Australian Government

Department of Industry, Science and Resources

National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval
No 5/6E/13A

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.

Diessel Model IZM-E DN50 G2 Milk Flowmetering System

submitted by   Flo-Gineering Pty Ltd
                             3/43 Leighton Place
                             Hornsby   NSW   2077

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 & variant 1 approved – certificate issued	24/12/04
1	Variant 1 amended (Table 1) – notification of change issued	13/11/06
2	Variants 2 & 3 approved – interim certificate issued	14/12/06
3	Variants 2 & 3 approved – certificate issued	11/06/07
4	Variant 4 approved – certificate issued	4/06/09
5	Variants 5 & 6 approved – interim certificate issued	22/01/10
6	Variants 5 & 6 approved – certificate issued	16/02/10
7	Pattern & variants 1 to 6 amended (Table 1 replaced), reviewed – notification of change issued	6/10/10

Document History (cont…)

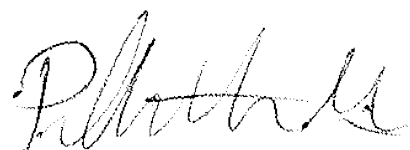| Rev	Reason/Details	Date
8	Pattern amended, pattern & variants 1 to 6 reviewed & updated – variant 7 approved – certificate issued	11/06/13
9	Variants 8 & 9 approved – certificate issued	17/01/14
10	Variants 10 provisionally approved – interim certificate issued	03/10/14
11	Variant 10 approved – certificate issued	02/12/14
12	Variant 11 provisionally approved – interim certificate issued	12/11/15
13	Pattern amended (Gas elimination device description) – Variant 12 and 13 approved – certificate issued	6/09/17
14	Variant 1 amended (Table 1) – certificate issued	25/10/19
15	Variant 14 approved – certificate issued	08/07/25

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 5/6E/13A' and only by persons authorised by the submittor.

It is the submittor'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*.

Dr Phillip Mitchell
A/g Manager
Policy and Regulatory Services

TECHNICAL SCHEDULE No 5/6E/13A

1.   Description of Pattern   approved on 24/12/04

A vehicle-mounted milk flowmetering system using a Diessel model IZM-E DN50 G2 electromagnetic flowmeter (Table 1) approved for measuring the milk collected from a milk tank.

1.1   Field of Operation

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

- Minimum measured quantity (V_{min})   200 L
- Maximum flow rate (Q_{max})   700 L/min
- Minimum flow rate (Q_{min})   70 L/min
- Maximum pressure of the liquid (P_{max})   800 kPa
- Ambient temperature range   −10 °C to 55 °C
- Accuracy class   0.5
- Vehicle-mounted operation
- Product – milk at nominal controlled temperature

The flowmeter is adjusted to be correct for the liquid (milk) for which it is to be verified as marked on the data plate.

1.2   The System (Figures 1)

(i)   A supply tank.

The supply tank is a milk tank or a vat to which the metering system is temporarily connected. The base of these tanks slopes towards the outlet to facilitate emptying of the contents during the measuring process.

(ii)   Pump

A centrifugal type pump or a positive displacement pump of sufficient capacity may be used to draw the milk from the supply tank outlet, which may be located lower than the inlet of the pump; however for the centrifugal type pump the level of milk in the supply tank is higher than the pump inlet.

A check valve at the inlet of the pump may be required to prevent draining of liquid.

Flexible piping may be used with an appropriate adaptor/reducer to connect the pump to the outlet of the supply tank.

(iii)   Gas Elimination Device

The gas elimination device is a Diessel/DME type E float-operated gas separator with a volume of approximately 60 litres fitted between the pump and the meter. The device incorporates a round float that has a shaft through its centre which allows the float to move in a vertical plane. At the top of this shaft is a 'needle' that operates a seat assembly designed to seal off the vent located at the top of the gas separator. As the liquid level in the gas separator rises, the float rises until the seat assembly, seals off the vent and the flow is directed to the flowmeter.

When the supply tank is emptied, pumping continues until the liquid level (and the float) in the gas eliminator drops, causing the 'needle' to lose contact with the vent seat, which allows the air to be vented to atmosphere and the flow to the meter stopped. The point at which the 'needle' loses contact with the vent seat defines the 'liquid reference level' in the gas separator for the start and end of the delivery. The spring-loaded vent valve located at the top of the gas separator can be operated manually or pneumatically for facilitating the clean-in-place (CIP) operation.

A drain valve is allowed to be installed in the pipe exiting from the air eliminator (Figure 1) so that during the calibration of the system, the air eliminator and pipework can be completely evacuated. This valve must be sealed after calibration is completed.

(iv)   Transfer Point

The transfer point is defined by the electrodes of the electromagnetic flowmeter in conjunction with the 'liquid reference level' established automatically by the gas separator. The quantity required to establish the 'liquid reference level' is known as the priming quantity, which is determined for each metering system.

(v)   Calculator/Indicator

A Diessel model Zevodat-M electronic calculator/indicator (Figure 2) or any other approved calculator/indicator compatible for use with an electromagnetic flowmeter and configured for displaying the volume in 1 L increments.

The signal from the measuring transducer is transferred to the calculator/indicator via three outputs – two outputs represent the volume throughput and the third output is used for detecting the flow direction. Each channel has an LED for checking integrity of operation. Flow in reverse direction will be indicated by a negative sign (-). Also, the calculator/indicator features an 'empty pipe detection' facility accessible via 'menu 2' which allows suppression of measurement while the pipe is empty.

The Zevodat-M calculator/indicator (software version ZD-M VO1) has the following features:

- A four-line liquid crystal display (20 digits per line with semi-graphics, background lighting, 2 lines changeable to bulk indication), four arrow keys and three soft keys.
- A keypad (0 to 9 digits, enter, clear, decimal point and minus keys).
- A function, open, start, stop and quit keys and a key-lock switch.
- A card or bar-code reader.
- Up to four digital inputs and outputs (controlling pumps, valves and sampler) and one analogue input for temperature measurement.
- Incorporates programmable levels of security. Access to meter calibration is only possible via a 'CAL/MEAS' switch located inside the unit. During normal operation the switch is set to 'MEAS' which locks access to calibration parameters.
- If access to parameters 'mode 2' is enabled, the parameters are accessible by using the keypad and pressing 'F98'. Parameters such as 'empty-pipe detection', selection of flow rate units and activation of printer output can be selected. For some applications access to these parameters may need to be disabled.

A typical sequence of operation is:

- Input driver number, load number and supplier number;
- Measure the quantity collected;
- Repeat above for each load;
- On last load, empty the gas separator;
- Discharge the milk collected and initiate data transfer sequence; and
- Initiate CIP (clean-in-place) operation.

(vi)   Measurement Transducer

The measurement transducer is a Diessel model IZM-E DN50 G2 electromagnetic flowmeter (Figure 3) installed in a vertical position downstream of the gas separator.

The flow through the flowmeter is in the upward direction.

(vii)   Check Valves

To prevent reverse flow, a spring-loaded non-return valve, which can be located immediately downstream or upstream of the flowmeter, opens at pressures above 20 kPa. An optional product sampler and/or strainer may be fitted between the pump and the gas separator.

(viii)   Flow Control

A flow control valve/device may be fitted downstream of the flowmeter.

(ix)   Power Supply

The power supply is provided by the vehicle to ensure the system operates on a voltage between 10 and 30 volts DC.

1.3   Verification Provision

Provision is made for the application of a verification mark.

1.4   Sealing Provision

The 'cal/measure' switch for the flow sensor electronics module and terminal box can be secured by a sealing wire through the holes in the two sealing screws provided, or alternatively by means of a destructible adhesive label over the switch. Note that the 'program enable' switch in the terminal box must be set to the 'off' position.

If a drain valve is installed in the pipe exiting from the air eliminator (Figures 1 and 5), it must be sealed after calibration of the system has been completed.

1.5 Descriptive Markings and Notices

Instruments are marked with the following data, together in one location, in the form shown at right:

Manufacturer's mark, or name written in full	…..
Pattern approval number for the instrument	NMI 5/6E/13A
Meter model full	………..
Serial number of the instrument	…..
Maximum flow rate, Q_{max}	….. L/min
Minimum flow rate, Q_{min}	….. L/min
Minimum measured quantity (V_{min})	….. L
Priming quantity	….. L
Approved for use with milk	…..

2. Description of Variant 1   approved on 24/12/04
                                                       amended on 25/10/19

With alternative electromagnetic flowmeters as listed in Table 1. The calculator/ indicator is configured to display the volume at least in 1 litre increments. Figure 4 shows a DME model MIF C63 flowmeter.

TABLE 1

Make Original Meter Model	Make Alternative Meter Model	Maximum Flow Rate (L/min)	Minimum Flow Rate (L/min)	Minimum Quantity (L)
Diessel	**Diessel**			
IZM-E DN 50 G2 (*)	IZM-SEG2 DN 50	700	70	200
IZM-E DN 65 G2	IZM-SEG2 DN 65	1000	100	500
IZM-E DN 80 G2	IZM-SEG2 DN 80	1500	150	500
IZM-E DN 100 (#)	IZM-SEG2 DN 100	4500	166	500
DME	**DME**			
MIF C63 (#)	MIF C63/PD340	1000	100	500
MIF C76	MIF C76/PD340	1500	150	500

(*) The pattern.

(#) For the Diessel model IZM-E (or IZM-SEG2) DN100 and the DME model MIF C63 (or MIF C63/PD340) meters, a straight pipe is fitted upstream and downstream of the measurement transducer. The upstream pipe has an internal diameter equal to the inlet diameter of the transducer and a length of at least ten times the internal diameter. The downstream pipe has an internal diameter equal to the outlet and a length of at least five times the internal diameter.

3.   Description of Variant 2   approved on 14/12/06

Similar to the pattern except that the pump is a self-priming liquid ring type pump (Figure 5) of sufficient capacity used to draw milk from the supply tank outlet which may be located lower than the inlet of the pump.

4.   Description of Variant 3   approved on 14/12/06

Similar to the pattern except that a dual pumping system is used (Figure 6). The system has a positive displacement pump acting as a priming pump combined with a centrifugal type pump of sufficient capacity which operates once the system has been primed to draw milk from the supply tank outlet which may be located lower than the inlet of the pump.

5.   Description of Variant 4   approved on 3/06/09

Any flowmeter of the pattern or variant 1 approved for use with Anipro liquid supplement having a density of 1.24 kg/L.

6.   Description of Variant 5   approved on 22/01/10

For use with liquids having a density between 1 and 1.5 kg/L. The system is used for delivering product from one or more supply tanks which are fitted with low-level cut-off devices (Figure 7), in which case a gas elimination device is not required.

7.   Description of Variant 6   approved on 22/01/10

For use with a GEA Diessel model ZEVODAT-flash calculator/indicator (Figure 8) which has a graphics display, and 28 numerical/function soft keys housed in an aluminium enclosure. The instrument uses various application software versions V21/XXX, V22/XXX, V23/XXX and V24/XXX, all use the same Metrological version V1.05.4740047 software which may be viewed using the procedure shown in Figure 9.

7.1   Field of Operation

The field of operation of this variant is determined by the following characteristics:

- •   Counting input   1 to 3 channels, 12 V DC/1 kHz
- •   Storage capacity   up to 2GB
- •   Power supply:
           For the calculator/indicator   12 to 30 V DC
           For the pulse generator   5 to 30 V DC
- •   Environment temperature range   −25 °C to 55 °C
- •   Digital inputs/outputs   up to 12

8. Description of Variant 7 approved on 11/06/13

With alternative electromagnetic flowmeters as listed in Table 2. The calculator/ indicator is configured to display the volume at least in 1 litre increments.

A typical Diessel IZM- SEAG2 series flowmeter is shown in Figure 10.

TABLE 2

Make	Meter Model	Maximum Flow Rate (L/min)	Minimum Flow Rate (L/min)	Minimum Quantity (L)
Diessel	IZM- SEAG2 DN 50	700	70	200
	IZM- SEAG2 DN 65	1000	100	500
	IZM- SEAG2DN 80	1500	150	500
	IZM- SEAG2DN 100	4500	900	500
GEA	IZMAG DN 80	3000	60	200

9. Description of Variant 8 approved on 17/01/14

For use with a Poul Tarp A/S model S12 calculator/indicator (Figures 11 and 12) which has a 320×240 mm black and white graphics display and 30 numerical/function soft keys housed in an aluminium enclosure. The instrument uses version 731134.AU 2013-12-06 software which may be viewed using the procedure shown in Figure 13.

9.1 Field of Operation

The field of operation of this variant is determined by the following characteristics:

- Counting input   1 to 3 channels, 10 to 40 V DC/1 kHz
- Storage capacity   up to 2MB
- Power supply:
  - For the calculator/indicator   10 to 36 V DC
  - For the pulse generator   5 to 30 V DC
- Temperature sensor $1 \times$PT100, 24 bit resolution
- Environment temperature range   −25 °C to 55 °C
- Digital inputs/outputs   up to 40

10. Description of Variant 9 approved on 17/01/14

With the following additional components:

a) Poul Tarp model 29106 electrical top valve for air eliminator (Figure 14a)

b) Poul Tarp model 018302641001 air-operated non-return valve (Figure 14b)

c) Jumo model 018302641001 vacuum/pressure sensor (Figure 14c)

d) Poul Tarp model 29120 milk level sensor in air eliminator (Figure 15a)

e) Poul Tarp model 018302571001 bubble sensor (Figure 15b)

f) Poul Tarp model 018302561001 milk conductivity sensor (identical to the sensor shown in Figure 15b apart from cable colour-coding)

**11.   Description of Variant 10   provisionally approved on 03/10/14
                                                                                approved on 02/12/14**

Similar to variant 8, for use with a Poul Tarp A/S model S12 calculator/indicator which has a 320 × 240 mm black and white graphics display and 30 numerical/function soft keys housed in an aluminium enclosure. The instrument uses legally relevant version BIOS733006_2012-11-21 and Checksum BIOS CRC 40E9B23B software, and non-legally relevant version 731134.AU yyyy-mm-dd (#) software which may be viewed as described for variant 8.

(#)   yyyy-mm-dd represents the release date of the non-legally relevant software, which may be updated without the system needing to be re-verified. Any changes to the legally relevant software require pattern approval and must be described in this approval.

12.   Description of Variant 11   provisionally approved on 12/11/15

Using a GEA Diessel model IZM G1 DN25 flowmeter for measuring beer. The beer is pumped through a gas separator fitted with pressure and level control sensors then measured by the flowmeter. The flowmetering system is controlled by a GEA Diesel model ZEVODAT-Flash computer and a remote control PLC. The system has following field of operation:

12.1   Field of Operation

• Minimum measured quantity (V_{min})	100 L
• Maximum flow rate (Q_{max})	120 L/min
• Minimum flow rate (Q_{min})	12 L/min
• Maximum pressure of the liquid (P_{max})	800 kPa
• Ambient temperature range	–10°C to 55°C
• Accuracy class	0.5
• Density range	1.005 to 1.050 kg/L
• Vehicle-mounted operation	
• Product – Beer	

13.   Description of Variant 12   approved on 6/09/17

With the following additional components:

a)   Poul Tarp Model 018302651001 Electrical Top Valve for Air Eliminator
b)   Poul Tarp Model 018302641001 Air-Operated Non-Return Valve
c)   Poul Tarp Model 018302621001 Pressure Gauge
d)   Poul Tarp Model 018302581001 Level Sensor
e)   Poul Tarp Model 018302561002 Liquid Detector
f)   Poul Tarp Model 018302571002 Bubble Detector
g)   Poul Tarp Model 016800011001/016800012001 Conductivity Sensor Short
h)   Poul Tarp Model 016800021001/016800022001 Conductivity Sensor Long

14.   Description of Variant 13   approved on 6/09/17

The calculator/indicator of the pattern replaced with the DME model MOBICOM indicator as described in the approval NMI S393.

15. Description of Variant 14   approved on 08/07/25

With an alternative model TACO II calculator/indicator (Figure 16) for use in milk-measuring systems incorporating an approved Proces Data or Diessel electromagnetic flowmeter approved for accuracy class 0.5. This is a 2025 computer for the Poul Tarp A/S S12 Computer and the Diessel Zevodat Flash Computer.

15.1 Field of Operation

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

- Counting input 1 to 3 channels,   10 to 40 V DC/1 kHz
- Storage capacity: up to 2MB
- Power supply: (nominal)   24 V DC
  - For the calculator/indicator   10 to 36 V DC
  - For the pulse generator   5 to 30 V DC
- Temperature sensor 1×PT100,   24-bit resolution
- Environment temperature range   −25 °C to 55 °C
- Digital inputs/outputs   up to 40
- Accuracy class   0.5
- Environmental   class I

15.2 Features

For use with a Poul Tarp A/S model TACO II calculator/indicator (Figure 16 & 17) which has an 8 inch 800 * 480 pixels TFT display with capacitive touch sensor colour graphics display and 34 numerical/function soft keys housed in an aluminium enclosure.

The approved metrological relevant software is identified as:

I/O board (Calculator)

TACO II and TACO II FLASH:

SW program (ID) 746023

Software Version v02.xx.yy

CRC checksum 44549CAD

xx is a placeholder for MINOR non- metrological changes,

yy is a placeholder for PATCH non- metrological changes.

The software version installed is displayed on startup, or by Pressing the "M" key then select "FTC" and then "Display Functions".

Select "Display program information" and press Enter.

15.3 Printer

The TACO II calculator/indicator may be connected to a POUL TARP A/S model MobiDouble printer for printing receipts and barcodes. The thermal printing mechanism is fitted with a metal enclosure and shielded cable and operates at 9 to 40 V DC. Or any other equivalent printers may be used.

"Equivalent" is defined to mean other proprietary equipment of the same or better specifications requiring no changes to software for satisfactory operation of the complete system including all checking facilities.

15.4   Power Supply

The calculator/indicator operates with a 24 V DC supply. The volume display is retained on power failure. The totaliser value is stored in the non-volatile memory.

15.5   Checking Facilities

A segment check is performed on power up. The calculator/indicator will display errors if the pulses are out of phase or the flow direction is incorrect causing the metering to stop, displaying "invalid measurement". The software version number is displayed when the calculator/indicator is turned on. This may also be viewed on the parameters printout.

15.6   Descriptive Markings and Notices

Each measuring system shall bear the following information, placed together either on the indicating device or on a data plate:

Manufacturer's mark, or name written in full	…..
Pattern approval number for the instrument	NMI 5/6E/13A
Meter model full	………..
Serial number of the instrument	…..
Year of manufacture	…..
Accuracy Class	…..
Environmental Class	…..
Maximum flow rate, $Qmax$	….. L/min
Minimum flow rate, $Qmin$	….. L/min
Minimum measured quantity ($Vmin$)	….. L
Priming quantity	….. L

15.7   Sealing Provision

When the system is sealed Figure 18 &19, no configuration or firmware update can take place, all connections to electronic calculator and/or indicating device are protected against removal or manipulation, and it is not possible to disassemble the device to give access to the electronic calculator and/or indicating devices hardware.

Legal parameters and firmware integrity are protected by a CRC32 checksum calculation which can be shown on the legal displays. The software related lock is activated by the 'software lock switch'.

The sealing kit with three rails and a tamper-proof sealing label locks automatically by the Software Lock Switch and protects the connections including transducers pulse transmission and prevents disassembling of the device.

TEST PROCEDURE No 5/6E/13A

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.

Instruments are to be tested with milk and the system either primed with milk before commencing the delivery, or the priming quantity marked on the data plate is added to the quantity measured.

NOTE: The quantity required to prime the system shall be determined at verification and shall be stamped on the nameplate. Complete one or more deliveries and check the volume indicated against the actual volume.

FIGURE 5/6E/13A – 1
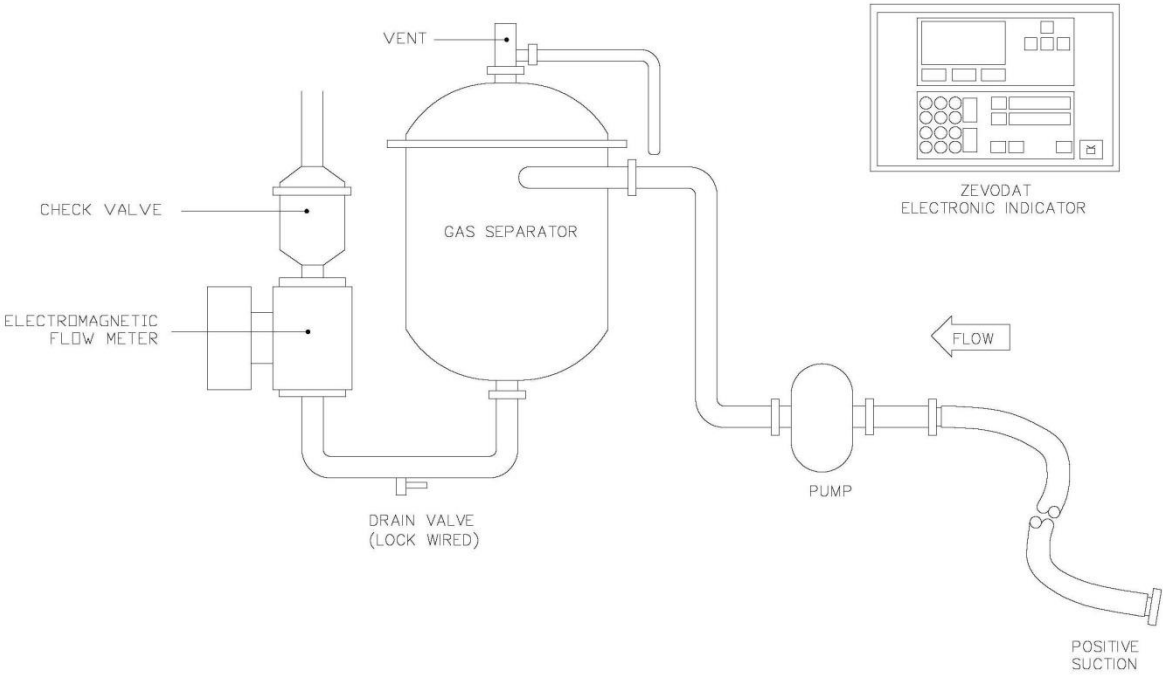
Diessel Model IZM-E DN50 G2 Milk Flowmetering System

FIGURE 5/6E/13A – 2
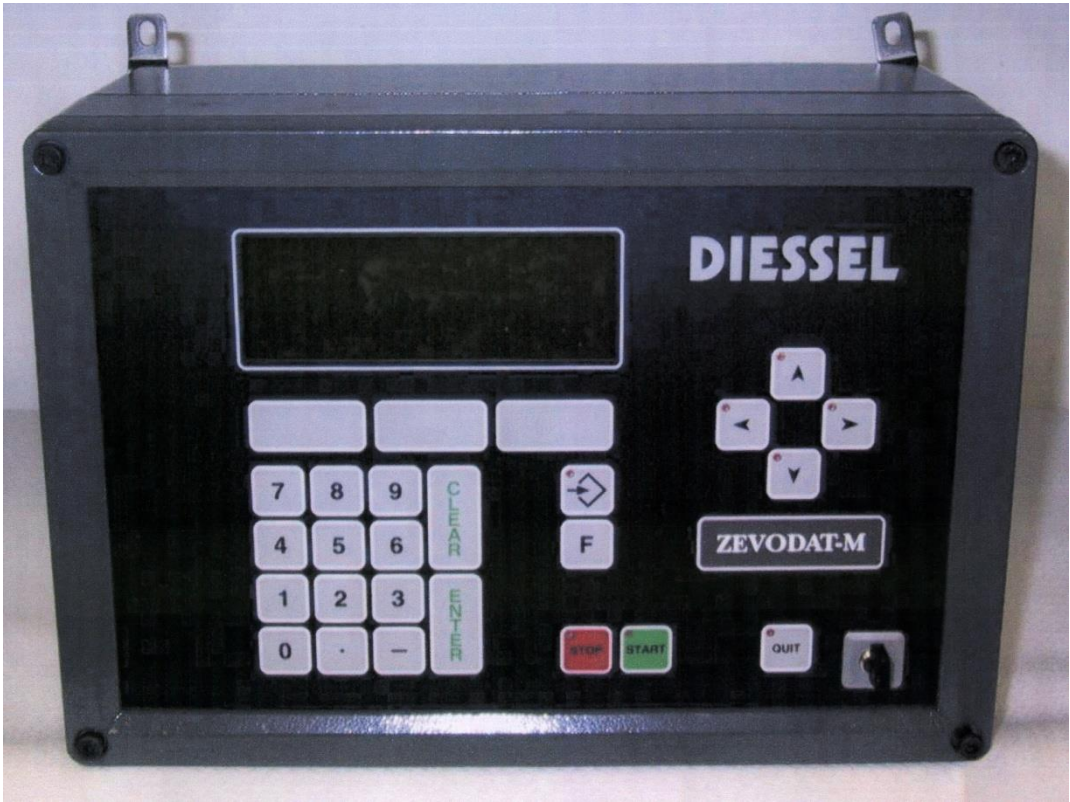
Diessel Model Zevodat-M Calculator/Indicator

FIGURE 5/6E/13A – 3
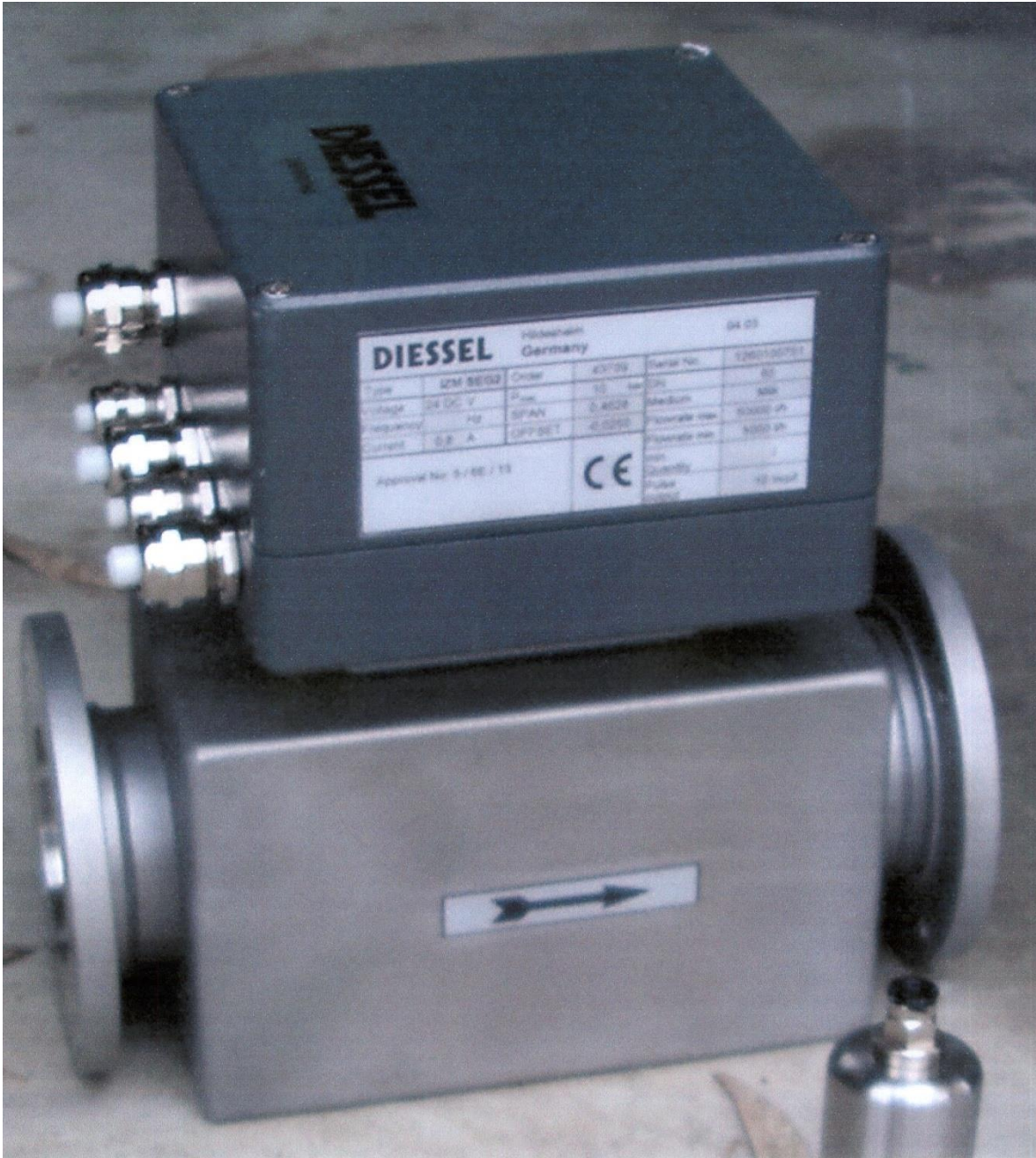
Diessel Model IZM-E DN50 G2 Electromagnetic Flowmeter

FIGURE 5/6E/13A – 4

DME Model MIF C63 Electromagnetic Flowmeter

FIGURE 5/6E/13A – 5
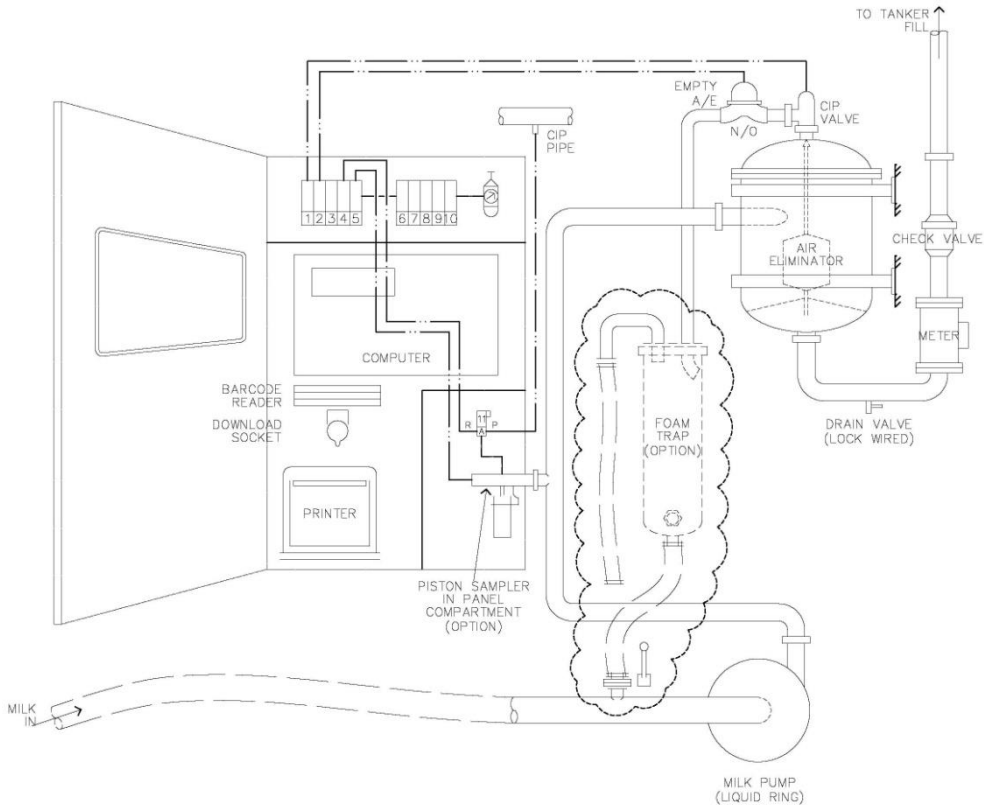
Typical System With Ring Type Pump – Variant 2

FIGURE 5/6E/13A – 6
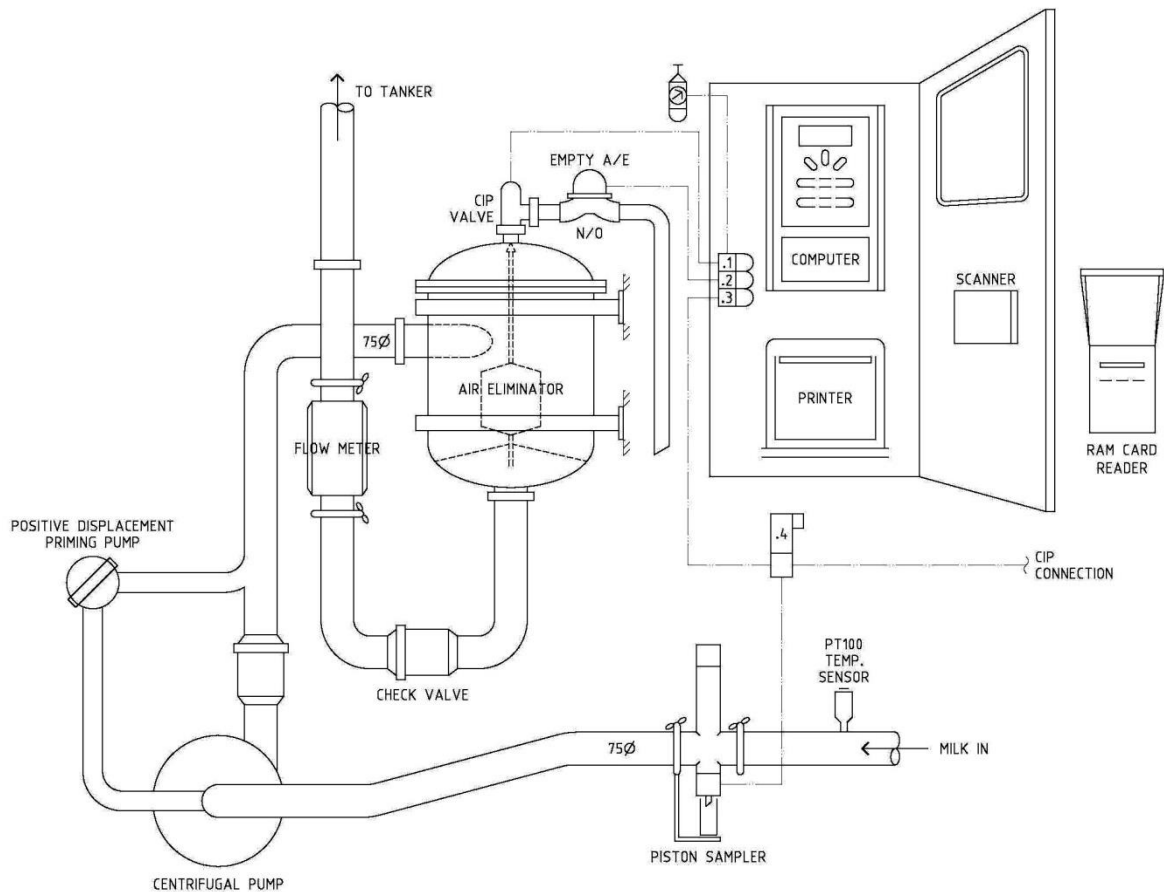
Typical System With Dual Pumps – Variant 3

FIGURE 5/6E/13A – 7

HORIZONTAL FLOW METER INSTALLATION

VERTICAL FLOW METER INSTALLATION
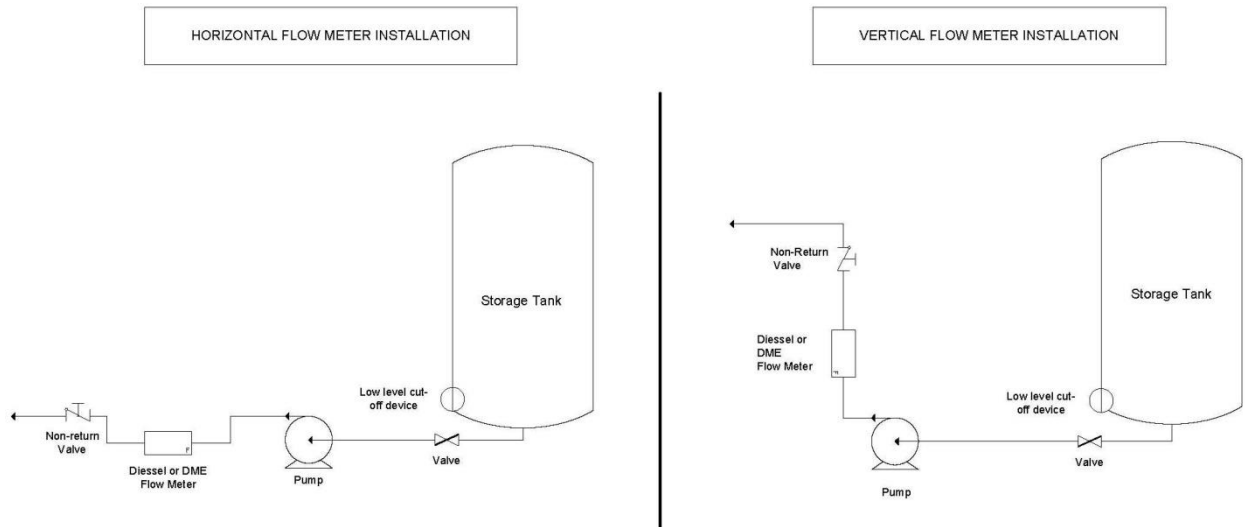
(a)   Typical Single Supply Tank Systems – Variant 5
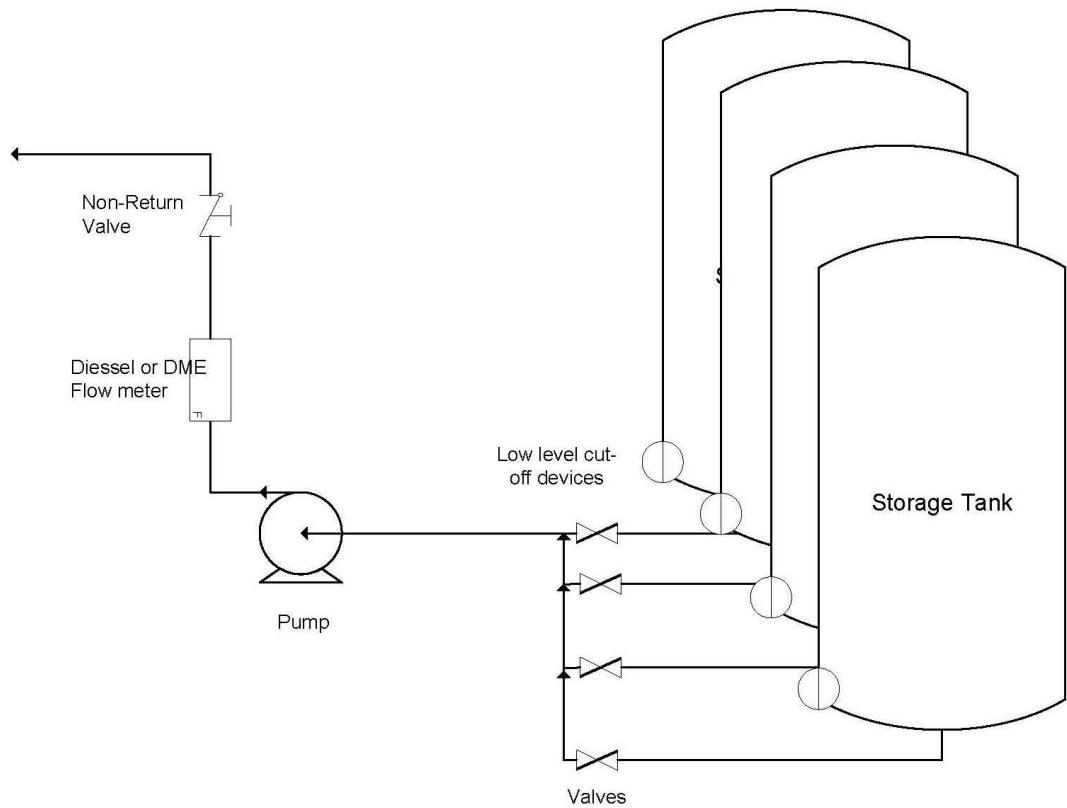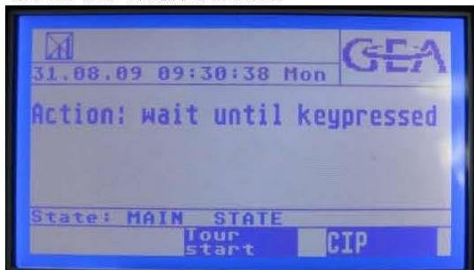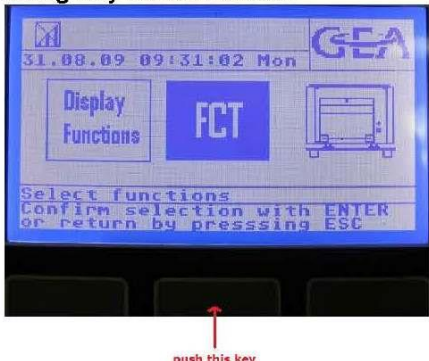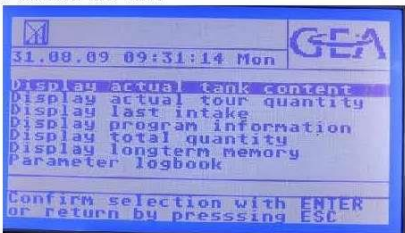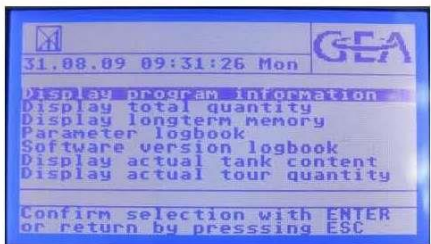
(b)   Typical Multiple Supply Tank System – Variant 5

FIGURE 5/6E/13A – 8

GEA Diessel Model ZEVODAT-Flash Calculator/Indicator – Variant 6

FIGURE 5/6E/13A – 9

1. Go to the main screen.	2. Select the 'M' key.
3. 'M' screen appears; select 'FCT' option by pushing key below screen.	4. Choose 'Display Functions' by pushing key below screen
5. Display screen appears; select 'Display program information' by using 'down' arrow key to scroll down.	6. Select 'Display program information'.
7. Press the 'Enter' key.	8. The software version number (V21/110 091118) appears.

How to View Software Version Number on a GEA Diessel Model ZEVODAT-Flash Calculator/Indicator – Variant 6
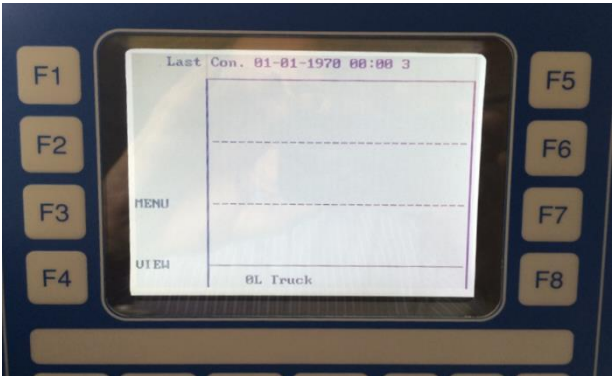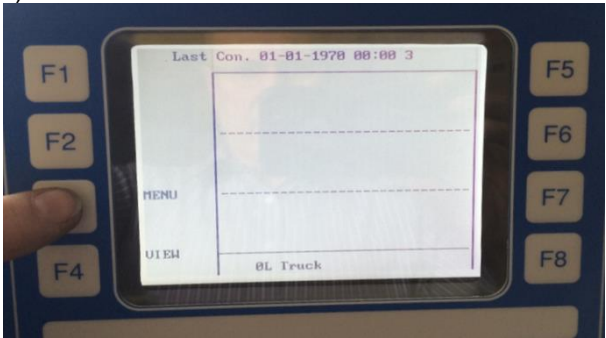
FIGURE 5/6E/13A – 10

A Typical Diessel IZM- SEAG2 Series Flowmeter (With Zevodat
Calculator/Indicator) – Variant 7

FIGURE 5/6E/13A – 11

Poul Tarp A/S Model S12 Calculator/Indicator – Variant 8

FIGURES 5/6E/13A – 12
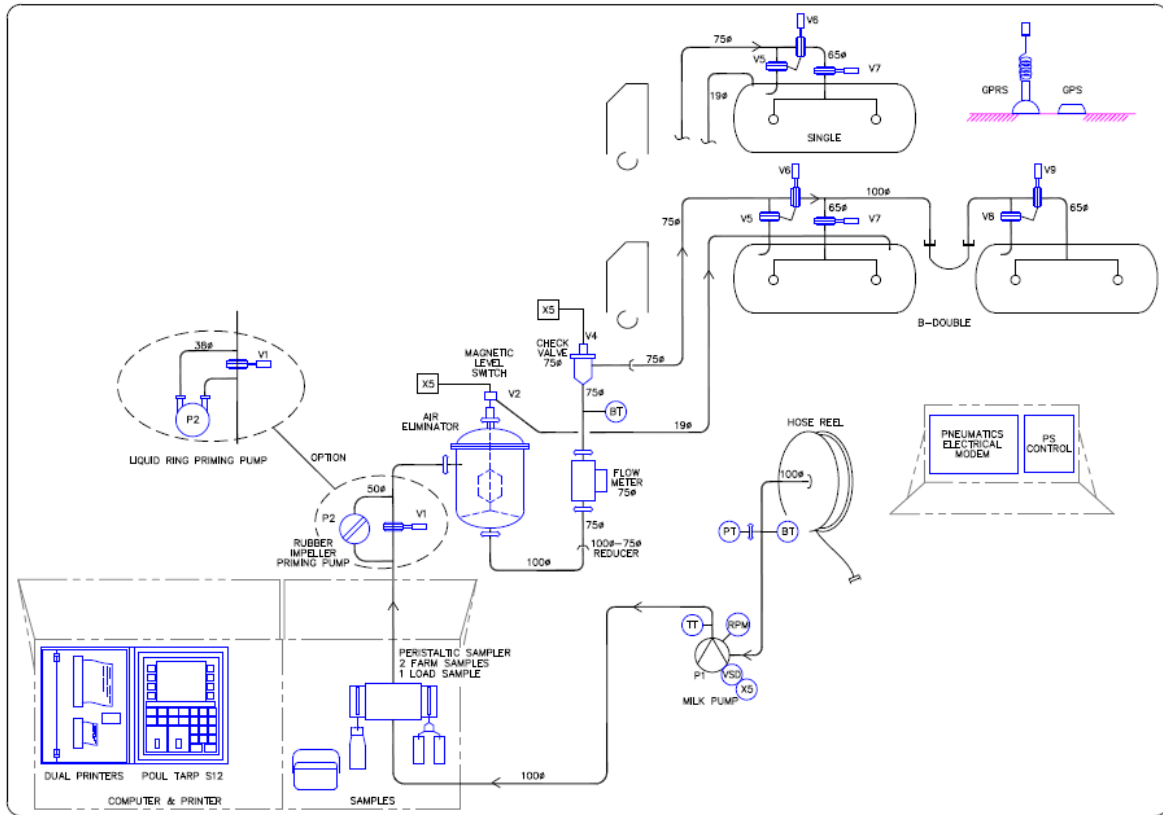
Typical System With a Poul Tarp A/S Model S12 Calculator/Indicator – Variant 8
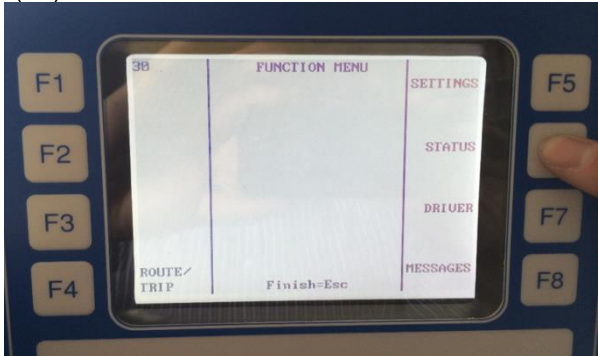
FIGURE 5/6E/13A – 13
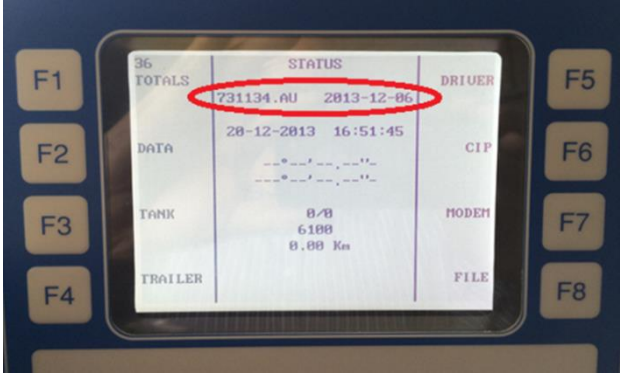
1. Go to the main screen

2. Press MENU (F3) button

3. Press STATUS (F6) button

4. The software version number will appear (circled in image below for clarity)

How to View Software Version Number on a Poul Tarp A/S Model S12 Calculator/
Indicator – Variant 8

FIGURE 5/6E/13A – 14

a) Poul Tarp Model 29106 Electrical Top Valve for Air Eliminator

b) Poul Tarp Model 018302641001 Air-Operated Non-Return Valve

c) Jumo Model 018302641001 Vacuum/Pressure Sensor

FIGURE 5/6E/13A – 15

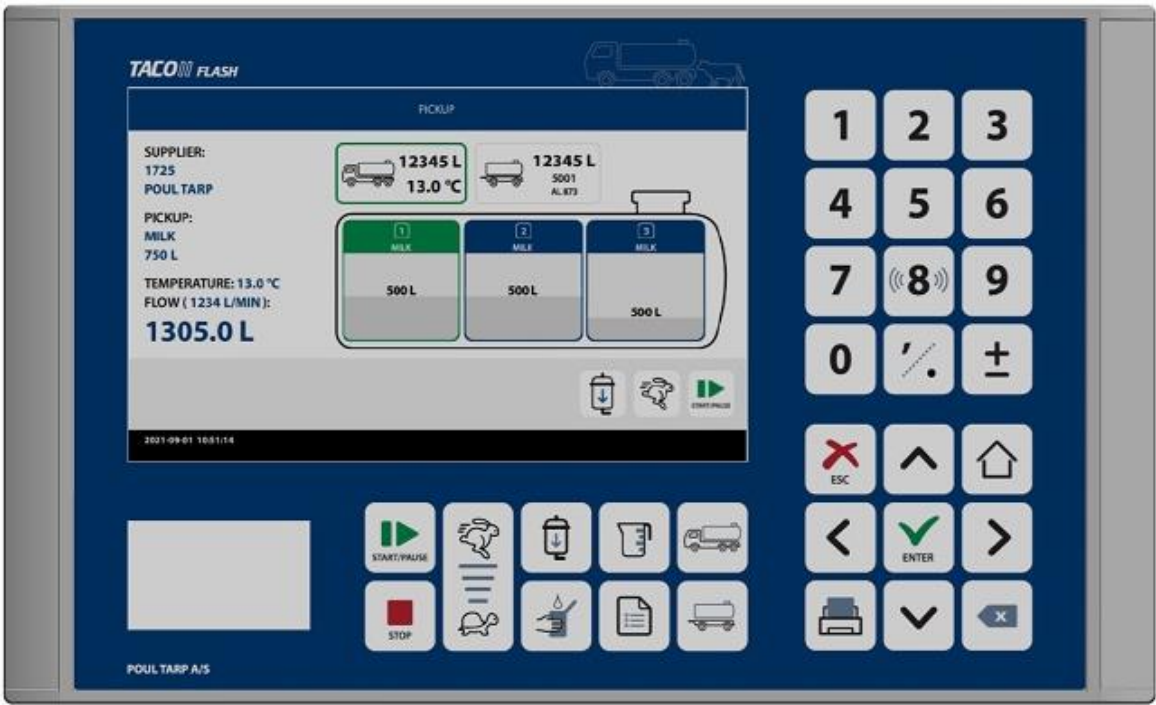a)   Poul Tarp Model 29120 Milk Level Sensor in Air Eliminator

b)   Poul Tarp Model 018302571001 Bubble Sensor/Model 018302561001 Milk
Conductivity Sensor

FIGURE 5/6E/13A – 16

TACO II calculator/indicator replacing the S12 Calculator/Indicator – Variant 14

FIGURE 5/6E/13A – 17

TACO II Flash Calculator/indicator replacing the Zevodat Flash
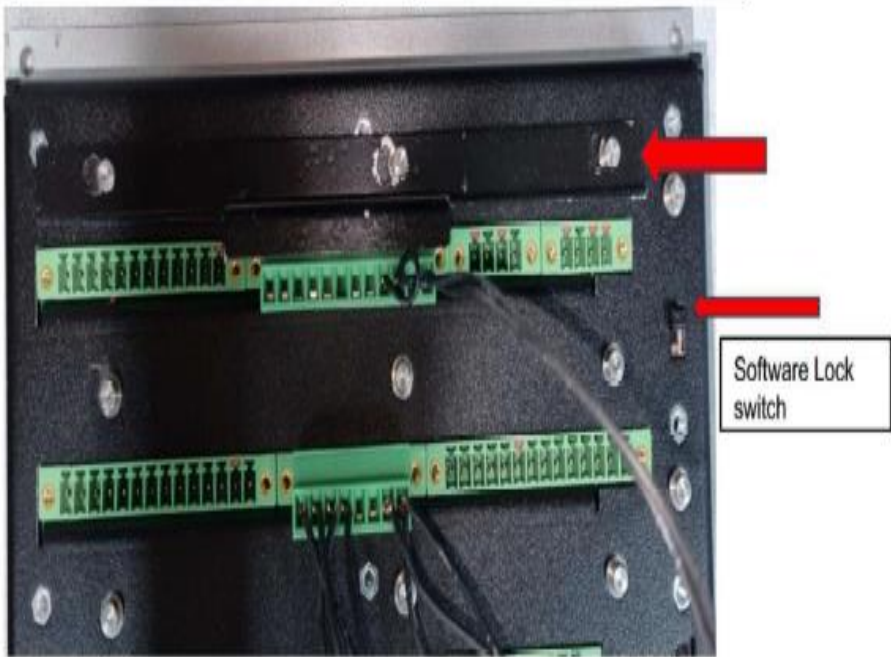Calculator/Indicator – Variant 14

FIGURE 5/6E/13A – 18
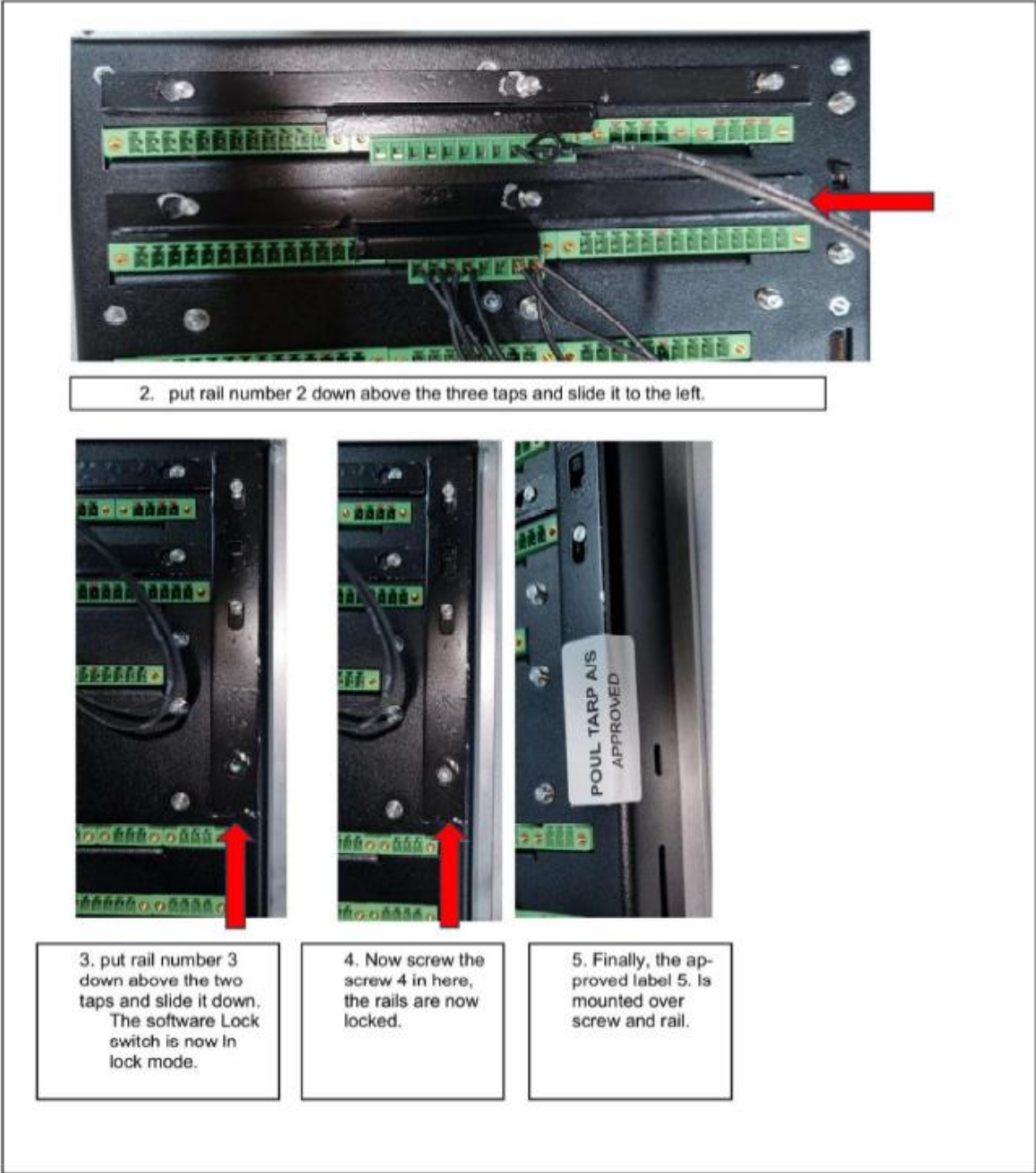

TACO II and TACO II Flash without sealing

TACO II and TACO II Flash Sealing Kit.

1. put rail number 1 down above the three taps and slide it to the left.

Software Lock switch

TACO II Flash sealing kit

FIGURE 5/6E/13A – 19

2. put rail number 2 down above the three taps and slide it to the left.

3. put rail number 3 down above the two taps and slide it down. The software Lock switch is now In lock mode.

4. Now screw the screw 4 in here, the rails are now locked.

5. Finally, the approved label 5. Is mounted over screw and rail.

TACO II Flash sealing kit

~ End of Document ~