

# SA40012 – Single Axis CMOS Signal Conditioning Module

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.

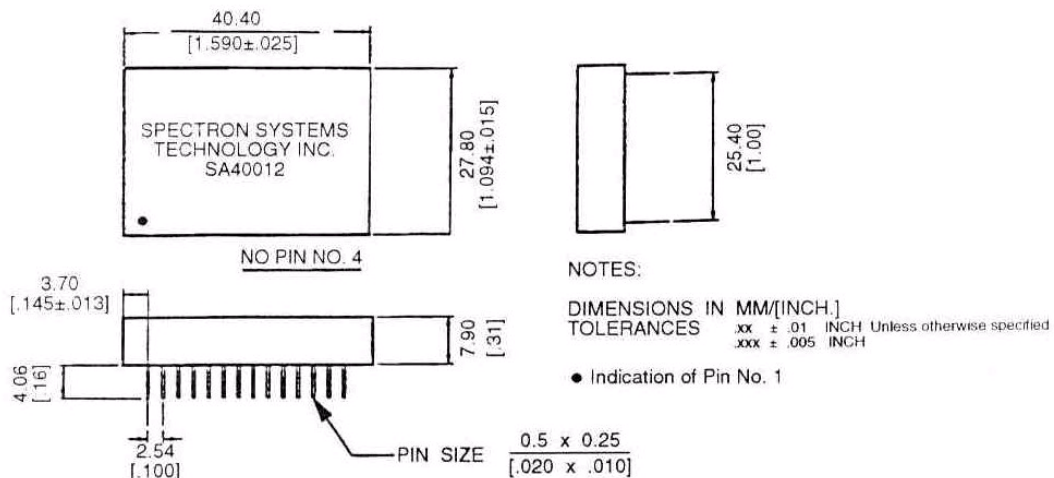
## General Specifications

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 w/out sensor)  
- Null ..... 100 microvolts / C° (typical)  
- Scale ..... 0.02% / C° @ +1Vdc output  
Output short duration ..... Continuous (Vout and Vref)  
Temperature range  
- Operating ..... -20 to +70C°  
- Storage ..... -40 to +80C°

### Temperature Compensation

- Temperature compensation of the assembly (module and sensor) can be accomplished using an external silicon temperature sensor (KTY81-120) and a resistor (.RT., see wiring diagram for typical values). With this configuration, it is possible to reduce the scale temperature coefficient error from a 0.3%/C° (nominal), to 0.03%/C° (nominal). Please see wiring diagram for connection points.

## Dimensions



SPECTRON SYSTEMS TECHNOLOGY INC.

595 OLD WILLETS PATH

HAUPPAUGE NY 11788

PHONE: 631 582-5600

FAX: 631 582-5671

www.spectronsensors.com

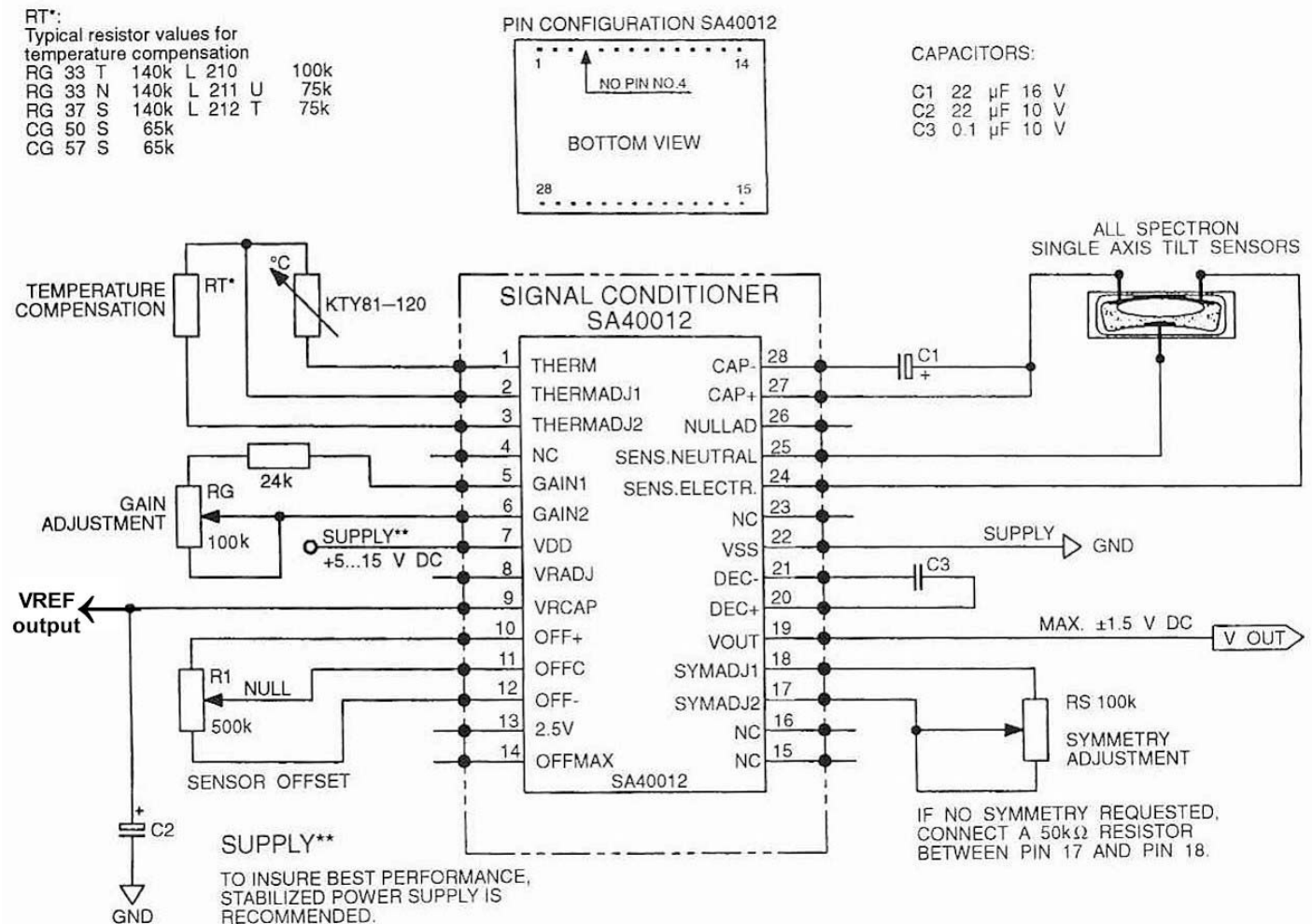
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## Input/Output Connections



## Calibration and Symmetry Adjustment

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 at 0Vdc.



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**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. 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!*



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