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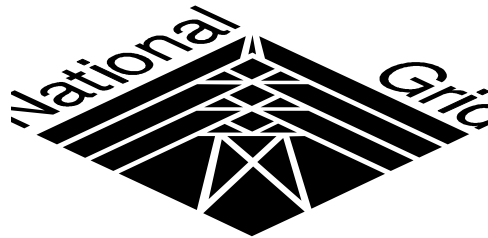
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Schedule of Site
Commissioning Tests
SCT 20.12.7
Issue 2
September 1998

GEC MICROMHO (SHNB) Distance Protection

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Authorised for Issue by:

Chris Parker
Head of Protection & Measurements
Network Control & Telecommunications
Engineering & Technology

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Registered Office
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SCHEDULE OF SITE COMMISSIONING TESTS

SCT 20.12.7 GEC MICROMHO (SHNB) DISTANCE PROTECTION

Station:

Manufacturer's Contract No:

NGC Contract No:

Contractor:

Circuit:

Contractor's Signature:.....

Accepted by:.....
(Engineer's Signature)

Date:

GEC MICROMHO (SHNB) DISTANCE PROTECTION

Note: + signifies that the item applies to blocking scheme only.

* signifies that item applies to acceleration scheme only.

Terminal numbers mentioned in this SCT refer to SHNB 102. For equivalent SHNB105 terminal numbers see Appendix B.

Caution: Equipment using transistors, CMOS devices and reed relays; special care to be taken.

Some of the modules in Micromho have a red warning triangle on the bottom left hand corner of the frontplate. These modules contain circuitry which may consist of devices that have been manufactured by the CMOS process (Complementary Metal Oxide Silicon).

CMOS devices are susceptible to damage due to static discharge, and for this reason it is essential that the correct handling procedure is followed:

The following procedure is recommended when handling all modules:

- Before removing modules from the Micromho subrack, the operator should firstly ground himself to the relay subrack, in order to remove any static charge difference between the operator and the Micromho.
- Modules should only be handled by holding the module frontplate, or the board edges; the board assemblies must not be 'grasped'.
- Modules must not be passed from one person to another unless both persons are grounded.
- Do not place modules in polystyrene trays.

1 GENERAL

CT Ratio:

VT Ratio:

Type of VT Capacitor/Wound:

Trip Supply Volts D.C.:

Relay Supply Volts D.C.:

Opto-isolator Supply Volts D.C.:

(i) Local Primary System Diagram:

(ii) Circuit Parameters:

Line Angle

Length

Primary Impedances

Positive Sequence Z_1

Zero Sequence Z_0

Earth Fault Loop $Z_p = \frac{2Z_1 + Z_0}{3}$

No 1 Feeder
Degrees
km
ohms
ohms
ohms

(iii) Mode of Operation:

(Required Thumbwheel Selection)

Block	Acc	Plain
17	13	11

(iv) Thumbwheel Selection No:

	Y	
----------------------	---	----------------------

(v) Relay/Serial Nos:

Model No	Serial No

(vi) Relay Settings:
(Primary ohms at relay angle)

Relay Angle

Zone 1 Impedance

Zone 2 Impedance

Zone 3 Impedance

Zone 3 Percentage Offset

+Zone 3

Forward

Reverse

Phase Fault
Degrees
ohms
ohms
ohms
%
ohms
ohms

Zone 3 Characteristic

Lenticular

Circular

Aspect Ratio (A/B)

Documents

Document Sharing Hub

Zone 2 Timer

Zone 3 Timer

Scheme Timer T_P

Scheme Timer T_D

Type of Signalling Equipment

Signal Equipment Operating Time (End-to-End) (max)

Signal Equipment Reset Time (min)

P/F	EF
ms	ms
ms	ms
ms	
ms	

--

ms

ms

2 ACTUAL RELAY SETTING

(i) Directional Impedance (mho) Measuring Elements:

Required Settings (Required primary ohms

Zone 1 secondary ohms

Zone 2 secondary ohms

Zone 3 secondary ohms Forward

Reverse

Phase Fault

Settings (Secondary Impedance - Phase fault and Earth fault)

Nominal Current rating of current input module (I_n)

AMP

Phase coarse settings

K ₁	ohms
K ₂	

Zone 1 setting K factors

K ₁₁	
K ₁₂	
K ₁₃	
K ₁₄	



	K ₁₅		#
# Required if phase fault Zone 1 setting extended	K ₁₆		#
Zone 1 setting = (K ₁ + K ₂) (K ₁₁ + K ₁₂ + K ₁₃)K ₁₄ divided by I _n			ohms
Zone 1X setting (extended Zone 1) = (K ₁ + K ₂) (K ₁₁ + K ₁₂ + K ₁₃)K ₁₄ (K ₁₅ + K ₁₆) divided by I _n			ohms
Zone 1 setting as a percentage of feeder length (P1)			%
Zone 2 setting K factors	K ₂₁		
	K ₂₂		
	K ₂₄		
Zone 2 setting = (K ₁ + K ₂) (K ₂₁ + K ₂₂)K ₂₄ divided by I _n			ohms
Actual Zone 2 setting as a percentage of feeder length (P2)			%
Zone 3 setting K factors	K ₃₁		
	K ₃₂		
	K ₃₃		
Zone 3 setting = (K ₁ + K ₂) (K ₃₁ + K ₃₂)K ₃₃ divided by I _n			ohms
Zone 3 offset setting K factor	K ₃₄		
Zone 3 offset setting = (K ₁ + K ₂) K ₃₃ x K ₃₄ divided by I _n			ohms
+For Blocking scheme direction of operation of Zone 3 must be correct. (See Section 6 Initial Checks).			
Residual compensation			
$\frac{Z_0 - Z_1}{3 Z_1}$			%
Neutral compensation setting K factors	K ₃		

$$(K_3 + K_4 + K_5) = \frac{(Z_0 - Z_1)}{(3Z_1)} (K_1 + K_2)$$

K ₄	
K ₅	

Neutral compensation setting = (K₃ + K₄ + K₅) divided by ln (K₁ + K₂)

ohms

(ii) Timer Settings:

Z ₂ Timer	Link Position available (mSec)	1	2	4	8	16	32	64	128	Total = Σ links x 10 Time (mSec)
Phase	Link in #									
Earth	Link in #									

Z ₃ Timer	Link Position available (mSec)	1	2	4	8	16	32	64	128	Total = Σ links x 20 Time (mSec)
Phase	Link in #									
Earth	Link in #									

t _p Scheme Timer	Link Position available (mSec)	1	2	4	8	Total = Σ links x 10 Time (mSec)
	Link in #					

t _D Scheme Timer	Link Position available (mSec)	1	2	4	8	Total = Σ links x 4 Time (mSec)
	Link in #					

Arrow where appropriate.

3 CALIBRATED TEST EQUIPMENT

Insulation Resistance Tester

Voltmeter or Multimeter

Ammeter or Multimeter

Timer

Injection Test Set

Others (state function)

<u>Manufacturer and Type</u>	<u>Serial No</u>	<u>Date Last Calibrated</u>	<u>Date Next Calibration Due</u>