MODBUS POINT MAP

F O R M A T					
Int	Float	R/W	NV	Model	Description
1	257/258	R	NV		Energy Consumption, kWh, Low-word integer
2	259/260	R	NV		Energy Consumption, kWh, High-word integer
					Both 257/258 and 259/260 have the same floating point value.
3	261/262	R			Real Power, kW
4	263/264	R			Reactive Power, kVAR
5	265/266	R			Apparant Power, kVA
6	267/268	R			Total Power Factor
7	269/270	R		-1	Not Applicable - reads 0xFFFF/NaN (int/float)
				-2	Avg Voltage, L-L, ave of 1
				-3	Avg Voltage, L-L, ave of 3
8	271/272	R		-1	Avg Voltage, L-N, ave of 1
		R		-2	Avg Voltage, L-N, ave of 2
		R		-3	Avg Voltage, L-N, ave of 3
9	273/274	R		-1	Avg Current, average of 1
		R		-2	Avg Current, average of 2
		R		-3	Avg Current, average of 3
10	275/276	R		-1	Real Power, phase A (same as Real Power, kW (3))
				-2/-3	Real Power, phase A
11	277/278	R		-1	Not Applicable – reads as 0xFFFF/NaN (int/float)
				-2/3	Real Power, phase B
12	279/280	R		-1/-2	Not Applicable – reads as 0xFFFF/NaN (int/float)
				-3	Real Power, phase C

13	281/282	R	-1	Power Factor, phase A (Same as Total PF (6))
			-2/-3	Power Factor, phase A
14	283/284	R	-1	Not Applicable – reads 0xFFFF/NaN (int/float)
			-2/-3	Power Factor, phase B
15	285/286	R	-1/-2	Not Applicable – reads 0xFFFF/NaN (int/float)
			-3	Power Factor, phase C
16	287/288	R	-1	Not Applicable – reads 0xFFFF/NaN (int/float)
			-2/-3	Voltage, phase A-B
17	289/290	R	-1/-2	Not Applicable – reads 0xFFFF/NaN (int/float)
			-3	Voltage, phase B-C
18	291/292	R	-1/-2	Not Applicable – reads 0xFFFF/NaN (int/float)
			-3	Voltage, phase A-C
19	293/294	R	-1	Voltage, phase A-N (Same as Avg. L-N (8))
			-2/-3	Voltage, phase A-N
20	295/296	R	-1	Not Applicable – reads 0xFFFF/NaN (int/float)
			-2/-3	Voltage, phase B-N
21	297/298	R	-1/-2	Not Applicable – reads 0xFFFF/NaN (int/float)
			-3	Voltage, phase C-N
22	299/300	R	-1	Current, phase A (Same as Avg. Current (9))
			-2/-3	Current, phase A
23	301/302	R	-1	Not Applicable – reads 0xFFFF/NaN (int/float)
			-2/-3	Current, phase B
24	303/304	R	-1/-2	Not Applicable – reads 0xFFFF/NaN (int/float)
			-3	Current, phase C

25	305/306	R		Present Demand Sub-Interval This is the currently accumulating Sub-Interval demand, which is constantly changing.
26	307/308	R		Present Demand (kW) This is the present demand, which is updated at the end of every Sub-Interval. This value is the average of the previous N sub intervals, where N is the number of sub intervals (register 37).
27	309/310	R	NV	Peak Demand The peak demand is the highest demand value (register 26) that has occurred. *Note: This value is also Displayed on LCD for MAX kW when the comms board is present.
28	311/312	R		Present KVAR Sub-Interval This is the currently accumulating Sub-Interval KVAR, which is constantly changing.
29	313/314	R		Present KVAR This is the present KVAR, which is updated at the end of every Sub-Interval. This value is the average of the previous N sub intervals, where N is the number of sub intervals (register 37).
30	315/316	R	NV	Peak KVAR The peak KVAR is the highest KVAR value (register 28) that has occurred.
31		R	NV	Count of KWH resets The number of times the KWH accumulator has been reset. This value can never be reset. It will roll-over from 65535 to zero.
32		R	NV	Count of Peak Demand Resets The number of times the peak demand (register 27) has been reset. This value can never be reset. It will roll-over from 65535 to zero.
33		R	NV	Count of Peak KVAR Resets The number of times the peak KVAR (register 30) has been reset. This value can never be reset. It will roll-over from 65535 to zero.

34	R		Count of elapsed Sub Intervals This counts the number of sub-intervals that have elapsed. Because the demand (register 28) is updated every sub-interval, this register may be read to determine if an identical value in register 28 is actually the same demand interval or if it is a new interval and the load has remained steady.
35	R		Number readings in present sub-interval This value indicates the number of readings that are represented by the present sub-interval (register 25). This register acts as an unsigned integer. See below for explaination of sub-interval reading count overflow. This register will increment every 200 ms (5 times per Second).
36	R/W	NV	Sub Interval Length Sets the length of a sub-interval. Value is the number of seconds * 5, eg 4500 is 15 minutes. For sync-to-comms, or sync-to-demand-reset-input (hardware signal), set this to zero.
37	R/W	NV	Number of Sub Intervals per Demand Interval Sets the number of sub-intervals that make a single demand interval. Legal values are 1 to 6. For block demand, set this to 1.
38	R	NV	System ID This register reads as 15024 for the Basic Meter and 15025 for the Enhanced Model to help identify the meter.
39	R	NV	CT Size This register reads as the CT size, 100, 300, etc.
40	R	NV	CT Number The number of CT’s that are connected, 1,2,or 3.
41	R/W		Command (bit mapped): bit 0 (mask 1) = Begin New Demand Sub-Interval bit 1 (mask 2) = Clear KWH accumulator bit 2 (mask 4) = Reset Peak Demand bit 3 (mask 8) = Reset Peak KVAR bits 4 to 15 should be written as zeros to avoid activating any additional commands that may be added in future revisions.

42	R/W	NV	Phase Loss, Latching Register (bit mapped): bit 0: phase A (unpredictable results on phase A) bit 1: phase B bit 2: phase C bits 3 to 15 should be written as zeros. This Latching reigister Should be cleared by user.
43	R	NV	Count of Phase Losses The number of times a phase loss has occurred on any phase. This is can never be reset and will roll-over from 65535 to zero.
44	R/W	NV	Date/Time Month 1-12(LSB) Day 1-31(MSB)
45	R/W	NV	Date/Time Year 0-199(LSB) Hour 0-23(MSB)
46	R/W	NV	Date/Time Minutes 0-59(LSB) Seconds 0-59(MSB)
47	R	NV	Phase Loss Timestamp, Month 1-12(LSB) Day 1-31(MSB)
48	R	NV	Phase Loss Timestamp, Year 0-199(LSB) Hour 0-23(MSB)
49	R	NV	Phase Loss Timestamp, Minutes 0-59(LSB) Seconds 0-59(MSB)
50	R	NV	Last Restart Timestamp, Month 1-12(LSB) Day 1-31(MSB)
51	R	NV	Last Restart Timestamp, Year 0-199(LSB) Hour 0-23(MSB)
52	R	NV	Last Restart Timestamp, Minutes 0-59(LSB) Seconds 0-59(MSB)
53	R	NV	Last KWH Reset Timestamp, Month 1-12(LSB) Day 1-31(MSB)
54	R	NV	Last KWH Reset Timestamp, Year 0-199(LSB) Hour 0-23(MSB)
55	R	NV	Last KWH Reset Timestamp, Minutes 0-59(LSB) Seconds 0-59(MSB)

R: R = Read-only, R/W = read from either format, write to integer format only
NV: Value is stored in non-volatile memory

Integer format registers represent the data as 16 bit integer values. Float format registers represent the same data, as 32-bit floating point values.

For measured data, the float format registers are recommended. The Integer format registers can be difficult to use for the measured data, as a multiplier must be used for each one to get the correct value. Most of the multipliers change depending on the CT Size. Reading the float format registers avoids the need to use multipliers.

Modbus Block Reads:

There is no maximum block size restriction, as with the 80xx-series power-meters, as the entire Modbus response is fully buffered. However, the total number of registers requested may not exceed 125, as the Modbus protocol only allows one byte in the Read Holding Registers (command 03) response to indicate the number of data bytes to send. 125 registers * 2 bytes per register + 5 bytes overhead = 255 bytes.

Demand Computation, Internal Algorithm:

The meter will compute average kw/kvar, by accumulating every kw/kvar reading and keeping a count of the number of kw/kvar readings accumulated. This will occur every 200 ms (5 Hz). The accumulated value, divided by the number of kw/kvar readings, will be the present sub-interval demand (kw/kvar), which may be read at registers 25 (KW) and 28 (KVAR).

A sub-interval may be terminated in three ways. If a write to the command register has bit #0 set, it will cause the present sub-interval to end. Second, if the Hardware signal (interval reset) is detected. Last, the present sub interval will also end automatically if the sub interval length (register 36) has been set to a non-zero value. If the count of the number of kw readings equals or exceeds the non-zero sub interval length, then the sub interval will be ended. While there are three ways to end a sub interval, it is expected that applications will use only one of them.

The maximum legal sub-interval length is 65535 readings, which corresponds to 3 hours, 38 minutes, 27.2 seconds. When the 65536th reading is taken, the sub-interval reading counter will overflow. This condition is detected and causes the sub-interval to end. The next sub-interval will begin on the next reading. In normal operation, it is expected that a sub interval should not last longer than 1 hour.

When a sub-interval ends, the average kw/kvar during that sub-interval (which is the accumulated kw/kvar readings divided by the number of readings) is added to a 6 value fifo that stores the 6 most recent sub-intervals. The kw/kvar accumulator and count of kw/kvar readings are cleared to zero, to begin a new sub interval. The count of sub intervals (register 34) is incremented. The present demand is recomputed by averaging the first N elements of the fifo, where N is the value in register 37. If the new present demand is higher than the stored peak demand, then the peak demand is updated to the new present demand.

Misc

Some registers list a Model suffix. These registers apply only to those model. Registers which are not avaliable for the particular Model will read 0xFFFF for integer points and NaN for floating point registers.

The kWH accumulator may be reset by writing to the command register with bit #1 set. This will clear the kWH accumulator to zero. Any writes to the kwh points will be ignored.

Floating Point Registers

All floating point values are compatible with the "32 bit IEEE Real" format in SMS-3000. All floating point variables are read-only, because they are generated on-the-fly. All R/W points must be written to their integer registers.