GENERAL

Model Series 380J Frequency Converter Modules convert frequency signals to standard process current or voltage signals. The frequency-to-current converter accepts any periodic waveform. It will trigger on the positive going edge of the waveform from tachometers, magnetic pickups or turbine flow meters. The input signal waveform is not critical and may be sine, square, triangular, pulse, etc.

For operation in a noisy signal area, the sensitivity of the converter can be reduced by means of an adjustment at the front of the card. Model 380J2 provides input isolation to eliminate noise caused by grounding or unwanted common mode signals.

The module accepts input voltage from 10 mV to 100V peak. The input frequency span is selected by field changeable jumpers on the card from 25 Hz. to 12K Hz.

The module provides field selectable process current outputs of 4 to 20 mA or 10 to 50 mA. Built-in current limiting prevents the output current from exceeding 200% of full scale when the input is overranged.

MODEL DESIGNATION

<table>
<thead>
<tr>
<th>Basic Series Designation</th>
<th>3 8 0 1 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designates Frequency Converter Module</td>
<td></td>
</tr>
<tr>
<td>Input Isolation Option</td>
<td></td>
</tr>
<tr>
<td>1 - Not provided</td>
<td></td>
</tr>
<tr>
<td>2 - Provided</td>
<td></td>
</tr>
</tbody>
</table>

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Input Voltage Range:</th>
<th>10 mV to 100V dc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Frequency Range:</td>
<td>0 to 12K Hz. (max)</td>
</tr>
<tr>
<td>Input Impedance:</td>
<td>18K Ohms (min)</td>
</tr>
<tr>
<td>Common Mode Rejection (Model 380J2 only):</td>
<td>100V (max)</td>
</tr>
</tbody>
</table>

MOORE PRODUCTS CO., Spring House, Pa. 19477
Output Current Range: Selectable, 4 to 20 mA or 10 to 50 mA

Output Current Limiting: 200% of Range

Maximum Output Load: 4 to 20 mA: 900 Ohms
10 to 50 mA: 360 Ohms

Output Ripple: 0.1% of Span (max)

Response Time: (nominal) Ranges A to C - 10 Sec.
Ranges D and E - 2.5 Sec.
Ranges F and H - 700 ms
Ranges J to L - 200 ms

INSTALLATION

GENERAL

Using the Card Cage Enclosure Instructions as a reference (Service Instructions, SD3801) set the keys as follows:

Left Key:  V (vertical)
Right Key: V (vertical)

If the Converter Module is factory calibrated, insert the module into the proper slot of the card cage enclosure and make the electrical connections shown in the connection diagram. If the module is not factory calibrated, refer to the CALIBRATION section of this instruction.

AC COUPLING

If the input signal source is capacitively coupled to the module input, it will be necessary to install a 20K Ohm resistor in the R2 position of the PC board. This resistor provides a dc path for the bias current of the input circuit.

NEGATIVE EDGE SENSING

The isolated input version (Model 380J2) can sense negative going edges of an input signal by reversing the input leads.

THRESHOLD SENSITIVITY

If it is necessary to increase the threshold voltage to a value greater than 0.5 Volts, a resistor can be installed in the position marked R2 on the PC board. The value of R2 can be determined from the following equation:

$$R_2 = \frac{20K}{4V_T - 1}$$

$V_T$ is the desired threshold voltage expressed in volts. After installing $R_2$, it may be necessary to readjust the sensitivity control. Refer to the CALIBRATION section of this instruction.

CALIBRATION

A stable frequency source that can be set to within 0.1% of the desired frequency along with accurate instrumentation for measuring output current, should be used
to guarantee accurate calibration. Refer to the connection diagram for input and output terminal locations.

1. Select the desired output current range with Jumper J1.
   - Output 4 to 20 mA: J1 OUT
   - Output 10 to 50 mA: J1 IN

2. Determine the desired input range from the following table and place jumper pin in the appropriate position (refer to parts location drawing). For best results, select the smallest frequency range that will cover the frequency span being monitored.

<table>
<thead>
<tr>
<th>FREQUENCY RANGE Hz.</th>
<th>JUMPER POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-25</td>
<td>A</td>
</tr>
<tr>
<td>0-50</td>
<td>B</td>
</tr>
<tr>
<td>0-100</td>
<td>C</td>
</tr>
<tr>
<td>0-200</td>
<td>D</td>
</tr>
<tr>
<td>0-400</td>
<td>E</td>
</tr>
<tr>
<td>0-800</td>
<td>F</td>
</tr>
<tr>
<td>0-1.5K</td>
<td>H</td>
</tr>
<tr>
<td>0-3K</td>
<td>J</td>
</tr>
<tr>
<td>0-6K</td>
<td>K</td>
</tr>
<tr>
<td>0-12K</td>
<td>L</td>
</tr>
</tbody>
</table>

3. Arrange "response time" jumpers for desired results, refer to the following table.

   NOTE: Units are supplied with a response time of 2.5 seconds for frequency ranges D thru L, while providing less than 0.1% output ripple at f max. The table below describes the frequency/response time combinations that can be achieved while maintaining less than 0.1% output ripple at f max.

   The faster response times may be used when output ripple is not critical.

   Cut Jumpers marked x

<table>
<thead>
<tr>
<th>J2</th>
<th>J3</th>
<th>J4</th>
<th>J5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   10 sec A thru L x x
   2.5 sec D thru L None Cut
   700 mS F thru L x x x x
   200 mS J thru L x x

4. Hook up instrument in accordance with connection diagram.

5. a) Set the amplitude of your signal generator at V max. and rotate sensitivity pot on module clockwise until end of pot is reached. Then rotate pot counterclockwise 6 complete turns. This sets the threshold voltage at approximately 0.2 volts.

   b) Set the input frequency from your signal generator to the lower limit frequency desired and adjust "ZERO" pot of module until the output current is 4 or 10 mA. If output cannot be reduced to 4 or 10 mA, turn the "SPAN" pot CCW until the output is reduced to the desired value.
c) Set input frequency from your signal generator to the upper limit frequency desired and adjust "SPAN" pot to give the maximum output of 20 or 50 mA. There is some interaction between the SPAN and ZERO adjustments making it necessary to repeat steps b and c until the current reading converge to the desired values. This completes calibration of the converter.

6. Set the amplitude of your signal generator output to the amplitude of the smallest input signal to be detected. Adjust the sensitivity control for a constant reading of the output current.

The threshold point may be set between 10 mV and ±0.5 volts with the 22 turn Sensitivity pot. Clockwise rotation increases the sensitivity. The threshold point may be increased up to 100 volts by adding a resistor to the board, see Threshold Sensitivity in the INSTALLATION section of this instruction.

MAINTENANCE

These instruments are solid state and require no maintenance on a regular basis, except for an annual cleaning, blowing out of dirt, and verifying calibration. If your converter is not operating properly, we suggest removing it and giving it a full bench check-out. We find most problems are in the field wiring or other circuits, not in the converter. If the problem is traced to the unit itself, conventional electronic troubleshooting methods suffice.

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**Terminal strips on Series 380 rack enclosures.**

1. **INPUT** (Note 1)

2. NC

3. NC

4. Common

5. RL

6. NC Load (Note 2)

7. NC

8. NC

9. NC

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1. The negative input terminal of the 380J1 is common with the rack DC power supply. The input terminals of the 380J2 (isolated version) are floating.

2. See output specifications for load limits.

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**CONNECTION DIAGRAM**