

PROVEN PERFORMANCE

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Kinco

Motion Control  
VFD

Kinco VFD Catalog

- FV20 Series
- CV100 Series
- CV20 Series
- EC Series
- UAV Power Series



**Kinco® Automation**  
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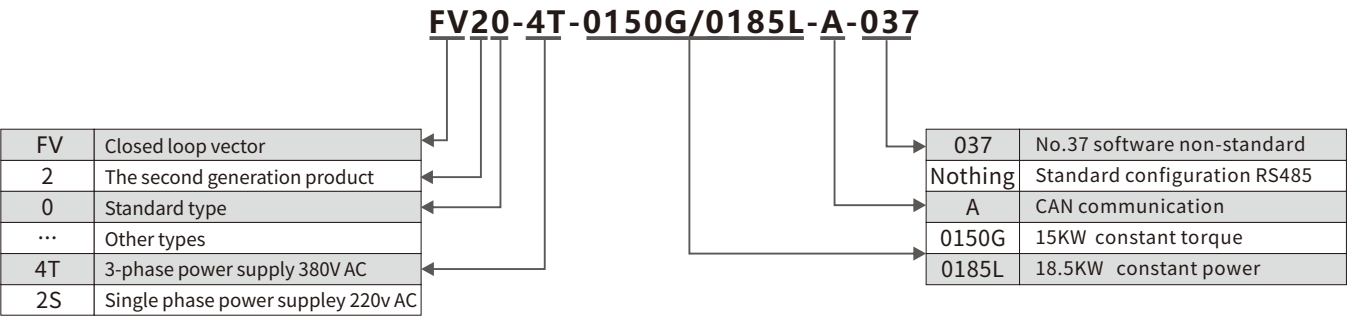


Fv20 :High cost performance and high performance vector VFD, gradually replacing FV100 series

Product Features

- Built in EMC filter to optimize the electrical environment of EMC field equipment
- Low speed, high torque, small torque ripple, automatic current limiting,avoid over current fault caused by sudden load or other reasons
- Optimized structure design, high power density, built-in brake unit under 45KW
- Strict reliability design, support the company background monitoring software

Product Model Description





Technical Specification

| Item                       |                                     | Description                                                                                                                                                  |
|----------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input                      | Rated Voltage/<br>frequency         | single-phase,220V AC,50HZ/60HZ;three-phase,380V AC,50HZ/60HZ<br>three-phase,220V AC,50Hz/60Hz                                                                |
|                            | Applicable<br>voltage range         | 4T:320V~460V; 2T/2S:180V~260V; Voltage unbalancedness: <3%;<br>Frequency tolerance: ±5%                                                                      |
| Output                     | Rated voltage                       | 0~Rated input voltage                                                                                                                                        |
|                            | Frequency                           | 0Hz~300Hz ((Customized 0Hz~3000Hz)                                                                                                                           |
|                            | Overload capacity                   | G Type:150% 1 minute, 180% 10 seconds; L type :110% 1 minute, 150% 1 second                                                                                  |
| Control<br>characteristics | Control method                      | Vector control without PG , Vector control with PG , V/F contro                                                                                              |
|                            | Modulation method                   | Space vector PWM modulation                                                                                                                                  |
|                            | Starting Torque                     | 0.5Hz: 150% of rated torque(Vector control without PG), 0.0Hz: 200% of rated torque(Vector control with PG)                                                  |
|                            | Frequency accuracy                  | Digital setting: Max. frequency× ±0.01%; Analog setting: Max. frequency× ±0.2%                                                                               |
|                            | Frequency resolution                | Digital setting: 0.01Hz; Analog setting : Max. frequency×0.05%                                                                                               |
|                            | Torque boost                        | Manual torque boost: 0%~30.0%(Only V / F mode is valid)                                                                                                      |
|                            | V/F pattern                         | 4 patterns:1 pattern is V/F curve setting by users. 3 patterns are drop torque characters curve<br>(2.0 power,1.7 power,1.2 power)                           |
|                            | Acceleration<br>/Deceleration curve | Linear or S-curve acceleration and deceleration mode;<br>Four kinds of acceleration and deceleration time                                                    |
|                            | Auto current limit                  | The current is automatically limited during operation to prevent frequent over-current fault tripping                                                        |
| Customized<br>function     | Jogging                             | Jogging frequency range: 0.00Hz~50.00Hz. Jogging acceleration/deceleration time: 0.1~60.0s.                                                                  |
|                            | Multiple speed operation            | Implement multiple speed operation by digital inputs.                                                                                                        |
| Operation<br>function      | Operation command                   | Keypad setting, Terminal setting, Communication setting                                                                                                      |
|                            | Frequency command                   | Digital setting, Analog voltage setting, Analog current setting, Pulse setting                                                                               |
|                            | Auxiliary frequency setting         | Implement flexible auxiliary frequency trim and frequency synthesis.                                                                                         |
|                            | Pulse output                        | 0.1kHz ~ 100kHz pulse square wave signal output, can achieve the set frequency,<br>output frequency and other physical quantities output                     |
|                            | Analog output                       | 2 channels analog output(0/4~20mA or 0/2~10V);Output setting frequency ,output frequency and so on                                                           |
| Operation panel            | LED Display                         | Display setting frequency, output frequency, output voltage, output current and so on, about 20 parameters.                                                  |
|                            | Parameters copy                     | Copy parameters by operation panel.                                                                                                                          |
|                            | Keys lock and<br>function selection | Lock part of keys or all the keys. Define the function of part of keys to prevent misoperation                                                               |
| Protection function        |                                     | Overcurrent protection, Overvoltage protection, Undervoltage protection,<br>Overheat protection, Overload protection, Open phase protection (optional), etc. |
| Environment                | Operating site                      | Indoor, free from direct sunlight, dust, corrosive gas, combustible gas, oil mist, water vapor, drip or salt                                                 |
|                            | Altitude                            | Derated above 1000m, the rated output current shall be decreased by 10% for every rise of 1000m                                                              |
|                            | Ambient temperature                 | - 10 °C~ + 40 °C (The ambient temperature is between 40 °C and 50 °C, reduce the rating for use)                                                             |
|                            | Humidity                            | 5%~95%RH, No water condensation                                                                                                                              |
|                            | Vibration                           | Less than 5.9 M / S2 (0.6g)                                                                                                                                  |
|                            | Storage temperature                 | −40°C~+70°C                                                                                                                                                  |
| Structure                  | Protection class                    | IP20                                                                                                                                                         |
|                            | Cooling method                      | Self cooling, air cooling, with fan control                                                                                                                  |
| Installation method        |                                     | Wall mounted, cabinet mounted                                                                                                                                |
| Effeciency                 |                                     | 45kW or below:≥93%; 55kW or above:≥95%                                                                                                                       |

Technical Specification

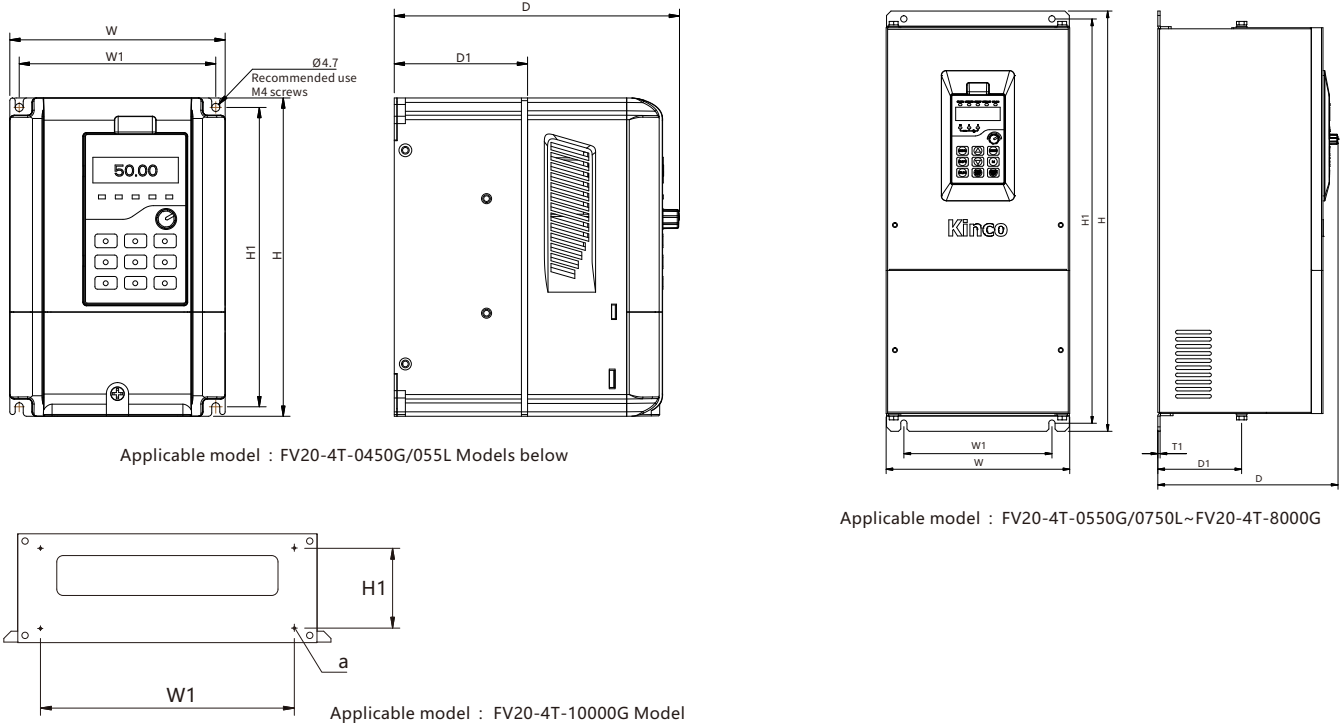
| VFD model                                 | Power capacity KVA | Input current A | Output current A | Adaptive motor KW |
|-------------------------------------------|--------------------|-----------------|------------------|-------------------|
| 220V,50/60HZ:Singel-phase 220V AC,50/60HZ |                    |                 |                  |                   |
| FV20-2S-0004G                             | 1.0                | 5.3             | 2.5              | 0.4               |
| FV20-2S-0007G                             | 1.5                | 8.2             | 4.0              | 0.75              |
| FV20-2S-0015G                             | 3.0                | 14.0            | 7.5              | 1.5               |
| FV20-2S-0022G                             | 4.0                | 23.0            | 10.0             | 2.2               |
| 380V, 50/60HZ:three-phase 380V AC,50/60HZ |                    |                 |                  |                   |
| FV20-4T-0007G/0015L                       | 1.5                | 3.4             | 2.3              | 0.75              |
| FV20-4T-0015G/0022L                       | 3.0                | 5.0             | 3.7              | 1.5               |
| FV20-4T-0022G/0037L                       | 4.0                | 5.8             | 5.5              | 2.2               |
| FV20-4T-0037G/0055L                       | 5.9                | 10.5            | 8.8              | 3.7               |
| FV20-4T-0055G/0075L                       | 8.5                | 14.5            | 13.0             | 5.5               |
| FV20-4T-0075G/0110L                       | 11.0               | 20.5            | 17.0             | 7.5               |
| FV20-4T-0110G/0150L                       | 17.0               | 26.0            | 25.0             | 11                |
| FV20-4T-0150G/0185L                       | 21.0               | 35.0            | 32.0             | 15                |
| FV20-4T-0185G/0220L                       | 24.0               | 38.5            | 37.0             | 18.5              |
| FV20-4T-0220G/0300L                       | 30.0               | 46.5            | 45.0             | 22.0              |
| FV20-4T-0300G/0370L                       | 40.0               | 62.0            | 60.0             | 30.0              |
| FV20-4T-0370G/0450L                       | 50.0               | 76.0            | 75.0             | 37.0              |
| FV20-4T-0450G/0550L                       | 60.0               | 92.0            | 90.0             | 45.0              |
| FV20-4T-0550G/0750L                       | 72.0               | 113.0           | 110.0            | 55.0              |
| FV20-4T-0750G/0900L                       | 100.0              | 157.0           | 152.0            | 75.0              |
| FV20-4T-0900G/1100L                       | 116.0              | 180.0           | 176.0            | 90.0              |
| FV20-4T-1100G/1320L                       | 138.0              | 260.0           | 210.0            | 110.0             |
| FV20-4T-1320G/1600L                       | 167.0              | 232.0           | 252.0            | 132.0             |
| FV20-4T-1600G/1850L                       | 200.0              | 282.0           | 304.0            | 160.0             |
| FV20-4T-1850G/2000L                       | 230.0              | 326.0           | 350.0            | 185.0             |
| FV20-4T-2000G/2200L                       | 250.0              | 352.0           | 380.0            | 200.0             |
| FV20-4T-2200G/2500L                       | 280.0              | 385.0           | 426.0            | 220.0             |
| FV20-4T-2500G/2800L                       | 320.0              | 437.0           | 470.0            | 250.0             |
| FV20-4T-2800G/3150L                       | 445.0              | 491.0           | 520.0            | 280.0             |
| FV20-4T-3150G/3550L                       | 500.0              | 580.0           | 600.0            | 315.0             |
| FV20-4T-3550G/4000L                       | 565.0              | 624.0           | 665.0            | 355.0             |
| FV20-4T-4000G/4500L                       | 630.0              | 670.0           | 690.0            | 400.0             |
| FV20-4T-6000G                             | 990.0              | 1035.0          | 1050.0           | 600.0             |
| FV20-4T-8000G                             | 1250.0             | 1300.0          | 1350.0           | 800.0             |
| FV20-4T-10000G                            | 1500.0             | 1650.0          | 1725.0           | 1000.0            |

Mechanical Parameters

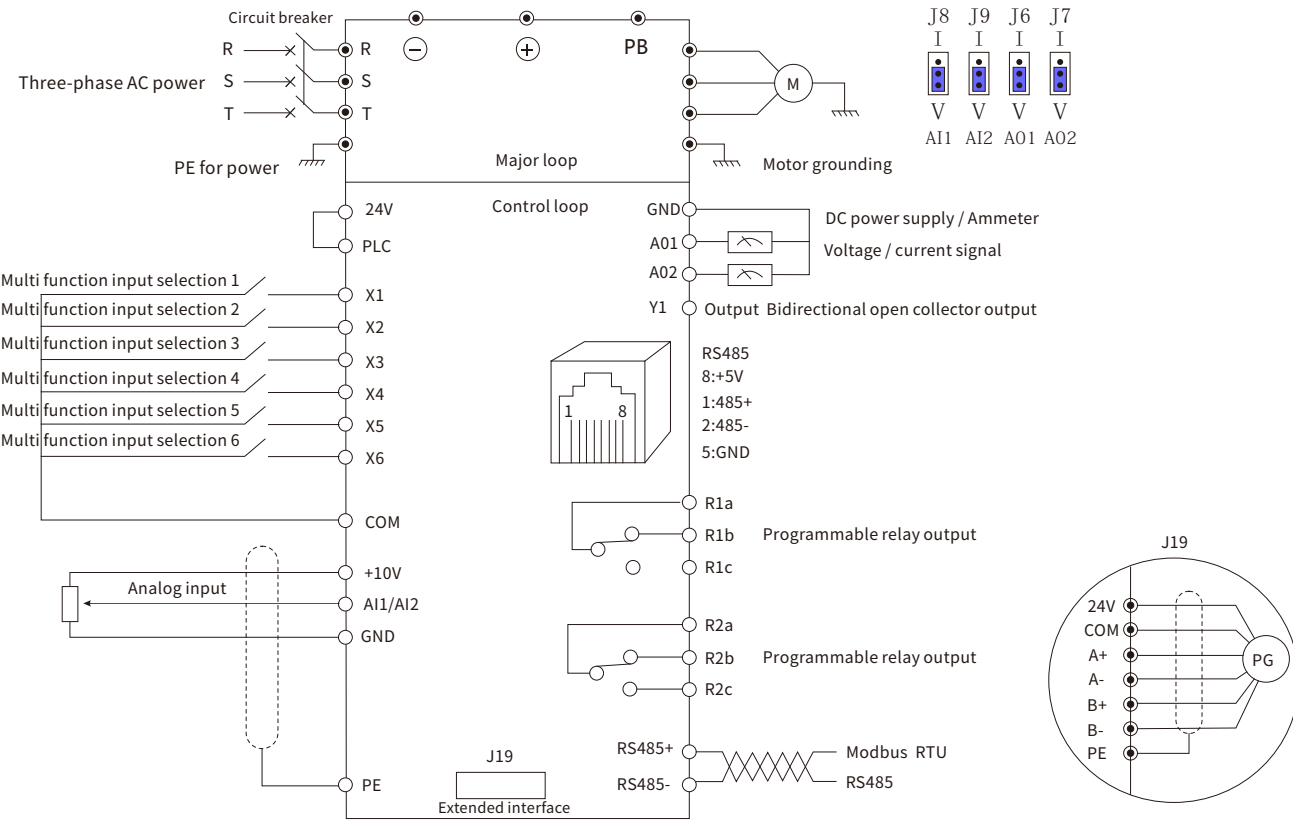
| VFD model<br>(G: Constant torque load;<br>L: Fan and pump load) | Outline and installation dimensions (mm) |      |     |                                            |      |       |                    | Approximate<br>weight<br>(Gross weight) |
|-----------------------------------------------------------------|------------------------------------------|------|-----|--------------------------------------------|------|-------|--------------------|-----------------------------------------|
|                                                                 | W                                        | H    | D   | W1                                         | H1   | D1    | Mounting<br>hole d |                                         |
| FV20-2S(2T)-0004G                                               | 126                                      | 186  | 167 | 115                                        | 175  | 78    | 4.7                | 2                                       |
| FV20-2S(2T)-0007G                                               |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-2S(2T)-0015G                                               |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-2S(2T)-0022G                                               |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-0007G/0015L                                             |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-0015G/0022L                                             |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-0022G/0037L                                             |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-0037G/0055L                                             |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-0055G/0075L                                             | 146                                      | 256  | 181 | 131                                        | 243  | 95    | 5.8                | 6                                       |
| FV20-4T-0075G/0110L                                             |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-0110G/0150L                                             |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-0150G/0185L                                             | 170                                      | 320  | 207 | 151                                        | 303  | 118.5 | 5.8                | 8                                       |
| FV20-4T-0185G/0220L                                             |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-0220G/0300L                                             |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-0300G/0370L                                             | 225                                      | 360  | 224 | 206                                        | 341  | 130   | 6.5                | 9                                       |
| FV20-4T-0370G/0450L                                             |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-0450G/0550L                                             |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-0550G/0750L                                             | 285                                      | 617  | 258 | 220                                        | 596  | 132   | 10                 | 35                                      |
| FV20-4T-0750G/0900L                                             |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-0900G/1100L                                             | 320                                      | 639  | 317 | 240                                        | 620  | 152   | 11                 | 60                                      |
| FV20-4T-1100G/1320L                                             |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-1320G/1600L                                             |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-1600G/1850L                                             | 530                                      | 940  | 380 | 340                                        | 910  | 206   | 14                 | 114                                     |
| FV20-4T-1850G/2000L                                             |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-2000G/2200L                                             |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-2200G/2500L                                             | 690                                      | 1006 | 380 | 500                                        | 974  | 207   | 14                 | 156                                     |
| FV20-4T-2500G/2800L                                             |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-2800G/3150L                                             |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-3150G/3550L                                             | 810                                      | 1228 | 400 | 520                                        | 1196 | 209   | 14                 | 225                                     |
| FV20-4T-3550G/4000L                                             |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-4000G/4500L                                             |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-6000G                                                   | 810                                      | 1328 | 400 | 520                                        | 1296 | /     | 14                 | 450                                     |
| FV20-4T-8000G                                                   |                                          |      |     |                                            |      |       |                    |                                         |
| FV20-4T-10000G                                                  | 1480                                     | 1807 | 600 | Seat type installation W1*H1=1040*440 d=14 |      |       |                    | 460                                     |

Size

The overall dimension of VFD is shown in the figure below



Wiring Diagram Of Product Terminal



# CV100 Series Mini Vector VFD

# CV100 Series Mini Vector VFD



### Product Features

- Built in Bluetooth module can realize debugging of smart phone
- Control mode: V / F control; Open loop vector control
- The carrier frequency can reach 15KHz
- Automatic torque lifting and automatic slip compensation
- Built in PID control
- Standard MODBUS (RS-485 baud rate up to 38400bps)
- Sleep / wake function

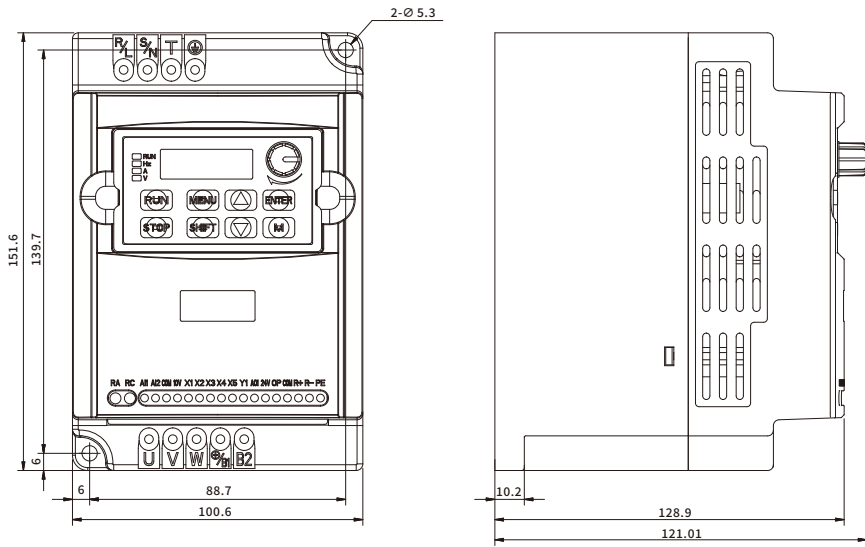
### Technical Specification

| Item                    |                                  | Description                                                                                                                                               |
|-------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input                   | Rated Voltage/frequency          | 4T:three-phase,380V AC,50HZ/60HZL 2S:single-phase,220 AC,50HZ/60HZ                                                                                        |
|                         | Applicable voltage range         | 4T:320V~460V; 2T:180V~260V; Voltage unbalancedness: <3%; Frequency tolerance: ±5%                                                                         |
| Output                  | Rated voltage                    | 0~Rated input voltage                                                                                                                                     |
|                         | Frequency                        | 0Hz~300Hz ((Customized 0Hz~2000Hz)                                                                                                                        |
|                         | Overload capacity                | G Type:150% 1 minute, 180% 10 seconds; L type :110% 1 minute, 150% 1 second                                                                               |
| Control characteristics | Control method                   | V / F control; SVC (open loop vector control)                                                                                                             |
|                         | Modulation method                | Space vector PWM modulation                                                                                                                               |
|                         | Starting Torque                  | 0.5Hz: 150% of rated torque(Vector control without PG), 0.0Hz: 200% of rated torque(Vector control with PG)                                               |
|                         | Frequency accuracy               | Digital setting: Max. frequency× ±0.01%; Analog setting: Max. frequency× ±0.2%                                                                            |
|                         | Frequency resolution             | Digital setting: 0.01Hz; Analog setting : Max. frequency×0.05%                                                                                            |
|                         | Torque boost                     | Manual torque boost: 0%~30.0%                                                                                                                             |
|                         | V/F pattern                      | 4 patterns:1 pattern is V/F curve setting by users. 3 patterns are drop torque characters curve(2.0 power,1.7 power,1.2 power)                            |
|                         | Acceleration/Deceleration curve  | Linear or S-curve acceleration and deceleration mode; Four kinds of acceleration and deceleration time                                                    |
| Customized function     | Auto current limit               | The current is automatically limited during operation to prevent frequent over-current fault tripping                                                     |
|                         | Bluetooth function               | Debugging Variable-frequence Driver with smart phone                                                                                                      |
|                         | Jogging                          | Jogging frequency range: 0.00Hz~50.00Hz. Jogging acceleration/deceleration time: 0.1~60.0s.                                                               |
| Operation function      | Multiple speed operation         | Implement multiple speed operation by digital inputs.                                                                                                     |
|                         | Operation command                | Keypad setting, Terminal setting, Communication setting                                                                                                   |
|                         | Frequency command                | Digital setting, Analog voltage setting(AI2,AI2), Analog current setting(AI1)                                                                             |
|                         | Auxiliary frequency setting      | Implement flexible auxiliary frequency trim and frequency synthesis.                                                                                      |
| Operation panel         | Analog output                    | 2 channels analog output,AO1 can select 0 / 4 ~ 20mA or 0 ~ 10V; AO2 0 ~ 10V output; Output setting frequency ,output frequency and so on                 |
|                         | LED Display                      | Display setting frequency, output frequency, output voltage, output current and so on, about 20 parameters.                                               |
|                         | Keys lock and function selection | Lock part of keys or all the keys. Define the function of part of keys to prevent misoperation                                                            |
| Protection function     |                                  | Overcurrent protection, Overvoltage protection, Undervoltage protection, Overheat protection, Overload protection, Open phase protection (optional), etc. |
| Environment             | Operating site                   | Indoor, free from direct sunlight, dust, corrosive gas, combustible gas, oil mist, water vapor, drip or salt                                              |
|                         | Altitude                         | Derated above 1000m, the rated output current shall be decreased by 10% for every rise of 1000m                                                           |
|                         | Ambient temperature              | - 10 °C ~ + 40°C (The ambient temperature is between 40 °C and 50 °C, reduce the rating for use)                                                          |
|                         | Humidity                         | 5%~95%RH; No water condensation                                                                                                                           |
|                         | Vibration                        | Less than 5.9 M / S2 (0.6g)                                                                                                                               |
| Structure               | Storage temperature              | — 40°C ~ + 70°C                                                                                                                                           |
|                         | Protection class                 | IP20                                                                                                                                                      |
| Installation method     | Cooling method                   | Self cooling, air cooling, with fan control                                                                                                               |
|                         | Effeciency                       | ≥90%                                                                                                                                                      |

### Technical Parameter

| VFD model      | Capacitance KVA | Input current A | Output current A | Adaptive motor KW |
|----------------|-----------------|-----------------|------------------|-------------------|
| CV100-2S-0004G | 1.0             | 5.3             | 2.5              | 0.4               |
| CV100-2S-0007G | 1.5             | 8.2             | 4.0              | 0.75              |
| CV100-2S-0015G | 3.0             | 14.0            | 7.5              | 1.5               |
| CV100-2S-0022G | 4.0             | 23.0            | 10.0             | 2.2               |
| CV100-4T-0007G | 1.5             | 3.4             | 2.3              | 0.75              |
| CV100-4T-0015G | 3.0             | 5.0             | 3.7              | 1.5               |
| CV100-4T-0022G | 4.0             | 5.8             | 5.5              | 2.2               |
| CV100-4T-0037G | 5.9             | 10.5            | 7.8              | 3                 |

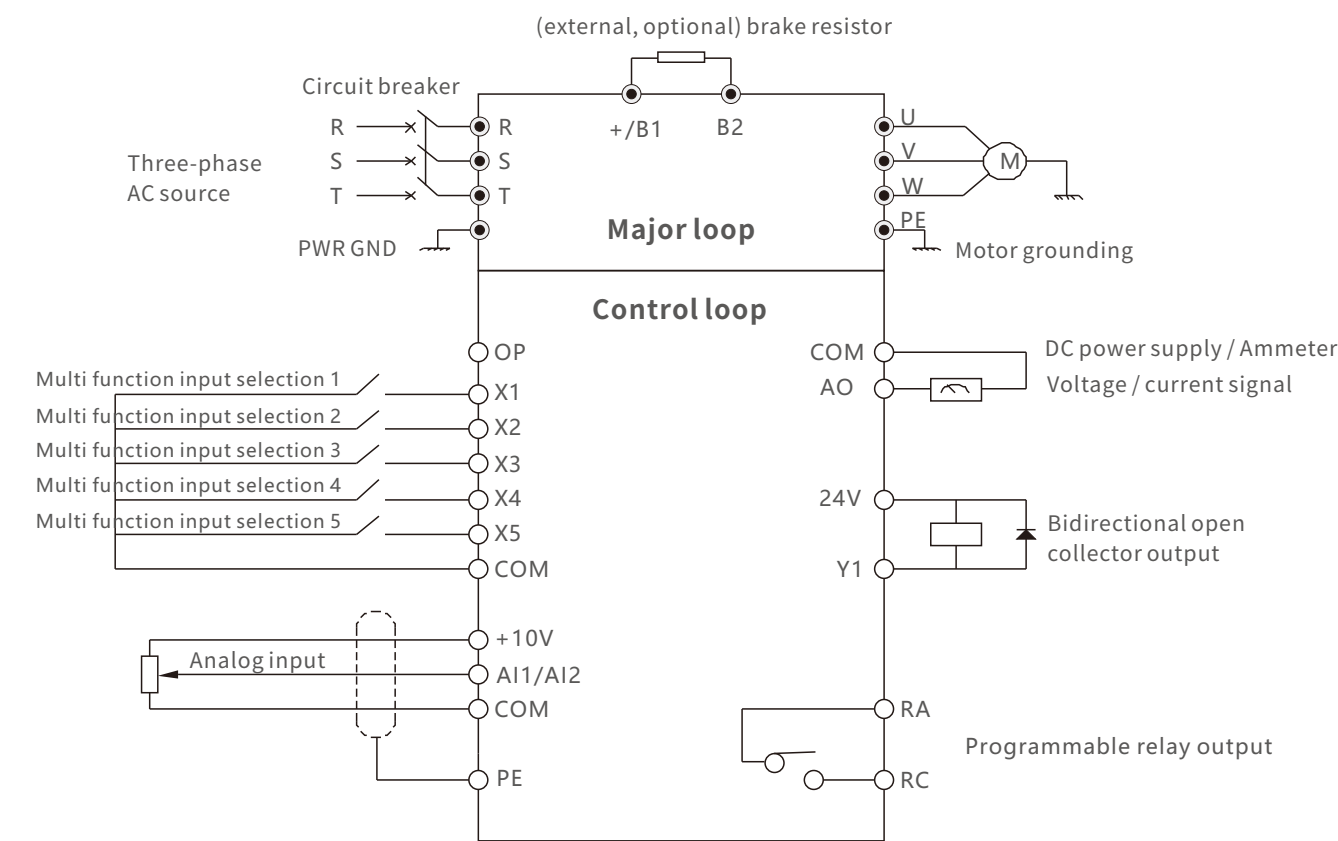
### Overall dimension





Cables And Wiring

Applicable model:CV100-2S-0004G ~ CV100-4T-0037G



Product Features

- Output frequency 0 ~ 300Hz
- V / F control and settable V / F curve
- Carrier frequency 6KHz
- Automatic torque lifting and automatic slip compensation
- Built in modbus, RS485 baud rate up to 19200bps

Technical Specification

| Item                     |                                    | Description                                                                                                  |
|--------------------------|------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Input                    | Rated Voltage/frequency            | AC220V 50HZ/60HZ; AC380V 50HZ/60HZ                                                                           |
|                          | Applicable voltage range           | 4T:320V~460V; 2T:180V~260V; Voltage unbalancedness: <3%; Frequency tolerance: ±5%                            |
| Output                   | Voltage                            | 0~Rated input voltage                                                                                        |
|                          | Frequency                          | 0Hz~300Hz ((Customized 0Hz~800Hz)                                                                            |
|                          | Overload capacity                  | 150% 1 minute, 180% 1 seconds; 200% 0.5 second                                                               |
| Main control performance | Control method                     | V / F control                                                                                                |
|                          | Starting Torque                    | 1Hz: 150% of rated torque                                                                                    |
|                          | Speed range                        | 1:100                                                                                                        |
| Basic function           | Speed stability accuracy           | ±0.5%                                                                                                        |
|                          | Frequency setting mode             | Panel mode; analog given; communication mode                                                                 |
|                          | Starting mode                      | Starting again; starting from DC speed; Speed tracking starting                                              |
|                          | Stop mode                          | ImplemenDeceleration stop; free stop; deceleration stop + DC braket stop                                     |
|                          | V / F curve                        | Four V / F curve modes: one user-defined and three torque reduction curves                                   |
| Protection function      | Acceleration and deceleration mode | Two ways of acceleration and deceleration: straight line and S-curve                                         |
|                          |                                    | With over-current, over-voltage, phase loss, under voltage, overheating, overload protection                 |
| Environment              | Operating site                     | Indoor, free from direct sunlight, dust, corrosive gas, combustible gas, oil mist, water vapor, drip or salt |
|                          | Altitude                           | 0m ~ 2000m; derating above 0 ~ 1000m, 10% for each 1000m rise                                                |
|                          | Temperature                        | - 10 °C ~ + 40 °C                                                                                            |
|                          | Humidity                           | 5%~95%RH, No water condensation                                                                              |
|                          | Vibration                          | Less than 5.9 M / S2                                                                                         |
|                          | Storage temperature                | —40°C ~ +70°C                                                                                                |
| Structure                | Protection class                   | IP20                                                                                                         |
|                          | Cooling method                     | air cooling                                                                                                  |
| Other                    | Installation method                | Wall mounted and rail mounted                                                                                |
|                          | Effeciency                         | ≥93%                                                                                                         |

Model Specification

| Model                     |                           | CV20-2S-0004G                                              | CV20-2S-0007G | CV20-2S-0015G | CV20-4T-0007G                                             | CV20-4T-0015G | CV20-4T-0022G | CV20-4T-0037G |
|---------------------------|---------------------------|------------------------------------------------------------|---------------|---------------|-----------------------------------------------------------|---------------|---------------|---------------|
| Adaptive motor power (kW) |                           | 0.4                                                        | 0.75          | 1.5           | 0.75                                                      | 1.5           | 2.2           | 3             |
| Input                     | Rated voltage / frequency | Single-phase 200V~240V, 50/60Hz                            |               |               | Three-phase 380V~440V, 50/60Hz                            |               |               |               |
|                           | Allowable voltage range   | 180V~260V, Voltage unbalance rate: <3%,<br>Frequency: ±5%  |               |               | 320V~460V, Voltage unbalance rate: <3%,<br>Frequency: ±5% |               |               |               |
|                           | Rated current (A)         | 5.3                                                        | 8.2           | 14.0          | 3.4                                                       | 5.0           | 5.8           | 10.5          |
| Output                    | Voltage (V)               | 0~Rated input voltage                                      |               |               | 0~Rated input voltage                                     |               |               |               |
|                           | Rated current (A)         | 2.5                                                        | 4.0           | 7.5           | 2.3                                                       | 3.7           | 5.5           | 7.8           |
|                           | Overload capacity         | 150% rated current 1 minute 、180% rated current 10 seconds |               |               |                                                           |               |               |               |
| Protection level          |                           | IP20                                                       |               |               |                                                           |               |               |               |
| Cooling mode              |                           | air cooling                                                |               |               |                                                           |               |               |               |

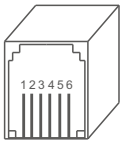
Control Terminal Function Description

Terminal arrangement of control board

|    |    |      |     |    |    |    |    |     |        |
|----|----|------|-----|----|----|----|----|-----|--------|
| RA | RC | +10V | AV1 | X1 | X2 | X3 | X4 | COM | RS-485 |
|----|----|------|-----|----|----|----|----|-----|--------|

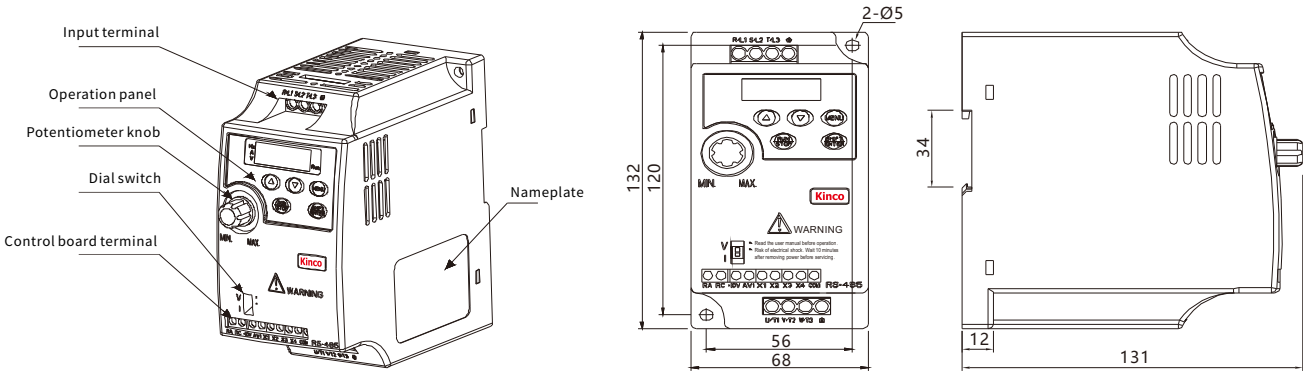
RS-485 pin definition

| Pin        | 1     | 2   | 3    | 4    | 5   | 6     |
|------------|-------|-----|------|------|-----|-------|
| Definition | empty | +5V | 485+ | 485- | GND | empty |

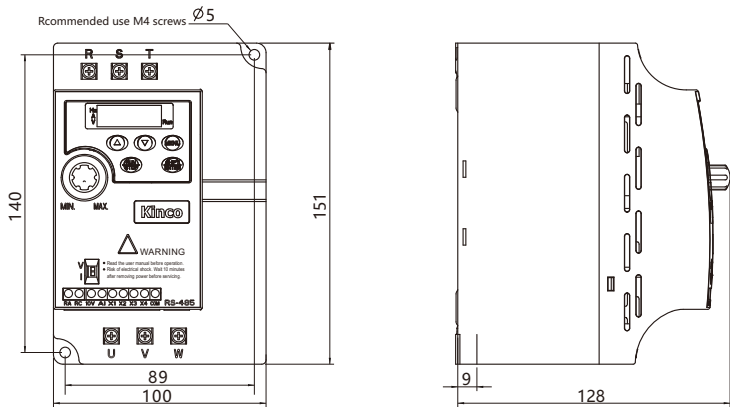


Product dimensions and installation

Applicable model:CV20-2S-0004G~CV20-2S-0015G

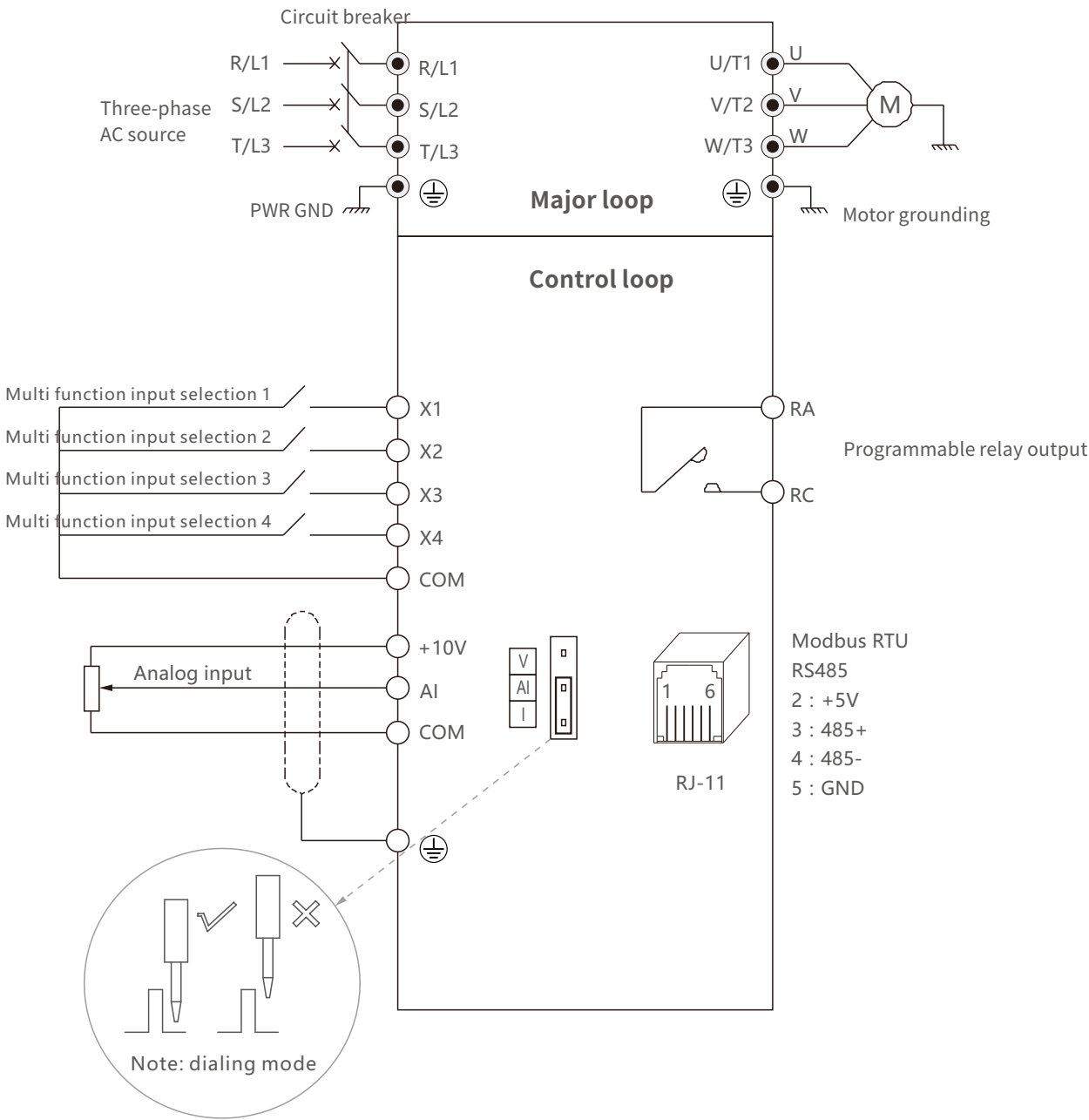


Applicable model:CV20-4T-0007G~CV20-4T-0037G



| Category              | Terminal Printing | Name                                                      | Terminal Function Description                                                                                      | Specifications                                                                               |
|-----------------------|-------------------|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Relay output terminal | RA                | Relay output                                              | Programmable defined as multi-function relay output terminals                                                      | RA—RC: Normally open contact; Contact capacity:AC250V/2A(COSØ=1) AC250V1A(COSØ=0.4) DC30V/1A |
|                       | RC                |                                                           |                                                                                                                    |                                                                                              |
| Power Supply          | +10V              | +10V                                                      | External supply of 10V power reference voltage                                                                     | Allowable output current 20mA                                                                |
| Analog input          | AI                | Analog input                                              | Analog voltage or current input, current / voltageThe signal is determined by the dial switch on the control board | Input voltage range: -10v-10v                                                                |
| Digital input         | X1                | Multi function input terminal                             | Programmable as a switch input with multiple functions                                                             | Optocoupler isolated input; input impedance: 3.3k                                            |
|                       | X2                |                                                           |                                                                                                                    |                                                                                              |
|                       | X3                |                                                           |                                                                                                                    |                                                                                              |
|                       | X4                |                                                           |                                                                                                                    |                                                                                              |
| Common terminal       | COM               | Switch value terminal, + 10V power supply common terminal | Switch input terminal and common terminal of + 10V power supply                                                    |                                                                                              |
| Communication port    | RS-485            | RS 485 communication interface                            | Modbus communication signal interface , 6-wire two pin socket                                                      | Standard RS485 communication interface, please use twisted pair shielded wire                |

Control Terminal Function Description



| Main Specifications |                 | Description                    |
|---------------------|-----------------|--------------------------------|
| Input               | Rated voltage   | DC 24V, 48V                    |
|                     | Rated current   | Three-phase, 100~150A; 0~300Hz |
| Output              | Maximum current | Three-phase, 200~300A; 0~300Hz |
|                     | Output voltage  | Three-phase, 16V, 32V; 0~301Hz |

Electric forklift driver EC series products

Efficient walking and steering drive solutions

Product Features

- 1. The walking drive is compatible with synchronous rotary transformer, synchronous encoder and asynchronous encoder mode, steering drive is compatible with DC brush and brushless motor mode;
- 2. Supports terminal communication, CANopen communication and communication between devices with CANopen interface;
- 3. Reserve various I / O interfaces to meet the system control requirements;
- 4. Advanced pulse width modulation technology ensures the efficient utilization of battery and reduces the loss of motor energy consumption and torque conversion;
- 5. Modular design, rich product series, meet the needs of customization.

series model description

EC3001-40Z0110A-I-\*\*-

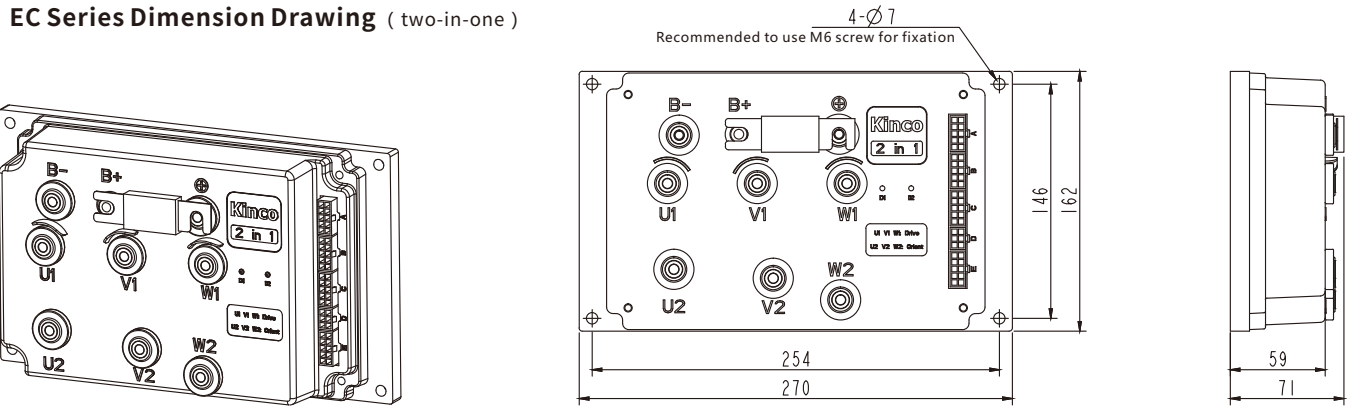
- ① Kinco electric vehicle driver
- ② Driver generation 3 First generation 5 Second generation
- ③ Structural style: 0 (Sheet metal shell) 1 (Die casting housing) 2 (Injection shell)
- ④ Module type in-box: 00 (No accessories) 01 (Main motor driver) 02 (Power steering drive) 03 (Air pump motor driver) 04 (DC.DCConverter) 05 (Main motor driver+ Power steering drive)
- ⑤ Rated voltage: 40Z:400VDC input (voltage When it is not an integer, it is rounded Rules, such as 366V:37Z)
- ⑥ Drive capacity: 0110:11kW 1100:110kW
- ⑦ Cooling mode: A (Forced air cooling) L (Liquid cooling) N (Natural air cooling)
- ⑧ Power module type: I (IGBT) M (mos)
- ⑨ Custom machine customer code

EC Series Specifications

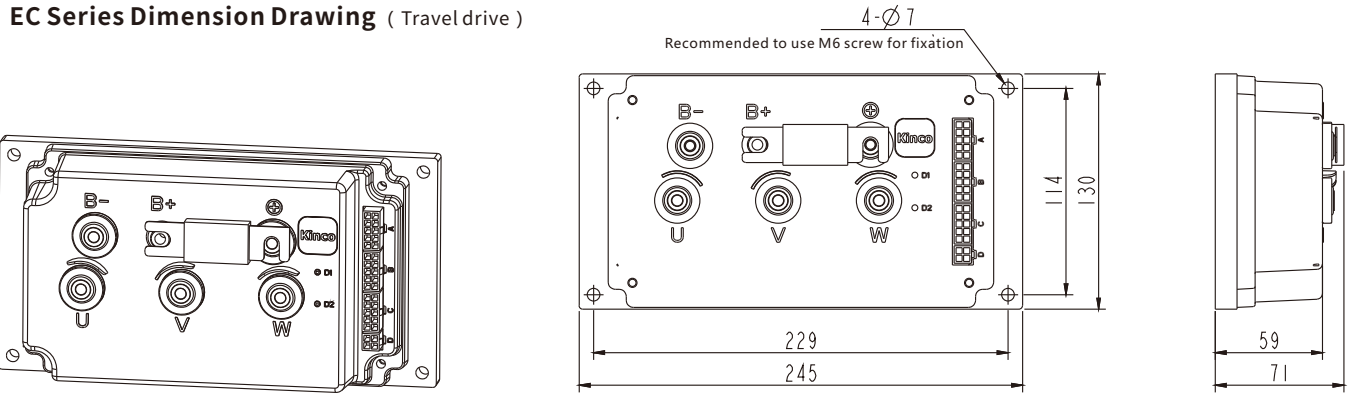
| Drive model       | Rated power | Input voltage | Maximum current | Drive type                  | Adaptive motor                                        |
|-------------------|-------------|---------------|-----------------|-----------------------------|-------------------------------------------------------|
| EC3001-02Z0022N-M | 2.2kW       | 24V           | 300A            | Travel drive                | Synchronous, asynchronous                             |
| EC3001-05Z0022N-M | 2.2kW       | 48V           | 200A            | Travel drive                | Synchronous, asynchronous                             |
| EC3001-02Z0037N-M | 3.7kW       | 24V           | 300A            | Travel drive                | Synchronous, asynchronous                             |
| EC3001-05Z0037N-M | 3.7kW       | 48V           | 200A            | Travel drive                | Synchronous, asynchronous                             |
| EC3002-02Z0008N-M | 0.8kW       | 24V           | 50A             | Steering motor              | DC brush, DC brushless                                |
| EC3002-05Z0008N-M | 0.8kW       | 48V           | 50A             | Steering motor              | DC brush, DC brushless                                |
| EC3005-02Z0022N-M | 2.2kW       | 24V           | 300A            | Travel plus direction drive | Synchronous, asynchronous plus DC brush, DC brushless |
| EC3005-05Z0022N-M | 2.2kW       | 48V           | 200A            | Travel plus direction drive | Synchronous, asynchronous plus DC brush, DC brushless |
| EC3005-02Z0037N-M | 3.7kW       | 24V           | 300A            | Travel plus direction drive | Synchronous, asynchronous plus DC brush, DC brushless |
| EC3005-05Z0037N-M | 3.7kW       | 48V           | 200A            | Travel plus direction drive | Synchronous, asynchronous plus DC brush, DC brushless |

EC Series Dimension Drawing

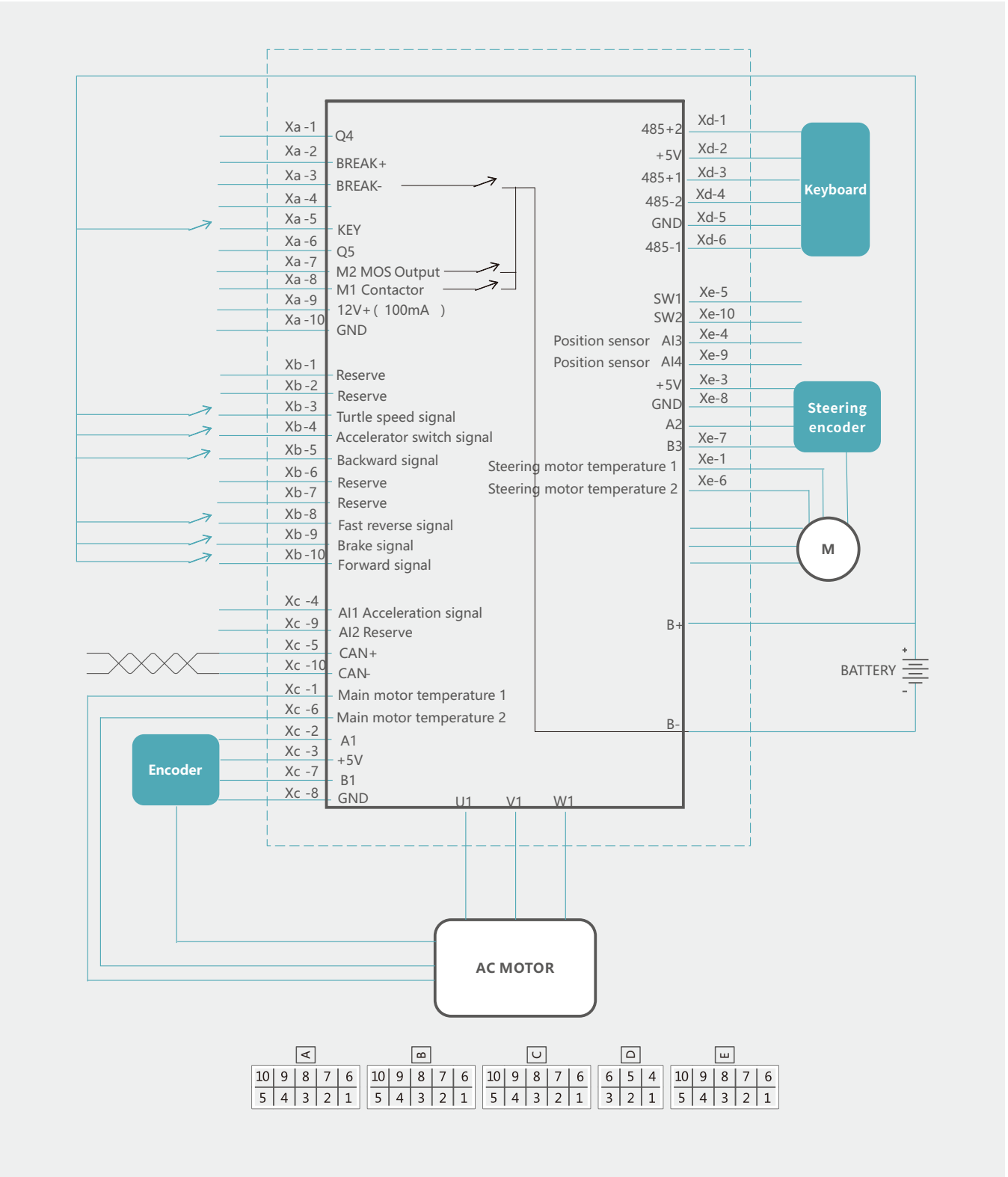
EC Series Dimension Drawing ( two-in-one )



EC Series Dimension Drawing ( Travel drive )



EC series forklift driver terminal function diagram (two in one)







Main features

- Support DC brush motor, DC brushless motor
- Support feedback of incremental encoder and Hall sensor
- Support can bus, RS485 communication, I/ O analog quantity
- Efficient vector control algorithm
- Over current, over voltage, under voltage, overload, over temperature, short circuit protection, etc
- EC Series Handcart Driver
- DC brushless driver, fast, flexible, stable and efficient drive solution

EC Series Handcart Driver

DC brushless driver, fast, flexible, stable and efficient drive solution

Model Specification

| Model Specification         |                         | EC-05Z0015-E-C                                                                                               | EC-05Z0020-E-C |
|-----------------------------|-------------------------|--------------------------------------------------------------------------------------------------------------|----------------|
| Power Supply                | Rated voltage           | DC48V                                                                                                        |                |
|                             | Operating voltage range | DC18~55V                                                                                                     |                |
| Output                      | Rated current           | 30A                                                                                                          | 50             |
|                             | Peak current            | 60A                                                                                                          | 100            |
| Feedback signal             |                         | Locked hall and Incremental encoder                                                                          |                |
| Over voltage alarm voltage  |                         | DC72V                                                                                                        |                |
| Under voltage alarm voltage |                         | DC12V                                                                                                        |                |
| Major function              | Terminal control        | Eight X-terminal input, three Y-terminal output and one analog signal input                                  |                |
|                             | RS 485                  | Maximum support 115.2k baud rate, support Modbus RTU protocol                                                |                |
|                             | CAN BUS                 | Maximum support 1M baud rate, support CANopen protocol and free protocol                                     |                |
|                             | Protection function     | ver current, over-voltage, under voltage, overheating, overload protection, etc                              |                |
| Type of suitable motor      |                         | Brushless motor, brush motor                                                                                 |                |
| Operation panel             |                         | Set parameters, Control the operation of the driver,Observe the operation parameters                         |                |
| Environment                 | Usage place             | Indoor, free from direct sunlight, dust, corrosive gas, combustible gas, oil mist, water vapor, drip or salt |                |
|                             | Altitude                | Derated above 1000m, the rated output current shall be decreased by 10% for every rise of 1000m              |                |
|                             | Ambient temperature     | - 10 °C~ + 40 °C (if the ambient temperature is between 40 °C and 50 °C, please reduce the rating for use)   |                |
|                             | Humidity                | 5% - 95% RH, no water condensation                                                                           |                |
| Structure                   | Storage temperature     | -40°C~+70°C                                                                                                  |                |
|                             | Protection level        | IP20                                                                                                         |                |
|                             | Cooling mode            | Self cooling (high current and long time operation, auxiliary heat dissipation required)                     |                |
|                             | Installation mode       | Horizontal installation                                                                                      |                |



Main features

- Support feedback of incremental encoder and Hall sensor
- Isolated communication design, support can bus, RS485 communication, strong anti-interference ability
- Dual power interface, dual communication interface design, plug and play, convenient field wiring
- Efficient vector control algorithm
- Over current, over voltage, under voltage, overload, over temperature, short circuit protection, etc

EC Series Roller Driver

DC brushless driver, fast, flexible, stable and efficient drive solution

Model Specification

| Model Specification                                 |                         | EC-05Z0005-E-C                                                                                               | EC-05Z0007-E-C |
|-----------------------------------------------------|-------------------------|--------------------------------------------------------------------------------------------------------------|----------------|
| Power Supply                                        | Rated voltage           | DC48V/24V                                                                                                    |                |
|                                                     | Operating voltage range | DC18~60V                                                                                                     |                |
| Output                                              | Rated current           | 10A                                                                                                          | 15A            |
|                                                     | Peak current            | 30A                                                                                                          | 45A            |
| Feedback signal                                     |                         | Locked hall and Incremental encoder                                                                          |                |
| Major function                                      | RS 485                  | Maximum support 115.2k baud rate, MODBUS protocol support RTU and ASCII mode                                 |                |
|                                                     | CAN BUS                 | Maximum support 1M baud rate, support CANopen protocol and free protocol                                     |                |
|                                                     | Protection function     | Over current, over-voltage, under voltage, overheating, overload protection, etc                             |                |
|                                                     | Dynamic Bracking        | Need external brake resistor (suitable for sudden change load)                                               |                |
| Energy consumption braking voltage absorption point |                         | DC60V ± 2V                                                                                                   |                |
| Safety motor                                        |                         | Built in replaceable fuse                                                                                    |                |
| Suitable motor type                                 |                         | Brushless motor, brush motor                                                                                 |                |
| Debugging mode                                      | Operation panel         | Indoor, free from direct sunlight, dust, corrosive gas, combustible gas, oil mist, water vapor, drip or salt |                |
| Environment                                         | Usage place             | Indoor, free from direct sunlight, dust, corrosive gas, combustible gas, oil mist, water vapor, drip or salt |                |
|                                                     | Altitude                | Derated above 1000m, the rated output current shall be decreased by 10% for every rise of 1000m              |                |
|                                                     | Ambient temperature     | - 10 °C~ + 40 °C (if the ambient temperature is between 40 °C and 50 °C, please reduce the rating for use)   |                |
|                                                     | Humidity                | -40°C~+70°C                                                                                                  |                |
| Structure                                           | Storage temperature     | IP20                                                                                                         |                |
|                                                     | Protection level        | 5% - 95% RH, no water condensation                                                                           |                |
|                                                     | Cooling mode            | Self cooling (high current and long time operation, auxiliary heat dissipation required)                     |                |
|                                                     | Installation mode       | Horizontal installation                                                                                      |                |



Main Features

- Professional industrial application, agricultural plant protection industry;
- Suitable for single axle 5-7kg load and IPX7 protection for the whole system;
- The 30 inch propeller is made of imported carbon fiber skin and filled with imported light wood, with excellent rigidity and light weight;
- DSP is used for electric control, and the industry-leading sensorless vector control algorithm is used for control algorithm (Sensorless FOC) ;
- A variety of early warning and protection functions are suitable for the mainstream flight control in the market.

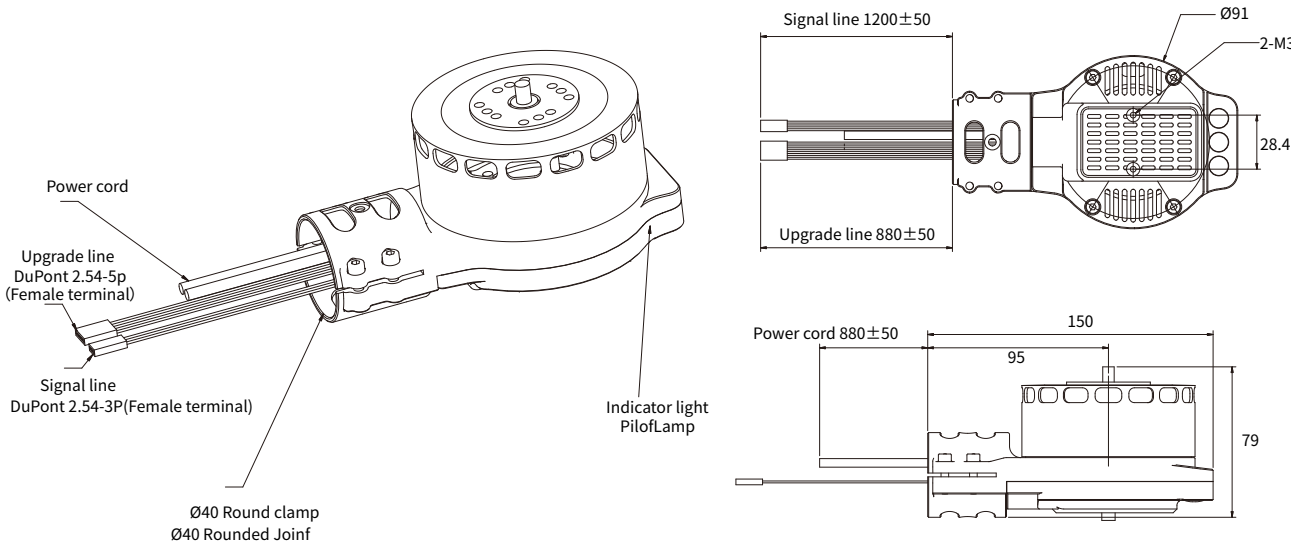
Kinco K8 Multi Rotor Power System

Power system of FOC multi rotor industrial UAV

Test Parameters

| Working voltage (V) | Throttle (%) | Pull (g) | Current (A) | Power (W) | Efferts (g/W) |
|---------------------|--------------|----------|-------------|-----------|---------------|
| 48                  | 40           | 3014     | 5.68        | 202.2     | 11.08         |
|                     | 45           | 3590     | 7.15        | 290.4     | 10.46         |
|                     | 50           | 4253     | 8.98        | 367.3     | 9.86          |
|                     | 55           | 4295     | 9.21        | 371.9     | 9.71          |
|                     | 60           | 5770     | 14.18       | 536       | 8.48          |
|                     | 65           | 6678     | 17.29       | 675.4     | 8.05          |
|                     | 70           | 7620     | 21.03       | 907.4     | 7.55          |
|                     | 75           | 8400     | 24.55       | 1022.2    | 7.13          |
|                     | 80           | 9637     | 29.82       | 1230.3    | 6.73          |
|                     | 85           | 10673    | 34.78       | 1457.6    | 6.39          |
|                     | 90           | 11712    | 41.25       | 1854.2    | 5.91          |
|                     | 95           | 12661    | 47.24       | 2480.2    | 5.58          |
|                     | 100          | 13739    | 54.12       | 3309.2    | 5.29          |

Dimensional Drawing



Model Specification

| Specification parameters                    |                                                 |
|---------------------------------------------|-------------------------------------------------|
| Maximum tension                             | 14kg(48V,Sea level)                             |
| Recommended battery                         | 12SLiPo                                         |
| Recommended take off weight                 | 5-7kg/Axis (48V,Sea level)                      |
| Applicable carbon tube outer diameter       | 40mm                                            |
| Overall protection level                    | IPX7                                            |
| Keep the ambient temperature                | - 10-50°C                                       |
| Powertrain weight                           | 985g                                            |
| Motor                                       |                                                 |
| Stator size                                 | 81*20mm                                         |
| Value                                       | 115                                             |
| Bearing                                     | Imported brands                                 |
| ZTW                                         |                                                 |
| Support battery                             | 6-13S                                           |
| Maximum allowable voltage                   | 56V                                             |
| Maximum allowable current (continuous)      | 80A(With excellent heat dissipation situation)  |
| Maximum allowable peak current (10 seconds) | 120A(With excellent heat dissipation situation) |
| PWM signal input level                      | 3.3/5V(Compatible)                              |
| Working pulse width                         | 1100-1940um                                     |
| Signal compatible frequency                 | 30-500Hz                                        |
| Propeller                                   |                                                 |
| Diameter x pitch                            | 3016                                            |
| Weight                                      | 155g                                            |



Main Features

- Professional industrial application, agricultural plant protection industry;
- Suitable for single axle 5-7kg load and IPX7 protection for the whole system;
- The 30 inch propeller is made of imported carbon fiber skin and filled with imported light wood, with excellent rigidity and light weight;
- DSP is used for electric control, and the industry-leading sensorless vector control algorithm is used for control algorithm (Sensorless FOC) ;
- A variety of early warning and protection functions are suitable for the mainstream flight control in the market.

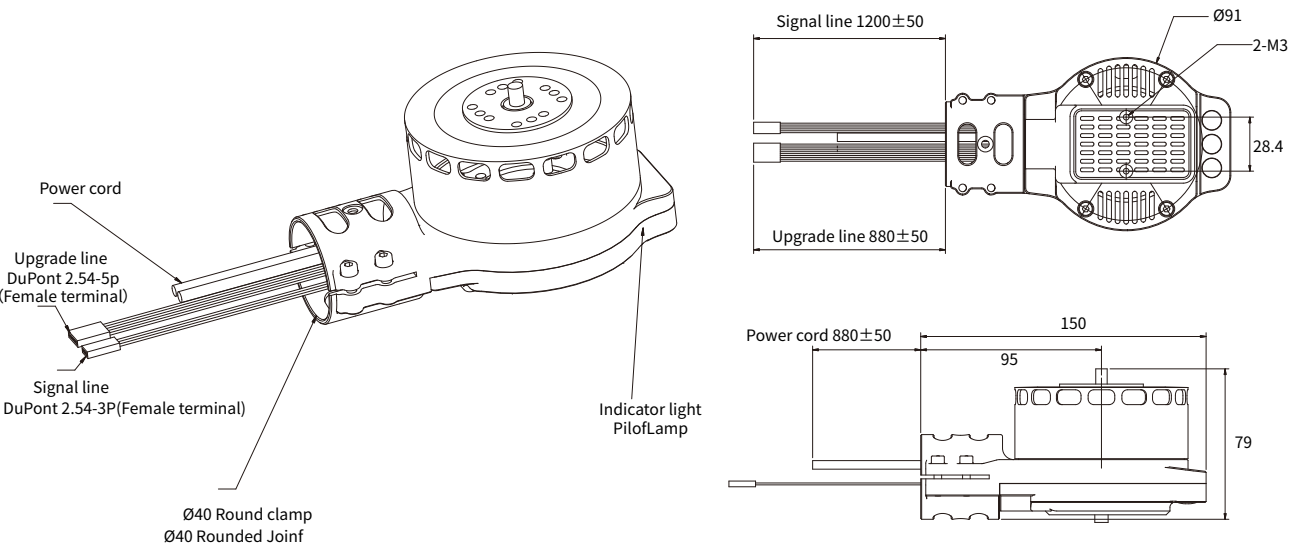
Kinco K8-HV Multi Rotor Power System

Power system of FOC multi rotor industrial UAV

Test Parameters

| Working voltage (V) | Throttle (%) | Pull (g) | Current (A) | Power (W) | Efferts (g/W) |
|---------------------|--------------|----------|-------------|-----------|---------------|
| 54                  | 40           | 3354     | 5.90        | 253.3     | 10.16         |
|                     | 45           | 3949     | 7.48        | 323.2     | 9.44          |
|                     | 50           | 4749     | 9.53        | 422.6     | 8.90          |
|                     | 55           | 5496     | 11.78       | 499.8     | 8.33          |
|                     | 60           | 6384     | 14.83       | 646.2     | 7.69          |
|                     | 65           | 7247     | 17.88       | 783.3     | 7.23          |
|                     | 70           | 8345     | 22.03       | 982.8     | 6.89          |
|                     | 75           | 9436     | 26.01       | 1224.8    | 6.59          |
|                     | 80           | 10565    | 30.77       | 1403      | 6.24          |
|                     | 85           | 11819    | 36.99       | 1719      | 5.81          |
|                     | 90           | 13323    | 43.72       | 1929      | 5.44          |
|                     | 95           | 14309    | 48.77       | 2236.4    | 5.33          |
|                     | 100          | 15585    | 56.04       | 2507.6    | 5.05          |

Dimensional Drawing



Model Specification

| Specification parameters                    |                                                 |
|---------------------------------------------|-------------------------------------------------|
| Maximum tension                             | 15.5kg(54V,Sea level)                           |
| Recommended battery                         | 14SLiPo                                         |
| Recommended take off weight                 | 5-7kg/Axis (54V,Sea level)                      |
| Applicable carbon tube outer diameter       | 40mm                                            |
| Overall protection level                    | IPX7                                            |
| Keep the ambient temperature                | - 10-50°C                                       |
| Powertrain weight                           | 985g                                            |
| Motor                                       |                                                 |
| Stator size                                 | 81*20mm                                         |
| Value                                       | 105                                             |
| Bearing                                     | Imported brands                                 |
| ZTW                                         |                                                 |
| Support battery                             | 6-14S                                           |
| Maximum allowable voltage                   | 60.9V                                           |
| Maximum allowable current (continuous)      | 80A(With excellent heat dissipation situation)  |
| Maximum allowable peak current (10 seconds) | 120A(With excellent heat dissipation situation) |
| PWM signal input level                      | 3.3/5V(Compatible)                              |
| Working pulse width                         | 1100-1940um                                     |
| Signal compatible frequency                 | 30-500Hz                                        |
| Propeller                                   |                                                 |
| Diameter x pitch                            | 3016                                            |
| Weight                                      | 155g                                            |



Main Features

- Professional industrial application, agricultural plant protection industry;
- Suitable for single axle 7-9kg load and IPX7 protection for the whole system;
- 34 inch carbon paddle;
- DSP is used for electric control, and the industry-leading sensorless vector control algorithm is used for control algorithm (Sensorless FOC) ;
- A variety of early warning and protection functions are suitable for the mainstream flight control in the market.

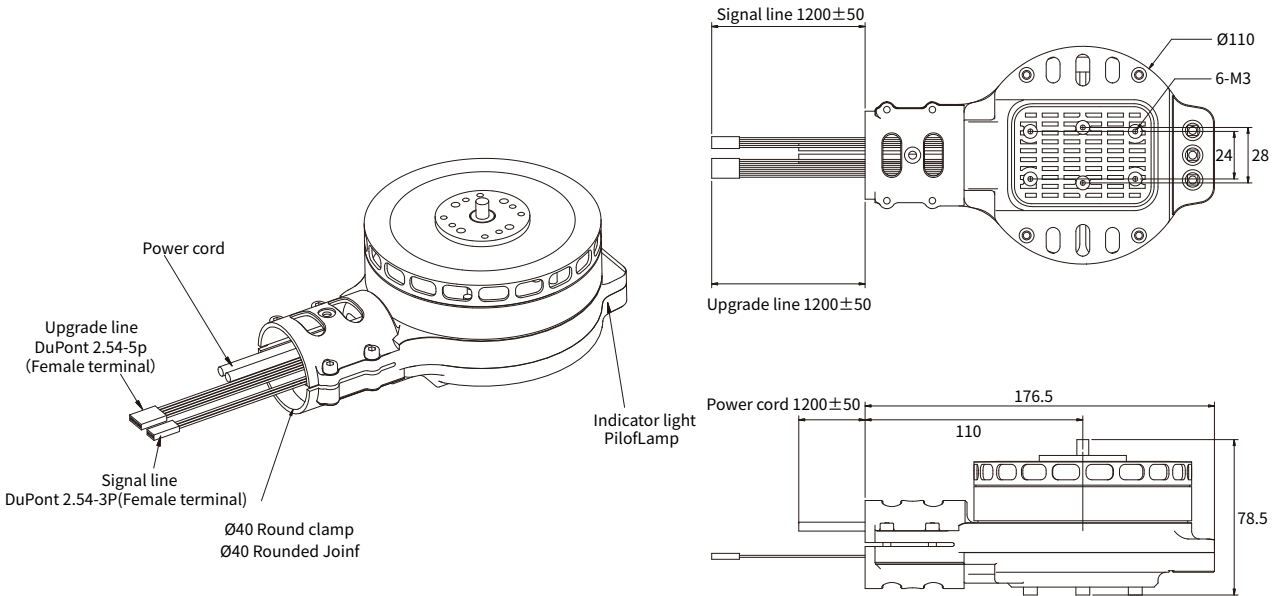
Kinco K10 Multi Rotor Power System

Power system of FOC multi rotor industrial UAV

Test Parameters

| Working voltage (V) | Throttle (%) | Pull (g) | Current (A) | Power (W) | Efferts (g/W) |
|---------------------|--------------|----------|-------------|-----------|---------------|
| 54                  | 40           | 6340     | 11.71       | 549.70    | 9.67          |
|                     | 45           | 7589     | 15.31       | 724.57    | 8.85          |
|                     | 50           | 8857     | 19.43       | 912.90    | 8.25          |
|                     | 55           | 10181    | 24.17       | 1118.82   | 7.65          |
|                     | 60           | 11512    | 29.65       | 1357.65   | 7.06          |
|                     | 65           | 12888    | 35.47       | 1602.57   | 6.67          |
|                     | 70           | 14272    | 42.52       | 1877.32   | 6.21          |
|                     | 75           | 15453    | 49.04       | 2097.94   | 5.83          |
|                     | 80           | 16233    | 53.82       | 2267.52   | 5.64          |
|                     | 85           | 16744    | 57.99       | 2416.26   | 5.44          |
|                     | 90           | 17748    | 65.04       | 2636.18   | 5.14          |
|                     | 95           | 18364    | 72.04       | 2814.41   | 4.89          |
|                     | 100          | 18962    | 78.12       | 2973.22   | 4.66          |

Dimensional Drawing



Model Specification

| Specification parameters                    |                                                 |
|---------------------------------------------|-------------------------------------------------|
| Maximum tension                             | 19kg(54V,Sea level)                             |
| Recommended battery                         | 14SLiPo                                         |
| Recommended take off weight                 | 7-9kg/Axis (48V,Sea level)                      |
| Applicable carbon tube outer diameter       | 40mm                                            |
| Overall protection level                    | IPX7                                            |
| Keep the ambient temperature                | - 10-50°C                                       |
| Powertrain weight                           | 1020g                                           |
| Motor                                       |                                                 |
| Stator size                                 | 100*10mm                                        |
| Value                                       | 105                                             |
| Bearing                                     | Imported brands                                 |
| ZTW                                         |                                                 |
| Support battery                             | 13-14S                                          |
| Maximum allowable voltage                   | 60.9V                                           |
| Maximum allowable current (continuous)      | 120A(With excellent heat dissipation situation) |
| Maximum allowable peak current (10 seconds) | 140A(With excellent heat dissipation situation) |
| PWM signal input level                      | 3.3/5V(Compatible)                              |
| Working pulse width                         | 1100-1940um                                     |
| Signal compatible frequency                 | 30-500Hz                                        |
| Propeller                                   |                                                 |
| Diameter x pitch                            | 34128                                           |
| Weight                                      | 102g                                            |





Main Features

- Professional industrial application, agricultural plant protection industry;
- Suitable for single axle 10-12kg load and IPX7 protection for the whole system;
- 36 inch carbon paddle;
- DSP is used for electric control, and the industry-leading sensorless vector control algorithm is used for control algorithm (Sensorless FOC) ;
- A variety of early warning and protection functions are suitable for the mainstream flight control in the market.

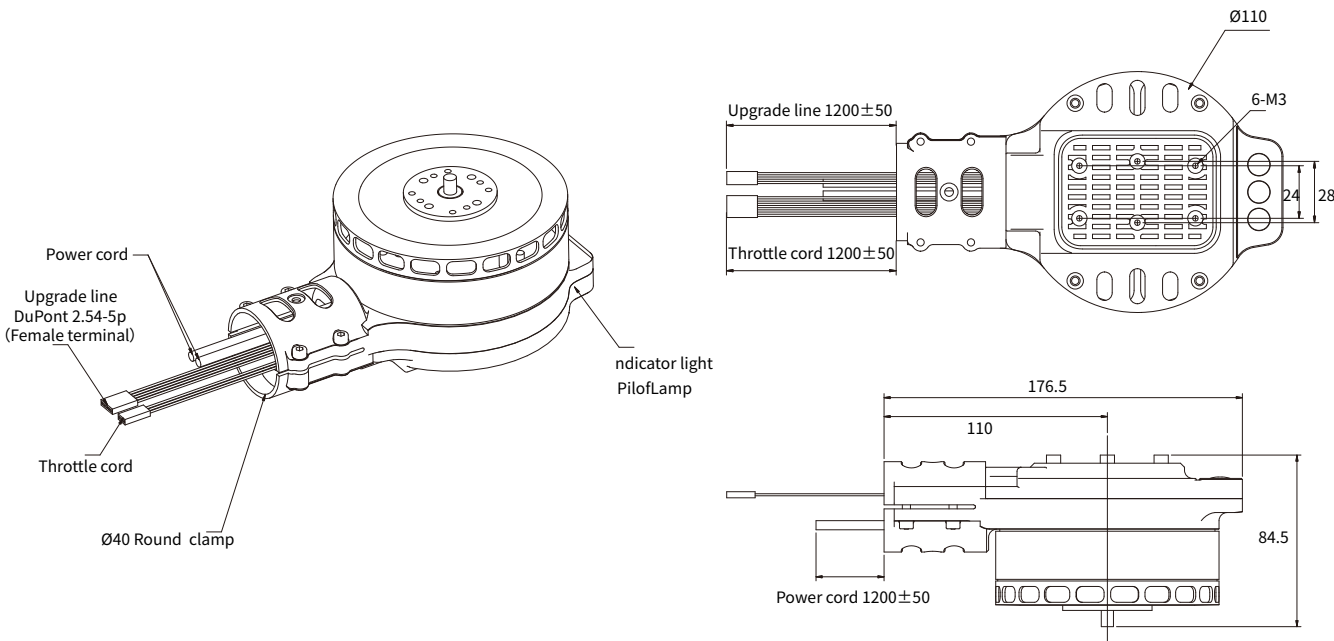
Kinco K10Plus-HV Multi Rotor Power System

Power system of FOC multi rotor industrial UAV

Test Parameters

| Working voltage (V) | Throttle (%) | Pull (g) | Current (A) | Power (W) | Efferts (g/W) |
|---------------------|--------------|----------|-------------|-----------|---------------|
| 54                  | 40           | 5435     | 8.79        | 415.87    | 10.85         |
|                     | 45           | 6575     | 11.45       | 551.64    | 10.08         |
|                     | 50           | 7748     | 14.53       | 705.73    | 9.36          |
|                     | 55           | 9096     | 18.25       | 892.70    | 8.74          |
|                     | 60           | 10372    | 22.33       | 1085.42   | 8.15          |
|                     | 65           | 11853    | 27.31       | 1320.96   | 7.75          |
|                     | 70           | 13362    | 33.20       | 1598.27   | 7.18          |
|                     | 75           | 14889    | 39.29       | 1893.01   | 6.76          |
|                     | 80           | 16539    | 46.58       | 2185.70   | 6.45          |
|                     | 85           | 18046    | 54.64       | 2525.82   | 6.00          |
|                     | 90           | 19737    | 63.52       | 2862.94   | 5.75          |
|                     | 95           | 21161    | 72.29       | 3216.95   | 5.42          |
|                     | 100          | 22613    | 81.10       | 3509.83   | 5.25          |

Dimensional Drawing



Model Specification

| Specification parameters                    |                                                 |
|---------------------------------------------|-------------------------------------------------|
| Maximum tension                             | 22.6kg(54V,Sea level)                           |
| Recommended battery                         | 14SLiPo                                         |
| Recommended take off weight                 | 10-12kg/Axis (54V,Sea level)                    |
| Applicable carbon tube outer diameter       | 40mm                                            |
| Overall protection level                    | IPX7                                            |
| Keep the ambient temperature                | - 10-50°C                                       |
| Powertrain weight                           | 1170g                                           |
| Motor                                       |                                                 |
| Stator size                                 | 100*15mm                                        |
| Value                                       | 105                                             |
| Bearing                                     | Imported brands                                 |
| ZTW                                         |                                                 |
| Support battery                             | 13-14S                                          |
| Maximum allowable voltage                   | 60.9V                                           |
| Maximum allowable current (continuous)      | 120A(With excellent heat dissipation situation) |
| Maximum allowable peak current (10 seconds) | 140A(With excellent heat dissipation situation) |
| PWM signal input level                      | 3.3/5V(Compatible)                              |
| Working pulse width                         | 1100-1940um                                     |
| Signal compatible frequency                 | 30-500Hz                                        |
| Propeller                                   |                                                 |
| Diameter x pitch                            | 36120                                           |
| Weight                                      | 112g                                            |