Manual Download

For detailed information on installation and commissioning,
full version of the G100 manual can be downloaded at www.lsis.com

## Verify & Identify the Delivery

- Inspect the drive for any damanage. If the drive appearsdamage upon receipt, contact your supplier.

- Verify receipt of the correct model by checking the information on thenameplate as shown below. If you have received the wrong model,contact your supplier.
(The nameplate is on the side of the product.)

LSLV 0022 G100 - 2 E O F N S

Motor Capacity
0001 - 0.1kW   0008 - 0.75kW
0002 - 0.2kW   0015 - 1.5kW
0004 - 0.4kW   0022 - 2.2kW

Series Name

Input Voltage
2~3 Single phase 200V - 240V

Keypad
E - LED keypad

UL Type
O - UL open type

EMC Filter
F - Built-in EMC filter[C2]

DC Reactor
N - Non-Reactor

I/O
S - Standard   A - Advanced

LSLV0022G100-2EOFNS

INPUT	200-240V 3Phase 50/60Hz HD: 11.8A ND: 13.1A
OUTPUT	0-Input V 3Phase 0.01-400Hz HD: 11A ND: 12A 4.2kVA IP: 20 Ser. No 5501406001F Inspected by D. K. YU KCC-REM-LSR-XXXXXXX
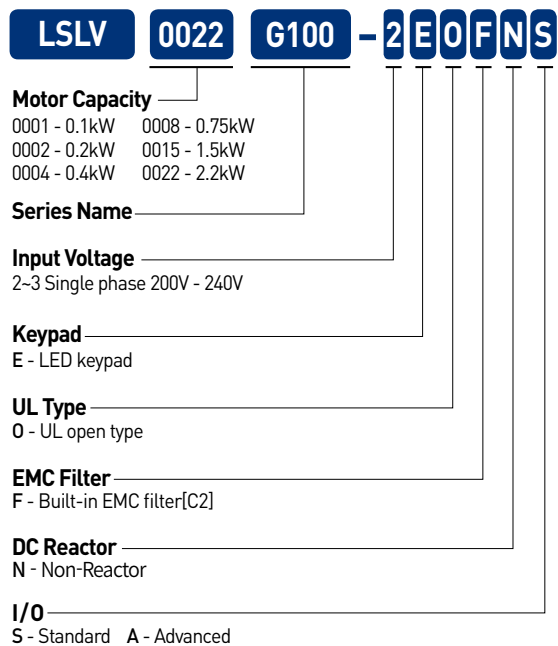
Installation Considerations

- Selecting the installation site
  - The location must be free from vibration, and the inverter must be installed on a wall that can support the inverter's weight.
  - The inverter can become very hot during operation. Install the inverter on a surface that is fire-resistant or flame-retardant and with sufficient clearance around the inverter to allow air to circulate.

- The illustrations below detail the required installation clearances. The inverter can become very hot during operation. Install the inverter on a surface that is fire-resistant or flame-retardant and with sufficient clearance around the inverter to allow air to circulate. The illustrations below detail the required installation clearances.

- If you are installing multiple inverters in one location, arrange them side-by-side and remove the top covers.
The top covers MUST be removed for side-by-side installations. Use a flat head screwdriver to remove the top covers.
(DIN rail installation is available.)

| Installation Site	Air Circulation Precaution	Side-by-side Installation

Installation Quick Guide
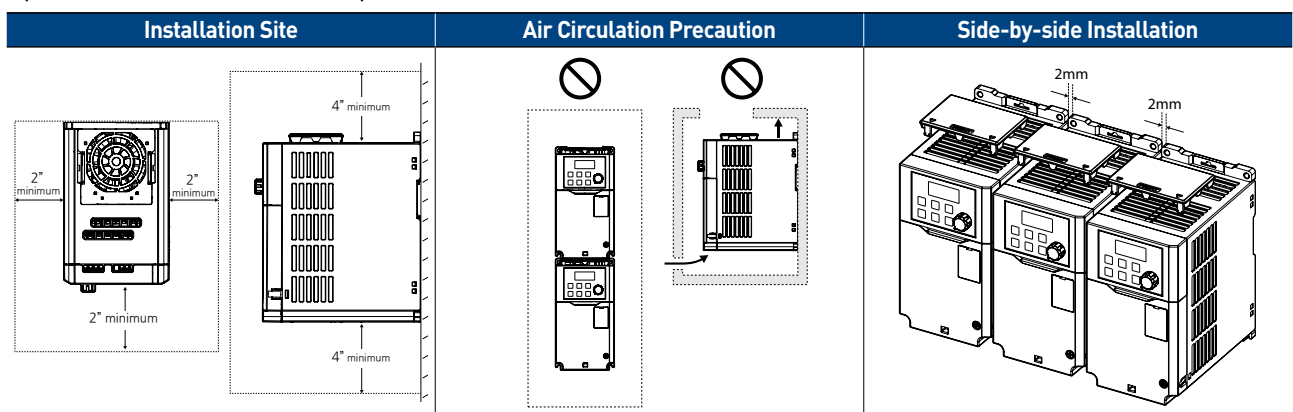
- Inverters are composed of various precision, electronic devices, and therefore the installation environment can significantly impact the lifespan and reliability of the product. The table below details the ideal operation and installation conditions for the inverter.

Items	Description
Ambient Temperature*	Heavy load: -10–50°C, Normal load: -10–40°C
Ambient Humidity	Less than 95% relative humidity (no condensation)
Storage Temperature	-20 - 65°C
Environmental Factors	An environment free from corrosive or flammable gases, oil residue, or dust
Operation Altitude/ Oscillation	Lower than 3,280 ft (1,000 m) above sea level, less than 1G (9.8 m/sec^2)
Air Pressure	70–106 kPa

* The ambient temperature is the temperature measured at a point 2″ (5 cm) from the surface of the inverter.

Power Terminal Wiring

- The following illustration shows the terminal layout on the power terminal block. Refer to the detailed descriptions to understand the function and location of each terminal before making wiring connections.

0.4 ~ 4.0kW	5.5 ~ 7.5kW
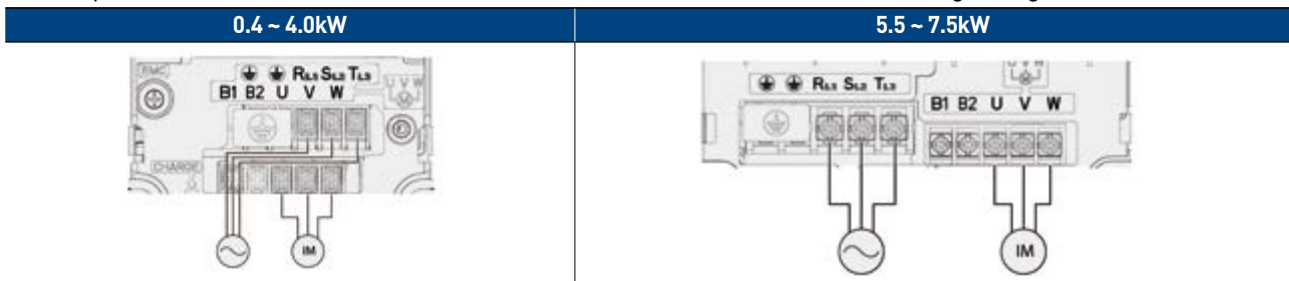
Terminal Labels	Name	Description
⏚	Ground terminal	Connect earth grounding.
R(L1)/S(L2)/T(L3)	AC power input terminal	Mains supply AC power connections.
B1/B2	Brake resistor terminals	Brake resistor wiring connection.
U/V/W	Motor output terminals	3-phase induction motor wiring connections.

Control Terminal Wiring

- The illustrations below show the detailed layout of control wiring terminals, and control board switches.


Switch	Description
SW1	NPN/PNP mode selection switch
SW2	Terminating resistor selection switch
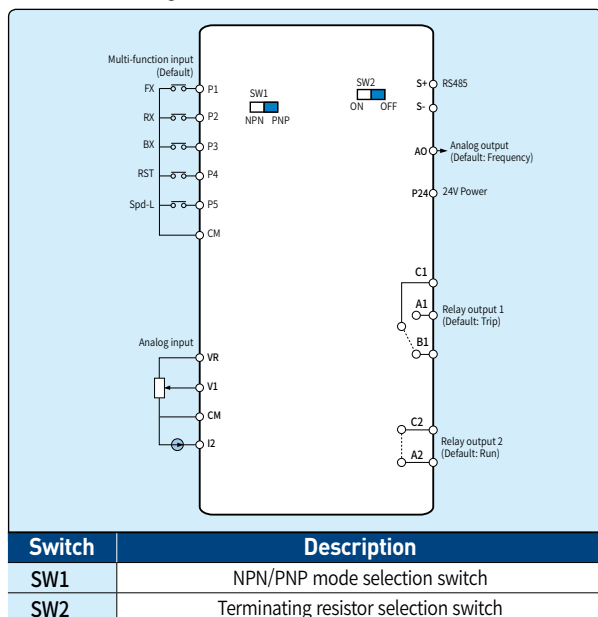
- Input terminal labels and descriptions

Labels	Linked Parameters	Description / Factory Default
P1~P5	IN-65 IN-66 IN-67 IN-68 IN-69	Functions for digital input terminals P1: FX P2: Rx P3: BX P4: RST P5: Speed-L
VR	-	Power source for analog freq. source (12Vout)
V1	IN-05~16	Voltage source for analog input
I1	IN-50~62	Current source for analog input
CM	-	Common terminal

- Output / Communication terminal labels and descriptions

Labels	Linked Parameters	Description / Factory Default
A1/B1/C1	OU-31	Relay output 1, Default: Trip
A2/C2	OU-33	Relay output 2, Default: Run
AO	-	Analog voltage output terminal Default: Output Frequency
24	-	External 24V power source
S+/S-	-	RS-485 signal line

About the Display

No.	Name	Description
❶	7-Segment Display	Displays current operational status and parameter information.
❷	SET Indicator	LED flashes during parameter configuration and when the ESC key operates as the multi-function key.
❸	RUN Indicator	LED turns on (steady) during an operation, and flashes during acceleration or deceleration.
❹	FWD Indicator	LED turns on (steady) during forward operation.
❺	REV Indicator	LED turns on (steady) during reverse operation.
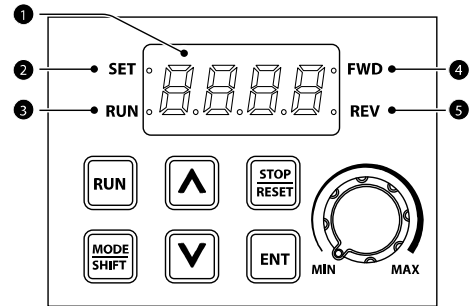
Operation Keys

Key	Name	Description
RUN	[RUN] key	Used to run the inverter (inputs a RUN command).
STOP/RESET	[STOP/RESET] key	STOP: Stops the inverter. RESET: Resets the inverter if a fault or failure occurs.
MODE/SHIFT	[MODE/SHIFT] key	Moves between groups or moves to the digit on the left when setting the parameter. Press the MODE/SHIFT key once again on the maximum number of digits to move to the minimum number of digits.
ENT	[ENTER] key	Switches from the selected state of parameter to the input state. Edits parameter and apply change. Accesses the operation information screen during failure on the failure screen.

Key	Name	Description
∧ ∨	[▲] key, [▼] key	Switches between codes, or increases or decreases parameter values.
(volume)	[Volume] key	Used to set the operation frequency.
∧＋∨ MODE/SHIFT＋∨ MODE/SHIFT＋∧	[ESC] key	ESC to the initial display.

Parameter Group and Code Selection

Parameter Selection	Keypad Monitoring
1. Operation group parameter · 14 basic setting parameters are categorized in the operation group. · Codes can be accessed through [▲] key, [▼] key. · Items can be accessed through [ENTER] key	※ Output current check
2. Group Selection · Groups can be accessed with [MODE/SHIFT] key. · Group access in a counter-direction can be accessed by pressing the [MODE/SHIFT] key for more than 1sec.	※ Parameter group circulation
3. Parameter selection · Parameters can be accessed with the [▲] key, [▼] key. · Press [ENTER] key to change the setting of the parameter. · Press [ENTER] x2 to save the setting.	※ Trip history confirmation

Basic Commissioning

Motor direction inspection

- In this step the motor is checked for proper direction and operation. This test is to be performed solely from the keypad. Apply power to the drive after all the electrical connections have been made and protective convers have been reattached.
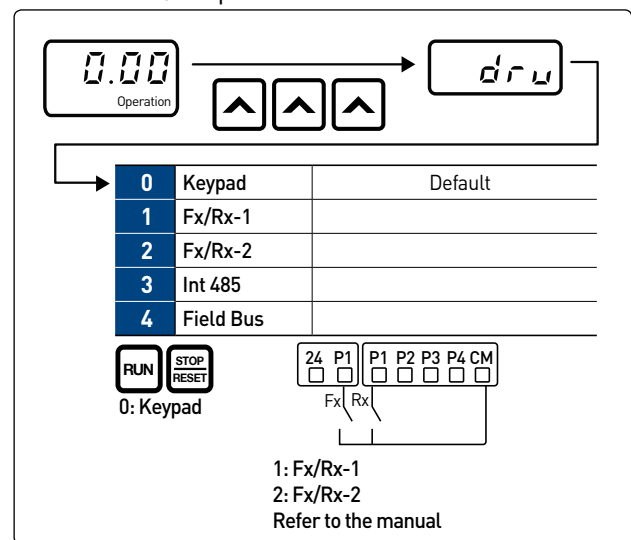- Please go through the following direction to run the motor.
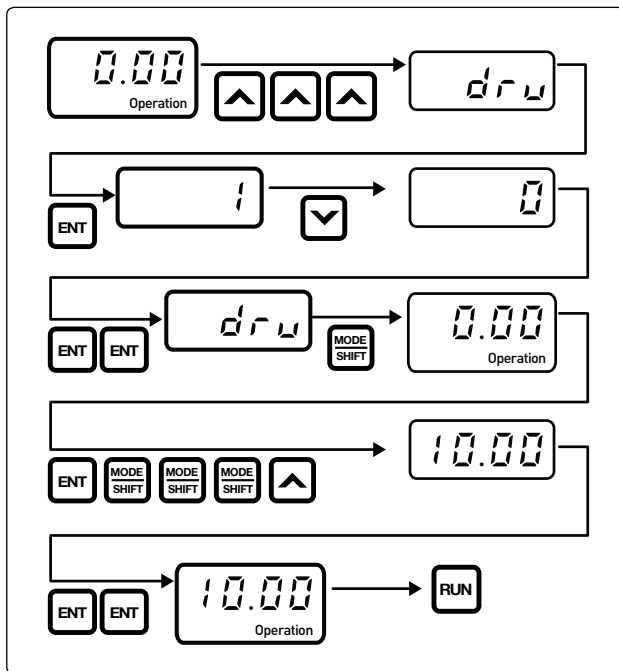
- Observe the motor's rotation from the load side and ensure that the motor rotates counterclockwise (forward).
- If the motor rotation is not correct, change the wiring of the motor. (ex. **U-V-W → V-U-W**)
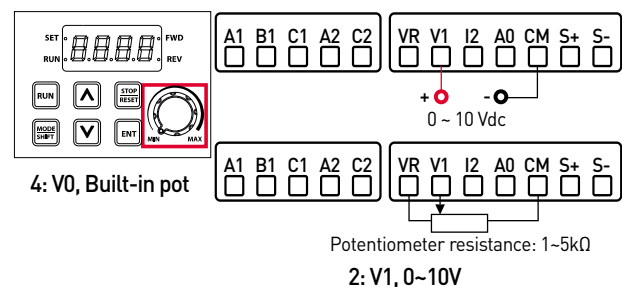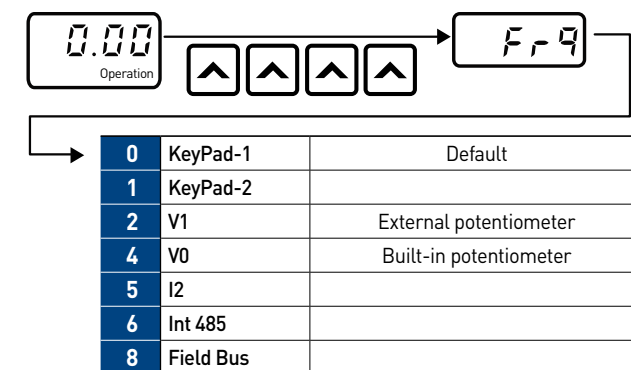
Start/Stop and speed source settings

- This step shows how to setup the sequence and reference method of the drive. The sequence method determines how the drive receives its start and stop command and the reference method determines how the speed of the motor is controlled. Make sure all protective covers have been reattached and power is turned on.

- Select start / Stop method

0	Keypad	Default
1	Fx/Rx-1	
2	Fx/Rx-2	
3	Int 485	
4	Field Bus	

0: Keypad

1: Fx/Rx-1
2: Fx/Rx-2
Refer to the manual

- Select frequency method

0	KeyPad-1	Default
1	KeyPad-2	
2	V1	External potentiometer
4	V0	Built-in potentiometer
5	I2	
6	Int 485	
8	Field Bus	

4: V0, Built-in pot

0 ~ 10 Vdc

Potentiometer resistance: 1~5kΩ
2: V1, 0~10V

Multi-step frequency

- This step shows how to set up and use the multi-step frequency of the drive.

Group	Code	Name	Parameter Setting
In	65	P1 function setting	7: Speed-L 8: Speed-M 9: Speed-H
	66	P2 function setting	
	67	P3 function setting	
	68	P4 function setting	
	68	P5 function setting	

- Example
  - Run command source: Terminal(Fx/Rx-1)
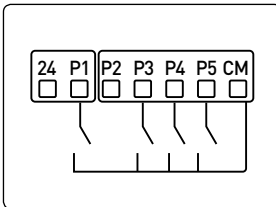
Group	Code	Setting Value
Op	Drv	1: Fx/Rx-1(default)
In	65	1: Fx(default)
	67	7: Speed-L
	68	8: Speed-M
	68	9: Speed-H

- Operation time table
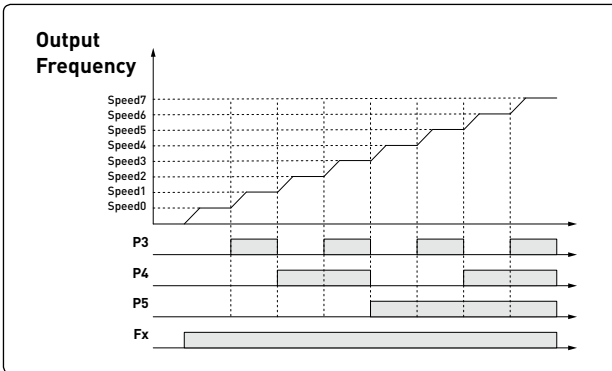
| Speed	P5	P4	P3	Description
0	-	-	-	Speed setting according to the source setting in frq
1	✓	-	-	St-1_Multi-step speed frequency1
2	-	✓	-	St-2_Multi-step speed frequency2
3	✓	✓	-	St-3_Multi-step speed frequency3
4	-	-	✓	bA-53_Multi-step speed frequency4
5	✓	-	✓	bA-54_Multi-step speed frequency5
6	-	✓	✓	bA-55_Multi-step speed frequency6
7	✓	✓	✓	bA-56_Multi-step speed frequency7

Automatic restart

- This step shows how to set up and use an auto restart function of the drive.
- This feature is enabled only when a digital input terminal is configured as a command input device.

Group	Code	Name	Setting	
Pr	08	Automatic restart	1	Yes
	09	Automatic restart no.	0~10	
	10	Automatic restart delay time	0.0~60.0 sec	

※ If the reset signal is given manually via terminal or keypad, the restart count initialized to the set no.
in Pr-09_Automatic restart no

※ When fault does not occur for 30 seconds, the remaining restart count revers one by one.

※ The Automatic restart function will not be activated if the drive stops due to the following fault trips:
  - LowVoltage(LV), Emergency stop(Bx),
    Inverter OverHeat(OH), Hardware error(ErrC, HOLd)

- Example)
  - Pr-08=1, Pr-09=3, Pr-10=5sec.
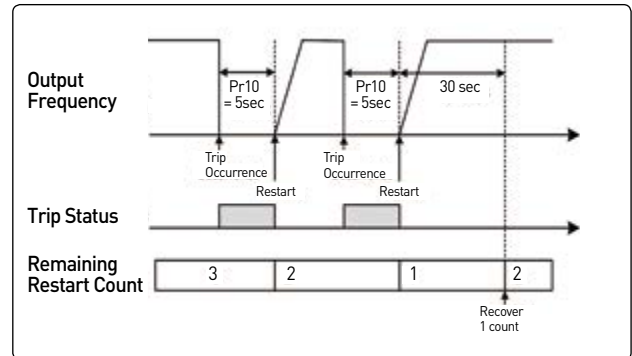
- Speed search
  - When a fault occurs, the motor is normally rotating at a free-run state. In order to operate the system without any additional fault due to rotating motor, speed search feature needs to be activated.

Group	Code	Name	Bit	Function
Cn	71	Speed search selection	_ _1_ (0010)	Initialization after a fault trip

Basic Parameter List

```
 0.00
```
Operation

Operation	
0.00	Target frequency
ACC	Acceleration time
dEC	Deceleration time
drv	Command source
Frq	Frequency ref. src.
St1	Multi-step freq.1
St2	Multi-step freq.1
St3	Multi-step freq.1
CUr	Output current
Rpm	Motor RPM
dCL	Inverter DC volt.
vOL	Inverter Vout
nOn	Current fault
drC	Rotation select

※ **Operation group**
- Operation group consist of 14 basic parameters

MODE SHIFT

Drive
Basic
Advanced
Control
Input
Output
Communication
Application
Protection
2nd **M**otor
Configuration

Drive	
09	Control mode
11	Jog frequency
15	Torque boost
19	Start frequency
20	Maximum frequency
26	Auto torque boost filter gain
27	Auto torque boost motoring gain
28	Auto torque boost regeneration gain
81	Select monitor code
93	Parameter initialization
95	Parameter lock settings
97	Software version

Basic	
04	2nd command source
05	2nd frequency source
07	V/f pattern
08	Acc/Dec reference
09	Time scale setting
11	No. of poles
12	Rated slip speed
14	Motor noload current
15	Motor rated voltage
53~56	Multi-step freq. 4~7

Advanced	
01	Acceleration pattern
02	Deceleration pattern
03	S-curve acceleration start point gradient
04	S-curve acceleration end point gradient
05	S-curve deceleration start point gradient
06	S-curve deceleration end point gradient
08	Stop mode
09	Run prevention options
10	Starting with power on
12	Start DC braking time
13	Amount of applied DC
14	Output blocking time before DC braking
15	DC braking time
16	DC braking rate
17	DC braking frequency
24	Frequency limit
25	Frequency lower limit value
26	Frequency upper limit value
41	Brake release current
42	Brake release delay time
44	Brake release forward frequency
45	Brake release reverse frequency
46	Brake engage delay time
47	Brake engage frequency
51	Energy saving amount
63	Rotation count speed unit
64	Cooling fan control
79	DB unit turn on voltage level

Control	
04	Carrier frequency
71	Speed search operation selection

Input	
01	Frequency for maximum analog input
07	Time constant of V1 input filter
08	V1 minimum input voltage
09	V1 output at minimum input voltage(%)
10	V1 maximum input voltage
11	V1 output at maximum input voltage(%)
52	I2 input filter time constant
53	I2 minimum input current
54	I2 output at minimum input current (%)
55	I2 maximum input current
56	I2 output at maximum input current(%)
65~69	P1~5 terminal function setting

Output	
01	Analog output1 item
02	Analog output1 gain
31~32	Multi-function relay1~2 item
41	Multi-function output monitor
57	FDT detection frequency
58	FDT detection frequency band

Communication	
01	Built-in communication inverter ID
02	Built-in communication protocol
03	Built-in communication speed

Application	
01	Application function selection
16	PID output monitor
18	PID feedback monitor
19	PID reference setting
20	PID reference source
21	PID feedback source
22	ID controller proportional gain(P-gain)
23	PID controller integral time(I-time)
28	PID mode (process/normal)
29	PID upper limit frequency
30	PID lower limit frequency
37	PID sleep mode delay time
38	PID sleep mode frequency
39	PID wake-up level
42	PID controller unit selection

Protection	
12	Motion at speed command loss
20	Motion at overload fault
21	Overload fault level
22	Overload fault time
50	Stall prevention motion and flux braking
79	Cooling fan fault selection
91~95	Fault history1~5

2nd Motor	
4	M2 Acceleration time
5	M2 Deceleration time
7	M2 Base frequency
12	M2 Rated current

Frequently Asked Questions (FAQ)

Question: The motor does not rotate and the output current is too high at start.

• Cause: the load is too high. It can be solved by using manual/auto torque boost and changing some parameters.

1	Manual Torque Boost	Slightly increase the forward or reverse boost in dr-16 or dr-17 If the torque boost level is too high, a trip may occur such as IOL.
2	Auto Torque Boost(ATB)	Set dr-15 to 1. It is necessary to reduce the manual boost value (ex. 0~2%) in dr-16 or dr-17, and then to adjust the values in dr-26~28.
3	Starting Frequency	Slightly increase the start frequency in dr-19. (ex. 0.5 → 1.0 → 1.5 → 2.0Hz)
4	User V/F Pattern	When bA-07 is set to 2(User V/f), User V/f pattern can be set up according to the applications and motor characteristics.

Question: The motor makes humming sound or loud noises.

• Answer: Slightly increase or decrease the carrier frequency in **Cn04**.

Question: When the drive is running, the Earth-Leakage Circuit Breaker(ELCB) is activated.

• Cause: The ELCB will disconnect the power if leakage current flows to grounding during drive operation.

• Answer1: Connect the drive to grounding terminal.

• Answer2: Check if the ground resistance is less than 100Ω for 200V class.

• Answer3: check the capacity of ELCB and connect it to the drive according to the rated current of the drive.

• Answer4: reduce the carrier frequency in **Cn-04**.

• Answer5: Attempt to keep the cable distance from the drive to motor short as possible.

Question: How do I reset the drive back to factory default settings?

• Answer: Set **CF-93** to 1 (All groups) and press the [ENT] key. **CF-93** is displayed again when the initialization has been completed.

Question: How do I adjust the time it takes the motor to speed up or down?

• Answer: Adjust the acceleration time in **ACC** and deceleration time in **dEC**.

Question: How do I prevent the drive from tripping on an OV fault (overvoltage) while the motor is ramping down?

• Answer1: Increase the deceleration time in **dEC**.

• Answer2: Activate flux braking in **Pr-50**. Activate the very first bit on the left.

• Answer3: DB resistor may be installed due to the characteristics of the load.

Question: How do I prevent the drive from tripping on an OLT(overload) while the motor is ramping up or down?

• Answer: Verify motor rated current in **bA-13** and motor overload parameter setting in **Pr-20**(Overload trip selection), **Pr-21**(Overload trip level), and **Pr-22**(Overload trip time).

Question: How do I run the motor above the nominal motor speed?

• Answer: Increase the maximum frequency in dr-20. At V/f mode, maximum frequency is 400Hz and 120Hz for sensorless mode.

Question: Does the drive create harmonics? If so, are they a problem?

• Answer: All standard drives create 5th and 7th harmonic frequencies. Occasionally, depending on the applications, there may be issues and harmonics can cause problems such as transformer heating or interference with other communication devices installed near the drive. To reduce interference, the installation of noise filters or line filters may be required. Additionally, it may be helpful to adjust the carrier frequency to the minimum value in **Cn-04**.

Troubleshooting Fault Trips

Item	Type	Cause	Remedy
OLT	Latch	The load is greater than the motor's rated capacity.	Replace the motor and inverter with models that have increased capacity.
		The set value for the overload trip level (Pr.21) is too low.	Increase the set value for the overload trip level.
OCT	Latch	Acc/Dec time is too short, compared to load inertia (GD2).	Increase Acc/Dec times.
		The inverter load is greater than the rated capacity.	Replace the inverter with a model that has increased capacity.
		The inverter supplied an output while the motor was idling.	Operate the inverter after the motor has stopped or use the speed search function (Cn.60).
		The mechanical brake of the motor is operating too fast.	Check the mechanical brake.
		A ground fault has occurred in the inverter output wiring.	Check the output wiring.
		The motor insulation is damaged.	Replace the motor.
OVT	Latch	Deceleration time is too short for the load inertia (GD2).	Increase Deceleration time.
		A generative load occurs at the inverter output.	Use the braking unit.
		The input voltage is too high.	Determine if the input voltage is above the specified value.
		A ground fault has occurred in the inverter output wiring.	Check the output wiring.
		The motor insulation is damaged.	Replace the motor.
LVT	Level	The input voltage is too low.	Determine if the input voltage is below the specified value.
		A load greater than the power capacity is connected to the system (e.g., a welder, direct motor connection, etc.).	Increase the power capacity.
		The magnetic contactor connected to the power source has a faulty connection.	Replace the magnetic contactor.
GFT	Latch	A ground fault has occurred in the inverter output wiring.	Check the output wiring.
		The motor insulation is damaged.	Replace the motor.
ETH	Latch	The motor has overheated.	Reduce the load or operation frequency.
		The inverter load is greater than the rated capacity.	Replace the inverter with a model that has increased capacity.
		The set value for electronic thermal protection is too low.	Set an appropriate electronic thermal level.
		The inverter has been operated at low speed for an extended duration.	Replace the motor with a model that supplies extra power to the cooling fan.
POT	Latch	The magnetic contactor on the output side has a connection fault.	Check the magnetic contactor on the output side.
		The output wiring is faulty.	Check the output wiring.
IPO	Latch	The magnetic contactor on the input side has a connection fault.	Check the magnetic contactor on the input side.
		The input wiring is faulty.	Check the input wiring.
		The DC link capacitor needs to be replaced.	Replace the DC link capacitor. Contact the retailer or the LSIS customer service center.
OHT	Latch	There is a problem with the cooling system.	Determine if a foreign object is obstructing the air inlet, outlet, or vent.
		The inverter cooling fan has been operated for an extended period.	Replace the cooling fan.
		The ambient temperature is too high.	Keep the ambient temperature below 50℃.
NTC	Latch	The ambient temperature is too low.	Keep the ambient temperature above -10℃.
		There is a fault with the internal temperature sensor.	Contact the retailer or the LSIS customer service center.
FAN	Latch	A foreign object is obstructing the fan's air vent.	Remove the foreign object from the air inlet or outlet.
		The cooling fan needs to be replaced.	Replace the cooling fan.

*Level: Automatically terminates when the failure is solved. This is not saved in the fault history.
*Latch: Terminates when the reset signals are input after the fault is solved.

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