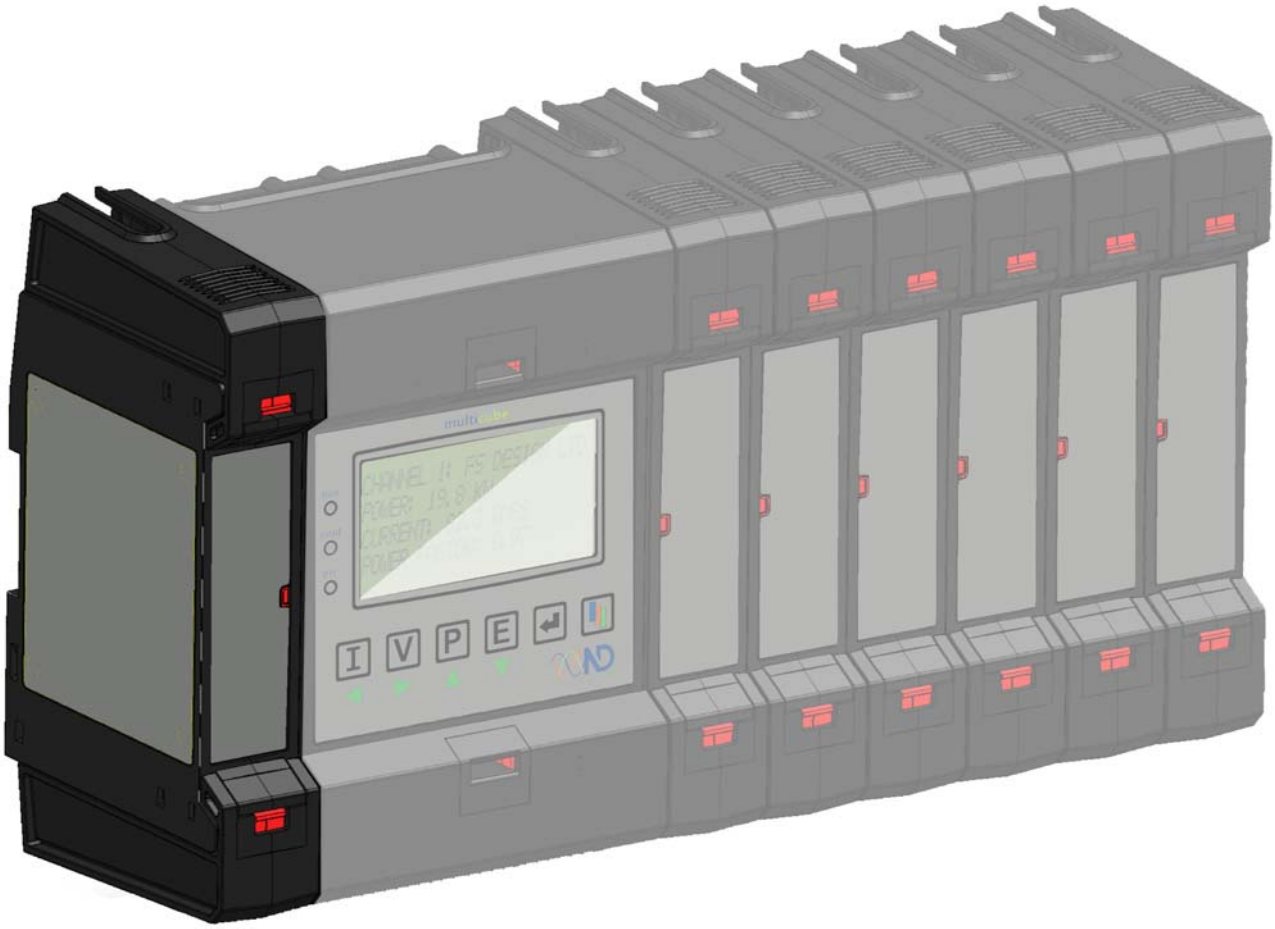
multicube

Modular Metering System
Modbus Communications Manual



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1 Description

The **multicube** modular electricity metering System simultaneously monitors up to 20 three-phase loads or up to 60 single-phase loads (or a combination of both load types). The system integrates load measurement I/O functions logging and communications in a single, flexible unit which can be tailored to suit a variety of energy management installations.

A ***multicube*** system is built up from a combination of the following modular components:

- **1 Master Display Unit**
- **1-10 Option Modules**
  - **Sub-Metering Modules (e.g. SM352*)**
  - **I/O Modules (eg Pulse Output Module(s) PM12)**
- **1 Communications Module (e.g. Modbus RS485)**
- *** At least 1 sub metering module must be fitted.**

1.1 Master Display Unit

The Master Display Unit provides a user interface and local display of metered parameters on a graphic LCD and can optionally log up to 200 days of energy readings from the Sub-Metering Modules.

The Master Display Unit also acts as a power supply and voltage measurement input for all the Sub-Metering Modules, which may be attached to it. This single voltage input point makes wiring much simpler and safer by removing the need for distributed voltage connections.

1.2 Dual Sub-Metering Module – SM352

The Electricity Metering Module ***SM352*** contains two complete 3-phase electricity meters, each of which may be optionally configured to monitor 3 single-phase loads.

Each electricity meter accurately measures a wide range of power and energy parameters using a range of current input devices selected to suit loads with nominal inputs from 5 to 800 Amps. These specially designed transducers each have a nominal output of 0.33V, are safety-isolated and internally protected against high open-circuit voltages at the output.

Split core current input devices can be fitted to existing power cables where it is inconvenient to remove one end of the cable for connection. Miniature ring type devices are also available for lower currents (up to 60A) providing a lower cost solution, with improved accuracy, where it is possible to slide these over one end of a power cable. Dual Sub-Metering Modules are configured using the Master Display Unit LCD/keypad interface or via the external communications network.

1.3 Communications Module

The Communications Module provides a connection point to external systems such as building energy management, billing data collection, SCADA etc. A specific Communications Module may be selected, such as the Modbus RTU - RS485 Module (RTU485), to suit a range of external systems.

The Communications Module provides external access to:

- **Master Display Unit Configuration**
- **Master Display Unit Logged Data (Optional)**
- **Sub-Metering Module Instantaneous Meter Readings and Energy Registers**
- **Sub-Metering Module Configuration**
- **Additional Module Data and Configuration**

2 Safety

This instruction manual gives details of safe installation and operation of the **multicube** electricity metering system. Safety may be impaired if the instructions are not followed or the system is used in a manner not specified by the manufacturer. Labels give details of equipment ratings for safe operation. Take time to examine all labels before commencing installation. Safety symbols on the meter have specific meanings.

WARNING

Contains no user serviceable parts. Field wiring and commissioning should only be carried out by qualified personnel in compliance with applicable national regulations.

This product has been tested to the requirements of EN61010-1, 2nd Edition - including Amendment 1.

2.1 Maintenance

The equipment should be maintained in good working order. Damaged equipment must be returned to the manufacturer (or his authorised agent) for repair. The meter may be cleaned by wiping lightly with a soft cloth. No solvents or cleaning agents should be used. All inputs and supplies must be isolated before cleaning any part of the equipment.

3 Protocol

3.1 Modbus ID

Each **multicube** contains a single "***Main Display Unit***" which has a graphic display and keypad, and up to 10 ***SM352*** metering modules each of which is a dual power meter containing ***2 Slave Meters***.

The user assigns the Modbus ID of the ***Main Display Unit*** in the programming menu (ref. **multicube** Modular metering System Operating and Installation manual). The ***Main Display Unit*** automatically detects its ***Slave Modules*** and assigns consecutive Modbus IDs for each starting at the Main ID +1.

When assigning Modbus IDs for multiple **multicube** systems, on a single Modbus network, the user must leave sufficient addresses between each ***Main Display Unit*** ID to allow for the ***Slave Modules***.

Each **multicube** system requires up to 21 Modbus IDs (1 for ***the Master Display Unit*** and up to 20 for the metering slaves)

Example: Setting Up 3 **multicube** systems each fitted with 6 ***SM352***s (12 Slave Meters).

	Display Unit ID (Set by User)	***Slave Modbus IDs Assigned by each EDM36***	
First **multicube**	**1**	**SM352 #1**	**2 – 3**
		SM352 #2	**4 – 5**
		SM352 #3	**6 – 7**
		SM352 #4	**8 - 9**
		SM352 #5	**10 – 11**
		SM352 #6	**12 – 13**
Second **multicube**	**14**	**SM352 #1**	**15 – 16**
		SM352 #2	**17 – 18**
		SM352 #3	**19 – 20**
		SM352 #4	**21 – 22**
		SM352 #5	**23 – 24**
		SM352 #6	**25 -26**
Third **multicube**	**27**	**SM352 #1**	**28 – 29**
		SM352 #2	**30 - 31**
		SM352 #3	**32 -33**
		SM352 #4	**34 - 35**
		SM352 #5	**36 – 37**
		SM352 #6	**38 - 39**

Note: The first ID available in a Modbus network is 1 as zero is reserved for broadcast commands.

3.2 Modbus Commands

The **multicube** supports the following standard Modbus commands:

Command	Function	Broadcast
03	Read Multiple Holding Registers	No
04	Read Multiple Input Registers	No
06	Preset a Single Register	Yes
08 (SF=00)	Sub Function 00 only (Loop Back)	No
16	Preset Multiple Registers	Yes

3.3 Exception Responses

If the **multicube** receives a Modbus command, with no errors and a valid address, it will attempt to handle the query and provide an appropriate response. If the meter cannot handle the query a standard Modbus exception response is sent (except broadcast queries). An exception response is characterised by its function byte which has 80H added to that sent in the query. The following exceptions codes are supported:

Code	Function
1	Preset data is out of range for parameter
2	Function cannot access requested register address

3.4 Data Tables

Data is stored in the **multicube** Master Display Unit in conveniently numbered data tables. Each Table is positioned at a data address, which is a multiple of 256 and so the ***Table Number*** forms the upper byte of the data address in the command packet. An entire table may be read with a single Modbus ***Command 3*** (Holding Registers). For compatibility with the Modbus standard each register contains a single data ***Word*** (16 bits).

Data in the multicube is stored as:

Unsigned Integer (U-INT)
16-bit data in the range 0 to 65,535. This is used for parameters such as CT Primary as this can never be negative.

Signed Integer (S-INT)
16-bit data in the range –32,767 to +32,767. This is used for parameters such as instantaneous kW, which may have a negative value indicating export power.

Long Integer (LONG)
32-bit data in the range 0 to 4,294,967,295. This is used for parameters such as kWh, which may have large values. Each LONG requires two consecutive Modbus data words. Standard software often handles long integer reads, however, a LONG may be calculated from the individual data words as:

LONG = (65536 x High Word) + Low Word

3.5 Scaling Modbus Values

3.5.1 Scaling Energy Values

All energy values are stored in Modbus tables as Long Integers in the range 0-99,999,999. This number represents the digits on the LCD with no decimal point or legend. For example if the LCD shows 1234567.8 kWh then the Modbus register for kWh will hold 12345678.

A single scaling factor ***"eScale"*** is used to scale all energy values and is available at several Modbus register locations for convenience.

To convert the long integer to a valid energy value scale as follows:

Long Integer	eScale	Factor	kWh
12345678	3	0.001	12345.678
12345678	4	0.01	123456.78
12345678	5	0.1	1234567.8
12345678	6	1	12345678
12345678	7	10	123456780

Examples:

Modbus register for System kWh contains 12345678 and eScale=5:

This represents 12345678 x 0.1 = 1234567.8 kWh

Modbus register for System kvarh contains 32149 and eScale=4:

This represents 32149 x 0.01 = 321.49 kvarh

3.5.2 Scaling Instantaneous Values

Instantaneous values are stored in Modbus tables as 16 bit Integers representing the numeric value shown on the LCD with no decimal point or legend. Different scaling factors are used to convert the integer as:

Parameter	Scaling Factor
Amps	Ki
Volts (Phase)	KVp
Volts (Line)	KVl
Power	Kp

The method for converting the Modbus data to real world parameters is the same for all the Parameter Types and scaling factors as follows:

Integer	Scaling Ki, KVp, KVl or Kp	Factor	Value Amps, Volts, kW kvar etc
1234	1	0.01	12.34
1234	2	0.1	123.4
1234	3	1	1234
1234	4	10	12340
1234	5	100	123400
1234	6	1,000	1234000
1234	7	10,000	12340000

Examples:

Modbus register for Phase 1 Volts contains 2300 and kVp=2:

This represents V1= 2300 x 0.1 = 230.0V

Modbus register for Phase 1 Amps contains 6000 and ki=1:

This represents I1= 6000 x 0.01 = 60.00A

4 Modbus Data Tables (Main Unit)

The ***Main Display Unit*** acts as a data concentrator for each of the ***Slave Modules*** connected to it. Communication with the Main Unit allows a summary of the data from all the slaves to be accessed with a single read.

4.1 Main Display Unit Table 1
3-Phase SM352 Energy Registers

Data Address	*Modbus Register*	*Slave*	*Data*	*Access*
256	40257	Slave 1	System kWh High Word	Read/Write
257	40258		System kWh Low Word	
258	40259		System kvarh High Word	Read/Write
259	40260		System kvarh Low Word	
260	40261	Slave 2	System kWh High Word	Read/Write
261	40262		System kWh Low Word	
262	40263		System kvarh High Word	Read/Write
263	40264		System kvarh Low Word	
264	40265	Slave 3	System kWh High Word	Read/Write
265	40266		System kWh Low Word	
266	40267		System kvarh High Word	Read/Write
267	40268		System kvarh Low Word	
268	40269	Slave 4	System kWh High Word	Read/Write
269	40270		System kWh Low Word	
270	40271		System kvarh High Word	Read/Write
271	40272		System kvarh Low Word	
272	40273	Slave 5	System kWh High Word	Read/Write
273	40274		System kWh Low Word	
274	40275		System kvarh High Word	Read/Write
275	40276		System kvarh Low Word	
276	40277	Slave 6	System kWh High Word	Read/Write
277	40278		System kWh Low Word	
278	40279		System kvarh High Word	Read/Write
279	40280		System kvarh Low Word	
280	40281	Slave 7	System kWh High Word	Read/Write
281	40282		System kWh Low Word	
282	40283		System kvarh High Word	Read/Write
283	40284		System kvarh Low Word	
284	40285	Slave 8	System kWh High Word	Read/Write
285	40286		System kWh Low Word	
286	40287		System kvarh High Word	Read/Write
287	40288		System kvarh Low Word	
288	40289	Slave 9	System kWh High Word	Read/Write
289	40290		System kWh Low Word	
290	40291		System kvarh High Word	Read/Write
291	40292		System kvarh Low Word	
292	40293	Slave 10	System kWh High Word	Read/Write
293	40294		System kWh Low Word	
294	40295		System kvarh High Word	Read/Write
295	40296		System kvarh Low Word	
296	40297	Slave 11	System kWh High Word	Read/Write
297	40298		System kWh Low Word	
298	40299		System kvarh High Word	Read/Write
299	40300		System kvarh Low Word	
300	40301	Slave 12	System kWh High Word	Read/Write
301	40302		System kWh Low Word	
302	40303		System kvarh High Word	Read/Write
303	40304		System kvarh Low Word	
304	40305	Slave 13	System kWh High Word	Read/Write
305	40306		System kWh Low Word	
306	40307		System kvarh High Word	Read/Write
307	40308		System kvarh Low Word	

308	40309	Slave 14	System kWh High Word	Read/Write
309	40310		System kWh Low Word	
310	40311		System kvarh High Word	Read/Write
311	40312		System kvarh Low Word	
312	40313	Slave 15	System kWh High Word	Read/Write
313	40314		System kWh Low Word	
314	40315		System kvarh High Word	Read/Write
315	40316		System kvarh Low Word	
316	40317	Slave 16	System kWh High Word	Read/Write
317	40318		System kWh Low Word	
318	40319		System kvarh High Word	Read/Write
319	40320		System kvarh Low Word	
320	40321	Slave 17	System kWh High Word	Read/Write
321	40322		System kWh Low Word	
322	40323		System kvarh High Word	Read/Write
323	40324		System kvarh Low Word	
324	40325	Slave 18	System kWh High Word	Read/Write
325	40326		System kWh Low Word	
326	40327		System kvarh High Word	Read/Write
327	40328		System kvarh Low Word	
328	40329	Slave 19	System kWh High Word	Read/Write
329	40330		System kWh Low Word	
330	40331		System kvarh High Word	Read/Write
331	40332		System kvarh Low Word	
332	40333	Slave 20	System kWh High Word	Read/Write
333	40334		System kWh Low Word	
334	40335		System kvarh High Word	Read/Write
335	40336		System kvarh Low Word	

Notes:

Table 1 provides data amalgamated from all SM352 Modules configured to measure 3-Phase electricity.
Slaves configured as single phase meters will return zero for 3-Phase energy values.
Energy registers require scaling as described in Section 3.5.

4.2 Main Unit Table 2
Single Phase SM352 Energy Registers

Data Address	Modbus Register	Slave	Data	Access
512	40513	Slave 1	Phase 1 kWh High Word	Read/Write
513	40514		Phase 1 kWh Low Word	
514	40515		Phase 2 kWh High Word	Read/Write
515	40516		Phase 2 kWh Low Word	
516	40517		Phase 3 kWh High Word	Read/Write
517	40518		Phase 3 kWh Low Word	
518	40519		Phase 1 kvarh High Word	Read/Write
519	40520		Phase 1 kvarh Low Word	
520	40521		Phase 2 kvarh High Word	Read/Write
521	40522		Phase 2 kvarh Low Word	
522	40523		Phase 3 kvarh High Word	Read/Write
523	40524		Phase 3 kvarh Low Word	
524	40525	Slave 2	Phase 1 kWh High Word	Read/Write
525	40526		Phase 1 kWh Low Word	
526	40527		Phase 2 kWh High Word	Read/Write
527	40528		Phase 2 kWh Low Word	
528	40529		Phase 3 kWh High Word	Read/Write
529	40530		Phase 3 kWh Low Word	
530	40531		Phase 1 kvarh High Word	Read/Write
531	40532		Phase 1 kvarh Low Word	
532	40533		Phase 2 kvarh High Word	Read/Write
533	40534		Phase 2 kvarh Low Word	
534	40535		Phase 3 kvarh High Word	Read/Write
535	40536		Phase 3 kvarh Low Word	
536	40537	Slave 3	Phase 1 kWh High Word	Read/Write
537	40538		Phase 1 kWh Low Word	
538	40539		Phase 2 kWh High Word	Read/Write
539	40540		Phase 2 kWh Low Word	
540	40541		Phase 3 kWh High Word	Read/Write
541	40542		Phase 3 kWh Low Word	
542	40543		Phase 1 kvarh High Word	Read/Write
543	40544		Phase 1 kvarh Low Word	
544	40545		Phase 2 kvarh High Word	Read/Write
545	40546		Phase 2 kvarh Low Word	
546	40547		Phase 3 kvarh High Word	Read/Write
547	40548		Phase 3 kvarh Low Word	
548	40549	Slave 4	Phase 1 kWh High Word	Read/Write
549	40550		Phase 1 kWh Low Word	
550	40551		Phase 2 kWh High Word	Read/Write
551	40552		Phase 2 kWh Low Word	
552	40553		Phase 3 kWh High Word	Read/Write
553	40554		Phase 3 kWh Low Word	
554	40555		Phase 1 kvarh High Word	Read/Write
555	40556		Phase 1 kvarh Low Word	
556	40557		Phase 2 kvarh High Word	Read/Write
557	40558		Phase 2 kvarh Low Word	
558	40559		Phase 3 kvarh High Word	Read/Write
559	40560		Phase 3 kvarh Low Word	
560	40561	Slave 5	Phase 1 kWh High Word	Read/Write
561	40562		Phase 1 kWh Low Word	
562	40563		Phase 2 kWh High Word	Read/Write
563	40564		Phase 2 kWh Low Word	
564	40565		Phase 3 kWh High Word	Read/Write
565	40566		Phase 3 kWh Low Word	
566	40567		Phase 1 kvarh High Word	Read/Write
567	40568		Phase 1 kvarh Low Word	
568	40569		Phase 2 kvarh High Word	Read/Write
569	40570		Phase 2 kvarh Low Word	
570	40571		Phase 3 kvarh High Word	Read/Write
571	40572		Phase 3 kvarh Low Word	

572	40573	Slave 6	Phase 1 kWh High Word	Read/Write
573	40574		Phase 1 kWh Low Word	
574	40575		Phase 2 kWh High Word	Read/Write
575	40576		Phase 2 kWh Low Word	
576	40577		Phase 3 kWh High Word	Read/Write
577	40578		Phase 3 kWh Low Word	
578	40579		Phase 1 kvarh High Word	Read/Write
579	40580		Phase 1 kvarh Low Word	
580	40581		Phase 2 kvarh High Word	Read/Write
581	40582		Phase 2 kvarh Low Word	
582	40583		Phase 3 kvarh High Word	Read/Write
583	40584		Phase 3 kvarh Low Word	
584	40585	Slave 7	Phase 1 kWh High Word	Read/Write
585	40586		Phase 1 kWh Low Word	
586	40587		Phase 2 kWh High Word	Read/Write
587	40588		Phase 2 kWh Low Word	
588	40589		Phase 3 kWh High Word	Read/Write
589	40590		Phase 3 kWh Low Word	
590	40591		Phase 1 kvarh High Word	Read/Write
591	40592		Phase 1 kvarh Low Word	
592	40593		Phase 2 kvarh High Word	Read/Write
593	40594		Phase 2 kvarh Low Word	
594	40595		Phase 3 kvarh High Word	Read/Write
595	40596		Phase 3 kvarh Low Word	
596	40597	Slave 8	Phase 1 kWh High Word	Read/Write
597	40598		Phase 1 kWh Low Word	
598	40599		Phase 2 kWh High Word	Read/Write
599	40600		Phase 2 kWh Low Word	
600	40601		Phase 3 kWh High Word	Read/Write
601	40602		Phase 3 kWh Low Word	
602	40603		Phase 1 kvarh High Word	Read/Write
603	40604		Phase 1 kvarh Low Word	
604	40605		Phase 2 kvarh High Word	Read/Write
605	40606		Phase 2 kvarh Low Word	
606	40607		Phase 3 kvarh High Word	Read/Write
607	40608		Phase 3 kvarh Low Word	
608	40609	Slave 9	Phase 1 kWh High Word	Read/Write
609	40610		Phase 1 kWh Low Word	
610	40611		Phase 2 kWh High Word	Read/Write
611	40612		Phase 2 kWh Low Word	
612	40613		Phase 3 kWh High Word	Read/Write
613	40614		Phase 3 kWh Low Word	
614	40615		Phase 1 kvarh High Word	Read/Write
615	40616		Phase 1 kvarh Low Word	
616	40617		Phase 2 kvarh High Word	Read/Write
617	40618		Phase 2 kvarh Low Word	
618	40619		Phase 3 kvarh High Word	Read/Write
619	40620		Phase 3 kvarh Low Word	
620	40621	Slave 10	Phase 1 kWh High Word	Read/Write
621	40622		Phase 1 kWh Low Word	
622	40623		Phase 2 kWh High Word	Read/Write
623	40624		Phase 2 kWh Low Word	
624	40625		Phase 3 kWh High Word	Read/Write
625	40626		Phase 3 kWh Low Word	
626	40627		Phase 1 kvarh High Word	Read/Write
627	40628		Phase 1 kvarh Low Word	
628	40629		Phase 2 kvarh High Word	Read/Write
629	40630		Phase 2 kvarh Low Word	
630	40631		Phase 3 kvarh High Word	Read/Write
631	40632		Phase 3 kvarh Low Word	

632	40633	Slave 11	Phase 1 kWh High Word	Read/Write
633	40634		Phase 1 kWh Low Word	
634	40635		Phase 2 kWh High Word	Read/Write
635	40636		Phase 2 kWh Low Word	
636	40637		Phase 3 kWh High Word	Read/Write
637	40638		Phase 3 kWh Low Word	
638	40639		Phase 1 kvarh High Word	Read/Write
639	40640		Phase 1 kvarh Low Word	
640	40641		Phase 2 kvarh High Word	Read/Write
641	40642		Phase 2 kvarh Low Word	
642	40643		Phase 3 kvarh High Word	Read/Write
643	40644		Phase 3 kvarh Low Word	
644	40645	Slave 12	Phase 1 kWh High Word	Read/Write
645	40646		Phase 1 kWh Low Word	
646	40647		Phase 2 kWh High Word	Read/Write
647	40648		Phase 2 kWh Low Word	
648	40649		Phase 3 kWh High Word	Read/Write
649	40650		Phase 3 kWh Low Word	
650	40651		Phase 1 kvarh High Word	Read/Write
651	40652		Phase 1 kvarh Low Word	
652	40653		Phase 2 kvarh High Word	Read/Write
653	40654		Phase 2 kvarh Low Word	
654	40655		Phase 3 kvarh High Word	Read/Write
655	40656		Phase 3 kvarh Low Word	
656	40657	Slave 13	Phase 1 kWh High Word	Read/Write
657	40658		Phase 1 kWh Low Word	
658	40659		Phase 2 kWh High Word	Read/Write
659	40660		Phase 2 kWh Low Word	
660	40661		Phase 3 kWh High Word	Read/Write
661	40662		Phase 3 kWh Low Word	
662	40663		Phase 1 kvarh High Word	Read/Write
663	40664		Phase 1 kvarh Low Word	
664	40665		Phase 2 kvarh High Word	Read/Write
665	40666		Phase 2 kvarh Low Word	
666	40667		Phase 3 kvarh High Word	Read/Write
667	40668		Phase 3 kvarh Low Word	
668	40669	Slave 14	Phase 1 kWh High Word	Read/Write
669	40670		Phase 1 kWh Low Word	
670	40671		Phase 2 kWh High Word	Read/Write
671	40672		Phase 2 kWh Low Word	
672	40673		Phase 3 kWh High Word	Read/Write
673	40674		Phase 3 kWh Low Word	
674	40675		Phase 1 kvarh High Word	Read/Write
675	40676		Phase 1 kvarh Low Word	
676	40677		Phase 2 kvarh High Word	Read/Write
677	40678		Phase 2 kvarh Low Word	
678	40679		Phase 3 kvarh High Word	Read/Write
679	40680		Phase 3 kvarh Low Word	
680	40681	Slave 15	Phase 1 kWh High Word	Read/Write
681	40682		Phase 1 kWh Low Word	
682	40683		Phase 2 kWh High Word	Read/Write
683	40684		Phase 2 kWh Low Word	
684	40685		Phase 3 kWh High Word	Read/Write
685	40686		Phase 3 kWh Low Word	
686	40687		Phase 1 kvarh High Word	Read/Write
687	40688		Phase 1 kvarh Low Word	
688	40689		Phase 2 kvarh High Word	Read/Write
689	40690		Phase 2 kvarh Low Word	
690	40691		Phase 3 kvarh High Word	Read/Write
691	40692		Phase 3 kvarh Low Word	

692	40693	Slave 16	Phase 1 kWh High Word	Read/Write
693	40694		Phase 1 kWh Low Word	
694	40695		Phase 2 kWh High Word	Read/Write
695	40696		Phase 2 kWh Low Word	
696	40697		Phase 3 kWh High Word	Read/Write
697	40698		Phase 3 kWh Low Word	
698	40699		Phase 1 kvarh High Word	Read/Write
699	40700		Phase 1 kvarh Low Word	
700	40701		Phase 2 kvarh High Word	Read/Write
701	40702		Phase 2 kvarh Low Word	
702	40703		Phase 3 kvarh High Word	Read/Write
703	40704		Phase 3 kvarh Low Word	
704	40705	Slave 17	Phase 1 kWh High Word	Read/Write
705	40706		Phase 1 kWh Low Word	
706	40707		Phase 2 kWh High Word	Read/Write
707	40708		Phase 2 kWh Low Word	
708	40709		Phase 3 kWh High Word	Read/Write
709	40710		Phase 3 kWh Low Word	
710	40711		Phase 1 kvarh High Word	Read/Write
711	40712		Phase 1 kvarh Low Word	
712	40713		Phase 2 kvarh High Word	Read/Write
713	40714		Phase 2 kvarh Low Word	
714	40715		Phase 3 kvarh High Word	Read/Write
715	40716		Phase 3 kvarh Low Word	
716	40717	Slave 18	Phase 1 kWh High Word	Read/Write
717	40718		Phase 1 kWh Low Word	
718	40719		Phase 2 kWh High Word	Read/Write
719	40720		Phase 2 kWh Low Word	
720	40721		Phase 3 kWh High Word	Read/Write
721	40722		Phase 3 kWh Low Word	
722	40723		Phase 1 kvarh High Word	Read/Write
723	40724		Phase 1 kvarh Low Word	
724	40725		Phase 2 kvarh High Word	Read/Write
725	40726		Phase 2 kvarh Low Word	
726	40727		Phase 3 kvarh High Word	Read/Write
727	40728		Phase 3 kvarh Low Word	
728	40729	Slave 19	Phase 1 kWh High Word	Read/Write
729	40730		Phase 1 kWh Low Word	
730	40731		Phase 2 kWh High Word	Read/Write
731	40732		Phase 2 kWh Low Word	
732	40733		Phase 3 kWh High Word	Read/Write
733	40734		Phase 3 kWh Low Word	
734	40735		Phase 1 kvarh High Word	Read/Write
735	40736		Phase 1 kvarh Low Word	
736	40737		Phase 2 kvarh High Word	Read/Write
737	40738		Phase 2 kvarh Low Word	
738	40739		Phase 3 kvarh High Word	Read/Write
739	40740		Phase 3 kvarh Low Word	
740	40741	Slave 20	Phase 1 kWh High Word	Read/Write
741	40742		Phase 1 kWh Low Word	
742	40743		Phase 2 kWh High Word	Read/Write
743	40744		Phase 2 kWh Low Word	
744	40745		Phase 3 kWh High Word	Read/Write
745	40746		Phase 3 kWh Low Word	
746	40747		Phase 1 kvarh High Word	Read/Write
747	40748		Phase 1 kvarh Low Word	
748	40749		Phase 2 kvarh High Word	Read/Write
749	40750		Phase 2 kvarh Low Word	
750	40751		Phase 3 kvarh High Word	Read/Write
751	40752		Phase 3 kvarh Low Word	

Notes:

Table 2 provides data amalgamated from all SM352 Modules configured to measure 1-Phase electricity.
Slaves configured as 3-phase meters will return zero for single phase energy values.
Energy registers require scaling as described in Section 3.5.

4.3 Main Unit Table 3

SM352 Module Instantaneous Readings

Data Address	Modbus Register	Slave	Data	Access
768	40769	Main Unit	Phase 1 Volts	Read Only
769	40770		Phase 2 Volts	Read Only
770	40771		Phase 3 Volts	Read Only
771	40772		Frequency	Read Only
772	40773		Phase 1 Volts THD	Read Only
773	40774		Phase 2 Volts THD	Read Only
774	40775		Phase 3 Volts THD	Read Only
775	40776	Slave 1	Phase 1 Amps	Read Only
776	40777		Phase 2 Amps	Read Only
777	40778		Phase 3 Amps	Read Only
778	40779		Phase 1 kW	Read Only
779	40780		Phase 2 kW	Read Only
780	40781		Phase 3 kW	Read Only
781	40782		Phase 1 Power Factor	Read Only
782	40783		Phase 2 Power Factor	Read Only
783	40784		Phase 3 Power Factor	Read Only
784	40785		System kW	Read Only
785	40786		System kvar	Read Only
786	40787		System PF	Read Only
787	40788	Slave 2	Phase 1 Amps	Read Only
788	40789		Phase 2 Amps	Read Only
789	40790		Phase 3 Amps	Read Only
790	40791		Phase 1 kW	Read Only
791	40792		Phase 2 kW	Read Only
792	40793		Phase 3 kW	Read Only
793	40794		Phase 1 Power Factor	Read Only
794	40795		Phase 2 Power Factor	Read Only
795	40796		Phase 3 Power Factor	Read Only
796	40797		System kW	Read Only
797	40798		System kvar	Read Only
798	40799		System PF	Read Only
799	40800	Slave 3	Phase 1 Amps	Read Only
800	40801		Phase 2 Amps	Read Only
801	40802		Phase 3 Amps	Read Only
802	40803		Phase 1 kW	Read Only
803	40804		Phase 2 kW	Read Only
804	40805		Phase 3 kW	Read Only
805	40806		Phase 1 Power Factor	Read Only
806	40807		Phase 2 Power Factor	Read Only
807	40808		Phase 3 Power Factor	Read Only
808	40809		System kW	Read Only
809	40810		System kvar	Read Only
810	40811		System PF	Read Only
811	40812	Slave 4	Phase 1 Amps	Read Only
812	40813		Phase 2 Amps	Read Only
813	40814		Phase 3 Amps	Read Only
814	40815		Phase 1 kW	Read Only
815	40816		Phase 2 kW	Read Only
816	40817		Phase 3 kW	Read Only
817	40818		Phase 1 Power Factor	Read Only
818	40819		Phase 2 Power Factor	Read Only
819	40820		Phase 3 Power Factor	Read Only
820	40821		System kW	Read Only
821	40822		System kvar	Read Only
822	40823		System PF	Read Only

823	40824	Slave 5	Phase 1 Amps	Read Only
824	40825		Phase 2 Amps	Read Only
825	40826		Phase 3 Amps	Read Only
826	40827		Phase 1 kW	Read Only
827	40828		Phase 2 kW	Read Only
828	40829		Phase 3 kW	Read Only
829	40830		Phase 1 Power Factor	Read Only
830	40831		Phase 2 Power Factor	Read Only
831	40832		Phase 3 Power Factor	Read Only
832	40833		System kW	Read Only
833	40834		System kvar	Read Only
834	40835		System PF	Read Only
835	40836	Slave 6	Phase 1 Amps	Read Only
836	40837		Phase 2 Amps	Read Only
837	40838		Phase 3 Amps	Read Only
838	40839		Phase 1 kW	Read Only
839	40840		Phase 2 kW	Read Only
840	40841		Phase 3 kW	Read Only
841	40842		Phase 1 Power Factor	Read Only
842	40843		Phase 2 Power Factor	Read Only
843	40844		Phase 3 Power Factor	Read Only
844	40845		System kW	Read Only
845	40846		System kvar	Read Only
846	40847		System PF	Read Only
847	40848	Slave 7	Phase 1 Amps	Read Only
848	40849		Phase 2 Amps	Read Only
849	40850		Phase 3 Amps	Read Only
850	40851		Phase 1 kW	Read Only
851	40852		Phase 2 kW	Read Only
852	40853		Phase 3 kW	Read Only
853	40854		Phase 1 Power Factor	Read Only
854	40855		Phase 2 Power Factor	Read Only
855	40856		Phase 3 Power Factor	Read Only
856	40857		System kW	Read Only
857	40858		System kvar	Read Only
858	40859		System PF	Read Only
859	40860	Slave 8	Phase 1 Amps	Read Only
860	40861		Phase 2 Amps	Read Only
861	40862		Phase 3 Amps	Read Only
862	40863		Phase 1 kW	Read Only
863	40864		Phase 2 kW	Read Only
864	40865		Phase 3 kW	Read Only
865	40866		Phase 1 Power Factor	Read Only
866	40867		Phase 2 Power Factor	Read Only
867	40868		Phase 3 Power Factor	Read Only
868	40869		System kW	Read Only
869	40870		System kvar	Read Only
870	40871		System PF	Read Only
871	40872	Slave 9	Phase 1 Amps	Read Only
872	40873		Phase 2 Amps	Read Only
873	40874		Phase 3 Amps	Read Only
874	40875		Phase 1 kW	Read Only
875	40876		Phase 2 kW	Read Only
876	40877		Phase 3 kW	Read Only
877	40878		Phase 1 Power Factor	Read Only
878	40879		Phase 2 Power Factor	Read Only
879	40880		Phase 3 Power Factor	Read Only
880	40881		System kW	Read Only
881	40882		System kvar	Read Only
882	40883		System PF	Read Only

883	40884	Slave 10	Phase 1 Amps	Read Only
884	40885		Phase 2 Amps	Read Only
885	40886		Phase 3 Amps	Read Only
886	40887		Phase 1 kW	Read Only
887	40888		Phase 2 kW	Read Only
888	40889		Phase 3 kW	Read Only
889	40890		Phase 1 Power Factor	Read Only
890	40891		Phase 2 Power Factor	Read Only
891	40892		Phase 3 Power Factor	Read Only
892	40893		System kW	Read Only
893	40894		System kvar	Read Only
894	40895		System PF	Read Only
895	40896	Slave 11	Phase 1 Amps	Read Only
896	40897		Phase 2 Amps	Read Only
897	40898		Phase 3 Amps	Read Only
898	40899		Phase 1 kW	Read Only
899	40900		Phase 2 kW	Read Only
900	40901		Phase 3 kW	Read Only
901	40902		Phase 1 Power Factor	Read Only
902	40903		Phase 2 Power Factor	Read Only
903	40904		Phase 3 Power Factor	Read Only
904	40905		System kW	Read Only
905	40906		System kvar	Read Only
906	40907		System PF	Read Only
907	40908	Slave 12	Phase 1 Amps	Read Only
908	40909		Phase 2 Amps	Read Only
909	40910		Phase 3 Amps	Read Only
910	40911		Phase 1 kW	Read Only
911	40912		Phase 2 kW	Read Only
912	40913		Phase 3 kW	Read Only
913	40914		Phase 1 Power Factor	Read Only
914	40915		Phase 2 Power Factor	Read Only
915	40916		Phase 3 Power Factor	Read Only
916	40917		System kW	Read Only
917	40918		System kvar	Read Only
918	40919		System PF	Read Only
919	40920	Slave 13	Phase 1 Amps	Read Only
920	40921		Phase 2 Amps	Read Only
921	40922		Phase 3 Amps	Read Only
922	40923		Phase 1 kW	Read Only
923	40924		Phase 2 kW	Read Only
924	40925		Phase 3 kW	Read Only
925	40926		Phase 1 Power Factor	Read Only
926	40927		Phase 2 Power Factor	Read Only
927	40928		Phase 3 Power Factor	Read Only
928	40929		System kW	Read Only
929	40930		System kvar	Read Only
930	40931		System PF	Read Only
931	40932	Slave 14	Phase 1 Amps	Read Only
932	40933		Phase 2 Amps	Read Only
933	40934		Phase 3 Amps	Read Only
934	40935		Phase 1 kW	Read Only
935	40936		Phase 2 kW	Read Only
936	40937		Phase 3 kW	Read Only
937	40938		Phase 1 Power Factor	Read Only
938	40939		Phase 2 Power Factor	Read Only
939	40940		Phase 3 Power Factor	Read Only
940	40941		System kW	Read Only
941	40942		System kvar	Read Only
942	40943		System PF	Read Only

943	40944	Slave 15	Phase 1 Amps	Read Only
944	40945		Phase 2 Amps	Read Only
945	40946		Phase 3 Amps	Read Only
946	40947		Phase 1 kW	Read Only
947	40948		Phase 2 kW	Read Only
948	40949		Phase 3 kW	Read Only
949	40950		Phase 1 Power Factor	Read Only
950	40951		Phase 2 Power Factor	Read Only
951	40952		Phase 3 Power Factor	Read Only
952	40953		System kW	Read Only
953	40954		System kvar	Read Only
954	40955		System PF	Read Only
955	40956	Slave 16	Phase 1 Amps	Read Only
956	40957		Phase 2 Amps	Read Only
957	40958		Phase 3 Amps	Read Only
958	40959		Phase 1 kW	Read Only
959	40960		Phase 2 kW	Read Only
960	40961		Phase 3 kW	Read Only
961	40962		Phase 1 Power Factor	Read Only
962	40963		Phase 2 Power Factor	Read Only
963	40964		Phase 3 Power Factor	Read Only
964	40965		System kW	Read Only
965	40966		System kvar	Read Only
966	40967		System PF	Read Only
967	40968	Slave 17	Phase 1 Amps	Read Only
968	40969		Phase 2 Amps	Read Only
969	40970		Phase 3 Amps	Read Only
970	40971		Phase 1 kW	Read Only
971	40972		Phase 2 kW	Read Only
972	40973		Phase 3 kW	Read Only
973	40974		Phase 1 Power Factor	Read Only
974	40975		Phase 2 Power Factor	Read Only
975	40976		Phase 3 Power Factor	Read Only
976	40977		System kW	Read Only
977	40978		System kvar	Read Only
978	40979		System PF	Read Only
979	40980	Slave 18	Phase 1 Amps	Read Only
980	40981		Phase 2 Amps	Read Only
981	40982		Phase 3 Amps	Read Only
982	40983		Phase 1 kW	Read Only
983	40984		Phase 2 kW	Read Only
984	40985		Phase 3 kW	Read Only
985	40986		Phase 1 Power Factor	Read Only
986	40987		Phase 2 Power Factor	Read Only
987	40988		Phase 3 Power Factor	Read Only
988	40989		System kW	Read Only
989	40990		System kvar	Read Only
990	40991		System PF	Read Only
991	40992	Slave 19	Phase 1 Amps	Read Only
992	40993		Phase 2 Amps	Read Only
993	40994		Phase 3 Amps	Read Only
994	40995		Phase 1 kW	Read Only
995	40996		Phase 2 kW	Read Only
996	40997		Phase 3 kW	Read Only
997	40998		Phase 1 Power Factor	Read Only
998	40999		Phase 2 Power Factor	Read Only
999	41000		Phase 3 Power Factor	Read Only
1000	41001		System kW	Read Only
1001	41002		System kvar	Read Only
1002	41003		System PF	Read Only

1003	41004	Slave 20	Phase 1 Amps	Read Only
1004	41005		Phase 2 Amps	Read Only
1005	41006		Phase 3 Amps	Read Only
1006	41007		Phase 1 kW	Read Only
1007	41008		Phase 2 kW	Read Only
1008	41009		Phase 3 kW	Read Only
1009	41010		Phase 1 Power Factor	Read Only
1010	41011		Phase 2 Power Factor	Read Only
1011	41012		Phase 3 Power Factor	Read Only
1012	41013		System kW	Read Only
1013	41014		System kvar	Read Only
1014	41015		System PF	Read Only

Notes:

Table 3 provides data amalgamated from all SM352 Modules.
Instantaneous registers require scaling as described in Section 3.5.

4.4 Main Unit Table 5
SM352 Module Demand (Sliding Window)

Data Address	Modbus Register	Slave	Data	Access
1280	41281	Master	Phase 1 Volts Sliding Window Demand	Read/Write
1281	41282		Phase 2 Volts Sliding Window Demand	Read/Write
1282	41283		Phase 3 Volts Sliding Window Demand	Read/Write
1283	41284	Slave 1	Phase 1 Amps Demand (Sliding Window)	Read/Write
1284	41285		Phase 2 Amps Demand (Sliding Window)	Read/Write
1285	41286		Phase 3 Amps Demand (Sliding Window)	Read/Write
1286	41287		Phase 1 kW Demand (Sliding Window)	Read/Write
1287	41288		Phase 2 kW Demand (Sliding Window)	Read/Write
1288	41289		Phase 3 kW Demand (Sliding Window)	Read/Write
1289	41290		System kW Demand (Sliding Window)	Read/Write
1290	41291		System kvar Demand (Sliding Window)	Read/Write
1291	41292		System kVA Demand (Sliding Window)	Read/Write
1292	41293	Slave 2	Phase 1 Amps Demand (Sliding Window)	Read/Write
1293	41294		Phase 2 Amps Demand (Sliding Window)	Read/Write
1294	41295		Phase 3 Amps Demand (Sliding Window)	Read/Write
1295	41296		Phase 1 kW Demand (Sliding Window)	Read/Write
1296	41297		Phase 2 kW Demand (Sliding Window)	Read/Write
1297	41298		Phase 3 kW Demand (Sliding Window)	Read/Write
1298	41299		System kW Demand (Sliding Window)	Read/Write
1299	41300		System kvar Demand (Sliding Window)	Read/Write
1300	41301		System kVA Demand (Sliding Window)	Read/Write
1301	41302	Slave 3	Phase 1 Amps Demand (Sliding Window)	Read/Write
1302	41303		Phase 2 Amps Demand (Sliding Window)	Read/Write
1303	41304		Phase 3 Amps Demand (Sliding Window)	Read/Write
1304	41305		Phase 1 kW Demand (Sliding Window)	Read/Write
1305	41306		Phase 2 kW Demand (Sliding Window)	Read/Write
1306	41307		Phase 3 kW Demand (Sliding Window)	Read/Write
1307	41308		System kW Demand (Sliding Window)	Read/Write
1308	41309		System kvar Demand (Sliding Window)	Read/Write
1309	41310		System kVA Demand (Sliding Window)	Read/Write
1310	41311	Slave 4	Phase 1 Amps Demand (Sliding Window)	Read/Write
1311	41312		Phase 2 Amps Demand (Sliding Window)	Read/Write
1312	41313		Phase 3 Amps Demand (Sliding Window)	Read/Write
1313	41314		Phase 1 kW Demand (Sliding Window)	Read/Write
1314	41315		Phase 2 kW Demand (Sliding Window)	Read/Write
1315	41316		Phase 3 kW Demand (Sliding Window)	Read/Write
1316	41317		System kW Demand (Sliding Window)	Read/Write
1317	41318		System kvar Demand (Sliding Window)	Read/Write
1318	41319		System kVA Demand (Sliding Window)	Read/Write
1319	41320	Slave 5	Phase 1 Amps Demand (Sliding Window)	Read/Write
1320	41321		Phase 2 Amps Demand (Sliding Window)	Read/Write
1321	41322		Phase 3 Amps Demand (Sliding Window)	Read/Write
1322	41323		Phase 1 kW Demand (Sliding Window)	Read/Write
1323	41324		Phase 2 kW Demand (Sliding Window)	Read/Write
1324	41325		Phase 3 kW Demand (Sliding Window)	Read/Write
1325	41326		System kW Demand (Sliding Window)	Read/Write
1326	41327		System kvar Demand (Sliding Window)	Read/Write
1327	41328		System kVA Demand (Sliding Window)	Read/Write
1328	41329	Slave 6	Phase 1 Amps Demand (Sliding Window)	Read/Write
1329	41330		Phase 2 Amps Demand (Sliding Window)	Read/Write
1330	41331		Phase 3 Amps Demand (Sliding Window)	Read/Write
1331	41332		Phase 1 kW Demand (Sliding Window)	Read/Write
1332	41333		Phase 2 kW Demand (Sliding Window)	Read/Write
1333	41334		Phase 3 kW Demand (Sliding Window)	Read/Write
1334	41335		System kW Demand (Sliding Window)	Read/Write
1335	41336		System kvar Demand (Sliding Window)	Read/Write
1336	41337		System kVA Demand (Sliding Window)	Read/Write

1337	41338	Slave 7	Phase 1 Amps Demand (Sliding Window)	Read/Write
1338	41339		Phase 2 Amps Demand (Sliding Window)	Read/Write
1339	41340		Phase 3 Amps Demand (Sliding Window)	Read/Write
1340	41341		Phase 1 kW Demand (Sliding Window)	Read/Write
1341	41342		Phase 2 kW Demand (Sliding Window)	Read/Write
1342	41343		Phase 3 kW Demand (Sliding Window)	Read/Write
1343	41344		System kW Demand (Sliding Window)	Read/Write
1344	41345		System kvar Demand (Sliding Window)	Read/Write
1345	41346		System kVA Demand (Sliding Window)	Read/Write
1346	41347	Slave 8	Phase 1 Amps Demand (Sliding Window)	Read/Write
1347	41348		Phase 2 Amps Demand (Sliding Window)	Read/Write
1348	41349		Phase 3 Amps Demand (Sliding Window)	Read/Write
1349	41350		Phase 1 kW Demand (Sliding Window)	Read/Write
1350	41351		Phase 2 kW Demand (Sliding Window)	Read/Write
1351	41352		Phase 3 kW Demand (Sliding Window)	Read/Write
1352	41353		System kW Demand (Sliding Window)	Read/Write
1353	41354		System kvar Demand (Sliding Window)	Read/Write
1354	41355		System kVA Demand (Sliding Window)	Read/Write
1355	41356	Slave 9	Phase 1 Amps Demand (Sliding Window)	Read/Write
1356	41357		Phase 2 Amps Demand (Sliding Window)	Read/Write
1357	41358		Phase 3 Amps Demand (Sliding Window)	Read/Write
1358	41359		Phase 1 kW Demand (Sliding Window)	Read/Write
1359	41360		Phase 2 kW Demand (Sliding Window)	Read/Write
1360	41361		Phase 3 kW Demand (Sliding Window)	Read/Write
1361	41362		System kW Demand (Sliding Window)	Read/Write
1362	41363		System kvar Demand (Sliding Window)	Read/Write
1363	41364		System kVA Demand (Sliding Window)	Read/Write
1364	41365	Slave 10	Phase 1 Amps Demand (Sliding Window)	Read/Write
1365	41366		Phase 2 Amps Demand (Sliding Window)	Read/Write
1366	41367		Phase 3 Amps Demand (Sliding Window)	Read/Write
1367	41368		Phase 1 kW Demand (Sliding Window)	Read/Write
1368	41369		Phase 2 kW Demand (Sliding Window)	Read/Write
1369	41370		Phase 3 kW Demand (Sliding Window)	Read/Write
1370	41371		System kW Demand (Sliding Window)	Read/Write
1371	41372		System kvar Demand (Sliding Window)	Read/Write
1372	41373		System kVA Demand (Sliding Window)	Read/Write
1373	41374	Slave 11	Phase 1 Amps Demand (Sliding Window)	Read/Write
1374	41375		Phase 2 Amps Demand (Sliding Window)	Read/Write
1375	41376		Phase 3 Amps Demand (Sliding Window)	Read/Write
1376	41377		Phase 1 kW Demand (Sliding Window)	Read/Write
1377	41378		Phase 2 kW Demand (Sliding Window)	Read/Write
1378	41379		Phase 3 kW Demand (Sliding Window)	Read/Write
1379	41380		System kW Demand (Sliding Window)	Read/Write
1380	41381		System kvar Demand (Sliding Window)	Read/Write
1381	41382		System kVA Demand (Sliding Window)	Read/Write
1382	41383	Slave 12	Phase 1 Amps Demand (Sliding Window)	Read/Write
1383	41384		Phase 2 Amps Demand (Sliding Window)	Read/Write
1384	41385		Phase 3 Amps Demand (Sliding Window)	Read/Write
1385	41386		Phase 1 kW Demand (Sliding Window)	Read/Write
1386	41387		Phase 2 kW Demand (Sliding Window)	Read/Write
1387	41388		Phase 3 kW Demand (Sliding Window)	Read/Write
1388	41389		System kW Demand (Sliding Window)	Read/Write
1389	41390		System kvar Demand (Sliding Window)	Read/Write
1390	41391		System kVA Demand (Sliding Window)	Read/Write
1391	41392	Slave 13	Phase 1 Amps Demand (Sliding Window)	Read/Write
1392	41393		Phase 2 Amps Demand (Sliding Window)	Read/Write
1393	41394		Phase 3 Amps Demand (Sliding Window)	Read/Write
1394	41395		Phase 1 kW Demand (Sliding Window)	Read/Write
1395	41396		Phase 2 kW Demand (Sliding Window)	Read/Write
1396	41397		Phase 3 kW Demand (Sliding Window)	Read/Write
1397	41398		System kW Demand (Sliding Window)	Read/Write
1398	41399		System kvar Demand (Sliding Window)	Read/Write
1399	41400		System kVA Demand (Sliding Window)	Read/Write
1400	41401	Slave 14	Phase 1 Amps Demand (Sliding Window)	Read/Write
1401	41402		Phase 2 Amps Demand (Sliding Window)	Read/Write
1402	41403		Phase 3 Amps Demand (Sliding Window)	Read/Write
1403	41404		Phase 1 kW Demand (Sliding Window)	Read/Write

1404	41405		Phase 2 kW Demand (Sliding Window)	Read/Write
1405	41406		Phase 3 kW Demand (Sliding Window)	Read/Write
1406	41407		System kW Demand (Sliding Window)	Read/Write
1407	41408		System kvar Demand (Sliding Window)	Read/Write
1408	41409		System kVA Demand (Sliding Window)	Read/Write
1409	41410	Slave 15	Phase 1 Amps Demand (Sliding Window)	Read/Write
1410	41411		Phase 2 Amps Demand (Sliding Window)	Read/Write
1411	41412		Phase 3 Amps Demand (Sliding Window)	Read/Write
1412	41413		Phase 1 kW Demand (Sliding Window)	Read/Write
1413	41414		Phase 2 kW Demand (Sliding Window)	Read/Write
1414	41415		Phase 3 kW Demand (Sliding Window)	Read/Write
1415	41416		System kW Demand (Sliding Window)	Read/Write
1416	41417		System kvar Demand (Sliding Window)	Read/Write
1417	41418		System kVA Demand (Sliding Window)	Read/Write
1418	41419	Slave 16	Phase 1 Amps Demand (Sliding Window)	Read/Write
1419	41420		Phase 2 Amps Demand (Sliding Window)	Read/Write
1420	41421		Phase 3 Amps Demand (Sliding Window)	Read/Write
1421	41422		Phase 1 kW Demand (Sliding Window)	Read/Write
1422	41423		Phase 2 kW Demand (Sliding Window)	Read/Write
1423	41424		Phase 3 kW Demand (Sliding Window)	Read/Write
1424	41425		System kW Demand (Sliding Window)	Read/Write
1425	41426		System kvar Demand (Sliding Window)	Read/Write
1426	41427		System kVA Demand (Sliding Window)	Read/Write
1427	41428	Slave 17	Phase 1 Amps Demand (Sliding Window)	Read/Write
1428	41429		Phase 2 Amps Demand (Sliding Window)	Read/Write
1429	41430		Phase 3 Amps Demand (Sliding Window)	Read/Write
1430	41431		Phase 1 kW Demand (Sliding Window)	Read/Write
1431	41432		Phase 2 kW Demand (Sliding Window)	Read/Write
1432	41433		Phase 3 kW Demand (Sliding Window)	Read/Write
1433	41434		System kW Demand (Sliding Window)	Read/Write
1434	41435		System kvar Demand (Sliding Window)	Read/Write
1435	41436		System kVA Demand (Sliding Window)	Read/Write
1436	41437	Slave 18	Phase 1 Amps Demand (Sliding Window)	Read/Write
1437	41438		Phase 2 Amps Demand (Sliding Window)	Read/Write
1438	41439		Phase 3 Amps Demand (Sliding Window)	Read/Write
1439	41440		Phase 1 kW Demand (Sliding Window)	Read/Write
1440	41441		Phase 2 kW Demand (Sliding Window)	Read/Write
1441	41442		Phase 3 kW Demand (Sliding Window)	Read/Write
1442	41443		System kW Demand (Sliding Window)	Read/Write
1443	41444		System kvar Demand (Sliding Window)	Read/Write
1444	41445		System kVA Demand (Sliding Window)	Read/Write
1445	41446	Slave 19	Phase 1 Amps Demand (Sliding Window)	Read/Write
1446	41447		Phase 2 Amps Demand (Sliding Window)	Read/Write
1447	41448		Phase 3 Amps Demand (Sliding Window)	Read/Write
1448	41449		Phase 1 kW Demand (Sliding Window)	Read/Write
1449	41450		Phase 2 kW Demand (Sliding Window)	Read/Write
1450	41451		Phase 3 kW Demand (Sliding Window)	Read/Write
1451	41452		System kW Demand (Sliding Window)	Read/Write
1452	41453		System kvar Demand (Sliding Window)	Read/Write
1453	41454		System kVA Demand (Sliding Window)	Read/Write
1454	41455	Slave 20	Phase 1 Amps Demand (Sliding Window)	Read/Write
1455	41456		Phase 2 Amps Demand (Sliding Window)	Read/Write
1456	41457		Phase 3 Amps Demand (Sliding Window)	Read/Write
1457	41458		Phase 1 kW Demand (Sliding Window)	Read/Write
1458	41459		Phase 2 kW Demand (Sliding Window)	Read/Write
1459	41460		Phase 3 kW Demand (Sliding Window)	Read/Write
1460	41461		System kW Demand (Sliding Window)	Read/Write
1461	41462		System kvar Demand (Sliding Window)	Read/Write
1462	41463		System kVA Demand (Sliding Window)	Read/Write

Notes:

Table 5 provides data amalgamated from all SM352 Modules.
Slaves configured as single phase meters will return zero for 3-Phase demand values.
Demand registers require scaling as described in Section 3.5.

4.5 Main Unit Table 6
SM352 Module Max/Min - Amp/Voltage Demand

Data Address	Modbus Register	Slave	Data	Access
1536	41537	Main Unit	Phase 1 Volts Maximum Demand	Read/Write
1537	41538		Phase 2 Volts Maximum Demand	Read/Write
1538	41539		Phase 3 Volts Maximum Demand	Read/Write
1539	41540		Phase 1 Volts Minimum Demand	Read/Write
1540	41541		Phase 2 Volts Minimum Demand	Read/Write
1541	41542		Phase 3 Volts Minimum Demand	Read/Write
1542	41543	Slave 1	Phase 1 Amps Maximum Demand	Read/Write
1543	41544		Phase 2 Amps Maximum Demand	Read/Write
1544	41545		Phase 3 Amps Maximum Demand	Read/Write
1545	41546		Phase 1 Amps Minimum Demand	Read/Write
1546	41547		Phase 2 Amps Minimum Demand	Read/Write
1547	41548		Phase 3 Amps Minimum Demand	Read/Write
1548	41549	Slave 2	Phase 1 Amps Maximum Demand	Read/Write
1549	41550		Phase 2 Amps Maximum Demand	Read/Write
1550	41551		Phase 3 Amps Maximum Demand	Read/Write
1551	41552		Phase 1 Amps Minimum Demand	Read/Write
1552	41553		Phase 2 Amps Minimum Demand	Read/Write
1553	41554		Phase 3 Amps Minimum Demand	Read/Write
1554	41555	Slave 3	Phase 1 Amps Maximum Demand	Read/Write
1555	41556		Phase 2 Amps Maximum Demand	Read/Write
1556	41557		Phase 3 Amps Maximum Demand	Read/Write
1557	41558		Phase 1 Amps Minimum Demand	Read/Write
1558	41559		Phase 2 Amps Minimum Demand	Read/Write
1559	41560		Phase 3 Amps Minimum Demand	Read/Write
1560	41561	Slave 4	Phase 1 Amps Maximum Demand	Read/Write
1561	41562		Phase 2 Amps Maximum Demand	Read/Write
1562	41563		Phase 3 Amps Maximum Demand	Read/Write
1563	41564		Phase 1 Amps Minimum Demand	Read/Write
1564	41565		Phase 2 Amps Minimum Demand	Read/Write
1565	41566		Phase 3 Amps Minimum Demand	Read/Write
1566	41567	Slave 5	Phase 1 Amps Maximum Demand	Read/Write
1567	41568		Phase 2 Amps Maximum Demand	Read/Write
1568	41569		Phase 3 Amps Maximum Demand	Read/Write
1569	41570		Phase 1 Amps Minimum Demand	Read/Write
1570	41571		Phase 2 Amps Minimum Demand	Read/Write
1571	41572		Phase 3 Amps Minimum Demand	Read/Write
1572	41573	Slave 6	Phase 1 Amps Maximum Demand	Read/Write
1573	41574		Phase 2 Amps Maximum Demand	Read/Write
1574	41575		Phase 3 Amps Maximum Demand	Read/Write
1575	41576		Phase 1 Amps Minimum Demand	Read/Write
1576	41577		Phase 2 Amps Minimum Demand	Read/Write
1577	41578		Phase 3 Amps Minimum Demand	Read/Write
1578	41579	Slave 7	Phase 1 Amps Maximum Demand	Read/Write
1579	41580		Phase 2 Amps Maximum Demand	Read/Write
1580	41581		Phase 3 Amps Maximum Demand	Read/Write
1581	41582		Phase 1 Amps Minimum Demand	Read/Write
1582	41583		Phase 2 Amps Minimum Demand	Read/Write
1583	41584		Phase 3 Amps Minimum Demand	Read/Write
1584	41585	Slave 8	Phase 1 Amps Maximum Demand	Read/Write
1585	41586		Phase 2 Amps Maximum Demand	Read/Write
1586	41587		Phase 3 Amps Maximum Demand	Read/Write
1587	41588		Phase 1 Amps Minimum Demand	Read/Write
1588	41589		Phase 2 Amps Minimum Demand	Read/Write
1589	41590		Phase 3 Amps Minimum Demand	Read/Write
1590	41591	Slave 9	Phase 1 Amps Maximum Demand	Read/Write
1591	41592		Phase 2 Amps Maximum Demand	Read/Write
1592	41593		Phase 3 Amps Maximum Demand	Read/Write
1593	41594		Phase 1 Amps Minimum Demand	Read/Write
1594	41595		Phase 2 Amps Minimum Demand	Read/Write
1595	41596		Phase 3 Amps Minimum Demand	Read/Write

1596	41597	Slave 10	Phase 1 Amps Maximum Demand	Read/Write
1597	41598		Phase 2 Amps Maximum Demand	Read/Write
1598	41599		Phase 3 Amps Maximum Demand	Read/Write
1599	41600		Phase 1 Amps Minimum Demand	Read/Write
1600	41601		Phase 2 Amps Minimum Demand	Read/Write
1601	41602		Phase 3 Amps Minimum Demand	Read/Write
1602	41603	Slave 11	Phase 1 Amps Maximum Demand	Read/Write
1603	41604		Phase 2 Amps Maximum Demand	Read/Write
1604	41605		Phase 3 Amps Maximum Demand	Read/Write
1605	41606		Phase 1 Amps Minimum Demand	Read/Write
1606	41607		Phase 2 Amps Minimum Demand	Read/Write
1607	41608		Phase 3 Amps Minimum Demand	Read/Write
1608	41609	Slave 12	Phase 1 Amps Maximum Demand	Read/Write
1609	41610		Phase 2 Amps Maximum Demand	Read/Write
1610	41611		Phase 3 Amps Maximum Demand	Read/Write
1611	41612		Phase 1 Amps Minimum Demand	Read/Write
1612	41613		Phase 2 Amps Minimum Demand	Read/Write
1613	41614		Phase 3 Amps Minimum Demand	Read/Write
1614	41615	Slave 13	Phase 1 Amps Maximum Demand	Read/Write
1615	41616		Phase 2 Amps Maximum Demand	Read/Write
1616	41617		Phase 3 Amps Maximum Demand	Read/Write
1617	41618		Phase 1 Amps Minimum Demand	Read/Write
1618	41619		Phase 2 Amps Minimum Demand	Read/Write
1619	41620		Phase 3 Amps Minimum Demand	Read/Write
1620	41621	Slave 14	Phase 1 Amps Maximum Demand	Read/Write
1621	41622		Phase 2 Amps Maximum Demand	Read/Write
1622	41623		Phase 3 Amps Maximum Demand	Read/Write
1623	41624		Phase 1 Amps Minimum Demand	Read/Write
1624	41625		Phase 2 Amps Minimum Demand	Read/Write
1625	41626		Phase 3 Amps Minimum Demand	Read/Write
1626	41627	Slave 15	Phase 1 Amps Maximum Demand	Read/Write
1627	41628		Phase 2 Amps Maximum Demand	Read/Write
1628	41629		Phase 3 Amps Maximum Demand	Read/Write
1629	41630		Phase 1 Amps Minimum Demand	Read/Write
1630	41631		Phase 2 Amps Minimum Demand	Read/Write
1631	41632		Phase 3 Amps Minimum Demand	Read/Write
1632	41633	Slave 16	Phase 1 Amps Maximum Demand	Read/Write
1633	41634		Phase 2 Amps Maximum Demand	Read/Write
1634	41635		Phase 3 Amps Maximum Demand	Read/Write
1635	41636		Phase 1 Amps Minimum Demand	Read/Write
1636	41637		Phase 2 Amps Minimum Demand	Read/Write
1637	41638		Phase 3 Amps Minimum Demand	Read/Write
1638	41639	Slave 17	Phase 1 Amps Maximum Demand	Read/Write
1639	41640		Phase 2 Amps Maximum Demand	Read/Write
1640	41641		Phase 3 Amps Maximum Demand	Read/Write
1641	41642		Phase 1 Amps Minimum Demand	Read/Write
1642	41643		Phase 2 Amps Minimum Demand	Read/Write
1643	41644		Phase 3 Amps Minimum Demand	Read/Write
1644	41645	Slave 18	Phase 1 Amps Maximum Demand	Read/Write
1645	41646		Phase 2 Amps Maximum Demand	Read/Write
1646	41647		Phase 3 Amps Maximum Demand	Read/Write
1647	41648		Phase 1 Amps Minimum Demand	Read/Write
1648	41649		Phase 2 Amps Minimum Demand	Read/Write
1649	41650		Phase 3 Amps Minimum Demand	Read/Write

1650	41651	Slave 19	Phase 1 Amps Maximum Demand	Read/Write
1651	41652		Phase 2 Amps Maximum Demand	Read/Write
1652	41653		Phase 3 Amps Maximum Demand	Read/Write
1653	41654		Phase 1 Amps Minimum Demand	Read/Write
1654	41655		Phase 2 Amps Minimum Demand	Read/Write
1655	41656		Phase 3 Amps Minimum Demand	Read/Write
1656	41657	Slave 20	Phase 1 Amps Maximum Demand	Read/Write
1657	41658		Phase 2 Amps Maximum Demand	Read/Write
1658	41659		Phase 3 Amps Maximum Demand	Read/Write
1659	41660		Phase 1 Amps Minimum Demand	Read/Write
1660	41661		Phase 2 Amps Minimum Demand	Read/Write
1661	41662		Phase 3 Amps Minimum Demand	Read/Write

Notes:

Table 6 provides data amalgamated from all SM352 Modules.
Demand registers require scaling as described in Section 3.5.

4.6 Main Unit Table 7
SM352 Maximum/Minimum Power Demand

Data Address	Modbus Register	Slave	Data	Access
1792	41793	Slave 1	Phase 1 kW Demand Maximum	Read/Write
1793	41794		Phase 2 kW Demand Maximum	Read/Write
1794	41795		Phase 3 kW Demand Maximum	Read/Write
1795	41796		Phase 1 kW Demand Minimum	Read/Write
1796	41797		Phase 2 kW Demand Minimum	Read/Write
1797	41798		Phase 3 kW Demand Minimum	Read/Write
1798	41799		System kW Demand Maximum	Read/Write
1799	41800		System kW Demand Minimum	Read/Write
1800	41801		System kvar Demand Maximum	Read/Write
1801	41802		System kvar Demand Minimum	Read/Write
1802	41803		System kVA Demand Maximum	Read/Write
1803	41804		System kVA Demand Minimum	Read/Write
1804	41805	Slave 2	Phase 1 kW Demand Maximum	Read/Write
1805	41806		Phase 2 kW Demand Maximum	Read/Write
1806	41807		Phase 3 kW Demand Maximum	Read/Write
1807	41808		Phase 1 kW Demand Minimum	Read/Write
1808	41809		Phase 2 kW Demand Minimum	Read/Write
1809	41810		Phase 3 kW Demand Minimum	Read/Write
1810	41811		System kW Demand Maximum	Read/Write
1811	41812		System kW Demand Minimum	Read/Write
1812	41813		System kvar Demand Maximum	Read/Write
1813	41814		System kvar Demand Minimum	Read/Write
1814	41815		System kVA Demand Maximum	Read/Write
1815	41816		System kVA Demand Minimum	Read/Write
1816	41817	Slave 3	Phase 1 kW Demand Maximum	Read/Write
1817	41818		Phase 2 kW Demand Maximum	Read/Write
1818	41819		Phase 3 kW Demand Maximum	Read/Write
1819	41820		Phase 1 kW Demand Minimum	Read/Write
1820	41821		Phase 2 kW Demand Minimum	Read/Write
1821	41822		Phase 3 kW Demand Minimum	Read/Write
1822	41823		System kW Demand Maximum	Read/Write
1823	41824		System kW Demand Minimum	Read/Write
1824	41825		System kvar Demand Maximum	Read/Write
1825	41826		System kvar Demand Minimum	Read/Write
1826	41827		System kVA Demand Maximum	Read/Write
1827	41828		System kVA Demand Minimum	Read/Write
1828	41829	Slave 4	Phase 1 kW Demand Maximum	Read/Write
1829	41830		Phase 2 kW Demand Maximum	Read/Write
1830	41831		Phase 3 kW Demand Maximum	Read/Write
1831	41832		Phase 1 kW Demand Minimum	Read/Write
1832	41833		Phase 2 kW Demand Minimum	Read/Write
1833	41834		Phase 3 kW Demand Minimum	Read/Write
1834	41835		System kW Demand Maximum	Read/Write
1835	41836		System kW Demand Minimum	Read/Write
1836	41837		System kvar Demand Maximum	Read/Write
1837	41838		System kvar Demand Minimum	Read/Write
1838	41839		System kVA Demand Maximum	Read/Write
1839	41840		System kVA Demand Minimum	Read/Write
1840	41841	Slave 5	Phase 1 kW Demand Maximum	Read/Write
1841	41842		Phase 2 kW Demand Maximum	Read/Write
1842	41843		Phase 3 kW Demand Maximum	Read/Write
1843	41844		Phase 1 kW Demand Minimum	Read/Write
1844	41845		Phase 2 kW Demand Minimum	Read/Write
1845	41846		Phase 3 kW Demand Minimum	Read/Write
1846	41847		System kW Demand Maximum	Read/Write
1847	41848		System kW Demand Minimum	Read/Write
1848	41849		System kvar Demand Maximum	Read/Write
1849	41850		System kvar Demand Minimum	Read/Write
1850	41851		System kVA Demand Maximum	Read/Write
1851	41852		System kVA Demand Minimum	Read/Write

1852	41853	Slave 6	Phase 1 kW Demand Maximum	Read/Write
1853	41854		Phase 2 kW Demand Maximum	Read/Write
1854	41855		Phase 3 kW Demand Maximum	Read/Write
1855	41856		Phase 1 kW Demand Minimum	Read/Write
1856	41857		Phase 2 kW Demand Minimum	Read/Write
1857	41858		Phase 3 kW Demand Minimum	Read/Write
1858	41859		System kW Demand Maximum	Read/Write
1859	41860		System kW Demand Minimum	Read/Write
1860	41861		System kvar Demand Maximum	Read/Write
1861	41862		System kvar Demand Minimum	Read/Write
1862	41863		System kVA Demand Maximum	Read/Write
1863	41864		System kVA Demand Minimum	Read/Write
1864	41865	Slave 7	Phase 1 kW Demand Maximum	Read/Write
1865	41866		Phase 2 kW Demand Maximum	Read/Write
1866	41867		Phase 3 kW Demand Maximum	Read/Write
1867	41868		Phase 1 kW Demand Minimum	Read/Write
1868	41869		Phase 2 kW Demand Minimum	Read/Write
1869	41870		Phase 3 kW Demand Minimum	Read/Write
1870	41871		System kW Demand Maximum	Read/Write
1871	41872		System kW Demand Minimum	Read/Write
1872	41873		System kvar Demand Maximum	Read/Write
1873	41874		System kvar Demand Minimum	Read/Write
1874	41875		System kVA Demand Maximum	Read/Write
1875	41876		System kVA Demand Minimum	Read/Write
1876	41877	Slave 8	Phase 1 kW Demand Maximum	Read/Write
1877	41878		Phase 2 kW Demand Maximum	Read/Write
1878	41879		Phase 3 kW Demand Maximum	Read/Write
1879	41880		Phase 1 kW Demand Minimum	Read/Write
1880	41881		Phase 2 kW Demand Minimum	Read/Write
1881	41882		Phase 3 kW Demand Minimum	Read/Write
1882	41883		System kW Demand Maximum	Read/Write
1883	41884		System kW Demand Minimum	Read/Write
1884	41885		System kvar Demand Maximum	Read/Write
1885	41886		System kvar Demand Minimum	Read/Write
1886	41887		System kVA Demand Maximum	Read/Write
1887	41888		System kVA Demand Minimum	Read/Write
1888	41889	Slave 9	Phase 1 kW Demand Maximum	Read/Write
1889	41890		Phase 2 kW Demand Maximum	Read/Write
1890	41891		Phase 3 kW Demand Maximum	Read/Write
1891	41892		Phase 1 kW Demand Minimum	Read/Write
1892	41893		Phase 2 kW Demand Minimum	Read/Write
1893	41894		Phase 3 kW Demand Minimum	Read/Write
1894	41895		System kW Demand Maximum	Read/Write
1895	41896		System kW Demand Minimum	Read/Write
1896	41897		System kvar Demand Maximum	Read/Write
1897	41898		System kvar Demand Minimum	Read/Write
1898	41899		System kVA Demand Maximum	Read/Write
1899	41900		System kVA Demand Minimum	Read/Write
1900	41901	Slave 10	Phase 1 kW Demand Maximum	Read/Write
1901	41902		Phase 2 kW Demand Maximum	Read/Write
1902	41903		Phase 3 kW Demand Maximum	Read/Write
1903	41904		Phase 1 kW Demand Minimum	Read/Write
1904	41905		Phase 2 kW Demand Minimum	Read/Write
1905	41906		Phase 3 kW Demand Minimum	Read/Write
1906	41907		System kW Demand Maximum	Read/Write
1907	41908		System kW Demand Minimum	Read/Write
1908	41909		System kvar Demand Maximum	Read/Write
1909	41910		System kvar Demand Minimum	Read/Write
1910	41911		System kVA Demand Maximum	Read/Write
1911	41912		System kVA Demand Minimum	Read/Write

1912	41913	Slave 11	Phase 1 kW Demand Maximum	Read/Write
1913	41914		Phase 2 kW Demand Maximum	Read/Write
1914	41915		Phase 3 kW Demand Maximum	Read/Write
1915	41916		Phase 1 kW Demand Minimum	Read/Write
1916	41917		Phase 2 kW Demand Minimum	Read/Write
1917	41918		Phase 3 kW Demand Minimum	Read/Write
1918	41919		System kW Demand Maximum	Read/Write
1919	41920		System kW Demand Minimum	Read/Write
1920	41921		System kvar Demand Maximum	Read/Write
1921	41922		System kvar Demand Minimum	Read/Write
1922	41923		System kVA Demand Maximum	Read/Write
1923	41924		System kVA Demand Minimum	Read/Write
1924	41925	Slave 12	Phase 1 kW Demand Maximum	Read/Write
1925	41926		Phase 2 kW Demand Maximum	Read/Write
1926	41927		Phase 3 kW Demand Maximum	Read/Write
1927	41928		Phase 1 kW Demand Minimum	Read/Write
1928	41929		Phase 2 kW Demand Minimum	Read/Write
1929	41930		Phase 3 kW Demand Minimum	Read/Write
1930	41931		System kW Demand Maximum	Read/Write
1931	41932		System kW Demand Minimum	Read/Write
1932	41933		System kvar Demand Maximum	Read/Write
1933	41934		System kvar Demand Minimum	Read/Write
1934	41935		System kVA Demand Maximum	Read/Write
1935	41936		System kVA Demand Minimum	Read/Write
1936	41937	Slave 13	Phase 1 kW Demand Maximum	Read/Write
1937	41938		Phase 2 kW Demand Maximum	Read/Write
1938	41939		Phase 3 kW Demand Maximum	Read/Write
1939	41940		Phase 1 kW Demand Minimum	Read/Write
1940	41941		Phase 2 kW Demand Minimum	Read/Write
1941	41942		Phase 3 kW Demand Minimum	Read/Write
1942	41943		System kW Demand Maximum	Read/Write
1943	41944		System kW Demand Minimum	Read/Write
1944	41945		System kvar Demand Maximum	Read/Write
1945	41946		System kvar Demand Minimum	Read/Write
1946	41947		System kVA Demand Maximum	Read/Write
1947	41948		System kVA Demand Minimum	Read/Write
1948	41949	Slave 14	Phase 1 kW Demand Maximum	Read/Write
1949	41950		Phase 2 kW Demand Maximum	Read/Write
1950	41951		Phase 3 kW Demand Maximum	Read/Write
1951	41952		Phase 1 kW Demand Minimum	Read/Write
1952	41953		Phase 2 kW Demand Minimum	Read/Write
1953	41954		Phase 3 kW Demand Minimum	Read/Write
1954	41955		System kW Demand Maximum	Read/Write
1955	41956		System kW Demand Minimum	Read/Write
1956	41957		System kvar Demand Maximum	Read/Write
1957	41958		System kvar Demand Minimum	Read/Write
1958	41959		System kVA Demand Maximum	Read/Write
1959	41960		System kVA Demand Minimum	Read/Write
1960	41961	Slave 15	Phase 1 kW Demand Maximum	Read/Write
1961	41962		Phase 2 kW Demand Maximum	Read/Write
1962	41963		Phase 3 kW Demand Maximum	Read/Write
1963	41964		Phase 1 kW Demand Minimum	Read/Write
1964	41965		Phase 2 kW Demand Minimum	Read/Write
1965	41966		Phase 3 kW Demand Minimum	Read/Write
1966	41967		System kW Demand Maximum	Read/Write
1967	41968		System kW Demand Minimum	Read/Write
1968	41969		System kvar Demand Maximum	Read/Write
1969	41970		System kvar Demand Minimum	Read/Write
1970	41971		System kVA Demand Maximum	Read/Write
1971	41972		System kVA Demand Minimum	Read/Write

1972	41973	Slave 16	Phase 1 kW Demand Maximum	Read/Write
1973	41974		Phase 2 kW Demand Maximum	Read/Write
1974	41975		Phase 3 kW Demand Maximum	Read/Write
1975	41976		Phase 1 kW Demand Minimum	Read/Write
1976	41977		Phase 2 kW Demand Minimum	Read/Write
1977	41978		Phase 3 kW Demand Minimum	Read/Write
1978	41979		System kW Demand Maximum	Read/Write
1979	41980		System kW Demand Minimum	Read/Write
1980	41981		System kvar Demand Maximum	Read/Write
1981	41982		System kvar Demand Minimum	Read/Write
1982	41983		System kVA Demand Maximum	Read/Write
1983	41984		System kVA Demand Minimum	Read/Write
1984	41985	Slave 17	Phase 1 kW Demand Maximum	Read/Write
1985	41986		Phase 2 kW Demand Maximum	Read/Write
1986	41987		Phase 3 kW Demand Maximum	Read/Write
1987	41988		Phase 1 kW Demand Minimum	Read/Write
1988	41989		Phase 2 kW Demand Minimum	Read/Write
1989	41990		Phase 3 kW Demand Minimum	Read/Write
1990	41991		System kW Demand Maximum	Read/Write
1991	41992		System kW Demand Minimum	Read/Write
1992	41993		System kvar Demand Maximum	Read/Write
1993	41994		System kvar Demand Minimum	Read/Write
1994	41995		System kVA Demand Maximum	Read/Write
1995	41996		System kVA Demand Minimum	Read/Write
1996	41997	Slave 18	Phase 1 kW Demand Maximum	Read/Write
1997	41998		Phase 2 kW Demand Maximum	Read/Write
1998	41999		Phase 3 kW Demand Maximum	Read/Write
1999	42000		Phase 1 kW Demand Minimum	Read/Write
2000	42001		Phase 2 kW Demand Minimum	Read/Write
2001	42002		Phase 3 kW Demand Minimum	Read/Write
2002	42003		System kW Demand Maximum	Read/Write
2003	42004		System kW Demand Minimum	Read/Write
2004	42005		System kvar Demand Maximum	Read/Write
2005	42006		System kvar Demand Minimum	Read/Write
2006	42007		System kVA Demand Maximum	Read/Write
2007	42008		System kVA Demand Minimum	Read/Write
2008	42009	Slave 19	Phase 1 kW Demand Maximum	Read/Write
2009	42010		Phase 2 kW Demand Maximum	Read/Write
2010	42011		Phase 3 kW Demand Maximum	Read/Write
2011	42012		Phase 1 kW Demand Minimum	Read/Write
2012	42013		Phase 2 kW Demand Minimum	Read/Write
2013	42014		Phase 3 kW Demand Minimum	Read/Write
2014	42015		System kW Demand Maximum	Read/Write
2015	42016		System kW Demand Minimum	Read/Write
2016	42017		System kvar Demand Maximum	Read/Write
2017	42018		System kvar Demand Minimum	Read/Write
2018	42019		System kVA Demand Maximum	Read/Write
2019	42020		System kVA Demand Minimum	Read/Write
2020	42021	Slave 20	Phase 1 kW Demand Maximum	Read/Write
2021	42022		Phase 2 kW Demand Maximum	Read/Write
2022	42023		Phase 3 kW Demand Maximum	Read/Write
2023	42024		Phase 1 kW Demand Minimum	Read/Write
2024	42025		Phase 2 kW Demand Minimum	Read/Write
2025	42026		Phase 3 kW Demand Minimum	Read/Write
2026	42027		System kW Demand Maximum	Read/Write
2027	42028		System kW Demand Minimum	Read/Write
2028	42029		System kvar Demand Maximum	Read/Write
2029	42030		System kvar Demand Minimum	Read/Write
2030	42031		System kVA Demand Maximum	Read/Write
2031	42032		System kVA Demand Minimum	Read/Write

Notes:

Table 7 provides data amalgamated from all SM352 Modules.
Slaves configured as single phase meters will return zero for 3-Phase demand values.
Demand registers require scaling as described in Section 3.5.

4.7 Main Unit Table 30
Main Unit Configuration

Data Address	Modbus Register	Data	Access
7680	47681	Main Unit Name ASCII Characters 1-2	Read/Write
7681	47682	Main Unit Name ASCII Characters 3-4	Read/Write
7682	47683	Main Unit Name ASCII Characters 5-6	Read/Write
7683	47684	Main Unit Name ASCII Characters 7-8	Read/Write
7684	47685	Main Unit Name ASCII Characters 9-10	Read/Write
7685	47686	Main Unit Name ASCII Characters 11-12	Read/Write
7686	47687	Main Unit Name ASCII Characters 13-14	Read/Write
7687	47688	Real Time Clock Year (eg 10 = 2010)	Read/Write
7688	47689	Real Time Clock Month (1= January)	Read/Write
7689	47690	Real Time Clock Day (1 -> 31)	Read/Write
7690	47691	Real Time Clock Hour	Read/Write
7691	47692	Real Time Clock Minute	Read/Write
7692	47693	Real Time Clock Second	Read/Write
7693	47694	Real Time Clock Date Format (0=dd/mm/yy, 1=mm/dd/yy)	Read/Write
7694	47695	Real Time Clock Week Start Day (Default =0) (1=Mon, 2=Tue etc) (Note 1)	Read/Write
7695	47696	Real Time Clock Day of week (1=Mon, 2=Tue etc)	Read Only
7696	47697	Modbus Address (Main Unit) Range 1-220	Read Only
7697	47698	Modbus Baud Rate / 100 (e.g. 96 = 9600): 96, 144, 192, 384, 560, 576 or 1152.	Read/Write
7698	47699	Modbus Parity Setting. 0 = no parity, 1 = odd, 2 = even,	Read/Write
7699	47700	Nominal Voltage (Range 60 – 600)	Read/Write
7700	47701	System Voltage (PT primary) Range 10 to 50,000	Read Only
7701	47702	Voltage Demand Period Phase 1 (x10 i.e. 1=10 Seconds, 2=20 seconds etc) Range 1-360	Read/Write
7702	47703	Voltage Demand Period Phase 2 (x10 i.e. 1=10 Seconds, 2=20 seconds etc) Range 1-360	Read/Write
7703	47704	Voltage Demand Period Phase 3 (x10 i.e. 1=10 Seconds, 2=20 seconds etc) Range 1-360	Read/Write
7704	47705	Number of Slave Modules (Range 1-20)	Read/Write
7705	47706	Slave Types, each bit set to make corresponding meter single phase (High word)	Read/Write
7706	47707	Slave Types each bit set to make corresponding meter single phase (Low Word)	Read/Write
7707	47708	Password 1 (Range 0 to 9999)	Read/Write
7708	47709	Password 2 (Range 0 to 9999)	Read/Write
7709	47710	Backlight OFF Delay in seconds (0-3600)	Read/Write
7710	47711	Serial No. High word	Read Only
7711	47712	Serial No. Low word	Read Only
7712	47713	Custom CT Primary 5 - 25,000 Amps	Read/Write
7713	47714	Custom CT Phase correction ±10 = ±1.0 degrees (Range -30 to 30)	Read/Write
7714	47715	Custom CT Secondary 33,333 = 0.33333V (Range 30,000 to 36,666)	Read/Write
7715	47716	Custom CT Multiplier 1-100 (Range 1 to 20)	Read/Write

Notes:
Week Start Day: Determines which day of the week (Monday to Friday) is considered as the first day.

4.8 Main Display Unit - Table 34 Logger Setup/Status

Data Address	Modbus Register	Data	Access
8704	48705	Log Period (minutes) = 15, 20 or 30 (note 1)	Read/Write
8705	48706	Daylight Saving OPERATION 0=OFF, 1=ON	Read/Write
8706	48707	Daylight Saving FORCE 0=NO, 1=YES, 2=AUTO (Use DS Dates)	Read/Write
8707	48708	Daylight Saving STATE 0=NO SAVING TODAY , 1=SAVING TODAY	Read Only
8708	48709	Daylight Saving Start on Day of Week after Date (1=Monday, 7=Sunday)	Read/Write
8709	48710	Daylight Saving Start Date Day (Day of Month 1-31)	Read/Write
8710	48711	Daylight Saving Start Date Month (1=January)	Read/Write
8711	48712	Daylight Saving Start Date Year (10 =2010)	Read/Write
8712	48713	Daylight Saving End on Day of Week after date (1=Monday, 7=Sunday)	Read/Write
8713	48714	Daylight Saving End Date Day (Day of Month 1-31)	Read/Write
8714	48715	Daylight Saving End Date Month (1=January)	Read/Write
8715	48716	Daylight Saving End Date Year (10 =2010)	Read/Write
8716	48717	Number of Parameters to Log (2 for MEMS-36) (note 1)	Read/Write
8717	48718	Parameter 1 Code = 1 for standard **multicube** (kWh logged) (note 1)	Read/Write
8718	48719	Parameter 2 Code = 2 for standard **multicube** (kvarh logged) (note 1)	Read/Write
8719	48720	Parameter 3 Code = 0 for standard **multicube** (Not Logged) (note 1)	Read/Write
8720	48721	Parameter 4 Code = 0 for standard **multicube** (Not Logged) (note 1)	Read/Write
8721	48722	Parameter 5 Code = 0 for standard **multicube** (Not Logged) (note 1)	Read/Write
8722	48723	Parameter 6 Code = 0 for standard **multicube** (Not Logged) (note 1)	Read/Write
8723	48724	Parameter 7 Code = 0 for standard **multicube** (Not Logged) (note 1)	Read/Write
8724	48725	Parameter 8 Code = 0 for standard **multicube** (Not Logged) (note 1)	Read/Write
8725	48726	Not Used Returns 0	Read Only
8726	48727		
8727	48728		
8728	48729		
8729	48730		
8730	48731		
8731	48732		
8732	48733		
8733	48734		
8734	48735		
8735	48736		
8736	48737	Maximum Number of Logger Days (Depends on number of loads)	Read Only
8737	48738	Number of loads being logged	Read Only
8738	48739	Number of metering modules being logged	Read Only
8739	48740	Number of parameters being logged per load (=2 for standard **multicube**)	Read Only
8740	48741	Memory Status (0=Not Full, 1=Overwriting Old Data)	Read Only
8741	48742	Days Since Log Start (0-65536 complete days stored)	Read Only
8742	48743	Lowest Logger Index	Read Only
8743	48744	Highest Logger Index	Read Only
8744	48745	Earliest Date Stored DAY(Day of Month 1-31)	Read Only
8745	48746	Earliest Date Stored MONTH (1=January)	Read Only
8746	48747	Earliest Date Stored YEAR (10 =2010)	Read Only
8747	48748	Latest Date Stored DAY(Day of Month 1-31)	Read Only
8748	48749	Latest Date Stored MONTH (1=January)	Read Only
8749	48750	Latest Date Stored YEAR (10 =2010)	Read Only
8750	48751	Logger Status (0=Running, 1=Stopped)	Read Only
8751	48752	Logger Start/Stop Enable (0=Default, 176=Enable)	Read/Write

Notes:

Some parameters cannot be written when the logger is running and a Modbus exception response with Code = XX is used to indicate this.

4.8.1 Daylight Saving

In some countries the local time is advanced by 1 hour for part of the year, decided by local government, to extend useful daylight hours.

The Daylight Saving System in the data logger does not affect the raw data stored but provides a method of recording whether daylight saving was applicable for each day. A Flag is recorded with the energy data to indicate days when Daylight Saving was applicable.

If the Daylight Saving system is used this allows historic data from the logger to be time-stamped with/without daylight saving applied.

- ***Daylight Saving OPERATION (Register 48706)***
  - ***OFF (0) The Daylight Saving Flag is recorded as 0 on all days***
  - ***ON (1) The Daylight Saving System Is Enabled (see below for flag settings)***
- ***Daylight Saving FORCE (Register 48707)***
  - ***NO (0) Daylight Saving Flag will be recorded as 0 with today's logged data***
  - ***YES (1) The Daylight Saving Flag will be recorded as 1 with today's logged data***
  - ***AUTO (2) The Daylight Saving Flag will be recorded as 1 during the PRESET DATES and as zero on all other days.***
- ***Daylight Saving STATE (Read Register 48708)***
  - ***NO SAVE (0) Daylight saving is not APPLICABLE TODAY***
  - ***SAVE (1) Daylight Saving is APPLICABLE TODAY***

NOTES:

If OPERATION is set to OFF (0) then Daylight Saving STATE will always be read as 0.

If Daylight Saving FORCE is set to AUTO (and OPERATION is set to ON (1)) then Daylight Saving STATE will be read as 1 during the time of year including the Dates set in registers 48709-48716.

If Daylight saving Day of Week >0 then this delays setting/resetting the daylight Saving Flag until the next Day of Week specified after the Start/End Date. For example if Day of Week is set to 7 = Sunday and the date is set to 25th March then daylight saving flag will always be set from the Last Sunday in March (Next Sunday after 25th May).

4.8.2 Logger Start/Stop

A command sequence via Modbus may be sent to Start/Stop the logger.

To Start the Logger:

i. Ensure the logger is Stopped by reading the Logger Status (48737).

ii. Enable the Logger Start Command by sending 176 (0xAA) to 48741

iii. Start the logger by sending the Start Command 85 (0x55) to 48742
The Enable Register is reset to 0 after the Start Command is received.
If the logger is already running an exception response is returned (Code XX).

To Stop the Logger:

i. Ensure the logger is Running by reading the Logger Status (48737).

ii. Enable the Logger Stop Command by sending 176 (0xAA) to 48741

iii. Stop the logger by sending the Stop Command 86 (0x56) to 48742
The Enable Register is reset to 0 after the Stop Command is received.
If the logger is already stopped an exception response is returned (Code XX).

4.9 Main Display Unit - Tables 35/36 Reading Logged Data

Logged Data is stored in '***Day Files'*** which each contain a single Day worth of data for a single Parameter from a Single Measured Load. For example a ***Day File*** may contain the 30 Minute kWh Profile for the Office Lighting (connected to Phase 2 of Module 3) on 20th January 2010.

Each ***Day File*** contains some summary data for the day recorded and up to 96 Period Energy Values (15 minute periods).

In order to access a ***Day File*** for a particular Load it is necessary to first load a ***Day File Request*** data into Modbus Table 35 as follows:

4.9.1 Day File Request

Data Address	Modbus Register	Data	Access
8960	48961	Logged Date DAY (1-31)	Read/Write
8961	48962	Logged Date MONTH (1-12. 1=January, 12=December)	Read/Write
8962	48963	Logged Date YEAR (10 = 2010 etc)	Read/Write
8963	48964	Logged Day File Index (0-65535)	Read/Write
8964	48965	Meter Number (1-20)	Read/Write
8965	48966	Load Number (0=3 Phase, 1=Ph1, 2=Ph2, 3=Ph3)	Read/Write
8966	48967	Parameter Number (1=kWh, 2=kvarh)	Read/Write
8967	48968	Apply Daylight Saving (0=DO NOT APPLY SAVING, 1=APPLY SAVING)	Read/Write
8968	48969	Search Type (0=By Date, 1=By Index)	Read/Write
8969	48970	Auto Increment	Read/Write
8970	48971	Requested Data Valid	Read Only

Notes:

i. Logged Day File Index

Every Day File has an index number starting at 1 for the 1st complete logged day and incrementing for each stored day. The index number is not incremented on missing days.

ii. Search Type (48969)

0: Use ***Logged Date (48961-48963)*** in Day File Request to search for Day Data Table

1: Use ***Logged Day Index (48964)*** in Day File Request to search for Day Data Table

iii. Auto Increment (48970)

0: No Auto Increment

1: After each successful read of the Day File Data Table, automatically increment the ***Logged Date (48961-48963)*** by 1 day and the ***Logged Day Index (48964)*** by 1.

2: After each successful read of the Day File Data Table, automatically decrement the ***Logged Date (48961-48963)*** by 1 day and the ***Logged Day Index (48964)*** by 1.

Auto Increment provides a means of reading sequential ***Day File*** data from the logger by entering a start date or index and performing repeated reads of the ***Day File*** data table.

When searching by date the automatically incrementing by calendar day may point to missing data resulting in invalid data being requested. This may result in an exception response (see below).

When searching by Logged ***Day File Index***, auto increment will point to the next/previous stored day, skipping over missing days with no exception response (except where Index = 0). All successfully logged days are thus sequentially returned.

iv. ***Manual Checking of Day Request Data (Register 48971)***

When the ***Requested Data Valid Register (48971)*** is read the data in the request Table is checked for errors and the Logger is checked to see if valid data is available for the selected date. This register may be used to manually check for errors in the request Table before attempting to read the ***Day Data File*** Table thus avoiding Exception responses. If the data being requested is valid the Modbus ***Day Data Table*** is loaded ready to read.

v.

Requested Data Valid Register (48971)	
Value	**Meaning**
0	Data in the requested table has changed (used internally for automatic checking)
1	Data is Valid
2	The date format is incorrect
3	The Meter number is unavailable
4	The Load number is not available for this meter
5	The Parameter type is not available for this meter
6	No data is available for the requested Date.

vi. ***Automatic Checking of Day Request Data***

When any register in the ***Day Data File*** Table is read using Modbus, the ***Requested Data Valid Register (48971)*** is first checked.

Requested Data Valid Register (48971)	
Value	**Result**
0	Validate the Day Request Data and update register 48971. If new Valid Status = 1 Then Load Day Data into Modbus Table Then reply to Modbus data request Else If new valid status > 1 Send exception response as below.
1	Reply to Modbus data request
2	Send Exception xxx
3	Send Exception xxx
4	Send Exception xxx
5	Send Exception xxx
6	Send Exception xxx

Note: When searching by Date the Day Page Index is not checked.
When searching by Day page Index the Logged Dates are not checked.

4.9.2 Day Data File

First set the values in the ***Day File Request Table.*** Then read the ***Day Data File*** which will return the actual profile energy data for the requested load as follows:

Data Address	Modbus Register	Data	Access
9216	49217	Number of Days After Logger Start Date	Read Only
9217	49218	Logged Date DAY (1-31)	Read Only
9218	49219	Logged Date MONTH (1-12. 1=January, 12=December)	Read Only
9219	49220	Logged Date YEAR (10 = 2010 etc)	Read Only
9220	49221	Logged Day File Index (0-65535)	Read Only
9221	49222	Meter Number (1-20)	Read Only
9222	49223	Load Number (0=3 Phase, 1=Ph1, 2=Ph2, 3=Ph3)	Read Only
9223	49224	Parameter Number (1=kWh, 2=kvarh)	Read Only
9224	49225	Number of Logs Per Day	Read Only
9225	49226	Module Type	Read Only
9226	49227	Daylight Saving Flag (Ref 4.8.1)	Read Only
9227	49228	Total Register Value at Day Start	Read Only
9228	49229		
9229	49230	Accumulated Energy During Period -4	Read Only
9230	49231	Accumulated Energy During Period -3	Read Only
9231	49232	Accumulated Energy During Period -2	Read Only
9232	49233	Accumulated Energy During Period -1	Read Only
9233	49234	Accumulated Energy During Period 1	Read Only
9234	49235	Accumulated Energy During Period 2	Read Only
9235	49236	Accumulated Energy During Period 3	Read Only
9236	49237	Accumulated Energy During Period 4	Read Only
⋮	⋮	⋮	⋮
9327	49327	Accumulated Energy During Period 95	Read Only
9328	49329	Accumulated Energy During Period 96	Read Only
9329	49330	Tariff Period 1 End Time (0-96)	
9330	49331	Tariff Period 2 End Time (0-96)	
9331	49332	Tariff Period 3 End Time (0-96)	
9332	49333	Tariff Period 4 End Time (0-96)	
9333	49334	Tariff Period 5 End Time (0-96)	
9334	49335	Tariff Period 6 End Time (0-96)	
9335	49336	Tariff Period 7 End Time (0-96)	
9336	49337	Tariff Period 8 End Time (0-96)	
9337	49338	Period 1 Tariff Number (0-8)	
9338	49339	Period 2 Tariff Number (0-8)	
9339	49340	Period 3 Tariff Number (0-8)	
9340	49341	Period 4 Tariff Number (0-8)	
9341	49342	Period 5 Tariff Number (0-8)	
9342	49343	Period 6 Tariff Number (0-8)	
9343	49344	Period 7 Tariff Number (0-8)	
9344	49345	Period 8 Tariff Number (0-8)	
9345	49346	Tariff 1 Value	
9346	49347	Tariff 2 Value	
9347	49348	Tariff 3 Value	
9348	49349	Tariff 4 Value	
9349	49350	Tariff 5 Value	
9350	49351	Tariff 6 Value	
9351	49352	Tariff 7 Value	
9352	49353	Tariff 8 Value	

9353	49354	Tariff 1 Register Value at Day Start	Read Only
9354	49355		
9355	49356	Tariff 2 Register Value at Day Start	Read Only
9356	49357		
9357	49358	Tariff 3 Register Value at Day Start	Read Only
9358	49359		
9359	49360	Tariff 4 Register Value at Day Start	Read Only
9360	49361		
9361	49362	Tariff 5 Register Value at Day Start	Read Only
9362	49363		
9363	49364	Tariff 6 Register Value at Day Start	Read Only
9364	49365		
9365	49366	Tariff 7 Register Value at Day Start	Read Only
9366	49367		
9367	49368	Tariff 8 Register Value at Day Start	Read Only
9368	49369		

Notes:

i. *Day Information*

a. **Number of Days after Logger Start Date**
This can be used to check that recorded data is continuous with no missing days.

b. **Logged Day File Index**
A sequential Index number is associated with each Day File which provides consecutive numbering from the first logged day (1,2….65000) regardless of the date the data was recorded.

ii. Load Information

a. **Meter Number**
Each Modular Meter is numbered depending on it's installed position. An SM352 contains two Modular Meters as described in Section **Error! Reference source not found.**

b. **Load Number**
Modular Meter configured as 1x3-Phase Meter: Load Number = 0
Modular Meter configured as 3x Single Phase meters: Load Number = 1-3.

iii. *Daylight Saving*

If the Day File Request Table has ***Apply Daylight Saving (48968) = 1,*** then the Day Data File registers are shifted automatically by 1hr to match local clocks adjusted to take daylight saving into account. This only occurs on days when the Daylight Saving Flag was recorded as 1 (Ref 4.8.1).

If the Day File Request Table has ***Apply Daylight Saving (48968) = 1,*** then Accumulated energy Periods -1 to -4 will Return 0.

Note: With daylight saving applied, 1hr of data will be lost on the day the local clocks are moved back to normal time.

iv. *Period Register Values*

When the logger is setup the user selects either 15, 20 or 30 minute time periods for each energy log. The energy accumulated during each of these time periods is provided in the Modbus Data Table as a single unsigned 16 bit number.

Period 1 is the first period of the day starting at 00:00.

Period 2 starts 1 time period later etc.

When the File Request Table has ***Apply Daylight Saving (48968) = 0*** then Period -1 is the last period of the previous day, Period -2 is the period before this etc. Thus 25 hours are stored each day allowing user external software to retrospectively apply daylight saving to the data. Accumulated data requested earlier than 1 hour before Period 1 is returned as 0.

4.10 Energy Tariffs

The kWh and kvarh energy measured during preset tariff periods is accumulated in up to 8 separate sets of "***Energy Tariff Registers***".

4.10.1 Tariff Values

Up to 8 Tariffs may be programmed. Each Tariff is defined by its number (T1-T8) and an associated value (0-65000). ***Tariff Values*** are set by the user and recorded along with the energy profile in the Day Data Files so that historic changes to values such as cost may be conveniently recorded for future reference. The ***Tariff Values*** have no effect on the accumulating Tariff Registers.

4.10.2 Tariff Day Types

Up to 8 ***Tariff Day Types*** may be user defined which are split into a maximum of 8 time periods to suit a local energy tariff structure. A single Tariff is assigned, using its number, to each tariff period in each ***Tariff Day Type***.

Example: To set a weekday tariff saved to Day Type 1 with:

A Day-time Tariff of T3 from 07:00h to 19:30h

A Night-time Tariff of T6 from 19:30 to 07:00

Tariff Day Type 1		
Day Period 1	00:00 – 07:00	Tariff = T6
Day Period 2	07:00 – 19:30	Tariff = T3
Day Period 3	19:30 – 24:00	Tariff = T6

4.10.3 Tariff Week Types

Up to 8 ***Week Types*** may be user defined each of which is made up of ***7 Day Types***.

Example: A summer week has different weekday and weekend tariffs as:

Monday to Friday

Day time from 07:00 to 19:30 = T3

Night time from 19:30 to 07:00 = T6

Saturday and Sunday

From Friday at 19:30 to Monday at 07:00 = T2

Monday ***Day Type 1***		
Day Period 1	00:00 – 07:00	Tariff = T2
Day Period 2	07:00 – 19:30	Tariff = T3
Day Period 3	19:30 – 24:00	Tariff = T6

Tuesday – Thursday ***Day Type 2***		
Day Period 1	00:00 – 07:00	Tariff = T6
Day Period 2	07:00 – 19:30	Tariff = T3
Day Period 3	19:30 – 24:00	Tariff = T6

Friday *Day Type 3*		
Day Period 1	00:00 – 07:00	Tariff = T6
Day Period 2	07:00 – 19:30	Tariff = T3
Day Period 3	19:30 – 24:00	Tariff = T2

Saturday – Sunday *Day Type 4*		
Day Period 1	00:00 – 24:00	Tariff = T2

Summer Season *Week Type 1*	
Monday	Tariff Day Type 1
Tuesday	Tariff Day Type 2
Wednesday	Tariff Day Type 2
Thursday	Tariff Day Type 2
Friday	Tariff Day Type 3
Saturday	Tariff Day Type 4
Sunday	Tariff Day Type 4

4.10.4 Tariff Seasons

Up to 8 periods of each calendar year (seasons) may be defined by selecting start and end dates. A single ***Tariff Week Type*** is assigned to each season to define the tariff structure for the period.

Example: 2 Seasons (Winter and Summer) Using Two Week Types

Tariff Week Type 1	
30th November - 22nd March (Winter)	Tariff Week Type 1
23rd March – 29th November (Summer)	Tariff Week Type 2

This structured approach simplifies setting of tariff periods for a year while maintaining flexibility to suit most tariff structures.

4.10.5 Table 37 Tariff Structures

Table 37 details the current Tariff settings being used in the meter.

Data Address	Modbus Register	Data	Access
9472	49473	Day Type 1 End Period 1 (0-96)	Read Only
9473	49474	Day Type 1 End Period 2 (0-96)	Read Only
9474	49475	Day Type 1 End Period 3 (0-96)	Read Only
9475	49476	Day Type 1 End Period 4 (0-96)	Read Only
9476	49477	Day Type 1 End Period 5 (0-96)	Read Only
9477	49478	Day Type 1 End Period 6 (0-96)	Read Only
9478	49479	Day Type 1 End Period 7 (0-96)	Read Only
9479	49480	Day Type 1 End Period 8 (0-96)	Read Only
9480	49481	Day Type 1 End Period 1 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9481	49482	Day Type 1 End Period 2 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9482	49483	Day Type 1 End Period 3 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9483	49484	Day Type 1 End Period 4 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9484	49485	Day Type 1 End Period 5 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9485	49486	Day Type 1 End Period 6 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9486	49487	Day Type 1 End Period 7 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9487	49488	Day Type 1 End Period 8 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9488	49489	Day Type 2 End Period 1 (0-96)	Read Only
9489	49490	Day Type 2 End Period 2 (0-96)	Read Only
9490	49491	Day Type 2 End Period 3 (0-96)	Read Only
9491	49492	Day Type 2 End Period 4 (0-96)	Read Only
9492	49493	Day Type 2 End Period 5 (0-96)	Read Only
9493	49494	Day Type 2 End Period 6 (0-96)	Read Only
9494	49495	Day Type 2 End Period 7 (0-96)	Read Only
9495	49496	Day Type 2 End Period 8 (0-96)	Read Only
9496	49497	Day Type 2 End Period 1 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9497	49498	Day Type 2 End Period 2 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9498	49499	Day Type 2 End Period 3 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9499	49500	Day Type 2 End Period 4 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9500	49501	Day Type 2 End Period 5 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9501	49502	Day Type 2 End Period 6 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9502	49503	Day Type 2 End Period 7 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9503	49504	Day Type 2 End Period 8 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9504	49505	Day Type 3 End Period 1 (0-96)	Read Only
9505	49506	Day Type 3 End Period 2 (0-96)	Read Only
9506	49507	Day Type 3 End Period 3 (0-96)	Read Only
9507	49508	Day Type 3 End Period 4 (0-96)	Read Only
9508	49509	Day Type 3 End Period 5 (0-96)	Read Only
9509	49510	Day Type 3 End Period 6 (0-96)	Read Only
9510	49511	Day Type 3 End Period 7 (0-96)	Read Only
9511	49512	Day Type 3 End Period 8 (0-96)	Read Only
9512	49513	Day Type 3 End Period 1 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9513	49514	Day Type 3 End Period 2 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9514	49515	Day Type 3 End Period 3 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9515	49516	Day Type 3 End Period 4 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9516	49517	Day Type 3 End Period 5 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9517	49518	Day Type 3 End Period 6 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9518	49519	Day Type 3 End Period 7 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9519	49520	Day Type 3 End Period 8 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9520	49521	Day Type 4 End Period 1 (0-96)	Read Only
9521	49522	Day Type 4 End Period 2 (0-96)	Read Only
9522	49523	Day Type 4 End Period 3 (0-96)	Read Only
9523	49524	Day Type 4 End Period 4 (0-96)	Read Only
9524	49525	Day Type 4 End Period 5 (0-96)	Read Only
9525	49526	Day Type 4 End Period 6 (0-96)	Read Only
9526	49527	Day Type 4 End Period 7 (0-96)	Read Only
9527	49528	Day Type 4 End Period 8 (0-96)	Read Only
9528	49529	Day Type 4 End Period 1 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9529	49530	Day Type 4 End Period 2 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9530	49531	Day Type 4 End Period 3 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9531	49532	Day Type 4 End Period 4 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9532	49533	Day Type 4 End Period 5 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9533	49534	Day Type 4 End Period 6 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9534	49535	Day Type 4 End Period 7 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9535	49536	Day Type 4 End Period 8 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only

9536	49537	Day Type 5 End Period 1 (0-96)	Read Only
9537	49538	Day Type 5 End Period 2 (0-96)	Read Only
9538	49539	Day Type 5 End Period 3 (0-96)	Read Only
9539	49540	Day Type 5 End Period 4 (0-96)	Read Only
9540	49541	Day Type 5 End Period 5 (0-96)	Read Only
9541	49542	Day Type 5 End Period 6 (0-96)	Read Only
9542	49543	Day Type 5 End Period 7 (0-96)	Read Only
9543	49544	Day Type 5 End Period 8 (0-96)	Read Only
9544	49545	Day Type 5 End Period 1 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9545	49546	Day Type 5 End Period 2 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9546	49547	Day Type 5 End Period 3 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9547	49548	Day Type 5 End Period 4 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9548	49549	Day Type 5 End Period 5 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9549	49550	Day Type 5 End Period 6 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9550	49551	Day Type 5 End Period 7 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9551	49552	Day Type 5 End Period 8 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9552	49553	Day Type 6 End Period 1 (0-96)	Read Only
9553	49554	Day Type 6 End Period 2 (0-96)	Read Only
9554	49555	Day Type 6 End Period 3 (0-96)	Read Only
9555	49556	Day Type 6 End Period 4 (0-96)	Read Only
9556	49557	Day Type 6 End Period 5 (0-96)	Read Only
9557	49558	Day Type 6 End Period 6 (0-96)	Read Only
9558	49559	Day Type 6 End Period 7 (0-96)	Read Only
9559	49560	Day Type 6 End Period 8 (0-96)	Read Only
9560	49561	Day Type 6 End Period 1 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9561	49562	Day Type 6 End Period 2 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9562	49563	Day Type 6 End Period 3 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9563	49564	Day Type 6 End Period 4 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9564	49565	Day Type 6 End Period 5 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9565	49566	Day Type 6 End Period 6 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9566	49567	Day Type 6 End Period 7 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9567	49568	Day Type 6 End Period 8 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9568	49569	Day Type 7 End Period 1 (0-96)	Read Only
9569	49570	Day Type 7 End Period 2 (0-96)	Read Only
9570	49571	Day Type 7 End Period 3 (0-96)	Read Only
9571	49572	Day Type 7 End Period 4 (0-96)	Read Only
9572	49573	Day Type 7 End Period 5 (0-96)	Read Only
9573	49574	Day Type 7 End Period 6 (0-96)	Read Only
9574	49575	Day Type 7 End Period 7 (0-96)	Read Only
9575	49576	Day Type 7 End Period 8 (0-96)	Read Only
9576	49577	Day Type 7 End Period 1 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9577	49578	Day Type 7 End Period 2 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9578	49579	Day Type 7 End Period 3 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9579	49580	Day Type 7 End Period 4 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9580	49581	Day Type 7 End Period 5 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9581	49582	Day Type 7 End Period 6 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9582	49583	Day Type 7 End Period 7 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9583	49584	Day Type 7 End Period 8 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9584	49585	Day Type 8 End Period 1 (0-96)	Read Only
9585	49586	Day Type 8 End Period 2 (0-96)	Read Only
9586	49587	Day Type 8 End Period 3 (0-96)	Read Only
9587	49588	Day Type 8 End Period 4 (0-96)	Read Only
9588	49589	Day Type 8 End Period 5 (0-96)	Read Only
9589	49590	Day Type 8 End Period 6 (0-96)	Read Only
9590	49591	Day Type 8 End Period 7 (0-96)	Read Only
9591	49592	Day Type 8 End Period 8 (0-96)	Read Only
9592	49593	Day Type 8 End Period 1 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9593	49594	Day Type 8 End Period 2 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9594	49595	Day Type 8 End Period 3 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9595	49596	Day Type 8 End Period 4 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9596	49597	Day Type 8 End Period 5 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9597	49598	Day Type 8 End Period 6 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9598	49599	Day Type 8 End Period 7 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9599	49600	Day Type 8 End Period 8 Tariff, 0=Unassigned, 1-8=T1-T8	Read Only
9600	49601	Week Type 1 Monday Day Type (0-8) (0=Unassigned)	Read Only
9601	49602	Week Type 1 Tuesday Day Type (0-8) (0=Unassigned)	Read Only
9602	49603	Week Type 1 Wednesday Day Type (0-8) (0=Unassigned)	Read Only
9603	49604	Week Type 1 Thursday Day Type (0-8) (0=Unassigned)	Read Only
9604	49605	Week Type 1 Friday Day Type (0-8) (0=Unassigned)	Read Only
9605	49606	Week Type 1 Saturday Day Type (0-8) (0=Unassigned)	Read Only
9606	49607	Week Type 1 Sunday Day Type (0-8) (0=Unassigned)	Read Only

9607	49608	Week Type 2 Monday Day Type (0-8) (0=Unassigned)	Read Only
9608	49609	Week Type 2 Tuesday Day Type (0-8) (0=Unassigned)	Read Only
9609	49610	Week Type 2 Wednesday Day Type (0-8) (0=Unassigned)	Read Only
9610	49611	Week Type 2 Thursday Day Type (0-8) (0=Unassigned)	Read Only
9611	49612	Week Type 2 Friday Day Type (0-8) (0=Unassigned)	Read Only
9612	49613	Week Type 2 Saturday Day Type (0-8) (0=Unassigned)	Read Only
9613	49614	Week Type 2 Sunday Day Type (0-8) (0=Unassigned)	Read Only
9614	49615	Week Type 3 Monday Day Type (0-8) (0=Unassigned)	Read Only
9615	49616	Week Type 3 Tuesday Day Type (0-8) (0=Unassigned)	Read Only
9616	49617	Week Type 3 Wednesday Day Type (0-8) (0=Unassigned)	Read Only
9617	49618	Week Type 3 Thursday Day Type (0-8) (0=Unassigned)	Read Only
9618	49619	Week Type 3 Friday Day Type (0-8) (0=Unassigned)	Read Only
9619	49620	Week Type 3 Saturday Day Type (0-8) (0=Unassigned)	Read Only
9620	49621	Week Type 3 Sunday Day Type (0-8) (0=Unassigned)	Read Only
9621	49622	Week Type 4 Monday Day Type (0-8) (0=Unassigned)	Read Only
9622	49623	Week Type 4 Tuesday Day Type (0-8) (0=Unassigned)	Read Only
9623	49624	Week Type 4 Wednesday Day Type (0-8) (0=Unassigned)	Read Only
9624	49625	Week Type 4 Thursday Day Type (0-8) (0=Unassigned)	Read Only
9625	49626	Week Type 4 Friday Day Type (0-8) (0=Unassigned)	Read Only
9626	49627	Week Type 4 Saturday Day Type (0-8) (0=Unassigned)	Read Only
9627	49628	Week Type 4 Sunday Day Type (0-8) (0=Unassigned)	Read Only
9628	49629	Week Type 5 Monday Day Type (0-8) (0=Unassigned)	Read Only
9629	49630	Week Type 5 Tuesday Day Type (0-8) (0=Unassigned)	Read Only
9630	49631	Week Type 5 Wednesday Day Type (0-8) (0=Unassigned)	Read Only
9631	49632	Week Type 5 Thursday Day Type (0-8) (0=Unassigned)	Read Only
9632	49633	Week Type 5 Friday Day Type (0-8) (0=Unassigned)	Read Only
9633	49634	Week Type 5 Saturday Day Type (0-8) (0=Unassigned)	Read Only
9634	49635	Week Type 5 Sunday Day Type (0-8) (0=Unassigned)	Read Only
9635	49636	Week Type 6 Monday Day Type (0-8) (0=Unassigned)	Read Only
9636	49637	Week Type 6 Tuesday Day Type (0-8) (0=Unassigned)	Read Only
9637	49638	Week Type 6 Wednesday Day Type (0-8) (0=Unassigned)	Read Only
9638	49639	Week Type 6 Thursday Day Type (0-8) (0=Unassigned)	Read Only
9639	49640	Week Type 6 Friday Day Type (0-8) (0=Unassigned)	Read Only
9640	49641	Week Type 6 Saturday Day Type (0-8) (0=Unassigned)	Read Only
9641	49642	Week Type 6 Sunday Day Type (0-8) (0=Unassigned)	Read Only
9642	49643	Week Type 7 Monday Day Type (0-8) (0=Unassigned)	Read Only
9643	49644	Week Type 7 Tuesday Day Type (0-8) (0=Unassigned)	Read Only
9644	49645	Week Type 7 Wednesday Day Type (0-8) (0=Unassigned)	Read Only
9645	49646	Week Type 7 Thursday Day Type (0-8) (0=Unassigned)	Read Only
9646	49647	Week Type 7 Friday Day Type (0-8) (0=Unassigned)	Read Only
9647	49648	Week Type 7 Saturday Day Type (0-8) (0=Unassigned)	Read Only
9648	49649	Week Type 7 Sunday Day Type (0-8) (0=Unassigned)	Read Only
9649	49650	Week Type 8 Monday Day Type (0-8) (0=Unassigned)	Read Only
9650	49651	Week Type 8 Tuesday Day Type (0-8) (0=Unassigned)	Read Only
9651	49652	Week Type 8 Wednesday Day Type (0-8) (0=Unassigned)	Read Only
9652	49653	Week Type 8 Thursday Day Type (0-8) (0=Unassigned)	Read Only
9653	49654	Week Type 8 Friday Day Type (0-8) (0=Unassigned)	Read Only
9654	49655	Week Type 8 Saturday Day Type (0-8) (0=Unassigned)	Read Only
9655	49656	Week Type 8 Sunday Day Type (0-8) (0=Unassigned)	Read Only
9656	49657	Season Type 1 – Start Date Day (1 - 31)	Read Only
9657	49658	Season Type 1 – Start Date Month (1 - 12, 1=January)	Read Only
9658	49659	Season Type 1 – End Day (1 - 31)	Read Only
9659	49660	Season Type 1 – End Month (1 - 12, 1=January)	Read Only
9660	49661	Season Type 1 – Associated Week Type (0-8) 0=Unassigned	Read Only
9661	49662	Season Type 2 – Start Date Day (1 - 31)	Read Only
9662	49663	Season Type 2 – Start Date Month (1 - 12, 1=January)	Read Only
9663	49664	Season Type 2 – End Day (1 - 31)	Read Only
9664	49665	Season Type 2 – End Month (1 - 12, 1=January)	Read Only
9665	49666	Season Type 2 – Associated Week Type (0-8) 0=Unassigned	Read Only
9666	49667	Season Type 3 – Start Date Day (1 - 31)	Read Only
9667	49668	Season Type 3 – Start Date Month (1 - 12, 1=January)	Read Only
9668	49669	Season Type 3 – End Day (1 - 31)	Read Only
9669	49670	Season Type 3 – End Month (1 - 12, 1=January)	Read Only
9670	49671	Season Type 3 – Associated Week Type (0-8) 0=Unassigned	Read Only
9671	49672	Season Type 4 – Start Date Day (1 - 31)	Read Only
9672	49673	Season Type 4 – Start Date Month (1 - 12, 1=January)	Read Only
9673	49674	Season Type 4 – End Day (1 - 31)	Read Only
9674	49675	Season Type 4 – End Month (1 - 12, 1=January)	Read Only
9675	49676	Season Type 4 – Associated Week Type (0-8) 0=Unassigned	Read Only

9676	49677	Season Type 5 – Start Date Day (1 - 31)	Read Only
9677	49678	Season Type 5 – Start Date Month (1 - 12, 1=January)	Read Only
9678	49679	Season Type 5 – End Day (1 - 31)	Read Only
9679	49680	Season Type 5 – End Month (1 - 12, 1=January)	Read Only
9680	49681	Season Type 5 – Associated Week Type (0-8) 0=Unassigned	Read Only
9681	49682	Season Type 6 – Start Date Day (1 - 31)	Read Only
9682	49683	Season Type 6 – Start Date Month (1 - 12, 1=January)	Read Only
9683	49684	Season Type 6 – End Day (1 - 31)	Read Only
9684	49685	Season Type 6 – End Month (1 - 12, 1=January)	Read Only
9685	49686	Season Type 6 – Associated Week Type (0-8) 0=Unassigned	Read Only
9686	49687	Season Type 7 – Start Date Day (1 - 31)	Read Only
9687	49688	Season Type 7 – Start Date Month (1 - 12, 1=January)	Read Only
9688	49689	Season Type 7 – End Day (1 - 31)	Read Only
9689	49690	Season Type 7 – End Month (1 - 12, 1=January)	Read Only
9690	49691	Season Type 7 – Associated Week Type (0-8) 0=Unassigned	Read Only
9691	49692	Season Type 8 – Start Date Day (1 - 31)	Read Only
9692	49693	Season Type 8 – Start Date Month (1 - 12, 1=January)	Read Only
9693	49694	Season Type 8 – End Day (1 - 31)	Read Only
9694	49695	Season Type 8 – End Month (1 - 12, 1=January)	Read Only
9695	49696	Season Type 8 – Associated Week Type (0-8) 0=Unassigned	Read Only

Notes:

Tariff Values are written directly to this Modbus table. A range of values from 0 to 65000 may be entered. (Values above 65000 will trigger an exception response).

Tariff values are written to the Day Data File at the end of the current day.

4.10.6 Setting Energy Tariffs

To avoid errors in programming Tariff structures, new settings are inserted into Modbus “Forms” which may be checked and verified by the **multicube** before copying the values to the tariff structure in the logger configuration database.

4.10.7 Day Types (Day1 – Day 8) Table 37 (Offset 198)

Day Types are entered in the following Modbus Form:

Data Address	Modbus Register	Data	Access
9670	49671	End of Day Type Period 1 (Number log of periods past 00:00)	Read/Write
9671	49672	End of Day Type Period 2 (Number log of periods past 00:00)	Read/Write
9672	49673	End of Day Type Period 3 (Number log of periods past 00:00)	Read/Write
9673	49674	End of Day Type Period 4 (Number log of periods past 00:00)	Read/Write
9674	49675	End of Day Type Period 5 (Number log of periods past 00:00)	Read/Write
9675	49676	End of Day Type Period 6 (Number log of periods past 00:00)	Read/Write
9676	49677	End of Day Type Period 7 (Number log of periods past 00:00)	Read/Write
9677	49678	End of Day Type Period 8 (Number log of periods past 00:00)	Read/Write
9678	49679	Tariff Number for Day Type Period 1, 0=Unassigned, 1-8=T1-T8	Read/Write
9679	49680	Tariff Number for Day Type Period 2, 0=Unassigned, 1-8=T1-T8	Read/Write
9680	49681	Tariff Number for Day Type Period 3, 0=Unassigned, 1-8=T1-T8	Read/Write
9681	49682	Tariff Number for Day Type Period 4, 0=Unassigned, 1-8=T1-T8	Read/Write
9682	49683	Tariff Number for Day Type Period 5, 0=Unassigned, 1-8=T1-T8	Read/Write
9683	49684	Tariff Number for Day Type Period 6, 0=Unassigned, 1-8=T1-T8	Read/Write
9684	49685	Tariff Number for Day Type Period 7, 0=Unassigned, 1-8=T1-T8	Read/Write
9685	49686	Tariff Number for Day Type Period 8, 0=Unassigned, 1-8=T1-T8	Read/Write
9686	49687	Copy Data to Day Type Number (1-8)	Read/Write
9687	49688	Day Type Data Valid (0=Incorrect data, 1=Valid Data)	Read Only

End of Day Type Periods

Up to 8 periods are defined by setting the Log Period number that corresponds to the end of the time period. The period number corresponding to a certain time of day is calculated from the number of periods per hour as :

Day Type End Period Number = Hours Past 00:00 x Log Periods Per hour

Time	Day Type End Period Number	
	Log Period=15 min	Log Period=30min
00:00h	0	0
00:30h	2	1
01:00h	4	2
01:30h	6	3
02:00h	8	4
02:30h	10	5
03:00h	12	6
03:30h	14	7
04:00h	16	8
04:30h	18	9
05:00h	20	10
05:30h	22	11
06:00h	24	12
06:30h	26	13
07:00h	28	14
07:30h	30	15
08:00h	32	16
08:30h	34	17
09:00h	36	18
09:30h	38	19
10:00h	40	20
10:30h	42	21
11:00h	44	22
11:30h	46	23
12:00h	48	24

Time	Day Type End Period Number	
	Log Period=15 min	Log Period=30min
12:30h	50	25
13:00h	52	26
13:30h	54	27
14:00h	56	28
14:30h	58	29
15:00h	60	30
15:30h	62	31
16:00h	64	32
16:30h	66	33
17:00h	68	34
17:30h	70	35
18:00h	72	36
18:30h	74	37
19:00h	76	38
19:30h	78	39
20:00h	80	40
20:30h	82	41
21:00h	84	42
21:30h	86	43
22:00h	88	44
22:30h	90	45
23:00h	92	46
23:30h	94	47
24:00h	96	48

Example: Day Type 1 with 4 Tariff Periods and a Logging Period of 30 Minutes

Tariff Day Type 1		
Tariff Period 1	00:00 – 07:00	Day Type End Period 1 = 14
Tariff Period 2	07:00 – 15:30	Day Type End Period 2 = 31
Tariff Period 3	15:30 – 19:00	Day Type End Period 3 = 38
Tariff Period 4	19:00 – 24:00	Day Type End Period 4 = 48

Day Type Data Rules

Data values entered in the Day Type Data Form must follow certain rules to be considered valid.

- Day Type End Period must be less than the number of logged periods in a 24 Hour Day which depends on the number of periods per hour as:

Log Period	Log Periods/Hour	Log Periods/Day
15 min	4	96
20 min	3	72
30 min	2	48

- Each Day Type End Period must be later than the end period of the previous one (ie Period 2 must be later than Period 1 etc).
- Tariff Numbers must be less than or equal to 8 (0 is unassigned)

Checking Form Values

After completing the Modbus Form it is possible to check if the data is valid by reading the Day Type Valid register (49688).

Saving a Day Type

If the data is valid it may be copied to a one of the Day Types in the meter for future use by writing the Day Type number (1-8) to the ***Copy Data to Day Type Number*** register 49687. When this register is written the form is first validated then, either it is copied to the selected Day Type, or an Exception Response is returned.

4.10.8 Week Types (Week Type 1 – Week Type 8) Table 37 (Offset 230)

Week Types are entered in the following Modbus Form:

Data Address	Modbus Register	Data	Access
9702	49703	Week Type Monday Day Type (0-8) (0=Unassigned)	Read/Write
9703	49704	Week Type Tuesday Day Type (0-8) (0=Unassigned)	Read/Write
9704	49705	Week Type Wednesday Day Type (0-8) (0=Unassigned)	Read/Write
9705	49706	Week Type Thursday Day Type (0-8) (0=Unassigned)	Read/Write
9706	49707	Week Type Friday Day Type (0-8) (0=Unassigned)	Read/Write
9707	49708	Week Type Saturday Day Type (0-8) (0=Unassigned)	Read/Write
9708	49709	Week Type Sunday Day Type (0-8) (0=Unassigned)	Read/Write
9709	49710	Copy Data to Week Type Number (1-8)	Read/Write
9710	49711	Week Type Data Valid (0=Incorrect data, 1=Valid Data)	Read Only

Week Type Data Rules

Data values entered in the Week Type Data Form must follow certain rules to be considered valid.

- Week Type Numbers must be less than or equal to 8 (0 is unassigned)

Checking Form Values

After completing the Modbus Form it is possible to check if the data is valid by reading the Week Type Valid register (49711).

Saving a Week Type

If the data is valid it may be copied to a one of the Week Types in the meter for future use by writing the Week Type number (1-8) to the ***Copy Data to Week Type Number*** register 49710. When this register is written the form is first validated then, either it is copied to the selected Week Type, or an Exception Response is returned.

4.10.9 Season Types (Season Type 1 –Season Type 8) Table 37 (Offset 249)

Season Types are entered in the following Modbus Form:

Data Address	Modbus Register	Data	Access
9721	49722	Season Type – Start Date Day (1 - 31)	Read/Write
9722	49723	Season Type – Start Date Month (1 - 12, 1=January)	Read/Write
9723	49724	Season Type – End Day (1 - 31)	Read/Write
9724	49725	Season Type – End Month (1 - 12, 1=January)	Read/Write
9725	49726	Season Type – Associated Week Type (0-8) 0=Unassigned	Read/Write
9726	49727	Copy Data to Season Type Number (1-8)	Read/Write
9727	49728	Season Type Data Valid (0=Incorrect data, 1=Valid Data)	Read Only

Season Type Data Rules

Data values entered in the Week Type Data Form must follow certain rules to be considered valid.

- Season Start Date must be before Season End Date
- The number of days must not be zero greater than the maximum for each calendar month.
- Week Type must be less than or equal to 8 (0 is unassigned)

Checking Form Values

After completing the Modbus Form it is possible to check if the data is valid by reading the Season Type Valid register (49728).

Saving a Season Type

If the data is valid it may be copied to a one of the Season Types in the meter for future use by writing the Season Type number (1-8) to the ***Copy Data to Season Type Number*** register 49727. When this register is written the form is first validated then, either it is copied to the selected Season Type, or an Exception Response is returned.

5 Modbus Data Tables (SM352 Metering Unit)

Each ***SM352*** Metering Module connected in a **multicube** system may be treated as a stand alone Modbus RTU meter making it compatible with other more conventional metering products. Each ***SM352*** contains two electricity meters which are accessed by a Modbus master using their individual Modbus IDs as described in Section 3.1.

Each ***SM352*** contains Modbus Data which is arranged into data tables for convenience. An entire data Table may be read with a single Modbus read command.

Modbus Tables in the ***SM352*** are arranged as follows:

5.1 SM352 Metering Unit Table 2 Energy Registers (System)

Data Address	Modbus Register	Data	Access
512	40513	eScale High Word	Read Only
513	40514	eScale Low Word	
514	40515	kWh High Word	Read/Write
515	40516	kWh Low Word	
516	40517	kVAh High Word	Read/Write
517	40518	kVAh Low Word	
518	40519	kvarh Import High Word	Read/Write
519	40520	kvarh Import Low Word	

5.2 SM352 Metering Unit Table 3 Energy Registers (Per Phase)

Data Address	Modbus Register	Data	Access
768	40769	eScale High Word	Read Only
769	40770	eScale Low Word	
770	40771	Load 1 kWh High Word	Read/Write
771	40772	Load 1 kWh Low Word	
772	40773	Load 2 kWh High Word	Read/Write
773	40774	Load 2 kWh Low Word	
774	40775	Load 3 kWh High Word	Read/Write
775	40776	Load 3 kWh Low Word	
776	40777	Load 1 Import kvarh High Word	Read/Write
777	40778	Load 1 Import kvarh Low Word	
778	40779	Load 2 Import kvarh High Word	Read/Write
779	40780	Load 2 Import kvarh Low Word	
780	40781	Load 3 Import kvarh High Word	Read/Write
781	40782	Load 3 Import kvarh Low Word	

5.3 SM352 Metering Unit Table 11 Instantaneous Meter Values

Data Address	Modbus Register	Data	Scaling
2816	42817	System kW	Kp
2817	42818	System kVA	Kp
2818	42819	System kvar	Kp
2819	42820	System PF	1000 = 1.000
2820	42821	Frequency	500 = 50.00
2821	42822	Phase 1 Volts	Kvp
2822	42823	Phase 1 Amps	Ki
2823	42824	Phase 1 kW	Kp
2824	42825	Phase 2 Volts	Kvp
2825	42826	Phase 2 Amps	Ki
2826	42827	Phase 2 kW	Kp
2827	42828	Phase 3 Volts	Kvp
2828	42829	Phase 3 Amps	Ki
2829	42830	Phase 3 kW	Kp
2830	42831	Phase 1 PF	1000 = 1.000
2831	42832	Phase 2 PF	1000 = 1.000
2832	42833	Phase 3 PF	1000 = 1.000
2833	42834	Ph1-Ph2 Volts	Kvl
2834	42835	Ph2-Ph3 Volts	Kvl
2835	42836	Ph3-Ph1 Volts	Kvl
2836	42837	Neutral Current	Ki
2837	42838	Amps Scale Ki	-
2838	42839	Phase Volts Scale Kvp	-
2839	42840	Line Volts Scale Kvl	-
2840	42841	Power Scale Kp	-

5.4 SM352 Metering Unit Table 12 Additional Instantaneous Values

Data Address	Modbus Register	Data	Scaling
3072	43073	Phase 1 kVA	Kp
3073	43074	Phase 2 kVA	Kp
3074	43075	Phase 3 kVA	Kp
3075	43076	Phase 1 kvar	Kp
3076	43077	Phase 2 kvar	Kp
3077	43078	Phase 3 kvar	Kp
3078	43079	Peak Hold Ph1 Amps	Ki
3079	43080	Peak Hold Ph2 Amps	Ki
3080	43081	Peak Hold Ph3 Amps	Ki
3081	43082	I1 % THD	1000 = 100%
3082	43083	I2 % THD	1000 = 100%
3083	43084	I3 % THD	1000 = 100%

5.5 SM352 Metering Unit Table 14 Meter Setup

Data Address	Modbus Register	Data	Scaling	Data Type	Access
3584	43585	Meter Model	352 = SM352	Unsigned Integer	R
3585	43586	Meter Type	0=1 x 3-Ph 1=3x1Ph	Unsigned Integer	R
3586	43587	Firmware Version	Eg. 0x14 = 1.04	Unsigned Integer	R
3587	43588	CT Primary	5 - 25,000 Amps	Unsigned Integer	R/W
3588	43589	CT Secondary	33,333 = 0.33333V	Unsigned Integer	R/W
3589	43590	CT Phase Angle	±10 = ±1.0 degrees	Signed Integer	R/W
3590	43591	CT Multiplier	1-20	Unsigned Integer	R/W
3591	43592	CT Auto Rotate	0=No Rotate, 1=Rotate	Unsigned Integer	R/W
3592	43593	PT Primary/System Volts	5 - 50,000V	Unsigned Integer	R
3593	43594	Meter Nominal Voltage	10 - 600V	Unsigned Integer	R
3594	43595	Current Demand Period 1	1=10S, 20=200S etc	Unsigned Integer	R/W
3595	43596	Current Demand Period 2		Unsigned Integer	R/W
3596	43597	Current Demand Period 3		Unsigned Integer	R/W
3597	43598	Sys Power Demand Period		Unsigned Integer	R/W
3598	43599	Power Demand Period 1		Unsigned Integer	R/W
3599	43600	Power Demand Period 2		Unsigned Integer	R/W
3600	43601	Power Demand Period 3		Unsigned Integer	R/W
3601	43602	Modbus ID	2 – 247	Unsigned Integer	R
3602	43603	Baud	96 = 9600 etc	Unsigned Integer	R/W
3603	43604	Parity	0=NO, 1=Even 2=Odd	Unsigned Integer	R/W

5.6 SM352 Metering Unit Table 28 Slave Module ASCII Names

Data Address	Modbus Register	Unit	Data	Access
7168	47169	SM352	Slave Module Serial Number High Word	Read Only
7169	47170		Slave Module Serial Number Low Word	
7170	47171	Load 1 or 3 Phase Load	Slave Module Name ASCII Characters 1-2	Read/Write
7171	47172		Slave Module Name ASCII Characters 3-4	
7172	47173		Slave Module Name ASCII Characters 5-6	
7173	47174		Slave Module Name ASCII Characters 7-8	
7174	47175		Slave Module Name ASCII Characters 9-10	
7175	47176		Slave Module Name ASCII Characters 11-12	
7176	47177		Slave Module Name ASCII Characters 13-14	
7177	47178	Load 2	Slave Module Name ASCII Characters 1-2	Read/Write
7178	47179		Slave Module Name ASCII Characters 3-4	
7179	47180		Slave Module Name ASCII Characters 5-6	
7180	47181		Slave Module Name ASCII Characters 7-8	
7181	47182		Slave Module Name ASCII Characters 9-10	
7182	47183		Slave Module Name ASCII Characters 11-12	
7183	47184		Slave Module Name ASCII Characters 13-14	
7184	47185	Load 3	Slave Module Name ASCII Characters 1-2	Read/Write
7185	47186		Slave Module Name ASCII Characters 3-4	
7186	47187		Slave Module Name ASCII Characters 5-6	
7187	47188		Slave Module Name ASCII Characters 7-8	
7188	47189		Slave Module Name ASCII Characters 9-10	
7189	47190		Slave Module Name ASCII Characters 11-12	
7190	47191		Slave Module Name ASCII Characters 13-14	

Table 28 Notes:

Each Load in each half of an SM352 slave module can be named with up to 14 printable ASCII characters. Each Modbus data register holds two 8-bit printable ASCII coded characters.

The Load Names can be programmed using the keyboard on the main Unit (Refer to the **multicube** Modular Metering System Installation Manual) or via the Modbus interface by writing to Table 28.

Example: The required name for Load Number 3 is “Freezer Num A1”

Character		ASCII Code		Data	
Number	Letter	Decimal	Hex	Address	Hex Value
1	***F***	70	0x46	47183	0x4672
2	***r***	114	0x72		
3	***e***	101	0x65	47184	0x6565
4	***e***	101	0x65		
5	***z***	122	0x7A	47185	0x7A65
6	***e***	101	0x65		
7	***r***	114	0x72	47186	0x7220
8	***Space***	32	0x20		
9	***N***	78	0x4E	47187	0x4E75
10	***u***	117	0x75		
11	***m***	109	0x6D	47188	0x6D20
12	***Space***	32	0x20		
13	***A***	65	0x41	47189	0x4131
14	***1***	49	0x31		

Figure 5-1 – Module Name Example

5.7 SM352 Metering Unit Table 30 Amalgamated Data Table (3-Phase)

Data Address	Modbus Register	Data	Scaling
7680	47681	KWh High Word	eScale
7681	47682	KWh Low Word	
7682	47683	KVAh High Word	eScale
7683	47684	KVAh Low Word	
7684	47685	Import Kvarh High Word	eScale
7685	47686	Import Kvarh Low Word	
7686	47687	Export kWh High Word	eScale
7687	47688	Export kWh Low Word	
7688	47689	Phase 1 Amps	Ki
7689	47690	Phase 2 Amps	
7690	47691	Phase 3 Amps	
7691	47692	Phase 1 Volts	Kvp
7692	47693	Phase 2 Volts	
7693	47694	Phase 3 Volts	
7694	47695	Ph1-Ph2 Volts	Kvl
7695	47696	Ph2-Ph3 Volts	
7696	47697	Ph3-Ph1 Volts	
7697	47698	Frequency	500 = 50.00
7698	47699	Phase 1 PF	1000 = 1.000
7699	47700	Phase 2 PF	
7700	47701	Phase 3 PF	
7701	47702	System PF	
7702	47703	Phase 1 kW	Kp
7703	47704	Phase 2 kW	
7704	47705	Phase 3 kW	
7705	47706	System kW	
7706	47707	Phase 1 kVA	Kp
7707	47708	Phase 2 kVA	
7708	47709	Phase 3 kVA	
7709	47710	System kVA	
7710	47711	Phase 1 kvar	Kp
7711	47712	Phase 2 kvar	
7712	47713	Phase 3 kvar	
7713	47714	System kvar	
7714	47715	Ph1 Amps Demand	Ki
7715	47716	Ph2 Amps Demand	
7716	47717	Ph3 Amps Demand	
7717	47718	Ph1 Volts Demand	Kvp
7718	47719	Ph2 Volts Demand	
7719	47720	Ph3 Volts Demand	
7720	47721	Peak Ph1 Amps	Ki
7721	47722	Peak Ph2 Amps	
7722	47723	Peak Ph3 Amps	
7723	47724	Peak Ph1 Volts	Kvp
7724	47725	Peak Ph2 Volts	
7725	47726	Peak Ph3 Volts	
7726	47727	System kW Demand (Sliding Window)	Kp
7727	47728	System kVA Demand (Sliding Window)	
7728	47729	System kvar Demand (Sliding Window)	
7729	47730	Peak Hold kW Demand (Sliding Window)	Kp
7730	47731	Peak Hold kVA Demand (Sliding Window)	
7731	47732	Peak Hold kvar Demand (Sliding Window)	
7732	47733	Neutral Current	Ki
7733	47734	Amps Scale Ki	-
7734	47735	Phase Volts Scale Kvp	-
7735	47736	Line Volts Scale Kvl	-
7736	47737	Power Scale Kp	-
7737	47738	Energy Scale eScale	-

Table 30 Notes:

All values in this table have read only access.

The amalgamated data table provides a copy of key variables in a single table, which may be read with a single Modbus command. The format and scaling of each parameter is identical to that found in the main tables.

5.8 SM352 Metering Unit Table 31 Amalgamated Data Table (Single Phase)

Data Address	Modbus Register	Data	Scaling
7936	47937	Load 1 KWh High Word	eScale
7937	47938	Load 1 KWh Low Word	
7938	47939	Load 2 KWh High Word	
7939	47940	Load 2 KWh Low Word	
7940	47941	Load 3 KWh High Word	
7941	47942	Load 3 KWh Low Word	
7942	47943	Load 1 Kvarh High Word	
7943	47944	Load 1 Kvarh Low Word	
7944	47945	Load 2 Kvarh High Word	
7945	47946	Load 2 Kvarh Low Word	
7946	47947	Load 3 Kvarh High Word	
7947	47948	Load 3 Kvarh Low Word	
7948	47949	Load 1 Pk kW Demand	Kp
7949	47950	Load 2 Pk kW Demand	
7950	47951	Load 3 Pk kW Demand	
7951	47952	Load 1 kW Demand	
7952	47953	Load 2 kW Demand	
7953	47954	Load 3 kW Demand	
7954	47955	Load 1 kW	
7955	47956	Load 2 kW	
7956	47957	Load 3 kW	
7957	47958	Load 1 kvar	
7958	47959	Load 2 kvar	
7959	47960	Load 3 kvar	
7960	47961	Load 1 kVA	
7961	47962	Load 2 kVA	
7962	47963	Load 3 kVA	
7963	47964	Load 1 Amps	Ki
7964	47965	Load 2 Amps	
7965	47966	Load 3 Amps	
7966	47967	Load 1 Volts	Kvp
7967	47968	Load 2 Volts	
7968	47969	Load 3 Volts	
7969	47970	Energy Scale (eScale)	-
7970	47971	Power Scale Kp	
7971	47972	Amps Scale Ki	
7972	47973	Phase Volts Scale Kv	
7973	47974	Load 1 PF	1000 = 1.000
7974	47975	Load 2 PF	
7975	47976	Load 3 PF	
7976	47977	Frequency	500 = 50.0

Table 31 Notes:

All values in this table have read only access.

The amalgamated data table provides a copy of key variables in a single table, which may be read with a single Modbus command. The format and scaling of each parameter is identical to that found in the main tables.

5.9 SM352 Metering Unit Table 16
Individual Tariff Energy Registers (Single Phase)

Data Address	Modbus Register	Data	Access
4096	44097	Tariff 1 - Phase 1 kWh High Word	Read Only
4097	44098	Tariff 1 - Phase 1 kWh Low Word	Read Only
4098	44099	Tariff 1 - Phase 2 kWh High Word	Read Only
4099	44100	Tariff 1 - Phase 2 kWh Low Word	Read Only
4100	44101	Tariff 1 - Phase 3 kWh High Word	Read Only
4101	44102	Tariff 1 - Phase 3 kWh Low Word	Read Only
4102	44103	Tariff 1 - Phase 1 kvarh High Word	Read Only
4103	44104	Tariff 1 - Phase 1 kvarh Low Word	Read Only
4104	44105	Tariff 1 - Phase 2 kvarh High Word	Read Only
4105	44106	Tariff 1 - Phase 2 kvarh Low Word	Read Only
4106	44107	Tariff 1 - Phase 3 kvarh High Word	Read Only
4107	44108	Tariff 1 - Phase 3 kvarh Low Word	Read Only
4108	44109	Tariff 2 - Phase 1 kWh High Word	Read Only
4109	44110	Tariff 2 - Phase 1 kWh Low Word	Read Only
4110	44111	Tariff 2 - Phase 2 kWh High Word	Read Only
4111	44112	Tariff 2 - Phase 2 kWh Low Word	Read Only
4112	44113	Tariff 2 - Phase 3 kWh High Word	Read Only
4113	44114	Tariff 2 - Phase 3 kWh Low Word	Read Only
4114	44115	Tariff 2 - Phase 1 kvarh High Word	Read Only
4115	44116	Tariff 2 - Phase 1 kvarh Low Word	Read Only
4116	44117	Tariff 2 - Phase 2 kvarh High Word	Read Only
4117	44118	Tariff 2 - Phase 2 kvarh Low Word	Read Only
4118	44119	Tariff 2 - Phase 3 kvarh High Word	Read Only
4119	44120	Tariff 2 - Phase 3 kvarh Low Word	Read Only
4120	44121	Tariff 3 - Phase 1 kWh High Word	Read Only
4121	44122	Tariff 3 - Phase 1 kWh Low Word	Read Only
4122	44123	Tariff 3 - Phase 2 kWh High Word	Read Only
4123	44124	Tariff 3 - Phase 2 kWh Low Word	Read Only
4124	44125	Tariff 3 - Phase 3 kWh High Word	Read Only
4125	44126	Tariff 3 - Phase 3 kWh Low Word	Read Only
4126	44127	Tariff 3 - Phase 1 kvarh High Word	Read Only
4127	44128	Tariff 3 - Phase 1 kvarh Low Word	Read Only
4128	44129	Tariff 3 - Phase 2 kvarh High Word	Read Only
4129	44130	Tariff 3 - Phase 2 kvarh Low Word	Read Only
4130	44131	Tariff 3 - Phase 3 kvarh High Word	Read Only
4131	44132	Tariff 3 - Phase 3 kvarh Low Word	Read Only
4132	44133	Tariff 4 - Phase 1 kWh High Word	Read Only
4133	44134	Tariff 4 - Phase 1 kWh Low Word	Read Only
4134	44135	Tariff 4 - Phase 2 kWh High Word	Read Only
4135	44136	Tariff 4 - Phase 2 kWh Low Word	Read Only
4136	44137	Tariff 4 - Phase 3 kWh High Word	Read Only
4137	44138	Tariff 4 - Phase 3 kWh Low Word	Read Only
4138	44139	Tariff 4 - Phase 1 kvarh High Word	Read Only
4139	44140	Tariff 4 - Phase 1 kvarh Low Word	Read Only
4140	44141	Tariff 4 - Phase 2 kvarh High Word	Read Only
4141	44142	Tariff 4 - Phase 2 kvarh Low Word	Read Only
4142	44143	Tariff 4 - Phase 3 kvarh High Word	Read Only
4143	44144	Tariff 4 - Phase 3 kvarh Low Word	Read Only
4144	44145	Tariff 5 - Phase 1 kWh High Word	Read Only
4145	44146	Tariff 5 - Phase 1 kWh Low Word	Read Only
4146	44147	Tariff 5 - Phase 2 kWh High Word	Read Only
4147	44148	Tariff 5 - Phase 2 kWh Low Word	Read Only
4148	44149	Tariff 5 - Phase 3 kWh High Word	Read Only
4149	44150	Tariff 5 - Phase 3 kWh Low Word	Read Only
4150	44151	Tariff 5 - Phase 1 kvarh High Word	Read Only
4151	44152	Tariff 5 - Phase 1 kvarh Low Word	Read Only
4152	44153	Tariff 5 - Phase 2 kvarh High Word	Read Only
4153	44154	Tariff 5 - Phase 2 kvarh Low Word	Read Only
4154	44155	Tariff 5 - Phase 3 kvarh High Word	Read Only
4155	44156	Tariff 5 - Phase 3 kvarh Low Word	Read Only

4156	44157	Tariff 6 - Phase 1 kWh High Word	Read Only
4157	44158	Tariff 6- Phase 1 kWh Low Word	Read Only
4158	44159	Tariff 6 - Phase 2 kWh High Word	Read Only
4159	44160	Tariff 6 - Phase 2 kWh Low Word	Read Only
4160	44161	Tariff 6 - Phase 3 kWh High Word	Read Only
4161	44162	Tariff 6 - Phase 3 kWh Low Word	Read Only
4162	44163	Tariff 6 - Phase 1 kvarh High Word	Read Only
4163	44164	Tariff 6 - Phase 1 kvarh Low Word	Read Only
4164	44165	Tariff 6 - Phase 2 kvarh High Word	Read Only
4165	44166	Tariff 6 - Phase 2 kvarh Low Word	Read Only
4166	44167	Tariff 6 - Phase 3 kvarh High Word	Read Only
4167	44168	Tariff 6 - Phase 3 kvarh Low Word	Read Only
4168	44169	Tariff 7 - Phase 1 kWh High Word	Read Only
4169	44170	Tariff 7 - Phase 1 kWh Low Word	Read Only
4170	44171	Tariff 7 - Phase 2 kWh High Word	Read Only
4171	44172	Tariff 7 - Phase 2 kWh Low Word	Read Only
4172	44173	Tariff 7 - Phase 3 kWh High Word	Read Only
4173	44174	Tariff 7 - Phase 3 kWh Low Word	Read Only
4174	44175	Tariff 7 - Phase 1 kvarh High Word	Read Only
4175	44176	Tariff 7 - Phase 1 kvarh Low Word	Read Only
4176	44177	Tariff 7 - Phase 2 kvarh High Word	Read Only
4177	44178	Tariff 7 - Phase 2 kvarh Low Word	Read Only
4178	44179	Tariff 7 - Phase 3 kvarh High Word	Read Only
4179	44180	Tariff 7 - Phase 3 kvarh Low Word	Read Only
4180	44181	Tariff 8 - Phase 1 kWh High Word	Read Only
4181	44182	Tariff 8 - Phase 1 kWh Low Word	Read Only
4182	44183	Tariff 8 - Phase 2 kWh High Word	Read Only
4183	44184	Tariff 8 - Phase 2 kWh Low Word	Read Only
4184	44185	Tariff 8 - Phase 3 kWh High Word	Read Only
4185	44186	Tariff 8 - Phase 3 kWh Low Word	Read Only
4186	44187	Tariff 8 - Phase 1 kvarh High Word	Read Only
4187	44188	Tariff 8 - Phase 1 kvarh Low Word	Read Only
4188	44189	Tariff 8 - Phase 2 kvarh High Word	Read Only
4189	44190	Tariff 8 - Phase 2 kvarh Low Word	Read Only
4190	44191	Tariff 8 - Phase 3 kvarh High Word	Read Only
4191	44192	Tariff 8 - Phase 3 kvarh Low Word	Read Only

Table 16 Notes:

All values in this table have read only access.
SM352 Modules configured as 3-Phase Meters will return zero for single phase values.
Tariff Energy registers require scaling as described in Section 3.5.

5.10 SM352 Metering Unit Table 17
Individual Tariff Energy Registers (Single Phase)

Data Address	Modbus Register	Data	Access
4352	44353	Tariff 1 System kWh High Word	Read Only
4353	44354	Tariff 1 System kWh Low Word	Read Only
4354	44355	Tariff 1 System kvarh High Word	Read Only
4355	44356	Tariff 1 System kvarh Low Word	Read Only
4356	44357	Tariff 2 System kWh High Word	Read Only
4357	44358	Tariff 2 System kWh Low Word	Read Only
4358	44359	Tariff 2 System kvarh High Word	Read Only
4359	44360	Tariff 2 System kvarh Low Word	Read Only
4360	44361	Tariff 3 System kWh High Word	Read Only
4361	44362	Tariff 3 System kWh Low Word	Read Only
4362	44363	Tariff 3 System kvarh High Word	Read Only
4363	44364	Tariff 3 System kvarh Low Word	Read Only
4364	44365	Tariff 4 System kWh High Word	Read Only
4365	44366	Tariff 4 System kWh Low Word	Read Only
4366	44367	Tariff 4 System kvarh High Word	Read Only
4367	44368	Tariff 4 System kvarh Low Word	Read Only
4368	44369	Tariff 5 System kWh High Word	Read Only
4369	44370	Tariff 5 System kWh Low Word	Read Only
4370	44371	Tariff 5 System kvarh High Word	Read Only
4371	44372	Tariff 5 System kvarh Low Word	Read Only
4372	44373	Tariff 6 System kWh High Word	Read Only
4373	44374	Tariff 6 System kWh Low Word	Read Only
4374	44375	Tariff 6 System kvarh High Word	Read Only
4375	44376	Tariff 6 System kvarh Low Word	Read Only
4376	44377	Tariff 7 System kWh High Word	Read Only
4377	44378	Tariff 7 System kWh Low Word	Read Only
4378	44379	Tariff 7 System kvarh High Word	Read Only
4379	44380	Tariff 7 System kvarh Low Word	Read Only
4380	44381	Tariff 8 System kWh High Word	Read Only
4381	44382	Tariff 8 System kWh Low Word	Read Only
4382	44383	Tariff 8 System kvarh High Word	Read Only
4383	44384	Tariff 8 System kvarh Low Word	Read Only

Table 17 Notes:

All values in this table have read only access.
SM352 Modules configured as Single Phase Meters will return zero for 3-Phase values.
Tariff Energy registers require scaling as described in Section 3.5.

6 Specification

6.1 Modbus RS485 Module

GENERAL		
Dimensions	Height :	164mm
	Depth: (Off Wall)	96mm
	Length:	29mm
Modbus RS485 Interface	RS485	Half duplex, 2 Wires + 0V
	RX Load:	¼ Unit load per meter (max 128 per bus)
	TX Drive:	32 Unit loads maximum
	Protocol:	Modbus RTU/JBUS, 16-Bit CRC
	Baud:	4800, 9600, 19200 user programmable
	Address:	1-200 user programmable
Isolation (RS485 Output)	2.5kV (1 minute) RS485 Port from all other circuits	
Performance		
Reply Time	Maximum 250mS	
Repeat Commands	Repeat command may start 10mS after last command is complete	
Buffer (Data Packet Size)	Data Read:	Max 128 Registers in as ingle Read Command (Modbus compatibility)
	Data Write:	Max 128 Registers in as ingle Write Command (Modbus compatibility)
POWER SUPPLY		
DC Power From Master Display	DC Power Supply:	5.0V DC
	Maximum Load:	1.2 W