REGISTER TABLES

NOTE. Highest number of registers (or bytes) which can be read with a single command:
- **in RTU mode: 127 registers**
- **in ASCII mode: 63 registers**
- **in TCP mode: 256 bytes**

NOTE. Highest number of registers which can be programmed with a single command:
- **in RTU mode: 29 registers**
- **in ASCII mode: 13 registers**
- **in TCP mode: 1 register**

NOTE. The register values are in hex format ($).

NOTE. The following registers describe all parameters for any instrument configuration. Refer to the instrument model before sending reading/writing commands: some register parameters may not be available.

TABLE HEADER	MEANING
Parameter	Measuring parameter to be read
Register description	Description of the register to be read / written
F. code (Hex)	Function code in hex format. It identifies the command type (reading / writing)
Sign	If this column is checked, the read register value can have positive or negative sign. The value conversion changes according to the instrument model. **SIGN BIT** Convert a signed register value as shown in the following instructions: The Most Significant Bit (MSB) indicates the sign as follows: 0=positive (+), 1=negative (-). NEGATIVE VALUE EXAMPLE: MSB $8020 = 1000000000100000 = -32 HEX BIN DEC **2'S COMPLEMENT** The negative values are represented with 2's complement.
INTEGER	Details for INTEGER type registers
IEEE	Details for IEEE standard type registers
Register (Hex)	Register address in hex format
Words	Number of word to be read / written for the register (length)
M.U.	Measuring unit of parameter
Data meaning	Description of data received by a response of a reading command
Programmable data	Description of data which can be sent for a writing command

4.1 READING REGISTERS (FUNCTION CODE $03 / $04)

Parameter	F. code (Hex)	Sign	INTEGER			IEEE		
			Register (Hex)	Words	M.U.	Register (Hex)	Words	M.U.
REAL TIME VALUES								
V1 • Phase 1-N voltage	03 / 04		0000	2	mV	1000	2	V
V2 • Phase 2-N voltage	03 / 04		0002	2	mV	1002	2	V
V3 • Phase 3-N voltage	03 / 04		0004	2	mV	1004	2	V
V12 • Line 12 voltage	03 / 04		0006	2	mV	1006	2	V
V23 • Line 23 voltage	03 / 04		0008	2	mV	1008	2	V
V31 • Line 31 voltage	03 / 04		000A	2	mV	100A	2	V
V∑ • System voltage	03 / 04		000C	2	mV	100C	2	V
A1 • Phase 1 current	03 / 04	X	000E	2	mA	100E	2	A
A2 • Phase 2 current	03 / 04	X	0010	2	mA	1010	2	A
A3 • Phase 3 current	03 / 04	X	0012	2	mA	1012	2	A
AN • Neutral current*	03 / 04	X	0014	2	mA	1014	2	A
A∑ • System current	03 / 04	X	0016	2	mA	1016	2	A
P1 • Phase 1 active power	03 / 04	X	0018	4	mW	1018	2	W
P2 • Phase 2 active power	03 / 04	X	001C	4	mW	101A	2	W
P3 • Phase 3 active power	03 / 04	X	0020	4	mW	101C	2	W
P∑ • System active power	03 / 04	X	0024	4	mW	101E	2	W
S1 • Phase 1 apparent power	03 / 04	X	0028	4	mVA	1020	2	VA
S2 • Phase 2 apparent power	03 / 04	X	002C	4	mVA	1022	2	VA
S3 • Phase 3 apparent power	03 / 04	X	0030	4	mVA	1024	2	VA
S∑ • System apparent power	03 / 04	X	0034	4	mVA	1026	2	VA
Q1 • Phase 1 reactive power	03 / 04	X	0038	4	mvar	1028	2	var
Q2 • Phase 2 reactive power	03 / 04	X	003C	4	mvar	102A	2	var
Q3 • Phase 3 reactive power	03 / 04	X	0040	4	mvar	102C	2	var
Q∑ • System reactive power	03 / 04	X	0044	4	mvar	102E	2	var
PF1 • Phase 1 power factor	03 / 04	X	0048	2	0,001	1030	2	-
PF2 • Phase 2 power factor	03 / 04	X	004A	2	0,001	1032	2	-
PF3 • Phase 3 power factor	03 / 04	X	004C	2	0,001	1034	2	-
PF∑ • System power factor	03 / 04	X	004E	2	0,001	1036	2	-
DPF1 • Phase 1 DPF	03 / 04	X	0050	2	0,001	1038	2	-
DPF2 • Phase 2 DPF	03 / 04	X	0052	2	0,001	103A	2	-
DPF3 • Phase 3 DPF	03 / 04	X	0054	2	0,001	103C	2	-
TANØ1 • Phase 1 tangent Ø	03 / 04	X	0056	2	0,001	103E	2	-
TANØ2 • Phase 2 tangent Ø	03 / 04	X	0058	2	0,001	1040	2	-
TANØ3 • Phase 3 tangent Ø	03 / 04	X	005A	2	0,001	1042	2	-
TANØ∑ • System tangent Ø	03 / 04	X	005C	2	0,001	1044	2	-
THDV1 • Phase 1-N voltage THD	03 / 04		005E	2	m%	1046	2	%
THDV2 • Phase 2-N voltage THD	03 / 04		0060	2	m%	1048	2	%
THDV3 • Phase 3-N voltage THD	03 / 04		0062	2	m%	104A	2	%
THDV12 • Line 12 voltage THD	03 / 04		0064	2	m%	104C	2	%
THDV23 • Line 23 voltage THD	03 / 04		0066	2	m%	104E	2	%
THDV31 • Line 31 voltage THD	03 / 04		0068	2	m%	1050	2	%
THDA1 • Phase 1 current THD	03 / 04		006A	2	m%	1052	2	%
THDA2 • Phase 2 current THD	03 / 04		006C	2	m%	1054	2	%
THDA3 • Phase 3 current THD	03 / 04		006E	2	m%	1056	2	%
THDAN • Neutral current THD*	03 / 04		0070	2	m%	1058	2	%

Available only for ENH instrument version.

* The neutral current and the derivative parameters (AN, THDAN, HaAN) are not available if the set CT ratio or FSA value is different for each phase.

Parameter	F. code (Hex)	Sign	INTEGER			IEEE		
			Register (Hex)	Words	M.U.	Register (Hex)	Words	M.U.
REAL TIME VALUES								
F • Frequency	03 / 04		0072	2	mHz	105A	2	Hz
Phase sequence ($00=123-CCW, $01=321-CW, $02=not defined)	03 / 04		0074	2	-	105C	2	-
Installation hourcounter	03 / 04		0076	2	0,1h	105E	2	h
Measurement hourcounter	03 / 04		0078	2	0,1h	1060	2	h
DEMAND VALUES (DMD)								
$A1_{DMD}$ • Phase 1 current DMD	03 / 04		010E	2	mA	110E	2	A
$A2_{DMD}$ • Phase 2 current DMD	03 / 04		0110	2	mA	1110	2	A
$A3_{DMD}$ • Phase 3 current DMD	03 / 04		0112	2	mA	1112	2	A
AN_{DMD} • Neutral current DMD*	03 / 04		0114	2	mA	1114	2	A
$A\sum_{DMD}$ • System current DMD	03 / 04		0116	2	mA	1116	2	A
$+P1_{DMD}$ • Phase 1 imported active power DMD	03 / 04		0118	4	mW	1118	2	W
$-P1_{DMD}$ • Phase 1 exported active power DMD	03 / 04		011C	4	mW	111A	2	W
$+P2_{DMD}$ • Phase 2 imported active power DMD	03 / 04		0120	4	mW	111C	2	W
$-P2_{DMD}$ • Phase 2 exported active power DMD	03 / 04		0124	4	mW	111E	2	W
$+P3_{DMD}$ • Phase 3 imported active power DMD	03 / 04		0128	4	mW	1120	2	W
$-P3_{DMD}$ • Phase 3 exported active power DMD	03 / 04		012C	4	mW	1122	2	W
$+P\sum_{DMD}$ • System imported active power DMD	03 / 04		0130	4	mW	1124	2	W
$-P\sum_{DMD}$ • System exported active power DMD	03 / 04		0134	4	mW	1126	2	W
$P\sum_{DMD}BAL$ • Balance of system active power DMD	03 / 04	X	0138	4	mW	1128	2	W
$+S1_{DMD}$ • Phase 1 imported apparent power DMD	03 / 04		013C	4	mVA	112A	2	VA
$-S1_{DMD}$ • Phase 1 exported apparent power DMD	03 / 04		0140	4	mVA	112C	2	VA
$+S2_{DMD}$ • Phase 2 imported apparent power DMD	03 / 04		0144	4	mVA	112E	2	VA
$-S2_{DMD}$ • Phase 2 exported apparent power DMD	03 / 04		0148	4	mVA	1130	2	VA
$+S3_{DMD}$ • Phase 3 imported apparent power DMD	03 / 04		014C	4	mVA	1132	2	VA
$-S3_{DMD}$ • Phase 3 exported apparent power DMD	03 / 04		0150	4	mVA	1134	2	VA
$+S\sum_{DMD}$ • System imported apparent power DMD	03 / 04		0154	4	mVA	1136	2	VA
$-S\sum_{DMD}$ • System exported apparent power DMD	03 / 04		0158	4	mVA	1138	2	VA
$S\sum_{DMD}BAL$ • Balance of system apparent power DMD	03 / 04	X	015C	4	mVA	113A	2	VA
$+Q1_{DMD}$ • Phase 1 imported reactive power DMD	03 / 04		0160	4	mvar	113C	2	var
$-Q1_{DMD}$ • Phase 1 exported reactive power DMD	03 / 04		0164	4	mvar	113E	2	var
$+Q2_{DMD}$ • Phase 2 imported reactive power DMD	03 / 04		0168	4	mvar	1140	2	var
$-Q2_{DMD}$ • Phase 2 exported reactive power DMD	03 / 04		016C	4	mvar	1142	2	var
$+Q3_{DMD}$ • Phase 3 imported reactive power DMD	03 / 04		0170	4	mvar	1144	2	var
$-Q3_{DMD}$ • Phase 3 exported reactive power DMD	03 / 04		0174	4	mvar	1146	2	var
$+Q\sum_{DMD}$ • System imported reactive power DMD	03 / 04		0178	4	mvar	1148	2	var
$-Q\sum_{DMD}$ • System exported reactive power DMD	03 / 04		017C	4	mvar	114A	2	var
$Q\sum_{DMD}BAL$ • Balance of system reactive power DMD	03 / 04	X	0180	4	mvar	114C	2	var
$+PF1_{DMD}$ • Phase 1 inductive power factor DMD	03 / 04		0184	2	0,001	114E	2	-
$-PF1_{DMD}$ • Phase 1 capacitive power factor DMD	03 / 04		0186	2	0,001	1150	2	-
$+PF2_{DMD}$ • Phase 2 inductive power factor DMD	03 / 04		0188	2	0,001	1152	2	-
$-PF2_{DMD}$ • Phase 2 capacitive power factor DMD	03 / 04		018A	2	0,001	1154	2	-
$+PF3_{DMD}$ • Phase 3 inductive power factor DMD	03 / 04		018C	2	0,001	1156	2	-
$-PF3_{DMD}$ • Phase 3 capacitive power factor DMD	03 / 04		018E	2	0,001	1158	2	-
$+PF\sum_{DMD}$ • System inductive power factor DMD	03 / 04		0190	2	0,001	115A	2	-
$-PF\sum_{DMD}$ • System capacitive power factor DMD	03 / 04		0192	2	0,001	115C	2	-

Available only for ENH instrument version.

* The neutral current and the derivative parameters (AN, THDAN, HaAN) are not available if the set CT ratio or FSA value is different for each phase.

Parameter	F. code (Hex)	Sign	INTEGER			IEEE		
			Register (Hex)	Words	M.U.	Register (Hex)	Words	M.U.
MAXIMUM VALUES								
$V1_{MAX}$ • Phase 1-N voltage MAX	03 / 04		0200	2	mV	1200	2	V
$V2_{MAX}$ • Phase 2-N voltage MAX	03 / 04		0202	2	mV	1202	2	V
$V3_{MAX}$ • Phase 3-N voltage MAX	03 / 04		0204	2	mV	1204	2	V
$V12_{MAX}$ • Line 12 voltage MAX	03 / 04		0206	2	mV	1206	2	V
$V23_{MAX}$ • Line 23 voltage MAX	03 / 04		0208	2	mV	1208	2	V
$V31_{MAX}$ • Line 31 voltage MAX	03 / 04		020A	2	mV	120A	2	V
$V\sum_{MAX}$ • System voltage MAX	03 / 04		020C	2	mV	120C	2	V
$A1_{MAX}$ • Phase 1 current MAX	03 / 04		020E	2	mA	120E	2	A
$A2_{MAX}$ • Phase 2 current MAX	03 / 04		0210	2	mA	1210	2	A
$A3_{MAX}$ • Phase 3 current MAX	03 / 04		0212	2	mA	1212	2	A
AN_{MAX} • Neutral current MAX*	03 / 04		0214	2	mA	1214	2	A
$A\sum_{MAX}$ • System current MAX	03 / 04		0216	2	mA	1216	2	A
$+P1_{MAX}$ • Phase 1 imported active power MAX	03 / 04		0218	4	mW	1218	2	W
$-P1_{MAX}$ • Phase 1 exported active power MAX	03 / 04		021C	4	mW	121A	2	W
$+P2_{MAX}$ • Phase 2 imported active power MAX	03 / 04		0220	4	mW	121C	2	W
$-P2_{MAX}$ • Phase 2 exported active power MAX	03 / 04		0224	4	mW	121E	2	W
$+P3_{MAX}$ • Phase 3 imported active power MAX	03 / 04		0228	4	mW	1220	2	W
$-P3_{MAX}$ • Phase 3 exported active power MAX	03 / 04		022C	4	mW	1222	2	W
$+P\sum_{MAX}$ • System imported active power MAX	03 / 04		0230	4	mW	1224	2	W
$-P\sum_{MAX}$ • System exported active power MAX	03 / 04		0234	4	mW	1226	2	W
$+S1_{MAX}$ • Phase 1 imported apparent power MAX	03 / 04		0238	4	mVA	1228	2	VA
$-S1_{MAX}$ • Phase 1 exported apparent power MAX	03 / 04		023C	4	mVA	122A	2	VA
$+S2_{MAX}$ • Phase 2 imported apparent power MAX	03 / 04		0240	4	mVA	122C	2	VA
$-S2_{MAX}$ • Phase 2 exported apparent power MAX	03 / 04		0244	4	mVA	122E	2	VA
$+S3_{MAX}$ • Phase 3 imported apparent power MAX	03 / 04		0248	4	mVA	1230	2	VA
$-S3_{MAX}$ • Phase 3 exported apparent power MAX	03 / 04		024C	4	mVA	1232	2	VA
$+S\sum_{MAX}$ • System imported apparent power MAX	03 / 04		0250	4	mVA	1234	2	VA
$-S\sum_{MAX}$ • System exported apparent power MAX	03 / 04		0254	4	mVA	1236	2	VA
$+Q1_{MAX}$ • Phase 1 imported reactive power MAX	03 / 04		0258	4	mvar	1238	2	var
$-Q1_{MAX}$ • Phase 1 exported reactive power MAX	03 / 04		025C	4	mvar	123A	2	var
$+Q2_{MAX}$ • Phase 2 imported reactive power MAX	03 / 04		0260	4	mvar	123C	2	var
$-Q2_{MAX}$ • Phase 2 exported reactive power MAX	03 / 04		0264	4	mvar	123E	2	var
$+Q3_{MAX}$ • Phase 3 imported reactive power MAX	03 / 04		0268	4	mvar	1240	2	var
$-Q3_{MAX}$ • Phase 3 exported reactive power MAX	03 / 04		026C	4	mvar	1242	2	var
$+Q\sum_{MAX}$ • System imported reactive power MAX	03 / 04		0270	4	mvar	1244	2	var
$-Q\sum_{MAX}$ • System exported reactive power MAX	03 / 04		0274	4	mvar	1246	2	var
$+PF1_{MAX}$ • Phase 1 inductive power factor MAX	03 / 04		0278	2	0,001	1248	2	-
$-PF1_{MAX}$ • Phase 1 capacitive power factor MAX	03 / 04		027A	2	0,001	124A	2	-
$+PF2_{MAX}$ • Phase 2 inductive power factor MAX	03 / 04		027C	2	0,001	124C	2	-
$-PF2_{MAX}$ • Phase 2 capacitive power factor MAX	03 / 04		027E	2	0,001	124E	2	-
$+PF3_{MAX}$ • Phase 3 inductive power factor MAX	03 / 04		0280	2	0,001	1250	2	-
$-PF3_{MAX}$ • Phase 3 capacitive power factor MAX	03 / 04		0282	2	0,001	1252	2	-
$+PF\sum_{MAX}$ • System inductive power factor MAX	03 / 04		0284	2	0,001	1254	2	-
$-PF\sum_{MAX}$ • System capacitive power factor MAX	03 / 04		0286	2	0,001	1256	2	-

Available only for ENH instrument version.

* The neutral current and the derivative parameters (AN, THDAN, HaAN) are not available if the set CT ratio or FSA value is different for each phase.

Parameter	F. code (Hex)	Sign	INTEGER			IEEE		
			Register (Hex)	Words	M.U.	Register (Hex)	Words	M.U.
MAXIMUM VALUES								
$+TAN\emptyset1_{MAX}$ • Phase 1 imported tangent Ø MAX	03 / 04		0288	2	0,001	1258	2	-
$-TAN\emptyset1_{MAX}$ • Phase 1 exported tangent Ø MAX	03 / 04		028A	2	0,001	125A	2	-
$+TAN\emptyset2_{MAX}$ • Phase 2 imported tangent Ø MAX	03 / 04		028C	2	0,001	125C	2	-
$-TAN\emptyset2_{MAX}$ • Phase 2 exported tangent Ø MAX	03 / 04		028E	2	0,001	125E	2	-
$+TAN\emptyset3_{MAX}$ • Phase 3 imported tangent Ø MAX	03 / 04		0290	2	0,001	1260	2	-
$-TAN\emptyset3_{MAX}$ • Phase 3 exported tangent Ø MAX	03 / 04		0292	2	0,001	1262	2	-
$+TAN\emptyset\sum_{MAX}$ • System imported tangent Ø MAX	03 / 04		0294	2	0,001	1264	2	-
$-TAN\emptyset\sum_{MAX}$ • System exported tangent Ø MAX	03 / 04		0296	2	0,001	1266	2	-
$THDV1_{MAX}$ • Phase 1-N voltage THD MAX	03 / 04		0298	2	m%	1268	2	%
$THDV2_{MAX}$ • Phase 2-N voltage THD MAX	03 / 04		029A	2	m%	126A	2	%
$THDV3_{MAX}$ • Phase 3-N voltage THD MAX	03 / 04		029C	2	m%	126C	2	%
$THDV12_{MAX}$ • Line 12 voltage THD MAX	03 / 04		029E	2	m%	126E	2	%
$THDV23_{MAX}$ • Line 23 voltage THD MAX	03 / 04		02A0	2	m%	1270	2	%
$THDV31_{MAX}$ • Line 31 voltage THD MAX	03 / 04		02A2	2	m%	1272	2	%
$THDA1_{MAX}$ • Phase 1 current THD MAX	03 / 04		02A4	2	m%	1274	2	%
$THDA2_{MAX}$ • Phase 2 current THD MAX	03 / 04		02A6	2	m%	1276	2	%
$THDA3_{MAX}$ • Phase 3 current THD MAX	03 / 04		02A8	2	m%	1278	2	%
$THDAN_{MAX}$ • Neutral current THD MAX*	03 / 04		02AA	2	m%	127A	2	%
$A1_{DMDMAX}$ • Phase 1 current DMD MAX	03 / 04		02AC	2	mA	127C	2	A
$A2_{DMDMAX}$ • Phase 2 current DMD MAX	03 / 04		02AE	2	mA	127E	2	A
$A3_{DMDMAX}$ • Phase 3 current DMD MAX	03 / 04		02B0	2	mA	1280	2	A
$A\sum_{DMDMAX}$ • System current DMD MAX	03 / 04		02B2	2	mA	1282	2	A
$+P1_{DMDMAX}$ • Phase 1 imported active power DMD MAX	03 / 04		02B4	4	mW	1284	2	W
$-P1_{DMDMAX}$ • Phase 1 exported active power DMD MAX	03 / 04		02B8	4	mW	1286	2	W
$+P2_{DMDMAX}$ • Phase 2 imported active power DMD MAX	03 / 04		02BC	4	mW	1288	2	W
$-P2_{DMDMAX}$ • Phase 2 exported active power DMD MAX	03 / 04		02C0	4	mW	128A	2	W
$+P3_{DMDMAX}$ • Phase 3 imported active power DMD MAX	03 / 04		02C4	4	mW	128C	2	W
$-P3_{DMDMAX}$ • Phase 3 exported active power DMD MAX	03 / 04		02C8	4	mW	128E	2	W
$+P\sum_{DMDMAX}$ • System imported active power DMD MAX	03 / 04		02CC	4	mW	1290	2	W
$-P\sum_{DMDMAX}$ • System exported active power DMD MAX	03 / 04		02D0	4	mW	1292	2	W
$+S1_{DMDMAX}$ • Phase 1 imported apparent power DMD MAX	03 / 04		02D4	4	mVA	1294	2	VA
$-S1_{DMDMAX}$ • Phase 1 exported apparent power DMD MAX	03 / 04		02D8	4	mVA	1296	2	VA
$+S2_{DMDMAX}$ • Phase 2 imported apparent power DMD MAX	03 / 04		02DC	4	mVA	1298	2	VA
$-S2_{DMDMAX}$ • Phase 2 exported apparent power DMD MAX	03 / 04		02E0	4	mVA	129A	2	VA
$+S3_{DMDMAX}$ • Phase 3 imported apparent power DMD MAX	03 / 04		02E4	4	mVA	129C	2	VA
$-S3_{DMDMAX}$ • Phase 3 exported apparent power DMD MAX	03 / 04		02E8	4	mVA	129E	2	VA
$+S\sum_{DMDMAX}$ • System imported apparent power DMD MAX	03 / 04		02EC	4	mVA	12A0	2	VA
$-S\sum_{DMDMAX}$ • System exported apparent power DMD MAX	03 / 04		02F0	4	mVA	12A2	2	VA
$+Q1_{DMDMAX}$ • Phase 1 imported reactive power DMD MAX	03 / 04		02F4	4	mvar	12A4	2	var
$-Q1_{DMDMAX}$ • Phase 1 exported reactive power DMD MAX	03 / 04		02F8	4	mvar	12A6	2	var
$+Q2_{DMDMAX}$ • Phase 2 imported reactive power DMD MAX	03 / 04		02FC	4	mvar	12A8	2	var
$-Q2_{DMDMAX}$ • Phase 2 exported reactive power DMD MAX	03 / 04		0300	4	mvar	12AA	2	var
$+Q3_{DMDMAX}$ • Phase 3 imported reactive power DMD MAX	03 / 04		0304	4	mvar	12AC	2	var
$-P3_{DMDMAX}$ • Phase 3 exported reactive power DMD MAX	03 / 04		0308	4	mvar	12AE	2	var
$+Q\sum_{DMDMAX}$ • System imported reactive power DMD MAX	03 / 04		030C	4	mvar	12B0	2	var
$-Q\sum_{DMDMAX}$ • System exported reactive power DMD MAX	03 / 04		0310	4	mvar	12B2	2	var

Available only for ENH instrument version.

* The neutral current and the derivative parameters (AN, THDAN, HaAN) are not available if the set CT ratio or FSA value is different for each phase.

Parameter	F. code (Hex)	Sign	INTEGER			IEEE		
			Register (Hex)	Words	M.U.	Register (Hex)	Words	M.U.
MINIMUM VALUES								
$P\sum_{MIN}$ • System active power MIN	03 / 04		0314	4	mW	12B4	2	W
$S\sum_{MIN}$ • System apparent power MIN	03 / 04		0318	4	mVA	12B6	2	VA
$Q\sum_{MIN}$ • System reactive power MIN	03 / 04		031C	4	mvar	12B8	2	var
ENERGY COUNTERS								
+kWh1 • Phase 1 imported active energy	03 / 04		0400	4	0,1Wh	1400	2	Wh
-kWh1 • Phase 1 exported active energy	03 / 04		0404	4	0,1Wh	1402	2	Wh
+kWh2 • Phase 2 imported active energy	03 / 04		0408	4	0,1Wh	1404	2	Wh
-kWh2 • Phase 2 exported active energy	03 / 04		040C	4	0,1Wh	1406	2	Wh
+kWh3 • Phase 3 imported active energy	03 / 04		0410	4	0,1Wh	1408	2	Wh
-kWh3 • Phase 3 exported active energy	03 / 04		0414	4	0,1Wh	140A	2	Wh
+kWh∑ • System imported active energy	03 / 04		0418	4	0,1Wh	140C	2	Wh
-kWh∑ • System exported active energy	03 / 04		041C	4	0,1Wh	140E	2	Wh
kWh∑BAL • Balance of system active energy (imp-exp)	03 / 04		0420	4	0,1Wh	1410	2	Wh
+kVAh1-C • Phase 1 imported capacitive apparent energy	03 / 04		0424	4	0,1VAh	1412	2	VAh
-kVAh1-C • Phase 1 exported capacitive apparent energy	03 / 04		0428	4	0,1VAh	1414	2	VAh
+kVAh1-L • Phase 1 imported inductive apparent energy	03 / 04		042C	4	0,1VAh	1416	2	VAh
-kVAh1-L • Phase 1 exported inductive apparent energy	03 / 04		0430	4	0,1VAh	1418	2	VAh
+kVAh1 • Phase 1 imported apparent energy	03 / 04		0434	4	0,1VAh	141A	2	VAh
-kVAh1 • Phase 1 exported apparent energy	03 / 04		0438	4	0,1VAh	141C	2	VAh
+kVAh2-C • Phase 2 imported capacitive apparent energy	03 / 04		043C	4	0,1VAh	141E	2	VAh
-kVAh2-C • Phase 2 exported capacitive apparent energy	03 / 04		0440	4	0,1VAh	1420	2	VAh
+kVAh2-L • Phase 2 imported inductive apparent energy	03 / 04		0444	4	0,1VAh	1422	2	VAh
-kVAh2-L • Phase 2 exported inductive apparent energy	03 / 04		0448	4	0,1VAh	1424	2	VAh
+kVAh2 • Phase 2 imported apparent energy	03 / 04		044C	4	0,1VAh	1426	2	VAh
-kVAh2 • Phase 2 exported apparent energy	03 / 04		0450	4	0,1VAh	1428	2	VAh
+kVAh3-C • Phase 3 imported capacitive apparent energy	03 / 04		0454	4	0,1VAh	142A	2	VAh
-kVAh3-C • Phase 3 exported capacitive apparent energy	03 / 04		0458	4	0,1VAh	142C	2	VAh
+kVAh3-L • Phase 3 imported inductive apparent energy	03 / 04		045C	4	0,1VAh	142E	2	VAh
-kVAh3-L • Phase 3 exported inductive apparent energy	03 / 04		0460	4	0,1VAh	1430	2	VAh
+kVAh3 • Phase 3 imported apparent energy	03 / 04		0464	4	0,1VAh	1432	2	VAh
-kVAh3 • Phase 3 exported apparent energy	03 / 04		0468	4	0,1VAh	1434	2	VAh
+kVAh∑-C • System imported capacitive apparent energy	03 / 04		046C	4	0,1VAh	1436	2	VAh
-kVAh∑-C • System exported capacitive apparent energy	03 / 04		0470	4	0,1VAh	1438	2	VAh
+kVAh∑-L • System imported inductive apparent energy	03 / 04		0474	4	0,1VAh	143A	2	VAh
-kVAh∑-L • System exported inductive apparent energy	03 / 04		0478	4	0,1VAh	143C	2	VAh
+kVAh∑ • System imported apparent energy	03 / 04		047C	4	0,1VAh	143E	2	VAh
-kVAh∑ • System exported apparent energy	03 / 04		0480	4	0,1VAh	1440	2	VAh
kVAh∑BAL-C • Balance of system capacitive apparent en. (imp-exp)	03 / 04		0484	4	0,1VAh	1442	2	VAh
kVAh∑BAL-L • Balance of system inductive apparent en. (imp-exp)	03 / 04		0488	4	0,1VAh	1444	2	VAh
kVAh∑BAL • Balance of system apparent energy (BAL-C + BAL-L)	03 / 04		048C	4	0,1VAh	1446	2	VAh
+kvarh1-C • Phase 1 imported capacitive reactive energy	03 / 04		0490	4	0,1varh	1448	2	varh
-kvarh1-C • Phase 1 exported capacitive reactive energy	03 / 04		0494	4	0,1varh	144A	2	varh
+kvarh1-L • Phase 1 imported inductive reactive energy	03 / 04		0498	4	0,1varh	144C	2	varh
-kvarh1-L • Phase 1 exported inductive reactive energy	03 / 04		049C	4	0,1varh	144E	2	varh

Available only for instrument with separated Inductive and Capacitive apparent counters.
Available only for instrument with Total apparent counters (ind+cap).

Parameter	F. code (Hex)	Sign	INTEGER			IEEE		
			Register (Hex)	Words	M.U.	Register (Hex)	Words	M.U.
ENERGY COUNTERS								
+kvarh2-C • Phase 2 imported capacitive reactive energy	03 / 04		04A0	4	0,1varh	1450	2	varh
-kvarh2-C • Phase 2 exported capacitive reactive energy	03 / 04		04A4	4	0,1varh	1452	2	varh
+kvarh2-L • Phase 2 imported inductive reactive energy	03 / 04		04A8	4	0,1varh	1454	2	varh
-kvarh2-L • Phase 2 exported inductive reactive energy	03 / 04		04AC	4	0,1varh	1456	2	varh
+kvarh3-C • Phase 3 imported capacitive reactive energy	03 / 04		04B0	4	0,1varh	1458	2	varh
-kvarh3-C • Phase 3 exported capacitive reactive energy	03 / 04		04B4	4	0,1varh	145A	2	varh
+kvarh3-L • Phase 3 imported inductive reactive energy	03 / 04		04B8	4	0,1varh	145C	2	varh
-kvarh3-L • Phase 3 exported inductive reactive energy	03 / 04		04BC	4	0,1varh	145E	2	varh
+kvarh∑-C • System imported capacitive reactive energy	03 / 04		04C0	4	0,1varh	1460	2	varh
-kvarh∑-C • System exported capacitive reactive energy	03 / 04		04C4	4	0,1varh	1462	2	varh
+kvarh∑-L • System imported inductive reactive energy	03 / 04		04C8	4	0,1varh	1464	2	varh
-kvarh∑-L • System exported inductive reactive energy	03 / 04		04CC	4	0,1varh	1466	2	varh
kvarh∑BAL-C • Balance of system capacitive reactive en. (imp-exp)	03 / 04		04D0	4	0,1varh	1468	2	varh
kvarh∑BAL-L • Balance of system inductive reactive en. (imp-exp)	03 / 04		04D4	4	0,1varh	146A	2	varh
kvarh∑BAL • Balance of system reactive energy (BAL-C + BAL-L)	03 / 04		04D8	4	0,1varh	146C	2	varh
VOLTAGE & CURRENT HARMONIC COMPONENT UP TO 15th								
HaV1 • Phase 1-N voltage component 0 (DC)	03 / 04		0500	2	0,01%	1500	2	%
HaV1 • Phase 1-N voltage component 1st	03 / 04		0502	2	0,01%	1502	2	%
HaV1 • Phase 1-N voltage component 2nd	03 / 04		0504	2	0,01%	1504	2	%
HaV1 • Phase 1-N voltage component 3rd	03 / 04		0506	2	0,01%	1506	2	%
HaV1 • Phase 1-N voltage component 4th	03 / 04		0508	2	0,01%	1508	2	%
HaV1 • Phase 1-N voltage component 5th	03 / 04		050A	2	0,01%	150A	2	%
HaV1 • Phase 1-N voltage component 6th	03 / 04		050C	2	0,01%	150C	2	%
HaV1 • Phase 1-N voltage component 7th	03 / 04		050E	2	0,01%	150E	2	%
HaV1 • Phase 1-N voltage component 8th	03 / 04		0510	2	0,01%	1510	2	%
HaV1 • Phase 1-N voltage component 9th	03 / 04		0512	2	0,01%	1512	2	%
HaV1 • Phase 1-N voltage component 10th	03 / 04		0514	2	0,01%	1514	2	%
HaV1 • Phase 1-N voltage component 11th	03 / 04		0516	2	0,01%	1516	2	%
HaV1 • Phase 1-N voltage component 12th	03 / 04		0518	2	0,01%	1518	2	%
HaV1 • Phase 1-N voltage component 13th	03 / 04		051A	2	0,01%	151A	2	%
HaV1 • Phase 1-N voltage component 14th	03 / 04		051C	2	0,01%	151C	2	%
HaV1 • Phase 1-N voltage component 15th	03 / 04		051E	2	0,01%	151E	2	%
HaV2 • Phase 2-N voltage component 0 (DC)	03 / 04		0520	2	0,01%	1520	2	%
HaV2 • Phase 2-N voltage component 1st	03 / 04		0522	2	0,01%	1522	2	%
HaV2 • Phase 2-N voltage component 2nd	03 / 04		0524	2	0,01%	1524	2	%
HaV2 • Phase 2-N voltage component 3rd	03 / 04		0526	2	0,01%	1526	2	%
HaV2 • Phase 2-N voltage component 4th	03 / 04		0528	2	0,01%	1528	2	%
HaV2 • Phase 2-N voltage component 5th	03 / 04		052A	2	0,01%	152A	2	%
HaV2 • Phase 2-N voltage component 6th	03 / 04		052C	2	0,01%	152C	2	%
HaV2 • Phase 2-N voltage component 7th	03 / 04		052E	2	0,01%	152E	2	%
HaV2 • Phase 2-N voltage component 8th	03 / 04		0530	2	0,01%	1530	2	%
HaV2 • Phase 2-N voltage component 9th	03 / 04		0532	2	0,01%	1532	2	%
HaV2 • Phase 2-N voltage component 10th	03 / 04		0534	2	0,01%	1534	2	%
HaV2 • Phase 2-N voltage component 11th	03 / 04		0536	2	0,01%	1536	2	%
HaV2 • Phase 2-N voltage component 12th	03 / 04		0538	2	0,01%	1538	2	%

Available only for ENH instrument version.

Parameter	F. code (Hex)	Sign	INTEGER			IEEE		
			Register (Hex)	Words	M.U.	Register (Hex)	Words	M.U.
VOLTAGE & CURRENT HARMONIC COMPONENT UP TO 15th								
HaV2 • Phase 2-N voltage component 13th	03 / 04		053A	2	0,01%	153A	2	%
HaV2 • Phase 2-N voltage component 14th	03 / 04		053C	2	0,01%	153C	2	%
HaV2 • Phase 2-N voltage component 15th	03 / 04		053E	2	0,01%	153E	2	%
HaV3 • Phase 3-N voltage component 0 (DC)	03 / 04		0540	2	0,01%	1540	2	%
HaV3 • Phase 3-N voltage component 1st	03 / 04		0542	2	0,01%	1542	2	%
HaV3 • Phase 3-N voltage component 2nd	03 / 04		0544	2	0,01%	1544	2	%
HaV3 • Phase 3-N voltage component 3rd	03 / 04		0546	2	0,01%	1546	2	%
HaV3 • Phase 3-N voltage component 4th	03 / 04		0548	2	0,01%	1548	2	%
HaV3 • Phase 3-N voltage component 5th	03 / 04		054A	2	0,01%	154A	2	%
HaV3 • Phase 3-N voltage component 6th	03 / 04		054C	2	0,01%	154C	2	%
HaV3 • Phase 3-N voltage component 7th	03 / 04		054E	2	0,01%	154E	2	%
HaV3 • Phase 3-N voltage component 8th	03 / 04		0550	2	0,01%	1550	2	%
HaV3 • Phase 3-N voltage component 9th	03 / 04		0552	2	0,01%	1552	2	%
HaV3 • Phase 3-N voltage component 10th	03 / 04		0554	2	0,01%	1554	2	%
HaV3 • Phase 3-N voltage component 11th	03 / 04		0556	2	0,01%	1556	2	%
HaV3 • Phase 3-N voltage component 12th	03 / 04		0558	2	0,01%	1558	2	%
HaV3 • Phase 3-N voltage component 13th	03 / 04		055A	2	0,01%	155A	2	%
HaV3 • Phase 3-N voltage component 14th	03 / 04		055C	2	0,01%	155C	2	%
HaV3 • Phase 3-N voltage component 15th	03 / 04		055E	2	0,01%	155E	2	%
HaV12 • Line 12 voltage component 0 (DC)	03 / 04		0560	2	0,01%	1560	2	%
HaV12 • Line 12 voltage component 1st	03 / 04		0562	2	0,01%	1562	2	%
HaV12 • Line 12 voltage component 2nd	03 / 04		0564	2	0,01%	1564	2	%
HaV12 • Line 12 voltage component 3rd	03 / 04		0566	2	0,01%	1566	2	%
HaV12 • Line 12 voltage component 4th	03 / 04		0568	2	0,01%	1568	2	%
HaV12 • Line 12 voltage component 5th	03 / 04		056A	2	0,01%	156A	2	%
HaV12 • Line 12 voltage component 6th	03 / 04		056C	2	0,01%	156C	2	%
HaV12 • Line 12 voltage component 7th	03 / 04		056E	2	0,01%	156E	2	%
HaV12 • Line 12 voltage component 8th	03 / 04		0570	2	0,01%	1570	2	%
HaV12 • Line 12 voltage component 9th	03 / 04		0572	2	0,01%	1572	2	%
HaV12 • Line 12 voltage component 10th	03 / 04		0574	2	0,01%	1574	2	%
HaV12 • Line 12 voltage component 11th	03 / 04		0576	2	0,01%	1576	2	%
HaV12 • Line 12 voltage component 12th	03 / 04		0578	2	0,01%	1578	2	%
HaV12 • Line 12 voltage component 13th	03 / 04		057A	2	0,01%	157A	2	%
HaV12 • Line 12 voltage component 14th	03 / 04		057C	2	0,01%	157C	2	%
HaV12 • Line 12 voltage component 15th	03 / 04		057E	2	0,01%	157E	2	%
HaV23 • Line 23 voltage component 0 (DC)	03 / 04		0580	2	0,01%	1580	2	%
HaV23 • Line 23 voltage component 1st	03 / 04		0582	2	0,01%	1582	2	%
HaV23 • Line 23 voltage component 2nd	03 / 04		0584	2	0,01%	1584	2	%
HaV23 • Line 23 voltage component 3rd	03 / 04		0586	2	0,01%	1586	2	%
HaV23 • Line 23 voltage component 4th	03 / 04		0588	2	0,01%	1588	2	%
HaV23 • Line 23 voltage component 5th	03 / 04		058A	2	0,01%	158A	2	%
HaV23 • Line 23 voltage component 6th	03 / 04		058C	2	0,01%	158C	2	%
HaV23 • Line 23 voltage component 7th	03 / 04		058E	2	0,01%	158E	2	%
HaV23 • Line 23 voltage component 8th	03 / 04		0590	2	0,01%	1590	2	%
HaV23 • Line 23 voltage component 9th	03 / 04		0592	2	0,01%	1592	2	%

Available only for ENH instrument version.

Parameter	F. code (Hex)	Sign	INTEGER			IEEE		
			Register (Hex)	Words	M.U.	Register (Hex)	Words	M.U.
VOLTAGE & CURRENT HARMONIC COMPONENT UP TO 15th								
HaV23 • Line 23 voltage component 10th	03 / 04		0594	2	0,01%	1594	2	%
HaV23 • Line 23 voltage component 11th	03 / 04		0596	2	0,01%	1596	2	%
HaV23 • Line 23 voltage component 12th	03 / 04		0598	2	0,01%	1598	2	%
HaV23 • Line 23 voltage component 13th	03 / 04		059A	2	0,01%	159A	2	%
HaV23 • Line 23 voltage component 14th	03 / 04		059C	2	0,01%	159C	2	%
HaV23 • Line 23 voltage component 15th	03 / 04		059E	2	0,01%	159E	2	%
HaV31 • Line 31 voltage component 0 (DC)	03 / 04		05A0	2	0,01%	15A0	2	%
HaV31 • Line 31 voltage component 1st	03 / 04		05A2	2	0,01%	15A2	2	%
HaV31 • Line 31 voltage component 2nd	03 / 04		05A4	2	0,01%	15A4	2	%
HaV31 • Line 31 voltage component 3rd	03 / 04		05A6	2	0,01%	15A6	2	%
HaV31 • Line 31 voltage component 4th	03 / 04		05A8	2	0,01%	15A8	2	%
HaV31 • Line 31 voltage component 5th	03 / 04		05AA	2	0,01%	15AA	2	%
HaV31 • Line 31 voltage component 6th	03 / 04		05AC	2	0,01%	15AC	2	%
HaV31 • Line 31 voltage component 7th	03 / 04		05AE	2	0,01%	15AE	2	%
HaV31 • Line 31 voltage component 8th	03 / 04		05B0	2	0,01%	15B0	2	%
HaV31 • Line 31 voltage component 9th	03 / 04		05B2	2	0,01%	15B2	2	%
HaV31 • Line 31 voltage component 10th	03 / 04		05B4	2	0,01%	15B4	2	%
HaV31 • Line 31 voltage component 11th	03 / 04		05B6	2	0,01%	15B6	2	%
HaV31 • Line 31 voltage component 12th	03 / 04		05B8	2	0,01%	15B8	2	%
HaV31 • Line 31 voltage component 13th	03 / 04		05BA	2	0,01%	15BA	2	%
HaV31 • Line 31 voltage component 14th	03 / 04		05BC	2	0,01%	15BC	2	%
HaV31 • Line 31 voltage component 15th	03 / 04		05BE	2	0,01%	15BE	2	%
HaA1 • Phase 1 current component 0 (DC)	03 / 04		05C0	2	0,01%	15C0	2	%
HaA1 • Phase 1 current component 1st	03 / 04		05C2	2	0,01%	15C2	2	%
HaA1 • Phase 1 current component 2nd	03 / 04		05C4	2	0,01%	15C4	2	%
HaA1 • Phase 1 current component 3rd	03 / 04		05C6	2	0,01%	15C6	2	%
HaA1 • Phase 1 current component 4th	03 / 04		05C8	2	0,01%	15C8	2	%
HaA1 • Phase 1 current component 5th	03 / 04		05CA	2	0,01%	15CA	2	%
HaA1 • Phase 1 current component 6th	03 / 04		05CC	2	0,01%	15CC	2	%
HaA1 • Phase 1 current component 7th	03 / 04		05CE	2	0,01%	15CE	2	%
HaA1 • Phase 1 current component 8th	03 / 04		05D0	2	0,01%	15D0	2	%
HaA1 • Phase 1 current component 9th	03 / 04		05D2	2	0,01%	15D2	2	%
HaA1 • Phase 1 current component 10th	03 / 04		05D4	2	0,01%	15D4	2	%
HaA1 • Phase 1 current component 11th	03 / 04		05D6	2	0,01%	15D6	2	%
HaA1 • Phase 1 current component 12th	03 / 04		05D8	2	0,01%	15D8	2	%
HaA1 • Phase 1 current component 13th	03 / 04		05DA	2	0,01%	15DA	2	%
HaA1 • Phase 1 current component 14th	03 / 04		05DC	2	0,01%	15DC	2	%
HaA1 • Phase 1 current component 15th	03 / 04		05DE	2	0,01%	15DE	2	%
HaA2 • Phase 2 current component 0 (DC)	03 / 04		05E0	2	0,01%	15E0	2	%
HaA2 • Phase 2 current component 1st	03 / 04		05E2	2	0,01%	15E2	2	%
HaA2 • Phase 2 current component 2nd	03 / 04		05E4	2	0,01%	15E4	2	%
HaA2 • Phase 2 current component 3rd	03 / 04		05E6	2	0,01%	15E6	2	%
HaA2 • Phase 2 current component 4th	03 / 04		05E8	2	0,01%	15E8	2	%
HaA2 • Phase 2 current component 5th	03 / 04		05EA	2	0,01%	15EA	2	%
HaA2 • Phase 2 current component 6th	03 / 04		05EC	2	0,01%	15EC	2	%

Available only for ENH instrument version.

Parameter	F. code (Hex)	Sign	INTEGER			IEEE		
			Register (Hex)	Words	M.U.	Register (Hex)	Words	M.U.
VOLTAGE & CURRENT HARMONIC COMPONENT UP TO 15th								
HaA2 • Phase 2 current component 7th	03 / 04		05EE	2	0,01%	15EE	2	%
HaA2 • Phase 2 current component 8th	03 / 04		05F0	2	0,01%	15F0	2	%
HaA2 • Phase 2 current component 9th	03 / 04		05F2	2	0,01%	15F2	2	%
HaA2 • Phase 2 current component 10th	03 / 04		05F4	2	0,01%	15F4	2	%
HaA2 • Phase 2 current component 11th	03 / 04		05F6	2	0,01%	15F6	2	%
HaA2 • Phase 2 current component 12th	03 / 04		05F8	2	0,01%	15F8	2	%
HaA2 • Phase 2 current component 13th	03 / 04		05FA	2	0,01%	15FA	2	%
HaA2 • Phase 2 current component 14th	03 / 04		05FC	2	0,01%	15FC	2	%
HaA2 • Phase 2 current component 15th	03 / 04		05FE	2	0,01%	15FE	2	%
HaA3 • Phase 3 current component 0 (DC)	03 / 04		0600	2	0,01%	1600	2	%
HaA3 • Phase 3 current component 1st	03 / 04		0602	2	0,01%	1602	2	%
HaA3 • Phase 3 current component 2nd	03 / 04		0604	2	0,01%	1604	2	%
HaA3 • Phase 3 current component 3rd	03 / 04		0606	2	0,01%	1606	2	%
HaA3 • Phase 3 current component 4th	03 / 04		0608	2	0,01%	1608	2	%
HaA3 • Phase 3 current component 5th	03 / 04		060A	2	0,01%	160A	2	%
HaA3 • Phase 3 current component 6th	03 / 04		060C	2	0,01%	160C	2	%
HaA3 • Phase 3 current component 7th	03 / 04		060E	2	0,01%	160E	2	%
HaA3 • Phase 3 current component 8th	03 / 04		0610	2	0,01%	1610	2	%
HaA3 • Phase 3 current component 9th	03 / 04		0612	2	0,01%	1612	2	%
HaA3 • Phase 3 current component 10th	03 / 04		0614	2	0,01%	1614	2	%
HaA3 • Phase 3 current component 11th	03 / 04		0616	2	0,01%	1616	2	%
HaA3 • Phase 3 current component 12th	03 / 04		0618	2	0,01%	1618	2	%
HaA3 • Phase 3 current component 13th	03 / 04		061A	2	0,01%	161A	2	%
HaA3 • Phase 3 current component 14th	03 / 04		061C	2	0,01%	161C	2	%
HaA3 • Phase 3 current component 15th	03 / 04		061E	2	0,01%	161E	2	%
HaAN • Neutral current component 0 (DC) *	03 / 04		0620	2	0,01%	1620	2	%
HaAN • Neutral current component 1st *	03 / 04		0622	2	0,01%	1622	2	%
HaAN • Neutral current component 2nd *	03 / 04		0624	2	0,01%	1624	2	%
HaAN • Neutral current component 3rd *	03 / 04		0626	2	0,01%	1626	2	%
HaAN • Neutral current component 4th *	03 / 04		0628	2	0,01%	1628	2	%
HaAN • Neutral current component 5th *	03 / 04		062A	2	0,01%	162A	2	%
HaAN • Neutral current component 6th *	03 / 04		062C	2	0,01%	162C	2	%
HaAN • Neutral current component 7th *	03 / 04		062E	2	0,01%	162E	2	%
HaAN • Neutral current component 8th *	03 / 04		0630	2	0,01%	1630	2	%
HaAN • Neutral current component 9th *	03 / 04		0632	2	0,01%	1632	2	%
HaAN • Neutral current component 10th *	03 / 04		0634	2	0,01%	1634	2	%
HaAN • Neutral current component 11th *	03 / 04		0636	2	0,01%	1636	2	%
HaAN • Neutral current component 12th *	03 / 04		0638	2	0,01%	1638	2	%
HaAN • Neutral current component 13th *	03 / 04		063A	2	0,01%	163A	2	%
HaAN • Neutral current component 14th *	03 / 04		063C	2	0,01%	163C	2	%
HaAN • Neutral current component 15th *	03 / 04		063E	2	0,01%	163E	2	%

Available only for ENH instrument version.

* The neutral current and the derivative parameters (AN, THDAN, HaAN) are not available if the set CT ratio or FSA value is different for each phase.

Register description	F. code (Hex)	INTEGER		Data meaning
		Register (Hex)	Words	
INSTRUMENT INFORMATION				
Serial number	03 / 04	2000	6	10 ASCII characters, $00...$FF
Firmware release	03 / 04	2006	2	Convert the read hexadecimal value in decimal format. e.g. $64=100=rel. 1.00
Hardware version	03 / 04	2008	2	Convert the read hexadecimal value in decimal format. e.g. $64=100=rev. 1.00
Model	03 / 04	200A	2	$04=1/5A CT, BASIC $05=80A direct connection, BASIC $06=Rogowski inputs, BASIC $0A=1/5A CT, ENH $0B=80A direct connection, ENH $0C=Rogowski inputs, ENH
COM features	03 / 04	200C	2	$02=RS485 port (MODBUS RTU/ASCII) $03=ETHERNET port (HTTP, MODBUS TCP)
Reserved	03 / 04	200E	2	
Digital output number	03 / 04	2010	2	$00=0 $01=1
Reserved	03 / 04	2012	4	
Calibration date	03 / 04	2016	2	UnixTime format. Convert the read hexadecimal value in decimal format. e.g. 0837B4C0=1378684800 →09/09/13, 00:00:00
Reserved	03 / 04	2018	4	
Error code	03 / 04	201C	2	Bit encoding (0=disabled, 1=active): b1(LSb)=wrong phase sequence (132) b2=overflow parameter/s b3=date&time lost, recordings automatically disabled b4=unable to generate pulses on digital output enabled in pulse mode e.g. $0000$0006=0110 →overflow parameter/s and date&time lost occurred

2 READING AND WRITING REGISTERS (FUNCTION CODE $03 / $04 / $10)

WARNING! If CT ratio, PT ratio, wiring mode or current full scale is modified, the instrument will:

- **reset all MIN/MAX values, all DMD values, all energy counters**
- **set to the default settings digital output (disabled)**
- **set the default recording setup (disabled) and delete all recorded data**

Register description	F. code (Hex)	INTEGER		Programmable data
		Register (Hex)	Words	
INSTRUMENT GENERAL SETUP				
MODBUS address	03 / 04 / 10	2026	2	$01...$F7 (1...247)
Communication speed	03 / 04 / 10	2028	2	$01=300 bps $02=600 bps $03=1200 bps $04=2400 bps $05=4800 bps $06=9600 bps $07=19200 bps $08=38400 bps $09=57600 bps
MODBUS mode	03 / 04 / 10	202A	2	$00=7E2 (ASCII) $01=8N1 (RTU)
Phase 1 current full scale, according to the instrument: • For 1/5A CT: CT primary ($CT1_{pri}$) • For 80A: Reserved • For Rogowski: Full scale (FSA1)	03 / 04 / 10	202C	2	Ph1 CT primary: $01...$C350 (1...50000) FSA1: $01F4=500 A $0FA0=4000 A $4E20=20000 A
Phase 1 CT secondary (only for 1/5 CT instrument)	03 / 04 / 10	202E	2	$01=1 A $05=5 A
Phase 2 current full scale, according to the instrument: • For 1/5A CT: CT primary ($CT2_{pri}$) • For 80A: Reserved • For Rogowski: Full scale (FSA2)	03 / 04 / 10	2030	2	Ph2 CT primary: $01...$C350 (1...50000) FSA2: $01F4=500 A $0FA0=4000 A $4E20=20000 A
Phase 2 CT secondary (only for 1/5 CT instrument)	03 / 04 / 10	2032	2	$01=1 A $05=5 A
Phase 3 current full scale, according to the instrument: • For 1/5A CT: CT primary ($CT3_{pri}$) • For 80A: Reserved • For Rogowski: Full scale (FSA3)	03 / 04 / 10	2034	2	Ph3 CT primary: $01...$C350 (1...50000) FSA3: $01F4=500 A $0FA0=4000 A $4E20=20000 A
Phase 3 CT secondary (only for 1/5 CT instrument)	03 / 04 / 10	2036	2	$01=1 A $05=5 A
PT primary (only for 1/5 CT or Rogowski instrument)	03 / 04 / 10	2038	2	$00001...$F423F (1...999999V) (for direct insertion, set PT_{pri}=1. PT_{sec}=1 will be set automatically)
PT secondary (only for 1/5 CT or Rogowski instrument)	03 / 04 / 10	203A	2	$50...$96 (80...150V) (if PT_{pri}=1 → PT_{sec}=1 automatically preset, not programmable)
Wiring mode	03 / 04 / 10	203C	2	$01=3 phases, 4 wires, 3 currents $02=3 phases, 3 wires, 2 currents $03=1 phase $04=3 phases, 3 wires, 3 currents
Mode for DMD value calculation	03 / 04 / 10	203E	2	$00=fixed window $01=sliding window
Integration time for DMD value calculation	03 / 04 / 10	2040	2	$05=05 min $0A=10 min $0F=15 min $1E=30 min $2D=45 min (not available with **Sliding window** mode) $3C=60 min (not available with **Sliding window** mode)

Available only for instrument with RS485 port.
Available only for ENH instrument version.

Register description	F. code (Hex)	INTEGER		Programmable data
		Register (Hex)	Words	
INSTRUMENT GENERAL SETUP				
Maximum and DMD max value reset	10	2042	2	$01=V1, V2, V3, V12, V23, V31, V∑ $02=A1, A2, A3, AN, A∑ $03=+P1, +P2, +P3, +P∑ $04=-P1, -P2, -P3, -P∑ $05=+S1, +S2, +S3, +S∑ $06=-S1, -S2, -S3, -S∑ $07=+Q1, +Q2, +Q3, +Q∑ $08=-Q1, -Q2, -Q3, -Q∑ $09=+PF1, +PF2, +PF3, +PF∑ $0A=-PF1, -PF2, -PF3, -PF∑ $0B=+TAN1, +TAN2, +TAN3, +TAN∑ $0C=-TAN1, -TAN2, -TAN3, -TAN∑ $0D=THDV1, THDV2, THDV3, THDV12, THDV23, THDV31 $0E=THDA1, THDA2, THDA3, THDAN $0F=$A1_{DMD}$, $A2_{DMD}$, $A3_{DMD}$, $A∑_{DMD}$ $10=+$P1_{DMD}$, +$P2_{DMD}$, +$P3_{DMD}$, +$P∑_{DMD}$ $11=-$P1_{DMD}$, -$P2_{DMD}$, -$P3_{DMD}$, -$P∑_{DMD}$ $12=+$S1_{DMD}$, +$S2_{DMD}$, +$S3_{DMD}$, +$S∑_{DMD}$ $13=-$S1_{DMD}$, -$S2_{DMD}$, -$S3_{DMD}$, -$S∑_{DMD}$ $14=+$Q1_{DMD}$, +$Q2_{DMD}$, +$Q3_{DMD}$, +$Q∑_{DMD}$ $15=-$Q1_{DMD}$, -$Q2_{DMD}$, -$Q3_{DMD}$, -$Q∑_{DMD}$ $16=ALL
Minimum value reset	10	2044	2	$01=P∑ $02=S∑ $03=Q∑ $04=ALL
DMD value reset	10	2046	2	$01=$A1_{DMD}$, $A2_{DMD}$, $A3_{DMD}$, AN_{DMD}, $A∑_{DMD}$ $02=+$P1_{DMD}$, +$P2_{DMD}$, +$P3_{DMD}$, +$P∑_{DMD}$ $03=-$P1_{DMD}$, -$P2_{DMD}$, -$P3_{DMD}$, -$P∑_{DMD}$ $04=+$S1_{DMD}$, +$S2_{DMD}$, +$S3_{DMD}$, +$S∑_{DMD}$ $05=-$S1_{DMD}$, -$S2_{DMD}$, -$S3_{DMD}$, -$S∑_{DMD}$ $06=+$Q1_{DMD}$, +$Q2_{DMD}$, +$Q3_{DMD}$, +$Q∑_{DMD}$ $07=-$Q1_{DMD}$, -$Q2_{DMD}$, -$Q3_{DMD}$, -$Q∑_{DMD}$ $08=+$PF1_{DMD}$, +$PF2_{DMD}$, +$PF3_{DMD}$, +$PF∑_{DMD}$ $09=-$PF1_{DMD}$, -$PF2_{DMD}$, -$PF3_{DMD}$, -$PF∑_{DMD}$ $0A=ALL
Energy counter reset	10	2048	2	$01=+kWh1, +kWh2, +kWh3, +kWh∑ $02=-kWh1, -kWh2, -kWh3, -kWh∑ $03=+kVAh1, +kVAh2, +kVAh3, +kVAh∑ (L&C) $04=-kVAh1, -kVAh2, -kVAh3, -kVAh∑ (L&C) $05=+kvarh1, +kvarh2, +kvarh3, +kvarh∑ (L&C) $06=-kvarh1, -kvarh2, -kvarh3, -kvarh∑ (L&C) $07=ALL
Real time clock The writing command can be sent also in broadcast by using $00 MODBUS address. For broadcast function, no instrument response is sent.	03 / 04 / 10	204A	2	UnixTime format. READING MODE - Convert the read hexadecimal value in decimal format. e.g. $522E$5FD4=1378770900 →09/09/13, 23:55:00 WRITING MODE - Convert the UnixTime decimal value in hexadecimal format. e.g. to set: 09/09/13, 23:55:00→1378770900= $522E$5FD4 value to be set
Digital output mode	03 / 04 / 10	204C	2	$00=disabled $01=alarm high or active power sign change from + to - $02=alarm low or active power sign change from - to + $03=pulse
Digital output parameter	03 / 04 / 10	204E	2	Refer to the "Parameter codes" table

■ **Available only for instrument with RS485 port.**

Register description	F. code (Hex)	INTEGER		Programmable data
		Register (Hex)	Words	
INSTRUMENT GENERAL SETUP				
Digital output setup according to the mode: • Alarm (AL): Threshold referred to the set parameter • Pulse (PULS): Pulse weight numerical value	03 / 04 / 10	2050	4	In Alarm mode: $0001... full scale value of the set parameter. The measuring unit changes according to the set parameter. The value is always expressed with the milli (m) coefficient: e.g. $38270=230000mV=230V For Phase sequence and Active power sign parameters, set $0000. In Pulse mode: $0001...$270F (1...9999) e.g. $0A00=2560=2.56 kWh / pulse with pulse value format X.XXX kWh, VAh, varh / pulse (value $01 in register $2054)
Digital output setup according to the mode: • Alarm (AL): Hysteresis value in case of real time/DMD parameter, delay value in case of Active power sign parameter • Pulse (PULS): Pulse value format	03 / 04 / 10	2054	2	In Alarm mode: $00...$32 (0...50%) For Phase sequence parameter, set $00. For Active power sign parameter: $01...$3C (1...60s) In Pulse mode: $01=X.XXX kWh, VAh, varh / pulse $02=XX.XX kWh, VAh, varh / pulse $03=XXX.X kWh, VAh, varh / pulse $04=X.XXX MWh, VAh, varh / pulse $05=XX.XX MWh, VAh, varh / pulse $06=XXX.X MWh, VAh, varh / pulse $07=XXXX MWh, VAh, varh / pulse
ETHERNET set default Restore the ETHERNET settings to the default values (IP, account username&password)	10	2074	2	$AAAA$AAAA=ETHERNET set default
Number of the stored AVG or MIN/AVG/MAX recordings (according to the instrument model)	03 / 04	2100	2	e.g. $007F=127 recordings
Timestamp of the first AVG or MIN/AVG/MAX recording (according to the instrument model)	03 / 04	2102	2	UnixTime format. Convert the read hexadecimal value in decimal format. e.g. $522E$5FD4=1378770900 →09/09/13, 23:55:00
Timestamp of the last AVG or MIN/AVG/MAX recording (according to the instrument model)	03 / 04	2104	2	UnixTime format. Convert the read hexadecimal value in decimal format. e.g. $522E$5FD4=1378770900 →09/09/13, 23:55:00
Status of AVG or MIN/AVG/MAX recording (according to the instrument model)	03 / 04	2106	2	Bit encoding: b1(LSb)=status (0=stopped, 1=active) b2=memory full (0=no, 1=yes) b3=memory overwritten (0=no, 1=yes) e.g. $0000$0002=010 →recording stopped, memory full and no memory overwritten
Mode of AVG or MIN/AVG/MAX recording (according to the instrument model)	03 / 04 / 10	2108	2	$01=fill, $02=ring

Available only for instrument with RS485 port.
Available only for instrument with ETHERNET port.

Register description	F. code (Hex)	INTEGER		Programmable data
		Register (Hex)	Words	
Rate of AVG or MIN/AVG/MAX recording (according to the instrument model)	03 / 04 / 10	210A	2	BASIC instrument version: $00=disabled $01=01 minute $05=05 minutes $0A=10 minutes $0F=15 minutes $1E=30 minutes $2D=45 minutes $3C=60 minutes ENH instrument version: $0000=disabled $0001...$0E10 (1...3600 s, with 10 s step)
Reserved	03 / 04 / 10	210C	6	
MIN/AVG/MAX recording parameter for position 1	03 / 04 / 10	2112	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 2	03 / 04 / 10	2114	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 3	03 / 04 / 10	2116	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 4	03 / 04 / 10	2118	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 5	03 / 04 / 10	211A	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 6	03 / 04 / 10	211C	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 7	03 / 04 / 10	211E	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 8	03 / 04 / 10	2120	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 9	03 / 04 / 10	2122	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 10	03 / 04 / 10	2124	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 11	03 / 04 / 10	2126	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 12	03 / 04 / 10	2128	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 13	03 / 04 / 10	212A	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 14	03 / 04 / 10	212C	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 15	03 / 04 / 10	212E	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 16	03 / 04 / 10	2130	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 17	03 / 04 / 10	2132	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 18	03 / 04 / 10	2134	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 19	03 / 04 / 10	2136	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 20	03 / 04 / 10	2138	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 21	03 / 04 / 10	213A	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 22	03 / 04 / 10	213C	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 23	03 / 04 / 10	213E	2	Refer to the "Parameter codes" table
MIN/AVG/MAX recording parameter for position 24	03 / 04 / 10	2140	2	Refer to the "Parameter codes" table
Number of the stored Energy counter recordings	03 / 04	2142	2	e.g. $007F=127 recordings
Timestamp of the first Energy counter recording	03 / 04	2144	2	UnixTime format. Convert the read hexadecimal value in decimal format. e.g. $522E$5FD4=1378770900 →09/09/13, 23:55:00
Timestamp of the last Energy counter recording	03 / 04	2146	2	UnixTime format. Convert the read hexadecimal value in decimal format. e.g. $522E$5FD4=1378770900 →09/09/13, 23:55:00

Available only for ENH instrument version.

Register description	F. code (Hex)	INTEGER		Programmable data
		Register (Hex)	Words	
Energy counter recording status	03 / 04 / 10	2148	2	Bit encoding: b1(LSb)=status (0=stopped, 1=active) b2=memory full (0=no, 1=yes) b3=memory overwritten (0=no, 1=yes) e.g. $0000$0002=010 →recording stopped, memory full and no memory overwritten
Energy counter recording rate	03 / 04 / 10	214A	2	$00=disabled, $01...$3C (1...60 min)

CODE (Hex)	Description	DIGITAL OUTPUT AL=Alarm PLS=Pulse	REC-ENH MAM=Min/Avg/Max EC=Energy counters
PARAMETER CODES			
0000	None	AL, PLS	MAM, EC
0001	V1 • Phase 1-N voltage	AL	MAM
0002	V2 • Phase 2-N voltage	AL	MAM
0003	V3 • Phase 3-N voltage	AL	MAM
0004	V12 • Line 12 voltage	AL	MAM
0005	V23 • Line 23 voltage	AL	MAM
0006	V31 • Line 31 voltage	AL	MAM
0007	V∑ • System voltage	AL	MAM
0008	A1 • Phase 1 current	AL	MAM
0009	A2 • Phase 2 current	AL	MAM
000A	A3 • Phase 3 current	AL	MAM
000B	AN • Neutral current*	AL	MAM
000C	A∑ • System current	AL	MAM
000D	P1 • Phase 1 active power	AL	MAM
000E	P2 • Phase 2 active power	AL	MAM
000F	P3 • Phase 3 active power	AL	MAM
0010	P∑ • System active power	AL	MAM
0011	S1 • Phase 1 apparent power	AL	MAM
0012	S2 • Phase 2 apparent power	AL	MAM
0013	S3 • Phase 3 apparent power	AL	MAM
0014	S∑ • System apparent power	AL	MAM
0015	Q1 • Phase 1 reactive power	AL	MAM
0016	Q2 • Phase 2 reactive power	AL	MAM
0017	Q3 • Phase 3 reactive power	AL	MAM
0018	Q∑ • System reactive power	AL	MAM
0019	PF1 • Phase 1 power factor	AL	MAM
001A	PF2 • Phase 2 power factor	AL	MAM
001B	PF3 • Phase 3 power factor	AL	MAM
001C	PF∑ • System power factor	AL	MAM
001D	DPF1 • Phase 1 DPF	AL	MAM
001E	DPF2 • Phase 2 DPF	AL	MAM
001F	DPF3 • Phase 3 DPF	AL	MAM
0020	TANØ1 • Phase 1 tangent Ø	AL	MAM
0021	TANØ2 • Phase 2 tangent Ø	AL	MAM
0022	TANØ3 • Phase 3 tangent Ø	AL	MAM
0023	TANØ∑ • System tangent Ø	AL	MAM

Available only for ENH instrument version.

* The neutral current and the derivative parameters (AN, THDAN, HaAN) are not available if the set CT ratio or FSA value is different for each phase.

CODE (Hex)	Description	DIGITAL OUTPUT AL=Alarm PLS=Pulse	REC-ENH MAM=Min/Avg/Max EC=Energy counters
PARAMETER CODES			
0024	THDV1 • Phase 1-N voltage THD	AL	MAM
0025	THDV2 • Phase 2-N voltage THD	AL	MAM
0026	THDV3 • Phase 3-N voltage THD	AL	MAM
0027	THDV12 • Line 12 voltage THD	AL	MAM
0028	THDV23 • Line 23 voltage THD	AL	MAM
0029	THDV31 • Line 31 voltage THD	AL	MAM
002A	THDA1 • Phase 1 current THD	AL	MAM
002B	THDA2 • Phase 2 current THD	AL	MAM
002C	THDA3 • Phase 3 current THD	AL	MAM
002D	THDAN • Neutral current THD*	AL	MAM
002E	F • Frequency	AL	MAM
002F	Phase sequence	AL	
0032	Active power sign	AL	
0040	$A1_{DMD}$ • Phase 1 current DMD	AL	
0041	$A2_{DMD}$ • Phase 2 current DMD	AL	
0042	$A3_{DMD}$ • Phase 3 current DMD	AL	
0043	AN_{DMD} • Neutral current DMD*	AL	
0044	$A\sum_{DMD}$ • System current DMD	AL	
0045	$+P1_{DMD}$ • Phase 1 imported active power DMD	AL	
0046	$-P1_{DMD}$ • Phase 1 exported active power DMD	AL	
0047	$+P2_{DMD}$ • Phase 2 imported active power DMD	AL	
0048	$-P2_{DMD}$ • Phase 2 exported active power DMD	AL	
0049	$+P3_{DMD}$ • Phase 3 imported active power DMD	AL	
004A	$-P3_{DMD}$ • Phase 3 exported active power DMD	AL	
004B	$+P\sum_{DMD}$ • System imported active power DMD	AL	
004C	$-P\sum_{DMD}$ • System exported active power DMD	AL	
004D	$P\sum_{DMD}BAL$ • Balance of system active power DMD	AL	
004E	$+S1_{DMD}$ • Phase 1 imported apparent power DMD	AL	
004F	$-S1_{DMD}$ • Phase 1 exported apparent power DMD	AL	
0050	$+S2_{DMD}$ • Phase 2 imported apparent power DMD	AL	
0051	$-S2_{DMD}$ • Phase 2 exported apparent power DMD	AL	
0052	$+S3_{DMD}$ • Phase 3 imported apparent power DMD	AL	
0053	$-S3_{DMD}$ • Phase 3 exported apparent power DMD	AL	
0054	$+S\sum_{DMD}$ • System imported apparent power DMD	AL	
0055	$-S\sum_{DMD}$ • System exported apparent power DMD	AL	
0056	$S\sum_{DMD}BAL$ • Balance of system apparent power DMD	AL	
0057	$+Q1_{DMD}$ • Phase 1 imported reactive power DMD	AL	
0058	$-Q1_{DMD}$ • Phase 1 exported reactive power DMD	AL	
0059	$+Q2_{DMD}$ • Phase 2 imported reactive power DMD	AL	
005A	$-Q2_{DMD}$ • Phase 2 exported reactive power DMD	AL	
005B	$+Q3_{DMD}$ • Phase 3 imported reactive power DMD	AL	
005C	$-Q3_{DMD}$ • Phase 3 exported reactive power DMD	AL	
005D	$+Q\sum_{DMD}$ • System imported reactive power DMD	AL	
005E	$-Q\sum_{DMD}$ • System exported reactive power DMD	AL	
005F	$Q\sum_{DMD}BAL$ • Balance of system reactive power DMD	AL	
0060	$+PF1_{DMD}$ • Phase 1 inductive power factor DMD	AL	
0061	$-PF1_{DMD}$ • Phase 1 capacitive power factor DMD	AL	
0062	$+PF2_{DMD}$ • Phase 2 inductive power factor DMD	AL	

Available only for ENH instrument version.

* The neutral current and the derivative parameters (AN, THDAN, HaAN) are not available if the set CT ratio or FSA value is different for each phase.

CODE (Hex)	Description	DIGITAL OUTPUT AL=Alarm PLS=Pulse	REC-ENH MAM=Min/Avg/Max EC=Energy counters
PARAMETER CODES			
0063	-PF2$_{DMD}$ • Phase 2 capacitive power factor DMD	AL	
0064	+PF3$_{DMD}$ • Phase 3 inductive power factor DMD	AL	
0065	-PF3$_{DMD}$ • Phase 3 capacitive power factor DMD	AL	
0066	+PF∑$_{DMD}$ • System inductive power factor DMD	AL	
0067	-PF∑$_{DMD}$ • System capacitive power factor DMD	AL	
00D7	+kWh1 • Phase 1 imported active energy	PLS	EC
00D8	-kWh1 • Phase 1 exported active energy	PLS	EC
00D9	+kWh2 • Phase 2 imported active energy	PLS	EC
00DA	-kWh2 • Phase 2 exported active energy	PLS	EC
00DB	+kWh3 • Phase 3 imported active energy	PLS	EC
00DC	-kWh3 • Phase 3 exported active energy	PLS	EC
00DD	+kWh∑ • System imported active energy	PLS	EC
00DE	-kWh∑ • System exported active energy	PLS	EC
00DF	kWh∑BAL • Balance of system active energy (imp-exp)		EC
00E0	+kVAh1-C • Phase 1 imported capacitive apparent energy	PLS	EC
00E1	-kVAh1-C • Phase 1 exported capacitive apparent energy	PLS	EC
00E2	+kVAh1-L • Phase 1 imported inductive apparent energy	PLS	EC
00E3	-kVAh1-L • Phase 1 exported inductive apparent energy	PLS	EC
00E4	+kVAh1 • Phase 1 imported apparent energy	PLS	EC
00E5	-kVAh1 • Phase 1 exported apparent energy	PLS	EC
00E6	+kVAh2-C • Phase 2 imported capacitive apparent energy	PLS	EC
00E7	-kVAh2-C • Phase 2 exported capacitive apparent energy	PLS	EC
00E8	+kVAh2-L • Phase 2 imported inductive apparent energy	PLS	EC
00E9	-kVAh2-L • Phase 2 exported inductive apparent energy	PLS	EC
00EA	+kVAh2 • Phase 2 imported apparent energy	PLS	EC
00EB	-kVAh2 • Phase 2 exported apparent energy	PLS	EC
00EC	+kVAh3-C • Phase 3 imported capacitive apparent energy	PLS	EC
00ED	-kVAh3-C • Phase 3 exported capacitive apparent energy	PLS	EC
00EE	+kVAh3-L • Phase 3 imported inductive apparent energy	PLS	EC
00EF	-kVAh3-L • Phase 3 exported inductive apparent energy	PLS	EC
00F0	+kVAh3 • Phase 3 imported apparent energy	PLS	EC
00F1	-kVAh3 • Phase 3 exported apparent energy	PLS	EC
00F2	+kVAh∑-C • System imported capacitive apparent energy	PLS	EC
00F3	-kVAh∑-C • System exported capacitive apparent energy	PLS	EC
00F4	+kVAh∑-L • System imported inductive apparent energy	PLS	EC
00F5	-kVAh∑-L • System exported inductive apparent energy	PLS	EC
00F6	+kVAh∑ • System imported apparent energy	PLS	EC
00F7	-kVAh∑ • System exported apparent energy	PLS	EC
00F8	kVAh∑BAL-C • Balance of system capacitive apparent en. (imp-exp)		EC
00F9	kVAh∑BAL-L • Balance of system inductive apparent en. (imp-exp)		EC
00FA	kVAh∑BAL • Balance of system apparent energy (imp-exp) (BAL-C + BAL-L)		EC
00FB	+kvarh1-C • Phase 1 imported capacitive reactive energy	PLS	EC
00FC	-kvarh1-C • Phase 1 exported capacitive reactive energy	PLS	EC
00FD	+kvarh1-L • Phase 1 imported inductive reactive energy	PLS	EC
00FE	-kvarh1-L • Phase 1 exported inductive reactive energy	PLS	EC
00FF	+kvarh2-C • Phase 2 imported capacitive reactive energy	PLS	EC
0100	-kvarh2-C • Phase 2 exported capacitive reactive energy	PLS	EC

Available only for instrument with separated Inductive and Capacitive apparent counters.
Available only for instrument with Total apparent counters (ind+cap).
Available only for ENH instrument version.

CODE (Hex)	Description	DIGITAL OUTPUT AL=Alarm PLS=Pulse	REC-ENH MAM=Min/Avg/Max EC=Energy counters
PARAMETER CODES			
0101	+kvarh2-L • Phase 2 imported inductive reactive energy	PLS	EC
0102	-kvarh2-L • Phase 2 exported inductive reactive energy	PLS	EC
0103	+kvarh3-C • Phase 3 imported capacitive reactive energy	PLS	EC
0104	-kvarh3-C • Phase 3 exported capacitive reactive energy	PLS	EC
0105	+kvarh3-L • Phase 3 imported inductive reactive energy	PLS	EC
0106	-kvarh3-L • Phase 3 exported inductive reactive energy	PLS	EC
0107	+kvarh∑-C • System imported capacitive reactive energy	PLS	EC
0108	-kvarh∑-C • System exported capacitive reactive energy	PLS	EC
0109	+kvarh∑-L • System imported inductive reactive energy	PLS	EC
010A	-kvarh∑-L • System exported inductive reactive energy	PLS	EC
010B	kvarh∑BAL-C • Balance of system capacitive reactive en. (imp-exp)		EC
010C	kvarh∑BAL-L • Balance of system inductive reactive en. (imp-exp)		EC
010D	kvarh∑BAL • Balance of system reactive energy (BAL-C + BAL-L)		EC
010E	HaV1 • Phase 1-N voltage component 0 (DC)		MAM
010F	HaV1 • Phase 1-N voltage component 1st		MAM
0110	HaV1 • Phase 1-N voltage component 2nd		MAM
0111	HaV1 • Phase 1-N voltage component 3rd		MAM
0112	HaV1 • Phase 1-N voltage component 4th		MAM
0113	HaV1 • Phase 1-N voltage component 5th		MAM
0114	HaV1 • Phase 1-N voltage component 6th		MAM
0115	HaV1 • Phase 1-N voltage component 7th		MAM
0116	HaV1 • Phase 1-N voltage component 8th		MAM
0117	HaV1 • Phase 1-N voltage component 9th		MAM
0118	HaV1 • Phase 1-N voltage component 10th		MAM
0119	HaV1 • Phase 1-N voltage component 11th		MAM
011A	HaV1 • Phase 1-N voltage component 12th		MAM
011B	HaV1 • Phase 1-N voltage component 13th		MAM
011C	HaV1 • Phase 1-N voltage component 14th		MAM
011D	HaV1 • Phase 1-N voltage component 15th		MAM
011E	HaV2 • Phase 2-N voltage component 0 (DC)		MAM
011F	HaV2 • Phase 2-N voltage component 1st		MAM
0120	HaV2 • Phase 2-N voltage component 2nd		MAM
0121	HaV2 • Phase 2-N voltage component 3rd		MAM
0122	HaV2 • Phase 2-N voltage component 4th		MAM
0123	HaV2 • Phase 2-N voltage component 5th		MAM
0124	HaV2 • Phase 2-N voltage component 6th		MAM
0125	HaV2 • Phase 2-N voltage component 7th		MAM
0126	HaV2 • Phase 2-N voltage component 8th		MAM
0127	HaV2 • Phase 2-N voltage component 9th		MAM
0128	HaV2 • Phase 2-N voltage component 10th		MAM
0129	HaV2 • Phase 2-N voltage component 11th		MAM
012A	HaV2 • Phase 2-N voltage component 12th		MAM
012B	HaV2 • Phase 2-N voltage component 13th		MAM
012C	HaV2 • Phase 2-N voltage component 14th		MAM
012D	HaV2 • Phase 2-N voltage component 15th		MAM
012E	HaV3 • Phase 3-N voltage component 0 (DC)		MAM

Available only for ENH instrument version.

CODE (Hex)	Description	DIGITAL OUTPUT AL=Alarm PLS=Pulse	REC-ENH MAM=Min/Avg/Max EC=Energy counters
PARAMETER CODES			
012F	HaV3 • Phase 3-N voltage component 1st		MAM
0130	HaV3 • Phase 3-N voltage component 2nd		MAM
0131	HaV3 • Phase 3-N voltage component 3rd		MAM
0132	HaV3 • Phase 3-N voltage component 4th		MAM
0133	HaV3 • Phase 3-N voltage component 5th		MAM
0134	HaV3 • Phase 3-N voltage component 6th		MAM
0135	HaV3 • Phase 3-N voltage component 7th		MAM
0136	HaV3 • Phase 3-N voltage component 8th		MAM
0137	HaV3 • Phase 3-N voltage component 9th		MAM
0138	HaV3 • Phase 3-N voltage component 10th		MAM
0139	HaV3 • Phase 3-N voltage component 11th		MAM
013A	HaV3 • Phase 3-N voltage component 12th		MAM
013B	HaV3 • Phase 3-N voltage component 13th		MAM
013C	HaV3 • Phase 3-N voltage component 14th		MAM
013D	HaV3 • Phase 3-N voltage component 15th		MAM
013E	HaV12 • Line 12 voltage component 0 (DC)		MAM
013F	HaV12 • Line 12 voltage component 1st		MAM
0140	HaV12 • Line 12 voltage component 2nd		MAM
0141	HaV12 • Line 12 voltage component 3rd		MAM
0142	HaV12 • Line 12 voltage component 4th		MAM
0143	HaV12 • Line 12 voltage component 5th		MAM
0144	HaV12 • Line 12 voltage component 6th		MAM
0145	HaV12 • Line 12 voltage component 7th		MAM
0146	HaV12 • Line 12 voltage component 8th		MAM
0147	HaV12 • Line 12 voltage component 9th		MAM
0148	HaV12 • Line 12 voltage component 10th		MAM
0149	HaV12 • Line 12 voltage component 11th		MAM
014A	HaV12 • Line 12 voltage component 12th		MAM
014B	HaV12 • Line 12 voltage component 13th		MAM
014C	HaV12 • Line 12 voltage component 14th		MAM
014D	HaV12 • Line 12 voltage component 15th		MAM
014E	HaV23 • Line 23 voltage component 0 (DC)		MAM
014F	HaV23 • Line 23 voltage component 1st		MAM
0150	HaV23 • Line 23 voltage component 2nd		MAM
0151	HaV23 • Line 23 voltage component 3rd		MAM
0152	HaV23 • Line 23 voltage component 4th		MAM
0153	HaV23 • Line 23 voltage component 5th		MAM
0154	HaV23 • Line 23 voltage component 6th		MAM
0155	HaV23 • Line 23 voltage component 7th		MAM
0156	HaV23 • Line 23 voltage component 8th		MAM
0157	HaV23 • Line 23 voltage component 9th		MAM
0158	HaV23 • Line 23 voltage component 10th		MAM
0159	HaV23 • Line 23 voltage component 11th		MAM
015A	HaV23 • Line 23 voltage component 12th		MAM
015B	HaV23 • Line 23 voltage component 13th		MAM
015C	HaV23 • Line 23 voltage component 14th		MAM

Available only for ENH instrument version.

CODE (Hex)	Description	DIGITAL OUTPUT AL=Alarm PLS=Pulse	REC-ENH MAM=Min/Avg/Max EC=Energy counters
PARAMETER CODES			
015D	HaV23 • Line 23 voltage component 15th		MAM
015E	HaV31 • Line 31 voltage component 0 (DC)		MAM
015F	HaV31 • Line 31 voltage component 1st		MAM
0160	HaV31 • Line 31 voltage component 2nd		MAM
0161	HaV31 • Line 31 voltage component 3rd		MAM
0162	HaV31 • Line 31 voltage component 4th		MAM
0163	HaV31 • Line 31 voltage component 5th		MAM
0164	HaV31 • Line 31 voltage component 6th		MAM
0165	HaV31 • Line 31 voltage component 7th		MAM
0166	HaV31 • Line 31 voltage component 8th		MAM
0167	HaV31 • Line 31 voltage component 9th		MAM
0168	HaV31 • Line 31 voltage component 10th		MAM
0169	HaV31 • Line 31 voltage component 11th		MAM
016A	HaV31 • Line 31 voltage component 12th		MAM
016B	HaV31 • Line 31 voltage component 13th		MAM
016C	HaV31 • Line 31 voltage component 14th		MAM
016D	HaV31 • Line 31 voltage component 15th		MAM
016E	HaA1 • Phase 1 current component 0 (DC)		MAM
016F	HaA1 • Phase 1 current component 1st		MAM
0170	HaA1 • Phase 1 current component 2nd		MAM
0171	HaA1 • Phase 1 current component 3rd		MAM
0172	HaA1 • Phase 1 current component 4th		MAM
0173	HaA1 • Phase 1 current component 5th		MAM
0174	HaA1 • Phase 1 current component 6th		MAM
0175	HaA1 • Phase 1 current component 7th		MAM
0176	HaA1 • Phase 1 current component 8th		MAM
0177	HaA1 • Phase 1 current component 9th		MAM
0178	HaA1 • Phase 1 current component 10th		MAM
0179	HaA1 • Phase 1 current component 11th		MAM
017A	HaA1 • Phase 1 current component 12th		MAM
017B	HaA1 • Phase 1 current component 13th		MAM
017C	HaA1 • Phase 1 current component 14th		MAM
017D	HaA1 • Phase 1 current component 15th		MAM
017E	HaA2 • Phase 2 current component 0 (DC)		MAM
017F	HaA2 • Phase 2 current component 1st		MAM
0180	HaA2 • Phase 2 current component 2nd		MAM
0181	HaA2 • Phase 2 current component 3rd		MAM
0182	HaA2 • Phase 2 current component 4th		MAM
0183	HaA2 • Phase 2 current component 5th		MAM
0184	HaA2 • Phase 2 current component 6th		MAM
0185	HaA2 • Phase 2 current component 7th		MAM
0186	HaA2 • Phase 2 current component 8th		MAM
0187	HaA2 • Phase 2 current component 9th		MAM
0188	HaA2 • Phase 2 current component 10th		MAM
0189	HaA2 • Phase 2 current component 11th		MAM
018A	HaA2 • Phase 2 current component 12th		MAM

Available only for ENH instrument version.

CODE (Hex)	Description	DIGITAL OUTPUT AL=Alarm PLS=Pulse	REC-ENH MAM=Min/Avg/Max EC=Energy counters
PARAMETER CODES			
018B	HaA2 • Phase 2 current component 13th		MAM
018C	HaA2 • Phase 2 current component 14th		MAM
018D	HaA2 • Phase 2 current component 15th		MAM
018E	HaA3 • Phase 3 current component 0 (DC)		MAM
018F	HaA3 • Phase 3 current component 1st		MAM
0190	HaA3 • Phase 3 current component 2nd		MAM
0191	HaA3 • Phase 3 current component 3rd		MAM
0192	HaA3 • Phase 3 current component 4th		MAM
0193	HaA3 • Phase 3 current component 5th		MAM
0194	HaA3 • Phase 3 current component 6th		MAM
0195	HaA3 • Phase 3 current component 7th		MAM
0196	HaA3 • Phase 3 current component 8th		MAM
0197	HaA3 • Phase 3 current component 9th		MAM
0198	HaA3 • Phase 3 current component 10th		MAM
0199	HaA3 • Phase 3 current component 11th		MAM
019A	HaA3 • Phase 3 current component 12th		MAM
019B	HaA3 • Phase 3 current component 13th		MAM
019C	HaA3 • Phase 3 current component 14th		MAM
019D	HaA3 • Phase 3 current component 15th		MAM
019E	HaAN • Neutral current component 0 (DC) *		MAM
019F	HaAN • Neutral current component 1st *		MAM
01A0	HaAN • Neutral current component 2nd *		MAM
01A1	HaAN • Neutral current component 3rd *		MAM
01A2	HaAN • Neutral current component 4th *		MAM
01A3	HaAN • Neutral current component 5th *		MAM
01A4	HaAN • Neutral current component 6th *		MAM
01A5	HaAN • Neutral current component 7th *		MAM
01A6	HaAN • Neutral current component 8th *		MAM
01A7	HaAN • Neutral current component 9th *		MAM
01A8	HaAN • Neutral current component 10th *		MAM
01A9	HaAN • Neutral current component 11th *		MAM
01AA	HaAN • Neutral current component 12th *		MAM
01AB	HaAN • Neutral current component 13th *		MAM
01AC	HaAN • Neutral current component 14th *		MAM
01AD	HaAN • Neutral current component 15th *		MAM

Available only for ENH instrument version.

* The neutral current and the derivative parameters (AN, THDAN, HaAN) are not available if the set CT ratio or FSA value is different for each phase.

Register description	F. code (Hex)	INTEGER		Programmable data
		Register (Hex)	Words	
RECORDING DOWNLOAD				
Prepare data for downloading (according to the instrument model)	10	F000	2	$01=prepare AVG or MIN/AVG/MAX rec. (according to the instr. model) $02=prepare Energy rec. (only ENH instr.)
Delete recorded data (irreversible operation)	10	F002	2	$01=delete AVG or MIN/AVG/MAX rec. (according to the instr. model) $02=delete Energy rec. (only ENH instr.) $03=delete all rec. (only ENH instr.)
Read the record/s block previously downloaded (do not consider the first word). The download block always contains an integer record number. For the block structure refer to the description of $F101 register.	03 / 04	F100	1+ ⩽124	Set the word number considering that the download block must contain an integer record number + 1 word. Each record contains only the enabled parameters + timestamp. Example 1: 109 words=$006D Example 2: 105 words=$0069 Example 3: 75 words=$004B
Download and read the first/next record/s block. Example 1 (BASIC instrument version) Active&reactive powers, 16 values; the record length is 2(timestamp)+16 words=18($12); the download block will contain 6 records. Example 2 (ENH instrument version) With 4 parameters enabled for recording: 24 values; the record length is 2(timestamp)+24 words=26($1A); the download block will contain 4 records. Example 3 (ENH instrument version) With 24 parameters enabled for recording: 72 values; the record length is 2(timestamp)+72 words=74($4A); the download block will contain 1 record.	03 / 04	F101	⩽124	Set the word number considering that the download block must contain an integer record number. Each record contains only the enabled parameters + timestamp. Example 1: 108 words=$006C Example 2: 104 words=$0068 Example 3: 74 words=$004A

Register description	Value format	Words
AVG RECORDING PARAMETER BLOCK (FIXED) - BASIC VERSION		
Timestamp of the record block	UnixTime	2
$+P1_{AVG}$ • Phase 1 imported active power AVG	0.005% FS	1
$-P1_{AVG}$ • Phase 1 exported active power AVG	0.005% FS	1
$+P2_{AVG}$ • Phase 2 imported active power AVG	0.005% FS	1
$-P2_{AVG}$ • Phase 2 exported active power AVG	0.005% FS	1
$+P3_{AVG}$ • Phase 3 imported active power AVG	0.005% FS	1
$-P3_{AVG}$ • Phase 3 exported active power AVG	0.005% FS	1
$+P\sum_{AVG}$ • System imported active power AVG	0.005% FS	1
$-P\sum_{AVG}$ • System exported active power AVG	0.005% FS	1
$+Q1_{AVG}$ • Phase 1 imported reactive power AVG	0.005% FS	1
$-Q1_{AVG}$ • Phase 1 exported reactive power AVG	0.005% FS	1
$+Q2_{AVG}$ • Phase 2 imported reactive power AVG	0.005% FS	1
$-Q2_{AVG}$ • Phase 2 exported reactive power AVG	0.005% FS	1
$+Q3_{AVG}$ • Phase 3 imported reactive power AVG	0.005% FS	1
$-Q3_{AVG}$ • Phase 3 exported reactive power AVG	0.005% FS	1
$+Q\sum_{AVG}$ • System imported reactive power AVG	0.005% FS	1
$-Q\sum_{AVG}$ • System exported reactive power AVG	0.005% FS	1

Register description	Value format	Words
MIN/AVG/MAX RECORDING PARAMETER BLOCK - ENH VERSION		
Timestamp of the record block	UnixTime	2
1_{MIN} • MIN value - parameter position 1	0.005% FS	1
1_{AVG} • AVG value - parameter position 1	0.005% FS	1
1_{MAX} • MAX value - parameter position 1	0.005% FS	1
2_{MIN} • MIN value - parameter position 2	0.005% FS	1
2_{AVG} • AVG value - parameter position 2	0.005% FS	1
2_{MAX} • MAX value - parameter position 2	0.005% FS	1
3_{MIN} • MIN value - parameter position 3	0.005% FS	1
3_{AVG} • AVG value - parameter position 3	0.005% FS	1
3_{MAX} • MAX value - parameter position 3	0.005% FS	1
4_{MIN} • MIN value - parameter position 4	0.005% FS	1
4_{AVG} • AVG value - parameter position 4	0.005% FS	1
4_{MAX} • MAX value - parameter position 4	0.005% FS	1
5_{MIN} • MIN value - parameter position 5	0.005% FS	1
5_{AVG} • AVG value - parameter position 5	0.005% FS	1
5_{MAX} • MAX value - parameter position 5	0.005% FS	1
6_{MIN} • MIN value - parameter position 6	0.005% FS	1
6_{AVG} • AVG value - parameter position 6	0.005% FS	1
6_{MAX} • MAX value - parameter position 6	0.005% FS	1
7_{MIN} • MIN value - parameter position 7	0.005% FS	1
7_{AVG} • AVG value - parameter position 7	0.005% FS	1
7_{MAX} • MAX value - parameter position 7	0.005% FS	1
8_{MIN} • MIN value - parameter position 8	0.005% FS	1
8_{AVG} • AVG value - parameter position 8	0.005% FS	1
8_{MAX} • MAX value - parameter position 8	0.005% FS	1
9_{MIN} • MIN value - parameter position 9	0.005% FS	1
9_{AVG} • AVG value - parameter position 9	0.005% FS	1
9_{MAX} • MAX value - parameter position 9	0.005% FS	1
10_{MIN} • MIN value - parameter position 10	0.005% FS	1
10_{AVG} • AVG value - parameter position 10	0.005% FS	1
10_{MAX} • MAX value - parameter position 10	0.005% FS	1
11_{MIN} • MIN value - parameter position 11	0.005% FS	1
11_{AVG} • AVG value - parameter position 11	0.005% FS	1
11_{MAX} • MAX value - parameter position 11	0.005% FS	1
12_{MIN} • MIN value - parameter position 12	0.005% FS	1
12_{AVG} • AVG value - parameter position 12	0.005% FS	1
12_{MAX} • MAX value - parameter position 12	0.005% FS	1
13_{MIN} • MIN value - parameter position 13	0.005% FS	1
13_{AVG} • AVG value - parameter position 13	0.005% FS	1
13_{MAX} • MAX value - parameter position 13	0.005% FS	1
14_{MIN} • MIN value - parameter position 14	0.005% FS	1
14_{AVG} • AVG value - parameter position 14	0.005% FS	1
14_{MAX} • MAX value - parameter position 14	0.005% FS	1
15_{MIN} • MIN value - parameter position 15	0.005% FS	1
15_{AVG} • AVG value - parameter position 15	0.005% FS	1
15_{MAX} • MAX value - parameter position 15	0.005% FS	1

Available only for ENH instrument version.

Register description	Value format	Words
MIN/AVG/MAX RECORDING PARAMETER BLOCK - ENH VERSION		
16_{MIN} • MIN value - parameter position 16	0.005% FS	1
16_{AVG} • AVG value - parameter position 16	0.005% FS	1
16_{MAX} • MAX value - parameter position 16	0.005% FS	1
17_{MIN} • MIN value - parameter position 17	0.005% FS	1
17_{AVG} • AVG value - parameter position 17	0.005% FS	1
17_{MAX} • MAX value - parameter position 17	0.005% FS	1
18_{MIN} • MIN value - parameter position 18	0.005% FS	1
18_{AVG} • AVG value - parameter position 18	0.005% FS	1
18_{MAX} • MAX value - parameter position 18	0.005% FS	1
19_{MIN} • MIN value - parameter position 19	0.005% FS	1
19_{AVG} • AVG value - parameter position 19	0.005% FS	1
19_{MAX} • MAX value - parameter position 19	0.005% FS	1
20_{MIN} • MIN value - parameter position 20	0.005% FS	1
20_{AVG} • AVG value - parameter position 20	0.005% FS	1
20_{MAX} • MAX value - parameter position 20	0.005% FS	1
21_{MIN} • MIN value - parameter position 21	0.005% FS	1
21_{AVG} • AVG value - parameter position 21	0.005% FS	1
21_{MAX} • MAX value - parameter position 21	0.005% FS	1
22_{MIN} • MIN value - parameter position 22	0.005% FS	1
22_{AVG} • AVG value - parameter position 22	0.005% FS	1
22_{MAX} • MAX value - parameter position 22	0.005% FS	1
23_{MIN} • MIN value - parameter position 23	0.005% FS	1
23_{AVG} • AVG value - parameter position 23	0.005% FS	1
23_{MAX} • MAX value - parameter position 23	0.005% FS	1
24_{MIN} • MIN value - parameter position 24	0.005% FS	1
24_{AVG} • AVG value - parameter position 24	0.005% FS	1
24_{MAX} • MAX value - parameter position 24	0.005% FS	1

Available only for ENH instrument version.

Register description	Value format	Words (IEEE)
ENERGY COUNTER RECORDING PARAMETER BLOCK - ENH VERSION		
Timestamp of the record block	UnixTime	2
+kWh1 • Phase 1 imported active energy	0.1 Wh	2
-kWh1 • Phase 1 exported active energy	0.1 Wh	2
+kWh2 • Phase 2 imported active energy	0.1 Wh	2
-kWh2 • Phase 2 exported active energy	0.1 Wh	2
+kWh3 • Phase 3 imported active energy	0.1 Wh	2
-kWh3 • Phase 3 exported active energy	0.1 Wh	2
+kWh∑ • System imported active energy	0.1 Wh	2
-kWh∑ • System exported active energy	0.1 Wh	2
kWh∑BAL • Balance of system active energy (imp-exp)	0.1 Wh	2
+kVAh1-C • Phase 1 imported capacitive apparent energy	0.1 VAh	2
-kVAh1-C • Phase 1 exported capacitive apparent energy	0.1 VAh	2
+kVAh1-L • Phase 1 imported inductive apparent energy	0.1 VAh	2
-kVAh1-L • Phase 1 exported inductive apparent energy	0.1 VAh	2
+kVAh1 • Phase 1 imported apparent energy	0.1 VAh	2
-kVAh1 • Phase 1 exported apparent energy	0.1 VAh	2
+kVAh2-C • Phase 2 imported capacitive apparent energy	0.1 VAh	2
-kVAh2-C • Phase 2 exported capacitive apparent energy	0.1 VAh	2
+kVAh2-L • Phase 2 imported inductive apparent energy	0.1 VAh	2
-kVAh2-L • Phase 2 exported inductive apparent energy	0.1 VAh	2
+kVAh2 • Phase 2 imported apparent energy	0.1 VAh	2
-kVAh2 • Phase 2 exported apparent energy	0.1 VAh	2
+kVAh3-C • Phase 3 imported capacitive apparent energy	0.1 VAh	2
-kVAh3-C • Phase 3 exported capacitive apparent energy	0.1 VAh	2
+kVAh3-L • Phase 3 imported inductive apparent energy	0.1 VAh	2
-kVAh3-L • Phase 3 exported inductive apparent energy	0.1 VAh	2
+kVAh3 • Phase 3 imported apparent energy	0.1 VAh	2
-kVAh3 • Phase 3 exported apparent energy	0.1 VAh	2
+kVAh∑-C • System imported capacitive apparent energy	0.1 VAh	2
-kVAh∑-C • System exported capacitive apparent energy	0.1 VAh	2
+kVAh∑-L • System imported inductive apparent energy	0.1 VAh	2
-kVAh∑-L • System exported inductive apparent energy	0.1 VAh	2
+kVAh∑ • System imported apparent energy	0.1 VAh	2
-kVAh∑ • System exported apparent energy	0.1 VAh	2
kVAh∑BAL-C • Balance of system capacitive apparent en. (imp-exp)	0.1 VAh	2
kVAh∑BAL-L • Balance of system inductive apparent en. (imp-exp)	0.1 VAh	2
kVAh∑BAL • Balance of system apparent energy (imp-exp) (BAL-C + BAL-L)	0.1 VAh	2
+kvarh1-C • Phase 1 imported capacitive reactive energy	0.1 varh	2
-kvarh1-C • Phase 1 exported capacitive reactive energy	0.1 varh	2
+kvarh1-L • Phase 1 imported inductive reactive energy	0.1 varh	2
-kvarh1-L • Phase 1 exported inductive reactive energy	0.1 varh	2
+kvarh2-C • Phase 2 imported capacitive reactive energy	0.1 varh	2
-kvarh2-C • Phase 2 exported capacitive reactive energy	0.1 varh	2
+kvarh2-L • Phase 2 imported inductive reactive energy	0.1 varh	2
-kvarh2-L • Phase 2 exported inductive reactive energy	0.1 varh	2

Available only for instrument with separated Inductive and Capacitive apparent counters.
Available only for instrument with Total apparent counters (ind+cap).
Available only for ENH instrument version.

Register description	Value format	Words (IEEE)
ENERGY COUNTER RECORDING PARAMETER BLOCK - ENH VERSION		
+kvarh3-C • Phase 3 imported capacitive reactive energy	0.1 varh	2
-kvarh3-C • Phase 3 exported capacitive reactive energy	0.1 varh	2
+kvarh3-L • Phase 3 imported inductive reactive energy	0.1 varh	2
-kvarh3-L • Phase 3 exported inductive reactive energy	0.1 varh	2
+kvarh∑-C • System imported capacitive reactive energy	0.1 varh	2
-kvarh∑-C • System exported capacitive reactive energy	0.1 varh	2
+kvarh∑-L • System imported inductive reactive energy	0.1 varh	2
-kvarh∑-L • System exported inductive reactive energy	0.1 varh	2
kvarh∑BAL-C • Balance of system capacitive reactive en. (imp-exp)	0.1 varh	2
kvarh∑BAL-L • Balance of system inductive reactive en. (imp-exp)	0.1 varh	2
kvarh∑BAL • Balance of system reactive energy (BAL-C + BAL-L)	0.1 varh	2

3 CONSIDERATIONS ON THE FULL SCALE VALUE CALCULATION

The full scale value calculation can change according to the instrument model (1/5A CT, 80A, Rogowski). The following description shows the formulas for each model.

1/5A CT instrument

The phase power full scale is the result of a multiplication between PT primary and phase X CT primary (X=1, 2 or 3). If the PT primary and secondary values are set to 1 (direct connection), the phase power full scale is the result of a multiplication between 290V and phase X CT primary (X=1, 2 or 3).

Example: formula for phase 1 power full scale

$FS_{P1,S1,Q1} = PT_{pri} * CT1_{pri}$ if $PT_{pri}=PT_{sec}=1 \rightarrow FS_{P1,S1,Q1} = 290V * CT1_{pri}$

The system power full scale is the result of a multiplication between 3 and PT primary and max phase CT primary. If the PT primary and secondary values are set to 1 (direct connection), the system power full scale is the result of a multiplication between 3 and 290V and max phase CT primary.

Example: formula for system power full scale

$FS_{P\sum,S\sum,Q\sum} = 3 * PT_{pri} * CT_{priMAX}$ if $PT_{pri}=PT_{sec}=1 \rightarrow FS_{P\sum,S\sum,Q\sum} = 3 * 290V * CT_{priMAX}$

80A instrument

The phase power full scale is the result of a multiplication between 290V and phase X CT primary (X=1, 2 or 3).

Example: formula for phase 1 power full scale

$FS_{P1,S1,Q1} = 290V * CT1_{pri}$

The system power full scale is the result of a multiplication between 3 and 290V and max phase CT primary.

Example: formula for system power full scale

$FS_{P\sum,S\sum,Q\sum} = 3 * 290V * CT_{priMAX}$

Available only for ENH instrument version.

Rogowski instrument

The phase power full scale is the result of a multiplication between PT primary and phase X current full scale (X=1, 2 or 3). If the PT primary and secondary values are set to 1 (direct connection), the phase power full scale is the result of a multiplication between 290V and phase X current full scale (X=1, 2 or 3).

For the current full scale value to be used in the formula, consider the following values according to the selected instrument scale:

Scale 500A $\rightarrow$ FS_A = 700A

Scale 4000A $\rightarrow$ FS_A = 5600A

Scale 20000A $\rightarrow$ FS_A = 28000A

Example: formula for phase 1 power full scale

$FS_{P1,S1,Q1} = PT_{pri} * FS_{A1}$ if $PT_{pri}=PT_{sec}=1 \rightarrow FS_{P1,S1,Q1} = 290V * FS_{A1}$

The system power full scale is the result of a multiplication between 3 and PT primary and max phase current full scale. If the PT primary and secondary values are set to 1 (direct connection), the system power full scale is the result of a multiplication between 3 and 290V and max phase current full scale.

Example: formula for system power full scale

$FS_{P\Sigma,S\Sigma,Q\Sigma} = 3 * PT_{pri} * FS_{AMAX}$ if $PT_{pri}=PT_{sec}=1 \rightarrow FS_{P\Sigma,S\Sigma,Q\Sigma} = 3 * 290V * FS_{AMAX}$