



Typical Specification

HPS Centurion D1 dV/dT Filter

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1 **GENERAL**

1.1 SCOPE

- A This section defines the Centurion D1 dV/dT filter with three phase iron core line reactor and resistors. The filter is designed to help prevent motor failures caused by operation on a variable frequency drive with a cable length up to 1000 feet. There is an option available for lengths up to 600 feet.

1.2 BACKGROUND

- A Large voltage spikes can be imposed on motor windings due to a long cable distance between a VFD and the motor. This is caused by PWM switching, high carrier frequencies and a mismatch in impedance between the cable and the motor. Voltage spikes of 2 to 3 times the VFD's DC bus voltage can occur which can lead to motor failure over time. The Centurion D1 dV/dT filter will reduce the peak voltages at the motor.

1.3 RELATED DOCUMENTS

- A Drawing and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

1.4 REFERENCES

- A NEMA ST-20 Dry-Type Transformer for General Applications
B IEEE C57.110 Recommended Practice for establishing transformer capability when feeding non-sinusoidal load currents.
C UL 508, CSA C9 & C22.2 No. 47.
D IEC 61558-1, IEC 61558-2-20

1.5 TESTING & QUALITY CONTROL

- A Production tests: each unit according to applicable sections of:
- UL 508
 - IEC 61558-1, IEC 61558-2-20
- B Perform a Type Test for each model design and submit report
- C Standard production tests to include:
- DC resistance
 - Hi POT
 - Inductance
 - Resistance check for resistors

1.6 SUBMITALS

- A Submit shop drawing and product data for approval and final documentation in the quantities listed according to the Conditions of the contract. Customer name, customer location and customer order number shall identify all transmittals.
- B Product Data including, current, temperature rise, detailed enclosure dimensions, system voltage, inductance, unit weight, warranty, insulation class.

1.7 STORAGE AND HANDLING

- A Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from potential damage from weather and construction operations. Store so condensation will not form on or in the dV/dT filter housing and if necessary, apply temporary heat where required to obtain suitable service conditions.

- B Handle dV/dT filters using proper equipment for lifting and handling; use when necessary lifting eye and/or brackets provided for that purpose.

1.8 WARRANTY

- A The Centurion D1 dV/dT filter shall carry a 1 year limited warranty.
(For details, refer to the manufacturers published warranty)

2 **PRODUCTS**

2.1 GENERAL CONSTRUCTION:

1. The filter shall have differential mode inductance. The inductance shall be implemented in the form of a three phase, iron core reactor. Three phase reactors shall be open style. All three phase reactors shall be constructed with three coils and a single core. Terminals may be terminal blocks or copper pads. Terminals shall be marked with A1, B1, C1, A2, B2, and C2.
2. Reactor winding shall be suitable for 150% RMS overload for 60 seconds once every 10 minutes.
3. Reactors shall be designed, constructed and rated in accordance with UL, CSA and NEMA standards.
4. Resistors shall be used up to a maximum of 60% of the rated wattage.

2.2 VOLTAGE REQUIREMENTS:

- A Fundamental Maximum Voltage : [600VAC]

2.3 DESIGN SPECIFICATIONS:

- A The filter shall be rated for a maximum fundamental frequency of 60Hz at a system voltage of 600V and up to 90Hz with de-rating.
- B The filter shall be suitable for a maximum VFD carrier frequency of 4kHz
- C Maximum cable length: 1000ft (600ft models available)
- D The filter shall be suitable for operation in an ambient temperature of 50 degrees C.
- E Insulation System:
 - i 130°C (2A – 54A) (50°C ambient),
 - ii 180°C (>55A) (50°C ambient)
- F Altitude: <1000m
- G Dielectric: 4000 volts RMS (2200 volts peak repetitive)
- H Coil conductors: continuous copper windings, with terminations brazed, welded or bolted.
- I Impregnation: vacuum pressure impregnated polyester resin.
- J Enclosure: (When specified) Ventilated, [Type 1] .
- K Enclosure Finish: ANSI 61 Grey suitable for UL50 outdoor applications [orange][other].
- L Reactors shall be terminated with copper terminal pads or terminal blocks. Contractors shall provide all necessary lugs not already provided with reactors.
- M UL listed, CSA approved.
- N Built to NEMA ST-20 and in accordance with all applicable UL, CSA and ANSI/IEEE standards.

2.4 ACCEPTABLE PRODUCT AND MANUFACTURER:

- A Hammond Power Solutions Inc. (Canada: 1-888-798-8882 / U.S.: 1-866-705-4684).
- B Substitutions are permitted, subject to meeting all requirements of this specification and also having written approval by engineering 10 days prior to bid closing.

3 EXECUTION

3.1 INSTALLATION

- A The installing contractor shall install the dv/dt filters per manufacturer's recommended installation practices as found in the installation, operation, and maintenance manual and comply with all applicable codes.
- B Check for damage and loose connections.