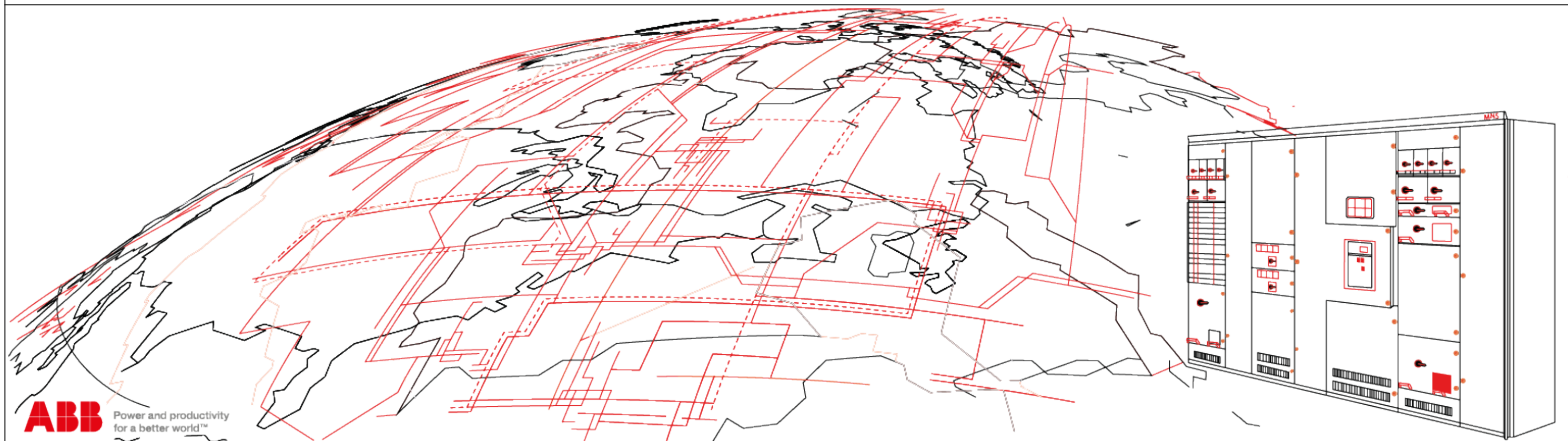




Low Voltage Systems

Customer	: RMG COPPER JSC
Contract Number	: -
Project Description	: OPP-20-4343531_RMG COPPER MADNEULI UPGRADE PROJECT
Switchgear Name	: BE01-WB-002 400V LV SWITCHBOARD

Approved
2021-8-31



Dilovasi OSB 4.Kısım D-4009 No:11
Dilovasi / Kocaeli / TURKEY

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<div>01 01.08.2021 Last Revision Date</div>				<div>SCALE</div> <div>1</div>		<div>DESIGNED BY : VINEETHA</div> <div>CHECKED BY : O.YILMAZ</div> <div>APPROVED BY : O.YILMAZ</div>		<div>RMG COPPER JSC</div> <div></div> <div>RMG RICH METALS GROUP</div>		<div>RMG COPPER JSC</div> <div></div> <div>RMG RICH METALS GROUP</div>		<div>OPP-20-4343531_RMG COPPER MADNEULI UPGRADE PROJECT BE01-WB-002 400V LV SWITCHBOARD</div>		<div>LV Switchgear Technical Parameters-General Arrangement-SLD</div> <div>Cover Sheet</div>		<div>PAGE No.</div> <div>1</div>		<div></div>	
<div>R0V0 13.05.2021 Creation Date</div>																<div>CONT.</div> <div>2</div>		<div>REV.</div>	
<div>Rev. Date Description SIGN</div>																			
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01	19.08.2021	Last Revision Date		SCALE 1	DESIGNED BY : VINEETHA		 		Table of Contents		Project No. K21010		PAGE No. 2				
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Rev.	Date	Description	SIGN		APPROVED BY : O.YILMAZ												

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TECHNICAL PARAMETERS



SWITCHGEAR PARAMETERS

SYSTEM MNS	MNS 3.0
STANDARD	IEC61439-2
INTERNAL ARC TEST STANDARD	N/A
SWITCHBOARD ARRANGEMENT	Single Front
MODULE CO-ORDINATION	TYPE-2, Icc= NA kA, IE2
DIVERSITY FACTOR	Not Applicable
COLOUR (SWITCHGEAR)	RAL 7035
COLOUR (W-MODULES)	RAL 7035
DOOR LOCK	Double Bit Lock 5mm
INGRESS OF PROTECTION (EXTERNAL)	IP41
INGRESS OF PROTECTION (INTERNAL)	IP 2X (including IPXXB)
ROOF PLATE TYPE	Raised Type
<u>INTERNAL FORM OF SEPERATION</u>	
WITHDRAWABLE MODULE COMPARTMENT	-
PLUG-IN MODULE COMPARTMENT	-
ACB/MCCB SECTION	4b
OTHER SECTION/COMPARTMENT	2b
<u>SWITCHGEAR DIMENSIONS</u>	
TOTAL SWITCHGEAR WIDTH [mm]	4440.0
SWITCHGEAR DEPTH [mm]	600.0
SWITCHGEAR HEIGHT [mm]	2200
SWITCHGEAR WEIGHT APPROX. [kg]	3291

VOLTAGE PARAMETERS

EARTHING SYSTEM	TT
SERVICE OPERATIONAL VOLTAGE	Ue = 400VAC
SERVICE FREQUENCY	fn = 50 Hz
RATED INSULATION VOLTAGE	Ui = 1000VAC
RATED IMPULSE WITHSTAND VOLTAGE	Uimp = 8kV

MAIN BUSBAR PARAMETERS

RATED CURRENT	Ie = 4000A
MAIN BUSBAR SIZE PER PHASE [mm]	2x4x60x10
RATED SHORT-TIME WITHSTAND CURRENT	Icw = 80 kA, 1s
RATED PEAK WITHSTAND CURRENT	Ipk = 220 kA
MATERIAL	Tin Plated Cu

NEUTRAL BUSBAR PARAMETERS (HORIZONTAL)

NEUTRAL BUSBAR SIZE [mm]	2x4x60x10
RATING OF NEUTRAL CONDUCTOR [%]	100%
MATERIAL	Tin Plated Cu

PE BUSBAR PARAMETERS (HORIZONTAL)

PE BUSBAR SIZE [mm]	2x60x10
MATERIAL	Tin Plated Cu
<u>VERTICAL BARS IN POWER CABLE AREA</u>	
N / PEN BUSBAR SIZE [mm]	-
PE BUSBAR SIZE [mm]	-
PE BUSBAR SIZE IN RE-INFORCED [mm]	-

DISTRIBUTION BUSBAR PARAMETERS

RATED CURRENT	Ie = -A
BUSBAR SIZE PER PHASE [mm]	-
RATED SHORT-TIME WITHSTAND CURRENT	Icw = - kA, 1s
RATED PEAK WITHSTAND CURRENT	Ipk = - kA
MATERIAL	

ADDITIONAL TREATMENT ON COPPER BARS

MAIN BUSBAR	Tin Plated Cu ②
PEN/N (HORIZONTAL)	Tin Plated Cu ②
PE (HORIZONTAL)	Tin Plated Cu ②
N-BAR (VERTICAL, IN CABLE COMPARTMENT)	- ②
PE/PEN (VERTICAL, IN CABLE COMPARTMENT)	- ②
CONNECTIONS BARS (SECTIONS)	Tin Plated Cu ②
CONNECTIONS BARS (MODULES)	- ②

SERVICE CONDITIONS

ALTITUDE	< 2000 m.a.s.l
TEMPERATURE AVERAGE DURING 24HRS	35°C
TEMPERATURE RANGE	-5°...+40°
HUMIDITY	<=50%
POLLUTION DEGREE	3
OVERVOLTAGE CATAGORY	III
SEISMIC ZONE	Zone-I

TERMINALS

CUSTOMER SIGNALS	SCREW TYPE
CONTROL / AUXILIARY POWER SUPPLY	SCREW TYPE
DRAWER INSIDE	PUSH-IN TYPE
DRAWER OUTSIDE	SCREW TYPE
CT-VT TERMINAL BLOCK SIZE	4mm²
SIGNAL TERMINAL BLOCK SIZE	2.5mm²
CONTROL TERMINAL BLOCK SIZE	2.5mm²

PROTOCOLS OF COMMUNICATIONS

IED (INTELLIGENT ELECTRONIC DEVICE)	-
ETHERNET SWITCH	-
MULTI FUNCTION METER	Modbus RTU
MOTOR CONTROLLER	-
PROTOCOL CONVERTOR	Modbus RTU to Ethernet IP

CONNECTIONS

INCOMING	BUSBAR	TOP
OUTGOING	CABLE	TOP
BOTTOM PLATES	YES	
CABLE GLANDS	NO	

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01		14.07.2021		Last Revision Date				SCALE 1		DESIGNED BY : VINEETHA														PAGE No. 3											
ROVO		13.05.2021		Creation Date						CHECKED BY : O.YILMAZ																									
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TECHNICAL PARAMETERS



CABLE COLOURS, CROSS SECTIONS AND TYPES

CABLE TYPES

Control circuit	H07Z-K (450/750V, halogen-free single core, harmonised, for wiring in control cabinets, acc. to EN 50525-2-31)
Power circuit	NSHXAFÖ (1.3/3kV, Flame retardance, Halogen free, Self-extinguishing)
Maximum operating temperature	90° Celcius
Halogen-free	YES
Tin Coating	NO

MAIN CIRCUIT	L1 - BK ^①
	L2 - BK ^①
	L3 - BK ^①
	N - BK ^①
	PE - GNYE

AC AUXILIARY CIRCUITS	COLOUR	SIZE
AUXILIARY VOLTAGE 1 (L, N, PE) 230VAC	BK, BK, GNYE	min. 1.5 mm²
AUXILIARY VOLTAGE 2	N/A	N/A
DC AUXILIARY CIRCUITS		
AUXILIARY VOLTAGE 1 (L+, L-) 24V DC	RD, WH	min. 1.5 mm²
AUXILIARY VOLTAGE 2	N/A	N/A
CT SECONDARY SIDE	L - BK	min. 2.5 mm²
VT SECONDARY SIDE	L - BK	min. 2.5 mm²
POTENTIAL FREE SIGNALS	L - BK	min. 1.5 mm²

* Cross-Section of wires mentioned here are for general use.
Higher Cross-Section of wires shall be used according to current requirment.

INTERCONNECTION CABLES

CUBICLE TO CUBICLE	BK	2.5 mm²
MODULE TO MODULE	BK	2.5 mm²
HEATER AND LIHGTING	BK	2.5 mm²

COMMUNICATION CABLE

PROFIBUS DP	N/A
MODBUS RTU	BELDEN 9841NH (BU,WH)
MODBUS TCP/IP	CAT6 RJ45 CABLE
IEC61850	N/A

MISCELLENEOUS ELECTRICAL INFORMATION

SURGE ARRESTORS	NO
SPACE HEATER	YES
THERMOSTAT	YES
PANEL LAMP	YES
POWER SOCKET	NO

INSTRUMENT SIZE

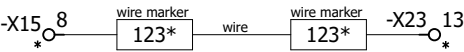
WITHDRAWABLE MODULE	-
DC2BB MODULE	72x72mm

LABELING

MIMIC DIAGRAM	YES
ENGRAVED LABELS FIXATION	CLENCHED (RIVET)
SWITCHGEAR MAIN TECHNICAL LABEL	PAPER LABEL
ENGRAVED LANGUAGE 1	ENGLISH
ENGRAVED LANGUAGE 2	N/A
LABEL WILL BE BLACK LETTER WHITE BACKGROUND	

WIRE MARKER

MOUNTING TYPE	CLIP-ON TYPE
MARKER TYPE	UCT-WMCO (PHOENIX)
COLOUR	WHITE



*wire marker text will be black colour according to control schematic.

ADDITIONAL REQUIREMENT



STEEL BASE FRAME	NO
REAR C PROFILES ANTIMAGNETICS	true
REAR WALL ANTIMAGNETICS	false
MAXIMUM SHIPPING SECTION LENGTH	3m

NOTES:

- Power cable shall be in black color while at both ends colored heat shrinkable tube (L1-BN, L2-BK, L3-GY, N-BU) shall be provided.
- L1,L2,L3,N Busbars shall be indicated with self adhesive type black colored labels.

COLOUR LEGEND - ACC. IEC 60757

BK Black	BN Brown	RD Red	OG Orange
YE Yellow	GN Green	BU Light blue	VT Violet
GY Grey	WH White	PK Pink	GD Gold
SR Silver	TQ Turquoise	GNYE Green-yellow	TR Transparent
DB Dark blue			

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Rev.	Date	Description	SIGN		APPROVED BY : O.YILMAZ																			

ACB	Air Circuit Breaker
ATS	Automatic Transfer Switch
BA	Busbar Arrangement
CCA	Control Cable Area
CT	Current Transformer
DBB	Distribution BusBar
DCS	Distributed Control System
DC2BB	Direct Connection to BusBar
DTM	Device Type Manager
EDS	Electronic Data Sheets
EOL	Electronic Overload
ELDS	Electrification Business Line, Distribution Solution
FBP	Field Bus Plug
GA	General Arrangement
GPS	Global Positioning System
GSD File	GeräteStammDaten
HGF	Halogen-Free
HMI	Human Machine Interface
I/O	Input/Output
IIP	Ingress of Protection
Icc	Rated conditional-short circuit current
LED	Light-Emitting Diode
LVS	Low Voltage System
MBB	Main BusBar
MCB	Miniature Circuit Breaker
MCC	Motor Control Center
MCCB	Moulded-Case Circuit Breaker
MCT	Measuring Current Transformer
MNS	Das Modulare Niederspannungs-schaltanlagen-Sy
NS	NonStandard
OLE	Object Linking and Embedding
OPC	OLE for Process Control
PCA	Power Cable Area
PCS	Process Control System
PCT	Protection Current Transformer
PLC	Programmable Logic Controller
PMU	Power Monitoring Unit
RCU	Remote Control Unit
SCADA	Supervisory Control And Data Acquisition
SNTP	Simple Network Time Protocol
TOL	Thermal OverLoad relay
UMC	Universal Motor Controller
UPS	Uninterruptible Power Supply
UTC	Coordinated Universal Time
VSD	Variable Speed Drive
VT	Voltage Transformer

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					Project No. K21010																
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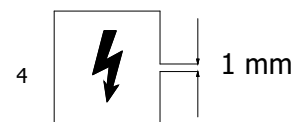
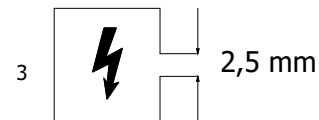
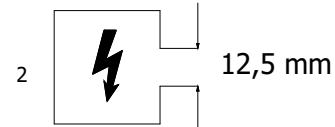
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IP legends

acc. IEC 60529

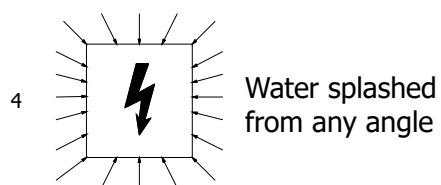
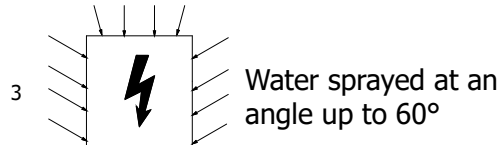
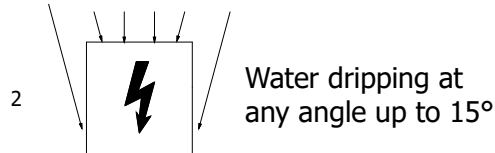
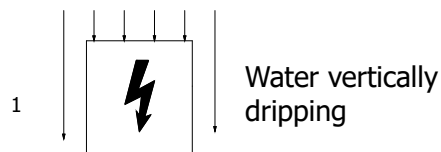
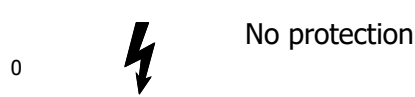
1.

Protection against penetration
by foreign bodies and dust



2.

Protection against ingress
of water with harmful effects



Additional letter

Protection against access
hazardous parts with:

A Back of the hand > 50 mm diameter

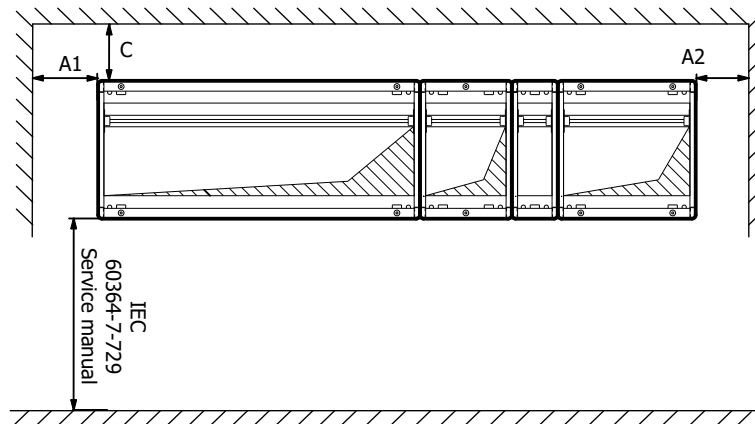
B Finger/tool > 12.5 diameter, 80 mm length

C Tool/Wire > 2.5 diameter, 100 mm length

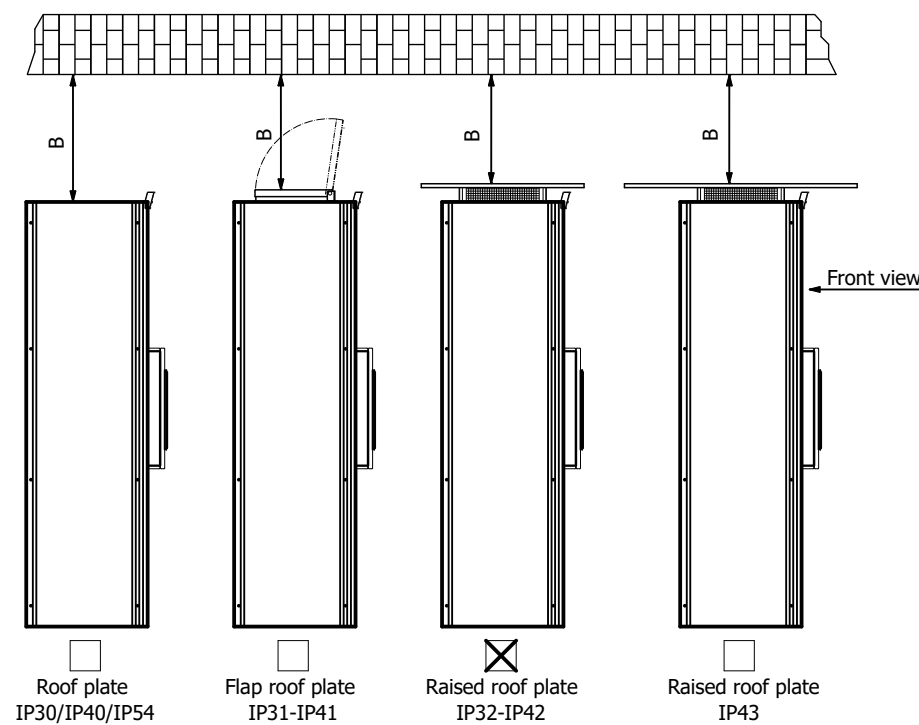
D Tool/Wire > 1.0 mm diameter, 100 mm length

Wall distances

Floor View



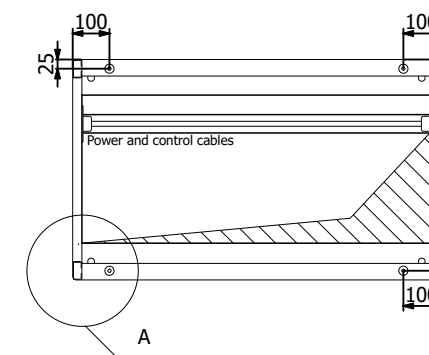
Side view



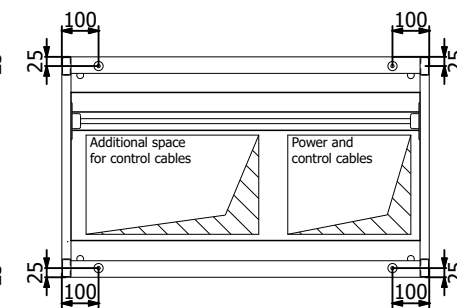
Internal protection	A1 (right mounted doors)	A1 (left mounted doors)	A2	B (Section to ceiling)	C (Section to back wall)
IP30-IP40	100 mm	170 mm	170 mm	500 mm	105 mm
IP54	100 mm	170 mm	170 mm	500 mm	105 mm
Raised roof plate (RRP)					
IP31-IP41	135 mm	170 mm	170 mm	500 mm	205 mm
IP32-IP42	135 mm	170 mm	170 mm	500 mm	205 mm
IP43	400 mm	400 mm	400 mm	500 mm	405 mm
Flap roof plate					
IP31-IP41	100 mm	170 mm	170 mm	500 mm	105 mm
IP32-IP42	100 mm	170 mm	170 mm	500 mm	105 mm
IP43	100 mm	170 mm	170 mm	500 mm	105 mm

Bottom plates

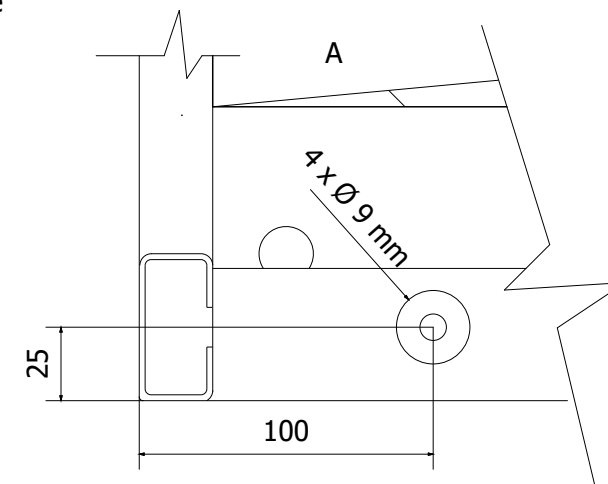
MNS 3.0 without bottom plate



MNS 3.0 with bottom plate



Anchor hole



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R0V0	13.05.2021	Creation Date	
Rev.	Date	Description	SIGN

Supplier ABB ELEKTRİK SAN. A.Ş.	
SCALE 1	DESIGNED BY : VINEETHA CHECKED BY : O.YILMAZ APPROVED BY : O.YILMAZ

Customer RMG COPPER JSC	
	

End User RMG COPPER JSC	
	

Project OPP-20-4343531_RMG COPPER MADNEULI UPGRADE PROJECT BE01-WB-002 400V LV SWITCHBOARD	
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Title LV Switchgear Technical Parameters-General Arrangement-SLD	
Legend Sheet	

Drawing No. 4TRD021010T9002	
Project No. K21010	

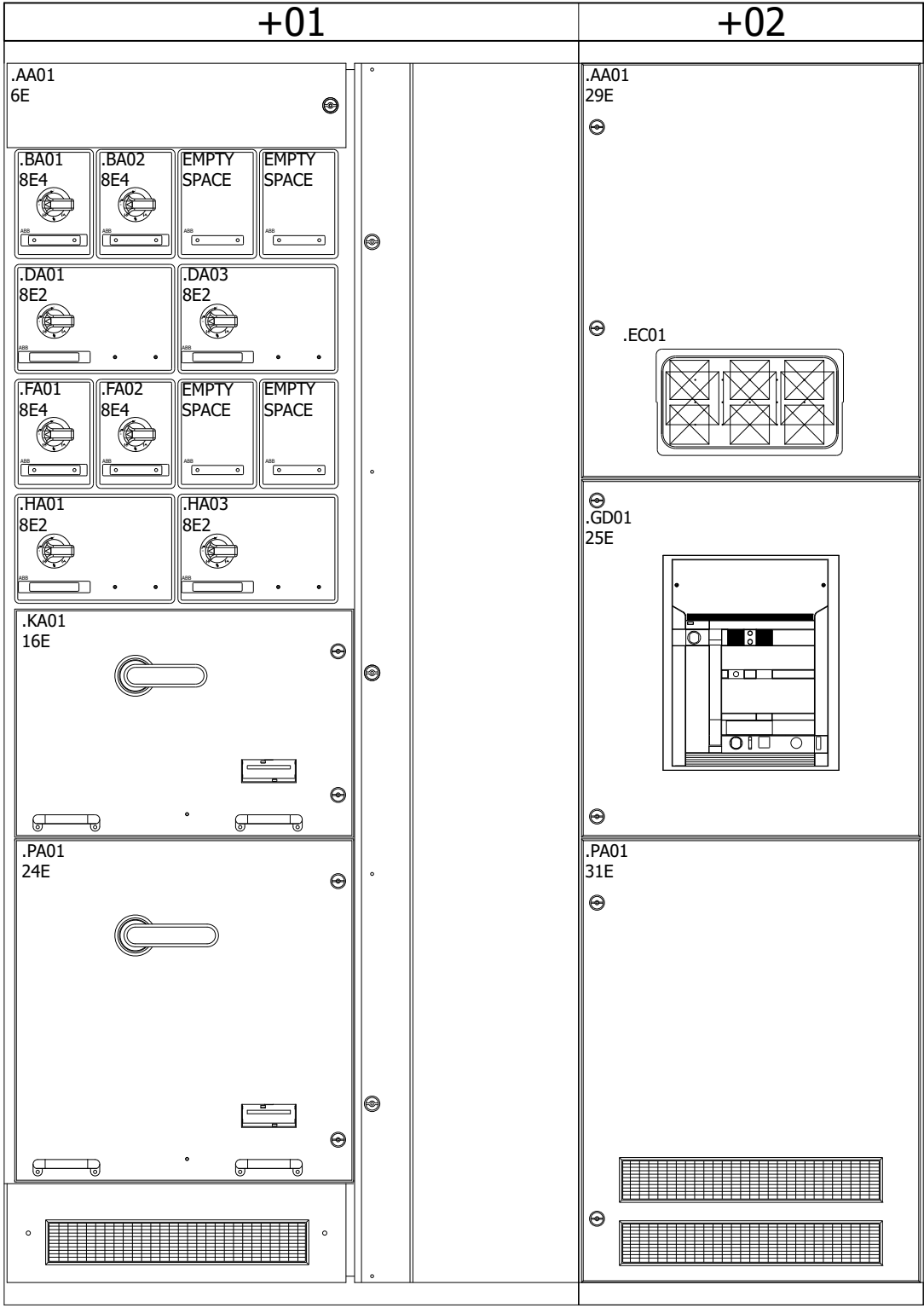
+DOCUMENTS	SIZE A3
PAGE No. 6	REV. 7
CONT.	

* Example

LOCATION CODING OF MNS 3.0

Section height				
mm	E	alphabetical classification		MNS IS
2200 mm		A	A	
2000 mm	72 E	B	A B C D	1
	68 E	C	A B C D	2
			A B C D	3
			A B C D	4
1800 mm	64 E	D	A B C D	5
			A B C D	6
	60 E	E	A B C D	7
			A B C D	8
1600 mm	56 E	F	A B C D	9
			A B C D	10
	52 E	G	A B C D	11
			A B C D	12
1400 mm	48 E	H	A B C D	13
			A B C D	14
	44 E	J	A B C D	15
			A B C D	16
1200 mm	40 E	K	A B C D	17
			A B C D	18
	36 E	L	A B C D	19
			A B C D	20
1000 mm	32 E	M	A B C D	21
			A B C D	22
	28 E	N	A B C D	23
			A B C D	24
800 mm	24 E	P	A B C D	25
			A B C D	26
	20 E	Q	A B C D	27
			A B C D	28
600 mm	16 E	R	A B C D	29
			A B C D	30
	12 E	S	A B C D	31
			A B C D	32
400 mm	8 E	T	A B C D	33
			A B C D	34
	4 E	U	A B C D	35
			A B C D	36
200 mm				
0 mm	0 E	W		

Equipment compartment				Power cable area	Incoming section
Position in compartment					Position in compartment
01	02	03	04	05	01



Location coding of functional withdrawable unit in sections of MNS 3.0

Location coding of functional withdrawable units diagrammed below in 2E modular dimensions

TOTAL 72E = 1800mm / 1E = 25mm

The withdrawable section is subdivided in:

- perpendicularly in alphabetical classification and MNS 3.0 clasification
- horizontal in numbers from 01 to 05

Example:

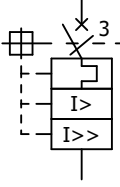
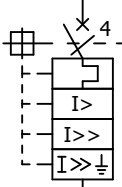
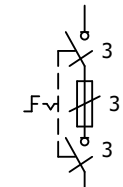
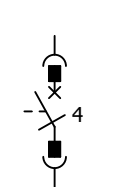
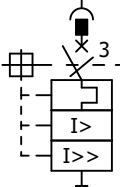
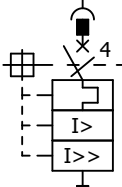
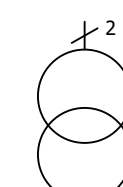
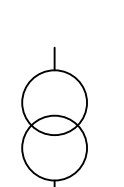
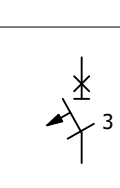
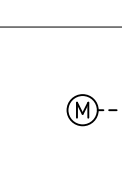
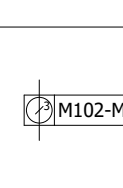
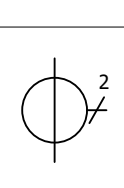
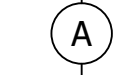
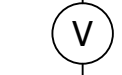
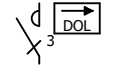
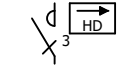
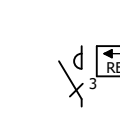
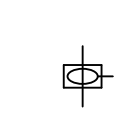
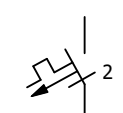
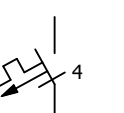
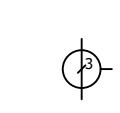
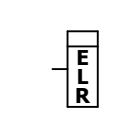
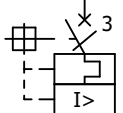
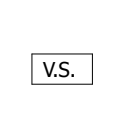
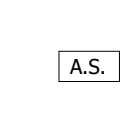

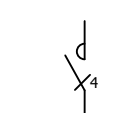
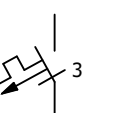
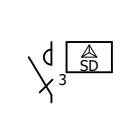
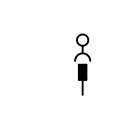

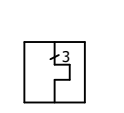



Quantity	Module size	Location in section
4	8E/4	BA01, BA02, FA01, FA02
4	8E/2	DA01, DA03, HA01, HA03
1	16E	KA01
1	24E	PA01




The withdrawable modules have five modes (operating handle schematised):

Mode	Position of switch			Mechanical / Electrical Status
	8E/4 and 8E/2	4E...24E	Designation	
1			ON position I	ON position-Main and control circuits are closed. Module is locked.
2			OFF position O	OFF position- Main circuit are disconnected, the control circuits are closed. Module is locked. Can be locked with 3 padlocks.
3			Test position 	TEST position-Main circuit are disconnected, the control circuits are closed. Module is locked. Can be locked with 3 padlocks.
4			Moving position (Withdrawn mode)	MOVE postion-Main and control circuits are disconnected.
5			Disconnected position (Isolated mode)	ISOLATED position-The module is 30 mm drawn out of the section.Main and control circuits are disconnected and the isolating distance is fulfilled. Can be locked with 3 padlocks.

Example for coding of location for withdrawable modules

SYMBOL OVERVIEW

	Fixed Circuit Breaker three-pole (L-S-I characteristic)		Fixed Circuit Breaker four-pole (L-S-I-G characteristic)		Fixed Switch Disconnecter with fuse element three-pole		Withdrawable Switch Disconnecter four-pole
	Withdrawable Circuit Breaker three-pole (L-S-I characteristic)		Withdrawable Circuit Breaker four-pole (L-S-I characteristic)		Control Power Transformer (MKT)		Potential Transformer
	Power Circuit Breaker three-pole		Motor Operator of Circuit Breaker		Motor/Heater Control Unit (with Modbus-RTU communication)		Bar or Cable Type Current Transformer
	Analog Ammeter		Analog Voltmeter		Motor Direct On Line Starter without reversing motion		Motor Direct On Line Starter without reversing motion, Heavy Duty
	Motor Direct On Line Starter with reversing motion		Toroidal Transformer		Miniature circuit-breaker (Double Pole)		Miniature circuit-breaker (Four Pole)
	KORC Current Transformer		Earth Leakage Relay		Fixed Circuit Breaker three-pole (L-I characteristic)		Voltmeter Selector switch
	Ammeter Selector switch		Residual Current Monitor		Power Contactor four-pole		Miniature circuit-breaker (Three Pole)
	Motor Star-Delta Starter		Power Terminal / Cable Connection Unit		Male and Female Pin		Thermal Over Load Relay
	Motor Control Unit (with Profibus DP communication)		Network Analyzer		Numerical Feeder Protection Relay		

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01	03.06.2021	Last Revision Date		SCALE 1	DESIGNED BY : VINEETHA								Project No. K21010		CONT. +GA/9		REV.		
ROV0	13.05.2021	Creation Date			CHECKED BY : O.YILMAZ														
Rev.	Date	Description	SIGN		APPROVED BY : O.YILMAZ														
1				2		3		4		5		6		7		8			

Architectural drawing of a 400V LV Switchboard, showing Front View, Side View, Floor Plan, and Top Plan.

Front View: Shows the main structure with four line units (LINE NO: 1, 2, 3, 4) and a central BUSBAR JOGGLE CUBICLE. Dimensions include a total width of 4040.0 mm and a total length of 2200 mm. The drawing includes a vertical scale from 0 to 2300 mm and a horizontal scale from 1 to 8.

Side View: Shows the profile of the switchboard, indicating a height of 2200 mm and a width of 652 mm. It includes a vertical scale from 0 to 2300 mm and a horizontal scale from 1 to 8.

Floor Plan: Shows the layout of the switchboard units, including dimensions for the main structure (1000 mm x 600 mm) and individual units (1200 mm x 600 mm). It includes a vertical scale from 0 to 1200 mm and a horizontal scale from 1 to 8.

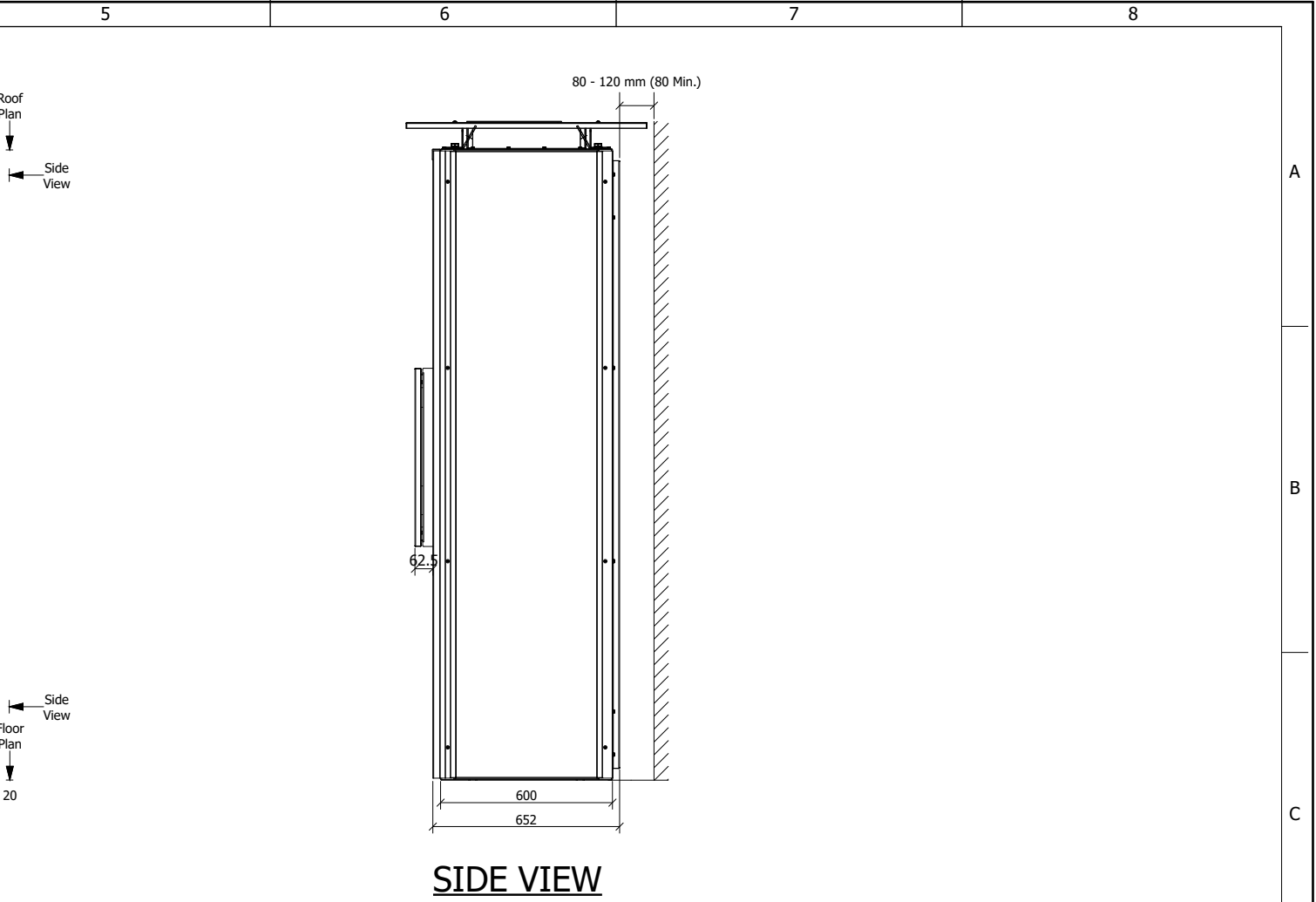
Top Plan: Shows the layout of the switchboard units, including dimensions for the main structure (1000 mm x 600 mm) and individual units (1200 mm x 600 mm). It includes a vertical scale from 0 to 1200 mm and a horizontal scale from 1 to 8.




Notes:

- 1. SWITCHBOARD BASE TOLERANCE: +/- 1mm/METRE IN ALL DIRECTIONS
- 2. FLOOR PLAN MOUNTING HOLE DIAMETER: 9mm

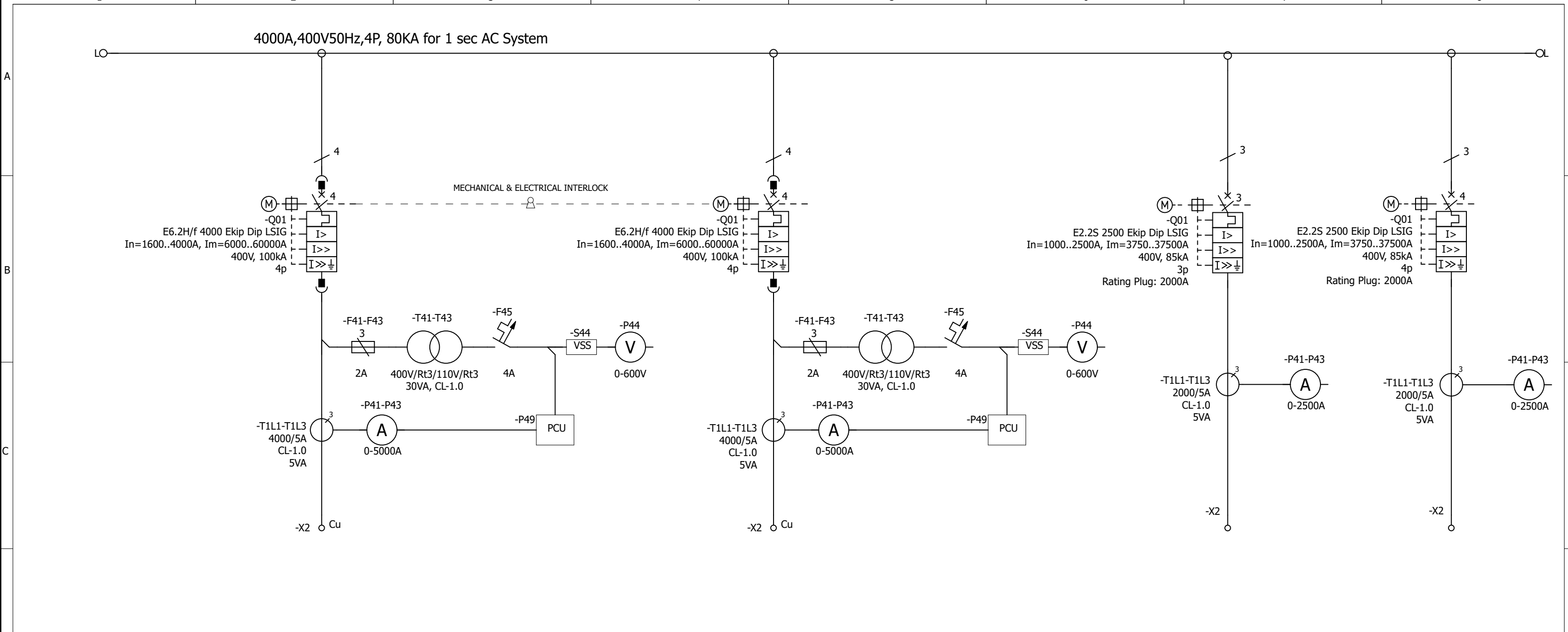
Legend:

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- Customer: RMG COPPER JSC
- End User: RMG COPPER JSC
- Project: OPP-20-4343531_RMGM COPPER MADNEULI UPGRADE PROJECT BE01-WB-002 400V LV SWITCHBOARD
- Title: LV Switchgear Technical Parameters-General Arrangement-SLD
- Drawing No.: 4TRD021010G9002
- Project No.: K21010
- Rev.: 01
- Rev. Date: 15.07.2021
- Rev. Description: Creation Date
- Rev. Description: Description
- Rev. Description: SIGN
- Rev. Description: SCALE 23
- Rev. Description: DESIGNED BY : VINEETHA
- Rev. Description: CHECKED BY : O.YILMAZ
- Rev. Description: APPROVED BY : O.YILMAZ
- Rev. Description: +GA
- Rev. Description: PAGE No. 9
- Rev. Description: CONT. +SL/10
- Rev. Description: REV.
- Rev. Description: SIZE A3





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01	15.07.2021	Last Revision Date		SCALE 23	DESIGNED BY : VINEETHA										Project No. K21010		CONT.		
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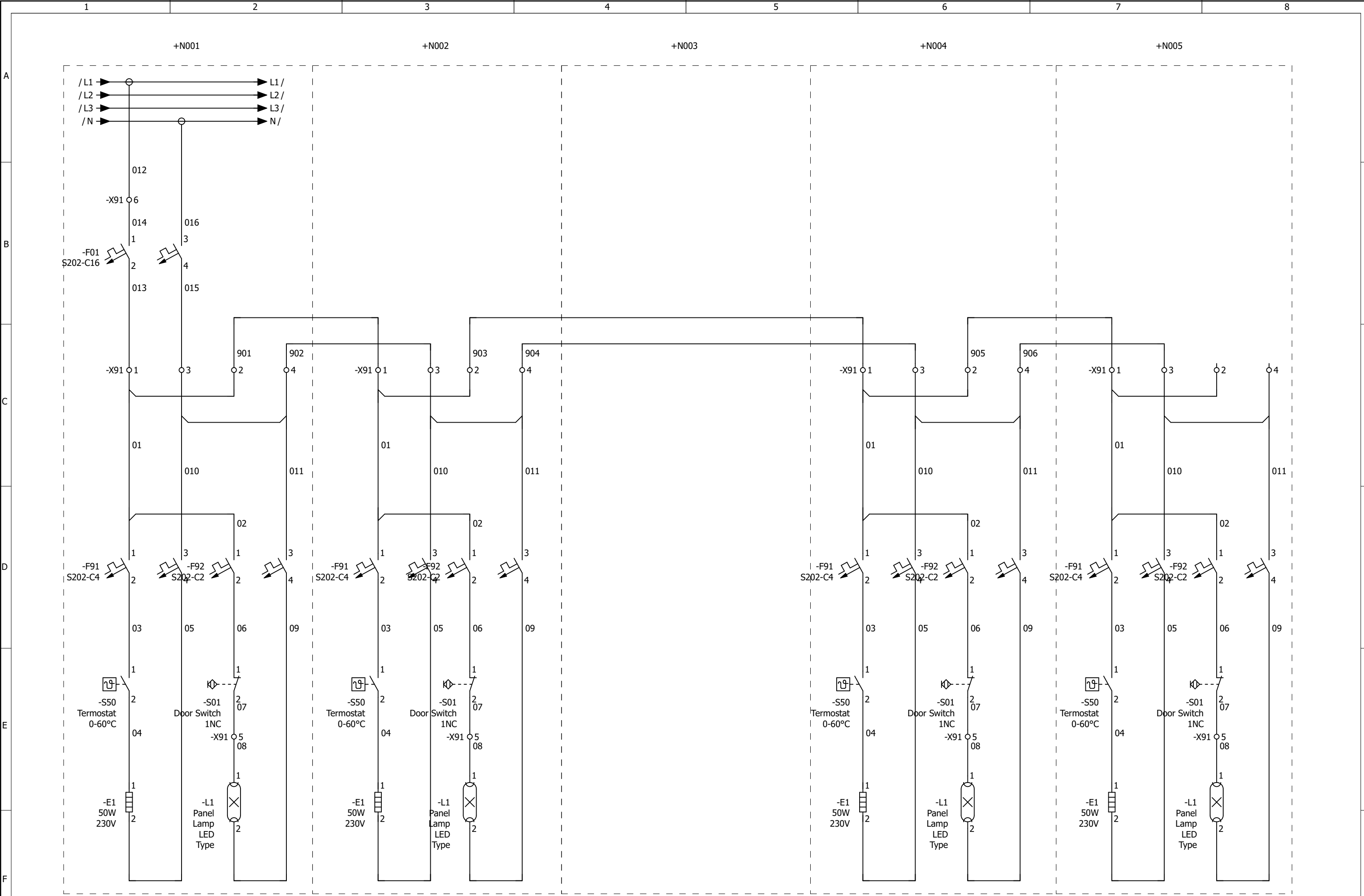
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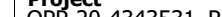


D	Module No	K2505_INC 1_4000A_Icu_Icw_100kA E6.2H Ekip DIP LSIG 4P BBB IOT BUSBAR 4000A DC2BB	K2506_INC 2_4000A_Icu_Icw_100kA_E6.2H Ekip DIP LSIG 4P BBB IOT BUSBAR 4000A DC2BB	K2535_ED_2500A_Icu_85kA_E2.2S_Ekip DIP LSIG _3P_Ics_66kA_IOT_CABLE_2000A_DC2BB	K2541_ED_2500A_Icu_85kA_E2.2S_Ekip DIP LSIG_4P_Ics_66kA_IOT_CABLE_2000A_DC2BB	D
	Control Diagram	K21010K8505	K21010K8506	K21010K8534	K21010K8541	
	Customer Control Diagram	INC-1	INC-2	ED	ED	
	Line No	1	2	3	4	
	Power (kW)	-	-	-	-	
	Voltage (V)	400	400	400	400	
E	Current (A)	-	-	-	-	E
	Cable Cross Section mm ²	-	-	4X240MM2/PHASE	4X240MM2/PHASE	
	Incoming / Outgoing	TOP [BUSBAR]	TOP [BUSBAR]	TOP	TOP	
	Tag No	INC-1	INC-2	-	-	
	Description	FROM TRANSFORMER BE01-TR-002	FROM LV SWITCHGEAR BE01-WB-003	TO MCC BE01-WC-003	TO MCC BE01-WC-004	
F	Location	+N001.AA01	+N002.AA01	+N004.AA01	+N005.AA01	F

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ROVO	13.05.2021	Creation Date			CHECKED BY : O.YILMAZ																
Rev.	Date	Description			APPROVED BY : O.YILMAZ																
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														Project No. K21010		PAGE No. 12		REV.