

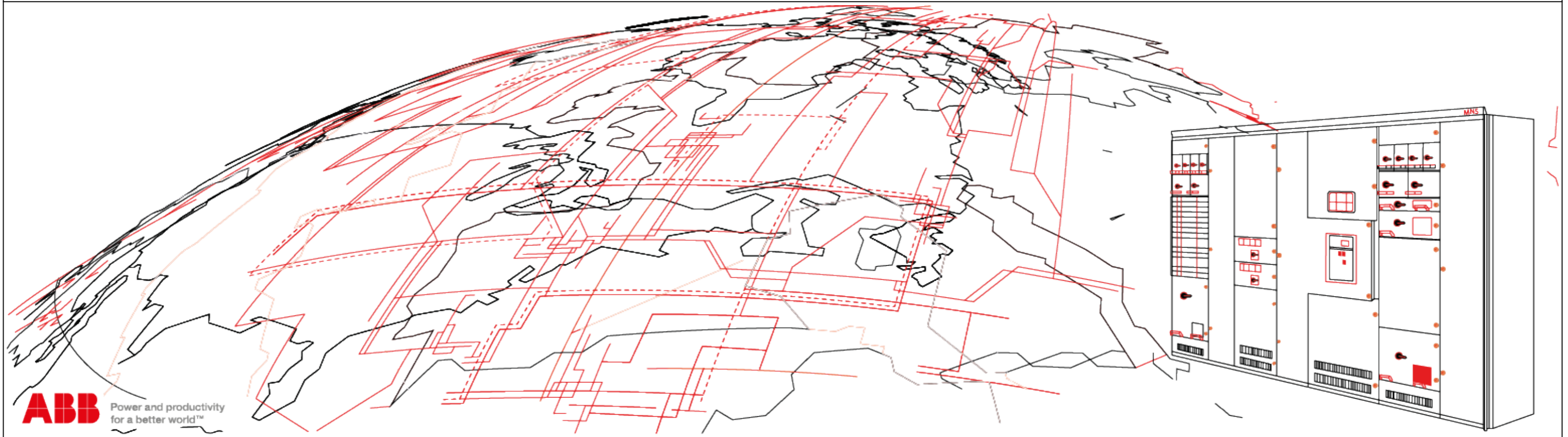


Elektrik Sanayi A.Ş.

Low Voltage Systems

Customer : RMG COPPER JSC
Contract Number : -
Project Description : OPP-20-4343531_RMG COPPER MADNEULI UPGRADE PROJECT
Switchgear Name : BE01-WB-001 400V LV SWITCHBOARD

Approved
2021-8-31



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

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As Tested	<input type="checkbox"/>	As Build	<input type="checkbox"/>
01	01.08.2021	Last Revision Date	
ROV0	13.05.2021	Creation Date	
Rev.	Date	Description	SIGN

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



Project
OPP-20-4343531_RMG COPPER MADNEULI
UPGRADE PROJECT
BE01-WB-001
400V LV SWITCHBOARD

Title
LV Switchgear Technical Parameters-General Arrangement-SLD



Cover Sheet

Drawing No.
4TRD021010X9001
Project No.
K21010

+DOCUMENTS	SIZE	A3
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Rev.	Date	Description	SIGN		APPROVED BY : O.YILMAZ								REV.				

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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]	3840.0
SWITCHGEAR DEPTH [mm]	600.0
SWITCHGEAR HEIGHT [mm]	2200
SWITCHGEAR WEIGHT APPROX. [kg]	2650

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 = 176 kA
MATERIAL	Tin Plated Cu

NEUTRAL BUSBAR PARAMETERS (HORIZONTAL)

NEUTRAL BUSBAR SIZE [mm]	2x2x60x10
RATING OF NEUTRAL CONDUCTOR [%]	50%
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			CHECKED BY : O.YILMAZ	APPROVED BY : O.YILMAZ	PAGE No.	3		CONT.	4	REV.	Project No. K21010							
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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

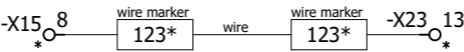
WITHDRAWABLE MODULE	-
DC2BB MODULE	72x72mm

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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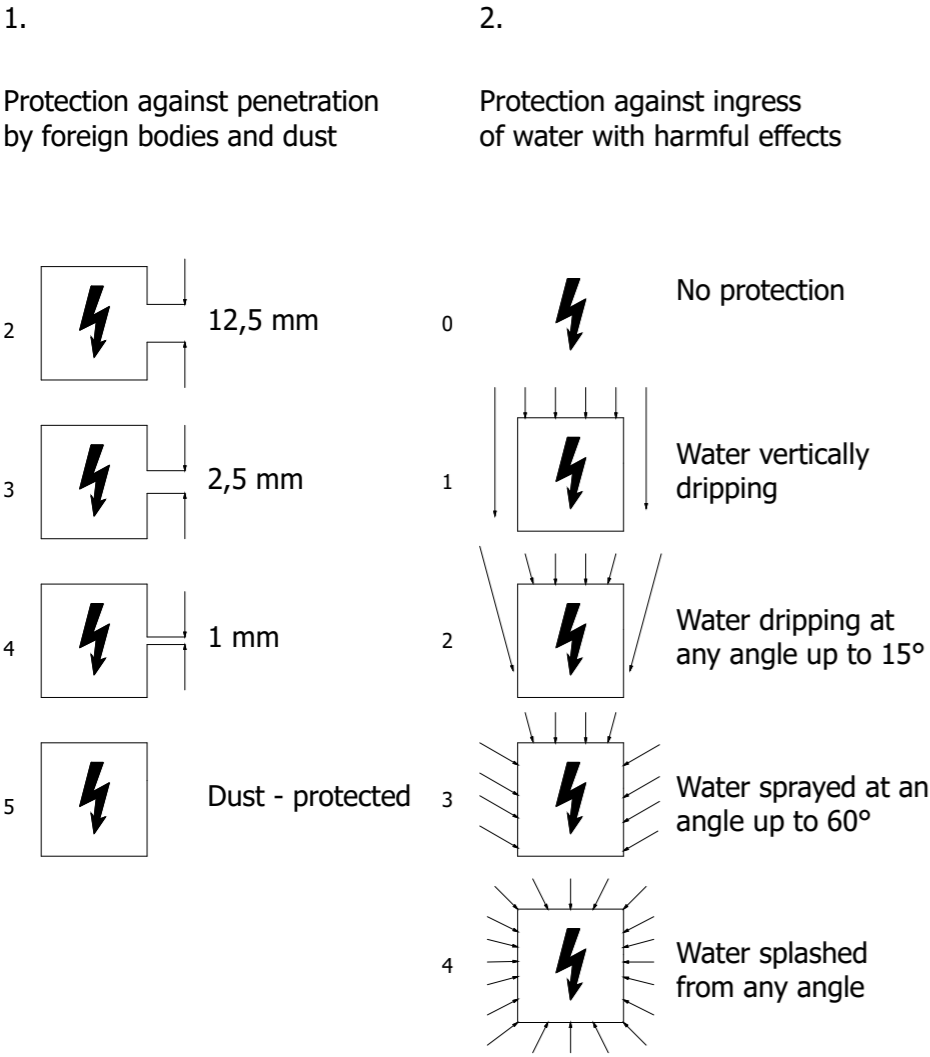
ACB	Air Circuit Breaker
ATS	Automatic Transfer Switch
BA	Busbar Arrangement
CCA	Control Cable Area
CT	Current Transformer
DBB	Distribution BusBar
DCS	Distributed Control System
DC2BB	Direct Connection to BusBar
DTM	Device Type Manager
EDS	Electronic Data Sheets
EOL	Electronic Overload
ELDS	Electrification 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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01	03.06.2021	Last Revision Date		SCALE 1	DESIGNED BY : VINEETHA			Project No. K21010	PAGE No. 5								
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IP legends

acc. IEC 60529



Additional letter

Protection against access hazardous parts with:

- A

Back of the hand > 50 mm diameter
- B

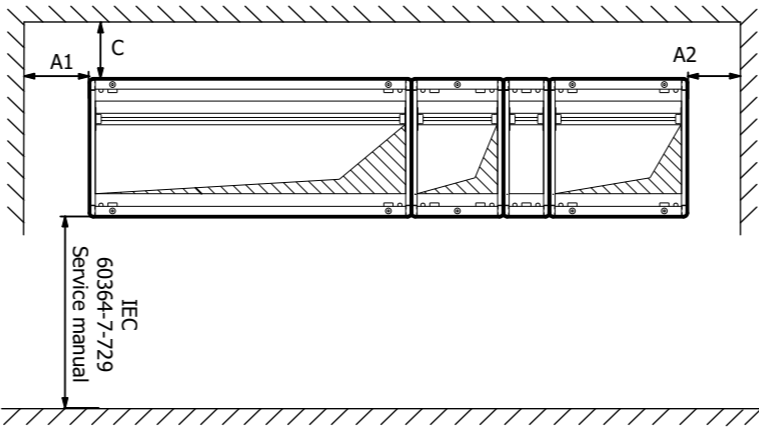
Finger/tool > 12.5 diameter, 80 mm length
- C

Tool/Wire > 2.5 diameter, 100 mm length
- D

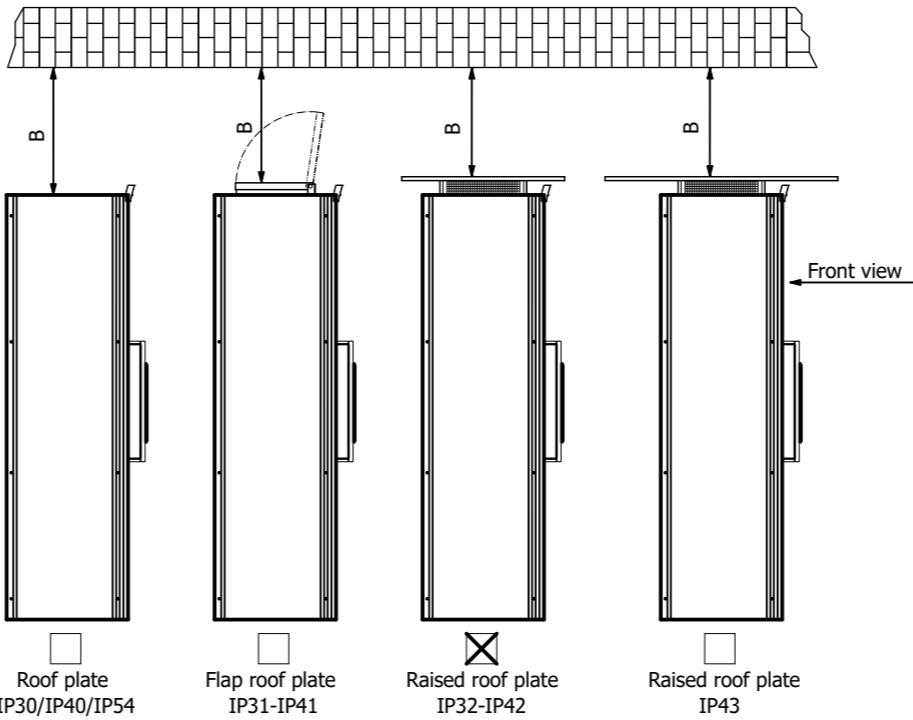
Tool/Wire > 1.0 mm diameter, 100 mm length

Wall distances

Floor View

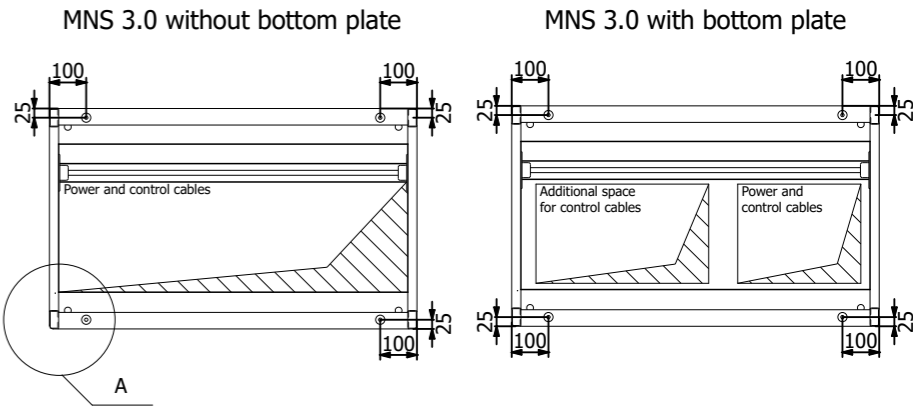


Side view

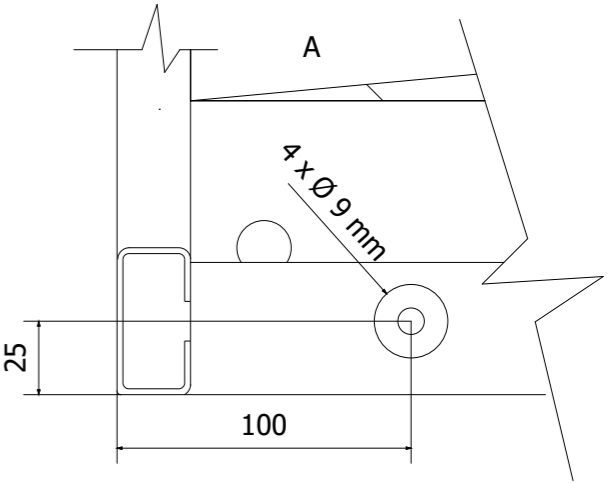


Internal protection	A1 (right mounted doors)	A1 (left mounted doors)	A2	B (Section to ceiling)	C (Section to back wall)
IP30-IP40	100 mm	170 mm	170 mm	500 mm	105 mm
IP54	100 mm	170 mm	170 mm	500 mm	105 mm
Raised roof plate (RRP)					
IP31-IP41	135 mm	170 mm	170 mm	500 mm	205 mm
IP32-IP42	135 mm	170 mm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



Anchor hole



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
Customer RMG COPPER JSC	
	

End User RMG COPPER JSC	
	

Project OPP-20-4343531_RMG COPPER MADNEULI UPGRADE PROJECT BE01-WB-001 400V LV SWITCHBOARD	
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Title LV Switchgear Technical Parameters-General Arrangement-SLD	
Legend Sheet	

Drawing No. 4TRD021010T9001	
Project No. K21010	

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* 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 2
	68 E	C	A B C D	3 4
	64 E	D	A B C D	5 6
	60 E	E	A B C D	7 8
1600 mm	56 E	F	A B C D	9 10
	52 E	G	A B C D	11 12
	48 E	H	A B C D	13 14
	44 E	J	A B C D	15 16
1200 mm	40 E	K	A B C D	17 18
	36 E	L	A B C D	19 20
	32 E	M	A B C D	21 22
	28 E	N	A B C D	23 24
800 mm	24 E	P	A B C D	25 26
	20 E	Q	A B C D	27 28
	16 E	R	A B C D	29 30
	12 E	S	A B C D	31 32
400 mm	8 E	T	A B C D	33 34
	4 E	U	A B C D	35 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

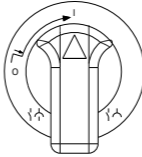
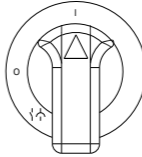

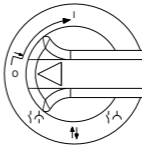
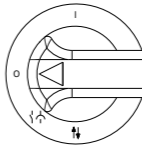

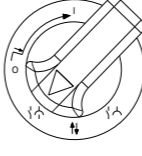
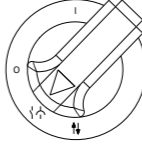

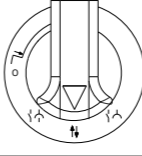
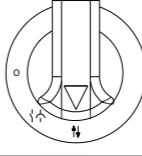

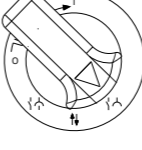
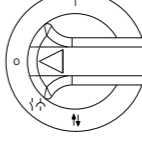

+01	+02
<p>.AA01 6E</p>	<p>.AA01 29E</p>
<p>.KA01 16E</p>	<p>.GD01 25E</p>
<p>.PA01 24E</p>	<p>.PA01 31E</p>

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

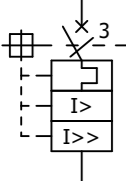
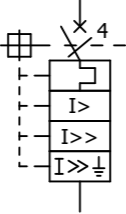
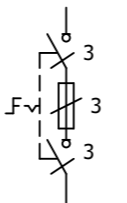

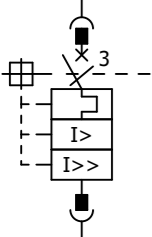
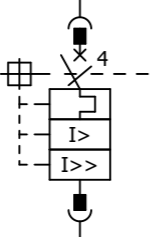
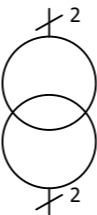



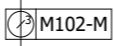
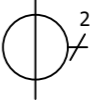










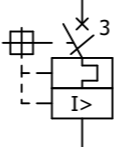



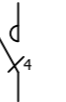








The withdrawable modules have five modes (operating handle schematised):

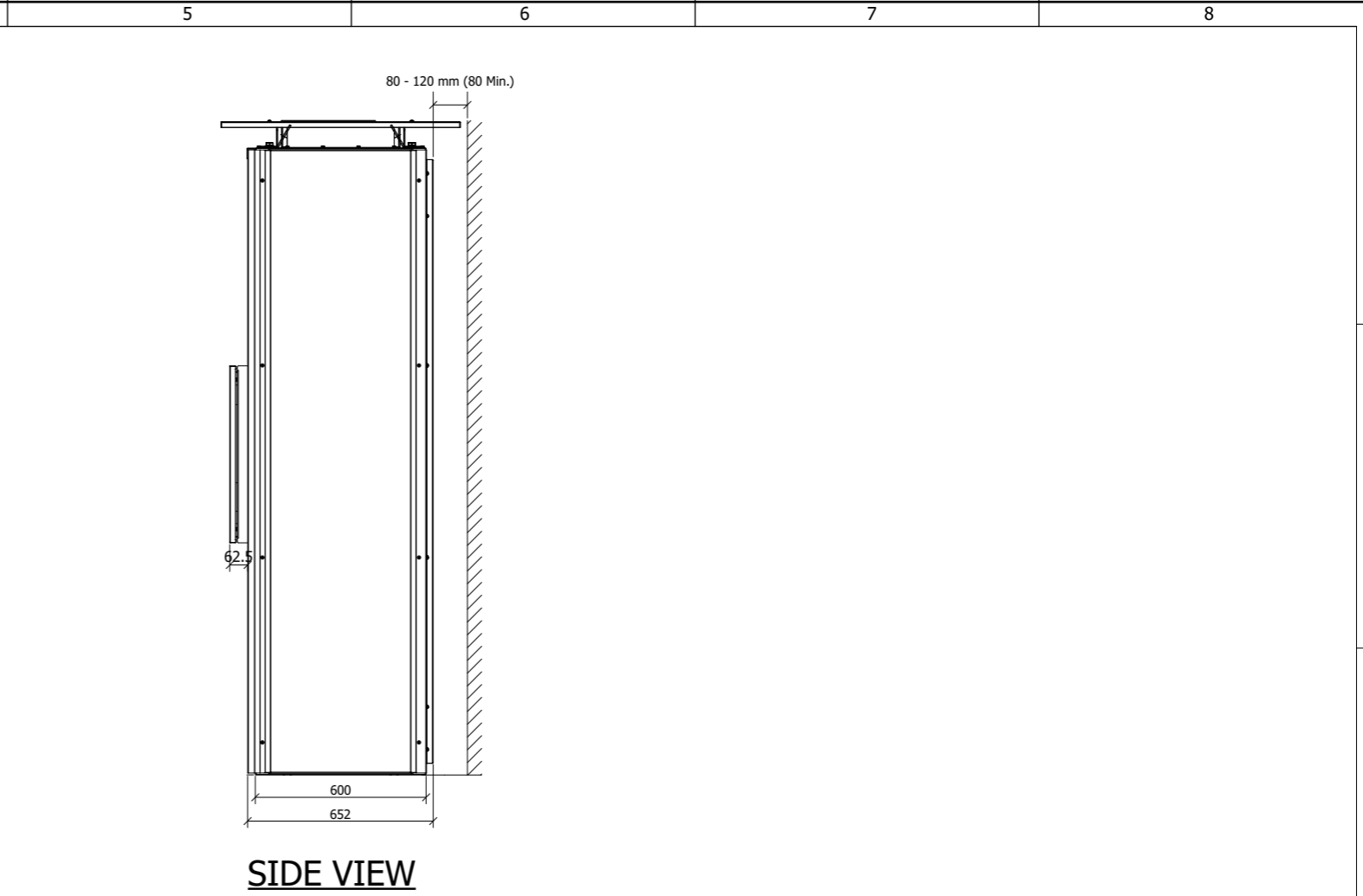
Mode	Position of switch			Mechanical / Electrical Status
	8E/4 and 8E/2	4E...24E	Designation	
1			ON position 	ON position-Main and control circuits are closed. Module is locked.
2			OFF position 	OFF position- Main circuit are disconnected, the control circuits are closed. Module is locked. Can be locked 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 position-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

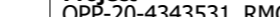
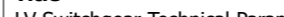
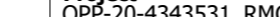
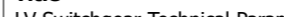
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SYMBOL OVERVIEW

 <div>Fixed Circuit Breaker three-pole (L-S-I characteristic)</div>	 <div>Fixed Circuit Breaker four-pole (L-S-I-G characteristic)</div>	 <div>Fixed Switch Disconnecter with fuse element three-pole</div>	 <div>Withdrawable Switch Disconnecter four-pole</div>
 <div>Withdrawable Circuit Breaker three-pole (L-S-I characteristic)</div>	 <div>Withdrawable Circuit Breaker four-pole (L-S-I characteristic)</div>	 <div>Control Power Transformer (MKT)</div>	 <div>Potential Transformer</div>
 <div>Power Circuit Breaker three-pole</div>	 <div>Motor Operator of Circuit Breaker</div>	 <div>Motor/Heater Control Unit (with Modbus-RTU communication)</div>	 <div>Bar or Cable Type Current Transformer</div>
 <div>Analog Ammeter</div>	 <div>Analog Voltmeter</div>	 <div>Motor Direct On Line Starter without reversing motion</div>	 <div>Motor Direct On Line Starter without reversing motion, Heavy Duty</div>
 <div>Motor Direct On Line Starter with reversing motion</div>	 <div>Toroidal Transformer</div>	 <div>Miniature circuit-breaker (Double Pole)</div>	 <div>Miniature circuit-breaker (Four Pole)</div>
 <div>KORC Current Transformer</div>	 <div>Earth Leakage Relay</div>	 <div>Fixed Circuit Breaker three-pole (L-I characteristic)</div>	 <div>V.S. Voltmeter Selector switch</div>
 <div>A.S. Ammeter Selector switch</div>	 <div>RD2 Residual Current Monitor</div>	 <div>Power Contactor four-pole</div>	 <div>Miniature circuit-breaker (Three Pole)</div>
 <div>Motor Star-Delta Starter</div>	 <div>Power Terminal / Cable Connection Unit</div>	 <div>Male and Female Pin</div>	 <div>Thermal Over Load Relay</div>
 <div>Motor Control Unit (with Profibus DP communication)</div>	 <div>P49 Network Analyzer</div>	 <div>REF620 Numerical Feeder Protection Relay</div>	

[illegible]




4343531_RMGM COPPER MADNEULI UPGRADE PROJECT BE01-WB-001 400V LV SWITCHBOARD	Title LV Switchgear Technical Parameters-General Arrangement-SLD			Drawing No. 4TRD021010G9001		+GA	SIZE A3
	Front View			Project No. K21010		PAGE No. 9	
						CONT. +SL/10	REV.
5		6		7		8	

<div>For Approval <input type="checkbox"/> As Tested <input type="checkbox"/></div> <div>Approved For Construction <input checked="" type="checkbox"/> As Build <input type="checkbox"/></div>				<div>Supplier</div> <div><div><div>ABB</div><div>ELEKTRİK SAN. A.Ş.</div></div></div>		<div>Customer</div> <div><div>RMG COPPER JSC</div><div></div></div>		<div>End User</div> <div><div>RMG COPPER JSC</div><div></div></div>		<div>Project</div> <div>OPP-20-4343531_RMG COPPER MADNEULI UPRADE PROJECT BE01-WB-001 400V LV SWITCHBOARD</div>		<div>Title</div> <div>LV Switchgear Technical Parameters-General Arrangement-SLD Single Line Diagram</div>		<div>Drawing No.</div> <div>4TRD021010S9001</div>		<div>Project No.</div> <div>K21010</div>		<div>+SL</div> <div>PAGE No. 10</div>		<div>SIZE</div> <div>A3</div>	
01	27.07.2021	Last Revision Date		SCALE 1	DESIGNED BY : VINEETHA																
ROV0	13.05.2021	Creation Date			CHECKED BY : O.YILMAZ																
Rev.	Date	Description	SIGN		APPROVED BY : O.YILMAZ																

Parts list

4TR-ABBME_Partlist

[illegible]

For Approval <input type="checkbox"/> Approved For Construction <input checked="" type="checkbox"/> As Tested <input type="checkbox"/> As Build <input type="checkbox"/>				Supplier ABB ELEKTRİK SAN. A.Ş.		Customer RMG COPPER JSC		End User RMG COPPER JSC		Project OPP-20-4343531_RMГ COPPER MADNEULI UPGRADE PROJECT BE01-WB-001 400V LV SWITCHBOARD		Title LV Switchgear Technical Parameters-General Arrangement-SLD		Drawing No. 4TRD021010H9001		+Space Heater SIZE A3	
01	01.08.2021	Last Revision Date		SCALE 1	DESIGNED BY : VINEETHA						Parts List		PAGE No. 12				
ROVO	13.05.2021	Creation Date			CHECKED BY : O.YILMAZ								CONT.		REV.		
Rev.	Date	Description	SIGN		APPROVED BY : O.YILMAZ												