Endevco
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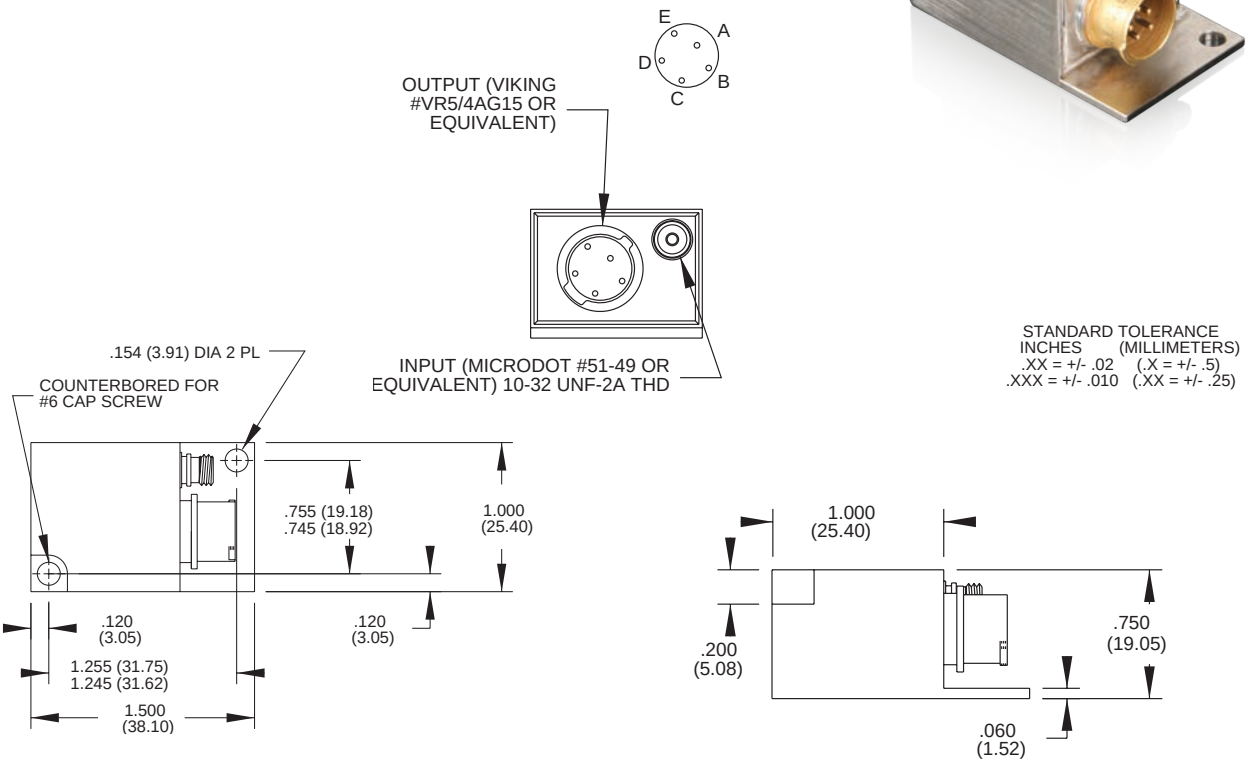
Airborne charge amplifiers

Model 2680M1-M7



Key features

- For use with piezoelectric transducers
- Small, rugged, light weight
- Dual outputs, biased and unbiased
- Adjustable gain
- Optional low pass filter

Description

Models 2680M1-XXX through 2680M7-XXX charge amplifiers are designed for use with piezoelectric trans-ducers 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 propor-tional 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.

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The following performance specifications conform to ISA-RP-37.2 (1964) and are typical values, referenced at +75˚F (+24˚C) and 100 Hz, unless otherwise noted. Calibration data, traceable to National Institute of Standards and Technology (NIST), is supplied.

Specifications

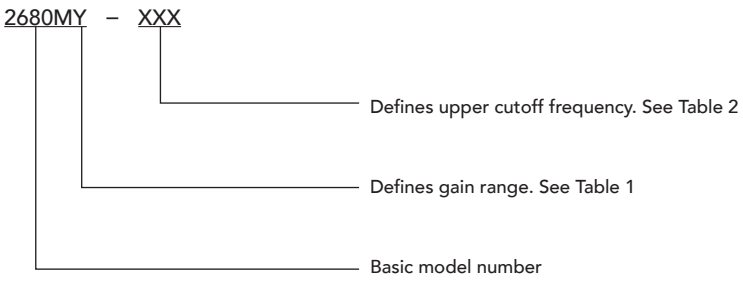
Inputs		
Type	Piezoelectric single-ended with one side connected to signal ground	
Source resistance	3 MΩ minimum	
Source capacitance	10 000 pF max	
Overload recovery	A half sine pulse of 1ms duration and with an amplitude as specified in Table 1 (or less) will cause no spurious effects at the amplifier 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 kΩ or greater to meet all specifications.	
Output impedance	Biased output	50 Ω max, direct coupled
	Unbiased output	50 Ω max, in series with at least 16 µF
DC output bias voltage	Biased output	2.50 V ±3% with load resistances of 10 kΩ minimum
	Unbiased output	0.00 V +0.050 V / -0.00 V
Linear output voltage	Biased output	4.65 V pk-pk minimum with 10 kΩ load
	Unbiased output	4.65 V pk-pk minimum with 1 MΩ load
		4.25 V pk-pk minimum with 10 kΩ load
Limited output voltage (biased output)	0.00 V +0.075/-0.000 V and 5.30 V +0.00/-0.30 V	
Limited output current (both output)	0.465 mA pk-pk minimum with 10 kΩ 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	±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 Characteristics		
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	
EMC capability	The unit meets the requirements of the following specifications: MIL-STD-826, CLASS Am; MIL-I-6181D; MSFC-SPEC-279, CLASS 1; AF/BSD 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 MΩ or greater at 50 VDC	
Physical Characteristics		
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 out	put, Pin D power and signal ground, Pin E case ground

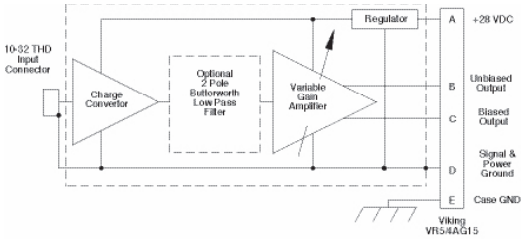
Accessories		
Options	**Description**	**2680M1-M7**
21997	Accessory Kit:	
	EP38 - Mating plug (Viking #VP5/4CE6), QTY 1	Included
	EP35 - Hood (Viking #VS4/16C5), QTY 1	Included
	EP31- Potting sleeve (Viking #VS4/16C9), QTY 1	Included
	EHW172 - Lockwasher, #6, QTY 2	Included
	EH293 - Screw, CAP 6-32 X 3/4, QTY 1	Included
	EH535 - Screw, CAP 6-32 X 1/4, QTY 1	Included

Notes

1. Maintain high levels of precision and accuracy using Endevco's factory calibration services. Call Endevco's inside sales force at 866-ENDEVCO for recommended intervals, pricing and turn-around time for these services as well as for quotations on our standard products.

2. Model number definition:





"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 freq. [-5%]	Upper cutoff freq. [-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

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