

## EL7 Series AC Servo Drive

EL7 Series AC servo products are high performance AC digital servo which is designed for position/velocity/torque high accurate control , power range up to 2kw ,which can provide intelligent performance with easy tuning process .

Combined with abundant features like MFC, vibration suppression, Multi-mode filter function etc. It provides machines a compact size, low tuning works, but high resolution encoder up to 23 bits ,which can be used for high accuracy applications

### Feature:

- ◆ Easy tuning, flexible to control
- ◆ Automatic identification for motor type
- ◆ RS485/Modbus/EtherCAT
- ◆ Notch filter, Damping filter
- ◆ Dynamic brake
- ◆ 17bit /23bit absolute encoder
- ◆ Internal resistor



### Technical Specification

| Type                         | EL7-*400Z  | EL7-*750Z     | EL7-*1000Z                                                                                                                                                                                                                                                           | EL7-*1500Z | EL7-*2000Z |
|------------------------------|------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|
| Cont current                 | 3.5        | 5.5           | 7                                                                                                                                                                                                                                                                    | 10         | 12         |
| Peak Current                 | 10.5       | 16.5          | 21                                                                                                                                                                                                                                                                   | 30         | 36         |
| Power Supply                 | 100W~2KW   | Main Power    | Single phase or three phase 220V -15%~+10% 50/60HZ                                                                                                                                                                                                                   |            |            |
|                              |            | Control Power | Single phase 220V -15%~+10% 50/60HZ                                                                                                                                                                                                                                  |            |            |
| Control Method               |            |               | IGBT SVPWM sinusoidal wave drive                                                                                                                                                                                                                                     |            |            |
| Encoder Feedback             |            |               | ◆ 17bit incremental encoder/absolute encoder<br>◆ 23bit multi-turn absolute encoder                                                                                                                                                                                  |            |            |
| IO                           | Digital IO | Input         | 9 inputs（Support common+ and common- two wiring modes）, functions can be configured, 12~24Vdc,30mA                                                                                                                                                                   |            |            |
|                              |            | Output        | 6 outputs（4 single-ended, 2 differential）, functions can be configured, 12~24Vdc,30mA                                                                                                                                                                                |            |            |
|                              | Analog     | Input         | 2 analog input( <i>optional</i> ), -10~+10Vdc, input resistance 20KΩ, no isolation                                                                                                                                                                                   |            |            |
|                              | Pulse      | Input Pulse   | 0-500kHz, 5V differential input/24V Single-ended                                                                                                                                                                                                                     |            |            |
|                              |            | Output Pulse  | Encoder ABZ output（3 single-ended, 3 differential）                                                                                                                                                                                                                   |            |            |
| Communication Port           | USB        |               | PC debug                                                                                                                                                                                                                                                             |            |            |
|                              | RS-485     |               | Modbus/RTU( <i>optional</i> ), 1:N communication up to 31axes to a host                                                                                                                                                                                              |            |            |
|                              | EtherCAT   |               | EtherCAT ( <i>optional</i> ), 1:N communication up to 128 axes to a host                                                                                                                                                                                             |            |            |
| Control Mode                 |            |               | ◆ Position mode: pulse+direction、internal register position setup、RS232/485<br>◆ Velocity mode: analog、internal register velocity setup. RS232/485<br>◆ Torque mode: analog                                                                                          |            |            |
| Operation Interface          |            |               | Five LED tubes and five keys                                                                                                                                                                                                                                         |            |            |
| Electronic gear ratio        |            |               | 1~8388608                                                                                                                                                                                                                                                            |            |            |
| Input Function Configuration |            |               | Servo-ON. Alarm clear. Positive/Negative Limit. Control mode switching. Gain switching. Deviation counter clear. Command pulse inhibition. Electronic gear switching. Torque limit switching. Speed zero clamp. Speed command sign input. Torque command sign input. |            |            |

|                                      |             |                                                                                                                                                                                                                |
|--------------------------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                      |             | E-STOP. Inertia ratio switching. Internal speed selection                                                                                                                                                      |
| <b>Output Function Configuration</b> |             | Alarm output. Servo-Ready. Positioning complete. At-speed. Zero-speed. Velocity coincidence. Positional command ON/OFF. Servo-ON. Home-OK                                                                      |
| <b>Safety Protection</b>             |             | Over-Current. Over-Voltage. Under-Voltage. Over-Heat. Over-Load. Encoder error. Over-Speed. Running-away. Positive/Negative Limit. Communication error. Position deviation error. Power-line out of phase etc. |
| <b>Dynamic braking</b>               |             | Built-in                                                                                                                                                                                                       |
| <b>Environment</b>                   | Temperature | Storage: -20-80℃; Installation: 0-55℃                                                                                                                                                                          |
|                                      | Humidity    | Under 90%RH (free from condensation)                                                                                                                                                                           |
|                                      | Altitude    | Lower than 1000m                                                                                                                                                                                               |
|                                      | Vibration   | Less than 0.5G (4.9m/s <sup>2</sup> ) 10-60Hz (non-continuous working)                                                                                                                                         |

## Features

|                                                                                                                                                                                                                                                  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Inertia ratio identification</b>                                                                                                                                                                                                              |  |
| Off-line inertia ratio identification, better performance, easy tuning                                                                                                                                                                           |  |
| <b>Position mode/Velocity mode/Torque mode</b>                                                                                                                                                                                                   |  |
| Supported Position mode/Velocity mode/Torque mode                                                                                                                                                                                                |  |
| <ul style="list-style-type: none"> <li>● Position mode: pulse+direction. internal register position setup. RS232/485</li> <li>● Velocity mode: analog. internal register velocity setup. RS232/485</li> <li>● Torque mode: analog</li> </ul>     |  |
| <b>Control mode switching</b>                                                                                                                                                                                                                    |  |
| IO signal for mode switching, select Position mode/Velocity mode/Torque mode                                                                                                                                                                     |  |
| <b>Gain switching</b>                                                                                                                                                                                                                            |  |
| Automatically switch gain under special conditions/ IO signal for gain switching                                                                                                                                                                 |  |
| <b>Internal 16 path velocity mode</b>                                                                                                                                                                                                            |  |
| No analog control required. 16 path speed and IO trigger                                                                                                                                                                                         |  |
| <b>Command pulse inhibition</b>                                                                                                                                                                                                                  |  |
| Invalid the pulse input, stop with deceleration                                                                                                                                                                                                  |  |
| <b>Position limit</b>                                                                                                                                                                                                                            |  |
| Protective equipment operation                                                                                                                                                                                                                   |  |
| <b>Input and output signal allocation function</b>                                                                                                                                                                                               |  |
| <ul style="list-style-type: none"> <li>● Set SI input function allocation</li> <li>● Set SO output function allocation</li> </ul>                                                                                                                |  |
| <b>Encoder signal output</b>                                                                                                                                                                                                                     |  |
| Output encoder signal: Single-ended /Differential                                                                                                                                                                                                |  |
| <b>Analog Input</b>                                                                                                                                                                                                                              |  |
| 2 analog input for velocity / torque mode control                                                                                                                                                                                                |  |
| <b>Speed zero clamp</b>                                                                                                                                                                                                                          |  |
| If the actual analog input is less than the setting value, the motor will stop rotating in servo-on condition                                                                                                                                    |  |
| <b>Vibration Suppression</b>                                                                                                                                                                                                                     |  |
| Specific resonance frequency can be obtained from PC upper computer software according to waveform monitoring, and filter frequency can be set to effectively suppress the oscillation ripple of a certain frequency in the current instruction. |  |
| <b>Command filter</b>                                                                                                                                                                                                                            |  |
| To make the positional command divided or multiplied by the electronic gear smooth, set the command filter                                                                                                                                       |  |
| <b>Friction torque compensation</b>                                                                                                                                                                                                              |  |
| Apply feed forward torque superposition directly to torque command                                                                                                                                                                               |  |

## ***EL7 series servo driver***

### EL7-D 2000 Z

① ② ③ ④

| NO | Details        |                                                                                                       |                          |                           |                                          |
|----|----------------|-------------------------------------------------------------------------------------------------------|--------------------------|---------------------------|------------------------------------------|
| ①  | Series Num     | EL7: New series servo driver                                                                          |                          |                           |                                          |
| ②  | Command source | D: Stand version (Pulse+direction)<br>RS: RS485 (Pulse+direction/Analog Input/Modbus)<br>EC: EtherCAT |                          |                           |                                          |
| ③  | Power          | 0100:100W<br>1000: 1000W                                                                              | 0200: 200W<br>1300:1300W | 0400: 400W<br>1500: 1500W | 0750: 750W<br>0850 : 850W<br>2000: 2000W |
| ④  | Encoder        | Z: Serial encoder                                                                                     |                          |                           |                                          |

## ***ELM series servo motor***

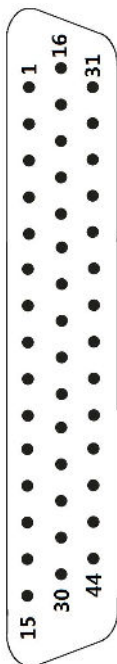
### ELM 0400 F L 80 H-SS

① ② ③ ④ ⑤ ⑥ ⑦

| NO | Details       |                                             |                           |                                         |                          |                           |      |
|----|---------------|---------------------------------------------|---------------------------|-----------------------------------------|--------------------------|---------------------------|------|
| ①  | Series Num    | ELM: ELM series motor                       |                           |                                         |                          |                           |      |
| ②  | Power         | 0100:100W<br>0850 : 850W                    | 0200: 200W<br>1000: 1000W | 0400: 400W<br>1300:1300W                | 0600:600w<br>1500: 1500W | 0750: 750W<br>2000: 2000W |      |
| ③  | Encoder Type  | D:17bit single-turn<br>F:17bit magnetic     |                           | E: 17bit multi-turn<br>L:23bit absolute |                          |                           |      |
| ④  | Inertia Ratio | L: Low                                      | M:Medium                  | H:High                                  |                          |                           |      |
| ⑤  | Frame Size    | 40:40mm                                     | 60:60mm                   | 80:80mm                                 | 110:110mm                | 130:130mm                 |      |
| ⑥  | Motor Form    |                                             |                           |                                         |                          |                           |      |
|    | NO            | Shaft Form                                  |                           | Brake                                   |                          | Oil Seal                  |      |
|    |               | Circular shaft                              | Keyhole                   | Install                                 | None                     | Install                   | None |
|    | A             | ●                                           |                           | ●                                       |                          | ●                         |      |
|    | B             | ●                                           |                           |                                         | ●                        | ●                         |      |
|    | C             | ●                                           |                           | ●                                       |                          |                           | ●    |
|    | D             | ●                                           |                           |                                         | ●                        |                           | ●    |
|    | E             |                                             | ●                         | ●                                       |                          | ●                         |      |
|    | F             |                                             | ●                         |                                         | ●                        | ●                         |      |
|    | G             |                                             | ●                         | ●                                       |                          |                           | ●    |
| H  |               | ●                                           |                           | ●                                       |                          | ●                         |      |
| ⑦  | Plug Type     | SS:Plastic plug<br>H:Big size aviation plug |                           | HS:Small size<br>HH:Injection plug      |                          |                           |      |

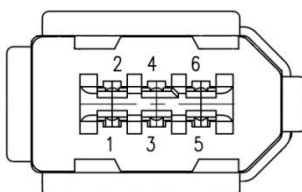
## Connectors and Pin Assignment

### Signal Explanation of Control Signal Port-CN1

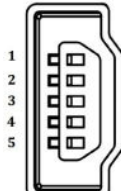
| Port |                                                                                    | Pin | Signal    | I/O    | Name                                                                                              | Explanation                                                                                                                                |                                                                           |
|------|------------------------------------------------------------------------------------|-----|-----------|--------|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| CN1  |  | 1   | COM_SI    | input  | Digital input common terminal, Com+ / Com-, 12VDC~24VDC                                           | Two-way digital input with common terminal, function can be configured. 12VDC ~ 24VDC                                                      |                                                                           |
|      |                                                                                    | 2   | SI1       | input  | Digital input 1                                                                                   |                                                                                                                                            |                                                                           |
|      |                                                                                    | 7   | SI2       | input  | Digital input 2                                                                                   |                                                                                                                                            |                                                                           |
|      |                                                                                    | 8   | SI3       | input  | Digital input 3                                                                                   |                                                                                                                                            |                                                                           |
|      |                                                                                    | 9   | SI4       | input  | Digital input 4                                                                                   |                                                                                                                                            |                                                                           |
|      |                                                                                    | 10  | SI5       | input  | Digital input 5                                                                                   |                                                                                                                                            |                                                                           |
|      |                                                                                    | 11  | SI6       | input  | Digital input 6                                                                                   |                                                                                                                                            |                                                                           |
|      |                                                                                    | 12  | SI7       | input  | Digital input 7                                                                                   |                                                                                                                                            |                                                                           |
|      |                                                                                    | 13  | SI8       | input  | Digital input 8                                                                                   |                                                                                                                                            |                                                                           |
|      |                                                                                    | 14  | SI9       | input  | Digital input 9                                                                                   |                                                                                                                                            |                                                                           |
|      |                                                                                    | 31  | COM_SO    | output | Digital output common-                                                                            | Low resistor output in default . OC, the maximum voltage/current is no more than 30V, 50mA . Recommended voltage : 12 V-24V. Current :10mA |                                                                           |
|      |                                                                                    | 33  | SO1 +     | output | Digital output 1                                                                                  |                                                                                                                                            |                                                                           |
|      |                                                                                    | 32  | SO2 +     | output | Digital output 2                                                                                  |                                                                                                                                            |                                                                           |
|      |                                                                                    | 34  | SO3 +     | output | Digital output 3                                                                                  |                                                                                                                                            |                                                                           |
|      |                                                                                    | 35  | SO4 +     | output | Digital output 4                                                                                  | Differential Digital output , the maximum voltage/current is no more than 30V, 50mA . Recommended voltage : 12 V-24V. Current :10mA        |                                                                           |
|      |                                                                                    | 18  | SO5 +     | output | Differential Digital output 5                                                                     |                                                                                                                                            |                                                                           |
|      |                                                                                    | 19  | SO5-      | output |                                                                                                   |                                                                                                                                            |                                                                           |
|      |                                                                                    | 20  | SO6-      | output | Differential Digital output 6                                                                     |                                                                                                                                            |                                                                           |
|      |                                                                                    | 21  | SO6 +     | output |                                                                                                   |                                                                                                                                            |                                                                           |
|      |                                                                                    | 23  | A +       | output | Differential output terminal of motor encoder A phase                                             |                                                                                                                                            | Differential output, High >= 2.5vdc, low <= 0.5vdc, maximum current ±20mA |
|      |                                                                                    | 24  | A -       | output |                                                                                                   |                                                                                                                                            |                                                                           |
|      |                                                                                    | 25  | B +       | output | Differential output terminal of motor encoder B phase                                             |                                                                                                                                            |                                                                           |
|      |                                                                                    | 26  | B -       | output |                                                                                                   |                                                                                                                                            |                                                                           |
|      |                                                                                    | 27  | Z +       | output | Differential output terminal of motor encoder Z phase                                             |                                                                                                                                            |                                                                           |
|      |                                                                                    | 28  | Z -       | output |                                                                                                   |                                                                                                                                            |                                                                           |
|      |                                                                                    | 36  | OCA       | output | OC output terminal of motor encoder A phase                                                       |                                                                                                                                            |                                                                           |
|      |                                                                                    | 37  | OCB       | output | OC output terminal of motor encoder B phase                                                       |                                                                                                                                            |                                                                           |
|      |                                                                                    | 29  | OCZ       | output | OC output terminal of motor encoder Z phase                                                       |                                                                                                                                            |                                                                           |
|      |                                                                                    | 30  | GND       | output | OC output GND terminal of motor encoder                                                           |                                                                                                                                            |                                                                           |
|      |                                                                                    | 3   | PUL +     | input  | Pulse input, PUL+ and PUL-: 5V differential input PUL+_24 and PUL-: 24V differential input        |                                                                                                                                            |                                                                           |
|      |                                                                                    | 4   | PUL -     | input  |                                                                                                   |                                                                                                                                            |                                                                           |
|      |                                                                                    | 16  | PUL + _24 | input  |                                                                                                   |                                                                                                                                            |                                                                           |
|      |                                                                                    | 5   | DIR +     | input  | Direction input , DIR+ and DIR- : 5V differential input DIR+_24 and DIR- : 24V differential input |                                                                                                                                            |                                                                           |
|      |                                                                                    | 6   | DIR -     | input  |                                                                                                   |                                                                                                                                            |                                                                           |
|      |                                                                                    | 17  | DIR + _24 | input  |                                                                                                   |                                                                                                                                            |                                                                           |
|      |                                                                                    | 39  | AI1+      | input  | Analog input 1, voltage input range : 10VDC~10VDC , input                                         |                                                                                                                                            |                                                                           |

|  |  |                |       |       |                                                                         |
|--|--|----------------|-------|-------|-------------------------------------------------------------------------|
|  |  | 40             | AI1 - | input | Analog input 3, voltage input range : 10VDC~10VDC , input resistor 20KΩ |
|  |  | 41             | AGND  | input |                                                                         |
|  |  | 43             | AI3 + | input |                                                                         |
|  |  | 44             | AI3 - | input |                                                                         |
|  |  | 15/22/38/40/42 | NC    | /     | Not connection                                                          |
|  |  | Shell          | FG    |       | Shield ground                                                           |

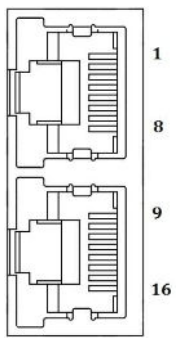
#### Encoder Input Port-CN2 for EL7 Series

| Port |                                                                                   | Pin | Signal |
|------|-----------------------------------------------------------------------------------|-----|--------|
| CN2  |  | 1   | VCC5V  |
|      |                                                                                   | 2   | GND    |
|      |                                                                                   | 3   | BAT+   |
|      |                                                                                   | 4   | BAT-   |
|      |                                                                                   | 5   | SD+    |
|      |                                                                                   | 6   | SD-    |
|      |                                                                                   |     | PE     |

#### Communication Port-CN6 for EL7 Series

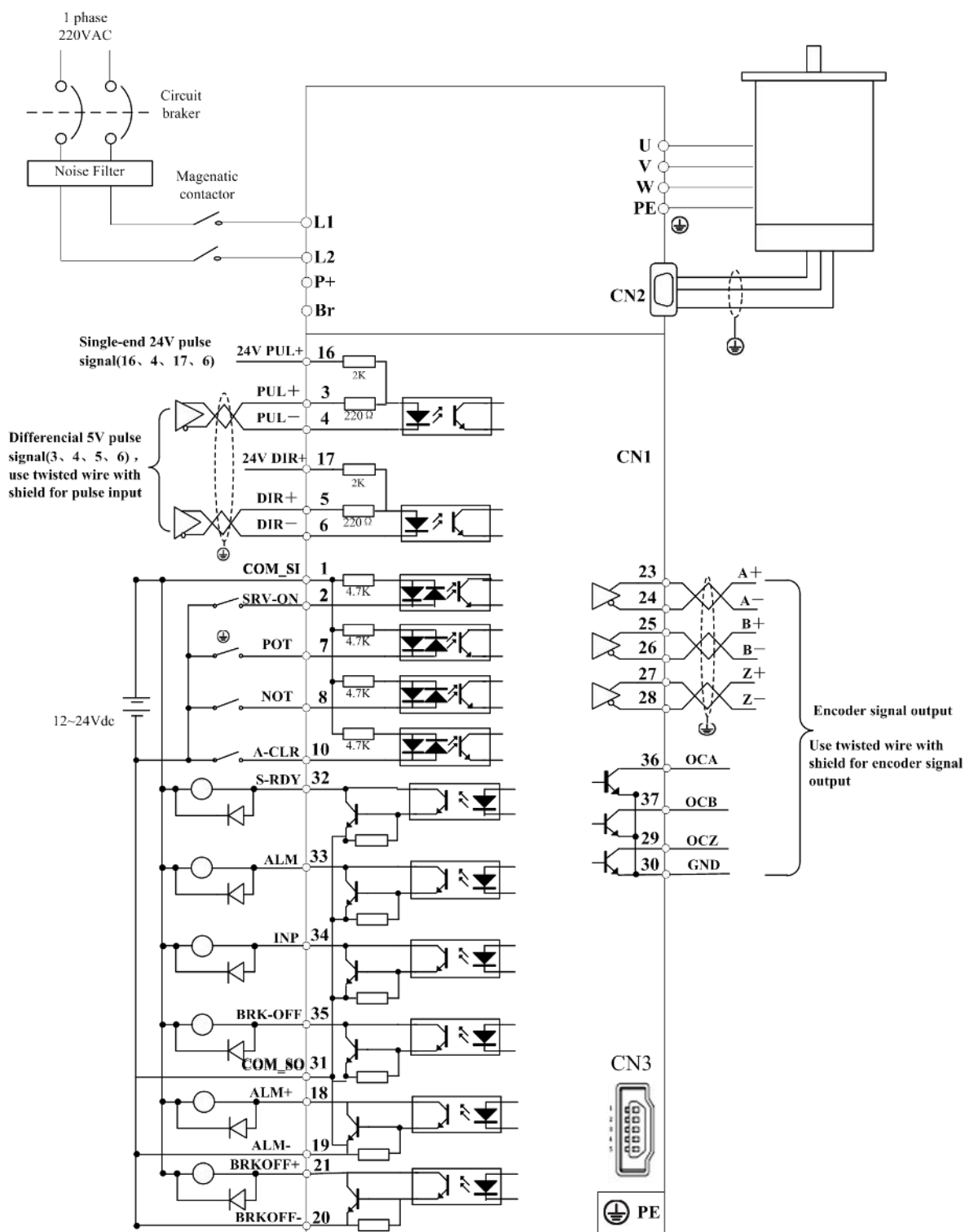
| Port |                                                                                     | Pin | Signal  |
|------|-------------------------------------------------------------------------------------|-----|---------|
| CN3  |  | 1   | VCC5V   |
|      |                                                                                     | 2   | D+      |
|      |                                                                                     | 3   | D-      |
|      |                                                                                     | 4   |         |
|      |                                                                                     | 5   | GND     |
|      |                                                                                     | FG  | USB_GND |

#### Bus connector- CN3 for EL7 Series

| Port       |                                                                                     | Pin    | Signal |
|------------|-------------------------------------------------------------------------------------|--------|--------|
| CN4<br>CN5 |  | 1 , 9  | RDO+   |
|            |                                                                                     | 2 , 10 | RDO-   |
|            |                                                                                     | 3 , 11 | /      |
|            |                                                                                     | 4 , 12 | TXD    |
|            |                                                                                     | 5 , 13 | RXD    |
|            |                                                                                     | 6 , 14 | VCC5V  |
|            |                                                                                     | 7 , 15 | GND    |
|            |                                                                                     | 8 , 16 | /      |
|            |                                                                                     |        | PE     |

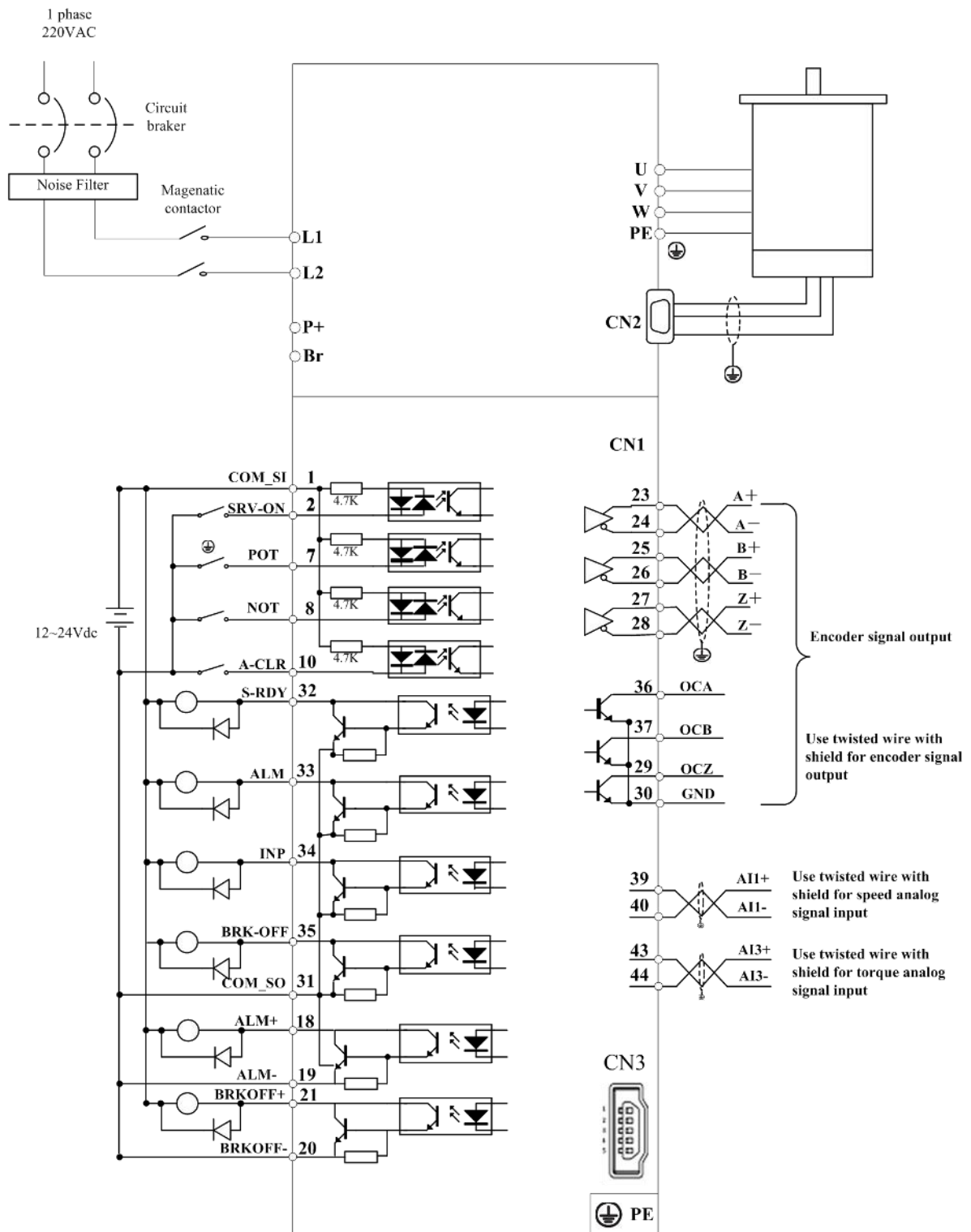
# Wiring

## Position Control Mode



Positional Control Mode Wiring

## Torque /Velocity Control Mode



Torque/Velocity Control Mode Wiring