

Airborne Charge Amplifiers

**ENDEVCO
MODEL
2680M1-M7**

Model 2680M1-M7

- For Use with Piezoelectric Transducers
- Small, Rugged, Light Weight
- Dual Outputs, Biased and Unbiased
- Adjustable Gain
- Optional Low Pass Filter



Not actual size

DESCRIPTION

The ENDEVCO® Models 2680M1-XXX through 2680M7-XXX Charge Amplifiers are designed for use with piezoelectric transducers and are suitable for airborne applications. Hybrid microcircuit construction results in small size, ruggedness and low power consumption. The airborne charge amplifiers have an output voltage proportional to the input charge. As a result, the amplifier sensitivity is not appreciably affected by the capacitance of the input cable.

The use of modular construction techniques permits great versatility in gain and filter choices. This unit has two outputs, a biased output and an unbiased output. Both outputs are adjustable with a common gain control. The M1 through M7 defines the charge gain per Table 1.

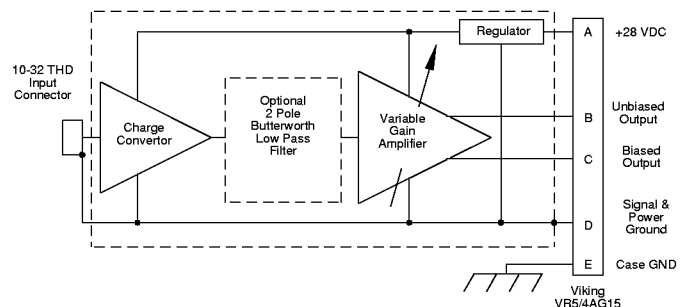
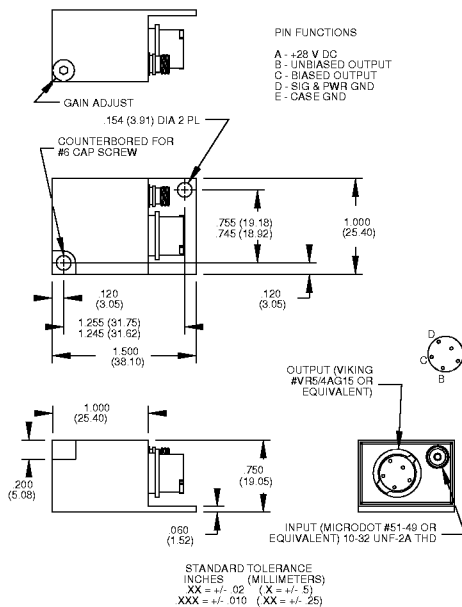
The -XXX describes the upper cutoff frequency (-5% point) per Table 2. For example, a -101 has a low pass filter which is flat up to 100 Hz, a -502 has a low pass filter which is flat up to 5000 Hz.

"M" Number	Gain Range [mV/pC]	Input Pulse [pC]	Residual Noise [mV rms]
M1	0.1 to 1.0	50 000	1.5
M2	0.2 to 2.0	25 000	1.5
M3	0.5 to 5.0	10 000	1.5
M4	1.0 to 10.0	5000	1.5
M5	2.0 to 20.0	2500	1.5
M6	5.0 to 50.0	1000	1.5
M7	10.0 to 100	500	2.0

TABLE 1: GAIN RANGES

Dash No.	Lower Cutoff Frequency [-5%]	Upper Cutoff Frequency [-5%]
None	5 Hz	20 kHz (10 kHz for M7)
101	5 Hz	100 Hz
201	5 Hz	200 Hz
501	5 Hz	500 Hz
102	5 Hz	1 kHz
202	5 Hz	2 kHz
502	5 Hz	5 kHz
103	5 Hz	10 kHz
203	5 Hz	20 kHz (10 kHz for M7)
402	5 Hz	4 kHz
250	5 Hz	25 Hz

TABLE 2: FREQUENCY RESPONSE



Airborne Charge Amplifiers

SPECIFICATIONS

INPUTS

TYPE	Piezoelectric single-ended with one side connected to signal ground
SOURCE RESISTANCE	25 M Ω minimum
SOURCE CAPACITANCE	10 000 pF maximum
OVERLOAD RECOVERY	A half sine pulse of 1ms duration and with an amplitude as specified in Table 1 (or less) will cause no spurious effects at the amplifier output other than clipping.

OUTPUTS

TYPE	Both biased and unbiased outputs are single-ended with one side connected to circuit ground.
LOAD IMPEDANCE	The parallel combination of both outputs load resistors shall be 10 k Ω or greater to meet all specifications.
OUTPUT IMPEDANCE	Biased Output 50 Ω maximum, direct coupled. Unbiased Output 50 Ω maximum, in series with at least 16 μ F
DC OUTPUT BIAS VOLTAGE	Biased Output 2.50 V \pm 3% with load resistances of 10 k Ω minimum Unbiased Output 0.00 V \pm .050 V/-0.00 V
LINEAR OUTPUT VOLTAGE	Biased Output 4.65 V pk-pk minimum with 10 k Ω load Unbiased Output 4.65 V pk-pk minimum with 1 M Ω load 4.25 V pk-pk minimum with 10 k Ω load
LIMITED OUTPUT VOLTAGE (BIASED OUTPUT)	0.00 V +0.075/-0.000 V and 5.30 V \pm 0.00/-0.30 V
LINEAR OUTPUT CURRENT (BOTH OUTPUTS)	0.465 mA pk-pk minimum with 10 k Ω load

TRANSFER CHARACTERISTICS

GAIN RANGE	Adjustable as specified in Table 1
GAIN STABILITY	0.05% maximum change per 1000 pF change in source capacitance at the input
Gain Stability with Supply Voltage	0.25% maximum with changes in supply voltage over the specified limits
FREQUENCY RESPONSE	The gain at the upper and lower cutoff frequencies is 5% lower than the gain at 20 Hz. See Table 2.
AMPLITUDE LINEARITY	\pm 0.5% of reading from best fit straight line approximation
RESIDUAL NOISE	0.01 pC rms + 0.01 pC rms per 1000 pF RTI or noise RTO as specified in Table 1 whichever is greater, when measured over a bandwidth of 3 Hz to 20 kHz
SHOCK AND VIBRATION SENSITIVITY	0.01 pC/g maximum RTI

ENVIRONMENTAL

TEMPERATURE	Operating -67°F to 212°F (-55°C to 100°C) Storage -99°F to 257°F (-73°C to 125°C)
HUMIDITY	100% R.H. when sealing screw is soldered. Meets MIL-STD-810D, Method 507.2, Procedure III.
ALTITUDE	No effect when sealing screw is soldered.
VIBRATION	120 mils D.A. 5 Hz to 55 Hz 20 g 55 Hz to 2000 Hz
SHOCK	100 g 6.5 millisecond sawtooth
E.M.C. CAPABILITY	The unit meets the requirements of the following specifications: MIL-STD-826, CLASS Am; MIL-I-6181D; MSFC-SPEC-279, CLASS 1; AF/BSO EXHIBIT 62-87

POWER

VOLTAGE	20 to 32 VDC (28 VDC nominal)
CURRENT	20 mA maximum for unfiltered units, 25 mA maximum for filtered units
POLARITY PROTECTION	Not damaged by a polarity reversal of the 28 V supply
CASE ISOLATION	Case and signal grounds isolated from each other by 50 M Ω or greater at 50 VDC

PHYSICAL

DIMENSIONS	1.00" l x 1.00" w x 0.75" h (25.4 mm x 25.4 mm x 19.1 mm) exclusive of mounting flange and connectors
MOUNTING	Unit mounts with two 6-32 screws
CASE MATERIAL	Aluminum with electroless nickel plate finish
WEIGHT	1.2 oz (34 gm) maximum
CONNECTORS	Input 10-32 coaxial Output Viking VR5/4AG15. Pin A is the 28 VDC, Pin B unbiased output, Pin C biased output, Pin D power and signal ground, Pin E case ground

ACCESSORIES

Instruction Manual 21997	Accessory Kit includes:
EP38	Mating Plug Viking #VP5/4CE6
EP35	Hood Viking #VS4/16C5
EP31	Potting Sleeve Viking #VS4/16C9

Continued product improvement necessitates that Endevco reserve the right to modify these specifications without notice. Endevco maintains a program of constant surveillance over all products to ensure a high level of reliability. This program includes attention to reliability factors during product design, the support of stringent Quality Control requirements, and compulsory corrective action procedures. These measures, together with conservative specifications have made the name Endevco synonymous with reliability.