CewePrometer
Modbus TCP/RTU mapping
Meter reading

Rev 1.3.02

Contents

Revision History

Revision	Date	Description	Signature
1.0	Sep 7, 2005	Messages in meter firmware 1.2.0	JHN
1.30.01	May 2, 2006	Added messages in CeweMod, Messages for read out last logged value in logger 1 and 2.	JHN
1.3.02	Apr. 16. 2008	Corrected table for extra registers	JHN

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Overview

This document describes how to read data from the CeweMod using Modbus TCP or RTU.

This document only describes meter reading. It is not intended for meter configuration.

Communication messages

General info

Floats
When the meter returns floating point values they are given in scientific notation with 1 to 9 significant digits. Decimal point and/or exponent will be omitted when possible, e.g.:
0
1e9
1.23456789
1.23456789e10 etc.

Floats are either single (32 bits) or double (64 bits) precision.

Hex bytes
Hex bytes are always sent/received as two characters i.e. “B” is sent/received as “0B”.

Integers
May be 8, 16 or 32 bits. Where the bit resolution exceeds 8, it is stated. Integers are always sent/received with leading zeroes omitted.

Message id:s
The message id:s are in hexadecimal format. Leading zeroes may be omitted i.e. 015200 may be sent as 15200. The meter will recognise both upper case and lower case characters in the id i.e. 108a00 and 1008A00 are both acceptable. The meter will always send upper case characters in the id.

Instantaneous values

Modbus register	Bytes per entry	Description	Type
	4 bytes	**Instant values**	2 Reg per float
1 – 2		1: phase voltage L1 (volts)[1]	Single precision
3 – 4		2: phase voltage L2	float
5 – 6		3: phase voltage L3	
7 – 8		4: main voltage L1-L2 (volts)	
9 – 10		5: main voltage L2-L3	
11 – 12		6: main voltage L3-L1	
13 – 14		7: current L1 (ampere)	
15 – 16		8: current L2	
17 – 18		9: current L3	
19 – 20		10: phase symmetry voltage L1 (rad -Pi...Pi)[2]	
21 – 22		11: phase symmetry voltage L2	
23 – 24		12: phase symmetry voltage L3	
25 – 26		13: phase symmetry current L1 (rad -Pi...Pi)	
27 – 28		14: phase symmetry current L2	
29 – 30		15: phase symmetry current L3	
31- 32		16: phase angle L1 (rad -Pi...Pi)	
33 – 34		17: phase angle L2	
35 – 36		18: phase angle L3	
37 – 38		19: power factor L1 (0.0...1.0)	
39 – 40		20: power factor L2	
41 – 42		21: power factor L3	
43 – 44		22: active power L1 (W)[4]	
45 – 46		23: active power L2	
47 – 48		24: active power L3	
49 – 50		25: reactive power L1 (var)[4]	
51 – 52		26: reactive power L2	
53 – 54		27: reactive power L3	
55 – 56		28: apparent power L1 (VA)	
57 – 58		29: apparent power L2	
59 – 60		30: apparent power L3	
61 – 62		31: THD voltage L1 (0.0...1.0)[5]	
63 – 64		32: THD voltage L2	
65 – 66		33: THD voltage L3	
67 – 68		34: THD current L1 (0.0...1.0)[5]	
69 – 70		35: THD current L2	
71 – 72		36: THD current L3	
73 – 74		37: total active power (W)[4]	
75 – 76		38: total reactive power (var)[4]	
77 – 78		39: total apparent power (VA)	
79 – 80		40: total power factor (0.0...1.0)	
81 – 82		41: total phase angle (rad -Pi...Pi)	
83 – 84		42: frequency (Hz)	
85 – 86		43: voltage transformer ratio	
87 – 88		44: current transformer ratio	
89 – 90		45: secondary nominal voltage (volt)[3]	
91 – 92		46: secondary nominal current (ampere)	
		[1] For 2-element meters phase voltage is 0.	
		[2] For 2-element meters the phase symmetries are for the line to line voltages.	
		[3] Given in phase voltage for 3-element meters and line to line voltage for 2-element meters.	
		[4] Positive values, means import energy direction, negative values export energy direction.	
		[5] 1.0 equals 100%	

Instantaneous values - Harmonics

Modbus register	Bytes per entry	Description	Type
	4 bytes	**Harmonic amplitudes**	2 Reg per float Double precision float
93 – 94		0: voltage L1	
95 – 96		voltage L1: fundamental value	
97 – 98		voltage L1: 1st harmonic value	
…		voltage L1: 2nd harmonic value	
153 – 154		…	
		voltage L1: 30th harmonic value	
155 – 156		1: voltage L2	
157 – 158		voltage L2: fundamental value	
158 – 159		voltage L2: 1st harmonic value	
…		voltage L2: 2nd harmonic value	
215 – 216		…	
		voltage L2: 30th harmonic value	
217 – 218		2: voltage L3	
219 – 220		voltage L3: fundamental value	
221 – 222		voltage L3: 1st harmonic value	
…		voltage L3: 2nd harmonic value	
277 – 278		…	
		voltage L3: 30th harmonic value	
279 – 280		3: current L1	
		current L1: fundamental value	
		current L1: 1st harmonic value	
		current L1: 2nd harmonic value	
339 – 340		…	
		current L1: 30th harmonic value	
341 – 342		4: current L2	
		current L2: fundamental value	
		current L2: 1st harmonic value	
		current L2: 2nd harmonic value	
401 – 402		…	
		current L2: 30th harmonic value	
403 – 404		5: current L3	
		current L3: fundamental value	
		current L3: 1st harmonic value	
		current L3: 2nd harmonic value	
		…	
		current L3: 30th harmonic value	

Energy registers

Modbus id	Bytes per entry	Description	Type
	8 bytes	**Energy registers**	4 Reg per float Double precision float
465 – 468		1: active energy imp. (Wh)	
469 – 472		2: active energy exp.	
473 – 476		3: reactive energy QI (varh)	
477 – 480		4: reactive energy QII	
481 – 484		5: reactive energy QIII	
485 – 488		6: reactive energy QIV	
489 – 492		7: apparent energy imp. (VAh)	
493 – 496		8: apparent energy exp.	
497 – 500		9: reactive energy imp. (varh)	
501 – 504		10: reactive energy exp.	
505 – 508		11: reactive energy ind.	
509 – 512		12: reactive energy cap.	
513 – 516		13: active energy imp. L1 (Wh)	
517 – 520		14: active energy imp. L2	
521 – 524		15: active energy imp. L3	
525 – 528		16: active energy exp. L1	
529 – 532		17: active energy exp. L2	
533 – 536		18: active energy exp. L3	

External registers (pulse input registers)

Modbus id	Bytes per entry	Description	Type
437 – 340 … 566 – 568	8 bytes	**External registers** External register 1. … External register 8.	4 registers per float Double precision float
569 – 577 … 632 – 640	18 bytes	**External register description 0...7** Description, External register 1 … Description, External register 8	9 registers with ASCII 9 registers null with terminated string
641 – 643 … 662 – 664	5 bytes	**External register unit 0...7** Description, External register 1 … Description, External register 8	3 registers with ASCII
665 666 … 679 680	1 byte (hi byte)	**External register format 0...7** (prefix, no. of decimals) External register 1 (Prefix) External register 1 (nbr of decimals) … External register 8 (Prefix) External register 8 (nbr of decimals) prefix use 0: no prefix 1: kilo 2: Mega 3: Giga 4: Tera no. of decimals: 0...4	One register for Prefix and one register for Decimals

Log registers

Modbus id	Bytes per entry	Description	Type
	8 bytes	Records Logger 1	1 Reg for date and mask 4 Reg per float for each channel
967		Year of log record	
968		Month of log record	
969		Day of log record	
970		Hour of log record	
971		Minute of log record	
972		Bitmask	
973-976		Logger 1 Log channel 1	
977-980		Logger 1 Log channel 2	
981-984		Logger 1 Log channel 3	
985-988		Logger 1 Log channel 4	
989-992		Logger 1 Log channel 5	
993-996		Logger 1 Log channel 6	
997-1000		Logger 1 Log channel 7	
1001-1004		Logger 1 Log channel 8	
1005-1008		Logger 1 Log channel 9	
1009-1012		Logger 1 Log channel 10	
	8 bytes	Records Logger 2	1 Reg for date and mask 4 Reg per float for each channel
1016		Year of log record	
1017		Month of log record	
1018		Day of log record	
1019		Hour of log record	
1020		Minute of log record	
1021		Bitmask	
1022-1025		Logger 2 Log channel 1	
1026-1029		Logger 2 Log channel 2	
1030-1033		Logger 2 Log channel 3	
1034-1037		Logger 2 Log channel 4	
1038-1041		Logger 2 Log channel 5	
1042-1045		Logger 2 Log channel 6	
1046-1049		Logger 2 Log channel 7	
1050-1053		Logger 2 Log channel 8	
1054-1057		Logger 2 Log channel 9	
1058-1061		Logger 2 Log channel 10	

Event log

Modbus id	Bytes per entry	Description	Type
	14 bytes	**Events** event id[1]: 16 bit integer data: 6 hex bytes of data. The interpretation of these bytes depends on the event id.	7 Registers for each event
681 – 694		Event 1	
…		…	
947 – 960		Event 40	
		[1]The event id's are listed in the section Event ID's and data	

Miscellaneous

Modbus id	Bytes per entry	Description	Example
961	1 bytes	**Measuring properties** as 16 bit integer. bit use 0: measuring mode 0 = 3-element, 1 = 2-element 1: nominal frequency 0 = 50Hz, 1 = 60Hz	
962	2 byte (hi byte)	**Prefix for energy registers** prefix use 0: no prefix 1: kilo 2: Mega 3: Giga 4: Tera no. of decimals: 0...4	One register for prefix and one register for decimals
963	2 byte (hi byte)	**Number of decimals for energy registers** no. of decimals: 0...4	

Extra registers

Modbus id	Bytes per entry	Description	Example
1062	4 bytes	**Energy registers** as 32 bit integer (divided by prefix).	
1062-1063		1: active energy imp. (Wh)	
1064-1065		2: active energy exp.	
1066-1067		3: reactive energy QI (varh)	
1068-1069		4: reactive energy QII	
1070-1071		5: reactive energy QIII	
1072-1073		6: reactive energy QIV	
1074-1075		7: apparent energy imp. (VAh)	
1076-1077		8: apparent energy exp.	
1078-1079		9: reactive energy imp. (varh)	
1080-1081		10: reactive energy exp.	
1082-1083		11: reactive energy ind.	
1084-1085		12: reactive energy cap.	
1086-1087		13: active energy imp. L1 (Wh)	
1088-1089		14: active energy imp. L2	
1090-1091		15: active energy imp. L3	
1092-1093		16: active energy exp. L1	
1094-1095		17: active energy exp. L2	
1096-1097		18: active energy exp. L3	

Instantaneous values

Modbus id	Bytes per entry	Description	Example
1098	4 bytes	**Instant values** As 32 bit integer (multiplied with 100) 1: phase voltage L1 (volts)[1] 2: phase voltage L2 3: phase voltage L3 4: main voltage L1-L2 (volts) 5: main voltage L2-L3 6: main voltage L3-L1 7: current L1 (ampere) 8: current L2 9: current L3 10: phase symmetry voltage L1 (rad -Pi...Pi)[2] 11: phase symmetry voltage L2 12: phase symmetry voltage L3 13: phase symmetry current L1 (rad -Pi...Pi) 14: phase symmetry current L2 15: phase symmetry current L3 16: phase angle L1 (rad -Pi...Pi) 17: phase angle L2 18: phase angle L3 19: power factor L1 (0.0...1.0) 20: power factor L2 21: power factor L3 22: active power L1 (W)[4] 23: active power L2 24: active power L3 25: reactive power L1 (var)[4] 26: reactive power L2 27: reactive power L3 28: apparent power L1 (VA) 29: apparent power L2 30: apparent power L3 31: THD voltage L1 (0.0...1.0)[5] 32: THD voltage L2 33: THD voltage L3 34: THD current L1 (0.0...1.0)[5] 35: THD current L2 36: THD current L3 37: total active power (W)[4] 38: total reactive power (var)[4] 39: total apparent power (VA) 40: total power factor (0.0...1.0) 41: total phase angle (rad -Pi...Pi) 42: frequency (Hz) 43: voltage transformer ratio 44: current transformer ratio 45: secondary nominal voltage (volt)[3] 46: secondary nominal current (ampere) [1] For 2-element meters phase voltage is 0. [2] For 2-element meters the phase symmetries	

Event ID's and data

The message event returns event ID's as well as additional event data. The event id is returned as a decimal integer and the additional data as 6 hexadecimal bytes.

ID	Data						Description	Example
1	Phase (L1=00...L3=02)						Single phase reverse energy direction	1,010000000000
	phase	00	00	00	00	00		
2	Meter time after adjustment in seconds since 1 Jan 1970 00:00 (32 bit)						Time set	(2004-11-04 16:58:07) 2,9F5F8A410000
	LSB			MSB	00	00		
3	N/A						Registers cleared	3,000000000000
4	Logger no. (00=logger0, 01=logger1)						Logger has been reset	4,010000000000
	logg.no.	00	00	00	00	00		
5	N/A						Supply lost	5,000000000000
6	N/A						Historical registers cleared (all billing periods cleared)	6,000000000000
7	N/A						Historical period finished and MD-registers reset (Billing period reset)	7,000000000000
8	N/A						All MD-registers cleared due to configuration changed	8,000000000000
9	Logger no. (00=logger0, 01=logger1)						Logger cleared due to configuration changed	9,010000000000
	logg.no.	00	00	00	00	00		
14	Duration in seconds (32 bit)						Voltage interruption in seconds	(0 seconds) 14,000000000000
	LSB	00	00	MSB	00	00		
15	Duration in seconds (32 bit)						Voltage sag	(674 seconds) 15,A20200000000
	LSB	00	00	MSB	00	00		
16	Duration in seconds (32 bit)						Voltage swell	(341 seconds) 16,550100000000
	LSB	00	00	MSB	00	00		
17	N/A						Voltage below limit	17,000000000000
18	N/A						Voltage exceeding limit	18,000000000000
19	N/A						Power factor below limit	19,000000000000
20	N/A						Voltage unbalance	20,000000000000
21	N/A						Current unbalance	21,000000000000
22	N/A						Active power below limit	22,000000000000
23	N/A						Active power exceeding limit	23,000000000000
24	N/A						Voltage THD exceeding limit	24,000000000000
25	N/A						Current THD exceeding limit	25,000000000000
26	Phase (L1=00...L3=02), Harmonic no (01-30)						Single harmonic on voltage exceeding limit	(5:th harm on L1) 26,000400000000
	phase	harm.no.	00	00	00	00		
27	Phase (L1=00...L3=02), Harmonic no (01-30)						Single harmonic on current exceeding limit	(3:rd harm on L2) 27,010200000000
	phase	harm.no.	00	00	00	00		
28	Input no. (00-07), pulse length in ms. (16 bit)						Digital input pulse length too long	(inp. 4, 300ms) 28,042C01000000
	inp.no.	pl.LSB	pl.MSB	00	00	00		

29	Input no. (00-07), pulse length in ms. (16 bit)						Digital input pulse length too short	(inp. 3, 20ms) 29,031400000000
	inp.no.	pl.LSB	pl.MSB	00	00	00		
30	Bitmask of one or a combination of phases (bit0=L1, bit1=L2, bit2=L3)						Voltage phase failure. 2-element meters will always have phases = 00.	(Phase failure on L1 and L2) 30,030000000000
	phases	00	00	00	00	00		
42	N/A						Meter configuration altered	42,000000...
43	N/A						Meter calibration altered	43,000000...
44	N/A						Meter initialised	44,000000...
45	Bitmask of one or a combination of phases/elements (bit0=L1, bit1=L2, bit2=L3)						Reverse running. 2-element meters will always have bit1(L2) = 0	(Reverse running on L1 and L3) 45,050000000000
	phases	00	00	00	00	00		
46	N/A						Meter firmware upgrade	46,000000...
1000	N/A						Energy registers corrupt	1000,000000...
1001	N/A						Communication module config. corrupt	1001,000000...
1002	N/A						I/O module config. corrupt	1002,000000...
1003	N/A						Measuring module config. corrupt	1003,000000...
1004	N/A						Measuring module initialisation corrupt	1004,000000...
1005	N/A						Measuring module calibration corrupt	1005,000000...
1006	N/A						Main module config. corrupt	1006,000000...
1007	N/A						Historical period corrupt	1007,000000...
1008	N/A						MD-register corrupt	1008,000000...
1009	N/A						Measuring module faulty	1009,000000...