

KBMK SERIES

Adjustable Frequency Drives



for 1/8 HP thru 1HP 3-Phase AC Motors
rated 208 – 230 VAC, 50 & 60 Hz

NEMA-1 / IP-40

Operates from 115 and 208/230 Volt 50/60 Hz AC Line
Variable Speed / Soft-Start AC Motor Drive
with Electronic Motor Overload Protection¹

TYPICAL APPLICATIONS



- Conveyors • Feeders • HVAC • Pumps
- Portable Equipment used with GFCIs³  



KBMK-24D (Part No. 9680) • KBMK-24DF (Part No. 9681)

CUSTOM SOFTWARE

All models can be factory programmed for applications that require special switching, timing, PLC functions.

STANDARD FEATURES

- **Multi-Function Keypad:** The keys are used to operate the drive, change operating parameters, reprogram functions, and change the display output (Run/Stop, Forward/Reverse, Up, Down, Shift/Reset, Jog-Local/Remote, Program/Display, Read/Enter).
- **4-Digit LED Display:** Provides readout of drive operating parameters and programming functions. Displays Output Frequency, Motor RPM, Output Current, Output Voltage, Bus Voltage, Function Codes and Values, Fault Codes, and Custom Units.
- **LED Status Indicators:** The LEDs provide indication of the drive's status and operating mode (Hz, PGM, LCL/REM, STOP, FWD, REV, OL, JOG/REM). Onboard power on (ON) LED.
- **Multi-Function Output Relay:** Can be used to turn on or off equipment or to signal a warning if the drive is put into the Stop Mode or a fault has occurred.
- **Barrier Terminal Blocks:** Facilitate wiring of AC line, motor, ground (earth), and Multi-Function Relay Output Contacts.
- **Main Speed Potentiometer:** Panel mounted. Provides adjustment of motor speed.
- **Line Input Selection Jumper:** Selects 115 or 230 Volts AC line input.
- **Compatible with GFCIs.³**

PERFORMANCE FEATURES

- **Power Start™:** Provides more than 200% starting torque, which ensures startup of high frictional loads.
- **Programmable Flux Vector Compensation with Static Auto-Tune and Boost:** Provides excellent load regulation and dynamic response over a wide speed range.
- **Speed Range:** 60:1

PROTECTION FEATURES

- **Motor Overload (I²t) with RMS Current Limit:** Provides motor overload protection, which prevents motor burnout and eliminates nuisance trips.¹
- **Electronic Inrush Current Limit (EICL™):** Eliminates harmful inrush AC line current during startup.
- **Short Circuit:** Shuts down the drive if a short circuit occurs at the motor (phase-to-phase).
- **Regeneration:** Eliminates tripping due to bus overvoltage caused by rapid deceleration of high inertial loads.
- **Undervoltage and Overvoltage:** Shuts down the drive if the AC line input voltage goes above or below the operating range.
- **MOV input transient suppression.**
- **Microcontroller self monitoring and auto-reboot.**

DESCRIPTION

The KBMK Series Adjustable Frequency Drives are variable speed controls housed in a NEMA-1/IP-40 enclosure. They are designed to operate 208 – 230 Volt 50 & 60 Hz 3-phase AC induction motors from 1/8 HP thru 1 HP. The sine wave coded Pulse Width Modulated (PWM) output provides high motor efficiency and low noise. Adjustable Linear Acceleration and Deceleration make the drive suitable for soft-start applications. Model KBMK-24DF contains a built-in AC line Class A RFI (EMI) filter which meets the CE Council Directive 89/336/EEC Industrial Requirement.

Due to its user-friendly design, the KBMK is easy to install and operate. Setting the drive to specific applications is accomplished using the Multi-Function Keypad, which provides easy operation and programming of the drive. To facilitate programming, all similar functions are presented in common groups. For more advanced programming, PC based Drive-Link™ software is available.

The 4-Digit LED Display provides readout of drive operating parameters and programming functions and displays Output Frequency, Motor RPM, Output Current, Output Voltage, Bus Voltage, Function Codes and Values, Fault Codes, and Custom Units. In addition to operating the drive, the Multi-Function Keypad is used to change drive operating parameters, reprogram functions, and change the display output. The LEDs provide indication of the drive's status and operating mode (Hz, PGM, LCL/REM, STOP, FWD, REV, OL, JOG/REM).

Main features include adjustable RMS Current Limit and I²t Motor Overload Protection.¹ Flux Vector Compensation with Static Auto-Tune and Boost provides high torque and excellent load regulation over a wide speed range. Power Start™ delivers over 200% motor torque to ensure startup of high frictional loads. Programmable Injection Braking provides rapid motor stop. Electronic Inrush Current Limit (EICL™) eliminates harmful AC line inrush current, which allows the drive to be line switched. A Multi-Function Output Relay is provided, which, in addition to many other functions, can be used to turn on or off equipment or to signal a warning if the drive is put into the Stop Mode or a fault has occurred.

Standard front panel features include a 4-Digit LED Display, Multi-Function Keypad, Status Indicator LEDs, and a Main Speed Potentiometer. Other features include PC board mounted power on LED (ON), Barrier Terminal Blocks to facilitate wiring (AC line, motor, ground (earth), and Multi-Function Output Relay Contacts), customer selectable jumper for AC Line Input Voltage Selection.

Optional accessories include: On/Off AC Line Switch and IODA Input/Output Multi-Function Board.

Notes: 1. UL approved as an electronic overload protector for motors. 2. Model KBMK-24DF contains a built-in AC line filter. 3. May cause increased audible motor noise.



Automation and Control

TABLE 1 – GENERAL PERFORMANCE SPECIFICATIONS

Description	Specification
115 Volt AC Line Input Voltage Operating Range (Volts AC)	115 (±15%)
208/230 Volt AC Line Input Voltage Operating Range (Volts AC)	208 (-15%) / 230 (+15%) ¹
Maximum Load (% Current Overload for 1 Minute)	150
Switching Frequency (kHz) ²	8, 10, 12
Output Frequency Resolution (Bits, Hz)	10, .06
Minimum Operating Frequency at Motor (Hz)	0.3
Speed Range (Ratio)	60:1
Speed Regulation (30:1 Speed Range, 0 – Full Load) (% Base Speed) ²	2.5
Overload Protector Trip Time for Stalled Motor (Seconds)	6
Multi-Function Output Relay Contact Rating (Amps at 30 Volts DC, 125 Volts AC, 250 Volts AC)	1, 0.5, 0.25
Undervoltage/Overvoltage Trip Points for 115 Volt AC Line Input (± 5%) (Volts AC) ⁴	76 / 141
Undervoltage/Overvoltage Trip Points for 208/230 Volt AC Line Input (± 5%) (Volts AC) ⁴	151 / 282
Operating Temperature Range (°C / °F)	0 – 40* / 32 – 104
Operating Humidity Range (% Relative, Non-condensing)	0 – 95
Storage Temperature Range (°C / °F)	-25 – +85 / -13 – +185

Notes: 1. The drive is factory set for 208/230 Volt AC line input (J1 not installed). For 115 volt AC line input, install Jumper J1 (supplied). See Figure 4, on page 4. 2. Set by Function No. 3.15
 3. Dependent on motor performance. 4. Do not operate the drive outside the specified AC line input voltage operating range.
 * All models are rated at 40 °C, maximum ambient temperature, at the Rated Load Current.

Table 2 – Electrical Ratings

Model	Part No.	AC Line Input			Fuse or Circuit Breaker Rating (Amps)	Output			Net Weight	
		Volts AC (50/60 Hz)	Phase (ϕ)	Maximum Current (Amps AC)		Voltage Range (Volts AC)	Maximum Continuous Load Current ³ (RMS Amps/Phase)	Maximum Horsepower (HP (kW))	Lbs.	kg
KBMK-24D	9680	115	1	16	20	0 – 230	3.6	1 (.75)	2.26	1.03
		208/230 ¹	1	10	15					
KBMK-24DF ²	9681	115	1	16	20	0 – 230	3.6	1 (.75)	2.33	1.06
		208/230 ¹	1	10	15					

Notes: 1. The drive is factory set for 208/230 Volt AC line input (J1 not installed). For 115 volt AC line input, install Jumper J1 (supplied). See Figure 4, on page 4. 2. Model KBMK-24DF contains a built-in AC line Class A RFI (EM) filter which meets the CE Council Directive 89/336/EEC Industrial Requirement. 3. For ambient temperatures above 40 °C, all drives are derated 2.5% per °C.

FIGURE 1 – MECHANICAL SPECIFICATIONS (Inches/mm)

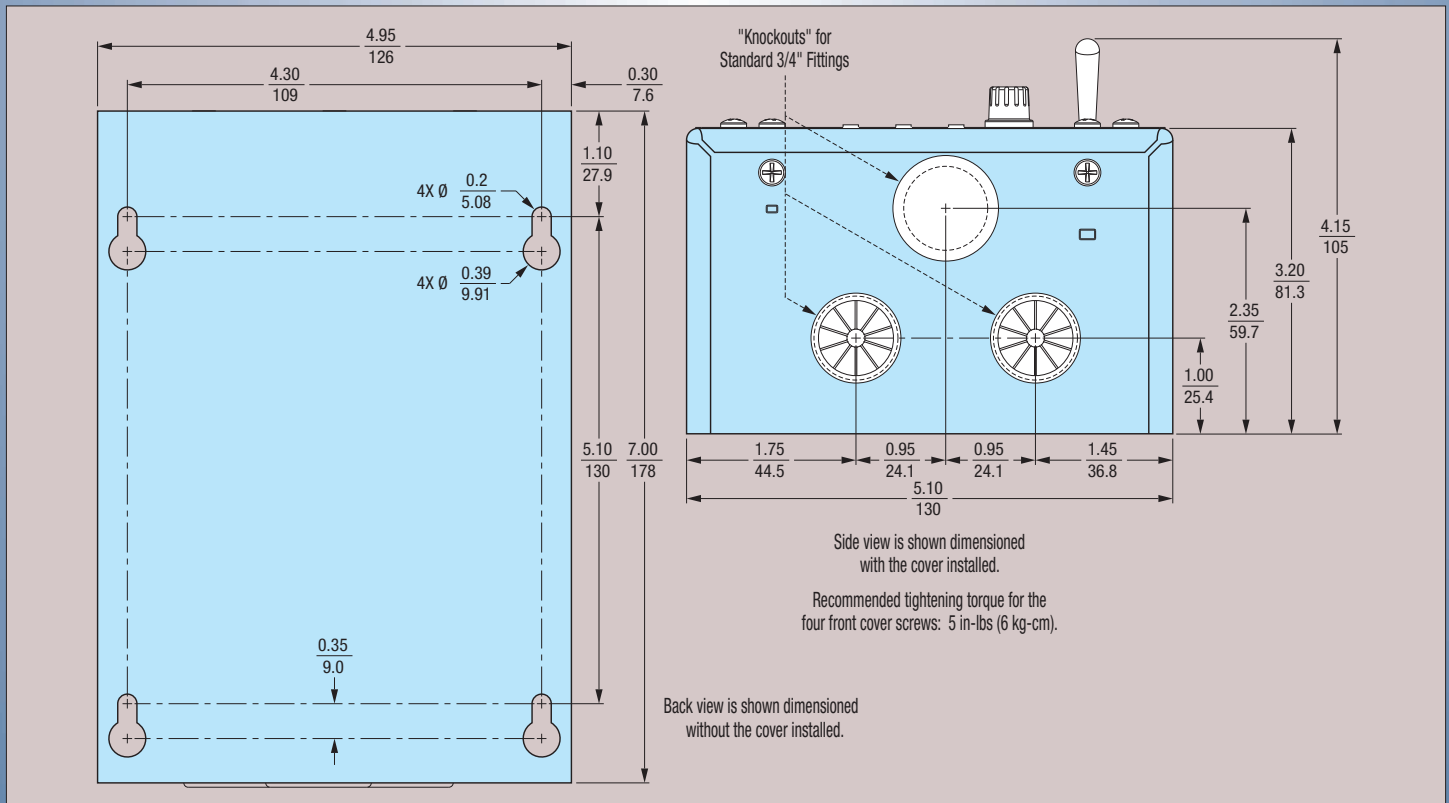


FIGURE 2 – COVER LAYOUT

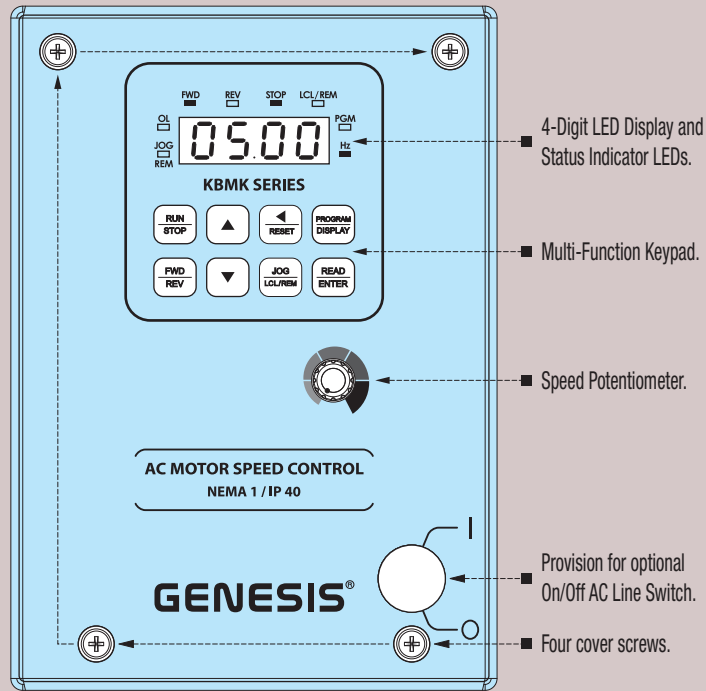
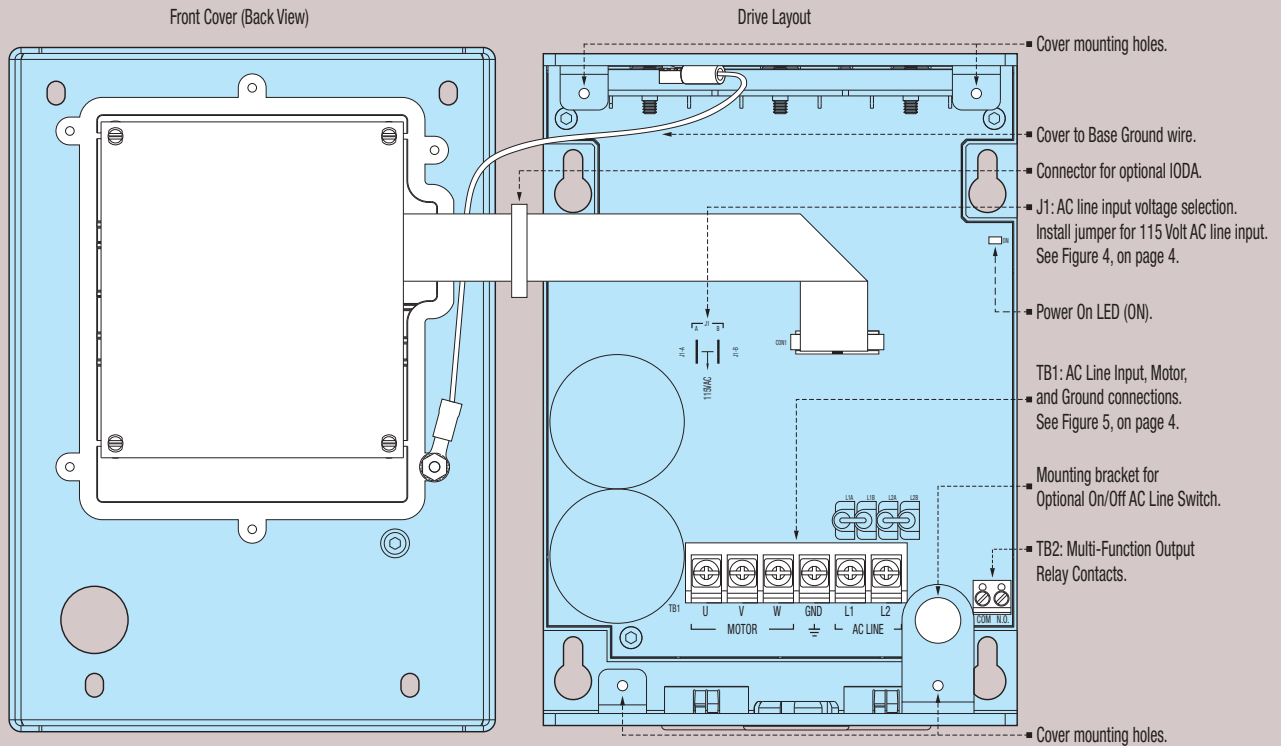
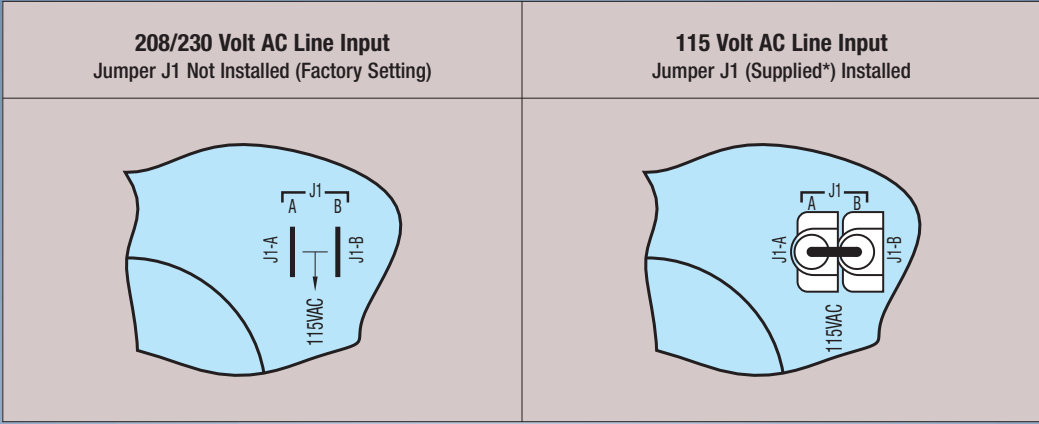


FIGURE 3 – DRIVE LAYOUT



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FIGURE 4 – AC LINE INPUT VOLTAGE SELECTION



*Jumper J1 is supplied in the hardware bag that is packaged with the drive.

FIGURE 5 – AC LINE INPUT, MOTOR AND GROUND CONNECTIONS

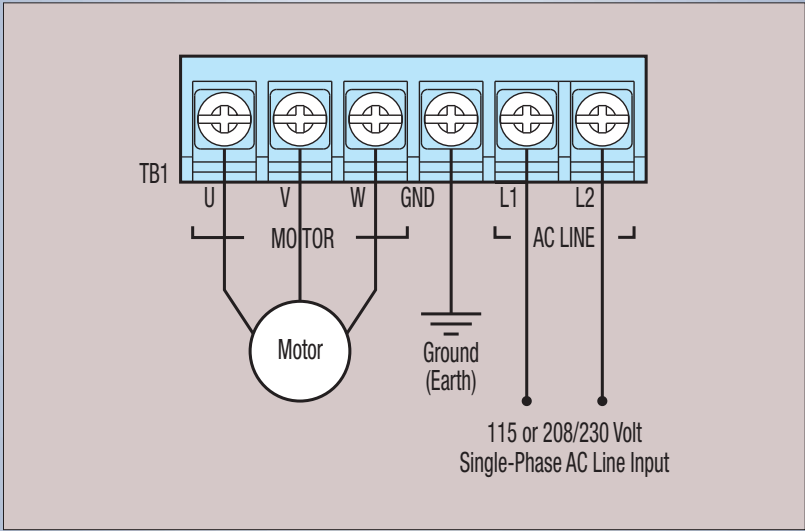


TABLE 3 – OPTIONAL ACCESSORIES

Description	Part No.
On/Off AC Line Switch: Panel mounted. Used to turn the power on or off to the drive.	9683
IODA Input/Output Multi-Function Board: Provides a variety of functions, which include preset frequency, Up/Down frequency, signal isolation, isolated output voltage for auxiliary devices, open collector outputs, and output relay contacts. Mounts on the drive's PC board with three screws (provided). All of the IODA inputs and outputs are isolated from the AC line.	9668

