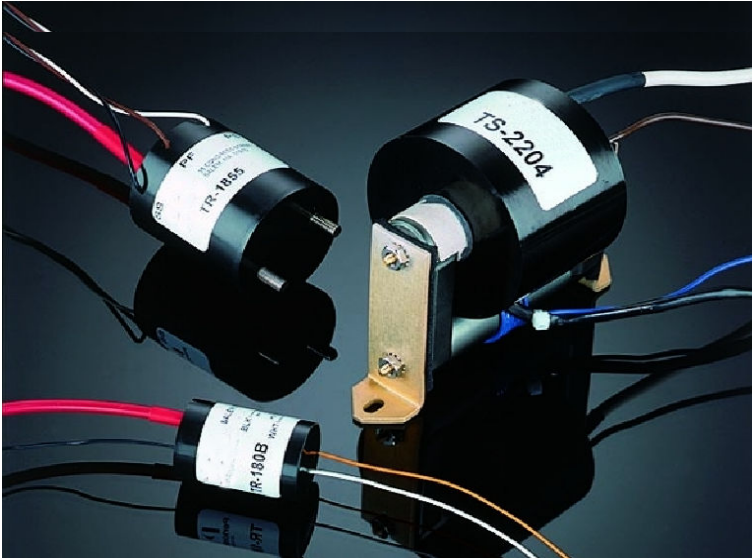


Trigger Transformers and Chokes



Description

Excelitas has been manufacturing high voltage transformers since 1956.

Standard and custom designs are available with a wide range of input and output voltages. High performance is ensured through state-of-the-art manufacturing techniques including vacuum impregnation, vacuum encapsulations, and meter-mix and dispense systems.

Features

- Peak output voltage up to 40kV
- Load current up to 80A RMS
- Surface mount, through hole or hardware mounted
- Flexible design—easily modified

EXCELITAS
TECHNOLOGIES

External Trigger Transformers

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| Type | Peak Output Voltage (kV)* | Primary Discharge Capacitor (ufd) | MAX Input DC Source (Volts) | Peak Primary Current (A)** | Rise Time 10%-90% (μs)** | Pulse Width 50% Amplitude (μs)** | Turns Ratio | Hold-off Voltage | | | | | | |
|------------|---------------------------|-----------------------------------|-----------------------------|----------------------------|--------------------------|----------------------------------|-------------|-------------------|-----------------|----------------|-----------------|-------------------|--|--|
| | | | | | | | | Sec to Pri (kVdc) | Length (inches) | Width (inches) | Height (inches) | Diameter (inches) | | |
| TR-2298*** | 5.0 | | | | | | | | | | | | | |
| | 6.0 | 0.1 | 150 | 50 | 0.1 | 0.35 | 21:1 | 4.0 | 0.35 | 0.41 | 0.34 | — | | |
| TR-36A | 7.0 | 1.0 | 250 | 25 | 1.0 | 5.0 | 15:1 | 0.5 | — | — | 0.69 | 1.06 | | |
| TR-2300*** | 10.0 | 0.1 | 200 | 80 | 0.15 | 0.35 | 21:1 | 4.0 | 0.35 | 0.41 | 0.35 | — | | |
| TR-1647 | 12.0 | 2.0 | 40 | 40 | 1.5 | 1.2 | 250:1 | 1.0 | — | — | 1.00 | 1.25 | | |
| TR-2289 | 12.0 | 0.5 | 160 | 90 | 0.8 | 1.0 | 58:1 | 4.0 | — | — | 0.78 | 1.03 | | |
| TR-148A | 12.0 | 0.5 | 400 | 120 | 0.35 | 0.5 | 30:1 | 2.0 | — | — | 1.93 | 1.25 | | |
| TR-2080 | 15.0 | 0.5 | 150 | 60 | 0.5 | 1.0 | 65:1 | 2.0 | — | — | 1.00 | 0.94 | | |
| TR-1749C | 18.0 | 0.5 | 250 | 120 | 0.7 | 0.7 | 80:1 | 0 | — | — | 1.25 | .625 | | |
| TR-2081 | 20.0 | 1.0 | 200 | 140 | 1.0 | 2.5 | 155:1 | 5.0 | — | — | 1.75 | 1.25 | | |
| TR-132C | 20.0 | 0.5 | 400 | 60 | 2.25 | 2.5 | 70:1 | 0 | — | — | 1.06 | 1.75 | | |
| TR-180B | 20.0 | 1.0 | 200 | 110 | 1.0 | 1.5 | 112:1 | 5.0 | — | — | 1.50 | 1.00 | | |
| TR-2070 | 25.0 | 0.5 | 240 | 76 | 1.5 | 1.2 | 220:1 | 0 | — | — | 1.50 | 0.75 | | |
| TR-2157 | 25.0 | 0.5 | 350 | 60 | 1.2 | 1.5 | 73:1 | 5.0 | — | — | 2.25 | 1.25 | | |
| TR-2012 | 28.0 | 0.5 | 300 | 90 | 2.0 | 5.0 | 163:1 | 1.5 | — | — | 2.06 | 1.75 | | |
| TR-1700 | 35.0 | 0.5 | 400 | 70 | 0.75 | 1.5 | 70:1 | 20.0 | 3.63 | 2.13 | 2.00 | — | | |
| TR-1795 | 40.0 | 0.22 | 600 | 96 | 0.5 | 0.5 | 51:1 | 15.0 | 3.06 | 3.63 | 7.00 | — | | |
| TR-1855 | | 2.0 | 300 | 90 | 5.0 | 5.0 | 121:1 | 5.0 | — | — | 2.06 | 1.75 | | |

*Open circuit, unloaded secondary.

**Measured at maximum voltage input, with primary discharge capacitor listed.

***Surface mount.

Series Trigger Transformers

| Type | Peak Output Voltage (kV)* | Rise Time 10%-90% (μs)** | Pulse Width 50% Amplitude (μs)** | MAX Input DC Source (Volts) | Peak Primary Current (A)** | Turns Ratio Secondary to Primary | Hold-off Voltage Secondary to Primary (kVdc) | Saturated Inductance μH sat | Winding Resistance ohms | MAX Current RMS (A) | Length (inches) | Width (inches) | Height (inches) |
|---------|---------------------------|--------------------------|----------------------------------|-----------------------------|----------------------------|----------------------------------|--|-----------------------------|-------------------------|---------------------|-----------------|----------------|-----------------|
| | | | | | | | | | | | | | |
| TS-1987 | 10 | 0.5 | 0.3 | 600 | 215 | 19:1 | 5 | 70 | 0.5 | 0.1 | — | 1.0 | 1.3 |
| TS-1952 | 10 | 0.6 | 0.2 | 400 | 300 | 40:1 | 5 | 36 | 0.1 | 1 | — | 1.5 | 1.0 |
| TS-2028 | 13 | 0.5 | 0.5 | 500 | 120 | 40:1 | 5 | 35 | 0.03 | 16 | 2.4 | 2.3 | 1.9 |
| TS-179 | 15 | 0.4 | 0.7 | 800 | 100 | 25:1 | 5 | 80 | 0.05 | 12 | 2.8 | 2.1 | 2.5 |
| TS-2295 | 18 | 0.8 | 1.0 | 500 | 170 | 29:1 | 20 | 350 | 0.22 | 18 | 3.5 | 2.8 | 3.56 |
| TS-170 | 20 | 0.2 | 0.5 | 2000 | 150 | 10:1 | 5 | 18 | 0.05 | 20 | 2.8 | 2.3 | 2.5 |
| TS-146B | 22 | 0.5 | 1.3 | 1000 | 850 | 30:1 | 30 | 73 | 0.015 | 35 | 4.0 | 3.5 | 6.0 |
| TS-146A | 27 | 0.5 | 0.5 | 1500 | 660 | 30:1 | 30 | 110 | 0.033 | 25 | 4.0 | 3.5 | 6.5 |
| TS-185 | 30 | 0.5 | 1.0 | 600 | 60 | 50:1 | 15 | 550 | 0.3 | 15 | 3.3 | 2.8 | 3.8 |
| TS-136B | 40 | 0.65 | 2.15 | 1500 | 1100 | 30:1 | 30 | 110 | 0.02 | 80 | 7.5 | 5.0 | 5.75 |

*Open circuit, unloaded secondary.

**Measured at maximum voltage input, with primary discharge capacitor listed.

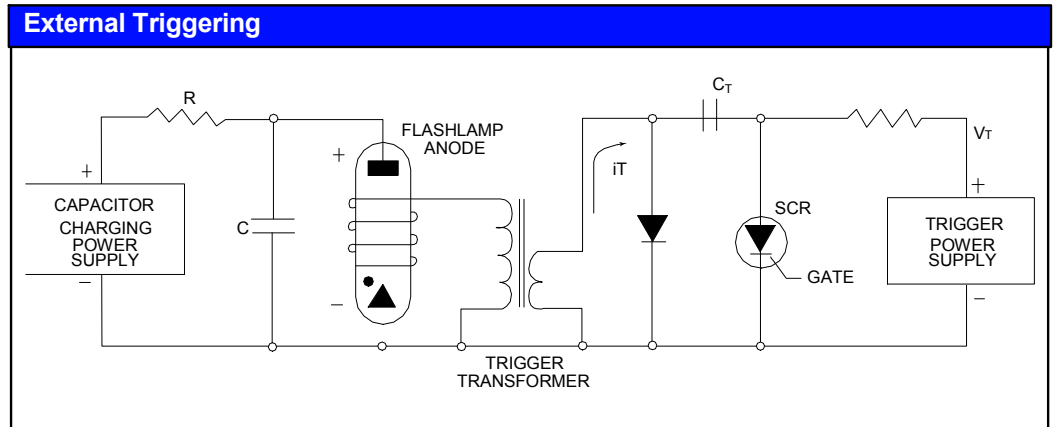
Chokes

| Type | Inductance | DC Resistance (ohms) | Voltage (kV) | MAX Peak Current 1 ms Pulse (amp) | MAX RMS Current (amp) | Length (inches) | Width (inches) | Height (inches) |
|---------|------------|----------------------|--------------|-----------------------------------|-----------------------|-----------------|----------------|-----------------|
| TC-2136 | 50 | 0.03 | 5 | 2000 | 25 | 2.6 | 3.5 | 4.3 |
| TC-1848 | 200 | 0.12 | 5 | 300 | 8 | — | 2.4 | 1.8 |
| TC-70 | 300 | 0.19 | 5 | 2000 | 8 | 3.5 | 2.6 | 4.75 |
| TC-71 | 600 | 0.25 | 5 | 2000 | 8 | 3.8 | 2.6 | 4.75 |
| TC-198 | 775 | 0.27 | 2.5 | 1000 | 4 | 4.0 | 2.6 | 4.75 |

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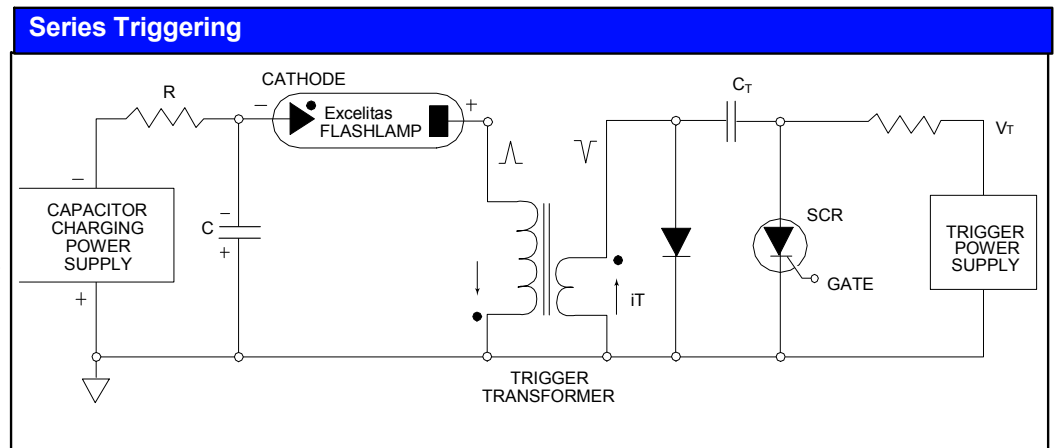
External Triggering

External triggering uses a high voltage trigger pulse to create a thin ionized streamer between the anode and cathode within the lamp. The coupling of this voltage to the lamp may be accomplished using a thin nickel wire wrapped around the surface of the lamp envelope as shown. Other techniques used to couple external trigger transformers are reviewed in the technical paper “Design Considerations for Triggering of Flashlamps”.



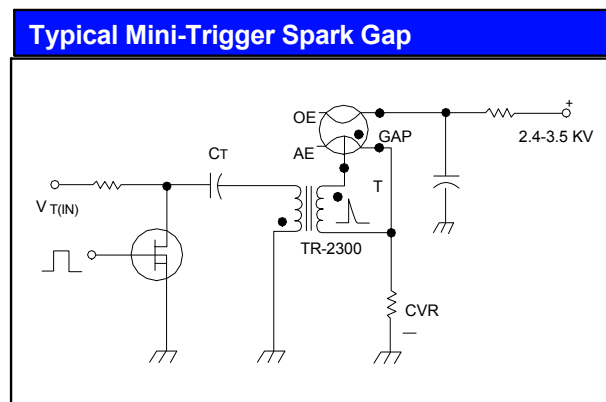
Series Injection Triggering

Series injection triggering differs from external triggering in that the discharge current from the energy storage capacitor passes through the secondary winding of the trigger transformer. The secondary winding of the transformer must therefore be designed to carry the total current of the discharge. This type of trigger transformer is consequently larger, heavier and more expensive than the external trigger transformer.



The inductance of the secondary winding (of the trigger transformer) is part of the discharge circuit and may be utilized to control the energy storage capacitor's current pulse wave shape. A typical series injection circuit is shown.

Additional series injection trigger circuit configurations are discussed in the technical paper “Design Considerations for Triggering of Flashlamps”.



Outline Drawings or Specification Charts

| | |
|---------------------------|---|
| $E = 1/2 CV^2$ | where: E = Discharge energy (joules) |
| | C = Capacitance (microfarads) |
| | V = Discharge voltage (kilovolts) |
| $PAVG = EF$ | PAVG = Average power (watts) |
| | E = Discharge energy (joules) |
| | F = Flash rate (pulses per second) |
| $IPK = V(C/L)^{1/2}$ | IPK = Peak discharge current (keep below 1000 amps) |
| | L = Circuit inductance (use 0.5 μ H for best approximation) |
| $t_{1/3} = \pi(LC)^{1/2}$ | $t_{1/3}$ = Pulse width at 1/3 peak. |

Note: Peak currents should be kept below 1000 amps. Exceeding this limit could cause envelope fracture, excessive electrode wear and premature darkening.

Caution

Some glass flashlamps are under high internal pressure, and, if broken, could result in glass particles being blown into the face and hand areas. To prevent injury, wear suitable protective devices such as safety glasses and/or face mask and gloves.

Some types of pulsed lamps generate intense ultraviolet radiation which, if not properly shielded from personnel in the area, will cause burns to any exposed skin and especially to the eyes. Do not expose any skin area or the eyes to the direct or reflected radiation of an operating lamp. If you have to view an operating lamp, always use protective covering for exposed skin area and ultraviolet-attenuating goggles for the eyes.

For more information email us at generalinquiries@excelitas.com or visit our web site at www.excelitas.com

Note: All specifications subject to change without notice.

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