



Australian Government
**Department of Industry,
Science and Resources**

**National
Measurement
Institute**

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval
NMI 5/6A/227

*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.

Gilbarco Model Horizon T950A8NP Fuel Dispenser for Motor Vehicles

submitted by Gilbarco Australia Limited
 20 Highgate Street
 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 117-1, Measuring Systems for Liquids Other than Water, dated June 2011.

This approval is subject to review at the decision of the Chief Metrologist in accordance with the conditions specified in the document NMI P 106.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern & variants 1 to 9 approved – certificate issued	30/05/12
1	Pattern amended (software version & Test Procedure) – certificate issued	13/02/13
2	Variant 10 approved – certificate issued	25/07/13
3	Variant 11 approved – certificate issued	16/12/13

Document History (cont...)

Rev	Reason/Details	Date
4	Variant 1 amended (new model added to Table 1) – certificate issued	12/02/15
5	Variant 12 approved – certificate issued	03/03/17
6	Variant 13 and 14 approved – certificate issued	26/06/18
7	Variant 12 amended – certificate issued	24/02/20
8	Variant 15 provisionally approved – certificate issued	27/09/22
9	Variant 15 approved – certificate issued	9/12/22

CONDITIONS OF APPROVAL

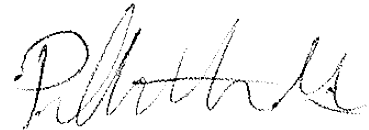
General

Instruments purporting to comply with this approval shall be marked with approval number 'NMI 5/6A/227' and 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*.



Phillip Mitchell
A/g Manager
Policy and Regulatory Services

TECHNICAL SCHEDULE No 5/6A/227

1. Description of Pattern **approved on 30/05/12**

A Gilbarco model Horizon T950A8NP fuel dispenser for motor vehicles is approved to dispense various grades of fuels (*), in attendant-operated mode, or in attended self-service mode using any compatible (#) approved control console. The meter is adjusted to be correct for the liquid for which it is to be verified.

- (*) including up to 10% ethanol (E10) and various grades of pure biodiesel and biodiesel/distillate blends (to Australian government standard).
- (#) 'Compatible' is defined to mean that no additions/changes to hardware/software are required for satisfactory operation of the complete system.

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} 50 L/min
- Minimum flow rate, Q_{min} 5 L/min
- Maximum pressure of the liquid, P_{max} 350 kPa
- Minimum pressure of the liquid, P_{min} 140 kPa (#1)
- Range of liquids viscosity 0.5 to 20 mPa.s (at 20 °C) (#2)
- Maximum temperature of the liquid, T_{max} 50 °C
- Minimum temperature of the liquid, T_{min} -10 °C
- Ambient temperature range -25 to 55 °C
- Accuracy class 0.5

(#1) Minimum pressure required for effective operation of the gas elimination device.

(#2) The flowmeter is adjusted for use with one product viscosity. Fuels include kerosene, distillate and various grades of petrol (which may include up to 10% ethanol). The pattern and variants constructed for use to dispense various grades of pure biodiesel and biodiesel/distillate blends (to Australian government standard).

1.2 Description of the Metering System

The instrument is in a lane oriented configuration (Figure 1) and incorporates the following components:

- (i) Gilbarco model GPU-90 pumping units (Figure 2) as described in the documentation of approval NMI S455.
- (ii) Measurement transducers comprising a Gilbarco model C+ (###) four piston positive displacement flowmeter (Figure 3) fitted with an IS type M03127 pulse generator;
- (###) The meter may also known as the model T19976 G3 (which may also have an 'S' suffix).
- (iii) Hoses/nozzles, mounted on the side of the dispenser housing. The nozzles used are 16 mm ZVA Elaflex nozzles. (*)
- (*) Note that the submitter must be consulted regarding the acceptability of any alternative nozzles.

1.3 Calculator/Indicator

A Gilbarco model Sandpiper 2 calculator/indicator (also known as the E101 electronic set – Figure 4) which has a single display for indicating volume and another for price. There is also a unit price display for each hose (Figure 1); an emergency stop may be provided in the vicinity of the indicating head.

The display limits and increments are:

Price	9999.99 in 0.01 \$ increments
Volume	9999.99 in 0.01 L increments
Unit price	999.9 in 0.1 ¢/L increments

The instrument is approved with versions 25xxx, 27xxx or 29xxx (*) software, which can be viewed by at power up or by forcing a restart by pushing the F1 then the F2 buttons on the Managers' keypad.

(*) 'xxx' may be a series of alphanumeric characters and may include hyphens, e.g. 27 A 04 154, 29 04 – 10 E, etc.

A pre-set device may also be fitted to allow pre-set to be selected by means of volume (litres) or price (dollars).

1.4 Descriptive Markings and Notices

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

Pattern approval sign	NMI 5/6A/227	
Manufacturer's identification mark or trade mark	.....
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})	..... kPa	
Minimum operating pressure (P_{min})	..... kPa	
Nature of liquids to be measured	.....	(#2)
Maximum temperature of the liquid, T_{max}	..... °C	(#3)
Minimum temperature of the liquid, T_{min}	..... °C	(#3)
Environmental class	class C	

(#1) In addition, the minimum measured quantity (V_{min}) shall be clearly visible on any indicating device visible to the user during measurement, in the form 'Minimum delivery 2 L'.

(#2) e.g. distillate or D.

(#3) Required if liquid temperature range differs from -10 °C to 50 °C .

1.5 Sealing Provision

The gas separator test valve has provision for sealing. The meter calibration access is sealed as shown in Figure 5.

1.6 Verification Provision

Provision is made for the application of a verification mark.

1.7 Checking Facilities

An automatic segment test is performed at the start of each delivery.

The calculator monitors the presence and correct transmission of signal from the measurement transducer, and in the event of detecting a fault the instrument indicates an error code and has provision for controlling electrically-operated valves to stop the delivery.

2. Description of Variant 1 approved on 30/05/12

Certain other models and configurations of the Horizon T95*** series of fuel dispensers identified using Table 1 below.

TABLE 1

Meaning of model designations for the Horizon T95*** series of fuel dispensers: (the pattern is a model Horizon T950A8NP)

1st, 2nd and 3rd digits, Series;

T95 = Gilbarco Australia product, base model

4th digit, Model Style;

0 = lane oriented

5th digit = Country code;

A = Australia

6th digit N = Number of hoses;

1 to 12 (for up to 6 petrol grades)

7th = Flow rate;

N = Normal (50 L/min, or 42 L/min when fitted with vapour recovery)

H = High (90 L/min)

U = Ultra high (160 L/min)

M = Mixed (combination of N and H hydraulics)

G = Mixed (combination of N and U hydraulics)

8th = Hydraulic module;

P = Pump (suction pumping unit, either type GDP-90 or GDP-140)

D = Dispenser (pressure system using approved submersible turbine pump)

3. Description of Variant 2 approved on 30/05/12

With one or more Gilbarco model Eco screw type flowmeters (Figure 6) instead of the model C+ flowmeters described for the pattern. This meter is fitted with an Eltomatic model ME 01 04 pulse generator.

4. Description of Variant 3 approved on 30/05/12

With standard pumps as described for the pattern, but with 25 mm piping, 25 mm hoses, and ZVA Elaflex 25 mm nozzles (*), and known as High flow rate fuel dispensers with the following field of operation:

- For use with distillate
- Maximum flow rate (Q_{max}) 90 L/min
- Minimum flow rate (Q_{min}) 9 L/min
- Minimum measured quantity (V_{min}) 5 L

5. Description of Variant 4 **approved on 30/05/12**

With Gilbarco model GPU-140 pumping units with 32 mm piping, 32 mm hoses, and ZVA Elaflex 32 mm nozzles (*), and known as **Ultra-high flow rate fuel dispensers** with the following field of operation:

- For use with distillate
- Maximum flow rate (Q_{max}) 130 L/min
- Minimum flow rate (Q_{min}) 13 L/min
- Minimum measured quantity (V_{min}) 5 L

6. Description of Variant 5 **approved on 30/05/12**

With two Gilbarco model GPU-90 pumping units in parallel, with 32 mm piping, 32 mm hoses, and ZVA Elaflex 32 mm nozzles (*), and known as **Ultra-high flow rate fuel dispensers** with the following field of operation:

- For use with distillate
- Maximum flow rate (Q_{max}) 120 – 160 L/min
- Minimum flow rate (Q_{min}) 12 – 16 L/min
- Minimum measured quantity (V_{min}) 5 L

(*) Note that the submitter must be consulted regarding the acceptability of any alternative nozzles.

7. Description of Variant 6 **approved on 30/05/12**

With one or more compatible submersible turbine pumps (STPs) incorporating a leak detection system (Figure 7). The STP replaces the equivalent components (i.e. motor, pump/strainer/gas separator, and associated pipework) in certain fuel dispensers covered by this approval.

Dispensers may operate with the standard maximum flow rate, Q_{max} of 50 L/min, or dispensers for use with distillate may be used with the **Ultra-high** maximum flow rate, Q_{max} of 160 L/min.

8. Description of Variant 7 **approved on 30/05/12**

The pattern and variants for use to dispense various grades of petrol which may include up to 85% ethanol ('E85').

9. Description of Variant 8

approved on 30/05/12

Instruments are fitted with a Gilbarco Stage 2 (VR2) vapour recovery and monitoring system and are used up to a maximum flow rate of 42 L/min. A typical instrument is shown in Figure 8.

The vapour recovery and monitoring system is approved by the German TÜV SÜD Industrie Service GmbH authority.

Only vapour recovery components and systems as listed below and included in the relevant TÜV approval certificates may be used.

The relevant TÜV approvals (and the approved components) are:

(i) For collection of vapour:

- TÜV 85-2.128 (electric valves); or
- TÜV 85-2.160 (manual valves),

and the only approved system components are:

- Vapour recovery nozzles – Elaflex models ZVA 200 GR, ZVA SLIMLINE 2 GR, or ZVA SLIMLINE 2 GRVP.
- Coaxial hose – Elaflex model Conti Slimline 21/8 Coax.
- Control valves – Burkert model 6022 / 2832.
- Control & monitor board – Gilbarco model VRB.
- Vapour recovery pump(s) – Durr models MEX 0831-10, MEX 0831-11, or MEX 0544.

(ii) For automatic monitoring of the vapour to fuel ratio:

- TÜV UE-12.5,

and the only approved system components are:

- Gilbarco (GVR) model VMC monitor.
- Gilbarco (GVR) model GE1 flowmeter.

10. Description of Variant 9

approved on 30/05/12

With one or more Gilbarco model V+ type four piston positive displacement flowmeters (Figure 9) instead of the model C+ flowmeters described for the pattern. This meter is also fitted with an IS type M03127 pulse generator.

11. Description of Variant 10

approved on 25/07/13

With a Gilbarco model Multi Media Display (MMD) calculator/indicator which has a large LCD type indicator (Figure 10a) which shows the price, volume, and unit price of the current sale, plus unit prices for each product, and in addition has a section available for non-measurement related information. The measurement related display limits and increments are the same as for the pattern, namely:

Price	up to 9999.99 in 0.01 \$ increments
Volume	up to 9999.99 in 0.01 L increments
Unit price	up to 999.9 in 0.1 ¢/L increments

The fuel dispenser has an additional indicator (shown at the top in Figure 10b) which runs simultaneously with the model MMD multimedia indicator and is situated behind a hinged panel marked with the following label 'If power fails - lift to check transaction. This additional indicator need only be viewed in the case of power failure; it repeats the price and volume information shown on the multimedia indicator.

The instrument is approved with the same software versions as the pattern (refer clause 1.3).

12. Description of Variant 11 **approved on 16/12/13**

Any model dispenser complying with variants 3 or 4 now fitted with one or more low/high flow rate selection button. When the delivery starts the fuel dispenser will start in the lower flow rate as per the **Field of Operation** for the pattern; if the selection button (Figure 11) is pushed the maximum possible flow rate will increase up to the maximum specified in the **Field of Operation** of the particular variant, i.e. either 'High flow' (variant 3) or 'Ultra high flow' (variant 4).

13. Description of Variant 12 **approved on 03/03/17**
amended on 24/02/20

For use with Gilbarco Apollo calculator/indicator. This indicator is approved with versions A30xxx software, which can be viewed as described above in clause 1.3 **Calculator/Indicator.**

14. Description of Variant 13 **approved on 26/06/18**

A Gilbarco model **Horizon 2** fuel dispenser which uses the Gilbarco Apollo calculator/indicator of variant 12 and the metering components of the pattern and variants, but having a different housing appearance as shown in figure 12 and 13.

15. Description of Variant 14 **approved on 26/06/18**

Instruments fitted with a Gilbarco Stage 2 (VR2) vapour recovery and monitoring system as described in Variant 8 with alternative components and are used up to a maximum flow rate of 38 L/min . The vapour recovery system may also be known as VAPORIX VR 2 system.

The relevant TÜV approvals (and the approved alternative components) are:

(i) For collection of vapour:

- TÜV VR2-1504-112EU

and the only approved system components are:

- Vapour recovery nozzles – ZVA SLIMLINE 2 GR.
- Coaxial hose – Elaflex model Slimline 21/8.
- Control board – Vapor TEK.
- Vapour recovery pump(s) – Veeder-Root Vapor TEK Pump.

(ii) For automatic monitoring of the vapour to fuel ratio:

- TÜV AM VR2-1504-140EU
- TÜV AM VR2-1504-120EU

and the only approved system components are:

- Control unit – VAPORIX-Control II.
- Gas flow sensor – VAPORIX-Flow

16. Description of Variant 15 **provisionally approved on 27/09/22**
approved on 9/12/22

With a variant of the Gilbarco Apollo Calculator/indicator approved with versions A32xxx software, which can be viewed as described above in clause **1.3 Calculator/Indicator**

TEST PROCEDURE No 5/6A/227

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

Tests should be conducted in conjunction with any tests specified in the approval documentation for any components used, including indicator/controller and submersible turbine pump (STP) hydraulic systems.

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

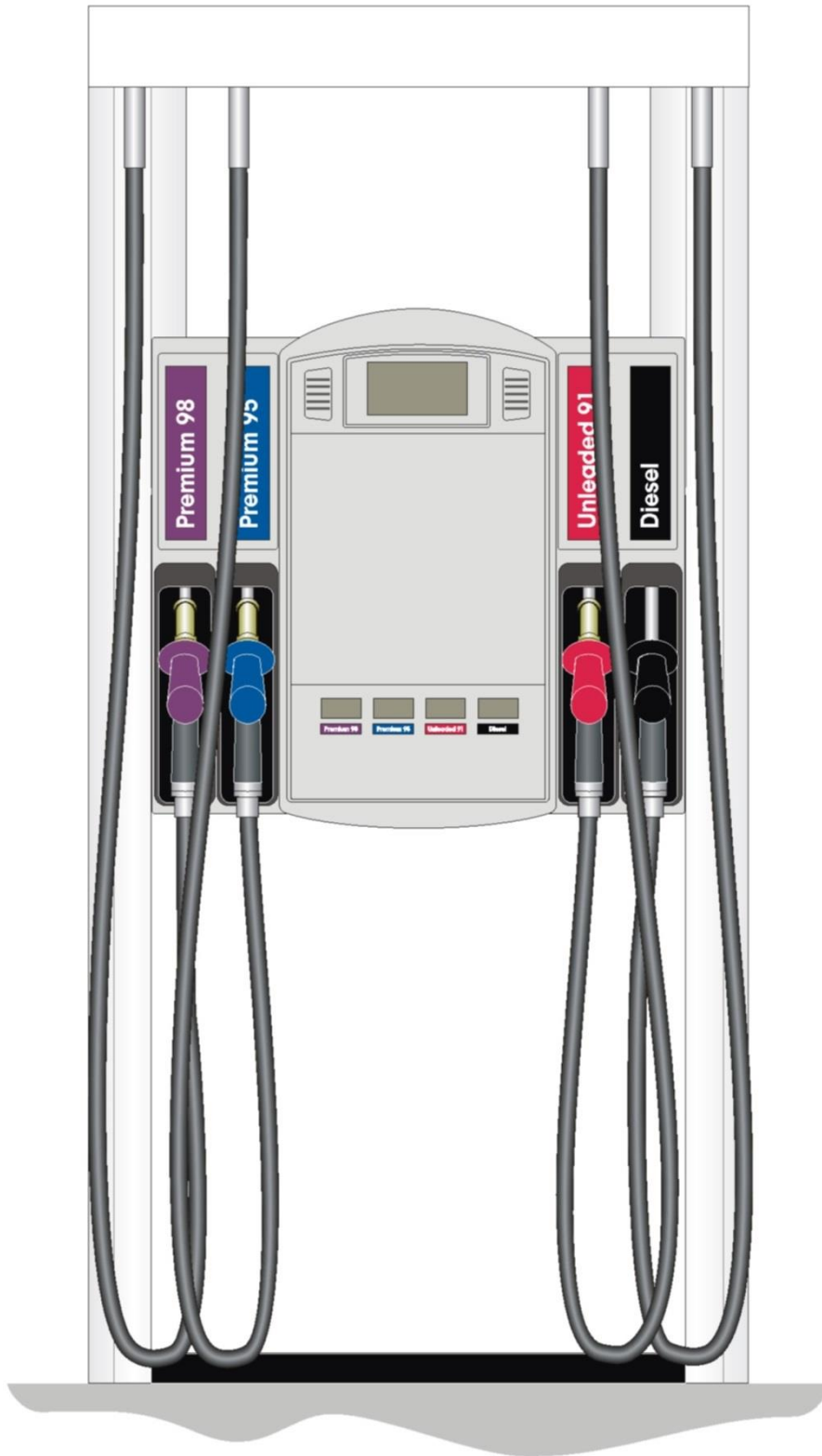
The maximum permissible errors are specified in Schedule 1 of the *National Trade Measurement Regulations 2009*.

Tests

For the model Multi Media Display (MMD) calculator/indicator (variant 10) the displays should be checked by using the following procedure

1. Perform a delivery of approximately 10 L to 15 L, record price and volume indication of the multimedia display, and also lift the hinged panel and record the price and volume indications of the additional display.
2. Repeat step 1. three times.
3. The multimedia display shall indicate the same measurement information as the additional display.

FIGURE 5/6A/227 – 1



A Typical Gilbarco Model Horizon T950A8NP Fuel Dispenser

FIGURE 5/6A/227 – 2

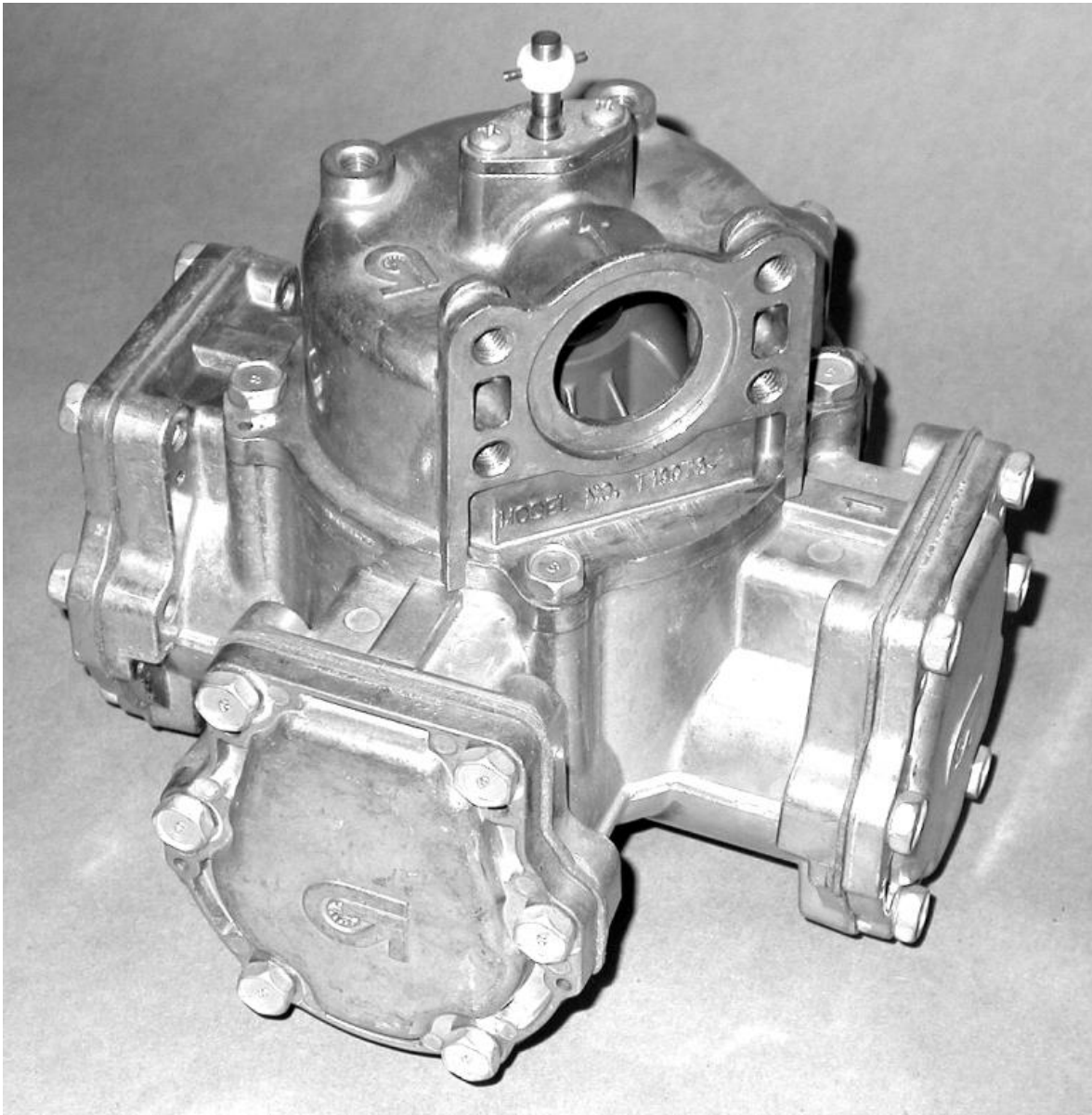


Gilbarco Model GPU-90 Pumping Unit (without inlet filter bowl)



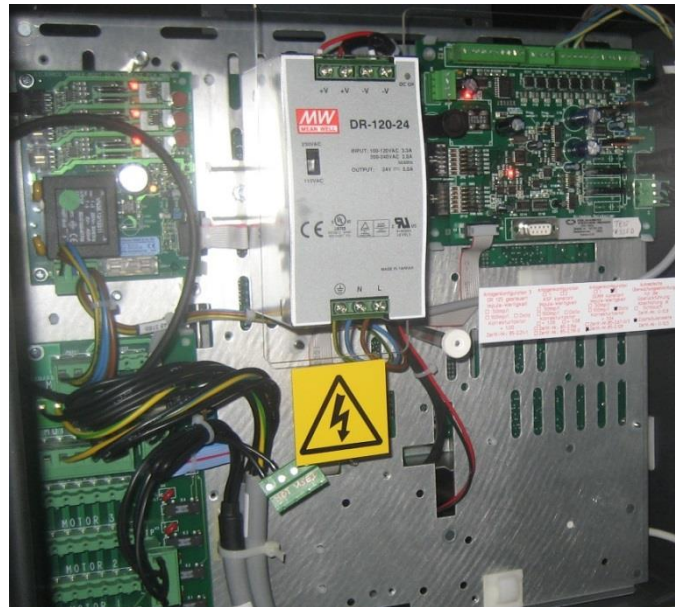
Gilbarco Model GPU-90 Pumping Unit (rear view no inlet filter bowl)

FIGURE 5/6A/227 – 3

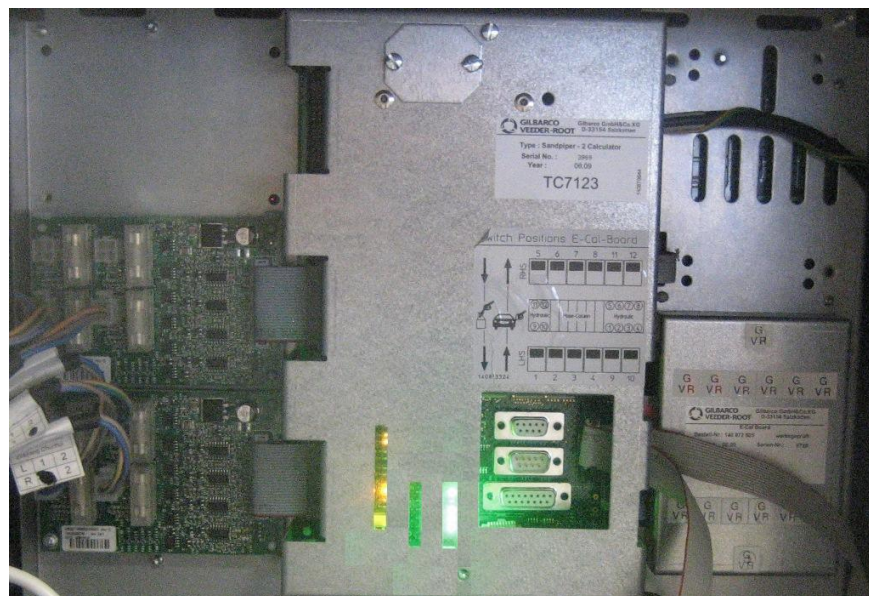


A Gilbarco Model C+ Flowmeter (aka Model T19976 G3)

FIGURE 5/6A/227 – 4



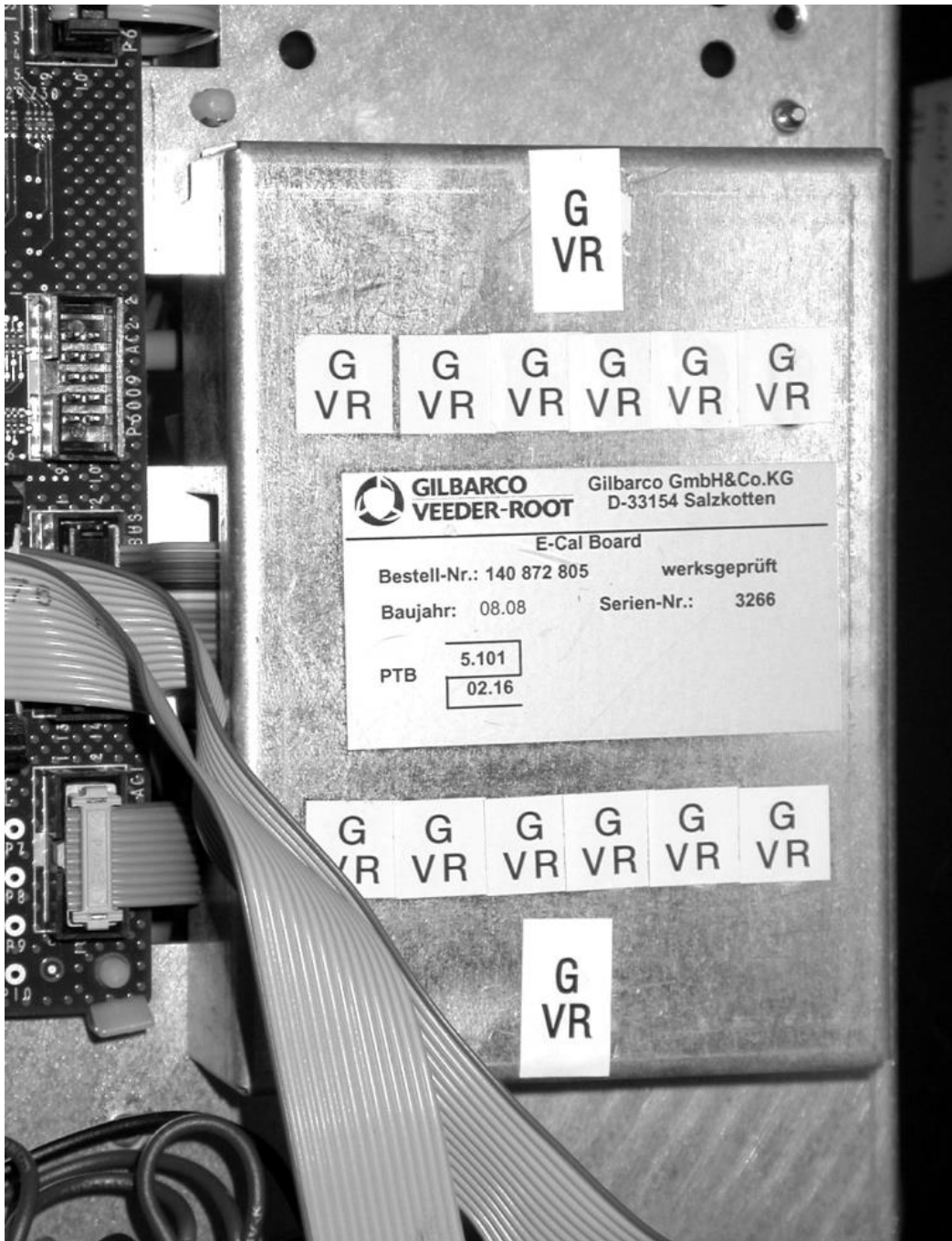
Power Supply and Driver Printed Circuit Boards



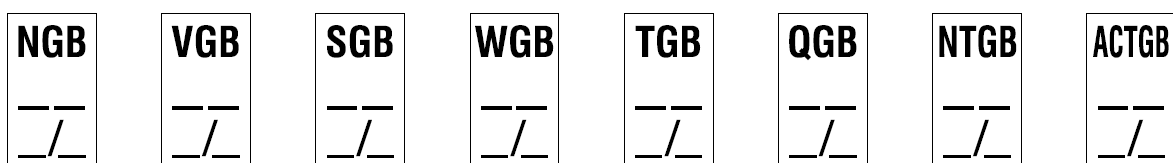
Processor PCB and Interface Cards

Sandpiper 2 Calculator/Indicator (aka Model E101) Electronics
(typical mounting arrangement)

FIGURE 5/6A/227 – 5

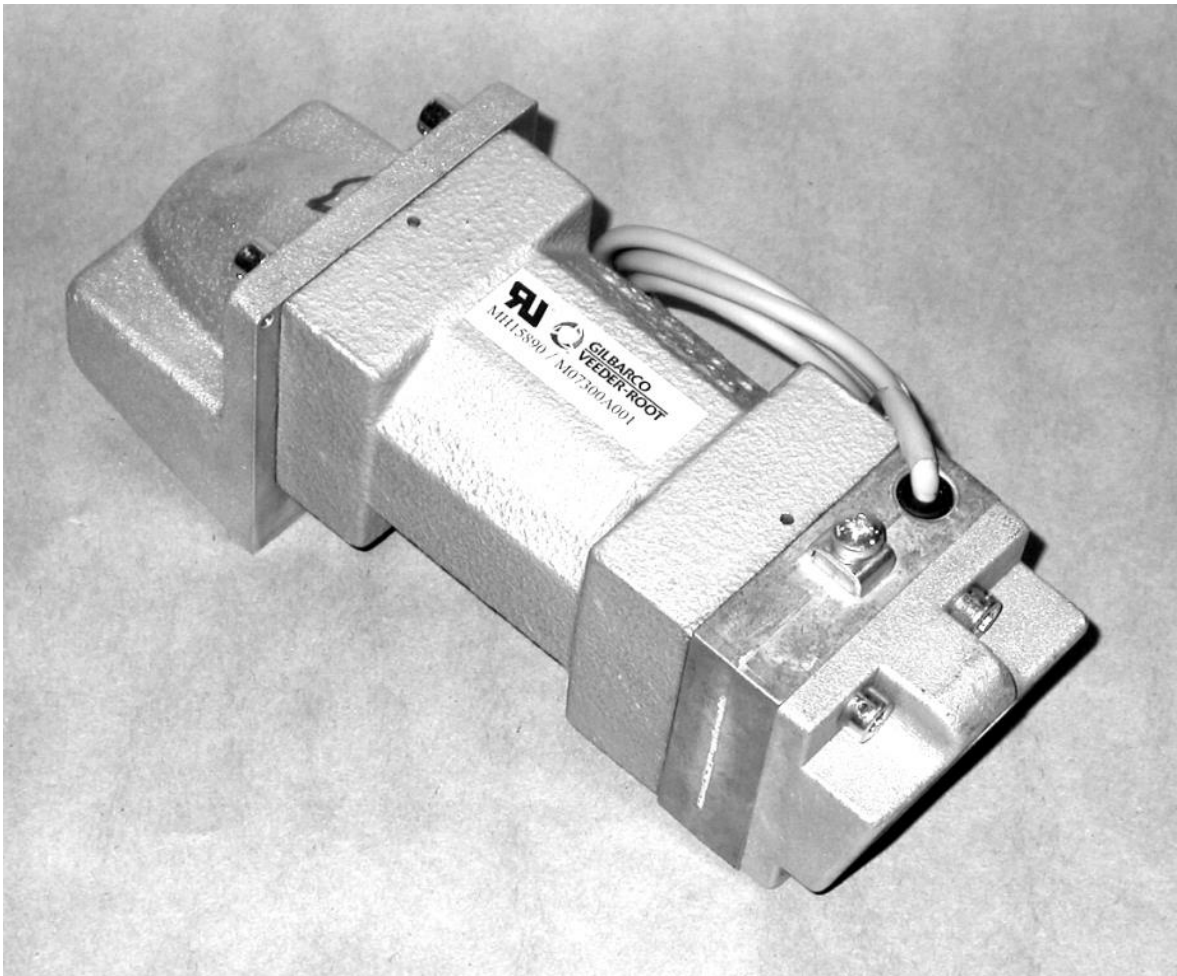


Typical Sealing of Meter Calibration Access
(using destructible adhesive labels)



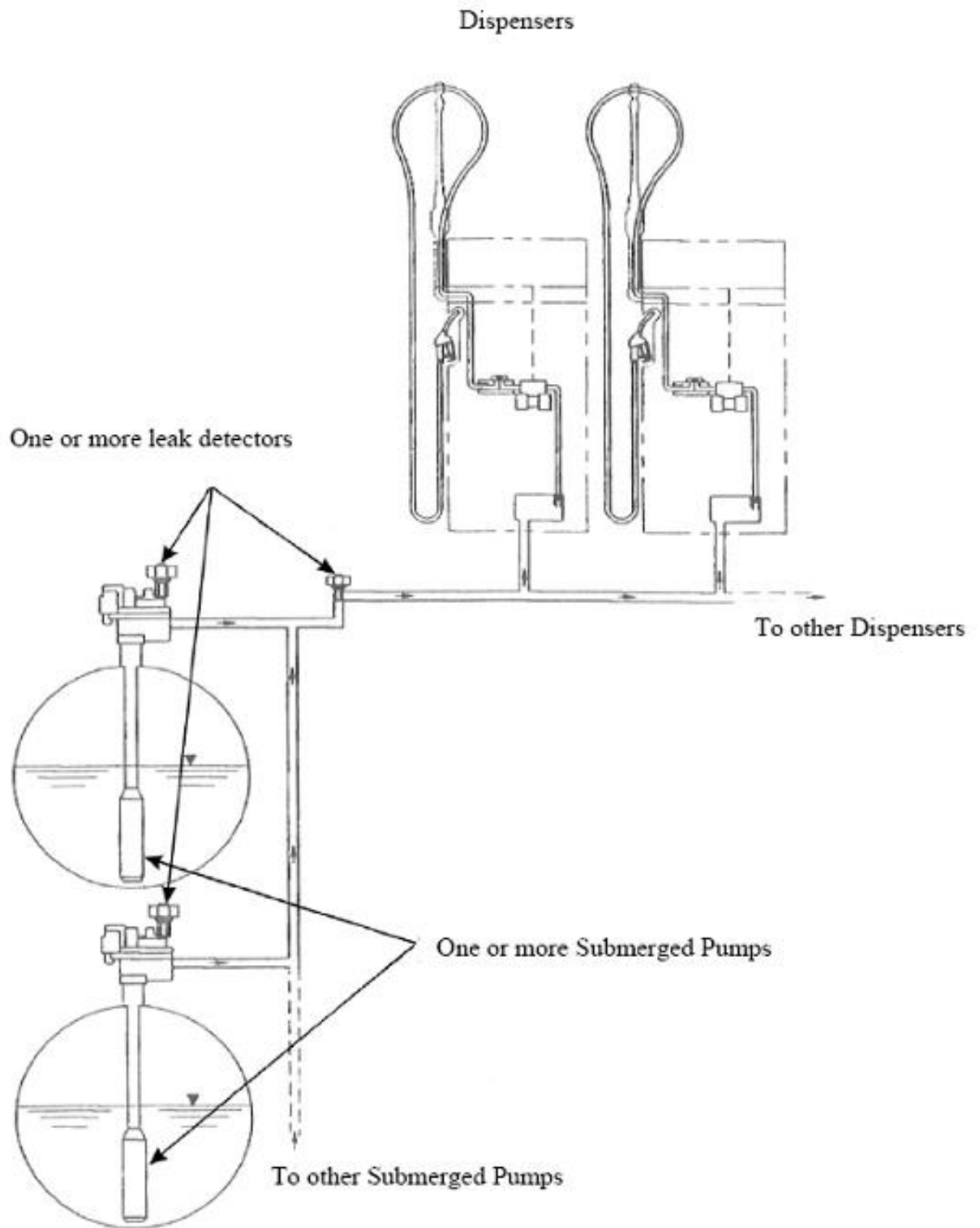
Examples of Different Seal Details

FIGURE 5/6A/227 – 6



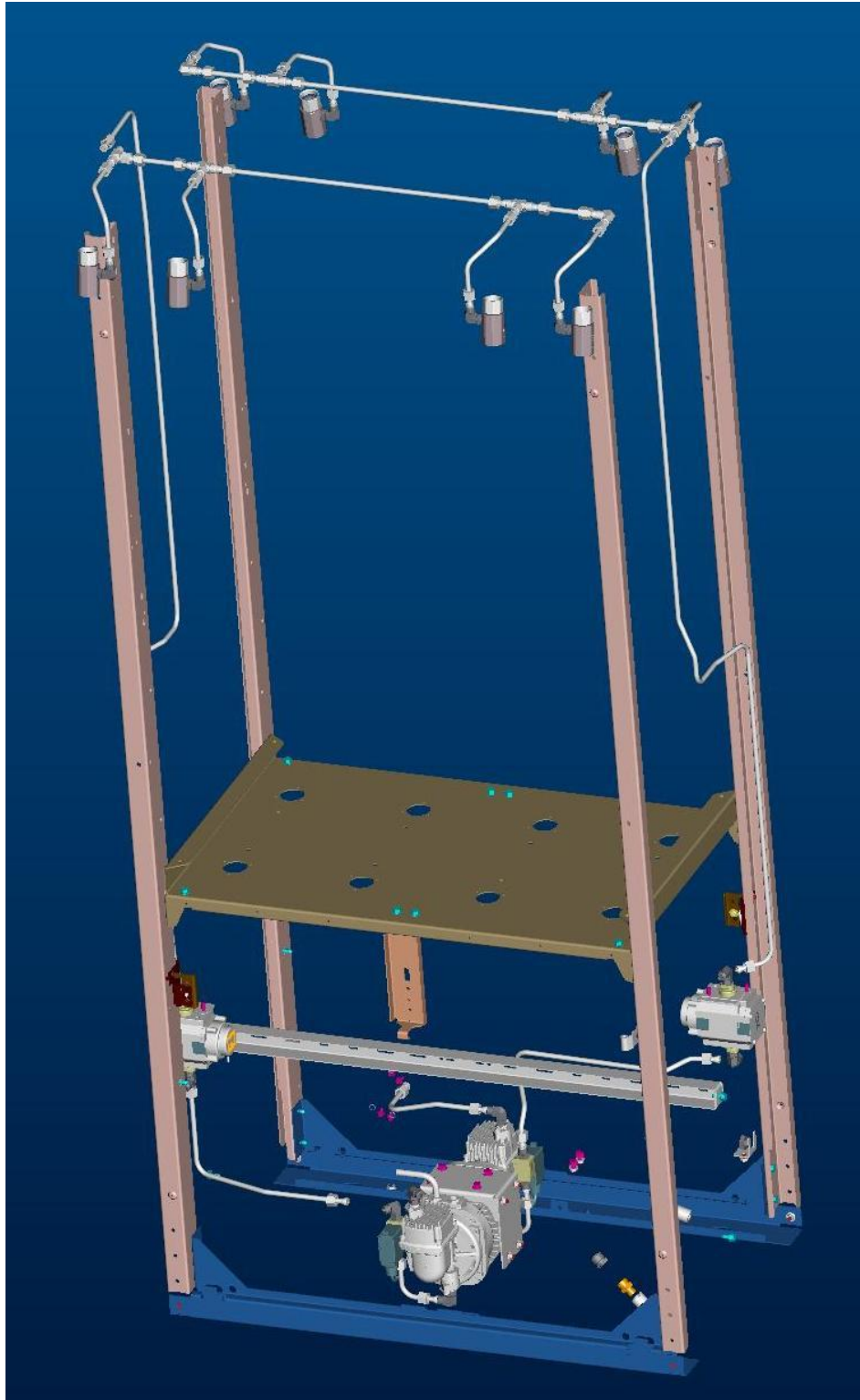
Gilbarco Model Eco Flowmeter

FIGURE 5/6A/227 – 7



Typical Submersible Turbine Pump (STPs) System

FIGURE 5/6A/227 – 8



Horizon Frame with VR 2 System Hydraulic Components

FIGURE 5/6A/227 – 9



A Gilbarco Model V+ Flowmeter

FIGURE 5/6A/227 – 10



(a) Gilbarco Model Multi Media Display (MMD) Calculator/Indicator



(b) Additional ('Power Failure') Display for Gilbarco Model MMD Calculator/Indicator

FIGURE 5/6A/227 – 11



Typical Low/High Flow Rate Selection Button – Variant 11

FIGURE 5/6A/227 – 12



A Typical Gilbarco Model Horizon 2 Fuel Dispenser with Retractable Hose –
Variant 13

FIGURE 5/6A/227 – 13



A Typical Gilbarco Model Horizon 2 Fuel Dispenser with Non Retractable Hose – Variant 13

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