

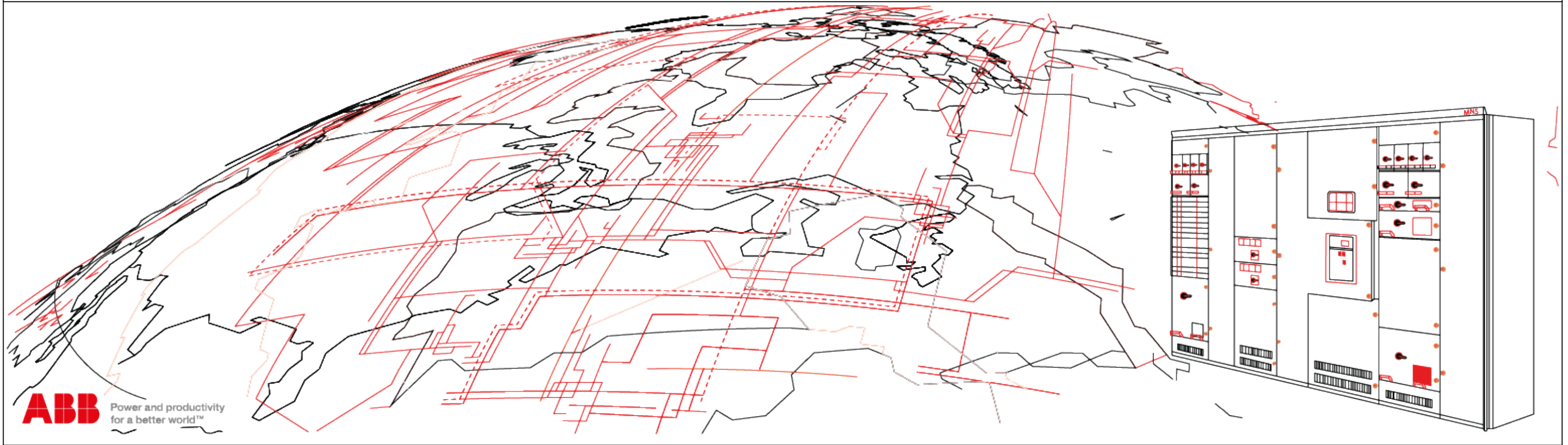


Elektrik Sanayi A.Ş.

Low Voltage Systems

Customer : RMG COPPER JSC
Contract Number : -
Project Description : OPP-20-4343531_RMG COPPER MADNEULI UPGRADE PROJECT
Switchgear Name : BE01-WB-003 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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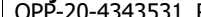




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01		01.08.2021		Last Revision Date				SCALE 1		DESIGNED BY : VINEETHA										1											
ROVO		13.05.2021		Creation Date				CHECKED BY : O.YILMAZ		PAGE No.														2							
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TECHNICAL PARAMETERS



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

INTERNAL FORM OF SEPERATION

WITHDRAWABLE MODULE COMPARTMENT	-
PLUG-IN MODULE COMPARTMENT	-
ACB/MCCB SECTION	4b
OTHER SECTION/COMPARTMENT	2b

SWITCHGEAR DIMENSIONS

TOTAL SWITCHGEAR WIDTH [mm]	3640.0
SWITCHGEAR DEPTH [mm]	600.0
SWITCHGEAR HEIGHT [mm]	2200
SWITCHGEAR WEIGHT APPROX. [kg]	3190

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
VERTICAL BARS IN POWER CABLE AREA	
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	BUSBAR	TOP
BOTTOM PLATES	YES	
CABLE GLANDS	NO	

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TECHNICAL PARAMETERS



CABLE COLOURS, CROSS SECTIONS AND TYPES

<u>CABLE TYPES</u>	
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

<u>AC AUXILIARY CIRCUITS</u>	<u>COLOUR</u>	<u>SIZE</u>
AUXILIARY VOLTAGE 1 (L, N, PE) 230VAC	BK, BK, GNYE	min. 1.5 mm²
AUXILIARY VOLTAGE 2	N/A	N/A
<u>DC AUXILIARY CIRCUITS</u>		
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.

<u>INTERCONNECTION CABLES</u>		
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

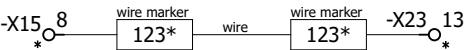
WITHDRAWABLE MODULE	-
DC2BB MODULE	72x72mm

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


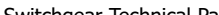

STEEL BASE FRAME	NO
REAR C PROFILES ANTIMAGNETICS	true
REAR WALL ANTIMAGNETICS	false
MAXIMUM SHIPPING SECTION LENGTH	3m


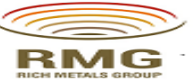

NOTES:

- 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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List of abbreviations																			
A	ACB	Air Circuit Breaker														A			
	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																	
B	EOL	Electronic Overload														B			
	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																	
	IP	Ingress of Protection																	
C	Icc	Rated conditional-short circuit current														C			
	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-System																	
	NS	NonStandard																	
D	OLE	Object Linking and Embedding														D			
	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																	
E	TOL	Thermal OverLoad relay														E			
	UMC	Universal Motor Controller																	
	UPS	Uninterruptible Power Supply																	
	UTC	Coordinated Universal Time																	
	VSD	Variable Speed Drive																	
	VT	Voltage Transformer																	
	F																F		
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IP legends

acc. IEC 60529

Wall distances

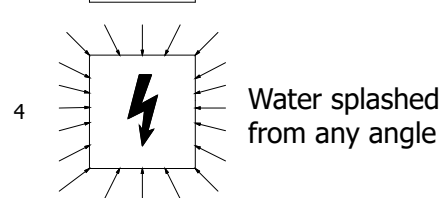
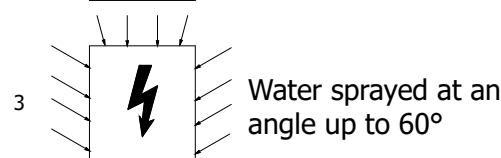
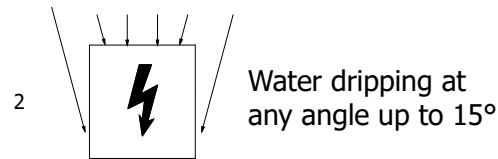
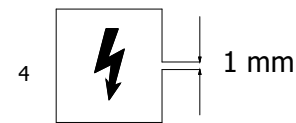
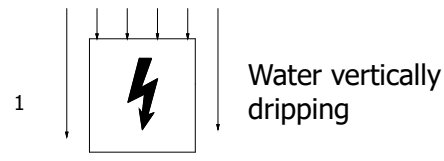
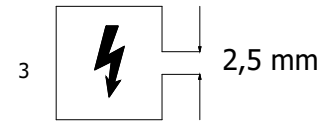
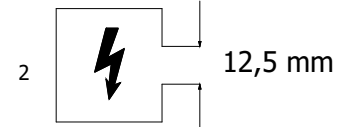
Bottom plates

1.

2.

Protection against penetration
by foreign bodies and dust

Protection against ingress of water with harmful effects



Additional letter

Protection against access hazardous parts with:

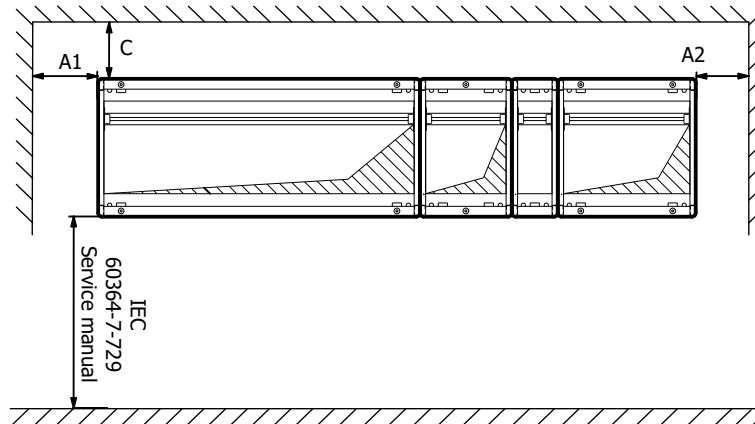
A Back of the hand > 50 mm diameter

B Finger/tool > 12.5 diameter, 80 mm length

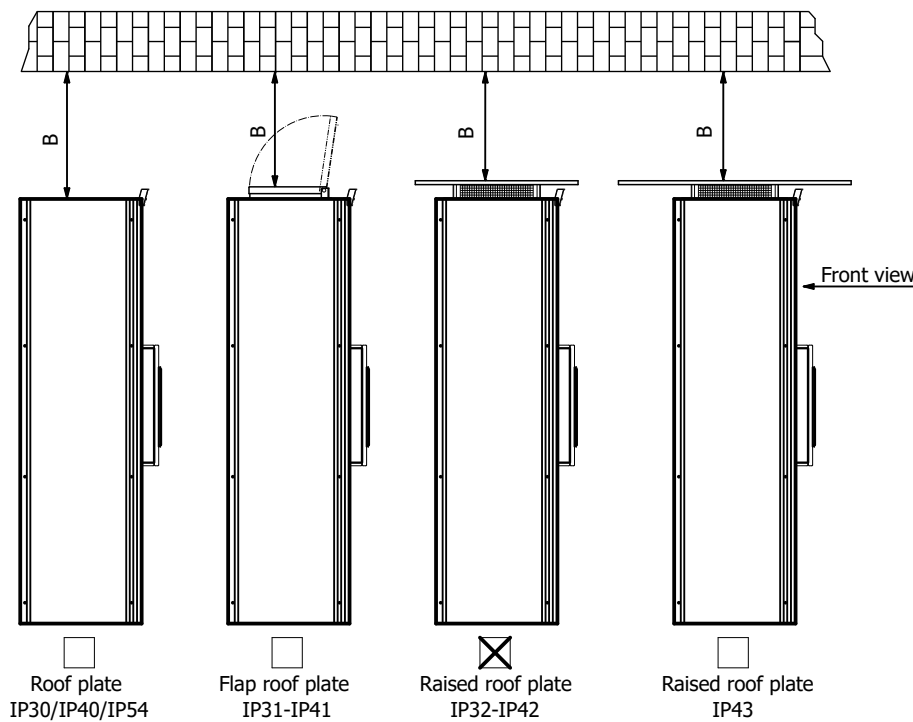
C Tool/Wire > 2.5 diameter, 100 mm length

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

Floor View



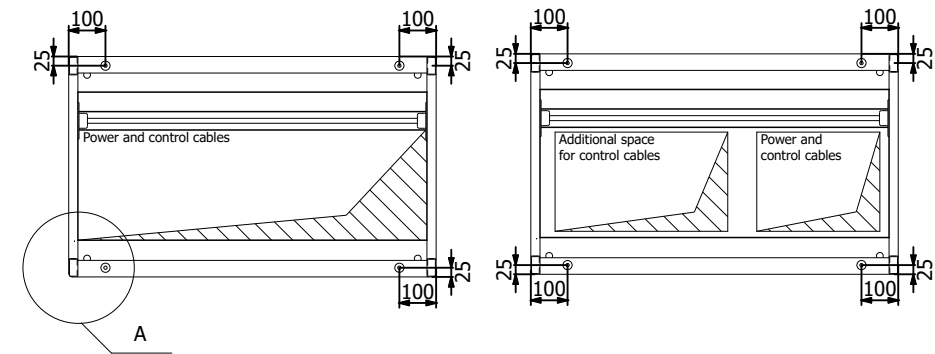
Side view



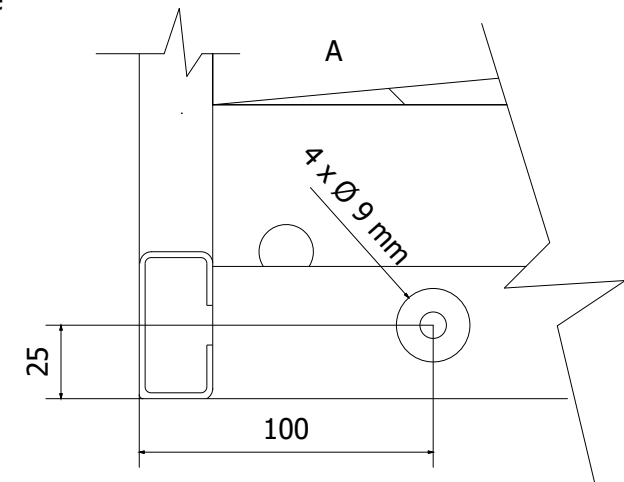
Internal protection	A1 (right mounted doors)	A1 (left mounted doors)	A2	B (Section to ceiling)	C (Section to back wall)
IP30-IP40	100 mm	170 mm	170 mm	500 mm	105 mm
IP54	100 mm	170 mm	170 mm	500 mm	105 mm
Raised roof plate (RRP)					
IP31-IP41	135 mm	170 mm	170 mm	500 mm	205 mm
IP32-IP42	135 mm	170 mm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



MNS 3.0 without bottom plate

MNS 3.0 with bottom plate



Anchor hole



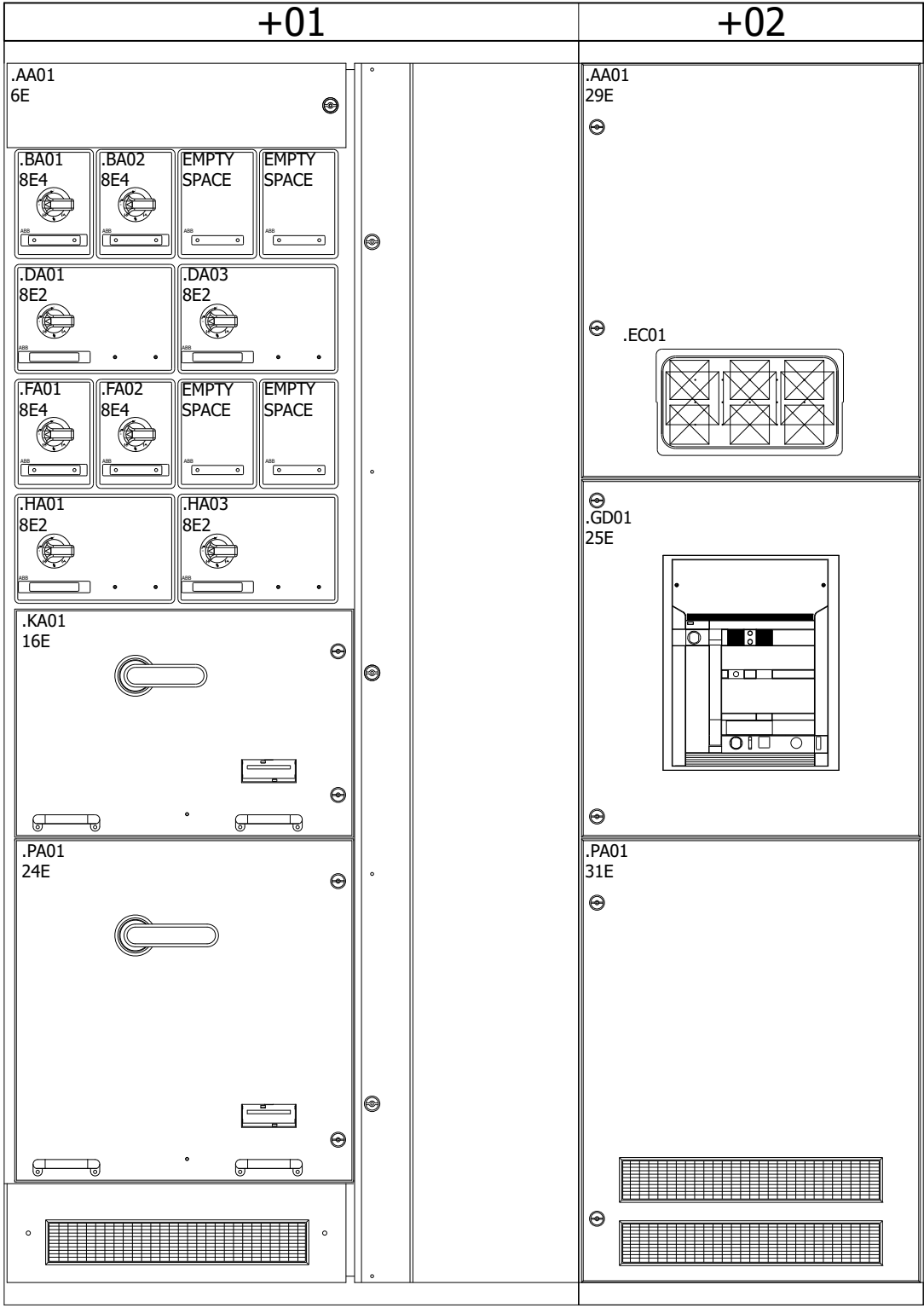
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* Example

LOCATION CODING OF MNS 3.0

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

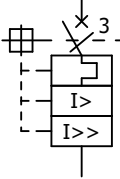
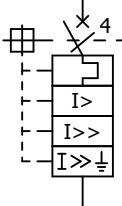
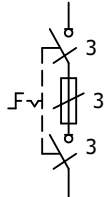
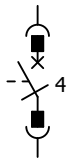
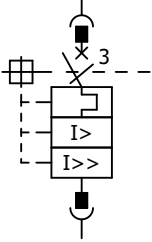
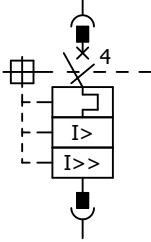
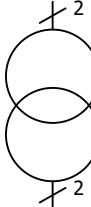
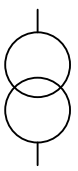
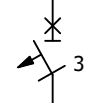

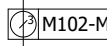
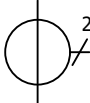


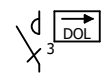

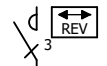





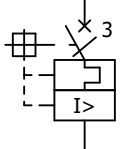




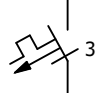







Quantity	Module size	Location in section
4	8E/4	BA01, BA02, FA01, FA02
4	8E/2	DA01, DA03, HA01, HA03
1	16E	KA01
1	24E	PA01




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.

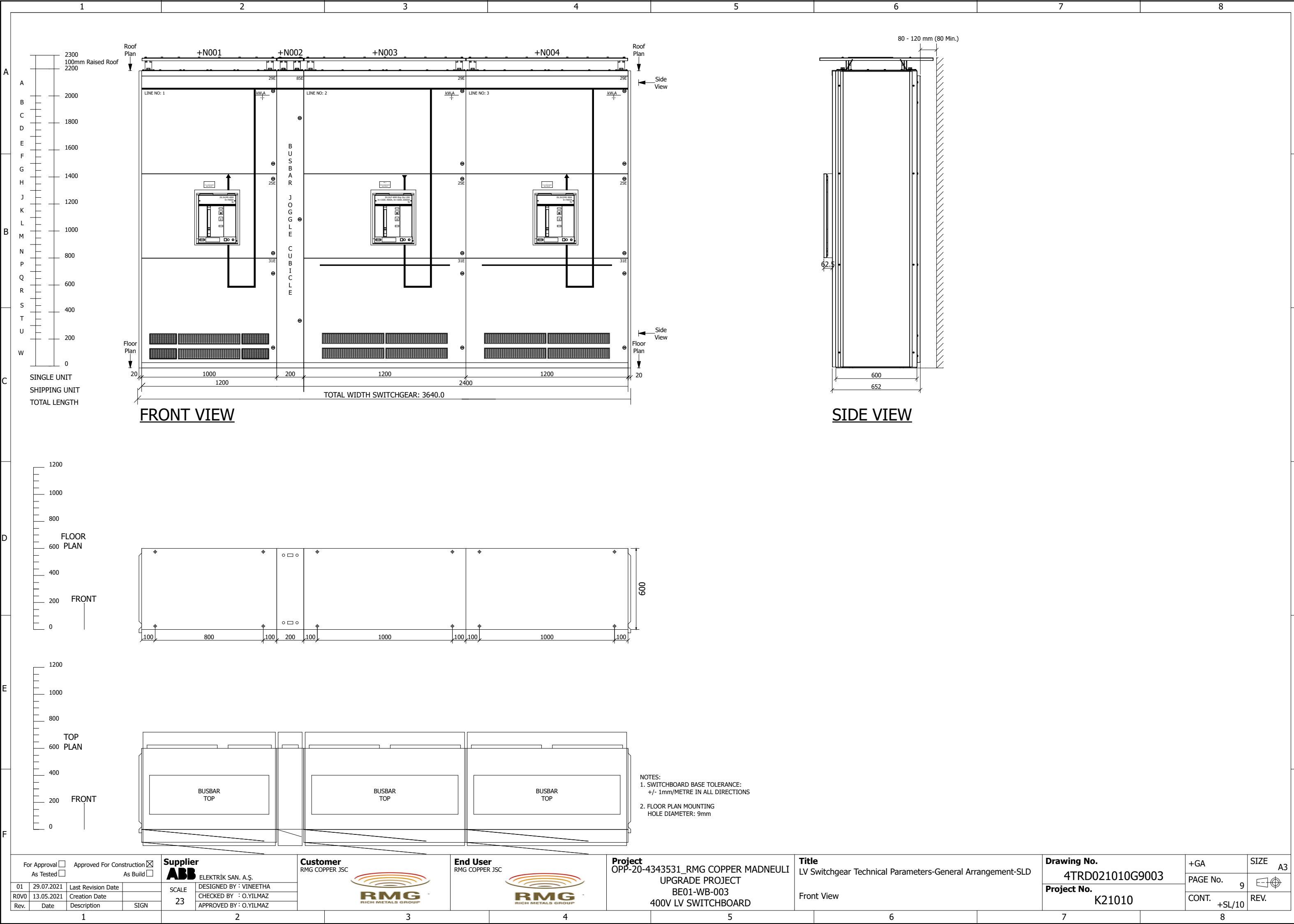
Example for coding of location for withdrawable modules

SYMBOL OVERVIEW

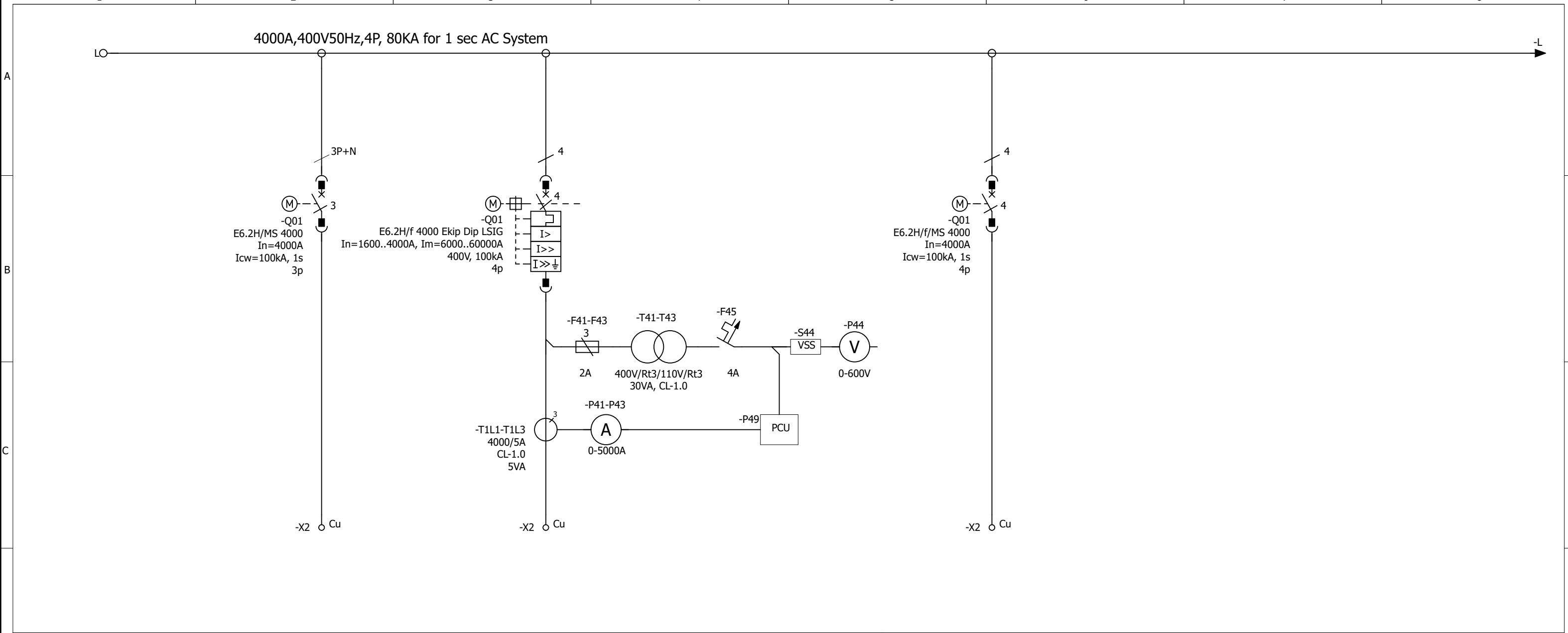
	Fixed Circuit Breaker three-pole (L-S-I characteristic)		Fixed Circuit Breaker four-pole (L-S-I-G characteristic)		Fixed Switch Disconnecter with fuse element three-pole		Withdrawable Switch Disconnecter four-pole
	Withdrawable Circuit Breaker three-pole (L-S-I characteristic)		Withdrawable Circuit Breaker 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		

For Approval <input type="checkbox"/> Approved For Construction <input checked="" type="checkbox"/> As Tested <input type="checkbox"/> As Build <input type="checkbox"/>				Supplier  ELEKTRİK SAN. A.Ş.		Customer RMG COPPER JSC 		End User RMG COPPER JSC 		Project OPP-20-4343531_RMG COPPER MADNEULI UPGRADE PROJECT BE01-WB-003 400V LV SWITCHBOARD		Title LV Switchgear Technical Parameters-General Arrangement-SLD Symbol Overview		Drawing No. 4TRD021010T9003		+DOCUMENTS PAGE No. 8		SIZE A3	
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			

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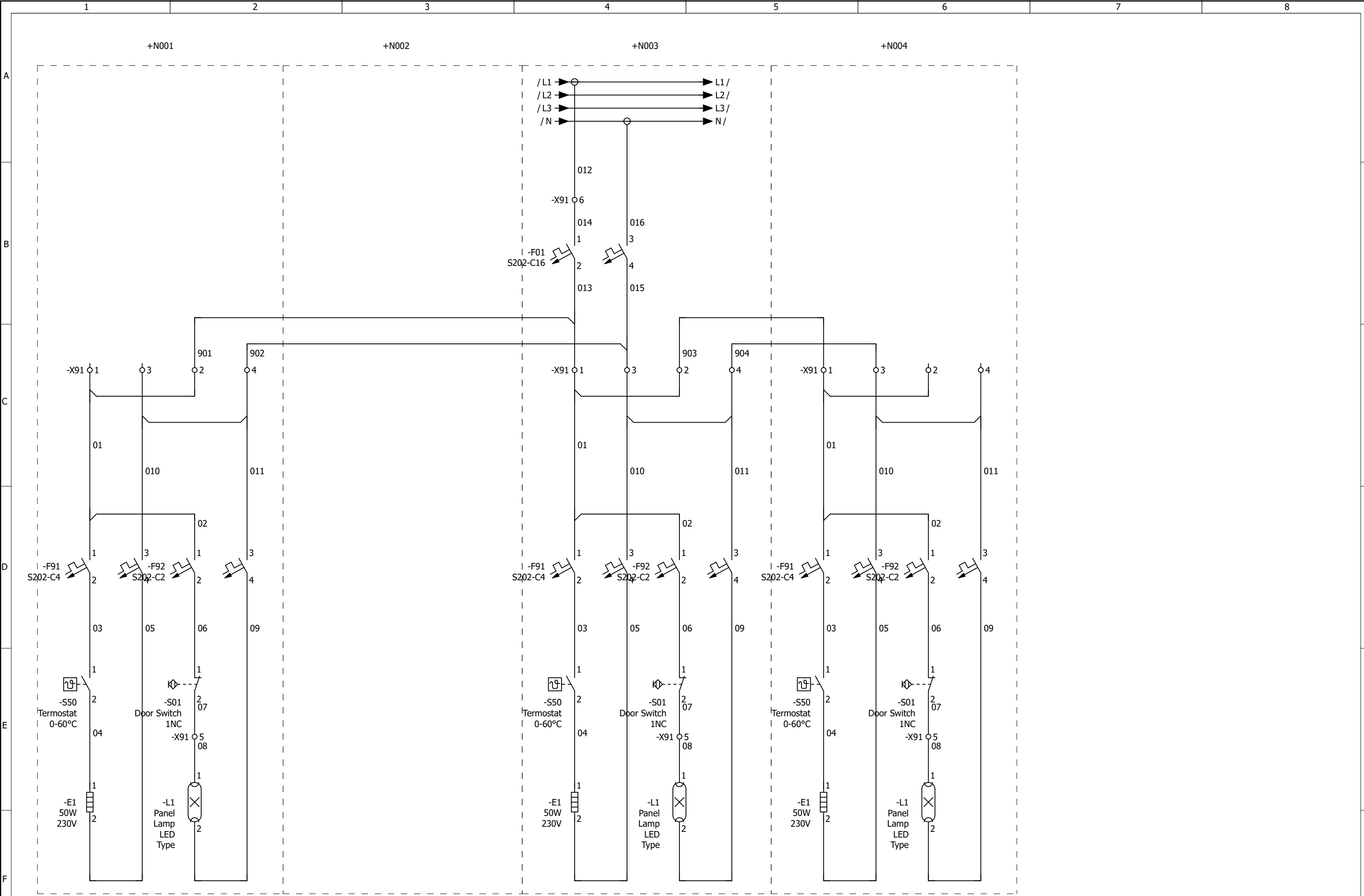





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Module No	K2532_ED_4000A_Icu_Icw_100kA_E6.2H_MS Type_3P_IOT_BUSBAR_4000A_DC2BB	K2507_INC_4000A_Icu_Icw_100kA_E6.2H_Ekip DIP_LSIG_4P_BBT_IOT_BUSBAR_4000A_DC2BB	K2542_ED_4000A_Icu_Icw_100kA_E6.2H_MS Type_4P_IOT_BUSBAR_4000A_DC2BB	
Control Diagram	K21010K8532	K21010K8507	K21010K8542	
Customer Control Diagram	ED	INC	ED	
Line No	1	2	3	
Power (kW)	-	-	-	
Voltage (V)	400	400	400	
Current (A)	-	-	-	
Cable Cross Section mm²	-	-	-	
Incoming / Outgoing	TOP [BUSBAR]	TOP [BUSBAR]	TOP [BUSBAR]	
Tag No	-	INC	-	
Description	TO LV SWITCHGEAR BE01-WB-001	FROM TRANSFORMER BE01-TR-003	TO LV SWITCHGEAR BE01-WB-002	
Location	+N001.AA01	+N003.AA01	+N004.AA01	

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01		29.07.2021		Last Revision Date				SCALE 1		DESIGNED BY : VINEETHA										PAGE No.		11													
R0V0		13.05.2021		Creation Date						CHECKED BY : O.YILMAZ										CONT.		12				REV.									
Rev.		Date		Description		SIGN				APPROVED BY : O.YILMAZ																									
1								2				3				4				5				6				7				8			

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_RMG COPPER MADNEULI UPGRADE PROJECT BE01-WB-003 400V LV SWITCHBOARD		Title LV Switchgear Technical Parameters-General Arrangement-SLD		Drawing No. 4TRD021010H9003		+Space Heater SIZE A3	
01	01.08.2021	Last Revision Date		SCALE 1	DESIGNED BY : VINEETHA						Parts List		Project No. K21010		PAGE No. 12		
ROVO	13.05.2021	Creation Date			CHECKED BY : O.YILMAZ								CONT.		REV.		
Rev.	Date	Description	SIGN		APPROVED BY : O.YILMAZ												