

Product Guide



Level and Flow Measurement

Ultra Range

Ultra 3, Ultra 5
and UltraTwin

pulsar

Ultra Range

Ultra 3

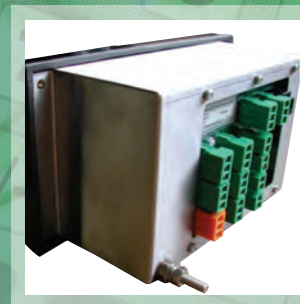
Ultra sophistication in a smart package, Ultra 3 combines reliable non-contacting ultrasonic level and volume measurement, high specification pump control and open channel flow measurement to international standards. Three control or alarm relays, optional data logging, Pulsar's world-leading DATEM echo processing software and a choice of wall, fascia, panel or 19" rack mounting.

Ultra 5

Ultra 5 continues where Ultra 3 leaves off, maintaining the same reliability, flexibility and menu-driven programming simplicity, with two extra relays, extra features for advanced pump control, differential level and open channel flow, plus the option of RS485 digital communication and 4-20 mA input.

UltraTWIN

Two independent ultrasonic systems in one unit. Each channel is user-configurable to operate in any combination of: a full function open channel flow monitor calculating flow rate to BS ISO standards, a pump control system or as a level and volume monitoring unit for liquids or solids, calculating volumes and providing alarms. UltraTWIN features six relays configurable for either channel as well as four digital inputs and 2 x 4-20mA outputs.



Ultra Range:

Ultra 3

Features

- Solids or liquids level measurement
- Choice of wall, panel, fascia or 19" rack mount controllers
- RS232 standard with optional 485 Modbus and Profibus
- AC or DC supply as standard
- No special interconnection cable
- Up to 1000m separation
- Ultra Wizard easy set up
- Backlit display
- DATEM Software



PANEL MOUNT OPTION



19" RACK MOUNT OPTION

Panel and 19" rack mount versions are calibrated by means of an Infra-Red communicator or via Ultra PC software. One communicator can calibrate any number of controllers.

Ultra 3 combines several full-function, world-beating ultrasonic level measurement instruments into one. Pulsar engineers have created devices that can be simply configured by the user to provide top-drawer performance. Through the use of ULTRA WIZARD, an integrated high level software configuration tool, you choose your application and the Ultra unit leads you through the set-up process for that specific operation. Full control functions are available: open channel flow is calculated to BS ISO 1438 and 4359. Pump control features are built into Ultra 3, and an extensive set of volume calculations and linearisation facilities are available for a tank or silo level measurement task.

Ultra 3 benefits from DATEM, the world's most advanced echo processing software, for reliable level measurement.

Level

Perfect for the wide range of level measurement applications in solids and liquids found in the food, pharmaceutical, chemical, power generation and many more industries. In level measurement configuration, Ultra 3 has three control relays and a measurement range from 125mm to 40m.

Note: A 'modified' Ultra 3 controller will power the dB50 which is available as an option.

Volume

Ultra 3 features pre-programmed tank shape conversion for a wide variety of standard tank shapes including: cylindrical, rectangular, cone base, pyramid base, sloped base, horizontal including parabolic ended tanks and spherical. Unusual shapes are also accommodated through the 32 point linearisation function.

Open Channel Flow

Ultra 3 in open channel flow mode provides non-contacting, maintenance free flow measurement and control in a wide range of flumes and weirs by calculating flow from the measured head preceding a primary element. Flow calculation to BS ISO 1438 and 4359. Three control relays for control choices.

A data logging board is an optional extra with RS485 connection and large data log capability together with Profibus DP V0 and V1 or Modbus communications.

Pump control

Pulsar pump control units are used throughout the global water and waste industries. Ultra 3 gives you sophisticated pump control on changing level or rate of level change to provide:

- **Power on delay**, allows to delay switching on pumps when power resumes.
- **Pump start delay**, allows delay switching on pumps after another has started.
- **Fixed duty assist**
- **Fixed duty back up**
- **Alternate duty assist**
- **Alternate duty back up**
- **Duty back up and assist**
- **Service ratio duty assist**
- **Service ratio duty back up**
- **FOFO (alternate first on first off duty assist)**

Display:

- **8 digit on-board totaliser**
- **6 digit display of flowrate or head**
- **Bar indicator displaying head or flow**

I.S. Barrier Option

The Ultra 3 extends the capability to Zone 0 (certified EEx ia). A wall mount unit with 3 relays is available incorporating I.S. barriers in a single enclosure (235 x 184 x 120mm)



WALL MOUNT ULTRA 3 and 5

Ultra Range:

Ultra 5

Ultra 5 offers the ultimate flexibility in ultrasonic control and measurement. Like Ultra 3, Ultra 5 is user-configurable to measure level or volume, provide advanced pump control or measure open channel flow to BS ISO 1438 and 4359. Over and above the facilities offered by Ultra 3, Ultra 5 gives you the ultimate flexibility of: five assignable relays with extra alarm options such as pump efficiency; extra pump control functions including pump run-on and pump exercising; storm and aeration control; differential control using two transducers, the addition of further relays in OCM applications.

Ultra 5 benefits from DATEM, the world's most advanced echo processing software, for reliable level measurement.

Level

All the features of the Ultra 3 with 2 additional relays. Offers optional 4 - 20mA input for a pressure transmitter or similar.

Volume

All the features of the Ultra 3 with 2 additional control/alarm relays.

Pump control

Ultra 5 in pump control configuration is a premium specification ultrasonic pump control unit offering many standard features. Advanced control functions include:

- **Pump run-on**, allowing the user to set both the run-on interval and the duration, for periodic pumping past the off point to remove solids from pump stations.
- **Pump exercising**, causes pumps to come on when a period of non operation has occurred, idle time and exercise time can be set.
- **Start point variation**, reduces material build up on the walls at the 'normal' level by setting a band in which the switch point varies.
- **Storm control feature** permits the identification of a storm condition and operate any relay with specific points being set to accommodate needs during a storm, and the ability to disable other relays during the storm if required.
- **Aeration control** activates on elapsed time (since pumps ran), in little used well. Introduces air to reduce well gases.
- **Flush valve control** activates a re-circulation valve for a specific time based on pump cycle frequency, Prevents solids settling.

Data logs

- Running total of individual pump running hours.
- Running total of individual pump starts
- Running total of individual pump run-ons.

Differential

Ultra 5 offers further sophistication with the inclusion of differential level capability using two transducers. With one upstream and the other downstream of a screen or penstock, an alarm or control signal is initiated as the difference between the level exceeds a user-defined limit to automatically operate the cleaning mechanism.

Open Channel Flow

All the features of the Ultra 3 with 2 additional relays. With the additional step/time control for use with a penstock.

A data logging board is an optional extra with RS485 connection and large data log capability together with Profibus DP V0 and V1 or Modbus communications.

Features

- Solids or liquids level measurement
- Linearisation for tank shapes
- Advanced pump control choices
- Pump efficiency alarm
- Optional 4 - 20mA input
- Wide choice of flumes and weirs in OCM
- Easy prompt set up
- DATEM software



FASCIA MOUNT OPTION



FASCIA MOUNT REAR VIEW



HAND-HELD INFRA RED PROGRAMMER USED WITH PANEL OR RACK MOUNT VERSIONS

UltraTWIN:

Features

- 2 independent channels
- Wall or Fascia mount options
- Datalogging option
- Easy prompt led set up
- 4 digital inputs assignable to other alarm functions

Twin-channel ultrasonic level/volume monitoring, pump control, open channel flow measurement or any combination of these.

Flexibility is the keyword for the UltraTWIN 2 channel ultrasonic system. Each channel is user-configurable to operate independently either as a full function open channel flow monitor calculating flow rate to BS ISO 1438 and 4359, a pump control system or as a level and volume monitoring unit for liquids or solids, calculating volumes and providing alarms. UltraTWIN is compatible with the full range of Pulsar's dB transducers, from the ultra-high resolution dBMACH 3 to the powerful 40m range dB40. Six relays configurable to either channel provide full alarm and control options.

Level/Volume measurement

Use the level/volume measurement setting and UltraTWIN provides everything you would get from the Pulsar Ultra 3 or Ultra 5 in level measurement mode. UltraTWIN in level/volume mode will calculate volumes based on a wide variety of standard tank shapes and is equally at home measuring liquids and solids.

Open Channel Flow measurement

When you select the Open Channel Flow option, you are getting the full power of Pulsar's flow measurement expertise, the choice of waste water companies and process industries worldwide to measure open channel flow within effluent treatment processes. Features include on-board totalisation and pulsed output. UltraTWIN provides outstanding accuracy when teamed with the high resolution accuracy of the dBMACH 3 transducer.

Pump Control

In pump control configuration, UltraTWIN provides all the power of the Pulsar Ultra 3. Extremely reliable level monitoring even in the most difficult applications, it also provides a wide range of sophisticated pump control routines to keep the application running perfectly. UltraTWIN also includes four digital inputs, making it possible to monitor the performance of other equipment, for example a no-flow signal from a pump can trigger an alarm without the need for a PLC.

Data logging/Digital Communications

A powerful data logging solution can be added to the UltraTWIN system. As a factory fit option, level and flow information is recorded and "date stamped" at user defined intervals to build up a complete picture of the changing situation on site. Information may be stored for up to a year, and easily downloaded to a computer through a standard RJ11 port. The data logging solution offers Pulsar's PC Ultra Log software package, which records and charts data and trends in an easily accessible form.

UltraTWIN may also be upgraded to include RS485 communications, operating the Modbus or Profibus DP V0 or V1 protocols.



UltraTWIN with dB10 and dB15 on 7m (23ft) and 10m (33ft) silos containing powder

Ultra Wizard:

A high level software configuration tool allowing the user to dedicate the device to a specific function.

Ultra Wizard is an on-board, menu-driven software tool that allows the user to quickly and simply set up an Ultra 3, 5 or UltraTWIN unit for a specific application.

Simply enter the programming code (1997) and Ultra Wizard leads the user through a set-up menu. From the first question, do you want me to operate as:

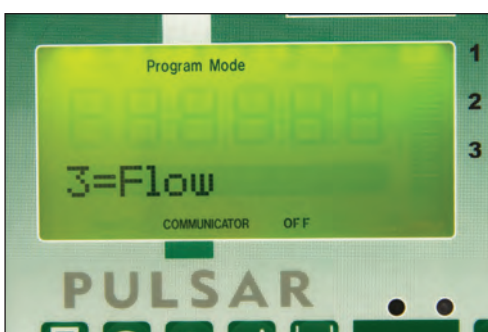
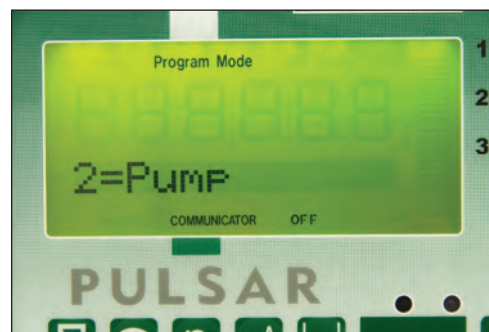
1. Level/volume controller, or
2. Pump controller, or
3. Open Channel Flow.

The user is led into a 'Quick Setup' menu specific to the application type that allows parameters such as empty and full distances and alarm/control relay settings to be entered. The majority of applications will then be 'ready to go', while it is easy to finish off the more demanding installations via further menus, refining the programming to add extra sophistication such as Ultra 5's advanced pump control routines.

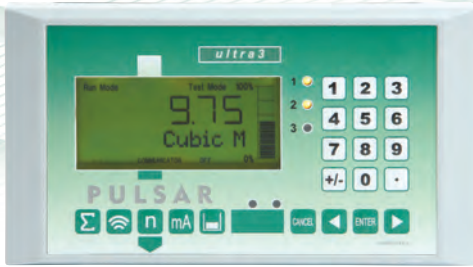
The unique 'Quick Setup' allows a user to avoid time-consuming programming and reference to parameter numbers.

Features

- Absolute flexibility
- User choice of function
- Lowers controller stock-holding
- Simple to set up
- Units can be reprogrammed to suit changing applications



Product comparison:

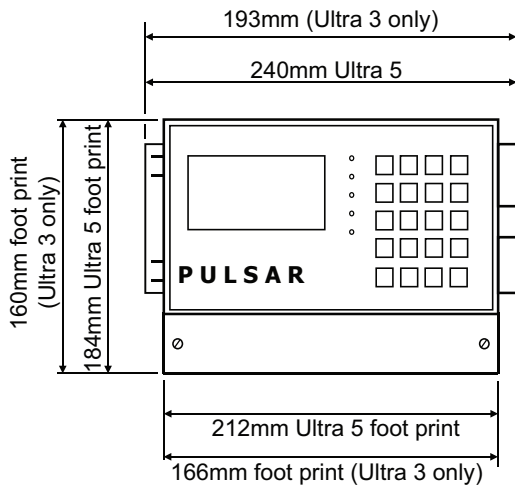


	Functions													
	Ultra 3				Ultra 5				Ultra TWIN					
	level	volume	pump control	open channel	level	volume	pump control	differential	open channel	level	volume	pump control	differential	open channel
Three control/alarm relays	•	•	•	•										
Five control/alarm relays					•	•	•	•	•					
Six control/alarm relays									•	•	•	•	•	•
Four digital inputs NO or NC									•	•	•	•	•	•
Compatible with all dB family transducers for 125mm to 40m (0.41ft-130ft) measurement range (X=db15max)	•	•	•	X	•	•	•	•	X	•	•	•	•	X
Compatible with dB50 transducer for 50m (164ft) measurement range	•	•	•											
High accuracy dBMACH3 transducer	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Liquids, solids and dusty applications	•	•	•	•	•	•	•	•	•	•	•	•	•	•
I.S. transducer (EEx ia) option	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Wall, fascia, panel and 19" rack mount versions (wall and fascia only on UltraTWIN)	•	•	•	•	•	•	•	•	•					
Volumetric conversion (12 tank shapes)		•				•				•				
Alarm Functions on changing level to provide:														
High/Low level	•	•	•	•	•	•	•	•	•	•	•	•	•	•
In band/out of band	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Rate of fill and empty	•	•	•	•	•	•	•	•	•	•	•	•	•	•
High/Low temperature	•	•	•	•	•	•	•	•	•	•	•	•	•	•
System fail (loss of echo)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Pump efficiency							•							
Fill/empty control (initiate/stop)	•	•			•	•	•		•	•		•		
Differential control/alarm using two transducers							•					•		
Pump control functions:														
Fixed duty assist			•	•			•	•			•	•	•	
Fixed duty backup			•	•			•	•			•	•	•	
Alternate duty assist			•	•			•	•			•	•	•	
Alternate duty backup			•	•			•	•			•	•	•	
Duty backup and assist			•	•			•	•			•	•	•	
Service ratio duty assist			•	•			•	•			•	•	•	
Service ratio duty backup			•	•			•	•			•	•	•	
FOFO (first on first off alternate duty assist)			•	•			•	•			•	•	•	
Standby			•	•			•	•			•	•	•	
Pump by time feature							•				•			
2 pump sets (4 pumps total)							•				•			
Advanced pump control functions:														
Pump run-on							•				•			
Power on/off delay							•				•			
Pump start/stop delay							•				•			
Pump exercising							•				•			
Pump start variation							•				•			
Storm control feature							•				•			
Aeration control							•				•			
Flush valve control							•				•			
Data logs:														
Pump running, run-on hours							•				•			
Number of pump starts							•				•			
Maximum and minimum recorded temperatures	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Optional datalogging board for expanded logging capacity and Modbus or Profibus connectivity	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Differential (using two transducers)							•				•			

Functions

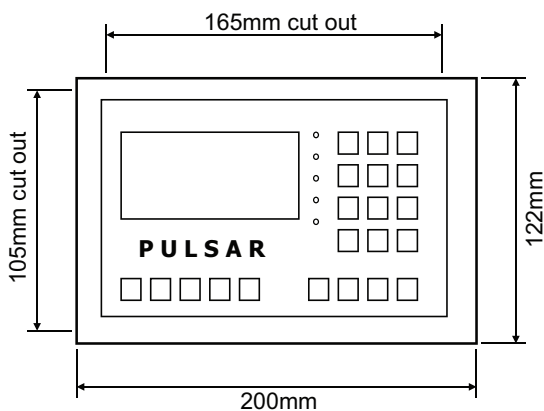
	Ultra 3				Ultra 5				Ultra TWIN					
	level	volume	pump control	open channel	level	volume	pump control	differential	open channel	level	volume	pump control	differential	open channel
Open channel flow				•					•					•
Simple exponential (venturi, parshall, trapezoidal weir etc)				•					•					•
Selected primary element to BS3680, ISO1438 and 4359				•					•					•
Flumes: rectangular, u-throated				•					•					•
Thin plate weirs (standard V-notch)				•					•					•
Thin plate weirs: Rectangular and V-notch 90° and 60°				•					•					•
Other types (Palmer-Bowlus, H-flume etc)				•					•					•
Universal flow calculation (32 setpoints)				•					•					•
Penstock control using step time				•			•	•					•	•

WALL MOUNT



Unit Depth - 108mm

FASCIA MOUNT

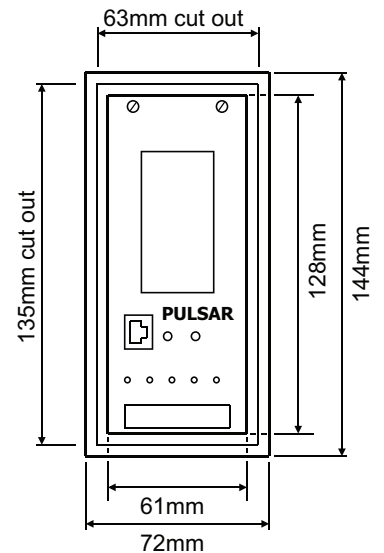


Unit Depth - 108mm



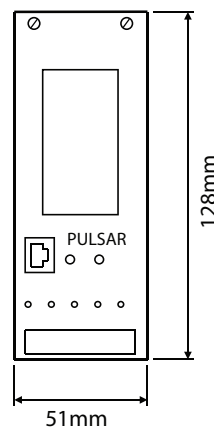
RAIL TRUCK LEVEL FOR WATER SPRAY CONTROL

PANEL MOUNT



Unit Depth - 176mm

19" RACK MOUNT



Technical Specification: Ultra Range

	Ultra 3	Ultra 3 I.S. Barrier Option	Ultra 5	Ultra Twin
Volt free contacts:	3 form C (SPDT) 5A, 240V ac	3 form C (SPDT) 5A, 240V ac	5 form C (SPDT) 5A, 240V ac	6 form C (SPDT) 5A, 240V ac
Outside dimensions (wall mount):	188 x 160 x 107mm (7.40 x 6.30 x 4.21in)	235 x 184 x 120mm (9.25 x 7.24 x 4.72in)	235 x 184 x 120mm (9.25 x 7.24 x 4.72in)	235 x 184 x 120mm (9.25 x 7.24 x 4.72in)
Cable entry:	8 cable entries 1 x M16, 3 x M20 underside 4 x PG11 at rear	10 cable entries 5 x M20, 1 x M16 underside 4 x PG11 at rear	10 cable entries 5 x M20, 1 x M16 underside 4 x PG11 at rear	10 cable entries 1 x M16, 5 x M20 underside 4 x PG11 at rear
Digital inputs:	n/a	n/a	n/a	Wall = 4, Fascia = 7, normally open or normally closed, 24VDC supply

COMMON FEATURES

Weight:	Nominal 1kg (2.2lbs)
Case material:	Polycarbonate, flame resistant to UL91 (wall), UL94-V0 (fascia) (UltraTWIN wall to UL94-5V)
Transducer cable:	Twin screened
Maximum separation:	1000m (3280ft)
Rack mount:	10HP x 160mm (6.29in) deep x 3U 128.5mm (5.06in) high (not UltraTWIN)
Panel mount:	72mm (2.83in) wide x 144mm (5.67in) high x 176mm (6.93in) deep (not UltraTWIN)
Fascia mount:	200mm x 112mm (7.87in x 4.41in) front x 108mm (4.25in) deep, 165mm x 105mm (6.50in x 4.13in) cutout
IP rating (wall mount):	IP65
Fascia mount:	IP64
IP rated panel mount (optional):	IP54
Max and min temp. (electronics):	-20°C to +50°C (-4°F to +122°F)
Hazardous area approval:	Safe area: compatible with approved dB transducers (see transducer specification sheet)
CE approval:	EMC approval to BS EN 50081-1: 1992 for emissions and BS EN 50082-2:1995 for immunity, and to BS EN 61010-1: 1993 for low voltage directive.
Accuracy:	0.25% of measured range or 6mm whichever is greater
Resolution:	0.1% of the measured range or 2mm whichever is greater
Range:	Depending upon transducer, from 125mm to 40m (0.41ft to 130ft). 50m on modified Ultra 3 and Ultra 5. (0m to 2.425m (0 - 7.95ft) dBMACH3 for open channel flow)
Echo processing:	Patented DATEM (Digital Adaptive Tracking of Echo Movement)
Analogue output:	Isolated output 4-20mA or 0-20mA into 500Ω (user programmable and adjustable), 0.1% resolution
Digital output:	Full duplex RS232 via RJ11 port
Display:	6 digits plus 12 character text, plus bargraph with direction indicators, remote communicator identifier and program/run/test mode indicators
Remote programming:	Standard on rack and panel mount units via infra red communicator
On-board programming:	Standard on wall and fascia mount with integral keypad
PC Programming:	Via RS232 (RJ11 port)
Programming security:	Via password (user selectable and adjustable)
Programmed data integrity:	Via non-volatile RAM, plus backup
Power supply:	115V ac +5% -10% 50/60Hz, 230V ac +5% -10%, 18-30V dc

All Pulsar Ultra units must be mounted in a safe area. See transducer specification sheet for flammable atmosphere approval to suit.

Ultra PC Software:

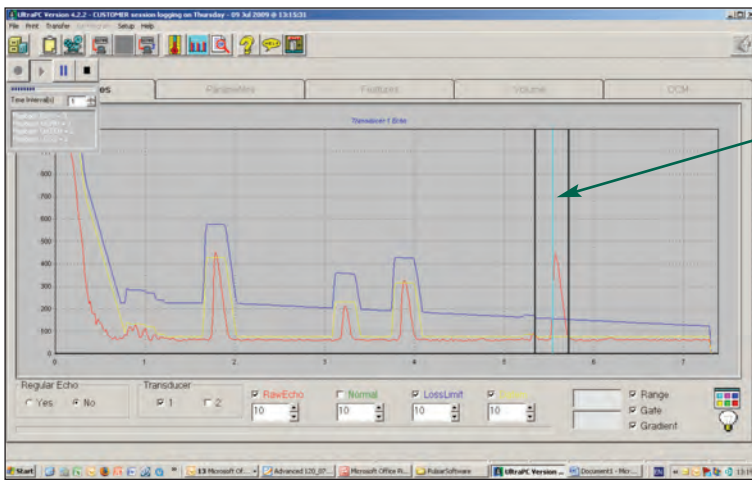
Ultra PC software is a powerful tool that fine tunes the Ultra series of controllers, helping the user get the best from their level or flow system.

Ultra PC can be used to record all the parameters for your applications, these may be saved to PC, disc or email. All programming parameters can be changed and downloaded to the instrument via your laptop or PC. The software may also be used to record echo profiles of your applications, these can be saved for

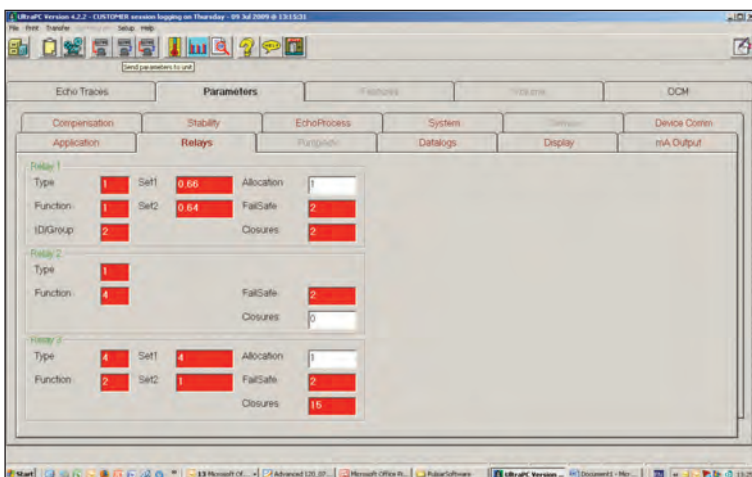
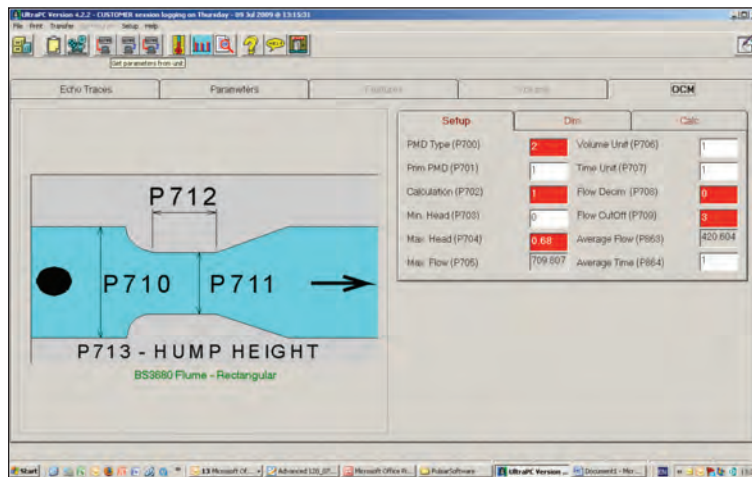
your records or sent via e-mail back to Pulsar for analysis. Ultra PC can also record echo profiles, allowing them to be saved for your records or emailed to Pulsar for analysis. Events may be recorded and logged over long periods of time, creating an archive of level or flow variations.

Features

- Allows 'cloning of units'
- Real time recording of echo trace
- Stores all calibrated parameters by site
- Clean effective and accurate storage
- CD with USB port or serial connection leads
- Easy to operate and setup



TRUE ECHO SHOWN BY THE BLUE LINE



Pump Control:



7m (23ft) PUMP CONTROL



27m (89ft) STORM TANK 3 PUMPS
DOWN CENTRAL WELL



4m (13ft) TIGHT WELL



3.5m (11ft) FOAMY WET WELL PUMP CONTROL



4m (13ft) WET WELL PUMP CONTROL AND HIGH FILL RATE

Differential Level:



5m (16ft) CANAL DIFFERENTIAL



9m (30ft) HARBOUR DIFFERENTIAL



1.5m (5ft) SCREEN DIFFERENTIAL

Open Channel Flow:



RECTANGULAR WEIR FLOW



AREA X VELOCITY IN A CHANNEL USING SPEEDY and dBS6



RECTANGULAR FLUME FLOW



RECTANGULAR WEIR and DUETT TRANSDUCER



RECTANGULAR FLUME and dBMACH3



FLOW BOX WITH A V-NOTCH WEIR and dBMACH3

Volume Measurement:



CEMENT 12m (40ft)



FUEL OIL 9m (30ft)



CRUSHER CONTROL 1.8m (5.9ft)



CLINKER 14m (46ft)



CHEMICAL TANK WITH STANDPIPE 1.9m (6ft)



PLASTIC PELLET SILOS 18m (60ft)

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ISO 9001
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011

CERTIFICATE NUMBER: 950136-1

ISO 14001
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CERTIFICATE NUMBER: 072570-1

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

Lit No. Ultra S616