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MOTOR CONTROL CENTER

ANSI C37.20.1 / NEMA ICS 2-322

H5600

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

We build a better future!

Applicable standards

MCC-H5600 complies with the following standards:
- ANSI C37.20.1
- NEMA ICS 2-322

MCC have been fully type-tested in
accordance with applicable ANSI/NEMA standards.

Labor saver

Cost saver

Rugged but light

Many advanced safety features

Applicable standards ANSI, NEMA

MOTOR CONTROL CENTER

ANSI C37.20.1 / NEMA ICS 2-322

For Withdrawable Combination Starters,
Size 1 through 6 up to 600 volts

H5600

Contents

Application and Characteristic Features

Motor Control Center H5600, a low-voltage switchboard with a withdrawable design, is primarily used where a large number of motors must be controlled by means of contactors or starters.

MCC-H5600 has a rugged, modular design combining labor-saving features with high electrical ratings and many special safety features. Vertical sections, taking up to six combination starter units, are 15 and 20 inches deep for front-board mounting and 20 inches deep for back-to-back mounting. Self-supporting vertical sections facilitate easy extension of existing panels.

Separate cable space permits replacement and connection of withdrawable units without disconnecting adjacent feeders.

鍶 Safety Features

- Non-metallic barrier between the horizontal bus and wireway.
- Insulating barrier between vertical bus and unit compartments.
- Barriers between unit compartments, vertical wire ways, and individual compartments (optional).

鍶 Basic Structural Types

15-inch deep front-of-board
20-inch deep front-of-board
20-inch deep back-to-back
standard 20-inch width for starters up to size 6

- Horizontal bus – 600A standard – can be up to 3000A.
- Vertical bus – 300A standard – can be up to 600A.

鍶 Bus Bar Bracing

- Horizontal bus – 42,000, 100,000A (symmetrical).
- Vertical bus – 22,000, 42,000, 100,000A (symmetrical).

鍶 Enclosure Types

- NEMA Type 1
- NEMA Type 1 – gasket
- NEMA Type 3 – walk-in, single-sided : walk-in, tunne : non-walk-in
- NEMA Type 12

鍶 Wiring Classes And Types

NEMA Standards Section Ⅱ, part 322, of the National Electrical Manufacturers Association Standards Publication No. ICS-1970 defines the following classes and types:

- Class Ⅰ Type A
- Class Ⅰ Type B
- Class Ⅰ Type C
- Class Ⅱ Type B
- Class Ⅱ Type C

Basic Design Advantage

鍶 *Structural Strength*

The design and construction of the Motor Control Center H5600 vertical section and units are in accordance with all applicable NEMA standards.
The central vertical channel around which each section is built results in even greater strength and rigidity and greater overall ruggedness than conventional designs using heavier gauge material.
A horizontal bus, top-or bottom-fed, provides power to a vertical bus for unit compartments.
Individual control units slide into the vertical sections on snap-in channel brackets and connect to bus with stabs.
Breaker and switch handles are mounted on devices not on the doors.

15-inch deep space-saving section for front-of-board mounting

鍶 *Vertical Wire Ways*

Ample wiring room in compartments and wire ways means quick, easy installation and modification.

15-inch deep section has a lighting transformer.

Vertical Working Spaces

All standard sections are 20 inches wide and 91½ inches high overall, including a 1½×3-inch mounting sill. Up to six sizes, 1 combination starter units can be inserted in the 72 inches of vertical mounting height. Snap-in brackets are simply repositioned in the basic vertical channel as needed, and 100A breakers for lighting can be twin-mounted in 12 inches of vertical height with individual doors.

Application Versatility

H5600 Motor Control Centers can be applied to any type of industrial motor control, utility service, sewage treatment facility, and anyplace that centrally located multiple controls from motors (and/or lighting circuits) are desired.

Typical examples are across-the-line starters, reduced voltage starters, reversing starters, transfer switches, lighting transformers, panelboards, and current-limiting reactors.

Long-Life Finish

The interior and exterior of Motor Control Center H5600 are finished with an epoxy electrostatic dry paint, extremely resistant to scratching and marring, ten times the usual service life under a self-spray test. The standard of painting color is RAL 7032/ MUNSELL No. 7.5 BG 6/1.5.

Seismic Qualifications

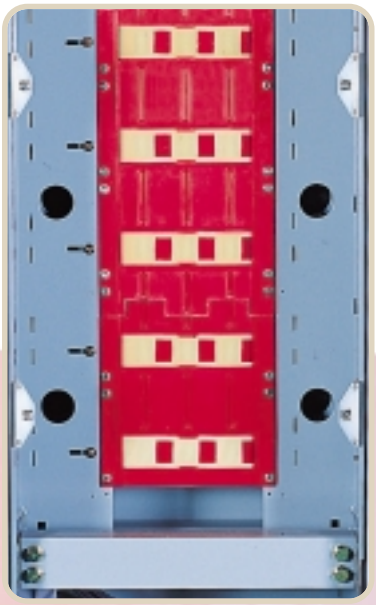
Motor Control Center H5600 is designed and has been tested to withstand high levels of seismic vibration.

Equipment for nuclear plants, qualified per IEEE 344, is available with full documentation and has been evaluated by comprehensive analysis and tests for maintainability and life expectancy. A document regarding aging conditions in accordance with IEEE 323 is available for Class 1E Nuclear applications.

Bus Bars and Bracing

Bus Bars

All horizontal and vertical bus bars meet NEMA and Underwriter's laboratories standards. Copper bus bars are an HHI standard.
Silver-plated or tin-plated coppers are also available.
A standard horizontal bus is rated for 600A (available for up to 3000A), and a standard vertical bus is rated for 300A (available for up to 600A). All bus bars are isolated from wireways and unit compartments.
A copper ground bus (1/4×1 or 1/4×2 inches) may be mounted in the bottom when specified. Bottom-mounted neutral is also available.



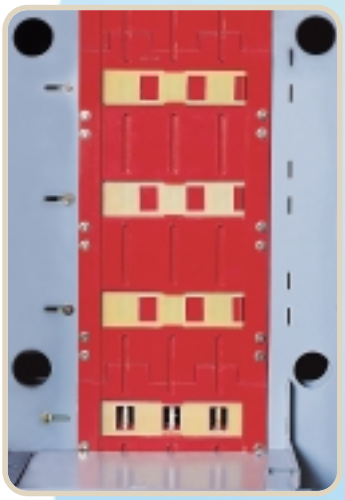
The rear of the 15-inch deep section has been bolted to half-height plates for access to bus.

Bus Bar Bracing

With today's higher available fault currents, HHI has designed extra-strong bus bar bracing for the H5600 equipment. Braces for horizontal buses rated for 42,000 or 100,000A (symmetrical) of fault current. Vertical bus braces rated for 22,000, 42,000 and 100,000A bracing are also available for all buses.

All bus bar joints are made with bolts with washers to ensure permanent tightness.

Special Safety Features



Nonmetallic barrier (fiberglass polyester) seperates vertical bus bars

HHI has gone to greater lengths than any other Motor Control Center manufacturer to provide a new standard of safety, offering numerous safety barriers and provisions never before available. We ensure maximum safety under all installation, operating, and maintenance conditions.

HHI has added flash barriers, nonmetallic shields, separation of control and power wiring, interlock, and many other innovations, all designed to allow maximum ease of use while providing maximum personnel and equipment with safety.

Nonmetallic sheets with stab openings at every 6 inches run the full length of a section to form an insulating back wall to unit compartments. This isolates the vertical bus. Available modifications are

Safety kit, available with all units, provides insulating barrier on side of the unit compartment adjacent to the vertical wireway, and shelf-type flash barrier under unit

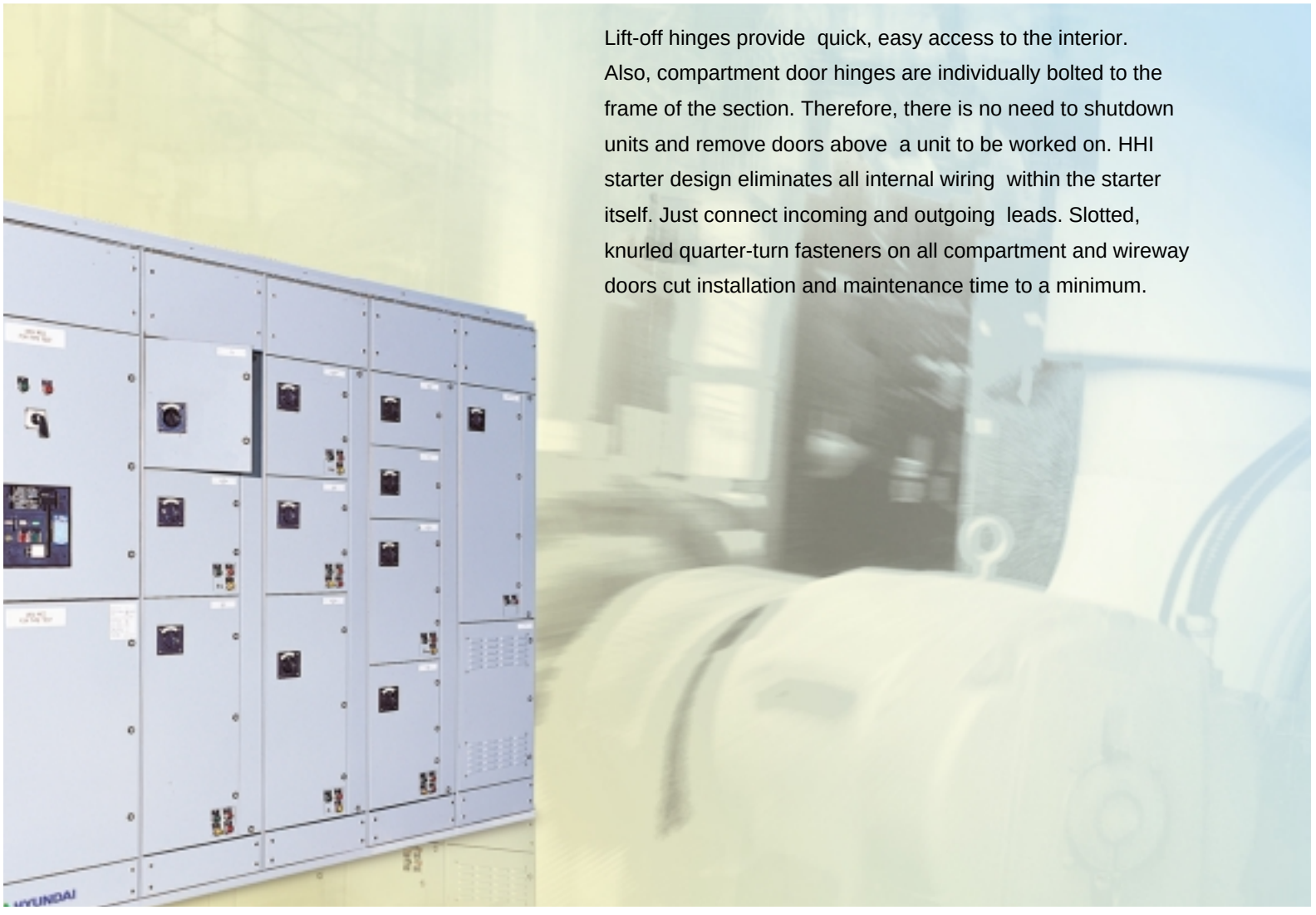
- Apertures for unit stabs with slides which can be slid to the closed position and locked with a single screw when compartments are not in use. No vertical bus is exposed in empty compartments. Slides are captive and cannot be misplaced.
- A safety kit, available with all units, provides an insulating barrier on the side of the unit compartment adjacent to the vertical wireway and shelf-type flasher barrier under the unit.
- Compartment doors and wireway doors are separate and independent. Working in one space does not expose personnel to live conductors in other.

Operating handle is interlocked with door for basic safety. Screwdriver-operated defeater is provided. Door cannot be opened with circuit breaker ON, nor can circuit breaker be turned ON with door open, unless the defeater is used.

Ease of Installment, Rearrangement, Maintenance

In the model Motor Control Center H5600, HHI has incorporated many new features to provide generous wiring room, easy access to working areas, quick and foolproof insertion of components and simplified means of rearrangement or addition of units. These features all add up to less time and less cost for installation and later work on equipment. Also the MCC H5600 has more reliability, based on simpler work procedures and foolproof methods of connection.

Right from the start, the H5600 equipment requires less work since as many as five sections are shipped as a single assembly.

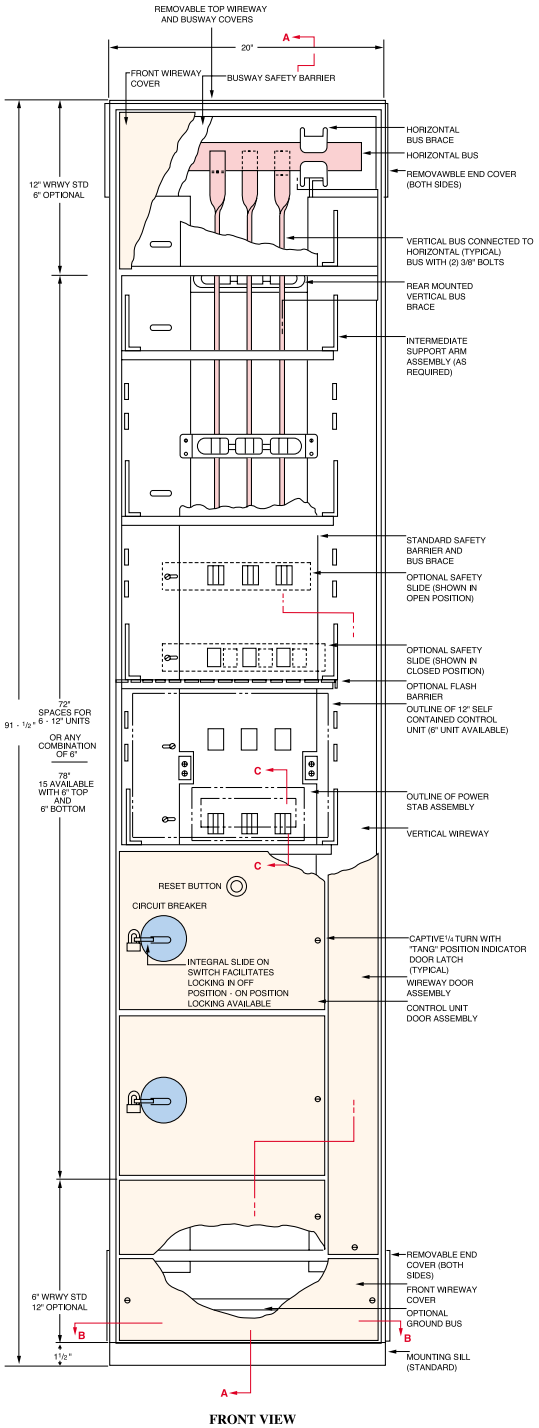


Lift-off hinges provide quick, easy access to the interior. Also, compartment door hinges are individually bolted to the frame of the section. Therefore, there is no need to shutdown units and remove doors above a unit to be worked on. HHI starter design eliminates all internal wiring within the starter itself. Just connect incoming and outgoing leads. Slotted, knurled quarter-turn fasteners on all compartment and wireway doors cut installation and maintenance time to a minimum.

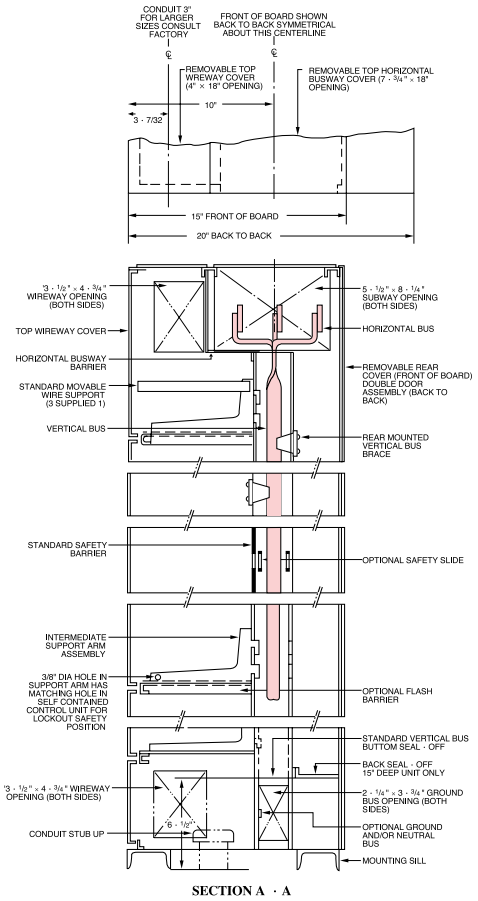
Bifurcated copper stabs, free-floating in all directions, prevent misalignment of unit in the section. Stabs are used for units with starters up through size 5. A stab is one piece, which cannot blow apart under fault nor develop hot spots from loose connections.

Side rails guide units into compartment easily, with no possibility of shorting or jamming.

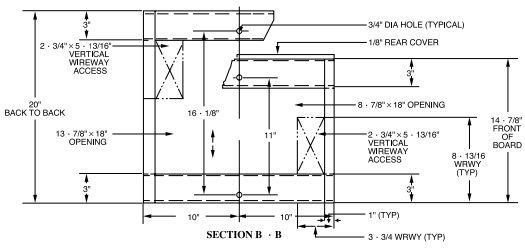
Typical Indoor Enclosure Arrangement



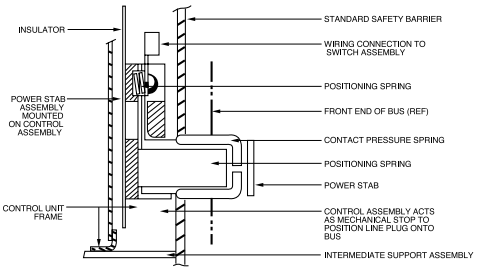
FRONT VIEW
FRONT OF BOARD AND BACK TO BACK



SECTION A - A



SECTION B - B



SECTION C - C

Space Modules Selection for Combination Starters

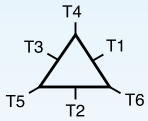
Applied Voltage	200-240 Volt AC Full Voltage		480-600 Volt AC Full Voltage	
Type of Starter	Maximum Horsepower	Space Modules	Maximum Horsepower	Space Modules
Non-Reversing	15	1.5	25	1.5
	50	2	100	2
	75	2.5	200	3
	150	6	400	6
Reversing	15	1.5	25	1.5
	30	2.5	50	2.5
	50	3	100	3
	75	5	200	5
Star-Delta	15	2	25	2
	30	3	50	3
	50	4	100	4
	100	5	200	5
Two-Speed Consequent Pole (One Winding)	CHP / CVT	See Note 2,3	CHP / CVT	See Note 2,3
	7.5 / 10	2	20 / 25	2
	20 / 25	3	40 / 50	3
	30 / 40	4	75 / 100	4
	60 / 75	5	150 / 200	5
Two-Speed Separate Winding (Two Winding)	7.5 / 10	1.5	20 / 25	1.5
	20 / 25	2.5	40 / 50	2.5
	30 / 40	3	75 / 100	3
	60 / 75	5	150 / 200	5

Allowable Max. Horse Power Rated 200-600Volts

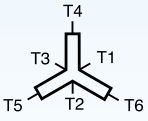
Applied Voltage / NEMA Size	Max. Horsepower		
	200-240 Volts	380 Volts	480-600 Volts
SIZE 00	1.5	1.5	2
SIZE 0	3	3	5
SIZE 1	7.5	10	10
SIZE 2	15	25	25
SIZE 3	30	50	50
SIZE 4	50	75	100
SIZE 5	100	150	200
SIZE 6	200	250	300

Note

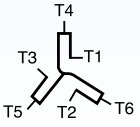
1. One vertical section can be taken up to six space module units.
2. CHP: Constant horsepower motor
3. CVT: Constant or variable torque motor



Two-speed constant horsepower motor wiring



Two-speed constant torque motor wiring



Two-speed variable torque motor wiring

Suggested Specifications

Specification Features List

■ *General Arrangements*

- ☐ 6 Space modules per section front
- ☐ Units front-of-board ☐ Units back-to-back
- ☐ 15” deep ☐ 20” deep
- ☐ 20” wide
- ☐ 91 1/2” high (including mounting sill)
- ☐ Padlock provision to lock unit with plugs disengaged from bus for maintenance
- ☐ Operator handle interlocked with unit door
- ☐ Circuit identification nameplate fastened to unit door
- ☐ Electrostatically applied epoxy finish
- ☐ Removable top plates – easy conduit entry
- ☐ Open bottom for conduit entry
- ☐ Optional safety slides for unused bus barrier openings
- ☐ Bottom covers over bus to prevent accidental contact with fish tapes

■ *Bus Bars*

☐ Aluminum ☐ Copper

Main lug compartment located:

☐ Front ☐ Rear ☐ Top ☐ Bottom

☐ Glass reinforced polyester bus insulators

Amperes symmetrical bus bracing:

☐ 22,000 rms ☐ 42,000 rms ☐ 100,000 rms

☐ 600A. main horizontal bus minimum capacity

Bus joints made with 2 bolts and washers

Bus barrier openings at 1/2 space factor intervals for convenient plug-in

Structure

☐ NEMA 1 ☐ NEMA 1 gasketed
☐ NEMA 2 drip-proof
☐ NEMA 3R ☐ NEMA 3R walk-in ☐ NEMA 12
☐ Steel lifting angles
☐ Steel base channels
☐ Sectionalized construction
☐ Provisions for future add-on of sections
☐ Section identification nameplate fastened to every section
☐ Prepaint treatment to resist corrosion

Control Units

☐ Fusible ☐ Circuit breaker
☐ Operator handle engaged with disconnect at all times
☐ Magnetic starters
☐ Molded case circuit breakers
☐ Compact disconnect switches
☐ Self aligning plug-in connection to vertical bus
☐ Doors fastened with 1/4 turn fasteners
☐ Units supported and guided by unit support pan
☐ Unit support pan easily relocated without use of tools

Wiring

☐ Generous wiring space
NEMA wiring class : ☐ I ☐ II
NEMA wiring type : ☐ A ☐ B ☐ C
☐ NEMA Type B track mounted terminals in unit
☐ NEMA Type B pull-apart terminals in unit
☐ Separate door on vertical wire troughs for access without disturbing units
☐ Continuous horizontal wireways throughout entire length
☐ Vertical wireway in every section intersects with horizontal wireways
☐ Wire ties in vertical wire trough