3 Phase Power Analyser / Data Logger Kit with Harmonics & Transients

Model LDW-6095K

The LDW-6095K is a complete hand held 3-phase power analyser kit, that supports data logging to SD memory card. This versatile meter measures all the power parameters for single phase or 3-phase systems, plus several higher level analysis functions and transient events. The meter has a graphical LCD display which displays all measured power parameters, and can also graphically display the harmonics, AC waveform, and phase diagrams. The instrument can record all its measurements to an SD memory card, with recording intervals ranging from 2 seconds to 2 hours, giving enough flexibility to capture short events or record data over a long period.

Parameters measured (single phase or 3 phase):

- Voltage (10 to 600V AC)
- Current (individual per phase and total – 0.2A to 1200A AC using supplied current clamps, or ranges from 20A to 3000A using other CT's)
- True Power (kW - individual per phase & total)
- Energy (kWh - individual per phase & total)
- Power Factor (individual and average)
- Apparent Power (KVA), Reactive Power (KVAR)
- Phase Angle
- Harmonics: 1st – 50th order
- Waveform Display with Peak Values
- Total Harmonic Distortion (THD) analysis
- Graphic Phase Diagram with 3-phase system parameters
- Transient Events: Dip, Swell and Outage, with programmable threshold (in percent) – sub millisecond speed
- 3-Phase Voltage or Current Unbalance Ratio and Unbalance Factor
- Calculated Unbalance Current through Neutral Line (An)

Measurements are true RMS and take into account the power factor.

The LDW-6095K kit also includes a full licence of the sophisticated graphing software *DPlot*, which makes it easy to generate graphs of the recorded parameters. This software is a general purpose graphing and analysis tool, so it can be used for other jobs as well.

The complete kit includes the meter, mains adaptor, 3 clamp-on current transformers (switchable range), 4 voltage leads with alligator clips, 2GB SD card, DPlot graphing software CD, SD card-USB adaptor, and a soft carry case.

Other current transformers available for this instrument include the LCP-3000 flexible Rogowski coil, with a range of 30 / 300 / 3000A (available separately), or any shunted CT with a voltage output of 0.2, 0.3, 0.5, 1, 2 or 3 volts.

Typical applications

- **Spot checking** all power parameters, including voltage, current, power, power factor, KVA, harmonics
- Monitoring over a period of time for **peak demand** (by using the data logging function with a short interval)
- Checking overall **energy usage** over a period of time (using the data logging function with a longer time interval)
- Recording **voltage dips and swells** from the incoming mains (including short transients)
- Checking for **harmonics** in the incoming supply or in the load current
- Checking for **phase unbalance**
- **Energy saving** studies – to help identify what is using the most energy within a site
- On site **demonstrations** of energy saving systems and appliances – show the customer the actual energy savings on their own site!

General Specifications – LDW-6095K 3Phase Power Analyser

Display	* LCD Size: 81.4 X 61 mm (3.2 X 2.4 inch) * Dot Matrix LCD (320 X 240 pixels) with back light			
Measurements	* AC V (phase to phase, phase to ground) * A (phase to ground) * kW,/ kVA/ kVAR/ PF (phase) kW/ kVA/ kVAR/ PF (system) kWh/ kVAh/ kVARh/ PFh (system)		* Power Factor * Phase Angle & Phase Unbalance * Frequency * Harmonics display & Analysis * Voltage Transients, Dip/Swell/Outage	
Cable connections	1Phase/2Wire, 1Phase/3Wire, 3Phase/3Wire, 3Phase/4Wire			
Voltage ranges	10V AC to 600V AC, auto range.			
Current probe input signal and range	* Current probe input signal voltage (AC V): 200mV / 300mV / 500mV / 1V / 2V / 3V (manual selection) * Current probe input current range (AC A): 20 A / 200A / 2000A (1200 A) / 30A / 300A / 3000A (manual selection)			
Safety standard	IEC1010 CAT III 600 V			
ACV input impedance	10 Megohms			
Current Clamp Frequency Response	40 Hz to 1 kHz			
AC frequency range	45 to 65 Hz.			
Overload protection	AC V	720V AC V rms		
	AC A	1300A AC with clamp probe CP-1201		
Overload Indicator	LCD display shows " OL ", recorded data in the SD card shows "9999" or "999"			
Under Indicator	Shows " UR ", recorded data in the SD card shows "9999" or "999"			
Data Hold	Freezes the display reading			
Data Record	SD Card Recording of all measured parameters			
Sampling Time	Normal Measurement & Data Logging: Approx. 1 second Transient Monitoring mode: Captures transients longer than 125µS			
Power ON/OFF	Manual OFF by push button			
Data Logger	Real time data logger, saves the measured data into SD memory card along with date/time stamps. Format compatible with Microsoft Excel, and DPlot graphing software			
	Sampling time for data logging in normal measurement mode: 2 seconds to 7200 seconds, user selectable in 2 second increments.			
	Other data logging modes supported: Harmonics, Phase Unbalance, Dips/Swells/Transients (only one mode at a time)			
USB/RS232 Computer interface	RS232 computer serial interface: Connect the optional USB or RS232 cable plug, to receive measurements in real-time to a PC running optional real-time software package.			
Operating Temperature	0 to 50 °C (32°F to 122°F).			
Operating Humidity	Less than 80% R.H.			
Power Supply	DC 1.5V, AA (UM-3) Battery X 8 PCs (Alkaline or heavy duty battery) for short term measurements AC to DC 9V mains adapter included			
Power Consumption	Meter: 300 mA DC / Clamp: 34mA DC			
Clamp max. cable size	50 mm (2.0 inch) Dia. (for included clamps CP-1201)			
Weight	Meter: 948g (includes batteries) / Clamp: 467g (includes cables)			
Dimensions	Meter : 225 X 125 X 64 mm (8.86 X 4.92 X 2.52 inch)			
	Clamp : 210 X 64 X 33mm (8.3 X 2.5 X 1.3 inch)			
	Clamp Jaw : 86 mm (3.4 inch)- outside			
Accessories Included	Instruction manual Test Leads (TL88-4AT) Alligator clips (TL88-4AC) Clamp-on Current Transformer (CP-1201) AC to DC 9V adapter SD card (2GB) SD card to USB adaptor DPlot Software CD	1 piece 1 Set (4 pieces) 1 Set (4 pieces) 3 pieces 1 piece 1 piece 1 piece 1 piece		
	Carrying bag	1 piece		
Optional Accessories	* 2000A current probe, LCP-2000 * 200A current probe, LCP-200 * Flexible 3000A Rogowski current probe, LCP-3000		* USB Cable , LUSB-01 * RS232 cable, LUPCB-02 * Data Acquisition software, LSW-U811-WIN	

Note: Product appearance and specifications are subject to change without notice. E&OE.

Electrical Specifications – LDW-6095K 3Phase Power Analyser

AC V

Range	*Resolution*	*Accuracy*
10.0V to 600.0V (*Phase to neutral line)*	0.1V	± (0.5%+0.5V)
10.0V to 600.0V (*Phase to phase)*		

AC A

Range	*Resolution*	*Accuracy*
20A	0.001A, <10A 0.01A, ≥10A	± (0.5%+0.1A)
200A	0.01A, <100A 0.1A, ≥100A	± (0.5%+0.5A)
1200A	0.1A, <1000A 1A, ≥1000A	± (0.5%+5A)

Power factor and Φ (Phase angle)

Range	*Resolution*	*Accuracy*
0.00 to 1.00 power factor	0.01	±0.04
-180° to 180° phase angle	0.1°	± 1° * ACOS(PF)
Measures PFH (long term power factor average). Measures PF∑ (average power factor across phases).		

Frequency

Range	*Resolution*	*Accuracy*
45 to 65 Hz	0.1 Hz	0.1 Hz

Real Power

Range	*Resolution*	*Accuracy*
0.000 to 9.999 kW	0.001- 0.1 kW*	± (1%+0.008 kW)
10.00 to 99.99 kW	0.01-0.1 kW*	± (1%+0.08 kW)
100.0 to 999.9 kW	0.1 kW	± (1%+0.8 kW)
1.000 to 9.999 MW	0.001 MW	± (1%+0.008 MW)

* The resolution varies according to the different current (AC A) ranges

Apparent Power

Range	*Resolution*	*Accuracy*
0.000 to 9.999 kVA	0.001-0.1 KVA*	± (1%+0.008 kVA)
10.00 to 99.99 kVA	0.01-0.1 KVA*	± (1%+0.08 kVA)
100.0 to 999.9 kVA	0.1 KVA	± (1%+0.8 kVA)
1.000 to 9.999 MVA	0.001 MVA	± (1%+0.008 MVA)

* The resolution varies according to the different current (AC A) ranges

Reactive Power

Range	*Resolution*	*Accuracy*
0.000 to 9.999 kVAR	0.001-0.1 kVAR*	± (1%+0.008 kVAR)
10.00 to 99.99 kVAR	0.01-0.1 kVAR*	± (1%+0.08 kVAR)
100.0 to 999.9 kVAR	0.1 kVAR	± (1%+0.8 kVAR)
1.000 to 9.999 MVAR	0.001 MVAR	± (1%+0.008 MVAR)

* The resolution varies according to the different current (ACA) ranges

Watt Hour (Real Energy) : WH

Range	*Resolution*	*Accuracy*
0.000 to 9.999 kWH	0.001 kWH	± (2%+0.008 kWH)
10.00 to 99.99 kWH	0.01 kWH	± (2%+0.08 kWH)
100.0 to 999.9 kWH	0.1 kWH	± (2%+0.8 kWH)
1.000 to 9.999 MWH	0.001 MWH	± (2%+0.008 MWH)

VA Hour (Apparent Energy) : SH

Range	*Resolution*	*Accuracy*
0.000 to 9.999 kVAH	0.001 kVAH	± (2%+0.008 kVAH)
10.00 to 99.99 kVAH	0.01 kVAH	± (2%+0.08 kVAH)
100.0 to 999.9 kVAH	0.1 kVAH	± (2%+0.8 kVAH)
1.000 to 9.999 MVAH	0.001 MVAH	± (2%+0.008 MVAH)

VAR Hour (Reactive Energy) : QH

Range	*Resolution*	*Accuracy*
0.000 to 9.999 kVARH	0.001 kVARH	± (2%+0.008 kVARH)
10.00 to 99.99 kVARH	0.01 kVARH	± (2%+0.08 kVARH)
100.0 to 999.9 kVARH	0.1 kVARH	± (2%+0.8 kVARH)
1.000 to 9.999 MVARH	0.001 MVARH	± (2%+0.008 MVARH)
Harmonics of AC Voltage in Magnitude *Fundamental frequency 50Hz, 60Hz		
Range	**Resolution**	**Accuracy**
1 to 20th	0.1V	± (2% + 0.5V)
21 to 30th		± (4% + 0.5V)
30 to 50th		reference
Harmonics of AC Voltage in Percentage *Fundamental frequency 50Hz, 60Hz		
Range	**Resolution**	**Accuracy**
1 to 20th	0.1%	± (2% + 10d)
21 to 30th		± (4% + 20d)
30 to 50th		reference
Harmonics of AC Current in Magnitude *Fundamental frequency 50Hz, 60Hz		
Range	**Resolution**	**Accuracy**
1 to 20th	0.1A	± (2% + 0.5A)
21 to 30th		± (4% + 0.5A)
30 to 50th		reference
Harmonics of AC Current in Percentage *Fundamental frequency 50Hz, 60Hz		
Range	**Resolution**	**Accuracy**
1 to 20th	0.1%	± (2% + 10d)
21 to 30th		± (4% + 20d)
30 to 50th		reference
Peak value of AC V or AC A		
Range	**Sample Time**	**Accuracy**
50Hz	19 µs	± (5% + 30d)
60Hz	16 µs	
Crest factor of AC V or AC A		
Range	**Resolution**	**Accuracy**
1.000 – 99.99	0.001	± (5% + 30d)
Total Harmonic Distortion		
Range	**Resolution**	**Accuracy**
0 to 20%	0.1%	± (2% + 5d)
20.1 to 100%		± (6% + 10d)

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