



# Use of Quartzdyne Transducers in Hazardous Locations

## System Overview

All Quartzdyne transducers consist of three quartz resonators, supporting oscillator circuits, and mechanical housings. Two of the resonators are designed to sense Pressure and Temperature as measured by a change in resonant frequency. The third resonator is designed as a frequency source to which the other resonant frequencies are compared.

## Piezoelectric Devices

The three quartz resonators incorporated in the transducers are capable of generating Voltage when impacted. However, the energy level is relatively small and should not be a problem in most systems. Impact testing has been performed on a typical unit. The results of this impact testing are summarized below.

| Resonator           | Impact Energy (Min) | Capacitance (Max) | Voltage (Max) |
|---------------------|---------------------|-------------------|---------------|
| Pressure Crystal    | 7 Joules            | 10pF              | 5.0V          |
| Temperature Crystal | 7 Joules            | 10pF              | 5.0V          |
| Reference Crystal   | 7 Joules            | 10pF              | 5.0V          |

## Ground and Earth Isolation

Circuit ground is connected to chassis within the device. This connection should not be considered as infallible. Clearance and creepage distances are such that shorting of any node to chassis must be considered. Most IS systems incorporating these devices will require an isolated barrier to comply with grounding rules.

## Internal Capacitance and Inductance

Clearance and creepage distances are such that shorting of any internal nodes should be considered. The following table lists the maximum capacitance and inductance contained in each of the various circuit technologies offered by Quartzdyne. Consult the manufacturer to determine which circuit is used in which transducers.

| Oscillator Circuit | Applicable Product Series | Capacitance (Max) | Inductance (Max) |
|--------------------|---------------------------|-------------------|------------------|
| Hybrid             | QH, QM, SXP               | 2.0 $\mu$ F       | 0                |
| LVLT               | QG, QM, QS                | 2.0 $\mu$ F       | 0                |
| SXP 3V             | SXP                       | 2.5 $\mu$ F       | 0                |
| Digital            | DM, DS                    | 2.5 $\mu$ F       | 0                |
| LP <sup>1</sup>    | QG, QS                    | 14.0 $\mu$ F      | 15 $\mu$ H       |
| QU <sup>1</sup>    | QU                        | 14.0 $\mu$ F      | 15 $\mu$ H       |
| QL <sup>1</sup>    | QL                        | 13.0 $\mu$ F      | 15 $\mu$ h       |

Note 1. These circuits are being phased out and are not recommended for new designs.

## Disclaimer

Quartzdyne, Inc. does not represent that its transducers are intrinsically safe. The information contained herein may be helpful, however in designing intrinsically safe systems incorporating Quartzdyne transducers. To the best of our knowledge, the information contained in this document is correct as of the date of publication. This document may be revised without notification to add additional information, make corrections where appropriate, or to reflect design changes. The system designer has sole responsibility for compliance with local regulations.

Milton Watts  
VP, Engineering  
Quartzdyne, Inc.  
9 September, 2002