

# Bus Safety Solutions



## Installation Manual

Extended Stop Arm v. 5.9

**ELECTRIC System – With ON/OFF Switch**



## Contents:

- Tools Needed
- Run Electrical Connections
- Install ON/OFF Switch
- Install Hinge Frame
- Install Lower Support
- Install Control Box and Board
- Run External Wiring and Replace Rib
- Attach Electric Actuator
- Run Electrical Connections
- Install Frame & Sign
- Install Bumper
- Button Up

## Tools and Supplies Needed

- Safety Glasses
- Work Cart
- Magnetic dish
- Tape measure
- Small Level
- Impact Driver
- Drill Motor
- Assorted nut drivers
- #2 Philips Bit, #3 Philips Bit
- Assorted drill bit set
- 7/8" Conduit Hole bit
- 9/64" steel bit
- 3/16" steel bit
- ¼" steel bit
- 9/32" steel bit
- 5/16" steel bit
- 5/8" steel bit
- 9/16" steel bit
- Hammer
- Vice Grip – Small & Large
- Utility Knife
- Needle Nose Pliers
- Cold Chisel
- #2 Philips head screwdriver
- #3 Phillips head screwdriver
- Flathead screwdriver
- 2 - ½" Wrenches
- 2 – 5/8" Wrenches
- 2 – 7/16" Wrenches
- 1/8" Allen Wrench
- Socket Set
- 1/2" NPT Steel Pipe (7/8" diameter) 8" Long
- Electrical Wire Crimping Tool
- Electrical Wire Stripping Tool
- Electrical Multi-Meter
- Clear Exterior Silicone
- School Bus Yellow Exterior Silicone
- Air hose cutter
- Roll of blue 16-gauge wire
- Roll of purple 16-gauge wire
- Roll of yellow 16-gauge wire
- Fish tape

Revised: 8-30-2019

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## Introduction

Welcome and thanks for installing our “Driver Select with On/Off Options” Extended Stop Arm!

This manual cover Blue Bird, International (IC), and Thomas buses for electric and air models. Each section will note if the steps are for “All” or a specific model. Skip parts that are for a model that you are not working on. If we mention a specific version model like Air or Electric, then you can skip if you are installing the other model.

Have fun and feel free to call us if you have a question. Number at end of document.

Note for Blue Bird and Thomas buses make sure you have the proper install kits for them before beginning.

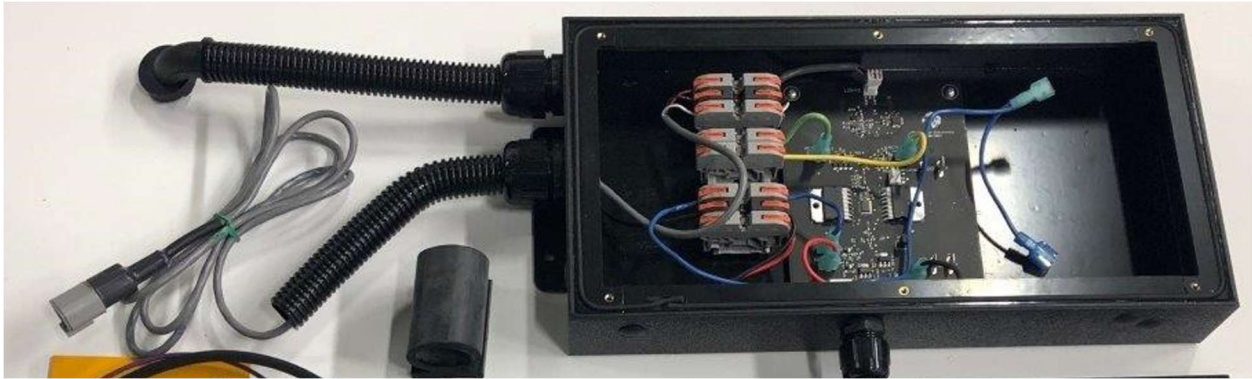
## Control Box Versions

There are two versions of the Control Box

### V2 Enclosure



V2.5 Enclosure: with all looms attached. May only need one in most cases for driver select.



### Install Black Frame Assembly - All

- PRIOR TO INSTALL, MAKE SURE NO SCREWS WILL PENETRATE A CABLE WITHIN THE BUS!
- Install Black Frame Assembly, must be vertical, use yellow bus siding panels as guide. Pre-drill with 9/64" drill bit as needed. Frame should mount using same two front holes with current stop sign box
- In the picture below, the original sign has not been removed and the vertical support has been installed using the original holes. In some cases, a new electrical supply hole will have to be drilled 4.5" towards the rear, and fish over the supply cables. Notice how the frame rest under the original box front mount using the same holes.



Note: Sign will center in frame and when opened it will not conflict with out frame. These same solutions will work with all Signs including Trans spec Plastic signs.

- Use ¾" x 12 self-tapping stainless-steel screws or 1-1/4" x 12 if necessary. Be sure no rivets or screws interfere with a tight fit against the side of the bus, if so remove them.
- The top left attachment on the vertical portion frame should be marked, drilled, and a self-tapping screw used to securely anchor the complete Black Frame Assembly.

## Install Control Box and Board – All

### **Important Notes:**

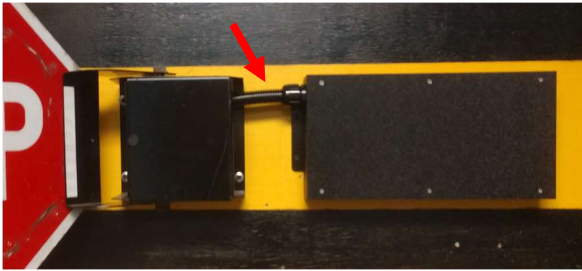
**New Enclosure units:** You may have a newer Enclosure with all wires running through the large Loom, This is the solution going forward.

- It is necessary to secure the airlines and wires so they don't get in the way of the old motor and bellows. Use your best judgement.
- **For Transpect Plastic signs** use the longest piece of loom and move to lower port for clearance and run all wires to front of box and bring wires in and out there.

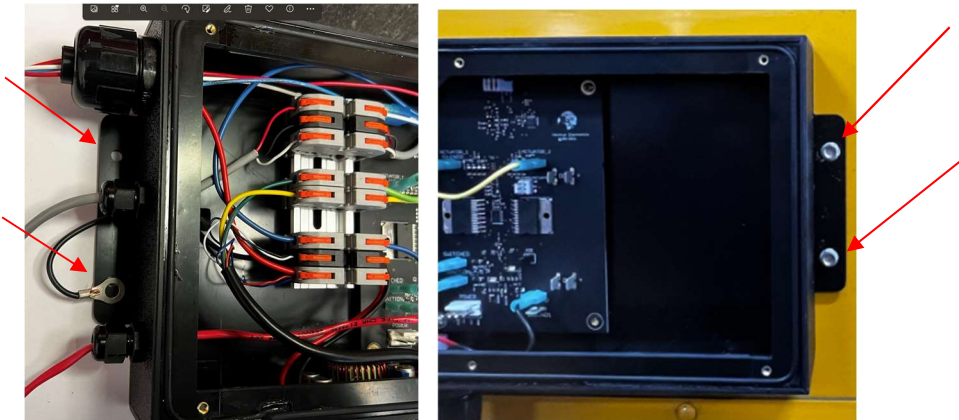
**All Installations except for Transpec signs (Plastic) the Loom will need to drop below frame and go to the front. Using loom like this diagram. This is not a transspec box but use concept:**



- Drill a 7/8" hole in the rear end of the electrical arm box cover to allow for the electric conduit.
- Install the Black Control box by inserting the flex conduit into the hole you just made.

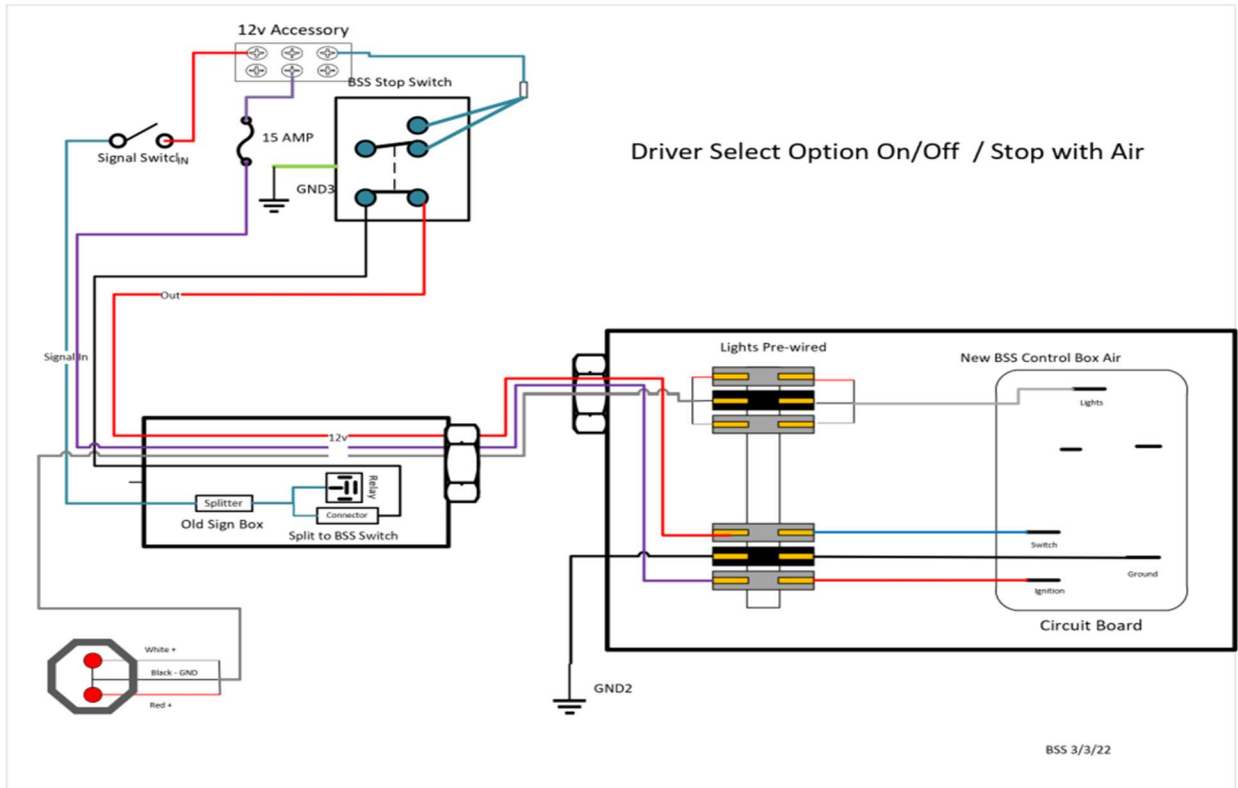


- Use 4 #12 x 1" ss screws
- Silicone back of box for additional adhesion if you wish.
- Attach the box with 4 short 12mm self-tapping screws

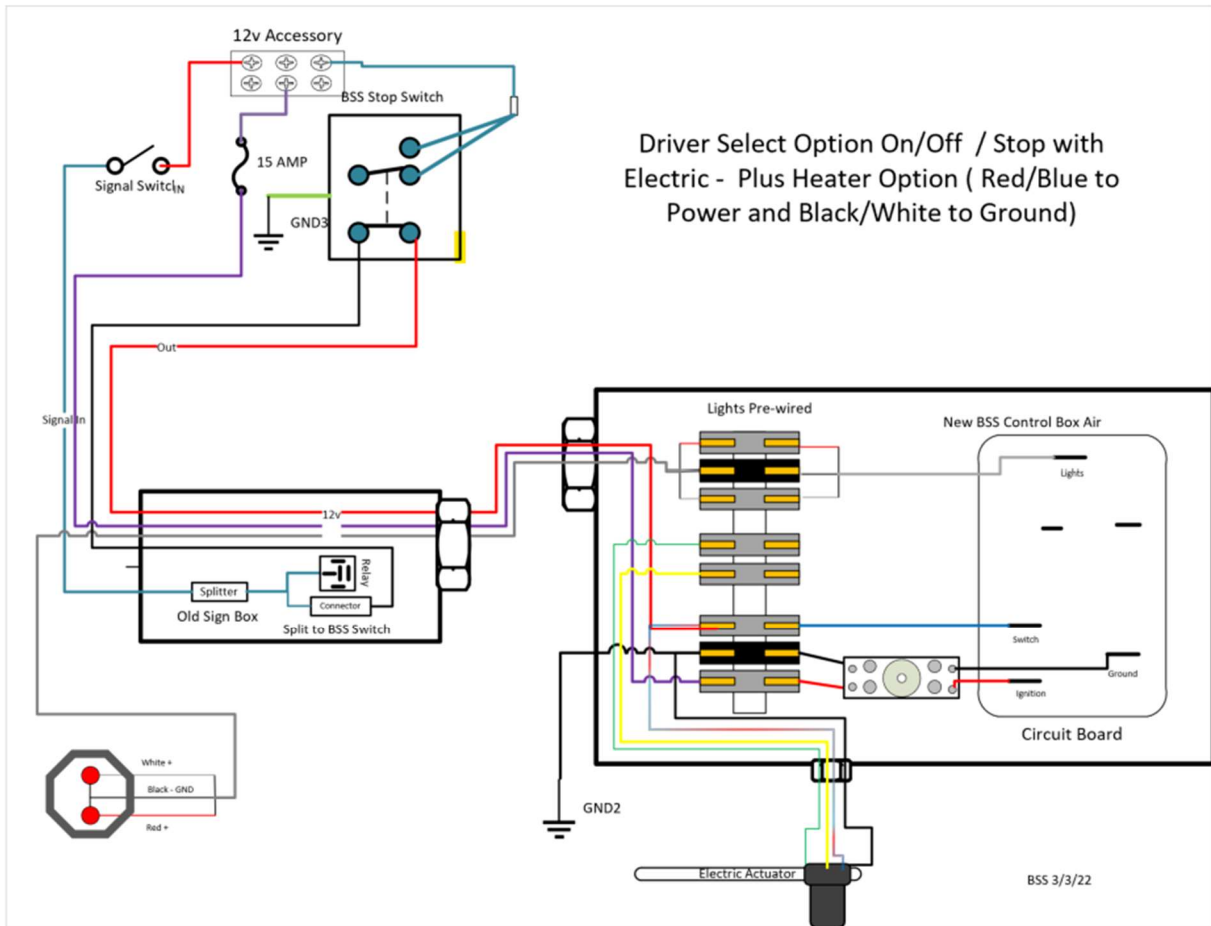


- Connect the black external wire to the lower left screw and then run the screw down.  
Note: Ground wire outside by hole
- Run the wiring harness and cables through the hole and attach the control box to the bus using 4 screws.
- If the control box covers any numbers, new decals will need to be applied.

Wiring diagrams:





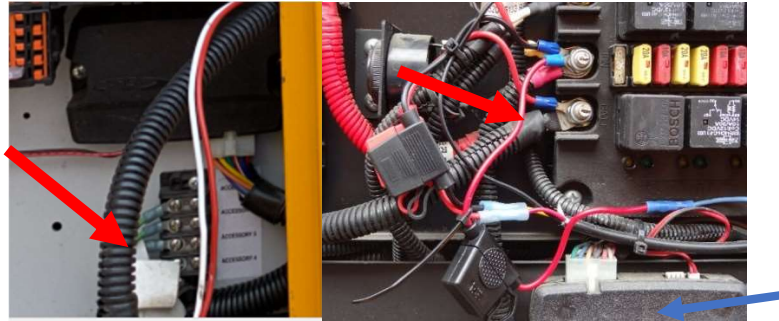


## Power source - All

Note: All power lines will run through the old box and into the loom provided into the new box.

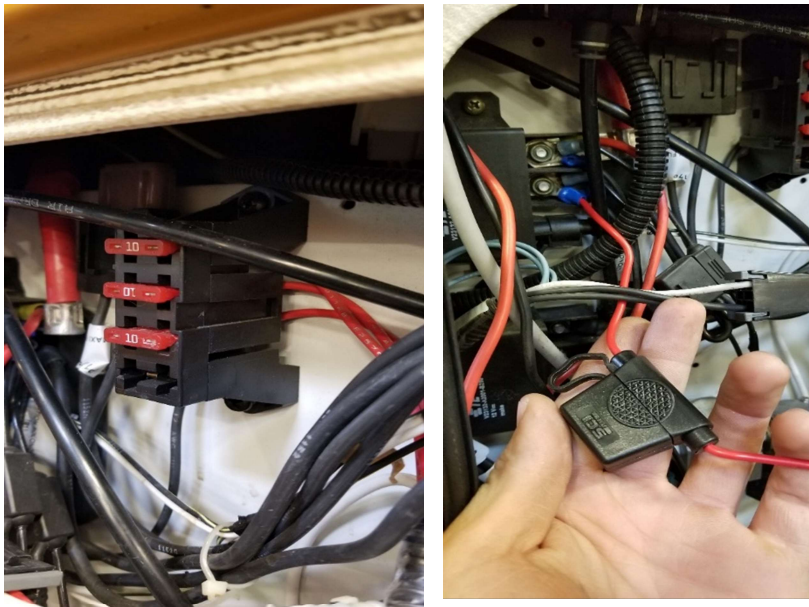
## IC Power

- The Extended Stop Arm requires a 12-Volt power source. This can be found in the electrical panel in an IC.
- On the IC equipped with an electric arm, run the power wire through the same hole that the Specialty light wires are located. This will typically require using a stiff wire to help fish the power wire through the siding and behind the rib of the bus.
- Preferred Solution: Connect the wire to an accessory block with a 15-amp inline fuse
- If the block is not present or functioning, connect to the solenoid and use an in-line 15-amp fuse.



### Blue Bird Power

- The Extended Stop Arm requires a 12-Volt power source. This can be found in the panel box in Bluebirds.
- On a **Bluebird**, run the power wire through the same hole that the Specialty light wires are located.
- Connect the wire to an accessory block **THAT IS CONTROLLED BY THE IGNITION SWITCH** and insert a 15-amp fuse
- If the accessory fuse block is not present or functioning, connect to the main power and use an in-line 15-amp fuse.
- Run the power wire all the way into the control box with the Bus Safety Air Solenoid. Connect the black power line to the 12-Volt source using a butt connector.

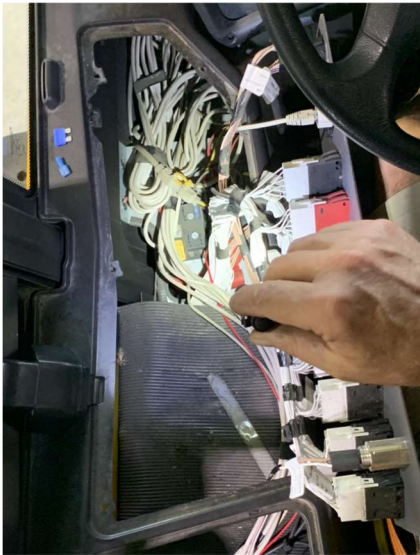


### Thomas Only

- The Extended Stop Arm requires a 12-Volt power source. This can be found underneath the left console switch panel.



- Open the left driver side console: Note the location and use empty space and connect purple wire direct instead of fusible link if able with female connector and 15-amp ATC fuse.



- The Purple wire is our preferred Power (Accessory) wire with 15amp in-line fuse or with 15-amp fuse in accessory block wire is attached. Locate an accessory connection if not able to use block.

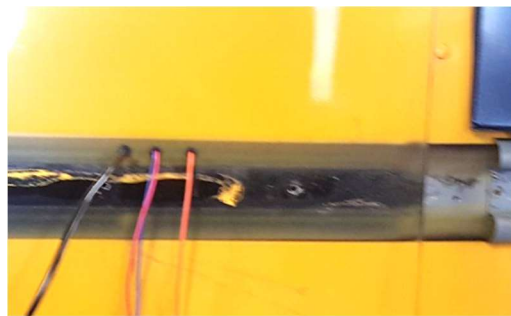


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*Thomas Only: Removing rub rail and drilling holes:*

- Remove the horizontal rib underneath the driver window. Carefully drill two or three 5/16" holes into the wiring compartment under the switch panel.
  - 3 holes is using air
    - Power
    - Stop Switch
    - Air – source from main line with full pressure

- Determine number of holes based on wire type. Run one 8-ft length of purple 16 gauge 6' length and a Red and black Paired 18–22-gauge wire or (hereafter referred to as “exterior wires”) into the bus compartment. Supplied as a pair in clear plastic tubing. Drill hole large enough for tubing to go through both wall.



**Note:**

- Red and Black are simply sign signal wire and low amperage. They can be smaller single pair wire to simplify installation like the switch wires on the provided switch. 18–22-gauge pair in insulation.
- Connect the purple accessory wire to the accessory block and run through the bus wall
- Be sure to protect the wires from rubbing the metal hole with gromets or other tubing large enough for wires and flexible enough to bend. We use rainbird tubing. Some is included in Thomas kit.
- Do not cut the exterior wiring replace rib until the hinge frame and control box are mounted.
- Inside the bus, remove the switch panel next to the driver’s seat and steering wheel.
- Run the red pair through the old electrical box and into the wire loom into the new box.
- Be sure when you install the box and loom to secure the loom to the old electrical

**Run External Wiring and Replace Side Rib**

- Cut a length of wire mold almost long enough to reach the next section of bus rib, run Both wires through it, and affix it to the side of the bus.



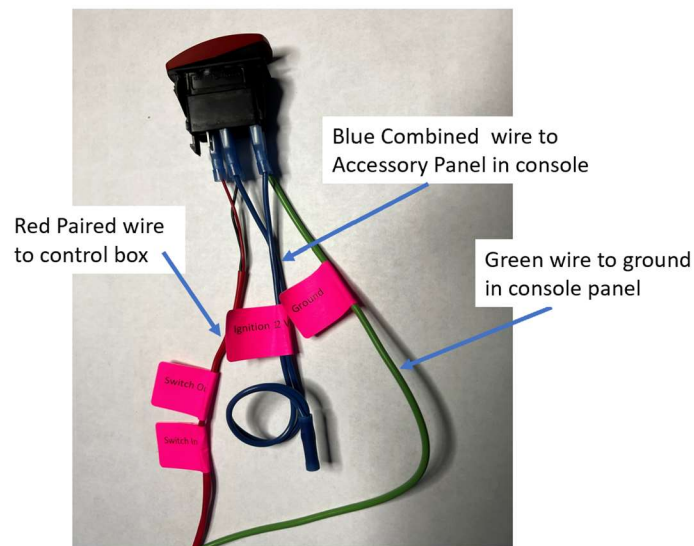
- Place a piece of ¼" flexible tubing (resembles airline) over the yellow wire and run it up inside the stop arm box.



### Install ON/OFF Switch - All

- Locate an empty switch slot and pop out the plastic cover.
- Insert new switch
- Review the following diagram:

Electric Stop Switch wire connectors

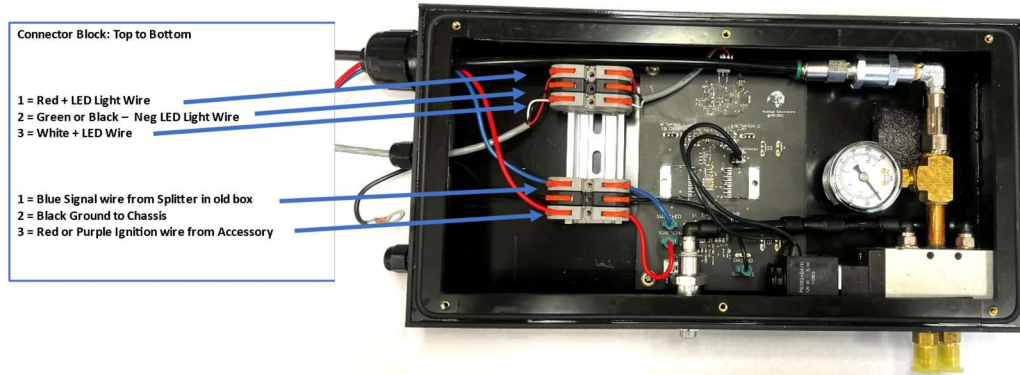


- Using butt connectors, connect exterior wire to the red wire pair and run pair to our control box outside of bus.
- Run Red wire through the top panel to the electrical wiring compartment for IC
- For Thomas Wire is already ready run using Thomas power process above.
- Find a solid ground for the green ground wire.
- Connect the combined blue wire pair from the switch to a 12V power source accessory block. These wires power the Red and Green Lamps in the Switch and are low power so a 2–5-amp fuse is sufficient. If you have no more available slots you could combine with the 12-volt power source with the purple wire.
- replace the panel.

## Control Box Install and Wiring: - All

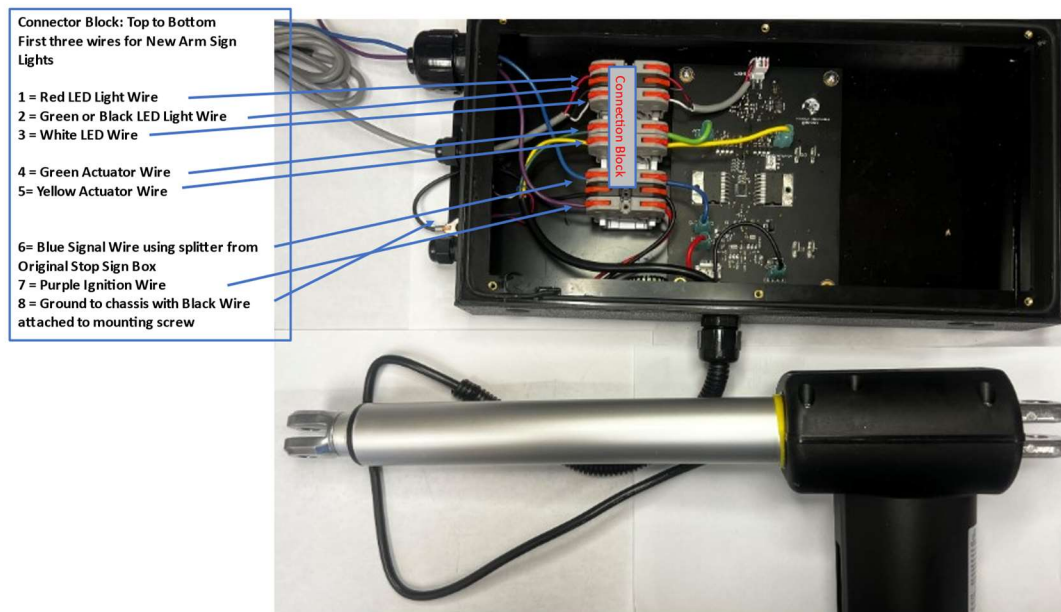
- Important to understand the wiring at this point.

## New Control Box with Air Driver Select



## Typical for Blue bird:

## Drive Select option / Electric Actuator



**Especially important:** When wiring using these terminal wires, they need to be **stripped ¾" long** and with orange tab lifted insert wires all the way in and then push orange lever back down to lock in wire.

**If Electric and using Heater:**

- Red and Blue wire got to main power on the connector block not the control board.
- Black and White go to ground. This should be on the Connection Block ground connector with main ground wire attached also.
- Do Not Screw on the cover plate until all testing is done later.

### Run Electrical Connections - All

- Finish running purple wire into control box
  - Make sure the wire is long enough to go through the old box and into watertight loom of control box. Run tubing in a fair distance and run purple wire into box.
- Connect Power "Purple lead" to connection block
- In Old Box connect provided splitter to blue signal wire and one end of the splitter will go to the stop switch wire. The other splitter connection connects to original point of connection.
- Other wire from the stop switch will run through the old box to the loom and into our box and then connect to the Switch connector See Wiring Diagram

Note: Leave the cover off the new box till testing is complete.

When done you will use supplied stainless steel screws and snug them down when closing

### Connect Actuators – All

We support two types of actuators

- Air (pneumatic)
- Electric in two options
  - Standard
  - Heated for Cold Weather: 0 and below

Note: The control box comes set up for the specific option.

### Attach Air Actuator – air model only

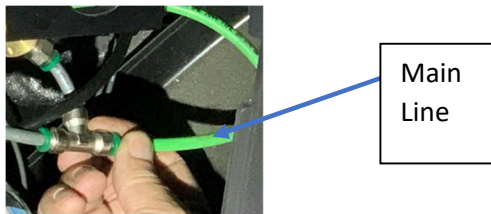
- Mount tail piece of Air actuator to the right-side mount on the horizontal support bar, using a nylon washer and 7/16" bolt and nut. The washer should rest between the top tab of the tail piece and the top side of the mount. Do not tighten bolts till complete and ready to wrap up job.
- If kit uses clevis pin and cotter key be sure to use them and set cotter pin by bending end to each side to lock it in.



- Connect the airline to the box – Right connection goes to front of actuator
- After you start bus check air pressure to ensure it will be between 100 – 120 PSI.
- Left port on box goes to rear connector on air cylinder. Looking at cylinder it will be on the right side per arrow.

#### Thomas Air

- Locate the air supply line—the sample shot: green hose—located on most Thomas C2s in the lower access panel left of driver.
- Connect before the tee to ensure main pressure.
- Note: Air should be on the high-pressure side 100-120 PSI. Not after the regulator valves.
- Trim off ½” of the line for clean fit when reconnected.
- Run this line to the new control box through the front of the Old Box or through the original holes if you can reach it.



#### IC AIR

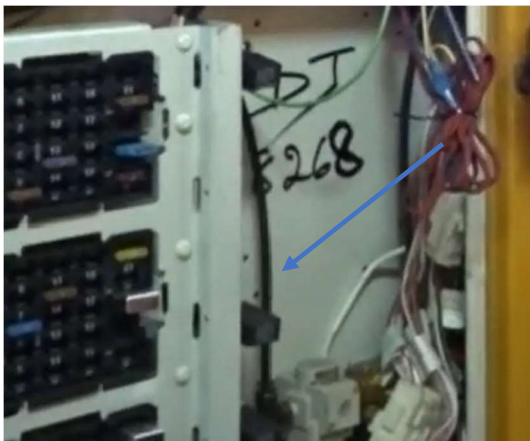
Connect to main airline from regulator and connect a new line to our control box which will be install further down.





#### *Blue Bird Air*

- Locate the input air line, connect a Tee connector and run the line straight out to the solenoid in the box.



#### Attach Electric Actuator - All with Electric

- Mount tail piece of Electric actuator to the right-side mount on the horizontal support bar, using a nylon washer and 7/16" bolt and nut. The washer should rest between the top tab of the tail piece and the top side of the mount. Do not tighten bolts till complete and ready to wrap up job.

- Kit uses clevis pin and cotter key be sure to use them and set cotter pin by bending end to each side to lock it in.
- Measure the length of loom needed for a loose fit for the external wire and cut to proper length. Wire nut on enclosure will lock down on loom.
- Insert cable through bottom middle connector by loosening the gland nut and sliding in. follow wiring diagram on connecting yellow and green wires, if with heated actuator option wiring will be paired together with Red and Blue together and Black and white together. They will connect in the connection block, Red/Blue with purple wire and Black/White with Ground.
- Don't forget the cotter pin when you are done. We do not lock in till we are sure of completed project.



#### Install Frame & Sign - All

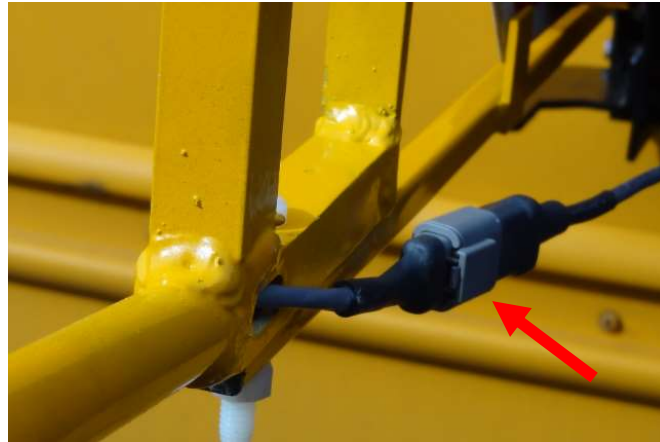
- Attach steel frame to the vertical frame using three 3/8" nylon insert nuts found on hinge plate.
- Tighten with 9/16" nut driver.
- Attach Extended Stop Arm to steel frame.
- Align using steel 1/4" round studs, once aligned, hold with vice grip, or an additional set of hands.



- Secure using two 5/16" nylon bolts and 2 nylon nuts.



- Tighten nylon nuts to snug with a wrench. Do not overtighten.
- Connect electrical harness to extended stop arm using harsh environment ATM connector



- Attach electrical harness to bottom of steel frame using 3 yellow zip ties.



### Install Bumper

- Position rubber bumper vertically at the point of the bar connecting sign to frame.



- Attach with 2 self-tap screws, one on either side of bumper.



- Adjust sign by bending it slightly away from bus to ensure lights do not hit the bus when closing.

### Button Up

- Close up stop arm box using original screws. Ensure yellow switch wire is secure.
- Cover exposed wiring from plastic box conduit to bus rib using wire loom.
- Place cover (bolts included) on plastic control box.
- Secure actuator nose piece to hinge using 7/16" clevis pin and 1/8" x 3/4" cotter key.
- Adjust actuator nose piece/cylinder to ensure reasonably tight fit against bumper, then tighten 7/16" bolt and nut.
- Run through installation checklist to ensure that all items are complete.
- Ensure that bus driver is aware and trained on using their new Extended Stop Arm.

**From your Friends at Bus Safety Solutions**

*Please Call* **336-671-0838**

**if you have any problems with the installation**

