



Australian Government

National Measurement
Institute

Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

NMI 10/1/20

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

This is to certify that an approval for use for trade has been granted in respect of the instruments herein described.

Batchen Model C2000-DCE-PA LPG Fuel Dispenser for Motor Vehicles

submitted by D J Batchen Pty Ltd
2-6 Raglan Road
Auburn NSW 2144

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use for trade only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

This approval has been granted with reference to document NMI R 117 Measuring Systems for Liquids Other than Water, dated June 2011.

This approval becomes subject to review on **1/09/18**, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern & variant 1 provisionally approved – interim certificate issued	14/08/01
1	Pattern & variant 1 provisionally approved – interim certificate issued	29/10/01
2	Variant 2 approved – certificate issued	10/12/01
3	Pattern amended (self-serve) – notification of change issued	11/01/02
4	Variant 3 approved – interim certificate issued	27/06/02
5	Variant 3 approved – certificate issued	16/09/02
6	Pattern & variants 1 to 3 amended & reviewed – variant 4 approved – certificate issued	22/08/06
7	Pattern amended (density range) – notification of change issued	10/03/10
8	Pattern & variants 1 to 4 reviewed & updated – certificate issued	14/04/14

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI (or NSC) 10/1/20' and only by persons authorised by the submitter.

Instruments purporting to comply with this approval and currently marked 'NSC P10/1/20' may be re-marked 'NMI (or NSC) 10/1/20' but only by persons authorised by the submitter.

It is the submitter's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the National Measurement Institute (NMI) and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with document NMI P 106.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificates No S1/0/A or No S1/0B.

Signed by a person authorised by the Chief Metrologist to exercise their powers under Regulation 60 of the *National Measurement Regulations 1999*.

A handwritten signature in black ink, appearing to read 'Dr A Rawlinson', with a horizontal line underneath.

Dr A Rawlinson

TECHNICAL SCHEDULE No 10/1/20

1. Description of Pattern **provisionally approved 14/08/01**
approved 29/10/01

The Batchen model C2000-DCE-PA is a fuel dispenser for refuelling motor vehicles using liquefied petroleum gas (LPG). The dispenser is approved for use in attendant-operated mode, or in attended self-service mode using any compatible (#) approved control console.

The model number may be without the 'PA' suffix, e.g. the pattern (model C2000-DCE-PA) may also be known as the model C2000-DCE.

(#) 'Compatible' is defined to mean that no additions/changes to hardware/software are required for satisfactory operation of the complete system.

The model C2000-DCE-PA dual (twin) LPG dispenser (Figures 1 and 2) includes the following components or features:

- A Batchen model Mk-V constant bleed vapour elimination device.
- Two Batchen model Mk III LPG liquefied petroleum gas (LPG) flowmeters each fitted with an Email Electronics model VN pulse generator.
- Two Batchen model Mk VI spring-loaded pressure differential valves.
- A calculator/indicator configured for use with a density detection device enabling the volume conversion to 15°C.

An optional pre-setting device.

1.1 Field of Operation

The field of operation of the measuring system is determined by the following characteristics:

- Minimum measured quantity, V_{min} 2 L
- Maximum flow rate, Q_{max} 60 L/min
- Minimum flow rate, Q_{min} 10 L/min
- Maximum pressure of the liquid, P_{max} 2450 kPa
- LPG density detection range (at 15°C) 500 kg/m³ to 590 kg/m³
- Ambient temperature range -10 to 55°C
- Volume conversion to 15°C over a liquid temperature range of -10°C to 45°C
- Operating pressure is maintained at least 200 kPa above the Equilibrium vapour pressure of LPG.
- Accuracy class 1.0

1.2 System Description

- (i) The supply tank may be located above or below ground.
- (ii) The pump may be positioned above the supply tank, in which case the pump shall be a multi-stage regenerative turbine LPG pump especially designed for use in **suction lift** installations. Alternatively, the pump shall be positioned below the supply tank so that it is always in a state of flooded suction (**suction head** installations). There are no restrictive fittings within ten pipe diameters of the pump inlet.

The inlet pipe to the pump is larger than the outlet from the pump. The external pump by-pass relief valve is installed in a line returning to the vapour space of the supply tank.

A pump supplying LPG to several flowmeters shall be of sufficient capacity rating to ensure that when all flowmeters are in use the flow rate through each flowmeter is greater than Q_{min} .

- (iii) A Batchen constant bleed vapour eliminator with an integral strainer (Figures 3 and 4) positioned upstream of each flowmeter, in conjunction with a pressure differential valve downstream of each flowmeter, protect the flowmeters from the measurement of vapour. The thermometer well for checking the temperature measurement of LPG is situated in the top of the vapour eliminator.
- (iv) Two Batchen model Mk III two-piston LPG flowmeters are used (Figure 5) each fitted with an Email Electronics model VN pulse generator with an output of 100 pulses per revolution.
- (v) A Batchen model Mk VI spring-loaded pressure differential valve is fitted to the flowmeter outlet. A pressure-equalising pipe is connected from the top of the differential valve to the vapour space of the supply tank. The differential valve may be fitted with one or more bleed valves. In normal operation, the bleed valves are sealed with caps to prevent leakage.
- (vi) A Batchen hydraulic accumulator may be fitted downstream of the pressure differential valve.
- (vii) A 1/2" NPT flow solenoid valve is located downstream of the pressure differential valve. The solenoid valve controls the delivery and prevents delivery during the reset cycle. If a pre-setting device is fitted, the system will also include a 1/4" NPT flow solenoid valve (Figure 6).
- (viii) The fuel dispenser is fitted with hoses of 15 or 20 mm nominal bore and incorporating a Batchen model Sentry 20 hose beak-away coupling fitted between the flow solenoid valve and the nozzle.

The nozzles used are either Gasguard model LG1DNS or any other compatible NMI-approved LPG nozzle, suitable for the hang-up mechanism. Note that the submitter must be consulted regarding the acceptability of any alternative nozzles.

- (ix) The calculator/indicator (Figure 7) comprises an Email model Vision computing board and two Email model Vision display boards. The indicators display the following maximum values:

- Volume 999.99 L in 0.01 L increments
- Unit price 999.9 c/L in 0.1 cent increments
- Total price \$999.99 in 1 cent increments
- Totaliser (volume) 99999 L in 1 L increments
- Pre-set (optional) \$999 in \$1 increments

The calculator/indicator can display LPG density at 15°C used for conversion of volume to 15°C, and can display the temperature of LPG flowing through the meter (refer Test Procedure).

The main software version number for the calculator/indicator is B4.### which may be viewed using the 'test' button (refer to the Test Procedure).

1.3 Operation

Removal of the nozzle from its hang-up starts the operating cycle. The display will be cleared of any previous sale and the remote pump will start. The system electronics will automatically check for pulse generator rotation and correct electronic parameters.

A segment check is initiated; when completed the unit price is displayed and the price and volume displays show all zeroes. At the end of this cycle, the flow solenoid valve opens allowing a delivery to commence. Replacing the nozzle to its normal hang-up position closes the solenoid valve. The delivery details are displayed until the next reset cycle.

1.4 Volume Conversion Device

The electronic volume conversion for temperature facility is used to convert the measured volume to volume at 15°C using the volume conversion factors as a function of density in accordance with Table 54 of the ASTM-IP-API Petroleum Measurement Tables for Light Hydrocarbon Liquids.

The calculator/indicator is configured for use with an LPG Measurement model DSS*-98 (*) density detector probe to display the delivered volume at 15°C.

(*) DSS*-98 where * is either B or P, depending on type of connection.

1.5 Descriptive Markings and Notices

Instruments are marked with the following data, together in one location on a data plate:

Pattern approval number	NMI (or NSC) No 10/1/20
Manufacturer's identification mark or name
Manufacturer's designation (model number)
Serial number
Year of manufacture
Maximum flow rate (Q_{max}) L/min
Minimum flow rate (Q_{min}) L/min
Minimum measured quantity (V_{min}) L (#1)
Maximum operating pressure (P_{max})	2450 kPa
Minimum pressure (P_{min})	200 kPa above vapour pressure (#2)
Approved for LPG density range	500 kg/m ³ to 590 kg/m ³ (at 15°C)
Maximum liquid temperature (T_{max})°C
Minimum liquid temperature (T_{min})°C
Accuracy class class	1.0
Environmental class	class C

(#1) The minimum measured quantity (V_{min}) shall be clearly visible on any indicating device visible to the user during measurement.

(#2) Alternatively, the following wording may be used:

'LPG pressure (at the meter) is maintained at least 200 kPa above vapour pressure.'

Note: The words 'at the meter' may be deleted to save space.

1.6 Recirculation Line

A recirculation line with a double check filler valve is provided at the dispenser for returning the LPG back to the supply tank. The recirculation line is used for maintenance checking or calibration of the dispenser.

1.7 Verification Provision

Provision is made for the application of a verification mark.

1.8 Sealing Provision

A plate covering the calibration switch situated inside the calculator/indicator, and the mechanical calibration device on the flowmeter (Figure 8), have provision for sealing.

2. Description of Variant 1 provisionally approved 14/08/01 approved 29/10/01

Certain models of the C2000 ('Concept 2000') series or CII ('Commander II') series as identified below: (The model number may be without the 'PA' or 'SA' suffix, e.g. the model C2000-DCE-SA) may also be known as the model C2000-DCE.)

- As CII ('Commander II') series dispensers (Figure 9) which have the same features and metrological specifications as the pattern, in which case the pattern (model C2000-DCE-PA) becomes a model **CII**-DCE-PA.
- As single (one hose) dispensers (Figure 9), in which case the pattern becomes a model C2000-**SCE**-PA.
- As quad (four hose) dispensers (Figure 10), in which case the pattern becomes a model C2000-**QCE**-PA.
- With alternative housing styles, e.g. '**W**ardrobe' (rectangular) style (Figure 9), in which case the pattern becomes a model C2000-**DWE**-PA. Other housing styles (and their codes) are 'twin column' (T) (Figure 11), 'MPP' (M) (Figure 12), 'end oriented' (J) (Figure 13), and 'handed twin' (H) (Figure 14).
- With lower (non-metrological) specification levels, namely '**S**tandard', in which case the pattern becomes a model C2000-DCE-**SA**. Refer to the optional items marked in Figure 2.

3. Description of Variant 2 approved on 10/12/01

With a magnetic coupling between the meter and the pulse generator (Figure 15).

4. Description of Variant 3 approved on 27/06/02

The Batchen model C11-SEE-PA (single) and model C11-DEE-PA dual (twin) LPG fuel dispensers which are similar to the pattern but in alternative housing styles as shown in Figures 16 and 17, respectively.

5. Description of Variant 4

approved on 21/08/07

With the calculator/indicator described for the pattern replaced by a Transponder Technologies model T5 calculator/indicator (as described in the documentation of approval NSC S414).

The model T5 calculator/indicator is configured for use with a density detection device enabling volume correction for temperature to 15°C.

TEST PROCEDURE No 10/1/20

Instruments shall be tested in accordance with any relevant tests specified in the National Instrument Test Procedures.

The instrument shall not be adjusted to anything other than as close as practical to zero error, even when these values are within the maximum permissible errors.

Maximum Permissible Errors

The maximum permissible errors are specified in Schedule 1 of the *National Trade Measurement Regulations 2009*.

Calibration Procedure

For detailed configuration and code setting procedures, refer to the manufacturer's service manual.

The calibration of the flowmeter shall be carried out using the unconverted volume.

To view temperature, density and unconverted volume on the calculator/indicator:

1. Turn the manager's key 90°. Dashes ('-----') will appear on the display.
2. There are four buttons marked by dots, broken lines or pre-set keypad, situated on the front or rear of the indicator/calculator.
3. The buttons from left to right are:
 - test button
 - manager digit change
 - down
 - up
4. Press the 'test' button to view unconverted volume. Keep pressing to view temperature, density and software version number (B4.###). Note that the displayed LPG density is at 15°C.

To perform a unit price change

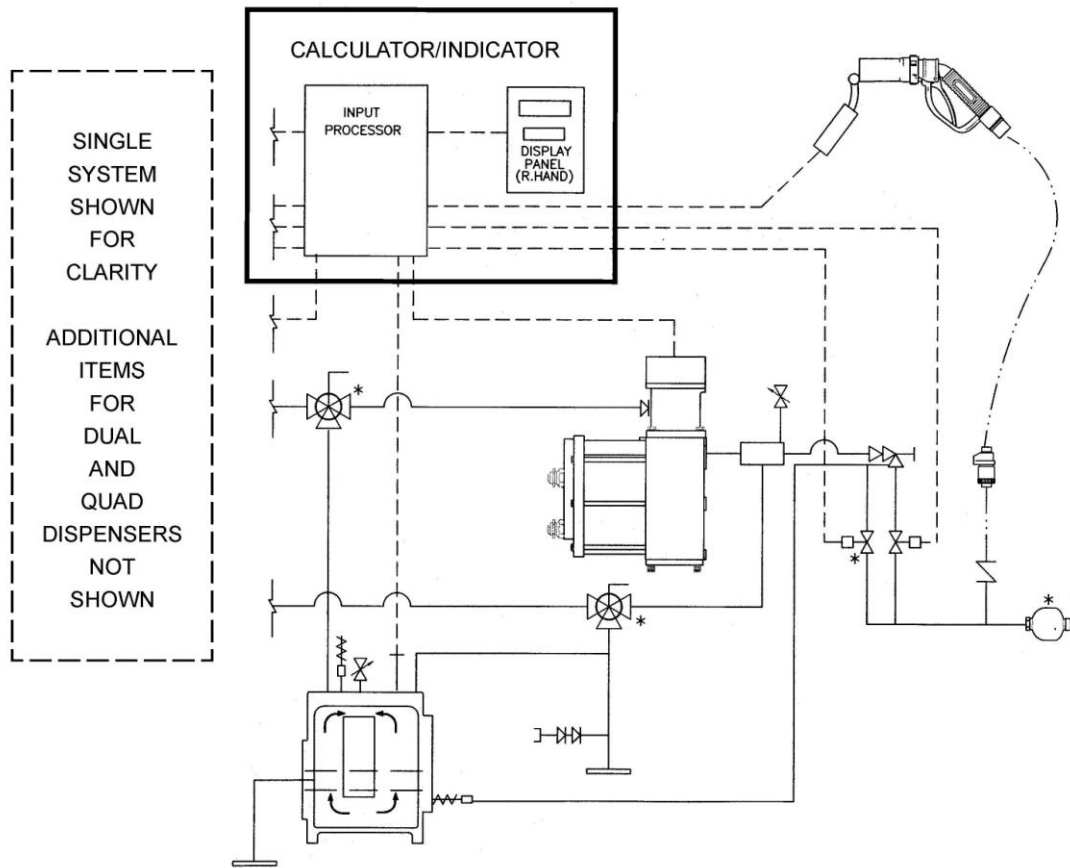
1. Turn the manager's key 90°. Dashes will appear on the display.
2. Press the 'test' button until 'Set Price' is displayed by the indicator.
3. Lift a nozzle and a small digit will appear on the indication – this correlates to the digit being changed, and pressing 'manager/digit change' button can change this digit.
4. Press the 'up' or 'down' button to change each digit of the unit price.

FIGURE 10/1/20 – 1



Batchen Model C2000-DCE-PA LPG Fuel Dispenser for Motor Vehicles

FIGURE 10/1/20 – 2



* OPTIONAL ITEMS — REFER 'STANDARD'
VERSION IN VARIANT 1

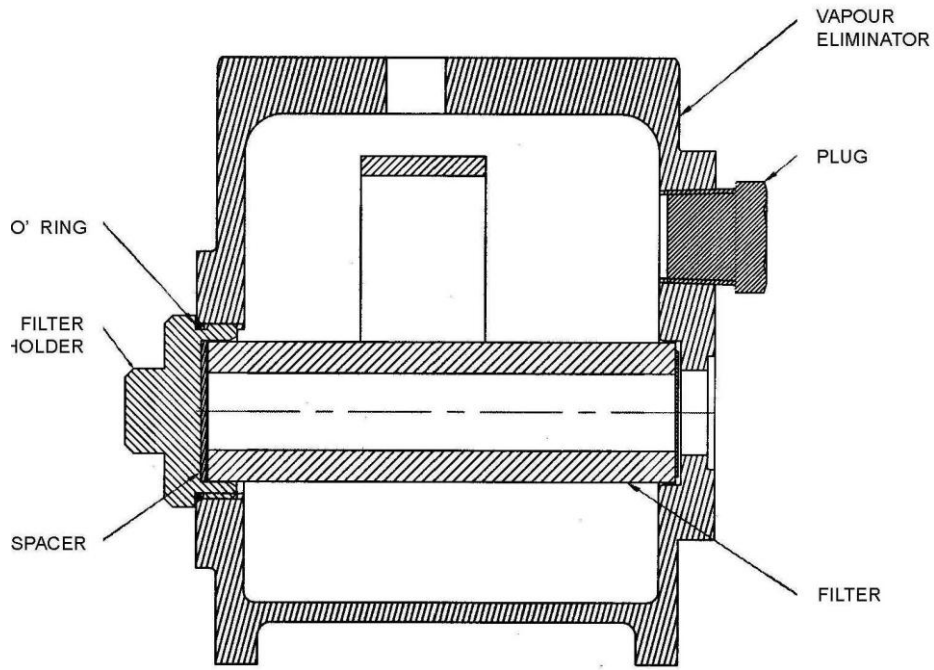
Batchen Model C2000-DCE-PA LPG Fuel Dispenser — Single System Shown

FIGURE 10/1/20 – 3



Batchen Vapour Eliminator

FIGURE 10/1/20 – 4



Batchen Vapour Eliminator (Diagram)

FIGURE 10/1/20 – 5



Batchen Model Mk III LPG Flowmeter and Email Electronics Model VN Pulser

FIGURE 10/1/20 – 6



Solenoid Valve for Pre-setting Device

FIGURE 10/1/20 – 7



Calculator/Indicator With Pre-setting Device

FIGURE 10/1/20 – 8



Typical Sealing of the Mechanical Calibration Device on the Flowmeter

FIGURE 10/1/20 – 9



Typical CII Dispensers — Single (One Hose) Wardrobe Housing (CII-SWE-PA)
and Dual Hose Cantilever Housing (CII-DCE-PA) Versions of the Pattern

FIGURE 10/1/20 – 10



Typical Quad (Four Hose) Housing

FIGURE 10/1/20 – 11



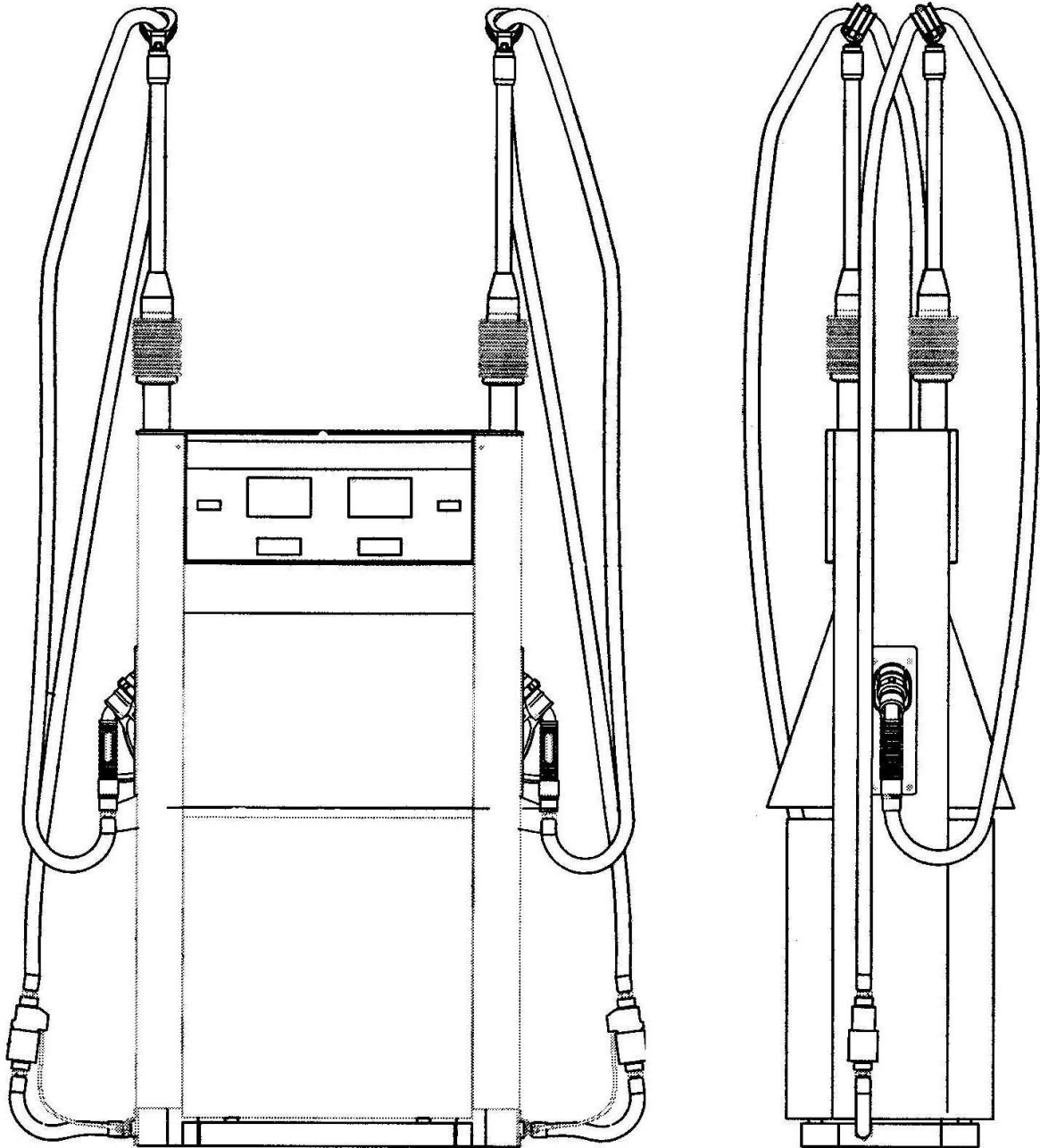
Typical Twin Column Housing

FIGURE 10/1/20 – 12



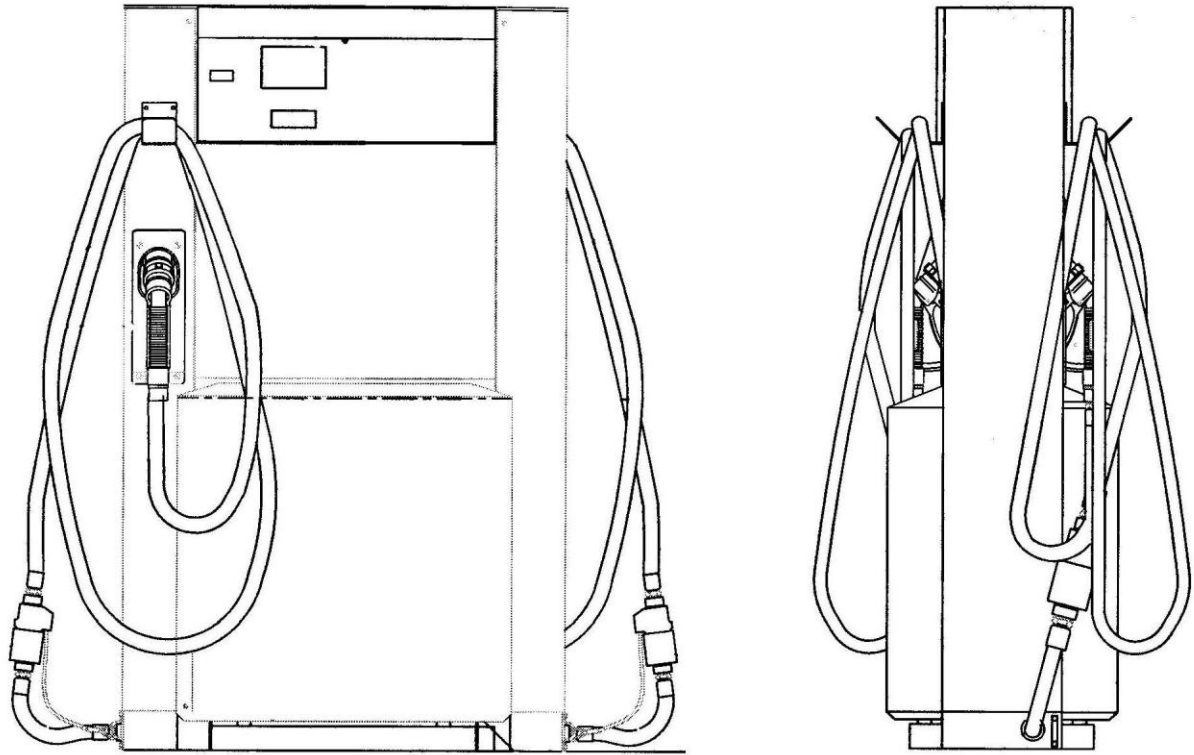
Typical MPP Housing

FIGURE 10/1/20 – 13



Typical End Oriented Housing

FIGURE 10/1/20 – 14



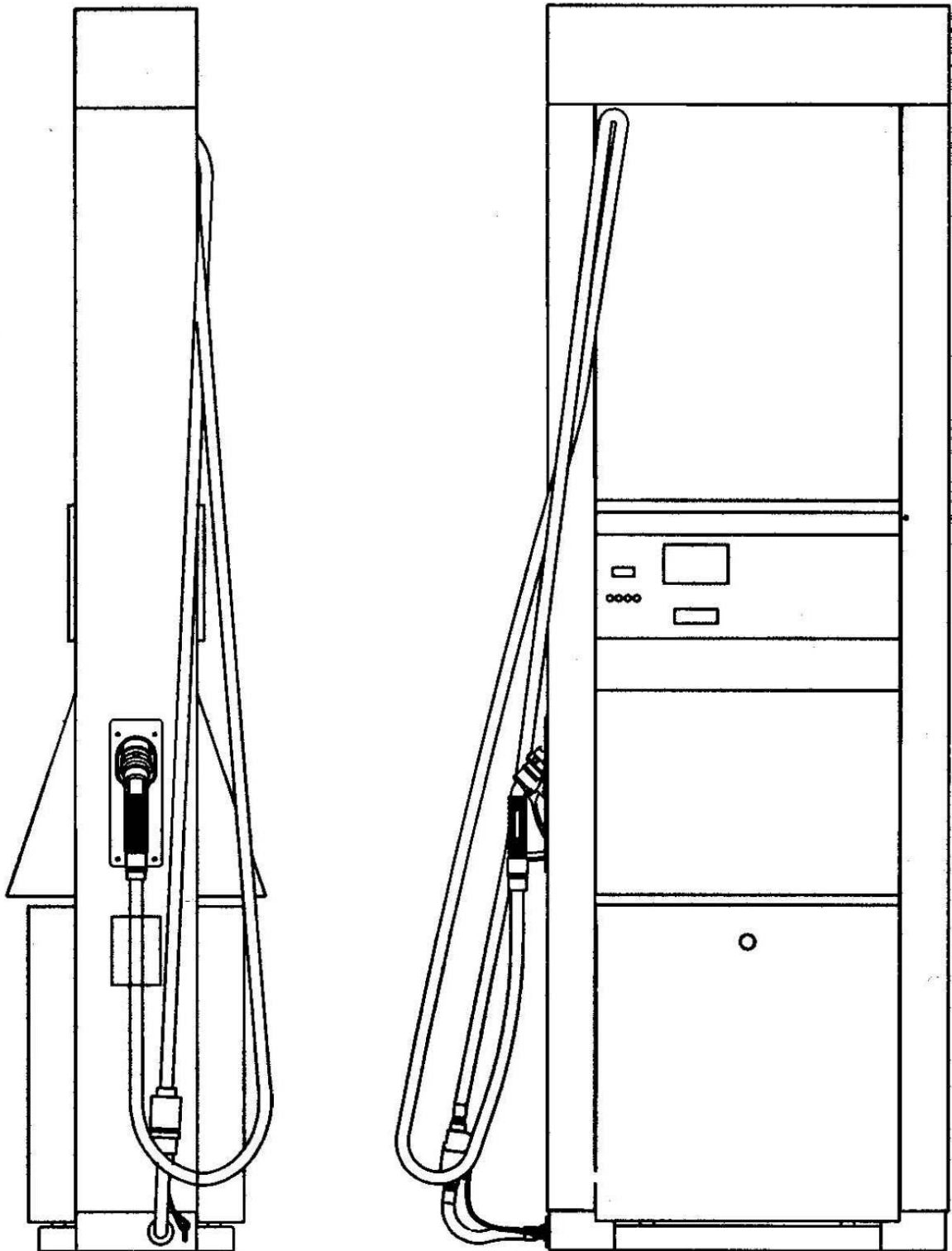
Typical Handed Twin Housing

FIGURE 10/1/20 – 15



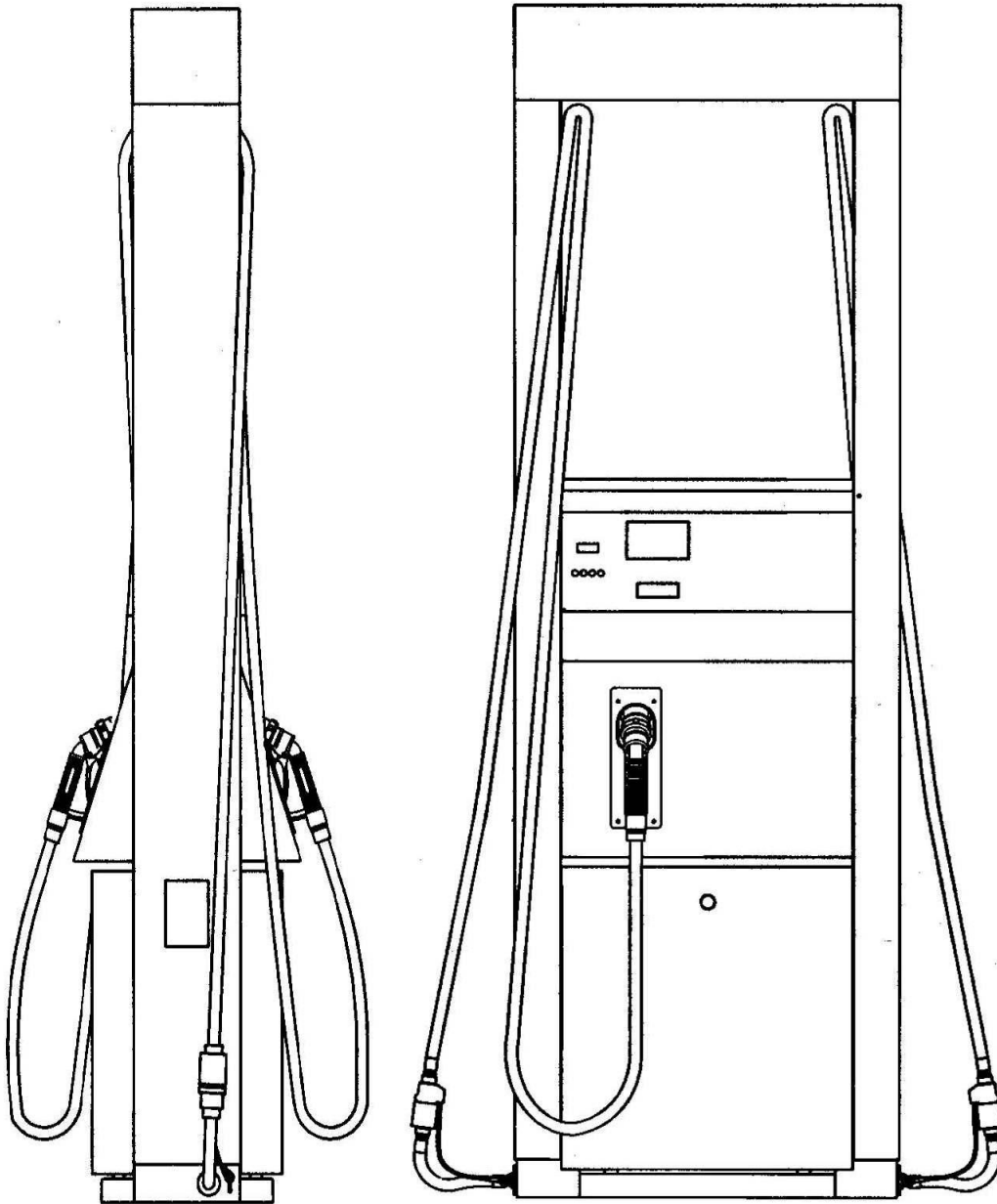
Showing Magnetic Coupling Between Meter and Pulse Generator

FIGURE 10/1/20 – 16



Batchen Model C11-SEE-PA Dispenser

FIGURE 10/1/20 – 17



Batchen Model C11-DEE-PA Dispenser

~ End of Document ~