

Electronic Sealing of Tank Truck Compartments

MultiSeal



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1 General

1.1 How to Find Information in the Manual

To enable you to find the required information in this manual easily, we have come up with a few orientation aids to help you.

- Page numbering
- Pictograms

The information in this manual varies from crucial, necessary precautions and standard tasks, to actual steps to take in handling and advice. To make it easier to distinguish information in context, it is indicated by corresponding pictograms before the text. These pictograms should not only draw attention to themselves, but also assist in finding the desired information quickly. For this reason each pictogram is symbolic of the textual content that follows it.

The following pictograms are used in this manual:



Danger. Here: Danger of explosion from inflammable gases and fluids.



Risk of Malfunction. Actions that damage the equipment.



Legal Advice. Actions that bear legal consequences.



Step-by-Step Instruction. Concrete work advice, e.g. "Please press <Enter>"



Feedback Positive, e.g. "The main menu is now displayed"



Feedback Negative, e.g. "Should an error message now be displayed..."



Background Information, Short Cut, e.g. "Further information available in Chapter XX"

2 General Description of MultiSeal Systems

The concept of MultiSeal Systems is to deliver to customers carefully measured, thin, mineral oil volume / amounts by means of secure and monitored transport in road tankers as Sealed Parcel Delivery.

- The tank section is electronically sealed after the load. The loaded amounts are entered in the load ticket.
- The status of the manlid covers and valves of the tank section are continuously monitored and every change retained in the log data.
- Even if the vehicle battery is disconnected the MultiSeal System maintains voltage from an internal battery enabling the monitoring to continue.
- The status of all compartments can be monitored for up to 100 hrs without additional current from the vehicle battery.
- After the load and before delivery to the customer a status report can be printed at any given time to record that the sections are sealed.
- By comparing the print-outs it can then be verified, for example, whether there had been any tampering during transportation from the fuel depot to the customer, possibly to remove some of the product.
- If the comparison of the print-outs indicates that there had been no tampering, i.e. no seal had been broken, it is then verified that the loaded amounts as per the tanker's delivery note are contained in the tanks.
- After the delivery the MultiSeal System indicates if the tanks are completely empty and there is no product remaining in the tank.
- Tampering with the sealed tanks is recorded directly. The tanks are then regarded as "unsealed".
- A "level gauge" – as required by some countries – becomes inapplicable when the MultiSeal System is fitted.

3 Operation of the MultiSeal system

3.1 General

The MultiSeal system is operated from the display interface



The keys have the following functions:

Key	Function
Function keys <F1>, <F2> and <F3>	The function keys will execute the function shown in the bottom row of the display.
<Stop> key	The <Stop> key enables all currently running discharge or loading processes to be stopped immediately. Menus can also be quit immediately.
<Menu> key	The menu control, e.g. for settings, execution of test, entering the loading plan, entering an override etc. is reached via the <Menu> key.
<Print> key	The print menu is reached via the <Print> key; Printing out of the setup, the logbook, activity reports, status reports, event reports etc.
<Enter> key	The <Enter> key is used to confirm entries.
<Numeric keys> 0 to 9	The <numeric keys> can be used to call up detailed information, start discharge and loading processes, and select submenus.
<Arrow keys> ← and →	Back / forward

3.2 Menu structure of the MultiSeal system

The menu structure of the MultiSeal system 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.

3.2.1 Main menu

The MultiSeal main menu is accessed by pressing the MENU key.



Pressing the <F1> key executes the "BACK" command, returning to the normal function display. By pressing the numeric key of each function you reach the corresponding sub-menu. By pressing the 2 key, for instance, you activate manual input of the loading plan.

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

3.3 Operation of the MultiSeal system

When neither loading nor discharge is activated MultiSeal is in the so 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.

 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).

3.3.1 Loading

Identification necessary

If the identification is required according to setup you have to key in some data before changing into the loading or discharge mode. This data are used as a release for loading and discharge. Without doing this no loading or discharge can be carried out.

The following data have to be keyed in:

- Shift number: Format: max. 4-digit numeric
- Tour number: Format: max. 4-digit numeric
- Depot / Station number: Format: max. 8-digit numeric

The release will be cancelled automatically after a timeout of 60 minutes. The start point of the timeout is the moment when loading- / discharge-mode changes to passive. That is when no loading arm or discharge hose is connected.

An override is not possible and the identification data are recorded in the event logbook.

Before loading at the depot, the functional display appears as follows:
(Master Switch has already been pulled).

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	UL	E	
4	KERO	E	
5	DERV	E	
6	UL	E	

LOAD . DISCH .

F 1 F 2 F 3

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	UL	E	
4	KERO	E	
5	DERV	L	
6	UL	E	

LOAD . DISCH .

F 1 F 2 F 3

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

- ☞ The <F1> key for loading must be pressed in order to begin loading.
- ☺ The following display appears:

LOADING			
C	Cnt.	FV	Status
1	LRP	E -	
2	LRP	E -	
3	UL	E -	
4	KERO	E -	
5	DERV	E -	
6	UL	E -	

SEAL DISCH .

F 1 F 2 F 3

- ☞ Load the tank truck in the usual manner.

- ☺ 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, the following display appears.

SEALED			
C	Cnt.	F	Status
1	LRP	L	SEALED
2	LRP	L	SEALED
3	UL	L	SEALED
4	KERO	L	SEALED
5	DERV	L	SEALED
6	UL	L	SEALED

F 1
F 2
F 3

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, as described in chapter 3.3.3.2.2.

If it is necessary, for whatever reason, to interrupt the loading and to then continue once more, the following procedure is to be followed.

3.3.1.1 Second loading / Second sealing

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

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

LOADING			
C	Cnt.	F	Status
1	LRP	L	SEALED
2	LRP	E	
3	UL	L	SEALED
4	KERO	L	SEALED
5	DERV	L	SEALED
6	UL	L	SEALED

SEAL		DISCH.
F 1	F 2	F 3

- ☞ Press the <F1> key for loading again. 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 vapour 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.

☺ The following display appears.

SEALED			
C	Cnt.	F	Status
1	LRP	L	SEALED
2	LRP	L	SEALED
3	UL	L	SEALED
4	KERO	L	SEALED
5	DERV	L	2L-SEAL
6	UL	L	SEALED

F 1
F 2
F 3

Compartments 1, 3, 4 and 6 are properly sealed, as they were before, and 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".

3.3.2 Discharge

Identification necessary (see chapter 3.3.1)

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	UL	L	SEALED
4	KERO	L	SEALED
5	DERV	L	SEALED
6	UL	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	UL	L	
4	KERO	L	SEALED
5	DERV	L	SEALED
6	UL	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, as described in chapter 3.3.3.2.2.
- ☞ The **<F3>** key for "Discharge" must be pressed in order to begin discharging.

- ☺ The following functional display appears.

DISCHARGE			
C	Cnt.	FV	Status
1	LRP	L-	SEALED
2	LRP	L-	SEALED
3	UL	L-	SEALED
4	KERO	L-	SEALED
5	DERV	L-	SEALED
6	UL	L-	SEALED
LOAD .		SEAL	
F 1		F 2	
			F 3

All compartments are sealed.

- ☞ Start discharging in the usual manner.
- ☺ 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, the following functional display appears.

EMPTY			
C	Cnt.	F	Status
1	LRP	E	
2	LRP	E	
3	UL	E	
4	KERO	E	
5	DERV	E	
6	UL	E	
F 1		F 2	
			F 3

3.3.2.1 Second sealing following discharge

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.

- ☞ To do this, press the <F2> key for the second sealing.
- 😊 A functional display similar to the following appears:

DISCHARGE			
C	Cnt.	FV	Status
1	LRP	E-	
2	LRP	L-	2D-SEAL
3	UL	L-	SEALED
4	KERO	E-	
5	DERV	L-	2D-SEAL
6	UL	L-	SEALED
LOAD .		SEAL	
F 1		F 2	F 3

Compartments 1 and 4 have been fully discharged and are empty; 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 of the other sealed and second-sealed compartments can then be continued at another petrol station.

- ☞ To do this: Start discharging in the usual manner.

- ☺ 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, the following functional display appears.

EMPTY		
C	Cnt.	F Status
1	LRP	E
2	LRP	E
3	UL	E
4	KERO	E
5	DERV	E
6	UL	E

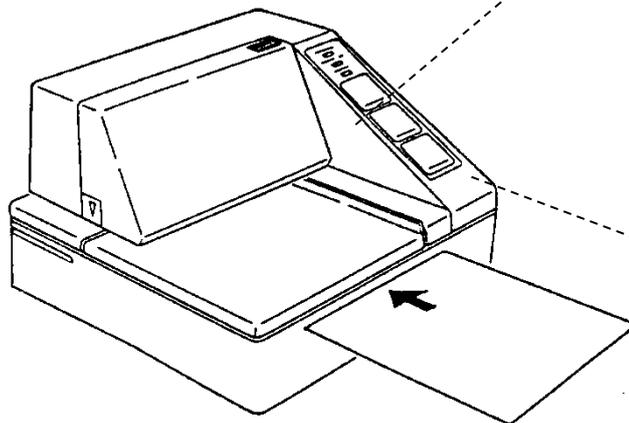
F 1
F 2
F 3

3.3.3 Printing

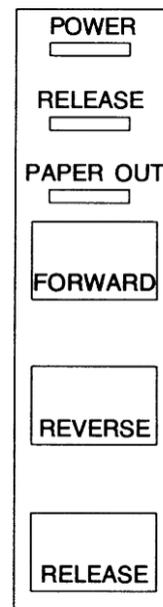
3.3.3.1 Using the printer (DR-295 / DR 298)

NOTE: The MultiSeal system is optionally supplied with a printer, model DR-295 or DR-298. Printer operation is described below.

- ☞ Switch on the printer via the switch on the left-hand side of the printer.
- 😊 The printer is operational if the **POWER** lamp is lit.
- ☞ Paper can only be inserted if the **PAPER OUT** and **RELEASE** lamps are on.
 - **PAPER OUT** comes on if there is no paper in the printing area of the printhead.
 - The **RELEASE** lamp indicates that the printhead has been lifted and the paper has been released.
- ☞ Press the **RELEASE** key to lift the printhead.
- 😊 The **RELEASE** lamp will come on, indicating that the paper has been released from the printhead and can be inserted or removed.
- ☞ Feed the paper into the printer from the front, along the guide edge on the right hand side and up to the end stop.
- 😊 The **PAPER OUT** lamp will go out.
- ☞ Press the **FORWARD** key.
- 😊 The printhead is lowered, thus holding the paper in place. The **RELEASE** lamp goes out, and the printer is ready to print.



Inserting paper into the printer



Printer control panel

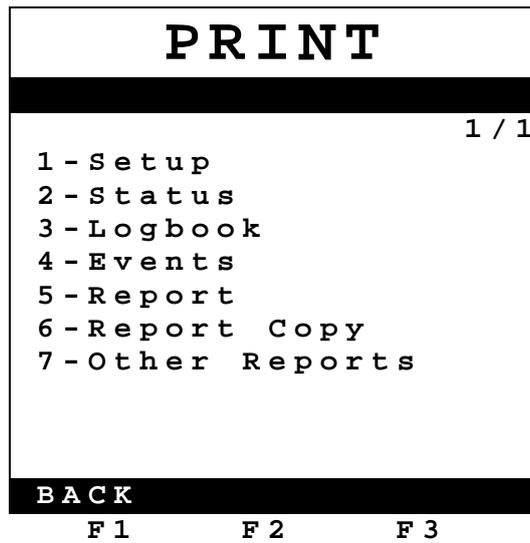
- ⚠ Do not use paper with perforations along the edges. The printer would interpret the perforation as "paper end", and the printout would be interrupted.

3.3.3.2 Print Menu

If the MultiSeal System is connected to a printer, the print menu can be called up by pressing the <Print> key.

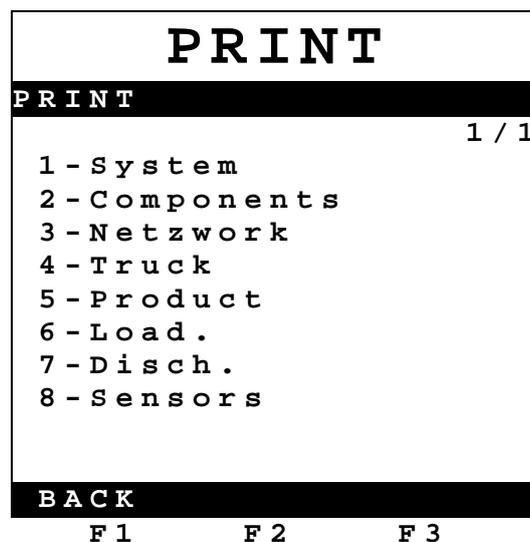
☞ You can get into the print menu by pressing the <PRINT> key.

The following message is displayed.



☞ You can get into the sub-menus by pressing the number key that precedes the function.

3.3.3.2.1 Setup



☞ You can start the printout of sub-menus by pressing the number key that precedes the sub-menu.

3.3.3.2.2 Status

☞ To start the status report printout you have to press the key <2>. Immediately the printout of the status report starts.

The status report contains the particular seal conditions of the individual compartments.

- Status report number
- Software version of MultiSeal Main Unit
- Date of printout
- Time of printout
- Series number of MultiSeal Main Unit
- Sealed compartments: date and time of sealing
- Manual sealed compartments: date and time of sealing at loading
- Manual sealed compartments: date and time of sealing at discharge
- Unsealed compartments: date and time of unsealing, event which causes the unsealing

3.3.3.2.2.1 Status report before loading (Example)

Status report printout	Explanation
<pre> Statusrep. No. 000005 MultiSeal Ver. 1.12 11.11.2002 S/N: 000001 14:25:27 ----- </pre>	<p>Heading with report no., Main Unit software version no. and series no., Date and Time of printout.</p>
<pre> Compartment 1: DERV EMPTY 17.09.2002 13:40 </pre>	<p>Product grade Compartment 1 = DERV Status Compartment 1= Empty, Date/Time</p>
<pre> Compartment 2: KERO EMPTY 17.09.2002 13:40 </pre>	<p>Product grade Compartment 2 = KERO Status Compartment 2 = Empty, Date/Time</p>
<pre> Compartment 3: LRP EMPTY 17.09.2002 13:41 </pre>	<p>Product grade Compartment 3 = LRP Status Compartment 3 = Empty, Date/Time</p>
<pre> Compartment 4: UL EMPTY 17.09.2002 13:41 </pre>	<p>Product grade Compartment 4 = UL Status Compartment 4 = Empty, Date/Time</p>
<pre> Compartment 5: DERV EMPTY 17.09.2002 13:41 </pre>	<p>Product grade Compartment 5 = DERV Status Compartment 5 = Empty, Date/Time</p>
<pre> Compartment 6: KERO EMPTY 17.09.2002 13:41 </pre>	<p>Product grade Compartment 6 = KERO Status Compartment 6= Empty, Date/Time</p>
<pre> --- End of print --- </pre>	

3.3.3.2.2 Status report after loading / before discharge (Example)

Status report printout	Explanation
<pre>Statusrep. No. 000006 MultiSeal Ver. 1.12 11.11.2002 S/N: 000001 14:28:54 -----</pre>	<p>Heading with report no., Main Unit Software version no. and series no., Date and Time of printout.</p>
<pre>Compartment 1: DERV SEALED 11.11.2002 14:28</pre>	<p>Product grade Compartment 1 = DERV Status Compartment 1 = Sealed, Date/Time</p>
<pre>Compartment 2: KERO SEALED 11.11.2002 14:28</pre>	<p>Product grade Compartment 2 = KERO Status Compartment 2 = Sealed, Date/Time</p>
<pre>Compartment 3: LRP SEALED 11.11.2002 14:28</pre>	<p>Product grade Compartment 3 = LRP Status Compartment 3 = Sealed, Date/Time</p>
<pre>Compartment 4: UL SEALED 11.11.2002 14:28</pre>	<p>Product grade Compartment 4 = UL Status Compartment 4 = Sealed, Date/Time</p>
<pre>Compartment 5: DERV SEALED 11.11.2002 14:28</pre>	<p>Product grade Compartment 5 = DERV Status Compartment 5 = Sealed, Date/Time</p>
<pre>Compartment 6: KERO SEALED 11.11.2002 14:28</pre>	<p>Product grade Compartment 6 = KERO Status Compartment 6 = Sealed, Date/Time</p>
<pre>--- End of print ---</pre>	

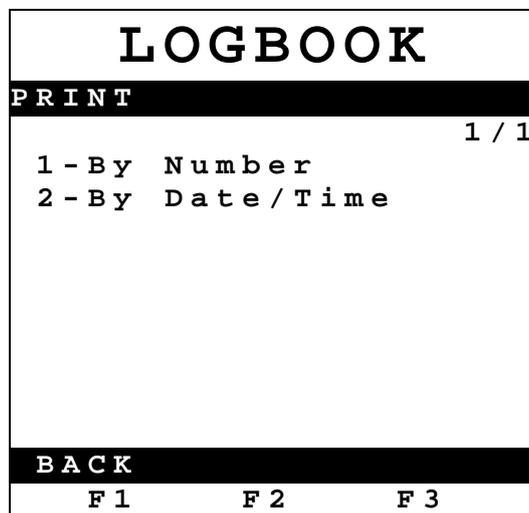
3.3.3.2.2.3 Status report, other possible compartment status entries (Example)

Status report printout	Explanation
<pre>Statusrep. No. 000008 MultiSeal Ver. 1.12 11.11.2002 S/N: 000001 14:43:13 -----</pre>	<p>Heading with report no., Main Unit Software version no. and series no., Date and Time of printout.</p>
<pre>Compartment 1: DERV SEALED 11.11.2002 14:41</pre>	<p>Product grade Compartment 1 = DERV Status Compartment 1 = Sealed, Date/Time</p>
<pre>Compartment 2: KERO MAN.LOAD.SEAL 11.11.2002 14:41</pre>	<p>Product grade Compartment 2 = KERO Manual Seal at Loading, Date/Time</p>
<pre>Compartment 3: LRP MAN.DEL.SEAL 11.11.2002 14:41</pre>	<p>Product grade Compartment 3 = LRP Manual Seal at Discharge, Date/Time</p>
<pre>Compartment 4: UL UNSEALED 11.11.2002 14:42 API-Coupling 4: Opened 11.11.2002 14:42</pre>	<p>Product grade Compartment 4 = UL Status Compartment 4 = Unsealed, Date/Time, Reason for Unsealing: API-Coupling Compartment 4 was opened, Date/Time</p>
<pre>Compartment 5: DERV EMPTY 11.11.2002 14:42</pre>	<p>Product grade Compartment 5 = DERV Status Compartment 5 = Empty, Date/Time</p>
<pre>Compartment 6: KERO SEALED 11.11.2002 14:41</pre>	<p>Product grade Compartment 6 = KERO Status Compartment 6 = Sealed, Date/Time</p>
<pre>--- End of print ---</pre>	

3.3.3.2.3 Logbook

The MultiSeal 2000 log book is an electronic memory that can store data that in some way deactivate or influence the MultiSeal monitoring functions (e.g. hardware fault, , change-over of date and time...). These actions can then be viewed sequentially by date under a consecutive number via the log book function. The log book can only be viewed, it cannot be deleted. Once the log book has reached the maximum number of entries, the first entry will be overwritten during the next action (ring buffer). In day-to-day operation when no faults occur there is no use for the logbook report printout.

- ☞ To start the Logbook printout you have to press the key <3>.
- The following message is displayed.



- 1 - Printout of Logbook entries by number.
- 2 - Printout of Logbook entries by date/time.

- ☞ After pressing key <1> enter a start number and an end number.

- Enter the start logbook number using the <numeric keys>.
- Press <ENTER> for acknowledge.
- Enter the end logbook number using the <numeric keys>.
- Press <ENTER> for acknowledge.
- Press <F1> „BACK“, for correction.
- Press <F3> „PRINT“, to start the printout

☞ After pressing key <2> enter a period from start date / time to end date / time.

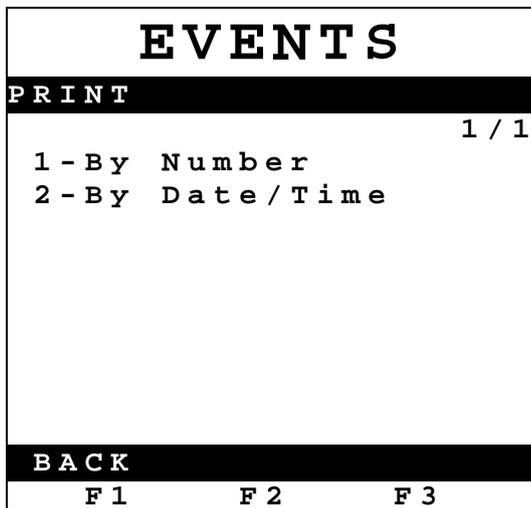
- Enter the start date using the <numeric keys>.
- Press <ENTER> for acknowledge.
- Enter the start time using the <numeric keys>.
- Press <ENTER> for acknowledge.
- Enter the end date using the <numeric keys>.
- Press <ENTER> for acknowledge.
- Enter the end time using the <numeric keys>.
- Press <ENTER> for acknowledge.
- Press <F1> „BACK“, for correction.
- Press <F3> „PRINT“, to start the printout

3.3.3.2.4 Events report

In day-to-day operation when no faults occur there is no use for the events report. If problems such as seal breaks etc. have arisen, however, it can then be used to seek particular information about events that have occurred. The events report contains a record of all the events, changes of status and actions such as the opening of valves.

☞ Numeric key <4> must be pressed to print out the events report.

The following display appears.



- 1 - Prints out all the events in accordance with the numbers entered
- 2 - Prints out all the events within a specific period of time

☞ The procedure is specified in the same way as for the logbook, according to chapter 3.3.3.2.3.

3.3.3.2.5 Reports (Worksheet)

- ☞ To start the status report printout you have to press the key <5>. Immediately the printout of the report starts.
- ☞ All reports that have taken place after the last printout will be printed. In this manner it is possible to create a complete tour or shift report.

3.3.3.2.5.1 Report of a Loading and Discharge (Example)

Loading: (Begin)

Report Printout	Explanation
<pre>Worksheet. No. 000005 MultiSeal Ver. 1.12 11.11.2002 S/N: 000001 14:32:07 ----- Truck Sign ----- L o a d i n g ----- Begin: 11.11.2002 14:26 004406 End: 11.11.2002 14:28 004483 1:E 2:E 3:E 4:E 5:E 6:E DERV LRP UL KERO KERO LRP Comp. 1, DERV: Uncoded: KERO 14:27-14:28 Not empty Comp. 2, LRP: Uncoded: UL 14:27-14:28 Not empty Comp. 3, UL: Uncoded: LRP 14:27-14:28 Not empty Comp. 4, KERO: Uncoded: UL 14:27-14:28 Not empty Comp. 5, KERO: Uncoded: DERV 14:27-14:28 Not empty Comp. 6, LRP: Uncoded: KERO 14:28-14:28 Not empty 1:S 2:S 3:S 4:S 5:S 6:S KERO UL LRP UL DERV KERO ----- D i s c h a r g e ----- Begin: 11.11.2002 14:29 004493</pre>	<p>Heading with worksheet no., Main Unit Software version no. and series no., Date and Time of printout</p> <p>Hand written truck identification, e.g. number plate, sign of the driver</p> <p>Begin of loading, date/time, log. No. End of loading, date/time, log. No.</p> <p>Compartment state before loading: E = empty Loading plan before loading</p> <p>Hand input loading plan, change from DERV to KERO Loading time compartment 1, state: not empty</p> <p>Hand input loading plan, change from LRP to UL Loading time compartment 2, state: not empty</p> <p>Hand input loading plan, change from UL to LRP Loading time compartment 3, state: not empty</p> <p>Hand input loading plan, change from KERO to UL Loading time compartment 4, state: not empty</p> <p>Hand input loading plan, change from KERO to DERV Loading time compartment 5, state: not empty</p> <p>Hand input loading plan, change from LRP to KERO Loading time compartment 6, state: not empty</p> <p>Compartment state after loading: S = Sealed Loading plan after loading</p> <p>Begin of discharge, date/time, log. No.</p>

<p>End: 11.11.2002 14:31 004554</p> <p>1:S 2:S 3:S 4:S 5:S 6:S DERV LRP UL KERO KERO LRP Comp. 1, DERV: Connected: NU 14:30-14:30 Empty</p> <p>Comp. 2, LRP: Connected: NU 14:30-14:30 Empty</p> <p>Comp. 3, UL: Connected: NU 14:30-14:30 Empty</p> <p>Comp. 4, KERO: Connected: NU 14:30- 14:31 Empty</p> <p>Comp. 5, KERO: Connected: NU 14:31-14:31 Empty</p> <p>Comp. 6, LRP: Connected: NU 14:31-14:31 Empty 1:L 2:L 3:L 4:L 5:L 6:L DERV LRP UL KERO KERO LRP</p> <p>--- End of Printout ---</p>	<p>End of discharge, date/time, log. No.</p> <p>Compartment state before discharge: S = Sealed Loading plan before discharge</p> <p>Discharge compartment 1, DERV uncoded (NU) Discharge time compartment 1, state: empty</p> <p>Discharge compartment 2, LRP uncoded (NU) Discharge time compartment 2, state: empty</p> <p>Discharge compartment 3, UL uncoded (NU) Discharge time compartment 3, state: empty</p> <p>Discharge compartment 4, KERO uncoded (NU) Discharge time compartment 4, state: empty</p> <p>Discharge compartment 5, KERO uncoded (NU) Discharge time compartment 5, state: empty</p> <p>Discharge compartment 6, LRP uncoded (NU) Discharge time compartment 6, state: empty</p> <p>Compartment state after discharge: E = empty Loading plan after discharge</p>
--	---

End of Discharge

3.3.3.2.5.2 Additional Compartment States

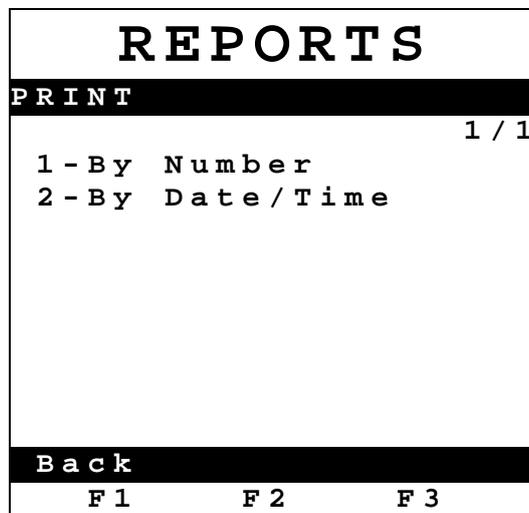
Report Printout	Explanation
<p>1:E 2:L 3:R 4:S 5:SL 6:SD DERV LRP UL KERO KERO LRP</p>	<p>The following compartment states can be displayed: Comp. 1 = E: Empty Compartment Comp. 2 = L: Loaded, not sealed Compartment Comp. 3 = R: Rest volume in the pipe system Comp. 4 = S: Sealed (loaded) Compartment Comp. 5 = SL: Hand sealed (loaded) Compartment Seal at Loading Comp. 6 = SD: Hand sealed (loaded) Compartment Seal at Discharge</p>

3.3.3.2.5.3 Copy Report

- ☞ To printout a copy of the last report the numeric key <6> has to be pressed. Immediately a copy of the last report will be printed.

3.3.3.2.5.4 Other Reports

- ☞ To start the printout of other reports you have to press the key <7>. The following message is displayed.

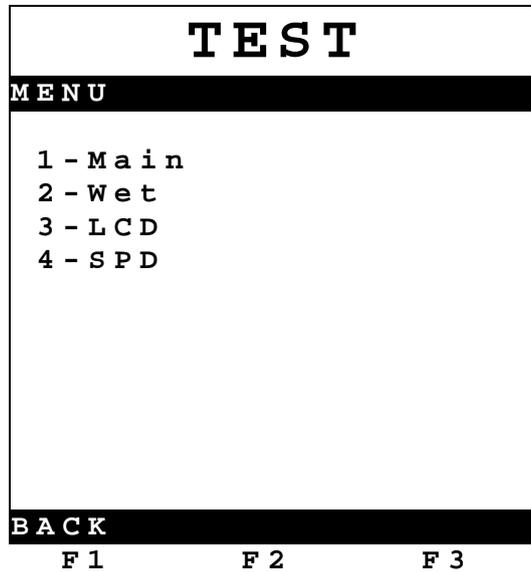


- 1 - Printout of reports by number.
- 2 - Printout of reports by date/time.

- ☞ The printout has to be done according to chapter 3.3.3.2.3 (Logbook printout).

3.3.4 Test Menu

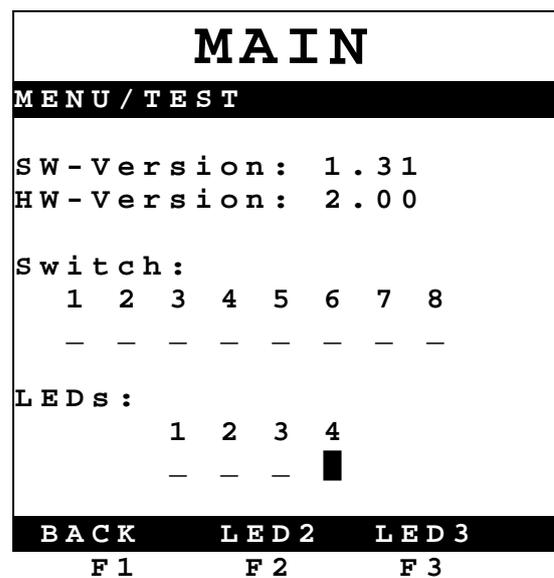
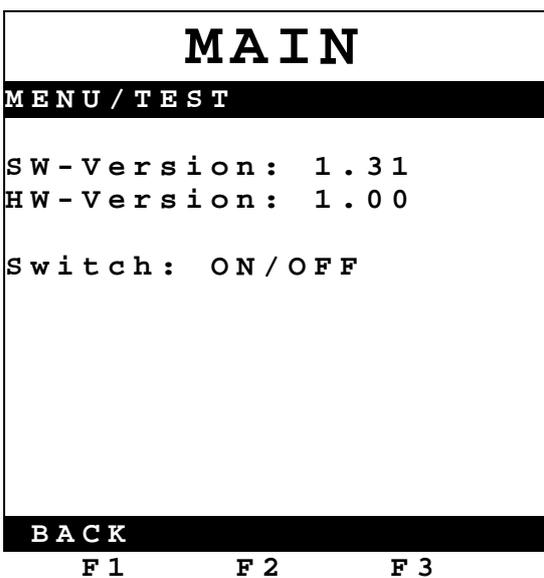
In Test Menu extensive tests can be carried out on the MultiSeal System's component assemblies.



☞ By pressing the number that precedes the function, you can get into the test sub-menu.

3.3.4.1 Main Unit Test

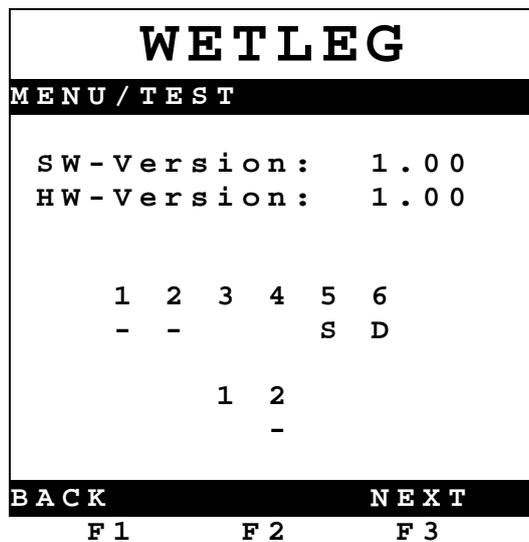
Depending of the hardware version different variants are displayed. Hardware version 1.00 correspond to the original Main Unit CPU-Board, predominantly used in Main Unit, part no. NM2MAIN, Hardware version 2 correspond to the Main Unit –Board used in Main Unit / Display, part no. NM2MAINDISP.



Note to hardware version 2.00:

- The setup switch is dipswitch no. 8
- Numbering of the LEDs:
 - 1 = Setup-Switch (red)
 - 2 & 3 = software controlled (green)
 - 4 = Power indication (always lighting) (green)

3.3.4.2 Wet-leg Sensor Test



☞ Please carry out the wet-leg sensor test for all compartments. The signs for the wet-leg sensors in their respective compartments mean:

- - : Compartment Status = Empty
- : Compartment Status = Remainder, not empty compartment
- **S** : Short-circuit in the sensor or sensor lead
- **D** : Break in the sensor or sensor lead circuit or sensor disconnected

The signs for both the intrinsically safe inputs mean:

- - : Input Open, not active
- : Input Closed, active

3.3.4.3 SPD Sensors Test

The following describes the testing of the SPD sensors:

S E N S O R S										
M E N U / T E S T										
S W - V e r s i o n :		1 . 0 0								
H W - V e r s i o n :		1 . 0 0								
0	0	0	0	0	0	0	0	0	1	
1	2	3	4	5	6	7	8	9	0	
-	-	-	-	S	-	D	-	-	-	
1	1	1	1	1	1	1	1	1	2	
1	2	3	4	5	6	7	8	9	0	
-	-	-	-	-	-	-	-	-	-	
B A C K										
F 1			F 2				F 3			

The following are displayed:

- - : Sensor passive (e. g. API closed)
- : Sensor active (e.g. API opened)
- S : Sensor short circuit
- D : Sensor disconnected /interruption

☞ Please activate the respective sensors for each compartment by opening the valves or by turning on the pressure switches with compressed air.

☺ The switch status displayed must be changed

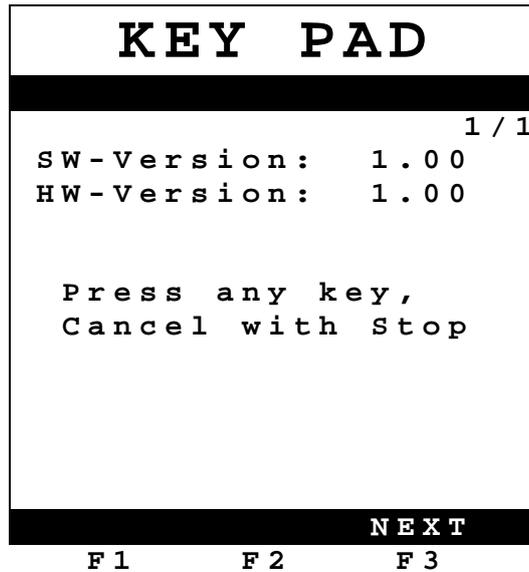
from “- “ to “ “

Additionally it can be observed which input the tested sensor is connected at any one time (Input K1 to K20).

3.3.4.4 Display / Keypad Test

- ☞ By pressing the Menu key you can get into the keypad test:
Exit the keypad test by pressing the Stop key.

Example of a keypad test display:



The function of the key being depressed is displayed e.g. "ENT".

3.4 Faults in the MultiSeal System

Fault (Message)	Possible Cause	Correction
No signs on the display	<ul style="list-style-type: none"> Supply voltage of 24 V in the main unit and in the interface component assemblies is not available. Power supply to the display interface defective. Serious CAN bus failure. 	<ul style="list-style-type: none"> Switch off and on the MultiSeal system. Same result → go to service workshop.
Display message: Generic Terminal FMC F.A.SENING DC electronics F1=Setup Display	<ul style="list-style-type: none"> There is no communication link between the main unit and the operating device or devices, or the operating device is defective. 	<ul style="list-style-type: none"> Switch off and on the MultiSeal system. Same result → go to service workshop.
Display message: ERROR No connection with interface Wet-leg Sensor 1.	<ul style="list-style-type: none"> The wet-leg sensor interface has no supply voltage or there is no communication link between the main unit and the wet-leg sensor interface or the wet-leg sensor interface is defective. 	<ul style="list-style-type: none"> Switch off and on the MultiSeal system. Same result → go to service workshop.
Display message: ERROR No connection with interface Sensor 1	<ul style="list-style-type: none"> The SPD sensor interface has no supply voltage or there is no communication link between the main unit and the SPD sensor interface or the SPD sensor interface is defective. 	<ul style="list-style-type: none"> Switch off and on the MultiSeal system. Same result → go to service workshop.

Fault (Message)	Possible Cause	Correction
A wet-leg sensor indicates not empty	<ul style="list-style-type: none"> • When “supervise filling of pipes” is activated the wetleg sensor only change to status empty when the footvalve is opened • Residue in the compartment. • Glass prism of the wetleg sensor is heavily soiled. • Wetleg sensor is faulty. • Connection line or wetleg sensor interface NM2WET is faulty. 	<ul style="list-style-type: none"> • Open footvalve • Empty compartment • Go to service workshop.
Message displayed in the wet-leg sensor test menu "S" or "D"	<ul style="list-style-type: none"> • Short-circuit or break in the wet-leg sensor lead • Wet-leg sensor defective • Wet-leg sensor interface defective 	<ul style="list-style-type: none"> • Go to service workshop
One or more keys on the operating device do not function.	<ul style="list-style-type: none"> • The keypad on the operating device is defective 	<ul style="list-style-type: none"> • Go to service workshop
The printer does not print	<ul style="list-style-type: none"> • Printer is not powered • The printer is not correctly connected • Printer defective 	<ul style="list-style-type: none"> • Switch on printer • Go to service workshop

3.5 Maintenance

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

 During cleaning with a steam cleaner or with pressurised 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.

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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