	Standard	Technology
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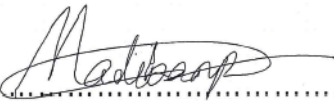


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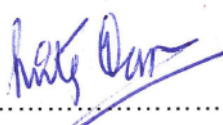


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1. INTRODUCTION

This document contains a list of products (e.g. protective IED's, relays, other electronic devices, etc.) for installation on Eskom Power Stations electrical plant.

2. SUPPORTING CLAUSES

2.1 SCOPE

2.1.1 Purpose

This document endorse to Eskom Generation, Technology and CoE Plant Engineering and PTM field teams in their choice of products (protection, excitation and measurement related) when developing new schemes and/or when performing modifications to existing schemes.

Discrete relays for design and modifications (protection, excitation and measurement related) within the Eskom Generation environment are also listed.

2.1.2 Applicability

This document applies to all Eskom Generation sites.

2.2 NORMATIVE/INFORMATIVE REFERENCES

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

These documents are indispensable for the application of this document, and must be used in conjunction with this document.

- [1] 32-9: Definition of Eskom documents.
- [2] 32-644: Eskom documentation management standard.
- [3] 240-64685228: Generic specification for protective intelligent electronic devices (IED's) standard
- [4] 36-726: List of Approved Electronic Devices to be used on Eskom Power Stations
- [5] 240-51999977: Specification for digital transducer-based measurement system for electrical quantities
- [6] 32-310 (240-56032475): Specification for analogue transducer-based measurement system for electrical quantities
- [7] 240-55410927: Cyber Security Standard for Operational Technology
- [8] 240-55863502: Definition of Operational Technology (OT) and OT/IT Collaboration Accountabilities
- [9] 32-373: Information Security – IT/OT Remote Access Standard

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2.3 DEFINITIONS

Definition	Description
N/A	N/A

2.3.1 Disclosure Classification

Controlled disclosure: Controlled Disclosure to external parties (either enforced by law, or discretionary).

2.4 ABBREVIATIONS

Abbreviation	Description
AC	Alternating Current
CoE	Centre of Excellence
DC	Direct Current
DPI	Dip Proofing Inverter
LV	Low Voltage
MV	Medium Voltage
N/A	Not Applicable
IED	Intelligent Electronic Devices

3. REQUIREMENTS

3.1 INTRODUCTION

The IED's/relays/equipment will be divided into their functional type and application. Multi-function IED's/relays will be indicated as such.

Tests performed on IED's/relays/equipment are listed under test guidelines. Application testing or specific function testing will only be performed on request.

IED's/relays/equipment that has failed the tests will also be included for completeness. Certain IED's/relays/equipment that has failed the tests may be used **temporarily** with approved modifications to cure symptomatic problems. These will be indicated together with the modifications. These relays **should not** be utilised in the design of new schemes.

The following items, not being relays in the strict sense of the word, have been included in this document as they form an integral part of certain protection systems, or subsystems:

- Timers
- Paralleling devices
- Generator disturbance recorders
- Dip Proofing Inverters
- Transducers

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3.2 IMPORTANT NOTES

- At the time of approval testing, the latest software tool version and current firmware version are used.
- The devices supplied might be of a higher version firmware. Attention is drawn to the relevant ESKOM standard. NOTE: The hardware shall be the same.
- Definitions of details in tables below:

➤ Approved devices.

➤ Devices not approved.

➤ Approved devices obsolete.

➤ Approved devices on hold.

3.3 ANSI DESCRIPTION OF FUNCTIONS

Table 1: ANSI Description of Functions

ANSI No.	DESCRIPTION
14	Locked Rotor protection
21	Distance protection, phase
24	Overfluxing
25	Synchronising, Synchronism check
26	Resistive Temperature detection
27	Under Voltage
27/51	Voltage controlled overcurrent
27TN	Third Harmonic under voltage
27X	Auxiliary Under Voltage
32	Directional Power
37	Undercurrent or Under power
38	Bearing Over temperature
39	Bearing Vibration
40	Loss of Excitation (Impedance)
40Q	Loss of Excitation (Reactive Power)
46	Negative Sequence Current
46R	Phase reversal
47	Phase Sequence voltage

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49M	Thermal Overload
49R	Rotor Overload
49S	Stator Overload
50P	Instantaneous overcurrent (Phase)
50/27	Inadvertent Energising
50BF	Breaker Failure (Instantaneous)
50N/G	Instantaneous overcurrent (Neutral/Ground)
51	Time Overcurrent
51BF	Breaker Failure (IDMT)
51N	Neutral Time overcurrent
51NBF	Breaker Failure (Neutral)
51V	Voltage Restraint Phase Overcurrent
53	Out of Step
56	Field Application
59	Overvoltage
59D	Third Harmonic Voltage Differential
59N	Generator Ground Fault
59X	Auxiliary Over Voltage
60	Voltage Balance
60FL	Fuse Loss
64G	Rotor Ground
64R	Rotor Ground (Injection Principle)
64S	Stator Ground (Injection Principle)
66	Cumulative Start-up
67	Ground Directional
67N	Sensitive ground fault
68	Blocking
74TC	Trip coil Supervision
76	Over excitation
78	Pole Slip
79	AC Reclosing
81	Frequency

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81A	Under Frequency Accumulation
81R	R.O.C.O.F
86	Lockout (Master Trip)
87G	Generator Differential
87T	Transformer Differential
87B	Bus Differential
87S	Stator Differential
87L	Line Current Differential
87PC	Line Phase Comparison
87Gnd	Ground Differential
AFD	Arc Flash Detection

3.4 TYPE TESTING GUIDELINE

3.4.1 General

3.4.1.1 Type testing shall consist of performing testing on at least one sample of the IED/equipment family design.

3.4.1.2 The Tenderer is not required to repeat type tests already passed by its equipment, provided type test certificates are produced, including fully detailed, certified test reports from an independent laboratory and has been scrutinised by an Eskom employee with the related skill.

3.4.1.3 The submitted certification should clearly indicate conformance.

3.4.1.4 Where type test certificates and test reports are not available for the specific model of equipment being offered, evidence of equivalent tests performed on substantially similar equipment may be accepted subject to Eskom's approval.

3.4.1.5 Where required, type testing will be at the Tenderer's expense.

3.4.2 Protective Intelligent Electronic Devices and /or similar (i.e. bay controllers, etc.)

Selection and type testing of IED's for protective systems shall be performed in accordance to procedure 240-64685228: Generic specification for protective intelligent electronic devices (IED's) standard, point 4.2, "Type test requirements".

3.4.3 Other Electronic Devices and/or tripping or critical function equipment

Note: A suite of tests or all as listed below shall be performed dependant on the technology type and application of the device under test. The tests performed shall be selected and listed by the tester in the template (Appendix 26).

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3.4.3.1 Electromagnetic Compatibility Tests

Table 2: EMC Testing

EMC immunity test level requirements	
1MHz burst disturbance test, class III <ul style="list-style-type: none"> Common mode Differential mode 	According to IEC60255-22-1 2,5 kV 1,0 kV
Electrostatic discharge test, class 3 <ul style="list-style-type: none"> For contact discharge For air discharge 	According to IEC61000-4-2, IEC60255-22-2 and ANSI C37.90.3-2001 6 kV 8 kV
Radio frequency interference tests <ul style="list-style-type: none"> Conducted, common mode Radiated, amplitude-modulated Radiated, pulse-modulated 	According to IEC61000-4-6 and IEC60255-22-6 (2000) 10V (rms), f=150 kHz...80 Mhz According to IEC61000-4-3 and IEC60255-22-3 (2000) 10 V/m (rms), f=80...1000 MHz According to the ENV 50204 and IEC60255-22-3 (2000) 10 V/m, f=900 Mhz
Fast transient disturbance tests <ul style="list-style-type: none"> Power outputs, energising inputs, power supply, I/O ports Communication ports 	According to IEC60255-22-4 and IEC61000-4-4 2 kV 1 kV
Surge immunity test <ul style="list-style-type: none"> Power outputs, energising inputs, power supply, I/O ports Communication ports 	According to IEC60255-22-5: 1.2/50 μ s voltage and 8/20 μ s current surges. 0.5, 1 and 2 kV line-to-earth and 0.5 and 1 kV line-to-line applied 0.5 and 1 kV line-to-earth applied
Power frequency (50 Hz) magnetic field IEC61000-4-8	Class 5: 100 A/m continuous, 1000A/m for 1 to 3 s, 50Hz
Voltage dips and short interruptions	According to IEC60255-11: <ul style="list-style-type: none"> Voltage dip: a 20 ms interruption has no effect on operation Interruption: no mal operation for a 5 s interruption. Gradual start-up/shut-down: no mal operation for decaying DC to zero over 60 s, rising over 60 s. AC ripple: the device shall function correctly with 12 % 100Hz AC signal superimposed on the DC supply.
Electromagnetic emission tests <ul style="list-style-type: none"> Conducted, RF-emission (Power supply) 	According to the IEC60255-25: 0.15 – 0.5 MHz 79 dB (μ V) quasi peak, 66 dB (μ V) average and 0.5 – 30 MHz 73 dB (μ V) quasi peak, 60 dB (μ V) average.

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<ul style="list-style-type: none"> Radiated RF-emission 	30 – 230 MHz 40 dB (μV) quasi peak at 10 m and 230 – 1000 MHz 47dB (μV) quasi peak at 10 m.
Capacitor discharge	1.5 x Vn Master trip circuits — 10 μF Other protection & control circuits — 2 μF Carrier/channel interface — 0,2 μF

3.4.3.2 Insulation Resistance Tests

Table 3: Insulation Resistance Test

Insulation tests	
Dielectric tests <ul style="list-style-type: none"> Test voltage 	According to IEC60255-5 2 kV, 50 Hz, 1 min
Electrical impulse voltage test <ul style="list-style-type: none"> Test voltage 	According to IEC60255-5 5 kV, unipolar impulses, waveform 1,2/50 μs, source energy 0,5 J
Insulation resistance measurements <ul style="list-style-type: none"> Isolation resistance 	According to IEC60255-5 >20 MΩ, 500 V dc

3.4.3.3 Environmental Tests

Table 4: Environmental Tests

Environmental test	
Vibration tests (sinusoidal)	According to IEC60255-21-1, Class 1
Shock and bump test	According to IEC60255-21-1, Class 1
Seismic	According to IEC60255-21-3, Class 1
Cold	According to IEC60068-2-1, Operate with tolerance at -10°C (LCD screen operative)
Dry heat	According to IEC60068-2-2, Operate with tolerance at +55°C
Cyclic temperature and humidity	According to IEC60068-2-30, 25°C and 95% relative humidity/ 55°C and 95% relative humidity, 12 + 12 hour cycle

3.4.4 Measurement/Metering Equipment Testing

All tests done according to Eskom Specification documents, 32-310 (240-56032475), Specifications for analogue transducer based measurement systems for electrical quantities, 240-51999977, Specification for digital transducer-based measurement system for electrical quantities and IEC60688:Edition 2.2 2002-05 Electrical measuring transducers for converting a.c. electrical quantities to analogue or digital signals. The list of approved metering/measurement devices shall be available on the relevant SCOT SC website.

3.4.5 Criteria to change device status from “Approved” to “On Hold”

- A device upon activation of the “watch dog” function or generating of a fault code issued an incorrect trip signal.
- If two or more consecutive device failures/codes generated of the same type/function on different devices within a time frame of three months without causing incorrect trip signals.
- Protection function/application not in line with Eskom practices/philosophies.

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- Any device that can/may cause a negative impact on quality of supply or safe and reliable operation of the Eskom Generation assets.
- When operation/information documentation with regard to a specific device/function are not clearly stated or described.

3.4.6 Criteria to change device status from “On Hold” to “Approved”

- Upon receiving a re-engineered or later version firmware device and tested by Eskom according to the testing guidelines of this document and found to be in order.
- When protection functions/application are re-engineered or revised to be in line with Eskom practice.
- Upon receiving and verifying that documentation/manuals regarding a device/function is clearly described and understood by Eskom staff.

3.5 LISTS OF EQUIPMENT

Note: Information can be found under “Contents”.

4. AUTHORISATION

This document has been seen and accepted by:

Name & Surname	Designation
Busi Green	Generation Electrical Protection and Control Care Group Chair

5. REVISIONS

Date	Rev.	Compiler	Remarks
November 2012	0	PI Heera	Draft document for Review created from GST 36-726
May 2013	1	PI Heera	Final Document for Authorisation and Publication
May 2015	1.1	J Strydom	Add 3.4.1 General Revise 3.4.2 Revise 3.4.3 Revise 3.4.4 Include new tested devices. Add “Bay controller” to annexure 16 description. Add annexure 26
June 2015	1.2	J Strydom	Add OT and IT procedures under references.
July 2015	2	J Strydom	Final Document for Authorisation and Publication

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September 2016	2.1	J Strydom	Add Comap GenSet Controllers to Appendix 19 Add Vecto II to Appendix 17 Add ION 8800 to Appendix 25 Add Iskra MT540 to Appendix 24 Add Measurelogic DTS 305 to Appendix 24 Add ABB RED67* to Appendix 8
October 2016	3	J Strydom	Final Document for Authorisation and Publication
June 2019	3.1	J Strydom	Add ABB UMC100.3 LV motor controller to Appendix 3 Add Arcteq AQ 2** series IED's to Appendices 4,6 and 10 Add Artech auxiliary devices to Appendix 13 Add Vecto III to Appendix 17 Add GE 350 IED to Appendix 6 Add ABB RE*-6** IED's to Appendix 4, 6 and 10 Add 2RMLG test block to Appendix 22 Add SEL 849 & 3421 to Appendix 3 Add SEL 710 to Appendix 4 Add SEL 2411 to Appendix 22 Add SEL 487E to Appendix 2 Add Siemens 7K*8* to Appendix 16 Add Siemens 7S*8** to Appendix 6 Add Siemens 7U*8** to Appendix 1, 2 and 4 Put DTS 305 in Appendix 24 "On Hold"
July 2019	3.2	J Strydom	No comments from PTM Technical Committee, Generation Electrical Protection and Control Care Group and Protection and Automation Study Committee. Final Draft for signature.
July 2019	4	J Strydom	Final Rev 3 Document for Authorisation and Publication

6. DEVELOPMENT TEAM

The following people were involved in the development of this document:

- Murray van Niekerk

7. ACKNOWLEDGEMENTS

The following members who provided valuable input when finalising the document:

- N/A

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APPENDIX 1: GENERATOR PROTECTION

MANUFACTURER	TYPE	FUNCTIONS	PASS / FAIL	Y2K	Communication	COMMENTS
SEG Power	MRR1	64G	Pass	Y		Rotor earth fault only
Siemens	7UM61	14, 21, 24, 27, 27/34, 32F, 32R, 40, 46, 48, 49, 49S, 50, 50N, 50BF, 51, 51N, 51V, 59, 59N, 59GN, 64R, 67, 67N, 67G, 74TC, 81, 81R, 86,	Pass	Y	IEC60870-5-103, Profibus DP, Modbus RTU, DNP 3.0	Generator and Motor
Siemens	7UM62	14, 21, 24, 27, 27/34, 32, 32F, 32R, 37, 40, 46, 48, 47, 49, 49S, 50, 50N, 50BF, 51GN, 51, 51N, 51V, 59, 59N, 59GN, 64, 64R, 67, 67N, 67G, 68, 74TC, 78, 81, 81R, 86, 87G, 87T, 87M, 87N	Pass	Y	IEC60870-5-103, Profibus DP, Modbus RTU, DNP 3.0	Generator and Motor
Siemens	7SJ600	46, 48, 49, 49R, 49S, 50, 50N, 51, 51N, 74TC, 79	Pass	Y	IEC60870-5-103	Motor and Generator
Siemens	7SJ62	14, 21FL, 27, 37, 46, 47, 48, 49, 49R, 49S, 50, 50N, 50BF, 51, 51N, 59, 59N/ 64, 66, 67, 67N, 74TC, 79, 81, 86, 87N	Pass	Y	IEC60870-5-103/IEC61850, Profibus-FMS/-DP, DNP 3.0, Modbus RTU	Motor and Generator
Siemens	7SJ642	14, 21FL, 25, 27/59, 32, 37, 38, 46, 47, 48, 49, 49R, 49S, 50, 50N, 50BF, 51, 51N, 55, 59N/64, 67, 67N, 74TC, 79M, 81, 86, 87N	Pass	Y	IEC60870-5-103/IEC61850, Profibus-FMS/-DP, DNP 3.0, Modbus RTU	Motor and Generator
ABB	GPU2000	21, 24, 25, 27, 27G, 32ROU, 40, 46, 50P, 50G, 50IE, 51GPV, 59, 59G, 60, 64F, 67, 67N, 81OU, 87	Pass	Y	INCOM, Modbus Plus, IIRIG-B	Generator
ABB	REG316	21, 24, 27, 32, 40, 46, 49, 49S, 49R, 50, 51, 51/27, 59, 60, 64R, 64S, 67, 78, 81, 87G, 87T	Pass	Y	SPA or IEC 60870-5-103, LON or MVB (part of IEC 61375), MVB (part of IEC 61375)	Product

MANUFACTURER	TYPE	FUNCTIONS	PASS / FAIL	Y2K	Communication	COMMENTS
ABB	REG216	21, 24, 32, 40, 46, 49, 50, 51, 51/27, 59, 60, 64, 78, 81, 87T, 87G	Pass	Y	SPA or IEC 60870-5-103, LON or MVB (part of IEC 61375), MVB (part of IEC 61375)	System
SEL	300G	21P/C, 24, 25, 27, 32, 40, 46, 49, 50PGQ, 50N, 51G, 51N, 51V/C, 52, 59PGQ, 60, 64G, 81OU, 87, 87N	Pass	Y	SEL ASCII, SEL Distributed Port Switch Protocol (LMD), SEL Fast Meter, SEL Compressed ASCII, Modbus® RTU	Generator
Areva	Micom P34x	87(Not P342), 50/51/67, 50N/51N, 67N/67W, 64, 51V, 21, 59V, 27/59, 81, 32, 40, 46T, 46OC, 47, 49, 24, 78, 27TN/59TN, 50/27, 50BF, 64S(P345)	Pass	Y	K-Bus, IEC-60870-5-103, MODBUS or DNP3.0, IEC 874-10.	Generator
GE	G60	21P, 24, 25, 27P, 27TN, 27X, 32, 40, 46G, 50/27, 50DD, 50P, 50G, 50N, 51P, 51G, 51N, 59N, 59P, 59X, 59_2, 64TN, 67P, 67N, 68, 78, 81U, 81O, 87S	Pass	Y	MMS/UCA2, DNP 3.0, Modbus RTU / TCP	Generator
GE	SR489	12, 21, 24, 27, 50/27, 32, 38, 39, 40, 40Q, 46, 47, 49, 50, 50BF, 50/51GN, 51V, 59, 59GN/27TN, 60FL, 67, 76, 81, 86, 87G	Pass	Y	Modbus RTU, DNP 3.0	Generator Management
Beckwith	M-3420	24, 27, 32, 40, 46, 50, 50/27, 50BF, 51N, 50N, 51V, 59, 59N, 60FL, 81, 87, 87GD	Pass	Y	Modbus, BECO 2200	Generator
Areva	Micom P391	64R	Pass	N/A		Injection unit to be used with Micom P345 Suffix K

MANUFACTURER	TYPE	FUNCTIONS	PASS / FAIL	Y2K	Communication	COMMENTS
ABB	REG216C	21, 24, 32, 40, 46, 49, 50, 51, 51/27, 59, 60, 64, 78, 81, 87T, 87G	Pass	Y	SPA or IEC 60870-5-103, LON or MVB (part of IEC 61375), MVB (part of IEC 61375)	System (Compact)
Beckwith	M-3425	21, 24, 27, 27TN, 32, 40, 46, 49, 50, 50DT, 50/27, 50BF, 50N, 51N, 51V, 59, 59D, 59N, 59X, 60FL, 67N, 78, 81, 81A, 81R, 87, 87GD	Pass	Y	Modbus, BECO 2200	Generator
VA-Tech	DRS Compact2	21, 24, 32, 40, 46, 49, 50/51, 50/51/37, 51/37, 59/27, 59/27DC, 64G, 64R, 78, 81, 87T, 87G	Pass	Y	IEC 60870-5-103 standard and IEC 60870-5-104 optional	Generator
ABB	REG670	21, 24, 25, 27, 32, 37, 40, 46, 49, 50, 50N, 50BF, 51/67, 51N/67N, 52PD, 59, 59N, 59THD, 60, 67N, 78, 81, 87T, 87, 87G, 87N, 94	Pass	Y	IEC 60870-5-103, TCP/IP or EIA-485 DNP 3.0, LON, SPA and IEC61850	Generator and Transformer
SEG	XE2	76E	Pass	N/A	Via XRS1 interface	DC over and under current with settable time delay
SEL	700G	Multi-function	Pass	Y	Modbus, DNP3.0, IEC61850	Protection, Control and Synchroniser
Siemens	7U*8**	Model dependant	Pass	Y	IEC61850	Protection and Control

APPENDIX 2: TRANSFORMER PROTECTION

MANUFACTURER	TYPE	FUNCTIONS	PASS/FAIL	Y2K	Communication	Comments
Siemens	7UT612	46, 49, 50, 50N, 50BF, 51, 51N, 74TC, 86, 87G, 87T, 87M, 87L	Pass	Y	IEC60870-5-103, Profibus-FMS/-DP, DNP 3.0 or Modbus	Transformer
Siemens	7UT613	24, 49, 50, 50N, 50BF, 51, 51N, 74TC, 86, 87G, 87T, 87BB, 87M, 87L	Pass	Y	IEC60870-5-103, Profibus-FMS/-DP, DNP 3.0 or Modbus	Transformer
Siemens	7UT635	24, 46, 49, 50, 50BF, 50N, 51, 51N, 74TC, 86, 87G, 87T, 87BB, 87M, 87L, 87N	Pass	Y	IEC60870-5-103, Profibus-FMS/-DP, DNP 3.0 or Modbus	Transformer
Siemens	7UT633	24, 46, 49, 50, 50BF, 50N, 51, 51N, 74TC, 86, 87G, 87T, 87BB, 87M, 87L, 87N	Pass	Y	IEC60870-5-103, Profibus-FMS/-DP, DNP 3.0 or Modbus	Transformer
Siemens	7VH60	87T, 87N	Pass	Y		Differential Transformer
ABB	SPAD346C	50, 50BF, 50N, 51, 51N, 87G, 87T	Pass	N/A	SPA-Bus	Transformer
ABB	RET54*	21, 24, 27, 46, 47, 49, 50, 51, 59, 60FL, 67N, 81, 87G, 87T	Pass	Y	SPA, LON, IEC 60870-5-103, DNP 3.0, Modbus RTU/ASCII, Profibus DP or IEC 61850	Transformer
SEL	387	50PGQ, 51PGQ, 52, 67G, 87	Pass	Y	Modbus, SEL Fast Messaging, or ASCII protocol	Diff and O/C
GE	T60	24, 27X, 50/87, 50P, 50G, 50N, 51P, 51G, 51N, 59N, 59P, 59X, 67P, 67N, 81U, 81O, 87T, 87G	Pass	Y	MMS/UCA2, DNP 3.0, Modbus RTU / TCP	Transformer
BECKWITH	M-3310	24, 27, 46, 50, 50BF, 50G, 51, 51G, 51N, 59G, 81U, 87, 87GD	Pass	Y	Modbus, BECO 2200	Transformer

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BECKWITH	M-3311	24, 27, 46, 49, 50, 50BF, 50G, 50N, 51, 51G, 51N, 59G, 81O/U, 87, 87GD	Pass	Y	Modbus, BECO 2200	Transformer
ABB	RET67*	21, 24, 25, 27, 46, 50, 50N, 50BF, 51/67, 51N/67N, 52PD, 59, 59N, 59THD, 67N, 81, 87T, 87, 87G, 87N, 94	Pass	Y	IEC61850-8-1, IEC60870-5-103, DNP3.0, LON, SPA	Transformer
Areva	Micom P632 and P633	50/51PQN, 67, 50/27, 85, 79, 25, 67N, 37/48/49/49LR/50S/66, 49, 46, 27/59PQW, 81,32, 50BF/62, 30/70	Pass	Y	IEC 60870-5-103, IEC 60870-5-101, DNP 3.0, Modbus	Transformer. Relays with processor boards P9651428 index G and P9651472 index B are approved.
ABB	RET63*	27, 46, 49T, 50/51P&N, 51P&NBF, 59, 87N&T	Pass	Y	DNP3.0, IEC61850	Transformer with differential
SEL	487E	16, 24, 25, 27, 32, 46, 49, 50/51P&N, 59, 67, 81, 85, 87	Pass	Y	IEC61850	Transformer with differential
Siemens	7U*8**	Model dependant	Pass	Y	IEC61850	Protection and Control

APPENDIX 3: LV MOTOR PROTECTION <1000V AC

MANUFACTURER	TYPE	FUNCTIONS	PASS / FAIL	Y2K	Communication	COMMENTS
Newelec	320M		Pass	N/A		AC Version only
Newelec	SDR1		Pass	N/A		Stall unit only
Newelec	KD & KE		Pass	N/A		
Newelec	NH200 /1/F220		Fail	N/A		
GECA	Motor Master		Fail	N/A		High failure rate
M.S.P.	MSP 3-2		Pass	N/A		
GE-Multilyn	MMII		Pass	N/A		Protection&Control
Siemens	3UN21		Pass	N/A		Thermistor type
FANOX	F20		Pass	N/A		
FANOX	G17		Pass	N/A		
Siemens	Simocode DP		Pass	N/A		RS232 + Profibus
Powertronics	M400		Pass	N/A		Version 5.5 only
Powertronics	M500		Pass	N/A		
Ningi Services	M550		Pass	Y		Use thermal protection functionality only
ABB	SPAM050		Pass	N/A		
GECA	M202S		Pass	N/A		
GECA	M203		Pass	N/A		
GECA	M204		Pass	N/A		
ABB	UMC100.3		Pass	Y		LV motor controller
SEL	849		Pass	Y	Modbus	LV motor controller
SEL	3421		Pass	Y		HMI

APPENDIX 4: MV MOTOR PROTECTION

MANUFACTURER	TYPE	FUNCTIONS	PASS / FAIL	Y2K	Communication	COMMENTS
GE-Multilin	M239 Plus	37, 38, 46, 48, 49, 50, 50G, 51, 66, 74TC, 86	Pass	O		Modbus Protocol
VA-Tech Reyrolle ACP	RHO3	14, 37, 38, 46, 49, 50, 51, 50BF, 66, 74TC	Pass	Y		Proper NPS
ABB	REM610	37, 38, 46, 46R, 48, 49M, 50, 51, 66, 86, 74TC	Pass	Y		Proper NPS
ABB	REM54*	21, 24, 25, 27, 32, 37, 40, 46, 49, 50, 51, 51V, 59, 60, 62BF, 66, 67, 68, 81O/81U, 87G/M/N	Pass	Y		
Siemens	7SJ6112	14, 37, 46, 48, 49, 49R, 49S, 50, 50N, 50BF, 51, 51N, 74TC, 79, 86, 87N	Pass	Y		Incl Trip CCt Superv and CB Fail
VAMP	VAMP150	14, 37, 46, 49, 50, 50BF, 51, 66, 74TC	Pass	Y		Arc Sensor input
Areva	Micom P241	14, 26, 37, 46, 48, 49, 27/49, 50, 51LR, 50N, 51N, 53, 59N, 61N, 32N/64N, 66, 81U	Pass	Y		
Schweitzer Eng	SEL-701	27/59, 37, 46, 47, 49, 50, 55, 66, 81	Pass	Y		
Schweitzer Eng	SEL- 710	14, 27, 37, 38, 46, 47, 49, 50P/G/N, 55, 59, 66, 81O/U, 87	Pass	Y		Motor
Schweitzer Eng	SEL- 749M	14, 27, 37, 38, 46, 47, 49, 50P/G/N, 55, 59, 66, 81O/U	Pass	Y		Motor
ABB	MCX913		Pass	N/A		
ABB	SPAM150	14, 37, 46, 46R, 49M, 50, 51, 66	On Hold due to no NPS and power supply problems.	N/A		Motor
Siemens	7SJ551		Pass	N/A		
Strike Technologies	FP2000		Pass	N/A		
Cutler Hammer	MP3000		Pass	N/A		
Microelletrica Scientifica	MM30		Pass	N/A		
Siemens	7UM61	14, 21, 24, 27, 27/34, 32F, 32R, 40, 46, 48, 49, 49S, 50, 50N, 50BF, 51, 51N, 51V, 59, 59N, 59GN, 64R, 67, 67N, 67G, 74TC, 81, 81R, 86,	Pass	Y	IEC60870-5-103, Profibus DP, Modbus RTU, DNP 3.0	Generator and Motor

MANUFACTURER	TYPE	FUNCTIONS	PASS / FAIL	Y2K	Communication	COMMENTS
Siemens	7UM62	14, 21, 24, 27, 27/34, 32, 32F, 32R, 37, 40, 46, 48, 47, 49, 49S, 50, 50N, 50BF, 51GN, 51, 51N, 51V, 59, 59N, 59GN, 64, 64R, 67, 67N, 67G, 68, 74TC, 78, 81, 81R, 86, 87G, 87T, 87M, 87N	Pass	Y	IEC60870-5-103, Profibus DP, Modbus RTU, DNP 3.0	Generator and Motor
Siemens	7SJ600	46, 48, 49, 49R, 49S, 50, 50N, 51, 51N, 74TC, 79	Pass	Y	IEC60870-5-103	Motor and Generator
Siemens	7SJ62	14, 21FL, 27, 37, 46, 47, 48, 49, 49R, 49S, 50, 50N, 50BF, 51, 51N, 59, 59N/ 64, 66, 67, 67N, 74TC, 79, 81, 86, 87N	Pass	Y	IEC60870-5-103/IEC61850, Profibus-FMS/-DP, DNP 3.0, Modbus RTU	Motor and Generator
Siemens	7SJ642	14, 21FL, 25, 27/59, 32, 37, 38, 46, 47, 48, 49, 49R, 49S, 50, 50N, 50BF, 51, 51N, 55, 59N/64, 67, 67N, 74TC, 79M, 81, 86, 87N	Pass	Y	IEC60870-5-103/IEC61850, Profibus-FMS/-DP, DNP 3.0, Modbus RTU	Motor and Generator
Areva	Micom P632 and P633	50/51PQN, 67, 50/27, 85, 79, 25, 67N, 37/48/49/49LR/50S/66, 49, 46, 27/59PQW, 81, 32, 50BF/62, 30/70	Pass	Y	IEC 60870-5-103, IEC 60870-5-101, DNP 3.0, Modbus	Generator and Motor
ABB	RE*6**	Model dependant	Pass	Y	DNP3.0, IEC61850, IEC60870-103	Protection and Control
Arcteq	AQ M2**	Model dependant	Pass	Y	IEC61850, IEEE 1588, RSTP, PRP, PTP, Modbus TCP, DNP 3.0, FTP, Telnet	Protection and Control
Siemens	7U*8**	Model dependant	Pass	Y	IEC61850	Protection and Control

APPENDIX 5: OVER/UNDER FREQUENCY PROTECTION

MANUFACTURER	TYPE	FUNCTIONS	PASS / FAIL	Y2K	Communication	COMMENTS
ABB	SPAF140	81	Pass	Y		
GECA	MFVU	81	Pass	N/A		
Siemens	7RW6000	24, 27, 59, 81	Pass	Y	IEC60870-5-103	
Areva	Micom P92*	27, 47, 59, 81	Pass	Y	IEC60870-5-103, Modbus (RTU), DNP3	

APPENDIX 6: FEEDER PROTECTION

MANUFACTURER	TYPE	FUNCTIONS	PASS / FAIL	Y2K	Communication	COMMENTS
General Electric Spa	MIC 1000		Pass	N/A		
Strike Technologies RSA	FeederGuard F150-1-0-0		Pass	N/A		Three phase
Strike Technologies RSA	FeederGuard FP2000		Pass	Y		
Schneider	SEPAM 2000		Pass	Y		With Thermal
GE	MIF		Pass	Y		With Thermal
ABB	REJ525	46, 50, 50N, 51, 51N, 62BF	Pass	Y		
ABB	REF54*	27, 27/47/59, 46, 50, 51, 50N, 51N, 59, 59N, 67, 79, 81U/81O	Pass	Y		
ABB	RXIDK2H	50, 51	Pass	N/a		40 – 2000 Hz
Thytronic	SCC-P72		Pass	Y		
Areva	Micom P12X	37, 46, 49, 50, 50N, 50BF, 51, 51N, 79	Pass	Y		
ABB	SPAJ14*	50, 50N, 51, 51N , 50BF	Pass	N/A		IDMT blocks when I>> pick-up
GECA	KCGG		Pass	N/A		
Siemens	7SJ511		Pass	N/A		
Basler	BE1-50/51M		Pass	N/A		Single phase
Basler	BE1-50/51B		Pass	N/A		Three phase
CEE	ITG7366		Pass	N/A		Three phase
ABB	SPAJ11*	50N, 51N	Pass	N/A		Earth fault
Siemens	7SD61	49, 50, 50N, 50BF, 51, 51N, 74TC, 79, 85, 86, 87T, 87L	Pass	Y	IEC 60870-5-103, Profibus-DP, DNP- 3.0	Feeder
SEL	351	25, 27, 32, 32 QVI, 50PGQ, 50N, 51PGQ, 51N, 52, 59, 67PGQ, 67N, 79	Pass	Y	Modbus , SEL Fast Messaging, or ASCII protocol	Directional O/C and Reclosing

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SEL	501	49, 50PGQ, 51PGQ, 52, 62, 66	Pass	Y	Modbus , SEL Fast Messaging, or ASCII protocol	Dual Universal O/C
SEL	551	50PQG, 50N, 51PGQ, 51N, 52, 79	Pass	Y	Modbus , SEL Fast Messaging, or ASCII protocol	O/C and Reclosing
SEL	387	50PGQ, 51PGQ, 52, 67G, 87	Pass	Y	Modbus , SEL Fast Messaging, or ASCII protocol	Diff and O/C
Areva	Micom P13*	24, 27/59, 49, 50, 51, 87, 87G	Pass	Y	IEC 60870-5-103, IEC 60870-5-101, DNP 3.0, Modbus and Courier	Feeder
GE	L90	21G&P, 25, 27P, 27X, 32N, 50BF, 50DD, 50P, 50G, 50N, 50P, 50_2, 51P, 51G, 51N, 51_2, 52, 59N, 59P, 59X, 67P, 67N, 67_2, 68, 78, 79, 87L	Pass	Y	DNP 3.0, IEC60870- 5-104	Line differential
GE	F35	27P, 27X, 50G, 50N, 50P, 51G, 51N, 51P, 52, 59N, 59X, 79, 81	Pass	Y	DNP 3.0 or IEC60870-5-104	Multiple Feeder in one
GE	MIF II	49, 50P, 50G, 51G, 51P, 79	Pass	Y	Modbus TCP/IP	Distribution Feeder
ABB	RE*6**	Model dependant	Pass	Y	DNP3.0, IEC61850- 8-1 (GOOSE)	Protection and Control (Functions model dependant)
VAMP	VAMP25*	27, 46, 49M, 50P/N, 50BF, 51P/N, 59, 79, 81, AFD	Pass	Y	DNP3.0, IEC61850. Modbus	Protection and Control
SEL	451	27, 59, 50, 50BF, 51, 52, 59, 67, 79	Pass	Y	IEC61850, DNP3.0, FTP, Telnet	Protection, automation, bay control
SEL	751	25, 27, 32, 50, 51, 59, AFD, 79	Pass	Y	IEC61850, Modbus, DNP3.0	Feeder protection with ARC flash
Arcteq	AQ F2**	Model dependant	Pass	Y	IEC61850, IEEE 1588, RSTP, PRP, PTP, Modbus TCP, DNP 3.0, FTP, Telnet	Protection and Control
GE	350	24, 25, 27, 27P, 27X, 32, 46, 49, 50/51P&N, 50BF, 59, 60, 67, 79 ,81, 86	Pass	Y	IEC61850, DNP 3.0, Modbus RTU,	LV Incomers

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					Modbus TCP/IP, IEC60870-5- 103&104, PRP & HSR, LLA, OPC-UA, IEEE1588	
Siemens	7S*8**	Model dependant	Pass	Y	IEC61850	Protection and Control

APPENDIX 7: SYNCHRONISM CHECK

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TYPE	MANUFACTURER	PASS / FAIL	Y2K Compliant	COMMENTS
SPAU140	ABB-Stromberg	Pass	N/A	
MIC 1000	General Electric Spa.	Pass	N/A	Alt. To TC32
BE3-25	Basler	Pass	N/A	
BE1-25	Basler	Pass	N/A	
MVAS	GECA	Pass	N/A	
7VE512	Siemens	Pass	N/A	
7VM21/22	Siemens	Pass	N/A	
7VK51	Siemens	Pass	N/A	
M-0359	Beckwith Electric Inc	Pass	N/A	

APPENDIX 8: DIFFERENTIAL PROTECTION

MANUFACTURER	TYPE	FUNCTIONS	PASS / FAIL	Y2K	Communication	COMMENTS
Microelettrica Scientifica	MD32-T	87	Pass	N/A	1	2 Transformer
ABB	SPAD330	87	Pass	N/A	3	4 Transformer or Motor
ABB	RADSB	87	Pass	N/A	5	6 Transformer or Motor
ABB	DT92	87	Pass	N/A	7	8 Transformer
Basler	BE1-87G	87	Pass	N/A	9	10 Generator
Basler	BE1-87T	87	Pass	N/A	11	12 Transformer
Siemens	7VH83	87	Pass	N/A	13	14 Bus Zone
ABB-Stromberg	SPAE010	87	Pass	N/A		High Impedance
ABB-Stromberg	SPAJ115C	87, 87Gnd	Pass	N/A	+ Res. E/F	High impedance
ABB	RED615	46, 46PD, 49F, 50P/51P, 51BF, 51NBF, 51N, 67N, 68, 79, 86, 87L	Pass	N/A	Modbus, DNP3 & IEC 60870-103. IEC61850 via Ethernet LAN using GOOSE	Line differential and bay control
SEL	787	24, 27, 32, 49, 50P&N, 50BF, 51P&N, 59, 67, 81, 87	Pass	Y	Modbus, Telnet, FTP, IEC61850, DNP3.0	Transformer Protection
Alstom/Schneider	Micom P746	50BF, 50P/N, 51P/N, 87CZ, 87BB	Pass	Y	Modbus, DNP3 & IEC61850 and IEC103 protocols	Bus bar protection
ABB	RED67*	87L,21,50,51,59,27,24,81	Pass	Y	IEC 60870-5-103, TCP/IP or EIA-485 DNP 3.0, LON, SPA and IEC61850	Line differential and bay control

APPENDIX 9: SENSITIVE EARTH FAULT PROTECTION

TYPE	MANUFACTURER	PASS / FAIL	Y2K Compliant	COMMENTS
SPAJ111C	ABB-Stromberg OY	Pass	N/A	
MCSU	GECA	Pass	N/A	

APPENDIX 10: OVER/UNDER VOLTAGE PROTECTION

MANUFACTURER	TYPE	FUNCTIONS	PASS / FAIL	Y2K	Communication	COMMENTS
ABB-Stromberg	SPAU120	59	Pass	N/A		
Basler	BE1-59	59	Pass	N/A		
Siemens	7RW6000	24, 27, 59, 81	Pass	Y	IEC60870-5-103	Voltage and Frequency
Areva	Micom P92*	27, 47, 59, 81	Pass	Y	IEC60870-5-103, Modbus (RTU), DNP3	Voltage and Frequency
ABB	RE*6**	27, 47, 59, 62, 86	Pass	Y	IEC61850, IEC60870-103, Modbus, Profibus, DNP3.0, SPA, LON	Voltage and Control 9Functions model dependant
Arcteq	AQ V2**	27, 59, 81	Pass	Y	IEC61850, IEEE 1588, RSTP, PRP, PTP, Modbus TCP, DNP 3.0, FTP, Telnet	Protection and Control

APPENDIX 11: TIMERS

TYPE	MANUFACTURER	PASS / FAIL	Y2K Compliant	COMMENTS
H3CA	OMRON	Pass	N/A	
H3BA	OMRON	Pass	N/A	
RXKL	ABB	Pass	N/A	
RXKM	ABB	Pass	N/A	
Timecount	Timecount	Fail	N/A	
T3D/S	Electro	Fail	N/A	
Klippon	Klippon	Pass	N/A	
RXKC	ABB	Fail	N/A	Reset Problems
RXKA	ABB	Fail	N/A	Spurious output
TRLM	Syrelec	Fail	N/A	
TDF 4	Arteche	Pass		Timer

APPENDIX 12: GENERATOR PARALLELING DEVICES

TYPE	MANUFACTURER	PASS / FAIL	Y2K Compliant	COMMENTS
RES010	ABB-Energi	Pass	N/A	
M-0193B	Beckwith Electric Inc	Pass	N/A	Dated Technology
M-0194	Beckwith Electric Inc.	Pass	N/A	Dated Technology
Synchrotact V	ABB	Pass	Y	Recommended
7VE63	Siemens	Pass	Y	Recommended
7VE61	Siemens	Pass	Y	
Synchrotact 4	ABB-Drives	Pass	N/A	Not recommended
7VE512	Siemens	Pass	N/A	
BE1-25A	Basler Electric	Pass	N/A	D/Gen only
BE3-25A	Basler Electric	Pass	N/A	D/Gen only
SYN3000	VA-Tech	Pass	N/A	S/w Syn-Win version 2.2

APPENDIX 13: AUXILIARY CONTROL RELAYS

TYPE	MANUFACTURER	PASS / FAIL	VOLTAGE	COMMENTS
SH05.22	AEG	Pass	24 DC	Mini-contactor
RSA1022-4/ED	Siemens	Pass	220 DC	Module type
Haller RE1.6505/10	Haller	Pass	220 DC	11 pin plug-in
MR301221	Schrack	Fail	220 DC	11 pin plug-in
RL300048	Schrack	Pass	48 DC	11 pin plug-in
RL301220	Schrack	Fail	220 DC	11 pin plug-in
MK2KP	Omron	Pass	24 DC	11 pin plug-in
7TR2001	Siemens	Fail	220 DC	Coupling Module
MY2-US-SV(DC)	Omron	Pass	24 DC	Plug-in/solder
MY2-US-SV(AC)	Omron	Fail	220/240 AC	Plug-in/solder
MK2 P-I (AC)	Omron	Fail	230 AC	11 pin plug-in
MY214-N	Omron	Pass	24 DC	Plug-in/solder
G6B-4BND	Omron	Fail	24 DC	PCB mount
RXMC 1	ABB	Pass	24 DC	1MRK000450-AD
MR900304	Schrack	Fail	250 DC	Used on AVR's
SH04.22	AEG	Pass	230 AC	Mini-contactor
SH04.22	AEG	Pass	24 DC	Mini-contactor
SKR115F AK 428391 P 124	ELESTA	Pass	24 DC	11 pin plug-in
SKR115F AK 428391 P 127	ELESTA	Fail	110 DC	Can be used with PTC (C890)
RXMVB	ABB	Pass	220 DC	Flip-flop
D-B	Smitt	Pass	24 DC	Plug-in type relays
D	Smitt	Pass	24 DC	Plug-in type relays
G08-D024	Smitt	Pass	24 DC	Plug-in type relays
G11-D220	Smitt	Pass	220 DC	Plug-in type relays

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G11-L D048	Smitt	Pass	48 DC	Plug-in type relays
KDN	Smitt	Pass	24 DC	Plug-in type relays
KDN	Smitt	Pass	220 DC	Plug-in type relays. Bi-stable
D-HL	Nieaf – Smit Products	Pass	110V & 220V DC	Auxiliary relay with PTC
MT323024	Schrack	Pass	24V DC	Plug-in type relays
CR-PO24 DC2	ABB	Pass	24V DC	Plug-in type relays. A PTC needs to be fitted when used
B65-30-10-1.7	ABB	Pass		Mini-contactor
KC6-40E	ABB	Pass		Mini-contactor
PSR-SCP	Phoenix	Pass	24V DC	Plug-in type relays
WDDE-1	Smitt	Pass	24-220V AC/DC	Plug-in relay. Pulse relay
RF4XR	Arteche	Pass	110&125V DC	
RF4SY	Arteche	Fail	110V DC	Use with desensitizing
RUT4	Arteche	Pass	110&125V DC	Passed 4,7 and 10 µF test
CF4	Arteche	Fail	110&125V DC	Contact, not auxiliary relay
RD2SY	Arteche	Fail	110V DC	Use with desensitizing
BF3	Arteche	Fail	110V DC	Use with desensitizing
BF4RP	Arteche	Pass	110&125V DC	Failed 10µF test at 187V
RJ8	Arteche	Pass	110V DC	VT selection
RF4XR4	Arteche	Pass	110&125V DC	
BJ8RP	Arteche	Pass	110V DC	Only as auxiliary, not master
RD2A	Arteche	Pass	1A DC	DC surge absorption
VDF10	Arteche	Pass	110&125V DC	Coil supervision
TDF 4	Arteche	Pass		Timer
RF4	Arteche	Pass	230V AC	Control circuit device

As these relays are electro-mechanical, Y2K is irrelevant.

APPENDIX 14: MASTER TRIPPING RELAYS

TYPE	MANUFACTURER	PASS / FAIL	VOLTAGE	COMMENTS
7PA1035-XXX	Siemens	Pass	220 DC	
VAA21ZG	GECA	Fail	220 DC	Needs Surge Unit
RSA1022-4/ED	Siemens	Pass	220 DC	
RTR98	Siemens	Pass	220 DC	
RXME var'E'	ABB	Fail	220 DC	Needs Surge Unit
RXMS1	ABB	Fail	220 DC	Needs Surge Unit
RXSF1	ABB	Pass	48 DC	PR5651 2019-AA
RXSF1	ABB	Pass	110 DC	PR5651 2019-AB
RXSF1	ABB	Pass	220 DC	PR5651 2019-AC
RXME18	ABB	Fail	220 DC	Needs Surge Unit
RXMH2	ABB	Fail	220 DC	Needs Surge Unit
RXMVB	ABB	Fail	220 DC	Needs Surge Unit
RTR95	Siemens	Pass	220 DC	
RPA9900(110v)	Siemens	Pass	110 DC	Bi-Stable type
RB4	Microelettrica Scientifica	Pass		

NOTE : All relays that are indicated in the shaded area above, i.e. RXSF1s, are to be used together with the specified surge units. Note : The PR numbers for relays having n/c contacts in the contact stack, will be announced shortly.

As these relays are electro-mechanical, Y2K is irrelevant.

APPENDIX 15: VOLTAGE REGULATOR RELAYS (TAP CHANGER CONTROLLERS)

TYPE	MANUFACTURER	PASS / FAIL	Y2K Compliant	COMMENTS
MK30	MaschinenFabrik-Reinhausen	Pass	N/A	Susceptible to Harmonics
VC100	MaschinenFabrik-Reinhausen	Pass	N/A	Replacement for MK30
REG-DA	Eberle	Pass	Y	

APPENDIX 16: GENERATOR DISTURBANCE RECORDER / BAY CONTROLLER

MANUFACTURER	TYPE	FUNCTIONS	PASS / FAIL	Y2K	Communication	COMMENTS
ABB	Indactic 650		Pass	Y		
ABB	Indactic 425		Pass	Y		S.E.R. only
Siemens	Siemeas R		Pass	Y		
ABB	RES505C1		Pass	Y		No mA inputs
KocOS	Sherlog		Pass	Y		
ABB	REC670	87X, 50, 51, 51/67, 26, 49, 50BF, 50STB, 52PD, 27, 59, 59N, 81, 25, 79	Pass	Y	IEC 60870-5-103, LON, SPA, IEC 61850-8-1, C37.94 & G.703	Bay Controller
Areva	C264	25, 79	Pass	Y	UCA2, IEC61850, IEC60870-5-104, DNP3.0	Bay Controller including interlocks
CSD	CSD-IMS8		Fail	Not used		
Areva	Bitronics M87*		Pass	Y	ZM OD EM, DNP3.0, Modbus	Virtual recorder can also be set up.
SEL	SEL3530	Real Time Automation Controller	Pass	Y		
SEL	SEL2440	Programmable Automation Controller	Pass	Y		
HV Test	IDM	Disturbance recorder	Pass	Y		
Siemens	7K*8*	Disturbance recorder	Pass	Y	IEC 61850	

APPENDIX 17: VOLTAGE MONITORING RELAYS FOR 380V AC

TYPE	MANUFACTURER	PASS / FAIL	Y2K Compliant	COMMENTS
ESN	Entrelec	Pass	N/A	
SX125/380A	Rhomberg Electronic	Fail	N/A	2kV Test failed
PFN	Entrelec	Pass	N/A	Fixed Settings
PVN	Entrelec	Pass	N/A	
PW380V-04X	Tele	Pass	N/A	Re-tested 20/2/97
CM-PVS	ABB	Pass	N/A	Over/Under Voltage
RXEDA 1	ABB	Pass	N/A	Time-over voltage only. AC or DC. No auxiliary supply.
3UG4615-1 CR20	Siemens	Pass	N/A	Up to 690V. Protection: phase sequence, phase loss, O/V, U/V, digital display, fault indications.
VME420	Bender	Pass	N/A	AC/DC over voltage, under voltage, over frequency and under frequency.
Vecto II	CT Lab	Pass	N/A	Power Quality Recorder with Osprey Light s/w 2.6.0 Build 46
Vecto III	CT Lab	Pass	N/A	Power Quality Recorder with Osprey Light s/w 2.6.0 Build 46

APPENDIX 18: MOTOR BUS TRANSFER SCHEMES

TYPE	MANUFACTURER	PASS / FAIL	Y2K Compliant	COMMENTS
SYNCROTRAN	Beckwith Electric		N/A	<i>M-5821 Scheme</i>
Transfer Logic Controller	Beckwith Electric	Pass	N/A	M-0272 Mod346
Power Transfer Relay	Beckwith Electric	Pass	N/A	M-0236B
Auto Transfer Switch and mains Control Module	Deep Sea Electronics	Pass	N/A	DSE8660

APPENDIX 19: DIESEL GENERATOR CONTROLLER MODULE

TYPE	MANUFACTURER	PASS / FAIL	Y2K Compliant	COMMENTS
GenCon II	Wexler CSD , Israel	Pass	N/A	Sync, Metering, Control unit
DSE5510	Deep Sea Electronics	Pass	N/A	PLC Control Unit
DSE8610	Deep Sea Electronics	Pass	N/A	Auto Start Multi-Set Controller
MainsPro; IntelliMains BaseBox; IntelliVision8; IntelliSys BaseBox; IntelliPro	Comap	Pass	N/A	Interface software: WinXP and Win 7 (64bit). Operating software: IntelliPro Install Suite V1.6.0-2, LiteEdit V5.1.0.3

APPENDIX 20: INTERNAL ARC PROTECTION

TYPE	MANUFACTURER	PASS / FAIL	Y2K Compliant	COMMENTS
REA101	ABB Stromberg OY	Pass	N/A	
VAMP	Vaasa Electronics	Pass	N/A	
REA103/105/ 107	ABB Stromberg OY	Pass	N/A	Extension Unit
VPJ140	Vaasa Electronics	Pass	Y	With Arc Option
VAMP 221	Vaasa Electronics	Pass	Y	O/C, E/F and CBFP
D1000	Selco	Fail	N/A	
AQ100	Arcmaq	Pass	Y	O/C, E/F and light

APPENDIX 21: DC EARTH FAULT PROTECTION

TYPE	MANUFACTURER	PASS / FAIL	Y2K Compliant	COMMENTS
Eldec	EPC	Pass	N/A	Dual Transcore version
Eldec-A-1 and CTE DC Differential relay	Strike Technologies	Pass	N/A	

APPENDIX 22: MISCELLANEOUS

TYPE	MANUFACTURER	PASS / FAIL	Y2K Compliant	COMMENTS
Ferruling System	Murrplastik	Pass	N/A	Much cheaper than Grafoplast
MCR1022ATD	GE Mini contactor – 24 VDC	Pass	N/A	
MCRC031ATN	GE Mini contactor – 220 VDC	Pass	N/A	
MCRC022AT	GE Mini contactor – 220 VDC	Pass	N/A	
MCRC040ATN	GE Mini contactor – 220 VDC	Pass	N/A	
UPCV3K 4-G-7, 62	Phoenix	Pass	N/A	Universal terminal Blocks
VBST 4-FS(6-2, 8-0.8)	Phoenix	Pass	N/A	ST4 Terminal Blocks
N/A	ELMEX	Pass	N/A	Products listed on the following product lists: 0902171, 0902172 & 0902168
N/A	Supplied by Alstom	Pass	N/A	Universal terminal blocks: KUT2.5, KUT4, KULT4, KUT6, KULT6, KUT10, KULT1, KUT16, KUT25, KUT35, KUT50, KUT95, MBT4, KATM5, KBTM5, DPCC70, DPBB70, DPBC70, DPCC70BS, DPBB70BS, DPBC70BS, KST4UWS, KST4U, KST6WS, KULTD6, KUDD4, KU2D4, KU2D4S, DU3D4, DUSD4, KUDT4, KUTSD6, KSTD6WS, KUTD10, KUDF4, KUDDF4, KUFH4, KATM4, KBTM4
P991	Areva	Pass	N/A	Test blocks
P992	Areva	Pass	N/A	Test plugs
PMBT 14	GE	Pass	N/A	Test block and plug
6MD6*	Siemens	Pass	Y	I/O enhancing box. IEC61850 – GOOSE
IRDH275	Bender	Pass	N/A	Insulation monitoring for IT systems
2RMLG	Siemens	Pass	N/A	Select correct compliance criteria

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2411	SEL	Pass	Y	Automation controller
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- Surge Suppression Circuit
Peak Pulse Voltage : 2000 V
Rated Voltage : 300V DC
Rated Current : 3 A
Supplier : Ningi Services

APPENDIX 23: DIP PROOF INVERTERS (DPI'S)

TYPE	MANUFACTURER	PASS / FAIL	Y2K Compliant	COMMENTS
4000ST	Switching Systems	Pass	N/A	
52L	Switching Systems	Pass	N/A	Slow synchronising time when dip is close to setting
53L	Switching Systems	Pass	N/A	Processor base
54L version 2	Switching Systems	Pass	N/A	Processor base. Vulnerable to harmonics.

APPENDIX 24: MEASUREMENT (TRANSDUCERS)

TYPE	MANUFACTURER	SERIES	PASS / FAIL	Y2K Compliant	COMMENTS
Din Rail	ISKRA	MI413 Watt (200W or 1000W)	Pass	N/A	Single measured output quantity
Din Rail	ISKRA	MI414 Var (200Var or 1000Var)	Pass	N/A	Single measured output quantity
Din Rail	ISKRA	MI416 Volts (0-132V)	Pass	N/A	Single measured output quantity
Din Rail	ISKRA	MI418 Amp (0 – 1,2A)	Pass	N/A	Single measured output quantity
Din Rail	ISKRA	MI420 Hz (45 – 55 Hz)	Pass	N/A	Single measured output quantity
Din Rail	ISKRA	MI421 pf (0 1 0)	Pass	N/A	Single measured output quantity
Din Rail	ISKRA	MI400 Programmable Universal transducer with energy.	Pass	N/A	4 Programmable analogue outputs. RS232/RS485 (Modbus)
Din Rail	ABB	E-SU Programmable Universal transducer	Pass	N/A	4 Programmable analogue outputs. RS232/RS485. 1xBinary.
Din Rail	DPM	Model 9000 Option 3002	Pass	N/A	Programmable (analogue in, analogue out). RS232 and/or RS485.
Din Rail	ISKRA	MT540 Multifunction Programmable	Pass	N/A	Cls 0,2. Four programmable outputs. Watt, Var, I, V and pf
Din Rail	Measurelogic	DTS 305	On hold. High rate of power supply failures. Caused unit trips.	N/A	Cls 0,5. Programmable outputs. Watt, Var, I, V, Hz and pf
Surface mounted	Schneider	ION 8800	Pass	N/A	Cls 0,2 4Q (3PH). SAP number 0242589. Buyers guide D-DT 9420. Not suitable for turbine load control transducer application. Slow response.

APPENDIX 25: METERING

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TYPE	MANUFACTURER	SERIES	PASS / FAIL	Y2K Compliant	COMMENTS
19"	Landis & Gyr	ZMQ202C.6r4af9.E22	Pass	N/A	Cls 0,2S (3phase 4 wire)
19"	Landis & Gyr	f9	Pass	N/A	19" chassis, option plugs for two meters
Surface mounted	Landis & Gyr	ZMQ202C.8r4af6.E22	Pass	N/A	Cls 0,2S (3phase 4 wire)
	Landis & Gyr	MAP110	Pass	N/A	Software (Data reading)
	Landis & Gyr	MAP120	Pass	N/A	Software (Meter configuration)
Surface mounted	Landis & Gyr	ZMD402CT44.457	Pass	N/A	Cls 0,2 (3phase 4 wire) with additional power supply board (RS232 + RS485)
Surface mounted	Landis & Gyr	ZMD405CT44.457	Pass	N/A	Cls 0,5 (3phase 4 wire) with additional power supply board (RS232 + RS485)
Surface mounted	Landis & Gyr	ZMD402CT44.657	Pass	N/A	Cls 0,2 (3phase 4 wire) with additional power supply board
Surface mounted	Landis & Gyr	ZMD405CT44.657	Pass	N/A	Cls 0,5 (3phase 4 wire) with additional power supply board
Surface mounted	Elster Kent	A1700 Vision meter	Pass	N/A	Cls 0,2 (3phase 4 wire) with additional power supply board (RS232 + RS485)
Surface mounted	Elster Kent	A1700 Vision meter	Pass	N/A	Cls 0,5 (3phase 4 wire) with additional power supply board (RS232 + RS485)
	Elster Kent	A1700	Pass	N/A	Software (Data reading)
	Elster Kent	A1700	Pass	N/A	Software (Meter configuration)
19"	Landis & Gyr	FBC datgyr Encoder	Pass	N/A	16 channel pulse encoder
Surface mounted	Landis & Gyr	FBC datgyr Encoder	Pass	N/A	16 channel pulse encoder
Surface mounted	Landis & Gyr	FBC datgyr Encoder	Pass	N/A	8 channel pulse encoder with STOM interface

APPENDIX 26: TYPE TEST CHECK SHEET

[illegible]

Compliance testing and/or verification done by:

Signature:

Date:

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