

PORTALEVEL[®]

DIGITAL LIQUID LEVEL INDICATOR FOR
CO₂, HALON, NOVEC, FM200[™]

OPERATING INSTRUCTIONS

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ISO 9001 Cert. GB8237

Contents

<u>Section 1</u>	INTRODUCTION	<u>Page</u>
A.	Principles of Ultrasonics	3
B.	Notes on Liquid Gaseous Extinguishants	4
<u>Section 2</u>	PREPARATION	
A.	Packing List	5
B.	Preparing Portalevel® Digital for Use	6
C.	First Time Users	7
D.	Bench Test	7
E.	User Notes: Ultrasonic Gel Calibration Sensors SPA Button	8
F.	Calculating The Level – CO ₂	9
G.	Calculating The Level – Halons	10
H.	Calculating the Level - FM200™	11
<u>Section 3</u>	OPERATION	
A.	Locating Liquid Level with the Portalevel	12
B.	User Notes	14
C.	Optional Accessories	16
D.	Unit Care and Maintenance	16

Section 1- Introduction

The **PORTALEVEL** is a liquid level indicator for level location and contents verification of all gaseous fire extinguishants stored in liquid state in single skinned cylinders. The Portalevel is designed for use on CO₂, Halon, FM200™ and other liquid Halon replacements stored in all commonly used cylinder types. It is not designed to work on fire extinguishants that are not stored as liquid.

A. PRINCIPLES OF ULTRASONICS

The **PORTALEVEL** works by generating ultrasound, then reading the returned signal the vessel to which the sensor is applied.

Ultrasound is sound at a frequency beyond the human audible range although it behaves in the same way as audible sound, ie it travels faster through most liquids than air. The Portalevel measures this difference, identifying thereby the level point to +/- 1.5mm (1/8") accuracy if used correctly, though for normal fire cylinder servicing checks, 5% accuracy is acceptable (which on a 45Kg CO₂ cylinder would be 75mm or 3").

Different materials dampen the echo received by varying degrees. The received signal creates digital readings on the LCD digital panel, and lights up the LED lights at a level set for each cylinder in turn by calibration. Sensors are hand-cut individually from naturally grown mineral crystals, and each different sensor is unique. Each sensor, every cylinder and every liquid will generate slightly different readings, so the readings obtained are not absolutes. What is consistent, however, is that when the sensor is moved up or down the cylinder, significant changes will be found in the readings when the level of the liquid is reached. Digital readings obtained can change due to many factors, including removing a cylinder from its bracket, taking readings on a weld line, at the curve at the top of a cylinder, or from different sides of the cylinder. Therefore the unit must be calibrated to each cylinder before testing.

B. NOTES ON LIQUID GASEOUS EXTINGUISHANTS

1. Notes on FM200TM

FM200TM is one of the most popular Halon 1301 replacements, ideal for use in occupied rooms or enclosed compartments, and quickly cleared. For normal Class A fire risks, only 7% by volume FM200TM is needed for extinguishing purposes. The Portalevel acts in reverse mode on FM200TM, ie readings are higher below the liquid level.

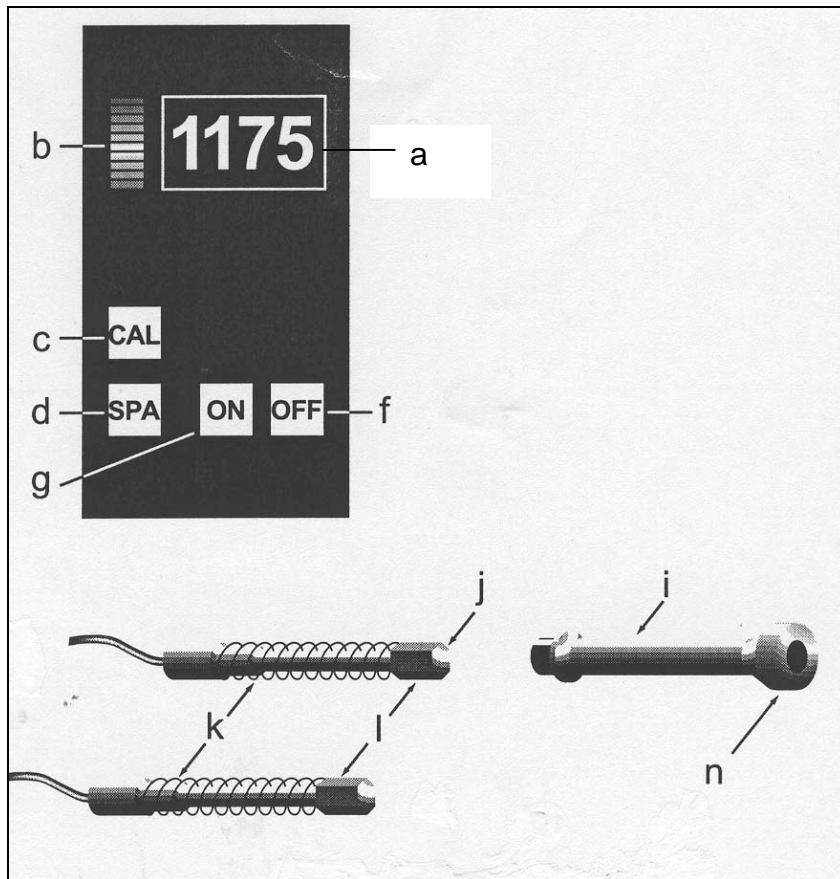
2. Notes on Carbon Dioxide

The standard size cylinders used for CO₂ is 67.5 litre steel filled with 45Kg CO₂. The most common applications for CO₂ are generators and switch rooms, flammable liquid storage areas, paint facilities, ovens, marine, explosive handling facilities and engineering facilities.

Section 2- Preparation

A. PACKING LIST (STANDARD DIGITAL UNIT)

- 1 x **PORTALEVEL** unit
- 1 x Standard Dry Sensor and Applicator
- 1 x Tube of Ultrasonic Couplant (Gel)
- 4 x 1.5v DC 'AA' Batteries (supplied inside the unit)
- 1 x Plastic Carrying Case
- 1 x Operating Instructions
- 1 x Calibration Certificate



- | | | |
|----|----------------------|--|
| a. | LCD Digital Display: | Liquid Crystal Display - 4 black numbers |
| b. | LED Light Display: | Light Emitting Diodes – 4 red lights |
| c. | CAL: | Calibration button – to calibrate the unit to the metal container, |
| d. | SPA: | Special Power Addition - Transmitting a stronger signal strength if required |

- f. Off: Power off
- g. On: Power On
- i. Sensor Applicator
- j. Black or blue pad Dry sensor only
- k. Sensor
- l. Sensor Tip
- n. Head of Applicator Allen key hole must be uppermost when testing.

Optional Accessories:

Marine Extension Rod:



Assemble the extension rod as above . Remove the BNC connector so that you can slot the wire through the 3 parts of the handle. Then screw them together.



Rod fully assembled

B. PREPARING THE PORTALEVEL FOR USE

1. Fit new or fully charged batteries (supplied in situ)
2. Check that the sensor and applicator units are fully and correctly assembled.
3. When the unit is switched on, before applying the sensor to any cylinder, the LCD display should read -000, or any low reading below -050, and the LED's should not be lit.
4. If one or two LEDs are lit without the sensor being applied to the cylinder, the unit will still function correctly. These LEDs will normally disappear after a little use.
5. The LCD digital readings will often change by small amounts, both when the sensor is applied to a cylinder and when it is not. This is a feature of ultrasound and is not a fault. (The digital readings reflect the ultrasonic activity)
6. The unit and sensor can be quickly checked by dipping the end of the sensor into water. The LED lights will light up and the LCD number will rise to approximately 400-1000.
7. **NB** The rubber pad on the dry sensor must be in good condition, which is essential to obtain correct readings. It is important not to drag the sensor along the cylinder but to lift off carefully between readings, holding the applicator. Pulling the sensor off the cylinder using the cable will break the sensor and invalidate the warranty.
8. Ensure that the sensor moves firmly but smoothly against the action of the spring in the applicator. If it is too tight, unscrew the cable end a little to make it easier to move. Do not dismantle the sensor applicator; it is set and calibrated to the Portalevel unit at the factory. The two white spots must be aligned and uppermost when testing.

C. FIRST TIME USER

1. We recommend that prior to opening your unit, first time users read the Operating Instructions thoroughly 3 times to familiarize themselves with its operation. Please do this as slowly as possible.
2. We then recommend the following bench test, before attempting to operate the Portalevel on any extinguishant or other cylinders on site, to gain confidence in its operation where the liquid level is clearly visible. This is only a test of the unit's function. NB. Please note that in this test the Portalevel is operating in Reverse Mode and the results should not be compared with those obtained on CO₂, Halon and other liquid gases.
3. Learn how to mathematically calculate the expected liquid level before using the Portalevel on fire systems, as this is critical to fire safety checks (see Section 2, Para F).

D. BENCH TEST

Equipment Required: One Portalevel
 One steel vessel approx 15cm/9" high - a domestic
 utensil would suffice

1. Half full the container with water.
2. Connect the sensor to the electronic unit. Switch on the Portalevel.
3. Press the sensor against the side of the container 2-3 times to ensure that the spring is working correctly. No LEDs will light.
4. Ensure that the silicon pad on the sensor face is lubricated with a little ultrasonic couplant, as supplied.
5. Wet with water the side of the container a few cm above and below the liquid level.
6. Place the sensor with the white spot uppermost on the outside of the container, 4cm BELOW the liquid level. Press CAL and count to 7. Release the CAL button. All LCDs lights will be lit.
7. Put a little more gel on the sensor. Place the sensor 1cm higher on the side of the vessel and then move upwards in short steps. When the sensor reaches the level of the water the LED lights will go out and the LCDs will show 3 digits.

8. Taking care to LIFT the sensor off the vessel between steps; it is extremely important not to SLIDE the sensor as this will damage the sensor and give incorrect readings.
9. The level point is taken from the top of the sensor tip (ie the rubber pad on the dry sensor), not the applicator.
10. Keep the surface wet at all times with water on the area to be tested and also put gel on the silicon pad on the sensor face to ensure good ultrasonic transmission.

E. USER NOTES

1. Ultrasonic Gel – A little of this should be applied every time the sensor is reapplied. Always clean this off thoroughly after testing as when dry it leaves an invisible layer on the cylinder. This can be purchased from a pharmacy; it is the same gel as used in hospitals for ultrasound scans.
2. Preparation of Test Area – Always clean a 1” vertical strip on each bottle prior to testing.
3. Sensor Movement – Do not slide the sensor or lift it using the cable. **Rough handling of the sensor resulting in tearing to the internal wires will invalidate the warranty.** Always ensure white spots are aligned and uppermost.
4. Calibration – No two cylinders are the same, even though manufactured by the same company. It is therefore essential to calibrate the unit anew to each vessel before attempting to take a reading. Similarly, it is important not to calibrate on parts of any vessel likely to be of uneven thickness, ie welds, the dome and the base. The unit must be recalibrated each time switched on, even if testing a vessel tested previously.
5. SPA Button – This gives additional power, when the signal is not strong enough to light the LEDs. When pressed a green light will show. Only use if there is not a strong enough signal, particularly when using the unit on rough or pitted surface.

F. CALCULATING EXPECTED LIQUID LEVEL

Before using the **PORTALEVEL** on a cylinder, the level should be calculated and marked as follows.

1. Calculating Expected Liquid level for CO₂

All CO₂ cylinders are normally filled up to 2/3rds of the height of the cylinder. The level, however, will change according to the temperature. In normal circumstances, level checking can not be carried out in temperatures over 27°C (80°F), as the liquid level will have risen too high in the cylinder. At 31°C (87°F), the CO₂ will no longer be a liquid, it will be a gas, and therefore has no liquid level. Ice or portable air conditioning units should be used to lower the CO₂ room temperature to below 26-27°C when necessary. Alternatively the coolest time of day should be chosen. The following table shows the correct height for the liquid level of most common sizes of CO₂ cylinder at various temperatures. All figures assume a fill level of 2/3rds of the cylinder height.

Table 1: Inches (Note 1" – 25mm)

CO ₂ Cylinder Dimensions			Correct Fill Height At:				
			5°C	10°C	15°C	20°C	25°C
59.0"	X	10.5"	38"	40"	42"	45"	48"
73.5"	X	7.0"	47"	49"	51"	54"	58"
43.0"	X	9.0"	27"	28"	29"	31"	34"
69.0"	X	8.0"	45"	46"	48"	51"	56"
55.5"	X	9.0"	41"	42"	44"	48"	52"
71.5"	X	9.0"	46"	48"	51"	54"	59"
72.0"	X	8.5"	53"	56"	59"	63"	68"

Table 2: Cm (Note 2.5cm or 25mm = 1")

CO ₂ Cylinder Dimensions			Correct Fill Height At:				
			5°C	10°C	15°C	20°C	25°C
150cm	X	26.70	96.50	101.50	107.00	114.50	122.00
185.50	X	17.80	119.50	124.50	129.50	137.00	147.50
186.70	X	22.40	68.5	71.00	73.50	78.50	86.50
175.20	X	20.30	114.50	117.00	122.00	129.50	142.00
141.00	X	22.90	104.00	107.00	112.00	122.00	132.00
181.60	X	22.90	117.00	122.00	129.50	137.00	150.00
183.00	X	2.60	134.50	142.00	150.00	160.00	173.00

2. Halon and Halon Replacements

Because cylinder fill levels for Halons are calculated for the correct amount to suit each extinguishing application, the ratio of the fill amount to the cylinder height will vary. However, if you know the cylinder height, it's water capacity and the Halon fill weight (Kg), a simple calculation will indicate the correct fill level.

As Halons are less sensitive to temperature variations than CO₂, the testing of cylinders can be carried out in temperatures of up to 40°C (105°F), as the critical temperature for Halon is 55°C.

a. Calculating Expected Liquid Level for Halons

- i. Find the water capacity of the cylinder, which is normally stamped on the base of the cylinder, or near the valve, e.g. WC 25 Ltr.
- ii. Measure the cylinder height, from the base of the cylinder to the base of the valve.
- iii. Divide the water capacity (WC) of the cylinder by the height of the cylinder. This will tell you how much water there is per cm or inch of the cylinder's height.
- iv. Next, find the Halon fill weight, normally marked on the cylinder's label, measured in Kg.
- v. Using Table 2 below, divide the Halon fill weight by the appropriate ratio, so the Halon content is known in water volume (WV).
- vi. Finally, divide the water volume (calculated in para 5 above), by the water capacity (WC) per cm or inch (see para 3 above). This result will give the height in cm or inches of the water contents which can now be marked on the cylinder with chalk.

Table 2:

Halon Type	Halon Weight (in Kg) per Litre of Water at:					
	15°C	20°C	25°C	30°C	35°C	40°C
1211	1.83	1.82	1.80	1.78	1.76	1.74
1301	1.51	1.58	1.54	1.50	1.46	1.41

b. Example of Halon Level Calculation

For this example, the following dimensions are used: -

Cylinder Water Content (WC) = 30Ltr

Cylinder Height = 100cm (40")

Halon Fill Weight = 25Kg

Halon Type = 1301

Temperature = 25°C

- i. WC divided by Cylinder Height
($30 \div 100 = 0.3\text{Ltr / cm}$)
- ii. Fill Weight divided by Ratio (Table 2)
($25 \div 1.54 = 16.2\text{Ltr Water Volume}$)
- iii. Water Volume divided by Water Capacity
($16.2 \div 0.3 = 54\text{cm}$, the height to be marked on the cylinder.)

c. Calculation of Expected Liquid Level for FM200™

Cylinders that contain FM200™ should be calculated using the same method as for Halons, except that instead of using the figures in Table 2, a universal figure of 1.4Kg per Litre should be used, to give the approximate fill level. No further information is available at this time. The unit functions in reverse mode on FM200™, ie higher readings are obtained below the liquid level than above it.

Section 3 - Operation

NB – DO NOT PROCEED TO THIS SECTION WITHOUT HAVING READ AND FOLLOWED THE INSTRUCTIONS IN SECTIONS 1 AND 2.

A. LOCATING THE LIQUID LEVEL WITH THE PORTALEVEL

Now the levels have been calculated and marked on the cylinder(s), ensure that your Portalevel has been prepared for use, as described in Section 2.

1. Switch the unit on and place the sensor on the cylinder, ensuring that the white spots on the sensor applicator are aligned and uppermost. To obtain an optimum reading, the sensor need only be held on the cylinder for 2-3 seconds.
2. If the magnet does not hold the sensor firmly on to the cylinder, the applicator end cap can be loosened to reduce the pressure on the spring, or the sensor may simply be held firmly in place by hand.
3. Calibrate the unit as described Section 2, Bench Test, para 6. The unit must be calibrated to each cylinder before testing
4. If the cylinder is in poor condition, or the readings are consistently low (below 200 when the sensor is above the level), then a small amount of ultrasonic gel should be used to ensure good contact between the sensor and the cylinder. A small amount of gel should be reapplied before each reading.
5. If the readings are very low, the SPA (Special Power Application) can also be selected by pressing the SPA button once, to increase the readings. The SPA adds approximately 10% more power to the sensor, but reduces the battery life when used. An LED green light illuminates to indicate when the SPA is being used. To return to the normal mode, press the SPA button once more and the LED green light will go off.

TYPICAL 45KG CO2 CYLINDER

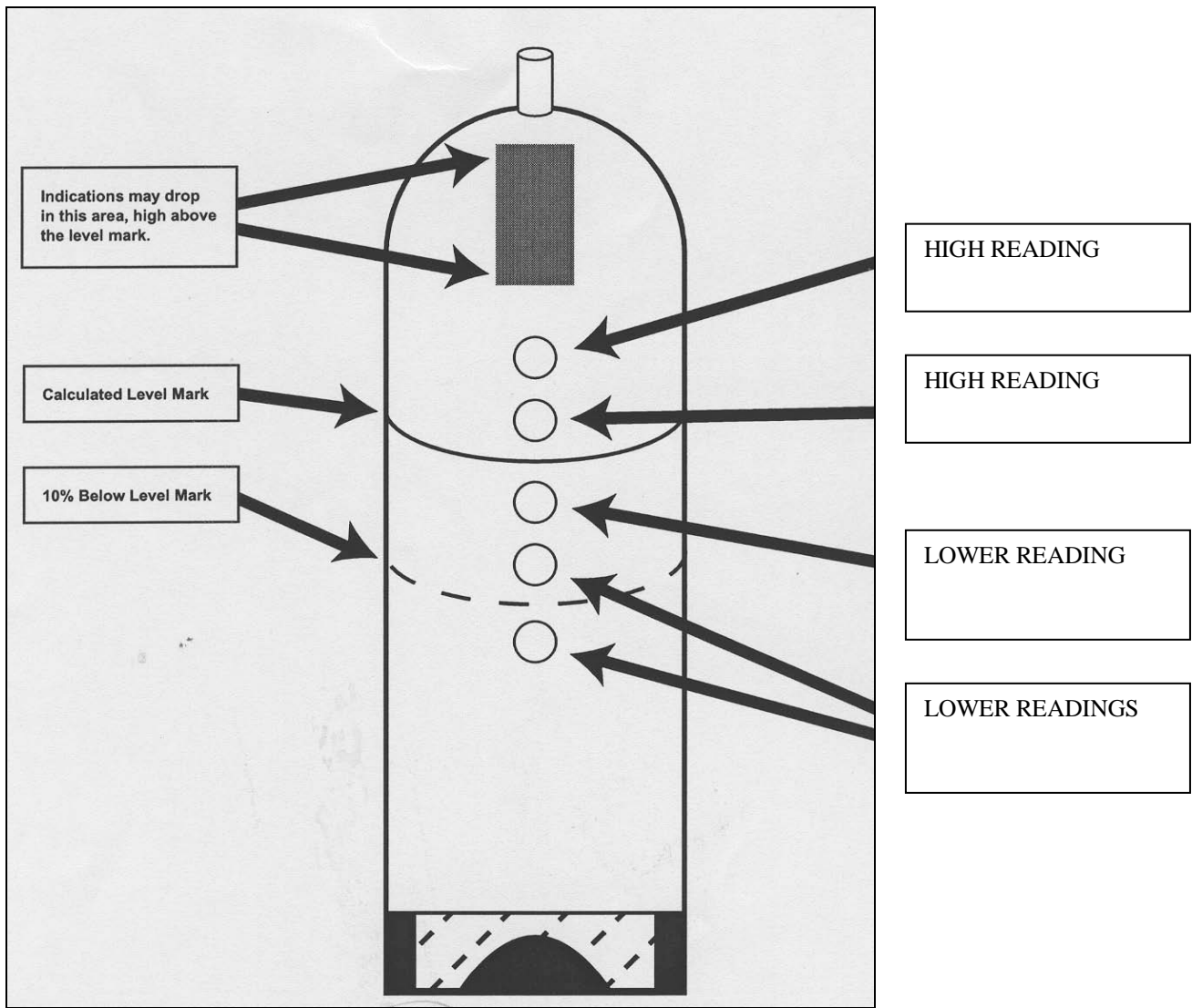


Diagram Showing typical readings on a standard 45Kg CO2 cylinder

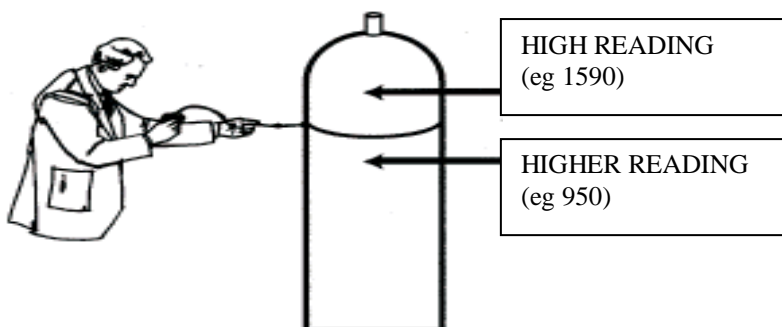
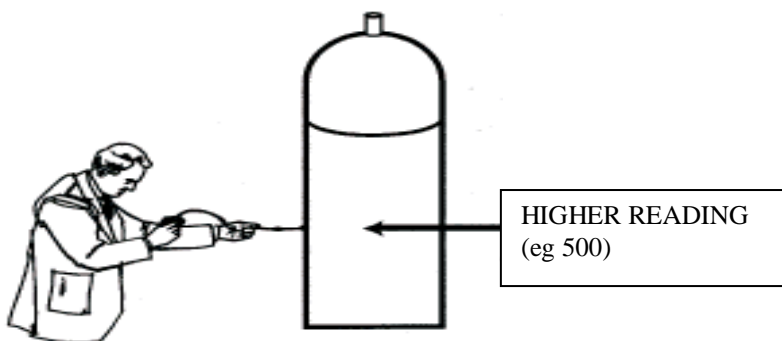
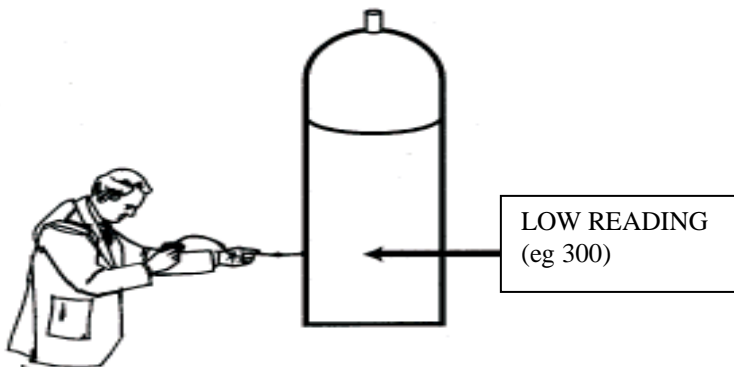
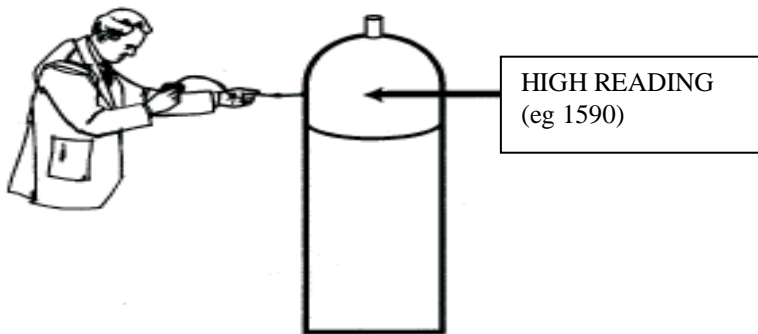
The structure of the cylinder becomes thicker at the bow. Avoid this point and work 2"/50mm below.

The wall thickness of a cylinder is generally 3mm/1/18" but it is not completely uniform and under a microscope would vary, hence the importance of calibrating the unit to each cylinder. Each cylinder has its own ultrasonic characteristics. Readings must always be taken on an imaginary vertical line, to reduce variability of readings due to cylinder structure.

B. USER NOTES

1. Weighing: If the readings above level and below level are the same, or the difference between them is not at least 50%, the cylinder should be treated as empty, and weighed for confirmation. If in doubt be safe – isolate and weigh. The Portalevel is your indicator to save you time. It is still the operator who must decide.
2. Reading the Level: The level is read from the top of the sensor, not the applicator, so when very accurate results are required, this point must be estimated, or marked on the outside of the applicator.
3. LED Display: The accuracy of the LED's lighting up will depend on how effectively they were calibrated, and may also not light on some cylinders where the LCD readings are lower than 050. In either case, the level can still be found, as it is the significant change in the LCD digital readings that is definitive.
4. Rubber Pad: The rubber pad on the sensor must be in good condition to give correct readings. Always treat the pad with care, and in particular; never drag the sensor up or down the cylinder; always lift the sensor off the vessel each time and move in short steps. Use ultrasonic gel until you are totally proficient, before attempting “dry” use, without gel.
5. Sensor Applicator: The applicator must always be used with the white spots aligned and uppermost. This is essential for accurate readings.
6. Reverse Mode: On some vessels and with some liquids, the LCD readings may be higher below the liquid level. This is known as the Reverse Mode. The principle is still the same, looking for the significant change in LCD readings. In this case, the LEDs should be calibrated below the level instead of above it.
7. Gel: If the cylinder is in poor condition, use plenty of ultrasonic gel to increase sensitivity.

Expected Approx. Digital Readings



Calculating the level - CO2

1. Measure cylinder height with tape measure from base of cylinder to base of valve.
2. Divide the cylinder height by 3, then multiply the result by 2.
3. Mark the level calculated in (2) on the cylinder (eg with chalk) as a permanent mark.
4. Check the temperature. The level is normally approximately two thirds of the height at about 5 -10°C (40-50°F). Above this temperature, the level will rise above the mark on the cylinder by about 50mm (2 inches) for every increase of 5° C (10°F).

These calculations will not be required if the cylinder dimensions are listed in Table 1, page

C. OPTIONAL ACCESSORIES

1. Wet Sensor

The optional wet sensor is for use on poor condition cylinders where thick or irregular coatings, or badly pitted and rusty surfaces prevent the dry sensor from getting firm and complete contact with the cylinder surface. This sensor should be assembled in the applicator (fig. 2), then used in the same way as the dry sensor, but with gel or water between the cylinder and the sensor to create complete contact. The gel or water should be applied to each area where the sensor is applied to ensure accurate readings.

2. Multi-Bank Extension Rod

Assemble the extension rod, taking care not to pinch the cable. Slide the sensor in its groove so that it will be in line with the centre of the cylinders when the extension rod is held horizontally. The position of the sensor should be adjusted to fit the cylinder, using a 4mm hexagonal key. Gel must always be used for poor condition cylinders and generally facilitates testing on all vessels. Check the levels in the same way as with the standard dry sensor, by sliding the rod between each row of cylinders, then twisting it so that it is horizontal. Check each cylinder in turn, ensuring that the sensor is pushed squarely and firmly onto the cylinder, forming good contact. It is important to calibrate the unit to each cylinder before testing and to ensure that the rod is held in a level, horizontal position for each reading.

D. UNIT CARE AND MAINTENANCE

1. Always remove the batteries before stowing the unit.
2. Clean remove traces of gel from the sensor tip and applicator, and from the cylinder after testing.
3. To replace the pad on the dry sensor, first clean the sensor face with 600-grit wet and dry paper on a flat surface, then glue the new pad into place with super-glue, taking extra special care that there are no air gaps between the pad and the sensor.

NB: Our Technical Department personnel are always available to assist with any technical queries.

All goods are supplied in accordance with our standard terms and conditions, copy attached

Terms and Conditions

1. Interpretation

1.1 In these Conditions these words have the following meanings:

- “Buyer” means the person whose order for the Goods is accepted by the Company.
“Conditions” means the standard terms and conditions of business set out in this document and (unless the context otherwise requires) includes any special terms and conditions agreed in writing between the Buyer and the Company.
“Contract” means the contract between the Buyer and the Company for the supply of Goods.
“Company” means Coltraco Limited
“Goods” means the goods, which the Company is to supply with these conditions.
“Premises” means 5 Church Hill, Midhurst, West Sussex, GU29 9NX, England.
“Specification” means the specification agreed between the Company and the Buyer setting out the way in which the Goods will be provided.
“Writing” and any similar expression, includes facsimile transmission and comparable means of communication but not electronic email.

2. Orders

- 2.1 The Buyer will be responsible to the Company for ensuring the accuracy of the terms of any order submitted by the Buyer and for confirming telephone orders in writing and for giving the Company any necessary information relating to the Goods within a sufficient time to enable the Company to perform the Contract in accordance with its terms.
2.2 The Company reserves the right to make any changes in the specification of Goods, which are required to conform with any applicable statutory or E.U. requirements, which do not materially affect their quality or performance.
2.3 No order, which has been accepted by the Company, may be cancelled by the Buyer except with the agreement in writing of the Company and on terms that the Buyer shall indemnify the Company in full against all loss (including loss of profit), costs, damages, charges and expenses incurred by the Company as a result of the cancellation.

3. Time

- 3.1 Unless otherwise agreed the Goods shall be ready for despatch or collection by the Buyer on a date to be confirmed by the Company at the commencement of the Contract.
3.2 Any period stated for despatch, collection or for compliance with any other contractual obligations of the Company are estimates only and in any event the Company accepts no responsibility for loss or damage resulting in delay or failure to notify the Buyer of any such delay.

4. Price of the Goods

- 4.1 The price of the Goods will be the Company’s quoted price or, where no price has been quoted (or a quoted price is no longer valid) the price listed in the Company’s published price list current at the date of acceptance of the order.
4.2 Every effort is made to ensure that prices shown in the Company’s current price list are accurate at the time that Buyer places an order. If an error is found, the Company will tell the Buyer as soon as possible. The Buyer can then either reconfirm the order at the correct price or cancel the order
4.3 The Company reserves the right, by giving written notice to the Buyer at any time before delivery, to increase the price of the Goods to reflect any increase in the cost to the Company which is due to any change in delivery dates, quantities or specifications for the Goods which is requested by the Buyer, or any delay caused by any instructions of the Buyer or failure of the Buyer to give the Company adequate information or instructions.
4.4 Unless otherwise stated, prices shall be exclusive of value added tax, which shall be payable by the Buyer in the manner and at the rate from time to time prescribed by law.

5. Delivery

- 5.1 Delivery of the Goods shall be made ex-works the Premises as defined in Incoterms referred to in Clause 16 below unless otherwise varied by the Conditions. The Company shall notify the Buyer that the Goods are ready for collection or, if some other place for delivery is agreed by the Company, by the Company delivering the Goods to that place.
5.2 Any dates quoted for delivery of the Goods are approximate only and the Company shall not be liable for any delay in delivery the Goods however caused. Time for delivery shall not be of the essence of the Contract unless previously agreed by the Company in writing. The Goods may be delivered by the Company in advance of the quoted delivery date of giving reasonable notice to the Buyer.
5.3 If the Buyer fails to take delivery of the Goods or fails to give the Company adequate delivery instructions at the time stated for delivery (otherwise than by reason of any cause beyond the Buyer’s reasonable control or by reason of the Company’s fault) then, without limiting any other right or remedy available to the Company, the Company may:
5.3.1 store the Goods until actual delivery and charge the Buyer for the reasonable costs (including insurance) of storage; or
5.3.2 sell the Goods at the best price readily obtainable and (after deducting all reasonable storage and selling expenses) account to the Buyer for the excess over the price under the Contract or charge the Buyer for any shortfall below the price under the Contract

6. Inspection

The Buyer shall be responsible for inspecting the Goods on arrival and shall notify the Company within 48 hours if there is any discrepancy or shortage or that the goods fail to correspond with the Specification.

7. Payment

- 7.1 Subject to any special terms agreed in writing between the Buyer and the Company, the Company may invoice the Buyer for the price of the Goods on or at any time after receipt of Contract, unless the Goods are to be collected by the Buyer or the Buyer wrongfully fails to take delivery of the Goods, in which event the Company shall be entitled to invoice the Buyer for the price at any time after the Company has notified the Buyer that the Goods are ready for collection or (as the case may be) the Company has tendered delivery of the Goods.
- 7.2 The Buyer shall pay the price of the Goods on despatch of Contract. Receipts will be issued only on request.
- 7.3 If the Buyer fails to make any payment on the due date then, without limiting any other right or remedy available to the Company, the Company may:
- 7.3.1 cancel the Contract or suspend any further deliveries to the Buyer;
 - 7.3.2 charge the Buyer interest (both before and after judgment) on the amount unpaid, at the rate of 4 per cent per annum above National Westminster Bank base rate from time to time, until payment in full is made (a part of a month being treated as a full month for the purpose of calculating interest)
 - 7.3.3 Unless otherwise specified in writing by the Company all payments are to be made in the currency referred to in the Company's invoice or as otherwise agreed between the parties.
 - 7.3.4 There shall be added to all sums payable hereunder the amount of any taxes however designated levied or based upon such sums including not limited to value added tax, local, excise, sales or use taxes or taxes designated or levied by a foreign government.

8 Warranty and Limitation of Liability

- 8.1 The goods supplied by the Company are warranted free from defects at the date of supply and the Buyer will be entitled to the benefit of a warranty specific to those Goods, details of which shall be provided to the Buyer.
- 8.2 These warranties do not apply to any defect in the Goods arising from fair wear and tear, wilful damage, accident, negligence by the Buyer or any third party, use otherwise than as recommended by the Company, failure to follow the Company's instructions, or any alteration carried out without the Company's approval.
- 8.3 Subject to expressly provided in these Conditions, and except where the Goods are sold to a person dealing as a consumer (within the meaning of the Unfair Contract Terms Act 1977), all warranties, conditions or other terms implied by statute or common law are excluded to the fullest extent permitted by law.
- 8.4 Unless the Buyer gives notice to the Company within 14 days from the date of receipt of the Goods, it shall be presumed that the Goods supplied to the Buyer are free from any defect in quality or condition. The Buyer must keep the Goods and allow the Company (or those appointed by it) reasonable access to those Goods for inspection. If delivery is not refused, and the Buyer does not notify the Company accordingly, the Buyer will not be entitled to reject the Goods and the Company shall have no liability for such defect or failure, and the Buyer shall be bound to pay the price as if the Goods had been delivered in accordance with the Contract.
- 8.5 Where a valid claim in respect of any of the Goods is notified to the Company in accordance with these Conditions, the Company may at its discretion replace the Goods (or the part in question) free of charge or refund to the Buyer the price of the Goods (or a proportionate part of the price), in which case the Company shall have no further liability.
- 8.6 **EXCEPT IN RESPECT OF DEATH OR PERSONAL INJURY CAUSED BY THE COMPANY'S NEGLIGENCE, OR LIABILITY FOR DEFECTIVE PRODUCTS UNDER THE CONSUMER PROTECTION ACT 1987, THE COMPANY SHALL NOT BE LIABLE TO THE BUYER BY REASON OF ANY REPRESENTATION (UNLESS FRAUDULENT), OR ANY OTHER IMPLIED WARRANTY, CONDITION OR OTHER TERMS, OR ANY DUTY AT COMMON LAW, OR UNDER THE EXPRESS TERMS OF THE CONTRACT, FOR LOSS OF PROFIT OR FOR ANY INDIRECT, SPECIAL OR CONSEQUENTIAL LOSS OR DAMAGE, COSTS, EXPENSES OR OTHER CLAIMS FOR COMPENSATION WHATSOEVER (WHETHER CAUSED BY THE NEGLIGENCE OF THE COMPANY, ITS EMPLOYEES OR AGENTS OR OTHERWISE) WHICH ARISE OUT OF OR IN CONNECTION WITH THE SUPPLY OF THE GOODS (INCLUDING ANY DELAY IN SUPPLYING OR ANY FAILURE TO SUPPLY THE GOODS IN ACCORDANCE WITH THE CONTRACT OR AT ALL) OR THEIR USE OR RESALE BY THE BUYER AND THE ENTIRE LIABILITY OF THE COMPANY UNDER OR IN CONNECTION WITH THE CONTRACT SHALL NOT EXCEED THE PRICE OF THE GOODS, EXCEPT AS EXPRESSLY PROVIDED IN THESE CONDITIONS.**

9 Indemnity

The Buyer will indemnify the Company in full on demand from and against all losses, costs, claims, damages, expenses and liabilities awarded against or incurred by the Company in connection with or agreed to be paid by the Company in settlement of any claim:

- (a) arising from any failure by the Buyer to comply with any instructions, procedures, precautions, guidelines or other measure specified verbally or in writing by the Company relating to the use of the Goods by it or from the Buyer's failure to use best endeavours to procure that any person who subsequently uses the Goods is made aware of the same and of the importance of complying with them;
- (b) arising because of any breach by the Buyer of any of its obligations under the Contract

10 Specification

- 10.1 The Company reserves the right on the sale of the Goods to make before despatch any alteration to or departure from the specification or design of the Goods provided that it shall not, to a material extent, adversely affect the performance of the Goods or the quality of the workmanship or the material used.

10.2 All specifications, drawings and technical documents issued by the Company either before or after conclusion of the Contract are issued solely for the Buyers use in connection with the Goods and shall not be copied, reproduced or communicated to any third party without the Company's express consent in writing.

11 Insolvency of the Buyer

11.1 This clause 11 applies if;

- (a) The Buyer makes a voluntary arrangement with its creditors or (being an individual or firm) becomes bankrupt or (being a company) becomes subject to an administration order or goes into liquidation (otherwise than for the purposes of amalgamation or reconstruction); or
- (b) An encumbrancer takes possession, or a receiver is appointed, of any of the Buyer's property or assets; or
- (c) The Buyer ceases, or threatens to cease, to carry on business; or
- (d) The Company reasonably believes that any of the events mentioned above is about to occur.

11.2 If this clause applies then, without limiting any other right or remedy available to the Company, the Company may cancel the Contract and any other contracts or orders placed by the Buyer; suspend any further deliveries due to the Buyer without any liability to the Buyer. If the Goods have been delivered but not paid for the price shall become immediately due and payable notwithstanding any previous agreement or arrangement to the contrary.

12 Force Majeure

The Company shall not be liable to the Buyer or be deemed to be in breach of the Contract by reason of any delay in performing or any failure to perform any of the Company's obligations in relation to the Goods if the delay or failure was due to any cause beyond the Company's reasonable control. Without prejudice to the generality of the foregoing, the following shall be regarded as causes beyond the Company's reasonable control:

- (a) Act of God, explosion, flood, tempest, fire or accident;
- (b) War or threat of war, sabotage, insurrection, civil disturbance or requisition;
- (c) Acts, restrictions, regulations, bye-laws, prohibitions or measure of any kind on the part of any governmental, parliamentary or local authority;
- (d) Import or export regulations or embargoes;
- (e) Strike, lock outs or other industrial actions or trade disputes (whether involving employees of the Company or of a third party);
- (f) Difficulties in obtaining raw materials, labour, fuel, parts or machinery;
- (g) Power failure or breakdown in machinery.

13 Export Terms

13.1 In these Conditions "Incoterms" means the International Rules for Interpretation of Trade Terms of the International Chamber of Commerce as in force at the date when the Contract is made. Unless the context otherwise requires, any term or expression which is defined in or given a particular meaning by the provisions of "Incoterms" shall have the same meaning in these Conditions, but if there is any conflict, these Conditions shall prevail.

13.2 Where the Goods are supplied for export from the UK, the provisions of this Clause 13 shall (subject to any special terms agreed in writing between the Buyer and the Company) apply.

13.3 The Buyer shall be responsible for complying with any legislation or regulations governing the Importation of the Goods into the country of destination, for the payment of any duties thereon and for obtaining all necessary licences, permits or consents for the sale or shipment of the Goods to the Buyer. The Buyer shall indemnify the Company in respect of any breach of the Buyer's obligations under this clause.

13.4 Unless otherwise agreed in writing between the Buyer and the Company, the Goods shall be delivered ex-works and the Company shall be under no obligation to give notice under Section 32 (3) of the Sale of Goods Act 1979.

13.5 The Buyer shall be responsible for arranging for testing and inspection of the Goods at such premises as may be specified by the Company before shipment. The Company shall have no liability for any claim in respect of any defect in Goods which would be apparent on inspection and which is made after shipment, or in respect of any damage during transit.