Quick Start Guide

Integrated, Intelligent (I^2) Servo Systems

Date: 04/01/2016

Model Numbers:
34i08-37     34i15-37
34i30-37     34i30-75

Specialty Motors
25060 Avenue Tibbitts
Valencia, CA 91355
Phone: 661-257-7388    Toll Free: 800-232-2612

Email: sales@specialtymotors.com
Website: www.Specialtymotors.com
Quick Start Guide

Description:
The I² Motor servo system is a fully integrated servo motor and control system in one compact package. It is programmed with a software host termed the “I² Wizard” that can be downloaded and used on any PC. This guide is intended to quickly familiarize users with the I² Motor system including the installation and use of the I² Wizard host software and operating the I² Motor with the default test program.

Warnings, Cautions and Notes:
Please read all equipment labels and manuals before attempting to use the I² Motor servo system. All documentation for the I² Motor product line can be found at the Specialty Motors web site: http://www.specialtymotors.com.

⚠️ WARNING: Do not use this product in wash-down or other application where it is not sufficiently protected from the environment, water or other fluids.

⚠️ WARNING: Always use this product in accordance with relevant electrical codes and always follow good electrical safety practices.

⚠️ WARNING: This product is capable of producing high speed and torque, always follow safe practices when connecting shaft to equipment or operating near personnel.

⚠️ CAUTION: Never apply more than 24 V DC to any of the inputs or outputs of this system.
CAUTION: Read i² Motor Installation Manual prior to installing this product in any equipment.
Quick Start Guide

Installing the I² Wizard

Follow Download instructions to install the I² Wizard software host on your computer from the Specialty Motors website at [www.specialtymotors.com](http://www.specialtymotors.com)

Connecting the I² Motor

- The I² Motor system comes complete with a power cord, a USB cord and the I² servo motor, as well as this manual. First, remove and inventory all items from the box.
- Without power applied connect the power cord into the Power Connector P1 (The default power receptacle is for 115VAC 50/60 Hz).
  - Note: The I² Motor will operate automatically on any line power from 90VAC to 230VAC at 50 or 60 Hz
- Connect USB cord from your computer to the USB Communication P3 receptacle on the back of I² Motor.
- Do Not connect any load to the motor at this time. Let the shaft run free of load.
- With the USB and power cords connected, start the I² Wizard by double clicking on the I² Wizard icon, or Shortcut if you made one.
- The main screen of the I² Wizard will appear with the upper status bar showing no motor connected.
• Plug the motor power cord into a suitable power source. Once power has been applied, the status light on the rear of the $I^2$ Motor will begin flashing red and green alternately. *(This indicates that the motor is in the disabled mode of operation. It is possible with certain setup configuration other than the default configuration with which the motor is shipped for the motor to power up enabled in which case the status light would be solid green. The defaults will have to be restored once the system has established communication with the $I^2$ Wizard software.)*

• The $I^2$ Wizard will immediately begin polling for a motor and uploading the parameters from the motor. A green status bar will appear indicating the status of the parameter upload. *(This operation does not always occur. If the $I^2$ Motor has been powered off or disconnected with no changes to the setup, the $I^2$ Wizard can recognize this condition and may skip the polling process.)*

• It will take about 20 seconds for the polling process to be completed. Once that has occurred the status bar will state, “Connected to 34iXX-XX listing the $I^2$ Motor model number.”
Quick Start Guide

- You will now be able to use the I² Wizard to demonstrate, test and modify the I² Motor system settings.

Using the I² Motor System in Demo Mode

Main Screen: (Screen 1)
The Main Screen allows you to navigate between sections and screens used to program and test the system. The system will be in “Hardware Control” mode once the I² Wizard recognizes the motor configuration. This means that hard wired I/O connections are controlling the I² Motor. The system will have to be changed to “PC Control” mode when programming is loaded or changed in the servo system. It will also have to be in “PC Control” mode when the system is being enabled and activated by the host PC.
Screen 1

Main Screen: (Screen 1)
The Main Screen allows you to navigate between sections and screens used to program and test the system. The system will be in “Hardware Control” mode once the I² Wizard recognizes the motor configuration. This means that hard wired I/O connections are controlling the I² Motor. The system will have to be changed to “PC Control” mode when programming is loaded or changed in the servo system. It will also have to be in “PC Control” mode when the system is being enabled and activated by the host PC.

To run the motor in DEMO mode:
- Click on PC Control Button
- Click on the DEMO Button
Test Motor: (Screen 2)
The DEMO Screen will appear TITLED “Test Motor”

Screen 2

This screen allows you to quickly DEMO the motor in four different modes and observe motor response to input commands.

Smooth Position will cause a slow acceleration response to a position command input when the motor is enabled.
Quick Start Guide

**Smooth Speed** will cause a slow acceleration response to a velocity command input when the motor is enabled.

**Fast Position** will cause a fast acceleration response to a position command input when the motor is enabled, and

**Fast Speed** will cause fast acceleration response to a velocity command input when the motor is enabled.

To run the DEMO Mode:

- Enable the motor by clicking on the **Enable** icon (See #2 in Screen2 above). It will light a green border when activated.

- Left Click and hold down your mouse on the blue command bar of the servo command ICON to move the slider up or down to command a position or speed. Moving the command bar up or down past the mid-point of the command icon will also change direction of rotation. (See #3 in Screen2).

- You may also left click and release in the white area of the Servo Command bar to move the command bar to a desired position.

- When selecting different servo modes, the \( i^2 \) **Wizard** will automatically disable the motor as indicated by a lit red border around the **Disable** icon. You can also manually click on the **Disable** icon anytime to stop as you will click on the enable to run.
Quick Start Guide

- The Test Screen also has a graphic display (see #5 on Test Motor Screen) to show the relationship between commanded input and motor response. Commanded speed or position inputs are shown on the green trace, motor response in speed or position are shown on the red trace motor current is shown on the blue trace.

- Return to the Application Setup screen by clicking: “Back to Main Page” button. (See #4 on the Test Motor screen) The I² Motor will automatically go to the disabled mode.
- As you command speed or position changes you can also observe the motor shaft tracking with the Red Trace.
Quick Start Guide

I² Motor Setup:

On the Main Screen shown below, click on the “Set Up Application” icon.
The Setup Motor screen will appear. (Screen 3)

Screen 3

The first step on this screen is to select appropriate Units for Position and/or Units for Velocity (See #1 and #2 in Screen3) via the pull down menus. These units will carry through all of the programming and displays.
Quick Start Guide

Other functions on this screen include:

- **Restore as Connected** allows you to reload the last program that was in the I² Motor unit when it was last powered up. (See #3 in Screen 3)

- **Restore Defaults** allows a reload of the default settings that came with the I² Motor when originally shipped. (See #4 in Screen 3)

  *Note: When either of the Restore as Connected or Restore Defaults are selected in the Motor Setup screen, these functions will restore all of the setup parameters, when used in other screens these buttons only affect the setup parameters controlled by that screen.*

- **Reverse Direction** is a check box that can be selected which will reverse the direction of the motor in all programmed functions. With this box UNCHECKED, all positive directions are clockwise when looking at the shaft face of the I² Motor. (See #5 in Screen 3)

- **Activate Changes** loads all changes into the I² Motor system. The I² Motor must be disabled for this operation to function. (See #7 in Screen 3)

- **Cancel Changes** will stop and remove all changes since the last set of changes was loaded to the I² Motor. (See #8 in Screen 3)

  *Note: Activate or Cancel Changes buttons are available on any of the setup pages and will activate or Cancel changes on all setup screens.*

Once all the above have been defined and selected, you are ready to program motion commands on the **Indexing Functions Screen**. Click on the **Indexing Functions Screen** (See #6 in Screen 3) and the **Indexing Functions Screen** will appear as shown below.
Indexing Functions are programmed on Screen 4 by entering desired parameters in the numbered rows of the indexing table. (#3 in Screen 4) Each row contains all of the necessary setup information needed to complete a motion command. The values shown in the indexing table are set at the factory and may be used to test or operate the system but they may also be erased or overwritten when actual programming begins.

You are now ready to begin programming motion commands.
Quick Start Guide

Programming the I² Motor system:

- Click your mouse on the first desired index (Idx) (See #3 in Screen #4) and highlight the row.

- Select the desired index mode of operation for position or velocity control from the pull down menu. The row will automatically be filled with the default values for velocity, acceleration and deceleration for the selected motion.

There are 8 selectable modes in the Index Mode Table pull down:

- **No action**: No index is required for this Index ID.
- **Analog Position Command**: Allows one Index to be assigned as a position index based on an analog signal level. Only one Analog Position Command or Analog Velocity Command can be set in the index table at one time.
- **Go to Set Position Absolute**: Allows entry of a position variable that is referenced to the system zero position.
- **Go to Set Position Relative**: Allows entry of a position variable as a function of the current position.
Quick Start Guide

• **Analog Velocity Command:** Allows an Index to be assigned as a velocity index based on an analog signal level. Only one Analog Velocity Command or Analog Position Command can be set in the index table at one time.

• **Go to Set Velocity:** Allows the entry of a velocity in already scaled units.

• **Home Find- Select Function:** This index function commands the system to follow the routine set into the Home Find function. (Home Find defined subsequently.)

• **Set Position to Zero:** This index function will cause the present position to be set to the value set in the position column of the row.

• Select the way in which motions are initiated and completed by choosing the desired check boxes on the Set up screen. (See #1 in Screen #4).

  ![Checkboxes](image)

  o **Must Complete Before Next Move** selection will require that a move be completed before another move is allowed to begin. In the case of continuous velocity motion, the set velocity must be achieved before another motion will begin.

  o **Valid Only on Trigger Input** selection enables the selected change to activate when the trigger transitions from a false to a true state.

  Note: As a rule of thumb, a trigger is used in applications that have transitional digital states that result in problematic motion indexes for an application.

• Enter desired values for position, velocity, acceleration and deceleration to accomplish the position move or velocity profile. Units for these values will be those previously selected on the Set Up Screen. If you choose a velocity profile the word “Velocity” will appear in the position column to indicate this parameter is not used.
Quick Start Guide

• If another move is desired after completion of the present move enter the row number defining the next move in the “Next” column. If no further moves are desired enter “End”.

• A delay can be set after the move is completed and before another move starts by entering a value in the “Time” column. The times are programmed in milliseconds.

• Once the desired motions have been set in the table download values into the $I^2$ Motor by clicking the “Activate Changes” button at the bottom of the screen. (See #7 in Screen 3)

• If you do not want to keep the changes click the “Cancel Changes” button and the system will revert to the previous settings.

• Return back to the main page by clicking the “Back to Main Page” button in the lower left corner of the screen.
Quick Start Guide

Test the Programmed Motions:

After motion commands are entered into the index table the move can be checked with the Motor I/O Emulation function

- After returning to the Main Screen Click on “Test/ Monitor” button.
Motor I/O Emulation: Screen 5

Screen 5

This screen allows the simulation of inputs, enabling the system and the monitoring of the I2 functions.

**Emulated Input** buttons on the upper portion of screen correspond to wiring connections on the motor and are used in binary format to select the row number of the desired motion command for test. The buttons are labeled: Enable, Trigger, D-0, D-1, D-2 and D-3. (See #1 in Screen 5) A Bit Index Table showing on/off positions for each button and the corresponding index row is presented below. Rows 0 through 15 are selected in this manner. Rows 16 through 32 can only be accessed by entering the row number in the **Next** column at the completion of a command.
Commanded Index monitor indicates the index row selected from the index table and the index mode. (See #2 in Screen 5)

State Information lists the state of the motor; Motor Position in the selected units, Motor Velocity in the selected units, Motor Current, Motor Temperature, the Analog Command (analog input) value, Analog Response (analog output) and any reasons why the system may be disabled. (See #3 in Screen 5)

To run the I² Motor
- Ensure the motor shaft is free to move
- Click on the “Enable” button.
- Click on the “Trigger” button, if the “Valid Only on Trigger Input” option is selected.
- The motor will perform the motion commanded by the index row.
- Observe the “State Information” changing as the motor shaft moves.
Managing Configuration Files (.i2m):

I² Configuration Files can be saved and stored in the host computers memory then retrieved for later use or programming of a new I² system. The Configuration File stores all the motion parameters and system values in a file with a (.i2m) file suffix. These files can be stored and moved like any standard PC file. Storing as well as opening and downloading stored programs and flashing changes into the controller are discussed in detail in the I² User’s Guide.

Other Functions on Motor Set Up Screen

In addition to the **Indexing Functions** screen, which has already been discussed in detail, the **Setup Motor Screen** has six additional buttons on the left side of the screen that are used to program inputs and outputs and perform a number of other functions. These functions are described in detail in the I² Motor User Guide
Quick Start Guide

**Input Interfaces:** Allows you to select different logic types and levels. This system can use most common logic types when setup properly. Inputs may be selected individually or with group settings.

*Note: See installation manual for detailed description of logic types, setup and connections.*

**Output Interfaces:** Function is similar to Input Interfaces Screen but is used for output parameters. Outputs may be selected individually or group settings.

**Output Functions:** Selects the type of functions under which a desired output is active.

**Home Find:** Allows you to program a repeatable reference position known as “Home” whenever the system is powered up or triggered to go to a home position.

**Analog Settings:** Used to program the range and type of analog input and output signals.

**Performance Adjustments:** Used to optimize motor performance using proportional, integral and/or rate feedback gain parameters.