



Medium Voltage Metal-Enclosed DS1 Transient Free Capacitor Switch



General

Northeast Power Systems, Inc. (NEPSI) Medium Voltage Metal-Enclosed DS1 Transient Free Capacitor Switch is designed for power systems requiring reliable transient free capacitor switching. At the heart of this metal enclosed solution is ABB's DS1 diode-based transient-free capacitor switch. It accomplishes transient free switching by exploiting the natural commutation characteristics of a diode, the precision of servos motors, and ABB's breaker switching technology and expertise. ABB's DS1 is able to carry out closing and opening operations without any current, voltage, or frequency transient, and without the possibility of pre-strike or re-strike.

NEPSI offers the DS1 switching technology as a stand alone metal-enclosed solution that may be applied in a retrofit application or as an integral part of their metal-enclosed capacitor banks. See nepsi.com for more information on NEPSI's metal-enclosed solutions and download that the [DS1 flyer](#) for more information on ABB's DS1 Switch.

Product Scope

- Manual / Remote Transient Free Switching of Capacitor Banks
- Retrofit designs | Integral Mounting within NEPSI's Metal-Enclosed Capacitor Banks
- Voltage Rating: 2.4kV through 17.5 kV (95kV BIL)
- System Frequency: 50 | 60 Hertz
- Current Rating: 600 amps (60 Hertz Systems), 630 amps (50 Hertz Systems)
- Single-step, multi-step capacitor bank applications (no requirement for transient inrush reactors)
- Short Circuit Protection: Current Limiting Fuses to: 63kA
- Seismic, wind, and snow load certification
- Custom designs (dimensions / color / layout) to match existing switchgear
- Applicable industries: Mining, Chemical, Petroleum, Commercial, General Industrial, Wind & Solar



Ratings / Specifications

Rating	Range of Available Ratings	
Bank Configuration:	Single Step Multiple Step Designs Floating Star (<u>Ungrounded Wye Capacitor Banks Only</u>) <i>Harmonic Filter Reactors must be located on line side of DS1. Transient Inrush Reactors not required</i>	
Operating Voltage (line-to-line):	15kV at 60 HZ 17.5kV at 50 HZ <i>Phase Rotation must be A-B-C</i>	
Operating Current:	600 Amps at 60 HZ 630 Amps at 50 HZ	
Operating Frequency:	50 Hertz 60 Hertz	
Reactive Power Rating:	60 Hertz System	50 Hertz Systems
	2.4kV: 1843 kvar 4.16kV: 3,195 kvar 7.2kV: 5,530 kvar 12.47kV: 9,578 kvar 13.2kV: 10,139 kvar 13.8kV: 10,600 kvar	3.3 kV: 1537 kvar 6.6 kV: 5,320 kvar 11 KV: 8,867 kvar
Fault Current Interrupt Rating:	The DS1 is not designed to interrupt fault current, it must be applied with a feeder breaker or current limiting fuses.	
Short Time Current Rating:	20kA for 0.5 Seconds	
Short Time Peak Current:	52kA	
Impulse withstand voltage (Basic Insulation Level):	95kV: Phase-to-phase and phase-to-earth 110kV: Across the insulating distance	
Short-time withstand voltage (1 minute 50/60 Hertz):	38kV Phase-to-phase and phase-to-earth 45kV Across the insulating distance	
Control voltages:	AC Volts: 110, 115, 120, 220, 50/60hz DC Volts: 24, 48, 110, 125, 220	
Operating temperature range:	-15°C to +55°C <i>supplemental heat and cooling added when environmental conditions require it</i> -5°F to 131°F	
Maximum altitude without de-rating:	1,000 Meters 3,300 Feet	
Enclosure Ratings:	(NEMA): 1, 3R, 4X, 12 (IEC): IP10, IP14, IP56, IP52 Arc Resistant Enclosure Designs: Type 1, Type 1D-SR-SL, Type 2	
Seismic:	As specified - Prior certification to Zone 4	
Wind	As specified - Prior certification to 190 mph (305.7 km/h)	
Snow Load	As specified - Prior certification to 22.96 feet (7 meters)	
Standards Codes:	<ul style="list-style-type: none"> • IEC 62271-103 • IEC62271-100—with some exclusions • UL-508, <i>Industrial Control Panels</i> • ANSI C37.20.2, <i>IEEE Standard for Metal-Clad Switchgear</i> 	
NEPSI designs and builds their equipment to a hosts of national and international standards, including CSA, ANSI, and IEC. Consult with NEPSI for standards not listed.		
Power Supply	Voltage: 93 to 300 VDC Current: 2.5 amps RMS (Max) Power 220 VA max Peak Inrush: 2 Amps	



Equipment Configuration

NEPSI's Metal-Enclosed DS1 Transient Free Capacitor Switch is offered in the following two configurations:

1. As a separate capacitor switch configured similar to a switchgear cubicle and designed for switching a remote capacitor bank. Most suitable as a retrofit application on systems having transient problems.
2. As an integral switching device, housed, and segregated within a compartmentalized capacitor bank manufactured by NEPSI. See NEPSI's product literature for metal-enclosed capacitor banks and harmonic filter banks.

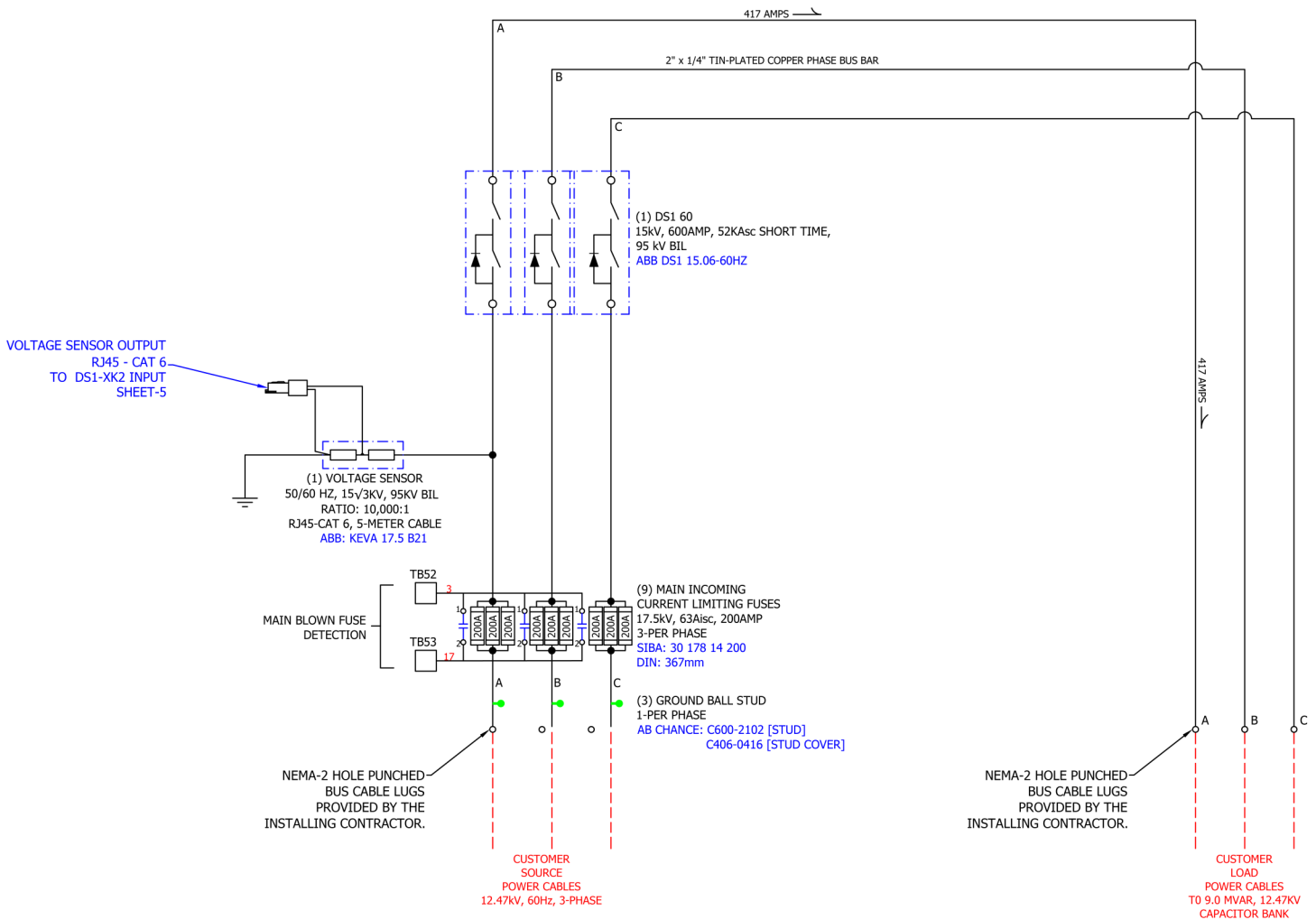
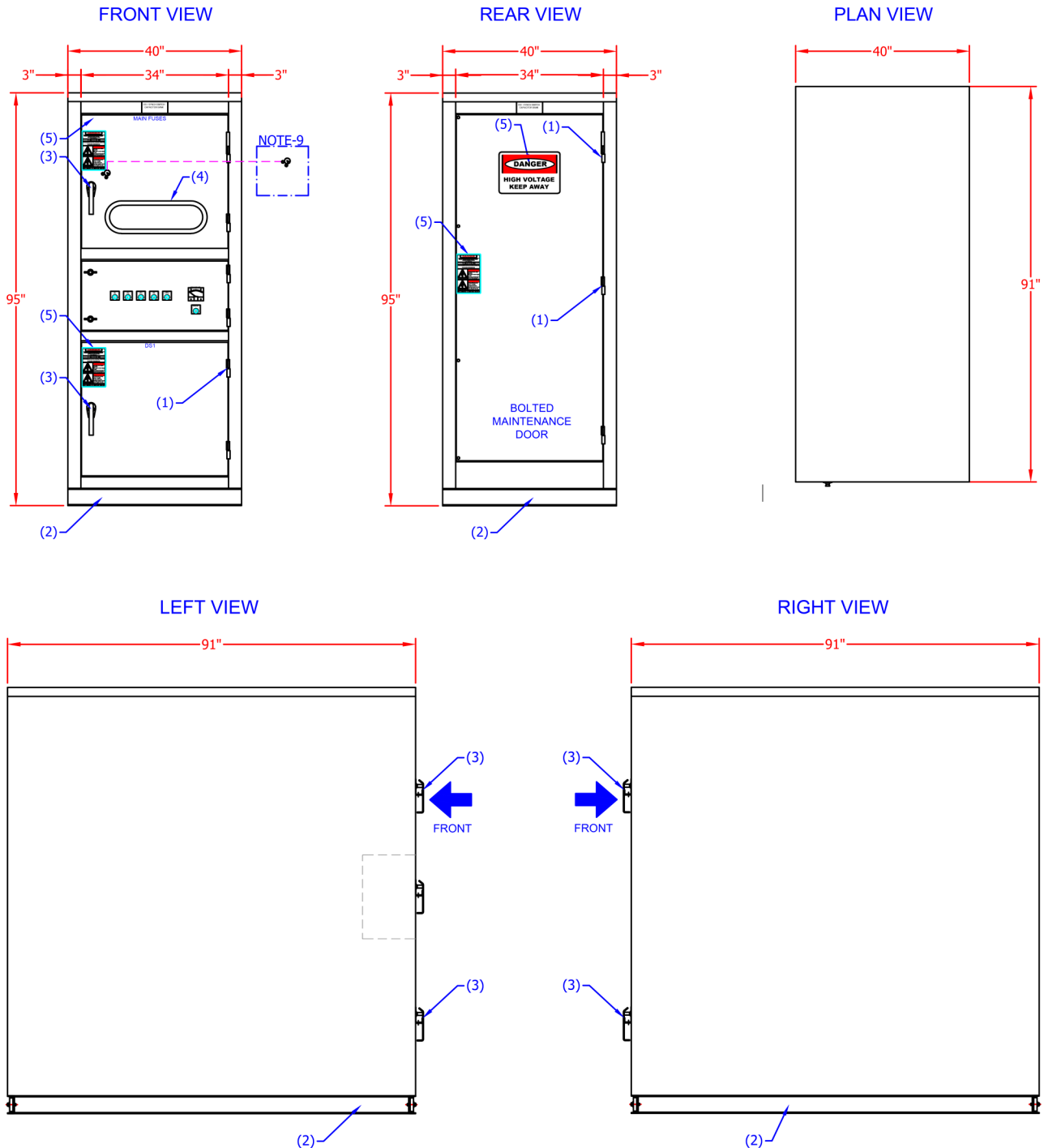


Figure 1—Typical 3-Line Diagram of a stand alone DS1 Capacitor Switch. Current limiting fuses provide short circuit protection for the DS1 and downstream capacitor bank. An optional disconnect switch and ground switch are available to provide a disconnect and ground for safe maintenance of the capacitor bank. The voltage sensor provides the necessary signal to the DS1 control to allow for synchronous switching.



Typical Dimensions—All Voltage Levels



- NOTES:**
- ENCLOSURE IS NEMA-1, ALL WELDED, 11-GAUGE, A60 GALVANNEALED SHEET STEEL, INDOOR CONSTRUCTION.
 - ENCLOSURE PAINT IS PSX700, EPOXY, FINISH IS GRAY ON INTERIOR AND EXTERIOR.
 - LIFTING PROVISION SHALL BE PROVIDED THROUGH LIFTING PLATES AT ENCLOSURE BASE.
 - DOORS ARE LIFT OFF IN OPEN POSITION.
 - ROOF IS FLAT
 - ENCLOSURE HAS NO FLOOR WITH BOTTOM FLOOR POWER CABLE ENTRY.
 - ALL DIMENSIONS HAVE A TOLERANCE OF 1/2"±.
 - LOCATION OF NON-DIMENSIONED COMPONENTS MAY NOT BE TO SCALE.
 - KEY INTERLOCK OF UPSTREAM BREAKER PROVIDED BY THE CUSTOMER, NUMBER OF KEY AND LOCK TO COORDINATE WITH MAIN FUSE DOOR INTERLOCK.

- LEGEND:**
- STAINLESS STEEL LIFT OFF HINGE
 - C4-CHANNEL BASE
 - PAD LOCKABLE STAINLESS STEEL OPERATOR
 - LEXAN VIEWING WINDOW
 - WARNING LABEL