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KISTLER

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Charge Converter

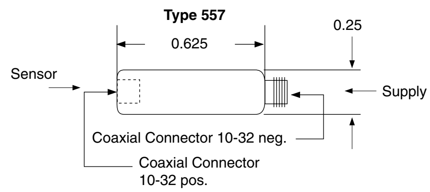
Type 557, 558, 571

External In-line Impedance Converter Module

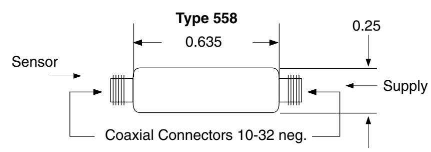
A Piezotron™ micro-electronic circuit converts the high impedance level of a charge output sensor into a low impedance high voltage output signal.

- Compatible with high impedance charge, mode sensors
- Miniature construction
- In-line or direct attachment to sensor
- Optional range capacitors to tailor output signal
- Two wire, constant current source operation

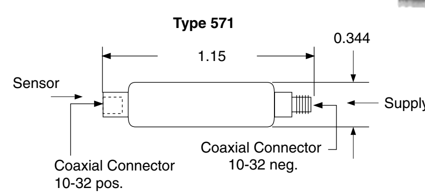
Type 557



Type 558



Type 571



Description

The low impedance voltage mode piezoelectric sensor such as the Piezotron type, incorporates a miniature MOSFET electronic circuit inside the sensor housing. The internal circuitry converts the high impedance charge generated by the quartz crystals to a high level voltage signal with an output impedance of less than 100 ohms. The advantages of using a stand alone low impedance voltage mode sensor are now available in a hybrid system combining a high impedance accelerometer, pressure or force transducer with an impedance converter. A distinct advantage of this system is that high temperature measurements can be made by separating both components and placing the quartz sensor in a considerably higher temperature environment than that of the impedance converter.

Most high impedance sensors develop a negative-going signal with increasing measurand. This produces positive-going output signals from charge amplifiers which invert polarities. When these sensors are used with Piezotron Impedance Converters, increasing measurands yield negative-going output signals.

Low frequency response relates inversely to the Input Time Constant. The approximate frequency at which 5% attenuation occurs is: f (Hz) = 0.5 / Input Time Constant

High frequency response depends upon output cable capacitance. Typical response -5% at ±1V with cable capacitance of

Application

Used primarily to convert the charge signals from piezoelectric sensors into proportional voltage signals. In high temperature installations requiring charge output type sensors for the measurement.

Technical Data

Type	Units	557/558
Output Characteristics:		
Voltage	V	±5
Impedance	Ω	100
Current	mA	2
Bias nom.	V	11
Input Characteristics:		
Voltage FSO	V	±5
Resistance min. at R.T.	Ω	5 x 10^{10}
Capacitance nom.	pF	3
Time Constant nom.	s	5
Transfer Characteristics		
Non-linearity	%	1
Voltage Gain nom.	V	0.97
Noise 10 ... 300 Hz	μV_{rms}	60

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Technical Data

Type	Units	557/558
Environmental Characteristics		
Temperature Range	°F	–65 ... 250
Temperature Effect on Gain	%	2
Temperature Effect on Bias	V	±2
Shock 1 ms pulse width	g_{pk}	2000
Vibration Limit	g_{pk}	500
Power Supply Characteristics		
Voltage	VDC	20 ... 30
Current	mA	4
Ripple	mV_{rms}	1

1 g = 9.80665 m/s², 1 inch = 25.4 mm, 1 gram = 0.03527 oz, 1 lbf-in = 0.1129 Nm

Mounting

Typically the sensor is placed in the high temperature environment and the charge converter is located some distance away at a location within its operating temperature range. High temperature cable such as the Type 1635Csp is used to connect the sensor to the input of the 557 or 558 impedance converter. The output of the impedance converter is connected to a power supply/coupler using a Type 1761Bsp cable.

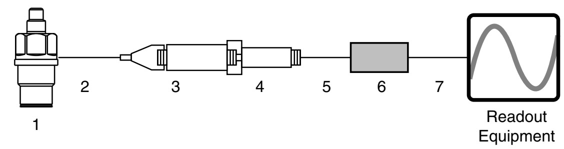
The Model 557 mounts directly on sensor for highest sensitivity, and lowest noise while the Model 558 mounts in-line with the same characteristics as Model 557, and features all welded construction and hermetic sealing.

Selecting a Range Capacitor

An impedance converter uses a MOSFET I.C. circuit, operating as a source follower with unity gain. For certain applications it may be necessary to use a range capacitor to reduce the voltage level from the sensor. A variety of range capacitors are offered:

1 Estimating max. pressure, force, or acceleration to be measured
2 Select sensor
3 Multiply sensor sensitivity (from data sheet) by estimated max. range as determined in step 1.
4 Select range capacitor
5 If possible, select one of four standard range capacitors which are stocked. Capacitance values below 100pF can be obtained by varying length of the sensor cable, Type 1631 series cable capacitance is 30pF/ft. Type 1601 series cable capacitance is 20pF/ft.
6 Compute exact system sensitivity (V = Q/Cs)

Ordering Information



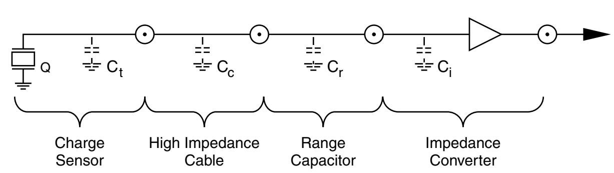
sp = specify cable length in meters

1 - charge sensor	specify a high impedance sensor
2 - 1631Asp	low noise cable, 10-32 pos. to BNC pos. or
1631Csp	premium low noise cable, 10-32 pos. to BNC pos.
3 - 571A...	range capacitor
4 - 557	impedance converter or
558	In-line impedance converter
5 - 1761Bsp	general purpose 10-32 pos. to BNC pos.
6 - 5100...	coupler series
7 - 1511sp	output cable, BNC pos. to BNC pos.

Range Capacitors

571...	A1	A2	A3	A4	A5	A6	A7
pF	100	220	470	1000	2200	4700	10000

Nominal Sensitivity



V = Q/Cs where: Cs = Ct + Cc + Cr + Ci
Q = Sensor change sensitivity (i.e. pC/psi, pC/g, pC/lbf)
Cs = Total capacitance at input of impedance converter (pF)
Ct = Sensor capacitance
Cc = Input cable capacitance
Cr = Range capacitor
Ci = Impedance converter input capacitance

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