

dBi Series Transducers

HART and Profibus PA Ultrasonic Transducers for Level Measurement

Pulsar's new range of self-contained, intelligent non-contacting ultrasonic level measurement transducers make use of HART and Profibus PA communications protocols to make plant integration simple. Pulsar's dBi Series Transducers are self-contained and are programmed either via a PC or through a proprietary calibration unit. With a choice of four units with 3,6,10 or 15m range (10, 20, 33 or 49 ft), Pulsar's Intelligent Transducers take installation simplicity, convenience and accuracy to a new level.



HART
COMMUNICATION PROTOCOL

PROFI
PROCESS FIELD BUS
BUS

pulsar
PROCESS MEASUREMENT

dBi Series Transducers

Intelligent Transducers for Level Measurement

Features

- Self-contained
- Two wire
- Solids or liquids applications
- HART or Profibus PA
- DATEM digital echo processing
- Various mounting options
- ATEX Ex mb Zone 1 standard. Option of ATEX Zone 0 I.S.
- Use standard programming tools or Pulsar's dedicated PC system

Self-contained non-contacting ultrasonic level measurement featuring a choice of HART or Profibus PA communications protocols, Pulsar's Intelligent Transducers set new standards in communications and convenience for reliable plant and field-based level measurement systems.

Pulsar's dBi Series Transducers are low-power devices featuring Pulsar's world-leading DATEM echo processing power for robust and reliable measurement from 125mm through to 15m (5 inches to 49 feet) depending on the unit chosen. Integration with plant systems and other equipment is straightforward. dBi Transducers support GSD, EDDL, FDT/DTM (available on request), making it easy to configure and calibrate the devices using standard PLC/HMI industry protocols, Pulsar's own software or on site multi-drop set up, providing options to program the transducers using either a standard interface or using Pulsar's programming parameters.

Intelligent Transducers are available as HART or Profibus PA devices in a range of models, and can be specified in various formats to suit the application, for example flanged, PTFE coated for corrosive applications, fitted with foam face or submergence shield and with threaded noses for easy installation. For solids applications, Intelligent Transducers are compatible with Pulsar's aiming kit for the best possible results and to measure right down to the draw-off point of a bin or silo.

Intelligent Transducers provide on-board conversion for volume with a number of pre-set tank shapes, plus the ability to curve-fit to non-standard shapes. The output from the unit can represent distance, level, space, or volume.

Echo Processing

Both Transducer types feature Pulsar's world-leading DATEM echo processing software. DATEM, Digital Adaptive Tracking of Echo Movement, allows the system to zero in on the echo from true target and follow it as it moves up and down the vessel, ignoring the stationary echoes from other elements in the measurement path. Stanchions, chains and ladders, that cause many ultrasonic systems to fail, are no barrier to Pulsar equipment, allowing Pulsar Intelligent Transducers to give reliable and accurate measurement in applications where other manufacturers' equipment would not work.



dBi Transducers with HART protocol



Pulsar's dBi Series Intelligent Transducers featuring HART are typically programmed either via one of the several hand-held calibrators available, or via PC interface. Measurement is signalled either via 4-20mA proportional to the measured value or using the HART protocol, modulated tones on the 4-20mA (1200/2200hz). HART equipped transducers are approved to ATEX Zone 1 (Ex mb) without requiring the use of a barrier. ATEX Zone 0 (Ex ia) optional, requires suitable barrier

dBi Transducers with HART are loop powered (3.8 - 22mA), IP68 for outdoor applications, temperature compensated for increased accuracy and make use of the HART Version 7 protocol, with individually addressable transducers. Alternatively, they can be programmed as stand-alone devices using a hand-held calibrator or PC to operate as low-power measuring devices, using HART as the mechanism for data collection. First boot is approximately 8 seconds, if a typical 15 minute boot interval is used, this becomes approximately 3.5 seconds. The dBi Transducers with HART will convert level to volume, with a library of typical tank shapes or a 16-point curve fit.

HART Registration Number: L2-06-1000-153



Programming

To set up dBi transducers with HART protocol using a PC you require the following:

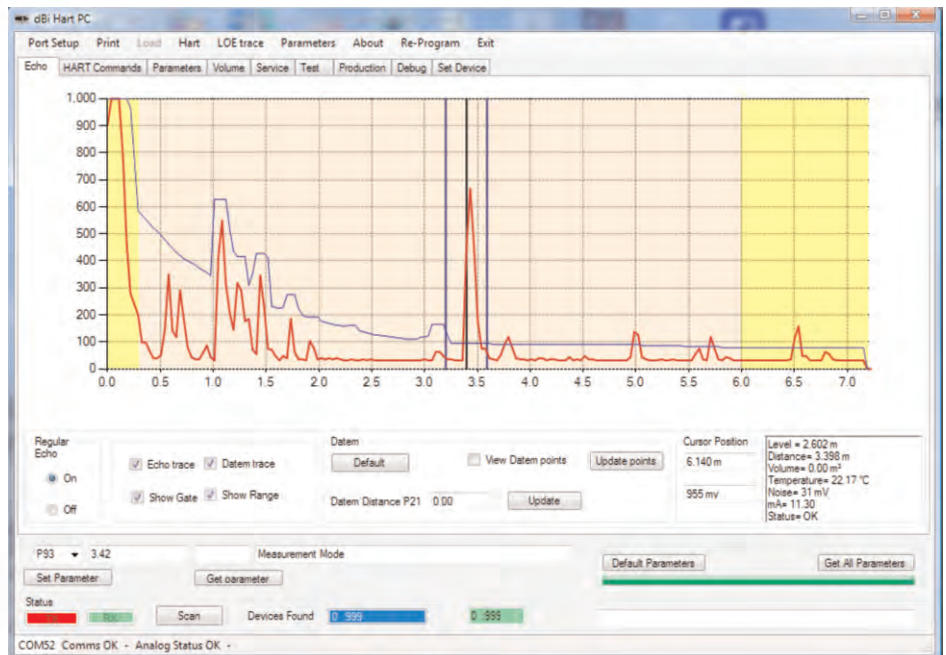
A HART Modem and 250 ohm resistor: A proprietary HART modem can be used, or Pulsar can supply the Pulsar HART Modem that is fully compatible with dBi transducers. The resistor is placed in series with the power of the transducer to provide resistance during the set-up process.

PC Software:

If you require set-up only: Pulsar's HART PC Lite free software is bundled with the dBi transducer or is available for download from www.pulsar-pm.com (click the 'support software' tab and download), and provides everything required for efficient set-up of the dBi transducer.

For complete control over set-up, installation, echo profile viewing, cloning and troubleshooting purchase Pulsar PC Suite, which includes HART PC along with other major Pulsar software packages. PC Suite is available as a free download for evaluation. Purchase a Pulsar 'dongle' to authorise continued usage after the evaluation period (see separate PC Suite literature for more details).

PULSAR HART MODEM



ECHO TRACE SHOWING DATEM SIGNAL PROFILING

dBi Transducers with Profibus PA protocol



Pulsar use the high data speeds available with Profibus PA to provide full digital communications from a DITEM-enabled transducer. Complying fully with communications standards IEC 61158 and Profibus PA profile 3.0.2, dBi Series Transducers with Profibus provide very high resolution to give millimetre accuracy and a rapid response time of approximately 1 second.

Pulsar's dBi Transducers use Profibus PA Profile 3.0.2 with a low power consumption. Fixed current at 20mA. Fully potted to IP68 for outdoor applications. dBi Transducers are temperature compensated for increased accuracy and offer volume conversion to a variety of standard tank shapes or 16-point curve fit. Supports GSD, EDDL and FDT/DTM drivers.

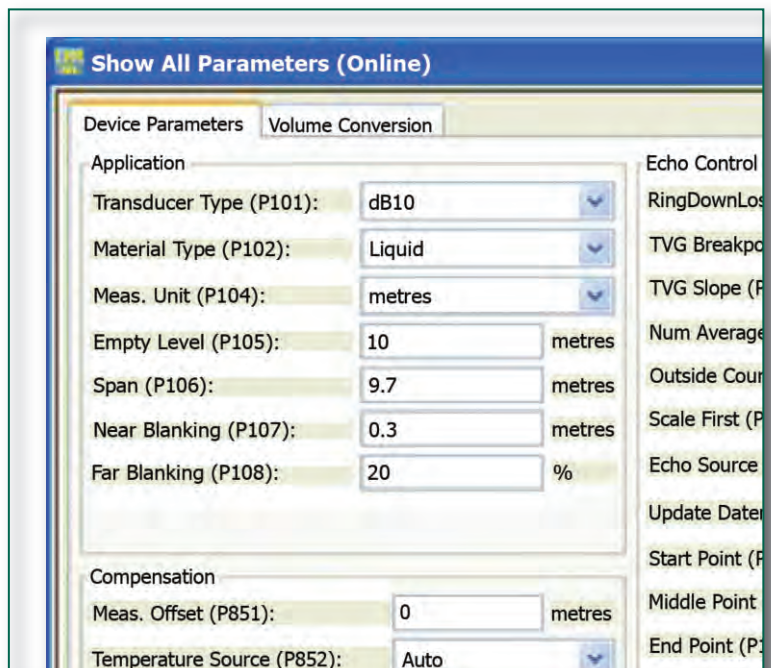
Programming

Using PLC/HMI with Profibus network that: a) supplies GSD Version 3.0 with pre-defined parameter blocks in cyclic or non-cyclic modes; b) supplies EDDL to provide full support for acquiring/logging of echo traces, diagnostics and full maintenance I&M functions according to IEC 61804-3 standards; c) supplies (on request) FDT/DTM direct to HMI software to provide enhanced diagnostic/commissioning capabilities.

Using Pulsar PC Software: Using Pulsar proprietary PC software with USB powered PA modem. The transducer can be operated and is fully functional from a laptop or desktop PC without an additional power supply, providing easy set-up.



PULSAR PROFIBUS MODEM INCLUDES SOFTWARE



ALL PARAMETERS VISIBLE AT A GLANCE (PARTIAL SCREEN SHOWN)

Standard Options

The dBi transducer range is available with the same set of options that have made the standard dB series so popular. dBi transducers are available with a host of mounting options: nose threaded or rear threaded, flange-mounted, faced with chemical resistant PTFE, or PVDF bodies, or fitted with a submergence shield. See the Transducer section in the main catalogue for more information or check out the Pulsar Process Measurement website. Pulsar's mounting brackets make installation easy, and the Aiming Kit helps in solids applications to direct the transducer at the draw-off point of the silo or bin.



Technical Specification: dBi Transducers

COMMON FEATURES			
Weight:	dBi3: 1kg (2.2lbs), dBi6: 1.2kg (2.7lbs), dBi10, 1.3kg (2.9lbs), dBi15: 1.4kg (3.1lbs)		
Dimensions & Mountings:	dBi3: 77mm dia x 135mm high (3 x 5.32 inch). Rear thread 1" BSP/NPT dBi6 & dBi10: 86mm dia x 121mm high (3.38 x 4.75 inch). Rear thread 1" BSP/NPT dBi15: 86mm dia x 135mm high (3.38 x 5.32 inch). Rear 1" BSP/NPT		
Performance Characteristics: (NB beam angles at -3dB. All beam angles are inclusive but give an effective beam angle of <3° on Pulsar controllers)	dBi3:	range 0.125 - 3m (5 inch to 10 feet) Resolution Accuracy	frequency 125kHz beam angle <10° 0.5mm (0.02 inch) 2mm (0.08 inch)
	dBi6:	range 0.3 - 6m (1 foot - 20 feet) Resolution Accuracy	frequency 75kHz beam angle <10° 1mm (0.04 inch) 4mm (0.16 inch)
	dBi10:	range 0.3 - 10m (1 foot - 33 feet) Resolution Accuracy	frequency 50kHz beam angle <10° 1mm (0.04 inch) 2mm (0.08 inch) 6mm (0.24 inch) up to 6m (20 ft) range over 6m range
	dBi15:	range 0.5 - 15m (20 inch - 49 feet) Resolution Accuracy	frequency 41kHz beam angle <10° 1.5mm (0.06 inch) 6mm (0.24 inch) 10mm (0.39 inch) up to 10m (33 ft) range over 10m range
Housing material:	Valox 357 PBT (Polybutylene terephthalate)		
Temperature Compensation:	Internal temperature sensor, +/- 0.5°C/F		
Transducer cable requirements:	Twin screened. Integral cable length 5, 10, 20 or 30m		
Operating temperature range:	-40°C to +80°C process temperature (-40°F to 176°F)		
Ingress Protection:	IP68 to BS EN 60068-2-17:1995 and BS EN 60529 (Nema 6P available)		
Hazardous Area Approval:	ATEX; Ex mb Zone 1 standard, Ex ia Zone 0 optional (Ex ia pending on PA version)		
dBi TRANSDUCERS WITH HART PROTOCOL:			
Digital communications:	FSK (Frequency Shift Keying) modulation of 1200-2400Hz		
Power :	10-28V dc, 4-20mA Average current 12mA. Typical wake-up power consumption on 15 minute cycle with average current 35µA		
dBi TRANSDUCERS WITH PROFIBUS PA:			
Power :	Bus powered, per IEC 61158-2;20mA (general purpose or I.S. version) 20mA 18-24Vdc		
Update time:	1-2 seconds at 20mA current loop		
Programming:	Patent Pending PA modem; Simatic PDM, EDDL, FDT/DTM. PC interface 2-wire loop powered from PC or laptop. No external power supply required.		
Outputs:	Profile 3.0.2, Class A with I&M functionality		



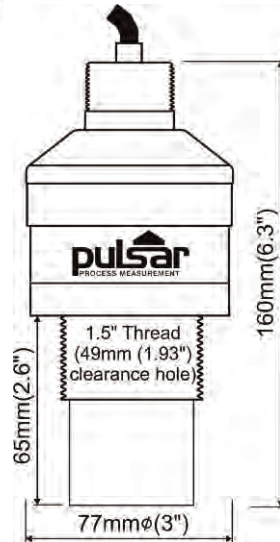
dBi3



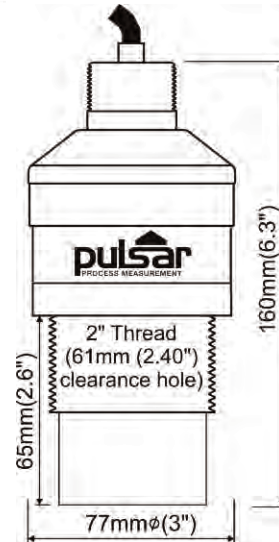
dBi6/10



dBi15



dBi3/6 front thread version



dBi10 front thread version

Pulsar® Process Measurement Ltd.

Cardinal Building
 Enigma Commercial Centre
 Sandy's Road
 Malvern
 Worcestershire
 WR14 1JJ
 England

Tel: +44 (0) 1684 891 371
 Fax: +44 (0) 1684 575 985
 Email: info@pulsar-pm.com

Pulsar® Process Measurement Inc.

P.O. Box 5177
 4565 Commercial Drive
 Suite 105
 Niceville
 FL 32578
 USA

Tel: +1 850 279 4882
 Fax: +1 850 279 4886
 Email: info.usa@pulsar-pm.com

www.pulsar-pm.com

UK AWARDS/CERTIFICATIONS



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Pulsar Process Measurement Limited operates a policy of constant development and improvement and reserves the right to amend technical details as necessary

Literature number: dBi/MHA/03/9-12