Appendix B

Modbus Memory Map

Date and Time Registers

The current time of the unit available in the Modbus registers below for the BMS to use Modbus data from these registers is transmitted as shown below in Table 1 (available through function codes 03h and 10h).

Table 1 (Modbus Registers-Time of Day)

Register	Data Type	Description
1411	int16	Month (1-12)
1412	int16	Day (1-31)
1413	int16	Year (1970-2030)
1414	int16	Hours (0-23)
1415	int16	Minutes (0-59)
1416	int16	Seconds (0-59)
1417	int16	Milliseconds (0-999)

System Status Registers

The current status of the unit available in the Modbus registers are below. Modbus data from these registers is transmitted as shown below in Table 2 (available through function codes 03h).

Table 2 (Modbus Registers-System Status)

Register	Data Type	Description	
1001	int16	Summary Alarm	Bit 0: (Set = Summary Alarm)
			Bit 2: (Set = Unacknowledged
1002	int16	Outputs at UIB Port	
1003	int16	Input on UIB Port	
1004	int16	Board Temperature	
1005	int16	Transformer 190degree status	
1006	int16	Transformer 220degree status	

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PDM Monitoring Registers

This Map includes all metering, alarm, and warning registers for the PDM system. All the registers have been defined as type int16.

Table 3 Modbus Registers (PDM Monitoring)

	Function Code	Parameter Name	Register Address	Scale	Notes
Monitoring Registers	**Holding Registers**				
		Output Voltage LL (A-B)	1	1	NA
		Output Voltage LL (B-C)	2	1	NA
		Output Voltage LL (C-A)	3	1	NA
		Output Voltage Phase A	4	10	
		Output Voltage Phase B	5	10	
		Output Voltage Phase C	6	10	
		Output Current Phase A	8	10	
		Output Current Phase B	9	10	
		Output Current Phase C	10	10	
		Ground Current	11	10	
		Neutral Current	12	10	
		Input Voltage LL (A-B)	13	10	
		Input Voltage LL (B-C)	14	10	
		Input Voltage LL (C-A)	15	10	
		Phase Sequence	16	1	ABC/BCA
		Freqency	17	10	
		Total KVA	18	10	
		Phase A KVA	19	10	
		Phase B KVA	20	10	
		Phase C KVA	21	10	
		Load Phase A	22	10	
		Load Phase B	23	10	
		Load Phase C	24	10	
		Total KW	25	10	

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	Function Code	Parameter Name	Register Address	Scale	Notes
		Phase A KW	26	10	
		Phase B KW	27	10	
		Phase C KW	28	10	
		Phase A PF	29	100	
		Phase B PF	30	10	
		Phase C PF	31	10	
		Total kWh	32	1	
		Phase A kWh	33	10	
		Phase B kWh	34	10	
		Phase C kWh	35	10	
		Total kVAh	36	10	
		Phase A kVAh	37	10	
		Phase B kVAh	38	10	
		Phase C kVAh	39	10	
		Peak Demand KW	40	1	
		Phase A Voltage THD	41	10	
		Phase B Voltage THD	42	10	
		Phase C Voltage THD	43	10	
		Phase A Crest Factor	44	10	
		Phase B Crest Factor	45	10	
		Phase C Crest Factor	46	10	
		Phase A Current THD	47	10	
		Phase B Current THD	48	10	
		Phase C Current THD	49	10	
		Alarm Register 1	50	1	See Alarm Registers Table
		Alarm Register 2	51	1	
		Alarm Register 3	52	1	
		Alarm Register 4	53	1	
		Phase A Voltage Fundamental Voltage	60	100	
		Phase A Voltage First Harmonic Component	61	100	

	Function Code	Parameter Name	Register Address	Scale	Notes
		Phase A Voltage Third Harmonic Component	62	100	
		Phase A Voltage Fifth Harmonic Component	63	100	
		Phase A Voltage Seventh Harmonic Component	64	100	
		Phase A Voltage Ninth Harmonic Component	65	100	
		Phase B Voltage Fundamental Voltage	70	100	
		Phase B Voltage First Harmonic Component	71	100	
		PhaseB Voltage Third Harmonic Component	72	100	
		Phase B Voltage Fifth Harmonic Component	73	100	
		Phase B Voltage Seventh Harmonic Component	74	100	
		Phase B Voltage Ninth Harmonic Component	75	100	
		Phase C Voltage Fundamental Voltage	80	100	
		Phase C Voltage First Harmonic Component	81	100	
		Phase C Voltage Third Harmonic Component	82	100	
		Phase C Voltage Fifth Harmonic Component	83	100	
		Phase C Voltage Seventh Harmonic Component	84	100	

	Function Code	Parameter Name	Register Address	Scale	Notes
		Phase C Voltage Ninth Harmonic Component	85	100	
		Phase A Current Fundamental Voltage	90	100	
		Phase A Current First Harmonic Component	91	100	
		Phase A Current Third Harmonic Component	92	100	
		Phase A Current Fifth Harmonic Component	93	100	
		Phase A Current Seventh Harmonic Component	94	100	
		Phase A Current Ninth Harmonic Component	95	100	
		Phase B Current Fundamental Voltage	100	100	
		Phase B Current First Harmonic Component	101	100	
		PhaseB Current Third Harmonic Component	102	100	
		Phase B Current Fifth Harmonic Component	103	100	
		Phase B Current Seventh Harmonic Component	104	100	
		Phase B Current Ninth Harmonic Component	105	100	
		Phase C Current Fundamental Voltage	110	100	
		Phase C Current First Harmonic Component	111	100	

	Function Code	Parameter Name	Register Address	Scale	Notes
		Phase C Current Third Harmonic Component	112	100	
		Phase C Current Fifth Harmonic Component	113	100	
		Phase C Current Seventh Harmonic Component	114	100	
		Phase C Current Ninth Harmonic Component	115	100	
Configuration Registers	Holding Registers/ Preset Single/ Preset Multiple	Uart Baud Rate	204	1	
		Maximum Power Demand Period	205	1	
		Input Voltage Rating	206	1	
		Output Volotage Rating	207	1	
		Current Rating	208	1	
		Frequency Rating	209	1	
		Line CT Type	210	1	See CT Types Table
		Neutral CT Type	211	1	
		Output Over Voltage Alarm Threshold	212	1	
		Output Over Voltage Warning Threshold	213	1	
		Output Under Voltage Alarm Threshold	214	1	
		Output Under Voltage Warning Threshold	215	1	
		Over Current Alarm Threshold	216	1	
		Over Current Warning Threshold	217	1	
		Input Over Voltage Alarm Threshold	218	1	
		Input Over Voltage Warning Threshold	219	1	
		Input Under Voltage Alarm Threshold	220	1	
		Input Under Voltage Warning Threshold	221	1	

	Function Code	Parameter Name	Register Address	Scale	Notes
		Neutral Current Threshold	222	1	
		Ground Current Threshold	223	1	
Reset	Force Single Coil Register	Reset kWh/kVAh/Demand	2		0 Clears

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Alarm Registers

Alarm Registers		
Alarm Register 1		
	Bit 0	Phase AB Over Voltage Alarm
	Bit 1	Phase AB Under Voltage Alarm
	Bit 2	Phase BC Over Voltage Alarm
	Bit 3	Phase BC Under Voltage Alarm
	Bit 4	Phase CA Over Voltage Alarm
	Bit 5	Phase CA Under Voltage Alarm
	Bit 6	Phase A Over Voltage Alarm
	Bit 7	Phase A Under Voltage Alarm
	Bit 8	Phase B Over Voltage Alarm
	Bit 9	Phase B Under Voltage Alarm
	Bit 10	Phase C Over Voltage Alarm
	Bit 11	Phase C Under Voltage Alarm
	Bit 12	Rsvd
	Bit 13	Phase A Over Current Alarm
	Bit 14	Phase B Over Current Alarm
	Bit 15	Phase C Over Current Alarm
Alarm Register 2		
	Bit 0	Phase AB Input Over Voltage Alarm
	Bit 1	Phase AB Input Under Voltage Alarm

Alarm Registers		
	Bit 2	Phase BC Input Over Voltage Alarm
	Bit 3	Phase BC Input Under Voltage Alarm
	Bit 4	Phase CA Input Over Voltage Alarm
	Bit 5	Phase CA Input Under Voltage Alarm
	Bit 6	Neutral Over Current Alarm
	Bit 7	Ground Over Current Alarm
	Bit 8	Rsvd
	Bit 9	Over Frequency Alarm
	Bit 10	Under Frequency Alarm
	Bit 11	Phase Loss Alarm
Alarm Register 3		
	Bit 0	Phase AB Over Voltage Warning
	Bit 1	Phase AB Under Voltage Warning
	Bit 2	Phase BC Over Voltage Warning
	Bit 3	Phase BC Under Voltage Warning
	Bit 4	Phase CA Over Voltage Warning
	Bit 5	Phase CA Under Voltage Warning
	Bit 6	Phase A Over Voltage Warning
	Bit 7	Phase A Under Voltage Warning
	Bit 8	Phase B Over Voltage Warning
	Bit 9	Phase B Under Voltage Warning
	Bit 10	Phase C Over Voltage Warning
	Bit 11	Phase C Under Voltage Warning
	Bit 12	Rsvd
	Bit 13	Phase A Over Current Warning

Alarm Registers		
	Bit 14	Phase B Over Current Warning
	Bit 15	Phase C Over Current Warning
Alarm Register 4		
	Bit 0	Phase AB Input Over Voltage Warning
	Bit 1	Phase AB Input Under Voltage Warning
	Bit 2	Phase BC Input Over Voltage Warning
	Bit 3	Phase BC Input Under Voltage Warning
	Bit 4	Phase CA Input Over Voltage Warning
	Bit 5	Phase CA Input Under Voltage Warning