H8238/MCM MODBUS POINT MAP

FORMAT Int	Float	R/W	NV	Description
1	257/258	R/W	NV	Energy Consumption, kWh, Low-word integer
2	259/260	R/W	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		Apparent Power, kVA
6	267/268	R		Total Power Factor
7	269/270	R		Voltage, L-L, ave of 3 phases
8	271/272	R		Voltage, L-N, ave of 3 phases
9	273/274	R		Current, average of 3 phases
10	275/276	R		Frequency
				Frequency is measured from the phase A voltage input. Range is 40-70Hz: ***This register will read as 0xFFFF for integer and 0x7FC00000 for float if frequencies outside of this range or if sufficient voltage is not present on phase A for an accurate determination.***
11	277/278	R		Real Power, phase A
12	279/280	R		Real Power, phase B
13	281/282	R		Real Power, phase C
14	283/284	R		Power Factor, phase A
15	285/286	R		Power Factor, phase B
16	287/288	R		Power Factor, phase C
17	289/290	R		Voltage, phase A-B
18	291/292	R		Voltage, phase B-C
19	293/294	R		Voltage, phase A-C
20	295/296	R		Voltage, phase A-N
21	297/298	R		Voltage, phase B-N
22	299/300	R		Voltage, phase C-N
23	301/302	R		Current, phase A
24	303/304	R		Current, phase B
25	305/306	R		Current, phase C
26	307/308	R		Current, Neutral
				Only valid in the 6-meter configuration. The CT Scale (register #30) for the meter also defines the CT for used this measurement. ***For the 8-meter configuration, this parameter always reads as 0xFFFF for integer and 0x7FC00000 for float***
27	309/310	R/W		Average kW
28	311/312	R/W		Minimum kW
29	313/314	R/W		Maximum kW
30		R/W	NV	CT Scale

			This parameter sets the size of the external 5-Amp CTs used. Range is 1-5999. A setting of 10 indicates that 10A:5A CTs are used. A setting of 4000 indicates 4000A:5A CTs are used. For the 6-meter configuration, this parameter also includes the Neutral Current CT. Default = 100 (100A:5A).
31	R/W	NV	Over Voltage Alarm Threshold An Over Voltage Alarm occurs if the Average L-L voltage (reg #7) is greater than this threshold ***for at least 10 seconds***. Units are absolute voltage (using integer multiplier). Range 0-65535, Default = 65535.
32	R/W	NV	Under Voltage Alarm Threshold An Under Voltage Alarm occurs if the Average L-L voltage (reg #7) is less than this threshold at any time. Units are absolute voltage (using integer multiplier). Range 0-65535, Default = 0.
33	R/W	NV	Over Current Alarm Threshold An Over Current Alarm occurs if the Average Current (reg #9) is greater than this threshold at any time. Units are absolute current (using integer multiplier). Range 0-65535, Default = 65535.
34	R/W	NV	Under Current Alarm Threshold An Under Current Alarm occurs if the Average Current (reg #9) is less than this threshold at any time. Units are absolute current (using integer multiplier). Range 0-65535, Default = 0.
35	R/W	NV	Over KVA Alarm Threshold An Over KVA Alarm occurs if the total Apparent Power (reg #5) is greater than this threshold at any time. Units are absolute KVA (using integer multiplier). Range 0-65535, Default = 65535.

36 R/W NV Under KVA Alarm Threshold

An Under KVA Alarm occurs if the total Apparent Power (reg #5) is less than this threshold at any time. Units are absolute KVA (using integer multiplier).
Range 0-65535, Default = 0.

37 R/W NV Meter Alarm Status (Latching)

Holds the state of the meter alarm latches. These alarms are latching and must be cleared by the user. To reset any alarm, read the register and then write the register with the desired alarm bit cleared. Writing a 1 to any bit has no effect.

bit 0: Over Current
bit 1: Under Current
bit 2: Over KVA
bit 3: Under KVA
bit 4: Over Voltage
bit 5: Under Voltage
bit 6: Phase Loss A
bit 7: Phase Loss B
bit 8: Phase Loss C
bits 9-15: 0

38 R/W NV ***Phase Loss Threshold (0-100%, Default = 65535)***

Phase Loss Alarms exist independently for all 3 phases (A,B,C). This one setting is used to set the alarm threshold for all three phases. This setting is the percent deviation of a phase from the average of all 3 phases (reg #8). The decision logic is constructed so that normal power-ups do not trigger alarms.

A Phase Loss Alarm will occur only if the following conditions are true:

- The average line-line voltage (reg #8) is greater than 25V.
- The line-neutral voltage on a phase (reg #20, #21 or #22) is less than the percent deviation set by this threshold.

* This threshold is set between 0 and 100%.

Thus, Phase Loss Alarms cannot be generated when all 3 phases are off.

Registers 39-42 expect the data-bytes in ASCII character format (i.e. 0x57 = 'W'.). Allowed Characters are 21h through 7Dh, excluding 5Ch. The high-order byte is the high-order character (i.e. 0x4D54 = 'MT'):

39	R/W	NV	Meter Name: 1st 2 characters (Default = 'MT')
40	R/W	NV	Meter Name: 2nd 2 characters (Default = 'Rx', where x is the meter #(0,1,2...7))
41	R/W-G	NV	Board Name: 1st 2 characters (Default = 'BR')
42	R/W-G	NV	Board Name: 2nd 2 characters (Default = 'D1')
43	R-G	NV	Firmware Revision – Reset System
44	R-G	NV	Firmware Revision – Operating System

The Serial Number is the time of manufacture expressed as the number of seconds past midnight 1/1/1970 in an unsigned-long format:

45	R-G	NV	Serial Number MSW
46	R-G	NV	Serial Number LSW

47 R-G Error Register

This register reports internal errors detected by the microcontroller. The ALIVE LED will be steadily lit (as opposed to blinking) if any errors are detected.

bit 0: NV Ram error
bits 1-15: Reserved for future use.

48 R-G NV Device ID. Always reads as 15027 for 8-meter configuration. 15029 for 6-meter.

49 R-G NV Meter Alarm Status (Non-Latching)

Holds the instantaneous state of the meter alarms. The bits in this register will only be set while the alarm condition exists. These alarms cannot be reset by the user. ***The Over-Voltage alarm will only be set when its time-delay condition is satisfied (see register #31).***

bit 0: Over Current
bit 1: Under Current
bit 2: Over KVA
bit 3: Under KVA
bit 4: Over Voltage
bit 5: Under Voltage
bit 6: Phase Loss A
bit 7: Phase Loss B
bit 8: Phase Loss C
bits 9-15: 0

Registers 50-67 are Set and Reset Counters for alarms. ***A Set Counter is incremented each time the Non-Latching Alarm transitions from a no-alarm to an alarm state. A Reset Counter is incremented each time the Non-Latching Alarm transitions from an alarm to a n0-alarm state.*** These registers cannot be cleared. They will overflow from 65535 to 0 and continue counting.

50	R	NV	Over Voltage Set Counter
51	R	NV	Over Voltage Reset Counter
52	R	NV	Under Voltage Set Counter
53	R	NV	Under Voltage Reset Counter
54	R	NV	Phase Loss A Set Counter
55	R	NV	Phase Loss A Reset Counter
56	R	NV	Phase Loss B Set Counter
57	R	NV	Phase Loss B Reset Counter
58	R	NV	Phase Loss C Set Counter
59	R	NV	Phase Loss C Reset Counter
60	R	NV	Over Current Set Counter
61	R	NV	Over Current Reset Counter
62	R	NV	Under Current Set Counter
63	R	NV	Under Current Reset Counter
64	R	NV	Over KVA Set Counter
65	R	NV	Over KVA Reset Counter
66	R	NV	Under KVA Set Counter
67	R	NV	Under KVA Reset Counter

68	R-G	NV	Modbus Address, as configured via Dipswitches (1-247)
69	R-G	NV	Reserved
70	R-G	NV	Reserved (always reads as 0)
71	R-G	NV	Baudrate, as configured via Dipswitches (2400, 4800, 9600, 19200)
72	R-G	NV	Reserved

73 R/W NV ***Meter Enable Register.***

This register allows the user to enable or disable selected meters on the board. A disabled meter will not respond to any Modbus queries. A 1 indicates an enabled meter: a 0 indicates a disabled meter. This registers may only be written to meter #1. When read from meters #2-8, the high bit (bit 15) will always be set as a flag that the register may not be written to that meter. When in 6-meter mode, bit 6 and bit 7 may not be set and will always read as 0.

bit 0: Meter #1 (Always reads as 1 – Cannot be reset)
bit 1: Meter #2
bit 2: Meter #3
bit 3: Meter #4
bit 4: Meter #5
bit 5: Meter #6
bit 6: Meter #7
bit 7: Meter #8
bits 8-14: 0
bits 15: 0 if read from Meter #1,
1 if read from Meters #2-8

74 R/W NV ***Critical Alarm Register.***

This register allows the user to indicate which of the meter's alarms are critical and non-critical. The product takes no action on the contents of this register: it is provided for monitoring systems' use. A 1 indicates a critical alarm, a 0 indicates a non-critical alarm.

bit 0: Over Current
bit 1: Under Current
bit 2: Over KVA
bit 3: Under KVA
bit 4: Over Voltage
bit 5: Under Voltage
bit 6: Phase Loss A
bit 7: Phase Loss B
bit 8: Phase Loss C
bits 9-15: 0

LEGEND

R/W: R = Read-only
R/W = Read from either format, Write to integer format only
-G = Read or write to any meter will report/set this value for all meters

NV: Value is stored in non-volatile memory

MODBUS DETAILS

Addressing

The MCM contains either 6 or 8 meters with a single Modbus connection. Each meter is independently accessed via Modbus at a separate address. Other devices on the network must not use any of the ModBus addresses in the range used by the MCM.

The ADDRESS DIPswitch sets the **base address** of the board. This setting is in binary increments of 8, beginning at 1:

ADDRESS DIPSWITCH	BASE ADDRESS	METER ADDRESSES	
87654321		8-meter conf.	6-meter conf.
00000000	1	1-8	1-6
00000001	9	9-16	9-14
00000010	17	17-24	17-22
.			
.			
00000010	225	225-232	225-230
00011101	233	233-240	233-238
00011110 or higher	off-line	off-line	off-line

Supported Commands

Read Holding Register (03h)

Preset Single Register (06h)

Report Slave ID (11h)

Integer vs. Floating Point

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

For measured data, the float format registers are recommended, since they do not require the use of a multiplier. 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. Many of the multipliers change depending on the CT Scale. Reading the float format registers avoids the need to use multipliers. **SEE THE INTEGER MULTIPLIER TABLE BELOW**

All registers above 29 are available only as integers.

Setting a Threshold requires writing an integer value to the register. Just as reading an integer register for measured data requires the use of a multiplier, writing an integer register requires the identical divisor.

For example, an integer voltage reading of 24000 multiplied by the 0.01 multiplier results in 240.00V. To set a threshold of 240.00V, you must write 240.00V / .01 = 24000.

All floating point variables are read-only. ***All R/W points must be written to their integer registers.***

Resetting KWH

The kWH accumulator may be reset to 0 by writing ANY value to EITHER of its two integer registers

Resetting Min/Max/Avg kW

Writing ANY value to any of the Average KW, Minimum KW or Maximum kW integer registers resets all three of these values to the current KW value.

Changing the CT Scale

Writing the CT Scale register will result in a resetting of the measured parameters to zero, as most of these values are CT-scale dependant. This is the same as powering up the device.

Non-volatile parameters, however, will NOT be changed if the CT Scale is changed. This is done to preserve the integrity of the NV parameters in the event of an accidental change of CT Scale. The user, however, should reset the NV parameters to new values based on the new CT Scale: The KWH register should be reset, the alarm thresholds should be rewritten with proper values and, finally, the alarm registers should be cleared.

INTEGER MULTIPLIER TABLE

		CT SCALE			
MB Point	**PARAMETER**	**1-5A**	**6-59A**	**60-599A**	**600-5999A**
1	kWH, low-word	0.0001	0.001	0.01	0.1
2	kWH, high-word	6.5536	65.536	655.36	6553.6
3	kW	0.0001	0.001	0.01	0.1
4	kVAR	0.0001	0.001	0.01	0.1
5	kVA	0.0001	0.001	0.01	0.1
6	PF	0.0001	0.0001	0.0001	0.0001
7	Voltage, L-L	0.01	0.01	0.01	0.01
8	Voltage, L-N	0.01	0.01	0.01	0.01
9	Current	0.0001	0.001	0.01	0.1
10	Frequency	0.01	0.01	0.01	0.01
11	kW, phase A	0.0001	0.001	0.01	0.1
12	kW, phase B	0.0001	0.001	0.01	0.1
13	kW, phase C	0.0001	0.001	0.01	0.1
14	PF, phase A	0.0001	0.0001	0.0001	0.0001
15	PF, phase B	0.0001	0.0001	0.0001	0.0001
16	PF, phase C	0.0001	0.0001	0.0001	0.0001
17	Voltage, phase A-B	0.01	0.01	0.01	0.01
18	Voltage, phase B-C	0.01	0.01	0.01	0.01
19	Voltage, phase A-C	0.01	0.01	0.01	0.01
20	Voltage, phase A-N	0.01	0.01	0.01	0.01
21	Voltage, phase B-N	0.01	0.01	0.01	0.01
22	Voltage, phase C-N	0.01	0.01	0.01	0.01
23	Current, phase A	0.0001	0.001	0.01	0.1
24	Current, phase B	0.0001	0.001	0.01	0.1
25	Current, phase C	0.0001	0.001	0.01	0.1
26	Average kW	0.0001	0.001	0.01	0.1
27	Minimum kW	0.0001	0.001	0.01	0.1
28	Maximum kW	0.0001	0.001	0.01	0.1
29	CT Scale	1	1	1	1
30	Over Voltage Thres.	0.01	0.01	0.01	0.01
31	Under Voltage Thres.	0.01	0.01	0.01	0.01
32	Over Current Thres.	0.0001	0.001	0.01	0.1
33	Under Current Thres.	0.0001	0.001	0.01	0.1
34	Over KVA Thres.	0.0001	0.001	0.01	0.1
35	Under KVA Thres.	0.0001	0.001	0.01	0.1