LS DRIVE

LS1000 *new* Model

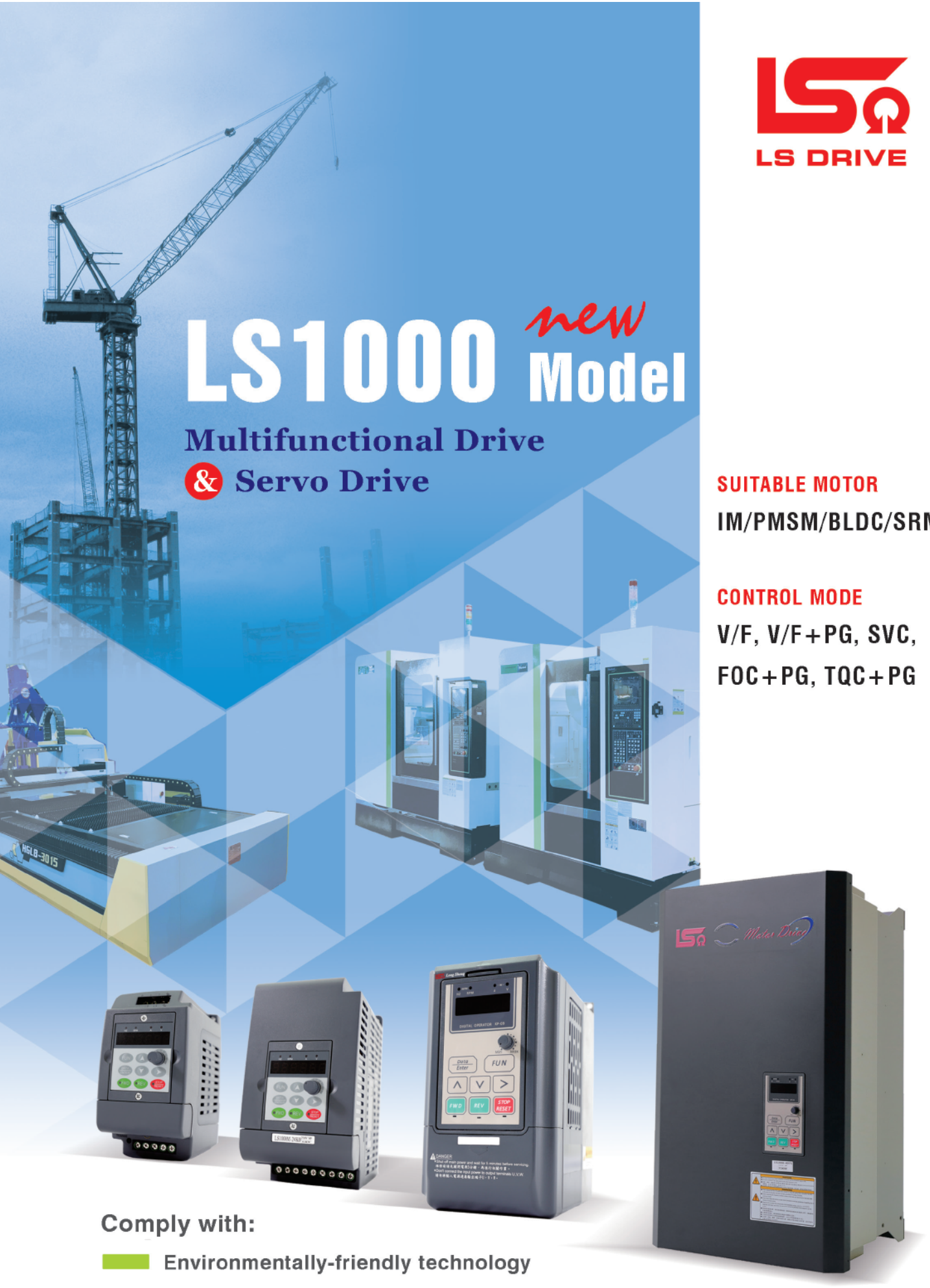
Multifunctional Drive & Servo Drive

SUITABLE MOTOR

IM/PMSM/BLDC/SRM

CONTROL MODE

V/F, V/F+PG, SVC,
FOC+PG, TQC+PG



Comply with:

- Environmentally-friendly technology
- Power-saving technology
- Innovative technology

CE Approval

About US

LS1000 inverter family series

Long Shenq Electronic co., Ltd., founded in 1985, located in New Teipei City, Taiwan . For many years, we produce AC motor vector inverters, permanent magnet servo drivers, controller units and peripheral equipment . We sell these products all over the world with good quality and at reasonable price . In 2002, we passed and we were recognized by the international quality standard certification ISO9001:2000(new version is 2015), increasing products quality and customer trust .

LS1000 is perfect product for AC motor and servo drive, using magnet flux vector control with advanced DSP flux quantity calculation to carry out maximum torque output .

LS1000 apply to precision speed control, for example, AC/DC motor control, servo machine, BLDC, crane equipment, elevators, vacuum pump and constant pressure water pump control, smart drilling machine etc.

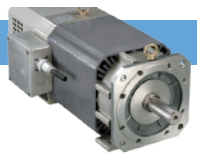
Also, LS1000 can be used in **angles and position control, constant speed and torque control** . if you have any requirements, please contact us .

LS1000 inverter family series

Feature description

A. Applicable motors are as follows

IM- Induction Motor
PMSM-Permanent Magnet Synchronous Motor
BLDC-Brushless DC motor
SRM-Synchronous reluctance motor



AC servo motor

PM servo motor

B. Control function

1. Built-in SVPWM two-phase modulation and three-phase modulation. It can be used as frequency inverter and servo drive.
2. Accurate parameter automatic learning (Auto-tuning), built-in static and static-dynamic parameters automatically learning function.
4. Magnetic flux vector control technology, built-in open and closed loop control:
   Multiple control modes: V/F, V/F+PG, SVC, FOC+PG, TQC+PG
5. PM servo drive control application can be used for angle, positioning, constant speed and constant torque control.

C. RS485 function

The communication system is RS485, the highest PC transmission rate is 1.0K~115.2K, and it can be used in ASCII and RTU modes.

D. Line drive ABZ encoder, magnetic encoder, feedback card

1. Encoder configuration:
   a. Line drive/push pull, up to 40,000 p/rev.
   b. The maximum magnetic encoder is 4096 p/rev. Manual correction or PC computer communication to set the magnetic pole angle.
   c. Feedback card: Directly accept the signal, divide frequency 1:1 times, divide frequency 1:1~32 times
2. Expansion card: RS485, I/O expansion card (Ai, high-speed Di, Do)
   a. Multiple groups of Ai, Ao, Di, Do, and virtual switches (software calculation)

E. Application field-built-in special parameter group:

a, constant pressure pump
b, intelligent tapping machine
c, passenger and cargo elevator
d, light, heavy crane
e, Angle positioning change knife
f, synchronous operation
g, automatic operation programming
h, injection molding machine
i, CNC machine tools
j, treadmill
k, electric car etc.

Model instructions

Applicable motors
IM、PMSM、BLDC、SRM
Control modes :
V/F, V/F+PG, SVC, FOC+PG, TQC+PG

LS1000X－2 4K0 XX－XX

- Drive1000 series
- No text : Standardization
  M : Miniaturization (simplified function)
- 2 = 200V Class
  4 = 400V Class Input voltage
- Model specification : 4K0=4.0KW
- S : Single phase input
  T : Three phases input
- N : No dynamic brake function
  D : Built-in dynamic brake
- Version

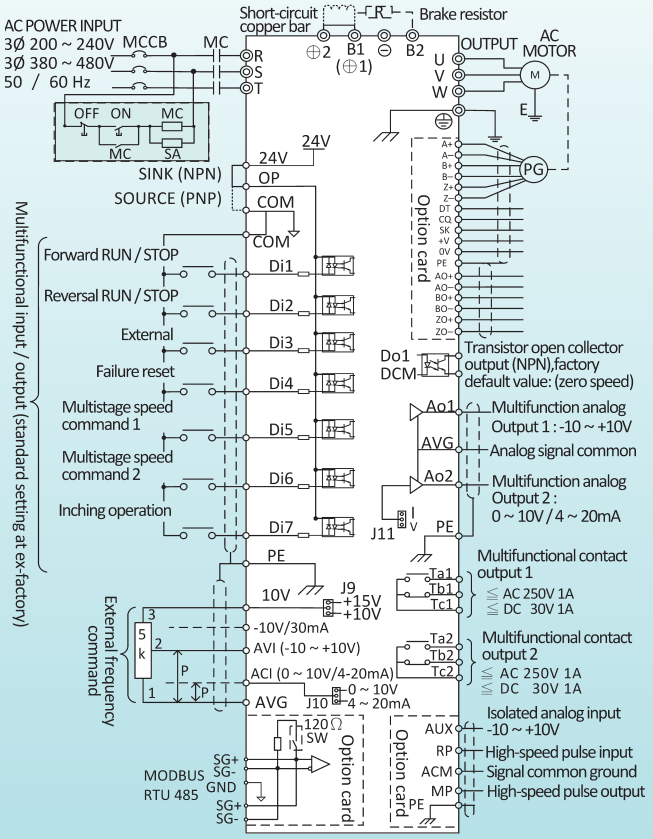
LS1000 Specification

Control Characteristics		
Operation method	6 digit number of LED digit display operation. 32- bit DSP-MCU, sine wave SVPWM control mode, using high-performance low-noise IGBT.	
System control mode	V/F control, V/F closed loop control (VF+PG), SensorLess flux vector control (SVC), closed loop flux vector control (FOC+PG), torque control (TQC+PG)	
Frequency accuracy (temperature change)	Digital instruction : ± 0.01 % (-10°C ~ + 40°C) analog instruction : ± 0.1 % (25°C ± 10°C)	
Frequency command resolution	Digital command: 0.01 Hz	Analog command: 0.03 Hz (11 bit/60 Hz)
Frequency output resolution	Digital instruction: ± 0.01 Hz	Analog instruction: ± 0.5 %
Starting torque	V/F, V/F + PG 150 % / 3.0 Hz, IM (SVC) 150 % / 0.3 Hz , PM (SVC) 100 % / 5 % speed, IM, PM (FOC + PG) 200 % / 0 Min.-1	
Speed control range	V/F control 1: 40; V/F + PG, IM (SVC) control 1: 200 PM (SVC) control 1 : 20 ; IM, PM (FOC + PG) control 1 : 1500	
Motor control	Induction motor (IM)	Permanent magnet motor (SPM, IPM)
External frequency setting signal	4 groups of analog commands: DC 0~5 V, 0~10 V, – 10~+10 V, 4~20mA 1 set of pulse command: pulse input.	
Protection functions		
Inverter overload (OL)	Inverter rated current - heavy duty (HD): 150 % / 1 minute Inverter rated current - light load type (ND): 120 % / 1 minute	
Motor overload (OL1)	Electronic overload curve protection (motor rated current)	
Over torque (OL2)	Inverter rated current 160 %	
Instantaneous overcurrent (OC)	Inverter rated current - heavy load type (HD): 200 %/ < 1 second Inverter rated current - light load type (ND): 160 %/ < 1 second	
Stall prevention	The operating current can be set during acceleration and constant speed, and the stall prevention voltage during deceleration can be set.	
Voltage protection	Low voltage level (Lu): Vdc < 190 (220 V class) / 380 (440V class) Overvoltage level (Hou): Vdc > 410 (220 V class) / 820 (440V class)	
Output three-phase unbalanced	Built-in current detector protection.	
Automatic restart after instantaneous power failure	Power off for more than 15 ms.	
Over temperature protection (oH2)	Built-in temperature detector or thermistor detection (inverter overheating protection)	
Environment specifications		
Ambient Temp	-10°C ~ +40°C (closed and wall mounted type), -10°C ~ +45°C (open type), no freezing	
Storage Temp (Note 2)	-20°C ~ +60°C	
Humidity	Below 95%RH (no condensation condition)	
Vibration	20HZ 1G, 20 ~ 50HZ, 0.2G	

LS1000M and LS1000 type dimension, Specification

Input Voltage	KW	HP	Amps	Frame	Mode Code	Brake circuit	
						Option	Built-in
110V 1Phase Input	0.4	0.5	3.7	1	LS1000M-10K4SN-A1	○	X
	0.75	1	5	1	LS1000M-10K7SN-A1	○	X
220V 1Phase Input	0.4	0.5	3.7	1	LS1000M-20K4SN-A1	○	X
	0.75	1	5	1	LS1000M-20K7SN-A1	○	X
	1.5	2	7.5	1	LS1000M-21K5SN-A1	○	X
	2.2	3	10	1	LS1000M-22K2SN-A1	○	X
	4.0	5	17.5	2	LS1000M-24K0SN-A1	○	X
220V 3Phase Input	0.4	0.5	3.7	1	LS1000M-20K4TN-A1	○	X
	0.75	1	5	1	LS1000M-20K7TN-A1	○	X
	1.5	2	7.5	1	LS1000M-21K5TN-A1	○	X
	2.2	3	10	1	LS1000M-22K2TN-A1	○	X
	4.0	5	17.5	2	LS1000M-24K0TD-A1	X	○
380V 3Phase Input	0.75	1	3.7	2	LS1000M-40K7TD-A1	X	○
	1.5	2	5	2	LS1000M-41K5TD-A1	X	○
	2.2	3	7.5	2	LS1000M-42K2TD-A1	X	○
	4.0	5	10	2	LS1000M-44K0TD-A1	X	○
220V 3Phase Input	0.75	1	5	3	LS1000-20K7TD-A1	X	○
	1.5	2	7.5	3	LS1000-21K5TD-A1	X	○
	2.2	3	10	3	LS1000-22K2TD-A1	X	○
	4.0	5	17.5	3 or 4	LS1000-24K0TD-A1	X	○
	5.5	7.5	25	4	LS1000-25K5TD-A1	X	○
	7.5	10	34	5	LS1000-27K5TD-A1	X	○
	11	15	50	5	LS1000-2011TD-A1	X	○
	15	20	68	5	LS1000-2015TD-A1	X	○
	18.5	25	82	6	LS1000-2018TN-B1	○	X
	22	30	100	6	LS1000-2022TN-B1	○	X
	30	40	130	6	LS1000-2030TN-B1	○	X
	37	50	165	7	LS1000-2037TN-B1	○	X
	45	60	190	7	LS1000-2045TN-B1	○	X
	55	75	230	7	LS1000-2055TN-B1	○	X
	75	100	300	8	LS1000-2075TN-B1	○	X
	90	125	350	9	LS1000-2090TN-B1	A separate brake unit must be installed, please refer to the manual.	
	110	150	455	9	LS1000-2110TN-B1		
380V 3Phase Input	0.75	1	3.7	3	LS1000-40K7TD-A1	X	○
	1.5	2	5	3	LS1000-41K5TD-A1	X	○
	2.2	3	7.5	3	LS1000-42K2TD-A1	X	○
	4.0	5	10	3 or 4	LS1000-44K0TD-A1	X	○
	5.5	7.5	15	4	LS1000-45K5TD-A1	X	○
	7.5	10	17.5	4	LS1000-47K5TD-A1	X	○
	11	15	25	5	LS1000-4011TD-A1	X	○
	15	20	38	5	LS1000-4015TD-A1	X	○
	18.5	25	43	5	LS1000-4018TD-A1	X	○
	22	30	50	6	LS1000-4022TN-B1	○	X
	30	40	68	6	LS1000-4030TN-B1	○	X
	37	50	82	6	LS1000-4037TN-B1	○	X
	45	60	100	7	LS1000-4045TN-B1	○	X
	55	75	130	7	LS1000-4055TN-B1	○	X
	75	100	165	7	LS1000-4075TN-B1	○	X
	90	125	200	8	LS1000-4090TN-B1	○	X
	110	150	230	8	LS1000-4110TN-B1	○	X
	132	175	275	8	LS1000-4132TN-B1	○	X
	160	215	300	9	LS1000-4160TN-B1	A separate brake unit must be installed, please refer to the manual.	
	185	250	350	9	LS1000-4185TN-B1		
	220	300	455	9	LS1000-4220TN-B1		
	280	375	550	10	LS1000-4280TN-B1		
	315	425	620	10	LS1000-4315TN-B1		

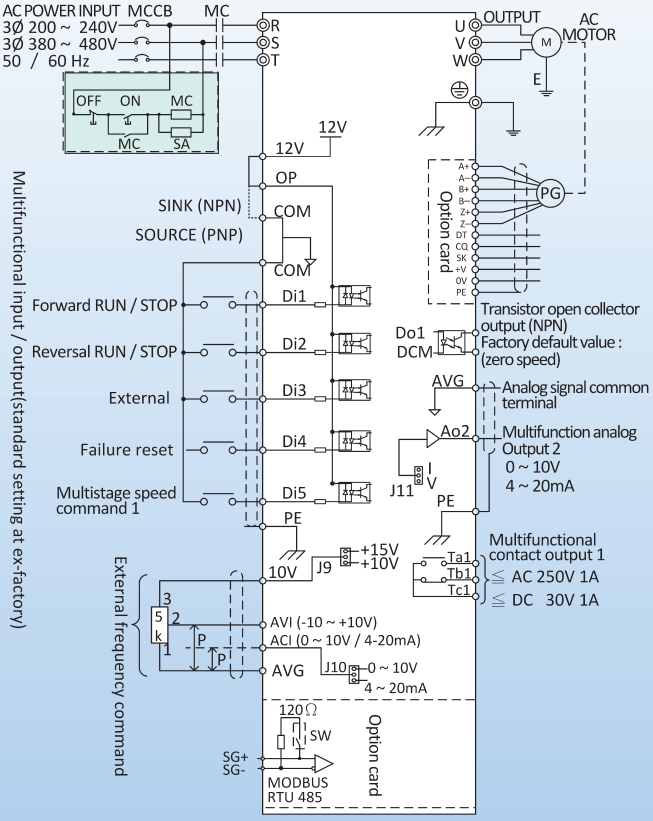
Standard type control terminal circuit wiring diagram



Standard-type control terminal description

Terminal Mark		Terminal Designation	Description
Multi-function Input Terminals	Di1	Forward command	When Di1-COM is connected (ON), it is forward rotation, and when it is open (OFF), it is stopped.
	Di2	Reverse instruction	When Di2-COM is connected (ON), it is reverse rotation, and when it is open (OFF), it is stopped.
	Di3	Input when external abnormality	When the external abnormal signal is ON, the inverter will trip and stop.
	Di4	Abnormal reset	Use the control terminal ON (closed) to release the holding state when the fault protection circuit operates.
	Di5	Multi-speed command 1	Multi-stage speed commands 1and 2, with binary 2 bit, can perform four-stage speed control.
	Di6	Multi-speed command 2	
	Di7	Inching operation	Execute the jog frequency with ON.
	COM	Input common terminal	+24 V output power supply reference ground.
PNP	COM	Input common terminal	+24 V output power supply reference ground.
NPN	OP	Digital input common terminal	Digital input common terminal.
	24V	Power output terminal	Power output 24 V/200 mA.
Analog frequency setup	10V	Power supply for frequency setting	+10 V/+15 V power supply, current: 30 mA / 50 mA.
	-10V	Negative power supply for frequency setting	- 10 V power supply, current: 30 mA.
	AVG	Analog signal common terminal	The common terminal of analog power, input and output signals.
	AVI	Analog voltage frequency command	DC : -10 V~10 V input.
	ACI	Analog current frequency instructions	DC : 0 V ~10 V/(0) 4 mA ~20 mA input. (J10 optional setting)
Multi-function Output Terminals	Do1	Detected in zero speed	It is ON in the stop state or below the zero speed level.
	DCM	Output common terminal	The digital Do1 output signal has a common endpoint.
	Ta1	When in operation	When the abnormal protection function of the inverter is activated, it will output with 1a and 1b contacts. Contact capacity: AC 250 V/1 A, DC 30 V/1 A *When abnormal, Ta1-Tc1 is ON. *When abnormal,Tb1-Tc1 is OFF.
	Tb1		
	Tc1		
	Ta2	Output when abnormal	The inverter output starting frequency is above the set value, and output with 1a, 1b contact action. Contact capacity: AC 250 V/1 A, DC 30 V/1 A *During operation, Ta2-Tc2 is ON. *During operation, Tb2-Tc2 is OFF.
	Tb2		
	Tc2		
	Ao1	Reference output frequency	Analog signal output -10 V~10 V.
	Ao2	Output current	The analog signal output 0~10 V / 0(4)~20 mA.(J11 optional setting)
	AVG	Analog signal common terminal	The common terminal of analog power, input and output signals.
	PE	Shield isolation ground terminal	Covered isolation wire, connection selection ground wire dedicated.

M-type control terminal circuit wiring diagram (miniaturization)



M-type control terminal description

Terminal Mark		Terminal Designation	Description
Multi-function Input Terminals	Di1	Forward command	When Di1-COM is connected (ON), it is forward rotation, and when it is open (OFF), it is stopped.
	Di2	Reverse instruction	When Di2-COM is connected (ON), it is reverse rotation, and when it is open (OFF), it is stopped.
	Di3	Input when external abnormality	When the external abnormal signal is ON, the inverter will trip and stop.
	Di4	Abnormal reset	Use the control terminal ON (closed) to release the holding state when the fault protection circuit operates.
	Di5	Multi-speed command 1	Multi-stage speed command 1.
	COM	Input common terminal	+12 V output power supply reference ground.
PNP	COM	Input common terminal	+12 V output power supply reference ground.
NPN	OP	Digital input common terminal	Digital input common terminal
	12V	Power output terminal	Power output 12 V/200 mA.
Analog frequency setup	10V	Power supply for frequency setting	+10 V/+15 V power supply, current: 30 mA/50 mA.
	AVG	Analog signal common terminal	The common terminal of analog power, input and output signals.
	AVI	Analog voltage frequency command	DC: -10 V~10 V input.
	ACI	Analog current frequency instructions	DC: 0 V~10 V/(0) 4 mA~20 mA input. (J10 optional setting)
Multi-function Output Terminals	Do1	Detected in zero speed	It is ON in the stop state or below the zero speed level.
	DCM	Output common terminal	The digital Do1 output signal has a common endpoint.
	Ta1	Output when abnormal	When the abnormal protection function of the inverter is activated, it will output with 1a and 1b contacts. Contact capacity: AC 250 V/1 A, DC 30 V/1 A *When abnormal, Ta1-Tc1 is ON. *When abnormal, Tb1-Tc1 is OFF.
	Tb1		
	Tc1		
	Ao2	Output current	The analog signal output 0~10 V / 0(4)~20 mA. (J11 optional setting)
	PE	Shield isolation ground terminal	Covered isolation wire, connection selection ground wire dedicated.

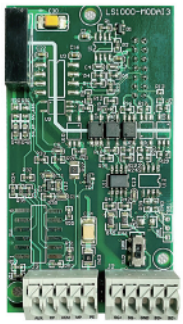
Outside Dimension

UNIT : m/m

Size	1	2	3	4	5	6	7	8	9	10
Height	145	169	199	286	335	458	563	790	770	1532
Width	83	92	115	129	175	253	345	430	604	612
Depth	138	147	151	176	193	227	276	336	322	428

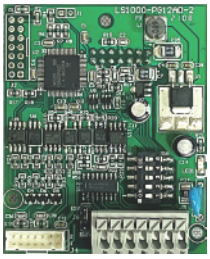
LS1000 series accessory card list

Option function card (485, Ai, Di, Do)



Model type	Function	Purpose of usage
LS1000-HMOD01-A1	Communication interface RS485	1. The inverter is connected to the RS485 network.
LS1000-HMOD02-A1	Communication interface RS485 + Speed pulse command	1. The inverter is connected to the RS485 network. 2. With (speed type) pulse input (Di) and output (Do).
LS1000-HMOD03-A1	Communication interface RS485 + AUX	1. The inverter is connected to the RS485 network. 2. Analog signal isolation input(Ai).
LS1000-HMOD04-A1	Communication interface RS485 + Speed pulse command + AUX	1. The inverter can be connected to the RS485 network. 2. With (speed type) pulse input (Di)/output (Do). 3. Analog signal isolation input (Ai).

Option Encoder feedback card (Standard equipment)

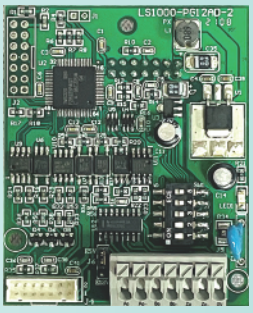


LS1000-HPG020-B1	Encoder signal input	• Line Driver, Push pull • Maximum input frequency: 300 kHz • Maximum current: 200 mA • Pulse signal (A, B, Z, -A, -B, -Z pulse) • Voltage output: 5 V or 12 V
LS1000-HPG021-B1	EncoderSignal input / Signal output (1:1)	• Line Driver, Push pull • Maximum input frequency: 300 kHz • Frequency divider output/1:1 • Pulse signal (A, B, Z, -A, -B, -Z pulse) • Maximum current: 200 mA
LS1000-HPG022-B1	EncoderSignal input / Signal output (**1:1~32**)	• Line Driver, Push pull • Maximum input frequency: 300 kHz • Maximum current: 200 mA • Pulse signal (A, B, Z, -A, -B, -Z pulse) • Voltage output: 5 V or 12 V • Frequency dividing output /1:1~32

Servo motor encoder module / PM motor encoder

PG-Feedback card :

Non-divider: LS1000-HPG020-B1
Frequency division (1:1): LS1000-HPG021-B1
Frequency division (1:1~32): LS1000-HPG022-B1

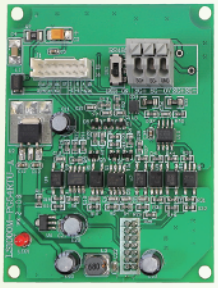


Corresponding to ENCODER (encoder) type:

- Optical (Line Driver)
- MG-H4096-A2 (Motor cam shaft)
- MG-H5012-A2 (Motor cam shaft)
- MG-H4096-A1 (Motor concave shaft)
- MG-H5012-A1 (Motor concave shaft)
- MG-H5012-B1 (Motor cam shaft)

PG-Feedback card :

Non-divider: LS1000M-HPG010-A1
Frequency division (1:1) : None
Frequency division (1:1~32) : None
Communication interface : RS485



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- Optical (Line Driver)
- MG-H4096-A2(Motor cam shaft)
- MG-H5012-A2 (Motor cam shaft)
- MG-H4096-A1(Motor concave shaft)
- MG-H5012-A1 (Motor concave shaft)
- MG-H5012-B1 (Motor cam shaft)

LS DRIVE

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