General

The Model PX106 is the digital output member of the PX106 transducer family. The transducer’s output signal is a frequency modulated square wave with a nominal 5 KHz range, set from 1 KHz to 6 KHz.

The PX106 logic level frequency output signal offers unique advantages over conventional analog voltage output transducers. The primary advantage is the ease with which the transducer can be interfaced to most microprocessors. Another advantage is superior noise immunity which allows the PX106 to perform in a variety of harsh environments without shielded cable or special care to protect transmission lines. Also, since it is a logic level signal at relatively low frequency, long communication lines can be used, and simple wave shape reconstruction can be performed if required.

The PX106 is designed to meet the needs of today’s high technology requirements. It is the ideal choice for those applications that need a rugged, reliable, cost efficient transducer with the benefits of 0.5% accuracy, long-term stability and a wide operating temperature range.

A unique stainless steel pressure chamber design ensures circuit protection from corrosive measurand while the outer case of Valox protects against harsh environments. This combination assures the Model PX106 performance to continue within original specification limits. The internal voltage regulator allows use of economical unregulated power sources of 10-20 Vdc.

Typical media used with the PX106 include oil, gases, saline solutions, ammonia, Freon, hydraulic fluids, alcohol, acids, and gasoline.

Pressure ranges extend from 0-6 psi to 0-5000 psi. Typical accuracy, including the effects of nonlinearity, hysteresis, and repeatability, is within 0.5% of span from best fit line.

Installation

The Model PX106 may be easily mounted on a printed circuit board using the two mounting holes or by supporting it from the stainless steel pressure port. Many applications require a threaded pressure port. For these we recommend the use of threaded adapters and bushings. A 10-20 volt DC power supply is required to energize the Model PX106. See power connections in diagram.

Maintenance

No maintenance is required with these transducers. The absence of moving parts and the solid-state electronics make them trouble-free and reliable.

Pressure Overloads

PX106 transducers will withstand high overloads. If the overload rating is exceeded, electrical failure may occur. As a safety feature, the transducers have been designed to withstand much higher burst pressures than the pressure which will cause permanent damage.

Important: Both static and dynamic overloads must be considered when selecting a pressure transducer. Pressure fluctuations exist in most systems. These fluctuations can have very large and very fast peak pressures, as in water hammer effects. If the transducer is connected to a slow responding instrument, such pressure peaks may not be observed. An oscilloscope is a convenient tool for determining if high pressure transients exist in a system. Where pressure pulses are expected, the transducer rating should be high enough to prevent overload by the peak, pressure. Where high pressure transients are unavoidable, use either a higher range transducer or a snubber, which will reduce the peak pressure applied to the transducer. The life of the transducer will be reduced if it is repeatedly overloaded, particularly under dynamic conditions.

WARNING! READ BEFORE INSTALLATION

Fluid hammer and surges can any pressure transducer and must always be avoided. A pressure snubber should be installed to eliminate the damaging hammering effects.

Fluid hammer occurs when a liquid flow is suddenly stopped, as with quick closing solenoid valves. Surges occur when flow is quickly begun, as when a pump is turned on at full power or a valve is quickly opened.

Liquid surges are particularly damaging to pressure transducers if the pipe is originally empty. To avoid damaging surges, fluid lines should remain full (if possible), pumps should be brought up to power slowly, and valves opened slowly. To avoid damage from both fluid hammer and surges, a surge chamber should be installed, and a pressure snubber should be installed on every transducer.

Symptoms of fluid hammer and surge’s damaging effects:

a) Pressure transducers exhibit an output at zero pressure (large zero offset). If zero offset is less than 10% FS, user can usually re-zero meter, install proper snubber and continue monitoring pressures.
b) Pressure transducer output remains constant regardless of pressure.
c) In severe cases, there will be no output.
### PX106 SPECIFICATIONS @ 25°C, SUPPLY VOLTAGE + 15 VOLTS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>PRESSURE RANGE</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6, 15, 25</td>
<td>50, 100, 200, 300</td>
</tr>
<tr>
<td></td>
<td>MIN</td>
<td>TYP</td>
</tr>
<tr>
<td>Full Scale Output (FSO)* [Fig. 3]</td>
<td>4.90</td>
<td>4.95-5.05</td>
</tr>
<tr>
<td>Null Offset</td>
<td>0.85</td>
<td>0.95-1.05</td>
</tr>
<tr>
<td>Linearity (Best Fit)</td>
<td>±0.5</td>
<td>±1.0</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>±0.25</td>
<td>±0.25</td>
</tr>
<tr>
<td>Temperature Error</td>
<td>±0.01</td>
<td>±0.02</td>
</tr>
<tr>
<td>- Null 0°C to 85°C (32° to 185°F)</td>
<td>±0.03</td>
<td>±0.03</td>
</tr>
<tr>
<td>- 40°C to 0°C (-40° to 32°F)</td>
<td>±0.01</td>
<td>±0.02</td>
</tr>
<tr>
<td>Sensitivity 0°C to 85°C (32° to 185°F)</td>
<td>±0.02</td>
<td>±0.02</td>
</tr>
<tr>
<td>- 40°C to 0°C (-40° to 32°F)</td>
<td>±1.0</td>
<td>±1.0</td>
</tr>
<tr>
<td>Supply Voltage (V_S)</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Supply Current (Quiescent)</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Output Voltage **</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Output Current (Sink)</td>
<td>5.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Enable Voltage (Inhibit)</td>
<td>8.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Enable Current (Source)</td>
<td>9.0</td>
<td>9.0</td>
</tr>
<tr>
<td>Pressure Overload</td>
<td>2 x</td>
<td>2 x</td>
</tr>
<tr>
<td>Burst Pressure</td>
<td>20 x</td>
<td>10 x</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>- 40°C to 85°C (-40° to 185°F)</td>
<td></td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>- 65°C to 150°C (-85° to 302°F)</td>
<td></td>
</tr>
</tbody>
</table>

* FSO is the frequency change between minimum and rated pressure.
For example: NOM F_O = 1.00 KHz @ Null Pressure, NOM V_O = 6.00 KHz @ Rated Pressure, FSO = (6.00-1.00) = 5.00 KHz.

** The output transistor functions when the enable input is grounded. The output is an open collector transistor and requires a pull-up resistor.
APPLICATIONS INFORMATION

Single Channel Interface

Multiple Channel CMOS Interface

Multiple Channel TTL Interface

Figure 3. Transducer Output

NORMALIZED PRESSURE

0 1 2 3 4 5 6
FREQUENCY OUTPUT (KHZ)

Block Diagram

*The sink current requirements of the device connected to the enable line will be the summation of the current available from the collector source and no more than .4 mA from the internal resistor (between the emitter and the +8V supply).

CONNECTIONS

PRESSURE:

1/4" straight stainless steel port.

ELECTRICAL:
Automotive type, Valox with crimp pins. (Supplied with transducer.)

F_{OUT} is the multiplexed signal of all of the pressure transducers. The transducers should be individually selected by a high logic level signal on the desired S input. This will drive the respective E_{N} line to ground, enabling the PX106 output transistor.
For immediate technical or application assistance:

**U.S.A. and Canada:** Sales Service: 1-800-826-6342/1-800-TC-OMEGA®
Customer Service: 1-800-622-2378/1-800-622-BEST®
Engineering Service: 1-800-872-9436/1-800-USA-WHEN®

Mexico:
En Español: (001) 203-359-7803
FAX: (001) 203-359-7807
e-mail: espanol@omega.com
info@omega.com.mx

**Czech Republic:**
Fryštatská 184, 733 01 Karviná, Czech Republic
Tel: +420 (0)59 6311899
FAX: +420 (0)59 6311114
Toll Free: 0800-1-66342
e-mail: info@omegashop.cz

**Germany/Austria:**
Daimlerstrasse 26, D-75392 Deckenpfronn, Germany
Tel: +49 (0)7056 9398-0
FAX: +49 (0)7056 9398-29
Toll Free in Germany: 0800 639 7678
e-mail: info@omega.de

**United Kingdom:**
One Omega Drive, River Bend Technology Centre
Northbank, Irlam, Manchester
M44 5BD United Kingdom
Tel: +44 (0)161 777 6611
Fax: +44 (0)161 777 6624
Toll Free in United Kingdom: 0800-488-488
e-mail: sales@omega.co.uk

It is the policy of OMEGA Engineering, Inc. to comply with all worldwide safety and EMC/EMI regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice. WARNING: These products are not designed for use in, and should not be used for, human applications.

**WARRANTY/DISCLAIMER**

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of 13 months from date of purchase. OMEGA’s WARRANTY adds an additional one (1) month grace period to the normal one (1) year product warranty to cover handling and shipping time. This ensures that OMEGA’s customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA’s Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA’s WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA’s control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a “Basic Component” under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

**RETURN REQUESTS / INQUIRIES**

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA’S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR WARRANTY RETURNS, please have the following information available BEFORE contacting OMEGA:
1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR NON-WARRANTY REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:
1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA’s policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering. OMEGA is a registered trademark of OMEGA ENGINEERING, INC.

© Copyright 2008 OMEGA ENGINEERING, INC. All rights reserved. This document may not be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form, in whole or in part, without the prior written consent of OMEGA ENGINEERING, INC.