



Intelligens

Data Logger

Intelligens is a data logger that is specifically engineered for the rigours of Waste Water applications.

It is compatible with a number of sensors, depending on what type of data need to be acquired. The device itself is IP68, making it fully water proof under pressurised immersion.

Intelligens flexibility and water proof design, when combined with its safety features in explosive environments make it ideal for use in applications such as combined sewer overflows, general sewer monitoring, storm drains and storage tanks, as well as in flood warning systems.



Key Features and Benefits

- **Safe for use in explosive environments:** Intrinsically safe ATEX/IEC Ex Zone 0.
- **Remote communications:** Data transmitted using GPRS & 3G telemetry (optional). Unit can also be remotely re-programmed.
- **Flexible sensor integration:** Intelligens is compatible with a wide variety of sensors & inputs.
- **Online data delivery and viewing:** Compatible with DataGate and HWM-Online.
- **Intelligent:** Unit comes with advanced data logging & alarm regimes.
- **Long term monitoring:** 5+ years' logger battery life.
- **Fully waterproof:** Unit is rated IP68, making it water proof when submerged.
- **Easy maintenance:** User replaceable SIM and battery, along with notifications of system health. (Non-ATEX applications only).
- **Anti-corrosion:** Unit is not susceptible to corrosion, including its communications antenna.
- **Upgradable:** Unit can be configured and its firmware upgraded remotely.

Applications

Intelligens is truly flexible, making it an ideal datalogger for hazardous utility network applications. With the ability to interface with many sensors, as well as optional external sensor input/batteries, Intelligens can be tailored to a specific user need.

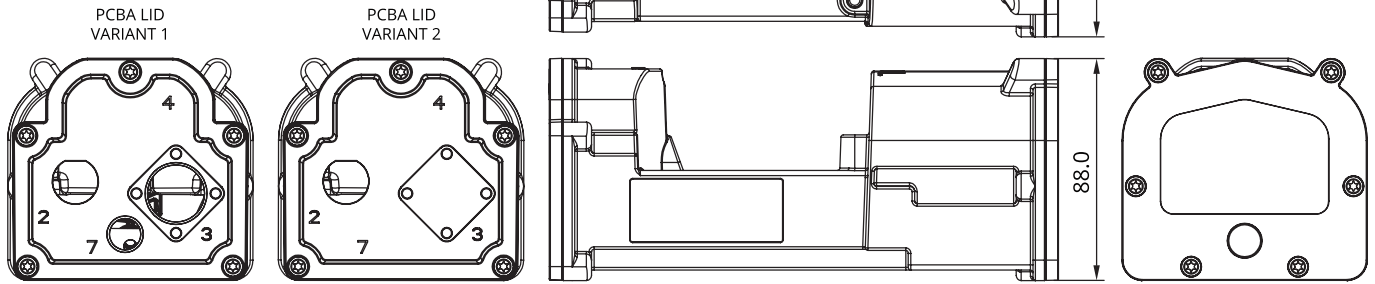
Waste water applications include combined sewer overflows, rainfall monitoring, pump run time monitoring, irrigation and many others.

Intelligens offers additional flexibility, through installation of ESI and ESIB accessories, that allows for a suite of sensors to be deployed.

MONITORING ASSETS, DELIVERING DATA, BRINGING CONTROL

Intelligens

Data Logger



Sensor Input

mV	Example: Pressure sensor for level measurement
Serial Digital Interface	Example: Conductivity measurement
4- 20 mA	Example: Mems tilt transmitter, radar sensor
Digital	Example: Float switch, rain gauge

Communication

Internal cellular modem	GPRS to HWM DataGate or customer specific server. SMS Backup Quad band modem Optional 3G Frequent Dial-In Available
Accelerated dial In	Dial-in rate is increased if alarm situation is triggered. Logger can accelerate dial-in at alarm level for multiple applications – including SonicSens, Flow, Pressure, and other alarmed sensors.

Control Output ports

Digital	2 independent configurable outputs.
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Logger Features

Rating	ATEX/IEC certified to Zone 0
Memory	Up to 2 million readings. (Larger memory is available as a build specification)
Firmware	Safe field / local and remote upgradable Firmware
Sampling rate	Variable sample rate 1s to 24hrs, accelerating on alarm.
Alarms logger ID	Multiple Lower/Upper Limit, Min Flow, Rate Of Change, Channel Difference, In/Out of Band alarm types. Accelerated dial-in on alarm.
Clock	On board 24 hour synchronized real time clock with date facility
Secondary channel	Log fast data, average minimum, average maximum or event duration
Dimensions (mm)	200H x 97W x 88D
Weight	1kg
Operating temp	-20°C to +60°C (-5°F to +140°F)
Ingress protection	IP68
Power	User Replaceable battery pack operational for 5 years + under standard operating conditions, complete with low battery alarm. External Power optional available with a suitable ATEX certified power source
External power input	External battery pack for non-ATEX applications.



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Sonic Sens

Ultrasonic Sensor

The SonicSens ultrasonic sensor is ideal for measuring water level, as part of a remote monitoring/telemetry system.

Using an ultrasonic pulse to measure level, the device is not in contact with its environment. This stops the unit from becoming contaminated and lowers maintenance requirements. It is also low power, allowing it to operate for extended periods of time.

When combined with an Intelligens logger, the combination of non-contact, low power and remote telemetry make the SonicSens ideal for remote or challenging installations.



Key Features and Benefits

- **Intelligent sensor:** Compatible with the advanced Intelligens telemetry data logger.
- **Dependable:** Alarm out on echo loss so user knows when the unit is operational.
- **Low maintenance:** Self-diagnostic for functionality & remotely reprogrammable.
- **Flexible operating range:** Unit can cover 300 mm to 2.5 m or 900 mm to 5 m.
- **Long term monitoring:** 5+ years' sensor battery life.
- **Fully waterproof:** Unit is rated IP68 making it water proof when submerged.
- **Superior system connectivity:** Second channel enables connection to other devices.
- **Simple installation:** Multiple pre-set options in software, including automatic level/flow conversion.
- **Adapted for ATEX:** Explosion proof sensor with non ATEX option also available.
- **Remotely programmable:** Control through Intelligens data logger.
- **Accurate:** Temperature compensation removes impact of environmental factors on measurement.
- **Flexible:** Multiple alarm thresholds allow for monitoring of water level at a variety of heights.

Applications

The sensor capabilities of the SonicSens make it a standard sensor in many different applications.

As a primary sensor SonicSens monitors the level within a water channel, where its accuracy and dependability make it ideally suited.

It is also highly useful as a secondary sensor in flow monitoring applications, where this output is combined with velocity to generate flow information.

Installation environments for the product include combined sewer overflow surveying, flood prediction and Inflow & Infiltration studies.

MONITORING ASSETS, DELIVERING DATA, BRINGING CONTROL

Sonic Sens

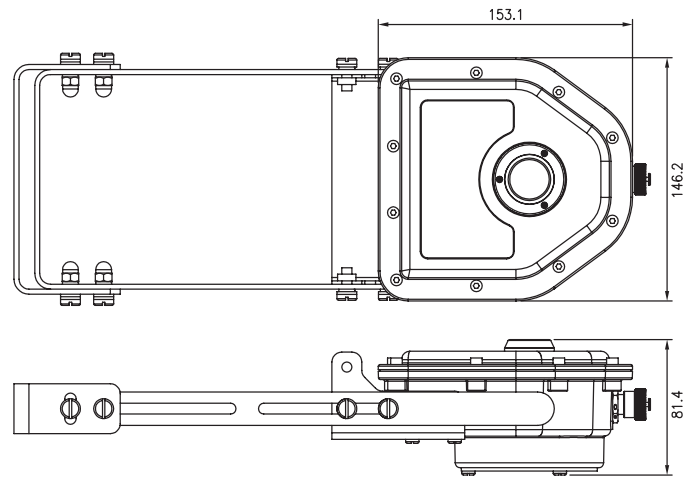
Ultrasonic Sensor

Logger Features

Rating	ATEX/IEC certified to Zone 0
Memory	Up to 2 million readings
Firmware	Safe field / local and remote upgradable Firmware
Sampling rate	Variable sample rate 1s to 24hrs, accelerating on alarm.
Alarms logger ID	Multiple Lower/Upper Limit, Min Flow, Rate Of Change, Channel Difference, In/Out of Band alarm types. Accelerated dial-in on alarm.
Clock	On board 24 hour synchronized real time clock with date facility
Secondary channel	Log fast data, average minimum, average maximum or event duration
Dimensions (mm)	200H x 97W x 88D
Weight	1kg
Operating temp	-20°C to +60°C (-5°F to +140°F)
Ingress protection	IP68
Power	User Replaceable battery pack operational for 5 years + under standard operating conditions, complete with low battery alarm. External Power optional available with a suitable ATEX certified power source
External power input	External battery pack for non-ATEX applications.

Communication

Internal cellular modem	GPRS to HWM DataGate or customer specific server. SMS Backup Quad band modem Optional 3G Frequent Dial-In Available
Accelerated dial In	Dial-in rate is increased if alarm situation is triggered. Logger can accelerate dial-in at alarm level for multiple applications – including SonicSens, Flow, Pressure, and other alarmed sensors.



Sensor Input

mV	Example: Pressure sensor for level measurement
Serial Digital Interface	Example: Conductivity measurement
4- 20 mA	Example: Mems tilt transmitter, radar sensor
Digital	Example: Float switch, rain gauge

Ultrasonic Sensor

Ultrasonic Measurement	Measurement Range: 300mm to 2.5m or 900mm to 5m. For higher ranges, please enquire to your HWM representative. Resolution 1 mm (1/25"). Built in temperature compensation Accuracy in air 0.25% of target range Beam Angle 10 deg at -3dB boundary Ultrasonic echo processing. Operating temperature -20 to +60°C (-5 to +140°F) Average power consumption 100 micro Amps at 5 minute sample rate
Construction	Potted ABS plastic enclosure, IP68 submersible
Dimensions/ Weight	Box Size: 140L x 80W x 67D mm (5.5"L x 3.1"W x 2.6"Deep) Aluminum adjustable bracket 170 to 210mm (sensor to side mount) Sensor weight, including bracket: 1.3 Kg (2.8 lb)
Connection	Serial communications and power from logger via single cable fitted with 4 pin Military connector



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dBi Series Transducers

Intelligent Transducers for Level Measurement

Features

- Self-contained
- Two wire
- Solids or liquids applications
- HART Protocol
- DATEM digital echo processing
- Various mounting options
- ATEX Ex mb IIC T4 Zone 1 standard. Option of ATEX Zone 0 I.S.
- Use standard programming tools or Pulsar's dedicated PC system
- FM/FMC approval

Self-contained non-contacting ultrasonic level measurement featuring HART communications protocol, 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 are easy to configure and calibrate 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 feature HART 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

dBi HART transducers 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

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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 IIC T4 / Ex mb IIIC T130°C) without requiring the use of a barrier. ATEX Zone 0 (Ex ia IIC T4 / Ex ia IIIC T130°C) 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

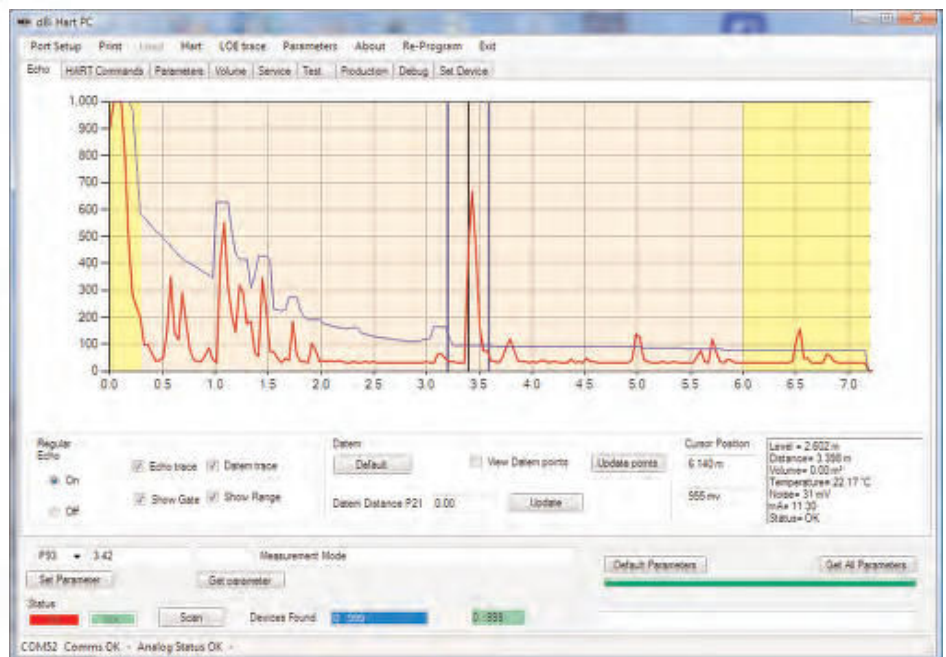
To set up dBi transducers with HART protocol using a PC you require the following:

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' tab, then 'downloads' and 'software'), 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).



ECHO TRACE SHOWING DATUM SIGNAL PROFILING

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 134mm high (3 x 5.31 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" thread BSP/NPT																																																
Performance Characteristics: (NB beam angles at -3dB). All beam angles are inclusive but give an effective beam angle of <3°).	<table border="0"> <tr> <td>dBi3:</td> <td>range 0.125 - 3m (5 inch to 10 feet)</td> <td>frequency 125kHz</td> <td>beam angle <10°</td> </tr> <tr> <td></td> <td>Resolution 1mm (0.04 inch)</td> <td></td> <td></td> </tr> <tr> <td></td> <td>Accuracy ±0.25% of the measured range or 6mm whichever is greater</td> <td></td> <td></td> </tr> <tr> <td>dBi6:</td> <td>range 0.3 - 6m (1 foot - 20 feet)</td> <td>frequency 75kHz</td> <td>beam angle <10°</td> </tr> <tr> <td></td> <td>Resolution 2mm (0.08 inch)</td> <td></td> <td></td> </tr> <tr> <td></td> <td>Accuracy ±0.25% of the measured range or 6mm whichever is greater</td> <td></td> <td></td> </tr> <tr> <td>dBi10:</td> <td>range 0.3 - 10m (1 foot - 33 feet)</td> <td>frequency 50kHz</td> <td>beam angle <10°</td> </tr> <tr> <td></td> <td>Resolution 3mm (0.12 inch)</td> <td></td> <td></td> </tr> <tr> <td></td> <td>Accuracy ±0.25% of the measured range or 6mm whichever is greater</td> <td></td> <td></td> </tr> <tr> <td>dBi15:</td> <td>range 0.5 - 15m (20 inch - 49 feet)</td> <td>frequency 41kHz</td> <td>beam angle <8°</td> </tr> <tr> <td></td> <td>Resolution 5mm (0.2 inch)</td> <td></td> <td></td> </tr> <tr> <td></td> <td>Accuracy ±0.25% of the measured range or 6mm whichever is greater</td> <td></td> <td></td> </tr> </table>	dBi3:	range 0.125 - 3m (5 inch to 10 feet)	frequency 125kHz	beam angle <10°		Resolution 1mm (0.04 inch)				Accuracy ±0.25% of the measured range or 6mm whichever is greater			dBi6:	range 0.3 - 6m (1 foot - 20 feet)	frequency 75kHz	beam angle <10°		Resolution 2mm (0.08 inch)				Accuracy ±0.25% of the measured range or 6mm whichever is greater			dBi10:	range 0.3 - 10m (1 foot - 33 feet)	frequency 50kHz	beam angle <10°		Resolution 3mm (0.12 inch)				Accuracy ±0.25% of the measured range or 6mm whichever is greater			dBi15:	range 0.5 - 15m (20 inch - 49 feet)	frequency 41kHz	beam angle <8°		Resolution 5mm (0.2 inch)				Accuracy ±0.25% of the measured range or 6mm whichever is greater		
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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)																																																
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 hour																																																
Hazardous area approval:	ATEX; Ex mb IIC T4/ IIC T130°C Zone 1 standard, Ex ia IIC T4/ IIIC T130°C Zone 0 optional																																																
Output:	4-20mA resolution 1µA																																																

MicroFlow-i

Non-Contacting Loop Powered Liquid Velocity Sensor

MicroFlow-i is a non-contacting low power consumption microwave liquid velocity sensor. It can be installed as an individual sensor or used to provide HART communication protocol or a 4-20mA loop powered signal into a system. It's extremely low power consumption makes it the ideal velocity solution for sewerage network monitoring (CSO) and all remote installations where mains power is unavailable.



Technical Specification:

PHYSICAL:

Sensor body dimensions:	Diameter 90mm x height 140mm (3.54in x 5.51in)
Sensor body weight:	Nominal 1kg (2.2lbs)
Sensor body material:	Valox 357
Transducer cable extensions:	2-core screened
Maximum separation:	Up to 1000m (3280ft)
Mounting connection:	Via 1" BSP back mounted thread or 20mm via supplied adaptor Optional mounting bracket available from Pulsar
Mounting angle:	45° optimum and mounted at the centre line of the channel with a clear uninterrupted view

ENVIRONMENTAL:

Enclosure protection:	IP68
Max. and min. temperature (electronics):	-20°C to +60°C (-4°F to +140°F)

APPROVALS:

CE & radar approvals:	Listed in the Certificate of Conformity within the manual .
ATEX approval:	Ex II 1 G D, Ex ia IIC T4 Ga, Ex ia IIIC T135°C Da (Directive 2014/34/EU)

PERFORMANCE:

Velocity range:	0.2 - 6m/s (0.66 - 19.7ft/s)
Operational range:	Up to 3m height
Accuracy:	The greater of ±1.5% or 0.05m/s (0.16ft/s)
Optimum installation:	Install at an angle of 45° in line with the flow. More information is provided within the manual - see the 'Locating the MicroFlow-i sensor' section
Max. channel width per sensor:	1.5m (4.92ft)
Radar:	K-Band (ISM)
Transmitter power:	<15 dBm
Beam width:	20° inclusive
Wake-up time:	Typically 4 seconds (warm <12 hours from last start-up)

OUTPUTS:

Communication:	HART compatible, 4-20mA loop powered
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PROGRAMMING:

PC programming:	MicroFlow-i HART PC
Programming security:	Via passcode
Programmed data integrity:	Via non-volatile memory
PC setup and monitoring software:	Compatible with Windows 7/8/10

SUPPLY:

Operating voltage:	10 - 28Vdc
Power consumption:	Start-up = 20mA, Average current = 60µA per hour when one velocity measurement is performed every 15 minutes