

A. T. M. S.

Proven Advanced Technology Solutions

TRIDENT Power Quality Recorders/Analysers

by MADE-SA

- Simple to Use
- P.C. Programmable
- Volts, Amps, Watts
- Dips, Swells, Interruptions
- Max. Power & Current
- Weatherproof Enclosure
- Harmonics Version
- Clamps or Coils
- User friendly Software



TRIDENT is an easy to use system for recording and analysing the behaviour in detail of the voltages, currents and power flows in a one- or three-phase network. The Power Quality analysis to **EN50160** includes slow fluctuations, dips, swells, short & long interruptions, frequency deviations, and overvoltages between neutral & earth. Normally, the recorder is configured for a measurement program using a PC although the version with a display can be configured using it's own keys. In operation the display shows the Voltage, Current & Power values. After a measurement program, the display can show the summary of the faults and variations encountered during the program.

TRIDENT correlates the currents flowing through the network with the fluctuations in voltage, follows the evolution of the active power over the measurement period and retains the value of the highest instantaneous current measured. It is supplied with our **WINTRID** software for PCs. for simple analysis of a wide range of parameters. It is manufactured to **ISO 9001** and is available in several versions : -

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TRIDENT+ measures the voltages between the phase and neutral and between neutral and earth,

TRIDENT+ 1U 1I measures the phase voltage and current.

The instruments above are for monitoring the voltage at a single-phase customer.

TRIDENT 3U – Portable recorder for monitoring the voltages at a three-phase customer.

TRIDENT 3U 3V – Portable recorder with display for the three phase voltages and the interphase voltages.

TRIDENT 3U 3I – Portable recorder with display for three-phase Voltages & Currents.

TRIDENT 3U 3I Blind – As above without display

TRIDENT 3U3I H61 – Three-phase Voltages & Currents in a Weatherproof case.

Main functions : -

Recordings & Analysis—Slow fluctuations of Voltage, Current & Power. Continuous recording of the true RMS values of the Voltage & Current on each of three phases, the Current in the Neutral and the Active Power. The integration period is programmable from 1 to 60 min.

TRIDENT stores approximately 30 days of readings taken every 10 mins.

Voltage Quality

The quality of the three voltages (phase or mesh) is continuously monitored by TRIDENT according to EN 50160 “Characteristics of the voltage supplied by Public Distribution Networks”

Slow Amplitude Variations

Passing the high & low thresholds by the mean values is recorded. The analysis can be made weekly.

Abrupt Amplitude Variations

Dips, Swells, Short & Long Interruptions are measure with a resolution of 10 msec.

A voltage fault is recorded with : -

- Start date & time, duration, type & phase
- The mean and highest 10 msec values during the fault
- The values of the 3 Vs & 3Is 1 second before the fault
- The values of the 3 Vs & 3Is 1 second after the fault

Threshold Parameters

- High Threshold +3% to +30%
- Low Threshold -3% to -80%
- Interruption Threshold -80% to -95%
- Time Threshold between short & long breaks from 0.1 to 999.9s
- Minimal event duration threshold 10msecs

Overvoltage between Earth & Neutral

The value between earth & neutral is measured over 10 msec. sliding by 1 msec. Any excesses between 5V. & 400V. are recorded.

Frequency Monitoring

TRIDENT has 10 weekly counters of frequency excesses (ave 10s phase 1)

Maximum RMS Power & Current

The 5 highest values of instantaneous current (all phases considered) are recorded and stamped with time & date. The 5

Technical Data

Current measurement inputs

The current is measured with MADE-FLEX Rogowski coils or clamp-on transducers with outputs of either : -

- Current 1 A. or 5 A.
- Voltage from 0.1 to 5V.

Power Supply

Switchable choice of

- Auxiliary power supply – 230 VAC +/- 20%, 50/60 Hz, 20VA max.
- Measurement input between phase 1 & neutral, idem.

Operating Conditions

Working temperature 0 to 55°C
Storage -20 to + 70°C
Relative Humidity 95%

Qualification

Safety rules EN61010-1
EMC NF EN 50081-2 EN55011 Class A

Susceptibility to Disturbance

NF EN 50082-2 IEC 1000-4-2 EN 61000-4-2
EN 61000-4-4 EN 61000-4-6 EN 61000-4-11

Transport

Supplied in carrying case Weight 3 kg.

Supplied Accessories

- 1 five-way cable to voltage measuring input
- 3 clamp-on transducers with cables and connectors
- 1 RS232 serial interface cable
- 1 folder with the user manual for TRIDENT & WINTRID disk & manual