ROUTINE TEST RESULTS

lame of S/S

Name of Feeder/Transformer :

rotection : Over Current / Earth Fault

Type

lake :

MFG No. :

.T.R. :

Date of Testing :

STARTING AND OPERATING CURRENT TEST

hase	Inverse Time Element				Instt. Element		Remarks
	Set at Amps.	Full creep at Amps.	Operated at Amps.	Resetting of Sector Amps	Set at Amps.	Operated at Amps.	
/F							

OPERATING TIME TEST OF INVERSE TIME ELEMENT

hase	Setting		Current injected Amps.	Operating Time in Secs		Remarks
	P.S.	Time		Actual	Computed	
R			×2 ×3			Operating time :—
Y			×2 ×3			
B			×2 ×3			
/F			×2 ×3			

Counter-signed

Tested by

Executive Engineer (T&C)

Assistant Engineer (T&C)

Note ;— This sheet is meant for Routine Testing of O/C & E/F Relays of active type e.g. Asea & Jyoti.

Routine Test Results

Name of S/S

Protection : Over Current / Earth Fault

Make :

C.T.R. :

Name of Feeder/Transformer

Type :

MFG. No. :

Date of Testing

Starting and Operating Current Test

Phase	Inverse Time Element				Instt. Element.		Remarks
	Set at Amps.	Full creep at Amps	Operated at Amps.	Resetting of Sector Amps.	Set at Amps.	Operated at Amps.	
R							
Y							
B							
E/F							

Operating Time Test of Inverse Time Element

Phase	Setting		Current Injected Amps.	Operating Time in Secs.		Remarks
	P.S.	Time		Actual	Computed	
R			×2 ×3			Operating time :—
Y			×2 ×3			
B			×2 ×3			
E/F			×2 ×3			

Counter-signed

Executive Engineer (T&C)

Tested by

Assistant Engineer (T&C)

Note :—This sheet is meant for Routine testing of O/c & E/F Relays of active type e.g. :— Asea & Jyoti.

ROUTINE TEST RESULTS

Name of S/s..... Date.....

Name of Feeder.....

Number of C.B.....

CHEKING OF C.T. SECONDARY CURRENTS :—

Phase	Primary Current Read by Ammeter On C.P.	C.T. Secondary Current measured on Relay/Energy-Meter Terminals					Remarks
		Core I	Core II	Core III	Core IV	Core V	
R Y B N							

Note :—Indicate the circuit connected on each Core in Remarks.

GENERAL CHECKING :—

1. Tripping of C.B. by

   (i) Manual Operation of Relay :—

   (ii) Manual Command by lead :—

2. Tripping of C.B. by Remote/Local Control Switch :—
3. Closing of C.B. by Remote/Local Control Switch :—
4. Trip Ckt. Healthy Indication/Alarm :—
5. Trip and Non-trip Alarms :
6. Semaphore Indications :—
7. Annunciation Relays for Various Circuits :—
8. Other Checkings .—

   (i)

   (i i)

   (iii)

C/s Tested by

Executive Engineer (T&C) Assistant Engineer (T&C)

Note :- This sheet is meant for 66KV/33KV/11KV feeders without Distance Protection scheme.

Commissioning of Transformer

Name of Sub Station..... Date.....

Transformer details :	Make	...	
	Capacity	...	
	Ratio	...	
	% impedance	... HV to LV	LV to TER HV to TER
	Vector group	...	
	Other details	...	
O. T. R. :	H.V. Side	...	
	L. V. Side	...	
	Tertiary Side	...	
	O. T. Make		H. V. Side
			L.V. Side
			Tertiary
Protection details :	H. V. Side	...	
	L. V. Side	...	

Make of relays :

Date of Commissioning :

Counter-signed by :

Executive Engineer (T&C) Assistant Engineer (T&C)

COMMISSIONING/ROUTINE TEST RESULTS

Name of S/S ;

Name of Transformer :

Checking of Thermal O/c Relay

Date of Testing

Make of Relay—Mistubishi

Type BL-1-D Style-PD-550

HV/LV Side	Phase	Setting		Starting Lower Scale	Starting Upper Scale	Remarks
		Lower Scale	Upper Scale			

Counter-signature

Executive Engineer (T&C)

Tested by

Assistant Engineer (T&C)

COMMISSIONING/ROUTINE TESTING RESULTS

Name of Sub station : Date of Testing :—

Name of Transformer ; Mfg. No. :

Protection :- Make :- Type :-

(A) OPERATING VOLTAGE TEST OF OVER FLUXING RELAY

Location of Relay	Set at V/f	Operated at in volts	Remarks
H·V.			
L.V.			

(B) OPERATING TIME TEST OF TIME LAG RELAYS

Location of Relay	Set at in secs	Operated at in secs	Remarks
H.V,			
L.V.			

(C) OPERATING CURRENT TEST OF RESTRICTED E/F RELAY

Phase	Set at Amps	Operated at Amp	Reset at Amps	Remarks

Counter-signed by

Executive Engineer (T&C)

Tested

Assistant Engineer (T&

COMMISSIONING TEST RESULTS

Name of S/S
Protection :—Differential
Make :—English Electric
Setting range :—Bias. 20%, 30%, & 40%
Op. current-40% to 100%

Name of Transformer
Type :—D.D.T.
MFG No. :
Date of testing :—
C.T.R. { H.V. Side / L.V. Side

OPERATING CURRENT TEST OF DIFFERENTIAL RELAY

Phase	Bias Setting %	Operating Current Set at %	Operating current through H.V. Side of operating coil	Operating current through L.V. Side of operating coil	Remarks
R		40			Physically :
		50			Op. Current :
		80			Contacts :
		100			Flags :
Y		40			Physically :
		50			Op. Current :
		80			Contacts :
		100			Flag :
B		40			Physically :
		50			Op. Current :
		80			Contacts :
		100			Flag :

Counter Signed by

Executive Engineer (T&C)

Tested by

Assistant Engineer (T&C)

Note :—This sheet is meant for initial commissioning tests.

COMMISSIONING/ROUTINE TEST RESULTS

Name of S/S — Date of Testing

Name of Transformer — Make of Relay—Mistubishi

Checking of BU & MU Element of Differential Relay Type HUB-2

Phase	Current Setting	Operating Current			Remarks
		Element H.V. Side	Element L.V. Side	Element tertiary	

Counter-signature

Executive Engineer (T&C)

Tested by

Assistant Engineer (T&C)

Checking of MU Element of Differential Relay Type HUB—2

Phase	Setting Difl.	Setting Bias			Current in Operating Coil		Remarks
		H.V.	L.V.	T.V.	Pick up	Drop up	

Checking of Instentaneous Element of Differential Relay Type HUB—2

Phase	HT/LT or T.T.	Setting of Differential	The Value Inst. Element	Operating Value Inst. Element	Remarks

Counter-signature

Executive Engineer (T&C)

Tested by

Asstt. Engineer (T&C)

ROUTINE TEST RESULTS

Name of S/S
Protection :—Differential
Make:—Asea
C.T.R. { H.V. Side :— / L.V. Side :—

Name of Transformer
Type :—RRMJ 3/4
MFG. No. :—
Date of testing :—

Operating Current Test of Differential Relays

Phase	Coarse Protection		Fine Protection		Remarks
	Set at Amps.	Operated at Amps.	Set at Amps.	Operated at Amps.	
R					Contacts :—
Y					Contacts :—
B					Contacts :—

Operating Time Test of Time Lag Relays

Phase	Coarse Protection		Fine Protection		Remarks
	Set at Secs.	Operated at Secs.	Set at Secs.	Operated at Secs.	
R					Flag 1 :—
Y					Flag 2 :—
B					Contacts :—

Operating Current Test of Blocking Relays

Type :—
MFG. No. :—

Phase	Set at		Operated at Amps.	Remarks
	Tan	I f		

Checking of C.T. Secondary Currents & Spill Current

Aux C.T.R. { H. V. Side :— / L. V. Side :—

Phase	Primary current as read by Amm-eter on C.P. Amps.	C. T. Secondary Current in Amps.						Spill Current m. a.	Remark
		H. V. Side			L. V. Side				
		Core I	Core II	Core III	Core I	Core II	Core III		
R									
Y									
B									

Counter-signed by

Executive Engineer (T&C)

Tested I

Assistant Engineer (T&

COMMISSIONING/ROUTINE TEST RESULTS

Name of Sub-Station :—

Date of Testing :-

Name of Transformer :-

C.T.R. {H.V. =
{L.V. =

Protection :- Differential, Make : English Electric, Type : DTH-31/32, Mfg. No.....

(A) PICK-UP SETTING DIFFERENTIAL UNIT :

Phase	Inject Current on Terminal No.	Theoretical Pick-up current in Amps	Actual Pick-up current in Amps	Remarks
R	14—12 (7—10)	0.15		
	——— (8—10)	0.15		
	11—12 (9—10)	0.15		
Y	18—16 (17—20)	0.15		
	——— (18—20)	0.15		
	15—16 (19—20)	0.15		
B	10—8 (27—30)	0.15		
	——— (28—30)	0.15		
	7—8 (29—30)	0.15		

(B) PICK-UP SETTING INSTANTANEOUS UNIT :—

Phase	Inject current on Terminal No.	Theoretical value 10x Rated current in Amps	Actual value in Amps	Remarks
R	14—12 (7—10)			
Y	18—16 (17—20)			
B	10—8 (27—30)			

Note : In this test secondary terminal of T-3 transformer should be shorted

(C) BIAS CHARACTERISTIC :—

Phase	Bias Setting %	Bias Current Ib in Amps	Operating current Io in Amps	% Bias $=\frac{100 \times Io}{Ib+0.5\ Io}$	Remarks
R					
Y					
B					

Note :— Bias Current should be set at Twice the Relay Rating.

(D) SECOND HARMONIC RESTRAIN :—

Phase	Inject Current I_1 (I_{AC} in Amps	Inject current I_2 (Idc) Just to operate/Block Diff. Relay	observed % 2nd Harmonic content to Block the relay	Remarks
R	0.5			
	1.0			
Y	0.5			
	1.0			
B	0.5			
	1·0			

Continued on page 38

(E) CHECKING OF C.T. SECONDARY CURRENTS & SPILL CURRENTS (ON LOAD)

Primary Current Read by Ammeter on C P. in Amps			C.T. Secondary Current in m. Amps									Remarks
			H.V. Side			L.V. Side			Spill Current			
R	Y	B	R	Y	B	R	Y	B	R	Y	B	

Note : (1) % 2nd Harmonic $= \frac{0.212\, I_2}{0.45\, I_1 + 0.51_2} \times 100$ should be 15% as differential Relay will start blocking feature for a 2nd harmonic content of 15%and more

(2) Terminal marking for DTH Relays

Phase	DTH—31		D.T.H.—32		
	Operating Coil	Bais Coil	Operating Coils	Bias Coil	
R	14-12 & 12-11	14—11	7-10, 8-10 & 9-10	7-(8&9 short)	
Y	18-16 & 16-15	18—15	17-20, 18-20 & 19-20	17-(18&19 ,,)	
B	10-8 & 8—7	10—7	27-30, 28-30 & 29-30	27-(28&29 ,,)	

Counter-signed

Executive Engineer (T&C)

Tested by

Assistant Engineer (T&C)

ROUTINE TEST RESULTS

Name of Sub-Station :-

Date of Testing :-

Name of Transformer :-

C.T.R. { H.V. =
L.V. =

Protection :- Differential, Make :- English Electric, Type :- D.D.T.

Mfg. No. :..... .....

(A) OPERATING CURRENT TEST OF DIFFERENTIAL RELAS :—

Phase	Set at		Opearted at Amps		Remarks
	Bias	Op. Current	current through H.V. side	Current Through L.V. Side	
R					
Y					
B					

(B) BIAS CHARACTERISTIC :—

Phase	% Bias settings	Current injected in Restraining wdg.	Operating Current	% Bias Observed	Remarks
		200%			
R					
Y					
B					

(C) OPERATING TIME TEST :—

Phase	Set at		Current injected in Amps	Operating time in secs		Remarks
	Op. Current	T.M.S.		Actual	Computed	
R						
Y						
B						

(D) CHECKING OF C.T. Secondary Currents and Spill Currents (ON LOAD)

Aux. C.T.R. :— H.V. Side = L.V. Side

Primary Currents read by Ammeter on C P. in Amps			C.T. Secondary Current in m. Amps									Remarks
			H.V. Side			L.V. Side			Spill Current			
R	Y	B	R	Y	B	R	Y	B	R	Y	B	

Counter-signed by

Tested by

Executive Engineer (T&C)

Assistant Engineer (T&C)

Commissioning Test Results

Name of S/S..... Name of Transformer.....

Date of Testing.....

C.T.R. { H.V. :
L.V. :

Aux C.T.R. { H.V. :
L.V. :

%Z..... %

Stability Test for Differential Protection :

400 Volts 3-ϕ A.C. supply was connected on transformer before the H.V. side current transformers and all the phases on L.V. side of the transformer were shorted after the current transformers on L.V. Side and following observations were taken. In case there is no spill current in the operating winding of the Differential Relays then the stability of the protection is proved. During this test the tap position of the transformer should be normal.

(A) Out of Zone fault :

Short Circuit Current { H.V. Side.....Amps.
L.V. Side.....Amps. Applied Voltage...Volts

Type of Fault	C.T. Secondary Current in m.a.									Remarks
	H.V. Side			L.V. Side			Spill Current			
	R	Y	B	R	Y	B	R	Y	B	
1	2	3	4	5	6	7	8	9	10	11
R—Y—B										
R—E										
Y—E										
B—E										

(B) In Zone fault

Type of Fault	C.T. Secondary Current in m.a.									Remarks
	H.V. Side			L.V. Side			Spill Current			
	R	Y	B	R	Y	B	R	Y	B	
1	2	3	4	5	6	7	8	9	10	11
R—Y—B										
R—E										
Y—E										
B—E										

Counter-Signed by

Executive Engineer (T&C) Roorkee

Tested by

Assistant Engineer (T&C)

COMMISSIONING TEST RESULTS

Name of Sub-station :—

Date of Testing :—

Name of Transformer :—
Protection :— Restricted Earth Fault
Mfg. No. :— Make :—

C.T.R. { H.V. Side =, Neutral H.V. =, L.V. Side =, Neutral L.V. = }

STABILITY TEST ON RESTRICTED E/F PROTECTION :

(A) Energize H.V. winding with 3—ϕ, 400 volts A.C. supply, before the H.V. side current Transformers. Now create earth fault on individual L.V. phase one by one after current transformers on L.V. side. Rccord spill current in R-E/F relay of L.V. side as below :-

Earth fault on L.V. phase	Short Circuit Current in Amps on L.V.	Spill Current in R-E/F relay in mA	Remarks
R—N			
Y—N			
B—N			

(B) Energize L.V. winding with 3-ϕ, 400 volts A.C. supply; before the L.V. side current transformers. Now create earth fault in individual H. V. phase one by one after current transformers on H.V. side. Record spill current in R—E/F relay of H.V. side as below :-

Earth fault on H.V. phase	Short circuit current in Amps on H.V.	Spill current in R-E/F relay in mA	Remarks
R—N			
Y—N			
B—N			

Note :—In case of Auto-transformers, there is only one Restricted Earth Fault relay but, the measurements of spill currents in both cases have to be recorded.

Counter-signed by

Executive Engineer (T & C)

Tested by

Assistant Engineer (T & C)

Commissioning Test Results

Name of S/S

Name of Transformer ....

Tests on Power Transformer

Date of Testing ....

A. Brief Specifications :

Voltage Ratio :—

H.V. Side F.L. Current

Top positions :— % to +

%; L.V. Side F.L. Currents :—

Capacity :—

Vector Group :—

Make :—

B. Voltage Ratio Test

% Imp :—

Top Position	Raising of Tap						Lowering of Top						REMARKS
	Voltage across H.V. winding Volts			Voltage measured on L.V. Side Volts			Voltage across H.V. winding Volts			Voltage measured on L.V. Side Volts			
	R—Y	Y—B	B—R	R—Y	Y—B	B—R	R—Y	Y—B	B—R	R—Y	Y—B	B—R	

Counter-signed

Executive Engineer (T&C)

Tested by

Assistant Engineer (T&C)