

<b>CHECK LIST FOR:</b> <b>MEDIUM-VOLTAGE SWITCHGEAR TESTING AND COMMISSIONING</b> <b>( TESTING &amp; COMMISSIONING REPORT)</b>	<b>Form No:</b> <b>Rev. No : 00</b> <b>Page : 1 of 17</b>
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<b>SECTION OF WORK:</b> Electrical	<b>LOCATION:</b>
<b>LEVEL:</b>	<b>WIR No.:</b>

**BUSBAR TORQUE TEST**

Temp:..... °C

PANEL No.				REMARKS
	R	Y	B	

**INSTRUMENT NAME:**.....

**SERIAL NO** : .....

**CALIBRATION DATE:** .....

Tested By : Supplier/Sub-contractor	Witnessed By Contractor	Witnessed By Consultant	Approved By : Client
Signature :	Signature :	Signature :	Signature :
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**BUS BAR CONTACT RESISTANCE MEASUREMENT**

Applied Current : 100 A DC

Temp :.....°C

PANEL NO.	MEASURED RESISTANCE IN MICRO OHMS			REMARKS
	R	Y	B	

**INSTRUMENT NAME** :.....

**SERIAL NO** :.....

**CALIBRATION DATE**: .....

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**CIRCUIT BREAKER CONTACT RESISTANCE MEASUREMENT**

Applied Current: 100 A DC

Temp:.....°C

PANEL NO.	CB Serial No.	MEASURED RESISTANCE IN $\mu\Omega$			REMARKS
		R	Y	B	

**INSTRUMENT NAME :** .....

**SERIAL NO :** .....

**CALIBRATION DATE:** .....

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SECTION OF WORK: Electrical LOCATION:  
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**CURRENT TRANSFORMER**

Panel No. :

Name plate rating details of the equipment

Type	Insulation level :			
Serial No	R:	Y:	B:	
Core	Class	VK/VA	Ratio	Used for
1				
2				

a) Insulation Resistance Measurement : ( 500 V megger )

Temp:.....°C

CT cores	Test combination & Test point	IR Value Measurement in Ω			Remarks
		R Phase	Y Phase	B Phase	
Core-1	1S1 to Earth				
Core-2	2S1 to Earth				

b) Polarity Test :

CT Cores	Secondary Terminals	R	Y	B
Core-1	1S1 to 1S2 & 1S3			
Core-2	2S1 to 2S2 & 2S3			

c) Winding Resistance Test :

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SUBCONTRACTOR  CONTRACTOR

SECTION OF WORK: Electrical LOCATION:  
LEVEL: WIR No.:

CT Core	Phase	Terminals	Resistance	Remarks
1	R	1S1 – 1S2		
		1S1 – 1S3		
	Y	1S1 – 1S2		
		1S1 – 1S3		
	B	1S1 – 1S2		
		1S1 – 1S3		
2	R	2S1 – 2S2		
		2S1 – 2S3		
	Y	2S1 – 2S2		
		2S1 – 2S3		
	B	2S1 – 2S2		
		2S1 – 2S3		

**d) Ratio Test :**

Core No	Actual Ratio	Applied Primary current in A	Measured Terminals	Measured Secondary Current in A		
				R	Y	B
1			1S1 -1S2			
			1S1 – 1S3			
2			2S1 – 2S2			
			2S1 – 2S3			

INSTRUMENT NAME : .....

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LEVEL: WIR No.:	

**FUNCTIONAL CHECKS**  
**11 kV Circuit Breaker Local Operations & Interlocks**

ITEM TO CHECK	WHAT TO CHECK	COMMENTS	REMARKS
BREAKER	- CAN RACK IN & OUT SMOOTHLY		
SERVICE POSITION	- EARTH SWITCH CANNOT BE CLOSED		
	- VCB CLOSED: BKR CANNOT BE RACK OUT		
	- VCB OPENED: BKR CAN BE RACK OUT		
	- MAIN DOOR CANNOT BE OPENED		
TEST POSITION	- VCB CAN BE CLOSED		
	- VCB CLOSED: BKR CANNOT BE RACKED IN		
	- CONTROL PLUG CAN BE REMOVED		
	- EARTH SWITCH CAN BE CLOSED		
INTERMEDIATE POSITION	- VCB CANNOT BE CLOSED		
EARTH SWITCH	- CAN OPEN & CLOSE SMOOTHLY		
	- PADLOCK FACILITY PROVIDED		
CB PLUG	- WITH OUT CB PLUG CB NOT POSSIBLE TO RACK IN		
VT SHUTTER PT SHUTTERS	- SMOOTH OPENING & CLOSING		
CB ON/OFF BY ELECTRICAL COMMAND	-ON COMMAND		
	-OFF COMMAND		
CB ON/OFF MANUAL	-ON & OFF CHECKED		

**INSTRUMENT NAME** : .....

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**VOLTAGE TRANSFORMER**

TYPE :  
RATED VOLTAGE :  
RATIO :  
OUTPUT (VA) :  
PURPOSE :  
SERIAL No. : R.....Y.....B.....  
YEAR OF MANUFT :

**INSULATION, RATIO, POLARITY & RESISTANCE TEST**

**1. INSULATION TEST ( Ω)**

WINDING	MEGGER (V)	R	Y	B
PRIMARY TO EARTH	5000			
PRIMARY TO SECONDARY-1	1000			
PRIMARY TO SECONDARY-2	1000			
SECONDAY -1 TO EARTH	500			
SECONDAY -1 TO EARTH	500			
SECONDAY -1 TO SECONDARY - 2	500			

**a) Polarity Test :**

CT Cores	Secondary Terminals	R	Y	B
Core-1	a1 – n1			
Core-2	a2 – n2			

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**VOLTAGE TRANSFORMER**

**3. RATIO CHECK:**

PHASE PRIMARY	APPLIED PRIMARY VOLTAGE (V)	MEASURED VOLTAGE (V) ON SECONDARY-1	MEASURED VOLTAGE (V) ON SECONDARY-2
RY			
YB			
BR			
RN			
YN			
BN			

**4. VT WINDING RESISTANCE:**

TEMP:..... °C

PHASE	PRIMARY(KΩ)	SECONDARY-1 (mΩ)	SECONDARY-2 (mΩ)
R			
Y			
B			

INSTRUMENT NAME:.....

SERIAL NO :.....

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### PROTECTION RELAY TESTING

**RELAY DETAILS**

TYPE : ..... MAKE : .....

AUX. VOLTS : ..... V SERIAL NO : .....

**GENERAL INSPECTION AND CHECKS**

Sl.No.	Checks	Result
1	Installation and wiring correct to relevant drawings	
2	Model number or rating information is correct	
3	Output contacts are operating properly	
4	LED Indication operation	

**a. Measurement:**

CT RATIO : .....

Phase	Phase R	Phase Y	Phase B	Earth
Current Injected(A)				
Current displayed on Relay(A)				

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**b. O/C & E/F Function**

Characteristic Curve = NI

Phase	Setting Current Is> Amps.	Pickup Current Amps	Drop off Current Amps.	Remarks
R	1.0			
Y	1.0			
B	1.0			
E/F	1.0			

Characteristic Curve = NI

Phase	Setting Current (A)	TMS	Injected =2 x Is		Injected=5 x Is	
			Expected Time Sec.	Actual Time Sec.	Expected Time Sec.	Actual Time Sec.
R	1.0	0.1				
Y	1.0	0.1				
B	1.0	0.1				
E/F	1.0	0.1				

**C . Testing definite time stages**

High set stage I >>

Test element	Relay setting I >> (A)	Current injected (A)	Time setting (Sec)	Operating time (Sec)
R	1	2		
Y	1	2		
B	1	2		
E/F	1	2		

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**CONTRACTOR**

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**LEVEL:**

**LOCATION:**  
**WIR No.:**

**d. Final settings for O/C & E/F Function**

Phase	Setting Current (A)	TMS	Injected =2 x Is		Injected=5 x Is	
			Expected Time Sec.	Actual Time Sec.	Expected Time Sec.	Actual Time Sec.
R						
Y						
B						
E/F						

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**HIGH VOLTAGE TEST**

**1. INSULATION RESISTANCE TEST**

Test Voltage: 5 kV DC

Ambient Temp:.....°C

Voltage Applied Between	BEFORE HV ( Ω )	AFTER HV ( Ω )
R to Y+B+ Earth		
Y to R+B+ Earth		
B to R+Y+ Earth		

**2. HIGH VOLTAGE TEST**

Applied Voltage: 22.4 kV AC for 60 SEC

Voltage Applied Between	Leakage Current (mA)	Result
R to Y+B+ Earth		
Y to R+B+Earth		
B to R+Y+Earth		

**INSTRUMENT NAME:**.....  
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**PRIMARY INJECTION TEST ON CT CIRCUIT**

CT RATIO & PUROSE	PHASES INJECTED	PRIMAR Y CURREN T (Amps)	ENTER DETAILS OF MEASURING POINTS AND PHASES							
			SWGR				SWGR			
CORE -1 Ratio -  Metering			TERMINAL BLOCK -				SA1 SWITCH			
			X311	X312	X313	X314	2	6	10	1
	R - E									
	R - Y									
	R - B									

CT RATIO & PUROSE	PHASES INJECTED	PRIMAR Y CURREN T (Amps)	ENTER DETAILS OF MEASURING POINTS AND PHASES							
			SWGR				SWGR.			
CORE -1 Ratio -  Metering			AMMETER DISPLAY							
			R	Y	B					
	R - E									
	R - Y									
	R - B									

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**LEVEL:** **WIR No.:**

**PRIMARY INJECTION TEST ON CT CIRCUIT**

CT RATIO & PUROSE	PHASES INJECTED	PRIMARY CURRENT (Amps)	ENTER DETAILS OF MEASURING POINTS AND PHASES									
			SWGR				SWGR					
CORE -1 Ratio -  Protection.	R - E  R - Y  R - B		TERMINAL BLOCK -				TEST PLUG					
			X301	X302	X303	X304	21/22	23/24	25/26	27/28		

CT RATIO & PUROSE	PHASES INJECTED	PRIMARY CURRENT (Amps)	ENTER DETAILS OF MEASURING POINTS AND PHASES									
			SWGR				SWGR					
CORE -1 Ratio -  Protection	R - E  R - Y  R - B		RELAY				RELAY DISPLAY					
			49	51	53	56	R	Y	B	N		

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**VOLTMETER FUNCTIONAL TEST**

**1. INSTRUMENT DETAILS**

MAKE : .....

RANGE : .....

MODEL/TYPE : .....

VT RATIO : .....

**2. SECONDARY INJECTION**

Sl. No.	Applied Voltage (V)	Expected Reading (KV) [s]	Measured Reading (KV) [ns]	% Error
1				
2				
3				
4				
5				

$$\% \text{ Error} = \frac{(\text{ns} - \text{s})}{(\text{Full scale value})} \times 100$$

**3. EQUIPMENT USED :**

INSTRUMENT NAME	MAKE / MODEL	SERIAL NO.	CAL DUE DATE

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