HYOSUNG MV Gas Insulated Switchgear

ProGIS [MV GIS]
Hyosung Power Systems has been continuously enhancing customer’s value since it started its operations in 1962. With core values focused on customer-oriented management, technological innovation and reliable quality, Hyosung Power Systems has built strong customer relationships based on trust and respect over the years. It promises to continue its quest to provide value-added products that enhances industrial productivity while conserving both energy and environment for clients all over the world.

**Power Systems Performance Unit**
- MV Gas Insulated Switchgear
- Control Panel
- UHV Power Transformer
- EHV Power Transformer
- Distribution Transformer
- Cast Resin Transformer
- Gas Circuit Breaker
- Isolated Phase Bus
- Welding Machine

**Industrial Machinery Performance Unit**
- Electric Motor
- Gear Reducer
- Generator
- Chemical Process Equipment
- Industrial Machinery
- Ropeway
- CNG Refill Station
Hyosung Power Systems strives to enhance the lives of people all over the world while conserving earth’s natural resources. With the goal to become a Leading Global Energy Solution Provider, Hyosung will pave the way towards next-generation technology and green energy solutions.
HYOSUNG
Gas Insulated Switchgear

To meet various requirements for substations, HYOSUNG designs and manufactures a wide range of SF₆ GIS system. It is HYOSUNG’s strength to supply high-quality products at a competitive price. HYOSUNG GIS is used in various sites including building, factory, subway and other public facilities requiring high reliability, stability and minimum floor area. HYOSUNG can design and manufacture the product that fulfills the requirements of the clients 100% in anywhere in the world. HYOSUNG designs and manufactures various types of SF₆ GIS of maximum rated breaking current of 63kA and the rated voltage ranging from 24kV to 800kV. All the models comply with IEC, ANSI, IEEE and other international standards and are exported to the clients around the world.

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HYOSUNG MV GIS

<table>
<thead>
<tr>
<th>Spec.</th>
<th>Model</th>
<th>Economy</th>
<th>General</th>
<th>Heavy duty</th>
<th>Export</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shape</td>
<td>External shape</td>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td>SIZE (W × D × H)</td>
<td>550 × 1200 × 2350</td>
<td>600 × 2100 × 2600</td>
<td>700 × 2100 × 2700</td>
<td>700 × 1800 × 2350</td>
<td></td>
</tr>
<tr>
<td>Rating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>25.8kV</td>
<td>25.8kV</td>
<td>24kV</td>
<td>36kV</td>
<td></td>
</tr>
<tr>
<td>Instantaneous current</td>
<td>25kA / 3sec</td>
<td>25kA / 1sec</td>
<td>40kA / 3sec</td>
<td>31.5kA / 3sec</td>
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</tr>
</tbody>
</table>
Main Features of HYOSUNG MV GIS

HYOSUNG GIS is designed for safety of product and user.

- The first GIS model that passes the internal arc test in Korea
  HYOSUNG GIS is the first Korean C-GIS that passed the internal arc test and is recognized with its stability in operation.

- 9T steel enclosure (28T for VCB)
  The steel enclosure has higher melting point than aluminum enclosure, and there is less chance that the enclosure is melted due to an accident caused by internal arc. Therefore, it is safer enclosure for adjacent equipment and operator.

Compartiment structure
Gas compartment structure prevents expansion of accident to the whole area.

Bellows at the tank connector
Bellows absorbs temperature changes, error in assembly, differential settlement of concrete base, and excessive displacement caused due to earthquake, maintaining mechanical safety of the system.

HYOSUNG GIS adopts the best design technology of Korea.

HYOSUNG GIS adopts the latest design technologies such as 3-D electromagnetic analysis, structural analysis and heat distribution analysis, based on the know-how acquired through development of super high-pressure GIS such as 362kV and 800kV.
HYOSUNG GIS attaches great importance to convenience of users.

- **Modularized parts**
  HYOSUNG GIS has an ES/DS unit, a circuit breaker unit and a panel unit all in modular structure for quick disassembly and prompt recovery with minimum replacement.

- **Uninterrupted expansion**
  Dual bus GIS supports uninterrupted expansion and maintenance of each feeder without power down in the system.

HYOSUNG GIS uses high-quality materials only for enhanced reliability.

- **Al₂O₃ insulation spacer**
  Typical epoxy fill contains Si, which reacts with oxygen and water in SF₆ gas, resulting in failure in maintaining the dielectric strength. HYOSUNG GIS adopts Al₂O₃ to avoid such problem.

- **Tulip contactor typically used for 154kV or higher**
  The tulip contactor which is typically used for GIS of 154kV or higher facilitates installation and disassembly, and guarantees firm contact.
## Specifications of HYOSUNG MV GIS

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>Rated voltage (kV)</td>
<td>25.8</td>
<td>25.8</td>
<td>25.8</td>
<td>25.8</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>36</td>
<td>36</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td>Rated current (A)</td>
<td>630</td>
<td>1250</td>
<td>2000</td>
<td>600</td>
<td>2000</td>
<td>1250</td>
<td>2500</td>
<td>3000</td>
<td>3150</td>
<td>1250</td>
<td>2500</td>
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</tr>
<tr>
<td>Rated breaking current (kA)</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>40</td>
<td>40</td>
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<td>40</td>
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<td>31.5</td>
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<tr>
<td>Rated breaking time (cycle)</td>
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<tr>
<td><em>Commercial frequency withstand voltage (kV)</em></td>
<td>70 (77)</td>
<td>70 (77)</td>
<td>70 (77)</td>
<td>70 (77)</td>
<td>70 (77)</td>
<td>70 (77)</td>
<td>70 (77)</td>
<td>70 (77)</td>
<td>70 (80)</td>
<td>70 (80)</td>
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</tr>
<tr>
<td><em>Surge impulse withstand voltage (kV)</em></td>
<td>150 (165)</td>
<td>150 (165)</td>
<td>150 (165)</td>
<td>150 (165)</td>
<td>150 (165)</td>
<td>150 (165)</td>
<td>150 (165)</td>
<td>150 (165)</td>
<td>150 (165)</td>
<td>150 (165)</td>
<td>150 (165)</td>
<td>170 (195)</td>
</tr>
<tr>
<td>Frequency (Hz)</td>
<td>50/60</td>
<td>50/60</td>
<td>50/60</td>
<td>60</td>
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<td>60</td>
<td>60</td>
<td>50/60</td>
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</tr>
<tr>
<td>Width (mm)</td>
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<td>600</td>
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<tr>
<td>Height (mm)</td>
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<td>2350</td>
<td>2350</td>
<td>2350/2600</td>
<td>2350/2600</td>
<td>2350/2700</td>
<td>2350/2700</td>
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<td>2350</td>
<td></td>
</tr>
<tr>
<td>Depth (mm)</td>
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<td>1200</td>
<td>1200</td>
<td>2000</td>
<td>2000</td>
<td>2090</td>
<td>2090</td>
<td>2500</td>
<td>2500</td>
<td>1800</td>
<td>1800</td>
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</tr>
<tr>
<td>Rated gas pressure (kgf/cm² · G)</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
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<tr>
<td>Minimum gas pressure (kgf/cm² · G)</td>
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<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
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</tr>
</tbody>
</table>

* Note: The figures in brackets in the withstanding voltage fields are the values of disconnecting switch (DS).

### Naming rule

**Pro G X X X X**

- **Professional**
- **Gas insulated SWGR**
- **Rated voltage [Unit: 10,000]**
- **Rated current [Unit: 100]**
- **Rated breaking current**
Structure of HYOSUNG MV GIS by Type

25.8kV 25kA 630A (ProG 20625)
25.8kV 25kA 1250A (ProG 21225)
25.8kV 25kA 2000A (ProG 22025)

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part Name</th>
<th>Part No.</th>
<th>Part Name</th>
<th>Part No.</th>
<th>Part Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>MAIN BUS</td>
<td>05</td>
<td>CABLE PLUG</td>
<td>09</td>
<td>ANN. LAMP</td>
</tr>
<tr>
<td>02</td>
<td>DS ASSEMBLY</td>
<td>06</td>
<td>CT</td>
<td>10</td>
<td>GAS DENSITY MONITOR</td>
</tr>
<tr>
<td>03</td>
<td>VCB ASSEMBLY</td>
<td>07</td>
<td>PANEL ASSEMBLY</td>
<td>11</td>
<td>SWITCH</td>
</tr>
<tr>
<td>04</td>
<td>MAIN TANK</td>
<td>08</td>
<td>DIGITAL RELAY</td>
<td>12</td>
<td>LPS</td>
</tr>
</tbody>
</table>

ProGIS
Structure of HYOSUNG MV GIS by Type

24kV 40kA 1250A (ProG21240)
24kV 40kA 2500A (ProG22540)
24kV 40kA 3000A (ProG23040)
24kV 40kA 3150A (ProG23140)

Part No. | Part Name        | Part No. | Part Name          | Part No. | Part Name            |
---------|-----------------|----------|---------------------|----------|----------------------|
01       | MAIN BUS        | 05       | CABLE PLUG          | 09       | ANN. LAMP            |
02       | DS ASSEMBLY     | 06       | CT                  | 10       | GAS DENSITY MONITOR  |
03       | VCB ASSEMBLY    | 07       | PANEL ASSEMBLY      | 11       | SWITCH               |
04       | MAIN TANK       | 08       | DIGITAL RELAY       | 12       | LPS                  |

Structure of HYOSUNG MV GIS by Type

36kV 31.5kA 1250A (ProG31231)
36kV 31.5kA 2500A (ProG32531)

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part Name</th>
<th>Part No.</th>
<th>Part Name</th>
<th>Part No.</th>
<th>Part Name</th>
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<tbody>
<tr>
<td>01</td>
<td>MAIN BUS</td>
<td>05</td>
<td>CABLE PLUG</td>
<td>09</td>
<td>ANN. LAMP</td>
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<tr>
<td>02</td>
<td>DS ASSEMBLY</td>
<td>06</td>
<td>CT</td>
<td>10</td>
<td>GAS DENSITY MONITOR</td>
</tr>
<tr>
<td>03</td>
<td>VCB ASSEMBLY</td>
<td>07</td>
<td>PANEL ASSEMBLY</td>
<td>11</td>
<td>SWITCH</td>
</tr>
<tr>
<td>04</td>
<td>MAIN TANK</td>
<td>08</td>
<td>DIGITAL RELAY</td>
<td>12</td>
<td>LPS</td>
</tr>
</tbody>
</table>
Structure of HYOSUNG MV GIS by Type

Dual Bus (Optional)
All models can adopt dual bus. Dual bus model supports uninterrupted expansion.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part Name</th>
<th>Part No.</th>
<th>Part Name</th>
<th>Part No.</th>
<th>Part Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>1 MAIN BUS</td>
<td>06</td>
<td>MAIN TANK</td>
<td>11</td>
<td>ANN. LAMP</td>
</tr>
<tr>
<td>02</td>
<td>2 MAIN BUS</td>
<td>07</td>
<td>CABLE PLUG</td>
<td>12</td>
<td>GAS DENSITY MONITOR</td>
</tr>
<tr>
<td>03</td>
<td>1 DS ASSEMBLY</td>
<td>08</td>
<td>CT</td>
<td>13</td>
<td>SWITCH</td>
</tr>
<tr>
<td>04</td>
<td>2 DS ASSEMBLY</td>
<td>09</td>
<td>PANEL ASSEMBLY</td>
<td>14</td>
<td>LPS</td>
</tr>
<tr>
<td>05</td>
<td>VCB ASSEMBLY</td>
<td>10</td>
<td>DIGITAL RELAY</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Example of Standard Configuration

*The order and layout of panels are subject to the specifications and the structure. Please consult with HYOSUNG before placing an order.
Dual Bus

*The order and layout of panels are subject to the specifications and the structure. Please consult with HYOSUNG before placing an order.
Introduction of HYOSUNG GIS

GIS is the substation equipment containing switches such as circuit breakers, disconnectors and earthing switches, and auxiliary devices such as current transformers, voltage transformers and lightning arrestors in the metal enclosure filled with highly-insurable SF$_6$ gas.

HYOSUNG GIS can be installed in minimum space, provides high reliability and safety of operation, and facilitates repair and maintenance. It is especially suitable for installation in highly-polluted area or seaside district.

HYOSUNG GIS ranging from 25.8kV to 800kV model has passed the CESI (Italy) and KEMA (The Netherlands) test as well as the Korea Electrotechnology Research Institute's test.

**Highest technology**
- GIS technology for wide range of voltage and current
  - Voltage: 24kV ~ 800kV
  - Current: 630A ~ 8000A

**Experience in supplying 22kV GIS to many projects**
- Starting supply of GIS to KEPCO, approximately 3,200 sets of GIS have been supplied so far.

**Reliable parts**
- AL$_2$O$_3$ spacer with superior insulation
- Tulip contractor proven through application in high-voltage facilities
- Highly reliable V.I.

**Superior installation capability**
- Experience in various projects
- Operating expert staffs (solution team)
  - Guarantees quality from commencement to A/S
Control Panel of HYOSUNG

**ProGIS(C-GIS)**
Advanced MV GIS with maximum reliability and stability, and minimum installation surface has been developed based on abundant experiences and technical capabilities acquired through contracts with many domestic / overseas clients.

**ProSWGR**
ProSWGR is a metal-clad type standard high-voltage switchgear with inner spaces completely separated by partitions. The switchgear supports system operations, such as circuit breaking and monitoring, from the front panel while the door is closed.

**Metal Clad Switchgear**
Metal Clad Switchgear is self-designed and developed by HYOSUNG and have the high reliability & performance.

**Low Voltage Metal Enclosed Switchgear**
Low Voltage Switchgear will provide safe power distribution with handy operation, easy to installation & maintenance.

**Motor Control Center**
Motor Control Center is designed with operator’s safety and easy to handling. It will provide the motor’s status supervision.

**Supervisory & Control Panel**
Supervisory & Control Panel will provide the easy to operation protection and control of power system by humane facto application.

**IPB (Isolated Phase Bus)**
IPB is designed for high current, critical equipment or large capacity power plants. IPB is applied to the bus with the rated voltage of 36kV or lower and the rated current of 5,000~50,000A.

**NSPB (Non Segregated Phase Bus)**
Metal Enclosed Bus is a good method for main bus application in power plants, substations, buildings and factories.

**25.8kV SIS**
25.8kV SIS is an environment-friendly product using epoxy solid insulation technology instead of SF₆ gas. The model adopts dual buses for uninterrupted expansion and maintenance. The isolated phase bus technology prevents short-circuit and the surface grounding provides high stability of the system.

**Spot Network System**
Spot Network System will eliminate the care about a power interruption and will provide the optimized installation area.