External Dimensions of Control Panel

Control panel model of KBU-BX1 whose appearance and external dimensions are shown in Fig. 1-1.

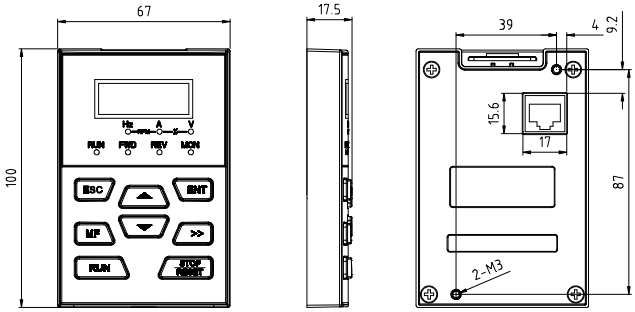
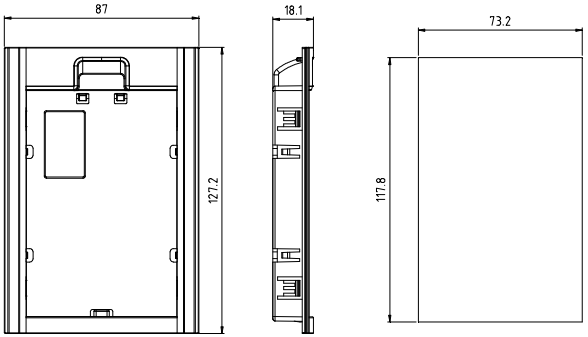


Fig. 1-1 External dimensions of KBU-BX1

External Dimensions of Control Panel Bracket

A bracket should be provided to support the panel and a hole in the cabinet needs to be opened when the control panel KBU-BX1 needs to be remotely used. Bracket model is KBU-DZ1 whose external dimensions are shown in Fig. 1-2 a). Fig.1-2 b) shows applicable hole dimensions in the cabinet.



a) External dimensions of KBU-DZ1 *b) Hole dimensions in the cabinet*

Fig. 1-2 External dimensions of KBU-DZ1 and cabinet hole dimensions

Operation of Control Panel

As a human-machine interface, control panel is the main part for the drive to receive command and display parameters.



Fig. 1-3 Control panel

Key Functions on Control Panel

On the control panel there are 8 keys whose functions are as shown in Table 1-1.

Table 1-1 Key functions on control panel

Symbol	Key name	Meaning
ENT	Enter key	1) Parameter edition enter 2) Confirmation of parameter settings 3) Confirmation of MF key function
ESC	Escape key	1) Return function 2) Invalid parameter edit value
▲	Increase key	1) Increase of selected bit of parameter value 2) Increase of selected bit of parameter value 3) Increase of set frequency
▼	Decrease key	1) Decrease of selected bit of parameter 2) Decrease of selected bit of parameter value 3) Decrease of set frequency

>>	Shift key	1) Selection of parameter bit 2) Selection of parameter value bit 3) Selection of stop/run status display parameter value 4) Fault status switches to parameter value display status
RUN	Run key	Run
Symbol	Key name	Meaning
STOP RESET	Stop/reset key	1) Stop 2) Fault reset
MF	Multi-function key	See Table 4-2 " MF key function definition"

Table 1-2 MF key function definition

L0-00 set value	Function of MF key	Meaning
0	Disabled	MF key disabled
1	Forward JOG	Forward JOG function
2	Reverse JOG	Reverse JOG function
3	Forward/Reverse switch	Running direction forward and reverse switching
4	Emergency STOP 1	Press MF to STOP, with ramp-down time b2-09
5	Emergency STOP 2	Coast to stop, the drive cuts off output
6	Run command setting mode switch	Control panel control -> Terminal control -> Communication control -> Control panel control, press ENT to confirm within 5 seconds

Control Panel Indicators

Control panel is furnished with 7 indicators whose descriptions are as below

Table 1-3 Description of indicators

Indicator	Designation	Meaning
Hz	Frequency indicator	ON: currently displayed parameter value is running frequency or the current parameter unit is frequency Flash: currently displayed parameter value is set frequency
A	Current indicator	ON: currently displayed parameter value is current

Indicator	Designation	Meaning
V	Voltage indicator	ON: currently displayed parameter value is voltage
Hz+A	Running speed indicator	ON: currently displayed parameter value is running speed Flash: currently displayed parameter value is setting speed
A+V	Percentage indicator	ON: currently displayed parameter value is a percentage value
All OFF	No unit	No unit
MON	Run command setting mode indicator	ON: Control panel OFF: Terminal Flash: Communication
RUN	Run status indicator	ON: Run OFF: Stop Flash: Stopping
FWD	Forward indicator	ON: If the drive in stop status, forward command enabled. If the drive in run status, the drive is running forward Flash: Forward is being transferred to reverse
REV	Reverse indicator	ON: If the drive in stop status, reverse command enabled. If the drive in run status, the drive is running reversely. Flash: Reverse is being transferred to forward

Control Panel Display Status

Control panel indicates eight types of status, STOP parameters display, Run parameters display, Fault display, parameter number edition, parameter setting, Password authentication, Direct frequency modification and Prompt message. The operation relating to these statuses and the switching among these statuses is described as follows.

Display of STOP Parameters

The drive normally gets into STOP parameters display once run has been stopped. By default, set frequency is displayed in such a status, and other parameters can be displayed through setting of L1-02 parameters and the >> key. For example, when users need to check set frequency as well as the values of bus voltage and AI1 value in stop status, set L1-02=0013 (refer to setting method of parameters) and press the >> key to display the value of bus voltage and then press >> again to display the value of AI1.



Fig.1-4 Stop parameter display status (Displaying setting frequency – 50.00Hz)

Run status will be enabled immediately upon receipt of run command in stop status. Press ENT to get into parameter edit status (get into password authentication status if parameter under password protection). Directly get into frequency modification status when receive UP/DOWN command from terminal, or ▲ and ▼ pressing on control panel. Switch to fault display status once a fault occurs or an alarm is given.

Run Parameter Display Status

In case there is no fault, the drive will get into run parameters display status upon receipt of run command. Default display is run frequency, and other parameters can be displayed through setting of L1-00 and L1-01 and press >> to shift. For example, in run status, when users need to check bus voltage, motor speed, and input terminals status, please set L1-00= 0084 and L1-01= 0004, and press >> to shift to the display of bus voltage, then press >> again to display motor speed, and then press >> to display input terminals state value.



Fig. 1-5 Run parameter display status (Displaying run frequency – 50.00Hz)

Stop status will be enabled immediately upon receipt of stop command in such a status. Press

ENT to get into parameter edit status (get into password authentication status if parameter under password protection). Directly get into frequency modification status when receiving UP/DOWN command from terminal, or pressing ▲ or ▼. Switch to fault alarm display status once a fault occurs or an alarm is given.

Fault Alarm Display Status

In case a fault occurs or an alarm is given, the drive will get into fault or alarm display status.



Fig. 1-6 Fault or alarm display status (CCL: Contactor act fault)

In such a status, the drive gets into stop status upon receipt of pressing ENT, and would get into parameter edit status when receiving pressing ENT command again (if parameter is under password protection, the drive would get into password authentication status). Directly get into frequency modification status when receiving UP/DOWN command from terminal, or pressing ▲ or ▼.

4.1.3.4 Parameter Edit Status

Enter parameter edit status immediately upon pressing ENT in STOP status, run parameters display status, and direct frequency modification status. This status could also be entered upon receipt of consecutive twice pressing ENT in fault display status. The drive shall quit current status and be previous status upon receipt of pressing ESC.



Fig. 1-7 Parameter edit status

Parameter Value Setting Status

Enter parameter value setting status upon receipt of pressing ENT when in parameter value edit status. When pressing ENT or ESC command is received in such a state, escape parameter edit status.



Fig. 1-8 Parameter value setting status (b0-02 is set to 49.83Hz)

Password Authentication Status

On condition that parameters are under password protection, users would have to go through password authentication when they want to modify function code parameter value. Only A0-00 is visible in such a state.

Under password protection, the password authentication status will be first entered upon the receipt of pressing ENT in STOP parameter display status, run parameter display status, or direct frequency modification status (refer to the setting method of parameters). It will enter parameter edit status upon the completion of password authentication.

Direct Frequency Modification Status

In the status of STOP, fault or run, the drive will enter frequency modification status when terminal UP/DOWN is enabled, or pressing ▲ or ▼.



Fig. 1-9 Direct frequency modification status

Prompt Message Status

Prompt message status shall be displayed upon the completion of some operations. For instance, the "bASIC" prompt message would be displayed upon the completion of parameter initialization.



Fig. 1-10 Prompt message status

Prompt message characters and their meanings are shown as specified in Table 1-4.

Table 1-4 Prompt characters

Prompt symbol	Meaning	Prompt symbol	Meaning
bASIC	When A0-01 is set to 0	CPyb1	Backup parameter value
dISP1	When A0-01 is set to 1	LoAd	Parameter upload to control panel
USEr	When A0-01 is set to 2	dnLd1	Parameter download from control panel (motor parameter excluded)
ndFLt	When A0-01 is set to 3	dnLd2	Parameter download from control panel (motor parameter included)
LoC-1	Control panel locked 1 (full locked)	P-SEt	Password has been set
LoC-2	Control panel locked 2 (all locked except RUN, STOP/RESET)	P-CLr	Password cleared
LoC-3	Control panel locked 3 (all locked except STOP/RESET)	TUNE	Motor parameter identification in process
LoC-4	Control panel locked 4	LoU	Drive undervoltage

	(all locked except shift >>)		
PrtCt	Control panel protection	CLr-F	Clear fault record
UnLoC	Control panel lock cleared	dEFt1	Restore to factory default parameters (motor parameter excluded)
rECy1	Read the backup parameter value to parameter	dEFt2	Restore to factory default parameters (motor parameter included)

Table 1-5 shows meanings of the characters displayed on control panel.

Table 1-5 Meanings of displayed characters

Displayed character	Character Meaning	Displayed character	Character Meaning	Displayed character	Character Meaning	Displayed character	Character Meaning
	0		A		I		T
	1		b		J		t
	2		C		L		U
	3		c		N		v
	4		d		n		y
	5		E		o		-
	6		F		P		8.
	7		G		q		.
	8		H		r		
	9		h		S		

Setting Method of Parameters

Parameter System

GK series drive parameter group: A0~A1, b0~b2, C0~C4, d0~d5, E0~E1, F0~F3, H0~H1, L0~L1, U0~U1. Each parameter group contains a number of parameters. Parameters are identified by the combination "parameter group character + parameter subgroup number + parameter number". For instance, "F3-07" indicates the seventh parameter at subgroup 3, group F.

Parameter Display Structure

Parameters and the parameter values are subject to a two-tier structure. Parameters correspond to first-tier display, while parameter values correspond to second-tier display.

First-tier display shown in Fig. 1-11:



Fig. 1-11 First-tier display of parameter

Second-tier display shown in Fig. 1-12:



Fig. 1-12 Second-tier display of parameter ("3" is the value of b0-00)

Example of Setting of Parameter

Parameter values are divided into decimal (DEC) and hexadecimal (HEX) values. When a parameter value is expressed by a hexadecimal, all its bits are independent of each other during edition and the range of value would be (0~F). Parameter value is composed of the unit, tens place, hundreds and kilobit. Shift Key >> is used to select the bit to be changed, while ▲ and ▼ are used to increase or decrease numerical value.

- Example of parameter password setting
  - ◆ Setting of password (A0-00 is set to 1006)

  1) In non-parameter edit status, it displays current parameter A0-00 when pressing. ENT

  2) Press ENT to display parameter value 0000 that belongs to A0-00;
  3) Press ▲ for six times to change the rightmost digit "0" to "6";
  4) Press >> to move the flashing digit to the leftmost bit;
  5) Press ▲ once to change "0" in leftmost bit to "1";
  6) Press ENT to save the value of A0-00, then Control panel will switch to display the next parameter A0-01;
  7) Press ▼ to change A0-01 to A0-00;
  8) Repeat steps 2) till 6). A0-01 will be displayed after control panel displaying P-SEt;
  9) There are three methods for users to bring the password setting above into effect:
  ① Press ESC + ENT + ▲ simultaneously (PrtCt displayed), ②won't operate control panel within 5 minutes, ③ restart the drive.

Flow chart of user password setting:

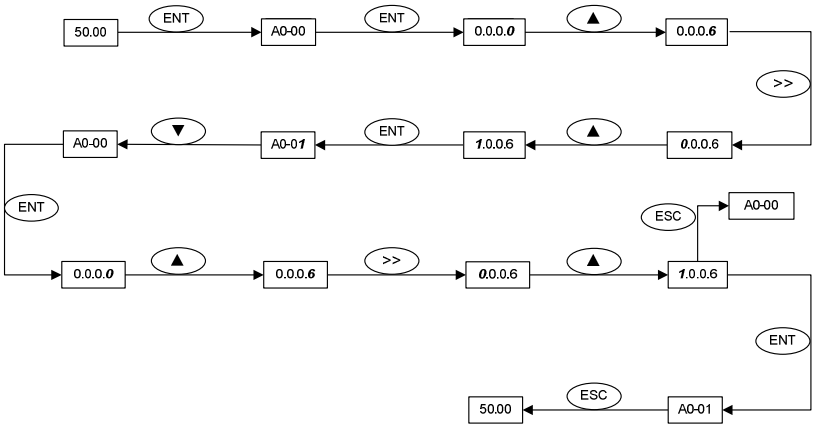


Fig.1-13 Flow chart of user password setting

🕮 ATTENTION:

User's password is successfully set when step 8 finished, but will not take effect until the completion of step 9.

◆ **Password authentication**

In non-parameter edit status, press ENT to enter first-tier display A0-00, then press ENT to enter second-tier display 0.0.0.0. Control panel will implement the display of other parameters only when correct password entered.

◆ **Clear password**

After successful password authentication, it will access password setting code A0-00. Password can be cleared by writing value 0000 into A0-00 twice.

- **Example of parameter setting**

◆ **Example 1**: modify upper limit frequency from 600Hz to 50Hz (change b0-09 from 600.00 to 50.00)

1) In non-parameter edit status, press ENT to display current parameter A0-00;
2) Press >> to move flashing digit to modification bit (A flashes);
3) Press ▲ once to change "A" to "b";
4) Press >> to move flashing to modification bit (0 in ones place flashing);
5) Press ▲ nine times to change "0" to "9";
6) Press ENT to view the parameter value (600.00) of b0-09;
7) Press >> to move flashing digit to modification digit (6 flashing);

8) Press ▼ six times to change "6" to "0";
9) Press >> once to move flashing digit rightwards by one bit;
10) Press ▲ for five times to change "0" to "5";
11) Press ENT to save the value (50.00) of b0-09. Then the control panel will automatically switch to display the next function code (b0-10);
12) Press ESC to exit parameter edit status.

Flow chart is shown below:

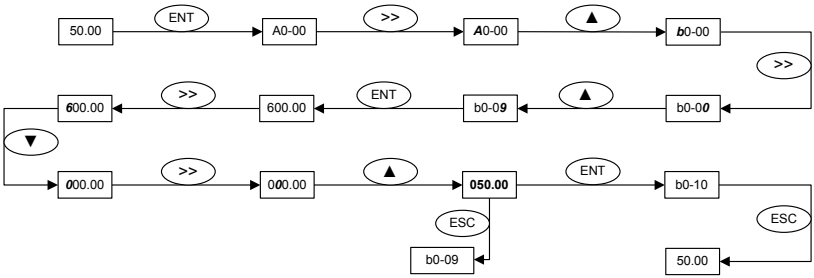


Fig. 1-14 Flow chart of upper limit frequency modification

◆ **Example 2**: user parameter initialization

1) In non-parameter edit status, press ENT to display current parameter A0-00;
2) Press ▲ three times to change "0" in the rightmost bit of A0-00 to "3";
3) Press ENT to display parameter value 0 of A0-03;
4) Press ▲ once to change "0" to "2" or "3" ("2" motor parameter excluded, "3" means motor parameter included);
5) Press ENT to save the value of A0-03.Then control panel will automatically display parameter A0-00;
6) Press ESC to escape parameter edit status.

Flow chart is shown below:

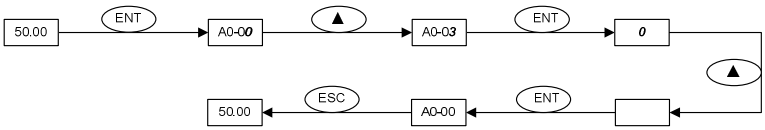


Fig. 1-15 Flow chart of user parameter initialization

◆ **Example 3**: setting method of hexadecimal parameter

Take L1-02 (LED STOP display parameter) for example, if LED control panel is required to display: setting frequency, bus voltage, AI1, running linear speed, and setting linear speed. Since all bits are independent of each other, the ones place, tens place, hundreds place and thousands place should be set separately. Determine the binary numbers of each bit and then convert the binary numbers into a hexadecimal number. See Table 4-6, the corresponding relation between binary numbers and a hexadecimal number.

Table 1-6 Corresponding relation between binary and hexadecimal

Binary numbers				Hexadecimal (LED bit display value)
BIT3	BIT2	BIT1	BIT0	
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	0	0	0	8
1	0	0	1	9
1	0	1	0	A
1	0	1	1	B
1	1	0	0	C
1	1	0	1	D
1	1	1	0	E
1	1	1	1	F

Set the value in the ones place:

As shown in Fig. 1-16, "setting frequency" and "bus voltage" are respectively determined by BIT0 and BIT1 in ones place of L1-02. If BIT0=1, setting frequency will be displayed. The bits that correspond to the parameters which are not required to display shall be set to 0. Therefore, the value in ones place should be 0011, corresponding to 3 in a hexadecimal number. Set the ones place to 3.

Set the value in tens place:

As shown in Fig.1-16, since it is required to display "AI1", the binary set value of tens place is

0001, corresponding to 1 in a hexadecimal number. Thus, bit of tens place shall be set to 1.

Set the value in hundreds place:

As shown in Fig. 1-16, the parameter required to display does not involve hundreds place, so the hundreds place shall be set to zero.

Set thousands place:

As shown in Fig. 1-16, since required to display "running linear speed" and "setting linear speed", the binary set value of thousands place shall be 0011 that corresponds to 3 in a hexadecimal number.

To sum up, L1-02 should be set to 3013.

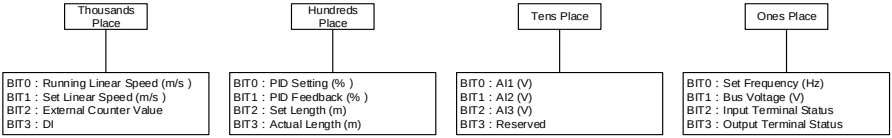


Fig. 1-16 Setting of hexadecimal parameter L1-02

Under parameter setting status, the parameter value cannot be modified if the value has no flashing digit. Possible causes include:

1) The parameter cannot be modified, such as actual detection parameters, running recording parameters, etc;
2) This parameter cannot be modified in run status but can be changed when motor stopped;
3) Parameter under protection. When parameter A0-02 is set to 1, parameters cannot be modified as the parameter protection against misoperation enabled. To edit parameter in such a circumstance, it is necessary to set A0-02 to 0 as first step.

4.1.4.4 Lock/Unlock Control Panel

- **Lock control panel**

  All or some keys of CONTROL PANEL can be locked by any of the following three methods. See the definition of parameter L0-01 for further information.

  Method 1: set the parameter value of L0-01 to non-zero, then press

  ESC + ENT + ▲ simultaneously.

  Method 2: do not operate CONTROL PANEL within five minutes after L0-01 is set to non-zero.

  Method 3: cut the power off and then apply power on after L0-01 parameter is set to non-zero.

  Refer to flow chart 1-17 for locking CONTROL PANEL.

- **Unlock control panel**

  To unlock the control panel, press ESC + >> + ▼ simultaneously. Unlocking won't change the value of parameter L0-01. In other words, the control panel will be locked again if the condition of locking control panel is fulfilled. To unlock the control panel completely, L0-01 value must be modified to 0 after unlocking.

Refer to flow chart 4- 16 of unlocking control panel

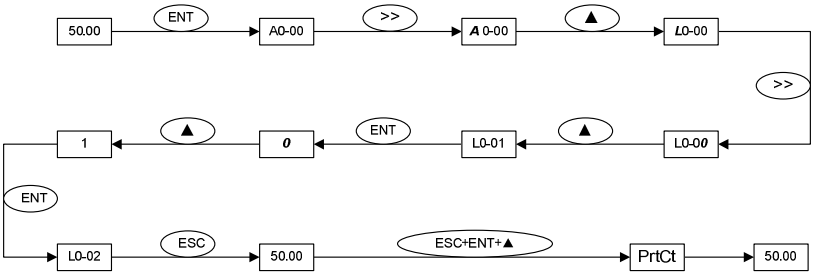


Fig. 1-17 Flow chart of locking control panel



Fig. 1-18 Flow chart of unlocking control panel