



Further documentation on this product:

Description	Order no.
GMVT 805 operating and installation instructions	DOK-397E
EPE2-Controller for Meter Draining System Service Instructions	DOK-512E

## History

Revision	Date	Editor	Status	Description
Rev. 1.00	February 2006	JS	Release	Basic edition
Rev. 1.01	August 2006	JP	Release	- new formatting / illustrations - editorial changes
Rev. 1.02	April 2009	/ JS / jp /	Release	Minor changes: - Table 1: DIP switch S1 settings - Figure 4: Connection label in the device cover - Drawing 61.351684 / - Drawing 61.351994 - Chapter: special service settings removed - Appendix: "HyperTerminal" terminal program settings removed
Rev. 1.03	March 2010	/ JS / jp /	Release	Minor changes: - Figure 5: Connection label in the device cover - DIP switch S1 settings (from MID version 3.50) - Figure 3: Schematic structure "Stand-Alone" - Figure 4: Schematic structure "with MultiFlow" - Chapter 3.1.1 Text corrections - New Chapter 3.7 "Parameters in the MultiFlow" - New Chapter 3.8 "Diagnose in the MultiFlow"

## 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 are always very grateful for notification of any errors found.

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## 1 General

### 1.1 Orientation aids for the manual

This manual contains a variety of information. For that you can easily find the required subjects we have designed some orientation aids for this manual.

- **Pictograms**

The information in this manual extends from mandatory safety measures and default values to concrete handling steps and well-intended advice. This information is identified with suitable pictograms in the left margin to enable better distinction in context.

The following pictograms are used in this manual:



**Danger sign.** Here: Danger of explosions caused by easily flammable gases and liquids.



**Working step.** Concrete action statements, e.g. "Press the <Enter>-key"



**Positive response message,** e.g. "The main menu now appears "



**Negative response message,** e.g. "If a fault message appears now..."



**Note, Short tip,** e.g. "See more detailed information in Chapter XX"



**Option, Special Case**



**Functional Description**



**NOTE:** indicates a special situation.



**ATTENTION:** particular attention is to be paid.

- The key word register at the end of the documentation enables easier location of theme areas.

## 1.2 Device description

☐ The **EPE2-Controller** (**Elektronik Pneumatische Entrestung**, type 2) are used for monitoring the residue discharge of **GMVT 805** measuring systems.

☐ The control electronics is designed for two operating modes. In the “**Stand-Alone residue discharge**“ mode the electronics work autonomously and during product change switch off the control air and, time delayed, the supply voltage of the flow computer, using a solenoid valve (**12V, Type MVS1-E11-12**).

☐ In the “**Restentleerung mit MultiFlow (MultiFlow residue discharge)**“ mode the Sening™ **MultiFlow** controls the residue discharge. The solenoid valve in the control air can then be omitted. For this purpose the CAN bus connection to the **MultiFlow** truck computer is prepared.

☐ The “**Stand-Alone residue discharge**“ or „**MultiFlow residue discharge**“ modes are set via a DIP switch S1 on the **REC-1S** printed circuit board (see also Figure 6 / page 18).

☐ The **EPE2-Controller** consists of a sealed **SVC-2S** power supply unit and an **REC-1S** control board. The use of the device is limited to products of hazard class AIII, whereby installation in zone II is permitted. (see chapter 3.6 “Components overview” / page 18).

☐ The operating status of the **EPE2-Controller** is displayed by a yellow (power) and a green (status) LED. (see chapter 5 “Display of the operating states” / page 31).

☞ The cover can be sealed to prevent manipulation.

☒ If the **EPE2-Controller** are used as a replacement of the previous EPE controls, then the solenoid valve is to be replaced with the one mentioned above (due to different control voltage).

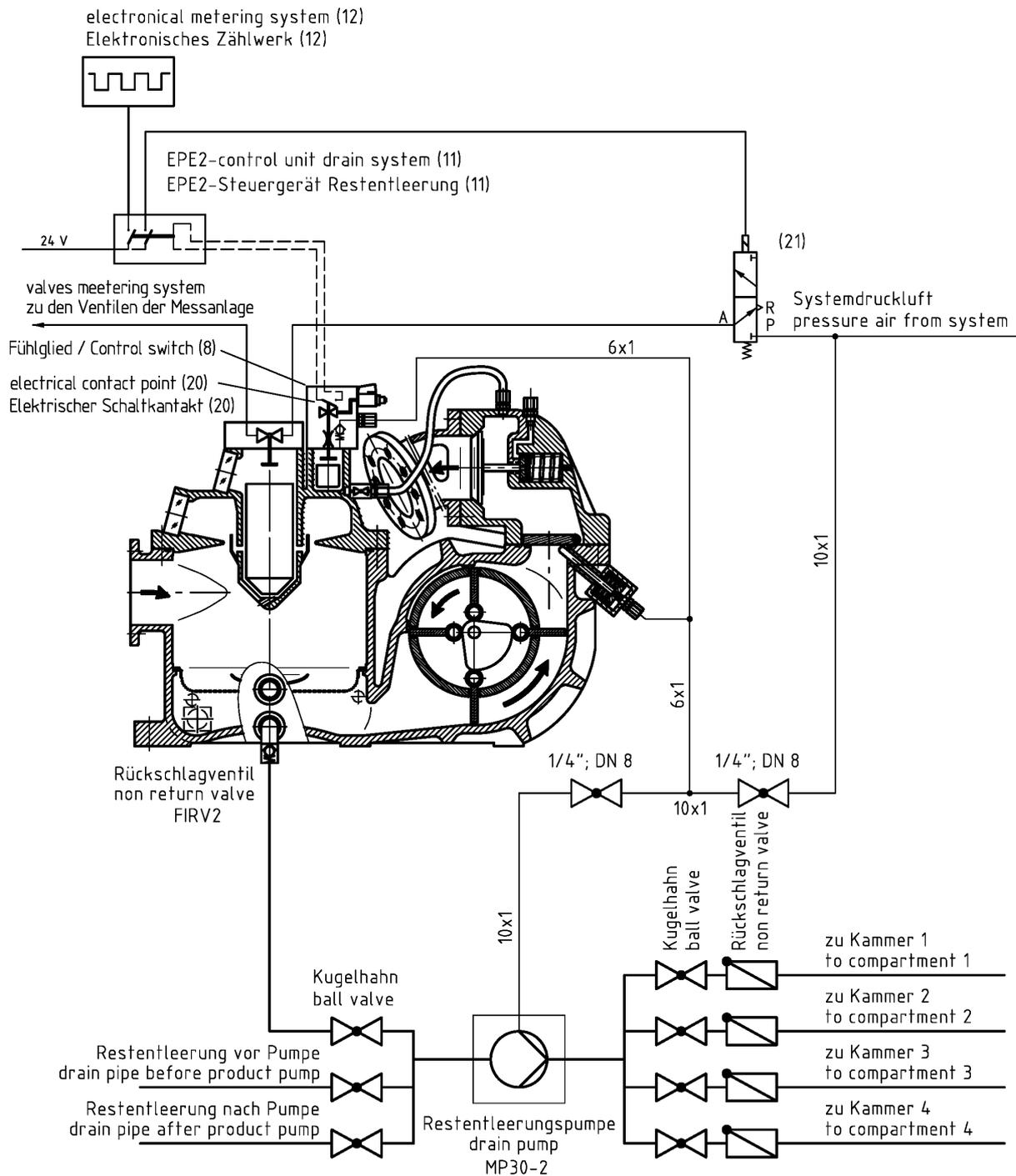


Figure 1: EPE2



Figure 2: EPE2 Internal overview

**1.3 Schematic Structure of GMVT 805 “Stand-Alone residue discharge”**



**Figure 3: Schematic structure of the device for discharging and refilling “Stand-Alone residue discharge”**

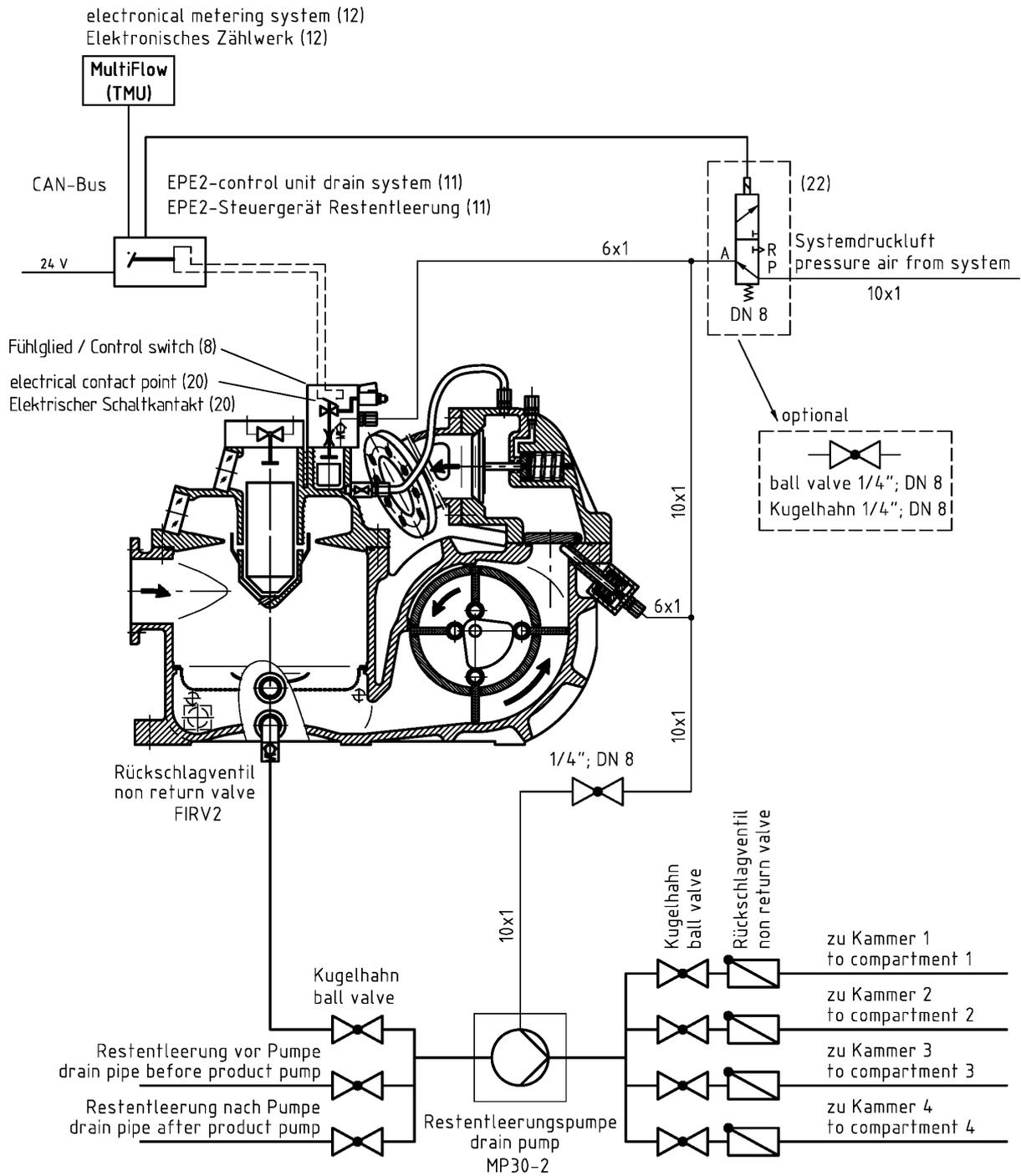


The GMVT 805 with residue discharge system was only conceived for flow measurement of combustible liquids of **Hazard Class AIII** on tank trucks.

### 1.3.1 “Stand-Alone residue discharge“ function

- ☐ The Illustrated **EPE2**-Controller [11] is fitted with an isolation circuit amplifier and a time relay and connected as per the electric circuit diagram drawing no. **E61.351684** / page 43.
- ☐ The input circuit (signal from initiator [20]) is monitored for broken wire and short circuit. An error in the input circuit causes blocking of the output (signal to flow computer electronic meter [12] and to the 3/2-way solenoid valve [21]). The electronic meter [12] is used together with a mechanical measuring chamber for temperature compensated delivery of mineral oil products.
- ☐ The above mentioned time relay is required that fluctuations of the liquid level in the sensing element causing measurement interruptions (closing of the shut-off valve) deactivate the elec. meter (interruption of the power supply) not until a delay of at least 8-10 s. The reactivation of the elec. meter takes place without delay, as well as the interruption of the power supply to the above 3/2-way solenoid valve [21] and its reactivation.

**1.4 Schematic Structure of GMVT 805 “MultiFlow residue discharge“**



**Figure 4: Schematic structure of the device for discharging and refilling “MultiFlow residue discharge“**

#### 1.4.1 “MultiFlow residue discharge“ function

- ☐ Alternatively for control the type approved MultiFlow electronic meter in connection with the **EPE2**-Controller can be used. The wiring is made as per the electric circuit diagram drawing no. **E61.351994** / page 44.
- ☐ The **EPE2**-Controller is connected via a data bus directly with the MultiFlow electronic meter [12]. The electronic MultiFlow meter takes over all control functions as per the **EPE2**. Hence the 3/2-way solenoid valve [21] of the switching devices is no longer needed.
- ☐ If the type approved MultiFlow electronic meter together with the **EPE2**-Controller is used for control, the 3/2-way solenoid valve [21] for the electric switching device is no longer needed. For the supply of residual discharge components with compressed air, can be used a solenoid valve [22] (DN8 / actuator spring-to-open) or an optional manually operated ball valve.

## 2 General installation instructions

In addition to the following points listed, you also have to follow all relevant regulations such as VDE 0165 during set-up, operation and maintenance. Only when the following recommendations are followed we can guarantee long and trouble-free operation.

### 2.1 Preventive measures

#### 2.1.1 For preventing accidents (caused by ignition of gases)



***Explosive protection ordinances are to be followed!***

The **EPE2**-Controller are **NOT** suitable for use in explosive areas. However installation of the device in Zone II is permitted.

#### 2.1.2 To meet the requirements stipulated by standards

- The wiring must be carried out according to the circuit diagrams supplied. The colours of the wires correspond to DIN 47100. Please follow the colour codes **strictly**.
- The electrical installation must be carried out according to EN 60079-14; VDE 0165.
- No additional components must be added to the **EPE2** housing, since this would void the device approval.

#### 2.1.3 To ensure trouble-free operation

- Disconnect the power supply during welding on the vehicle.
- Always mount the cable entries facing to the side or downwards, to avoid water from penetrating the housing.
- Unused PG screw joints should be sealed on the device using waterproof sealing plugs.
- Protect the terminal- and electronic housings as well as the plugs against direct water spray (e.g. from the tyres).
- Install all cables so that they cannot get damaged or kinked.
- Fit all wires with end sleeves.
- All electric connections are made using screw clamping technology. They are to be fed into the housing through the PG-screw joints provided according to their respective cross section.

- ✂ If wires have to be trimmed, no cable residues must be allowed to fall into the open unit. This could cause short circuits on the printed circuit board.
- ✂ There must never be any connection between the housing/shield and the 0V terminal. Otherwise functional errors can occur.
  - Install the solenoid valve upright, i. e. the magnetic coil must point upwards.

#### 2.1.4 To make the job of the service personnel easier

- Install the junction boxes such that they are easily accessible.
- Even the electronic housings should be installed such that they are easily accessible.
- Cables without plug-in connectors may be shortened.
- Slightly lubricate the fixing bolts of the covers prior to installation (e.g. copper paste, graphite grease). This prevents the screws from corroding and ensures that you can loosen them after prolonged operation.

## 2.2 Maintenance

The **EPE2**-Controller for Meter Draining System are maintenance free. The device must not be modified mechanically or electronically in any way.

- ✂ During cleaning with a steam cleaner or with pressurised water, the device should be protected from the water jet. Never aim the steam jet directly onto the device!
- § We won't accept liability for any damage caused by water invasion in the equipment caused by improper cleaning.

## 3 Commissioning

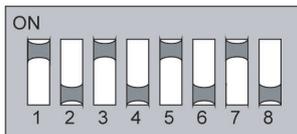
The **EPE2-Controller** is factory set so that no adjustments are required rafter installation. Just the operating mode, switching logic and the sensor type have to be checked and adapted if necessary.

### 3.1 Adaptation of the operating mode

- A difference is made between the **“Stand-Alone residue discharge“** and **“MultiFlow residue discharge“**.
- Both operating modes as well as other settings are made via the DIP switch S1 on the **REC-1S** printed circuit board (see also Figure 6 / page 18).

The DIP switch **S1** settings are shown in the following table.

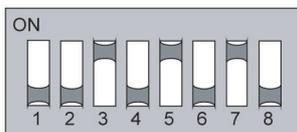
DIP switch **S1**  
 on the **REC-1S** board



**MultiFlow residue discharge**  
 (from MID version 5.00)

- 1 = ON – With MultiFlow
- 2 = OFF – No Test
- 3 = ON – Only channel 2
- 4 = OFF – Reserved
- 5 = ON
- 6 = OFF | CAN-Bus
- 7 = ON | address = 5
- 8 = OFF |

DIP switch **S1**  
 on the **REC-1S** board



**Stand-Alone**

- 1 = OFF – Stand-Alone
- 2 = OFF – No Test
- 3 = ON – Only channel 2
- 4 = OFF – Reserved
- 5 = x
- 6 = x | CAN-Bus
- 7 = x | address = xx
- 8 = x |

Table 1: DIP switch S1 settings

### 3.1.1 Operating modes

The **EPE2**-Controller are designed for two operating modes.

- In both operating modes the residue discharge switch or sensor is connected with the sensor input **J3** on the **REC-1S** control board.  
(see also drawing no. **61.351684** / page 43 and **61.351994** / page 44)
- The sensor or switch type has to be adjusted as described in paragraph 3.4 / page 16.

#### 3.1.1.1 “Stand-Alone residue discharge“ mode

**REC-1S** printed circuit board DIP switch **S1-1**: **OFF**

- In this operating mode there are 2 switching outputs available.
- The switching output “**2**“ controls the solenoid valve in the main air feed.
- The “**Power Out**“ switching output, switches the supply voltage for the flow computer meter electronics.
- The flow chart of the residue discharge and an exact functional description can be found in chapter 0 / page 19.

#### CAN Bus termination resistors

**SVC-2S** printed circuit board DIP switch **S1-1**: **OFF** (termination resistors **ON**)

- The switch has no effect on function in this operating mode. The selected switch setting is thus arbitrary.

#### 3.1.1.2 “MultiFlow residue discharge“ mode

**REC-1S** printed circuit board DIP switch **S1-1**: **ON**

- In this operating mode control of the main air is made via the Sening™ MultiFlow. The meter electronics needs *not* to be switched separately.
- The “**Power Out**“ switching output is *not* switched in this operating mode and can thus be used optionally otherwise.
- In this case the DIP switch **S1-2** on the power supply printed circuit board **SVC-2S** is to be set to the “**ON**“ position.

#### CAN Bus termination resistors

If the **EPE2**-Controller is used together with the MultiFlow in a CAN Bus network and operated as the last device on the Bus, then the termination resistors are to be switched **ON**.

**SVC-2S** printed circuit board DIP switch **S1-1**: **OFF** (termination resistors **ON**)

- To *activate* the termination resistors the DIP switch **S1-1** on the power supply board **SVC-2S** is to be placed in the “**OFF**“ position.
- This is only necessary when the **EPE2**-Controller is the *last* device in a CAN Bus network !

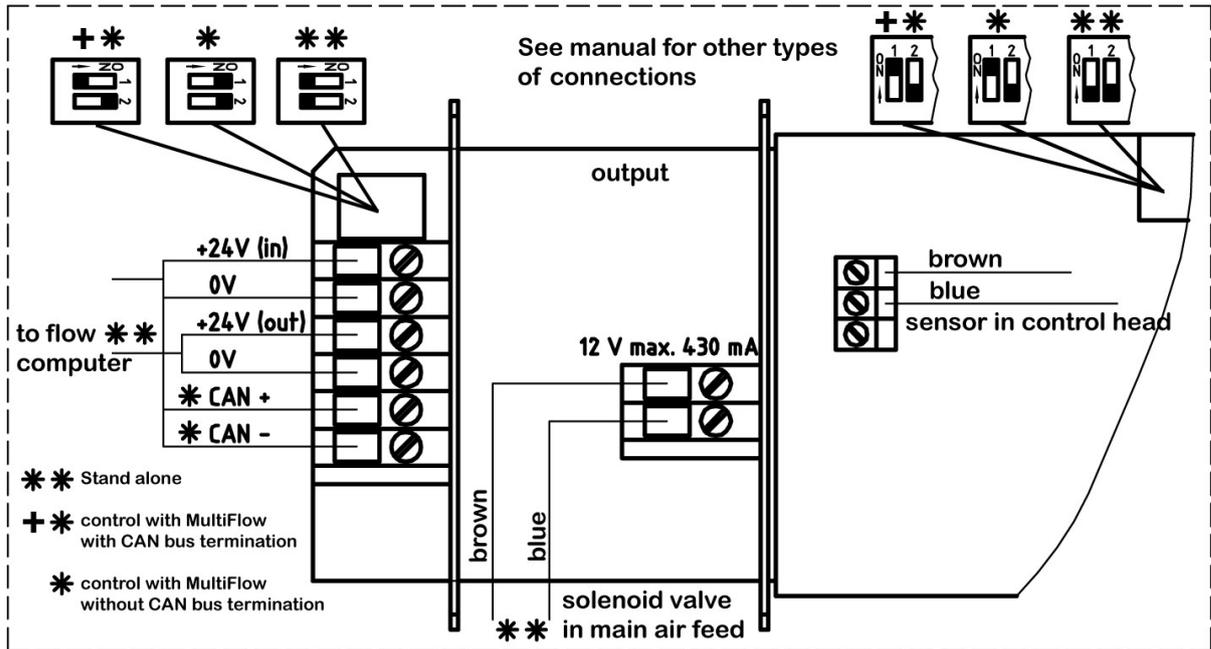


Figure 5: Connection label in the device cover

## 3.2 Switching outputs in “Stand-Alone residue discharge“ operation

The **EPE2-Controller** switching device activates the 24 Volt supply of the electronic truck computer. The level in the metering system is monitored by the attached sensor. An additional solenoid valve that interrupts the main air supply of the metering system is connected.

### 3.2.1 Switching output of the solenoid valve for the control air

- The control air is switched off immediately after product shortage is detected.
- The output is designed for the operation of solenoid valves with 12 volt control voltage with a max. current of 430 mA (order no. MVS1-E11-12).

### 3.2.2 Power Out switching output for the flow computer

- This output is for controlling the flow computer.
- The deactivation of the output and hence the switching off of the supply voltage of the meter electronics (flow computer) is time delayed (typically 8 secs ).
- The switching output is designed for a max. switching current of 8 A at 24V supply voltage.

### 3.3 Switching outputs for “MultiFlow residue discharge“ operation

During operation of „**MultiFlow residue discharge**“ none of the **EPE2** outputs are switched. The switching information is transferred via the CAN Bus to the MultiFlow, which then takes over the control.



When setting the “**MultiFlow residue discharge** “ the DIP switch S1-2 on the power supply board **SVC-2S** always has to be set into the “**ON**“ position. Hence other optional devices can be powered by the flow computer 24V (out) connection.

### 3.4 Setting the sensor type

The **EPE2**-Controller supports 3 types of sensors. The selected switch or sensor is connected to the **J3** input on the **REC-1S** control board.

☞ The setting has to be made before commissioning via the jumpers **Jp4** and **Jp5** on the **REC-1S** printed circuit board, listed in the following table.

The 3 sensor types have to be supplied with different voltages. This adjustment is made with the two jumpers as displayed in the table:

	Sensor type	Short circuit interruption detection	Jumper Jp4 Jp4 2-3  2-1 	Jumper Jp5	Parameter 2 (via PC or Laptop) **	*
1	Sensor with Namur output	YES	2-3	inserted	1	◀
2	optoelectronic sensors (NS2)	YES	1-2	removed	2	
3	mechanical switch	NO	1-2	inserted	3	

\*: Factory or reset settings.

Table 2: Sensor type settings

► The proximity switches are Namur set in the factory.

### 3.4.1 Setting the sensor switching logic

#### REC-1S printed circuit board DIP switch **S1-3**: **ON** / **OFF**

- The switching logic of the connected sensor is defined with this DIP switch (see Figure 6 / page 18). It can be set whether the switch is an NO contact (in active state switch is closed) or NC contact (in active state switch is open). The DIP switch is factory set to ON = “0” active.

 If an inverted function of the switching signal is required, then the DIP switch S1-3 has to be placed in the opposite position.

### 3.5 Further tips for commissioning

- For the commissioning of the residue discharge it may be helpful, if the switching output is continually switched, independent of the input signals.
- For this the DIP switch S1-2 on the power supply printed circuit board **SVC-2S** is to be set to the “**ON**” position. The supply voltage (24 volts) is thus always through-connected to the flow computer connection.
- If the “**Stand-Alone residue discharge**” is to be activated, then the DIP switch S1-2 (**SVC-2S**) has to be placed in the “**OFF**” position. Now the supply voltage for the flow computer connection is switched according to the input state.
- If a PC or Laptop is available, then the relay can also be switched via the service function. (see also chapter in DOK-512E).

### 3.6 Components overview

#### 3.6.1 Control board REC-1S

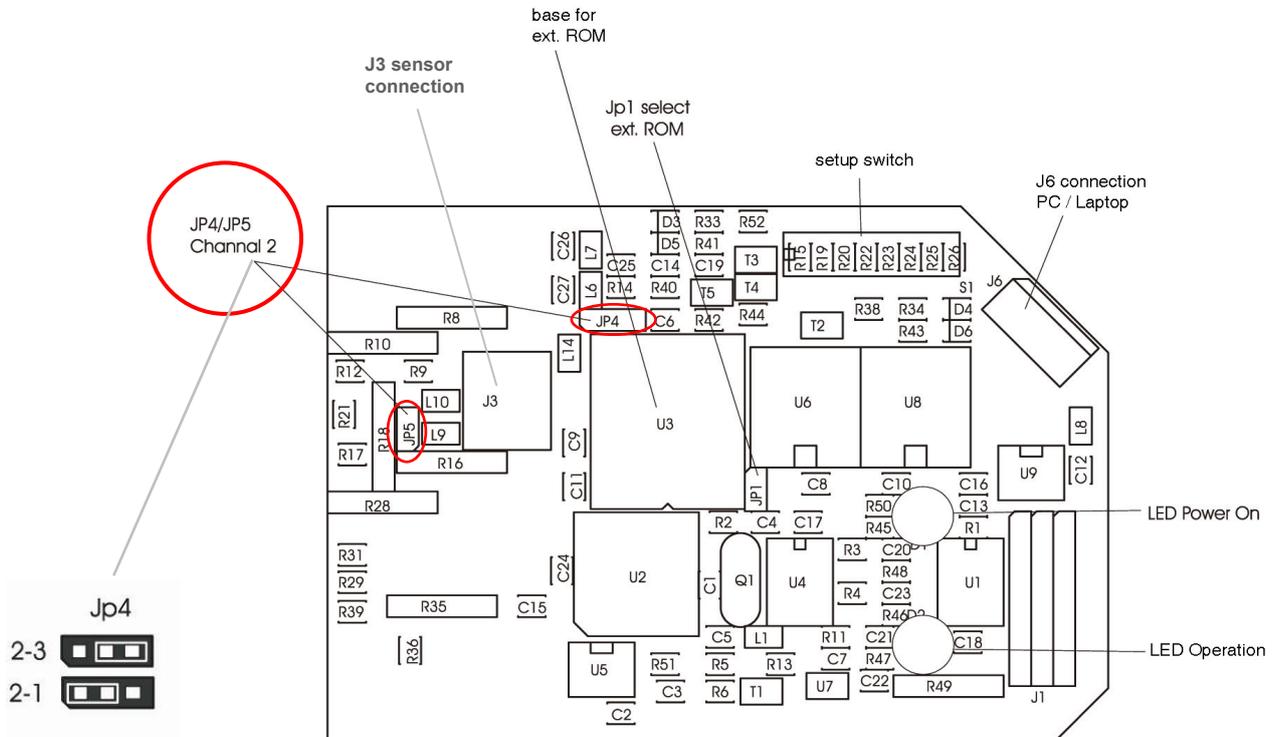


Figure 6: Control board REC-1S

#### 3.6.2 EPE2-Controller Internal overview

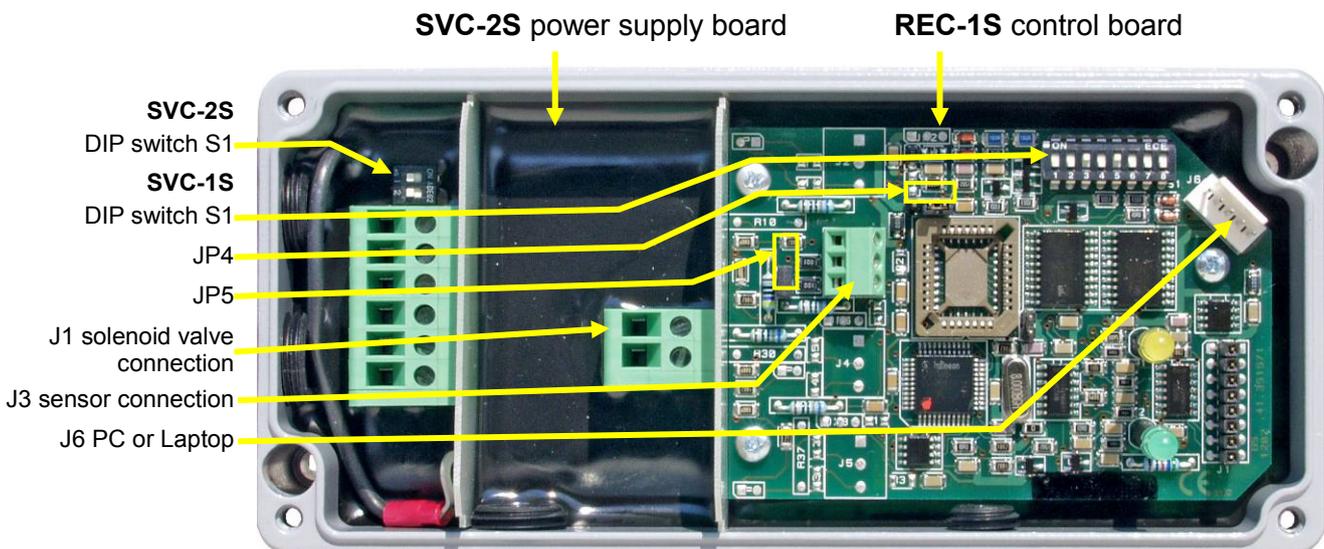


Figure 7: EPE2-Controller Internal overview

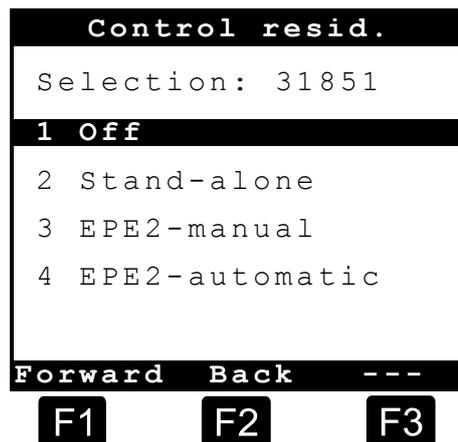
### 3.7 Parameters in MultiFlow

No.	Name	Seal	K	Factory Setting	Meaning
<b>3.1.6.8</b>	<b>EPE2</b>				<b>(from version 5.00)</b>
3.1.6.8.1	Use of EPE2	M	2	0 (no)	Activation of EPE2 required for optional residue discharge
3.1.6.8.2	EPE2 node	M	2	5	Node number of EPE2 when activated
3.1.6.8.3	EPE2 interval	M	2	600ms	EPE2 request interval. Used to trigger EPE2 inactivity monitor.

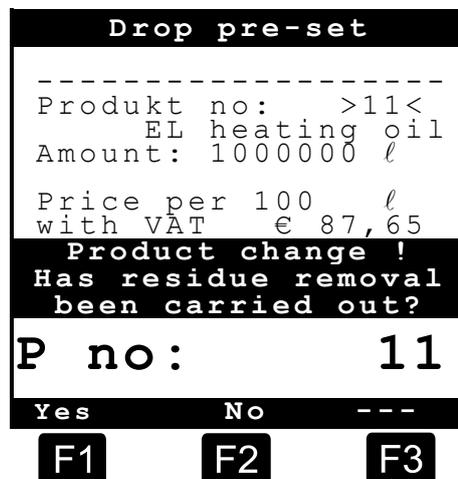
<b>3.1.8.5 Draining</b>					
3.1.8.5.1	Drain control	M	2	0 (no)	(up to version 5.00) Activates an instruction for residue removal in the event of product change.
3.1.8.5.2	Receipt draining	M	2	0 (no)	(up to version 5.00) Parameter currently not in use. In a future program version will activate printout of a receipt after residue removal.
3.1.8.5.1	Residue removal control	M	2	1	(from version 5.00) 1 : Off  2: Stand-alone Activates an instruction for residue removal in the event of product change.  3: EPE2 manual As 2, however the wet leg sensor connected to the EPE2 monitors the residue removal. No restart of MultiFlow required after residue removal.  4: EPE2 automatic As 3, however "Autom. residue removal" menu item (menu 8) includes the option to control a pump for the measuring system residue removal via the EPE2 output.
3.1.8.5.2	Residue removal timeout	M	2	0 (no)	(from version 5.00) Timeout for the autom. draining of the measuring system with the aid of the EPE2 in "EPE2 automatic" mode. Residue removal stops automatically after this period.
3.1.8.5.3	Residue removal receipt	M	2	0 (no)	(from version 5.00) Parameter currently not in use. In a future program version will activate printout of a receipt after residue removal.

### 3.7.1 Residue removal control with MultiFlow

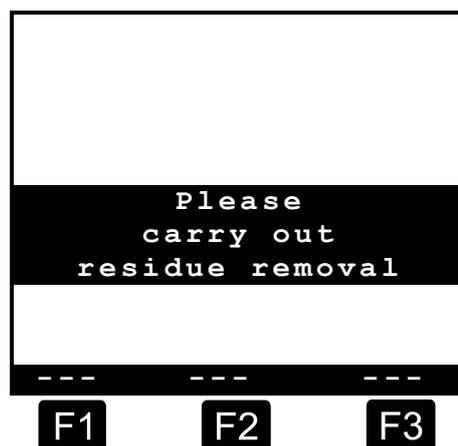
- ☞ The following description is relevant only for program versions from 5.00 (approval according to MID).
- ☞ The measuring system residue removal message can be switched on and off with Parameter **3.1.8.5.1**. In addition Parameter **3.1.8.5.2** has already been implemented which in a future version will activate the printing out of a document concerning successful residue removal.
- ☞ If parameter **3.1.8.5.1** (residue removal control) is set to "2", this causes the following new operating sequence:



- ☞ After entering all the preset values and pressing the **<START>** key again, the MultiFlow checks whether a product change has taken place between diesel and heating oil / heating oil with additives. If this has happened a corresponding message is shown about the necessary residue removal:
- ☞ If residue removal has not been carried out the driver must press the **<F2>** key.

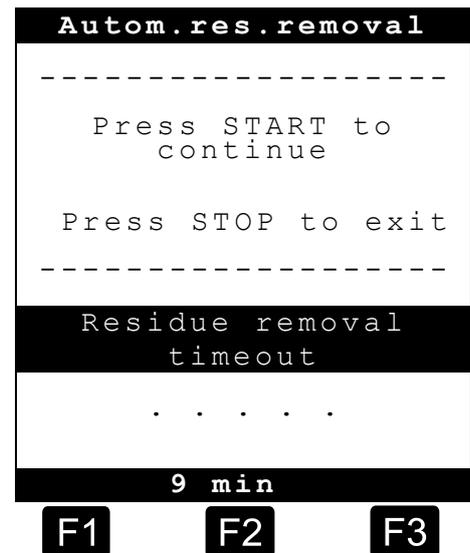


- ☞ A corresponding entry is then made in the log-book and the display shows the following information:
- ☞ The MultiFlow remains in this operating state until it is switched off, i.e. it will not react to key entries (e.g. **>START<** , **>STOP<** etc.).



- ☞ After carrying out the residue removal operation (for this period the MultiFlow is switched off by the residue removal controller) the MultiFlow starts up again and the driver must repeat the drop pre-set entries. The query as to whether residue removal has been carried out is this time confirmed by pressing the **<F1>** key. The confirmation is saved in the logbook.
- ☐ If parameter **3.1.8.5.1** (residue removal control) is set to **"3"** and/or **"4"** the wet leg sensor connected to the EPE2 is continuously monitored to check whether residue removal has been carried out on the measuring system (complete discharge and refilling). If residue removal is detected, this is recorded in the MultiFlow logbook. If residue discharge has been detected, the residue removal message is not displayed when switching between diesel and heating oil / heating oil with additives. If residue removal has not been detected, the corresponding message is displayed. Delivery in this case is not started until the measuring system has undergone residue removal. The MultiFlow does not need to be restarted in this case.

- ☐ If parameter **3.1.8.5.1** is set to **"4"** it is also possible to control the residue removal from the measuring system from the MultiFlow using a residue removal pump. A suitable pump must be connected to the **EPE2** output for this purpose. The "Autom. residue removal" menu item (**menu 8**) can be used for removal of residue from the measuring system. It is controlled in accordance with the maximum operating time (parameter **3.1.8.5.2**), with the **<START>** and **<STOP>** keys.



**Parameters: Menu 8**

No.	Name	Seal	K	Factory setting	Meaning
8	Autom.res.removal	D			Control of a residue discharge pump connected to the EPE2. For this purpose the "EPE2 automatic" mode must be activated (parameter 3.1.8.5.1).

**Seal sense:**

K	Priority	Meaning
2	Master	High security level due to additional checksum; parameter transfer <i>from</i> the chip card only possible when <i>seal is broken</i> !
3	Master	Medium security level
x	Driver	Lowest security level; parameters which are <i>not</i> saved on the chip card

### 3.8 Diagnosis in MultiFlow

Although during the MultiFlow development consideration has been given to ensure a low degree of effort in installation, faults may still occur during initial operation.

When a fault occurs, the MultiFlow supports error analysis with diagnostic functions and thus increases easy installation of the device.

The diagnostic functions mainly involve peripheral devices:

- Temperature sensor, pulse sensor, inputs and outputs
- CAN Bus
- Remote control
- EPE2
- IO-Interface
- Sensor-Interface

#### 3.8.1 Inputs and Outputs

In **Menu 4.3.1** the diagnostic functions for the inputs and outputs, including temperature and pulse sensors are summarised.

##### Diagnosis I/O Menu 4.3.1

 The status of the **pulse inputs A and B** must continually change between '0' and '1' when the pulse transmitter rotates. In contrast, the input **PT** must always be at '1' because '0' indicates a fault (no sensor connected).

 The **temperature display** continually indicates the currently measured temperature. It can be used for checking the temperature recording device.

		In-/Outputs						
Outputs		Outputs						
		1	2	3	4	5	6	7
		0	0	0	0	0	0	0
Inputs		Inputs				Pulses		
		1	2	3	4	A	B	PT
		0	0	0	0	0	0	1
Present temperature		+12,34 C						
Status		Testing ...						
System messages		Selftest						OK
		Seal						OK
		Version 3.30 [3.30] DE						
		---	---	---	---	---	---	---
		<b>F1</b>	<b>F2</b>	<b>F3</b>				



A temperature display outside the  $\pm 200^{\circ}\text{C}$  range points to a cable fracture, short circuit or missing sensor. Please check the wiring of the sensor.

The seven **outputs** can be switched (provided the MultiFlow has not been sealed) by pressing the corresponding number (1-7). That way a functional test of the connected device (solenoid valve) is possible.



For safety reasons all outputs are set to '0' (inactive) on calling and on leaving the diagnostic screen.



The assignment of the outputs to functions depends on the selection of the valve control, please refer to **Parameter 3.1.8.1** and the respective circuit diagrams.



The current status of the valves must be observed without fail.

When a vehicle is operational actuation of the valves can lead to escape of the product!

### 3.8.2 CAN Bus

The diagnostic functions for the CAN Bus are shown in **Menu 4.3.3**.

#### Diagnosis CANbus Menu 4.3.3

The display shown above gives a quick summary of the actual status of the CAN Bus links.

Communication status  
of linked devices

Global CANbus					
No.		No.		No.	
0	??	1	**	2	OK
3	--	4	--	5	--
6	--	7	--	8	--
9	--	10	--	11	--
12	--	13	--	14	--
15	--	16	--	17	--
18	--	19	--	20	--
21	--	22	--	23	--
24	--	25	--	26	--
27	--	28	--	29	--
30	--	31	--		
<b>New</b>					
<b>F1</b>		<b>F2</b>		<b>F3</b>	

The following conditions are possible:

Display	Condition
--	Status unknown
OK	Link in order
??	Link interference, no communication possible
**	Node reference of operating device

#### 3.8.2.1 Testing Links

By pressing key <F1> a general request (broadcast) will be sent to all nodes (devices). This request is to be answered within a few seconds. Thus with this test function the linking status can be brought up to date.



While testing the links internal timeouts will occur, so the display will need up to 10 sec. for complete updating.

Please do not activate this function twice within this time frame (10 sec).

### 3.8.3 EPE2

- ☞ The following description is relevant only for program versions from 5.00 (approval according to MID).
- ☒ The connection to the EPE2 is interrupted during the data transfer between the MultiFlow and the chip card and is automatically restored at the end.

The EPE2 diagnostic functions are compiled in **menu 4.3.6**.

#### Diagnosis EPE2 Menü 4.3.6

		<b>EPE2</b>		
Control options		1	2	3
		Link ON	Output change	Link OFF
Current status		Link	Output	Input
		<b>1</b>	<b>0</b>	<b>H</b>
Testing ...				
		<b>Link.</b>	<b>Start</b>	<b>Broken</b>
		<b>F1</b>	<b>F2</b>	<b>F3</b>

- ☒ The EPE2 is connected to the MultiFlow's external CAN bus. A connection to the EPE2 via the CAN bus is required in order to control the EPE2. This connection can be made for test purposes using key <1> and/or broken using key <3>.
- ☒ The EPE2 has one output. The status of this output can be changed during the test using key <2>. The EPE2 also has one further input.
- ☒ Actual statuses (connection, input and output) are shown in the central section of the display.

### 3.8.4 IO interface

**Menu 4.3.7** contains the diagnostic functions for the IO interface (8 outputs, 2 inputs). It gives a view of the current statuses of the inputs and outputs of the external interface module.

This menu item can be actuated only when the connection to the IO interface is active.

#### Diagnosis IO-Interface Menu 4.3.7

 The eight **outputs** can be switched by pressing the corresponding number (**1-8**). In the case of outputs allocated to a hose path in the configuration of the IO interface, this is possible only when the electronic seal is broken.

		IO-Interface			
Outputs	Outp. 1	2	3	4	
		0	0	0	0
	Outp. 5	6	7	8	
		0	0	0	0
-----					
Inputs	Input 1	2			
		0	0		
Status	<b>Testing ...</b>				
System message	IO online				
	IO Test-Start				
---					
		<b>F1</b>	<b>F2</b>	<b>F3</b>	



The diagnostic function can be used only when the connection to the IO interface is active.



On exiting the diagnostic screen, the IO interface is re-initialised according to the specified configuration.



It is essential that the functions of each output are noted.

### 3.8.5 Sensor interface

The diagnostic function for the sensor interface is contained in **menu 4.3.8**. For every sensor input used, the corresponding sensor status is displayed. The statuses of the sensor inputs not used in the configuration are indicated with '-'.  
 This menu item can be actuated only when the connection to the sensor interface is active.

#### Diagnosis Sensor-Interface Menu 4.3.8

**Possible statuses:**

- ▶ 0 - open,
- ▶ 1- closed,
- ▶ 2 - interrupted,
- ▶ 3 - = short-circuited

Status of the used sensor inputs

 Press the **<F1>** key to initiate an update of the overall status display. Under normal circumstances this is not necessary however because all statuses are updated automatically as soon as they have been detected by the MultiFlow. There is a short delay between the change in status and the display updating due to the internal evaluation logic.

Sensor-Interface					
Inputs					
No.	No.		No.		
-----					
1	0	2	1	3	-
4	-	5	-	6	-
7	-	8	-	9	-
10	1	11	-	12	-
13	-	14	-	15	-
16	-	17	-	18	-
19	-	20	0		
Testing ...					
SI connected					
SI online					
New					
		---		---	
<b>F1</b>		<b>F2</b>		<b>F3</b>	



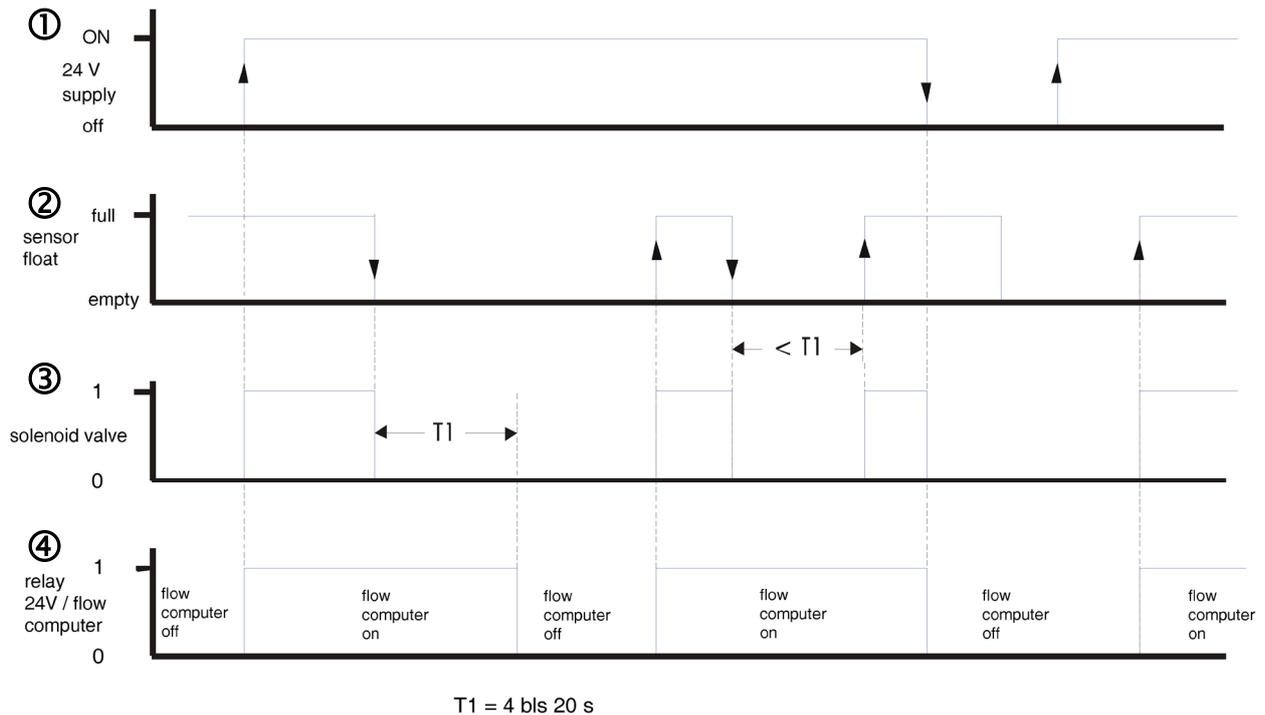
The diagnosis function can be used only when the connection to the sensor interface is active.



There is a short delay between the change in status and the display updating due to the internal evaluation logic.



## 4 Residue discharge function description



**Figure 8: Residue discharge function**

If the **EPE2-Controller** in the “**Stand-Alone residue discharge**” position (DIP-switch S1-1 on the **REC-1S** printed circuit board see Figure 6 / page 18) is operated in the “**OFF**” position, then the above sequence results.

- ☐ If the float switch ② (sensor input) indicates that there is enough product in the measuring system after switching on the 24V supply voltage ①, the solenoid valve ③ (switch output) and the supply voltage relay ④ (Power Out) are switched on immediately. The flow computer electronic meter is powered via the switch contact of the supply voltage relay ④ .
- ☐ In case of product shortage the float switch ② in the measuring system falls to dry and switches from “**full**” to “**empty**”. Once the empty state is detected, the solenoid valve ③ in the main air is switched off and thus interrupts the discharge. The flow computer is switched off via switching relay ④ after the set time **T1**. The time **T1** has to be set long enough so that the discharge comes to a standstill and the pulses entered up to this point in time can be counted completely.
- ☐ However if the product shortage is rectified within time **T1**, i.e. the float switch ② switches from “**empty**” to “**full**”, then the solenoid valve ③ of the main air is switched on again. The power supply ④ of the flow computer is not interrupted in this case.



## 5 Display of the operating states

The two LEDs **“Power“** and **“Status“** provide information about the current operating status of the **EPE2-Controller for Meter Draining System**.

- ☐ After switching on the power supply the **yellow “Power“** LED lights briefly and then goes off for approx. 1s. Then it has to light up continuously.
- ☐ If an error was determined during initialisation, the corresponding flashing error code is emitted (see Table 3: Display of the operating states with LED's below).
- ☐ In **“Stand-Alone residue discharge“** mode (DIP switch S1-2 **“OFF“** on the power supply board **SVC-2S**) the **green “Status“** LED shows the current switch status of the solenoid valve and the flow computer switching relay.
- ☐ If the **green “Status“** LED lights continuously then the solenoid valve is powered and the flow computer switching relay has engaged.
- ☐ If a product shortage is detected, the **green “Status“** LED starts flashing for the time interval **T1**. The solenoid valve is now de-energised and switched off.
- ☐ If time **T1** is elapsed the **green “Status“** LED goes off, the switching relay is now also de-energised and thus switches off the supply voltage of the flow computer.

Yellow LED	Green LED	Residue discharge	CAN-Bus
On	Off	Ready for operation	
On	On	Outputs active	Device enabled
ON	flashes (approx. 1Hz)	delayed switching off active	* / *
flashes (approx. 1Hz)	Off	Setup checksum error. Factory settings loaded	
2 x flashing		Sensor cable disconnected	* / *
3 x flashing		Sensor shorted	* / *
4 x flashing		Sensor defective	* / *
5 x flashing	Off or On	* / *	Wave command

Table 3: Display of the operating states with LED's



## 6 EPE2-Controller Technical data

### Power supply unit:

<b>Type:</b>	<b>SVC-2S</b>
Input voltage	15V – 28V /1A
Outputs(static):	12V DC, max total current 430 mA
Outputs (frequency):	12V AC, f = 100Hz when connecting solenoid valves, rated current consumption < 400mA per solenoid valve
Working temperature:	T <sub>amb</sub> -20 °C to +55 °C

### Control unit:

<b>Type:</b>	<b>REC-1S</b>
Input circuit:	Connection of sensors as per Namur / level sensor Type NS2
Working temperature:	T <sub>amb</sub> -20 °C to +55 °C



## 7 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.



## 8 Address and contact details

### 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 are always very grateful for notification of any errors found.

Our service department will be happy to assist and can be contacted as follows:



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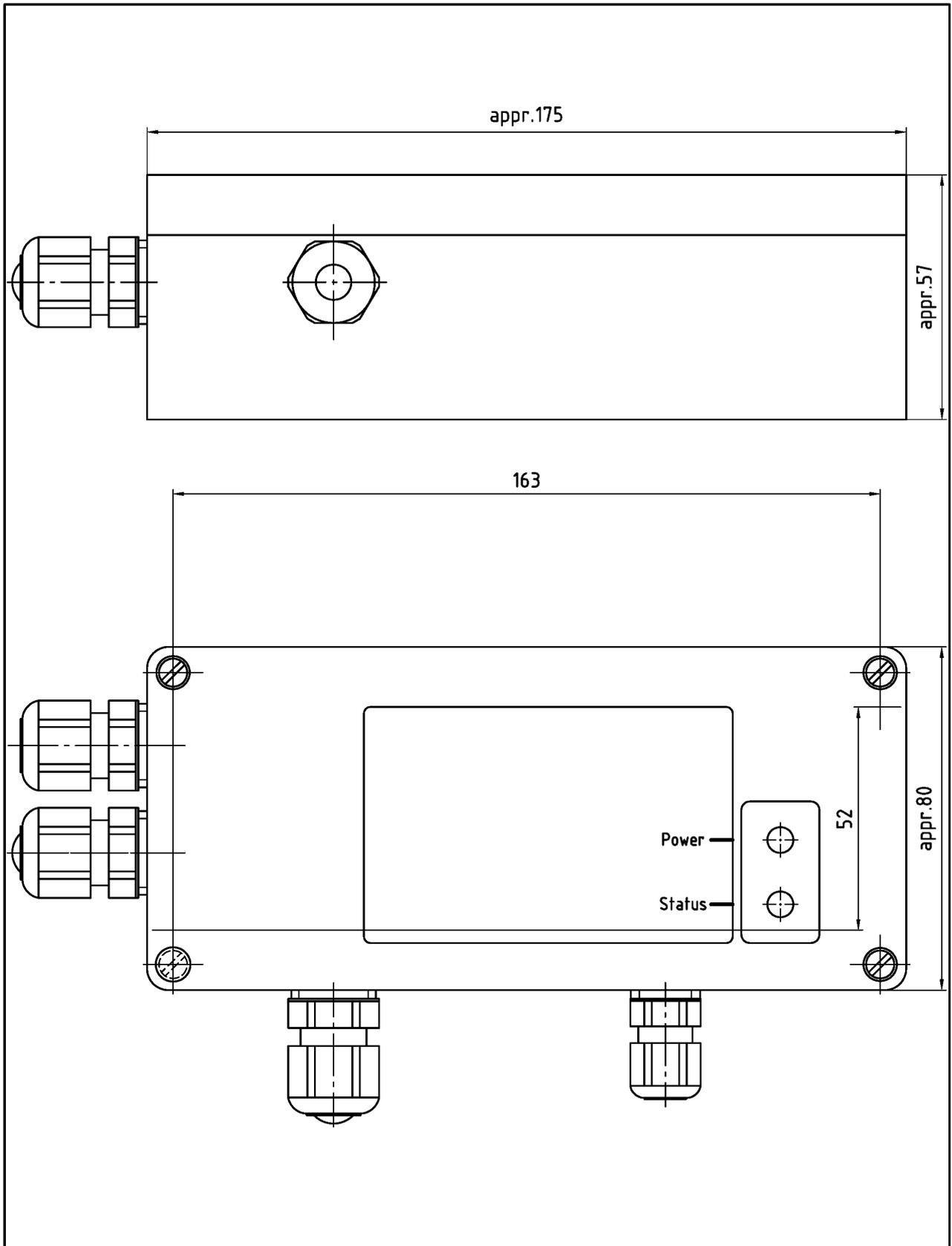
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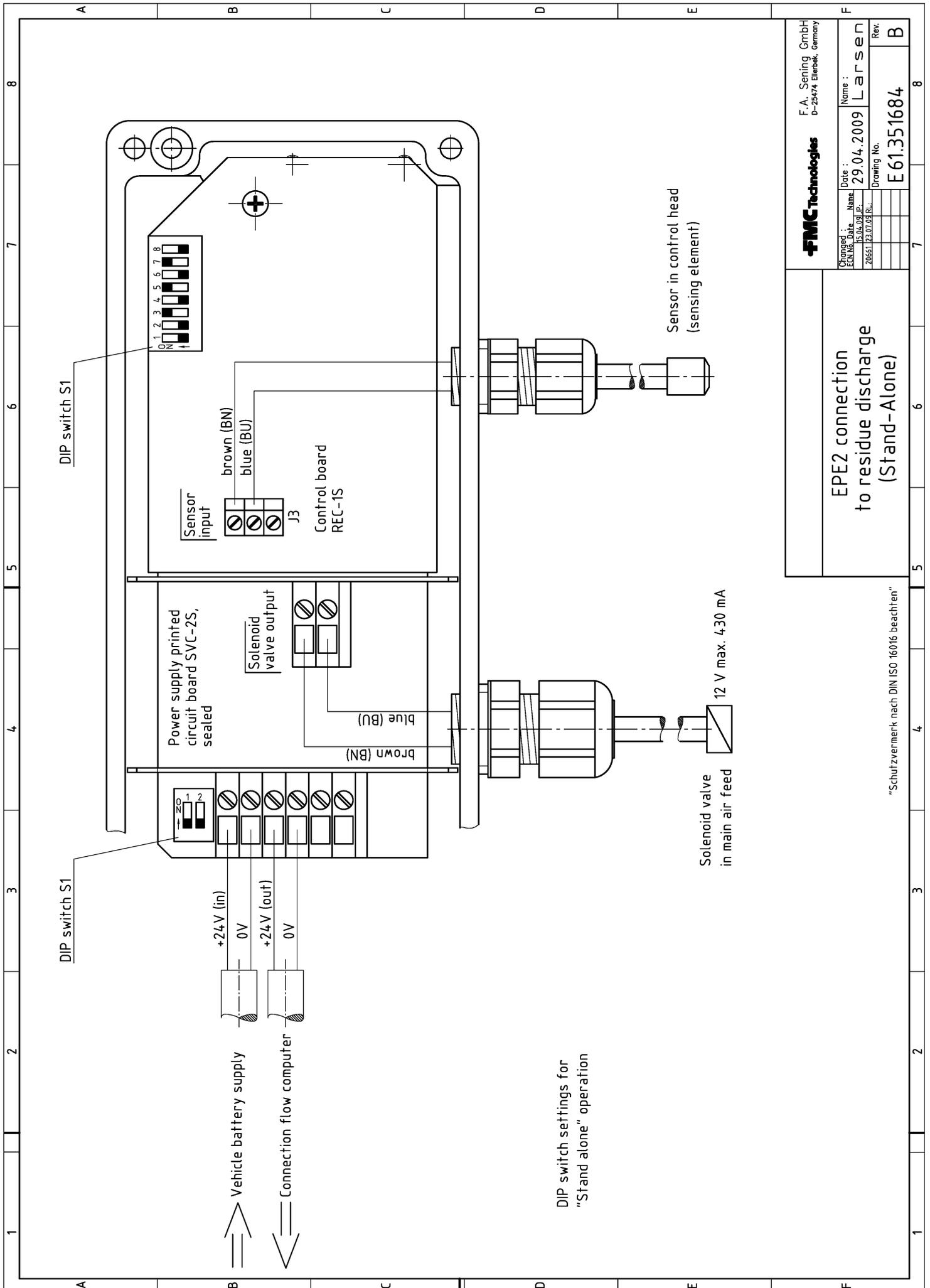
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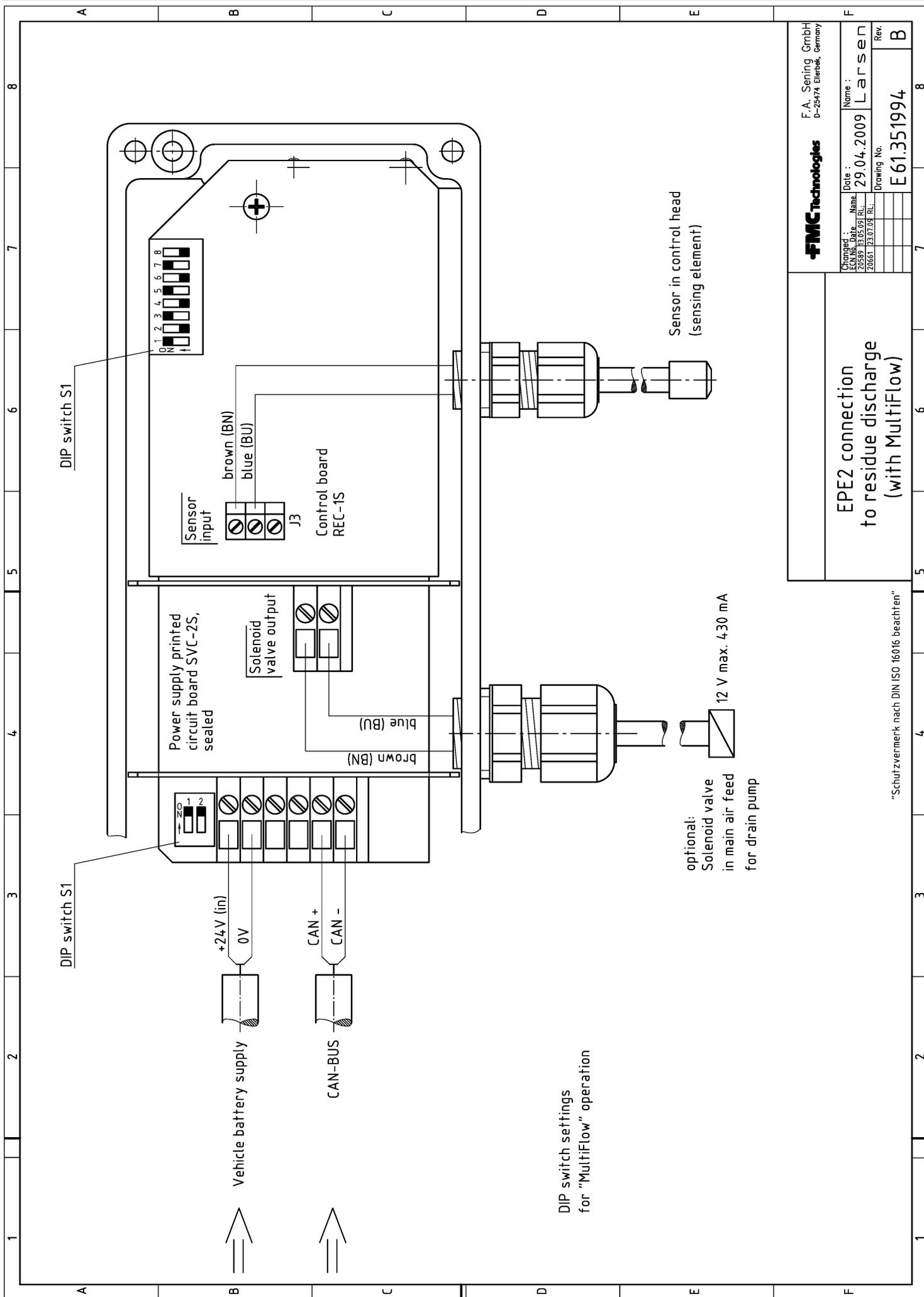
"Schutzvermerk nach DIN ISO 16016 beachten"

Steuergerät Restentleerung (REC-1)		<b>FMC Technologies</b>		F.A. Sening GmbH D-25474 Ellerbek, Germany	
		Weight :	Date :	Name :	
Part-No.      EPE2		kg	29.04.2009	Larsen	
		Drawing No.: E51.351677		Rev.	



<b>FMC Technologies</b> F.A. Sening GmbH D-25474 Eilerbek, Germany		Checked by: _____ ECN No.: 15.04.09 JP: _____ Date: 29.04.2009 Z0561.23.07.03 BL: _____	Name: <b>Larsen</b> Drawing No.: <b>E 61.351684</b> Rev.: <b>B</b>
		EPE2 connection to residue discharge (Stand-Alone)	

"Schutzvermerk nach DIN ISO 16016 beachten"





Smith Meter GmbH  
Ellerbek, Germany

1

# EG - Konformitätserklärung

## EC - Declaration of Conformity

2

Der Hersteller / The Manufacturer

3

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

erklärt hiermit, dass das (die) Gerät(e)

*herewith we declare, that the equipment*

**Produktbezeichnung:**  
*Product:*

**EPE2**

**(B)** der EG-Richtlinie 2004/108/EG über elektromagnetische Verträglichkeit  
*defined by the electromagnetic compatibility directive 2004/108/EC*

4

entspricht, die in der genannten EG – Richtlinie einschließlich aller Änderungen über die elektromagnetische Verträglichkeit festgelegt ist. Zur Beurteilung des Erzeugnisses hinsichtlich der Elektromagnetischen Verträglichkeit wurden die folgenden Vorschriften angewendet:

*is in conformity with the named E.C. directive including all changes relating to the electromagnetic compatibility. For verification of conformity with the protection requirements the following standard was applied:*

5

Grundlegende Norm:.....EN61000-6-3  
*Basic norm:*

6

Ort und Datum: Ellerbek, den 9.11.2009  
*Location and date:*

Geschäftsführer  
*General Manager*





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.

---

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