SYSTEMS ELECTRONICS GROUP

SYSTEMS M200 INTERFACE MODULES

M231: FREQUENCY-TO-VOLTAGE CONVERTER With OFFSET

- **Converts 0-1KHZ input frequency to proportional analog output**
- **0-10 volt or 0-20 milliamp analog output**
- **Adjustable output full scale range**
- **Adjustable offset (added to output) with threshold adjustment**
- **Optically isolated 10-30 VDC differential input**
- **Powered from +24VDC**
- **Removable Field Wiring Connector**
- **Standard 3" x 3" x 1" DIN Rail Mountable Module**

General Description

The M231 Frequency-to-Voltage converter module converts an input frequency to a proportional analog voltage or current level. The input is a 10-30VDC optically isolated differential input. The output can be selected for either 0-20 milliamps or 0-10 volts via wire jumper on the field wiring connector. See figure 1 for details on connecting the M231 for 0-10 volt output and figure 2 for details on connecting the M231 for 0-20 milliamp output.

In addition, the M231 incorporates an adjustable offset voltage from 0 to 10 volts with adjustable threshold. This is essentially an offset added to the normal output which is proportional to frequency. The M231 contains an adjustable threshold such that when the input frequency is below the threshold, the preset offset is added to the normal output value such that the output is proportional to the input frequency plus the offset. When the input frequency is above the threshold, the offset is not added and the output is directly proportional to the input frequency only.

The threshold can be set anywhere between zero HZ and the full scale input frequency of 1000 HZ. Thus the offset could be used as an idle speed when the input frequency is zero by setting the threshold at just above zero input frequency (i.e. 50 HZ) and setting the offset for the desired idle speed. As another example, the offset could be used to add a preset fixed offset to the proportional output by setting the threshold to the maximum frequency and setting the offset to the desired value to be added to the proportional output. The threshold and offset are adjustable via the "Threshold" and "Offset" potentiometers accessible through the front of the M231.

With the offset set to zero, the output is proportional to the input frequency such that at the input frequency of zero HZ, the output = 0. At an input frequency of 500HZ, the output is at half of full scale. At an input frequency of 1000HZ, the output is at full scale, etc. The full scale output level (input freq = 1KHZ) can be adjusted via either an external 20K ohm potentiometer (see figure 3) or via the internal "Gain" potentiometer. Note that when the internal "Gain" potentiometer is used, pin 4 must be connected to pin 5 on the connector. When the external 20K potentiometer is used, pin 4 must be disconnected from pin 5 and the 20K potentiometer wired as shown in figure 3. The full scale output can be adjusted between 5 and 10 volts or 10 and 20 milliamps.

M231: FREQUENCY-TO-VOLTAGE CONVERTER With OFFSET

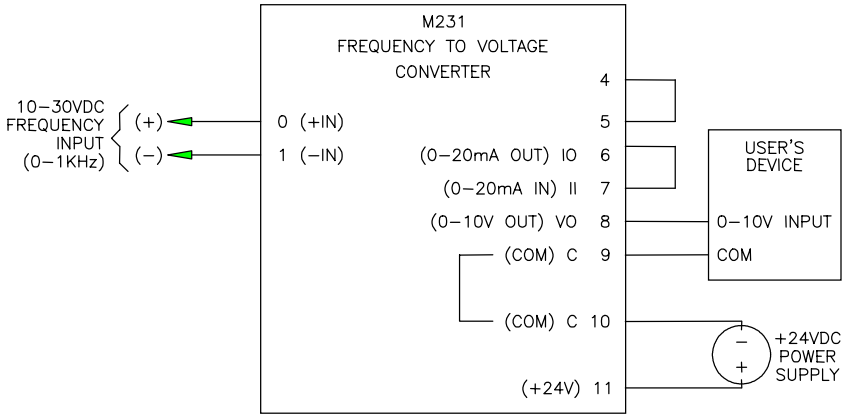

Figure 1
Connecting the M231 for 0-10 Volt Output

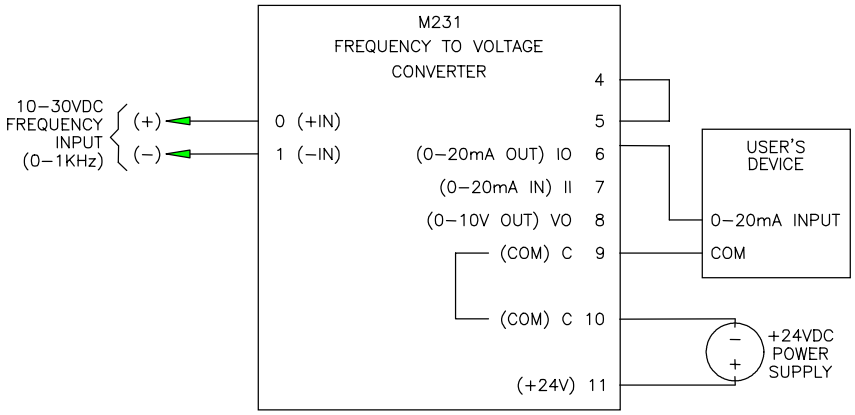

Figure 2
Connecting the M231 for 0-20 milliamp Output

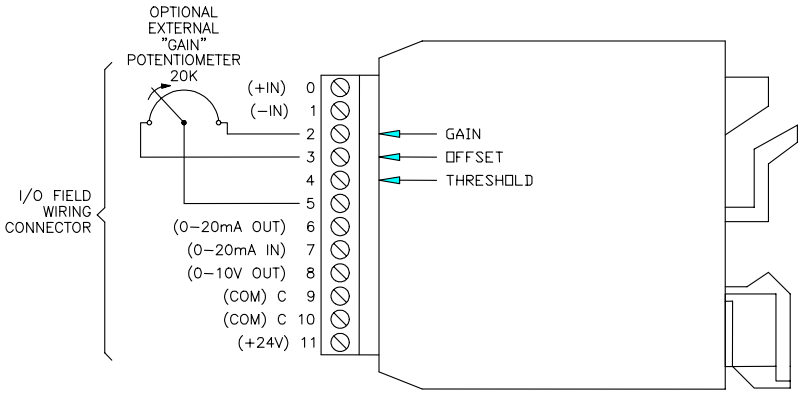

Figure 3
Connector Pin-Out

M230: FREQUENCY-TO-VOLTAGE CONVERTER

Specifications

Module Size:	
Length:	3.25”
Height:	3.75”
Width:	1.00”
Input Section:	
Vin (on-min):	10.0 volts
Vin (on-max):	30.0 volts
Vin (off-min):	5.0 volts
Input Current (max):	27 milliamps at Vin=30volts
Input to Output Optical Isolation:	1500 Vrms
Input Configuration:	Can be wired for Sourcing, Sinking, or Differential
Output Section:	
Output Types (wire selectable):	0-10 volt or 0-20 milliamp
Full Scale Output Range (input Freq = 1KHZ):	
0-10 Volt Output Mode:	5 to 10 volts
0-20 milliamp Output Mode:	10 to 20 milliamps
Load Resistance:	
0-10 Volt Output Mode:	2K ohms or greater
0-20 milliamp Output Mode:	400 ohms or less
Short Circuit Duration:	
0-10 Volt Output Mode:	Continuous
0-20 milliamp Output Mode:	Continuous
Output Ripple:	
0-10 Volt Output Mode:	0.150 volts (max)
0-20 milliamp Output Mode:	0.300 milliamps (max)
Step Response time (full scale output Response from input freq = 0 to an Instant freq = 1KHZ):	300 milliseconds
Power Requirements:	
User Supply Voltage:	+24VDC +/-10%
User Supply Current:	200 milliamps
Temperature Ranges:	
Storage:	0 to 85 degrees C
Operating:	0 to 60 degrees C
Relative Humidity:	5 to 95% non-condensing