

Needed: Kinco Servo Package (motor, driver, phase and encoder cables), 24V power supply, UT232R-200 Communication Cable (FDxx2S), Flat head screw driver, Kinco Servo+ Software.

1) Remove drive from packaging and affix associated terminals to



- a. For the FDxx2S models, a 24Vdc power supply is required to power the control logic of the driver
- b. For motors with a Friction Brake, another 24Vdc must be applied to the 24VB and GNDB terminals
- 2) Without power on the circuit, connect to the inputs



a. For FD4x2S modules, apply line voltage to R terminal on connector X7, apply Neutral to S terminal on X7 and connect Ground to Shield screw on chassis, leave T terminal floating.
b. For FD3x2S modules, Apply line voltage to L (R) and Neutral to N (S) on X7 terminal.
Connect ground to shield screw on chassis, leave (T) terminal floating

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3) Apply a 24Vdc power source to 24VS and GNDS on X2, this will power the LED and EEPROM logic



4) Connect the Motor phases (ferruled and labeled) with mating terminals





5) Connect the Encoder cable to mating terminal (X6)





6) For programming, attach programming cable to drive and connect to a COM port on your computer



a. For FDxx2S, an RS232 cable (DB9) is required for the X5 connector.

7) Apply power to the unit and the LED should display "FFF.F" by default8) Open Kinco Servo+ Software and establish communication to the driver



a. At the drop-down tabs, Select Communication > Communication Settings

- i. Use the dropdown to select the appropriate COM port to which X5 is connected
- ii. Baud is default 38,400 and COM ID is default 127

| Kš | Communication Settings | × |
|----|------------------------|---|
| C  | ом                     |   |
|    |                        |   |
| L  | COM COM4 Refresh       |   |
|    | Baud 38400             |   |
|    |                        |   |
|    | COM ID 127             |   |

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b. Press the "Open" Button and it should change to "Close"i. The Cable and Error buttons below the drop down menu should illuminate Green

| KincoServo+                                | KincoServo+                                |
|--|--|
| File Communication Driver Motor Tools Help | File Communication Driver Motor Tools Help |
|  |  |
| Ks Communication Settings                  | Ks Communication Settings                  |
| СОМ  | СОМ  |
| COM COM3  Refresh                          | COM COM4 - Refresh                         |
| Baud 38400 -                               | Baud 38400                                 |
| COM ID 127                                 | COM ID 127                                 |
|  |  |

ii. If so, close out of "Communication Settings" by pressing the red "x" at the top right corner

Note: If these are Red, there is an Error. Press the red button and review the error list. Check your wiring appropriately

| KincoServo+            | -                 |            |
|------------------------|-------------------|------------|
| File Communication Dri | iver Motor To     | ols Help   |
|                        | I-0 🔷 📲           | <b>+</b> ] |
| Ks Commun              | nication Settings | <b></b>    |
| сом ]                  |                   | 1          |
| сом                    | COM1 -            | Refresh    |
| Baud                   | 38400 💌           |            |
| COM ID                 | 127               | OPEN       |
|                        |                   |            |
|                        |                   |            |

9) Change the motor settings on the drive to the motor for your system

a. On the Servo Motor label, there is a "Motor Code" value that is "####/X#" format



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- i. This code is either input onto the LED or on the PC. Since we are programming on Kinco Servo + Software via PC, we need the "X#" code which is "E8"
- b. In the drop down list, go to Motor > Motor Settings



- i. The 3rd line will say "Motor\_Num" which is defaulted to value "K@". On the "Value" column, change this to the "X#" value we found earlier.
- Note: hit "Enter" to save your values

| Kŝ | Ks Motor Settings |        |                     |            |  |
|----|-------------------|--------|---------------------|------------|--|
| N  | Index             | Туре   | Name                | Value Unit |  |
| 0  | 60F612            | uint16 | Motor_IIt_Real      | %          |  |
| 1  | 641016            | uint16 | Motor_Using         | ASCII      |  |
| 2  | 641001            | uint16 | Motor Num           | E8 ASCII   |  |
| 3  | 641002            | uint8  | Feedback_Type       | HEX        |  |
| 4  | 641003            | uint32 | Feedback_Resolution | inc/r      |  |
| 5  | 641004            | uint32 | Feedback_Period     | DEC        |  |
| 6  | 641005            | uint8  | Motor_Pole_Pairs    | 2p/r       |  |
| 7  | 641006            | uint8  | Commu_Mode          | DEC        |  |
| 8  | 641007            | int16  | Commu_Curr          | Ap         |  |
| 9  | 641008            | uint16 | Commu_Delay         | ms         |  |
| 10 | 641009            | uint16 | Motor_IIt_I         | Ap         |  |
| 11 | 64100A            | uint16 | Motor_IIt_Filter    | S          |  |
| 12 | 64100B            | uint16 | Imax_Motor          | Ap         |  |
| 13 | 64100C            | uint16 | L_Motor             | mH         |  |
| 14 | 64100D            | uint8  | R_Motor             | Ohm        |  |
| 15 | 64100E            | uint16 | Ke_Motor            | Vrms/krpr  |  |
| 16 | 64100F            | uint16 | Kt_Motor            | Nm/Arms    |  |
| 17 | 641010            | uint16 | Jr_Motor            | kg*cm^2    |  |
| 18 | 641011            | uint16 | Brake_Duty_Cycle    | %          |  |
| 19 | 641012            | uint16 | Brake_Delay         | ms         |  |
| 20 | 641013            | uint8  | Invert_Dir_Motor    | DEC        |  |
| 21 | 641015            | uint16 | Motor_Current_BW    | Hz         |  |
| 22 | 641017            | uint8  | Addition_Device     | DEC        |  |
| 23 | 641018            | int16  | Temp_Motor_Ref      | DEC        |  |
| 24 | 641019            | int16  | Temp_Motor          | DEC        |  |



ii. The 2nd line will still say K@ after pressing enter. Go to drop down lists, Driver > Init Save Reboot and press "SaveMotor Parameters" then Press "Reboot"

| 🥳 KincoServo+      |  |
|--------------------|--|
| File Communication | Driver Motor Tools Help                                  |
|                    | Basic Operation<br>Control Loops<br>Digital IO Functions |
|                    | Control Modes   Object Dictionary Driver Configuration   |
|                    | ECAN Configuration +<br>485 Configuration                |
|                    | Scope<br>Advanced Tuner<br>Error Display                 |
|                    | Error History<br>Panel Menu                              |
|                    | Init Save Reboot   |
|                    | Driver Properties<br>Load Firmware                       |

- iii. This should update the "Motor\_Using" line to match the Motor\_Num line and the below values should update accordingly.
- iv. If your motor has a brake, edit line 22 "Addition\_Device" to a value of 1, save motor parameters again, and reboot the driver again.

10) Set up I/O to test your system

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a. With the motor sitting freely, open both the I/O and basic operation (drop down list, Driver > Basic Operation)

| Basic Operation      | 1       |                              |              |          |      |  |          |
|----------------------|---------|------------------------------|--------------|----------|------|--|----------|
| Control Loops        |         |                              |              |          |      |  |          |
| Digital IO Functions |         |                              |              |          |      |  |          |
| Control Modes        |         |                              |              |          |      |  |          |
| Object Dictionary    |         |                              |              |          |      |  |          |
| Driver Configuration |         |                              |              |          |      |  |          |
| ECAN Configuration   |         |                              |              |          |      |  |          |
| 485 Configuration    |         | 🚯 Digital IO Functions       |              |          |      |  |          |
| Scope                |         | Digital Input                |              | 1        |      |  |          |
| Advanced Tuner       |         | Num Function                 | ×            | Simulate | Real | Polarity   | Internal |
| Error Display        |         | DIN1 Enable                  | >> ×         |          | •    |  | •        |
| Error History        |         | DIN2 Reset Errors            | >> ×         |          | •    |  | •        |
| Panel Menu 🕨         |         | DIN3 Operate Mode Sel        | >> ×         |          | •    |  | •        |
| Init Save Reboot     |         | DIN4 Kvi Off                 | >> ×         |          |      |  |          |
| Driver Properties    | 11 2000 | DINS Plimit +                |              |          | -    |  |          |
| Load Firmware        |         | DINK PULL                    |              |          | _    |  |          |
|                      |         | Davo jp Limit -              | >> _         |          |      |  | -        |
|                      | 1-1-0-0 | DIN7 Home Signal             | >> 2         |          | •    |  | •        |
|                      |         | DIN8                         | >> ×         |          | •    |  |          |
|                      |         | Digital Output               |              |          |      |  | 1        |
|                      |         | Num Function                 | ×            | Simulate | Real | Polarity   |          |
|                      |         | OUT1 Ready                   | >> ×         |          | •    |  |          |
|                      |         | OUT2 Error                   | >> ×         |          | •    |  |          |
|                      |         | OUT3 Pos Reached+Speed Reach | ed+Spec >> > |          |      |  |          |
|                      |         | OLET Zero Speed              |              |          |      |  |          |
|                      |         | OLITE Mater Basis            |              |          | -    |  |          |
|                      |         | OUTS Motor Brake             | >> _         |          |      |  |          |
|                      |         | OUTE                         | >> ×         |          | •    |  |          |
|                      |         | OUT7                         | >> ×         |          | •    |  |          |
|                      |         | OUTS                         | >> ×         |          |      |  |          |
|                      |         |                              |              |          |      | ( American Street Stree |          |
|                      | L       |                              |              |          |      |  |          |
|                      |         |                              |              |          |      |  |          |
|                      |         |                              |              |          |      |  |          |



b. Clear all DIN functions by selecting the top "X" to the left of the "Simulate" text on Digital Input Screen

| igital I | nput                             | 0  | - | e e e    |      |          |          |
|----------|----------------------------------|----|---|----------|------|----------|----------|
| Num      | Function                         |    | × | Simulate | Real | Polarity | Internal |
| DIN1     | Enable                           | >> | × |          | •    |          | •        |
| DIN2     | Reset Errors                     | >> | × |          | •    |          | •        |
| DIN3     | Operate Mode Sel                 | >> | × |          | •    |          | •        |
| DIN4     | Kvi Off                          | >> | × |          | •    |          | •        |
| DIN5     | P Limit +                        | >> | × |          | •    |          | •        |
| DIN6     | P Limit -                        | >> | × |          | •    |          | •        |
| DIN7     | Home Signal                      | >> | × |          | •    |          | •        |
| DIN8     |                                  | >> | × |          | •    |          | •        |
| igital C | Dutput                           |    |   |          |      |          |          |
| Num      | Function                         |    | × | Simulate | Real | Polarity |          |
| OUT1     | Ready                            | >> | × |          | •    |          |          |
| OUT2     | Error                            | >> | × |          | •    |          |          |
| оитз     | Pos Reached +Speed Reached +Spee | >> | × |          | •    |          |          |
| OUT4     | Zero Speed                       | >> | × |          | •    |          |          |
| OUT5     | Motor Brake                      | >> | × |          | •    |          |          |
| OUT6     |                                  | >> | × |          | •    |          |          |
|          |                                  | >> | × |          | •    |          |          |
|          |                                  | ~  | × |          |      |          |          |

- c. On Basic Operation Screen, set the following:
  - i. Line 7 (NUM 6) "Operation Mode" change to "3: Speed Control"

| s  | Basic Ope | ration |                     |                        |       |
|----|-----------|--------|---------------------|------------------------|-------|
| Ν  | Index     | Туре   | Name                | Value                  | Unit  |
| 0  | 606100    | int8   | Operation_Mode_Buff |                        | DEC   |
| 1  | 604100    | uint16 | Statusword          |                        | HEX   |
| 2  | 606300    | int32  | Pos_Actual          |                        | inc   |
| 3  | 606C00    | int32  | Speed_Real          |                        | rpm   |
| 4  | 607800    | int16  | I_q                 |                        | Ap    |
| 5  | 268000    | uint16 | Warning_Word        |                        | HEX   |
| 6  | 606000    | int8   | Operation_Mode      | •                      | DEC   |
| 7  | 604000    | uint16 | Controlword         | -4:Pulse train Control | HEX   |
| 8  | 607A00    | int32  | Target_Position     | -3:Speed Control       | inc   |
| 9  | 608100    | uint32 | Profile_Speed       | 4:Torque Control       | rpm   |
| 10 | 608300    | uint32 | Profile_Acc         | 1:Position Control     | rps/s |
| 11 | 608400    | uint32 | Profile_Dec         | 6:Homing mode          | rps/s |
| 12 | 60FF00    | int32  | Target_Speed        | o.noning mode          | rpm   |
| 13 | 607100    | int16  | Target_Torque%      |                        | %     |
| 14 | 607300    | uint16 | CMD_q_Max           | 6                      | Ap    |
| 15 | 20200D    | int8   | Din_Mode0           | 6                      | DEC   |
| 16 | 20200E    | int8   | Din_Mode1           |                        | DEC   |
| 17 | 269000    | uint8  | Encoder_Data_Reset  |                        | DEC   |

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Note: "3" references accel/decel parameters and "-3" does not

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ii. Line 11 (NUM 10) "Profile\_Acc" set to 100 rps/s

iii. Line 12 (NUM11) "Profile\_Dec" set to 100 rps/s

- iv. Line 13 (NUM12) "Target Speed" set to 500 rpm
- v. Line 16 (NUM15) "Din\_Mode0" set to 3 DEC

| Kŝ | Basic Operation |        |                     |       |       |
|----|-----------------|--------|---------------------|-------|-------|
| Ν  | Index           | Туре   | Name                | Value | Unit  |
| 0  | 606100          | int8   | Operation_Mode_Buff |       | DEC   |
| 1  | 604100          | uint16 | Statusword          |       | HEX   |
| 2  | 606300          | int32  | Pos_Actual          |       | inc   |
| 3  | 606C00          | int32  | Speed_Real          |       | rpm   |
| 4  | 607800          | int16  | I_q                 |       | Ap    |
| 5  | 268000          | uint16 | Warning_Word        |       | HEX   |
| 6  | 606000          | int8   | Operation_Mode      | 3     | DEC   |
| 7  | 604000          | uint16 | Controlword         |       | HEX   |
| 8  | 607A00          | int32  | Target_Position     |       | inc   |
| 9  | 608100          | uint32 | Profile_Speed       |       | rpm   |
| 10 | 608300          | uint32 | Profile_Acc         | 100   | rps/s |
| 11 | 608400          | uint32 | Profile_Dec         | 100   | rps/s |
| 12 | 60FF00          | int32  | Target_Speed        | 500   | rpm   |
| 13 | 607100          | int16  | Target_Torque%      |       | %     |
| 14 | 607300          | uint16 | CMD_q_Max           |       | Ap    |
| 15 | 20200D          | int8   | Din_Mode0           | 3     | DEC   |
| 16 | 20200E          | int8   | Din_Mode1           | -3    | DEC   |
| 17 | 269000          | uint8  | Encoder_Data_Reset  | 1     | DEC   |



d. On Digital IO Functions Screen, set the following:

## i. DIN1 > Function > Enable

1. Do this by pressing the ">>" Button and checking the "Enable" check box and pressing "ok" on the bottom right of the pop up window

## ii. DIN2> Reset Errors

iii. DIN3> Invert Direction

| igital I  | nput                             |    |   |          |      |          |          |
|-----------|----------------------------------|----|---|----------|------|----------|----------|
| Num       | Function                         |    | × | Simulate | Real | Polarity | Internal |
| DIN1      | Enable                           | >> | × |          | •    |          | •        |
| DIN2      | Reset Errors                     | >> | × |          | •    |          | •        |
| DIN3      | Invert Direction                 | >> | × |          | •    |          | •        |
| DIN4      | Operate Mode Sel                 | >> | × |          | •    |          | •        |
| DIN5      |                                  | >> | × |          | •    |          | •        |
| DIN6      |                                  | >> | × |          | •    |          | •        |
| DIN7      |                                  | >> | × |          | •    |          | •        |
| DIN8      |                                  | >> | × |          | •    |          | •        |
| Digital C | Dutout                           |    |   |          |      |          |          |
| Num       | Function                         |    | × | Simulate | Real | Polarity |          |
| OUT1      | Ready                            | >> | × |          | •    |          |          |
| OUT2      | Error                            | >> | × |          | •    |          |          |
| олтз      | Pos Reached +Speed Reached +Spee | >> | × |          | •    |          |          |
| OUT4      | Zero Speed                       | >> | × |          | •    |          |          |
| OUT5      | Motor Brake                      | >> | × |          | •    |          |          |
| OUT6      |                                  | >> | × |          | •    |          |          |
| OUT7      |                                  | >> | × |          | •    |          |          |
|           |                                  | 55 | × |          |      |          |          |



## 11) Test your system

a. On your IO screen, simulate the DIN1 "Enable" button so that the gray box turns green

i. You should get motion out of your motor at 500 RPM, if there is no motion, an error has occurred. Check that you have power to the unit and open the error menu to confirm. After confirmation, simulate DIN 2 "Reset Errors" and attempt to Enable the system again

b. The Basic Operation Screen shows Real Time Motion in the green filled boxes. Notice the Pos\_Actual is increasing and Speed Real is oscillating around 500 RPM. The LED should show a value of 500.

c. The Operation\_Mode value should read "3", and the control word should say "2F"

i. Simulate DIN3 to show the speed change to -500 and Pos\_Actual reducing

d. By Simulating DIN4 "Operate Mode Sel", the Operation\_Mode will change between "3" and "-3" depending on the state of that input.

i. Reduce Target Speed to roughly 100 RPM and invert direction on your system to notice the impulse when the accel/decel parameters are not considered

12) Refer to other documentation for wiring / set up of different control methods.