Error while transferring the data record

错误信息列表

The module always checks all the values of the transferred data record. Only if all the values were transferred without errors does the module apply the values from the data record.

The WRREC instruction writes data records and returns corresponding error codes when errors occur in the STATUS parameter.

The following table shows the module-specific error codes and their meaning for the measured value data record 143:

Error code in STATUS parameter (hexadecimal)				Meaning	Solution
Byte 0	Byte 1	Byte 2	Byte 3		
DF	80	B0	00	Number of the data record unknown	Enter a valid number for the data record.
DF	80	B1	00	Length of the data record incorrect	Enter a valid value for the data record length.
DF	80	B2	00	Slot invalid or cannot be accessed	Check the station whether the module is plugged. Check the assigned parameter values for the WRREC instruction.
DF	80	E1	01	Reserved bits are not 0.	Check Byte 2 ... 7 and set the reserved bits to 0.
DF	80	E1	39	Incorrect version entered	Check Byte 0. Enter a valid version
DF	80	E1	3A	Incorrect data record length entered	Check the parameters of the WRREC instruction. Enter a valid length.
DF	80	E1	3C	At least one start value is invalid.	Check Bytes 8 ... 103 and Bytes 158 ... 169. The start values may not be negative.
DF	80	E1	3D	At least one start value is too large.	Check Bytes 8 ... 103 and Bytes 158 ... 169. Observe the ranges of values for start values.

E.4 Maximum values data record (DS 144)

Maximum values

The largest values measured or calculated from the time SM 1238 Energy Meter 480VAC was started are stored in this data record.

Byte	Measured variable	Format	Unit	Default	Value ID	Connection type				
						1P2W	3x1P2W	2P3W	3P4W	3P4W1
0	Version	BYTE	-	0	-	✓	✓	✓	✓	✓
1	Reserved	BYTE	-	0	-	✓	✓	✓	✓	✓
2 ... 5	Max. voltage UL1-N	REAL	V	0	40	✓	✓	✓	✓	✓
6 ... 9	Max. voltage UL2-N	REAL	V	0	41		✓	✓	✓	✓
10 ... 13	Max. voltage UL3-N	REAL	V	0	42		✓		✓	✓
14 ... 17	Max. voltage UL1-L2	REAL	V	0	43				✓	✓
18 ... 21	Max. voltage UL2-L3	REAL	V	0	44				✓	✓
22 ... 25	Max. voltage UL3-L1	REAL	V	0	45				✓	✓
26 ... 29	Max. current L1 [1]	REAL	A	0	46	✓	✓	✓	✓	✓
30 ... 33	Max. current L2 [1]	REAL	A	0.	47		✓	✓	✓	✓
34 ... 37	Max. current L3 [1]	REAL	A	0	48		✓		✓	✓
38 ... 41	Max. apparent power L1	REAL	VA	0	49	✓	✓	✓	✓	✓
42 ... 45	Max. apparent power L2	REAL	VA	0	50		✓	✓	✓	✓
46 ... 49	Max. apparent power L3	REAL	VA	0	51		✓		✓	✓
50 ... 53	Max. active power L1	REAL	W	-3.0×10^9	52	✓	✓	✓	✓	✓
54 ... 57	Max. active power L2	REAL	W	-3.0×10^9	53		✓	✓	✓	✓
58 ... 61	Max. active power L3	REAL	W	-3.0×10^9	54		✓		✓	✓
62 ... 65	Max. reactive power L1	REAL	var	-3.0×10^9	55	✓	✓	✓	✓	✓
66 ... 69	Max. reactive power L2	REAL	var	-3.0×10^9	56		✓	✓	✓	✓
70 ... 73	Max. reactive power L3	REAL	var	-3.0×10^9	57		✓		✓	✓
74 ... 77	Max. power factor L1	REAL	-	0	58	✓	✓	✓	✓	✓
78 ... 81	Max. power factor L2	REAL	-	0	59		✓	✓	✓	✓
82 ... 85	Max. power factor L3	REAL	-	0	60		✓		✓	✓
86 ... 89	Max. frequency	REAL	Hz	45	61	✓	✓	✓	✓	✓
90 ... 93	Max. total apparent power	REAL	VA	0	67	✓	✓	✓	✓	✓
94 ... 97	Max. total active power	REAL	W	-3.0×10^9	65	✓	✓	✓	✓	✓
98 ... 101	Max. total reactive power	REAL	var	-3.0×10^9	66	✓	✓	✓	✓	✓
102 ... 105	Max. total power factor	REAL	-	0	68	✓	✓	✓	✓	✓

[1] The absolute value of the electrical measured current

E.5 Minimum values data record (DS 145)

Minimum values

The smallest values measured or calculated from the time SM 1238 Energy Meter 480VAC was started are stored in this data record.

Byte	Measured variable	Format	Unit	Default	Value ID	Connection type				
						1P2W	3x1P2W	2P3W	3P4W	3P4W1
0	Version	BYTE	-	0	-	✓	✓	✓	✓	✓
1	Reserved	BYTE	-	0	-	✓	✓	✓	✓	✓
2 ... 5	Min. voltage UL1-N	REAL	V	1000000	70	✓	✓	✓	✓	✓
6 ... 9	Min. voltage UL2-N	REAL	V	1000000	71		✓	✓	✓	✓
10 ... 13	Min. voltage UL3-N	REAL	V	1000000	72		✓		✓	✓
14 ... 17	Min. voltage UL1-L2	REAL	V	1800000	73				✓	✓
18 ... 21	Min. voltage UL2-L3	REAL	V	1800000	74				✓	✓
22 ... 25	Min. voltage UL3-L1	REAL	V	1800000	75				✓	✓
26 ... 29	Min. current L1 [1]	REAL	A	100000	76	✓	✓	✓	✓	✓
30 ... 33	Min. current L2 [1]	REAL	A	100000	77		✓	✓	✓	✓
34 ... 37	Min. current L3 [1]	REAL	A	100000	78		✓		✓	✓
38 ... 41	Min. apparent power L1	REAL	VA	$+3.0 \times 10^9$	79	✓	✓	✓	✓	✓
42 ... 45	Min. apparent power L2	REAL	VA	$+3.0 \times 10^9$	80		✓	✓	✓	✓
46 ... 49	Min. apparent power L3	REAL	VA	$+3.0 \times 10^9$	81		✓		✓	✓
50 ... 53	Min. active power L1	REAL	W	$+3.0 \times 10^9$	82	✓	✓	✓	✓	✓
54 ... 57	Min. active power L2	REAL	W	$+3.0 \times 10^9$	83		✓	✓	✓	✓
58 ... 61	Min. active power L3	REAL	W	$+3.0 \times 10^9$	84		✓		✓	✓
62 ... 65	Min. reactive power L1	REAL	var	$+3.0 \times 10^9$	85	✓	✓	✓	✓	✓
66 ... 69	Min. reactive power L2	REAL	var	$+3.0 \times 10^9$	86		✓	✓	✓	✓
70 ... 73	Min. reactive power L3	REAL	var	$+3.0 \times 10^9$	87		✓		✓	✓
74 ... 77	Min. power factor L1	REAL	-	1	88	✓	✓	✓	✓	✓
78...81	Min. power factor L2	REAL	-	1	89		✓	✓	✓	✓
82 ... 85	Min. power factor L3	REAL	-	1	90		✓		✓	✓
86 ... 89	Min. frequency	REAL	Hz	65	91	✓	✓	✓	✓	✓
90 ... 93	Min. total apparent power	REAL	VA	$+3.0 \times 10^9$	97	✓	✓	✓	✓	✓
94 ... 97	Min. total active power	REAL	W	$+3.0 \times 10^9$	95	✓	✓	✓	✓	✓
98 ... 101	Min. total reactive power	REAL	var	$+3.0 \times 10^9$	96	✓	✓	✓	✓	✓
102 ... 105	Min. total power factor	REAL	-	1	98	✓	✓	✓	✓	✓

[1] The absolute value of the electrical measured current

E.6 L1 phase-based values data record (DS 147)

L1 phase measured variables (DS 147)

Byte	Measured variable	Format	Unit	Value range	Value ID	Connection type				
						1P2W	3x1P2W	2P3W	3P4W	3P4W1
0	Version	BYTE	-	0	-	✓	✓	✓	✓	✓
1	Reserved	BYTE	-	0	-	✓	✓	✓	✓	✓
2 ... 3	Qualifier L1	WORD	Bit field	0b 00 00 00 00 0b qq 00 00 xx	65500	✓	✓	✓	✓	✓
4 ... 7	Voltage UL1-N	REAL	V	0.0 ... 1000000.0	1	✓	✓	✓	✓	✓
8 ... 11	Current L1	REAL	A	0.0 … 100000.0	7	✓	✓	✓	✓	✓
12 ... 15	Apparent power L1	REAL	VA	-3.0×10^9 … $+3.0 \times 10^9$	10	✓	✓	✓	✓	✓
16 ... 19	Active power L1	REAL	W	-3.0×10^9 … $+3.0 \times 10^9$	13	✓	✓	✓	✓	✓
20 ... 23	Reactive power L1	REAL	var	-3.0×10^9 … $+3.0 \times 10^9$	16	✓	✓	✓	✓	✓
24 ... 27	Power factor L1	REAL	-	0.0 ... 1.0	19	✓	✓	✓	✓	✓
28 ... 31	Phase angle L1	REAL	°	0.0 ... 360.0	61178	✓	✓	✓	✓	✓
32 ... 39	Apparent energy L1	LREAL	VAh	0.0 ... 1.8×10^{308}	61184	✓	✓	✓	✓	✓
40 ... 47	Active energy (total) L1	LREAL	Wh	$\pm 1.8 \times 10^{308}$	61185	✓	✓	✓	✓	✓
48 ... 55	Reactive energy (total) L1	LREAL	varh	$\pm 1.8 \times 10^{308}$	61186	✓	✓	✓	✓	✓
56 ... 59	Max. voltage UL1-N	REAL	V	0.0 ... 1000000.0	40	✓	✓	✓	✓	✓
60 ... 63	Max. current L1	REAL	A	0.0 ... 100000.0	46	✓	✓	✓	✓	✓
64 ... 67	Max. apparent power L1	REAL	VA	-3.0×10^9 … $+3.0 \times 10^9$	49	✓	✓	✓	✓	✓
68 ... 71	Max. active power L1	REAL	W	-3.0×10^9 … $+3.0 \times 10^9$	52	✓	✓	✓	✓	✓
72 ... 75	Max. reactive power L1	REAL	var	-3.0×10^9 … $+3.0 \times 10^9$	55	✓	✓	✓	✓	✓
76 ... 79	Max. power factor L1	REAL	-	0.0 ... 1.0	58	✓	✓	✓	✓	✓
80 ... 83	Min. voltage UL1-N	REAL	V	0.0 ... 1000000.0	70	✓	✓	✓	✓	✓
84 ... 87	Min. current L1	REAL	A	0.0 ... 100000.0	76	✓				
88 ... 91	Min. apparent power L1	REAL	VA	-3.0×10^9 … $+3.0 \times 10^9$	79	✓	✓	✓	✓	✓
92 ... 95	Min. active power L1	REAL	W	-3.0×10^9 … $+3.0 \times 10^9$	83	✓	✓	✓	✓	✓

Byte	Measured variable	Format	Unit	Value range	Value ID	Connection type				
						1P2W	3x1P2W	2P3W	3P4W	3P4W1
96 ... 99	Min. reactive power L1	REAL	var	-3.0×10^9 … $+3.0 \times 10^9$	85	✓	✓	✓	✓	✓
100 ... 103	Min. power factor L1	REAL	-	0.0 ... 1.0	88	✓	✓	✓	✓	✓

E.7 L2 phase-based values data record (DS 148)

L2 phase measured variables (DS 148)

Byte	Measured variable	Format	Unit	Value range	Value ID	Connection type				
						1P2W	3x1P2W	2P3W	3P4W	3P4W1
0	Version	BYTE	-	0	-	✓	✓	✓	✓	✓
1	Reserved	BYTE	-	0	-	✓	✓	✓	✓	✓
2 ... 3	Qualifier L2	WORD	Bit field	0b 00 00 00 00 0b qq 00 00 xx	65501		✓	✓	✓	✓
4 ... 7	Voltage UL1-N	REAL	V	0.0 ... 1000000.0	2		✓	✓	✓	✓
8 ... 11	Current L2	REAL	A	0.0 … 100000.0	8		✓	✓	✓	✓
12 ... 15	Apparent power L2	REAL	VA	-3.0×10^9 … $+3.0 \times 10^9$	11		✓	✓	✓	✓
16 ... 19	Active power L2	REAL	W	-3.0×10^9 … $+3.0 \times 10^9$	14		✓	✓	✓	✓
20 ... 23	Reactive power L2	REAL	var	-3.0×10^9 … $+3.0 \times 10^9$	17		✓	✓	✓	✓
24 ... 27	Power factor L2	REAL	-	0.0 ... 1.0	20		✓	✓	✓	✓
28 ... 31	Phase angle L2	REAL	°	0.0 ... 360.0	61198		✓	✓	✓	✓
32 ... 39	Apparent energy L2	LREAL	VAh	0.0 ... 1.8×10^{308}	61204		✓	✓	✓	✓
40 ... 47	Active energy (total) L2	LREAL	Wh	$\pm 1.8 \times 10^{308}$	61205		✓	✓	✓	✓
48 ... 55	Reactive energy (total) L2	LREAL	varh	$\pm 1.8 \times 10^{308}$	61206		✓	✓	✓	✓
56 ... 59	Max. voltage UL1-N	REAL	V	0.0 ... 1000000.0	41		✓	✓	✓	✓
60 ... 63	Max. current L2	REAL	A	0.0 ... 100000.0	47		✓	✓	✓	✓
64 ... 67	Max. apparent power L2	REAL	VA	-3.0×10^9 … $+3.0 \times 10^9$	50		✓	✓	✓	✓
68 ... 71	Max. active power L2	REAL	W	-3.0×10^9 … $+3.0 \times 10^9$	53		✓	✓	✓	✓

Byte	Measured variable	Format	Unit	Value range	Value ID	Connection type				
						1P2W	3x1P2W	2P3W	3P4W	3P4W1
72 ... 75	Max. reactive power L2	REAL	var	-3.0×10^9 … $+3.0 \times 10^9$	56		✓	✓	✓	✓
76 ... 79	Max. power factor L2	REAL	-	0.0 ... 1.0	59		✓	✓	✓	✓
80 ... 83	Min. voltage UL1-N	REAL	V	0.0 ... 1000000.0	71		✓	✓	✓	✓
84 ... 87	Min. current L2	REAL	A	0.0 ... 100000.0	77					
88 ... 91	Min. apparent power L2	REAL	VA	-3.0×10^9 … $+3.0 \times 10^9$	80		✓	✓	✓	✓
92 ... 95	Min. active power L2	REAL	W	-3.0×10^9 … $+3.0 \times 10^9$	84		✓	✓	✓	✓
96 ... 99	Min. reactive power L2	REAL	var	-3.0×10^9 … $+3.0 \times 10^9$	86		✓	✓	✓	✓
100 ... 103	Min. power factor L2	REAL	-	0.0 ... 1.0	89		✓	✓	✓	✓

E.8 L3 phase-based values data record (DS 149)

L3 phase measured variables (DS 149)

Byte	Measured variable	Format	Unit	Value range	Value ID	Connection type				
						1P2W	3x1P2W	2P3W	3P4W	3P4W1
0	Version	BYTE	-	0	-	✓	✓	✓	✓	✓
1	Reserved	BYTE	-	0	-	✓	✓	✓	✓	✓
2 ... 3	Qualifier L3	WORD	Bit field	0b 00 00 00 00 0b qq 00 00 xx	65502		✓		✓	✓
4 ... 7	Voltage UL1-N	REAL	V	0.0 ... 1000000.0	3		✓		✓	✓
8 ... 11	Current L3	REAL	A	0.0 … 100000.0	9		✓		✓	✓
12 ... 15	Apparent power L3	REAL	VA	-3.0×10^9 … $+3.0 \times 10^9$	12		✓		✓	✓
16 ... 19	Active power L3	REAL	W	-3.0×10^9 … $+3.0 \times 10^9$	15		✓		✓	✓
20 ... 23	Reactive power L3	REAL	var	-3.0×10^9 … $+3.0 \times 10^9$	18		✓		✓	✓
24 ... 27	Power factor L3	REAL	-	0.0 ... 1.0	21		✓		✓	✓
28 ... 31	Phase angle L3	REAL	°	0.0 ... 360.0	61218		✓		✓	✓
32 ... 39	Apparent energy L3	LREAL	VAh	0.0 ... 1.8×10^{308}	61224		✓		✓	✓

Byte	Measured variable	Format	Unit	Value range	Value ID	Connection type				
						1P2W	3x1P2W	2P3W	3P4W	3P4W1
40 ... 47	Active energy (total) L3	LREAL	Wh	$\pm 1.8 \times 10^{308}$	61225		✓		✓	✓
48 ... 55	Reactive energy (total) L3	LREAL	varh	$\pm 1.8 \times 10^{308}$	61226		✓		✓	✓
56 ... 59	Max. voltage UL1-N	REAL	V	0.0 ... 1000000.0	42		✓		✓	✓
60 ... 63	Max. current L3	REAL	A	0.0 ... 100000.0	48		✓		✓	✓
64 ... 67	Max. apparent power L3	REAL	VA	-3.0×10^9 … $+3.0 \times 10^9$	51		✓		✓	✓
68 ... 71	Max. active power L3	REAL	W	-3.0×10^9 … $+3.0 \times 10^9$	54		✓		✓	✓
72 ... 75	Max. reactive power L3	REAL	var	-3.0×10^9 … $+3.0 \times 10^9$	57		✓		✓	✓
76 ... 79	Max. power factor L3	REAL	-	0.0 ... 1.0	60		✓		✓	✓
80 ... 83	Min. voltage UL1-N	REAL	V	0.0 ... 1000000.0	72		✓		✓	✓
84 ... 87	Min. current L3	REAL	A	0.0 ... 100000.0	78					
88 ... 91	Min. apparent power L3	REAL	VA	-3.0×10^9 … $+3.0 \times 10^9$	81		✓		✓	✓
92 ... 95	Min. active power L3	REAL	W	-3.0×10^9 … $+3.0 \times 10^9$	85		✓		✓	✓
96 ... 99	Min. reactive power L3	REAL	var	-3.0×10^9 … $+3.0 \times 10^9$	87		✓		✓	✓
100 ... 103	Min. power factor L3	REAL	-	0.0 ... 1.0	90		✓		✓	✓

E.9 Advanced measurements and status values (DS 150)

Advanced measurement and status variables (DS 150)

Byte	Measured variable	Format	Unit	Value range	Value ID
0	Version	BYTE	-	0	-
1	Reserved	BYTE	-	0	-
2 ... 5	Operating hours counter L1L2L3 [1]	REAL	h	0.0 ... 3.4 x 10^{38}	65504
6 ... 9	Operating hours counter L1	REAL	h	0.0 ... 3.4 x 10^{38}	65505
10 ... 13	Operating hours counter L2	REAL	h	0.0 ... 3.4 x 10^{38}	65506
14 ... 17	Operating hours counter L3	REAL	h	0.0 ... 3.4 x 10^{38}	65507
18 ... 19	Reserved	WORD	Bit string	-	-
20 ... 21	Status of energy counter overflows [2]	WORD	Bit string	xxxx xxxx xxxx xxxx	65508
22 ... 25	Reserved	UDINT	-	-	-
26 ... 29	Reserved	UDINT	-	-	-
30 ... 33	Reserved	UDINT	-	-	-
34 ... 37	Reserved	UDINT	-	-	-
38 ... 41	Reserved	UDINT	-	-	-
42 ... 45	Reserved	UDINT	-	-	-
46 ... 49	Reserved	UDINT	-	-	-
50 ... 53	Reserved	UDINT	-	-	-
54 ... 57	Reserved	UDINT	-	-	-
58 ... 61	Reserved	UDINT	-	-	-
62 ... 65	Reserved	UDINT	-	-	-
66 ... 69	Reserved	UDINT	-	-	-
70 ... 73	Reserved	UDINT	-	-	-
74 ... 77	Reserved	UDINT	-	-	-
78 ... 81	Reserved	UDINT	-	-	-

Byte	Measured variable	Format	Unit	Value range	Value ID
82 ... 85	Reserved	UDINT	-	-	-
86 ... 87	Qualifier L1L2L3	WORD	Bit string	xxxx xxxx xxxx xxxx	65503

[1] Corresponds to the maximum of the phase-specific operating hours counters

[2] Energy counters count periodically - counter overflow at:
Bit 0 = 1: Active energy inflow L1
Bit 1 = 1: Active energy outflow L1
Bit 2 = 1: Reactive energy inflow L1
Bit 3 = 1: Reactive energy outflow L1
Bit 4 = 1: Apparent energy L1
Bit 5 = 1: Active energy inflow L2
Bit 6 = 1: Active energy outflow L2
Bit 7 = 1: Reactive energy inflow L2
Bit 8 = 1: Reactive energy outflow L2
Bit 9 = 1: Apparent energy L2
Bit 10 = 1: Active energy inflow L3
Bit 11 = 1: Active energy outflow L3
Bit 12 = 1: Reactive energy inflow L3
Bit 13 = 1: Reactive energy outflow L3
Bit 14 = 1: Apparent energy L3
Bit 15: Reserved

Tips and tricks

F

F.1 Tips and tricks

Processing and visualizing energy data

The S7-1200 PLC analog I/O module "SM 1238 Energy Meter 480VAC" (6ES7238-5XA32-0XB0) emulates the behaviors and performance of the ET 200SP I/O module "Analog input module AI Energy Meter 480VAC" (6ES7134-6PA20-0BD0) with the exceptions shown in the following list.

Analog input module AI Energy Meter 480VAC features that are not supported by the SM 1238 Energy Meter 480VAC:

- User-defined I/O memory allocation (User-specific module version)
- Limit monitoring
- Hardware interrupts

STEP 7 (TIA Portal) programming methods for the two modules are similar, for features that are supported by both modules.

Information about the concepts of energy management and application examples are available from Siemens customer support on the Internet (http://support.automation.siemens.com/WW/view/en/86299299).

Embedded software license

G

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