SATAM

METERING UNIT
ZCE 21 – ZCE 22

Description - Installation - Operation - Maintenance

U514456-e – Revision 4 – 21 October 2014

This document consists of 11 pages (including flyleaf)

SATAM may modify this document without prior notice

In conformity with the European directive 94/9/CE-ATEX and 97/23/CE - PED

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Summary

1. General

The ZCE 21 and ZCE 22 models from the SATAM range of metering units are intended respectively for the reception or the reception and loading of hydrocarbons liquids of kinematic viscosity lower than 20 mm2/, industrial oil and methyl esters of fatty acids for diesel engine and ethanol delivered by tankers or loaded into tankers from an upperground storage facility.

Additional instructions relating to accessory fittings are supplied separately.

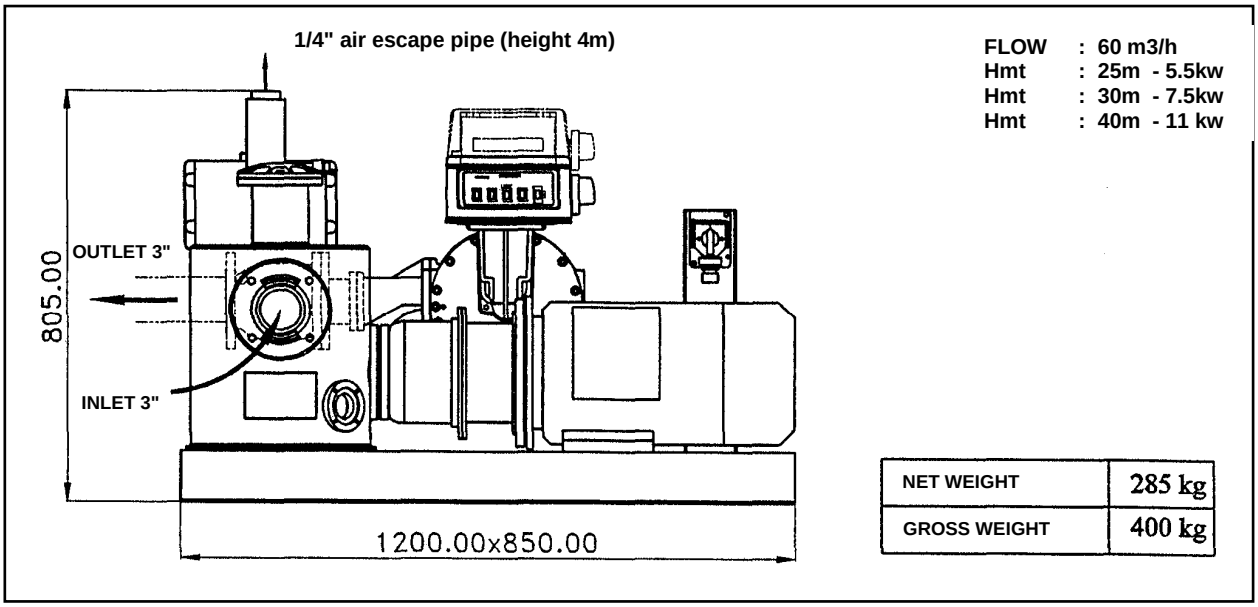
These sets of measuring are in conformity with the metrological regulation and were the subject of an approval C.E.E of models N° 97.00.482.002.0.du 16/0 797 with indicator mechanical and renewed by the certificate of approval C.E.E of models N° F-06-C-1 139, and of a certificate of examination of the type N° F-05-C-168 with electronic computer renewed by the certificate of examination of the type N° F-06-C-1145 and the certificate of examination of type LNE-16067 and the certificate of examination IT of type N°19549.

Main Features:

- maximum flow : 60 m3/h
- minimum flow : 8 m3/h
- maximum discharge pressure : 2 bar or 3 bar (according to the model)
- minimum reception or delivery : 500 litres

2. Reception

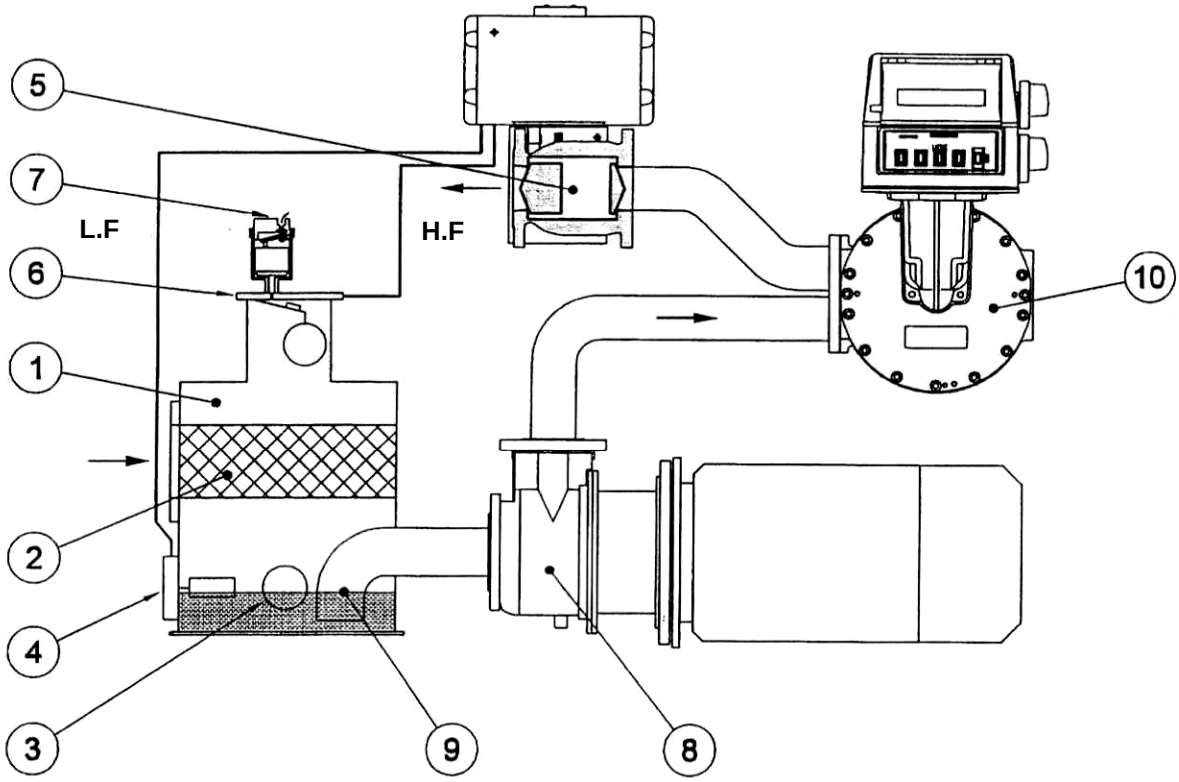
The ZCE 21 and ZCE 22 metering units are supplied mounted on a frame fixed to a pallet and surrounded by a plywood casing.
If, on arrival, the packaging appears to have been damaged, the customer should notify the carrier of the damage immediately and inform SATAM.



3. Components

The ZCE 21 and ZCE 22 metering units are composed of the following elements:

Figure 1



L.F : Low Flow
H.F : High Flow

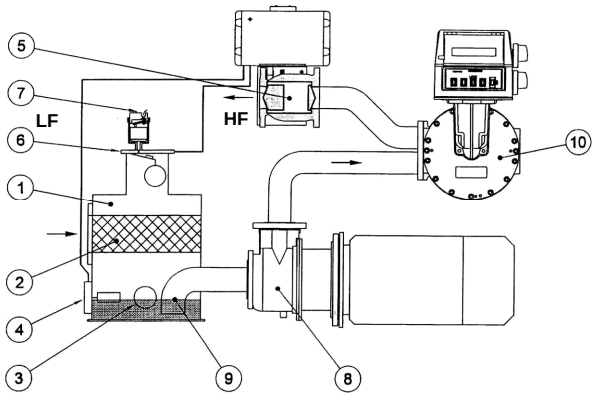
- a gas separator (EC 41-60 model) ① placed upstream from the meter ⑩, composed of a filter ②, a viewfinder ③ used to mark the transfer point and a degasifier head ⑦ used to release the gasses,

- a centrifugal pump ⑧ with a maximum flow of 60 m3/h located between the gas separator ① and the meter ⑩,
- a SATAM meter (ZC 17-80/80 model) ⑩ to which additional devices (ticket printer, predeterminator, impulse generator, electronic calculator …) may be fitted,
- a two-way flow electrical control valve (XAD 37 model) ⑤ complete with non-return check valve and linked to the gas separator ①.

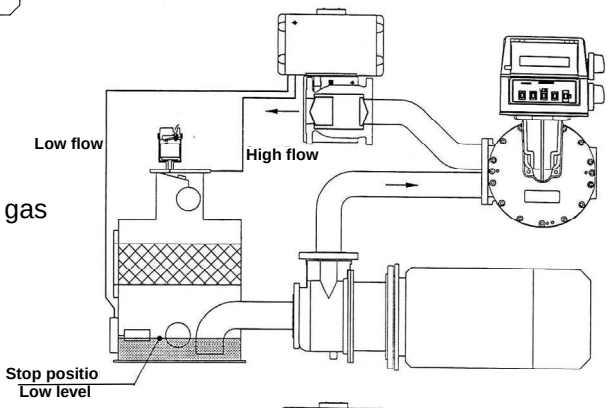
If the ZCE 22 metering unit is to be used for reception and delivery, it is fitted with a three-way sluice valve (AD 53 model) linked to the pick-up head of the metering unit.

Input: 4" gas pitch tapping fitted with a semi-symmetrical connector or other as required.
Output: 3" flange (DN 80) ASA 150.

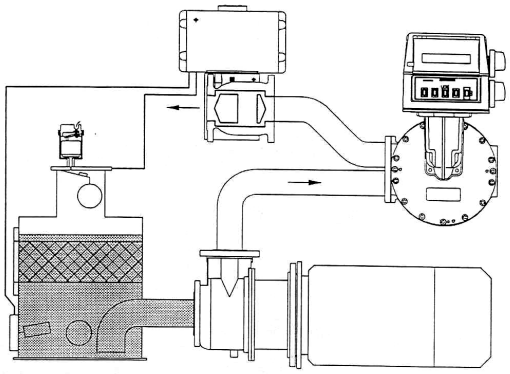
4. Operating principle



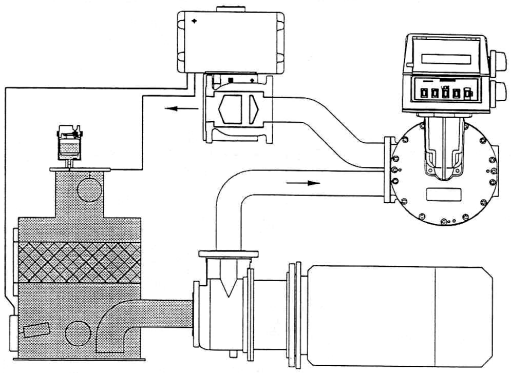
① Gas separator
② Filter
③ Viewfinder
④ Lower level contact
⑤ Two-way flow control valve
⑥ Upper level contact
⑦ Degasifier head
⑧ Centrifugal pump
⑨ Suction pipe
⑩ Meter



The loaded liquid reaches the mouth of the gas separator filter ①.



The level rises in the chamber, and the lower level contact ④ commands the low-flow position opening of the control valve.
The centrifugal pump ⑧ sucks the liquid up via the suction pipe ⑨ and forces it back towards the meter⑩ and the control valve ⑤ that remains in low-flow position during the gas desorption (reception) phase.



Once all gas has been released, the liquid fills the chamber ① and the upper-level contact ⑥ commands the high-flow position opening of the control valve ⑤.

In the final stages of reception, the level in the chamber ① goes down and the upper level contact ⑥ commands the high flow shut-off. The final stage of reception is carried out at low flow until the low level marker is visible through the viewfinder ③. The lower level contact ④ commands the closing of the control valve ⑤.
Emptying the delivery hose causes the liquid in the chamber ① to rise and the lower level contact ④ commands the opening of the control valve ⑤ in low-flow position. When emptying is completed, the liquid returns to its original level and the control valve ⑤ is closed.

5. Installation

Underground storage:

Regulation for category one liquids:
In the case of reception meters, in order to comply with the clauses of article 18, paragraph 3 of the ministerial directive of 17 April 1975 concerning the requirement whereby a single fill piping may lead to an underground reservoir, the following installation plan should be adhered to:

- one reception meter per product, linked to one or more three-way sluice valves.
  These valves should be wired in such a way as to supply only one reservoir.

Example of the filling of 4 tanks with SCA high-octane petrol (See Figure 2).

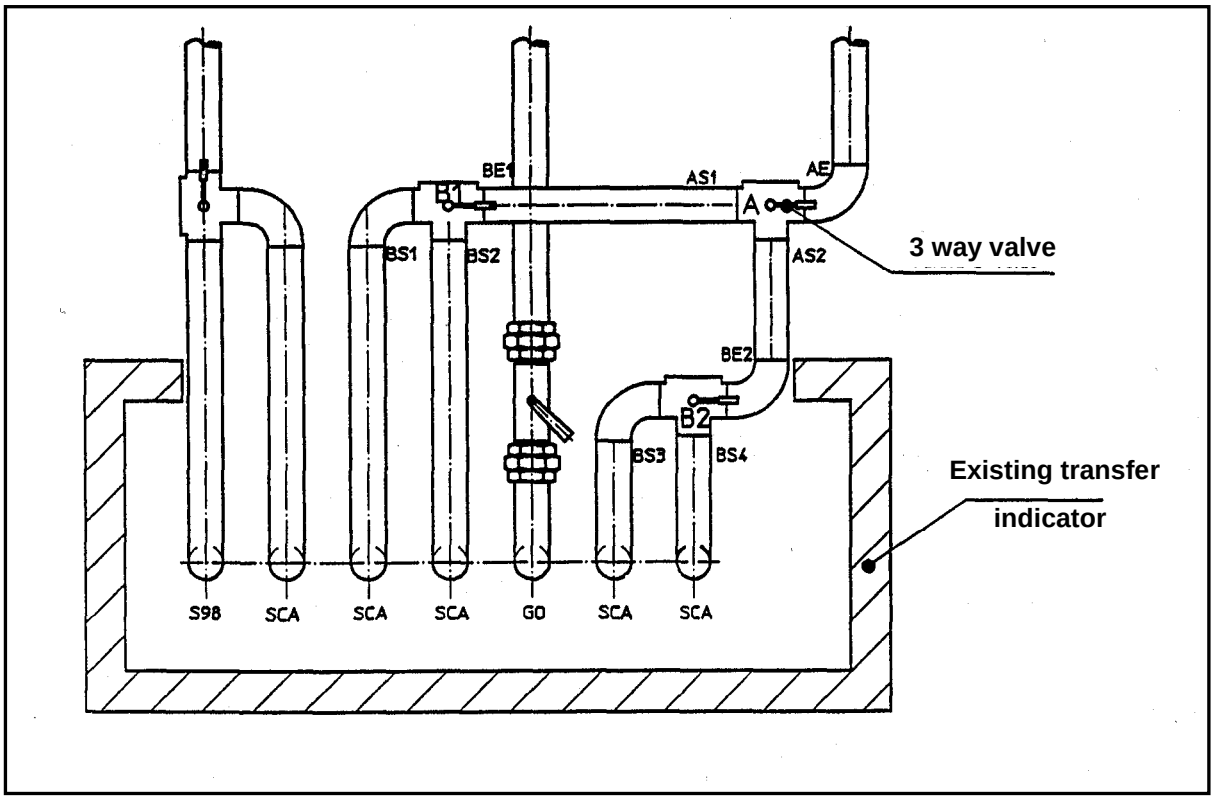
A three-way sluice valve A (AE input - AS1 and AS2 output) is placed on the output piping of the reception unit. Two sluice valves B1 and B2 (input BE1 and BE2 - output BS1, BS2 and BS3, BS4) are placed in cascade on the AS1 and AS2 outputs. Valve A connects AE with AS1. Valve B1 connects BE1 with BS1; AS2 and BS2 outputs are closed.

Note: this installation is not required in the case of diesel oil.
For countries other than FRANCE, the current regulations relating to category one liquids should be respected.

Earthing:

To ensure electrical continuity during installation, the earthing points must be connected and the delivery vehicle must be earthed.

Figure 2



Hydraulic connections:

The unit is fixed to the base by 4 anchor bolts.
Connect the storage piping to a DN 80 (3") rigid pipe.

Electrical connections:

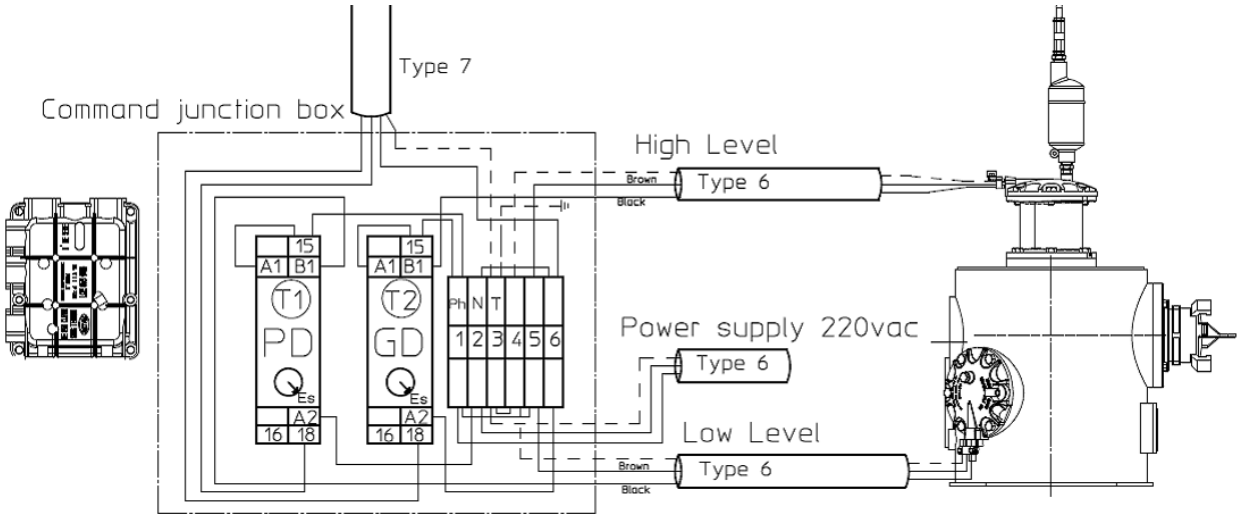
Power lines are protected by appropriate fuses.

The pump's electric motor should be protected by a circuit-breaker contactor whose thermal relay is calibrated in line with the motor that supplies the unit: 5.5kw, 7.5kw or 11 kw.

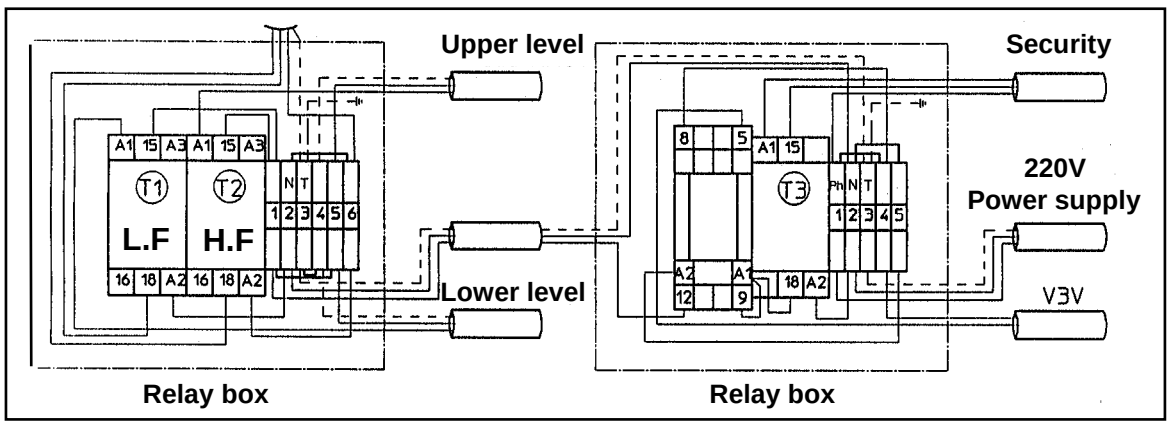
Connect the electric motor according to the supply voltage: 240-400 volts or 400-660 volts.

Connect the single-phase 220 volts in the junction box:

ZCE 21



ZCE 22



The Start-Stop button is used as a remote control for the pump's motor contactor.

Check the pump's rotation direction:

- remove the plastic guard on the suspension strap between the pump and the motor to reveal the drive shaft.

The cables comply with current standards.

An emergency stop button is installed close to the reception unit.

In the case of upperground storage, connect the atmosphere outlet of the degasifier to a vertical tube, the end of which is placed at a higher level than that of the stored liquid **(See Figures 3 and 4).**
Figure 3

ZCE 21 Reception unit

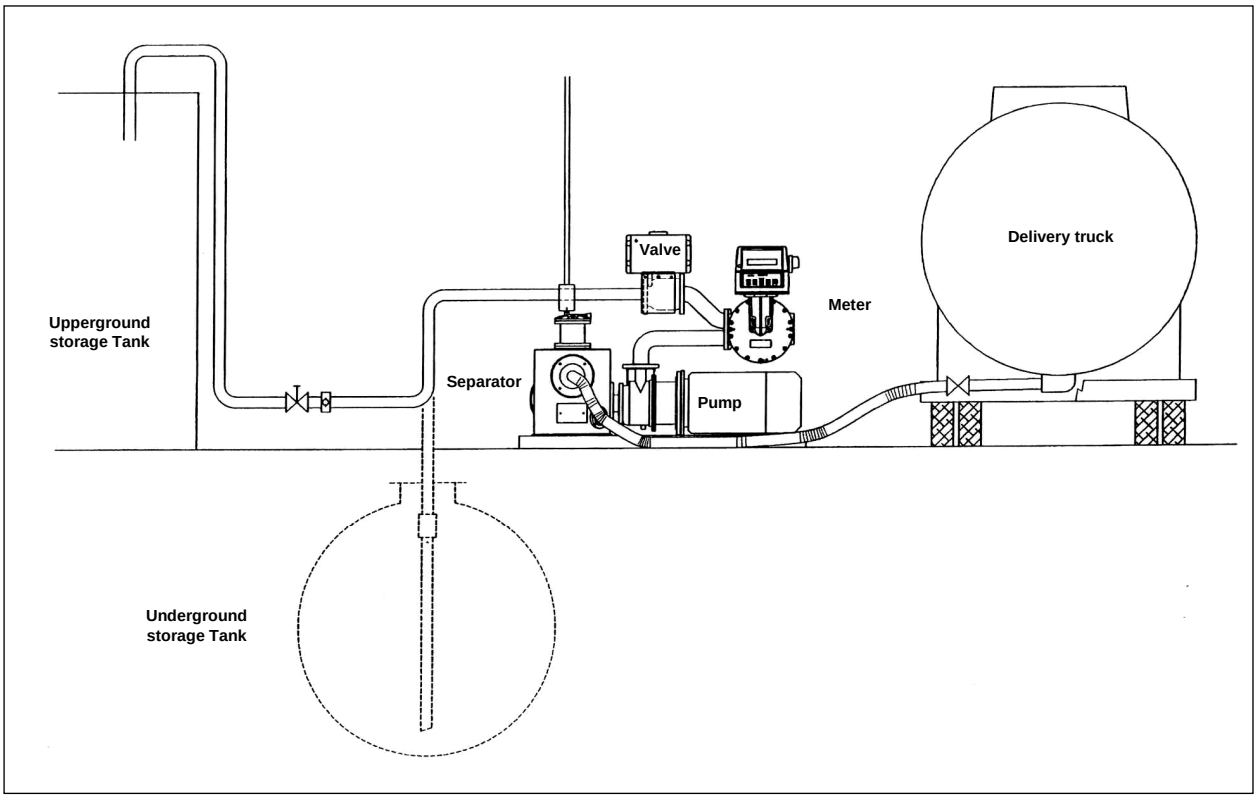
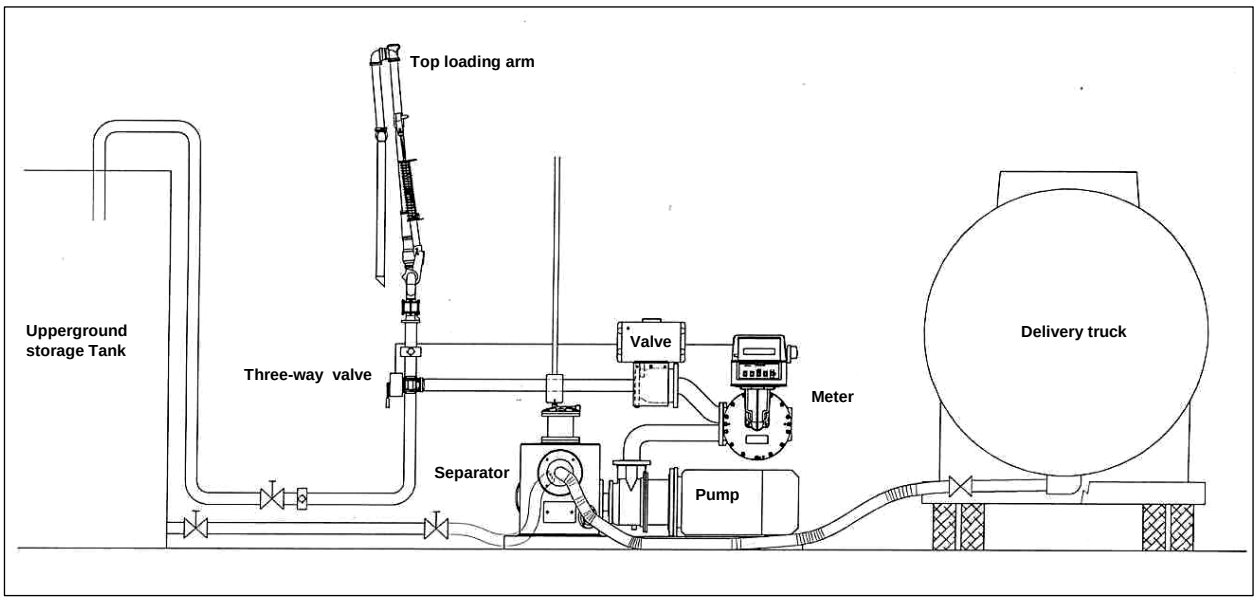


Figure 4

ZCE 22 Reception and loading unit



6. Operation

Once the hydraulic and electrical installation has been completed, the reception unit may be put into operation.

Important: always bear in mind the dangers involved when handling an essentially combustible product and respect the safety regulations, in particular the no-smoking requirement, the need for a fire extinguisher at hand etc.

ZCE 21 Reception unit:

- Earthing of the truck.
- Reset the counter to zero by turning the handle. If the device is fitted with a ticket printer, feed in a ticket with the printed side face down and turn the handle as far as it will go to lock it and reset the counter to zero.
- Connect the hose between the reception unit and the truck. The hose should be as short as possible - DN 80 (3") minimum, DN100 (4") if possible.
- Operate the pump via the command button.
- Open the truck's sluice valve.
- The gas separator fills up and the control valve opens at low-flow position, followed by high-flow when the gas separator is full of liquid.
- In the final stages of transfer, air enters the separator and the control valve automatically switches to low-flow position until transfer is completed. When the lower level marker is visible in the viewfinder, the control valve shuts off automatically.
- Drain the hose (the control valve opens in low-flow position and shuts off again once the liquid is at low level).
- Use the command button to stop the pump.
- If the device is fitted with a ticket printer, turn the handle as far as it will go to print and deliver the ticket.

ZCE 22 Reception and loading unit:

For reception, operation is identical to that of the ZCE 21.

Loading:

- Adjust the three-way input sluice valve to link the piping from the storage to the device's input , or connect the hose.
- Open the storage valve to fill the gas separator filter.
- Adjust the three-way sluice valve located on the discharge unit of the device to loading.
- Resetting the counter: feed in a ticket printed side face down and turn the handle as far as it will go to lock it and reset the counter to zero.
- The pump's operation is controlled by a Start-Stop button located near to the loading unit. Other command modes are possible, including fitting out the handle of a predeterminator, lowering the loading arm, etc.
- Perform loading.
- Turn the handle as far as it will go to print and deliver the ticket.

Setting to reception mode:

- Close the storage valve.
- Adjust the three-way sluice valve located on the discharge unit of the device to storage.
- Resetting the counter: feed in a ticket printed side face down and turn the handle as far as it will go to lock it and reset the counter to zero.
- Start the pump with the button located near to the device and let air into the device by turning the three-way sluice to the reception position or by opening the nozzle of the hose.
- When the liquid is at low level, stop the pump.
- Print the ticket.

The fitter should carry out a metrological check of the metering unit and make any necessary adjustments. To do so, he should have access to a gauge with a minimum capacity of 1000 litres.

7. Maintenance

- Check regularly that the filter is clean. Any clogging may result in jerky operation when the high flow is shut off.
- Every six months check the range of electromagnetic command for the control valve.
- At least once a year check the precision tuning of the device.

8. Remark very important

We strongly advise against the use of a high pressure water jet to clean the measuring unit, as this could seriously damage the metering unit.