lamaPLC: Communication with Eastron Smart X96

The Smart X96-5 is a high accuracy multifunction power meter that is a traditional wired 1/5A current transformer operated meter. Configurable for 1p2w, 3p3w and 3p4w systems and hosting a vast range of measuring parameters such as Amps, Volts, Power, Power and Current Demand (Sliding and fix scale options), Power Factor, imported and exported kWh, Individual harmonics, Phase sequence and a phase summary page. It is one of the most user-friendly multifunction power meters in the market form installation to end client use.

It is typical in most installations that the current transformers are mounted on the left-hand side of the breaker so P1 is facing the correct way. However, it is also possible to mount the current transformer on the right-hand side with P2 facing the breaker. This is possible due to the meter having the option to reverse the flow to correct this type of application.

The SMART X96-5 requires mains voltage inputs and external current transformers in order to operate, it is self-supplied via a internal three phase transformer, this means if any of the phases fail the meter will remain powered and does not require an external auxiliary supply. The Smart X96-5 meter comes complete with RS485 Modbus RTU and dual pulsed outputs as standard.

- MID Certified to Class C (0.5%) accuracy
- Designed and tested in the UK by an independent laboratory
- 1/5A Current transformer operated
- Individual harmonics up to 63rd level (Class 1)
- Internal three phase power supply
- Highly visible backlit display from all angles
- Programmable reverse flow for right/left side of breaker CT installation.
- Built in Modbus and Pulsed outputs

Modbus map

input register	Measurement	Variable	Unit	Note
1st Modbus read block				
30000	Phase 1 line to neutral volts	Float	V	**1:** Basis 0, 0x00, 79 words
30002	Phase 2 line to neutral volts	Float	V	0x02
30004	Phase 3 line to neutral volts	Float	V	0x04
30006	Phase 1 current	Float	A	0x06
30008	Phase 2 current	Float	A	0x08
30010	Phase 3 current	Float	A	0x0A
30012	Phase 1 active power	Float	W	0x0C
30014	Phase 2 active power	Float	W	0x0E
30016	Phase 3 active power	Float	W	0x10
30018	Phase 1 apparent power	Float	VA	0x12
30020	Phase 2 apparent power	Float	VA	0x14
30022	Phase 3 apparent power	Float	VA	0x16

input register	Measurement	Variable	Unit	Note
30024	Phase 1 reactive power	Float	VAr	0x18
30026	Phase 2 reactive power	Float	VAr	0x1A
30028	Phase 3 reactive power	Float	VAr	0x1C
30030	Phase 1 power factor	Float	None	0x1E Positive: forward current, negative: reverse current
30032	Phase 2 power factor	Float	None	0x20 Positive: forward current, negative: reverse current
30034	Phase 3 power factor	Float	None	0x22 Positive: forward current, negative: reverse current
30036	Phase 1 phase angle	Float	°	0x24
30038	Phase 2 phase angle	Float	°	0x26
30040	Phase 3 phase angle	Float	°	0x28
30042	Average line to neutral volts	Float	V	0x2A
30046	Average line current	Float	A	0x2E
30048	Sum of line currents	Float	A	0x30
30052	Total system power	Float	W	0x34
30056	Total system volt amps	Float	VA	0x38
30060	Total system V Ar	Float	VAr	0x3C
30062	Total system power factor	Float	None	0x3E Positive: forward current, negative: reverse current
30066	Total system phase angle	Float	Degrees	0x42
30070	Frequency of supply voltages	Float	Hz	0x46
30072	Import Wh since last reset	Float	kWh	0x48
30074	Export Wh since last reset	Float	kWh	0x4A
30076	Import V Arh since last reset	Float	kVArh	0x4C
30078	Export V Arh since last reset	Float	kVArh	0x4E
2nd Modbus read block				
30080	VAh since last reset	Float	kVAh	Basis 0x50 (80), 31 words
30082	Ah since last reset	Float	Ah	0x02
30084	Total system power demand	Float	W	0x04 The power sum demand calculation is for import - export

input register	Measurement	Variable	Unit	Note
30086	Maximum total system power demand	Float	W	0x06 The power sum demand calculation is for import - export
30088	Import active power demand	Float	W	0x08
30090	Import active power max. demand	Float	W	0x0A
30092	Export active power demand	Float	W	0x0C
30094	Export active power max. demand	Float	W	0x0E
30100	Total system VA demand	Float	VA	0x14
30102	Maximum total system VA demand	Float	VA	0x16
30104	Neutral current demand	Float	A	0x18
30106	Maximum neutral current demand	Float	A	0x1A
30108	Total system reactive power demand	Float	VAr	0x1C The power sum demand calculation is for import - export
30110	Maximum total system reactive power demand	Float	VAr	0x1E
30160	Voltage phase sequence (normal= 1, reverse=2)	Float	None	
30162	Current phase sequence (normal= 1, reverse=2)	Float	None	
30192	Nature of the load (Resistive= 1, inductive= 2, capacitive= 3)	Float	None	
30194	Nature of L1 load (Resistive= 1, inductive= 2, capacitive= 3)	Float	None	
30196	Nature of L2 load (Resistive= 1, inductive= 2, capacitive= 3)	Float	None	
30198	Nature of L3 load (Resistive= 1, inductive= 2, capacitive= 3)	Float	None	
30200	Line 1 to Line 2 volts	Float	V	
30202	Line 2 to Line 3 volts	Float	V	
30204	Line 3 to Line 1 volts	Float	V	
30206	Average line to line volts	Float	V	
30224	Neutral current	Float	A	
30234	Phase 1 LIN volts THD	Float	%	
30236	Phase 2 LIN volts THD	Float	%	
30238	Phase 3 LIN volts THD	Float	%	
30240	Phase 1 Current THD	Float	%	
30242	Phase 2 Current THD	Float	%	
30244	Phase 3 Current THD	Float	%	
30248	Average line to neutral volts THD	Float	%	
30250	Average line current THD	Float	%	
30258	Phase 1 current demand	Float	A	
30260	Phase 2 current demand	Float	A	
30262	Phase 3 current demand	Float	A	

input register	Measurement	Variable	Unit	Note
30264	Maximum phase 1 current demand	Float	A	
30266	Maximum phase 2 current demand	Float	A	
30268	Maximum phase 3 current demand	Float	A	
30334	Line 1 to line 2 volts THD	Float	%	
30336	Line 2 to line 3 volts THD	Float	%	
30338	Line 3 to line 1 volts THD	Float	%	
30340	Average line to line volts THD	Float	%	
30342	Total kwh	Float	kWh	Total kWh/ kVarh equals to Import+ export
30344	Total kvarh	Float	kVArh	Total kWh/ kVarh equals to Import+ export
30346	L1 import kwh	Float	kWh	
30348	L2 import kwh	Float	kWh	
30350	L3 import kWh	Float	kWh	
30352	L1 export kWh	Float	kWh	
30354	L2 export kwh	Float	kWh	
30356	L3 export kWh	Float	kWh	
30358	L1 total kwh	Float	kWh	
30360	L2 total kWh	Float	kWh	
30362	L3 total kwh	Float	kWh	
30364	L1 import kvarh	Float	kVArh	
30366	L2 import kvarh	Float	kVArh	
30368	L3 import kvarh	Float	kVArh	
30370	L1 export kvarh	Float	kVArh	
30372	L2 export kvarh	Float	kVArh	
30374	L3 export kvarh	Float	kVArh	
30376	L1 total kvarh	Float	kVArh	
30378	L2 total kvarh	Float	kVArh	
30380	L3 total kvarh	Float	kVArh	
30402	Voltage 2st- 63st Harmonic L1	62*Float	%	
30526	Voltage 2st- 63st Harmonic L2	62*Float	%	
30650	Voltage 2st- 63st Harmonic L3	62*Float	%	
30774	Current 2st- 63st Harmonic L1	62*Float	%	
30898	Current 2st- 63st Harmonic L2	62*Float	%	
31022	Current 2st- 63st Harmonic L3	62*Float	%	
31146	Voltage Total Harmonic L1	Float	%	
31148	Voltage Total Harmonic L2	Float	%	
31150	Voltage Total Harmonic L3	Float	%	
31152	Current Total Harmonic L1	Float	%	
31154	Current Total Harmonic L2	Float	%	
31156	Current Total Harmonic L3	Float	%	