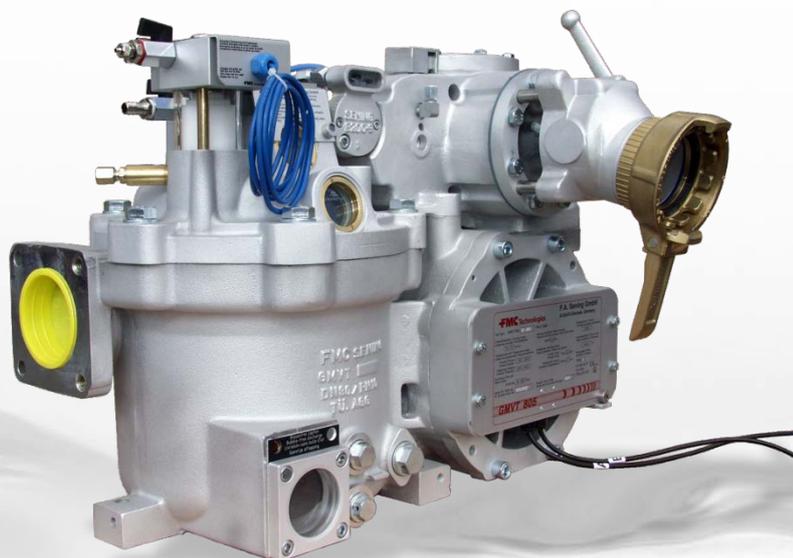


Metering System **GMVT 805**



Further Documentation for this Product:

Description	Order No.
EPE2-A1 Controller for GMVT Meter Draining System	MN F08 002 EN / DOK-527E
MultiFlow / Instruction Manual	MN F09 002 EN / DOK-383E

History

Revision	Date	Editor	Status	Description
Rev. 1.00	February 2006	/ AJ / as/ jp /	released	format modifications / new Drawings
Rev. 1.01	April 2009	/ HS / jp /	released	format modifications / new Drawings

Important

All information and technical specifications in this documentation have been carefully checked and compiled by the author. However, we cannot completely exclude the possibility of errors. **F.A.Sening GmbH** is always grateful to be informed of any errors.

Contents

1	General Remarks	5
1.1	How to Use this Manual.....	5
1.2	Safety instructions.....	6
1.2.1	To Avoid Accidents (Due to Gas Explosion)	6
1.2.2	Particular attention.....	6
1.2.3	Appropriate use	6
2	Structure and Method of Operation	7
2.1	Schematic Structure	8
2.1.1	View from the right.....	9
2.1.2	View from in front.....	10
2.1.3	View from the left	11
2.2	Gas extractor.....	12
2.2.1	Venting	13
2.2.2	Supplementary ventilation (optional).....	13
2.2.3	Pressure switch (optional).....	14
2.3	Volume Meter	14
2.4	Valves.....	14
2.4.1	Wet hose valve	14
2.4.2	Wet hose valve	14
2.4.3	Bypass Valve	15
2.4.4	Elbow.....	15
2.5	Pneumatic Control	15
2.5.1	Control by mechanical operating blocks.....	16
2.5.2	Control by Electronic Flow computer.....	16
2.6	Residual Discharge System (Optional)	17
2.6.1	Construction and Mode of Operation	18
2.6.2	Residual Quantities.....	18
2.7	Order Codes	19
2.7.1	GMVT 805	19
2.7.2	GMVT 805 with Residual discharge	20
3	Installation	21
3.1	General.....	21
3.1.1	Preventive measures	21
3.2	Installation	22
3.2.1	Pneumatic Installation.....	22
3.2.2	Electrical installation	23
3.2.3	Final testing	24

- 3.3 Commissioning24**
- 3.4 Calibration25**
- 4 Operation 27**
- 4.1 Mechanical Control27**
- 4.1.1 Delivery with overfill prevention27
- 4.1.2 Delivery via the Bypass28
- 4.2 Electronic Control30**
- 4.2.1 Delivery with overfill prevention30
- 4.2.2 Delivery via the Bypass31
- 4.3 Residual Discharge (Optional)32**
- 5 Maintenance 33**
- 6 Trouble shooting..... 35**
- 7 Technical Data..... 37**
- 8 Warranty and Service 39**
- 9 Address and Contact..... 41**
- 10 Keyword Index 43**
- 10.1 Table of Figures43
- 10.2 Index of Tables43
- Anhang A. Drawings and Approvals..... 44**
- Overviews Schematics44**
- Drawings.....45**
- 51.250810 - General structure of the metering system GMVT 805.....45
- 51.251123 - General structure of the metering system GMVT 805 with residue discharge46
- 52.251256 - Volumes and residual quantities of the metering system sheet 1.....47
- 52.251256 - Volumes and residual quantities of the metering system sheet 2.....48
- E51.351740 - Solenoid valves – Connection diagrams & Order codes.....49
- E51.252087 - Pneumatic diagram - Metering system control with external overfill amplifier50
- E51.252088 - Pneumatic diagram - Metering system control without overfill amplifier or
integrated overfill amplifier51
- E51.252089 - Pneumatic diagram - unmetered with 2 outlets52
- Declaration of Conformity53**

1 General Remarks

1.1 How to Use this Manual

This manual contains multiple information. In order to help you find the information you require, the following orientation aids have been used:

- Icons

The information in this manual ranges from absolutely required protective measures and standardised requirements to concrete operating steps and good advice. For easy reference the different types of information are marked by pictographs.

The intention is not only to increase the reader's attention, but also to help to identify the desired information quickly. For this reason the respective icon symbols are closely related to the contents of the text.

In this manual you will find the following icons:



Danger! In this case: Danger of explosion caused by highly inflammable gases or liquids.



Environment protection; recycling



Threat of disruption. Action that may damage the equipment.



Legal information. Actions that have legal consequences.



Operation step, concrete handling instruction, e.g. "Press the <Enter> Key".



Feed-back positive, e.g. "Now the main menu appears"



Feed-back negative, e.g. "If an error message appears ... "



Additional information, advice, tip, e.g. "Further details in chapter XX"



Optional or special case



Function / Functional description



NOTE: Indicate a special Situation



IMPORTANT: For strict observation

1.2 Safety instructions



IMPORTANT:

Before starting up attention should be paid to the special details in the following.

1.2.1 To Avoid Accidents (Due to Gas Explosion)



The metering system type GMVT 805 has been designed for the flow measurement of flammable liquids in Classes AI and AIII on tank trucks.

That means especially danger of explosions caused by flammable gases.

Keep aware of the regulations for the EX protection.



IMPORTANT:

The GMVT 805 with residual discharge system is **only** designed for flow measurement of combustible liquids of **Hazard Class AIII** on road tankers.

1.2.2 Particular attention



The GMVT 805 type metering equipment has precise and high quality components. Hence mechanical effects which are not due to operation (e.g. falling) are to be avoided.



The metering system to be subject to obligatory calibration. Every manipulation, intended or unintended, appears the soft seal has failed.



Attention please that no mineral oil products flows in the ground.

1.2.3 Appropriate use

The metering system type GMVT 805 shall be installed on road tankers exclusively for the discharge of low viscosity mineral oil products with a viscosity $\eta < 1$ to 20 mPa·s. The appropriate safety regulations (e.g. explosion protection) must be complied with.

Using the device for any other purpose would constitute inappropriate use. The manufacturer will not be liable for any resulting damages.

Appropriate use also includes compliance with the operation, installation and maintenance conditions specified by the manufacturer.

The metering system type GMVT 805 must only be installed, operated, serviced and repaired by persons who are familiar with the device and have been briefed about the risks.

Unauthorised alterations on the metering system GMVT 805 invalidate any liability by the manufacturer for any resulting damages.

2 Structure and Method of Operation

F.A. Sening has developed a compact 800 litre metering system type GMVT 805 for gravity and pump operation. The metering system is a completely new design, which comprises and optimises the tried and tested technologies of the gas extractor and the positive displacement meter.

The positive displacement meter is fitted with an integrated pulse transmitter for direct connection to an electronic flow computer (e.g. MultiFlow). Electronic control of the Type GMVT 805 metering system is implemented by the MultiFlow type flow computer in combination with the overfill prevention amplifier type ASE-E-.. or ASE-D-...

The GMVT 805 metering system is a volumetric meter with integrated gas extractor. The metering system was designed for the discharge of low viscosity mineral oil products with a viscosity $\eta < 1$ to 20 mPa·s on road tankers.

Advantages:

- Small, compact and light weight metering system
- Integrated pulse transmitter
- Electronic valve control
- Gas extractor with integrated strainer for meter protection
- Curved path-controlled positive displacement meter
- High flow rate in pump and gravity operation
- Low residual quantity when changing product (with residual discharge system)
- Simple and inexpensive fitting

Functional description:

- ☐ The measured liquid passes through the spout into the gas extractor.
- ☐ The measured liquid starts rotating as a result of the tangential orientation of the spout.
- ☐ Gases present in the liquid are thus separated (functional principle of the centrifuge).
- ☐ The gases rise up and gather in the gas extractor hood, which is fitted with an automatic venting system.
- ☐ The de-gassed measured liquid is passed by the Sight-glass (at the bottom) into the volume meter. This is a positive displacement meter with internally mounted rotor blades.
- ☐ The measured liquid leaves the GMVT 805 metering system via the stop valve mounted at the measuring chamber outlet.

2.1 Schematic Structure

In the following figures the metering system is fitted with a high/low flow valve for wet hose. The metering system equipment can be varied widely according to requirements:

Gas extractor hood

- with/without pressure switch
- with/without supplementary ventilation
- with/without residual discharge

Positive displacement meter

- with/without residual discharge

Discharge valves

- Wet hose valve high/low flow
- single or dual wet hose
- with/without bypass

2.1.1 View from the right

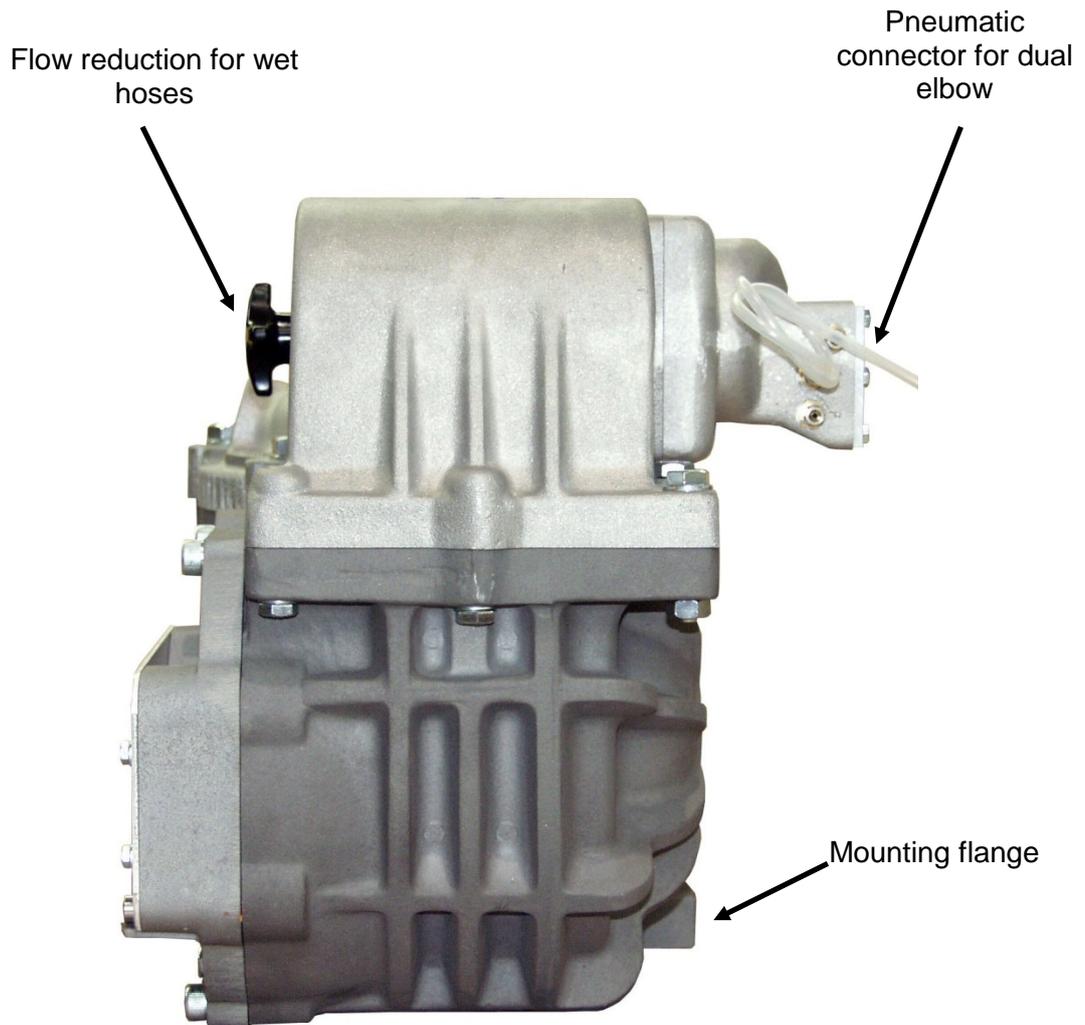


Figure 1: View from the right

2.1.2 View from in front

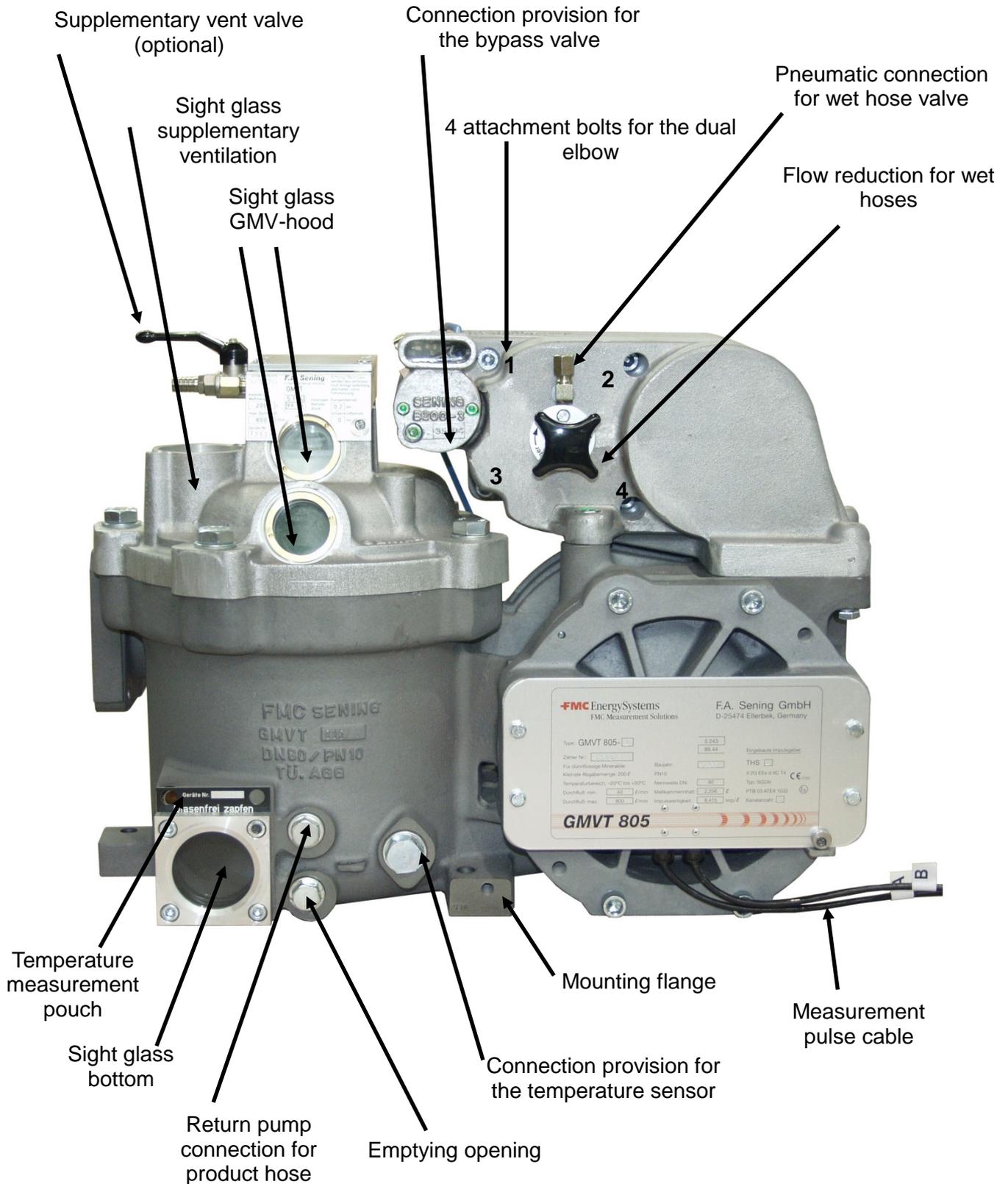


Figure 2: Front view

2.1.3 View from the left

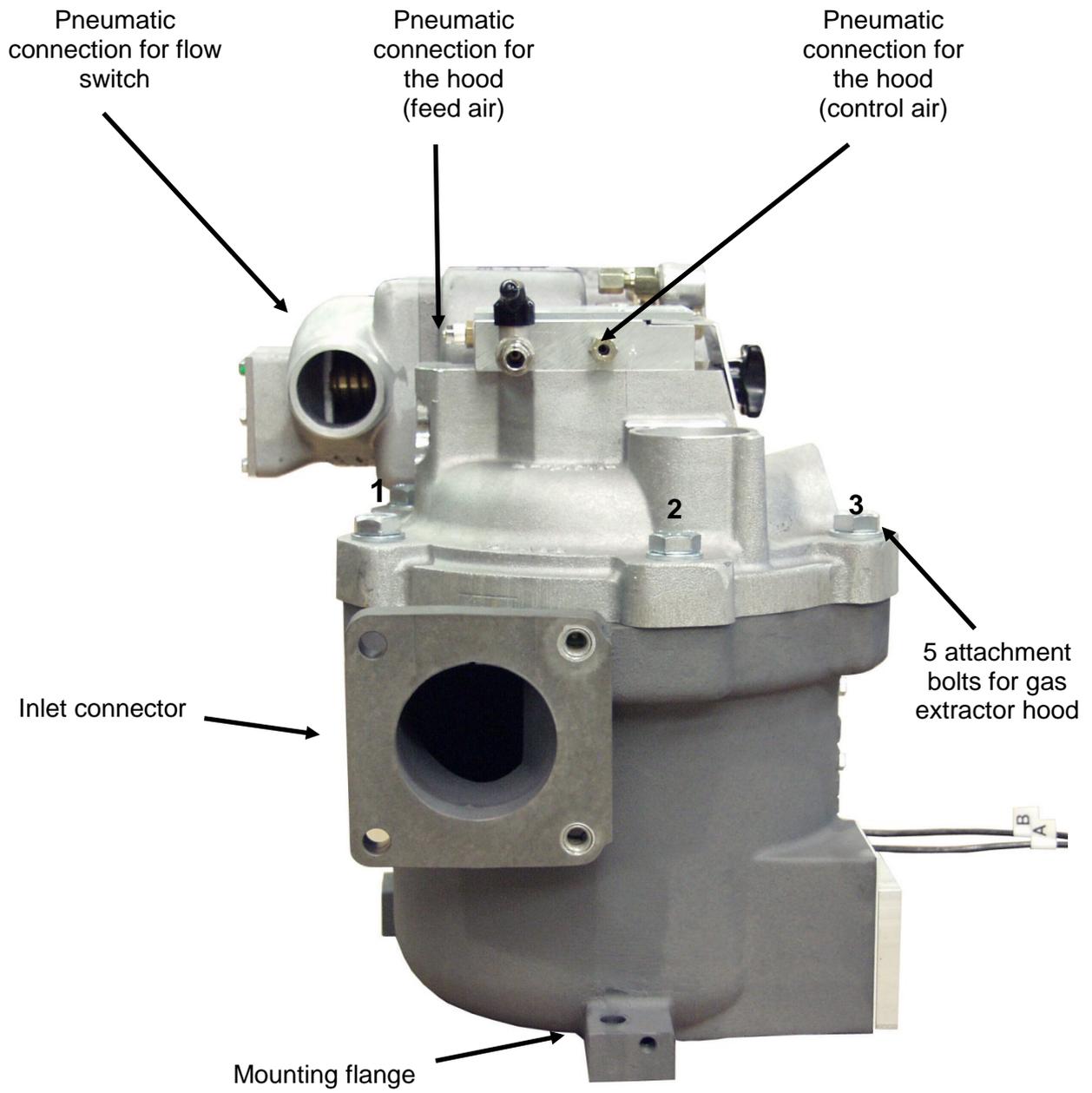


Figure 3: View from the left

2.2 Gas extractor

Metering is automatically interrupted if gases enter or are present in the metering system. The venting of the gas extractor’s housing that is required after shut-off and the subsequent continuation of the metering process are likewise carried out automatically.

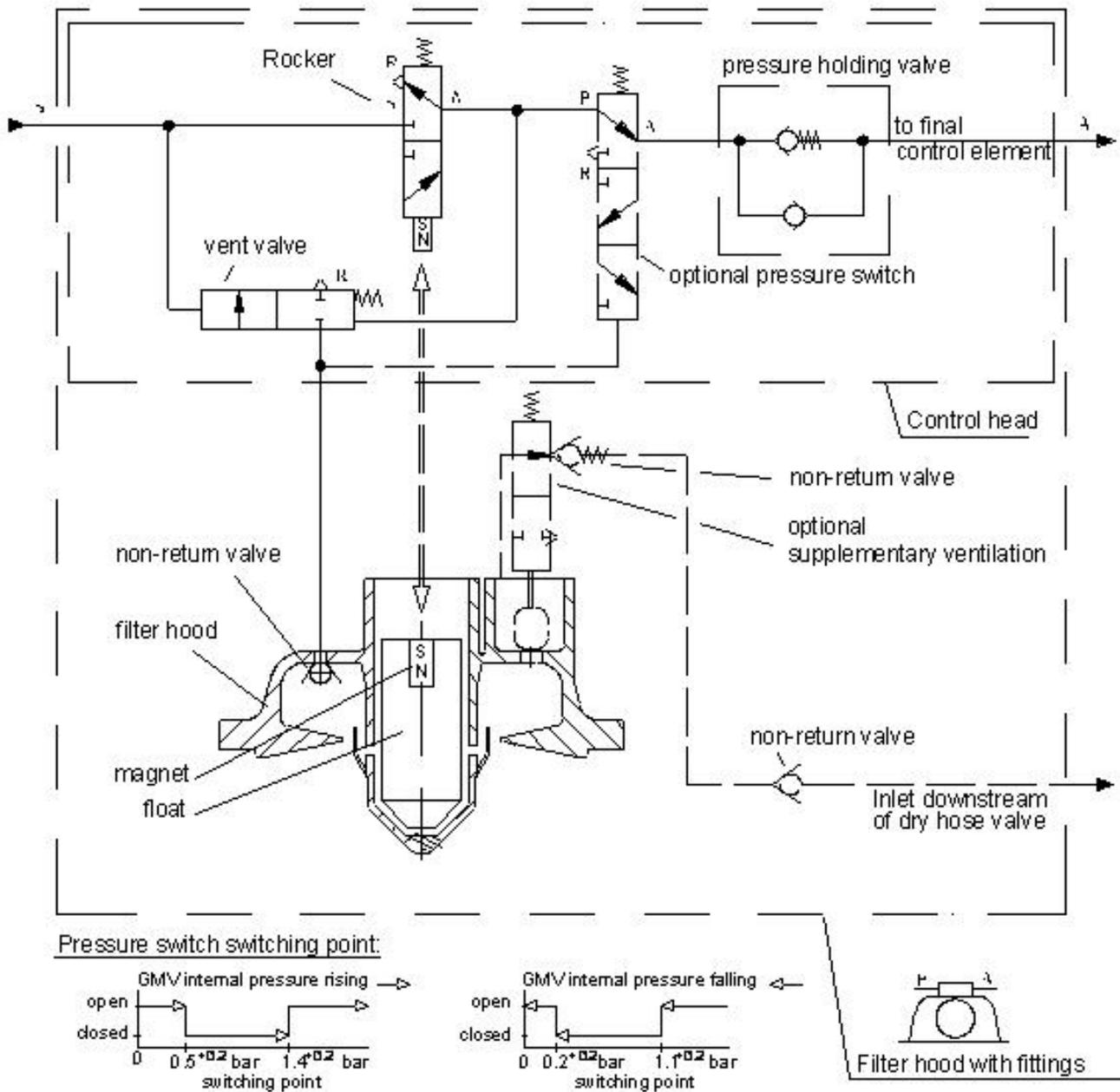


Figure 4: Schematic structure of gas extractor hood with control head

2.2.1 Venting

If the gas extractor hood is filled up to the upper edge of the Sight-glass with measured liquid (switch-on level), the float raised by the measured liquid operates the 3/2-way valve in the control head. The venting valve is thereby closed and the air pressure passes via Output A to the stop valve of the metering system. The measured liquid can now flow through the positive displacement meter.

If so much gas collects in the gas extractor hood that the liquid level sinks to the switch-off level, the 3/2-way valve vents the stop valve, the stop valve is closed by spring force and the venting valve opens until the measured liquid in the gas extractor's hood has reached the switch-on level again.

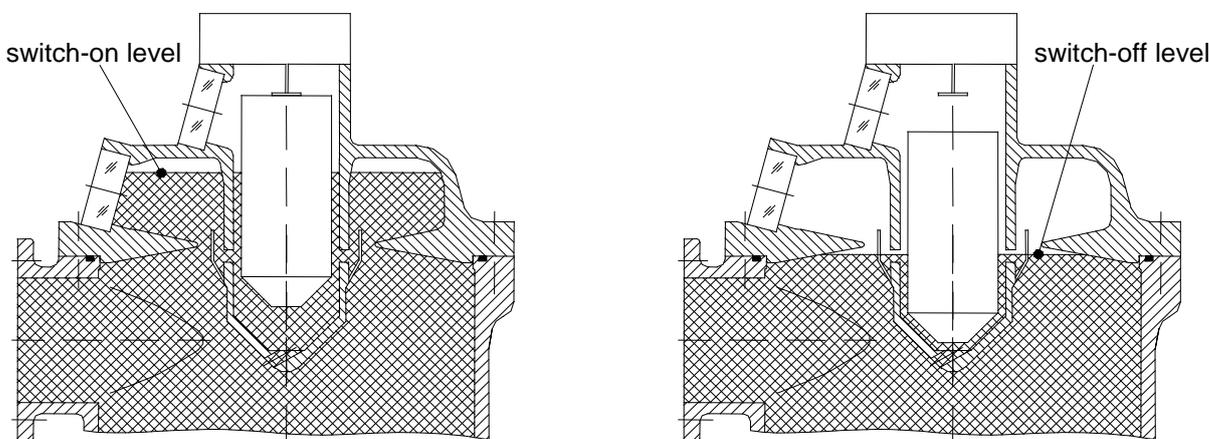


Figure 5: Switch-on and switch-off levels (static)

When gas is produced an automatic change takes place between venting with the stop valve closed and measurement with the standard venting closed. Venting takes place into the open air via a shut-off valve.

2.2.2 Supplementary ventilation (optional)

Supplementary ventilation reduces the number of stop valve switching processes for gravity discharge by the fact that it continuously removes the resulting gases. The gases are introduced into the product line (empty hose) downstream of the stop valve via a venting line bypassing the volume flowmeter. The venting line is to be closed by a shut-off valve. At its end there is a non-return valve, which closes automatically in the event of delivery by pump. Supplementary ventilation is only necessary for gravity operation of the system with gasoline.

A GMVT 805 equipment with supplementary ventilation is only possible without a residue discharge system.

2.2.3 Pressure switch (optional)

For delivery by pump the liquid pressure on the pressure side drops in the event of air entry on the suction side. In order to avoid possible faulty measurement as a result of this the controller can be equipped with an additional pressure switch. The latter is a 3/2-way valve integrated into the control head.

If the pressure falls below a defined value (1.1 bar) for delivery by pump the stop valve closes. For gravity discharge (pressure less than 0.2 bar) the pressure switch is automatically non-operational and the stop valve is released.

2.3 Volume Meter

The volume meter is a curved path-operated positive displacement meter with integrated pulse transmitter for connecting electrical meters.

The blades of the positive displacement meter are controlled by an inside curved path. The blades of the positive displacement meter thus run in the measuring chamber housing without contact to the walls of the housing. The robust volume meter is characterised by a low run-up resistance and a long operating life.

The integrated pulse transmitter converts the rotation of the positive displacement meter into electrical pulses. This non-contact process takes place in the measuring chamber. The pulse transmitter is connected directly to the MultiFlow type electronic flow computer or to an external flow computer.

2.4 Valves

2.4.1 Wet hose valve

A valve of 80 mm nominal size is used as a wet hose valve. There is no non-return flap between the wet hose valve and the volume meter.

Compressed air is applied to a piston to open the valve and the piston is forced into the end position against spring force. The valve cone is connected to the piston by means of a shaft. It carries out the same stroke and opens the valve outlet. The valve cone is constructed in the form of annular pistons such that all surfaces subjected to liquid do not result in outside forces (pressure-balanced) preventing the valve to be opened by the liquid pressure.

The wet hose valve can optionally be fitted with a manual throttle to reduce the flow.

2.4.2 Wet hose valve

A valve of nominal size 80 mm is used as a wet hose valve. There is no non-return flap between the wet hose valve and the volume meter.

For opening the valve, compressed air is applied to a piston which is forced into its end position against spring force. The valve cone being connected to the piston by a shaft carries out the same stroke and opens the valve outlet. To prevent the valve from being opened by the liquid pressure, the valve cone is designed as annular pistons so that liquid load of any surfaces doesn't result in external forces (pressure-balanced).

Optionally the wet hose valve can be fitted with a manual throttle to reduce the flow rate.

2.4.3 Bypass Valve

The two-way valves and the wet hose valves with "B" in the type name are equipped with a bypass valve in addition to the wet hose main valve.

Compressed air drives a piston against the tappet of the bypass valve. With the bypass valve open, the product passes into the wet hose by bypassing the closed wet hose valve.

A reed contact that is cast into the cover of the bypass valve has contacts that are closed by a permanent magnet in the piston if the bypass valve is in the closed position. When operating the control unit for the bypass the magnet gets out of the switching region of the reed contact and its contacts open.

The electrical contact of the bypass valve is located in the electric circuit of the level sensor. Thus the requirement is fulfilled that the green standby lamp of the overfill prevention amplifier goes out when discharge takes place via the bypass, independently of whether the switching amplifier is switched on or not.

2.4.4 Elbow

A pivotable outlet elbow with non-return valve has to be fitted to the wet hose side for two-way valves and wet hose valves. The Type KRW outlet elbow can be used to control a pump drive.

For systems with 2 hose reels a type DKRW double elbow is used. This double elbow likewise has control units for a pump. The changeover between hose reel 1 and 2 can take place under full pump pressure (8 bar).

Both elbows can be swivelled by the square flange on the valve in steps of 90°. For the double elbow the pipe bend can additionally be swivelled by 180°.

2.5 Pneumatic Control

All shut-off valves of the GMVT 805 metering system are arranged after the positive displacement meter looking in the flow direction. These are pneumatically actuated stop valves, which are closed by spring action in the pressure-free condition.

Pneumatic control of the shut-off valves takes place by means of magnetic valves, manual control valves, electronic flow computer systems and if necessary by locking valves.

2.5.1 Control by mechanical operating blocks

The pneumatic shut-off valves of the GMVT 805 metering system are controlled by mechanical operating blocks. All locking functions that are required for calibrating the metering systems and for output with a delivery protection device are undertaken by the mechanical operating blocks in combination with pneumatically controlled locking valves.

The overfill prevention amplifier is fitted with a solenoid valve as actuator.

A F.A. Sening overfill prevention amplifier with type name ASE-2, ASE E mV or ASE D MV is used for this. Alternatively, a F.A. Sening overfill prevention amplifier with the type name ASE-M, which is connected via the NOMIX system with a solenoid valve, can be used.

The electronic computer (meter for temperature quantity conversion) releases the supply air to the metering system using a single solenoid valve. If necessary, unlocking of the control switch takes place at the zero position of the meter.

Pneumatic Circuit Diagrams/ Control by Mechanical Operating Blocks				
51.250821	51.250822	51.250823	51.250824	51.250825
51.250826	51.250827	51.250828	51.250829	51.250830
51.250831	51.250832	51.250833	51.250864	

2.5.2 Control by Electronic Flow computer

The pneumatic shut-off valves of the GMVT805 metering system are controlled by the MultiFlow type electronic flow computer. The MultiFlow type electronic flow computer performs all locking functions that are required for calibration of the metering system and for discharge with an overfill prevention device.

Each shut-off valve of the GMVT805 metering system has an associated solenoid valve and the selection of the hose path is made by the MultiFlow type electronic computer.

For this "electronic control" by the flow computer, two options are possible depending upon the overfill prevention amplifier used.

1. AS (overfill prevention) amplifier with solenoid valve
2. Integrated AS amplifier supplied by Sening (without solenoid valve)



Input S4 of the MultiFlow type electronic flow computer may be only connected to a Sening AS amplifier (ASE-E-MF, ASE-D-MF or ASE-M) or to a differential pressure switch (see electrical connection diagrams).

Electrical Circuit Diagrams				
AI Version	51.351189		AIII Version	51.351125

2.6 Residual Discharge System (Optional)

The device for complete draining and re-filling of the entire metering system is designed to reduce the quantity of mixed product when product is changed (e.g. between fuel oil and diesel). For a product change, in addition to the gas extractor the liquid meter and the wet and/or dry hose valves are also discharged with a discharge pump. The product is forced out of the metering system into the chamber of the road tanker by means of the discharge pump.

Before the next discharge the gas extractor, the liquid meter and the wet and/or dry hose valve are filled up with new product from the chamber of the road tanker. It is ensured that the shut-off valves are not opened and the electronic meter is deactivated while the metering system is being discharged.



The GMVT 805 with residual discharge system is **only** designed for flow measurement of combustible liquids of **Hazard Class AIII** on road tankers..

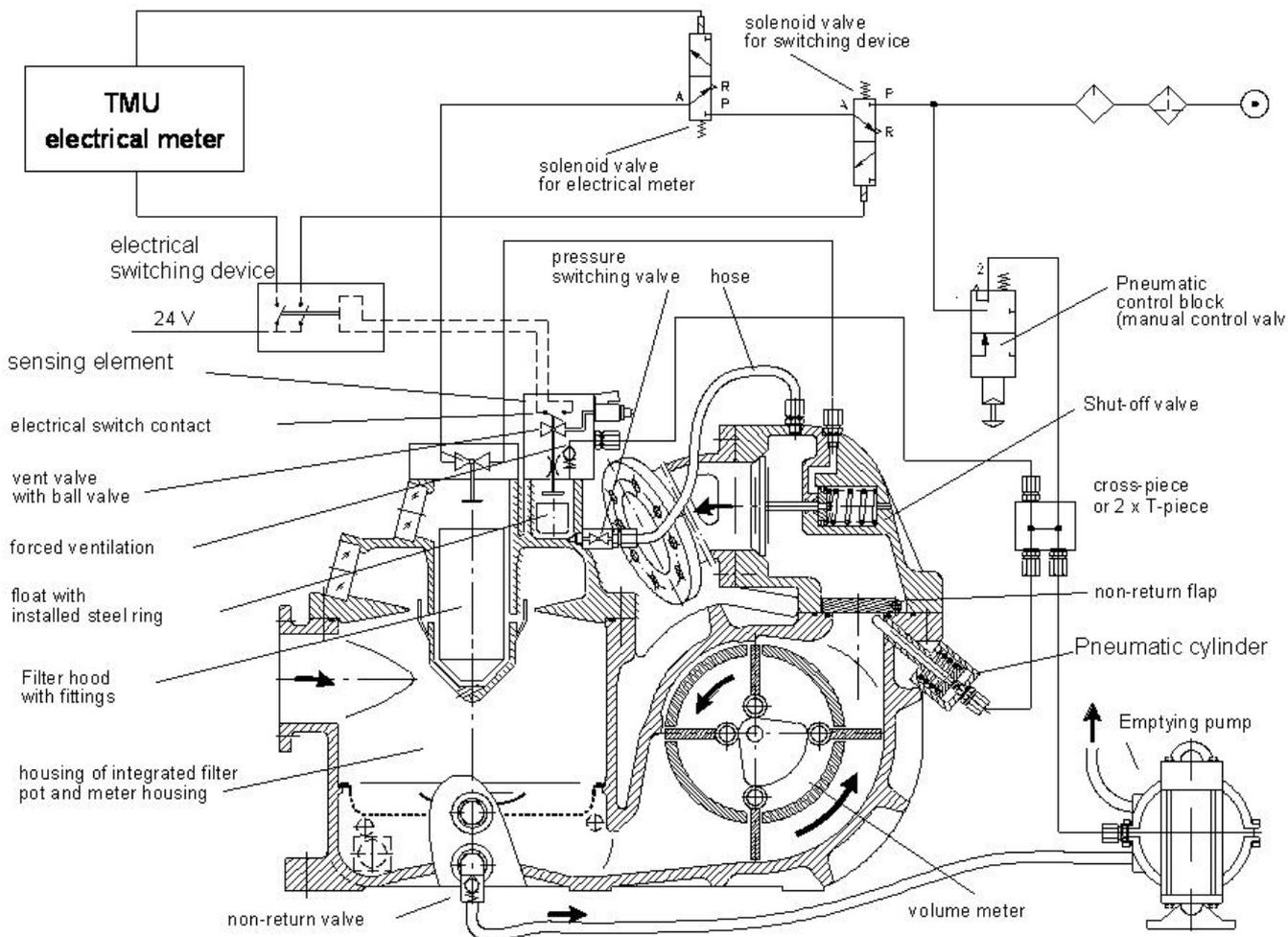


Figure 6: Schematic structure of the system for discharging and re-filling.

2.6.1 Construction and Mode of Operation

The lower opening of the gas extractor is connected via a non-return valve and a hose (G1/2) to a discharge pump. This discharge pump can be a purely pneumatically controlled pump (e.g. a diaphragm pump) or an electrically controlled pump with additional solenoid valve as control valve.

A pneumatic cylinder is only screwed into the housing of the volume flowmeter for metering systems with combined wet and dry hose valves. This pneumatic cylinder is spring-loaded on one side and opens the non-return valve between the volume flowmeter and the shut-off valves with pneumatic control air.

The pneumatic cylinder is not used for a metering system with a genuine wet hose valve.

The level of the combined wet and dry hose valve or the wet hose valve is monitored by a sensor connected to the interior of the shut-off valve via a pressure retaining valve. The sensor contains a float, a bleed valve with ball valve, a forced ventilation device and an electrical switch contact, which switches contactlessly via a steel ring mounted on the float.

This sensor and the pressure-retaining valve are mounted on the gas extractor hood of the metering system and connected to the shut-off valve via a hose. There is no connection between the sensing element and the interior of the gas extractor.

The electrical switch contact of the sensing element is connected to an electrical switching device. This switching device deactivates or reactivates the electronic meter and the power supply of the solenoid valve in the main air feed of the metering system.

Pneumatic circuit diagrams/ Pneumatically controlled diaphragm pump				
51.251209	51.251210	51.2501211		
Electrically controlled pump				
51.251251	51.251252	51.251253		
Electrical circuit diagram				
51.351508				

2.6.2 Residual Quantities

The residual quantities after discharging with the residual discharge system can be found in drawing 52.251256.

2.7 Order Codes

2.7.1 GMVT 805

Order Number	Description
Meter	
GMVT805-J	GMVT805 Meter
Gas extractor head	
FH5	Low head
FH5-D	Low head with pressure switch
FH5E	Low head with high capacity vent
FH5E-D	Low head with pressure switch and high capacity vent
Valve V,L	
GVL80	Wet/Dry Hose Valve
GVL80-D	Wet/Dry hose valve with throttle
SGA-DO80/3"	Sight-glass discharge nozzle with throttle
Valve V,L,B	
GVLB80	Wet/Dry hose valve with bypass
GVLB80-D	Wet/Dry hose valve with bypass and throttle
SGA-DO80/3"	Sight-glass discharge nozzle with throttle
valve V	
GV80	Wet hose valve
GV80-D	Wet hose valve with throttle
Valve V,B	
GVB80	Wet hose valve with bypass
GVB80-D	Wet hose valve with bypass and throttle
Elbows	
DKRW	Double elbow with controller
KRW	Elbow with controller
Unmeasured	
DV80-2	Line valve
SGA80/3"	Sight-glass outlet port

Table 1: Order Codes

2.7.2 GMVT 805 with Residual discharge

Order Number	Description
Meter	
GMVT805-J	GMVT805 Meter (wet hose only)
GMVT805-PE	GMVT805 meter (for wet/dry)
Hood	
FH5-PE	Low head
FH5-D-PE	Low head with pressure switch
Valve V,L	
GVL80PE	Wet/Dry hose valve
GVL80PE-D	Wet/Dry hose valve with throttle
SGA-DO80/3"	Sight-glass discharge nozzle with throttle
Valve V,L,B	
GVLB80PE	Wet/Dry hose valve with bypass
GVLB80PE-D	Wet/Dry hose valve with bypass and throttle
SGA-DO80/3"	Sight-glass discharge nozzle with throttle
valve V	
GV80PE	Wet hose valve
GV80PE-D	Wet hose valve with throttle
Valve V,B	
GVB80PE	Wet hose valve with bypass
GVB80PE-D	Wet hose valve with bypass and throttle
Elbows	
DKRW	Double elbow with controller
KRW	Elbow with controller
Unmetered	
DV80-2	Line valve
SGA80/3"	Sight-glass outlet port

Table 2: Order Codes with Residual discharge

3 Installation

3.1 General

- § Installation of the GMVT 805 metering system on road tankers may only be carried out by specialised workshops. (Qualified installers are defined as companies according to TRbF 180 Chapter no. 1.7.)

3.1.1 Preventive measures

3.1.1.1 For Accident Prevention:

- The type GMVT 805 metering system is constructed only for the discharge of low viscosity mineral oil products on road tankers. The appropriate safety regulations (e.g. explosion protection) must be complied with.
- All regulations and instructions in the manuals of the electronic equipment connected to the metering system must be considered (e.g. MultiFlow, AS amplifier).
- Instructions on all signs must always be observed.
- In case of a fault, the complete module must be replaced.

3.1.1.2 To meet the requirements stipulated by standards:

- All regulations, requirements and guidelines for the calibration of volume measuring instruments are to be considered. (see design approval).
- The overfill prevention device must correspond to the requirements of TRbF 512.
- The electrical installation must be carried out according to EN 60079-14; VDE 0165.

3.1.1.3 To ensure trouble-free operation:

- The hoses, pipelines and vehicle chambers must be carefully cleaned before assembly. The lines are to be screw-connected to the metering system without stresses.
- The metering system must be carefully filled with the measured liquid using the throttle (bottom valve open). Damage to the measuring chamber is avoided in this way.
- After pressure-cleaning the metering system with water, the metering system must be filled with product (e.g. fuel oil). Damage to the measuring chamber by corrosion is avoided in this way.
- You should interrupt the electrical supply (plus 24V and minus 24V) to all electronic components during welding work on the vehicle.

3.1.1.4 To make the job of the service personnel easier:

- Fit the metering system so that the head can be removed for cleaning the filter and the elbow or that the double elbow can be replaced without dismantling the metering system.

- Screw a pressure manometer into the feed line to the gas extractor for vehicles with pumps.
- Install electronics housings such that they are easily accessible.
- Slightly lubricate the fixing bolts of the covers prior to installation (copper paste, graphite grease). This prevents the bolts from corroding and becoming stuck after prolonged operation.

3.2 Installation

The metering system is to be installed horizontally. There are two options for fixing it in the valve cabinet:

- Attachment from below (through bores in the floor of the valve cabinet)
- Lateral attachment

Three threaded bores are fitted to the feet of the housing for both possibilities respectively (from below M12, from the side M10).

 The hoses and pipelines must be carefully cleaned before installation. They are to be screw-connected to the system without stresses.

When arranging the metering system, care should be taken that the switch-on point of the gas extractor hood is below the valve seat in the distribution channel of the tanker vehicle. The switch-on point can be found in the quotation drawings. (See appendix).

The feed to the intake into the gas extractor should be installed with a slight downward gradient and with the minimum possible number of detours (tube bends). In this way the gravity fed discharge performance is increased.

3.2.1 Pneumatic Installation

The pneumatic lines are to be connected in the system in accordance with the circuit diagrams. The connections shown in the pneumatic circuit diagrams with a cross (X) must be implemented to be proof against manipulation.

This is ensured by the use of 6x1 corrosion-resistant steel pipes, which are provided with connection security devices (Type VS) at both ends. If for example a flexible air line is required for the gas extractor hood, then a bend-proof hydraulic hose of 4 mm diameter with connection security devices must be used at both ends.

The line lengths given in the pneumatic circuit diagrams may not be exceeded. Lines without length data may not exceed 0.2 m after solenoid valves characterised by AS.

With Residual Discharge

For metering systems with residual discharge an additional solenoid valve is used in the main air feed. The pneumatic line to the residual discharge pump and if appropriate to the cylinder, which raises the non-return flap, must be implemented such that is secure against manipulation (steel pipe / connection security device). A kink-resistant hydraulic hose of 4 mm diameter with

connection security devices is used as the pneumatic line to the control head of the residual discharge device (sensing element/forced ventilation device).

3.2.2 Electrical installation

All electronic equipment and terminal boxes must be fixed in the valve cabinet in a stable and vibration-less manner.

All screws that are used for the attachment of all housings must be inserted with e.g. Molikote (graphite paste) or similar.

During assembly each metal housing must be connected with a reliable electrical connection to the vehicle chassis, using corrosion resistant screws (V2A).

All cables used must be fuel-resistant. Explosion proof-cable must be used for wiring in non-intrinsically safe areas.

In order to be protected all cables are to be installed in such a way that they are not damaged by the actions (working habit) of the operator. Wire end sleeves, cable shoes etc. are to be used for clamping the cables. The cable screw connections are to be carefully tightened. Unused cable screw connections are to be closed watertight with suitable blank screw connectors or suitable closure pins. Non-occupied terminal screws are to be tightened. The cover of the housing is to be carefully replaced after the connection work.

With Bypass

The electrical contact (blue cable) of the bypass valve must be connected into the circuit of the level sensor. Thus the requirement is fulfilled that the green standby lamp of the overflow prevention amplifier does not light if filling takes place via the bypass and irrespective of whether the amplifier is switched on or not.

With Residual Discharge

The Type EPE electrical switching device de-energises the 24 Volt supply voltage of the electronic flow computer. The level in the metering system is monitored by the attached sensor. An additional solenoid valve is connected which interrupts the main air supply of the metering system.



The residual discharge function is only ensured if the switch on the isolation circuit amplifier (yellow device) is in position "R".

As the electronic flow computer is not supplied with power if the metering system is dry, the switch of the isolation switching amplifier can be switched temporarily to "A" for parameterisation of the flow computer.

The time switch of the switch device must be adjusted in approx. 10 seconds (see electric circuit diagram).

3.2.3 Final testing

This qualified installer examines the complete system in accordance with the test criteria specified in the associated workshop and installation manuals. Correct establishment is to be certified by stating the pneumatic control circuit diagram and the circuit diagrams of the electronic systems.

The following tests should be carried out on the vehicle:

	Test	Comment
1	Leak test of the entire metering system, e.g. hydraulic pressure test.	Completely remove water from the metering system after testing.
2	Functional and leak testing of the pneumatic installation.	
3	Functional testing of the electrical installation. (see appropriate manuals)	

3.3 Commissioning

After switching on the compressed air supply and enabling the electronic meter the shut-off valve at the control head of the hood is to be opened. The associated shut-off valve is also to be opened for a system with supplementary ventilation.

The measured liquid is then to be fed to the system (bottom valve open). The system now vents until the measured liquid is at the upper edge of the gas extractor hood viewing glass.

The vent valve then closes, the stop valve opens and filling of the measuring chamber, discharge valve and if appropriate the wet hoses starts. Filling of the measuring chamber must be carried out with a low flow rate (low pump power/ throttle closed).

If there are two wet hoses are then both hoses must be filled before the first measurement.

With Residual Discharge System

After switching on the compressed air supply, the shut-off valves on the control head of the hood and on the control head of the residual discharge arrangement are to be opened.

The measured liquid is then to be fed to the system (bottom valve open). The system vents via the residual discharge control head until the measuring chamber and the stop valve are filled.

Now the electronic meter releases the system. The system now vents until the measured liquid is at the upper edge of the sight glass of the gas extractor head .

Then the vent valve closes, the stop valve opens and filling of the wet hoses can begin. Filling at low flow rate (low pump power/throttle closed) is not necessary.

If there are two wet hoses then both hoses must be filled before the first metering.

3.4 Calibration

The Type GMVT 805 metering system can only be operated with an electronic flow computer (e.g. MultiFlow). Thus Weights and Measures calibration of the metering system is carried out by the electronic flow computer.

Calibration is carried out by altering the so-called K factor. The new K factor is computed as follows:

$$K_{NEU} = \frac{\text{AnzeigeEichnormal}}{\text{AnzeigeElektr.Zählwerk}} \times K_{ALT}$$

Further data can be obtained from the associated manual.

There is a measurement pouch for the calibration thermometer on the cover of the lower monitoring sight-glass of the gas extractor.

Calibration testing must be carried out in accordance with the regulations and/or building and test provisions of the design approval. The stamp locations of the GMVT 805 metering system are to be taken from the attached stamp plans.

4 Operation

4.1 Mechanical Control

The pneumatic stop valves of the metering system are controlled by mechanical operating switches (such as control switch, control unit, control blocks). A bypass discharge is optionally provided. The AS amplifier is fitted with a solenoid valve as the final control element for the overfill prevention device. The system is equipped with electronic temperature compensation.

The pneumatically operated final control elements of the overfill prevention system and of the gas extractor for metered and unmetered discharge and also the bypass valve can only open if the pneumatic operating pressure is at least 3 bar. If the pressure falls below 2.5 bar, the force for self-holding in the switched-on position by the pneumatic control devices (such as control switches, control unit, control blocks) is no longer high enough and the previously opened shut-off valves close.

4.1.1 Delivery with overfill prevention

- Making the hose connection from the selected delivery connector of the tank truck to the relevant filler neck of the customer's storage tank.
- Determining the quantity of liquid in the storage tank.
- Switching on the switching amplifier (yellow lamp lights) and the electronic tank truck computer. Connecting the switching amplifier and the level sensor of the involved storage tank. After approx. 10 seconds up to a maximum of 3 minutes the green lamp of the switching amplifier lights (AS ready).
- Entering the preset data according to the operating instructions of the electronic computer.
- Opening the foot and distribution valves of the corresponding compartment of the tank truck. Switching on the tank truck pump if necessary.

Control Switch

- Setting the selection disk of the control switch to the delivery connector that is to be used. Changing the selection disk position is only possible if it is unlocked. Unlocking is carried out by the solenoid valve for the zero position of the electronic computer.

Delivery begins with operation of the pull button at the control switch, whereby for metered delivery it is assumed that the automatic gas extractor has released when the liquid filling is sufficient. Locking the selection disk in its position during or after delivery measurement is made automatically when operating the pull button on the control switch.

Control Unit or Control Block

- The pull button of the control unit and/or control block concerned is to be operated to initiate the delivery procedure.
- Air and/or gas inclusions in the gas extractor trigger an automatic interruption of the delivery procedure and venting of the gas extractor; afterwards delivery is automatically continued.
- Setting the desired flow rate using the throttle on the stop valves if required.

- If the permissible filling level in the tank is reached, delivery is automatically stopped (green lamp goes out). Furthermore, the delivery procedure can be interrupted at any time by pushing the pull button or by the electronic computer, without response of the overfill prevention.
- Closing the foot and distribution valves of the corresponding tank truck compartment. Switching off the tank truck pump if necessary.
- Removing the connection between the circuit amplifier and the level sensor and the hose connection from the tank truck to the filled storage tank again. Setting the electronic computer to zero by printing a receipt.
- Switching off the switching amplifier (yellow lamp goes out) and the electronics of the tank truck computer.

4.1.2 Delivery via the Bypass

Filling via the bypass of the overfill prevention in the wet hose system is only allowed for tanks up to 1000 l content with EL fuel oil or diesel fuel or movable machines without fixed connection to a filler connector outdoor with diesel or petrol, whereby the delivery flow rate has to be limited to a maximum of 200 l/min.

- When delivering via the bypass it is only possible using the wet hose. For vehicles with 2 wet hoses, you can choose between them.
- Determining the liquid quantity in the customer's container to be filled.
- Connecting the self-closing nozzle to the closed nozzle at the end of the wet hose using a tank truck coupling.
- Entering the preset data according to the operating instructions of the electronic computer.
- Opening the foot and distribution valves of the corresponding compartment of the tank truck. Switching on the tank truck pump if necessary.
- Setting the selection disk of the control switch to delivery connector "B" respectively "B1" or "B2". Changing the setting of the selection disk of the control switch to another delivery connector is only possible if it is unlocked. Unlocking is carried out by the solenoid valve for the zero position of the electronic computer.
- Operating the pull button on the control switch triggers opening of the bypass valve and at the same time locking of the selection disk in its position.
- For delivery the lockable nozzle at the end of the wet hose must be opened by locking the control lever. The upstream self-closing hose nozzle has to be opened too, but cannot be locked in the open position but must be kept open by hand during the entire delivery procedure (dead man safety device).
- The overfill prevention is not working. The filling process has to be watched closely.
- Air and/or gas inclusions in the gas extractor trigger an automatic interruption of the delivery procedure and venting of the gas extractor; afterwards delivery is automatically continued.
- Delivery is terminated by closing the nozzle that is being held open by hand. Push the pull-out knob of the vehicle control switch, the bypass valve closes.
- Releasing the control lever of the nozzle on the wet hose end from locking and closing the nozzle. Briefly open the upstream self-closing dispensing valve again, so that a small residual quantity can still be delivered to the container that is to be filled.
- Removing the self-closing nozzle by releasing the tank truck coupling before the wet hose is spooled.

- Closing the foot and distribution valves of the corresponding tank truck compartment. Switching off the tank truck pump if necessary.
- Setting the electronic computer to zero by printing a receipt.
- Switching off the switching amplifier (yellow lamp goes out) and the electronics of the tank truck computer.

Control units

Control units are included instead of a control switch and the pull-out knob with a "B" marking must be operated to open the bypass valve and to close it again later after completion of delivery.

4.2 Electronic Control

The pneumatic shut-off valves of the measurement system are controlled by the MultiFlow type electronic tank truck computer and bypass delivery is optionally provided. The AS amplifier is fitted with a solenoid valve (or NOMIX–solenoid valve) as actuator of the overfill prevention or the AS amplifier is connected via an „Open Collector“ output to the MultiFlow type electronic tank truck computer.

The pneumatically operated shut-off valves for metered and unmetered delivery and the bypass valve are opened by the MultiFlow type electronic computer as soon as release took place by the switching amplifier of the overfill prevention.

4.2.1 Delivery with overfill prevention

- Making the hose connection from the selected delivery connector of the tank truck to the relevant filler neck of the customer's storage tank.
- Determining the quantity of liquid in the storage tank.
- Switching on the switching amplifier (yellow lamp lights), MultiFlow type electronic computer and, if appropriate, the NOMIX system. Connecting the switching amplifier and the level sensor of the involved storage tank. After approx. 10 seconds up to a maximum of 3 minutes the green lamp of the switching amplifier lights (AS ready).
- Opening the foot and distribution valves of the corresponding compartment of the tank truck. Switching on the tank truck pump if necessary.
- Selecting the delivery connector to be used according to the operating instructions of the MultiFlow type electronic computer. Changing the selected delivery connector is only possible if the litre indicator of the MultiFlow type electronic computer still shows zero litres (zero position).
- After the preset data have been entered at the MultiFlow type electronic computer (see MultiFlow operating instructions), delivery starts by actuating the start button. For metered delivery it is provided that the automatic gas extractor was released at sufficient liquid filling. Selecting another hose path is not possible during or after delivery.
- Air and/or gas inclusions in the gas extractor trigger an automatic interruption of the delivery procedure and venting of the gas extractor; afterwards delivery is automatically continued.
- Setting the desired flow rate using the throttle on the stop valves if required.
- If the permissible filling level in the tank is reached, delivery is automatically stopped (green lamp goes out). The delivery process can, however, be interrupted at any time by pressing the stop button without waiting for the response of the overfill prevention device.
- Closing the foot and distribution valves of the corresponding tank truck compartment. Switching off the tank truck pump if necessary.
- Removing the connection between the circuit amplifier and the level sensor as well as the hose connection from the tank truck to the filled storage tank. Setting the meter to null with a receipt print at the MultiFlow type electronic computer.
- Switching off the switching amplifier (yellow lamp goes out) and the MultiFlow type electronic computer, if appropriate also switching off the NOMIX system.

4.2.2 Delivery via the Bypass

Filling via the bypass of the overfill prevention in the wet hose system is only allowed for tanks up to 1000 l content with EL fuel oil or diesel fuel or movable machines without fixed connection to a filler connector outdoor with diesel or petrol, whereby the delivery flow rate has to be limited to a maximum of 200 l/min.

- Delivering via the bypass is only possible using the wet hose. For vehicles with 2 wet hoses, you can choose between them.
- Determining the liquid quantity in the customer's container to be filled.
- Connecting the self-closing nozzle to the closed nozzle at the end of the wet hose using a tank truck coupling.
- Opening the foot and distribution valves of the corresponding compartment of the tank truck. Switching on the tank truck pump if necessary.
- Selecting connector "B" and/or "B1" or "B2" according to the operating instructions of the MultiFlow type electronic computer. Changing the selected delivery connector is only possible if the litre indicator of the MultiFlow type electronic computer still shows zero litres (zero position).
- After having entered the preset data at the MultiFlow type electronic computer (see operating instructions), delivery starts by operating the start button. As a prerequisite the automatic gas extractor has to be enabled at sufficient liquid filling. Selecting another hose path is not possible during or after delivery.
- For delivery, the lockable nozzle at the end of the wet hose must be opened by locking the control lever. The upstream self-closing hose nozzle has to be opened too, but cannot be locked in the open position but must be kept open by hand during the entire delivery procedure (dead man safety device).
- The overfill prevention is not working. The filling process has to be watched closely.
- Air and/or gas inclusions in the gas extractor trigger an automatic interruption of the delivery procedure and venting of the gas extractor; afterwards delivery is automatically continued.
- Delivery is terminated by closing the nozzle that is being held open by hand. The bypass valve closes by pressing the stop button on the MultiFlow type electronic computer.
- Release the control lever of the nozzle on the wet hose end from locking and close the nozzle. Briefly open the upstream self-closing dispensing valve again, so that a small residual quantity can still be delivered to the container that is to be filled.
- Removing the self-closing nozzle by releasing the tank truck coupling before the wet hose is spooled.
- Closing the foot and distribution valves of the corresponding tank truck compartment. Switching off the tank truck pump if necessary.
- Setting the meter to null with a receipt print at the MultiFlow type electronic computer.
- Switching off the switching amplifier (yellow lamp goes out) and the MultiFlow type electronic computer, if appropriate also switching off the NOMIX system.

4.3 Residual Discharge (Optional)

Residual discharge of the GMVT 805 type metering system minimises product mixing during a product change (e.g. heating oil / diesel).

Before residual discharge of the metering system is started, the preceding discharge should be completely finished (Receipt print).

- Close all bottom valves and distribution valves of the road tanker.
- Open the return pump line of the appropriate chamber and start the return suction pump. The level in the float chamber of the residual discharge arrangement falls and the electronic flow computer is deactivated.
- After emptying the entire metering system, close the return pump line and switch off the return suction pump.
- For refilling, open the appropriate chamber and fill the metering system under gravity or using the tank truck pump. The ball valve on the residual discharge control head must be opened. The level in the residual discharge float chamber rises and the electronic flow computer is reactivated.
- If the residual discharge product emanates from the venting line on the control head, the ball valve can be closed.
- Discharge with the new product can be started..

5 Maintenance

The filter, which is located before the inlet of the measured liquid into the volume flow meter, is to be cleaned regularly (under normal operation at least once every year, and more frequently for contaminated liquid). Proceed as follows:

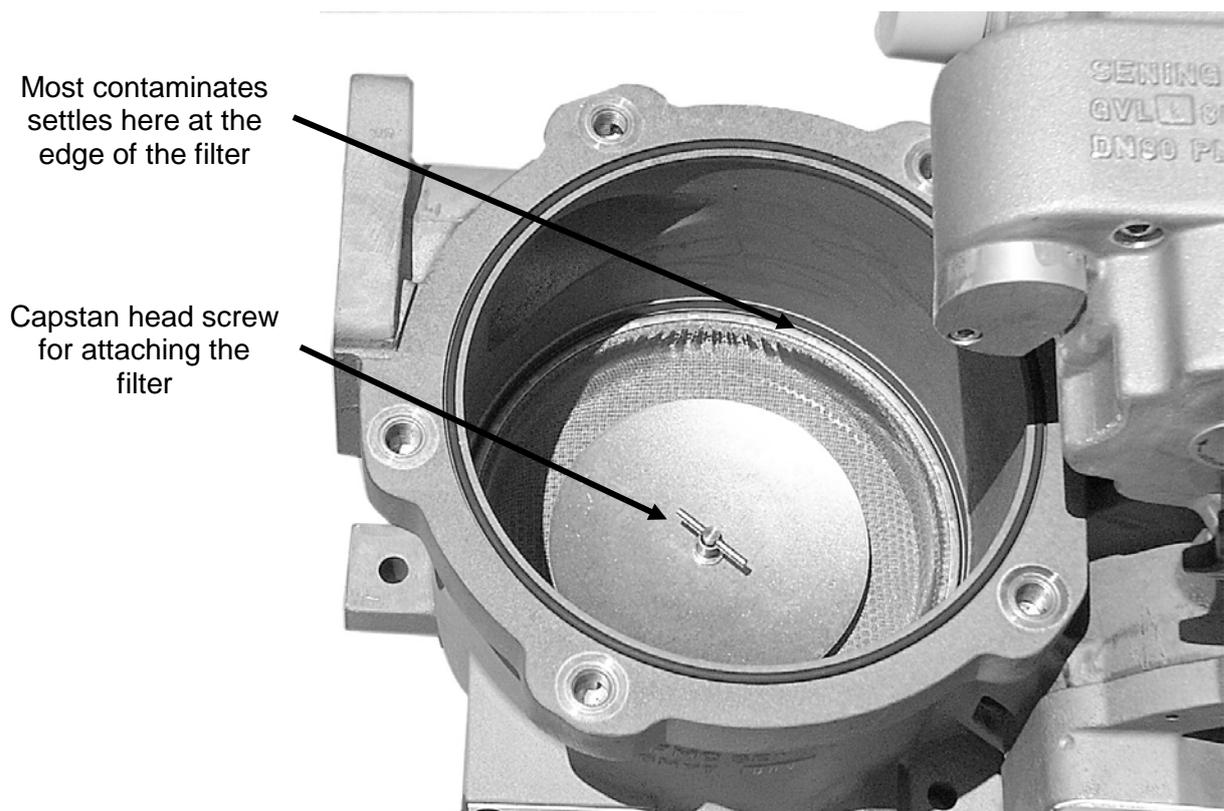


Figure 7: Maintenance filter

- ☞ Dismantle gas extractor hood
(To do so loosen the five hexagonal bolts)
Remove impurities from the filter's edge with a brush.



IMPORTANT:
No dirt must pass into the space below the filter.
Dirt inevitably damages the meter!

- ☞ Remove and clean filter (also loosen the toggle bolt).
Clean gas extractor hood and housing floor.
Ensure clean flange surfaces and correct O-ring seating for assembly.
- ⚠ When discharging with a pump same can be damaged.

6 Trouble shooting

§ The replacement or repair of components of the GMVT805 metering system on road tankers may only be performed by qualified installers. [Qualified installers are defined as companies according to TRbF 180 Chapter no. 1.7.]

Fault	Possible Cause	Measure
No flow	No control air, or air pressure too low	Check compressed air supply
	Pressure switch in gas extractor has not enabled (only for GMV D)	Increase pump pressure / slightly close throttle on stop valve
	Solenoid valve defective / electronic device not connected	Check solenoid valve / replace if necessary / check electronic device
	Liquid level in head too low	Check inlet flow
	Vent valve closed	Open vent valve
	Filter in GMV filter pot blocked / dirty	Clean filter (see Maintenance)
	Float of gas extractor defective/ jammed Control head defective	Replace float with control head (always replace both parts together)
	The stop valve (V,L or B) does not open	Replace valve if compressed air present
	Rotor of volume meter jammed	Replace measuring chamber Make rotor operable (remove impurities) *)
Flow too low	Filter in GMV filter pot dirty	Clean filter (see Maintenance)
	Throttle on stop valve closed	Open throttle
	Pressure upstream of metering system too low (only for pump operation)	Check feed to metering system pump) (pump is drawing air on the suction side)
Output valve does not open	No control air or air pressure too low	Check compressed air supply
	Defective valve insert	Replace appropriate valve if compressed air present

*) only by factory-trained qualified installers

Fault	Possible Cause	Measure
Flow switch in elbow joint does not switch	No control air or air pressure too low	Check compressed air supply
	Defective flow switch	Replace elbow if compressed air present
Mineral oil emanates from venting control switch or solenoid valve off	For a stop valve the seal leaks to the compressed air side	Determine defective valve and replace (e.g. connect transparent PA air hose and deliver by pump))
Electronic flow computer gives false indication	Erroneous calibration	Recalibration / New calibration (see operating manual)
	Rotor of volume meter is running tight	Replace measuring chamber Make rotor operable (remove impurities) *)
Supplementary vent valve (optional) is not venting	Vent valve closed	Open vent valve
	Defective non-return valve on dry hose connector	Replace non-return valve
Supplementary vent valve (optional): a large quantity of mineral oil is sucked through the hose	Discharge taking place by pump	Close venting valve
	Defective venting valve	Replace supplementary ventilation
Residual discharge (optional) is not venting	Vent valve closed	Open vent valve
	Pressure for filling the metering system too low.	Switch on tanker pump
	Defective vent valve	Replace residual discharge (additional control head on GMV)
Residual discharge (optional) is not feeding air to the metering system	Air pressure too low	Check compressed air supply
	Residual discharge pump not working	Open return suction line and/or check residual discharge pump
	Non-return flap does not open	Check pneumatic cylinder (after measuring chamber)
Residual discharge (optional) does not unlock electronic flow computer	Sight-glass with float is not filled	Open venting valve / open chamber and if appropriate switch on the tank truck pump
	Check voltage supply of the electrical switching device (residual discharge)	Provide voltage supply and/or replace switching device.
	Float does not switch sensor	Replace residual discharge (additional control head on GMV)

*) only by factory-trained qualified installers

Table 3: Trouble shooting

7 Technical Data

Nominal size:	DN 80
	Dry hose: DN 80
	Wet hose: DN 50
Materials:	Housing: Aluminium
	Rotor: Grey cast iron
	also glass, POM, Viton, NBR, brass, high-grade steel
Weight:	approx. 68kg
Rated pressure:	10 bar (PN 10)
Pneumatics:	Working pressure $p = 3 - 7.5$ bar (45 to 110 psi)
Rated flow:	800 l/min
Minimum flow:	40 l/min
Smallest discharge quantity:	200 litres
Meter accuracy:	$\pm 0,15\%$ rel.
Measuring chamber volume:	2.258 litres
Discharge temperature:	-10°C to +50°C (Measured liquid temperature)
Measured liquid:	Mineral oils and mineral oil products with a viscosity
	$\eta < 1$ mPa·s to 20 mPa·s
Connection dimensions:	see appendix drawing number 61.250904 to 7
Licenses:	<u>PTB</u>
	Gas extractor: License number 5.154 / 99.06
	Positive displacement meter: License number 5.243 / 99.44
	Discharge device: License number 5.162 / 01.01
	<u>TÜV-Nord</u>
	Overfill prevention device: Certificate from 17.08.1999 / 2543 ru

8 Warranty and Service

In addition to the dealer's legal warranty in the purchase agreement we grant the end user a warranty for this device on the following conditions:

1. The warranty period is twelve months and starts at the time of delivery of the device by F. A. Sening. With electronic products the registration form must have been received at Sening fully completed and signed by the installation department.
2. The warranty includes the rectification of all device damage or defects occurring within the warranty period and which can be shown to be due to material or production faults.

The warranty does not include:

- slight deviations from the intended quality which are insignificant for the value or usefulness of the device,
 - damage or defects due to connection other than as specified, improper handling or non-observance of the installation guidelines and instructions for use,
 - damage caused by the chemical and electrochemical effects of water or other liquids, electrical or electromagnetic influences and or caused by abnormal ambient conditions in general,
 - damage due to external effects such as damage in shipment, damage due to shock or impact, the effects of the weather or other natural phenomena.
3. The right to claim under warranty becomes invalid if repairs or tampering have been carried out by persons not authorised by us for the work or if our devices have been fitted with supplementary parts or accessories which are not suitable for our devices and not released by us for that purpose.
 4. The warranty service is carried out, free of charge and according to our choice, by repairing defective parts or replacing them by perfect parts. Replaced parts become our property.
 5. During the first six months of the warranty period the warranty service is carried out without billing. Thereafter, travelling times, travelling costs and working time for the service staff and any transport costs occurred are billed or not reimbursed.
 6. Work under warranty does not imply any extension of the warranty period nor does it initiate a further period of warranty. The warranty period for installed replacement parts terminates with the end of the warranty period for the complete device.
 7. Any more extensive or additional claims, in particular those for compensation of damages or consequential damages occurred outside of the device are expressly excluded, provided no liability is deemed mandatory in law.

9 Address and Contact

Important Note

All explanations and technical details given in this documentation have been produced and edited by the author with the greatest care. However the possibility of errors cannot be completely eliminated. We would be very grateful for the notification of any errors found.

Our service department would be pleased to advise and help you.
They can be reached under:

FMCTechnologies

Measurement Solutions

F. A. Sening GmbH

Regentstrasse 1
D-25474 Ellerbek

Tel.: +49 (0) 4101 304 - 0 (Switchboard)

Fax: +49 (0) 4101 304 - 152 (Service)

Fax: +49 (0) 4101 304 - 133 (Sales)

Fax: +49 (0) 4101 304 - 255 (Customer Service)

E-mail: fa.sening@intl.fmcti.com

Web: www.fmctechnologies.com/measurementsolutions

10 Keyword Index

A

Advantages 7
AS_amplifier 27

C

calibration 25
Capstan_head 33

E

Electrical_installation 23

F

filter 33
Final_testing 24
flow_computer 16
Functional_description 7

G

Gas_extractor 12
gas_extractor_hood 33
Gas_extractor_hood 8

K

K_factor 25

M

MultiFlow 16

P

Pneumatic_control 15

S

Safety_instructions 6

T

temperature_compensation 27
Trouble_shooting 35

V

venting_valve 13
volume_meter 14

W

warranty 39
Wet_hose_valve 14

10.1 Table of Figures

Figure 1: View from the right..... 9
 Figure 2: Front view..... 10
 Figure 3: View from the left..... 11
 Figure 4: Schematic structure of gas extractor hood with control head..... 12
 Figure 5: Switch-on and switch-off levels (static) 13
 Figure 6: Schematic structure of the system for discharging and re-filling..... 17
 Figure 7: Maintenance filter 33

10.2 Index of Tables

Table 1: Order Codes 19
 Table 2: Order Codes with Residual discharge 20
 Table 3: Trouble shooting 36

Anhang A. Drawings and Approvals

Overviews Schematics

Description	Drawing No.	Page
General structure of the metering system GMVT 805	51.250810	45
General structure of the metering system GMVT 805 with residue discharge	51.251123	46
Volumes and residual quantities of the metering system	52.251256	47

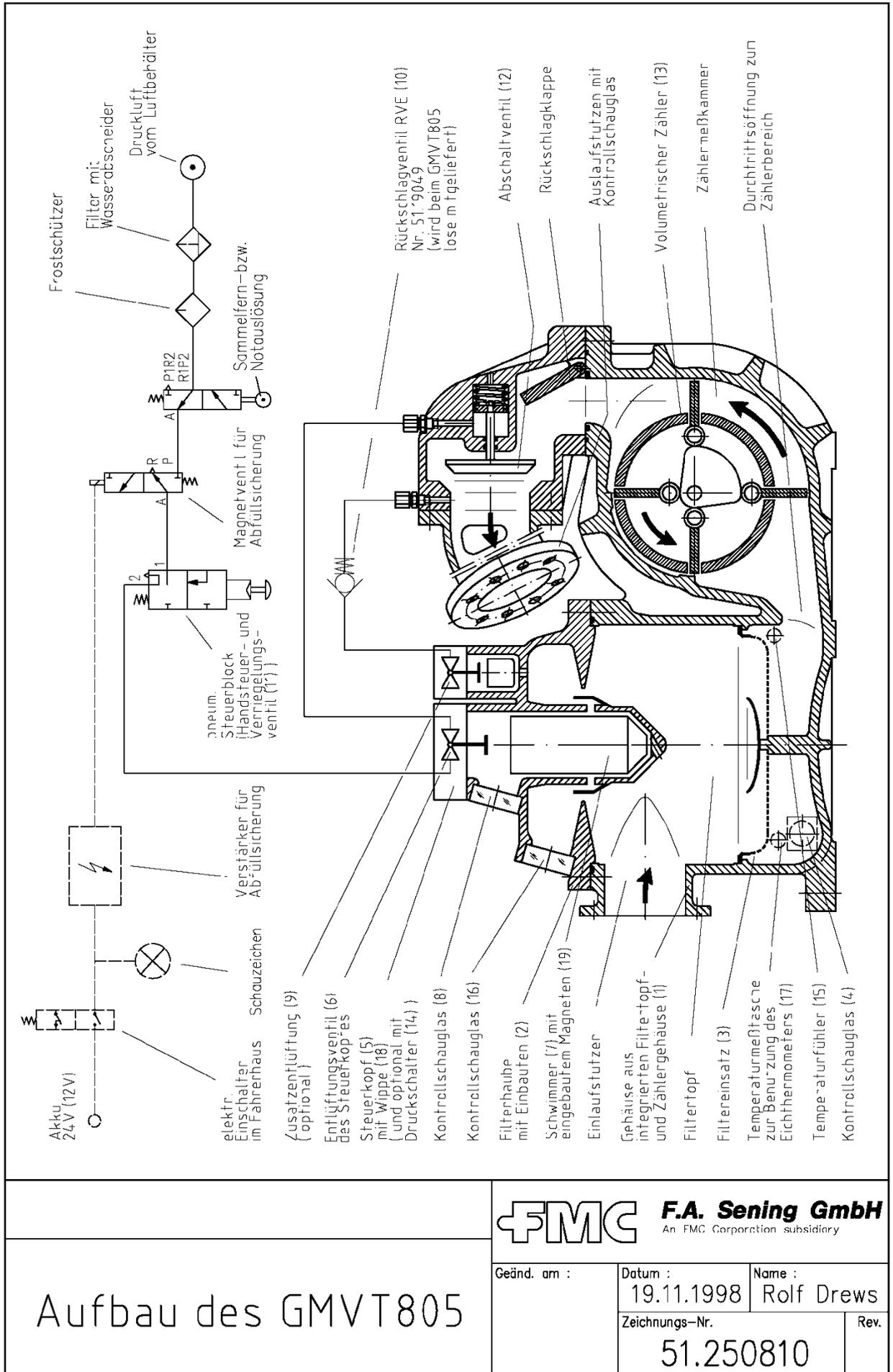
Pneumatic Circuit Diagrams

Description	Drawing No.	Page
Solenoid valves Connection diagrams & Order codes	E51.351740	49
Pneumatic diagram Metering system control with external overfill amplifier	E51.252087	50
Pneumatic diagram Metering system control without overfill amplifier or integrated overfill amplifier	E51.252088	51
Pneumatic diagram unmetered with 2 outlets	E51.252089	52

Declarations

Description	Drawing No.	
Declaration of Conformity		53

"Schutzvermerk nach DIN 34 beachten"



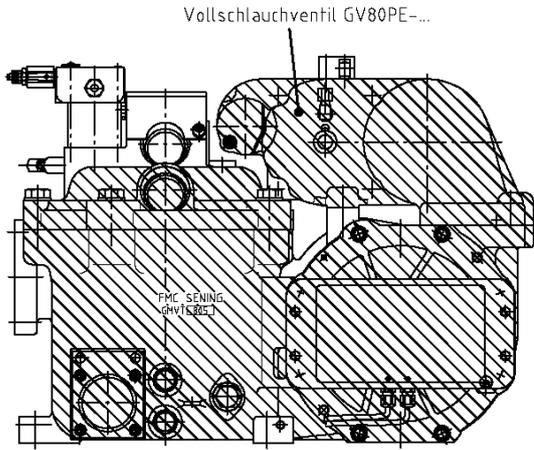
Aufbau des GMVT805

FMC F.A. Sening GmbH
An FMC Corporation subsidiary

Geänd. am :	Datum :	Name :
	19.11.1998	Rolf Drews
Zeichnungs-Nr.		Rev.
51.250810		

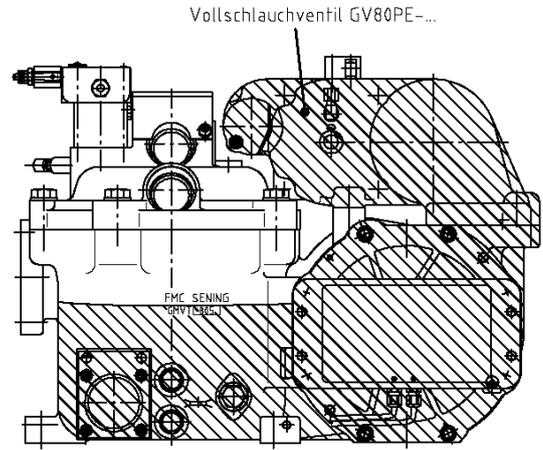
gefüllt bis EIN-Schaltpunkt
der Haube

$$V_{\text{Rest Haube}} = 18.1 \text{ Liter}$$



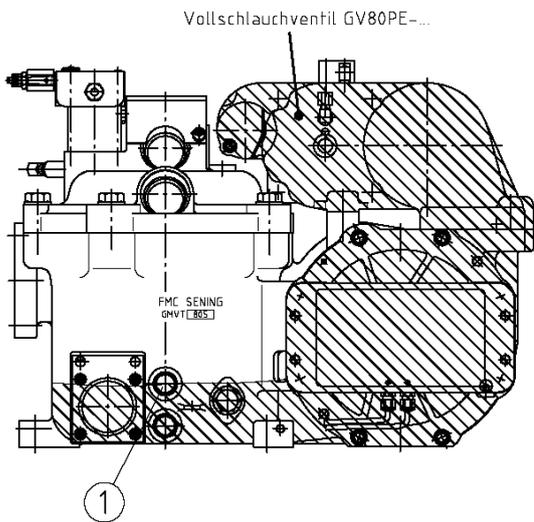
übliche Restmenge nach
dynamischem Abschalten
des Gasmeßverhüters

$$V_{\text{Rest dyn.}} = \text{ca. } 14.5 \text{ Liter}$$



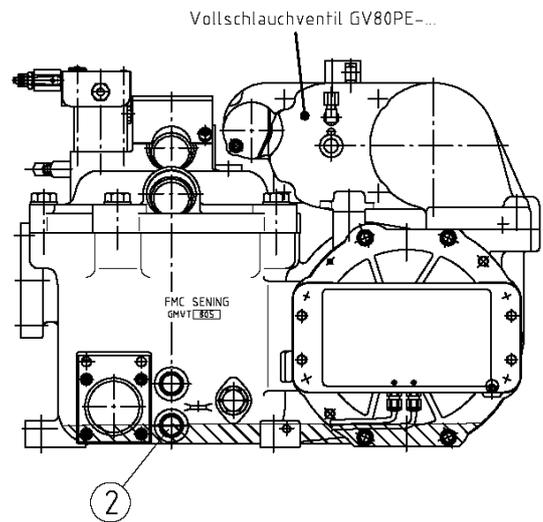
Restmenge nach Entleerung
bis zur G1/2" Ablaßschraube Pos.1

$$V_{\text{Rest Pos.1}} = 9.5 \text{ Liter}$$



Restmenge nach Entleerung mit
Restentleerungssystem bis zur
G1/2" Ablaßschraube Pos.2

$$V_{\text{Rest Pos.2}} = \text{ca. } 1 \text{ Liter}$$



"Schutzvermerk nach DIN 34 beachten"

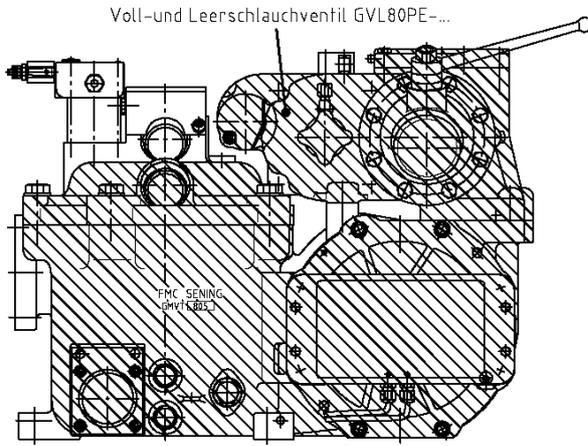
Volumen und Restmengen
Meßanlage GMVT805-PE V
mit Restentleerungssystem

FMC EnergySystems **F.A. Sening GmbH**
FMC Measurement Solutions Eiterbek, Germany

Geänd. am :	Datum :	Name :
	26.07.2001	Schaewe
Zeichnungs-Nr.		Rev.
52.251256 Bl.1		

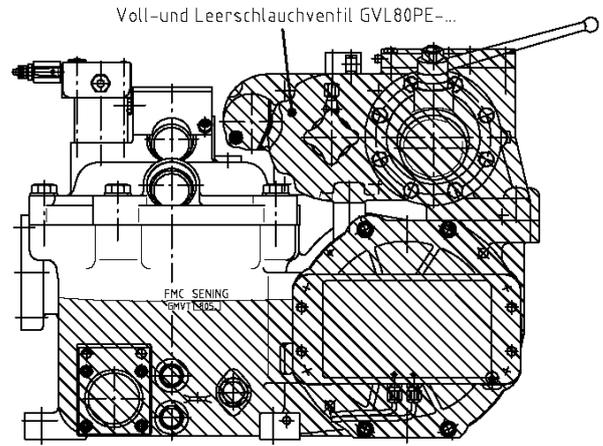
gefüllt bis EIN-Schaltpunkt
der Haube

$$V_{\text{Rest Haube}} = 18.1 \text{ Liter}$$



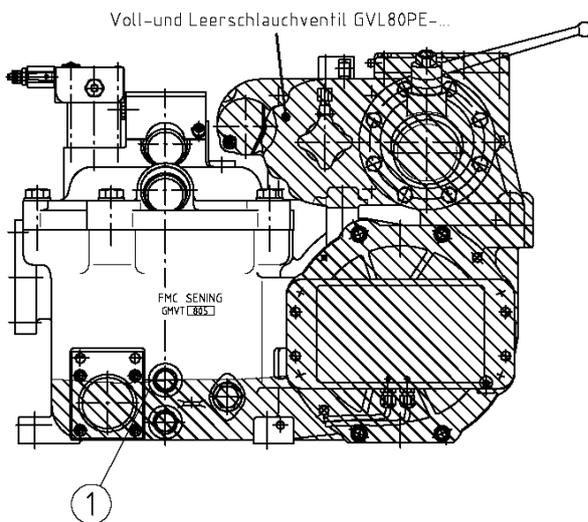
übliche Restmenge nach
dynamischem Abschalten
des Gasmeßverhüters

$$V_{\text{Rest dyn.}} = \text{ca. } 14.5 \text{ Liter}$$



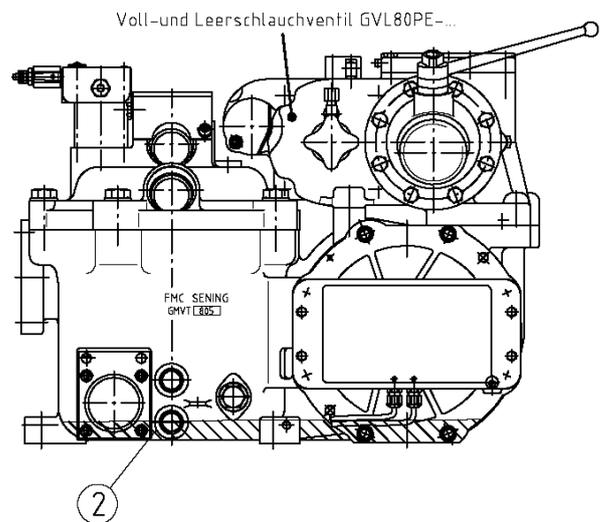
Restmenge nach Entleerung
bis zur G1/2" Ablasschraube Pos.1

$$V_{\text{Rest Pos.1}} = 9.5 \text{ Liter}$$



Restmenge nach Entleerung mit
Restentleerungssystem bis zur
G1/2" Ablasschraube Pos.2

$$V_{\text{Rest Pos.2}} = \text{ca. } 1 \text{ Liter}$$

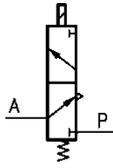


"Schutzvermerk nach DIN 34 beachten"

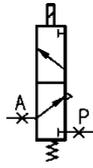
Volumen und Restmengen
Meßanlage GMVT805-PE V+L
mit Restentleerungssystem

FMC EnergySystems **F.A. Sening GmbH**
FMC Measurement Solutions Ellerbek, Germany

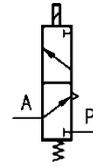
Geänd. am :	Datum :	Name :
	26.07.2001	Schaewe
Zeichnungs-Nr.		Rev.
52.251256 Bl.2		



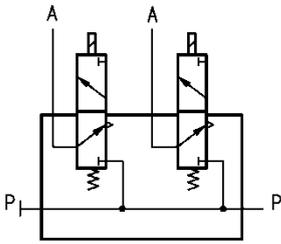
MVS1-E11-12



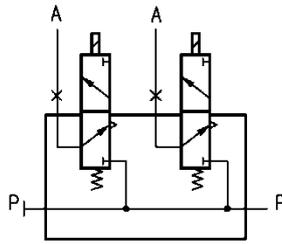
MVS1-E11-122
MVS1-E11-262



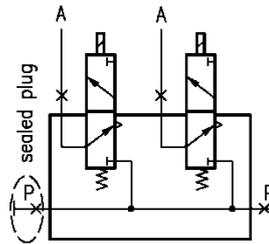
MVS1-S11-12K
MVS1-S11-24K



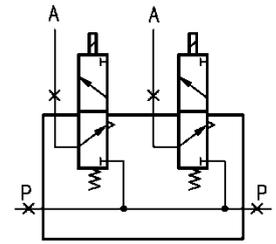
MVS2-E12-12



MVS2-E12-122



MVS2-E12-123
MVS2-E12-263



MVS2-E12-124
MVS2-E12-264

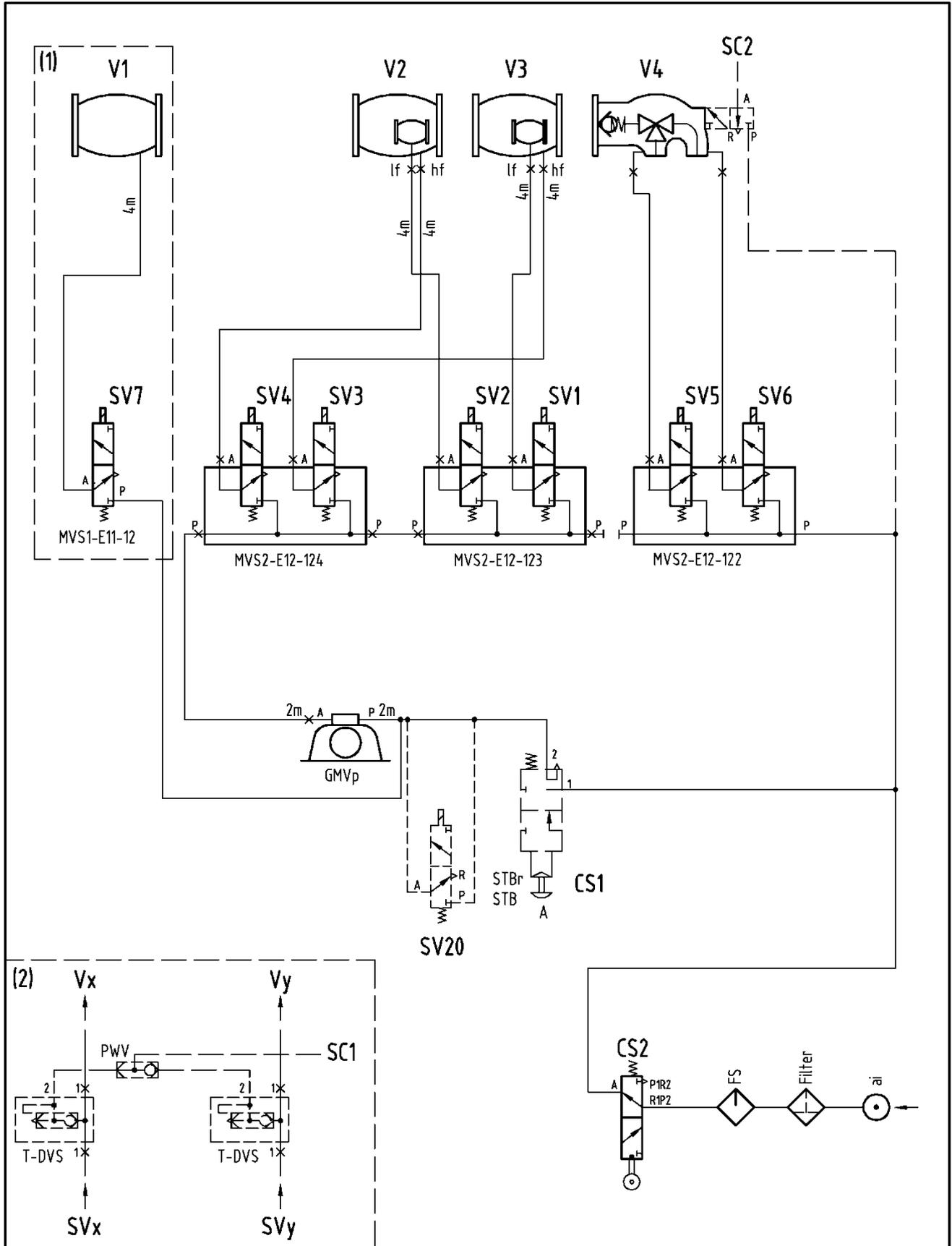
A/P | A/P |
 ——— | ——— |
 without | with |
 Swirvellung screw-fitting (e.g. Ermeto)

MVxx-xxx-xxx

- Optional: Number of swirvellung screw-fittings (e.g. Ermeto)
K = no screw fitting
- Solenoid voltage 26 = 26 Volt 24 = 24 Volt
12 = 12 Volt
06 = 6 Volt
- Number of air outputs
- Number of air inputs
- Explosion protection (E=EX; S=Standard)
- Number of solenoid valves
- S = Standard (without manual operation)
N = Emergency operation (with manual operation)

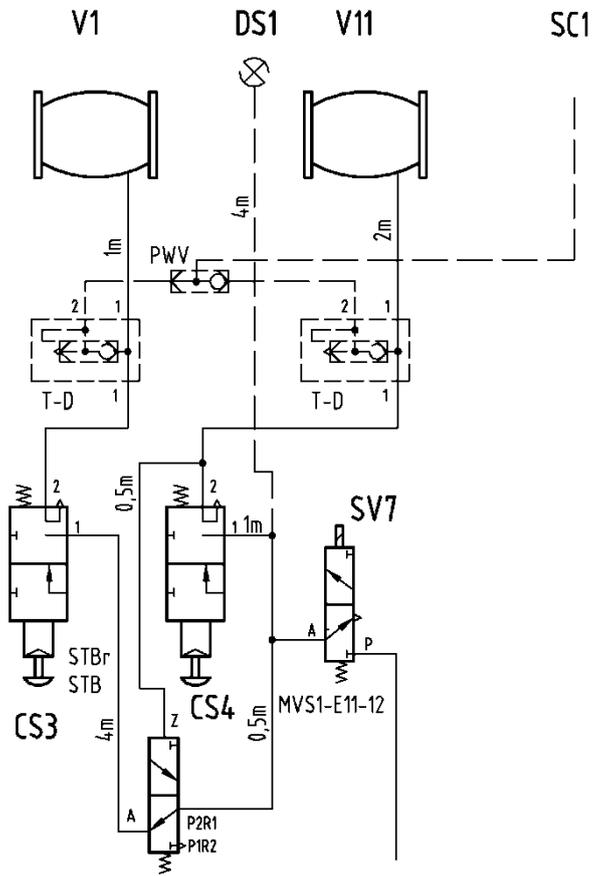
"Schutzvermerk nach DIN 34 beachten"

<p>Solenoid valves Connection diagrams & Order codes</p>		<p>FMC EnergySystems F.A. Sening GmbH <small>FMC Measurement Solutions D-25474 Ellerbek, Germany</small></p>	
		<p>Changed : 28.09.04 NB;</p>	<p>Date : 27.07.2004</p>
		<p>Drawing No. E51.351740</p>	<p>Rev. A</p>



"Schutzvermerk nach DIN ISO 16016 beachten"

<p>Pneumatic diagram Metering system control without overfill amplifier or integrated overfill amplifier</p>	<p>FMC Technologies F.A. Sening GmbH D-28474 Ellerbek, Germany</p>	
	<p>Geänd. am : ECN Nr. Datum Name</p>	<p>Datum : 20.06.2008</p>
<p>Zeichnungs-Nr. E51.252088</p>		<p>Rev.</p>



"Schutzvermerk nach DIN ISO 16016 beachten"

Pneumatic diagram
unmetered with 2 outlets

FMC Technologies

F.A. Sening GmbH
D-25474 Eilerbek, Germany

Geänd. am :	Datum :	Name :
ECN Nr. Datum Name	20.06.2008	Larsen
	Zeichnungs-Nr.	Rev.
	E51.252089	

1 **EG - Konformitätserklärung**
EC - Declaration of Conformity

2 im Sinne der EG-Richtlinie über Messgeräte
nach 2004/22/EG (MID)
as defined by EC-directive on measuring instruments 2004/22/EG (MID)

3 Der Hersteller / *The Manufacturer*

F.A. Sening GmbH, Regentstraße 1, D-25474 Ellerbek

4 erklärt hiermit, dass das Messgerät
herewith we declare, that the measuring instrument

Produktbezeichnung / *Product designation*

Messanlage auf Straßentankwagen für Flüssigkeiten, Viskosität < 20 mPas·s

Typ / *Type*

TTS-GMVT-805-MF(M)-

EG – Baumusterprüfbescheinigung* / *EC – Type-examination certificate**

DE-07-MI005-PTB017

Ausgestellt von: *Issued by:*

Physikalisch-Technischen Bundesanstalt

*einschließlich aller Ergänzungen / *including all supplements*

5 in der gelieferten Ausführung den Anforderungen der EG-Richtlinie entspricht.
corresponds to the EC-directive requirements in the delivered implementation.

6 Diese Erklärung und das Anbringen der CEM-Kennzeichnung erfolgt auf Grundlage der durch eine benannte Stelle
erstellten Konformitätsbescheinigung gemäß Anhang F der Richtlinie. Die Konformitätsbescheinigung wurde durch
die benannte Stelle gemäß Kennnummer der CEM-Kennzeichnung erstellt.
*This declaration and the affixing of the CEM-marking based on the certificate of conformity issued by a notified body according
annex F of the directive. The certificate of conformity was issued by the notified body according the identification number named on
the CEM-marking.*

7 Die zugehörige Betriebsanleitung enthält wichtige sicherheitstechnische Hinweise und Vorschriften für die
Aufstellung, Inbetriebnahme, Wartung und Instandhaltung der (s) Gerät(es).
*The appropriate operator's manual contains important safety technical notes and regulations for the installation, placing into
operation, maintenance and maintenance of the equipment.*

8 Ort und Datum: Ellerbek, den 07.04.2008
Location and date

Geschäftsführer
General Manager


(H. Short)

The specifications contained herein are subject to change without notice and any user of said specifications should verify from the manufacturer that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications which may have been changed and are no longer in effect.

Contact information is subject to change. For the most current contact information, visit our website at www.fmctechnologies.com/measurementsolutions and click on the "Contact Us" link in the left-hand column.

Headquarters:

500 North Sam Houston Parkway West, Suite 100 Houston, TX 77067 USA, Phone: +1 (281) 260 2190, Fax: +1 (281) 260 2191

Measurement Products and Equipment:

Erie, PA USA +1 (814) 898 5000

Ellerbek, Germany +49 (4101) 3040

Barcelona, Spain +34 (93) 201 0989

Beijing, China +86 (10) 6500 2251

Buenos Aires, Argentina +54 (11) 4312 4736

Burnham, England +44 (1628) 603205

Dubai, United Arab Emirates +971 (4) 883 0303

Los Angeles, CA USA +1 (310) 328 1236

Melbourne, Australia +61 (3) 9807 2818

Moscow, Russia +7 (495) 5648705

Singapore +65 6861 3011

Integrated Measurement Systems:

Corpus Christi, TX USA +1 (361) 289 3400

Kongsberg, Norway +47 (32) 28 67 00

San Juan, Puerto Rico +1 (787) 772 8100

Dubai, United Arab Emirates +971 (4) 883 0303

Visit our website at www.fmctechnologies.com/measurementsolutions

Printed in Germany © 04/15 F. A. Sening GmbH, Inc. All rights reserved. MN F08 002 EN / DOK-397 Issue/Rev. 1.01 (04/09)