



G478-0001



# ULTRA SLIMPAK® G478-0001

## Frequency Input, Field Configurable Isolator

Provides an Isolated DC Output  
in Proportion to a Frequency Input



- Field Configurable Input Ranges from 2Hz to 10,000Hz
- Eliminates Ground Loops
- Field Configurable Output Ranges: 0-5V, 0-10V, 0-1mA, 0-20mA, 4-20mA
- Ultra Slim Housing for High Density Installations

- 150mV to 150V Input Amplitude Level
- Touch-Cal™ for Simplified Ranging
- Flexible Power Supply Accepts 9 to 30 VDC
- ASIC Technology for Enhanced Reliability
- RoHS Compliant

### Description

The G478 is a DIN rail mount, frequency input signal conditioner with 1800VDC isolation between input, output and power. The field configurable input and output offer flexible, wide ranging capability for variable frequency drives, magnetic pick-ups, turbine flow meters, and other pulse or frequency output transducers.

The input of the G478 can be configured for any frequency span from 2Hz to 10,000Hz. The input amplitude threshold sensitivity can be adjusted from 150mVp to 10Vp to ensure accurate frequency measurement and minimize transient noise related errors. The maximum input amplitude is 150 Vrms. The output can be set for 0-5V, 0-10V, 0-1mA, 0-20mA or 4-20mA.

The G478 to be field configured for virtually any frequency input to DC signal output within the ranges specified. Calibration utilizes 'Touch-Cal' technology in which the user simply applies the minimum and maximum input frequencies, and touches a recessed button to configure the corresponding minimum and maximum output range.

The Ultra SlimPak housing allows installation of up to 24 units per linear foot. The wide ranging power supply is inverter isolated and accepts any voltage between 9 and 30VDC.

### Application

The G478 is useful in eliminating ground loops and interfacing pulse output transducers, such as turbine flow meters and magnetic pick-ups, to data acquisition and control systems.

Advanced digital technology, combined with Action's ASIC technology, provide a stable output at low frequencies for higher accuracy.

### 'Touch-CAL™ Technology

The G478 utilizes 'Touch-Cal' technology to greatly simplify configuration. To set the input frequency range, simply apply the high input frequency and push the CAL button while the INPUT LED is lit. The low input frequency is then applied and pushing the CAL button once again stores the low frequency input. The high and low ranges are stored in non-volatile memory and correspond to the high and low output range which is selected via DIP switches.

To precisely adjust the output, the user adjusts the input frequency while the OUTPUT LED is lit until the desired output level is achieved. The output levels are locked-in by pushing the CAL button. Status LEDs show the operation mode of the device.

### Status LEDs

The G478 utilizes three status LEDs.

The green LED varies intensity as the frequency changes from 0 to 100% of full scale range (e.g., for a configuration of 0-1000Hz, the LED will be off with an input of 0Hz and fully illuminated at 1000Hz. With an input of 500Hz, the LED will be dim). If the input signal is 10% more than full scale range (over-ranged), the LED will flash at 8Hz.

The yellow INPUT LED denotes input programming modes.

The red OUTPUT LED denotes output programming modes (see Configuration, Calibration and Figure 2 for details).

### Configuration

Any 2Hz range from 0 to 10,000Hz can be converted to a full scale output signal (e.g. 0-2Hz/4-20mA or 9998-10,000Hz/4-20mA). Unless otherwise specified, the factory presets the Model G478 as follows:

Input Range: 0 to 1000Hz  
Sensitivity: 1V RMS  
Output Range: 4 to 20mA

**Note:** "Sensitivity" refers to the noise rejection level (the trigger threshold) of the input.

For other I/O ranges, refer to Table 1 and 2. For calibration mode reference, see the step-by-step flow chart in Figure 4.

1. With DC power off, choose the desired output voltage/current range from Table 1 and set position 1 through 8 of SW1.
2. Set the Input sensitivity switch (SW1, 9 & 10) to LO for input amplitudes between 150mVp and 50Vrms, with noise rejection to 1Vp. Set the switch to HI for input amplitudes between 500mVp and 150Vrms, with noise rejection up to 10Vp (see Table 2).

## Calibration

1. Connect the input to a calibrated frequency source and apply power. Wait 1 hour for thermal stability before monitoring the voltage or current output.
2. Adjust the input frequency to the desired maximum and observe that the output has increased and is sensing the input. If the output does not increase, turn the sensitivity potentiometer in a counter-clockwise direction until the output begins to change proportionally to the input, plus another full turn.
3. Press the CAL button once to enter the calibration mode. The yellow and green LEDs will be on.
4. Input the maximum desired frequency and press the CAL button to store. The yellow LED will now be the only LED on.
5. Input the minimum desired frequency and press the CAL button to store. The green and red LEDs will now be on.

**Note:** The most reliable way to input 0Hz is to short circuit the input (Pins 41 & 42). It is usually easier to choose a value greater than 0Hz (e.g., 10% of full scale) when calibrating the minimum input and output (also 10%). When using this method signals below 10% are still converted linearly.

6. To precisely adjust the maximum output, adjust the input frequency until the output reads within  $\pm 0.1\%$  of the maximum selected output range. This typically occurs near 90% of the HI input frequency. Press the CAL button to store the value. The red LED will now be on.
7. To precisely adjust the minimum output, lower the input frequency until the output reads within  $\pm 0.1\%$  of the minimum selected output. This typically occurs near 10% of the HI input frequency. Press the CAL button to store the value. All three LEDs will be on.
8. Press the CAL button one final time to exit the calibration mode. The green LED will now be on.
9. Check the minimum and maximum input-to-output calibration. Repeat steps 1 through 8 if calibration is not within desired specifications.

**Note 1:** To skip Steps 6 and 7 (output adjustment), press CAL button two times after Step 5.

**Note 2:** Removing power to the unit at any time before Step 8 will restore previous settings and calibration.

## Optimal Sensitivity

If the amplitude of the input frequency is within the sensitivity parameters (i.e. 150mVp - 1Vp for LO and 0.5Vp - 10Vp for HI), then the sensitivity parameters can be set for optimum noise rejection:

1. Set the input near midrange (50% input) or to a frequency that exhibits the minimum pulse amplitude.
2. Turn the sensitivity pot (SENS) clockwise (CW) until the output drops to minimum.
3. Turn the sensitivity pot counter-clockwise (CCW) a turn or two until the output returns to the previous level.
4. Run the input through the full frequency range to make sure that the pulses are sensed at both the low and high input frequencies. If the output drops out during this test (and the input freq. >0%) then turn the sensitivity pot counter-clockwise another turn or two until the output picks up. Repeat to validate sensitivity settings.

Table 1: G478 Output Ranges

Output	SW1							
	1	2	3	4	5	6	7	8
0 to 5V	■	■	■	■				
0 to 10V	■		■	■				
0 to 1mA		■	■	■				
4 to 20mA						■	■	■
0 to 20mA	■	■			■		■	■

Key: ■ = 1 = ON or Closed

Table 2: G478 Input Sensitivity Settings

Sensitivity	SW1	
	9	10
High: 0.5 to 10Vp (150Vrms maximum)		
Low: 150mVp to 1Vp (50Vrms maximum)		■

Key: ■ = 1 = ON or Closed

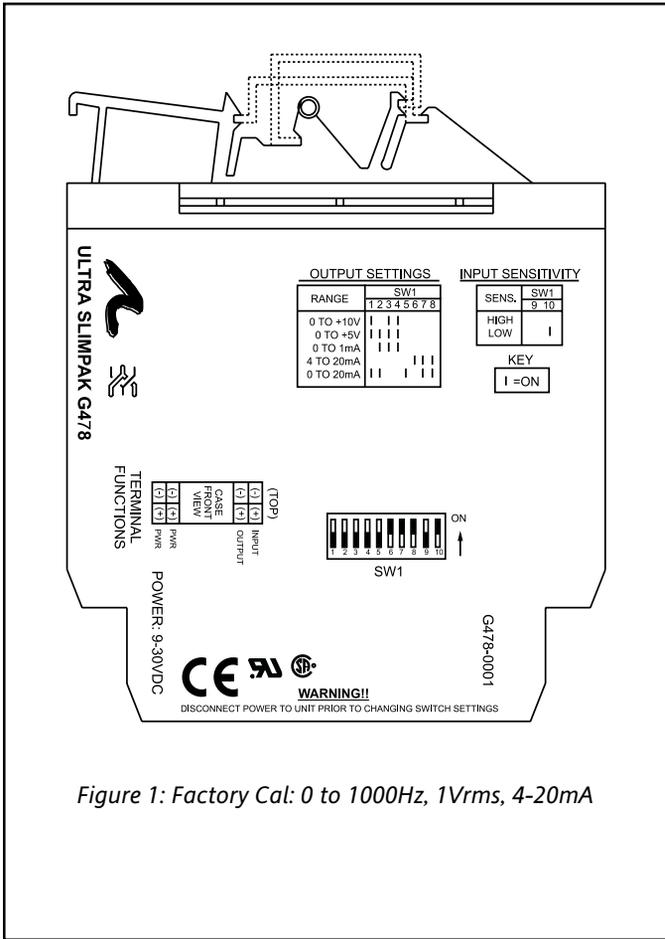


Figure 1: Factory Cal: 0 to 1000Hz, 1Vrms, 4-20mA

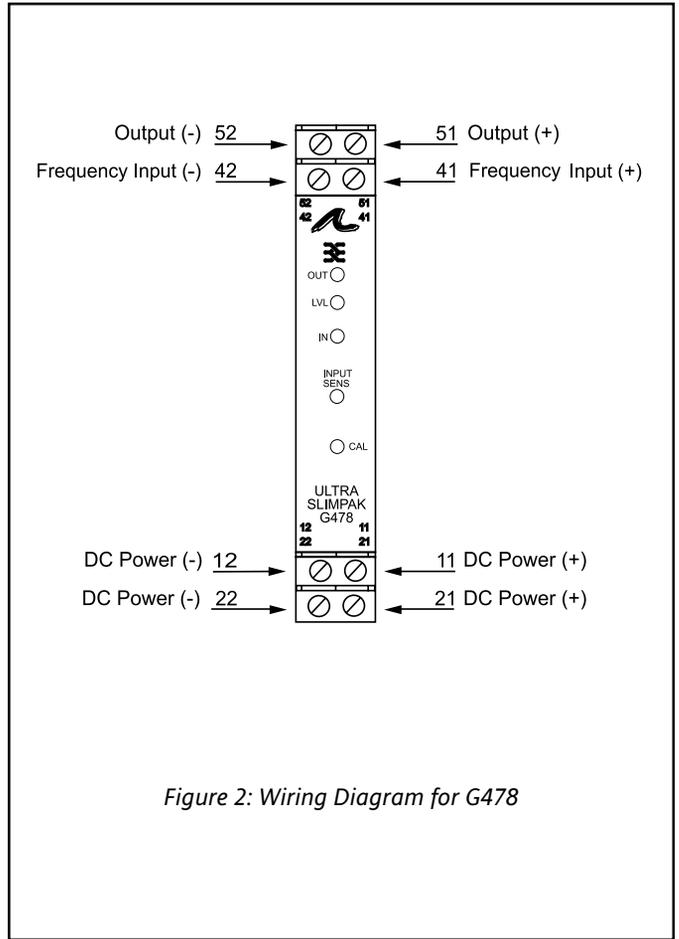
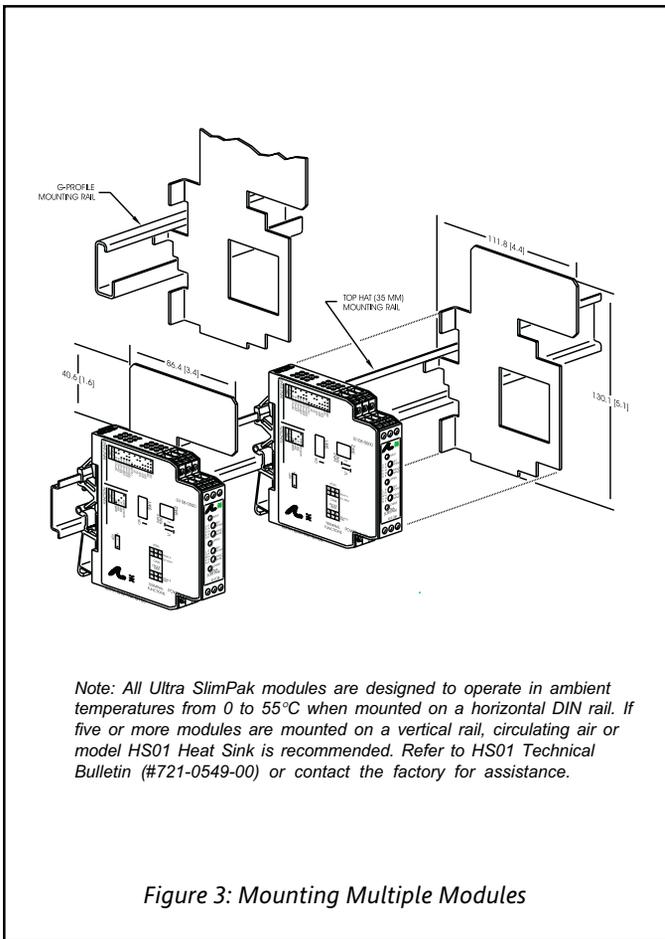


Figure 2: Wiring Diagram for G478



Note: All Ultra SlimPak modules are designed to operate in ambient temperatures from 0 to 55°C when mounted on a horizontal DIN rail. If five or more modules are mounted on a vertical rail, circulating air or model HS01 Heat Sink is recommended. Refer to HS01 Technical Bulletin (#721-0549-00) or contact the factory for assistance.

Figure 3: Mounting Multiple Modules

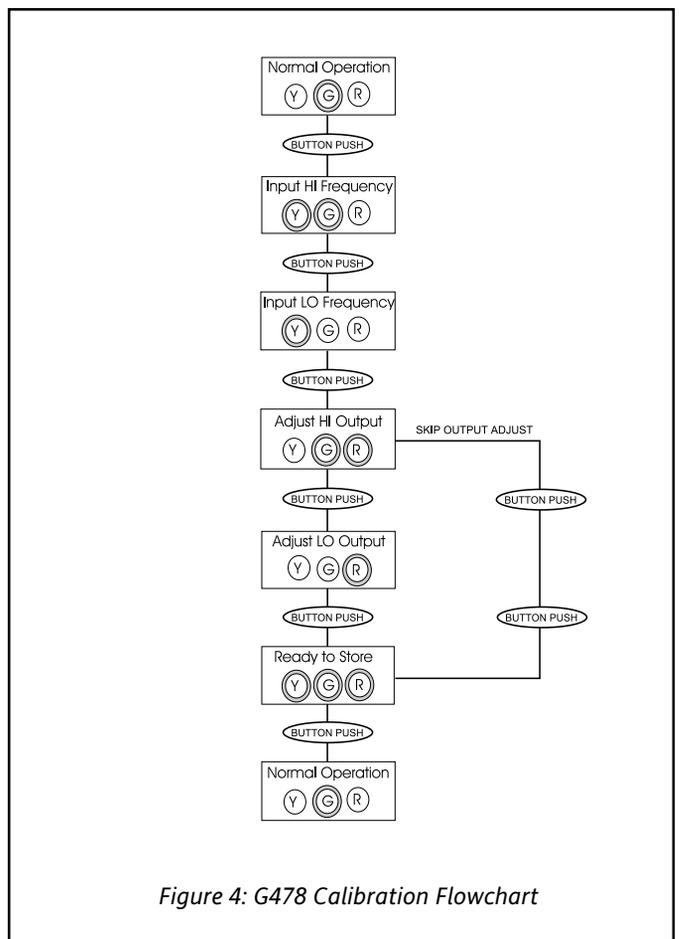


Figure 4: G478 Calibration Flowchart

## Specifications

### Input:

- Frequency Input
  - Full Scale Range: 2 Hz minimum from 2Hz to 10,000Hz.
  - Amplitude Range: 150mVp to 150Vrms
  - Impedance: >10K Ohms
  - Over-voltage: 180Vrms, max.
  - Over-range: 20KHz, max.
  - Common Mode (Input to Gnd): 1800VDC, max.
- Zero Turn-Up:
  - 99% of full scale range (9998Hz)
- Span Turn-Down:
  - 99% of full scale range (2Hz)

### Output:

- Voltage:
  - Output: 0-5V, 0-10V
  - Source Impedance: <100 Ohms
  - Drive: 10mA, max. (1K Ohms, min. @ 10V)
- Current:
  - Output: 0-1mA, 0-20mA, 4-20mA
  - Source Impedance: >100K Ohms
  - Compliance:
    - 0-1mA; 7.5V, max. (7.5K Ohms, max.)
    - 0-20mA; 12V, max. (600 Ohms, max.)
    - 4-20mA; 12V, max. (600 Ohms, max.)

### Accuracy (Including Linearity, Hysteresis):

±0.1% of selected range at 25°C.

### Stability:

±0.025%/°C maximum of selected range.

### Response Time (10 to 90%):

3 input cycles + 250ms

### Common Mode Rejection:

DC: 100dB  
>60Hz: 80dB

### Isolation:

1800VDC between input, output & power.

### EMC Compliance (CE Mark):

Emissions: EN50081-1  
Immunity: EN50082-2  
Safety: EN50178

### LED Indication:

LEVEL (green):  
lit when power is on  
Input > 110% then 8Hz. flash  
Input < -10% then 4Hz flash  
INPUT (yellow):  
input range programming status  
OUTPUT (red):  
output range programming status

### Humidity (Non-Condensing):

Operating: 15 to 95% @ 45°C  
Soak: 90% for 24 hours @ 65°C

### Temperature Range:

Operating: 0 to 55°C (5 to 131°F)  
Storage: -25 to 70°C (-13 to 158°F)

### Power:

Consumption: 1.5W typical, 2.5W max.  
Range: 9 to 30VDC

### Weight:

0.50 lbs

### Wire Terminations:

Screw terminals for 12-22 AWG

### Agency Approvals:

UL recognized per standard UL508  
(File No.E99775).  
CE Conformance per EMC directive 89/336/EEC  
and Low Voltage 73/23/EEC  
(Input < 75Vp or < 50Vrms, only).  
RoHS Compliant

## Ordering Information

### Models & Accessories

#### Specify:

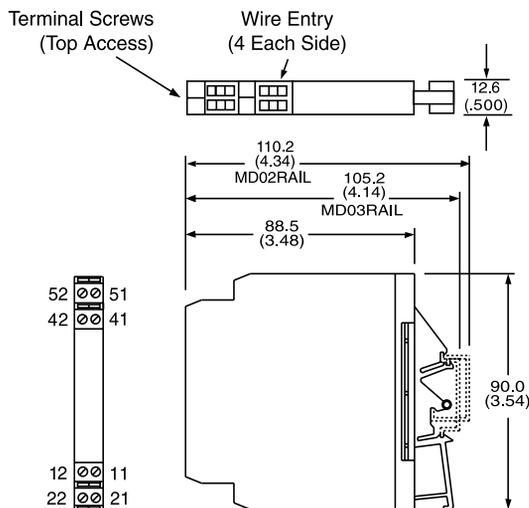
- Model: **G478-0001**
- Accessories: (see accessories)
- Optional Custom Factory Calibration: specify **C620** with desired input and output range

### Accessories

SlimPak "G" Series modules will mount on standard TS32 (model MD02) or TS35 (model MD03) DIN Rail. In addition, the following accessories are available:

- HS01** Heat Sink
- MD03** TS35 x 7.5 DIN rail
- WV905** 24VDC Power Supply (0.5 Amp)
- H910** 24VDC Power Supply (1 Amp)
- H915** 24VDC Power Supply (2.3 Amp)
- MB03** End Bracket for MD03
- C664** I/O Descriptive Tags

## Dimensions



Dimensions are in mm (inches)



## Factory Assistance

For additional information on calibration, operation and installation contact our Technical Services Group:

**703-669-1318**

[actionsupport@eurotherm.com](mailto:actionsupport@eurotherm.com)

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## Eurotherm, Inc

741-F Miller Drive  
Leesburg, VA 20175-8993  
703-443-0000

[info@eurotherm.com](mailto:info@eurotherm.com) or [www.eurotherm.com/actionio](http://www.eurotherm.com/actionio)