



The **SA40012 Single Axis CMOS Signal Conditioning Module** is a DC input/output operated device, which operates off a single ended supply, and provides a bipolar DC output. Specifically designed to interface directly with all **Spectron Single Axis Tilt Sensors**, this low power consumption conditioner is ideal for battery driven applications. Featuring a PC board mountable design, the module internally converts the DC input voltage into an AC excitation voltage for the sensor, and demodulates the sensor output into a smooth amplified DC output voltage. Incorporating a proprietary signal processing algorithm, and an external temperature compensation sensor (optional), normal measurement errors are severely reduced. The **SA40012** also features overload protection, and is 100% reliability tested to provide the highest quality available.

### General Specifications

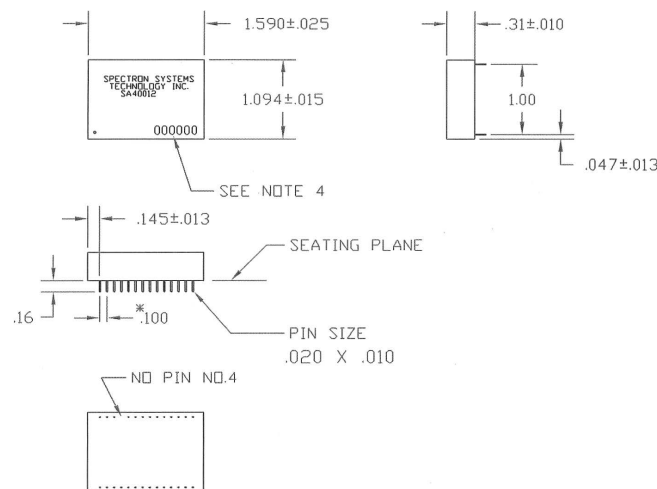
|   |                                      |
|---|--------------------------------------|
| Input voltage .....   | +5Vdc to +15Vdc                      |
| Input current .....   | 0.5mA @ +5Vdc, 0.9mA @ +15Vdc        |
| Sensor excitation .....   | 380 mV pp, square wave               |
| Input impedance .....   | 5 megohms                            |
| Output +/-1.5Vdc @+6Vdc supply, referenced to VREF (pin #9, see input/output connections) |                                      |
| Load .....  | 100k ohm minimum                     |
| Time constant.....  | 30 msec                              |
| Offset adjustment.....  | +/-45 mVdc                           |
| Output ripple .....   | 0.35% of output voltage (RG 24k ohm) |
| Temperature coefficients (module /out sensor)   |                                      |
| - Null .....  | 100 microvolts / Co (typical)        |
| - Scale .....   | 0.02% / Co @ +1Vdc output            |
| Output short duration .....   | Continuous (Vout and Vref)           |
| Temperature range   |                                      |
| - Operating.....  | -20 to +70Co                         |
| - Storage .....   | -40 to +80Co                         |

### Temperature Compensation

- Temperature compensation of the assembly (module and sensor) can be accomplished using an external silicon temperature sensor (KTY81-120) and a resistor (SBT). Exact resistor value is determined by placing a decade resistor box across R3, and adjusting until desired results is obtained. With this configuration, it is possible to reduce the scale temperature coefficient error from a 0.3%/Co (nominal), to 0.03%/Co (nominal). Please see wiring diagram for connection points.

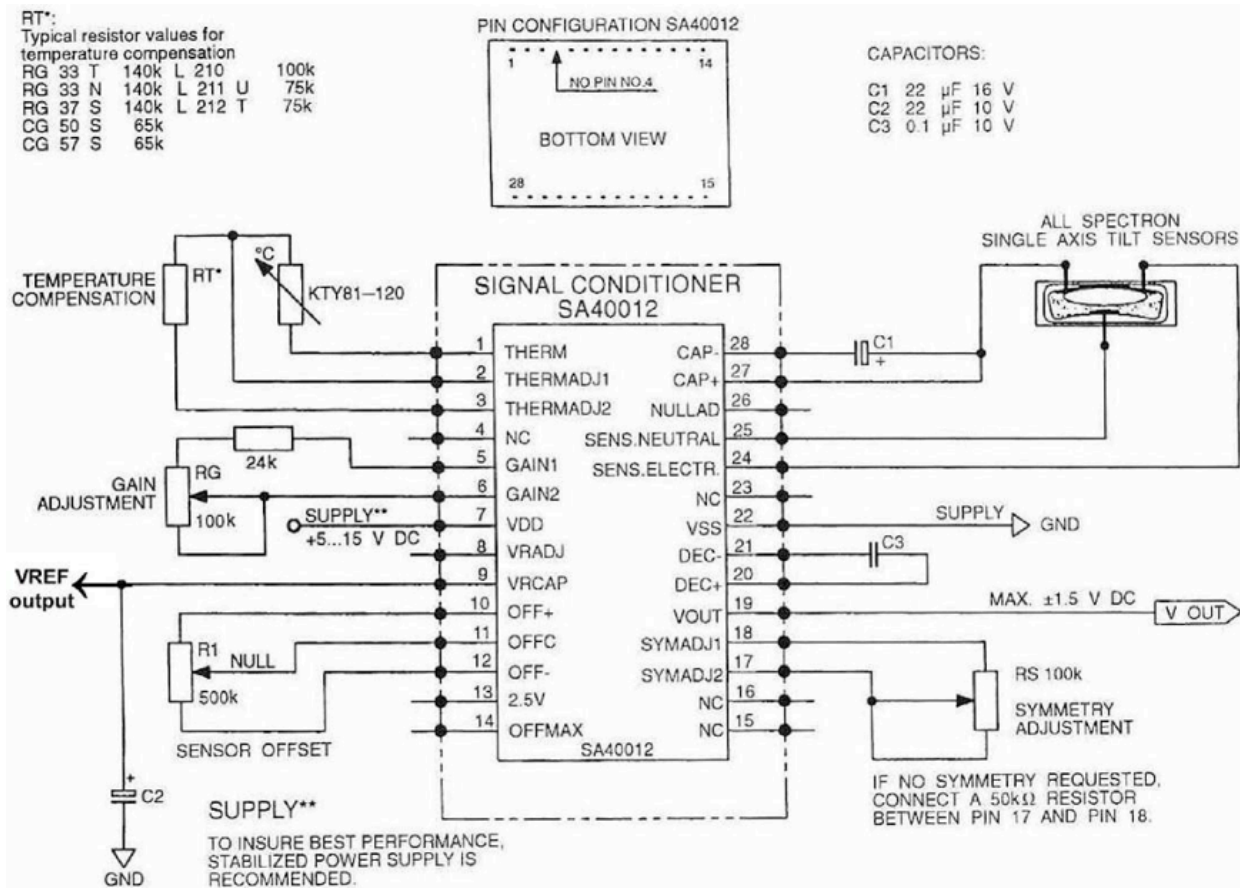
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### Dimensions





### Input/Output Connections



The following is a suggested procedure for adjusting the null (zero), gain (output level) and symmetry of the SA40012 when used with a mating tilt sensor. In order for this procedure to work properly, all peripheral circuitry, and the tilt sensor must be connected as shown above.

It is important to note that this procedure is provided strictly as a guideline for calibration and symmetry adjustment, and provides no guarantee as to the resultant accuracy. The validity of the calibration will be highly dependent upon the accuracy of the supporting equipment used to perform the calibration, as well as the true angular position(s) of the tilt sensor during the procedure.

**1. Set null (zero) output =** Place the tilt sensor in its mechanical null (level) position. Adjust the potentiometer connected between pins #10, #11 and #12 until the output is 0Vdc between pin 9 (vref) and pin 19 (vout)

**Input/Output Connections (continued)**

**2. Set output level =** Rotate the tilt sensor to a known angle from null (zero), assuring that the output changes in a positive (+) direction. Adjust the potentiometer between pins #5 and #6 until the desired positive output voltage is achieved.

**3. Set symmetry =** Rotate the tilt sensor in the opposite direction from null, to the same differential angular position. Observe the negative output voltage level between pin 9 (vref) and pin 19 (vout) If the output level exceeds the allowable tolerance, adjust the potentiometer between pins #17 and #18 until they are within acceptable limits. Repeat all steps above until no further adjustments are required throughout entire procedure.

***Consult factory for further technical information and ordering details!***