

Cross Over Prevention **NoMix**



Further documentation for this product:

Description	Order No.
NoMix Instruction manual	MN F16 002 EN / DOK-415
MultiLevel Instruction manual	MN F19 008 GE / DOK-474

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1 General

1.1 Safety instructions



Caution:

This information must be carefully read and observed before operating the unit.

1.1.1 Notes on Ex protection

All the components marked with the sign of  are explosion-proof electrical equipment and safety-tested and certified.



Caution:

Any interference, mechanical or electrical, is not permitted.



EX-protection regulations must be observed!

1.1.2 Operating elements

**CAUTION:**

Do not open the housing cover when the unit is connected to the voltage supply!

Work must only be carried out on the Ex-e terminals when the unit is voltage free. National regulations must be satisfied when operating this unit. When performing operational checks, observe the guidelines laid out in EN 60 079-17.

1.1.3 Disposal

**Disposal of batteries**

The batteries in the controller should be replaced by a skilled person. Used batteries must not be disposed of as standard domestic waste. Ensure that all used batteries are disposed of via suitable disposal facilities.

1.1.4 Proper intended use

-  The system is used exclusively for quality control in collaboration with measuring systems on tank trucks. The corresponding applicable safety regulations (e.g. Ex protection) must be complied with.
-  Any form of use which exceeds the scope described above is deemed to be improper use; the F. A. Sening GmbH is not liable for damages resulting from such improper use.
-  Proper use also includes compliance with the conditions set out by the F. A. Sening GmbH with regard to operation, installation and maintenance.
-  The system must only be operated, serviced and repaired by personnel who are familiar with the equipment and who have been trained regarding the dangers involved.
-  If you discover any signs of damage or breakage on any parts of the system or if the system's safe operation cannot be guaranteed for any other reason, do not start the system or, if already in operation, shut down the system immediately. Notify your maintenance department.
-  The F. A. Sening GmbH cannot be held liable for any damages arising as a result of unauthorized changes to the system.

2 General description of the NoMix system

2.1 Intended use

The NoMix system deals with control and monitoring functions on tank trucks during delivery of mineral oil products. The petrol stations and depots served have to be equipped with TAGs or ESD modules.

The NoMix system has the following main functions:

- **Cross Over Prevention (COP)**
- **Overfill prevention (optional)**
- **Discharge hose safety system**
- **Vapor recovery hose monitoring**
- **Sealed Parcel Delivery (SPD) (optional)**

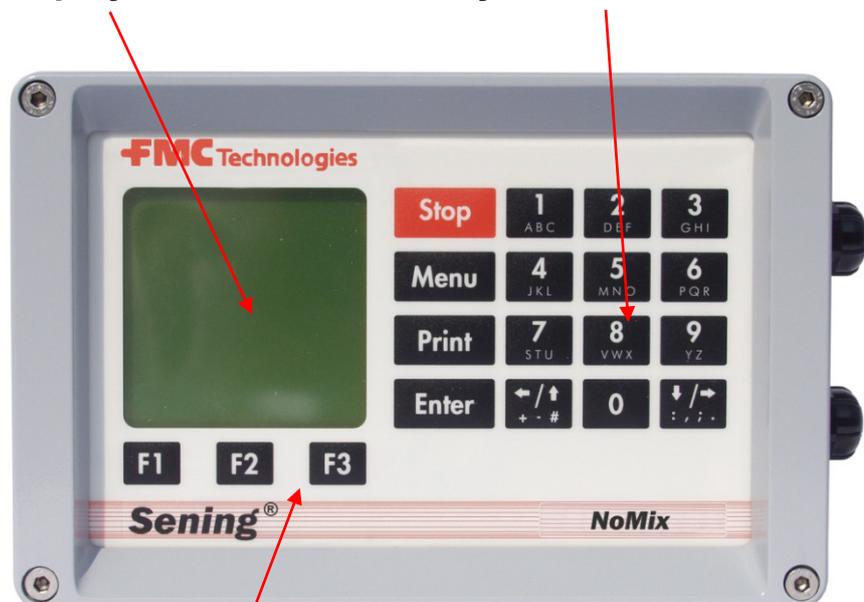
3 Operation of the NoMix system

3.1 Overview of operating elements

The NoMix system is operated from the display interface.

Display

Keyboard



Function keys

3.2 Key functions

Key	Function
	The function keys will execute the function shown in the bottom row of the display.
	The <Stop> key enables all currently running discharge or loading processes to be stopped immediately. Menus can also be quit immediately.
	The menu control, e.g. for settings, execution of test, entering the loading plan, entering an override etc. is reached via the <Menu> key.
	The print menu is reached via the <Print> key; Printing out of the setup, the logbook, activity reports, status reports, event reports etc.
	The <Enter> key is used to confirm entries.
	The <numeric keys> can be used to call up detailed information, start discharge and loading processes, and select submenus.
	Use these keys to move back / forward or to move on to the next display.

Table 1: Key functions

3.3 Menu structure of the NoMix & SPD systems

The menu structure of the NoMix and SPD systems is based on the use of “pull-up and pull-down” menus, through which it is possible to move from a main menu into sub-menus and back again.

3.3.1 Main Menu

The main menu is described as follows

☞ The main NoMix menu is accessed by pressing the **<MENU>**- key.

☞ By pressing the **<Numeric key>** of each function you reach the corresponding sub-menu. By pressing the 3 key, for instance, you activate manual input of the loading plan.

☞ Pressing the **<F1>** key executes the **"BACK"** command, returning to the normal function display.



Explanation of the sub-menus

1-Setup	Setting of the NoMix setup (not relevant for normal operation)
2-Override	Input of an override during discharge
3-Lplan	Input of the loading plan (uncoded bottom loading / top loading)
4-LOG	Query and display of the NoMix logbook (overrides of the NoMix functionality)
5-Events	Query and display of the recorded events stored in the (SPD) events logbook (SPD functionality)
6-Clock	Indicating the date and the time
7-Test	Calling up the test menu

3.3.2 Loading menu

LOADING:

Loading mode

Compartiment number
(1, 2, 3, 4, 5, 6)

Cnt. Contents of the compartment:
(LRP, ULG, SULG, DI etc.)

Filling condition:
(E = Empty, L = Loaded)

Vapor connection:
(C = Common vapor)

Status:
(Ready, Loading etc.)

DISCH.:
F3 → Discharge mode

LOADING				
C	Cnt.	F	V	Status
1	LRP	E	--	
2	LRP	E	--	
3	ULG	E	--	
4	SULG	E	--	
5	DI	E	--	
6	ULG	E	--	
				DISCH.

F1

F2

F3

3.3.3 Discharge Menu

The following discharge example describes a hybrid tank truck. (In this example AS1 (*overflow prevention*) is assigned to measuring system 1, AS2 is assigned to measuring system 2.)*

* (*overflow prevention optional*)

DISCHARGE:

Discharge mode

Compartiment number
(1, 2, 3, 4, 5, 6)

Cnt. Contents:
(LRP, ULG, SULG, DI etc.)

Filling condition:
(E = Empty, L = Loaded)

(Overfill prevention:
(1, 2, 3, 4))*

Vapor connection:
(C = common vapor)

Status:
(Ready, Disch. etc.)

DISCHARGE			
C	Cnt.	FOV	Status
1	LRP	E--	
2	LRP	E--	
3	ULG	E--	
4	SULG	E--	
5	DI	E--	
6	ULG	E--	

LOAD .			
F1		F2	
F3			

LOAD.:

F1 → Loading mode

3.4 Loading (standard)

3.4.1 Compartment empty test

- ☐ Depending on how the setup has been set, the optional compartment empty test can be carried out.
- ☐ The compartment empty test is used to detect any residue that may have collected in the compartments prior to loading. This means that all compartments / foot valves have to be opened prior to loading. The test functionality and procedure depends on the respective tank truck type.

Tank truck without overfill prevention

- ☐ For this type of tank truck, during the compartment empty test all foot valves are opened for approx. 5 seconds via the NoMix solenoid valves. Depending on the setting setup, they remain open in order to save air, or they are closed again.
- ☐ If loading arms are connected during the compartment empty test, an error message appears immediately, and the compartments are closed.

* (overfill prevention optional)

When changing to Loading mode the following compartment empty test display is shown

☞ Start the compartment empty test by pressing the

- ▶ **<Enter>** key
If a hose connection is detected during the empty test, the following error message appears immediately:

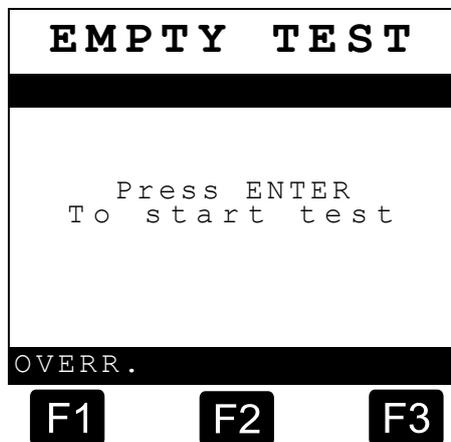
☹ **“Please disconnect hose”.**

- ▶ The empty test can be aborted at any time with the **<STOP>** key.

If an override according to the Setup setting is permitted, the empty test can be bypassed with the

- ▶ **<F1>** key.

👁 This is recorded in the logbook.



If residue is detected during the compartment empty test, the following display appears

☞ Press the

- ▶ **<F1>** key and check in which compartment or compartments residue was detected.



Tank trucks with overfill prevention

☞ Tank trucks with overfill prevention always need to have pneumatic switches installed for the foot valves, even if the truck is to be loaded via *“coded loading only”*. The foot valves have to be opened by pulling the

overflow prevention valve manifolds as prompted in the display. The rest of the procedure is continued as described above.

3.4.2 Coded loading

It is necessary for the loading arm at the tank depot to be equipped with TAGs.

 Open the cabinet on the loading side.

- ▶ Pull the master switch.

 All compartments = **empty**

1. **Loading**

 One or more compartments = **not empty**

2. Press <F1>.

3. **Loading**

- ▶ Connect the overflow prevention cable.
- ▶ Connect the vapour recovery hose to truck vapour adapter.
- ▶ Connect the loading arms (for compartments to be loaded).
- ▶ Use the control blocks to open the foot valves.
- ▶ **Load truck compartments**

After loading is finished:

- ▶ Remove the overflow prevention cable, the loading arms and the vapor recovery hose.
- ▶ Push the master switch back in.

LOADING			
C	Cnt.	FV	Status
1	LRP	EC	Load.
2	LRP	EC	Load.
3	ULG	EC	Load.
4	SULG	EC	Load.
5	DI	EC	
6	SULG	EC	

DISCH.

F1 **F2** **F3**

3.4.3 Uncoded loading

If a tank depot is not equipped for product coding (TAGs) it is additionally necessary to enter the loading plan for uncoded loading.

Use:

 Open the cabinet on the loading side.

- ▶ Pull the master switch.

 All compartments = **Empty**

4. **Loading**

 One or more chambers = **not empty**

5. Press <F1>.

Loading

- ▶ Enter the loading plan, as described:
6. Press <Menu> to enter the Main menu.
 7. Press <3> for the loading plan.
 8. Change the product quality for compartment 1 by following the displayed instructions.
 9. Press <F3> for next compartment and continue as described above (if the product grade is not to be changed press directly <F3> for the next compartment).
 10. When the loading plan is complete press 3 times <F1> to save the loading plan, quit the loading plan menu and leave the main menu.
 - ▶ Connect the overfill prevention cable.
 - ▶ Connect the vapour recovery hose to truck vapour adapter.
 - ▶ Connect the loading arms.
 - ▶ Use the control blocks to open the foot valves.

▶ Load truck compartments

After loading is finished:

- ▶ Remove the overfill prevention cable, the loading arms and the vapor recovery hose.
- ▶ Push the master switch back in.

3.4.4 Error during loading

- **Compartment x not empty**
A residual quantity has been detected after opening the foot valves, or the loading plan has not been entered.
- **Code defect compartment x**
The tank station product sensor or the tank truck scan line are defective.
- **Incorrect product compartment x**
The product code of the loading coupling does not match with the product code of the non-empty compartment.

3.5 Discharge (standard)

- ☐ The following discharge example describes a hybrid tank truck. In this example AS1 (*overfill prevention, optional*) is assigned to measuring system 1, AS2 is assigned to measuring system 2.

3.5.1 Coded discharge

Tank truck without measuring system

- ☞ Switch on NoMix
 - ▶ Open the cabinet on the discharge side.
 - ▶ Pull the master switch.
 - ▶ Connect the vapour recovery hose.
 - ▶ Connect the loading arms.
 - ▶ *(Connect the level sensor cable.)**
 - ▶ If all these are connected properly, the following display appears :

Display on tank trucks without measuring systems

Display example for compartment 1:

Compartment 1,
Cnt. Contents LRP,
Filling condition Loaded,
*(Overfill prevention 1)**
Vapor connection,
Common vapor,
Status ready

DISCHARGE			
C	Cnt.	FOV	Status
1	LRP	L1C	Ready
2	LRP	L2C	Ready
3	ULG	L3C	Ready
4	SULG	L--	
5	DI	L--	
6	ULG	L--	

LOAD .			
F1		F2	
F1		F3	

- ▶ Start the discharge by pressing the numeric keys <1>, <2> and <4>.

Operation with a measuring system

- For operation with a measuring system you may need to select the discharge compartments before the process of discharge can be started.

* (overfill prevention optional)

Use:

- ▶ Press **<F3>** to select measuring system no. 1.
- ▶ Choose one or more of the available compartments using the numeric keys and confirm your selection with **<Enter>**.
- ▶ Press **<F1>** to select measuring system no. 2 and select the compartments as described for measuring system 1.

ABGABE			
C	Cnt.	FOV	Status
1	LRP	L--	
2	LRP	L--	
3	LRP	L--	
4	LRP	L--	
5	SULG	L--	
6	SULG	L--	

Meter 2		Meter 1	
Select		Select	
F1		F2	
		F3	

Display during operation with measuring system

The following is an example display for measuring system operation 1:

Compartment **5-6**,
Ctn. Contents **SULG**,
Filling condition **L**oaded,
Measuring system **1**
*(Overfill prevention 1)**
Vapor recovery hose **1**
Status is **Ready**

ABGABE			
C	Cnt.	FOV	Status
1	LRP	L2-	Ready
2	LRP	L2-	Ready
3	LRP	L2-	Ready
4	LRP	L2-	Ready
5	SULG	L11	Ready
6	SULG	L12	Ready

Mess 2		Mess 1	
BEFÜLL.			
F1		F2	
		F3	

- ▶ Start the discharge by pressing **<F3>** for measuring system 1 and **<F1>** for measuring system 2.

Discharge end (for operation with and without measuring systems)

- ☞ Empty all compartments.
 - ▶ Remove all product hoses.
 - ▶ Remove all vapor recovery hoses.
 - ▶ *(Remove the level sensor cable.)**

* (overfill prevention optional)

- ▶ Push the master switch back in.

3.5.2 Uncoded discharge (override)

Even when there is no discharge hose safety system in place, it is possible to discharge simultaneously from two compartments / with two measuring systems.



Take care to ensure that the level sensor cable lies parallel to the discharge hose.

Also, the level sensor product codes will be analysed depending on the settings entered in the system setup.

Use:



Press the **<Menu>** key.

- ▶ Connect the product and vapor hose as well as the level sensor cable.
- ▶ Press the **<2>** key (override).
(NOTE: This step can also be taken before connecting the hoses)
- ▶ Press **<1>** to confirm the override.
- ▶ Choose an overfill prevention channel* or a measuring system.
- ▶ Select one or several compartments.
- ▶ Press **<F1>** to confirm the override and enter a second override if desired.
- ▶ Press **<F1>** (BACK) to leave the Main Menu.
- ▶ Start the discharge with the respective numeric keys or with **<F3>** for measuring unit 1 and **<F1>** for measuring unit 2.
- ▶ Start any further overrides as described above.

3.5.3 Error during discharge

As soon as an error occurs at the connection at the petrol station



ERROR appears in the status for the relevant measuring system or compartment.

- ▶ Press the measuring system number / compartment number to obtain detailed information.

* (overfill prevention optional)

☞ Serious errors, such as the absence of communication to interface x, are displayed as errors on the full-screen.

The following errors are displayed:

- **(No overfill prevention:** *Level sensor cable not connected)**
- **(Incorrect overfill prevention:** *Compartment /Measuring system not accepted for this overfill prevention)**
- **No vapor:** No vapor hose is connected
- **Wrong vapor:** Wrong vapor hose is connected
- **Wrong prod.:** Wrong product is connected
- **Wrong code:** Wrong level sensor product code
- **No code:** No level sensor product code
- **Code fault:** Level sensor product code damaged
- **(Level sensor not ready:** *Level sensor still warming up)**

(If a petrol station tank is full (level sensor responding) the following status is displayed:

- **Tank full)***

3.6 Additional SPD functionality

☞ The description of operation of the NoMix Standard applies also to vehicles with the additional SPD functionality. The difference is that in addition to the display for the loading and discharge mode, there is what is called transport mode, in which the current status of the vehicle is displayed.

This can be:

- EMPTY
- SEALED
- UNSEALED

☞ If one or more of the tank truck compartments are sealed, this is also displayed in the status of the relevant compartment.

☞ Some tank truck types do not have the ability to automatically detect the switchover from transport mode to loading/discharge mode through pneumatic switches. In this case, manually change to loading or discharge mode with the buttons <F1> and <F3> respectively.

* *(overfill prevention optional)*

☞ A compartment that is not empty cannot automatically be sealed. It is necessary here, according to how the system has been set up or to the specification of the operator, to seal manually a second time. This applies both to loading and to a split discharge (where a compartment could not be fully emptied).

3.6.1 Loading (SPD)

☞ Before loading at the depot, the functional display appears as follows:
(Master Switch has already been pulled, discharge hose safety system and vapour recovery hose connection are not displayed here)

The tank truck was fully emptied at the petrol station. Neither have residual quantities formed during the journey from the petrol station to the depot.

EMPTY			
C	Cnt.	F	Status
1	LRP	E	
2	LRP	E	
3	ULG	E	
4	SULG	E	
5	DI	E	
6	ULG	E	

LOAD . DISCH .

F1 **F2** **F3**

The tank truck was fully emptied at the petrol station, but residual quantities have collected on the journey from the petrol station to the depot.

UNSEALED			
C	Cnt.	F	Status
1	LRP	L	
2	LRP	E	
3	ULG	E	
4	SULG	E	
5	DI	L	
6	ULG	E	

LOAD . DISCH .

F1 **F2** **F3**

The compartments that are not empty must be cleared in accordance with the operator's specifications.

☞ In order to begin loading

- the <F1> key for loading must be pressed.
This step is unnecessary if the start of loading is automatically detected by a pneumatic loading switch.

The following display appears

Use:

☞ Load the tank truck in the usual manner (see chapter 3.4 / page 9).

😊 After loading is complete :

- ▶ all product hoses, the vapour recovery hose and the over-fill safety plug have been disconnected
- ▶ and the Master Switch has been pressed

LOADING			
C	Cnt.	FV	Status
1	LRP	E-	
2	LRP	E-	
3	ULG	E-	
4	SULG	E-	
5	DI	E-	
6	SULG	E-	
SEAL		DISCH.	
F1		F2	
F1		F3	

The following display appears

😊 Loading is in this way properly completed.

☞ Depending on how the tank truck has been fitted out and the specifications of the operator, it is possible for the status to be printed out or to send the data automatically to an On-Board-Computer.

VERSIEGELT			
K	Inh.	Z	Status
1	BI	G	SIEGEL
2	DK	G	SIEGEL
3	SUP	G	SIEGEL
4	SUP	G	SIEGEL
5	SU	G	SIEGEL
6	SUP	G	SIEGEL
F1		F2	
F1		F3	

👁️ If it is necessary, for whatever reason, to interrupt the loading and to then continue once more, the procedure according to "**Second loading / Second sealing (SPD)**" is to be followed.

3.6.2 Second loading / Second sealing (SPD)

The functional display will have an appearance similar to the following before a second sealing

Use:

☞ Press the <F1> key for loading again (this step is unnecessary if the start of loading is automatically detected by a pneumatic loading switch). In this example, fill compartment **2** (which is still empty) and complete the filling of compartment **5**.

☞ After loading is complete (all product hoses, the vapor recovery hose and the over-fill plug have been disconnected) and the Master Switch has been pressed, the <F2> key for the second sealing must be pressed.

Compartment 2 was not filled during the first loading, and compartment 5 is to be filled with additional product of the same product grade.

LOADING			
C	Cnt.	F	Status
1	LRP	L	SEALED
2	LRP	E	
3	ULG	L	SEALED
4	SULG	L	SEALED
5	DI	L	SEALED
6	ULG	L	SEALED

SEAL DISCH.

F1 **F2** **F3**

The following display appears

- The compartments **1,3,4** and **6** are properly sealed, as they were before.
- Compartment **2** is additionally marked as sealed.
- A second filling has been carried out at compartment **5**; the status is therefore „**2L-Seal**“.
- **2L-SEAL.** indicates that for compartment 5 a "second seal" has been applied manually during "Loading".

SEALED			
C	Cnt.	F	Status
1	LRP	L	SEALED
2	LRP	L	SEALED
3	ULG	L	SEALED
4	SULG	L	SEALED
5	DI	L	2L-SEAL.
6	ULG	L	SEALED

F1 **F2** **F3**

3.6.3 Discharge (SPD)

☞ The functional display will have an appearance similar to the following before discharge at the petrol station:

(Master Switch has already been pulled)

The tank truck is sealed, as before. No seal has been broken during the journey between the depot and the petrol station.

SEALED			
C	Cnt.	F	Status
1	LRP	L	SEALED
2	LRP	L	SEALED
3	ULG	L	SEALED
4	SULG	L	SEALED
5	DI	L	SEALED
6	ULG	L	SEALED
LOAD.		DISCH.	
F1	F2	F3	

The tank truck has been unsealed. The SPD sensors have detected a break in the seal at compartment 3.

UNSEALED			
C	Cnt.	F	Status
1	LRP	L	SEALED
2	LRP	L	SEALED
3	ULG	L	SEALED
4	SULG	L	SEALED
5	DI	L	SEALED
6	ULG	L	SEALED
LOAD.		DISCH.	
F1	F2	F3	

☞ Depending on how the tank truck has been fitted out and the specifications of the operator, it is possible for the status to be printed out or sent automatically to an On-Board computer.

☞ In order to begin discharging

- The <F3> key for "Discharge" must be pressed (unless the start of discharge has been detected automatically by a pneumatic discharge switch).

The following functional display appears

Use:

All compartments are sealed.



Start discharging in the usual manner (see chapter 3.5 / page 12).

DISCHARGE			
C	Cnt.	FOV	Status
1	LRP	E--	SEALED
2	LRP	E--	SEALED
3	ULG	E--	SEALED
4	SULG	E--	SEALED
5	DI	E--	SEALED
6	ULG	E--	SEALED

LOAD. SEAL

F1 **F2** **F3**



When discharge is complete, all the tank truck compartments are empty "E".



After the product hoses and the vapour recovery hose have been disconnected and the master switch has been pressed in, the following functional display appears.

EMPTY			
C	Cnt.	F	Status
1	LRP	E	
2	LRP	E	
3	ULG	E	
4	SULG	E	
5	DI	E	
6	ULG	E	

F1 **F2** **F3**

3.6.4 Second sealing following discharge (SPD)

☐ If it is not possible for one or more of the tank truck compartments to be fully emptied at the petrol station, a second sealing can be carried out for those compartments that are not completely empty, if this is enabled when the system is set up.

A functional display similar to the following appears

Use:

☞ Press the <F2> key for the second sealing.

- Compartments 1 and 4 have been fully discharged and are empty ("E"); they cannot be sealed a second time.
- Compartments 3 and 6 are properly sealed, as they were before.
- A second sealing has been carried out at compartments 2 and 5; the status is therefore „2D-Seal“. The “D” indicates that the second seal was set during Discharge.

DISCHARGE			
C	Cnt.	F	Status
1	LRP	E--	
2	LRP	L--	2D-SEAL.
3	ULG	L--	SEAL
4	SULG	E--	
5	DI	L--	2D-SEAL.
6	ULG	L--	SEAL
LOAD .		SEAL	
F1		F2	
		F3	

☐ Discharge of the other sealed and second-sealed compartments can then be continued at another petrol station.

Display:

☞ To do this: Start discharging in the usual manner (see chapter 3.5 / page 12).

☺ When discharge is complete, all the tank truck compartments are empty, the product hoses and the vapour recovery hose have been disconnected and the master switch has been pressed in, this functional display appears.

EMPTY			
C	Cnt.	F	Status
1	LRP	E	
2	LRP	E	
3	ULG	E	
4	SULG	E	
5	DI	E	
6	ULG	E	
F1		F2	
		F3	

4 NoMix errors

4.1 Operation errors / information for users

Error (message)	Possible cause	Corrective action
Error: Wrong prod.	<ul style="list-style-type: none"> The selected tank truck product does not correspond with the product of the buried tank 	<ul style="list-style-type: none"> Inspect the loading plan and select a compartment containing the same product as the buried tank
Error: Wrong code	<ul style="list-style-type: none"> The selected tank truck product does not correspond with the product of the buried tank (discharge mode QSS-ASS or NoMix & QSS-ASS) 	<ul style="list-style-type: none"> Inspect the loading plan and select a compartment containing the same product as the buried tank
Not connected	<ul style="list-style-type: none"> Short circuit of the "scan line" at the tank truck Short circuit of the "scan line" at the petrol station Resistance of the delivery hoses is too high (Target: $\leq 10 \Omega$) 	<ul style="list-style-type: none"> Rectify the short circuit The insulation of the flanges is faulty. Check the insulation of the product and vapour recovery connectors Check the hose resistance and renew the connections if necessary
Error. No vapor	<ul style="list-style-type: none"> No vapor recovery line connected 	<ul style="list-style-type: none"> Check the connection
Wrong prod.	<ul style="list-style-type: none"> A product loading arm with a different product grade has been connected to a non-empty tank truck compartment 	<ul style="list-style-type: none"> Disconnect the product loading arm and connect a different product loading arm (same product grade as residue product quality) or discharge residue

Table 2: Overview of operation errors / information

4.2 Maintenance

The electronic NoMix components are maintenance-free. The devices must not be modified mechanically or electronically in any way.

✂ During cleaning with a steam cleaner or with pressurized water, the devices should be protected from the water jet. Never aim the steam jet directly onto the devices!

§ We cannot accept responsibility for any damage caused by moisture in the equipment as a result of improper cleaning procedures.

5 Address and contact details

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



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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.

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