EG

NATIONAL STANDARDS COMMISSION

WEIGHTS & MEASURES (PATTERNS OF INSTRUMENTS) REGULATIONS

REGULATION 9

CERTIFICATE OF APPROVAL No 5/6A/68

This is to certify that an approval has been granted by the Commission that the patterns and variants of the

Micro-M Self-serve Driveway Flowmeter System

submitted by Production Engineering Co Ltd
Station Road
Marton, New Zealand

are suitable for use for trade.

The approval is subject to review on or after 1/7/83.

Instruments purporting to comply with this approval shall be marked NSC No 5/6A/68.

Relevant drawings and specifications are lodged with the Commission.

Signed

Executive Director

Descriptive Advice

Pattern: approved 21/9/78

. Micro-M self-serve driveway flowmeter system.

Technical Schedule No 5/6A/68 dated 4/10/78 describes the pattern.

Variant: approved 29/10/80

1. With switching unit for installation between Micro-M console and driveway flowmeters.

Technical Schedule No 5/6A/68 Variation No 1 dated 28/11/80 describes variant 1.

Variant: approved 9/3/81

2. With authorisation sequences modified.

Technical Schedule No 5/6A/68 Variation No 2 dated 27/3/81 describes variant 2.

Variant: approved 31/8/81

3. Production Engineering driveway flowmeters of various models approved as attendant-operated or interfaced with the Micro-M self-serve system.

Technical Schedule No 5/6A/68 Variation No 3 dated 17/9/81 describes variant 3.

Variants: approved 6/11/81

4. Driveway flowmeters described in variant 3 with alternative hose mast and preset panel.

5. Driveway flowmeters described in variant 3 with alternative nozzle hang-up.

Technical Schedule No 5/6A/68 Variation No 4 dated 2/12/81 describes variants 4 and 5.

Variants: approved 16/7/82

6. Production Engineering driveway flowmeter model 5301 H approved as attendant-operated or interfaced with the Micro-M self-serve system.

7. Variant 6 fitted with a preset panel and preset control valve, and known as model 5301 P.

Technical Schedule No 5/6A/68 Variation No 5 dated 3/8/82 describes variants 6 and 7.

Variant: approved 8/11/82

8. With Production Engineering driveway flowmeter models 6301 H(AH) and 6301 P(AH) approved as attendant-operated or interfaced with the Micro-M self-serve system.

Technical Schedule No 5/6A/68 Variation No 6 dated 1/12/82 describes variant 8.

Filing Advice

Certificate of Approval No 5/6A/68 dated 3/8/82 is superseded by this Certificate and may be destroyed.

The documentation for this approval now comprises:

Certificate of Approval No 5/6A/68 dated 1/12/82
Technical Schedule No 5/6A/68 dated 4/10/78 (including Special Tests and Table 1)
Technical Schedule No 5/6A/68 Variation No 1 dated 28/11/80 (including Test Procedures)
Technical Schedule No 5/6A/68 Variation No 2 dated 27/3/81
Technical Schedule No 5/6A/68 Variation No 3 dated 17/9/81
Technical Schedule No 5/6A/68 Variation No 4 dated 2/12/81
Technical Schedule No 5/6A/68 Variation No 5 dated 3/8/82
Technical Schedule No 5/6A/68 Variation No 6 dated 1/12/82
Test Procedure No 5/6A/68 Variation No 2 dated 27/3/82
Test Procedure No 5/6A/68 Variation No 3 dated 17/9/81
Figures 1 to 16 dated 4/10/78
Figures 17 to 20 dated 28/11/80
Figures 21 to 35 dated 17/9/81
Figures 36 and 37 dated 2/12/81
Figures 38 to 42 dated 3/8/82
Figures 43 to 45 dated 1/12/82

NATIONAL STANDARDS COMMISSION

TECHNICAL SCHEDULE No 5/6A/68

Pattern: Productive Driveway Flowmeter — Micro-M Self-serve System

Submittor: Production Engineering Co. Ltd,
Station Road,
Marton, New Zealand.

Date of Approval: 21 September 1978

All instruments conforming to this approval shall be marked "NSC No 5/6A/68" on each driveway flowmeter and on the control console.

Description:

The pattern is a post-payment and prepayment self-serve driveway flowmeter system comprising up to ten driveway flowmeters, a remotely located control console for the vendor, a purchaser's indicator located adjacent to the control console, and a service module (see Figures 1 to 4).

The system provides the operator with supervisory control over each driveway flowmeter, repeat indications of the price and volume indicated by each driveway flowmeter, a preset-value (prepayment) facility in whole dollars for each driveway flowmeter and remote unit price changing for each driveway flowmeter.

Control Console:

The control console has an indicator, which is shared by the ten driveway flowmeters, an emergency all-stop switch, two key-operated switches (operator's and proprietor's), driveway-flowmeter status lights and fifteen buttons enabling the mode of operation to be selected, individual driveway flowmeters to be authorised or their pump motors stopped, the unit prices to be entered, prepaid values to be entered and peripheral functions to be selected (see Figure 2).

The facilities significant to the approval are:

1. Vendor's indicator — which is in three sections labelled "mode", "dispenser" and "amount". The mode section displays the symbol

"A" when operating in post-pay mode, "H" when operating in prepay mode and "P" when monitor (attendant-operated) mode is selected. The dispenser section indicates the number of the driveway flowmeter which has been selected for display. The amount section displays:

(a) When in post-pay mode, a repeat indication of the price or volume indicated by the driveway flowmeter selected. This indication is only available after the nozzle is returned to its hang-up.

(b) When in prepay mode, the amount in whole dollars which has been prepaid and assigned to the driveway flowmeter selected. This indicator will also show the balance of the prepaid amount to the nearest cent if a nozzle is returned to its hang-up before the prepaid value has been delivered.

(c) When in monitor mode (attendant-operated), a continuous repeat indication of the price or volume indicated by any selected driveway flowmeter.

2. All-stop switch — when selected, stops the pump motor of all driveway flowmeters without any loss of data and without terminating any delivery taking place. Each driveway flowmeter is individually released, allowing the delivery to continue, by simultaneously pressing the clear button and the appropriate driveway-flowmeter select button. An all-stop button may be fitted as an alternative to the switch.

3. Temp (temporary) stop button —

(a) When pressed simultaneously with a driveway-flowmeter select button will stop the pump motor of the appropriate driveway flowmeter without any loss of data or terminating the particular delivery. The driveway flowmeter is released as described for all-stop function.

(b) When pressed simultaneously with the enter button will cancel the authorisation of any driveway flowmeter not in use and prevent further authorisation of those in use. When the last transaction is concluded, or immediately if no transactions are in progress, the mode of operation selected will be cancelled allowing the mode of operation to be changed. A mode change is not possible until every transaction is completed.

4. Volume indication — while held pressed, changes the price

indication on the vendor's indicator to a volume indication.

5. Set price — With modes 4 to 9 selected by the proprietor's key-switch, pressing the set-price button will select mode 8. In this mode the unit price of up to four grades of petrol can be set by selecting in sequence the grade of petrol (buttons 1 to 4), the appropriate unit price (buttons 0 to 9), and then pressing the enter button. A previous unit price is cancelled by selecting the grade of petrol and then pressing the clear button. The unit price thus entered into the system will only apply to driveway flowmeters which have their unit price set to 00,0 cents per litre, otherwise the unit price set at the driveway flowmeter will take precedence. The unit-price change will only take effect one minute after the proprietor's key-switch is returned to its normal position. During this one minute the unit-price display on the affected driveway flowmeters will be blank, the quantity and price indicators will be zero and "PAoo" will be indicated on the driveway-flowmeter preset-value indicator.

6. Post-pay — when the mode of operation has been cancelled as described in para 3 (b), pressing the post-pay button will select the post-pay mode of operation. After a delivery, pressing the appropriate driveway-flowmeter select button will display, on the console and on the purchaser's indicator located adjacent to the console, the driveway-flowmeter number and the value of the sale.

   After the transaction is completed a second press of the same driveway-flowmeter select button will reauthorise the driveway flowmeter so that it is available for the next purchaser, and release the vendor's console so that the next driveway flowmeter can be selected for display.*

7. Prepay — when the mode of operation has been cancelled as described in para 3 (b), pressing the prepay button will select the prepay mode of operation. Before a delivery, pressing a driveway-flowmeter select button and keying-in a value by means of the 0 to 9 keyboard will display the driveway-flowmeter number and the amount preset to the vendor and the purchaser. Pressing the clear button will cancel this entry or pressing the enter button will confirm the transaction and transfer the prepaid value into the system memory and to the prepaid-value indicator

* As the remote indicator is not provided with data from a secure or fail-safe system, the primary indications displayed by the driveway flowmeter must be retained until the transaction is completed, thus allowing a comparison between the primary driveway-flowmeter indications of price accepted by the purchaser, and the remote indicator.

on the driveway flowmeter. Once entered, the authorisation cannot be cancelled. If a delivery is terminated before the prepaid value is reached, the driveway flowmeter will be locked out of service for three minutes. Pressing the driveway-flowmeter select button will then display, on the vendor's and purchaser's displays, the balance of the prepaid amount.

8. Monitor — when the mode of operation has been cancelled as described in para 3 (b), pressing the monitor button will select monitor mode of operation (attendant-operated). An attendant can then use the driveway flowmeters without an operator authorising each use. In this mode the console indicator will repeat the indications on the driveway flowmeters selected.

9. Driveway-flowmeter status lights — the top row indicate red for out-of-service; the bottom row (yellow) indicate various pay situations by flashing or continuous display.

Integral with the self-serve system are other facilities which are classified as peripheral functions which do not affect the performance of the measuring instrument as approved by the Commission. The use of these functions does not cause any loss of measurement data or measurement control; they are:

1. Operator's key-switch — when switched to "mode 4" allows the operator to select add-volume (mode 4) and add to the inventory maintained by the Micro-M the volume of petrol delivered to the service station.

2. Proprietor's key-switch — when switched to "modes 4 to 9" allows the proprietor to select the following functions:

   (a) Add-volume (mode 4) — as for operator key-switch mode 4.

   (b) Current data (mode 5) — when selected allows the volume of each grade of petrol, the value of each grade of petrol, and the value of all sales of petrol made since the shift-totals function was last used, to be displayed on the console without resetting the current-data memories to zero.

   (c) Running totals (mode 6) — when selected displays the volume of each grade of petrol and the value of all sales of petrol made by the service station since installation of the Micro-M system; these totals are accumulative and are non-resettable.

   (d) Set min volume (mode 7) — when selected allows a minimum

inventory volume to be set; a warning light will illuminate when the volume of any grade of petrol falls below the minimum set.

(e) Set volume (mode 9) — when selected allows the inventory volumes to be adjusted.

3. Shift-totals — when shift-totals and enter buttons are pressed simultaneously, the Micro-M output is provided with the volume of each grade of petrol, the value of each grade of petrol, and the value of all sales of petrol made since the shift-totals function was last used; this resets the current-data memories to zero.

A lead stamping plug for a verification seal prevents access to the control console (see Figure 5).

Purchaser's Indicator:

The purchaser's indicator is located near the control console and repeats the control-console indications when the system is in post-pay or prepay modes (see Figure 3).

Service Module:

The service module contains the computer-programme elements, interlocks, power supplies, and the communication line to the driveway flowmeter (see Figure 4). A switch on the service module can be used to shut down the entire system. This switch, which is a requirement of other authorities, may when operated cause some loss of data, necessitating the operator retrieving such data from the driveway-flowmeter displays. The switch may be located separate from the service module; it should not be located near the control console.

An output socket and plug on the service module may be used to provide data to peripheral devices which are not a part of the measuring instrument.* These devices, which may only be provided with the authorisation of the Weights and Measures Authority of the State, may, for example, print receipts in the presence of the purchaser and the vendor, or store and process the data, etc. A lead-plug security seal prevents access to the service module (see

* Devices which determine and indicate the value of a physical quantity, devices which calculate price and in the presence of the purchaser or vendor indicate price, devices which control the measurement, and devices which record the value of a physical quantity or price in the presence of the purchaser only or the vendor only, are a part of the measuring instrument which requires approval by the Commission.

Figure 4). Provision is made to seal the plug for peripheral devices to the output socket, with or without a cable connected to the plug (see Figure 6).

Driveway Flowmeters:

The following driveway flowmeters may be used with this system:

1. Single driveway flowmeter Model EMPEC-80 (see Figures 1 and 7).

2. Dual driveway flowmeters Model EMPEC-80D (see Figure 8), comprising two sets of the components of the EMPEC-80 in one housing.

The driveway flowmeters are for the delivery of petrol at flow rates between 15 and 55 litres per minute. The hydraulic diagram of each driveway flowmeter is illustrated in Figure 9. The instrument data plate of each driveway flowmeter is marked "approved for petrol".

The component parts of each driveway flowmeter are listed in Figure 10 and comprise:

1. Avery-Hardoll PP 2142 positive displacement rotary pump incorporating a gas separator with integral float chamber and non-return valve (see Figures 11 and 12).

2. Gas-separation test valve. A cover over the valve is held in position by a screw which is located beneath a stamping-plug seal.

3. Meter — Avery-Hardoll PM 400 (see Figure 13). The meter is sealed by two brackets, each of which is held in position by a screw which is covered by a verification seal; one bracket is over each of the calibration adjustments which are located on opposite sides of the meter.

4. Solenoid valves — two electrically operated solenoid valves are located downstream of the meter. The valves prevent liquid passing through the meter before the computer has reset to zero, and stop liquid flow for preset deliveries. When the main valve is closed the flow rate is reduced to less than 15 litres per minute; the smaller valve when closed stops liquid flow. The flow rate may be less than 15 litres per minute for up to 10 seconds.

5. Sight glass Model 75003 — full-flow type.

6. Hose — 16 mm bore.

7. Nozzle — ZVA Slimline automatic hose nozzle. The anti-drain valve which is incorporated in the main valve retains a pressure of not less than 15 kPa. A swivel hose coupling may be fitted to the nozzle.

8. Pump interlock (see Figure 14) — the starting lever prevents the spout of the nozzle being inserted into the holster without generating a signal which causes the pump motor to stop and the solenoid valve to close. After three to six seconds the slow-flow solenoid valve will reopen to prevent excessive hose pressure which can occur if the temperature of the liquid in the hose rises.

   When the nozzle is removed from the holster, the pump motor will start and the solenoid valve will close, preventing liquid flow until the computer is reset to zero.

9. Pulse-generator unit Model 42020 (see Figure 15) — driven from the meter output shaft, provides two separate pulse outputs to the electronic computer unit.

10. Computer unit Model 42221 (see Figure 16) — the electronic computer unit receives pulses from the pulse generator which are suitably divided and displayed as volume-delivered on the front and back of the instrument. The quantity indicated is multiplied by the indicated unit price, which is set on three thumb-wheel switches on the bottom of the computer unit, and displayed as total price. The volume, unit-price and total-price indicators are liquid-crystal reflective digital displays with three digits for unit price, five digits for total price and five digits for volume. Each time the nozzle is removed from its hang-up, all displays will indicate "8", then the volume and price indicators will go to zero and the unit price will be displayed.

    Note: The computer unit is not internally illuminated and depends on external illumination in order to read the liquid-crystal display.

    A preset keyboard and liquid-crystal display of the preset value is provided on the side of the computer unit (see Figure 16). The preset keyboard may be used before a delivery as an aid to delivering a given value of product. The keyboard only presets in whole dollar increments. A preset value which is set by this keyboard may be cancelled at any time by pressing the "C" button. A delivery will be automatically stopped at exactly the preset value. The use of this presetting facility is optional.

The computer unit is sealed to prevent access by passing a wire through the drilled heads of two set screws which retain the cover on the computer and terminating the ends of the wire in a lead seal.

The failure of any of the driveway flowmeters in the system or the failure of the control console does not affect the operation of the other separately verified parts of the system; that is, in the event of a driveway flowmeter becoming unserviceable it may be isolated by placing a temporary stop on the instrument or by turning its power off, and in the event of a control-console failure the control console can be isolated from the driveway flowmeters by turning the power to the control console off at the main switchboard and allowing the driveway flowmeters to be attendant-operated.*

The approval includes each driveway flowmeter as an individually approved measuring instrument.

Special Tests:

The following test procedure will ensure that the system is operating in accordance with the approved design:

1. Driveway-flowmeter performance

At the control console select monitor mode and then in turn for each driveway flowmeter:

(a) by pressing the appropriate button on the driveway-flowmeter preset keyboard, select a value of product to be delivered, say, $2,00. Make a delivery and check that the delivery stops when the price indicated is exactly the preset value.

(b) Carry out the repeatability and accuracy tests which are normally applied to a driveway flowmeter; these should include a gas-separation test:

The progressive opening of the gas-separation test valve should allow flow rates to be reduced to, say, 90%, 80%, 70%, etc., of full flow rate, until either the flow rate becomes less than the minimum of 15 litres per minute or the flow stops due to the pump losing prime. For all tests prior to reaching the opening of the gas-separation

* Separate verification seals are provided on each driveway flowmeter and on the control console, allowing individual seals to be cancelled in the event of an unserviceability without affecting the remainder of the system or the other driveway flowmeters.

test valve at which the flow rate is less than 15 litres per minute or the delivery stops due to the pump losing prime, the effect of the admitted air on the accuracy of measurement should not exceed 0,5% of the quantity delivered.

2. Price-computing and volume circuits

These tests may be done in conjunction with the Driveway-flowmeter Performance Test:

At the console select monitor mode and then in turn for each driveway flowmeter:

(a) Record the unit price set on the instrument.

(b) Set the unit price to 00,1 c/L.

The preset indicator will immediately indicate "PA" and after about 15 seconds the quantity and price indicators will go zero and the unit-price indicator will go blank. After a further 1 minute the unit-price indicator will show 00,1 c/L.

(c) Remove the nozzle from its hang-up.

The pump motor will start and run for about 15 seconds and the digital indicators will display 8's, then zero, except for the unit-price indicator which will show 00,1 c/L, and the preset indicator which will show "3Poo" (fault condition).

(d) On the preset keyboard press a number key, then the "C" key.

The preset indicator will show "LPoc" indicating the computer has gone into the test mode.

(e) With the nozzle still off its hang-up, set the unit price to a value as listed in Table 1 and, using the preset keyboard, enter the corresponding quantity listed in Table 1. Then press the ~~blank~~ Fill key on the preset keyboard.

(i) The unit price set will be immediately displayed.

(ii) As the quantity is entered it will be displayed on the volume indicator. Holding a preset-keyboard key down for more than 1 second will

cause the same number to be entered as successive digits. If an error occurs in entering a quantity it may be cancelled by pressing the "C" key and starting again.

(iii) Pressing the ~~blank~~ Fill or blank key will instruct the computer to calculate and display the price for the unit price and volume indicated.

(iv) The exact value listed in Table 1 should be indicated as rounding is effected within the computer.

(f) Repeat (e) for the other unit prices and quantities listed in Table 1, the "C" key being pressed after each test to clear the previous volume displayed.

(g) Press the "C" key to cancel the test-volume displayed, reset the unit price to its original value noted in (a) and return the nozzle to its hang-up. Turn the supply voltage to the driveway flowmeter off and on again, or if the instrument is installed as a part of a self-serve system, turn the shut-down switch on the service module off then on again.

This will, after a 15 seconds' delay, cancel the test mode and return the instrument to normal operation. The original unit price will be indicated, the volume and price indicators will be zero and the preset indicator will be zero.

3. Micro-M System

During the testing of the Micro-M System it will be necessary to stop the service station operating as it is not possible to test half the instruments at a time.

(a) Select a mass stop by simultaneously pressing the Temp-stop and Enter keys. This will allow the deliveries in progress to be completed but will prevent further authorisations of driveway flowmeters.

For each driveway flowmeter not in use the upper (red) driveway-flowmeter status light (driveway flowmeter out of service) will illuminate and as each transaction in progress is completed the remaining upper (red) status lights will illuminate. When all driveway flowmeters are indicated as out of service the control-console indicator will go blank except for a minus sign flashing in the mode position.

(b) Select post-pay mode, then simultaneously press Temp-stop and clear buttons.

The letter "A" will be displayed on the control-console indicator and after a few seconds the driveway-flowmeter out-of-service status lights of each driveway flowmeter installed in the self-serve system will go out.

(c) For each driveway flowmeter deliver sufficient liquid to cause the price and quantity indicators on the computer to move significantly off zero; at least two driveway flowmeters should be left running with their nozzles not returned to their hang-up.

At the control console the lower (yellow) driveway-flowmeter status lights corresponding to the driveway flowmeters which have had a delivery and which have had their nozzles returned to their hang-up will be slow-flashing. The lights corresponding to the driveway flowmeters with their nozzles still off their hang-ups will be continuously on.

(d) Operate the all-stop switch on the control console and return it to the operating position.

The pump motors of the driveway flowmeters left running will stop.

(e) Return one of the nozzles which was left off its hang-up to its hang-up.

The lower driveway-flowmeter status light for this driveway flowmeter will slowly flash.

(f) In turn, simultaneously press the clear button and the driveway-flowmeter select button of any driveway flowmeter which has not had its nozzle returned to its hang-up, and at least one driveway flowmeter which has had its nozzle returned to its hang-up.

The pump motors of the driveway flowmeters which did not have their nozzles returned to their hang-up will restart. Removing the nozzle from its hang-up of any driveway flowmeter which has its nozzle on its hang-up should not cause its pump motor to start.

(g) Deliver a further quantity of liquid from the restarted driveway flowmeters and return all nozzles to their hang-ups. Record for each driveway flowmeter the quantity delivered and the price indicated.

(h) At the control console simultaneously press temp-stop and enter button, then in turn select each driveway flowmeter so as to display the price, hold the volume button down to display the quantity and then reselect the driveway flowmeter to clear it so that the next one can be displayed.

The quantity and price indicated on the purchaser's and vendor's indicators for each driveway flowmeter should correspond exactly with the quantity and price recorded for each driveway flowmeter.

When the last driveway flowmeter has been displayed and cleared the upper driveway-flowmeter status lights will illuminate to indicate that all driveway flowmeters are out of service, and the indicator will go blank except for a flashing minus sign in the mode position. The mode selected has been cleared, allowing the selection of a new mode.

(i) Select prepay mode, then simultaneously press temp-stop and clear buttons.

The letter "H" will be displayed on the control-console indicator and after a few seconds the driveway-flowmeter out-of-service status lights of each driveway flowmeter installed in the self-serve system will go out.

(j) At the control console in turn select each driveway flowmeter, key in an appropriate value of petrol to be delivered, say, $1,00, and press the enter button. For at least one driveway flowmeter, the first time a value is keyed in, press the clear button before the enter button; the value will have to be keyed in again and entered.

For each driveway flowmeter the purchaser's and vendor's indicators will display the appropriate driveway-flowmeter number and the value keyed in. The next driveway flowmeter cannot be selected until the value keyed in is entered into the system memory by pressing the enter button, or alternatively clearing the value selected by one press of the clear button, or the driveway flowmeter selected by a second press of the clear button.

(k) For at least one driveway flowmeter which has had a value keyed in and entered, simultaneously press the clear button and the driveway-flowmeter select button.

This should have no effect; the driveway-flowmeter status

lights should remain lower row (yellow) on and upper row (red) off.

(l) In turn for each driveway flowmeter, check that the value entered as prepaid is displayed on the prepay indicator on the driveway flowmeter and that the delivery from the driveway flowmeter automatically stops when this exact value of delivery is reached. For at least two driveway flowmeters deliver only a portion of the preset value and leave the driveway flowmeters running with their nozzles not returned to their hang-ups.

At the control console the status lights for the driveway flowmeters which have had a completed delivery will be out. The lower (yellow) status lights for the deliveries still in progress will be continuously on.

(m) Operate the all-stop switch on the control console and return it to the operating position.

The pump motors of the driveway flowmeters left running will stop.

(n) In turn, simultaneously press the clear buttons and the driveway-flowmeter select buttons of the driveway flowmeters which were left running.

The pump motors of the driveway flowmeters will restart.

(o) For one driveway flowmeter continue the delivery.

The delivery will automatically stop when the exact value indicated by the prepay indicator is reached.

(p) Return the nozzles of the remaining driveway flowmeters left running to their hang-ups without completing the deliveries. Record the times at which the nozzles were returned to their hang-ups and the exact values delivered.

At the control console the upper (red) status lights will be on and the lower (yellow) status lights will be flashing corresponding to the driveway flowmeters which have had their deliveries terminated before the prepaid value was reached.

(q) In turn select the driveway flowmeters which have had incomplete deliveries.

The purchaser's and vendor's displays will show the number of

the driveway flowmeters selected, a flashing minus sign and the exact difference between the prepaid value and the value of the delivery.

This will continue for at least 3 minutes from the time the nozzles were returned to their hang-ups.

(r) After recording the unit price set on the price-posting mechanism and the unit price displayed on at least one driveway flowmeter for each grade of petrol sold, set the price-posting mechanism of those driveway flowmeters to 00,0 cents per litre.

For those driveway flowmeters which have had the unit price adjusted, the preset indicator will immediately indicate "PAoo" and after about 15 seconds the quantity and price indicators will go to zero and the unit-price indicator will go blank.

(s) At the control console turn the proprietor's key to "modes 4 to 9", select set price (mode 8) and select a grade of petrol by pressing key 1.

The indicator will show "mode 8", dispenser "1" (grade of petrol) and the unit price set for petrol grade 1 at the console.

(t) Record the unit price displayed and cancel it by pressing the clear key. Change the unit price by keying in a new unit price, using the 0 to 9 keyboard and pressing the enter button. Turn the proprietor's key to its normal off position.

At the driveway flowmeters which have had their unit-price-posting mechanism set to 00,0 cents per litre and which deliver petrol grade 1, the unit price displayed will go blank for not less than 1 minute, "PAoo" will indicate on the preset and the quantity and price indicators will go to zero. After the 1-minute delay the unit price displayed will be the unit price entered on the control console.

(u) Repeat (s) and (t) but select grades of petrol 2, 3 and 4, if appropriate.

(v) Return the unit-price-posting mechanism of each driveway flowmeter to the setting recorded in (r).

(w) At the control console reset the unit price of each grade of petrol to that recorded in (t) and (u).

(x) Select a mass stop by simultaneously pressing temp-stop and enter keys. Return the system to the mode required by the operator.

TABLE 1

Indicated volume	Price per litre	Total price
L	c/L	$
11,91	99,9	11,90
22,82	98,9	22,57
33,73	97,9	33,02
44,64	96,9	43,26
55,55	95,9	53,27
66,46	94,9	63,07
477,37	93,9	448,25
388,28	92,9	360,71
276,84	1,9	5,26
101,04	10,0	10,10
612,37	29,1	178,20
555,10	39,2	217,60
684,18	49,3	337,30
748,15	59,4	444,40
771,05	69,5	535,88
761,61	79,6	606,24
846,86	89,7	759,63
890,00	99,8	888,22
999,99	99,9	998,99

NATIONAL STANDARDS COMMISSION

TECHNICAL SCHEDULE No 5/6A/68

VARIATION No 1

Pattern: Driveway Flowmeter Micro-M Self-serve System

Submittor: Production Engineering Co. Ltd,
Station Road,
Marton, New Zealand.

1. Description of Variant

1. Optional switching unit for installation between the Micro-M control console and the driveway flowmeters, to allow an operator to electrically disconnect one or more driveway flowmeters from the Micro-M control console so that they may be operated in STAND-ALONE (operator-attended) mode for testing purposes (Figure 17).

   The switching unit may consist of one switch section for each driveway flowmeter, or optionally, fewer sections may be used, with one switch shared among two or more dispensers. There should always be at least two switches (Figures 18, 19 and 20).

2. Sealing

No sealing is required, however the unit may be sealed for owner convenience (Figure 18).

3. Test Procedures

Those Micro-M Self-serve Systems modified in accordance with Variation No 1 are to be tested as per Test Procedures 1 and 2 of the original Technical Schedule dated 4/10/78, except for Test 3, Micro-M System, which is to be replaced by the following:

3. Micro-M System

   During testing of the Micro-M system, the optionally installed switching unit should be used as described to allow approximately half of the total complement of installed driveway flowmeters to be attendant-operated while the Control Console and the remaining driveway flowmeters are being tested.

   3.1 Remove sealing wire from cable switching unit, if present, and pull-off plastic cover. The switch unit may safely be handled and operated while live, provided only non-conductive tools are used.

   3.2 Select a mass stop by simultaneously pressing the Temp-stop and Enter keys. This will allow the deliveries in progress to be completed but will prevent further authorisations of driveway flowmeters.

   For each driveway flowmeter not in use the upper (red) driveway flowmeter status light (driveway flowmeter out of service) will illuminate and as each transaction in progress is completed the remaining upper (red) status lights will illuminate.

When all driveway flowmeters are indicated as out of service the control console indicator will go blank except for a minus sign flashing in the mode position.

3.3 Open the switch links for approximately half of the driveway flowmeters (one switch may control more than one driveway flowmeter).

Ensure that the price posting mechanism on each of these driveway flowmeters is set to the current unit price of product dispensed from that flowmeter. Switch off, then on, mains power to each of these driveway flowmeters (this authorises them to run in attendant-operated mode).

3.4 At the console select post-pay mode, then simultaneously press temp-stop and clear buttons.

The letter "A" will be displayed on the control console indicator and after a few seconds the driveway flowmeter out-of-service status lights of each driveway flowmeter still connected to the self-serve system will go out.

The out-of-service status lights of each driveway flowmeter disconnected from the self-serve system will remain illuminated and should be ignored for the remainder of the tests.

3.5 For each driveway flowmeter deliver sufficient liquid to cause the price and quantity indicators on the driveway flowmeter indicator to move significantly off zero; at least two driveway flowmeters should be left running with their nozzles not returned to their hang-up.

At the control console the lower (yellow) driveway flowmeter status lights corresponding to the driveway flowmeters which have had a delivery and which have had their nozzles returned to their hang-up will be slow flashing. The lights corresponding to the driveway flowmeters with their nozzles still off their hang-ups will be continuously on.

3.6 Operate the all stop switch on the control console for at least one second, and return it to the operating position.

The pump motors of the driveway flowmeters left running will stop.

3.7 Return one of the nozzles which was left off its hang-up to its hang-up.

The lower driveway flowmeter status light for this driveway flowmeter will slowly flash.

3.8 In turn, simultaneously press the clear button and the driveway flowmeter select button of any driveway flowmeter which has not had its nozzle returned to its hang-up, and at least one driveway flowmeter which has had its nozzle returned to its hang-up.

The pump motors of the driveway flowmeters which did not have their nozzles returned to their hang-up will restart. Removing the nozzle from its hang-up of any driveway flowmeter which has its nozzle on its hang-up should not cause its pump motor to start.

3.9 Deliver a further quantity of liquid from the restarted driveway flowmeters and return all nozzles to their hangups. Record for each driveway flowmeter the quantity delivered and the price indicated.

3.10 At the control console simultaneously press temp-stop and enter button, then in turn select each driveway flowmeter so as to display the price, hold the volume button down to display the quantity and then reselect the driveway flowmeter to clear it so that the next one can be displayed.

The quantity and price indicated on the purchaser's and vendor's indicators for each driveway flowmeter should correspond exactly with the quantity and price recorded for each driveway flowmeter.

When the last driveway flowmeter has been displayed and cleared the upper driveway flowmeter status lights will illuminate to indicate that all driveway flowmeters are out-of-service, and the indicator will go blank except for a flashing minus sign in the mode position. The mode selected has been cleared, allowing the selection of a new mode.

3.11 Select prepay mode, then simultaneously press temp-stop and clear buttons.

The letter "H" will be displayed on the control console indicator and after a few seconds the driveway flowmeter out-of-service status lights of each driveway flowmeter in the self-serve system will go out.

3.12 At the control console in turn select each driveway flowmeter, key in an appropriate value of petrol to be delivered, say, $1.00, and press the enter button. For at least one driveway flowmeter, the first time a value is keyed in, press the clear button before the enter button; the value will have to be keyed in again and re-entered.

For each driveway flowmeter the purchaser's and vendor's indicators will display the appropriate driveway flowmeter number and the value keyed in. The next driveway flowmeter cannot be selected until the value keyed in is entered into the system memory by pressing the enter button, or alternatively clearing the value selected by one press of the clear button, and the driveway flowmeter deselected by a second press of the clear button.

3.13 For at least one driveway flowmeter which has had a value keyed in and entered, simultaneously press the clear button and the driveway flowmeter select button.

This should have no effect; the driveway flowmeter status lights should remain lower row (yellow) slow flashing and upper row (red) off.

3.14 In turn for each driveway flowmeter, check that the value entered as prepaid is displayed on the prepay indicator on the driveway flowmeter and that the delivery from the driveway flowmeter automatically stops when this exact value of delivery is reached.

For at least two driveway flowmeters deliver only a portion of the preset value and leave the driveway flowmeters running with their nozzles not returned to their hang-ups.

At the control console the status lights for the driveway flowmeters which have had a completed delivery will be out. The lower (yellow) status lights for the deliveries still in progress will be continuously on.

3.15 Operate the all stop switch on the control console for at least one second, and return it to the operating position.

The pump motors of the driveway flowmeters left running will stop.

3.16 In turn, simultaneously press the clear buttons and the driveway flowmeter select buttons of the driveway flowmeters which were left running.

The pump motors of the driveway flowmeters will restart.

3.17 For one driveway flowmeter continue the delivery.

The delivery will automatically stop when the exact value indicated by the prepay indicator is reached.

3.18 Return the nozzles of the remaining driveway flowmeters left running to their hang-ups without completing the deliveries. Record the times at which the nozzles were returned to their hang-ups and the exact values delivered.

At the control console the upper (red) status lights will be on and the lower (yellow) status lights will be flashing corresponding to the driveway flowmeters which have had their deliveries terminated before the prepaid value was reached.

3.19 In turn select the driveway flowmeters which have had incomplete deliveries.

The purchaser's and vendor's displays will show the number of the driveway flowmeters selected, a flashing minus sign and the exact difference between the prepaid value and the value of the delivery.

This will continue for at least 3 minutes from the time the nozzles were returned to their hang-ups.

3.20 After recording the unit price set on the price-posting mechanism and the unit price displayed on at least one driveway flowmeter for each grade of petrol sold, set the price-posting mechanism of those driveway flowmeters to 00.0 cents per litre.

For those driveway flowmeters which have had the unit price adjusted, the preset indicator will immediately indicate "PAoo" and after about 15 seconds the quantity and price indicators will go to zero and the unit price indicator will go blank.

3.21 At the control console turn the proprietor's key to "modes 4 to 9", select set price (mode 8) and select a grade of petrol by pressing key 1.

The indicator will show "mode 8" dispenser "1" (grade of petrol) and the unit price set for petrol grade 1 at the console.

3.22 Record the unit price displayed and cancel it by pressing the clear key. Change the unit price by keying in a new unit price, using the 0 to 9 keyboard and pressing the enter button. Turn the proprietor's key to its normal off position.

At the driveway flowmeters which have had their unit price posting mechanism set to 00.0 cents per litre and which deliver petrol grade 1, the unit price displayed will go blank for not less than 1 minute, "PAoo" will indicate on the preset and the quantity and price indicators will go to zero. After the 1 minute delay the unit price displayed will be the unit price entered on the control console.

3.23 Repeat 3.21 and 3.22 but select grades of petrol 2, 3 and 4 if appropriate.

3.24 Return the unit price posting mechanism of each driveway flowmeter to the setting recorded in 3.20.

3.25 Select a mass stop by simultaneously pressing temp-stop and enter keys.

3.26 Close the switch links to those driveway flowmeters which were running attendant-operated - do this while they are not being used, as this action may terminate deliveries in progress.

Wait 15 seconds, then simultaneously press the clear button and each driveway flowmeter select button in turn.

3.27 Repeat steps 3.3 to 3.26 inclusive with those driveway flowmeters just tested running in attendant-operated mode.

3.28 At the control console reset the unit price of each grade of petrol to that recorded in 3.22 and 3.23.

3.29 Replace plastic cover on cable switching unit.

NATIONAL STANDARDS COMMISSION

TECHNICAL SCHEDULE No 5/6A/68

VARIATION No 2

Pattern: Driveway Flowmeter Micro-M Self-serve System

Submittor: Production Engineering Co. Ltd,
Station Road,
Marton, New Zealand.

1. Description of Variant

1.1 Variant 2

The variant provides for modification to the authorisation sequence, so that

(a) specific authorisation is required for each driveway flowmeter, and

(b) an authorised driveway flowmeter not used within 15 seconds is automatically de-authorised.

The description of this variant is the same as that of the pattern given in pages 1 to 8 of Technical Schedule No 5/6A/68 dated 4/10/78, with the exception of the second paragraph of section 6 on page 3, which is replaced by the following:

> After the transaction is completed, a second operation of the same driveway flowmeter select button will release the vendor's console so that the next driveway flowmeter can be selected for display.
>
> At any time after the console has been so released from a particular driveway flowmeter, that driveway flowmeter can be re-authorised by simultaneously pressing the clear button and the driveway flowmeter select button. The driveway flowmeter is automatically de-authorised if it remains unused for 15 seconds.
>
> An optional audible alarm may be provided to indicate when the nozzle is removed from an unauthorised driveway flowmeter.

TEST PROCEDURE No 5/6A/68

VARIATION No 2

1. Those Micro-M Self-serve Systems modified in accordance with Variation No 2 are to be tested as per Test Procedures 1, 2 and 3 of Technical Schedule 5/6A/68 dated 4/10/78 with the exception that section (c) of Test Procedure 3 is replaced by:

(c) Remove the nozzles of all the driveway flowmeters from their hang-ups. None of the pump motors will start.

At the control console, all the upper (red) driveway flowmeter status lights will be fast-flashing and an audible alarm (if fitted) will be sounding.

For each driveway flowmeter in turn, simultaneously press the clear button and the driveway flowmeter select button. As each driveway flowmeter is cleared in this manner, the lower (yellow) status light for each driveway flowmeter will illuminate, and the corresponding pump motor will start.

For each driveway flowmeter deliver sufficient liquid to cause the price and quantity indicator on the computer to move significantly off zero; at least two driveway flowmeters should be left running with their nozzles not retuned to their hang-up.

At the control console, the lower (yellow) driveway flowmeter status light corresponding to the driveway flowmeters which have completed a delivery and which have had their nozzles returned to their hang-up will be flashing. The lights corresponding to the driveway flowmeters with their nozzles still not hung-up will be continuously on.

NATIONAL STANDARDS COMMISSION

TECHNICAL SCHEDULE No 5/6A/68

VARIATION No 3

Pattern: Driveway Flowmeter Micro-M Self-serve System

Submittor: Production Engineering Co. Ltd,
Station Road,
Marton, New Zealand.

1. Description of Variant

1.1 Variant 3

1.1.1 General

Production Engineering driveway flowmeters of various models as listed in Figure 21. These were formerly Gilbarco driveway flowmeters, now modified to include a preset control valve (Figure 22), customer preset panel and display, and hose supporting mast (Figure 23). The driveway flowmeters are approved for use either in attendant-operated mode or with the Micro-M self-serve system. The driveway flowmeters are approved for a maximum flowrate of 30 litres per minute. The hydraulic diagrams for these driveway flowmeters are detailed in Figures 24 to 27; Figures 28 to 34 list their component parts.

1.1.2 Range

Volume	999.9 L in 0.01 L increments
Price	$399.99 in 1 c increments
Unit price	99.9 c/L in 0.1 c increments
Totaliser	9999999 L in 1 L increments

1.1.3 Marking

The driveway flowmeter nameplate is marked with the following information:

Manufacturer's name or mark	
Serial number	
Model number	
Year of manufacture	
Year of modification	
NSC approval number	NSC No 5/6A/68
Maximum flowrate	30 L/min
Minimum flowrate	15 L/min
Liquid temperature range	
Viscosity range and/or type of liquid	
Maximum operating pressure	

1.1.4 Sealing

The totaliser and computer are sealed as in Figure 35, or by a similar method.

The meter calibration and gas separator test valve are sealed in the usual manner.

The Micro-M consoles, where used, are sealed as described in Technical Schedule No 5/6A/68 dated 4/10/78.

TEST PROCEDURE No 5/6A/68

VARIATION No 3

As per Technical Schedule No 5/6A/68 dated 4/10/78.

17/9/81

NATIONAL STANDARDS COMMISSION

TECHNICAL SCHEDULE No 5/6A/68

VARIATION 4

Pattern: Driveway Flowmeter - Micro-M Self-serve System

Submittor: Production Engineering Co. Ltd,
Station Road,
Marton, New Zealand.

1. Description of Variants

1.1 Variant 4

The PEC model driveway flowmeters approved in variant 3 with alternative hose mast and preset panel (Figure 36).

1.2 Variant 5

The PEC model driveway flowmeters approved in variant 3 with alternative nozzle hang-up (Figure 37).

NATIONAL STANDARDS COMMISSION

TECHNICAL SCHEDULE No 5/6A/68

VARIATION No 5

Pattern: Micro-M Self-Serve Driveway Flowmeter System

Submittor: Production Engineering Co Ltd,
Station Road,
Marton, New Zealand.

1. Description of Variants

1.1 Variant 6

1.1.1 General

Production Engineering driveway flowmeter model 5301H (Figure 38) used either as an attendant-operated unit, or when connected to a Micro-M self-serve system as approved in this Certificate.

Figure 39 shows the hydraulic diagram for the model 5301H. The component parts of the driveway flowmeters are listed in Figure 40, and comprise:

(a) Avery Hardoll rotary pump PP2142, gas separator with integral float chamber and non-return valve, gas separator test valve, and Avery Hardoll PM 400 meter, all as in the pattern (Figures 11, 12 and 13).

(b) Nozzle interlock, as in variant 5 (Figure 37).

(c) Retron 80 price-computing indicator, as approved in Certificate of Approval No S101.

1.1.2 Range

Volume	999.99 L in 0.01 L increments
Price	$399.99 in 1c increments
Unit Price	99.9 c/L in 0.1c increments
Totaliser	9999999 L in 1 L increments

1.1.3 Markings

The driveway flowmeter is marked with the following data, together in one location:

Manufacturers name or mark	
Serial number	
Model number	
NSC approval number	NSC No 5/6A/68
Maximum flow rate	55 L/min
Minimum flow rate	15 L/min
Liquid Temperature range	
Approved for petrol	
Maximum operating pressure	

1.1.4 Sealing

The totaliser and computer are sealed as in Figure 35, or by a similar method. The meter calibration and gas separator test valve are sealed as in Figure 41. The Micro-M consoles, where used, are sealed as described in Technical Schedule No 5/6A/68 dated 4/10/78 pages 5 and 6.

1.2 Variant 7

Variant 6 fitted with a preset panel (Figure 36) and Bestobell preset control valve (Figure 22),and known as model 5301P.

Figure 42 shows the hydraulic diagram for the model 5301P. The component parts of the driveway flowmeters are listed in Figure 40.

NATIONAL STANDARDS COMMISSION

TECHNICAL SCHEDULE No 5/6A/68

VARIATION 6

Pattern: Micro-M Self-serve Driveway Flowmeter System

Submittor: Production Engineering Co Ltd
Station Road
Marton, New Zealand.

1. Description of Variant 6

Production Engineering driveway flowmeter models 6301 H(AH) and 6301 P(AH) (Figure 43). Each is approved for use either in attendant-operated mode or with the Micro-M self-serve system. They are approved for delivering at flow rates between 15 L/min and 50 L/min.

Their hydraulics are similar to the Empec 80 driveway flowmeters approved in the pattern and they are fitted with Retron 80 price-computing indicators (approved in NSC No S101).

Both models are fitted with hose masts and the model 6301 P(AH) is fitted with a preset control valve and customer preset panel and display (Figure 44).

Volume	999.99 L in 0.01 L increments
Price	$399.99 in 1c increments
Unit price	99.9 c/L in 0.1c increments
Totaliser	9999999 L in 1 L increments

1.1 Marking

The driveway flowmeter is marked with the following data, together in one location:

Manufacturers name or mark	
Serial number	
Model number	
NSC approval number	NSC No 5/6A/68
Maximum flow rate	50 L/min
Minimum flow rate	15 L/min
Liquid temperature range	
Maximum operating pressure	

In addition, the instrument is marked APPROVED FOR PETROL or APPROVED FOR KEROSENE.

1.2 Sealing

The totaliser and computer are sealed as in Figure 35, or by a similar method.

The meter calibration and gas separator test valve are sealed as in Figure 45.

The Micro-M consoles, where used, are sealed as described in Technical Schedule No 5/6A/68 dated 4/10/78 pages 5 and 6.

Test Procedure

As per Technical Schedule No 5/6A/68 dated 4/10/78 Special Tests pages 8 to 15.

F6

NATIONAL STANDARDS COMMISSION

NOTIFICATION OF CHANGE

CERTIFICATE OF APPROVAL No 5/6A/68

CHANGE No 1

The following changes are made to the description of the Driveway Flowmeter Micro-M Self-serve System

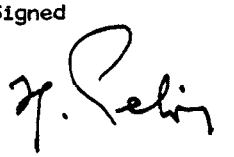
given in Technical Schedule No 5/6A/68 Variation No 3 dated 17/9/81

Change (*) to (ϕ) for:

Figure 28	Sight glass T261X Sight glass T261AC
Figure 29	Sight glass T261X Sight glass T261AC
Figure 30	Sight glass T261AD
Figure 31	Sight glass T261AC Sight glass T261AD
Figure 32	Sight glass T261AC Sight glass T261AD
Figure 33	Sight glass T261AD
Figure 34	Sight glass T261AD

This is required to correct these figures to reflect policy that sight glasses are now an optional fitting.

Signed



Executive Director

4/1/82

G.H

5/6A/68
31/5/88

NATIONAL STANDARDS COMMISSION

CANCELLATION CERTIFICATE OF APPROVAL No 5/6A/68

This is to certify that the approval for use for trade granted in respect of the pattern and variants of the

Micro-M Self-serve Driveway Flowmeter System

submitted by Production Engineering Co Ltd
(now known as Production Engineering (Aust) Pty Ltd)
270 Pacific Highway
Crows Nest NSW 2065

has been cancelled in respect of new instruments as from 31 May 1988.

(This approval has been reviewed and a new approval (5/6A/68A) has been issued.)

Signed

J. Birch

Executive Director

Notification of Change

In Technical Schedule No 5/6A/68 Variation No 6 dated 1/12/82, the heading Description of Variant 6 should be amended to read Description of Variant 8.

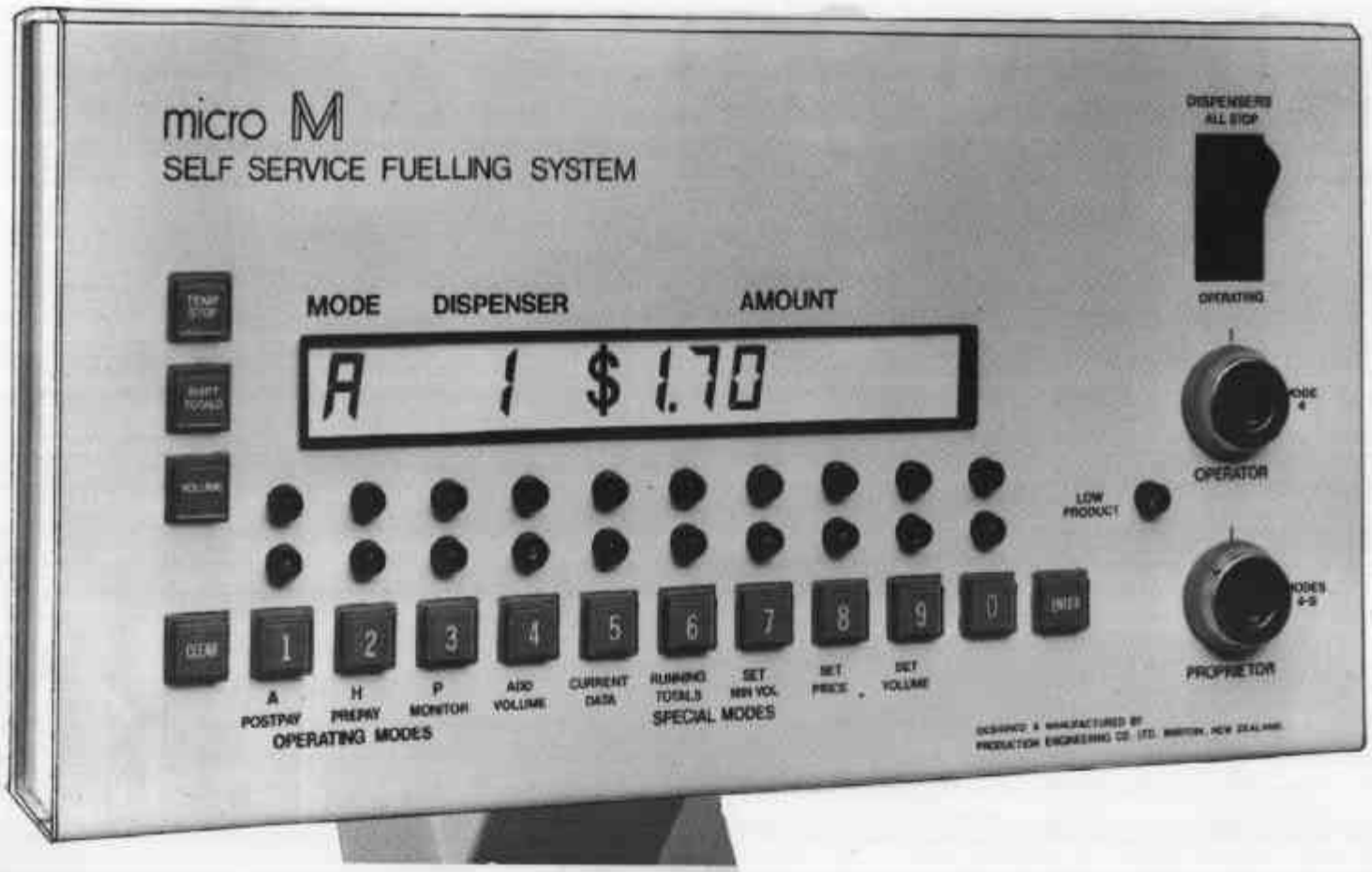
FIGURE 5/6A/68 - 1

EMPEC-80

4/10/78

FIGURE 5/6A/68 - 2

4/10/78



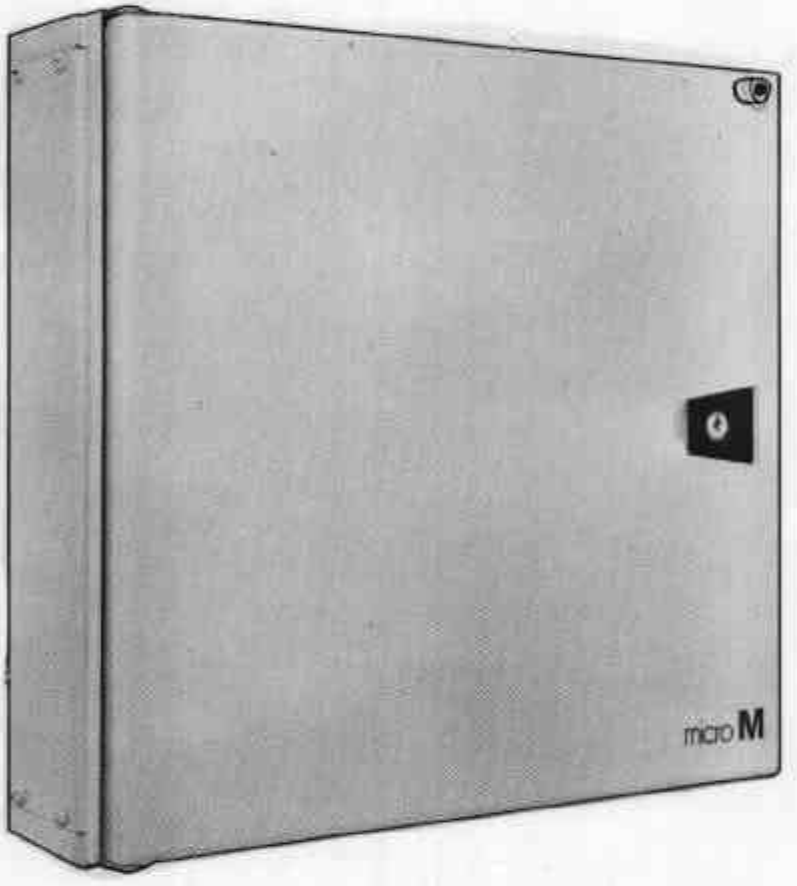
Micro-M Control Console

FIGURE 5/6A/68 - 3

4/10/78

Purchaser's Indicator

FIGURE 5/6A/68 - 4

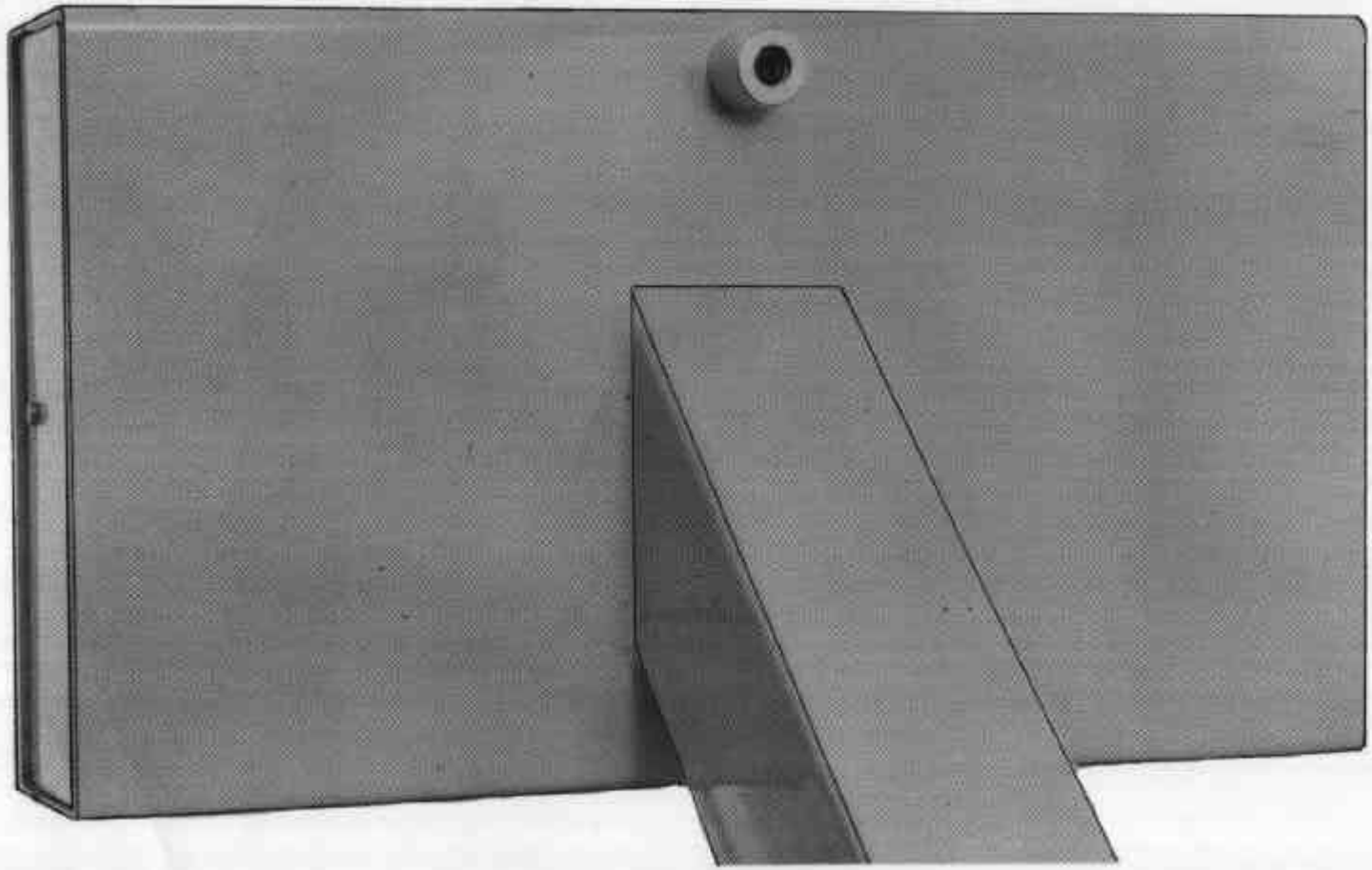


Service Module

4/10/78

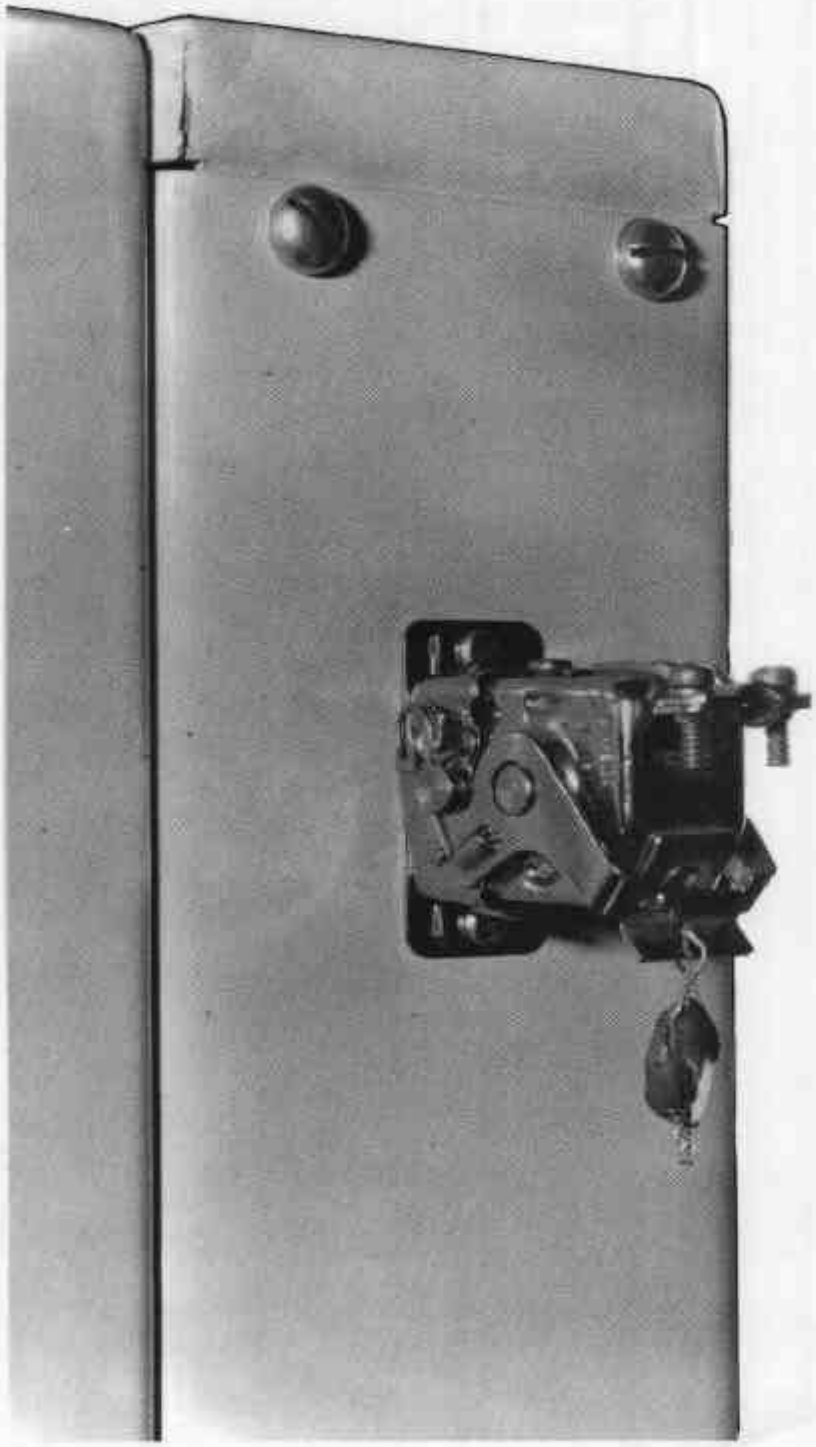
FIGURE 5/6A/68 - 5

4/10/78



Sealing Plug on Rear of Micro-M Control Console

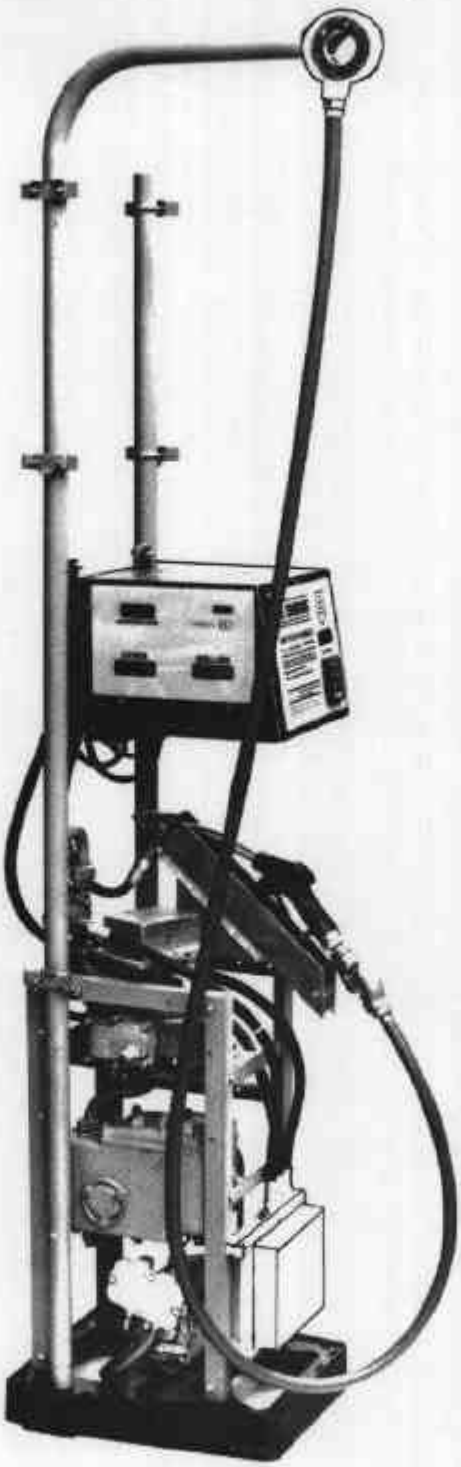
FIGURE 5/6A/68 - 6



Sealing of Output Socket

4/10/78

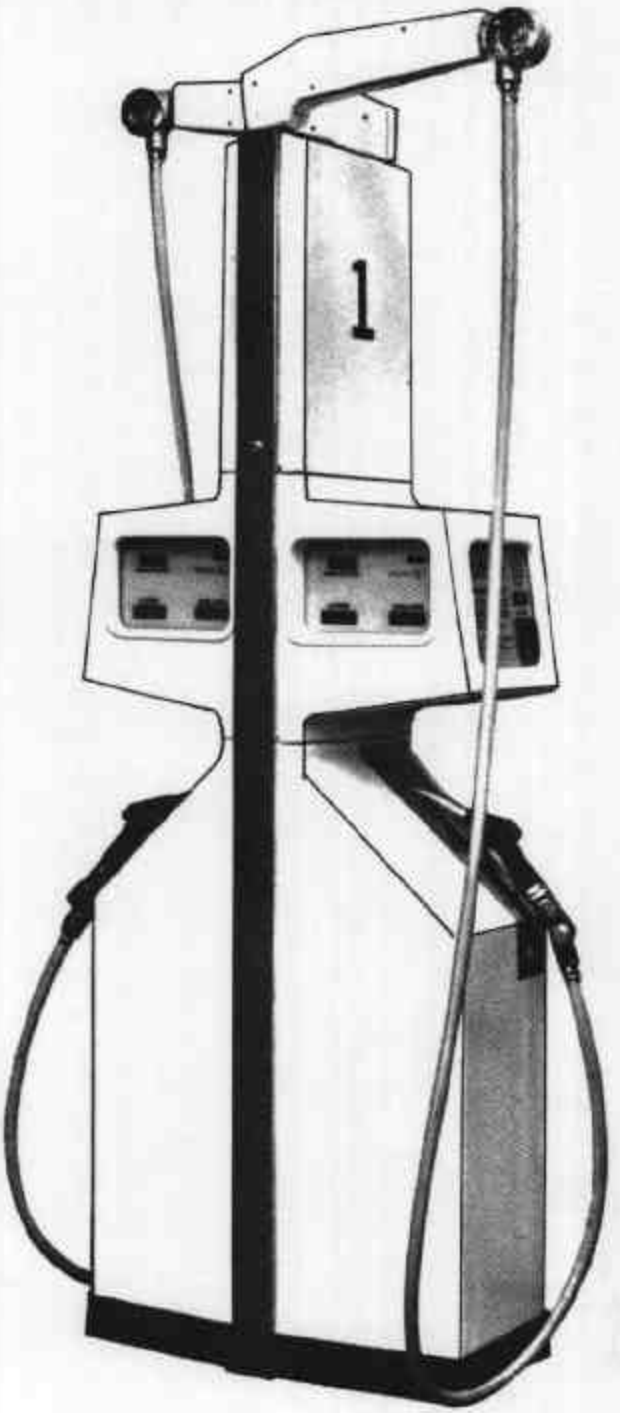
FIGURE 5/6A/68 - 7



EMPEC-80

4/10/78

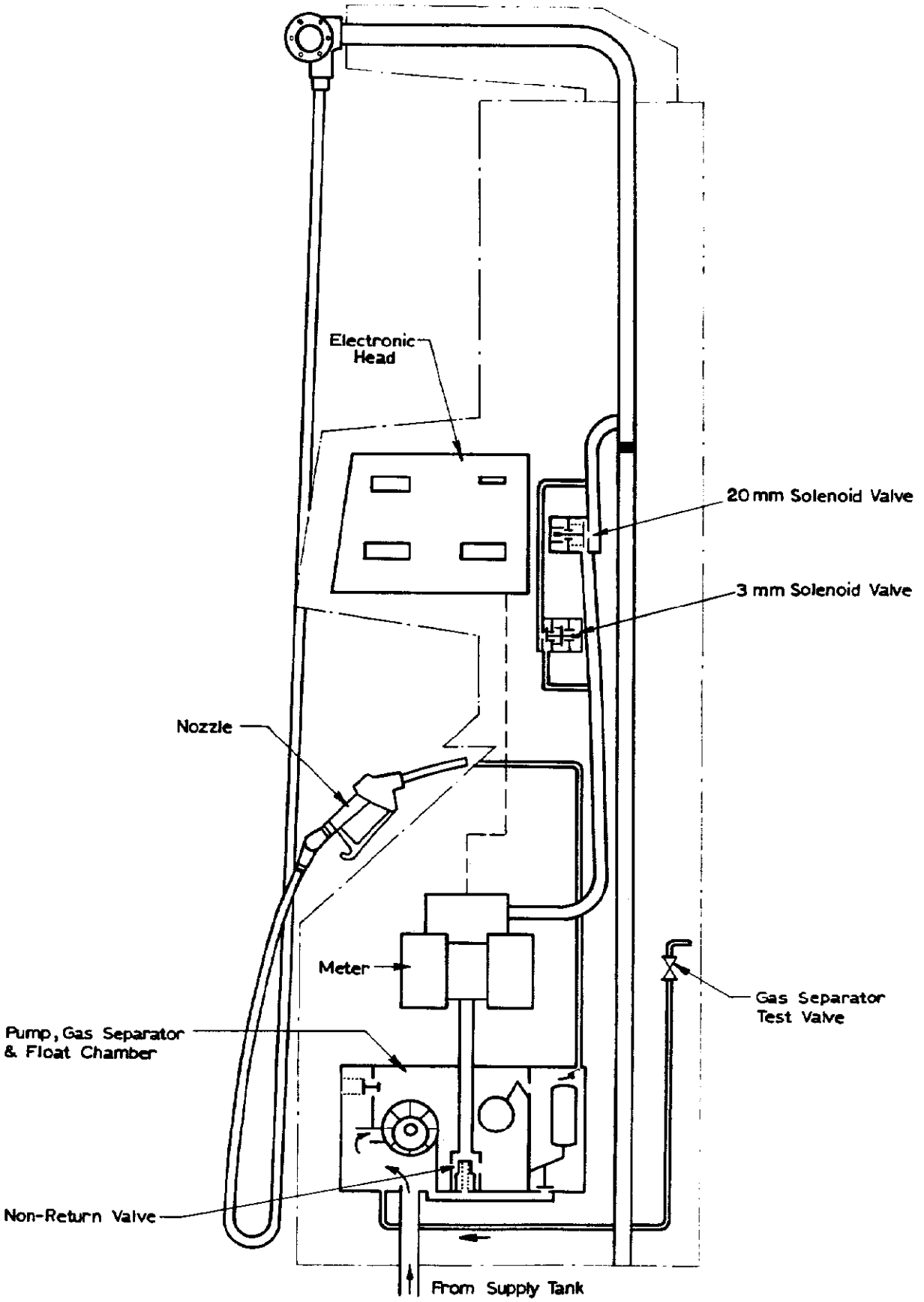
FIGURE 5/6A/68 - 8



EMPEC-80D

4/10/78

FIGURE 5/6A/68 - 9



EMPEC-80 — Hydraulic Diagram

4/10/78

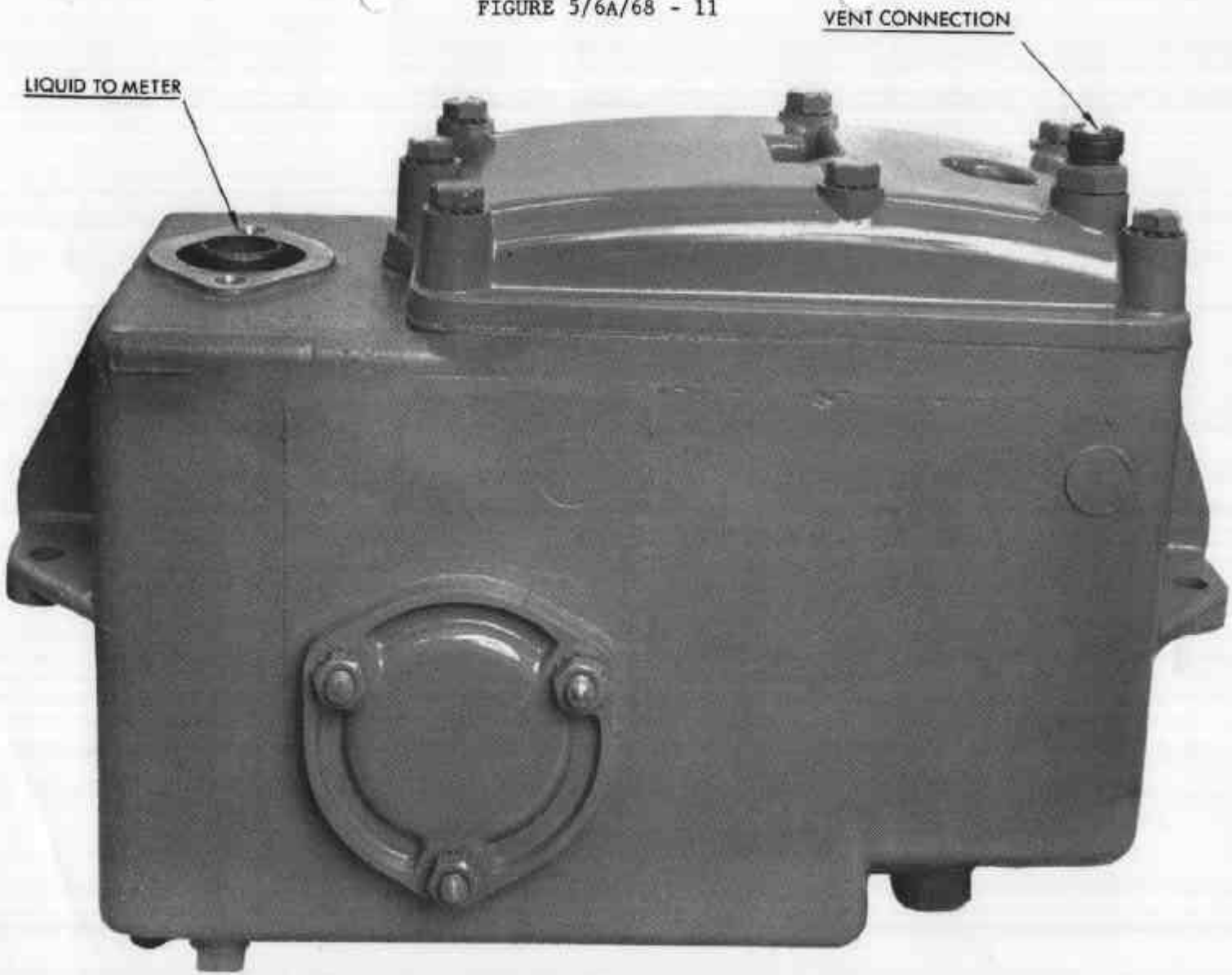
FIGURE 5/6A/68 - 10

1	2	3	
No	Components	Driveway flowmeters	
		EMPEC-80	EMPEC-80D [1]
	Pump, gas separator, integral float chamber and non-return valve, AH PP 2142	*	*
	Gas-separator test valve	*	*
	Meter, AH PM 400	*	*
	Solenoid valve	*	*
	Sight glass, 75003	*	*
	Hose	*	*
	Nozzle, ZVA Slimline	*	*
	Pump interlock — starting lever	*	*
	Pulse-generator unit, 42020	*	*
	Computer unit, 42221	*	*

* - indicates required component

Footnotes: [1] The EMPEC-80D dual driveway flowmeter comprises two flowmeters in the one housing.

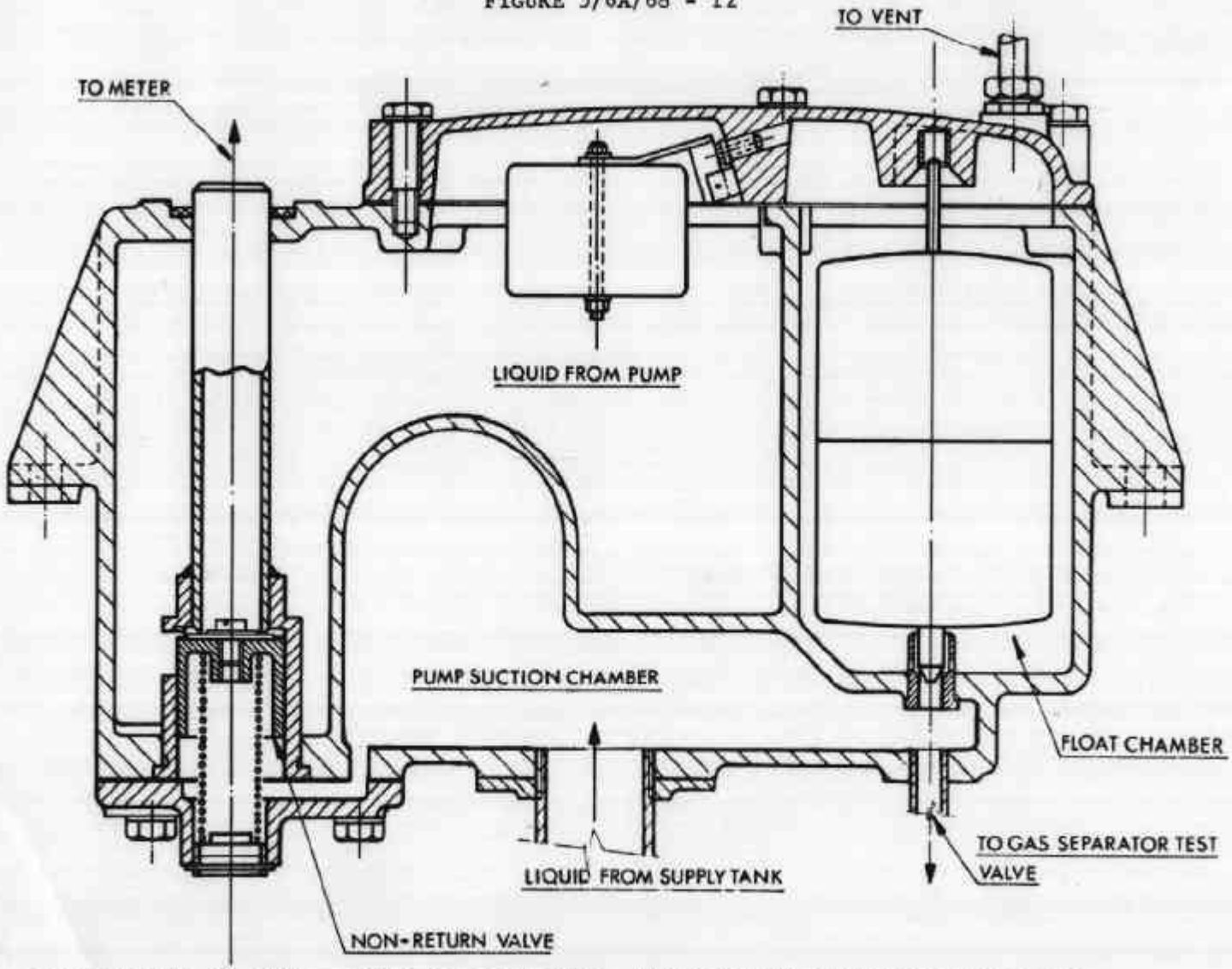
Compatibility Table



Avery-Hardoll PP 2142 — Pump, Gas Separator, Float Chamber and Non-return Valve

FIGURE 5/6A/68 - 12

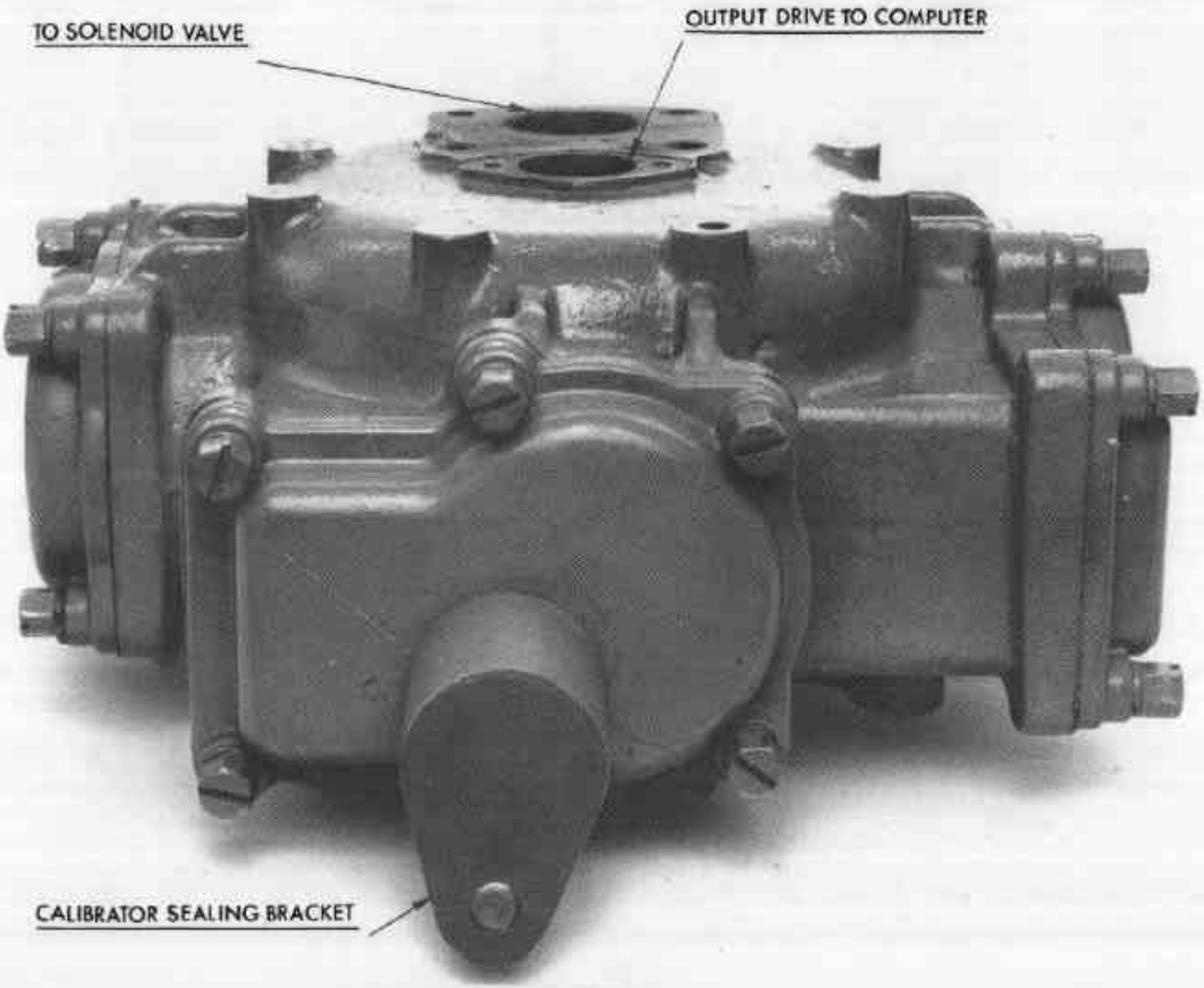
4/10/78



Avery-Hardoll PP 2142 — Pump, Gas Separator, Float Chamber and Non-return Valve — Schematic Diagram

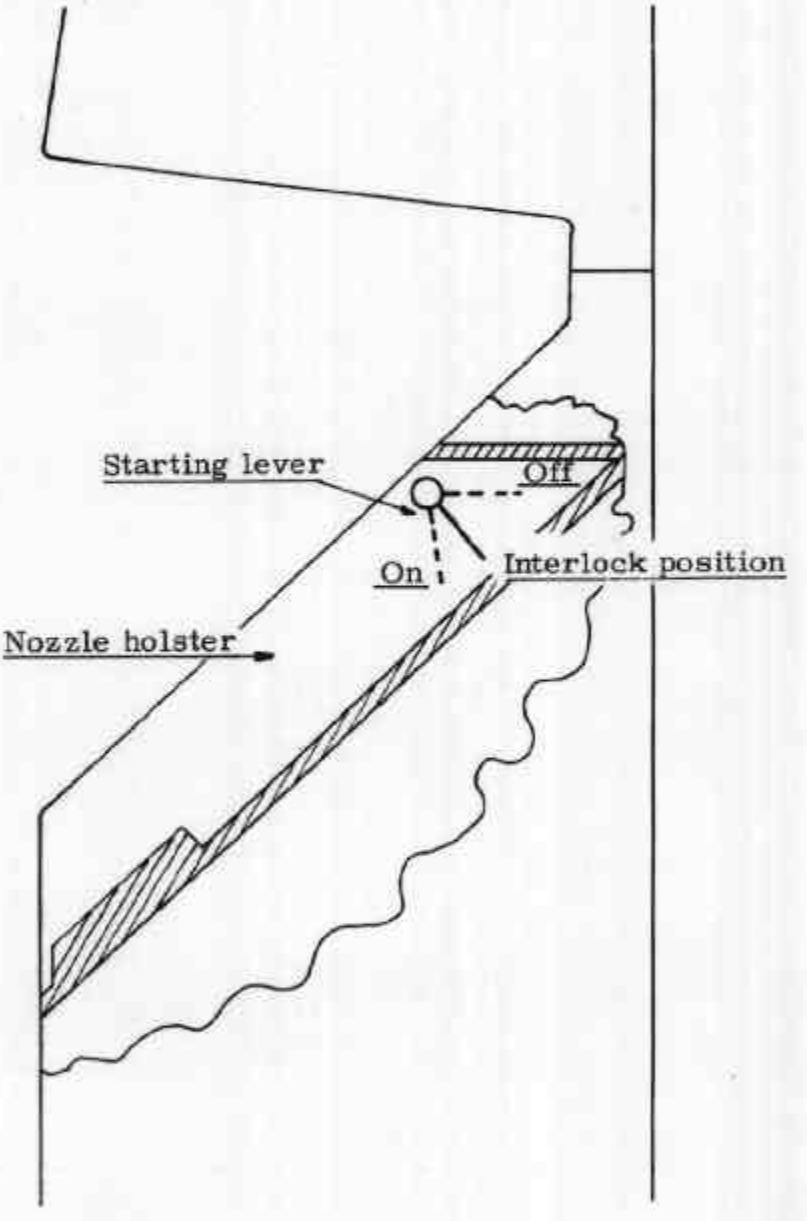
FIGURE 5/6A/68 - 13

4/10/78



Avery-Hardoll PM 400 Meter

FIGURE 5/6A/68 - 14

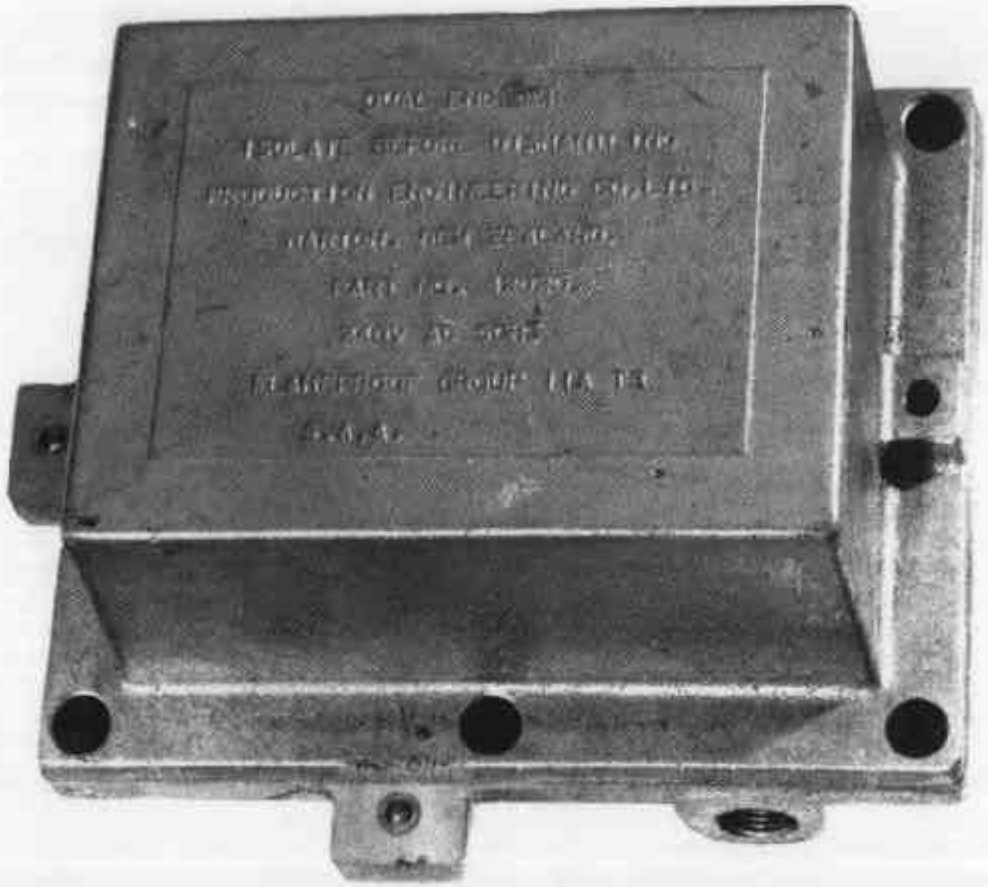


EMPEC-80 — Nozzle Hang-up

4/10/78

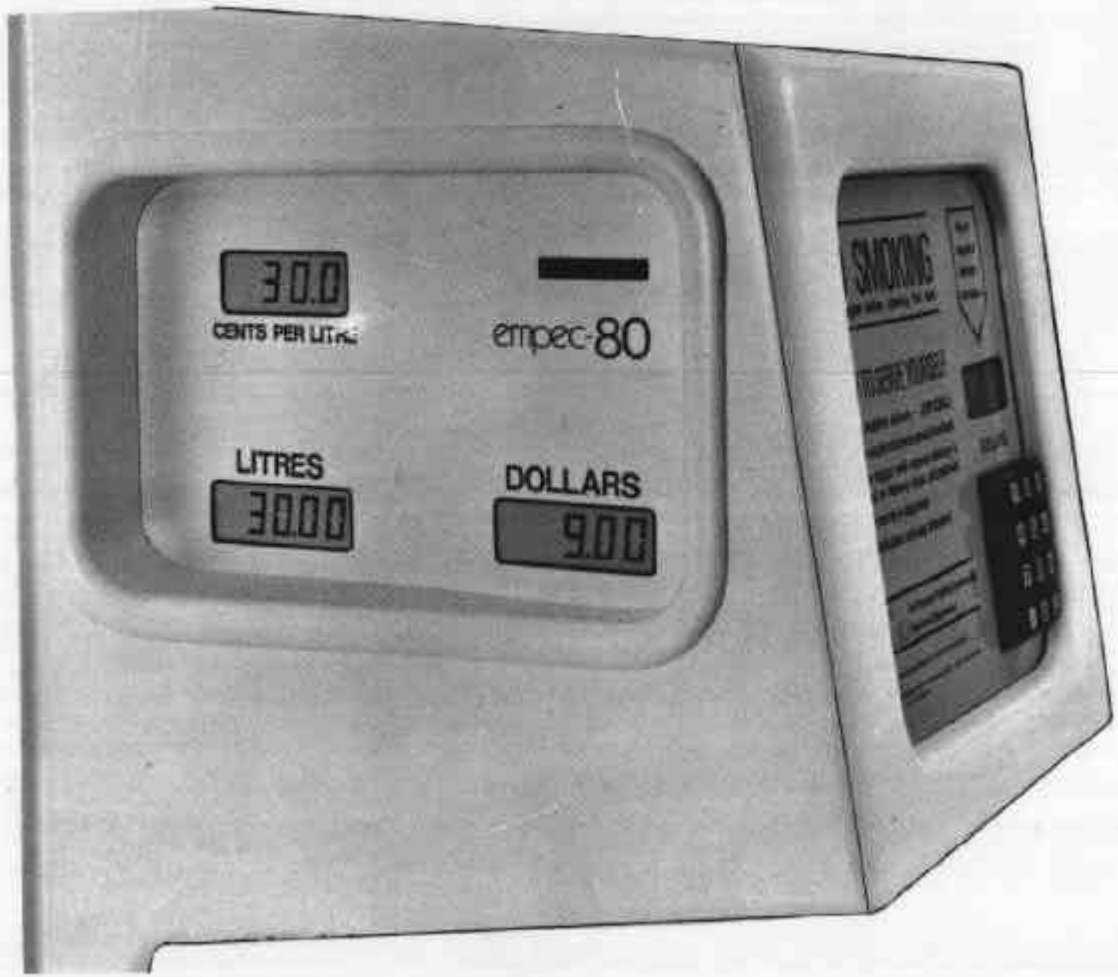
FIGURE 5/6A/68 - 15

4/10/78



Pulse-generator Unit, Model 42020

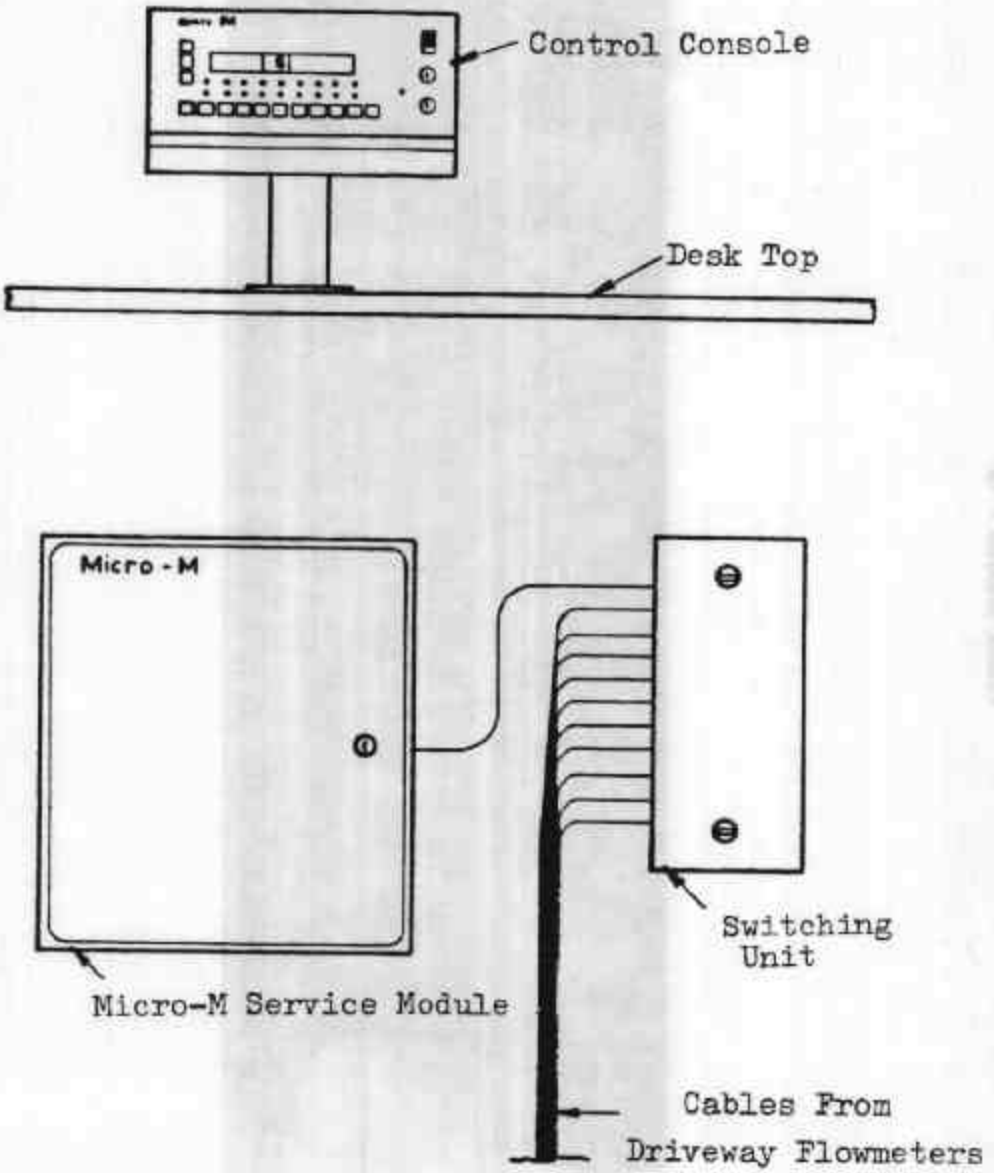
FIGURE 5/6A/68 - 16



Computer Unit, Model 42221

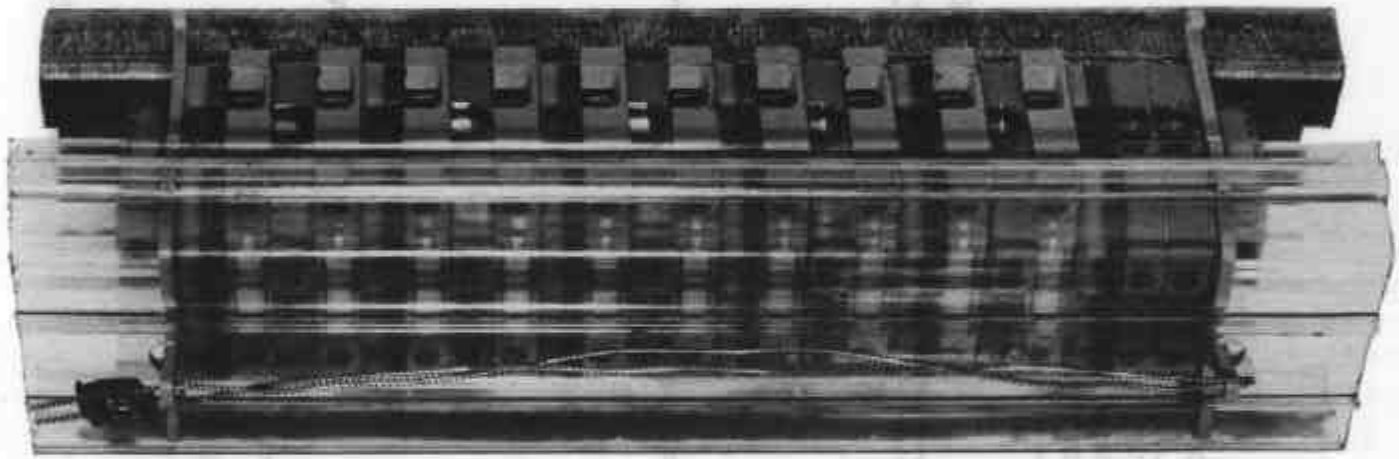
4/10/78

FIGURE 5/6A/6B - 17



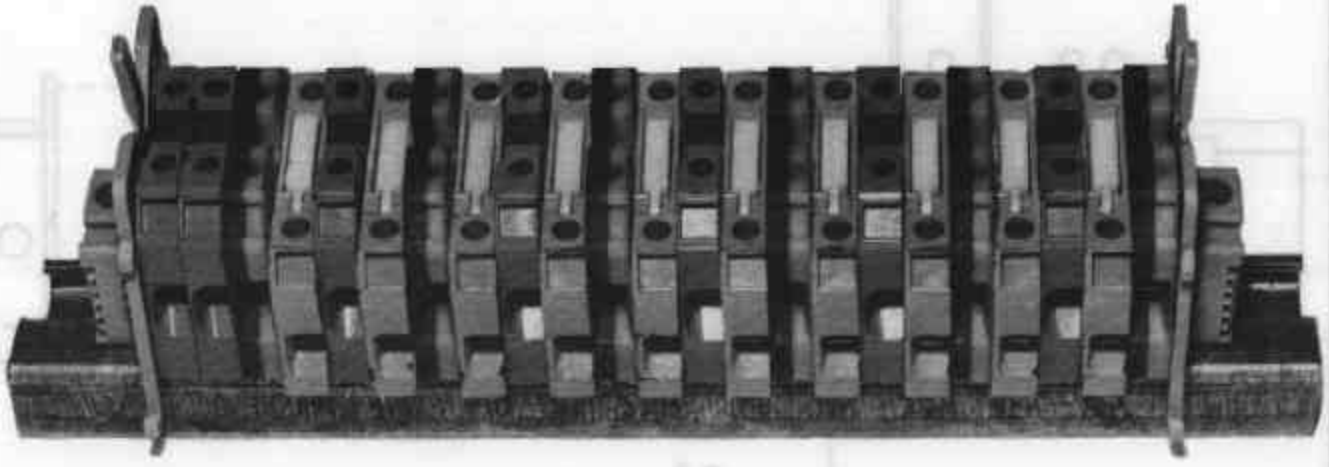
Configuration of Switching-unit in Micro-M
Self-serve system

28/11/80



Switching-unit showing optional sealed cover

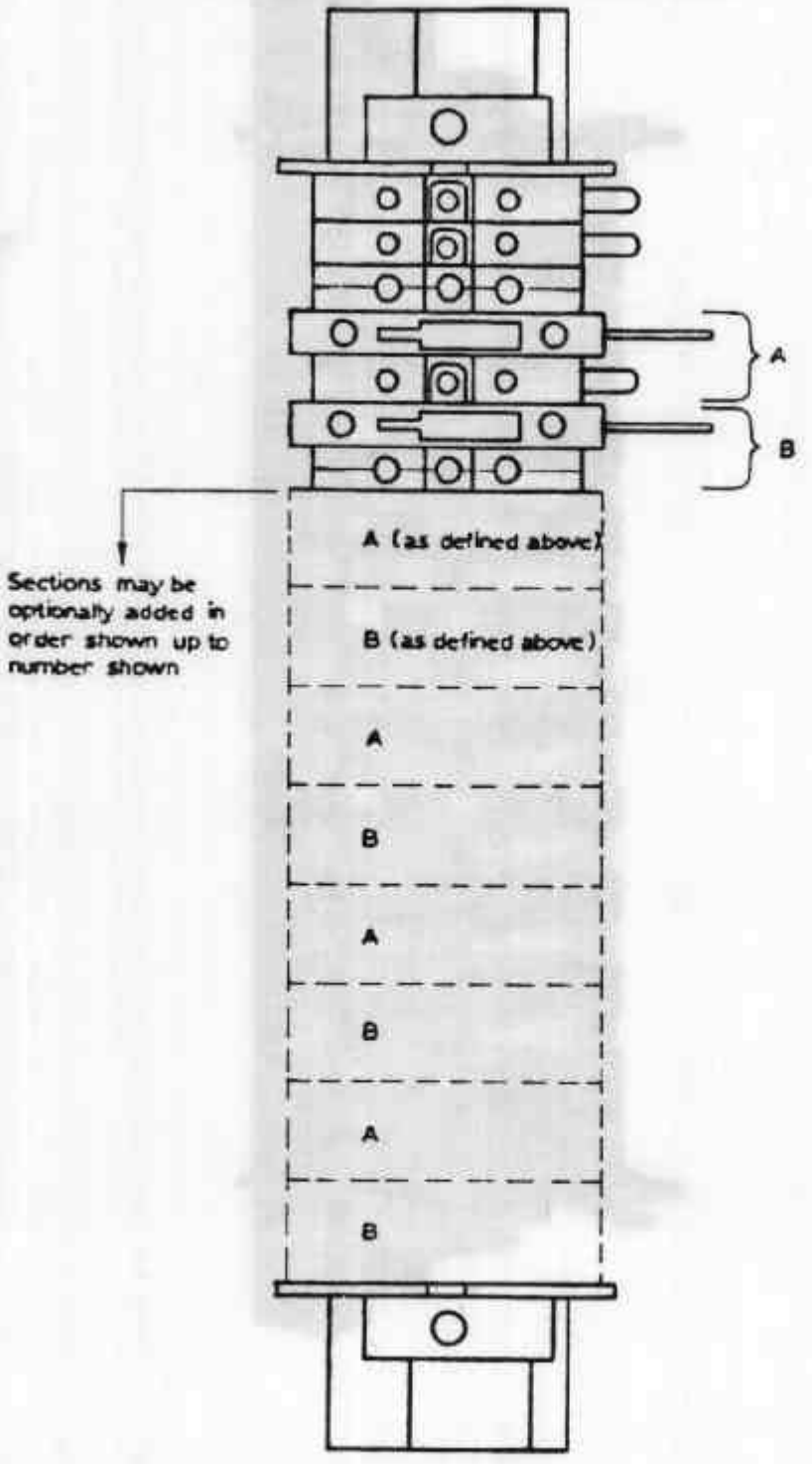
FIGURE 5/6A/68 - 19



Switching-unit

FIGURE 5/6A/68 - 20

MICRO-M CABLE SWITCHING UNIT

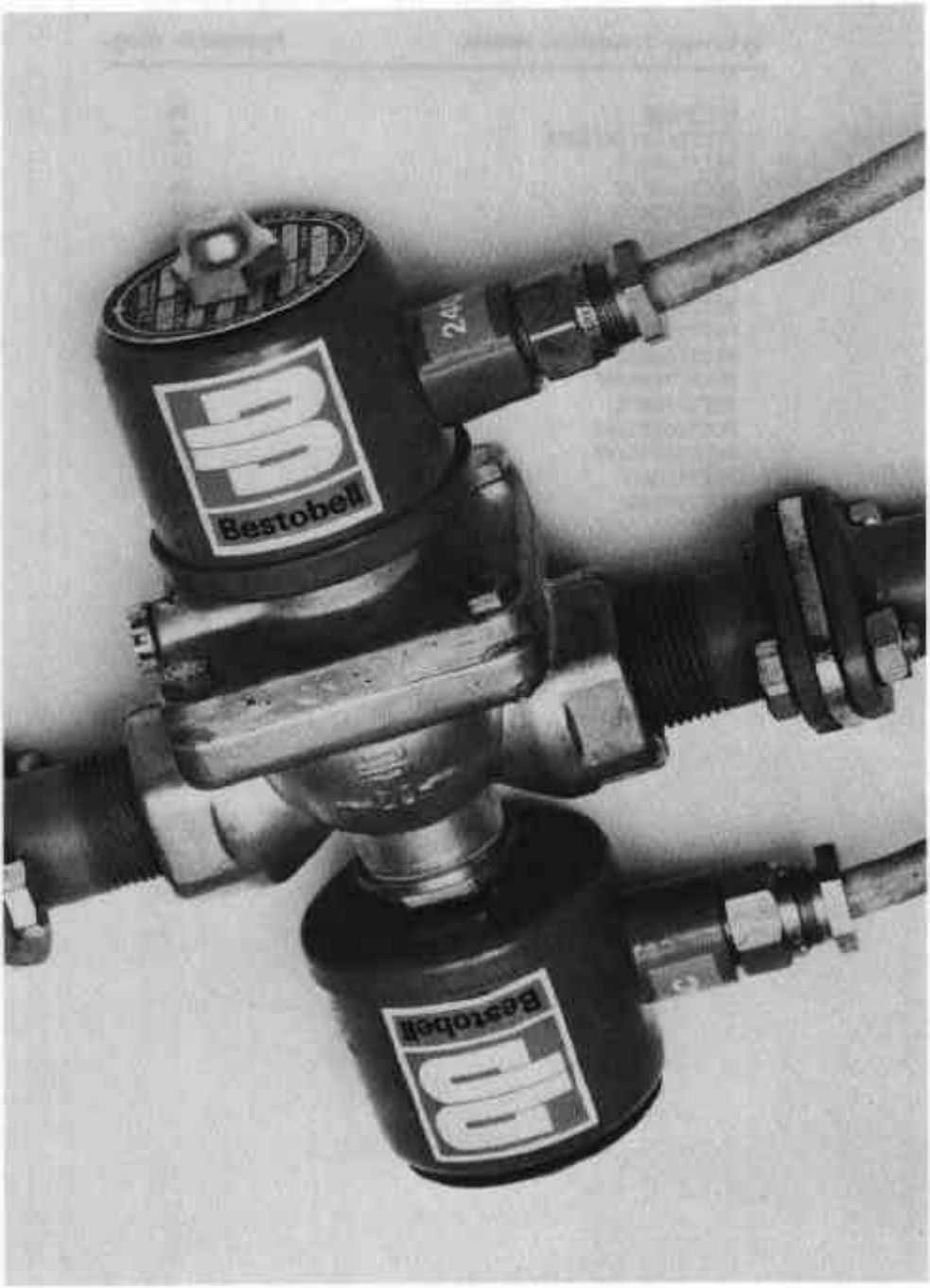


Switching-unit

28/11/80

FIGURE 5/6A/68 - 21

Driveway Flowmeter Models	Hydraulic diag.
PECT166X	25
PECT166Y/YA/Z/ZA	27
PECT166S/T	24
PECT180F/G	24
PECT167M/N	24
PECT166AE/AF	27
PECT180AE/AF	27
PECT167AE/AF	27
PECT181AE/AF	27
PECT172AE/AF	26
PECT183D/E	26
PECT171AE/AF	26
PECT184D/E	26
PECT166XG/AG	25
PECT167AG/XG	25
PECT180AG	25
PECT181AG	25



Preset Control Valve

FIGURE 5/6A/68 - 23

Hose Supporting Mast

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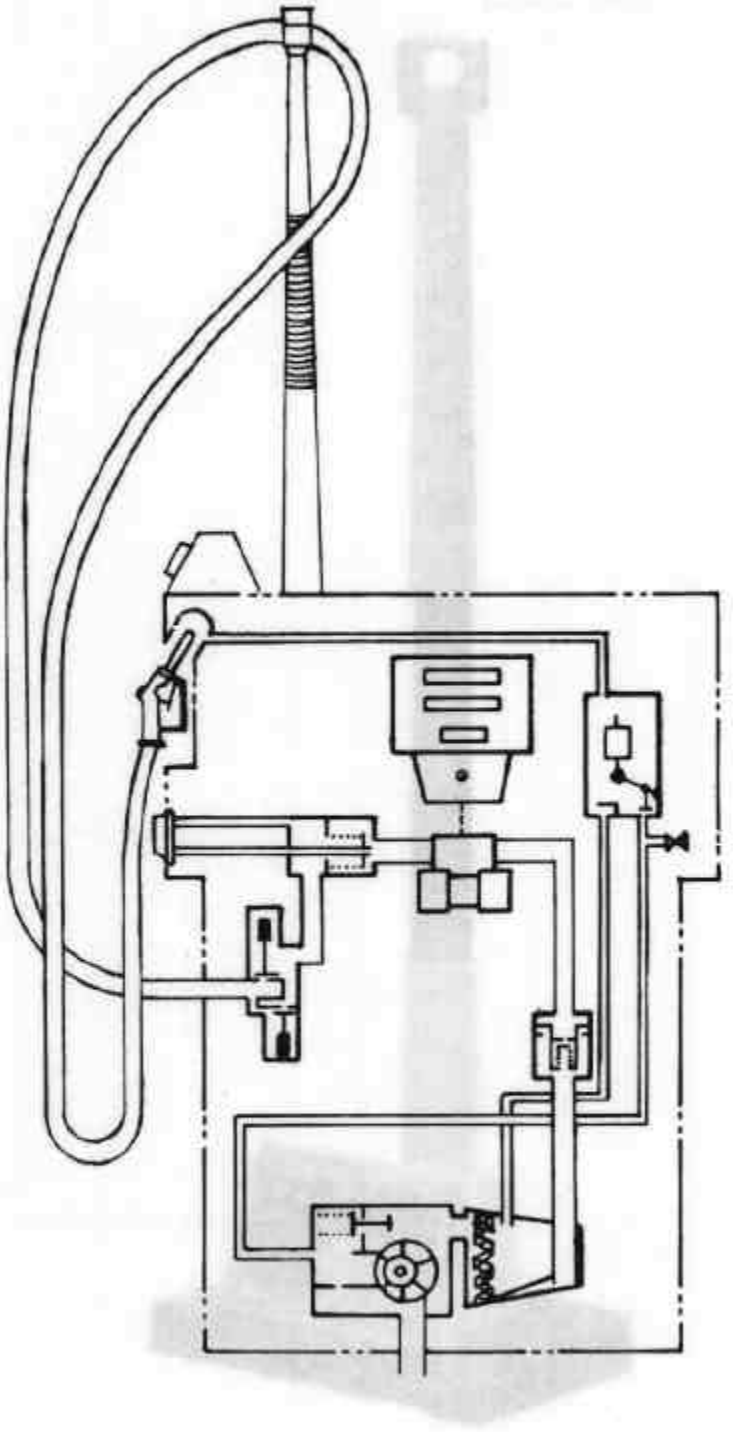
FIGURE 5/6A/68 - 24



Hydraulic Diagram, Models PECT166S/T, PECT180F/G and PECT167M/N

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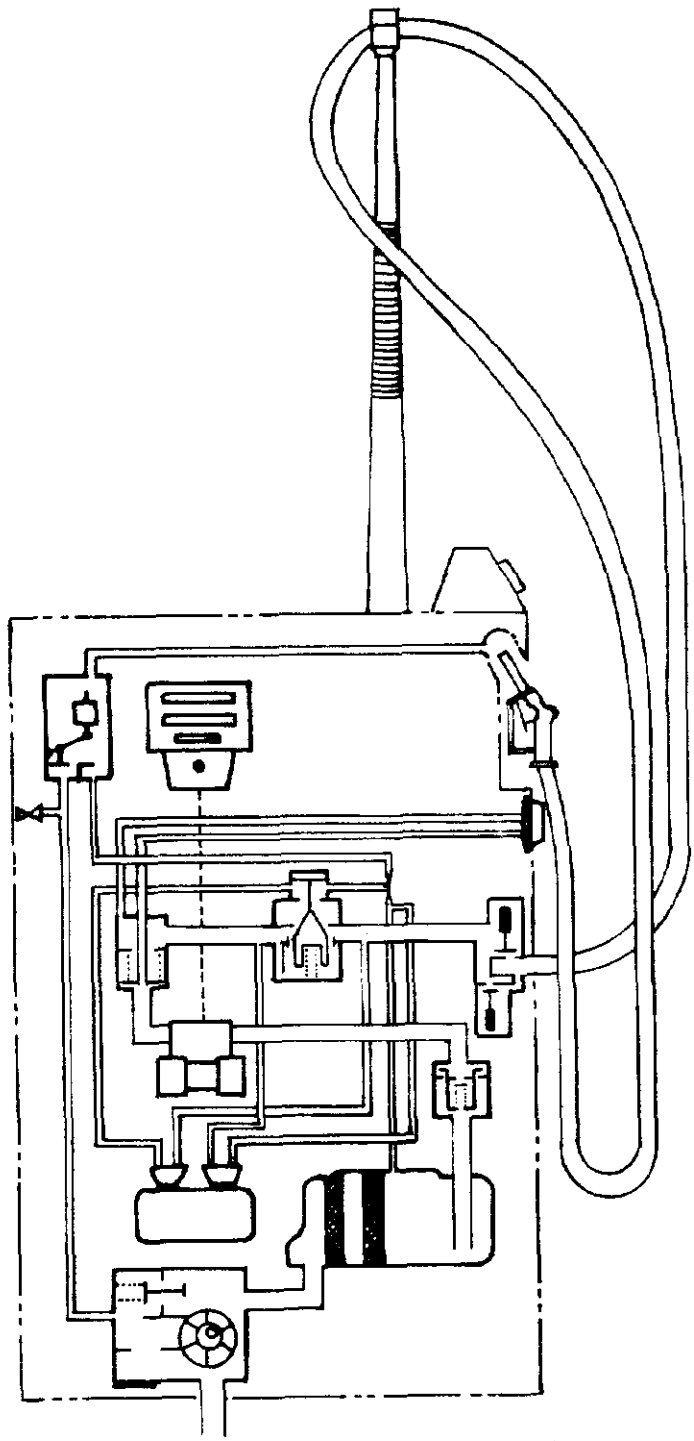
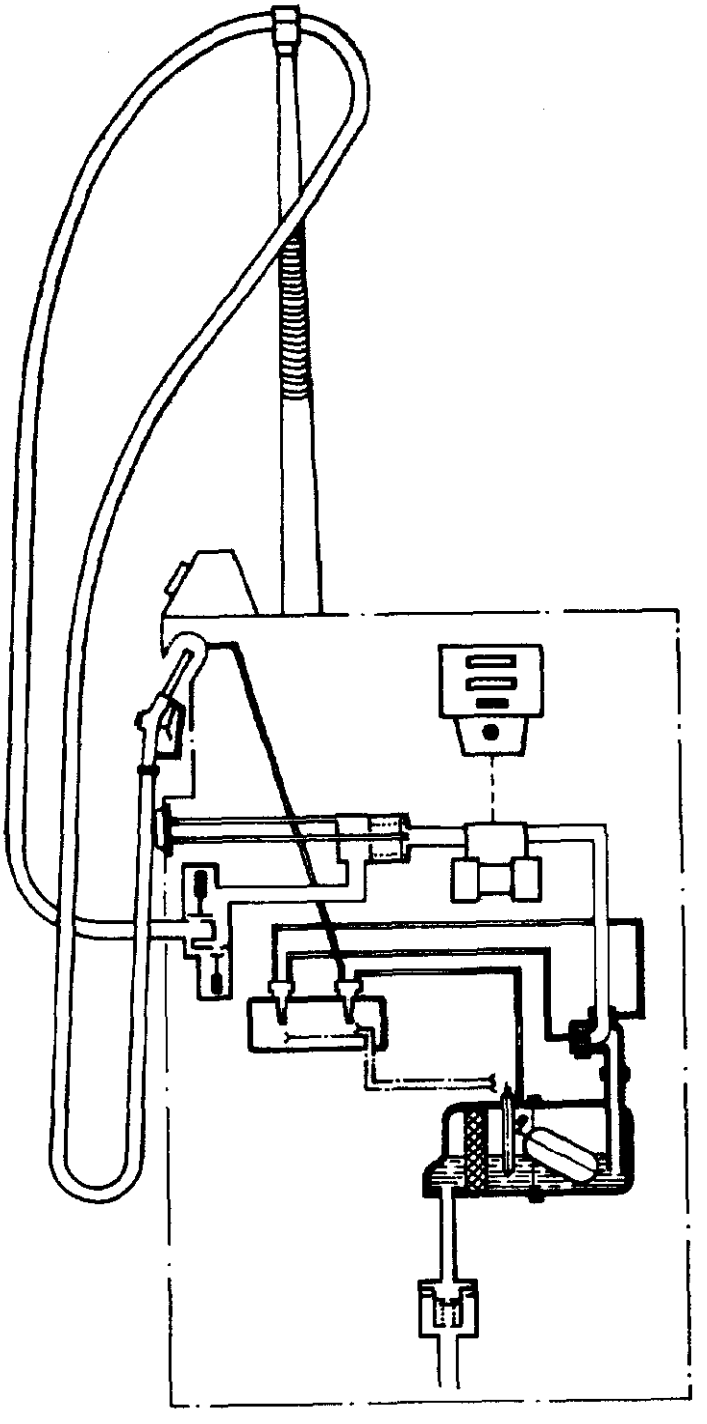
FIGURE 5/6A/68 - 25



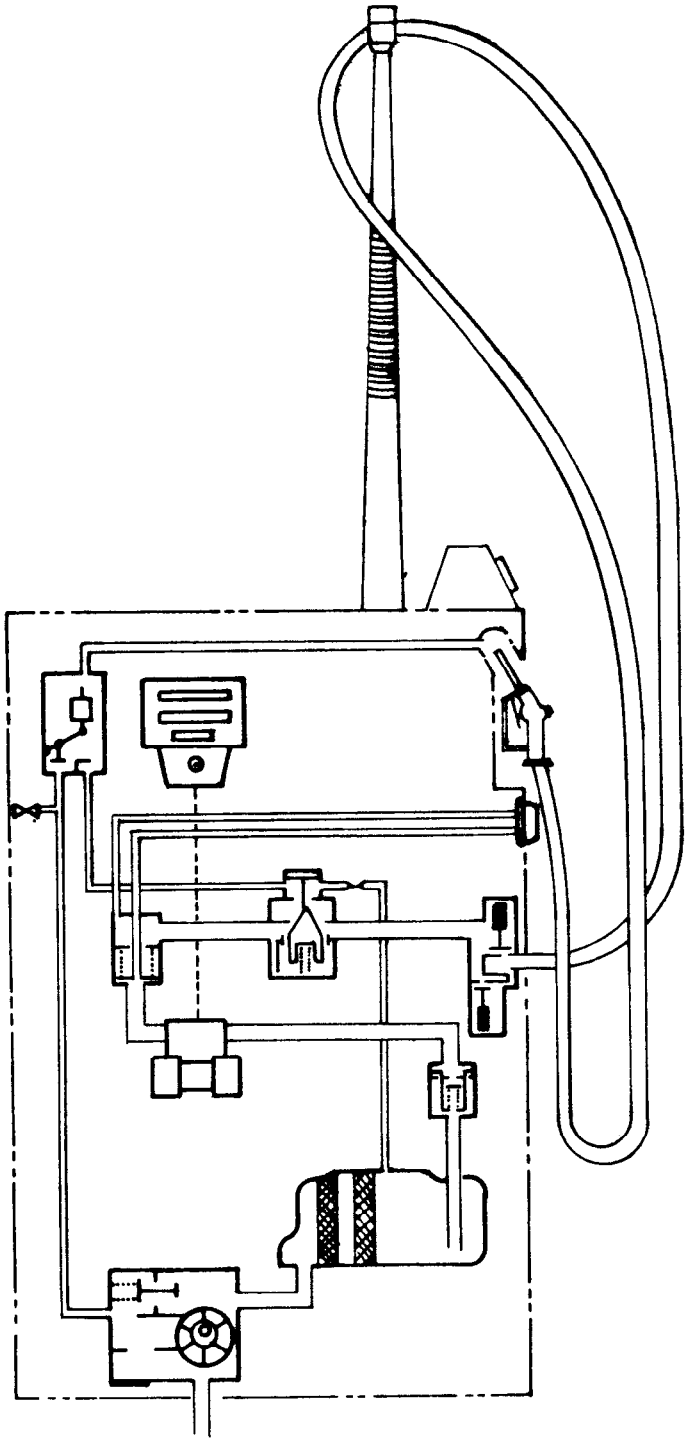
Hydraulic Diagram, Models PECT166X, PECT166XG/AG, PECT167AG/XG, PECT180AG and PECT181AG



Hydraulic Diagram for Models PECT172AE/AF, PECT183D/E, PECT171AE/AF and PECT184D/E

REMOTE POINT

FIGURE 5/6A/68 - 27



Hydraulic Diagram for Models PECT166AE/AF, PECT180AE/AF, PECT167AE/AF, PECT181AE/AF and PECT166Y, YA, Z and ZA

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FIGURE 5/6A/68 - 28

Components	Single Driveway Flowmeters				Dual Driveway[1] Flowmeters	
	PECT1666S	PECT1666T	PECT1180F	PECT1180G	PECT1167M	PECT1167N
Pump T258GD	*	*	*	*	*	*
Gas-separation test valve T166-0170	*	*	*	*	*	*
Float chamber T257AC			*	*		
Float chamber T257R	*	*			*	*
Meter T262Y	*	*	*	*		
Meter T262T					*	*
Retron 80	*	*	*	*	*	*
Non-return valve T260Y	*	*				
Non-return valve T260Z			*	*	*	*
Sight glass T261X	*	*		*	*	
Sight glass T261AC			*	*		
Back-pressure valve T162-6	*	*	*	*	*	*
Hose 19 mm bore	*	*	*	*	*	*
Swivel hose coupling	ø	ø	ø	ø	ø	ø
Nozzle STM 363[2]	A	A	A	A	A	A
Nozzle T250H	A	A	A	A	A	A
Nozzle OPW 1A[2]	A	A	A	A	A	A
Nozzle EMCO 200A[2]	A	A	A	A	A	A
Nozzle ZVA Slimline[2]	A	A	A	A	A	A
Final filter	ø	ø	ø	ø	ø	ø
Data plate - "approved for petrol"	B	B	B	B	B	
Pump interlock - starting lever	*	*	*	*	*	*
Bestobell Model B20VX 2-stage solenoid valve	*	*	*	*	*	*
Hose mast 05014	*	*	*	*	*	*
Preset keyboard and display assembly 09000	*	*	*	*	*	*

* - Indicates required component
A - Indicates alternative components, one of which is required
B - As for A
ø - Indicates optional components

Footnotes: [1]Dual driveway flowmeter comprises two flowmeters in one housing.

[2]Operating lever latch mechanism may be removed to allow nozzle to comply with requirements of other Statutory Authorities.

COMPATIBILITY TABLE FOR COMPONENTS DESCRIBED IN THIS CERTIFICATE

FIGURE 5/6A/68 - 29

Components	Driveway Flowmeters							
	PECT1717AE	PECT1717AF	PECT1783D	PECT1783E	PECT1772AE	PECT1772AF	PECT1784D	PECT1784E
Submerged turbine pump assembly	*	*	*	*	*	*	*	*
Non-return valve DK 00492-001	*	*	*	*	*	*	*	*
Gas-separation system T257AH	*	*	*	*	*	*	*	*
Meter T262Y	*	*	*	*				
Meter T262T					*	*	*	*
Retron 80	*	*	*	*	*	*	*	*
Back-pressure valve T162-6	*	*	*	*	*	*	*	*
Sight glass T261X	*	*			*	*		
Sight glass T261AC			*	*			*	*
Nozzle STM 363[1]	A	A	A	A	A	A	A	A
Nozzle T250H[1]	A	A	A	A	A	A	A	A
Nozzle OPW 1A[1]	A	A	A	A	A	A	A	A
Nozzle ZVA Slimline[1]	A	A	A	A	A	A	A	A
Nozzle ZVA 25[1]	A	A	A	A	A	A	A	A
Nozzle EMCO 200A[1]	A	A	A	A	A	A	A	A
Final filter	ø	ø	ø	ø	ø	ø	ø	ø
Pump interlock - starting lever	*	*	*	*	*	*	*	*
Gas-separation test valve T040-0068	*	*	*	*	*	*	*	*
Data plate - "approved for petrol"	*	*	*	*	*	*	*	*
Bestobell Model B20VX 2 stage solenoid valve	*	*	*	*	*	*	*	*
Hose mast 05014	*	*	*	*	*	*	*	*
Preset keyboard and display assembly 09000	*	*	*	*	*	*	*	*

* - indicates required component
A - indicates alternative components, one of which is required
ø - indicates optional component

Footnote: [1]The nozzle operating lever latch mechanism may be removed to allow the nozzle to comply with the requirements of other Statutory Authorities

COMPATIBILITY TABLE

FIGURE 5/6A/68 - 30

Components	Driveway Flowmeters			
	PECT1666Y	PECT1666YA	PECT1666Z[3]	PECT1666ZA[3]
Pump T258AC	*	*	*	*
Gas separator T257AK	*	*	*	*
Float chamber T257AD	*	*	*	*
Meter T262AJ	*	*	*	*
Retron 80	*	*	*	*
Flow-control valve DR 00929	*	*	*	*
Non-return valve T260AH	*	*	*	*
Back-pressure valve DK 00660-001	*	*	*	*
Sight glass T261AD	*	*	*	*
Nozzle STM 363[2]	A		A	
Nozzle T250H[2]	A		A	
Nozzle OPW 1A[2]	A		A	
Nozzle ZVA Slimline[2]	A		A	
Nozzle ZVA 25[2]	A		A	
Nozzle EMCO 200A[2]	A		A	
Nozzle OPW 1AN 32 mm[2]		*		*
Final filter	ϕ	ϕ	ϕ	ϕ
Pump interlock - starting lever	*		*	
Pump interlock - starting lever (OPW 1AN nozzle)		*		*
Gas-separation test valve T166-0170	*	*	*	*
Data plate - "approved for petrol"[1]	B	B	B	B
Data plate - "approved for diesel fuel"[1]	B	B	B	B
Bestobell Model B20VX 2 stage solenoid valve	*	*	*	*
Hosemast 05014	*	*	*	*
Preset keyboard and display assembly 09000	*	*	*	*

* - indicates required component
A - indicates alternative components, one of which is required
ϕ - indicates optional component
B - as for A

Footnotes:

[1]A known trade name or abbreviation of the name of the liquid is acceptable on the data plate.

[2]The nozzle operating lever latch mechanism may be removed to allow the nozzle to comply with the requirements of other Statutory Authorities

[3]Driveway flowmeters Models T166Z and T166ZA have only one pulse transmitter unit fitted

COMPATIBILITY TABLE

FIGURE 5/6A/68 - 31

Components	Driveway Flowmeters							
	PEC T1166AE	PEC T1166AF	PEC T180AE	PEC T180AF	PEC T1667AE	PEC T1667AF	PEC T1181AE	PEC T1181AF
Pump T258AD	*	*	*	*	*	*	*	*
Float chamber T257AC	*	*	*	*	*	*	*	*
Meter T262AK	*	*	*	*			*	*
Meter T262AJ					*	*		
Retron 80	*	*	*	*	*	*	*	*
Non-return valve T260AF	*	*	*	*	*	*	*	*
Back-pressure Valve DK00 660-001	*	*	*	*	*	*	*	*
Sight glass T261AC			*	*			*	*
Sight glass T261AD	*	*			*	*		
Nozzle STM 363[1]	A	A	A	A	A	A	A	A
Nozzle T250H[1]	A	A	A	A	A	A	A	A
Nozzle OPW 1A[1]	A	A	A	A	A	A	A	A
Nozzle ZVA Slimline[1]	A	A	A	A	A	A	A	A
Nozzle ZVA 25[1]	A	A	A	A	A	A	A	A
Nozzle EMCO 200A[1]	A	A	A	A	A	A	A	A
Pump interlock - starting lever	*	*	*	*	*	*	*	*
Gas-separation test valve T166-0170	*	*	*	*	*	*	*	*
Data plate - "approved for petrol"	*	*	*	*	*	*	*	*
Bestobell Model B20 VX 2 stage solenoid valve	*	*	*	*	*	*	*	*
Hosemast 05014	*	*	*	*	*	*	*	*
Preset keyboard and display assembly 09000	*	*	*	*	*	*	*	*

* - indicates required component
A - indicates alternative components, one of which is required
ϕ - indicates optional component

Footnote: [1]The nozzle operating lever latch mechanism may be removed to allow the nozzle to comply with the requirements of other Statutory Authorities

COMPATIBILITY TABLE

FIGURE 5/6A/68 - 32

Components	Driveway Flowmeters			
	PECT166AG	PECT166A G[2]	PECT167AG	PECT181A G[2]
Pump T258AK	*	*	*	*
Float chamber T257AC	*	*	*	*
Gas-separation test valve T166-0170	*	*	*	*
Meter T262AJ		*		*
Meter T262AK	*		*	
Retron 80	*	*	*	*
Flow-control valve DK 1044	ø	ø	ø	ø
Non-return valve T260AF	*	*	*	*
Back-pressure valve DK 00660-001	*	*	*	*
Sight glass T261AC			*	*
Sight glass T261AD	*	*		
Nozzle ZVA Slimline [1]	A	A	A	A
Nozzle ZVA 25 [1]	A	A	A	A
Nozzle EMCO 200A [1]	A	A	A	A
Nozzle STM 363 [1]	A	A	A	A
Nozzle STM 377 [1]	A	A	A	A
Nozzle OPW 1A [1]	A	A	A	A
Nozzle OPW 1AS [1]	A	A	A	A
Final filter	ø	ø	ø	ø
Pump interlock - starting lever	*	*	*	*
Bestobell Model B20 VX 2 stage solenoid valve	*	*	*	*
Hosemast 05014	*	*	*	*
Preset keyboard and display assembly 09000	*	*	*	*

* - indicates required component
A - indicates alternative components, one of which is required
ø - indicates optional component

Footnotes:

[1]The nozzle operating lever latch mechanism may be re-removed to comply with the requirements of other Statutory Authorities.

[2]The T167AG and T181AG are dual driveway flowmeters, which comprise two driveway flowmeters in one housing.

[3]The flow-control valve may not be fitted as it is not used with the T10 self-serve system.

COMPATIBILITY TABLE

FIGURE 5/6A/68 - 33

Components	Driveway Flowmeter Model PECT166XG
Pump, Gilbarco T258AL	*
Gas separator, Gilbarco T257AK	*
Float chamber, Gilbarco T257AD	*
Non-return valve, Gilbarco T260AH	*
Meter, Gilbarco T262AJ	*
Back-pressure valve, Gilbarco DK 00660-003	*
Sight glass, Gilbarco T261AD	*
Flow-control valve, Gilbarco DR 00929-001	*
Pilot valve (main flow), Gilbarco AN 20475-15	*
Pilot valve (slow-flow), Gilbarco AN 20475-15	*
Gas-separation test valve, Gilbarco T166-0170	*
Final filter	ϕ
Nozzle, STM 363 [2]	A
Nozzle, STM 377 [2]	A
Nozzle, T250H [2]	A
Nozzle, OPW 1AS [2]	A
Nozzle, ZVA Slimline [2]	A
Nozzle, ZVA 25 [2]	A
Nozzle, EMCO 200A [2]	A
Retron 80	*
Bestobell Model B20 XV 2 stage solenoid valve	*
Hosemast 05014	*
Preset keyboard and display assembly 09000	*
Pump interlock - starting lever	*
Data plate - "approved for petrol" [1]	B
Data plate - "approved for kerosene" [1]	B
Data plate - "approved for diesel fuel" [1]	B

* - indicates required component
A - indicates alternative components, one of which is required
B - as for A
ϕ - indicates optional component

Footnotes: [1]A known trade name or abbreviation of the name of the liquid is acceptable

[2]The nozzle operating lever latch mechanism may be removed to comply with the requirements of other Statutory Authorities.

COMPATIBILITY TABLE

FIGURE 5/6A/68 - 34

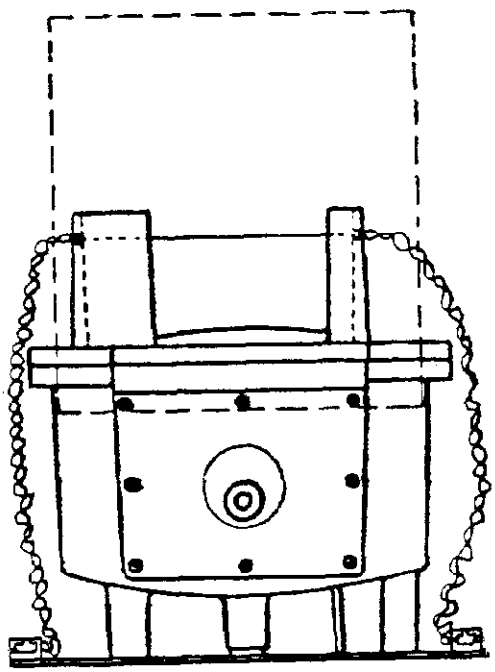
Components	Driveway Flowmeter Model PECT166X
Pump T258AC	*
Gas separator T257AK	*
Float chamber T257AD	*
Meter T262AJ	*
Retron 80	*
Flow-control valve DR 00929	*
Non-return valve T260AH	*
Back-pressure valve DK 00660-001	*
Sight glass T261AD	*
Nozzle, STM 363	A
Nozzle, T250H	A
Nozzle, OPW 1A	A
Nozzle, ZVA Slimline	A
Nozzle, EMCO 200A	A
Nozzle, ZVA 25	A
Nozzle, OPW 1AN 32 mm	A
Final filter	ϕ
Pump interlock - starting lever	*
Gas-separation test valve T166-0170	*
Data plate - "approved for petrol" [1]	B
Data plate - "approved for diesel fuel" [1]	B
Bestobell Model B20 VX 2 stage solenoid valve	*
Hosemast 05014	*
Preset keyboard and display assembly 09000	*

* - indicates required component
A - indicates alternative components, one of which is required
B - as for A
ϕ - indicates optional component

Footnote: [1]A known trade name or abbreviation of the name of the liquid is acceptable

COMPATIBILITY TABLE

FIGURE 5/6A/68 - 35



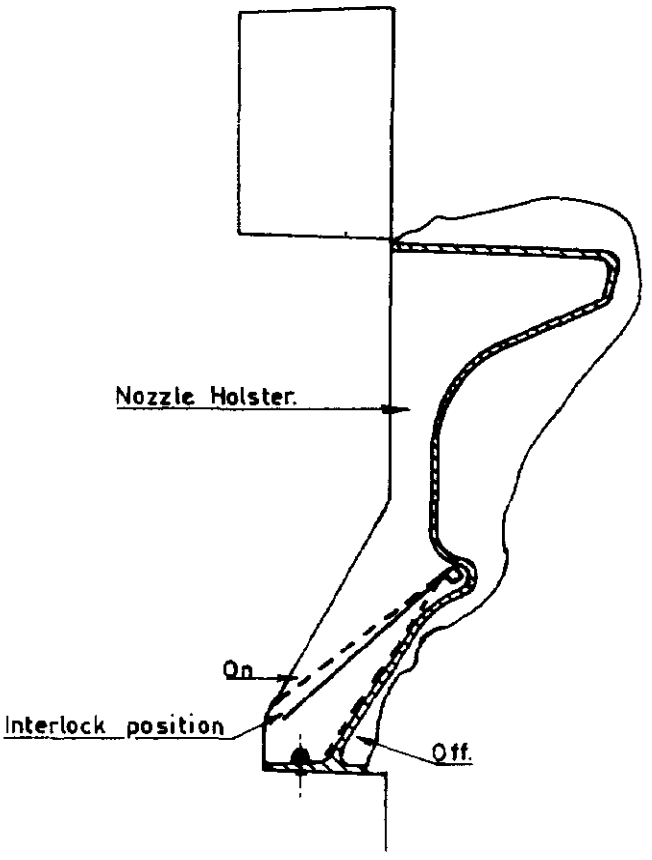
Sealing Arrangement, Totaliser and Computer

17/9/81

FIGURE 5/6A/68 - 36

Alternate Hose Mast and Preset Panel for Model PEC
Driveway Flowmeters (Variant 4)

2/12/81



Alternate Nozzle Arrangement for Model PEC
Driveway Flowmeters (Variant 5)

2/12/81

FIGURE 5/6A/68 - 38

Model 5301H or 5301P

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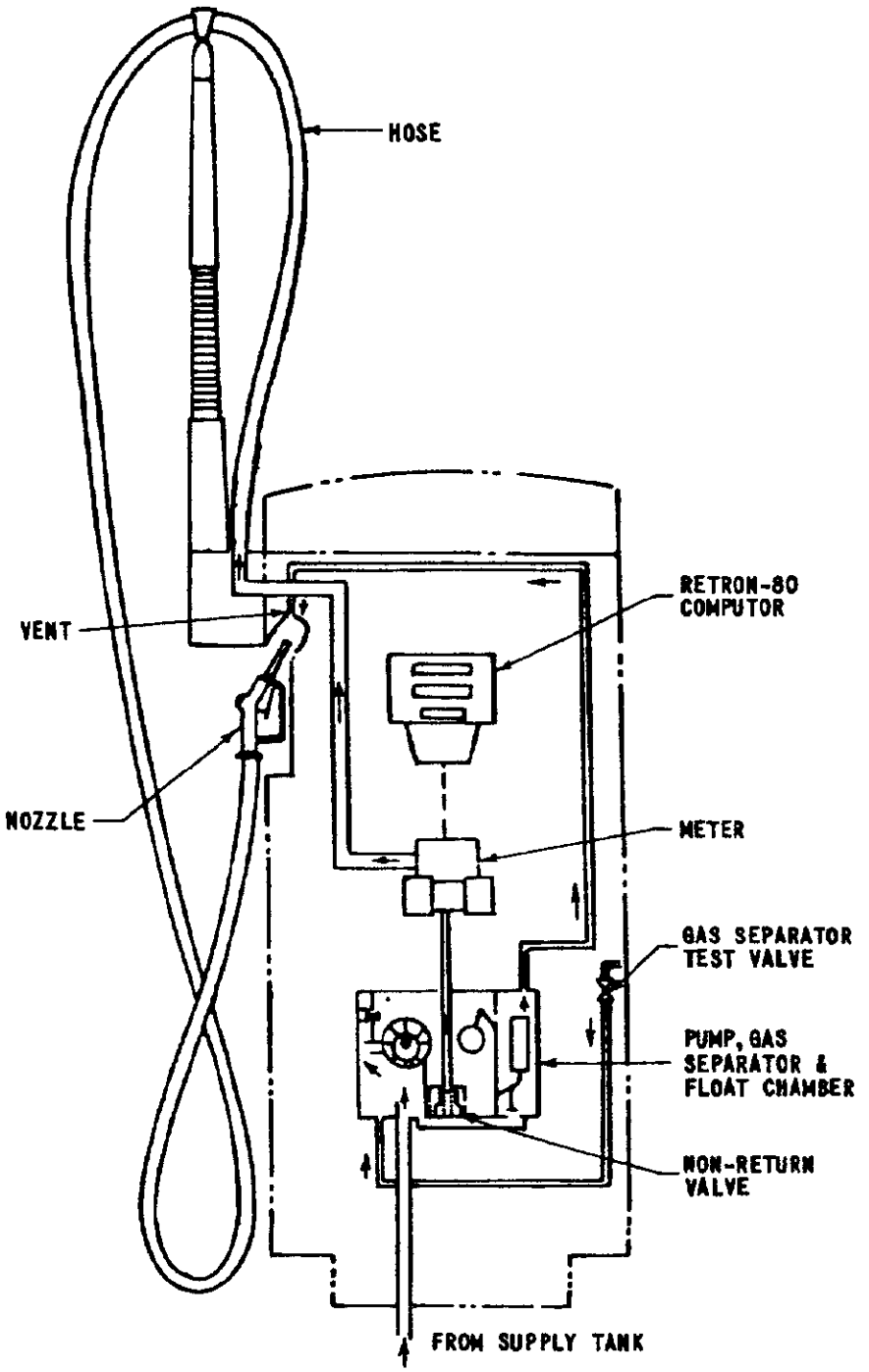
FIGURE 5/6A/68 - 39



Model 5301H - Hydraulic Diagram

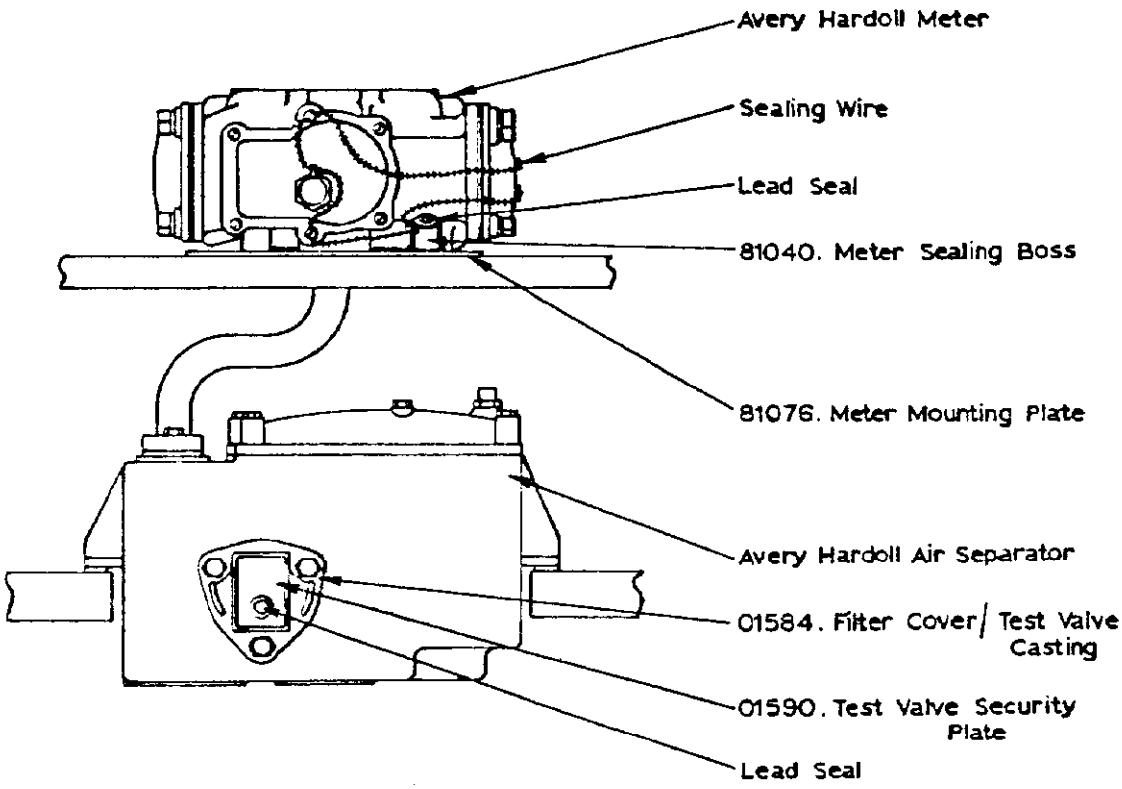
3/8/82

FIGURE 5/6A/68 - 40

Component	Driveway Flowmeter	
	5301H	5301P
AH PP2142 pump, gas separator, integral float chamber and non-return valve.	*	*
Gas separator test valve	*	*
Meter AH PM400	*	*
Solenoid valve, Bestobell B20VX2		*
Hose	*	*
Hosemast	*	*
Preset keyboard and display assembly 09041		*
Nozzle ZVA Slimline	*	*
Retron 80 (as approved under NSC No S101)	*	*

* - indicates required component

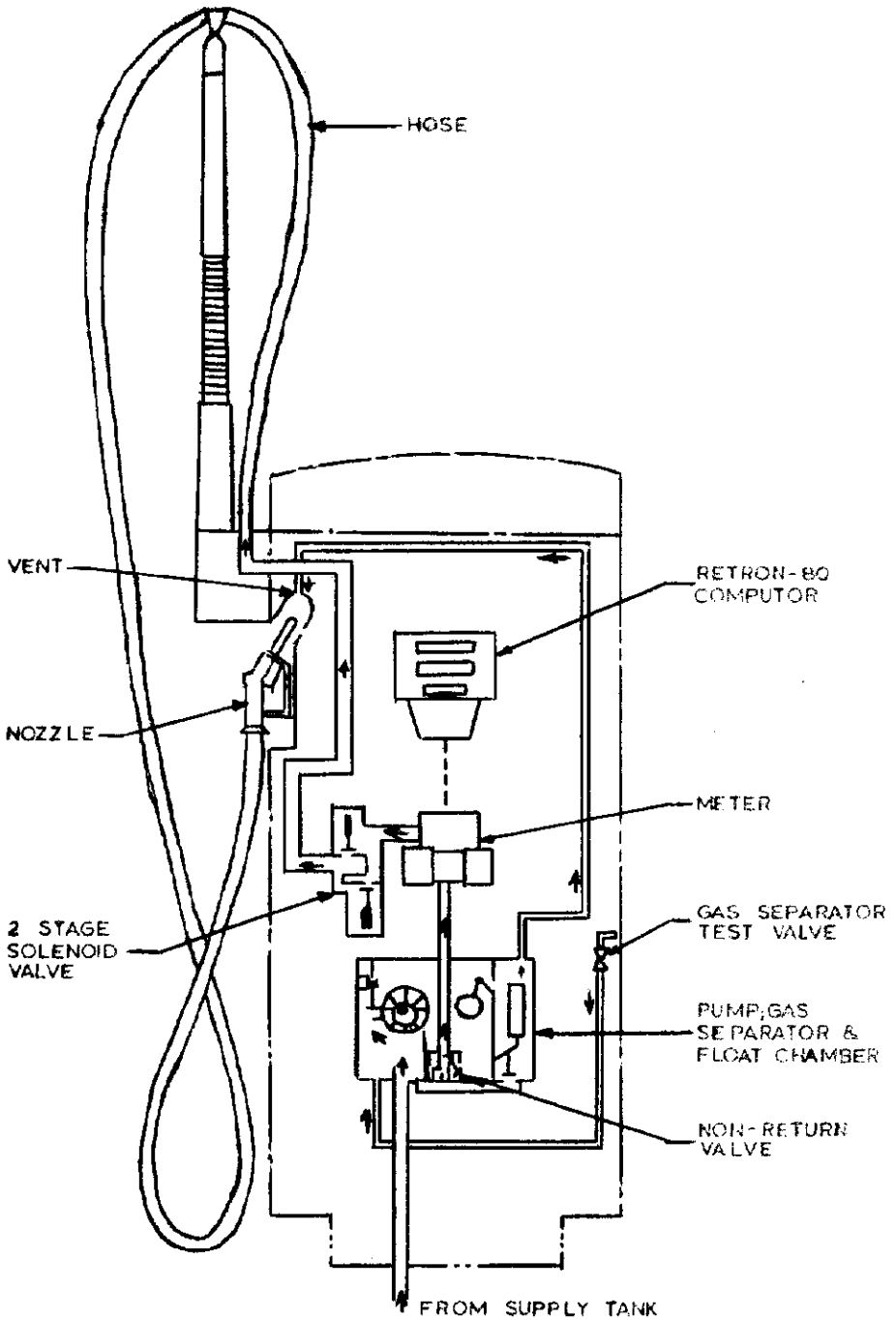
Compatibility Table



Sealing Of Meter Calibration And
Gas Separator Test Valve

3/8/82

FIGURE 5/6A/68 - 42



Model 5301P - Hydraulic Diagram

3/8/82

FIGURE 5/6A/68 - 43

Production Engineering Models 6301 H(AH) or 6301 P(AH)

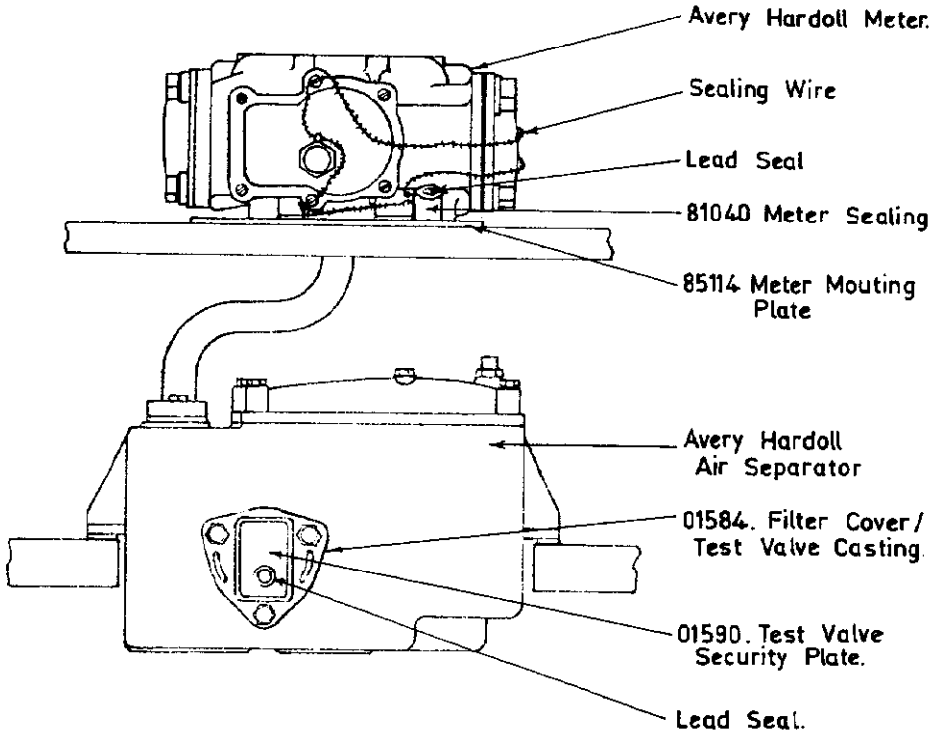
1/12/82

FIGURE 5/6A/68 - 44

Model 6301 P(AH) Preset Panel

1/12/82

FIGURE 5/6A/68 - 45



Sealing of Meter Calibration And
Gas Separator Test Valve

1/12/82