

**HLS Low Voltage**

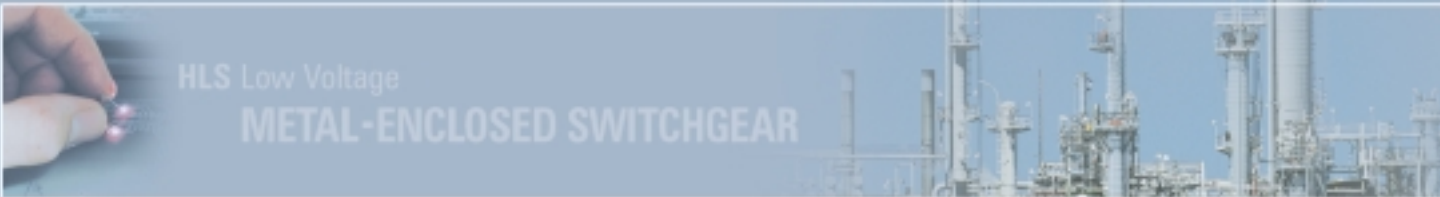
# Metal-enclosed Switchgear



HLS Low Voltage  
METAL-ENCLOSED SWITCHGEAR



# HLS Low Voltage Metal-enclosed Switchgear



- HYUNDAI's low voltage metal-enclosed HLS-type switchgears are factory assembled and suitable for rated voltage up to 1000V. They can be applied to various industrial fields in low voltage power distribution systems.

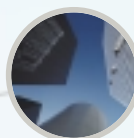
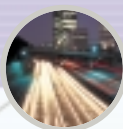
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HLS Low Voltage

METAL-ENCLOSED SWITCHGEAR





## DESIGN CONCEPTS

HLS switchgears have been designed and manufactured on the basis of our quality assurance program ensuring:

- Maximum safety and reliability
- Minimum maintenance, all parts easily accessible
- Ease of installation
- Simplified but flexible design
- Various options
- Saving installation space

## APPLICABLE STANDARDS

HLS switchgears comply with the following international standards:

- IEC 439-1
- VDE 0110
- BS 5486

## PROTECTION DEGREES

The protection degrees for a standard switchgear are as follows:

Protection degree for switchgear enclosure: IP4X

Protection degree for internal partition: IP2X

Other degrees (such as IP41 and IP51) are available on request.

## DESCRIPTION OF PROTECTION DEGREES

Degree	Description of Protection
IP2X	Protection against fingers or solid foreign objects of diameters greater than 12mm from coming into contact with hazardous parts. No specification against water.
IP4X	Protection against wires of diameters or strips thicker than 1.0mm from coming into contact with hazardous parts. No specification against water. Recommended for power plants, offshore plants, substations and industrial plants.
IP41	Same as IP4X, but vertically falling drop protection is added.
IP51	Same as IP4X, but dust protection is added. (Ingress of dust is not totally prevented, but dust cannot penetrate in a quantity to interfere with satisfactory operation.) Recommended for coal mine plants.

## SERVICE CONDITIONS

Hyundai's switchgears are intended for use under both normal and special service conditions.

### ***NORMAL INDOOR SERVICE CONDITIONS***

Ambient temperature: 35 maximum 24-hour mean.

40 maximum valve.

Altitude not to exceed 1000M above sea level.

Relative humidity: 95% maximum 24-hour average.

90% maximum one-month average.



## ***SPECIAL SERVICE CONDITIONS***

The following conditions are considered special service conditions:

Different values other than those specified in normal indoor conditions.

Outdoor service.

Heavy vibration or shocks.

Hazardous areas.

Seismic requirements for nuclear power plants.





## ENCLOSURES

The rigid enclosures of the switchgear consist of steel sheets with folded edges bolted together.

Use of the CNC machine and FMS (Flexible Manufacturing System) enables a high accuracy of dimension, thus facilitating the best quality and installation saving on-site.



## FINISH

The enclosure of the switchgear is cleaned, rust-proofed, and painted in accordance with Hyundai's standard electrostatic powder coating procedure.

The average thickness of the painted finish is 40 microns.

Standard finish colours are Munsell no. 7.5BG 6/1.5 and 5Y 7/1.

The equipment frame for drawable units and internal barriers are made of sheets coated with anti-corrosive Al+Zn and insulation material.

This ensures a firm earth connection.

## NAME PLATE

Material: Laminated plastic (white background or black background)

Fixing method: PVC lock (sealer)

## ROUTINE TESTS

Routine tests are conducted with each unit at Hyundai's factory to ensure that the switchgears are in accordance with all requirements.

Visual inspection

Insulation resistance measurement

Dielectric strength test

Function test

Sequential test

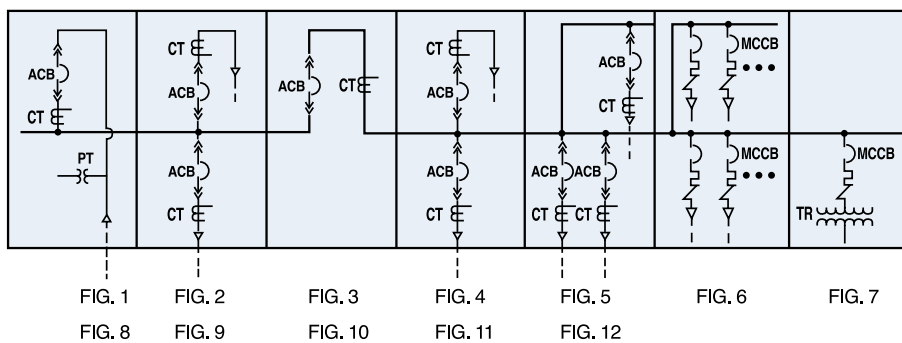
## FORMS OF SWITCHGEARS

Forms 1, 2, 3a, 3b  
Form 4 (optional)

## CONSTRUCTION



## SKELETON VIEW



## ELECTRICAL SPECIFICATIONS

Classification	Specification
Rated insulation voltage	1000V
Rated current	600A to 4000A
Rated short time withstand current (1sec) <sup>(1)</sup>	3.1kV to 85kA
Rated frequency	50 / 60Hz
Cable entrance	Top or Bottom
Control voltage	DC110V, DC220V, AC110V, AC220V

<sup>(1)</sup> For duration above 1sec, please consult us.



### ***DIMENSION OF ACB PANEL (W x D x H in mm)***

ACB Frame	3 3W		3 4W		Comments
	Window Type	Normal Type	Window Type	Normal Type	
	W x D x H	W x D x H	W x D x H	W x D x H	
600AF	800x1200x2350	800x1500x2350	800x1500x2350	800x1500x2350	2
	800x1500x2350		800x1600x2350	1000x1600x2350	stage stack 3
1200AF	800x1200x2350	800x1500x2350	800x1500x2350	800x1500x2350	2
	800x1500x2350		1000x1600x2350	1000x1600x2350	3
1600AF	800x1200x2350	800x1500x2350	800x1500x2350	800x1500x2350	2
	800x1500x2350	800x1800x2350	1000x1600x2350	1000x1800x2350	3
2000AF	800x1200x2350	800x1500x2350	800x1500x2350	800x1600x2350	2
2500AF	800x1200x2350	800x1500x2350	1000x1500x2350	800x1600x2350	2
3200AF	800x1200x2350	800x1500x2350	1000x1500x2350	1000x1600x2350	1, 2
4000AF	1000x1200x2350	1000x1500x2350	1000x1500x2350	1000x1600x2350	1
5000AF	–	–	–	–	–

### **Three-stage stack application of ACB**

600AF – 600AF to 1600AF – 600AF  
 1200AF – 1200AF – 1200AF to 1600AF  
 1600AF – 1600AF – 1600AF

### **Two-stage stack application of ACB**

600AF – 600AF to 2500AF  
 1200AF – 1200AF to 2500AF  
 1600AF – 1600AF to 2500AF  
 2500AF – 2500AF

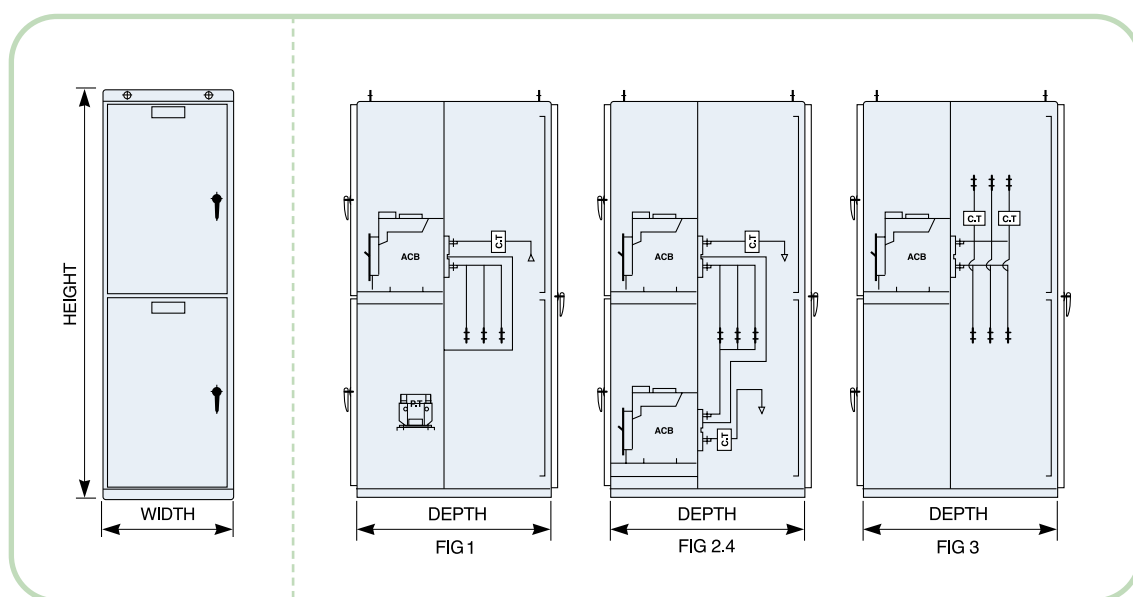




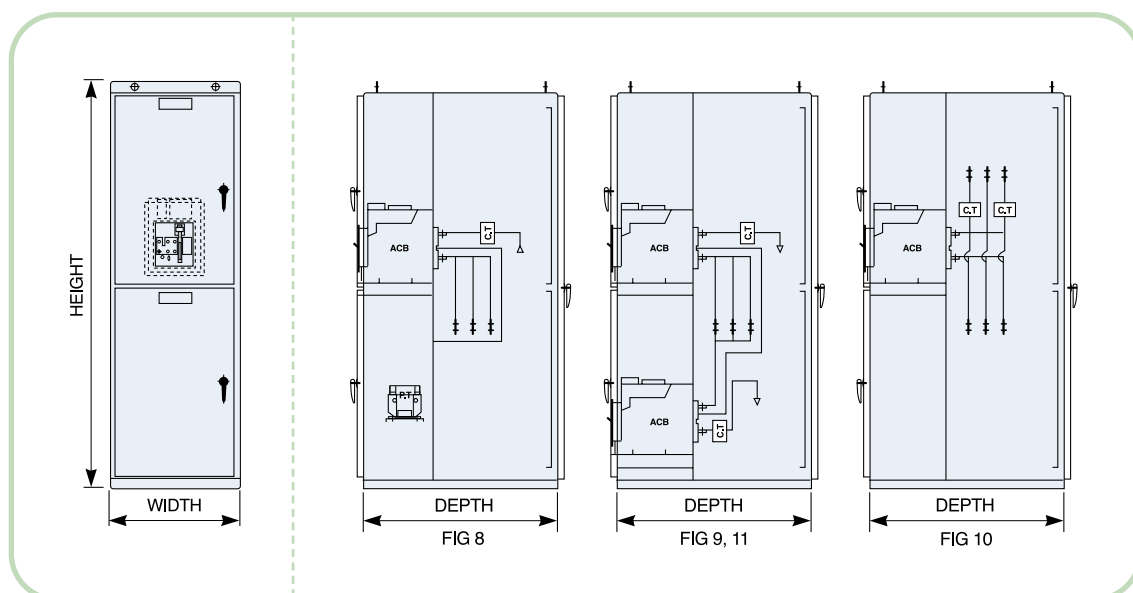
## INNER VIEW

### Two-stage stack : Form 3b

Normal type of ACB Panel



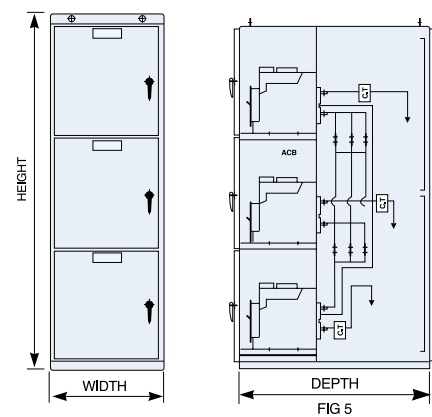
Window type of ACB Panel



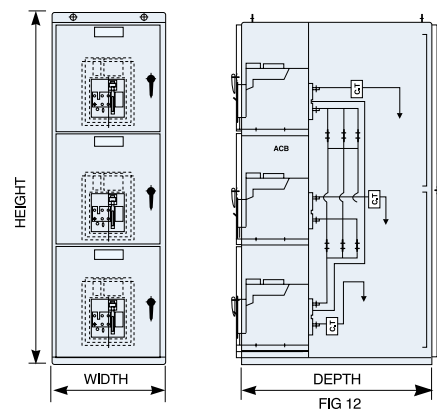


### Three-stage stack : Form 3b

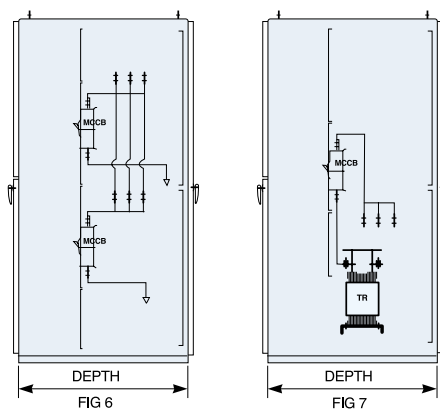
Normal type of ACB Panel

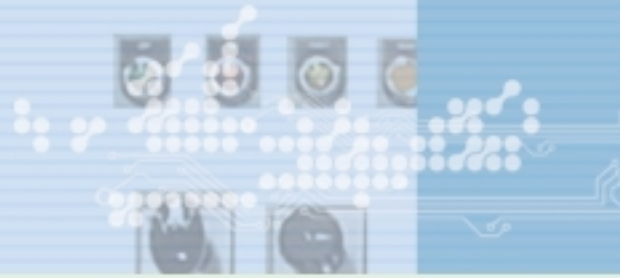


Window type of ACB Panel

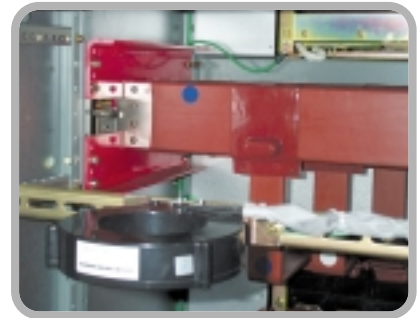
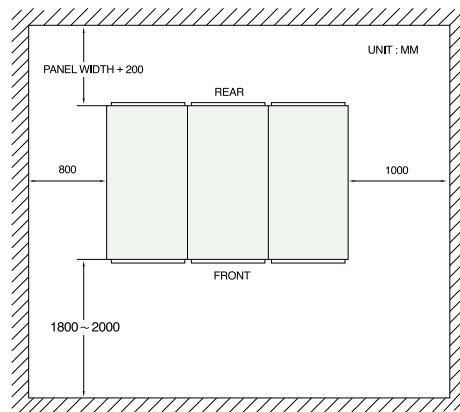


Others: Form 1

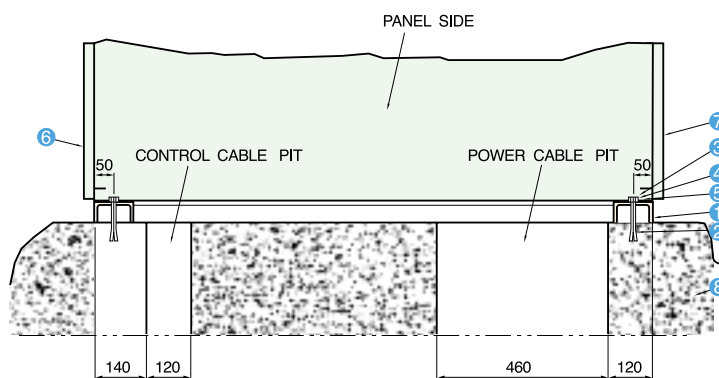




## ROOM ARRANGEMENT



## ANCHORING & FOUNDATION



### Note

Channel 100 × 50 × t5/7.5  
 Strong Anchor Nut (M12 × L50)  
 Anchor Bolt (M12)  
 Plan Washer

Spring Washer  
 Front Door  
 Rear Door  
 Concrete

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