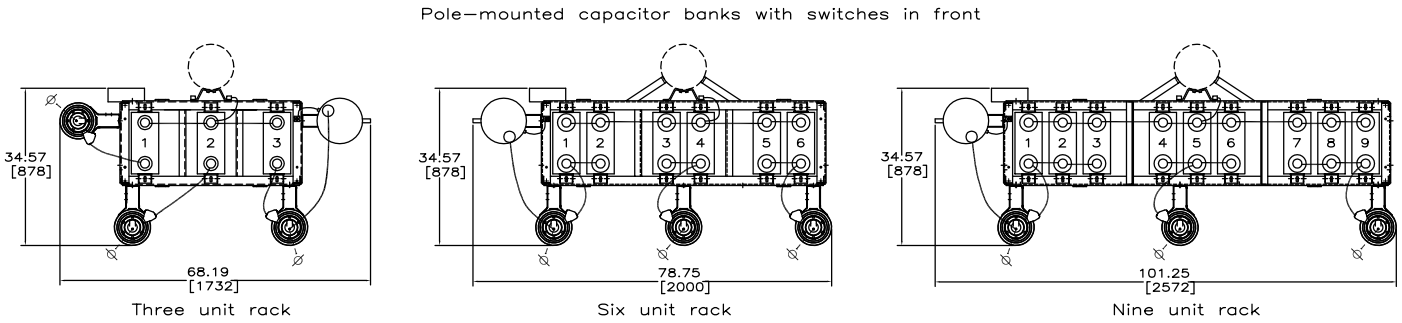


Figure 6. Capacitor rack assemblies 110, 125 and 150 kV BIL with 50, 100, 150, 200, 300, 400, 500, and 600 kvar units

Notes:

1. Drawings show location of Edison capacitor switches on switched racks.
2. Ground connector accommodates .080-.355 diameter wire (No. 12 solid–No. 1 stranded AWG).
3. Edison capacitor switch's switched terminals accommodate No. 8–No. 2/0 copper or aluminum in horizontal or vertical position.
4. Pole mounting bolts are 18 in. on centers.
5. Contact factory for additional capacitor rack configurations.

Table 14. 110, 125 & 150 kV BIL Capacitor Rack Assembly Weights

kVar (Units)	Number of Capacitor Units lbs (kG)		
	3	6	9
50	349 (158)	433 (196)	517 (234)
100	379 (172)	493 (223)	607 (275)
150	403 (183)	541 (245)	679 (308)
200	427 (193)	589 (267)	751 (340)
300	469 (212)	673 (305)	877 (397)
400	505 (229)	745 (337)	985 (446)
500	571 (259)	877 (397)	1183 (536)
600	625 (283)	985 (446)	1345 (609)

* Approximate weights are representative of switched capacitor rack configurations with 2-bushing capacitor units, Control Power Transformer (CPT) and accessories. Contact factory for exact weights of capacitor rack assemblies.

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