# **Triggergaps**



#### DESCRIPTION

CP Clare's Triggergaps are high-energy spark gaps that are capable of switching stored energy in a fraction of a microsecond. Triggergaps require no standby power, are extremely rugged, and require only a low-energy, high-voltage triggering pulse. The miniature TA series (1-15kV) provides switching capability for pulses with energy content as high as 50 joules. The larger TB series (2.5-25 kV) will reliably switch pulses with up to 300 joules of energy. The TG-221 to 226 (1-60 kV) can switch pulses with energy contents of up to 6000 joules and feature adjustable self-breakdown voltages.

#### **FEATURES**

- Tight self-breakdown voltage tolerance (±10%;TA & TB series)
- Adjustable self-breakdown voltage (TG-221 to TG-226)
- Rugged ceramic-metal construction
- Refractory metal electrodes
- Corrosion-resistant stainless steel external surfaces (TB series)

#### **APPLICATIONS**

- High current surge generators
- Exploding bridge wire systems
- Crowbars
- Flashtube triggers

## STANDARD VOLTAGES

Series or P/N	Self-Breakdown	Units
	Voltage (typ)	
TA	1.0	kV
	2.0	kV
	5.0	kV
	7.0	kV
	10.0	kV
	15.0	kV
ТВ	2.5	kV
	5.0	kV
	10.0	kV
	15.0	kV
	20.0	kV
	25.0	kV
TG-221	1.0-20.0	kV
TG-222	18.0-40.0	kV
TG-224	1.0-20.0	kV
TG-225	18.0-40.0	kV
TG-226	35.0-60.0	kV



# **Triggergaps**

#### **SPECIFICATIONS**

All characteristics at 25°C			7	ΓA-1.0	)		TA-2.0	)		TA-5.0	)	
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	UNITS
Device Specifications Self-Breakdown Voltage Applied Voltage Trigger Voltage <sup>1</sup> Dimension A	100V/s t <sub>r</sub> =0.5μs, PW=3.0μs	E <sub>z</sub> E <sub>bb</sub> e <sub>trig</sub>	0.9 0.4 3.0 0.687	1.0 - - 0.750	1.1 0.85 2.5 0.813	1.8 0.7 3.0 0.697	2.0 - - 0.760	2.2 1.7 2.5 0.823	4.5 1.2 3.5 0.697	5.0 - - 0.760	5.5 4.2 2.5 0.823	kV kV kV pk inches
<b>Life Ratings</b> Discharge Life <sup>2</sup>	≥1000 shots into $.2\Omega$	-	45	-	-	50	-	-	50	-	-	J

				A-7.0	)	IA-10.0 IA-15.0						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	UNITS
Device Specifications Self-Breakdown Voltage Applied Voltage Trigger Voltage¹ Dimension A	100V/s t <sub>,</sub> =0.5μs, PW=3.0μs	E <sub>z</sub> E <sub>bb</sub> e <sub>trig</sub>	6.3 1.9 3.7 0.697	7.0 - - 0.760	7.7 5.8 2.8 0.823	9.0 3.5 5 0.727	10.0 - - 0.790	11.0 8.5 3.5 0.853	13.5 7.0 8.0 0.767	15.0 - - 0.830	16.5 12.5 4.5 0.893	kV kV kV pk inches
<b>Life Ratings</b> Discharge Life <sup>2</sup>	≥1000 shots into .2Ω	-	50	-	-	60	-	-	70	-	-	J

				B-2.	)		I B-5.0	J	- 1	B-10.	U	
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	UNITS
Device Specifications Self-Breakdown Voltage Applied Voltage Trigger Voltage¹ Dimension A Dimension B Dimension C	100V/s t <sub>r</sub> =0.5μs, PW=3.0μs	E <sub>z</sub> E <sub>bb</sub> e <sub>trig</sub> - -	2.25 0.8 3.1 - -	2.50 - - 1.99 - -	2.75 2.0 1.8 - 0.23 2.03	4.5 1.5 3.2 - -	5.0 - - 1.99 - -	5.5 4.0 1.9 - 0.23 2.03	9.0 3.0 4.6 - -	10.0 - - 1.99 - -	11.0 8.0 2.1 - 0.58 2.10	kV kV pk inches inches inches
<b>Life Ratings</b> Discharge Life <sup>2</sup>	discharges into $.3\Omega$	-	150	-	-	150	-	-	300	-	-	J

			T	B-15.	0	Т	B-20.	0	T	B-25.	.0	
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	UNITS
Device Specifications Self-Breakdown Voltage Applied Voltage Trigger Voltage¹ Dimension A Dimension B Dimension C	100V/s t <sub>r</sub> =0.5μs, PW=3.0μs	E <sub>Z</sub> E <sub>bb</sub> e <sub>trig</sub> -	13.5 4.5 6.3 - -	15.0 - - 2.67 -	16.5 12.0 3.5 - 0.58 2.10	18.0 6.0 8.0 - -	20.0 - - 2.79 -	22.0 16.0 4.5 - 0.58 2.10	22.5 7.5 9.7 - -	25.0 - - 2.79 - -	27.5 20.0 5.2 - 0.58 2.10	kV kV pk inches inches inches
Life Ratings Discharge Life <sup>2</sup>	discharges into $.3\Omega$	-	300	_	_	300	-	-	300	_	-	J

<sup>&</sup>lt;sup>1</sup> The trigger voltages given in these tables are the minimum triggering voltages necessary for triggering at the corresponding applied voltage limits. As the applied trigger voltage increases, the trigger voltage required for triggering decreases. It is assumed that the trigger is applied across the trigger and adjacent main electrodes — higher trigger voltages are required if it is applied across the trigger voltage and opposite main electrodes.



<sup>&</sup>lt;sup>2</sup> End point for life testing is a 15% reduction in the self-breakdown voltage.

<sup>&</sup>lt;sup>3</sup> Because the self-breakdown voltage of these devices is adjustable, the trigger voltage required for any particular applied voltage cannot be specified. Clare suggests setting the self-breakdown voltage to at least 115% of the maximum applied voltage.

# **Triggergaps**

### **SPECIFICATIONS**

All characteristics at 25°C **TG-221** TG-222 **TG-224** 

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PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	UNITS
Device Specifications Self-Breakdown Voltage Applied Voltage Dimension A Dimension B	100V/s	Е <sub>z</sub> Е <sub>рь</sub>	1.0 0.5 -	- - 2.25 2.50	20.0 18.0 -	18.0 15.0 -	- - 3.25 2.50	40.0 35.0 -	1.0 0.5 -	- 3.00 4.50	20.0 19.0 -	kV kV inches inches
<b>Life Ratings</b> Peak Current Discharge Life <sup>3</sup>	PW=30μs 1000 shots into 1Ω	-	20 3000	-	- -	20 3000	-	- -	50 6000	-	- -	kA J

TG-225 TG-226

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	MIN	TYP	MAX	UNITS
Device Specifications Self-Breakdown Voltage AppliedVoltage Dimension A Dimension B	100V/s	Е <sub>z</sub> Е <sub>рь</sub>	18.0 15.0 -	- - 3.50 4.50	40.0 35.0 -	35.0 30.0 -	- - 4.50 4.50	60.0 55.0 -	kV kV inches inches
<b>Life Ratings</b> Peak Current Discharge Life <sup>3</sup>	PW=30μs 1000 shots into 1Ω	- -	50 6000		- -	50 6000	- -	- -	kA J

<sup>1</sup> The trigger voltages given in these tables are the minimum triggering voltages necessary for triggering at the corresponding applied voltage limits. As the applied trigger voltage increases, the trigger voltage required for triggering decreases. It is assumed that the trigger is applied across the trigger and adjacent main electrodes — higher trigger voltages are required if it is applied across the trigger voltage and opposite main electrodes.

<sup>2</sup> End point for life testing is a 15% reduction in the self-breakdown voltage.

**MECHANICAL DIMENSIONS** 

#### **TA SERIES DIMENSIONS** mm (inches) TB series) are available upon request. 11.11 MAX (0.438) 16.67 ± 0.79 DIA. 25.40 ± 1.59 (1.000 ± 0.063) $(0.656 \pm 0.031)$ specifications. 1.59 DIA TYP TA- X.X (0.063) TA-XX.X 12.70 ± 1.59 4.76 ± 1.59 TB- X.X $(0.500 \pm 0.063)$ $(0.188 \pm 0.063)$ TB- XX.X **TB SERIES** Series

# ORDERING INFORMATION

Triggergaps with self-breakdown voltages other than the standard values listed (in the ranges of 1-15kV for the TA series and 2.5-25kV for the

A complete part number is represented by the digits below. Self-breakdown voltages are expressed in kV. For example, TA-5.0 is a 5kV TA series device and TB-25.0 is a 25kV TB series device. The TG-221 to 226 are ordered by the appropriate part number as given in the

for 1.0-9.0kV for 10.0-15.0kV for 2.5-9.0kV for 10.0-25.0kV Self-breakdown voltage See specification tables OPPOSITE

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A DIA.

ADJACENT W

TRIGGER W

TA

TB

<sup>&</sup>lt;sup>3</sup> Because the self-breakdown voltage of these devices is adjustable, the trigger voltage required for any particular applied voltage cannot be specified. Clare suggests setting the selfbreakdown voltage to at least 115% of the maximum applied voltage.