SUPERIOR ELECTRIC
Bristol, CT 06010

COMPUTER GENERATED DRAWING .. DO NOT UPDATE MANUALLY

REV. A ISSUE
REV. B 3/15/93 Added coil mounting plug & updated sense turns.
REV. C 4/19/93 ECN92310, revised output connections.
REV. D 7/27/93 ECN92407, added tap locations for 5.5 amp input.
REV. E 9/7/93 ECN92422, revised tapping & VA tables. R & L

PRODUCT SPECIFICATION & INSTRUCTIONS for STABILINE® RVK40033 REGULATORS

(Part No. 221593-001)

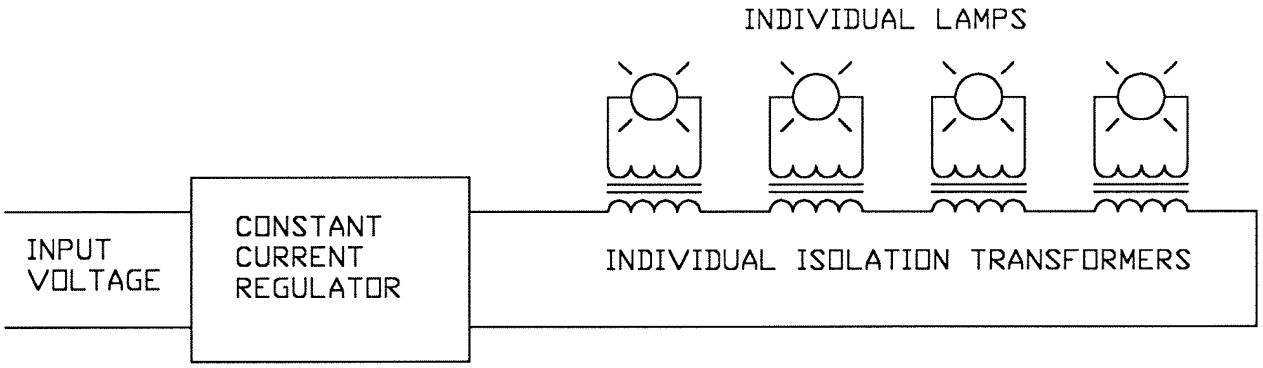
WARNING: High voltages are present on these components during operation. Installation and servicing should only be done by qualified personnel.

SUPERIOR ELECTRIC
WARNER ELECTRIC
DANA
383 Middle Street • Bristol, CT 06010
(203) 582-9561 • Fax (203) 589-2136

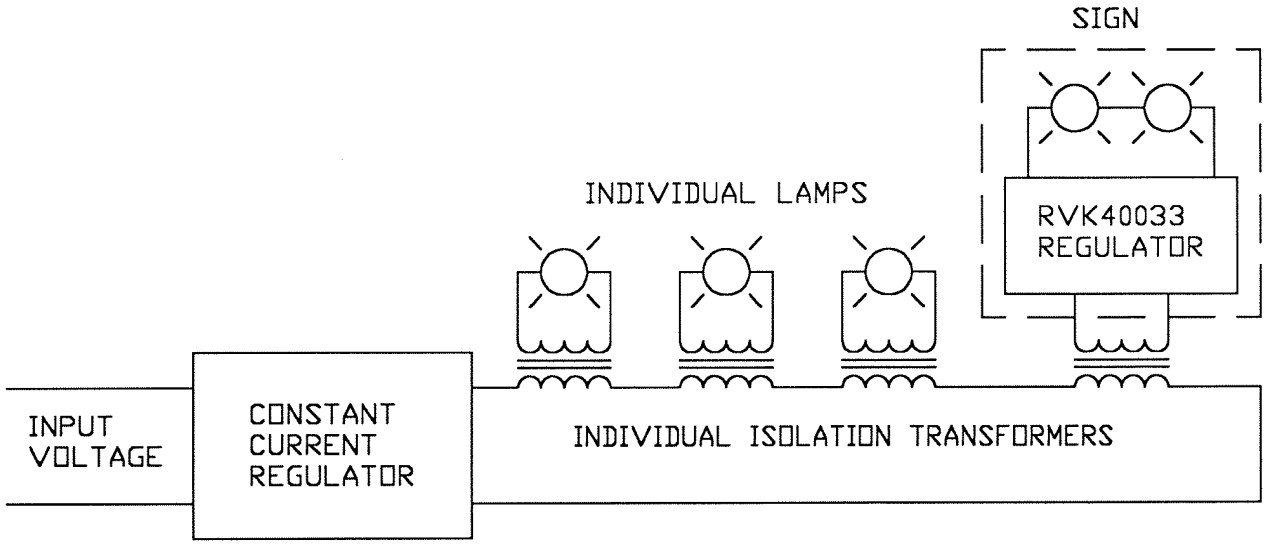
GENERAL

RVK40033 STABILINE® Regulators maintain constant brightness of runway signs as the other runway lighting (edge, center-line, touch down, and taxiway lighting) on the same circuit, is dimmed to match requirements of the prevailing conditions.

Runway lighting systems are series connected, constant current systems. Each lighting fixture is powered from the secondary of a small isolated current transformer. The primary of all the isolation transformers are connected in series and are powered from a constant current source as shown below. The current is regulated at the desired level regardless of the number of lamps in the circuit. Lamp intensity is in direct relationship to the current passed through it. Uniform brightness is produced in all bulbs because all receive the same current due to the series connection. All lamps on such a system can be dimmed by setting the constant current regulator to lower current levels.



As shown below, RVK40033 Regulators are connected between isolation transformers and the bulbs in signs. The regulator maintains constant voltage to the sign bulbs as the constant current regulator is adjusted to different current levels.



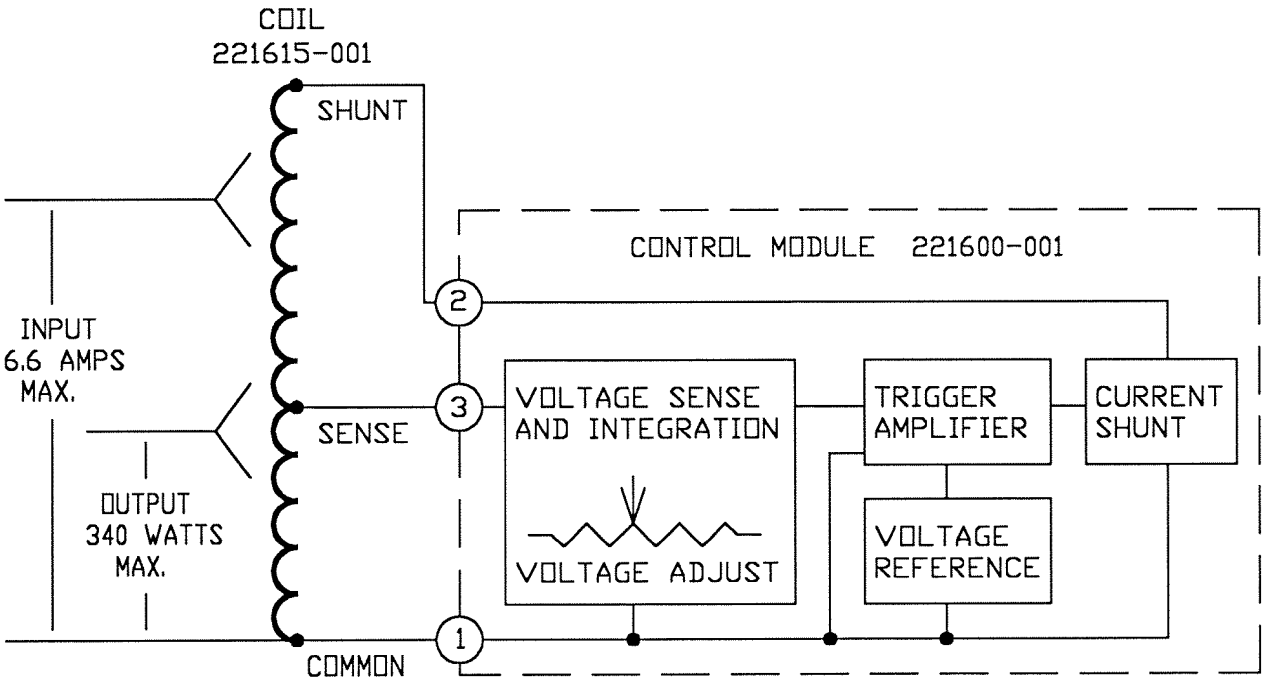
THEORY OF OPERATION

To understand the operation of RVK40033 STABILINE Regulators, it must be remembered that in constant current circuits, voltage is a measure of load magnitude. An open circuit is an overload resulting in excessive voltage. A short circuit is a no load condition resulting in zero voltage. In both these cases the current tries to remain constant.

This is in contrast to the more familiar constant voltage system where the current is a measure of load magnitude. In a constant voltage system an open circuit is a no load condition resulting in zero current. A short circuit is an overload condition resulting in excessive current. In both these cases the voltage tries to remain constant.

RVK40033 Regulators consist of a coil and a control module. To derive constant output voltage from a current source the RVK40033 control module senses the output voltage of the RVK 40033 coil and removes the load when the voltage reaches the desired level. This is done each half cycle. Since the input is a constant current system, the control module removes the load by shunting all the current away from the load. The shunted current is returned to the constant current system through the RVK40033 coil.

RVK40033 Block Diagram



The RVK40033 Regulator coil matches the available source current to the load requirements, provides sensing voltage to the control module, and provides the proper shunt current characteristics needed by the control module. The input turns on the coil are selected so that the required load power is available with the minimum desired input current. The output turns on the coil are selected to deliver the required nominal output voltage.

INSTALLATION

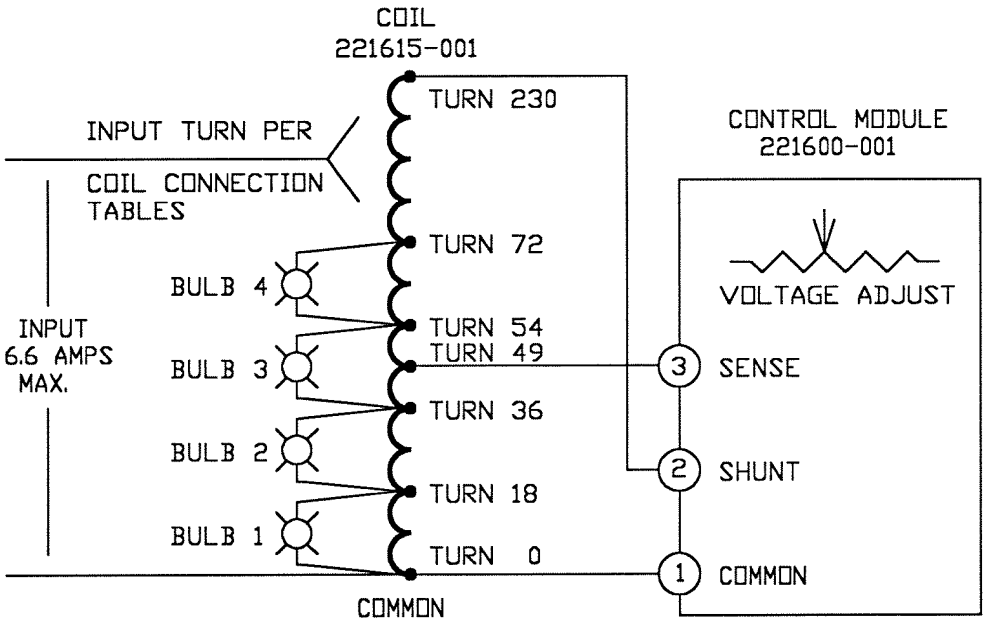
Each RVK40033 consists of a coil and a control module which must be mounted and wired. Reference the Connection Diagram and Dimensions for the RVK40033 STABILINE Regulator.

The coil can be mounted to a plate using 1/4" through 3/8" hardware and the plastic coil mounting plug furnished with the RVK40033. Insert the coil mounting plug in the top of the coil and bolt through the plug, coil and mounting plate. If the plate is metallic, an insulator rated for at least 120 volts AC is required between the coil and the plate. The control module has two clearance holes for #8 hardware. The control module does not need to be insulated from it's mounting plate, and does not need to be mounted to a heatsink.

All wiring to the coil and control module must be rated for at least 120 volts AC and 6.6 amps. Coil connections are soldered directly to the required turn. Control module connections are made through 1/4" quick connect terminals.

The coil has 230 turns. All turns are counted from the "common" connection which is located at turn zero. The enclosed RVK40033 dimension drawing shows which end of the coil is "common". The coil has tap insulators installed for the common (turn zero), sense (turn 49) and shunt (turn 230) connections. The coil also has tap insulators installed for connecting up to four bulbs (turns 18, 36, 54 and 72). Multiple bulbs may be connected in series, or each may be connected to the RVK40033 coil as shown in the following connection diagram. If one bulb burns out, the others will remain lit if the bulbs are each connected to the coil. With one bulb, omit bulbs 2, 3 and 4. With 2 bulbs, omit bulbs 3 and 4. With three bulbs, omit bulb 4.

RVK40033 Connection Diagram



The tap connection for the coil input turns must be located by the user. The location of this connection depends on the following combination of factors for the particular sign. The coil connection tables on the following pages show the input and output turns required for each of these combination of factors. A tap insulator is provided for the input connection.

1. Input Current Range: The tables are for input current ranges of 2.8 to 6.6 amps if a five step regulator is used, 4.8 to 6.6 amps if a three step regulator is used, and constant 5.5 amps.

   The input current to the RVK40033 regulator is provided from a constant current regulator feeding an isolation transformer. Usually a standard five step regulator with current steps of 2.8, 3.4, 4.1, 5.2 and 6.6 amps with a 1:1 isolation transformer is used; or a three step regulator with current steps of 4.8, 5.5, and 6.6 amps feeding a 1:1 isolation transformer is used, or a fixed current of 5.5 amps feeding a 1:1 isolation transformer is used.

   Input taps listed for a wider current range can be used. However, the maximum input VA will increase to that listed for the wider current range.

2. Bulb Rating: The tables are for 12 volt lamps rated at 42, 50 or 75 watts.

3. Number of Bulbs: The tables assume all bulbs are wired in series. Since all bulbs are in series, all will carry the same current, and all must have the same rating.

Individual bulb watt rating:	42	50	75
Maximum number of bulbs:	8	6	4

4. Actual Bulb Voltage Desired: The tables are for maximum actual voltages of 12.0, 11.5, and 11.0 volts. Tap locations for a higher voltage can be used. However, the maximum input VA will increase to that listed for the higher voltage.

Coil Connection Tables

Maximum Bulb Voltage - 12.0										
Number of Bulbs In Series	Output Turns	Input Turns								
		42 Watt Bulbs			50 Watt Bulbs			75 Watt Bulbs		
		2.8 - 6.6 Amp 5 Step Regulator	4.8 - 6.6 Amp 3 Step Regulator	5.5 Amp Regulator	2.8 - 6.6 Amp 5 Step Regulator	4.8 - 6.6 Amp 3 Step Regulator	5.5 Amp Regulator	2.8 - 6.6 Amp 5 Step Regulator	4.8 - 6.6 Amp 3 Step Regulator	5.5 Amp Regulator
1	18	27	18	16	33	21	18	49	30	26
2	36	54	36	32	66	42	36	98	60	52
3	54	81	54	48	99	63	54	147	90	78
4	72	108	72	64	132	84	72	196	120	104
5	90	135	90	80	165	105	90	----	----	----
6	108	162	108	96	198	126	108	----	----	----
7	126	189	126	112	----	----	----	----	----	----
8	144	216	144	128	----	----	----	----	----	----

Maximum Bulb Voltage - 11.5										
Number of Bulbs In Series	Output Turns	Input Turns								
		42 Watt Bulbs			50 Watt Bulbs			75 Watt Bulbs		
		2.8 - 6.6 Amp 5 Step Regulator	4.8 - 6.6 Amp 3 Step Regulator	5.5 Amp Regulator	2.8 - 6.6 Amp 5 Step Regulator	4.8 - 6.6 Amp 3 Step Regulator	5.5 Amp Regulator	2.8 - 6.6 Amp 5 Step Regulator	4.8 - 6.6 Amp 3 Step Regulator	5.5 Amp Regulator
1	18	26	18	16	31	21	18	47	29	25
2	36	52	34	30	62	40	34	94	58	50
3	54	78	51	45	93	60	51	141	87	75
4	72	104	68	60	124	80	68	188	116	100
5	90	130	85	75	155	100	85	----	----	----
6	108	156	102	90	186	120	102	----	----	----
7	126	182	119	105	----	----	----	----	----	----
8	144	208	136	120	----	----	----	----	----	----

Coil Connection Table

Maximum Bulb Voltage - 11.0										
Number of Bulbs In Series	Output Turns	Input Turns								
		42 Watt Bulbs			50 Watt Bulbs			75 Watt Bulbs		
		2.8 - 6.6 Amp 5 Step Regulator	4.8 - 6.6 Amp 3 Step Regulator	5.5 Amp Regulator	2.8 - 6.6 Amp 5 Step Regulator	4.8 - 6.6 Amp 3 Step Regulator	5.5 Amp Regulator	2.8 - 6.6 Amp 5 Step Regulator	4.8 - 6.6 Amp 3 Step Regulator	5.5 Amp Regulator
1	18	25	17	15	30	20	17	45	28	24
2	36	50	32	28	60	38	32	90	56	48
3	54	75	48	42	90	57	48	135	84	72
4	72	100	64	56	120	76	64	180	112	96
5	90	125	80	70	150	95	80	----	----	----
6	108	150	96	84	180	114	96	----	----	----
7	126	175	112	98	----	----	----	----	----	----
8	144	200	128	112	----	----	----	----	----	----

OUTPUT VOLTAGE ADJUSTMENT - TROUBLESHOOTING

After all input, output and control wiring has been completed, apply the maximum nominal amps (6.6 or 5.5 amps) to the input of the RVK40033 STABILINE Regulator from a 60 Hz, constant current source. Adjust the output voltage to the maximum voltage desired. The total output voltage of the RVK40033 Regulator equals the desired individual bulb voltage times the number of bulbs (all bulbs are in series). Because the output voltage and current are not sine waves, a true RMS voltmeter should be used. The adjustment is made by rotating the "Adjust" potentiometer on the RVK40033 control module. Clockwise rotation increases the output voltage, and counter clockwise decreases the output voltage.

When the RVK40033 Regulator is operating properly, the output voltage to the bulbs will be held to within approximately one volt per bulb as the input current is varied over the normal range. Disconnecting the load bulbs will not hurt the RVK40033 Regulator. However, the output voltage will increase approximately 10%.

If the control module fails shorted, the output voltage will be approximately zero regardless of the input current or load. If the control module fails open, the unit will no longer regulate. With a load connected, the output voltage will vary with the input current, up to a maximum of approximately 16 volts per bulb. With no load connected the output voltage will read approximately 16 volts per bulb when input current is applied. If the control module fails, replace the module and readjust the output voltage.

SPECIFICATIONS

Electrical

Input Current	6.6 Amps Nominal, 60 Hz, Single Phase
Max Input Voltage	150 Volts
Output Voltage	10 to 96 Volts - User Selectable
Load	340 VA Max. or 6.3 Amps Max
Bulb Rating	12 volt lamps rated at 42, 50 or 75 watts.
Configuration	All bulbs to be wired in series and all must have the same rating.
Number of Bulbs:	Individual bulb watts: 42 50 75
	Maximum bulbs: 8 6 4
Output Voltage Regulation	± 10% Max

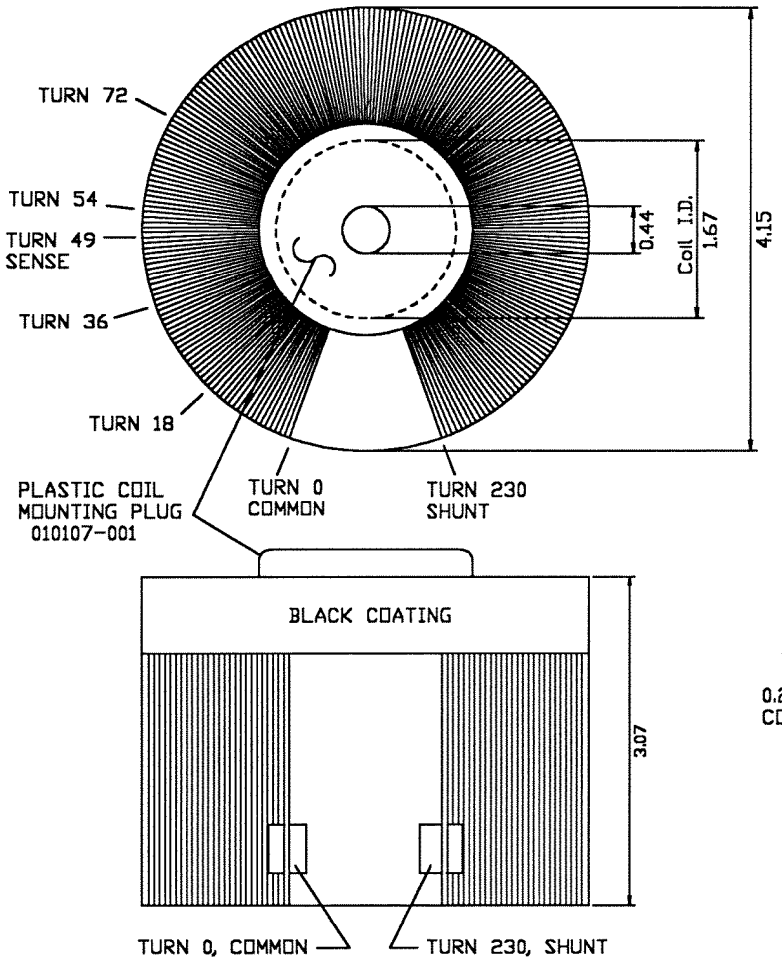
Maximum input VA to the RVK40033 Regulator is estimated to be as shown in the following table. These values are with the input and output turns connected as shown in the "Coil Connection Tables", and the control module adjusted for the maximum bulb voltage shown in the "Coil Connection Tables". The maximum input VA values below are per bulb and with maximum nominal amps into the regulator.

Maximum Input VA Per Bulb									
Coil Tapped Per Coil Connection Table For	42 Watt Bulbs			50 Watt Bulbs			75 Watt Bulbs		
	2.8 - 6.6 Amp 5 Step Regulator	4.8 - 6.6 Amp 3 Step Regulator	5.5 Amp Regulator	2.8 - 6.6 Amp 5 Step Regulator	4.8 - 6.6 Amp 3 Step Regulator	5.5 Amp Regulator	2.8 - 6.6 Amp 5 Step Regulator	4.8 - 6.6 Amp 3 Step Regulator	5.5 Amp Regulator
12.0 Volts	125	81	59	152	97	70	226	142	101
11.5 Volts	115	73	53	137	88	65	208	132	94
11.0 Volts	106	65	51	127	79	58	191	121	86

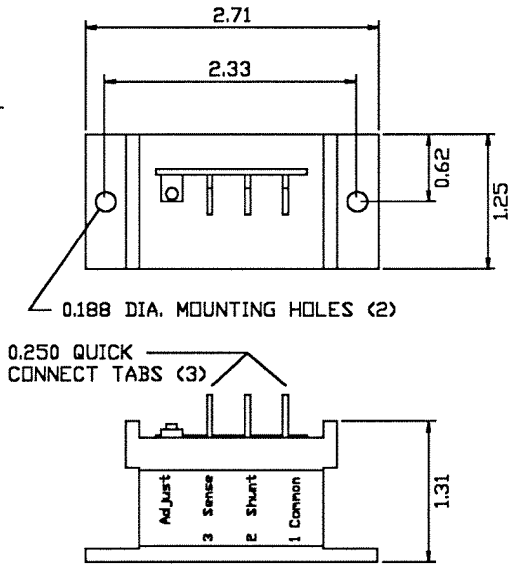
Environmental

Construction	Units are open constructed components.
Temperature, Operating & Storage	-48°C to +65°C (-55°F to +150°F)
Humidity, Operating and Storage	Relative humidity not to exceed 95% non-condensing.
Altitude	
Operating	6,600 ft (2,000 meters) Max.
Storage	50,000 ft (15,000 meters) Max

DIMENSIONS



COIL 221615-001



CONTROL MODULE 221600-001