**Guideform Specification**

**Bender NGRM700**

Neutral grounding resistor (NGR) monitoring shall be provided by a Bender NGRM700 Neutral Grounding Resistor Monitor.

Protection and Monitoring Functions

Grounding-resistor failure detection:

* Active and passive measurement methods; user-selectable as automatic or passive
* Open NGR detection
* Shorted NGR detection per CE code Section 10-302
* Calibrates to monitored system
* Continuous monitoring of NGR and grounding-connection resistance with a 10 to 200% resistance-tolerance setting range
* Continuous monitoring of the resistance of the NGR even when the power system is de-energized (active)

Grounding-fault detection:

* Measures NGR current
* Detects neutral overvoltage
* Detection of AC and/or DC faults
* Choice of filters to detect ground faults; broadband, fundamental frequency, or band pass with definable limits of 0 to 1.9 kHz
* Safe physical connection to the power system using a CD-series coupling device
* Neutral current and voltage harmonics measured and displayed
* Fast Fourier Transform analysis of measured signals

Communications:

* Integrated web server over Ethernet to manage settings, display measured values, and provide alarm notifications
* Modbus TCP (over Ethernet) and Modbus RTUS (over RS-485) fieldbus protocols
* Password and external write protection

Datalogging:

* Up to 1,000 events

Operating temperature:

* -40 to 160° F ( -40 to 70° C)

Inputs:

* Current input: One type W, WAB, CTUB100 series and standard 5 – or 0.05-A secondary
current transformer
* Test button (HMI and external digital input)
* Reset button (HMI and external digital input)
* Pulser activation digital input
* Coupling device input for ground-path and neutral-voltage monitoring

HMI:

* Digital display to show information and manage settings
* Selectable languages – US English, UK English, French, German, Spanish
* LEDs for power and alarm indication
* Push buttons for menu control, reset, test, set point selection, and metering-screen selection
* Chassis mounted; detachable for door mounting

Phase-voltage monitoring:

* Phase-to-ground and phase-to-phase voltage monitoring

Outputs:

* 3 x Form-C relay outputs activated on ground-fault and NGR-fault selectable fail-safe or non-fail-safe
* Selectable analog output – 4 to 20 mA, 0 to 10 V, 0 to 20 mA, and 2 to 10 V
* Analog output configurable for 0 to 100% of NGR current or 0 to 200% of NGR resistance
* Audible alarm, selectable
* 2 x digital outputs: pulser control and unit health

Supply voltage and power consumption:

* AC/DC 24 to 240 V, maximum 6.5 W/13 VA at 50/60 Hz

Terminal rating:

* IP20/NEMA 1

Enclosure ratings:

* Chassis: NEMA 1 (IP30); HMI: NEMA 1 (IP30) or NEMA 4 (IP65) with optional cover

Altitude:

* 5,000 m AM