

KBPW-240D

PWM DC MOTOR SPEED CONTROL

NEMA-4X / IP-65

For PM and Shunt Motors Rated:

1/50 – 3/4 HP (SCR), 1 HP (PWM) @ 115 VAC

1/25 – 1½ HP (SCR), 2 HP (PWM) @ 230 VAC

Rated 7.5 Amps DC, 11.5 Amps AC @ 115/230 VAC

Washdown and Watertight
for Indoor and Outdoor Use



Model KBPW-240D
KB Part No. 8401 (Black Case)
KB Part No. 8402 (White Case)

STANDARD FEATURES

- Short Circuit Protection: Protects control from short circuits.
- Electronic Motor Burnout Protection: Shuts down the control if a prolonged overload condition exists.
- Active Bridge: Limits AC Line inrush current.
- Power Transistor Short Circuit Protection: Prevents high speed runaway if the power transistor shorts.
- Heat Spreader: Prevents power transistor failure during momentary overload conditions.
- LEDs: Power on (ON), Stop (STOP) and Overload (OL).
- Auto AC Line Select: Control automatically adjusts for 115 VAC or 230 VAC – 50/60 Hz.
- Start/Stop Switch: Provides electronic start/stop function.
- Output Run Relay: Indicates state of control – (Run or Stop)

TRIMPOT ADJUSTMENTS

- Acceleration (ACCEL)
- Deceleration (DECEL)
- Maximum Speed (MAX)
- Minimum Speed (MIN)
- Current Limit (CL)
- Timed Current Limit (TCL)
- IR Compensation (IR)
- Jog (JOG)

JUMPER SELECTABLE FEATURES

- J1 (T/90V/180V) selects nominal motor voltage or tachometer generator feedback.
- J2 (1.7A, 2.5A, 3.5A, 5.0A, 7.5A, also low current range) selects motor current. See general performance specifications.
- J3 (TCL/NTCL) selects timed or non-timed current limit.
- J4 (7V/50V) selects tachometer generator voltage.
- J5 (NC/NO) selects normally closed or open run relay contacts.

OPTIONAL ACCESSORIES

- On/Off AC line switch (P/N 9341): Disconnects the AC line.
- FWD-BRK-REV switch (P/N 9339): Provides reversing and dynamic braking.
- Run-Stop-Jog switch (P/N 9340): Selects speed setting from either main potentiometer or JOG trimpot.
- Signal Isolator KBSI-240D (P/N 9431): Provides isolation between non-isolated signal sources and the KBPW-240D.
- Anti-Plug Reversing Module APRM (P/N 9378A): Provides electronic braking and instant reversing.
- Auto/Manual Switch (P/N 9377): Selects either isolated signal (from KBSI-240D) or main speed potentiometer signal.

*Note: Requires CE RFI filter KBRF-200A (KB P/N 9945) or equivalent.

DESCRIPTION

The KBPW-240D is a PWM (pulse width modulated) control in a NEMA-4X / IP-65 washdown and watertight enclosure designed to operate Permanent Magnet and Shunt Wound motors through 7.5 Amps DC. The efficient PWM waveform, operating at a switching frequency greater than 16kHz, provides almost pure DC to the motor (form factor <1.05). This provides high motor efficiency, whisper quiet operation along with less motor heating. This allows for a smaller, less costly motor to be used in most applications. Another advantage of PWM is higher output voltage (up to 130 VDC for 115 VAC lines and 220 VDC for 230 VAC lines) which provides increased motor speed.

The KBPW-240D contains pulse-by-pulse current sensing, which provides short circuit protection and prevents control damage due to commutator arcing. Permanent magnet motor demagnetization is virtually eliminated because current peaks are reduced to safe levels. In addition, the main power transistor is mounted to a heat spreader, providing enhanced heat dissipation. This eliminates over temperature cycles that cause premature transistor failure.

A unique feature of the KBPW-240D is its active bridge, which substantially reduces the AC line surge current during cycling of the AC line. This allows the control to be turned on and off rapidly without damage to critical components. The active bridge is coupled with a failsafe circuit that will shut down the control if the main power transistor shorts, preventing a dangerous high-speed runaway condition. Motor burnout is prevented with the Timed Current Limit circuit (TCL) by shutting down the control when an overload condition exists for a predetermined amount of time. A special AC line input circuit automatically adjusts the control for 115 or 230 VAC.

Standard front panel features include diagnostic LEDs (for power on, stop, and overload), Start/Stop Switch, and Speed Potentiometer. Other features include barrier terminal blocks to facilitate wiring, adjustable trimpots (accel, decel, max speed, min speed, current limit, timed CL, IR comp, and jog speed), customer selectable jumpers (motor voltage, motor current, timed current limit, and tach voltage), and an output run relay.

Optional accessories include Fwd-Brk-Rev Switch, On/Off AC Line Switch, Run-Stop-Jog Switch, Signal Isolator, and an Anti-plug Reversing Module. Quick-connect terminals are provided for easy installation of all accessories.

MODEL KBPW-240D (KB Part No's 8401 and 8402¹) – GENERAL PERFORMANCE SPECIFICATIONS

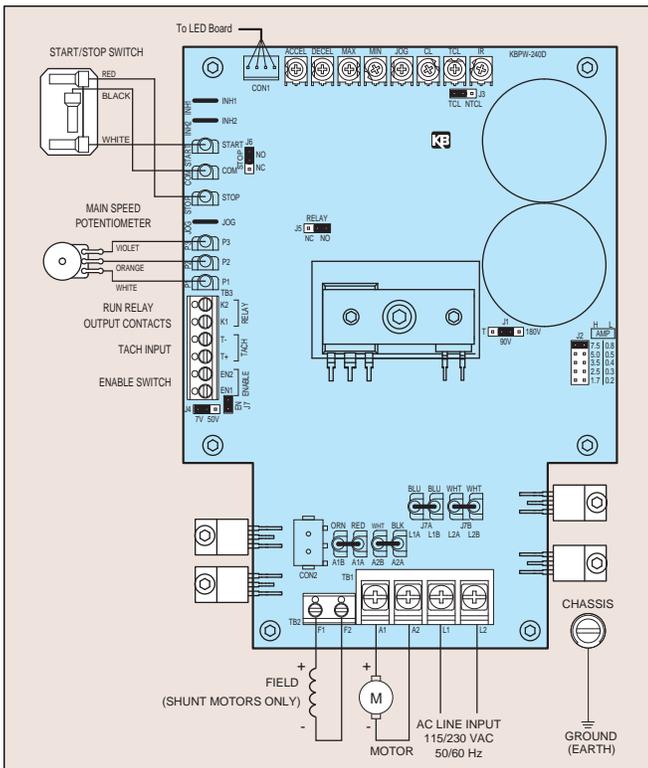
| Parameter | Specification | Factory Setting |
|--|--------------------------------|-----------------|
| Operating Frequency (kHz) | >16 | — |
| Operating Temperature Range at Full Rating (°C) | 0 – 50 | — |
| Current Range (High Scale) (Amps DC) | 1.7, 2.5, 3.5, 5.0, 7.5 | 7.5 |
| Current Range (Low Scale) (Amps DC) ² | 0.2, 0.3, 0.4, 0.5, 0.8 | — |
| ACCEL and DECEL Range (Seconds) | 0.5 – 10 | 1 |
| Jog Speed (% Base Speed) | 0 – 50 | 15 |
| MIN Speed Range (% Base Speed (90VDC & 180VDC Motors)) | 0 – 30 | 0 |
| MAX Speed Range (% Base Speed (90VDC & 180VDC Motors)) | 50 – 140 | 100 |
| IR Comp Range at 90 Volts DC Output (ΔVolts DC at Full Load) | 0 – 15 | 4 |
| IR Comp Range at 180 Volts DC Output (ΔVolts DC at Full Load) | 0 – 30 | 8 |
| CL Range (% Range Setting) | 0 – 200 | 150 |
| Timed Current Limit (TCL) Range (Seconds) | 0.5 – 10 | 5 |
| AC Line Input Voltage (Volts AC ±10%, 50/60 Hz) | 115 – 208/230 | — |
| AC Line Regulation (% Base Speed) | 0.5 | — |
| Armature Voltage Range at 115 Volts AC Line Input (Volts DC) | 0 – 130 | 90 |
| Armature Voltage Range at 208/230 Volts AC Line Input (Volts DC) | 0 – 130 ³ , 0 – 260 | 90 |
| Armature Feedback Load Regulation (% Base Speed) | ± 1 | — |
| Tach-Generator Feedback Load Regulation (% Set Speed) | ± 1 | — |
| Field Voltage at 115 Volts AC Line Input (Volts DC) | 100 / 50 | — |
| Field Voltage at 208/230 Volts AC Line Input (Volts DC) | 200 / 100 | — |
| Speed Range (Ratio) | 50:1 | — |
| Voltage Following Linearity (% Base Speed) | ± 0.5 | — |

Notes: 1. KB P/N 8402 – FDA approved white epoxy finish. 2. For low current operation, remove R35. 3. Step-down operation – Motor may have reduced brush life – Consult motor manufacturer.

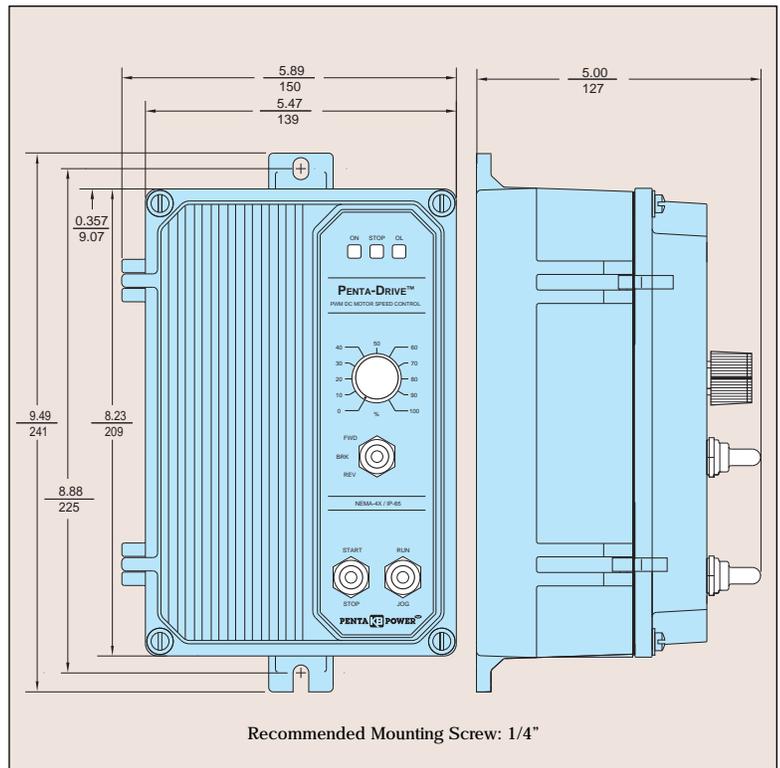
ELECTRICAL RATINGS

| AC Line Voltage (±10%, 50/60 Hz) (VAC) | Maximum Motor Voltage (VDC) | Maximum AC Line Current (Amps RMS) | Maximum DC Load Current (Amps DC) | Maximum Horsepower HP, (kW) | | Field Voltage (VDC) |
|--|-----------------------------------|--|---|--------------------------------|------------------|------------------------|
| | | | | SCR Rated Motors | PWM Rated Motors | |
| 115 | 130 | 11.5 | 7.5 | 3/4, (0.5) | 1, (0.75) | 100 |
| 230 | 220 | 11.5 | 7.5 | 1 1/2, (1) | 2, (1.5) | 200 |

CONTROL LAYOUT & CONNECTION DIAGRAM



MECHANICAL SPECIFICATIONS (Inches / mm)



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