

**Class HMS-DC BRIDGE CONTROLS**  
**Three-Phase Adjustable Speed**  
**Standard Features**



**GENERAL**

Fincor Automation Class HMS-DC drive systems provide smooth, step less, adjustable speed controls for Bridge Control Systems. The units feature high efficiency, electronic conversion of AC line power to regulated DC for precise control of motor speed over a wide range of operating speeds and loads. The HMS-DC units are derived from Fincor general purpose, industrial drives by the addition of required features for operation of Movable Bridges control systems.

A. Basic Controller DIGITAL REGENERATIVE 230/460V, 3 Phase 50/60 Hz, 0-40 deg.C, 1.0 S.F.,3300 Ft. El.

1. NEMA 12 Ventilated  
Sized according to horsepower requirements
2. DC Module with the following features

(See drive specification for additional information)

**ADJUSTMENTS**

*(NOTE: Adjustments are made via PLC Link or the keypad)*

- |                              |  |
|------------------------------|--|
| a. Acceleration/Deceleration | 1-1999 seconds, dual ramp<br>Linear, independently adjustable<br>1-1999 seconds<br>S-curve, independently adjustable |
| b. Current Limit             | 50-150% full-load torque   |
| c. Maximum Current           | 150% full-load torque<br>(factory set)   |
| d. Minimum Speed             | 0-100% of motor base speed   |
| e. Maximum Speed             | 0-100% of motor base speed   |
| f. Resolution                | .01% of rated load, rated speed  |

**POWER CONVERSION** -Two full power rated bridges NEMA type C converters.

**VOLTAGE TRANSIENT PROTECTION**

**ISOLATED REGULATOR** - Internal DC circuits are isolated from the AC power source for operator and equipment safety.

**SERIAL COMMUNICATIONS** – 2 or 4-wire RS 232 or RS 485

**TACHOMETER / ENCODER FEEDBACK** - A motor mounted tachometer or quartered encoder is used to give a true indication of actual motor speed under all conditions. As an additional feature the motor generated counted EMF can be used as a back-up in case the primary feedback is lost.

**PHASE-LOSS PROTECTION**

**OVERLOAD PROTECTION** - A non-adjustable inverse time electronic circuit continuously monitors motor armature current and shuts down the Regulated Power Conversion Module whenever the armature current exceeds 150% for 30 seconds (APPROX.).

**UNDERVOLTAGE PROTECTION**

**FIELD SUPPLY** - Independent current regulated high efficiency DC supply as standard to include field economy. Transient and Fuse protected.

**FIELD ECONOMY** - Automatically reduces the field voltage to approx. 66% of rated whenever the armature contactor is opened.

**DRIVE SETUP OPERATOR PANEL** - Includes a digital first fault meter and key pad to address registers check and monitor essential controller operating parameters.

**VISUAL INDICATORS** - LED indicators are provided to monitor circuit operation and as an aid to field troubleshooting.

**50/60Hz OPERATION** - Selected by a programming module.

**RUGGED MODULAR CONSTRUCTION**

3. CIRCUIT BREAKER - Magnetic only, adjustable trip with door interlock.
4. CONTROL TRANSFORMER - Fused 115VAC isolates all magnetic control logic from the AC power source .
5. MOTOR CONTACTOR - Magnetic DC contactor provides a positive disconnection of the motor armature from the controller power source.

## B. Added Requirements for Movable Bridge Operation

### 1. *Drive Related*

#### a. **Speed Feedback Loss Protection:**

A circuit is incorporated so the actual motor speed is measured at all times. A contact is included in the emergency stop circuit and a signal light is incorporated to indicate a stop due to a feedback loss condition.

#### b. **Motor Overheat Protection**

A normally closed thermal switch is embedded as standard in the main drive motor which will open if the motor overheats. A visual indicator and a N.C. contact is provided in the series stop circuit.

#### c. **Drive Motor Shunt Field Loss Protection:**

A circuit is incorporated in the drive to sense motor field current and to open a contact in the series stop circuit if the field current is lost OR drops below the field economy value. A signal light is also provided to indicate a stop due to field loss.

#### d. **Fault Indicators with Memory:**

Logic circuits are provided to detect any stops due to items as described in the preceding a-c. The Fault will remain active until a reset function is initiated or power is removed from the drive.

2. *Machine Related*

a. **Proof of Torque:**

A circuit is provided to insure that torque is applied to the Bridge motors before the mechanical holding brake(s) is released.

b. **Locking Mode:**

A circuit is provided to insure that the motor(s) torque (armature current) is limited in the stall condition while the bridge locking system is set to provide proper motor protection during this mode of operation.

3. *Relay Logic Related*

a. **Normal Stop:**

A stop initiated by a stop pushbutton or the main motor thermal guard will initiate a "normal" stop which is a controlled linear ramp deceleration to approximately 50 RPM of the main drive motor at which time the motor armature is disconnected from its power source and the mechanical holding brake is applied.

b. **Emergency Stop:**

A stop initiated by an emergency stop pushbutton, field loss, feedback loss, and over speed will initiate an "Emergency" stop which will immediately disconnect the motor armature from its power source and allow the mechanical brakes to be applied.

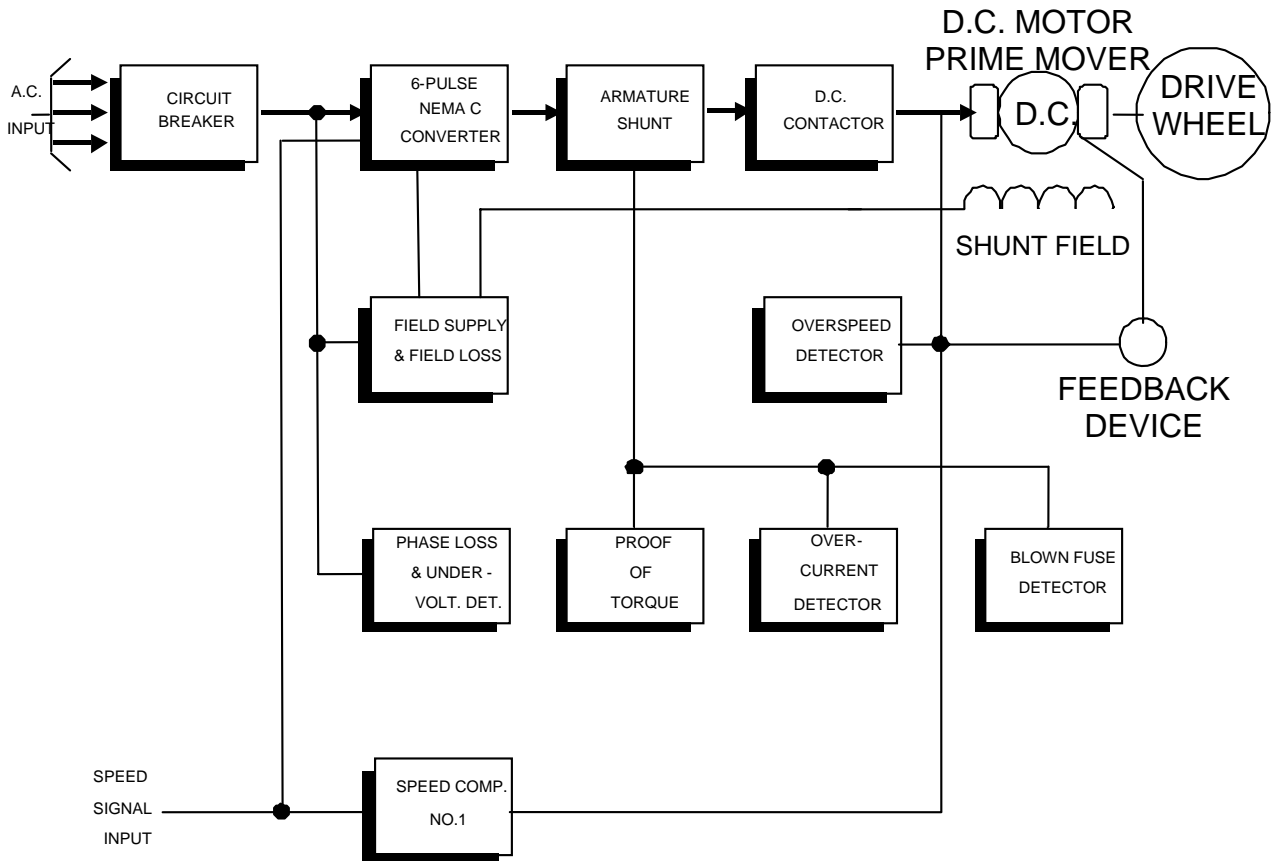
C. Motor (*When supplied*) (NOTE: JOB SPECIFICATIONS MAY SUPERSEDE THIS GENERAL SPECIFICATION)

1. Foot Mounted, ODFV, TENV, etc. (application dependant)
2. RPM depending on system requirements
3. 60 min duty rating (typical)
4. Class F Insulation - 90 degree C Rise
5. Normally Closed Thermal Guard
6. 500 Volt Armature, 300 Volt Field
7. Maximum Capacity Ball Bearings (Drive End)
8. Motor Mounted Encoder
9. Motor Mounted Blower with Filter (when required)

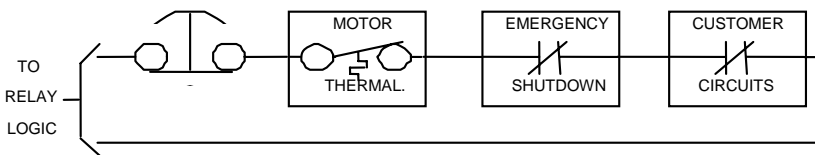
D. Options available for Drive and Motor

1. Isolation Transformer for separate mounting
  - a. Sized dependant on HP requirements
  - b. NEMA 1 Enclosure
2. Line reactors for mounting within drive enclosure
  - a. Sized dependant on HP requirements
3. Drive Options
  - a. Larger enclosures to house additional custom logic.
  - b. Enclosure heating (strip heaters).
  - c. Speed Indicator (Door Mounted Digital).  
Capable of being calibrated for direct reading of RPM (revolutions per minute), FPM (feet per minute).
  - d. DC load meter on drive enclosure.
  - e. Custom logic to interface with customer equipment.
  - f. Environmental control system.
  - g. Contact to indicate when Arm current exceeds 150%.
  - h. Dynamic braking

**BASIC BLOCK DIAGRAM**

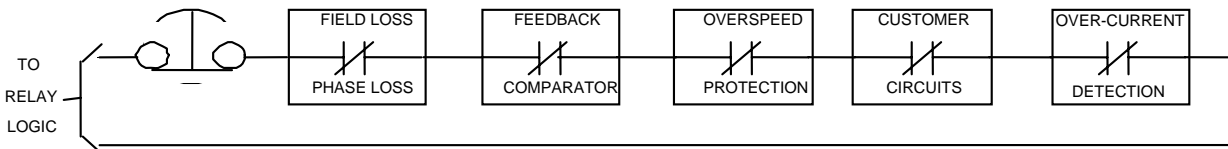


\*-NORMAL STOP



**NORMAL STOP CIRCUIT**

\*-EMERGENCY SHUTDOWN



**EMERGENCY SHUTDOWN CIRCUIT**

\*- ADDITIONAL CIRCUITS CAN BE PROVIDED AS AN OPTION