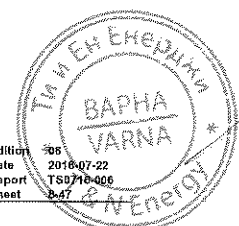


Summary

Table with 2 columns: Item ID (e.g., 1.2.2.6) and Description/Remarks (e.g., Tripping time characteristics, Test condition: see item 1.2.2.1, 1.2 threshold, Time dial: 0.05 ≤ T ≤ 15.00, Permissible tolerance/Limiting values: 6 % of setting value or + 2 % of current tolerance or 30 ms)

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Summary

Table with 2 columns: Item ID (e.g., 1.2.2.10) and Description/Remarks (e.g., ANSI moderately Inverse, Test condition: 6 % of setting value or + 2 % of current tolerance or 30 ms)

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Summary

Table with 2 columns: Item ID (e.g., 1.2.3.2) and Description/Remarks (e.g., IEC vary Inverse (type B), Test results/Remarks: 5 % of setting value or + 2 % of current tolerance or 30 ms)

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Summary

Table with 2 columns: Item ID (e.g., 1.2.3.2) and Description/Remarks (e.g., IEC vary Inverse (type B), Test results/Remarks: 5 % of setting value or + 2 % of current tolerance or 30 ms)

Summary

12.4.8 Duration of V-sag-In time
Test condition: t_{V-sag} value
Test values: $0.10 \leq T \leq 60.00$ s
Permissive tolerance/Limiting values: 1 % of setting value or 10 ms
Test results/Remarks: 1 % of setting value or 10 ms

12.5 Undervoltage Sag-In and voltage released stage

12.5.1 Pickup values I>
Test condition: $0.030 I_{L-OP} \leq$ threshold value $\leq 35.000 I_{L-OP}$
Test values: $I_{L-OP} = 60$ Hz, 60 Hz
 $0.030 I_{L-OP} \leq$ threshold value $\leq 35.000 I_{L-OP}$
Method of measurement = fundamental components of the rms
Permissive tolerance/Limiting values: 1 % of setting value or 0.005 I_{L-OP}
Test results/Remarks: 1 % of setting value or 0.005 I_{L-OP}
Method of measurement = RMS value of phasor
Permissive tolerance/Limiting values: up to 30th harmonic: 1 % of setting value or 0.005 I_{L-OP}
up to 50th harmonic, $f_{L-OP} = 60$ Hz: 3 % of setting value or 0.02 I_{L-OP}
up to 60th harmonic, $f_{L-OP} = 60$ Hz: 4 % of setting value or 0.02 I_{L-OP}
Test results/Remarks: up to 30th harmonic: 1 % of setting value or 0.005 I_{L-OP}
up to 50th harmonic, $f_{L-OP} = 60$ Hz: 3 % of setting value or 0.02 I_{L-OP}
up to 60th harmonic, $f_{L-OP} = 60$ Hz: 4 % of setting value or 0.02 I_{L-OP}

12.5.2 Pickup values V2
Test condition: 0.300 V \leq threshold value ≤ 200.000 V
Test values: 0.300 V \leq threshold value ≤ 200.000 V
Permissive tolerance/Limiting values: in the range $f_{L-OP} \pm 10$ %
0.5 % of setting value or 0.05 V
Test results/Remarks: in the range $f_{L-OP} \pm 10$ %
0.5 % of setting value or 0.05 V

12.5.3 Dropout ratio
Test condition: $0.030 I_{L-OP} \leq$ threshold value $\leq 35.000 I_{L-OP}$
 0.300 V \leq threshold value ≤ 200.000 V
Test values: $0.80 \leq r \leq 0.80$
Permissive tolerance/Limiting values: 1 % of dropout value
Test results/Remarks: 1 % of dropout value

12.5.4 Pickup values Vph-phV, V-sag-In
Test condition: 0.300 V \leq threshold value ≤ 175.000 V
Test values: 0.300 V \leq threshold value ≤ 175.000 V
Permissive tolerance/Limiting values: in the range $f_{L-OP} \pm 10$ %
0.5 % of setting value or 0.05 V
Test results/Remarks: in the range $f_{L-OP} \pm 10$ %
0.5 % of setting value or 0.05 V

12.5.5 Dropout ratio of V-sag-In
Test condition: 0.300 V \leq threshold value ≤ 175.000 V
Test values: $1.01 \leq r \leq 1.20$
Permissive tolerance/Limiting values: 1 % of dropout value
Test results/Remarks: 1 % of dropout value

12.5.6 Pickup time
Test condition: see item 12.5.1
Test values: 1.2*threshold



Summary

Permissive tolerance/Limiting values: 1 approx.
30 ms + OOT at $f_{L-OP} = 60$ Hz
25 ms + OOT at $f_{L-OP} = 60$ Hz

Test results/Remarks: 1 approx.
30 ms + OOT at $f_{L-OP} = 60$ Hz
25 ms + OOT at $f_{L-OP} = 60$ Hz

12.5.7 Dropout times
Test condition: see item 12.5.1
Permissive tolerance/Limiting values: 1 approx.
20 ms + OOT
Test results/Remarks: 1 approx.
20 ms + OOT

12.5.8 Operate delays
Test condition: t_{V-sag} value
Test values: $0.00 \leq T \leq 60.00$ s
Permissive tolerance/Limiting values: 1 % of setting value or 10 ms
Test results/Remarks: 1 % of setting value or 10 ms

12.5.8 Duration of V-sag-In time
Test condition: t_{V-sag} value
Test values: $0.10 \leq T \leq 60.00$ s
Permissive tolerance/Limiting values: 1 % of setting value or 10 ms
Test results/Remarks: 1 % of setting value or 10 ms

Summary

1.3 81 Frequency Protection

1.3.1 Specifications
- VDE 0435
- IECEN 60255-1, item 7, Annex A, B

1.3.2 Pickup values f_1, f_2
Test condition: 40.00 Hz $\leq f_1 \leq 70.00$ Hz
Method A: Angle difference method
Method B: Tripping method
Test values: A: $f_{pick} = 0.2$ Hz $< f_1 < f_{pick} + 0.2$ Hz
B: $f_{pick} = 3.0$ Hz $< f_1 < f_{pick} + 3.0$ Hz
Permissive tolerance/Limiting values: A: ± 5 mHz at $V = V_{pick}$
B: ± 10 mHz at $V = V_{pick}$
Test results/Remarks: A: ± 5 mHz at $V = V_{pick}$
B: ± 10 mHz at $V = V_{pick}$

1.3.3 Dropout ratio $1/f$
Test condition: 20 mHz to 2000 mHz
Permissive tolerance/Limiting values: ± 5 mHz at $V = V_{pick}$
Test results/Remarks: ± 5 mHz at $V = V_{pick}$

1.3.3.1 Pickup times f_1, f_2
Permissive tolerance/Limiting values: Method A:
1 approx.
70 ms + OOT at $f_{pick} = 60$ Hz
60 ms + OOT at $f_{pick} = 60$ Hz
Method B:
1 approx.
75 ms + OOT at $f_{pick} = 60$ Hz
70 ms + OOT at $f_{pick} = 60$ Hz
Test results/Remarks: Method A:
t
< 70 ms + OOT at $f_{pick} = 60$ Hz
< 60 ms + OOT at $f_{pick} = 60$ Hz
Method B:
t
< 75 ms + OOT at $f_{pick} = 60$ Hz
< 70 ms + OOT at $f_{pick} = 60$ Hz

1.3.3.2 Dropout times f_1, f_2
Test values: dropout by t, V -> 0
Permissive tolerance/Limiting values: 60 ms $\leq t \leq 80$ ms
Test results/Remarks: 60 ms $\leq t \leq 80$ ms

1.3.3.3 Time delays
Test condition: added to the inherent operating times
Test values: $0.00 \leq T \leq 60.00$ s
Permissive tolerance/Limiting values: $|t| \leq 1$ % of setting value or 10 ms
Test results/Remarks: $|t| \leq 1$ % or 10 ms

1.3.4 Positive- or negative sequence V_1, V_2

1.3.4.1 Pickup values
Test condition: 0.300 V $\leq V \leq 200.000$ V
Permissive tolerance/Limiting values: $|t| \leq 0.5$ % of setting value or 0.5 V
Test results/Remarks: $|t| \leq 0.5$ % of setting value or 0.5 V

Summary

1.3.4.2 Dropout ratio
Test condition: $r =$ settable dropout ratio
 $0.80 \leq r \leq 0.89$
Test results/Remarks: confirmed

1.3.4.3 Pickup times
Permissive tolerance/Limiting values: 1 approx.
25 ms + OOT at $f_{pick} = 60$ Hz
22 ms + OOT at $f_{pick} = 60$ Hz
Test results/Remarks: t
< 25 ms + OOT at $f_{pick} = 60$ Hz
< 22 ms + OOT at $f_{pick} = 60$ Hz

1.3.4.4 Dropout times
Permissive tolerance/Limiting values: 1 approx.
20 ms + OOT
Test results/Remarks: t
< 20 ms + OOT

1.3.4.5 Time delays
Test condition: added to the inherent operating times
Test values: $0.00 \leq T \leq 60.00$ s
Permissive tolerance/Limiting values: ≤ 1 % of setting value or 10 ms
Test results/Remarks: $|t| < 1$ % or 10 ms

1.3.4.6 Operating ranges
Permissive tolerance/Limiting values: Method A:
 5 V $\leq V_{pick} \leq 230$ V
 10 Hz $\leq f \leq 80$ Hz
Method B:
 5 V $\leq V_{pick} \leq 230$ V
 25 Hz $\leq f \leq 80$ Hz
Test results/Remarks: Method A:
 5 V $\leq V_{pick} \leq 230$ V
 10 Hz $\leq f \leq 80$ Hz
Method B:
 5 V $\leq V_{pick} \leq 230$ V
 25 Hz $\leq f \leq 80$ Hz

Summary

1.4 B1R Rate of Frequency Change

1.4.1 Specifications

- VDE 0435
- IEC/EN 60255-1, Item 7, Annex A, B

1.4.2 dff/dt falling

1.4.2.1 Pickup values

Test condition: $0.9 \leq f_{pickup} \leq 1.1$

Test values: $0.10 \text{ Hz/s} \leq df/dt \leq 20.00 \text{ Hz/s}$

Permissible tolerance/Limiting values: $< 5\%$ of set point value or 0.1 Hz/s

Test results/Remarks: Measuring window ≤ 3 periods $< 5\%$; $< 0.08 \text{ Hz/s}$
Measuring window > 3 periods $< 3\%$; $< 0.08 \text{ Hz/s}$

1.4.2.2 Dropout differential

Test condition: $0.9 \leq f_{pickup} \leq 1.1$

Test values: $0.02 \text{ Hz/s} \leq \text{Dropout differential} \leq 0.08 \text{ Hz/s}$

Permissible tolerance/Limiting values: $< 5\%$ of Dropout value or 0.1 Hz/s

Test results/Remarks: Measuring window ≤ 3 periods $< 5\%$; $< 0.08 \text{ Hz/s}$
Measuring window > 3 periods $< 3\%$; $< 0.08 \text{ Hz/s}$

1.4.2.3 Pickup times

Test condition: $0.10 \text{ Hz/s} \leq df/dt \leq 20.00 \text{ Hz/s}$

Test results/Remarks: Approx. 185 ms to 225 ms (depends on measuring window length)

1.4.2.4 Dropout times

Test condition: $0.10 \text{ Hz/s} \leq df/dt \leq 20.00 \text{ Hz/s}$

Test results/Remarks: Approx. 185 ms to 225 ms (depends on measuring window length)

1.4.2.5 Time delays

Test condition: Added to the inherent operating times

Test values: $0.00 \text{ s to } 60.00 \text{ s}$

Permissible tolerance/Limiting values: $\leq 1\%$ of setting value or 10 ms

Test results/Remarks: $< 1\%$ or 10 ms

1.4.3 dff/dt rising

1.4.3.1 Pickup values

Test condition: $0.9 \leq f_{pickup} \leq 1.1$

Test values: $0.10 \text{ Hz/s} \leq df/dt \leq 20.00 \text{ Hz/s}$

Permissible tolerance/Limiting values: $< 5\%$ of set point value or 0.1 Hz/s

Test results/Remarks: Measuring window ≤ 3 periods $< 5\%$; $< 0.08 \text{ Hz/s}$
Measuring window > 3 periods $< 3\%$; $< 0.08 \text{ Hz/s}$

1.4.3.2 Dropout differential

Test condition: $0.9 \leq f_{pickup} \leq 1.1$

Test values: $0.02 \text{ Hz/s} \leq \text{Dropout differential} \leq 0.08 \text{ Hz/s}$

Permissible tolerance/Limiting values: $< 5\%$ of Dropout value or 0.1 Hz/s

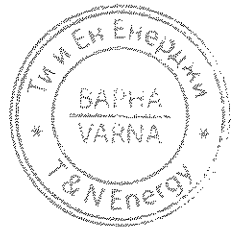
Test results/Remarks: Measuring window ≤ 3 periods $< 5\%$; $< 0.08 \text{ Hz/s}$
Measuring window > 3 periods $< 3\%$; $< 0.08 \text{ Hz/s}$

1.4.3.3 Pickup times

Test condition: $0.10 \text{ Hz/s} \leq df/dt \leq 20.00 \text{ Hz/s}$

Test results/Remarks: Approx. 185 ms to 225 ms (depends on measuring window length)

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1.4.3.4 Dropout times

Test condition: $0.10 \text{ Hz/s} \leq df/dt \leq 20.00 \text{ Hz/s}$

Test results/Remarks: Approx. 185 ms to 225 ms (depends on measuring window length)

1.4.3.5 Time delays

Test condition: Added to the inherent operating times

Test values: $0.00 \text{ s to } 60.00 \text{ s}$

Permissible tolerance/Limiting values: $\leq 1\%$ of setting value or 10 ms

Test results/Remarks: $< 1\%$ or 10 ms

Summary

1.5 External Trip Initiation

1.5.1 Pickup times

Test condition: with initiation via binary input signal

Test values: $I_{pickup} = 50 \text{ Hz, } 60 \text{ Hz}$

Permissible tolerance/Limiting values: approx. $5 \text{ ms} + \text{ODT}$

Test results/Remarks: $< 5 \text{ ms} + \text{ODT}$

1.5.2 Dropout times

Test condition: with initiation via binary input signal

Test values: $I_{dropout} = 50 \text{ Hz, } 60 \text{ Hz}$

Permissible tolerance/Limiting values: approx. $3 \text{ ms} + \text{ODT}$

Test results/Remarks: $< 3 \text{ ms} + \text{ODT}$

1.5.3 Time delays

Test condition: added to the inherent operating times

Test values: $0.00 \text{ s to } 60.00 \text{ s}$

Permissible tolerance/Limiting values: $\leq 1\%$ of setting value or 10 ms

Test results/Remarks: $< 1\%$ of setting value or 10 ms

Summary

1.6 Inrush-Current Detection

1.6.1 Specifications

- VDE 0435
- IEC/EN 60255-1, Item 7, Annex A, B

1.6.2 General test conditions

I_{inrush} 50 Hz, 60 Hz

1.6.3 Operating-range limit Imax

Test condition: $0.030 I_{max} \leq I_{inrush} \leq 35.000 I_{max}$

Test values: $0.030 I_{max} \leq I_{inrush} \leq 35.000 I_{max}$

Permissible tolerance/Limiting values: $|R| \leq 1\%$ of setting value or $0.005 I_{max}$

Test results/Remarks: $|R| \leq 1\%$ of setting value or $0.005 I_{max}$

1.6.4 Content of 2nd harmonics

Test condition: $10\% \leq I_{2nd} \leq 45\%$

Test values: $10\% \leq I_{2nd} \leq 45\%$

Permissible tolerance/Limiting values: $|R| \leq 1\%$ of setting value

Test results/Remarks: $|R| \leq 1\%$ of setting value

1.6.5 Duration of the cross-blocking

Test condition: $0.03 \text{ s} \leq T \leq 200.00 \text{ s}$

Test values: $0.03 \text{ s} \leq T \leq 200.00 \text{ s}$

Permissible tolerance/Limiting values: $|R| \leq 1\%$ of setting value or 10 ms

Test results/Remarks: $|R| \leq 1\%$ of setting value or 10 ms

1.6.6 Pickup times

Permissible tolerance/Limiting values: approx. $20 \text{ ms} + \text{ODT}$

Test results/Remarks: approx. $20 \text{ ms} + \text{ODT}$

1.6.7 Dropout ratios

1.6.7.1 Current measurement Imax

Test condition: $I = 0.95 \text{ or } 0.915 \text{ A at } I_{pickup} = 1 \text{ A}$
 $I = 0.95 \text{ or } 0.975 \text{ A at } I_{pickup} = 5 \text{ A}$

Permissible tolerance/Limiting values: 1% of the setting value or 5 mA

Test results/Remarks: 1% of the setting value or 5 mA

1.6.7.2 Harmonics I2 Harm2.Harm

Test condition: $r = 0.85$

Permissible tolerance/Limiting values: 1% of the setting value for settings of I_{pickup} - I_{inrush} . Time delays

Test results/Remarks: 1% of the setting value for settings of I_{pickup} - I_{inrush} . Time delays

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Summary

1.7 25 Synchronization Function

1.7.1 Tolerances

1.7.1.1 Tolerances of the voltage settings
Permissible tolerance/Limiting values: 2 % of setting value or 1 V
Test results/Remarks: Confirmed

1.7.1.2 Voltage difference $V2 > V1$; $V2 < V1$
Permissible tolerance/Limiting values: 1 V
Test results/Remarks: $\pm 0,15$ V

1.7.1.3 Frequency difference $f2 > f1$; $f2 < f1$
Permissible tolerance/Limiting values: 1 mHz
Test results/Remarks: ± 1 mHz

1.7.1.4 Angular difference $\alpha2 > \alpha1$; $\alpha2 < \alpha1$
Permissible tolerance/Limiting values: 1°
Test results/Remarks: $\pm 0,2$ °

1.7.1.5 Tolerance of all time settings
Permissible tolerance/Limiting values: 10 ms
Test results/Remarks: ± 10 ms

1.7.1.8 Max. phase displacement angle
Permissible tolerance/Limiting values: 5° for $\Delta f \leq 1$ Hz
10° for $\Delta f > 1$ Hz
Test results/Remarks: ≤ 5 ° for $\Delta f \leq 1$ Hz
 ≤ 10 ° for $\Delta f > 1$ Hz

1.7.2 Tested functionality
Test values: Synchronous operation mode
Asynchronous operation mode
De-energized switching
- Dead line
- Dead bus
Block limitation
Low frequent oscillations
Direct closing
Function values
Error reactions
Threshold values for
- Voltages and voltage difference
- Frequency and frequency difference
- Angle difference
- Rate of frequency change
- Delay time
Binary inputs
- Start and stop
- Selection
- Blocking
- De-energized switching
Start synchronization by
- Control function
- Auto recloser
- Binary input
Conditions
- Connection types PtoP and PtoGnd
- 5th and 1st measuring points
- V sync. Selection by measuring point ID
Test results/Remarks: Functionality according to manual confirmed

Summary

1.8 78 Automatic Reclosing Function
Permissible tolerance/Limiting values: Funct. acc. to manual
Test results/Remarks: Function correct



Summary

1.9 Arc Protection

1.9.1 General test conditions
 I_{LWD} 60 Hz, 00 Hz
 I_{LWD} 1 A

1.9.2 Light only

1.9.2.1 Pickup time
Test condition: 100 measurements
Pickup of stage measured with high-speed-relays
Test results/Remarks: $t_{LWD} = 2,8$ ms
 $t_{LWD} = 2,6$ ms
 $t_{LWD,app} = 3,0$ ms

1.9.2.2 Dropout time
Test condition: 100 measurements
Pickup of stage measured with high-speed-relays
Test results/Remarks: $t_{LWD} = 27,3$ ms
 $t_{LWD} = 26,7$ ms
 $t_{LWD,app} = 27,3$ ms

1.9.3 Light and current

1.9.3.1 Threshold 10
Test condition: 1pol-fault, 3pol-fault
 $0,03 \leq I_{LWD,app} \leq 10,00$
Permissible tolerance/Limiting values: no operate below threshold, measurement accuracy not considered
Test results/Remarks: confirmed

1.9.3.2 Threshold 310
Test condition: 1pol-fault, IN calculated, IN measured
 $0,03 \leq I_{LWD,app} \leq 10,00$
Permissible tolerance/Limiting values: no operate below threshold, measurement accuracy not considered
Test results/Remarks: confirmed

1.9.3.3 Dropout ratio 10
Test condition: 1pol-fault, 3pol-fault
 $0,03 \leq I_{LWD,app} \leq 10,00$
Permissible tolerance/Limiting values: approx. 0,80
Test results/Remarks: 0,80 – 0,95

1.9.3.4 Dropout ratio 310
Test condition: 1pol-fault
 $0,03 \leq I_{LWD,app} \leq 10,00$
Permissible tolerance/Limiting values: approx. 0,80
Test results/Remarks: 0,80 – 0,95

1.9.3.5 Pickup time
Test condition: 100 measurements per fault type and frequency
Fault inception angle $10(0^\circ, 16^\circ, 36^\circ, 162^\circ)$
Current jump from 1A to 10A at default threshold
Pickup of stage measured with high-speed-relays
Test results/Remarks:

	1pol, 50 Hz	1pol, 60 Hz	3pol, 50 Hz	3pol, 60 Hz
t_{LWD}	0,2 ms	0,0 ms	0,8 ms	0,0 ms
t_{LWD}	4,4 ms	3,8 ms	4,0 ms	3,6 ms
$t_{LWD,app}$	5,5 ms	5,8 ms	5,3 ms	5,3 ms

Summary

1.9.3.8 Dropout time
Test condition: 100 measurements
Current jump to 0 A
Pickup of stage measured with high-speed-relays
Test results/Remarks:

	1pol, 50 Hz	1pol, 60 Hz	3pol, 50 Hz	3pol, 60 Hz
t_{LWD}	27,3 ms	27,8 ms	27,3 ms	27,6 ms
t_{LWD}	26,7 ms	26,3 ms	26,2 ms	26,2 ms
$t_{LWD,app}$	27,2 ms	27,3 ms	27,2 ms	27,3 ms

1.9.4 Frequency operating range
Test condition: $t_{LWD} = 5 t_{LWD}$ at default threshold, $f = 6$ Hz - 100 Hz
Permissible tolerance/Limiting values: 10 Hz – 60 Hz
Test results/Remarks: confirmed

Summary

- 1.10 Thermoboxes for Temperature Detection**
- 1.10.1 Specifications**
- IEC/EN 60255-1
- 1.10.2 Connection**
- Ethernet: TR1200 IP
- RS 485: TR1200
- 1.10.3 Temperature detectors**
Test condition: Connectable Thermoboxes 4
Test values: Number of Thermoboxes per type 4
Test results/Remarks: numbers correct
- 1.10.4 Number of temperature sensors per thermobox**
Test condition: Max 12
Test values: Max 12
Test results/Remarks: numbers correct
- 1.10.5 Thresholds for indication stage 1**
Test condition: -50 °C to 250 °C
-58 °F to 482 °F
Test values: -50 °C to 250 °C
-58 °F to 482 °F
Permissive tolerance/Limiting values: ± 1% of setting value or ± 1 °C or ±2 °F
Test results/Remarks: ± 1% of setting value or ± 1 °C or ±2 °F
- 1.10.6 Thresholds for indication stage 2**
Test condition: -50 °C to 250 °C
-58 °F to 482 °F
Test values: -50 °C to 250 °C
-58 °F to 482 °F
Permissive tolerance/Limiting values: ± 1% of setting value or ± 1 °C or ±2 °F
Test results/Remarks: ± 1% of setting value or ± 1 °C or ±2 °F
- 1.10.7 Dropout ratio**
Test condition: 3 °C or 6 °F
Test values: 3 °C or 6 °F
Test results/Remarks: Function correct
- 1.10.8 Time delays**
Test condition: Added to the Inherent Operating Times
Test values: 0.00 s to 60.00 s or +
Permissive tolerance/Limiting values: ± 1 % of setting value or 10 ms
Test results/Remarks: ± 1 % of setting value or 10 ms

Summary

- 1.11 CB wear monitoring**
- 1.11.1 JK-method**
No accuracies defined, because this method is a monitoring function, which contains no protection-specific task and the principles are based upon empiric determined data.
- 1.11.2 2P-method**
No accuracies defined, because this method is a monitoring function, which contains no protection-specific task and the principles are based upon empiric determined data.
- 1.11.3 IZ-method**
No accuracies defined, because this method is a monitoring function, which contains no protection-specific task and the principles are based upon empiric determined data.
- 1.11.4 Supr.CB make time**
Test condition/Operative range: $f_{min} = 50 \text{ Hz}, 60 \text{ Hz}$
 $0.001 \text{ s} \leq t_{make} \leq 0.800 \text{ s}$
Test values: $0.03 \text{ A} \leq I \leq 6 \text{ A}$
Permissive tolerance/Limiting values: $t_{make} \leq 2 \text{ ms}$
Test results/Remarks: $t_{make} < 2 \text{ ms}$

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Summary

- 1.12 BOV Voltage Control**
- 1.12.1 Specifications**
- VDE 0435
- IEC/EN 60255-1, Item 7, Annex A, B
- 1.12.2 General Test conditions**
 f_{nom} : 50 Hz, 60 Hz
 I_{nom} : 1 A, 5 A
 V_{nom} : 100 V
- 1.12.3 Voltage Control**
- 1.12.3.1 Target voltage**
Test condition: $10.000 \text{ V} \leq V_{target} \leq 340.000 \text{ V}$
Permissive tolerance/Limiting values: $|s| \leq 0.5 \% \text{ of setting value or } 0.05 \text{ V}$
Test results/Remarks: $|s| < 0.6 \% \text{ of setting value or } 0.05 \text{ V}$
- 1.12.3.2 Bandwidth**
Test condition: 0.2 % to 10.0 %
Test results/Remarks: confirmed
- 1.12.4 Line compensation LDC-Z**
- 1.12.4.1 Target voltage rising**
Test condition: 0.0 % to 20.0 %
Test results/Remarks: confirmed
- 1.12.4.2 Max load current**
Test condition: 0.0 % to 500.0 %
Test results/Remarks: confirmed
- 1.12.5 Line compensation LDC-X and R**
- 1.12.5.1 R line**
Test condition: 0.0 Ω to 30.0 Ω
Test results/Remarks: confirmed
- 1.12.5.2 X line**
Test condition: 0.0 Ω to 30.0 Ω
Test results/Remarks: confirmed
- 1.12.6 Limiting**
- 1.12.6.1 Vmin Threshold**
Test condition: $10.000 \text{ V} \leq V_{min} \leq 340.000 \text{ V}$
Permissive tolerance/Limiting values: $|s| \leq 0.5 \% \text{ of setting value or } 0.05 \text{ V}$
Test results/Remarks: $|s| < 0.5 \% \text{ of setting value or } 0.05 \text{ V}$
- 1.12.6.2 Vmax Threshold**
Test condition: $10.000 \text{ V} \leq V_{max} \leq 340.000 \text{ V}$
Permissive tolerance/Limiting values: $|s| \leq 0.5 \% \text{ of setting value or } 0.05 \text{ V}$
Test results/Remarks: $|s| < 0.5 \% \text{ of setting value or } 0.05 \text{ V}$
- 1.12.6.3 Vmin Time delays**
Test condition: added to the inherent operating times
Test values: $0 \text{ s} \leq T \leq 20 \text{ s}$
Permissive tolerance/Limiting values: $|s| \leq 1 \% \text{ of setting value or } 10 \text{ ms}$
Test results/Remarks: $|s| < 1 \% \text{ or } 10 \text{ ms}$

Summary

- 1.12.6.4 Vmax Time delays**
Test condition: added to the inherent operating times
Test values: $0 \text{ s} \leq T \leq 20 \text{ s}$
Permissive tolerance/Limiting values: $|s| \leq 1 \% \text{ of setting value or } 10 \text{ ms}$
Test results/Remarks: $|s| < 1 \% \text{ or } 10 \text{ ms}$
- 1.12.7 Blocking**
- 1.12.7.1 Vc Threshold**
Test condition: $10.000 \text{ V} \leq V_{vc} \leq 340.000 \text{ V}$
Permissive tolerance/Limiting values: $|s| \leq 0.5 \% \text{ of setting value or } 0.05 \text{ V}$
Test results/Remarks: $|s| < 0.5 \% \text{ of setting value or } 0.05 \text{ V}$
- 1.12.7.2 I> Threshold**
Test condition: $10 \% \leq I < 500 \%$
Test results/Remarks: confirmed
- 1.12.7.3 I< Threshold**
Test condition: $3 \% \leq I < 100 \%$
Test results/Remarks: confirmed
- 1.12.7.4 I> Time delays**
Test condition: added to the inherent operating times
Test values: $0 \text{ s} \leq T \leq 20 \text{ s}$
Permissive tolerance/Limiting values: $|s| \leq 1 \% \text{ of setting value or } 10 \text{ ms}$
Test results/Remarks: $|s| < 1 \% \text{ or } 10 \text{ ms}$
- 1.12.7.5 I< Time delays**
Test condition: added to the inherent operating times
Test values: $0 \text{ s} \leq T \leq 20 \text{ s}$
Permissive tolerance/Limiting values: $|s| \leq 1 \% \text{ of setting value or } 10 \text{ ms}$
Test results/Remarks: $|s| < 1 \% \text{ or } 10 \text{ ms}$

Summary

1.13 Supervision Functions	
1.13.1 Voltage-transformer circuit breaker	
Permissible tolerance/Limiting values:	func. acc. to manual
Test results/Remarks:	Function correct
1.13.2 Current-balance supervision	
Permissible tolerance/Limiting values:	func. acc. to manual
Test results/Remarks:	Function correct
1.13.3 Voltage-balance supervision	
Permissible tolerance/Limiting values:	func. acc. to manual
Test results/Remarks:	Function correct
1.13.4 Current-sum supervision	
Permissible tolerance/Limiting values:	func. acc. to manual
Test results/Remarks:	Function correct
1.13.5 Voltage-sum supervision	
Permissible tolerance/Limiting values:	func. acc. to manual
Test results/Remarks:	Function correct
1.13.6 Missing-voltage failure (Fuse failure monitor)	
Permissible tolerance/Limiting values:	func. acc. to manual
Test results/Remarks:	Function correct
1.13.7 Current phase rotation supervision	
Permissible tolerance/Limiting values:	func. acc. to manual
Test results/Remarks:	Function correct
1.13.8 Voltage phase rotation supervision	
Permissible tolerance/Limiting values:	func. acc. to manual
Test results/Remarks:	Function correct
1.13.9 74TC Trip circuit supervision	
Test condition:	Number trip circuit: 1 to 3 Operation mode: with 1 or 2 BI
Permissible tolerance/Limiting values:	func. acc. to manual
Test results/Remarks:	Function correct

Summary

1.14 Ancillary Functions	
1.14.1 Log buffers	
1.14.1.1 Operational log	
Permissible tolerance/Limiting values:	Func. acc. to manual
Test results/Remarks:	Function correct
1.14.1.2 Fault log	
Permissible tolerance/Limiting values:	Func. acc. to manual
Test results/Remarks:	Function correct. Not applicable for Fault Recorder 7KE85.
1.14.1.3 Ground fault log	
Permissible tolerance/Limiting values:	Func. acc. to manual
Test results/Remarks:	Function correct. Not applicable for Fault Recorder 7KE85.
1.14.2 Fault recording	
Permissible tolerance/Limiting values:	Func. acc. to manual
Test results/Remarks:	Function correct
1.14.3 Date and time	
Permissible tolerance/Limiting values:	Func. acc. to manual
Test results/Remarks:	Function correct
1.14.4 Setting group switching	
Permissible tolerance/Limiting values:	Func. acc. to manual
Test results/Remarks:	Function correct. Not applicable for Fault Recorder 7KE85.
1.14.5 Test functions	
1.14.5.1 CB tripping test	
Test condition:	Live tripping of CB
Permissible tolerance/Limiting values:	Func. acc. to manual
Test results/Remarks:	Function correct. Not applicable for Fault Recorder 7KE85.
1.14.5.2 Test record	
Permissible tolerance/Limiting values:	Func. acc. to manual
Test results/Remarks:	Function correct



Summary

1.15 Operational Measured Values	
1.15.1 Specifications	
	IECEN 60255-1, Annex A, B
1.15.2 Currents, instrument transformers	
Test condition:	Current range <math>< 1.0 I_{nom}</math>
	Nominal range 1 A, 5 A
	Measuring ranges (0.1 to 1.0) I_{nom}
	Frequency range: $f_{min} = 50$ Hz: 49 Hz to 51 Hz $f_{max} = 60$ Hz: 59 Hz to 61 Hz
Test values:	I_1, I_2, I_3 in A (prim), A (sec), % (of I_{nom})
Permissible tolerance/Limiting values:	≤ 0.1 % of the measured value in the above mentioned ranges
Test results/Remarks:	≤ 0.1 %
Test condition:	Frequency range: $f_{min} = 50$ Hz: 40 Hz to 60 Hz $f_{max} = 60$ Hz: 60 Hz to 70 Hz
Test values:	I_1, I_2, I_3 in A (prim), A (sec), % (of I_{nom})
Permissible tolerance/Limiting values:	≤ 0.3 % of the measured value in the above mentioned ranges
Test results/Remarks:	≤ 0.3 %
1.15.3 Currents, protection-class transformers	
Test condition:	Current range <math>< 100 I_{nom}</math>, $\leq 50 I_{nom}</math>$
	Nominal range 1 A, 5 A
	Measuring ranges 0.1 to 25 A
	Frequency range: $f_{min} = 50$ Hz: 49 Hz to 51 Hz $f_{max} = 60$ Hz: 59 Hz to 61 Hz
Test values:	I_1, I_2, I_3 in A (prim), A (sec), % (of I_{nom})
Permissible tolerance/Limiting values:	≤ 0.1 % of the measured value in the above mentioned ranges
Test results/Remarks:	≤ 0.1 % of the measured value
Test condition:	Frequency range: $f_{min} = 50$ Hz: 40 Hz to 60 Hz $f_{max} = 60$ Hz: 50 Hz to 70 Hz
Test values:	I_1, I_2, I_3 in A (prim), A (sec), % (of I_{nom})
Permissible tolerance/Limiting values:	≤ 0.3 % of the measured value in the above mentioned ranges
Test results/Remarks:	≤ 0.3 %

Summary

1.15.4 Voltages	
Test condition:	Voltage Range <math>< 200 V</math> (sec.) Secondary rated voltage 100 V to 125 V Measuring Range (1.1 to 2) V_{nom}
	Frequency range: $f_{min} = 50$ Hz: 49 Hz to 51 Hz $f_{max} = 60$ Hz: 59 Hz to 61 Hz
Test values:	$V_1, V_2, V_3, V_{4n}, V_{5n}, V_{6n}$ in kV (prim), in V (sec), % of V_{nom}
Permissible tolerance/Limiting values:	0.1 % of the measured value in the above mentioned ranges
Test results/Remarks:	≤ 0.1 %
Test condition:	Frequency range: $f_{min} = 50$ Hz: 40 Hz to 60 Hz $f_{max} = 60$ Hz: 50 Hz to 70 Hz
Test values:	$V_1, V_2, V_3, V_{4n}, V_{5n}, V_{6n}$ in kV (prim), in V (sec), % of V_{nom}
Permissible tolerance/Limiting values:	0.3 % of the measured value in the above mentioned ranges
Test results/Remarks:	≤ 0.3 %
1.15.5 Phase angle, current and voltage	
Test condition:	I_{nom}, V_{nom}
	Frequency range: $f_{min} = 50$ Hz: 47.5 Hz to 52.5 Hz $f_{max} = 60$ Hz: 57.5 Hz to 62.5 Hz
	(operative range 10 Hz to 80 Hz with higher tolerances)
Test values:	$\varphi(I_1-I_2), \varphi(I_1-I_3), \varphi(I_2-I_3)$ in ° $\varphi(V_1-V_2), \varphi(V_1-V_3), \varphi(V_2-V_3)$ in °
Permissible tolerance/Limiting values:	Current ≤ 0.2 ° at I_{nom} Voltage ≤ 0.2 ° at V_{nom}
Test results/Remarks:	Current ≤ 0.2 ° at I_{nom} Voltage ≤ 0.2 ° at V_{nom}
1.15.6 Power, ratings	
1.15.6.1 Active Power P	
Test condition:	W secondary
	Measuring Range: $\cos \varphi \geq 0.01$
	Voltage Range: (0.8 to 1.2) V_{nom}
	Current range: (0.1 to 2) limited
	Frequency range: $f_{min} = 50$ Hz: 40 Hz to 51 Hz $f_{max} = 60$ Hz: 50 Hz to 61 Hz
Test values:	P_1, P_2, P_3, P_4 in W (secondary)
Permissible tolerance/Limiting values:	≤ 0.3 % of the measured value in the above mentioned ranges
Test results/Remarks:	≤ 0.3 %
Test condition:	Frequency range: $f_{min} = 50$ Hz: 40 Hz to 60 Hz $f_{max} = 60$ Hz: 50 Hz to 70 Hz
Test values:	P_1, P_2, P_3, P_4 in W (secondary)
Permissible tolerance/Limiting values:	≤ 0.5 % of the measured value in the above mentioned ranges
Test results/Remarks:	≤ 0.5 %

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¹ for modular device only
² for non-modular device only

Summary

1.15.6.2 Reactive Power Q

Test condition:

VA secondary
Measuring Range: $[\cos\phi] \geq 0.984$
Voltage Range: (0.6 to 1.2) V_{rated}
Current range: (0.1 to 2) I_{rated}
Frequency range:
 $f_{min} = 60$ Hz: 40 Hz to 61 Hz
 $f_{max} = 60$ Hz: 59 Hz to 61 Hz

Test values:

Permissible tolerance/Limiting values: $\pm 1\%$ of the measured value in the above mentioned ranges

Test results/Remarks: $\pm 1\%$

Test values:

Permissible tolerance/Limiting values: $\pm 1.5\%$ of the measured value in the above mentioned ranges

Test results/Remarks: $\pm 1.5\%$

1.15.8.3 Apparent Power S

Test condition:

VA secondary
Measuring Range: (0.01 to 2) S_{rated}
Voltage Range: (0.8 to 1.2) V_{rated}
Current range: (0.1 to 2) I_{rated}
Frequency range:
 $f_{min} = 60$ Hz: 40 Hz to 61 Hz
 $f_{max} = 60$ Hz: 59 Hz to 61 Hz

Test values:

Permissible tolerance/Limiting values: $\pm 0.3\%$ of the measured value in the above mentioned ranges

Test results/Remarks: $\pm 0.3\%$

Test condition:

Frequency range:
 $f_{min} = 60$ Hz: 40 Hz to 61 Hz
 $f_{max} = 60$ Hz: 59 Hz to 61 Hz

Test values:

Permissible tolerance/Limiting values: $\pm 0.5\%$ of the measured value in the above mentioned ranges

Test results/Remarks: $\pm 0.5\%$

1.15.7 Frequency

Test condition:

Frequency range 10 Hz to 60 Hz

Test values:

Permissible tolerance/Limiting values: ± 20 mHz in the range $f_{min} \pm 10\%$ at V_{rated} , I_{rated}

Test results/Remarks: ± 10 mHz in the range $f_{min} \pm 10\%$ at V_{rated} , I_{rated} (operative range $> f_{min} \pm 10\%$ with higher tolerances)

Summary

1.16 Interfaces

1.16.1 USB interface (front panel)

Permissible tolerance/Limiting values: Funct. acc. to manual
Test results/Remarks: Function correct

1.16.2 Integrated ethernet interface (rear)

Permissible tolerance/Limiting values: Funct. acc. to manual
Test results/Remarks: Function correct

1.16.3 System interfaces

1.16.3.1 IEC 60970-5-103

Test values: RS232, RS485, LWL
Permissible tolerance/Limiting values: Funct. acc. to manual
Test results/Remarks: Function correct

1.16.3.2 IEC 60970-5-104

Permissible tolerance/Limiting values: Funct. acc. to manual
Test results/Remarks: Function correct

1.16.3.3 DNP3.0

Test values: RS485, LWL
Permissible tolerance/Limiting values: Funct. acc. to manual
Test results/Remarks: Function correct

1.16.3.4 IEC 61850

Permissible tolerance/Limiting values: Funct. acc. to manual
Test results/Remarks: Function correct

1.16.4 Time synchronization

Test condition: IRIG-B, DCF77, SNTP
Permissible tolerance/Limiting values: Funct. acc. to manual
Test results/Remarks: Function correct

1.16.5 Protection interfaces

Test values: Flush-mount housing
Surface-mounting housing
Permissible tolerance/Limiting values: Funct. acc. to manual
Test results/Remarks: Function correct

1.16.6 Phasor measurement unit (PMU)

Permissible tolerance/Limiting values: Accuracy according to IEEE STD C37.118.1 (class P)
Accuracy according to IEEE STD C37.118.1 (class M)
Test results/Remarks: Function correct

ВЯРНО С
ОРИГИНАЛА

functional test / during ramp -25°C to +75°C

Test State:
Test passed

Undercurrent protection:

Test Settings
Ramped Quantities
L1-L2 / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 29-May-2016 14:37:00 Test End: 29-May-2016 14:37:10
User Name: Manager

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Meas. 2	Ramp 2	Start 0->1	L1, L2	350.0 mA	361.5 mA	10.00 mA	10.00 mA	1.500 mA		17.80 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Overvoltage protection:

Test Settings
Ramped Quantities
V L1-E, L2-E, L3-E / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 29-May-2016 14:37:25 Test End: 29-May-2016 14:37:33
User Name: Manager

Test Results

Assessment Results

ВЪРНО С
ОРИГИНАЛА

functional test / during ramp -25°C to +75°C

Device:
Name/Description: EUT_07
Device type: 7SJB7
Serial/model number: BK1410002158

Manufacturer: SIEMENS
Device address: 172.16.50.7

Hardware Configuration

Test Equipment

Type	Serial Number
CMC2260bus	3P487R

Hardware Check

Performed At	Result	Details
03/27/2016 10:28:03 AM	Passed	

Overcurrent protection:

Test Settings
Ramped Quantities
L1-L2 / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 29-May-2016 14:37:53 Test End: 29-May-2016 14:38:00
User Name: Manager

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1, L2	1.000 A	1.052 A	10.00 mA	10.00 mA	2.000 mA		20.20 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Undercurrent protection:

Test Settings
Ramped Quantities
L1-L2 / Magnitude

Ramp States

functional test / during ramp -25°C to +75°C

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E, L2-E, L3-E	50.60 V	50.60 V	1.000 V	1.000 V	500.0 mV		16.90 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Undervoltage protection:

Test Settings
Ramped Quantities
V L1-E, L2-E, L3-E / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 29-May-2016 14:37:30 Test End: 29-May-2016 14:37:47
User Name: Manager

Test Results

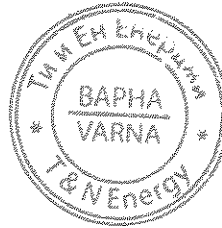
Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E, L2-E, L3-E	54.80 V	54.90 V	1.000 V	1.000 V	100.0 mV		31.30 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Test Object - Device Settings



functional test / during ramp -25°C to +75°C

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 29-May-2016 14:38:12 Test End: 29-May-2016 14:38:24
User Name: Manager

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Meas. 2	Ramp 2	Start 0->1	L1, L2	350.0 mA	352.0 mA	10.00 mA	10.00 mA	2.000 mA		22.20 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Overvoltage protection:

Test Settings
Ramped Quantities
V L1-E, L2-E, L3-E / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 29-May-2016 14:38:28 Test End: 29-May-2016 14:38:37
User Name: Manager

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E, L2-E, L3-E	50.60 V	50.60 V	1.000 V	1.000 V	500.0 mV		20.10 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Undervoltage protection:

functional test / during ramp -25°C to +75°C

functional test / during ramp -25°C to +75°C

Test Settings

Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 28-Mai-2015 14:38:44 Test End: 28-Mai-2015 14:38:52
User Name: Manager
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	04,80 V	04,80 V	0,000 V	0,000 V	000,0 mV	+	0,00 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Test Object - Device Settings

Device: EUT_08
Name/Description: EUT_08 Manufacturer: SIEMENS
Device type: 6MS06 Device address: 172.16.60.1
Serial/model number: DM1410001703

Hardware Configuration

Test Equipment

Type	Serial Number
CMC28plus	2F46TR

Hardware Check

Performed At	Result	Details
15/02/2015 10:28:00 AM	Passed	

Overcurrent protection:

Test Settings

Ramped Quantities

Test
ВЯРНО С
ОРИГИНАЛА

L1; L2; L3 / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 28-Mai-2015 14:38:58 Test End: 28-Mai-2015 14:39:10
User Name: Manager
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	1,050 A	1,052 A	0,00 mA	0,00 mA	2,000 mA	+	0,70 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Overvoltage protection:

Test Settings

Ramped Quantities

V L1-E; L2-E; L3-E / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 28-Mai-2015 14:39:16 Test End: 28-Mai-2015 14:39:25
User Name: Manager
Company:

Test Results

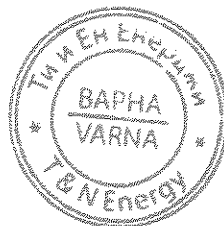
Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	50,80 V	50,80 V	0,000 V	0,000 V	200,0 mV	+	0,00 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Undervoltage protection:



functional test / during ramp -25°C to +75°C

functional test / during ramp -25°C to +75°C

Test Settings

Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 28-Mai-2015 14:39:31 Test End: 28-Mai-2015 14:39:38
User Name: Manager
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	04,80 V	04,80 V	0,000 V	0,000 V	000,0 mV	+	0,00 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Test Object - Device Settings

Device: EUT_11
Name/Description: EUT_11 Manufacturer: SIEMENS
Device type: 7UT86 Device address: 172.16.60.11
Serial/model number: DM1410002174

Hardware Configuration

Test Equipment

Type	Serial Number
CMC28plus	2F48TR

Hardware Check

Performed At	Result	Details
18.05.2015 16:00:48	Passed	

Overcurrent protection:

Test Settings

Ramped Quantities

L1; L2; L3 / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 28-Mai-2015 14:39:45 Test End: 28-Mai-2015 14:39:57
User Name: Manager
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	1,050 A	1,051 A	0,00 mA	0,00 mA	1,000 mA	+	0,80 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Undercurrent protection:

Test Settings

Ramped Quantities

L1; L2; L3 / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 28-Mai-2015 14:40:03 Test End: 28-Mai-2015 14:40:15
User Name: Manager
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Meas. 2	Ramp 2	Start 0->1	L1; L2; L3	0,600 mA	0,625 mA	0,00 mA	0,00 mA	2,500 mA	+	27,10 ms

Assess: + Passed x Failed o Not assessed

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functional test / during ramp -25°C to +75°C

functional test / end of ramp -25°C to +75°C

Test State:
Test passed

Test Object - Device Settings

Device:
Name/Description: EUT_17 Manufacturer: SIEMENS
Device type: 7U162 Device address: 172.16.00.17
Serial/model number: BM1503002655

Hardware Configuration

Type	Serial Number
EMC250plus	ZF407R

Hardware Check

Performed At	Result	Details
09.06.2016 10:47:40	Passed	

Undercurrent protection:

Test Settings

Ramped Quantities
L1; L2; L3 / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 04-Jun-2016 10:41:00 Test End: 04-Jun-2016 10:41:21
User Name: Manager:
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.	Tol.*	Dev.	Assess	Fact
Misc. 2	Ramp 2	Start 0->1	L1; L2; L3	250.0 mA	250.0 mA	0.00 mA	10.00 mA	3.000 A	*	22.70 ms

Assess + .. Passed x .. Failed o .. Not assessed

Test State:
Test passed



functional test / end of ramp -25°C to +75°C

functional test / end of ramp -25°C to +75°C

Overcurrent protection:

Test Settings
Ramped Quantities
L1; L2; L3 / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 04-Jun-2016 10:41:27 Test End:
User Name: Manager: 04-Jun-2016 10:41:39
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.	Tol.*	Dev.	Assess	Fact
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	1.000 A	1.000 A	10.00 mA	10.00 mA	500.0 µA	*	10.70 ms

Assess + .. Passed x .. Failed o .. Not assessed

Test State:
Test passed

Performed At	Result	Details
07.05.2015 10:25:04	Passed	

Overcurrent protection:

Test Settings
Ramped Quantities
L1; L2; L3 / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 04-Jun-2016 10:41:45 Test End:
User Name: Manager: 04-Jun-2016 10:41:59
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.	Tol.*	Dev.	Assess	Fact
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	1.000 A	1.032 A	10.00 mA	10.00 mA	1.600 mA	*	11.50 ms

Assess + .. Passed x .. Failed o .. Not assessed

Test State:
Test passed

Undercurrent protection:

Test Settings
Ramped Quantities
L1; L2; L3 / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 04-Jun-2016 10:42:04 Test End:
User Name: Manager: 04-Jun-2016 10:42:16
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.	Tol.*	Dev.	Assess	Fact
Misc. 2	Ramp 2	Start 0->1	L1; L2; L3	250.0 mA	251.6 mA	10.00 mA	10.00 mA	3.800 mA	*	10.60 ms

Test Object - Device Settings

Device:
Name/Description: EUT_03 Manufacturer: SIEMENS
Device type: 7S352 Device address: 172.16.00.3
Serial/model number: BM1410001134

Hardware Configuration

Type	Serial Number
EMC250plus	ZF407R

Hardware Check

Performed At	Result	Details

1002

functional test / end of ramp -25°C to +75°C

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Overvoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Test Module
Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 04-Jun-2016 10:42:22 Test End: 04-Jun-2016 10:42:30
User Name: Manager

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	30.00 V	30.70 V	1,000 V	1,000 V	100.0 mV	+	37.20 ms

Assess: + Passed x Failed o Not assessed

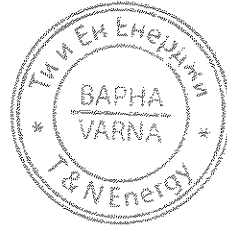
Test State:
Test passed

Undervoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Ramp
States

ВЕРНО С
ОРИГИНАЛА



functional test / end of ramp -25°C to +75°C

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 04-Jun-2016 10:42:30 Test End: 04-Jun-2016 10:42:44
User Name: Manager

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	34.80 V	34.80 V	1,000 V	1,000 V	100.0 mV	+	38.20 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Test Object - Device Settings

Device:
Name/Description: EUT_05 Manufacturer: SIEMENS
Device type: 7S302 Device address: 172.16.60.5
Serial/model number: BMT410001130

Hardware Configuration

Type	Serial Number
OMC325plus	CF407R

Hardware Check

Performed At	Result	Details
04/06/2016 10:28:50 AM	Passed	

Overcurrent protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

functional test / end of ramp -25°C to +75°C

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 04-Jun-2016 10:43:00 Test End: 04-Jun-2016 10:43:03
User Name: Manager

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	I L1; L2; L3	1,050 mA	1,052 mA	10,00 mA	10,00 mA	1,500 mA	+	21.20 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Undercurrent protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Ramp
States

Test Module
Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 04-Jun-2016 10:43:00 Test End: 04-Jun-2016 10:43:21
User Name: Manager

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Mess. 2	Ramp 2	Start 0->1	I L1; L2; L3	950.0 mA	951.6 mA	10,00 mA	10,00 mA	1,500 mA	+	12.30 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

functional test / end of ramp -25°C to +75°C

Overvoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 04-Jun-2016 10:43:27 Test End: 04-Jun-2016 10:43:35
User Name: Manager

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	30.60 V	30.80 V	1,000 V	1,000 V	100.0 mV	+	17.60 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Undervoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Ramp
States

Test Module
Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 04-Jun-2016 10:43:41 Test End: 04-Jun-2016 10:43:49
User Name: Manager

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	34.80 V	34.80 V	1,000 V	1,000 V	100.0 mV	+	34.20 ms

1003

functional test / end of ramp -25°C to +75°C

functional test / end of ramp -25°C to +75°C

Assess + Passed x Failed o Not assessed

Test State:
Test passed

Test Object - Device Settings

Device:
Name/description: EUT_07
Device type: 7S167
Serial/model number: BM1410002168
Manufacturer: SIEMENS
Device address: 172.18.60.7

Hardware Configuration

Test Equipment

Type	Serial Number
CMC725plus	2F467R

Hardware Check

Performed At	Result	Details
03/02/2015 10:26:03 AM	Passed	

Overcurrent protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module
Name: OMICRON Ramping
Version: 3.00 SR 1
Test Start: 04-Jun-2016 10:43:55
Test End: 04-Jun-2016 10:44:07
User Name:
Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	1,050 A	1,052 A	10,00 mA	10,00 mA	2,000 mA	*	28,20 ms

Assess + Passed x Failed o Not assessed

Test State:
Test passed

Undercurrent protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Ramp Status

Test Module
Name: OMICRON Ramping
Version: 3.00 SR 1
Test Start: 04-Jun-2016 10:44:13
Test End: 04-Jun-2016 10:44:26
User Name:
Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Miss. 2	Ramp 2	Start 0->1	L1; L2; L3	250,0 mA	252,0 mA	10,00 mA	10,00 mA	2,000 mA	*	84,40 ms

Assess + Passed x Failed o Not assessed

Test State:
Test passed

Overvoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Test Module
Name: OMICRON Ramping
Version: 3.00 SR 1
Test Start: 04-Jun-2016 10:44:31
Test End: 04-Jun-2016 10:44:39
User Name:
Manager:



functional test / end of ramp -25°C to +75°C

functional test / end of ramp -25°C to +75°C

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1; L2; L3-E	50,00 V	50,80 V	1,000 V	1,000 V	200,0 mV	*	10,80 ms

Assess + Passed x Failed o Not assessed

Test State:
Test passed

Undervoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Ramp Status

Test Module
Name: OMICRON Ramping
Version: 3.00 SR 1
Test Start: 04-Jun-2016 10:44:45
Test End: 04-Jun-2016 10:44:53
User Name:
Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1-E; L2-E; L3-E	34,00 V	34,00 V	0,200 V	1,000 V	100,0 mV	*	10,00 ms

Assess + Passed x Failed o Not assessed

Test State:
Test passed

Test Object - Device Settings

Device:
Name/description: EUT_09
Device type: 6MD86
Serial/model number: BM1410001763
Manufacturer: SIEMENS
Device address: 172.16.60.9

Hardware Configuration

Test Equipment

Type	Serial Number
CMC725plus	2F467R

Hardware Check

Performed At	Result	Details
03/02/2015 10:26:00 AM	Passed	

Overcurrent protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module
Name: OMICRON Ramping
Version: 3.00 SR 1
Test Start: 04-Jun-2016 10:44:59
Test End: 04-Jun-2016 10:45:12
User Name:
Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	1,050 A	1,052 A	10,00 mA	10,00 mA	2,000 mA	*	10,40 ms

Assess + Passed x Failed o Not assessed

Test State:
Test passed

Overvoltage protection:

Test Settings

1004

functional test / end of ramp -25°C to +75°C

functional test / end of ramp -25°C to +75°C

Ramped Quantities
V L1-E, L2-E, L3-E / Magnitude

Test Module

Name: OMACRON Ramping Version: 3.00 SR 1
Test Start: 04-Jun-2015 10:45:18 Test End: 04-Jun-2015 10:45:28
User Name: Manager:
Company:

Test Results

Assessment Results

Name/Exec	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Pick-up	Ramp 2	Start 0->1	L1, L2, L3-E	30,80 V	30,80 V	1,000 V	1,000 V	000,0 mV	+	14,40 ms

Assess: + Passed x Failed o Not assessed

Test State:

Test passed

Undervoltage protection:

Test Settings

Ramped Quantities
V L1-E, L2-E, L3-E / Magnitude

Ramp States

Test Module

Name: OMACRON Ramping Version: 3.00 SR 1
Test Start: 04-Jun-2015 10:45:32 Test End: 04-Jun-2015 10:45:40
User Name: Manager:
Company:

Test Results

Assessment Results

Name/Exec	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Pick-up	Ramp 2	Start 0->1	L1, L2, L3-E	31,80 V	34,00 V	1,000 V	1,000 V	000,0 mV	+	27,10 ms

Assess: + Passed x Failed o Not assessed

Test State:

Test passed

Test Object - Device Settings

Device:

Name/Description: EUT_11 Manufacturer: SIEMENS
Device type: 7UT85 Device address: 172.16.05.11
Serial/model number: BM1410002174

Hardware Configuration

Test Equipment

Type	Serial Number
CMC255plus	DF4076

Hardware Check

Performed At	Result	Details
16.05.2016 10:50:48	Passed	

Overcurrent protection:

Test Settings

Ramped Quantities
I L1, L2, L3 / Magnitude

Test Module

Name: OMACRON Ramping Version: 3.00 SR 1
Test Start: 04-Jun-2015 10:45:46 Test End: 04-Jun-2015 10:45:58
User Name: Manager:
Company:

Test Results

Assessment Results

Name/Exec	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Pick-up	Ramp 2	Start 0->1	L1, L2, L3	1,050 A	1,051 A	10,00 mA	10,00 mA	1,000 mA	+	22,00 ms

Assess: + Passed x Failed o Not assessed

ВЪРХУ С
ОРИГИНАЛА



functional test / end of ramp -25°C to +75°C

functional test / after damp heat cycle

Test State:

Test passed

Undercurrent protection:

Test Settings

Ramped Quantities
I L1, L2, L3 / Magnitude

Ramp States

Test Module

Name: OMACRON Ramping Version: 3.00 SR 1
Test Start: 04-Jun-2015 10:48:04 Test End: 04-Jun-2015 10:48:16
User Name: Manager:
Company:

Test Results

Assessment Results

Name/Exec	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Meas. 2	Ramp 2	Start 0->1	L1, L2, L3	150,0 mA	152,5 mA	10,00 mA	10,00 mA	2,500 mA	+	37,60 ms

Assess: + Passed x Failed o Not assessed

Test State:

Test passed

Test Object - Device Settings

Name/Description: EUT_17 Manufacturer: SIEMENS
Device type: 7UT82 Device address: 172.16.05.17
Serial/model number: BM160002955

Hardware Configuration

Test Equipment

Type	Serial Number
CMC255plus	DF497R

Hardware Check

Performed At	Result	Details
28.05.2016 10:35:47	Passed	

Overcurrent Protection:

Test Settings

Ramped Quantities
I L1, L2, L3 / Magnitude

Test Module

Name: OMACRON Ramping Version: 3.00 SR 1
Test Start: 28-Mai-2015 10:36:12 Test End: 28-Mai-2015 10:36:23
User Name: Manager:
Company:

Test Results

Assessment Results

Name/Exec	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Pick-up	Ramp 2	Start 0->1	L1, L2, L3	1,050 A	1,052 A	10,00 mA	10,00 mA	1,500 mA	+	18,30 ms

Assess: + Passed x Failed o Not assessed

Test State:

Test passed

Undercurrent protection:

Test Settings

Ramped Quantities
I L1, L2, L3 / Magnitude

1005

functional test / after damp heat cycle

functional test / after damp heat cycle

Ramp States

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 28-Mai-2015 10:36:28 Test End: 28-Mai-2016 10:36:41
User Name: Manager:

Test Results

Assessment Results

Table with 12 columns: Name/Exec, Ramp, Condition, Sig, Nom., Act., Tol., Tol+, Dev., Assess, Test. Row 1: Meas. 2, Ramp 2, Start 0->1, L1; L2; L3, 350.0 mA, 252.5 mA, 10.00 mA, 10.00 mA, 2.500 mA, +, 35.00 ms.

Test State: Test passed

Test Object - Device Settings

Name/description: EUT_03 Manufacturer: SIEMENS
Device type: 7SJ82 Device address: 172.16.80.3
Serial/model number: BM1410001134

Hardware Configuration

Test Equipment

Table with 2 columns: Type, Serial Number. Row 1: CM:265plus, KF467R

Hardware Check

Table with 3 columns: Performed At, Result, Details. Row 1: 07.05.2016 11:28:00, Passed, Details

Handwritten signature

Overcurrent Protection:

Test Settings

Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 28-Mai-2015 10:36:47 Test End: 28-Mai-2016 10:36:60
User Name: Manager:

Test Results

Assessment Results

Table with 12 columns: Name/Exec, Ramp, Condition, Sig, Nom., Act., Tol., Tol+, Dev., Assess, Test. Row 1: Pick-up, Ramp 2, Start 0->1, L1; L2; L3, 1.050 A, 1.054 A, 10.00 mA, 10.00 mA, 1.000 mA, +, 20.20 ms.

Test State: Test passed

Undercurrent protection:

Test Settings

Ramped Quantities
I L1; L2; L3 / Magnitude

Ramp States

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 28-Mai-2016 10:37:04 Test End: 28-Mai-2016 10:37:17
User Name: Manager:

Test Results

Assessment Results

Table with 12 columns: Name/Exec, Ramp, Condition, Sig, Nom., Act., Tol., Tol+, Dev., Assess, Test. Row 1: Meas. 2, Ramp 2, Start 0->1, L1; L2; L3, 350.0 mA, 353.5 mA, 10.00 mA, 10.00 mA, 3.000 mA, +, 37.00 ms.

ВЯРНО С ОРИГИНАЛА



functional test / after damp heat cycle

functional test / after damp heat cycle

Test State: Test passed

Overvoltage protection:

Test Settings

Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 28-Mai-2015 10:37:23 Test End: 28-Mai-2016 10:37:30
User Name: Manager:

Test Results

Assessment Results

Table with 12 columns: Name/Exec, Ramp, Condition, Sig, Nom., Act., Tol., Tol+, Dev., Assess, Test. Row 1: Pick-up, Ramp 2, Start 0->1, V L1-E; L2-E; L3-E, 80.00 V, 80.90 V, 1.000 V, 1.000 V, 800.0 mV, +, 21.80 ms.

Test State: Test passed

Undervoltage protection:

Test Settings

Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Ramp States

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 28-Mai-2015 10:37:38 Test End: 28-Mai-2016 10:37:45
User Name: Manager:

Handwritten signature

Test Results

Assessment Results

Table with 12 columns: Name/Exec, Ramp, Condition, Sig, Nom., Act., Tol., Tol+, Dev., Assess, Test. Row 1: Pick-up, Ramp 2, Start 0->1, V L1-E; L2-E; L3-E, 84.00 V, 85.00 V, 1.000 V, 1.000 V, 200.0 mV, +, 21.80 ms.

Test State: Test passed

Test Object - Device Settings

Name/description: EUT_03 Manufacturer: SIEMENS
Device type: 7SJ82 Device address: 172.16.80.3
Serial/model number: BM1410001134

Hardware Configuration

Test Equipment

Table with 2 columns: Type, Serial Number. Row 1: CM:265plus, KF467R

Hardware Check

Table with 3 columns: Performed At, Result, Details. Row 1: 28.05.2016 10:36:52, Passed, Details

Overcurrent Protection:

Test Settings

Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 28-Mai-2016 10:37:51 Test End: 28-Mai-2016 10:38:03
User Name: Manager:

Handwritten signature

functional test / after damp heat cycle

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	1,050 A	1,054 A	10,00 mA	10,00 mA	0,050 mA	*	27,00 ms

Test State:
Test passed

Undercurrent protection:

Test Settings

Ramped Quantities
I L1; L2; L3 / Magnitude

Ramp States

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
 Test Start: 28-May-2016 10:38:08 Test End: 28-May-2016 10:38:21
 User Name: Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Meas. 2	Ramp 2	Start 0->1	L1; L2; L3	150,0 mA	153,5 mA	10,00 mA	10,00 mA	3,600 mA	*	32,70 ms

Test State:
Test passed

Overvoltage protection:

Test Settings

Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

functional test / after damp heat cycle

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
 Test Start: 28-May-2016 10:38:27 Test End: 28-May-2016 10:38:34
 User Name: Manager:
 Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	30,00 V	30,90 V	1,000 V	1,000 V	300,0 mV	*	25,20 ms

Test State:
Test passed

Undervoltage protection:

Test Settings

Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Ramp States

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
 Test Start: 28-May-2016 10:38:40 Test End: 28-May-2016 10:38:49
 User Name: Manager:
 Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	34,00 V	35,00 V	1,000 V	1,000 V	300,0 mV	*	23,20 ms

Test State:
Test passed



functional test / after damp heat cycle

Test Object - Device Settings

Device: EUT_07 Manufacturer: SIEMENS
 Name/Description: 78J67 Device address: 172.15.60.7
 Device type:
 Serial/Model number: EM1410002158

Hardware Configuration

Test Equipment

Type	Serial Number
CMC7250plus	3F467R

Hardware Check

Performed At	Result	Details
11.05.2016 15:07:50	Passed	

Overcurrent Protection:

Test Settings

Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
 Test Start: 28-May-2016 10:38:54 Test End: 28-May-2016 10:39:06
 User Name: Manager:
 Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	1,050 A	1,064 A	10,00 mA	10,00 mA	1,000 mA	*	26,60 ms

Test State:
Test passed

Undercurrent protection:

functional test / after damp heat cycle

Test Settings

Ramped Quantities
I L1; L2; L3 / Magnitude

Ramp States

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
 Test Start: 28-May-2016 10:39:12 Test End: 28-May-2016 10:39:24
 User Name: Manager:
 Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Meas. 2	Ramp 2	Start 0->1	L1; L2; L3	350,0 mA	354,0 mA	10,00 mA	10,00 mA	4,000 mA	*	17,60 ms

Test State:
Test passed

Overvoltage protection:

Test Settings

Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
 Test Start: 28-May-2016 10:39:30 Test End: 28-May-2016 10:39:37
 User Name: Manager:
 Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	30,00 V	30,90 V	1,000 V	1,000 V	300,0 mV	*	25,20 ms

Test State:

functional test / after damp heat cycle

Test passed

Undervoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 28-Mai-2016 10:39:43 Test End: 28-Mai-2016 10:39:62
User Name: Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	24,80 V	25,00 V	1,000 V	1,000 V	200,0 mV	+	21,60 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Test Object - Device Settings

Device: EUT_09
Name/Description: EUT_09 Manufacturer: SIEMENS
Device type: GMD80 Device address: 172.16.00.6
Serial/model number: BM1410001763

Hardware Configuration

functional test / after damp heat cycle

Test Equipment

Type	Serial Number
CMC260plus	DF407R

Hardware Check

Performed At	Result	Details
17.05.2016 11:35:20	Passed	

Overcurrent Protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 28-Mai-2016 10:39:58 Test End: 28-Mai-2016 10:40:00
User Name: Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	I L1; L2; L3	1,050 A	1,053 A	10,00 mA	10,00 mA	1,000 mA	+	32,80 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Overvoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 28-Mai-2016 10:40:16 Test End: 28-Mai-2016 10:40:22
User Name: Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	30,00 V	30,00 V	1,000 V	1,000 V	200,0 mV	+	21,60 ms

Assess: + Passed x Failed o Not assessed

ВЯРНО С
ОРИГИНАЛА



functional test / after damp heat cycle

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	34,80 V	35,00 V	1,000 V	1,000 V	200,0 mV	+	20,60 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Undervoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 28-Mai-2016 10:40:20 Test End: 28-Mai-2016 10:40:37
User Name: Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	34,80 V	35,00 V	1,000 V	1,000 V	200,0 mV	+	20,60 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Test Object - Device Settings

Device:

functional test / after damp heat cycle

Name/Description: EUT_11
Device type: 7UT85
Serial/model number: BM1410002174
Manufacturer: SIEMENS
Device address: 172.16.60.11

Hardware Configuration

Test Equipment

Type	Serial Number
CMC260plus	DF407R

Hardware Check

Performed At	Result	Details
11.06.2016 16:08:06	Passed	

Overcurrent Protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 28-Mai-2016 10:40:43 Test End: 28-Mai-2016 10:40:54
User Name: Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	I L1; L2; L3	1,650 A	1,654 A	10,00 mA	10,00 mA	1,500 mA	+	12,30 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Undercurrent protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Ramp States

1008

functional test / after damp heat cycle

functional test / after damp heat 60 days

Test Module

Name: OMCRON Ramping
Version: 3.00 SR 1
Test Start: 28-Mai-2015 10:41:00
Test End: 28-Mai-2015 10:41:13
User Name: Manager

Test Results

Assessment Results

Table with 12 columns: Name/Exec, Ramp, Condition, Sig, Nom, Act, Tol-, Tol+, Dev, Assess, Test. Row 1: Meas. 2, Ramp 2, Start 0->1, L1, L2, 350.0 mA, 354.5 mA, 10.00 mA, 10.00 mA, 1.500 mA, Passed, 11.40 ms

Assess: * Passed x Failed o Not assessed

Test State:

Test passed

Test Object - Device Settings

Device: EUT_17
Name/Description: 7UT82
Device type: 7UT82
Manufacturer: SIEMENS
Serial/model number: BM1803002656
Device address: 172.16.60.17

Hardware Configuration

Test Equipment

Table with 2 columns: Type, Serial Number. Row 1: CMK760plus, 2F407R

Hardware Check

Table with 3 columns: Performed At, Result, Details. Row 1: 07/31/2016 2:41:03 PM, Passed, Details

Overcurrent protection:

Test Settings

Ramped Quantities
L1, L2, L3 / Magnitude

Test Module

Name: OMCRON Ramping
Version: 3.00 SR 1
Test Start: 31-Jul-2016 15:00:37
Test End: 31-Jul-2016 15:00:48
User Name: Manager

Test Results

Assessment Results

Table with 12 columns: Name/Exec, Ramp, Condition, Sig, Nom, Act, Tol-, Tol+, Dev, Assess, Test. Row 1: Pick-up, Ramp 2, Start 0->1, L1, L2, L3, 1.000 A, 1.000 A, 10.00 mA, 10.00 mA, 1.000 mA, Passed, 13.20 ms

Assess: * Passed x Failed o Not assessed

Test State:

Test passed

Undercurrent protection:

Test Settings

Ramped Quantities
L1, L2, L3 / Magnitude



ВЯРНО С
ОРИГИНАЛА

functional test / after damp heat 60 days

functional test / after damp heat 60 days

Ramp States

Test Module

Name: OMCRON Ramping
Version: 3.00 SR 1
Test Start: 31-Jul-2016 15:00:54
Test End: 31-Jul-2016 15:01:07
User Name: Manager

Test Results

Assessment Results

Table with 12 columns: Name/Exec, Ramp, Condition, Sig, Nom, Act, Tol-, Tol+, Dev, Assess, Test. Row 1: Meas. 2, Ramp 2, Start 0->1, L1, L2, L3, 350.0 mA, 350.5 mA, 10.00 mA, 10.00 mA, 500.0 uA, Passed, 27.00 ms

Assess: * Passed x Failed o Not assessed

Test State:

Test passed

Test Module

Name: OMCRON Ramping
Version: 3.00 SR 1
Test Start: 31-Jul-2016 16:01:14
Test End: 31-Jul-2016 16:01:26
User Name: Manager

Test Results

Assessment Results

Table with 12 columns: Name/Exec, Ramp, Condition, Sig, Nom, Act, Tol-, Tol+, Dev, Assess, Test. Row 1: Pick-up, Ramp 2, Start 0->1, L1, L2, L3, 1.000 A, 1.002 A, 10.00 mA, 10.00 mA, 1.000 mA, Passed, 27.00 ms

Assess: * Passed x Failed o Not assessed

Test State:

Test passed

Undercurrent protection:

Test Settings

Ramped Quantities
L1, L2, L3 / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping
Version: 3.00 SR 1
Test Start: 31-Jul-2016 16:01:32
Test End: 31-Jul-2016 16:01:45
User Name: Manager

Test Results

Assessment Results

Table with 12 columns: Name/Exec, Ramp, Condition, Sig, Nom, Act, Tol-, Tol+, Dev, Assess, Test. Row 1: Meas. 2, Ramp 2, Start 0->1, L1, L2, L3, 350.0 mA, 351.6 mA, 10.00 mA, 10.00 mA, 1.000 mA, Passed, 21.30 ms

Assess: * Passed x Failed o Not assessed

Test State:

Test passed

Test Object - Device Settings

Device: EUT_03
Name/Description: 7S162
Device type: 7S162
Manufacturer: SIEMENS
Serial/model number: BM1410001134
Device address: 172.16.0.3

Hardware Configuration

Test Equipment

Table with 2 columns: Type, Serial Number. Row 1: CMK760plus, 2F407R

Hardware Check

Table with 3 columns: Performed At, Result, Details. Row 1: 07.05.2016 11:28:09, Passed, Details

Overcurrent protection:

Test Settings

Ramped Quantities
L1, L2, L3 / Magnitude

1009

functional test / after damp heat 66 days

functional test / after damp heat 66 days

Overvoltage protection:

Test Settings

Ramped Quantities
V L1-E, L2-E, L3-E / Magnitude

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 31-Jul-2016 15:01:51 Test End: 31-Jul-2016 16:01:55
User Name: Manager

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E, L2-E, L3-E	50.00 V	50.00 V	1.000 V	1.000 V	200.0 mV	*	10.70 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:

Test passed

Undervoltage protection:

Test Settings

Ramped Quantities
V L1-E, L2-E, L3-E / Magnitude

Ramp States

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 31-Jul-2016 16:02:05 Test End: 31-Jul-2016 16:02:14
User Name: Manager

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1, L2, L3	1.050 A	1.052 A	10.00 mA	10.00 mA	1.500 mA	*	10.70 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:

Test passed

Undercurrent protection:

Test Settings

Ramped Quantities
I L1, L2, L3 / Magnitude

Ramp States

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 31-Jul-2016 16:02:30 Test End: 31-Jul-2016 16:02:52
User Name: Manager

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Meas. 2	Ramp 2	Start 0->1	I L1, L2, L3	350.0 mA	351.5 mA	10.00 mA	10.00 mA	1.500 mA	*	25.40 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:

Test passed

Overvoltage protection:

Test Settings

Ramped Quantities
V L1-E, L2-E, L3-E / Magnitude

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 31-Jul-2016 16:02:58 Test End: 31-Jul-2016 16:03:06
User Name: Manager

ВЯРНО С
ОРИГИНАЛА

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E, L2-E, L3-E	54.00 V	54.00 V	1.000 V	1.000 V	100.0 mV	*	27.10 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:

Test passed

Test Object - Device Settings

Device: EUT_06
Name/Description: 78J22
Device type: 78J22
Manufacturer: SIEMENS
Serial/model number: BM1410001139
Device address: 172.10.80.6

Hardware Configuration

Test Equipment

Type	Serial Number
EMC250plus	314672

Hardware Check

Performed At	Result	Details
11.05.2016 15:07:50	Passed	

Overcurrent protection:

Test Settings

Ramped Quantities
I L1, L2, L3 / Magnitude

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 31-Jul-2016 16:02:21 Test End: 31-Jul-2016 16:02:32
User Name: Manager

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	I L1, L2, L3	20.00 A	20.00 A	1.000 A	1.000 A	200.0 mA	*	20.80 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:

Test passed

Undervoltage protection:

Test Settings

Ramped Quantities
V L1-E, L2-E, L3-E / Magnitude

Ramp States

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 31-Jul-2016 15:03:17 Test End: 31-Jul-2016 15:03:21
User Name: Manager

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E, L2-E, L3-E	54.00 V	54.00 V	1.000 V	1.000 V	100.0 mV	*	27.10 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:

Test passed

Test Object - Device Settings

Device:

1010

functional test / after damp heat 60 days

Name/description: EUT_07
Device type: 78467
Serial/model number: 6M1419002168
Manufacturer: SIEMENS
Device address: 172.16.00.7

Hardware Configuration

Test Equipment

Type	Serial Number
CMC250plus	3P407R

Hardware Check

Performed At	Result	Details
11.05.2016 16:07:59	Passed	

Overcurrent protection:

Test Settings

Ramped Quantities
I L1, L2, L3 / Magnitude

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 31-Jul-2016 16:03:28 Test End: 31-Jul-2016 16:03:30
User Name: Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1, L2, L3	1.050 A	1.053 A	10.00 mA	10.00 mA	2.000 mA		18.48 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Undercurrent protection:

Test Settings

Ramped Quantities
I L1, L2, L3 / Magnitude

Ramp States

ВЪРНО С
ОРИГИНАЛА



functional test / after damp heat 60 days

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 31-Jul-2016 16:03:45 Test End: 31-Jul-2016 16:03:58
User Name: Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1, L2, L3	100.0 mA	100.0 mA	10.00 mA	10.00 mA	2.000 mA		20.50 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Overvoltage protection:

Test Settings

Ramped Quantities
V L1-E, L2-E, L3-E / Magnitude

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 31-Jul-2016 16:04:05 Test End: 31-Jul-2016 16:04:12
User Name: Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E, L2-E, L3-E	90.00 V	90.80 V	1.000 V	1.000 V	200.0 mV		22.20 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Undervoltage protection:

functional test / after damp heat 60 days

Test Settings

Ramped Quantities
V L1-E, L2-E, L3-E / Magnitude

Ramp States

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 31-Jul-2016 16:04:19 Test End: 31-Jul-2016 16:04:28
User Name: Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E, L2-E, L3-E	90.00 V	91.50 V	1.000 V	1.000 V	100.0 mV		16.20 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

functional test / after damp heat 60 days

Overcurrent protection:

Test Settings

Ramped Quantities
I L1, L2, L3 / Magnitude

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 31-Jul-2016 16:04:24 Test End: 31-Jul-2016 16:04:46
User Name: Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1, L2, L3	1.050 A	1.052 A	10.00 mA	10.00 mA	2.000 mA		23.20 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Overvoltage protection:

Test Settings

Ramped Quantities
V L1-E, L2-E, L3-E / Magnitude

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 31-Jul-2016 16:04:52 Test End: 31-Jul-2016 16:04:59
User Name: Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E, L2-E, L3-E	90.00 V	90.80 V	1.000 V	1.000 V	200.0 mV		16.20 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Test Object - Device Settings

Name/description: EUT_00
Device type: 6MDE5
Serial/model number: 6M1419001783
Manufacturer: SIEMENS
Device address: 172.16.00.0

Hardware Configuration

Test Equipment

Type	Serial Number
CMC250plus	3P407R

Hardware Check

Performed At	Result	Details
10.10.2015 2:56:00 PM	Passed	

Handwritten signature

10.11

Undervoltage protection:

Test Settings
Ramped Quantities
 V L1-E, L2-E, L3-E / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
 Test Start: 31-Jul-2016 15:05:00 Test End: 31-Jul-2016 15:05:15
 User Name: Manager:
 Company:

Test Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E, L2-E, L3-E	04.00 V	04.00 V	1.000 V	1.000 V	100.0 mV	+	22.10 ms

Assess: + Passed x Failed o Not assessed

Test State:
 Test passed

Test Object - Device Settings

Device:
 Name/description: EUT_11 Manufacturer: SIEMENS
 Device type: 7UT65 Device address: 172.16.60.11
 Serial/model number: BM141002174

Hardware Configuration

Test Equipment	
Type	Serial Number
SMC2155plus	3240FR

Meas. 2	Ramp 2	Start 0->1	L1, L2, L3	50.0 mA	52.0 mA	10.00 mA	10.00 mA	2.500 mA	+	0.10 ms

Assess: + Passed x Failed o Not assessed

Test State:
 Test passed

Hardware Check

Performed At	Result	Details
07/31/2016 2:41:18 PM	Passed	

Overcurrent protection:

Test Settings
Ramped Quantities
 I L1, L2, L3 / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
 Test Start: 31-Jul-2016 15:05:21 Test End: 31-Jul-2016 15:05:33
 User Name: Manager:
 Company:

Test Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	I L1, L2, L3	0.050 A	0.052 A	0.000 mA	0.000 mA	1.500 mA	+	17.00 ms

Assess: + Passed x Failed o Not assessed

Test State:
 Test passed

Undercurrent protection:

Test Settings
Ramped Quantities
 I L1, L2, L3 / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
 Test Start: 31-Jul-2016 15:05:09 Test End: 31-Jul-2016 15:06:02
 User Name: Manager:
 Company:

Test Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test

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 ВЯРНО С
 ОРИГИНАЛА



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[Handwritten Signature]

Technical Statement

on environmental tests according IEC 60068 and IEC 60255

The product family

SIPROTEC 5 System

“Protection, Automation and Monitoring”

manufactured by

Siemens AG

has been tested and was found to comply with the following standards

- IEC 60255-1 / 2009
- IEC 60068-2-6 / 2007
- IEC 60068-2-27 / 1987
- IEC 60068-2-27 / 2008
- IEC 60068-2-29 / 1987
- IEC 60068-3-3 / 1991
- IEC 60068-2-1 / 2007
- IEC 60068-2-2 / 2007
- IEC 60068-2-14 / 2009
- IEC 60068-2-30 / 2005
- IEC 60068-2-42 / 2003
- IEC 60068-2-43 / 2003
- IEC 60068-2-60 / 1995
- IEC 60068-2-78 / 2001
- IEC 60529 / 2001
- IEC 60255-21-1 / 1988
- IEC 60255-21-2 / 1988
- IEC 60255-21-3 / 1993

We confirm this with the Test Reports listed in the appendix 1

R. Lein

Dipl.-Ing. R. Lein
head of test lab / test manager
Berlin, 15 October 2015



M. Geburtig
Dipl.-Ing. M. Geburtig
test engineer

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Commerzbank AG
BIC: COBKDE33HAN
IBAN: DE53 1003 0000 0400 4292 00



Product designation

Basic devices

Line Protection
7SA82, 7SA84, 7SA86, 7SA87
7SD82, 7SD84, 7SD86, 7SD87
7SL82, 7SL86, 7SL87

Breaker Management

7VK87
7SJ82, 7SJ85, 7SJ86

Overcurrent Protection

6MD85, 6MD86

Bay Control Unit

7UT82, 7UT85, 7UT86, 7UT87

Transformer Protection

Railway Protection

Fault Recorder

Motor Protection

Busbar Protection

Generator Protection

Replacement devices

Replacement base modules are universal substitute devices that can be used for several device types. Different technical versions of these replacement base modules are available. They differ only with respect to the input and output module IO2xx, so the replacement devices contain an identical hardware as the basic devices.
A replacement device is immediately operable after transfer of the software and of the existing parameterization.

Line Protection

ESL84, ESL86, ESL87

Bay Control Unit

EMD85, EMD86

Transformer Protection

Railway Protection

Overcurrent Protection

Motor Protection

Fault Recorder

All firmware and DIGSI versions

Del

ВАРНА С
ОРИГИНАЛА



Description of SIPROTEC 5 System

SIPROTEC 5 Platform and Hardware Characteristics

The SIPROTEC 5 series includes both modular and non-modular devices. Modular devices consist of a base module (1/3 of 19 inches) and can be expanded with expansion modules (1/6 of 19 inches). The device type identifier for modular devices is XXX85, XXX86 or XXX87, for example, 7SA86

Type xxx84 devices have the same hardware properties as the modular devices, but they cannot be expanded with expansion modules.

All non-modular devices consist of just a base module (1/3 of 19 inches) and cannot be expanded with expansion modules (1/6 of 19 inches). The device type identifier for non-modular devices is 7XX82, for example, 7SJ82.

Hardware Characteristics of Modular Devices

A modular device always consists of a base module and optionally of expansion modules.

The modules can be chosen according to hardware characteristics. These characteristics are:

- Module size
- Type of construction
- Mounting of the on-site operation panel
- Layout (or design) of the on-site operation panel
- Input and output module
- Plug-in modules

The modules are available in 2 sizes:

- Base module (1/3 of 19 in)
- Extension module (1/6 of 19 in)

The devices are available in 3 designs:

- Flush-mounting devices with on-site operation panel fitted directly on the device
- Surface-mounting devices with integrated on-site operation panel
- Surface-mounting devices with detached on-site operation panel

The on-site operation panels of the base modules can be selected from 3 variants:

- With a large display, keypad, and 16 2-colored LEDs
- With a small display, keypad, and 16 2-colored LEDs
- Without a display, without a keypad (standard), but with 16 2-colored LEDs

The on-site operation panels of the extension modules can be selected from 3 variants:

- With 16 1-colored LEDs and 2 key switches
- With 16 1-colored LEDs
- Without display elements

The base module always contains the central processor board CP200, CP300, the power-supply board PS201 and an input and output module IO2XX.

The extension module contains an input and output module IO2XX or a plug-in module assembly with integrated power supply CB202.

The 1st extension module in the 2nd device row always contains power supply module PS203.

The plug-in modules are available for various applications. The following plug-in modules can be installed in the base module or in an extension module with plug-in module assembly with integrated power supply CB202:

- Communication module
- Measuring-transducer module

Hardware Characteristics of Non-Modular Devices

A non-modular device always consists of just one module (1/3 of 19 inches) and cannot be expanded with expansion modules (1/6 of 19 inches). These hardware characteristics are:

- Module size: 1/3 of 19 in.
- Type of construction: Flush-mounting devices with on-site operation panel fitted directly on the device

The on-site operation panels can be chosen from 2 variants:

- With a large display, keypad, and 16 2-colored LEDs
- With a small display, keypad, and 16 2-colored LEDs

The module always contains the central processor board CP100, the power supply board PS101 and an input and output module IO10X.

The input and output module IO10X includes the terminals for current and voltage transformers.

Optionally, the module can be equipped with an additional input and output module IO110 for extra binary inputs and outputs.

The plug-in modules are available for various applications. The following plug-in modules can be installed in the module:

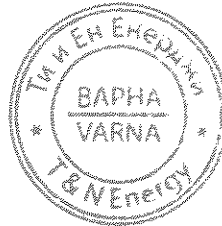
- Communication modules
- Measuring-transducer modules


For further information see manufacturer's documentation:

Product Information Part No.: C53000-B5040-C001

Hardware Manual Part No.: C53000-G5040-C002

ВЯРНО С
ОРИГИНАЛА



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**Functional description of SIPROTEC 5 System,
Application sheet of the Input and Output Modules of the Modular Devices**

Module	Functional description
PS203	Power Supply Board for the 2 nd device row, (DC: 24 V/48 V or 60 V to 250 V and AC: 100 V to 230 V), mounted in 1/6 19-inch size housing
CB202	Plug-in module assembly, including an additional power supply, (DC: 24 V/48 V or 60 V to 250 V and AC: 100 V to 230 V), mounted in 1/6 19-inch size housing
IO201	Input Output Module, 4 current inputs, 8 binary inputs, 6 binary outputs, reduced assembled variant of IO202
IO202	Input Output Module, 4 current measuring inputs, 4 voltage measuring inputs, 8 binary inputs, 6 binary outputs, mounted in 1/6 or 1/3 19-inch size housing
IO203	Input Output Module, 8 current measuring inputs, 4 binary inputs, 4 binary outputs, mounted in 1/6 19-inch size housing
IO204	Input Output Module, 10 binary inputs, 4 binary outputs, 4 power relays for controlling 2 motors, mounted in 1/6 19-inch size housing
IO205	Input Output Module, 12 binary inputs, 16 binary outputs, mounted in 1/6 19-inch size housing
IO206	Input Output Module, 6 binary inputs, 7 binary outputs, mounted in 1/6 19-inch size housing, reduced assembled variant of IO205
IO207	Input Output Module, 16 binary inputs, 8 binary outputs, mounted in 1/6 19-inch size housing
IO208	Input Output Module, 4 current measuring inputs, 4 voltage measuring inputs, 4 binary inputs, 11 binary outputs, mounted in 1/3 or 1/6 19-inch size housing
IO209	Input Output Module, 8 binary inputs, 4 High Speed Outputs, mounted in 1/6 19-inch size housing
IO211	Input Output Module, 8 voltage measuring inputs, 8 binary inputs, mounted in 1/6 or 1/3 19-inch size housing
IO212	Input Output Module, 8 binary inputs, 8 high-speed transducer inputs current/voltage, mounted in 1/6 19-inch size housing
IO214	Input Output Module, 4 current measuring inputs, 4 voltage measuring inputs, 2 binary inputs, 5 binary outputs, mounted in 1/6 or 1/3 19-inch size housing, reduced assembled variant of IO202
IO215	Input Output Module, 4 current measuring inputs, 4 voltage measuring inputs (designed for a measuring range up to 7.07 V) 8 binary inputs, 6 binary outputs, mounted in 1/6 or 1/3 19-inch size housing
IO230	Input Module, 48 binary inputs, mounted in 1/6 19-inch size housing
IO231	Input Output Module, 24 binary inputs and 24 binary outputs
PB201	Process-Bus Module, 7 LC Duplex interfaces of which 1 is a service port, mounted in 1/6 19-inch size housing



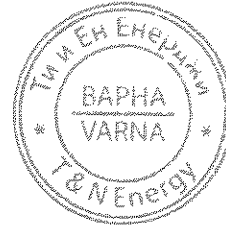
Application sheet of the Input and Output Boards of the Non-Modular Devices

Board	Functional description
IO101	Input Output Board, 4 current inputs, 8 binary inputs, 6 binary outputs, reduced assembled variant of IO102
IO102	Input Output Board, 4 current inputs, 4 voltage inputs, 8 binary inputs, 6 binary outputs
IO103	Input Output Board, 8 current inputs, 4 binary inputs, 4 binary outputs
IO110	Input Output Board, 12 binary inputs, 7 binary outputs

ВЪРХО С
ОПЪТНАТА

Function Description of Plug-in Modules of Modular and Non-Modular Devices

Plug-in module	Functional description
USART-xx ¹ -y ² EL	Serial communication module, electrical connection
USART-xx ¹ -y ² FO	Serial communication module, optical connection
USART-xx ¹ -y ² LDFO	Serial communication module for long distances, optical connection
ETH-xx ¹ -2EL	Ethernet module, electrical connection
ETH-xx ¹ -2FO	Ethernet module, optical connection
ANAI-CA-4EL	Measuring-transducer module
ARC-CD-3FO	Arc Protection module




¹ 2 letters, unique code of the Module in the product code of the device
² 1 = 1 channel, 2 = 2 channels



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Appendix 1

List of Test Reports

Report	Dated	Performed tests	Device size from 19 inch
No. 11605.01 / 15	2015-10-05	Vibration, shock, bump, seismic test	1/2 surface mounting
No. 10569 / 14	2014-06-03	Vibration, shock, bump, seismic test	1/2 surface mounting
No. 10478.02 / 14	2014-06-03	Damp heat steady state, 56 days	1/3
No. 10478.01 / 14	2014-04-07	Vibration, shock, bump, seismic test	1/3
No. 10134 / 13	2013-10-18	Degree of protection	1/3
No. 10077.02 / 13	2013-09-18	Damp heat, cyclic	1/3
No. 10094 / 13	2013-09-12	Vibration, shock, bump, seismic test	1/3 and 1/3
No. 10093 / 13	2013-09-18	Damp heat, cyclic	1/3
No. 10034 / 13	2013-08-27	Vibration, shock, bump, seismic test	1/3
No. 9889 / 13	2013-05-30	Vibration, shock, bump, seismic test	1/1
No. 9865 / 13	2013-05-15	Vibration, shock, bump, seismic test	1/1
No. 9830 / 13	2013-04-24	Vibration, shock, bump, seismic test	1/3
No. 9752 / 13	2013-04-09	Vibration, shock, bump, seismic test	2/3
No. 9760 / 13	2013-04-08	Cold, heat, damp heat steady state	2/3
No. 9577 / 12	2012-11-23	Vibration, shock, bump, seismic test	1/1
No. 9291 / 12	2012-06-20	Vibration, shock, bump, seismic test	1/3
No. 8325 / 11	2011-02-11	Vibration, shock, bump, seismic test	1/1
No. 8122 / 10	2010-10-15	Vibration	1/1
No. 7828-01 / 10	2010-04-16	Shock, seismic test	1/1
No. 7779 / 10	2010-03-8	Vibration, shock, bump, seismic test	1/2
No. 7763 / 10	2010-02-26	Degree of protection	1/2
No. 7827.02 / 10	2010-06-09	Flowing mixed gas	1/2
No. 78.27.01 / 10	2010-05-27	Sulphur dioxide SO ₂ , Hydrogen sulphide H ₂ S	1/2
No. 7829 / 10	2010-04-27	Salt mist	1/2
No. 7862 / 10	2010-05-17	Fast temperature change	1/2
No. 7829.01 / 10	2010-04-27	Damp heat, cyclic	1/2
No. 7352 / 09	2009-06-24	Vibration, shock, bump, seismic test	1/1
No. 7156 / 09	2009-04-27	Vibration, shock, bump	1/1 surface mounting
No. 6799.03 / 08	2008-09-25	Vibration, shock, seismic test	1/3
No. 6894 / 08	2008-08-18	Vibration, shock, bump, seismic test	1/2
No. 6895 / 08	2008-08-18	Vibration, shock, bump, seismic test	1/1
No. 6893 / 08	2008-08-15	Vibration, shock, bump, seismic test	1/6
No. 6892 / 08	2008-08-13	Vibration, shock, bump, seismic test	1/3

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Appendix 2

List of Standards

Standard	Short description of test
IEC 60255-1	Measuring relays and protection equipment – Part 1: Common requirements
IEC 60255-21-1	Electrical relays; part 21: vibration, shock, bump and seismic tests on measuring relays and protection equipment; section one: vibration tests (sinusoidal)
IEC 60255-21-2	Electrical relays; part 21: vibration, shock, bump and seismic tests on measuring relays and protection equipment; section two: shock and bump tests
IEC 60255-21-3	Electrical relays; part 21: vibration, shock, bump and seismic tests on measuring relays and protection equipment; section 3: seismic tests
IEC 60068-2-1	Environmental testing - Part 2-1: Tests - Test A: Cold
IEC 60068-2-2	Environmental testing. Part 2-2: Tests. Test B: Dry heat
IEC 60068-2-6	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)
IEC 60068-2-14	Environmental testing - Part 2-14: Tests - Test N: Change of temperature
IEC 60068-2-27	Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock
IEC 60068-2-29	Basic environmental testing procedures. Part 2: Tests. Test Eb and guidance: Bump
IEC 60068-2-30	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)
IEC 60068-2-42	Environmental testing - Part 2-42: Tests; Test Kc: Sulphur dioxide test for contacts and connections
IEC 60068-2-43	Environmental testing - Part 2-43: Tests; Test Kd: Hydrogen sulphide test for contacts and connections
IEC 60068-2-60	Environmental testing - Part 2: Tests - Test Ke: Flowing mixed gas corrosion test
IEC 60068-2-78	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state
IEC 60068-3-3	Environmental testing; part 3: guidance, seismic test methods for equipments
IEC 60529	Degrees of protection provided by enclosures (IP code)

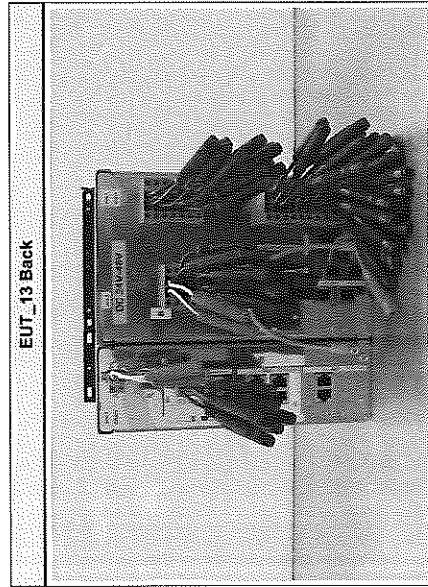
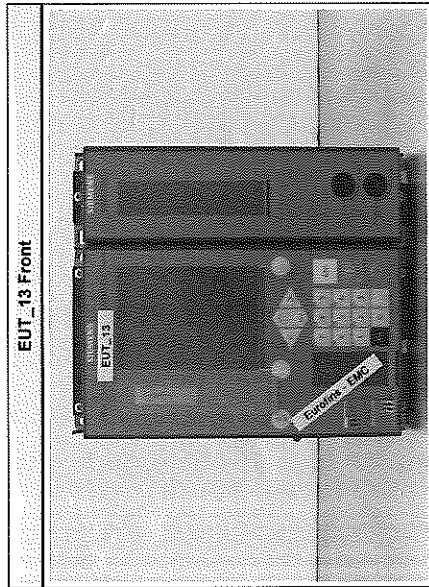
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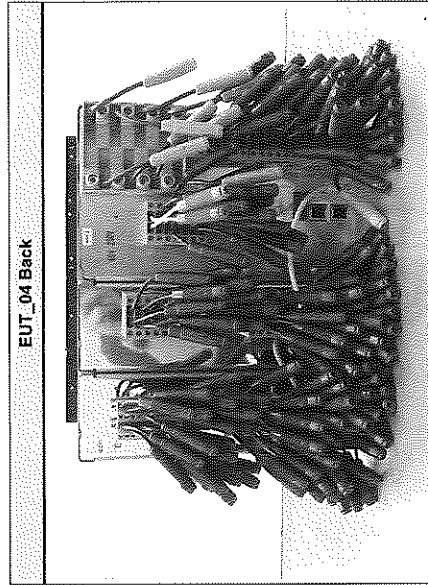
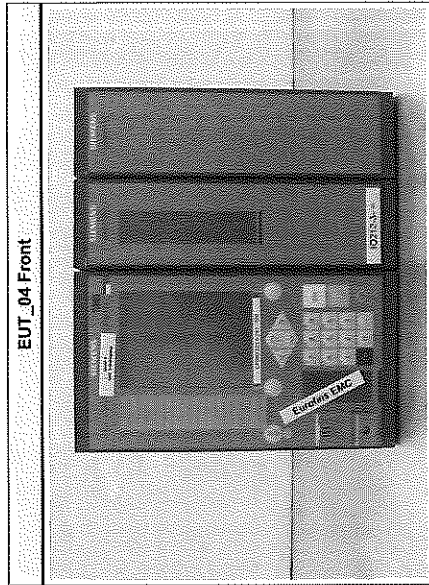
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1.2 Input / Output Ports

Input / Outputs Ports on EUT_07 7SL87

Port #	Name	Type*	Max. Cable Length	Cable Shielded	Comments
1	Power	DC	Not defined	-	PS 201: 1 ports CB 202: 1 ports
2	Binary Outputs	I/O	Not defined	-	PS 201: 3 ports IO 208: 11 ports IO 230: 0 ports IO 211: 0 ports IO 209: 4 ports CB 202: 0 ports
3	Binary Inputs	I/O	Not defined	-	PS 201: 3 ports IO 208: 4 ports IO 230: 48 ports IO 211: 8 ports IO 209: 8 ports CB 202: 0 ports
4	Measurement Inputs	I/O	Not defined	-	PS 201: 0 ports IO 208: 8 ports IO 230: 0 ports IO 211: 8 ports IO 209: 0 ports CB 202: 4 ports
5	Ethernet	I/O	Not defined	Yes	Cat 5 shielded
6	USART	I/O	Not defined	Yes	Cat 5 shielded
7	USART	N/E	Not defined	-	Fibre-optic
8	PE	GND	Not defined	-	-

*Note: Use the following abbreviations:
 DC : DC power port
 I/O : Signal input or output port
 N/E : None electrical
 GND : Ground connection



ВЯРНО С
ОРИГИНАЛА

Input / Outputs Ports on EUT_09 6MD86

Port #	Name	Type*	Max. Cable Length	Cable Shielded	Comments
1	Power	DC	Not defined	-	PS 201: 1 ports CB 202: 1 ports
2	Binary Outputs	I/O	Not defined	-	PS 201: 3 ports IO 202: 6 ports IO 205: 16 ports IO 204: 8 ports IO 207: 8 ports CB 202: 0 ports
3	Binary Inputs	I/O	Not defined	-	PS 201: 3 ports IO 202: 8 ports IO 205: 12 ports IO 204: 6 ports IO 207: 12 ports CB 202: 0 ports
4	Measurement Inputs	I/O	Not defined	-	PS 201: 0 ports IO 202: 8 ports IO 205: 0 ports IO 204: 0 ports IO 207: 0 ports CB 202: 4 ports
5	Ethernet	I/O	Not defined	Yes	Cat 5 shielded
6	USART	N/E	Not defined	-	Fibre-optic
7	PE	GND	Not defined	-	-

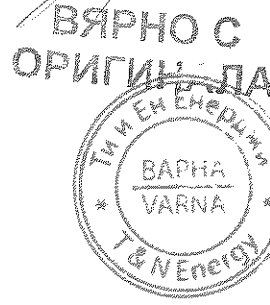
*Note: Use the following abbreviations:
 DC : DC power port
 I/O : Signal input or output port
 N/E : None electrical
 GND : Ground connection

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Input / Outputs Ports on EUT_11 7UT85

Port #	Name	Type*	Max. Cable Length	Cable Shielded	Comments
1	Power	DC	Not defined	-	Power Input
2	Binary Outputs	I/O	Not defined	-	PS 201: 3 ports IO 203: 4 ports IO 206: 7 ports IO 202: 6 ports
3	Binary Inputs	I/O	Not defined	-	PS 201: 3 ports IO 203: 4 ports IO 206: 6 ports IO 202: 8 ports
4	Measurement Inputs	I/O	Not defined	-	PS 201: 0 ports IO 203: 8 ports IO 206: 0 ports IO 202: 0 ports
5	Ethernet	I/O	Not defined	Yes	Cat 5 shielded
6	USART	N/E	Not defined	-	Fibre-optic
7	PE	GND	Not defined	-	-

Note: Use the following abbreviations:
 DC : DC power port
 I/O : Signal input or output port
 N/E : None electrical
 GND : Ground connection



Input / Outputs Ports on EUT_13 7KE85

Port #	Name	Type*	Max. Cable Length	Cable Shielded	Comments
1	Power	DC	Not defined	-	Power Input
2	Binary Outputs	I/O	Not defined	-	PS 201: 3 ports IO 211: 0 ports CB202: 0 ports
3	Binary Inputs	I/O	Not defined	-	PS 201: 3 ports IO 211: 8 ports CB202: 0 ports
4	Measurement Inputs	I/O	Not defined	-	PS 201: 0 ports IO 211: 8 ports CB202: 4 ports
5	Ethernet	I/O	Not defined	Yes	Cat 5 shielded
6	USART	I/O	Not defined	Yes	Cat 5 shielded
7	PE	GND	Not defined	-	-

Note: Use the following abbreviations:
 DC : DC power port
 I/O : Signal input or output port
 GND : Ground connection

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Input / Outputs Ports on EUT_13 7UM85

Port #	Name	Type*	Max. Cable Length	Cable Shielded	Comments
1	Power	DC	Not defined	-	Power Input PS 201: 3 ports IO 202: 6 ports IO 212: 0 ports IO 231: 24 ports
2	Binary Outputs	I/O	Not defined	-	PS 201: 3 ports IO 202: 8 ports IO 212: 8 ports IO 231: 24 ports
3	Binary Inputs	I/O	Not defined	-	PS 201: 0 ports IO 202: 8 ports IO 212: 16 ports IO 231: 0 ports
4	Measurement Inputs	I/O	Not defined	-	Cat 5 shielded
5	Ethernet	I/O	Not defined	Yes	Cat 5 shielded
6	USART	I/O	Not defined	Yes	Cat 5 shielded
7	PE	GND	Not defined	-	-

*Note: Use the following abbreviations:

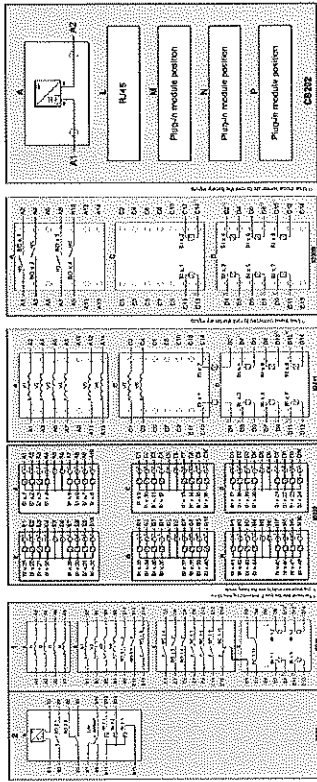
DC : DC power port

I/O : Signal input or output port

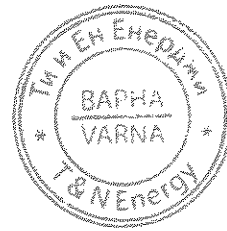
GND : Ground connection

1.3 Terminal Diagrams

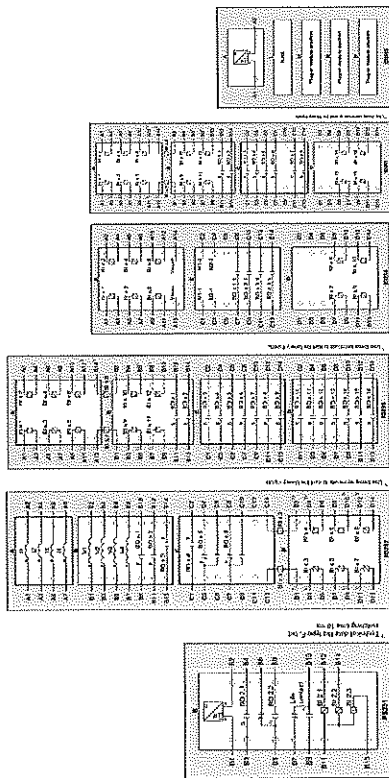
Terminal Diagram from EUT_73 7SL87



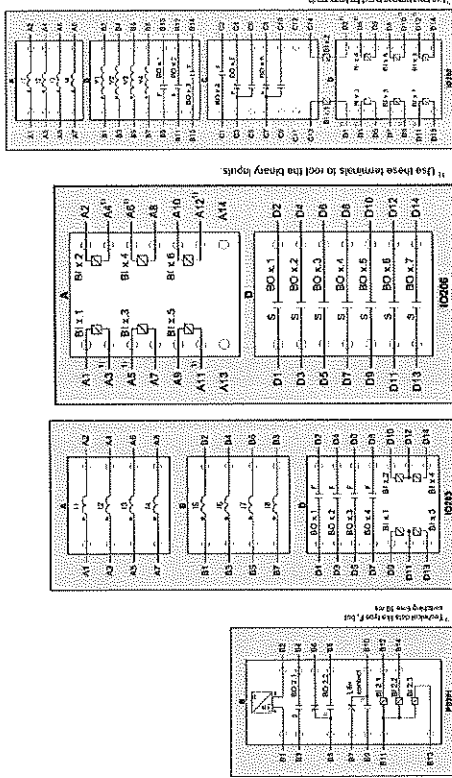
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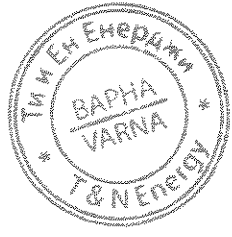
Terminal Diagram from EUT_09 6MD86



Terminal Diagram from EUT_11 7UT85

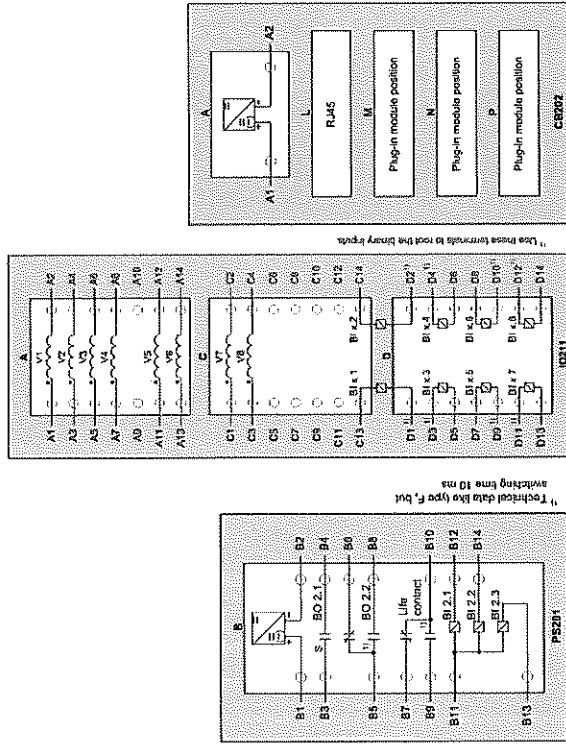


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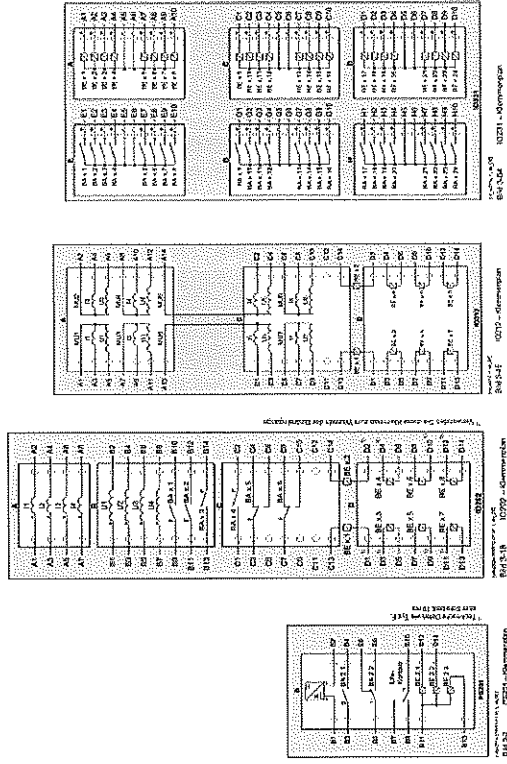


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Terminal Diagram from EUT_13 7KE85



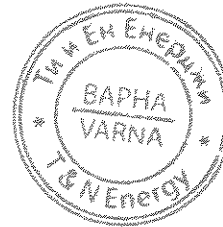
Terminal Diagram from EUT_04 7KE85



1.4 Supporting Equipment Used During Testing

Product Type	Device	Manufacturer	Model No.	Comments
AE	True RMS Multimeter	Fluke	Fluke 117	-
AE	Laptop	DELL	E6400	-
AE	Current and Voltage source	Siemens	7VP4800-0/ 7VP4801-0	-
AE	RS485-USB converter	Gantner	ISK 200	-

*Note: Use the following abbreviations:
 AE : Auxiliary/Associated Equipment, or
 SIM : Simulator (Not Subjected to Test)
 CABL : Connecting cables

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Test Report No.: GOM-1507-4895-EE02-V01

 Eurofins Product Service GmbH
 Stohower Str. 36c, D-15526 Reichenwalde, Germany

1.5 Test Equipment Used During Testing

Measurement Software			
Description	Manufacturer	Name	Version
Industrial and Telecom Transient Testing	EM-Test GmbH	ies.control	5.3.6
AC/DC Power Source Control Software	EM-Test GmbH	Netwave.control	5.3.2

Damped oscillatory wave					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Oscillatory Wave Simulator	EM-Test	OCS 500N6F-3	EF01103	2015-08	2016-08
Capacitive Coupling Clamp	Keytek	CCL-4/5	EF00053	functional test	functional test
AC/DC Power Source	EM Test GmbH	NetWave 7.2	EF00413	2014-05	2017-05

Test Report No.: GOM-1507-4895-EE02-V01

 Eurofins Product Service GmbH
 Stohower Str. 36c, D-15526 Reichenwalde, Germany

1.6 EUT Operation Modes

Mode #	Description
	EUT in normal operation mode:
	<ul style="list-style-type: none"> - Current Inputs: connected with a current source ($I_{\text{terminal}} = 1A$ during test) - Voltage Inputs: connected with a voltage source ($U_{\text{terminal}} = 100V$ during test) - Binary Inputs: open circuit - Binary Outputs: open circuit - Ethernet: connected with a PC, connected via a shielded CAT 5 cable - USART (electrical): connected with a RS485/USB converter to a PC, connected via a shielded CAT 5 cable - PE connected with GND
1	<ul style="list-style-type: none"> - Status 1 (Normal operating mode) <ul style="list-style-type: none"> $I_{L1}, I_{L2}, I_{L3} = 1.0 A$ $U_{L1-4} = 3 \times 100 VAC$ Operate delay = 0 s - Status 2 (tripped): <ul style="list-style-type: none"> Over current: $I_{L1}, I_{L2}, I_{L3} = 1.1 A$ Under current: $I_{L1}, I_{L2}, I_{L3} = 0.9 A$ Operate delay = 0.5 s Over voltage = 110 VAC Under voltage = 90 VAC

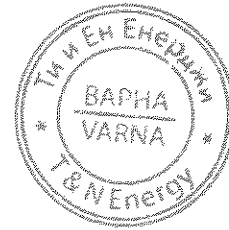
1.7 Immunity Performance Criteria

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level defined by its manufacturer or the requestor of the test, or agreed between the manufacturer and the purchaser of the product.

Definition related to the performance level:

- based on the used product standard
 based on the declaration of the manufacturer, requestor or purchaser

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Performance criteria according to customer requirements (according to IEC 60255-26):

Criteria	Function	Conditions for acceptance during and after test.
A	Protection	Normal performance within the specification limits, during and after test.
	Command and control	Normal performance within the specification limits, during and after test.
	Measurement	No degradation or no loss of function during test. No loss of stored data.
	Integral human-machine interface and visual alarms	Possible bit error rate increase but no loss of transmitted data.
	Data communication	No unwanted change of status is allowed during the test. ^a
B	Binary input, binary output and output contacts	Normal performance within the specification limits, during and after test.
	Command and control	Normal performance within the specification limits, during and after test.
	Measurement	Temporary degradation during test, with self-recovery at the end of the test. No loss of stored data.
	Integral human-machine interface and visual alarms	Temporary degradation or loss of function during test, with self-recovery at the end of the test. No loss of stored data.
	Data communication ^b	Possible bit error rate increase but no loss of transmitted data.
C	Binary input, binary output and output contacts	No unwanted change of status is allowed during the test. ^a
	Protection	Temporary loss of function provided the function is self-recoverable.
	Command and control	No unwanted operation shall be observed.
	Measurement	Temporary loss of function provided the function is self-recoverable.
	Integral human-machine interface and visual alarms	Temporary loss of function provided the function is self-recoverable.
Data communication	Temporary loss of function, provided the function is self-recoverable. Possible loss of transmitted data.	
Binary input, binary output and output contacts	Binary input, binary output and output contacts	No unwanted change of status is allowed during the test. ^a

If the manufacturer is using a specification for degradation during or after the testing required by this standard, the specification shall be provided in the product documentation available to the user.

^a For binary inputs the manufacturer shall state the minimum filtering value for which the test was successful.

^b Excluding communication ports for protection or control functionality. For those acceptance criteria see protection or command and control.

Test Report No.: GOM-1507-4895-EE02-V01

 Eurofins Product Service GmbH
 Starkower Str. 38c, D-15526 Reichenwalde, Germany

Monitored parameters	
Monitored value / parameter	Criteria
Voltage Inputs	Performance criteria B were used acc. IEC 60255-26.
Current inputs	Performance criteria B were used acc. IEC 60255-26.
Binary Inputs	Performance criteria B were used acc. IEC 60255-26.
Binary Outputs	Performance criteria B were used acc. IEC 60255-26.
Ethernet connections	Performance criteria B were used acc. IEC 60255-26.
USART connections	Performance criteria B were used acc. IEC 60255-26.
Protection function	Performance criteria B were used acc. IEC 60255-26.
Monitoring setup	
<ul style="list-style-type: none"> - Voltage- and Current Inputs were monitored on the EUT display. - Binary Input ports were monitored via the LEDs on the EUT and the "operation Log" on the EUT. - Binary Output ports were monitored via a multi meter and the "operation Log" on the EUT. - Ethernet and USART connection was monitored via the connection to the PC. - Protection function were monitored via LEDs and "operation Log" on the EUT. 	


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Test Report No.: GOM-1507-4895-EE02-V01

 Eurofins Product Service GmbH
 Starkower Str. 38c, D-15526 Reichenwalde, Germany

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2 Result Summary

IEC 61000-4-18			
Product Specific Standard	Requirement - Test	Reference Method	Result
IEC 61000-4-18 Clause 4.2	Fast Damped oscillatory waves	IEC 61000-4-18:2006	PASS
Remarks:			

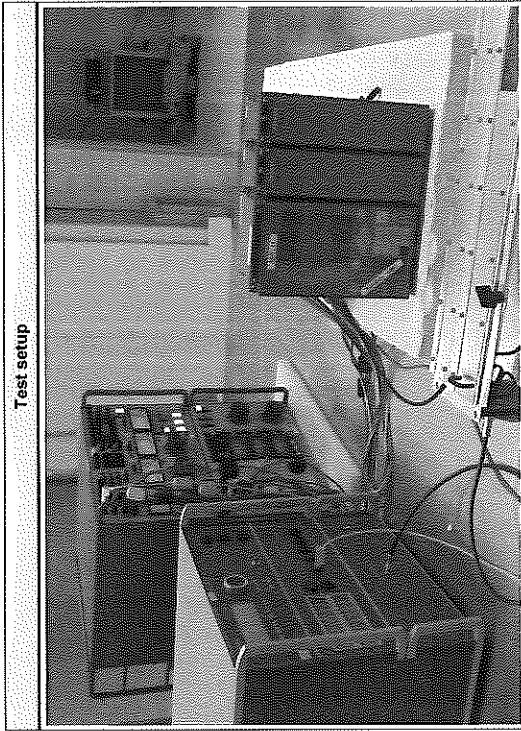
3 Test Conditions and Results
3.1 Test Conditions and Results – Damped oscillatory wave immunity

Damped oscillatory wave to IEC 61000-4-18		Verdict: PASS
Laboratory Parameters:	Required prior to the test	During the test
Ambient Temperature	15 to 35°C	22°C
Relative Humidity	30 to 60%	45%
Test according to referenced standards	Reference Method	
	EN 61000-4-18	
Points of Application	Application interface	
Power	Direct via CDN	
Binary Input Ports	Capacitive clamp	
Binary Output Ports	Capacitive clamp	
Measure Input Ports	Direct via CDN	
Ethernet	Capacitive clamp	
USART	Capacitive clamp	
EUT operating mode	1	



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Test parameters and results						
Test Port	Voltage [kV]	Polarity (+/-)	Duration [s]	Repetition frequency [MHz]	Result	Criterion
Power	2.5	alternating	60	3	PASS	B
Power	2.5	alternating	60	10	PASS	B
Power	2.5	alternating	60	30	PASS	B
Binary Input	2.5	alternating	60	3	PASS	B
Binary Input	2.5	alternating	60	10	PASS	B
Binary Input	2.5	alternating	60	30	PASS	B
Binary Output	2.5	alternating	60	3	PASS	B
Binary Output	2.5	alternating	60	10	PASS	B
Binary Output	2.5	alternating	60	30	PASS	B
Measure Input	2.5	alternating	60	3	PASS	B
Measure Input	2.5	alternating	60	10	PASS	B
Measure Input	2.5	alternating	60	30	PASS	B
Ethernet	2.5	alternating	60	3	PASS	B
Ethernet	2.5	alternating	60	10	PASS	B
Ethernet	2.5	alternating	60	30	PASS	B
USART	1	alternating	60	3	PASS	B
USART	1	alternating	60	10	PASS	B
USART	1	alternating	60	30	PASS	B
Comments:						



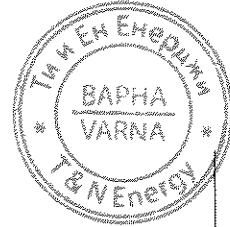

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EUT_07 7SL87

Module	Interface	Test level	Coupling	Remarks
PS 201	B1, B2	± 2.5 kV to GND	Direct via CDN	-
	B3, B4, B5, B6, B7, B8, B9, B10, B11, B12, B13, B14	± 2.5 kV to GND	capacitive clamp	-
	Ethernet Port 1 / F	± 2.5 kV to GND	capacitive clamp	for Port F was only one terminal tested

Module	Interface	Test level	Coupling	Remarks
IO 208	A1, A2, A3, A4, A5, A6, A7, A8	± 2.5 kV to GND	Direct via CDN	-
	B1, B2, B3, B4, B5, B6, B7, B8	± 2.5 kV to GND	Direct via CDN	-
	B9, B10, B11, B12, B13, B14	± 2.5 kV to GND	capacitive clamp	-
	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14	± 2.5 kV to GND	capacitive clamp	-
	D1, D2, D3, D4, D7, D8, D9, D10, D11, D12, D13, D14	± 2.5 kV to GND	capacitive clamp	D5 and D6 were not internal used in the EUT

Module	Interface	Test level	Coupling	Remarks
IO 230	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10	± 2.5 kV to GND	capacitive clamp	-
	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10	± 2.5 kV to GND	capacitive clamp	-
	D1, D2, D3, D4, D5, D6, D7, D8, D9, D10	± 2.5 kV to GND	capacitive clamp	-
	E1, E2, E3, E4, E5, E6, E7, E8, E9, E10	± 2.5 kV to GND	capacitive clamp	-
	G1, G2, G3, G4, G5, G6, G7, G8, G9, G10	± 2.5 kV to GND	capacitive clamp	-
	H1, H2, H3, H4, H5, H6, H7, H8, H9, H10	± 2.5 kV to GND	capacitive clamp	-



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Module	Interface	Test level	Coupling	Remarks
IO 211	A1, A2, A3, A4, A5, A6, A7, A8, A11, A12, A13, A14, C1, C2, C3, C4	± 2.5 kV to GND	Direct via CDN	A9 and A10 were not internal used in the EUT
	C13, C14, D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14	± 2.5 kV to GND	capacitive clamp	C5, C6, C7, C8, C9, C10, C11, C12 were not internal used in the EUT

Module	Interface	Test level	Coupling	Remarks
IO 209	A1, A2, A3, A4, A7, A8, A9, A10	± 2.5 kV to GND	capacitive clamp	A5, A6, A11, A12, A13, A14 were not internal used in the EUT
	C11, C12, C13, C14, D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12	± 2.5 kV to GND	capacitive clamp	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, D13, D14 were not internal used in the EUT

Module	Interface	Test level	Coupling	Remarks
CB 202	A1, A2	± 2.5 kV to GND	Direct via CDN	-
	Plug-in M, 4-20mA ports	± 2.5 kV to GND	capacitive clamp	-
	Plug-in P, USART ports	± 1 kV to GND	capacitive clamp	for Port P was only one terminal tested

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EUT_09 6MD86

Module	Interface	Test level	Coupling	Remarks
PS 201	B1, B2	± 2.5 kV to GND	Direct via CDN	-
	B3, B4, B5, B6, B7, B8, B9, B10, B11, B12, B13, B14	± 2.5 kV to GND	capacitive clamp	-
	Ethernet Port J / E	± 2.5 kV to GND	capacitive clamp	-

Module	Interface	Test level	Coupling	Remarks
IO 202	A1, A2, A3, A4, A5, A6, A7, A8	± 2.5 kV to GND	Direct via CDN	-
	B1, B2, B3, B4, B5, B6, B7, B8	± 2.5 kV to GND	Direct via CDN	-
	B9, B10, B11, B12, B13, B14	± 2.5 kV to GND	capacitive clamp	-
	C1, C2, C3, C4, C6, C7, C8, C10, C13, C14	± 2.5 kV to GND	capacitive clamp	C5, C9, C11, C12 were not internal used in the EUT
	D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14	± 2.5 kV to GND	capacitive clamp	-

Module	Interface	Test level	Coupling	Remarks	
IO 205	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, A13, A14	± 2.5 kV to GND	capacitive clamp	-	
	B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12, B13, B14	± 2.5 kV to GND	capacitive clamp	-	
	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14	± 2.5 kV to GND	capacitive clamp	-	
	D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14	± 2.5 kV to GND	capacitive clamp	-	

Module	Interface	Test level	Coupling	Remarks
IO 204	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, A13, A14	± 2.5 kV to GND	capacitive clamp	-
	C1, C2, C3, C4, C7, C8, C9, C10, C11, C12, C13, C14	± 2.5 kV to GND	capacitive clamp	C5, C6 were not internal used in the EUT
	D7, D8, D9, D10, D11, D12, D13, D14	± 2.5 kV to GND	capacitive clamp	D1, D2, D3, D4, D5, D6 were not internal used in the EUT

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Module	Interface	Test level	Coupling	Remarks
IO 207	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, A13, A14	± 2.5 kV to GND	capacitive clamp	-
	B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12, B13, B14	± 2.5 kV to GND	capacitive clamp	-
	C1, C2, C3, C4, C5, C6, C7, C8, C11, C12, C13, C14	± 2.5 kV to GND	capacitive clamp	C9, C10 were not internal used in the EUT
	D5, D6, D7, D8, D9, D10, D11, D12	± 2.5 kV to GND	capacitive clamp	D1, D2, D3, D4, D13, D14 were not internal used in the EUT

Module	Interface	Test level	Coupling	Remarks
CB 202	A1, A2	± 2.5 kV to GND	Direct via CDN	-
	Plug-in M, 4-20mA ports	± 2.5 kV to GND	capacitive clamp	-


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EUT_11 7UT85

Module	Interface	Test level	Coupling	Remarks
PS 201	B1, B2	± 2.5 kV to GND	Direct via CDN	-
	B3, B4, B5, B6, B7, B8, B9, B10, B11, B12, B13, B14	± 2.5 kV to GND	capacitive clamp	-
	Ethernet Port J	± 2.5 kV to GND	capacitive clamp	-
IO 203	Interface	Test level	Coupling	Remarks
	A1, A2, A3, A4, A5, A6, A7, A8	± 2.5 kV to GND	Direct via CDN	-
	B1, B2, B3, B4, B5, B6, B7, B8	± 2.5 kV to GND	Direct via CDN	-
	D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14	± 2.5 kV to GND	capacitive clamp	-

Module	Interface	Test level	Coupling	Remarks
IO 206	Interface	Test level	Coupling	Remarks
	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12	± 2.5 kV to GND	capacitive clamp	A13, A14 were not internal used in the EUT
	D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14	± 2.5 kV to GND	capacitive clamp	-

Module	Interface	Test level	Coupling	Remarks
IO 202	Interface	Test level	Coupling	Remarks
	A1, A2, A3, A4, A5, A6, A7, A8	± 2.5 kV to GND	Direct via CDN	-
	B1, B2, B3, B4, B5, B6, B7, B8	± 2.5 kV to GND	Direct via CDN	-
	B9, B10, B11, B12, B13, B14	± 2.5 kV to GND	capacitive clamp	-
	C1, C2, C3, C4, C6, C7, C8, C10, C13, C14	± 2.5 kV to GND	capacitive clamp	C5, C9, C11, C12 were not internal used in the EUT
	D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14	± 2.5 kV to GND	capacitive clamp	-

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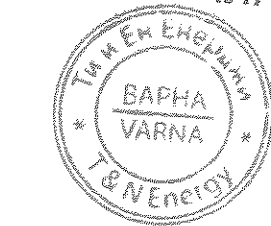
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EUT_13 7KE85

Module	Interface	Test level	Coupling	Remarks
PS 101	B1, B2	± 2.5 kV to GND	Direct via CDN	-
	B3, B4, B5, B6, B7, B8, B9, B10, B11, B12, B13, B14	± 2.5 kV to GND	capacitive clamp	-
	Ethernet Port J / E / F	± 2.5 kV to GND	capacitive clamp	-

Module	Interface	Test level	Coupling	Remarks
IO 211	Interface	Test level	Coupling	Remarks
	A1, A2, A3, A4, A5, A6, A7, A8, A11, A12, A13, A14, C1, C2, C3, C4	± 2.5 kV to GND	Direct via CDN	A9 and A10 were not internal used in the EUT
	C13, C14, D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14	± 2.5 kV to GND	capacitive clamp	C5, C6, C7, C8, C9, C10, C11, C12 were not internal used in the EUT

Module	Interface	Test level	Coupling	Remarks
CB 202	Interface	Test level	Coupling	Remarks
	A1, A2	± 2.5 kV to GND	Direct via CDN	-
	Plug-in M, 4-20mA ports	± 2.5 kV to GND	capacitive clamp	-
	Plug-in N, USART ports	± 1 kV to GND	capacitive clamp	for Port N was only one terminal tested
	Plug-in P, USART ports	± 1 kV to GND	capacitive clamp	for Port P was only one terminal tested


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 Eurofins Product Service GmbH
 Storkower Str. 39c, D-15526 Reichenwalde, Germany

9030

EUT_04 7UM85

Module	Interface	Test level	Coupling	Remarks
PS 101	B1, B2	± 2.5 kV to GND	Direct via CDN	-
	B3, B4, B5, B6, B7, B8, B9, B10, B11, B12, B13, B14	± 2.5 kV to GND	capacitive clamp	-
	Ethernet-Port J	± 2.5 kV to GND	capacitive clamp	-

Module	Interface	Test level	Coupling	Remarks
IO 202	A1, A2, A3, A4, A5, A6, A7, A8	± 2.5 kV to GND	Direct via CDN	-
	B1, B2, B3, B4, B5, B6, B7, B8	± 2.5 kV to GND	Direct via CDN	-
	B9, B10, B11, B12, B13, B14	± 2.5 kV to GND	capacitive clamp	-
	C1, C2, C3, C4, C6, C7, C8, C10, C13, C14	± 2.5 kV to GND	capacitive clamp	C5, C9, C11, C12 were not internal used in the EUT
	D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14	± 2.5 kV to GND	capacitive clamp	-

Module	Interface	Test level	Coupling	Remarks
IO 212	A1, A2, A3, A4, A7, A8, A9, A10, A13, A14, C1, C2, C5, C6, C7, C8	± 2.5 kV to GND	capacitive clamp	A5, A6, A11, A12, C3, C4, C9, C10 were not configured in EUT
	C13, C14, D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14	± 2.5 kV to GND	capacitive clamp	C11, C12 were not internal used in the EUT

Module	Interface	Test level	Coupling	Remarks
IO 230	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10	± 2.5 kV to GND	capacitive clamp	-
	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10	± 2.5 kV to GND	capacitive clamp	-
	D1, D2, D3, D4, D5, D6, D7, D8, D9, D10	± 2.5 kV to GND	capacitive clamp	-
	E1, E2, E3, E4, E5, E6, E7, E8, E9, E10	± 2.5 kV to GND	capacitive clamp	-
	G1, G2, G3, G4, G5, G6, G7, G8, G9, G10	± 2.5 kV to GND	capacitive clamp	-
	H1, H2, H3, H4, H5, H6, H7, H8, H9, H10	± 2.5 kV to GND	capacitive clamp	-



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Test Report No. P50-15-0191_1-en-Rev-02 Environmental Tests

Order No.: 50-15-0191 This report includes
Date: 18/09/2015 11 pages + 1 attachment.
Test engineer: Mr. Litza
Documentation: lsl/hb phone: 03302 49982 50

Delivery date specimen: 05/05/2015
Test date: 08/05/2015 until 31/07/2015
Specimen: Siprotec 6 Platform (selected EUT's, 3 devices non-modular (light) and 4 devices modular, manufacturer: Siemens AG (for details see page 2))
Relevant specification:
- Test Bb: Dry heat for non heat-dissipating specimen with gradual change of temperature according to DIN EN 60068-2-2 (edition 2008-05)
- Test Ab: Cold for non heat-dissipating specimen with gradual change of temperature according to DIN EN 60068-2-1 (edition 2008-01)
- Test Nb: Change of temperature with specified rate of change according to DIN EN 60068-2-14 (edition 2010-02)
- Test Cab: Damp heat, steady state according to DIN EN 60068-2-78 (edition 2014-02)
- Test Db: Damp heat, cyclic (12 + 12-hour cycle), variant 1 according to DIN EN 60068-2-30 (edition 2008-06)
- Visual inspection (for details see page 2)
Objective: Proof of the climate stability and operability of the specimens at the conditions mentioned in the relevant specification.
Results: The devices were tested according to the relevant specification. The operability of the tested devices was ensured before, during and after each exposure. No significant changes were detected in comparison with the initial state of the specimens (for details see page 6).

Rita Förster
Environmental Lab

The results refer only to the specimens above mentioned.
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1 Specimens
Siprotec 5 Platform; selected EUT's, 3 devices non-modular (light) and 4 devices modular, manufacturer: Siemens AG (for details see Table 1).

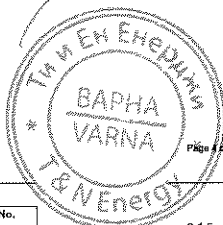
Table 1: Specimen

Specimen No. 50-15-0191-... [Device Type]	Long Code	Serial No.	HW-MODULES	Serial No.	PCBA Part No.
<i>non-modular (light)</i>					
EUT-3 [7SJB2]	7SJB2-DAAA- AA0-QAAAA- A90211- 13111A- CAB000- 000AB0- HB1B03-JA0	BM1410001134	CP100	BF1409059556	C53207A 601B271 2
			ID102	BF1409056801	C53207A 601B520 1
			PS101	BF14090234923	C53207A 601B101 1
EUT-5 [7SJB2]	7SJB2-DAAA- AA0-QAAAA- A90211- 13111A- EAE000- 000AB0- HB1B03-JA0	BM1410001136	IO110	BF1409025734	C53207A 601B510 1
			USART-AC-2EL	BF1408038055	C53207A 602B150 1
			USART-AG-1EL	BF1405083559	C53207A 602B160 1
EUT-5 [7SJB2]	7SJB2-DAAA- AA0-QAAAA- A90211- 13111A- EAE000- 000AB0- HB1B03-JA0	BM1410001136	CP100	BF1409056566	C53207A 601B271 2
			ID102	BF1410056082	C53207A 601B520 1
			PS101	BF1408084688	C53207A 601B100 1
EUT-17 [7UT82]	7UT82-DAAA- AA0-QAAAA- A90411- 13111A- AAA000- 000AB0- HC1B04-JZ0	BM1603002955	CP100	BF1503029524	C53207A 601B271 2
			ID103	BF1408039822	C53207A 601B530 1
			PS101	BF1503029528	C53207A 601B100 1
EUT-7 [7SLB7]	7SLB7-DAAA- AA0-QAAAA- A91211- 13111A- DBACAC- DACA00- CH1BA2- EAGCL0- C70B52	BM1410002168	CP200	BF1410039223	C53207A 601B211 4
			IO208	BF1409021605	C53207A 601B380 4
			PS201	BF1408020577	C53207A 601B110 4
			IO230	BF1408039059	C53207A 601B520 1
			IO211	BF1409021537	C53207A 601B410 2
			IO209	BF1406020870	C53207A 601B390 4
			CB202	BF1302587697	C53207A 601B120 3
			USART-AD-1FO	BF1409022515	C53207A 602B180 2
			ETH-BA-2EL	BF1409059923	C53207A 602B100 1
			ARC-CD-3FO	BF1409038336	C53207A 602B342 2
			USART-AC-2EL	BF1410021352	C53207A 602B150 1
			ANAL-CA-4EL	BF1409059620	C53207A 602B300 2
EUT-9 [6MD66]	6MD66-DAAA- AA0-QAAAA- A90111- 13111B- AAYCAA- CAVAAD- CB3BA1- CEG0DD- CG0BB1	BM1410001763	CP200	BF1409059474	C53207A 601B211 4
			IO202	BF1409068566	C53207A 601B320 4
			PS201	BF1408069302	C53207A 601B111 4
			IO205	BF1409056651	C53207A 601B350 4
			IO204	BF1409030753	C53207A 601B340 2
			IO207	BF1409059783	C53207A 601B370 4
			CB202	BF1406037644	C53207A 601B121 3
			ETH-BA-2EL	BF1409069910	C53207A 602B100 1
			USART-AY-2LDF0	BF1410025921	C53207A 602B110 1
			USART-AG-1LDF0	BF1409021790	C53207A 602B230 1
			USART-AG-1LDF0	BF1410025551	C53207A 602B110 1
			USART-AV-2LDF0	BF1410021384	C53207A 602B300 2

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Specimen No. 50-15-0191-... [Device Type]	Long Code	Serial No.	HW-MODULES	Serial No.	PCBA Part No.
EUT-11 [7UT85]	7UT85-DAAA- AA0-QAAAA- A90111- 12111A- WAE000- 000AA0- CC1BA1- CF0CQ1	BM1410002174	ANAL-CA-4EL	BF1410039183	C53207A 601B211 4
			CP200	BF1410021068	C53207A 601B330 4
			IO203	BF1409069380	C53207A 601B111 4
EUT-13 [7KEB5]	7KEB5-DAAA- AA0-QAAAA- A94212- 23112B- ABACAA- CABA11- C10BA2-BB2	BM1410001321	USART-AW-2LDF0	BF1304010219	C53207A 601B450 3
			USART-AE-2FO	BF1410039654	C53207A 602B110 1
			CP200	BF1409069462	C53207A 601B211 4
			IO211	BF1409021542	C53207A 601B410 2
			PS201	BF1408020599	C53207A 601B110 4
			CB202	BF1302587694	C53207A 601B120 3
			ETH-BA-2EL	BF1409056915	C53207A 602B100 1
			ETH-BA-2EL	BF1409059807	C53207A 602B100 1
			USART-AC-2EL	BF1410021355	C53207A 602B150 1
			USART-AB-1EL	BF1405083526	C53207A 602B160 1
			ANAL-CA-4EL	BF1409059584	C53207A 602B300 2

2 Relevant Specification

2.1 Exposures

2.1.1 Test Bb: Dry heat for non heat-dissipating specimen with gradual change of temperature according to DIN EN 60068-2-2 (edition 2008-05)

temperature: (+85 ± 2) °C
duration of the test: 16 hours
operation state: on

2.1.2 Test Bb: Dry heat for non heat-dissipating specimen with gradual change of temperature according to DIN EN 60068-2-2 (edition 2008-05)

temperature: (+70 ± 2) °C
duration of the test: 96 hours
operation state: on

2.1.3 Test Ab: Cold for non heat-dissipating specimen with gradual change of temperature according to DIN EN 60068-2-1 (edition 2008-01)

temperature: (-25 ± 3) °C
duration of the test: 96 hours
operation state: on

2.1.4 Test Ab: Cold for non heat-dissipating specimen with gradual change of temperature according to DIN EN 60068-2-1 (edition 2008-01)

temperature: (-40 ± 3) °C
duration of the test: 18 hours
operation state: on

2.1.5 Test Nb: Change of temperature with specified rate of change according to DIN EN 60068-2-14 (edition 2010-02)

lower temperature: (-25 ± 3) °C
higher temperature: (+75 ± 2) °C
exposure time: 3 hours at lower / higher temperature
rate of temperature change: 0,33 K / min
number of cycles: 5 cycles (each 16 hours)
duration of the test (total): 80 h
operation state: on

2.1.6 Test Db: Damp heat, cyclic (12 + 12-hour cycle), variant 1 according to DIN EN 60068-2-30 (edition 2008-06)

lower temperature: (25 ± 3) °C relative humidity: 95 % ... 100 %
higher temperature: (55 ± 2) °C relative humidity: 90 % ... 96 %
number of cycles: 6 cycles (each 24 h)
duration of the test (total): 144 h
operation state: on

2.1.7 Test Cab: Damp heat, steady state according to DIN EN 60068-2-78 (edition 2014-02)

temperature: (40 ± 2) °C
relative humidity: (95 ± 3) %
duration of the test: 56 d
operation state: off

2.2 Evaluations

2.2.1 Visual inspection

Examination of changes in relation to the initial state of the specimens.

2.2.2 Performance tests

The operability of the devices before, during and after the tests will be checked by the customer. The life contacts of all devices must be monitored to detect possible switching operations.

3 Test procedure

3.1 Test equipment

The test and measuring instruments as well as the calibration status were checked before using.

Test equipment	Inv. No.
Climate test chamber CW-6015 CTS-15	7993 1292
Climate test chamber CW-6013 CTS-13	7992 8235
Climate test chamber C-70/1000/S CTS-1	7993 0770
Multimeter Fluke 79	7050 9300

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4 Results

4.1 Visual inspection

No significant changes were detected in comparison with the initial state of the specimens at the inspections after the individual tests.

4.2 Performance tests

Operating Modes:

1. All Protection functions (trip at $\pm 5\%$) were continuously active on all devices.
2. Between the devices EUT-9 and EUT-7 a gose communication (IEC 61850) was continuously active. The max. monitoring time here was 2000 ms.
3. On device EUT-13 (KE85) the continues fault recorder function (1 second interval) was permanent active.

Functional test:

1. Before and after each test case a functional test was realized by the client for each device.
2. Before and after each test the operational log of every device were checked.
3. During all tests in operating mode the life contacts of all devices were monitored (see Diagram 6 to Diagram 9). The voltage curves of each device are shown as blue lines (superimposed). No peaks (switching operations) were detected.

For details see attachment 1.

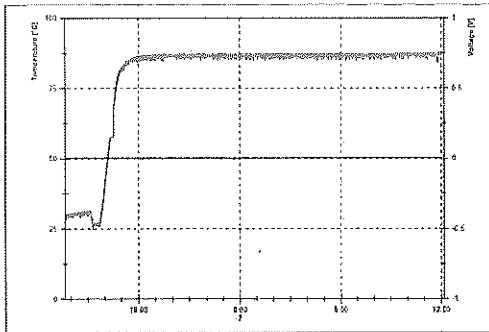


Diagram 6: Monitoring of life contacts during the climatic test according to clause 2.1.1 (test Bb (85 °C))

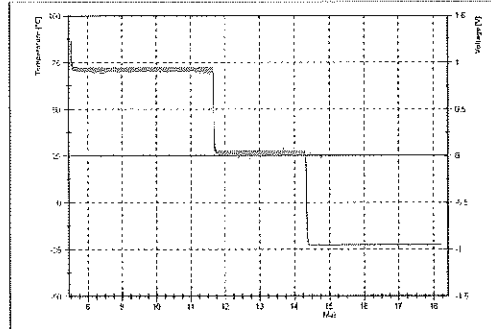


Diagram 7: Monitoring of life contacts during the climatic test according to clause 2.1.2 and clause 2.1.3 (test Bb 70 °C / test Ab -25 °C)

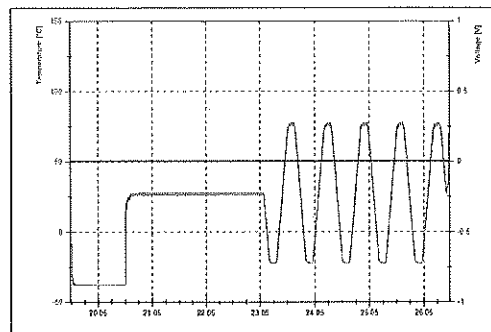


Diagram 8: Monitoring of life contacts during the climatic test according to clause 2.1.4 and clause 2.1.5 (test Ab -40 °C / test Nb)

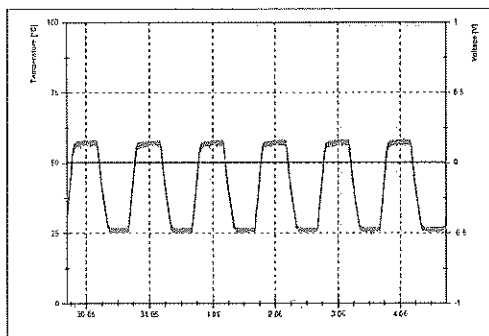
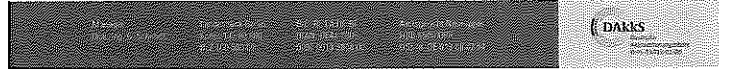
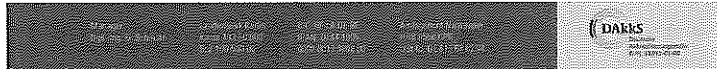


Diagram 9: Monitoring of life contacts during the climatic test according to clause 2.1.6 (test Db55)

ВЯРНО С
ОРИГИНАЛА



Test Object - Device Settings

Device: EUT_17
Manufacturer: SIEMENS
Device type: 7UT82
Device address: 172.16.50.17
Serial/Model number: BA1503002955

Hardware Configuration

Test Equipment	
Type	Serial Number
EMC210plus	27467R

Hardware Check

Performed At	Result	Details
07.05.2016 11:35:14	Passed	

Overcurrent Protection:

Test Settings
Ramped Quantities
I L1; L2; I Magnitude

Test Module

Name: OMRON Ramping
Version: 3.00 SR 1
Test Start: 07-May-2016 11:35:43
Test End: 07-May-2016 11:35:56
User Name: Manager
Company:

Test Results

Assessment Results

Item	Exec.	Ramp	Condition	Err	Num.	Act.	Rel.	Rel +	Dev.	Success	Test
Pick-up	Ramp 2	Start 0-1	I L1; L2; I S		1,050 A	1,050 A	10,00 mA	10,00 mA	0,500 mA		30,00 ms

Assess: + - Passed - - Failed 0 - Not assessed

Test State:

Test passed

Undercurrent protection:



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functional test / dry heat +85°C

functional test / dry heat +85°C

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping
Test Start: 07-Mai-2016 11:38:01
User Name:
Company:
Version: 3.00 SR 1
Test End: 07-Mai-2016 11:38:13
Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Meas. 2	Ramp 2	Start 0->1	L1; L2; L3	350,0 mA	354,0 mA	10,00 mA	10,00 mA	1,000 mA		12,60 ms

Assess: * .. Passed x ... Failed o ... Not assessed

Test State:

Test passed

Test Object - Device Settings

Device:

Name/description: EUT_03
Device type: 7SJB2
Serial/model number: BM1410001134
Manufacturer: SIEMENS
Device address: 172.16.60.17

Hardware Configuration

Test Equipment

Type	Serial Number
EMC255plus	EJF487H

Hardware Check

Performed At	Result	Details
07.05.2016 11:28:08	Passed	

Overcurrent Protection:

Test Settings

Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module

Name: OMCRON Ramping
Test Start: 07-Mai-2016 11:36:20
User Name:
Company:
Version: 3.00 SR 1
Test End: 07-Mai-2016 11:36:31
Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	3,550 A	3,550 A	10,00 mA	10,00 mA	3,500 mA		11,70 ms

Assess: * .. Passed x ... Failed o ... Not assessed

Test State:

Test passed

Undercurrent protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping
Test Start: 07-Mai-2016 11:36:37
User Name:
Company:
Version: 3.00 SR 1
Test End: 07-Mai-2016 11:36:50
Manager:

Test Results

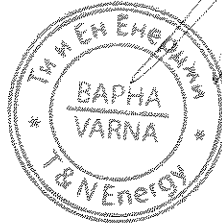
Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Meas. 2	Ramp 2	Start 0->1	L1; L2; L3	350,0 mA	354,0 mA	10,00 mA	10,00 mA	1,000 mA		10,10 ms

Assess: * .. Passed x ... Failed o ... Not assessed

Test State:

ВЯРНО С
ОРИГИНАЛА



functional test / dry heat +85°C

functional test / dry heat +85°C

Test passed

Overvoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Test Module

Name: OMCRON Ramping
Test Start: 07-Mai-2016 11:38:06
User Name:
Company:
Version: 3.00 SR 1
Test End: 07-Mai-2016 11:37:03
Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	30,00 V	31,00 V	7,000 V	1,000 V	100,0 mV		25,20 ms

Assess: * .. Passed x ... Failed o ... Not assessed

Test State:

Test passed

Undervoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping
Test Start: 07-Mai-2016 11:37:10
User Name:
Company:
Version: 3.00 SR 1
Test End: 07-Mai-2016 11:37:18
Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	34,80 V	35,10 V	1,000 V	1,000 V	300,0 mV		22,60 ms

Assess: * .. Passed x ... Failed o ... Not assessed

Test State:

Test passed

Test Object - Device Settings

Device:

Name/description: EUT_03
Device type: 7SJB2
Serial/model number: BM1410001136
Manufacturer: SIEMENS
Device address: 172.16.60.5

Hardware Configuration

Test Equipment

Type	Serial Number
EMC255plus	EJF487H

Hardware Check

Performed At	Result	Details
07.05.2016 11:38:20	Passed	

Overcurrent Protection:

Test Settings

Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module

Name: OMCRON Ramping
Test Start: 07-Mai-2016 11:37:24
User Name:
Company:
Version: 3.00 SR 1
Test End: 07-Mai-2016 11:37:38
Manager:

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functional test / dry heat +85°C

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	0,050 A	0,050 A	0,00 mA	0,00 mA	0,000 mA	P	10,20 ms

Assess: P... Passed X... Failed O... Not assessed

Test State:

Test passed

Undercurrent protection:

Test Settings

Ramped Quantities
I L1; L2; L3 / Magnitude

Ramp
Status

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
 Test Start: 07-Mai-2016 11:27:42 Test End: 07-Mai-2016 11:27:55
 User Name: Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Meas. 2	Ramp 2	Start 0->1	L1; L2; L3	0,050 mA	0,050 mA	0,00 mA	0,00 mA	0,000 mA	P	21,90 ms

Assess: P... Passed X... Failed O... Not assessed

Test State:

Test passed

Overvoltage protection:

Test Settings

Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

functional test / dry heat +85°C

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
 Test Start: 07-Mai-2016 11:28:01 Test End: 07-Mai-2016 11:28:08
 User Name: Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1-E; L2-E; L3-E	30,00 V	31,00 V	0,000 V	0,000 V	0,000 mV	P	27,50 ms

Assess: P... Passed X... Failed O... Not assessed

Test State:

Test passed

Undervoltage protection:

Test Settings

Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Ramp
Status

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
 Test Start: 07-Mai-2016 11:28:14 Test End: 07-Mai-2016 11:28:23
 User Name: Manager:

Test Results

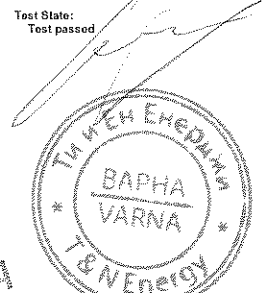
Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1-E; L2-E; L3-E	34,80 V	35,10 V	0,000 V	0,000 V	0,000 mV	P	36,00 ms

Assess: P... Passed X... Failed O... Not assessed

Test State:

Test passed



ВЯРНО С
ОРИГИНАЛА

functional test / dry heat +85°C

Test Object - Device Settings

Device: EUT_07 Manufacturer: SIEMENS
 Name/description: 7S10P Device address: 172.16.00.3
 Device type: Device model number: BM1410002158

Hardware Configuration

Test Equipment

Type	Serial Number
CMC250plus	DF 451R

Hardware Check

Performed At	Result	Details
07.05.2016 11:28:23	Passed	

Overcurrent Protection:

Test Settings

Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
 Test Start: 07-Mai-2016 11:28:28 Test End: 07-Mai-2016 11:28:41
 User Name: Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	0,050 A	0,050 A	0,00 mA	0,00 mA	0,000 mA	P	24,30 ms

Assess: P... Passed X... Failed O... Not assessed

functional test / dry heat +85°C

Test State:

Test passed

Undercurrent protection:

Test Settings

Ramped Quantities
I L1; L2; L3 / Magnitude

Ramp
Status

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
 Test Start: 07-Mai-2016 11:28:47 Test End: 07-Mai-2016 11:28:59
 User Name: Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Meas. 2	Ramp 2	Start 0->1	L1; L2; L3	0,050 mA	0,050 mA	0,00 mA	0,00 mA	0,000 mA	P	38,30 ms

Assess: P... Passed X... Failed O... Not assessed

Test State:

Test passed

Overvoltage protection:

Test Settings

Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
 Test Start: 07-Mai-2016 11:28:05 Test End: 07-Mai-2016 11:28:13
 User Name: Manager:

Test Results

Assessment Results

1036

functional test / dry heat +85°C

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0>1	V L1-E; L2-E; L3-E	50,80 V	51,00 V	1,000 V	1,000 V	100,0 mV		17,10 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:
Test passed

Undervoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 07-Mai-2016 11:39:18 Test End: 07-Mai-2016 11:39:27
User Name: Manager

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0>1	V L1-E; L2-E; L3-E	54,80 V	55,10 V	1,000 V	1,000 V	100,0 mV		16,80 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:
Test passed

Test Object - Device Settings

Device:

functional test / dry heat +85°C

Name/description: EUT_09 Manufacturer: SIEMENS
Device type: 6ES5 Device address: 172.18.60.9
Serial/model number: BK1410001703

Hardware Configuration

Test Equipment

Type	Serial Number
EMC286plus	3F-621R

Hardware Check

Performed At	Result	Details
07.05.2016 11:39:28	Passed	

Overcurrent Protection:

Test Settings

Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 07-Mai-2016 11:39:33 Test End: 07-Mai-2016 11:39:45
User Name: Manager

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0>1	I L1; L2; L3	1,000 A	1,054 A	10,00 mA	10,00 mA	1,000 mA		38,80 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:
Test passed

Overvoltage protection:

Test Settings

Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1

ВЯРНО С
ОРИГИНАЛА



functional test / dry heat +85°C

Test Start: 07-Mai-2016 11:42:02 Test End: 07-Mai-2016 11:42:10
User Name: Manager

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0>1	V L1-E; L2-E; L3-E	50,80 V	51,00 V	1,000 V	1,000 V	100,0 mV		20,20 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:
Test passed

Undervoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 07-Mai-2016 11:40:16 Test End: 07-Mai-2016 11:40:24
User Name: Manager

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0>1	V L1-E; L2-E; L3-E	54,80 V	55,10 V	1,000 V	1,000 V	100,0 mV		20,20 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:
Test passed

functional test / dry heat +85°C

Name/description: EUT_11 Manufacturer: SIEMENS
Device type: 7U185 Device address: 172.18.60.11
Serial/model number: BM1410002174

Hardware Configuration

Test Equipment

Type	Serial Number
EMC286plus	3F-621R

Hardware Check

Performed At	Result	Details
07.05.2016 11:36:28	Passed	

Overcurrent Protection:

Test Settings

Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 07-Mai-2016 11:40:30 Test End: 07-Mai-2016 11:40:42
User Name: Manager

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0>1	I L1; L2; L3	1,050 A	1,059 A	10,00 mA	10,00 mA	5,000 mA		36,40 ms

Assess: * - Passed x - Failed o - Not assessed

functional test / dry heat +85°C

functional test / Dry Heat +70°C

Test State:
Test passed

Test Object - Device Settings

Device:
Name/Description: EUT_17
Device type: 7U7E2
Serial/model number: BMX503002956
Manufacturer: SIEMENS
Device address: 172.16.60.17

Undercurrent protection:

Test Settings
Ramped Quantities
L1; L2; L3 / Magnitude

Ramp
States

Test Module
Name: OMICRON Ramping
Test Start: 07-Mai-2016 11:40:48
User Name:
Company:
Version: 3.00 SR 1
Test End: 07-Mai-2016 11:41:00
Manager:

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Meas. 2	Ramp 2	Start 0->1	L1; L2; L3	350,0 mA	350,0 mA	10,00 mA	10,00 mA	0,000 mA	+	17,50 ms

Assess: + .. Passed x .. Failed o .. Not assessed

Test State:
Test passed

Hardware Configuration

Type	Serial Number
EMC75plus	DF407R

Performed At	Result	Details
11.05.2016 16:07:50	Passed	

Overcurrent protection:

Test Settings
Ramped Quantities
L1; L2; L3 / Magnitude

Test Module
Name: OMICRON Ramping
Test Start: 11-Mai-2016 15:08:10
User Name:
Company:
Version: 3.00 SR 1
Test End: 11-Mai-2016 16:08:20
Manager:

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	1,000 A	1,000 A	10,00 mA	10,00 mA	0,000 mA	+	25,00 ms

Assess: + .. Passed x .. Failed o .. Not assessed

Test State:
Test passed

Undercurrent protection:

Test Settings
Ramped Quantities
L1; L2; L3 / Magnitude



functional test / Dry Heat +70°C

functional test / Dry Heat +70°C

Ramp
States

Test Module
Name: OMICRON Ramping
Test Start: 11-Mai-2016 15:08:34
User Name:
Company:
Version: 3.00 SR 1
Test End: 11-Mai-2016 16:08:47
Manager:

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Meas. 2	Ramp 2	Start 0->1	L1; L2; L3	350,0 mA	353,5 mA	10,00 mA	10,00 mA	0,500 mA	+	18,30 ms

Assess: + .. Passed x .. Failed o .. Not assessed

Test State:
Test passed

Test Module
Name: OMICRON Ramping
Test Start: 11-Mai-2016 16:08:53
User Name:
Company:
Version: 3.00 SR 1
Test End: 11-Mai-2016 16:09:04
Manager:

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	1,000 A	1,006 A	10,00 mA	10,00 mA	0,000 mA	+	19,20 ms

Assess: + .. Passed x .. Failed o .. Not assessed

Test State:
Test passed

Test Object - Device Settings

Device:
Name/Description: EUT_03
Device type: 7U7E2
Serial/model number: BMX410001104
Manufacturer: SIEMENS
Device address: 172.16.60.3

Hardware Configuration

Type	Serial Number
EMC75plus	DF407R

Performed At	Result	Details
07.05.2016 11:28:00	Passed	

Overcurrent protection:

Test Settings
Ramped Quantities
L1; L2; L3 / Magnitude

Undercurrent protection:

Test Settings
Ramped Quantities
L1; L2; L3 / Magnitude

Test Module
Name: OMICRON Ramping
Test Start: 11-Mai-2016 16:09:10
User Name:
Company:
Version: 3.00 SR 1
Test End: 11-Mai-2016 16:09:23
Manager:

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Meas. 2	Ramp 2	Start 0->1	L1; L2; L3	350,0 mA	354,5 mA	10,00 mA	10,00 mA	0,500 mA	+	24,30 ms

Assess: + .. Passed x .. Failed o .. Not assessed

Test State:
Test passed

1038

Overvoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Test Module
Name: OMCRON Ramping
Version: 3.00 SR 1
Test Start: 11-Mai-2016 16:09:20
Test End: 11-Mai-2016 16:09:37
User Name: Manager
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	50,50 V	50,90 V	5,000 V	1,000 V	500,0 mV	*	20,50 ms

Assess: * Passed x Failed o Not assessed

Test State:
Test passed

Undervoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Ramp States

Test Module
Name: OMCRON Ramping
Version: 3.00 SR 1
Test Start: 11-Mai-2016 15:06:43
Test End: 11-Mai-2016 15:06:62
User Name: Manager
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E;	54,80 V	55,00 V	5,000 V	1,000 V	200,0 mV	*	16,10 ms

Assess: * Passed x Failed o Not assessed

Test State:
Test passed

Undercurrent protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Ramp States

Test Module
Name: OMCRON Ramping
Version: 3.00 SR 1
Test Start: 11-Mai-2016 16:10:16
Test End: 11-Mai-2016 16:10:28
User Name: Manager
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Meas. 2	Ramp 2	Start 0->1	I L1; L2; L3	950,0 mA	954,5 mA	10,00 mA	10,00 mA	1,500 mA	*	23,10 ms

Assess: * Passed x Failed o Not assessed

Test State:
Test passed

Overvoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Test Module
Name: OMCRON Ramping
Version: 3.00 SR 1
Test Start: 11-Mai-2016 16:10:34
Test End: 11-Mai-2016 16:10:41
User Name: Manager
Company:

Assess	Passed	Failed	Not assessed
	1	0	0

Test State:
Test passed

Test Object - Device Settings

Device:
Name/Description: EUT_05
Device type: 75 J62
Manufacturer: SIEMENS
Device address: 172.16.60.5
Serial/model number: BM1410001138

Hardware Configuration

Type	Serial Number
EM-758plus	3F467R

Hardware Check

Performed At	Result	Details
11.05.2016 16:07:58	Passed	

Overcurrent protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module
Name: OMCRON Ramping
Version: 3.00 SR 1
Test Start: 11-Mai-2016 16:06:58
Test End: 11-Mai-2016 16:10:00
User Name: Manager
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	I L1; L2; L3	1,050 A	1,065 A	10,00 mA	10,00 mA	1,800 mA	*	21,20 ms

Assess: * Passed x Failed o Not assessed



Test Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	50,50 V	50,90 V	5,000 V	1,000 V	500,0 mV	*	20,70 ms

Assess: * Passed x Failed o Not assessed

Test State:
Test passed

Undervoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Ramp States

Test Module
Name: OMCRON Ramping
Version: 3.00 SR 1
Test Start: 11-Mai-2016 16:10:47
Test End: 11-Mai-2016 16:10:59
User Name: Manager
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	54,80 V	55,10 V	5,000 V	1,000 V	200,0 mV	*	17,40 ms

Assess: * Passed x Failed o Not assessed

Test State:
Test passed

Test Object - Device Settings

functional test / Dry Heat +70°C

Device: EUI_07
Name/description: TSJ67
Device type: BM1410002158
Manufacturer: SIEMENS
Device address: 172.19.50.7

Hardware Configuration

Test Equipment

Table with 2 columns: Type, Serial Number. Row 1: CMCT56plus, DF467R

Hardware Check

Table with 3 columns: Performed At, Result, Details. Row 1: 11.06.2016 16:07:59, Passed

Overcurrent protection:

Test Settings

Ramped Quantities
I L1; L2 / Magnitude

Test Module

Name: OMACRON Ramping
Version: 3.00 SR 1
Test Start: 11-Mai-2016 16:11:02
Test End: 11-Mai-2016 16:11:14
User Name: Manager:

Test Results

Assessment Results

Table with 12 columns: Name/Exec, Ramp, Condition, Sig, Nom., Act., Tol.-, Tol.+ , Dev., Assess, Test. Row 1: Pick-up, Ramp 2, Start 0->1, L1; L2; L3, 0,050 A, 0,055 A, 10,00 mA, 10,00 mA, 0,000 mA, +, 22,10 ms

Test State:
Test passed

Undercurrent protection:

Test Settings

Ramped Quantities
I L1; L2; L3 / Magnitude

Ramp

functional test / Dry Heat +70°C

States

Test Module

Name: OMACRON Ramping
Version: 3.00 SR 1
Test Start: 11-Mai-2016 16:11:20
Test End: 11-Mai-2016 16:11:32
User Name: Manager:

Test Results

Assessment Results

Table with 12 columns: Name/Exec, Ramp, Condition, Sig, Nom., Act., Tol.-, Tol.+ , Dev., Assess, Test. Row 1: Meas. 2, Ramp 2, Start 0->1, L1; L2; L3, 20,0 mA, 20,0 mA, 10,00 mA, 10,00 mA, 0,500 mA, +, 25,50 ms

Test State:
Test passed

Overvoltage protection:

Test Settings

Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Test Module

Name: OMACRON Ramping
Version: 3.00 SR 1
Test Start: 11-Mai-2016 15:11:38
Test End: 11-Mai-2016 15:11:40
User Name: Manager:

Test Results

Assessment Results

Table with 12 columns: Name/Exec, Ramp, Condition, Sig, Nom., Act., Tol.-, Tol.+ , Dev., Assess, Test. Row 1: Pick-up, Ramp 2, Start 0->1, L1-E; L2-E; L3-E, 50,00 V, 50,00 V, 1,000 V, 1,000 V, 500,0 mV, +, 31,00 ms

Test State:
Test passed

Undervoltage protection:



functional test / Dry Heat +70°C

Test Settings

Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Ramp States

Test Module

Name: OMACRON Ramping
Version: 3.00 SR 1
Test Start: 11-Mai-2016 16:11:52
Test End: 11-Mai-2016 16:12:00
User Name: Manager:

Test Results

Assessment Results

Table with 12 columns: Name/Exec, Ramp, Condition, Sig, Nom., Act., Tol.-, Tol.+ , Dev., Assess, Test. Row 1: Pick-up, Ramp 2, Start 0->1, V L1-E; L2-E; L3-E, 54,80 V, 55,10 V, 1,000 V, 1,000 V, 300,0 mV, +, 26,50 ms

Test State:
Test passed

Test Object - Device Settings

Device: EUI_09
Name/description: 6M09
Device type: BM1410001763
Manufacturer: SIEMENS
Device address: 172.18.60.9

Hardware Configuration

Test Equipment

Table with 2 columns: Type, Serial Number. Row 1: CMCT56plus, DF467R

Hardware Check

Table with 3 columns: Performed At, Result, Details. Row 1: 07.05.2016 11:29:20, Passed

Overcurrent protection:

functional test / Dry Heat +70°C

Test Settings

Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module

Name: OMACRON Ramping
Version: 3.00 SR 1
Test Start: 11-Mai-2016 16:12:00
Test End: 11-Mai-2016 16:12:10
User Name: Manager:

Test Results

Assessment Results

Table with 12 columns: Name/Exec, Ramp, Condition, Sig, Nom., Act., Tol.-, Tol.+ , Dev., Assess, Test. Row 1: Pick-up, Ramp 2, Start 0->1, L1; L2; L3, 0,050 A, 0,054 A, 10,00 mA, 10,00 mA, 1,000 mA, +, 16,20 ms

Test State:
Test passed

Overvoltage protection:

Test Settings

Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Test Module

Name: OMACRON Ramping
Version: 3.00 SR 1
Test Start: 11-Mai-2016 16:12:24
Test End: 11-Mai-2016 16:12:31
User Name: Manager:

Test Results

Assessment Results

Table with 12 columns: Name/Exec, Ramp, Condition, Sig, Nom., Act., Tol.-, Tol.+ , Dev., Assess, Test. Row 1: Pick-up, Ramp 2, Start 0->1, V L1-E; L2-E; L3-E, 50,50 V, 50,85 V, 1,000 V, 1,000 V, 300,0 mV, +, 28,00 ms

Test State:
Test passed

1010

functional test / Dry Heat +70°C

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Test Settings

Ramped Quantities
V L1-E, L2-E / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 11-Mai-2015 15:12:37 Test End: 11-Mai-2015 15:12:45
User Name: Manager:
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E, L2-E / L3-E	64,80 V	55,10 V	1,000 V	1,000 V	800,0 mV	+	20,10 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Test Object - Device Settings

Device:
Name/Description: EUT_11 Manufacturer: SIEMENS
Device type: RUT85 Device address: 172.16.00.11
Serial/model number: BM1410002174

Hardware Configuration

Test Equipment

Type	Serial Number
EMC266plus	17467R

Hardware Check

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**ВАРНО С
ОРИГИНАЛА**

functional test / Dry Heat +70°C

functional test / Dry Heat +70°C

Performed At	Result	Details
11.05.2015 15:08:00	Passed	

Overcurrent protection:

Test Settings

Ramped Quantities
L1, L2, L3 / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 11-Mai-2015 15:12:52 Test End: 11-Mai-2015 15:13:04
User Name: Manager:
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1, L2, L3	1,650 A	1,655 A	0,00 mA	10,00 mA	1,500 mA	+	23,40 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Undercurrent protection:

Test Settings

Ramped Quantities
L1, L2, L3 / Magnitude

Ramp States

Test Module

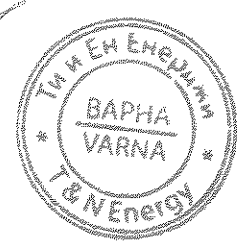
Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 11-Mai-2015 15:13:10 Test End: 11-Mai-2015 15:13:22
User Name: Manager:
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Mess. 2	Ramp 2	Start 0->1	L1, L2, L3	340,0 mA	346,6 mA	10,00 mA	10,00 mA	5,500 mA	+	21,40 ms

Assess: + Passed x Failed o Not assessed



functional test / dry cold -25°C

Test State:
Test passed

Test Object - Device Settings

Device:
Name/Description: EUT_17 Manufacturer: SIEMENS
Device type: RUT82 Device address: 172.16.00.17
Serial/model number: BM1503002655

Hardware Configuration

Test Equipment

Type	Serial Number
EMC266plus	17467R

Hardware Check

Performed At	Result	Details
18.05.2015 10:00:33	Passed	

Undercurrent protection:

Test Settings

Ramped Quantities
L1, L2, L3 / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 18-Mai-2015 10:50:59 Test End: 18-Mai-2015 10:51:12
User Name: Manager:
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Mess. 2	Ramp 2	Start 0->1	L1, L2, L3	350,0 mA	348,5 mA	10,00 mA	10,00 mA	5,500 mA	+	19,80 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Overcurrent Protection:

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1042

functional test / dry cold -25°C

functional test / dry cold -25°C

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module

Name: OMICRON Ramping
Version: 3.00 SR 1
Test Start: 18-Mai-2016 10:51:16
Test End: 18-Mai-2016 10:51:30
User Name:
Manager:
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Elg	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	1,050 A	1,046 A	0,00 mA	10,00 mA	14,000 mA	*	10,70 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Test Object - Device Settings

Device:
Name/description: EUT_03
Device type: 7S.02
Serial/model number: BM1410001134
Manufacturer: SIEMENS
Device address: 172.16.60.3

Hardware Configuration

Test Equipment

Type	Serial Number
CMOZ85plus	DF487R

Hardware Check

Performed At	Result	Details
17.05.2016 10:53:04	Passed	

Overcurrent Protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module

Name: OMICRON Ramping
Version: 3.00 SR 1
Test Start: 18-Mai-2016 10:52:12
Test End: 18-Mai-2016 10:52:20
User Name:
Manager:
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Elg	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	60,60 V	60,60 V	1,000 V	1,000 V	100,0 mV	*	21,80 ms

Assess: + Passed x Failed o Not assessed

functional test / dry cold -25°C

functional test / dry cold -25°C

Test Module

Name: OMICRON Ramping
Version: 3.00 SR 1
Test Start: 18-Mai-2016 10:52:12
Test End: 18-Mai-2016 10:52:20
User Name:
Manager:
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Elg	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	60,60 V	60,60 V	1,000 V	1,000 V	100,0 mV	*	21,80 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Undervoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Ramp States

Test Module

Name: OMICRON Ramping
Version: 3.00 SR 1
Test Start: 18-Mai-2016 10:52:28
Test End: 18-Mai-2016 10:52:34
User Name:
Manager:
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Elg	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	34,50 V	34,50 V	1,000 V	1,000 V	200,0 mV	*	20,60 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Test Start: 18-Mai-2016 10:51:36
User Name:
Company:
Test End: 18-Mai-2016 10:51:48
Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Elg	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	1,050 A	1,047 A	0,00 mA	10,00 mA	3,000 mA	*	20,20 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Undercurrent protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Ramp States

Test Module

Name: OMICRON Ramping
Version: 3.00 SR 1
Test Start: 18-Mai-2016 10:51:54
Test End: 18-Mai-2016 10:52:00
User Name:
Manager:
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Elg	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Mass. 2	Ramp 2	Start 0->1	L1; L2; L3	350,0 mA	347,6 mA	0,00 mA	10,00 mA	2,600 mA	*	14,80 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Overvoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude



Test passed

Test Object - Device Settings

Device:
Name/description: EUT_05
Device type: 7S.02
Serial/model number: BM1410001138
Manufacturer: SIEMENS
Device address: 172.16.60.5

Hardware Configuration

Test Equipment

Type	Serial Number
CMOZ85plus	DF487R

Hardware Check

Performed At	Result	Details
18.05.2016 10:52:00 AM	Passed	

Overcurrent Protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module

Name: OMICRON Ramping
Version: 3.00 SR 1
Test Start: 18-Mai-2016 10:52:40
Test End: 18-Mai-2016 10:52:52
User Name:
Manager:
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Elg	Nom.	Act.	Fol.-	Fol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	1,050 A	1,047 A	0,00 mA	10,00 mA	3,600 mA	*	26,60 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

1072

functional test / dry cold -25°C

Undercurrent protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Ramp
States

Test Module
Name: OMIACRON Ramping Version: 3.00 SR 1
Test Start: 18-Mai-2015 10:52:58 Test End: 18-Mai-2016 10:53:11
User Name: Manager:
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Meas. 2	Ramp 2	Start O->1	L1; L2; L3	350,0 mA	347,0 mA	10,00 mA	10,00 mA	3,000 mA	*	27,00 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:
Test passed

Overvoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Test Module
Name: OMIACRON Ramping Version: 3.00 SR 1
Test Start: 18-Mai-2016 10:53:17 Test End: 18-Mai-2016 10:53:26
User Name: Manager:
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Pick-up	Ramp 2	Start O->1	V L1-E; L2-E; L3-E	50,00 V	50,50 V	1,000 V	1,000 V	100,0 mV	*	10,50 ms

Assess: * - Passed x - Failed o - Not assessed

functional test / dry cold -25°C

Test State:
Test passed

Undervoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Ramp
States

Test Module
Name: OMIACRON Ramping Version: 3.00 SR 1
Test Start: 18-Mai-2015 10:53:31 Test End: 18-Mai-2016 10:53:30
User Name: Manager:
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Pick-up	Ramp 2	Start O->1	V L1-E; L2-E; L3-E	54,80 V	54,60 V	6,000 V	1,000 V	200,0 mV	*	17,70 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:
Test passed

Test Object - Device Settings

Device:
Name/Description: EUT_57 Manufacturer: SIEMENS
Device type: 78J87 Device address: 172.10.60.7
Serial/model number: BM1410002159

Hardware Configuration



functional test / dry cold -25°C

functional test / dry cold -25°C

Type	Serial Number
EMC/CE/SELV	2F487R

Performed At	Result	Details
18/02/2015 10:26:03 AM	Passed	

Overcurrent Protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module
Name: OMIACRON Ramping Version: 3.00 SR 1
Test Start: 18-Mai-2015 10:53:46 Test End: 18-Mai-2016 10:53:57
User Name: Manager:
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Pick-up	Ramp 2	Start O->1	L1; L2; L3	350 A	348 A	10,00 mA	10,00 mA	2,000 mA	*	12,00 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:
Test passed

Undercurrent protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Ramp
States

Test Module
Name: OMIACRON Ramping Version: 3.00 SR 1
Test Start: 18-Mai-2015 10:54:03 Test End: 18-Mai-2015 10:54:16
User Name: Manager:
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Meas. 2	Ramp 2	Start O->1	L1; L2; L3	350,0 mA	348,0 mA	10,00 mA	10,00 mA	2,000 mA	*	16,30 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:
Test passed

Overvoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Test Module
Name: OMIACRON Ramping Version: 3.00 SR 1
Test Start: 18-Mai-2016 10:54:21 Test End: 18-Mai-2016 10:54:20
User Name: Manager:
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Fact
Pick-up	Ramp 2	Start O->1	V L1-E; L2-E; L3-E	50,60 V	50,80 V	1,000 V	1,000 V	100,0 mV	*	26,20 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:
Test passed

Undervoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Ramp
States

1043

functional test / dry cold -25°C

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 18-Mai-2015 10:54:35 Test End: 18-Mai-2015 10:54:43
User Name: Manager:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	24,80 V	24,70 V	1,000 V	1,000 V	100,0 mV	*	10,80 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:
Test passed

Test Object - Device Settings

Device: EUT_00 Manufacturer: SIEMENS
Name/description: 6MS88 Device type:
Serial/model number: BM1410001763 Device address: 172.16.60.9

Hardware Configuration

Test Equipment

Type	Serial Number
CMC250plus	2F487R

Hardware Check

Performed At	Result	Details
18.05.2015 10:25:06 AM	Passed	

Overcurrent protection:

Test Settings

Ramped Quantities
L1; L2; L3 / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 18-Mai-2015 10:54:49 Test End: 18-Mai-2015 10:55:01
User Name: Manager:

functional test / dry cold -25°C

User Name: Manager:
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	0,050 A	0,048 A	0,000 mA	0,000 mA	2,000 mA	*	17,50 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:
Test passed

Overvoltage protection:

Test Settings

Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 18-Mai-2015 10:55:07 Test End: 18-Mai-2015 10:55:15
User Name: Manager:
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	30,00 V	30,50 V	1,000 V	1,000 V	100,0 mV	*	23,80 ms

Assess: * - Passed x - Failed o - Not assessed

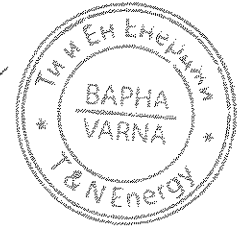
Test State:
Test passed

Undervoltage protection:

Test Settings

Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

ВЯРНО С
ОРИГИНАЛА



functional test / dry cold -25°C

functional test / dry cold -25°C

Ramp States

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 18-Mai-2015 10:55:21 Test End: 18-Mai-2015 10:55:30
User Name: Manager:
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	24,80 V	24,70 V	1,000 V	1,000 V	100,0 mV	*	11,30 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:
Test passed

Test Object - Device Settings

Device: EUT_11 Manufacturer: SIEMENS
Name/description: 7UT55 Device type:
Serial/model number: BM1410002174 Device address: 172.16.60.11

Hardware Configuration

Test Equipment

Type	Serial Number
CMC250plus	2F487R

Hardware Check

Performed At	Result	Details
18.05.2015 10:50:48	Passed	

Overcurrent protection:

Test Settings

Ramped Quantities
L1; L2; L3 / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 18-Mai-2015 10:55:35 Test End: 18-Mai-2015 10:55:47
User Name: Manager:
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	0,050 A	0,047 A	0,000 mA	0,000 mA	3,500 mA	*	14,20 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:
Test passed

Undercurrent protection:

Test Settings

Ramped Quantities
L1; L2; L3 / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 18-Mai-2015 10:55:53 Test End: 18-Mai-2015 10:56:05
User Name: Manager:
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Meas. 2	Ramp 2	Start 0->1	L1; L2; L3	850,0 mA	848,0 mA	0,000 mA	0,000 mA	2,000 mA	*	18,00 ms

Assess: * - Passed x - Failed o - Not assessed

Test State:
Test passed

7049

functional test / dry cold -25°C

functional test / dry cold -40°C

Test Object - Device Settings

Device:
 Name/Description: EUT_17 Manufacturer: SIEMENS
 Device type: 7UTE2 Device address: 172.16.00.17
 Serial/model number: BM1503002055

Hardware Configuration

Type	Serial Number
EMC250plus	3P46TR

Performed At	Result	Details
18.05.2016 10:50:03	Passed	

Undercurrent protection:

Test Settings
 Ramped Quantities
 I L1, L2, L3 / Magnitude

Ramp
 States

Test Module
 Name: OMBRON Ramping Version: 3.00 SR 1
 Test Start: 20-Mai-2016 11:27:22 Test End: 20-Mai-2016 11:27:35
 User Name: Manager:
 Company:

Test Results

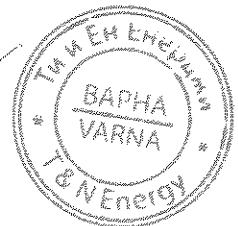
Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Mess. 2	Ramp 2	Start 0->1	L1; L2; L3	350,0 mA	345,0 mA	0,00 mA	10,00 mA	6,000 mA	+	28,40 ms

Assess: + Passed x Failed o Not assessed

Test State:
 Test passed

Overcurrent protection:

ВАРНО С
 ОРИГИНАЛА



functional test / dry cold -40°C

functional test / dry cold -40°C

Test Settings
 Ramped Quantities
 I L1, L2, L3 / Magnitude

Test Module
 Name: OMBRON Ramping Version: 3.00 SR 1
 Test Start: 20-Mai-2016 11:27:41 Test End: 20-Mai-2016 11:27:52
 User Name: Manager:
 Company:

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	1,050 A	1,044 A	0,00 mA	10,00 mA	6,000 mA	+	26,10 ms

Assess: + Passed x Failed o Not assessed

Test State:
 Test passed

Test Object - Device Settings

Device:
 Name/Description: EUT_03 Manufacturer: SIEMENS
 Device type: 75J52 Device address: 172.16.00.3
 Serial/model number: BM1410001134

Hardware Configuration

Type	Serial Number
EMC250plus	3P46TR

Performed At	Result	Details
07.05.2016 10:35:04	Passed	

Overcurrent protection:

Test Settings
 Ramped Quantities
 I L1, L2, L3 / Magnitude

Test Module
 Name: OMBRON Ramping Version: 3.00 SR 1

Test Start: 20-Mai-2016 11:27:58 Test End: 20-Mai-2016 11:28:09
 User Name: Manager:
 Company:

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	1,050 A	1,045 A	0,00 mA	10,00 mA	6,000 mA	+	26,10 ms

Assess: + Passed x Failed o Not assessed

Test State:
 Test passed

Undercurrent protection:

Test Settings
 Ramped Quantities
 I L1, L2, L3 / Magnitude

Ramp
 States

Test Module
 Name: OMBRON Ramping Version: 3.00 SR 1
 Test Start: 20-Mai-2016 11:28:16 Test End: 20-Mai-2016 11:28:28
 User Name: Manager:
 Company:

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Mess. 2	Ramp 2	Start 0->1	L1; L2; L3	350,0 mA	348,0 mA	0,00 mA	10,00 mA	4,000 mA	+	18,80 ms

Assess: + Passed x Failed o Not assessed

Test State:
 Test passed

7095

functional test / dry cold -40°C

Overvoltage protection:

Test Settings

Ramped Quantities
V L1-E, L2-E, L3-E / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 20-Mai-2016 11:28:33 Test End: 20-Mai-2016 11:28:41
User Name: Manager: Manager:
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E, L2-E, L3-E	30,60 V	30,40 V	1,000 V	1,000 V	200,0 mV	*	16,90 ms

Assess: + Passed x Failed o Not assessed

Test State:

Test passed

Undervoltage protection:

Test Settings

Ramped Quantities
V L1-E, L2-E, L3-E / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 20-Mai-2016 11:28:47 Test End: 20-Mai-2016 11:28:55
User Name: Manager: Manager:
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E, L2-E, L3-E	34,80 V	34,00 V	1,000 V	1,000 V	200,0 mV	*	15,80 ms

Assess: + Passed x Failed o Not assessed

functional test / dry cold -40°C

Assess: + Passed x Failed o Not assessed

Test State:

Test passed

Test Object - Device Settings

Device:

Name/Description: EUT_05 Manufacturer: SIEMENS
Device type: 75302 Device address: 172.16.60.6
Serial/Model number: B21410001130

Hardware Configuration

Test Equipment

Type	Serial Number
EMC289plus	3F487R

Hardware Check

Performed At	Result	Details
03/02/2016 10:28:00 AM	Passed	

Overcurrent protection:

Test Settings

Ramped Quantities
I L1, L2, L3 / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 20-Mai-2016 11:28:01 Test End: 20-Mai-2016 11:28:10
User Name: Manager: Manager:
Company:

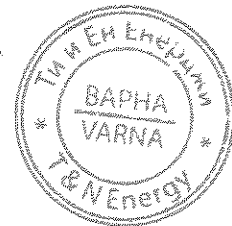
Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	I L1, L2, L3	1,050 A	1,046 A	10,00 mA	10,00 mA	2,000 mA	*	20,00 ms

Assess: + Passed x Failed o Not assessed

ВЯРНО С
ОРИГИНАЛА



functional test / dry cold -40°C

Test State:

Test passed

Undercurrent protection:

Test Settings

Ramped Quantities
I L1, L2, L3 / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 20-Mai-2016 11:28:18 Test End: 20-Mai-2016 11:28:31
User Name: Manager: Manager:
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Miss. 2	Ramp 2	Start 0->1	I L1, L2, L3	350,0 mA	345,6 mA	10,00 mA	10,00 mA	4,800 mA	*	28,00 ms

Assess: + Passed x Failed o Not assessed

Test State:

Test passed

Overvoltage protection:

Test Settings

Ramped Quantities
V L1-E, L2-E, L3-E / Magnitude

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 20-Mai-2016 11:28:37 Test End: 20-Mai-2016 11:28:44
User Name: Manager: Manager:
Company:

Test Results

functional test / dry cold -40°C

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E, L2-E, L3-E	30,60 V	30,40 V	1,000 V	1,000 V	200,0 mV	*	14,00 ms

Assess: + Passed x Failed o Not assessed

Test State:

Test passed

Undervoltage protection:

Test Settings

Ramped Quantities
V L1-E, L2-E, L3-E / Magnitude

Ramp States

Test Module

Name: OMCRON Ramping Version: 3.00 SR 1
Test Start: 20-Mai-2016 11:28:50 Test End: 20-Mai-2016 11:29:03
User Name: Manager: Manager:
Company:

Test Results

Assessment Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Tol.-	Tol.+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E, L2-E, L3-E	34,80 V	34,00 V	1,000 V	1,000 V	200,0 mV	*	16,60 ms

Assess: + Passed x Failed o Not assessed

Test State:

Test passed

Test Object - Device Settings

Device:

Name/Description: EUT_07 Manufacturer: SIEMENS

1096

functional test / dry cold -40°C

Undervoltage protection:

Test Settings
Ramped Quantities
V L1-E, L2-E, L3-E / Magnitude

Ramp
States

Test Module
Name: OMRON Ramping Version: 3.00 SR 1
Test Start: 20-Mai-2016 11:31:30 Test End: 20-Mai-2016 11:31:47
User Name: Manager
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol-	Tol+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	V L1-E, L2-E, L3-E	54,80 V	54,80 V	5,000 V	7,000 V	200,0 mV	+	27,60 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Test Object - Device Settings

Device:
Name/Description: EUT_11 Manufacturer: SIEMENS
Device type: 7UT86 Device address: 172.18.60.11
Serial/model number: BM1410002174

Hardware Configuration

Type	Serial Number
CNC255plus	EF467R

Performed At	Result	Details

functional test / dry cold -40°C

16.05.2016 10:50:48 Passed

Overcurrent protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module
Name: OMRON Ramping Version: 3.00 SR 1
Test Start: 20-Mai-2016 11:31:53 Test End: 20-Mai-2016 11:32:04
User Name: Manager
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol-	Tol+	Dev.	Assess	Test
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	1,050 A	1,045 A	10,00 mA	10,00 mA	5,000 mA	+	23,70 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Undercurrent protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Ramp
States

Test Module
Name: OMRON Ramping Version: 3.00 SR 1
Test Start: 20-Mai-2016 11:32:10 Test End: 20-Mai-2016 11:32:22
User Name: Manager
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol-	Tol+	Dev.	Assess	Test
Meas. 2	Ramp 2	Start 0->1	L1; L2; L3	350,0 mA	346,5 mA	10,00 mA	10,00 mA	3,500 mA	+	25,10 ms

Assess: + Passed x Failed o Not assessed



functional test / dry cold -40°C

Test State:
Test passed

functional test / during ramp -25°C to +75°C

Test Object - Device Settings

Device:
Name/Description: EUT_17 Manufacturer: SIEMENS
Device type: 7UT82 Device address: 172.18.60.17
Serial/model number: BM1503002955

Hardware Configuration

Type	Serial Number
CNC255plus	EF467R

Performed At	Result	Details
20.05.2016 10:47:40	Passed	

Undercurrent protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Ramp
States

Test Module
Name: OMRON Ramping Version: 3.00 SR 1
Test Start: 20-Mai-2016 14:35:09 Test End: 20-Mai-2016 14:35:10
User Name: Manager
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig	Nom.	Act.	Tol-	Tol+	Dev.	Assess	Test
Meas. 2	Ramp 2	Start 0->1	L1; L2; L3	350,0 mA	350,5 mA	10,00 mA	10,00 mA	300,0 µA	+	28,90 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Overcurrent protection:

1078

functional test / during ramp -25°C to +75°C

functional test / during ramp -25°C to +75°C

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Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module
Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 20-Mai-2016 14:35:25 Test End: 20-Mai-2016 14:35:37
User Name: Manager:
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Ref.-	Ref.+	Dev.	Assess	Rect
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	1,050 A	1,050 A	0,000 mA	0,000 mA	0,000 A	1	16,80 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Test Object - Device Settings

Device: EUT_00 Manufacturer: SIEMENS
Name/Description: EUT_00 Device address: 172.16.80.3
Device type: 75.362
Serial/model number: BM1410001134

Hardware Configuration

Type	Serial Number
CNC256plus	IF467R

Performed At	Result	Details
07.05.2016 10:35:04	Passed	

Overcurrent protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 20-Mai-2016 14:36:43 Test End: 20-Mai-2016 14:36:56
User Name: Manager:
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Ref.-	Ref.+	Dev.	Assess	Rect
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	1,050 A	1,052 A	0,000 mA	0,000 mA	1,600 mA	1	78,00 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Undercurrent protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Ramp States

Test Module

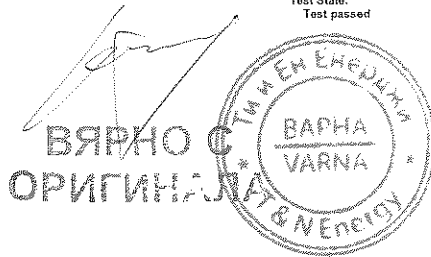
Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 20-Mai-2016 14:36:02 Test End: 20-Mai-2016 14:36:13
User Name: Manager:
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Ref.-	Ref.+	Dev.	Assess	Rect
Meas. 2	Ramp 2	Start 0->1	L1; L2; L3	360,0 mA	351,6 mA	10,00 mA	10,00 mA	1,500 mA	1	34,49 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed



functional test / during ramp -25°C to +75°C

functional test / during ramp -25°C to +75°C

Overvoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 20-Mai-2016 14:36:18 Test End: 20-Mai-2016 14:36:27
User Name: Manager:
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Ref.-	Ref.+	Dev.	Assess	Rect
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	00,50 V	00,50 V	1,000 V	1,000 V	200,0 mV	1	14,20 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Undervoltage protection:

Test Settings
Ramped Quantities
V L1-E; L2-E; L3-E / Magnitude

Ramp States

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 20-Mai-2016 14:36:34 Test End: 20-Mai-2016 14:36:42
User Name: Manager:
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Ref.-	Ref.+	Dev.	Assess	Rect
Pick-up	Ramp 2	Start 0->1	V L1-E; L2-E; L3-E	54,80 V	54,00 V	1,000 V	1,000 V	100,0 mV	1	24,10 ms

Assess: + Passed x Failed o Not assessed

Test State:
Test passed

Test Object - Device Settings

Device: EUT_05 Manufacturer: SIEMENS
Name/Description: EUT_05 Device address: 172.16.80.5
Device type: 75.362
Serial/model number: BM1410001138

Hardware Configuration

Type	Serial Number
CNC256plus	IF467R

Performed At	Result	Details
03.02.2016 10:28:00 AM	Passed	

Overcurrent protection:

Test Settings
Ramped Quantities
I L1; L2; L3 / Magnitude

Test Module

Name: OMICRON Ramping Version: 3.00 SR 1
Test Start: 20-Mai-2016 14:36:48 Test End: 20-Mai-2016 14:37:00
User Name: Manager:
Company:

Test Results

Name/Exec.	Ramp	Condition	Sig.	Nom.	Act.	Ref.-	Ref.+	Dev.	Assess	Rect
Pick-up	Ramp 2	Start 0->1	L1; L2; L3	1,050 A	1,052 A	0,000 mA	0,000 mA	1,600 mA	1	21,80 ms

Assess: + Passed x Failed o Not assessed

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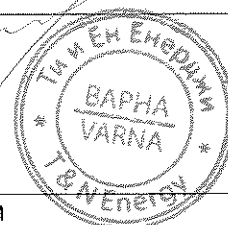


Functional description of SIPROTEC 5 System,

Application sheet of the Input and Output Modules of the Modular Devices

Module	Functional description
PS203	Power Supply Board for the 2 nd device row, (DC: 24 V/48 V or 60 V to 250 V and AC: 100 V to 230 V), mounted in 1/6 19-inch size housing
CB202	Plug-in module assembly, including an additional power supply, (DC: 24 V/48 V or 60 V to 250 V and AC: 100 V to 230 V), mounted in 1/6 19-inch size housing
IO201	Input Output Module, 4 current inputs, 8 binary inputs, 6 binary outputs, reduced assembled variant of IO202
IO202	Input Output Module, 4 current measuring inputs, 4 voltage measuring inputs, 8 binary inputs, 6 binary outputs, mounted in 1/6 or 1/3 19-inch size housing
IO203	Input Output Module, 8 current measuring inputs, 4 binary inputs, 4 binary outputs, mounted in 1/6 19-inch size housing
IO204	Input Output Module, 10 binary inputs, 4 binary outputs, 4 power relays for controlling 2 motors, mounted in 1/6 19-inch size housing
IO205	Input Output Module, 12 binary inputs, 16 binary outputs, mounted in 1/6 19-inch size housing
IO206	Input Output Module, 6 binary inputs, 7 binary outputs, mounted in 1/6 19-inch size housing, reduced assembled variant of IO205
IO207	Input Output Module, 16 binary inputs, 8 binary outputs, mounted in 1/6 19-inch size housing
IO208	Input Output Module, 4 current measuring inputs, 4 voltage measuring inputs, 4 binary inputs, 11 binary outputs, mounted in 1/3 or 1/6 19-inch size housing
IO209	Input Output Module, 8 binary inputs, 4 High Speed Outputs, mounted in 1/6 19-inch size housing
IO211	Input Output Module, 8 voltage measuring inputs, 8 binary inputs, mounted in 1/6 or 1/3 19-inch size housing
IO212	Input Output Module, 8 binary inputs, 8 high-speed transducer inputs current/voltage, mounted in 1/6 19-inch size housing
IO214	Input Output Module, 4 current measuring inputs, 4 voltage measuring inputs, 2 binary in-puts, 5 binary outputs, mounted in 1/6 or 1/3 19-inch size housing, reduced assembled variant of IO202
IO215	Input Output Module, 4 current measuring inputs, 4 voltage measuring inputs (designed for a measuring range up to 7.07 V) 8 binary inputs, 6 binary outputs, mounted in 1/6 or 1/3 19-inch size housing
IO230	Input Module, 48 binary inputs, mounted in 1/6 19-inch size housing
IO231	Input Output Module, 24 binary inputs and 24 binary outputs
PB201	Process-Bus Module, 7 LC Duplex interfaces of which 1 is a service port, mounted in 1/6 19-inch size housing

PRO EMV
LABOR STRAUSBERG



1050

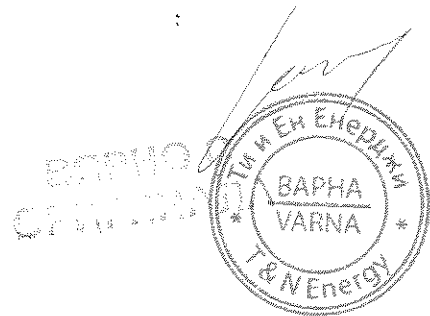


Application sheet of the Input and Output Boards of the Non-Modular Devices

Board	Functional description
IO101	Input Output Board, 4 current inputs, 8 binary inputs, 6 binary outputs, reduced assembled variant of IO102
IO102	Input Output Board, 4 current inputs, 4 voltage inputs, 8 binary inputs, 6 binary outputs
IO103	Input Output Board, 8 current inputs, 4 binary inputs, 4 binary outputs
IO110	Input Output Board, 12 binary inputs, 7 binary outputs

Function Description of Plug-in Modules of Modular and Non-Modular Devices

Plug-in module	Functional description
USART-xx ¹ -y ² EL	Serial communication module, electrical connection
USART-xx ¹ -y ² FO	Serial communication module, optical connection
USART-xx ¹ -y ² LDFO	Serial communication module for long distances, optical connection
ETH-xx ¹ -2EL	Ethernet module, electrical connection
ETH-xx ¹ -2FO	Ethernet module, optical connection
ANAI-CA-4EL	Measuring-transducer module
ARC-CD-3FO	Arc Protection module

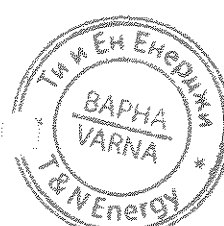




- 1 2 letters, unique code of the Module in the product code of the device
 2 1 = 1 channel, 2 = 2 channels

Appendix 1

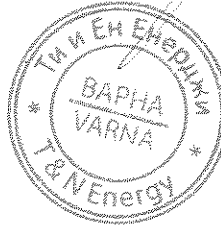
List of Test Reports

Report No.	Dated	Boards and plug-in modules included
PLE150818	2015-09-17	CP300, PS201, IO202, IO212, IO251, OSOP
PLE150810	2015-08-13	CP300, PS201, IO202, IO231, ETH-BA-2EL
PLE141104	2015-01-12	CP200, PS201, IO202, PB201
PLE140918	2014-09-26	CP100, PS101, IO102, IO110, USART-AE-2FO, ARC-CD-3FO
PLE140911	2014-09-12	CP200, PS201, IO202, ARC-CD-3FO
PLE140509	2014-05-22	CP100, PS101, IO103, ETH-BA-2EL, ARC-CD-3FO
PLE140415	2014-04-25	CP100, PS101, IO103, ETH-BA-2EL
PLE131210	2013-12-20	CP200, PS201, IO202, IO230, IO230, ETH-BA-2EL
PLE130921	2013-09-30	CP100, PS101, IO102, IO110
PLE130902	2013-09-04	CP100, PS101, IO102, IO110, ETH BA 2EL, USART-AE-2FO
PLE130809	2013-08-26	CP100, PS101, IO102, IO110, USART-AE-2FO, USART-AE-2FO
PLE130807	2013-08-13	CP200, PS201, 4 x IO202, IO204, 2 nd device row: PS203, IO206, IO209, IO204, IO202, IO230
PLE130601	2013-06-07	CP200, PS201, 5 x IO203
PLE130216	2013-02-27	CP200, PS201, IO202, IO204, IO211
PLE130105	2013-01-11	CP200, PS201, IO208, IO215, USART-AD-1FO, USART-AV-2LDFO
PLE121006	2012-10-11	CP200, PS201, IO202, IO202, ETH-BA-2EL
PLE120903	2012-09-10	CP200, PS201, IO203, IO208, IO203, CB202, ETH-BA-2EL, USART-AC-2EL, ANAI-CA-4EL, USART-AD-1FO, ETH-BA-2EL
PLE120513	2012-05-25	CP200, PS201, IO202, IO205, USART-AE-2FO, ANAI-CA-4EL
PLE110825	2011-08-25	CP200, PS201, IO208, IO205, IO209
PLE110501	2011-05-06	CP200, PS201, IO208, IO205, USART-AD-1FO, ETH-BB-2FO
PLE110204	2011-02-02	Device 1: CP200, PS201, IO202, ETH-BA-2EL, USART-AC-2EL Device 2: CP200, PS201, IO202, IO203, IO207, IO209, CB202, ANAI-CA-4EL, ANAI-CA-4EL, USART-AC-2EL, ANAI-CA-4EL
PLE110116	2011-01-24	CP200, PS201, IO202, ETH-BA-2EL, USART-AC-2EL
PLE110117	2011-01-31	CP200, PS201, IO202, IO203, IO207, IO209, CB202, ETH-BA-2EL, ANAI-CA-4EL, ANAI-CA-4EL, USART-AC-2EL, ANAI-CA-4EL
PLE101214	2010-12-21	CP200, PS201, IO202, IO208, IO205, IO209, CB202, ETH-BA-2FO, ETH-BA-2EL, USART-AE-2FO, USART-AC-2EL
PLE101213	2010-12-21	CP200, PS201, IO208, IO209, IO205, ETH-BA-2EL, USART-AC-2EL, detached on-site operation panel
PLE100720	2010-07-29	CP200, PS201, IO208, IO202, IO209, IO205, CB202, ANAI-CA-4EL, ETH-BA-2EL, ETH-BB-2FO, USART-AC-2EL, USART-AE-2FO
PLE100621	2010-06-30	CP200, PS201, IO208, IO202, IO209, IO205, CB202, ANAI-CA-4EL, ETH-BA-2EL, ETH-BB-2FO, USART-AC-2EL, USART-AE-2FO
PLE100502	2010-05-12	CP200, PS201, IO208, IO209, IO202, IO205, CB202, ANAI-CA-4EL, ETH-BA-2EL, ETH-BB-2FO, USART-AC-2EL, USART-AE-2FO



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Appendix 2

List of Standards

Product standards	Date of issue	Description
IEC 60255-1	2009	Measuring relays and protection equipment – Part 1: Common requirements
IEC 60870-2-1	1995	Telecontrol equipment and systems – Part 2: Operating conditions – Section 1: Power supply and electromagnetic compatibility
IEC 61850-3	2002	Communication networks and systems in substations – Part 3: General requirements
IEEE Std C37.90.1	2012	IEEE Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus
IEEE Std C37.90.2	2004	IEEE Standard for Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers

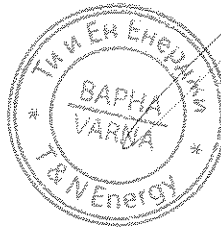
Generic standards	Date of issue	Description
IEC 61000-3-2	2009	Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤16 A per phase)
IEC 61000-3-3	2013	Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16 A per phase and not subject to conditional connection
IEC 61000-6-2	2005	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments
IEC 61000-6-4	2007	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments
IEC TS 61000-6-5	2001	Electromagnetic compatibility (EMC) – Part 6-5: Generic standards – Immunity for power station and substation environments

Standards for testing	Date of issue	Description
IEC 60255-11	replaced by IEC 60255-26	Measuring relays and protection equipment – Part 11: Voltage dips, short interruptions, variations and ripple on auxiliary power supply port
IEC 60255-22-1	replaced by IEC 60255-26	Electrical disturbance tests – 1 MHz burst immunity tests
IEC 60255-22-2	replaced by IEC 60255-26	Electrical disturbance tests – Electrostatic discharge tests
IEC 60255-22-3	replaced by IEC 60255-26	Electrical disturbance tests – Radiated electromagnetic field immunity
IEC 60255-22-4	replaced by IEC 60255-26	Electrical disturbance tests – Electrical fast transient/burst immunity test
IEC 60255-22-5	replaced by IEC 60255-26	Electrical disturbance tests – Surge immunity test



Deutsche
Akkreditierungsstelle
D-PL-12052-01-01

BAPHA
VARNA



Labor Strausberg GmbH

Standards for testing	Date of issue	Description
IEC 60255-22-6	replaced by IEC 60255-26	Immunity to conducted disturbances induced by radio frequency fields
IEC 60255-22-7	replaced by IEC 60255-26	Electrical relays – Part 22-7: Electrical disturbance tests for measuring relays and protection equipment – Power frequency immunity tests
IEC 60255-25	replaced by IEC 60255-26	Electromagnetic emission tests for measuring relays and protection equipment

Standards for testing	Date of issue	Description
IEC 60255-26	2013	Measuring relays and protection equipment – Part 26: Electromagnetic compatibility requirements (with reference to IEC 61000 and CISPR)
IEC 61000-4-2	2008	Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test
IEC 61000-4-3	2010	Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test
IEC 61000-4-4	2012	Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test
IEC 61000-4-5	2005	Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test
IEC 61000-4-6	2013	Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields
IEC 61000-4-8	2009	Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test
IEC 61000-4-9	2001	Electromagnetic compatibility (EMC) – Part 4-9: Testing and measurement techniques – Pulse magnetic field immunity test
IEC 61000-4-11	2004	Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests
IEC 61000-4-16	2011	Electromagnetic compatibility (EMC) – Part 4-16: Testing and measurement techniques – Test for immunity to conducted, common mode disturbances in the frequency range 0 Hz to 150 kHz
IEC 61000-4-17	2009	Electromagnetic compatibility (EMC) – Part 4-17: Testing and measurement techniques – Ripple on d.c. input power port immunity test
IEC 61000-4-18	2011	Electromagnetic compatibility (EMC) – Part 4-18: Testing and measurement techniques – Damped oscillatory wave immunity test
IEC 61000-4-29	2000	Electromagnetic compatibility (EMC) – Part 4-29: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests
CISPR 11	2010	Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement
CISPR 16	2013	Specification for radio disturbance and immunity measuring apparatus and methods
CISPR 22	2008	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement

Test lab

CERTIFICATE of QUALITY TEST



DAP-PL-3439.00

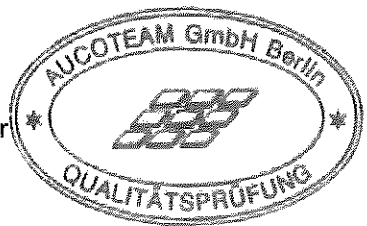
according to DIN 55 350 - 18 - 4.3.4.

Test report - No. 7829.01 / 10

Client	Siemens AG Energy Sector E D E A D S C 12 Wernerwerkdammm 5 13629 Berlin	
Equipment under test	Protection Relay 1/3 basic device 1/6 extension device PCBs	SIPROTEC 5 (combined) 1/3 of 19" for panel flush mounting 1/6 of 19" for panel flush mounting PS201-3-4, IO203-1-4, CP200-3, IO209-2, USART_el.-2, Ethernet_opt.-2
Purpose	Environmental test of the climatic resistance	
Test program	Damp heat, cyclic	<i>according to IEC 60068-2-30</i>
Test period	8 April to 15 April 2010	
Realization / results	see page 2 to 3	
Test result	After the test with damp heat no corrosive damages or other changes was detected at the specimen. The functional performance was ensured at any time. The further evaluation will be done by the client.	



R. Lein
Dipl.-Ing. R. Lein
head of test lab / test manager
Berlin, 27 April 2010



M. Geburzig
Dipl.-Ing. M. Geburzig
test engineer



F. 1055

1055

1 Purpose

Environmental test of the climatic resistance under defined environmental conditions, according to the standards and to the demands of the client.

2 Equipment under test (EUT)

Protection Relay	SIPROTEC 5, Line Protection, 7SL8x
1 combined device	device 308 (2 devices combined)
$\frac{1}{3}$ basic device	PS201-3-4, IO203-1-4, CP200-3,
	USART_el.-2, Ethernet_opt.-2
$\frac{1}{6}$ extension device	IO209-2
delivery date of the EUT	8 April 2010

3 Basics

3.1 Demands of the client

3.2 Used standards

IEC 60068-1 / 1988 and "Environmental testing Part 1 -	DIN EN 60068-1 / 03.95 General and guidance"
IEC 60068-2-30 / 1980 and "Environmental testing Part 2 -	DIN EN 60068-2-30 / 02.00 Test Db: Damp heat, cyclic (12 + 12 hour cycle)"

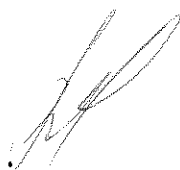
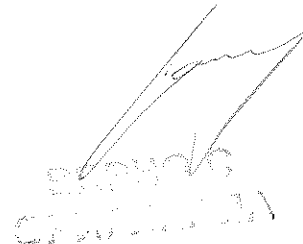


4 Test program

Damp heat cyclic – test Db
according to IEC 60068-2-30

specimen	operating	
lower temperature	(+25 ± 2)°C	
relative humidity	(95 ± 3) %	
upper temperature	(+55 ± 2)°C	
relative humidity	(93 ± 3) %	
storage duration	each 9 h	
transfer duration	each 3 h	(0,17 K/min)
test duration	6 d	(6 cycles each 24 h)

Visual inspection

Before and after each test, the specimen shall be examined visually for possible corrosive, thermal and mechanical damages.

5 Realization

The environmental tests were carried out one by one according to the program of testing methods (complex 4), according to the standards and to the demands of the client.

Visual inspection

Before and after each test, the specimen was examined visually for possible corrosive, thermal and mechanical damages.

Measuring and test equipment

climatic chamber 20 KPK 200 (SN: 075/02, Feutron, calibrated till 11.2010)
power supply UP60-3.5 (Lambda)

climatic protocol see appendix 1

Pictures see appendix 2

6 Results

After the test of the **combined Protection Relay SIPROTEC 5** with

- **Damp heat, cyclic** (25°C, 95 % / 55°C, 95 %, 6 cycles each 24 h)

- **test Db**

the no corrosive or other damages were detected at the specimen.

The functional performance during and after the test was ensured at any time.

**After the test with damp heat no corrosive damages
or other changes was detected at the specimen.
The functional performance was ensured at any time.
The further evaluation will be done by the client.**

The results of the test only refer to the above mentioned equipment under test.

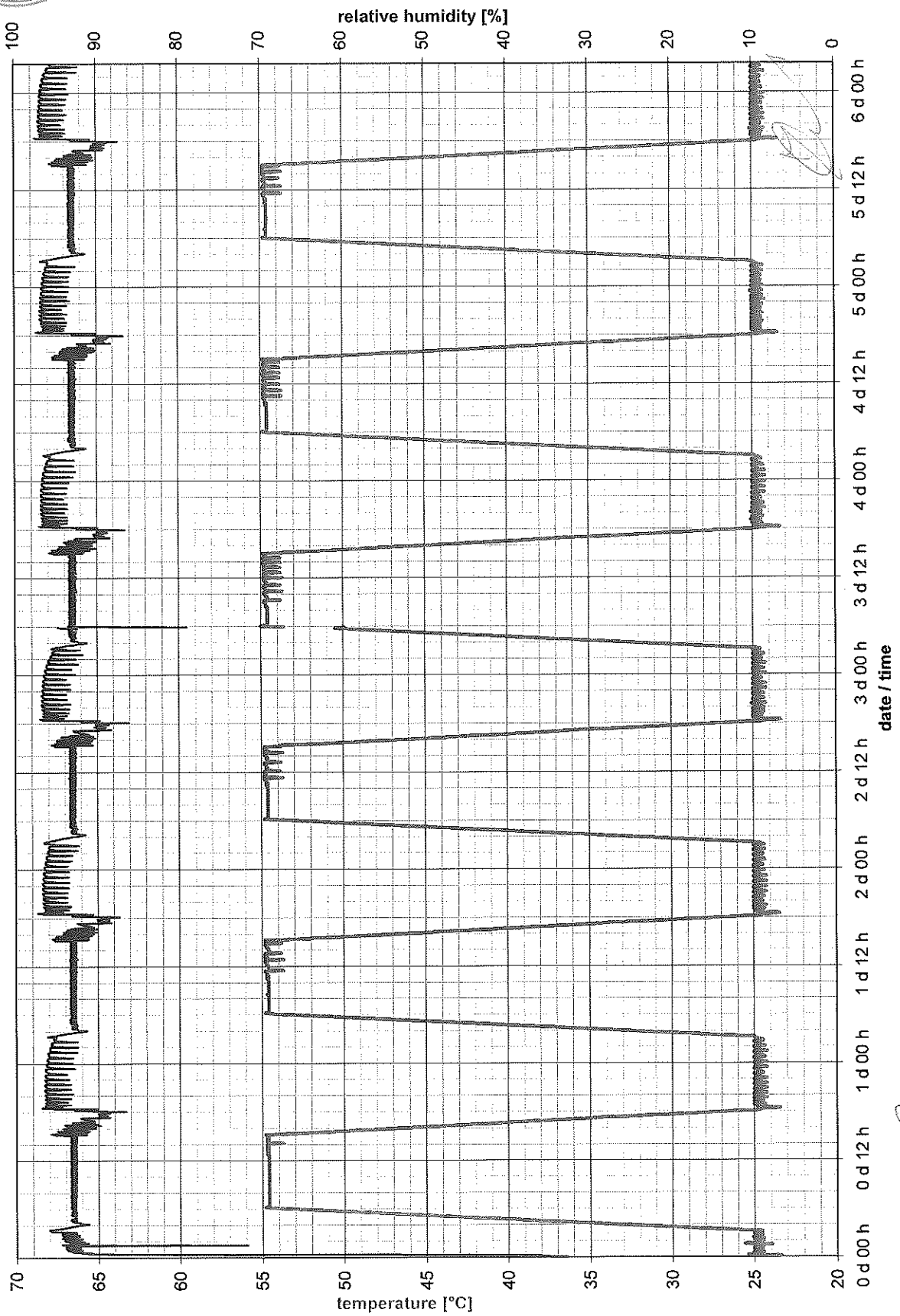
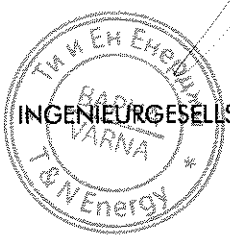
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appendix 1 – climatic protocol

appendix 2 – pictures



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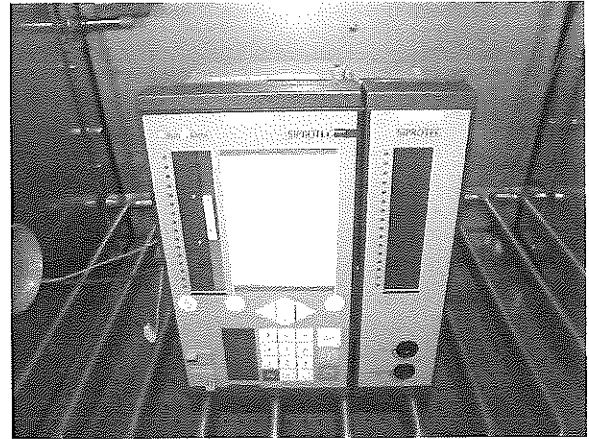
Climatic protocol of the test with damp heat cyclic

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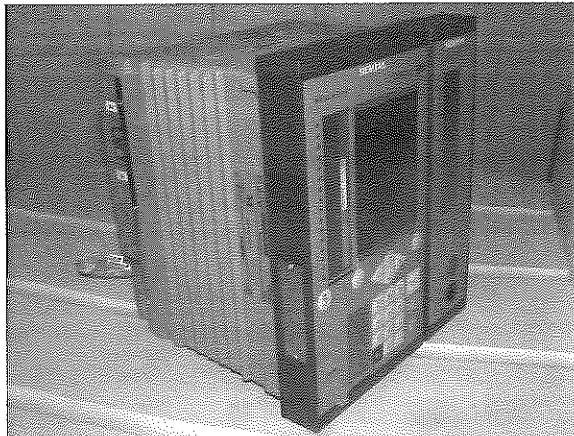
Pictures



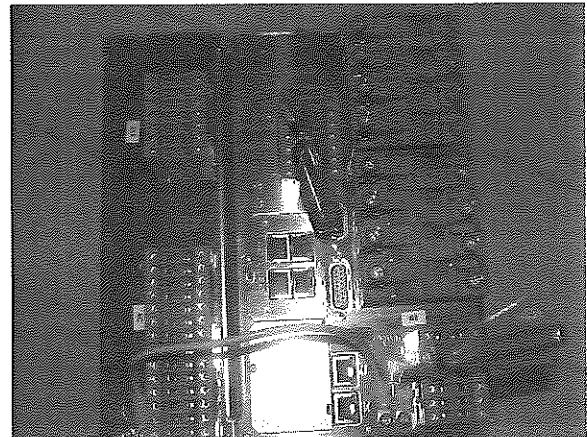
picture 1
Protection Relay SIPROTEC 5
in the climatic chamber KPK 20
during damp heat, cyclic



picture 2
Protection Relay SIPROTEC 5
in the climatic chamber KPK 20
during damp heat, cyclic



picture 3
Protection Relay SIPROTEC 5
no corrosive damages
after damp heat, cyclic



picture 4
Protection Relay SIPROTEC 5
no corrosive damages
after damp heat, cyclic

DEPNO G
СРЪН ПЛНИА



Test lab

CERTIFICATE of QUALITY TEST



according to DIN 55 350 - 18 - 4.3.4.

Test report - No. 7862 / 10

Client
Siemens AG
Energy Sector
 E D E A D SC 12
 Wernerwerkdamm 5
 13629 Berlin

Equipment under test
Protection Relay
 1/3 basic device
 1/6 extension device
 PCBs

SIPROTEC 5 (combined)
 1/3 of 19" for panel flush mounting
 1/6 of 19" for panel flush mounting
 PS201-3, IO208-2, CP200-3, IO202-3

Purpose **Environmental test of the climatic resistance**

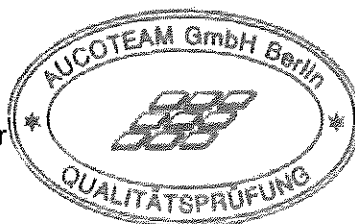
Test program **Temperature shock** according to IEC 60068-2-14

Test period 6 May to 16 May 2010

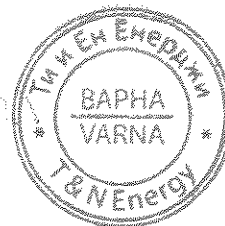
Realization / results see page 2 to 3

Test result
 After the test with Temperature shock no thermal damages or other changes was detected at the specimen.
 The functional performance was ensured after the test.
 The further evaluation will be done by the client.

P. L.
 Dipl.-Ing. R. Lein
 head of test lab / test manager
 Berlin, 17 May 2010



M. Geburtig
 Dipl.-Ing. M. Geburtig
 test engineer



1 Purpose

Environmental test of the climatic resistance under defined environmental conditions, according to the standards and to the demands of the client.

2 Equipment under test (EUT)

Protection Relay	SIPROTEC 5, Line Protection, 7SL8x
1 combined device	2 devices combined
1/3 basic device	PS201-3, IO208-2, CP200-3,
1/6 extension device	IO202-3
date of manufacturing	February 2010
delivery date of the EUT	5 May 2010



3 Basics

3.1 Demands of the client

3.2 Used standards

IEC 60068-1:1988 + Corr. 1988 + A1:1992 **DIN EN 60068-1:1995-03**
 „Environmental testing - Part 1: General and guidance“

IEC 60068-2-14:2009 **DIN EN 60068-2-14; VDE 0468-2-14:2010-04**
 „Environmental testing - Part 2-14: Tests - Test N: Change of temperature“

4 Test program

Temperature shock – test Na

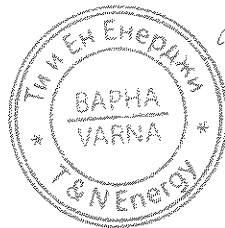
according to IEC 60068-2-14

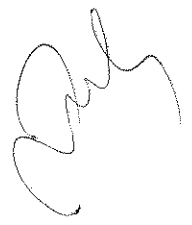
specimen	not operating
lower temperature	(- 25 ± 2)°C
upper temperature	(+70 ± 2)°C
storage duration	each 2:00 h
transfer duration	each < 10 s
test duration	10 d (60 cycles each 4:00 h)

Visual inspection

Before and after the test, the specimen shall be examined visually for possible corrosive, thermal and mechanical damages.

ЕАРМО С
СРМ. 2010



5 Realization

The environmental tests were carried out one by one according to the program of testing methods (complex 4), according to the standards and to the demands of the client.

Visual inspection

Before and after each test, the specimen was examined visually for possible corrosive, thermal and mechanical damages.

Measuring and test equipment

temperature shock chamber 49 TSS 2 x 125 (SN: VMS 2/08/22/120, Heraeus, calibrated till 01.2010)
power supply UP60-3.5 (Lambda)

climatic protocol see appendix 1

Pictures see appendix 2

6 Results

After the test of the **Protection Relay SIPROTEC 5 (combined device)** with

- **Temperature shock** (- 25°C / +70°C, 60 cycles each 4:00 h) – **test Na**

no thermal, corrosive or other damages were detected at the specimen.

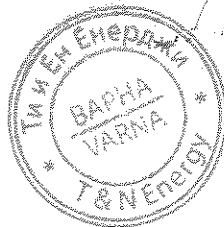
The functional performance after the test was ensured.

**After the test with Temperature shock no thermal damages or other changes was detected at the specimen.
The functional performance was ensured after the test.
The further evaluation will be done by the client.**

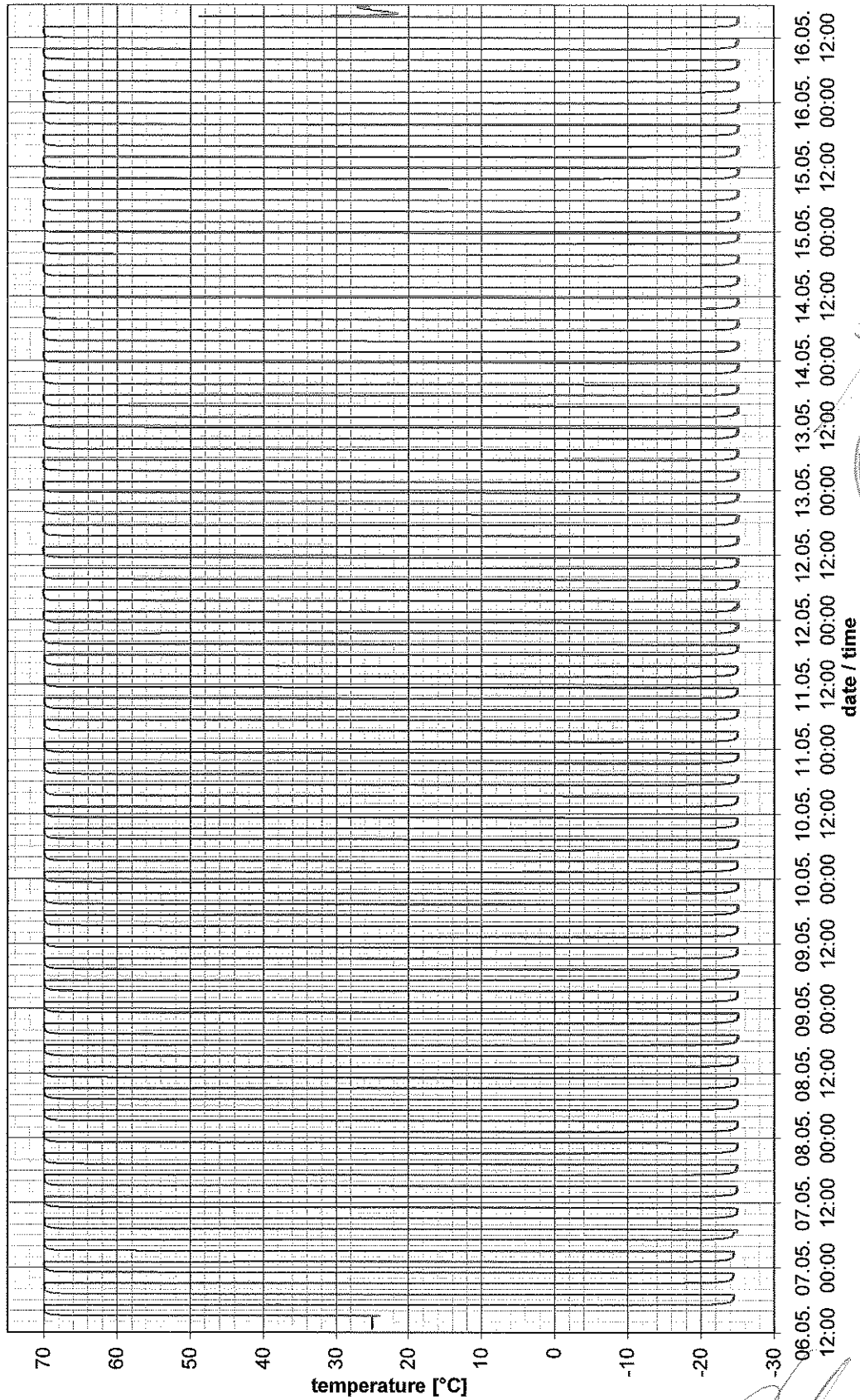
The results of the test only refer to the above mentioned equipment under test.
The report or individual pages of this test report may only be copied following the written consent of the test laboratory. The test report-No. 7862 / 10 includes 3 pages and appendix 1 and 2.

appendix 1 – climatic protocol

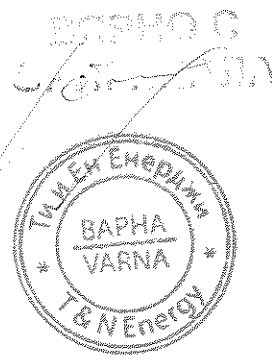
appendix 2 – pictures



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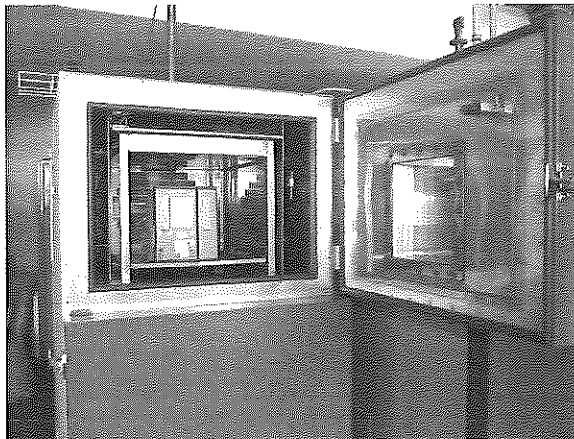
Temperature protocol of the test with Temperature shock



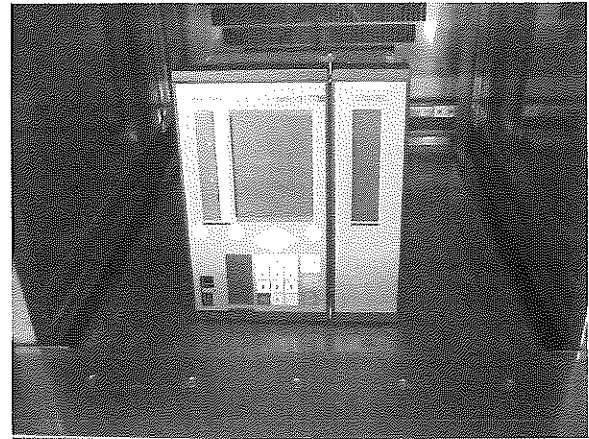
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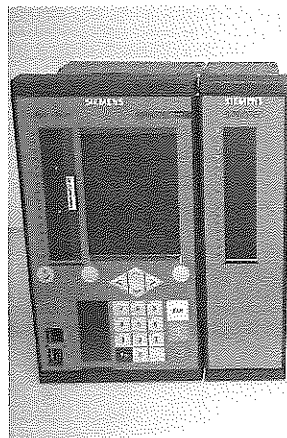
Pictures



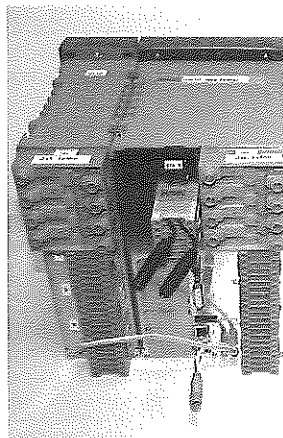
picture 1
 Protection Relay SIPROTEC 5
 in the temperature shock chamber TSS 49
 during Temperature shock



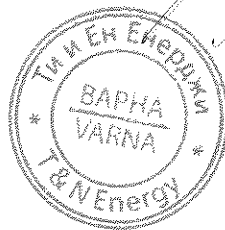
picture 2
 Protection Relay SIPROTEC 5
 in the temperature shock chamber TSS 49
 during Temperature shock



picture 3
 Protection Relay SIPROTEC 5
 no thermal damages
 after Temperature shock



picture 4
 Protection Relay SIPROTEC 5
 functional performance ensured
 after Temperature shock




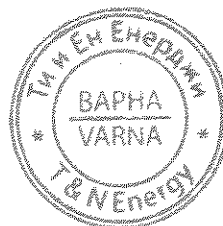
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EMC TEST REPORT	
Customer specific test plan	
Report Reference No.	G0M-1507-4895-EE02-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	 AZLA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Filed Test Laboratory, Reg.-No.: 96970 IC DATS Filing assigned code: 3470A
Applicant's name	Siemens AG - Energy Management Digital Grid
Address	Wernerwerdamm 5 13629 Berlin Germany
Test specification:	In accordance with customer requests
Standard	IEC 61000-4-18:2006(A);2010
Non-standard test method	None
Test scope	partial EMC compliance test



Test Report No.: G0M-1507-4895-EE02-V01

 Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

1065

Equipment under test (EUT):	
Product description	SIPROTEC 5 Modular
Model No. 1	7SL87
Model No. 2	6MD86
Model No. 3	7UT85
Model No. 4	7KE85
Model No. 5	7UM85
Additional Models	None
Hardware Version Model No. 1	7SL87-DAAA-AA0-0AAAA0-A91211-13111A-DBACAC-DACAA0-CH1BA2-EA0CLO-CJ0BB2
Hardware Version Model No. 2	6MD86-DAAA-AA0-0AAAA0-A90111-13111B-AAYCAA-GAVAA0-CB3BA1-CE0CDO-CG0BB1
Hardware Version Model No. 3	7UT85-DAAA-AA0-0AAAA0-A90111-12111A-WAE000-000AA0-CC1BA1-CF0CC1
Hardware Version Model No. 4	7KE85-DAAA-AA0-0AAAA0-A94212-23112B-ABACAA-CABAA1-CL0BA2-BB2
Hardware Version Model No. 5	7UM85-DAAA-AA0-0AAAA0-A90111-33112A-AA0000-000AC0-CB2BA1-CM0EB0
Software / Firmware Version Model No. 1	V06.03.01
Software / Firmware Version Model No. 2	V06.03.01
Software / Firmware Version Model No. 3	V06.03.00
Software / Firmware Version Model No. 4	V06.02.00
Software / Firmware Version Model No. 5	V07.00.30
Test result	Passed

Test Report No.: G0M-1507-4895-EE02-V01

 Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany



Possible test case verdicts:

- neither assessed nor tested: N/N
- required by standard but not appl. to test object.....: N/A
- required by standard but not tested.....: N/T
- not required by standard for the test object.....: N/R
- test object does meet the requirement.....: P (Pass)
- test object does not meet the requirement.....: F (Fail)

Testing:

Date of receipt of test item.....: 2015-08-13

Date (s) of performance of tests.....: 2015-09-10 – 2015-10-08

Compiled by.....: Steffen Zünke

Responsible for the tests (+ signature): Steffen Zünke

Approved by (+ signature).....: Marcus Klein

Date of issue.....: 2015-10-16

Total number of pages.....: 44

General remarks:

The test results presented in this report relate only to the object tested.
 The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory.

Additional comments:

Test Report No.: GOM-1507-4895-EE02-V01

Eurofins Product Service GmbH
Storkower Str. 38c, D-15528 Reichenwalde, Germany

Version History

Version	Issue Date	Remarks	Revised by
V01	2015-10-16	Initial Release	

ВЯРНО С
ОРИГИНАЛА



Test Report No.: GOM-1507-4895-EE02-V01

Eurofins Product Service GmbH
Storkower Str. 38c, D-15528 Reichenwalde, Germany

2066

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3.1	Test Conditions and Results – Damped oscillatory wave immunity	34

ВАРНА
 ОФИЦИАЛНА

1 Equipment (Test item) Description

Description	SIPROTEC 5 Modular
Model 1 (EUT_07)	7SL87
Serial number	BM1410002158
Hardware version	7SL87-DAAA-AA0-0AAAA0-A91211-13111A-DBACAC-DACAA0-CH1BA2-EA0CLO-CJ0BB2
Software version	V06.03.01
Model 2 (EUT_09)	6MD86
Serial number	BM1410001763
Hardware version	6MD86-DAAA-AA0-0AAAA0-A90111-13111B-AAAYCAA-GAVAA0-CB3BA1-CE0CD0-CG0BB1
Software version	V06.03.01
Model 3 (EUT_11)	7UT85
Serial number	BM1410002174
Hardware version	7UT85-DAAA-AA0-0AAAA0-A90111-12111A-WAE000-000AA0-CC1BA1-CF0CQ1
Software version	V06.03.00
Model 4 (EUT_13)	7KE85
Serial number	BM1410001321
Hardware version	7KE85-DAAA-AA0-0AAAA0-A94212-23112B-ABACAA-CABAA1-CL0BA2-BE2
Software version	V06.02.00

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Model 5 (EUT_04)	7UM85
Serial number	BMDDDD123456 (Prototype)
Hardware version	7UM85-DAAA-AA0-0AAAA0-A90111-33112A-AAA000-000AC0-CB2BA1-CM0EB0
Software version	V07.00.30
Additional Models	None
Manufacturer	Siemens AG - Energy Management Digital Grid Wernerwerkdamn 5 13629 Berlin Germany
Ratings / Power supply EUT_07	24 VDC
Ratings / Power supply EUT_09	60 VDC
Ratings / Power supply EUT_11	60 VDC
Ratings / Power supply EUT_13	24 VDC
Ratings / Power supply EUT_04	60 VDC
Number of tested samples	one from every type
Protective Earth / Ground	None
Functional Earth	Yes

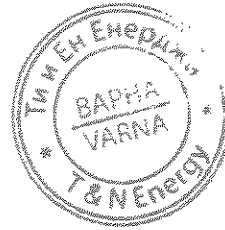
Test Report No.: G0M-1507-4895-EE02-V01

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Hardware module from EUT_07 7SL87

HW-Module	PCBA	Serial Number
CP200	BF1410039223	C53207A 601B211 4
IO208	BF1409021505	C53207A 601B380 4
PS201	BF1408020577	C53207A 601B110 4
IO230	BF1408030093	C53207A 601B620 1
IO211	BF1409021537	C53207A 601B410 2
IO209	BF1406020870	C53207A 601B390 4
CB202	BF1302587697	C53207A 601B120 3
USART-AD-1FO	BF1409022515	C53207A 602B190 2
ETH-BA-2EL	BF1409069923	C53207A 602B100 1
ARC-CD-3FO	BF1409036336	C53207A 602B342 2
USART-AC-2EL	BF1410021352	C53207A 602B150 1
ANAI-CA-4EL	BF1409059620	C53207A 602B300 2

 ВАРНА
 ОФИС


Test Report No.: G0M-1507-4895-EE02-V01

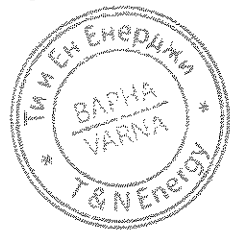
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Product Service

Hardware module from EUT_09 6MD86

HW-Module	PCBA	Serial Number
CP200	BF1409068474	C53207A 601B211 4
IO202	BF1409069596	C53207A 601B320 4
PS201	BF1409069392	C53207A 601B111 4
IO205	BF1409056651	C53207A 601B350 4
IO204	BF1409007513	C53207A 601B340 2
IO207	BF1409069783	C53207A 601B370 4
CB202	BF1406037544	C53207A 601B121 3
ETH-BA-2EL	BF1409069910	C53207A 602B100 1
USART-AY-2LDFO	BF1410025921	C53207A 602B110 1
USART-AG-1LDFO	BF1409021790	C53207A 602B230 1
USART-AV-2LDFO	BF1410025551	C53207A 602B110 1
ANAI-CA-4EL	BF1410021384	C53207A 602B300 2



Test Report No.: GOM-1507-4895-EE02-V01
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Storktower Str. 38c, D-15526 Reichenwalde, Germany

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Product Service

Hardware module from EUT_11 7UT85

HW-Module	PCBA	Serial Number
CP200	BF1410039183	C53207A 601B211 4
IO203	BF1410021068	C53207A 601B330 4
PS201	BF1409069390	C53207A 601B111 4
IO206	BF1409069725	C53207A 601B360 4
IO215	BF1304019218	C53207A 601B450 3
USART-AW-2LDFO	BF1410039654	C53207A 602B110 1
USART-AE-2FO	BF1407054457	C53207A 602B180 2

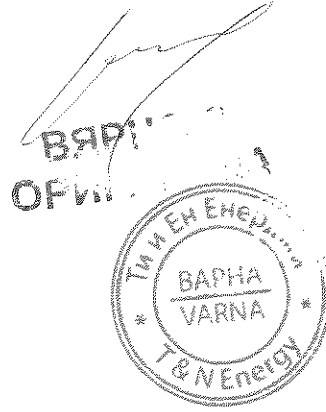
Hardware module from EUT_13 7KE85

HW-Module	PCBA	Serial Number
CP200	BF1409069462	C53207A 601B211 4
IO211	BF1409021542	C53207A 601B410 2
PS201	BF1408020569	C53207A 601B110 4
CB202	BF1302587694	C53207A 601B120 3
ETH-BA-2EL	BF1409069915	C53207A 602B100 1
ETH-BA-2EL	BF1409069897	C53207A 602B100 1
USART-AC-2EL	BF1410021355	C53207A 602B150 1
USART-AB-1EL	BF1405083526	C53207A 602B160 1
ANAI-CA-4EL	BF1409059584	C53207A 602B300 2

Test Report No.: GOM-1507-4895-EE02-V01
Eurofine Product Service GmbH
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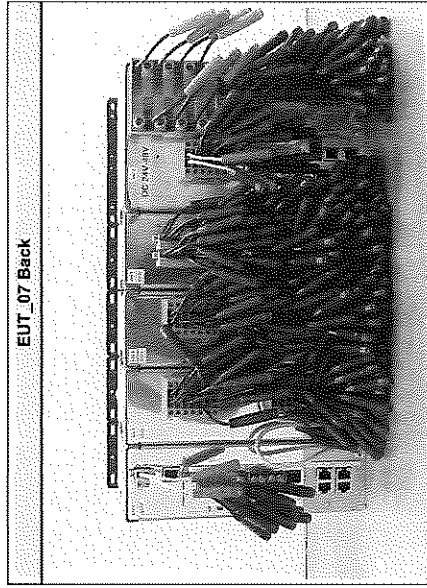
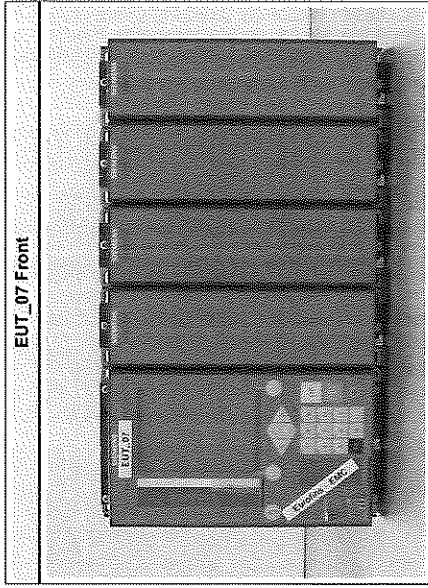
Hardware module from EUT_04 7UM85

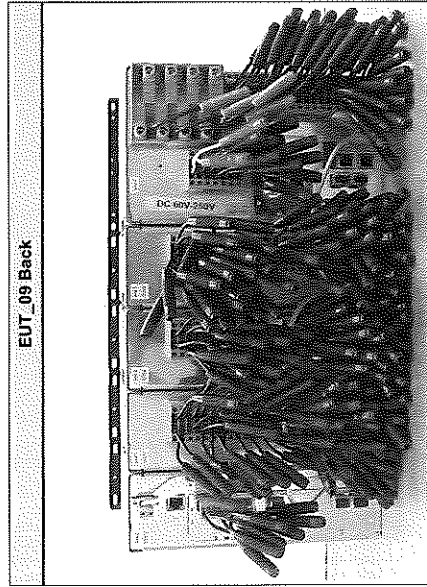
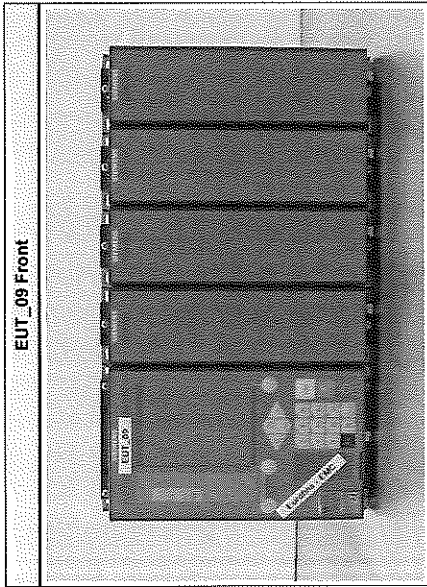
HW-Module	PCBA	Serial Number
CP300	BF1507021118	C53207-A601-B282-2
IO202	BF1506087310	C53207-A601-B320-4
PS201	BF1506086526	C53207-A601-B111-4
IO212	BF1210047678	C53207-A601-B420-1
IO231	BF1506069113	C53207-A601-B621-1
	BF1506069111	C53207-A601-B620-1



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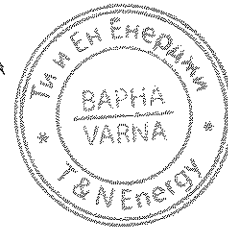
1.1 Equipment photos





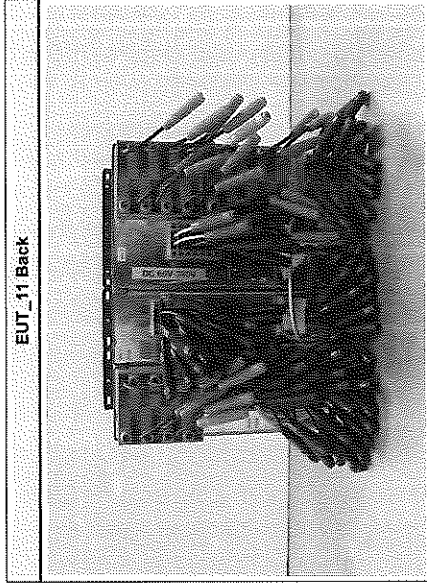
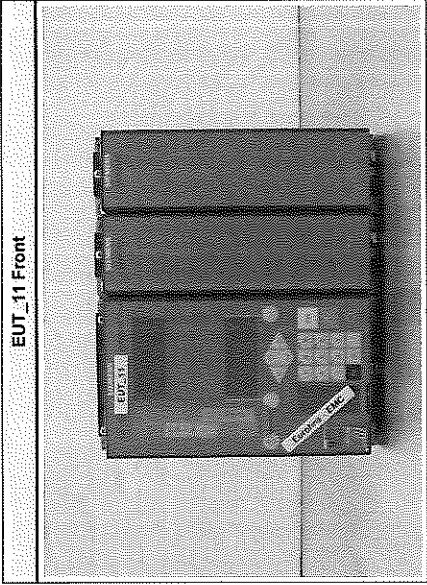
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ВЯРНО
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74101422-MOC/INC 13-2437

Conformance test report of the IEC60870-5-103 protocol implementation in the Siemens SIPROTECS 7SL87 Device

Arnhem, December 17, 2012

Autor: PHS Ermans
KEMA Nederland B.V.

By order of Siemens

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1 INTRODUCTION

1.1 Background

Siemens manufactures digital equipment that can be used in substations. Siemens has implemented the IEC 60870-5 Telecontrol Companion Standard 103 in the SIPROTECS 7SL87 device for communication with a Master system. The IEC 6080-5 Telecontrol Companion Standard 103 (TCS103) can be used to transport control and data acquisition information like measurands, status messages and disturbance data.

Figure 1 shows the configuration of the test environment for the SIPROTECS 7SL87 and the scope of the conformance test.

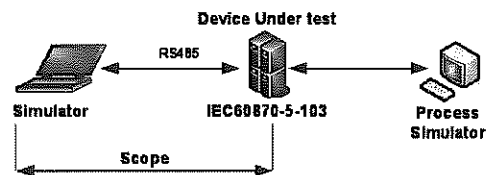


Figure 1 Configuration of the target environment

An overview and description of the actual test environment is given in Chapter 2.

DNV KEMA's assignment was to answer the following question:

"Does the Siemens IEC60870-5-103 Slave protocol implementation V2 in the SIPROTECS 7SL87 conform to the IEC60870-5-103 Companion Standard and the Siemens IEC 60870-5-103 Interoperability List?"

To answer this question, DNV KEMA has performed a conformance test of the Siemens 60870-5-103 slave protocol implementation in the SIPROTECS 7SL87.

1.2 Testing Viewpoints

There are two viewpoints for testing: conformance testing and Interoperability testing.

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The first testing viewpoint, **conformance testing**, is the process of verifying that an implementation performs in accordance with a particular standard. A manufacturer may claim: "my equipment is conformant to standard ISO/IEC xxx-x". Conformance testing enables such a claim to be investigated and assessed by an objective and independent institute, like DNV KEMA, to establish its validity. The test may result in certification by means of an Attestation of Conformity, guaranteed by DNV KEMA, for the tested implementation version in that equipment. DNV KEMA maintains a list of conformance-tested and approved equipment with IEC 870-5 implementations (see www.dnvkema.com).

The second viewpoint, **Interoperability testing**, shows whether or not a protocol implementation, installed in one product, can be used to exchange information with another product which has implemented the same protocol. No direct attention is paid to the implementation of the protocol itself. After completion of the tests, there is no guarantee that the protocol implementation is in accordance with that particular standard. It is clear, however, whether or not the protocol functions required in order to exchange information can work together to accomplish the required task.

1.2 Purpose of this document

The purpose of this document is to describe the results of the type test of the IEC 870-5-103 implementation in the System Under Test [further SUT]. As such, the audience for this report consists of product development departments and customers that are interested in detailed features. The conformance test was executed at DNV KEMA, Arnhem, The Netherlands from December 10 till December 13, 2012. The results will form the basis for an Attestation of Conformance. This Attestation is primarily of interest to product marketers and customers, as a proof of independent verification of minimized interoperability risks.

This test is performed on basis of the IEC60870-5-103 standard and the Siemens IEC 60870-5-103 interoperability List.

1.3 Contents of this document

Chapter 2 describes the various relevant components for the type test and their configuration as used in the type test, including the System Under Test. This chapter also gives an overview and introduction to the various test groups that together constitute the type-test. Chapter 3 gives an overview and summary of the test results, the conclusion(s) and recommendations based on the conclusions. The summary contains two defect categories for defects found during the type test: a Major category and a Minor category. Also a Remarks category is introduced. These categories are further explained in this chapter. Chapter 4 shows the interoperability list. Chapter 5 specifies the detailed results of the test cases.

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2 THE CONFORMANCE TEST

2.1 Components in the test environment

The test environment consists of the following components:

- the System Under Test (SUT): SIPROTEC5 7SL87 acting as the slave (Serial no 17044617);
- UniECim version 2.25.01 (April 2012) protocol test platform, which runs the CS103MasterNormal2.4.uts simulator test suite and acts as a single-node Master station in unbalanced mode;
- ADAM-4520 Isolated RS-422/485 Converter, to convert from the serial port (RS232) on the test laptop to RS485.

Figure 2 shows the (simple) layout of the connected test components.

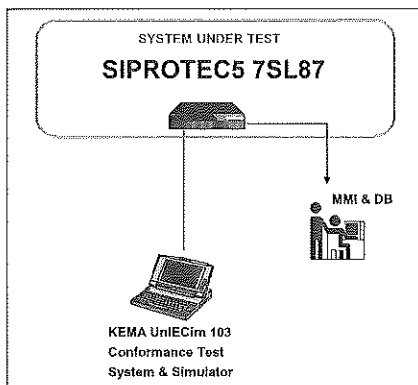


Figure 2: Test environment layout

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1.4 Normative references

The tests defined in this document are based on the following IEC (International Electrotechnical Committee) documents in the IEC 870-5 range: Telecontrol equipment and systems part 5: Transmission protocols:

1. IEC 870-5-1: TELECONTROL EQUIPMENT AND SYSTEMS, PART 5, Transmission protocols: Transmission Frame Formats, IS (International Standard), 1990, further referred to as [IECS-1]
2. IEC 870-5-2: TELECONTROL EQUIPMENT AND SYSTEMS, PART 5, Transmission protocols: Link Transmission Procedures, IS, 1992, further referred to as [IECS-2]
3. IEC 870-5-3: TELECONTROL EQUIPMENT AND SYSTEMS, PART 5, Transmission protocols: General Structure of Application Data, IS, 1992, further referred to as [IECS-3]
4. IEC 870-5-4: TELECONTROL EQUIPMENT AND SYSTEMS, PART 5, Transmission protocols: Definition and Coding of Application Information Elements, IS, 1993, further referred to as [IECS-4]
5. IEC 870-5-5: TELECONTROL EQUIPMENT AND SYSTEMS, PART 5, Transmission protocols: Basic Application Functions, IS, 1995, further referred to as [IECS-5]
6. IEC 60870-5-103: Companion Standard for the Informative Interface of Protection Equipment, IS, June 1998, further referred to as [IECS-103]

1.5 Other References

1. Siemens IEC 60870-5-103 Interoperability List, Document Version 1.0, Date 2/14/2012.

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2.1.1 SUT requirements

Next to the CS103 communication capability specified in the PID, the System Under Test must support the following requirements for control and simulation purposes during testing, e.g. via additional test equipment attached to the SUT or one or more configured and running operator MMI stations:

- Display the current values of the Information Elements described in I/O list, mapped to visible MMI-elements
- Manually shut down and restart or equivalent
- Manually cut-off of the connection to the communication link
- Manually activate the supported Basic Application Functions
- Direct physical connection to the communication link.

2.1.2 SUT configuration

The configuration of the SUT is as follows:

- The telecontrol communication modes are Unbalanced Master-Slave capable of using fixed (point-to-point) communication lines, and UniECim and the SUT are respectively acting as the (simulated) Slave and Master
- FT1.2 frames at maximum 19200 bps¹, 8 data bits, even parity, and 1 stop bit
- 1 octet for data link address
- 1 octets for the Common address of ASDU (same address as link address)
- 1 octet for the Information Object Addresses (see next section)
- Further details of the implemented protocol (interoperability sheet) subset can be found in Chapter 4, Protocol Implementation Conformance Statement (PICS). The PICS forms the basis for the applicable test cases performed as described in Chapter 5.

2.1.3 UniECim test system requirements

The UniECim IEC 60870-5 protocol test platform is DNV KEMA's test system for testing IEC 60870-5 protocol implementations. The UniECim software supports real-time data capturing, analysis and decoding, combined with construction of frames and real-time script execution for simulation of conforming (positive) as well as non-conforming (negative) communication functions. UniECim softwares automatically execute all scripts (test cases) in a so-called test suite.

UniECim is the test tool for testing Master, Slave and peer implementations based on the IEC 870-5 Telecontrol Companion Standard 103 (TCS 103) for the informative interface for protection equipment.

¹ Configurable as in the PID

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2.2 Overview of the test suite

2.2.1 Tests on physical level

For signal transmission between both end systems the V24/V28 (the well-known EIA232 standard) interface with interface connector (ELA DB9) is used. UniECim checks constantly physical level failures. The SUT can send and receive octets after connecting the systems. The tests are passed if the physical connection doesn't fail permanently. Some of the additional tests defined in Chapter 5 are performed on physical level.

2.2.2 Tests on link level

The tests on link level are automatically performed by the UniECim test system on each transmitted frame. The tests are passed if no error is reported during a test session. If relevant, redundant link tests are defined in Chapter 5.

2.2.3 Tests on application level

The Basic Application Functions (BAFs) tests defined in the tables of Chapter 5 are performed by a combination of automatic verification and manual expert analysis for each test case if applicable. The tests have passed if no defects are found during a test session.

2.2.4 Negative tests

The Negative tests defined in Chapter 5 are performed by a combination of automatic verification and manual expert analysis for each applicable test case. The tests have passed if the SUT continues correct operation, that is: does not send corrupted frames and reacts in a correct and sensible manner.

The SUT may not fail permanently when receiving:

- Corrupted frames
- Illegal functions
- Not supported functions
- Not supported Basic Application Functions (BAF) or ASDU's.



3 TEST RESULTS

Table 1 in this Chapter gives a summary of the type test results. Numbers shown in the table columns refer to test numbers of individual test cases in Chapter 5.

Major defects are a certain cause for operational risks: these MUST be corrected before going into an operational situation! They imply the test is failed.

A minor defect is non-conformant behaviour, and can have a negative influence on the use of the product in specific configurations. Minor defects are a potential cause for operational problems. Therefore in a type test they also imply the test is failed. In interoperability tests a minor defect could pass the test, depending on the severity of the defect. In configurations with different products and/or different manufacturers these minor defects in the implementation are a potential risk for the interoperability when not taken into account before going into an operational situation.

Finally, remarks introduce additional observations about the test case results, like limitations in the implementation.

The Protocol Implementation Conformance Statement (PICS) in Chapter 4 is the basis for the applicable test cases in Chapter 5. The PICS gives an overview of the tested protocol implementation, but this isn't a guarantee that the complete function or ASDU, as enabled in the PICS, is tested and supported. Partial testing is possible and the completeness of the tests for the specific function or ASDU should be consulted in Chapter 5.

BERNARD
C. W. J. ...



Table 1 Summary of test results for the System Under Test

Test Group	Major	Minor	Remarks on test case number	Verdict
Table 1 Link Level	-	-	2, 71	Passed
Table 2 Data Unit Identifier	-	-	-	Passed
Table 3 Information object	-	-	-	Passed
Table 4 ASDU in monitor direction	-	-	-	Passed
Table 5 ASDU in control direction	-	-	-	Passed
Table 6 Initialization function	-	-	-	Passed
Table 7 Data acquisition by polling function	-	-	4002, 4004	Passed
Table 8 Cyclic data transmission function	-	-	5000, 5001	Passed
Table 9 Acquisition of events	-	-	-	Passed
Table 10 General interrogation function	-	-	-	Passed
Table 11 Clock synchronization function	-	-	8100	Passed
Table 12 Command transmission function	-	-	-	Passed
Table 13 Transmission of disturbance data	-	-	13021	Passed
Table 15 Companion Standard specific functions	-	-	-	Passed
a. Blocking of monitoring direction	-	-	-	Passed
b. Generic Services	-	-	15103	Passed
c. Test mode	-	-	-	Passed
d. Local parameter setting	-	-	-	N.A.
Table 20 Implementation-specific tests	-	-	20100	Passed
Table 21 Negative tests	-	-	-	Passed
TOTALS	0	0	16	Passed

* N.A. = Not Applicable

3.1 Conformance Test Conclusion

The assignment was to give a well-founded answer on the question:

"Does the Siemens IEC60870-5-103 Slave protocol implementation V2 in the SIPROTECS 7SL87 conform to the IEC60870-5-103 Companion Standard and the Siemens IEC 60870-5-103 Interoperability List?"

Based on the test results described in this report, DNV KEMA declares the tested Siemens Slave CS103 implementation for the SIPROTECS 7SL87 in conformance with the IEC 870-5-103 standard and the Siemens IEC 60870-5-103 Interoperability List.



3.2 Remarks & Recommendations following from the test

Because ASDU Type 3 (Measurands 1) was not configured during the test, it was not possible to perform the applicable test cases for ASDU Type 3. After the test Siemens provided a communication log file to show that the System under test is capable of sending messages of ASDU Type 3. However this could be included in the test results anymore

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4 PROTOCOL IMPLEMENTATION CONFORMANCE STATEMENT (PICS)

The Protocol Implementation Conformance Statement (PICS) in this paragraph is the basis for the applicable test cases in Chapter 5. This PICS gives an overview of the tested protocol implementation, but this isn't a guarantee that the complete function or ASDU, as enabled in the PICS, is tested and supported. Partial testing is possible and the completeness of the tests for the specific function or ASDU should be consulted in Chapter 5.

4.1 Supported Application Functions

Application Function	Supported
Station Initialization with Reset communication Unit (CU)	Supported
Station Initialization with Reset Frame Count BH (FCB)	Supported
General Interrogation	Supported
Time Synchronization of remote device	Supported
Broadcast Time Synchronization	Supported
General Command Transmission	Supported
Test Mode	Supported
Transmission of Disturbance Data	Supported
Generic Services	Supported (Only read and G1)
Blocking of Monitoring Direction	Supported

4.2 Physical Layer

Transmission Speed	Supported
9600 bit/s	Supported
19200 bit/s	Supported

4.3 Selections of Standard Application Service Data Units

Type ID	Description	Supported
1	Time-tagged message.	Supported
2	Time-tagged message with relative time.	Supported
3	Measurands Type 1.	Supported ²
4	Time-tagged measurands with relative time.	Not Supported
5	Identification message.	Supported
6	Time synchronization.	Supported

² During the conformance test, ASDU Type 3 was not configured and could therefore not be tested.

8	General interrogation termination.	Supported
9	Measurands Type II.	Supported
10	Generic data.	Supported
11	Generic identification.	Supported
23	List of recorded disturbances.	Supported
26	Ready for transmission of disturbance data.	Supported
27	Ready for transmission of a channel.	Supported
28	Ready for transmission of tags.	Supported
29	Transmission of tags.	Supported
30	Transmission of disturbance values.	Supported
31	End of transmission.	Supported

Type ID	Description	Supported
6	Time Synchronization.	Supported
7	General interrogation initiation.	Supported
10	Generic data.	Supported
20	General command.	Supported
21	Generic command.	Supported
24	Order for disturbance data transmission.	Supported
25	Acknowledgement for disturbance data transmission.	Supported

4.4 Function types (FUN)

The following function types were used during the test:

Standard function types

- 128: Distance Protection.

Private function types:

- 253: Transmission of disturbance records.



5 TEST RESULTS CONFORMANCE TESTING IEC 60870-5-103

An overview of tests is given in tables 1 through 20. Testing starts with the Station Initialization function and proceeds with the next Basic Application Functions. Lower level tests are automatically performed by the UniECm test system.

Legend:
 ✓ = Passed
 ✗ = Failed
 N.A. = Not applicable

Table 1 Tests on Link Level

Test No.	Test Name	Description	Reference	Result
1	STATION INITIALIZATION	Unbalanced: Low maximum and minimum baud rate and one other baud rate.	IEC 60870-5-511.6.2.2.2	✓
2	TRANSMISSION SPEED	single contact character 1: E is forced at Secondary Function Code 0	IEC 60870-5-511.6.2.2.2	N.A.
3	RTU FRAME LAYOUT	start character of fixed length frames: 10h	IEC 60870-5-511.6.2.2.2	✓
4		start character of variable length frames: 16h	IEC 60870-5-511.6.2.2.2	✓
5		second start character of variable length frames: 16h	IEC 60870-5-511.6.2.2.2	✓
6		start character of fixed length frames: 10h	IEC 60870-5-511.6.2.2.2	✓
7		start character of variable length frames: 16h	IEC 60870-5-511.6.2.2.2	✓
8		second start character of variable length frames: 16h	IEC 60870-5-511.6.2.2.2	✓
9		start character of fixed length frames: 10h	IEC 60870-5-511.6.2.2.2	✓
10		start character of variable length frames: 16h	IEC 60870-5-511.6.2.2.2	✓
11		second start character of variable length frames: 16h	IEC 60870-5-511.6.2.2.2	✓
12		start character of fixed length frames: 10h	IEC 60870-5-511.6.2.2.2	✓
13		start character of variable length frames: 16h	IEC 60870-5-511.6.2.2.2	✓
14		second start character of variable length frames: 16h	IEC 60870-5-511.6.2.2.2	✓
15	RTU TAG	no link idle search, are admitted between direction of a frame	IEC 60870-5-511.6.2.2.2	✓
16	TIMEOUT INTERVAL	maximum time per interval: 10s to 250ms	IEC 60870-5-511.6.2.2.2	✓
17		also: always maximum within specified time	IEC 60870-5-511.6.2.2.2	✓
18		maximum number of retries of unacknowledged data: 10	IEC 60870-5-511.6.2.2.2	✓
19	TRANSMISSION PROCEDURE	Unbalanced transmission	IEC 60870-5-511.6.2.2.2	✓
20		Services S1 - S10: No reply	IEC 60870-5-511.6.2.2.2	✓



Test No.	Test Name	Description	Reference	Result
21	GENERAL INTERROGATION	Service R - BRID/CONTROL reported	IEC 60870-5-511.6.2.2.2	✓
22		Service R - BRID/CONTROL reported	IEC 60870-5-511.6.2.2.2	✓
23		print F-CODE 0: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
24		print F-CODE 1: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
25		print F-CODE 2: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
26		print F-CODE 3: not answered by sec.	IEC 60870-5-511.6.2.2.2	✓
27		print F-CODE 4: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
28		print F-CODE 5: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
29		print F-CODE 6: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
30		print F-CODE 7: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
31		print F-CODE 8: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
32		print F-CODE 9: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
33		print F-CODE 10: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
34		print F-CODE 11: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
35		print F-CODE 12: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
36		print F-CODE 13: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
37		print F-CODE 14: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
38		print F-CODE 15: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
39		print F-CODE 16: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
40		print F-CODE 17: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
41		print F-CODE 18: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
42		print F-CODE 19: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
43		print F-CODE 20: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
44		print F-CODE 21: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
45		print F-CODE 22: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
46		print F-CODE 23: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
47		print F-CODE 24: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
48		print F-CODE 25: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
49		print F-CODE 26: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
50		print F-CODE 27: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
51		print F-CODE 28: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
52		print F-CODE 29: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
53		print F-CODE 30: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
54		print F-CODE 31: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
55		print F-CODE 32: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
56		print F-CODE 33: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
57		print F-CODE 34: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
58		print F-CODE 35: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
59		print F-CODE 36: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
60		print F-CODE 37: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
61		print F-CODE 38: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
62		print F-CODE 39: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
63		print F-CODE 40: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
64		print F-CODE 41: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
65		print F-CODE 42: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
66		print F-CODE 43: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
67		print F-CODE 44: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
68		print F-CODE 45: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
69		print F-CODE 46: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
70		print F-CODE 47: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
71		print F-CODE 48: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
72		print F-CODE 49: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
73		print F-CODE 50: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
74		print F-CODE 51: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
75		print F-CODE 52: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
76		print F-CODE 53: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
77		print F-CODE 54: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
78		print F-CODE 55: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
79		print F-CODE 56: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
80		print F-CODE 57: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
81		print F-CODE 58: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
82		print F-CODE 59: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
83		print F-CODE 60: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
84		print F-CODE 61: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
85		print F-CODE 62: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
86		print F-CODE 63: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
87		print F-CODE 64: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
88		print F-CODE 65: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
89		print F-CODE 66: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
90		print F-CODE 67: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
91		print F-CODE 68: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
92		print F-CODE 69: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
93		print F-CODE 70: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
94		print F-CODE 71: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
95		print F-CODE 72: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
96		print F-CODE 73: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
97		print F-CODE 74: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
98		print F-CODE 75: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
99		print F-CODE 76: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
100		print F-CODE 77: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
101		print F-CODE 78: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
102		print F-CODE 79: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
103		print F-CODE 80: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
104		print F-CODE 81: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
105		print F-CODE 82: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
106		print F-CODE 83: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
107		print F-CODE 84: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
108		print F-CODE 85: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
109		print F-CODE 86: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
110		print F-CODE 87: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
111		print F-CODE 88: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
112		print F-CODE 89: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
113		print F-CODE 90: answered with sec. F-CODE 0.1	IEC 60870-5-511.6.2.2.2	✓
114		print F-CODE 91: answered with sec. F-CODE 0.1		



Table 2 Tests on Data Unit Identifier

No.	Test	Description	Reference	Result
150	TYPE IDENTIFICATION	Variable structure qualifier SQ is defined for each ASDU (Compared to a control dimension)	IEC 60870-5-5:103/7.2.6.1	✓
151		Variable structure qualifier SQ is defined for each ASDU	IEC 60870-5-5:103/7.2.6.2	✓
152		Variable structure qualifier SQ is defined for each ASDU	IEC 60870-5-5:103/7.2.6.3	✓
153		Length of ASDU in bytes	IEC 60870-5-5:103/7.2.7	✓
154		Only (exceptions of) ASDU types 1, 3, 4, 5, 6, 8, 9 is monitoring direction.	IEC 60870-5-5:103/7.2.8	✓
161	CAUSE OF TRANSMISSION	COV is defined for each ASDU type as defined in the appropriate range	IEC 60870-5-5:103/7.2.9	✓
162		1 set of compression address (ASDU) (AS41)	IEC 60870-5-5:103/7.2.10	✓
163		COV is equal to value of link layer address	IEC 60870-5-5:103/7.2.11	✓



Table 3 Tests on Information object

No.	Test	Description	Reference	Result
200	OBJECT ADDRESS	1 set of information object address	IEC 60870-5-5:103/7.2.3.1	✓
201		1 set of information object address	IEC 60870-5-5:103/7.2.3.2	✓
202		1 set of information object address	IEC 60870-5-5:103/7.2.3.3	✓
210	INFORMATION ELEMENT	Value valid range 0..8	IEC 60870-5-5:103/7.2.6.1	✓
211	ACC	ACC=0 is used in ASDU 24, 26 and 31 if the transmission of a channel is to be	IEC 60870-5-5:103/7.2.6.1	✓
212	ASC	Value valid range 0..255	IEC 60870-5-5:103/7.2.6.2	✓
213	COL	Value valid range 2..3	IEC 60870-5-5:103/7.2.6.3	✓
214	COV	Value 3 indicates that remote version is supported	IEC 60870-5-5:103/7.2.6.4	✓
215	DFI	Value valid range 1..2	IEC 60870-5-5:103/7.2.6.5	✓
216	DFI	Value valid range 1..2	IEC 60870-5-5:103/7.2.6.5	✓
217	FAN	Value valid range 0..255 (always 0)	IEC 60870-5-5:103/7.2.6.6	✓
218	PH	Value valid range 1..65535	IEC 60870-5-5:103/7.2.6.7	✓
219	MHA	Value valid range 1..65535	IEC 60870-5-5:103/7.2.6.8	✓
220	ER	ER = 0..1	IEC 60870-5-5:103/7.2.6.9	✓
221	OVFL	OVFL value = 1..10 (if 1..20) (if 0) if the transmission of a channel is to be	IEC 60870-5-5:103/7.2.6.10	✓
222	NOF	Range 0..255	IEC 60870-5-5:103/7.2.6.11	✓
223	NOU	Contains the amount of analogue channels within a discharge data set	IEC 60870-5-5:103/7.2.6.12	✓
224	NOE	Range 1..65535	IEC 60870-5-5:103/7.2.6.13	✓
225	NOF	All elements contain the same number of information elements	IEC 60870-5-5:103/7.2.6.14	✓
226	NOI	Range 1..255	IEC 60870-5-5:103/7.2.6.15	✓
227	NOV	Contains the number of TAGS to be transmitted for ASDU	IEC 60870-5-5:103/7.2.6.16	✓
228	NOV	Value range 1..255	IEC 60870-5-5:103/7.2.6.17	✓
229	NOV	Contains the number of TAGS to be transmitted for ASDU	IEC 60870-5-5:103/7.2.6.18	✓



No.	Test	Description	Reference	Result
360	BEA	BEA value is transmitted in the secondary value set	IEC 60870-5-5:103/7.2.6.19	✓
361		BEA value is transmitted in the secondary value set	IEC 60870-5-5:103/7.2.6.20	✓
362		BEA value is transmitted in the secondary value set	IEC 60870-5-5:103/7.2.6.21	✓
363		BEA value is transmitted in the secondary value set	IEC 60870-5-5:103/7.2.6.22	✓
364		BEA value is transmitted in the secondary value set	IEC 60870-5-5:103/7.2.6.23	✓
365		BEA value is transmitted in the secondary value set	IEC 60870-5-5:103/7.2.6.24	✓
370	RFV	The primary value can be calculated as: RFV = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.25	✓
371		RFV = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.26	✓
372		RFV = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.27	✓
373		RFV = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.28	✓
374		RFV = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.29	✓
375		RFV = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.30	✓
380	NSV	The primary value can be calculated as: NSV = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.31	✓
381		NSV = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.32	✓
382		NSV = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.33	✓
383		NSV = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.34	✓
384		NSV = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.35	✓
385		NSV = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.36	✓
390	RII	RII = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.37	✓
391	SCI	SCI = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.38	✓
401		Function range 0..255	IEC 60870-5-5:103/7.2.6.39	✓
402		Function range 0..255	IEC 60870-5-5:103/7.2.6.40	✓
403		Function range 0..255	IEC 60870-5-5:103/7.2.6.41	✓
404		Function range 0..255	IEC 60870-5-5:103/7.2.6.42	✓
410	SCV	SCV = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.43	✓
420	SDV	SDV = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.44	✓



No.	Test	Description	Reference	Result
430	SDN	SDN = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.45	✓
431		SDN = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.46	✓
432		SDN = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.47	✓
433		SDN = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.48	✓
440	SOE	SOE = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.49	✓
441		SOE = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.50	✓
442		SOE = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.51	✓
443		SOE = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.52	✓
444		SOE = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.53	✓
450	TOP	TOP = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.54	✓
451		TOP = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.55	✓
460	TDI	TDI = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.56	✓
461		TDI = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.57	✓
462		TDI = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.58	✓
463		TDI = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.59	✓
470	TPD	TPD = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.60	✓
480	TPD	TPD = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.61	✓
481		TPD = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.62	✓
482		TPD = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.63	✓
483		TPD = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.64	✓
484		TPD = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.65	✓
485		TPD = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.66	✓
490	TPD	TPD = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.67	✓
491		TPD = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.68	✓
492		TPD = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.69	✓
493		TPD = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.70	✓
494		TPD = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.71	✓
495		TPD = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.72	✓
496		TPD = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.73	✓
497		TPD = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.74	✓
498		TPD = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.75	✓
499		TPD = (primary value * (range / (range - 1))) + (secondary value * (range - 1))	IEC 60870-5-5:103/7.2.6.76	✓

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Table 6 Tests of the initialization function

No.	Test	Description	References	Result
3495	Local initialization of the controlled system in unbalanced transmission systems	After the initialization (A, B, C received), the controlling station is updated by the controlling station and a General Interrogation. The control station is then ready to receive data from the controlled station.	REC 60870-5-103 7.4.1 REC 60870-5-103 7.4.1 REC 60870-5-103 7.4.1	N.A.
3501	Local initialization of the controlled system in unbalanced transmission systems	After power on, hardware reset or voltage from the controlling station more than 10 seconds available. (Start responding after a "Reset" message from the controlling station)	REC 60870-5-103 7.4.1 REC 60870-5-103 7.4.1 REC 60870-5-103 7.4.1	N.A.
3502	Local initialization of the controlled system in unbalanced transmission systems	After a reset the controlled station sends a "I" reset message, an ASDU 4 with COT=4 (RESET CUB) or COT=3 (RESET FCB) to the controlling station. The controlling station sends an ASDU 4 with COT=5 (START RESTART) or COT=6 (POWER ON) to the controlled station.	REC 60870-5-103 7.4.1 REC 60870-5-103 7.4.1 REC 60870-5-103 7.4.1	✓
3503	Local initialization of the controlled system in unbalanced transmission systems	Only in case of "Reset FCB" (transmission F), even in the buffer of the controlled station the data is transmitted.	REC 60870-5-103 7.4.1	✓
3504	Local initialization of the controlled system in unbalanced transmission systems	Determine time needed for initialization cycle	REC 60870-5-103 7.4.1	✓
3505	Local initialization of the controlled system in unbalanced transmission systems	Any lower Application Function in program is checked without further messages	REC 60870-5-103 7.4.1	✓



Table 7 Tests of the data acquisition by polling function

No.	Test	Description	References	Result
4000	Data acquisition by polling - sequential procedure	Request (ASDU) standard services with FCODE 11 request. User data Class 3 is used by controlling station as default.	REC 60870-5-103 7.6.2 REC 60870-5-103 7.6.2	N.A.
4001	Data acquisition by polling - sequential procedure	Controlled station responds with standard FCODE 8 (no data of Class 3 is available)	REC 60870-5-103 7.6.2 REC 60870-5-103 7.6.2	✓
4002	Data acquisition by polling - sequential procedure	Controlled station responds with ASDU 11 (even-tagged communication user data)	REC 60870-5-103 7.6.2 REC 60870-5-103 7.6.2	✓
4003	Data acquisition by polling - sequential procedure	Controlled station responds with ASDU 11 (even-tagged communication user data) based on data of Class 3 is available.	REC 60870-5-103 7.6.2 REC 60870-5-103 7.6.2	✓
4004	Data acquisition by polling - sequential procedure	Controlled station responds with ASDU 11 (even-tagged communication user data) based on data of Class 3 is available. When FCB is not in the controlling station user need further commands to prevent loss of information. Only a broadcast command (Time Synchronization) may be used.	REC 60870-5-103 7.6.2 REC 60870-5-103 7.6.2	N.A.
4005	Data acquisition by polling - sequential procedure	When FCB is not in the controlling station user need further commands to prevent loss of information. Only a broadcast command (Time Synchronization) may be used.	REC 60870-5-103 7.6.2 REC 60870-5-103 7.6.2	N.A.
4007	Data acquisition by polling - sequential procedure	When FCB is not in the controlling station user need data for detecting end of FCB.	REC 60870-5-103 7.6.2 REC 60870-5-103 7.6.2	N.A.

9 On a class 2 data poll by the master, the SUT also responds with class 1 data (if available)
7 ACD is class not to 1 during a General Interrogation



Table 8 Tests of the cyclic data transmission function

No.	Test	Description	References	Result
5000	Cyclic data transmission	ASDU messages 1, 2 with COT=1 (Emergency) and controlling event driven (Voltage Class 3) data is sent to the controlling station	REC 60870-5-103 7.6.1 REC 60870-5-103 7.6.1	✓
5001	Cyclic data transmission	Determine cyclic period	REC 60870-5-103 7.6.1	✓
5002	Cyclic data transmission	The controlled station tries to interrupt in the connection	(PFD)	N.A.
5003	Cyclic data transmission	Timeout test for the cyclic data value	(PFD)	N.A.

Table 9 Tests of the acquisition of events function

No.	Test	Description	References	Result
6000	Acquisition of events	ASDU messages 1, 2 with COT=1 (Emergency) and controlling event driven (Voltage Class 3) data is sent to the controlling station	REC 60870-5-103 7.6.1 REC 60870-5-103 7.6.1 REC 60870-5-103 7.6.1	✓
6001	Acquisition of events	The controlled station waits for a REQUEST for data before RESPONDING with event message	REC 60870-5-103 7.6.1 REC 60870-5-103 7.6.1	✓
6002	Acquisition of events	When the buffer becomes to smaller events that may appear later than their transmission to the data link	REC 60870-5-103 7.6.1 REC 60870-5-103 7.6.1	✓
6003	Acquisition of events	The time taken in the event represents the time of occurrence (Stability test)	(PFD)	✓
6004	Acquisition of events	Determine cyclic period	(PFD)	✓
6005	Acquisition of events	The controlled station tries to interrupt in the connection	(PFD)	N.A.

8 Only ASDU 0 is tested. During the performance test, ASDU Type 3 was not configured and could therefore not be tested.
9 Only ASDU 0 (INF 148) is tested. During the performance test, ASDU Type 3 was not configured and could therefore not be tested.



Table 10 Tests of the general interrogation function

No.	Test	Description	References	Result
7000	General Interrogation	The controlling station sends a general interrogation command (ASDU 7) to the controlled station	REC 60870-5-103 7.4.3 REC 60870-5-103 7.4.3	✓
7001	General Interrogation	All messages whose transmission is mandatory during GI are consecutively sent with COT = 9 to the controlling station	REC 60870-5-103 7.4.3 REC 60870-5-103 7.4.3	✓
7002	General Interrogation	When the transmission is mandatory during GI (consecutively) sent with COT = 9 to the controlling station	REC 60870-5-103 7.4.3 REC 60870-5-103 7.4.3	✓
7003	General Interrogation	The message is sent on end of interrogation (ASDU 7) with COT = 10 to the controlling station	REC 60870-5-103 7.4.3 REC 60870-5-103 7.4.3	✓
7004	General Interrogation	Supervisory messages from controlled station are allowed within a GI cycle	REC 60870-5-103 7.4.3 REC 60870-5-103 7.4.3	✓
7005	General Interrogation	A GI cycle may be interrupted by a stop of cycle from the controlling station	REC 60870-5-103 7.4.3 REC 60870-5-103 7.4.3	✓
7006	General Interrogation	When the controlled station sends a GI message after a RESET FCB message, the message must be accepted in the controlling station	REC 60870-5-103 7.4.3 REC 60870-5-103 7.4.3	N.A.
7007	General Interrogation	The General Interrogation function will be repeated in intervals of 15 minutes (or more) if the controlled station does not respond	REC 60870-5-103 7.4.3 REC 60870-5-103 7.4.3	N.A.
7008	General Interrogation	When the controlled station sends a GI message after a RESET FCB message, the message must be accepted in the controlling station	REC 60870-5-103 7.4.3 REC 60870-5-103 7.4.3	✓
7009	General Interrogation	During a General Interrogation the controlled station will send an empty list of records if the transmission with COT = 31, because the message must be part of the General Interrogation (PFD)	REC 60870-5-103 7.4.3 REC 60870-5-103 7.4.3	✓

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Table 13 Tests of the transmission of disturbance data

Table with 4 columns: No., Test, Description, Reference, Result. Tests include transmission of disturbance data via ASDU 24, ASDU 25, and ASDU 26.



Table with 4 columns: No., Test, Description, Reference, Result. Tests include transmission of disturbance data via ASDU 25 and ASDU 26.



Table 11 Tests of the clock synchronization function

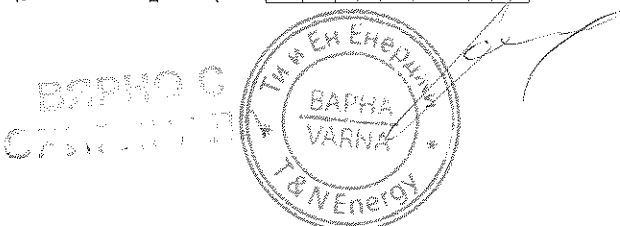
Table with 4 columns: No., Test, Description, Reference, Result. Tests include clock synchronization via ASDU 21 and ASDU 22.



Table 12 Tests of the command transmission function

Table with 4 columns: No., Test, Description, Reference, Result. Tests include command transmission via ASDU 20 and ASDU 21.

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11 The SUT sets ACC=1 in the bot message, but there is no more data available.

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Table 15 Tests on Companion Standard specific functions on all levels

No.	Test	Description	Reference	Result
1501	Blocking of monitor direction	Blocking of monitor direction	REC 60RFS-5-103 7.4.6	✓
1502	Blocking of monitor direction	When local parameter setting is activated all messages normally transmitted in COT = 1 (Repetition) and COT = 2 (Cycle) must be sent with COT = 1 (Repetition) or COT = 2 (Cycle) in the controlling station.	REC 60RFS-5-103 7.4.6	✓
1503	Blocking of monitor direction	When the current data station name is not cyclic, all messages whose transmission is mandatory during (T) are still sent with COT = 0 in the controlling station.	REC 60RFS-5-103 7.4.6	✓
1504	Blocking of monitor direction	When the current data station name is not cyclic, all messages whose transmission is mandatory during (T) are still sent with COT = 0 in the controlling station.	REC 60RFS-5-103 7.4.6	✓
1505	Blocking of monitor direction	The flow synchronization function will normally be accepted and performed by the controlled station when tested by the controlling station.	REC 60RFS-5-103 7.4.6	✓
1506	Blocking of monitor direction	A "blocking of monitoring direction" function is transmitted locally and is equal in operation.	REC 60RFS-5-103 7.4.6	✓
1507	Blocking of monitor direction	Generic services received in spite of the blocking of monitoring direction will be accepted and performed by the controlled station when tested by the controlling station.	REC 60RFS-5-103 7.4.6	✓
1508	Blocking of monitor direction	A GI cycle in progress is immediately terminated by the controlled station by a GI cycle in progress in immediately terminated according to the specified procedure.	REC 60RFS-5-103 7.4.6	✓

Table 15d Tests of the Local parameter setting function

No.	Test	Description	Reference	Result
1510	Local parameter setting	The controlled station may indicate a locally set value of the "local parameter setting" function by sending an ASDU-1 with INF-22 and COT = 1 (local operation).	REC 60RFS-5-103 7.4.5	N.A.
1511	Local parameter setting	When local parameter setting is activated all messages normally transmitted in COT = 1 (Repetition) and COT = 2 (Cycle) must be sent with COT = 1 (Repetition) or COT = 2 (Cycle) in the controlling station.	REC 60RFS-5-103 7.4.5	N.A.
1512	Local parameter setting	When the current data station name is not cyclic, all messages whose transmission is mandatory during (T) are still sent with COT = 0 in the controlling station.	REC 60RFS-5-103 7.4.5	N.A.
1513	Local parameter setting	When the current data station name is not cyclic, all messages whose transmission is mandatory during (T) are still sent with COT = 0 in the controlling station.	REC 60RFS-5-103 7.4.5	N.A.

Table 20 Implementation-specific tests

No.	Test	Description	Reference	Result
2000	Private Identification Numbers	Standard for low priority in the data Clean 3 data	REC 60RFS-5-103 7.2.5.2 (PB)	✓
2001	Private Identification Numbers	Standard for low priority in the data Clean 3 data	REC 60RFS-5-103 7.2.5.2 (PB)	✓
2010	Basic Application Function flow	The test results shall be the same as the test results in the Companion Standard (see Companion Clean 3 data)	[PB]	✓
		Basic Application Function flow is:		
		1. Station Identification		
		2. Data acquisition by polling		
		3. Generic Interruption		
		4. Data acquisition by polling		
		5. Cyclic data transmission		
		6. Disturbance data		

13 After power on, the SUT sends the status of all INF as spontaneous messages

Table 21 Negative tests

No.	Test	Description	Reference	Result
2100	Low of	The controlled station is starting successfully with its initialization procedure after a hardware "power off" in time after which the link is available.	REC 60RFS-5-103 7.5.1	✓
2101	Low of "out of service"	The controlled station is starting successfully with its initialization procedure in the situation that "bit 1" is set of service for a certain time.	REC 60RFS-5-103 7.5.1	✓

Table 15b Generic services

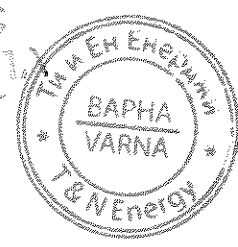
No.	Test	Description	Reference	Result
1510	Generic services	Block holding of all defined generic services	REC 60RFS-5-103 7.4.5.1	N.A.
1511	Generic services	Block holding of all defined generic services	REC 60RFS-5-103 7.4.5.2	N.A.
1512	Generic services	Block holding of all defined generic services	REC 60RFS-5-103 7.4.5.3	N.A.
1513	Generic services	Block holding of all defined generic services	REC 60RFS-5-103 7.4.5.4	✓
1514	Generic services	Block holding of all defined generic services	REC 60RFS-5-103 7.4.5.5	✓

Table 15c Tests of the test mode function

No.	Test	Description	Reference	Result
1520	Test mode	The controlled station may indicate a locally set value of the "test mode" function by sending an ASDU-1 with INF-21 and COT = 1 (local operation).	REC 60RFS-5-103 7.4.5	✓
1521	Test mode	When in test mode all messages normally transmitted in COT = 1 (Repetition) and COT = 2 (Cycle) must be sent with COT = 1 (Repetition) or COT = 2 (Cycle) in the controlling station.	REC 60RFS-5-103 7.4.5	✓
1522	Test mode	When the controlled station starts a GI cycle, all messages whose transmission is mandatory during (T) are still sent with COT = 0 in the controlling station.	REC 60RFS-5-103 7.4.5	✓
1523	Test mode	When the controlled station starts a GI cycle, all messages whose transmission is mandatory during (T) are still sent with COT = 0 in the controlling station.	REC 60RFS-5-103 7.4.5	✓

12 SUT only supports datatypes Integer and Short Real.

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EU-Konformitätserklärung / EU-Declaration of Conformity

Nr. / No. 039/16

Produktbezeichnung: Produktfamilie / Product Family SIPROTEC 5
Product identification: s. Folgeseiten / see next pages

Hersteller: Siemens AG
Manufacturer:

Anschrift: Humboldtstraße 59
Address: D-90459 Nuremberg, Germany.....

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Der oben beschriebene Gegenstand der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften der Union:

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

Niederspannungsrichtlinie:

Low Voltage Directive:

2014/35/EU Richtlinie des Europäischen Parlaments und des Rates vom 26. Februar 2014 zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die Bereitstellung elektrischer Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen auf dem Markt; Amtsblatt der EU L96, 29/03/2014, S. 357–374

2014/35/EU Directive of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits; Official Journal of the EU L96, 29/03/2014, p. 357–374

EMV-Richtlinie:

EMC Directive:

2014/30/EU Richtlinie des Europäischen Parlaments und des Rates vom 26. Februar 2014 zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit; Amtsblatt der EU L96, 29/03/2014, S. 79–106

2014/30/EU Directive of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility; Official Journal of the EU L96, 29/03/2014, p. 79–106

RoHS-Richtlinie:

RoHS Directive:

2011/65/EU Richtlinie des Europäischen Parlaments und des Rates vom 8. Juni 2011 zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten; Amtsblatt der EU L174, 1/07/2011, S. 88–110

2011/65/EU Directive of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment; Official Journal of the EU L174, 1/07/2011, p. 88–110

Anbringung der CE-Kennzeichnung / affixing of the CE-marking: 16

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder Haltbarkeitsgarantie. Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

This declaration is an attestation of conformity with the indicated Directive(s) but does not imply any guarantee of quality or durability. The safety instructions of the accompanying product documentation shall be observed.

Siemens Aktiengesellschaft: Chairman of the Supervisory Board: Gerhard Cromme; Managing Board: Joe Kaeser, Chairman, President and Chief Executive Officer; Roland Busch, Lisa Davis, Klaus Helmrich, Janina Kugel, Siegfried Russwurm, Ralf P. Thomas
Registered offices: Berlin and Munich, Germany; Commercial registries: Berlin Charlottenburg, HRB 12300, Munich, HRB 6684; WEEE-Reg.-No. DE 23691322

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Die Übereinstimmung des bezeichneten Produkts mit den Vorschriften der angewandten Richtlinie(n) wird nachgewiesen durch die vollständige Einhaltung folgender Normen / Vorschriften:

The conformity of the designated product with the provisions of the applied Directive(s) is proved by full compliance with the following standards / regulations:

Harmonisierte Normen, sonstige technische Normen, Spezifikationen / Harmonised standards, other technical standards, specifications:

Referenznummer Reference number	Ausgabedatum Date of issue	Referenznummer Reference number	Ausgabedatum Date of issue
EN 60255-27	2014	EN 60255-26	2013
EN 50581	2012
.....
.....
.....

Unterzeichnet für und im Namen von:/ Signed for and on behalf of:

Siemens Aktiengesellschaft

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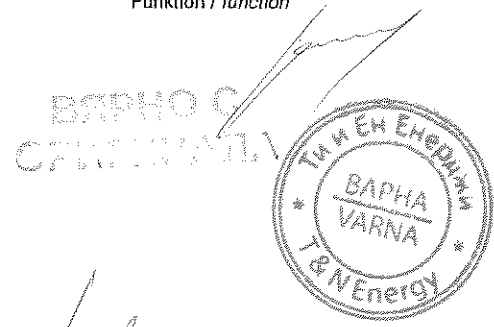
Nuremberg 2016-12-12
Ort / place Datum der Ausstellung / Date of issue

Dr. Catherine Fritsch *[Signature]*
Name / name Unterschrift / signature

Michael Kläring *[Signature]*
Name / name Unterschrift / signature

Head of Lifecycle Management & Development
Funktion / function

Head of Manufacturing
Funktion / function



Produktbezeichnung:
Product designation:

Grundgeräte / Basic devices

Leitungsschutz / Line Protection

7SA82, 7SA84, 7SA86, 7SA87
7SD82, 7SD84, 7SD86, 7SD87
7SL82, 7SL86, 7SL87

Schaltermanagement / Breaker management

7VK87

Überstromzeitschutz / Overcurrent Protection

7SJ82, 7SJ85, 7SJ86

Feldleitgerät / Bay Controller

6MD85, 6MD86

Bahn-Feldleitgerät

6MD89

Transformatorschutz / Transformer Protection

7UT82, 7UT85, 7UT86, 7UT87

Bahnschutz / Railway Protection

7ST85

Digitaler Störschreiber / Digital Fault Recorder

7KE85

Motorschutz / Motor Protection

7SK82, 7SK85

Sammelschienenschutz / Busbar Protection

7SS85

Maschinenschutz / Generator Protection

7UM85

Ersatz-Basismodule / Replacement base modules

Leitungsschutz / Line Protection

ESL84, ESL86, ESL87

Feldgerät / Bay Controller

EMD85, EMD86

Transformatorschutz / Transformer Protection

EUT87

Bahnschutz / Railway Protection

EST85

Überstromzeitschutz / Overcurrent Protection

ESJ85

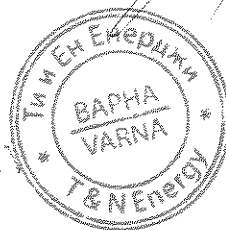
Motorschutz / Motor Protection

ESK85

Digitaler Störschreiber / Digital Fault Recorder

EKE85

ВАРНА С



Grundmodule / Base modules

Prozessorbaugruppe / Processor module	CP200
Prozessorbaugruppe / Processor module	CP300
Stromversorgungsbaugruppe / Power supply module	PS201
Ein- Ausgabebaugruppe / Input - Output module	IO201
Ein- Ausgabebaugruppe / Input - Output module	IO202
Ein- Ausgabebaugruppe / Input - Output module	IO203
Ein- Ausgabebaugruppe / Input - Output module	IO208
Ein- Ausgabebaugruppe / Input - Output module	IO211
Ein- Ausgabebaugruppe / Input - Output module	IO214

Erweiterungsmodule / Expansion modules

Ein- Ausgabebaugruppe / Input - Output module	IO201
Ein- Ausgabebaugruppe / Input - Output module	IO202
Ein- Ausgabebaugruppe / Input - Output module	IO203
Ein- Ausgabebaugruppe / Input - Output module	IO204
Ein- Ausgabebaugruppe / Input - Output module	IO205
Ein- Ausgabebaugruppe / Input - Output module	IO206
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Ein- Ausgabebaugruppe / Input - Output module	IO211
Ein- Ausgabebaugruppe / Input - Output module	IO212
Ein- Ausgabebaugruppe / Input - Output module	IO214
Ein- Ausgabebaugruppe / Input - Output module	IO215
Eingabebaugruppe / Input module	IO230
Ein- Ausgabebaugruppe / Input - Output module	IO231
Steckmodul-Trägerbaugruppe / plug-in module assembly	CB202
Stromversorgungsbaugruppe für zweite Gerätezeile / Power supply module for second device row	PS203

Kommunikationsmodule / Communication modules

USART Modul elektrisch / USART module electrical	USART-xx-yEL
USART Modul optisch / USART module optical	USART-xx-yFO
USART Modul optisch für Weitbereichsübertragung / USART module optical for wide-range transmission	USART-xx-yLDFO
Ethernet Modul elektrisch / Ethernet module electrical	ETH-xx-2EL
Ethernet Modul optisch / Ethernet module optical	ETH-xx-2FO
Process Bus Module	PB201

xx: zwei Buchstaben, eindeutiger Code für das Modul im Produkt-Code des Gerätes
two letters, unique code for the module in the product code of the device

y: 1 = 1 Kanal / 1 channel
2 = 2 Kanäle / 2 channels



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SIEMENS

Messumformer Modul / *Transducer module*
Lichtbogenschutz Modul / *Arc Protection module*

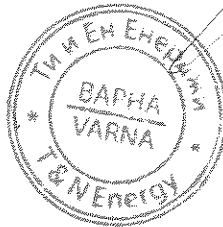
ANAI-CA-4EL
ARC-CD-3FO

Del

Kabelsatz für Vorort-Bedienung /
Cabel kit for on-site operation panel
Verbindungskabel zum Anschluss einer 2. Gerätezeile /
Connecting Cable for the 2nd Device Row

C53207-A600-B905/-B906/-B912/-B913
C53207-A600-B904

ВАРНА С
СЪСТАН.



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Technical Statement

in accordance with the EMC Directive 2004/108/EEC inclusive all modifications

The product family

SIPROTEC 5 System

“Protection, Automation and Monitoring”

manufactured by

Siemens AG

has been tested and was found to comply with the following standards for
electromagnetic compatibility

IEC 60255-26 / 2013

with reference to

IEC 61000-4-18 / 2010

IEC 61000-4-2 / 2008

IEC 61000-4-3 / 2010

IEC 61000-4-4 / 2012

IEC 61000-4-5 / 2005

IEC 61000-4-6 / 2008

IEC 61000-4-11 / 2004

IEC 61000-4-17 / 2008

IEC 61000-4-18 / 2011

IEC 61000-4-29 / 2000

CISPR 11 / 2010, CISPR 22 / 2008

CISPR 11 / 2010, CISPR 22 / 2008

IEC 61000-4-8 / 2009

IEC 61000-4-9 / 2001

EN 61000-3-2 / 2006-04 + A1 / 2009-07 + A2 / 2009-07

EN 61000-3-3 / 2008-09

EN 61000-6-2 / 2005-08

EN 61000-6-4 / 2007-01


IEEE Std C37.90.1-2012

IEEE Std C37.90.2-2004

CISPR 16 / 2010

We confirm this with the Test Reports listed in the appendix 1

Date: 2015-10-16

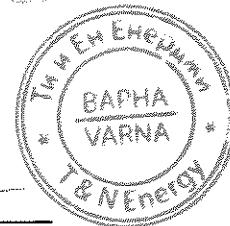


Dipl.-Ing. A. Koch





Dipl.-Ing. R. Erleben



Product designation

Basic devices

Line Protection	7SA82, 7SA84, 7SA86, 7SA87 7SD82, 7SD84, 7SD86, 7SD87 7SL82, 7SL86, 7SL87
Breaker Management	7VK87
Overcurrent Protection	7SJ82, 7SJ85, 7SJ86
Bay Control Unit	6MD85, 6MD86
Transformer Protection	7UT82, 7UT85, 7UT86, 7UT87
Railway Protection	7ST85
Fault Recorder	7KE85
Motor Protection	7SK82, 7SK85
Busbar Protection	7SS85
Generator Protection	7UM85

Replacement devices

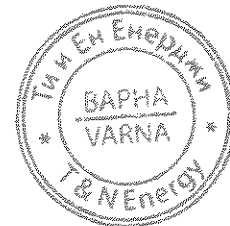
Replacement base modules are universal substitute devices that can be used for several device types. Different technical versions of these replacement base modules are available. They differ only with respect to the input and output module IO2xx, so the replacement devices contain an identical hardware as the basic devices. A replacement device is immediately operable after transfer of the software and of the existing parameterization.

Line Protection	ESL84, ESL86, ESL87
Bay Control Unit	EMD85, EMD86
Transformer Protection	EUT87
Railway Protection	EST85
Overcurrent Protection	ESJ85
Motor Protection	ESK85
Fault Recorder	EKE85

All firmware and DIGSI versions

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Deutsche
Akkreditierungsstelle
D-PL-12052-01-01



Description of SIPROTEC 5 System

SIPROTEC 5 Platform and Hardware Characteristics

The SIPROTEC 5 series includes both modular and non-modular devices.

Modular devices consist of a base module (1/3 of 19 inches) and can be expanded with expansion modules (1/6 of 19 inches). The device type identifier for modular devices is XXX85, XXX86 or XXX87, for example, 7SA86

Type xxx84 devices have the same hardware properties as the modular devices, but they cannot be expanded with expansion modules.

All non-modular devices consist of just a base module (1/3 of 19 inches) and cannot be expanded with expansion modules (1/6 of 19 inches). The device type identifier for non-modular devices is 7XX82, for example, 7SJ82.

Hardware Characteristics of Modular Devices

A modular device always consists of a base module and optionally of expansion modules.

The modules can be chosen according to hardware characteristics. These characteristics are:

- Module size
- Type of construction
- Mounting of the on-site operation panel
- Layout (or design) of the on-site operation panel
- Input and output module
- Plug-in modules

The modules are available in 2 sizes:

- Base module (1/3 of 19 in)
- Extension module (1/6 of 19 in)

The devices are available in 3 designs:

- Flush-mounting devices with on-site operation panel fitted directly on the device
- Surface-mounting devices with integrated on-site operation panel
- Surface-mounting devices with detached on-site operation panel

The on-site operation panels of the base modules can be selected from 3 variants:

- With a large display, keypad, and 16 2-colored LEDs
- With a small display, keypad, and 16 2-colored LEDs
- Without a display, without a keypad (standard), but with 16 2-colored LEDs

The on-site operation panels of the extension modules can be selected from 3 variants:

- With 16 1-colored LEDs and 2 key switches
- With 16 1-colored LEDs
- Without display elements

The base module always contains the central processor board CP200, CP300 and the power-supply board PS201 and an input and output board IO2XX.

The extension module contains an input and output board IO2XX or a plug-in module assembly with integrated power supply CB202.

The 1st extension module in the 2nd device row always contains power supply module PS203.

The plug-in modules are available for various applications. The following plug-in modules can be installed in the base module or in an extension module with plug-in module assembly with integrated power supply CB202:

- Communication module
- Measuring-transducer module

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Hardware Characteristics of Non-Modular Devices

A non-modular device always consists of just one module (1/3 of 19 inches) and cannot be expanded with expansion modules (1/6 of 19 inches). These hardware characteristics are:

- Module size: 1/3 of 19 in.
- Type of construction: Flush-mounting devices with on-site operation panel fitted directly on the device

The on-site operation panels can be chosen from 2 variants:

- With a large display, keypad, and 16 2-colored LEDs
- With a small display, keypad, and 16 2-colored LEDs

The module always contains the central processor board CP100, the power supply board PS101 and an input and output board IO10X.

The input and output board IO10X includes the terminals for current and voltage transformers.

Optionally, the module can be equipped with an additional input and output board IO110 for extra binary inputs and outputs.

The plug-in modules are available for various applications. The following plug-in modules can be installed in the module:

- Communication modules
- Measuring-transducer modules

For further information see manufacturer's documentation:

Product Information	Part No.:	C53000-B5040-C001
Hardware Manual	Part No.:	C53000-G5040-C002

