

## PERFORMANCE SPECIFICATION CHARGE AMPLIFIER 2680M14-XXX

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EDVPS2680M14	к	9/22/22	NAD	Current Being Changed 22mA Maximum	EPL	53110

## 1.0 DESCRIPTION

The ENDEVCO<sup>®</sup> Model 2680M14-XXX Series Charge Amplifier is designed for use with piezoelectric transducers and is suitable for airborne applications. Hybrid microcircuits construction results in small size, ruggedness and low power consumption. The unit is a charge amplifier; that is, it has an output voltage proportional to the charge at the input. As a result, the amplifier sensitivity is not appreciably affected by the capacitance of the input cable.

This unit has two outputs, an unbiased, low gain output with a gain range of 1-10 mV/pC, and an unbiased high gain output with a gain range of 10-100 mV/pC. Both outputs are adjustable with a common gain control.

The -XXX describes the upper cutoff frequency (-5% point) per Table 1. 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.

## 1.1 KEY FEATURES

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

## 2.0 <u>INPUTS</u>

2.1	TYPE	Piezoelectric single-ended with one side connected to signal ground.
2.2	SOURCE RESISTANCE	$3 M\Omega$ minimum.
2.3	SOURCE CAPACITANCE	10 000 pF maximum.
2.4	OVERLOAD RECOVERY	A half sine pulse of 1 ms duration and an amplitude of 5000 pC or less will cause no spurious effects at the amplifier output other than clipping.



 $\geq$  5.00 V pk-pk (1.77 V rms) with 10 k $\Omega$  load

0.500 mA pk-pk minimum (0.177 mA rms) with

10 k $\Omega$  load at linear output voltage.

# 3.0 <u>OUTPUT CHARACTERISTICS (the following characteristics apply to both outputs)</u>

3.1 TYPE Single-ended with one side connected to circuit ground.

resistance

6.00 V pk-pk

- 3.2 OUTPUT IMPEDANCE 50  $\Omega$  maximum, in series with at least 16  $\mu$ F.
- 3.3 DC OUTPUT BIAS VOLTAGE 0.00 V + .050 V/-0.00 V
- 3.4 LINEAR OUTPUT VOLTAGE
- 3.5 LIMITED OUTPUT VOLTAGE
- 3.6 LINEAR OUTPUT CURRENT

### 4.0 TRANSFER CHARACTERISTICS

4.1.1	Low Gain Output	1 to 10 mV/pC, adjustable
4.1.2	High Gain Output	10 to 100 mV/pC, adjustable
4.1.3	Gain Ratio	10:1 ± 3% between high and low gain outputs at any gain control setting
4.2	GAIN STABILITY	0.05% maximum change per 1000 pF change in source capacitance at the input.
4.2.1	Gain Stability with Source Capacity	0.25% maximum with changes in supply voltage over the specified limits.
4.2.2	Gain Stability with Temperature at Reference Frequency	The gain change referred to the 77°F (25°C) gain over the range -67°F to 212°F (-55°C to 100°C) is dependent upon gain setting as shown in Figure 3.
4.2.3	Gain Stability with Supply Voltage	0.25% maximum with changes in supply voltage over the specified limits
4.3	FREQUENCY RESPONSE	The gain at the lower and upper cutoff frequency is 5% lower than the gain at 20 Hz. See Table 1.
4.4	AMPLITUDE LINEARITY	± 0.5% of reading from best fit straight line approximation to the curve of output amplitude versus input amplitude for signals less than the output limits.



4.5	TOTAL HARMONIC DISTORTION	Less than 0.5% for signals within the output limits.		
4.6	RESIDUAL NOISE	0.01 pC rms +0.01 pC rms 1.5 mV rms RTO low gain high gain, whichever is gr over a bandwidth of 3 Hz	s per 1000 pF RTI or and 15 mV rms RTO eater, when measured to 20 kHz.	
4.7	SHOCK AND VIBRATION SENSITIVITY	0.01 pC/g maximu	um RTI	
5.0	ENVIRONMENTAL			
5.1	TEMPERATURE Storage:	Operating: -67°F to 212°F(-55°C to 100°C) -99°F to 257°F(-73°C to 125°C)		
5.2	HUMIDITY	100% R.H. when sealing screw is soldered. Meets MIL-STD-810D, Method 507.2, Procedure III.		
5.3	ALTITUDE	No effect when sealing sc	rew is soldered.	
5.4	VIBRATION	120 mils D.A. 20g	5 Hz to 55 Hz 55 Hz to 2000 Hz	
5.5	SHOCK	100g sawtooth	6.5 millisecond	
5.6	E.M.C. CAPABILITY	The unit will meet the requirements of the following specifications: MIL-STD-826, Class Am MIL-I-6181D MSFC-SPEC-279, Class I; AF/BSD Exhibit 62- 87		

#### 6.0 **POWER REQUIREMENTS**

- VOLTAGE 20 to 32 VDC (28 VDC nominal) 6.1
- 6.2 CURRENT
- 6.3 WARMUP TIME
- POLARITY PROTECTION 6.4
- CASE ISOLATION 6.5

### 22mA maximum

30 seconds maximum to meet all specifications.

Not damaged by a polarity reversal of the 28 V supply.

Case and signal grounds isolated from each other by 50 M $\Omega$  or greater at 50 VDC. Case ground must be connected to signal ground at some point in the system to keep the residual noise within specifications.



7.0	PHYSICAL	
7.1	DIMENSIONS	1.20" I x 1.00" w x 0.75" h (30.5 mm x 25.4 mm x 19.1 mm) exclusive of mounting flange and connectors see outline drawing on page 6.
7.2	MOUNTING	Unit mounts with two 6-32 screws.
7.3	CASE MATERIAL AND FINISH	Aluminum with electroless nickel plate finish.
7.4	WEIGHT	1.5 oz (42.5 gm) maximum
7.5	CONNECTORS	
7.5.1	Input	10-32 coaxial connector is used to connect the signal from the transducer to the amplifier.
7.5.2	Output	Viking VR5/4AG15. Pin A is the 28 VDC, Pin B unbiased low gain output, Pin C unbiased high gain output, Pin D power and signal ground, Pin E case ground.
7.5.3	Gain Control	The gain control is a 12 turn trim pot, and varies the gain of both outputs as specified in paragraph 2.3.1.
8.0	ORDERING INFORMATION	

2680M14-xxx

-xxx is the upper -5% cutoff frequency, if the optional low-pass filter is equipped.



#### 9.0 **ACCESSORIES**

- 9.1 **INSTRUCTION MANUAL**
- 9.2 21997 Accessory Kit includes:
  - EP38 Mating Plug
  - EP35 Hood
  - Viking #VS4/16C5 EP31 Potting Sleeve Viking #VS4/16C9 Mounting Hardware 6-32 Cap Screws & Lockwashers

DASH	GAIN	+5%		+5%		
NO.	RANG	-10%	± 5%	-10%	-3 dB	-12dB
	E					
None	1-10	3 Hz to 5 Hz	5 Hz to 20 kHz	-	-	-
	10-100	3 Hz to 5 Hz	5 Hz to 10 kHz	20 kHz	-	-
-101	Both	3 Hz to 5 Hz	5 Hz to 100 Hz	-	200 Hz	400 Hz
-201	Both	3 Hz to 5 Hz	5 Hz to 200 Hz	-	400 Hz	800 Hz
-501	Both	3 Hz to 5 Hz	5 Hz to 500 Hz	-	1 kHz	2 kHz
-102	Both	3 Hz to 5 Hz	5 Hz to 1 kHz	-	2 kHz	4 kHz
-202	Both	3 Hz to 5 Hz	5 Hz to 2 kHz	-	4 kHz	8 kHz
-502	Both	3 Hz to 5 Hz	5 Hz to 5 kHz	-	10 kHz	20 kHz
-103	Both	3 Hz to 5 Hz	5 Hz to 10 kHz	-	20 kHz	40 kHz
-203	1-10	3 Hz to 5 Hz	5 Hz to 20 kHz	-	40 kHz	80 kHz
	10-100	3 Hz to 5 Hz	5 Hz to 10 kHz	20 kHz	40 kHz	80 kHz

## TABLE 1

Viking #VP5/4CE6



# OUTLINE DRAWING FIGURE 1





# BLOCK DIAGRAM FIGURE 2





# GAIN STABILITY FIGURE 3



Gain Change in ±%