

# Technical data sheet for middle voltage switchgear

## General

1.1	Project Name:	Auramine concentrate plan
1.2	Country of destination:	Georgia
1.3	Main specification Doc. No.:	MIDDLE VOLTAGE SWITCHGEAR SPECIFICATION
1.4	Related list of attachment	attachement 1
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	attachement 1

## INDIVIDUAL SITE CONDITIONS

2.1	Individual site conditions	-
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	9 level

## ELECTRICAL RATING OF SWITCHGEAR

3.2	System Nominal voltage (V)	12kV
3.3	Type of neutral earthing	Insulated Earth (IT)
3.4	Service voltage	10kV , 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)	42kV
3.9	Rated lightning impulse withstand voltage (Up)	75kV
3.10	Rated current (Ir)(Incomer & Busbar)	1000 A
3.11	Rated current (Ir) for (Feeders)	630A
3.12	Rated short-time withstand current (Ik) (Incomer / Busbar / Feeder)	25 kA
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	12
4.2	Manufacturer	ABB Unigear ZS1
4.3	Type / Number	-
4.4	Dimension of Switchgear: Width Depth Height	Dimension of MV room (to be discussed later)
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	-
4.18	Spare space	-

#### **INCOMER**

5.1	Number of feeders	1
5.2	Lettering	as per SLD
5.3	Power connection type / location	cables from bottom
5.4	Power connection quantity and size:	
5.5	3 surge arrestors, metal oxide varistor type	YES

5.6	3 capacitive voltage indications on front of the cubicle	<ul style="list-style-type: none"> <li>- Yes on incoming and outgoing line</li> <li>- The voltage presence indicator shall operate even with a line voltage drop of 30% of rated voltage.</li> </ul>
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	1000/1/1/1 A 5 VA, 0,5 FS 5 5 VA, 5P 20 5 VA, 5P 20
5.9	Core balanced Current transformer (CBCT) for earth fault protection	NO
5.10	Voltage transformers:  secondary winding residual voltage winding	10kV/ $\sqrt{3}$ / 100V/ $\sqrt{3}$ / 100V/3  25 VA, class 0,5 10 VA, 6P
5.11	Vacuum type circuit breaker Make: Type: Rating:	ABB VD-4 1000 A
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	<ul style="list-style-type: none"> <li>- CB in Test/Service</li> <li>- CB in Open/Closed</li> <li>- CB Trip</li> <li>- Earth Switch Open/Close</li> <li>- Lamp Test</li> </ul>

5.16	Push Button	CB Open CB Closed
5.17	Multifunction Meter Required	Yes, Cl.- 0.5 (IEC 61850 communication protocol)
<b>MOTOR – FEEDER</b>		
8.1	Number of feeders	1
8.2	Lettering	as per SLD (to be discussed)
8.3	Power connection type / location	cables from bottom
8.4	Power connection quantity and size	as per SLD (to be discussed)
8.5	3 surge arrestors, metal oxide varistor type	YES
8.6	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.
8.7	Earthing switch (interlocked by CB position)	YES, with special requirements - "KIRK KEY", as per attachment 2
8.8	Current transformers:  measuring core protection core for overcurrent	to be discussed/1/1/1 A A  5 VA, 0.5 FS 10 5 VA, 5P 20
8.9	Window type / self-balancing CT for earth fault protection	YES
8.10	Vacuum type Make: Type: Rating:	Circuit breaker ABB VD-4 630 A
8.11	Measuring & Protection Relay for protection, monitoring, metering and control	YES (with RTD inputs)
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	<ul style="list-style-type: none"> <li>- CB in Test/Service</li> <li>- CB in Open/Closed</li> <li>- CB Trip</li> <li>- Earth Switch Open/Close</li> <li>- Lamp Test</li> </ul>
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
<b>TRANSFORMER FEEDER</b>		
9.1	Number of feeders	1
9.2	Lettering	as per SLD
9.3	Power connection type / location	cables from bottom
9.4	Power connection quantity and size	as per SLD (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	600/1/1/1 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 ABB VD-4 630A
9.11	Measuring & Protection Relay for protection, monitoring, metering and control	YES (with RTD inputs)
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)
<b>MV VFD FEEDER</b>		
9.1	Number of feeders	1
9.2	Lettering	as per SLD
9.3	Power connection type / location	cables from bottom
9.4	Power connection quantity and size	as per SLD (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, interlocked with MV VFD START SIGNAL
9.8	Current transformers:  measuring core protection core for overcurrent	600/1/1/1 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 ABB VD-4 630A
9.11	Measuring & Protection Relay for protection, monitoring, metering and control	YES (with RTD inputs)
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, Cl.- 0.5 (IEC 61850 communication protocol)