DJB Instruments
PRECISION IS OUR BUSINESS

CA/04/V charge amplifier velocity converter: 04 system

Transducer interface converts; acceleration to velocity input range 1/100pC/g; O/Ps 100mV/g and 1V/mm.sec. (max)

1/100pC/g normalizing charge amplifier input section proceeds noise limiting 10Hz 4 pole high pass filter and single integrator. Integrator converts periodic acceleration above the filter corner frequency to velocity. Integrator gain is controlled over 50dB dynamic range by 6 position switch.

CHARGE AMPLIFIER

Provides wideband 100mV/g acceleration proportional output when normalized, transducer sensitivity range 1/100pC/g, by means of ten-turn dial and x1, x10 multiplier. Output is independent of transducer lead capacitance. CAL input terminal allows injection of test signal, 1mV ≡ 1pC.

HIGH PASS FILTER

Noise level alter integration, hence the realizable signal threshold, is proportional to fmin -n, where fmin is the high pass filter corner frequency and n is a function of the noise type, being 1/2 for that predominating in FET input stage charge amplifiers at low frequencies (<100Hz). Spurious signals also emanate from the transducer and its cable resultant upon environmental factors, and these may be considered as introducing additional f-n noise components, subject to high pass filter constraint. HP filter corner frequency is thus the determinant of threshold velocity level.

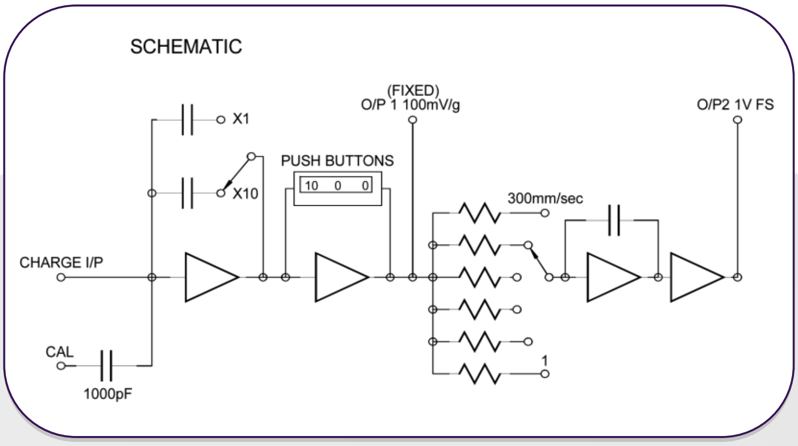
INTEGRATOR/RANGE AMPLIFIER

Converts acceleration input to velocity output levels of 1-316mm/sec/volt in six 10dB increments. Integrator bandwidth is controlled by the HP filter integrator frequency response constraints and ultimately background noise. Peak limiting input of around 120g pk. Equates to a velocity-frequency product (v x f) of 2 x 105mm/sec2 thus absolute constraints may be readily calculated.

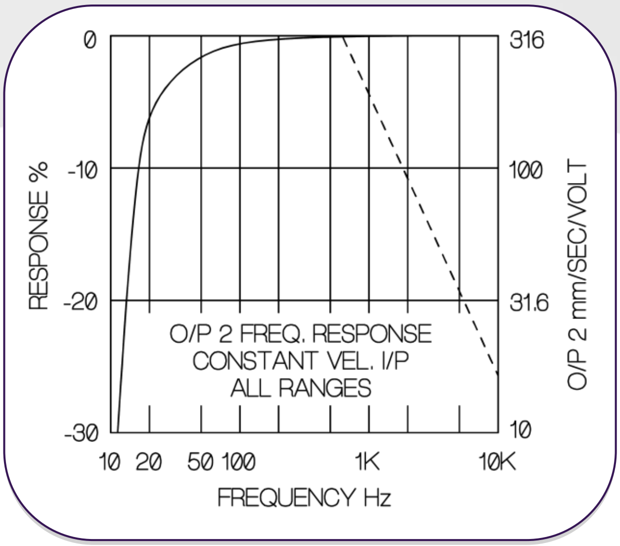
APPLICATIONS

Confined to quasi steady state inputs as emanating from vibration on rotating plant, where vibration velocity is a more representative wide band signal than either acceleration (high frequency biased) or displacement (low frequency biased), allows retro-fit of piezoelectric accelerometers for velocity transducers. Integration of transient signals, i.e. to convert to velocity change, is invalid.

Figure 1



Typical Frequency Response



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A UK company with UK-based manufacturing, assembly and calibration in-house.

ISO 9001:2008

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Type	CA/04/V
Input	Single ended
Max input charge, nC	12
Input capacitance loading	10nF =1% gain reduction
Normalising range, pC/g	1/100
Noise level @ 1pC/g, mm/sec. Rms scaling	0.05mm/sec+0.05mm/sec/1nF input capacitance
Outputs 1 & 2 • O/P1 mV/g • O/P2 vel, Switch selectable 10dB mm/sec/V	Single ended 100±2% @500Hz, 3dB bandwidth, 1Hz/100kHz, 1,3.16,10,31.6,100,316±3%@ 500kHz,5% bandwidth 20Hz/10kHz
Peak O/P volts @ Vs = ±15V	±12V, O/P’ s 1 & 2
Peak O/P current, O/Ps 1 & 2, mA	±10
Output impedance, O/Ps 1 & 2 mA	<10Ω +47μF
Supply voltage Vs, V	±10/15
Supply current, mA	±15

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