

Inertial Tech Note:

Input Power and Output Signal Types



Jewell Inertial products are currently available with the following output types:

- 0-5 VDC,
- 4-20mA,
- ± 5 VDC, (dual voltage output)
- Digital (RS232, RS485, Modbus, ETC)

Jewell Instruments typically denotes each analog output type in the sensor model number with “L” corresponding to 4-20mA, S corresponding to 0-5VDC, and D for ± 5 VDC output.

Input Power Types

Power supply requirements can also change from unit to unit, often dictated by the output type. Simply put, these are presented in two types:

- Single-rail AKA Single-ended supply, typically ranged from 12 to 30VDC,
- Dual-rail, AKA Dual-ended ranged from ± 12 to ± 18 VDC, meaning positive 12 to positive 18VDC on one rail, and negative 12 to negative 18VDC on the other rail.

Below is a typical example of a dual input power specification taken from the LCF-2530 Dual axis Accelerometer datasheet

ELECTRICAL

NUMBER OF AXES	2
INPUT VOLTAGE RANGE (VDC)	± 12 to ± 18
INPUT CURRENT (mA, max)	50
OUTPUT IMPEDANCE (Ohms) nominal	100
NOISE (Vrms, max)	0.002

ENVIRONMENTAL

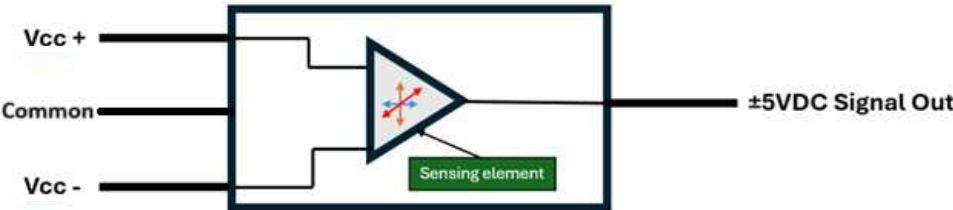
OPERATING TEMP. RANGE	-40° to +80°C
STORAGE TEMP. RANGE	-60° to +90°C

PIN OUTS

1	+12 to +18 VDC
2	-12 to -18 VDC
3	POWER COMMON
4	X-AXIS OUTPUT SIGNAL
5	X-AXIS OUTPUT RETURN
6	Y-AXIS OUTPUT SIGNAL
7	Y-AXIS OUTPUT RETURN
8-13	N/C

Most of our analog products are available in either single-rail or dual-rail configurations depending on output type. This convention began with the advent of dual voltage, or bi-polar output Force-Balance sensors, which require internal electrical components to be biased at both positive and negative voltages so that the sensor output can swing negative or positive to ± 5 VDC about 0VDC, as opposed to a single rail, single voltage output model that operates from 0-5VDC only. These input power conventions now apply to MEMS and our other product lines.

Dual input, Dual Output Inertial Sensor



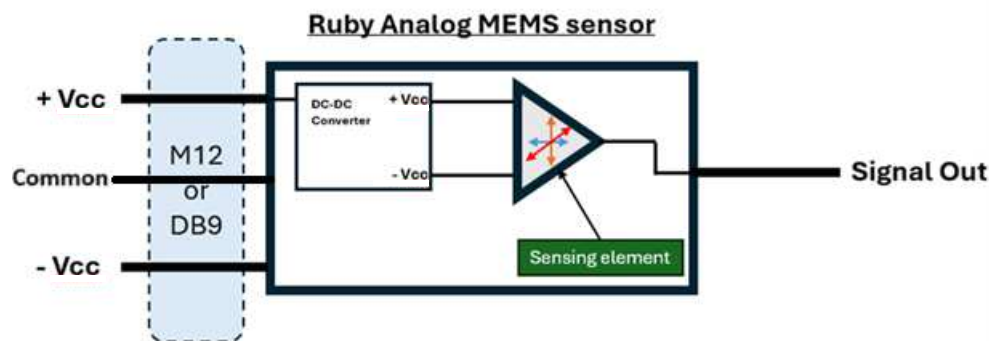
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Enter The Ruby Series

Our new Ruby Analog MEMS inertial sensors will be the first to be compatible with both single ended and dual-ended power supplies. The Ruby was designed to be as flexible as possible, so it includes an internal DC-DC converter, which provides the positive and negative bias voltages various components require.



FAQ

Q: “What happens if I connect a single ended supply to the Ruby?”

A: The Ruby will function as expected, provided the supply voltage falls within the specified supply range, and the positive supply and supply common is connected.

Q: “What If I have a dual voltage output unit? Do I have to use dual input power?”

A: You can use either dual or single input power if the supply voltage falls within the specified range, and the positive and supply common is connected.

Q: “I have a unit that outputs 4-20mA. Which type of input power should I use?”

A: Dual or single ended will work with any of the analog Ruby sensors, provided that the positive supply and supply common is connected.

Q: “If I am powering a Ruby with a dual supply, but the negative supply voltage dips or drops out completely, what happens?”

A: Nothing, as the DC-DC convertor will supply the negative bias the internal components require from the input power provided by the positive rail, provided that the positive rail is still powered within the specified voltage range and supply common is connected.

Q: “What if the positive supply rail drops out?”

A: The output will become indeterminate once the supply voltage falls outside of the specified range and eventually will fall to 0 VDC.