CONTROL CONCEPTS

5021

True RMS Current Transmitter

Description

The model 5021 is a two wire, true RMS, current transmitter that provides a 4/20mA signal proportional to the RMS value of the output of a current transformer. The circuit is intended to be mounted directly to a current transformer which outputs 0 to 100ma proportional to the current passing through it. The circuit, depending upon the model number, may be used with either sinusoidal waveforms, waveforms resulting from phase-angle control by SCRs or saturable core reactors, or waveforms resulting from zero-cross control by SCRs. The circuit can be obtained to provide 4/20mA output for any input mA signal from 5mA to 100mA for phase-angle or 5mA to 50mA for zero-cross.

Power to the circuit is to be provided by a remote 24VDC supply and the 4/20mA signal is transmitted on the two leads supplying the 24Vdc power. Although the circuit is factory calibrated, multiturn potentiometers are provided for user adjustment of the zero and span.

The ripple on the output is decreased as the response rate or filter is increased. A potentiometer is provided by which the user can adjust the filter time constant for the specific application.

Additional features include:

Reverse supply voltage protection.
Zero-cross or Phase-angle signals.
Selectable Current Range.
Field adjustable filter time constant.
Zero and Span adjustments.

Manufactured by

CONTROL CONCEPTS

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Specifications

SUPPLY VOLTAGE: 15 to 35 Vdc.

ACCURACY: 3% of Span from 10 to 100% of range. Accuracy of the 5021 below 10% is questionable due to errors that may be encountered in the current transformer.

MAX. LOOP VOLTAGE DROP: 10 Volts.

TIME CONSTANT LIMITS:

30 seconds maximum, Zero-cross.
1 second maximum, Phase-angle.

INPUT CURRENT RANGES:

5 to 50 mA, Zero-Cross.
5 to 100 mA Phase-Angle.
Adjustable by resistor selection

MAXIMUM. LOAD RESISTANCE may be calculated as follows:

$$\text{Max. } R_L = \frac{\text{Supply Volts} - 10}{\text{(Max. load Amps)}}$$

For example:

$$\text{Max. } R_L = \frac{24V - 10}{20mA} = \frac{14}{.02} = 700\text{ohms}$$

Installation

The5021 circuit may be used for either phase-angle or zero-cross current. However, because of the fact that the current transformer may saturate, it is recommended that the current transformer be sized for twice the actual current when used with zero-cross controllers.

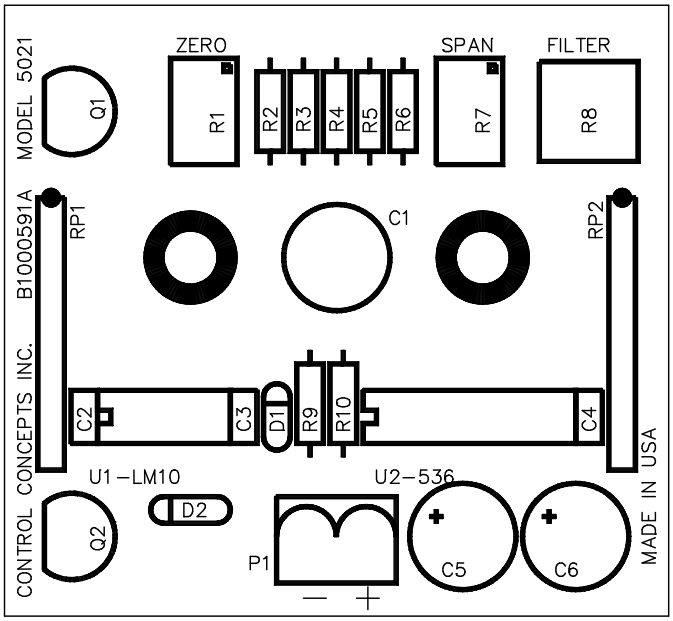
Typical current transformer supplied with the 5021 would be one of the following.

CCI part No.	Zero Cross Input	Zero Cross Output	Phase Angle Input	Phase Angle Output
14240-001-0150	25A	50 mA	50A	100 mA
14240-001-0210	50A	50 mA	100A	100 mA
14240-001-0220	100A	50 mA	200A	100 mA
14240-001-0225	250A	50 mA	500A	100 mA
14240-001-0230	300A	50 mA	1000A	100 mA

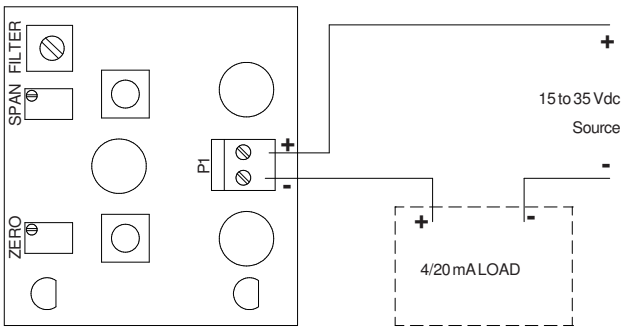
The output of the 5021 circuit is "scaled" by a resistor (R6) on the circuit such that 1 volt is developed across the current transformer terminals at the maximum desired current. This AC voltage is coupled by a capacitor to an integrated circuit which computes the RMS value of the wave form developed across the resistor.

To calculate the value of the scaling resistor, determine which transformer is capable of handling the maximum current, calculate the output current accordingly, then divide that current (amps) into 1 Volt.

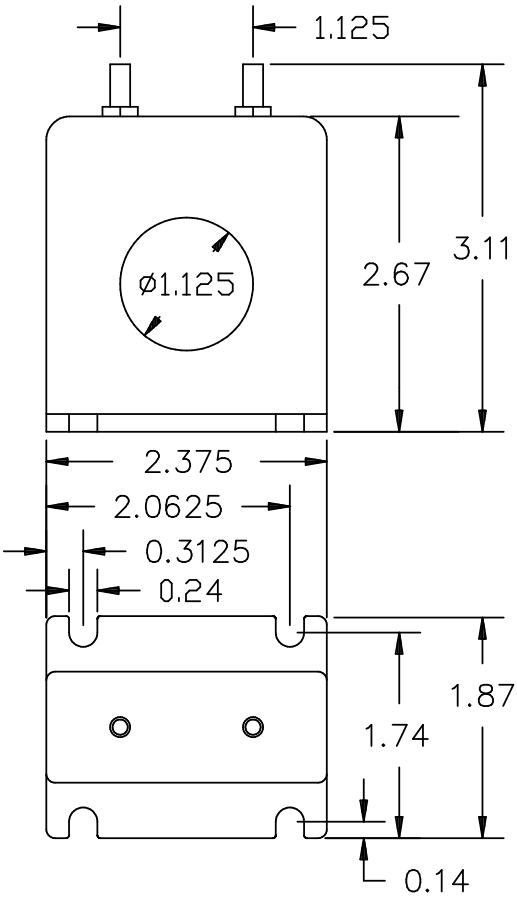
For example: Maximum current is 75 Amps. Using a 2000 : 1 transformer, the output would be .0375 amps. Dividing 1 Volt by .0375Amps, the value of the scaling resistor would be 26.7 ohms (standard 1% value). Use 1% resistors in all cases for scaling.



Electrical connection



Dimensions



How to Order

5021 - (XX)mA - (YY)mA - ZC or PA

5021 = True RMS, Current Transmitter.

(XX)mA = input from current transformer. (Typically 0/50 mA.)

(YY)mA = current controlled by circuit. (Typically 4/20mA.)

ZC or PA = **Z**ero-**C**ross or **P**hase-**A**ngle Current being monitored.