AN_6511_CECode Details

APPLICATION NOTE

NOVEMBER 2006

Compute Engine firmware details

Compute Engine firmware (CE11b07c) was developed based on the several customer requests to support anti-tampering features using either Rogowski coils, current transformers and current shunt sensors for single phase metering.

The firmware was developed with freedom to choose either similar kind of sensors or a combination to support the customer needs. The firmware also provides the flexibility to chose either of the sensors on the desired current channel(IA or IB).

The calibration and compute engine details provided in the datasheet hold good. Only the details of additional registers added for supporting Rogowski and Current Transformer features are provided in this document.

Register details

To support Rogowski coils, current transformers and Current shunt inputs the Compute engine firmware was modified the following registers whose details are shown the table below

IA input Selection

CE register Address	Bit 1	Bit 0	Value	Description
0x2a	0	0	0	CT/Shunt and no gain
0x2a	0	1	1	CT/Shunt with Gain(8x)
0x2a	1	0	2	Rogowski current input and no gain
0x2a	1	1	3	Rogowski current input with Gain(8x)

Note: All other bit data is ignored if possible set those bits to zero.

IB input Selection

CE register Address	Bit 1	Bit 0	Value	Description
0x2b	0	0	0	CT/Shunt and no gain
0x2b	0	1	1	CT/Shunt with Gain(8x)
0x2b	1	0	2	Rogowski current input and no gain
0x2b	1	1	3	Rogowski current input with Gain(8x)

Note: All other bit data is ignored if possible set those bits to zero.

For example for setting IA for CT with 8x gain and IB for Rogowski coil inputs one can set

0x2a = 1 and 0x2b = 2

Calibration parameters for Rogowski coils

Additional calibration parameter known as VFEED factor is added to the Compute engine firmware for supporting Rogowski coil calibration. Utilizing this parameter one can reduce the voltage to current coupling factor and is similar to the details provided in the 71M6513 data sheet.

CE register Address	Description
0x64	VFEEDA – Rogowski coil calibration parameter
0x65	VFEEDB – Rogowski coil calibration parameter

Test results

Phase A CT test results:

step	volt	Amp	Error(%)
1	240	200	0.0294
2	240	100	0.0259
3	240	30	0.0315
4	240	25	0.031
5	240	10	0.0359
6	240	3	0.057
7	240	1	0.0592
8	240	0.3	0.0881
9	240	0.1	0.1151

Phase A Varh test:

step	volt	amp	freq	Phase90	Phase150	Phase 60
1	240	10	50	0.1293	0.0937	0.14
4	240	1	50	0.2324	0.2327	0.2581
7	240	0.5	50	0.3038	0.4177	0.3556
10	240	0.2	50	0.542	0.8114	0.7411
13	240	0.1	50	0.9559	1.4972	1.1022

Phase B Rog Varh Test:

step	volt	amp	Error(%)
1	240	6	-0.0462
2	240	3	-0.0087
3	240	1	-0.0123
4	240	0.5	-0.3763
5	240	0.25	-0.3968
6	240	0.1	-0.656

Phase B Rog. Varh Test

step	volt	amp	Phase 0
1	240	200	-0.0297
2	240	100	-0.0013
3	240	50	-0.0098
4	240	20	0.0286
5	240	10	-0.0124
6	240	3	-0.0296
7	240	1	-0.1177
8	240	0.5	-0.3103
9	240	0.25	-0.2314
10	240	0.1	-0.556

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