

АО RMG Copper

ТЕХНИЧЕСКОЕ ЗАДАНИЕ

Комплекс работ по модернизации распределительного устройства 6кВ модели
ABB ZS1

Грузия, 2023

**СОСТАВ
ТЕХНИЧЕСКОГО ЗАДАНИЯ**

№ п./п.	Название документа	№ страницы	Количество листов
1.	Комплекс работ	2	3
2.	Приложение	5	10


Разработал:

Инженер - Энергетик
(должность исполнителя)



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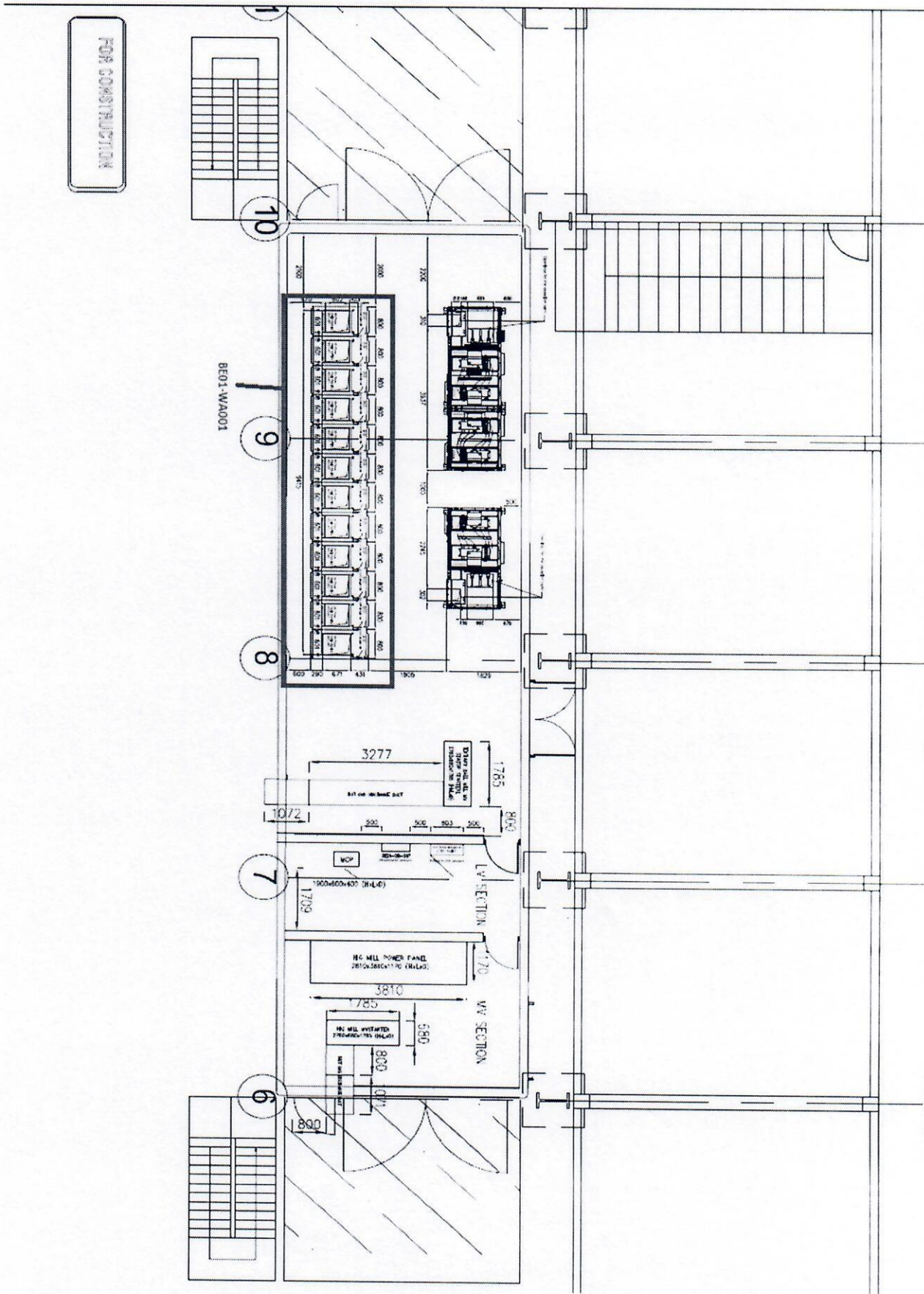
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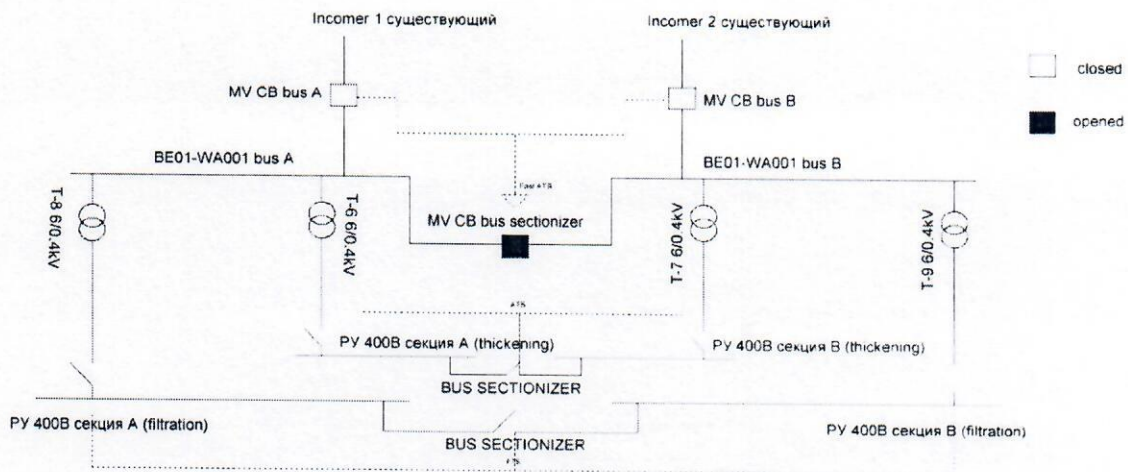
Комплекс работ по модернизации РУ 6кВ BE01-WA001

1	Наименование объекта	Фабрика Маднеули
2	Местоположение объекта	Казрети, Грузия
3	Источник финансирования	CAPEX RMG Copper
4	Основание для проведения работ	Строительство проекта по складированию «сухих хвостов»
5	Описание перечня объектов	Распределительное устройство 6кВ
6	Описание местоположения, климатической характеристики района	Казрети, Грузия
7	Режим работы объекта	Круглосуточный
8	Схема местонахождения и расположения оборудования	NA
9	Описание места проведения работ/оказания услуг	Помещение «MV room» (см. Приложение 1)
10	Техническая документация, основания для проведения работ	Однолинейная и принципиальная схема; схема расположения оборудования MV room
11	Перечень работ	<p>Проведение модернизации существующего РУ6кВ:</p> <ol style="list-style-type: none"> 1. Из односекционного модернизация в двухсекционный с наличием секиционного быстродействующего выключателя с терминалом РЗА для организации БАРВ 2. Предоставление монтажных, однолинейных, принципиальных и логических схем нового РУ6кВ. Проведение анализа по возможности интеграции с существующим DCS на базе протокола Ethernet IP. 3. Установка дополнительных трансформаторных ячеек с терминалами РЗА в количестве 3х штук для целей и нужд проекта «сухие хвосты» 4. Установка доп.колонн (пустых) по одной с каждой секции – опционально, требует обсуждения после выбора поставщика услуг

		<p>5. Терминалы РЗА поставляются преднастроенными для выполнения своих функций</p> <p>6. По окончании сборки подрядчик предоставляет инструкцию по эксплуатации нового РУ</p>
12	Информация для организации посещения площадки и предварительного ознакомления с объектом	По запросу Исполнителя
13	Наличие ограничений по возможности предоставления альтернативного решения	Нет ограничений
14	Сроки выполнения работы	01.07.24
15	Пропускной режим, порядок оформления наряд-допусков	NA
16	Описание требований к предоставлению гарантий и порядку устранения нарушений и дефектов	Гарантийные обязательства на выполненные работы и материалы должны составлять не менее 24 месяцев. В случае выхода монтируемого оборудования из строя в период действия гарантии и по вине исполнителя, исполнитель проводит ремонтные работы за свой счёт.
17	Описание порядка проведения и оценки испытаний и диагностики	В соответствии с требованиями НТД.
18	Требования к расчету стоимости работ, рекомендованный порядок расчета	30%аванс, 70% согласно этапов выполнения проекта
19	Требования к комплектации материалами, оборудованием, инструментами	Общие требования к материалам и оборудованию. Использовать при оказании услуг исключительно сертифицированные материалы и оборудование, если в отношении них предусмотрена обязательная сертификация.
20	Условия привлечения субподрядных организаций	Возможность и объем привлечения субисполнителей. В случае привлечения третьих лиц для оказания услуг и выполнения работ по данному техническому заданию, письменно согласовать как кандидатуру, так и сам факт привлечения с Заказчиком.
21	Требования к количеству и сертификации персонала подрядчика (субподрядчика)	NA
22	Требования в части ОТ и ПБ	NA
23	Требования к квалификации и оснащенности	NA

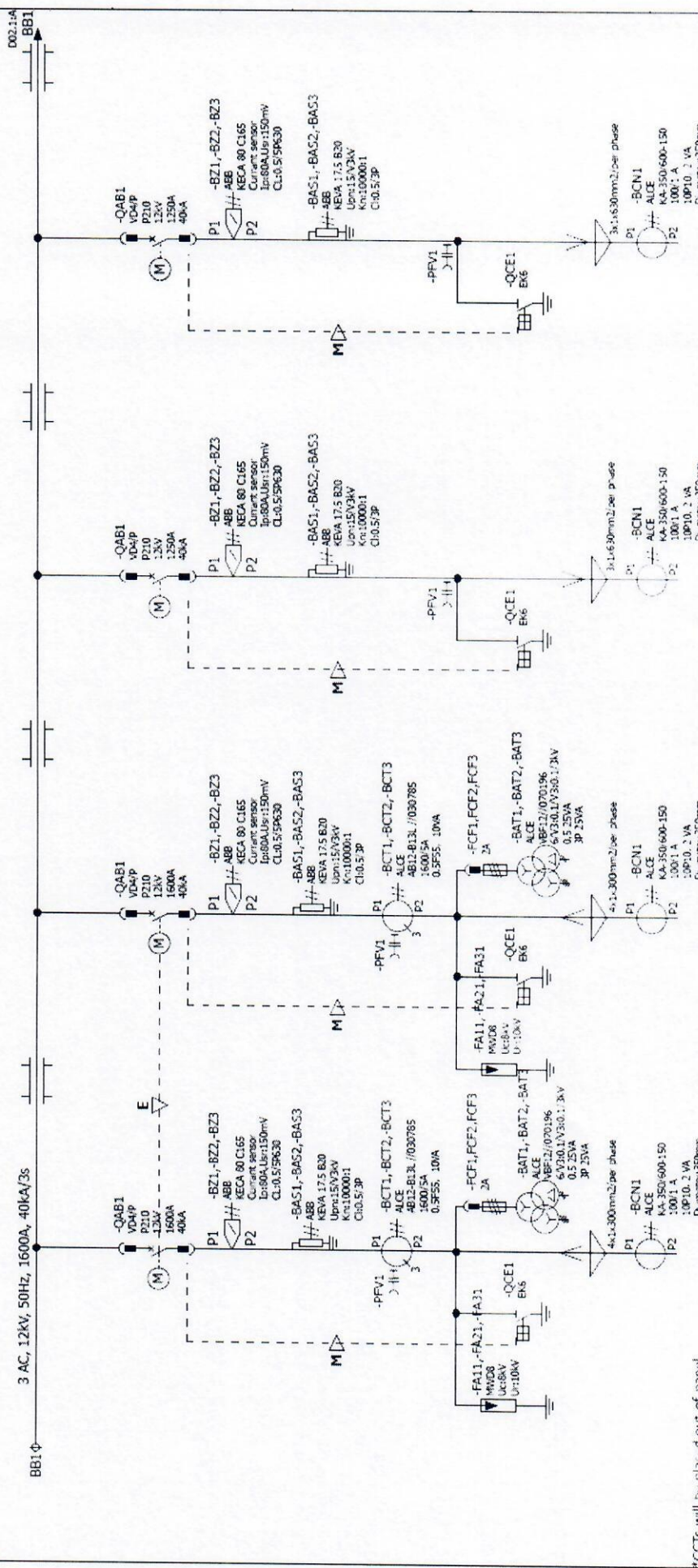
24	Дополнительные условия	NA
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*MV CB bus sectionizer and LV bus sectionizer are opened in normal operation mode power transfer is divided into two transformers for each lv swg, two transformers for each lv swg work at the same time in case of trip one should transfer all power to his lv swg

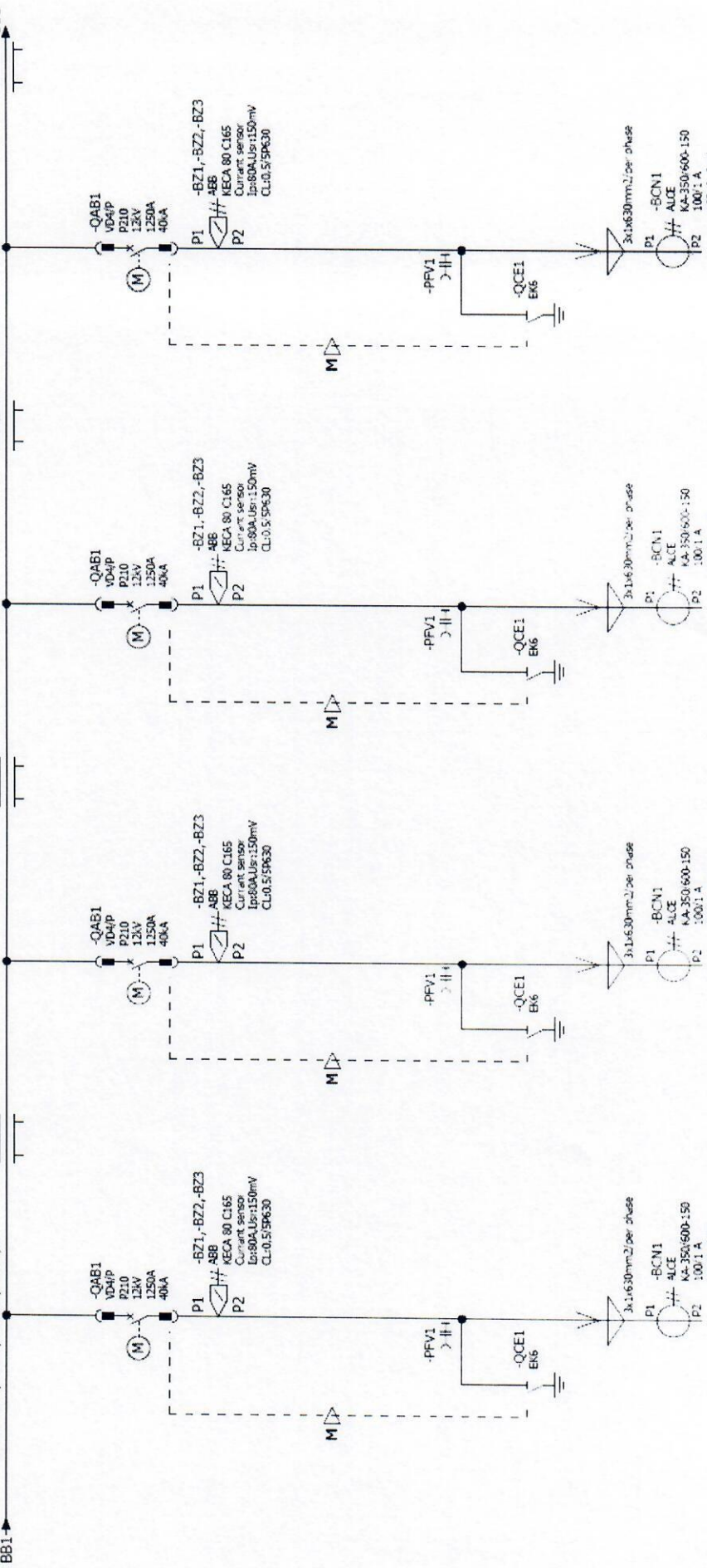
Однолинейная схема нового РУ6кВ



MCCTs will be placed out of panel.

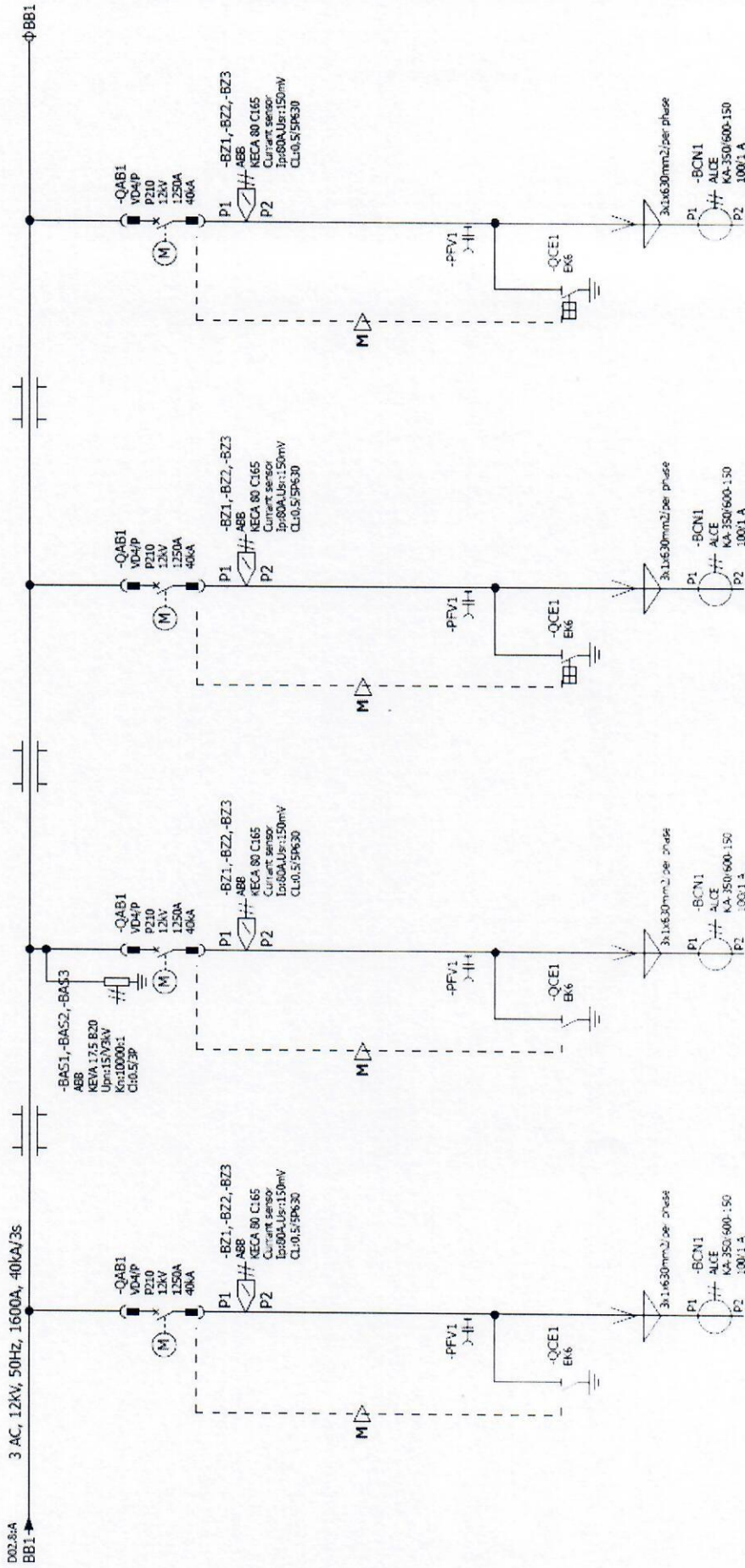
PANEL	1	2	3	4
PANEL NAME	H01	H02	H03	H04
DRAWING No	From main feeder transformer 1YTU210034T1151	From stand by feeder transformer 1YTU210034T1152	1YTU210034T1153	Tertiary Ball Mill Motor 1YTU210034T1153
TYPICAL	INC1	INC2	OUT1	OUT1
PROT. RELAY	REF620 // RBFNACNNFCLBBN11G	REF620 // RBFNACNNFCLBBN11G	REF620 // NBMNDABNFCFLBBN11G	REF620 // NBMNDABNFCFLBBN11G
PROT. POINT	27.47,50,51,50N,51N,59,50U/50N,81U,81O,81R,86	27.47,50,51,50N,51N,59,50U/50N,81U,81O,81R,86	27.46,49M,50,51,50N,51N,51U,51M,56,59,50U/50N	27.46,49M,50,51,50N,51N,51U,51M,56,59,50U/50N
METERING POINT	3I,In,3U,Vn,f,P,E	3I,In,3U,Vn,f,P,E	3I,In,3U,Vn,f,P,E	3I,In,3U,Vn,f,P,E
COMMUNICATION	IEC61850(2XRJ45+1XLC)+PROCESS BUS+GOOSE	IEC61850(2XRJ45+1XLC)+PROCESS BUS+GOOSE	IEC61850(2XRJ45+1XLC)+PROCESS BUS+GOOSE	IEC61850(2XRJ45+1XLC)+PROCESS BUS+GOOSE
METERING, TEST AND CONTROL EQUIPMENT	 	 	 	

D01L6A BB1 3 AC, 12kV, 50Hz, 1600A, 40kA/3s



*CCTs will be placed out of panel

PANEL	H05	H06	H07	H08
PANEL NAME	TRANSFORMER 1 BE01-TR-001	TRANSFORMER 2 BE01-TR-002	TRANSFORMER 3 BE01-TR-003	TRANSFORMER 4 BE01-TR-004
DRAWING N°	1YTU210034T1154	1YTU210034T1154	1YTU210034T1154	1YTU210034T1154
TYPICAL	OUT2	OUT2	OUT2	OUT2
PROT. RELAY	REF620 // NBFNACNNFCLBBN11G	REF620 // NBFNACNNFCLBBN11G	REF620 // NBFNACNNFCLBBN11G	REF620 // NBFNACNNFCLBBN11G
PROT. FUNCT.	50, 51, 50N, 51N, 59, 81, 86, 50L, 50NL	50, 51, 50N, 51N, 59, 81, 86, 50L, 50NL	50, 51, 50N, 51N, 59, 81, 86, 50L, 50NL	50, 51, 50N, 51N, 59, 81, 86, 50L, 50NL
METERING FUNCT.	3I, In, f, P, E	3I, In, f, P, E	3I, In, f, P, E	3I, In, f, P, E
COMMUNICATION	IEC61850(2XRJ45+1XLC)+PROCESS BUS-GOOSE	IEC61850(2XRJ45+1XLC)+PROCESS BUS-GOOSE	IEC61850(2XRJ45+1XLC)+PROCESS BUS-GOOSE	IEC61850(2XRJ45+1XLC)+PROCESS BUS-GOOSE
METERING, TEST AND CONTROL EQUIPMENT	ABC SENSOR	ABC SENSOR	ABC SENSOR	ABC SENSOR

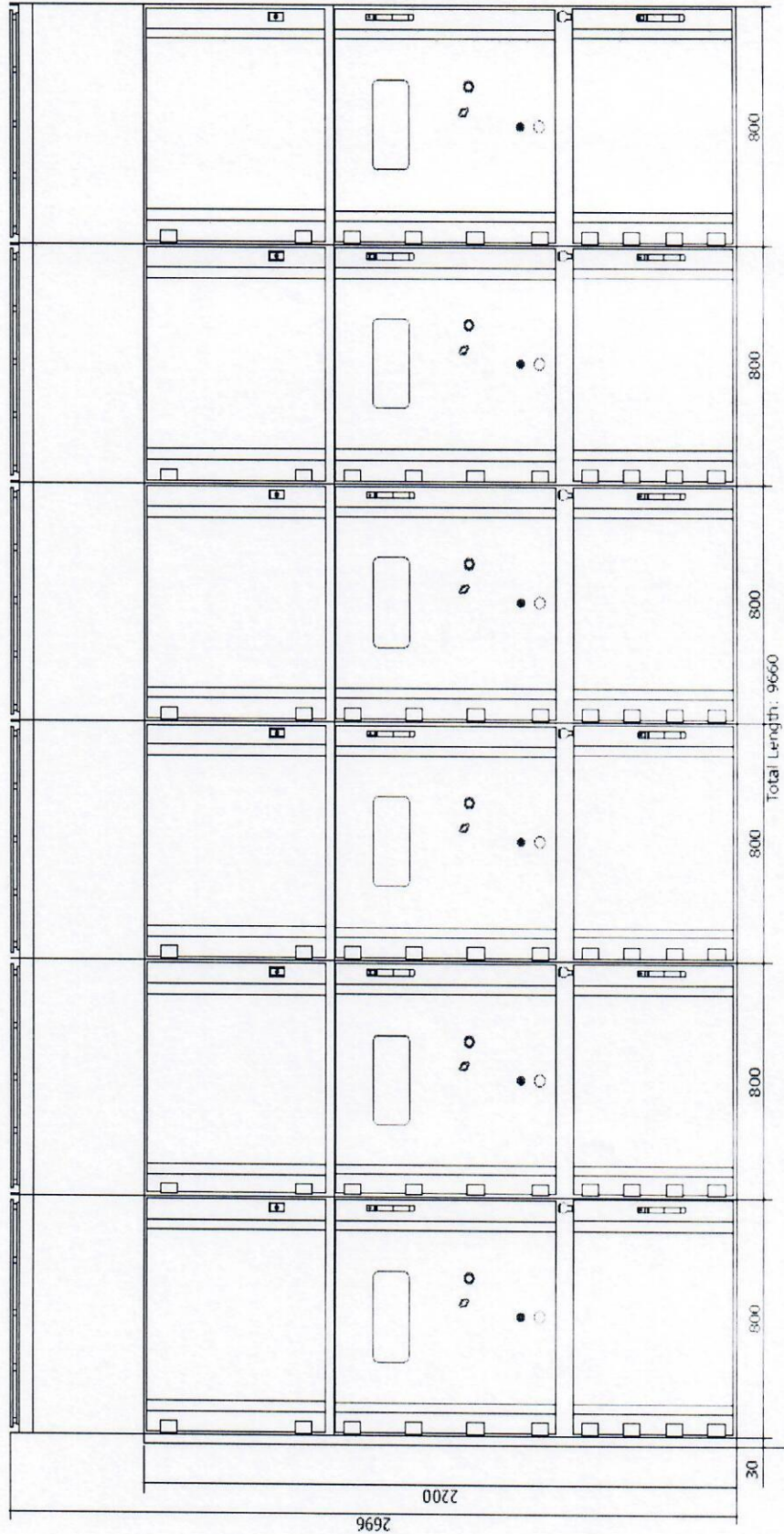


*CCTs will be placed out of panel.

PANEL	H09	H10	H11	H12
PANEL NAME	TRANSFORMER-5 BE01-TR-005	New Cabinet	Power Factor Correction-1 BE01-CA-001	Power Factor Correction-2 BE01-CA-002
DRAWING No.	1YTU210034T1154	1YTU210034T1155	1YTU210034T1156	1YTU210034T1156
TYPICAL	OUT2	OUT3	OUT4	OUT4
PROT. RELAY	REF620 // NBFVACNNFCLBBN11G	REF620 // NBFVACNNFCLBBN11G	REF620 // NBFVACNNFCLBBN11G	REF620 // NBFVACNNFCLBBN11G
PROT. FUNCT.	50.51,50N,51N,59,81,86,50L,50NL	27,50,51,50N,51N,59,50L,50NL	27,47,50,51,50N,51N,59,50L,50NL,81U,81O,81R,86	27,47,50,51,50N,51N,59,50L,50NL,81U,81O,81R,86
METERING FUNCT.	3I,In,f,P,E	3I,In,3U,Vo,f,P,E	3I,In,f,P,E	3I,In,f,P,E
COMMUNICATION	IEC61850(2XRJ45+3XLC)+PROCESS BUS+GOOSE	IEC61850(2XRJ45+3XLC)+PROCESS BUS+GOOSE	IEC61850(2XRJ45+3XLC)+PROCESS BUS+GOOSE	IEC61850(2XRJ45+3XLC)+PROCESS BUS+GOOSE
METERING, TEST AND CONTROL EQUIPMENT	REF620 // NBFVACNNFCLBBN11G	REF620 // NBFVACNNFCLBBN11G	REF620 // NBFVACNNFCLBBN11G	REF620 // NBFVACNNFCLBBN11G

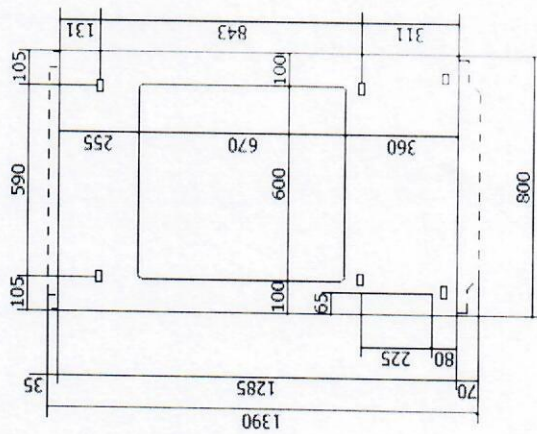


Minimum switchgear room height - H: 3290

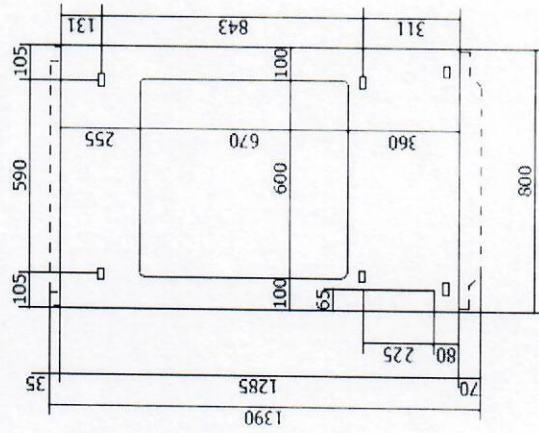


PANEL	1	2	3	4	5	6
H01	H02	H03	H04	H05	H06	
From main feeder transformer	From stand by feeder transformer	Hig Mill Motor	Tertiary Ball Mill Motor	TRANSFORMER 1 BE01-TR-001	TRANSFORMER-2 BE01-TR-002	
OFF	OFF	OFF	OFF	OFF	OFF	OFF
C.B MECHANICAL CONTROL						

Tolerances for laying the floor frame are:
 Evenness tolerance: ± 1 mm within a measuring length of 1 m
 Straightness tolerance: 1 mm per 1 m, but not more than 3 mm over entire length of frame.




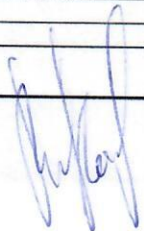
PANELS:
 H01,H02



PANELS:
 H03,H04,H05, H06, H07, H08, H09,H10,H11,H12

MIDDLE VOLTAGE SWITCHGEAR SPECIFICATION

 RMG	TAILINGS FACILITY DETAILED ENGINEERING		
Projet N° :	Document N° :	Rev : 1	Date :
MEDIUM VOLTAGE SWITCHGEAR SPECIFICATION			



1.0 INTRODUCTION

This specification is related to the tailings facility located in Bolnisi Georgia. The present technical sheet covers the specifications for Medium voltage switchgear.

2.0 SCOPE OF SUPPLY

The present document describes the minimum specifications required for the design, Installation and tests for medium voltage switchgear. The supplier will remain responsible on the technical quality of its supply.

The quantities of equipment to be provided are listed in the table below:

ITEM	TAG	SERVICE VOLTAGE	TYPE	Frequency
1	BE01-WA001	6kV	Vacuum	50Hz

3.0 REFERENCE DOCUMENTS

- Applicable Standards.
- The present document.
- The Single Line Diagram
- MV room GA drawings
- Technical data sheet


5.0 STANDARDS, CODES AND REGULATIONS

The equipment shall comply with the latest editions of appropriate UL, CSA or IEC standards, codes and regulations.

In general, MV swg will be designed, manufactured, tested and installed in accordance with the relevant European or North American standards.

6.0 TECHNICAL SPECIFICATIONS

- Service Voltage: 6,000V.
- Frequency: 50Hz.
- Type: Metal-Clad.
- Insulation: Air
- Busbars: insulated
- Circuit Breakers Type: Withdrawable type.
- Circuit Breakers Insulation: vacuum
- Construction: Self-supporting.

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- Material: galvanized or electro-galvanized steel sheets.
- Protection: IP42.
- Installation: Indoor.
- Incoming Cables: top side
- Outgoing Cables: top side


7.0 SWITCHGEAR DESIGN

The Switchgear will contain Circuit Breakers protecting the primary side of the MV/LV main transformers.


It will be constructed with the following minimum features:

Fully compliant with Standards.

- Metal-Clad Type.
- Operation service 6kV.
- Frequency 50Hz.
- Manually operated vacuum Circuit Breakers.
- Protection relays (SEPAM, MULTILIN, siprotec, ref/rem).
- Lights for power presence indication
- Temperature-Rises: At rated current under steady-state conditions the maximum temperature-rises related to the average temperature of the air outside the external enclosure are those permitted by sub clause 4.4.2 of IEC Standard 60298.
- All control equipment and bus bars of MV switchgears shall withstand fault currents that may occur in the Unit distribution system. Bus bars shall be insulated
- The withdrawal or engagement of a circuit-breaker shall not be possible unless this device is in the open position.
- It shall be possible to close the earthing switch only when the circuit breaker is drawn-out; the engagement of the circuit-breaker shall not be possible unless the earthing switch is in the open position.
- It shall be possible to prevent the earthing switch from closing if the incoming lines are not surely de-energized.
- In order to avoid a false handling of 10 KV switches and earthing blades, necessary mechanical and electromagnetic interlocks shall be implemented excluding the possibility of any voltage applied to engaged earthing blades.


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- In order to avoid a false handling of 10 KV switches and earthing blades, necessary mechanical and electromagnetic interlocks shall be implemented excluding the possibility of any voltage applied to engaged earthing blades. In order to avoid a false handling of 10 KV switches and earthing blades, necessary mechanical and electromagnetic interlocks shall be implemented excluding the possibility of any voltage applied to engaged earthing blades.
- Low Voltage Circuits: The rated voltages of the auxiliary circuits are specified in data sheet and it shall be manufacturer's care to check the correct operation of the equipment manufactured or chosen by the manufacturer.
- Cabinet-to-cabinet interconnection wiring shall be laid in ducts made of self-extinguishing material, properly arranged and easily accessible, while wiring passing through the "MV equipment" or "external connections" compartments or entering said compartments for connecting the auxiliary or measuring circuits of the equipment, shall be protected by means of metal tubes or cases.
- The L.V. interconnections of devices placed in different sections shall not be made directly but by means of terminal blocks placed in the relevant sections. Identification marks shall be put on conductor ends and on terminals and other devices to permit the easy identification of the various circuits. Labels shall also be provided for each apparatus, marked with the relevant item indicated on the elementary diagram.
- The following equipment shall usually be of the "draw-out" type: Circuit-breakers, VT's and relevant fuses.
- Overvoltage limiters shall be installed in the cubicles with vacuum circuit breaker.
- The current transformers shall be capable of withstanding the heating due to short-time currents and the dynamic stresses due to short-time current initial peak values. The instrument transformers shall ensure the correct operating of the protection and measuring equipment they supply. The instrument transformers shall always be insulated. The CT's on the incoming and outgoing lines shall not be installed in the housing of the bus-bars nor shall be electrically connected on the bus-bars side of the isolating means of said lines. Whatever may be the function of the CT's installed in stationary position, with the enclosure door open, CT terminals shall be easily


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accessible to carry out tightening operations, changes of ratio (where possible), etc. without removing the CT or any other device or connection.

- Each enclosure of the switchgear shall be fitted with a voltage indicator on the incoming or outgoing line. Each enclosure of the switchgear shall be fitted with a voltage indicator on the incoming or outgoing line. The voltage presence indication shall be operating even with a line voltage drop of 30 %.
- Relay protection functions should be performed by "intellectual" microprocessor devices, using IEC 61850 communication protocol, oriented on automatic dispatcher electric power control system. The secondary circuit protection circuit breakers shall be capable of breaking the maximum expected short circuit currents
- For 10/0.4 kV transformers, the following protection types shall be provided: Overcurrent protection without time delay; Overcurrent protection with current independent time delay; Overload alarm operating protection; Ground fault alarm operating protection; Overheating two-step tripping and alarm operating protection of transformer windings.
- Motor feeder protection: Tripping protection (current cutoff) against multiphase faults in stator winding (for motors of ≤ 2 MW); Overload tripping protection with current-independent time delay; Ground fault tripping protection; Under voltage protection; Tripping and alarm operating protection against overheating of stator winding and bearings (according to special requirements of Motor feeder protection: Tripping protection (current cutoff) against multiphase faults in stator winding (for motors of ≤ 2 MW); Overload tripping protection with current-independent time delay; Ground fault tripping protection; Under voltage protection; Tripping and alarm operating protection against overheating of stator winding and bearings
- 10kV switchgear cubicles for the motors shall be fitted with the following: two relays to provide external emergency disconnection of a 10kV switch from PLC system; two relays of motor closing-tripping commands; alarm operating ground fault protection in 10kV mains.
- For 10kV switchgear bus protection, the following shall be provided:
 - partial differential current protection with two-step time delay;
 - arc protection with starting by voltage or by current (including arc flash)
 - logic bus protection

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- Optical fast arc detector sensors should be installed in:
 - bus bar compartment;
 - vacuum circuit breaker compartment;
 - cable connections compartment
- For switchgear, as a rule, two-step group undervoltage protection and power-loss protection shall be provided. For the first - motors without self-starting, for the second-motors with self-start.
- All switchgear cubicles shall be fitted with protection operation indicators.
- Control of main switches, switches of outgoing lines to transformer is local and performed from switchgear cubicles.
- Control of cubicles of motors is performed as follows:
 - start/stop from a pushbutton console nearby the motor;
 - emergency stop from the device control panel;
 - start/stop by PLC, from the rack the rack room or control room
- All switchgear cubicles shall be fitted with light indication as follows:
 - lamps of switch on- and off- positions;
 - lamps of switch emergency turn-off
 - all analog measuring parameters shall be displayed on the switchgear using microprocessor based metering and protection unit.
- Circuit labels: each assemble shall be provided with the following circuit identification label - circuit label on the front of the fixed and removable part of withdrawable units; identification number of the connected equipment or circuit destination; circuit labels should be installed on the front and on the rear side of the switchgear cell; warning plates - in locations where dangerous situations may be created.
Cabinet and panel board front door shall bear tag number and operational description of equipment connected to or controlled from the respective cabinet.
- Documentation: the supplier shall provide a factory certificate for the switchgear and two copies of the operating manual in English, assembly drawing, general arrangement, single line diagrams, control schematics, internal wiring diagrams, technical passport, interlock/intertrip diagram with downstream/upstream of the the MV switchgear .

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- Voltage transformers must be in the windrable version. Rack out position must be achieved by the same mechanism as that of the vacuum circuit breakers (by means of trolley and handle).
- During switchgear construction, the manufacturer shall allow the purchaser's inspector to access his factory in order to check that the work progress is technically correct and in accordance with the scheduled time. The costs of the routine tests are charged to manufacturer, excepting the expenses of the purchaser's inspector.

8.0 LOCAL CONDITIONS

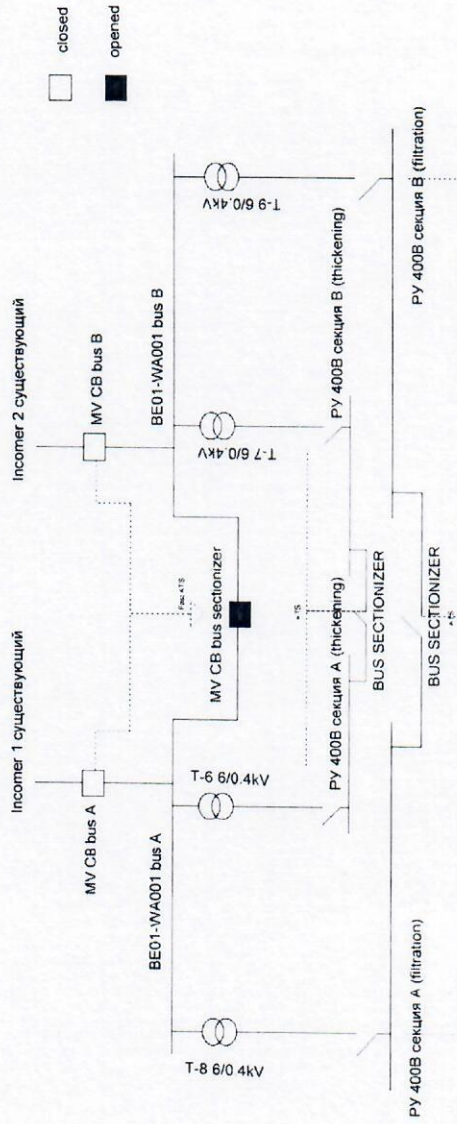
- Seismic activity: Yes, zone 1.
- Climat: Continental.
- Plant elevation: 750 m above mean sea level.
- Outside temperature: -24 to 39 °C minimum and maximum (annual average).
- Relative humidity: 76% (average).
- Rainfall: 512 mm (monthly average).
- Snow accumulation: 10 cm (max, during January).

9.0 SHIPPING


The equipment must be packed in suitable packaging for transportation to Poti port, Georgia (for foreign suppliers) and then by train or trucks to project site.

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10.0 APPENDIX
- MV SLD



*MV CB bus sectionizer and LV bus sectionizer are opened in normal operation mode. power transfer is divided into two transformers for each lv swg. two transformers for each lv swg work at the same time. in case of trip - one should transfer all power to his lv swg

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MEDIUM VOLTAGE SWITCHGEAR SPECIFICATION		

Technical data sheet for middle voltage switchgear

General		
1.1	Project Name:	Tailings facility
1.2	Country of destination:	Georgia
1.3	Main specification Doc. No.:	MV SWG specification
1.4	Related list of attachment	thickener mv sld
1.5	Switchgear Type	as per vendor standard
1.6	Communication protocol	Ethernet IP for DCS, IEC 61850
1.7	Communication interface	RS485
1.8	Switchgear Type	metal-enclosed switchgear and control gear
1.9	Type of insulation	AIR
1.10	Signal exchange described in	to be discussed
INDIVIDUAL SITE CONDITIONS		
2.1	Individual site conditions	to be discussed
2.2	Location Type	indoor
2.3	Climatic condition - indoor	3K3 (Based on IEC 60721, no solar radiation)
2.4	Special climatic conditions	As per IEC 60271
2.5	Classification of biological conditions	As per IEC 60271
2.6	Classification of chemically active substances	As per IEC 60271
2.7	Classification of mechanical conditions	As per IEC 60271
2.8	Pollution (IEC 61439)	pollution degree 3 (industrial)
2.9	Altitude	< 1000m
2.10	EMC environment	Environment A
2.11	EMC compatibility level acc to. IEC 61000-2-4	class 3
2.12	Seismic zone	zone 1
ELECTRICAL RATING OF SWITCHGEAR		
3.2	System Nominal voltage (V)	12kV
3.3	Type of neutral earthing	Insulated Earth (IT)
3.4	Service voltage	6kV , 3 AC
3.5	Static voltage variation Instantaneous voltage variations	± 5 % +10 / -10%
3.6	Rated frequency (fr)	50 Hz
3.7	Frequency variation	+/- 0,4Hz
3.8	Rated short-duration power-frequency withstand voltage (Ud)	to be discussed
3.9	Rated lightning impulse withstand voltage (Up)	75kV
3.10	Rated current (Ir) (Incomer & Busbar)	to be discussed
3.11	Rated current (Ir) for (Feeders)	As per single line diagram of MV Switchgear
3.12	Rated short-time withstand current (Ik) (Incomer / Busbar / Feeder)	to be discussed
3.13	Rated short-time current (Ike) (earthing circuit)	equal to Ik (main circuit)

3.14	Rated peak withstand current (Ip)	2,5 – times (50Hz) of rated short time withstand current
3.15	Rated duration of short circuit (tk)	1 sec
3.16	Internal Arc Fault classification	A FLR
3.17	Arc fault current and duration	1 sec.
3.18	Rated voltage and frequency for auxiliary supply (VCB Spring charging, closing & tripping, indication, numerical relay) (Ua)	220 V DC L1/L2 (isolated) Vendor shall provide one feeder per switchgear section. Vendor to suggest the rating of incoming 220V DC feeder.
3.19	Rated voltage and frequency for auxiliary supply (space heater, lighting, convenience outlets)	220 V AC, 50Hz, L/N/PE (grounded) Vendor shall provide one feeder per switchgear section. Vendor to suggest the rating of incoming 220V AC feeder.
3.20	Withstand voltage for low voltage circuit	2kV at rated frequency for 60 sec.

MECHANICAL DATA OF SWITCHGEAR AND GENERAL DESIGN

4.1	Number of cubicles	17
4.2	Manufacturer	
4.3	Type / Number	
4.4	Dimension of Switchgear: Width Depth Height	GA MV room
4.5	Weight per cubicle / total	as per Vendor
4.6	Waste heat per cubicle / total	as per Vendor
4.7	Protection class (IP coding)	As per Cl. 2.5
4.8	Protection class (IK coding)	As per IEC 62271-200
4.9	Number of busbar systems	Single
4.10	Accessibility Busbar compartment Switching device compartment Connection compartment Low voltage compartment CT / VT compartment	According to IEC 62271-200 Tool-based Toolbased & Interlock based accessible Toolbased & Interlock based accessible Tool-based Toolbased & Interlock based accessible
4.11	Pressure relief flaps	on top
4.12	Pressure relief ducting to outside building (in vendor scope)	YES
4.13	Painting	light grey, RAL 7035
4.14	Cabinet lights and convenience outlets	YES
4.15	Cabinet space heaters	YES
4.16	Special Requirement	Insulated busbars (Tinned)
4.17	Spare	1 fully equipped spare cubicle for transformer and 1 fully equipped spare cubicle for Motor
4.18	Spare space	One panel on each side

INCOMER

5.1	Number of feeders	2
5.2	Lettering	as per SLD
5.3	Power connection type / location	cables from top
5.4	Power connection quantity and size:	to be discussed

5.5	3 surge arrestors, metal oxide varistor type	YES
5.6	3 capacitive voltage indications on front of the cubicle	- Yes on incoming and outgoing line - The voltage presence indicator shall operate even with a line voltage drop of 30% of rated voltage.
5.7	Earthing switch (block able by electromagnetic interlocking relay)	YES YES
5.8	Current transformers: measuring core protection core for overcurrent core for line differential protection	to be discussed
5.9	Core balanced Current transformer (CBCT) for earth fault protection	NO
5.10	Voltage transformers: secondary winding residual voltage winding	6kV/ $\sqrt{3}$ / 100V/ $\sqrt{3}$ / 100V/3 25 VA, class 0,5 10 VA, 6P
5.11	Vacuum type circuit breaker Make: Type: Rating:
5.12	Measuring & Protection Relay for protection, monitoring, metering and control	YES
5.13	Measuring & Protection Relay Multifunction Relay with integrated mimic diagram Make: Type: No of integrated LED's No of binary in/outputs No of analogue in/outputs	YES
5.14	Separate mimic diagram on front of the switchgear required	YES
5.15	Control and indication lamps	- CB in Test/Service - CB in Open/Closed - CB Trip - Earth Switch Open/Close - Lamp Test

5.16	Push Button	CB Open CB Closed
5.17	Multifunction Meter Required	Yes, Cl.- 0.5 (IEC 61850 communication protocol)
BUS COUPLER		
6.1	Number of feeders	1
6.2	Lettering	as per SLD
6.3	Power connection type / location	as per vendor standard
6.4	Current transformers: measuring core protection core for overcurrent	1600/1/1/1 A (to be discussed) 5 VA, 0.5 FS 10 5 VA, 5P 20
6.5	Vacuum type circuit breaker Make: Type: Rating:
6.6	Measuring & Protection Relay for protection, monitoring, metering and control	YES
6.7	Window type / self-balancing CT for earth fault protection	NO
6.8	Measuring & Protection Relay Multifunction Relay with integrated mimic diagram Make: Type: No of integrated LED's No of binary in/outputs No of analogue in/outputs	YES
6.9	Separate mimic diagram on front of the switchgear required	YES
6.10	Automatic Transfer System (ATS) Make: Type:	YES automatic transfer. The automatic transfer shall be quick operating but shall not exceed 80-90ms.
6.11	Control and indication lamps	- CB in Test/Service - CB in Open/Closed - CB Trip - Earth Switch Open/Close - Lamp Test
6.12	Push Button	LAMP TEST
6.13	Earthing Switch Required	YES

6.14	Multifunction Meter Required	Yes, CI.- 0.5 (IEC 61850 communication protocol)
BUS RISER		
7.1	Number of feeders	1
7.2	Lettering	as per SLD
7.3	Power connections	as per vendor standard
7.4	Control and indication lamps	<ul style="list-style-type: none"> - CB in Test/Service - CB in Open/Closed - CB Trip - Earth Switch Open/Close - Lamp Test - FATS STOPPED - FATS ALARM - INCOMER A OFF - INCOMER B OFF - BUS COUPLER OFF - INCOMER A ON - INCOMER B ON - BUS COUPLER ON
7.5	Push Button	<ul style="list-style-type: none"> - FATS STOP - FATS START - ISOLATION INCOMER A - ISOLATION INCOMER B - ISOLATION BUS COUPLER
7.6	3 capacitive voltage indications on front of the cubicle	<ul style="list-style-type: none"> - Yes on incoming and outgoing line - The voltage presence indicator shall operate even with a line voltage drop of 30% of rated voltage.
MOTOR – FEEDER		
8.1	Number of feeders	13 (+ 2 incomers + 1 bus copler+1 bus riser)
8.2	Lettering	to be discussed
8.3	Power connection type / location	cables from top
8.4	Power connection quantity and size	to be discussed
8.5	3 surge arrestors, metal oxide varistor type	YES
8.6	3 capacitive voltage indications on front of the cubicle	<ul style="list-style-type: none"> - Yes on incoming and outgoing line - The voltage presence indicator shall operate even with a line voltage drop of 30% of rated voltage.
8.7	Earthing switch (interlocked by CB position)	YES
8.8	Current transformers: measuring core protection core for overcurrent	<p>...../1/1/1 A A</p> <p>5 VA, 0.5 FS 10 5 VA, 5P 20</p>

8.9	Window type / self-balancing CT for earth fault protection	YES
8.10	Vacuum type Make: Type: Rating:	Circuit breaker
8.11	Measuring & Protection Relay for protection, monitoring, metering and control	YES
8.12	SIL-switching capability	to be discussed
8.13	Measuring & Protection Relay Multifunction relay with integrated mimic diagram	YES
8.14	Make: Type: No of integrated LED's No of binary in/outputs No of analogue in/outputs	to be discussed
8.15	Separate mimic diagram on front of the switchgear required	YES
8.16	Motor space heaters to be fed by MV SWG	YES, thermo state controlled
8.17	Control and indication lamps	- CB in Test/Service - CB in Open/Closed - CB Trip - Earth Switch Open/Close - Lamp Test
8.18	Push Button	CB Open CB Close
8.19	Multifunction Meter Required	YES, CI.- 0.5 (IEC 61850 communication protocol)
8.20	Counter for number of operation of Circuit Breaker	YES
TRANSFORMER FEEDER		
9.1	Number of feeders	to be discussed
9.2	Lettering	to be discussed
9.3	Power connection type / location	cables from top
9.4	Power connection quantity and size	to be discussed
9.5	3 surge arrestors, metal oxide varistor type	YES
9.6	3 capacitive voltage indications on front of the cubicle	YES

9.7	Earthing switch (interlocked by CB position)	YES
9.8	Current transformers: measuring core protection core for overcurrent/1/1/1 A as per SLD 5 VA, 0,5 FS 5 5 VA, 5P 20
9.9	Window type / self-balancing CT for earth fault protection	YES
9.10	Vacuum type Make: Type: Rating:	Circuit breaker
9.11	Measuring & Protection Relay for protection, monitoring, metering and control	YES
9.12	Transformer protection	YES
9.13	Measuring & Protection Relay Multifunction relay with integrated mimic diagram Make: Type: No of integrated LED's No of binary in/outputs No of analogue in/outputs	YES
9.14	Transformer winding Temperature relay	- Provided by Other (Transformer Vendor) - Mounted in LV Compartment of MV Switchgear - Wiring & Installation by Vendor
9.15	Switchgear - Wiring & Installation by Vendor	YES
9.16	Control and indication lamps	- CB in Test/Service - CB in Open/Closed - CB Trip - Earth Switch Open/Close - Lamp Test
9.17	Push Button	CB Open CB Closed
9.18	Multifunction Meter Required	Yes, CI.- 0.5 (IEC 61850 communication protocol)