



















# RUMURUTI 132/33kV SUBSTATION UPS SINGLE LINE DIAGRAM

COVER

REFERENCE DRAWINGS			
DRAWING NO.	REV.		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
APPROVED	APPROVED WITH COMMENTS	NOT APPROVED	FOR INFORMATION
DATE: .....		SIGNATURE/STAMP: PROJECT CONSULTANT	
		KENYA ELECTRICITY TRANSMISSION COMPANY LTD	
		COLENCO CONSULTING LIMITED	
PROJECT:			
KENYA TRANSMISSION NETWORK IMPROVEMENT PROJECT (KTRNIP).			
PROJECT DRAWING NO.	PROJECT NO.		
NAME:	DATE:	PROJECT NO.	
PREPARED:	HL	RUMURUTI 132/33kV SUBSTATION	
DRAWN:	F.J	19/05/2023	REV.
CHECKED:	V.JOSHI	19/05/2023	
APPROVED:	S.DENAHAN	19/05/2023	
			COVER
REVISIONS			
NO.	NAME	DATE	
SCALE:	1:400	DWG NO.	REV.:





### LEGEND

	FUSE SWITCH		VOLTMETER		VOLTAGE SELECTOR SWITCH		SIGNAL LAMP
	MINIATURE CIRCUIT BREAKER		AMMETER		EARTH FAULT RELAY		EARTH
	CURRENT TRANSDUCER		WATT METER		INSTANTANEOUS AND INVERSE EARTH FAULT RELAY		CONTACT
	VOLTAGE TRANSDUCER		CURRENT TRANSFORMER		UNDER/OVER VOLTAGE		REVISION MARK

NOTES:

- 1-NUMBERS AND RATINGS SHALL BE SPECIFIED AT DETAIL DESIGN STAGE BY EPC CONTRACTOR BASED ON CALCULATIONS SUBJECT TO CLIENT/CONSULTANT APPROVAL.
- 2-AT LEAST 20 PERCENT OF EACH FEEDERS SIZE SHALL BE CONSIDERED AS SPARE FEEDER IN ADDITION TO FUTURES.
- 3-SHORT CIRCUIT CAPACITY OF BUSBAR ARE THE MIN-VALUE, AND SHALL BE FINALIZED AT DETAIL DESIGN STAGE BY EPC CONTRACTOR BASED ON CALCULATIONS SUBJECT TO CLIENT/CONSULTANT APPROVAL.
- 4-ALL MEASURING VALUES(VOLTAGE, CURRENT, REACTIVE POWER, ACTIVE POWER, FREQUENCY, POWER FACTOR, ENERGY, TEMPERATURE AND ETC) SHALL BE MONITORED THROUGH HMI AND ALL NECESSARY EQUIPMENT SUCH AS TRANSDUCERS SHALL BE CONSIDERED.
- 5-ALL OF INVERTER INFORMATION SHOULD BE SENT TO HMI.
- 6-THE CAPABILITY OF PARALLELING SHOULD BE SUPPLIED FOR 2 INVERTERS.
- 7-ALL MCCBs/MCBs FOR FUTURE EXTENSION SHALL BE SUPPLIED.
- 8-OPERATION OF ALL RELAYS SHALL BE SHOWN IN HMI.
- 9-ALL MCCBs AND MCBs SHALL BE EQUIPPED WITH AUXILIARY CONTACT.
- 10-SIZE OFF ALL CABLES SHALL BE DETERMINED AT DETAIL DESIGN STAGE BY EPC CONTRACTOR BASED ON CALCULATIONS SUBJECT TO CLIENT/CONSULTANT APPROVAL.
- 11-SINGLE LINE DIAGRAM OF INVERTER SHALL BE SHOWN IN HMI WITH DYNAMIC COLORS.
- 12-AUTOMATIC CHANGE OVER OPERATION (A.C.O) SHOULD BE DONE BELOW 4ms AND SUPPLIED BY INVERTER MANUFACTURER.(STATIC SW.)
- 13-THE RANGE OF INVERTER SHALL BE SIZED (MINIMUM 6000 VA FOR A 10HR AUTONOMY PERIOD) CONSISTING OF DUAL INDEPENDENTLY OPERATION UNITS COMPLETE WITH ALL ACCESSORIES. THE CONTRACTOR SHALL PROVIDE SIZING CALCULATIONS FOR THE UPS LOADING AT DETAIL DESIGN STAGE SUBJECT TO CLIENT/CONSULTANT APPROVAL.
- 14-THE UPS SYSTEM SHALL CONSIST OF DUAL INDEPENDENTLY OPERATING UNITS WORKING AS SHARING THE LOAD METHOD WITH ALL NECESSARY CONTROL, STATIC SWITCHES, MANUAL BYPASS SWITCH, ETC. NECESSARY FOR THE RELIABLE OPERATION OF UPS SYSTEM UNDER ALL OPERATING CONDITIONS OF THE SUBSTATION.
- 15-SUITABLE FILTERS & STABILIZERS SHALL BE USED TO OBTAIN A PURE SINUSOIDAL WAVE OUTPUT.
- 16-ALL SIGNALS REQUIRED TO CONTROL THE UPS SYSTEM SHOULD BE CONSIDERED/MONITORED IN SAS.
- 17-IN NORMAL CONDITION THE UPS SHALL BE FED BY MAIN DC BOARD(OFF-LINE MODE OPERATION)
- 18-INVERTER SWITCHING SHALL BE DONE IN AUTO & MAN MODE IN SYNCHRONIZING CONDITION.
- 19-THE CONTRACTOR SHALL PROVIDE SUB-DISTRIBUTION BOARDS AS REQUIRED SUBJECT TO CLIENT/CONSULTANT APPROVAL.
- 20-INVERTER OUTPUT EARTHING SYSTEM SHOULD BE "IT" TYPE & AN INSULATION MONITORING RELAY SHOULD BE USED AS THE RELAY OF ANSI CODE 64.
- 21-LIGHTNING ARRESTOR SHALL BE CONSIDERED.
- 22-MANUAL BY PASS SWITCH SHALL BE MAKE BEFORE BREAK.
- 23-THE UPS SHALL BE SUITABLE FOR CONTINUOUS OPERATION, AND FUNCTION SATISFACTORILY WITH A COMBINATION OF VARIATIONS OF THE INCOMING SUPPLY VOLTAGE OF 10% OF NOMINAL AND FREQUENCY OF 5% OF NOMINAL.
- 24-THE UPS SYSTEM SHALL BE FED FROM 110V DC/415V AC SWITCHBOARDS BY TWO SUITABLE RATED MCCB CONNECTED TO THE SEPARATE BUS SECTIONS.
- 25-MULTIPLICATION RELAYS WITH THREE CONTACTS FOR EACH ALARM OF THE UPS SYSTEM TO BE PROVIDED.
- 26-THE CUBICLES SHALL BE COMPLETELY SELF-SUPPORTING, MADE OF A REQUIRED NUMBER OF STANDARDIZED, PREFABRICATED, VERTICAL SECTIONS BOLTED TOGETHER TO FORM INDOOR METAL CLAD, DUST-PROOF RIGID UNIT, DEGREE OF PROTECTION IP51. THE CUBICLES SHALL BE FREE STANDING, EQUIPPED WITH BOTTOM FRAMES SUITABLE FOR BOLTING TO THE FLOOR. SHEET STEEL THICKNESS SHALL NOT BE LESS THAN 2 mm.

#### LEGEND & NOTE

REFERENCE DRAWINGS			
DRAWING NO.:		TITLE:	
<input type="checkbox"/> APPROVED <input type="checkbox"/> APPROVED WITH COMMENTS <input type="checkbox"/> NOT APPROVED <input type="checkbox"/> FOR INFORMATION DA: _____      SIGNATURE/STAMP: _____      PROJECT CONSULTANT: _____			
 <b>KETRACO</b> Kenya Electricity Transmission Company Limited		KENYA ELECTRICITY TRANSMISSION COMPANY LTD	
 <b>COLOENCO</b> innovative for sustainable future		COLOENCO CONSULTING LIMITED	
PROJECT: KENYA TRANSMISSION NETWORK IMPROVEMENT PROJECT (KETNIP).			
PROJECT DRAWING NO.		PROJECT NO.	
NAME:		PROJECT NO.	
PREPARED: NIL		RUMURUTI 132/33KV SUBSTATION	
DRAWN: JJ		DATE: 30/05/2010	
CHECKED: J JOJA		DATE: 30/05/2010	
APPROVED: L DEDHURU		DATE: 30/05/2010	
		UPS SINGLE LINE DIAGRAM	
		LEGEND & NOTE	
REVISIONS			
NO. NAME DATE			
SCALE: 1:60		DWG NO: RUMURUTI-UPS-SLD-001	
		REV.:	

