



AP7380-0000

Action PAK® AP7380

Frequency Input, Field Configurable Signal Conditioner

Provides an Isolated DC Output
in Proportion to Frequency Input



- Field Configurable Input Ranges from 2Hz to 10,000Hz
- Four Field Configurable Output Ranges 0-5V, 0-10V, 0-1mA, 4-20mA
- Eliminates Ground Loops
- Plug-in Installation
- Selectable 120/240VAC Input Power
- ASIC Technology for Enhanced Reliability

Description

The Action Pak Model AP7380 is a frequency input signal conditioner with 1500VDC isolation between input, output and power. The field configurability of the input and output offers flexible, wide ranging capability for magnetic pick-ups, turbine flow meters, and other pulse or frequency output transducers.

The input of the AP7380 can be configured for any frequency span from 2Hz (e.g., 59-61Hz) to 10,000Hz. The input amplitude threshold (SENS POT) 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 either 0-5V, 0-10V, 0-1mA or 4-20mA.

Advanced digital technology allows the AP7380 to be field configured to convert virtually any frequency input to a DC signal output within the ranges specified. Calibration utilizes 'Touch-Sample' technology by which the user simply applies the desired input frequency, and touches a recessed button to configure the corresponding input range.

The convenient Action Pak is very easy to install using surface mount, DIN rail mount or snap track mounting sockets. Trouble shooting is very easy since no wires need to be removed when swapping units. The wide ranging power supply can be configured for either 120 or 240VAC power.

Application

The AP7380 field configurable, frequency input signal conditioner 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, provides a stable output at low frequencies for higher accuracy, and three-way isolation completely eliminates ground loops from any source.

Option

- U Urethane coating of internal circuitry for protection from corrosive atmospheres

'Touch Sample' Technology

The AP7380 utilizes Action Instruments' 'Touch-Sample' technology which greatly simplifies configuration. To set the input frequency range, the user simply applies the high input frequency and pushes the CAL button while the INPUT LED is on. The low input frequency is then applied and pushing the CAL button 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 ranges which have been selected via DIP switches.

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

Status LEDs

The AP7380 utilizes three status LEDs. The green LEVEL LED changes in intensity with input level. Its intensity varies with the frequency of the input signal during normal operation. If the input signal is 10% more than full scale range, the LED will flash at 8Hz. Below 0%, the flash rate is 4Hz.

The yellow INPUT LED, when on, denotes input programming modes.

The red OUTPUT LED, when on, denotes output programming modes (see Configuration, Calibration and Figure 1 for details).

Configuration

A major advantage of the AP7380 is its wide ranging capabilities and ease of configuration. The AP7380 enables virtually 99% zero and span adjustability. 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 are as follows:

Input Range: 0 to 1000Hz
 Sensitivity: 1V peak (LO)
 Output Range: 4 to 20mA
 Power: 120VAC

Note: "Sensitivity" refers to the noise rejection level or the trigger threshold of the input.

For other I/O ranges, refer to Table 1 for output range (SW1) switch settings and to Figure 4 for sensitivity jumper setting (P3). For quick and easy calibration mode reference, see the step-by-step flow chart in Figure 1.

1. With DC power off, choose the desired output voltage/current range from Table 1 and set position 1 through 6 of the output switch selector (SW1).
2. Set the Input sensitivity jumper (P3) to LO for input amplitudes between 150mVp and 50Vrms, with noise rejection to 1Vp. Set P3 to HI for input amplitudes between 500mVp and 150Vrms, with noise rejection up to 10Vp.

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 this is not observed, turn the sensitivity potentiometer in a counter-clockwise direction until the output changes proportionally to the input.
3. With the green LED on press the CAL button once to enter the calibration mode. The yellow and green LEDs should now be on.
4. Input the maximum desired frequency (if not done already) and press the CAL button to store. The yellow LED should now be the only LED on.
5. Input the minimum desired frequency and press the CAL button to store. The green and red LEDs should now be on.

Note: The most reliable way to input 0Hz is to short circuit the input pins (5&6).

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 should 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 less than 10% of the HI input frequency. Press the CAL button to store the value. The Yellow, Red and Green LEDs should be on (see Figure 1).

8. Press the CAL button one final time to exit the calibration mode. The green LED should now be on. (With only 5-10% of input, the green LED is off.)

9. Check the minimum and maximum input-to-output calibration. Repeat steps 1 through 8 if calibration is not within desired specifications.

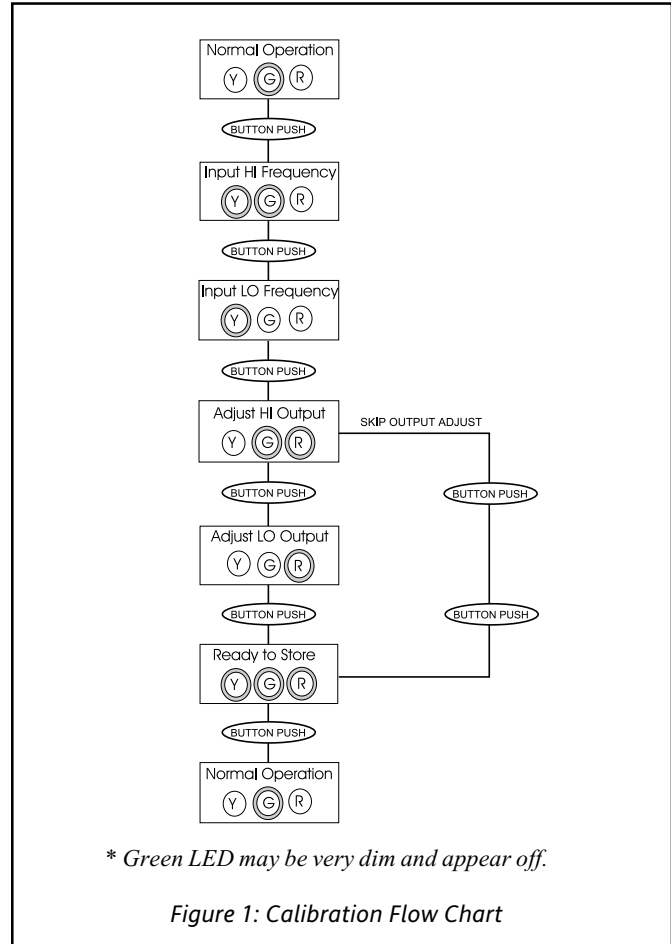
Note 1: To skip Steps 6 and 7 (output adjustment), press CAL button two times after Step 5.

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

Optimal Sensitivity

If the amplitudes 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.

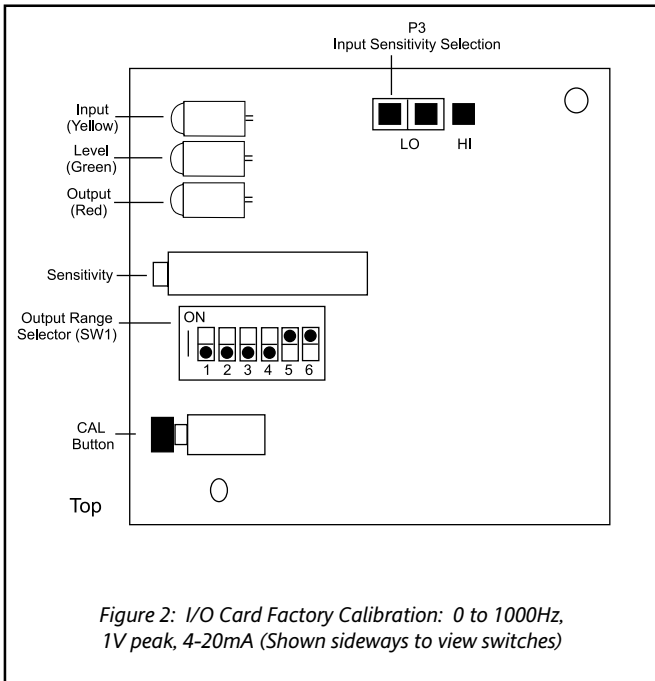
1. Set the input near midrange (50% input) or to a frequency that exhibits the minimum pulse amplitude.
2. Turn the sensitivity pot (SENS) clockwise (CW) until the output drops to minimum.
3. Turn the sensitivity pot counter-clockwise (CCW) until the output returns to the previous level. A couple more CCW turns will provide optimal noise rejection.
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, when 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.



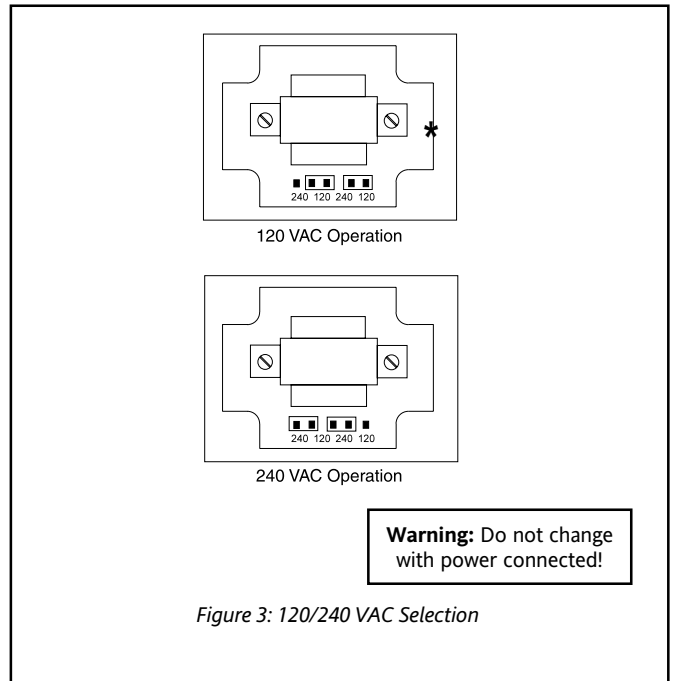
* Green LED may be very dim and appear off.

Figure 1: Calibration Flow Chart

I/O Card Configuration



Top View Diagram



Warning: Do not configure I/O switch ranges with power on. Damage will result!

Warning: Applying voltage to the input with W1 in current (I) position will result in damage to the unit.

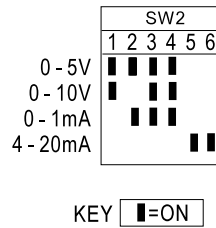


Table 1: Output Switch Settings (SW1, 1 through 6)

Warning: Do not change with power connected!

LO 150mVp -1Vp,

 HI 0.5Vp-10Vp,
P3

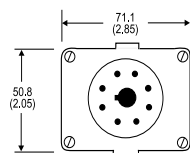
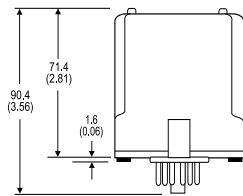
Figure 4: Input Sensitivity Settings (P3) (can reject voltage up to those shown)

Accessories

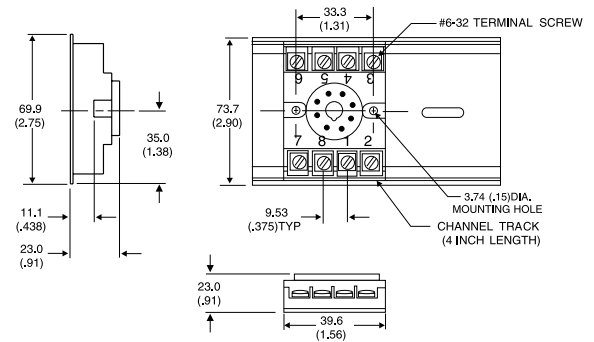
All Action Paks feature plug-in installation. Model AP7380 uses an 8-pin base and either molded socket M008 or DIN socket MD08.

Dimensions

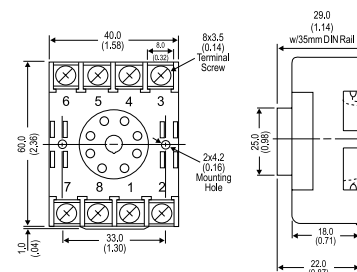
Dimensions are in millimeters (inches)



Mark II



M008 (Track/Surface)



MD08 (DIN Rail)

Specifications

Input Ranges (selectable):

Frequency Input:

Full Scale Range: 2 Hz to 10,000Hz

Amplitude Range:

150mVp to 10Vp, 150Vrms max

Impedance: >10K Ohms

Over-voltage: 180Vrms, max

Over-range: 20KHz, max.

Common Mode (Input to Ground):

1500VDC, max

Zero Turn-Up:

99% of full scale range (9998Hz)

Span Turn-Down:

99% of full scale range (2Hz)

Output:

Voltage Output:

Output: 0-5V, 0-10V

Impedance: <10 Ohms

Drive: 10mA, max. (1K Ohms, min @10V)

Current Output:

Output: 0-1mA, 4-20mA

Impedance: >100K Ohms

Compliance:

0-1mA; 10V, max.(10K Ohms, max)

4-20mA; 20V, max.(1K Ohms, max)

Accuracy (including Linearity & Hysteresis):

±0.1% of selected range at 25°C.

Stability:

±0.025%/°C maximum of selected range.

Response Time (10-90%):

3 input cycles plus 250mSec

Common Mode Rejection:

DC: 100dB

>60Hz: 80dB

Isolation:

1500VDC between input, output and power.

ESD & Transient Susceptibility:

Meets IEC 801-2, Level 2 (4KV)

LED Indication:

LEVEL (green): lit when power is on
(Intensity varies with input signal);

input > 107% then 8Hz flash

input < -7% 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: -15 to 60°C (5 to 140°F)

Storage: -25 to 70°C (-13 to 158°F)

Power:

Consumption:

2W typical, 3W max

Standard:

selectable 120/240VAC, ±10%, 50-60Hz

Weight:

.60lbs

Agency Approvals:

CSA certified per standard C22.2 No. 0-M91
and 142-M1987 (File No. LR42272 - 64).

UL recognized per standard UL508

(File No. E99775)

Ordering Information

Specify:

1. Model: **AP7380-0000**
2. Option: U, see text
3. Line Power: 120/240VAC
4. C620: Factory Calibration of input range, setpoints and output relays.

(All power supplies are transformer-isolated from the internal circuitry.)

Note: For UL applications above 100V (unrestricted), the signal must be transient limited (e.g. 150V MOV). For CSA applications above 100V (unrestricted), the signal must be isolated from the primary by a 150VA transformer and no fire result from a short circuit at the input.

Accessories:

M801-0000 Retaining Spring

M008-A 8 pin Track Mount Socket

M004-0000 4 ft Long Channel Track

MD08-0000 8 pin DIN Mount Socket

Pin Connections

- 1 Power (Hot)
- 2 Shield (Gnd)
- 3 Power (Neu)
- 4 Spare Termination
- 5 Frequency Input (+)
- 6 Frequency Input (-)
- 7 Output (+)
- 8 Output (-)

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