

PQM-1000s

Digital Power Quality Network Analyzer

features

- True RMS Measurement
- Waveform Display for Voltage and Current
- Graphical Phasor Display
- Harmonics Spectrum Bar Graph Display
- 4 Quadrant Energy Measurement
- Demand for kW, kVA and Ampere (Max, Previous, Rolling)
- Info / Event Summary Page Display
- Phase Supply LED Indicator
- Phase Rotation Indication

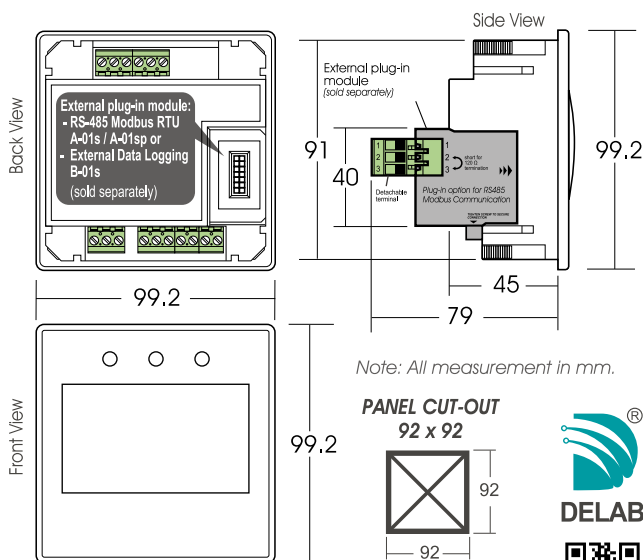
Complies with:
IEC 60255-27-Clause 10.6.4.2 / 4.3 ; EN 61326-1

External Plug-in Module for RS-485 Modbus RTU
Model: A-01s / A-01sp (isolated type)

External Data Logging Module
Model: B-01s (micro SD card / max. storage capacity 32GB)
(Compatible only with firmware version 2.0.02 onwards)

YouTube : Delab Scientific Sdn. Bhd.

Casing Dimension



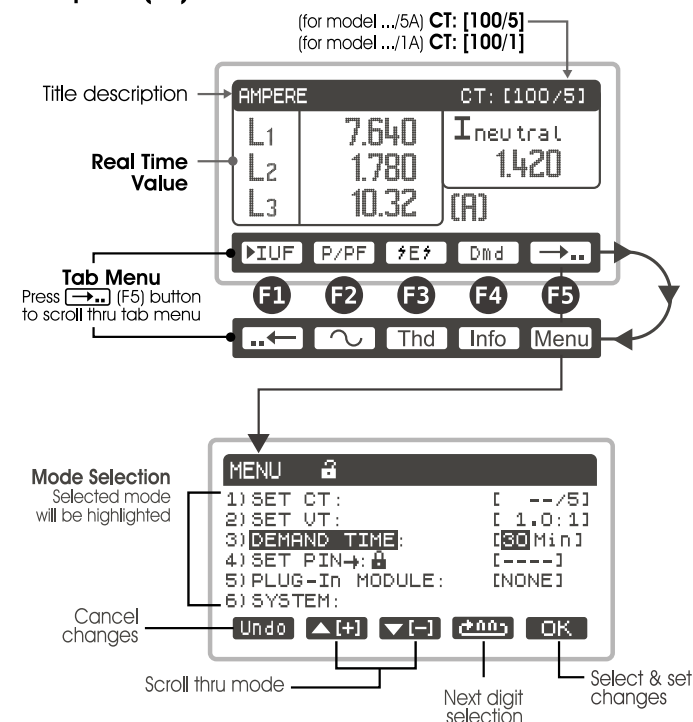
Note: Specification subject to change without prior notification
(please visit www.delab.com.my for latest specification)

Menu Page

Set CT, VT, Demand Time, Pin Lock, Plug-in Module & System

At Home page:

Press **→** (F5) button to scroll thru tab menu for **Menu** tab then press (F5) button to enter Menu mode.



Setting Range

1) Set CT Primary	0 ~ 10,000 / 5 (A) : For model CT.../5A 0 ~ 4,000 / 1 (A) : For model CT.../1A
2) Set VT	1.0 ~ 2500.0 : 1
3) Set Demand Time	10 ~ 60 mins
4) Set Pin Lock	0000 ~ 9999 (4 digits)
5) Plug-In Module	A-01 (RS-485 modbus RTU) B-01 (Data Logging)
Selectable as:	Address : 1 ~ 247 Date (D / M / Y)
	Baud rate : 0.6 ~ 38.4 kbps Time (H : M : S)
	Parity : None / Odd / Even Log Interval: 10 ~ 3600 sec.
	(press SAVE) Format SD card : Yes / No
6) System (->press OK)	Backlit : Auto / 1 ~ 7
	Contrast : 0 ~ 15
	Phase Fail LED : Flash / Off
	Factory Reset : Yes / No

Note : All modes exit automatically if left untouched for more than 20 secs.

Technical Data

Aux Power Supply

Model (220a)	: 65~275 Vac, 90~300 Vdc
Model (024d)	: 18~72 Vdc
Consumption	: < 3VA

Current Measurement

AC Input Range	: 0.005~6.500 A
Accuracy	: ± 0.5 %
CT Range	: 0~10,000 / 5A 0~4,000 / 1A
Burden	: < 0.1 VA at 5A

Voltage Measurement

AC Input Range	: 0~300 VLN 0~500 VLL
Accuracy	: ± 0.5 %
VT Range	: 1.0 ~ 2500.0:1

Power Measurement

W, VAR, VA, PF, Cos Φ	
Accuracy	: ± 1.0 %

Frequency Measurement

Range	: 45~65 Hz
Accuracy	: ± 0.1 %

Energy Measurement (4 Quadrant)

Range	: 0.0 ~ 9,999,999,999.9 (kWh, kVAh, kVAh)
-------	--

Network Type

3P4W, 3P3W, 3P3W (ARON) & 1P2W

Display Type

Graphical LCD with white LED backlight

Mechanical

Operating Temp.	: -5°C ~ +55°C
IP Rating	: IP54 (front panel)
Installation	: Panel flush mount
Dimension (mm)	: 99.2(h) x 99.2(w) x 45(d)
Weight	: approx. 310 gram

Communication

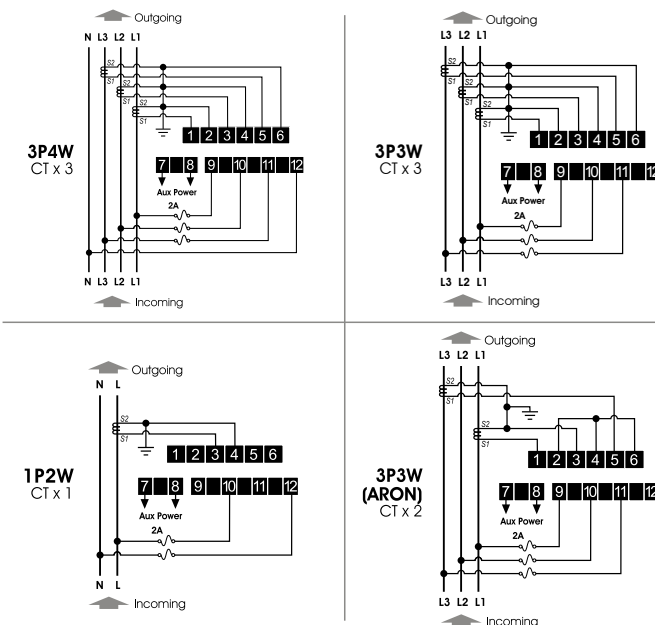
A-01s / A-01sp Plug in module
Modbus RTU RS-485 (isolated type)

Selectable address: 1~247

Selectable baud rate (kbps):
0.6, 1.2, 2.4, 4.8, 9.6, 19.2, 28.8, 38.4

Selectable parity: None / Odd / Even

Wiring



►IUF Default Home Page - Ampere Page

Default Home Page (AMPERE PAGE)

Select by pressing the corresponding button to view :

F1 - Voltage (L-N) ► F1 - Voltage (L-L)

AMPERE		CT: [100/5]
L1	7.640	I _{neutral}
L2	1.780	1.420
L3	10.32	(A)

Press (F1) button to view **VOLTAGE (L-N)** page

VOLTAGE (L-N)		γ: A-B-C
L1	243.4	V _{asymmetry}
L2	244.4	2.3 %
L3	245.3	(V)

Press (F1) button to view **VOLTAGE (L-L)** page

VOLTAGE (L-L)		γ: A-B-C
L1-2	422.4	Freq (Hz)
L2-3	424.7	50.00
L3-1	424.4	(V)

Press (F1) button to view **AMPERE** page

POWER [kW]		Σ(kW)
L1	240.87	729.03
L2	243.81	(kW)
L3	244.35	

At Default Home Page, press F2 button to view **Power Parameters** page.

Select by pressing the corresponding button to view :

F2 - kW F3 - kVar F4 - kVA
F5 - Power Factor ► F5 - cos φ

POWER [kVar]		Σ(kVar)
L1	112.80	348.00
L2	21.240	91.020
L3	43.020	(kVar)

Press (F1) button to return to previous tab menu

POWER [kVA]		Σ(kVA)
L1	269.82	763.05
L2	244.76	(kVA)
L3	248.46	

Press (F1) button to return to previous tab menu

POWER FACTOR		PFavg
L1	0.972	0.965
L2	0.860	
L3	0.979	

Press (F1) button to return to previous tab menu

COS (φ)		COS φ avg
L1	0.906	0.992
L2	0.996	
L3	0.985	

Press (F1) button to return to previous tab menu

ENERGY [kWh]		Σ(kWh)
E _{imp}	0,000,000,388.1	354.1
E _{exp}	0,000,000,172.9	276.3

At Default Home Page, press F3 button to view **Energy Parameters** page.

Select by pressing the corresponding button to view :

F2 - kVarh F3 - kWh F4 - kVAh

Press (F1) button to return to previous tab menu

►Dmd Demand Parameters for kW, kVA & Ampere (Max, Rolling, Previous)

At Default Home Page, press F4 button to view **Demand Parameters** page.

Select by pressing the corresponding button to view.

F2 - kVA ► F2 - I (A) ► F2 - kW
F3 - Roll ► F3 - Previous ► F3 - Max
F4 - 0.0 (Reset / Restart Demand)

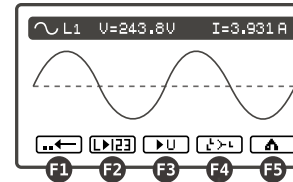
Maximum Demand		Rolling Demand		Previous Demand	
DEMAND (kW) [30 Min]		DEMAND (kW) [15:02/30Min]		DEMAND (kW) [30 Min]	
L1	321.16	L1	41.940	L1	321.16
L2	325.08	L2	43.234	L2	325.08
L3	325.80	L3	45.548	L3	325.80
Σ(kW)		Σ(kW)		Σ(kW)	
972.12		148.68		972.12	
(kW) Max demand		(kW) Rolling demand		(kW) Prev demand	

To reset **Max Demand** / To restart **Rolling Demand**
Press F2 button to select page (kVA / I (A) / kW)

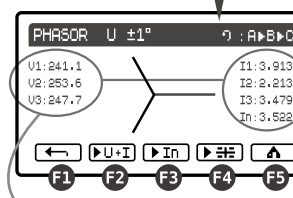
Max Demand (kW)		Rolling Demand (kW)	
DEMAND (kW) [30 Min]		DEMAND (kW) [15:02/30Min]	
L1	321.16	L1	41.940
L2	325.08	L2	43.234
L3	325.80	L3	45.548
Σ(kW)		Σ(kW)	
972.12		148.68	
(kW) Max demand		(kW) Rolling demand	

Press (F2) button to select kVA page
Press (F3) button to view Rolling Demand
Press (F4) button to return to previous tab menu

~ Voltage & Ampere Waveform Page



F1 ◀: Back to previous tab menu
F2 ◀▶: Scroll thru L1, L2, L3 phase
F3 ▶: To switch view between :
Voltage only, Ampere only or Voltage & Ampere simultaneously for the selected phase
F4 ◀▶: To view **Phasor diagram**
F5 ▲: To Home page



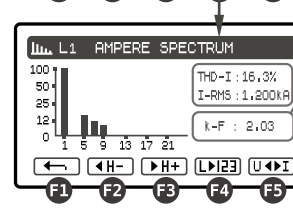
F1 ◀: Back to previous page
F2 ◀▶: To switch view between :
Voltage only; Ampere only; Voltage & Ampere
F3 ▶: **I neutral phasor**
Press & hold (F3) button
F4 ◀▶: **Phasor Angle Definition**
Press & hold (F4) button
F5 ▲: To Home page

Alternate between RMS value and Phase Angle value every 3 seconds

Thd Total Harmonic Distortion Page

THD [U]		[A]
L1	1.7 %	16.3 %
L2	0.5 %	2.0 %
L3	0.8 %	5.0 %

F1 ◀: Back to previous tab menu
F2 ◀▶: Scroll thru **Harmonic Spectrum**
To select 1st ~31st Harmonics spectrum
F4 ◀▶: To display **Spectrum Bar Graph**
F5 ▲: To Home page



Selected Phase info
k factor for selected Phase current
F1 ◀: Back to previous page
F2 ◀▶: Scroll thru **Harmonic Spectrum**
To select 1st ~31st Harmonics spectrum
F4 ◀▶: To switch view between :
Voltage or Ampere Spectrum Bar Graph

Info Device Info Page

F1 ◀: Back to previous page
F2 ◀▶: To view previous / next info page

Clear Min/Max : Press (F4) CLR Min / (F5) CLR Max to clear recorded value. Value will also be clear when the device is power ON

VIP INFO		VOLTAGE INFO		AMPERE INFO		THD VOLTAGE INFO		THD AMPERE INFO	
U A kW PF		U _{LL} U _{LN} U _{LLN}		A I _{Min} I _{Max} Last-DMD		THD Min Max		THD Min Max	
L1: 244.5	80.22 16.062	U _{LL} : 244.5	391.1 226.4	I ₁ : 1.200N	1.200N	L1: 1.7%	1.7%	L1: 1.7%	1.7%
L2: 244.8	81.53 16.198	U _{LN} : 244.5	391.3 226.2	I ₂ : 1.053N	1.053N	L2: 0.5%	0.5%	L2: 0.5%	0.5%
L3: 245.0	82.21 16.244	U _{LLN} : 245.0	392.4 226.7	I ₃ : 1.102N	1.102N	L3: 0.8%	0.8%	L3: 0.8%	0.8%
FREQ: 50.00Hz		Max Elapsed (hh:mm:ss): 00:03:18		Max Elapsed (hh:mm:ss): 00:05:18		Max Elapsed (hh:mm:ss): 00:10:18		Max Elapsed (hh:mm:ss): 00:10:18	

Data logging info will only be display when:
i) B-01s is securely plugged into the device
ii) Select B-01 in Plug-in module setting (Menu Page)