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Power Analyser
UMG 20 CM

Modbus Address List

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Janitza®

Inhalt

General

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Voltage measurement in electrical systems

The UMG 20 CM can perform voltage measurements in three-phase, 4-conductor system (TT system, TN system) and three-phase, 3-conductor system (IT system).

Three-phase, 4-conductor system

All measured values listed in the table refer to a “three-phase, 4-conductor system” (TT, TN system).

Modbus

Modbus functions (Master)

As a master the UMG 20 CM does not support the modbus functions.

Modbus functions (Slave)

As a slave, the UMG 20 CM 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 4XXXX registers, and then return the contents of another group of 4XXXX registers. Broadcast is not supported.

Transfer parameters

The UMG 20 CM supports the following transfer parameters:

Baud rate	: 9.6kbps, 19.2kbps, 38.4kbps, 57.6kbps, 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 200ms.

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

Explanations of the measured values

Measured value

- A measured value is a effective value which is formed over a period (measuring window) of 200ms
- A measuring window is 10 periods in the 50Hz system and 12 periods in the 60Hz system
- A measuring window has a start time and an end time.
- The resolution between the start time and end time is approximately 2ns.
- The accuracy of the start time and end time depends on the accuracy of the internal clock. (Typically ± 1 minute/month)
- In order to improve the accuracy of the internal clock, it is recommended that the clock in the device is compared with a time service and reset.

Mean value of measured value

- For each measured value, a sliding mean value is calculated over the selected averaging time.
- The mean value is calculated every 200ms
- You can take the possible averaging times from the table.

n	Mean time / seconds
0	5
1	10
2	15
3	30
4	60
5	300
6	480
7	600
8	900

Max. value of measured value

- The ***max. value of the measured value*** is the largest measured value which has occurred since the last deletion.

Min. value of measured value

- The ***min. value of the measured value*** is the lowest measured value which has occurred since the last deletion.

Max. value of mean value

- The ***max. value of the mean value*** is the largest mean value which has occurred since the last deletion.

Nominal current, voltage, frequency

- The limit values for events and transients are set by the nominal value in percentage.

Nominal current I_{rated}

- The I_{rated} is the nominal current of the transformers and is required for calculation of the K-factor.

Peak value negative

- Highest negative sampling value from the last 200ms measuring window.

Peak value positive

- Highest positive sampling value from the last 200ms measuring window.

Crest factor

- The crest factor describes the relation between the peak value and effective value of a periodic quantity. It serves as a characteristic value for general description of the curve form of a periodic quantity. The distortion factor is another example of a quantity for characterization of the difference from the pure sinusoidal form.
- *Example:*
  A sinusoidal change voltage with an effective value of 230 V has a peak value of approx. 325 V.
  The crest factor is then 325 V / 230 V =1.414 .

Address list

Frequently required readings

Address	Type	Designation	Unit	Range	Remark
700	short	Reset device			function is triggered by writing the value 1357h
701	uint	Time of day	UTC		
**** Error codes of firmware ****					
703	char	Device faults			
704	short	Errors 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			
**** Measured values ****					
1000	float	Voltage[0]	V		effective value of voltage channel V1-VN
1002	float	Voltage[1]	V		effective value of voltage channel V2-VN
1004	float	Voltage[2]	V		effective value of voltage channel V3-VN
1006	float	Voltage[3]	V		effective value of voltage channel V2-V1
1008	float	Voltage[4]	V		effective value of voltage channel V3-V2
1010	float	Voltage[5]	V		effective value of voltage channel V1-V3
1012	float	Current[0]	A		effective value of current channel I1
1014	float	Current[1]	A		
1016	float	Current[2]	A		
1018	float	Current[3]	A		
1020	float	Current[4]	A		
1022	float	Current[5]	A		
1024	float	Current[6]	A		
1026	float	Current[7]	A		
1028	float	Current[8]	A		
1030	float	Current[9]	A		
1032	float	Current[10]	A		

Address	Type	Designation	Unit	Range	Remark
1034	float	Current[11]	A		
1036	float	Current[12]	A		
1038	float	Current[13]	A		
1040	float	Current[14]	A		
1042	float	Current[15]	A		
1044	float	Current[16]	A		
1046	float	Current[17]	A		
1048	float	Current[18]	A		
1050	float	Current[19]	A		
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		
1064	float	Real power[6]	W		
1066	float	Real power[7]	W		
1068	float	Real power[8]	W		
1070	float	Real power[9]	W		
1072	float	Real power[10]	W		
1074	float	Real power[11]	W		
1076	float	Real power[12]	W		
1078	float	Real power[13]	W		
1080	float	Real power[14]	W		
1082	float	Real power[15]	W		
1084	float	Real power[16]	W		
1086	float	Real power[17]	W		
1088	float	Real power[18]	W		
1090	float	Real power[19]	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		
1104	float	Reactive power[6]	var		
1106	float	Reactive power[7]	var		
1108	float	Reactive power[8]	var		
1110	float	Reactive power[9]	var		
1112	float	Reactive power[10]	var		
1114	float	Reactive power[11]	var		
1116	float	Reactive power[12]	var		
1118	float	Reactive power[13]	var		
1120	float	Reactive power[14]	var		
1122	float	Reactive power[15]	var		
1124	float	Reactive power[16]	var		
1126	float	Reactive power[17]	var		
1128	float	Reactive power[18]	var		
1130	float	Reactive power[19]	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		
1144	float	Apparent power[6]	VA		
1146	float	Apparent power[7]	VA		
1148	float	Apparent power[8]	VA		
1150	float	Apparent power[9]	VA		
1152	float	Apparent power[10]	VA		

Address	Type	Designation	Unit	Range	Remark
1154	float	Apparent power[11]	VA		
1156	float	Apparent power[12]	VA		
1158	float	Apparent power[13]	VA		
1160	float	Apparent power[14]	VA		
1162	float	Apparent power[15]	VA		
1164	float	Apparent power[16]	VA		
1166	float	Apparent power[17]	VA		
1168	float	Apparent power[18]	VA		
1170	float	Apparent power[19]	VA		
1172	float	Power factor[0]	1	-1…+1	
1174	float	Power factor[1]	1		
1176	float	Power factor[2]	1		
1178	float	Power factor[3]	1		
1180	float	Power factor[4]	1		
1182	float	Power factor[5]	1		
1184	float	Power factor[6]	1		
1186	float	Power factor[7]	1		
1188	float	Power factor[8]	1		
1190	float	Power factor[9]	1		
1192	float	Power factor[10]	1		
1194	float	Power factor[11]	1		
1196	float	Power factor[12]	1		
1198	float	Power factor[13]	1		
1200	float	Power factor[14]	1		
1202	float	Power factor[15]	1		
1204	float	Power factor[16]	1		
1206	float	Power factor[17]	1		
1208	float	Power factor[18]	1		
1210	float	Power factor[19]	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		
1224	float	Energy[6]	Wh		
1226	float	Energy[7]	Wh		
1228	float	Energy[8]	Wh		
1230	float	Energy[9]	Wh		
1232	float	Energy[10]	Wh		
1234	float	Energy[11]	Wh		
1236	float	Energy[12]	Wh		
1238	float	Energy[13]	Wh		
1240	float	Energy[14]	Wh		
1242	float	Energy[15]	Wh		
1244	float	Energy[16]	Wh		
1246	float	Energy[17]	Wh		
1248	float	Energy[18]	Wh		
1250	float	Energy[19]	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]			
1258	short	reset energy[6]			
1259	short	reset energy[7]			
1260	short	reset energy[8]			
1261	short	reset energy[9]			
1262	short	reset energy[10]			
1263	short	reset energy[11]			

Address	Type	Designation	Unit	Range	Remark
1264	short	reset energy[12]			
1265	short	reset energy[13]			
1266	short	reset energy[14]			
1267	short	reset energy[15]			
1268	short	reset energy[16]			
1269	short	reset energy[17]			
1270	short	reset energy[18]			
1271	short	reset energy[19]			
1272	float	Mains frequency	Hz		
1274	float	Current of fundamental wave[0]	A		amount of the basic oscillation current
1276	float	Current of fundamental wave[1]	A		
1278	float	Current of fundamental wave[2]	A		
1280	float	Current of fundamental wave[3]	A		
1282	float	Current of fundamental wave[4]	A		
1284	float	Current of fundamental wave[5]	A		
1286	float	Current of fundamental wave[6]	A		
1288	float	Current of fundamental wave[7]	A		
1290	float	Current of fundamental wave[8]	A		
1292	float	Current of fundamental wave[9]	A		
1294	float	Current of fundamental wave[10]	A		
1296	float	Current of fundamental wave[11]	A		
1298	float	Current of fundamental wave[12]	A		
1300	float	Current of fundamental wave[13]	A		
1302	float	Current of fundamental wave[14]	A		
1304	float	Current of fundamental wave[15]	A		
1306	float	Current of fundamental wave[16]	A		
1308	float	Current of fundamental wave[17]	A		
1310	float	Current of fundamental wave[18]	A		
1312	float	Current of fundamental wave[19]	A		
1314	float	cos(Phi)[0]	1	-1…+1	
1316	float	cos(Phi)[1]	1		
1318	float	cos(Phi)[2]	1		
1320	float	cos(Phi)[3]	1		
1322	float	cos(Phi)[4]	1		
1324	float	cos(Phi)[5]	1		
1326	float	cos(Phi)[6]	1		
1328	float	cos(Phi)[7]	1		
1330	float	cos(Phi)[8]	1		
1332	float	cos(Phi)[9]	1		
1334	float	cos(Phi)[10]	1		
1336	float	cos(Phi)[11]	1		
1338	float	cos(Phi)[12]	1		
1340	float	cos(Phi)[13]	1		
1342	float	cos(Phi)[14]	1		
1344	float	cos(Phi)[15]	1		
1346	float	cos(Phi)[16]	1		
1348	float	cos(Phi)[17]	1		
1350	float	cos(Phi)[18]	1		
1352	float	cos(Phi)[19]	1		
1354	float	Phase angle of current[0]	degree	-180…+180	phase angle of basic oscillation current in relation to the associated voltage channel
1356	float	Phase angle of current[1]	degree		
1358	float	Phase angle of current[2]	degree		
1360	float	Phase angle of current[3]	degree		
1362	float	Phase angle of current[4]	degree		
1364	float	Phase angle of current[5]	degree		
1366	float	Phase angle of current[6]	degree		
1368	float	Phase angle of current[7]	degree		
1370	float	Phase angle of current[8]	degree		

Address	Type	Designation	Unit	Range	Remark
1372	float	Phase angle of current[9]	degree		
1374	float	Phase angle of current[10]	degree		
1376	float	Phase angle of current[11]	degree		
1378	float	Phase angle of current[12]	degree		
1380	float	Phase angle of current[13]	degree		
1382	float	Phase angle of current[14]	degree		
1384	float	Phase angle of current[15]	degree		
1386	float	Phase angle of current[16]	degree		
1388	float	Phase angle of current[17]	degree		
1390	float	Phase angle of current[18]	degree		
1392	float	Phase angle of current[19]	degree		
1394	float	Voltage of fundamental wave[0]	V		V1-VN amount of the basic oscillation voltage
1396	float	Voltage of fundamental wave[1]	V		V2-VN
1398	float	Voltage of fundamental wave[2]	V		V3-VN
1400	float	Voltage of fundamental wave[3]	V		V2-V1
1402	float	Voltage of fundamental wave[4]	V		V3-V2
1404	float	Voltage of fundamental wave[5]	V		V1-V3
1406	float	Phase angle of voltage[0]	degree		V1-VN
1408	float	Phase angle of voltage[1]	degree		V2-VN phase angle of basic oscillation voltage in relation to voltage V1-VN
1410	float	Phase angle of voltage[2]	degree		V3-VN
1412	float	Phase angle of voltage[3]	degree		V2-V1
1414	float	Phase angle of voltage[4]	degree		V3-V2
1416	float	Phase angle of voltage[5]	degree		V1-V3
**** 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		
2012	float	Minimum current[6]	A		
2014	float	Minimum current[7]	A		
2016	float	Minimum current[8]	A		
2018	float	Minimum current[9]	A		
2020	float	Minimum current[10]	A		
2022	float	Minimum current[11]	A		
2024	float	Minimum current[12]	A		
2026	float	Minimum current[13]	A		
2028	float	Minimum current[14]	A		
2030	float	Minimum current[15]	A		
2032	float	Minimum current[16]	A		
2034	float	Minimum current[17]	A		
2036	float	Minimum current[18]	A		
2038	float	Minimum current[19]	A		
2040	float	Maximum current[0]	A		
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		
2052	float	Maximum current[6]	A		
2054	float	Maximum current[7]	A		
2056	float	Maximum current[8]	A		
2058	float	Maximum current[9]	A		
2060	float	Maximum current[10]	A		
2062	float	Maximum current[11]	A		

Address	Type	Designation	Unit	Range	Remark
2064	float	Maximum current[12]	A		
2066	float	Maximum current[13]	A		
2068	float	Maximum current[14]	A		
2070	float	Maximum current[15]	A		
2072	float	Maximum current[16]	A		
2074	float	Maximum current[17]	A		
2076	float	Maximum current[18]	A		
2078	float	Maximum current[19]	A		
2080	uint	Minimum current timestamp[0]	UTC		
2082	uint	Minimum current timestamp[1]	UTC		
2084	uint	Minimum current timestamp[2]	UTC		
2086	uint	Minimum current timestamp[3]	UTC		
2088	uint	Minimum current timestamp[4]	UTC		
2090	uint	Minimum current timestamp[5]	UTC		
2092	uint	Minimum current timestamp[6]	UTC		
2094	uint	Minimum current timestamp[7]	UTC		
2096	uint	Minimum current timestamp[8]	UTC		
2098	uint	Minimum current timestamp[9]	UTC		
2100	uint	Minimum current timestamp[10]	UTC		
2102	uint	Minimum current timestamp[11]	UTC		
2104	uint	Minimum current timestamp[12]	UTC		
2106	uint	Minimum current timestamp[13]	UTC		
2108	uint	Minimum current timestamp[14]	UTC		
2110	uint	Minimum current timestamp[15]	UTC		
2112	uint	Minimum current timestamp[16]	UTC		
2114	uint	Minimum current timestamp[17]	UTC		
2116	uint	Minimum current timestamp[18]	UTC		
2118	uint	Minimum current timestamp[19]	UTC		
2120	uint	Maximum current timestamp[0]	UTC		
2122	uint	Maximum current timestamp[1]	UTC		
2124	uint	Maximum current timestamp[2]	UTC		
2126	uint	Maximum current timestamp[3]	UTC		
2128	uint	Maximum current timestamp[4]	UTC		
2130	uint	Maximum current timestamp[5]	UTC		
2132	uint	Maximum current timestamp[6]	UTC		
2134	uint	Maximum current timestamp[7]	UTC		
2136	uint	Maximum current timestamp[8]	UTC		
2138	uint	Maximum current timestamp[9]	UTC		
2140	uint	Maximum current timestamp[10]	UTC		
2142	uint	Maximum current timestamp[11]	UTC		
2144	uint	Maximum current timestamp[12]	UTC		
2146	uint	Maximum current timestamp[13]	UTC		
2148	uint	Maximum current timestamp[14]	UTC		
2150	uint	Maximum current timestamp[15]	UTC		
2152	uint	Maximum current timestamp[16]	UTC		
2154	uint	Maximum current timestamp[17]	UTC		
2156	uint	Maximum current timestamp[18]	UTC		
2158	uint	Maximum current timestamp[19]	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]			
2166	short	reset minimum and maximum current[6]			

Address	Type	Designation	Unit	Range	Remark
2167	short	reset minimum and maximum current[7]			
2168	short	reset minimum and maximum current[8]			
2169	short	reset minimum and maximum current[9]			
2170	short	reset minimum and maximum current[10]			
2171	short	reset minimum and maximum current[11]			
2172	short	reset minimum and maximum current[12]			
2173	short	reset minimum and maximum current[13]			
2174	short	reset minimum and maximum current[14]			
2175	short	reset minimum and maximum current[15]			
2176	short	reset minimum and maximum current[16]			
2177	short	reset minimum and maximum current[17]			
2178	short	reset minimum and maximum current[18]			
2179	short	reset minimum and maximum current[19]			
**** Status of threshold monitoring of current channels ****					
2180	uint	Under current faults	bit field		bit0…19 - current channel I1…I20
2182	uint	Over current faults	bit field		bit0…19 - current channel I1…I20
2184	uint	Overdrive faults	bit field		bit0…19 - current channel I1…I20
2186	uint	Under current warnings	bit field		bit0…19 - current channel I1…I20
2188	uint	Over current warnings	bit field		bit0…19 - current channel I1…I20
2190	uint	Current transformer faults	bit field		bit0…19 - current channel I1…I20
2192	uint	Amplifier faults	bit field		bit0…19 - current channel I1…I20
**** 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		
2212	float	Minimum real power[6]	W		
2214	float	Minimum real power[7]	W		
2216	float	Minimum real power[8]	W		
2218	float	Minimum real power[9]	W		
2220	float	Minimum real power[10]	W		

Address	Type	Designation	Unit	Range	Remark
2222	float	Minimum real power[11]	W		
2224	float	Minimum real power[12]	W		
2226	float	Minimum real power[13]	W		
2228	float	Minimum real power[14]	W		
2230	float	Minimum real power[15]	W		
2232	float	Minimum real power[16]	W		
2234	float	Minimum real power[17]	W		
2236	float	Minimum real power[18]	W		
2238	float	Minimum real power[19]	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		
2252	float	Maximum real power[6]	W		
2254	float	Maximum real power[7]	W		
2256	float	Maximum real power[8]	W		
2258	float	Maximum real power[9]	W		
2260	float	Maximum real power[10]	W		
2262	float	Maximum real power[11]	W		
2264	float	Maximum real power[12]	W		
2266	float	Maximum real power[13]	W		
2268	float	Maximum real power[14]	W		
2270	float	Maximum real power[15]	W		
2272	float	Maximum real power[16]	W		
2274	float	Maximum real power[17]	W		
2276	float	Maximum real power[18]	W		
2278	float	Maximum real power[19]	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		
2290	uint	Minimum real power timestamp[5]	UTC		
2292	uint	Minimum real power timestamp[6]	UTC		
2294	uint	Minimum real power timestamp[7]	UTC		
2296	uint	Minimum real power timestamp[8]	UTC		
2298	uint	Minimum real power timestamp[9]	UTC		
2300	uint	Minimum real power timestamp[10]	UTC		
2302	uint	Minimum real power timestamp[11]	UTC		
2304	uint	Minimum real power timestamp[12]	UTC		
2306	uint	Minimum real power timestamp[13]	UTC		
2308	uint	Minimum real power timestamp[14]	UTC		
2310	uint	Minimum real power timestamp[15]	UTC		
2312	uint	Minimum real power timestamp[16]	UTC		
2314	uint	Minimum real power timestamp[17]	UTC		
2316	uint	Minimum real power timestamp[18]	UTC		
2318	uint	Minimum real power timestamp[19]	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		
2332	uint	Maximum real power timestamp[6]	UTC		
2334	uint	Maximum real power timestamp[7]	UTC		
2336	uint	Maximum real power timestamp[8]	UTC		
2338	uint	Maximum real power timestamp[9]	UTC		
2340	uint	Maximum real power timestamp[10]	UTC		
2342	uint	Maximum real power timestamp[11]	UTC		
2344	uint	Maximum real power timestamp[12]	UTC		
2346	uint	Maximum real power timestamp[13]	UTC		

Address	Type	Designation	Unit	Range	Remark
2348	uint	Maximum real power timestamp[14]	UTC		
2350	uint	Maximum real power timestamp[15]	UTC		
2352	uint	Maximum real power timestamp[16]	UTC		
2354	uint	Maximum real power timestamp[17]	UTC		
2356	uint	Maximum real power timestamp[18]	UTC		
2358	uint	Maximum real power timestamp[19]	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]			
2366	short	reset minimum and maximum real power[6]			
2367	short	reset minimum and maximum real power[7]			
2368	short	reset minimum and maximum real power[8]			
2369	short	reset minimum and maximum real power[9]			
2370	short	reset minimum and maximum real power[10]			
2371	short	reset minimum and maximum real power[11]			
2372	short	reset minimum and maximum real power[12]			
2373	short	reset minimum and maximum real power[13]			
2374	short	reset minimum and maximum real power[14]			
2375	short	reset minimum and maximum real power[15]			
2376	short	reset minimum and maximum real power[16]			
2377	short	reset minimum and maximum real power[17]			
2378	short	reset minimum and maximum real power[18]			
2379	short	reset minimum and maximum real power[19]			
**** Sum channels ****					
2400	float	Sum of real power[0]	W		total real power of summed channels
2402	float	Sum of real power[1]	W		
2404	float	Sum of real power[2]	W		
2406	float	Sum of real power[3]	W		
2408	float	Sum of real power[4]	W		
2410	float	Sum of real power[5]	W		
2412	float	Sum of real power[6]	W		
2414	float	Sum of energy[0]	Wh		total energy of summed channels
2416	float	Sum of energy[1]	Wh		
2418	float	Sum of energy[2]	Wh		
2420	float	Sum of energy[3]	Wh		
2422	float	Sum of energy[4]	Wh		

Address	Type	Designation	Unit	Range	Remark
2424	float	Sum of energy[5]	Wh		
2426	float	Sum of energy[6]	Wh		
2428	uint	Channels to sum up[0]	bit field		bit0…19 - current channel I1… I20 include in the sum
2430	uint	Channels to sum up[1]			
2432	uint	Channels to sum up[2]			
2434	uint	Channels to sum up[3]			
2436	uint	Channels to sum up[4]			
2438	uint	Channels to sum up[5]			
2440	uint	Channels to sum up[6]			
2442	short	Sum of under current faults	bit field		bit0…6 - sum channel 1…7
2443	short	Sum of over current faults	bit field		
2444	short	Sum of under current warnings	bit field		
2445	short	Sum of over current warnungs	bit field		
**** Analysis channel ****					
2500	byte	Channel to analyze			0 - no analysis; 1…20 - analyze current channel I1… I20; (-1) - analyze voltage channel (V1-VN); (-2) - (V2-VN); (-3) - (V3-VN); (-4) - (V2-V1); (-5) - (V3-V2); (-6) - (V1-V3)
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]	%		
2508	char	Proportion of harmonic[3]	%		
2509	char	Proportion of harmonic[4]	%		
2510	char	Proportion of harmonic[5]	%		
2511	char	Proportion of harmonic[6]	%		
2512	char	Proportion of harmonic[7]	%		
2513	char	Proportion of harmonic[8]	%		
2514	char	Proportion of harmonic[9]	%		
2515	char	Proportion of harmonic[10]	%		
2516	char	Proportion of harmonic[11]	%		
2517	char	Proportion of harmonic[12]	%		
2518	char	Proportion of harmonic[13]	%		
2519	char	Proportion of harmonic[14]	%		
2520	char	Proportion of harmonic[15]	%		
2521	char	Proportion of harmonic[16]	%		
2522	char	Proportion of harmonic[17]	%		
2523	char	Proportion of harmonic[18]	%		
2524	char	Proportion of harmonic[19]	%		
2525	char	Proportion of harmonic[20]	%		
2526	char	Proportion of harmonic[21]	%		
2527	char	Proportion of harmonic[22]	%		
2528	char	Proportion of harmonic[23]	%		
2529	char	Proportion of harmonic[24]	%		
2530	char	Proportion of harmonic[25]	%		
2531	char	Proportion of harmonic[26]	%		
2532	char	Proportion of harmonic[27]	%		
2533	char	Proportion of harmonic[28]	%		
2534	char	Proportion of harmonic[29]	%		
2535	char	Proportion of harmonic[30]	%		
2536	char	Proportion of harmonic[31]	%		
2537	char	Proportion of harmonic[32]	%		

Address	Type	Designation	Unit	Range	Remark
2538	char	Proportion of harmonic[33]	%		
2539	char	Proportion of harmonic[34]	%		
2540	char	Proportion of harmonic[35]	%		
2541	char	Proportion of harmonic[36]	%		
2542	char	Proportion of harmonic[37]	%		
2543	char	Proportion of harmonic[38]	%		
2544	char	Proportion of harmonic[39]	%		
2545	char	Proportion of harmonic[40]	%		
2546	char	Proportion of harmonic[41]	%		
2547	char	Proportion of harmonic[42]	%		
2548	char	Proportion of harmonic[43]	%		
2549	char	Proportion of harmonic[44]	%		
2550	char	Proportion of harmonic[45]	%		
2551	char	Proportion of harmonic[46]	%		
2552	char	Proportion of harmonic[47]	%		
2553	char	Proportion of harmonic[48]	%		
2554	char	Proportion of harmonic[49]	%		
2555	char	Proportion of harmonic[50]	%		
2556	char	Proportion of harmonic[51]	%		
2557	char	Proportion of harmonic[52]	%		
2558	char	Proportion of harmonic[53]	%		
2559	char	Proportion of harmonic[54]	%		
2560	char	Proportion of harmonic[55]	%		
2561	char	Proportion of harmonic[56]	%		
2562	char	Proportion of harmonic[57]	%		
2563	char	Proportion of harmonic[58]	%		
2564	char	Proportion of harmonic[59]	%		
2565	char	Proportion of harmonic[60]	%		
2566	char	Proportion of harmonic[61]	%		
2567	char	Proportion of harmonic[62]	%		
2568	char	Proportion of harmonic[63]	%		
**** 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
3020	short	Current transformer ratio[0]	1		primary current/secondary current (see transformer label)
3021	short	Current transformer ratio[1]	1		
3022	short	Current transformer ratio[2]	1		
3023	short	Current transformer ratio[3]	1		
3024	short	Current transformer ratio[4]	1		
3025	short	Current transformer ratio[5]	1		
3026	short	Current transformer ratio[6]	1		
3027	short	Current transformer ratio[7]	1		
3028	short	Current transformer ratio[8]	1		
3029	short	Current transformer ratio[9]	1		
3030	short	Current transformer ratio[10]	1		
3031	short	Current transformer ratio[11]	1		
3032	short	Current transformer ratio[12]	1		
3033	short	Current transformer ratio[13]	1		
3034	short	Current transformer ratio[14]	1		
3035	short	Current transformer ratio[15]	1		
3036	short	Current transformer ratio[16]	1		
3037	short	Current transformer ratio[17]	1		
3038	short	Current transformer ratio[18]	1		
3039	short	Current transformer ratio[19]	1		

Address	Type	Designation	Unit	Range	Remark
3040	short	Burden[0]	10mOhm	0…100Ohm	additional load resistance (see transformer label)
3041	short	Burden[1]	10mOhm		
3042	short	Burden[2]	10mOhm		
3043	short	Burden[3]	10mOhm		
3044	short	Burden[4]	10mOhm		
3045	short	Burden[5]	10mOhm		
3046	short	Burden[6]	10mOhm		
3047	short	Burden[7]	10mOhm		
3048	short	Burden[8]	10mOhm		
3049	short	Burden[9]	10mOhm		
3050	short	Burden[10]	10mOhm		
3051	short	Burden[11]	10mOhm		
3052	short	Burden[12]	10mOhm		
3053	short	Burden[13]	10mOhm		
3054	short	Burden[14]	10mOhm		
3055	short	Burden[15]	10mOhm		
3056	short	Burden[16]	10mOhm		
3057	short	Burden[17]	10mOhm		
3058	short	Burden[18]	10mOhm		
3059	short	Burden[19]	10mOhm		
3060	short	Cutoff frequency[0]	48.6mHz		cut-off frequency of transformer secondary circuit
3061	short	Cutoff frequency[1]	48.6mHz		
3062	short	Cutoff frequency[2]	48.6mHz		
3063	short	Cutoff frequency[3]	48.6mHz		
3064	short	Cutoff frequency[4]	48.6mHz		
3065	short	Cutoff frequency[5]	48.6mHz		
3066	short	Cutoff frequency[6]	48.6mHz		
3067	short	Cutoff frequency[7]	48.6mHz		
3068	short	Cutoff frequency[8]	48.6mHz		
3069	short	Cutoff frequency[9]	48.6mHz		
3070	short	Cutoff frequency[10]	48.6mHz		
3071	short	Cutoff frequency[11]	48.6mHz		
3072	short	Cutoff frequency[12]	48.6mHz		
3073	short	Cutoff frequency[13]	48.6mHz		
3074	short	Cutoff frequency[14]	48.6mHz		
3075	short	Cutoff frequency[15]	48.6mHz		
3076	short	Cutoff frequency[16]	48.6mHz		
3077	short	Cutoff frequency[17]	48.6mHz		
3078	short	Cutoff frequency[18]	48.6mHz		
3079	short	Cutoff frequency[19]	48.6mHz		
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]			
3082	char	Related voltage channel[2]			
3083	char	Related voltage channel[3]			
3084	char	Related voltage channel[4]			
3085	char	Related voltage channel[5]			
3086	char	Related voltage channel[6]			
3087	char	Related voltage channel[7]			
3088	char	Related voltage channel[8]			
3089	char	Related voltage channel[9]			
3090	char	Related voltage channel[10]			
3091	char	Related voltage channel[11]			
3092	char	Related voltage channel[12]			
3093	char	Related voltage channel[13]			
3094	char	Related voltage channel[14]			
3095	char	Related voltage channel[15]			
3096	char	Related voltage channel[16]			

Address	Type	Designation	Unit	Range	Remark
3097	char	Related voltage channel[17]			
3098	char	Related voltage channel[18]			
3099	char	Related voltage channel[19]			
3100	short	Trigger delay[0]	10ms	0…655.35s	response delay of threshold monitoring
3101	short	Trigger delay[1]	10ms		
3102	short	Trigger delay[2]	10ms		
3103	short	Trigger delay[3]	10ms		
3104	short	Trigger delay[4]	10ms		
3105	short	Trigger delay[5]	10ms		
3106	short	Trigger delay[6]	10ms		
3107	short	Trigger delay[7]	10ms		
3108	short	Trigger delay[8]	10ms		
3109	short	Trigger delay[9]	10ms		
3110	short	Trigger delay[10]	10ms		
3111	short	Trigger delay[11]	10ms		
3112	short	Trigger delay[12]	10ms		
3113	short	Trigger delay[13]	10ms		
3114	short	Trigger delay[14]	10ms		
3115	short	Trigger delay[15]	10ms		
3116	short	Trigger delay[16]	10ms		
3117	short	Trigger delay[17]	10ms		
3118	short	Trigger delay[18]	10ms		
3119	short	Trigger delay[19]	10ms		
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		
3132	float	Under current fault level[6]	A		
3134	float	Under current fault level[7]	A		
3136	float	Under current fault level[8]	A		
3138	float	Under current fault level[9]	A		
3140	float	Under current fault level[10]	A		
3142	float	Under current fault level[11]	A		
3144	float	Under current fault level[12]	A		
3146	float	Under current fault level[13]	A		
3148	float	Under current fault level[14]	A		
3150	float	Under current fault level[15]	A		
3152	float	Under current fault level[16]	A		
3154	float	Under current fault level[17]	A		
3156	float	Under current fault level[18]	A		
3158	float	Under current fault level[19]	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		
3172	float	Over current fault level[6]	A		
3174	float	Over current fault level[7]	A		
3176	float	Over current fault level[8]	A		
3178	float	Over current fault level[9]	A		
3180	float	Over current fault level[10]	A		
3182	float	Over current fault level[11]	A		
3184	float	Over current fault level[12]	A		
3186	float	Over current fault level[13]	A		
3188	float	Over current fault level[14]	A		
3190	float	Over current fault level[15]	A		
3192	float	Over current fault level[16]	A		
3194	float	Over current fault level[17]	A		
3196	float	Over current fault level[18]	A		
3198	float	Over current fault level[19]	A		

Address	Type	Designation	Unit	Range	Remark
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		
3212	float	Hysteresis[6]	A		
3214	float	Hysteresis[7]	A		
3216	float	Hysteresis[8]	A		
3218	float	Hysteresis[9]	A		
3220	float	Hysteresis[10]	A		
3222	float	Hysteresis[11]	A		
3224	float	Hysteresis[12]	A		
3226	float	Hysteresis[13]	A		
3228	float	Hysteresis[14]	A		
3230	float	Hysteresis[15]	A		
3232	float	Hysteresis[16]	A		
3234	float	Hysteresis[17]	A		
3236	float	Hysteresis[18]	A		
3238	float	Hysteresis[19]	A		
3240	short	Release delay[0]	10ms	0…655.35s	
3241	short	Release delay[1]	10ms		
3242	short	Release delay[2]	10ms		
3243	short	Release delay[3]	10ms		
3244	short	Release delay[4]	10ms		
3245	short	Release delay[5]	10ms		
3246	short	Release delay[6]	10ms		
3247	short	Release delay[7]	10ms		
3248	short	Release delay[8]	10ms		
3249	short	Release delay[9]	10ms		
3250	short	Release delay[10]	10ms		
3251	short	Release delay[11]	10ms		
3252	short	Release delay[12]	10ms		
3253	short	Release delay[13]	10ms		
3254	short	Release delay[14]	10ms		
3255	short	Release delay[15]	10ms		
3256	short	Release delay[16]	10ms		
3257	short	Release delay[17]	10ms		
3258	short	Release delay[18]	10ms		
3259	short	Release delay[19]	10ms		
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		
3272	float	Under current warning level[6]	A		
3274	float	Under current warning level[7]	A		
3276	float	Under current warning level[8]	A		
3278	float	Under current warning level[9]	A		
3280	float	Under current warning level[10]	A		
3282	float	Under current warning level[11]	A		
3284	float	Under current warning level[12]	A		
3286	float	Under current warning level[13]	A		
3288	float	Under current warning level[14]	A		
3290	float	Under current warning level[15]	A		
3292	float	Under current warning level[16]	A		
3294	float	Under current warning level[17]	A		
3296	float	Under current warning level[18]	A		
3298	float	Under current warning level[19]	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		

Address	Type	Designation	Unit	Range	Remark
3306	float	Over current warning level[3]	A		
3308	float	Over current warning level[4]	A		
3310	float	Over current warning level[5]	A		
3312	float	Over current warning level[6]	A		
3314	float	Over current warning level[7]	A		
3316	float	Over current warning level[8]	A		
3318	float	Over current warning level[9]	A		
3320	float	Over current warning level[10]	A		
3322	float	Over current warning level[11]	A		
3324	float	Over current warning level[12]	A		
3326	float	Over current warning level[13]	A		
3328	float	Over current warning level[14]	A		
3330	float	Over current warning level[15]	A		
3332	float	Over current warning level[16]	A		
3334	float	Over current warning level[17]	A		
3336	float	Over current warning level[18]	A		
3338	float	Over current warning level[19]	A		
3340	char	Channel control flags[0]			bit0: 0 - transformer connection monitoring off; 1 - on
3341	char	Channel control flags[1]	bit field		bit0: 0 - transformer connection monitoring on bit1: - key acknowledgement for limit value message bit2: - reverse polarity of transformer bit3: - activate low pass filter
3342	char	Channel control flags[2]			
3343	char	Channel control flags[3]			
3344	char	Channel control flags[4]			
3345	char	Channel control flags[5]			
3346	char	Channel control flags[6]			
3347	char	Channel control flags[7]			
3348	char	Channel control flags[8]			
3349	char	Channel control flags[9]			
3350	char	Channel control flags[10]			
3351	char	Channel control flags[11]			
3352	char	Channel control flags[12]			
3353	char	Channel control flags[13]			
3354	char	Channel control flags[14]			
3355	char	Channel control flags[15]			
3356	char	Channel control flags[16]			
3357	char	Channel control flags[17]			
3358	char	Channel control flags[18]			
3359	char	Channel control flags[19]			
3360	byte	Trafo calibration value[0]	0.1%	-12.8… +12.7%	(see transformer label)
3361	byte	Trafo calibration value[1]	0.1%		
3362	byte	Trafo calibration value[2]	0.1%		
3363	byte	Trafo calibration value[3]	0.1%		
3364	byte	Trafo calibration value[4]	0.1%		
3365	byte	Trafo calibration value[5]	0.1%		
3366	byte	Trafo calibration value[6]	0.1%		
3367	byte	Trafo calibration value[7]	0.1%		
3368	byte	Trafo calibration value[8]	0.1%		
3369	byte	Trafo calibration value[9]	0.1%		
3370	byte	Trafo calibration value[10]	0.1%		
3371	byte	Trafo calibration value[11]	0.1%		
3372	byte	Trafo calibration value[12]	0.1%		
3373	byte	Trafo calibration value[13]	0.1%		
3374	byte	Trafo calibration value[14]	0.1%		

Address	Type	Designation	Unit	Range	Remark
3375	byte	Trafo calibration value[15]	0.1%		
3376	byte	Trafo calibration value[16]	0.1%		
3377	byte	Trafo calibration value[17]	0.1%		
3378	byte	Trafo calibration value[18]	0.1%		
3379	byte	Trafo calibration value[19]	0.1%		
3380	float	Under voltage fault level L-N	V		
3382	float	Over voltage fault level L-N	V		
3384	float	Under voltage fault level L-L	V		
3386	float	Over voltage fault level L-L	V		
3388	short	Eff1Min			
3389	short	Eff1MinEnergy			
**** Settings of communication ****					
3800	char	Modbus slave address			
3801	uint	Modbus baudrate	baud	9600… 921600baud	
3803	uint	Output1: Under current faults to sum	bit field		bit0…19 - current channel I1… I20
3805	uint	Output1: Over current faults to sum	bit field		
3807	uint	Output2: Under current faults to sum	bit field		
3809	uint	Output2: Over current faults to sum	bit field		
3811	uint	Output1: Under current warning to sum	bit field		
3813	uint	Output1: Over current warning to sum	bit field		
3815	uint	Output2: Under current warnings to sum	bit field		
3817	uint	Output2: Over current warnings to sum	bit field		
**** Unrestricted use comment strings ****					
4000	short	Length of string[0]		0…63	length of string1; is calculated by the device
4001	short	Length of string[1]			
4002	short	Length of string[2]			
4003	short	Length of string[3]			
4004	short	Length of string[4]			
4005	short	Length of string[5]			
4006	short	Length of string[6]			
4007	short	Length of string[7]			
4008	short	Length of string[8]			
4009	short	Length of string[9]			
4010	short	Length of string[10]			
4011	short	Length of string[11]			
4012	short	Length of string[12]			
4013	short	Length of string[13]			
4014	short	Length of string[14]			
4015	short	Length of string[15]			
4016	short	Length of string[16]			
4017	short	Length of string[17]			
4018	short	Length of string[18]			
4019	short	Length of string[19]			
4020	short	Length of string[20]			
4021	short	Length of string[21]			
4022	short	Length of string[22]			
4023	short	Length of string[23]			
4024	short	Length of string[24]			
4025	short	Length of string[25]			
4026	short	Length of string[26]			

Address	Type	Designation	Unit	Range	Remark
4027	short	Length of string[27]			
4028	short	Length of string[28]			
4029	short	Length of string[29]			
4030	short	Length of string[30]			
4031	short	Length of string[31]			
4100-4131	short	String 1			zero terminated
4132-4163	short	String 2			
4164-4195	short	String 3			
4196-4227	short	String 4			
4228-4259	short	String 5			
4260-4291	short	String 6			
4292-4323	short	String 7			
4324-4355	short	String 8			
4356-4387	short	String 9			
4388-4419	short	String 10			
4420-4451	short	String 11			
4452-4483	short	String 12			
4484-4515	short	String 13			
4516-4547	short	String 14			
4548-4579	short	String 15			
4580-4611	short	String 16			
4612-4643	short	String 17			
4644-4675	short	String 18			
4676-4707	short	String 19			
4708-4739	short	String 20			
4740-4771	short	String 21			
4772-4803	short	String 22			
4804-4835	short	String 23			
4836-4867	short	String 24			
4868-4899	short	String 25			
4900-4931	short	String 26			
4932-4963	short	String 27			
4964-4995	short	String 28			
4996-5027	short	String 29			
5028-5059	short	String 30			
5060-5091	short	String 31			
5092-5123	short	String 32			
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	short	Record: Data			measured value record to read address
**** Calibration of the device ****					
8000	uint	Calibration key			
8002	short	Calibration value voltage N-Gnd			
8003	short	Calibration value voltage V1-Gnd			
8004	short	Calibration value voltage V2-Gnd			
8005	short	Calibration value voltage V3-Gnd			
8006	short	Calibration value current[0]			
8007	short	Calibration value current[1]			
8008	short	Calibration value current[2]			
8009	short	Calibration value current[3]			

Address	Type	Designation	Unit	Range	Remark
8010	short	Calibration value current[4]			
8011	short	Calibration value current[5]			
8012	short	Calibration value current[6]			
8013	short	Calibration value current[7]			
8014	short	Calibration value current[8]			
8015	short	Calibration value current[9]			
8016	short	Calibration value current[10]			
8017	short	Calibration value current[11]			
8018	short	Calibration value current[12]			
8019	short	Calibration value current[13]			
8020	short	Calibration value current[14]			
8021	short	Calibration value current[15]			
8022	short	Calibration value current[16]			
8023	short	Calibration value current[17]			
8024	short	Calibration value current[18]			
8025	short	Calibration value current[19]			
**** Firmware update *****					
9900	uint	Firmware update: code size			
9902	uint	Firmware update: operation result			
9904	uint	Firmware update: segment address			
9906-10029	short	Firmware update: segment[0] … segment[123]			