User Manual

ES2-DA808

Vector Easy Servo Drive

Revision 1.0
©2016　China Leadshine Technology Co., Ltd.

Table of Contents

Notice

Read this manual carefully before any assembling and using. Incorrect handling of products in this manual can result in injury and damage to persons and machinery. Strictly adhere to the technical information regarding installation requirements.

This document is proprietary information of Leadshine that is furnished for customer use ONLY. Information in this document is subject to change without notice and does not represent a commitment on the part of Leadshine. Therefore, information contained in this manual may be updated from time-to-time due to product improvements, etc., and may not conform in every respect to former issues.

Record of Revisions

Revision	Date	Description of Release
1.0	Mar, 2017	Initial Release
3.0	Oct, 2019	Add 24V logical voltage, 500KHz, updated firmware

1 Introductions

Leadshine ES2 series easy servo drives are based on the latest vector control algorithm of combing AC servo and stepper systems. They are featured with full closed-loop include current loop, speed loop and position loop, offering enhanced acceleration & quick response, extra lower noise & heating, smooth motor movement, no torque reservation, high standstill stiffness, no overshooting for almost zero settling time, and easy tuning for almost all applications. The ES2-DA808 operating voltage is 40-80VAC or 60-100VDC and it can output up to 8.0 current. Therefore, the ES2-DA808 is ideal for applications requiring fast response, precise position and smooth movement of NEMA34 easy servo motors.

1.1 Features

● Advanced servo technology to combine advantages of open-loop stepper systems and AC servo systems
● Closed-loop controls to eliminate loss of steps, stall or movement synchronization
● High starting torque and quick response
● Vector control ,smooth motor movement with lower vibration & heating and quick response
● Excellent respond time, quick acceleration, and very high high-speed torque (30% over open-loop)
● Load-dependent dynamic current output from drive to motor to significantly motor heating deduction
● Input voltage from 40- 80VAC or 60-100VDC; MAX 8.0A peak current output from drive to motor
● Micro step resolution value from 200-51,200 (increased by 1) via software configuration
● Isolated control inputs of Pulse, Direction and Enable
● Easy tuning for plug and play setup and built-in on-board HMI for easy setup and configuration
● Easy Servo motors with selectable encoder resolution 1000,5000 lines and output signal include A,B,Z;
● In-position and fault outputs to external motion controllers for complete system controls.
● Over voltage, over-current, and position-error protection

1.2 Applications

Due to combining the features of both AC servo drives and stepper drives, Leadshine ES2 series easy servo drives are suitable for both upgrading conventional stepper systems, and replacing AC servo systems which have closed loop and high torque requirements. ES2-DA808 has been successfully implemented by many OEM clients in applications such as electronic equipment, laser engraving machine, medical equipment, CNC routers, packaging machines and printing equipment.

2 Specifications

2.1 Electrical Specifications

Parameters	ES2-DA808
Operating Voltage	40-80VAC or 60-100VDC
Maximum Continuous Current	8.0 A
MAX Step Frequency	200KHz
Step, Direction and Enable Voltage	5 – 24 V
Logic Signal Input Current	7 – 20 mA

2.2 Control Specifications

Parameters	ES2-DA808
Command Input	Step/Direction, CW/CCW
Enable/Disable Input	Differential
Alarm Signal Output	Isolated OC Output
Encoder Signal Output	ABZ Output
Configuration Interface	On-board HMI or RS232 communication
Regeneration Resistor	Built-in (50 Ohm, 100W), Support External

2.3 Mechanical Specifications

Parameters	ES2-DA808
Size	158mm * 130mm* 54mm
Weight	1500 g
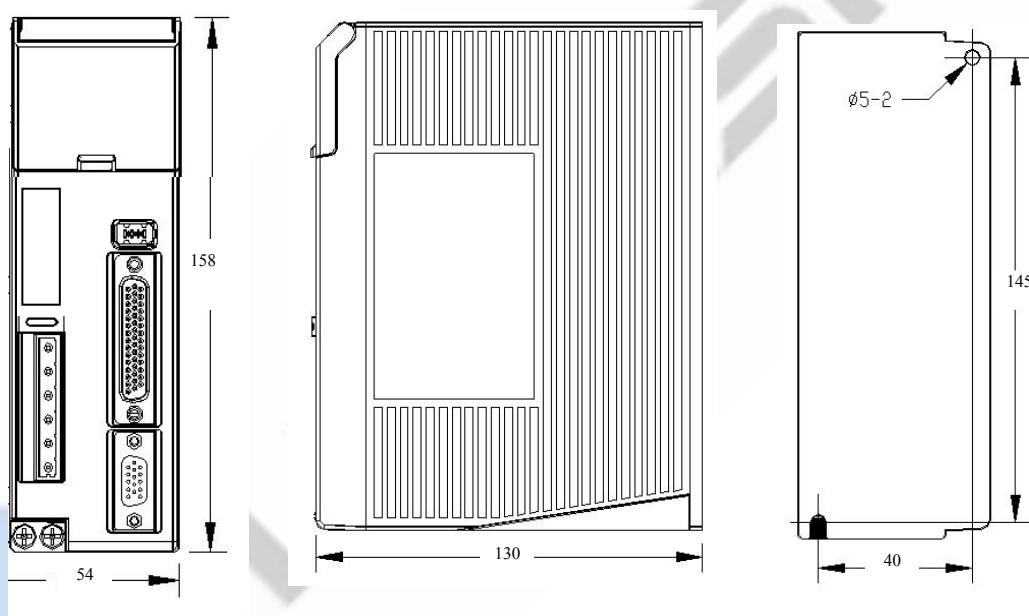
2.4 Operating Environment

Cooling	Natural cooling or Forced cooling
Ambient Temperature	0 – 40 °C
Humidity	40% RH to 90% RH, No Condensation
Vibration	5.9 m/s^2 MAX
Storage Temperature	-20 °C to 65 °C

3 Connectors and Pin Assignments

On-board HMI
Self-test,
On-board Configuration

CN3
RS232 Configuration
Port

CN1
Control Signal Connector
Pulse, Direction, Enable Inputs
and Fault Output

Main Power Input

Motor Outputs

CN2
Feedback Signal Connector
Encoder Connection
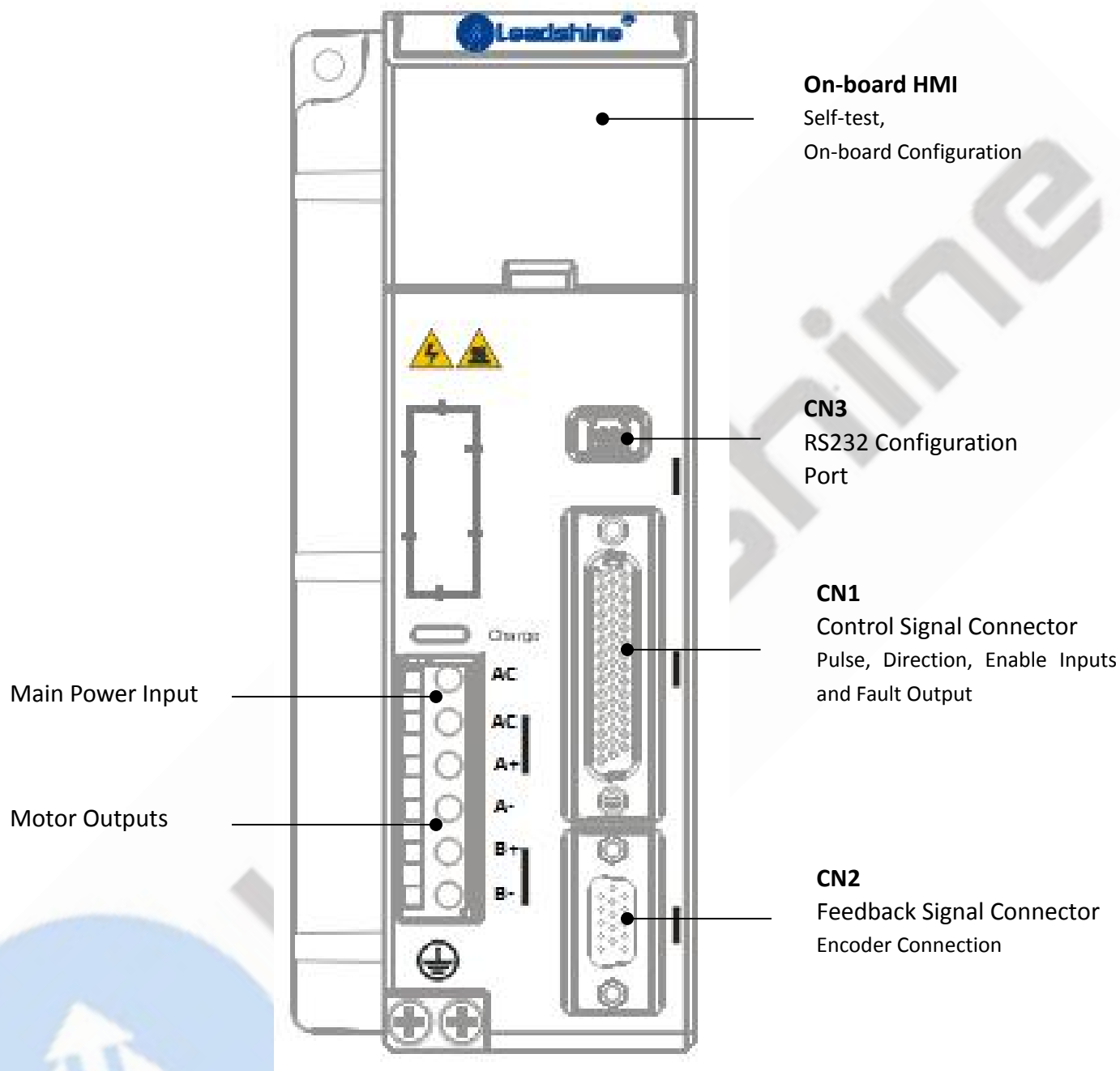
3.1 Control Signal Connector CN1

CN1 – Control Signal Connector			
DB44, 44Pin, Female			
Pin	Name	I/O	Description
1	PUL+ / 24V	-	Pulse signal: when using PLC as controller, you can connect this pin with PUL-
2	DIR+ / 24V	-	Direction signal: when using PLC as controller, you can connect this pin with DIR-

3	PUL+ / 5V	I	Pulse signal: In single pulse (pulse/direction) mode, this input represents pulse signal, each rising or falling edge active (software configurable); In double pulse mode (software configurable), this input represents clockwise (CW) pulse, active both at high level and low level. 4.5-5V when PUL-HIGH, 0-0.5V when PUL-LOW. For reliable response, pulse width should be longer than 1uS(500K bandwidth)
4	PUL-	I	
5	DIR+ / 5V	I	Direction Signal: In single-pulse mode, this signal has low/high voltage levels, representing two directions of motor rotation. In double-pulse mode (software configurable), this signal is counter-clock (CCW) pulse, active both at high level and low level. For reliable motion response, DIR signal should be ahead of PUL signal by 5μs at least. 4.5-5V when DIR-HIGH, 0-0.5V when DIR-LOW. The direction signal's polarity is software configurable.
6	DIR-	I	
7	ALM+	O	Alarm Signal: OC (Open Collector) output signal, activated when one of the following protection is activated: over-voltage, over current, braking error and position following error. They can sink or source MAX 100mA current at 24V. The active impedance of alarm signal is software configurable.
8	ALM-	O	
9	Pend+	O	In-position Signal: OC output signal, active when the difference between the actual position and the command position is zero. This port can sink or source 20mA current at 24V. The resistance between Pend+ and Pend- is active at high impedance. The signal also can be used for **brake output by setting parameter NO 30004 in ProTuner.**
10	Pend-	O	
11	ENA+	O	Enable signal: This signal is used for enabling/disabling the driver. By default, high level (NPN control signal) for enabling the driver and low level for disabling the driver. It is usually left UNCONNECTED (ENABLED). Please note that the PNP and Differential control signals are on the contrary, namely Low level for enabling. The active level of ENA signal is software configurable.
12	ENA-	O	
13-22	NC	-	No connection.
23	AO+	O	Encoder A + output
24	AO-	O	Encoder A - output
25	BO+	O	Encoder B+ output
26	BO-	O	Encoder B- output
27	ZO+	O	Encoder Z+ output
28	ZO-	O	Encoder Z- output
29-44	NC	-	No connection.
	FG	-	Ground Terminal for shield

3.2 Encoder Signal Input CN2

CN2 – Feedback Signal (Encoder) Connector
HDD15, 15Pin, Female

Pin	Name	I/O	Description
1	EA+	I	Encoder A+ input
2	EB+	I	Encoder A- input
3	EGND	I/O	+5V output return ground
4	NC	I	No Connection.
5	NC	I	No Connection.
6	FG	I	Ground terminal for shield
7	EZ+	I	Encoder Z+ input
8	EZ-	I	Encoder Z- input
9	NC	I	No Connection.
10	NC	I	No Connection.
11	EA-	I	Encoder A- input
12	EB-	I	Encoder B- input
13	VCC	O	+5V power output
14	NC	I	No Connection.
15	NC	I	No Connection.

3.3 RS232 Communication Connector for Tuning CN3

CN3 – RS232 Communication Connector			
RS232	Can be connected to PC for drive configuration or servo tuning. Recommended twisted shielded c able and cable length < 2 meter.		
Pin	**Name**	**I/O**	**Description**
1	GND	GND	Ground.
2	TxD	O	RS232 transmit.
3	+5V	O	Reserved +5V power output (Note: Do not connect it to RS232 port)
4	RxD	O	RS232 receive.
5	NC	-	NC
6	NC	-	NC

3.5 Power and motor Connector

Power Supply and motor Connector:			
Pin	**Name**	**I/O**	**Description**
1	AC	I	Main power supply input connected to 40- 80VAC or 60-100VDC.
2	AC	I	

3	**A+**	O	Motor phase A+
4	**A-**	O	Motor phase A-
5	**B+**	O	Motor phase B+
6	**B-**	O	Motor phase B-

3.6 Connector Pin-Out

CN1 – Control Signal Connector

16 NC
31 NC

1 PUL+ / 24V
2 DIR+ / 24V
3 PUL+ / 5V
4 PUL-
5 DIR+ / 5V
6 DIR-
7 ALM+
8 ALM-
9 Pend+
10 Pend-
11 ENA+
12 ENA-
13 NC
14 NC
15 NC

23 AO+
24 AO-
25 BO+
26 BO-
27 ZO+
28 ZO-
44 NC

30 NC

CN2 – Feedback Signal Connector

6 FG
7 EZ+
8 EZ-
9 NC
10 NC
1 EA+
2 EB+
3 GND
4 NC
5 NC

11 EA-
12 EB-
13 +5V
14 NC
15 NC
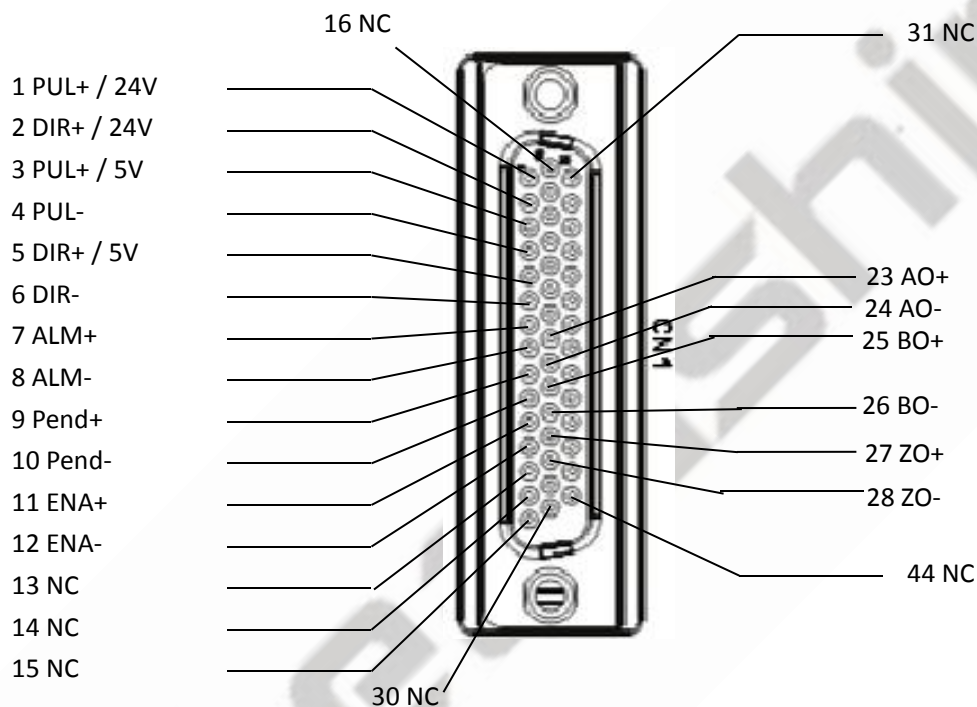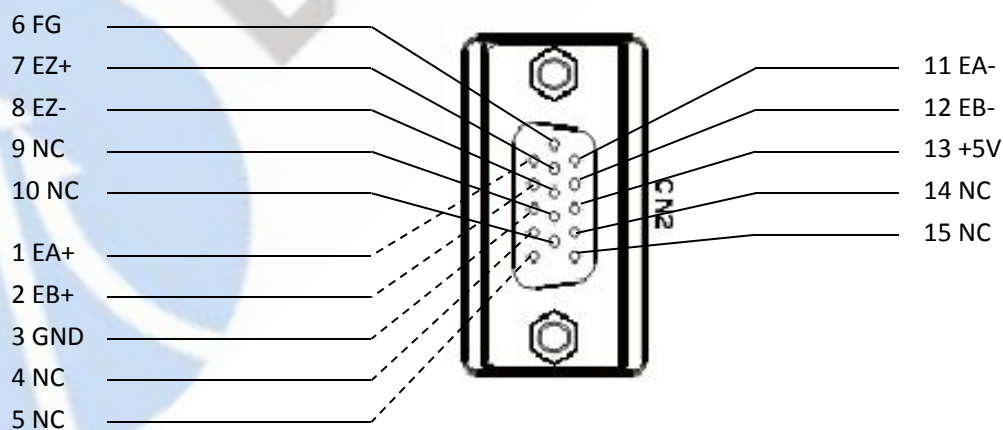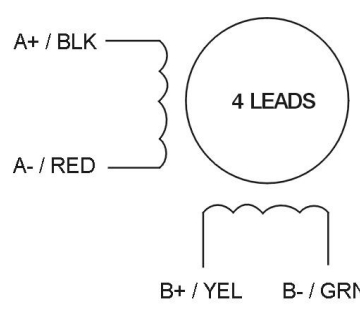
CN4 – RS232 & RS485 Connector

1 GND   3 +5V   5 NC

2 TxD   4 RxD   6 NC

Power Supply and motor Connector

	AC
	AC
	A+
	A-
	B+
	B-
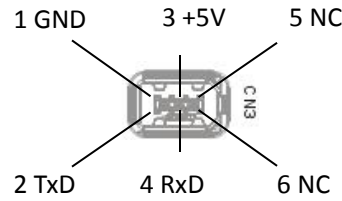
3.7 Matching CS-M Series Easy Servo Motors

	CS-M23445-E5Z	CS-M23480-E5Z	CS-M23485-E5Z	CS-M23445B-E5Z	Wiring Diagram
Step Angle (°)	1.8	1.8	1.8	1.8	
Holding Torque (N.m)	4.0	8.0	8.5	4.0	A+ / BLK
Phase Current (A)	6.0	6.0	6.0	6.0	4 LEADS
Phase Resistance (Ohm)	0.47	0.63	0.55	0.47	
Phase Inductance (mH)	3.6	4.0	4.2	3.6	A- / RED
Shaft Inertia (g.cm²)	1.95	2.5	2.8	1.95	
Weight (Kg)	2.7	3.5	4.0	2.7	
Encoder (ppr)	5000	5000	5000	5000	B+ / YEL B- / GRN

3.8 Motor Encoder Cable Pin-Out

CS-M23445-E5Z, CS-M23480-E5Z, CS-M23485-E5Z, CS-M23440B-E5Z

Pin	Name	Wire Color	I/O	Description	
1	**EA+**	Black	O	Channel A+ output	HDD15 Male
2	**VCC**	Red	I	+5V power input	
3	**GND**	White	GND	Ground	1 5
7	**EZ+**	Orange	O	Channel Z+ output	6 10
8	**EZ-**	Grey	O	Channel Z- output	11 15
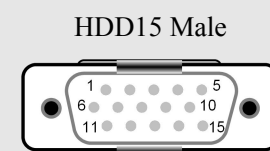
11	EB+	Yellow	O	Channel B+ output	
12	EB-	Green	O	Channel B- output	
13	EA-	Blue	O	Channel A- output	

3.9 Motor Encoder Extension Cable

CABLEG-BMXMX
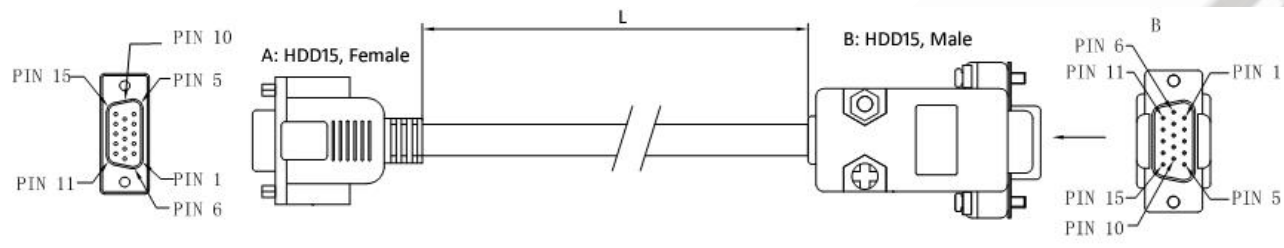
Pin Assignments

A: Connect with Motor Pin	Wire Color	B: Connect with Drive Pin	Name	Description
1	Black	1	EA+	Channel A+
2	Red	13	VCC	+5V power input
3	White	3	GND	+5V GND
7	Orange	7	EZ+	Channel Z+
8	Grey	8	EZ-	Channel Z-
11	Yellow	2	EB+	Channel B+
12	Green	12	EB-	Channel B-
13	Blue	11	EA-	Channel A-

Cable Length

Part Number	L	Matching Motor
CABLEG-BM3M0Z(V4.0)	3.0m	
CABLEG-BM8M0Z(V4.0)	8.0m	CS-M23445-E5Z, CS-M23480-E5Z, CS-M23485-E5Z, CS-M23440B-E5Z
CABLEG-BM10M0Z(V4.0)	10.0m	
CABLEG-BM12M0Z(V4.0)	12.0m	

Note:

(1) The encoder extension cable is necessary. You cannot connect the motor's encoder cable to the drive directly.

(2) The easy servo motors with 5000 ppr encoder resolution are recommended, but with 1000 ppr are also available for this drive.

(3) "Z" in the models of cables and motors indicates that Z signal (index signal), you can remove the "Z" from the models if you don't need

4.0 Getting Start

To get start you need one easy servo drive, one easy servo motor (stepper drive with encoder) and an AC / DC power supply for the first time evaluation. A motion controller - like indexer, pulse generator or PLC is required too if you

would like to verify the complete function. If you have a PC with one serial port or one PC with USB-RS232 converter, you can also rotate the motor in the PC software. However it is recommended to verify the complete function of the easy servo using another motion controller.

4.1 Wiring Diagrams

50-80VAC or 70-100VDC

RS232 Cable

Or   USB-232 Converter

Motion Controller

Encoder Extension Cable (must be sued)

Power Extension Cable
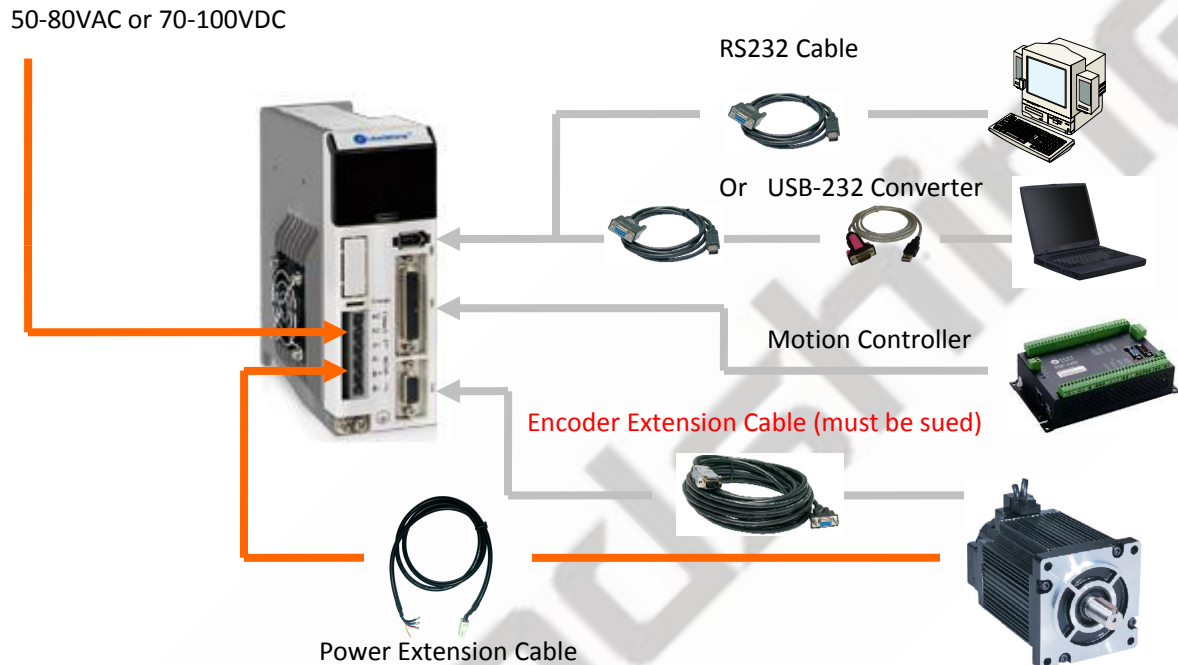
Wiring Diagram of the ES2-DA808 and CS-M series motor

4.1.1 Power Wiring

The ES2-DA808 requires two powers input as follows. The main power is used to energize the motor and the control power is used for logic circuit. Typically they can share the same AC power.

| Main Power | L | | AC | 40-80VAC or |
| | N | | AC | 60-100VDC |

Note:

(1) When using a DC power supply, there is no need to distinguish between positive and negative electrodes.

Power Supply Selection

To achieve good driving performances, it is important to choose a suitable supply voltage and use a matching current value. Generally speaking, supply voltage determines the high speed performance of the motor, while output current

determines the output torque of the driven motor (particularly at lower speed). Higher supply voltage will allow higher motor speed to be achieved, at the price of more noise and heating. If the motion speed requirement is low, it's better to use lower supply voltage to decrease noise, heating and improve reliability.

Multiple Drives

It is recommended to have multiple drives to share one power supply to reduce cost, if the supply has enough capacity. To avoid cross interference, DO NOT daisy-chain the power supply input pins of the drives. Instead, please connect them to power supply separately.

Selecting Supply Voltage

Higher supply voltage can increase motor torque at higher speeds, thus helpful for avoiding losing steps. However, higher voltage may cause bigger motor vibration at lower speed, and it may also cause over-voltage protection or even drive damage. Therefore, it is suggested to choose only sufficiently high supply voltage for intended applications, and it is suggested to use power supplies with theoretical output voltage of drive's minimum + 10% to drive's maximum – 10%, leaving room for power fluctuation and back-EMF.

4.1.2 Control Signal Wiring
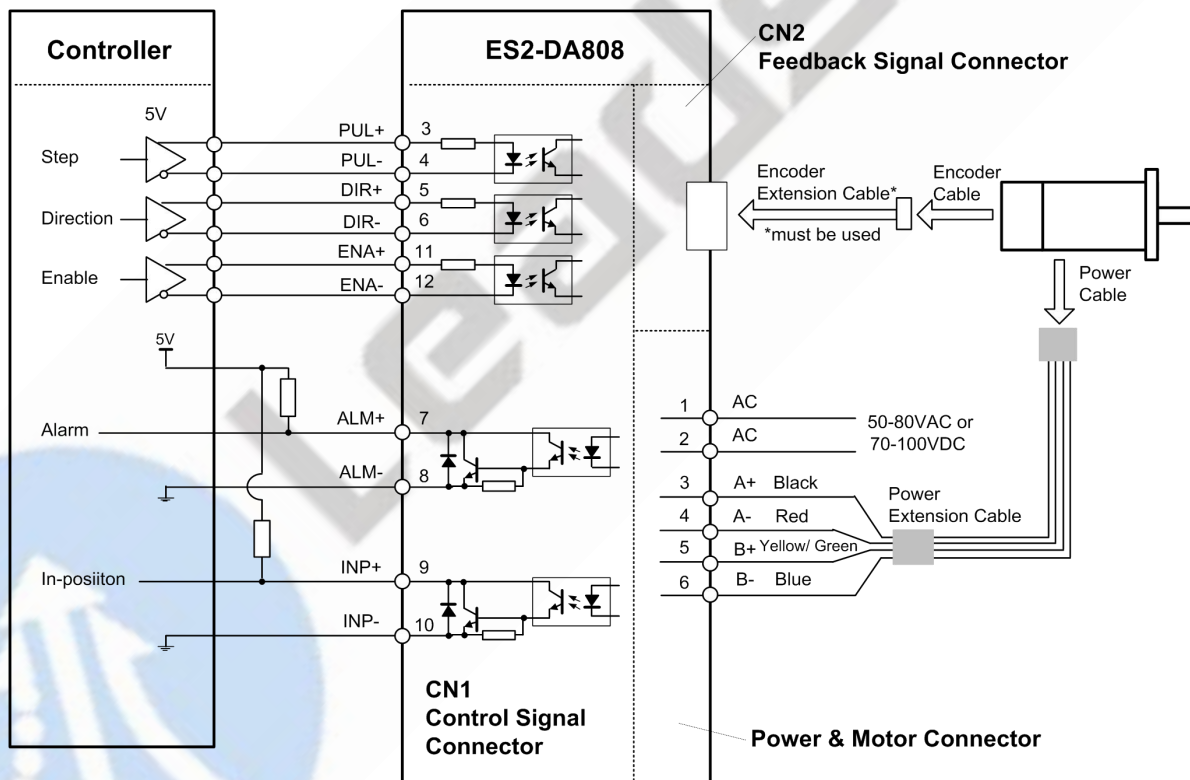
Connections to controller of differential output

Leadshine

Controller

ES2-DA808

CN2
Feedback Signal Connector

5-24V,
5V recommended

| | PUL+ | 3 |
| | PUL- | 4 |
Step | DIR+ | 5 |
| DIR- | 6 |
Direction | ENA+ | 11 |
| ENA- | 12 |
Enable

5V

Encoder
Extension Cable*   Encoder
                     Cable
*must be used

Alarm | ALM+ | 7 |
| ALM- | 8 |

Power
Cable

In-posiiton | INP+ | 9 |
| INP- | 10 |

| 1 | AC |
| 2 | AC |

50-80VAC or
70-100VDC

3	A+	Black
4	A-	Red
5	B+	Yellow/ Green
6	B-	Blue

Power
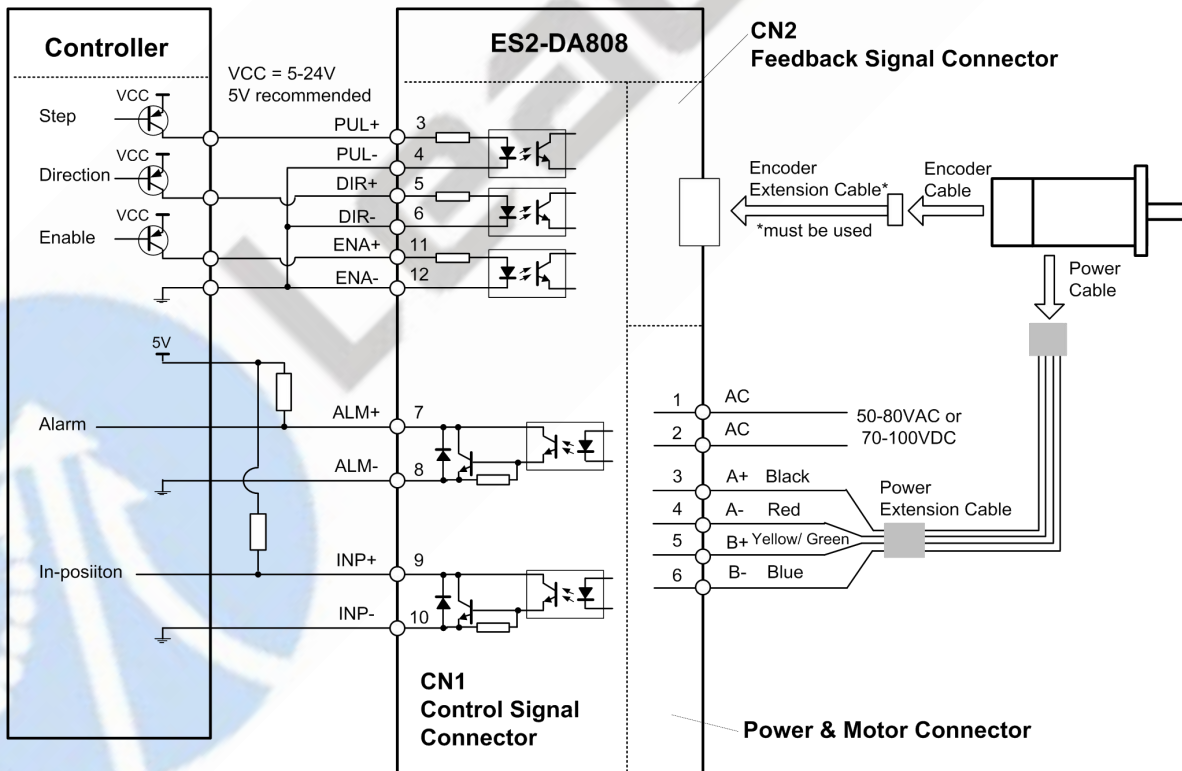Extension Cable

CN1
Control Signal
Connector

Power & Motor Connector

Connection to controller of sinking output

Controller

ES2-DA808

CN2
Feedback Signal Connector

VCC = 5-24V
5V recommended

VCC
Step | PUL+ | 3 |
| PUL- | 4 |
VCC
Direction | DIR+ | 5 |
| DIR- | 6 |
VCC
Enable | ENA+ | 11 |
| ENA- | 12 |

5V

Encoder
Extension Cable*   Encoder
                     Cable
*must be used

Alarm | ALM+ | 7 |
| ALM- | 8 |

Power
Cable

In-posiiton | INP+ | 9 |
| INP- | 10 |

| 1 | AC |
| 2 | AC |

50-80VAC or
70-100VDC

3	A+	Black
4	A-	Red
5	B+	Yellow/ Green
6	B-	Blue

Power
Extension Cable

CN1
Control Signal
Connector

Power & Motor Connector

Connection to controller of sourcing output

Wiring Notes

● In order to improve anti-interference performance of the drive, it is recommended to use twisted pair shield cable.

● To prevent noise incurred in PUL/DIR signal, pulse/direction signal wires and motor wires should not be tied up together. It is better to separate them by at least 10 cm, otherwise the disturbing signals generated by motor will easily disturb pulse direction signals, causing motor position error, system instability and other failures.

● If a power supply serves several drives, separately connecting the drives is recommended instead of daisy-chaining.

● It is prohibited to pull and plug power connector while the drive is powered ON, because there is high current flowing through motor coils (even when motor is at standstill). Pulling or plugging power connector with power on will cause extremely high back-EMF voltage surge, which may damage the drive.

4.2 Sequence Chart of Control Signals

In order to avoid some fault operations and deviations, PUL, DIR and ENA should abide by some rules, shown as following diagram:
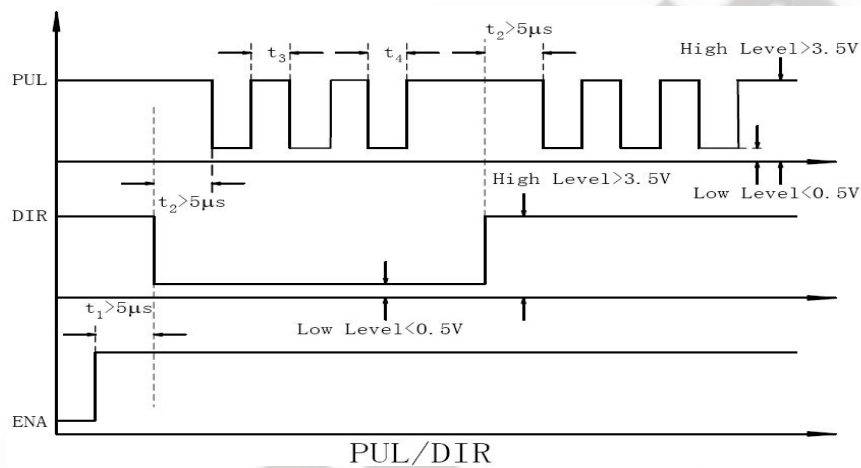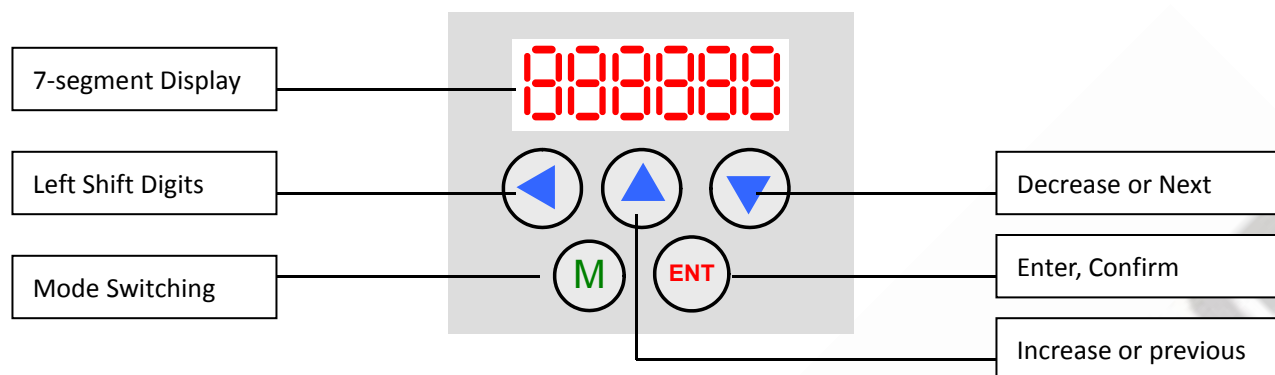

Remark:

a) t1: ENA must be ahead of DIR by at least 5s. Usually, ENA+ and ENA- are NC (not connected). See "Connector P1 Configurations" for more information.

b) t2: DIR must be ahead of PUL effective edge by 5s to ensure correct direction;

c) t3: Pulse width not less than 2.5s;

d) t4: Low level width not less than 2.5s.

4.3 Configuring ES2-DA808

4.3.1 Configuring ES2-DA808 by the on-board HMI

Users can configure the drive via the on-board HMI in the front panel. This HMI includes six 7-segment digits and five keys for users operation as follows:

7-segment Display	
Left Shift Digits	Decrease or Next
Mode Switching	Enter, Confirm
	Increase or previous

There are 4 operation modes in the on-board HMI. Users can switch between these modes by pressing the "Mode" key. The following figure illustrates the operation procedure of this on-board HMI.
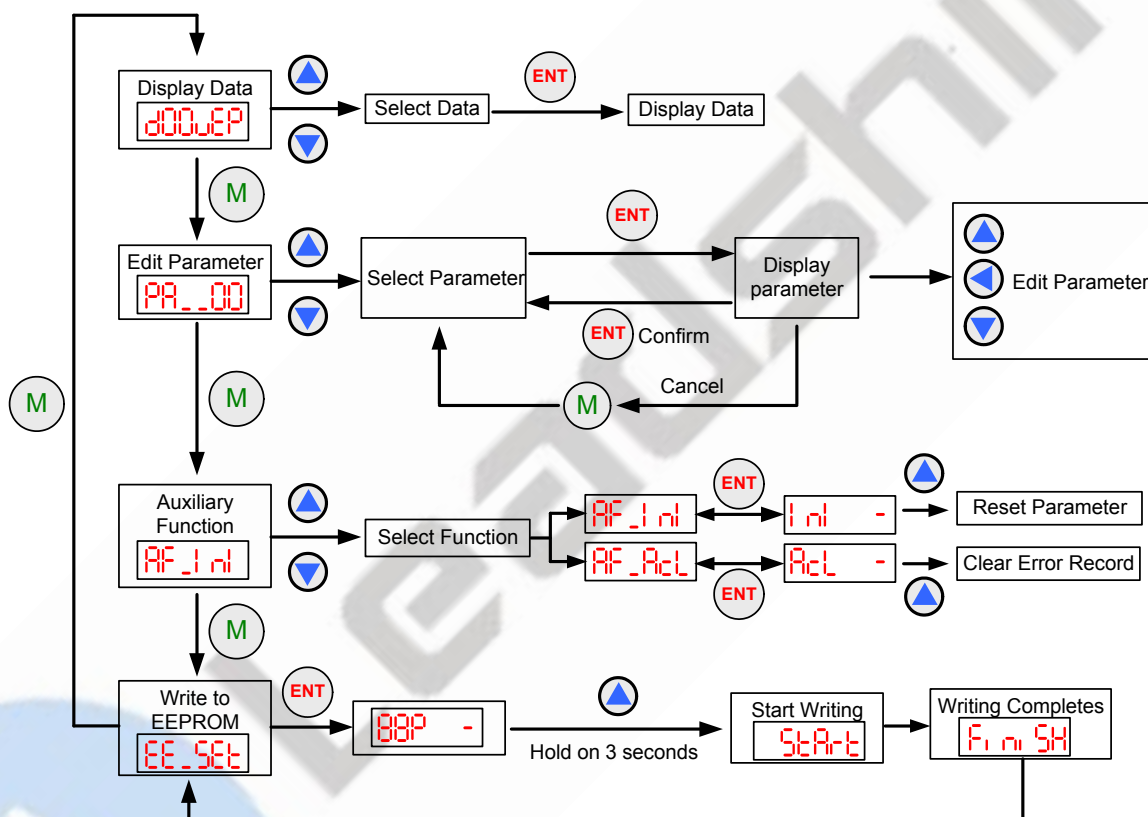
Operation Procedure of the on-board HMI

Display Data Mode

This mode is active initially at drive's power-up. In this mode, users can check the monitoring data as shown in the following table.

Display Code	Name	Description
L 0	"L "	Low order digits display.
H 0	"H "	High order digits display.

d00uEP	"d00uEP"	Position error which is the difference between command and feedback. Press "◀" to switch between low and high order digits display.
d01SPF	"d01SPF"	Actual feedback motor speed in RPM.
d02SPr	"d02SPr"	Reference motor speed in RPM.
d03PLF	"d03PLF"	Actual feedback position in pulses.
d04PLr	"d04PLr"	Reference position in pulses.
d05 iP	"d05iP "	Reference current (peak) in mA.
d06Err	"d06Err"	Error code: 0001----Over-current protection activated 0002----Over-voltage protection activated 0008----Brake protection activated 0020----Position error exceeds the limit 000d----Encoder cable error
d07 Pn	"d07 Pn"	Bus voltage which is 1/10 of the actual value.
d08 no	"d08 no"	Drive version number.

4.3.2 Configuring ES2-DA808 by the ProTuner

Leadshine also provide the tuning software named ProTuner to configure the parameter of ES2-DA808

Parameter list

PA No.	Definition	Property	Default value	Range	Description
0	Current loop Kp	R/W	0	0—65535	This parameter can be modified
1	Current loop Ki	R/W	0	0—65535	This parameter can be modified
3	Position Loop Kp	R/W/S	300	0—10000	
4	Speed loop Ki	R/W/S	100	0—10000	
5	Speed loop Kp	R/W/S	700	0—10000	
6	Torque feed-forward	R/W/S	0	0—1000	
7	Pulses /Revolution	R/W/S	1600	200—60000	Motor runs a round needs pulse

8	Encoder resolution	R/W/S	4000	200—20000	Four multiplying frequency for 1000 line encoder
9	Maximum following error	R/W/S	1000	1—60000	Unit：pulse
10	Lock Shaft Current Percentage(power on)	R/W/S	20	0—100	The percent of Maximum current. it is effective when NO.30015 setting is 3.
11	Percent of closed loop current	R/W	80	1—100	Invalid
12	Soft Start Time(power on)	R/W/S	8	1—20	Unit：100ms。 Reduce the vibration when power up or Enable
13	Pulse filter enable	R/W	0	0—1	Invalid
14	Command Pulse Filter Time	R/W/S	30	1—600	Unit：0.05ms
15	Enable control	R/W/S	1	0—1	0：High 1：Low
16	Fault Output Level	R/W/S	0	0—1	0：High 1：Low
17	Pulse input mode	R/W/S	0	0—1	0：Pulse+Direction 1：CW/CCW
18	Pulse edge	R/W/S	0	0—1	0：Rising Edge 1：Following Edge
19	Motor Running Direction	R/W/S	1	0—1	0：Forward 1：Backward
20	Bandwidth selection	R/W/S	0	0—1	0：200KHZ 1：300KHZ （Invalid ）
21	Acceleration	R/W	200	1~2000	
22	Speed	R/W	60	1~3000	
23	Distance	R/W	100	1~65535	
24	Running times	R/W	1	1~65535	These parameters are effective when running the motor with keypad
25	Start direction	R/W	1	0/1	
26	Running interval time	R/W	100	1~65535	
27	Enable for reciprocating motion	R/W	1	0/1	

28	Start Stop	R/W	0	0/1	
29	Open/Closed -loop Mode selection	R/W/S	1	0—1	0：Open loop 1：Closed loop
30	Auto tuning	R/W	0	0—1	Invalid
31	Resonance compensation	R/W	0	0—1000	Invalid
32	Choosing Shaft Locking in Disable	R/W/S	0	0—1	0：Unlock 1：Lock
33	Reset fault by enable input	R/W/S	0	0—1	0-Disable 1-Enable
34	Choosing Winding Short of Lower Bridge Arm	R/W/S	0	0—1	0-No winding short 1-Winding short
35	Pend output function	R/W/S	0	0—1	0：Pend output 1：brake output
36	Pend outputs the active level	R/W/S	0	0—1	0：High 1：Low
37	Gravity Compensation	R/W/S	0	0—1	Invalid
38	Speed loop integral limited	R/W/S	20	0—80	
39	Ocuppied parameter1	R/W/S	15	0—127	Invalid
40	Ocuppied parameter2	R/W/S	32	0—64	Invalid
41	Voltage Percentage in Power Off	R/W/S	0	0—100	Unit：% Invalid
42	Motor model	R/W/S	6	0—100	=6　CS-MH23485-E1/E5 =7　CS-M23480-E1/E5 =8　ES-MH23480B =9　CS-MH234120-E1/E5 =10　CS-M23445-E1/E5
43	Pend positioning error value	R/W/S	4	0—100	Unit：pulse
44	Delay for vibration removing of software	R/W/S	3	0—100	Unit：1ms
45	Velocity loop VpH	R/W/S	1000	0—10000	

46	Occupied parameter3	R/W/S	48	0—64	Invalid
47	Time Constant for Over Voltage Detection	R/W/S	45	0—20	Unit：100ms
48	Voltage Limited Value for Enabling Brake Resistor	R/W/S	160	110-420	Unit：V
49	Brake Resistor Enable	R/W/S	1	0—1	0：Disable 1：Enable
50	Motion model	R/W/S	1	0—9	0-2：interpolation motion 3：point to point motion
51	Position Loop Filter Frequency	R/W/S	4	0—31	The actual range is 0-12
52	Speed Loop Filter Frequency	R/W/S	0	0—31	The actual range is 0-12
54	Speed Loop Sampling Frequency	R/W/S	4	0—31	The actual range is 0-12
56	Self-test Enable	R/W/S	0	0—1	0-Disable, 1-Enable(for special application)
57	Detection Enable	R/W/S	4739	0—65535	Invalid
58	ALM output function	R/W/S	1	1—5	1- Fault,2~5-Reserved
59		R/W/S	80	0—100	Unit：%
60	Times For Over Current Jitters Elimination	R/W/S	45	0—50	Current jitters times limited before outputting over current error
61	Current loop Kc	R/W	0	0—32767	Invalid
62	Back EMF coefficient	R/W/S	0	0—32767	Unit：100mV /rps Invalid
63	Weak magnetic coefficient 0	R/W/S	0	0—255	Invalid
64	Weak magnetic coefficient 01	R/W/S	0	0—255	Invalid
65	Position loop KpH	R/W/S	120	0—10000	=[Pr03]*0.8
66	Rigidity	R/W/S	0	0—31	Invalid

67	Inertia ratio	R/W/S	100	100—10000	Unit：% Invalid
68	Speed feed-forward	R/W/S	10	0—32	
73	Occupied paramete5	R/W/S	0	0—32767	
74	Occupied paramete6	R/W/S	0	0—32767	
75	Motor peak phase current	R/W/S	0	0—32767	
76	Motor holding torque	R/W/S	0	0—32767	
77	Motor Resistance	R/W/S	0	0—32767	
78	Motor Inductance	R/W/S	0	0—32767	

Notice!

The sequence of parameters number is from HMI panel, which is different from in ProTuner

Key Parameters

NO. on panel HMI	Position Loop Kp	Range	unit	default
3		0—10000	-	300

You can determine the response of the positional control system. Higher the gain of position loop you set, faster the positioning time you can obtain. Note that too high setup may cause vibration. Set a suitable value base on the machine performance.

NO. on panel HMI	Speed Loop Ki	Range	unit	default
5		0—10000	-	100

You can set up the integration time constant of speed loop, Smaller the set up, faster you can dog-in deviation at stall to 0.Set a suitable value base on the machine performance.

NO. on panel HMI	Speed loop Kp	Range	unit	default
6		0—10000	-	700

You can determine the response of the velocity loop. In order to increase the response of overall servo system by setting high position loop gain, you need higher setup of this velocity loop gain as well. However, too high setup may cause vibration. Set a suitable value base on the machine performance.

NO. on panel HMI	Pulse /Rev	Range	unit	default
7		200—60000	-	1600

Pulse per Revolution.

NO. on panel HMI	Encoder resolution	Range	unit	default
8		200—20000	-	4000

The encoder of easy servo motor from Leadshine is 1000PPR, so If you use these motors, the value must be 4000.if you use the motor from other supplier , please contact Leadshine firstly.

NO. on panel HMI	Maximum following error	Range	unit	default
9		1—60000	Pulse	1000

The tolerance for position following error, if the error is over this value of setting, drive will display ERR20 .

NO. on panel HMI	Lock Shaft Current Percentage(power on)	Range	unit	default
10		1—100	%	20

The percent of Maximum current output for motor. it is effective only when NO.30015 setting is 3. And if the parameter No.24 setting (Open/Closed -loop Mode selection) is 0(open loop), this current will be working current for motor.

NO. on panel HMI	Soft Start Time(power on)	Range	unit	default
12		1—20	100ms	8

The time for output current increasing from 0 to Maximum. if the motor with load, it need a suitable time setting to find a balance point to reduce vibration when power on or motor enable.

NO. on panel HMI	Enable control	Range	unit	default
15		0--1		1

The input level for motor enable.
0: Low level ,if set it 0 , the enable input of drive should connect a 5V power supply ,and the motor will be response with input pulse
1:High level. Keep the enable input of drive being unconnected, and the motor will be response with input pulse.

NO. on panel HMI	Fault Output Level	Range	unit	default
16		0--1		0

The level for fault output
0: High level   1:Low level
The recommended setting is 1.

NO. on panel HMI	Pulse input mode	Range	unit	default
17		0--1		0

0: Pulse+Direction   1:CW+CCW

NO. on panel HMI	Open/Closed -loop Mode selection	Range	unit	default
29		0--1		1

0: Open loop   1:Closed loop
The recommended setting is 1.

NO. on panel HMI	Pend output function	Range	unit	default
35		0--1		0

0: Pend output   1:Brake output
If the using motor is with brake , set it 1

NO. on panel HMI	Pend outputs the active level l	Range	unit	default
36		0--1		0

0: High   1:Low
Pend or brake output level ,if use motor with brake ,please set it 1.

NO. on panel HMI	Motor model	Range	unit	default
42		0--100		7

=5   CS-M22430-E1/E5
=6   CS-M23485-E1/E5

=7   CS-M23480-E1/E5
=8   ES-MH23485B
=9   CS-M234120-E1/E5
=10   CS-M23445-E1/E5

Set correctly code base on the motor model you are using. If the motor model CS-M22430, please set PA42=5, PA 03=120, PA05=400

NO. on panel HMI	Motion model	Range	unit	default
50		0--9		1

0-3：interpolation motion

4：point to point motion

This parameter setting depend on the application of motor .if it is used for interpolation application , like as engraving ,laser cutting ,milling, and so on , it can be set 0—3 ;if used for point to point application, like scara arm, it can be set 4--5

5 Frequently Asked Questions

In the event that your drive doesn't operate properly, the first step is to identify whether the problem is electrical or mechanical in nature. The next step is to isolate the system component that is causing the problem. As part of this process you may have to disconnect the individual components that make up your system and verify that they operate independently. It is important to document each step in the troubleshooting process. You may need this documentation to refer back to at a later date, and these details will greatly assist our Technical Support staff in determining the problem should you need assistance.

Many of the problems that affect motion control systems can be traced to electrical noise, controller software errors, or mistake in wiring.

Problem Symptoms and Possible Causes

Symptoms	Possible Problems
Motor is not rotating	No power
	Encoder resolution setting is wrong
	Fault condition exists
	The drive is disabled
Motor rotates in the wrong direction	The direction signal level is reverse
The drive in fault	Power supply voltage beyond drive's input range
	Something wrong with motor coil
	Wrong connection
Erratic motor motion	Control signal is too weak
	Control signal is interfered
	Something wrong with motor coil
	Motor is undersized for the application
	Acceleration is set too high
	Power supply voltage too low
Excessive motor and drive heating	Inadequate heat sinking / cooling
	Load is too high

6 Warranty

Leadshine Technology Co., Ltd. warrants its products against defects in materials and workmanship for a period of 12 months from shipment out of factory. During the warranty period, Leadshine will either, at its option, repair or replace products which proved to be defective.

Exclusions

The above warranty does not extend to any product damaged by reasons of improper or inadequate handlings by customer, improper or inadequate customer wirings, unauthorized modification or misuse, or operation beyond the electrical specifications of the product and/or operation beyond environmental specifications for the product.

Obtaining Warranty Service

To obtain warranty service, a returned material authorization number (RMA) must be obtained from customer service at e-mail: before returning product for service. Customer shall prepay shipping charges for products returned to Leadshine for warranty service, and Leadshine shall pay for return of products to customer.

Warranty Limitations

Leadshine makes no other warranty, either expressed or implied, with respect to the product. Leadshine specifically disclaims the implied warranties of merchantability and fitness for a particular purpose. Some jurisdictions do not allow limitations on how long and implied warranty lasts, so the above limitation or exclusion may not apply to you. However, any implied warranty of merchantability or fitness is limited to the 12-month duration of this written warranty.

Shipping Failed Product

If your product fail during the warranty period, e-mail customer service at   to obtain a returned material authorization number (RMA) before returning product for service. Please include a written description of the problem along with contact name and address. Send failed product to distributor in your area or11/F, Block A3, iPark No.1001 Xueyuan Blvd. Nanshan District, Shenzhen, China:U Also enclose information regarding the circumstances prior to product failure.