

# Certificate

## Pursuant to section 12 of the Weights and Measures Act 1985

*Certification No 2798 Revision 2*

*Valid Until 30 September 2016*

*In accordance with the provisions of section 12 of the Weights and Measures Act 1985, the Secretary of State for Business, Innovation & Skills hereby certifies as suitable for use for trade a pattern of a road tanker meter measuring system, as described in the descriptive annex to this Certificate, and having the following characteristics:-*

*A vehicle-mounted meter measuring system with a wet-line delivery system and a dry-line delivery system, based on EC standard scheme 7. System control and headgear is, electronic and has the option of price calculation.*

<i>Model designation:</i>	<i>80/50 mm system</i>
<i>the maximum rate of flow:</i>	<i>800 litres/minute</i>
<i>the minimum rate of flow:</i>	<i>150 litres/minute</i>
<i>the minimum delivery:</i>	<i>50 mm wet line 350 litres</i>
	<i>80 mm dry line 2000 litres</i>
<i>the liquids measured:</i>	<i>gas oil, derv, kerosene</i>

*Note: This certificate relates to the suitability of the equipment for use for trade only in respect of its metrological characteristics. It does not constitute or imply any guarantee as to the safety of the equipment in use for trade or otherwise.*

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Reference No:T1121/0012

Date: 03 December 2010

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# Descriptive Annex

## 1 INTRODUCTION

This pattern of a vehicle mounted electronic liquid fuel meter measuring system (Figure 1) comprises a four-compartment tanker fitted with a wet- and dry-hose hydraulic system, EC standard scheme 7, having a pulse generator fitted to the output shaft of the positive displacement meter. The pulse output is used to drive the litre counter/control box and a receipt printer. The litre counter/control box has an LED batch and totaliser display. The minimum delivery for the system is 350 litres for wet- line delivery and 2000 litres for dry-line delivery. The batch display indicates to 99999.9 litres, the totaliser to 99999999 litres. Delivery information is entered into the system, either by hand at the point of delivery or by computer at the vehicle depot via an input device, Portamat. The system is able to calculate a price-to-pay for a transaction when a unit price has been previously specified for that delivery.

Alternatives include:

- (i) tankers with 1,2,3,5 or 6 compartments
- (ii) a system without the Portamat, where deliveries are initiated and controlled from the litre counter/control box
- (iii) using other EC-approved meters of equivalent flowrate range.

## 2 CONSTRUCTION

### 2.1 Mechanical

The tanker consists of a tank, divided into four compartments, rigidly mounted onto the vehicle chassis. Each compartment is equipped with a top loading dipstick system and man-way, and adjacent to each man-way there is a foot-valve operating lever. From each foot valve at the base of the compartments, rigid piping runs underneath the tank to approximately its centre where the four faucet valves are situated. The system air solenoids are contained in a metal cabinet above the cargo pump. The hose reel and the litre counter/control box are situated between the tank and the vehicle cab.

The input device, the Portamat, which can be easily removed from the vehicle for loading and downloading transaction and journey information to a depot computer, is mounted in the cab, as is the receipt printer.

### 2.2 Hydraulic

The 50 mm wet-line/80 mm dry-line hydraulics (Figure 7) consist of four compartments, each with a foot valve and faucet valve. A flexible “jumper” hose connects one compartment to the cargo pump inlet via a filter. The pump is a Drum AD system hydraulically driven from the vehicle power takeoff arranged to maintain a constant delivery pressure whilst fuel is being delivered but reducing when it is not. The hydraulic liquid used to drive the pump is cooled

using a heat exchanger around the fuel inlet to the pump, the fuel being used to cool the liquid.

The pumped fuel passes through the special gas extractor to the meter. The fuel then flows through a sight glass to a “T” piece where the fuel passes to either the wet- or dry-line outlets. The wet-line outlet comprises a two-stage preset valve and the 50 mm hose reel which terminates in the nozzle valve. There is a pressure detector immediately before the hose that is interlocked with the rewind mechanism to ensure that the latter is not operable whilst fuel is being pumped. The dry-line outlet has a two stage preset valve and an open ended 80 mm hose. Just down stream of the dry- line preset valve there is a sight glass and a tapping into the pipe where air is introduced at the end of such a delivery to blow the hose clear. When, during a delivery, air is detected at the top of the special gas extractor whichever preset valve is open is closed to ensure no air is taken through the meter and is kept closed until the special gas extractor is clear of air. The hydraulics of the system conform to those of an EC standard scheme 7 arrangement (Figure 7) as defined in Council Directive 77/313/EEC as amended, with the modification that a vessel is authorised for the special gas extractor to catch liquid particles entrained by the gases with no return to the tank.

### **2.2.1 Meter**

The meter manufactured by Satam (Figure 2) is a rotary vane operating principle meter. It is of 50 mm nominal bore as described in EC Certificate No F81/03.422 but having the mechanical indicator removed and the pulser installed in its place.

### **2.2.2 Special gas extractor**

The special gas extractor (Figure 3) is manufactured by Alfons Haar and is of 80 mm nominal bore. Liquid enters tangentially at the top of the main chamber inducing a centrifugal action in the fuel. This action, the volume of the chamber and the strainer at its base, removes the gas from the liquid. The liquid leaves the extractor at its base. The gas rises to the top of the chamber where a valve vents it to an upper chamber and hence via another valve and a short length of pipe to the vapour froth collection tank. Whilst the extractor is venting, marked by the white sleeve in the indicator at the top of the extractor retracting, it switches a pneumatic signal that is used to control the two preset valves. There is also a push-button operated valve on top of the extractor that may be used to accelerate venting of the chamber at start-up. The vapour/froth collection tank is mounted immediately adjacent to the special gas extractor. The vapour/froth line from the special gas extractor to the collection tank has no valves in it and is of such a material that if it is crushed or deformed it will not subsequently recover its shape.

The Physikalische-Technische Bundesanstalt (PTB) Approval Number for the Alfons Haar Special Gas Extractor is No 1.51.7-3265.152-HAM 03/85.

### **2.2.3 Preset valves**

The preset valves, situated one in each of the dry- and wet-lines are two-stage, fast and slow flow, air-operated valves. The dry-line valve incorporates a sight glass downstream of the valve shuttle. The solenoids controlling air to the valves are situated in the control box and are actuated by the litre counter/control box.

## **2.3 Electronics**

The main electronics for the system (Figure 10) are contained within the input device or “Portamat” (1), the dock device “Dock I” (2) in which the Portamat is placed, the printer (4), the litre counter/control box (5) and the pulser (7). A junction box (3) and control box (8) interface the cab mounted equipment and system’s pneumatic equipment respectively, with the litre counter/control box. Next to the litre counter/control box is a box (6) with two illuminated push button switches, for selecting wet- or dry-line delivery and an indicator lamp, which lights when the system has detected low air pressure.

**2.3.1** The litre counter/control box (Figure 4) receives data from the pulser, calculates the delivered volume, and displays batch and total quantities. The keypad is used to manually enter delivery data and the push buttons to give manual control of deliveries. It also handles communication between the electronic units of the system and controls the preset valves and the dry line air blast valve and timer.

**2.3.2** The input device (Portamat) (Figure 5) which can be loaded with delivery information from a depot computer supplies quantity and fuel data to the controller from memory. It collects and processes data from the controller during transactions. The device incorporates eight function keys, with adjacent prompting LED display, for stepping through delivery sequence and number pad for delivery number entries. At the top of the device is an LCD display for indicating quantity, type of fuel to be delivered and error codes.

**2.3.3** The pulser is a dual train 50-slot magnetic instrument giving an output of approximately 100 pulses per litre, the meter having a cyclic volume of 0.77 litres.

**2.3.4** The printer is a tractor feed dot matrix printer with paper detect.

## **2.4 Electrical**

The main dc supply to the system is from the vehicle 24 V battery. The input device contains a 5 V battery for stored data retention and the litre counter/control box has battery backup of the batch and total display, in case of vehicle battery failure, via an internal lithium battery.

## **2.5 Pneumatics**

Air is supplied to the system from the vehicle’s compressor and reservoir tank. Air is used to operate the two preset valves, to blow out the dry line hose, via the blow down valve, when a delivery is completed, to signal when there is air present in the special gas extractor and for switching the hose rewind.

The following pipes are run in high pressure hydraulic hose:

- (1) the pipe from the air reservoir to the blow down valve
- (2) the pipe from the blow down valve to the air injection point after the preset valve
- (3) the pipe from the air reservoir to the control box
- (4) the two pipes from the special gas extractor manifold block to the float valve on the top chamber section of the special gas extractor.

The following pipes are run in metal tubing:

- (1) the two pipes from the control box to each preset valve
- (2) the two pipes from the special gas extractor manifold block to the control box.
- (3) the pipe from the control box to the blow down valve

## 2.6 Technical data

minimum flowrate	150 L/min
maximum flowrate	800 L/min
maximum operating pressure	8 bar
minimum delivery	350 L
maximum delivery	99999.9 L
maximum totaliser display	99999999 L
nominal wet-line diameter	50 mm
nominal dry-line diameter	80 mm
minimum air system pressure	7 bar
system supply voltage	24 V dc
liquids	gas oil, derv, kerosene

## 2.7 Display and legends

The litre counter/control box (Figure 4) carries a batch and totaliser display. This is a light emitting diode display (LED) 12 mm high and of 99999.9 litres capacity when showing delivered quantity and 99999999 litres when showing the total. In both cases leading zeros are suppressed. A leading upper case “L” is displayed when showing the batch quantity. To the right of the display is a keypad. Beneath the display are six push buttons with associated lamps and legends. The buttons are marked F1 to F6 from left to right. Button F1 has three lamps above it marked “PRESET”, “TOTAL” and “BATCH”. Button F2 has one lamp marked “PRODUCT”. Button F3 has two lamps above it marked “START” and “STOP”. Button F4 has one lamp above it marked “NOT FULL CUST”. Button F5 has one lamp marked “NOT FULL SUPPLIER” and button F6 has one lamp marked “FULL”.

The system carries a data plate (Figure 8) bearing the tank builder’s name, the certificate number and the metrological characteristics of the system.

## 2.8 Sealing

In addition to the normal meter measuring system sealing points the following parts specific to this system shall be sealed to prevent unauthorised adjustment or dismantling:

- (a) the pulser retaining bolts
- (b) the control box cover
- (c) both end connectors on the pipe from the air reservoir to the blow down valve
- (d) both end connectors on the pipe from the blow down valve to the air injection point after the preset valve
- (e) both end connectors on the two pipes from the control box to each preset valve
- (f) both end connectors on the two pipes from the special gas extractor manifold block to the control box

- (g) both end connectors on the two pipes from the special gas extractor manifold block to the float valve on the top chamber section of the special gas extractor.

High pressure hydraulic hose connections have drilled nuts through which a wire is passed, drawn taut and a lead seal applied. Metal tubing connections are sealed using the same method, unless fitted with a Harr anti-tamper device employing split mouldings and metal sleeve.

The meter and special gas extractor are sealed in accordance with their respective certificates. In the case of the special gas extractor, the upper four bolts, which give access to the internal filter, may be left unsealed.

### **3 OPERATION**

**3.1.1** Before the vehicle leaves the depot, the driver enters his/her initialising data directly into the input device: i.e. date, driver's number, truck number, and trip number. Delivery data may previously have been entered into the input device from the depot computer.

**3.1.2** On arrival at the delivery point the driver initiates either a planned or unplanned delivery. For the former he/she then enters into the input device a delivery number from the list loaded at the depot. For an unplanned delivery he/she has to enter the quantity and grade of fuel to deliver. In both cases the litre counter/control box then displays the quantity to be delivered and the transaction number at that site. Having acknowledged that the correct delivery data is shown on the litre counter/control box, it will then show in the batch display the quantity and grade of fuel to be delivered.

**3.1.3** The vehicle power takeoff is engaged to drive the cargo pump.

**3.1.4** For a wet-line delivery the nozzle of the 50 mm hose is opened and placed in the tank to be filled. For a dry-line delivery the 80 mm hose is connected to the receiving tank. Having connected the jumper hose to the correct compartment the foot and faucet valves are opened.

**3.1.5** Before the delivery is started (see Section 3.1.6) either a wet- or dry-line delivery is selected. This is achieved by pushing the correct pushbutton switch on the box located next to the litre counter/control box.

**3.1.6** To start the delivery the Start button, F3, on the counter/control box is pressed. The display then blanks, shows 'TEST' and then zeros. The delivery starts. When approximately 30 litres short of the preset quantity is reached the preset valve closes to slow flow state and the delivery is completed.

**3.1.7** Having satisfactorily completed the delivery the "Not Full Cust.", "Not Full Supplier" or "Full" and then the "E" buttons are pressed to complete the transaction. The litre counter/control box now shows "END". With a dry line delivery the hose is blown out after 15 seconds after the "END" button is pressed. If there are no more deliveries at that location then a receipt (Figure 6a or Figure 6b) is printed in the cab. If there are other deliveries to-be made then the operation continues as in 3.1.4 above until all have been made and then the receipt is printed.

**3.1.8** The display now blanks but either the batch or totaliser quantities can be recalled by pressing F1.

**3.1.9** If the Start/Stop button is pressed during a delivery the preset valve closes completely and the system awaits a Start or Complete command.

**3.1.10** The preset valve, faucet valve and foot valve are closed, the hose rewound and the PTO disengaged.

## **3.2 Interlocks and security features**

**3.2.1** If the system is operated with the pulser electrically disconnected an error is detected and no delivery is possible.

**3.2.2** If the system is operated with no paper in the printer an error is detected when the End button is pressed and this cannot be cleared without inserting paper and no further deliveries can be made.

**3.2.3** Any receipts for a transaction printed after the initial one are clearly marked "DUPLICATE".

**3.2.4** If the air pressure in the reservoir falls below 85 psi a bulk delivery cannot be initiated.

**3.2.5** Once a delivery has been started it is not possible to change from wet- to dry-line operation or vice versa.

**3.2.6** The system shuts down after eight minutes from receiving the last pulse from the meter.

## **4 AUTHORISED ALTERNATIVES**

**4.1** As described above, but having a 1, 2, 3, 5 or 6-compartment tanker.

**4.2** As described but having an alternative EC-approved meter of cyclic volume approximately 0.8 litre.

**4.3** As described but without the input device (Portamat). In this configuration only unplanned deliveries can be made, i.e. no transaction data can be downloaded into the system before the trip is made and the driver has to enter all such details on site using the litre counter/control box.

For each delivery made a receipt is printed, if more than one is made at one address then more than one receipt is produced. The printer is a dot matrix type with paper detect.



### **4.3.1 Display and Legends**

The litre counter/control box carries a batch and totaliser display. This is a LED display 12 mm high and of 99999.9 litres capacity when showing delivered quantity and 9999999 litres when showing the total. In both cases leading zeros are suppressed. A leading upper case “L” is displayed when showing the batch quantity. To the right of the display is a keypad. Beneath the display are six push buttons with associated lamps and legends. The buttons are marked F1 to F6 from left to right. Button F1 has three lamps above it marked “PRESET”, “TOTAL” and “BATCH”. Button F2 has two lamps marked “DATE” and “TIME”. Button F3 has two lamps above it marked “START” and “STOP”. Button F4 has one lamp above it marked “CUSTOMER NUMBER”. Button F5 has one lamp marked “PRODUCT” and button F6 has one lamp without an associated legend.

### **4.3.2 Operation**

**4.3.2.1** Having engaged the vehicle power takeoff to drive the cargo pump for a wet-line delivery the nozzle of the 50 mm hose is opened and placed in the tank to be filled. For a dry-line delivery the 80 mm hose is connected to the receiving tank. Having connected the jumper hose to the correct compartment the foot and faucet valves are opened.

**4.3.2.2** Before the delivery is started (see Section 4.3.2.5 below) either a wet- or dry-line delivery is selected. This is achieved by pushing the correct pushbutton switch on the box located next to the litre counter/control box.

**4.3.2.3** To initiate the delivery the driver presses F4 and enters a “customer number” followed by “E”.

**4.3.2.4** A product code is then entered followed by “E”.

**4.3.2.5** For preset delivery F1 is pressed and the required quantity is selected. The delivery process, which terminates automatically, is started by pressing F3. The preset quantity may be changed during a delivery by pressing F3 to halt the pump, pressing F1 for preset delivery, selecting a new quantity and pressing F3 to restart the pump.

For non-preset delivery, a large quantity such as 99999 litres must be selected. Delivery is started by pressing F3, which will then have to be pressed again when the desired quantity is reached.

**4.3.2.6** When the delivery has finished “E” is pressed which terminates the transaction. Another product may be selected by returning to Section 4.3.2.3. For dry- line operation, the hose is blown down each time “E” is pressed.

**4.3.2.7** A ticket is now automatically printed (Figure 9) and the transaction completed.

**4.3.2.8** The preset valve, faucet valve and foot valve are closed, the hose rewound and the PTO disengaged.

**4.4** Having a small expansion tank (Figure 11) fitted to the vent pipe line, above the manifold, below the vent valve. The device allows any air, which is entrained in the liquid in the vent pipe, to separate more easily and exit via the upper part of the vent pipe.

The “expansion tank” has a slope on its base to aid liquid drainage back into the manifold. It has no communication with atmosphere other than via the vent pipe.

**4.5** As described in the certification, but having the option to fit the wet hose reel system only. The changeover valve is no longer required and may be omitted.

**4.6** As described in the certification, but having the option to fit the bulk hose delivery system only. The changeover valve is no longer required and may be omitted.

**4.7** As described in the certificate but having an alternative flow meter, the ALMA turbine meter model Adriane DN 50-50.

#### **4.8 Utilisation of the LC-98 Temperature compensation**

**4.8.1** Having the LC-98 litre counter as described in Certificate Number 2798/11, but having the temperature compensation function enabled.

**4.8.2** Conditions

**4.8.2.1** A Type PT100 temperature probe is mounted within 1m of flow meter inlet port. This should be sealed securely. The wiring loom is modified to connect the PT100 probe to the LC98 Electronic register.

**4.8.2.2** Software to be upgraded to include Temperature Compensation option. Temperature Compensation can be applied to two main product groups: Diesel/Gas Oil and Kerosene/Paraffin. The applicable software versions are 50208-124 (or later) or 50260-112 (or later)

**4.8.2.3** When Temperature Compensation option is selected, at the end of the delivery the lower scrolling prompt display on the register will flash

– *Temperature Compensated Volume.*

Additionally the delivery ticket will have printed on it:

“*Temperature Compensated Delivery to 15°C*”.

## **5 RECOMMENDED TESTS**

In addition to the tests specified in Regulations the following may be performed to ensure conformity of the pattern:

**5.1** Check that the system detects the absence of paper in the printer.

**5.2** Check that if more than one receipt per transaction is printed the second and subsequent ones are marked as duplicates.

**5.3** Check that if the vehicle battery is isolated the litre counter/control box display retains transaction data.

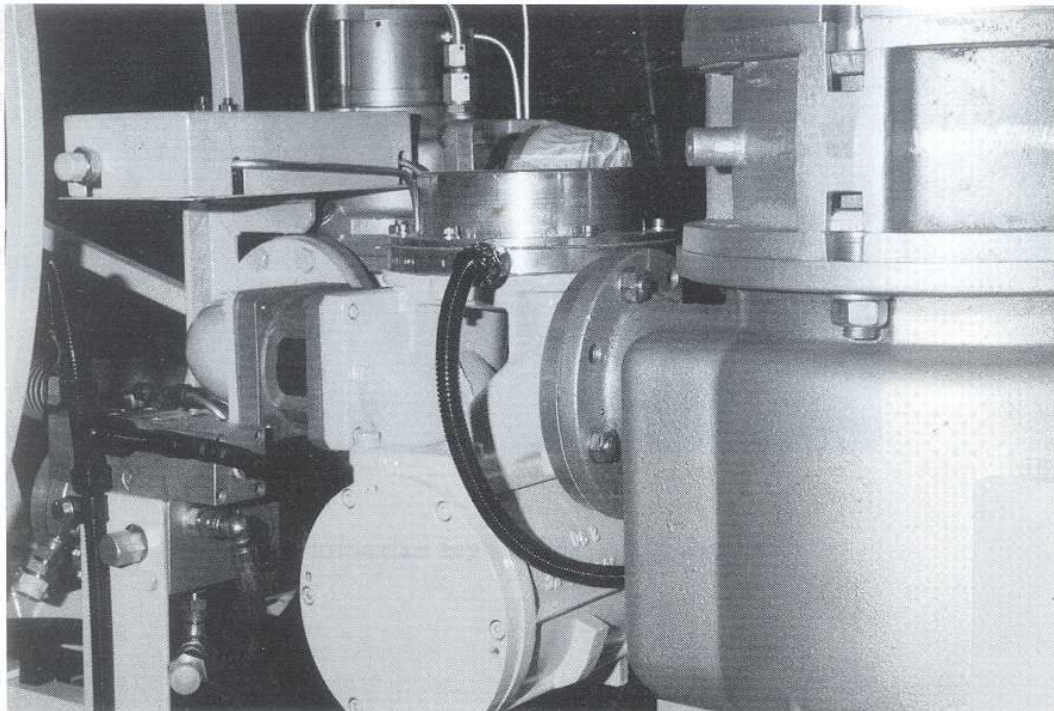
**5.4** Simulate a multiple dry-line delivery at one location with one receipt required and check that the 80 mm hose is blown down automatically after each individual delivery.

## **6 CERTIFICATE HISTORY**

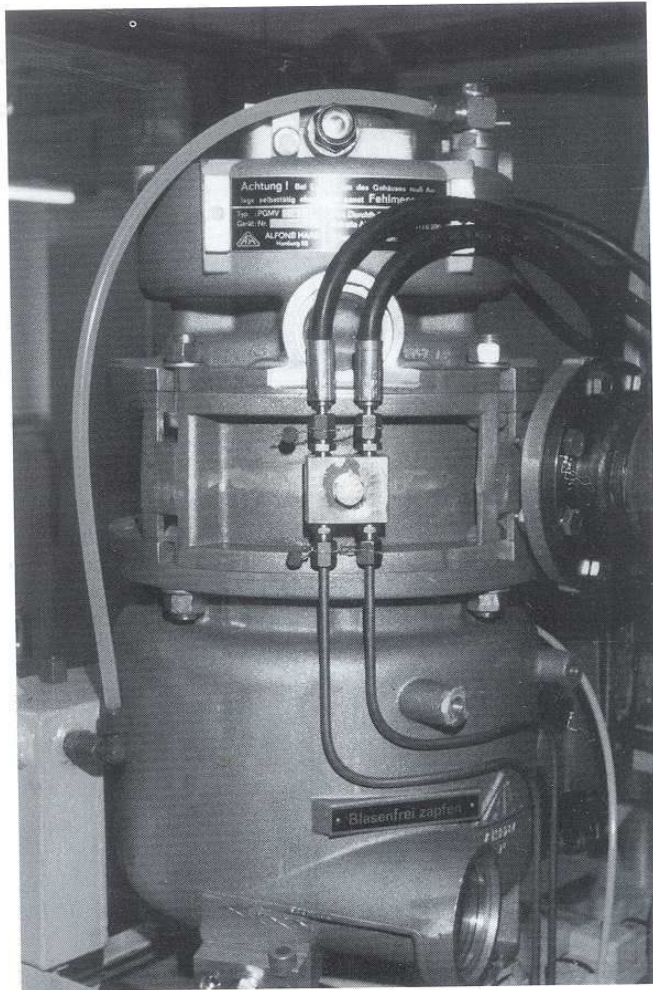
<b>ISSUE NO.</b>	<b>DATE</b>	<b>DESCRIPTION</b>
2798	1 October 2006	Type examination certificate first issued.
2798 Revision 1	30 October 2009	Section 4.7 added, ALMA turbine meter Section 6 added, Certificate History
2797 Revision 2	03 December 2010	Section 4.8 added, Utilisation of the LC-98 Temperature compensation



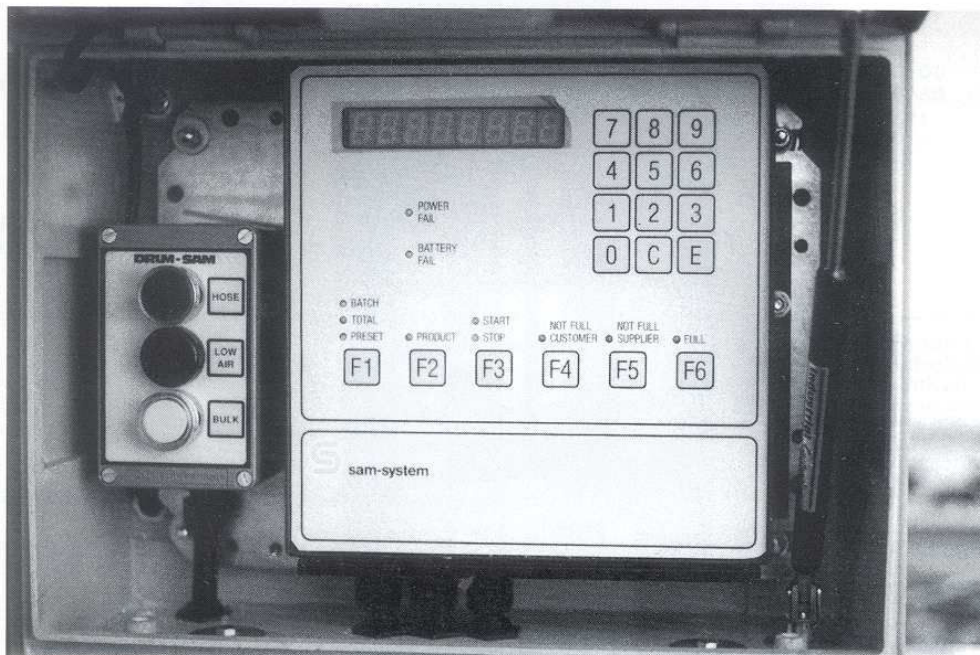
**Figure 1 Side view of tanker**



**Figure 2 Meter with pulser**



**Figure 3 Special gas extractor**



**Figure 4 Litre counter/control box**

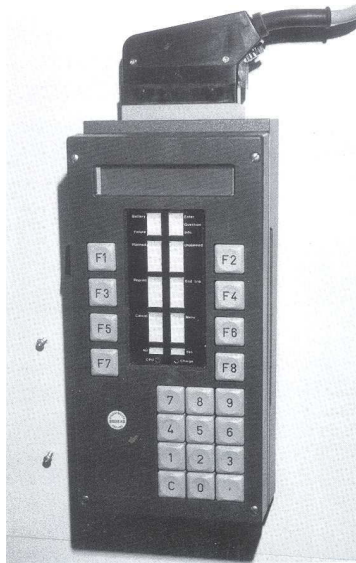


Figure 5 Input device (Portamat)



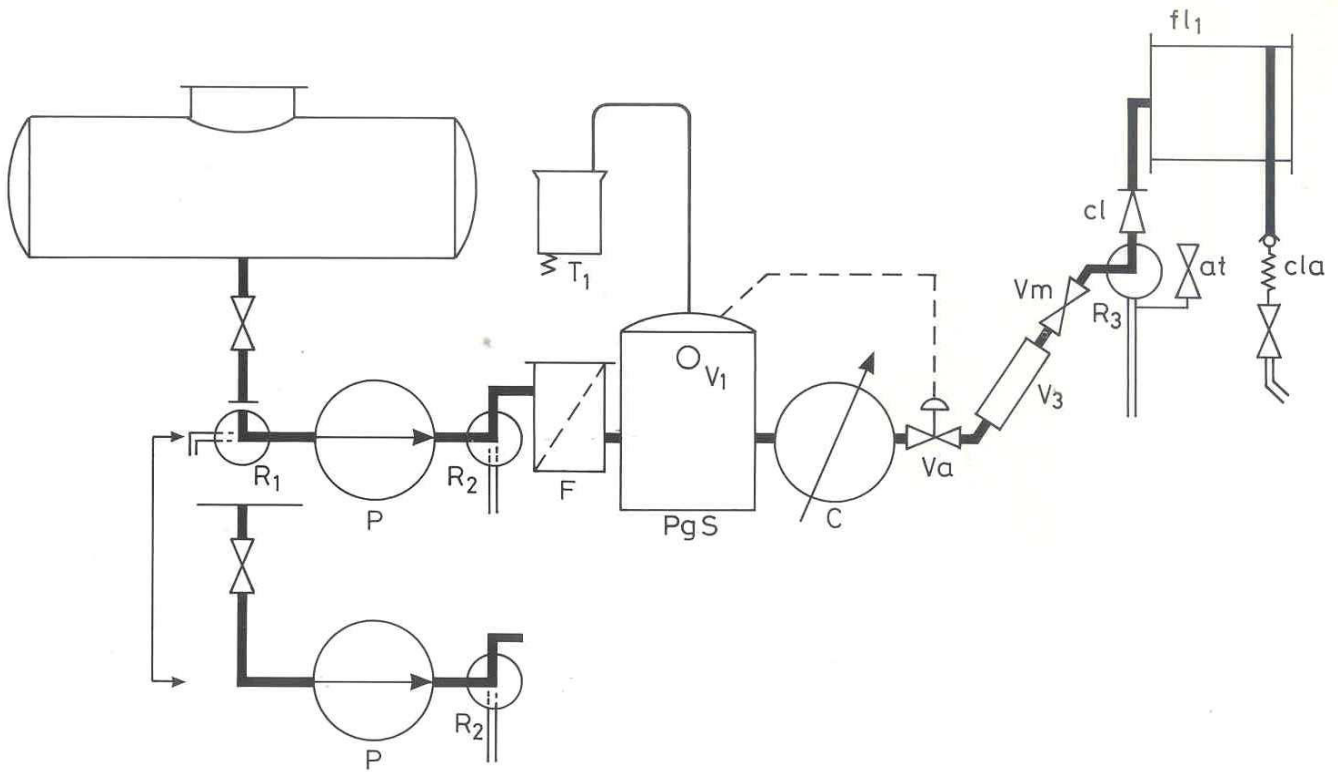
					 <b>Phoenix Petroleum Limited</b> <small>Head office: Phoenix House, Newmarket Road,          Bury St. Edmunds, Suffolk IP33 3TF          Tel: (0284) 755337 Fax: (0284) 752823          Telex: 81587 PHENIXG          "THE EAST ANGLIAN FUEL COMPANY"          VAT No. 388 8366 81</small>
Duplicate copy number : 1					<b>I N V O I C E</b>
Number: 472557		Account: 6006248			
Date : 05/04/91	Order Number: 00000000	Vehicle Number: 051			
Sold : MRS J PROUDFOOT 1 BEECH AVENUE GREAT STUKELEY HUNTINGDON , CAMBS		Del. : MRS J PROUDFOOT 1 BEECH AVENUE GREAT STUKELEY HUNTINGDON , CAMBS			
Description	Del. Amount	Unit Price	Value(£)	VAT rate	
GAS OIL	950.01	16.70p	158.65	00.00	
				Total VAT :£	0.00
Less discount of £ 19.00				Total	£ 139.65
for payment to driver or by return of post. Payment due by : 15/05/91					
Quantity Received by :					
Payment Received by :					
WARNING - Only Derv & Motor Spirit to be used as Road Fuel					
Sold subject to Company's Terms & Conditions of Sale					
-----					
R E M I T T A N C E   A D V I C E					
Please return with your payment to the above address					
MRS J PROUDFOOT		Acc. no. : 6006248			
		Invoice no : 472557			
		Date : 05/04/91			
Amount Due :£ 158.65					
Payment due by : 15/05/91					

Figure 6a Planned delivery receipt

 <b>Phoenix Petroleum Limited</b> Head office: Phoenix House, Newmarket Road, Bury St Edmunds, Suffolk IP33 3TF Tel: (0284) 755337 Fax: (0284) 752623 Telex: 61587 PHENXG "THE EAST ANGLIAN FUEL COMPANY" VAT No. 388 8366 81	
Duplicate copy number : 2	
DELIVERY NOTE	
Number: 472556	Account : 6006248
Date : 05/04/91	Vehicle Number : 051
	Order Number:
Sold : MRS J PROUDFOOT 1 BEECH AVENUE GREAT STUKELEY HUNTINGDON , CAMBS	Del. : MRS J PROUDFOOT 1 BEECH AVENUE GREAT STUKELEY HUNTINGDON , CAMBS
Product Description GAS OIL	Delivered Quantity 900.0 l
Qty Rec. By:	

**Figure 6b** Unplanned delivery receipt



**Figure 7** Hydraulic system diagram

## Key to Figure 7


- R<sub>1</sub>: Two-way valve for metered delivery, unmetered delivery and emptying and filling of the tank without passing through the meter.  
This valve is optional. It may be replaced by a direct connection.
- P: Pump. The pump may be reversible. In that case, a non-return valve must be added between valve R<sub>2</sub> and the special gas extractor PgS.
- R<sub>2</sub>: Optional two-way valve for direct unmetered delivery.
- F: Filter. May be included as part of the special gas extractor.
- PgS: Special gas extractor.
- V<sub>1</sub>: Sight glass of special gas extractor.
- C: Meter.
- Va: Valve automatically closed by the special gas extractor when the pressure is insufficient to prevent vapourisation in the meter or when a gas pocket accumulates in the extractor. In addition, this valve must close in the event of a failure in its control system.
- at: Automatic air vent.
- Vm: Operating valve.
- The automatic valve Va and the operating Vm may be combined in a special valve performing both functions. This special valve must be placed downstream of the sight glass V<sub>3</sub>.
- cl: Non-return valve.
- V<sub>3</sub>: Sight glass, also serving as a gas indicator.
- Fl<sub>1</sub>: Full hose-on reel.
- cla: Valve to prevent the full hose from emptying.
- R<sub>3</sub>: Device allowing deliveries to be made via either, the full or empty hose.
- T<sub>1</sub>: A vessel authorised for the gas venting device to catch liquid particles entrained by the gases.

METER MEASURING SYSTEM			
SYSTEM	80mm/50mm	CERTIFICATE NUMBER	
SERIAL No		2798	
METER No		CALIBRATION	
DATE OF MANUFACTURE			
FLOW		MAX:800	MIN:150 LITRES/MIN
LIQUIDS MEASURED	MAXIMUM PRESSURE	8	BAR
GAS OIL; DERV; KEROSENE	MINIMUM DELIVERY – 80mm	2000	LITRES
	MINIMUM DELIVERY – 50mm	350	LITRES

Figure 8 Data plate



**DELIVERY TICKET**

Authorized  Distributor

Inv./del. note No.

123789

Warning - Oils sold on this document other than motor spirit, autodiesel or motor diesel must not be used as road fuel.

DATE

20 11 90

2419

5

11 47

0

TIME

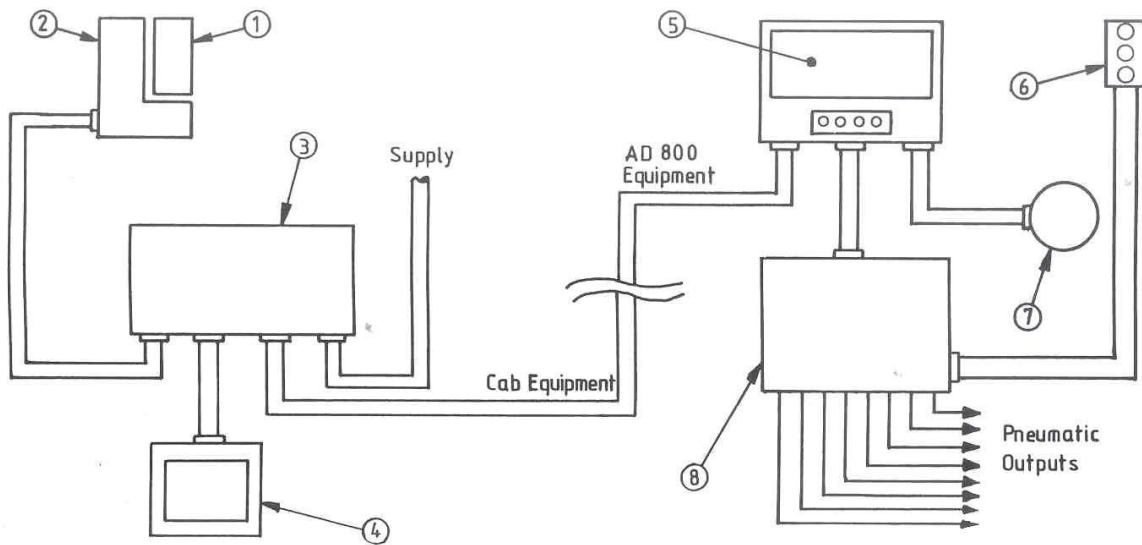
**PRODUCT CODE**

Cash/cheque received with thanks £			
Meter/dip record	5	20 11 90 11 47	2419 0
Litres delivered		850.3 L	
Quantity checked and goods received		Adjustment for any discrepancy will be made by debit/credit note	
		Driver's signature	
I certify that I have delivered fuel to the above premises, but was unable to obtain a signature as the customer was absent.		Driver's signature	

Sales are made in accordance with conditions on reverse.  
All quantities are in litres. 1 gallon = 4.546 09 litres

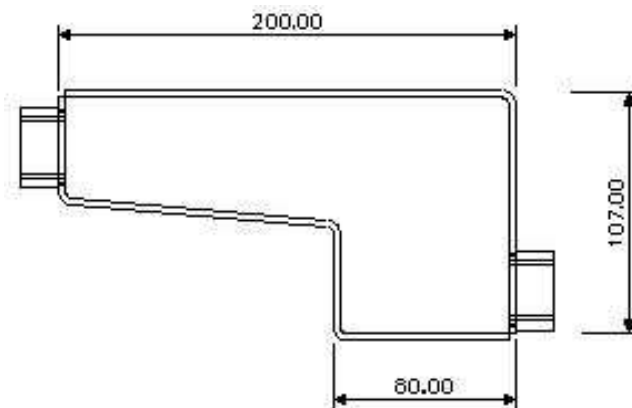
**NOTE.**  
IF A DUPLICATE TICKET IS PRINTED THE WORD **DUPLICATE** IS PRINTED AT THE RIGHT HAND SIDE OF THE DELIVERY NUMBER

**Figure 9 Receipt from authorised alternative**



- |   |              |   |                           |
|---|--------------|---|---------------------------|
| 1 | Input device | 5 | Litre counter/control box |
| 2 | Dock device  | 6 | Wet/dry-line selector nox |
| 3 | Junction box | 7 | Pulser                    |
| 4 | Printer      | 8 | Control box               |

**Figure 10 Electronic system diagram**



**Figure 11 Expansion tank (section view)**

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