

RUDOLF DIGITAL POWER ANALYZER

■ Advanced Version



RUDOLF™



DIGITAL POWER ANALYZER

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Company Introduction

Bridex Singapore Pte Ltd is founded in 1978 as a manufacturer of instruments transformer for the Asian market. We are the first local electrical switchgear components manufacturer that launches our own Asian identity – **RUDOLF™**

Today we aim to become a knowledge-based, technology driven engineering organization, with emphasis on providing solution for electrical distribution and control. Specialize in instruments & power quality equipment, we offer our expertise as a solution provider in this area. With our present headquarter in Singapore and subsidiaries that are located in Australia, Malaysia, Philippines and Vietnam, we are well equipped to service both local market and countries in the Asia Pacific.

Product Introduction

Control your energy distribution with Rudolf digital power analyzer – made to measure.

There is an increasing trend in electrical installations, operators need to identify large consumers, analyze networks and diagnose fault. Rudolf provides a universal multi-function solution with the advanced version R-DPA96A. The R-DPA96A optimizes the operation of your electrical network by

- Reducing operating costs
- Cutting down production losses
- Optimizing maintenance costs
- Improving the performance of the installation

Basic Features

- **Measure**
 - all electrical values to check that your network is functioning properly.
- **Monitor**
 - your electrical networks using alarms for feeder load levels or loss of phase, voltage surges, voltage dips and outage.
- **Analyze**
 - energy quality by breaking down the harmonics by phases to prevent cable over-heating, transformer overload or equipment ageing.
- **Meter**
 - the energy used by buildings or production processes so that you can spread and optimize energy costs.
- **Control**
 - to open or close feeder control gear (lighting, motor, production line, heating, air-conditioning).
- **Centralize**
 - all data using digital (RS485 JBUS/MODBUS or PROFITBUS DB) or analogue communication.

Added Advantages



Optimized visibility – The display showing the electrical values of the installation has have optimize using a large easy-to-read configurable backlit LCD.



Direct access – The large keys give quick and direct access to the data you want, without having to navigate through the menu.



Plug & display modules – Optional modules which can be used to add additional functions at any time.

Easy to install – Designed for ease in installation, R-DPA96A come with

- Compact 96 x 96 x 60 mm dimension (80mm with optional module)
- Easy to use terminal blocks for fast cabling
- Simple fixing using retaining clips
- A self test diagnostic menu to identify incorrect connection

Rudolf Digital Power Analyzer - Advanced Version

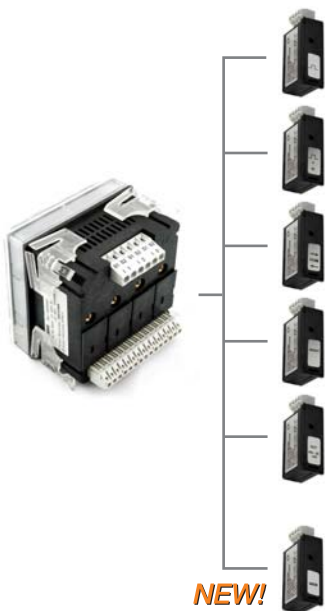
Basic Features

Standard Functions



Instantaneous, RMS values
Current (3I, In)
Neutral current sensing transformer for highly pertubated networks(harmonics) (only with R-DPA96AN)
Phase to neutral & phase to phase voltage (3V, 3U)
Frequency (F)
Total & per phase active, reactive & apparent power ($\pm 3P$, $\pm 3Q$, 3S, $\pm \Sigma P$, $\pm \Sigma Q$, ΣS)
Total & per phase power factor ($3PF^{L/C}$, $\Sigma PF^{L/C}$)
Average and Maximum values
Current (3I, In)
Phase-to-neutral & phase-to-phase voltage & frequency (3U, 3V, F)
Total active, reactive & apparent power ($\pm \Sigma P$, $\pm \Sigma Q$, ΣS)
Power – Quality values
Voltage & current harmonics distortion level upto row 51 (THD 3I, In, 3V, 3U)
Meters
Active, reactive & apparent energy 4 quadrants ($\pm kWh$, $\pm kVarh$, $kVAh$)

Optional Functions



Pulse outputs

- 2 configurable pulse outputs (type, weight & duration)

Pulse outputs & Harmonics

- 2 configurable pulse output (type, weight & duration)
- Harmonics spectral analysis per rating & per phase for 3I, In, 3V, 3U upto row 25

Communication

- RS485 link with JBUS/MODBUS protocol (speed up to 38400 bauds) 1 module
- RS485 link with PROFITBUS DP protocol (speed upto 1.5Mbauds) 2 module

Analogue outputs

- 2 configurable outputs on 3I, In, 3V, 3U, F, $\pm \Sigma P$, $\pm \Sigma Q$, ΣS & $\Sigma PF^{L/C}$ (max 2 module)

2 Inputs – 2 Outputs

- 2 to 6 outputs for monitoring of 3I, In, 3V, 3U, F, $\pm \Sigma P$, $\pm \Sigma Q$, ΣS & $\Sigma PF^{L/C}$, THD 3I, THD In, THD 3V, THD 3U and hours run or remote control (max 3 module)
- 2 to 6 inputs for pulse metering

Memory

- Storage P+, P-, Q+, Q- values with internal/external synchronization signal (5, 8, 10, 15, 20 & 30 minutes during 31 & 62 days)
- Storage last 10 time-stamped alarms
- Storage min/max instantaneous values for 3I, In, 3V, 3U, F, $\pm \Sigma P$, $\pm \Sigma Q$, ΣS , THD 3I, THD In, THD 3V, THD 3U
- Storing last 10 time-stamped voltage dips, surges & outage
- Storage average values according to synchronization signal for 3U, 3V & F

Note : Maximum 4 module for R-DPA96A & 3 module for R-DPA96AN

Rudolf Digital Power Analyzer - Advanced Version

Specifications

Type of measurement

Network (3P3W, 3P4W & single phase)
True RMS value upto harmonics

LV/HV
51

Accuracy of measurement

Current

0.2% from 10 to 110% In

Voltage

0.2% from 140 to 700% VAC

Power

0.5% of full scale (-90° to +90°)

Power Factor

0.5% for $0.5 < PF < 1$

Frequency

0.1% from 45 to 65 Hz

Active energy

$\pm 0.5\%$ from 0.02 to 1.2 In with
PF = 0.5L or 0.8C

(Class 0.5s IEC 62053-22)

$\pm 2\%$ from 0.1 to 1.2 In with

$\cos \theta = 0.5L$ or C

(Class 2 IEC 62053-23)

Reactive energy

Display refresh rate

Time

1sec

Current inputs

Primary CT

5-10000A

Secondary CT

5A / 1A

Sensing range

10mA to 10A

Permissible overload

50A 1sec

Consumption

$< 0.1VA$

Galvanic insulation

2.5kV

CT earth connection (secondary)

yes

Voltage inputs

Direct measurement

from 18 to 700VAC (phase/ phase)

Voltage sensing transformer

from 10 to 404VAC (phase/ neutral)

(secondary 60, 100, 110, 115, 120, 173, 190V)

Galvanic insulation

2.5kV

Frequency

45 to 65 Hz

Update period 1 second

Auxiliary power supply

Standard

110 to 440 VAC $\pm 10\%$

120 to 350 VDC $\pm 20\%$

Others

12- to 48VDC -6/+20%

Consumption

$< 10VA$

Inputs

Type

Optocouplers (10 to 30VDC)

Monitoring or command outputs

Type

REED relays (250VAC – 5A – 1250VA)

Pulse outputs

Type

REED relays (100VDC – 0.5A – 10VA)

Communication

RS 485

2 or 3 wire half duplex

Protocol

PROFIBUS/ JBUS/ MODBUS

protocol mode

Speed

2400 to 38400 Bauds

Analogue outputs 0/4 – 20mA

Load resistance

0 to 600 ohms

Response time

1sec

Memory

Memory size

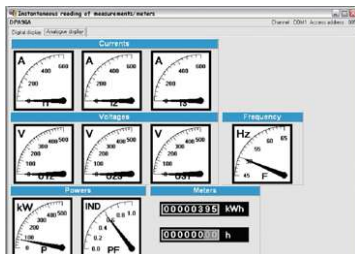
512 ko

Ordering Information

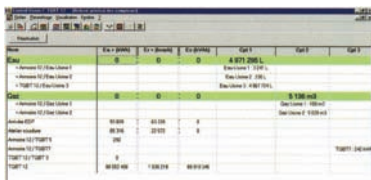
Product code	Description	
R-DPA96A	Basic unit supply 110 to 440VAC & 120 to 350VDC	
R-DPA96AN	Basic unit with measured neutral supply 110 to 440VAC & 120 to 350VDC	
R-MODULE 1	Pulse Output 2 configurable pulse outputs	
R-MODULE 2	Pulse Output & Harmonics 2 configurable pulse outputs + harmonics	
R-MODULE 3	Communication JBUS/MODBUS Communication module RS485 for JBUS/MODBUS	
R-MODULE 4	Analogue Outputs 2 configurable analogue outputs	
R-MODULE 5	2 inputs - 2 outputs 2 inputs / 2 outputs	
R-MODULE3+6	Communication PROFITBUS DB Communication module RS485 for PROFITBUS DB	
R-MODULE 7	Memory Memory module	

R-DPA96A can be communicated remotely using Control Vision software to:

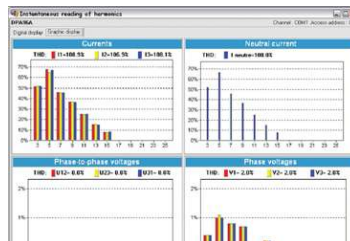
- Centralize and display all electrical values
- Create demand curves
- Historical trend analysis of measured values
- Manage alarm logs



Display showing numerical values or Indicator for all electrical values



Display tables of energy consumption (electricity, gas, water) or pulses counted

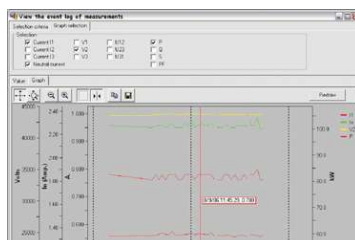


All electrical values permanently scanned are stored in a database in a table which can be displayed for a selected time period



Param.	U1 (V)	U2 (V)	U3 (V)	U4 (V)	U5 (V)	U6 (V)	U7 (V)	U8 (V)	U9 (V)	U10 (V)	U11 (V)	U12 (V)
U1 (V)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
U2 (V)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
U3 (V)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
U4 (V)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
U5 (V)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
U6 (V)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
U7 (V)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
U8 (V)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
U9 (V)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
U10 (V)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
U11 (V)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
U12 (V)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Every R-DPA96A present on the network can be viewed in the form of a table showing all electrical values



3rd order to 25th order harmonics display in table form or as bar chart