Product Guide

Level and Flow Measurement

Blackbox

pulsar®
PROCESS MEASUREMENT

Blackbox Controllers:

Level measurement made simple

All standard Blackbox units share a common IP67 enclosure with 3 cable glands fitted. A flashing LED indicates healthy operation. Programmed through PC using supplied software or Pulsar hand held programmer using RS232 via RJ11 port.

Blackbox130

Level

Non-contacting level measurement featuring a 4-20mA output, which can be supplied isolated or non isolated, proportional to level and two alarm or control relays.

Blackbox133

Level Control

Two control or alarm relays, with simple 0-5V output proportional to level to drive a local display. Simple 2 pump control with alternation is also included in the 133.

Blackbox134/135

Level Comms

Blackbox Level Comms retains the alarm relays of Blackbox 133, and adds an RS485 port for digital communications.

Modbus (code 134), Profibus DP V0 or V1 (model 135)

Blackbox136

Level CSO

Pulsar's blackbox 136 CSO is a sophisticated ultrasonic system specifically designed for use with batteries to provide non-contacting monitoring of level or overflow events, with exceptionally low power consumption to maximise battery life in remote locations. Also features on board data logging.

Blackbox Calibration:
Standard Blackbox range offers two set-up options

Blackbox units can be set up using Pulsar's Blackbox PC Software and optional interface cable, which links the Blackbox RJ11 RS232 port to the PC's serial or USB port. Part numbers PCLEAD-UP for USB connection and PCLEAD-SP if a serial connector is needed. The interface cable is common for all standard Blackbox units and is removed after programming, so only a single cable is required for multiple Blackbox controllers.

Blackbox units can also be set up using a hand-held programming unit (see right). Simple to operate and with a visual display of parameters entered, the hand-held programmer will program any of the Blackbox range and can be used for any number of controllers. The Blackbox unit will return to 'run' mode once the interface cable is removed.

Programming options include: PC software download, removable hand-held programming unit.

REMOVABLE HAND-HELD PROGRAMMING UNIT CONNECTED TO BLACKBOX

FOOD PROCESSING TANK LEVEL

BLACKBOX PC SOFTWARE SUPPLIED ON A CD AND OPTIONAL CABLE CONNECTING FROM RJ11 TO PC

MINERAL OIL TANK LEVEL

BLACKBOX ON MIXING TANKS WITH AGITATORS

Blackbox Display:

Blackbox with integral display - component non-contacting level monitoring with integrated readout

Features

- Clear backlit display
- Keypad with 'hot keys'
- Easy set up

Pulsar's integral display option extends the capability of the blackbox range, allowing users to locally program the unit and give a readout of level. Economical and simple to program and operate, users benefit from extremely accurate and reliable digital echo processing with access to the dB range of transducers, measuring from 125mm (0.41ft) right through to 40m (130ft).

The integral keypad and display is available for any unit in the blackbox range with the exception of the blackbox 136 CSO.

The integrated keypad and display means that you have complete flexibility in your control application, providing a local display for those applications that require local indication. Alternatively, blackbox with integral keypad and display provides an economical alternative for simple level measurement or control applications.

Blackbox units are compatible with Pulsar's complete range of transducers, giving a range extending from 125mm right through to 40m, on solids, powders or liquids. The Blackbox range benefits from DATEM (Digital Adaptive Tracking of Echo Movement) digital echo processing, providing unrivalled performance particularly on difficult applications.

SHOWS THE BLACKBOX DISPLAY IN SITU

Technical Specification: Blackbox Dis-

PHYSICAL	
Dimensions:	130mm x 150mm x 63.5mm (5.12in x 5.90in x 2.5in)
Weight:	Nominal 0.65kg (1.4lbs)
Enclosure:	ABS Base with polycarbonate lid
Programming:	integral keypad or RS232 interface using optional software or hand-held programmer

ENVIRONMENTAL	
Flammability rating UL94HB:	Fitted with 3 x M20 nylon cable glands for 6-12mm (0.24-0.47in) cable. IP rating: IP66/67
Electronics should be mounted in a safe area. Please see detailed specification for full details of EMC approvals etc.	
Max/min temperatures (electronics):	-20C to +55C (-4F to +131F)
Measurement range:	125mm - 40m (0.41ft -130ft) depending on transducer

PERFORMANCE	
Accuracy:	0.25% of measured range or 6mm whichever is greater
Resolution:	dBMACH3 0.25mm, dB3 0.5mm, dB6 and dB10 1mm, dB15 1.5mm, dB25 2.5mm and dB40 5mm.
Display:	2 x 12 alpha numeric (backlit)

ECHO PROCESSING	
Programming security:	Via Passcode (user selectable)
Outputs:	2 volt-free contacts, form "C" SPDT rated 2A at 220V AC, RS232 for programming and data
Comms:	RS232 via RJ11 port standard and optional RS485 providing digital communications by 134/5 units

Blackbox:
Modem

The ultimate distributed stock monitoring and control system, Blackbox Modem features a built-in GSM modem that provides SMS (text) messages in response to low level or re-fill points, meaning you can monitor stocks across a site, a city or a country – plan your transport efficiently, save time and money and most importantly, keep your customers happy.

Blackbox modem features superb digital echo processing to give reliable level measurement over anything from 125mm to 40m on solids, powders or liquids, making it perfect for measurement of almost any kind of bulk material.

"Blackbox modem" includes a GSM modem, which is simply configured via a PC set-up to provide a mobile phone SMS text message either when stocks reach a user configured "restock" point or at user-set intervals. That allows the supplier to plan properly for restocking, decide the most efficient routes for delivery vehicles in advance, and perhaps most importantly, avoid the dreaded "I've run out – can you be here in ten minutes?!" phone calls.

Blackbox modem is aimed at companies with distributed stocks of material that need replenishment on a regular basis, for example: cement silos in construction sites over a wide area, chemical tanks based on customers' premises and so on. Alternatively, Blackbox modem is ideal for large sites where it is important to maintain a stock level in strategic areas, or for environmental protection applications where high levels or overflow conditions are critical. The GSM modem can also act as a wireless connection to Pulsar's Blackbox PC software for diagnostics and programming.

Blackbox Modem is available in 4 versions:-

Modem Level 130: which also features a 4-20mA output for local display of level;

Modem Level Control 133: which offers two mechanical relays (Type C, 230V 2A SPDT) for alarm or control functions.

Modem Level Comms 134/5: with Modbus or Profibus DP V0 or V1 digital comms on board.

Two software packages are available - Blackbox PC, which provides set-up facilities for the Blackbox unit and allows the user to fully set up the unit, view echo profiles and perform diagnostic checks. SMS Server is specifically designed for collating SMS data from multiple units in the field. Use a Pulsar GSM modem at a PC to receive and record the data.

SMS Server software

SMS Server shows you all your sites at a glance on your PC screen. A simple colour-coded mimic tells you when a site has reached a re-order point or is at a dangerously low level, so you can make the right decisions about restocking materials and programming vehicles for the best possible efficiency - saving time, resources, manpower and energy.

SMS Server is easy to set up and runs on a standard PC connected to the compact Pulsar GSM modem.

Blackbox Modem:

Blackbox with integrated GSM Modem

The system* is dependent on SIM card used; it can be either "data" enabled or standard SMS type (Voice/PAYG).

If the SIM card is standard voice type, the Blackbox Modem (1) can send SMS text messages on alarm to designated mobile phones, or customer can install Pulsar SMS server on a PC connected to a PC modem (2). The SMS server software can collect data and reports and present data in a graphical format, also this data can be saved into Excel format. This is a many to one connection.

If SIM card fitted on the remote site is a "data" type then, using Blackbox PC software on a local PC with modem (2), this allows getting and setting of parameters and getting traces, this is a one to one transparent connection from Blackbox PC software to the remote unit.

*Coverage dependent on network.

1: The modem is a quad band modem GSM 900/DCS 1800/GSM 850/PCS 1900 fitted in larger enclosure with Blackbox processor board and PSU.

2: The modem is a quad band modem GSM 900/DCS 1800/GSM 850/PCS 1900 fitted in larger enclosure with PSU.


PC and GSM Modem unit
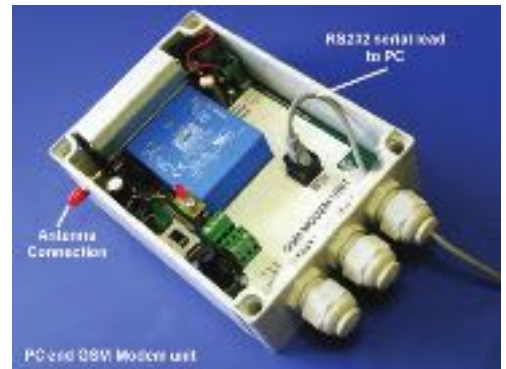
FIGURE 1: THE OPERATIONS OVERVIEW SCREEN

The bars here show the most recent levels for each "station". Green bars mean stock levels are OK, yellow show that level is below a warning threshold but above the alarm level, and red shows that levels are below an alarm threshold.
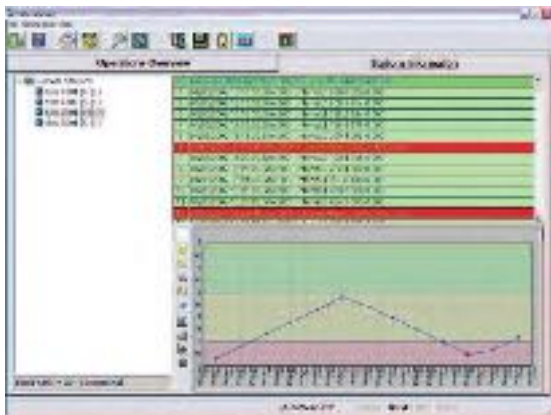
FIGURE 2: STATIONS INFORMATION SCREEN

More detailed information for each station is available here: the type of site, the number of reports received from each site, the number of alarms received are all displayed, and a graph showing the trend data from each station helps decisions to be made on restock frequency etc. All the data can be exported in .csv format for additional analysis or reporting in spreadsheets or other programs.
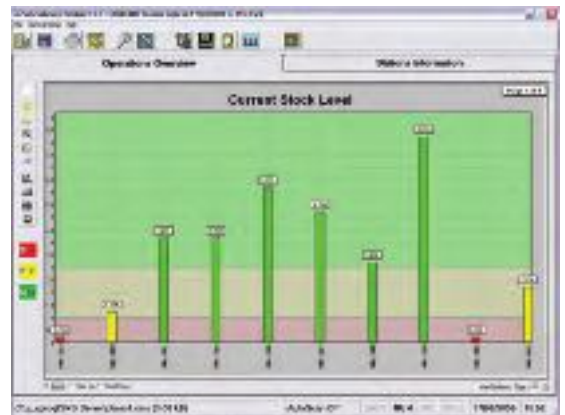
Technical Specification: Blackbox Modem

PHYSICAL:	
Enclosure:	polycarbonate lid, ABS base, IP66/67
Dimensions:	130mm x 180mm x 60mm (5.12in x 7.09in x 2.36in)
Power requirement:	30W max
Transducer:	compatible with the dB range of transducers, 125mm to 40m (0.41ft - 130ft) measurement range
Flammable atmosphere:	Blackbox unit must be mounted in safe area, see transducers data for Zone approvals

Brief Specification: (NB: for full specification see Blackbox specification below):

Blackbox 136:
Level CSO

Pulsar's blackbox 136 CSO is a sophisticated ultrasonic system specifically designed for non-contacting monitoring of level or overflow events, with exceptionally low power consumption to maximise battery life in remote locations and built in data logger.

Blackbox 136 CSO provides a self-contained solution to level and event recording and with the ability to supply a voltage output to an external monitoring or telemetry outstation if required. Blackbox 136 CSO may be programmed to provide level measurement using the optional hand-held calibrator or using Blackbox PC calibrator software,
a copy of which is supplied with the unit.

If data logging is a requirement, the optional CSO log software is available both to set up the unit and download and analyse the logged data. The software includes powerful graphing, data analysis, export and print functions so that the history of the site can be easily understood and displayed.

136 CSO may be set to read level continuously, or in order to prolong battery life, may be set to wake up to take readings at user-defined intervals (1-99 minutes). Each data record is internally logged and also supplied as a 0-5v output. On standby, 136 CSO is ready to be polled by an external data logger or telemetry outstation for the retrieval of information.

Wake up intervals may also be varied automatically. For instance, if the level approaches a critical point, the interval between measurements can be reduced on even set to run the system continuously so that more detailed records of the event are available. The new interval will be maintained until the level returns to normal values and then the system reverts back to the previous wake up interval.

Should a weir or other flow structure be available in the CSO then the Blackbox 136 can totalise 'spill volume' through this structure. Not only will the 136 CSO unit log the day, time and duration of any 'spill event' it logs the quantity too.

Flexibility and adaptability to specific site requirements are key features of the 136 CSO system.

Logging capacity for the Blackbox 136 CSO system is 256KB. The total logged period is dependent on the amount of information required to be data logged. Examples are: 1) Monitoring level and temperature every 15 minutes would result in a memory capacity of 569 days. 2) Monitoring level, temperature and echo strength every 5 minutes would result in a memory capacity of 163 days.

Features

- Low power with large internal data log
- Flexible and variable wake up periods
- Can be externally polled for logged data
- Battery life calculator included in CSO Log software

LEVEL CSO MOUNTED ON BATTERY PACK INSIDE A BOLLARD

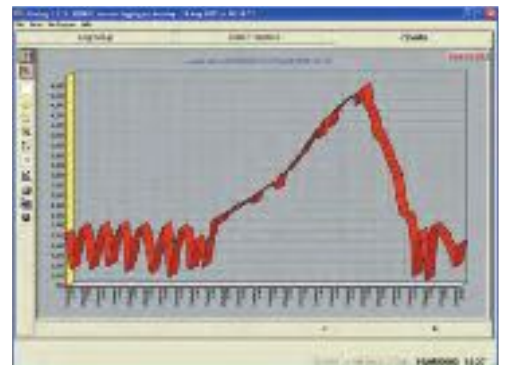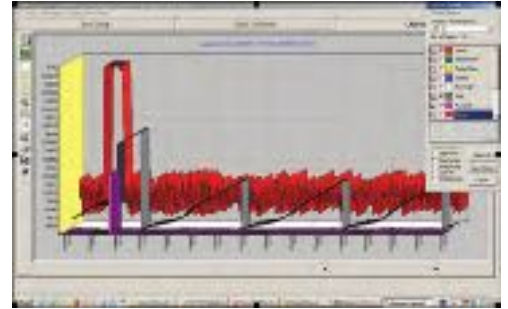# Blackbox 136 Level CSO
Software

Features

- CSO Log easy set up software optional
- Multi parameter logging feature of level/ day/ time/ duration/volume spill
- Volume of spill over weir calculation included
- Plug in set up and leave on site

CSO log software is a powerful way to record and manage accumulated data. CSO log software provides both set-up of Blackbox 136 CSO units and the download and analysis of internally logged data for graphing and output. PC connection to the system is from a PC RS232 (COM) via the 136 CSO's on-board RJ11 port.

The 136 CSO unit may be completely calibrated, either in advance or on site. As with all Pulsar equipment, set up parameters are logical and intuitive. All you have to do is set up the physical dimensions of the application and tell the unit what you want to measure and how often. Data logging is flexible; you select the information you wish to log and the logging interval. The unit will let you know how many months storage is available and any aspect of measurement or logging may be adjusted to suit the reporting requirements. Depending on measurement frequency, 136 CSO is easily capable of recording twelve months of data and may be set so that new data overwrites the oldest where required.

Logged site data is downloaded to a PC file through the same cable connection used for programming. In addition, all programming parameters may be downloaded for backup or repeat set up (cloning).

The powerful graphical analysis tools in CSO log software put the story of the site at your fingertips. You can see how all your logged data has varied over time, clearly plotted and available to be "cut and pasted" into a word processor or other reporting program. A standard CSV file may be exported to a spreadsheet or data analysis package or archive.

dB3 WITH DRIP SHIELD MOUNTED IN CSO CHAMBER

Product Functions

	Blackbox				
	130 Level	133 Level Control	134 Level Comms	135 Level Comms	136 Level CSO
115/220 VAC	•	•	•	•	
10-28v DC	•	•	•	•	•
4-20mA o/p Max 1K	•				
0-5V o/p Min Load 10K		•			•
2 relays 220V, 2A Form C (SPDT)	•	•	•	•	
RS232 RJ11 port	•	•	•	•	•
RS485 Modbus			•		
RS485 Profibus DP V0 or V1				•	
Logging					•

WATERPROOF CONNECTION (TO IP67) MOUNTED ON UNIT'S ENCLOSURE INSTEAD OF RJ11 PORT INSIDE.

Technical Specification: Blackbox

PHYSICAL

Weight:	nominal 0.65Kg (1.4lbs)
Enclosure:	ABS Base with polycarbonate lid, flammability rating UL94HB
Cable entries:	3xM20 nylon cable glands for 6-12mm cable, two 15mm x 35mm rear knockouts

ENVIRONMENTAL

IP Rating:	IP66/67
Max/min temperature (electronics):	-20C to +55C (-4F to +131F)
Flammable atmosphere approval:	All blackbox units must be mounted in a safe area.

PERFORMANCE

Accuracy:	0.25% of measured range or 6mm whichever is greater
Resolution:	dBMACH3 0.25mm, dB3 0.5mm, dB6 and dB10 1mm, dB15 1.5mm, dB25 2.5mm and dB40 5mm
Range:	Dependent on transducer. Nominally 125mm to 40m (0.41ft to 130ft). Compatible with all dB transducers

ECHO PROCESSING

DATEM:	(Digital Adaptive Tracking of Echo Movement)
Programming security:	Via Passcode (user selectable)
Programmed data integrity:	Via non-volatile RAM

POWER SUPPLY

115V ac +5% / -10% 50-60Hz

230V ac +5% / -10% 50-60Hz

dc 10-28V

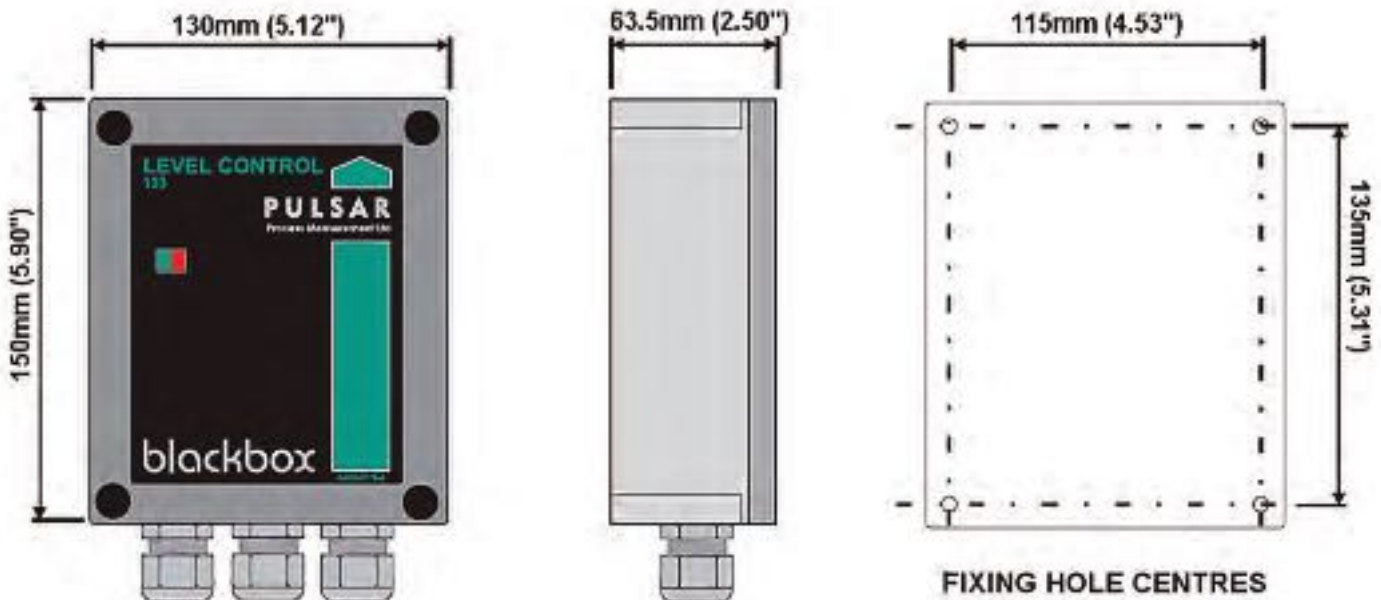10W maximum power (typically 5W)

HAND HELD PROGRAMMER

Power supplied via Blackbox RS232 RJ11 connector

FUSES

50mA at 200 - 240V ac

100mA at 90 - 120V ac

Dimensions: Blackbox Standard

130mm (5.12")

150mm (5.90")

LEVEL CONTROL
133

PULSAR
Process Measurement Ltd

blackbox

63.5mm (2.50")

115mm (4.53")

135mm (5.31")

FIXING HOLE CENTRES

UKAS
QUALITY
MANAGEMENT

011
sira
ISO 9001:2008
Registered Company
Cert No.950136-1

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ENVIRONMENTAL
MANAGEMENT

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