PRODUCT DATA

Charge Amplifier — Type 2634

The 2634 is a compact, two-stage charge amplifier which conditions the output signal from piezoelectric transducers before onward transmission to the measuring/analysis instrumentation. It is intended mainly for vibration measurements in industrial environments where its sturdy construction will permit it to be sited in conditions alien to normal electronic instrumentation.

FEATURES

- ❍ Small, rugged construction
- ❍ Suitable for both differential and single-ended output type transducers
- ❍ Sensitivity adjustable from 1 to 10 mV/pC
- ❍ Built-in high-pass filter
- ❍ Single or dual polarity power supply

USES

- ❍ Vibration measurements in industrial environments
- ❍ Permanent vibration monitoring on industrial machinery
- ❍ Airborne vibration monitoring on aircraft engines
- ❍ General vibration measurements with a measuring amplifier

Charge Amplifier Type 2634 is a very robust construction and is ideal for use in conditions where the preamplifier must be sited near to the transducer, in order to avoid noise pick-up in long transducer cables due to electromagnetic noise and triboelectric noise.

Power Supply and output signal can be obtained from the 5 pin Lemo socket on the Amplifier 2634. Both differential (balanced) type and normal, single ended type piezoelectric accelerometers may be used with the 2634. The differential types will be used especially in conditions of severe electromagnetic interference. With differential transducers, where both poles of the piezoelectric element are isolated from the case, and therefore from the machine frame, ground loop interference problems are largely eliminated.

When the 2634 is used with normal, single ended transducers, the microplug adaptor JJ 0207 supplied allows the use of normal, low-noise coaxial cables; this adaptor automatically grounds one of the input poles. The input amplifier is a differential charge amplifier consisting of a dual, low-noise FET and two, high-gain IC operational amplifiers (Fig. 1). The lower limiting frequency of 1 Hz is determined by a filter network around the input amplifier which provides a 40 dB/decade fall-off in response over the decade 1 Hz to 0.1 Hz. This eliminates the influence of low frequency noise on the measured signal, for example due to the pyroelectric effects of some transducers in fluctuating temperature conditions.

The output amplifier has a low output impedance which is suitable for driving long cables. The influence of load capacitance on the high frequency response of the amplifier is shown in Fig. 2. By means of an internal 10 turn potentiometer, the gain of the amplifier can be adjusted between 0 and 20 dB. In the interest of producing a rugged unit, the body of the Charge Amplifier is cast in aluminium alloy. The back plate, which is removable for access to the sensitivity adjustment potentiometer, is fitted with a rubber seal which protects the electronics by preventing the ingress of dirt, oil etc.

The Power Input and Signal Output of the 2634 is supplied with a 3.5 m long cable AO 0198 fitted with matching connector. Wherever possible power should be provided by a dual polarity supply with voltage between ±6 and ±24 V. This ensures that the output signal is centred at ground potential with negligible DC offset and that power supply noise and common mode signals ar more effectively suppressed. When the 2634 is used with normal, single-ended transducers, the microplug adaptor JJ 0207 supplied is employed. With single polarity power supplies, the output signal is DC offset to approximately +6 V. Voltages of +12 V to +28 V may be used. In conjunction with a Brüel & Kjær measuring amplifier or frequency analyzer, it is convenient to use the +12 V power supply provided at the 7 pin preamplifier input socket on these instruments. This may be applied to the 2634 using the power and signal cable WL 0309 which is available on special order.

Fig. 1
Simplified block diagram of the Charge Amplifier Type 2634

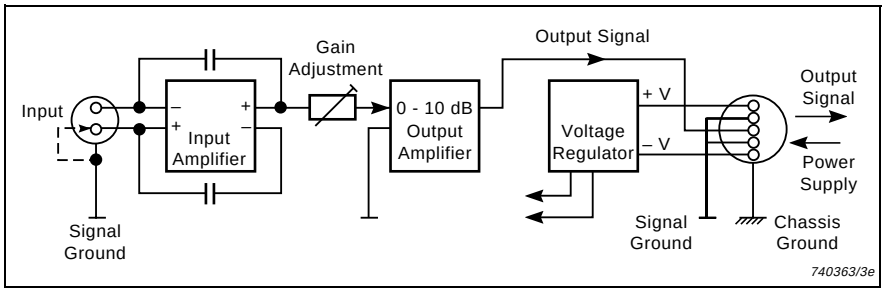
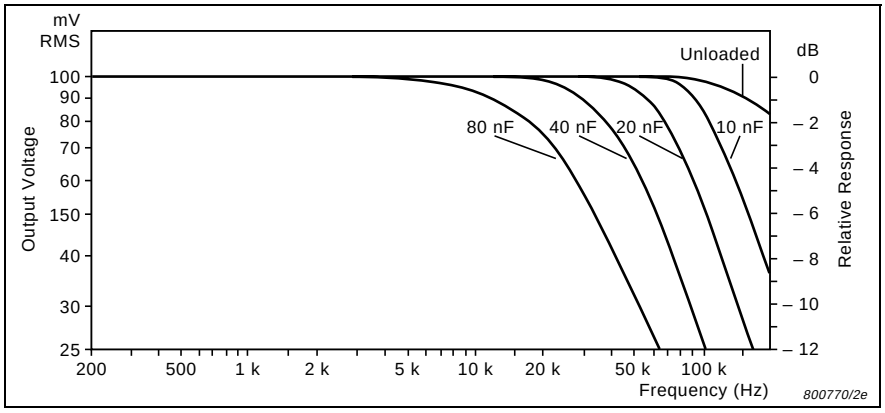


Fig. 2
Typical small signal high frequency response of Type 2634 for different capacity loads at the output. Assuming a cable capacitance of 100 pF/m, a 10 nF load is equivalent to 100 m of cable at the output



Specifications – Charge Amplifier Type 2634

CHARGE INPUT
Via 2 pole TNC socket
Max. Input: ~10^4 pC

AMPLIFIER SENSITIVITY
Factory preset to 1 mV/pC ±1%. Internally adjustable from approximately 0.9 to 10 mV/pC, corresponding to 0 to +20 dB with transducer capacitance of 1 nF

SIGNAL OUTPUT
Via 5-pole LEMO socket
Max. Output: 8 V (8 mA) peak with ±14 V supply
Output Impedance: ~100 Ω
DC Offset: 50 mV with dual polarity supply or half of single polarity supply voltage

LOWER LIMITING FREQUENCY
1 Hz (–3 dB limit) with attenuation slope of 40 dB/decade

UPPER LIMITING FREQUENCY
>200 kHz (–3 dB limit). See small signal response Fig. 2

INHERENT NOISE (2 HZ TO 22 KHZ)
Dual Supply: $<15\times10^{-3}$ pC referred to input with maximum sensitivity and 1 nF transducer capacitance
Single Supply: $<20\times10^{-3}$ pC referred to input with maximum sensitivity and 1 nF transducer capacitance

COMMON-MODE AND POWER SUPPLY REJECTION
>60 dB at 50 to 400 Hz with 0 dB gain

HARMONIC DISTORTION
<1%

RISE TIME
~2 V/µs

RECOVERY TIME
<100 µs

POWER SUPPLY
Dual Supply: ±14 to ±18 V (±6 to ±24 V with reduced specifications) 5 to 23 mA
Single Supply: +12 to +28 V (5 to 20 mA)

ENVIRONMENTAL CONDITIONS
Temperature Range: –40 to +55 °C (–40 to +131 °F)
Humidity: 0 to 90% RH (non-condensing)
Electromagnetic Fields: 100 A/m

DIMENSIONS AND WEIGHT
Height: 21 mm (0.83 in)
Width: 34.5 mm (1.35 in)
Length: 100 mm (3.94 in) plus 11 mm (0.43 in) for sockets
Weight: 112 g (0.24 lb)
Note: All values are typical at 25 °C (77 °F), unless measurement uncertainty is specified. All uncertainty values are specified at 2σ (i.e. expanded uncertainty using a coverage factor of 2)

CE Compliance with EMC Directive

Compliance with the EMC requirements of Australia and New Zealand

Ordering Information

Type 2634 Charge Amplifier
Includes the following accessories:
JJ 0207: 2-pin TNC to 10–32 UNF plug adaptor
AO 0198: 5-pin LEMO cable (power and signal cable)

OPTIONAL ACCESSORIES
WL 0309: Power and signal cable for use with measuring amplifier

Brüel & Kjær reserves the right to change specifications and accessories without notice

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