

KBAC SERIES

ADJUSTABLE FREQUENCY DRIVES

For 3-Phase AC Motors

NEMA-4X / IP-65

Models KBAC-24D, 27D, 29, 45, 48
 Rated for 208 - 230 and 400/460 Volt 50/60 Hz
 3-Phase AC Induction Motors thru 5 HP

Operates from 115, 208/230, and 400/460 Volt 50/60 Hz AC Line
 Washdown and Watertight for Indoor and Outdoor Use



TYPICAL APPLICATIONS



- Conveyors • Feeders • Packaging Equipment •
- Pumps • Printing Presses • Indexers • Fans • Blowers •

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STANDARD FEATURES

- **Industrial Duty Die-Cast Aluminum Case:** Available in black finish or FDA approved white finish.
- **Digital Programming:** Drive-Link™ PC based software allows advanced programming. Requires optional Programming Kit (Part No. 9582).
- **Diagnostic LEDs:** Power on (POWER) and drive status (STATUS).
- **Run/Fault Relay Output Contacts:** 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.
- **Start/Stop Switch:** Provides electronic start and stop functions.
- **Barrier Terminal Block:** Facilitates wiring of motor, AC line, and Run/Fault Relay output contacts.

PERFORMANCE FEATURES

- **Power Start™:** Provides more than 200% starting torque and ensures startup of high frictional loads.
- **Slip Compensation with Auto-Tune and Boost:** Provides excellent load regulation over a wide speed range.
- **Speed Range:** 60:1 with full motor torque.¹

PROTECTION FEATURES

- **Motor Overload (I²t):** Provides motor overload protection which prevents motor burnout and eliminates nuisance trips.²
- **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.
- **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.**

TRIMPOT ADJUSTMENTS

- | | |
|-----------------------------------|-------------------------------|
| • Minimum Speed (MIN) | • Maximum Speed (MAX) |
| • Acceleration (ACCEL) | • Deceleration (DECEL) |
| • Slip Compensation (COMP) | • Current Limit (CL) |
| • Boost (BOOST) | • Jog (JOG) |

DESCRIPTION

The KBAC Adjustable Frequency Drives are variable speed controls housed in a NEMA-4X / IP-65 washdown and watertight enclosure. They are designed to operate 208 - 230 and 460 Volt 3-phase AC induction motors through 5 HP. The sine wave coded Pulse Width Modulated (PWM) output operates at a carrier frequency of 16 kHz which provides high motor torque, high efficiency, and low noise.

Due to its user-friendly design, the KBAC is easy to install and operate. Tailoring to specific applications is accomplished with selectable jumpers and trimpots, which eliminate the computer-like programming required on other drives. However, for most applications no adjustments are necessary. For more advanced programming, PC based Drive-Link™ software is available.

Main features include adjustable RMS Current Limit and I²t Motor Overload Protection. In addition, Adjustable Slip Compensation with Auto-Tune and Boost provides excellent load regulation over a wide speed range. Power Start™ delivers over 200% motor torque to ensure startup of high frictional loads. Electronic Inrush Current Limit (EICL™) eliminates harmful AC line inrush current. Adjustable Linear Acceleration and Deceleration make the drive suitable for soft-start applications. A Run/Fault Relay is provided, which 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. The drive is suitable for machine or variable torque (HVAC) applications.

Standard front panel features include diagnostic LEDs for power on and drive status, a Start/Stop Switch, and a Main Speed Potentiometer. Other features include a Barrier Terminal Block to facilitate wiring of the AC line and motor, adjustable trimpots (MAX, MIN, ACCEL, DECEL, COMP, CL, BOOST, JOG), customer selectable jumpers (line voltage, motor horsepower, auto or manual restart modes, motor frequency, frequency multiplier, fixed or adjustable boost).

Optional accessories include: Forward-Stop-Reverse Switch, Power On/Off Switch, Run-Stop-Jog Switch, Signal Isolator, Auto/Manual Switch, AC Line Filter, Multi-Speed Board, Programming Kit, and Modbus Communication Module. Quick-connect terminals are provided for easy installation of accessories.

* Requires CE approved RFI filter. See AC Line Filters, in Optional Accessories.

** Models KBAC-24D and KBAC-27D are UL Listed for USA and Canada. Other models pending.

Notes: 1. Dependent on motor performance. 2. UL approved as an electronic overload protector for motors.



A Complete Line of Motor Drives

Table 1 - Jumper Selectable Features

Jumper	KBAC-24D	KBAC-27D	KBAC-29, 45, 48	Description (bold indicates factory setting)
J1	✓	✓	—	AC Line Input Voltage (115, 230)
J2	✓	✓	✓	Motor Horsepower (see Table 3)
J3	✓	✓	✓	Automatic or Manual Restart Mode (A, M)
J4	✓	✓	✓	Motor Frequency Multiplier (1X , 2X)
J5	✓	✓	✓	Motor Frequency (50Hz, 60Hz)
J6	✓	✓	✓	Fixed or Adjustable Boost (FIX , ADJ)
J7	✓	✓	✓	Regenerative or DC Injection Braking (RG , INJ)
J8	✓	✓	✓	"Run" or "Fault" Relay Operation (R , F)
J9	✓	✓	✓	Normally Open or Closed Stop Contact (NO , NC)
J10	*	✓	✓	Constant or Variable Torque Mode (VT, CT)
J11	*	✓	✓	Factory Assignable Function (1, 2)

* Feature available 1st Qtr. 2005.

Table 2 - General Performance Specifications

Description	Specification	Factory Setting
115 Volt AC Line Input Voltage Operating Range (Volts AC)	115 (± 10%)	—
208/230 Volt AC Line Input Voltage Operating Range (Volts AC)	208 (-10%) / 230 (+10%)	—
460 Volt AC Line Input Voltage Operating Range (Volts AC)	380 (-10%) - 460 (+10%)	—
Maximum Load (% of Current Overload for 2 Minutes)	150	—
Carrier, Switching Frequency (kHz)	16, 8	—
Signal Following Input Voltage Range (Non-Isolated Input) ¹ (Volts DC)	0 - 5	—
Output Frequency Resolution (Bits, Hz)	10, .06	—
Maximum Speed Trimptot (MAX) Range (% Frequency Setting)	70 - 110	100
Minimum Speed Trimptot (MIN) Range (% Frequency Setting)	0 - 40	0
Acceleration Trimptot (ACCEL) Range (Seconds)	.3 - 20	1.5
Deceleration Trimptot (DECEL) Range (Seconds)	.3 - 20	1.5
Slip Compensation Trimptot (COMP) Range (% Base Speed)	±3	1.5
Current Limit Trimptot (CL) Range (% Full Load)	0 - 200	160
Jog Trimptot (JOG) Range (% Frequency Setting)	0 - 100	35
Output Frequency Range Settings (Hz)	0 - 50, 0 - 60	0 - 60
Output Frequency Multiplier (1X, 2X)	1, 2	1
Minimum Operating Frequency at Motor (Hz)	1	—
Speed Regulation (30:1 Speed Range, 0 - Full Load) (% Base Speed) ²	2.5	—
Speed Range (Ratio)	60:1	—
AC Line Input Undervoltage/Overvoltage Trip Points for 208/230 Volt AC Line (± 5%) (Volts AC) ³	152 - 283	—
AC Line Input Undervoltage/Overvoltage Trip Points for 460 Volt AC Line (± 5%) (Volts AC) ³	303 - 565	—
Operating Temperature Range (°C)	0 - 45	—

Notes: 1. Requires an isolated signal. If a non-isolated signal voltage is used, install the SIAC Signal Isolator (Part No. 9467). 2. Dependent on motor performance. 3. Do not operate the drive outside the specified AC line input voltage operating range. Operating the drive near the trip points for an extended period of time can result in catastrophic failure.

Table 3 - Electrical Ratings

Model	Part No. (Black / White) ¹	AC Line Input			Motor Output			Motor Horsepower Selection (Jumper J2) ² (bold indicates factory setting)				
		Volts AC (50/60 Hz)	Phase (Φ)	Maximum Current (Amps AC)	Voltage Range (Volts AC)	Maximum Continuous Load Current (RMS Amps/Phase)	Maximum Horsepower (HP (kW))					
KBAC-24D	9987 / 9988	115	1	16	0 - 230	3.6	1 (.75)	1	¾	½	¼	⅛
		208/230	1	10	0 - 230	3.6	1 (.75)					
KBAC-27D	9520 / 9521	115	1	22	0 - 230	5.5	1½ (1.13)	—	1½	1	¾	½
		208/230	1	15	0 - 230	6.7	2 (1.5)	2	1½	1	¾	½
KBAC-29	9528 / 9529	208/230	1	15	0 - 230	6.7	2 (1.5)	—	2	1½	1	¾
			3	10.8	0 - 230	9.0	3 (2.25)	3	2	1½	1	¾
KBAC-45	9530 / 9531	400/460	3	5.3	0 - 400/460	4.6	3 (2.25)	3	2	1½	1	¾
KBAC-48	9540 / 9541	400/460	3	9.6	0 - 400/460	8.3	5 (3.75)	5	3	2	1½	1

Notes: 1. White FDA approved finish. 2. Jumper J2 on Models KBAC-29, 45, 48 is labeled "A", "B", "C", "D", "E".

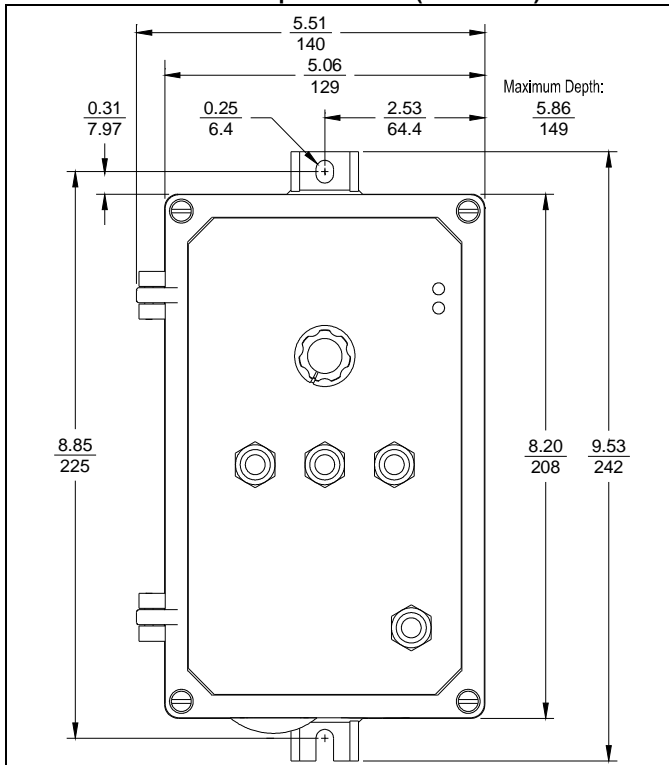


Table 4 - Optional Accessories

Description	Accessory KB Part No.				
	Model KBAC-24D	Model KBAC-27D	Model KBAC-29	Model KBAC-45	Model KBAC-48
Forward-Stop-Reverse Switch: Provides motor reversing and stop functions. Mounts on the enclosure cover and is supplied with a switch seal to maintain liquid-tight integrity.	9480A	9480A	9480A	9480A	9480A
Power On/Off Switch: Disconnects the AC line. Mounts on the enclosure cover and is supplied with a switch seal to maintain liquid-tight integrity.	9482	9523	9532	9532	9532
Run-Stop-Jog Switch: Selects speed setting from either the Main Speed Potentiometer or the JOG trimpot. Mounts on the enclosure cover and is supplied with a switch seal to maintain liquid-tight integrity.	9488	9488	9488	9488	9488
Signal Isolator: Provides isolation between a non-isolated signal voltage source and the drive. Mounts on the KBAC PC board with four snap-ins.	9467	9467	9467	9467	9467
Auto/Manual Switch: When used with the Signal Isolator, it selects remote process signal or the Main Speed Potentiometer. Mounts on the enclosure cover and is supplied with a switch seal to maintain liquid-tight integrity.	9481	9481	9481	9481	9481
AC Line Filter¹: Provides RFI (EMI) suppression. Installs onto the drive's PC board with quick-connect terminals. Suffix "S": Filter must be used with built-in Power On/Off Switch. Suffix "NS": Filter must be used without Power On/Off Switch.	Suffix "S"	9516	9512	9479	9479
	Suffix "NS"	9507	9513	9515	9515
Multi-Speed Board: Provides multi-speed operation through a PLC. Mounts on the KBAC PC board with four snap-ins.	9489	9489	9489	9489	9489
Programming Kit²: Includes DownLoad Module™ (DLM) handheld programming device which uploads and downloads drive programs, PC to DLM serial communication cable, DLM to inverter communication cable, and PC Windows® based Drive-Link™ communication software.	9582	9582	9582	9582	9582
Modbus Communication Module: Allows direct communication between drive and Modbus protocol.	9517	9517	9517	9517	9517

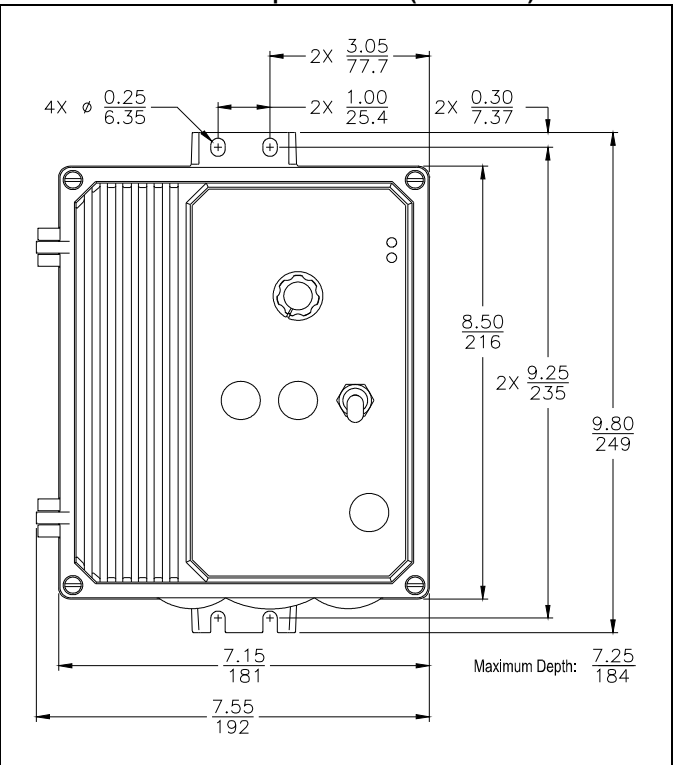
Notes: 1. AC Line Filter complies with CE Council Directive 39/336/EEC relating to the Class A Industrial Standard. 2. If a USB communication cable is required, purchase Part No. 19008.

Figure 1 - Model KBAC-24D
Mechanical Specifications (Inches/mm)



Contains 2 mounting holes for standard 1/2" liquid-tight fittings.

Figure 2 - Models KBAC-27D, 29, 45, 48
Mechanical Specifications (Inches/mm)



Contains 2 mounting holes for standard 1/2" liquid-tight fittings and 1 mounting hole for standard 3/4" liquid-tight fitting.

Figure 3 - Control Layout (All Models)

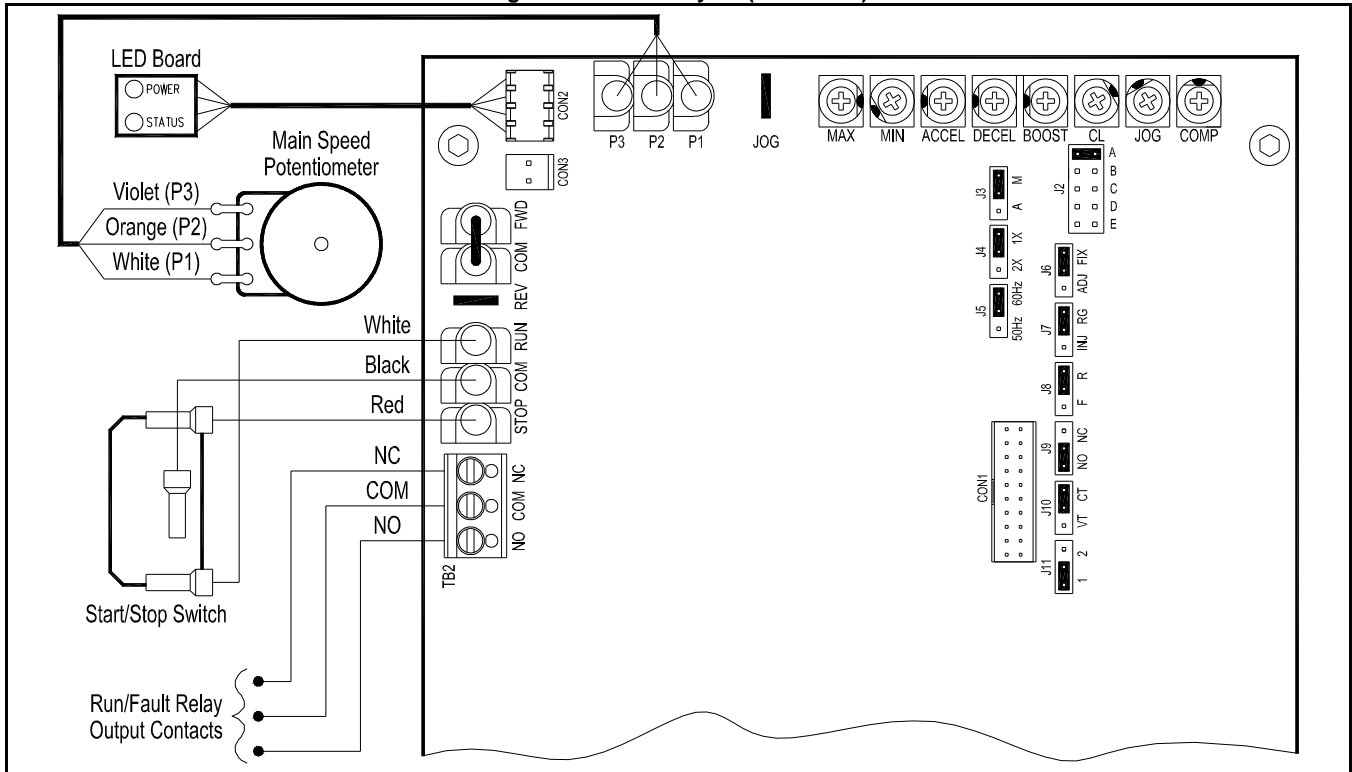


Figure 4 - Models KBAC-24D, 27D Connection Diagram

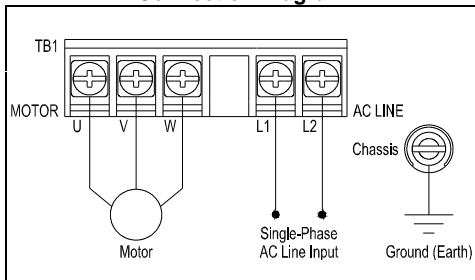


Figure 5 - Models KBAC-24D, 27D AC Line Input Voltage Selection

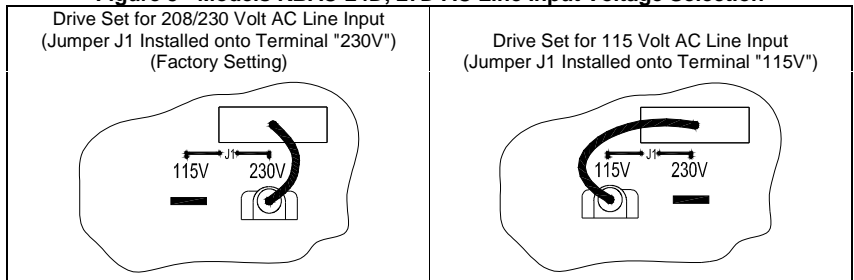
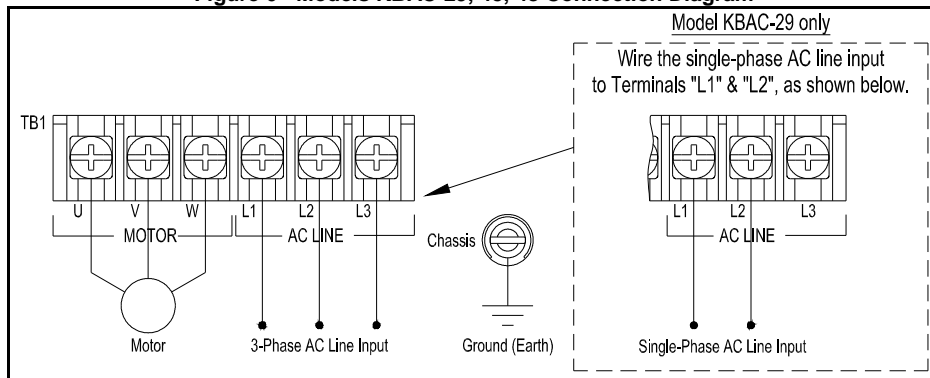


Figure 6 - Models KBAC-29, 45, 48 Connection Diagram



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