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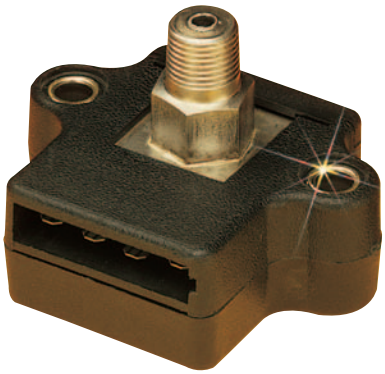
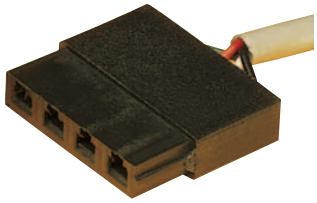
PX106

PRESSURE TRANSDUCER





INSTRUCTION SHEET

M0214-1008

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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 insures 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.

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 value 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.

Maintenance

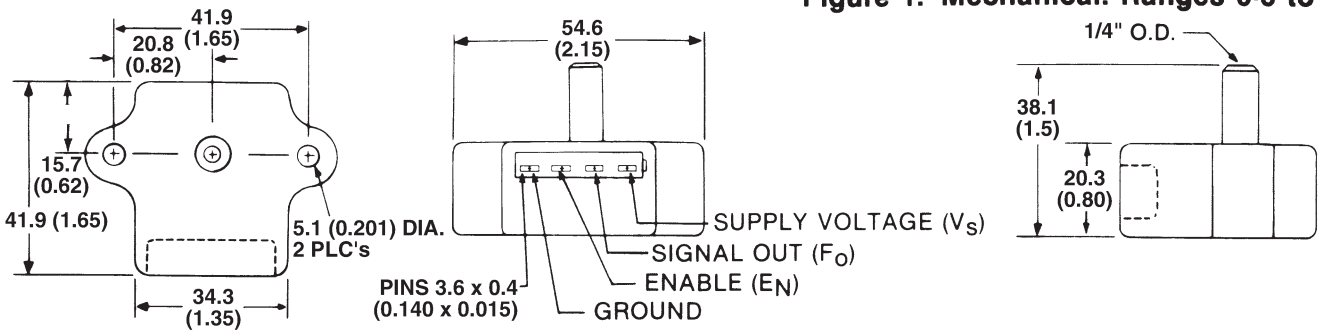
No maintenance is required with these transducers The absence of moving parts and the solid-state electronics make them trouble-free and reliable.

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.

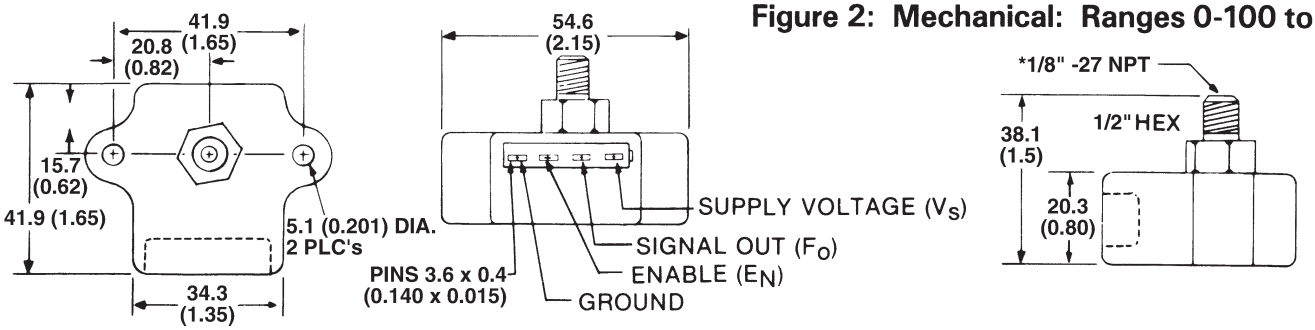
Important: Both static and dynamic overloads must be considered when selecting a pressure transducer. Pressure fluctuations exist in most systems. These fluctuations can have very large and very fast peak pressures, as in water hammer effects. If the transducer is connected to a slow responding instrument, 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.

Figure 1. Mechanical: Ranges 0-6 to 0-50 PSI



DIMENSIONS mm (in.)

Figure 2: Mechanical: Ranges 0-100 to 0-2000 PSI



PX106 SPECIFICATIONS @ 25°C, SUPPLY VOLTAGE + 15 VOLTS

TABLE I

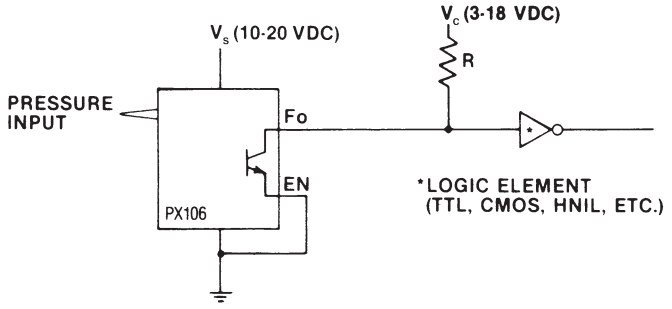
PARAMETER	PRESSURE RANGE 6, 15, 25 MIN	6, 15, 25 TYP	6, 15, 25 MAX	50, 100, 200, 300 MIN	50, 100, 200, 300 TYP	50, 100, 200, 300 MAX	500, 1K, 2K, MIN	500, 1K, 2K, TYP	500, 1K, 2K, MAX	UNITS
Full Scale Output (FSO)* [Fig. 3]	4.90	4.95-5.05	5.10	4.90	4.95-5.05	5.10	4.90	4.95-5.05	5.10	KHz
Null Offset	0.85	0.95-1.05	1.15	0.85	0.95-1.05	1.15	0.85	0.95-1.05	1.15	KHz
Linearity (Best Fit)		±0.5	±1.0		±0.2	±0.5		±0.2	±0.5	% FSO
Hysteresis		±0.25			±0.25			±0.25		% FSO
Temperature Error										
Null 0° to 85°C (32° to 185°F)		±0.01	±.02		±0.01	±0.02		±0.01	±0.02	% FSO/°C
– 40° to 0°C (-40° to 32°F)		±0.03			±0.03			±0.03		% FSO/°C
Sensitivity 0° to 85°C (32° to 185°F)		±0.01	±.02		±0.01	±0.02		±0.01	±0.02	% RDG/°C
– 40° to 0°C (-40° to 32°F)		±0.02			±0.02			±0.02		% RDG/°C
Stability (1 year)		±1.0			± 1.0			±1.0		% FSO
Supply Voltage (V_S)	10		20	10		20	10		20	Vdc
Supply Current (Quiescent)		30			30			35		mA
Output Voltage**			18			18			18	Vdc
Output Current (Sink)	5.0	8.0		5.0	8.0		5.0	8.0		mA
Enable Voltage (Inhibit)			8.0			8.0			8.0	Vdc
Enable Current (Source)			9.0			9.0			9.0	mA
Pressure Overload			2×			2×			1.5×	Rated Pressure
Burst Pressure	20×			10×			5×			Rated Pressure
Operating Temperature	– 40° to 85°C (-40° to 185°F)									
Storage Temperature	– 65° to 150°C (-85° to 302°F)									

*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.

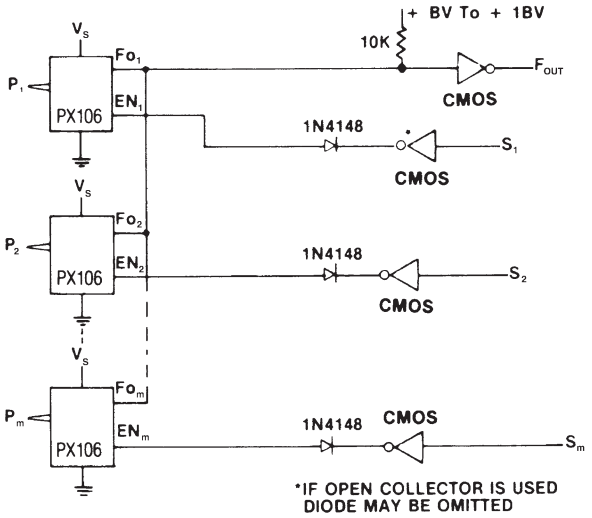
**The output transistor functions when the enable input is grounded. The output is an open collector transistor and requires a pull-up resistor.

APPLICATIONS INFORMATION

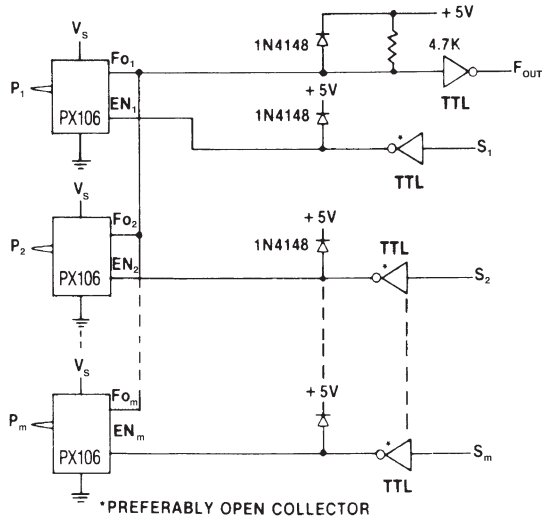
Single Channel Interface



Multiple Channel CMOS Interface

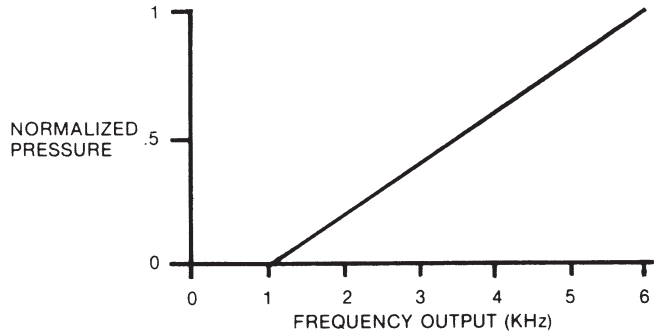


Multiple Channel TTL Interface

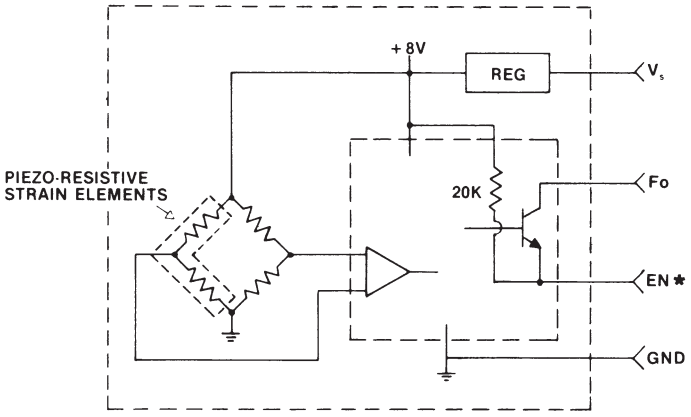


F_{OUT} is the multiplexed signal of all of the pressure transducers. The transducers should be individually selected by a high logic level signal on the desired S input. This will drive the respective E_N line to ground, enabling the PX106 output transistor.

Figure 3. Transducer Output



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:
¼" straight stainless steel port.

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

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Canada:
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Servicing Europe:

Czech Republic:
Frystatska 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
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United Kingdom: ISO 9001 Certified
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Northbank, Irlam, Manchester
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Tel: +44 (0)161 777 6611
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2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

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2. Model and serial number of the product, and
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