CS3E Series Stepper Drive

The newly released CS3E series drives support CANopen over EtherCAT (CoE) control and CiA 402 operating modes including Profile Position (PP), Profile Velocity (PV), Homing (HM) and Cyclic Synchronous Position (CSP). The products can be matched with many brands of EtherCAT controller/PLC such as Beckhoff, Omron, Trio, Keneyce etc.

The CS3E series is highly reliable and affordable and performs excellently in many industrial applications such as solar equipment, textile, civil, robotics, power generation equipment, 3C, packaging...

Feature

- No loss of step, No hunting, No torque reservation
- CANopen over EtherCAT (CoE) with full support of CiA402,100Mbps full-duplex.
- Support operation modes: Profile Position, Profile Velocity, Cyclic Synchronous Position, Homing
- 7 configurable digital inputs, 7 optically isolated digital outputs include brake output
- Low noise and vibration, smooth motion
- 20-50VDC supply voltage for CS3E-D503 and CS3E-D507, max 7A output current
  20-72VDC supply voltage for CS3E-D728, max 8A output current
  20-80VAC or 30-100VDC supply voltage for CS3E-D1008, max 8A output current
- USB port for parameters configuration
- Encoder resolution: 1000 / 2500 / 5000 line for NEMA11/17/23/24/ 34 CS motors,
- Two 7-segment display velocity or slave ID or operation mode or error code
- Protections for over voltage, over current and position following error, encoder cable error, etc.

Model Designation

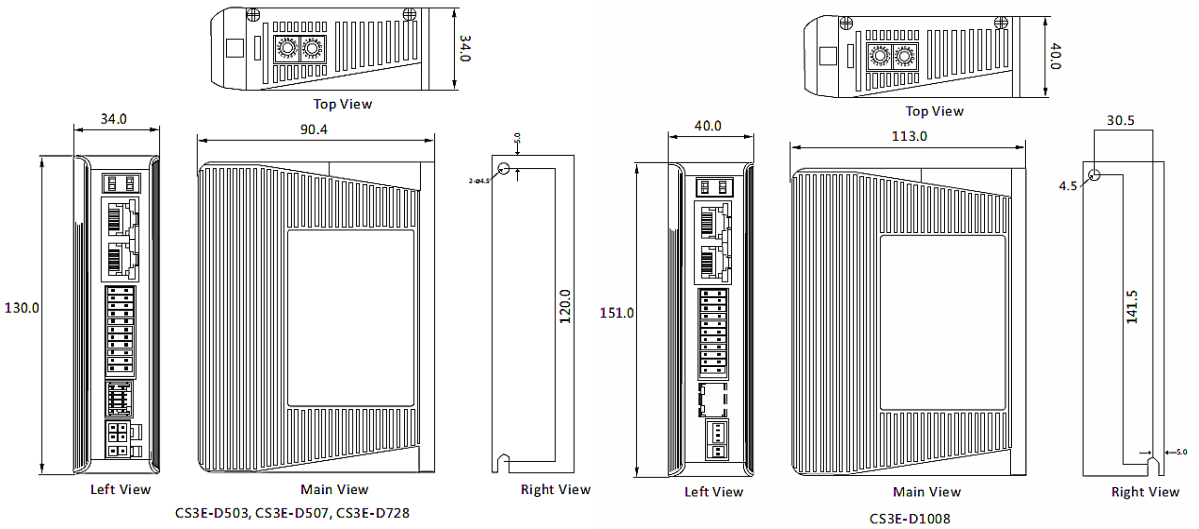
1. Series Name
   CS3: 3rd generation closed loop stepper drives
2. Communication Mode
   E: EtherCAT
3. Product Type
   D: Drive
4. AC or DC
   A: AC power voltage
   Blank: DC power voltage
5. Maximum Operating Voltage
   50: 50V
   100: 100V
6. Maximum Output Current
   7: 7.0A
   8: 8.0A
7. Customerized Code
   Blank: standard
   E: Economic type

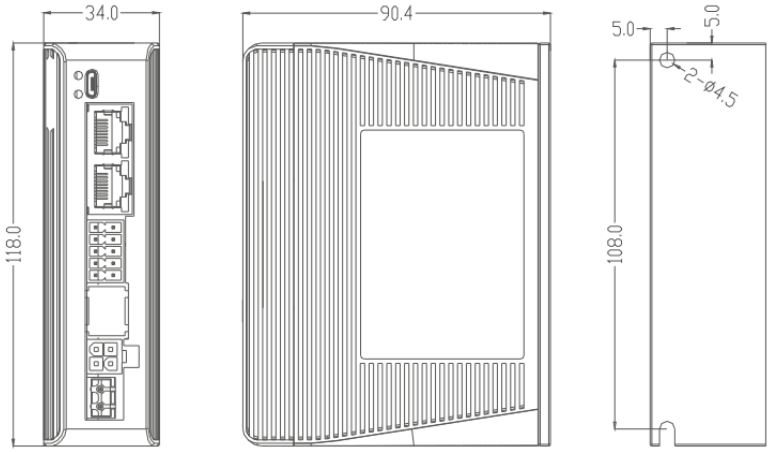
Technical Specification

Name	CS3E-D503	CS3E-D507	CS3E-D1008	CS3E-D503E	CS3E-D507E
Supply Voltage	20-50VDC	20-50VDC	30-100VDC or 20-80VAC	20-50VDC	20-50VDC
Output Current (Peak)	0.5-2.5A	1.0-7.0A	2.1-8.0A	0.3-3.0A	0.5-7.0A
Size (H*W*L mm)	130*90.4*34		151*113*30.5	118*90.4*34	
Weight (kg)	0.65		0.85	0.57	
Matched Motor	NEMA 11, 14, 17	NEMA 17,23, 24	NEMA23, 24, 34	NEMA 11,14, 17	NEMA 17,23, 24
Input Signals	Home Input, Positive Limit, Negative Limit, Touch Probe, GPIOs				
Output Signals	Brake, Alarm, In Position, GPIOs				
Protection Functions	Over Current, Over Voltage, Position Following Error, Encoder Cable Error, etc.				
PC Software	Leadshine ProTuner (coming soon)				
Operating Environment	Environment	Avoid dust, oil ,fog and corrosive gases			
	Operating Temperature	0-50℃ (32 F – 122 F)			
	Storage	-20℃-65℃ (-4 F – 149 F)			

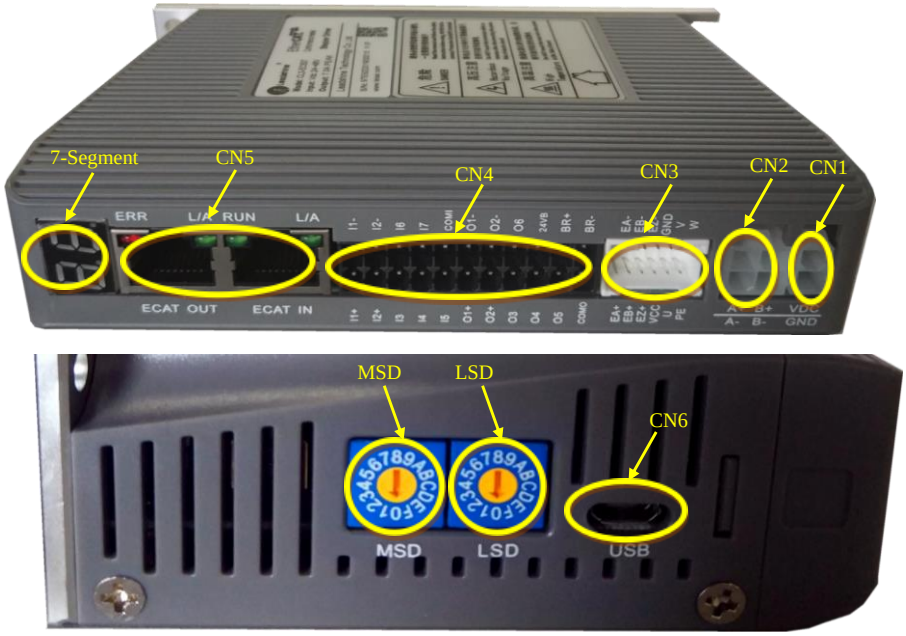
	Temperature	
	Humidity	40-90%RH
	Vibration	10-55Hz/0.15mm
	Mount	Vertical or horizontal mounting

Dimension



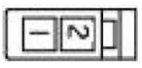


Connector and Pin Assignment

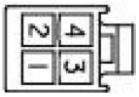


Name	Description
CN1	Input power connector
CN2	Motor connector
CN3	Encoder input signals connector
CN4	Digital input and output connector
CN5	EtherCAT communication connector
CN6	Micro USB tuning connector
7-Segment	Two 7-Segment display slave ID, velocity, statue machine, operation mode and error code
MSD	Setting communication high address
LSD	Setting communication low address

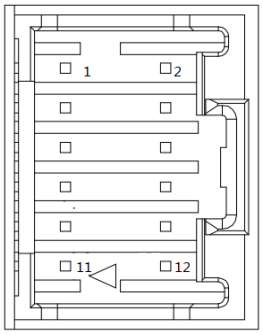
➢ **CN1-Input Power Connector**

Name	Pic	PIN	Signal	Description
CN1		1	GND	GND
		2	VDC	24V- 50V

➢ **CN2-Motor Connector**

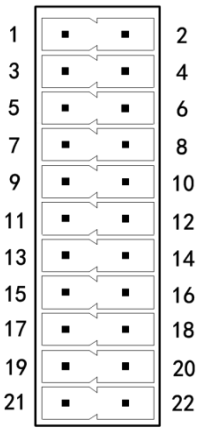
Name	Pic	PIN	Signal	Description
CN2		4	A+	Motor phase A+
		2	A-	Motor phase A-
		3	B+	Motor phase B+
		1	B-	Motor phase B-

➢ **CN3-Encoder Input Signals Connector**

Name	Pic	PIN	Signal	Description
CN3		1	EA+	Encoder signal of phase A+
		2	EA-	Encoder signal of phase A-
		3	EB+	Encoder signal of phase B+
		4	EB-	Encoder signal of phase B-
		5	EZ+	Encoder Z+ signal
		6	EZ-	Encoder Z- signal
		7	VCC	Encoder +5V voltage
		8	GND	Encoder ground
		9	U	Reserved
		10	V	Reserved
		11	W	Reserved

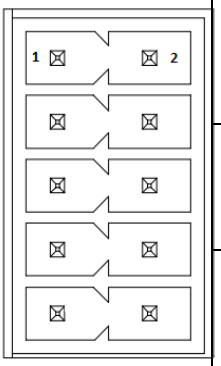
Note: only available for CS3E-D*** models

➢ **CN4-I/O Signals Connector**

Name	Pic	PIN	Signal	I/O	Description
CN4		1	I1+	I	Configurable Differential Digital Input I1, 3.3V - 5V, 500KHz, Touch Probe 1 (default)
		2	I1-	I	
		3	I2+	I	Configurable Differential Digital Input I2, 3.3V - 5V, 500KHz, Touch Probe 2 (default)
		4	I2-	I	
		5	I3	I	Configurable Single-ended Digital Inputs I3-I7, 12V - 24V, 10KHz, I3 is Origin Signal, I4 is Positive Limit, I5 is Negative Limit, I6 and I7 are GPIO
		6	I6	I	
		7	I4	I	
		8	I7	I	
		9	I5	I	
		10	COMI	I	Common connection of single-end input signals (common-cathode and common-anode)
		11	O1+	O	Configurable Differential Digital Output O1, Max. 30V/100mA. Alarm (default).
		12	O1-	O	
		13	O2+	O	Configurable Differential Digital Output O2, Max. 30V/100mA. In Position (default).
		14	O2-	O	

		15	O3	O	Configurable Single-ended Digital Outputs O3, O4, O6, Max. 30V/100mA. Default is GPIO
		16	O6	O	
		17	O4	O	
		19	O5	O	
		18	24VB	O	Used for brake signal, connect with +24 DC of external power supply, refer to chapter 4.2.5
		20	BR+	O	Brake + signal, Max. 24/500mA, connect with brake coil. It's shown as SO7 in Leadshine ProTuner and level cannot be modified
		21	COMO	O	Common connection of single-end output signals (common-cathode)
		22	BR-	O	Brake-signal, Max. 24/500mA, connect with brake coil. It's shown as SO7 in Leadshine ProTuner and level cannot be modified

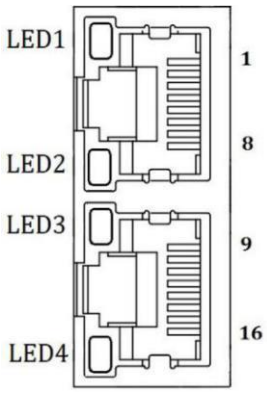
Note: only available for CS3E-D*** models.

Name	Pic	PIN	Signal	I/O	Description
CN3		1	DI5	I	Configurable Single-ended Digital Input 5,12V - 24V, 10KHz, Negative Limit (default)
		2	DI6	I	Configurable Single-ended Digital Input 6, 12V - 24V, 10KHz, GPIO
		3	DI3	I	Configurable Single-ended Digital Input 3, 12V - 24V, 10KHz, Home switch (default)
		4	DI4	I	Configurable Single-ended Digital Input 4,12V - 24V, 10KHz, Positive Limit (default)
		5	DI1	I	Configurable Single-ended Digital Input 1,12V - 24V, 10KHz, Touch Probe 1 (default)
		6	DI2	I	Configurable Single-ended Digital Input 2,12V - 24V, 10KHz, Touch Probe 2 (default)
		7	COMI	I	Common anode of external input signals
		8	COMO	O	Common ground of digital output signals

		9	DO1	O	Configurable Single-ended Digital Outputs 1, OC output, Max. 30V/100mA. Alarm output (default)
		10	DO2	O	Configurable Single-ended Digital Outputs 2, OC output, Max. 30V/100mA. Brake output (default)

Note: only available for CS3E-D***E models.

➢ **CN5-EtherCAT Communication Connector**

Name	Pic	PIN	Signal	Description
CN5		1, 9	E_TX+	EtherCAT TxD+
		2, 10	E_TX-	EtherCAT TxD-
		3, 11	E_RX+	EtherCAT RxD+
		4, 12	/	/
		5, 13	/	/
		6, 14	E_RX-	EtherCAT RxD-
		7, 15	/	/
		8, 16	/	/
		Cover	PE	Shield earthing
Note	(1) LED1 as'Link/Activity IN' indicator, green (2) LED3 as'Link/Activity OUT' indicator, green (3) LED2 as'RUN' indicator, green (4) LED4 as'ERR' indicator, red			

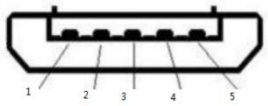
This LED informs EtherCAT communication status. RUN LED, ERROR LED positions at the front side of product and, Link/Activity LED individually positions at the top of right corner of EtherCAT ports..

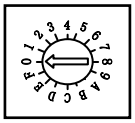
Name	Color	Statue	Description
LED1	Green	OFF	Link not established in physical layer
		ON	Link established in physical layer
		Flickering	In operation after establishing link
LED3	Green	OFF	Link not established in physical layer
		ON	Link established in physical layer
		Flickering	In operation after establishing link

Table 3.3 Link/Activity LED status

➢ **CN6-Micro USB Tuning Port**

Name	Pic	PIN	Signal

CN6		1	GND
		2	Reserved
		3	Data+
		4	Data-
		5	V_Bus



➢ **Salve ID (Site Alias) Setting**

The Salve ID (also called Site Alias) of CS3E series can be set by the following 3 methods:

- **Setting via Rotary Switches**

When Object (2151h) is set to value '0', user can set a value non-zero via the two rotary switches as the salve ID, activated after restarting the power supply. The specific definition is as below:

The salve ID of drives comes from the constituent hexadecimal value by rotary switch 1 (MSD) and rotary switch 2 (LSD). For example, when the MSD is set value 'A' , and the LSD is set value '8' , the ID is 168 (decimalism).

- **Setting via Reading ESC(EtherCAT Salve Controller)**

When Object (2151h) is set to value '2' and MSD, LSD rotary switches are set to 0, the EtherCAT master will configure site alias to the address of EEPROM 0004h of ESC automatically.

- **Setting via Object (2150h)**

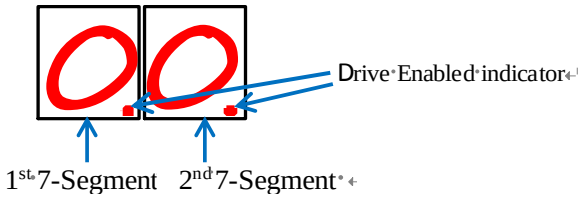
When Object (2151h) is set to value '1', the value written in Object (2150h) is as the site alias, activated after saving parameter and restarting the power supply.

➢ **Two 7-Segment**

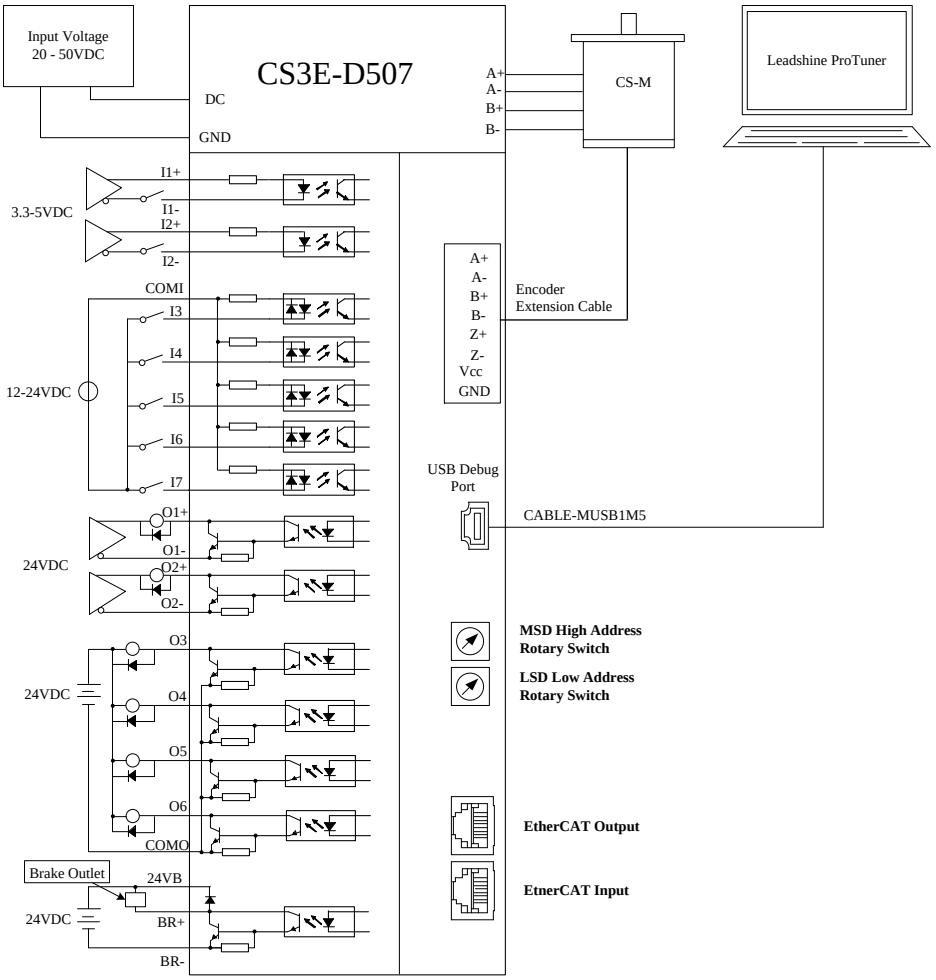
There are two 7-Segment with two LED indicators on the front of CS3E-D507 (turn on when drive is enabled).The displayed content of after initialization can be set by Object (214b-00h):

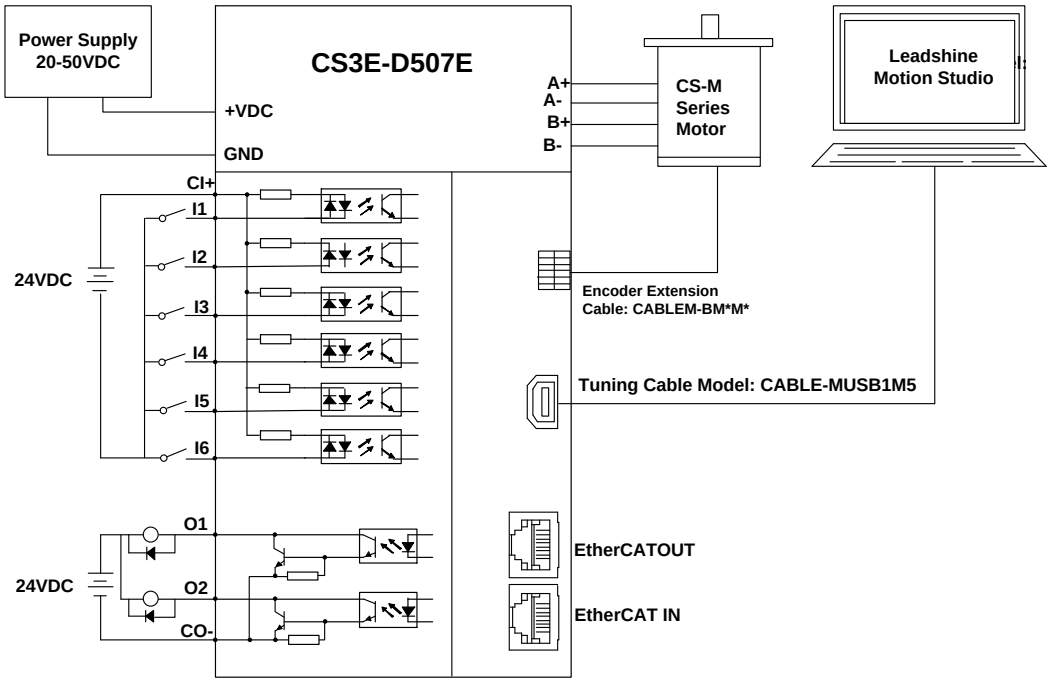
- 2-Velocity
- 0-Statue machine / operation mode
- 1-Slave ID

When an error occurs, the 7-Segment displays only the alarm code, please refer to chapter 5.2



Wiring


Input Voltage
20 - 50VDC
CS3E-D507
DC
GND
A+
A-
B+
B-
CS-M
Leadshine ProTuner
I1+
I1-
I2+
I2-
3.3-5VDC
COMI
I3
I4
I5
I6
I7
12-24VDC
A+
A-
B+
B-
Z+
Z-
Vcc
GND
Encoder
Extension Cable
USB Debug
Port
CABLE-MUSB1M5
O1+
O1-
O2+
O2-
24VDC
O3
O4
O5
O6
COMO
24VDC
MSD High Address
Rotary Switch
LSD Low Address
Rotary Switch
EtherCAT Output
EtnerCAT Input
Brake Outlet
24VB
BR+
BR-
24VDC


Power Supply
20-50VDC
CS3E-D507E
+VDC
GND
A+
A-
B+
B-
CS-M
Series
Motor
Leadshine
Motion Studio
CI+
I1
I2
I3
I4
I5
I6
24VDC
Encoder Extension
Cable: CABLEM-BM*M*
Tuning Cable Model: CABLE-MUSB1M5
O1
O2
CO-
24VDC
EtherCATOUT
EtherCAT IN