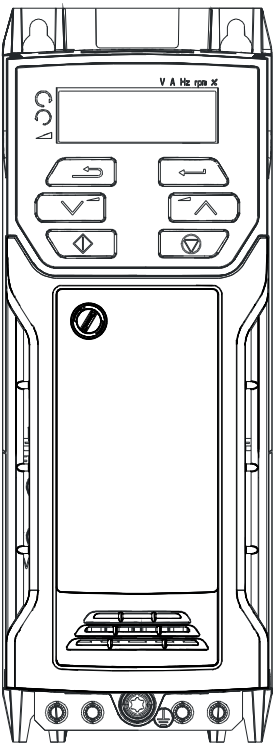
STEP-BY-STEP GUIDE
KBG2, KBG3



KBG Setup

www.kbelectronics.com/KBG-Drive-Setup.html

Frame Sizes 1 to 4

EN

This guide provides a fast and simple start-up procedure for a basic drive and motor installation.

For help with more advanced installations: Comprehensive user guides, online videos and help tools can be accessed using the web address.

⚠ *Please read the safety information booklet supplied with the drive before installation or set-up.*
*For KBG3, it is essential to read the **Control User Guide** prior to using the Safe Torque Off function in safety systems.*

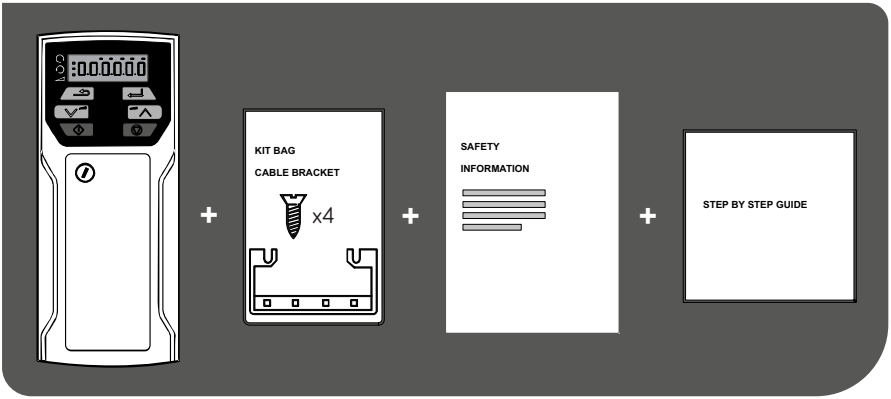
KB GENESIS®

Automation and Control

English

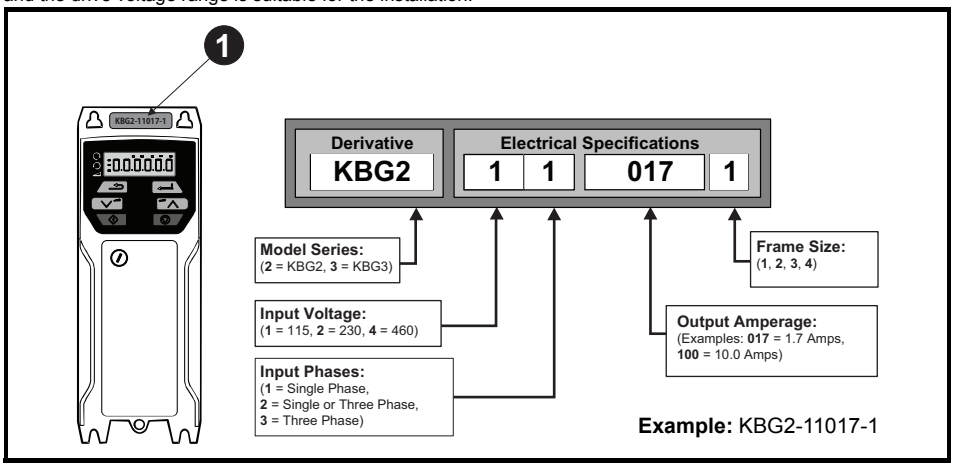
STEP 1: Check the contents of the box

Check you have all the components and your drive has not been damaged during transportation.



STEP 2: Check model and voltage

The model number can be found on the identification label ❶ on the top of the drive. Please check that the model and the drive voltage range is suitable for the installation.



STEP 3: Mount the drive

Ambient Temperature Operating Range: -20 °C to 60 °C (-4 °F to 140 °F).

Output current derating may be required at ambient temperatures > 40 °C (104 °F). Refer to the **Power Installation Guide** (Section 5.1). For UL installations, the maximum ambient temperature permitted is 50 °C (122 °F) with any specified derating applied.

Drives can be panel mounted with **0 mm** space between them. A minimum clearance of **100 mm (3.94 in)** is required above and below the drive. Refer to Section 3.4 in the **Power Installation Guide** for information on derating for reduced clearances

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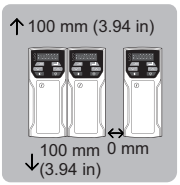
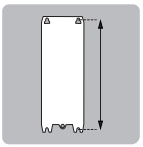
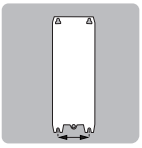
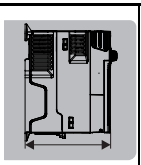
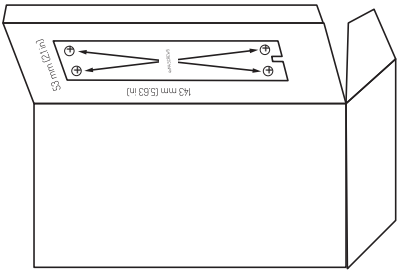


The Drive can be screwed onto a backplate or mounted on a DIN rail (size 1 and 2 only). If you choose to mount it on a rail use 2 screws to secure the drive to the back plate.

Frame	 H		 W		 D*	 Ø	Weight
	Mounting	Overall	**Mounting**	Overall	Overall	Diameter	
1	**143 mm (5.7 in)**	160 mm (6.3 in)	**53 mm (2.08 in)**	75 mm (2.95 in)	130 mm (5.1 in)	5 mm (0.2 in)	0.75 kg (1.65 lb)
2	**194 mm (7.63 in)**	205 mm (8.07 in)	**55 mm (2.17 in)**	75 mm (2.95 in)	150 mm (5.9 in)	5 mm (0.2 in)	1.3 kg (3.0 lb)
3	**215 mm (8.46 in)**	226 mm (8.9 in)	**70.7 mm (2.80 in)**	90 mm (3.54 in)	160 mm (6.3 in)	5 mm (0.2 in)	1.5 kg (3.3 lb)
4	**265 mm (10.43 in)**	277 mm (10.9 in)	**86 mm (3.40 in)**	115 mm (4.5 in)	175 mm (6.9 in)	6 mm (0.23 in)	3.13 kg (6.9 lb)

* The *Speed Ref Potentiometer* adds an additional **11 mm (0.43 in)** to the overall depth on the KBG2 only.

A **Drill template** for wall mounting is included on the drive packaging (shown below).



STEP 4: Fit cable ground bracket

The cable bracket helps you to organize the cables once they have been connected to the drive. The bracket is used to clamp the shield of the cables to facilitate EMC compliance (refer to Figure 7-1).

STEP 5: Select cables and fuses or MCB

WARNING

The voltage rating of fuses and MCBs must be greater than or equal to the highest supply voltage of the system. **Fuses**: The AC supply to the drive must be installed with suitable protection against overload. Failure to observe this requirement will cause risk of fire.

NOTE Ground conductor size: Either 10 mm^2 or two conductors of the same cross-sectional area as the input conductors.

Model Suffix (KBG2, 3)	Input Phases	Fuses		MCB rating**	Cables			
		IEC Class gG	UL Class CC J, or T*		mm (IEC60364-5-52)		AWG (UL 508C)	
		A	A		Input	Output	Input	Output
11017-1	1	10	15	15	1	1	16	16
11024-1	1	16	15	15	1.5	1	14	16
11042-1	1	20	20	15	2.5	1	12	16
11056-1	1	25	25	15	4	1	10	16
21017-1	1	6	6	15	1	1	16	16
21024-1	1	6	6	15	1	1	16	16
21033-1	1	10	15	15	1	1	16	16
21042-1	1	16	15	15	1	1	16	16
22024-2	1 / 3	6/6	6/6	15	1	1	16	16
22033-2	1 / 3	10/10	10/10	15	1	1	16	16
22042-2	1 / 3	16/10	15/10	15	1	1	16	16
22056-2	1 / 3	20/16	20/15	15	2.5/1.5	1	12/14	16
22075-2	1 / 3	20/16	20/15	15	2.5	1	12	16
22100-3	1 / 3	25/20	25/20	25/20	4	1.5	10/12	14
22133-4	1 / 3	25/20	25/20	25/20	4/2.5	2.5	10	12
23176-4	3	25	25	25	4	2.5	10	12
43013-2	3	6	6	15	1	1	16	16
43018-2	3	6	6	15	1	1	16	16
43023-2	3	6	6	15	1	1	16	16
43032-2	3	6	6	15	1	1	16	16
43041-2	3	10	6	15	1	1	16	16
43056-3	3	10	15	15	1	1	14	16
43073-3	3	16	15	15	1.5	1	12	16
43094-3	3	16	15	25	2.5	1.5	12	14
43135-4	3	20	20	20	2.5	2.5	10	12
43170-4	3	25	25	25	4	2.5	10	12

* These fuses are fast acting.

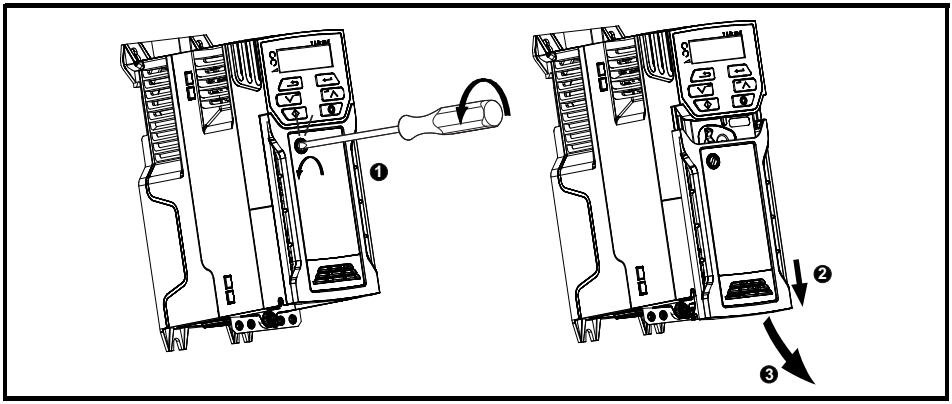
** For UL installations, the circuit breaker must be Listed under category control number DIVQ / DIVQ7, rated 600 Vac with a short circuit rating > 10 kA. In other countries, circuit breakers compliant with EN IEC 60947-2 are recommended, with > 10 kA short circuit breaking capacity

NOTE The product is UL listed for use on a circuit up to 100 kA maximum supply symmetrical fault current, when protected by fuses.

NOTE IEC cable sizes assume Copper conductor, PVC insulation, Installation method B2 and ambient temperature of 40 °C (104 °F). UL cable sizes assume Copper conductor with insulation rated at 75 °C (167 °F).

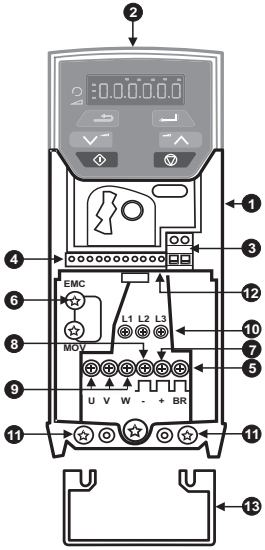
STEP 6: Remove the terminal cover

1. Using a flat bladed screwdriver, turn the terminal cover locking clip anti-clockwise by approximately 30°.
2. Slide the terminal cover down.
3. Remove terminal cover in direction shown.



STEP 7: Understand features of the drive

Figure 7-1 Feature diagram (size 2 shown)



Key

1. Rating label (on side of drive)
2. Identification label
3. Relay connections
4. Control connections
5. Braking terminal
6. Internal EMC filter screw*
7. DC bus +
8. DC bus -
9. Motor connections
10. AC supply connections
11. Ground connections
12. Safe Torque Off terminals (STO)**
13. Cable bracket to screw onto ground terminals (11).

* Before removing the screw, refer to section 4.7.2 in the **Power Installation Guide**.

** KBG3 only.

Table 7-1 Recommended torque settings

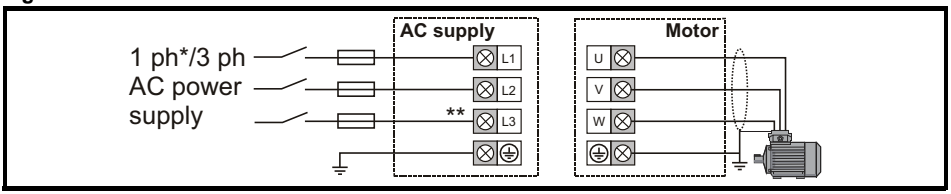
Model size	Terminal block description	Torque settings
All	Control terminals	0.2 N m (0.15 lb ft)
	Relay terminals	0.5 N m (0.37 lb ft)
1	Power terminals	0.5 N m (0.37 lb ft)
2, 3, 4		1.4 N m (1.03 lb ft)
All	Ground terminals	1.5 N m (1.10 lb ft)

STEP 8: Wire the drive up

KBG3: The wiring diagram is for use with the default drive configuration (Pr. **05** set to AV) which is frequency control via Analog Input 1 (0-10 V) or Analog Input 2 (0-10 V) selected by terminal 14.

KBG2: The default setting uses the onboard *Speed Ref Potentiometer* rather than the analog input for the frequency reference (only the drive enable terminal is required).

Figure 8-1 Power terminal connections



* On dual phase input drives, connect the single phase input to terminals L1 and L3.

** Single phase input drives do not contain Terminal L3.

Figure 8-2 KBG2 Control Terminal Connections (See "Appendix - General Control Terminal Connections", on Page 11, for the Complete Connection Diagram)

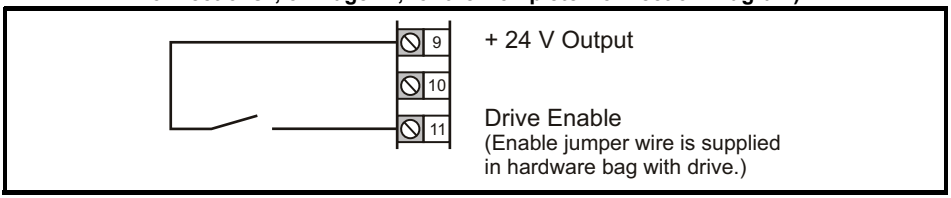
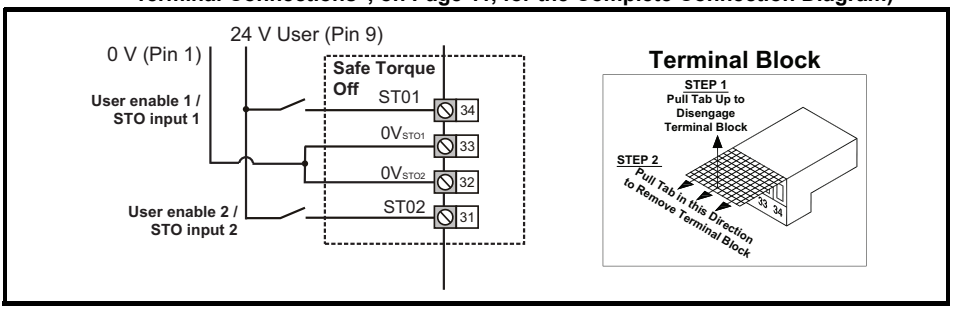


Figure 8-3 Control Terminal Connections (KBG3 Only) (See "Appendix - General Control Terminal Connections", on Page 11, for the Complete Connection Diagram)



Refer to **Control User Guide** for information and wiring diagrams for alternative configurations.

An external braking resistor can be connected if required. Refer to Section 4.5.1 in the **Power Installation Guide** for further details.

CAUTION

DO NOT ATTEMPT TO CHANGE MOTOR OR DRIVE PARAMETERS WHILE THE DRIVE IS ENABLED OR THE MOTOR IS RUNNING.

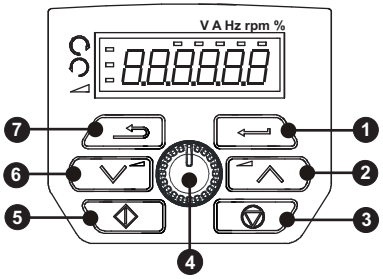
STEP 9: Power up the drive

- Ensure the drive enable signal is not given, terminal 11 (or terminal 31 and 34 on KBG3) is open.
- Ensure the run signal is not given, terminal 12 and 13 are open (KBG2, KBG3).
- Ensure the motor is connected to the drive.
- Ensure the motor connection (Δ or Y) is correct.
- You may now safely apply the AC Line input to the drive. The drive is now ready for programming. 'inh' will be displayed.

STEP 10: Learn to use the keypad

The display provides information to the user regarding the operating status of the drive, alarms and trip code. The keypad provides the means for changing parameters, stopping and starting the drive, and the ability to perform a drive reset.

Figure 10-1 Keypad description



(1) The Enter button is used to enter parameter view or edit mode, or to accept a parameter edit.

(2 / 6) The Navigation buttons can be used to select individual parameters or to edit parameter values.

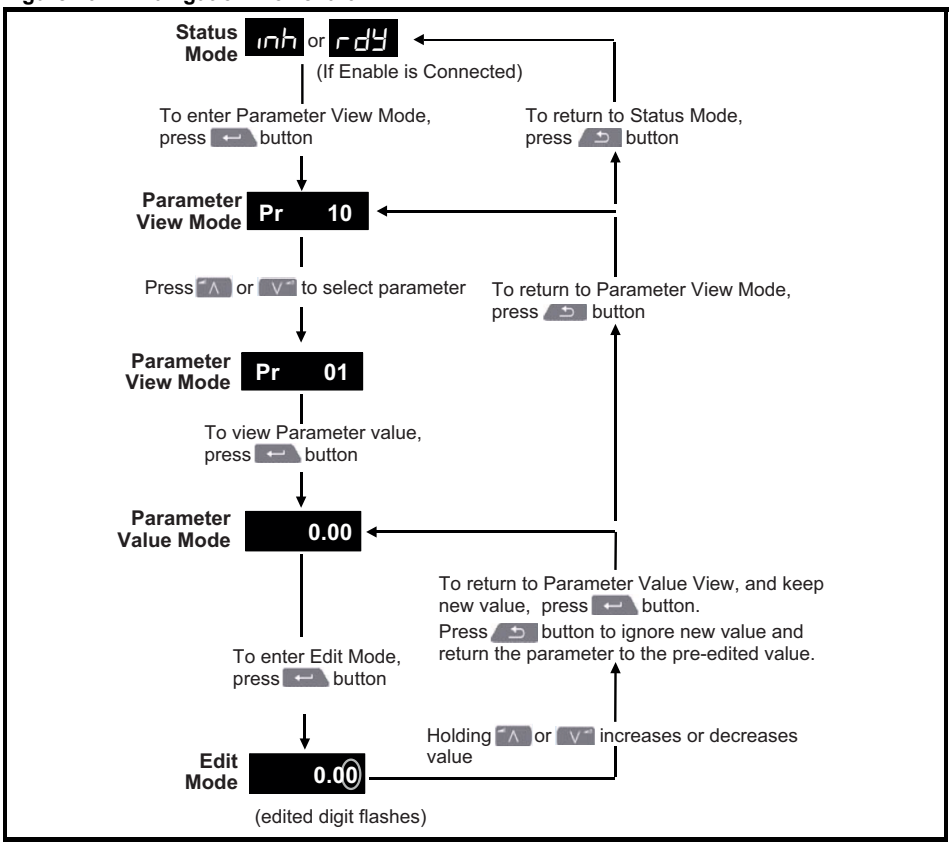
(3) The Stop / Reset button (red) is used to stop and reset the drive in keypad mode (enabled for KBG2). It can also be used to reset the drive in terminal mode.

(4) The *Speed Ref Potentiometer* is used to control the frequency reference (only on KBG2).

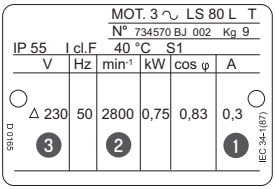
(5) The Start button (green) is used to start the drive in keypad mode (enabled for KBG2).

(7) The Escape button is used to exit from the parameter edit / view mode and return to the previous operation.

Figure 10-2 Navigation Flowchart



STEP 11: Program the drive for the motor

Action	Detail
Power Up	**Ensure:** • The drive displays: inh (Enable terminal(s) is open)
Minimum and Maximum Speed (OPTIONAL)*	**Enter:** • Minimum speed Pr. **01** (Hz) • Maximum speed Pr. **02** (Hz)
Accel and Decel Rates (OPTIONAL)*	**Enter:** • Acceleration rate Pr. **03** (s/100 Hz) • Deceleration rate Pr. **04** (s/100 Hz)
Motor Nameplate Details (REQUIRED)*	❶ Motor rated current in Pr **06** (Amps) ❷ Motor rated speed in Pr **07** (rpm / min^{-1}) ❸ Motor rated voltage in Pr **08** (Volts) 
Set Drive Configuration (KBG3 Only)*	**Enter** KEYPAD on Pr. **05**.

* The default value settings should be appropriate for most applications.

STEP 12: Run the motor

12A: Finalizing Setup / Running the motor

- Enable the drive as shown in Figure 8-2 and Figure 8-3.
- The drive is now ready for use.
  - Use the green Start button to start the drive. See Figure 10-1.
  - Use the Up and Down buttons (on KBG3) and the Speed Reference Potentiometer (KBG2) to select the frequency of the motor. Increase or decrease speed by turning potentiometer.
  - Use the red Stop button to stop the drive.

12B: Autotune Procedure (To Improve Efficiency)

The drive is able to perform either a stationary or a rotating autotune. The motor must be at a standstill before any autotune is enabled and disconnected from the load for a rotating autotune.

To perform an autotune:

- Set Pr. **10** = Level 2 for access to additional features such as autotune. (Do not choose level “ALL”.)*
- Set Pr. **38** = 1 for a stationary autotune or set Pr. **38** = 2 for a rotating autotune.
- Close the drive enable signal (apply +24 V to terminal 11 or terminal 31 and 34 on KBG3). The drive will display 'rdy'.
- Give a Run command press keypad Start button. The display will flash 'tuning' while the drive is performing the autotune.
- Wait for the drive to display 'inh' and for the motor to come to a standstill (if rotating autotune).
- Remove the drive enable and run signal from the drive.
- The drive is now ready for use. The display will show 'inh'. Disconnect and reconnect enable or disconnect and reconnect the AC line.

* Pr **10**, Level “ALL” should be avoided unless the user is very familiar with advanced programming of the Drive. Refer to the User Guide for detailed information. To exit from Level “ALL” and return to Level 1 programming, set code 00.010 to “Level 1”.

Table 11-1 Status indications

String	Description	Drive output stage
inh	The drive is inhibited and cannot be run. The Drive Enable signal is not applied to the drive enable terminal or is set to 0.	Disabled
rdy	The drive is ready to run. The drive enable is active, but the drive inverter is not active because the final drive run is not active	Disabled
StoP	The drive is stopped / holding zero speed.	Enabled
S.Loss	Supply loss condition has been detected	Enabled
dc inj	The drive is applying dc injection braking	Enabled
Er	The drive has tripped and no longer controlling the motor. The trip code appears on the display.	Disabled
UV	The drive is in the under voltage state.	Disabled

STEP 13: Understand key parameters and restoring default

When changing a parameter, the new value is saved when pressing the Enter button to return to parameter view mode from parameter edit mode.

Restoring default parameters:

1. Ensure the drive is not enabled, i.e. terminal 11 (or terminal 31 and 34 on KBG3) is open.
2. Select 'Def.50 (50 Hz settings) or Def.60 (60 Hz settings)' in Pr **00**.
3. Press Enter button.
4. Press the red reset button

Parameter		Range (⇳)	Default (⇨)
00	N/A	N/A	N/A
01	Minimum Speed	0.00 to Pr **02** Hz	0.00 Hz
02	Maximum Speed	0.00 to 550.00 Hz	Def.50: 50.00 Hz Def.60: 60.00 Hz
03	Acceleration Rate 1	0.0 to 32000.0 sec.	5.0 sec.
04	Deceleration Rate 1	0.0 to 32000.0 sec.	10.0 sec.
05	Drive Configuration	Refer to the **Control User Guide** for further information on all drive configurations	PAd
06	Motor Rated Current	0.00 to Drive Rating Amps	Maximum Heavy Duty Rating Amps
07	Motor Rated Speed	0.0 to 33000.0 rpm	Def.50: 1500.0 rpm Def.60: 1800.0 rpm
08	Motor Rated Voltage	0 to 240 V or 0 to 480 V	110V drive: 230 V 200V drive: 230 V 400V drive Def.50: 400 V 400V drive Def.60: 460 V
09	Motor Rated Power Factor	0.00 to 1.00	0.85
10	User Security Status	Refer to the **Control User Guide** for further information	LEVEL.1

Troubleshooting

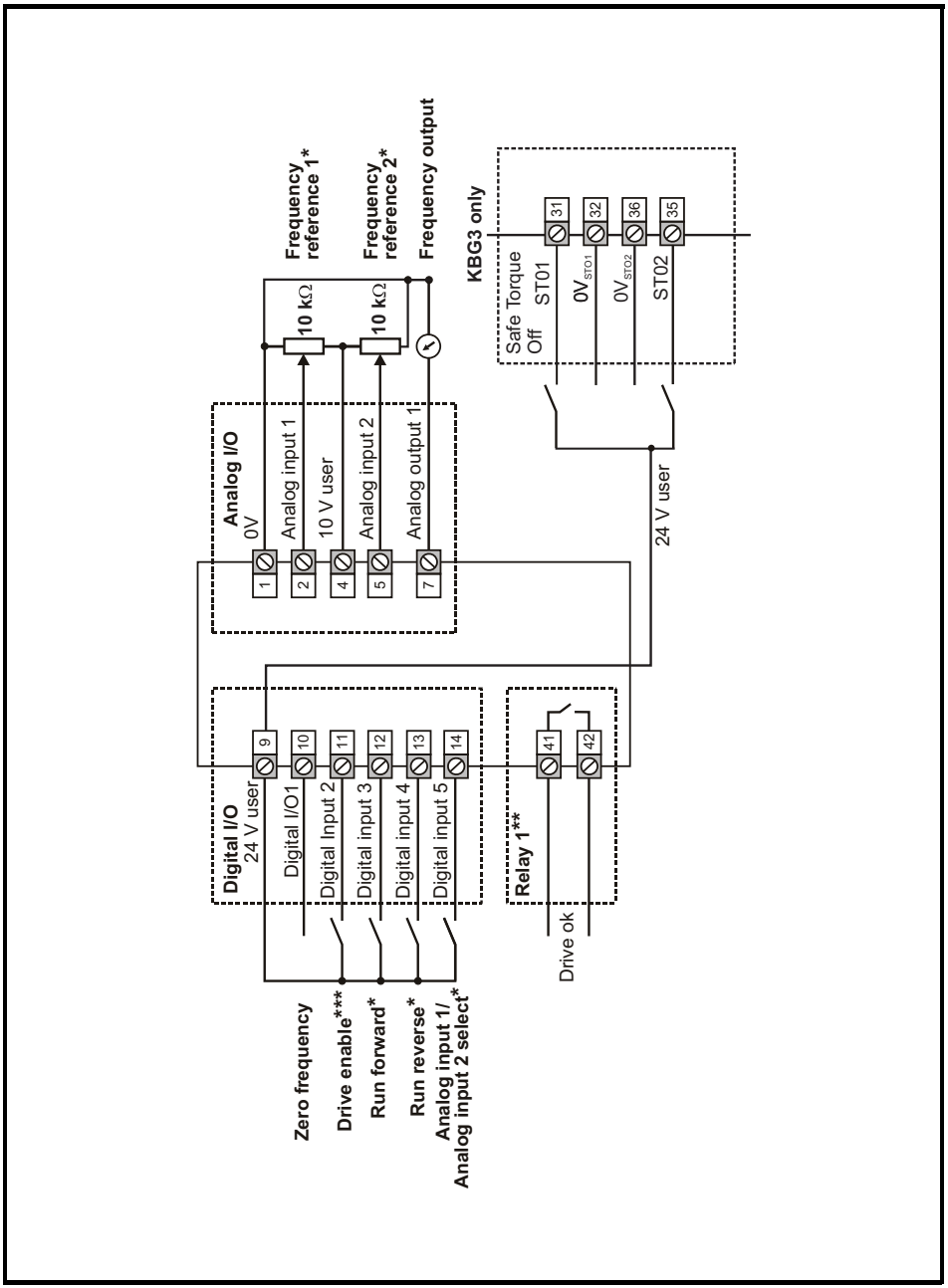
When the drive detects a fault, it will display an error code. To locate and solve all error codes, a 'Diagnostic Tool (App)' is available on Microsoft, Android and iOS platform via the 'Apps' store on smartphone / tablet, search for '**KB Electronics diagnostics tool in the Apps store**'.

Alternatively, please download the 'Diagnostic Tool (App)' from the KB Electronics 'App Center' or view the diagnostics section in the **Control User Guide** available for download from the KB Electronics website.

IMPORTANT!

- This Step-by-Step Guide covers Programming Level 1 (Pr. 00 – 10) and Pr. **38** (autotune, which requires access to Programming Level 2).
- Level 2 access requires changing Pr. **10** to "Level 2".
- Pr. **10**, Level "ALL" should be avoided unless the user is very familiar with advanced programming of the drive. Refer to the Control User Guide for detailed information. To exit from Level "ALL" and return to Level 1 programming, set code 00.010 to Level 1.

APPENDIX - GENERAL CONTROL TERMINAL CONNECTIONS



LIMITED WARRANTY

For a period of 24 months from the date of original purchase, KB Electronics, Inc. will repair or replace without charge, devices which our examination proves to be defective in material or workmanship. This warranty is valid if the unit has not been tampered with by unauthorized persons, misused, abused, or improperly installed, and has been used in accordance with the instructions and/or ratings supplied. The foregoing is in lieu of any other warranty or guarantee, expressed or implied. KB Electronics, Inc. is not responsible for any expense, including installation and removal, inconvenience, or consequential damage, including injury to any person, caused by items of our manufacture or sale. Some states do not allow certain exclusions or limitations found in this warranty and therefore they may not apply to you. In any event, the total liability of KB Electronics, Inc., under any circumstance, shall not exceed the full purchase price of this product. (rev. 2/2002)

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