

Guide Form Specification

RC-Snubber for Transformer Protection

1 General

1.1 This specification is for a _____ kV (line-line voltage) medium voltage three phase metal-enclosed RC-Snubber. The RC-Snubber protects the primary windings of a medium voltage transformer from high frequency voltage transients associated with primary circuit-breaker switching.

1.2 The system shall have a BIL rating of _____ kV with arresters rated for application on a _____ grounded system (*ungrounded, solidly grounded, or resistance grounded*).

1.3 The RC Snubber surge protector shall come fully assembled and ready for interconnection. All exceptions to this specification shall be clearly stated with your bid. If no exceptions are taken, the bid should include the phrase "no exceptions have been taken".

2 Compliance with Standard & Codes

2.1 The RC-Snubber shall conform to or exceed the applicable requirements of the following standards and codes:

- UL-347, High Voltage Industrial Control Equipment
- UL-508, Industrial Control Panels, Issue Number: 2, October 1993
- UL-50, Standard for enclosures for Electrical Equipment
- ANSI Z535.4 Product Safety Label Standard July 1, 2002.
- Applicable portions of Article 710 in the National Electrical Code
- Article 460 of the National Electrical Code
- ANSI C37.20.2 – Guide for Enclosure Categories and Related Requirements
- IEEE Std. 1036-1992, IEEE Guide for Application of Shunt Power Capacitors
- CP-1 NEMA Standard on Shunt Capacitors
- UL – 519
- REA Standards
- NESC Standards

3 Enclosure

3.1 The medium voltage RC-Snubber shall be housed in a NEMA 1, 3R, 12 (*specify 4X when required and delete 1, 3R, and 12*) 11 gauge galvaneel (316 and 409 stainless available) steel all-welded enclosure. The base of the unit shall consist of C2 channel for floor mounting and skidding into place.

3.2 The enclosure shall be equipped with a hinged door(s) for maintenance and termination. The hinged door shall bolt close with two 3/8"x16 stainless steel bolts. The hinges shall be stainless steel. The door shall be removable when in the open position.

3.3 The enclosure shall be prepared and painted with a high-solid epoxy coating as specified below. The inside shall be white while the outside shall be (ANSI gray 61 – Munsell No. 8.3G 6.10/0.54, ANSI Gray 70 – Munsell No. 5BG 7.0/0.4 or Green - Munsell No. 7Gy 3.29/1.5).

3.4 High voltage warning signs and a nameplate showing rating information shall be located on the front of the enclosure.

3.5 The design shall accept bottom entry (may also specify top, back, left side, right side).

4 Connections

4.1 The RC-Snubber shall come fully assembled and ready for interconnection. Standoff insulators shall be provided for termination of customer phase conductors. Termination points shall accommodate a NEMA 2 hole compression lug.

5 Main Incoming Fuses

5.1 The RC-Snubber shall be equipped with main incoming current limiting fuses. The fuses shall be located on the load side of the main air-disconnect switch (if specified). They shall be accessible only when the bank is de-energized by the main incoming air disconnect switch and shall be completely isolated from any live parts.

5.2 Fuses shall be equipped with blown fuse indication. The indication shall be wired to terminal blocks for connection with external indicator and/or plant DCS system.

6 RC-Snubber Trouble Alarm/Trip (optional)

6.1 In addition to the above, current transformers shall be placed in each phase of the RC-Snubber. The current transformer secondaries shall be connected to an appropriate protection relay to indicate the RC-Snubber is properly operating (not open, not shorted, and drawing the correction amount of current). Incorrect operation shall trip a relay contact to either alert plant personal of improper operation of the RC-Snubber or trip the upstream breaker lockout relay.

7 Load Interrupter - Air Disconnect Switch (optional)

7.1 The harmonic filter bank shall be supplied with an external chain operated load interrupting switch that accomplishes capacitive current interruption utilizing the dual arc extinguishing system based on the auto-pneumatic air-blast and hard gas nozzle principle. The switch shall be rated at 135% of the banks nominal current rating and shall have a 40-kA RMS momentary asymmetrical rating. This switch shall be interlocked with the vacuum switches to prevent it from being opened while the filter stage(s) are energized. The switch shall be pad-lockable in either the open or closed position.

7.2 The Air Disconnect Switch shall be located in a separate compartment that is isolated from the capacitor/reactor compartment and the low voltage control compartment by a steel barrier. In addition to the exterior enclosure door, a protective screen (behind the door) shall be provided before access to the switch is allowed.

8 Ground Switch (optional)

8.1 An externally operated ground switch shall be provided to ground the load-side terminals of the air disconnect switch. The ground switch shall be pad-lockable in either the open or closed position. The ground switch must be tested in accordance with ANSI/IEEE standards. Test reports shall be furnished upon request.

8.2 The ground switch shall be interlocked with the Air Disconnect Switch to prevent closing of the ground switch when the air disconnect switch is in the closed position.

9 Snubber Capacitor(s)

9.1 A low inductance snubber capacitor shall be provided for decreasing the slope of impending voltage surges. The capacitor shall be rated _____ micro-farads to ground and have a _____ voltage rating.

9.2 The capacitor shall be equipped with discharge resistors that reduce the capacitor voltage to 50 volts in 5 minutes when disconnected from the source.

9.3 The surge capacitor shall be capable of operating in the temperature range between -50°C to +50°C.

10 Snubber Resistor

10.1 The medium voltage RC-Snubber shall be equipped with non-inductive ceramic resistors able to withstand high peak power or high-energy pulses. The resistor shall have a _____ ohm, 1000 watt rating.

10.2 The resistors shall be clip mounted with metalized ends for electrical contact to clips.

10.3 The resistors shall be rated for -55°C to +350°C with a resistance temperature coefficient of +0.2 to -0.08%/°C

11 Lightning Arrester

11.1 The medium voltage RC-Snubber shall be equipped with line-to-line and line-to-ground heavy duty distribution class (*specify station class if desired*) lightning arresters for limiting the crest of impending voltage surges to safe values.

11.2 The lightning arrester shall be silicone rubber housed and shall utilize MOV blocks. The arresters shall comply with ANSI/IEEE C62.11 standards.

11.3 The voltage rating and MCOV ratings shall be appropriately rated for the system voltage and grounding as specified above.

12 Submittals

12.1 Upon issue of a purchase order, the supplier shall provide 3 copies of approval drawings. The submittals shall include:

- Installation Instructions
- Single Line and three line diagrams
- Pad and cable entry drawings
- Drawings showing component layout
- Data sheets for all internal components

13 Bid Requirements

13.1 Supplier must state all exceptions in the Bid. If no exceptions are taken, the supplier must state that there are no exceptions.

13.2 Supplier must complete attached supplier qualification form and attach to quote. Failure to provide qualification form with quote will be cause for rejection.

13.3 Supplier must have optional extended warranty and field service agreements available. These policies shall be provided with the bid.

13.4 Supplier must provide their written quality policy with the Bid.

13.5 Quotes are to be FOB factory, freight allowed.

14 Product Listing

14.1 The RC-Snubber Control panel shall be UL508A Certified for both Canadian and US products.

14.2 The RC-Snubber shall be "listed" per OSHA (in the USA) and the Standards Council of Canada (in Canada) to the following standards.

- For products shipping to the United States, IEEE C37.20.3-2001
- For products shipping to Canada, C22.2 No. 190-M1985+GI1 + GI2 (R2004)

14.3 A copy of the NRTL Certificate showing compliance with the above shall be included with the bid.

15 Acceptable Product & Suppliers

15.1 Suppliers must offer a minimum 2 year warranty and have available extended warranty programs.

15.2 Supplier must show that they are a regular supplier of medium voltage surge protection equipment.

Acceptable Manufacturer and Product:

Northeast Power Systems, Inc. (*NEPSI*)
66 Carey Road
Queensbury, NY 12804

Phone: 518-792-4776

Fax: 518-792-5767

Email: sales@nepsi.com

website: www.nepsi.com