



Schedule of Site
Commissioning Tests
SCT 20.12.9
Issue 2
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GEC Alsthom OPTIMHO (LFZP) Distance Protection

Contents	Page
General Data	3
Relay Settings	4
Calibrated Test Equipment.....	8
Wiring	8
Mechanical Inspection.....	9
Initial Checks.....	9
Check Tests Using Test Options.....	10
Secondary Injection Tests	10
Zone Reach Tests	12
Scheme Tests	19
Live System Checks.....	21
Putting Protection Into Service	23
Appendices	25
Figures	29

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SCHEDULE OF SITE COMMISSIONING TESTS

**SCT 20.12.9 GEC ALSTHOM OPTIMHO (LFZP) DISTANCE
PROTECTION**

Station:

Circuit:

Manufacturer's Contract No:

Contractor's Signature:

NGC Contract No:

Accepted by:
(Engineer's Signature)

Contractor:

Date:

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GEC ALSTHOM OPTIMHO (LFZP) DISTANCE PROTECTION

1 GENERAL DATA

1.1 CT Ratio:

VT Ratio:

VT Type: Capacitor/Wound

1.2 Supplies

Trip Supply			V d.c.
Relay Supply	Vx(1)		V d.c.
Opto-Isolator Supply	Vx(2)		V d.c.
Relay Rated Current	In		A

1.3 Local Primary Systems Diagram

1.4 Circuit Parameters

Line Angle		°
Line Length		km

1.5 Primary Impedances

Positive Sequence Z_1		Ω
Zero Sequence Z_0		Ω
Earth Fault Loop = $\frac{2Z_1 + Z_0}{3}$		Ω

1.6 Relay Serial No

(Caution: See notes on handling electronic equipment in Section 5)

Relay Model	
Relay Serial No	

2 RELAY SETTINGS

2.1 Setting Data

Identifier

Distance

Fault Locator (if used)

Default Display

Blank

Group
Identifier

Active
Group No

Clock

Crystal

System Voltage

Contact Configuration No

Normal (01)

Testing Only (02)

Active Setting Group No

Base Settings

Distance Ground Characteristic

Tick

Mho

Quadrilateral

(Note: Quadrilateral characteristic only available on LFZP111)

KZph = THETA Ph =

KZN =

THETA N =

KR (for quadrilateral characteristic) =

Zone 1 and Zone 2 Settings

KZ1 =

KZ1X = (not used)

KZ1Y = (not used)

KZ2 =

Zone 3 Settings (not available in LFZP114)

Z3

Tick

Offset

Reverse

KZ3 =

KZ3' (offset/reverse) =

Aspect Ratio a/b (for lenticular Zone 3)

Time Delay Trips

Timers	Enabled	Blocked	Setting (seconds)
TX1X	-	Yes	N/A
TZ1Y	-	Yes	N/A
TZ2	Yes	-	
TZ3	Yes	-	

Scheme and Scheme Timers

Mode of Operation (required scheme selection)

Basic Pur Blocking

Note: Blocked mode of operation not available in LFZP 114

TP = ms

TD = ms

Loss of Load Accelerated Trip

Enabled Blocked

Zone 1 Trip

Enabled Blocked

Switch-on-to-fault

Enabled Blocked Time seconds

Type of Signalling Equipment

VT Supervision

Allow Blocked

Self Resetting

Enabled Blocked

Start Indication

Enabled Blocked

Power Swing Detector (available on LFZP 111, 112, 113)

	Enabled	Blocked
Power Swing Detector		

If enabled use following setting

	Z6-Z3	Z6-Z2
Timing		
TZ6	ms	

KZ6 = KZ6' =

Aspect ratio a/b =

Zone	Allow	Block
Zone 1		
Zone 1X		
Zone 1Y		
Zone 2		
Zone 3		

Tick as necessary

Auto-reclose

Condition	Enabled	Blocked
Zone 1 or Aided Trip Caused by 2 or 3 Phase Fault		
Zone 1 or Aided Trip Caused by 3 Phase Fault		
Zone 1X Time Delayed Trip		
Zone 1Y Time Delayed Trip		
Zone 2 Time Delayed Trip		
Channel Out of Service		

Fault Locator (if used)

KZF = Line Units = Line Length =
CT Ratio = VT Ratio =

	Enabled	Blocked
Mutual Compensation =		

If enabled above

KZM = Theta M =

2.2 Setting Applied

Zone 1 = $KZ1 \times KZPh \times 5/In$ ohms

Zone 2 = $KZ2 \times KZPh \times 5/In$ ohms

Zone 3 = $KZ3 \times KZPh \times 5/In$ ohms

Zone 3' (reverse or offset) = $KZ3' \times KZPh \times 5/In$ ohms

RR (resistive reach for quadrilateral characteristic) = $KR.5/In$ ohms

RR' (resistive reverse reach for quadrilateral characteristic) = $KR.6/IN$ ohms

Z6 (power swing) ohms

Z6' (power swing-reverse) ohms

3 CALIBRATED TEST EQUIPMENT

(i) Record of Calibrated Test Equipment used during Commissioning

	<u>Manufacturer and Type</u>	<u>Serial No</u>	<u>Date Last Calibrated</u>	<u>Date Next Calibration Due</u>
<u>Insulation Resistance Tester</u>				
<u>Voltmeter or Multimeter</u>				
<u>Ammeter or Multimeter</u>				
<u>Injection Test Set</u>				
<u>Timer</u>				
<u>Phase Angle Meter</u>				
<u>Others (state function)</u>				

4 WIRING

Where OPTIMHO is part of the TPS 5/33 it is not necessary to perform insulation tests or to check the cubicle wiring. The test below should be performed on all wiring where the cubicle has been wired on site and on the site made connection for TPS 5/33 systems. See also SCT 20.18.

4.1 Insulation Tests. Caution: Use an electronic or brushless tester of 500 V d.c.

4.1.1 Measure insulation of VT Circuits to earth.

 MΩ

4.1.2 Measure insulation of CT Circuits to earth.

 MΩ

4.1.3 Measure Insulation resistance of external d.c. terminals and earth.

 MΩ

4.2 Insulation tests on general and cubicle wiring (see SCT Guidance Notes).

4.3 Inter Relay and Cubicle Wiring Checked to

	NGC No	Manuf No
Circuit Diagram No		
Wiring Diagram No		

5 MECHANICAL INSPECTION

Caution: The equipment contains components sensitive to electrostatic voltage discharge. To avoid damage handle modules by the front plate, avoid contact with electrical components or connections and use electrostatic precautions.

- 5.1 Check proper mounting and access in addition to requirements of SCT Guidance Notes.

- 5.2 Check fuse and links for correctness to standard and rating.

- 5.3 Check that the module IPCB identification numbers agree with the list on the relay 'rating card' and that the relay ratings are as expected.

- 5.4 Inspect where possible module/PCB for signs of damage, and check that the Serial No painted on one PCB in each module is the same as that on the relay's front label.

6 INITIAL CHECKS

Isolate the relay from the CT and VT by applying shorts between Terminals 1 and 3, 5 and 7, 9 and 11, 21 and 23, and 25 and 27 on an MMLB01 test plug 1 and inserting it into the MMLG test socket, thus shorting the CT, and disconnecting the CT and VT from the relay.

- 6.1 Check voltage and polarity of the d.c. supplies before linking through the relay.

- 6.2 On power up, which takes about 700 ms, note that the red and yellow LEDs (trip and alarm respectively) will flash on and then off once, followed by the green LED lighting and remaining on.

- 6.3 Check that the Relay Inoperative Alarm contact (RIA) is open.

7 CHECK TESTS USING TEST OPTIONS

To check the operation of contacts, select the appropriate output option (list given below). When the SET button is pressed, the appropriate contact will operate. The function assigned to these contacts are given in Appendix A and throughout commissioning tests, these should be checked.

Output Test Option	Contact Operated
1	29-33
2	29-35
3	37-39
4	41-43
5	45-47
6	49-51
7	53-55
8	30-32
9	30-34
10	30-36
11	38-40
12	42-44
13	46-48
14	50-52
15	54-56
16	57-59
17	57-61
18	57-63
19	65-67
20	69-71
21	73-75
22	77-79
23	81-83

8 SECONDARY INJECTION TESTS

During these tests, the LCD indication facility should be used to confirm relay operation. By choosing the appropriate monitor option, the LCD indication provides 2 to 9 LCD positions and operation is indicated by the appearance of '1' under the appropriate LCD position (example shown below).

LCD Position

Monitor	2	3	4	5	6	7	8	9
Option		1		1			1	