



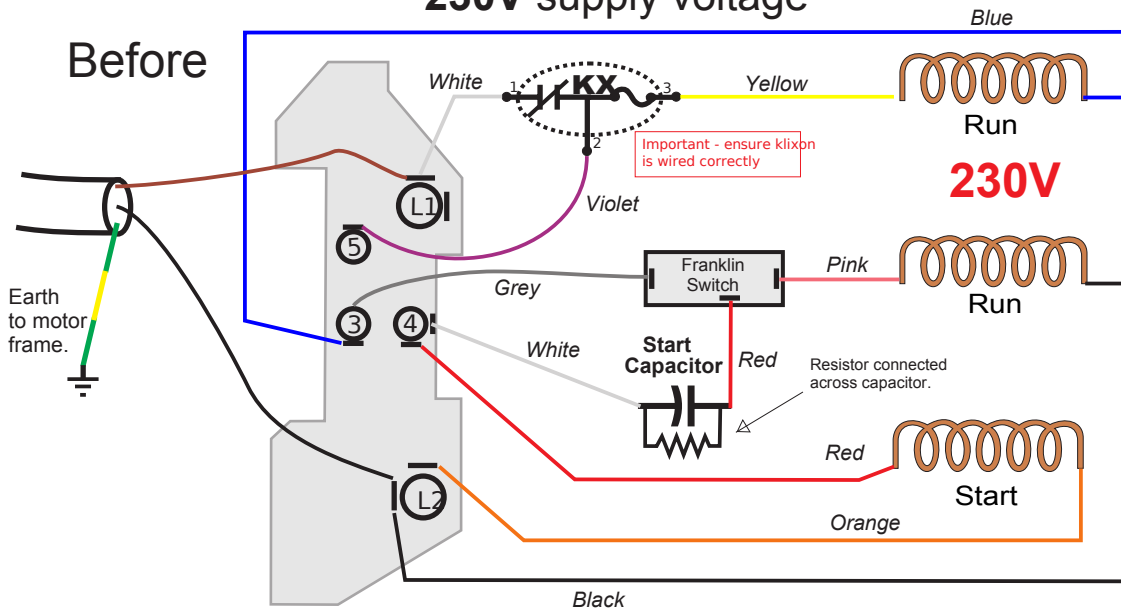
# Solid State Start Switch

## SS110BE (BACKEND)

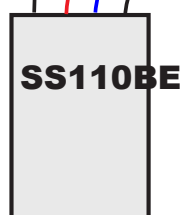
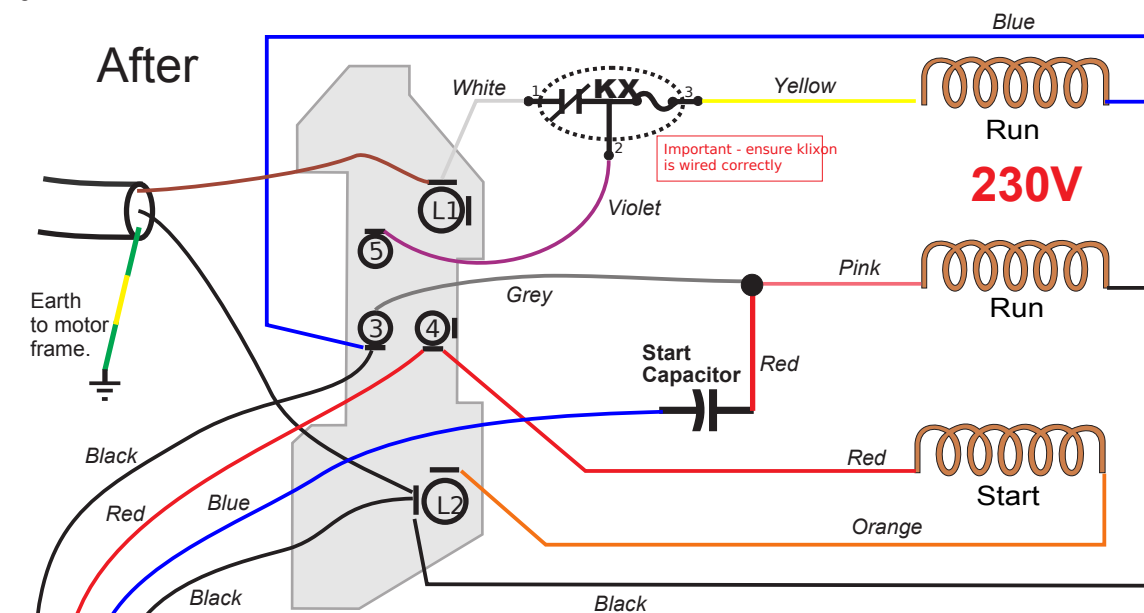
### Franklin Back-end Motors AMF 82-90

#### Dual Voltage 115/230V motor

#### 230V supply voltage



Note: The terminal positions may vary from that shown on AMF diagrams. These drawing are based on an actual motor from an 82-90XL

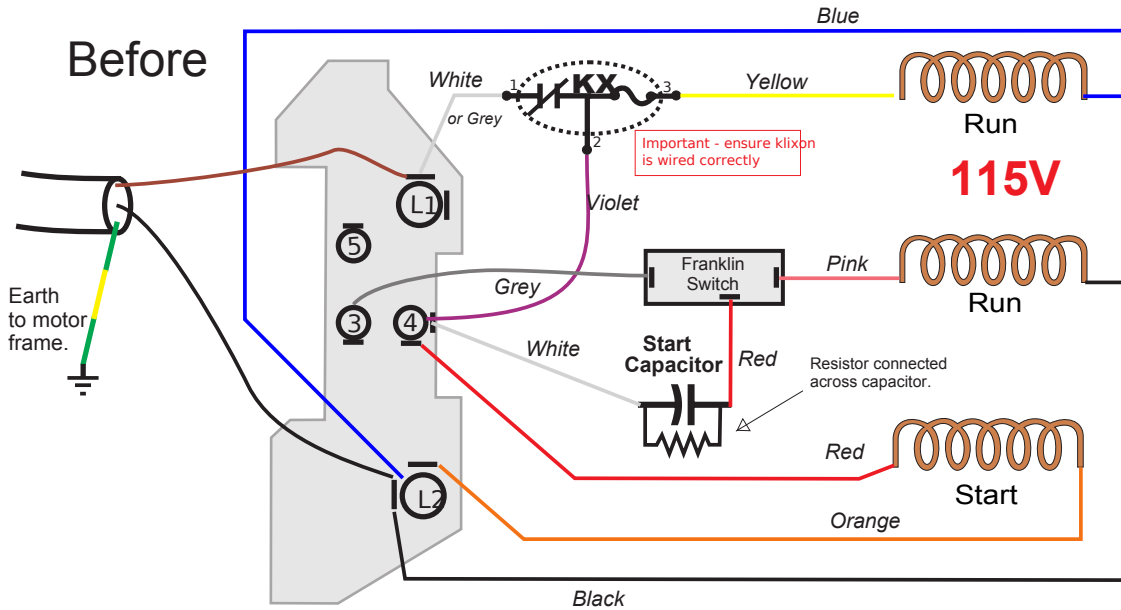


- Remove resistor from capacitor.
- Remove Franklin switch.
- Join the grey, pink & red wires together using a BP connector or "wire nut".
- Remove white wire from terminal 4 and capacitor.
- Blue wire from *tenpintec* switch goes to capacitor (Where white wire was removed from).
- Red wire from *tenpintec* switch goes to terminal 4.
- One black wire from *tenpintec* switch goes to terminal L2.
- The remaining black wire from the *tenpintec* switch goes to terminal 3.

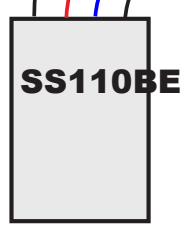
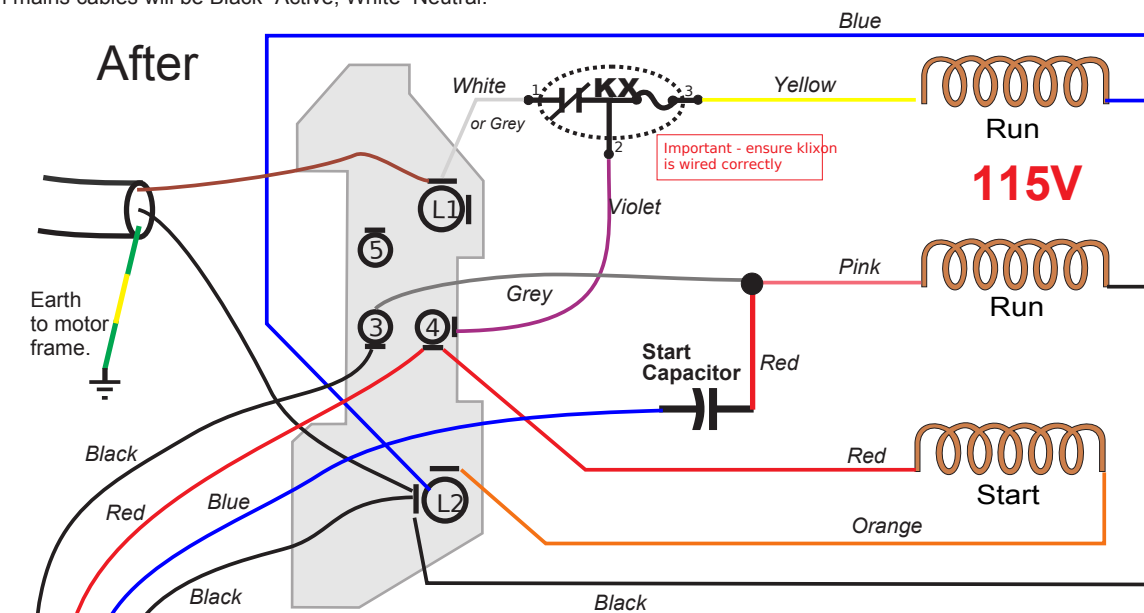
As noted in the motor manual..... To convert to 115V operation, move the blue wire from terminal 3 to L2 and the violet wire from terminal 5 to terminal 3. Start switch wiring remains the same.

# Solid State Start Switch SS110BE (BACKEND)

Connection diagram for AMF Franklin and Blufton (82-90) dual voltage  
Back-End motors and Ball Return motors  
Supply Voltage 115V



Note: The terminal positions may vary from that shown on AMF diagrams. White wire from L1 to Klixon may be Grey. These drawing are based on an actual motor from an 82-90XL American mains cables will be Black=Active, White=Neutral.

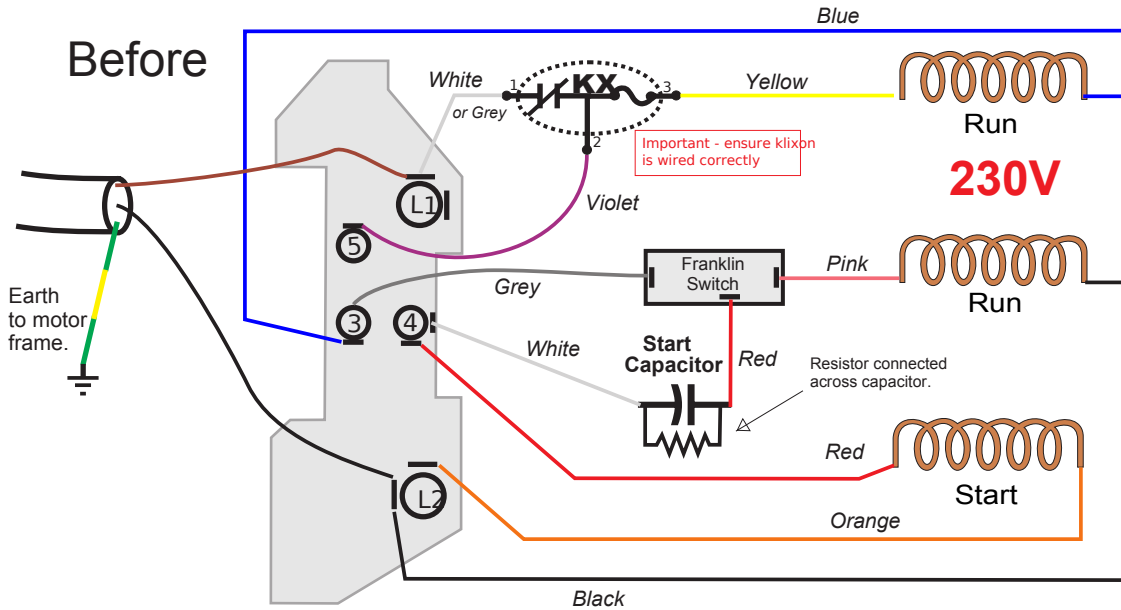


- Remove resistor from capacitor.
- Remove Franklin switch.
- Join the grey, pink & red wires together using a BP connector or "wire nut".
- Remove white wire from terminal 4 and capacitor.
- Blue wire from *tenpintec* switch goes to capacitor (Where white wire was removed).
- Red wire from *tenpintec* switch goes to terminal 4.
- One black wire from *tenpintec* switch goes to terminal L2.
- The remaining black wire from the *tenpintec* switch goes to terminal 3.

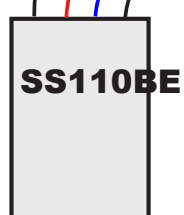
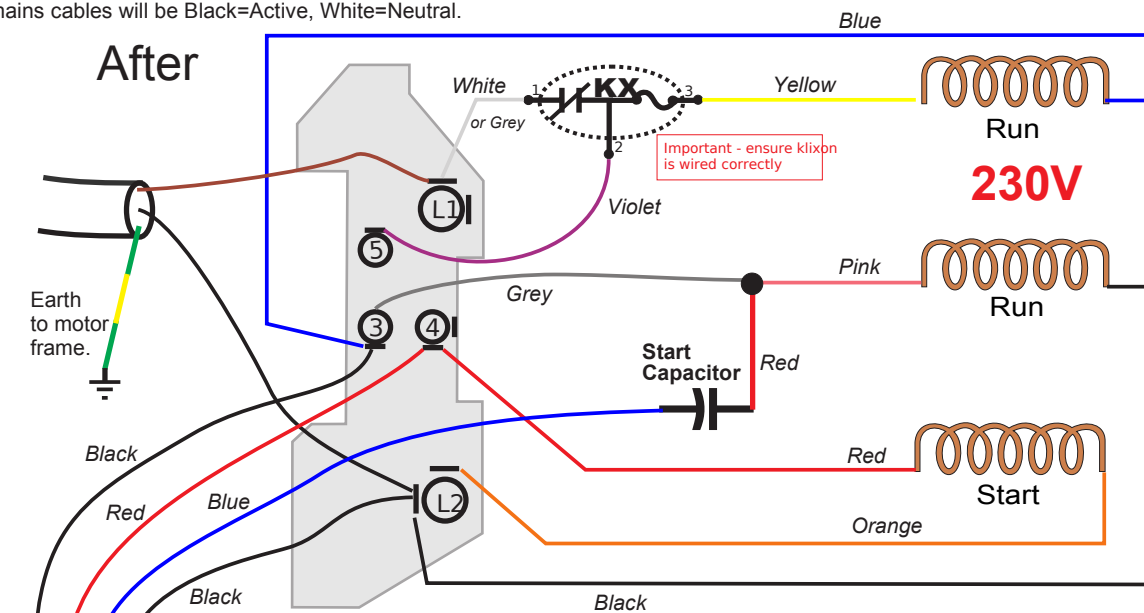
As noted in the motor manual.... To convert to 115V operation, move the blue wire from terminal 3 to L2 and the violet wire from terminal 5 to terminal 3. Start switch wiring remains the same. To reverse direction, swap Red & Orange wires. Ball return motors already have Red & Orange swapped.

# Solid State Start Switch SS110BE (BACKEND)

Connection diagram for AMF Franklin/Bluffton (82-90) dual voltage  
Back-End motors and ball return motors  
Supply Voltage 230V



Note: The terminal positions may vary from that shown on AMF diagrams. White wire from L1 to Klaxon may be Grey. These drawings are based on an actual motor from an 82-90XL. American mains cables will be Black=Active, White=Neutral.



- Remove resistor from capacitor (if fitted).
- Remove Franklin/Bluffton switch.
- Join the grey, pink & red wires together using a BP connector or "wire nut".
- Remove white wire from terminal 4 and capacitor.
- Blue wire from *tenpintec* switch goes to capacitor (Where white wire was removed).
- Red wire from *tenpintec* switch goes to terminal 4.
- One black wire from *tenpintec* switch goes to terminal L2.
- The remaining black wire from the *tenpintec* switch goes to terminal 3.

As noted in the motor manual.....  
To convert to 115V operation, move the blue wire from terminal 3 to L2 and the violet wire from terminal 5 to terminal 3. Start switch wiring remains the same. To reverse direction, swap Red & Orange wires. Ball return motors already have Red & Orange swapped.

# Solid State Start Switch

## SS110BE (BACKEND)

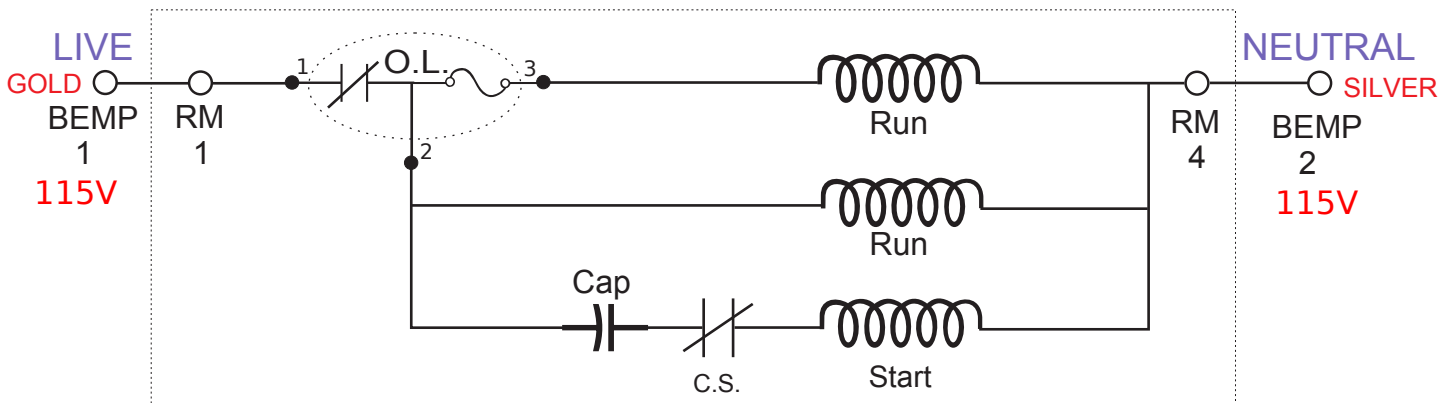
**General Electric Back-end Motors AMF 82-30 and 82-70**

**Westinghouse Back-end Motors AMF 82-30 and 82-70**

**Franklin, Smith etc Back-end and Ball Return Motors**

Dual Voltage 115/230V motor  
**115V** supply voltage

### Before

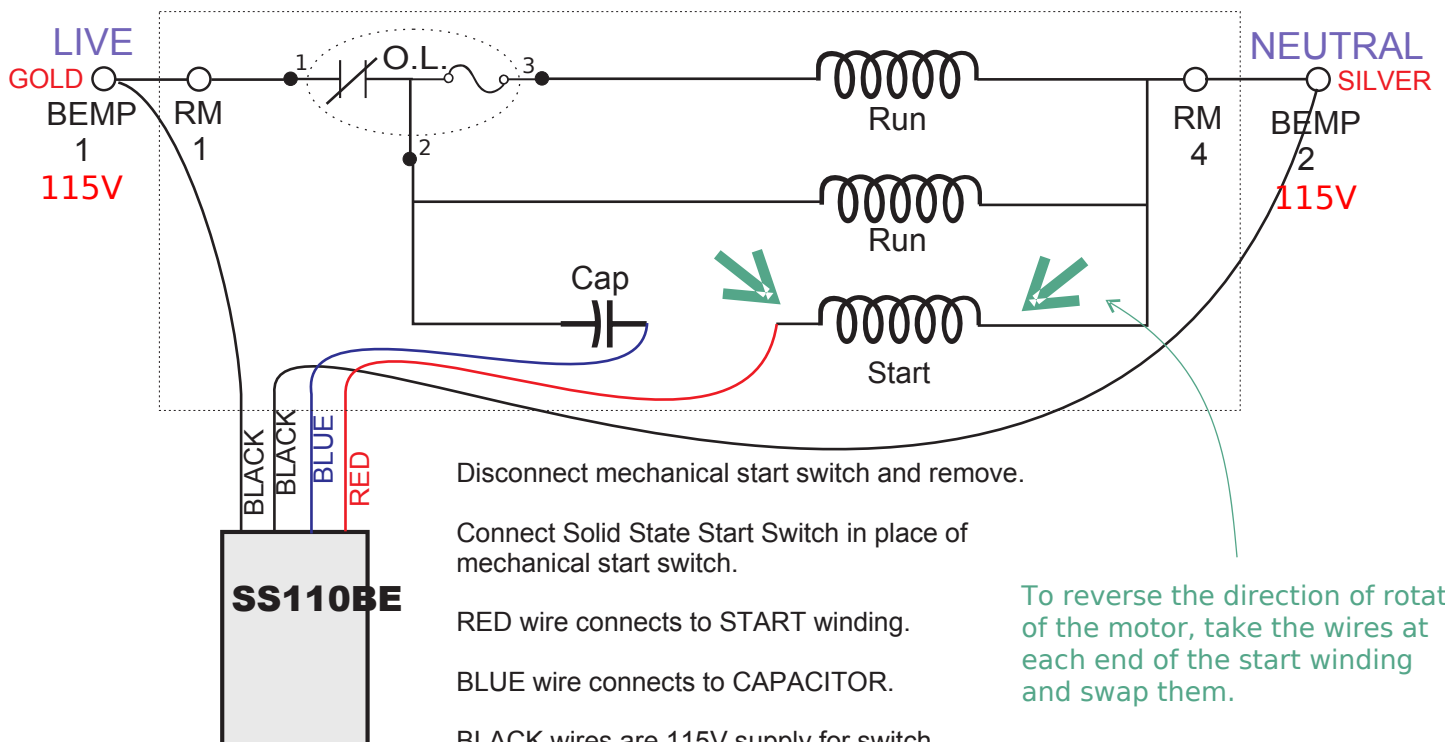


The RED and BLUE wires of the Solid State Start Switch take the place of the mechanical start switch.

The two BLACK wires supply 115V to power the switch.

The Solid State Start Switch senses the load on the motor by constantly measuring the current draw in order to determine when and for how long the START windings are required to be in-circuit.

### After



Disconnect mechanical start switch and remove.

Connect Solid State Start Switch in place of mechanical start switch.

RED wire connects to START winding.

BLUE wire connects to CAPACITOR.

BLACK wires are 115V supply for switch.

The Solid State Start Switch will not work if the RED and BLUE wires are reversed.

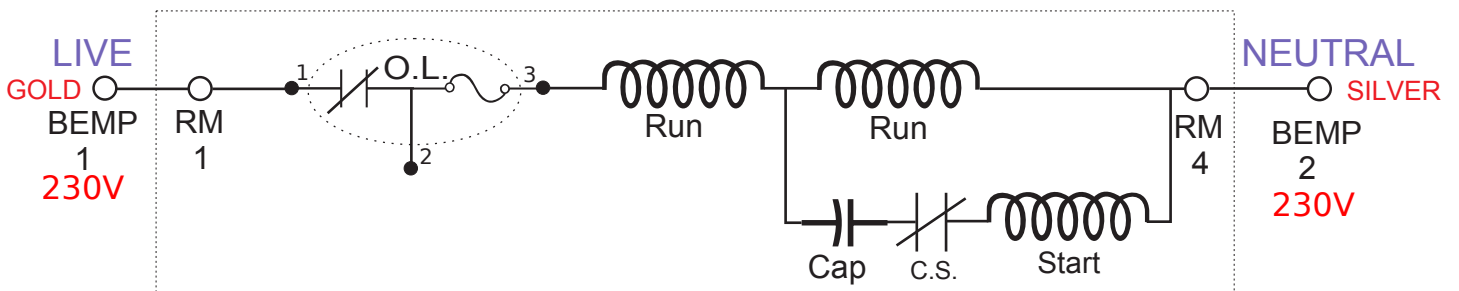
To reverse the direction of rotation of the motor, take the wires at each end of the start winding and swap them.

# Solid State Start Switch

## SS110BE (BACKEND)

**General Electric Back-end Motors AMF 82-30 and 82-70**  
**Westinghouse Back-end Motors AMF 82-30 and 82-70**  
**Franklin, Smith etc Back-end and Ball Return Motors**  
 Dual Voltage 115/230V motor  
**230V supply voltage**

### Before

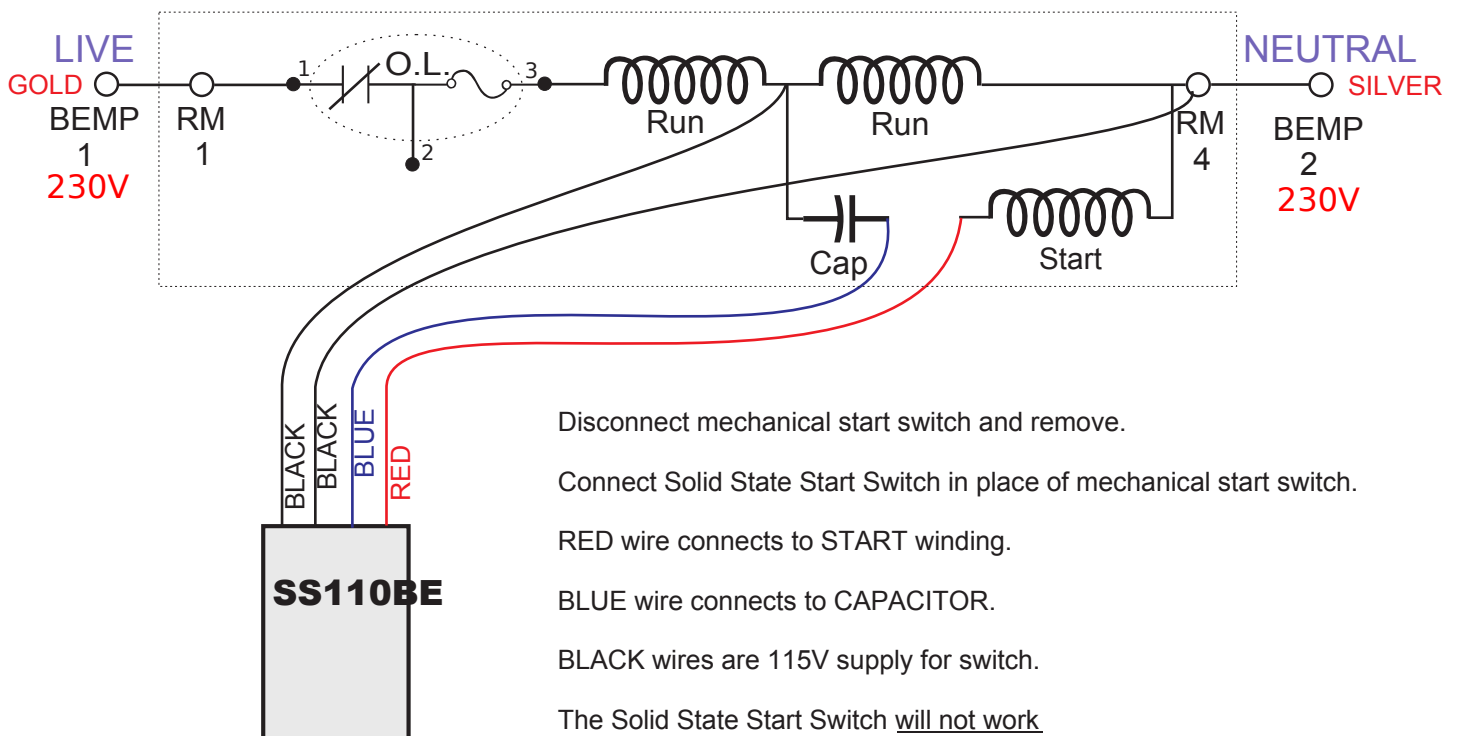


The RED and BLUE wires of the Solid State Start Switch take the place of the mechanical start switch.

The two BLACK wires supply 115V to power the switch.

The Solid State Start Switch senses the load on the motor by constantly measuring the current draw in order to determine when and for how long the START windings are required to be in-circuit.

### After



Disconnect mechanical start switch and remove.

Connect Solid State Start Switch in place of mechanical start switch.

RED wire connects to START winding.

BLUE wire connects to CAPACITOR.

BLACK wires are 115V supply for switch.

The Solid State Start Switch will not work if the RED and BLUE wires are reversed.

# Solid State Start Switch

## SS110BE (BACKEND)

**General Electric Back-end Motors AMF 82-30 and 82-70**

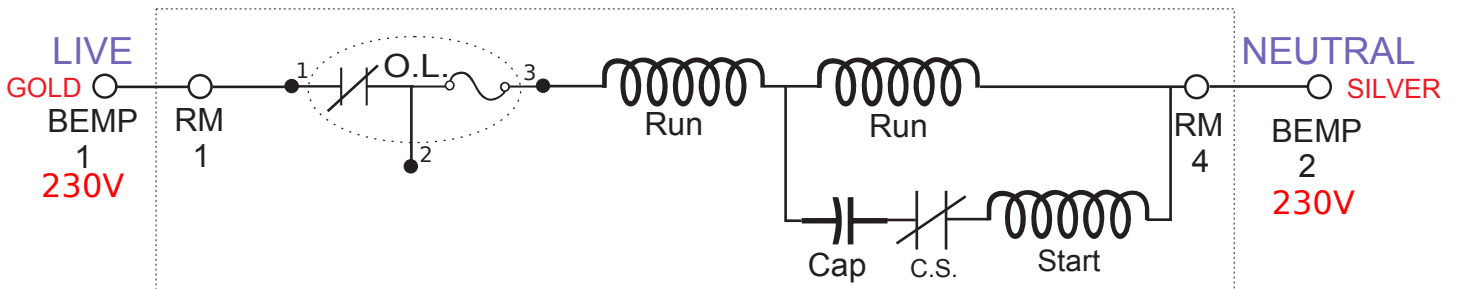
**Westinghouse Back-end Motors AMF 82-30 and 82-70**

**Franklin, Smith etc Back-end and Ball Return Motors**

Dual Voltage 115/230V motor

**230V** supply voltage

### Before

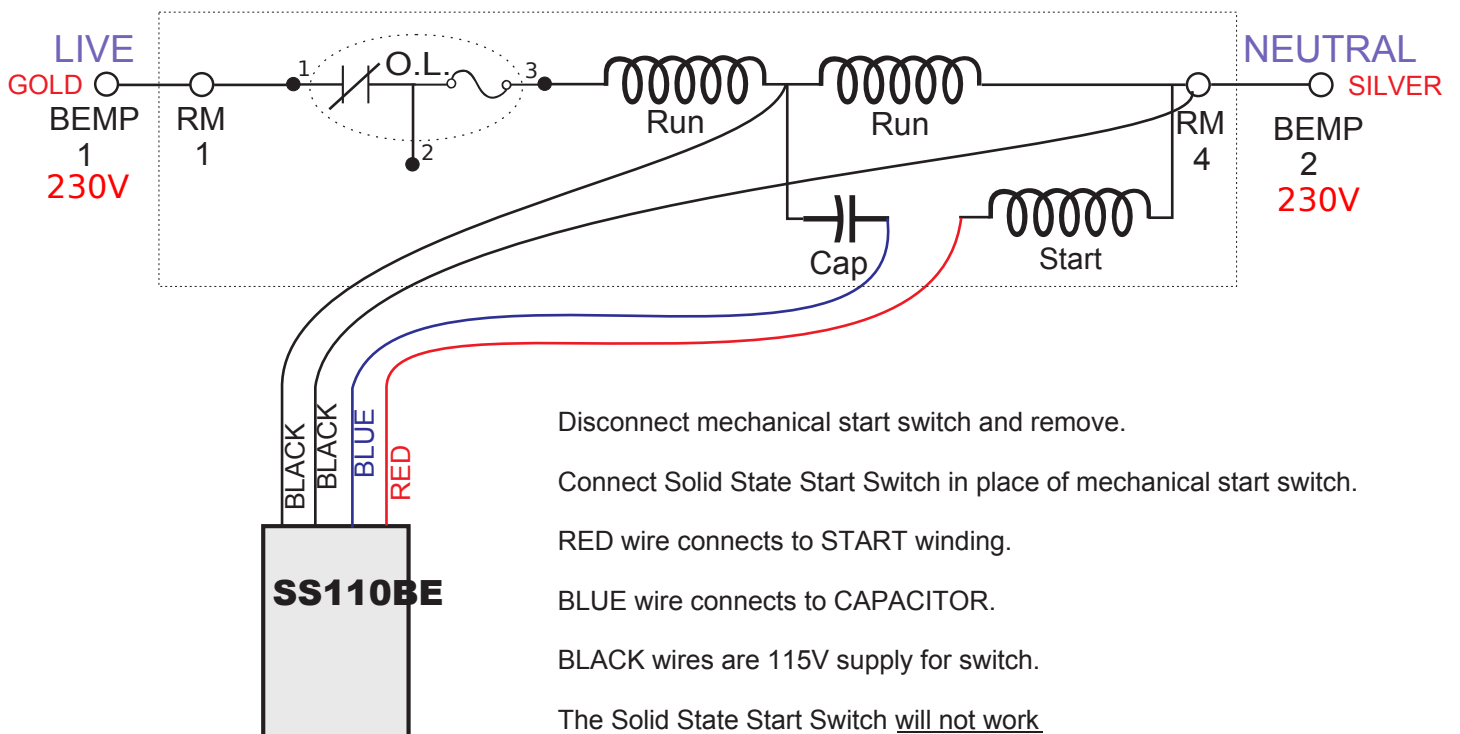


The RED and BLUE wires of the Solid State Start Switch take the place of the mechanical start switch.

The two BLACK wires supply 115V to power the switch.

The Solid State Start Switch senses the load on the motor by constantly measuring the current draw in order to determine when and for how long the START windings are required to be in-circuit.

### After



Disconnect mechanical start switch and remove.

Connect Solid State Start Switch in place of mechanical start switch.

RED wire connects to START winding.

BLUE wire connects to CAPACITOR.

BLACK wires are 115V supply for switch.

The Solid State Start Switch will not work if the RED and BLUE wires are reversed.

# Solid State Start Switch

## SS110BE (BACKEND)

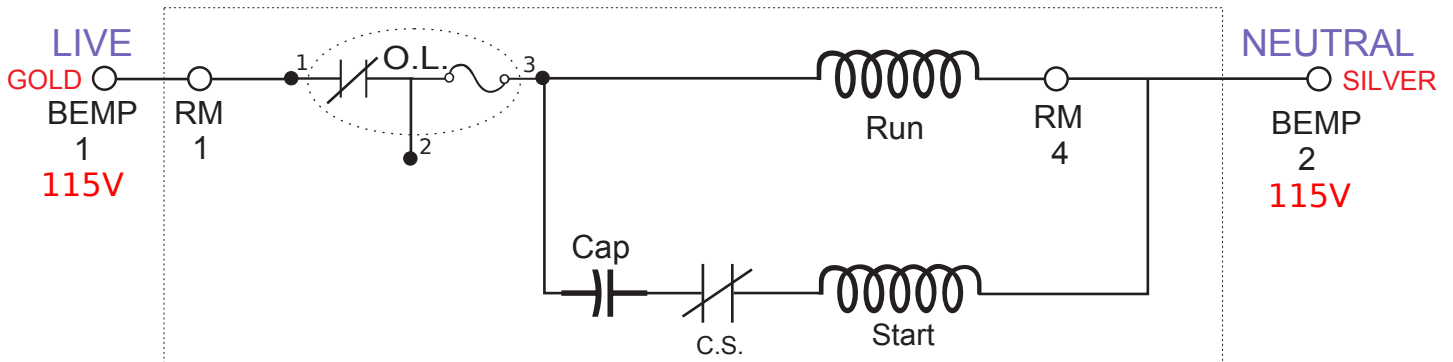
**General Electric Back-end Motors AMF 82-30 and 82-70**

**Westinghouse Back-end Motors AMF 82-30 and 82-70**

**Franklin, Smith etc Back-end and Ball Return Motors**

Single Voltage **115V** motor

### Before

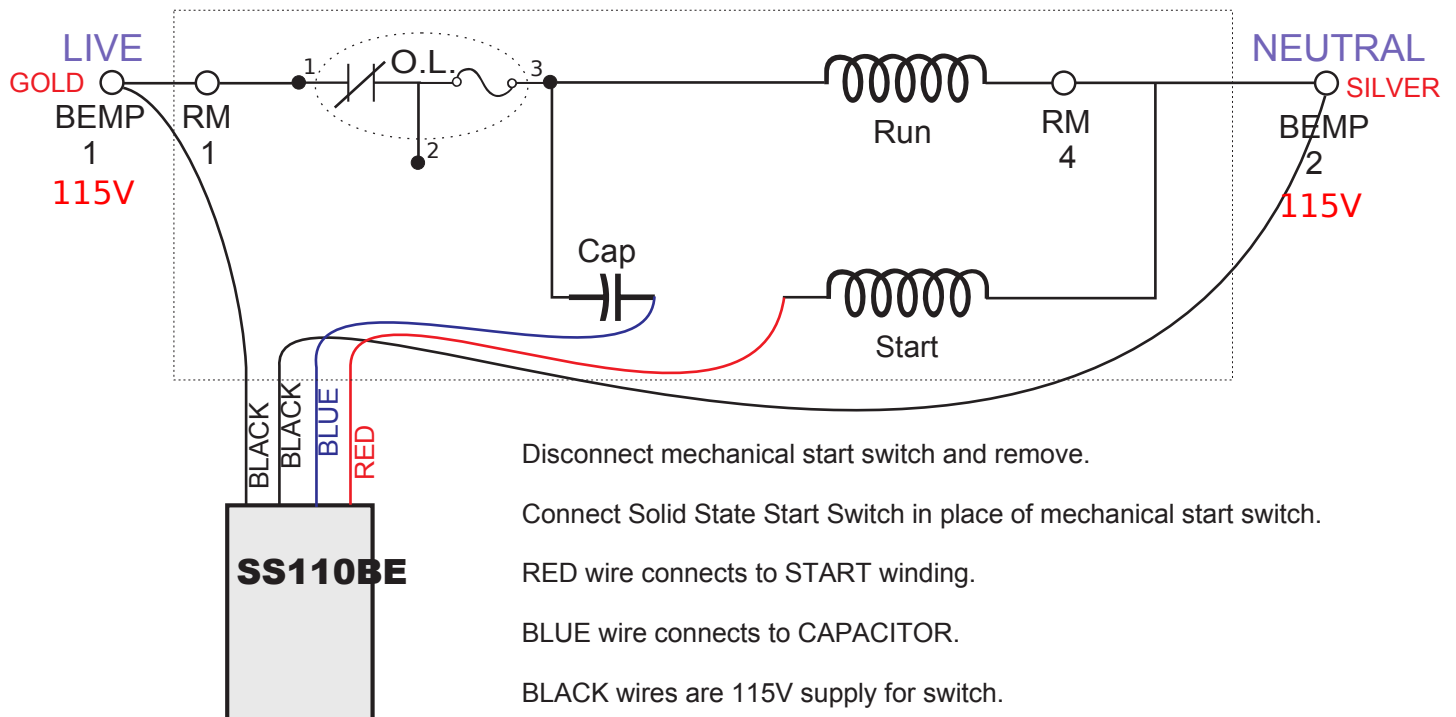


The RED and BLUE wires of the Solid State Start Switch take the place of the mechanical start switch.

The two BLACK wires supply 115V to power the switch.

The Solid State Start Switch senses the load on the motor by constantly measuring the current draw in order to determine when and for how long the START windings are required to be in-circuit.

### After



Disconnect mechanical start switch and remove.

Connect Solid State Start Switch in place of mechanical start switch.

RED wire connects to START winding.

BLUE wire connects to CAPACITOR.

BLACK wires are 115V supply for switch.

The Solid State Start Switch will not work if the RED and BLUE wires are reversed.



# Solid State Start Switch

## SS110BE (BACKEND)

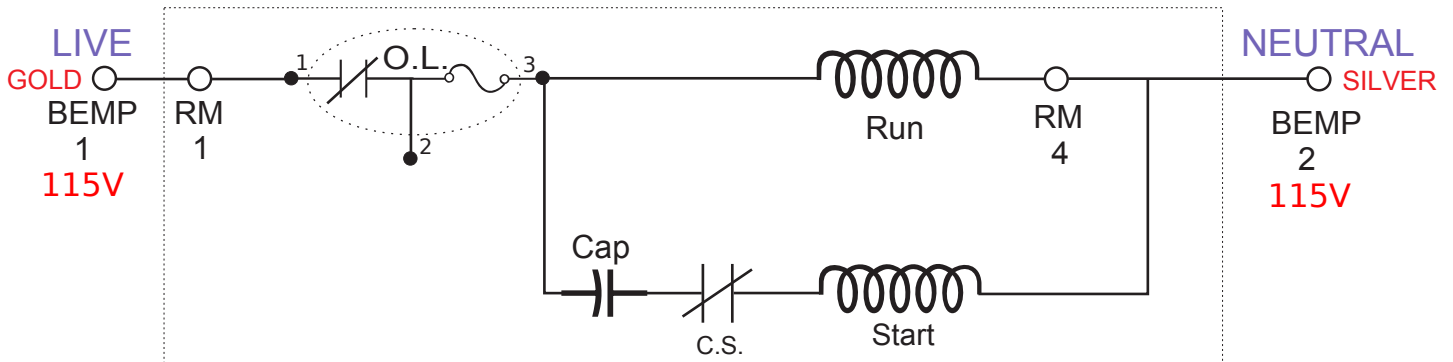
**General Electric Back-end Motors AMF 82-30 and 82-70**

**Westinghouse Back-end Motors AMF 82-30 and 82-70**

**Franklin, Smith etc Back-end and Ball Return Motors**

Single Voltage **115V** motor

### Before

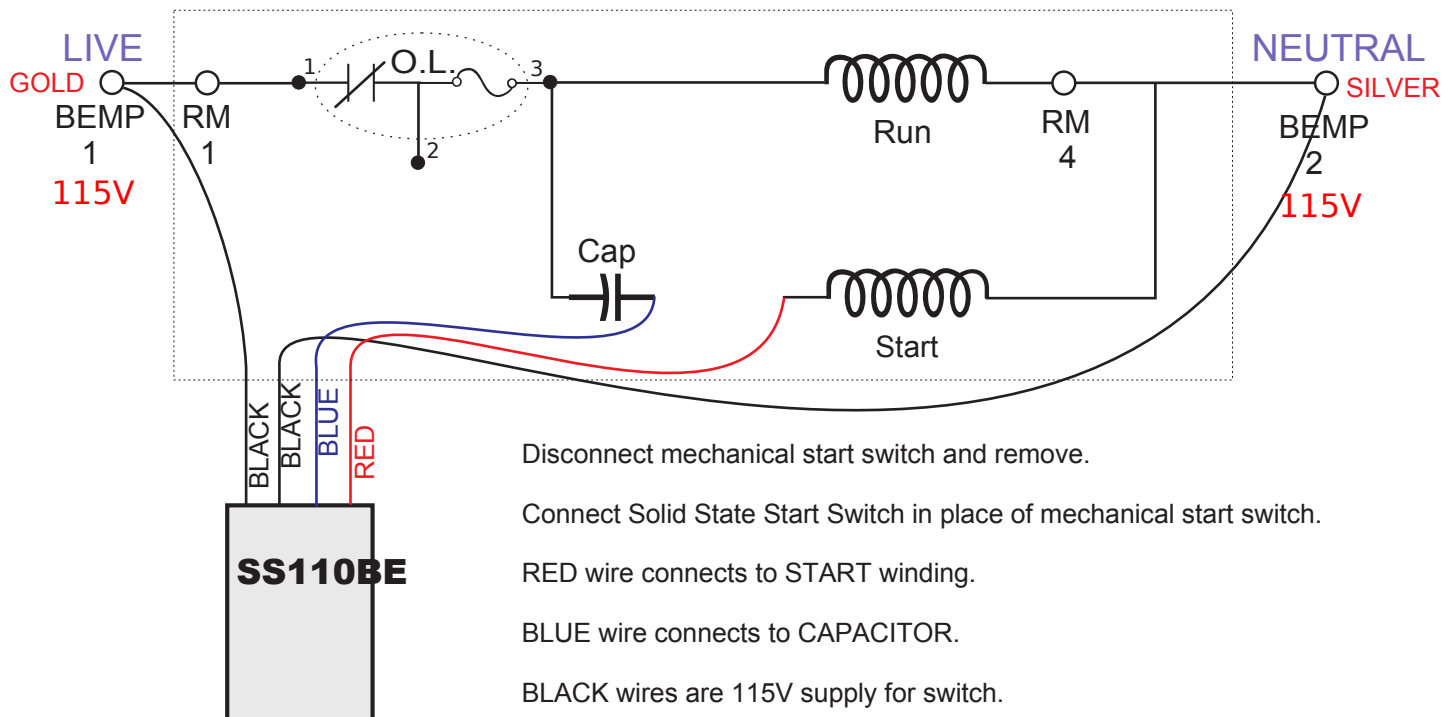


The RED and BLUE wires of the Solid State Start Switch take the place of the mechanical start switch.

The two BLACK wires supply 115V to power the switch.

The Solid State Start Switch senses the load on the motor by constantly measuring the current draw in order to determine when and for how long the START windings are required to be in-circuit.

### After



Disconnect mechanical start switch and remove.

Connect Solid State Start Switch in place of mechanical start switch.

RED wire connects to START winding.

BLUE wire connects to CAPACITOR.

BLACK wires are 115V supply for switch.

The Solid State Start Switch will not work if the RED and BLUE wires are reversed.

# Solid State Start Switch

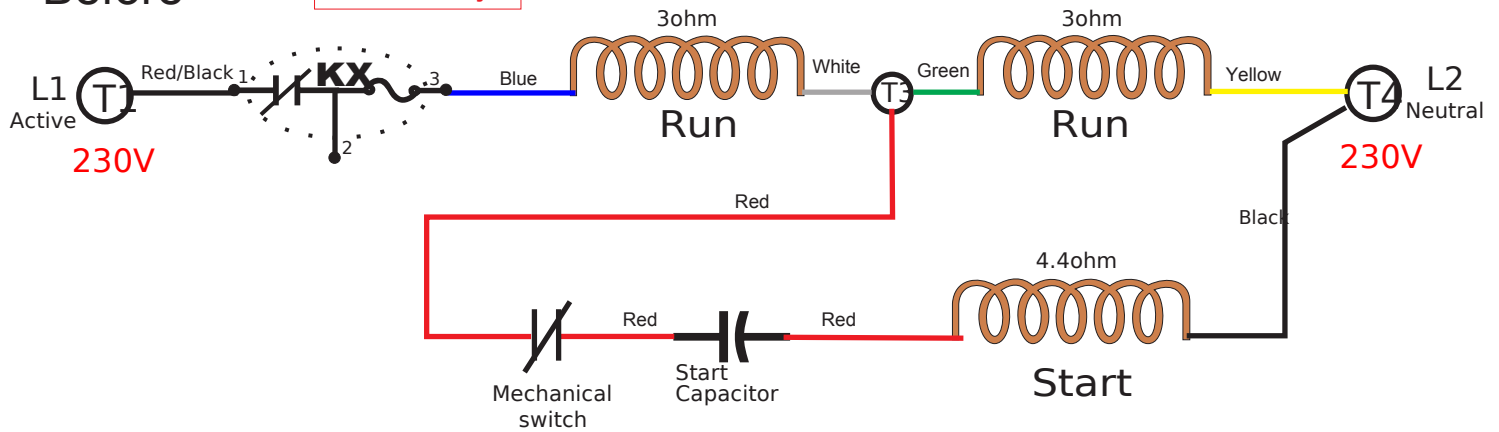
## SS110BE (BACKEND)

### Howell Dual Voltage Brunswick Ball Booster Motors

Dual Voltage 115/230V motor  
**230V supply voltage**

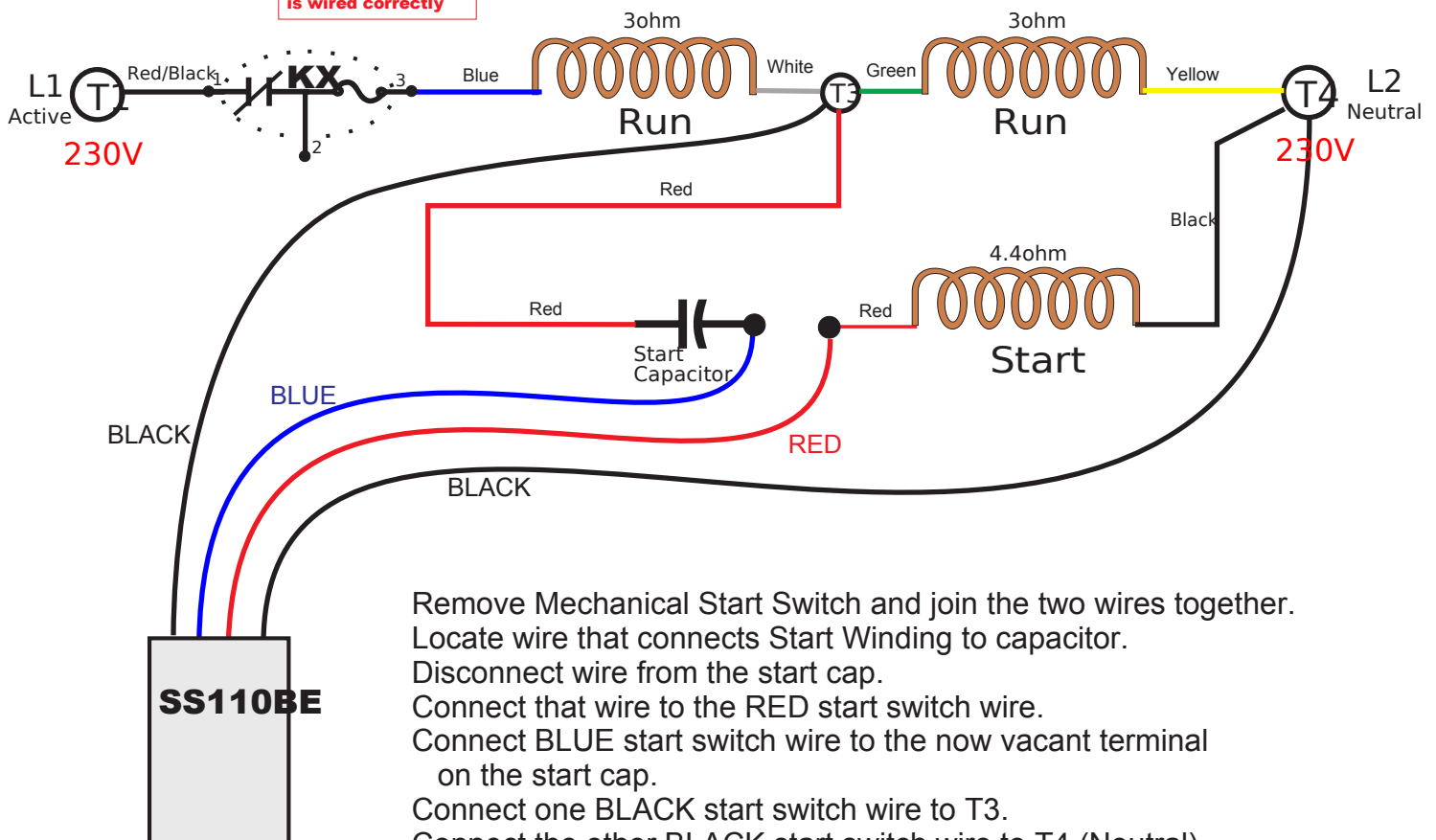
Before

**Important - ensure klaxon is wired correctly**



After

**Important - ensure klaxon is wired correctly**



- Remove Mechanical Start Switch and join the two wires together.
- Locate wire that connects Start Winding to capacitor.
- Disconnect wire from the start cap.
- Connect that wire to the RED start switch wire.
- Connect BLUE start switch wire to the now vacant terminal on the start cap.
- Connect one BLACK start switch wire to T3.
- Connect the other BLACK start switch wire to T4 (Neutral).

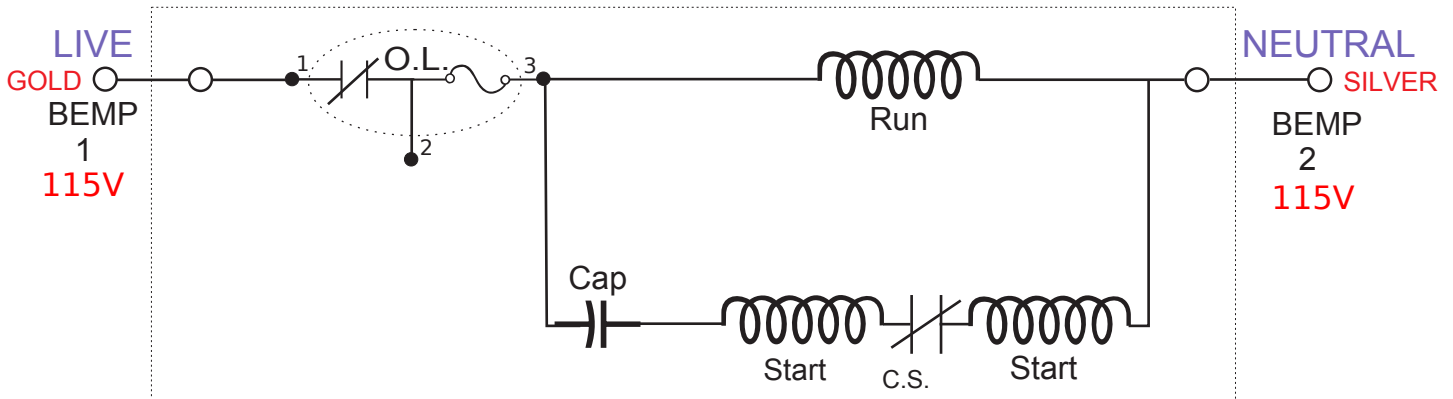
# Solid State Start Switch

## SS110BE (BACKEND)

### National Back-end Motors AMF 82-70

Single Voltage 115V motor  
**115V** supply voltage

#### Before

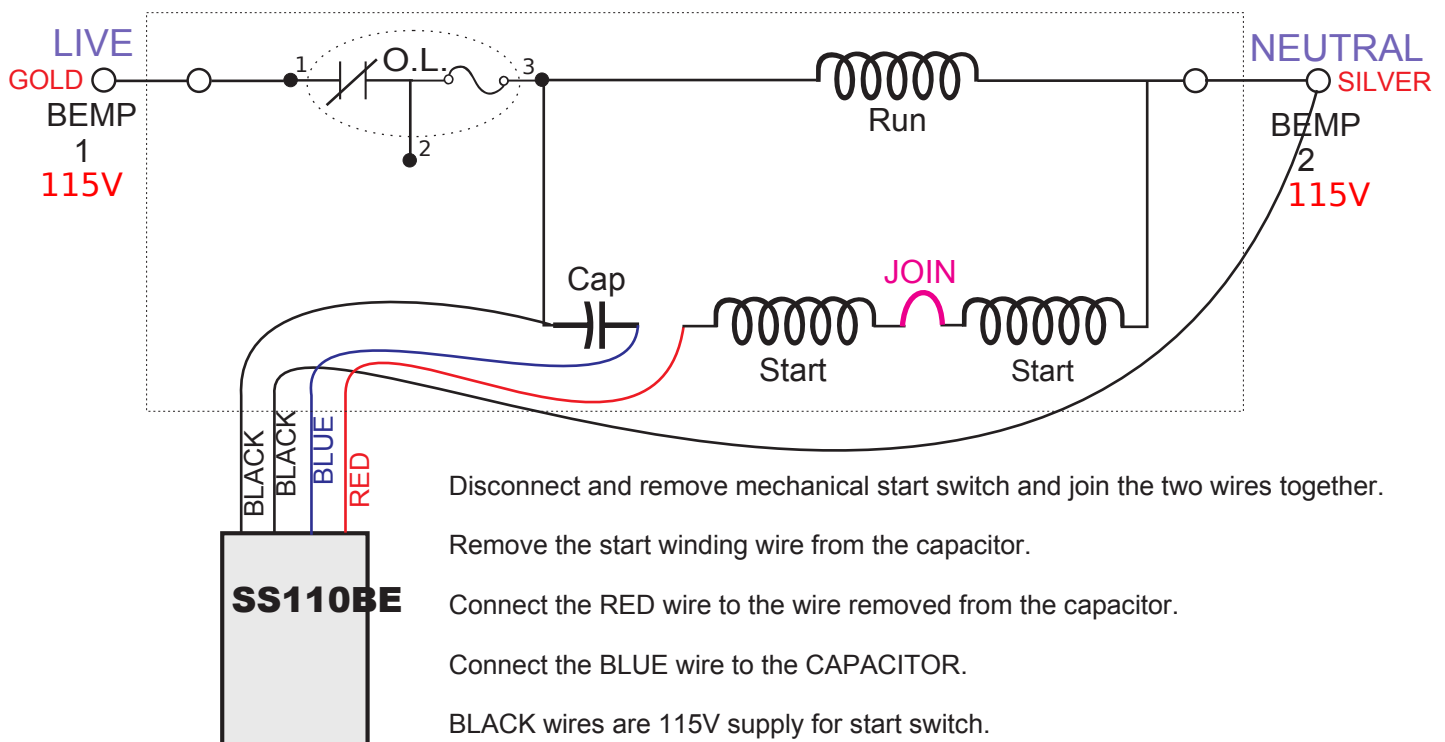


The RED and BLUE wires of the Solid State Start Switch take the place of the mechanical start switch.

The two BLACK wires supply 115V to power the switch.

The Solid State Start Switch senses the load on the motor by constantly measuring the current draw in order to determine when and for how long the START windings are required to be in-circuit.

#### After



Disconnect and remove mechanical start switch and join the two wires together.

Remove the start winding wire from the capacitor.

Connect the RED wire to the wire removed from the capacitor.

Connect the BLUE wire to the CAPACITOR.

BLACK wires are 115V supply for start switch.

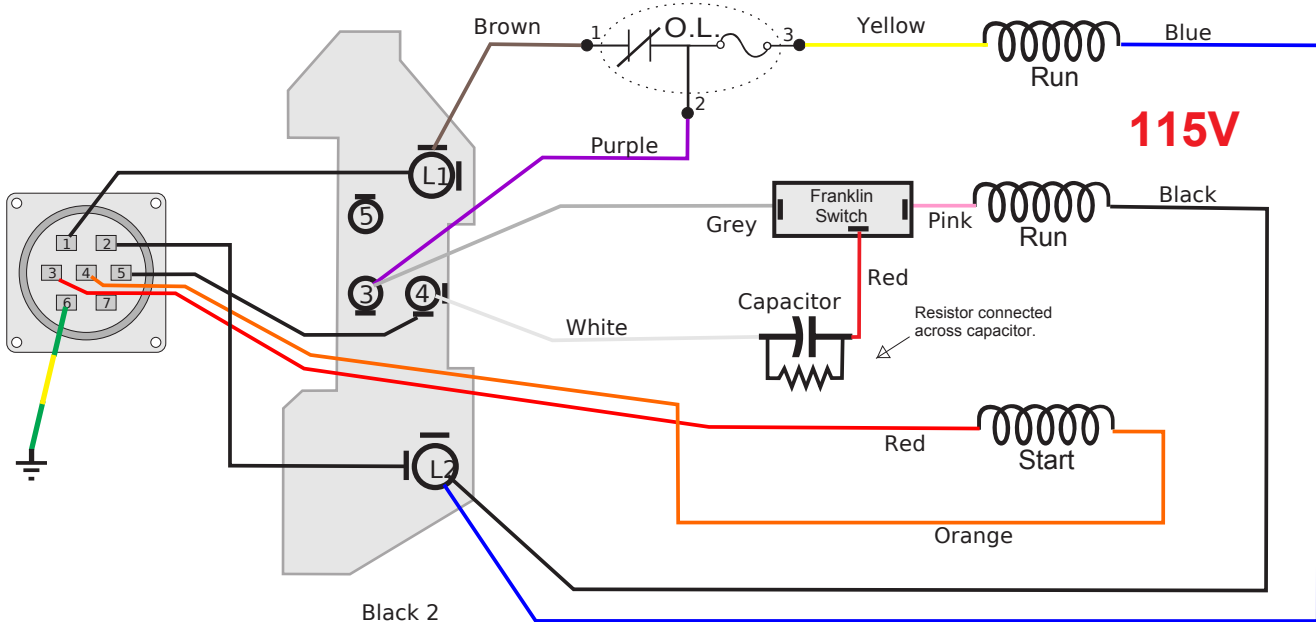
The Solid State Start Switch will not work if the RED and BLUE wires are reversed.

# Solid State Start Switch SS110C (Combination Motor)

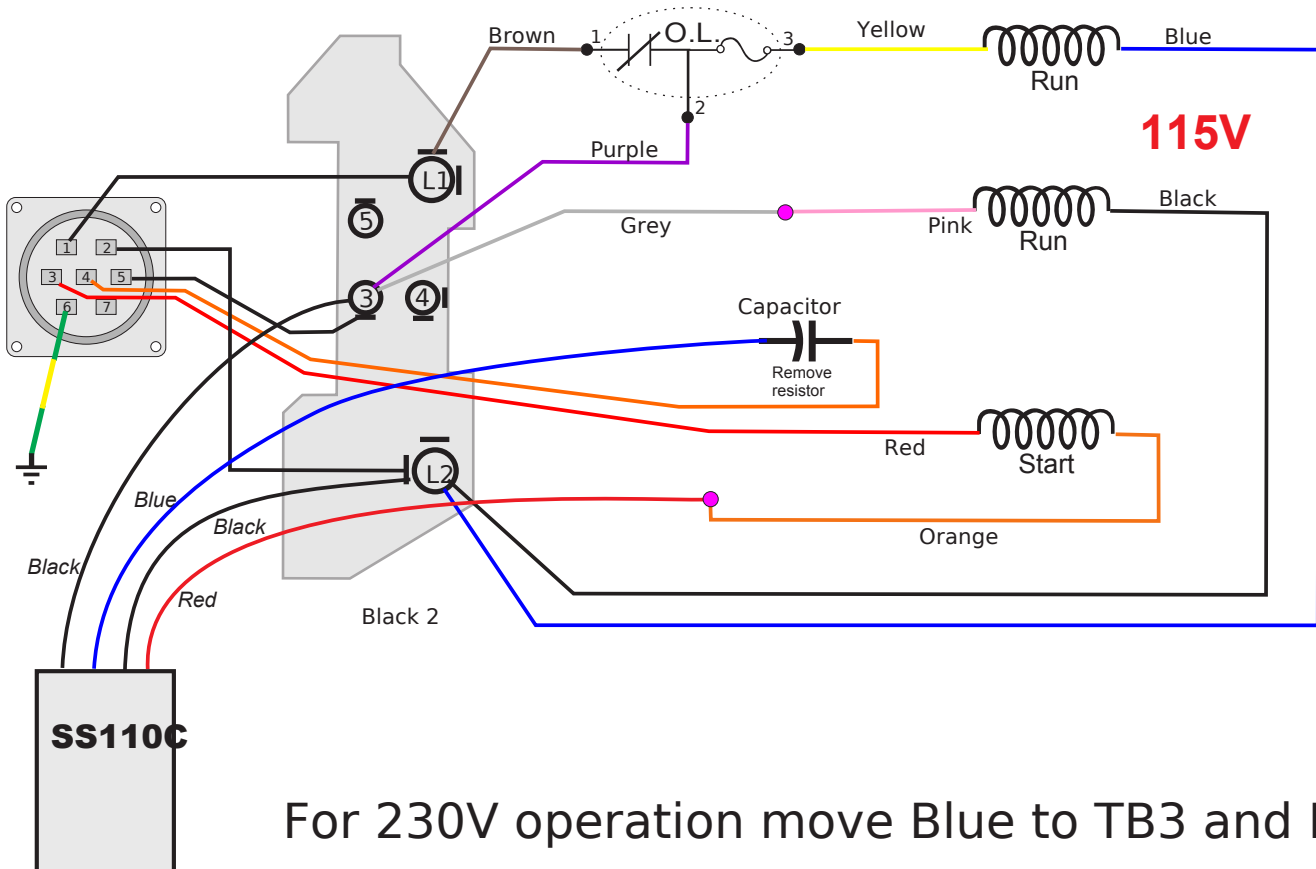
Document version 20230112

Connection diagram for AMF Franklin (82-90) dual voltage Sweep and Table motors  
Supply Voltage 115V

## Before



## After



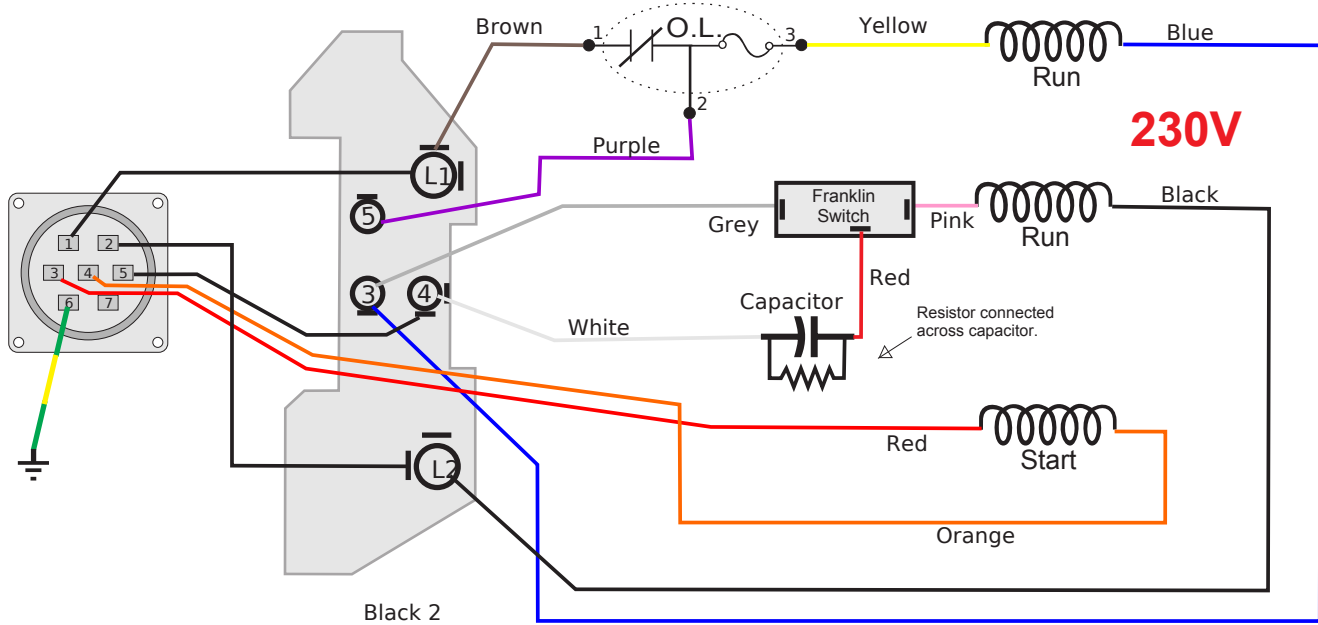
For 230V operation move Blue to TB3 and Purple to

# Solid State Start Switch SS110C (Combination Motor)

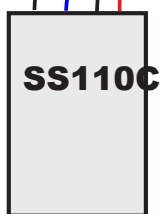
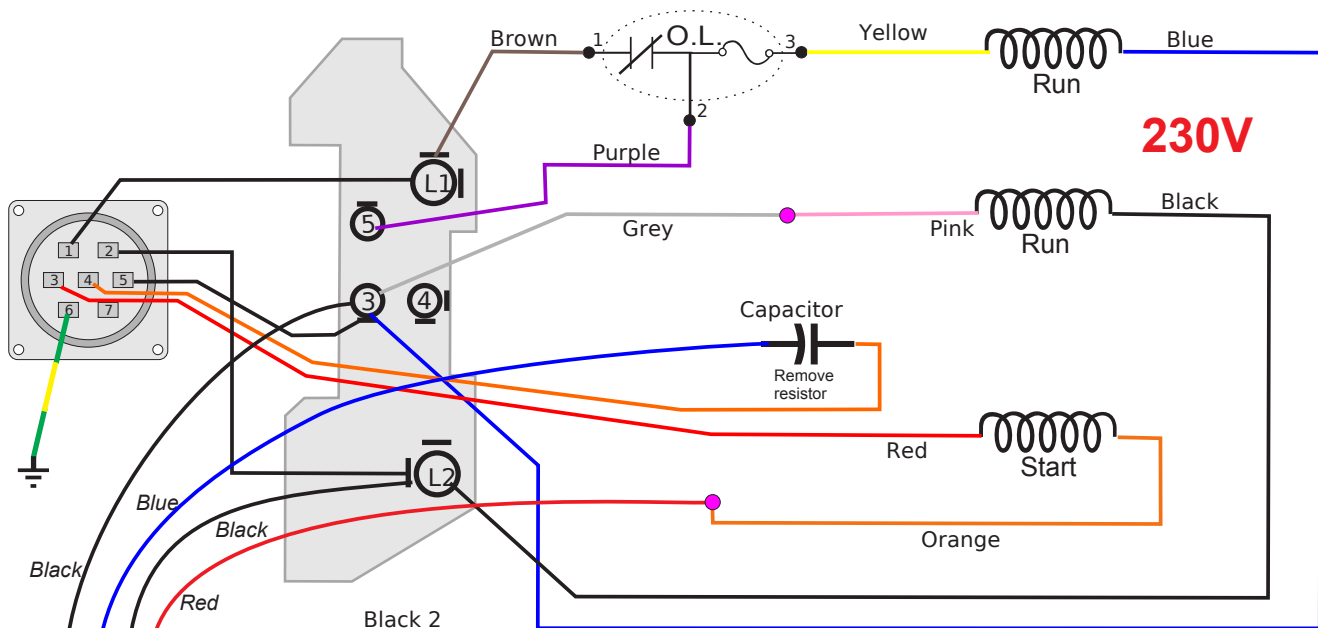
Document version 20230112

Connection diagram for AMF Franklin (82-90) dual voltage Sweep and Table motors  
Supply Voltage 230V

## Before



## After



For 230V operation move Blue to TB3 and Purple to TB5  
For 115V operation move Blue to L2 and Purple to TB5

# Solid State Start Switch

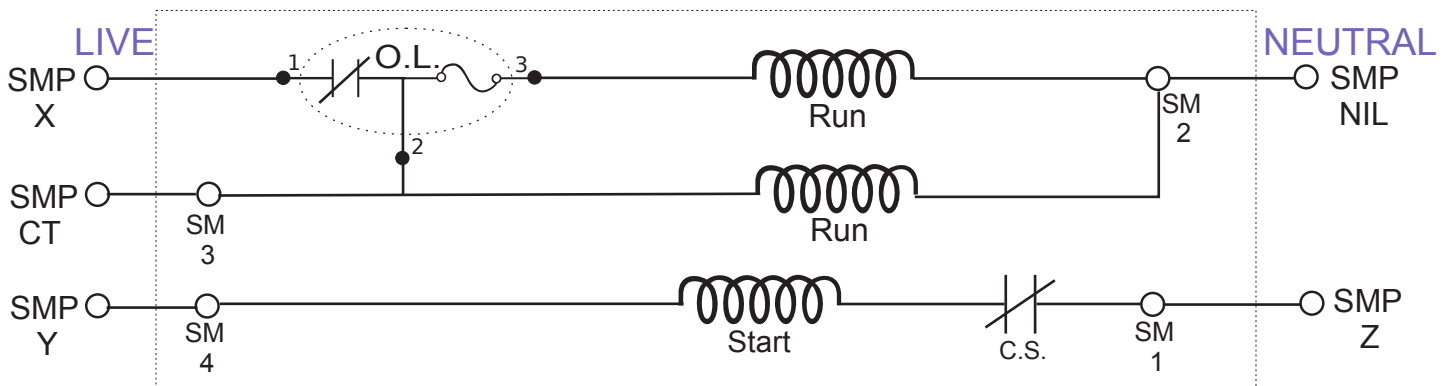
## SS110C (Combination Motor)

Document version 20230112

**General Electric** Table and Sweep Motors AMF 82-70  
**Westinghouse** Table and Sweep Motors AMF 82-70  
**Franklin and Smith** Table and Sweep Motors AMF 82-70

Dual Voltage 115/230V motor  
**115V** supply voltage

### Before

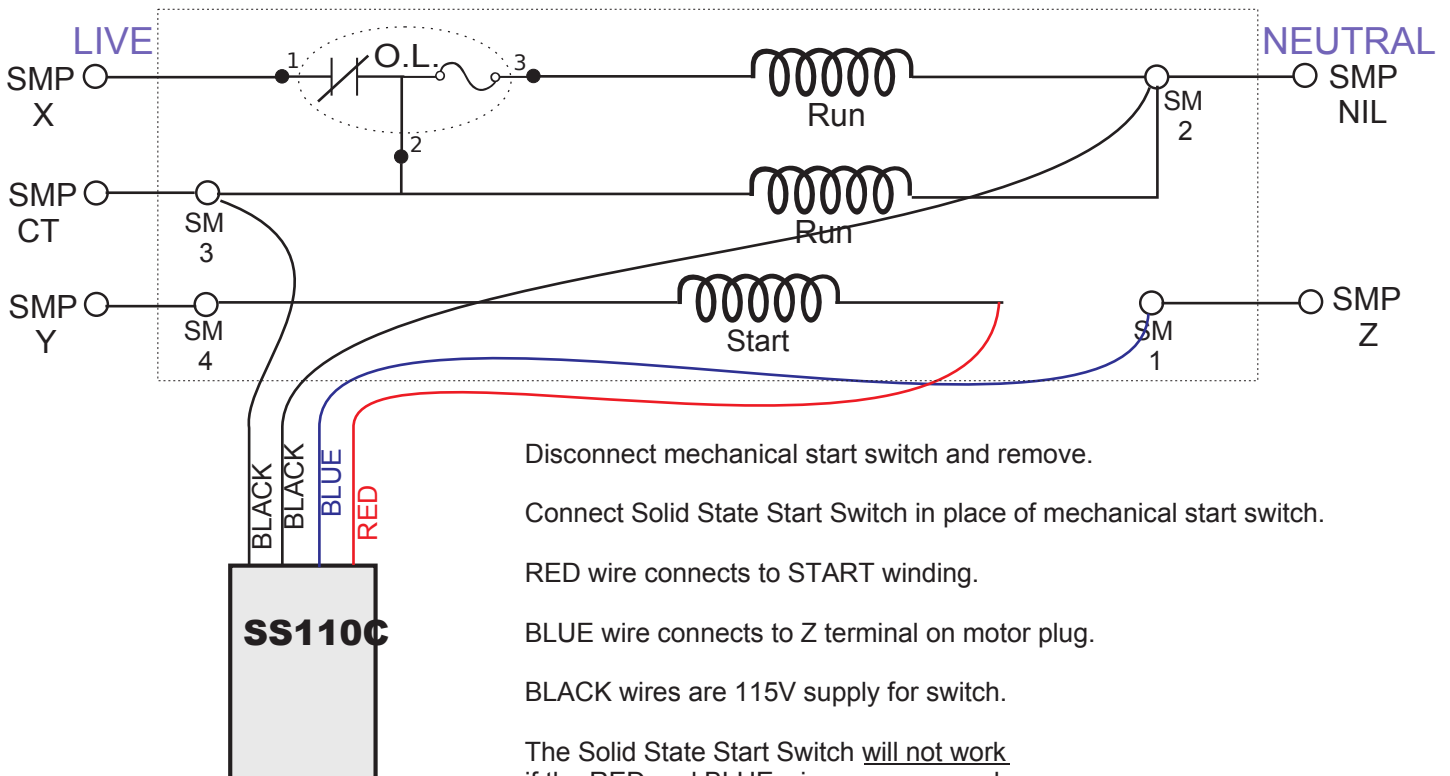


The RED and BLUE wires of the Solid State Start Switch take the place of the mechanical start switch.

The two BLACK wires supply 115V to power the switch.

The Solid State Start Switch senses the load on the motor by constantly measuring the current draw in order to determine when and for how long the START windings are required to be in-circuit.

### After



Disconnect mechanical start switch and remove.

Connect Solid State Start Switch in place of mechanical start switch.

RED wire connects to START winding.

BLUE wire connects to Z terminal on motor plug.

BLACK wires are 115V supply for switch.

The Solid State Start Switch will not work if the RED and BLUE wires are reversed.

See also separate guide for REGAINING SWEEP REVERSE.

# Solid State Start Switch

## SS110C (Combination Motor)

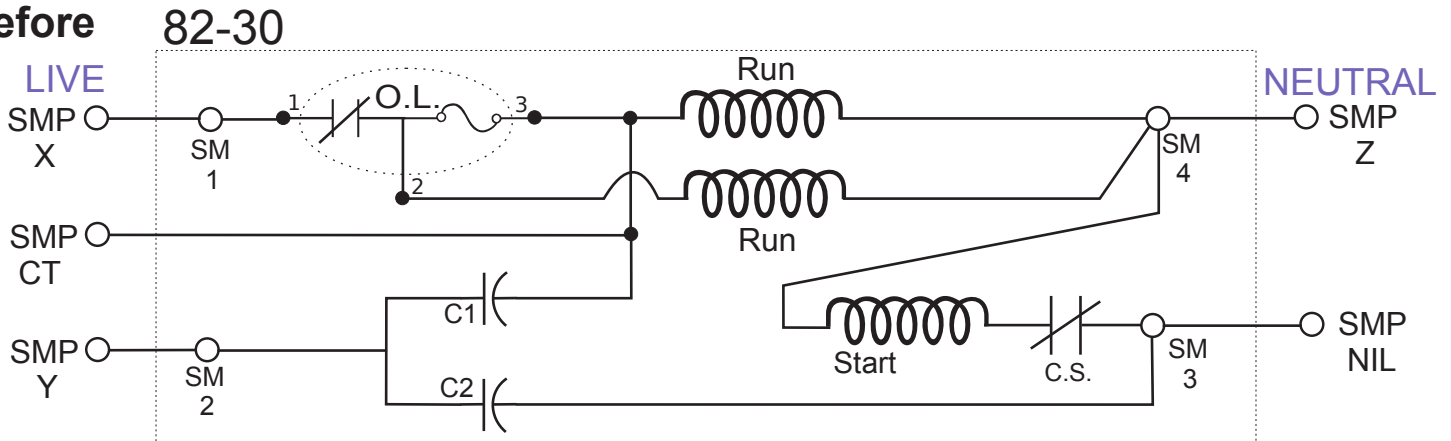
Document version 20230112

### General Electric Table and Sweep Motors AMF 82-30

### Westinghouse Table and Sweep Motors AMF 82-30

Dual Voltage 115/230V motor  
115V supply voltage

**Before**

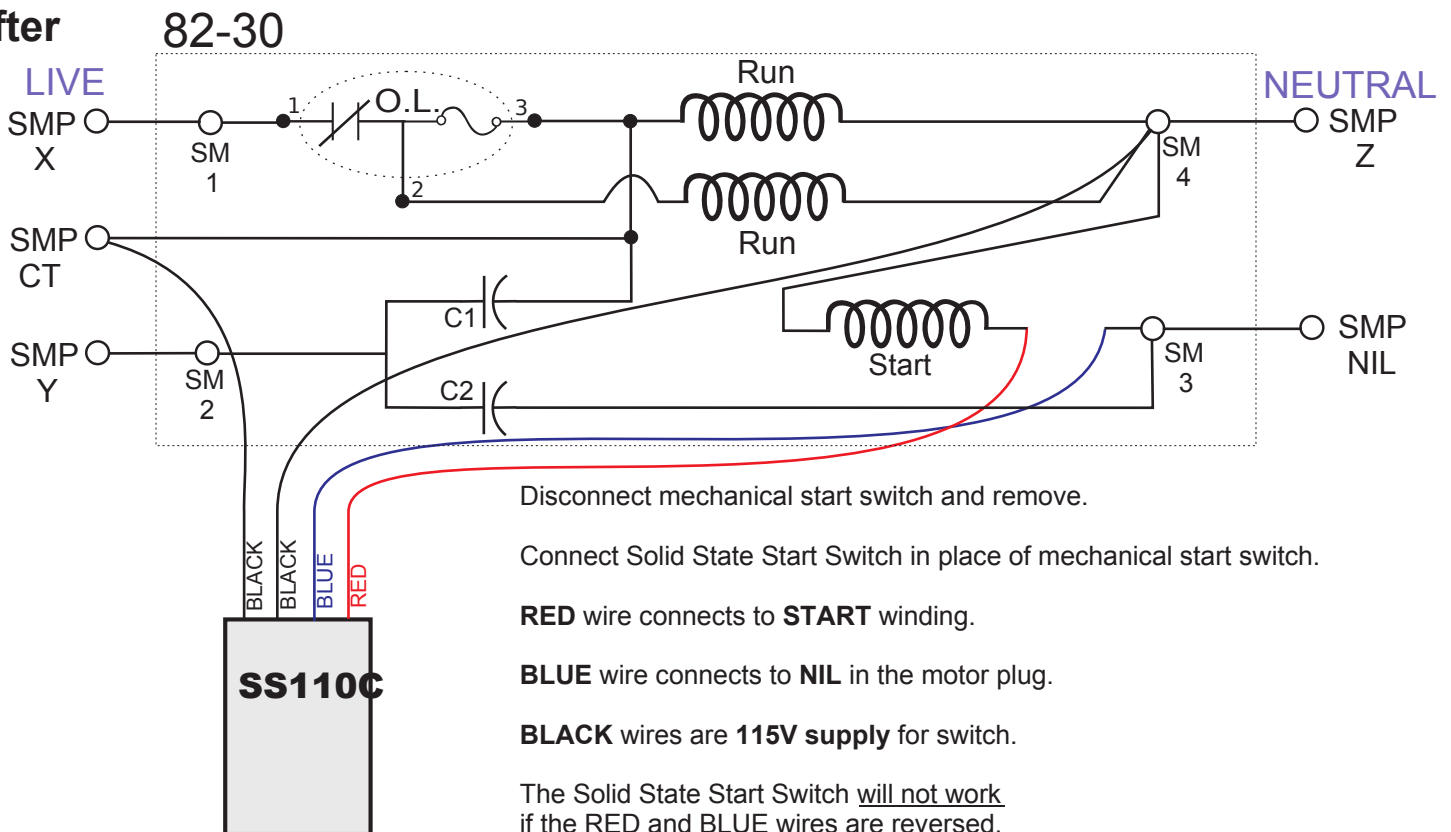


The RED and BLUE wires of the Solid State Start Switch take the place of the mechanical start switch.

The two BLACK wires supply 115V to power the switch.

The Solid State Start Switch senses the load on the motor by constantly measuring the current draw in order to determine when and for how long the START windings are required to be in-circuit.

**After**



Disconnect mechanical start switch and remove.

Connect Solid State Start Switch in place of mechanical start switch.

**RED** wire connects to **START** winding.

**BLUE** wire connects to **NIL** in the motor plug.

**BLACK** wires are **115V supply** for switch.

The Solid State Start Switch will not work if the RED and BLUE wires are reversed.

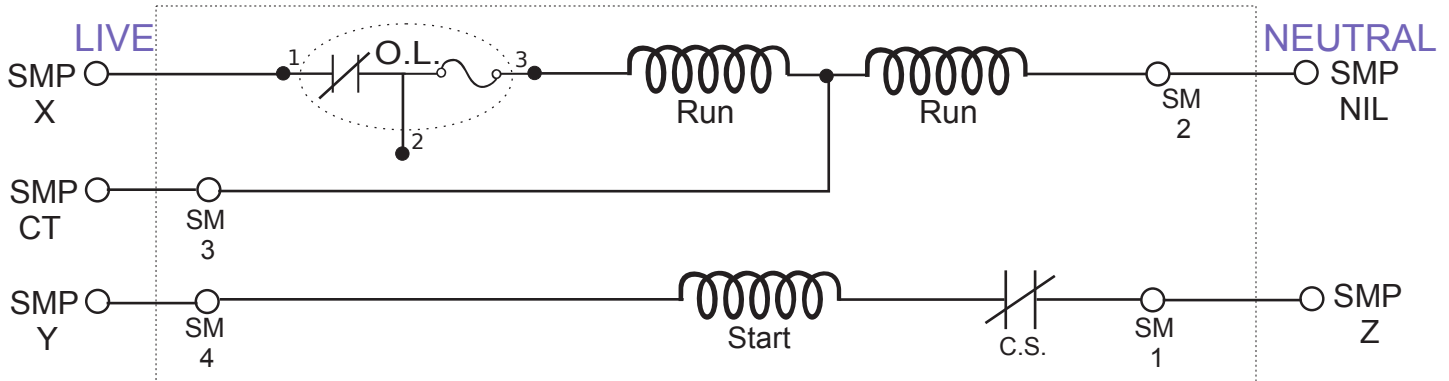
# Solid State Start Switch

## SS110C (Combination Motor)

Document version 20230112

**General Electric** Table and Sweep Motors AMF 82-70  
**Westinghouse** Table and Sweep Motors AMF 82-70  
**Franklin and Smith** Table and Sweep Motors AMF 82-70  
 Dual Voltage 115/230V motor  
**230V** supply voltage

### Before

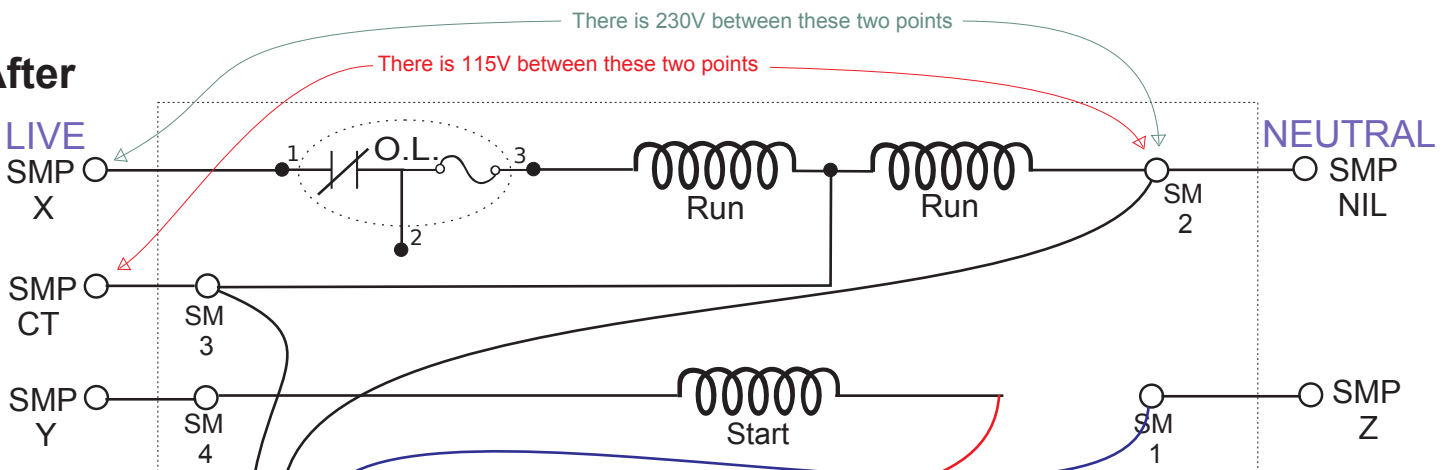


The RED and BLUE wires of the Solid State Start Switch take the place of the mechanical start switch.

The two BLACK wires supply 115V to power the switch.

The Solid State Start Switch senses the load on the motor by constantly measuring the current draw in order to determine when and for how long the START windings are required to be in-circuit.

### After



Disconnect mechanical start switch and remove.

Connect Solid State Start Switch in place of mechanical start switch.

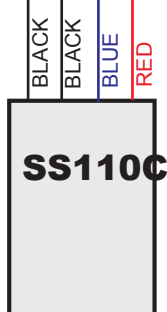
RED wire connects to START winding.

BLUE wire connects to Z terminal on motor plug.

BLACK wires are 115V supply for switch.

The Solid State Start Switch will not work if the RED and BLUE wires are reversed.

See also separate guide for REGAINING SWEEP REVERSE.





# Solid State Start Switch

## SS110C (Combination Motor)

Document version 20230112

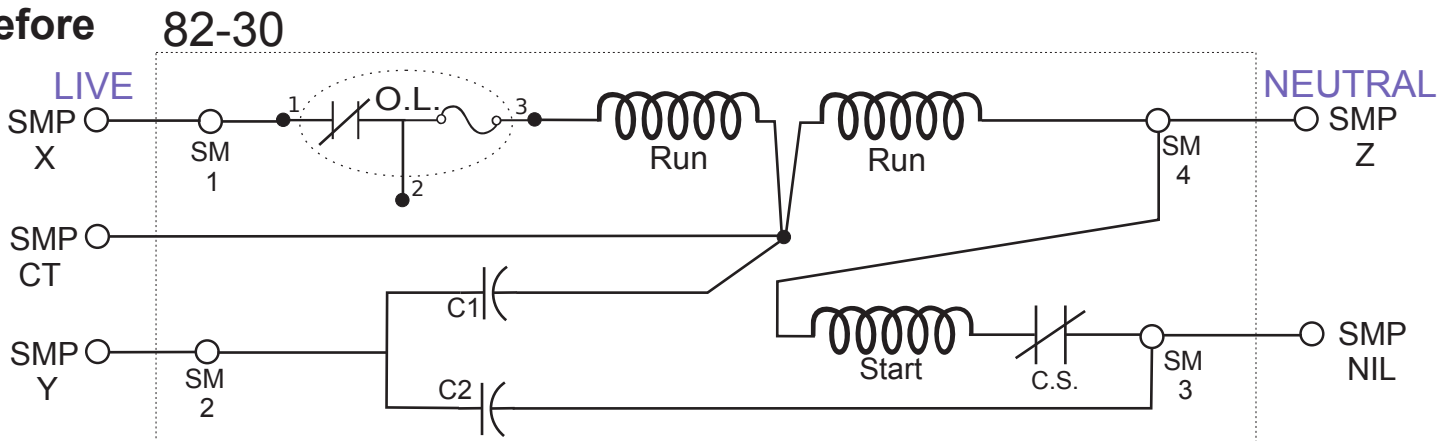
### General Electric Table and Sweep Motors AMF 82-30

### Westinghouse Table and Sweep Motors AMF 82-30

### Dual Voltage 115/230V motor

### 230V supply voltage

**Before**

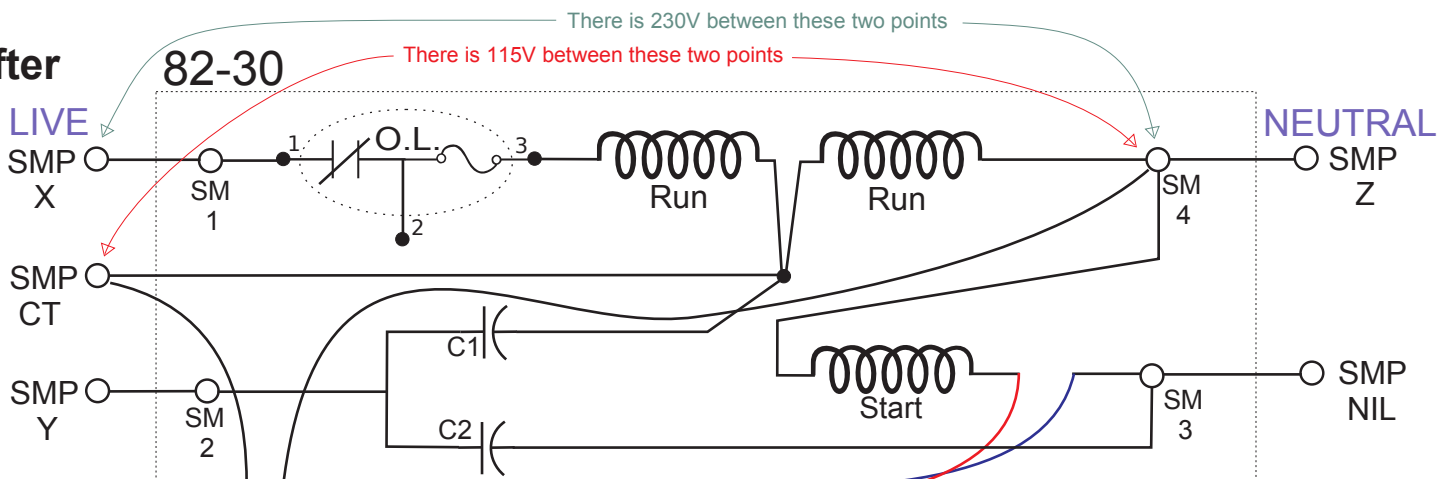


The RED and BLUE wires of the Solid State Start Switch take the place of the mechanical start switch.

The two BLACK wires supply 115V to power the switch.

The Solid State Start Switch senses the load on the motor by constantly measuring the current draw in order to determine when and for how long the START windings are required to be in-circuit.

**After**



Disconnect mechanical start switch and remove.

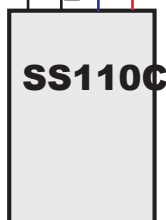
Connect Solid State Start Switch in place of mechanical start switch.

**RED** wire connects to **START** winding.

**BLUE** wire connects to **NIL** in the motor plug.

**BLACK** wires are **115V supply** for switch.

The Solid State Start Switch will not work if the RED and BLUE wires are reversed.



# Solid State Start Switch

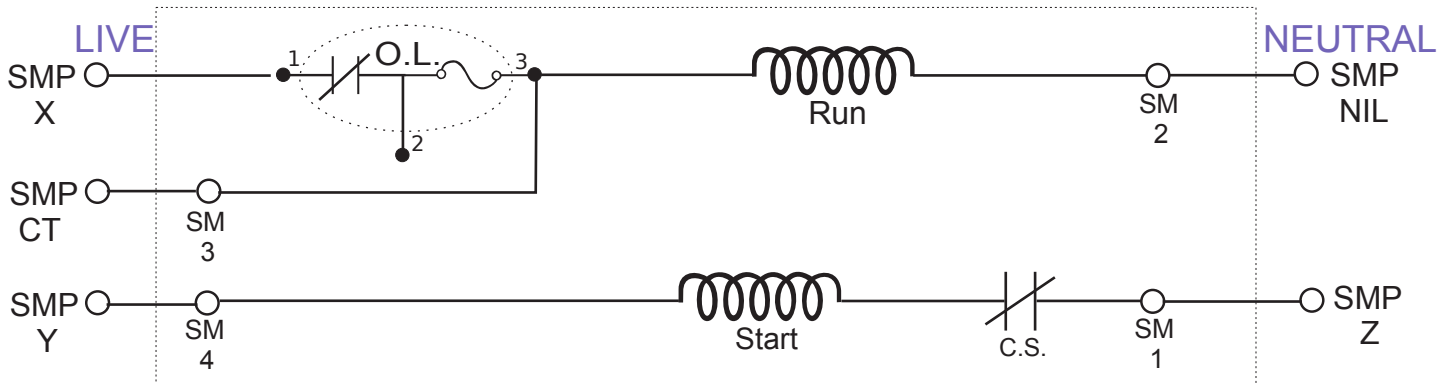
## SS110C (Combination Motor)

Document version 20230112

**General Electric** Table and Sweep Motors AMF 82-70  
**Westinghouse** Table and Sweep Motors AMF 82-70  
**Franklin and Smith** Table and Sweep Motors AMF 82-70

### Single Voltage 115V motor

#### Before

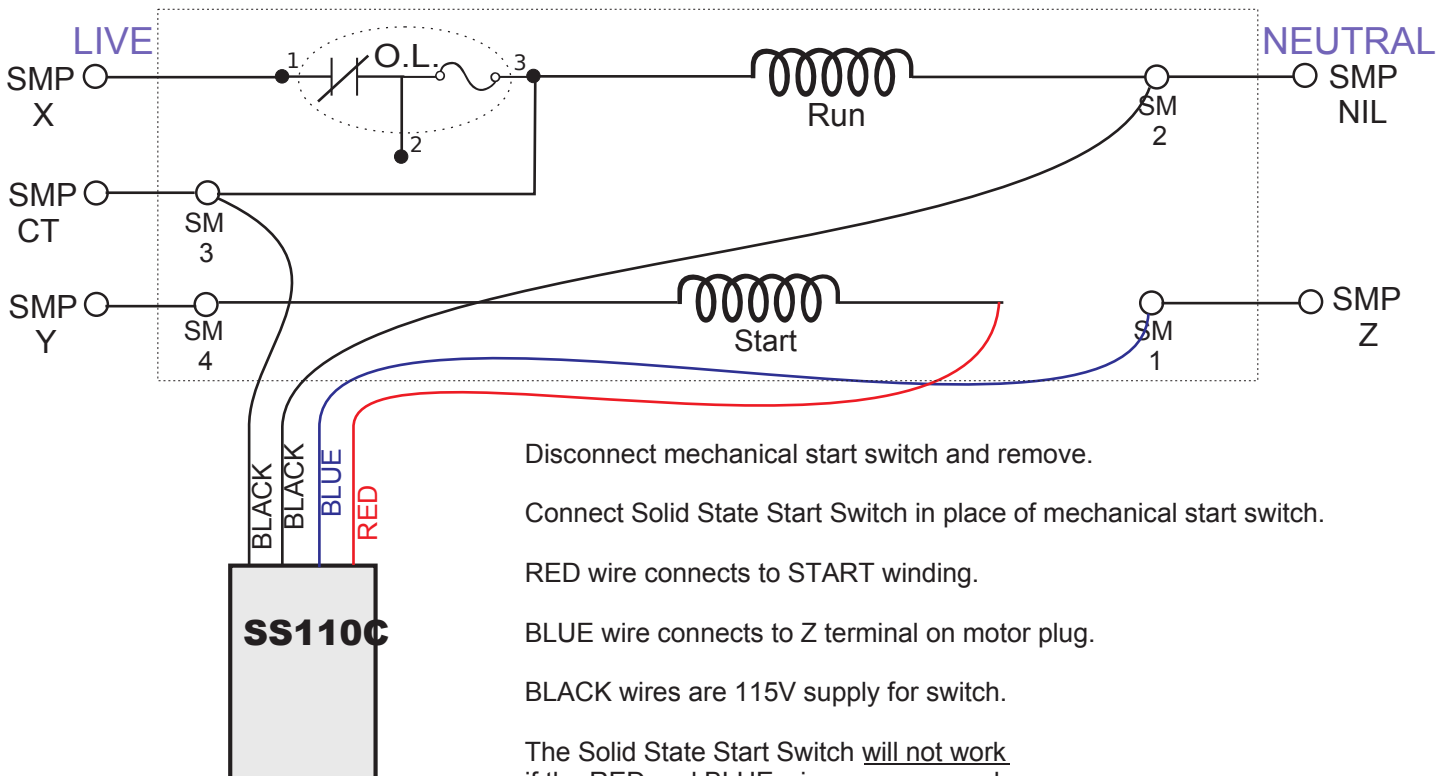


The RED and BLUE wires of the Solid State Start Switch take the place of the mechanical start switch.

The two BLACK wires supply 115V to power the switch.

The Solid State Start Switch senses the load on the motor by constantly measuring the current draw in order to determine when and for how long the START windings are required to be in-circuit.

#### After



Disconnect mechanical start switch and remove.

Connect Solid State Start Switch in place of mechanical start switch.

RED wire connects to START winding.

BLUE wire connects to Z terminal on motor plug.

BLACK wires are 115V supply for switch.

The Solid State Start Switch will not work if the RED and BLUE wires are reversed.

See also separate guide for REGAINING SWEEP REVERSE.

# Solid State Start Switch

## SS110C (Combination Motor)

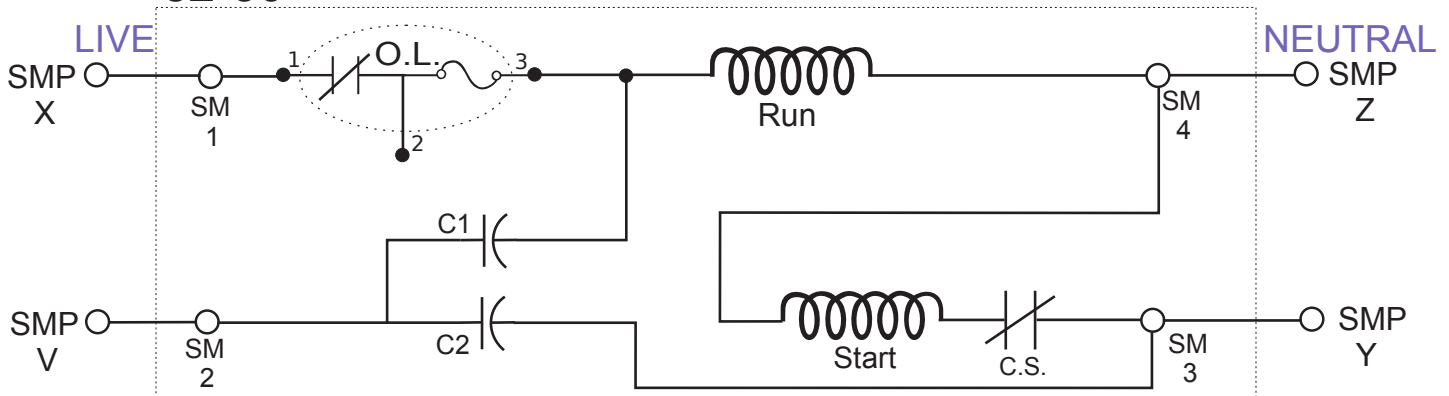
Document version 20230112

### General Electric Table and Sweep Motors AMF 82-30

### Westinghouse Table and Sweep Motors AMF 82-30

### Single Voltage 115V motor

#### Before 82-30

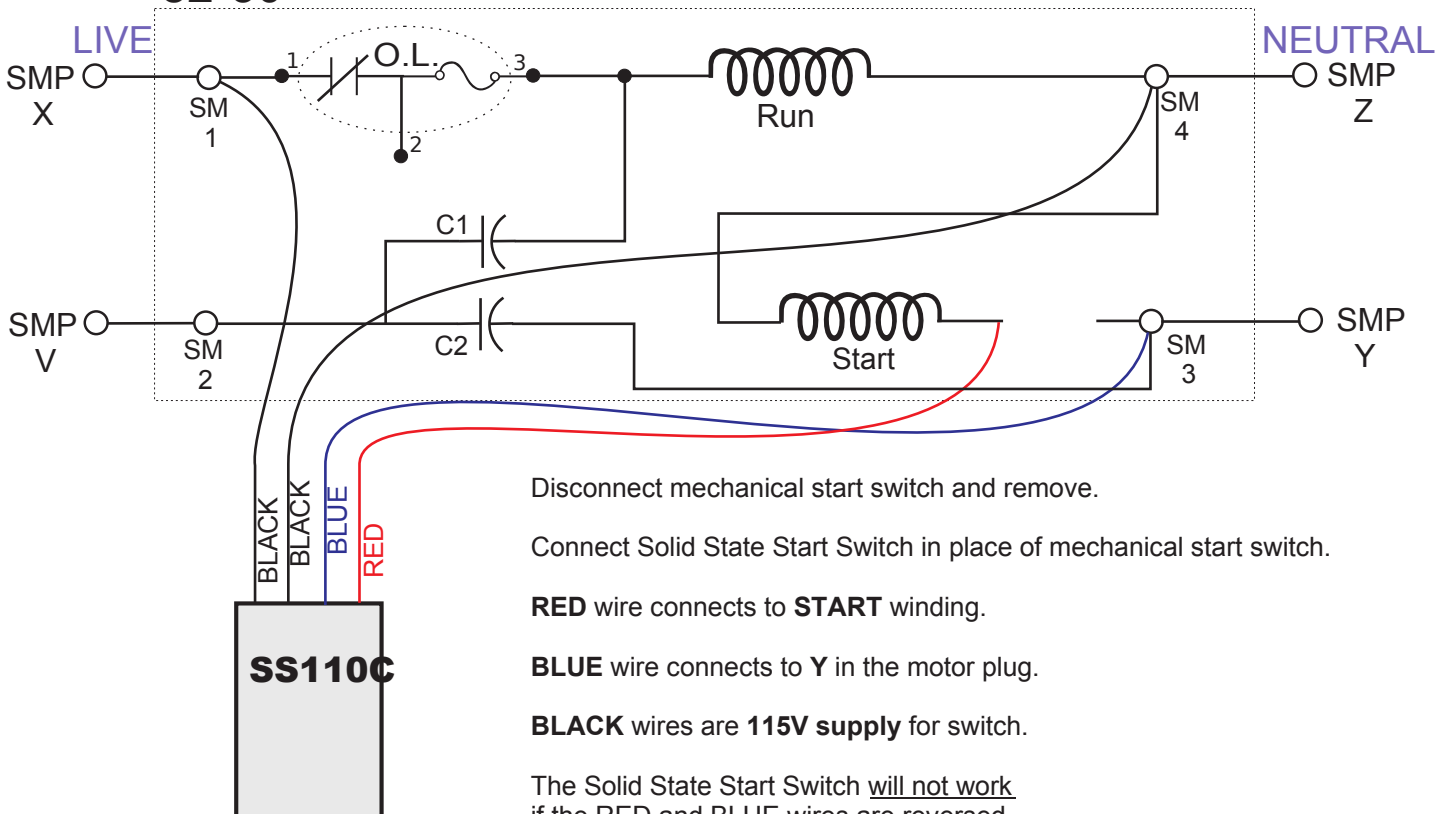


The RED and BLUE wires of the Solid State Start Switch take the place of the mechanical start switch.

The two BLACK wires supply 115V to power the switch.

The Solid State Start Switch senses the load on the motor by constantly measuring the current draw in order to determine when and for how long the START windings are required to be in-circuit.

#### After 82-30



Disconnect mechanical start switch and remove.

Connect Solid State Start Switch in place of mechanical start switch.

**RED** wire connects to **START** winding.

**BLUE** wire connects to **Y** in the motor plug.

**BLACK** wires are **115V** supply for switch.

The Solid State Start Switch will not work if the RED and BLUE wires are reversed.

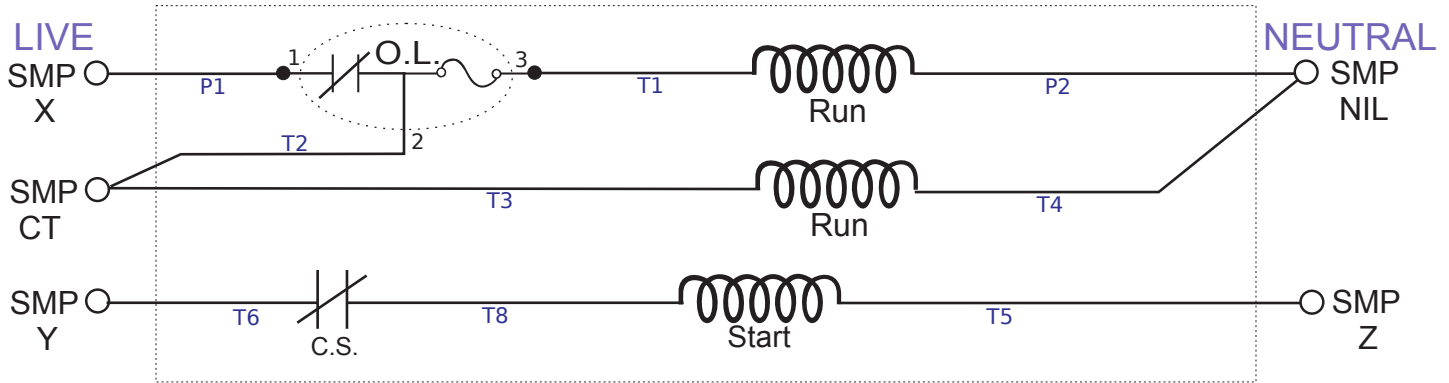
# Solid State Start Switch

## SS110C (Combination Motor)

### Leeson Table and Sweep Motors AMF 82-70

### Dual Voltage 115/230V motor 115V supply voltage

#### Before

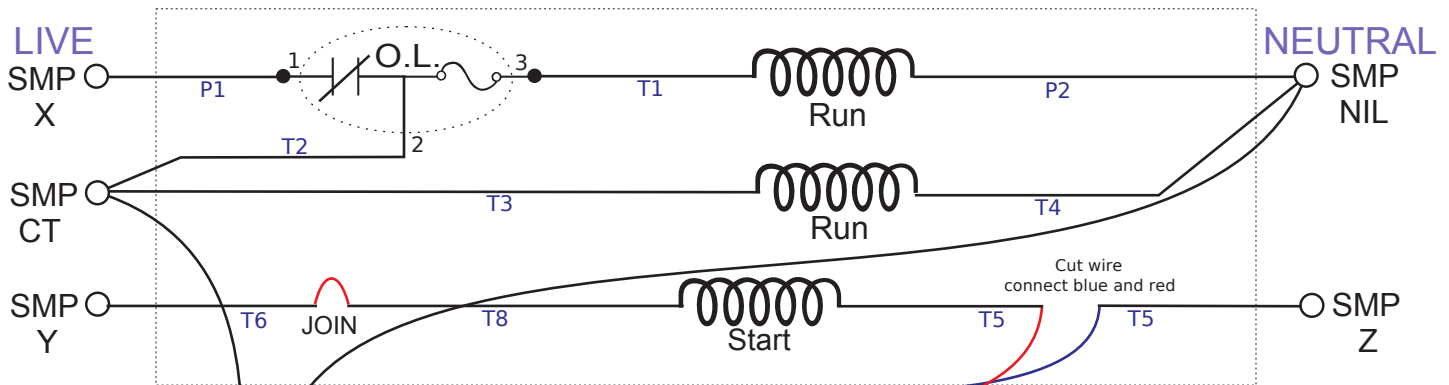


The RED and BLUE wires of the Solid State Start Switch take the place of the mechanical start switch.

The two BLACK wires supply 115V to power the switch.

The Solid State Start Switch senses the load on the motor by constantly measuring the current draw in order to determine when and for how long the START windings are required to be in-circuit.

#### Before



Note: wires T5 and T8 can be reversed

Disconnect mechanical start switch and remove.

Connect Solid State Start Switch in place of mechanical start switch.

RED wire connects to START winding.

BLUE wire connects to Z terminal on motor plug.

BLACK wires are 115V supply for switch.

The Solid State Start Switch will not work if the RED and BLUE wires are reversed.

See also separate guide for REGAINING SWEEP REVERSE.

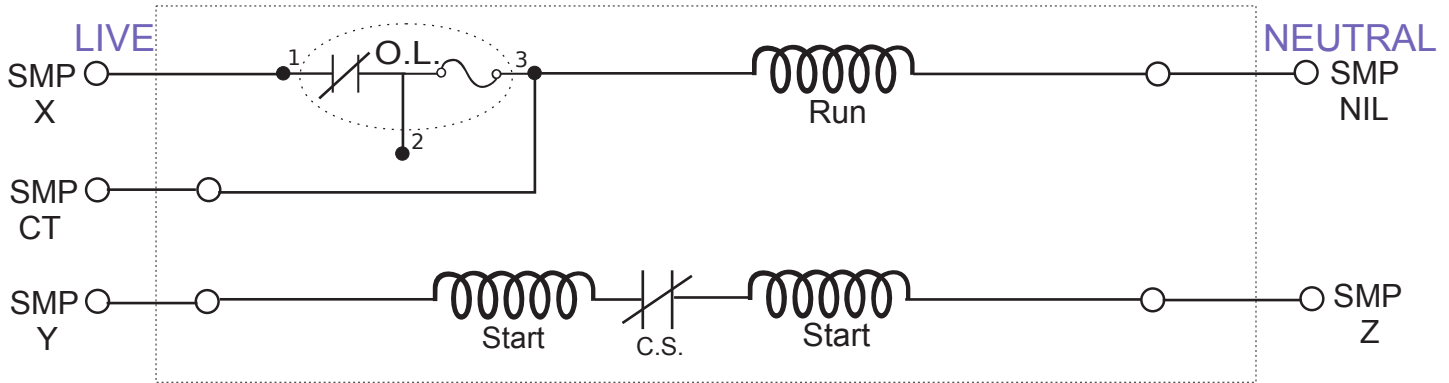
# Solid State Start Switch

## SS110C (Combination Motor)

### National Table and Sweep Motors AMF 82-70

### Dual Voltage 115/230V motor 115V supply voltage

#### Before

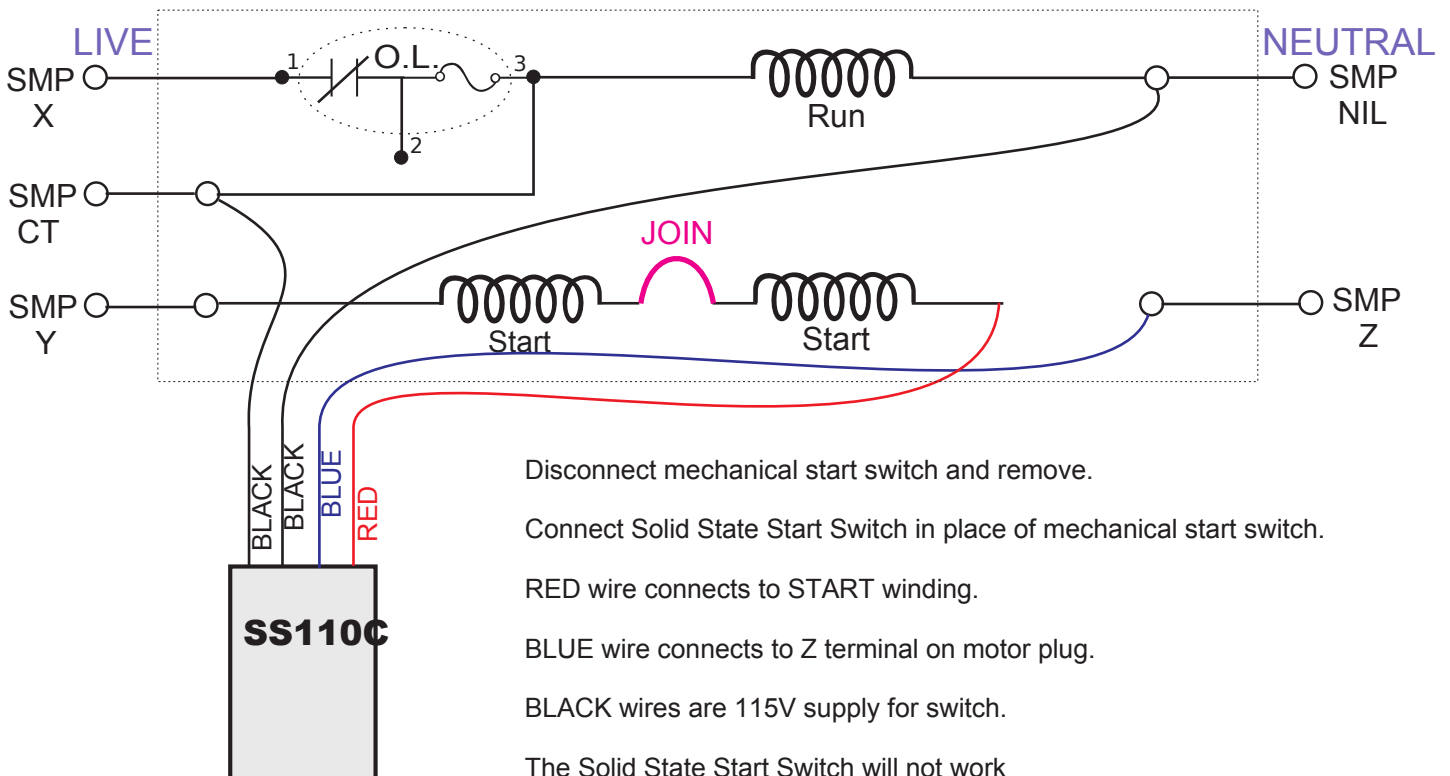


The RED and BLUE wires of the Solid State Start Switch take the place of the mechanical start switch.

The two BLACK wires supply 115V to power the switch.

The Solid State Start Switch senses the load on the motor by constantly measuring the current draw in order to determine when and for how long the START windings are required to be in-circuit.

#### After



Disconnect mechanical start switch and remove.

Connect Solid State Start Switch in place of mechanical start switch.

RED wire connects to START winding.

BLUE wire connects to Z terminal on motor plug.

BLACK wires are 115V supply for switch.

The Solid State Start Switch will not work if the RED and BLUE wires are reversed.

See also separate guide for REGAINING SWEEP REVERSE.

# Solid State Start Switch

## SS110C (Combination Motor)

# Regaining Sweep Reverse

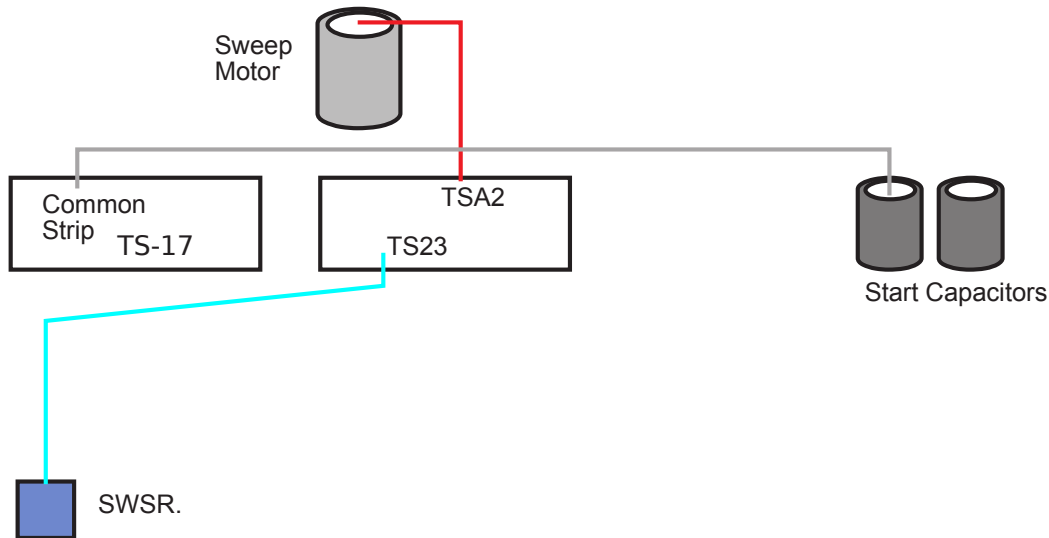
(AMF 82-70 with SS chassis)

**\* In some instances Sweep reverse may be lost after connecting the SS110C. To regain sweep reverse, just perform this simple modification.**

**Motors fitted with mechanical switches will continue to run as normal when this modification has been made.**

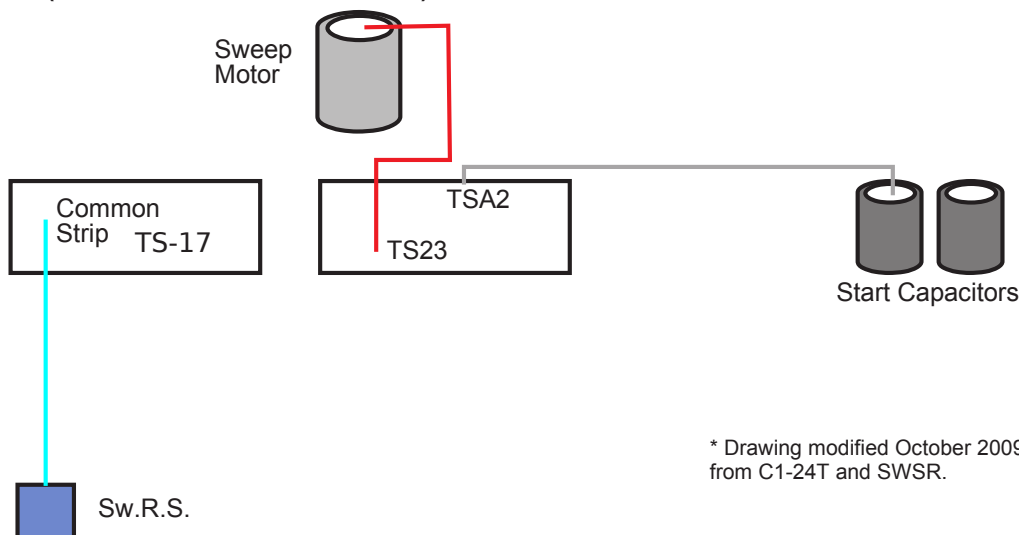
### Before modification:

Red wire from sweep motor goes to TSA2.  
White wire from common terminal strip goes to motor start capacitors.  
Blue wire ( R or L133) from Sweep Reverse Switch goes to TS23.



### After Modification

Red wire from sweep motor goes to TS23.  
White wire from motor start capacitors goes to TSA2.  
Blue wire ( R or L133) from Sweep Reverse Switch goes to common terminal strip.  
( Where white wire came from. )



\* Drawing modified October 2009 to show correct wire colours from C1-24T and SWSR.

# Solid State Start Switch SS110C (Combination Motor)

## Regaining Sweep Reverse (AMF 82-70)

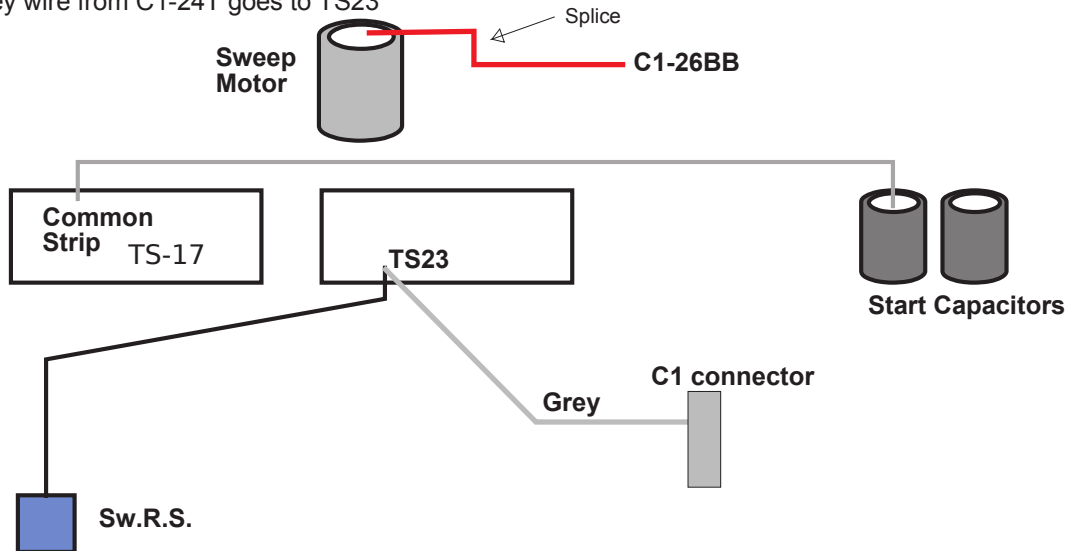
On machines fitted with AMF MP chassis that have been converted from SS chassis operation or made prior to 1985.

**\*** In some instances Sweep reverse may be lost after connecting the SS110C. To regain sweep reverse, just perform this simple modification.

Motors fitted with mechanical switches will continue to run as normal when this modification has been made.

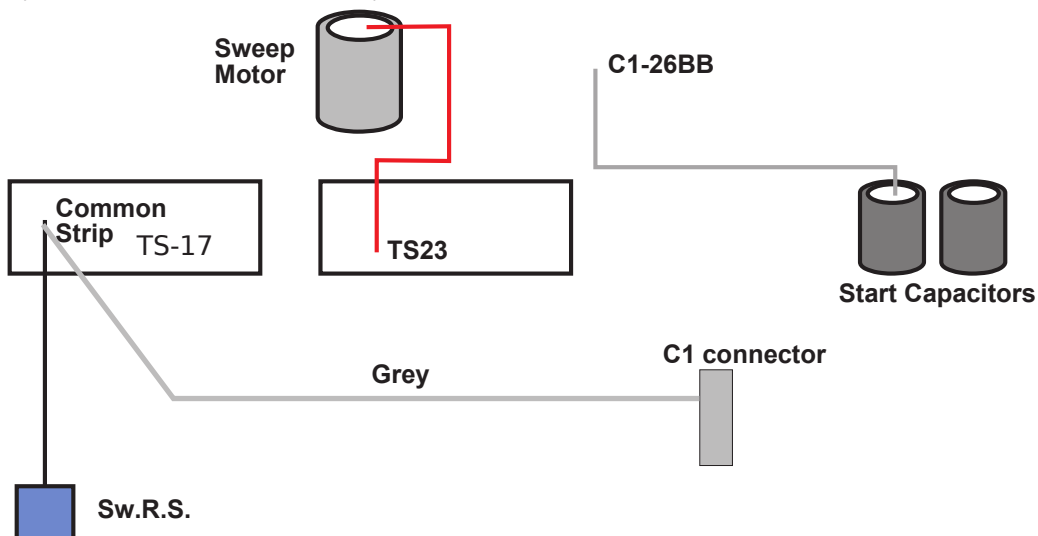
### Before modification:

Red wire from sweep motor is spliced to a wire that goes to C1-26BB  
White wire from common terminal strip goes to motor start capacitors.  
Wire from Sweep Reverse Switch goes to TS23.  
Grey wire from C1-24T goes to TS23



### After Modification

Red wire from sweep motor goes to TS23.  
White wire from motor start capacitors is sliced into the wire from C1-26BB  
Wire from Sweep Reverse Switch and grey wire from C1-24T both go to common terminal strip.  
( Where white wire came from. )



# Solid State Start Switch

## SS110C (Combination Motor)

### Regaining Sweep Reverse (AMF 82-70)

For machines fitted with AMF MP chassis that have been converted from SS chassis operation or made prior to 1985.

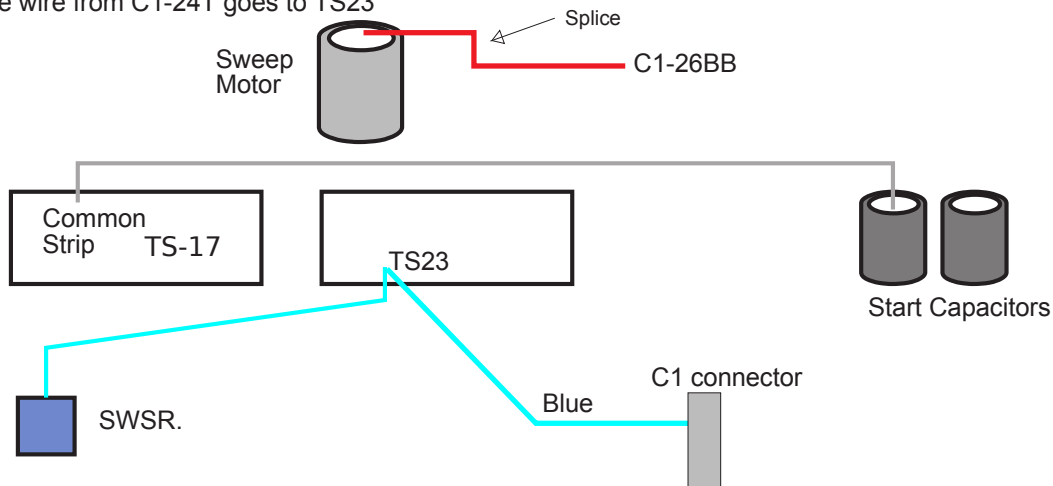
This is an alternate for those of you experiencing braking problems with some versions of MP machines and some Omega-tek expander installations.

**\*** In some instances Sweep reverse may be lost after connecting the SS110C. To regain sweep reverse, just perform this simple modification.

Motors fitted with mechanical switches will continue to run as normal when this modification has been made.

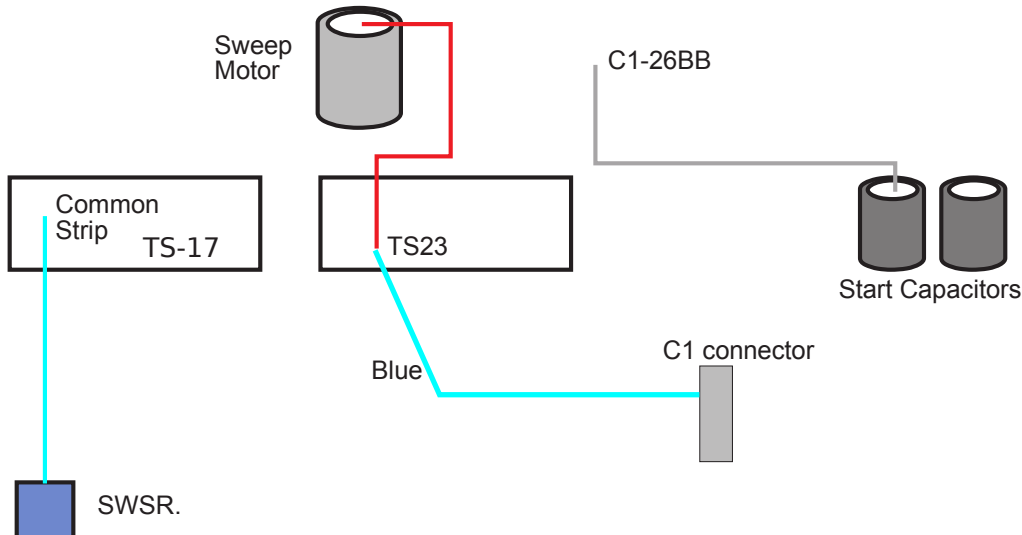
#### Before modification:

Red wire from sweep motor is spliced to a wire that goes to C1-26BB  
 White wire from common terminal strip goes to motor start capacitors.  
 Blue wire ( R or L133) from Sweep Reverse Switch goes to TS23.  
 Blue wire from C1-24T goes to TS23



#### After Modification

Red wire from sweep motor goes to TS23.  
 White wire from motor start capacitors is spliced into the wire from C1-26BB  
 Blue wire ( R or L133) from Sweep Reverse Switch goes to common terminal strip.  
 ( Where white wire came from. )



Many thanks to Paul Hawthorne from Sun Valley Lanes in Lincoln, Nevada USA for first testing this mod and bringing it to our attention.

\* Oct 2009 Drawing changed to show correct wire colour from C1-24T and from SWSR.



# Solid State Start Switch

## SS110C (Combination Motor)

Document version 20230112

### Regaining Sweep Reverse (AMF 82-70)

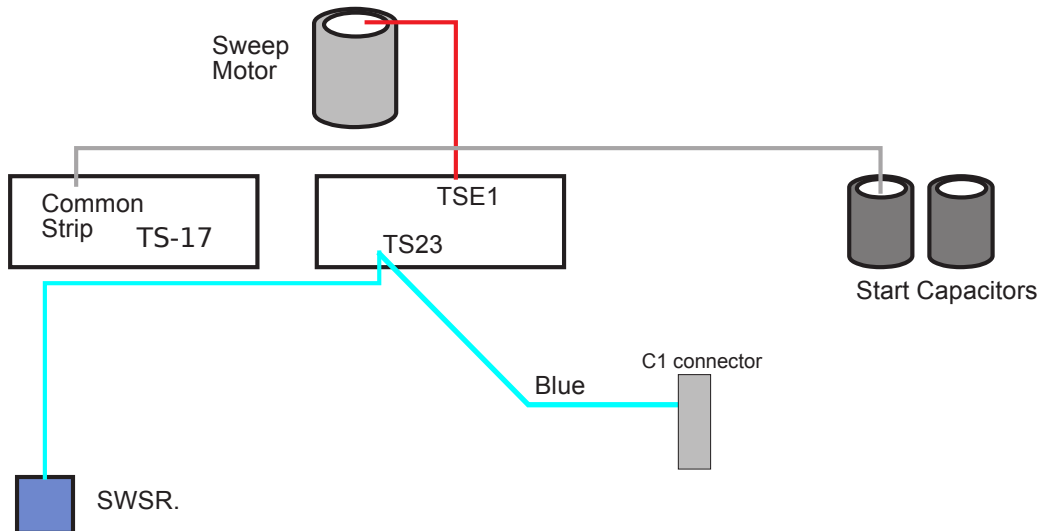
On machines fitted with AMF MP chassis with sweep reverse relay fitted manufactured after 1985.  
For machines prior to 1985 or machines that have been converted from SS chassis operation please see the correct instruction sheet.

**\*** In some instances Sweep reverse may be lost after connecting the SS110C.  
To regain sweep reverse, just perform this simple modification.

Motors fitted with mechanical switches will continue to run as normal when this modification has been made.

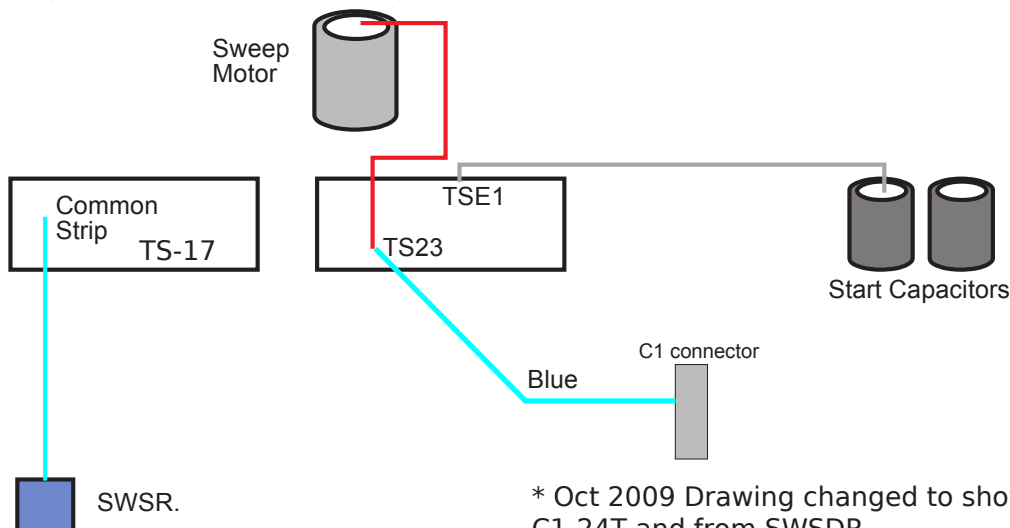
#### Before modification:

Red wire from sweep motor goes to TSE1  
White wire from common terminal strip goes to motor start capacitors.  
Blue wire ( R or L133) from Sweep Reverse Switch goes to TS23.  
Blue wire from C1-24T goes to TS23



#### After Modification

Red wire from sweep motor goes to TS23.  
White wire from motor start capacitors goes to TSE1.  
Blue wire ( R or L133) from Sweep Reverse Switch and grey wire from C1-24T both go to common terminal strip.  
( Where white wire came from. )



\* Oct 2009 Drawing changed to show correct wire color from C1-24T and from SWSDR.  
Drawing now shows mod as tested by Paul Hawthorne.

# Solid State Start Switch SS110C (Combination Motor)

## Regaining Sweep Reverse (AMF 82-70)

For machines fitted with AMF MP chassis with sweep reverse relay fitted manufactured after 1985.  
For machines prior to 1985 or machines that have been converted from SS chassis operation please see the correct instruction sheet.

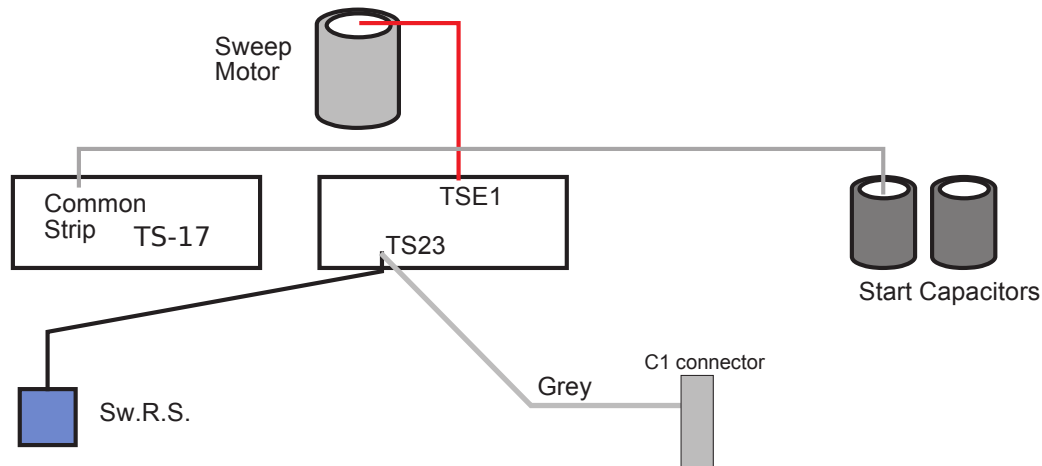
This is an alternate for those of you experiencing braking problems with some versions of MP machines and some Omega-tek expander installations.

**\*** In some instances Sweep reverse may be lost after connecting the SS110C.  
To regain sweep reverse, just perform this simple modification.

Motors fitted with mechanical switches will continue to run as normal when this modification has been made.

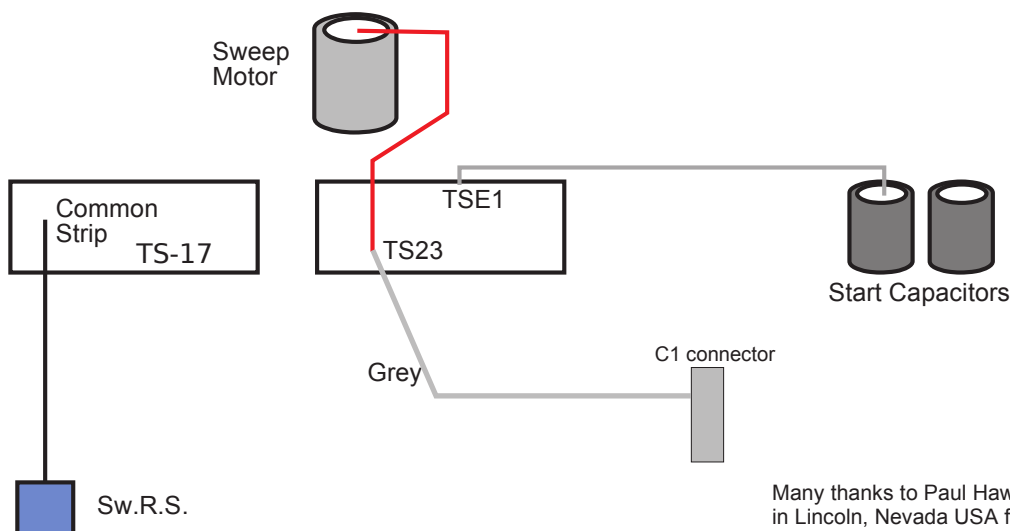
### Before modification:

Red wire from sweep motor goes to TSE1  
White wire from common terminal strip goes to motor start capacitors.  
Wire from Sweep Reverse Switch goes to TS23.  
Grey wire from C1-24T goes to TS23



### After Modification

Red wire from sweep motor goes to TS23.  
White wire from motor start capacitors goes to TSE1.  
Wire from Sweep Reverse Switch goes to common terminal strip. ( Where white wire came from. )



Many thanks to Paul Hawthorne from Sun Valley Lanes in Lincoln, Nevada USA for first testing this mod and bringing it to our attention.