***Generic Specification For***

**Multifunction Electrical Power Quality Meter**

**GE PQM II-T20-C-A**

# General

* 1. Electrical Power Quality Meter shall provide continuous monitoring of a three-phase system as required. Meter shall measure current, voltage, real and reactive power, energy use, cost of power, power factor and frequency.
  2. Programmable setpoints and 4 assignable output relays shall be provided for control functions for specific applications.
  3. Meter shall be capable of basic alarm on over/under current or voltage, unbalance, demand-based load shedding, and capacitor power factor correction control.
  4. More complex control shall be possible using the 4 switch inputs which also can be used for status such as breaker open/closed, flow information etc.
  5. Conformal coating is available as an option for harsh environments.
  6. The meter shall provide both of the following methods for setup and configuration:

1. Front panel, using keys and the display
2. Setup software from the meter vendor running on a computer connected to rear terminal RS485 port COM1 or COM2, or front RS232 port

## 2.1 Manufacturer

## General Electric (GE) Vernova products are to be used as the basis for design. Other manufactures’ products of equivalent quality and operating features may be acceptable, only if they comply with all requirements specified. The preferred product is the GE PQM II Power Quality Meter.

# Electronic Power Quality Meters

### Testing and Approvals

## The meter shall have the following testing and approvals:

## Type Tests

|  |  |  |
| --- | --- | --- |
| **TEST** | **REFERENCE STANDARD** | **TEST LEVEL** |
| Dielectric voltage withstand | EN60255-5 | 2300-3700VAC |
| Impulse voltage withstand | EN60255-5 | 5KV |
| Insulation resistance | EN60255-5 | 500VDC >100mohm |
| Damped Oscillatory | IEC61000-4-18IEC60255-22-1 | 2.5KV CM, 1KV DM |
| Electrostatic Discharge | EN61000-4-2/IEC60255-22-2 | Level II |
| RF immunity | EN61000-4-3/IEC60255-22-3 | 10V/m 80-1Ghz |
| Fast Transient Disturbance | EN61000-4-4/IEC60255-22-4 | Class A and B |
| Surge Immunity | EN61000-4-5/IEC60255-22-5 | 4Kv, 2KV |
| Conducted RF Immunity | EN61000-4-6/IEC60255-22-6 | 10Vrms |
| Radiated & Conducted Emissions | CISPR11 /CISPR22/ IEC60255-25 | Class A |
| Sinusoidal Vibration | IEC60255-21-1 | Class 1 |
| Shock & Bump | IEC60255-21-2 | Class 1 |
| Power magnetic Immunity | IEC61000-4-8 | Level 4 |
| Pulse Magnetic Immunity | IEC61000-4-9 | Level 4 |
| Voltage Dip & interruption | IEC61000-4-11 | 0,40,70,% dips,250/300cycle interrupts |
| Ingress Protection | IEC60529 | IP40 front, IP20 Back |
| Environmental (Cold) | IEC60068-2-1 | -10C 16 hrs |
| Environmental (Dry heat) | IEC60068-2-2 | 70C 16hrs |
| Relative Humidity Cyclic | IEC60068-2-30 | 6day variant 2 |
| EFT | IEEE/ANSI C37.90.1 | 4KV, 2.5Khz |
| Damped Oscillatory | IEEE/ANSI C37.90.1 | 2.5KV,1Mhz |
| Altitude: | 2000m (max) |  |
| Pollution Degree: | II |  |
| Overvoltage Category: | II |  |
| Ingress protection: | IP40 Front, IP20 back |  |

## Approvals

|  |  |  |
| --- | --- | --- |
|  | **Applicable Council Directive** | **According to** |
| CE compliance | Low voltage directive | EN60255-5 |
|  | EMC Directive | EN61000-6-2 |
| North America | cULus e83849 NKCR/7 | UL508 |
|  |  | UL1053 |
|  |  | C22.2. No 14 |
| ISO | Manufactured under a registered quality program | ISO9001 |

## Environmental

|  |  |
| --- | --- |
| Ambient temperatures: | Operating range: -10C to 60C |
| Humidity: | Operating up to 95% (non condensing) @ 55C (As per IEC60068-2-30 Variant 2, 6days) |
| Ventilation: | No special ventilation required as long as ambient temperature remains within specifications. Ventilation may be required in enclosures exposed to direct sunlight. |
| Cleaning: | May be cleaned with a damp cloth. |

## Production tests

## Dielectric Strength: 2200 VAC for 1 second (as per UL & CE)

### Metering and Monitoring

#### Meter shall be panel mount design with integrated display. Display shall be a Liquid Crystal Display (LCD), minimum 40-character display capable of clearly displaying alphanumeric characters.

#### Meter shall provide separate LED indicators for Alarms, Relay Activation, Auxiliary and Communication (Rx,Tx) status

#### Set-point keys shall be provided on the front panel of the meter to program the meter. Meter shall be able to display all measured value on demand using the keys on meters front panel

#### For testing purposes meter shall be able to run in self test and simulation mode. The meter shall simulate values for current, voltage, analog input, switches and analog outputs.

#### Meter shall provide a true RMS monitoring of Ia, Ib, Ic, In, Van, Vbn, Vcn, Vab, Vbc, Vca, voltage/current unbalance, power factor, line frequency, watts, vars, VA, Wh, varh, VAh, and demand readings for A, W, vars, and VA. Maximum and minimum values of measured quantities shall also be recorded and date/time stamped.

#### Meter shall be able to provide demand metering for energy and power. Demand shall be programmable for Thermal or Rolling demand with the demand interval of 5-60 minutes in step of 1.

#### Meter shall be capable of calculating energy costs. User shall be able to program up to 3 different tariff rates for cost calculations.

#### Following minimum accuracy for the monitored parameters shall be provided:

Voltage: ±0.2% of full-scale

Current: ±0.2% of full-scale

Voltage unbalance: ±1% of full-scale

Current unbalance: ±1% of full-scale

kW: per curves ±1 digit on display

kvar: per curves ±1 digit on display

kVA: per curves ±1 digit on display

kWh: per curves ±1 digit on display

kvarh: per curves ±1 digit on display

kVAh: per curves ±1 digit on display

Power factor: ±1% of full-scale

Frequency: ±0.02 Hz

kW demand: ±0.4% of full-scale

kvar demand: ±0.4% of full-scale

kVA demand: ±0.4% of full-scale

Current demand: ±0.4% of full-scale

Current THD: ±2.0% of full-scale

Voltage THD: ±2.0% of full-scale

Crest factor: ±0.4% of full-scale

#### User shall be able to set Alarm conditions for all measured quantities. These include over-current, under-current, neutral current, current unbalance, voltage unbalance, phase reversal, over-frequency, under-frequency, power factor, switch inputs, etc. The alarm messages shall be displayed on the meter LCD display in a simple and easy to understand English format.

### Power Quality

#### Power analysis features shall include an event recorder, waveform capture, trace memory, harmonic spectrum display (through the 62nd harmonic with total harmonic distortion) and a data logger function. Meter shall be able to sample harmonic spectrum at 256 samples per cycle. All analysis data shall be non-volatile.

#### Meter shall have a Voltage Disturbance Recorder (VDR) function to monitor and record sag and swell disturbances. It shall record up to 500 sag/swell events for all voltages simultaneously and log them with a time stamp.

#### Meter shall be able to capture waveform for voltage and current channels. Meter shall simultaneously sample all channels at minimum 16 samples per cycle. Meter shall be able to automatically capture waveforms based on user-defined set-points.

#### Meter shall automatically generate log for alarms, triggers and input/output events. Up to 150 events records with time stamp shall be stored in the meter.

### Input/Outputs

#### Meter shall have available built in input and output modules for control and transducer functions:

##### Four switch inputs (digital inputs) shall be provided which can be programmed for relay activation, counters, logic, demand sync, reset and alarms.

##### Four output relays shall be provided which can be programmed to activate on alarms, setpoints, switch inputs, kWh pulse, trace memory triggers or KYZ communications control. These output relays shall also be able to use demand-metering values of A, VAR, W and VA to control load shedding.

##### Four isolated 4-20mA or 0-1mA analog outputs assignable to all measured and calculated parameters for output to PLC and other such external devices.

### Communication:

#### Meter shall be able to communicate using Modbus and DNP 3.0 protocols over assignable RS 485 communication ports at minimum rate baud rate of 19200. Through the use of communication user shall be able to read/write set-points, read actual values, execute commands and read device status loop-back test.

##### Meter shall have a RS232 9-pin computer interface port accessible from the front of the meter for interface with local computer.

##### Two RS485 ports shall be provided for communication with SCADA and other systems. Each port shall be able to communicate independently to different systems using Modbus or DNP protocols.

##### Through the use of an external Ethernet module (preferably from the same vendor as the meter) the meter shall be able to communicate over Local Area Network (LAN) using TCP/IP. The external Ethernet module shall support both 10BaseT (copper) and 10BaseF (fiber optic) connections.

##### The external Ethernet module shall allow up to 32 RS-485/Modbus RTU devices to be connected to communicate via Ethernet.

### Warranty:

##### The meter shall have a standard 10-year warranty.

For additional specification information please contact:

GE Grid Automation

650 Markland St.

Markham, ON

Canada L6C 0M1

Toll Free (NA Only): 1-800-547-8629

Tel: 905-927-7070

Fax: 905-927-5098

[sales.gridsolutionsap@ge.com](mailto:sales.gridsolutionsap@ge.com)

<https://www.gegridsolutions.com/index.htm>