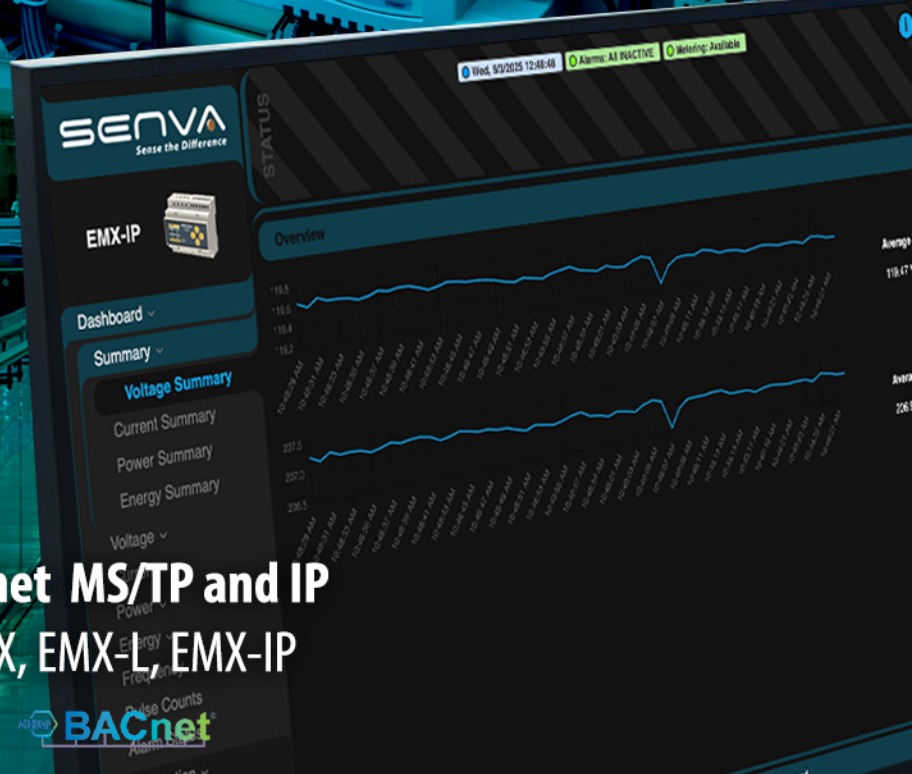


EMX BACnet Guide



BACnet MS/TP and IP
EMX, EMX-L, EMX-IP

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Congratulations on installing your new Senva EMX energy meter! This BACnet Protocol Guide assumes the first stage of installation is complete, with the meter and any CTs connected and powered. If using the EMX or EMX-IP the OLED display should show the home screen when any button is pressed. If not, refer to the separate Installation Instructions before continuing. For EMX-L, the SenvaSync app, available on both Android and iOS, is used instead of the display. Now, only the network configuration remains between you and the data.

BACnet

Protocol Implementation Conformance Statement

EMX

Vendor Name	Senva Inc.
Vendor Identifier	665
Product Name	EMX Energy Meter
Product Model Number	EMX
Firmware Revision	v14.10
Application Software Version	1.0. Version may be higher
BACnet Protocol Revision	14
Product Description	Advanced Energy Meter
BACnet Standardized Device Profile	BACnet Application Specific Controller (B-ASC)
List of BACnet Interoperability Building Blocks Supported	DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM-B, DM-DDB-B, DM-DOB-B, DM-DCC-B, DM-RD-B
Segmentation Capability	No Support
Standard Object Types Supported	Device, Network Port, Analog Input, Analog Value, Large Analog Value, and Multi-State Value
Data Link Layer Options	BACnet MS/TP
Device Address Binding	No Support
Networking Options	No Support
Character Sets Supported	ISO 10646 (UTF-8)
Communications Gateway	No Support
Network Security Options	Non-Secure Device

EMX-L

Vendor Name	Senva Inc.
Vendor Identifier	665
Product Name	EMX-L Energy Meter
Product Model Number	EMX-L
Firmware Revision	v14.10
Application Software Version	1.0. Version may be higher
BACnet Protocol Revision	14
Product Description	Advanced Energy Meter
BACnet Standardized Device Profile	BACnet Application Specific Controller (B-ASC)
List of BACnet Interoperability Building Blocks Supported	DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM-B, DM-DDB-B, DM-DOB-B, DM-DCC-B, DM-RD-B
Segmentation Capability	No Support
Standard Object Types Supported	Device, Network Port, Analog Input, Analog Value, Large Analog Value, and Multi-State Value
Data Link Layer Options	BACnet MS/TP
Device Address Binding	No Support
Networking Options	No Support
Character Sets Supported	ISO 10646 (UTF-8)
Communications Gateway	No Support
Network Security Options	Non-Secure Device

EMX-IP

Vendor Name	Senva Inc.
Vendor Identifier	665
Product Name	EMX-IP Advanced Energy Meter
Product Model Number	EMX-IP
Firmware Revision	v19.01
Application Software Version	1.0. Version may be higher
BACnet Protocol Revision	19
Product Description	Advanced Energy Meter with IP
BACnet Standardized Device Profile	BACnet Application Specific Controller (B-ASC)
List of BACnet Interoperability Building Blocks Supported	DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM-B, DM-DDB-B, DM-DOB-B, DM-DCC-B, DM-RD-B
Segmentation Capability	No Support
Standard Object Types Supported	Device, Network Port, Analog Input, Analog Value, Large Analog Value, and Multi-State Value
Data Link Layer Options	BACnet IP
Device Address Binding	No Support
Networking Options	No Support
Character Sets Supported	ISO 10646 (UTF-8)
Communications Gateway	No Support
Network Security Options	Non-Secure Device

Configuration

EMX

Device information for the EMX can be configured or referenced using the below table.

Property	Min/Max	Default	Read
OBJECT_IDENTIFIER (DEVICE INSTANCE)	0 / 4194302	1	R/W
DEVICE_NAME	N/A	EMX	R/W
DESCRIPTION	N/A	Device Description	R/W
LOCATION	N/A	Device Location	R/W
PROFILE_NAME	N/A	665-Device-EMX	read only
MODEL_NAME	N/A	EMX	read only
VENDOR_NAME	N/A	Senva Inc.	read only
APPLICATION_SOFTWARE_VERSION	N/A	Varies	read only
FIRMWARE_REVISION	N/A	Varies	read only
VENDOR_IDENTIFIER	N/A	665	read only
PROTOCOL_VERSION	N/A	1	read only
PROTOCOL_REVISION	N/A	14	read only

EMX-L

Device information for the EMX-L can be configured or referenced using the below table.

Property	Min/Max	Default	Read
OBJECT_IDENTIFIER (DEVICE INSTANCE)	0 / 4194302	1	R/W
DEVICE_NAME	N/A	EMX-L	R/W
DESCRIPTION	N/A	Device Description	R/W
LOCATION	N/A	Device Location	R/W
PROFILE_NAME	N/A	665-Device-EMXL	read only
MODEL_NAME	N/A	EMX-L	read only
VENDOR_NAME	N/A	Senva Inc.	read only
APPLICATION_SOFTWARE_VERSION	N/A	Varies	read only
FIRMWARE_REVISION	N/A	Varies	read only
VENDOR_IDENTIFIER	N/A	665	read only
PROTOCOL_VERSION	N/A	1	read only
PROTOCOL_REVISION	N/A	14	read only

EMX-IP

Device information for the EMX-IP can be configured or referenced using the below table.

Property	Min/Max	Default	Read
OBJECT_IDENTIFIER (DEVICE INSTANCE)	0 / 4194302	1	R/W
DEVICE_NAME	N/A	EMX-IP	R/W
DESCRIPTION	N/A	Device Description	R/W
LOCATION	N/A	Device Location	R/W
PROFILE_NAME	N/A	665-Device-EMXIP	read only
MODEL_NAME	N/A	EMX-IP	read only
VENDOR_NAME	N/A	Senva Inc.	read only
APPLICATION_SOFTWARE_VERSION	N/A	Varies	read only
FIRMWARE_REVISION	N/A	Varies	read only
VENDOR_IDENTIFIER	N/A	665	read only
PROTOCOL_VERSION	N/A	1	read only
PROTOCOL_REVISION	N/A	19	read only

Setup Registers and Parameters

Setup registers and parameters are available in 8 groups in the settings menu using the display or they may also be accessed using BACnet communications.

Settings

Settings are available in the following groups on the display (EMX and EMX-IP only) or SenvaSync App. A parameter list is provided in the following sections.

- **Metering** – Adjust metering parameters such as voltage and current scaling, phase sequencing, and display units.
- **Pulse Config** – Read the count of the two pulse inputs.
- **Communications** – See IPv4 and IPv6 values.
- **Alarms** - Enable or disable alarms and set trip points.
- **Real-Time Clock** – Set the date and time.
- **Logging** – Enable or disable logging as well as setting trigger source and what is logged.
- **Passcode** – Choose a passcode to lock device.
- **Advanced** – View firmware versions or initiate a factory reset.

The following sections detail how to adjust settings over the BACnet interface. All settings are stored in non-volatile memory. Stored values will not be lost if the meter experiences a power loss.

R/W:

- **R** = Readable Only
- **R/W** = Read and writeable

Multi State Values

NOTE • All MSV registers are **Readable/Writable**.

Multi State values are used for all primary configuration of the meter. These settings determine the phasing and what device is being used to measure (CT or Rogowski coil). They are also used to configure the pulse outputs if available along with enabling/disabling alarms.

NOTE Pulse output parameters (MSV4 - MSV9) are not applicable to the EMX-IP

Reg.	Description	Values	Default	Functionality
MSV1	Wiring Configuration	1 - 3-Ph A-B-C-N 2 - 3-Ph A-B-C 3 - Single-Ph A-B-N 4 - Single-Ph A-B 5 - Split-Ph A-B-N	1	Sets the wiring configuration of the meter based on the phases connected.
MSV2	Current Element	1 - Current Transformer 2 - Rogowski Coil	1	Select if the current input is a 0.33V CT or Rogo Coil
MSV3	Current Element Orientation	1- +++ 2- ++- 3- +-+ 4- +-- 5- -++ 6- -+- 7- ---+ 8- ---	1	Polarity of CT, phase ordering is ABC
MSV4	Pulse Out 1 Wh per pulse	1-1 2-10 3-100 4-1000 5-10000	1	Sets the pulse configuration in Wh
MSV5	Pulse Output 1 Duration	1-10ms 2-25ms 3-50ms 4-100ms 5-250ms 6-500ms	1	Sets the pulse duration in ms

Reg.	Description	Values	Default	Functionality
MSV6	Pulse Output 1 Source	1-Export Wh 2-Export Wh 3-Export VARh 4-Export VARh 5-Mirror Input 1 6-Mirror Input 2 7-Alarm Normally Open 8-Alarm Normally Closed 9-Phase Loss Normally Open 10-Phase Loss Normally Closed	1	Sets the Source for the pulse output
MSV7	Pulse Out 2 Wh per pulse	1-1 2-10 3-100 4-1000 5-10000	1	Sets the pulse configuration in Wh
MSV8	Pulse Output 2 Duration	1-10ms 2-25ms 3-50ms 4-100ms 5-250ms 6-500ms	1	Sets the pulse duration in ms
MSV9	Pulse Output 2 Source	1-Export Wh 2-Export Wh 3-Export VARh 4-Export VARh 5-Mirror Input 1 6-Mirror Input 2 7-Alarm Normally Open 8-Alarm Normally Closed 9-Phase Loss Normally Open 10-Phase Loss Normally Closed	1	Sets the Source for the pulse output
MSV10	Alarm Enable - Voltage Rng	1 - Disable 2 - Enable	1	Sets the state of the Voltage Range alarm, default is set to disable the alarm.
MSV11	Alarm Enable - Current Rng	1 - Disable 2 - Enable	1	Sets the state of the Current Range alarm, default is set to disable the alarm.
MSV12	Alarm Enable - Neutral Current Rng	1 - Disable 2 - Enable	1	Sets the state of the Neutral Current Range alarm, default is set to disable the alarm.

Reg.	Description	Values	Default	Functionality
MSV13	Alarm Enable - Frequency Rne	1 - Disable 2 - Enable	2	Sets the state of the Frequency Range alarm, default is set to disable the alarm.
MSV14	Alarm Enable - V. Phase Loss	1 - Disable 2 - Enable	2	Sets the state of the Phase Loss alarm, default is set to enable the alarm.
MSV15	Alarm Enable - V. Phase Imbalance	1 - Disable 2 - Enable	2	Sets the state of the Phase Unbalance alarm, default is set to enable the alarm.
MSV16	Alarm Enable - Low Power Factor	1 - Disable 2 - Enable	2	Sets the state of the Low Power Factor alarm, default is set to enable the alarm.

Analog Inputs

NOTE All registers in this section are **Read Only**.

The Analog Input registers return all the main power values and other status values.

Reg.	Description	Min Max	Default	Units	Store	Functionality
AI1 ✓ EMX ✓ EMX-L ✓ EMX-IP	Average L-N Voltage	0 65535	-	V (rms)	No	Returns the average rms line to neutral voltage, for all phases.
AI2 ✓ EMX ✓ EMX-L ✓ EMX-IP	Average L-L Voltage	0 65535	-	V (rms)	No	Returns the average rms line to line voltage.
AI3 ✓ EMX ✓ EMX-L ✓ EMX-IP	Average Current	0 65535	-	A (rms)	No	Returns the phase average RMS Current.
AI4 ✓ EMX ✓ EMX-L ✓ EMX-IP	Current Sum	0 65535	-	A (rms)	No	Returns the total RMS sum for all valid phases.
AI5 ✓ EMX ✓ EMX-L ✓ EMX-IP	Total Real Power	-90071992 90071992	-	W	No	Returns the absolute sum of the Real Power of all the valid phases.
AI6 ✓ EMX ✓ EMX-L ✓ EMX-IP	Total Reactive Power	-90071992 90071992	-	VAR	No	Returns the absolute sum of the Reactive Power of all the valid phases.
AI7 ✓ EMX ✓ EMX-L ✓ EMX-IP	Total Apparent Power	-90071992 90071992	-	VA	No	Returns the absolute sum of the Apparent Power of all the valid phases.
AI8 ✓ EMX ✓ EMX-L ✗ EMX-IP	Total Net Real Energy	-90071992 90071992	-	Wh	Yes	Returns the absolute sum of the Real Energy of all the valid phases.
AI9 ✓ EMX ✓ EMX-L ✗ EMX-IP	Total Net Reactive Energy	-90071992 90071992	-	VARh	Yes	Returns the absolute sum of the Reactive Energy of all the valid phases.

Reg.	Description	Min Max	Default	Units	Store	Functionality
AI10 ✓ EMX ✓ EMX-L ✗ EMX-IP	Total Net Apparent Energy	-90071992 90071992	-	Vah	Yes	Returns the absolute sum of the Apparent Energy of all the valid phases.
AI11 ✓ EMX ✓ EMX-L ✓ EMX-IP	A-N Voltage	0 65535	-	V (rms)	No	Returns RMS Voltage of Line A to neutral voltage.
AI12 ✓ EMX ✓ EMX-L ✓ EMX-IP	B-N Voltage	0 65535	-	V (rms)	No	Returns RMS Voltage of Line B to neutral voltage.
AI13 ✓ EMX ✓ EMX-L ✓ EMX-IP	C-N Voltage	0 65535	-	V (rms)	No	Returns RMS Voltage of Line C to neutral voltage.
AI14 ✓ EMX ✓ EMX-L ✓ EMX-IP	A-B Voltage	0 65535	-	V (rms)	No	Returns RMS Voltage of Line A to line B voltage.
AI15 ✓ EMX ✓ EMX-L ✓ EMX-IP	B-C Voltage	0 65535	-	V (rms)	No	Returns RMS Voltage of Line B to Line C voltage.
AI16 ✓ EMX ✓ EMX-L ✓ EMX-IP	C-A Voltage	0 65535	-	V (rms)	No	Returns RMS Voltage of Line C to Line A voltage.
AI17 ✓ EMX ✓ EMX-L ✓ EMX-IP	A Current	0 65535	-	A (rms)	No	Returns the RMS Current of Phase A.
AI18 ✓ EMX ✓ EMX-L ✓ EMX-IP	B Current	0 65535	-	A (rms)	No	Returns the RMS Current of Phase B.
AI19 ✓ EMX ✓ EMX-L ✓ EMX-IP	C Current	0 65535	-	A (rms)	No	Returns the RMS Current of Phase C.

Reg.	Description	Min Max	Default	Units	Store	Functionality
AI20 ✓ EMX ✓ EMX-L ✓ EMX-IP	A Power Factor	-100 100	-	Unitless	No	Returns the power factor of the Phase A.
AI21 ✓ EMX ✓ EMX-L ✓ EMX-IP	B Power Factor	-100 100	-	Unitless	No	Returns the power factor of the Phase B.
AI22 ✓ EMX ✓ EMX-L ✓ EMX-IP	C Power Factor	-100 100	-	Unitless	No	Returns the power factor of the Phase C.
AI23 ✓ EMX ✓ EMX-L ✓ EMX-IP	A Frequency	480 620	-	Hz	No	Returns the Frequency of Phase A.
AI24 ✓ EMX ✓ EMX-L ✓ EMX-IP	A Real Power	-90071992 90071992	-	W	No	Returns Phase A real Power in watts, negative values indicate export power.
AI25 ✓ EMX ✓ EMX-L ✓ EMX-IP	B Real Power	-90071992 90071992	-	W	No	Returns Phase B real Power in watts, negative values indicate export power.
AI26 ✓ EMX ✓ EMX-L ✓ EMX-IP	C Real Power	-90071992 90071992	-	W	No	Returns Phase B real Power in watts, negative values indicate export power.
AI27 ✓ EMX ✓ EMX-L ✓ EMX-IP	A Reactive Power	-90071992 90071992	-	VAR	No	Returns Phase A reactive power in VAR. A negative value indicates a capacitive load.
AI28 ✓ EMX ✓ EMX-L ✓ EMX-IP	B Reactive Power	-90071992 90071992	-	VAR	No	Returns Phase B reactive power in VAR. A negative value indicates a capacitive load.
AI29 ✓ EMX ✓ EMX-L ✓ EMX-IP	C Reactive Power	-90071992 90071992	-	VAR	No	Returns Phase C reactive power in VAR. A negative value indicates a capacitive load.

Reg.	Description	Min Max	Default	Units	Store	Functionality
AI30 ✓ EMX ✓ EMX-L ✓ EMX-IP	A Apparent Power	-90071992 90071992	-	VA	No	Returns Phase A apparent power in VA. Values are always positive.
AI31 ✓ EMX ✓ EMX-L ✓ EMX-IP	B Apparent Power	-90071992 90071992	-	VA	No	Returns Phase B apparent power in VA. Values are always positive.
AI32 ✓ EMX ✓ EMX-L ✓ EMX-IP	C Apparent Power	-90071992 90071992	-	VA	No	Returns Phase C apparent power in VA. Values are always positive.
AI33 ✓ EMX ✓ EMX-L ✗ EMX-IP	Net A Apparent Energy	-90071992 90071992	-	Wh	Yes	Returns the Total Apparent Energy for Phase A
AI34 ✓ EMX ✓ EMX-L ✗ EMX-IP	Net B Apparent Energy	-90071992 90071992	-	Wh	Yes	Returns the Total Apparent Energy for Phase B
AI35 ✓ EMX ✓ EMX-L ✗ EMX-IP	Net C Apparent Energy	-90071992 90071992	-	Wh	Yes	Returns the Total Apparent Energy for Phase C
AI36 ✓ EMX ✓ EMX-L ✗ EMX-IP	Net A Reactive Energy	-90071992 90071992	-	VARh	Yes	Returns the Total Reactive Energy for Phase A
AI37 ✓ EMX ✓ EMX-L ✗ EMX-IP	Net B Reactive Energy	-90071992 90071992	-	VARh	Yes	Returns the Total Reactive Energy for Phase B
AI38 ✓ EMX ✓ EMX-L ✗ EMX-IP	Net C Reactive Energy	-90071992 90071992	-	VARh	Yes	Returns the Total Reactive Energy for Phase C
AI39 ✓ EMX ✓ EMX-L ✗ EMX-IP	Net A Apparent Energy	-90071992 90071992	-	VAh	Yes	Returns the Total Apparent Energy for Phase A

Reg.	Description	Min Max	Default	Units	Store	Functionality
AI40 ✓ EMX ✓ EMX-L ✗ EMX-IP	Net B Apparent Energy	-90071992 90071992	-	VAh	Yes	Returns the Total Apparent Energy for Phase B
AI41 ✓ EMX ✓ EMX-L ✗ EMX-IP	Net C Apparent Energy	-90071992 90071992	-	VAh	Yes	Returns the Total Apparent Energy for Phase C
AI42 ✓ EMX ✓ EMX-L ✓ EMX-IP	Alarm Status	0 65535	-	Unitless	No	Bit 0: Pulse configuration error Bit 1: Pulse overrun error Bit 2: Voltage out of range Bit 3: Current out of range Bit 4: Neutral current out of range Bit 5: Frequency out of range Bit 6: Voltage phase loss Bit 7: Voltage phase unbalance Bit 8: Power factor low Bit 9: Accumulator Loss Bit 10: RTC Communication Bit: 11 Logs Full Bit 12: Meter Settings error Bit 13 - 15: Reserved
AI43 ✓ EMX ✓ EMX-L ✓ EMX-IP	Load Status	0 1	-	Unitless	No	0: No load detected 1: Load above threshold
AI44 ✓ EMX ✓ EMX-L ✓ EMX-IP	Power On Time	0 4294967295	-	Seconds	Yes	How long in seconds since the last power cycle
AI45 ✓ EMX ✓ EMX-L ✓ EMX-IP	Load Active Time	0 4294967295	-	Seconds	Yes	Total time in seconds the device has been powered.
AI46 ✓ EMX ✓ EMX-L ✓ EMX-IP	Power Loss Count	0 4294967295	-	Unitless	Yes	The amount of times that the device has lost power.
AI47 ✓ EMX ✓ EMX-L ✓ EMX-IP	Pulse Count 1	0 4294967295	-	Unitless	Yes	Total amount of input pulses on channel 1.

Reg.	Description	Min Max	Default	Units	Store	Functionality
AI48 ✓ EMX ✓ EMX-L ✓ EMX-IP	Pulse Count 2	0 4294967295	-	Unitless	Yes	Total amount of input pulses on channel 2.
AI68 ✓ EMX ✗ EMX-L ✓ EMX-IP	RTC - Year	2022 2060	2022	Years	No	Real Time Clock year
AI69 ✓ EMX ✗ EMX-L ✓ EMX-IP	RTC - Month	1 12	1	Months	No	Real Time Clock month
AI70 ✓ EMX ✗ EMX-L ✓ EMX-IP	RTC - Day of Month	1 31	1	Days	No	Real Time Clock day of the month
AI71 ✓ EMX ✗ EMX-L ✓ EMX-IP	RTC - Day of Week	0 6	0	Unitless	No	Real Time Clock day of the week, 0 = Sunday, 6 = Saturday
AI72 ✓ EMX ✗ EMX-L ✓ EMX-IP	RTC - Hours	0 23	0	Hours	No	Real Time Clock Hours
AI73 ✓ EMX ✗ EMX-L ✓ EMX-IP	RTC - Minutes	0 59	0	Minutes	No	Real Time Clock Minutes
AI74 ✓ EMX ✗ EMX-L ✓ EMX-IP	RTC - Seconds	0 59	0	Seconds	No	Real Time Clock Seconds
AI75 ✓ EMX ✗ EMX-L ✓ EMX-IP	RTC - AM/PM Flag	0 3	0	Unitless	No	If in 24-hour mode, will return 0, if in 12-hour mode: 1 = AM, 2 = PM
AI79 ✓ EMX ✓ EMX-L ✗ EMX-IP	Total Import Apparent Energy	0 18.446e+18	-	Wh	Yes	Returns the Total Import Apparent energy for all Phases

Reg.	Description	Min Max	Default	Units	Store	Functionality
AI80 ✓ EMX ✓ EMX-L ✗ EMX-IP	Import A Apparent Energy	0 18.446e+18	-	Wh	Yes	Returns the Import Apparent energy for Phase A
AI81 ✓ EMX ✓ EMX-L ✗ EMX-IP	Import B Apparent Energy	0 18.446e+18	-	Wh	Yes	Returns the Import Apparent energy for Phase B
AI82 ✓ EMX ✓ EMX-L ✗ EMX-IP	Import C Apparent Energy	0 18.446e+18	-	Wh	Yes	Returns the Import Apparent energy for Phase C
AI83 ✓ EMX ✓ EMX-L ✗ EMX-IP	Total Import Reactive Energy	0 18.446e+18	-	VARh	Yes	Returns the Total Reactive energy for Phase Import
AI84 ✓ EMX ✓ EMX-L ✗ EMX-IP	Import A Reactive Energy	0 18.446e+18	-	VARh	Yes	Returns the Import Reactive energy for Phase A
AI85 ✓ EMX ✓ EMX-L ✗ EMX-IP	Import B Reactive Energy	0 18.446e+18	-	VARh	Yes	Returns the Import Reactive energy for Phase B
AI86 ✓ EMX ✓ EMX-L ✗ EMX-IP	Import C Reactive Energy	0 18.446e+18	-	VARh	Yes	Returns the Import Reactive energy for Phase C
AI87 ✓ EMX ✓ EMX-L ✗ EMX-IP	Total Import Apparent Energy	0 18.446e+18	-	VAh	Yes	Returns the Total Apparent energy for Phase Import
AI88 ✓ EMX ✓ EMX-L ✗ EMX-IP	Import A Apparent Energy	0 18.446e+18	-	VAh	Yes	Returns the Import Apparent energy for Phase A
AI89 ✓ EMX ✓ EMX-L ✗ EMX-IP	Import B Apparent Energy	0 18.446e+18	-	VAh	Yes	Returns the Import Apparent energy for Phase B

Reg.	Description	Min Max	Default	Units	Store	Functionality
AI90 ✓ EMX ✓ EMX-L ✗ EMX-IP	Import C Apparent Energy	0 18.446e+18	-	VAh	Yes	Returns the Import Apparent energy for Phase C
AI91 ✓ EMX ✓ EMX-L ✗ EMX-IP	Total Export Apparent Energy	0 18.446e+18	-	Wh	Yes	Returns the Total Apparent energy for Phase Export
AI92 ✓ EMX ✓ EMX-L ✗ EMX-IP	Export A Apparent Energy	0 18.446e+18	-	Wh	Yes	Returns the Export Apparent energy for Phase A
AI93 ✓ EMX ✓ EMX-L ✗ EMX-IP	Export B Apparent Energy	0 18.446e+18	-	Wh	Yes	Returns the Export Apparent energy for Phase B
AI94 ✓ EMX ✓ EMX-L ✗ EMX-IP	Export C Apparent Energy	0 18.446e+18	-	Wh	Yes	Returns the Export Apparent energy for Phase C
AI95 ✓ EMX ✓ EMX-L ✗ EMX-IP	Total Export Reactive Energy	0 18.446e+18	-	VARh	Yes	Returns the Total Reactive energy for Phase Export
AI96 ✓ EMX ✓ EMX-L ✗ EMX-IP	Export A Reactive Energy	0 18.446e+18	-	VARh	Yes	Returns the Export Reactive energy for Phase A
AI97 ✓ EMX ✓ EMX-L ✗ EMX-IP	Export B Reactive Energy	0 18.446e+18	-	VARh	Yes	Returns the Export Reactive energy for Phase B
AI98 ✓ EMX ✓ EMX-L ✗ EMX-IP	Export C Reactive Energy	0 18.446e+18	-	VARh	Yes	Returns the Export Reactive energy for Phase C
AI99 ✓ EMX ✓ EMX-L ✗ EMX-IP	Total Export Apparent Energy	0 18.446e+18	-	VAh	Yes	Returns the Total Apparent energy for Phase Export

Reg.	Description	Min Max	Default	Units	Store	Functionality
AI100 ✓ EMX ✓ EMX-L ✗ EMX-IP	Export A Apparent Energy	0 18.446e+18	-	VAh	Yes	Returns the Export Apparent energy for Phase A
AI101 ✓ EMX ✓ EMX-L ✗ EMX-IP	Export B Apparent Energy	0 18.446e+18	-	VAh	Yes	Returns the Export Apparent energy for Phase B
AI102 ✓ EMX ✓ EMX-L ✗ EMX-IP	Export C Apparent Energy	0 18.446e+18	-	VAh	Yes	Returns the Export Apparent energy for Phase C
AI103 ✓ EMX ✓ EMX-L ✗ EMX-IP	Time Since Boot	0 18.446e+18	-	Seconds	No	From MSP - Time since last reset

Analog Values

NOTE All registers in this section are **Readable/Writable**.

The Analog Value registers are used to set current and voltage scaling, along with adjusting alarm thresholds, and setting the Real-time clock (RTC).

Reg.	Description	Min Max	Default	Units	Store	Functionality
AV1	Current Scale	1 6000	1	Amps	Yes	Sets the scaling of the Current
AV2	Voltage Scale	0.01 320	1	Volts	Yes	Sets the scaling of the Voltage
AV3	Phase Angle Compensation	-768 768	0	Unitless	Yes	Manually adjust metered phase angle
AV5	Alarm - Nominal Voltage	1 6000	240	Volts	Yes	Sets the alarm level for the Nominal Voltage
AV6	Alarm - Voltage Threshold	1 20	10	%	Yes	Sets the threshold for the voltage alarm
AV7	Alarm - Nominal Current	1 6000	5	Amps	Yes	Sets the alarm level for the Nominal Current
AV8	Alarm - Current Threshold	1 20	10	%	Yes	Sets the threshold for the current alarm
AV9	Alarm - Nominal Neutral Current	1 6000	5	Amps	Yes	Sets the alarm level for the nominal neutral current
AV10	Alarm - Neutral Current Limit	1 20	10	%	Yes	Sets the threshold for the neutral current alarm
AV11	Alarm - Nominal Frequency	45 65	60	Hz	Yes	Sets the alarm level for the nominal frequency
AV12	Alarm - Frequency Threshold	1 20	10	%	Yes	Sets the threshold for the frequency alarm
AV13	Alarm - Voltage Phase Loss Limit	1 20	10	%	Yes	Sets the threshold for the Phase Loss alarm
AV14	Alarm - V. Phase Imbalance Threshold	1 20	10	%	Yes	Sets the threshold for the Phase Unbalance alarm
AV15	Alarm - Low Power Factor Limit	1 99	50	Unitless	Yes	Sets the threshold for Low Power Factor alarm

Reg.	Description	Min Max	Default	Units	Store	Functionality
AV16	Set Passcode	0 65535	0	Unitless	Yes	Sets the device passcode.
AV17	Reset Energy	0 1	0	Unitless	No	Resets the Wh
AV18	Reset Runtime	0 1	0	Unitless	No	Resets the device runtime
AV19	Reset Pulse Counts	0 1	0	Unitless	No	Resets the device pulse counters

IMPORTANT

Remaining AV points, AV20 to AV28, only apply to EMX and EMX-IP. EMX-L does not have any of the remaining points.

Reg.	Description	Min Max	Default	Units	Store	Functionality
AV20	Reset Log Contents	0 1	0	Unitless	No	Write a 1 to reset all log data
AV21	RTC - Year	2022 2060	2022	Years	No	Set the real time clock Year
AV22	RTC - Month	1 12	1	Months	No	Set the real time clock Month
AV23	RTC - Day of Month	1 31	1	Days	No	Set the real time clock Day of Month
AV24	RTC - Day of Week	1 7	1	Unitless	No	Set the real time clock Day of Week
AV25	RTC - Hours	0 23	0	Hours	No	Set the real time clock Hours
AV26	RTC - Minutes	0 59	0	Minutes	No	Set the real time clock Minutes
AV27	RTC - Seconds	0 59	0	Seconds	No	Set the real time clock Seconds
AV28	RTC - Commit Time	0 1	0	Unitless	No	Set to 1 to commit clock time changes and update PCF85263 RTC module

Large Analog Values

NOTE

- All LAV registers are **Read Only**.
- Available only on EMX-IP meters.
- Not Available on EMX or EMX-L meters.

Large Analog Value registers contain all of the energy accumulation readings for the EMX-IP meters.

Reg.	Description	Min Max	Units	Functionality
LAV1	Real Net Energy Total	-90071992 90071992	Wh	Returns the absolute sum of the Real Energy of all the valid phases.
LAV2	Real Net Energy Phase A	-90071992 90071992	Wh	Returns the net Real Energy for Phase A
LAV3	Real Net Energy Phase B	-90071992 90071992	Wh	Returns the net Real Energy for Phase B
LAV4	Real Net Energy Phase C	-90071992 90071992	Wh	Returns the net Real Energy for Phase C
LAV5	Reactive Net Energy Total	-90071992 90071992	VARh	Returns the absolute sum of the Reactive Energy of all the valid phases.
LAV6	Reactive Net Energy Phase A	-90071992 90071992	VARh	Returns the net Reactive Energy for Phase A
LAV7	Reactive Net Energy Phase B	-90071992 90071992	VARh	Returns the net Reactive Energy for Phase B
LAV8	Reactive Net Energy Phase C	-90071992 90071992	VARh	Returns the net Reactive Energy for Phase C
LAV9	Apparent Net Energy Total	-90071992 90071992	VAh	Returns the absolute sum of the Apparent Energy of all the valid phases.
LAV10	Apparent Net Energy Phase A	-90071992 90071992	VAh	Returns the net Apparent Energy for Phase A
LAV11	Apparent Net Energy Phase B	-90071992 90071992	VAh	Returns the net Apparent Energy for Phase B
LAV12	Apparent Net Energy Phase C	-90071992 90071992	VAh	Returns the net Apparent Energy for Phase C
LAV13	Real Import Energy Total	0 90071992	Wh	Returns the absolute sum of the Real Import Energy of all the valid phases

Reg.	Description	Min Max	Units	Functionality
LAV14	Real Import Energy Phase A	0 90071992	Wh	Returns the import Real Energy for Phase A
LAV15	Real Import Energy Phase B	0 90071992	Wh	Returns the import Real Energy for Phase B
LAV16	Real Import Energy Phase C	0 90071992	Wh	Returns the import Real Energy for Phase C
LAV17	Reactive Import Energy Total	0 90071992	VARh	Returns the absolute sum of the Reactive Import Energy of all the valid phases
LAV18	Reactive Import Energy Phase A	0 90071992	VARh	Returns the import Reactive Energy for Phase A
LAV19	Reactive Import Energy Phase B	0 90071992	VARh	Returns the import Reactive Energy for Phase B
LAV20	Reactive Import Energy Phase C	0 90071992	VARh	Returns the import Reactive Energy for Phase C
LAV21	Apparent Import Energy Total	0 90071992	VAh	Returns the absolute sum of the Apparent Import Energy of all the valid phases
LAV22	Apparent Import Energy Phase A	0 90071992	VAh	Returns the import Apparent Energy for Phase A
LAV23	Apparent Import Energy Phase B	0 90071992	VAh	Returns the import Apparent Energy for Phase B
LAV24	Apparent Import Energy Phase C	0 90071992	VAh	Returns the import Apparent Energy for Phase C
LAV25	Real Export Energy Total	0 90071992	Wh	Returns the absolute sum of the Real Export Energy of all the valid phases
LAV26	Real Export Energy Phase A	0 90071992	Wh	Returns the export Real Energy for Phase A
LAV27	Real Export Energy Phase B	0 90071992	Wh	Returns the export Real Energy for Phase B
LAV28	Real Export Energy Phase C	0 90071992	Wh	Returns the export Real Energy for Phase C
LAV29	Reactive Export Energy Total	0 90071992	VARh	Returns the absolute sum of the Reactive Export Energy of all the valid phases
LAV30	Reactive Export Energy Phase A	0 90071992	VARh	Returns the export Reactive Energy for Phase A

Reg.	Description	Min Max	Units	Functionality
LAV31	Reactive Export Energy Phase B	0 90071992	VARh	Returns the export Reactive Energy for Phase B
LAV32	Reactive Export Energy Phase C	0 90071992	VARh	Returns the export Reactive Energy for Phase C
LAV33	Apparent Export Energy Total	0 90071992	VAh	Returns the absolute sum of the Apparent Export Energy of all the valid phases
LAV34	Apparent Export Energy Phase A	0 90071992	VAh	Returns the export Apparent Energy for Phase A
LAV35	Apparent Export Energy Phase B	0 90071992	VAh	Returns the export Apparent Energy for Phase B
LAV36	Apparent Export Energy Phase C	0 90071992	VAh	Returns the export Apparent Energy for Phase C

Logging Registers

NOTE

- Logging is available on EMX and EMX-IP meters.
- Logging is not available on EMX-L meters.

Log Source 1 through Log source 12 sets the source for the logging. Set log sources using Modbus address of 1-190 to the desired source to log that point. Modbus addresses are used in setting log source when BACnet is used. If a log source register has multiple registers all registers need to be set. For example, if Real Net Energy total is desired to be logged all four registers need to be set.

To trigger a log event AV29 (Log – Trigger Mode) needs to be set to the desired trigger mode, by default it is set to be disabled. Logging can be triggered with the timer, set on AV30 (Log – Interval) in seconds from 15-3600. Triggering can be set over COMMS by writing a '1' to AV44 (Log – Create Entry), or Pulse In 1 or 2 can be set to trigger a log whenever a pulse is detected.

Analog Values

NOTE

- All Analog Value registers are **Readable/Writable**.

Logging Analog Value registers are used to configure all logging parameters.

Reg.	Description	Min Max	Default	Units	Store	Functionality
AV29	Log - Trigger Mode	0 3	0	Unitless	Yes	0: Timer 1: Comms 2: Pulse In 1 3: Pulse In 2
AV30	Log - Interval	15 3600	300	Seconds	Yes	Sets the interval in seconds that the logging will trigger will "Log – Trigger Mode" is set to timer.
AV31	Log - Logging Mode	0 1	0	Unitless	Yes	0: One Shot - once full, stop logging and throw alarm 1: Continuous - circle back to first entry and overwrite after final entry

Reg.	Description	Min Max	Default	Units	Store	Functionality
AV32	Log - Source 1	1 190	1	Unitless	Yes	Log - Source 1- Log - Source 12 will set which data point is being logged. 12 different sources can be set for logging. Use Modbus addresses for setting log source.
AV33	Log - Source 2	1 190	0	Unitless	Yes	
AV34	Log - Source 3	1 190	0	Unitless	Yes	
AV35	Log - Source 4	1 190	0	Unitless	Yes	
AV36	Log - Source 5	1 190	0	Unitless	Yes	
AV37	Log - Source 6	1 190	0	Unitless	Yes	
AV38	Log - Source 7	1 190	0	Unitless	Yes	
AV39	Log - Source 8	1 190	0	Unitless	Yes	
AV40	Log - Source 9	1 190	0	Unitless	Yes	
AV41	Log - Source 10	1 190	0	Unitless	Yes	
AV42	Log - Source 11	1 190	0	Unitless	Yes	
AV43	Log - Source 12	1 190	0	Unitless	Yes	
AV44	Log - Create Entry	0 1	0	Unitless	No	Create an entry at current index
AV45	Log - Get Entry at Index	0 4096	0	Unitless	No	Read a log entry from specific index in EEPROM

Analog Inputs

NOTE

- All Analog Input registers are **Read Only**.

Logging Analog Input registers return the outputs of the selected log sources.

Reg.	Description	Min Max	Units	Functionality
AI49	Log - Data 1	0 65535	Log source	Output of log sources for selected entry
AI50	Log - Data 2	0 65535	Log source	
AI51	Log - Data 3	0 65535	Log source	
AI52	Log - Data 4	0 65535	Log source	
AI53	Log - Data 5	0 65535	Log source	
AI54	Log - Data 6	0 65535	Log source	
AI55	Log - Data 7	0 65535	Log source	
AI56	Log - Data 8	0 65535	Log source	
AI57	Log - Data 9	0 65535	Log source	
AI58	Log - Data 10	0 65535	Log source	
AI59	Log - Data 11	0 65535	Log source	
AI60	Log - Data 12	0 65535	Log source	
AI61	Log - CRC	0 65535	Unitless	CRC for reported log entry, includes timestamp
AI62	Log - Year	0 6153	Unitless	Year portion of the timestamp for the selected log entry
AI63	Log - Month	0 5919	Unitless	Month portion of the timestamp for the selected log entry

Reg.	Description	Min Max	Units	Functionality
AI64	Log - Day	0 15163	Unitless	Day portion of the timestamp for the selected log entry
AI65	Log - Hours	0 6153	Unitless	Hours portion of the timestamp for the selected log entry
AI66	Log - Minutes	0 5919	Unitless	Minutes portion of the timestamp for the selected log entry
AI67	Log - Seconds	0 15163	Unitless	Seconds portion of the timestamp for the selected log entry
AI76	Log - Oldest Index	0 4096	Unitless	xxxx
AI77	Log - Count of Entries	0 4096	Unitless	xxxx
AI78	Log - Current Requested Entry	1 4096	Unitless	xxxx