

Level transmitter with PVDF transducer



Advantages / Benefits

- ▶ Non-contact, continuous measurement with 4-20 mA and 10 amp relay output
- ▶ Measurement range from 15 - 750 centimeters
- ▶ All plastic construction with PVDF transducer and G 2 mounting threads
- ▶ Digital display indicates level in centimeter value
- ▶ Easy-Cal™ push button calibration for offset, span and relay set points
- ▶ Echo-Map™ signal return logic profiles the tank to disregard false echoes
- ▶ Fail-safe relay logic provides maximum process safety in the event of both power or signal loss
- ▶ Signal invert, relay latch and time delay

Application

Level Measurement

Liquid or slurries in bulk storage, day tank or process vessels.

Enclosed Tank Environments

The gas reference tube and special calibration mode will compensate for the ongoing changes in gas density found within enclosed tanks.

Outputs

The non-isolated, three-wire 4-20 mA output provides level measurement.

The 10 amp, SPDT relay may be configured as an alarm or latched for automatic fill or empty operation.

Interface

Controller

Type 8620 continuous rail mount controller

## Principle of Operation

An ultrasonic sound wave is pulsed eight times per second from the base of the transducer. As the sound wave moves downward into the vessel, it reflects against the process material and returns to the transducer. The microprocessor based electronics then measures the time between the signals

generation and receipt, and relates this figure to the distance between the transmitter and the process material. Advanced signal processing techniques, including temperature compensation and Echo-Map™ tank logic ensure the integrity of echo signal returns. The ultrasonic level transmitter is used for continuous,

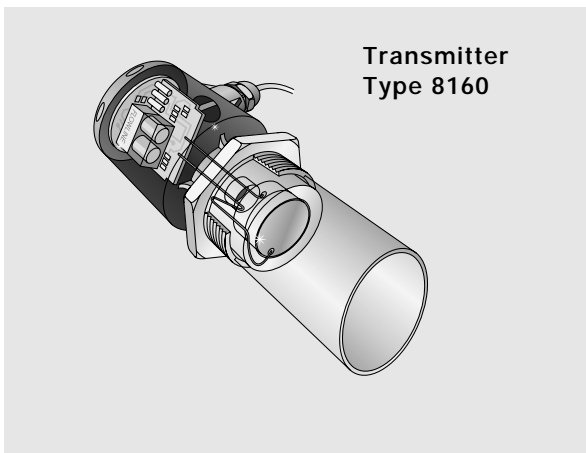
non-contact measurement of liquids and slurries.

## Faceplate



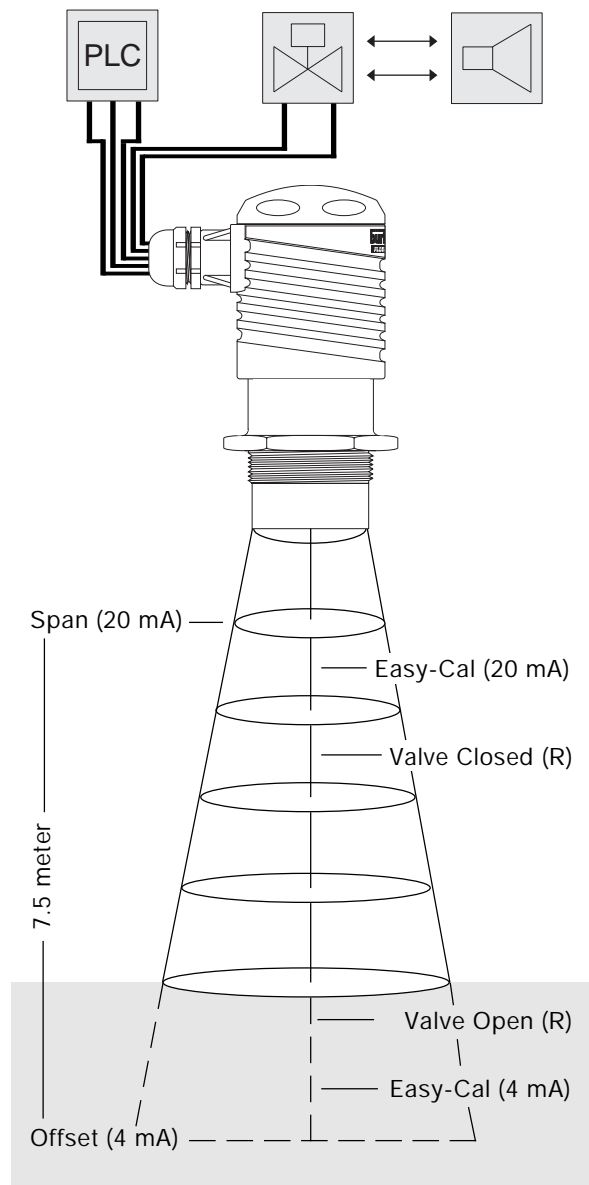
The transmitter faceplate features a digital display with Easy-Cal™ push button calibration for offset, span, relay, signal invert and time delay set points.

## Gas Reference Tube



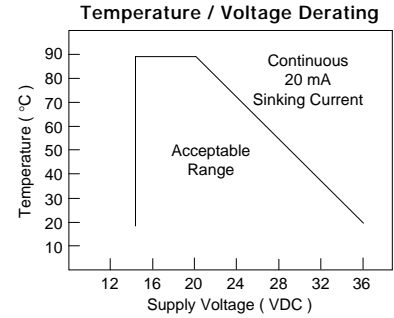
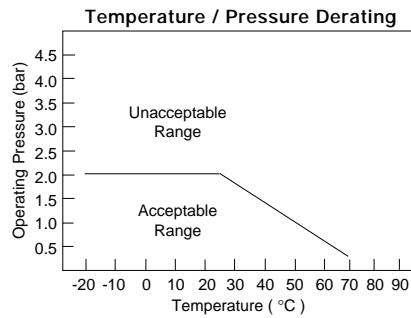
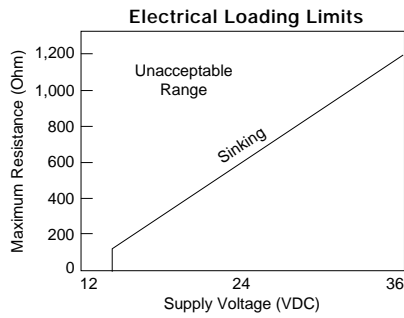
The optional reference tube and special calibration mode are used to compensate for ongoing changes in gas density within enclosed tank environments.

## Easy-Cal™

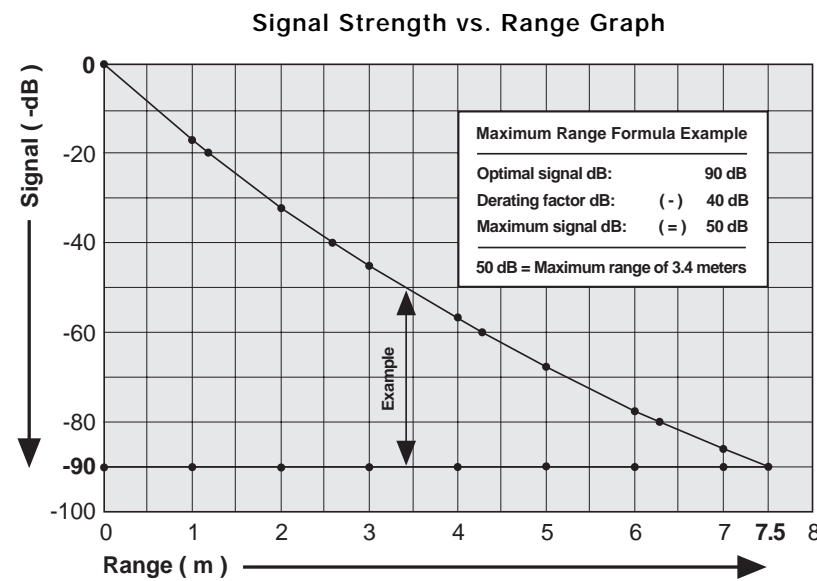


Easy-Cal™ push button calibration provides a fast and simple method to adjust the Echotouch™ measurement span and apply the relay set points.

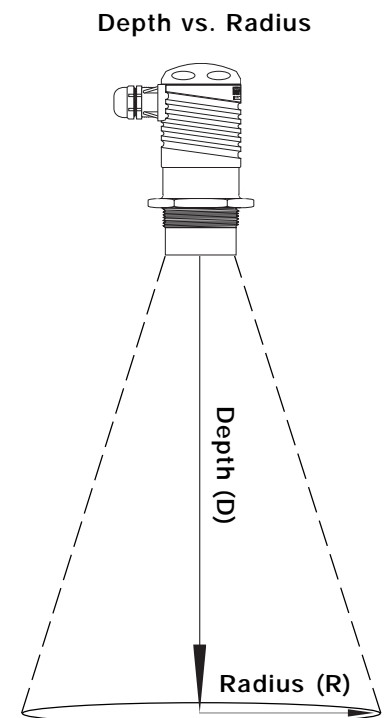
## Derating Graphs



## Measurement Range



## Beam Cone Radius



Centimeter			
(D)	(R)	(D)	(R)
25	4.2	400	37.0
50	6.4	425	39.2
75	8.6	450	41.4
100	10.8	475	43.6
125	13.0	500	45.7
150	15.1	525	48.0
175	17.3	550	50.1
200	17.5	575	52.3
225	21.7	600	54.5
250	23.9	625	56.7
275	26.1	650	58.9
300	28.2	675	61.1
325	30.4	700	63.2
350	32.6	725	65.4
375	34.8	750	67.6

### Maximum Range Formula

With an optimal signal return strength of 90 decibels, the ultrasonic transmitter has a maximum measurement range of 7.5 meters. Although various application factors can reduce the overall signal return strength and shorten the total range of the transmitter. Such derating factors include: (1) significant air to liquid temperature differential; (2) beam cone interference such as fill streams, piping or mixers; and (3) liquid surface tension. To estimate the maximum range of the transmitter in your application, apply the maximum range formula ( 90 dB - the sum of the derating factor dB = maximum signal dB ) to the graph above. Refer to the maximum range formula example.

### Derating Factors

**Air / Liquid Temperature dB**  
 00 - 15 degrees C.....0  
 16 - 43 degrees C.....5-10  
 44 - 60 degrees C.....10-20

Factor: \_\_\_\_\_

**Beam Cone Interference dB**  
 Outside beam cone.....0  
 Edge of beam cone.....5-10  
 Inside beam cone.....10-20

Factor: \_\_\_\_\_

**Liquid Surface Tension dB**  
 Calm surface.....0  
 Agitated surface.....5-10  
 Wavy surface.....10-20

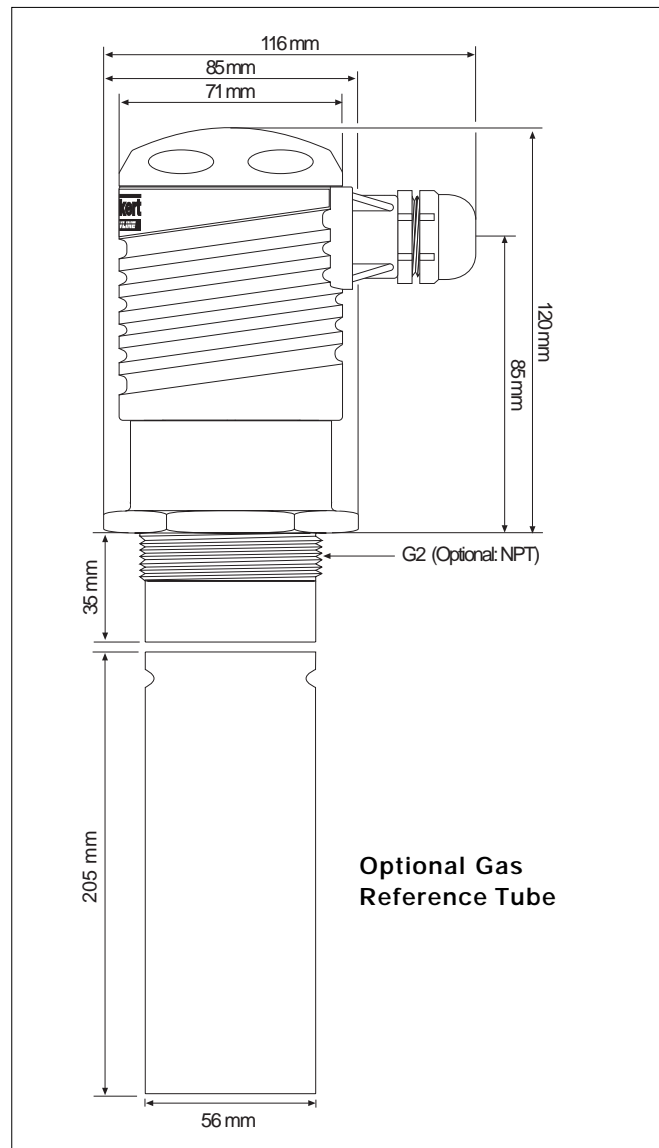
Factor: \_\_\_\_\_

**Total derating factor dB:** \_\_\_\_\_

## Technical Data

Range:	7.5 meters
Accuracy:	± 0.25% of full Span
Resolution:	± 3 mm
Frequency:	50 kHz
Pulse rate:	8 pulses per second
Full beam width:	8 degrees conical
Blocking distance:	15 cm from transducer base
Display type:	Four segment LED
Display units:	Centimeters or inches
Supply voltage:	14-36 VDC
Current consumption:	200 mA maximum
Current flow:	Sinking (Sourcing: optional)
Signal output:	4-20 mA, 12-36 VDC
Signal invert:	4-20 mA or 20-4 mA
Offset adjustment:	Easy-Cal™ push button (4 mA)
Span adjustment:	Easy-Cal™ push button (20 mA)
Relay output:	10 amp, SPDT (Form C)
Switch voltage:	240 VAC, 120 VDC (resistive)
Relay set point(s):	Easy-Cal™ push button (relay)
Relay time delay:	Slow-2,5 minutes Fast-30 seconds
Relay indication:	LED for ON / OFF status
Contact resistance:	30 milliohms maximum
Fail-safe diagnostics:	Relay automatically inverts to the pre-determined NO / NC position
Temperature range:	-20 to 60 °C.
Temp. compensation:	Automatic over entire range
Pressure rating:	2 bar at 25 °C.
Transducer material:	PVDF
Enclosure material:	PP, flame retardent (U.L.94VO)
Enclosure rating:	IP65 (NEMA 4X)
Cable gland:	PG13 liquid tight gland
Mounting threads:	G2 (Optional: NPT)
Gasket material:	Viton

## Dimensions



## Ordering Chart for Ultrasonic Level Transmitter Type 8160

Description	Order-No.
Transmitter Type 8160 with G2 mounting thread	417 387 Q

## Ordering Chart for Accesories

Description	Order-No.
Viton gasket	417 396 R
Reference tube	417 407 M
Side Mount Bracket	417 075 J