

MODBUS POINT MAP - Rev B

DENO GATEWAY MODBUS POINT MAP

The DENO Gateway supports the SunSpec Common Model, Irradiance Model, and Back Of Module Temperature Model maps and a SunSpec Experimental Model for Energy Simulation. See www.sunspec.org for more information. A proprietary Denowatts point map (encoded in the SunSpec style) follows. The layout of these register blocks is as follows: The Logical Unit Number (LUN) identifies a specific DENO device attached to the gateway at a given location. The Gateway supports LUN numbers 1 through 5. Unused Irradiance registers report 0xFFFF (Unsupported uint16) and unused Temperature registers report 0x8000 (Unsupported int16) per the SunSpec accepted practice.

Summary Of Key Register Addresses by LUN # (Note: Each Deno on a given site is defined as a LUN, or Logical Unit Number. Clients will often treat each LUN as a subarray.)

LUN #1

- Plane Of Array Average Irradiance 40073
- Back Of Module Temperature 40124
- Denowatts 40136, Denowatts Fractional 40137
- Expected Energy 40138, Expected Energy Watts Fractional 40139
- Sun Hours 40140, Sun Hours Fractional 40141

LUN #2

- Plane Of Array Average Irradiance 40083
- Back Of Module Temperature 40126
- Denowatts 40142, Denowatts Fractional 40143
- Expected Energy 40144, Expected Energy Watts Fractional 40145
- Sun Hours 40146, Sun Hours Fractional 40147

LUN #3

- Plane Of Array Average Irradiance 40093
- Back Of Module Temperature 40128
- Denowatts 40148, Denowatts Fractional 40149
- Expected Energy 40150, Expected Energy Watts Fractional 40151
- Sun Hours 40152, Sun Hours Fractional 40153

LUN #4

- Plane Of Array Average Irradiance 40103
- Back Of Module Temperature 40130
- Denowatts 40154, Denowatts Fractional 40155
- Expected Energy 40156, Expected Energy Watts Fractional 40157
- Sun Hours 40158, Sun Hours Fractional 40159

LUN #5

- Plane Of Array Average Irradiance 40113
- Back Of Module Temperature 40132
- Denowatts 40160, Denowatts Fractional 40161
- Expected Energy 40162, Expected Energy Watts Fractional 40163
- Sun Hours 40164, Sun Hours Fractional 40165

Configuration Notes:

Irradiance is reported as the weighted irradiance value last reported by the DENO device. Weighted meaning some numerical combining of the 2 discrete photodiode outputs to produce a single average irradiance value. Irradiance values are reported as 16 bit unsigned numbers that may be divided by 10 to get W/m² reported with 0.1 W/m² resolution.

Temperature is reported as a 16-bit signed value. The value divided by 256 is degrees C reported with 0.00390625 degrees C resolution. Range is limited to +/- 127 degrees C.

Energy Simulation values and Sun Hours are reported as a 16-bit unsigned value and a second 16-bit unsigned fractional value. The fractional value divided by 65536 is the calculated fractional portion of the result (right of decimal point) reported with 0.0000152587890625 kW or kWh/m2 resolution.

Register Block	Start	End
SunSpec Common Model	40001	40069
SunSpec Irradiance Model	40070	40121
SunSpec Back Of Module Temperature Model	40122	40133
SunSpec Experimental, Denowatts Energy Sim	40134	40165
SunSpec Null Block	40166	40167

Start	End	#	R/W	Name	Type	Units	ScaleFactor	Contents	Description
0001	0002	2	R	C_SunSpec_ID	uint32	N/A	N/A	0x53756e53 ("SunS")	Well-known value. Uniquely identifies this as a SunSpec Modbus Map
0003	0003	1	R	C_SunSpec_DID	uint16	N/A	N/A	0x0001	Well-known value. Uniquely identifies this as a SunSpec Common Model block
0004	0004	1	R	C_SunSpec_Length	uint16	Registers	N/A	0x0041 (65)	Length of Common Model block
0005	0020	16	R	C_Manufacturer	String(32)	N/A	N/A	"Denowatts"	Well-known value
0021	0036	16	R	C_Model	String(32)	N/A	N/A	"DENO"	Manuf specific value
0037	0044	8	R	C_Options	String(16)	N/A	N/A	"0"	Manuf specific value
0045	0052	8	R	C_Version	String(16)	N/A	N/A	"1"	Manuf specific value
0053	0068	16	R	C_SerialNumber	String(32)	N/A	N/A	Serial #	Manuf specific value
0069	0069	1	R/W	C_DeviceAddress	uint16	N/A	N/A	50	Modbus Id
0070	0070	1	R	C_SunSpec_DID	uint16	N/A	N/A	0x012E	Irradiance Device
0071	0071	1	R	C_SunSpec_Length	uint16	N/A	N/A	0x0032	Device Model Block Size
0072	0072	1	R	E_Irradiance_Global_Horizontal	uint16	W/m2	-1	0xFFFF Unsupported	LUN-1 Global Horiz Irradiance1
0073	0073	1	R	E_Irradiance_Plane-of-Array	int16	W/m2	-1	Measured	LUN-1 Plane-of-Array Irradiance1
0074	0074	1	R	E_Irradiance_Diffuse	int16	W/m2	-1	0xFFFF Unsupported	LUN-1 Diffuse Irradiance1
0075	0075	1	R	E_Irradiance_Direct	int16	W/m2	-1	0xFFFF Unsupported	LUN-1 Direct Irradiance1
0076	0076	1	R	E_Irradiance_Other	int16	W/m2	-1	0xFFFF Unsupported	LUN-1 Other Irradiance1
0077	0077	1	R	E_Irradiance_Global_Horizontal	uint16	W/m2	-1	0xFFFF Unsupported	LUN-1 Global Horiz Irradiance2
0078	0078	1	R	E_Irradiance_Plane-of-Array	int16	W/m2	-1	Measured	LUN-1 Plane-of-Array Irradiance2

0079	0079	1	R	E_Irradiance_Diffuse	int16	W/m2	-1	0xFFFF Unsupported	LUN-1 Diffuse Irradiance2
0080	0080	1	R	E_Irradiance_Direct	int16	W/m2	-1	0xFFFF Unsupported	LUN-1 Direct Irradiance2
0081	0081	1	R	E_Irradiance_Other	int16	W/m2	-1	0xFFFF Unsupported	LUN-1 Other Irradiance2
0082	0082	1	R	E_Irradiance_Global_Horizontal	uint16	W/m2	-1	0xFFFF Unsupported	LUN-2 Global Horiz Irradiance1
0083	0083	1	R	E_Irradiance_Plane-of-Array	int16	W/m2	-1	Measured	LUN-2 Plane-of-Array Irradiance1
0084	0084	1	R	E_Irradiance_Diffuse	int16	W/m2	-1	0xFFFF Unsupported	LUN-2 Diffuse Irradiance1
0085	0085	1	R	E_Irradiance_Direct	int16	W/m2	-1	0xFFFF Unsupported	LUN-2 Direct Irradiance1
0086	0086	1	R	E_Irradiance_Other	int16	W/m2	-1	0xFFFF Unsupported	LUN-2 Other Irradiance1
0087	0087	1	R	E_Irradiance_Global_Horizontal	uint16	W/m2	-1	0xFFFF Unsupported	LUN-2 Global Horiz Irradiance2
0088	0088	1	R	E_Irradiance_Plane-of-Array	int16	W/m2	-1	Measured	LUN-2 Plane-of-Array Irradiance2
0089	0089	1	R	E_Irradiance_Diffuse	int16	W/m2	-1	0xFFFF Unsupported	LUN-2 Diffuse Irradiance2
0090	0090	1	R	E_Irradiance_Direct	int16	W/m2	-1	0xFFFF Unsupported	LUN-2 Direct Irradiance2
0091	0091	1	R	E_Irradiance_Other	int16	W/m2	-1	0xFFFF Unsupported	LUN-2 Other Irradiance2
0092	0092	1	R	E_Irradiance_Global_Horizontal	uint16	W/m2	-1	0xFFFF Unsupported	LUN-3 Global Horiz Irradiance1
0093	0093	1	R	E_Irradiance_Plane-of-Array	int16	W/m2	-1	Measured	LUN-3 Plane-of-Array Irradiance1
0094	0094	1	R	E_Irradiance_Diffuse	int16	W/m2	-1	0xFFFF Unsupported	LUN-3 Diffuse Irradiance1
0095	0095	1	R	E_Irradiance_Direct	int16	W/m2	-1	0xFFFF Unsupported	LUN-3 Direct Irradiance1
0096	0096	1	R	E_Irradiance_Other	int16	W/m2	-1	0xFFFF Unsupported	LUN-3 Other Irradiance1
0097	0097	1	R	E_Irradiance_Global_Horizontal	uint16	W/m2	-1	0xFFFF Unsupported	LUN-3 Global Horiz Irradiance2
0098	0098	1	R	E_Irradiance_Plane-of-Array	int16	W/m2	-1	Measured	LUN-3 Plane-of-Array Irradiance2
0099	0099	1	R	E_Irradiance_Diffuse	int16	W/m2	-1	0xFFFF Unsupported	LUN-3 Diffuse Irradiance2
0100	0100	1	R	E_Irradiance_Direct	int16	W/m2	-1	0xFFFF Unsupported	LUN-3 Direct Irradiance2
0101	0101	1	R	E_Irradiance_Other	int16	W/m2	-1	0xFFFF Unsupported	LUN-3 Other Irradiance2
0102	0102	1	R	E_Irradiance_Global_Horizontal	uint16	W/m2	-1	0xFFFF Unsupported	LUN-4 Global Horiz Irradiance1
0103	0103	1	R	E_Irradiance_Plane-of-Array	int16	W/m2	-1	Measured	LUN-4 Plane-of-Array Irradiance1

0104	0104	1	R	E_Irradiance_Diffuse	int16	W/m2	-1	0xFFFF Unsupported	LUN-4 Diffuse Irradiance1
0105	0105	1	R	E_Irradiance_Direct	int16	W/m2	-1	0xFFFF Unsupported	LUN-4 Direct Irradiance1
0106	0106	1	R	E_Irradiance_Other	int16	W/m2	-1	0xFFFF Unsupported	LUN-4 Other Irradiance1
0107	0107	1	R	E_Irradiance_Global_ Horizontal	uint16	W/m2	-1	0xFFFF Unsupported	LUN-4 Global Horiz Irradiance2
0108	0108	1	R	E_Irradiance_Plane- of-Array	int16	W/m2	-1	Measured	LUN-4 Plane-of- Array Irradiance2
0109	0109	1	R	E_Irradiance_Diffuse	int16	W/m2	-1	0xFFFF – Unused	LUN-4 Diffuse Irradiance2
0110	0110	1	R	E_Irradiance_Direct	int16	W/m2	-1	0xFFFF – Unused	LUN-4 Direct Irradiance2
0111	0111	1	R	E_Irradiance_Other	int16	W/m2	-1	0xFFFF – Unused	LUN-4 Other Irradiance2
0112	0112	1	R	E_Irradiance_Global_ Horizontal	uint16	W/m2	-1	0xFFFF Unsupported	LUN-5 Global Horiz Irradiance1
0113	0113	1	R	E_Irradiance_Plane- of-Array	int16	W/m2	-1	Measured	LUN-5 Plane-of- Array Irradiance1
0114	0114	1	R	E_Irradiance_Diffuse	int16	W/m2	-1	0xFFFF Unsupported	LUN-5 Diffuse Irradiance1
0115	0115	1	R	E_Irradiance_Direct	int16	W/m2	-1	0xFFFF Unsupported	LUN-5 Direct Irradiance1
0116	0116	1	R	E_Irradiance_Other	int16	W/m2	-1	0xFFFF Unsupported	LUN-5 Other Irradiance1
0117	0117	1	R	E_Irradiance_Global_ Horizontal	uint16	W/m2	-1	0xFFFF Unsupported	LUN-5 Global Horiz Irradiance2
0118	0118	1	R	E_Irradiance_Plane- of-Array	int16	W/m2	-1	Measured	LUN-5 Plane-of- Array Irradiance2
0119	0119	1	R	E_Irradiance_Diffuse	int16	W/m2	-1	0xFFFF Unsupported	LUN-5 Diffuse Irradiance2
0120	0120	1	R	E_Irradiance_Direct	int16	W/m2	-1	0xFFFF Unsupported	LUN-5 Direct Irradiance2
0121	0121	1	R	E_Irradiance_Other	int16	W/m2	-1	0xFFFF Unsupported	LUN-5 Other Irradiance2
0122	0122	1		C_SunSpec_DID	uint16	N/A	N/A	0x012F	Back Of Module Temperature
0123	0123	1	R	C_SunSpec_Length	unit16	N/A	N/A	0x000A	Device Model Block Size
0124	0124	1	R	E_Bom_Temp	Int16	°C	°C *256	Measured	LUN-1 BOM Temperature1
0125	0125	1	R	E_Bom_Temp	Int16	°C	°C *256	0x8000 Unsupported	LUN-1 BOM Temperature2
0126	0126	1	R	E_Bom_Temp	Int16	°C	°C *256	Measured	LUN-2 BOM Temperature1
0127	0127	1	R	E_Bom_Temp	Int16	°C	°C *256	0x8000 Unsupported	LUN-2 BOM Temperature2
0128	0128	1	R	E_Bom_Temp	Int16	°C	°C *256	Measured	LUN-3 BOM Temperature1

0129	0129	1	R	E_Bom_Temp	Int16	°C	°C *256	0x8000 Unsupported	LUN-3 BOM Temperature2
0130	0130	1	R	E_Bom_Temp	Int16	°C	°C *256	Measured	LUN-4 BOM Temperature1
0131	0131	1	R	E_Bom_Temp	Int16	°C	°C *256	0x8000 Unsupported	LUN-4 BOM Temperature2
0132	0132	1	R	E_Bom_Temp	Int16	°C	°C *256	Measured	LUN-5 BOM Temperature1
0133	0133	1	R	E_Bom_Temp	Int16	°C	°C *256	0x8000 Unsupported	LUN-5 BOM Temperature2
0134	0134	1	R	C_SunSpec_DID	uint16	N/A	N/A	0xFD84	Energy Simulation
0135	0135	1	R	C_SunSpec_Length	uint16	N/A	N/A	0x001E	Device Model Block Size
0136	0136	1	R	E_Denowatts	uint16	KW	1	Measured	LUN-1 Denowatts
0137	0137	1	R	E_Denowatts Fractional	uint16	KW	KW*256	Measured	LUN-1 Denowatts
0138	0138	1	R	E_Expected Energy	uint16	KW	1	Measured	LUN-1 Energywatts
0139	0139	1	R	E_Expected Energy Fractional	uint16	KW	KW*256	Measured	LUN-1 Energywatts
0140	0140	1	R	E_Sun_Hours	uint16	kWh/ m2	1	Measured	LUN-1 Sun Hours
0141	0141	1	R	E_Sun_Hours Fractional	uint16	kWh/ m2	kWh/m2*25 6	Measured	LUN-1 Sun Hours
0142	0142	1	R	E_Denowatts	uint16	KW	1	Measured	LUN-2 Denowatts
0143	0143	1	R	E_Denowatts Fractional	uint16	KW	KW*256	Measured	LUN-2 Denowatts
0144	0144	1	R	E_Expected Energy	uint16	KW	1	Measured	LUN-2 Energywatts
0145	0145	1	R	E_Expected Energy Fractional	uint16	KW	KW*256	Measured	LUN-2 Energywatts
0146	0146	1	R	E_Sun_Hours	uint16	kWh/ m2	1	Measured	LUN-2 Sun Hours
0147	0147	1	R	E_Sun_Hours Fractional	uint16	kWh/ m2	kWh/m2*25 6	Measured	LUN-2 Sun Hours
0148	0148	1	R	E_Denowatts	uint16	KW	1	Measured	LUN-3 Denowatts
0149	0149	1	R	E_Denowatts Fractional	uint16	KW	KW*256	Measured	LUN-3 Denowatts
0150	0150	1	R	E_Expected Energy	uint16	KW	1	Measured	LUN-3 Energywatts
0151	0151	1	R	E_Expected Energy Fractional	uint16	KW	KW*256	Measured	LUN-3 Energywatts
0152	0152	1	R	E_Sun_Hours	uint16	kWh/ m2	1	Measured	LUN-3 Sun Hours
0153	0153	1	R	E_Sun_Hours Fractional	uint16	kWh/ m2	kWh/m2*25 6	Measured	LUN-3 Sun Hours
0154	0154	1	R	E_Denowatts	uint16	KW	1	Measured	LUN-4 Denowatts
0155	0155	1	R	E_Denowatts Fractional	uint16	KW	KW*256	Measured	LUN-4 Denowatts
0156	0156	1	R	E_Expected Energy	uint16	KW	1	Measured	LUN-4 Energywatts

0157	0157	1	R	E_Expected Energy Fractional	uint16	KW	KW*256	Measured	LUN-4 Energywatts
0158	0158	1	R	E_Sun_Hours	uint16	kWh/m2	1	Measured	LUN-4 Sun Hours
0159	0159	1	R	E_Sun_Hours Fractional	uint16	kWh/m2	kWh/m2*256	Measured	LUN-4 Sun Hours
0160	0160	1	R	E_Denowatts	uint16	KW	1	Measured	LUN-5 Denowatts
0161	0161	1	R	E_Denowatts Fractional	uint16	KW	KW*256	Measured	LUN-5 Denowatts
0162	0162	1	R	E_Expected Energy	uint16	KW	1	Measured	LUN-5 Energywatts
0163	0163	1	R	E_Expected Energy Fractional	uint16	KW	KW*256	Measured	LUN-5 Energywatts
0164	0164	1	R	E_Sun_Hours	uint16	kWh/m2	1	Measured	LUN-5 Sun Hours
0165	0165	1	R	E_Sun_Hours Fractional	uint16	kWh/m2	kWh/m2*256	Measured	LUN-5 Sun Hours
0166	0166	1	R	C_SunSpec_DID	uint16	N/A	N/A	0xFFFF	End Model
0167	0167	1	R	C_SunSpec_Length	uint16	N/A	N/A	0x0000	End Of Map