

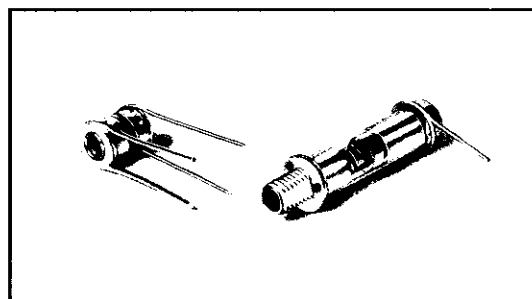
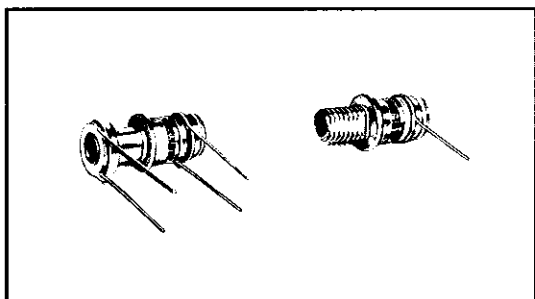
# Sprague-Goodman

ENGINEERING BULLETIN

**SG-205B**

Supercedes SG-205A

## PISTONCAP® PRECISION TRIMMER CAPACITORS



**Sprague-Goodman Electronics, Inc.**

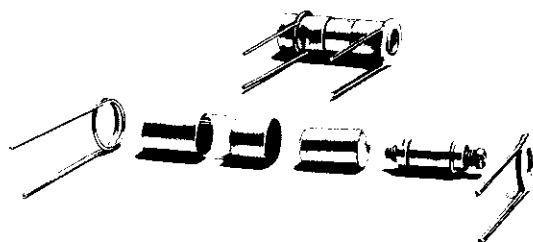
1700 SHAMES DRIVE, WESTBURY, NY 11590

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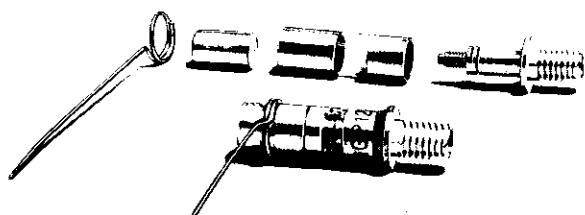
## PRECISION ADJUST MECHANISMS

All Sprague-Goodman Pistoncap Trimmer Capacitors described in U. S. Patent No. 3,840,786 utilize a simplified and highly reliable adjust mechanism. There are two slots 180° apart, more than half way through the bushing threads. Following slotting, the bushing is compressed, causing the slotted end to behave as a spring. The threaded segments of the bushing are biased axially, pressing the bushing threads firmly into flank-to-flank engagement with the screw threads. This eliminates all backlash and provides the required smooth and uniform adjust torque. Note that no extra threaded washers, springs, etc. are required. Fewer parts mean greater reliability.

**JFD PISTONCAP** models, now manufactured by Sprague-Goodman, include the differential and split-stator types shown on page 11 of this bulletin. High Voltage and High RF Voltage quartz dielectric models are on page 15.

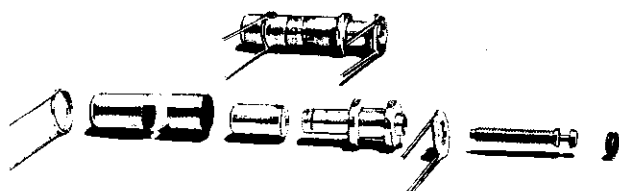


FORM FACTOR C, OPEN END

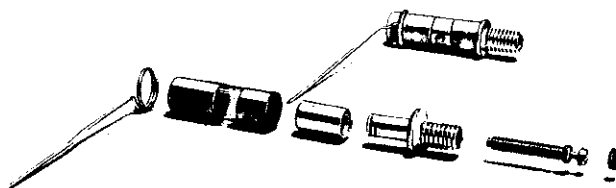


FORM FACTOR P, OPEN END

**SEALED TYPES.** Sealed versions are available in both panel mounting and printed circuit mounting. The electrode end is sealed either by closing the end of the glass tube or by soldering on a turret cap. The adjust end is sealed by means of a multi-lobed seal. This seal provides twice as many lobes as an "O" ring and good sealing is provided with one-quarter of the gasket compression required for an "O" ring.

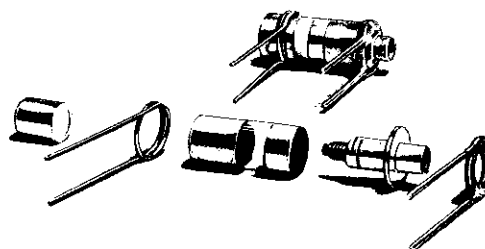


FORM FACTOR L, PRINTED CIRCUIT SEALED

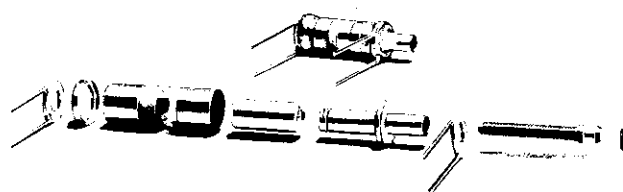


FORM FACTOR R, PANEL MOUNTING  
SEALED CONSTRUCTION

**COLLARED BUSHING STYLES (Form Factors N and V).** Certain applications require that the head of the adjusting screw remain wholly within the bushing over the entire range of adjustment. To meet this need, collared bushing types, both sealed and unsealed, have been added to the broad line of printed circuit mounting styles. All panel mounting styles, other than the 'W' series, are also designed for blind hole tuning.

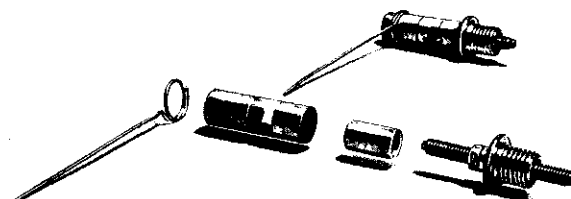


FORM FACTOR N, COLLARED BUSHING  
OPEN END



FORM FACTOR V, COLLARED BUSHING  
SEALED CONSTRUCTION

**W STYLES.** In some panel-mounting applications, a protruding adjust screw is required. In W series capacitors, the adjust screw protrudes from the mounting bushing for all positions of adjustment.



FORM FACTOR W

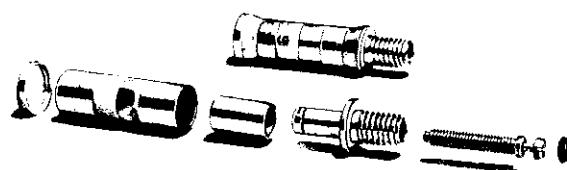
**THREE DIELECTRICS.** Three dielectrics are available. The standard glass has a dielectric constant of about 6.7 and a dissipation factor of about 0.0012. High-range glass achieves the unusual combination of higher dielectric constant but lower dissipation factor of about 8.5 and about 0.008, respectively. Quartz dielectric has the much lower dielectric constant of about 3.7 but has extremely low loss, for a dissipation factor of about 0.0001.

Generally, the standard glass, which is least expensive, will suit most applications. For some applications where higher capacitance and/or greater Q is required for a given physical structure, high-range glass should be specified. For applications involving moderate r-f currents, fused quartz is used.

High-range glass trimmers will generally cost about 25% more than standard glass and quartz trimmers are about three times the price of standard glass trimmers. Expanded range types generally cost about 2.5 times the non-expanded range equivalents.

**EXPANDED RANGE** models are available in both panel mounting and printed circuit mounting styles,

sealed and unsealed. The electrode band is embedded within the wall of the glass tube, providing a thinner dielectric gap and, at the same time, keeping the overall wall thick enough for mechanical strength. This generally yields about three times the capacitance range for a given size compared with the standard Pistoncap Capacitors. This is accomplished by a laminating technique. An electrode band is metallized on the O.D. of a thin (0.005") glass tube and a slightly larger and heavier walled tube is then telescoped over it. The two tubes are then fused, providing the embedded structure. Additional metallization is then added at both ends to provide electrical and mechanical termination.



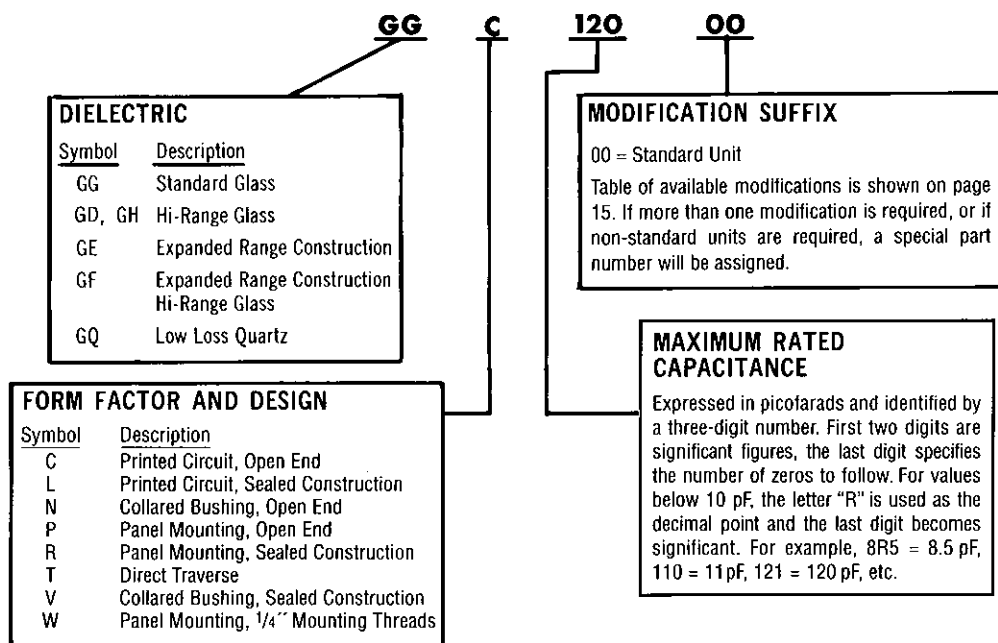
FORM FACTOR R, EXPANDED RANGE

## MILITARY APPROVALS

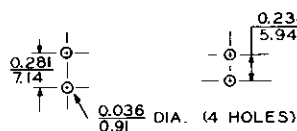
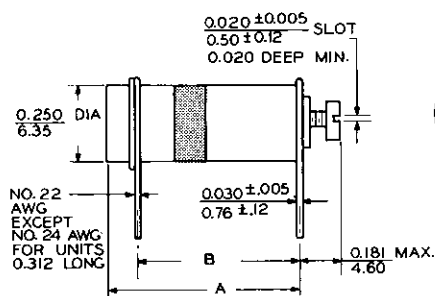
Pistoncap Precision Trimmer Capacitors are approved to Military Specification MIL-C-14409D, Styles PC35, PC37, PC38, PC39, PC40, PC41, PC42, PC43, PC48, PC50, PC51, and PC 52 in all characteristics and values and are listed on the Qualified Products List (QPL) for this specification. In Canada, these capacitors have been approved by the Department of National Defense in accordance with the terms of the U.S.-Canada agreement for qualification

of products of non-resident manufacturers. In the United Kingdom, these capacitors have been approved by the Ministry of Defense (DCVD) in accordance with the provisions of STANAG 4093, while in West Germany they have been approved by the Bundesamt für Wehrtechnik und Beschaffung (BWB) for G-QPL in accordance with STANAG 4093.

## PART NUMBERING SYSTEM

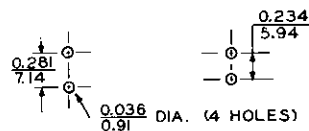
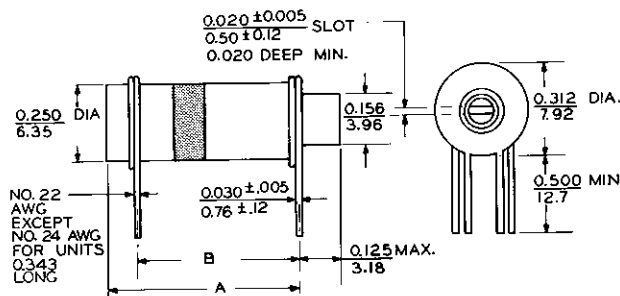


## PRINTED CIRCUIT MOUNTING



SUGGESTED MOUNTING HOLES

Figure 1A



SUGGESTED MOUNTING HOLES

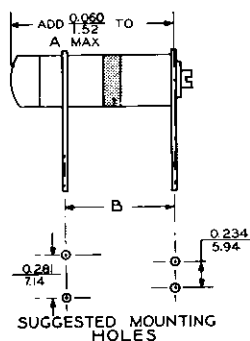
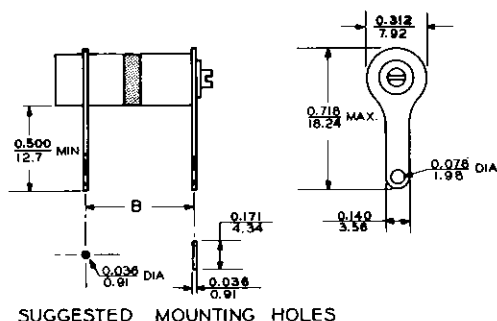
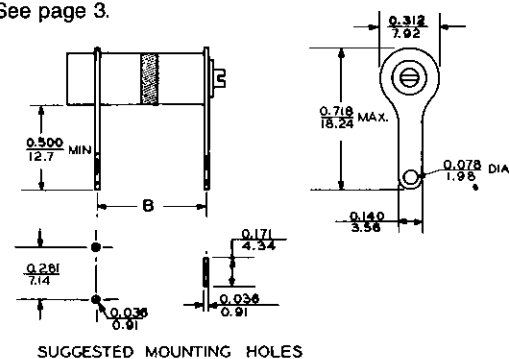
Figure 1B

| Capacitance<br>Range in pF<br>Min.    Max. |      | D-C<br>Voltage<br>Rating<br>(Volts) | Temp.<br>Char.<br>(See<br>Table) | Minimum<br>Quality<br>Factor<br>Q | OPEN END STYLE (Fig. 1A) |                      |                     |                                  | COLLARED BUSHING STYLE (Fig. 1B) |                     |                                  |       |       |       |       |
|--------------------------------------------|------|-------------------------------------|----------------------------------|-----------------------------------|--------------------------|----------------------|---------------------|----------------------------------|----------------------------------|---------------------|----------------------------------|-------|-------|-------|-------|
|                                            |      |                                     |                                  |                                   | Model No.                | Mil Desig-<br>nation | A Max.<br>In.    mm | B ± 0.031<br>(0.79)<br>In.    mm | Model No.                        | A Max.<br>In.    mm | B ± 0.031<br>(0.79)<br>In.    mm |       |       |       |       |
| STANDARD GLASS DIELECTRIC                  |      |                                     |                                  |                                   |                          |                      |                     |                                  |                                  |                     |                                  |       |       |       |       |
| 0.8                                        | 4.5  | 750                                 | J                                | 500                               | GGC4R500                 | *PC41J4R5            | 0.312               | 7.92                             | 0.250                            | 6.35                | GGN4R500                         | 0.343 | 8.71  | 0.250 | 6.35  |
| 0.8                                        | 8.5  | 750                                 | J                                | 500                               | GGC8R500                 | *PC41J8R5            | 0.562               | 14.27                            | 0.438                            | 11.13               | GGN8R500                         | 0.593 | 15.06 | 0.438 | 11.13 |
| 0.8                                        | 12.0 | 750                                 | H                                | 500                               | GGC12000                 | *PC41H120            | 0.766               | 19.46                            | 0.625                            | 15.88               | GGN12000                         | 0.797 | 20.24 | 0.625 | 15.88 |
| 0.8                                        | 18.0 | 750                                 | H                                | 500                               | GGC18000                 | *PC41H180            | 1.000               | 25.40                            | 0.875                            | 22.23               | GGN18000                         | 1.031 | 26.19 | 0.875 | 22.23 |
| 0.8                                        | 30.0 | 750                                 | H                                | 350                               | GGC30000                 | *PC41H300            | 1.609               | 40.87                            | 1.375                            | 34.93               | GGN30000                         | 1.640 | 41.66 | 1.375 | 34.93 |
| HI-RANGE GLASS DIELECTRIC                  |      |                                     |                                  |                                   |                          |                      |                     |                                  |                                  |                     |                                  |       |       |       |       |
| 0.8                                        | 5.5  | 750                                 | J                                | 1000                              | GHC5R500                 | PC51J5R5             | 0.312               | 7.92                             | 0.250                            | 6.35                | GHN5R500                         | 0.343 | 8.71  | 0.250 | 6.35  |
| 0.8                                        | 11.0 | 750                                 | J                                | 900                               | GHC11000                 | PC51J110             | 0.562               | 14.27                            | 0.438                            | 11.13               | GHN11000                         | 0.593 | 15.06 | 0.438 | 11.13 |
| 0.8                                        | 16.0 | 750                                 | H                                | 800                               | GHC16000                 | PC51H160             | 0.766               | 19.46                            | 0.625                            | 15.88               | GHN16000                         | 0.797 | 20.24 | 0.625 | 15.88 |
| 0.8                                        | 23.0 | 750                                 | H                                | 700                               | GHC23000                 | PC51H230             | 1.000               | 25.40                            | 0.875                            | 22.23               | GHN23000                         | 1.031 | 26.19 | 0.875 | 22.23 |
| 0.8                                        | 38.0 | 750                                 | H                                | 500                               | GHC38000                 | PC51H380             | 1.609               | 40.87                            | 1.375                            | 34.93               | GHN38000                         | 1.640 | 41.66 | 1.375 | 34.93 |
| QUARTZ DIELECTRIC                          |      |                                     |                                  |                                   |                          |                      |                     |                                  |                                  |                     |                                  |       |       |       |       |
| 0.6                                        | 1.8  | 750                                 | Q                                | 1500                              | GQC1R800                 | PC41Q1R8             | 0.312               | 7.92                             | 0.250                            | 6.35                |                                  |       |       |       |       |
| 0.6                                        | 5.5  | 750                                 | Q                                | 1500                              | GQC5R500                 | PC41Q5R5             | 0.562               | 14.27                            | 0.438                            | 11.13               |                                  |       |       |       |       |
| 0.6                                        | 9.5  | 750                                 | Q                                | 1500                              | GQC9R500                 | PC41Q9R5             | 1.000               | 25.40                            | 0.875                            | 22.23               |                                  |       |       |       |       |
| 0.8                                        | 16.0 | 750                                 | Q                                | 1500                              | GQC16000                 | PC41Q160             | 1.609               | 40.87                            | 1.375                            | 34.93               |                                  |       |       |       |       |

\*These capacitors were listed in MIL-C-14409B but do not appear in MIL-C-14409D.

## MODIFICATIONS

To specify the modifications shown below, replace the last two digits of the catalog number with the modification no. See page 3.


 No. 06  
CYLINDER END CLOSED

 No. 16  
BASE LUG, SINGLE LEAD

 No. 17  
BASE LUG, DOUBLE LEAD

## EXPANDED RANGE PRINTED CIRCUIT MOUNTING

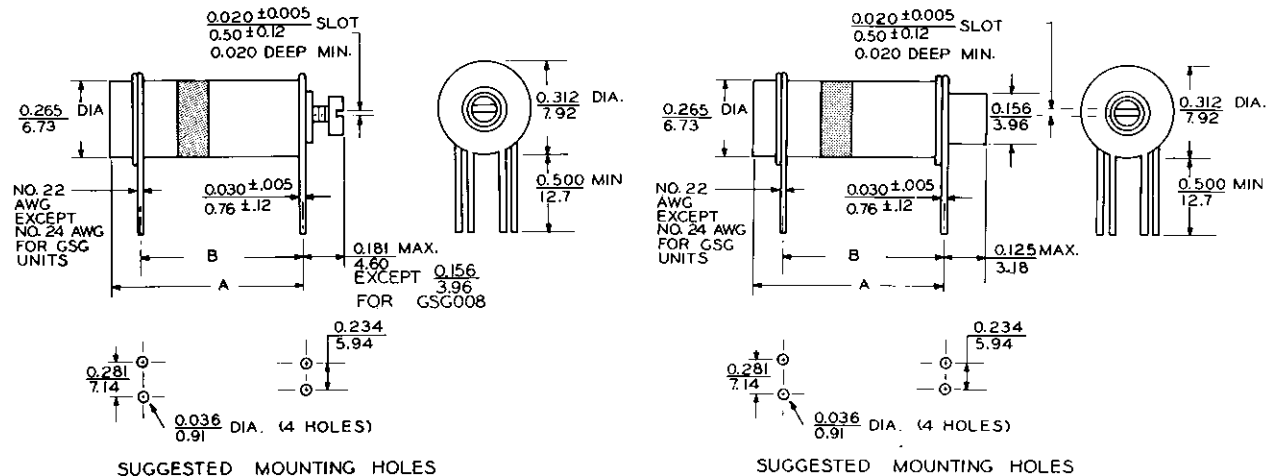
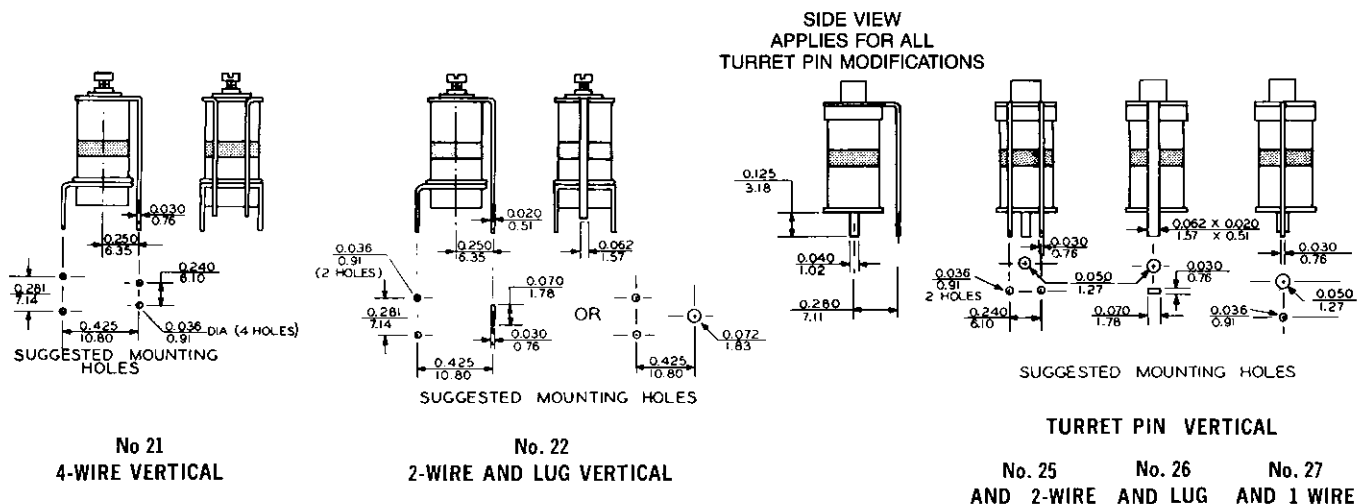


Figure 1C

Figure 1D

| Capacitance<br>Range in pF<br>Min.    Max. |       | D-C<br>Voltage<br>Rating<br>(Volts) | Temp.<br>Char.<br>(See<br>Table) | Minimum<br>Quality<br>Factor<br>Q | OPEN END STYLE (Fig. 1C) |                         |       |                                                 | COLLARED BUSHING STYLE (Fig. 1D) |           |                         |       |                                                 |       |
|--------------------------------------------|-------|-------------------------------------|----------------------------------|-----------------------------------|--------------------------|-------------------------|-------|-------------------------------------------------|----------------------------------|-----------|-------------------------|-------|-------------------------------------------------|-------|
|                                            |       |                                     |                                  |                                   | Model No.                | A Max.<br>In.        mm |       | B <sup>± 0.031</sup><br>(0.79)<br>In.        mm |                                  | Model No. | A Max.<br>In.        mm |       | B <sup>± 0.031</sup><br>(0.79)<br>In.        mm |       |
| STANDARD GLASS DIELECTRIC                  |       |                                     |                                  |                                   |                          |                         |       |                                                 |                                  |           |                         |       |                                                 |       |
| 1.2                                        | 10.0  | 500                                 | Y                                | 500                               | GSG008                   | 0.277                   | 7.04  | 0.250                                           | 6.35                             | —         | —                       | —     | —                                               |       |
| 1.0                                        | 14.0  | 750                                 | G                                | 500                               | GEC14000                 | 0.391                   | 9.93  | 0.328                                           | 8.33                             | GEN14000  | 0.422                   | 10.72 | 0.328                                           | 8.33  |
| 1.0                                        | 28.0  | 750                                 | G                                | 350                               | GEC28000                 | 0.625                   | 15.88 | 0.500                                           | 12.70                            | GEN28000  | 0.656                   | 16.66 | 0.500                                           | 12.70 |
| 1.0                                        | 42.0  | 750                                 | G                                | 250                               | GEC42000                 | 0.843                   | 21.41 | 0.734                                           | 18.64                            | GEN42000  | 0.875                   | 22.23 | 0.734                                           | 18.64 |
| 1.0                                        | 60.0  | 750                                 | G                                | 250                               | GEC60000                 | 1.093                   | 27.76 | 0.906                                           | 23.01                            | GEN60000  | 1.125                   | 28.58 | 0.906                                           | 23.01 |
| 1.0                                        | 90.0  | 750                                 | G                                | 250                               | GEC90000                 | 1.688                   | 42.88 | 1.516                                           | 38.51                            | GEN90000  | 1.719                   | 43.66 | 1.516                                           | 38.51 |
| HI-RANGE GLASS DIELECTRIC                  |       |                                     |                                  |                                   |                          |                         |       |                                                 |                                  |           |                         |       |                                                 |       |
| 1.2                                        | 16.0  | 500                                 | Y                                | 750                               | GSG009                   | 0.323                   | 8.20  | 0.250                                           | 6.35                             | —         | —                       | —     | —                                               | —     |
| 1.0                                        | 16.0  | 750                                 | G                                | 750                               | GFC16000                 | 0.391                   | 9.93  | 0.328                                           | 8.33                             | GFN16000  | 0.422                   | 10.72 | 0.328                                           | 8.33  |
| 1.0                                        | 36.0  | 750                                 | G                                | 550                               | GFC36000                 | 0.625                   | 15.88 | 0.500                                           | 12.70                            | GFN36000  | 0.656                   | 16.66 | 0.500                                           | 12.70 |
| 1.0                                        | 52.0  | 750                                 | G                                | 350                               | GFC52000                 | 0.843                   | 21.41 | 0.734                                           | 18.64                            | GFN52000  | 0.875                   | 22.23 | 0.734                                           | 18.64 |
| 1.0                                        | 75.0  | 750                                 | G                                | 250                               | GFC75000                 | 1.093                   | 27.76 | 0.906                                           | 23.01                            | GFN75000  | 1.125                   | 28.58 | 0.906                                           | 23.01 |
| 1.0                                        | 120.0 | 750                                 | G                                | 250                               | GFC12100                 | 1.688                   | 42.88 | 1.516                                           | 38.51                            | GFN12100  | 1.719                   | 43.66 | 1.516                                           | 38.51 |

NOTE: Capacitance increases up to 0.5 pF on vertical modifications due to position of leads alongside capacitor body.



# SEALED PRINTED CIRCUIT MOUNTING

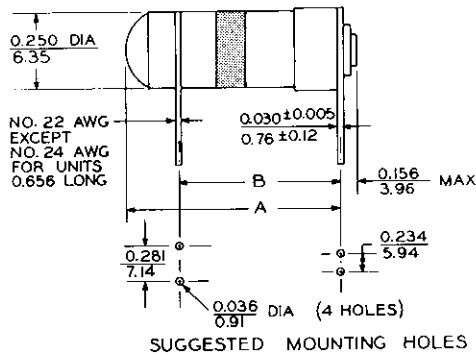


Figure 2A

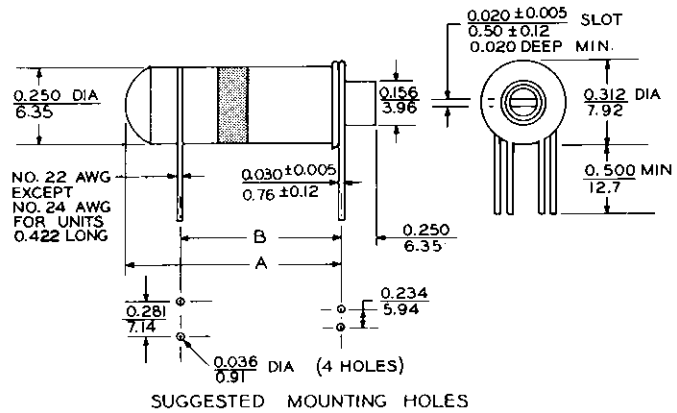
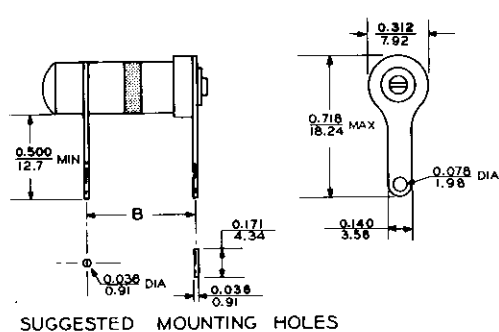


Figure 2B

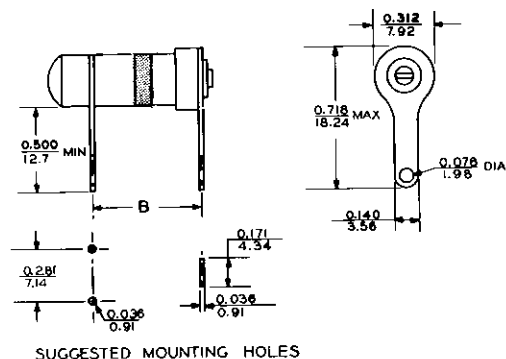
| Capacitance<br>Range in pF<br>Min. Max. |      | D-C<br>Voltage<br>Rating<br>(Volts) | Temp.<br>Char.<br>(See<br>Table) | Minimum<br>Quality<br>Factor<br>Q | STANDARD SEALED STYLE (Fig. 2A) |                      |                  |       |                                         |       | COLLARED BUSHING SEALED STYLE<br>(Fig. 2B) |                  |       |                                         |       |  |
|-----------------------------------------|------|-------------------------------------|----------------------------------|-----------------------------------|---------------------------------|----------------------|------------------|-------|-----------------------------------------|-------|--------------------------------------------|------------------|-------|-----------------------------------------|-------|--|
|                                         |      |                                     |                                  |                                   | Model No.                       | Mil Desig-<br>nation | A Max.<br>In. mm |       | B <sup>±0.031</sup><br>(0.79)<br>In. mm |       | Model No.                                  | A Max.<br>In. mm |       | B <sup>±0.031</sup><br>(0.79)<br>In. mm |       |  |
| STANDARD GLASS DIELECTRIC               |      |                                     |                                  |                                   |                                 |                      |                  |       |                                         |       |                                            |                  |       |                                         |       |  |
| 0.8                                     | 4.5  | 750                                 | J                                | 500                               | GGL4R500                        | *PC42J4R5            | 0.656            | 16.66 | 0.500                                   | 12.70 | GGV4R500                                   | 0.422            | 10.72 | 0.250                                   | 6.35  |  |
| 0.8                                     | 8.5  | 1250                                | J                                | 500                               | GGL8R500                        | *PC42J8R5            | 0.906            | 23.01 | 0.703                                   | 17.86 | GGV8R500                                   | 0.641            | 16.28 | 0.438                                   | 11.13 |  |
| 0.8                                     | 12.0 | 1250                                | H                                | 500                               | GGL12000                        | *PC42H120            | 1.109            | 28.17 | 0.844                                   | 21.44 | GGV12000                                   | 0.859            | 21.82 | 0.625                                   | 15.88 |  |
| 0.8                                     | 18.0 | 1250                                | H                                | 500                               | GGL18000                        | *PC42H180            | 1.359            | 34.52 | 1.016                                   | 25.81 | GGV18000                                   | 1.109            | 28.17 | 0.875                                   | 22.23 |  |
| 0.8                                     | 30.0 | 1250                                | H                                | 350                               | GGL30000                        | *PC42H300            | 1.953            | 49.61 | 1.469                                   | 37.31 | GGV30000                                   | 1.703            | 43.26 | 1.375                                   | 34.93 |  |
| HI-RANGE GLASS DIELECTRIC               |      |                                     |                                  |                                   |                                 |                      |                  |       |                                         |       |                                            |                  |       |                                         |       |  |
| 0.8                                     | 5.5  | 750                                 | J                                | 1000                              | GHL5R500                        | PC52J5R5             | 0.656            | 16.66 | 0.500                                   | 12.70 | GHV5R500                                   | 0.422            | 10.72 | 0.250                                   | 6.35  |  |
| 0.8                                     | 11.0 | 1250                                | J                                | 900                               | GHL11000                        | PC52J110             | 0.906            | 23.01 | 0.703                                   | 17.86 | GHV11000                                   | 0.641            | 16.28 | 0.438                                   | 11.13 |  |
| 0.8                                     | 16.0 | 1250                                | H                                | 800                               | GHL16000                        | PC52H160             | 1.109            | 28.17 | 0.844                                   | 21.44 | GHV16000                                   | 0.859            | 21.82 | 0.625                                   | 15.88 |  |
| 0.8                                     | 23.0 | 1250                                | H                                | 700                               | GHL23000                        | PC52H230             | 1.359            | 34.52 | 1.016                                   | 25.81 | GHV23000                                   | 1.109            | 28.17 | 0.875                                   | 22.23 |  |
| 0.8                                     | 38.0 | 1250                                | H                                | 500                               | GHL38000                        | PC52H380             | 1.953            | 49.61 | 1.469                                   | 37.31 | GHV38000                                   | 1.703            | 43.26 | 1.375                                   | 34.93 |  |
| QUARTZ DIELECTRIC                       |      |                                     |                                  |                                   |                                 |                      |                  |       |                                         |       |                                            |                  |       |                                         |       |  |
| 0.6                                     | 1.8  | 750                                 | Q                                | 1500                              | GQL1R800                        | PC42Q1R8             | 0.656            | 16.66 | 0.500                                   | 12.70 |                                            |                  |       |                                         |       |  |
| 0.6                                     | 5.5  | 1250                                | Q                                | 1500                              | GQL5R500                        | PC42Q5R5             | 0.922            | 23.42 | 0.703                                   | 17.86 |                                            |                  |       |                                         |       |  |
| 0.6                                     | 9.5  | 1250                                | Q                                | 1500                              | GQL9R500                        | PC42Q9R5             | 1.359            | 34.52 | 1.016                                   | 25.81 |                                            |                  |       |                                         |       |  |
| 0.8                                     | 16.0 | 1250                                | Q                                | 1500                              | GQL16000                        | PC42Q160             | 1.953            | 49.61 | 1.469                                   | 37.31 |                                            |                  |       |                                         |       |  |

\*These capacitors were listed in Military Specification MIL-C-14409B but do not appear in MIL-C-14409D.

## MODIFICATIONS



No. 16  
BASE LUG, SINGLE LEAD



No. 17  
BASE LUG, DOUBLE LEAD

## EXPANDED RANGE SEALED PRINTED CIRCUIT MOUNTING

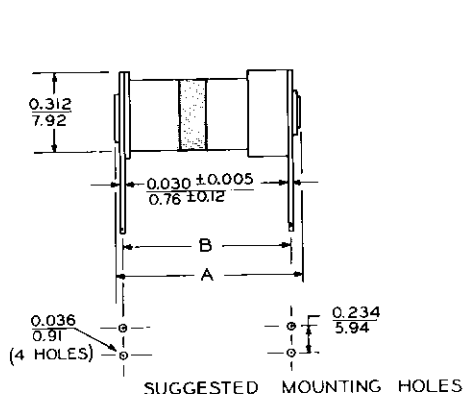


Figure 2C

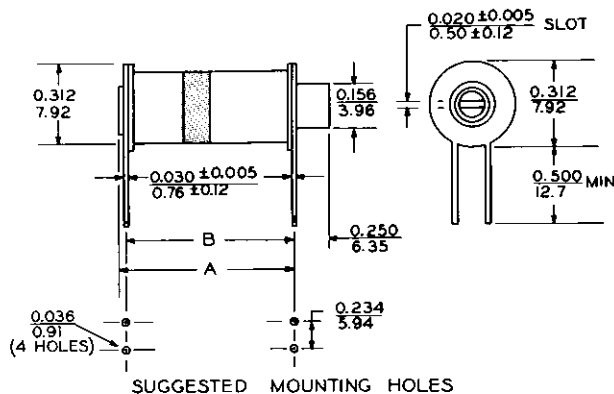
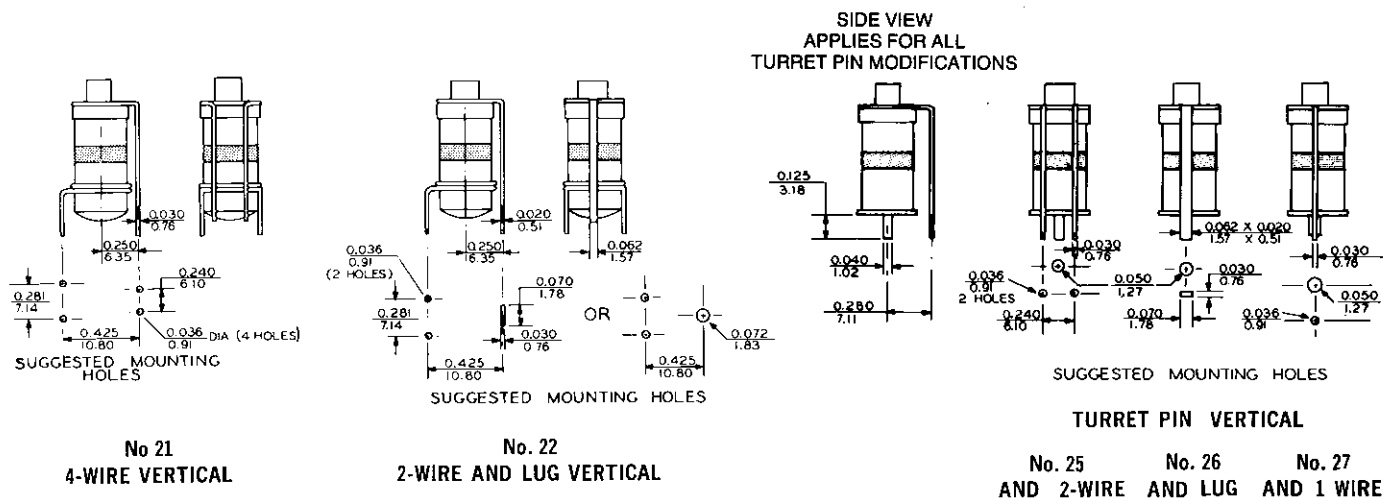


Figure 2D

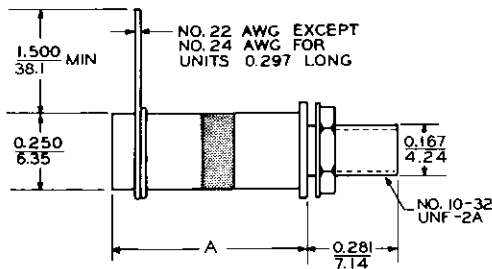
| Capacitance<br>Range in pF<br>Min.    Max. |       | D-C<br>Voltage<br>Rating<br>(Volts) | Temp.<br>Char.<br>(See<br>Table) | Minimum<br>Quality<br>Factor<br>Q | SEALED END STYLE (Fig. 2C) |                      |                     |                                             |       |           | COLLARED BUSHING STYLE (Fig. 2D) |                                             |       |       |       |
|--------------------------------------------|-------|-------------------------------------|----------------------------------|-----------------------------------|----------------------------|----------------------|---------------------|---------------------------------------------|-------|-----------|----------------------------------|---------------------------------------------|-------|-------|-------|
|                                            |       |                                     |                                  |                                   | Model No.                  | Mil Desig-<br>nation | A Max.<br>In.    mm | B <sup>± 0.031</sup><br>(0.79)<br>In.    mm |       | Model No. | A Max.<br>In.    mm              | B <sup>± 0.031</sup><br>(0.79)<br>In.    mm |       |       |       |
| STANDARD GLASS                             |       |                                     |                                  |                                   |                            |                      |                     |                                             |       |           |                                  |                                             |       |       |       |
| 1.0                                        | 14.0  | 1000                                | G                                | 500                               | GEL14000                   | *PC43G140            | 0.780               | 19.81                                       | 0.700 | 17.78     | GEV14000                         | 0.484                                       | 12.29 | 0.422 | 10.72 |
| 1.0                                        | 28.0  | 1000                                | G                                | 350                               | GEL28000                   | *PC43G280            | 1.020               | 25.91                                       | 0.940 | 23.88     | GEV28000                         | 0.734                                       | 18.64 | 0.672 | 17.07 |
| 1.0                                        | 42.0  | 1000                                | G                                | 250                               | GEL42000                   | *PC43G420            | 1.235               | 31.37                                       | 1.155 | 29.34     | GEV42000                         | 0.938                                       | 23.83 | 0.875 | 22.23 |
| 1.0                                        | 60.0  | 1000                                | G                                | 250                               | GEL60000                   | *PC43G600            | 1.480               | 37.59                                       | 1.400 | 35.56     | GEV60000                         | 1.188                                       | 30.18 | 1.125 | 28.58 |
| 1.0                                        | 90.0  | 1000                                | G                                | 250                               | GEL90000                   | *PC43G900            | 2.080               | 52.83                                       | 2.000 | 50.80     | GEV90000                         | 1.781                                       | 45.24 | 1.734 | 44.04 |
| HI-RANGE GLASS                             |       |                                     |                                  |                                   |                            |                      |                     |                                             |       |           |                                  |                                             |       |       |       |
| 1.0                                        | 16.0  | 1000                                | G                                | 750                               | GFL16000                   | PC43G160             | 0.780               | 19.81                                       | 0.700 | 17.78     | GFV16000                         | 0.484                                       | 12.29 | 0.422 | 10.72 |
| 1.0                                        | 36.0  | 1000                                | G                                | 550                               | GFL36000                   | PC43G360             | 1.020               | 25.91                                       | 0.940 | 23.88     | GFV36000                         | 0.734                                       | 18.64 | 0.672 | 17.07 |
| 1.0                                        | 52.0  | 1000                                | G                                | 350                               | GFL52000                   | PC43G520             | 1.235               | 31.37                                       | 1.155 | 29.34     | GFV52000                         | 0.938                                       | 23.83 | 0.875 | 22.23 |
| 1.0                                        | 75.0  | 1000                                | G                                | 250                               | GFL75000                   | PC43G750             | 1.480               | 37.59                                       | 1.400 | 35.56     | GFV75000                         | 1.188                                       | 30.18 | 1.125 | 28.58 |
| 1.0                                        | 120.0 | 1000                                | G                                | 250                               | GFL12100                   | PC43G121             | 2.080               | 52.83                                       | 2.000 | 50.80     | GFV12100                         | 1.781                                       | 45.24 | 1.734 | 44.04 |

\*These capacitors were listed in Military Specification MIL-C-14409B but do not appear in MIL-C-14409D.

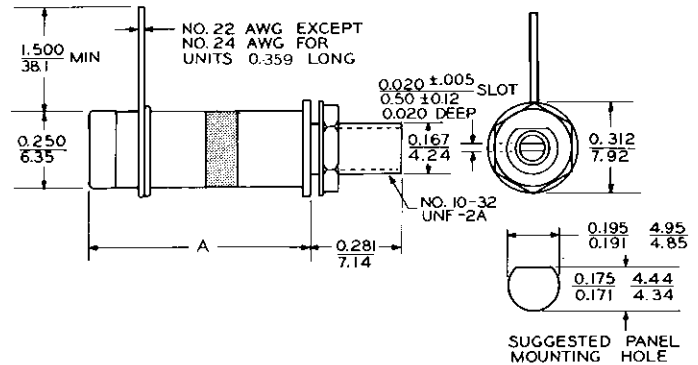
NOTE: Capacitance increases up to 0.5 pF on vertical modifications due to position of leads alongside capacitor body.



## PANEL MOUNTING


**Figure 3A**

## SEALED PANEL MOUNTING

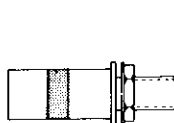

**Figure 3B**

| Capacitance Range in pF<br>Min. Max. | D-C Voltage Rating (Volts) | Min. Quality Factor Q | Temp. Char. (See Table) | Model No. Figure 3A | Mil Designation | A<br>+0.047, -0.031<br>(+1.19, -0.79)<br>In. mm |
|--------------------------------------|----------------------------|-----------------------|-------------------------|---------------------|-----------------|-------------------------------------------------|
| <b>STANDARD GLASS</b>                |                            |                       |                         |                     |                 |                                                 |
| 0.8 4.5                              | 750                        | 500                   | J                       | GGP4R500            | *PC40J4R5       | 0.297 7.54                                      |
| 0.8 8.5                              | 750                        | 500                   | J                       | GGP8R500            | *PC40J8R5       | 0.547 13.89                                     |
| 0.8 12.0                             | 750                        | 500                   | H                       | GGP12000            | *PC40H120       | 0.750 19.05                                     |
| 0.8 18.0                             | 750                        | 500                   | H                       | GGP18000            | *PC40H180       | 0.984 24.99                                     |
| 0.8 30.0                             | 750                        | 350                   | H                       | GGP30000            | *PC40H300       | 1.594 40.49                                     |
| <b>HI-RANGE GLASS</b>                |                            |                       |                         |                     |                 |                                                 |
| 0.8 5.5                              | 750                        | 1000                  | J                       | GHP5R500            | PC50J5R5        | 0.297 7.54                                      |
| 0.8 11.0                             | 750                        | 900                   | J                       | GHP11000            | PC50J110        | 0.547 13.89                                     |
| 0.8 16.0                             | 750                        | 800                   | H                       | GHP16000            | PC50H160        | 0.750 19.05                                     |
| 0.8 23.0                             | 750                        | 700                   | H                       | GHP23000            | PC50H230        | 0.984 24.99                                     |
| 0.8 38.0                             | 750                        | 500                   | H                       | GHP38000            | PC50H380        | 1.594 40.49                                     |
| <b>QUARTZ</b>                        |                            |                       |                         |                     |                 |                                                 |
| 0.6 1.8                              | 750                        | 1500                  | Q                       | GQP1R800            | PC40Q1R8        | 0.297 7.54                                      |
| 0.6 5.5                              | 750                        | 1500                  | Q                       | GQP5R500            | PC40Q5R5        | 0.547 13.89                                     |
| 0.6 9.5                              | 750                        | 1500                  | Q                       | GQP9R500            | PC40Q9R5        | 0.984 24.99                                     |
| 0.8 16.0                             | 750                        | 1500                  | Q                       | GQP16000            | PC40Q160        | 1.594 40.49                                     |

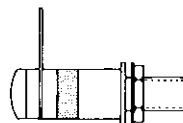
| Capacitance Range in pF<br>Min. Max. | D-C Voltage Rating (Volts) | Min. Quality Factor Q | Temp. Char. (See Table) | Model No. Figure 3B | Mil Designation | Length A<br>±0.031 (0.79)<br>In. mm |
|--------------------------------------|----------------------------|-----------------------|-------------------------|---------------------|-----------------|-------------------------------------|
| <b>STANDARD GLASS</b>                |                            |                       |                         |                     |                 |                                     |
| 0.8 4.5                              | 750                        | 500                   | J                       | GGR4R500            | *PC38J4R5       | 0.359 9.12                          |
| 0.8 8.5                              | 1250                       | 500                   | J                       | GGR8R500            | *PC38J8R5       | 0.594 15.09                         |
| 0.8 12.0                             | 1250                       | 500                   | H                       | GGR12000            | *PC38H120       | 0.812 20.62                         |
| 0.8 18.0                             | 1250                       | 500                   | H                       | GGR18000            | *PC38H180       | 1.062 26.97                         |
| 0.8 30.0                             | 1250                       | 350                   | H                       | GGR30000            | *PC38H300       | 1.656 42.06                         |
| <b>HI-RANGE GLASS</b>                |                            |                       |                         |                     |                 |                                     |
| 0.8 5.5                              | 750                        | 1000                  | J                       | GHR5R500            | PC48J5R5        | 0.359 9.12                          |
| 0.8 11.0                             | 1250                       | 900                   | J                       | GHR11000            | PC48J110        | 0.594 15.09                         |
| 0.8 16.0                             | 1250                       | 800                   | H                       | GHR16000            | PC48H160        | 0.812 20.62                         |
| 0.8 23.0                             | 1250                       | 700                   | H                       | GHR23000            | PC48H230        | 1.062 26.97                         |
| 0.8 38.0                             | 1250                       | 500                   | H                       | GHR38000            | PC48H380        | 1.656 42.06                         |
| <b>QUARTZ</b>                        |                            |                       |                         |                     |                 |                                     |
| 0.6 1.8                              | 750                        | 1500                  | Q                       | GQR1R800            | PC38Q1R8        | 0.359 9.12                          |
| 0.6 5.5                              | 1250                       | 1500                  | Q                       | GQR5R500            | PC38Q5R5        | 0.625 15.88                         |
| 0.6 9.5                              | 1250                       | 1500                  | Q                       | GQR9R500            | PC38Q9R5        | 1.062 26.97                         |
| 0.8 16.0                             | 1250                       | 1500                  | Q                       | GQR16000            | PC38Q160        | 1.656 42.06                         |

\*These capacitors were listed in Military Specification MIL-C-14409B but do not appear in MIL-C-14409D.

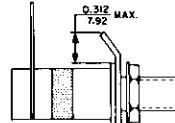
## MODIFICATIONS



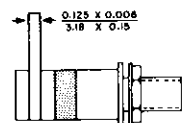
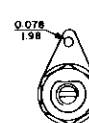
**No. 01**  
**OMIT ELECTRODE LEAD**



**No. 06**  
**CYLINDER END CLOSED**



**No. 11**  
**EXTRA BASE LUG**



**No. 12**  
**RIBBON LEAD**



## EXPANDED RANGE PANEL MOUNTING

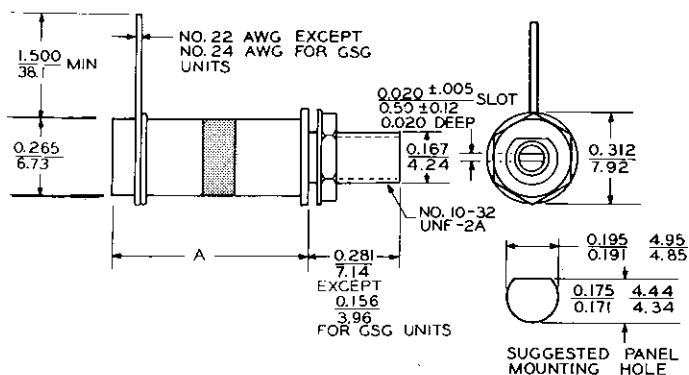


Figure 3C

## EXPANDED RANGE SEALED PANEL MOUNTING

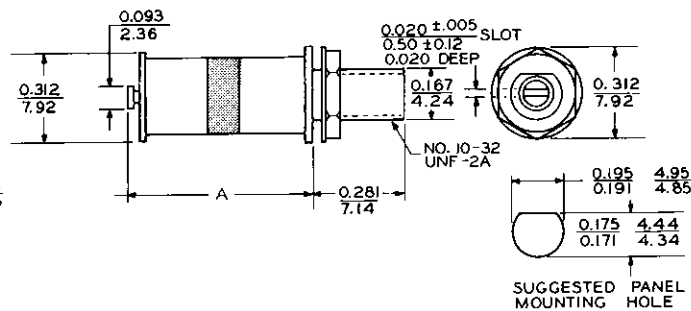
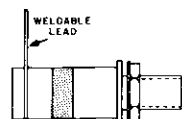


Figure 3D

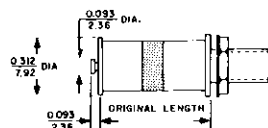
| Capacitance<br>Range in pF<br>Min. Max. | D-C<br>Voltage<br>Rating<br>(Volts) | Minimum<br>Quality<br>Factor<br>Q | Temp.<br>Char.<br>(See<br>Table) | Model No.<br>Figure 3C | A<br>± 0.031<br>(0.79)<br>In. mm |       |
|-----------------------------------------|-------------------------------------|-----------------------------------|----------------------------------|------------------------|----------------------------------|-------|
| STANDARD GLASS DIELECTRIC               |                                     |                                   |                                  |                        |                                  |       |
| 1.2 10.0                                | 500                                 | 500                               | Y                                | GSG006                 | 0.266                            | 6.76  |
| 1.0 14.0                                | 750                                 | 500                               | G                                | GEP14000               | 0.375                            | 9.53  |
| 1.0 28.0                                | 750                                 | 350                               | G                                | GEP28000               | 0.609                            | 15.47 |
| 1.0 42.0                                | 750                                 | 250                               | G                                | GEP42000               | 0.828                            | 21.03 |
| 1.0 60.0                                | 750                                 | 250                               | G                                | GEP60000               | 1.078                            | 27.38 |
| 1.0 90.0                                | 750                                 | 250                               | G                                | GEP90000               | 1.672                            | 42.47 |
| HI-RANGE GLASS DIELECTRIC               |                                     |                                   |                                  |                        |                                  |       |
| 1.2 16.0                                | 500                                 | 750                               | Y                                | GSG007                 | 0.312                            | 7.92  |
| 1.0 16.0                                | 750                                 | 750                               | G                                | GFP16000               | 0.375                            | 9.53  |
| 1.0 36.0                                | 750                                 | 550                               | G                                | GFP36000               | 0.609                            | 15.47 |
| 1.0 52.0                                | 750                                 | 350                               | G                                | GFP52000               | 0.828                            | 21.03 |
| 1.0 75.0                                | 750                                 | 250                               | G                                | GFP75000               | 1.078                            | 27.38 |
| 1.0 120.0                               | 750                                 | 250                               | G                                | GFP12100               | 1.672                            | 42.47 |

| Capacitance<br>Range in pF<br>Min. Max. | D-C<br>Voltage<br>Rating<br>(Volts) | Min.<br>Quality<br>Factor<br>Q | Temp.<br>Char.<br>(See<br>Table) | Model No.<br>Figure 3D | Mil Desig-<br>nation | Length A<br>± 0.031<br>(0.79)<br>In. mm |
|-----------------------------------------|-------------------------------------|--------------------------------|----------------------------------|------------------------|----------------------|-----------------------------------------|
| STANDARD GLASS                          |                                     |                                |                                  |                        |                      |                                         |
| 1.0 14                                  | 1000                                | 500                            | G                                | GER14000               | *PC39G140            | 0.469 11.91                             |
| 1.0 28                                  | 1000                                | 350                            | G                                | GER28000               | *PC39G280            | 0.703 17.86                             |
| 1.0 42                                  | 1000                                | 250                            | G                                | GER42000               | *PC39G420            | 0.922 23.42                             |
| 1.0 60                                  | 1000                                | 250                            | G                                | GER60000               | *PC39G600            | 1.172 29.77                             |
| 1.0 90                                  | 1000                                | 250                            | G                                | GER90000               | *PC39G900            | 1.766 44.86                             |
| HI-RANGE GLASS                          |                                     |                                |                                  |                        |                      |                                         |
| 1.0 16                                  | 1000                                | 750                            | G                                | GFR16000               | PC39G160             | 0.469 11.91                             |
| 1.0 36                                  | 1000                                | 550                            | G                                | GFR36000               | PC39G360             | 0.703 17.86                             |
| 1.0 52                                  | 1000                                | 350                            | G                                | GFR52000               | PC39G520             | 0.922 23.42                             |
| 1.0 75                                  | 1000                                | 250                            | G                                | GFR75000               | PC39G750             | 1.172 29.77                             |
| 1.0 120                                 | 1000                                | 250                            | G                                | GFR12100               | PC39G121             | 1.766 44.86                             |

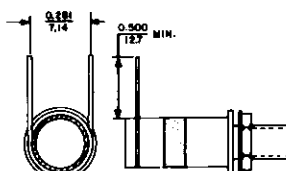
\*These capacitors were listed in Military Specification MIL-C-14409B but do not appear in MIL-C-14409D.



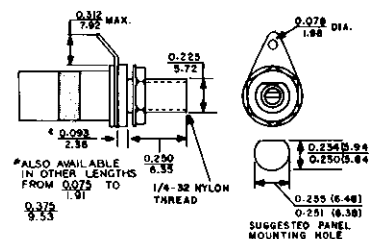
No. 13  
WELDABLE LEAD



No. 14  
TURRET CAP



No. 15  
DOUBLE LEADS



No. 30  
INSULATED NYLON BUSHING

# **EXTENDED-SCREW, 1/4" DIA. MOUNTING BUSHING**

## **SPECIFICATIONS**

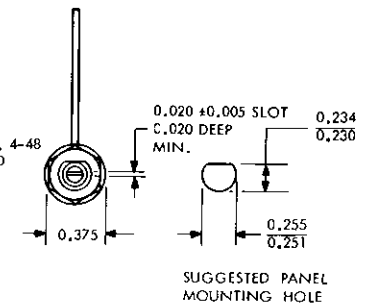
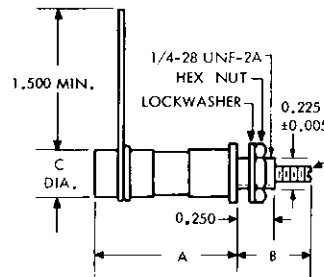
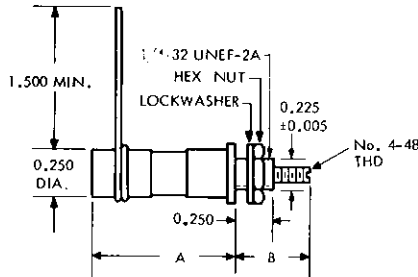
Operating Temperature Range:

—55°C to +125°C (Glass)  
—55°C to +150°C (Quartz)

Voltage Rating: 750 Volts D-C

Wire Size:

No. 22 AWG  
Except GGW3R000  
No. 24 AWG



TYPES GGW, GHW, GSG904 THRU 906

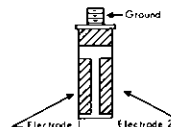
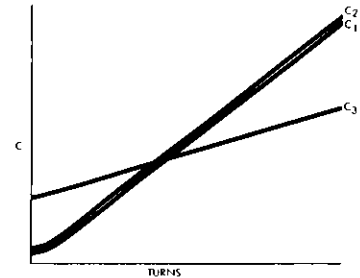
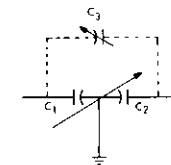
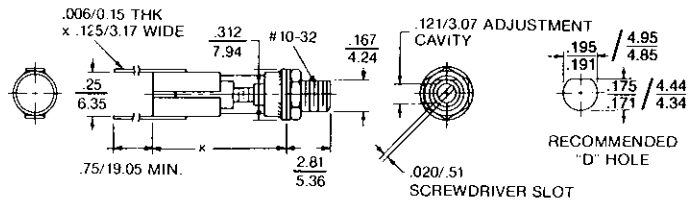
TYPES GQW, GSG900 THRU 903, AND GSG907 THRU 910

| Cap. Range<br>in pF                   |      | Min.<br>Q<br>at 20 MHz | Temp.<br>Coeff.<br>in ppm/°C | Model No. | Length   |           | Screw Extension |       |
|---------------------------------------|------|------------------------|------------------------------|-----------|----------|-----------|-----------------|-------|
| Min.                                  | Max. |                        |                              |           | A ± .031 | mm ± 0.79 | B Max.          | mm    |
| STANDARD GLASS                        |      |                        |                              |           |          |           |                 |       |
| 0.5                                   | 3.0  | 500                    | ± 50                         | GGW3R000  | 0.484    | 12.29     | 0.625           | 15.88 |
| 0.8                                   | 8.5  | 500                    | ± 75                         | GGW8R500  | 0.578    | 14.68     | 0.625           | 15.88 |
| 0.7                                   | 9.0  | 500                    | ± 75                         | GGW9R000  | 0.656    | 16.66     | 0.656           | 16.66 |
| 0.8                                   | 12.0 | 500                    | ± 100                        | GGW12000  | 0.765    | 19.43     | 0.750           | 19.05 |
| 0.8                                   | 18.0 | 500                    | ± 100                        | GGW18000  | 1.000    | 25.40     | 0.843           | 21.41 |
| 0.8                                   | 30.0 | 500                    | ± 100                        | GGW30000  | 1.594    | 40.49     | 1.141           | 28.98 |
| HI-RANGE GLASS                        |      |                        |                              |           |          |           |                 |       |
| 0.5                                   | 4.5  | 1000                   | ± 100                        | GHW4R500  | 0.484    | 12.29     | 0.625           | 15.88 |
| 0.8                                   | 11.0 | 900                    | ± 100                        | GHW11000  | 0.578    | 14.68     | 0.625           | 15.88 |
| 0.8                                   | 13.0 | 900                    | ± 100                        | GHW13000  | 0.609    | 15.47     | 0.625           | 15.88 |
| 0.8                                   | 17.0 | 800                    | ± 100                        | GHW17000  | 0.765    | 19.43     | 0.750           | 19.05 |
| 1.0                                   | 24.0 | 700                    | ± 100                        | GHW24000  | 1.000    | 25.40     | 0.812           | 20.62 |
| 1.0                                   | 40.0 | 500                    | ± 100                        | GHW40000  | 1.594    | 40.49     | 1.125           | 28.58 |
| STANDARD GLASS —SPECIAL TEMP. COEFF.* |      |                        |                              |           |          |           |                 |       |
| 0.7                                   | 9.0  | 500                    | +400 ± 100                   | GSG904    | 0.656    | 16.66     | 0.797           | 20.24 |
| 0.8                                   | 18.0 | 500                    | +400 ± 100                   | GSG905    | 1.000    | 25.40     | 0.938           | 23.83 |
| 0.8                                   | 30.0 | 500                    | +400 ± 100                   | GSG906    | 1.594    | 40.49     | 1.250           | 31.75 |
| QUARTZ (C = 0.250 DIA. TUBE)          |      |                        |                              |           |          |           |                 |       |
| 0.6                                   | 5.5  | 1500                   | +50, —0                      | GQW5R500  | 0.563    | 14.30     | 0.765           | 19.43 |
| 0.6                                   | 9.5  | 1500                   | +50, —0                      | GQW9R500  | 1.000    | 25.40     | 0.891           | 22.63 |
| 0.8                                   | 16.0 | 1500                   | +50, —0                      | GQW16000  | 1.594    | 40.49     | 1.250           | 31.75 |
| QUARTZ (C = 0.250 DIA. TUBE)*         |      |                        |                              |           |          |           |                 |       |
| 0.7                                   | 4.5  | 1500                   | +50, —0                      | GSG907    | 0.438    | 11.13     | 0.546           | 13.87 |
| 0.6                                   | 6.0  | 1500                   | +50, —0                      | GSG908    | 0.625    | 15.88     | 0.906           | 23.01 |
| 0.8                                   | 10.0 | 1500                   | +50, —0                      | GSG909    | 1.000    | 25.40     | 0.891           | 22.63 |
| 9.0                                   | 21.0 | 1500                   | +50, —0                      | GSG910    | 1.594    | 40.49     | 1.000           | 25.40 |
| STANDARD GLASS (C = 0.250 DIA. TUBE)* |      |                        |                              |           |          |           |                 |       |
| 0.7                                   | 9.0  | 500                    | +0, —150                     | GSG900    | 0.656    | 16.66     | 0.765           | 19.43 |
| 0.6                                   | 14.0 | 500                    | +0, —150                     | GSG901    | 1.000    | 25.40     | 1.000           | 25.40 |
| 0.8                                   | 18.0 | 500                    | +0, —150                     | GSG902    | 1.000    | 25.40     | 0.953           | 24.21 |
| 0.8                                   | 30.0 | 500                    | +0, —150                     | GSG903    | 1.594    | 40.49     | 1.250           | 31.75 |

\*The "GSG" model prefix signifies a special design. Part numbers for these devices are assigned sequentially and are not in accordance with the standard part numbering system.

# MINIATURE SPLIT STATOR CAPACITORS

Piston adjustment varies capacitance simultaneously from each plate to bushing and from plate to plate for use in push-pull circuits and similar networks.



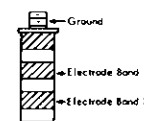
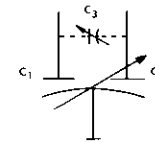
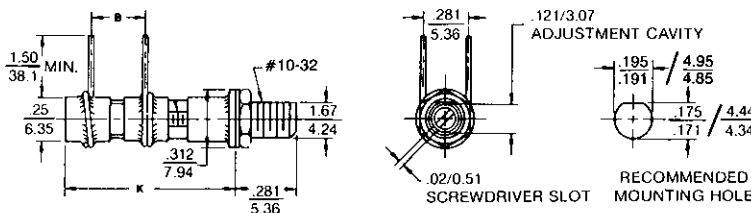
$C_1$  = Capacitance of Electrode Band 1 to Ground.  
 $C_2$  = Capacitance of Electrode Band 2 to Ground.  
 $C_3$  = Capacitance of Electrode Band 1 to Electrode Band 2.

Panel Mounting Model. For other configurations, contact factory.

| Model No.  | Cap. Range (pF)  |      |                |      | K ± 0.031/0.79<br>in. mm |       |
|------------|------------------|------|----------------|------|--------------------------|-------|
|            | Plate to Bushing |      | Plate to Plate |      |                          |       |
|            | Min.             | Max. | Min.           | Max. |                          |       |
| JFD-SP86GY | 0.8              | 4.2  | 0.8            | 2.0  | .547                     | 13.89 |
| JFD-SP87GY | 0.8              | 9.0  | 1.5            | 4.5  | 1.000                    | 25.40 |
| JFD-SP88GY | 1.0              | 14.0 | 2.0            | 7.0  | 1.609                    | 40.87 |

# MINIATURE DIFFERENTIAL CAPACITORS

Piston adjustment increases capacitance of one gang while capacitance of other gang decreases.



Panel Mounting Model. For other configurations, contact factory.

| Model No.  |         | Cap. Range (pF) |      | Typical (pF)<br>Crossover | B ± .024/0.62 |       | K ± .031/0.79 |       | Wire Dia. |     |
|------------|---------|-----------------|------|---------------------------|---------------|-------|---------------|-------|-----------|-----|
|            |         | Min.            | Max. |                           | in.           | mm    | in.           | mm    | in.       | mm  |
| JFD-DC411Y | Sect. 1 | 0.7             | 3.0  | 2.3                       | .094          | 2.39  | .312          | 7.92  | .016      | .41 |
|            | Sect. 2 | 2.0             | 3.0  |                           |               |       |               |       |           |     |
| JFD-DC413Y | Sect. 1 | 1.0             | 8.0  | 5.0                       | .219          | 5.56  | .547          | 13.89 | .020      | .51 |
|            | Sect. 2 | 3.0             | 8.0  |                           |               |       |               |       |           |     |
| JFD-DC414Y | Sect. 1 | 1.0             | 12.0 | 6.8                       | .312          | 7.92  | .750          | 19.05 | .025      | .64 |
|            | Sect. 2 | 3.5             | 12.0 |                           |               |       |               |       |           |     |
| JFD-DC416Y | Sect. 1 | 1.5             | 16.0 | 9.2                       | .406          | 10.31 | .937          | 23.80 | .025      | .64 |
|            | Sect. 2 | 4.0             | 11.0 |                           |               |       |               |       |           |     |
| JFD-DC419Y | Sect. 1 | 2.0             | 26.0 | 15.2                      | .656          | 16.66 | 1.437         | 36.50 | .025      | .64 |
|            | Sect. 2 | 6.0             | 28.0 |                           |               |       |               |       |           |     |

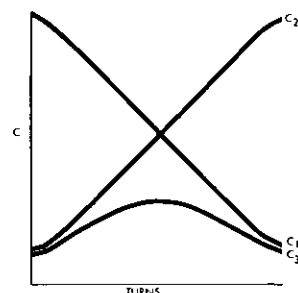
Sect. #1: Base to end electrode  
 Sect. #2: Base to center electrode

$C_1$  = Capacitance of Electrode Band 1 to Ground.  
 $C_2$  = Capacitance of Electrode Band 2 to Ground.  
 $C_3$  = Capacitance of Electrode Band 1 to Electrode Band 2.

## NOTES:

1. TCC =  $0 \pm 100$  ppm/°C; -55°C to +125°C
2. Q @ 20 MHz: 500 min.
3. Adjust torque: 1-10 oz.-in.

4. Working Voltage Rating: 500 VDC
5. Drift = 0.2% or 0.04 pF
6. IR =  $10^9$  MΩ



# Surface Mount Glass PISTONCAP®

## Vertical and Horizontal Mount Types

### Available in Standard and Extended Range Models

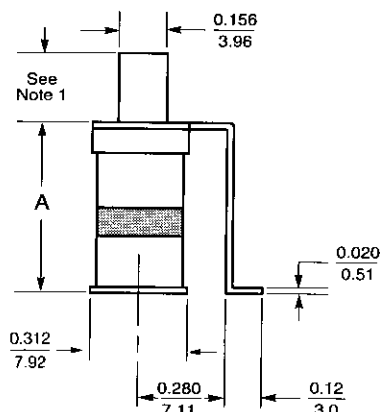
## VERTICAL MOUNT TYPES

### EXTERNAL ELECTRODE

| Capacitance Range in pF<br>min max |              | D-C Voltage Rating (Volts) | Temp. Char. (See Table) | Minimum Quality Factor Q | A max<br>in mm |      | Unsealed Model No. (See Note 2) | Sealed Model No.     |
|------------------------------------|--------------|----------------------------|-------------------------|--------------------------|----------------|------|---------------------------------|----------------------|
| 1.3                                | 4.5<br>5.5   | 750                        | J                       | 500<br>1000              | 0.383          | 9.73 | GGN4R531<br>GHN5R531            | GGV4R531<br>GHV5R531 |
| 1.3                                | 8.5<br>11.0  | 750                        | J                       | 500<br>900               | 0.633          | 16.1 | GGN8R531<br>GHN11031            | GGV8R531<br>GHV11031 |
| 1.3                                | 12.0<br>16.0 | 750                        | H                       | 500<br>800               | 0.837          | 21.3 | GGN12031<br>GHN16031            | GGV12031<br>GHV16031 |
| 1.3                                | 18.0<br>23.0 | 750                        | H                       | 500<br>700               | 1.071          | 27.2 | GGN18031<br>GHN23031            | GGV18031<br>GHV23031 |

### EMBEDDED ELECTRODE

| Capacitance Range in pF<br>min max |              | D-C Voltage Rating (Volts) | Temp. Char. (See Table) | Minimum Quality Factor Q | A max<br>in mm |      | Unsealed Model No. (See Note 2) | Sealed Model No.     |
|------------------------------------|--------------|----------------------------|-------------------------|--------------------------|----------------|------|---------------------------------|----------------------|
| 1.5                                | 14.5<br>16.5 | 1000                       | G                       | 500<br>750               | 0.462          | 11.7 | GEN14031<br>GFN16031            | GEV14031<br>GFV16031 |
| 1.5                                | 28.5<br>36.5 | 1000                       | G                       | 350<br>550               | 0.696          | 17.7 | GEN28031<br>GFN36031            | GEV28031<br>GFV36031 |



#### Notes:

- 1) Unsealed models:  $\frac{0.120}{3.05}$   
Sealed models:  $\frac{0.245}{6.22}$
- 2) For an optional sealing cap to cover adjustment access on unsealed models, contact factory.

### VERTICAL MOUNT

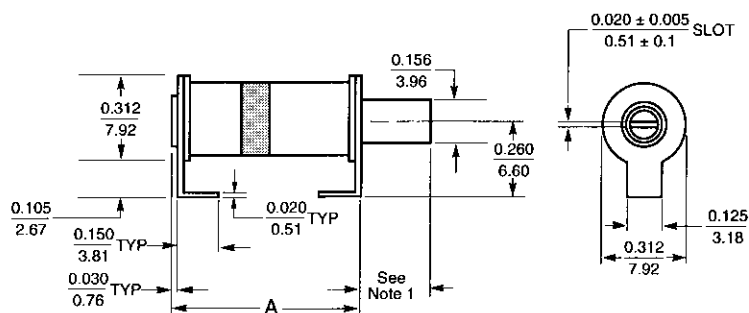
# HORIZONTAL MOUNT TYPES

## EXTERNAL ELECTRODE

| Capacitance Range in pF<br>min max |              | D-C Voltage Rating (Volts) | Temp. Char. (See Table) | Minimum Quality Factor Q | A max<br>in mm |      | Unsealed Model No. (See Note 2) | Sealed Model No.     |
|------------------------------------|--------------|----------------------------|-------------------------|--------------------------|----------------|------|---------------------------------|----------------------|
| 0.8                                | 8.5<br>11.0  | 750                        | J                       | 500<br>900               | 0.673          | 17.1 | GGN8R533<br>GHN11033            | GGV8R533<br>GHV11033 |
| 0.8                                | 12.0<br>16.0 | 750                        | H                       | 500<br>800               | 0.877          | 22.3 | GGN12033<br>GHN16033            | GGV12033<br>GHV16033 |
| 0.8                                | 18.0<br>23.0 | 750                        | H                       | 500<br>700               | 1.111          | 28.2 | GGN18033<br>GHN23033            | GGV18033<br>GHV23033 |
| 0.8                                | 30.0<br>38.0 | 750                        | H                       | 350<br>500               | 1.720          | 43.7 | GGN30033<br>GHN38033            | GGV30033<br>GHV38033 |

## EMBEDDED ELECTRODE

| Capacitance Range in pF<br>min max |               | D-C Voltage Rating (Volts) | Temp. Char. (See Table) | Minimum Quality Factor Q | A max<br>in mm |      | Unsealed Model No. (See Note 2) | Sealed Model No.     |
|------------------------------------|---------------|----------------------------|-------------------------|--------------------------|----------------|------|---------------------------------|----------------------|
| 1.0                                | 28.0<br>36.0  | 1000                       | G                       | 350<br>550               | 0.736          | 18.7 | GEN28033<br>GFN36033            | GEV28033<br>GFV36033 |
| 1.0                                | 42.0<br>52.0  | 1000                       | G                       | 250<br>350               | 0.955          | 24.3 | GEN42033<br>GFN52033            | GEV42033<br>GFV52033 |
| 1.0                                | 60.0<br>75.0  | 1000                       | G                       | 250<br>250               | 1.205          | 30.6 | GEN60033<br>GFN75033            | GEV60033<br>GFV75033 |
| 1.0                                | 90.0<br>120.0 | 1000                       | G                       | 250<br>250               | 1.799          | 45.7 | GEN90033<br>GFN12133            | GEV90033<br>GFV12133 |



HORIZONTAL MOUNT

### Notes:

- 1) Unsealed models: 0.120  
3.05  
Sealed models: 0.245  
6.22
- 2) For an optional sealing cap to cover adjustment access on unsealed models, contact factory.

# DIRECT TRAVERSE GLASS TRIMMERS

## FEATURES

- Shortest sealed PISTONCAP®
- Designed to meet MIL-C-14409.
- Annular band and embedded band models.
- High Q.
- High self-resonant frequency.
- Surface mount or through-hole mount.
- O-ring seal protects (to 276 kPa, 40 psi) against dust, flux, moisture, solder and solvents.
- Direct traverse (non-rotating) piston.

## SPECIFICATIONS

Operating Temperature Range: -55°C to 125°C

Voltage Rating: 250 VDC

Dielectric Withstanding Voltage: 500 VDC

Insulation Resistance: 10<sup>6</sup> Megohms min

Torque: 36 to 360 g-cm (0.50 to 5.0 oz-in)

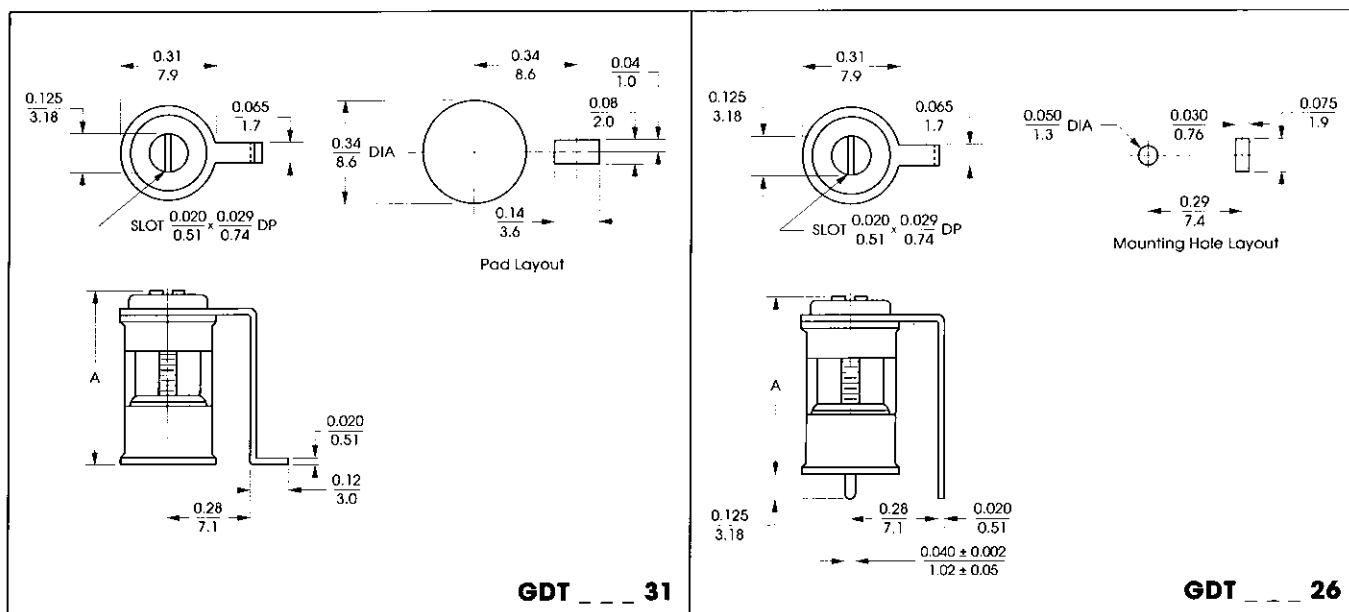
Tuning Resolution:

0.7 pF per turn for Annular Band

2.7 pF per turn for Embedded Band



|                             | Capacitance Range (pF) |     | TCC (ppm/°C) | Q min (1 MHz) | A max (in/mm) | Surface Mount Model No. | Through-hole Model No. |
|-----------------------------|------------------------|-----|--------------|---------------|---------------|-------------------------|------------------------|
|                             | min                    | max |              |               |               |                         |                        |
| <b>Annular Band Models</b>  | 1.0                    | 5.5 | 0 ± 50       | 1000          | 0.42/11       | GDT5R531                | GDT5R526               |
|                             | 1.0                    | 8.5 | 0 ± 50       | 650           | 0.57/14       | GDT8R531                | GDT8R526               |
| <b>Embedded Band Models</b> | 1.5                    | 10  | 0 ± 150      | 800           | 0.37/9.4      | GDT10031                | GDT10026               |
|                             | 1.5                    | 20  | 0 ± 150      | 800           | 0.44/11       | GDT20031                | GDT20026               |
|                             | 1.5                    | 30  | 0 ± 150      | 800           | 0.52/13       | GDT30031                | GDT30026               |
|                             | 1.5                    | 40  | 0 ± 150      | 800           | 0.63/16       | GDT40031                | GDT40026               |

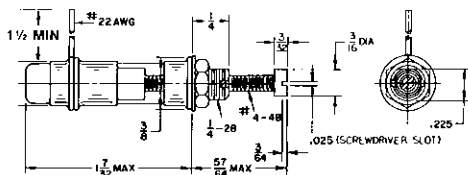


Note: For horizontal mounting configurations, contact factory.

All dimensions are in /mm.

Unless otherwise specified, the tolerance on all dimensions is ±0.005/0.1, except slot tolerance is ±0.002/0.05.

## HIGH VOLTAGE TRIMMER (Quartz Dielectric)



| Model No. | Capacitance Range (pF) | WVDC  | Dielectric Strength VDC |
|-----------|------------------------|-------|-------------------------|
| JFD-VC99  | 0.8 – 10.0             | 5,000 | 10,000                  |

**Notes:** 1. Operating Temp.: -55° C to +150° C  
 2. Temp. coefficient: +25 ± 25 PPM/° C  
 3. Q factor @ 20 MHz: 1500 min.  
 4. Insulation Resistance: 10<sup>6</sup> megohms

## HIGH RF VOLTAGE TRIMMER (Quartz Dielectric)

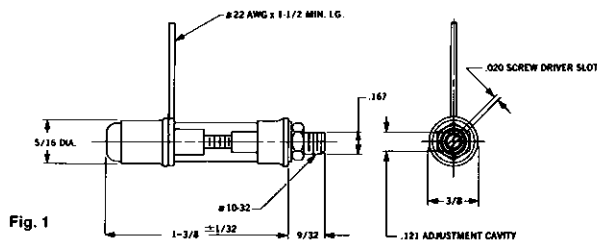


Fig. 1

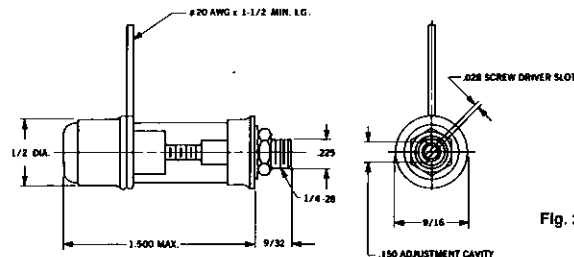


Fig. 2

| Model No.    | Capacitance Range (pF) | Operating RF voltage (measured for 1 min.) at 50% R.H. and 2 MHz                 | Fig. |
|--------------|------------------------|----------------------------------------------------------------------------------|------|
| JFD-VCJ1616M | 0.5 – 5.0              | 3,100 v peak at +25° C<br>2,500 v peak at +200° C<br>(superimposed on 2,500 VDC) | 1    |
| JFD-VCJ1616E | 0.9 – 5.0              | 4,000 v peak at +25° C<br>3,500 v peak at +200° C<br>(superimposed on 2,500 VDC) | 2    |

**Notes:** 1. Operating Temp.: -55° C to +200° C  
 2. Temp. coefficient: (-55 thru +150° C): ± 100 PPM/° C  
 3. Dielectric strength: 10,000 VDC  
 4. Q @ 1 MHz: 2000 min.  
 5. Insulation Resistance (after 1 min. @ 500 VDC and 50/R.H.): 10<sup>6</sup> megohms min.  
 6. Suitable frequency range: 1 to 30 MHz.

## STANDARD MODIFICATIONS

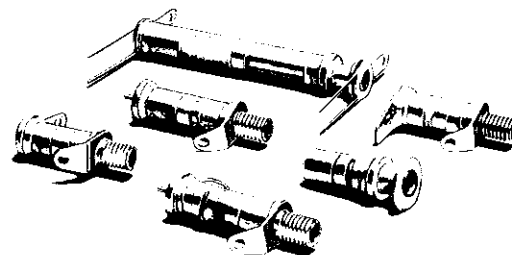
| Mod. Suffix | Description of Modification | Availability on Models | Shown on Pages | Mod. Suffix | Description of Modification        | Availability on Models | Shown on Pages |
|-------------|-----------------------------|------------------------|----------------|-------------|------------------------------------|------------------------|----------------|
| 01          | Omit Electrode Lead         | Panel Mtg.             | 8, 9           | 22          | Two Wire & Lug Vertical            | PC Mtg.                | 4, 5, 6, 7     |
| 06          | Cylinder End Closed         | Open End Panel & PC    | 4, 5, 8        | 25          | Turret Pin Cap & Two Wire Vertical | PC Mtg.                | 4, 5, 6, 7     |
| 11          | Extra Base Lug              | Panel Mtg.             | 8, 9           | 26          | Turret Pin Cap & Lug Vertical      | PC Mtg.                | 4, 5, 6, 7, 14 |
| 12          | Ribbon Lead                 | Panel Mtg.             | 8, 9           | 27          | Turret Pin Cap & One Wire Vertical | PC Mtg.                | 4, 5, 6, 7     |
| 13          | Weldable Lead               | Panel Mtg.             | 8, 9           | 30          | Insulated Nylon Bushing            | Panel Mtg.             | 8, 9           |
| 14          | Turret Cap                  | Open End Panel Mtg.    | 8, 9           | 31          | Vertical Surface Mount             | PC Mtg.                | 12, 14         |
| 15          | Double Leads                | Panel Mtg.             | 8, 9           | 33          | Horizontal Surface Mount           | PC Mtg.                | 13             |
| 16          | Base Lug, Single Lead       | PC Mtg.                | 4, 5, 6, 7     |             |                                    |                        |                |
| 17          | Base Lug, Double Leads      | PC Mtg.                | 4, 5, 6, 7     |             |                                    |                        |                |
| 21          | Four Wire Vertical          | PC Mtg.                | 4, 5, 6, 7     |             |                                    |                        |                |

## CUSTOM PISTONCAP® CAPACITOR DESIGNS

There are many possible design variations utilizing Pistoncap technology. The standard modifications given on pages 4 through 9 show the more popular design variations. In addition, dual electrode band models (differential) and split electrode band models (split stator) are shown below. Both styles are available in any of the standard or modified mechanical designs listed in the bulletin.

Pistoncaps are rated quite conservatively for both minimum and maximum capacitance. Therefore, units with a larger guaranteed range can be supplied on special order.

Shown at right is a variety of special leads, lugs, and combinations of leads and lugs available on Sprague-Goodman Pistoncap capacitors. These, in addition to other possibilities, afford the design engineer a wide selection of mounting and attachment for his packaging requirements.



### NOTES ON MEASUREMENTS

1. Capacitance measured at 1 MHz  $\pm$  100 kHz in a test fixture incorporating a guard provision.
2. Dielectric Strength: Twice Rated Voltage.
3. Dielectric strength measured at maximum rated capacitance.
4. Insulation Resistance:  $10^6$  Megohms at +25°C.
5. Insulation resistance at peak operating temperature: see table.
6. Insulation resistance measured at maximum rated capacitance with 500  $\pm$  50 volts applied for 1 minute.
7. Quality factor (Q) measured at 20 MHz  $\pm$  200 kHz at maximum rated capacitance.
8. Temperature coefficient of capacitance measured at 1 MHz  $\pm$  100 kHz at approximately 75% of maximum rated capacitance.
9. All measurements per MIL-C-14409D.
10. Driving torque: 1 to 10 ounce-inches.
11. Tolerance on dimensions:  $\pm$  0.016 ( $\pm$  0.41 mm) unless otherwise specified.

TEMPERATURE TABLE

| Temp. Char. | Operating Temperature Range | Temp. Coefficient (ppm/°C) | Max. Drift            | IR at Peak Temp. (MΩ) |
|-------------|-----------------------------|----------------------------|-----------------------|-----------------------|
| G           | - 55°C to + 125°C           | $\pm$ 150                  | $\pm$ 0.5%            | $10^5$                |
| H           | - 55°C to + 125°C           | $\pm$ 100                  | $\pm$ 0.2% or 0.04pF  | $10^5$                |
| J           | - 55°C to + 125°C           | $\pm$ 50                   | $\pm$ 0.15% or 0.02pF | $10^5$                |
| Q           | - 55°C to + 150°C           | + 50, -0                   | $\pm$ 0.10% or 0.01pF | $10^6$                |
| Y           | - 55°C to + 125°C           | + 75, $\pm$ 75             | $\pm$ 0.5%            | $10^5$                |



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