

VACTEC GENERAL PURPOSE VACTROLS

Bulletin VTL 9

MAXIMUM RATINGS	
Maximum case dissipation (5)	400 mW — derate 10 mW/°C above 35°C — case
Maximum cell power	200 mW — derate 4 mW/°C above 25°C — case,
Isolation voltage	500V
Thermal resistance— case to ambient	40°C/W
Ambient temperature	-40°C to +75°C

SPECIFICATIONS @ 25°C

Part Number	LAMP Volts	mA	PHOTOCELL			RESPONSE — mSec (5)	Dark Cell Ascent (typ) (max)	Light Cell Descent (typ) (max)
			Dark Adapt (typ) (max)	OFF (min)	ON RESISTANCE — OHMS (3)			
VTL9A1	1.5	50	150	400	10 ⁴	70	350	100
VTL9A2	6.0	40	30	60	10 ⁴	50	350	100
VTL9A3	10	14	80	250	10 ⁴	55	160	100
VTL9A4	10	22	65	300	10 ⁴	80	400	100
VTL9A5	10	22	700	1500	10 ⁴	80	225	200
VTL9A9	6.0	40	110	200	10 ⁴	55	250	300
VTL9A10	10	14	550	800	10 ⁴	60	150	300
VTL9A11	12	25	400	600	10 ⁴	90	250	300

These Vactrols combine incandescent or neon lamps in a low cost aluminum case. Both single and dual cell units are available in the same case size.

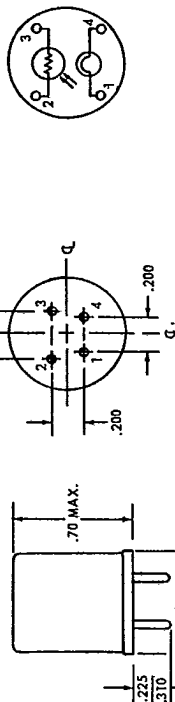
These units may be operated in the ON-OFF mode or in proportional control circuits with a wide range of control. Neon units are intended primarily for ON-OFF operation although a 10:1 variation in lamp current is usually workable. Neon lamps are of the "circuit components" type which have enhanced breakdown characteristics in total darkness. Applications include photochoppers, DC isolators, noiseless switching, automatic gain controls, audio limiting and compression, SCR and Triac firing, audio effects and computer interfacing. Low resistance units are compatible with TTL logic.

- NOTES:**
- Incandescent Lamps: The rated voltage at the maximum DC or RMS value which may be applied to the lamp is the rated voltage. Lamps may be operated at any lower voltage.
 - Neon Lamps: The photocell resistance values apply for DC lamp currents. These lamps require a minimum voltage to ignite the gas within the lamp. The voltage at which the lamp ignites is approximately 100V. The voltage across the lamp drops and remains substantially constant, regardless of the current through the lamp. This lower voltage is called the "sustaining voltage." When the lamp ignites, the lamp turns off. The lamp turns off. The breakdown and sustaining voltages for the neon modules are:
 - VTL9A5, 9B7 Sustaining 60VDC Breakdown 100VDC
 - VTL9A9, 9B7 Sustaining 60VDC Breakdown 100VDC
 - Before operation, the resistance of the lamp is very high. However, after breakdown, the lamp resistance drops to a low value, as shown in the graph above. A resistor must be placed in series with the lamp to limit the current to the lamp. The approximate value for this resistor is given by the following formula:

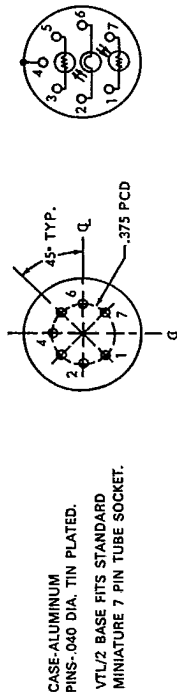
$$R = \frac{V_s - V_l}{I}$$
 where:
 - V_s = Supply voltage, DC or RMS
 - V_l = Lamp voltage, DC or RMS
 - I = Lamp current
 - While neon lamps will ignite and glow at less than the indicated breakdown value, it is recommended that the supply voltage be at least 10% greater than this value.
 - AC Operation: The lamp must be energized each half cycle of AC. To assure operation only during the positive half cycle, minimum response times are recommended:
 - VTL9A1, 9A2, 9A3, 9A4, 9A5, 9A9, 9B7 100VAC
 - VTL9A10, 9A11 150VAC
 - After breakdown, the lamp resistance is very high. The lamp current must be limited to the rated value. Typical series resistors for 120VAC operation are:
 - VTL9A1, 9A2, 9A3, 9A4, 9A5, 9A9, 9B7 100VAC
 - VTL9A10, 9A11 150VAC
 - For equal lamp current, the photocell resistance will be slightly higher with AC lamp current than with DC lamp current.
 - Turn-On Time: The time required for the neon lamp to turn on depends upon the ratio of peak applied voltage to lamp breakdown voltage. To assure breakdown in total dark-

DIMENSION DRAWINGS

VTL9 Series Bottom View



VTL9/2 Series Bottom View



CASE—ALUMINUM
PINS—.040 DIA. TIN PLATED.
VTL/2 BASE FITS STANDARD MINIATURE 7 PIN TUBE SOCKET.

ORDERING INFORMATION

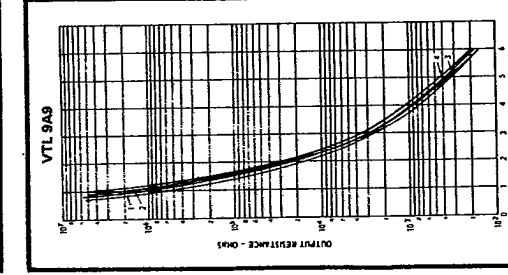
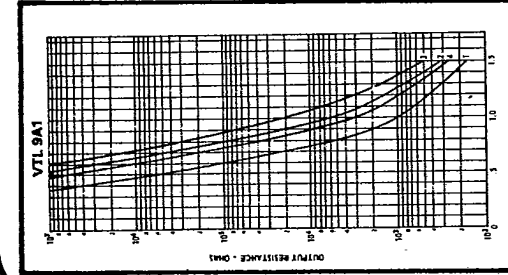
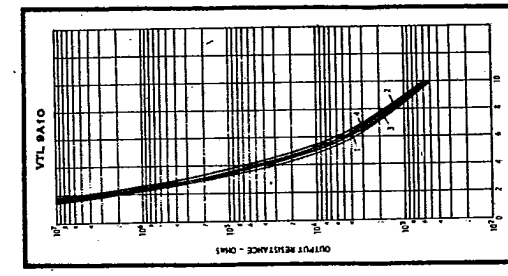
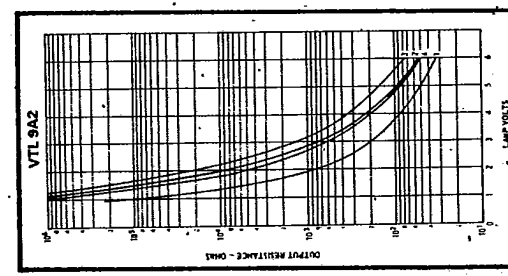
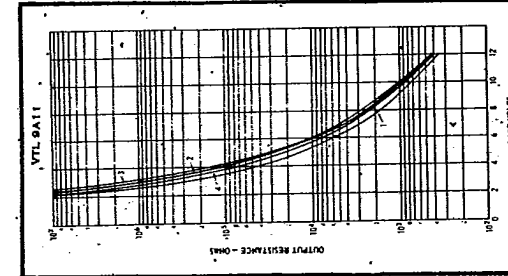
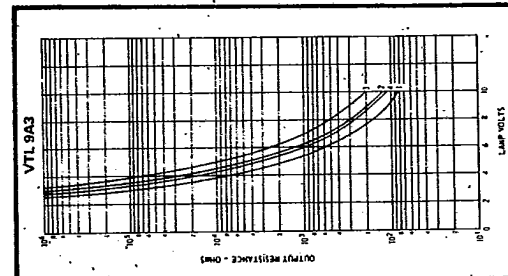
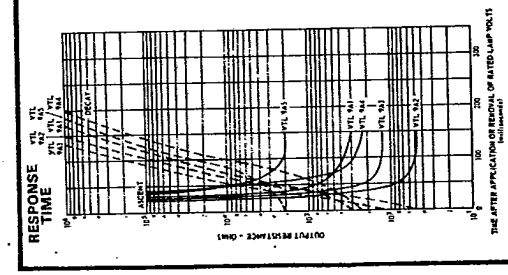
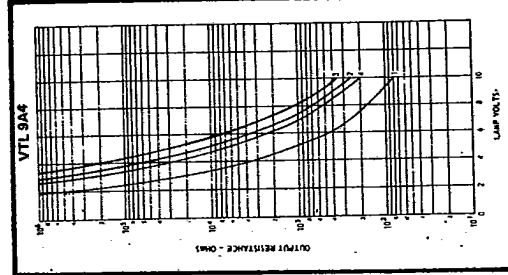
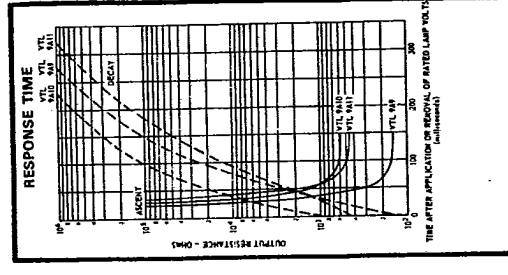
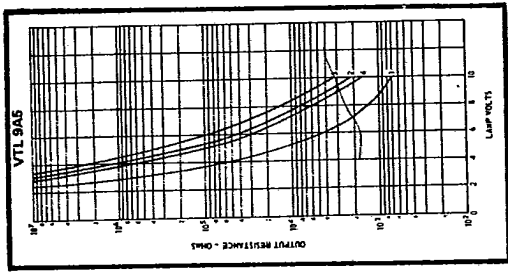
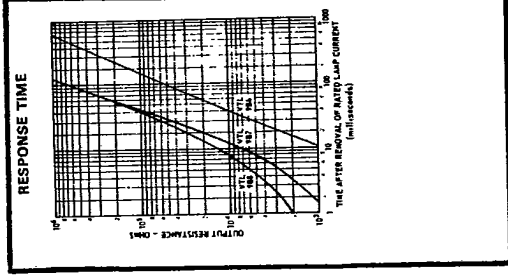
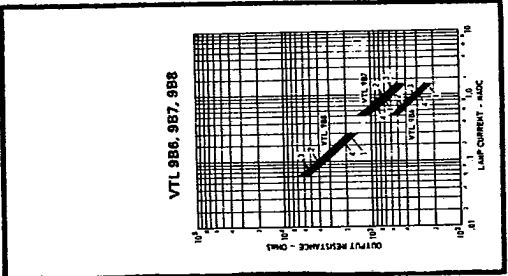
Single Element Vactrols Order by the indicated part number.
Dual Element Vactrols These units have one lamp and two photocells, each of which conforms to the basic specification, except the maximum on resistance at rated input will be 25% higher. Where special matching or tracking is required, consult the factory. Order by indicated part number adding /2 after the basic part number.
Inquiries for special characteristics are invited.

The VTL9 series replaces, for new design, devices listed on Bulletin PCD-4C1 and PCD-4C2 as follows:

INCANDESCENT TYPES	NEON TYPES
New part numbers	Replace these part numbers
VTL9A1	VT15040
VTL9A2	VT6005
VTL9A4	VT10030
VTL9A5	VT10150
VTL9B6	VT120020N
VTL9B7	VT120100N

Designers and manufacturers of CdS, CdSe photoconductive cells—See photovoltaic cells.

VTL9



- Notes:
1. All curves are typical.
 2. Where guaranteed transfer characteristics are required over a range of input conditions, please consult the factory.
 3. Figures 1-4 show input voltage vs. output resistance after the following adapt conditions:
 - (1) 25°C - 24 hour no input
 - (2) 25°C - 24 hour at rated input
 - (3) 50°C - 24 hour at rated input
 - (4) -20°C - 24 hour at rated input
 4. Incandescent lamp ascent times are reduced approximately 25-30 ms for rapid re-application of lamp voltage.