

Polyphase power quality and energy metering gateway with Modbus TCP, analog/digital I/O, on-board data logging, and a built-in web configuration interface.

METERING & POWER QUALITY

Measurement engine	ADE9000 polyphase metrology IC
Phases	3-phase (A/B/C) voltage & current RMS
Power values	Active, reactive, apparent power per phase
Totals	Arithmetic & vector VA totals, PF quadrant
Harmonics (VTHD/ITHD)	Roadmap — register support planned
Event capture	Roadmap — waveform/event-triggered capture planned
Target compliance	IEC 62053, IEC 61000-4-30, IEC 61010-1

COMMUNICATIONS

Primary protocol	Modbus TCP (Ethernet)
Network	10/100 Ethernet, DHCP or static IP
Time sync	NTP/SNTP client, automatic DST
Configuration	Built-in web interface, any browser, no software install

INPUTS / OUTPUTS

Analog inputs	5 channels, 4–20 mA, 3-segment piecewise-linear calibration
Digital inputs	5 channels, edge/pulse counting for sub-metering
Digital outputs	5 channels, hardware present — firmware trigger logic on near-term roadmap
Local display	OLED status display: IP, NTP, uptime, system status

DATA & LOGGING

On-board storage	microSD, circular historical log
Live data access	Real-time register viewer over Modbus TCP & web
Trending	Built-in trend charts: voltage, current, power
Export	CSV / file download via web interface
Calibration	Versioned, deterministic — reproducible datasets

AI-Ready Data Platform — Every register is logged locally and exposed live over Modbus TCP, providing clean, structured, versioned data suitable for trend analysis, anomaly detection, and future predictive-maintenance tooling. On-device inference is enabled by available ARM processing headroom and is not a currently shipped feature.

Specifications reflect current development hardware and are subject to change during productization. Features marked “roadmap” are planned but not yet implemented.

BUILT-IN WEB INTERFACE

Real-time Modbus holding register view, refreshed automatically — useful for commissioning, troubleshooting, and verifying live values against SCADA/PLC reads.

Live Registers

Configuration ▾Live RegistersTrendsDownload Log

MODBUS REGISTERS

Live holding register view, port 502

REFRESHES EVERY 25

REG #	DESCRIPTION	VALUE
0-1	AVRMS raw	32045
2-3	AIRMS raw	31756
4-5	AWATT raw	0
6-7	BVRMS raw	32088
8-9	BIRMS raw	31563
10-11	BWATT raw	0
12-13	CVRMS raw	32075
14-15	CIRMS raw	31186
16-17	CWATT raw	0
18	Poll counter	16307
19-20	Phase A voltage	341 mV (0.341 V)
21-22	Phase B voltage	341 mV (0.341 V)
23-24	Phase C voltage	341 mV (0.341 V)
25	XADC A0	7
26	XADC A1	7
27	XADC A2	7
28	XADC A3	7
29	XADC A4	7
30	Digital input IO9	1
31	Digital input IO10	1
32	Digital input IO11	1
33	Digital input IO12	1
34	Digital input IO13	1

BUILT-IN WEB INTERFACE

Phase gain/offset calibration, piecewise-linear analog input scaling (4/12/24 mA points), and digital input debounce settings — all applied live, no separate software required.

Calibration

Configuration
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CALIBRATION

Phase Monitor - Analogue Inputs - Digital Inputs -- applies immediately

LIVE • APPLIES IMMEDIATELY

PHASE CALIBRATION

PHASE A

V gain num/den: 1066 / 100000
I gain num/den: 1 / 1
V/I offset: 0 / 0

PHASE B

V gain num/den: 1066 / 100000
I gain num/den: 1 / 1
V/I offset: 0 / 0

PHASE C

V gain num/den: 1066 / 100000
I gain num/den: 1 / 1
V/I offset: 0 / 0

ANALOGUE INPUTS CALIBRATION

$\text{nominal_mA} = \text{raw_mV} / \text{shunt_ohms} \cdot \text{coefficient}$ linearly interpolated between the 4/12/24 mA points - displayed = $\text{nominal_mA} \cdot \text{coeff} \cdot 100 + \text{offset}$ (offset can be negative)

A0

Shunt: 120 Offset: 4
4 mA coeff: 1 / 1
12 mA coeff: 1 / 1
24 mA coeff: 1 / 1

A1

Shunt: 120 Offset: 4
4 mA coeff: 1 / 1
12 mA coeff: 1 / 1
24 mA coeff: 1 / 1

A2

Shunt: 120 Offset: 4
4 mA coeff: 1 / 1
12 mA coeff: 1 / 1
24 mA coeff: 1 / 1

A3

Shunt: 120 Offset: 4
4 mA coeff: 1 / 1
12 mA coeff: 1 / 1
24 mA coeff: 1 / 1

A4

Shunt: 120 Offset: 4
4 mA coeff: 1 / 1
12 mA coeff: 1 / 1
24 mA coeff: 1 / 1

DIGITAL INPUTS

Debounce samples: 5

SAVE

BUILT-IN WEB INTERFACE

Addressing (IP, netmask, gateway) and NTP time sync configuration, applied on reboot.

Network Configuration

The screenshot displays the 'Configuration' menu in the INVOLTA web interface, with the 'NETWORK' section selected. The interface is dark-themed with orange accents. At the top, there are tabs for 'Configuration', 'Live Registers', 'Trends', and 'Download Log'. The 'NETWORK' section has a subtitle 'Addressing & time sync -- changes apply after reboot' and a 'REBOOT REQUIRED' button. Under the 'ADDRESSING' heading, there are three input fields: 'IP ADDRESS' (192.168.1.10), 'NETMASK' (255.255.255.0), and 'GATEWAY' (192.168.1.1). Below these is a 'MAC ADDRESS (DECIMAL)' field (0.10.53.0.1.2). Under the 'TIME SYNC (NTP)' heading, there is an 'NTP SERVER IP' field (216.239.35.0). A 'SAVE & REBOOT' button is located at the bottom right.

Configuration ▾ Live Registers Trends Download Log

NETWORK

Addressing & time sync -- changes apply after reboot

REBOOT REQUIRED

ADDRESSING

IP ADDRESS: 192 . 168 . 1 . 10

NETMASK: 255 . 255 . 255 . 0

GATEWAY: 192 . 168 . 1 . 1

MAC ADDRESS (DECIMAL): 0 . 10 . 53 . 0 . 1 . 2

TIME SYNC (NTP)

NTP SERVER IP: 216 . 239 . 35 . 0

SAVE & REBOOT

BUILT-IN WEB INTERFACE

SD-backed circular log status — file size, record count, capacity, and time span covered, with one-click download of the raw log file.

Historical Log

Configuration ▾Live RegistersTrendsDownload Log

HISTORICAL LOG

SD-backed circular log -- file size, record count, and download

File	histlog.bin
File size	444.9 MB (466560512 bytes, pre-allocated)
Record size	90 bytes
Records logged	338595 of 5184000 capacity (6% full)
Time span covered	3d 22h 3m (1 sec/record)

DOWNLOAD HISTLOG.BIN