SS-100-120 & SS-100-240 v3.0 UNIVERSAL SOFT START MODULE v3.0 ASSEMBLY & INSTALLATION INSTRUCTIONS

WARNING: Voltages inside the amplifier or other equipment CAN & WILL KILL YOU! You MUST know how to work around HIGH VOLTAGE safely. If you do not, get assistance from someone who does. You MUST also be able to read your specific amplifier or equipment schematic and understand the design, theory and wiring of your amplifier or equipment to properly perform this installation.

SS-100-120/240 UNIVERSAL SOFT-START ASSEMBLY

( ) **Read, re-read and fully understand these instructions prior to beginning this installation.** Make sure to label wires as they are disconnected from various points inside the equipment. This will help when the time comes to re-attach the wires that will be disconnected during installation of the soft-start module.

( ) Go through the Bill of Materials (BOM) and compare that list with the parts in the kit to make sure all parts are present. If you are missing any parts, please contact Harbach Electronics, LLC.

( ) Assemble the SS-100-120/240 according to the parts layout pictorial (top view of PCB). There is no right or wrong assembly sequence, just be sure to observe correct polarity of diode D9 and electrolytic capacitors C7-C8.

SS-100-120/240 UNIVERSAL SOFT-START INSTALLATION

It is not possible to give exact installation instructions for the Universal "Soft Start" module because I have neither the schematic nor the physical layout of your specific amplifier or equipment. I can give you enough information, together with the theory of operation of the Universal "Soft Start", to help you install this module. **NOTE: This module is designed for a typical 120 VAC single-primary or 120/240 VAC dual-primary transformer system.** Installation diagrams for different amplifiers and equipment are available for download from the Harbach Electronics, LLC website.

Examine the SS-100-120/240 module. Note that there are letters on the silk screened (top) side of the PCB that designate the leads to be connected. The **"C"** and **"D"** leads will be connected to the switched power input. The **"A"** and **"B"** leads will be connected to the load. A #20 wire from the hole between pads **"C"** and **"D"** (user supplied) is connected to the return (finish lead of the transformer winding) of the input power line (NOT to chassis ground). The module can be mounted using mounting holes in the corners of the PCB or by using a dab of silicone adhesive on the top of each relay and sticking the module to the chassis.

The overall operation is quite simple. When the power switch in turned ON, 120 volts is applied to the load through a 10Ω or 20Ω 10W resistor in either or both sides of the AC input lines. The voltage at the load is measured by the diode connected to pad **"A"**. As the filter capacitors and other components charge or stabilize in current drain, the voltage at pad **"A"** rises. When this voltage reaches approximately 90 volts, the two relays are activated, shorting out the 10Ω or 20Ω resistors. Now the power circuit is back to its full power state and the soft-start circuit is locked out of operation.

If the SS-100-120/240 is to be installed in equipment operating from 120 VAC mains (model SS-100-120), the 10Ω 10-watt resistors will be installed on the PCB. If the SS-100 is to be installed in equipment operating from 240 VAC mains, the 20Ω 10-watt resistors will be installed on the PCB.

INSTALLATION IN 234/240 VAC 4-WIRE EQUIPMENT

If the soft-start is to be installed in equipment operating from 234/240 AC 4-wire mains system, the following connections must be used:

PAD A One leg of the 234/240 VAC to the load device, usually the transformer primary.
PAD B One leg of the 234/240 VAC to the load device, usually the transformer primary.
PAD C One leg of the 234/240 VAC mains supply (usually RED or BLACK).
PAD D One leg of the 234/240 VAC mains supply (usually RED or BLACK).
PAD F Connection to the neutral of the 234/40 VAC mains supply (usually WHITE) (NOT GROUND-GREEN).

INSTALLATION IN 117/120 VAC 3-WIRE EQUIPMENT

If the soft-start is to be installed in equipment operating from 110/117 AC 3-wire mains system, the following connections must be used:

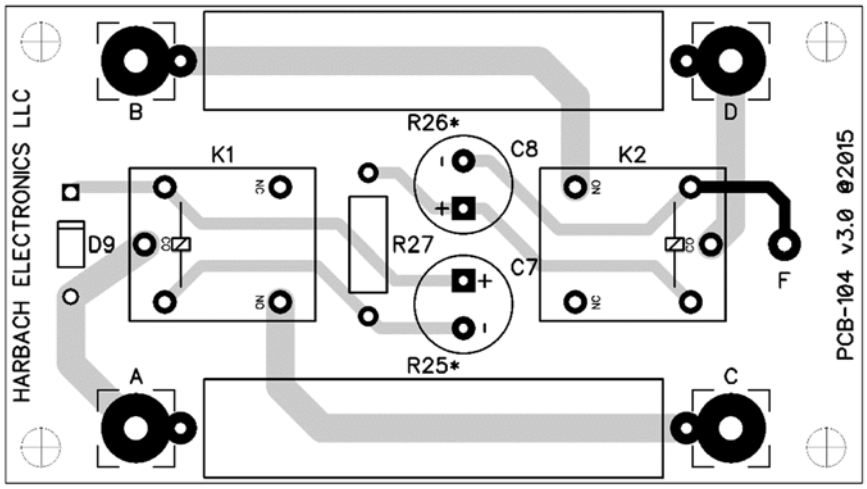
PAD A The switched hot or power leg of the 110/117 VAC to the load device, usually the transformer primary.
PAD B No connection.
PAD C The hot or power leg of the 110/117 VAC mains supply (usually BLACK).
PAD D No connection.
PAD F Connection to the neutral of the 110/117 VAC mains supply (usually WHITE) (NOT GROUND).

NOTE: If only one side of the input power line is switched, be sure that the switched lead is on the "C to A" side of the soft-start circuit.

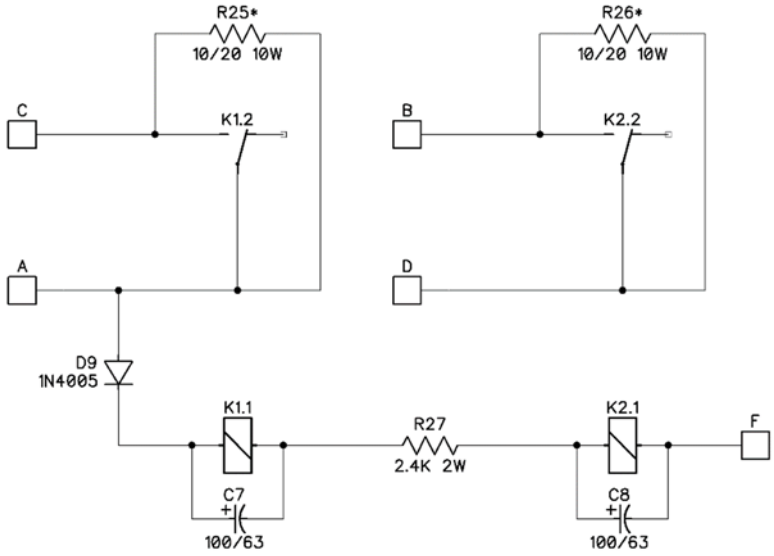
SS-100-120/240 BILL OF MATERIALS (BOM)				
Verification	**Part Number**	**Quantity**	**Description**	**Designation**
[ ]	PCB-104	1	SS-100-120/240 Soft-Start PCB v3.0	N/A
[ ]	CAP-104	2	100µF 63 VDC Electrolytic Capacitor	C7, C8
[ ]	DIO-101	1	1N4005 Diode	D9
[ ]	REL-104	2	SPDT 48 VDC Relay	K1, K2
[ ]	RES-121*	2	10Ω 10W Resistor	R25, R26
[ ]	RES-102*	2	20Ω 10W Resistor	R25, R26
[ ]	RES-115*	1	2.4KΩ 2W Resistor	R27

***The SS-100-120/240 kit will contain EITHER two (2) 10Ω 10W resistors (SS-100-120) or two (2) 20Ω 10W resistors (SS-100-240), depending on the SS-100 model you ordered.**

SS-100-120/240 UNIVERSAL SOFT-START MODULE PCB PARTS LAYOUT (PCB-104)



SS-100-120/240 UNIVERSAL SOFT-START MODULE SCHEMATIC



*FOR 120VAC OPERATION, R25 & R26 ARE 10 OHM 10 WATT
*FOR 240VAC OPERATION, R25 & R26 ARE 20 OHM 10 WATT

CIRCUIT PATH "BD" NOT USED FOR 120VAC MAINS

PAD 'F' CONNECTED TO LINE OUT NEUTRAL

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