

# Expansion module 20CM-CT6

## Modbus Address List



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## General

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# Modbus

## Modbus functions (Slave)

As a slave, the 20CM-CT6 supports the following modbus functions:

### 03 Read Holding Registers

Reads the binary contents of holding registers (4X references) in the slave.

### 06 Preset Single Register

Presets a value into a single holding register (4X reference). When broadcast, the function presets the same register reference in all attached slaves.

### 16 (10Hex) Preset Multiple Registers

Presets values into a sequence of holding registers (4X references). When broadcast, the function presets the same register references in all attached slaves.

### 23 (17Hex) Read/Write 4X Registers

Performs a combination of one read and one write operation in a single Modbus transaction. The function can write new contents to a group of 4XXX registers, and then return the contents of another group of 4XXX registers. Broadcast is not supported.

## Transfer parameters

The 20CM-CT6 supports via the head unit the following transfer parameters:

Baud rate	: 9.6 kbps, 19.2 kbps, 38.4 kbps, 57.6 kbps, 115.2 kbps und 921.6 kbps
Data bits	: 8
Parity	: none
Stop bits (UMG 20 CM)	: 1

## Byte sequence

The data in the modbus address list can called up in the Big-Endian (high-Byte before low-Byte). The addresses described in this address list supply the data in the "Big-Endian" format.

## Update rate

The modbus register addresses are updated every 200 ms.

## Number formats

Type	Size	Minimum	Maximum
char	8 bit	0	255
byte	8 bit	-128	127
short	16 bit	$-2^{15}$	$2^{15} - 1$
int	32 bit	$-2^{31}$	$2^{31} - 1$
uint	32 bit	0	$2^{32} - 1$
long64	64 bit	$-2^{63}$	$2^{63} - 1$
float	32 bit	IEEE 754	IEEE 754
double	64 bit	IEEE 754	IEEE 754

## Address list

Address	Type	Designation	Unit	Range	Remark
700	short	reset device			function is triggered by writing the value 1357h
701	uint	Time of Day	UTC		
**** FehlerCodes der Firmware ****					
703	char	Device faults			
704	short	Erros can			
705	char	Errors main			
706	char	Errors io			
707	char	Errors eeprom			
708	short	Errors i2c			
709	char	Errors measure			
710	short	Errors parameter			
711	char	Errors RTC			
712	char	Errors Scheduler			
713	char	Errors History			measured value memory
**** Device identification ****					
911	uint	Serial Number			
913	short	Firmware Version			low-byte: bug fix; high-byte: functional range
914	char	Hardware Version			
915	char	Device Type			50 - 20CM-CT6
**** Measured values ****					
1012	float	Current[0]	A		effective value of current channel I1
1014	float	Current[1]	A		effective value of current channel I2
1016	float	Current[2]	A		effective value of current channel I3
1018	float	Current[3]	A		effective value of current channel I4
1020	float	Current[4]	A		effective value of current channel I5
1022	float	Current[5]	A		effective value of current channel I6

Address	Type	Designation	Unit	Range	Remark
1052	float	Real Power[0]	W		
1054	float	Real Power[1]	W		
1056	float	Real Power[2]	W		
1058	float	Real Power[3]	W		
1060	float	Real Power[4]	W		
1062	float	Real Power[5]	W		
1092	float	Reactive Power[0]	var		
1094	float	Reactive Power[1]	var		
1096	float	Reactive Power[2]	var		
1098	float	Reactive Power[3]	var		
1100	float	Reactive Power[4]	var		
1102	float	Reactive Power[5]	var		
1132	float	Apparent power[0]	VA		
1134	float	Apparent power[1]	VA		
1136	float	Apparent power[2]	VA		
1138	float	Apparent power[3]	VA		
1140	float	Apparent power[4]	VA		
1142	float	Apparent power[5]	VA		
1172	float	Power factor[0]	1	-1..+1	
1174	float	Power factor[1]	1	-1..+1	
1176	float	Power factor[2]	1	-1..+1	
1178	float	Power factor[3]	1	-1..+1	
1180	float	Power factor[4]	1	-1..+1	
1182	float	Power factor[5]	1	-1..+1	
1212	float	Energy[0]	Wh		
1214	float	Energy[1]	Wh		
1216	float	Energy[2]	Wh		
1218	float	Energy[3]	Wh		
1220	float	Energy[4]	Wh		
1222	float	Energy[5]	Wh		
1252	short	reset energy[0]			function is triggered by writing the value 1357h
1253	short	reset energy[1]			
1254	short	reset energy[2]			
1255	short	reset energy[3]			
1256	short	reset energy[4]			
1257	short	reset energy[5]			
1272	float	Main Frequency	Hz		
1274	float	Current of fundamental wave[0]	A		amount of the basic oscillation current
1276	float	Current of fundamental wave[1]	A		amount of the basic oscillation current

Address	Type	Designation	Unit	Range	Remark
1278	float	Current of fundamental wave[2]	A		amount of the basic oscillation current
1280	float	Current of fundamental wave[3]	A		amount of the basic oscillation current
1282	float	Current of fundamental wave[4]	A		amount of the basic oscillation current
1284	float	Current of fundamental wave[5]	A		amount of the basic oscillation current
1314	float	cosPhi[0]	1	-1..+1	
1316	float	cosPhi[1]	1	-1..+1	
1318	float	cosPhi[2]	1	-1..+1	
1320	float	cosPhi[3]	1	-1..+1	
1322	float	cosPhi[4]	1	-1..+1	
1324	float	cosPhi[5]	1	-1..+1	
1354	float	Phase Angle of current[0]	Grad	-180..+180	phase angle of basic oscillation current in relation to the associated voltage channel
1356	float	Phase Angle of current[1]	Grad	-180..+180	phase angle of basic oscillation current in relation to the associated voltage channel
1358	float	Phase Angle of current[2]	Grad	-180..+180	phase angle of basic oscillation current in relation to the associated voltage channel
1360	float	Phase Angle of current[3]	Grad	-180..+180	phase angle of basic oscillation current in relation to the associated voltage channel
1362	float	Phase Angle of current[4]	Grad	-180..+180	phase angle of basic oscillation current in relation to the associated voltage channel
1364	float	Phase Angle of current[5]	Grad	-180..+180	phase angle of basic oscillation current in relation to the associated voltage channel

\*\*\*\* Extreme value memory for currents \*\*\*\*

2000	float	Minimum Current[0]	A		
2002	float	Minimum Current[1]	A		
2004	float	Minimum Current[2]	A		
2006	float	Minimum Current[3]	A		
2008	float	Minimum Current[4]	A		
2010	float	Minimum Current[5]	A		
2040	float	Maximum Current[0]	A		

Address	Type	Designation	Unit	Range	Remark
2042	float	Maximum Current[1]	A		
2044	float	Maximum Current[2]	A		
2046	float	Maximum Current[3]	A		
2048	float	Maximum Current[4]	A		
2050	float	Maximum Current[5]	A		
2080	uint	Minimum Current Time-stamp[0]	UTC		
2082	uint	Minimum Current Time-stamp[1]	UTC		
2084	uint	Minimum Current Time-stamp[2]	UTC		
2086	uint	Minimum Current Time-stamp[3]	UTC		
2088	uint	Minimum Current Time-stamp[4]	UTC		
2090	uint	Minimum Current Time-stamp[5]	UTC		
2120	uint	Maximum Current Time-stamp[0]	UTC		
2122	uint	Maximum Current Time-stamp[1]	UTC		
2124	uint	Maximum Current Time-stamp[2]	UTC		
2126	uint	Maximum Current Time-stamp[3]	UTC		
2128	uint	Maximum Current Time-stamp[4]	UTC		
2130	uint	Maximum Current Time-stamp[5]	UTC		
2160	short	reset minimum and maximum current[0]			function is triggered by writing the value 1357h
2161	short	reset minimum and maximum current[1]			
2162	short	reset minimum and maximum current[2]			
2163	short	reset minimum and maximum current[3]			
2164	short	reset minimum and maximum current[4]			
2165	short	reset minimum and maximum current[5]			

Address	Type	Designation	Unit	Range	Remark
**** Status of threshold monitoring of current channels ****					
2180	uint	Under current faults	bit field		Bit0..5 - current channel I1-I6
2182	uint	Over Current faults	bit field		Bit0..5 - current channel I1-I6
2184	uint	Overdrive faults	bit field		Bit0..5 - current channel I1-I6
2186	uint	Under current warnings	bit field		Bit0..5 - current channel I1-I6
2188	uint	Over current warnings	bit field		Bit0..5 - current channel I1-I6
2190	uint	Current transformer faults	bit field		Bit0..5 - current channel I1-I6
2192	uint	Amplifier faults	bit field		Bit0..5 - current channel I1-I6
2194	short	reset limit messages			function is triggered by writing the value 1357h
**** Extreme value memory for real power ****					
2200	float	Minimum real power[0]	W		
2202	float	Minimum real power[1]	W		
2204	float	Minimum real power[2]	W		
2206	float	Minimum real power[3]	W		
2208	float	Minimum real power[4]	W		
2210	float	Minimum real power[5]	W		
2240	float	Maximum real power[0]	W		
2242	float	Maximum real power[1]	W		
2244	float	Maximum real power[2]	W		
2246	float	Maximum real power[3]	W		
2248	float	Maximum real power[4]	W		
2250	float	Maximum real power[5]	W		
2280	uint	Minimum real power Timestamp[0]	UTC		
2282	uint	Minimum real power Timestamp[1]	UTC		
2284	uint	Minimum real power Timestamp[2]	UTC		
2286	uint	Minimum real power Timestamp[3]	UTC		
2288	uint	Minimum real power Timestamp[4]	UTC		



Address	Type	Designation	Unit	Range	Remark
2290	uint	Minimum real power Timestamp[5]	UTC		
2320	uint	Maximum real power Timestamp[0]	UTC		
2322	uint	Maximum real power Timestamp[1]	UTC		
2324	uint	Maximum real power Timestamp[2]	UTC		
2326	uint	Maximum real power Timestamp[3]	UTC		
2328	uint	Maximum real power Timestamp[4]	UTC		
2330	uint	Maximum real power Timestamp[5]	UTC		
2360	short	reset minimum and maximum real power[0]			function is triggered by writing the value 1357h
2361	short	reset minimum and maximum real power[1]			
2362	short	reset minimum and maximum real power[2]			
2363	short	reset minimum and maximum real power[3]			
2364	short	reset minimum and maximum real power[4]			
2365	short	reset minimum and maximum real power[5]			
**** Sum channels ****					
2400	float	Sum of real power[0]	W		total real power of summed channels
2402	float	Sum of real power[1]	W		total real power of summed channels
2404	float	Sum of real power[2]	W		total real power of summed channels
2414	float	Sum of energy[0]	Wh		total real power of summed channels
2416	float	Sum of energy[1]	Wh		total real power of summed channels
2418	float	Sum of energy[2]	Wh		total real power of summed channels

Address	Type	Designation	Unit	Range	Remark
2428	uint	Channels to sum up[0]	Bitfeld		Bit0..5 - current channel I1..I6 include in the sum
2430	uint	Channels to sum up[1]	Bitfeld		Bit0..5 - current channel I1..I6 include in the sum
2432	uint	Channels to sum up[2]	Bitfeld		Bit0..5 - current channel I1..I6 include in the sum
2442	short	Sum of under current faults	Bitfeld		Bit0..2 - sum channel 1..3
2443	short	Sum of over current faults	Bitfeld		Bit0..2 - sum channel 1..3
2444	short	Sum of under current warnings	Bitfeld		Bit0..2 - sum channel 1..3
2445	short	Sum of over current warnings	Bitfeld		Bit0..2 - sum channel 1..3
**** Analysis channel ****					
2500	byte	Channel to analyze			0 - no analysis; 1..6 - analyze current channel I1..I6
2501	float	Crest factor	1		
2503	float	Total Harmonic distortion	1		
2505	char	Proportion of harmonic[0]	%	0..100	basic oscillation
2506	char	Proportion of harmonic[1]	%	0..100	1. Harmonic
2507	char	Proportion of harmonic[2]	%	0..100	2. Harmonic
2508	char	Proportion of harmonic[3]	%	0..100	3. Harmonic
2509	char	Proportion of harmonic[4]	%	0..100	4. Harmonic
2510	char	Proportion of harmonic[5]	%	0..100	5. Harmonic
2511	char	Proportion of harmonic[6]	%	0..100	6. Harmonic
2512	char	Proportion of harmonic[7]	%	0..100	7. Harmonic
2513	char	Proportion of harmonic[8]	%	0..100	8. Harmonic
2514	char	Proportion of harmonic[9]	%	0..100	9. Harmonic
2515	char	Proportion of harmonic[10]	%	0..100	10. Harmonic
2516	char	Proportion of harmonic[11]	%	0..100	11. Harmonic
2517	char	Proportion of harmonic[12]	%	0..100	12. Harmonic
2518	char	Proportion of harmonic[13]	%	0..100	13. Harmonic
2519	char	Proportion of harmonic[14]	%	0..100	14. Harmonic
2520	char	Proportion of harmonic[15]	%	0..100	15. Harmonic
2521	char	Proportion of harmonic[16]	%	0..100	16. Harmonic
2522	char	Proportion of harmonic[17]	%	0..100	17. Harmonic
2523	char	Proportion of harmonic[18]	%	0..100	18. Harmonic
2524	char	Proportion of harmonic[19]	%	0..100	19. Harmonic

Address	Type	Designation	Unit	Range	Remark
2525	char	Proportion of harmonic[20]	%	0..100	20. Harmonic
2526	char	Proportion of harmonic[21]	%	0..100	21. Harmonic
2527	char	Proportion of harmonic[22]	%	0..100	22. Harmonic
2528	char	Proportion of harmonic[23]	%	0..100	23. Harmonic
2529	char	Proportion of harmonic[24]	%	0..100	24. Harmonic
2530	char	Proportion of harmonic[25]	%	0..100	25. Harmonic
2531	char	Proportion of harmonic[26]	%	0..100	26. Harmonic
2532	char	Proportion of harmonic[27]	%	0..100	27. Harmonic
2533	char	Proportion of harmonic[28]	%	0..100	28. Harmonic
2534	char	Proportion of harmonic[29]	%	0..100	29. Harmonic
2535	char	Proportion of harmonic[30]	%	0..100	30. Harmonic
2536	char	Proportion of harmonic[31]	%	0..100	31. Harmonic
2537	char	Proportion of harmonic[32]	%	0..100	32. Harmonic
2538	char	Proportion of harmonic[33]	%	0..100	33. Harmonic
2539	char	Proportion of harmonic[34]	%	0..100	34. Harmonic
2540	char	Proportion of harmonic[35]	%	0..100	35. Harmonic
2541	char	Proportion of harmonic[36]	%	0..100	36. Harmonic
2542	char	Proportion of harmonic[37]	%	0..100	37. Harmonic
2543	char	Proportion of harmonic[38]	%	0..100	38. Harmonic
2544	char	Proportion of harmonic[39]	%	0..100	39. Harmonic
2545	char	Proportion of harmonic[40]	%	0..100	40. Harmonic
2546	char	Proportion of harmonic[41]	%	0..100	41. Harmonic
2547	char	Proportion of harmonic[42]	%	0..100	42. Harmonic
2548	char	Proportion of harmonic[43]	%	0..100	43. Harmonic
2549	char	Proportion of harmonic[44]	%	0..100	44. Harmonic
2550	char	Proportion of harmonic[45]	%	0..100	45. Harmonic
2551	char	Proportion of harmonic[46]	%	0..100	46. Harmonic
2552	char	Proportion of harmonic[47]	%	0..100	47. Harmonic
2553	char	Proportion of harmonic[48]	%	0..100	48. Harmonic
2554	char	Proportion of harmonic[49]	%	0..100	49. Harmonic
2555	char	Proportion of harmonic[50]	%	0..100	50. Harmonic
2556	char	Proportion of harmonic[51]	%	0..100	51. Harmonic
2557	char	Proportion of harmonic[52]	%	0..100	52. Harmonic
2558	char	Proportion of harmonic[53]	%	0..100	53. Harmonic
2559	char	Proportion of harmonic[54]	%	0..100	54. Harmonic
2560	char	Proportion of harmonic[55]	%	0..100	55. Harmonic
2561	char	Proportion of harmonic[56]	%	0..100	56. Harmonic
2562	char	Proportion of harmonic[57]	%	0..100	57. Harmonic
2563	char	Proportion of harmonic[58]	%	0..100	58. Harmonic
2564	char	Proportion of harmonic[59]	%	0..100	59. Harmonic
2565	char	Proportion of harmonic[60]	%	0..100	60. Harmonic
2566	char	Proportion of harmonic[61]	%	0..100	61. Harmonic

Address	Type	Designation	Unit	Range	Remark
2567	char	Proportion of harmonic[62]	%	0..100	62. Harmonic
2568	char	Proportion of harmonic[63]	%	0..100	63. Harmonic
**** Settings of measuring and monitoring functions ****					
3000	short	save settings			save settings in non-volatile memory; function is triggered by writing the value 1357h
3001	short	reset settings			reset settings (delivery status); function is triggered by writing the value 1357h
3080	char	Related voltage channel[0]			0 - (V1-VN); 1 - (V2-VN); 2 - (V3-VN); 3 - (V2-V1); 4 - (V3-V2); 5 - (V1-V3)
3081	char	Related voltage channel[1]			0 - (V1-VN); 1 - (V2-VN); 2 - (V3-VN); 3 - (V2-V1); 4 - (V3-V2); 5 - (V1-V3)
3082	char	Related voltage channel[2]			0 - (V1-VN); 1 - (V2-VN); 2 - (V3-VN); 3 - (V2-V1); 4 - (V3-V2); 5 - (V1-V3)
3083	char	Related voltage channel[3]			0 - (V1-VN); 1 - (V2-VN); 2 - (V3-VN); 3 - (V2-V1); 4 - (V3-V2); 5 - (V1-V3)
3084	char	Related voltage channel[4]			0 - (V1-VN); 1 - (V2-VN); 2 - (V3-VN); 3 - (V2-V1); 4 - (V3-V2); 5 - (V1-V3)
3085	char	Related voltage channel[5]			0 - (V1-VN); 1 - (V2-VN); 2 - (V3-VN); 3 - (V2-V1); 4 - (V3-V2); 5 - (V1-V3)
3100	short	Trigger delay[0]	10 ms	0..655.35 s	response delay of threshold monitoring
3101	short	Trigger delay[1]	10 ms	0..655.35 s	response delay of threshold monitoring
3102	short	Trigger delay[2]	10 ms	0..655.35 s	response delay of threshold monitoring
3103	short	Trigger delay[3]	10 ms	0..655.35 s	response delay of threshold monitoring
3104	short	Trigger delay[4]	10 ms	0..655.35 s	response delay of threshold monitoring
3105	short	Trigger delay[5]	10 ms	0..655.35 s	response delay of threshold monitoring

Address	Type	Designation	Unit	Range	Remark
3120	float	Under current fault level[0]	A		
3122	float	Under current fault level[1]	A		
3124	float	Under current fault level[2]	A		
3126	float	Under current fault level[3]	A		
3128	float	Under current fault level[4]	A		
3130	float	Under current fault level[5]	A		
3160	float	Over current fault level[0]	A		
3162	float	Over current fault level[1]	A		
3164	float	Over current fault level[2]	A		
3166	float	Over current fault level[3]	A		
3168	float	Over current fault level[4]	A		
3170	float	Over current fault level[5]	A		
3200	float	Hysteresis[0]	A		
3202	float	Hysteresis[1]	A		
3204	float	Hysteresis[2]	A		
3206	float	Hysteresis[3]	A		
3208	float	Hysteresis[4]	A		
3210	float	Hysteresis[5]	A		
3240	short	Release delay[0]	10 ms	0..655.35 s	
3241	short	Release delay[1]	10 ms	0..655.35 s	
3242	short	Release delay[2]	10 ms	0..655.35 s	
3243	short	Release delay[3]	10 ms	0..655.35 s	
3244	short	Release delay[4]	10 ms	0..655.35 s	
3245	short	Release delay[5]	10 ms	0..655.35 s	
3260	float	Under current warning level[0]	A		
3262	float	Under current warning level[1]	A		
3264	float	Under current warning level[2]	A		
3266	float	Under current warning level[3]	A		
3268	float	Under current warning level[4]	A		
3270	float	Under current warning level[5]	A		
3300	float	Over current warning level[0]	A		
3302	float	Over current warning level[1]	A		
3304	float	Over current warning level[2]	A		
3306	float	Over current warning level[3]	A		

Address	Type	Designation	Unit	Range	Remark
3308	float	Over current warning level[4]	A		
3310	float	Over current warning level[5]	A		
3340	char	Channel control flags[0]	Bitfeld		bit0: 0 - unused
3341	char	Channel control flags[1]	Bitfeld		Bit1: Automatic resetting of the threshold message off;
3342	char	Channel control flags[2]	Bitfeld		Bit2: reverse polarity of transformer;
3343	char	Channel control flags[3]	Bitfeld		Bit3: activate low pass filter
3344	char	Channel control flags[4]	Bitfeld		
3345	char	Channel control flags[5]	Bitfeld		
3388	short	Eff1Min			
3389	short	Eff1MinEnergy			

\*\*\*\* frei verwendbare Kommentarstrings \*\*\*\*

4000	short	Length of String[0]		0..63	length of string 1; is calculated by the device
4001	short	Length of String[1]			length of string 2; is calculated by the device
4002	short	Length of String[2]			length of string 3; is calculated by the device
4003	short	Length of String[3]			length of string 4; is calculated by the device
4004	short	Length of String[4]			length of string 5; is calculated by the device
4005	short	Length of String[5]			length of string 6; is calculated by the device
4006	short	Length of String[6]			length of string 7; is calculated by the device
4007	short	Length of String[7]			length of string 8; is calculated by the device
4008	short	Length of String[8]			length of string 9; is calculated by the device
4009	short	Length of String[9]			length of string 10; is calculated by the device
4100-4131	short	String 1			zero terminated
	short	String 2			zero terminated
	short	String 3			zero terminated

Address	Type	Designation	Unit	Range	Remark
	short	String 4			zero terminated
	short	String 5			zero terminated
	short	String 6			zero terminated
	short	String 7			zero terminated
	short	String 8			zero terminated
	short	String 9			zero terminated
	short	String 10			zero terminated
6000	char	Record: Flags			bit0: - cyclic storage active
6001	uint	Record: Interval			measuring interval in seconds
6003	short	Record: Synchronize			write 0x1357 to perform the function
6004	short	Record: erase memory			write 0x1357 to perform the function
6005	short	Record: Data Type			not used
6006	uint	Record: Start Time	UTC		
6008	uint	Record: Next Byte			read address
6010	uint	Record: Return Value			return value or next read address
6012-6091	short	Record: Data			measured value record to read address (80 bytes)
**** Calibration of the device ****					
8000	uint	Calibration Key			
8006	float	Calibration value current[0]			
8008	float	Calibration value current[1]			
8010	float	Calibration value current[2]			
8012	float	Calibration value current[3]			
8014	float	Calibration value current[4]			
8016	float	Calibration value current[5]			
**** Firmware update ****					
9900	uint	Firmware update: code size			
9902	uint	Firmware update: operation result			
9904	uint	Firmware update: segment adress			

<b>Address</b>	<b>Type</b>	<b>Designation</b>	<b>Unit</b>	<b>Range</b>	<b>Remark</b>
9906-10029	short	Firmware update: segment[0]..segment[123]			



