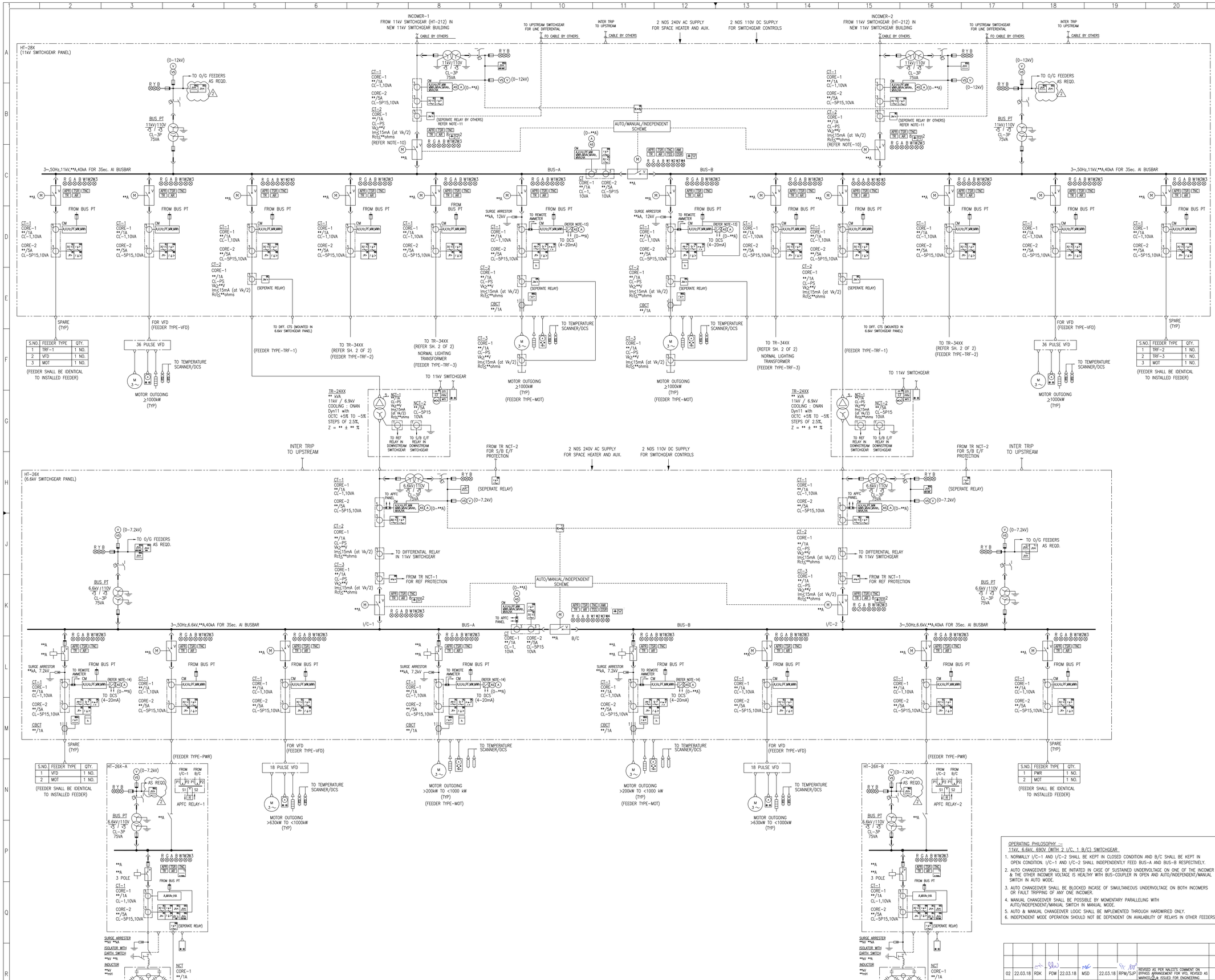

S.NO.	FEEDER TYPE	QTY.
1	TRF-1	1 NO.
2	VFD	1 NO.
3	MOT	1 NO.

(FEEDER SHALL BE IDENTICAL TO INSTALLED FEEDER)

S.NO.	FEEDER TYPE	QTY.
1	TRF-2	1 NO.
2	TRF-3	1 NO.
3	MOT	1 NO.

(FEEDER SHALL BE IDENTICAL TO INSTALLED FEEDER)

S.NO.	FEEDER TYPE	QTY.
1	VFD	1 NO.
2	MOT	1 NO.

(FEEDER SHALL BE IDENTICAL TO INSTALLED FEEDER)

S.NO.	FEEDER TYPE	QTY.
1	PWR	1 NO.
2	MOT	1 NO.

(FEEDER SHALL BE IDENTICAL TO INSTALLED FEEDER)

LEGEND

SYMBOL	DESCRIPTION
	DISCONNECTOR
	MOTORISED DRAW-OUT TYPE CIRCUIT BREAKER T= V, S OR A V-VCB,S=SF6 A-ACB
	VACUUM CONTACTOR (HV)
	THREE PHASE TRANSFORMER WITH OFF CIRCUIT TAP CHANGER WITH 'S' STEPS
	CURRENT TRANSFORMER 3 INDICATES NUMBER
	MINIATURE CIRCUIT BREAKER (MCB) WITH POTENTIAL FREE CONTACT
	DRAW-OUT TYPE CONTACTS
	CABLE GLAND
A,V,Hz,PF,kW,kWh	COMPOSITE MULTIFUNCTION METER
	POTENTIAL TRANSFORMER (DRAWOUT TYPE)
	BUSDUCT
	'NO' CONTACT OF CONTACTOR
	ELECTRONIC OVERLOAD RELAY / DIGITAL MOTOR PROTECTION RELAY
	SWITCH FUSE UNIT
	FUSE
	CORE BALANCE CURRENT TRANSFORMER
	SURGE ARRESTER
	VACUUM CONTACTOR (LV)
	MOULDED CASE CIRCUIT BREAKER (MCCB)
	EARTH LEAKAGE CIRCUIT BREAKER
	MINIATURE CIRCUIT BREAKER (MCB)
	SPACE HEATER
	THERMISTOR
	THREE PHASE INDUCTION MOTOR
	INDICATING LAMP R – RED G – GREEN A – AMBER (AUTO TRIP) B – BLUE (SPRING CHARGED) W1 – WHITE (TRIP CIRCUIT HEALTHY) W2 – WHITE (TEST) W3 – WHITE (SERVICE) W4 – WHITE (DC SUPPLY HEALTHY) R – RED Y – YELLOW B – BLUE
BCH/PRV/OTI/WTI/MOG	BUCHHOLZ RELAY/PROTECTIVE DEVICE (96 – SECOND STAGE) OIL TEMPERATURE INDICATOR PRESSURE RELIEF VALVE WINDING TEMPERATURE INDICATOR MAGNETIC OIL GAUGE
	LOAD BREAK SWITCH

SYMBOL	DESCRIPTION
AR	AUXILIARY RELAY
APR	ANTI PUMPING RELAY
TNC	TRIP–NEUTRAL–CLOSE SWITCH
TSS	TRIP SELECTOR SWITCH
DSR	DC SUPPLY SUPERVISION RELAY
V	VOLTMETER
VS	VOLTMETER SELECTOR SWITCH
A	AMMETER
AS	AMMETER SELECTOR SWITCH
49/**	LOCKED ROTOR DETECTION RELAY (99)
49	THERMAL OVERLOAD PROTECTION (49)
46	NEGATIVE PHASE SEQUENCE OVER CURRENT (46)
50N+2	DEFINITE TIME EARTH FAULT ELEMENT (50N+2)
θ	THERMISTOR RELAY
51	IDMT OVER CURRENT ELEMENT (51)
51N	IDMT EARTH FAULT ELEMENT (51N)
50N	INSTANTANEOUS OVER CURRENT ELEMENT (50N)
50N	INSTANTANEOUS EARTH FAULT ELEMENT (50N)
64R	RESTRICTED EARTH FAULT PROTECTION (64R)
51G	IDMT EARTH FAULT ELEMENT (51G)
MCP, 49, 50N, 51N	MOTOR PROTECTION RELAY (MPR)
27	UNDER VOLTAGE RELAY (27)
27/TD	UNDER VOLTAGE RELAY WITH TIMER (27+2)
59/TD	OVER VOLTAGE RELAY WITH TIMER (59+2)
	TIMER
25	SYNCHRONISM CHECK RELAY (25)
50G	INSTANTANEOUS EARTH FAULT ELEMENT (50G)
87L	LINE DIFFERENTIAL PROTECTION RELAY (87L)
87M	MOTOR DIFFERENTIAL PROTECTION RELAY (87M)
87T	TRANSFORMER DIFFERENTIAL PROTECTION RELAY (87T)
	LOCAL CONTROL STATION WITH START/ STOP PUSH BUTTONS
	LOCAL CONTROL STATION WITH STOP PUSH BUTTON AND INDICATING LAMP
	LOCAL CONTROL STATION WITH START/ STOP PUSH BUTTONS AND AMMETER
	LOCAL CONTROL STATION WITH TNC SWITCH, START & STOP INDICATING LAMP AND AMMETER
	CONTROL TRANSFORMER
M-I	MANUAL / INDEPENDENT SWITCH
A-M	AUTO/MANUAL SWITCH
AMI	AUTO/MANUAL/INDEPENDENT SWITCH
TSR	TRIP CIRCUIT SUPERVISION RELAY
TR	TRIPPING RELAY
SDVS	SERVO CONTROLLED VOLTAGE STABILIZER
EI	ELECTRICAL INTERLOCK
MI	MECHANICAL INTERLOCK
	BATTERY BANK
	INVERTER
	RECTIFIER
	STATIC SWITCH
	HOUR METER / HOUR COUNTER (INTEGRATING TYPE)
	RTD/BTD
X – Y	ANNUNCIATOR X – NO. OF WINDOWS Y – NO. OF AUDIBLE ALARM
TS	CURRENT TRANSDUCER (WITH OUTPUT GALVANIC ISOLATION) TEMPERATURE SCANNER

NOTES

1. DATA MARKED '**' SHALL BE DECIDED BY LSTK CONTRACTOR. THE RATING OF COMPONENTS IN INDIVIDUAL FEEDERS SHALL BE DECIDED BY SWITCHGEAR VENDOR BASED ON FEEDER LIST PROVIDED BY LSTK CONTRACTOR.
2. ONLY MAJOR RELAYS HAVE BEEN INDICATED IN THE SLD. ANY OTHER COMPONENTS LIKE AUXILIARY RELAYS,TIMERS, SWITCHES ETC. AS REQUIRED WHILE DEVELOPING THE DETAILED SCHEMATIC FOR SAFE OPERATION SHALL BE IN THE SWITCHGEAR VENDOR'S/ LSTK CONTRACTOR SCOPE.
3. 415V DG SETS ARE ENVISAGED AT TWO LOCATIONS NEAR SUBSTATIONS NO. US–503 & US–505.
4. THE RATING OF 11kV/ 0.433kV TRANSFORMER SHALL BE RESTRICTED TO 2.5MVA. ACCORDINGLY NO. OF TRANSFORMERS, PCC PANELS SHALL BE PROVIDED.
5. THE PCC & MCC PANELS SHOWN ARE TYPICAL.
6. NORMAL LIGHTING TRANSFORMER SHALL BE RATED FOR NORMAL LIGHTING LOAD, EMERGENCY LIGHTING TRANSFROMER SHALL BE RATED FOR ONLY EMERGENCY LIGHTING LOAD.
7. FOR ALL AGITATOR MOTORS IN PCC VACUUM CONTACTOR SHALL BE PROVIDED.
8. OVERLOAD RELAY TYPE : ELECTRONIC OVERLOAD RELAY : ≤ 7.5kW
   DIGITAL MOTOR PROTECTION RELAY WITH DISPLAY & FAULT RECORD: 7.5kW ≤ MOTOR kW < 75kW
   DIGITAL MOTOR PROTECTION RELAY WITH DISPLAY & FAULT RECORD: ≥ 55kW FOR AGITATOR MOTORS
   COMPREHENSIVE NUMERICAL MOTOR PROTECTION RELAY: MOTOR kW ≥ 75kW
   COMPREHENSIVE NUMERICAL MOTOR PROTECTION RELAY: > 55kW FOR AGITATOR MOTORS
9. 50G SHALL BE PROVIDED FOR NON–MOTORING LOADS (e.g PROCESS HEATER LOAD) RATED ABOVE 5kVA. 50G SHALL NOT BE PROVIDED FOR POWER FEEDERS(e.g VFD, PFIC, HVAC, UPS, BATTERY CHARGER,ETC.)
10. CLASS PS CT PARAMETERS SHALL BE PROVIDED DURING DETAIL ENGINEERING.
11. SPACE FOR LINE DIFFERENTIAL RELAY (FREE ISSUE TO LSTK CONTRACTOR) SHALL BE CONSIDERED IN SWITCHGEAR PANEL BY SWITCHGEAR VENDOR/LSTK CONTRACTOR.
12. DETAIL SLD SHOWN IS TYPICAL. LSTK CONTRACTOR SHALL DEVELOP DETAIL SLD INCLUDING ALL SUBSTATION EQUIPMENTS BASED ON ACTUAL REQUIREMENT.
13. TRANSDUCER SHALL BE MOUNTED IN THE OUTGOING MOTOR FEEDER IN 11kV SWITCHGEAR.
14. TRANSDUCER SHALL BE MOUNTED IN A SEPARATE PANEL FOR 6.6kV SWITCHGEAR, WHICH SHALL BE INSTALLED IN SUBSTATION.
15. TRANSDUCERS SHALL BE MOUNTED IN A SEPARATE PANEL FOR 415V SWITCHGEAR, WHICH SHALL BE INSTALLED IN SUBSTATION. ONE COMMON TRANSDUCER PANEL FOR ALL 415V SWITCHGEAR SHALL BE PROVIDED.

REFERENCE DRAWINGS

6695–ELT–G00–EC–0002	GENERAL ENGINEERING SPECIFICATION – ELECTRICAL
6695–ELT–G00–EC–0003	GUIDELINES FOR ELECTRICAL EQUIPMENT NUMBERING SYSTEM
6695–ELT–G00–EC–0004	DESIGN GUIDELINES FOR ELECTRICAL FACILITIES
6695–ELT–G00–FA–0001	KEY SINGLE LINE DIAGRAM

OPERATING PHILOSOPHY :–
11kV, 6.6kV, 690V (WITH 2 I/C, 1 B/C) SWITCHGEAR

1. NORMALLY I/C–1 AND I/C–2 SHALL BE KEPT IN CLOSED CONDITION AND B/C SHALL BE KEPT IN OPEN CONDITION. I/C–1 AND I/C–2 SHALL INDEPENDENTLY FEED BUS–A AND BUS–B RESPECTIVELY.
2. AUTO CHANGEOVER SHALL BE INITIATED IN CASE OF SUSTAINED UNDERVOLTAGE ON ONE OF THE INCOMER & THE OTHER INCOMER VOLTAGE IS HEALTHY WITH BUS–COUPLER IN OPEN AND AUTO/INDEPENDENT/MANUAL SWITCH IN AUTO MODE.
3. AUTO CHANGEOVER SHALL BE BLOCKED INCASE OF SIMULTANEOUS UNDERVOLTAGE ON BOTH INCOMERS OR FAULT TRIPPING OF ANY ONE INCOMER.
4. MANUAL CHANGEOVER SHALL BE POSSIBLE BY MOMENTARY PARALLELING WITH AUTO/INDEPENDENT/MANUAL SWITCH IN MANUAL MODE.
5. AUTO & MANUAL CHANGEOVER LOGIC SHALL BE IMPLEMENTED THROUGH HARDWIRED ONLY.
6. INDEPENDENT MODE OPERATION SHOULD NOT BE DEPENDENT ON AVAILABILITY OF RELAYS IN OTHER FEEDERS.

Rev.	Date	Drawn/Prepared	Date	Checked	Date	Approved	Description	Acc. Code
02	22.03.18	RDK	22.03.18	MSD	22.03.18	RPM/SJP	REVISED AS PER NALCO'S COMMENT ON BYPASS ARRANGEMENT FOR VFD, REVISED AS MARKED,O/A ISSUED FOR ENGINEERING	
01	19.01.18	RDK	19.01.18	MSD	19.01.18	RPM	FINALIZED AFTER NALCO'S REVIEW, ISSUED FOR ENGINEERING	
00	31.10.17	RDK	31.10.17	MSD	31.10.17	RPM/SJP	ISSUED FOR ENGINEERING	

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Category Codes (Submission purpose)
- ☐ 1 For Approval
- ☐ 2 For Review / Comments
- ☐ 3 For Information
- ■ 4 For Engineering
- ☐ 5 For Enquiry
- ☐ 6 For Order Placement
- ☐ 7 Final & Approved
- ☐ 8 Released for Construction

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Acceptance Codes (Verified Copy)
- ☐ 1 Approved
- ☐ 2 Approved for Manufacturing/ Fabrication With Comments as Marked
- ☐ 3 Not Approved/Resubmit
- ☐ 4 Retained for Information/Records
- ☐ 5 Reviewed
- ☐ 6 Reviewed as Noted/Resubmit

Date : __/__/____ Name : _____

Contract No.	Document ID	Port	Rev.
66–6695	6695–ELT–G00–FA–0003		02

Store Location: Server/Share: 66–6695–Ado\Acad
Store Location: Folder: \Lssel\Drg\Electrical\Single_Line_Diagram
Store Name: 6695–ELT–G00–FA–0003_Sh1_R1
BAR–Code

Pro. Unit	Con. Unit	TON	Group	Order No.	Type of Document	Sheet
					FA	1 / 2

नाल्को NALCO
नेशनल एलुमिनियम कम्पनी लिमिटेड
National Aluminium Company Ltd.

1.0 MTPA ALUMINA REFINERY STREAM-5
DAMANJODI, ODISHA

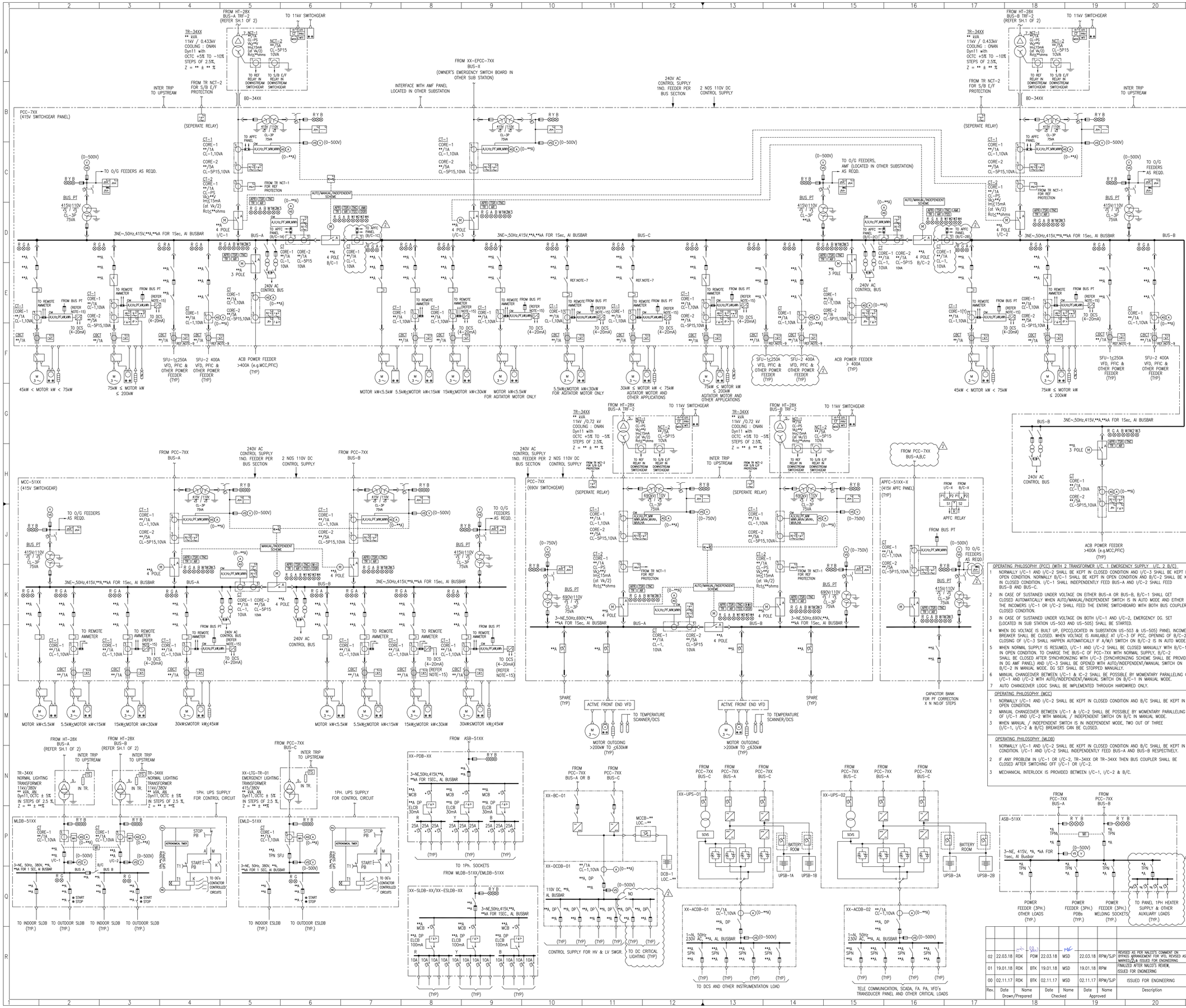
thyssenkrupp

	Date	Name
Drawn	31.10.17	RDK
Prepared	31.10.17	BTK
Checked	31.10.17	MSD
Approved	31.10.17	RPM/SJP

Description: TYPICAL DETAIL SINGLE LINE DIAGRAM

Scale: N.T.S. | Cat. Code: 4 | Acc. Code | Status

ISO A0



LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	DISCONNECTOR	AR	AUXILIARY RELAY
	MOTORISED DRAW-OUT TYPE CIRCUIT BREAKER T= V, S OR A V-VCB,S=SF6 A-ACB	APR	ANTI PUMPING RELAY
	VACUUM CONTACTOR (HV)	TNC	TRIP-NEUTRAL-CLOSE SWITCH
	THREE PHASE TRANSFORMER WITH OFF CIRCUIT TAP CHANGER WITH 'S' STEPS	TSS	TRIP SELECTOR SWITCH
	CURRENT TRANSFORMER 3 INDICATES NUMBER	DSR	DC SUPPLY SUPERVISION RELAY
	MINIATURE CIRCUIT BREAKER (MCB) WITH POTENTIAL FREE CONTACT	(V)	VOLTMETER
	DRAW-OUT TYPE CONTACTS	VS	VOLTMETER SELECTOR SWITCH
	CABLE GLAND	(A)	AMMETER
CM A,V,Hz,PF,MW,MVAR	COMPOSITE MULTIFUNCTION METER	AS	AMMETER SELECTOR SWITCH
	POTENTIAL TRANSFORMER (DRAWOUT TYPE)	49	LOCKED ROTOR DETECTION RELAY (99)
	BUSDUCT	49	THERMAL OVERLOAD PROTECTION (49)
	'NO' CONTACT OF CONTACTOR	46	NEGATIVE PHASE SEQUENCE OVER CURRENT (46)
	ELECTRONIC OVERLOAD RELAY / DIGITAL MOTOR PROTECTION RELAY	50N	DEFINITE TIME EARTH FAULT ELEMENT (50N+2)
	SWITCH FUSE UNIT	49	THERMISTOR RELAY
	FUSE	50/51	IDMT OVER CURRENT ELEMENT (51)
	CORE BALANCE CURRENT TRANSFORMER	51N	IDMT EARTH FAULT ELEMENT (51N)
	SURGE ARRESTER	50	INSTANTANEOUS OVER CURRENT ELEMENT (50)
	VACUUM CONTACTOR (LV)	50N	INSTANTANEOUS EARTH FAULT ELEMENT (50N)
	MOULDED CASE CIRCUIT BREAKER (MCCB)	64R	RESTRICTED EARTH FAULT PROTECTION (64R)
	EARTH LEAKAGE CIRCUIT BREAKER	51G	IDMT EARTH FAULT ELEMENT (51G)
	MINIATURE CIRCUIT BREAKER (MCB)	MPR	MOTOR PROTECTION RELAY (MPR)
	SPACE HEATER	27	UNDER VOLTAGE RELAY (27)
	THERMISTOR	27/T	UNDER VOLTAGE RELAY WITH TIMER
	THREE PHASE INDUCTION MOTOR	59	OVER VOLTAGE RELAY WITH TIMER (59+2)
	INDICATING LAMP R - RED G - GREEN A - AMBER (AUTO TRIP) B - BLUE (SPRING CHARGED) W1 - WHITE (TRIP CIRCUIT HEALTHY) W2 - WHITE (TEST) W3 - WHITE (SERVICE) W4 - WHITE (DC SUPPLY HEALTHY) R - RED Y - YELLOW B - BLUE	T	TIMER
		25	SYNCHRONISM CHECK RELAY (25)
		50G	INSTANTANEOUS EARTH FAULT ELEMENT (50G)
		87L	LINE DIFFERENTIAL PROTECTION RELAY (87L)
		87M	MOTOR DIFFERENTIAL PROTECTION RELAY (87M)
		87T	TRANSFORMER DIFFERENTIAL PROTECTION RELAY (87T)
		LCS	LOCAL CONTROL STATION WITH START/ STOP PUSH BUTTONS
		LCS	LOCAL CONTROL STATION WITH STOP PUSH BUTTON AND INDICATING LAMP
		LCS	LOCAL CONTROL STATION WITH START/ STOP PUSH BUTTONS AND AMMETER
		LCS	LOCAL CONTROL STATION WITH TNC SWITCH, START & STOP INDICATING LAMP AND AMMETER
	BUCHHOLZ RELAY/PROTECTIVE DEVICE (96 - SECOND STAGE)		CONTROL TRANSFORMER
OTI	OIL TEMPERATURE INDICATOR	M-H	MANUAL / INDEPENDENT SWITCH
PRV	PRESSURE RELIEF VALVE	A-M	AUTO/MANUAL SWITCH
WTI	WINDING TEMPERATURE INDICATOR	AM	AUTO/MANUAL/INDEPENDENT SWITCH
MOG	MAGNETIC OIL GAUGE	TSW	TRIP CIRCUIT SUPERVISION RELAY
	LOAD BREAK SWITCH	TR	TRIPPING RELAY
		SDVS	SERVO CONTROLLED VOLTAGE STABILIZER
		EI	ELECTRICAL INTERLOCK
		MI	MECHANICAL INTERLOCK
			BATTERY BANK
			INVERTER
			RECTIFIER
			STATIC SWITCH
			HOUR METER / HOUR COUNTER (INTEGRATING TYPE)
			RTD/BTD
			ANNUNCIATOR X - NO. OF WINDOWS Y - NO. OF AUDIBLE ALARM
			CURRENT TRANSDUCER (WITH OUTPUT GALVANIC ISOLATION)
		TS	TEMPERATURE SCANNER

OPERATING PHILOSOPHY (PCC) (WITH 2 TRANSFORMER I/C, 1 EMERGENCY SUPPLY I/C, 2 B/C)

1. NORMALLY I/C-1 AND I/C-2 SHALL BE KEPT IN CLOSED CONDITION AND I/C-3 SHALL BE KEPT IN OPEN CONDITION. NORMALLY B/C-1 SHALL BE KEPT IN OPEN CONDITION AND B/C-2 SHALL BE KEPT IN CLOSED CONDITION. I/C-1 SHALL INDEPENDENTLY FEED BUS-A AND I/C-2 SHALL FEED BUS-B AND BUS-C.
2. IN CASE OF SUSTAINED UNDER VOLTAGE ON EITHER BUS-A OR BUS-B, B/C-1 SHALL GET CLOSED AUTOMATICALLY WHEN AUTO/MANUAL/INDEPENDENT SWITCH IS IN AUTO MODE AND EITHER OF THE INCOMERS I/C-1 OR I/C-2 SHALL FEED THE ENTIRE SWITCHBOARD WITH BOTH BUS COUPLERS IN CLOSED CONDITION.
3. IN CASE OF SUSTAINED UNDER VOLTAGE ON BOTH I/C-1 AND I/C-2, EMERGENCY DG. SET (LOCATED IN SUB STATION US-503 AND US-505) SHALL BE STARTED.
4. WHEN DG VOLTAGE IS BUILT UP, EPCC(LOCATED IN SUBSTATION US-503 & US-505) PANEL INCOMER BREAKER SHALL BE CLOSED. WHEN VOLTAGE IS AVAILABLE AT I/C-3 OF PCC, OPENING OF B/C-2 AND CLOSING OF I/C-3 SHALL HAPPEN AUTOMATICALLY IF A/M/I SWITCH ON B/C-2 IS IN AUTO MODE.
5. WHEN NORMAL SUPPLY IS RESUMED, I/C-1 AND I/C-2 SHALL BE CLOSED MANUALLY WITH B/C-1 IN OPEN CONDITION. TO CHARGE THE BUS-C OF PCC-7XX WITH NORMAL SUPPLY, B/C-2 SHALL BE CLOSED AFTER SYNCHRONIZING WITH I/C-3 (SYNCHRONIZING SCHEME SHALL BE PROVIDED IN DG AMF PANEL) AND I/C-3 SHALL BE OPENED WITH AUTO/INDEPENDENT/MANUAL SWITCH ON B/C-2 IN MANUAL MODE. DG SET SHALL BE STOPPED MANUALLY.
6. MANUAL CHANGEOVER BETWEEN I/C-1 & IC-2 SHALL BE POSSIBLE BY MOMENTARY PARALLELING OF I/C-1 AND I/C-2 WITH AUTO/INDEPENDENT/MANUAL SWITCH ON B/C-1 IN MANUAL MODE.
7. AUTO CHANGEOVER LOGIC SHALL BE IMPLEMENTED THROUGH HARDWIRED ONLY.

OPERATING PHILOSOPHY (MCC)

1. NORMALLY I/C-1 AND I/C-2 SHALL BE KEPT IN CLOSED CONDITION AND B/C SHALL BE KEPT IN OPEN CONDITION.
2. MANUAL CHANGEOVER BETWEEN I/C-1 & I/C-2 SHALL BE POSSIBLE BY MOMENTARY PARALLELING OF I/C-1 AND I/C-2 WITH MANUAL / INDEPENDENT SWITCH ON B/C IN MANUAL MODE.
3. WHEN MANUAL / INDEPENDENT SWITCH IS IN INDEPENDENT MODE, TWO OUT OF THREE (I/C-1, I/C-2 & B/C) BREAKERS CAN BE CLOSED.

OPERATING PHILOSOPHY (MLDB)

1. NORMALLY I/C-1 AND I/C-2 SHALL BE KEPT IN CLOSED CONDITION AND B/C SHALL BE KEPT IN OPEN CONDITION. I/C-1 AND I/C-2 SHALL INDEPENDENTLY FEED BUS-A AND BUS-B RESPECTIVELY.
2. IF ANY PROBLEM IN I/C-1 OR I/C-2, TR-34XX OR TR-34XX THEN BUS COUPLER SHALL BE CLOSED AFTER SWITCHING OFF I/C-1 OR I/C-2.
3. MECHANICAL INTERLOCK IS PROVIDED BETWEEN I/C-1, I/C-2 & B/C.

NOTES

1. DATA MARKED '**' SHALL BE DECIDED BY LSTK CONTRACTOR. THE RATING OF COMPONENTS IN INDIVIDUAL FEEDERS SHALL BE DECIDED BY SWITCHGEAR VENDOR BASED ON FEEDER LIST PROVIDED BY LSTK CONTRACTOR.
2. ONLY MAJOR RELAYS HAVE BEEN INDICATED IN THE SLD. ANY OTHER COMPONENTS LIKE AUXILIARY RELAYS,TIMERS, SWITCHES ETC. AS REQUIRED WHILE DEVELOPING THE DETAILED SCHEMATIC FOR SAFE OPERATION SHALL BE IN THE SWITCHGEAR VENDOR'S/ LSTK CONTRACTOR SCOPE.
3. 415V DG SETS ARE ENVISAGED AT TWO LOCATIONS NEAR SUBSTATIONS NO. US-503 & US-505.
4. THE RATING OF 11kV/ 0.433kV TRANSFORMER SHALL BE RESTRICTED TO 2.5MVA. ACCORDINGLY NO. OF TRANSFORMERS, PCC PANELS SHALL BE PROVIDED.
5. THE PCC & MCC PANELS SHOWN ARE TYPICAL.
6. NORMAL LIGHTING TRANSFORMER SHALL BE RATED FOR NORMAL LIGHTING LOAD, EMERGENCY LIGHTING TRANSFORMER SHALL BE RATED FOR ONLY EMERGENCY LIGHTING LOAD.
7. FOR ALL AGITATOR MOTORS IN PCC VACUUM CONTACTOR SHALL BE PROVIDED.
8. OVERLOAD RELAY TYPE : ELECTRONIC OVERLOAD RELAY : ≤ 7.5kW DIGITAL MOTOR PROTECTION RELAY WITH DISPLAY & FAULT RECORD: 7.5kW < MOTOR kW < 75kW DIGITAL MOTOR PROTECTION RELAY WITH DISPLAY & FAULT RECORD: ≥ 55kW FOR AGITATOR MOTORS COMPREHENSIVE NUMERICAL MOTOR PROTECTION RELAY: MOTOR kW ≥ 75kW COMPREHENSIVE NUMERICAL MOTOR PROTECTION RELAY : > 55kW FOR AGITATOR MOTORS
9. 50G SHALL BE PROVIDED FOR NON-MOTORING LOADS (e.g PROCESS HEATER LOAD) RATED ABOVE 5kVA. 50G SHALL NOT BE PROVIDED FOR POWER FEEDERS(e.g VFD, PFIC, HVAC, UPS, BATTERY CHARGER,ETC.)
10. CLASS PS CT PARAMETERS SHALL BE PROVIDED DURING DETAIL ENGINEERING.
11. SPACE FOR LINE DIFFERENTIAL RELAY (FREE ISSUE TO LSTK CONTRACTOR) SHALL BE CONSIDERED IN SWITCHGEAR PANEL BY SWITCHGEAR VENDOR/LSTK CONTRACTOR.
12. DETAIL SLD SHOWN IS TYPICAL. LSTK CONTRACTOR SHALL DEVELOP DETAIL SLD INCLUDING ALL SUBSTATION EQUIPMENTS BASED ON ACTUAL REQUIREMENT.
13. TRANSDUCER SHALL BE MOUNTED IN THE OUTGOING MOTOR FEEDER IN 11kV SWITCHGEAR.
14. TRANSDUCER SHALL BE MOUNTED IN A SEPARATE PANEL FOR 6.6kV SWITCHGEAR, WHICH SHALL BE INSTALLED IN SUBSTATION.
15. TRANSDUCERS SHALL BE MOUNTED IN A SEPARATE PANEL FOR 415V SWITCHGEAR, WHICH SHALL BE INSTALLED IN SUBSTATION. ONE COMMON TRANSDUCER PANEL FOR ALL 415V SWITCHGEAR SHALL BE PROVIDED.

REFERENCE DRAWINGS

6695-ELT-G00-EC-0002	GENERAL ENGINEERING SPECIFICATION – ELECTRICAL
6695-ELT-G00-EC-0003	GUIDELINES FOR ELECTRICAL EQUIPMENT NUMBERING SYSTEM
6695-ELT-G00-EC-0004	DESIGN GUIDELINES FOR ELECTRICAL FACILITIES
6695-ELT-G00-FA-0001	KEY SINGLE LINE DIAGRAM

tkIS India / Owner/Client

Category Codes (Submission purpose)
- [ ] 1 For Approval
- [ ] 2 For Review / Comments
- [ ] 3 For Information
- [x] 4 For Engineering
- [ ] 5 For Enquiry
- [ ] 6 For Order Placement
- [ ] 7 Final & Approved
- [ ] 8 Released for Construction

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Acceptance Codes (Review Only)
- [ ] 1 Approved
- [ ] 2 Approved for Manufacturing/ Fabrication With Comments as Marked
- [ ] 3 Not Approved/Resubmit
- [ ] 4 Retained for Information/Records
- [ ] 5 Reviewed
- [ ] 6 Reviewed as Noted/Resubmit

Date : __ /__ /____ Name :

Contract No.	Document ID	Port	Rev.
66-6695	6695-ELT-G00-FA-0003		02

Store Location: Server/Share	BAR-Code
66-6695-Ado\Acad	
Store Location: Folder	
\Cascl\Drg\Electrical\Single_Line_Diagram	
Store Name	
6695-ELT-G00-FA-0003_Sh2_R1	

Pro. Unit	Con. Unit	TON	Group	Order No.	Type of Document	Sheet
					FA	2 / 2

Rev.	Date	Drawn/Prepared	Checked	Approved	Description	Acc. Code
02	22.03.18	RDK PDW	22.03.18 MSD	22.03.18 RPM/SJP	REVISED AS PER NALCO'S COMMENT ON BYPASS ARRANGEMENT FOR VFD, REVISED AS MARKED/Z,A ISSUED FOR ENGINEERING	
01	19.01.18	RDK BTK	19.01.18 MSD	19.01.18 RPM	FINALIZED AFTER NALCO'S REVIEW, ISSUED FOR ENGINEERING	
00	02.11.17	RDK BTK	02.11.17 MSD	02.11.17 RPM/SJP	ISSUED FOR ENGINEERING	

नालको NALCO
नेशनल एल्यूमिनियम कम्पनी लिमिटेड
National Aluminium Company Ltd.

1.0 MTPA ALUMINA REFINERY STREAM-5
DAMANJODI, ODISHA

thyssenkrupp

	Date	Name
Drawn	02.11.17	RDK
Prepared	02.11.17	BTK
Checked	02.11.17	MSD
Approved	02.11.17	RPM/SJP

Description: TYPICAL DETAIL SINGLE LINE DIAGRAM

Code	Scale	Cat. Code	Acc. Code	Status
	N.T.S.	4		

ISO A0