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## Product Overview

Carbon Dioxide, Density & Level Measurement

# Introduction

Canongate Technology is a leading supplier of process measurement technology for level, liquid concentration and density and Carbon Dioxide. Using our unique non invasive ultrasonic technology our products are widely used amongst World leading organisations in the Petrochemical, Pharmaceutical, Beverage, Refrigeration and Transport industries.

Our proven technology developed through experience is well suited for level, liquid concentration and density across numerous applications. The non tank break in ensures no downtime is lost during the easy installation process, and our products require minimal maintenance thus reducing the overall cost of ownership. This low cost highly reliable solution that is suitable for most shapes of tanks and materials has been successfully monitoring our customers requirements in facilities of World leading companies throughout the globe.

## Rototherm Group

Since 2012, Canongate Technology has become a prominent member of the Rototherm Group - a global leader in the measurement of Temperature, Pressure, Flow and Level.

With over 170 years of manufacturing and in-house knowledge coupled with technical and on-site expertise we have the experience to ensure you find the correct instrumentation solution for your specific application.

In addition to our experience and expertise our worldwide presence and local market knowledge allows us to provide technical and sales support when and wherever it is needed.

With experience throughout Oil & Gas, Pharmaceutical, Water, Transport, Beverage, Power, Defence, Chemicals & Refining industries and the seal of approval from these industry leaders we have no doubt that by choosing Rototherm products and services you too will have confidence in knowing that your processes are been monitored by the highest quality and reliable product along with peace of mind knowing support is available 24/7.

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## DensiCheck TX

### In-line liquid concentration transmitter

DensiCheck TX is an economic answer to the problem of monitoring liquid concentration and density in a wide variety of applications.

Available as an in-line transmitter in both Non-invasive and invasive formats.

DensiCheck TX provides a continuous output of concentration to enable processes to be optimised.

The result - reduced rework, improved quality and lower costs.

Approved for ATEX installations.

On applications where a non-invasive instrument is required, Canongate can supply you with a custom designed sensor. These sensors are typically fitted on a flanged or opened spool piece with a remote connection to the electronics.



### Applications

DensiCheck TX is being used in many different industries to measure the concentration of numerous different liquids including:

- Acetic Acid
- Beer
- Ethanol
- Glycol
- Hydrogen Peroxide
- Nitric Acid
- Sodium Hydroxide
- Sucrose
- Acetone
- Calcium Chloride
- Ethylene Chloride
- Hydrofluoric Acid
- Isopropyl Alcohol
- Phosphoric Acid
- Soft Drinks
- Sulphuric Acid
- Ammonium Hydroxide
- Chromic Acid
- Ferric Chloride
- Hydrogen Chloride
- Methanol
- Sodium Chloride
- Spirits
- Wort

### Features

DensiCheck TX's many features include:

- Non-invasive and invasive process connections
- Zero drift and no-recalibration
- High accuracy and repeatability
- ATEX Hazardous area approval
- No moving parts

### Benefits

DensiCheck TX simplifies liquid concentration measurement bringing countless benefits of ownership such as:

- Lower installation and maintenance costs
- High reliability
- Low ownership costs
- Increased process efficiency
- Improved quality monitoring

### Working Principle

DensiCheck TX uses the established principal that sound velocity in a liquid is related to its concentration. Ultrasound pulses are transmitted through the liquid and reflected to their source. The time of transmission is measured using advanced highspeed electronics, and the variation is converted by the on-board microprocessor to a signal representing the liquid concentration. Temperature is automatically compensated for by an integral sensor, and the resulting value of transmitted via an analogue or digital signal to a suitable display or host controller.

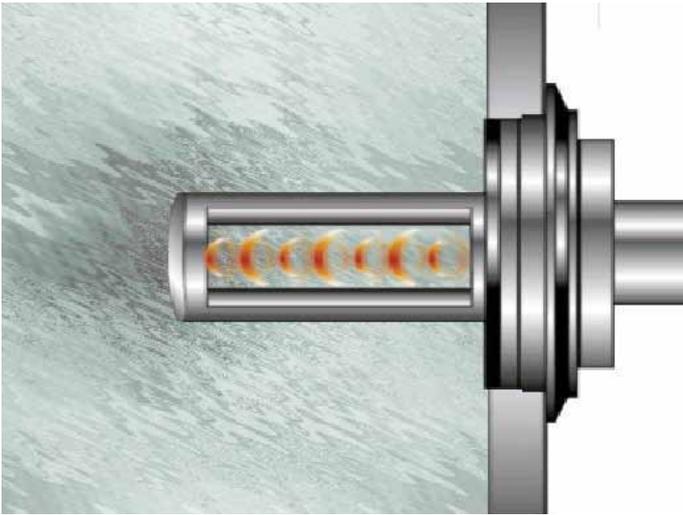
### Mode of Operation

DensiCheck TX is designed to hold a two pre-loaded calibration for measuring two liquid types at a single process point. For multi-line or multi-product applications, DensiCheck TX can be combined with a separate Display/Control unit to form a DensiCheck 2000 System capable of monitoring up to four lines with 32 different calibrations.

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## Sensor Options



There are also intrusive options with integral temperature sensor.

## Specifications

General	
<b>Rating</b>	IP65
<b>Accuracy</b>	Typically +/- 0.1%
<b>Repeatability</b>	+/- 0.01 m/s, +/- 0.02°C
<b>Response Time</b>	< 1 second
<b>Update</b>	Every 2 seconds
<b>Stability</b>	No drift
<b>Calibrations</b>	Two
<b>Supply</b>	24Vdc, 250 mA
<b>Output</b>	0..5V or 4..20 mA (Active) Maximum -Loop resistance 500 Ω Non-isolated Two digital for hi/lo alarm open collector
<b>Input</b>	One digital for flow indication
<b>Electronics Approval</b>	Ex II 2G EExd II B T5 (-20°C ≤ Ta ≤ 60°C) DEMC: 03 ATEX 135596X
<b>Serial Communications</b>	RS485, Modbus RTU / ASCII Comm2

Ultrasonic Transducer	
<b>Rating</b>	Ex II 2G Exmb II CT5 GB (-20°C ≤ Ta ≤ 60°C)
<b>Temperature</b>	-10 to +110°C (continuous) (14° to 230°F) 150°C (5 min intermittently) (302°F)
Process Connections	
DensiCheck TX can be supplied with various process connections, including:	
<ul style="list-style-type: none"> <li>• Non-invasive strap-on / Min. dia 50mm (2")</li> <li>• Varivent - Probe depth 63 mm</li> <li>• Tri-clamp (2 1/2") - Probe depth 81mm</li> <li>• Flanged (2 1/2") - Probe depth 133 mm</li> <li>• DIN 50 - Probe depth 63 mm</li> </ul>	

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# VesselCheck

## Non-Invasive Liquid Level Measurement



VesselCheck is a highly versatile and accurate range of non-invasive liquid level measurement systems, comprising a signal processing unit and ultrasonic transceivers.

### Working Principle

Ultrasonic sensors are clamped or bonded to the outside walls of the vessel; one on the bottom of the vessel, with the fully density compensated option, one on the side. Signals from the transducers are fed into the processor and either displayed locally, if that option is selected, or output to a separate system. The system calculates the height and volume of the liquid in the tank, from the time taken for the signal to be received from the liquid surface.

### Benefits

- Fast, reliable and accurate tank contents measurement
- Not affected by pressure
- Easy installation - no tank break-in, easy retrofit to existing tanks
- No down-time during installation
- No moving parts – little or no maintenance required

### Features

- Ultrasound technology proven for over twenty years
- Fits tanks of most shapes and sizes above ground
- Truly non-invasive sensing technique
- Sensors bonded to outside of tank base and side wall
- Optional local display and/or output to higher level system for up to two tanks



### VesselCheck Range Overview

Typical Application	Maximum Height	Number of Tanks	Hazardous Area Approval	Display	Variant
High accuracy: beer, spritis, acids, solvents, water, LPG spheres, wine	20 metres	2	Optional	Optional	ST2
Less accurate: LPG spheres, wine	20 metres	4	Optional	Optional	ST4
Fuel, water, light oils, acids	3 metres	1	No	Optional	ST1
LPG, small spirit tanks	3 metres	1	Sensor Only	Optional	ST1(A)
LPG, solvents, acids, fuels, Sulphur Dioxide, Chlorine	3 metres	1	Sensor & Processor	Yes	ST1AD
Refrigerent Gas	2 metres	1	No	Optional	ST1(R)
Graphic colour operator interface terminal & evaluation unit for use with VesselCheck systems	N/A	Up to 32	No	Yes	VCHMI

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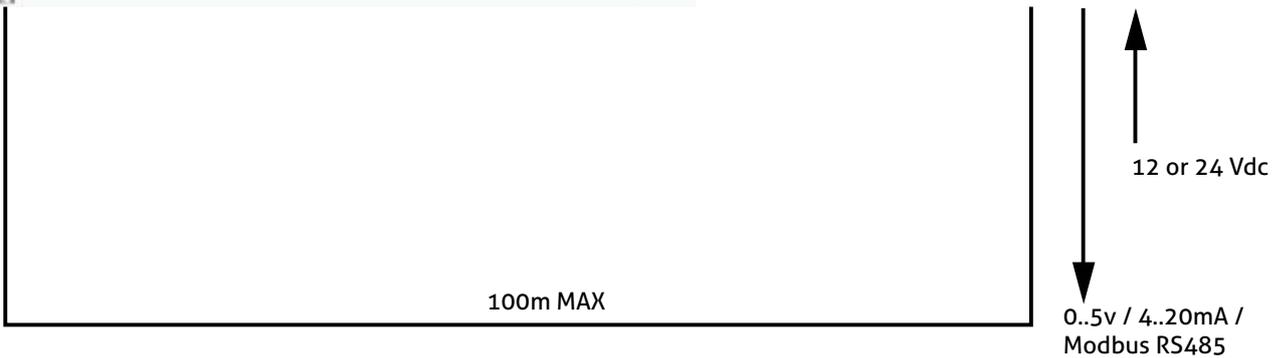


# VesselCheck ST1

## Non-Invasive Tank Level Gauge



Processor / Display Unit



### Principle of Operation

A small ultrasonic sensor is clamped or bonded to the outside base of the vessel. The system calculates the height of the liquid in the tank from the time taken for the signal to be transmitted and then received from the liquid surface. Signals from the transducer are fed into the processor and then output to a separate system. The package is supplied as a sensor / processor pair.

A temperature integrate ultrasonic sensor is available offering compensation for the effects of varying temperatures.

### Features:

- Truly non-invasive sensing technique
- Sensors bonded to outside of tank base
- Fits tanks of most shapes and sizes
- Output to telemetry system – various options
- ATEX / IECEx approved for hazardous areas (ST1A sensor)
- Temperature integrated sensors available

### Benefits:

- Low cost, reliable & accurate tank gauging
- Not affected by pressure
- Easy installation - no tank break-in
- Simple retrofit to existing tanks
- No down-time during installation
- No moving parts – no maintenance



### Applications:

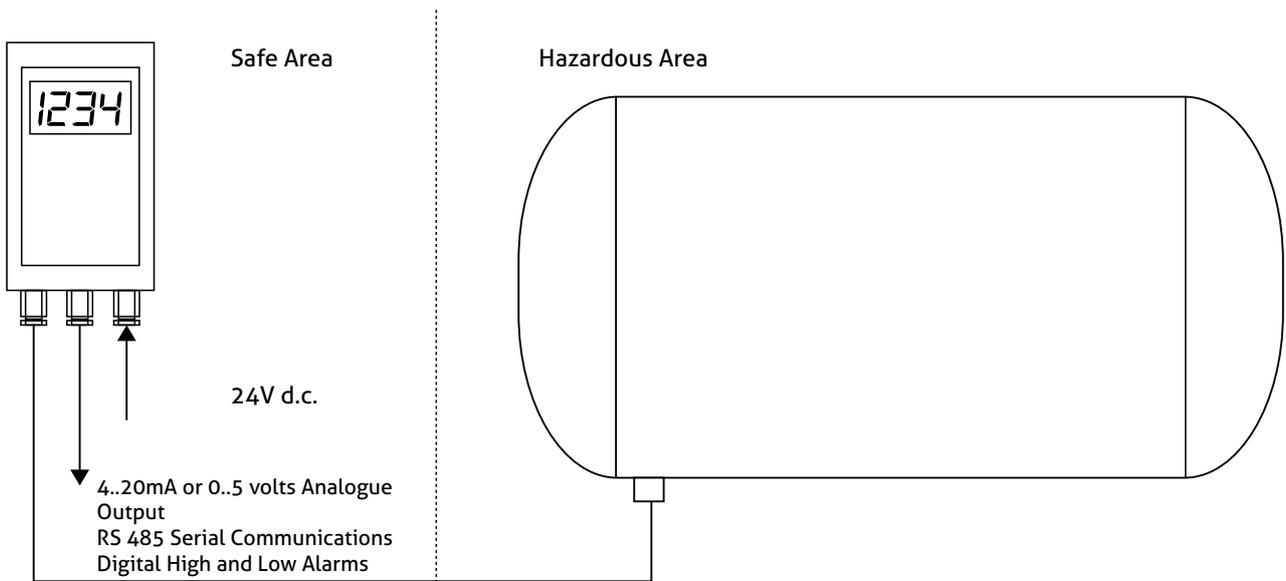
- Refrigerant receivers (up to 2000mm)
- LPG tanks
- Fuel Tanks
- Distilled spirit vats
- Beers tanks
- Pure water tanks
- Liquid chlorine tanks
- Acids/solvents tanks

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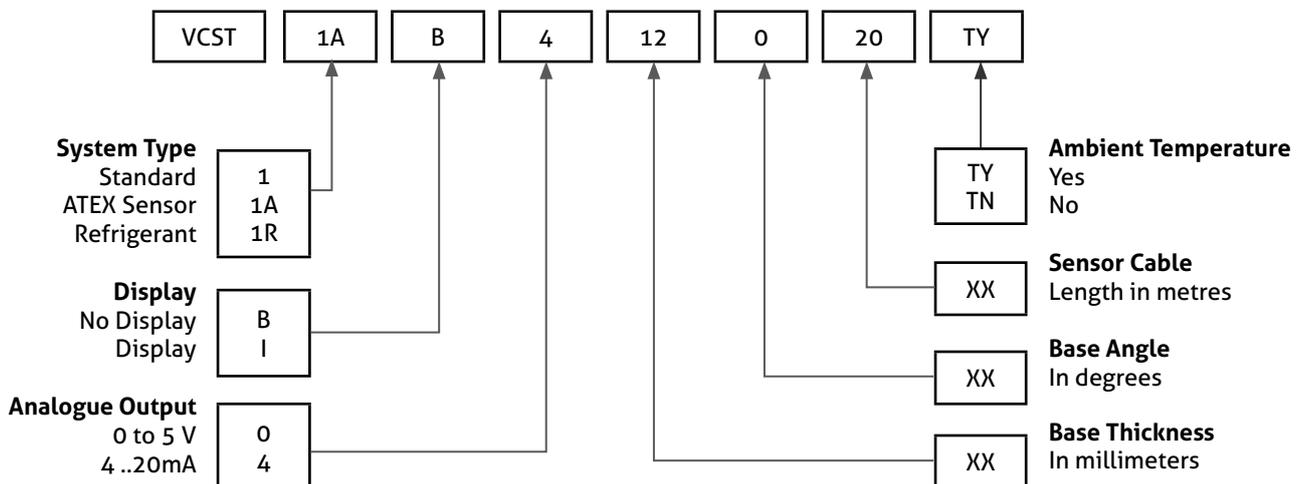


### Vessel Check ST1 - Technical Specification

<b>Accuracy</b>	Depends on liquid and temperature range
<b>Measuring Range</b>	Up to 3000mm / 10 feet (application dependent)
<b>Temperature Range (sensors)</b>	-20°C to +125°C / - 40°F to 257°F
<b>Hazardous Area Approval (sensors)</b>	Ex mb IIC T5 Gb (-20°C ≤ Ta ≤ 60°C) Cert No. IECEx BAS 11.00.0039X
<b>Analogue Outputs (optional)</b>	4..20mA (active) / 0..5Vdc
<b>Digital Alarm Outputs (optional)</b>	2 x Solid state volt-free contacts
<b>Max distance (processor to sensor)</b>	100m (it is recommended that this distance is kept as short as possible)
<b>Serial Outputs</b>	RS485, Modbus RTU / ASCII
<b>Power Supply</b>	12 or 24Vdc
<b>Protection Rating (processor)</b>	IP65
<b>Protection Rating (sensor)</b>	IP66
<b>Sensor Material</b>	Tufnol + stainless steel housing for ST1A version
<b>Processor Enclosure Material</b>	Polycarbonate
<b>Display Size (optional)</b>	70x43mm / 2.75x1.7"
<b>Dimensions (processor / display unit)</b>	150x110x70mm / 6x4.5x3"
<b>Temperature Compensation</b>	Optional via TIVP sensor

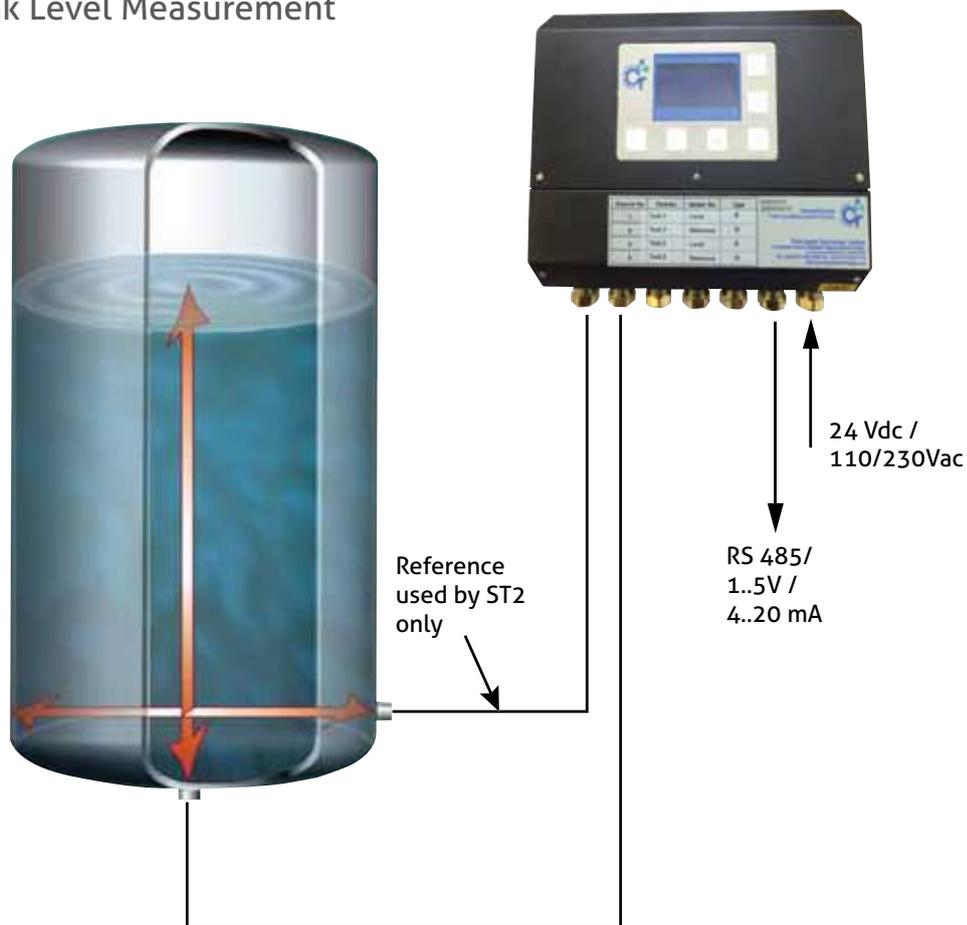


### Product Identification Code (PIC)



## VesselCheck ST2

### Non-Invasive Tank Level Measurement System



### Principle of Operation

The ST2 uses two small ultrasonic sensors bonded or clamped to the outside walls of the vessel - one on the bottom of the vessel and the other on the side, to compensate for variations in sonic velocity and temperature. Signals from the transducers are fed into the processor and displayed locally and/or output to the plant control system. The system calculates the height and volume of the liquid in the tank from the time taken for the signal to be received from the liquid surface.

### Features:

- Truly non-invasive sensing technique
- Sensors bonded to outside of tank base and side wall
- 20 point calibration table
- Optional local display & keypad
- 4..20mA / 1..5V analogue outputs
- RS485 / 232 Modbus serial communications
- ATEX / IECEx approved sensors for hazardous areas available

### Benefits:

- Fast, reliable and accurate tank contents measurement
- Easy installation - no tank break-in, easy retrofit to existing tanks
- No down-time during installation



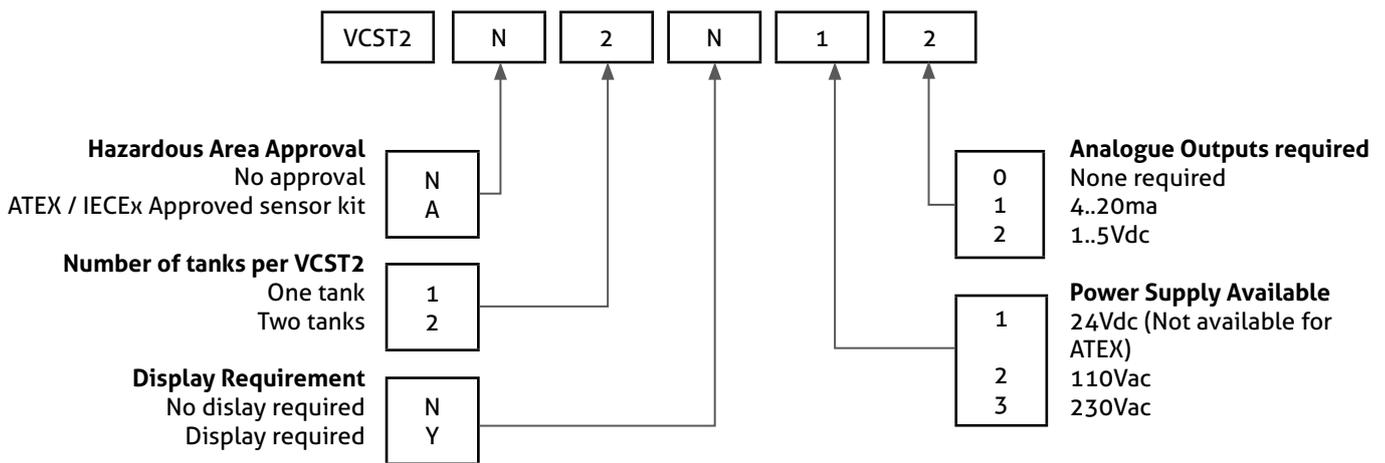
ATEX Sensor shown

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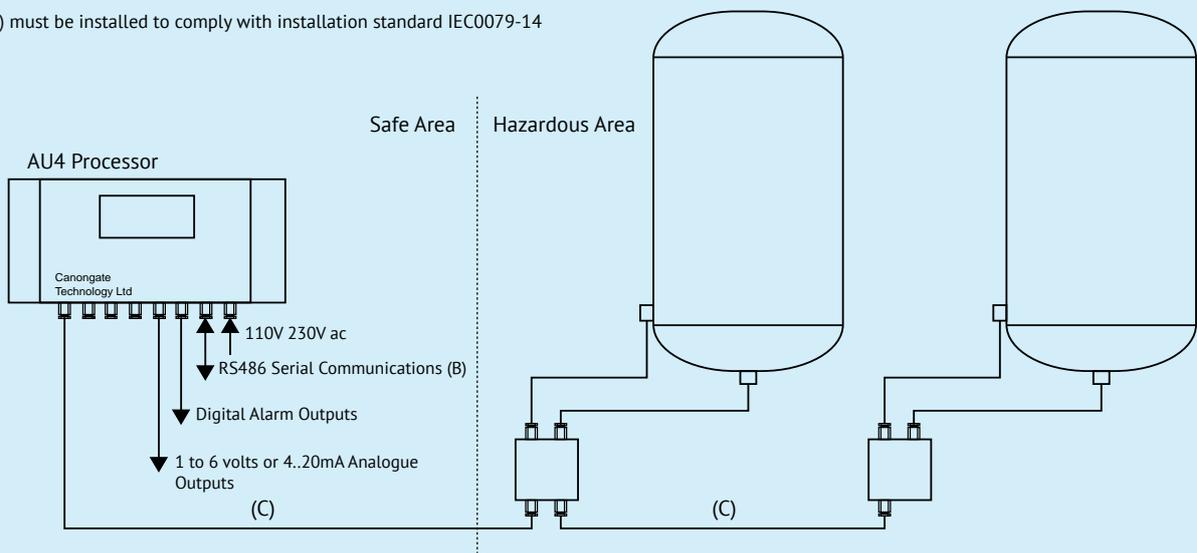
**TECHNOLOGIES**  
We Measure Quality...

Vessel Check ST2 - Technical Specification	
Accuracy	+/- 2mm or better
Repeatability	+/-0.5mm
Measuring Range	75mm to 25 metres / 3" to 80 feet (application dependent)
Temperature Range (sensors)	-20°C to +125°C / - 4°F to 257°F
Hazardous Area Approval (sensors)	Ex mb IIC T5 Gb (-20°C ≤ Ta ≤ 60°C) Cert No. IECEx BAS 11.00.0039X
Analogue Outputs (optional)	4..20mA (active) / 1..5Vdc
Digital Alarm Outputs (optional)	4 x Solid state active outputs (>17Vdc)
Max distance (processor to sensor)	100m
Serial Outputs	RS232, RS485, Modbus RTU / ASCII
Power Supply	24Vdc (N/A for haz area applications) or 110 / 230 Vac, 50/60Hz.
Protection Rating (processor)	IP65
Protection Rating (sensor)	IP66
Sensor Material	Tufnol / Ertacetal
Processor Enclosure Material	High Impact Polystyrene
Display Size (optional)	70x43mm / 2.75x1.7"
Dimensions (processor / display unit)	270x215x85mm / 10.5x8.5x3.5"
Weight (processor)	1.4Kg, 3lbs

Product Identification Code (PIC)

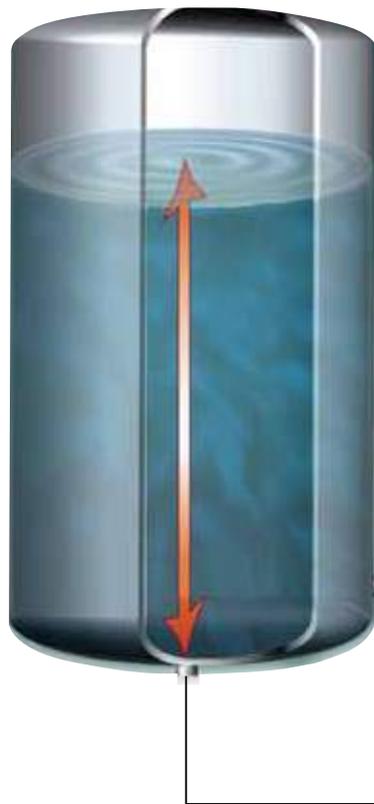


NOTE  
Cable (C) must be installed to comply with installation standard IEC0079-14



# VesselCheck ST4

## Non-Invasive Tank Level Measurement System



24 Vdc /  
110/230Vac

RS 485/  
1..5V /  
4..20 mA

### Features:

- Truly non-invasive sensing technique
- Sensors bonded to outside of tank base and side wall
- 20 point calibration table
- Optional local display & keypad
- 4..20mA / 1..5V analogue outputs
- RS485 / 232 Modbus serial communications
- ATEX / IECEx approved sensors for hazardous areas available
- Various methods of temperature compensation

### Benefits:

- Fast, reliable and accurate tank contents measurement
- Easy installation - no tank break-in, easy retrofit to existing tanks
- No down-time during installation



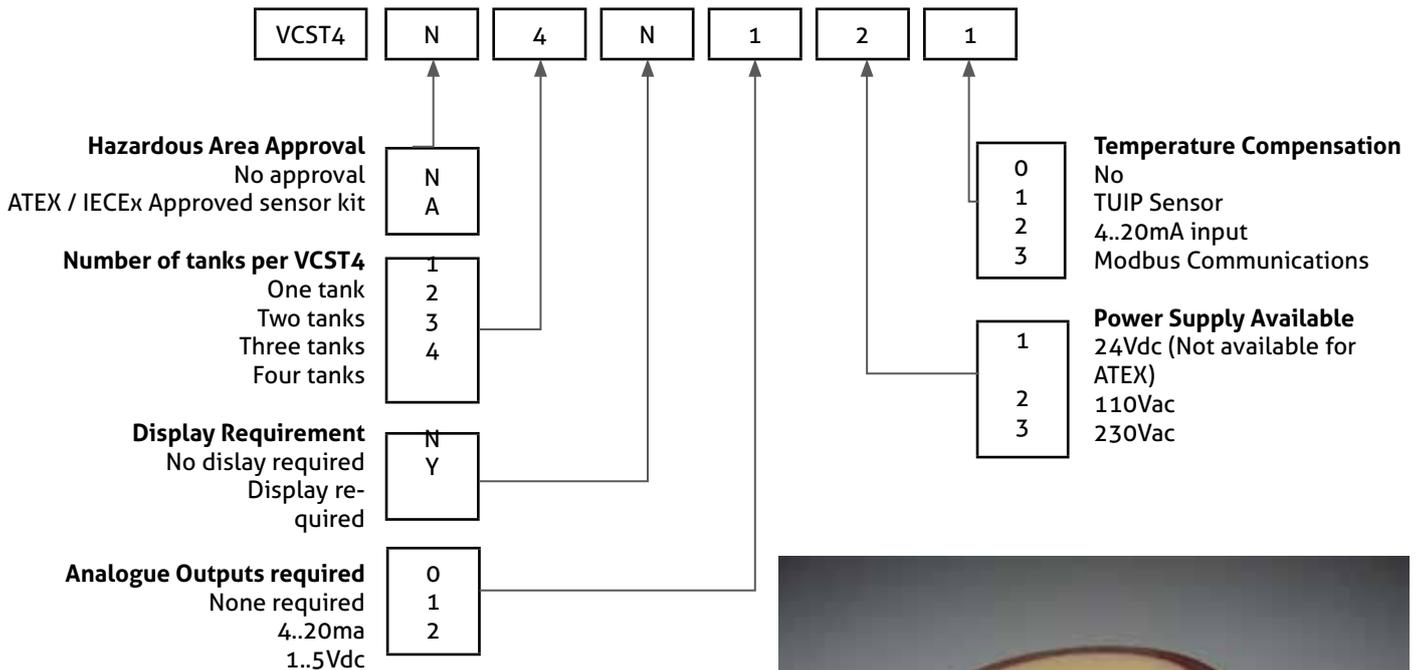
ATEX Sensor shown

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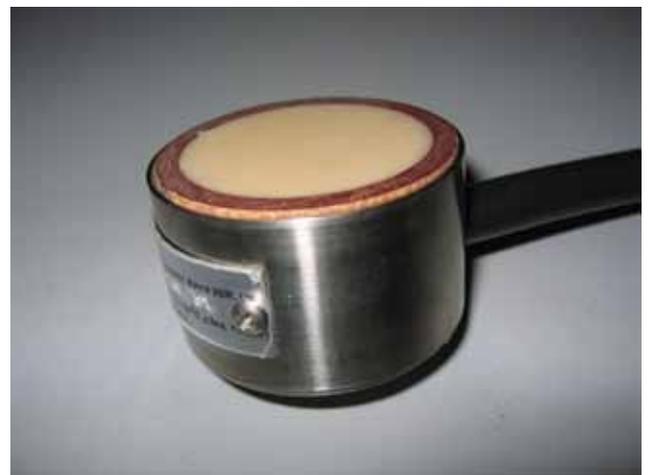


Vessel Check ST4 - Technical Specification	
Accuracy	+/- 2mm or better
Repeatability	+/-0.5mm
Measuring Range	75mm to 25 metres / 3" to 80 feet (application dependent)
Temperature Range (sensors)	-20°C to +125°C / - 4°F to 257°F
Hazardous Area Approval (sensors)	Ex mb IIC T5 Gb (-20°C ≤ Ta ≤ 60°C) Cert No. IECEx BAS 11.00.0039X
Analogue Outputs (optional)	4..20mA (active) / 1..5Vdc
Digital Alarm Outputs (optional)	4 x Solid state active outputs (>17Vdc)
Max distance (processor to sensor)	100m
Serial Outputs	RS232, RS485, Modbus RTU / ASCII
Power Supply	24Vdc (N/A for haz area applications) or 110 / 230 Vac, 50/60Hz.
Protection Rating (processor)	IP65
Protection Rating (sensor)	IP66
Sensor Material	Tufnol / Ertacetal
Processor Enclosure Material	High Impact Polystyrene
Display Size (optional)	70x43mm / 2.75x1.7"
Dimensions (processor / display unit)	270x215x85mm / 10.5x8.5x3.5"
Weight (processor)	1.4Kg, 3lbs

Product Identification Code (PIC)

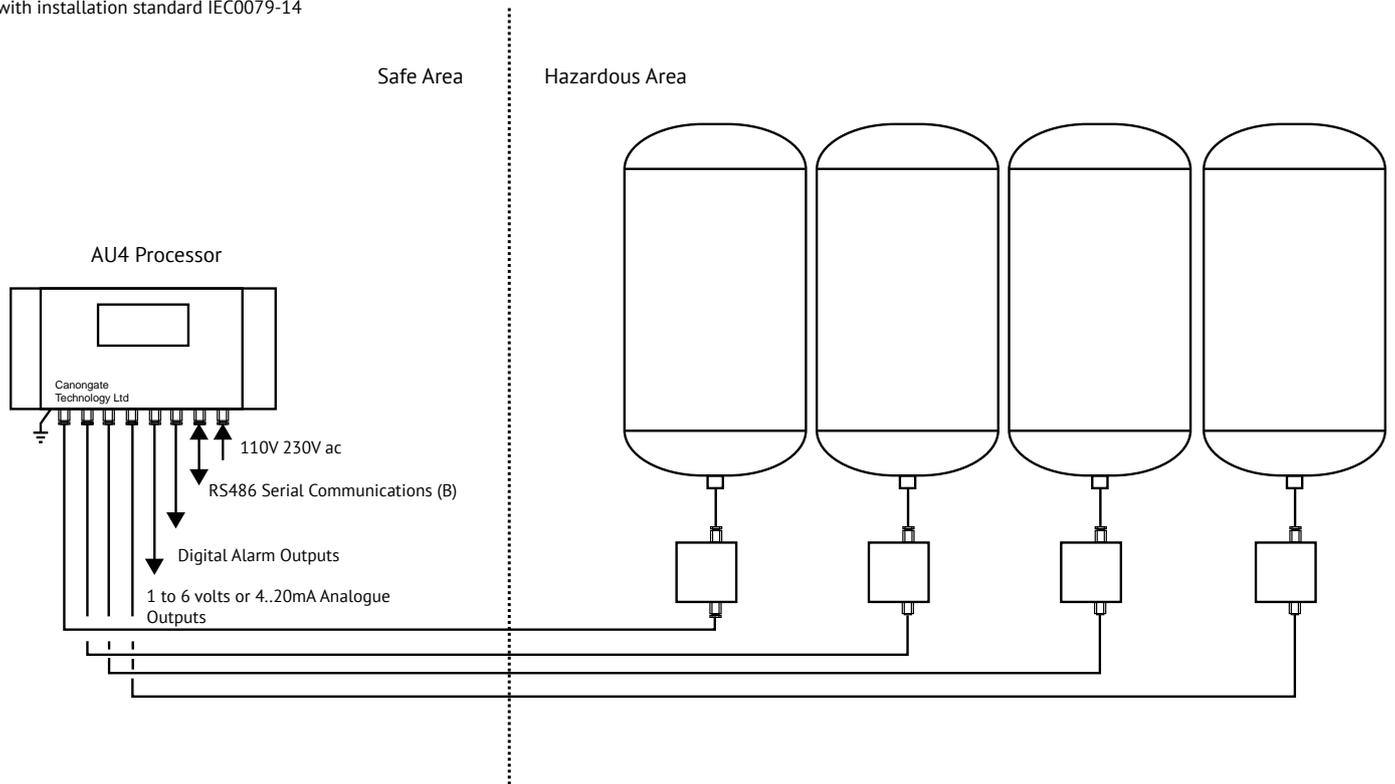


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ATEX Sensor shown

NOTE  
 Cable (C) must be installed to comply  
 with installation standard IEC0079-14



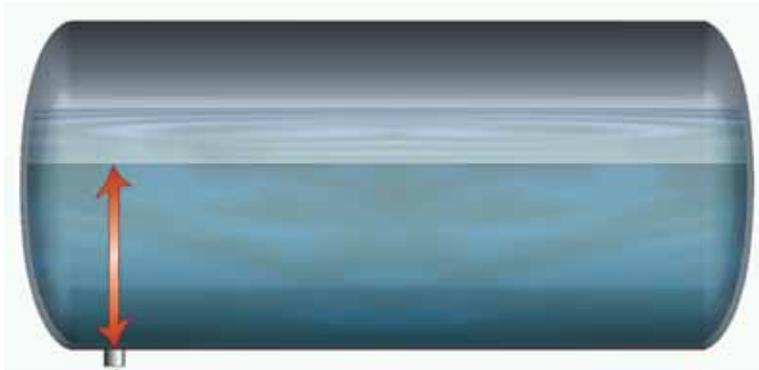
 Where Steel Wired Armour Cable is not available, cables must be mechanically protected in Steel Conduit. Systems connect to an ATEX sensor, can only be supplied as either 110V a.c. or 230V a.c.

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## VesselCheck ST1AD

### Non-Invasive Level Gauge



Processor /  
Display Unit



12 to 24 Vdc

0..5v / 4..20mA /  
Modbus RS485

### Background

Canongate Technology has been using ultrasound technology in a variety of applications for over twenty years. VesselCheck is used by most of the leading beverage, pharmaceutical and chemical companies around the world for accurate, reliable, simple and safe tank contents gauging. This particular configuration has been specifically designed to meet requirements on LPG vessels. A number of leading LPG suppliers and users are already using our technology to provide reliable level measurement.

### Principle of Operation

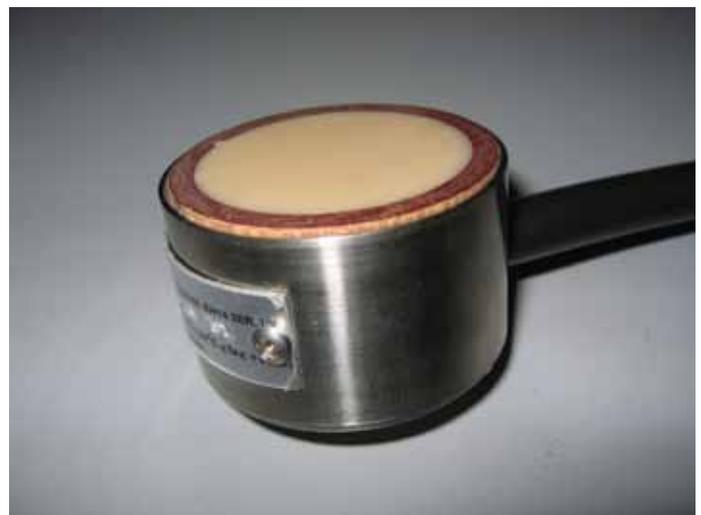
A small ultrasonic sensor is bonded to the outside base of the vessel. Signals from the transceiver are fed into the processor, displayed beside the tank and/or output to a separate system. The ST1AD transmitter measures the time for the transmitted ultrasonic signal to return from the liquid surface. It applies ambient temperature compensation to that value and uses it to accurately calculate the height of the liquid in the tank. The package is supplied as a sensor / processor pair.

### Features:

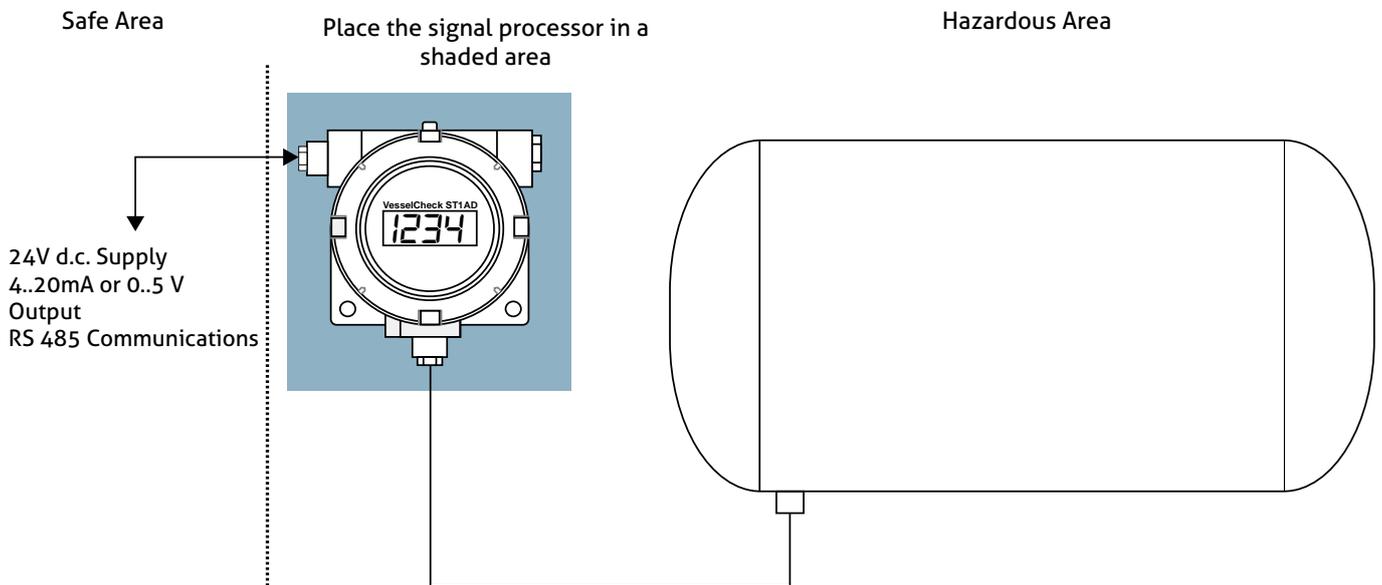
- Truly non-invasive sensing technique
- Transceiver bonds to outside of tank shell
- Ambient temperature compensated (temperature measurement in display unit)
- 0..5v / 4...20mA Analogue Output
- Approved for hazardous areas (flameproof Exd)

### Benefits:

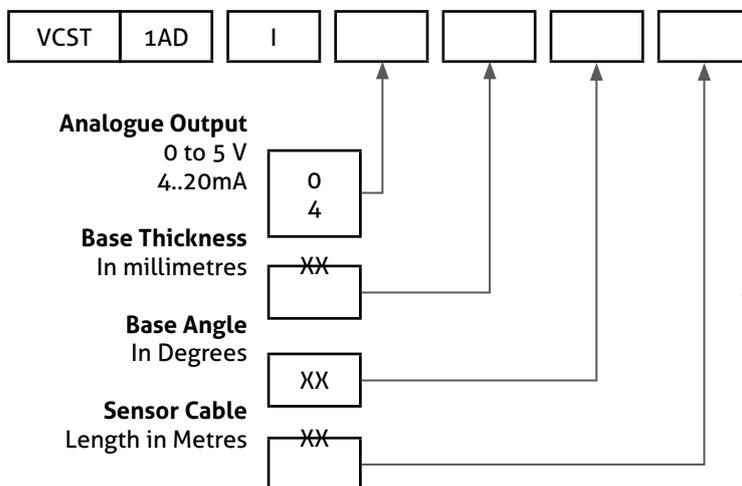
- No tank break-in - Easy installation
- No down-time during installation
- Suitable for tanks of most shapes and materials
- Not affected by pressure
- No moving parts – no maintenance
- Low cost & reliable tank gauging



Vessel Check ST1AD - Technical Specification	
<b>Accuracy</b>	Depends on liquid and temperature range
<b>Measuring Range</b>	Up to 3000mm / 10 feet
<b>Temperature Range (sensors)</b>	-20°C to +125°C / - 4°F to 257°F
<b>Hazardous Area Approval (processor/display)</b>	IECEX BAS 10.0080 Exd IIC T5 (-20°C <Ta<+60°C)
<b>Hazardous Area Approval (sensor)</b>	Ex mb IIC T5 Gb (-20°C ≤ Ta ≤ 60°C) Cert No. IECEX BAS 11.00.0039X
<b>Sensor Material</b>	Tufnol with stainless steel cladding
<b>Analogue Output</b>	0..5v / 4...20mA
<b>Serial Communications</b>	Modbus RS485 RTU / ASCII
<b>Power Supply</b>	12 to 24Vdc
<b>Protection Rating</b>	IP66



**Product Identification Code (PIC)**



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# VesselCheck HMI

## Graphic Colour Operator Interface Terminal

Graphic Colour Operator Interface Terminal and Evaluation Unit for use with Canongate VesselCheck series of level measurement systems.

Standard Features:

- 5.7" TFT Colour LCD
- 5 Button Keypad
- Resistive Analogue Touchscreen
- RS232/422/485 Comms ports
- Integrated Ethernet & web server
- USB port
- Configured to your application

### General Description

The G306 Operator Interface Terminal combines unique capabilities normally expected with high-end units. It is built around a high performance core with integrated functionality. This core allows us to configure the unit to the specific duty required. As standard the unit is supplied within a stainless steel enclosure but other configurations are available. Larger screen sizes up to 10" are available.

### Communications

The G306 is able to communicate with many different types of hardware using high-speed RS232/422/485 communications ports and Ethernet 10 Base T/100 Base TX communications.

A USB port is included for fast downloads of trending and logging data. Screens can be navigated by means of the 5-button keypad or the touchscreen.

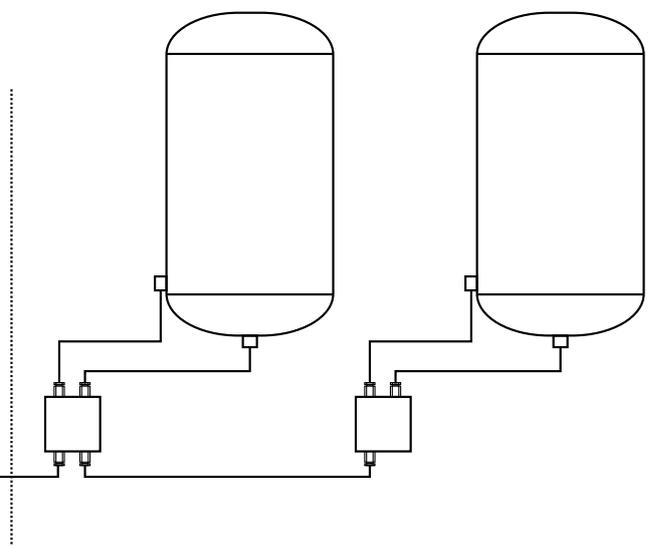
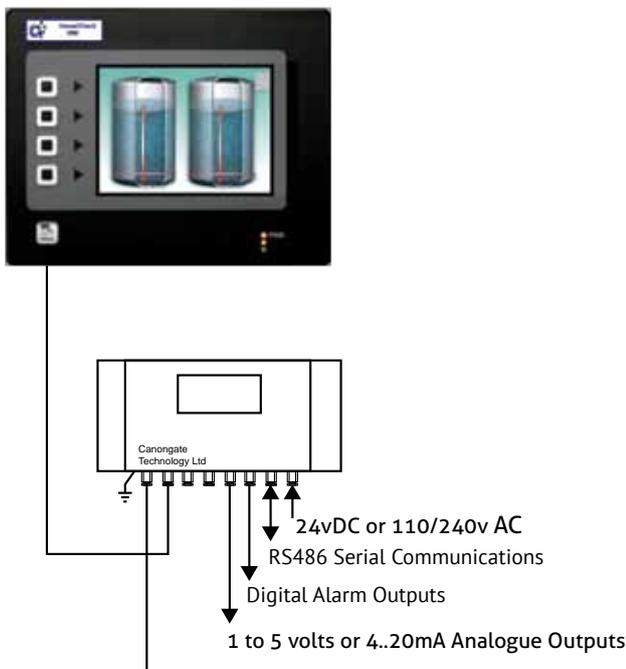


Optional cards are available for:

- PROFIBUS
- DeviceNet
- OPC
- Communicating with over 170 different protocols

### Remote Monitoring

Using a standard web browser you can see the same screens as the operator. We also offer an online troubleshooting and maintenance service that can be delivered via the internet. The G306A can also send alarm events by email or SMS allowing you to keep control of your process when you are off-site.



Vessel Check HMI - Technical Specification	
<b>Description</b>	6" TFT Analogue Touchscreen Terminal
<b>Display Type</b>	5.7" TFT Active Matrix, 256-colour QVGA display
<b>Resolution</b>	320x240 pixels
<b>Comms Ports</b>	Two RS232, one RS422/485
<b>Ethernet</b>	10 Base-T / 100 Base-TX
<b>Compact Flash Slot</b>	CompactFlash Slot
<b>Power Supply</b>	110/230 Vac
<b>Keypad</b>	Touch Screen
<b>Environmental</b>	0 to 50°C / 32 to 122°F
<b>Material</b>	Housed in stainless steel wall mounting enclosure
<b>Dimensions</b>	295 x 295 x 160 mm
<b>Weight</b>	8Kg
<b>Ratings</b>	NEMA 6 / IP66

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## SpotCheck 1000

### Non-invasive Point Level Detector for tanks & pipes



SpotCheck is a liquid level switch for use in applications where avoiding contact is vital. The sensor is clamped externally to the wall of the pipe or vessel. The method of measurement is suitable for steel, plastic or glass up to 50mm thick.

#### Working Principle

SpotCheck uses an ultrasonic "footprint" to determine the presence or absence of liquid inside a tank or pipe. It provides two wire, 24Vdc operation with an appropriate current sensor but also incorporates a relay switch output.

The piezo-electronic transducer emits ultrasonic energy into the wall of the tanks or pipe, which acts as a wave-guide. The electronics detect the difference between "wet", "dry" and "fault" conditions.

#### Typical Applications

- Tank high / low level alarm
- Non contact level switch
- Overfill procedure
- Pump run dry protection
- Pig Detection
- Tanker off-load pump control
- Liquids with suspended solids and free gas
- Detect liquid / foam interface
- Aggressive or toxic liquids, effluent, sewage etc.
- Hygienic level switch for hygienic liquids, foodstuffs, pharmaceuticals, chemicals
- Flowing and static liquids
- High or low pressure pipes or vessels
- Detect presence of spray e.g. Tank washing

#### Installation / Set-up

SpotCheck is easy to install and set-up. Simply push the calibrate button when the sensor is uncovered. A red / green / amber LED gives an indication of status.

#### Series 1000 - Standard Version

The Series 1000 SpotCheck is powered by 24Vdc and includes a single relay output. The sensor also modulates the current draw



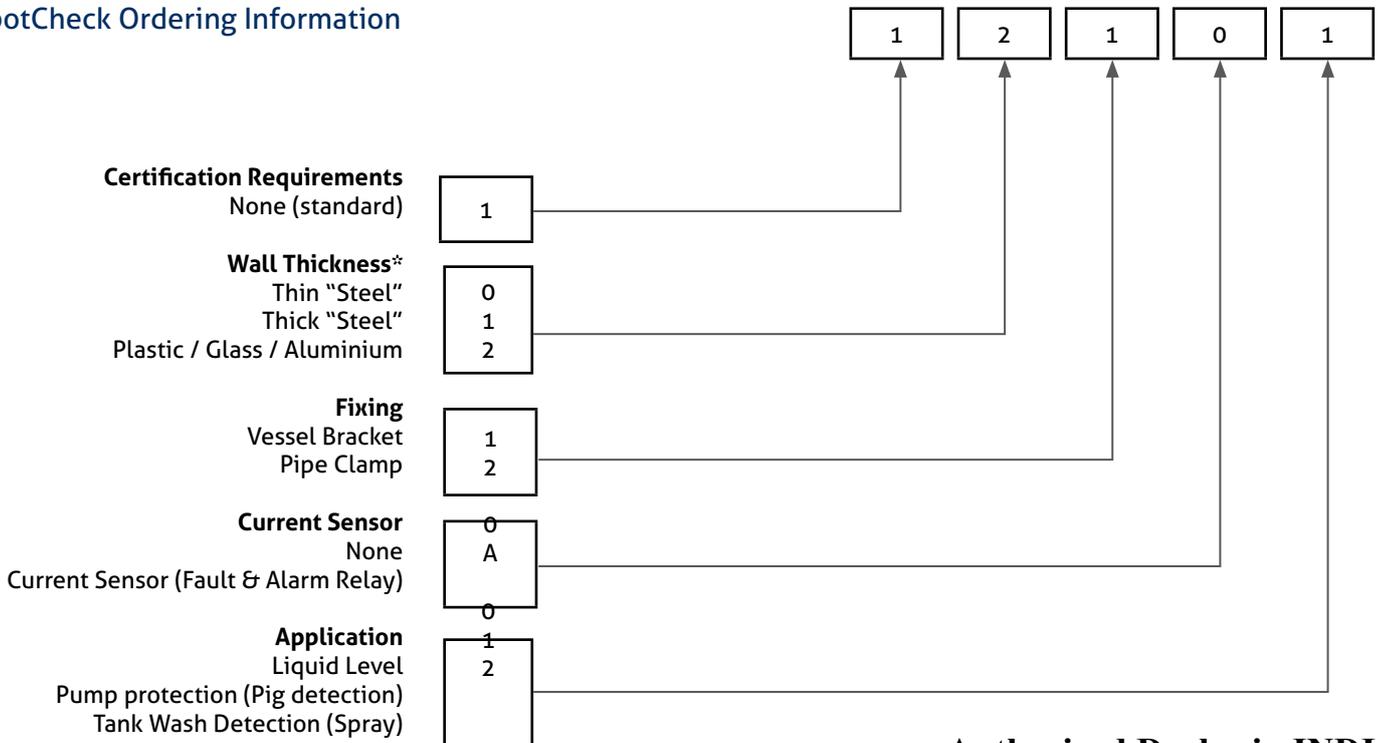
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## SpotCheck - Technical Specification

<b>Input:</b>	Amplitude of ultrasonic ring
<b>Output:</b>	Single relay deual change-over contacts
<b>Switches at:</b>	Midpoint of sensor
<b>Repeatability:</b>	+/- 2mm
<b>Response Time:</b>	1 second as standard
<b>Wall Thickness:</b>	1.6...50 mm
<b>Surface Finish:</b>	240...300 grit or better
<b>Vessel Diameter:</b>	Minimum 60mm - no maximum
<b>Power:</b>	+24V dc (50 mA maximum)
<b>Dimensions:</b>	<b>Body:</b> 11 cm long <b>Cap:</b> 8 cm wide Width of top including gland = 10 cm
<b>Weight:</b>	256 grms
<b>Electrical Connection:</b>	2 or 4 core cable
<b>Vessel / Pipe</b>	
<b>Temperature Range:</b>	-40 to +110°C (125°C for short periods)
<b>Sensor Electronics</b>	

### SpotCheck Ordering Information



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\*for wall thicknesses between 6mm & 8mm contact Canongate

## Embra CarboCheck System 2000

Non-sampling, integrated CO<sub>2</sub> measurement and control for carbonated beverages

Originally launched in 1982 and with over two thousand sensors installed round the world.

### General Description

As the world's leading CO<sub>2</sub> monitor and control system, Embra CarboCheck uses the well-known saturation pressure / temperature technique for accurate, non-sampling measurement. Embra CarboCheck can be used for measurement alone or configured as a control system.

### Principle of Operation

The CarboCheck sensor features a silicone rubber membrane, through which the dissolved CO<sub>2</sub> permeates into a sealed, evacuated chamber. The partial pressure of the gas is then measured and displayed by the analyser / control unit as a CO<sub>2</sub> content. The system incorporates a vacuum exhaustor to regularly evacuate the sensor, providing continual, accurate measurement of dissolved CO<sub>2</sub>.

The analyser / control unit can be linked to a carbonation system to enable fully integrated CO<sub>2</sub> measurement, injection and control. Enhancements

CarboCheck System 2000 incorporates:

- Measurement and compensation for the effect of O<sub>2</sub> and N<sub>2</sub>
- Discrete calibrations for different products
- Start / stop and product set-point remote change facility
- Faster performance on filling lines

### Typical Applications

- Beer carbonation ex-filter
- Mineral waters carbonation
- Sparkling wines carbonation
- In-line CO<sub>2</sub> monitoring on brewery and soft drinks packaging lines
- Carbonation of pre-mixed drinks

### Benefits

- Accurate monitoring and control of dissolved CO<sub>2</sub> levels in carbonated beverages
- Improved "right first time" carbonation figures in-line or in tank
- More efficient process control
- Reduction in re-work

### Features

- Accurate to +/-0.02 vol/vol (+/-0.04 g/l)
- No sampling or product by-pass lines
- Hygienic fitting, can be cleaned-in place
- No moving parts
- Low maintenance requirement
- Available as single / dual channel controller or up to 4 channel monitor



### Description of Equipment

The measuring system comprises the analyser / control unit, CO<sub>2</sub> sensor assembly, resistance thermometer and vacuum exhaustor.

### Analyser / Control Unit

Supplied in an IP65 (NEMA 4) enclosure for panel or wall mounting, the control unit can monitor up to four process streams. High and low alarms are available for each channel, as are outputs for recorders, PLCs or supervisory systems.

The analyser / control unit also provides:

- Analogue outputs of CO<sub>2</sub> temperature and pressure
- Analogue input for remote set-point
- Digital outputs for high and low level alarms
- Digital inputs for remote start, no flow
- RS422 serial communications link

### The CO<sub>2</sub> Sensor

This is designed to fit in the shortened leg of a standard 3" ISS T-piece or Varivent type body. The materials in contact with the liquid are food quality 316 stainless steel and silicone rubber cured to 250°C, impervious to all known CIP solutions.

### The Vacuum Exhaustor

This is housed in a separate IP65 (NEMA 4) poly-carbonate (or optional stainless steel) enclosure. The function of the unit is to evacuate the sealed chamber of the CO<sub>2</sub> sensor at start-up to remove all gases. The cell is 'refreshed' regularly (at a user defined interval) to maintain the accuracy of the reading.

## EmbraLabs CT4 Mashing Bath

Measurement of extract by IOB, EBC or ASBC Procedures

### Application

- Precision control of Standard Methods mashing conditions for preparation of laboratory worts
- Facility to handle up to 25 samples per batch

### Features:

- PLC control
- Colour graphics with touch display
- Programmable delayed start
- Audible alarm
- Remote servicing available via modem
- Two automatic pre-programmed mashing sequences
- One user programmable sequence

### Description

The CT4 Mashing Bath replaces the world-renowned CM1/2/3 Mashing Baths. The apparatus consists of a stainless steel bath supported in a steel framework. An integral pump circulates water through a heater box and the bath. Beakers in the bath are stirred using magnetic followers driven by electric motors beneath the bath. All samples are mashed and cooled together. Distilled water for mashing is heated in a separate stainless steel tank and dispensed to the beakers by an electric pump.



Touch screen user interface

### Features / Benefits

- Bath temperature controlled by internal attenuation unit
- Temperature measured and controlled to +/- 0.2o C
- Low level water cut out
- Accurate water dispense (+/- 5 ml ) to all beakers in less than 2 minutes
- Simple touch screen access to volume calibrations
- Real time trending of machine sequence
- Overview screen to monitor all control and I/O operations

The bath is designed to be fully automatic although some of the operations can be done manually. Manual control of the water fill valve, the water drain valve and each motor stirring bank are

### Technical Specification

<b>Case:</b>	Painted Mild Steel
<b>Bath:</b>	Stainless Steel
<b>Net Dimensions:</b>	113 cm x 86 cm c 61 cm / 44.5" x 33.8" x 24" (l x h x w)
<b>Approximate Gross Weight:</b>	270 Kg / 595 lb
<b>Power Supply:</b>	240 vAC, 50/60Hz
<b>Number of Samples</b>	25

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## EmbraLabs GrainStain

Designed to carry out rapid staining tests on seeds, particularly barley and wheat

### Features:

- Two and four place versions available
- Electronic control of staining fluid temperature
- Independent vacuum gauge and control for each tube
- Integral pump adjustable to 380 mm Hg
- Individual tube drain system
- Audible alarm system

Precision control of temperature, vacuum and time allows staining to be carried out under reproducible and standardised conditions, thereby ensuring optimum staining performance. Powered by mains voltage it can accommodate several samples at once or in overlapping sequence.

The GrainStain is completely self-contained with its own integral vacuum pump. Electrically heated sample tubes, fitted into a corrosion resistant casing are sealed with push fit tops. An adjustable vacuum relief valve allows evacuation to 380 mm of mercury indicated by a gauge. Vacuum to each gauge is controlled by individual 3-way taps via a manifold. The vacuum pump filter bowl and adjustable relief valve are fitted on the outside of the case for ease of maintenance.

Tubes are individually heated and temperature control is by electronic sensor with front of panel set-point adjustaments up to 60°C. Each tube can be drained for cleaning and replacement of staining fluid by means of a tap mounted on the outside of the casing. All taps connect with a common drain outlet.



### Other Features / Benefits

- Illuminated mains power on/off switch
- Vacuum pump switch plus indicating LED
- Timers adjustable up to 30 minutes each with indicating LEDs
- Audible alarm system with push button cancel facility
- Heater indicating LEDs
- Individual adjusters for each sample tube temperature measurement

### Technical Specification

<b>Case:</b>	Glass reinforced plastic
<b>Dimensions:</b>	Two Place : 335 x 300 x 165 mm Four Place : 535 x 300 x 165 mm
<b>Sample Tubes:</b>	Material : High Temperature plastic Dimensions : 150 mm deep x 35 mm diameter
<b>Weight:</b>	Two Place : 8 Kg Four Place : 14 Kg
<b>Power Supply:</b>	Mains - 110 or 240v 50/60 Hz
<b>Vacuum System Capacity:</b>	Adjustable up to 380 mm Hg
<b>Timer</b>	Adjustable up to 30 minutes delay
<b>Heater Mats:</b>	20 watt
<b>Temperature Controls:</b>	Adjustable up to 60°C +/- 0.5°C

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## CT Holledge

Pneumatic and electronic level and pressure measurement systems.

### Features

- Suitable for hygienic applications
- High accuracy
- Long term proven reliability
- Rugged construction
- Simple installation and set-up
- Standard and bespoke units
- Pneumatic systems for hazardous areas
- Liquid and slurry continuous level measurement
- Continuous pressure monitoring

### CT Holledge "PB" systems

There are many reasons for the popularity and continued success of the Holledge pneumatic "PB" (pressure balance) system. Firstly it is attractive due to its proven reliability. It is also intrinsically safe, has a low cost of installation and exhibits high accuracy and repeatability.

The sensor - A pressure sensitive diaphragm - can be matched to most requirements. Whether it's a hygienic application such as brewing, dairy or food, or a corrosive one, such as chemicals or CIP (cleaning in place), there is a Holledge sensor to suit.

CT Holledge helps you to achieve the highest accuracy of measurement with minimal risk to your production process.

The system can be used to measure pipe pressure, vessel contents or other parameters such as mass or density (SG).

The principle - The "Pressure Balance" principle is simple and comprises a transmitter, an air flow regulator, and a receiving instrument, usually a P to I (pressure to current) converter or a pneumatic gauge.

A constant flow of instrument air - at a pressure above the maximum process pressure - is fed into a transmitter. With no process pressure applied, the air is vented past the transmitter diaphragm to atmosphere. When the process exerts a pressure on the diaphragm, the diaphragm distends slightly, reducing the size of the vent, thus restricting the flow and causing a back pressure, equivalent to the process pressure, to build up in the system. The P to I converter turns the back pressure into a mA signal, directly proportional to the process pressure. The analogue output means that the PB system can be easily integrated with electronic displays SCADA control and monitoring facilities or PLC's.

Capable of sensing process pressures from a few mm water gauge to 14bar, these sensors are suitable for all kinds of pipes or vessels either pressurised or vented.

The options - The standard version is manufactured entirely in 316 Stainless Steel, with options covering the supply of wetted parts in TITANIUM, INCONEL, HASTELLOYS or Stainless Steel coated with FEP, thus providing full compatibility with the product media.



### Applications

#### • Series "HF" Air flow regulator

By maintaining a constant differential pressure across a built in pneumatic regulator, the series "HF" is able to provide a set flow of instrument air to the transmitter. The unit is also suitable for bubbler type systems and for purging electrical enclosures in hazardous areas. Constructed in epoxy coated aluminium with treated springs and screws, the unit offers robust performance and a constant air supply to the "PB" transmitters.

#### • Series H420. P to I converters

CT Holledge H420 instruments are two-wire pressure to current converters. Two models are available for applications where pneumatic signals are required to be converted to current outputs:

- H420G - for single pressure inputs
- H420D - for differential pressure inputs

Both converters use high performance, solid state piezoresistive sensors, they measure air pressure, or any non-corrosive gas. Output is a proportional 4..20mA

### Accessories

- Diaphragm protection guard - to protect the unit from physical damage.
- Body extension - for lagged or jacketed vessels
- Angled air connectors - allow connections without distorting transmission lines where space is tight.
- Submerged type vent - for use when the "PB" is completely submerged.
- Weather type vent - prevents ingress of rain or damaging particulates.

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## Beverage Industry

### Process Instrumentation

Since our inception Canongate has been a leader and innovator working successfully with the Beverage industry. During this period we have continuously developed and enhanced our product through knowledge and experience.

With the ever growing stricter regulatory standards, instrumentation need to be reliable, accurate and quality manufactured.

Today Canongate Technology product is present in most of the leading beverage organisations plants throughout the world.

### Light Beer level measurement

The Canongate VesselCheck is a highly accurate, truly non invasive liquid level system based on our unique ultrasonic technology proven for over 20 years and is ideally suited for level detection of light beer.

### Concentration monitoring

The Canongate DensiCheck can be used to measure the Alcohol, Plato or SG concentrations in bright beer. The DensiCheck can also be used to measure the concentration of cold, hot and boiling wort in the brewhouse.

For blending applications where a higher degree of accuracy is required in the concentration measurement, a signal from a densitometer may be combined with the DensiCheck measurement to achieve this.

### Carbon Dioxide Monitoring

The Canongate CarboCheck has been used for over 30 years in the brewing industry to measure and control the level of CO<sub>2</sub> in a bright beer stream.

### Products

- **VesselCheck ST2**  
Bright Beer Tank Level Measurement
- **CarboCheck In-line CO<sub>2</sub> Analyser**  
Used by all the major breweries worldwide, the CarboCheck is a highly accurate system for the monitoring and control of CO<sub>2</sub> in-line.
- **DensiCheck TX In-line Alcohol Measurement**  
High accuracy system used to measure density, alcohol and plato.

## Transport Industry



### Level Measurement in Aircraft Refueling Vehicles

The aviation industries search for continuous improvement of high safety standards across airport infrastructure is an ever growing process and the refuelling of aircraft from lorry tankers is no exception to this.

Canongate VesselCheck ST1A has provided a unique cost effective solution to tanker companies and has resulted in enhanced levels of safety and efficiencies in the process of refuelling of aircraft.

The ST1A provides the operator real time level measurement of fuel levels within the vehicle, ensuring awareness of level before the refuelling process begins. This non manual monitoring of fuel levels is significantly safer and quicker than current level measure manual process.

Canongate product is being rolled out across a number of airports throughout continental Europe.

## Pharmaceutical Industry

### Process Instrumentation

Our control and instrumentation solution are widely used by many of the world's leading chemical and pharmaceutical companies to improve all kinds of processes and delivering key process measurements allowing tighter quality control.

### Level measurement in High Purity Water

Canongate VesselCheck ST2 is ideally suited for the level measurement of pure water storage and mixing tanks, as the sensor is coupled to the outside of the tank wall and does not come into contact with the product.

The reliable and highly accurate measurement system is unaffected by pressure, concentration and temperature variations as it uses a reference sensor to self-compensate. This technology has been proven on this style of application over the past 20 years.

Today Canongate systems are installed in World leading Pharmaceutical companies Water for pure water storage tanks, providing reliable results in a highly regulated industry.

## Refrigeration Industry

### Process Instrumentation

Refrigerant leakage is one of the main challenges facing the commercial refrigeration industry and solutions aimed at reducing the probability of a leak is welcomed within the industry. As our products are truly non-invasive no new sources of potential leaks are created hence Canongate's unique non-invasive level measurement technology provides a low cost solution to monitoring of refrigerant levels.

Non-invasive level monitoring for Horizontal refrigerant receivers

Canongate VesselCheck ST1-R was specifically designed as a low cost solution for measuring refrigerant. The ST1-R is highly reliable, accurate, requires no re-calibration, no drift, no moving parts and is not affected by pressure fluctuations making the product well suited to this type of application. The ST1-R is an easy external fitting to the receiver resulting in no down time lost during the installation process.

Our ST1-R is installed in over 3000 tanks throughout the UK.

### Products

#### VesselCheck ST2

Entirely Non-Invasive Chemical Tank Level Measurement

Our well recognised non-invasive ultrasonic tank level measurement system has been around for over 25 years. Our latest systems offer fast, reliable and very accurate tank level monitoring for all chemical types.

#### Benefits

- Entirely non-invasive
- Accuracy +/- 2mm
- No Maintenance
- ATEX Approved

#### DensiCheck TX

In-line liquid concentration & density transmitter

Our DensiCheck TX in-line liquid concentration system is by far the most accurate and recognised system in the chemical industry.

#### Benefits

- Zero Drift
- Rapid payback
- ATEX Approved

### Products

#### VesselCheck ST1-R

Non-Invasive Level Gauge for Horizontal Refrigerant Receivers

#### Features & Benefits

- Ideal for retrofit - OEM installation also applies
- Easy external fitting to receiver - no need to stop plant
- No refrigerant handling issues - electrical work only
- No refrigerant decanting required - service or replacement
- No re-calibration, no drift, no moving parts, no leakage sources
- Low cost, reliable & accurate tank gauging
- Not affected by pressure fluctuations
- Easy Installation - no tank break-in
- Simple retrofit to existing tanks
- Various interface / output options available

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## Chemical Industry



### Process Instrumentation

The Canongate VesselCheck systems are ideally suited for measuring the levels in light liquids. Due to the non invasive concept they are unaffected by corrosion from acids and solvents.

Acetic Acid	Glycol	R134A
Acetone	Glycerine H2SO4	R404A
Benzene	HCL	R407A
Beer	Heptane	R410A R410A
Butane (Liquid)	Hexane	Sea Water
Calcium Chloride	Hydrofluoric Acid	Sodium Chloride
Chlorine	IPA 100%	Sodium Hydroxide
Carbon Disulfide	Jet A-1	Sugar Solution
Carbon Tetrachloride	kerosene	Toluene
Chloroform	Mthanol	Trichloroethane
Diesel	Methyl Glycol	Turpentine
DME	Nitric Acid	Water
EP70	Octane	White Spirit
Ether	Pentane	Wine
Ethylene Glycol	Propane (Liquid)	
Ethanol	R22	

The DensiCheck has been used for many years in the chemicals industry to measure the online concentration of liquids without drawing a sample from product stream. Where required the DensiCheck has been tailored designed to meet the customers process requirements. Some typical applications:

Acetone	Hydrogen Peroxide
Ammonia	Nitric Acid
Ammonium Sulphate	Phosphoric Acid
Calcium Chlorate	Sodium Chloride
Ethanol	Sodium Hydroxide
Ethylene Glycol	Sodium Nitrate
Fluorine	Sulphuric Acid
Glycerine	Toluene
Hydrochloric Acid	Tryptophan

## LPG Industry



### Process Instrumentation

Our non-invasive sensors technology provides robust, safe, reliable and simple to install level gauging solutions across a variety of LPG applications.

VesselCheck from Canongate Technology provides a truly non-invasive level measurement system, where the sensors are bonded to outside of tank walls. Options for mutlipoint calibration tables and local or remote display indication.

Connectivity to plant control systems via 4..20mA or 1..5volt analogue signals, or RS485 Modbus RTU and ASCII serial protocol.

Easy installation with no tank break-in, ideal to retrofit to existing installations. With no moving parts there is little to no maintenance required.

Systems can be custom designed to suit applications where the non-approved equipment needs to be placed in an approved flameproof enclosure

### Products

#### VesselCheck ST1AD

Non-invasive Level Gauge for LPG Tanks

#### Benefits

- No Tank break-in - easy installation
- No downtime during installation
- Suitable for tanks of most shapes and materials
- Not affected by pressure
- No moving parts - no maintenance
- Low cost, reliable & accurate tank gauging

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## Petrochemical Industry



### Applications in Liquid Petroleum Gas (LPG) and Liquid Natural Gas (LNG)

The nature of the Petrochemical industries, high standards, critical safety requirements means quality and reliability are principle foundations for any products operating in this environment.

Canongate part of the Rototherm group with a strong heritage in the Petrochemical sector manufacture our products to the highest quality to ensure our products meet and exceed standards set by regulatory bodies. This ensures our products meet the high demands in the field and maintain their reputation for reliability.

#### Level Measurement with VesselCheck ST1AD

The Canongate VesselCheck ST1AD is a truly non invasive liquid level system based on our unique ultrasonic technology proven for over 20 years and is well suited for level detection applications in LPG to give a contents measurement in percentage. The non tank break in ensures no downtime is lost during the easy installation process, and our products require minimal maintenance thus reducing the overall cost of ownership.

This low cost highly reliable solution that is suitable for most shapes of tanks and materials has been successfully monitoring LPG levels in facilities of World leading companies throughout the globe. Both the electronics and transducer can be placed in the hazardous area.

#### Level Measurement with VesselCheck ST1A

The Canongate VesselCheck ST1A uses the same unique measurement principles as the ST1AD, however the electronics are not suitable to be mounted in the hazardous area.

#### Level Measurement with VesselCheck ST4

The Canongate VesselCheck ST4 is a 4 channel monitor using the same unique measurement principles as the ST1AD, but measures over a greater distance and gives a contents display in measurement units (tonnes, litres, etc). The ST4 sensor incorporates a temperature sensor in the ultrasonic transducer to compensate for sonic velocity changes due to temperature. The ST4 electronics must be placed in the non hazardous area.

#### Level Measurement with VesselCheck ST2

The Canongate VesselCheck ST2 is a 2 channel monitor using the same unique measurement principles as the ST1AD, but measures over a greater distance and gives a contents display in measurement units (tonnes, litres, etc). The ST2 uses a reference sensor to compensate the sonic velocity for temperature and concentration changes. The use of the reference sensor makes ST2 a highly accurate self compensating measurement system.

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# Rototherm Group



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