

# KNC-SRV-FD135S Series Servo Driver



## FEATURES

- **24-60VDC**
- **2 Channel STO**
- **Max Continuous Output Current 30A**
- **1000 Watt Rated Power Range**
- **Position, Speed, and Torque Control**
- **Supports RS485, CANopen, EtherCAT, and PROFINET**
- **Natural Air Cooling**
- **MODBUS RTU or Pulse and Direction**
- **Supports Incremental or 16/17-Bit Multi-Turn Magnetic Encoders**
- **Communication Software**
  - **Configure Parameters**
  - **I/O Signal Monitoring**
  - **Speed and Position Curves**
  - **Gain Adjustments**
- **Programmable Inputs and Outputs**
  - **4 Inputs (3 Digital, 1 Analog)**
  - **2 Outputs (1 Standard & 1 for Brake)**
- **CE & UL Certified**

## DESCRIPTION

The FD1X5S represents our fifth-generation low-voltage servo drive, engineered for a 24-60VDC wide-range supply and power outputs spanning 600 W to 1000 W. As a high-performance DC servo drive, it supports CANopen, Modbus RTU, EtherCAT, and PROFINET, enabling flexible integration into industrial servo drive systems. The drive also meets CE, UL, and RoHS requirements and integrates STO (Safe Torque Off) for safe and reliable motion control. Built on a new auto-tuning algorithm architecture, the FD1X5S combines an adaptive notch filter with S-curve acceleration profiles to suppress mechanical resonance and reduce operating noise. This enables smooth and stable motor rotation under changing load conditions, making it a reliable DC servo motor drive for demanding motion control applications.

## SPECIFICATIONS

| Category                | Servo Driver                     | Servo Motor                    | Description                            | Power/Brake Cable                     | Encoder Cable                                                        | Rated Power /<br>Rated Speed / Rated Torque |
|-------------------------|----------------------------------|--------------------------------|----------------------------------------|---------------------------------------|----------------------------------------------------------------------|---------------------------------------------|
| Medium Inertia<br>DC48V | FD135S-AS-000<br>/ FD135S-ES-000 | KNC-SRV-SMK80D-0075-30QAK-5DCA | Multi-Turn Magnetic Encoder            | M-Y-20A-KD0-LL-S<br>^M-Y-20A-KD1-LL-S | E-H-MV-KA0-LL<br>*E-H-QY-KA0-LL<br>^E-H-MV-KA1-LL<br>^*E-H-QY-KA1-LL | 750W / 3000 RPM /<br>338 oz-in              |
|                         |                                  | KNC-SRV-SMK80D-0075-30QBK-5DCA | Multi-Turn Magnetic Encoder with Brake | M-Y-20A-KD0-LL-BS                     |                                                                      |                                             |
|                         |                                  | KNC-SRV-SMK80D-0100-30QAK-5DCA | Multi-Turn Magnetic Encoder            | M-Y-30A-KD0-LL-S<br>^M-Y-30A-KD1-LL-S |                                                                      | 1000W / 3000 RPM<br>/ 450 oz-in             |
|                         |                                  | KNC-SRV-SMK80D-0100-30QBK-5DCA | Multi-Turn Magnetic Encoder with Brake | M-Y-30A-KD0-LL-BS                     |                                                                      |                                             |
|                         |                                  | KNC-SRV-SMK60D-0060-30QAK-5DCU | Multi-Turn Magnetic Encoder            | M-Y-20A-SP-LL-S                       | E-H-MV-U-LL<br>*E-H-QY-U-LL                                          | 600W / 3000 RPM /<br>270 oz-in              |
|                         |                                  | KNC-SRV-SMK60D-0060-30QBK-5DCU | Multi-Turn Magnetic Encoder with Brake | M-Y-20A-SP-LL-S &<br>BRA-LL-KL        |                                                                      |                                             |
|                         |                                  | KNC-SRV-SMK80D-0075-30QAK-5DCU | Multi-Turn Magnetic Encoder            | M-Y-20A-SP-LL-S                       |                                                                      | 750W / 3000 RPM /<br>338 oz-in              |
|                         |                                  | KNC-SRV-SMK80D-0075-30QBK-5DCU | Multi-Turn Magnetic Encoder with Brake | M-Y-20A-SP-LL-S &<br>BRA-LL-KL        |                                                                      |                                             |
|                         |                                  | KNC-SRV-SMK80D-0100-30QAK-5DCU | Multi-Turn Magnetic Encoder            | M-Y-30A-SP-LL-S                       |                                                                      | 1000W / 3000 RPM<br>/ 450 oz-in             |
|                         |                                  | KNC-SRV-SMK80D-0100-30QBK-5DCU | Multi-Turn Magnetic Encoder with Brake | M-Y-30A-SP-LL-S &<br>BRA-LL-KL        |                                                                      |                                             |

"LL" indicates the cable length (03 = 3m is standard).

\*Essential battery power cable for multi turn absolute encoders, not needed if using as single turn.

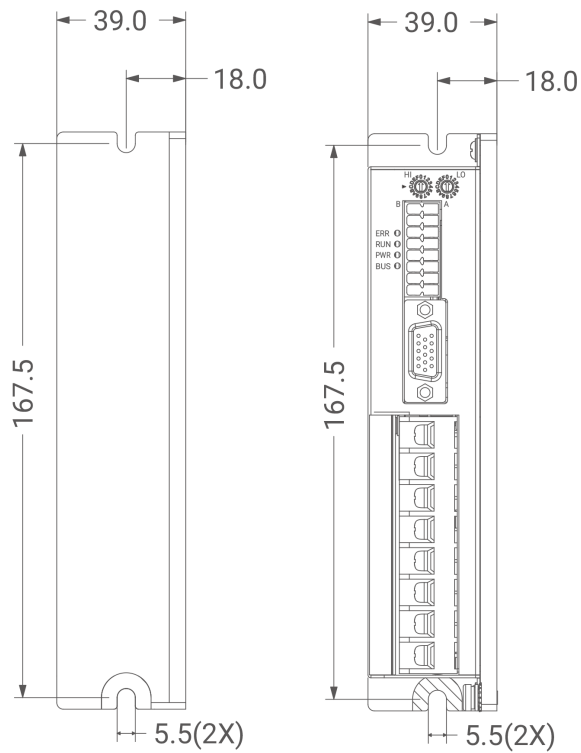
^Cable exits away from shaft (Tail Out).

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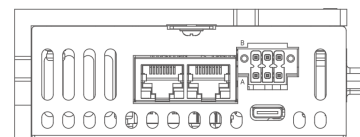
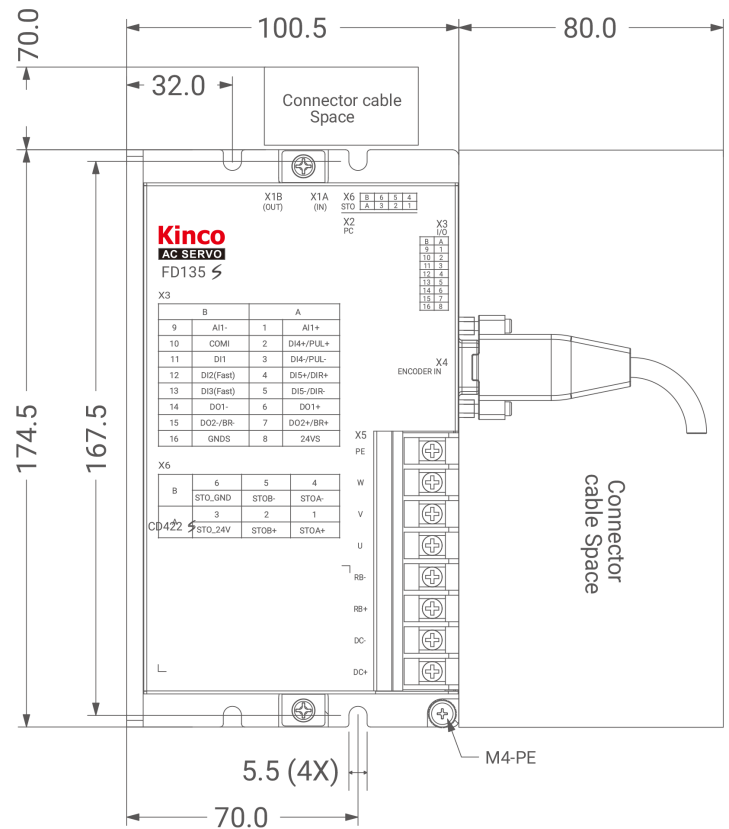


## DIMENSIONS



Hole position  
for fixation

Units are in mm



# KNC-SRV-FD135S Series Servo Driver



## TECHNICAL SPECIFICATIONS

| Model Parameter                                   |                         | KNC-SRV-FD135S Series                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power                                             | Main Supply Voltage     | 24VDC-60VDC                                                                                                                                                                                                                                                                                                 |
|                                                   | Control Circuit Voltage | DC24V (Allowable Fluctuation Range 18V-30V), 500mA+Holding brake coil current, the logic power is an isolated power supply with an isolation voltage of 500 VDC                                                                                                                                             |
| Current                                           | Max Current (RMS)       | 30Arms (Up to 22A without auxilliary cooling plate)                                                                                                                                                                                                                                                         |
|                                                   | Peak Current (PEAK)     | 100A                                                                                                                                                                                                                                                                                                        |
| Feedback Signal                                   |                         | Tamagawa Protocol, Incremental Encoder                                                                                                                                                                                                                                                                      |
| Energy Consumption Brake                          |                         | Need external brake resistance (depending on the operation condition, mainly used in rapid start-stop occasions)                                                                                                                                                                                            |
| Energy Consumption Brake Voltage Absorption Point |                         | DC63V $\pm$ 2V (Default Value, Adjustable via Software)                                                                                                                                                                                                                                                     |
| Over-Voltage Alarming Threshold                   |                         | DC70V $\pm$ 2V (Default Value, Adjustable via Software)                                                                                                                                                                                                                                                     |
| Under-Voltage Alarming Threshold                  |                         | DC16V $\pm$ 2V (Default Value, Adjustable via Software)                                                                                                                                                                                                                                                     |
| Cooling Method                                    |                         | Natural Air Cooling                                                                                                                                                                                                                                                                                         |
| Weight                                            |                         | 1.53 lbs                                                                                                                                                                                                                                                                                                    |
| Logic Loss Power                                  |                         | 2500 mW                                                                                                                                                                                                                                                                                                     |
| Safety Function STO                               |                         | 2-Channel STO, STO interface can be connected with the safety controller, safety switch, safety sensor, etc., to realize the safety function of the driver. Input voltage range: 24 VDC $\pm$ 15%; Input current: 2.3 mA (Typ.); Logic level standard: IEC 61131-2 Type 1; Input impedance: 10 k $\Omega$ . |
| Input Specification                               | Digital Input           | 3-Channel Digital Inputs, Common COM1 Port, High Level: 12.5V~30VDC, Low Level: 0~5VDC; Max Frequency: 1KHz, Input Impedance: 5K $\Omega$ . Among them, DI2 and DI3 are high-speed inputs, with a response time of $\leq$ 10 $\mu$ s and an input impedance of 2.7 k $\Omega$ .                             |
|                                                   | Pulse Input             | 2-Channel Pulse Input, Pulse+Direction, CCW+CW, phase A+phase B (12V~24V). Max Frequency: 500KHz. It can be multiplexed as 2-channel DI (DI4 and DI5) by software setting.                                                                                                                                  |
| Analog Input                                      |                         | 1-Channel Voltage Type Analog Input, 12bit, -10V~+10V, Differential Connection Method.                                                                                                                                                                                                                      |
| Output Specification                              | Digital Output          | 1-Channel Digital Output, Open Collector Output, Max Voltage: 30V, Driving Capacity: 100mA.                                                                                                                                                                                                                 |
|                                                   | Brake Output            | 1-Channel Brake (Voltage: 24V, Output Capacity: 1A, can directly drive the brake). It can be multiplexed as 24V source output or open collector output.                                                                                                                                                     |
| Station Number                                    |                         | Two 16-bit rotary DIP switch are provided for setting the station number.                                                                                                                                                                                                                                   |
| Gantry Synchronization                            |                         | AS version supports Gantry synchronization.                                                                                                                                                                                                                                                                 |
| USB                                               |                         | Debug linterface, can use Kinco PC software to connection.                                                                                                                                                                                                                                                  |
| Protect Function                                  |                         | Overvoltage protection, undervoltage protection, motor I <sup>2</sup> T protection, short circuit protection, drive overheat protection.                                                                                                                                                                    |
| Bus Function                                      | Modbus / RS485          | It supports a maximum of 115200 bps and can communicate with the controller using Modbus RTU.                                                                                                                                                                                                               |
|                                                   | CANopen                 | It supports a maximum of 1Mbps and can communicate with the controller using the CANopen.                                                                                                                                                                                                                   |
|                                                   | EtherCAT                | Support CoE(CiA402 protocol) and CSP/CSV/PP/PV/PT/HM mode, Communication Speed 100Mbps.                                                                                                                                                                                                                     |
|                                                   | PROFINET                | Non periodic parameter read and write; Message 1, message 3, message 5, message 9, message 102, message 105, message 111; Support IRT synchronous mode; Support absolute value encoder; Support DSC dynamic servo control, Supports additional message 750.                                                 |

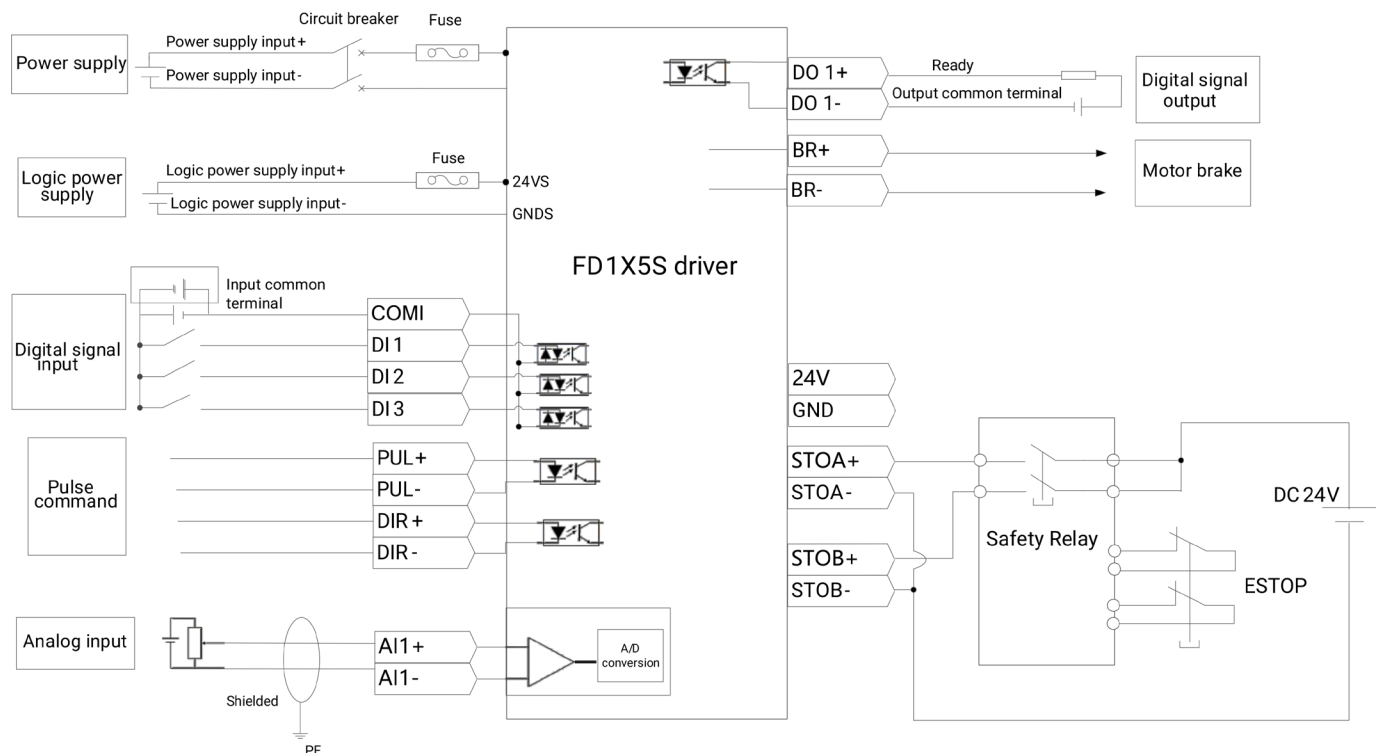
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## TECHNICAL SPECIFICATIONS

| Model Parameter      | KNC-SRV-FD135S Series                                                                                                                                                                                                                                                 |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Working Temperature  | -20°~+40°C (no freezing), when the operating temperature exceeds 40°C, the driver needs to be derated.                                                                                                                                                                |
| Working Humiditing   | Less than 90%RH (no condensation)                                                                                                                                                                                                                                     |
| Storage Temperature  | Short-term storage (with 1 month) : -20°C ~ +65°C                                                                                                                                                                                                                     |
| Storage Humidity     | 90%RH (no condensation)                                                                                                                                                                                                                                               |
| Protection Class     | IP20 (Power supply terminal X5 only meets IP00 protection level)                                                                                                                                                                                                      |
| Altitude             | Less than 3000m, power derating 1.5%/100m between 1000m and 3000m                                                                                                                                                                                                     |
| Atmospheric Pressure | 70kpa~106kpa                                                                                                                                                                                                                                                          |
| Installation Site    | It needs to be installed in an electrical cabinet with an IP54 protection class. The length of the control cable and bus cable installed on the equipment shall not exceed 30 meters, and the length of the power cable and encoder cable shall not exceed 10 meters. |
| Installation Method  | Install vertically or horizontally                                                                                                                                                                                                                                    |

## TECHNICAL SPECIFICATIONS

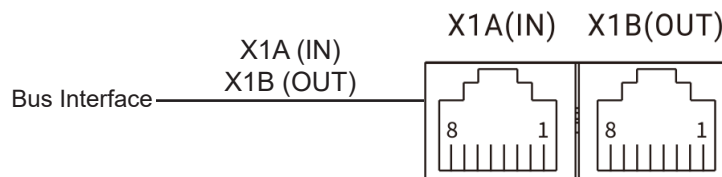


# KNC-SRV-FD135S Series Servo Driver



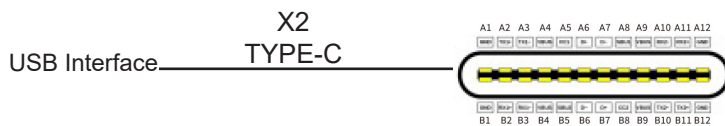
## Bus Interface

| Model | FD1x5S-AS-000    |         | FD1x5S-ES / PS-000  |
|-------|------------------|---------|---------------------|
| PIN # | RS485/<br>Modbus | CAN     | EtherCAT / PROFINET |
| 1     | /                | CAN_H   | TD+                 |
| 2     | /                | CAN_L   | TD-                 |
| 3     | /                | GND_CAN | RD+                 |
| 4     | 485B             | /       | /                   |
| 5     | 485A             | /       | /                   |
| 6     | /                | /       | RD-                 |
| 7     | /                | DATA+   | /                   |
| 8     | /                | DATA-   | /                   |



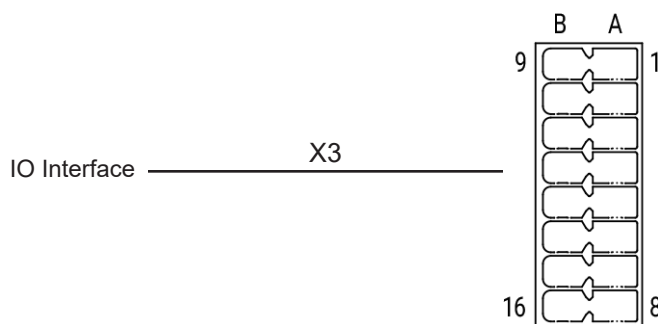
## USB Interface

| PIN Number | Signal |
|------------|--------|
| A1 & B12   | GND    |
| A6 & B6    | USBDP  |
| A7 & B7    | USBDN  |
| A4 & B9    | +5V    |



## IO Interface

| B     |           | A     |            |
|-------|-----------|-------|------------|
| PIN # | Signal    | PIN # | Signal     |
| 9     | AI1-      | 1     | AI1+       |
| 10    | COMI      | 2     | DI4+/ PUL+ |
| 11    | DI1       | 3     | DI4-/ PUL- |
| 12    | DI2(Fast) | 4     | DI5+/ DIR+ |
| 13    | DI3(Fast) | 5     | DI5-/ DIR- |
| 14    | DO1-      | 6     | DO1+       |
| 15    | DO2- /BR- | 7     | DO2+/ BR+  |
| 16    | GNDS      | 8     | 24VS       |



# KNC-SRV-FD135S Series Servo Driver



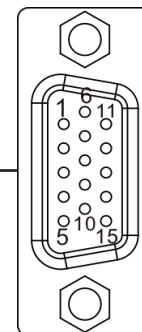
## INTERFACE DESCRIPTION

### Encoder Input

| PIN No. | Incremental | Communication |
|---------|-------------|---------------|
| 1       | +5V         | +5V           |
| 2       | GND         | GND           |
| 3       | (PTC)       | (PTC)         |
| 4       | U           | /             |
| 5       | /U          | /             |
| 6       | Z           | /             |
| 7       | B           | /             |
| 8       | A           | /             |
| 9       | W           | SD+           |
| 10      | V           | /             |
| 11      | /Z          | /             |
| 12      | /B          | /             |
| 13      | /A          | /             |
| 14      | /W          | SD-           |
| 15      | /V          | /             |

Encoder Input

X4

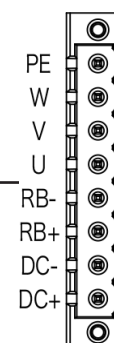


### Power and Motor Interface

| PIN No. | Signal | Pin Specification                                           |
|---------|--------|-------------------------------------------------------------|
| 1       | PE     | Servo motor power supply output end and motor grounding end |
| 2       | W      |                                                             |
| 3       | V      |                                                             |
| 4       | U      |                                                             |
| 5       | RB-    | External brake resistance input                             |
| 6       | RB+    |                                                             |
| 7       | DC-    | Drive power input                                           |
| 8       | DC+    |                                                             |

Power and Motor Interface

X5



### STO

| PIN No. | Signal | Description                                                                                                                                                            |
|---------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3       | 24V    | 24V power supply, logic electric output, can be jumped to STOA and STOB for testing                                                                                    |
| 6       | GND    |                                                                                                                                                                        |
| 1       | STOA+  | STO safety interface A, input voltage range 24VDC $\pm$ 15%<br>Input Current: 2.3mA (Type)<br>Logic level standard: IEC61131-2 Type 1<br>Input impedance: 10K $\Omega$ |
| 4       | STOA-  | STO safety interface B, input voltage range 24VDC $\pm$ 15%<br>Input current: 2.3mA (Type)<br>Logic level standard: IEC61131-2 Type 1<br>Input impedance: 10K $\Omega$ |
| 2       | STOB+  |                                                                                                                                                                        |
| 5       | STOB-  |                                                                                                                                                                        |

STO

X6

