USER MANUAL

KOLORROL ENERGY
PVT. LTD

KLX series
AC DRIVES

An ISO 9001:2000 Company

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W A R R A N T Y

Kolorrol Energy Pvt. Ltd. warrants the product delivered in Kolorrol Energy Pvt. Ltd. package to be free from defects in material and workmanship, under normal use and service, for 12 months from the date of initial delivery despatch. Products that fail during this period will be repaired or replaced at Kolorrol Energy Pvt. Ltd.'s discretion provided the original purchaser returns the product and provides proof of original date of purchase. This warranty does not apply, in the judgement of Kolorrol Energy Pvt. Ltd., to damage caused during shipment, handling, storage or accidental misuse of the product.

The maximum liability of this warranty is limited to the purchase price of the product. Under no circumstances, regardless of cause, shall Kolorrol Energy Pvt. Ltd. be liable for

1. Penalty or penalty clauses of any description

2. For certification not otherwise specifically provided herein and / or indemnification of purchase or others for costs, damages, or expenses, each arising out of or related to the product or services.

3. For any damages resulting from loss of profits, use of products or for any incidental, indirect or consequential damages.

MODEL NO.: _____

SERIAL NO.: _____

DATE OF DISPATCH: _____

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Thank you for choosing Kolorrol's high performance ac drives. These drives are manufactured using high quality components and tested rigorously for harsh industrial environments.

This manual will guide you through installation, operation and maintenance of Kolorrol ac drives.

⚠ Always read this manual before using Kolorrol ac drives.

Safety guidelines

The following safety signs have been used in this manual.

⚠ **DANGER** A high risk situation may result due to violation of instruction leading to fatal or major injuries

⚠ **WARNING** A medium risk situation may arise due to violation of instruction leading to minor injuries or physical damage.

Important Precautions

⚠ Danger

- ⚠ AC input power must be disconnected before performing any maintenance.
- ⚠ After turning off power, some voltage remains on the DC bus. It takes about 1min for the dc bus voltage to discharge completely, after which maintenance can be performed.
- ⚠ The ac drive may be damaged beyond repair due to wrong connections at connectors marked **Input**(R,S,T) and **Motor**(U,V,W). Never connect ac supply mains to connectors marked **Motor**.

⚠ Warning

- ⚠ No voltage withstand test should be taken on any part of the unit. Such a test can damage the unit.
- ⚠ Do not touch electronic components on printed circuit board.
- ⚠ Provide ground to the ac drive at the earth terminal. The grounding method must comply with the laws of the country where the drive is to be installed.
- ⚠ Heatsink temperatures may go up to 70^{0}C. Do not touch the heatsink.
- ⚠ The drive cover must be closed before giving power to the unit.

⚠ Warning

This product can cause a dc current in the protective conductor. Where a residual device is used for protection in case of direct contact or indirect contact, only an RCD of type B is allowed on the supply side of this product. Otherwise another protective measure shall be applied, such as separation from the environment by double or reinforced insulation, or isolation from the supply by a transformer. (IEC 61800-5-1 : 2003 clause 4.2.11)

CHAPTER : 01 RECEIVING AND INSPECTION

KOLORROL ac drives have gone through rigorous quality control tests at the factory before shipment.

After receiving the AC DRIVE, please check for the following;

- Check to make sure that package includes an AC DRIVE and user manual.
- Inspect unit to ensure it was not damaged during shipment.
- Make sure that the part number indicated on the name plate corresponds with the part number of your order.

Name plate Information

Model : KLX750 A 43 H	AC Drive Model
Input : 3 PH, 12.0A, 350-460V, 50/60 Hz	Input Specification
Output : 3 PH, 0-460VAC, 12 A, 7.5 HP	Output Specification
Frequency Range : 0.1Hz-600Hz	Output Frequency range
Sr. No. 43H-11-02-XXX	Serial No.

MODEL EXPLANATION :

KLX	300	A	43	H
↑	↑	↑	↑	↑
Series Name	Applicable Motor Capacity	Series	Input Voltage 43=Three phase 415 VAC	Version type

eg. : 500 [5 HP, 3.7 kW]

SERIAL NO. EXPALANATION

KLX 300 :- Model and HP

43H – 12 – 02 – XXX

↑ ↑ ↑ ↑

Month Year Serial No.

415VAC
3Phase System

CHAPTER : 02 STORAGE AND INSTALLATION

The AC DRIVE should be stored properly when it is not be used for an extended period of time.

Ambient Conditions :

Operation :	* Air temperature	: -10°C to + 40°C
	* Atmospheric pressure	: 85 to 105 kPa
	* Installation site Altitude	: below 1000m
	* Vibration	: Max. 9.86 m/s^2 at below 20 Hz Max 5.88 m/s^2 at 20 Hz to 50 Hz
Storage :	* Temperature	: -20°C to + 60°C
	* Relative Humidity	: Less than 90%, non condensing
	* Atmospheric pressure	: 85 to 105 kPa
Transporation :		
	* Temperature	: -20°C to + 60°C
	* Relative Humidity	: Less than 90%, non condensing
	* Atmospheric pressure	: 85 to 105 kPa
	* Vibration	: 9.8m/s^2 at less than 20Hz, 5.8 m/s^2 at 20 to 50Hz

Pollution degree : 2 : good for a factory type environment

Installation

Mounting and Installation

⚠ Warning

⚠ Always install the drive vertically.

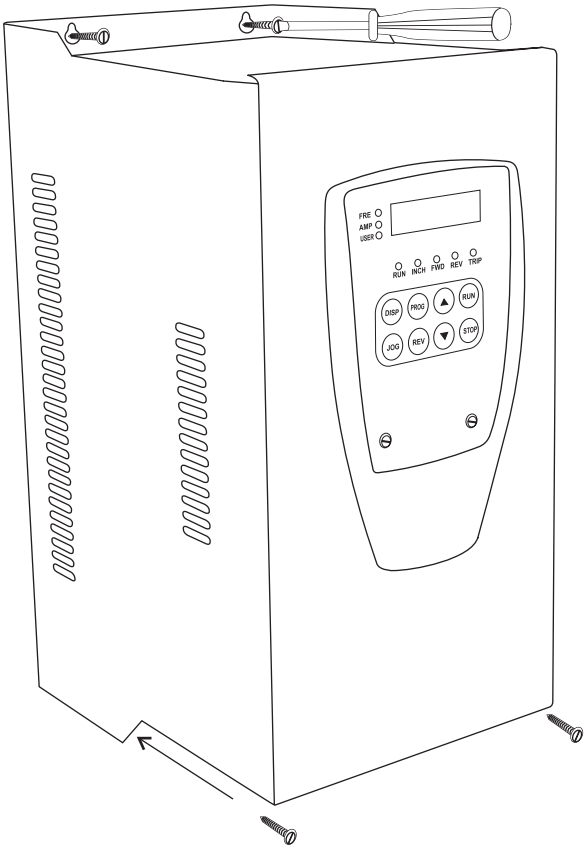
⚠ Mount the drive in such a way that air flow through the heat sink fins is not restricted.

⚠ When mounting inside an enclosure or a panel, ensure that the enclosure is appropriately cooled so that the maximum ambient temperature rating of the drive is not exceeded.

⚠ Avoid installing the drive in the following environments:

- Near vibrating sources.
- In direct sunlight.
- In atmosphere with conductive dust , cotton lint.
- In places with corrosive gases, high humidity levels or explosive gases.

Drive mounting figure.



Warning

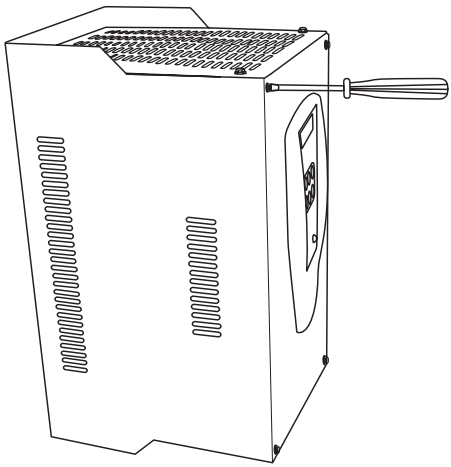
- The control, AC input power supply and motor cables should be laid separately.
- Always use recommended wire sizes for power terminals as listed on page 46
- Always mount the drive properly before doing wiring.
- Confirm that the voltage and frequency ratings of the drive match the ratings of the ac input power supply.
- Tighten the terminal screws with the torque specified in the manual.
- Protective devices such as fuses or MCCB of appropriate rating should always be connected between the drive and ac input power supply. Recommended input line fuses are specified on page 46
- Do not remove wiring when power is applied to the drive.
- Route the power and control wires separately or at 90^0 to each other.
- Make sure that the power source is capable of supplying the correct voltage and required current to the drive.
- When multiple ac drives are to be installed in one location, all units should be grounded to a common ground terminal.
- The ac drive may be damaged beyond repair due to wrong connections at connectors marked **Input**(R,S,T) and **Motor**(U,V,W). Never connect ac supply mains to connectors marked **Motor**.
- Provide ground to the ac drive at the earth terminal. The grounding method must comply with the laws of the country where the drive is to be installed.

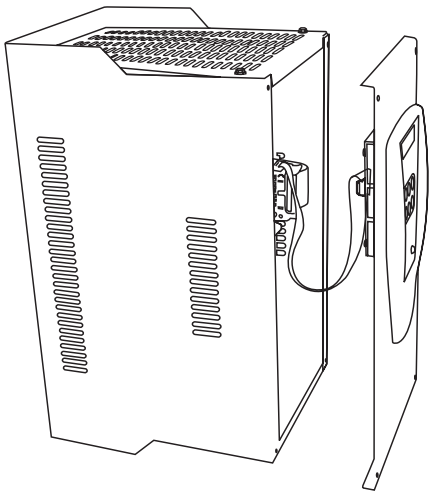
General wiring instructions

Remove the front cover as shown and detach the keypad cable from the control board.

Complete control and power wiring and replace front cover after connecting keypad cable to the control board.

Diagram indicating front cover removal

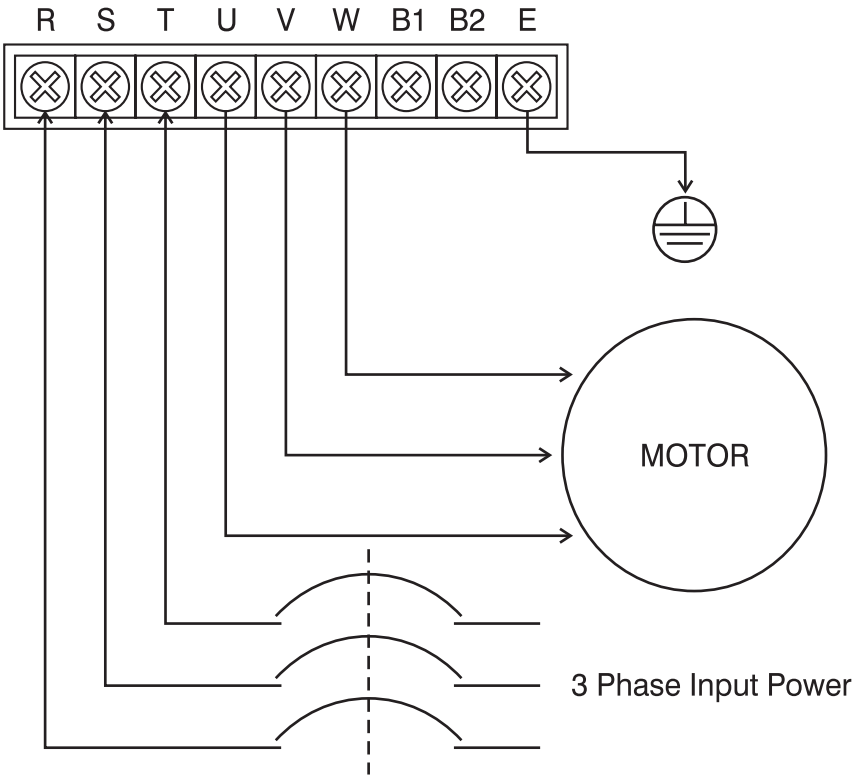




- **TERMINAL EXPLANANTION**

Terminal Symbol	Explanation of Terminal Function
R, S, T	AC line Input Terminals
U, V, W	AC drive output terminal [Motor Connection]
B1, B2	Connection for braking Resistor [Optional]
E	Earth
DC+	DC bus positive
DC-	DC bus negative
L	Connection for DC choke between L & DC+

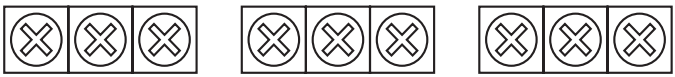
Power Terminal Connections



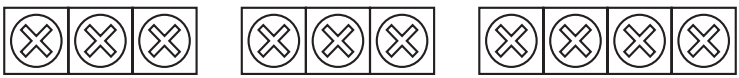
Note: Exact terminal configuration may vary with drive rating.

Power terminal layout KLX300

Power terminal layout for KLX750 to KLX1500



Power terminal layout (KLX2000 and above)



Control Terminals

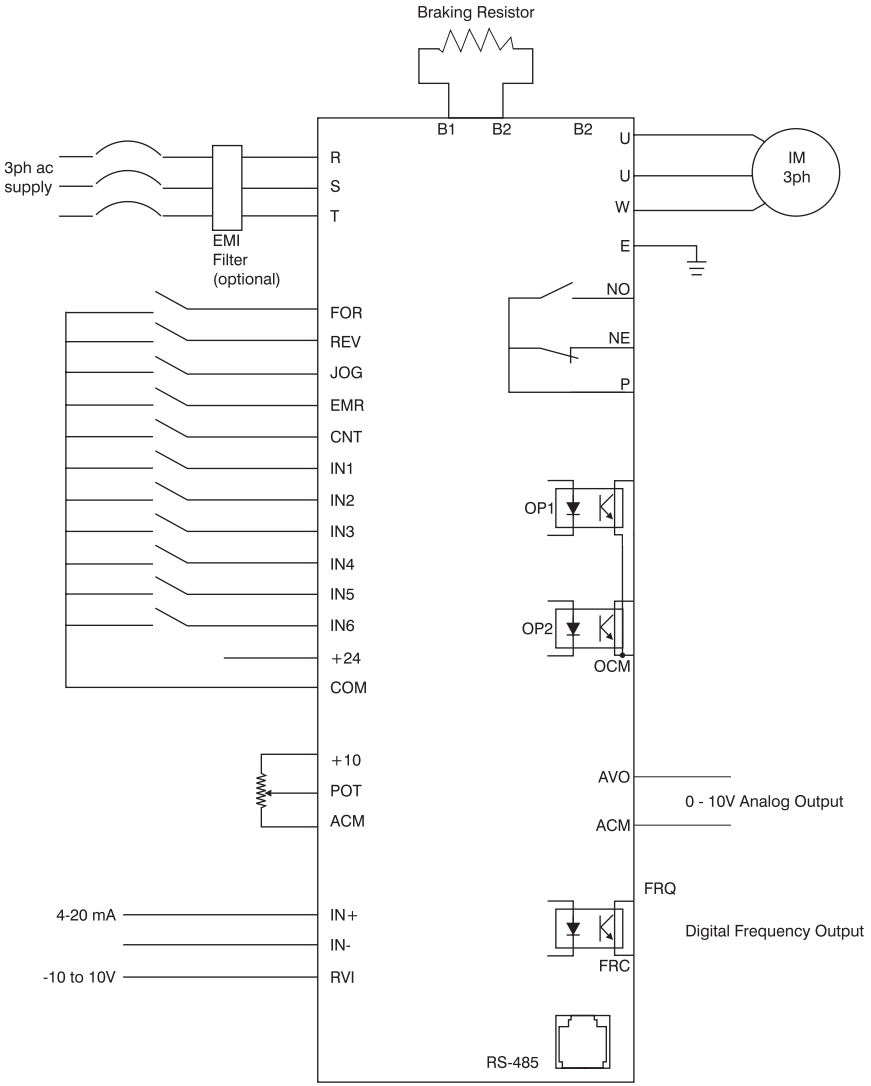
NC	NO	P			Frq	Frc	Op1	Op2	Ocm	I0+	Avo	Acm	In+	In-	Pot
For	Rev	Jog	Emr	Cnt	In1	In2	In3	In4	In5	In6	+24	Com	+10	Rvi	Acm

Terminal	Operation	
For	Forward start, non latching in modes 0 and 1(see page 18) Forward start, latching(momentary activation) in mode 2	
Rev	Reverse start, non latching in mode 0 (see page 18) Reverse command, in modes 1 and 2 (see page 18)	
Jog	Jog command	
Emr	External fault	
Cnt	Counter input	
In1-In6	Multi function inputs (see page 19)	
+24	DC voltage source	
Com	Digital input common	
+10	+10Vdc for potentiometer	
Rvi	Reversible voltage(-10V to +10V)dc voltage input	
Acm	Analog common	
NC	Programmable Output relay NC contact (see page 22)	Contact rating : 230 VAC, 10A
NO	Programmable Output relay NO contact	
P	Programmable Output relay pole	
Frq	Digital frequency output 50VDC, 20mA	
Frc	Digital frequency output common	
Op1	Programmable optoisolator output 50VDC, 20mA	
Op2		
Ocm	Programmable optoisolator output common	
IO+	Analog current output 0 – 20mAdc	
Avo	Analog voltage output 0 – 10Vdc	
Acm	Analog common	
In+	Analog current input 0- 20mA	
In-		
Pot	Potentiometer wiper or 0-10Vdc voltage input	

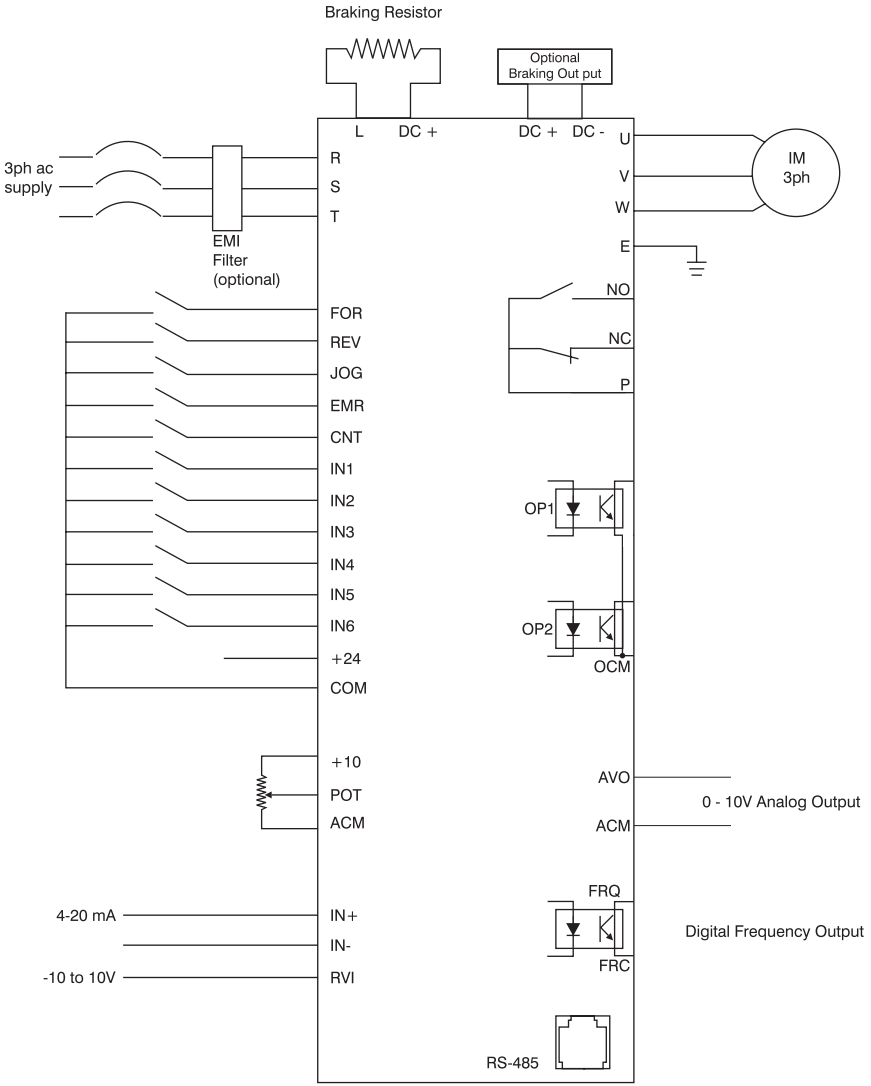
- Use any multi strand wire between AWG15 and AWG26 for control wiring.
- Use a twisted pair or twisted pair shielded wire for analog signals. Wire shield should be connected to ACM.

Basic Wiring scheme

(KLX300 to KLX1500)



Basic Wiring scheme
(KLX 2000 Above)



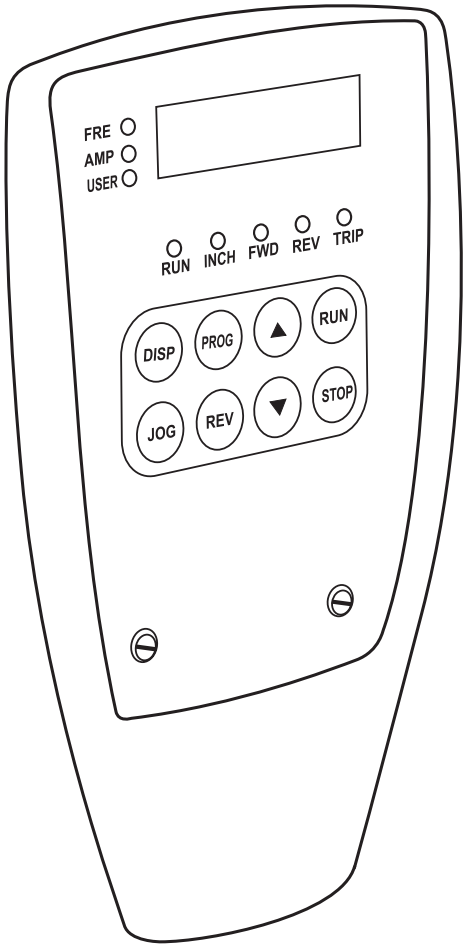
Maintenance

- Vacuum clean the drive regularly in power off condition. Do not use water or organic solvents to clean the drive.
- Contact Kolorrol for any part replacement . Part replacement and repairs should be carried out by qualified / trained personnel only.

MOTOR GUIDELINES

- Avoid running a standard induction motor at low speed. Under these condition the motor temperature may rise above the rated value due to limited airflow produced by motor's fan.
- If 100% output torque is required at low speed, it may be necessary to use a special " INVERTER-DUTY" motor.
- When using the AC DRIVE to operate a standard 3 Phase induction motor, notice that energy losses are greater than for inverter duty motor.
- When the standard motor operates at low speed, the output load current rating of the drive must be derated.

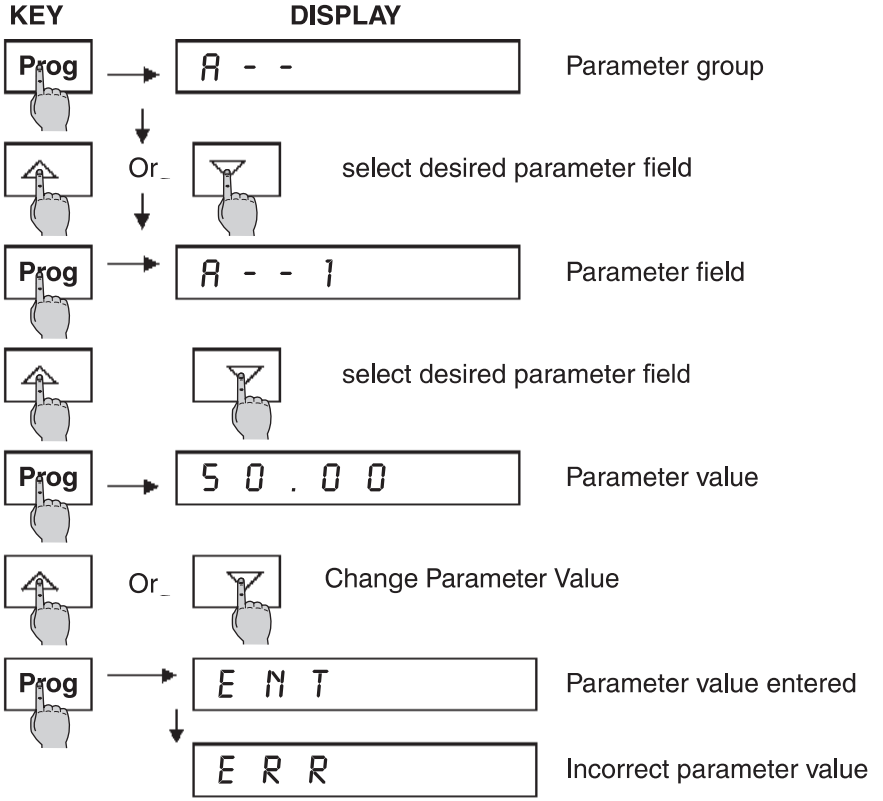
Digital Keypad Operation
Keypad diagram



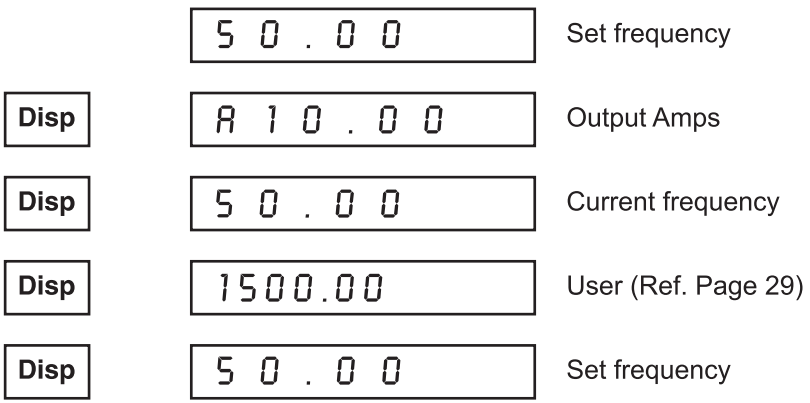
Digital Keypad Operation

Keypad diagram

Paramter entry :



Display selection :



Parameter description:

**** All parameters marked ▶ can be changed while drive is running.**

Group A:

A-0: Acceleration time 1 **Factory setting: 10.0s** ▶
A-7: Acceleration time 2 **Range: 0.1 to 6000.0s**

This is the time required to accelerate from 0hz to maximum frequency(**G-1**). Acceleration is linear provided that s curve (**A-6**) is 0.

A-1: Deceleration time 1 **Factory setting: 10.0s** ▶
A-8: Deceleration time 2 **Range: 0.1 to 6000.0s**

This is the time required to decelerate from maximum frequency**(G-1)** to 0hz. Deceleration is linear provided that s curve (**A-6**) is 0.

Selection between accel /decel time 1 and accel/decel time 2 is done by multi function inputs (see page 19)

A-2: Jog frequency **Factory setting: 5.00hz**
Range: 0.1hz to 400.0hz

On pressing the inch key on the keypad or actuating the jog input on the control terminals the drive accelerates as per jog accel/decel time(**A-3**)from minimum frequency(**G-6**) to the jog frequency. On releasing the inch key the drive decelerates or coasts to a stop. Only reverse and stop commands are accepted when drive is in jog mode.

A-3: Jog acceleration/deceleration time **Factory setting:2.0s** ▶
Range: 0.1s to 1000.0s

This is the acceleration / deceleration time in jog mode.

A-4: Frequency reference upper limit **Factory setting:100%**
Range: 1% – 110%

This parameter clamps maximum set frequency to a percentage of max frequency(**G-1).**

$$\text{Max set frequency} = \frac{\textbf{A-4} * \textbf{G-1}}{100}$$

This parameter should be greater than **A-5** – frequency reference lower limit.

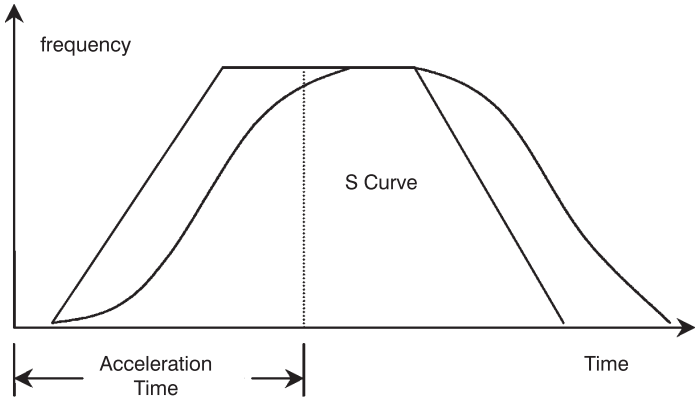
A-5: Frequency reference lower limit **Factory setting:1%**
Range: 0% – 100%

This parameter clamps minimum set frequency to a percentage of max frequency (**G-1).**

$$\text{Min set frequency} = \frac{\textbf{A-5} * \textbf{G-1}}{100}$$

This parameter should be less than **A-4**- frequency reference upper limit.

A-6: S curve **Factory setting: 0**
Range: 0 – 10



The S curve is for smooth acceleration and deceleration of the drive. If set to 0 it is deactivated. For a higher value, the speed time curve is no longer linear. With s curve the acceleration and deceleration times are higher than their set values.

Group B:

B-0: Frequency reference select **Factory setting: 0**
Range: 0 to 5

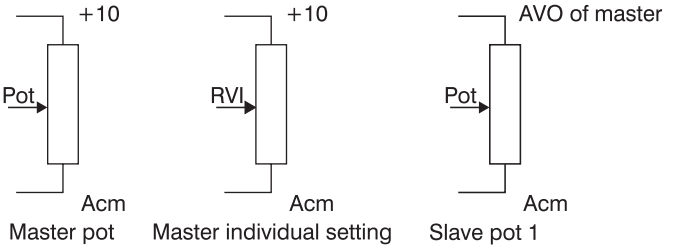
By setting this parameter , source of set frequency can be selected.

For changing set frequency by inc/dec
push buttons or inc/dec keys = 0
RVI: -10V to 10VDC = 1
0 to 10VDC analog input = 2
0-20mA, 4-20mA current input = 3
frequency ref set by serial communication (Rs485) = 4
Synch mode = 5

This mode is used for master slave synchronization. In this mode drive works as master. Two references are given: Master input at POT (0 to 10V). Individual control input at RVI (0 to 10V). Master 0 to 10V reference is available for other slave drives at AVO or IO+(D-5 = 3). Input at RVI is used for individual trimming of master speed.

$$\text{Master set frequency} = \frac{\text{POT(0 to 10V)} \times \text{RVI(0 to 10V)}}{10}$$

A maximum of 10mA can be drawn from master +10 terminal
Example shows 2 potentiometers connected to master drive and 1 potentiometer connected to slave. Variable input at POT of master is available as reference at AVO. Master individual frequency setting can be done using RVI input. This setting has no effect on AVO of master.



B-1: Operator select **Factory setting:0**
Range: 0 to 2

Operator or command source can be one of the following:

Keypad	=	0
Control terminals	=	1
Serial interface RS485	=	2

B-2: Stop method **Factory setting:0**
Range: 0 to 1

For coasting stop	= 0
For ramp to stop (on giving stop command)	= 1

B-3: Stop key operation **Factory setting:0**
Range: 0 to 1

Stop key(on keypad) always functional regardless of operator (**B-1**)	=	0
Stop key functional only if keypad selected as operator **(B-1 = 0)**	=	1

B-4: Reverse operation **Factory setting: 0**
Range: 0 to 1

This parameter is used to enable or disable reverse operation.

Disable reverse operation	=	0
Enable reverse o eration	=	1

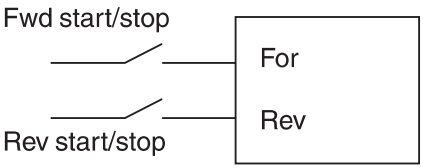
B- 5: Control method **Factory setting: 0**
Range: 0 to 3

This parameter is used to select the mode of operation of ac drive.

V/f	= 0
V/f closed loop	= 1
Sensorless vector open loop	= 2
Sensorless vector closed loop	= 3

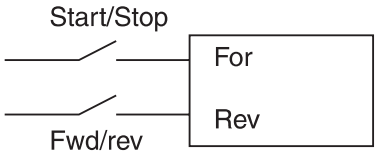
B-6: 2 wire 3 wire selection **Factory setting:0**
Range: 0 to 2

Mode 0: (B-6 = 0)



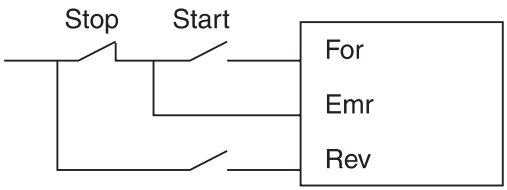
Both inputs are non latching type.

Mode 1: (B-6 = 1)



Start / stop input is non latching type.

Mode 2: (B-6 = 2)



Start /stop input require momentary actuation.

B-7: Set frequency resolution **Factory setting: 0**
Ran e: 0 to 1

This parameter sets resolution of set frequency.
For 0.1 hz resolution = 0
0.01 hz resolution = 1

B-8: Set frequency storage **Factory setting:0**
Range: 0 to 1

With this parameter set frequency , if changed, can be stored without pressing PROG key. This operation is valid only for **B-0** = 0

Normal operation. = 0
Store set frequency
without pressing PROG key = 1

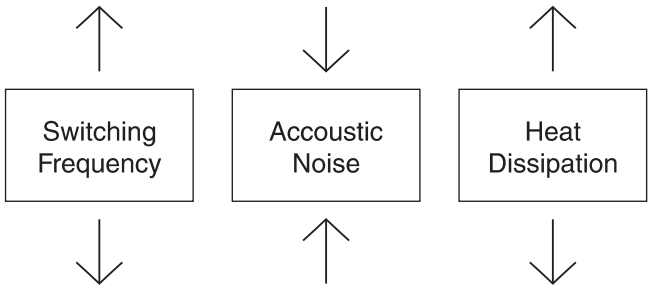
B-9: Switching frequency **Factory setting: 8khz**
Range: 3 to 15khz

This is the switching frequency of the output PWM voltage.

Higher switching frequency results in higher heat dissipation and lower acoustic noise.

Recommended values of switching frequency:

3hp to 20hp b-9 = 8khz
20hp onwards b-9 = 4khz



Group C
Multi function opto isolated inputs

C-0: **Factory setting: 1**
C-1: **Factory setting: 2**
C-2: **Factory setting: 3**
C-3: **Factory setting: 4**
C-4: **Factory setting: 5**
C-5: **Factory setting: 6**
Range: 0 to 20

C-0/C-1/C-2/C-3/C-4/C-5 value	Explanation
0	Disable input. No function
1	Increase set frequency if **B-0** = 0
2	Decrease set frequency if **B-0** = 0
3	Multi step speed 1
4	Multi step speed 2
5	Multi step speed 3
6	Multi step speed 4
7	External fault reset
8	If **B-0** = 2 or 3 select 0-10V or 0-20mA analog inputs

C-0/C-1/C-2/C-3/C-4/C-5 value	Explanation
9	If B-0 = 1 or 2 select 0-10V or -10V to 10V analog inputs
10	Select keypad or terminal as command source. Selection by **B-1** is bypassed.
11	Acceleration/deceleration inhibit
12	Select 1st or 2nd acceleration/deceleration times
13	Select 3rd or 4th acceleration/deceleration times
16	Emergency stop NO contact
17	Emergency stop NC contact
18	Clear Counter
19	PID Select
20	Select inc/dec or POT reference

C-6: Multi function input delay time **Factory setting: 1**
Range: 1ms to 10ms

This is the time delay in recognizing a multi function input. It is similar to debouce time. A higher value provides better noise immunity.

C-7: RVI bias frequency
C-13: 0-10VDC input bias frequency
C-16: Current input bias frequency

Factory setting: 0
Range: 0 to 300.0hz

Analog input bias frequency

C-9 RVI gain
C-12 0-10VDC input gain
C-15 Current input gain

Factory setting:100
Range: 0 to 200

Analog input gain

C-8: Analog input bias polarity **Factory setting: 0**
Range: 0 to 1

Positive bias polarity = 0
Negative bias polarity = 1

For positive bias polarity , gain required to attain a required frequency at 10V input is given by:

$$\text{Gain (for 10V input)} = \frac{\text{required frequency} - \text{bias frequency}}{\text{max frequency} - \text{bias frequency}} * 100$$

For negative bias polarity, gain required to attain a required frequency at 10V input is given by:

$$\text{Gain(for 10V input)} = \frac{\text{required frequency + bias frequency}}{\text{min frequency + bias frequency}} * 100$$

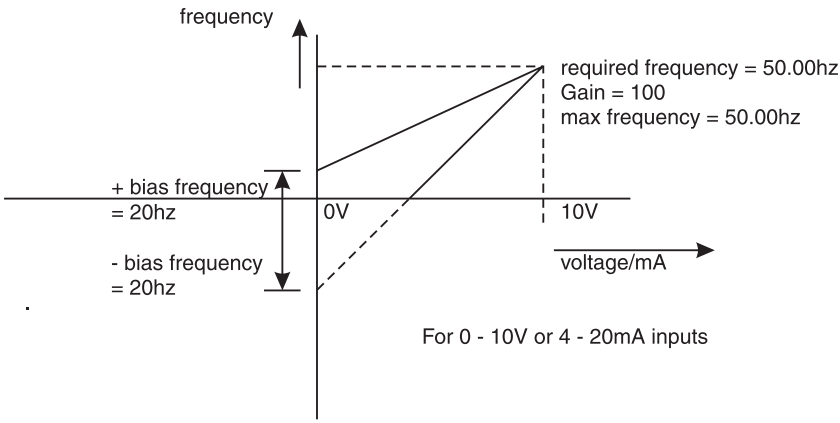
max frequency and min frequency used should take into account **A-4**(frequency ref upper limit) and **A-5**(frequency ref lower limit)

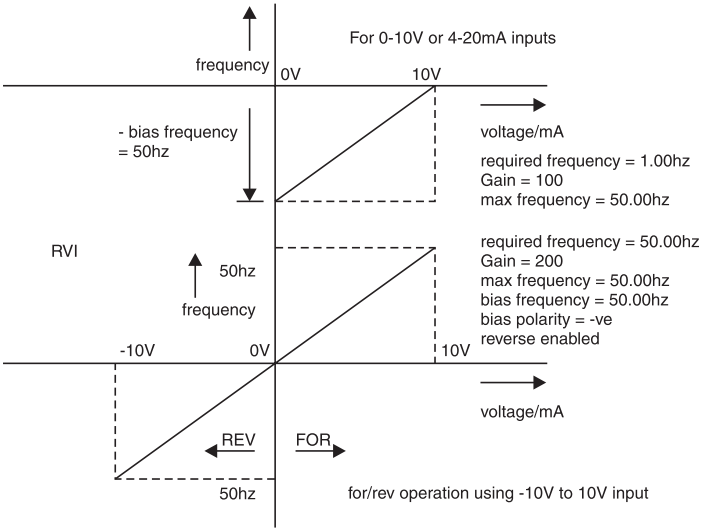
Eg: max frequency = 50.00hz, bias frequency = 20.00hz, frequency required at 10V input = 50hz, bias polarity positive

$$\text{Gain} = \frac{50 - 20}{50 - 20} * 100 = 100$$

negative bias polarity can be used to obtain min frequency(or bias frequency) at 10 V input. Eg: max frequency = 50.00hz, bias frequency = 50.00hz, frequency required at 10V = 5.00hz, min. frequency = 5.00hz

$$\text{Gain} = \frac{5+50}{5+50} * 100 = 100$$





C-11: -10V to 10V input filter time constant
C-14: 0 to 10V input filter time constant **Factory setting: 0.1s**
C-17: 4-20mA input filter time constant **Range: 0.01s to 2.00s**

This is the time constant of the built in analog input filter.
Higher the value of this parameter, more is the noise immunity.

Group D

D-0: Programmable output MO1
D-1: Programmable output MO2 **Factory setting: 0**
D-2: Programmable relay output **Range: 0 to 10**

D-0/D-1/D-2 value	Operation
0	Output is activated on drive fault.
1	Output activated in run condition
2	Output activated when set frequency is attained.
3	Output activated when desired frequency 1 **D-3** is attained
4	Output activated in case of an alarm
5	Output activated if command source other than keypad is selected
6	Output activated when drive is ready to run
7	Output activated in case of direction reversal
8	Output activated in case of dc under voltage trip
9	Output activated when desired frequency 2 **D-4** is attained
10	Output activated when counter match value attained

D-3: Desired frequency 1

Factory setting: 50.00hz
Range: 0.10 to 600.00hz

D-4: Desired frequency 2

Factory setting: 1.00hz
Range: 0.10 to 600.00hz

If frequency of ac drive is greater than desired frequency, the corresponding output(set by D-0 , D-1 or D-2) is activated. The output is deactivated when frequency is less than desired frequency.

D-5: Multi function analog output

Factory setting: 0
Range: 0 to 3

D-6: Multi function analog output gain

Factory setting: 100
Range: 0 to100

Analog output voltage(0-10Vdc) and current(0-20mA) proportional to the selected parameter is available.

This output can be scaled by setting appropriate value of gain.

D-5	Operation
0	Output proportional to frequency
1	Output proportional to drive output voltage
2	Output proportional to drive output current
3	Output proportional to set frequency

D-7: Output frequency multiplier

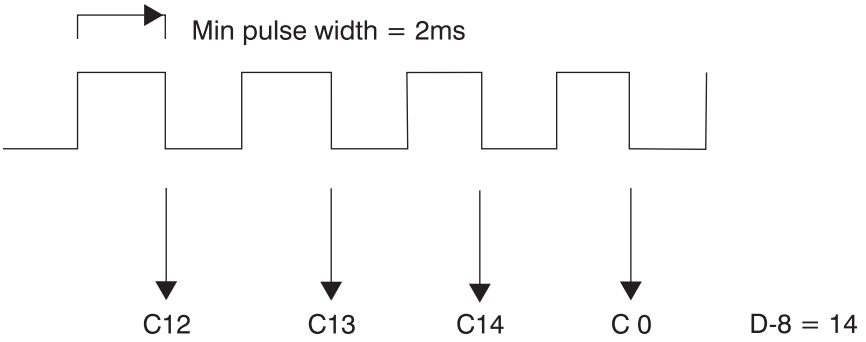
Factory setting: 10
Range: 10 to 20

Frequency output proportional to frequency of ac drive is available at terminal **Frq** with respect to **Frc**. Frequency output at **Frq** = D-7 * ac drive frequency. For example if D-7 = 10 and current ac drive frequency = 50hz, frequency at **Frq** = 500hz

D-8: Counter match value

Factory setting: 65535
Range: 0 to 65535

Cnt input counts the number of pulses. The counter is incremented on falling edge of each pulse. When the counter value reaches the counter match value the counter is reset to 0 on the next count.

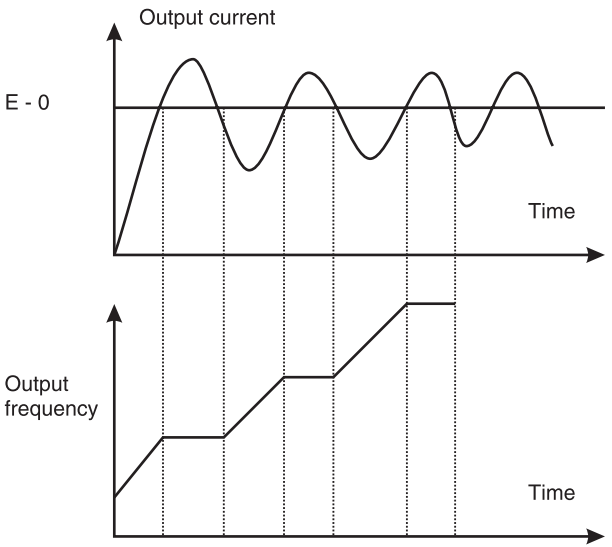


Example:
After counter match value(D-8 = 14) is attained, counter is reset.

Gruop E

E-0: Overcurrent stall prevention during acceleration

Factory setting:150%
Range: 20% to 200%



During acceleration if drive output current exceeds this limit, acceleration stops and drive continues to run at the same speed. Acceleration resumes when current falls below the stall prevention limit. Above value is a percentage of drive output current rating. (G - 8)

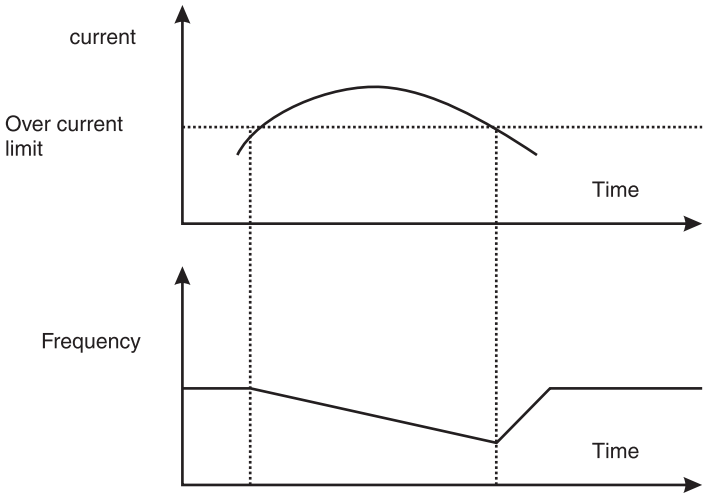
E-1: Overcurrent stall prevention during deceleration

Factory setting: 150%
Range: 20% to 200%

During deceleration if drive output current exceeds this limit, deceleration stops and drive continues to run at the same speed. Deceleration resumes when current fall below the stall prevention limit. Above value is a percentage of drive output current (G - 8)

E-2: Overcurrent stall prevention while running

Factory setting: 100%
Range: 20% to 200%



While running (no acceleration, no deceleration) if drive output current exceed this limit, drive begins decelerating (as per the set deceleration time) till current falls below this limit. When the current drops below the stall prevention limit, drive accelerates to set speed.

Fault history

E-5: last fault
E-6: one fault before last fault
E-7: two faults before last fault

Faults are stored in e2prom and are displayed at the above locations.

Fault display	Fault	Fault code
Oc	Overcurrent	31
Sc	Short circuit	47
Uv	Dc under voltage	143
Ee	E2prom error	16xxx
Ot	Over temperature	32783
Ov	Dc overvoltage	79

Group F

F-0 F-4 F-8 F-12
F-1 F-5 F-9 F-13
F-2 F-6 F-10 F-14
F-3 F-7 F-11

Factory setting:2.00hz
Multi step speed
Range: 0.1 to 600.00hz

By programming any input as multi step speed input , any one of the 15 preset speeds can be selected. All inputs should be within the minimum frequency(**G-6**) and maximum frequency(**G-1**) band.

Eg: Program In3 = 3, In4 = 4, In5 = 5, In6 = 6

In6(= 6)	In5(=5)	In4(=4)	In3(=3)	Speed
0	0	0	0	Default set speed
0	0	0	1	F-0
0	0	1	0	F-1
0	0	1	1	F-2
0	1	0	0	F-3
0	1	0	1	F-4
0	1	1	0	F-5
0	1	1	1	F-6
1	0	0	0	F-7
1	0	0	1	F-8
1	0	1	0	F-9
1	0	1	1	F-10
1	1	0	0	F-11
1	1	0	1	F-12
1	1	1	0	F-13
1	1	1	1	F-14

0: Inactive, 1: active

Group G

G-0: Motor rotation — **Factory setting: 0**, **Range: 0 to 1**

Default motor direction of rotation can be set with this parameter.
Set to 0 or 1 depending upon the desired direction.

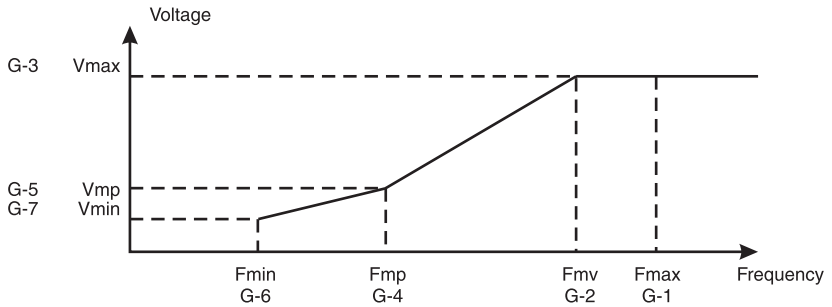
G-1: Maximum output frequency — **Factory setting: 50.00hz**, **Range: 0.1 – 600.00hz**

This is the drive's maximum output frequency.

This is the reference frequency for acceleration, deceleration times, frequency reference upper limit, frequency reference lower limit.

G-2: Maximum voltage frequency — **Factory setting:50.00hz**, **Range:0.1- 600.00hz**

This is the frequency at which drive's output voltage becomes maximum.



G-3: Maximum voltage — **Factory setting: 440.0V**, **Range: 0.1 to 510V**

This is the maximum output voltage of the ac drive.

G-4: Mid point frequency — **Factory setting:0.5hz**, **Range: 0.1 – 600.00hz**

G-5: Mid point voltage — **Factory setting: 16.0V**, **Range: 0.1 – 510.0V**

G-6: Min frequency — **Factory setting: 0.5hz**
Range: 0.1 – 600.00hz

G-7: Min voltage — **Factory setting:16.0V**, **Range: 0.1 – 510.0V**

The following conditions must be met:
Fmax ≥ Fmv ≥ Fmp ≥ Fmin

Vmax ≥ Vmp ≥ Vmin

If Fmp = Fmin the V/f curve is a straight line and the setting of Vmp is disregarded.

G-9: Torque compensation **Factory setting: 2.0**
Range: 0 to 10.0V

IR compensation is required at low speeds.

Low speed voltage can be increased by increasing this parameter, resulting in higher torque.

If this parameter is set too high it can cause the motor to saturate and the drive can trip in overcurrent.

G-10: Rated slip **Factory setting: 2.50hz**
Range: 0 to 20.00hz

$$\text{Rated slip frequency} = \frac{(\text{synchronous speed of IM} - \text{rated speed (as on name plate)}) * \text{No of poles}}{120}$$

G-11: Motor no load current **Factory setting: 40%**
Range: 0 to 90%

This is the motor no load current as a percentage of rated current(G-8).

G-12: Motor Stator resistance **Factory setting: 0**
Range: 0 to 655.35E

This is the stator resistance between 2 phases of motor.
This parameter can be set manually or auto tuned .

G-13: Auto Tune **Factory setting: 0**
Range: 0 to 1

0: Drive runs normally on giving start command
1: Drive performs auto tuning on giving start command.
Run led is on at the time of auto tuning. After auto tuning is completed Run led turns off. After auto tuning , stator resistance value is stored and G-13 is reset to 0. Any start command after auto tuning will start the drive normally.

Auto tuning should only be performed with motor of rating equal to or less than that of the drive.

G-14: Maximum slip compensation **Factory setting: 200%**
Range: 0 to 250%

This is the maximum slip compensation expressed as a percentage of rated slip(G-10).

G-15: Motor number of poles **Factory setting: 4**
Range: 2 to 10

G-16: Vector control current limit **Factory setting: 1.0**
Range: 0 to 2.0

The output current during vector control is limited by this parameter.
The output current is a percentage of rated current (G-8).
For example if G-16 = 1.0 , maximum current with vector control = 1.0x rated current.

Group H

H-0: Drive identification number **Factory set**

This is a unique identification number and is read only.

H-1: Default parameters **Factory setting: 1**
Range: 0 to 1

If set to 0 all parameters are initialized to factory setting.

If set to 1 all parameters are initialized from the non volatile memory on power up.

H-2: Power up display **Factory setting: 0**
Range: 0 to 3

On power up , the display can be initialized to the following parameters:

H-2	Display
0	Set frequency
1	Any parameter as per H-3 selection
2	Drive output frequency
3	User parameter as per coefficient H-4

H-3: Parameter selection **Factory setting:0**
Range: 0 to 5

Any one of the following parameters can be displayed when AMP led is on.

H-3	Display (AMP Led on)
0	Output current (A)
1	DC link voltage (VDC)
2	Output voltage (V)
3	Power (Watts)
4	Energy (KW-hr)
5	Total run time (hours)
6	Counter value

For display selection see page 14.

H-4: User selection **Factory setting: 0**
Range: 0 to 6

Any one of the following parameters can be displayed when USER led is on.

H-4	Display (USER LED on)
0	User value
1	DC link voltage (VDC)
2	Output voltage
3	Power (Watts)
4	Energy (KW-hr)
5	Total run time (hours)
6	Counter value

For display selection see page 14.

H-5: software version **Factory set**

This is a version number of the drive software.

H-6: Password **Factory setting: 0**
Range: 0 to 1

If set to 0 all the drive parameters can be changed.

If set to 1, all the drive parameters except set frequency are locked and no change is possible.

Group I Communication

Modbus registers:

Command	Address	Register	
Read (03)	2001H	Current Fre	
Read (03)	2002H	Amps *	
Read (03)	2003H	User **	
Read (03)	2004H	Keypad Led Status	
Read (03)	2005H	Status	
Read (03)	2006H	Trip status	
Read (03)	2007H	Control terminal status	
Read (03)	2008H	Set Frequency	
Read (03)	Gr(Pr+1)H	Any Parameter in a group	
Write (06)	3001H	Other commands	
Write (06)	3002H	Set frequency (serial)	
Write (06)	3003H	Parameter write password	
Write (06)	Gr(Pr+1)H	Any parameter in a group	

* selection depends on H3
**selection depends on H4
Note: 8 holding registers can be read at a time

Status (address: 2005h)

Bit15-Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
x	Accel-eration	Decel-eration	Accel Current limit	Decel Current limit	Steady State Current Limit	PWM	trip

Keypad LED Status (address: 2004h)

Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8	Bit7-Bit 0
TRIP	REV	FWD	RUN	USER	AMP	FRE	INCH	X

Led on = 1
Led off = 0

Control terminal status(address:2007h)

Bit15-Bit12	Bit11	Bit10	Bit9	Bit8	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1-0
X	For	Rev	Jog	EMR	I1	I2	I3	I4	I5	I6	X

Trip Status(address:2006h)

Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8	Bit7	Bit6	Bit5	Bit4	Bit3-Bit0
OT	EE	EMR	I^2t	CE	X	X	X	UV	OV	SC	OC	X

EE E2PROM read error
EMR: emergency stop
I^2t: thermal overload trip
CE: communication error
UV: DC under voltage
OV: DC over voltage
Sc: Output short circuit
Oc: Over current

Other command (address:3001h)

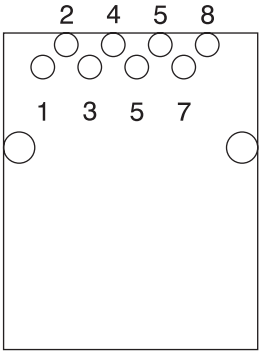
Bit15-13	Bit12	Bit11	Bit10	Bit9	Bit8	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
X	Trip reset	START	STOP	INCH	FWD	REV	MSI	MS2	MS3	MS4	Accel1/ Decel1/2	Accel3/ Decel3/4	Enable Msx And accelx

Activate = 1
Deactivate = 0

examples:

run : 01 06 3000 0800 chksum CR LF
stop: 01 06 3000 0400 chksum CR LF
rev start: 01 06 3000 0880 chksum CR LF
fwd start: 01 06 3000 0900 chksum CR LF
read B-1: 01 03 0101 0001 chksum CR LF
set frequency: 01 06 3001 1388 chksum CR LF
(set frequency = 50.00 hz)
Paramater groups are mapped as A: 0 , B: 1 and so on.

RJ45 header layout on PCB(top view):



1,8 : Vcc
4: Rs485+
5: RS485-
2: Gnd

I-0: Modbus slave address

Factory setting: 1
Range: 1 to 254

I-1: Baud rate

Factory setting: 1
Range: 0 to 3

Setting	Baud rate
0	4800
1	9600
2	19200
3	38400

I-2: Error response

Factory setting: 1
Range: 0 to 2

This parameter decides response in case of communication error.
It is indicated as CE- < exception response code> on the drive display.

Setting	Error response
0	No response
1	Display error code
2	Display error code and stop

Modbus exception response codes

01 ILLEGAL FUNCTION The function code received in the query is not an allowable action for the slave.

02 ILLEGAL DATA ADDRESS The data address received in the query is not an allowable address for the slave.

03 ILLEGAL DATA VALUE The data value received in the query is not valid for the slave

04 SLAVE DEVICE FAILURE An unrecoverable error occurred while the slave was attempting to perform the requested action.

06 SLAVE DEVICE BUSY The slave is engaged in processing a long–duration program command. The master should retransmit the message later when the slave is free.

Other exception responses displayed on drive(if I2 = 1) , but not transmitted to master:

08 Check sum error
09 Invalid message from master
12 Value received is not an ascii value (for ascii mode only)
13 Parity error
14 Framing error
15 overrun error

I-3: Modbus Protocol **Factory setting: 0**
Range: 0 to 4

0: Modbus ASCII , 7b data, even parity, 1 stop bit
1: Modbus ASCII , 7b data, odd parity, 1 stop bit
2: Modbus RTU, 8b data, no parity, 2 stop bits
3: Modbus RTU, 8b data, even parity, 1stop bit
4: Modbus RTU, 8b data, odd parity, 1 stop bit

Any one of the above RTU or ASCII modes can be selected.

I-4: Polling mode

Factory setting: 0
Range: 0 to 1

The polling mode enables monitoring the drive status. All communication parameters have to be appropriately selected. However, this mode is independent of B-0(frequency reference) and B-1(Operator) parameters. This means, that even if frequency reference or operator is not controlled by modbus, all drive parameters and status can be monitored.

0: disable polling
1: enable polling

No parameter write is possible in the polling mode. It is a read only mode.

Group J

J-0: PID mode

Factory setting: 0
Range: 0 to 4

J-0	Mode of operation
0	PID disabled
1	PID enabled
2	Inverse PID
3	PID + reference
4	Inverse PID + reference

The Proportional, Integral and derivative control provides closed loop control of a system process variable(pressure, temperature, etc). The feedback signal is compared with a reference signal which results in an error signal. This signal after being processed by the PID parameters is the new frequency reference.

J-1: PID feedback gain

Factory setting: 1.00
Range: 0 to 10.00

The feedback value is multiplied by PID feedback gain before being compared to set point value.

J-2: PID feedback selection

Factory setting: 0
Range: 0 to 1

0: voltage input at RVI is the feedback for PID control.
1: current input at IN+, IN- is the feedback for PID control.

J-3: PID offset

Factory setting: 0
Range: 0 to 100%

This parameter adds a fixed offset (polarity is determined by J-4) to the PID output. The offset is a percentage of maximum frequency(G-1).
It is used to remove small system noise.

J-4: PID offset polarity

Factory setting: 0
Range: 0 to 1

This parameter determines the polarity of PID offset (J-3).
0: positive PID offset polarity
1: negative PID offset polarity

J-5: Proportional gain

Factory setting: 1.0
Range: 1.0 to 10.0

Proportional gain P is specified by this value.
A higher value will result in a more responsive system.
A lower value will result in a more stable system.

J-6: Integral time

Factory setting: 1.00s
Range: 0 to 100.00s

This time determines how fast the PID controller will seek to eliminate steady state error. Steady state error will be eliminated faster with a lower setting. Effect of this parameter can be eliminated completely by making it 0.

J-7: Derivative time

Factory setting: 0
Range: 0 to 1.00s

This parameter can be used to increase system response to fast load or reference changes. The effect of this parameter can be eliminated completely by making it 0

J-8: Integral gain upper limit

Factory setting: 100%
Range: 0 to 100%

This parameter limits the output of integrator. It is used to prevent integrator ‘windup'.

J-9: Feedback loss time

Factory setting: 60.0s
Range: 0 to 3600.0s

If feedback signal value is less than feedback detection level for a time interval equal to feedback loss time, feedback loss mechanism is activated.

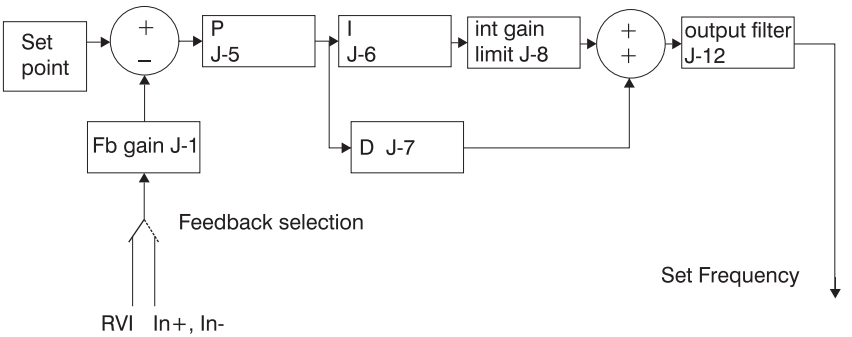
J-10: Feedback loss response **Factory setting: 0**
Range: 0 to 2

In case of feedback signal less than feedback loss level(J-11), the response is :
0 No response
1 Warn and keep operating
2 Stop

J-11: Feedback loss detection level **Factory setting: 0**
Range: 0 to 100%

J-12: PID output filter time constant **Factory setting: 0**
Range: 0 to 2.5s

This parameter adds a filter to the PID output. This filter can be utilized to remove noise at PID output.



Group L Miscellaneous

L-0: Speed search initiating level **Factory setting: 100%**
Range: 1 to 200%

Speed search begins if drive output current >= L-0

L-1: Speed search scan time **Factory setting: 2.0s**
Range: 0.1 to 10.0s

This is the maximum time taken for speed search.

L-2: Speed search **Factory setting: 0**
Range: 0 to 1

If the drive is to be started on a spinning motor, speed search should be enabled.
Speed search starts from maximum frequency G-1.
0: Speed search disabled
1: Speed search enabled

L-3: Power loss ride through **Factory setting: 0**
Range: 0 to 2

0: Power loss ride through disabled
1: Power loss ride through for a period of 2secs. If power loss exceeds 2secs, drive trips
2: Power loss ride through for indefinite period provided control power is maintained.

L-4: Auto restart **Factory setting: 0**
Range: 0 to 10

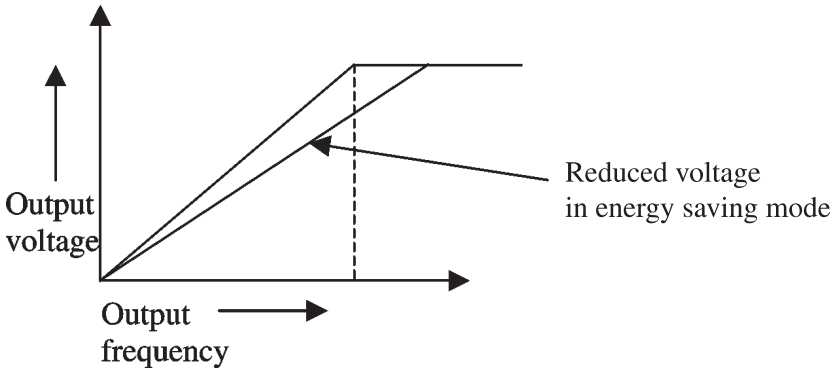
This is the number of restart attempts made by the drive in case of a fault. If set to 0, no fault reset, restart is attempted. No auto reset attempts are made in case of short circuit trip(Sc).Auto restart counter is reset after 10mins of occurrence of last trip.

L-5: Skip frequency1 upper limit
L-6: Skip frequency1 lower limit
L-7: Skip frequency2 upper limit
L-8: Skip frequency2 lower limit
L-9: Skip frequency3 upper limit
L-10: Skip frequency3 lower limit **Factory setting: 0**
Range: 0 to 400.00hz

Three skip frequency bands are available. Frequencies in these bands are skipped while accelerating, decelerating or running.
Following condition should be met: L-6<=L-8<=L-10

L-14: Energy saving mode **Range: 0 to 1**
Factory setting: 0

0: Energy saving mode is disabled
1: Energy saving mode is enabled. The output voltage of the drive is reduced according to load torque. Maximum reduction in voltage is 30% of rated voltage.



L-15: Automatic voltage regulation **Range: 0 to 1**
Factory setting: 0

0: The output voltage of the drive is regulated to rated value against input voltage variations.
1: The output voltage of the drive is not regulated.

No.	Parameter	Default	Settings	
	BASIC A			
0	Acceleration time 1	10.0s	0.1 - 6000s	OL
1	Deceleration time 1	10.0s	0.1 - 6000s	OL
2	Jog Frequency	5.00hz	0.1hz - 400Hz	OL
3	Jog accel/decl time	2.0s	0.1 - 1500s	OL
4	Frequency ref upper limit	100%	1-110%	
5	Frequency ref lower limit	1%	1-100%	
6	S curve	0	0-10	
7	Acceleration Time 2	10.0s	0.1-6000s	OL
8	Acceleration time 2	10.0s	0.1-6000s	OL
	OPERATING MODES B			
0	Frequency reference select	0	0: keypad	
			1: -10V to 10VDC input at RVI	
			2: 0 to 10VDC input at POT	
			3: 4-20mA input at IN+, IN-	
			4: serial comm freq reference	
			5: Synch mode	
1	Operator	0	0: keypad	
			1: terminals	
			2: serial interface (modbus)	
2	Stop method	0	0: coasting stop	
			1: ramp stop	
3	Stop key function	0	0: stop key on keypad always enabled	
			1: stop key enabled if keypad selected	
4	Reverse operation	0	0: reverse disabled	
			1: reverse enabled	
5	Control method	0	0: V/f control	
			1: V/f closed loop	
			2: open loop sensorless vector	
			3: closed loop sensorless vector	
6	2 wire/3 wire selection	0	0: fwd start/stop rev start/stopy	
			1: start/stop fwd/rev	
			2: start stop emr	
7	Display selection for frequency ref 0.1hz , 0.01 hz	0	0: 0.1hz display format	
			1: 0.01hz display format	
8	Frequency set : Must be entered to be stored or can be store by inc/dec also.	0	0: no frequency storage	
			1: set frequency saved	
9	Switching freq.	8khz	3-15khz	

	INPUT FUNCTIONS C			
0	MI terminal 1	1	0: disabled	
1	MI terminal 2		1: increase set frequency	
2	MI terminal 3		2:decrease set frequency	
3	MI terminal 4.		3: Multi step speed 1	
4	MI terminal 5		4: Multi step speed 2	
5	MI terminal 6		5: Multi step speed 3	
			6: Multi step speed 4	
			7: externel fault reset	
			8: 0-10VDC or 4-20mA input selection	
			9:0-10VDC or -10 to 10VDC input selection	
			10: keypad/terminal selection	
			11: acceleration/deceleration inhibit	
			12:1st/2nd accel/decel time selection	
			13:3rd/4th accel/decel time selection	
			16:emergency stop NO	
			17:emergency stop NC	
			18:counter clear	
			19:PID select	
			20:select inc/dec or pot ref	
6	MI terminal input delay time	1ms	1-10ms	
7	RVI bias frequency	0Hz	0-300hz	OL
8	Analog input bias polarity	0	0: positive	OL
			1: negative	
9	RVI input frequency gain	100	0-200	OL
10	Analog input inverse enable	0	0: inverse disabled	
			1: inverse enabled	
11	RVI filter time constant	0.1s	0.01s-2s	
12	POT gain	100%	0 - 200%	OL
13	POT bias frequency	0hz	0-300hz	OL
14	POT filter time constant	0.10s	0.015-25	
15	Current input gain	100	0-200	OL
16	Current input bias	0hz	0-300hz	OL
17	Current input time constant	0.1s	0.01s-2.00s	
	OUTPUT FUNCTIONS D			
0	Multi Function output 1	1	Output active on:	
1	Multi Function output 2	2	0: Drive fault	
2	Programable relay output	3	1: Run	
			2: Set frequency attainded	
			3: Desired frequency1 attained	
			4: Alarm	
			5: command source other than keypad	

			6: Drive ready	
			7: Direction reverse	
			8: dc under voltage	
			9: Desired frequency2 attained	
			10: Counter match	
3	Desired Frequency 1	50.0hz	0.1 - 600.0hz	
4	Desired Frequency 2	1.0hz	0.1- 600.0Hz	
5	Multi Function analog output	0	0 : Output a Frequency	
			1 : Output a output voltage	
			2 : Output a output current	
			3: Output a set frequency	
6	Multi Function analog output gain	100	0-100	
7	Output frequency multiplier	10	10-20	
8	Counter match value	65535	0-65535	
	PROTECTION E			
1	Over current stall prevention level during acceleration	150%	20 - 200%	
2	Over current stall prevention level during deceleration	150%	20 - 200%	
3	Stall prevention level at set speed.	100%	20 - 200%	
4	Thermal overload protection 0-2	0	0-2	
5	Thermal overload time constant	30s	30-300s	
6	Fault record 1	0		
7	Fault record 2	0		
8	Fault record 3	0		
	Multi Step Speeds F			
0	Multi Step Speed1	2.00hz	0.1-600.0hz	
1	Multi Step Speed2	2.00hz	0.1-600.0hz	
2	Multi Step Speed3	2.00hz	0.1-600.0hz	
3	Multi Step Speed4	2.00hz	0.1-600.0hz	
4	Multi Step Speed5	2.00hz	0.1-600.0hz	
5	Multi Step Speed6	2.00hz	0.1-600.0hz	
6	Multi Step Speed7	2.00hz	0.1-600.0hz	
7	Multi Step Speed8	2.00hz	0.1-600.0hz	
8	Multi Step Speed9	2.00hz	0.1-600.0hz	
9	Multi Step Speed10	2.00hz	0.1-600.0hz	
10	Multi Step Speed11	2.00hz	0.1-600.0hz	
11	Multi Step Speed12	2.00hz	0.1-600.0hz	
12	Multi Step Speed13	2.00hz	0.1-600.0hz	
13	Multi Step Speed14	2.00hz	0.1-600.0hz	

14	Multi Step Speed15	2.00hz	0.1-600.0hz	
	MOTOR G			
0	Motor rotation	0	0-1	
1	Max output frequency	50.00hz	0.1 - 600hz	
2	Max voltage frequency	50.00hz	0.1-600hz	
3	Max voltage	440.0V	0.1 - 510V	
4	Mid point frequency	0.50hz	0.1-600hz	
5	Mid point Voltage	16.0V	0.1 - 510V	
6	Min frequency	0.50hz	0.1 - 600hz	
7	Min voltage	16.0V	0.1 - 510V	
8	Reserved for rated current	8.0A	1 - 200A	
9	torque compensation	0	0 - 10	OL
10	rated slip	2.50hz	0 - 20hz	
11	Motor no load current	40%	0 - 90%	
12	Motor stator resistance	0E	655.35E	
13	Auto tune	0	0: auto tune off	
			1: auto tune on	
14	Max slip compensation	200%	0 - 250%	
15	Motor no of poles	4	2-10	
16	Vector control current compensation limit	1.0	0-2	
	SYSTEM H			
0	Drive identification no		Factory set	
1	Default parameters enable/disable	1	0: Default parameters	
			1: Set Parameters	
2	Power up display	0	0: Set Frequency	OL
			1: as per H-3	
			2: Output frequency	
			3: User	
3	Parameter selection	0	0: Output Current	
4	Parameter selection1	0	1: DC Bus voltage	
			2: Output voltage	
			3: Power(KW)	
			4: Energy (KW-hr)	
			5: Total run time(hrs)	
			6: Counter value	
5	User coefficient	30.00	0-200	OL
6	Software version		Factory set	
7	Password enter	0	0: all parameters can be changed	
			1:parameters locked	
8	reserved for password			

9	Reserved for display current gain	5.0		
	Communication I			
0	Modbus slave address	1	1-254	
1	Baud rate	1	0: 4800 bauds	
			1: 9600 bauds	
			2: 19200 bauds	
			3: 38400 bauds	
2	Error response	0	0: No response	
			1: Display error code	
			2: Display error code and stop	
3	Modbus Protocol	0	0: Ascii, 7b data, even parity, 1stop bit	
			1: Ascii, 7b data, odd parity, 1stop bit	
			2: RTU, 8b data, no parity, 2stop bits	
			3: RTU, 8b data, even parity, 2stop bits	
			4: RTU, 8b data, odd parity, 2stop bits	
4	Polling mode	0	0: Polling disabled	
			1: Polling enabled	
	PID J			
0	PID mode.	0	0:PID disabled	
			1:PID enabled	
			2: inverse PID	
			3: PID + reference	
			4: inverse PID + reference	
1	PID feedback gain	1.00	0-10	
2	PID feedback selection	0V	0-10V feedback at POT	
3	PID offset	0V	0-100	
4	PID offset polarity	0	0: +ve polarity	
			1: -ve polarity	
5	P gain	1.0	0-10	
6	I time	0s	0-100s	
7	D gain	0.00s	0-1s	
8	integral gain upper limit	100	0-100	
9	Feedback loss time	60.0s	0-3600s	
10	Feedback loss response	0	0-2	
11	Feedback loss detection level	0	0-100	
12	PID output filter TC	0.0s	0-2.5s	
	MISCELLANEOUS L			
0	Speed search initiating level	100%	1-200%	
1	Speed search scan time	2.0s	0.1-10s	
2	Flying start	0	0: speed search disabled	

			1: speed search enabled	
3	Power loss ride through	0	0-2	
4	Auto restart	0	0-10	
5	Skip Freq 1 Upper limit	0hz		
6	Skip Freq 1 Lower limit	0hz		
7	Skip Freq 2 Upper limit	0hz		
8	Skip Freq 2 Lower limit	0hz		
9	Skip Freq 3 Upper limit	0hz		
10	Skip Freq 3 Lower limit	0hz		
11	reserved power calib constant	192		
12	KWH counter			
13	Run time counter			
14	Energy saving mode	0	0: energy saving mode enabled	
			1: energy saving mode disabled	
15	Automatic voltage regulation	0	0: voltage regulation enabled	
			1: voltage regulation disabled	

Trouble shooting

T-1 The ac drive has fault diagnostic features which will be displayed when activated.

To reset a drive after occurrence of a fault , press stop/reset key.

Stop/reset can also be activated from the user terminals. (see page 9)

Fault display	Fault description	Fault correction
No display	No display on keypad	1. Check supply voltage at input terminals. 2. Check whether keypad cable is damaged or accidentally removed.
Oc Sc	Output over current Output Short circuit	1. Check whether mechanical load on motor is abnormal. 2. Check drive and motor wiring. 3. Check whether motor hp corresponds to drive hp. 4. Check parameters : acceleration time. deceleration time, torque compensation and V/f characteristics. 5. if Sc is displayed even after motor connections have been removed, send unit to factory.
Ov	Dc bus voltage has exceeded its allowable value	1. Check whether input supply voltage is within specified range. 2. Increase deceleration time. Ov can be casued by regeneration from the motor while decelerating. 3. Dynamic braking might be required if load inertia is high. Use recommended dynamic brake resistors or brake units.
Uv	Dc bus voltage is below allowable value.	1. Check whether input voltage is within specified limits. 2. It can be caused by internal fault within the unit. In that case return unit to factory.
Ot	Over temperature of ac drive heatsink.	1. Ensure that ambient temperature is within specified range. 2. Check whether drive cooling fans are working properly. 3. Ensure that heatsink fins are not obstructed or deposited with dirt or debris. 4. If the unit is mounted inside a panel, ensure that it is properly ventilated.

EE	E2prom error	1. This error occurs if one or more drive parameters is not within its specified range. Check whether all parameters are within specified range. This error can also be removed by setting H1=0. This sets all parameters to default factory settings. H1 can now be set to I and drive powered up again. If error persists return unit to factory.

Specifications
Voltage class: 460V

Model : KLX	300	500	750	1000	1500	2000	2500	3000	4000	5000	6000	7500	10000
Max applicable motor output (HP)	3	5	7.5	10	15	20	25	30	40	50	60	75	100
Max applicable motor output (KW)	2.2	3.7	5.5	7.5	11	15	18	22	30	37	45	55	75
Rated output (KVA)	3.6	6.5	9.9	13.7	18.3	24.4	28.9	34.3	45.7	55.6	69.3	87	116
Rated output current (A)	4.9	8.5	11.6	16	23	32	38	44	60	73	91	110	150
Rated input current (A)	4.7	8	11	15.2	21.8	30.4	36.1	41.8	57	69.3	86.4	104	142.5
Maximum output voltage	Proportional to input Voltage												
Rated input voltage	340 - 500V AC												
Rated input frequency	48-63hz												
Output frequency resolution	0.01hz												
Overload limit	150% rated current for 1 minute												
Output switching frequency	1-15khz												
Input output wire size AWG 1)	10-18 standed		12-8 copper standed			8-2 copper standed			4	3	2	2/0	3/0
Torque (kg - cm)	10	18	18	18	18	30	30	30	30	60	60	60	60
Input line fuse (A) 2)	10	15	20	25	35	50	50	70	90	110	130	160	220
Ambient temperature	-10 to 40^{0}C												
Ambient humidity	Below 90% RH Non condensing												
Weight (kg)	1.8	5.7	5.7	7.3	7.3	11	11	20	20	30	50	50	80
vibration	9.80665m/s^2 (IG) less that 20hz, 5.88m/s^2 (0.6G) at 20 to 50hz												
Enclosure	IP00												

1) Use 60^{0}C rated power cable
2) Input line fuse type : UL class CC or T For non UL installation IEC269gG

Dynamic brake resistor values and brake units

The brake resistor values mentioned below are minimum values.
Any value selected below this value can damage internal brake transistor.

Drive model	Resistor value	Brake unit		
KLX300	250E, 300W			
KLX500	150E, 400W			
KLX750	100E, 500W			
KLX1000	75E, 1000W			
KLX1500	50E, 1000W	BRK150		
KLX2000		BRK200		
KLX2500		BRK250		
KLX3000		BRK300		
KLX4000		BRK400		
KLX5000		BRK500		
KLX6000		BRK600		
KLX7500		BRK750		
KLX10000		BRK1000		

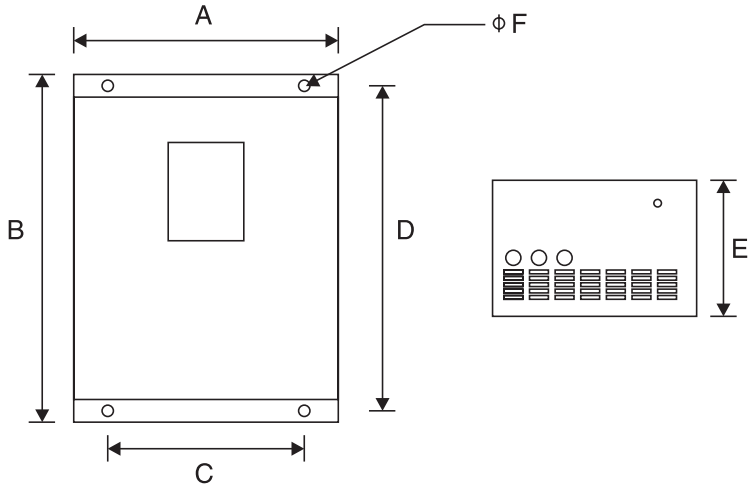
EMI filters

Drive model	EMI filter
KLX300	KEM300
KLX500	KEM500
KLX750	KEM750
KLX1000	KEM1000
KLX1500	KEM1500
KLX2000	KEM2000
KLX2500	KEM2500
KLX3000	KEM3000
KLX4000	KEM4000
KLX5000	KEM5000
KLX6000	KEM6000
KLX7500	KEM7500
KLX10000	KEM10000

Input line reactors

Drive model	Input line choke (3%)
KLX300	KLI300
KLX500	KLI500
KLX750	KLI750
KLX1000	KLI1000
KLX1500	KLI1500
KLX2000	KLI2000
KLX2500	KLI2500
KLX3000	KLI3000
KLX4000	KLI4000
KL5000	KLI5000
KLX6000	KLI6000
KLX7500	KLI7500
KLX10000	KLI10000

Dimensions (mm)



Model	A	B	C	D	E	F
KLX 300	124	192	104	183	191	5.5
KLX 500	147	313	65	292	225	10
KLX 750	147	313	65	292	225	11
KLX 1000	173	360	100	345	233	10
KLX 1500	173	360	100	345	233	11
KLX 2000	263	380	161	360	245	10
KLX 2500	263	380	161	360	245	11
KLX 3000	243	595	140	570	283	12
KLX 4000	243	595	140	570	283	11
KLX 5000	278	706	175	675	332	12
KLX 6000	278	706	175	675	332	11
KLX 7500	270	785	200	760	421	12
KLX 10000	570	860	464	813	415	12

Note : For drives above 100hp, consult factory for dimension .