Ceramic-Metal
Triggered Spark Gaps

Key Features

- Fast switching operation
- High voltage holdoff
- Ceramic-metal construction
- No warm up period
- High current capability
- Long life

Applications

- Flashlamps
- Electronically pumped gas lasers
- Medical lithotripers
- Crowbar protection devices

Description

Excelitas' Triggered Spark Gaps are a family of versatile high voltage switches. They consist of three electrodes in a hermetically sealed, pressurized ceramic envelope. Triggered Spark Gaps are generally characterized by a peak current capability of thousands to tens of thousands of amperes, delay times of tens of nanoseconds, arc resistance of tens of milliohms and inductance of 5 to 30 nanohenries. They are suitable for capacitor switching applications such as flashlamps, electrically pumped gas lasers, medical lithotripters, and as crowbar protection devices.

Table 1 Specifications

Environmental Specifications	
Ambient temperature range	
Operating temperature range	-54 to +100°C
Nonoperating temperature range	-65 to +125°C
Vibration	15 to 500 Hz at 10 g maximum
Shock	50 g, 11 milliseconds
Thermal Shock	-65 to +125°C
Electrical Specifications	
Electrode capacity	Less than 5 pf.
Interelectrode resistance	Greater than 10^{10} ohms at 500V.
Mechanical Specifications	
Envelope	Ceramic-metal, hermetically sealed, exposed metal parts nickel plated
Torque applied to studs	6 inch-pounds maximum

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TABLE 2 Triggered Spark Gap Ratings

Excelitas Model No.	O-A Range, kV Min/Max (1,10)		SBV, kV	V_T Min Trig (kV Open Circuit	Trigger Mode	Recommended Excelitas Transformer	Typical Delay Time* *when operated in mode A (Nanoseconds)		Simultaneous Ratings Crowbar Service, Typical Life: 5000-20,000 Shots	Simultaneous Ratings Repetitive Switching Typical Life: 1-5 Million Shots
	(2)	(3)	(4)	(5)		(6, 7)			(11)	(11)
GP-89	0.7	2.1	2.6	10	C	TR-148A TR-180B	100	1000	5 Ka peak 0.1 coulomb	3 millicoulombs/shot Ib = 35 mAdc Ip = 6 Aac
GP-90	1.3	3.4	4.2		C					
GP-91	4.4	10	12.5		A, C					
GP-93	8	20	25		A, C					
GP-82B	0.4	1.6	2	10	A, B	TR-148A TR-180B	30	300	7.5 kA peak 0.2 coulomb	4 millicoulombs/shot Ib = 60 mAdc Ip = 8 Aac
GP-31B	2	6	7.5		A					
GP-20B	3.5	11	14							
GP-46B	8	20	25							
GP-85	2	6	8	20	A, B	TR-1795 TR-180b TR-1700	30	300	25 kA peak 0.4 coulomb	4 millicoulombs/shot Ib = 100 mAdc Ip = 10 Aac
GP-86	6	15	20		A					
GP-87	10	24	30							
GP-70	12	36	42(8)							
GP-30B	2	6	7.5	20	A, B	TR-1795 TR-1700	30	300	50 kA peak 0.5 coulomb	10 millicoulombs/shot Ib = 100 mAdc Ip = 15 Aac
GP-22B	6	15	19							
GP-12B	10	24	30		A					
GP-14B	12	36	42(8)							
GP-41B	12	36	42		A, B	TR-1795 TR-1700	30	300	Peak currents up to 100 kA and charge transfer up to 5 coulombs are obtainable at reduced life (100-1000 shots).	
GP-32B	20	48	60(8)	20	A					
GP-15B	25	60	86(8)							
GP-74B	40	100	120(8)	20	A	TR-1795 TR-1700	30	300		
GP-81B	40	100	120(9)							

Notes:

1. Optimum operating voltage is typically 60 to 80% of SBV.
2. Operation below minimum value may result in erratic firing over time.
3. Operation at this value may result in self-firing over time.
4. Represents minimum main-gap breakdown voltage with no trigger applied.
5. Value shown contains safety factor for end-of-life requirements.
6. Excelitas TM-11A Trigger Module can be used to trigger all gaps
7. Transformers listed vary mechanically and electrically. See Excelitas Transformer Data Sheet.
8. These units must be operated in a liquid or gas dielectric to prevent external flashover: GP-70 and GP-14b, above 24 kV; GP-32B AND GP-15B, above 35 kV; CP-74B and GP-81B, above 60 kV.
9. Designed for high altitude, high holdoff conditions.
10. Other voltage ranges and mechanical configurations are available on request; for example, the GP-20B can be supplied with a 6 to 16 kV operating range by specifying GP-20B-20. The 20 would be the SBV and E-E maximum would be 80% of SBV = 16kV.
11. E = Stored energy in joules ($1/2CV^2$), Ib = average current in amperes , Ip = RMS current in amperes, R = total circuit resistance in ohms, P= average power in watts.

FIGURE 1 Mechanical Specifications GP-89, GP-90, GP-91, GP-93

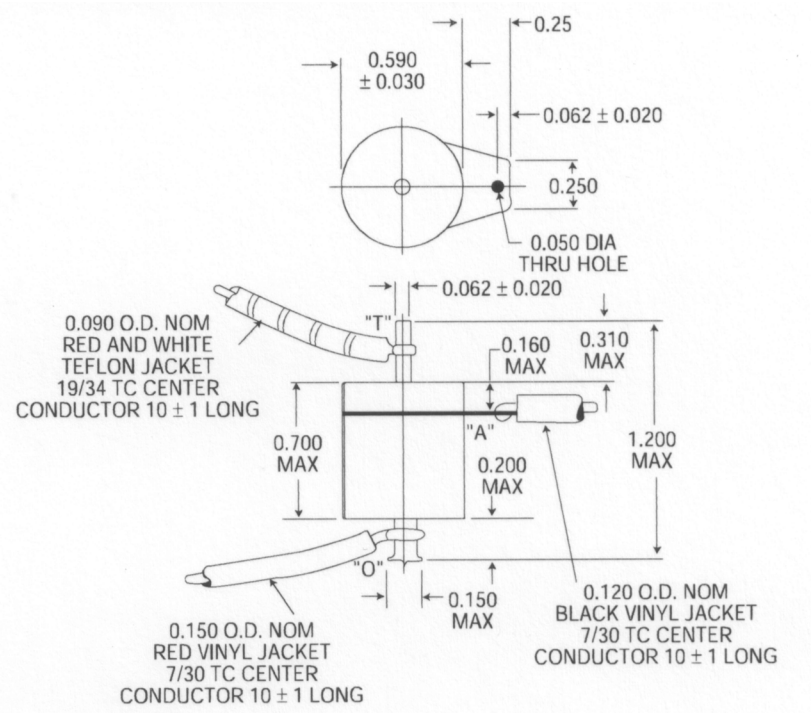
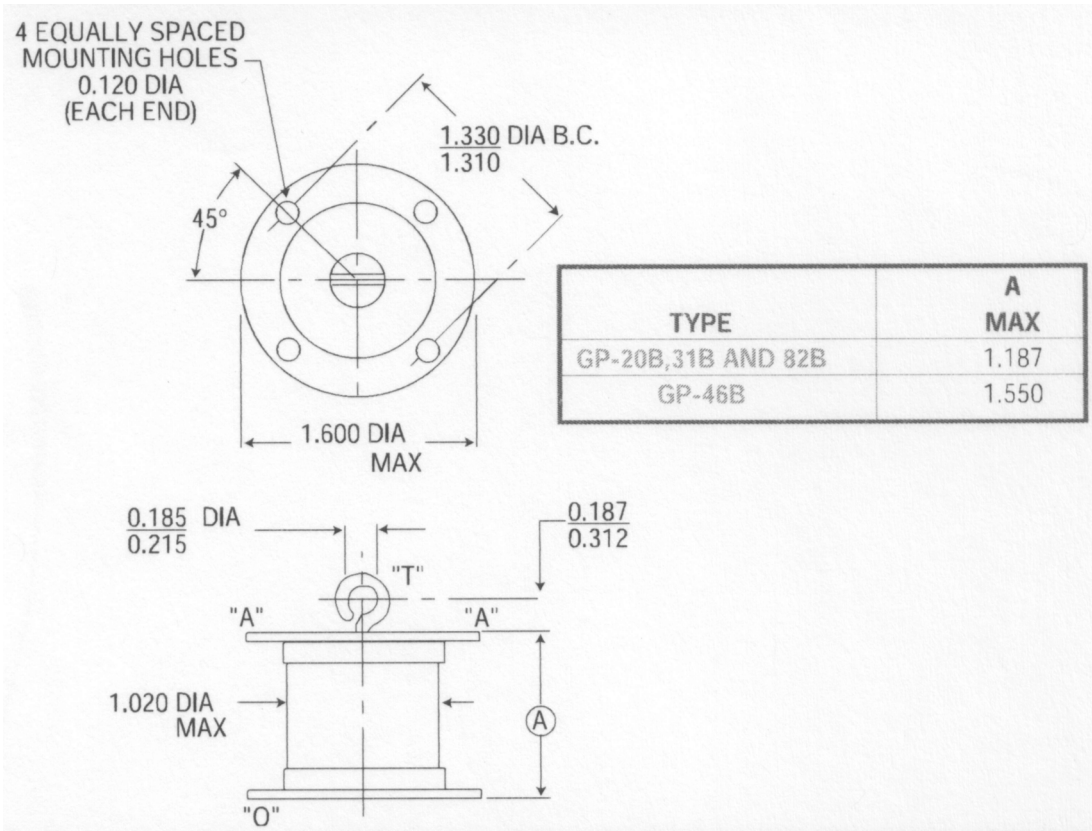


FIGURE 2 Mechanical Specifications GP-20B, GP31B, GP-46B, GP-82B



TYPE	A MAX
GP-20B,31B AND 82B	1.187
GP-46B	1.550

FIGURE 3 Mechanical Specifications GP-70, GP-85, GP-86, GP-87

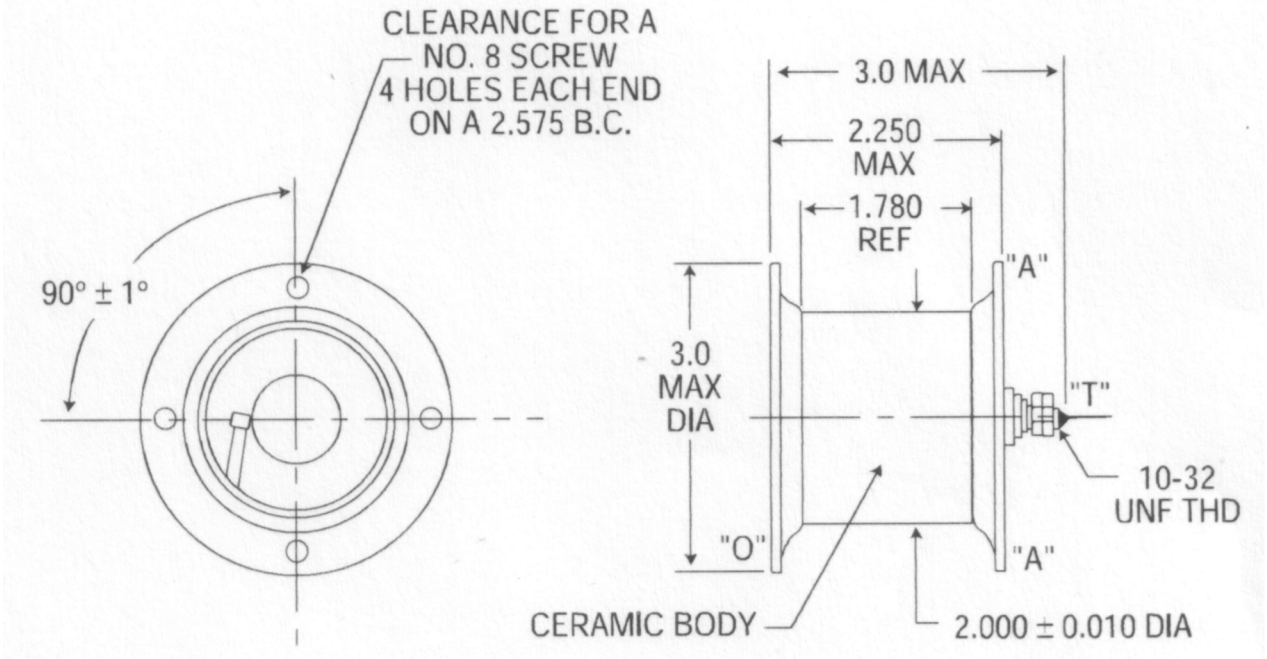
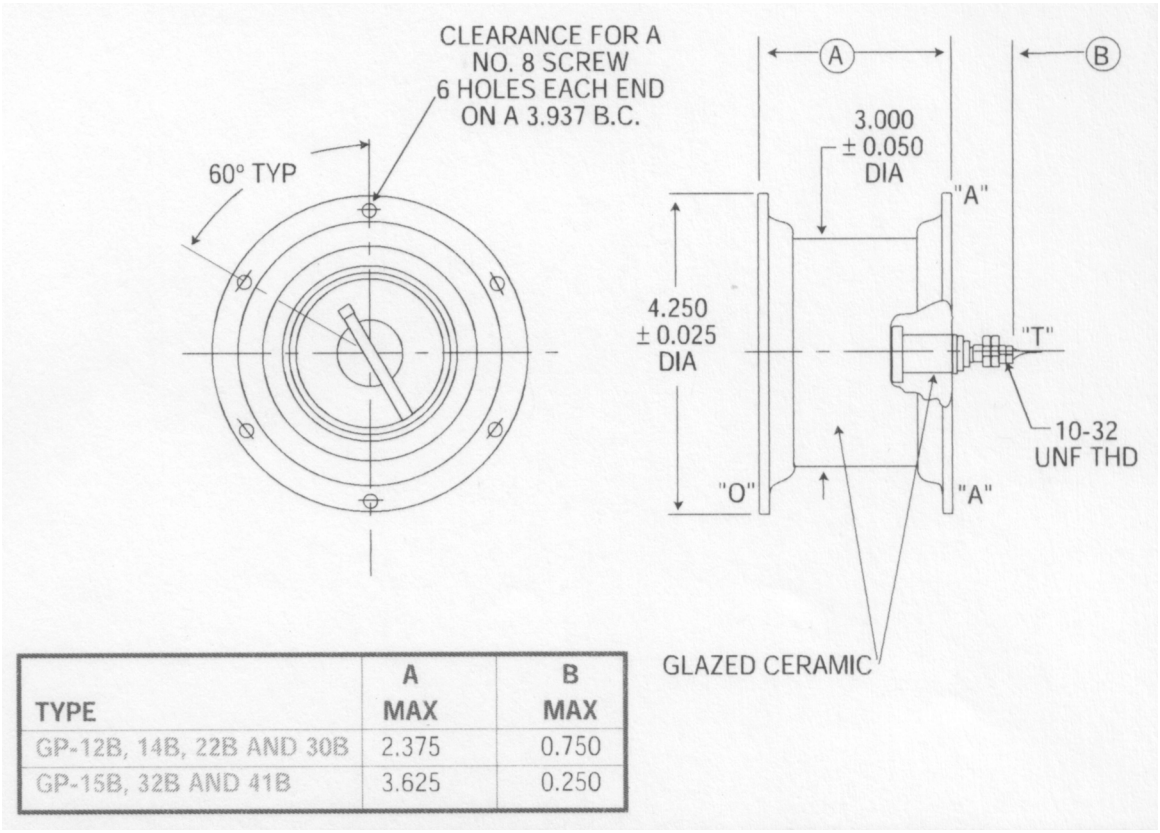
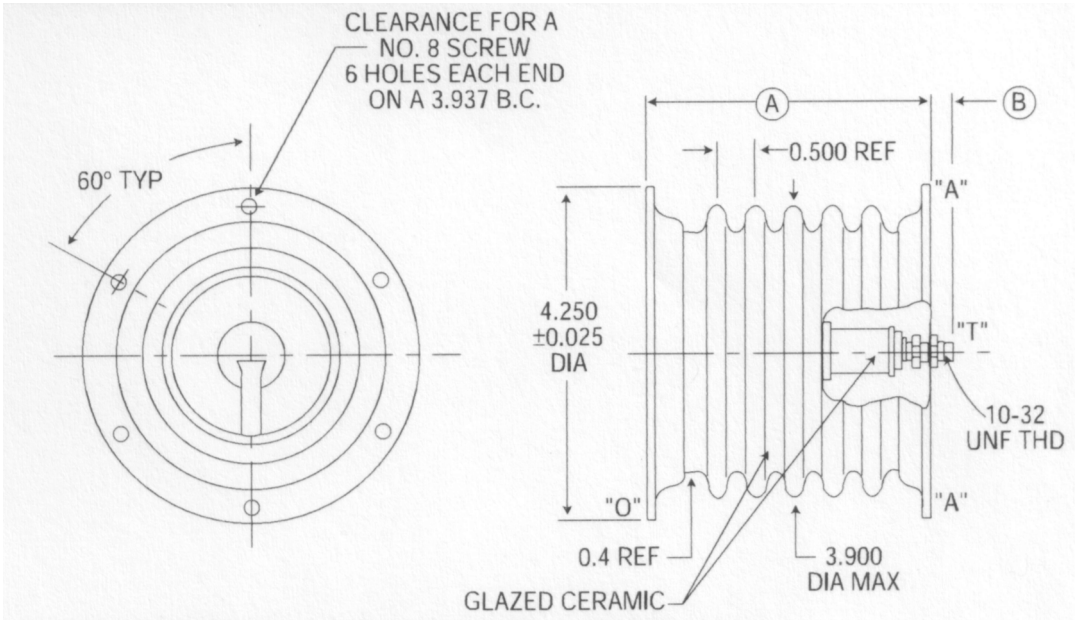


FIGURE 4 Mechanical Specifications GP-12B, GP=14B, GP-15B, GP-22B, GP-30B, GP-32B, GP-41B



TYPE	A MAX	B MAX
GP-12B, 14B, 22B AND 30B	2.375	0.750
GP-15B, 32B AND 41B	3.625	0.250

FIGURE 5 Mechanical Specifications GP-74B, GP-81B



TYPE	A MAX	B MAX	MIN CREEPAGE PATH IN INCHES
GP-74B	3.625	0.250	4
GP-81B	4.500	RECESSED	6

About Excelitas Technologies

Excelitas Technologies is a global technology leader focused on delivering innovative, customized solutions to meet the lighting, detection, energetic, frequency standards and high-reliability power needs of OEM customers. From aerospace and defense applications to industrial, safety and security, medical lighting, analytical instrumentation, and clinical diagnostics, Excelitas Technologies is committed to enabling our customers' success in their specialty end-markets. Excelitas Technologies has approximately 3,000 employees in North America, Europe and Asia, serving customers across the world.

AES@excelitas.com
www.excelitas.com

Excelitas Technologies
Energetic Systems
1100 Vanguard Blvd.
Miamisburg, Ohio 45432
USA
Telephone: (+1) 937.865.3800
Toll Free: (+1) 866.539.5916
Fax: (+1) 937.865.5170

Excelitas Technologies
Power Supplies
1330 East Cypress Street
Covina, California 91724 USA
Telephone: (+1) 626.967.6021
Toll Free: (+1) 800.363.2095
Fax: (+1) 626.967.3151

Excelitas Technologies
Frequency Standards
& Switching
35 Congress Street
Salem Massachusetts 01970
USA
Telephone: (+1) 978.745.3200
Toll Free: (+1) 800.950.3441
Fax: (+1) 978.745.0894

Excelitas Technologies
Lighting & Radiant Sources
44370 Christy Street
Fremont, California 94538-3180
USA
Telephone: (+1) 510.979.6500
Toll Free: (+1) 800.775.6786
Fax: (+1) 510.687.1140

Excelitas Technologies
Sensors
22001 Dumberry Road
Vaudreuil-Dorion, Quebec
Canada J7V 8P7
Telephone: (+1) 450.424.3300
Toll Free: (+1) 800.775.6786
Fax: (+1) 450.424.3345

Excelitas Technologies
International Sales Office
Bat HTDS BP 246, 91882
Massy Cedes, France
Telephone: +33 (1) 6486 2824

For a complete listing of our global offices, visit www.excelitas.com/ContactUs