

# KBSL-200

## Microprocessor Controlled Battery Powered DC/DC

### Variable Speed Motor Control

for 24 Volt Permanent Magnet and Series Wound DC Motors  
through 3/4 HP Continuous Duty and 1 HP Peak Duty.

### Infrared Remote Control Built-In Custom PLC Programs



#### Typical Applications

• Stair Lifts • Chair Lifts • Dumbwaiters • Elevators • Hoists



### Standard Features

**High Frequency PWM Operation:** Reduces motor noise and increases efficiency.

**Controlled Acceleration and Deceleration:**\* Provides timed acceleration to set speed and deceleration to zero speed.

**Diagnostic LEDs:** The drive has a green power on LED (PWR) and three LEDs (green, yellow, and red) to provide indication of the drive's operational status.

**Brake Driver Circuit:** Provides power for an optional electromechanical brake (current regulated and short circuit protected).

**Latching Circuit:** Allows momentary switches to start, stop, and reverse the drive. Can also be used for key switch operation.

**Limit Switch Circuit (Stop Forward and Stop Reverse):** Allows limit switches to be used to immediately stop the drive in forward or reverse directions.

**Simple Connections:** Removable connectors and quick-connect terminals allow easy connections to the drive.

**Power Control Relay:** Automatically connects and disconnects power from the battery to the drive with key switch operation.

**Audible Annunciator:**\* Provides indication of drive and remote control operations.

**Built-In Battery Charger:** Charges and maintains the battery. (Requires external power supply (not included)).

**Sleep Mode:** If the battery charger is unavailable, the drive will go into sleep mode after one hour of inactivity.

**Soft Start and Stop:** Provides smooth starting and stopping.

### Protection Features

**Emergency Stop:** Uses the Power Control Relay to disconnect power from the battery to the drive.

**Motor Overload Protection (I<sup>2</sup>t):** The drive will trip if the motor has been overloaded for an extended period of time.

**Current Limit (CL):** Limits the maximum current to the motor, which prevents demagnetization and nuisance trips.

**Undervoltage/Overvoltage Protection:** If the battery voltage falls below 11 Volts or exceeds 30 Volts DC, the drive will shut down.

**Brake Monitoring:** The drive will trip if a short or open circuit is detected. This protects the equipment and the drive if a brake malfunction occurs.

**Remote Control vs. Local Operation:**\* The drive's (local) direction selection overrides the Remote Control's direction selection. If opposite directions are selected, with the drive and the Remote Control, the drive's direction selection will take priority.

**Electronically Interlocked Push Button Switches:**\* If both push buttons on the Remote Control are pressed simultaneously, the motor will stop until one button is released.

*\*This feature can be custom factory programmed for your specific application. Contact our Sales Department.*

### Description

The KBSL-200 is specifically designed for OEM lift applications. The Pulse Width Modulated (PWM) DC motor speed control provides forward and reverse operation for 3/4 – 1 HP Permanent Magnet and Series Wound DC motors. The drive provides continuous duty operation to 22 Amps and peak duty operation to 33 Amps with a 24 Volt DC input. The 16 kHz PWM allows for high motor efficiency and quiet operation.

Standard features include an audible annunciator to provide indication of drive and remote control operations; a power control relay to automatically connect and disconnect power from the battery to the drive; and quick-connect terminals, connectors, and removable terminal blocks to facilitate wiring. Selectable jumpers are provided for Preset Speeds, Start-Up Delay Time, Remote Control ID, and optional Brake Enable.

With Motor Overload Protection (I<sup>2</sup>t), the drive will trip if the motor has been overloaded for an extended period of time. Also, Current Limit (CL) prevents nuisance trips and demagnetization. The drive also includes Short Circuit and Undervoltage/Overvoltage protections. Four diagnostic LEDs provide indication of the drive's operational status.

Optional features include ten built-in programmable functions and user defined logic inputs for applications requiring PLC, limit switches, latching circuits, key switch, emergency stop, sensors, actuators, etc. The remote control provides operation of the drive from up to 50 feet (15.25 m).

### Selectable Jumpers

**Remote ID (J1):** Provides up to four drive ID Channels (AA, BB, CC, DD). This allows multiple drives to be used in the same area without cross-interference from the remote controls.

**Brake (J4):** In the "EN" position (and a brake connected to CON5) the brake will be applied to the motor in the stop mode to prevent movement.

**Preset Speeds (J6):**\* Provides selection of preset speed settings (High, High/Medium, Medium, Low).

**Start-Up Delay (J7):**\* Provides selection for initial delay of 0.1, 0.5, 1.0, and 2.0 seconds before operation

### Optional Features

**Custom PLC Programming:**\* Ten built-in programmable functions and user defined logic inputs for applications requiring PLC, limit switches, latching circuits, key switch, emergency stop, sensors, actuators, etc.

**Infrared Remote Control:** Provides remote operation of the drive.



**Table 1 – General Performance Specifications**

| Description   | Specification          | Factory Setting |
|---|------------------------|-----------------|
| Rated Battery Input Voltage (Nominal Volts DC)  | 24                     | —               |
| Battery Charger Input (Requires External Power Supply (Not Included)) (Volts DC at 1 Amp) | 33 – 35                | —               |
| Maximum Load (% Current Overload for 1 Second)  | 150                    | —               |
| Switching Frequency at Motor (kHz)  | —                      | 16              |
| Current Limit Locked Rotor Current (CL) (Amps DC)   | —                      | 35              |
| Speed Range* (Ratio)  | 20:1                   | —               |
| Speed Regulation (10:1 Speed Range, 0 – Full Speed) (% Base Speed)                        | 1                      | —               |
| Number of Programmable Logic Inputs   | 10                     | —               |
| Remote ID (J1) Selection Channels (Channel)   | AA, BB, CC, DD         | AA              |
| Remote Control Operating Distance (Feet / m)  | 50 / 15.25             | —               |
| Remote Control Battery Type (Not Included)  | 9V Alkaline            | —               |
| Auxiliary Brake Output Selection (J4) (Enable / Disable)                                  | Enable, Disable        | Enable          |
| Auxiliary Brake Output Current Rating (Amps DC)   | 1                      | —               |
| Armature Voltage Output Selection (J6) (Volts DC) (High, Medium/High, Medium, Low)        | 24, 17.5, 12, 8        | 24              |
| Preset Start Delay Selection (J7) (Seconds)   | 0.1, 0.5, 1.0, 2.0     | 0.1             |
| Acceleration Time (Seconds)   | 0.1 – 20               | 1.5             |
| Deceleration Time when First Limit Reached (Seconds)                                      | 0.1 – 20               | 0.5             |
| Deceleration Time when Final Limit Reached (Seconds)                                      | 0 – 1                  | 0.1             |
| Deceleration Time when Optional Limit is Detected (Seconds)                               | 0 – 1                  | 0.1             |
| Deceleration Time when Command to Run Is Released (Seconds)                               | 1 – 10                 | 1.5             |
| Overvoltage Trip Point (Volts DC)   | —                      | 30              |
| Overvoltage Recovery Point (Volts DC)   | —                      | 27              |
| Undervoltage Trip Point (Volts DC)  | —                      | 11              |
| Undervoltage Recovery Point (Volts DC)  | —                      | 12              |
| Caution Low Battery Indication ON (Volts DC)  | —                      | 20              |
| Caution Low Battery Indication OFF (Volts DC)   | —                      | 21              |
| Operating Temperature Range (°C / °F)   | 0 – 40 / 32 – 104      | —               |
| Operating Humidity Range (% Relative, Non-Condensing)                                     | 0 – 95                 | —               |
| Storage Temperature (°C / °F)   | -25 – +85 / -13 – +185 | —               |

\*Dependent on motor performance.

**Table 2 – Electrical Ratings**

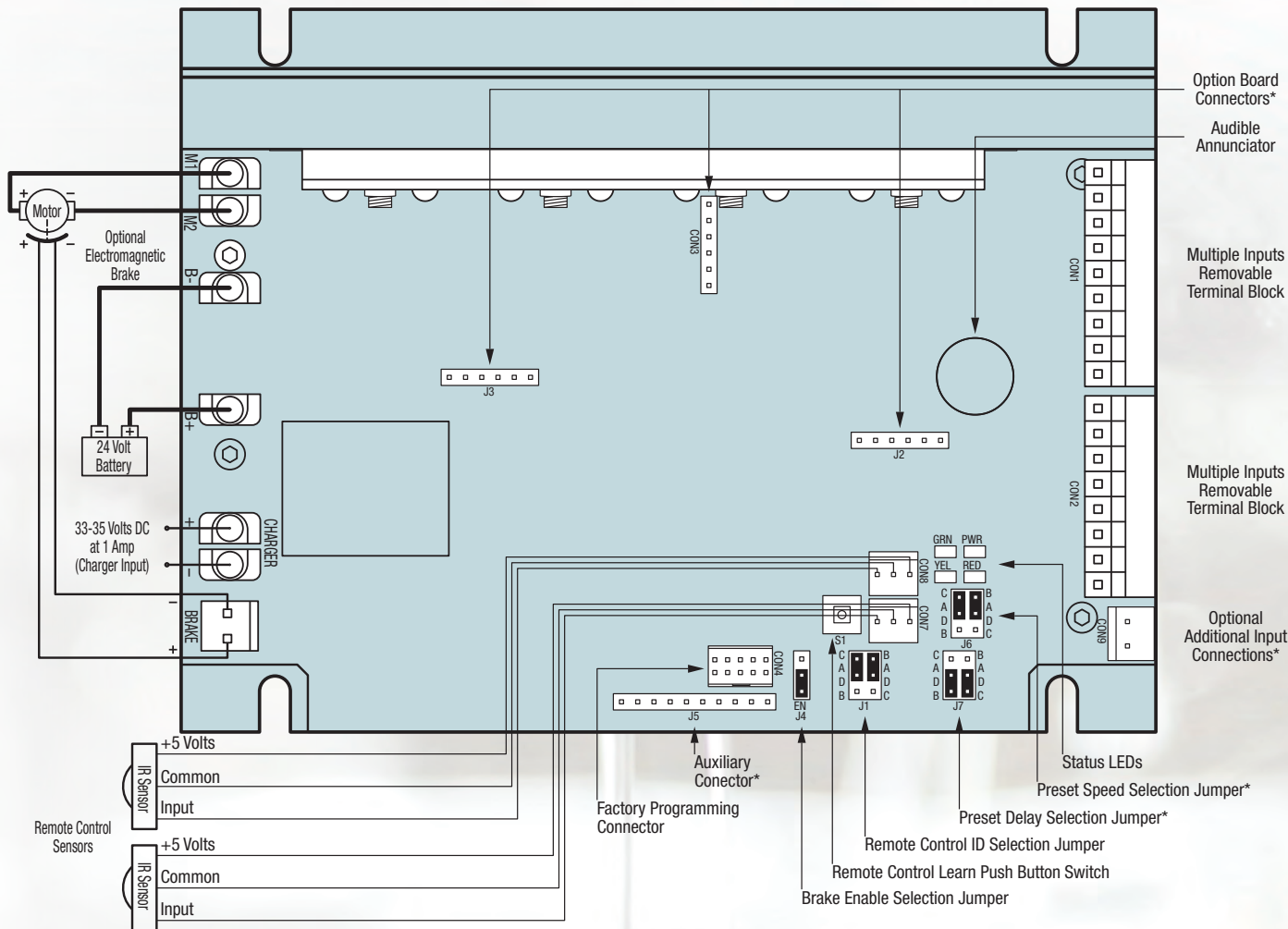
| Model    | Part No. | Nominal Battery Voltage (Volts DC) | Nominal Motor Voltage (Volts DC) | Continuous Duty Operation |         | Peak Duty Operation (7 Seconds) |         |
|----------|----------|------------------------------------|----------------------------------|---------------------------|---------|---------------------------------|---------|
|          |          |                                    |                                  | Max. HP                   | Amps DC | Max. HP                         | Amps DC |
| KBSL-200 | 9902     | 24                                 | 0 – ±24                          | 3/4                       | 22      | 1                               | 33      |

**Table 3 – LED Status Indicators (Flash Rates\*)**

| Drive Status                                   | Green LED | Yellow LED | Red LED |
|--|-----------|------------|---------|
| Run  | Steady    | —          | —       |
| Stop   | Slow      | —          | —       |
| Caution Low Battery                            | —         | Steady     | —       |
| Undervoltage                                   | —         | Slow       | —       |
| Overvoltage                                    | —         | Quick      | —       |
| Emergency Stop                                 | —         | —          | Slow    |
| Current Limit                                  | —         | —          | Steady  |
| Current Limit Overload Trip (I <sup>2</sup> t) | —         | —          | Quick   |
| Short Circuit                                  | —         | Quick      | Quick   |
| Brake Open Circuit                             | Quick     | Quick      | Slow    |
| Brake Short Circuit                            | —         | Slow       | Slow    |

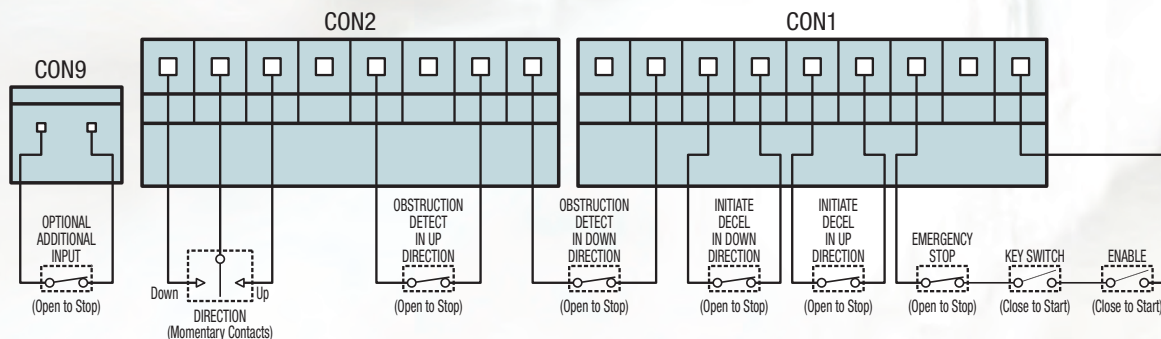
\*Flash Rate: Slow = 1 Second on / 1 Second off. Quick = 0.25 Second on / 0.25 Second off.

Figure 1 – Drive Layout and General Connection Diagram

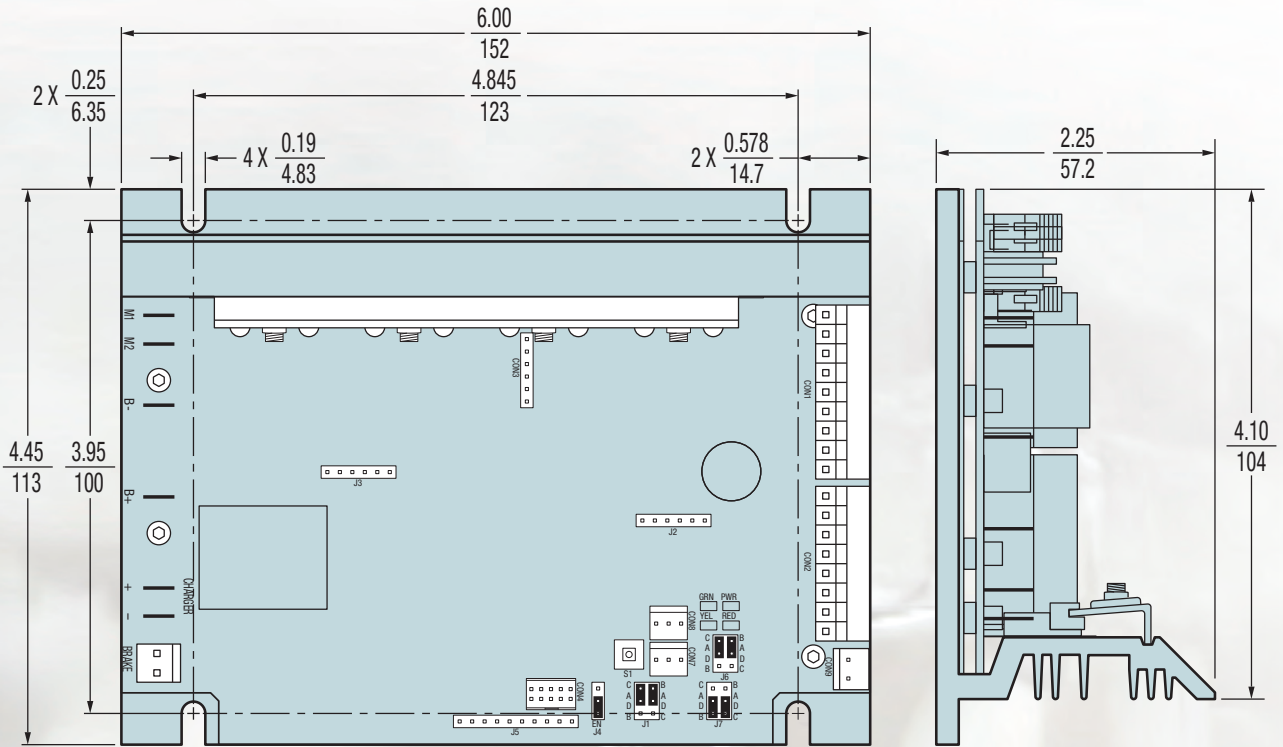


\*Customizable feature. Contact our Sales Department.

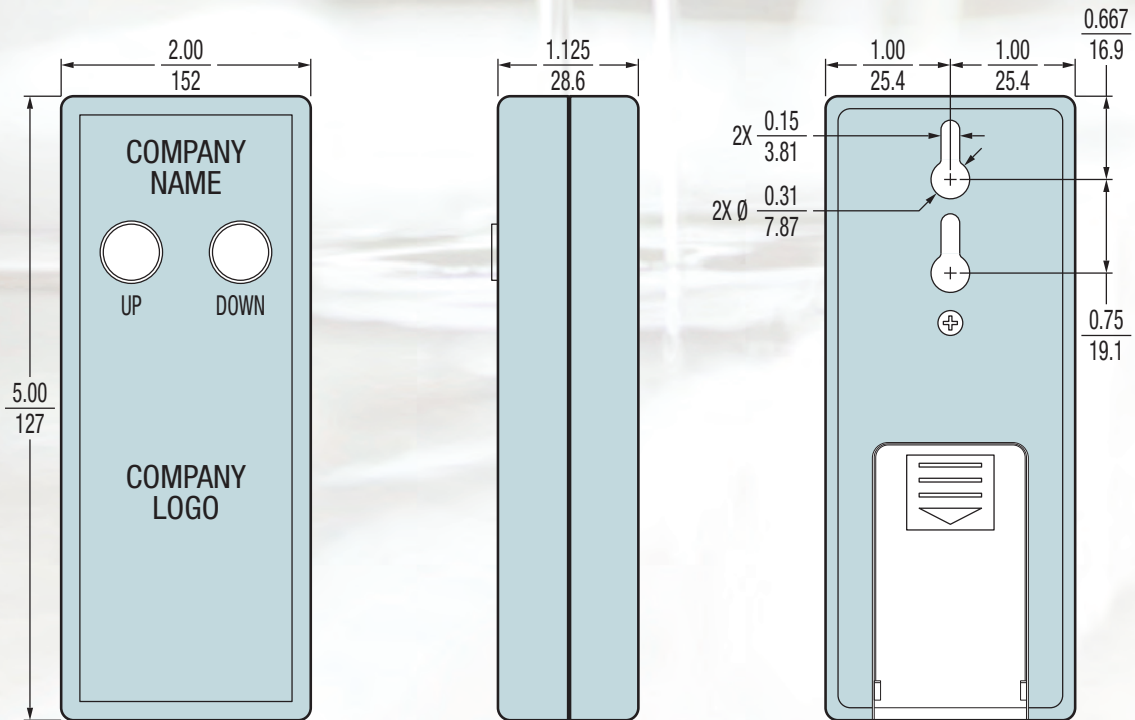
Figure 2 – Typical Connections for Multiple Inputs, PLC, Limit Switches, Latching Circuits, Key Switch, Emergency Stop, Sensors, Actuators, Etc.



**Figure 3 – Drive Mechanical Specifications (Inches/mm)**



**Figure 4 – Remote Control Mechanical Specifications (Inches/mm)**



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