Smart Storm

USI

UNIVERSAL SMART INSTRUMENT

Intelligent Flow, Level and Water Quality Monitoring

ONE INSTRUMENT.
MULTIPLE APPLICATIONS.

The USI is designed to input several parameters on a single, easy to programme instrument – meaning the user saves on both purchasing and operating costs.

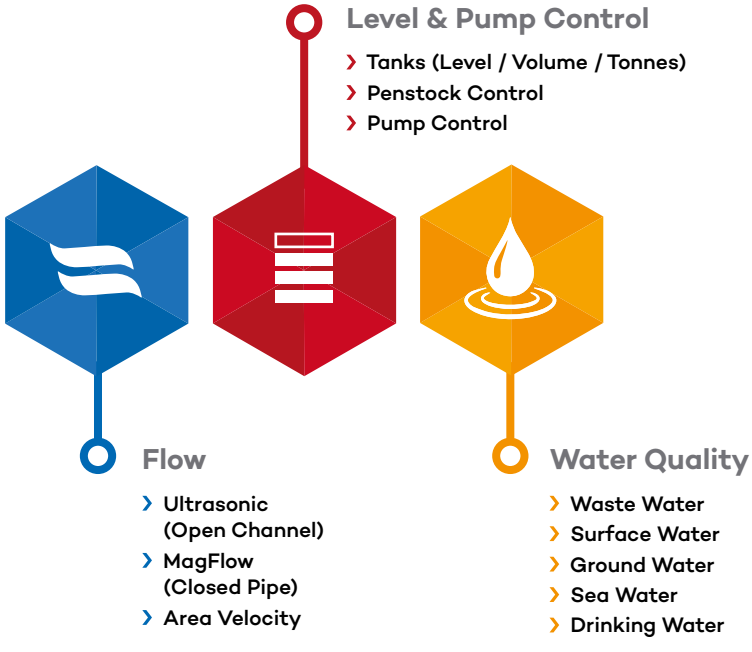
The Universal Smart Instrument (USI) is an innovative monitoring instrument and data logger that delivers multi-parameter measurement in a single device. Several standard instruments can therefore be replaced by a single USI in a wide range of clean water and waste water applications.

Whilst giving highly accurate and reliable monitoring, the USI sets itself apart from traditional instrumentation by utilising powerful processors (as used in smartphones and satellite navigation) and dynamic software to display real-time data and graphs on its 7 inch high resolution touch screen. This provides the user with unrivalled accessibility and clarity of information.

Based on the robust and reliable industrial version of Windows, the USI is as intuitive and simple to operate as a home computer, which makes both programming and operation simple and efficient. With superior functionality and multiple communication outputs, measurement and control has never been so simple.

The USI is the result of four years research and development. Designed solely with the end user in mind it is the market leader in terms of both functionality and user experience.

MULTIPLE MEASUREMENTS



WATER AND WASTEWATER SPECIALISTS

Built on its research and advanced capability Smart Storm has always been at the forefront of innovative products for the water and waste water industries and has won many prestigious UK and European awards for its innovative technology.

FEATURES AND BENEFITS

One instrument - multiple sensors inputs

- Reduced purchasing costs
- Less space required
- One instrument to programme
- Multiple data collected in one place and format

Windows programming

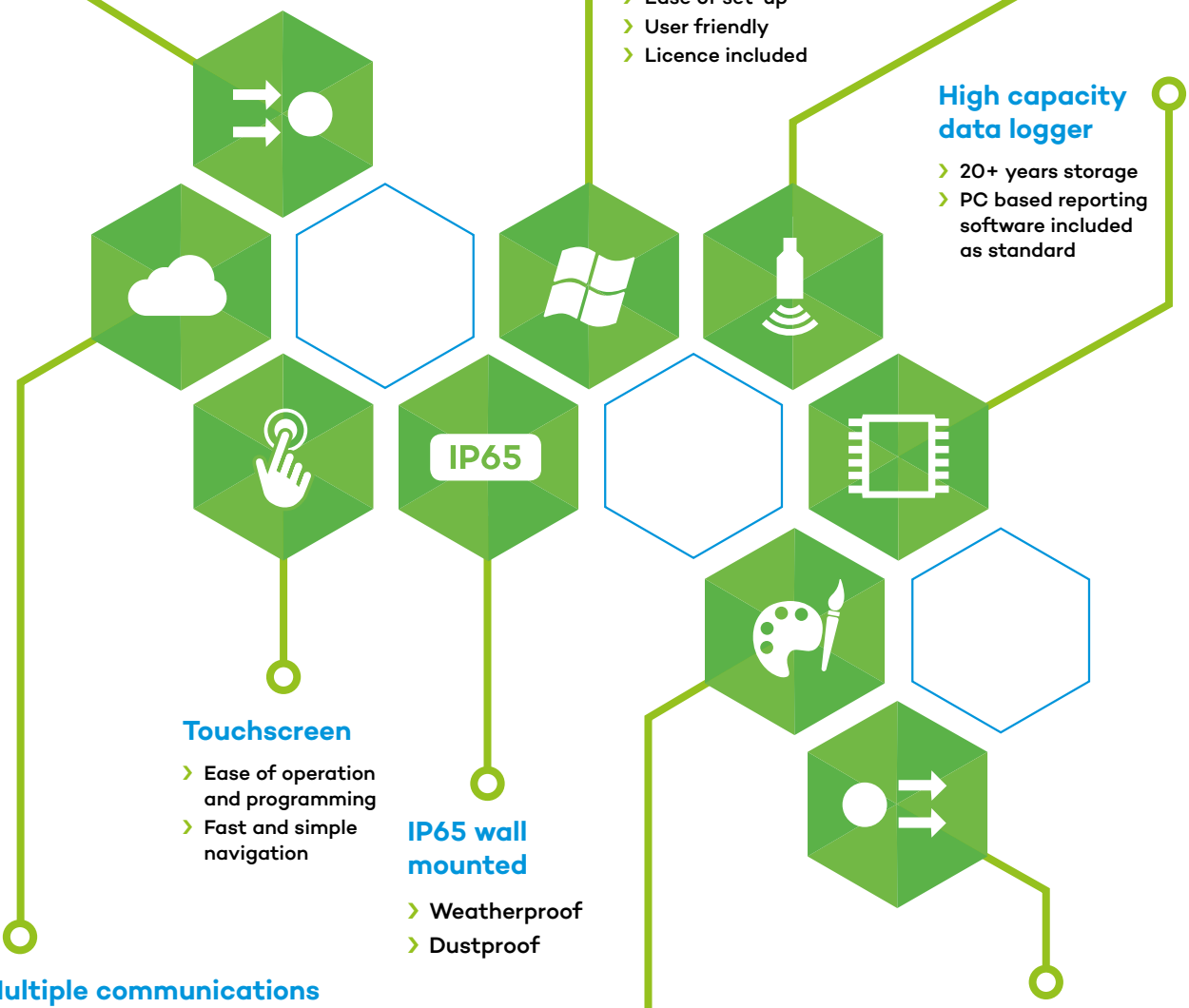
- Familiar and intuitive
- Ease of set-up
- User friendly
- Licence included

Smart sensors

- Reliable and accurate measurement
- Digital signal processing
- Excellent signal quality in extreme operating environments

High capacity data logger

- 20+ years storage
- PC based reporting software included as standard



Touchscreen

- Ease of operation and programming
- Fast and simple navigation

IP65 wall mounted

- Weatherproof
- Dustproof

Multiple communications

- USB – quick and convenient data download
- GPRS – cloud upload and storage
- GSM – text alerts
- Ethernet – building management/ remote PC
- RS232 – RF transmitter

Graphic colour display

- User selectable colour schemes for various light conditions
- Real-time and historical trend graphs instantly viewable on USI display
- On screen echo profiling and tank mapping

Multiple outputs

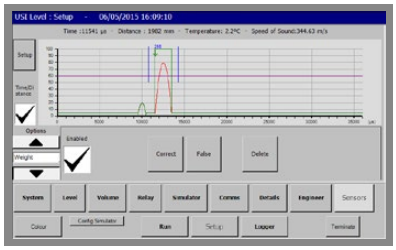
- Six programmable relays as standard (expandable to 16)
- Two 4-20mA outputs

INFORMATION & DISPLAY FEEDBACK

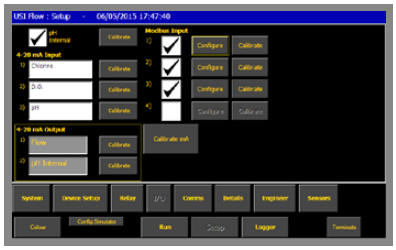
Smart Storm recognises that most industrial control products are a nightmare to programme and often require specific training or hours of referencing complex user manuals. Confusion and uncertainty often reign when programming such instruments, and small single or multi-line displays give little information feedback to the user.

Hence, the USI has been developed to offer a new dimension in intuitive programming and information feedback. The software is wholly consumer orientated and intentionally designed to give the user a positive programming experience, without confusion and without uncertainty. Programming options are instantly available through intuitive menus and give clear and precise options. Graphics are used to give clear choices when appropriate and parameter selection is simplicity itself. Programming pages are separated on the graphics display and once programmed users can simply and easily review their programme choices on a single display screen.

Just like a smartphone, the USI menus are quick and simple to navigate!



Echo Profiling



Input & Output Set-up

Live Flow Data

Beautifully Simple – Windows CE is recognised as the most reliable and easy to use operating system.

Stunning touchscreen displays

The USI gives an enhanced user experience through its 7 inch full colour TFT touchscreen. This delivers sharp images, detailed real-time information and intuitive programming. The user even has the option to change background colours to compensate for different ambient light conditions (examples on opposite page).

Real-time, On-screen Flow Trend Graph

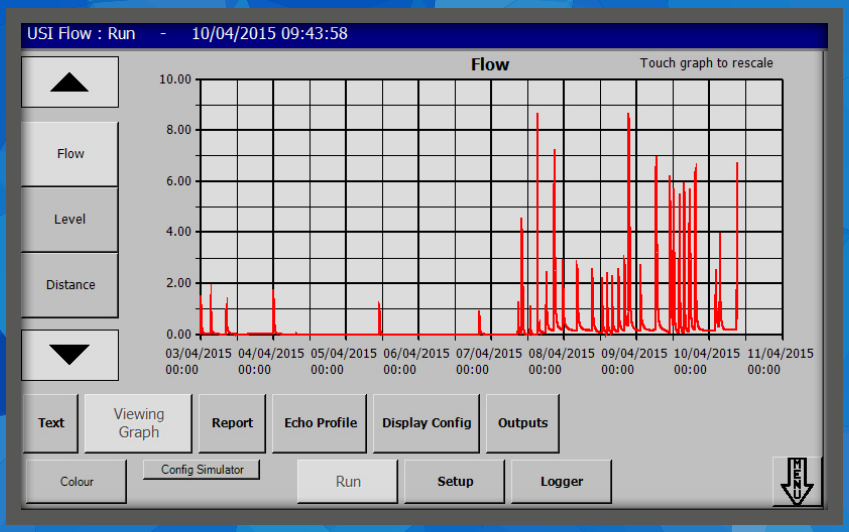
The user can choose to display real-time data as either a running trend graph or as live text fields. Graphs can be scaled by the user to show trends over different time periods. Historical data from the internal data logger can be viewed on screen for instantaneous analysis without the need to download to a PC.

Relay Set-up

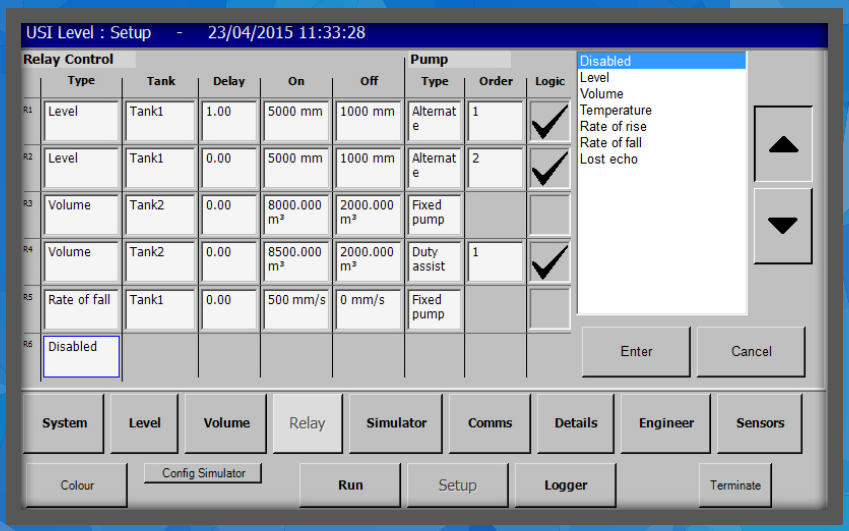
The USI excels in its ease of programming; for example, relays can be simply programmed by selecting from a choice of fields accessed via drop down menus. The integral graphical simulator enables the user to simulate filling and emptying tanks, so the user may check his or her control process remotely.

Tank Selection

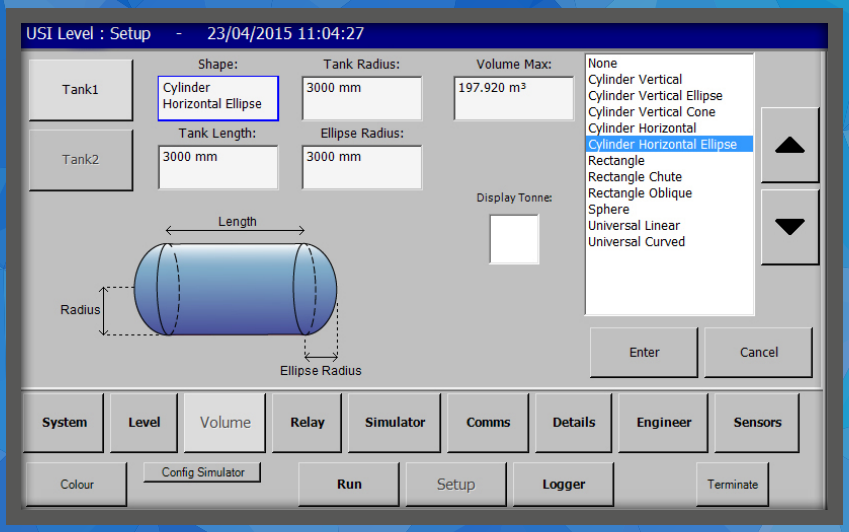
In level applications, tank shapes are selected from a pre-programmed list and the chosen tank is displayed on screen as a three-dimensional image. All information is clearly displayed, thus avoiding confusion and uncertainty often found when programming other less advanced products.



Flow Trend Graph



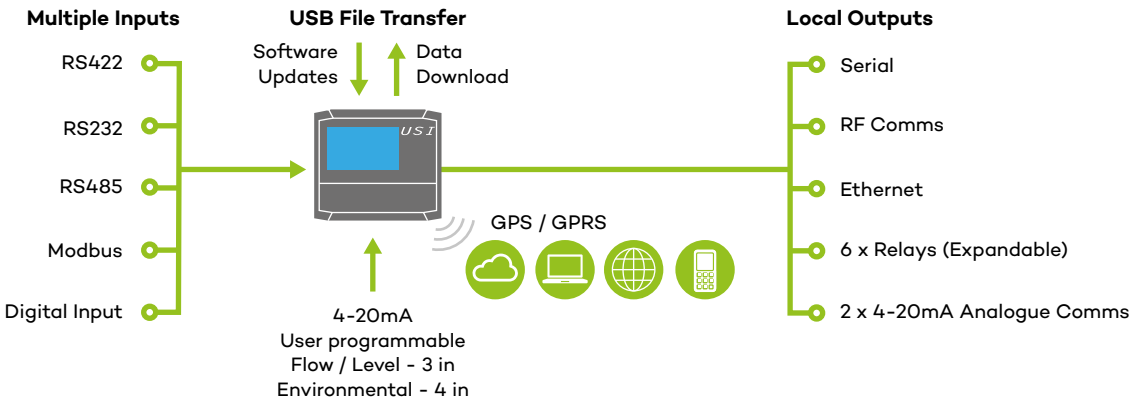
Relay Set-up



Tank Selection

COMMS / USER APPLICATIONS

Universal Communications



Core Measurement Applications

Flow

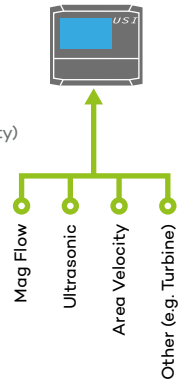
Inputs

1 x Digital Flow Sensor (i.e ultrasonic & area velocity)

4 x Modus Sensors (i.e Digisens water quality)

1 x Dedicated pH

3 x 4-20mA (e.g. Magflow, turbine, external pH input etc.)

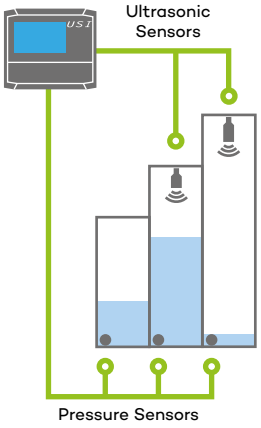


Tank Level / Volume / Tonnes

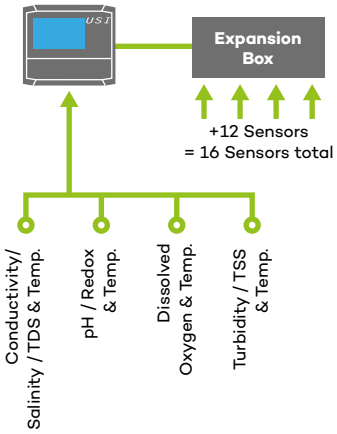
Inputs

2 x Digital Ultrasonic Level

3 x 4-20mA Inputs (e.g. pressure sensor, level switch, temp sensor etc.)

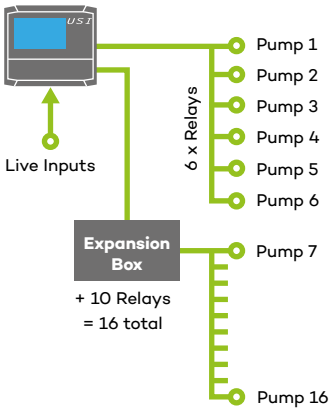


Water Quality

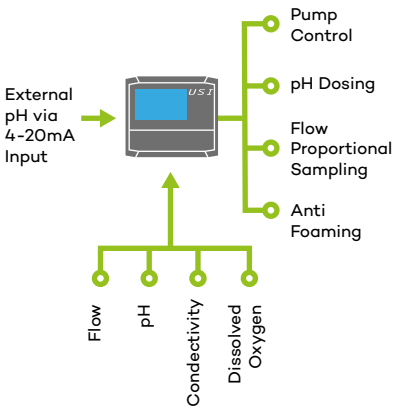


Typical User Applications

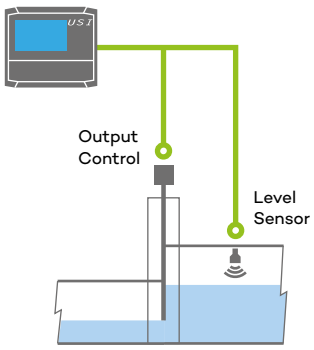
Pump Control



Effluent



Penstock Control



Note: For advice on how the advanced functionality of the USI can be used in other specific applications please visit our website or contact our engineers.

DIGITAL SENSORS

Ultrasonic Sensors for Level and Flow

Smart Storm has developed the world's most advanced range of ultrasonic sensors which use Field Programmable Array Processors (FPGA) incorporated into the sensor body.

Known for high reliability the FPGA processor can be programmed directly from the USI and parameters such as sensor frequency, firing delay and signal amplitude can all be controlled and adjusted by the user. ***All sensors benefit from integrated temperature sensors as standard***. Available in ranges from 3m to 20m the DIGISON range of ultrasonic sensors offer unrivalled performance.

Water Quality Sensors

The DIGISENS range of water quality sensors has been developed with advanced digital signal processing within the sensor body for high accuracy measurement in a range of applications. Designed to be compact and robust, ***all sensors benefit from integrated temperature sensors as standard***. With Modbus interface up to 4 sensors of any combination can be connected directly to the USI, or up to 16 via an additional input expansion module.

WATER QUALITY (DIGISENS SENSORS)

PH / REDOX (ORP) & TEMPERATURE

SSPH Sensor

Range: pH 0-14 units
Radox –1,000 - +1,000 mV

Applications:

- Pure mountain water > 20 µS/cm
- Lakes and rivers 100 – 2000 µS/cm
- Seawater > 50 mS/cm
- Wastewater > 200 mS/cm

Data Sheet: SSPH

CONDUCTIVITY / SALINITY & TEMPERATURE

SSCS Sensor

Range: 0-200 mS/cm

Applications:

- Urban wastewater treatment
- Industrial effluent treatment
- Surface water monitoring
- Sea water
- Drinking water

Data Sheet: SSCS

NEPHELOMETRIC TURBIDITY & TEMPERATURE

SSNT Sensor

Range: 0-4000 NTU or 0-4500 mg/L

Applications:

- Urban wastewater treatment (inlets/outlet controls)
- Sanitation network
- Industrial effluent treatment
- Surface water monitoring
- Sea water
- Drinking water

Data Sheet: SSNT

OPTICAL DISSOLVED OXYGEN & TEMPERATURE

SSDO Sensor

Range: 0,00-20,00 mg/L, 0,00-20,00 ppm, 0-200%

Applications:

- Urban wastewater treatment
- Industrial effluent treatment
- Surface water monitoring
- Drinking water

Data Sheet: SSDO

LEVEL

	Range	Frequency
DIGISON 3	3m	150kHz
DIGISON 6	6m	80kHz
DIGISON 10	10m	60kHz
DIGISON 20	20m	40kHz

(All models include temperature sensors)

Applications:

- Liquid and solid level
- Pump Control
- Penstock Control

Data Sheet: DIGISON 3-20

FLOW

Open Channel	Range	Frequency
DIGISON 3	3m	150kHz
DIGISON 6	6m	80kHz

(All models include temperature sensors)

Closed Pipes

FLOWMAG 3000

Range: 0.028-48858 m^3/h

Pipe sizes: DN10-1200mm / DN $^3/_8$-48"

Liquid temp. 0-150°C

Applications:

- Open Channel Flow
- Closed Channel Flow
- Effluent Flow
- Process Flow

Data Sheets: DIGISON 3-6
FLOWMAG 3000

AREA VELOCITY

SSAV 60mA / 5 secs

Dual-Wave Ultrasonic Doppler technology.

High resolution 15PSI stainless steel pressure transducer.

Measures flow in channels up to 9m without loss of depth accuracy.

Applications:

- Open Channel Flow
- Surveys
- Irrigation control

Data Sheet: SSAV

Note: Measurement ranges are based on optimum conditions.
Please see relevant data sheets for full sensor specifications.

USI SPECIFICATIONS

STANDARD SPECIFICATIONS	
Display	7" High Resolution Full Colour TFT LCD Graphics Display 800x480 Anti-Glare
Programming	Touch Screen or Remote Keypad via USB Port
Operating System	Windows CE 6.0 R3 (licence included)
PHYSICAL	
Dimensions (mm)	234 (H) x 264 (W) x 142 (D) mm
Ratings	IP65/DIN VDE 60529 NEMA 12
Approvals	ABS Lid UL94 HB/1.6 Polyamide Base UL94 VO/1
Mounting	4 Fixing Holes (optional wall brackets or DIN-rail holder)
POWER	
Supply (AC)	Universal Power Supply 85 - 264V ~ 15W
Supply (DC)	18 - 36V (optional)
ELECTRONIC PERFORMANCE	
Processors	Dual Processors with SPARTAN 3AN FPGA and ARM CPU
Internet Connectivity	Via Ethernet, GPRS Modem or optional Wi-Fi
Logger	512MB NAND Flash plus Internal SD Card
Temperature Range	–20 to +70°C (–4 to +176°F)

STANDARD FEATURES

- User Selectable Display
- Trend Graph with Zoom Control
- Simple, fast and intuitive programming
- Tab based Menu Selection
- 6 different User Configurable Display Colours for different light conditions
- Up to 20 years Logging Capacity
- Historical Data Viewable on USI Display without the need to download to PC
- USB Data download
- Cloud based Data Retrieval*
- GSM Message Alerts*
- Internal Address Book for GSM Message Alerts
- Windows based Data Presentation Software included for PC Report Generation
- Fault and Event Logging
- Echo Profiling and Tank Mapping**
- Easily modified to meet bespoke programming requirements
- Units: SI and Imperial
- Service Reminder Alarm
- 6 LEDs to indicate Relay Status
- 3 layers of Password Protection

USI LEVEL	USI FLOW	USI WATER QUALITY
Dedicated Measurement Inputs		
› Ultrasonic Level (2 channels) › Displays Level, Distance, Volume and Tonnes	› Ultrasonic Open Channel Flow (single channel) OR › Area Velocity Flow (single channel)	› 4 Modbus Sensors (4 channels) in any combination from: pH, ORP, Dissolved Oxygen, Conductivity, Salinity, Turbidity, Suspended Solids, Temperature › Expansion Modules for up to 16 Sensors
› pH Sensor (single channel)	› pH Sensor (single channel)	
Auxiliary Measurement Inputs		
› 4-20mA or 0-20mA - 3 channels (isolation optional) 0.1% resolution › Configurable for numerous inputs from other devices including: Pressure, Specific Gravity, pH, ORP, Dissolved Oxygen, Chlorine, Temperature › 4-20mA channels configurable as Float Switch Inputs	› 4-20mA or 0-20mA - 3 channels (isolation optional) 0.1% resolution › Configurable for numerous inputs from other devices including: pH, ORP, Dissolved Oxygen, Chlorine, Temperature, Mag Flow, Turbine Flow › User defined axis over 4-20mA range	› 4-20mA or 0-20mA - 4 channels (isolation optional) 0.1% resolution
› Digital Input	› Digital Input	› Digital Input
Outputs		
› 4-20mA or 0-20mA - 2 channels, isolated, expandable to 16 outputs › Configurable to any input	› 4-20mA or 0-20mA - 2 channels, isolated › Configurable to any input	› 4-20mA or 0-20mA - 2 channels, isolated, expandable to 16 outputs › Configurable to any input
› Digital Output	› Digital Output	› Digital Output
Comms		
› Ethernet: 100BaseT, 10BaseT for Building Management System (BMS) or data retrieval to remote PC › USB External (2 channels) › USB Stick: USB2.0, FAT file system	› Ethernet: 100BaseT, 10BaseT for Building Management System (BMS) or data retrieval to remote PC › USB External (2 channels) › USB Stick: USB2.0, FAT file system	› Ethernet: 100BaseT, 10BaseT for Building Management System (BMS) or data retrieval to remote PC › USB External (2 channels) › USB Stick: USB2.0, FAT file system › RS232
› ModbusRS485*, RTU and ASCII, Baudrate: 9600 or 19200, Parity: none, even or odd, DataBits: 8, StopBits: 1 or 2	› Modbus RS485*, RTU and ASCII, Baudrate: 9600 or 19200, Parity: none, even or odd, DataBits: 8, StopBits: 1 or 2	› Modbus RS485*, RTU and ASCII, Baudrate: 9600 or 19200, Parity: none, even or odd, DataBits: 8, StopBits: 1 or 2
› RS232: GPRS Modem or RF Link	› RS232: GPRS Modem or RF Link	› RS232: GPRS Modem or RF Link
Relays		
› 6 Fully Programmable Relays (10A @230Vac)	› 6 Fully Programmable Relays (10A @230Vac)	› 6 Fully Programmable Relays (10A @230Vac) expandable to 16
Additional Features		
› Graphical Selection of 9 Tank Shapes › 32-point Lookup Table for non-standard tanks › Fast access to on-screen 7-day Report › Advanced Programmable Pump Control › Pump Control Simulator › Real-time Echo Profiling and Tank Mapping on USI Display › Data Logging of all Parameters › User Naming of Tanks › Differential Level	› Real-time Echo Profiling and Tank Mapping on USI Display › Fast access to on-screen 7-day Report › 8 Primary Devices, Manning Formula and 32-point Lookup Table › Penstock Control › Real-time Echo Profiling and Tank Mapping on USI Display › Data Logging of all Parameters	› Data Logging of all Parameters › Fast access to on-screen 7-day Report › User Naming of all Measurement Inputs › Integral Temperature Sensors on all Modbus Probes Notes: * Requires external modem ** USI flow and level only *** Via optional daughter board

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ISO 9001:2008 REGISTERED FIRM

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