

ELECTRICITY GENERATING AUTHORITY OF THAILAND

SUPPLEMENTAL NOTICE NO. 1

INVITATION TO BID NO. HSIS-S-04(R)

SUPPLY AND CONSTRUCTION OF 230/115 kV NAKHON SI THAMMARAT
SUBSTATION (GIS) AND IMPROVEMENT OF 230 kV KHANOM,
230 kV THUNG SONG, 230 kV PHATTHALUNG AND
115 kV CHIAN YAI SUBSTATIONS

HIGH VOLTAGE SUBSTATION IMPROVEMENT IN THE SOUTHERN AREA
FOR TERRORISM AND FLOOD PROTECTION

The following supplemental information is hereby given for the above
described Invitation:

Volume II of IV

Section I : Ratings and Features

1. Replace pages I6 thru I14 and pages I31 thru I34 of Ratings and Features
with the revised pages with (Rev.1) attached.
2. Add the attached page I14.1 of Ratings and Features.

Bid submitted must be in accordance with this Notice. Receipt of this Notice
shall be acknowledged by the Bidder on the proposal included in the Bidding Documents
in the space provided on page Part 3 - C22, Article C-5 Supplemental Notices.

ELECTRICITY GENERATING
AUTHORITY OF THAILAND

March 16, 2024

ELECTRICITY GENERATING AUTHORITY OF THAILAND

Supplemental Notice No. 1

Invitation to Bid No. HSIS-S-04(R)

**Supply and Construction of 230/115 kV Nakhon Si Thammarat Substation (GIS)
and Improvement of 230 kV Khanom, 230 kV Thung Song,
230 kV Phatthalung and 115 kV Chian Yai Substations**

**High Voltage Substation Improvement in the Southern Area
for Terrorism and Flood Protection**

Two-Envelope (Pre-Qualification)

The attached Supplemental Notice shall be considered as part of the bidding documents No. HSIS-S-04(R).

As acknowledgement of receipt that all additions, deletions and revisions contained in this Supplemental Notice are incorporated into the above bidding documents, Bidder is requested to sign and return this acknowledgement via email address: **chalitapengnoo@egat.co.th** within three (3) days from the date of the announcement of this Supplemental Notice on <http://www4.egat.co.th/fprocurement/biddingeng/>.

The original acknowledgement which is manually signed in ink by a person or persons duly authorized shall be included in the proposal to be submitted on the bid opening date.

ELECTRICITY GENERATING AUTHORITY OF THAILAND

March 16, 2024

ACKNOWLEDGEMENT

This undersigned Bidder hereby certifies that the additions, deletions and revisions set forth in this Supplemental Notice to Invitation to Bid No. HSIS-S-04(R) are incorporated as part of the above bidding documents and will be fully included in any bids which he may submit.

Signed _____

Title _____

Company _____

Date _____

SF₆ Gas Insulated Switchgear (GIS)
Specification No. 170



Substation Electrical
Equipment Engineering Department

Ratings and Features	Designed : via ECM system	Validated : via ECM system	Revision 4	Page 1/3
RF No. IS8450(IEC)	Verified : via ECM system	Approved : via ECM system	Dated : via ECM system	

- | | | |
|--|--|----------------------------------|
| a. Type | SF ₆ gas | |
| b. Service condition | Indoor for GIS and Outdoor for GIB/GIL | |
| c. Enclosure | Single phase enclosure | |
| d. Rated voltage | 245 | kV |
| e. Number of phases | 3 | |
| f. Rated frequency | 50 | Hz |
| g. Maximum permissible partial discharge intensity at 120% rated voltage | 5 | pC |
| h. Rated Insulation level | | |
| - Rated short-duration power-frequency withstand voltage, r.m.s. | | |
| - Phase-to-earth, across open switching device | 460 | kV |
| - Across the isolating distance | 530 | kV |
| - Rated lightning impulse withstand voltage, peak. | | |
| - Phase-to-earth, across open switching device | 1,050 | kV |
| - Across the isolating distance | 1,200 | kV |
| i. Current rating | | |
| - Rated normal current | | |
| - Busbars | 4,000 | A |
| - Diameters | 4,000 | A |
| - Feeders | 4,000 | A |
| - Rated short-time (1 s) withstand current for main and earthing circuit | 50 | kA |
| - Rated peak withstand current for main and earthing circuit | 125 | kA |
| j. Circuit Breaker | | |
| - Type of mechanism | Spring, Hydraulic-Spring Operating mechanism | |
| - Rated Insulation level | | |
| - Rated short-duration power-frequency withstand voltage, r.m.s. | | |
| - Phase-to-earth, across open switching device | 460 | kV |
| - Rated lightning impulse withstand voltage, peak. | | |
| - Phase-to-earth, across open switching device | 1,050 | kV |
| - Rated normal current | 4,000 | A |
| - Rated short-time (1 s) withstand current | 50 | kA |
| - Rated short circuit breaking current | 50 | kA |
| - Rated interrupting time | 3 | Cycles |
| - Rated short circuit making current | 125 | kA |
| - Rated permissible tripping delay | 1 | Sec |
| - Rated reclosing time | 20 | Cycles |
| - Type of tripping | Single pole and three poles | |
| - Rated operating sequence | O - 0.3s - CO - 3 min - CO | |
| - Control circuit voltage | 125 | V _{dc} |
| - Max/Min control voltage | | |
| - Opening coil | 137.5/87.5 | V _{dc} /V _{dc} |
| - Closing coil | 137.5/106.25 | V _{dc} /V _{dc} |
| - External AC power source | 400/230 V _{ac} , 50 Hz | |



Ratings and Features	Designed : via ECM system	Validated : via ECM system	Revision 4	Page 2/3
RF No. IS8450(IEC)	Verified : via ECM system	Approved : via ECM system	Dated : via ECM system	

- k. Disconnecter
- Type Triple pole, Single throw and Single break
 - Rated Insulation level
 - Rated short-duration power-frequency withstand voltage, r.m.s.
 - Phase-to-earth 460 kV
 - Across the isolating distance 530 kV
 - Rated lightning impulse withstand voltage, peak.
 - Phase-to-earth 1,050 kV
 - Across the isolating distance 1,200 kV
 - Rated normal current 4,000 A
 - Rated short-time (1 s) withstand current 50 kA
 - Rated peak withstand current 125 kA
 - Operating mechanism Motor and emergency manual operation
 - Operating and control voltage 125 V_{dc}
- l. Fast-acting earthing Switch
- Type Triple pole, Single throw and Single break
 - Rated short time (1 s) withstand current 50 kA
 - Rated short circuit making current 125 kA
 - Induced-current switching Classification B
 - Operating mechanism Motor and emergency manual operation
 - Operating and control voltage 125 V_{dc}
 - The ground connection shall be brought out through minimum 2 kV insulated bushing.
- m. Standard earthing switch
- Type Triple pole, Single throw and Single break
 - Rated short time (1 s) withstand current 50 kA
 - Operating mechanism Motor and emergency manual operation
 - Operating and control voltage 125 V_{dc}
 - The ground connection shall be brought out through minimum 2 kV insulated bushing.
- m. Voltage Transformer and Current Transformer as specified in Rating and Features of VT and CT for GIS Sheets
- n. Terminations (Entrance Bushing)
- Number per feeder 3
 - Type SF₆ to Air
 - Rated current 4,000 A
 - Rated thermal short-time current 50 kA
 - Rated dynamic current 125 kA
 - Cantilever withstand load 5,000 N
 - Creepage distance ≥ 6,125 mm
 - Insulation level
 - Power-frequency withstand voltage, rms 460 kV
 - Lightning impulse withstand voltage, peak 1,050 kV
 - Porcelain insulator colour Chocolate brown
 - Terminal Terminal and Terminal connector suitable for 4x1272 MCM ACSR (supplied by contractor)
 - EMC at $1.1U_r/\sqrt{3}$ RIV ≤ 2500 μV or partial discharge free
- o. Rated control circuit voltage 125 V_{dc}
- p. Sync. Check relay (25), located in local control cubicle (x) Required () Not required



Ratings and Features	Designed : via ECM system	Validated : via ECM system	Revision 4	Page 3/3
RF No. IS8450(IEC)	Verified : via ECM system	Approved : via ECM system	Dated : via ECM system	

- q. Enclosure and gas Compartment length
- Enclosure GIS ≤ 10 m
 - Enclosure GIL ≤ 10 m
 - Gas compartment ≤ 50 m
- (Weight of SF₆ gas filling for each gas compartment shall not exceed 150 kg.)
- r. SF₆ gas service and storage unit (complete with hoses, coupling, connectors DN20 that suitable for operate 3 phases in the same time and weighing scale for SF₆ liquid storage tank)
(if any, see Price Schedule)
- Type Oil free compressor
 - Compression pressure ≥ 50 bar
 - Suction rate ≥ 35.0 m³/hr.
 - SF₆ gas recovery down to ≤ 50 mbar
 - Vacuum pump rate ≥ 40 m³/hr.
 - Final vacuum down to ≤ 1 mbar
- s. SF₆ gas filling cart (complete with 6 m. hoses, primary and secondary gauge show the value of pressure with the Matric Unit of Bar)
(if any, see Price Schedule)
- Vacuum pump rate ≥ 16 m³/hr.
 - Evacuate rate down to ≤ 1 mbar
 - The weighting scale 0 – 150 kg, accuracy ± 50 g
 - Pressure reducer for SF₆ 0 to 10 bar
- t. Portable SF₆ gas leak detector (with digit display)
(if any, see Price Schedule)
- Sensitivity ≤ 3 ppmv or ≤ 3 g/year
 - Accuracy ± 5 % of full scale
- u. SF₆ gas quality measuring device (automatic return system with pumping back measuring gas to equipment)
(if any, see Price Schedule)
- Moisture content : Range of Dew point -50 to 0 °C, accuracy ± 2 °C
 - SF₆ content : Range 0-100 % by volume, accuracy ± 1 % volume
- v. Gas decomposition tester
(if any, see Price Schedule)
- SO₂ : Range 1-25 ppmv, accuracy ± 15 %

Voltage Transformer

- for all VTs as specified in DWG. NO. NT-S-1 Sheet 01/04, 03/04 Rev.-
 - Quantity As specified in Single Line Diagram
 - Type Electromagnetic
 - Voltage Factor 1.5 for 30s
 - Connection Line-to-ground
 - Highest voltage for equipment (U_m) 245 kV
 - Rated primary voltage (U_{pr}) 230/ $\sqrt{3}$ kV
 - Withstand test voltage (H1)
 - Lightning impulse withstand voltage, peak 1,050 kV
 - Power frequency withstand voltage, rms
 - Primary to ground 460 kV
 - Withstand test voltage (H2)
 - Power frequency withstand voltage, rms
 - Neutral end of the primary to ground 10 kV
 - Voltage ratio 1,155/2,000&1,155/2,000 : 1
 - Secondary voltage rating
 - No 1 secondary winding 115/66.4 V
 - No 2 secondary winding 115/66.4 V
 - Accuracy class
 - No 1 secondary winding 3P
 - No 2 secondary winding 3P
 - Burden
 - No 1 secondary winding 30 VA
 - No 2 secondary winding 30 VA
 - Simultaneous 30 VA
 - Polarity Subtractive

Current Transformer

- for QZ1A, QZ1B, QZ1C, QZ2A, QZ2B, QZ2C, QZ3A, QZ3B, QZ3C, QZ4A, QZ4B, QZ4C, QZ5A, QZ5B & QZ5C as specified in DWG. NO. NT-S-1 Sheet 01/04, 03/04 Rev.-
 - Quantity per phase 1
 - No of core 5
 - Current ratio 500/1,000/1,500/2,000/2,500/3,000
3,500/4,000 : 1//1//1//1//1 A
 - Accuracy class & burden 5P20, 20 VA
 - Continuous thermal current rating factor 1.0
 - Polarity Subtractive
 - Thermal short time current rating for 1 s 50 kA
 - Mechanical short time current rating, peak 125 kA

SF₆ Gas Insulated Switchgear (GIS)
Specification No. 170



Substation Electrical
Equipment Engineering Department

Ratings and Features	Designed : via ECM system	Validated : via ECM system	Revision 2	Page 1/4
RF No. IS7541(IEC)	Verified : via ECM system	Approved : via ECM system	Dated : via ECM system	

- | | | |
|--|--|-----------------|
| a. Type | SF ₆ gas | |
| b. Service condition | Indoor for GIS and Outdoor for GIB/GIL | |
| c. Enclosure | Single phase or three phase enclosure | |
| d. Rated voltage | 123 | kV |
| e. Number of phases | 3 | |
| f. Rated frequency | 50 | Hz |
| g. Maximum permissible partial discharge intensity at 120% rated voltage | 5 | pC |
| h. Rated Insulation level | | |
| - Rated short-duration power-frequency withstand voltage, r.m.s. | | |
| - Phase-to-earth, across open switching device and between phases | 230 | kV |
| - Across the isolating distance | 265 | kV |
| - Rated lightning impulse withstand voltage, peak. | | |
| - Phase-to-earth, across open switching device and between phases | 550 | kV |
| - Across the isolating distance | 630 | kV |
| i. Current rating | | |
| - Rated normal current | | |
| - Busbars | 2,000 | A |
| - Coupling Bay | 2,000 | A |
| - Feeders | 2,000 | A |
| - Rated short-time (1 s) withstand current for main and earthing circuit | 40 | kA |
| - Rated peak withstand current for main and earthing circuit | 100 | kA |
| j. Circuit Breaker | | |
| - Type of mechanism | Spring, Hydraulic-Spring Operating mechanism | |
| - Rated Insulation level | | |
| - Rated short-duration power-frequency withstand voltage, r.m.s. | | |
| - Phase-to-earth, across open switching device and between phases | 230 | kV |
| - Rated lightning impulse withstand voltage, peak. | | |
| - Phase-to-earth, across open switching device and between phases | 550 | kV |
| - Rated normal current | | |
| - Feeders and transformers | 2,000 | A |
| - Coupling bay | 2,000 | A |
| - Rated short-time (1 s) withstand current | 40 | kA |
| - Rated short circuit breaking current | 40 | kA |
| - Rated interrupting time | 3 | Cycles |
| - Rated short circuit making current | 100 | kA |
| - Rated permissible tripping delay | 1 | Sec |
| - Rated reclosing time | 20 | Cycles |
| - Type of tripping | Three poles | |
| - Rated operating sequence | O - 0.3s - CO - 3 min - CO | |
| - Control circuit voltage | 125 | V _{dc} |



Ratings and Features	Designed : via ECM system	Validated : via ECM system	Revision 2	Page 2/4
RF No. IS7541(IEC)	Verified : via ECM system	Approved : via ECM system	Dated : via ECM system	

- Max/Min control voltage
- Opening coil 137.5/87.5 V_{dc}/V_{dc}
- Closing coil 137.5/106.25 V_{dc}/V_{dc}
- External AC power source 400/230 V_{ac} , 50 Hz
- k. Disconnecting Switch Combined with Standard Earthing Switch
 - Type Triple pole, Triple throw and Single break
 - Rated Insulation level
 - Rated short-duration power-frequency withstand voltage, r.m.s.
 - Phase-to-earth and between phases 230 kV
 - Across the isolating distance 265 kV
 - Rated lightning impulse withstand voltage, peak.
 - Phase-to-earth and between phases 550 kV
 - Across the isolating distance 630 kV
 - Rated normal current
 - for feeders and transformers 2,000 A
 - for coupling bay 2,000 A
 - Rated short-time (1 s) withstand current 40 kA
 - Rated peak withstand current 100 kA
 - Operating mechanism Motor and emergency manual operation
 - Operating and control voltage 125 V_{dc}
 - The ground connection shall be brought out through minimum 2 kV insulated bushing.
- l. Bus Section Disconnecting Switch (if any, see Single Line Diagram Drawing)
 - Type Triple pole, Single throw and Single break
 - Rated continuous current 2,000 A
 - Rated short time (1s) withstand current 40 kA
 - Rated peak withstand current 100 kA
 - Operating mechanism Motor and emergency manual operation
 - Operating and control voltage 125 V_{dc}
- m. Fast-acting earthing Switch
 - Type Triple pole, Single throw and Single break
 - Rated short time (1 s) withstand current 40 kA
 - Rated short circuit making current 100 kA
 - Induced-current switching Classification B
 - Operating mechanism Motor and emergency manual operation
 - Operating and control voltage 125 V_{dc}
 - The ground connection shall be brought out through minimum 2 kV insulated bushing.
- n. Voltage Transformer and Current Transformer as specified in Rating and Features of VT and CT for GIS Sheets
- o. Terminations
 - Entrance Bushing (if any, see Single Line Diagram Drawing)
 - Number per feeder 3
 - Type SF₆ to Air
 - Rated current 2,000 A
 - Rated thermal short-time current 40 kA
 - Rated dynamic current 100 kA
 - Cantilever withstand load 4,000 N
 - Creepage distance $\geq 3,075$ mm

SF₆ Gas Insulated Switchgear (GIS)
Specification No. 170



Substation Electrical
Equipment Engineering Department

Ratings and Features	Designed : via ECM system	Validated : via ECM system	Revision 2	Page 3/4
RF No. IS7541(IEC)	Verified : via ECM system	Approved : via ECM system	Dated : via ECM system	

- Insulation level
 - Power-frequency withstand voltage, rms 230 kV
 - Lightning impulse withstand voltage, peak 550 kV
 - Porcelain insulator colour Chocolate brown
 - Terminal Terminal and Terminal connector suitable for 2x1272 MCM ACSR (supplied by contractor)
- EMC at $1.1U_r/\sqrt{3}$ RIV $\leq 2500 \mu V$ or partial discharge free
- Cable Connection (if any, see Single Line Diagram Drawing)
 - Number per feeder as specified in Single Line Diagram Drawing
 - Type Plug-in Cable
 - Insulation level
 - Power frequency withstand voltage, rms 230 kV
 - Lightning impulse withstand voltage, peak 550 kV
 - Rated normal current 2,000 A
 - Rated short time (1 s) withstanding current 40 kA
 - Rated peak withstand current 100 kA
- p. Rated control circuit voltage 125 V_{dc}
- q. Sync. Check relay (25), located in local control cubicle (x) Required () Not required
- r. Enclosure and gas Compartment length
 - Enclosure GIS ≤ 10 m
 - Enclosure GIL ≤ 10 m
 - Gas compartment ≤ 50 m
 (Weight of SF₆ gas filling for each gas compartment shall not exceed 150 kg.)
- s. Gas buffer compartments which are intentionally designed for maintenance, repair and extension (MRE) propose as specified in Single Line Diagram Drawing
- t. SF₆ gas service and storage unit (complete with hoses, coupling, connectors DN20 that suitable for operate 3 phases in the same time and weighing scale for SF₆ liquid storage tank) (if any, see Price Schedule)
 - Type Oil free compressor
 - Compression pressure ≥ 50 bar
 - Suction rate ≥ 35.0 m³/hr.
 - SF₆ gas recovery down to ≤ 50 mbar
 - Vacuum pump rate ≥ 40 m³/hr.
 - Final vacuum down to ≤ 1 mbar
- u. SF₆ gas filling cart (complete with 6 m. hoses, primary and secondary gauge show the value of pressure with the Matric Unit of Bar) (if any, see Price Schedule)
 - Vacuum pump rate ≥ 16 m³/hr.
 - Evacuate rate down to ≤ 1 mbar
 - The weighting scale 0 – 150 kg, accuracy ± 50 g
 - Pressure reducer for SF₆ 0 to 10 bar
- v. Portable SF₆ gas leak detector (with digit display) (if any, see Price Schedule)
 - Sensitivity ≤ 3 ppmv or ≤ 3 g/year
 - Accuracy $\pm 5\%$ of full scale

SF₆ Gas Insulated Switchgear (GIS)
Specification No. 170



Substation Electrical
Equipment Engineering Department

Ratings and Features	Designed : via ECM system	Validated : via ECM system	Revision 2	Page 4/4
RF No. IS7541(IEC)	Verified : via ECM system	Approved : via ECM system	Dated : via ECM system	

- w. SF₆ gas quality measuring device (automatic return system with pumping back measuring gas to equipment)
 (if any, see Price Schedule)
 - Moisture content : Range of Dew point -50 to 0 °C, accuracy ± 2 °C
 - SF₆ content : Range 0-100 % by volume, accuracy ± 1 % volume
- x. Gas decomposition tester
 (if any, see Price Schedule)
 - SO₂ : Range 1-25 ppmv, accuracy ± 15 %

Voltage Transformer

- for VY1A, VY3A, VY4A, VY5A, VY7A, VY2A, VY9A, VY10A, VY7B and VY7C

As specified in DWG. NO. NT-S-1 Sheet 02/04, 03/04

- Type Electromagnetic
- Voltage Factor 1.5 for 30s
- Connection Line-to-ground
- Quantity As specified in Single Line Diagram Drawing
- Highest voltage for equipment (U_m) 123 kV
- Rated primary voltage (U_{pr}) $115/\sqrt{3}$ kV
- Withstand test voltage (H1)
 - Lighting impulse withstand voltage, peak 550 kV
 - Power frequency withstand voltage, rms
 - Primary to ground 230 kV
- Withstand test voltage (H2)
 - Power frequency withstand voltage, rms
 - Neutral end of the primary to ground 10 kV
- Voltage ratio 577/1,000 & 577/1,000 : 1
- Secondary voltage rating
 - No. 1 secondary winding 115/66.4 V
 - No. 2 secondary winding 115/66.4 V
- Burden
 - No 1 secondary winding 30 VA
 - No 2 secondary winding 30 VA
 - Simultaneous 30 VA
- Accuracy class
 - No 1 secondary winding 3P
 - No 2 secondary winding 3P
- Polarity Subtractive

- for VY8A, VY11A and VY12A As specified in DWG. NO. NT-S-1 Sheet 02/04, 03/04

- Type Electromagnetic
- Voltage Factor 1.5 for 30s
- Connection Line-to-ground
- Quantity As specified in Single Line Diagram Drawing
- Highest voltage for equipment (U_m) 123 kV
- Rated primary voltage (U_{pr}) $115/\sqrt{3}$ kV
- Withstand test voltage (H1)
 - Lighting impulse withstand voltage, peak 550 kV
 - Power frequency withstand voltage, rms
 - Primary to ground 230 kV
- Withstand test voltage (H2)
 - Power frequency withstand voltage, rms
 - Neutral end of the primary to ground 10 kV
- Voltage ratio 575/1,150 & 575/1,150 : 1
- Secondary voltage rating
 - No. 1 secondary winding 115.47/57.74 V
 - No. 2 secondary winding 115.47/57.74 V
- Burden
 - No 1 secondary winding 0 - 15 VA
 - No 2 secondary winding 0 - 15 VA
 - Simultaneous 30 VA

- Accuracy class
 - No 1 secondary winding 0.2 & 3P
 - No 2 secondary winding 0.2 & 3P
- Polarity Subtractive

Current Transformer

- for QY1A, QY2A, QY3A, QY4A, QY5A, QY7A, QY8A, QY9A, QY10A, QY11A and QY12A
As specified in DWG. NO. NT-S-1 Sheet 02/04, 03/04
 - Quantity per phase 1 Set
 - No of core 4
 - Current ratio 300/400/500/800/1,100/1,200/1,500
1,600/2,000 : 1//1//1//1
 - Accuracy class & burden 5P20, 20 VA
 - Continuous thermal current rating factor 1.0
 - Polarity Subtractive
 - Thermal short time current rating for 1 s 40 kA
 - Mechanical short time current rating, peak 100 kA
- for QY6A As specified in DWG. NO. NT-S-1 Sheet 02/04, 03/04
 - Quantity per phase 1 Set
 - No of core 4
 - Current ratio 300/500/800/1,000/1,200/1,500/2,000/
2,200/2,500/3,000 : 1//1//1//1
 - Accuracy class & burden 5P20, 20 VA
 - Continuous thermal current rating factor 1.0
 - Polarity Subtractive
 - Thermal short time current rating for 1 s 40 kA
 - Mechanical short time current rating, peak 100 kA
- for QY8B, QY11B and QY12B As specified in DWG. NO. NT-S-1 Sheet 02/04, 03/04
 - Quantity per phase 1 Set
 - No of core 2
 - Current ratio 600 × 1,200 : 1//1 *
 - Accuracy class & burden 0.2S, 20 VA (special extended range) #
 - Continuous thermal current rating factor 1.0
 - Polarity Subtractive
 - Thermal short time current rating for 1 s 40 kA
 - Mechanical short time current rating, peak 100 kA

Note : * In case of double ratio with taps in secondary winding are proposed, the accuracy class shall be in accordance with the specified Accuracy class at all ratios.

The special extended range from 1% to 120% of rated current for the specified accuracy class in accordance with IEC Standard is required. Under the specified accuracy class, the limit of current (ratio) error and phase displacement shall not exceed $\pm 0.2\%$ and ± 10 minutes when the primary current is any value from 1% to 120% of rated current.

**Metal-Clad SF₆ Gas Insulated Switchgear
Specification No. 181**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : via ECM system	Validated : via ECM system	Revision 2	Page 1/3
RF No. MS3527(IEC)	Verified : via ECM system	Approved : via ECM system	Dated : via ECM system	

- | | | | |
|--|---|--|--------|
| a. Type | Metal-Clad, Indoor installation,
SF ₆ - insulated | | |
| b. Enclosure | Single phase or three phases enclosure | | |
| c. Rated voltage | 36 | | kV |
| d. Number of phase | 3 | | |
| e. Rated insulation level | | | |
| - Rated short-duration power-frequency withstand voltage, r.m.s | 70 | | kV |
| - Rated lightning impulse withstand voltage, peak | 170 | | kV |
| f. Rated frequency | 50 | | Hz |
| g. Maximum permissible partial discharge level at 110 % rated voltage | < 20 | | pC |
| h. Current rating | | | |
| - Rated continuous circuit current | | | |
| - Busbar | 1,250 | | A |
| - Feeder Circuits | | | |
| - Incoming Feeder | 1,250 | | A |
| - Outgoing Feeder (to PEA) | 1,250 | | A |
| - Outgoing Feeder (to C-Bank) | 630 | | A |
| - Rated short time (1 s) withstand current for main and earthing circuit | 25 | | kA |
| - Rated peak withstand current for main and earthing circuit | 63 | | kA |
| i. Busbar material | Copper or better | | |
| j. Circuit Breaker | | | |
| - Type | Vacuum circuit breaker, 3 pole,
Spring operated | | |
| - Rated insulation level | | | |
| - Rated short-duration power-frequency Withstand voltage, r.m.s | 70 | | kV |
| - Rated lightning impulse withstand voltage, peak | 170 | | kV |
| - Maximum permissible partial discharge level at 110 % rated voltage | < 20 | | pC |
| - Rated normal current | | | |
| - Feeder Circuits | | | |
| - Outgoing Feeder (to PEA) | 1,250 | | A |
| - Outgoing Feeder (to C-Bank) | 630 | | A |
| - Rated short circuit breaking current | 25 | | kA |
| - Rated short time (1 s) withstand current | 25 | | kA |
| - Rated interrupting time | 5 | | Cycles |
| - Rated short circuit making current | 63 | | kA |
| - Type of tripping | Three poles | | |
| - Rated operating sequence | CO – 15s - CO | | |



Ratings and Features	Designed : via ECM system	Validated : via ECM system	Revision 2	Page 2/3
RF No. MS3527(IEC)	Verified : via ECM system	Approved : via ECM system	Dated : via ECM system	

- | | | |
|---------------------------------|------------------|---------|
| - Rated control circuit voltage | 125 | Vdc |
| - Max/Min control voltage | | |
| - Opening coil | 137.5/87.5 | Vdc/Vdc |
| - Closing coil | 137.5/106.25 | Vdc/Vdc |
| - External power source | 400/230 V, 50 Hz | |
- k. Disconnecter Switch Combined with Standard Earthing Switch (Class A)
- | | | |
|--|---|-----|
| - Type | Triple pole, Triple throw and Single break | |
| - Rated Insulation level | | |
| - Rated short-duration power-frequency withstand voltage, r.m.s. | | |
| - Phase-to-earth | 70 | kV |
| - Across the isolating distance | 80 | kV |
| - Lightning impulse withstand voltage, peak | | |
| - Phase-to-earth | 170 | kV |
| - Across the isolating distance | 195 | kV |
| - Rated normal current | | |
| - Feeder Circuits | | |
| - Incoming Feeder | 1,250 | A |
| - Outgoing Feeder (to PEA) | 1,250 | A |
| - Outgoing Feeder (to C-Bank) | 630 | A |
| - Rated short time (1 s) withstand current | 25 | kA |
| - Rated peak withstand current | 63 | kA |
| - Operating mechanism | Motor and emergency manual operation to be provided | |
| - Mechanical interlocks | to be provided | |
| - Operating and control voltage | 125 | Vdc |
- l. Standard Earthing Switch at Main Bus (Class A)
- | | | |
|--|--|-----|
| - Type | Triple pole, Triple throw and Single break | |
| - Rated short time (1 s) withstand current | 25 | kA |
| - Rated peak withstand current | 63 | kA |
| - Operating mechanism | Motor and emergency manual operation | |
| - Operating and control voltage | 125 | Vdc |
- m. Voltage Transformer and Current Transformer
- as specified in Ratings and Features of VT and CT for Metal-Clad SF₆ Gas Insulated Switchgear Sheets
- n. Surge Arrester
- | | | |
|---------------------------|----|-------|
| - Voltage rating | 30 | kVrms |
| - Duty cycle test current | 10 | kA |
- o. Terminations
- | | | |
|--|--|----|
| - Type | Cable terminations, Dry type plug in as specified in Single Line Diagram Drawing | |
| - Number per feeder | | |
| - Rated Insulation level | | |
| - Rated short-duration power-frequency Withstand voltage, r.m.s. | 70 | kV |
| - Rated lightning impulse withstand voltage, peak | 170 | kV |



Ratings and Features	Designed : via ECM system	Validated : via ECM system	Revision 2	Page 3/3
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- Rated normal current
 - Feeder Circuits
 - Incoming Feeder 1,250 A
 - Outgoing Feeder (to PEA) 1,250 A
 - Outgoing Feeder (to C-Bank) 630 A
 - Cable size
 - Feeder Circuits
 - Incoming Feeder 2x1/C-500 mm²/phase
 - Outgoing Feeder (to PEA) 2x1/C-500 mm²/phase
 - Outgoing Feeder (to C-Bank) 1x1/C-500 mm²/phase
 - Rated short time (1 s) withstanding current 25 kA
 - Rated peak withstand current 63 kA
- p. Rated control circuit voltage 125 Vdc
- q. SF₆ gas filling cart (complete with 6 m. hoses, primary and secondary gauge show the value of pressure with the Matric Unit of Bar)
(if any, see Price Schedule)
 - Vacuum pump rate ≥ 16 m³/hr.
 - Evacuate rate down to ≤ 1 mbar
 - The weighting scale 0 – 150 kg, accuracy ± 50 g
 - Pressure reducer for SF₆ 0 to 10 bar
- r. Application Standard IEC 62271-200

Ratings and Features of VT and CT for Metal-Clad SF6 GIS (RF No.MS3527 (IEC))	Revision 2	Page 1/1
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Voltage Transformer

- for all VT's As specified in DWG. NO. NT-S-1 Sheet 04/04
- Quantity per bus 3
- Highest voltage for equipment (Um) 36 kV
- Rated primary voltage (Upr) 33/ $\sqrt{3}$ kV
- Voltage ratio 300 & 300 : 1
- Secondary voltage rating
 - No 1 secondary winding 110/ $\sqrt{3}$ V
 - No 2 secondary winding 110/ $\sqrt{3}$ V
- Burden
 - No 1 secondary winding 25 VA
 - No 2 secondary winding 25 VA
 - Simultaneous 25 VA
- Accuracy class
 - No 1 secondary winding 0.2S
 - No 2 secondary winding 0.2S
- Polarity Subtractive

Current Transformer

- for QW11A and QW12A As specified in DWG. NO. NT-S-1 Sheet 04/04
 - Quantity per phase 1
 - No of core 2
 - Current ratio
 - Core No 1 1200 : 1 A
 - Core No 2 1200 : 1 A
 - Continuous thermal current rating factor 1.0
 - Accuracy class & burden 5P20, 20 VA
 - Polarity Subtractive
 - Thermal short time current rating for 1 s 25 kArms
 - Mechanical short time current rating, peak 63 kApeak
- for QW31A and QW32A As specified in DWG. NO. NT-S-1 Sheet 04/04
 - Quantity per phase 1
 - No of core 2
 - Current ratio
 - Core No 1 600 : 1 A
 - Core No 2 600 : 1 A
 - Continuous thermal current rating factor 1.0
 - Accuracy class & burden 5P20, 20 VA
 - Polarity Subtractive
 - Thermal short time current rating for 1 s 25 kArms
 - Mechanical short time current rating, peak 63 kApeak
- for QW11B and QW12B As specified in DWG. NO. NT-S-1 Sheet 04/04
 - Quantity per phase 1
 - No of core 2
 - Current ratio
 - Core No 1 600/1200 : 1 A
 - Core No 2 600/1200 : 1 A
 - Continuous thermal current rating factor 1.0
 - Accuracy class & burden 0.2S, 20 VA
 - Polarity Subtractive
 - Thermal short time current rating for 1 s 25 kArms
 - Mechanical short time current rating, peak 63 kApeak