PULSAR

Process Measurement

Full function: level & volume measurement, pump control and open channel flow monitoring, combined in a single unit

Ultra 3 & Ultra 5

non-contacting ultrasonic level and flow instruments

fascia mount

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

Making use of the latest microprocessor developments and clever software development, Pulsar engineers have created devices that can be simply configured by the user to become fully functioned complete 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 to suit. Full control functions are available: for example an open channel flow application is measured to BS3680. A pump control application can use the functionality of Pulsar's exceptional Advanced 120 control unit in *Ultra 5* and Vantage 100 in *Ultra 3*, and all the volume calculations and linearisation facilities within the Level Star 110 are available for a tank or silo level measurement task.

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 a 4-20mA analogue input.

Options include: Wall, panel, fascia or 19" rack mount, a full range of transducers available providing measurement from 70mm right through to 40m.

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

panel mount

19" rack mount

Ultra 3

Level (Level Star 110)
Perfect for a diverse range of level measurement applications 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.

Volume (Level Star 110)
Both *Ultra 3* and *Ultra 5* feature 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 linearisation function.

Pump control (Vantage 100)
Ultra 3 in pump control configuration is Pulsar's entry level for this function. Pulsar pump control units are used throughout the global water and waste industries. Fit and forget maintenance free performance with three user definable control relay setpoints to provide maximum control versatility. *Ultra 3* gives you sophisticated pump control on changing level or rate of level change.

Open channel flow (Flow Oracle 160)
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 is to BS3680 where applicable. Three control relays for control choices.
Display:
- 8 digit on-board totaliser
- 6 digit display of flowrate or head

Ultra 5

Level (Level Star 110)
In level measurement configuration, *Ultra 5* shares all the facilities of *Ultra 3*, with the addition of two extra relays for alarm setpoints or additional control flexibility.

Volume (Level Star 110)
As in Ultra 3, 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 linearisation setpoints. Ultra 5 adds the flexibility of five control and alarm relays for alarm or product re-order setpoints or for simple empty/fill control.

Pump control (Advanced 120)
Ultra 5 in pump control configuration is a premium specification ultrasonic pump control unit offering many standard features. Designed for performance in applications where its advanced control routines will provide benefits. Five relays provide maximum choice and *Ultra 5* incorporates a list of sophisticated pump control functions designed around the day to day needs of operators and engineers. Cost-effective and efficient, *Ultra 5* is the best there is.

Differential (Advanced 120)
Ultra 5 offers further sophistication with the inclusion of differential level capability using two transducers. With one upstream and the other downstream of a 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 (Flow Oracle 160)
Ultra 5 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 is to BS3680 where applicable. Five control relays for complete control flexibility.

As with *Ultra 3*, a data logging board is an optional extra with RS485 connection and large data log capability together with Profibus or Modbus communications.

Ultra 5 also includes the capability to accept an input from a velocity sensor such as Pulsar's Speedy unit, so area x velocity (Q=VA) calculations for channels or pipes are available.

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 (Eex ia) option	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wall, fascia, panel and 19" rack mount versions	✓	✓	✓	✓	✓	✓	✓	✓	✓
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 (device fail/device alarm)							✓		
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			✓				✓		
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	✓	✓	✓	✓	✓	✓	✓	✓	✓
Diferential (using two transducers)								✓	
Penstock control on level difference								✓	✓
Open channel flow									
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-Bowlus, 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

	Ultra 3	**Ultra 5**
Volt free contacts:	3 form C (SPDT) 5A, 240V ac	5 form C (SPDT) 5A, 240V ac
Outside dimensions (wall mount):	193 x 155 x 102mm	240 x 184 x 118mm
Cable entry:	8 cable entries	10 cable entries
	3 x PG11, 1 x PG9 underside	5 x PG11, 1 x PG9 underside
	4 x PG11 at rear	4 x PG11 at rear

Common Features

Weight:	Nominal 1kg
Case material:	Polycarbonate, flame resistant to UL94-V2
Transducer cable:	Twin screened
Maximum separation:	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
IP rating (wall mount):	IP65
Fascia mount:	IP64
IP rated panel mount (optional):	IP65
Max and min temp. (electronics):	-20°C to +60°C
Flammable atmosphere 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 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 125mm to 40m (75mm to 2.5m 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%, **18-36V dc**

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

Represented by:
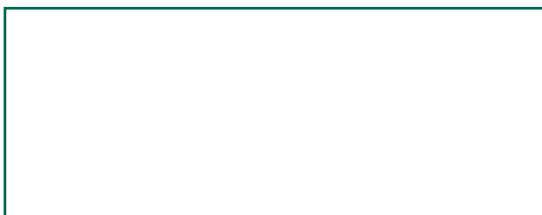
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