

# PULSAR

## All in One:

- \* Level and Volume Measurement
- \* Advanced Pump Control
- \* Differential Level and Control
- \* Open Channel Flow



*Ultra 3 & Ultra 5*

non-contacting ultrasonic level  
and flow instruments



fascia mount

**Ultra 3 and Ultra 5 combine several world-class, full function, non-contacting ultrasonic level measurement instruments into one.**

Making use of the latest microprocessor and clever software development, Pulsar engineers have created devices that can be simply configured by the user to become fully functioned control units. Through the use of ULTRA WIZARD, an integrated high level software configuration tool, you select your application and the *Ultra* unit configures itself. For example, if flow is chosen, you get the most accurate open channel flow meter available with all the PMD calculations preconfigured. Market-leading pump control features are built into both *Ultra 3 and 5*, and an extensive set of volume calculations and linearization features are available for tank or silo level measurement.

All applications enjoy the benefit of DATEM, the world's most advanced echo processing software for level measurement.

All you have to decide is whether you need *Ultra 3*, with three control relays, or to opt for *Ultra 5*, with the benefit of two extra relays, advanced pump control and an optional 4-20mA analog input.

Options include: Wall, panel, fascia or 19" rack mount, with a full range of transducers available providing measurement from 0 to 132 ft.

High capacity data logging and digital communications using Modbus or Profibus via RS485 interface can also be specified. Ethernet Module available soon.



UltraTwin

## Ultra 3

### Level (Vanguard 90)

Perfect for a diverse range of level measurement applications found in industrial and municipal markets. In level measurement configuration, *Ultra 3* has three control relays and a measurement range to 132 feet.

### Volume (Level Star 110)

Includes 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.

### Pump Control (Vantage 100)

Pump control mode has the basic fixed or lead/lag pump routines. Set it and forget it maintenance-free performance with three user-definable control relays for up to three pump or alarm configurations. The perfect choice for the common duplex pump station.

### Open Channel Flow (Flow Oracle 160)

Open channel flow mode provides accurate flow measurement and control in a wide range of flumes and weirs. Three relays for alarms, control, automated samplers and more. Also, with the new dB MACH3 transducer you get the most accurate flowmeter in the world!

## Ultra 5

### Level (Vanguard 90)

In level measurement configuration, the *Ultra 5* shares all the facilities of the *Ultra 3*, with the addition of two extra relays for alarm setpoints or additional control flexibility.

### Volume (Level Star 110)

*Ultra 5* offers a range of 12 pre-programmed tank shapes for accurate volume measurement for inventory control, together with the capability to measure unusual shapes with up to 32 user-defined linearization setpoints.

### Pump Control (Advanced 120)

A premium ultrasonic pump controller designed for performance in the toughest lift stations. Five relays are available for fixed, lead/lag, FOFO, ratio, and the new Pump-by-Time control routines. Cost-effective and efficient, the *Ultra 5* is the best there is.

### Differential (Advanced 120)

Differential level mode uses two transducers, with one upstream and the other downstream of a bar screen. The control relay is initiated as the difference between the level exceeds a user-defined limit to automatically operate the cleaning mechanism.

### Open Channel Flow (Flow Oracle 160)

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. Five control relays for complete control flexibility, including sample automation. The optional *Ultra 5* Full Spec unit includes the capability to accept a velocity sensor input such as Pulsar's Speedy unit, so Area x Velocity ( $Q=VA$ ) calculations for channels or pipes are available.

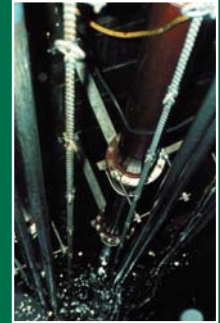
## UltraTwin

The *UltraTwin* provides dual-channel capability with all the features of the *Ultra 3 x 2*. That's right, it can monitor any combination of level, volume, pump control or open channel flow with 2 displays and 2 4-20 mA outputs. Also, it can average, add or subtract both levels and provide corresponding display and outputs.

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

# Functions

	Ultra 3				Ultra 5				
	Level	Volume	Pump control	Open channel	Level	Volume	Pump Control	Differential	Open Channel
Three control/alarm relays	✓	✓	✓	✓	✓	✓	✓	✓	✓
Five control/alarm relays									
Compatible with all dB family transducers for 125mm to 40m measurement range	✓	✓	✓		✓	✓	✓	✓	
High accuracy dBMACH3 transducer				✓					✓
Liquids, solids and dusty applications	✓	✓	✓		✓	✓	✓	✓	✓
I.S. transducer (Ex ia) option	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wall, fascia, panel and 19" rack mount versions	✓	✓	✓	✓	✓	✓	✓	✓	✓
Volumetric conversion (12 tank shapes)		✓				✓			
<b>Alarm Functions on changing level to provide:</b>									
High/Low level	✓	✓	✓	✓	✓	✓	✓	✓	✓
In band/out of band	✓	✓	✓	✓	✓	✓	✓	✓	✓
Rate of fill and empty	✓	✓	✓	✓	✓	✓	✓	✓	✓
High/Low temperature	✓	✓	✓	✓	✓	✓	✓	✓	✓
System fail (loss of echo)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pump efficiency (device fail/device alarm)							✓		✓
Fill/empty control (initiate/stop)	✓	✓			✓	✓		✓	
Differential control/alarm using two transducers								✓	
<b>Pump control functions:</b>									
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			✓						
2 pump sets (4 pumps total)							✓		
<b>Advanced pump control functions:</b>									
Pump run-on							✓		
Power on/off delay							✓		
Pump start/stop delay							✓		
Pump exercising							✓		
Pump start variation							✓		
Storm control feature							✓		
Aeration control							✓		
Flush valve control							✓		
<b>Data logs:</b>									
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)								✓	
Penstock control on level difference								✓	✓
<b>Open channel flow</b>									
Simple exponential (venturi, parshall, trapezoidal weir etc)				✓					✓
Selected primary element to BS3680:									
Flumes: rectangular, u-throated				✓					✓
Thin plate weirs (standard V-notch)				✓					✓
Thin plate weirs: Rectangular & V-notch 90° and 60°				✓					✓
Other types (Palmer-Bowlius, H-flume etc)				✓					✓
Universal flow calculation (32 setpoints)				✓					✓
Penstock control using step time				✓				✓	✓
Analogue input for velocity sensor for area x velocity (O=VA calculation) in channels or pipes								✓	✓



# Technical Specifications

	<b>Ultra 3</b>	<b>Ultra 5</b>	<b>Ultra Twin</b>
Relay Outputs:	3 form C (SPDT) 5A, 240V ac	5 form C (SPDT) 5A, 240V ac	6 form C (SPDT) 5A, 240V ac
Digital Inputs:	NA	NA	4 N.O. or N.C. with 24V dc supply
Outside dimensions (wall mount):	7.6 x 6.1 x 4.0 inches	9.4 x 7.2 x 4.6 inches	9.4 x 7.2 x 4.6 inches
Cable entry:	8 cable entries 3 x PG11, 1 x PG9 underside 4 x PG11 at rear	10 cable entries 5 x PG11, 1 x PG9 underside 4 x PG11 at rear	10 cable entries 5 x PG11, 1 x PG9 underside 4 x PG11 at rear
<b>Common Features</b>			
Weight:	Nominal 2.2lbs (1kg)		
Case material:	Polycarbonate, flame resistant to UL94-V2		
Transducer cable:	Three conductor shielded (Can be spliced with two conductor shielded)		
Maximum separation:	3000 Feet (1000m)		
Rack mount:	10HP x 160mm deep x 3U (128.5mm) high		
Panel mount:	72mm wide x 144mm high x 176mm deep		
Fascia mount:	See separate technical update TU-001-Z		
Wall mount:	NEMA 4X (IP65)		
Fascia mount:	NEMA 12 (IP64)		
Panel mount (optional):	NEMA 4X (IP65)		
Max and min temp. (electronics):	-4°F to 140°F (-20°C to +60°C)		
Flammable atmosphere approval:	Safe area: compatible with approved dB transducers (FM Approved: Class 1, Div 1, Group A, B, C, D; Class 2, Div 1, Groups E, F, G)		
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 the measured range or 6mm (whichever is greater)		
Resolution:	0.1% of the measured range or 2mm (whichever is greater), 1mm when using dBMACH3		
Range:	Depending upon transducer, from 0 to 132 ft (0 to 8 ft dBMACH3 for open channel flow)		
Echo processing:	Patented DATEM (Digital Adaptive Tracking of Echo Movement)		
Analog output:	Isolated output 4-20mA or 0-20mA into 500 ohms (user programmable and adjustable), 0.1% resolution		
Display:	6 digits plus 12 character text, plus bargraph with direction indicators, remote communicator identifier and program/run/test mode indicators 8 digit on-board resettable and non-resettable flow totalizers		
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 Communication:	Full duplex RS232 via RJ11 port for Ultra PC Software		
Programming security:	Via password (user selectable and adjustable)		
Programmed data integrity:	Via non-volatile RAM, plus backup		
Power supply:	115V AC +5% -10%, 18-36V DC (230V AC +5% - 10% upon request)		

All Pulsar Ultra 3, Ultra 5 and UltraTwin units must be mounted in a safe area. See transducer specification sheet for flammable atmosphere approval to suit.

## Choose the appropriate dB Transducer:



**dB MACH 3**  
0 - 8 feet



**dB3**  
0.5 - 10 feet



**dB10**  
1 - 33 feet



**dB15**  
1.5 - 50 feet



**dB25**  
2 - 82 feet



**dB40**  
3 - 132 feet



### Pulsar Inc

PO Box 799, Shalimar, Florida 32579, USA  
Tel: 1 850 609 1777, Fax: 1 850 651 4777  
e-mail: info@pulsar-us.com  
website: [www.pulsar-us.com](http://www.pulsar-us.com)



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