

KBVF SERIES QUICK-START INSTRUCTIONS

FOR TECHNICAL ASSISTANCE
CONTACT OUR SALES DEPARTMENT AT 954-346-4900
CALLTOLL FREE 800-221-6570

For Complete Details and Instructions, See the
KBVF Series Installation and Operation Manual Online



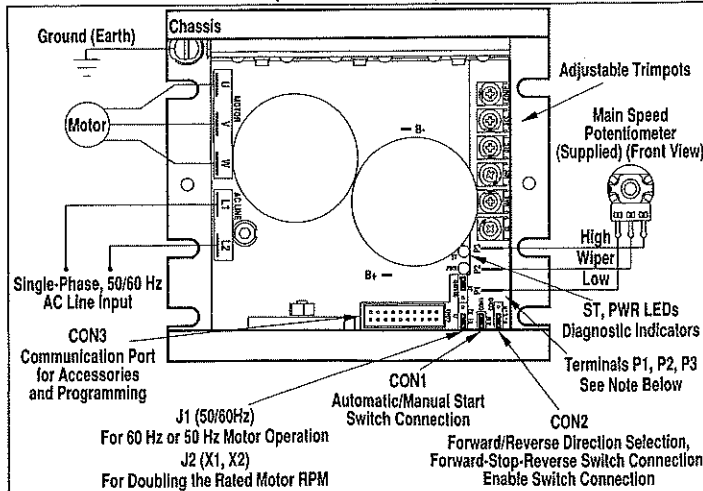
Scan this QR Code

Wire the control in accordance with National Electrical Code requirements and other local codes that may apply to the application.

ELECTRICAL RATINGS

Model	Part No.	AC Line Input			Fuse or Circuit Breaker Rating (Amps)	Drive Output		
		Volts (50/60 Hz)	Phase (Ø)	Maximum Current (Amps AC)		Voltage Range (Volts AC)	Maximum Load Current (Amps/Phase)	Maximum Horsepower (HP (kW))
KBVF-21D	9581	115	1	4.0	5	0 - 208/230	1.0	1/10 (0.07)
		208/230	1	2.5	10	0 - 208/230	1.5	1/4 (0.18)
KBVF-22D	9572	115	1	6.0	10	0 - 208/230	1.5	1/4 (0.18)
		208/230	1	3.8	5	0 - 208/230	2.4	1/2 (0.37)
KBVF-13	9957	115	1	9.6	15	0 - 208/230	2.4	1/2 (0.37)
KBVF-23	9958	208/230	1	6.0	10	0 - 208/230	2.4	1/2 (0.37)
KBVF-23D	9959	115	1	9.6	15	0 - 208/230	2.4	1/2 (0.37)
		208/230	1	6.0	10	0 - 208/230	2.4	1/2 (0.37)
KBVF-23P	9676	208/230	3	3.2	5	0 - 208/230	2.4	1/2 (0.37)
KBVF-14	9977	115	1	14	20	0 - 208/230	4.0	1 (0.75)
KBVF-24	9978	208/230	1	10	15	0 - 208/230	4.0	1 (0.75)
KBVF-24D	9979	115	1	14	20	0 - 208/230	4.0	1 (0.75)
		208/230	1	10	15	0 - 208/230	4.0	1 (0.75)
KBVF-24P	9677	208/230	3	5.2	10	0 - 208/230	4.0	1 (0.75)
KBVF-26D	9496	115	1	22	25	0 - 208/230	5.5	1½ (1.13)
		208/230	1	14	20	0 - 208/230	5.5	1½ (1.13)

CONTROL LAYOUT AND GENERAL CONNECTION DIAGRAM (KBVF-22 SHOWN)



Note: An isolated 0 - 5 Volt DC Signal input can be used on Terminals P1 (-) and P2 (+) in lieu of the Main Speed Potentiometer. If an isolated signal is not available, the SIVFR Signal Isolator with Run/Fault Relay (Part No. 9597) must be installed, which accepts voltage (0 - ± 2.5 thru 0 - ±25 Volts DC) and current (4 - 20 mA DC) signal inputs.

AC LINE FUSING

WARNING! Do not fuse neutral or ground connections.

CAUTION! Do not fuse motor leads.

This drive does not contain AC line fuses. Most electrical codes require that each ungrounded conductor contain circuit protection. It is recommended to install a fuse (Littelfuse 326, Buss ABC, or equivalent) or circuit breaker (Square D QOU or equivalent) in series with each ungrounded conductor. For the recommended fuse or circuit breaker, see the Electrical Ratings table. Wire the drive in accordance with the National Electrical Code requirements and other local codes that may apply to the application.

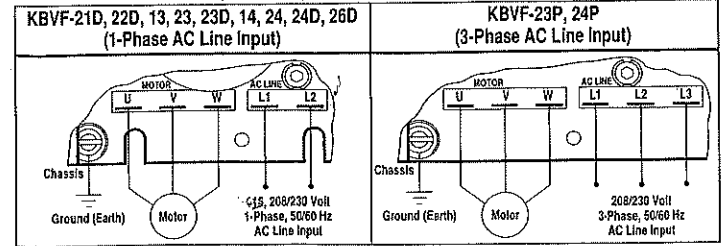
AC LINE, MOTOR, AND GROUND CONNECTIONS

See the Control Layout and General Connection Diagram. Download the Installation and Operation Manual by scanning the QR Code at the top left of this page.

WARNING! High Voltage! Read Safety Warning before using the drive. Disconnect the main power before making connections to the drive. To avoid electric shock, be sure to properly ground the drive.

CAUTION! The AC Line voltage setting of the drive must match the actual AC Line input voltage.

AC LINE, MOTOR, AND GROUND CONNECTIONS



KBVF-13, 14: Rated for 115 Volt 1-phase AC Line input only. Wire the AC Line to Terminals L1 and L2.

KBVF-23, 24: Rated for 208/230 Volt 1-phase AC Line input only. Wire the AC Line to Terminals L1 and L2.

KBVF-21D, 22D, 23D, 24D: Rated for 115 and 208/230 Volt 1-phase AC Line input. Wire the AC Line to Terminals L1 and L2. **Older Drives:** For 208/230 Volt AC Line, set Jumper J1 to the "230V" position (factory setting); for 115 Volt AC Line, set Jumper J1 to the "115V" position. **Newer Drives:** For 208/230 Volt AC Line, the supplied jumper is not installed onto Terminals J1A and J1B (factory setting); for 115 Volt AC Line, install the supplied jumper onto Terminals J1A and J1B.

KBVF-26D: Rated for 115 and 208/230 Volt 1-phase AC Line input. Wire the AC Line to Terminals L1 and L2. For 208/230 Volt AC Line, install the jumper onto Terminal "230VAC" (factory setting); for 115 Volt AC Line, install the Jumper onto Terminal "115VAC". Do not remove the center terminal.

KBVF-23P, 24P: Rated for 208/230 Volt 3-phase AC Line input only. Wire the AC Line to Terminals L1, L2, and L3.

MOTOR: Wire the motor to Terminals U, V, and W.

GROUND: Connect the ground wire (earth) to the drive chassis green ground screw.

ADJUSTABLE TRIMPOTS

The drive contains trimpots which have been factory set for most applications. Some applications may require readjustment of the trimpots in order to tailor the control for a specific requirement.

Read Safety Warning.

MINIMUM SPEED (MIN): Sets the minimum speed of the motor when the Main Speed Potentiometer is set fully counterclockwise. **Units:** % Frequency Setting

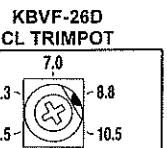
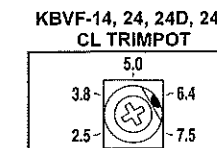
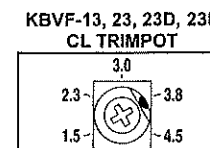
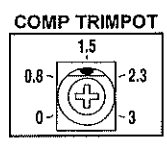
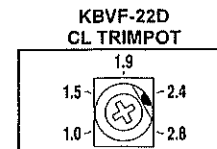
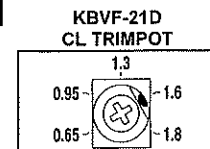
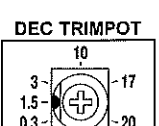
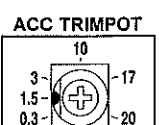
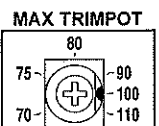
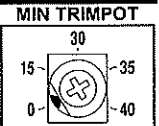
MAXIMUM SPEED (MAX): Sets the maximum speed of the motor when the Main Speed Potentiometer is set fully clockwise. **Units:** % Frequency Setting

ACCELERATION (ACC): Sets the time it will take for the motor to accelerate from zero speed to full speed. **Units:** Seconds

DECELERATION (DEC): Sets the time it will take for the motor to decelerate from full speed to zero speed. **Units:** Seconds

SLIP COMPENSATION (COMP): Sets the amount of Volts/Hz to maintain set motor speed under varying loads. **Units:** Volts/Hz

MOTOR OVERLOAD (I²t) WITH RMS CURRENT LIMIT (CL): Sets the current limit (overload), which limits the maximum current to the motor, prevents motor burnout, and eliminates nuisance trips. **Units:** Amps AC



THESE QUICK-START INSTRUCTIONS COVER MODELS

KBVF-21D (9581), KBVF-22D (9572), KBVF-13 (9957), KBVF-23 (9958), KBVF-23D (9959), KBVF-23P (9676), KBVF-14 (9977), KBVF-24 (9978), KBVF-24D (9979), KBVF-24P (9677), KBVF-26D (9496)

SELECTABLE JUMPERS

The drive has selectable jumpers which must be set before the drive can be used.

AC LINE INPUT VOLTAGE (MODELS KBVF-21D, 22D, 23D, 24D, 26D ONLY)

Models KBVF-21D, 22D, 23D, 24D have one of the following configurations.

Older Drives: Jumper J1 is factory set to the "230V" position for 208/230 Volt AC line input. For 115 Volt AC line input, set Jumper J1 to the "115V" position.



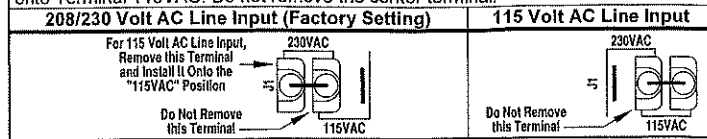
- OR -

Newer Drives: The jumper is not installed on Terminals J1A and J1B for 208/230 Volt AC line input (factory setting). For 115 Volt AC Line input, install the supplied jumper onto Terminals J1A and J1B.



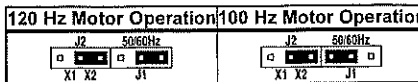
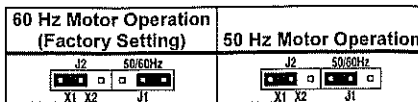
Model KBVF-26D has the following configuration only.

Jumper J1 is factory installed on Terminal 230VAC for 208/230 Volt AC Line input. For 115 Volt AC Line input, remove the jumper from Terminal 230VAC and install it onto Terminal 115VAC. Do not remove the center terminal.



OUTPUT FREQUENCY (J1, J2)

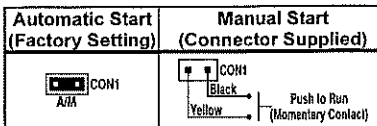
60 Hz / 50 Hz Motor Operation: Jumper J1 is factory set to the "60Hz" position and Jumper J2 is factory set to the "X1" position for 60 Hz motors. For 50 Hz motors, set Jumper J1 to the "50Hz" position, and be sure Jumper J2 is set to the "X1" position.



120 Hz / 50 Hz Motor RPM: The drive can also operate the motor up to two times the rated RPM. However, constant horsepower will result when operating the drive in the "X2" mode above the motor rated frequency.

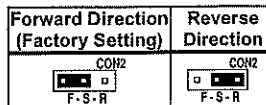
AUTOMATIC START (CON1)

The drive is factory set for Automatic Start (jumper installed). The drive will automatically start when power is applied and a run command is given. The drive will automatically restart after a recovered fault due to undervoltage, overvoltage, or short circuit. For an I²T Trip, due to a prolonged overload, the drive must be manually restarted. For Manual Start, a momentary contact must be installed onto CON1 (connector supplied).

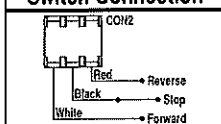


FWD/REV SPEED SELECTION (CON2)

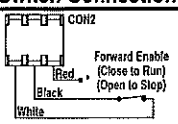
The drive is factory set for Forward Speed Operation (jumper installed in the "F" position). For Reverse Speed Operation, install the jumper in the "R" position. A connector is supplied, to wire a switch or contact.



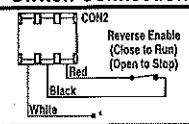
Forward-Stop-Reverse Switch Connection



Forward Enable Switch Connection



Reverse Enable Switch Connection



*Forward Enable Switch Connection: Red wire is not used. Reverse Enable Switch Connection: White wire is not used. The unused wire must be insulated or it may be cut off at the connector.

DIAGNOSTIC LEDs

The drive contains two diagnostic LEDs to display the drive's operational status.

DRIVE OPERATING CONDITION AND STATUS LED INDICATOR

LED	Drive Status	Color and Flash Sequence	Flash Rate	Color and Flash Sequence After Recovered Fault ⁴
ST (Status)	Normal Operation (Run)	Green	1 Sec. On / Off	—
	Overload (120% - 160% Full Load)	Red	On Continuously	Green
	I ² T (Drive Timed Out)	Red	0.25 Sec. On / Off	—
	Short Circuit	Red	1 Sec. On / Off	—
	Undervoltage	Red / Yellow	0.25 Sec. On / Off	Red / Yellow / Green ⁵
	Overvoltage	Red / Yellow	1 Sec. On / Off	Red / Yellow / Green ⁵
	Stop	Yellow	On Continuously	—
	Phase Loss Detection ^{1,2}	Yellow	0.04 Sec. On / 0.06 Sec. Off	—
PWR (Power)	Communication Error ³	Green / Red	1 Sec. On / Off	Green
	Bus and Logic Power Supply	Green	On Continuously	—

Notes: 1. Phase Loss Detection: Models KBVF-23P, 24P. 2. Requires AC line restart. 3. With DiVf Modbus Communication Module installed. 4. All LED flash rates, after recovered faults, are 1 Sec. On / Off. 5. Drive will require manual restart to return the Status LED color to normal flashing green.

FAULT RECOVERY

The drive monitors four faults (Undervoltage, Overvoltage, Short Circuit at the motor (phase-to-phase), and I²T). The drive is factory set to the Automatic Start Mode.

FAULT RECOVERY AND RESETTING THE DRIVE*

Fault	Automatic Start Mode (Factory Setting)
Undervoltage	Drive will automatically start after the bus voltage returns to the operational level or when the drive is first turned on (power up).
Overvoltage	Drive will automatically start after the bus voltage returns to the operational level.
Short Circuit	Drive will automatically start after the short circuit is removed.
I ² T	Drive must be manually restarted.

*The fault must be cleared before the drive can be reset.

Manual Start/Reset: In Manual Start Mode, the drive must be manually reset for any fault. Remove the factory installed jumper on CON1 and install the 2-wire connector (supplied). The connector must be wired to a momentary switch or contact. In the Manual Start Mode, the drive will trip due to all faults (Overvoltage, Undervoltage, Short Circuit, and I²T) and remain tripped even when the fault is cleared. To Start/Reset the drive, the switch or contact must be manually closed. The drive must be restarted each time the AC line is interrupted.

OPTIONAL ACCESSORIES

SIVFR Signal Isolator with Run/fault Relay (Part No. 9597 for 2G Drives and Part No. 9651 for 3G Labeled Drives): Provides isolation between a non-isolated signal source and the drive. Can be used in single-ended or bidirectional mode. Run/Fault Relay Output Contacts are also 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.

Multi-Speed Board (Part No. 9503): Provides multi-speed operation using external contacts or a PLC. Mounts on the end of the drive's heat sink.

DBVF Dynamic Brake Module (Part No. 9598): Provides up to 25% continuous braking and 200% instantaneous braking torque (maximum 1 HP (0.75 kW)).

DiVf Modbus Communication Module (Part No. 9568): Allows the drive to communicate with PLCs, PCs, and HMs with Modbus RTU protocol utilizing a serial communication cable. If a USB communication cable is required, purchase Part No. 19008. Other Protocols available.

To Validate the 18 Month Warranty, Register this Product Online

KBElectronics.com/registration.htm

HIGH VOLTAGE DIELECTRIC WITHSTAND TEST (HI-POT TEST)



WARNING! Disconnect all AC power before performing hi-pot test.

Testing agencies such as UL, CSA, etc., usually require that equipment undergo a Hi-Pot Test. In order to prevent catastrophic damage to the control, which has been installed in the equipment, it is recommended that the procedure outlined in the Installation and Operation Manual (viewable online and downloadable) be followed. Do not exceed 1500 VAC for 115 VAC controls and 1700 VAC for 230 VAC controls. Control damage may result if hi-pot voltage is exceeded.

Note: Controls have been factory hi-pot tested in accordance with UL508C Standard.

CE INFORMATION

This product complies with all CE directives pertinent at the time of manufacture. Contact our Sales Department for Declaration of Conformity. Installation of a CE approved RFI filter is required. Additional shielded cable and/or AC Line cables may be required.

Note: To meet CE requirements, a separate CE approved filter must be installed.

UL NOTICE

115 Volt Drives: Suitable for use on a circuit capable of delivering not more than 5 kA RMS symmetrical Amperes. 115 Volts maximum. Use copper conductors rated 75 °C. Suitable for operation in a maximum surrounding air temperature of 40 °C.

230 Volt Drives: Suitable for use on a circuit capable of delivering not more than 5 kA RMS symmetrical Amperes. 230 Volts maximum. Use copper conductors rated 75 °C. Suitable for operation in a maximum surrounding air temperature of 40 °C.



SAFETY WARNING! - PLEASE READ CAREFULLY!

This product must be installed and serviced by a qualified technician, electrician, or electrical maintenance person familiar with its operation and the hazards involved. Proper installation, which includes electrical connections, fusing or other current protection, and grounding, can reduce the chance of electrical shocks, and/or fires, in this product or products used with this product, such as electric motors, switches, coils, solenoids, and/or relays. Do not use this drive in an explosion-proof application. Eye protection must be worn and insulated adjustment tools must be used when working with drive under power. This product is constructed of materials (plastics, metals, carbon, silicon, etc.) which may be a potential hazard. Proper shielding, grounding, and filtering of this product can reduce the emission of radio frequency interference (RFI) which may adversely affect sensitive electronic equipment. It is the responsibility of the equipment manufacturer and individual installer to supply this Safety Warning to the ultimate end user of this product. (SW 8/2012)

The control must be mounted in an enclosure. Care should be taken to avoid extreme hazardous locations where physical damage to the control can occur due to moisture, metal chips, dust, and other contamination including corrosive atmosphere. If such contamination is present, special enclosures may be required, such as NEMA type 4X. To prevent accidental contact with high voltage, it is required that the finger-safe cover be properly installed onto the control after all connections are complete.

The control contains electronic Start/Stop circuits, which can be used to start and stop the control. However, these circuits are never to be used as safety disconnects since they are not fail-safe. Disconnect the input power for this purpose. Be sure to read and follow all instructions carefully. Fire and/or electrocution can result due to improper use of this product.

The information contained in these instructions is intended to be accurate. However, the manufacturer retains the right to make changes in design which may not be included herein.



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(A40808) - Rev. C00 - 5/31/2018