# FCB-2 Operating Manual



This is the instruction manual for the FIRGELLI FCB-2 LCD screen control box. The FCB-2 control box is designed to control up to four linear actuators, accommodating both actuators with built-in feedback systems (such as hall or optical sensors) and those without feedback.

# FCB-2 FEATURES

**Features for Actuators with Feedback (Actuators with 5 or 6 wires):**

- Synchronize and run 2 to 4 actuators at the same speed regardless of loads on either actuator – This feature is essential if you are lifting something that requires 2, 3, or 4 actuators to work together.
- Adjustable limit stopping positions – Program specific start and stop points.
- Adjustable speed.
- Timer functions – Extend and retract at different times of day, up to 5 times per day.
- Interval timing modes – Extend and retract after a set number of minutes/hours.

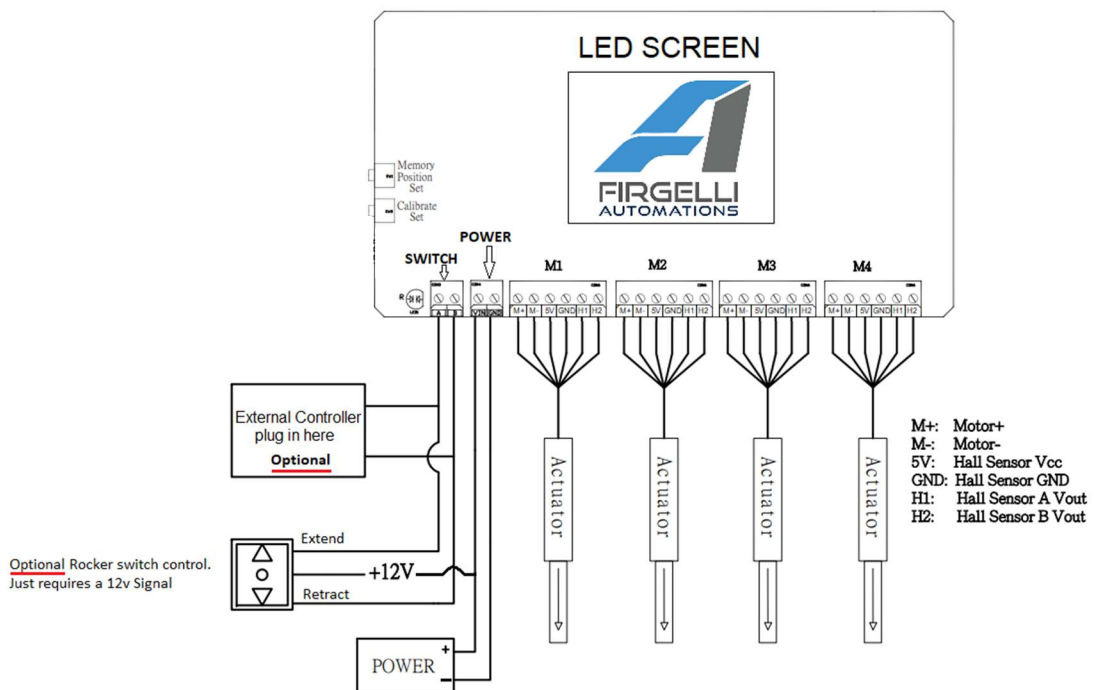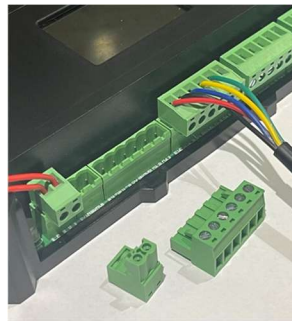**Features for Actuators without Feedback (Actuators with 2 wires):**

- Adjustable speed.
- Run 1, 2, 3, or 4 actuators; the actuators will still run together but not in sync, meaning one will always be faster than the others.
- Timer functions – Extend and retract at different times of day, up to 5 times per day.
- Interval timing modes – Extend and retract after a set number of minutes/hours.

# TIMER CONTROL OPTIONS

1. **Time of day controller option** - set the actuator(s) to open and close at a certain time of day or day of the week.
2. **Set up to 5 different program times** - have the actuator(s) open/close up to 5 times in a 24-hr period.  You can even set them for different days and different times on different days.
3. **Interval mode** - set the actuator(s) to open and close after a certain amount of time. So, let's say you want to open a flap for 10 mins then close it for 1 hour, and repeat that cycle continuously; this mode allows interval running, all day every day, just set it and leave.

# SET-UP GUIDE

1. Wire up the power to the control box.  The controller comes with all the removable green blocks installed. Pull them off for better access to connecting the wires to each block.





M+: Motor+
M-: Motor-
5V: Hall Sensor Vcc
GND: Hall Sensor GND
H1: Hall Sensor A Vout
H2: Hall Sensor B Vout

2. Use the wiring diagram above to help wire the power, switch, and actuators correctly.

3. Wire up the Actuators as shown.  Remove the green blocks from the control box and wire a block to each actuator. Actuators may have different wire colors for the same connection.  For example, the motor wires on some actuators are red/black, but on others blue/brown.

   - The green blocks with 6 holes on them are for the actuators. The left 2 holes are for the motor on the actuators. The wiring diagram on the actuator will have a label to show +/- or maybe written as M+/M- both basically mean + (positive) and - (negative) to the motor.

   - Feedback wires – The control box requires at least 3 wires for the control box to see a positional signal.  Each actuator will have the labels for each wire. 5V can also be called VCC. GND is the Ground. H1 is the sensor output. Some actuators have 2 output wires which would be called Hall 1 and Hall 2 or Opt 1 and Opt 2.

   - For actuators with only 2 wires and the Feedback option in the controller turned to "OFF," just connect the 2 wires from the actuator to the leftmost 2 empty spots on the connecting block and leave the Feedback terminals empty.

4. Power to the controller is via the small green block to the left of the first actuator M1. The controller takes 12-24vdc input, remember if you use a 24vdc input then the actuator(s) will also end up been powered by the same 24vdc power.

   - Remove the green block and wire in power + to the left side and -ve to the right side of the green block.  If you are going to use a rocker switch in your system then you will also want to connect a second wire in this green block where the +ve wire goes. This extra +ve 12-24vdc power is going to get wired up to the rocker switch.

   - **Note:** You do not have to wire up a rocker switch. You can control the actuator from the LCD screen, but for some applications you may want a manual switch option.  Follow the wiring diagram above for this.

5. Once the actuator(s) are wired up and the power is connected, the control box will turn on and you will see the FIRGELLI Logo on the loading screen.

**Note:** *If you have trouble pressing the buttons on the LCD screen you can use the end of a pen, the eraser end of a pencil, or similar sized item to accurately tap the buttons.*

6. Press the **SYSTEM SET** button to set the time and date. Here you can also turn off the buzzer if you find that annoying and also adjust the backlight of the screen.

   - **Note:** Time must be set in 24-hr format.

7. In the **ACTUATOR SET** menu select **# of ACT'S** to set the number of actuators you are using.
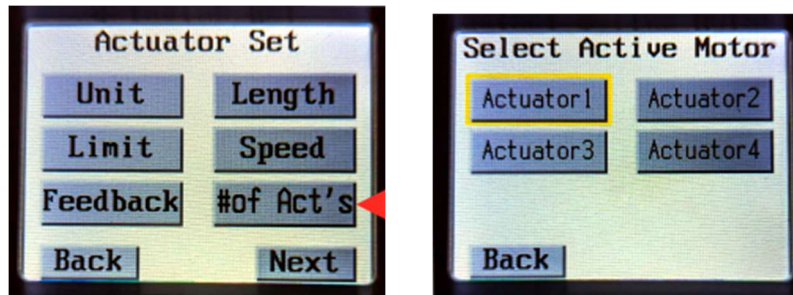


8. Also, in the **ACTUATOR SET** menu, press **FEEDBACK** to set the controller to either "FEEDBACK ON" mode or "FEEDBACK OFF" mode. If your actuators have built-in Feedback, then this needs to be turned on. If your actuators only have 2 wires (No Feedback), then turn this off.
   - **Note**: If the Feedback option is turned off, some features will be greyed out in the controller, such as the Units, Limits, Length, and Calibration options. This is because, without feedback from the actuators, these features do not work.



9. Press the **ACTUATOR SET** button and then then hit the **CAL** (calibration) button. The actuator(s) will all run an entire cycle out then back again to calibrate and, if you are using 2 or more, synchronize them.
   - If the actuator(s) are not wired up correctly this is the part where you will find out. If the calibration is successful the controller will click a few times at the end of the cycle and the green light will flash.

   - **Note:** If you did not set the DIP switches correctly the calibration process can still be performed and will still give you a green light, but when you go to run the actuators, they will not run. If that occurs, simply adjust DIP switches to the correct setting for the number of actuators you are running and then run the calibration process again.

10. Once the calibration is complete, press **ACTUATOR SET** and then **LENGTH.**
    - The controller needs to know what the stroke length of the actuator is. Read the label on the actuator and enter the correct value. So, if it's a 6" stroke enter on the keypad 0600, the screen will read **06.00 INCHES.** Then hit the **SAVE** button.

- **Note:** Remember even though the stroke is 6" you still have to enter a 0 before the 6, because the system allows 4 digits in total and even zero's need to be entered.

11. **ACTUATOR SET - Speed and Limit settings**.  Also, in the **ACTUATOR SET** menu you can adjust the speed (extend and retract speeds separately), as well as, move the limits for both the retracted and extended positions.
    - For the limit position setting, press the **LIMIT** button then slide the arrows back and forth to adjust them. The bottom arrow refers to the retracted position and the top arrow refers to the extended position. **They should not cross over each other.**

# TIMER OPERATION

**INTERVAL MODE:**  This mode is ideal for applications where you want to open and close the actuator(s) on a set time frequency.  Example: you want to extend and retract the actuator at specific intervals repeatedly, then this is the setting you would choose.
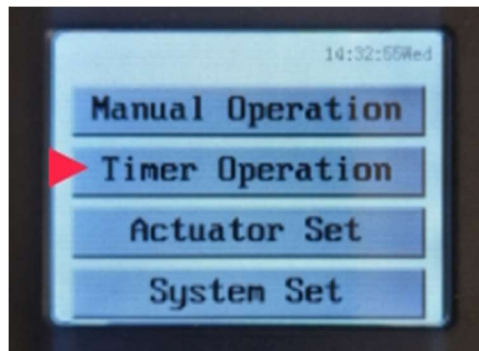


1. Press **TIMER OPERATION** to enter the TIME SET menu, select **INTERVAL MODE**.

    - You will be prompted to enter the **"Delay Until Extend"** time.  The format is: hours: minutes: seconds and two digits are required for each.  2 hours would be entered as 02:00:00, 2 minutes would be 00:02:00. Press **SAVE**.
    - You will be prompted to enter the **"Delay Until Retract"** time. Enter the length of time that will pass before the actuator(s) retract. Press **SAVE**.

**NOTE**: It's important to remember that these times do not include the actuator(s) run time or the time delay to extend. The countdown to retract time will only begin once the actuator(s) has extended and the countdown to extend time will begin only when the actuator(s) returned in its retracted position.

    - After saving the screen goes back to the screen below.
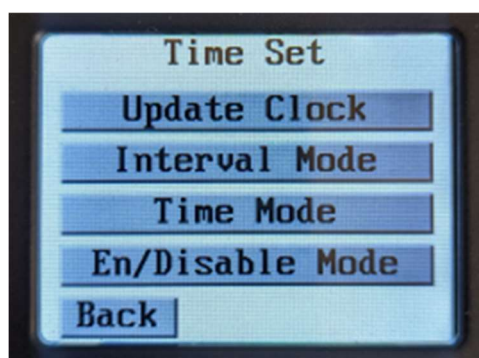
2. Press the **EN/DISABLE MODE** button, which takes you to the next screen as shown below, to enable and start the interval program you just set.
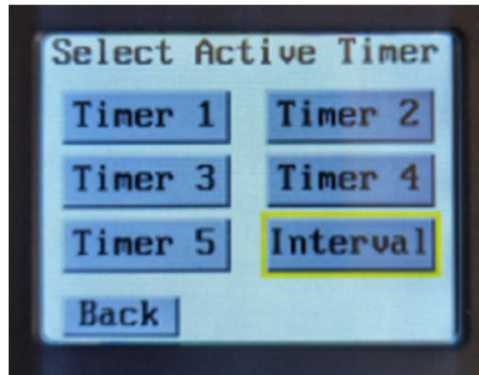


- Select the mode you wish to enable, in this case, **INTERVAL**, and it will become highlighted in yellow.

3. <u>Press the **BACK** button **twice**</u> to get to the screen below and the program will begin to run.
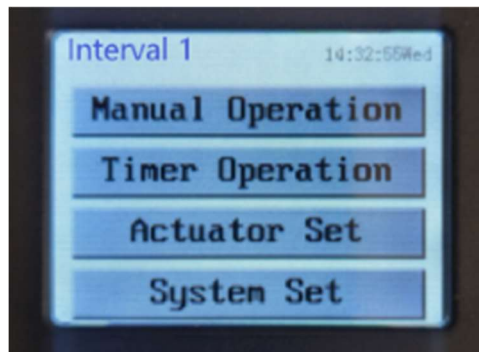


**Note:** At the top of the screen, it says **"Interval 1"**, this means the program is enabled and running.

<u>**TIME MODE**</u>: This mode is used to make the actuator(s) extend and retract on certain days at the specific times you set. Example: If you want the actuator(s) to extend at 10 am and retract at 4pm every Mon, Tues, Thurs, and Sat, but on Wed and Fri they extend at 11am and retract at 7pm, and on Sun they don't run at all, this is the mode you would choose.

- **Note:** You can program up to 5 timers.
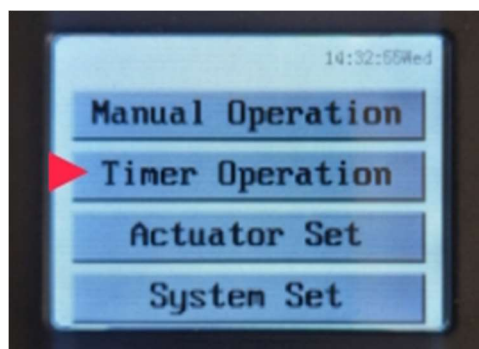
2. Press **TIMER OPERATION** to enter the TIME SET menu, select **TIME MODE,** then **TIMER 1.**

- You will be prompted to enter the **"Extend Time Set"**.  The times should be set in the 24hr clock format, and if the first digit is not required you must first enter the zero button.  So, a 9am start time will be entered as 09:00:00 and a 1pm start time is entered as 13:00:00.  Press **SAVE.**
- After saving you will be prompted to enter the **"Retract Time Set"**.  Enter the retract time, again using the 24hr format. Press **SAVE**.
- **"Select Active Day"** will appear and you will select which day(s) you would like the time setting to apply to. Active days will become highlighted in yellow.  Press **SAVE.**

3. To set another timer select a different timer option **(TIMER 2, TIMER 3, TIMER, 4, or TIMER 5)** and repeat the steps listed above.

4. Once you've saved the timers you wish to run, press the **BACK** button to return to the TIME SET MENU.

5. Press the **EN/DISABLE MODE** button to select which timers you want to enable.
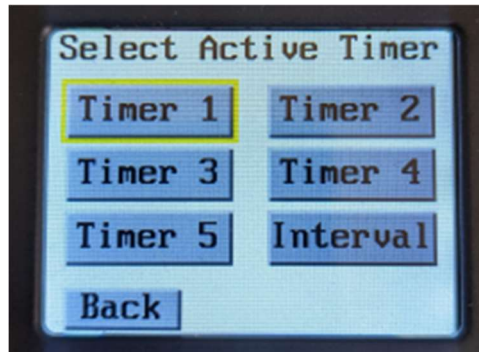


- Selected timers will be highlighted in yellow.

6. Once you have selected the timers you want to use, <u>press the **BACK** button **twice**</u> to start running the program(s).

   **Note:**  At the top of the screen all the enabled modes will be shown.  If more than one timer mode is running the display will show **"Timer 1+2+3" …. etc."**
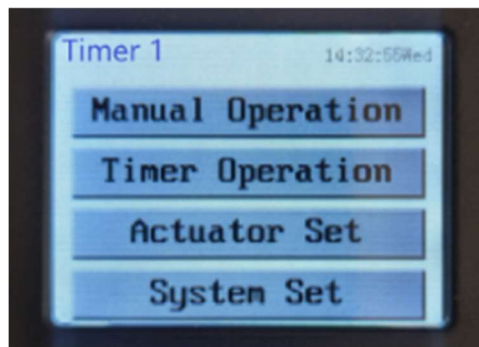
7.  To stop the programs running: press the **TIMER OPERATION** button then press **EN/DISABLE MODE**.
    - Simply press the timer number you want to disable.
    - Those highlighted in yellow are active and those not highlighted are inactive.


**NOTE:** When a timer is enabled you can still over-ride it by using the toggle switch (if installed) or the on-screen **MANUAL OPERATION** button to move the actuator. Remember that moving the actuator(s) manually will not disengage the TIME MODE programs, and it will still try to run those programs even though you are moving the actuator(s) via the switch or Manual Operation function.  **For this reason, it's always best to disable any timers and/or interval modes when working on the actuator(s) or the application.**


# REMOTE CONTROLS

The system comes with 2 remote controls and the system can run a maximum of 4 remotes purchased separately off our website.

Program more remotes in the **SYSTEMS SETTINGS** menu, press **REMOTES** to add or even delete some remotes that are pre-programmed into the controller.  Follow the on-screen instructions to add/delete any remotes.



# TROUBLE SHOOTING GUIDE

**Actuator(s) running in the wrong direction:**  Sometimes the motor wires are wired up the wrong way around, so back could really be red and red be blue.  If actuator(s) run in opposite directions then in the green blocks switch over the 2 motor wires to fix this.

**One actuator does not move after it has been calibrated:**  It's possible that one or more wires are not connecting properly in the green connector. Unscrew each of the feedback wires in the green block, and check each wire individually.  Also, ensure that the number of actuators set in the "Actuator Set" menu is correct.

**All actuators calibrated fine but the system flashes red:** This can happen because the number of actuators set in the "Actuator Set" menu is not correct. Adjust the setting to the correct number of actuators and run the calibration process again.

If you are still having problems, unplug all the actuators and plug in just one actuator (the one you are having problems with) and try calibrating and running just that one actuator. Remember to set the controller to run just one actuator in the "Actuator Set" menu.

Other problems may occur if you have the "Feedback Off" selected when you have Feedback actuators installed and are trying to run the actuators in sync or set limits.

**Nothing happens when you press a button on the remote fob:** Fob hasn't been paired to the FCB-2.  In the "System Settings" menu select the "Remotes" button and follow the instructions on the screen to add additional remotes.