

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 (HMS-DC) 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 the address parameters)

- | | |
|------------------------------|--|
| a. Acceleration/Deceleration | 1-3000 seconds, dual ramp
Linear, independently adjustable
1-3000 seconds
S-curve, independently adjustable |
| b. Current Limit | 50-150% full-load torque |
| c. Maximum Current | 150% full-load torque
(factory set) |
| d. Minimum Speed | 0-25% of motor base speed |
| e. Maximum Speed | 70-100% of motor base speed |
| f. Droop Compensation | 0-10% of rated load
(Not used with tach/encoder
feedback) |

POWER CONVERSION -Two full rated bridges NEMA type C converter with 1600 PIV devices.

VOLTAGE TRANSIENT PROTECTION

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

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 electronic circuit continuously monitors motor armature current and shuts down the Regulated Power Conversion Module whenever the armature current exceeds 115% for 80 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:**

Indicating lights are provided to detect any stops due to items as described in the preceding a-c. Indicating lights will remain lit 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.

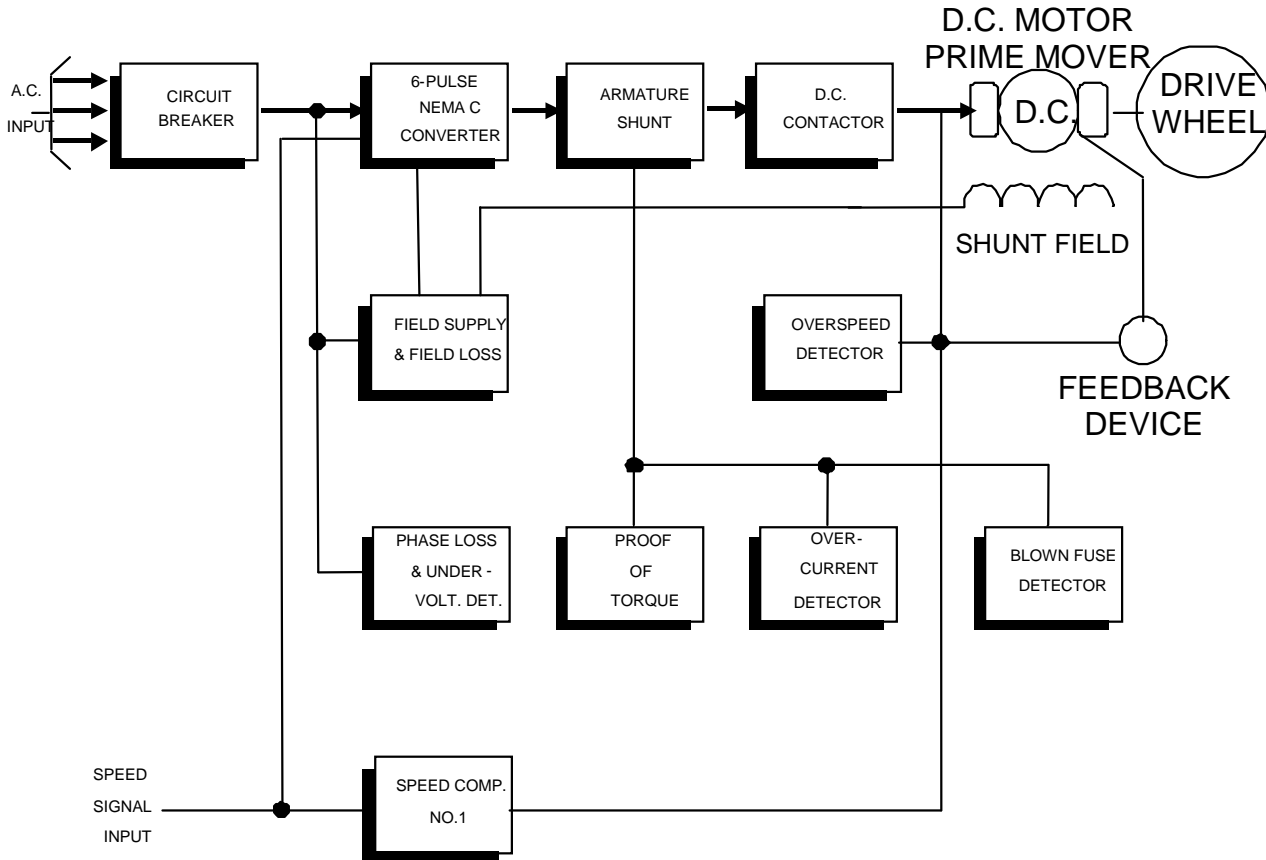
C. Motor (*When supplied*) (NOTE: JOB SPECIFICATIONS MAY SUPERSEDE THIS GENERAL SPECIFICATION)

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

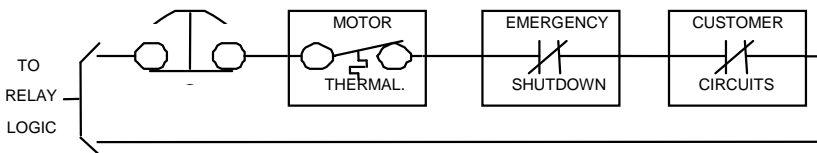
D. Options available for Drive and Motor

1. Isolation Transformer for separate mounting
 - a. Sized dependant on HP requirements
 - b. NEMA 1 Enclosure
2. Line reactors for separate mounting
 - a. Sized dependant on HP requirements
 - b. NEMA 1 Enclosure
3. Drive Options
 - a. Larger enclosures to house additional custom logic.
 - b. Enclosure heating (strip heaters) (Opt. 1152).
 - 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 (Opt. 1070).
 - e. Custom logic to interface with customer equipment.
 - f. Environmental control system.
 - g. Serial interface capability (PLC or Computer control).
 - h. Contact to indicate when Arm current exceeds 150%.
 - i. Dynamic braking
 - j. Fincor HMI/PLC Touch Screen Annunciation System

BASIC BLOCK DIAGRAM

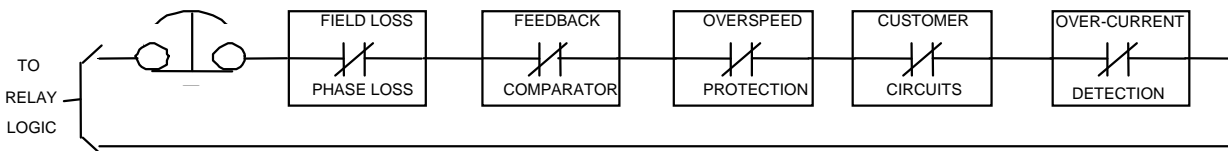


*-NORMAL STOP



NORMAL STOP CIRCUIT (LEVEL 1)

*-EMERGENCY SHUTDOWN



EMERGENCY SHUTDOWN CIRCUIT (LEVEL II)

*- ADDITIONAL CIRCUITS CAN BE PROVIDED AS AN OPTION