TechnipFMC

MANUAL

Level Gauging System

MultiLevel

Instruction Manual

Bulletin MNF18001EN / DOK-479-E Issue/Rev 1.4 (9/18)

Further documentation on this product:

Description	Order number
MultiLevel Driver's operating instructions	MNF18019EN / DOK-518
MultiLevel Calibration Instructions	MNF18005EN / DOK-480
MultiLevel Calibration Testing	MNF18003EN / DOK-514
MultiLevel Seal Receipt	MNF18007EN / DOK-482
NoMix Installation / Drawings	MNF16002EN / DOK-415
NoMix Approvals	MNF16006EN / DOK-454
NoMix Standard / System Circuit Diagrams	MNF16007EN / DOK-419
EMIS2 Workshop and Installation Manual	MNF19008EN / DOK-447
EMIS2 Wiring Diagrams and Drawings	MNF19004EN / DOK-456
EMIS3 Workshop and Installation Manual	MNF19009EN / DOK-493
EMIS3 Interface Description	MNF19002EN / DOK-411

Documentation on the Internet: www.fmctechnologies.com/seningttp

History

Revision	Order number	Responsible staff	Status	Description
Rev. 1.00	October 2006	R. Arndt	Release	Basic Edition
Rev. 1.10	December 2007	MF / jp	Release	- Format changes/new drawings - Editorial change
Rev. 1.22	December 2009	GE / jp	Release	- Chapter 8: new form layout (GE)
Rev. 1.23	May 2010	GE / jp	Release	- Chapter 10 new „Technical Data“
Rev. 1.27	May 2011	GE / jp	Preliminary	- Temp. Compensation during Loading - Loading pre-switching - Communication: Loading & Delivery Data - Totalizer / Delivery Report - Print reports and tables
Rev. 1.29	January 2012	GE / jp	Release	-Temp. Compensation - Bioethanol mix (new procedure) - Second wet-leg sensor - Adjust sensor allocation
Rev. 1.30	April 2013	jp / elf	Release	- Format changes - Editorial revision
Rev. 1.40	September 2018	kb	Release	- New company branding

Important

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

Measurement Solutions
Regentstrasse 1
D-25474 Ellerbek

Tel.: +49 (0) 4101 304 - 0 (Switchboard)
Fax: +49 (0) 4101 304 - 152 (Service)
Fax: +49 (0) 4101 304 - 133 (Sales)
Fax: +49 (0) 4101 304 - 255 (Order processing)

E-Mail: info.ellerbek@fmcti.com
Web: www.fmctechnologies.com/seningttp

1 – General

1.1. Orientation aids for the manual

We have provided some orientation aids so that you can easily find the necessary information in this manual.

The information in this manual ranges from imperative safety procedures and standardized guidelines through to concrete handling procedures and advice. To differentiate these more easily, the information is marked with corresponding pictograms in front of the relevant text.

These are intended not just to draw particular attention to these passages, but also to make it easier to find the information you want. Therefore the pictograms are symbolic of the underlying textual content.

The following pictograms are used in this manual:

	**Danger sign** Danger of explosions caused by easily ignited gases and liquids here.
	**Risk of operating fault** Actions that may damage the equipment.
	**Legal notice** Actions that may have legal consequences.
	**Working step** Concrete action statements, e.g.: “Press the <Enter> key”.
	**Input necessary** e.g. via numeric or function keys.
	**Positive response message** e.g. “The main menu now appears”
	**Negative response message** e.g. “If a fault message appears now...”
	**Background information**
	**Option** Special case.
	**Function** Functional description.
	**NOTE:** Indicates a special situation.
	**ATTENTION:** Particular attention is to be paid.
	**Battery disposal** Ensure that all used batteries are disposed of via suitable disposal facilities.

Page intentionally left blank.

2 – Installation

§ **The installation of the system to a road tanker may only be carried out by a qualified company.**

☞ This qualified company carries out and tests the whole system according to the testing criteria set out in the operation and installation instructions. The correct fitting of the system is to be certified.

☞ Apart from the points outlined in the following, all the relevant regulations, such as IEC / EN 60079-14, must be observed during installation, operation and maintenance. Only if the instructions below are followed, long and trouble-free operation can be ensured.

2.1. Preventative measures

2.1.1. To avoid accidents (due to gas explosions)

⚠ **Ex-protection regulations must be observed!**
If cable glands at junction boxes has to be changed, only Ex approved cable glands shall be used.

ⓘ The entire assembly is explosion-protected, tested and certified for electrical safety. Instructions on explosion advice signs must absolutely be observed. In case of malfunction, the defective unit may be replaced as a whole unit only.

ⓘ The printer is intended for use outside explosion risk areas only. To protect it from the effects of the weather, it should preferably be installed in the cabin.

2.1.2. To meet the standard requirements

▶ The wiring must be implemented according to the attached wiring diagrams. The core colors correspond to those in DIN 47100 (see also national standards). Please observe without fail the prescribed core colors.

▶ Carry out the electrical installation in accordance with IEC / EN 60079 14 (see also national standards).

▶ It is not permissible to fit additional components into the housing or in the terminal box (e.g. additional terminals), since this would contravene the device approval.

▶ The Manufacturer’s EMV Declaration of Conformity is only valid if the system has been installed exactly according to the manufacturer’s instructions (Operation and Installation Instructions).

2.1.3. To ensure trouble-free operation

- When carrying out welding work on the vehicle, please disconnect current supply to all electronic components.
- The lead entries must always be mounted at the side or underneath in order to prevent the ingress of water into the housing.
- Unused PG glands on the terminal box or on the MultiFlow must be closed off watertight using blind plugs.
- The terminal and electronics boxes as well as the connectors must be protected against direct water spray (e.g. from the tires).
- All cables must be routed such that they are not damaged or kinked.
- The supplied blind plugs must be used on AI terminal boxes.
- In the AIII version all wire ends must be fitted with wire-end sleeves. No wire-end sleeves are required in the terminal box (only version AI).
- All electrical connections are implemented in either screw-secured plug-in connectors or terminals. The leads must be introduced into the housing through PG glands appropriate to the lead cross-section.
- The solenoid valves must be mounted upright, i.e. the solenoid coil must point upwards.
- For each fitting, a reliable electrical connection that meets the standard must be provided between any metal casing and the vehicle chassis. For this, corrosion resistant screws (V2A) with additional shake proof washers are to be used.
- The solenoid valves must be mounted upright, i.e. the solenoid coil must point upwards.

When shortening the cores, observe that absolutely no cable debris falls into the opened device, since this might lead to short-circuits on the PCB board.

Never produce a connection between the housing/sheath and the 0V strip. Failure to observe this point can give rise to malfunctions.

2.1.4. To facilitate future service work

- Terminal boxes should be fitted allowing easy access.
- The housings of the electronics system should always be accessible.
- Cables without connectors may be shortened.
- The cover mounting screws should be slightly lubricated before fitting (copper paste, graphite grease). Thus corrosion of the screws after long periods of operation is prevented and easy unscrewing enabled.

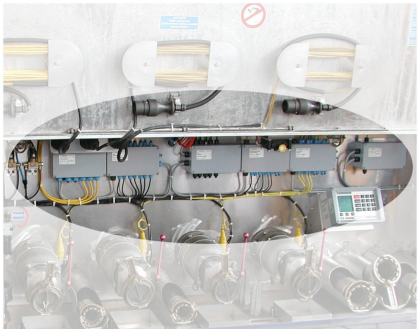
2.2. Routing the cables in the vehicle

The device/system is intended for use in a vehicle only.

To ensure fault-free operation, the guidelines described in the sections above must be observed on installation. If these guidelines are not observed, faults may occur.

§ If it can be proven that guidelines were not observed, or installation was carried out by unqualified personnel (violation of applicable regulations) we assume no liability for the malfunctions experienced and any further claims that may arise thereof.

⚠ All cables used must be fuel-resistant. For cabling in an area that is not intrinsically safe, explosion-grade cable must be used! For wiring the battery supply and the internal CAN bus the enclosed instructions part no. NM2KABEL only may be used.



Installed devices in the Tank Truck

⚠ All cables must be laid (protected) in such a way that they are not damaged, nor the operators injured, as a result of normal operation and use.

☞ Please lay a separate supply cable from the voltage source.

☞ Please use a cable of ≥ 1.5mm² cross-section.

☞ The cable need not be shielded.

☞ Tap off the voltage of +24V directly from the battery positive pole (Terminal 30) via a fused line using a lead fitted with a separate switch.

☞ Protect the system with an 8 A fuse.

☞ Obtain the +24V voltage through a secured cable directly from the battery's plus pole.

☞ Use this voltage supply only for the device/system.

☞ If the system is switched off via a switch, the switch must be placed in the +24V supply line only.

☞ The 0V line must not be switched.

☞ Never supply the printer with external voltage.

EX **EXPLOSION HAZARD**
Any kind of manipulation, either mechanical or electrical, is prohibited!

2.3. Maintenance

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.

For all devices, a regular safety check in accordance with industrial safety regulations must be carried out. Equipment and protective systems which fall under the scope of EC Directive 94/9/EC and are operated in hazardous areas are also classified installations. The standard IEC / EN 60079 17 shall be observed and there could be other country-specific policies applicable.

2.3.1. Maintenance plan

	daily	weekly	monthly	annually
Clean the outside of the device			X	
Visual testing	X			
Checking the LED's				X
Examination of the case mounting for tight fit		X		
Check the cable and check function with GWG		X		

2.4. Safety instructions

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

2.4.1. Notes on Ex protection

EX The measuring systems are designed for flow measurements of highly flammable and flammable liquids (hazard classes AI and AIII) on tank trucks. Sparks and naked flames must be strictly avoided.

2.4.2. Special requirements

The measuring systems contain high-precision, high-quality components. Consequently, mechanical actions not directly relating to the operation of the unit (e.g. dropping the unit) must be avoided.

§ The measuring devices must be properly and officially calibrated. Any manipulation, whether intentional or unintentional, will break the calibration seal.

CAUTION:
Make sure that no fuel is allowed to soak or flow into the ground!

2.4.3. 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 IEC / EN 60 079-17.

2.4.4. Disposal

It is the operator's responsibility to obtain the necessary information about all relevant regulations and requirements from your local authorities. Ensure that the relevant materials are disposed of in an environmentally safe fashion.

§ The operator is responsible for ensuring compliance with all general and local regulations which are in force at the time of disposal.

2.4.4.1. Disposal of production materials and auxiliary materials

- Mineral oil products are extremely hazardous to the environment; they must not be allowed to enter the drains/sewage system or the ground.
- These materials and any objects contaminated with them should be disposed of via suitable waste disposal facilities.

CAUTION:

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.

2.4.4.2. Disposal of a functional component or system

- When a functional component or system is taken out of service, we recommend that it should be sorted into its different types of waste and then disposed of or recycled as appropriate. Sort and separate iron, nonferrous metals, plastics, electronic waste, etc.
- Fuels, grease, oil and objects or lines contaminated with them must be disposed of separately.

2.4.5. Proper intended use

- The measuring systems are to be used exclusively for delivery of low-viscosity mineral oils 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 manufacturer is not liable for damages resulting from such improper use.
- Proper use also includes compliance with the conditions set out by the manufacturer with regard to operation, installation and maintenance.
- The measuring systems must only be operated, serviced and repaired by personnel who are familiar with the equipment and who have been trained regarding the dangers involved.
- The manufacturer cannot be held liable for any damages arising as a result of unauthorized changes to the measuring systems.

3 – Quick Start

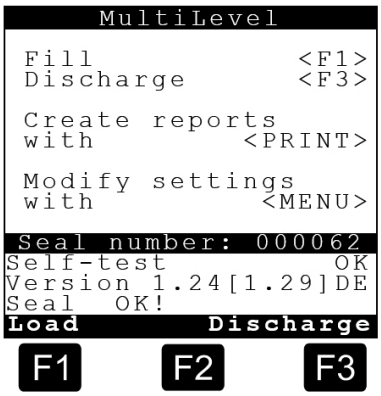
The following status screen is displayed when the MultiLevel system is switched on:

1 **Start screen**

Operation:

☞ To start a discharge process, press <F3>.

🔁 If necessary, the compartment monitoring screen will be displayed and you will be instructed to connect the hoses.



2 **Discharge screen**

Operation:

☞ Detailed information about compartment 1 is displayed in the lower area of the screen.

▶ Press <F2> for detailed information about the other compartments..

▶ Press the arrow keys ← / → on the control panel to access further detailed information, such as:
-- Roll slope,
-- Pitch slope,
-- Temperature,
-- Compartment VT,
-- Compartment V15
-- etc.

☞ At the **start of a discharge process** press the **<number keys>** for the connected compartments. The foot valves are opened. In the example shown, compartments '1', '2' or '3'.

3 Discharge screen – pre-selection

Operation:

The volume pre-selection query can now be used to modify the default volume by entering a new value using the number keys <1>...<0>. The new value must be greater than the minimum discharge volume. If this is not the case, the discharge is uncalibrated.

Use the <Enter> key to accept the value.

Alternatively, press <F3> to cancel the process and return to the compartment selection screen.

This step can be repeated for all the compartments.

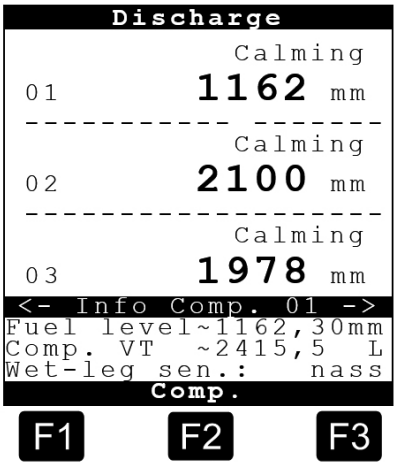
Once the default values have been entered, the following screen appears:

Discharge screen – Calming

MultiLevel now waits until any liquid movements have evened out in order to take a correct measurement.

This is shown on the display as 'Calming'.

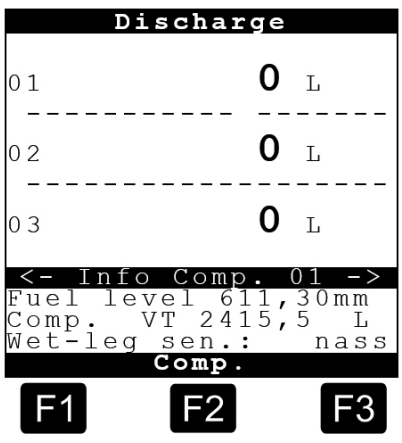
Non-calmed values: Next to the fuel level and compartment volume



Discharge screen – Start

This example shows the discharge screen:

- The discharged volume for the compartments to be discharged is displayed.
- Detailed information on the first compartment is also displayed.



Conditions for *metered* and *calibrated* DISCHARGE processes.

The following conditions must be fulfilled for a ***metered*** discharge process to take place:

- The fuel level is within the range of the dip table and the slope table.
- The foot valve is open.
- The wet-leg sensor is wet.
- The slope angles for the Pitch and Roll slope are within the configured range with regard to calibration (i.d.R. +/- 3,0°).

IMPORTANT:
If this is not the case, an 'F' will be displayed above the compartment number.

Conditions for *unmetered* DISCHARGE processes.

Unmetered discharge processes can occur under the following conditions:

- The fuel level is outside the range of the dip table and the slope table.
- The slope angles for the longitudinal and transversal slope are outside the permissible configured range. (i.d.R. +/- 5,0°).

IMPORTANT:
Sensor failure will also lead to an unmetered discharge process!

The line valve is automatically opened and the following screen appears:

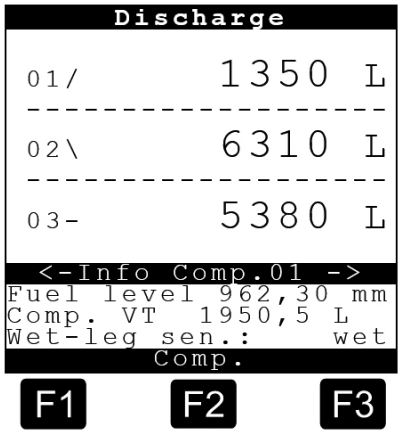
4 **Screen during the discharge process**

Operation:

Press **<F2>** to call information on the other compartments.

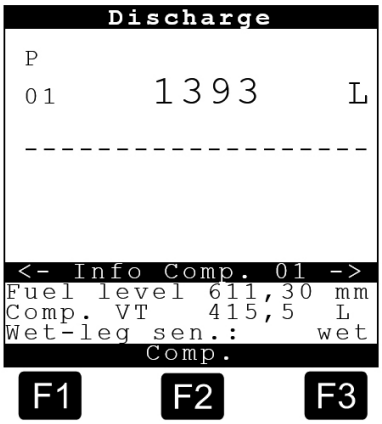
Use the arrow keys ← / → to scroll between the different pages of information.

As soon as product is flowing, the bar (/) to the right of the compartment number starts to move clockwise; the discharged volume is updated.



5 Discharge screen – Pause

Operation:



This example shows the discharge of compartment **<1>**.

You can stop the discharge at any time by pressing the compartment number (the <1> key in the example shown).

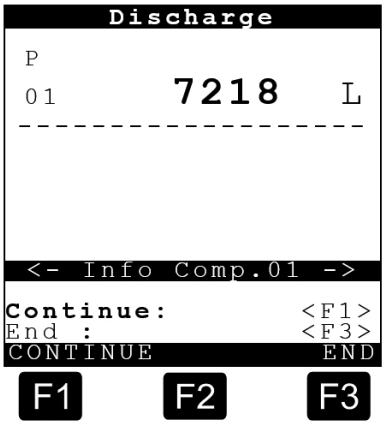
This closes both the foot valve and the line valve of the compartment in question and MultiLevel switches to a pause status.

This is indicated by a 'P' (pause) being displayed above the compartment number.

You can restart the discharge process at any time by pressing the compartment number (the <1> key in the example shown).

6 Ending the discharge process – Measurement / end

Operation:



To end the discharge process, press the compartment number (the **'1'** key in the example shown).

The foot valve and the line valve are closed and a **'P'** (pause) symbol appears on the display.

The discharge process can then be continued by pressing **<F1>** or conclusively ended by pressing **<F3>**.

Once the discharge hose has been uncoupled, the foot valve is reopened and the fuel level is measured. This is indicated by an **'M'** above the compartment number.

If a valid value is recorded, the foot valve is closed and the **end** of the discharge process from compartment 1 is indicated by the letter **'E'** above the compartment number.

This procedure occurs for both the partial discharge and the complete discharge of the compartment.

IMPORTANT:
If complete compartment discharge occurs, the residual product in the pipe is not added unless the wet-leg sensor shows the reading 'dry'!

If the wet-leg sensor shows as 'wet' due to the medium passing through from the compartment, the current discharge process can be started at any time by connecting the discharge hose and pressing the compartment number as long as no delivery note has been printed!

The process described is then repeated.

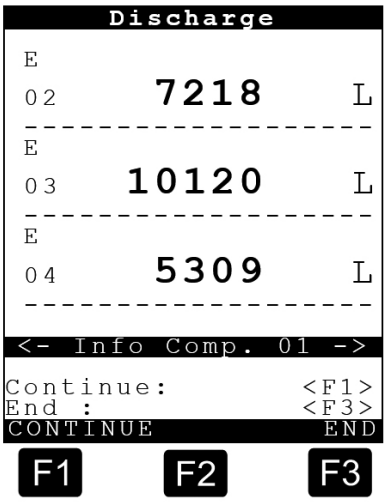
7 Ending the discharge process – Measurement / end

Operation:

Discharge all the other compartments using the same process as for compartment **1**.

▶ Once all the compartments have been discharged and all hoses and GWG cables removed, create a printout.

▶ To do this, the compartment measurement must have ended, which is indicated by the letter **'E'** above the compartment number.



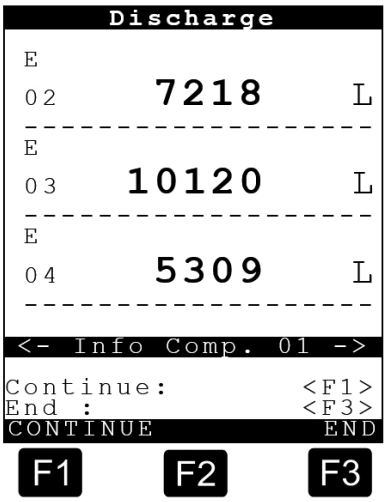
8 Print delivery note

Operation:

▶ Insert paper into the printer and press the **<Print>** key on the MultiLevel control panel.

▶ You will now be asked to select a form layout **<F1> / <F2>**. For example, depending on the precise definition, the discharge volumes of a product can be used to create a combined volume.

▶ Start the print process by pressing the <Print> key again.



IMPORTANT:
No delivery note is printed for compartments without a valid measurement, indicated by an **'M'** above the compartment number. The print process can be repeated once the measurement has finished, indicated by an **'E'** above the compartment number.

The discharge process is now complete.

3.1. Operating error

Unable to leave operating mode.

• If you are in the NoMix "Menu", for example, and press "Discharge" or "Loading" for MultiLevel, and are then unable to navigate to or leave the mode in question, then please check the NoMix device to establish whether it is in the same mode as the MultiLevel device. You can only access a different operating type in MultiLevel if both devices are in the same mode.

• This situation always occurs if MultiLevel and NoMix have not synchronized their modes.

No status screen after switching on.

• If the Status screen fails to appear after switching on and an incomplete discharge is shown instead, you must first print the outstanding receipt.

Permissible calibration slope exceeded / underrun.

• A calibrated discharge cannot be carried out if the slope is outside of the calibration limit (± 5).

The following error message is issued:
„Uncalibrated discharge2! Longitudinal slope not within calibration limits!“

▶ You must acknowledge this error message by pressing the **<F1>** key = OK.

Generally permissible slope exceeded / underrun.

• Measured discharge is not possible if the slope is outside the generally permissible slope (± 8).

The following error message is issued:
„Unmeasured discharge 3! Slope outside of the slope table“

▶ You must acknowledge this error message by pressing the **<F1>** key = OK.

4 – Remote Access to NoMix

The basic screen is normally displayed after switching on and is in the basic state:

- NoMix can also be operated without its own display. MultiLevel then displays the NoMix information.
- The MultiLevel display automatically switches over to NoMix if a "full screen error" has occurred in NoMix.
- In normal operation, the switchover must be made by the operator.

CAUTION:
During "Discharge" or "Loading", you ***MUST NOT*** switch over from one operating mode ("Discharge" / "Loading") to the other directly!

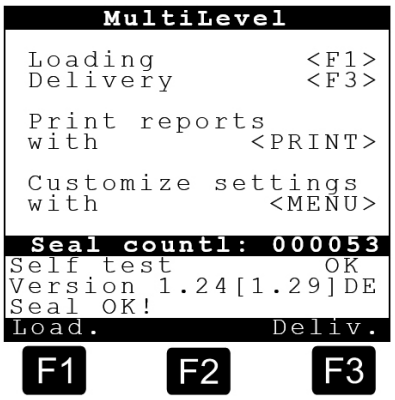
4.1. Loading

The basic screen is normally displayed after switching on and is in the basic state:

Start Screen

Operation:

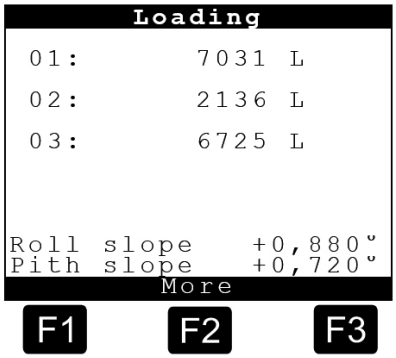
By pressing the **<F1>** button change in the loading mode.



Loading Screen (1)

Operation:

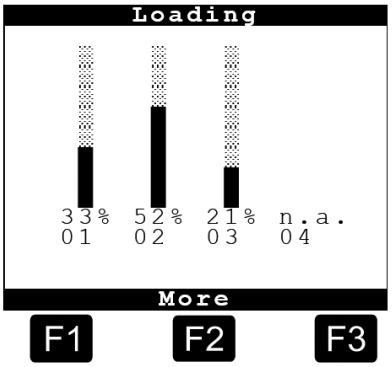
By pressing the **<F2>** button change in the individual compartments are displayed as percentages in bar charts.



Loading Screen (2)

Operation:

Press again the **<F2>** button to change in the NoMix display.

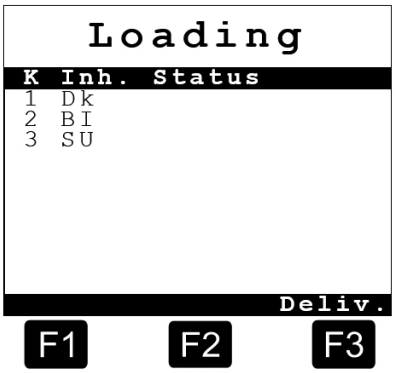


Loading NoMix Screen

Operation:

To return to the MultiLevel display:

In NoMix by a short pressing the **<MENU>** button to switch in the menu and leaving again with **<F1>** or **<STOP>** button.



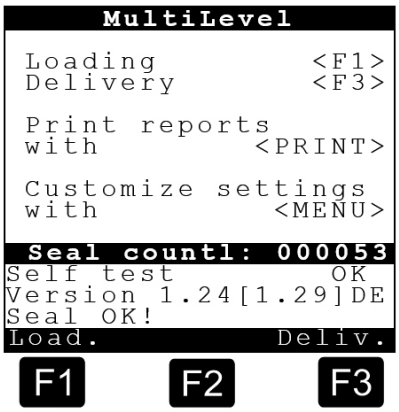
4.2. Delivery

The basic screen is normally displayed after switching on and is in the basic state:

Start Screen

Operation:

By pressing the **<F3>** button change in the delivery mode.



Delivery Screen

Operation:

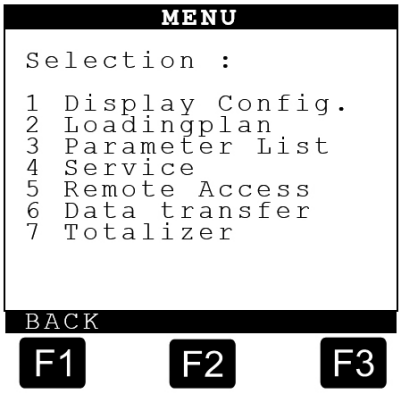
All operating steps and displays are performed on the MultiLevel, a display of the NoMix screen is only required in a few cases, eg for entering a bypass.

For this purpose initially pressing the **<MENU>** button at MultiLevel, to switch in the menu.

MENU screen

Operation:

Via menu option **<5>** is the remote access to the *("non-existent")* NoMix Display



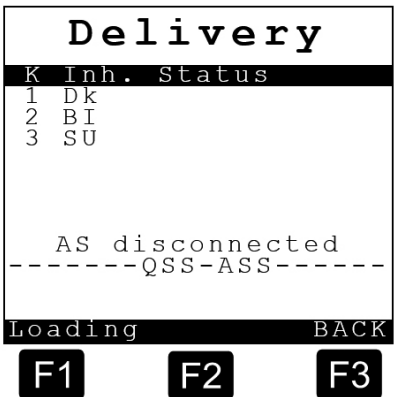
Delivery NoMix screen

Operation:

Please push again the **<MENU>** button, to enter the NoMix Menu.

Then, as usual, the bypass can be unlocked.

When leaving the NoMix menus, at first the display returns back to the MultiLevel menu. Will also leave this menu again so the Delivery screen are displayed.



ATTENTION:
The MultiLevel can only be switched in the menu, are any Deliveries stopped.
A remote access to NoMix is only possible when no Delivery is running!

Page intentionally left blank.

5 – Description of the Level Gauging System

5.1. Electrical components

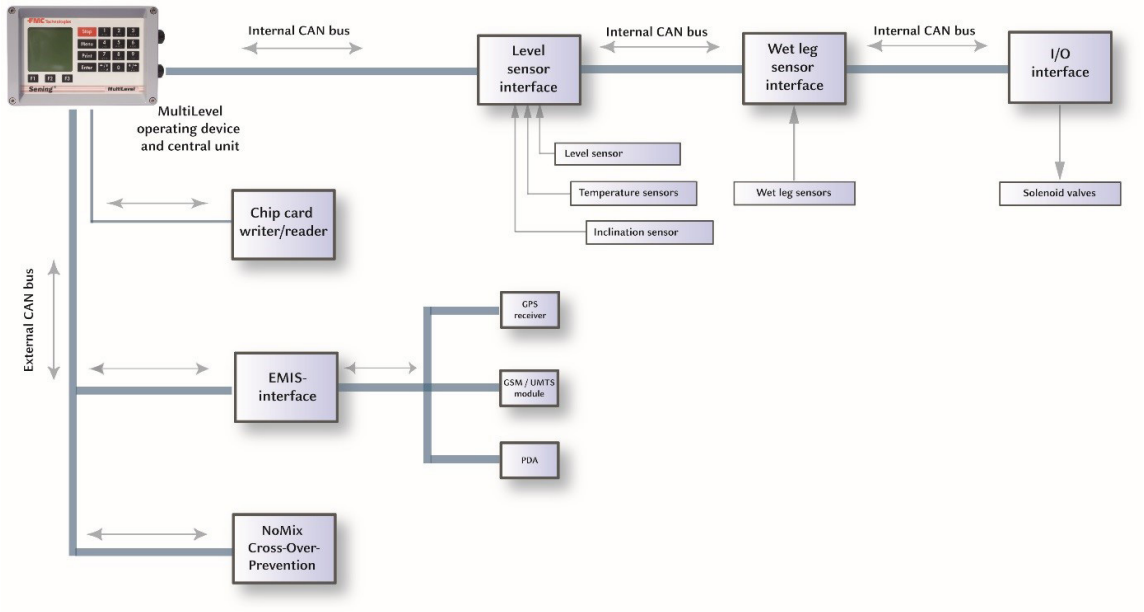


Figure 1: Electrical components

5.2. Mechanical components

For a correct temperature-volume conversion for the delivery ***and*** for the filling, the temperature sensor (9) must be installed near the bottom valve (6) to ensure a reliable incident flow in both modes!

Pos.	Name
13	Distance bushing
12	Protection tube
11	Piping system
10	Remaining fluid sensor
9	Temperature sensor
8	Discharge connector
7	Filling coupling
6	Foot valve
5	Stop valve
4	Product
3	Float
2	Dip stick
1	Compartment

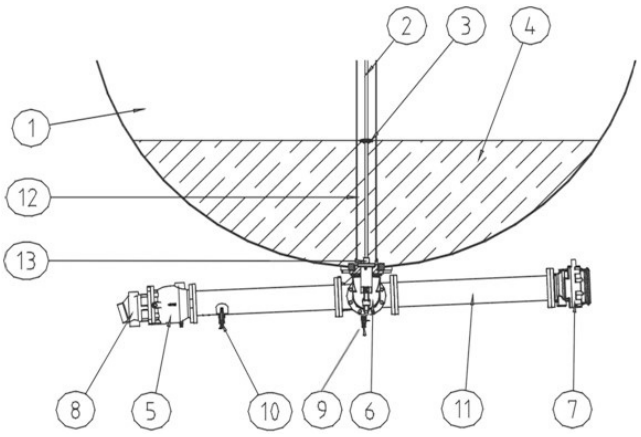


Figure 2: Overview of direct delivery left / left-right

The slope of the piping system may vary and is dependent on the tank truck construction.

Pos.	Name
13	Distance bushing
12	Protection tube
11	Piping system
10	Remaining fluid sensor
9	Temperature sensor
8	Discharge connector
7	Filling coupling
6	Foot valve
5	Stop valve
4	Product
3	Float
2	Dip stick
1	Compartment

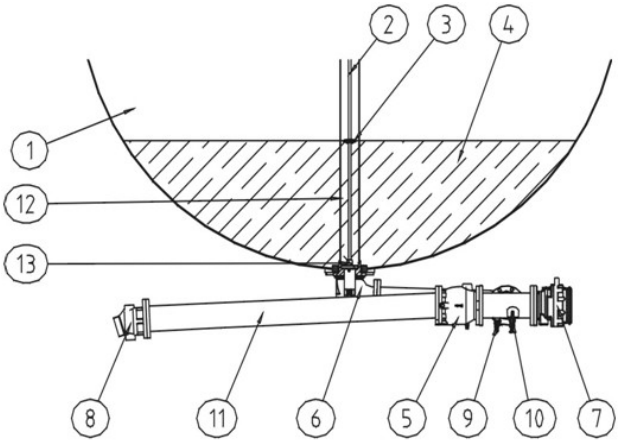


Figure 3: Overview of direct delivery left / left-right

The slope of the piping system may vary and is dependent on the tank truck construction.

Note:

All materials, flanges, protective tubes and seals, if they exist, are to be implemented in compliance with current material standards. The materials used are stated on the sales drawings for the parts; drawings to this end are to be found in the appendix.

ATTENTION:

The choice of materials, particularly with regard to resistance to media and weldability in combination with other tank materials, is the responsibility of the tank truck manufacturer. TechnipFMC does not offer any guarantee of the weldability of the parts in combination with the tank materials.

5.3. Functional Description

MultiLevel is a system for measuring delivery quantities from a tank truck. In each compartment there is a sensor that measures the fill level of the liquid.

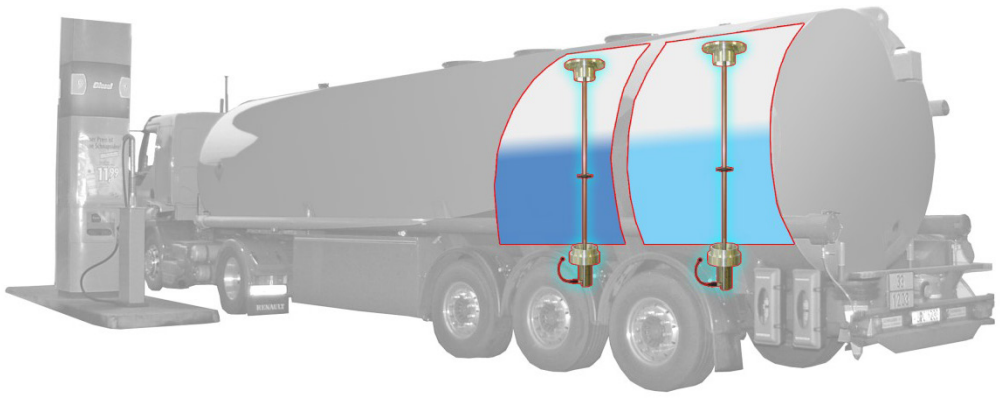


Figure 4: Tank truck with level sensors

The filling height of each compartment is assigned a filling volume via a compartment-specific gauge table, whereby intermediate values within the table are interpolated linearly (see figure xxx). The delivery quantity corresponds to the difference between the fill volume before and after the delivery.

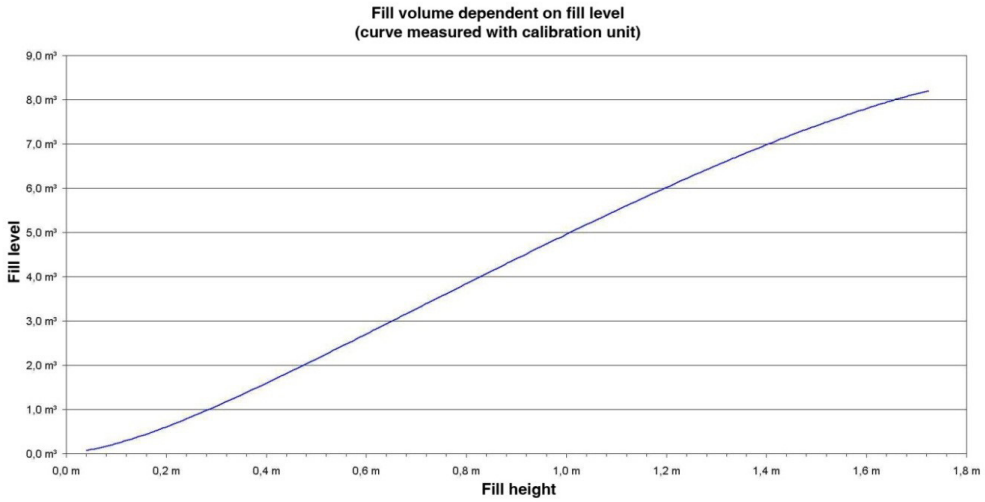


Figure 5: Typical fill height – gauge curve

ATTENTION:

The level gauging measuring system is not suitable for assuming display, monitoring and receipt printing functions during loading. Separate devices are to be used for this according to the prescribed technical safety rules.

The filling volume is independent of the inclination of the compartment only in the case of specially designed and precisely manufactured compartments. In almost all common compartment forms, errors occur in the assignment of the filling height to the filling volume as soon as the compartment is inclined. (The level in the compartment changes with inclination, although the filling volume remains constant.) Here, the gauge table is valid only for a defined angular alignment of the vehicle. (Normally 0° in the longitudinal and transverse direction.).

The size of the error in the case of inclination depends on the geometry of the compartment and the position of the level sensor. There is an ideal level sensor position for each compartment. The further away the level sensor is from the ideal position, the greater the influence of the inclination becomes. The error must be corrected if the measuring error exceeds calibration limit values.

The inclination correction values are calculated with the help of a 3D drawing program. To this end, the tank geometry including the position of the level sensor, the alignment of the tank compartment during the calibration and the basis of the height measurement need to be known. The inclination table, as shown in the table below is created using the 3D drawing program.

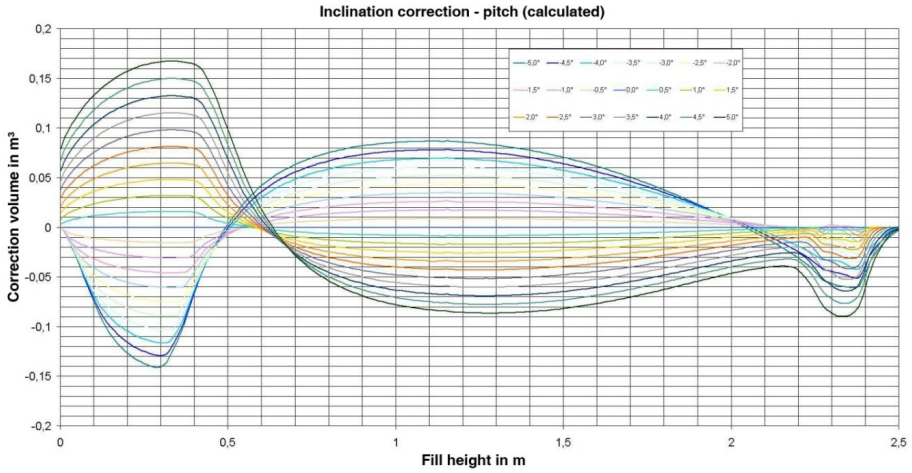


Figure 6: Typical inclination correction curves

The calibration limit of the absolute inclination correction values is determined by the accuracy of the angle sensor. If the correction values become too large in relation to the size of the compartment, the error due to the angle sensor exceeds the calibration limits and the compartment can no longer be calibrated.

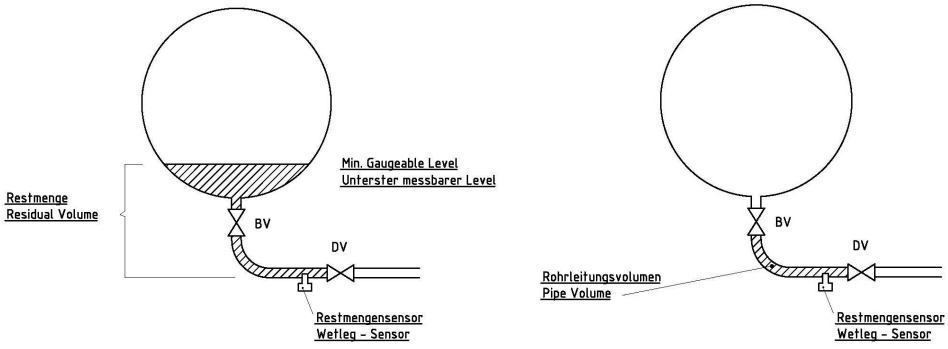
A deviation of the level sensor from the target position due to manufacturing tolerances also produces a measuring error. Compensation is possible within limits by means of the computational shifting (X/Y shift) of the level sensor to its ideal position. However, in this case also there is an additional error due to the accuracy of the angle sensor, which affects the calibration capability.

ATTENTION:

Level sensor measuring compartments place stricter demands on the manufacturing tolerances. The more precise manufacturing is, the simpler the ensuing calibration and official verification of the vehicle will be.

For reasons related to the system, the fill level measurement can neither take place completely down to the foot of the compartment, nor is the filling quantity in the piping measured by the level sensor. Therefore, the residual quantities in the tank compartment and in the piping must be accounted for in a different way, once the tank compartment has been emptied to the extent that the measurement of the fill level is no longer possible.

As soon as the level falls below the measurable range, no further quantity is added to that already indicated. The residual volume is only added to the delivery quantity when the wet leg sensor becomes dry at the end of the delivery. The definitions of residual volume and pipe volume are represented in the following diagram.



Drawing 73-WM-008

Figure 7: Definitions of residual volume and pipe volume

For reasons related to the system, gauging systems in purely direct delivery tanks always exhibit residual quantities in the compartment that can no longer be measured by the level sensors.

ATTENTION:
If the delivery is stopped during the residual volume delivery (e.g. because the delivery tank is full), it cannot be determined how much liquid from the residual volume has already run into the delivery tank. The residual volume is only added to the delivery when the wet leg sensor becomes dry.

Moreover, the angles of inclination of the compartment must be accounted for.

5.4. Condition for the calibration capability

5.4.1. Germany

The following fundamental requirements must be satisfied:

These requirements must already be considered during the development and construction of the measuring tank!

- Vehicles equipped with a level measuring system require a PTB approval in Germany. The requirements for such a vehicle are illustrated in PTB-A 4.5, among others.
- The level measuring system employed requires its own PTB approval. The requirements are likewise illustrated in PTB-A 4.5.
- The measuring compartments and the installation position of the level sensors must be designed such that the overall system fulfills the accuracy requirements of PTB-A 4.5. Due to the inclination correction in particular, certain geometry requirements arise that must be adhered to.

If necessary, TechnipFMC will be pleased to assist you in the planning phase.

- It is essential to comply with the accuracy requirement when installing the level sensors. The level sensors must be aligned precisely in accordance with the drawing. Deviations can lead to inaccuracies in the inclination correction. (See also drawing no. "61.251579")
- The installation must be performed such that manipulation of measurements is not possible. Sealing points must be illustrated in the approval and in the measuring system document.

5.4.2. Outside Germany

- So far, there are no known valid national standards or regulations outside Germany that contain requirements for a gauging system in tank trucks.
- The working paper OIML R80-1 is currently being prepared; this is intended to be an international recommendation for vehicles with a level measuring system. Following its completion, it must be implemented nationally in the individual countries in order for the installation of a gauging system in a tank truck to be formally allowed.

5.5. Operating principle of height measurement

- A magnetostrictive sensor is used for the height measurement, whose measurement principle is based on a transit-time method. To this end a wire made of magnetostrictive material is stretched inside the sensor pipe. A magnet installed in the float generates a constant magnetic field at its position. Current pulses flowing through the wire briefly generate a second magnetic field around the wire.
- At the place where these magnetic fields overlap, tension is generated that runs as a mechanical wave along the wire and is converted into an electrical signal in the sensor head by a piezo-ceramic transducer.

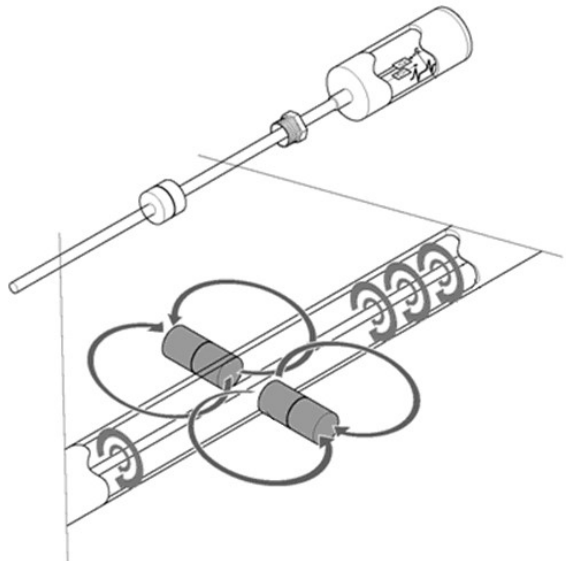


Figure 8: Operating Principle

- A microcontroller measures the transit time and, from that and the wire length, calculates the float position.

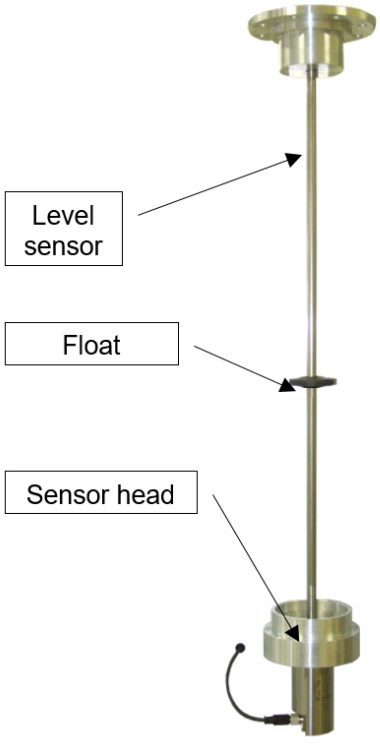


Figure 9: Level sensor

5.5.1. Transmission of the level sensor data

Figure 10: Level sensor plug-in connector

The data is transferred digitally to the level sensor interface, whereby the level sensor can only send data. Hence, it is impossible to change the software or the parameters. In addition to that it is impossible to exchange the level sensors, since each level sensor is identified electronically by its serial number!

ATTENTION:
We use special cable sockets made by Hirschmann, which are particularly suitable for this purpose. **Other cables must not be used!**

5.5.2. Suppression of surface waves (sloshing of the liquid)

If undulations occur, in particular when the tank truck brakes, then these are damped:

1. by the sensor protection tube, which is connected to the tank compartment by boreholes, and
2. by a digital filter in the sensor.

The delivery is only enabled if a valid average value of the sloshing liquid can be formed.

ATTENTION:
Undulations sometimes take a long time to subside if the tank compartments have an unfavorable shape! Tank compartments should be constructed in such a way that undulations subside quickly.

5.6. Explanation of the gauge tables

5.6.1. Tank shape and calibration

Tank shape

An individual gauge table must be provided for each tank compartment by means of volumetric measurement, because they are always shaped differently due to manufacturing tolerances. The fill volume is calculated from the associated measured level with the aid of the gauge table and interpolation. The accuracy attained when manufacturing the measuring system determines the accuracy of the delivery measurements. The more precisely the system is manufactured, the simpler calibration and official verification will be. The specifications of the applicable rules and approvals must be adhered to.

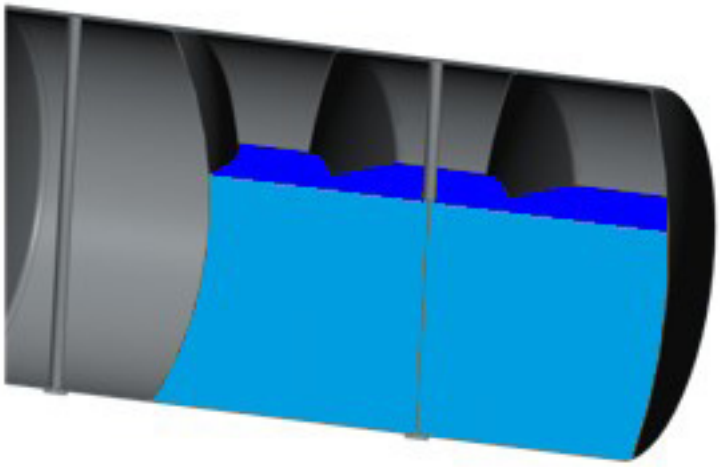


Figure 11: Tank shapes

Calibration unit

The calibration of the tank compartments is carried out with the aid of the calibration system. Following calibration, the calibration data is transmitted to the tank truck by means of a chip card.

The creation of the gauge tables for the tank compartments takes place in the normal position, which is normally 0° in both directions. Each tank truck must have a reference surface, with which the vehicle can be brought back into the normal position.

Details for the calibration unit and calibration can be found in the document "MultiLevel calibration instructions", order number DOK-480.

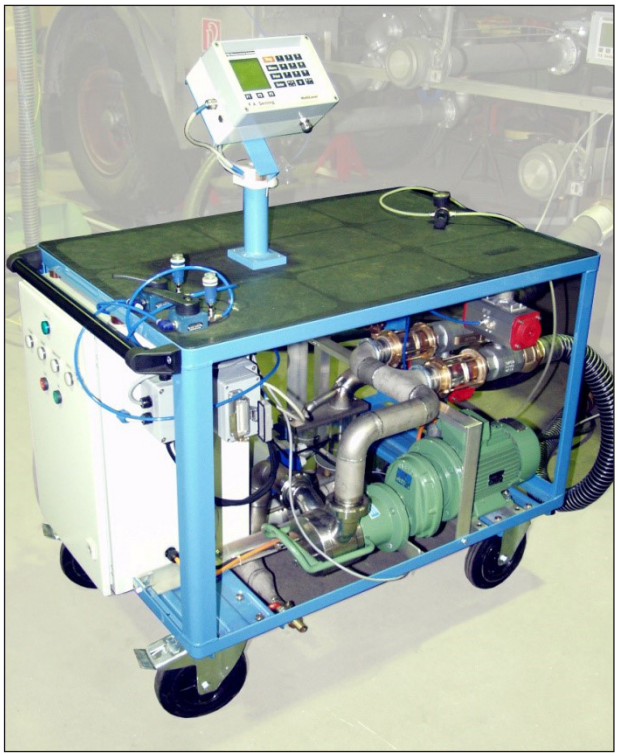


Figure 12: Calibration system

For further information compare document "MultiLevel calibration instructions" DOK-480.

5.6.2. Diagram of a typical volumetric measurement curve (created from the gauge table)

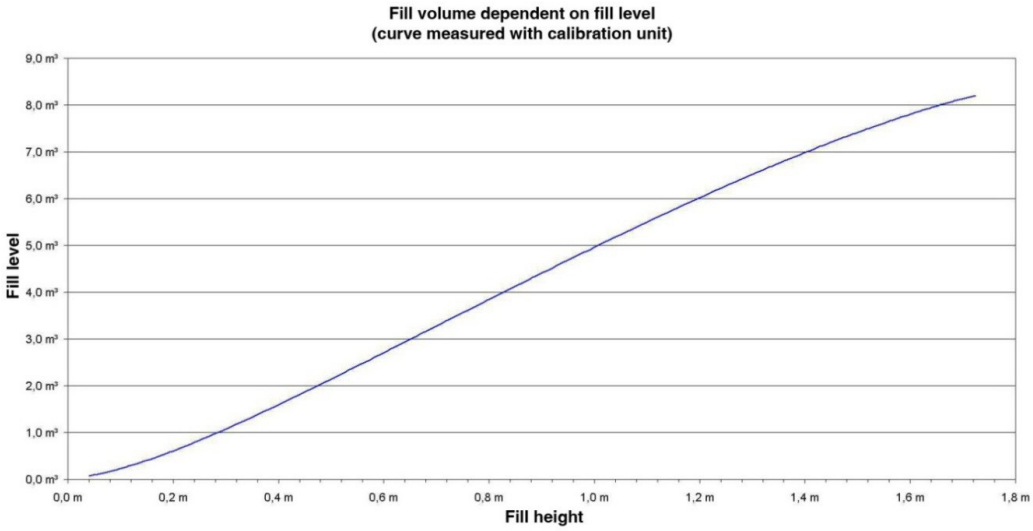


Figure 13: Graph of a typical volumetric measurement curve

The graph shown above is stored as a table in the MultiLevel. Each height is assigned a filling volume. Intermediate values are interpolated linearly.

5.7. Explanation of the inclination correction

During the delivery of a compartment the vehicle does not usually stand in the normal position of 0°. It is therefore necessary to make an inclination correction to the filling quantity. In order to correct the filling volume, the inclinations are measured in the longitudinal (pitch) and transverse (roll) directions by an inclination sensor. For the determination of the inclination correction tables, a computational procedure is used that is based on a volume model of the tank compartment created in the 3D-CAD system.

The inclination table is determined only once for each type of measuring container.

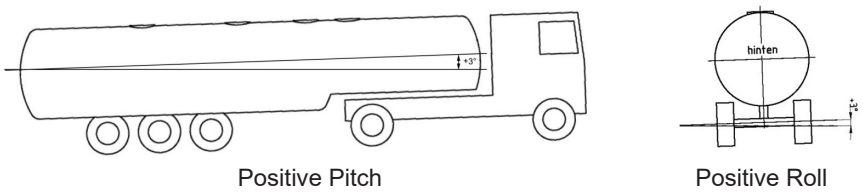


Figure 14: Inclination

5.7.1. Graph of a typical inclination correction curve

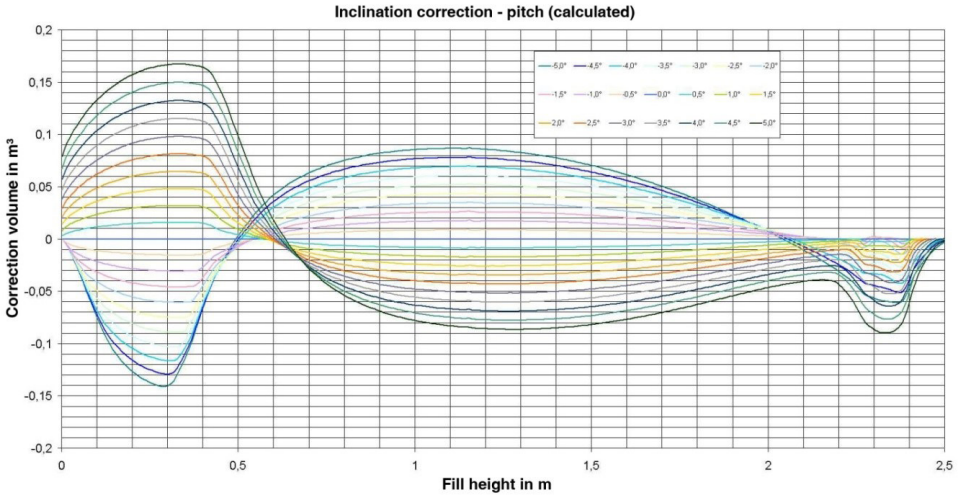


Figure 15: Typical inclination correction curves

The graph shown above is stored as a table in the MultiLevel. Each height is assigned an inclination correction volume. Intermediate values are interpolated linearly.

5.7.2. Inclination Sensor

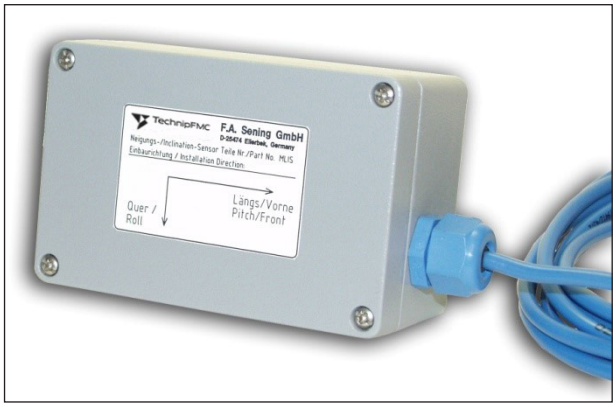


Figure 16: Inclination sensor – MLIS

The inclination sensor must be permanently installed on a stable cross beam. The alignment of the sensor may not be changed by the external application of force.

The inclination sensor must be installed on the tank truck with the correct alignment. The label on the sensor is to be observed!

5.7.3. Inclination Sensor – Definition of the Angle Corrections

In order to determine the vehicle inclination with the required accuracy, the angle parameters must be input into the system with particular care.

- Calculation specification for the angle correction:

Raw sensor data + Sensor correction + Installation correction = Vehicle Inclination

(see also pre-testing models DOK-476 inclination sensor)

- Procedure for inputting the angle corrections:

1. Entry of the correction values from the pre-acceptance test certificate
2. Alignment of the vehicle to 0° in both directions
3. The installation corrections are entered in the parameter list by means of ‘ZEROING’ the system!

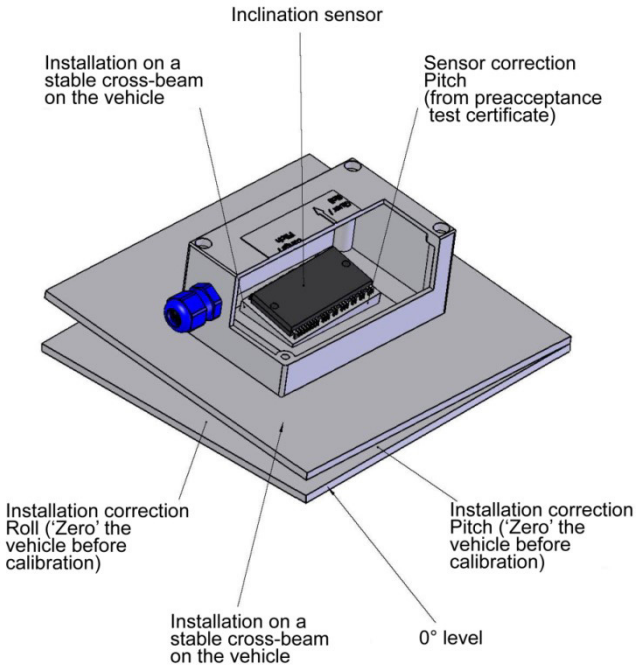


Figure 17: Inclination sensor (drawing: 51.251917)

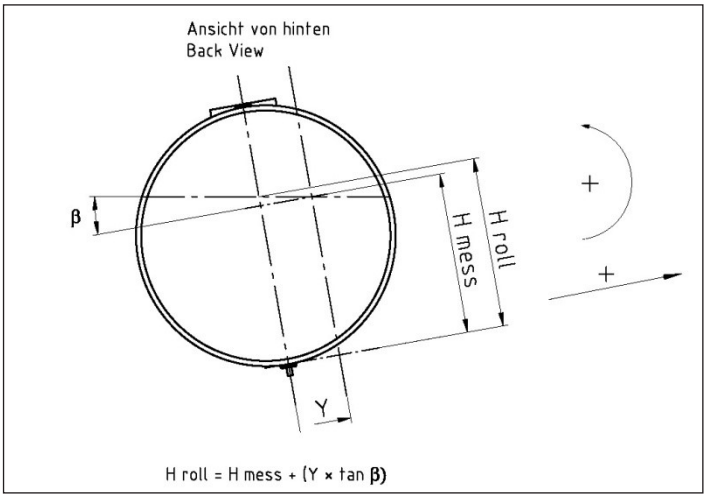
By dividing the correction value into sensor correction and installation correction, the inclination sensor can be exchanged without having to bring the vehicle into the normal position again. It is only necessary to transfer the sensor correction data from the pre-acceptance test certificate to the parameter table.

5.7.4. X / Y Correction

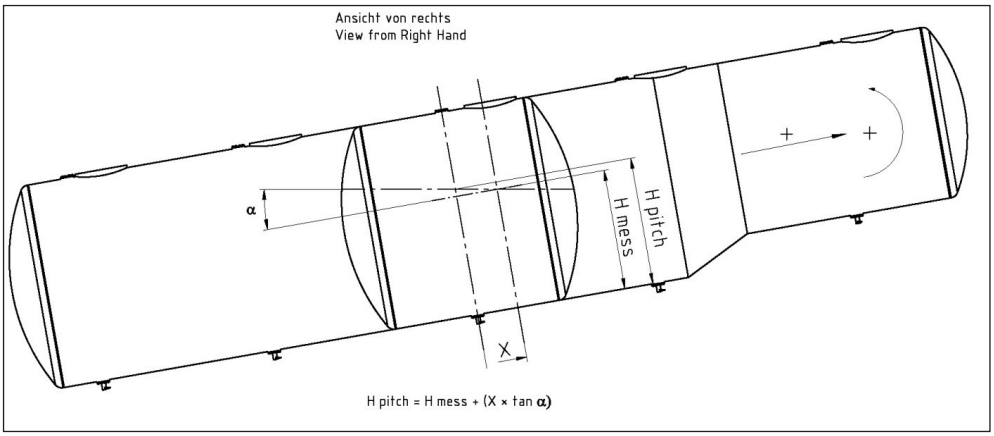
The inclination correction values are generated by means of a PC and a 3D-CAD program for the target position of the level sensor. If the position of the level sensor does not correspond to the target position due to manufacturing tolerances, this has negative effects on the inclination correction. The errors are particularly large if the deviations from the target position occur in the longitudinal or transverse direction of the vehicle.

The deviation can be compensated by means of computational shift of the level sensor in the longitudinal and transverse direction of the vehicle.

Y – Correction in the transverse direction:



X – Correction in the longitudinal direction:



The correction values are determined experimentally and checked by the W&M official in the case of an official calibration acceptance.

5.8. Height definition of the sensor head

Calculation of the fill height H:

$$H = H_{raw} - H_{0mess} + H_o + T$$

Description:

- The difference between the height displayed by the level sensor and the imaginary fill level is determined with the aid of the float resting on the bottom.
- The difference remains constant and is used afterwards to calculate the fill height from the level sensor measurement at each level.
- It is possible to shift the inclination table in the longitudinal direction of the level sensor in order to compensate for coarse height deviations in the installation of the level sensor. The shift is not normally necessary.

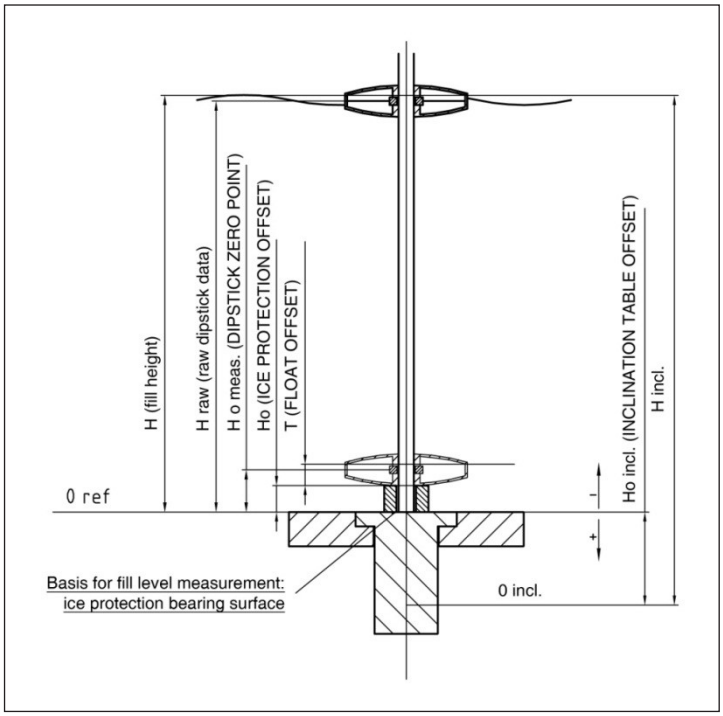


Figure 18: Height definitions (drawing: 51.251916)

Page intentionally left blank.

6 – Installation of the mechanical level sensor components

6.1. Packing the level sensors

The level sensors are sensitive measuring instruments, which must be transported and handled carefully. The level sensors must be transported in sturdy packaging. Improper packaging leads to transport damage!

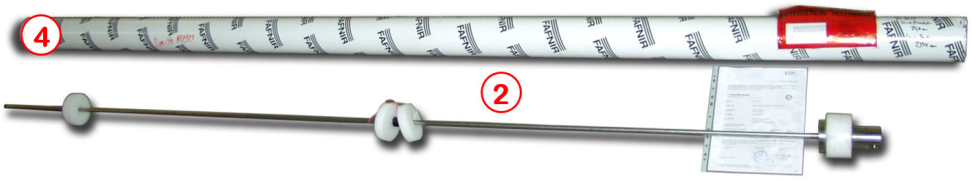


Figure 19: Level sensor with foam parts and outer packaging

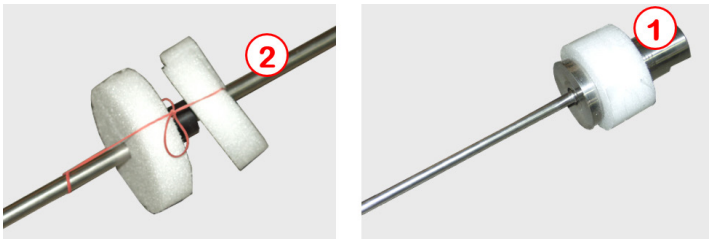


Figure 20: Fixing the foam parts

The foam parts should be fixed to the level sensor in such a way that they remain fixed at the positions shown when pushed inside the outer packaging.

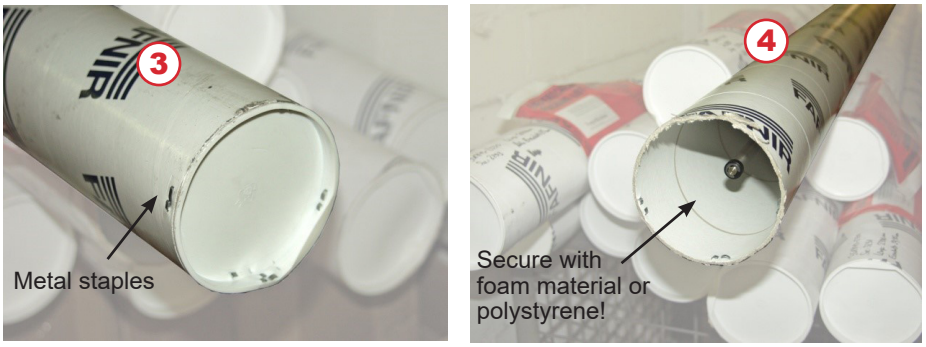


Figure 21: Secure the lids at both ends of the outer packaging with metal staples

Before pushing the lids onto the outer packaging at left and right, secure the level sensor against slipping appropriately using foam parts or polystyrene!

6.2. Transporting the level sensors

Care must be taken in every case before assembly that the level sensors do not bend. On no account may the level sensors be grasped centrally or carried without supporting the sensor head.

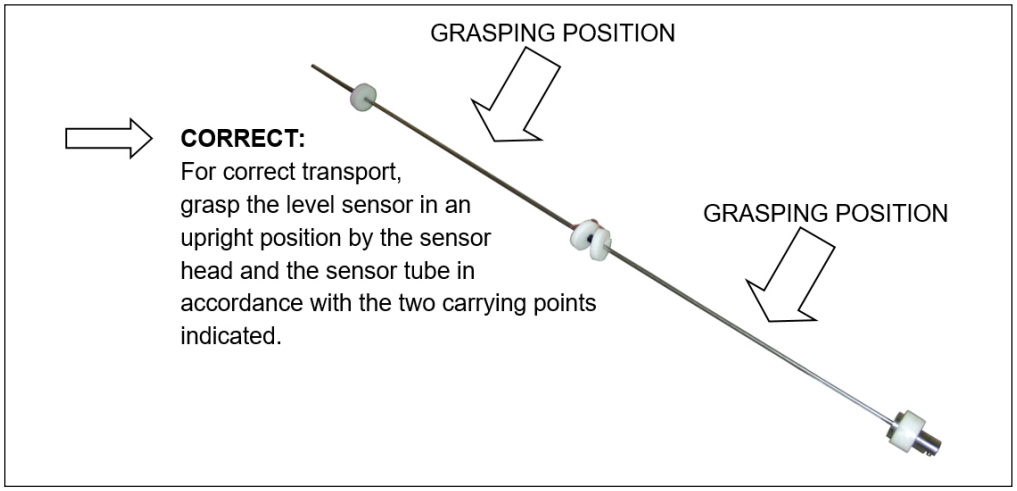


Figure 22: Correct transport

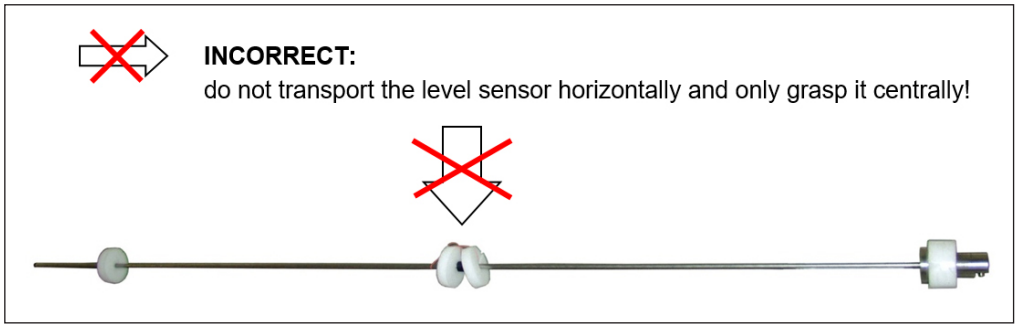


Figure 23: Incorrect transport

Result: In the case of incorrect transport the level sensors can bend very quickly and are then useless for the further installation and may no longer be used.

Figure 24: Result of incorrect transport

6.3. Structure of the sensor head

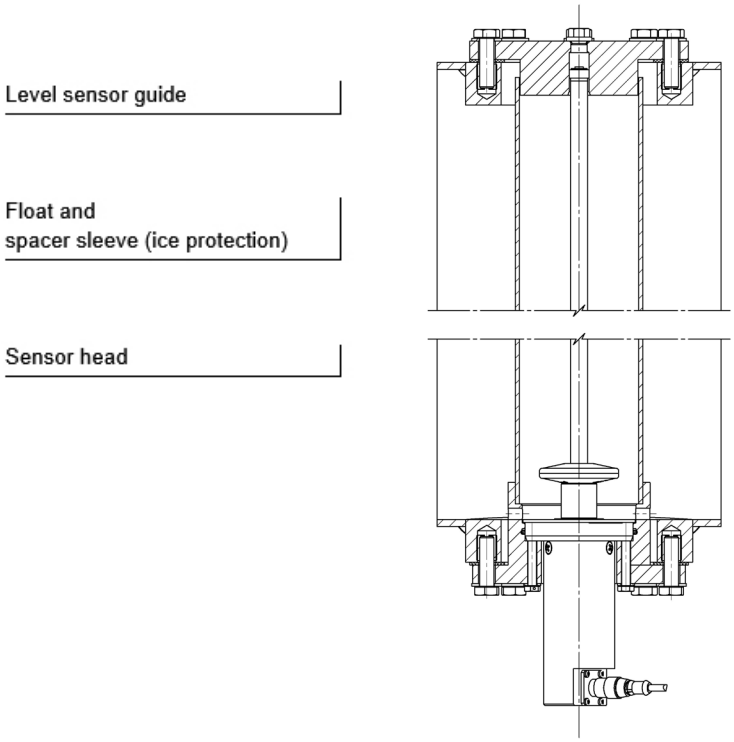


Figure 25: Structure of the sensor head (Drawing 71.251579)

Flanges of type TW220 DN65 are required for the installation of the level sensors. (Tipping valve flange).

The part numbers are shown on the assembly drawings in the appendix.

6.4. Definition of the Sensor Length

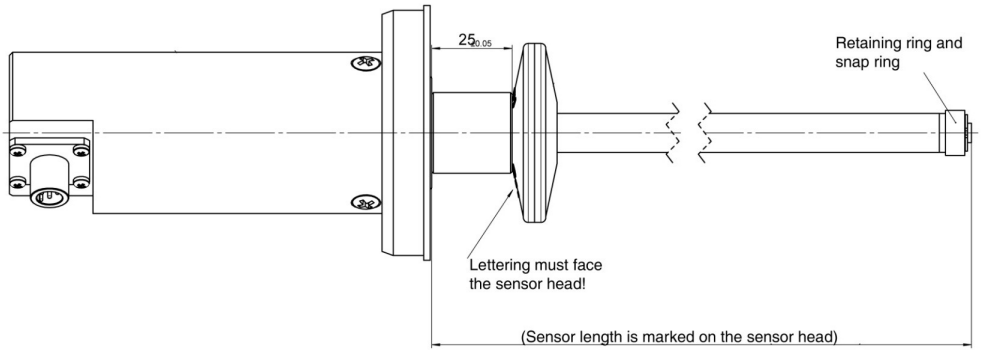


Figure 26: Sensor length (Drawing 25531.351851)

6.5. Mechanics

6.5.1. Installation specifications for the sensor head

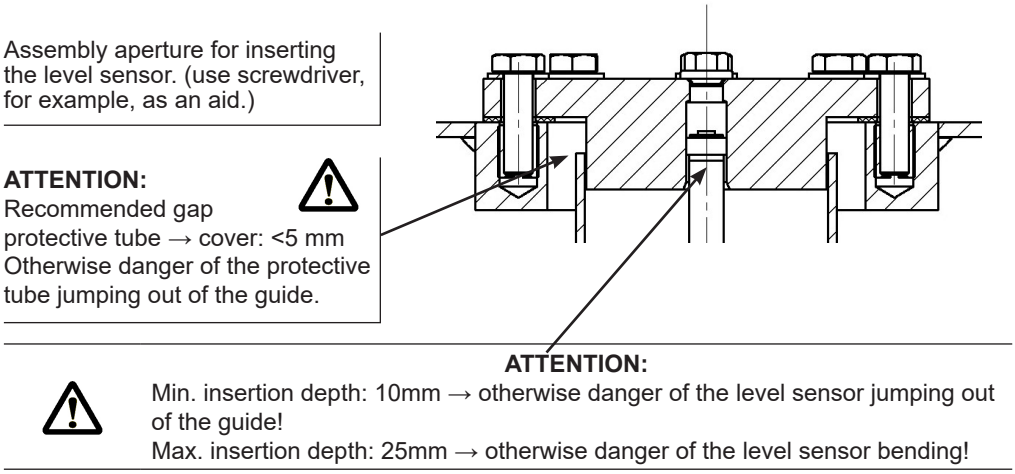


Figure 27: Installation of sensor head, part 1

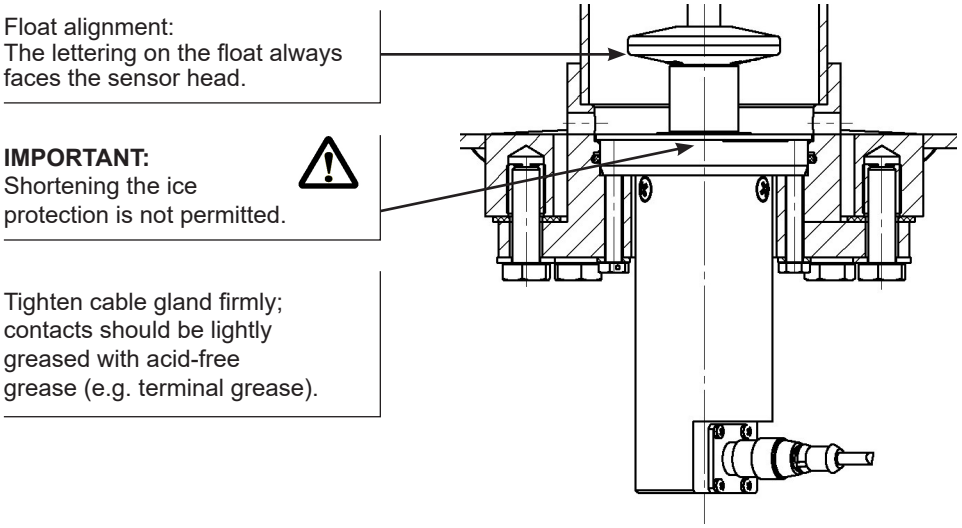


Figure 28: Installation of sensor head, part 2

6.5.2. Float

A float made of POM (polyoxymethylene) with added graphite is used for measurements of mineral oils.

- The float is resistant to all low-viscosity mineral oils and alcohols/bio-diesel RME.
- Liquid can flow off well from the top side.
- In the level sensor tube guide area there are small spacer studs that prevent adhesion to the level sensor tube.

Figure 29: Float

ATTENTION:
The lettering on the float must always face the sensor head.

6.5.3. Cable Plug Connector

The level sensor is equipped with an M12 plug-in connector.

Figure 30: Level sensor plug-in connector

ATTENTION:
We use special cable sockets made by Hirschmann, which have proven to be leak proof. Other cables may not be used.

6.5.4. Level sensor – MLDSBO-XXXX

Parts no.: MLDSBO-xxxx
(xxxx = sensor length in mm)

Drawing no.: 51.351851
Wiring diagram no.: 51.351918

- The high-precision level sensor supplies information about the fill level of containers.
- As a continuous level measuring device it provides for quality assurance and process reliability.
- The level sensor is suitable for all applications where a very precise level measurement is necessary.

Technology

- Measurement accuracy better than ±0.2 mm
- Resolution better than 0.1 mm
- Measurement evaluation controlled by microcontroller
- Temperature-compensated measurement principle
- 2-wire connection, digital transmission of measured values
- Very short measuring intervals
- Employment in Ex zone 0 (ATEX approval)
- Long service life thanks to sturdy structure
- Insensitive to shocks and vibration

Figure 31: Level sensor – MLDSBO-xxxx (xxxx = sensor length in mm)

7 – Modules

7.1. Main Unit / Display – MLMAINDISP / MLMAINDISP2

Parts no.: **MLMAINDISP2**
Drawing no.: 61.352025
Wiring diagram no.: 51.351673

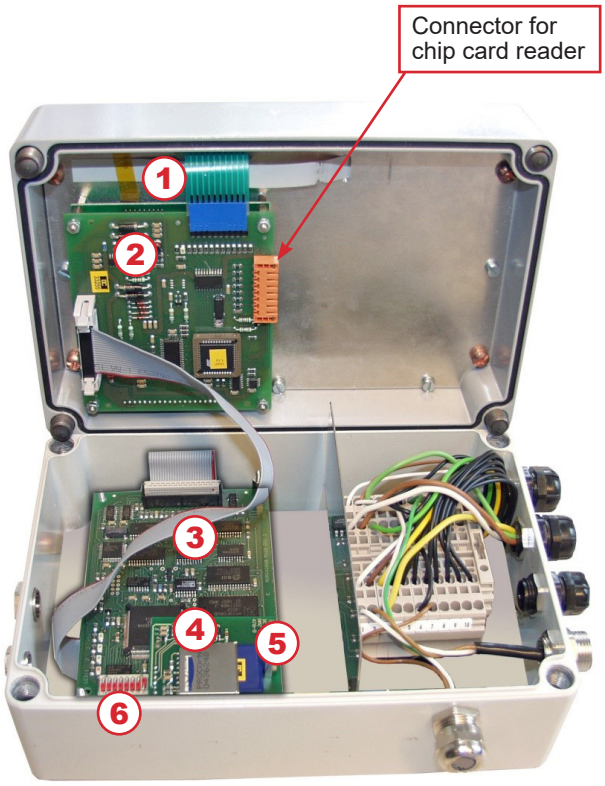
Figure 32: Main Unit and Display – MLMAINDSIP2

- The main unit/display, part no. MLMAINDISP2 is the central control unit of the MultiLevel system.
- It receives data from/sends data to the interface modules via the internal CAN bus connection. For example, to the integrated display interface, wet leg sensor interface (NM2WET-E) and the level sensor interface (MLIF).
- The main unit stores and evaluates the data.
- A "life test" is performed continuously between the main unit and all connected interface modules. This ensures that all interface modules function properly.
- Apart from the internal CAN bus connection there is also an external CAN bus connection. This connects the MultiLevel system to the NoMix 2000 system (quality assurance, monitoring of filling hose and vapour recovery hose, overfill protection).
- Since the MultiLevel in connection with the NoMix 2000 does not have its own I/O interface, it sends telegrams to the NoMix 2000 via the external CAN bus, for example in order to open/close foot valves and line valves.

7.1.1. Display / keyboard 2 – MLMAINDISP2

The MultiLevel system is operated via the keyboard and the display.

Parts no.: **MLMAINDISP2**
Drawing no.: 61.352025
Wiring diagram no.: 51.351673



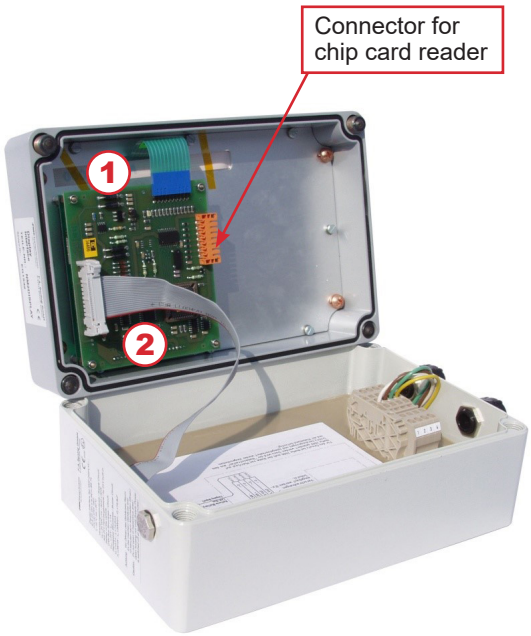
1. **Name strip**
2. **Display CPU board**
3. **MAIN Unit CPU board**
4. **CPU**
5. **SD card PCB with memory card**

   The PCB with the internal memory card, in which the gauge and inclination tables are stored, is installed above the main unit CPU board.
6. **Setup switch: DIP 8 seal switch**

Figure 33: Display Interface 2 / open - with SD-card

7.1.2. Display / Interface – NM2MAINDISP2

Parts no.: **NM2MAINDISP2**
Drawing no.: 31.352023
Wiring diagram no.: 51.351673



1. **Name strip**
2. **Display CPU board**

Figure 34: Display Interface – NM2MAINDISP2

7.1.3. Display Interface – Keyboard Functions Definition of Symbols and Key Functions

Key	Function
F1 F2 F3	The function keys will execute the function shown in the bottom row of the display.
Stop	The **<Stop>** key enables all currently running delivery or loading processes to be stopped immediately. Menus can also be quit immediately.
Menu	The **<MENU>** key is used to access the menu control, e.g. for adjustment of the setup, execution of tests. In NoMix / MultiSeal, entering the loading plan, entering a bypass etc.
Print	The **<Print>** key is used to access the print menu in order to print: Parameter list (setup), gauge tables, logbook, screenshots and delivery receipts. In MultiLevel of Gauging Table, screen shots and delivery documents.
Enter	The **<Enter>** key is used to confirm entries.
1 ABC ... 9 YZ 0	The **<numeric keys>** are used to start deliveries and to select submenus as well as for the input of numbers and letters.
←/↑ + - # and ↓/→ : ; .	Back / forward, scroll to the next display page and the input of special characters. In tank trucks with more than 10 compartments, the display can be scrolled to the upper or lower compartment numbers.

Table 1: Key functions

Important functions and inputs

- Entering the parameters / SETUP (adaptation of the MultiLevel system to different tank truck variants)
- Execution of tests during commissioning and troubleshooting
- Printout of the MultiLevel delivery receipts
- Printout of: parameter list (setup), gauge tables, logbook, screenshots
- Starting/stopping the delivery
- Display of detailed error messages

The sealing status is displayed permanently in the transport display in the status line (top line), such as:

- SEALED
- UNSEALED
- EMPTY

Furthermore, the product quality, the compartment status EMPTY (E) or FULL (F) and the compartment sealing status are displayed for each compartment:

- SEAL
- 2B-SEAL (manual / second seal during loading)
- 2A-SEAL (manual / second seal during delivery)

7.1.4. Important functions and settings

- Entering the SETUP (adaptation of the MultiSeal system to different tank trucks variants).
- Execution of tests during commissioning and troubleshooting.
- Printout of MultiLevel reports.
- Printout of: Parameters (Setup), gauge tables, logbook, screenshots.
- Starting/Stopping the delivery.
- Display of detailed error messages.

The chip card reader, part no. CCR, is connected to the Display CPU board via a plug-in connector. The main function of the chip card reader is to transmit the gauge tables from the calibration system to the MultiLevel / NoMix system and to store the gauge tables and the parameter list.

7.1.5. MultiLevel functionality with NoMix

Filling

The loading operation is controlled by NoMix. For this, a NoMix operating device is installed on the loading side.

The MultiLevel installed on the delivery side does not need to be operated during loading.

If NoMix fails to switch automatically to loading mode after being switched on it is necessary to press the <F1> key on the NoMix operating panel to switch to loading.

As a rule, no further operation is required to load the vehicle.

Delivery

During the delivery process, operation is performed solely on the MultiLevel system.

The NoMix system then receives all further commands via the CAN bus, for example to open or to close valves, etc.

This presupposes that NoMix has been enabled!

No further operation is required on the NoMix operating panel.

In the event of an emergency, it is possible to stop the complete delivery by pressing the **<Stop>** key on both the MultiLevel and the NoMix!

7.1.6. Stand-alone mode

In stand-alone mode, the I/O interface (chapter 7.8 "I/O interface - NM2IO") is connected directly to the MultiLevel for the control of the foot and line valves.

As a result of that, all information from the NOMIX system is omitted:

- The loading plan must now be entered manually.
- No information is available about connected hoses/level sensors etc.
- No information is available about the readiness of a compartment for delivery (i.e. whether a compartment is completely and correctly connected).
- Mixing protection is likewise not guaranteed; this is the responsibility of the operator.

As a result of omission of the NOMIX system, the operating sequences for filling and delivery are also changed:

Changes for filling:

▶ When changing to loading mode, the foot valves can be opened automatically or manually in order to start filling.

▶ Filling must be stopped manually.

▶ There is no mixing protection.

ATTENTION:
It is possible to fill a compartment that is not empty with new product!

Changes for delivery:

▶ The operator must start a compartment manually!

▶ There are no safety precautions (hose monitoring, product recognition!

▶ Interruption / termination of a delivery is likewise done manually.

7.2. Wet leg sensor interface – NM2WET-E

Parts no.: **NM2WET-E**
Wiring diagram no.: 51.351346

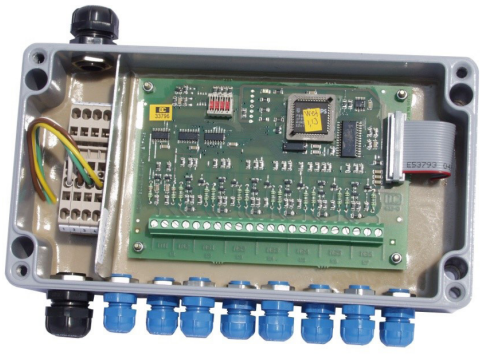


Figure 35: Wet Leg Sensor Interface – NM2WET-E

The wet leg sensor interface evaluates the fill level of the tank truck compartments via wet leg sensors (part no. **NS-2E**) installed in the pipe system of each individual tank truck compartment.

The compartment state can either be empty or not empty/filled.

Short-circuits and interruptions such as the detachment of the plug-in connectors can be detected. The states of the wet leg sensors or the changes of their states are transmitted via the internal CAN bus to the MultiLevel main unit for further processing and relayed from there to the NoMix.

Apart from the wet leg sensors, there are two intrinsically safe inputs in the wet leg sensor interface for the evaluation, for example, of a main pneumatic switch.

Via the pneumatic switch, the system detects whether the supply of the pneumatic system with compressed air is ensured. This information is also transmitted to the MultiLevel main unit via the internal CAN bus and relayed to the NoMix.

7.3. Wet leg sensor – NS-2E

Parts no.: **NS-2F**
Drawing: 51.351307
Wiring diagram: 51.351346

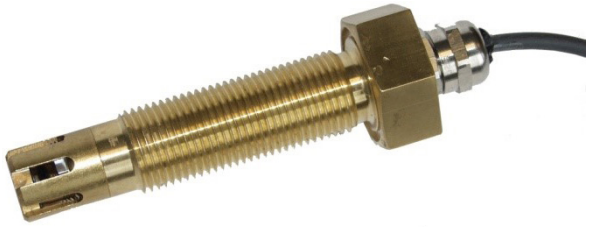


Figure 36: Wet Leg Sensor – NS-2F

The wet leg sensors (part nos. **NS-2F**) are to be installed with the aid of the welded nozzles at the lowest points of the piping that are still part of the respective compartments.

This lowest point is located on the underside of the pipe in front of the flange of the line valve (as seen from the foot valve) or in the loading coupling.

The wet leg sensors must always be installed vertically from below.

The wet leg sensors are electrically connected with the terminals of the wet leg sensor interface.

If necessary, the detection level of the **NS-2F** wet leg sensors can be adjusted with the aid of different intermediate bushes. To increase the detection level, the bush has to be shortened with a lathe, or it can be left out completely.

For tank trucks with double-sided discharge and two wet leg sensors per compartment there is one of the sensor in the API coupling. The second in front of the outlet connection at the lowest point of the pipe on the opposite side.

7.4. Temperature sensor – MLDTS-2

Parts no.: **MLDTS-2**
Drawing: 51.351978
Wiring diagram: 61.351918

Figure 37: Temperature sensor – MLDTS-2

The temperature sensor MLDTS-2 serves for the temperature measurement in the piping system. It is connected to the level sensor interface - MLIF.

All components are installed in a housing and sealed for protection against the influences of the weather.

- Analogue temperature sensor type PT 1000, 1/3 DIN class B
- Analogue / digital converter circuit
- Microprocessor circuit for the generation of a digital 4-20 mA signal

7.5. Level sensor interface – MLIF

Parts no.: **MLIF**
Drawing: 51.351998
Wiring diagram: 61.351918

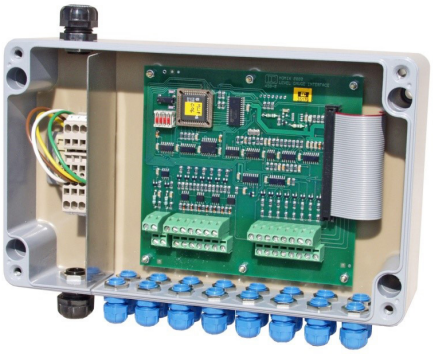


Figure 38: Level sensor interface – MLIF

The level sensor interface - MLIF is a component of the MultiLevel level sensor system and evaluates the level sensor sensors, temperature sensors and the inclination sensor.

The entire system is fundamentally structured in accordance with the overall wiring diagram, drawing no. 11.351906 and, depending upon the configuration level, consists of different interface modules, whereby one of the modules is the level sensor interface. The level sensor interface is connected to the main unit and other interface modules via a bus system, the internal CAN bus.

7.6. Inclination sensor – MLIS

Parts no.: **MLIS**
Drawing: 31.351914
Wiring diagram: 51.351918

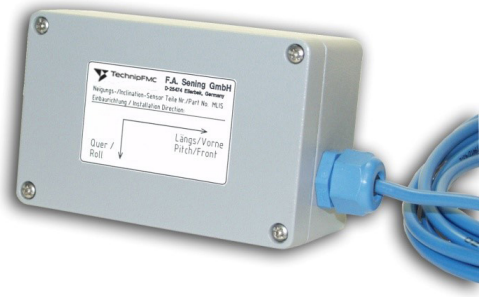


Figure 39: Inclination sensor – MLIS

As a component of the MultiLevel level sensor system, the task of the inclination sensor MLIS on tank trucks is to measure the inclination in the longitudinal and transverse directions.

It is connected to the level sensor interface – MLIF.

All components are installed in a housing and sealed for protection against the influences of the weather.

The components of the inclination sensor are essentially:

- Inclination sensor
- Analogue / digital converter circuit
- Microprocessor circuit for the generation of a digital 4-20 mA signal

7.7. Chip card reader – CCR

Parts no.: **CCR**
Drawing: 51.351801
Wiring diagram: 51.351751

Figure 40: Chip card reader – CCR

The chip card reader, part no. **CCR**, is an auxiliary device that can be connected to both MultiLevel and NoMix.

The CCR is connected to the main unit / display unit **MLMAINDISP / MLMAINDISP2 / NM2MAINDISP** via the internal CAN bus.

The purpose of the chip card reader (CCR) is to store and read gauge tables and setup settings for the MultiLevel/NoMix level sensor system.

Please use exclusively the chip cards supplied by Sening®. The slot for the chip card is located behind the plastic flap on the top of the device, where it is protected against dirt. The chip card reader corresponds to protection class IP65 when locked.

7.8. I/O interface – NM2IO

Parts no.: **NM2IO**
Drawing: 51.351466
Wiring diagram: 51.351468

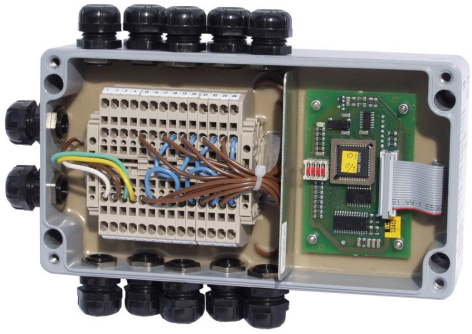


Figure 41: I/O Interface – NM2IO

The I/O interface (output driver interface) is used for controlling solenoid valves that start or stop the delivery/filling process pneumatically. The I/O interface receives information from the MultiLevel for the control of a solenoid valve. The solenoid valves of the already certified NoMix system are preferably used.

Second I/O Interface

In some tank truck types such as measuring system, hybrid trucks or trucks with more than 6 compartments and trucks in which the foot valves and in-line valves are switched separately, it is necessary to install a second I/O interface.

Page intentionally left blank.

8 – Commissioning

Before switching the system on for the first time, re-check the wiring for correct connection and firm fit one more time.

Insert the fuse, so that power is supplied to the MultiLevel system.

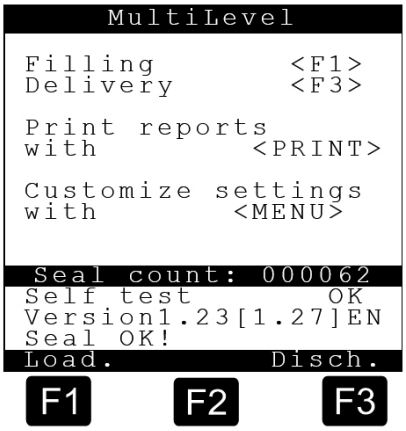
If **nothing** (no text) is shown on the display or if the green LEDs, which indicate the presence of supply voltage on the PCB in the opened main unit/display and on the interface modules, are not lit:

Immediately switch off the system again and check the complete wiring.

If everything is connected correctly, then the following function display, for example, can be read on the display, and the green LED in the main unit/display labeled '+5V' as well as the LEDs on all of the interface modules light up.

Start screen

After switching on, the following status display, for example, appears on the MultiLevel display.



8.1. Display interface setup

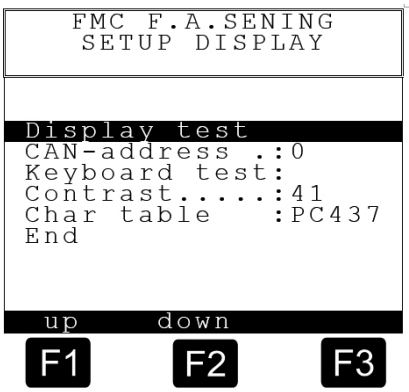
If the MultiLevel system is running, the display must be set up first. The display interface is set up independently. To access the setup, the <F1> key must be pressed and held when switching on the MultiLevel. This will automatically call up the display setup. Additionally, this menu contains a display and keyboard test.

Menu items in the display setup

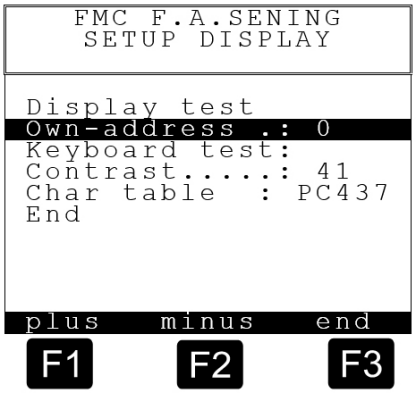
The function keys **<F1>** and **<F2>**, **"up" and "down"**, are used to select the respective setup / test parameter, e.g.: CAN address.

- Display test
- CAN address
- Keyboard test
- Contrast
- Char table
- End

The **<ENTER>** key must be pressed to make a change.



The following display appears:



<Display test>:
All ASCII characters are displayed; the test ends automatically.

<Own-address>:
(CAN bus address) The **<F1>** and **<F2>** keys, **"plus"** and **"minus"** are then used to set the respective CAN address. It is stored with **<F3> "End"**.

- Display Interface 1: address 0
- Display Interface 2: address 1
- Display Interface 3: address 2
- Display Interface 4: address 3

Node number **'0'** must be set for the display of the 'Main Unit/Display' module MLMAINDISP. For an additional display in the case of, for example, 'left/left/right' tank truck, set node number '1'.

If a chip card reader CCR exists, it must always be connected to the display with the node number **'0'**!

<Keyboard test>:
A keyboard test can be carried out with this menu item. With each actuation of a key the latter is represented with its corresponding identification in the row. The test can be exited by pressing the <ENTER> key twice.

<Contrast>:
The range of values for the contrast of the display is (0 – 100) and is adjusted with:
<F1> for 'lower contrast', or with
<F2> for 'higher contrast' and confirmed with
<F3> for **'End'**.
(default value about: **'40'**)

The display interface features automatic contrast adjustment, dependent on the temperature. Correction is not normally necessary.

<Char table>:
Setting of the character sets (PC437, PC852, PC866) with **<F1>** for "plus" and with **<F2>** for "minus" and **<F3>** for "end" and adoption of the newly-set value. (default value: "PC437").
The preset character set may be changed only after consulting F. A. Sening!

<End>:
The setup / test is terminated by selecting the line: **"End"** with the function keys and pressing the **<Enter>** key.

After ending the setup settings/ tests, the MultiLevel system should be switched **'OFF'** and **'ON'** again.

9 – MENU Structure

The MENU structure of the MultiLevel system consists of pull up and pull down menus. Submenus are accessible from the main menu and vice versa.

Refer also to the short overview of the menu system in chapter 15 "Short overview of menu system".

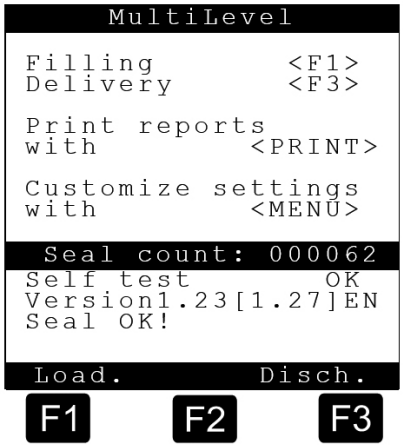
Start Screen

The basic screen is normally displayed after switching on.

Exceptions:

If previous deliveries have not yet been printed, the MultiLevel jumps to delivery mode. Now the delivery in the memory must be printed first. After that it is possible to switch to the basic screen.

The MultiLevel switches automatically to certain operating conditions (e.g. delivery mode, loading mode or calibration mode) if the command to do so comes from the NoMix, sensors or other units.



Explanation of the submenus

1 **Loading:** <F1> Display during loading (page chapter 4.1 "Loading")

2 **Delivery:** <F3> Display during delivery (page chapter 4.2 "Delivery")

3 **Print:** Display during printing (page chapter 9.3 "Print reports and tables")

4 **Menu:** Display for the main menu (page chapter 9 "MENU structure")

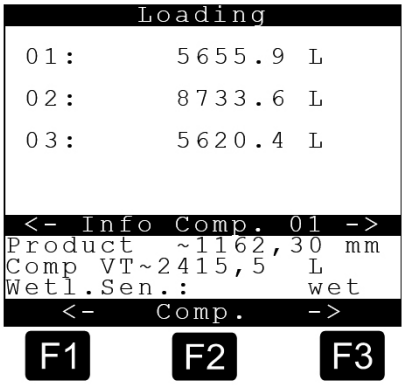
9.1. Loading

Display during loading

Pressing <F1> from the Start screen switches to the following display:

The volume VT in the individual compartments is displayed (compartments 1 to 3) here. If no volume display is possible, e.g. because the level sensor information lies outside the gauge table, the height is displayed in mm.

In the lower third of the display: Help is displayed as for delivery.

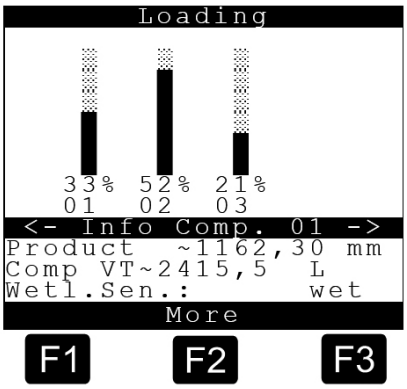


The same display appears even if the mode is changed to loading in the case of the NoMix 2000 system.

By pressing the **<F2>** key (= more) it is possible to access a further display, where the fill levels of the individual compartments are displayed as percentages in bar charts.

By pressing the **<PRINT>** key, a printout of the current display can be generated.

The ‘loading’ menu can be used also for inclination tests during the calibration.

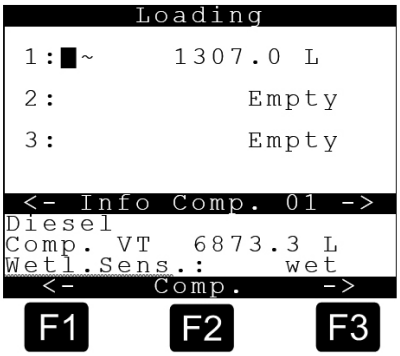


9.1.1. Temperature-compensated measurement during loading

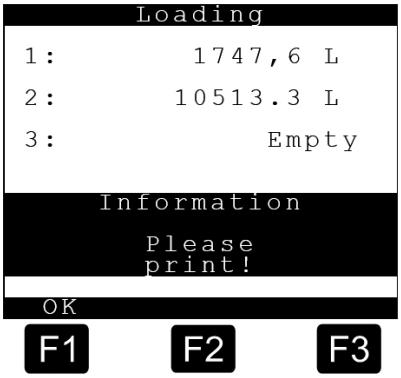
At the start of loading it may be necessary to wait for measurement values to stabilize (**~**).

After this, the filling procedure runs as before.

In the lower third of the display: Help is displayed as for delivery.



After filling:
Exiting with **<STOP>** is not possible: ”Please print!”.

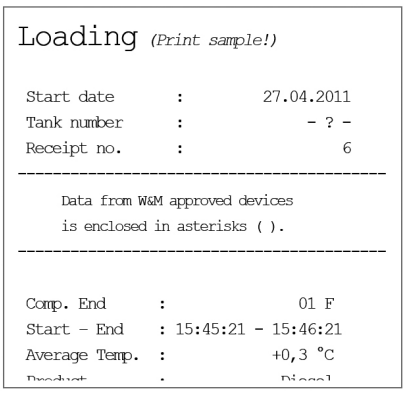


Print using **<PRINT>**.

Various layouts are configurable (as for delivery).

Measurement / print-out always without W&M approval!

Measurement values stored in log book.



9.2. Delivery

Start display delivery

In the Help displays (compartment info) you can scroll through individual info-pages (max. 10) using the arrow keys (← / →).

Or it can be changed in advance as usual.

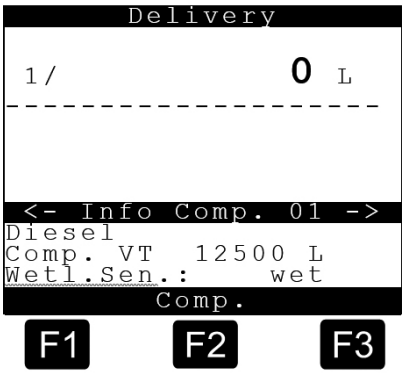
Delivery is started when the pre-selected quantity is confirmed (<ENTER> key).

Display during delivery

Detailed information is displared for compartment **1** at the bottom of the display.

By pressing the **<F2>** key you obtain detailed information on the other compartments.

By pressing the arrow keys ← / → on the operating apparatus, further detailed information can be called up.

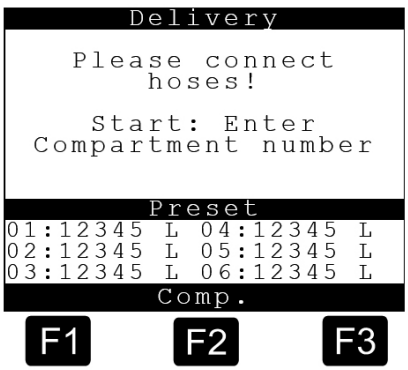


Display with EMIS during delivery after transmission of presets

The presets are displayed instead of the compartment-related Help displays.

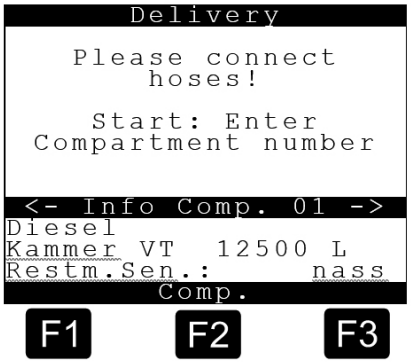
Max. 6 presets can be displayed.

You can switch over to the normal Help display using **<F2>**.



For the Help displays (compartment info) you can scroll through the individual info-pages (max. 10) using the arrow keys ← / →.

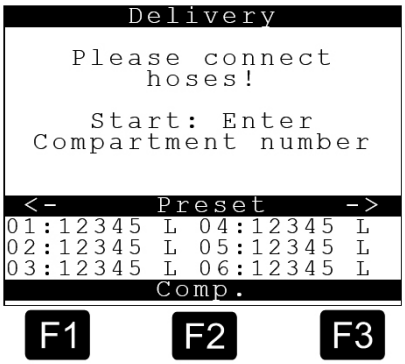
When scrolling through the compartments using <F2> the display of pre-selected quantity appears again after the last compartment.



If more than 6 presets have been transmitted, attention in drawn by 2 arrows in the heading “quantity preset” to the possibility of scrolling through using the arrow keys ← / →.

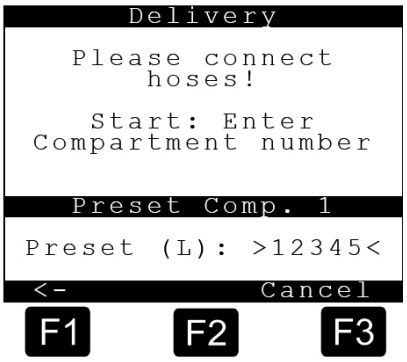
A delivery can be started as usual by inputting the compartment number.

If the Query Preset Quantity (parameter 314211) is active, the operator can still change the preset quantity transmitted by the EMIS.



Delivery is started when the preset quantity is confirmed (Key **<ENTER>**).

If the Query Preset Quantity (parameter 314211) is deactivated, delivery is started directly with the preset quantity transmitted by EMIS.



The preset quantities transmitted by EMIS remain stored in the MultiLevel until the end of delivery (printout).

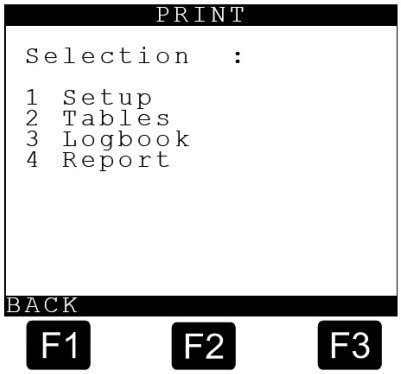
9.3. Print reports and tables

The Print menu looks like this:

Pressing the **<PRINT>** button from the Start screen switches to the MultiLevel Print Main Menu.

The appropriate submenu is accessed by pressing the **<numeric keys>** (here, for example, **<1>** to **<4>**) corresponding to the number preceding the respective function.

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



Explanation of the submenus

1	**Setup:**	Printout of the parameters
2	**Tables:**	Printout of the gauging tables
3	**Logbook:**	Printout of the event logbook (for example: Event Report, Loading and Delivery Note, Receipt copies etc.
4	**Report:**	Printout of the tour reports

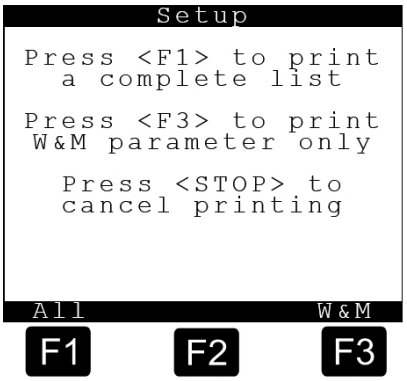
9.3.1. PRINT <1> – Setup

The Print menu looks like this:

☞ Press the **<1>** button to enter the MultiLevel print setup menu.

☞ By pressing the **<function keys>** (here for example **<F1>** and **<F3>**.) you enter the corresponding submenu.

☞ By pressing the **<STOP>** button the print job is cancelled. You return to the print main menu display.



9.3.1.1. Setup <F1> – Complete Parameter List

☞ The calibration parameters protected by W&M are marked with a **"+"** sign.

Parameter *(sample printout!)*

```
          16.05.2011 12:57:29
  Device            : MultiLevel
-----------------------------------------
  Version           : 1.23[1.27]DE
  Sealcounter       : 000002
  Serial no.        : ????????
  Comp. no.         : - ? -
-----------------------------------------
  Seal broken!
-----------------------------------------
  Parameter CRC     : 77A5
-----------------------------------------
        13 User language          English
        14 Customer lang.         English
Local CAN-Bus
-----------------------------------------
       3111 Terminals                    1
+      3112 Level-IF                     1
+      3114 Wetleg-IF                    1
       3115 IO-IF                        1
Global CAN-Bus
-----------------------------------------
       3121 Global node no.              1
       3122 EMIS node                   21
       3123 NOMIX node                   0
       3124 Printer admin                1
```

```
Compartments
-----------------------------------------
+      3131 No of Comp.                  3
+   3132111 Level sensor no.             1
+   3132112 Temp. sensor no.             1
+   3132113 Wetleg sensor no.            1
+   3132114 Level serial no.          3000
+   3132121 Zero level sensor            0
+   3132122 Offset Ice Prot.         25000
+   3132123 Offset slope table           0
+   3132124 Offset float                 0
+   3132125 X Offset Level               0
+   3132126 Y Offset Level               0
+   3132127 Offset Temp.               0.0
+   3132131 Comp. volume              5000
+   3132132 Pipe volume                  0
+   3132133 Residual volume              0
+   3132134 Float MIN                40000
+   3132135 Float MAX              1000000
+   3132136 Correction          1.00000000
    3132137 PreStop-Level                0
    3132138 SlopeStop-Level              0
    3132139 Overfill Volume              0
+   3132141 Min. Pitch Slope         -3.00
+   3132142 Max. Pitch Slope          3.00
+   3132143 Min. Roll Slope          -3.00

continued...
```

```
MultiLevel  ????????  16.05.11 12:57  -02-
-----------------------------------------
+   3132144 Max. Roll Slope              3.00
+   3132145 Min. Dlv. Volume             5000
+   3132146 Max. Volume Change            100
+   3132147 Max. Diff.V15                   0
    3132151 Preset Correction           59000
    3132152 Default Preset               5000
+   3132211 LevelSensor-No.                 2
+   3132212 Temp.Sensor-No.                 2
+   3132213 WetlegSensor-No.                2
+   3132214 Level Serial                 3000
+   3132221 Zero Levelsensor                0
+   3132222 Offset Ice Prot.            25000
+   3132223 Offset Slope table              0
+   3132224 Offset Float                    0
+   3132225 X Offset Level                  0
+   3132226 X Offset Level                  0
+   3132227 Offset Temp.                  0.0
+   3132231 Comp. Volume                 5000
+   3132232 Pipe Volume                     0
+   3132233 Residual Volume                 0
+   3132234 Float MIN                   40000
+   3132235 Float MAX                 1000000
+   3132236 Correction             1.00000000
    3132237 PreStop-Level                   0
    3132238 SlopeStop-Level                 0
    3132239 Overfill Volume                 0
+   3132241 Min. Pitch Slope            -3.00
+   3132242 Max. Pitch Slope             3.00
+   3132243 Min. Roll Slope             -3.00
+   3132244 Max. Roll Slope              3.00
+   3132245 Min. Dlv. Volume             5000
+   3132246 Max. Volume Change            100
+   3132247 Max. Diff.V15                   0
    3132251 Preset Correction           59000
    3132252 Default Preset               5000
+   3132311 LevelSensor-No.                 3
+   3132312 Temp.Sensor-No.                 3
+   3132313 WetlegSensor-No.                3
+   3132314 Level Serial                 3000
+   3132321 Zero Levelsensor                0
+   3132322 Offset Ice Prot.            25000
+   3132323 Offset Slope table              0
+   3132324 Offset Float                    0
+   3132325 X Offset Level                  0
+   3132326 Y Offset Level                  0
+   3132327 Offset Temp.                  0.0
+   3132331 Comp. Volume                 5000
+   3132332 Pipe Volume                     0
+   3132333 Residual Volume                 0
+   3132334 Float MIN                   40000
+   3132335 Float MAX                 1000000
+   3132336 Correction             1.00000000
    3132337 PreStop-Level                   0

continued...

MultiLevel  ????????  16.05.11 12:57  -03-
-----------------------------------------
    3132338 SlopeStop-Level                 0
    3132339 Overfill Volume                 0
+   3132341 Min. Pitch Slope            -3.00
+   3132342 Max. Pitch Slope             3.00
+   3132343 Min. Roll Slope             -3.00
+   3132344 Max. Roll Slope              3.00
+   3132345 Min. Dlv. Volume             5000
+   3132346 Max. Volume Change            100
+   3132347 Max. Diff.V15                   0
    3132351 Preset Correction           59000
    3132352 Default Preset               5000
Comp. Monitoring
-----------------------------------------
      31351 at Loading                    OFF
+     31352 at Delivery                   OFF
```

```
Operation Options
-----------------------------------------
      31411 Change LPlan                always
     314211 Preset Query                   NO
     314212 Preset Type          Preset to V0
     314213 Auto-Adjust                   YES
      31431 Valve Control               Manual
      31432 Loadplan Query                 NO
      31433 Loading Measurem.             YES
     314711 Column 1                       36
     314712 Column 2                       37
     314713 Column 3                       38
     314721 Column 1                        1
     314722 Column 2                        2
     314723 Column 3                        3
     314731 Column 1                        6
     314732 Column 2                        7
     314733 Column 3                        8
     314741 Column 1                       16
     314742 Column 2                       19
     314743 Column 3                       20
     314751 Column 1                       23
     314752 Column 2                       24
     314753 Column 3                       31
     314761 Column 1                       28
     314762 Column 2                       29
     314763 Column 3                       30
     314771 Column 1                       42
     314772 Column 2                       43
     314773 Column 3                       44
     314781 Column 1                       46
     314782 Column 2                       36
     314783 Column 3                       38
     314791 Column 1                        0
     314792 Column 2                        0
     314793 Column 3                        0
     314701 Column 1                        0
     314702 Column 2                        0

continued...

MultiLevel  ????????  16.05.11 12:58  -04-
-----------------------------------------
     314703 Column 3                        0
W&M Restrictions
-----------------------------------------
+      3151 Seal Password            12345678
+     31541 Min. Pitch Slope            -5.00
+     31542 Max. Pitch Slope             5.00
+     31543 Min. Roll Slope             -5.00
+     31544 Max. Roll Slope              5.00
+     31545 Sens.Correct.Pitch           0.00
+     31546 Sens.Correct.Roll            0.00
+     31547 Inst.Correct.Pitch           0.00
+     31548 Inst.Correct.Roll            0.00
+     31551 Minimum Form
                          101,103,500,503,504
+     31552 Decimal Separator            Comma
+     31561 Device Number                - ? -
+     31562 Tank Number                  - ? -
+     31563 Truck ID                     - ? -
Printer Settings
-----------------------------------------
       321 Printer Selection          DR-295
      3221 Port Number                  COM1
      3222 Interface Type              RS232
      3223 Transfer Rate                9600
      3224 Parity Check                 even
      3241 Paper Feed                    YES
      3242 Reverse Eject                  NO
      3243 Printer Mode     Exclusive access
      3244 Page Width                     35
     32511 Init-Sequence
     32512 Reset-Sequence               1B40
     32513 All attributes OFF
```

```
                              1B77001B541B2100
      32521 10 CPI                    1B501B32
      32522 12 CPI                    1B4D1B32
      32523 12 CPI                    1B671B30
      32524 Double Width                1B5701
      32525 Double Height         1B77011B3336
      32531 Condensed font            1B671B30
      32532 Bold font                    1B45
      32533 Italic font                  1B34
      32534 Underlined font           1B2D01
      32535 Superscript               1B5300
      32536 Subscript                 1B5301
Wetleg-IF
-----------------------------------------
+      3341 Timeout ON                     7
+      3342 Timeout OFF                   30
Page Layout
-----------------------------------------
      34112 Page Length                  55
      34113 Columns Offset                0
      34114 Lines Offset                  0

continued...

MultiLevel  ????????  16.05.11 12:58  -05-
-----------------------------------------
      34116 No. of Positions             99
      34122 Page Length                  55
      34123 Columns Offset                0
      34124 Lines Offset                  0
      34126 No. of Positions             99
      34132 Page Length                  55
      34133 Columns Offset                0
      34134 Lines Offset                  0
      34136 No. of Positions             99
      34142 Page Length                  55
      34143 Columns Offset                0
      34144 Lines Offset                  0
      34146 No. of Positions             99
      34152 Page Length                  55
      34153 Columns Offset                0
      34154 Lines Offset                  0
      34156 No. of Positions             99
      34162 Page Length                  55
      34163 Columns Offset                0
      34164 Lines Offset                  0
      34166 No. of Positions             99
      34172 Page Length                  55
      34173 Columns Offset                0
      34174 Lines Offset                  0
      34176 No. of Positions             99
      34182 Page Length                  55
      34183 Columns Offset                0
      34184 Lines Offset                  0
      34186 No. of Positions             99
      34192 Page Length                  55
      34193 Columns Offset                0
      34194 Lines Offset                  0
      34196 No. of Positions             99
      34102 Page Length                  55
      34103 Columns Offset                0
      34104 Lines Offset                  0
      34106 No. of Positions             99
Product Setup
-----------------------------------------
+    351111 Product Name           Heating Oil
     351112 Short Name                    HEL
+     35112 Product Type        Liquid Product
+     35113 W&M Code                       1
+    351171 Compensation                 YES
+    351172 Comp. Temperature             15
+    351173 Comp. Method                 54B
+    351174 Average Density            846.0
+     35119 Float Correction             700
+    351211 Product Name               Diesel
     351212 Short Name                    DK
+     35122 Product Type        Liquid Product
+     35123 W&M Code                       2
+    351271 Compensation                 YES

continued...
```

```
MultiLevel  ????????  16.05.11 12:58  -06-
-----------------------------------------
+    351272 Comp. Temperature             15
+    351273 Comp. Method                 54B
+    351274 Average Density            836.0
+     35129 Float Correction             750
+    351311 Product Name             Unleaded
     351312 Short Name                    UL
+     35132 Product Type        Liquid Product
+     35133 W&M Code                       3
+    351371 Compensation                 YES
+    351372 Comp. Temperature             15
+    351373 Comp. Method                 54B
+    351374 Average Density            741.0
+     35139 Float Correction            1800
+    351411 Product Name        Super Unleaded
     351412 Short Name                    SU
+     35142 Product Type        Liquid Product
+     35143 PTB - Code                     5
+    351471 Compensation                 YES
+    351472 Comp. Temperature             15
+    351473 Comp. Method                 54B
+    351474 Average Density            749.0
+     35149 Float Correction            1700
+    351511 Product Name          Super Leaded
     351512 Short Name                   SUL
+     35152 Product Type        Liquid Product
+     35153 PTB - Code                     4
+    351571 Compensation                 YES
+    351572 Comp. Temperature             15
+    351573 Comp. Method                 54B
+    351574 Average Density            749.0
+     35159 Float Correction            1700
+    351611 Product Name               4-Star
     351612 Short Name                   SUP
+     35162 Product Type        Liquid Product
+     35163 PTB - Code                     6
+    351671 Compensation                 YES
+    351672 Comp. Temperature             15
+    351673 Comp. Method                 54B
+    351674 Average Density            753.0
+     35169 Float Correction            1600
+    351711 Product name              Kerosene
     351712 Kurzbezeichnung               KER
+     35172 Product Type        Liquid Product
+     35173 PTB - Code                     7
+    351771 Compensation                 YES
+    351772 Comp. Temperature             15
+    351773 Comp. Method                 54B
+    351774 Average Density            807.0
+     35179 Float Correction            1000
+    351811 Produktname               Jet Fuel
     351812 Kurzbezeichnung               JET
+     35182 Product Type        Liquid Product
+     35183 PTB - Code                     8

continued...

MultiLevel  ????????  16.05.11 12:58  -07-
-----------------------------------------
+    351871 Compensation                 YES
+    351872 Comp. Temperature             15
+    351873 Comp. Method                 54B
+    351874 Average Density            801.0
+     35189 Float Correction            1050
+    351911 Product name          Bio Fuel Oil
     351912 Short Name                   RME
+     35192 Product Type        Liquid Product
+     35193 PTB - Code                     9
+    351971 Compensation                 YES
+    351972 Comp. Temperature             15
+    351973 Comp. Method                 54B
+    351974 Average Density            831.0
+     35199 Float Correction             800
Driver List
```

```
----------------------------------------
      3611 Driver Number                0
      3612 Driver Name           Driver 1
      3613 Master Keyword               0
      3621 Driver Number                0
      3622 Driver Name           Driver 2
      3623 Master Keyword               0
      3631 Driver Number                0
      3632 Driver Name           Driver 3
      3633 Master Keyword               0
      3641 Driver Number                0
      3642 Driver Name           Driver 4
      3643 Master Keyword               0
      3651 Driver Number                0
      3652 Driver Name           Driver 5
      3653 Master Keyword               0
      3661 Driver Number                0
```

```
      3662 Driver Name           Driver 6
      3663 Master Keyword               0
      3671 Driver Number                0
      3672 Driver Name           Driver 7
      3673 Master Keyword               0
      3681 Driver Number                0
      3682 Driver Name           Driver 8
      3683 Master Keyword               0
      3691 Driver Number                0
      3692 Driver Name           Driver 9
      3693 Master Keyword               0
      3601 Driver Number         99999999
      3602 Driver Name             Master
      3603 Master Keyword        98765432

end
```

9.3.1.2. Setup <F3> – PTB parameter list

Only the parameters protected by W&M will be printed.

See also chapter 9.3.1.1 "Setup <F1> – Complete Parameter List".

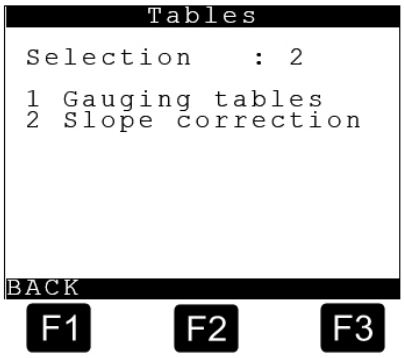
Parameter (sample printout!)

```
          16.05.2011 13:18:34
  Device           : MultiLevel
----------------------------------------
  Version          : 1.23[1.27]DE
  Sealcounter      : 000002
  Serial no.       : ????????
  Comp. no.        : - ? -
----------------------------------------
  Seal broken!
----------------------------------------
  Parameter CRC    : 77A5
----------------------------------------
Local CANbus
----------------------------------------
+      3112 Level-IF                  1
+      3114 Wetleg-IF                 1
Global CANbus
----------------------------------------
Compartments
----------------------------------------
+      3131 No of comp.               3
+   3132111 LevelSensor-No.             1
+   3132112 Temp.Sensor-No.            1
+   3132113 WetlegSensor-No.           1
+   3132114 Level Serial            3000
+   3132121 Zero Levelsensor           0
+   3132122 Offset Ice Prot.       25000
+   3132123 Offset Slope table         0
+   3132124 Offset Float               0
+   3132125 X Offset Level             0
+   3132126 Y Offset Level             0
+   3132127 Offset Temp.             0.0

  .
```

```
  .
  .
  .
  .
  .
+   3132142 Max. Pitch Slope          3.00
+   3132143 Min. Roll Slope          -3.00
+   3132144 Max. Roll Slope           3.00
+   3132145 Min. Dlv. Volume          5000
+     35189 Float Correction          1050
+    351911 Product Name       Bio Fuel Oil
+     35192 Product Type      Liquid Product
+     35193 W&M Code                     9
+    351971 Compensation                JA
+    351972 Comp. temperature           15
+    351973 Comp. method               54B
+    351974 Average Density           831.0
+     35199 Float Correction            800
Driver List
----------------------------------------

End
```

9.3.2. PRINT <2> – Tables

The Print Tables menu looks like this:



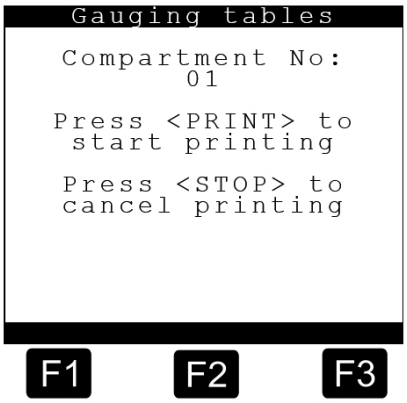
☞ Press the **<2>** button to enter the MultiLevel tables print menu for printing the gauging and slope tables.

☞ The appropriate submenu is accessed by pressing the **<numeric keys>** (here, for example, **<1>** or **<2>**) corresponding to the number preceding the respective function.

☞ Press the **<F1>** key to execute the "**BACK**" command, returning to the print main menu display.

9.3.2.1. Tables <1> – Gauging Tables

The Print Gauging Tables menu looks like this:



☞ Press the **<1>** button to enter the gauging table printing menu or press the **<2>** button to enter the slope table printing menu.

☞ The selection of a compartment number can be entered with the **<numeric keys>**.

☞ By pressing the **<PRINT>** button the print job is started.

☞ The print job is aborted by pressing the **<STOP>** button. You return to normal function display.

9.3.2.2. Gauging Table

Gauging table (sample printout!)

```
          16.05.2011 14:07:38
  Device              : MultiLevel
-----------------------------------------
  Version             : 1.23[1.27]DE
  Sealcounter         : 000002
  Serial no.          : ????????
  Comp. no.           : - ? -
-----------------------------------------
  Seal broken!
-----------------------------------------
Calibration unit
 Device               : MultiLevel
 Version              : 00.16
 Serial no.           : 1322804
-----------------------------------------
 Compartment 1        : 194 records
 SoftwCRC           : E58BDCEE
     No.       h              VT
=========================================
       1     39.702 mm       0.000 L
       2     43.930 mm       7.821 L
       3     52.302 mm      26.128 L
       4     60.602 mm      45.305 L
       5     69.084 mm      66.190 L
       6     77.456 mm      88.896 L
       7     86.004 mm     112.484 L
       8     94.545 mm     137.907 L
       9    103.005 mm     164.167 L
      10    111.372 mm     191.310 L
      11    119.845 mm     219.593 L
      12    128.292 mm     249.778 L
      13    136.604 mm     277.024 L
      14    144.916 mm     308.725 L
      15    153.407 mm     340.459 L
      16    162.046 mm     373.463 L
      17    170.582 mm     406.530 L
      18    178.936 mm     441.030 L
      19    187.540 mm     476.860 L
      20    195.847 mm     511.342 L
      21    204.677 mm     547.593 L
      22    213.010 mm     583.858 L
      23    221.840 mm     622.231 L
      24    230.815 mm     663.044 L
      25    239.116 mm     701.611 L
      26    247.518 mm     740.229 L
      27    256.204 mm     781.047 L
      28    264.514 mm     819.420 L
      29    272.861 mm     858.126 L
      30    281.350 mm     899.140 L
      31    289.904 mm     942.141 L
      32    298.530 mm     985.400 L
      33    307.047 mm    1026.376 L

continued...



MultiLevel  ????????  16.05.11 14:07  -02-
-----------------------------------------
      34    315.394 mm    1067.434 L
      35    324.222 mm    1112.951 L
      36    332.753 mm    1156.166 L
      37    341.756 mm    1201.689 L
      38    350.476 mm    1247.432 L
      39    359.180 mm    1290.735 L
      40    367.701 mm    1336.421 L
      41    376.517 mm    1382.101 L
      42    385.109 mm    1427.170 L
      43    393.524 mm    1472.182 L
      44    402.224 mm    1517.075 L
      45    411.193 mm    1564.275 L
      46    419.563 mm    1609.181 L
      47    428.164 mm    1656.160 L
      48    436.525 mm    1700.497 L
      49    444.903 mm    1747.005 L
      50    453.530 mm    1793.487 L
      51    461.928 mm    1840.076 L
      52    470.425 mm    1886.553 L
      53    478.955 mm    1933.022 L
      54    487.504 mm    1980.378 L
      55    496.132 mm    2027.724 L
      56    504.757 mm    2075.237 L
      57    513.218 mm    2122.637 L
      58    521.519 mm    2167.868 L
      59    530.154 mm    2215.394 L
      60    538.689 mm    2262.964 L
      61    547.231 mm    2310.421 L
      62    555.895 mm    2360.249 L
      63    564.393 mm    2407.839 L
      64    573.142 mm    2455.316 L
      65    581.535 mm    2502.704 L
      66    590.342 mm    2552.678 L
      67    598.893 mm    2600.412 L
      68    607.485 mm    2648.172 L
      69    615.878 mm    2695.932 L
      70    624.575 mm    2745.987 L
      71    633.169 mm    2793.847 L
      72    641.725 mm    2841.601 L
      73    650.332 mm    2889.110 L
      74    658.904 mm    2938.346 L
      75    667.269 mm    2985.187 L
      76    675.723 mm    3034.531 L
      77    684.464 mm    3083.924 L
      78    693.019 mm    3131.036 L
      79    701.544 mm    3180.317 L
      80    710.263 mm    3229.686 L
      81    718.802 mm    3276.780 L
      82    727.123 mm    3324.042 L
      83    735.537 mm    3371.369 L
      84    744.054 mm    3418.650 L
      85    752.531 mm    3465.801 L
      86    761.075 mm    3515.283 L

continued...


MultiLevel  ????????  16.05.11 14:07  -03-
-----------------------------------------
      87    769.734 mm    3562.553 L
      88    778.262 mm    3612.073 L
      89    786.850 mm    3659.406 L
      90    795.521 mm    3708.864 L
      91    803.843 mm    3756.101 L
      92    812.435 mm    3803.541 L
      93    820.888 mm    3850.936 L
      94    829.460 mm    3898.299 L
      95    837.986 mm    3947.795 L
      96    846.683 mm    3995.283 L
      97    855.161 mm    4042.622 L
      98    863.585 mm    4090.036 L
      99    872.102 mm    4137.532 L
     100    881.014 mm    4187.397 L
     101    889.835 mm    4234.805 L
     102    898.297 mm    4282.450 L
     103    906.670 mm    4329.808 L
     104    915.496 mm    4377.305 L
     105    924.259 mm    4427.216 L
     106    932.769 mm    4472.511 L
     107    941.166 mm    4520.152 L
```

108	949.884 mm	4567.786 L
109	958.290 mm	4613.257 L
110	966.908 mm	4661.010 L
111	975.519 mm	4708.500 L
112	983.863 mm	4754.040 L
113	992.273 mm	4799.512 L
114	1000.871 mm	4845.166 L
115	1009.473 mm	4892.921 L
116	1018.349 mm	4940.662 L
117	1026.880 mm	4986.303 L
118	1035.273 mm	5031.775 L
119	1044.173 mm	5079.655 L
120	1052.558 mm	5125.271 L
121	1061.189 mm	5171.001 L
122	1069.664 mm	5216.542 L
123	1078.290 mm	5262.141 L
124	1086.785 mm	5307.846 L
125	1095.280 mm	5353.545 L
126	1103.896 mm	5399.293 L
127	1112.219 mm	5442.803 L
128	1120.645 mm	5486.350 L
129	1129.047 mm	5529.822 L
130	1137.760 mm	5575.572 L
131	1146.556 mm	5621.290 L
132	1155.117 mm	5666.933 L
133	1164.157 mm	5712.845 L
134	1172.852 mm	5756.387 L
135	1181.190 mm	5800.067 L
136	1190.202 mm	5845.929 L
137	1198.730 mm	5889.497 L
138	1207.356 mm	5933.240 L
139	1215.864 mm	5976.958 L

continued...

MultiLevel ???????? 16.05.11 14:08 -04-

140	1224.396 mm	6018.381 L
141	1233.151 mm	6062.156 L
142	1241.525 mm	6105.768 L
143	1249.930 mm	6147.792 L
144	1258.531 mm	6189.754 L
145	1267.494 mm	6234.173 L
146	1276.151 mm	6276.161 L
147	1284.519 mm	6316.129 L
148	1292.919 mm	6358.242 L
149	1301.541 mm	6398.337 L
150	1310.260 mm	6440.689 L
151	1318.578 mm	6480.759 L
152	1327.139 mm	6520.903 L
153	1335.462 mm	6561.017 L
154	1344.273 mm	6603.438 L
155	1353.160 mm	6643.558 L
156	1361.864 mm	6683.784 L
157	1370.276 mm	6724.031 L
158	1379.041 mm	6764.264 L
159	1388.062 mm	6804.509 L
160	1396.392 mm	6842.548 L
161	1404.803 mm	6880.619 L
162	1413.282 mm	6918.734 L
163	1422.614 mm	6958.942 L
164	1431.403 mm	6999.289 L
165	1440.580 mm	7037.397 L
166	1449.396 mm	7077.618 L
167	1458.016 mm	7113.481 L
168	1466.790 mm	7151.621 L
169	1475.363 mm	7187.359 L
170	1483.700 mm	7223.299 L
171	1492.095 mm	7256.981 L
172	1500.970 mm	7295.272 L
173	1509.462 mm	7329.086 L
174	1517.893 mm	7362.944 L
175	1526.316 mm	7396.777 L
176	1535.017 mm	7430.478 L
177	1544.549 mm	7468.757 L
178	1553.372 mm	7502.552 L
179	1561.838 mm	7534.084 L
180	1570.486 mm	7567.960 L
181	1578.942 mm	7599.574 L
182	1587.520 mm	7631.137 L
183	1596.408 mm	7662.726 L
184	1605.176 mm	7694.402 L
185	1614.030 mm	7726.023 L
186	1622.627 mm	7755.492 L
187	1631.388 mm	7787.150 L
188	1640.041 mm	7816.576 L
189	1649.114 mm	7846.064 L
190	1657.668 mm	7873.202 L
191	1666.063 mm	7900.495 L
192	1675.102 mm	7928.197 L
193	1684.007 mm	7955.916 L
194	1692.553 mm	7981.124 L

End

9.3.2.3. Tables <2> – Slope Table List

Slope table

(sample printout! NOT complete!)

```
          16.05.2011 14:38:04
  Device           : MultiLevel
-----------------------------------------
  Version          : 1.23[1.27]DE
  Sealcounter      : 000002
  Serial no.       : ????????
  Comp. no.        : - ? -
-----------------------------------------
  Seal broken!
-----------------------------------------
Calibration unit
 Device            : MultiKalli
 Version           : 01.00 BE
 Serial no.        : 18AB0001
-----------------------------------------
 Compartment 1     : 250 Records
 SoftwCRC         : 96418FE7
=========================================
---------- No.   1      1.000 mm ---------
    33645    26300    19316    12718
     6521      755    -4548    -9338
   -13546   -17016   -18943   -18430
   -15882   -12602    -8814    -4598
     4947    10220    15798    21668
    27814    34227    40897    47816
    54977    62375    70006    77864
    85947    94250   102810   111686
    21316    18271    15542    13104
    10934     9010     7314     5828
     4538     3429     2490     1712
     1086      607      268       67
       67      268      607     1086
     1712     2490     3428     4538
     5828     7314     9010    10934
    13104    15542    18271    21316
---------- No.   2     11.000 mm ---------
    36665    28877    21439    14368
     7698     1442    -4337    -9553
   -14000   -17033   -18452   -18497
   -16939   -13679    -9602    -5006
     5360    11042    17021    23280
    29807    36590    43620    50891
    58396    66130    74088    82268
    90664    99281   108133   117284
    25615    22021    18785    15881
    13285    10973     8927     7128
     5559     4208     3060     2107
     1339      749      332       83
       83      332      749     1339
     2107     3060     4208     5559
     7128     8927    10973    13285
    15881    18785    22021    25615
continued...                MultiLevel
????????  16.05.11 14:38  -02-
-----------------------------------------
---------- No.   3     21.000 mm ---------
    39147    31013    23232    15834
     8856     2358    -3555    -8665
   -12467   -14916   -16261   -16541
   -15701   -13470    -9732    -5146
     5576    11513    17769    24319
    31141    38222    45550    53118
    60917    68943    77190    85652
    94335   103225   112341   121742
    30170    26001    22232    18836
    15789    13068    10650     8518
     6654     5043     3673     2532
     1610      901      399      100
      100      399      901     1610
     2531     3673     5043     6654
     8518    10651    13068    15790
    18836    22232    25999    30170
---------- No.   4     31.000 mm ---------
    40969    32592    24601    17037
     9969     3506    -2142    -6572
    -9801   -12055   -13398   -13840
   -13356   -11865    -9104    -4977
     5567    11586    17983    24709
    31732    39030    46587    54390
    62429    70698    79188    87902
    96820   105949   115300   124916
    34939    30170    25845    21937
    18419    15267    12462     9981
     7804     5921     4316     2977
     1895     1061      470      118
      118      470     1061     1894
     2977     4316     5920     7805
     9981    12460    15267    18419
    21936    25844    30171    34940
---------- No.   5     41.000 mm ---------
    42061    33563    25505    17956
    11027     4911      -65    -3941
    -6926    -9087   -10451   -11022
   -10785    -9699    -7677    -4466
     5308    11221    17606    24386
    31508    38936    46646    54620
    62842    71302    79974    88904
    98028   107358   116897   126694
    39883    34518    29618    25174
    21167    17568    14356    11509
     9010     6841     4991     3445
     2193     1230      545      137
      136      545     1229     2194
     3445     4990     6841     9009
    11510    14356    17569    21167
    25175    29618    34517    39884



continued...


MultiLevel  ????????  16.05.11 14:38  -03-
-----------------------------------------
---------- No.   6     51.000 mm ---------
    42360    33868    25897    18555
    12017     6556     2117    -1492
    -4336    -6447    -7842    -8522
    -8475    -7679    -6085    -3607
     4776    10371    16586    23288
    30399    37865    45649    53723
    62066    70646    79504    88572
    97853   107329   117031   126980
    44560    38731    33370    28457
    23988    19950    16326    13101
    10264     7799     5693     3931
     2504     1404      622      155
      155      622     1404     2504
     3931     5693     7800    10264
    13101    16326    19950    23989
    28456    33369    38732    44561
---------- No.   7     61.000 mm ---------
    41817    33467    25749    18821
    12918     7975     3819      382
    -2370    -4457    -5886    -6660
    -6771    -6201    -4921    -2883
     3966     9028    14893    21373
    28356    35761    43533    51633
```

```
    60019    68712    77646    86815
    96206   105801   115605   125669
    48489    42270    36534    31254
    26429    22041    18091    14561
    11438     8711     6370     4406
     2811     1577      700      175
      175      700     1577     2810
     4406     6370     8711    11438
    14561    18092    22041    26428
    31253    36534    42271    48487
---------- No.   8     71.000 mm ---------
    40776    32710    25419    19107
    13708     9057     5091     1775
     -915    -2991    -4457    -5315
    -5559    -5175    -4145    -2436
     3252     7546    12876    18988
    25719    32957    40628    48668
    57068    65758    74724    83944
    93395   103058   112938   123073
    51732    45194    39144    33552
    28417    23740    19512    15723
    12365     9427     6901     4777
     3049     1711      759      190
      190      759     1712     3050
     4778     6901     9428    12365
    15723    19512    23740    28417
    33552    39144    45195    51729



continued...              MultiLevel
????????  16.05.11 14:38  -04-
-----------------------------------------
---------- No.   9     81.000 mm ---------
    39676    32044    25350    19530
    14428     9982     6157     2929
      283    -1790    -3294    -4228
    -4588    -4363    -3541    -2097
     2800     6391    10992    16577
    22925    29889    37358    45283
    53578    62211    71147    80361
    89828    99514   109412   119586
    54557    47752    41417    35558
    30157    25227    20756    16742
    13175    10052     7363     5099
     3257     1829      812      203
      203      812     1829     3257
     5100     7363    10053    13176
    16742    20756    25226    30157
    35559    41418    47752    54560
---------- No.  10     91.000 mm ---------
    38762    31710    25498    19979
    15092    10802     7085     3924
     1309     -767    -2307    -3311
    -3774    -3688    -3043    -1821
     2454     5591     9499    14391
    20221    26787    33975    41666
    49801    58311    67153    76292
    85711    95382   105262   115423
    57027    49998    43429    37329
    31709    26554    21870    17657
    13905    10612     7777     5389
     3443     1934      859      215
      215      859     1934     3443
     5388     7777    10613    13904
    17656    21869    26554    31709
    37330    43432    50001    57027
---------- No.  11    101.000 mm ---------
    38210    31631    25723    20428
    15709    11543     7911     4803
     2209      126    -1450    -2516
    -3073    -3110    -2619    -1589
     2171     4958     8410    12618
```

```
    17782    23843    30628    38006
    45884    54194    62881    71893
    81204    90800   100611   110728
    59192    51957    45197    38829
    33079    27747    22868    18483
    14566    11127     8154     5652
     3611     2029      901      225
      225      901     2029     3611
     5652     8154    11125    14563
    18482    22868    27753    33122
    38885    45070    51955    59194
.
.
.
etc.
```

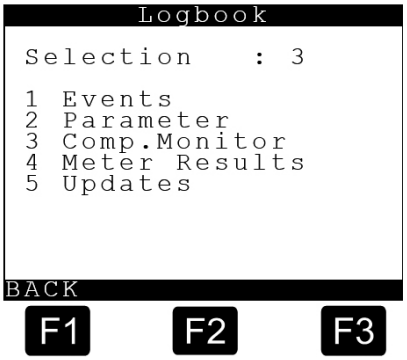
9.3.3. PRINT <3> – Logbook

The Print Logbook menu looks like this:

☞ Press the **<3>** button to enter the MultiLevel logbook print menu.

☞ The appropriate submenu is accessed by pressing the **<numeric keys>** (here, for example, **<1>** to **<5>**) corresponding to the number preceding the respective function.

☞ Press the **<F1>** key to execute the **"BACK"** command, returning to the print main menu display.

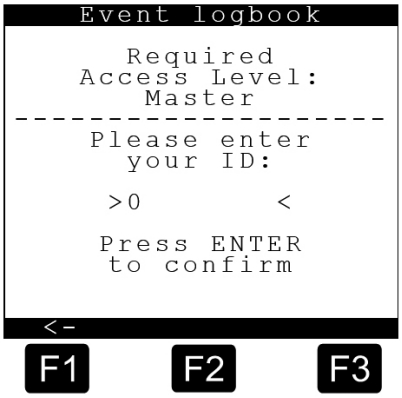


9.3.3.1. Logbook <1> – Event Logbook

The Print Event Logbook menu looks like this:

☞ Press the **<1>** button to enter the MultiLevel event logbook print menu.

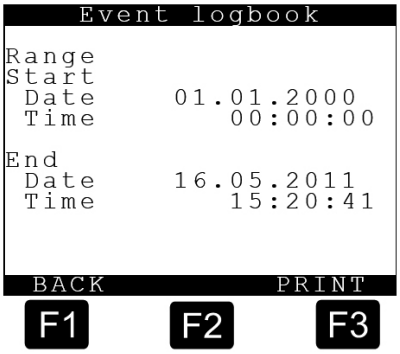
☞ The **<ID>** and **<Password>** for master authorization are required in order to print the event logbook.



Event Logbook menu / Start- and End date/time input:

☞ The printout can be selected with **<Start>** and **<End>** date/time for the printing range.

↻ At the input you can use the arrow keys ← / → to jump between the input fields.



9.3.3.2. Logbook <1> – Event Report List

Event report

(sample printout! NOT complete!)

```
09.04.2010 10:15:17 - 16.05.2011 12:45:37
  Device           : MultiLevel
-----------------------------------------
  Version          : 1.23[1.27]DE
  Sealcounter      : 000002
  Serial no.       : ????????
  Meter name       : - ? -
-----------------------------------------
  Seal broken!
-----------------------------------------
09.04.2010
10:15:17      1 Power ON
10:16:22      2 Main Mode I
10:16:22      3 Main Mode E
10:16:48      4 Power OFF
10:16:56      5 Power ON
10:17:00      6 NMX stat.1: I Prd.: 1
10:17:00      7 NMX stat.2: I Prd.: 2
10:17:00      8 NMX stat.3: I Prd.: 3
10:17:00      9 Main Mode I
10:17:08     10 Power OFF
11:22:02     11 Power ON
11:22:06     12 NMX stat.1: I Prd.: 1
11:22:06     13 NMX stat.2: I Prd.: 2
11:22:06     14 NMX stat.3: I Prd.: 3
11:22:06     15 Main Mode I
11:22:09     16 Main Mode M
11:22:09     17 Enter Menu
                        11:22:17     18
Wetleg 1 DRY
11:22:17     19 Wetleg 2 DRY
11:22:17     20 Wetleg 3 DRY
11:22:57     21 Leave Menu
11:22:59     22 Main Mode I
11:23:07     23 Power OFF
11:23:13     24 Power ON
11:23:16     25 Main Mode I
11:23:48     26 BottomValve 1: OPEN
11:24:56     27 BottomValve 1: CLOSE
11:25:01     28 Main Mode I
11:25:05     29 Main Mode D
11:25:10     30 Main Mode I
11:25:20     31 BottomValve 1: OPEN
11:25:23     32 BottomValve 1: CLOSE
11:25:32     33 BottomValve 1: OPEN
11:25:34     34 Wetleg 1 WET
11:25:35     35 BottomValve 1: CLOSE
11:25:40     36 BottomValve 2: OPEN
11:25:42     37 BottomValve 2: CLOSE
11:25:44     38 Main Mode I
11:25:46     39 Main Mode D
11:25:52     40 Main Mode I
11:25:56     41 Main Mode M

continued...

MultiLevel  ????????  16.05.11 15:00  -02-
-----------------------------------------
11:25:56     42 Enter Menu
11:26:06     43 Leave Menu
11:26:08     44 Main Mode I
11:26:19     45 Wetleg 2 WET
11:26:21     46 Wetleg 3 WET
11:27:23     47 Main Mode D
11:27:40     48 User start 1
11:27:40     49 Dlv. 1 : Test
11:27:40     50 BottomValve 1: OPEN
11:27:48     51 Dlv. 1 : Lvl1
11:27:52     52 Dlv. 1 : StartDlv
11:27:57     53 Dlv. 1 : Dlv
11:27:57     54 Line Valve 1: OPEN
11:28:10     55 Dlv. 1 : Stop
11:28:10     56 BottomValve 1: CLOSE
11:28:10     57 Line Valve 1: CLOSE
11:28:30     58 Dlv. 1 : Lvl2
11:28:30     59 BottomValve 1: OPEN
11:28:35     60 Dlv. 1 : Wait Print
11:28:35     61 BottomValve 1: CLOSE
11:28:35     62 Delivery 1 finished
11:28:49     63 Dlv. 1 : Print
11:28:55     64 Dlv. 1 : Idle
11:28:55     65 Delivery 1 printed
11:29:10     66 Main Mode I
11:29:11     67 Main Mode M
11:29:11     68 Enter Menu
11:29:30     69 Manual loading plan comp.
0: 2
11:44:03     70 Power OFF
11:47:59     71 Power ON
11:48:02     72 Main Mode I
11:48:05     73 Dipswitch 8 OFF
11:48:06     74 Main Mode M
11:48:06     75 Enter Menu
11:48:37     76 Leave Menu
11:48:40     77 Main Mode I
11:48:41     78 Main Mode D
11:49:09     79 User start 1
11:49:09     80 Dlv. 1 : Test
11:49:09     81 BottomValve 1: OPEN
11:49:17     82 Dlv. 1 : Lvl1
11:49:22     83 Dlv. 1 : StartDlv
11:49:26     84 Dlv. 1 : Dlv
11:49:26     85 Line Valve 1: OPEN
11:49:36     86 Dlv. 1 : Wetleg
11:49:45     87 Dlv. 1 : Stop
11:49:45     88 BottomValve 1: CLOSE
11:49:45     89 Line Valve 1: CLOSE
11:49:48     90 Unapproved 1: Wetleg
11:49:48     91 Dlv. 1 : Wait Print
11:49:48     92 Delivery 1 finished
11:49:55     93 User confirm 1:1015


continued...              MultiLevel
????????  16.05.11 15:00  -03-
-----------------------------------------
11:50:12     94 Dlv. 1 : Print
11:50:19     95 Dlv. 1 : Idle
11:50:19     96 Delivery 1 printed
11:51:25     97 Main Mode M
11:51:25     98 Enter Menu
11:51:59     99 Leave Menu
11:52:02    100 Main Mode D
11:52:12    101 User start 1
11:52:12    102 Dlv. 1 : Test
11:52:12    103 BottomValve 1: OPEN
11:52:19    104 Dlv. 1 : Lvl1
11:52:24    105 Dlv. 1 : StartDlv
11:52:29    106 Dlv. 1 : Dlv
11:52:29    107 Line Valve 1: OPEN
11:54:31    108 User stop 1
11:54:31    109 Dlv. 1 : Stop
11:54:31    110 BottomValve 1: CLOSE
11:54:31    111 Line Valve 1: CLOSE
11:54:42    112 User confirm 1:1018
11:55:19    113 User start 1
11:55:19    114 Dlv. 1 : StartDlv
```

```
11:55:19    115 BottomValve 1: OPEN
11:55:24    116 Dlv. 1 : Dlv
11:55:24    117 Line Valve 1: OPEN
11:55:28    118 Dlv. 1 : Wetleg
11:56:18    119 Wetleg 1 DRY
11:56:24    120 User stop 1
11:56:24    121 Dlv. 1 : Stop
11:56:24    122 BottomValve 1: CLOSE
11:56:24    123 Line Valve 1: CLOSE
11:56:28    124 Dlv. 1 : Wait Print
11:56:28    125 Delivery 1 finished
11:56:39    126 Dlv. 1 : Print
11:56:39    127 Unapproved 1: Min. Vol.:
4521 (5000)
11:56:44    128 User confirm 1:1014
11:56:50    129 Power OFF
11:56:58    130 Power ON
11:56:59    131 Main Mode D
11:56:59    132 Delivery 1 finished
11:57:26    133 Power OFF
```

```
13.04.2010
14:52:16    134 Power ON
14:52:19    135 Main Mode D
14:52:19    136 Delivery 1 finished
14:52:30    137 Dlv. 1 : Print
14:52:31    138 Dlv. 1 : Idle
14:52:31    139 Delivery 1 printed
14:52:33    140 Main Mode M
14:52:33    141 Enter Menu
14:52:36    142 Leave Menu
14:52:39    143 Main Mode D
14:52:40    144 Main Mode I
  .
  etc.
```

9.3.3.3. Logbook <2> – Parameter Report List

The printout can be selected with <Start> and <End> date/time for the printing range.

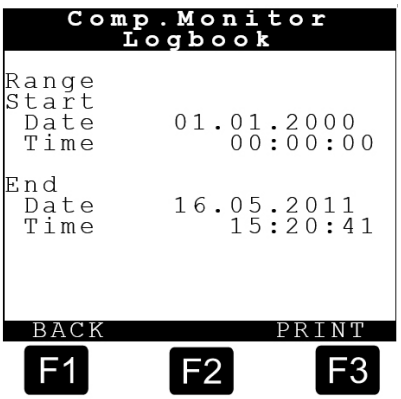
See also chapter 13.5 "Download / software Update".

```
Parameter report

(sample printout!)

09.04.2010 11:22:30 - 11.05.2011 12:39:43
  Device           : MultiLevel
-----------------------------------------
  Version          : 1.23[1.27]DE
  Sealcounter      : 000002
  Serial no.       : ????????
  Meter name       : - ? -
-----------------------------------------
  Seal broken!
-----------------------------------------
09.04.2010
11:22:30     3115 (Anz. IO-IF         ):
                  0>                    1
11:22:42     3123 (NOMIX Knoten       ):
                  11>                   0
11:48:28        1 SET     ,
11:51:45  3132138 (Neigungsstop       ):
                  0>                  250
19.04.2010
08:32:19        2 BROKEN  , DIP-switch
08:32:35  3132136 (Korrektur          ):
          1.00000000>          1.00399995
19.08.2010
15:05:02    31547 (Inst. K-Wert Längs ):
               0.00>               -0.87
15:05:47    31548 (Inst. K-Wert Quer  ):
               0.00>                1.13
15:06:31    31548 (Inst. K-Wert Quer  ):
               1.13>               -1.13
15:26:41  3132124 (Offset Schwimmer   ):
                  0>                7500
23.08.2010
11:11:50     3131 (Nr. of Comp.       ):
                  3>                    4
```

```
27.04.2011
14:08:34     3115 (Anz. IO-IF         ):
                  0>                    1
14:08:44     3123 (NOMIX Knoten       ):
                  11>                   0
15:32:08    31433 (Loading Measurem.  ):
                  NO>                 YES
28.04.2011
09:11:49     3122 (EMIS Node          ):
                  0>                   21
11.05.2011
12:39:43   314211 (Abfrage Vorwahl    ):
                  JA>                NEIN


End
```

9.3.3.4. Logbook <3> – Compartment Monitor Logbook

The Print Compartment Monitor Logbook menu looks like this:



☞ The **<ID>** and **<Password>** for master authorisation are required in order to print the comp. monitor logbook. See also chapter 9.3.3 "PRINT **<3>** - Logbook".

☞ The printout can be selected with **<Start>** and **<End>** date/time for the printing range.

At the input you can use the arrow keys ← / → to jump between the input fields.

☞ Start the print job with **<F3>**.

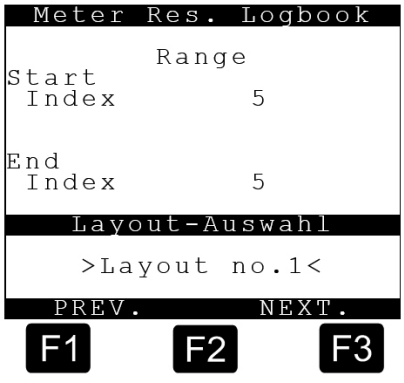
9.3.3.4.1. Logbook <3> – Compartment Monitor List

```
Compartment Monitor
(sample printout!)

27.01.2011 08:59:12 - 06.05.2011 11:16:23
Device : MultiLevel
----------------------------------------
Version : 1.23[1.27]DE
Sealcounter : 000040
Serial no. : ????????
Comp. no. : - ? -
----------------------------------------
Seal broken!
----------------------------------------
```

```
27.01.2011
08:59:12 Before delv. / BV closed
01: 6139.8 L 1005.3 mm wet
02: 7309.7 L 1189.0 mm wet
03: 7439.2 L 1158.4 mm wet
04: 2237.5 L 515.5 mm dry
05: 0.0 L 26.0 mm dry
08:59:52 Before delv. / BV open
01: 6139.8 L 1005.3 mm wet
02: 7309.7 L 1189.0 mm wet
03: 7439.2 L 1158.4 mm wet
04: 0.0 L 515.5 mm dry
05: 0.0 L 26.0 mm dry
09:18:32 After delv. / BV closed
01: 1369.4 L 301.2 mm wet
02: 7309.7 L 1189.0 mm wet
03: 7439.2 L 1158.4 mm wet
04: 2237.5 L 515.5 mm dry
05: 0.0 L 26.0 mm dry
```

9.3.3.5. Logbook <4> – Meter Results

The Print Meter Results menu looks like this:



☞ The printout can be selected with **<Start>** and **<End>** date/time for the printing range.

At the input you can use the arrow keys ← / → to jump between the input fields.

☞ Select the corresponding print layout with the **<F1>** and **<F3>** buttons.

☞ By confirming the print layout (**<ENTER>** button) the print job is started.

Depending on the logbook entry the print-out can vary. Here, for example for loading and delivery.

9.3.3.5.1. Logbook <4> – Meter Results Logbook List (Loading / Delivery Note)

Loading note (sample printout!)

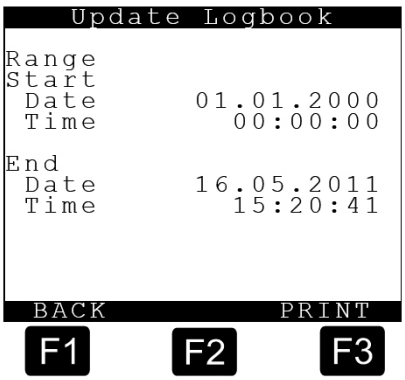
```
        (Copy)
Start date          :         27.04.2011
Tanknumber          :              - ? -
Receipt no.         :                  6
-----------------------------------------
   Data from W&M approved devices
  is enclosed in asterisks ( ).
-----------------------------------------

Comp. End           :                01 F
Start-End           :15:45:21 - 15:46:21
Average Temp.       :             +0,3 °C
Product             :              Diesel
Start Account       :           0 Liter
Vol. Dlv.T.         :        440,6 Liter
Vol. 15°C           :        446,0 Liter
-----------------------------------------
Comp. End           :                02 F
Start-End           :15:45:29 - 15:45:56
Average Temp.       :             +0,4 °C
Product             :              4-Star
Start Account       :           0 Liter
Vol. Dlv.T.         :      10513,3 Liter
Vol. 15°C           :      10695,5 Liter
-----------------------------------------
End                          Delivery note
```

(sample printout!)

```
        (Copy)
Start date          :         09.04.2010
Tanknumber          :              - ? -
Receipt no.         :                  2
-----------------------------------------
   Data from W&M approved devices
  is enclosed in asterisks ( ).
-----------------------------------------

Comp. End           :                01 E
Start-End           :11:52:12 - 14:52:19
Average Temp.       :             +0,0 °C
Product             :              Diesel
Start Account       :           0 Liter
Vol. Dlv.T.         :       4521,2 Liter
Vol. 15°C           :       4578,7 Liter
-----------------------------------------
End
```

9.3.3.6. Logbook <5> – Updates

The Print Update Logbook menu looks like this:



☞ The **<ID>** and **<Password>** for master authorisation are required in order to print the update logbook. See also chapter 9.3.3.1 "Event logbook".

☞ The printout can be selected with **<Start>** and **<End>** date/time for the printing range.

At the input you can use the arrow keys ← / → to jump between the input fields.

A logbook with a broken seal can only be reset after the printout of the update logbook.

9.3.3.6.1. Logbook <5> – Update Report List

```
Update report (Sample printout!)

17.10.2010 14:48:45 - 07.11.2010 19:38:22
  Device            : MultiLevel
-----------------------------------------
  Version           : 1.23[1.27]DE
  Sealcounte        : 000003
  Serial no.        : 18AB1234
  Comp. no.         : 1234ABCD
-----------------------------------------
  Seal broken!
-----------------------------------------
  Remaining attempts   : 95
-----------------------------------------
17.10.08 14:48 + 098BB138          Eggers
19.10.08 12:32 - FFFFFFFF           Meier
20.10.08 15:12 + 098AB37F         Schmidt
05.11.08 09:17 + A35FBD97          Müller
07.11.08 19:38 - FFFFFFFF          Eggers
```

9.3.4. PRINT <4> – Report

The Report menu looks like this:

- Press the **<4>** button to enter the MultiLevel report print menu.
- The appropriate submenu is accessed by pressing the **<numeric keys>** (here, for example, **<1> or <2>**) corresponding to the number preceding the respective function.
- If necessary, select the corresponding printing layout with the keys **<F1> and <F3>**.
- Pressing the **<F1>** key executes the **"BACK"** command, returning to the print main menu display.

9.3.4.1. Report <1/2> – Tour report List – Example 1

```
Tour report
(sample printout!)


01.07.2010 13:42:45 - 15.09.2010 12:46:10
  Device           : MultiLevel
****************************************
* Version          : 1.22[1.26]EN       *
* Seal number      : 000004             *
* Serial no.       : 18AB1234           *
* Comp. no.        : 4711/0815          *
****************************************
* Seal OK!                              *
****************************************

01.07.2010
 Receipt Time  Co  Pr Tmp S  Vt(L)  V0(L)
 0012345 13:42 01L 05 +23 + 123456 123456
 0012346 13:42 02L 02 +22 + 123456 123456
 0012347 13:42 03L 03 +24 + 123456 123456
 0012348 17:48 01L 03 +19 + 123456 123456
 0012348 17:48 02G 02 +20 - 123456 123456
 0012348 17:48 03L 06 +18 + 123456 123456
02.07.2010
 Receipt Time  Co  Pr Tmp S  Vt(L)  V0(L)
 0012349 11:12 01L 05 +23 + 123456 123456
 0012349 11:12 02L 02 +22 + 123456 123456
 0012349 11:12 03L 03 +24 + 123456 123456
 0012350 14:48 01L 03 +19 + 123456 123456
 0012351 14:48 02G 02 +20 - 123456 123456
 0012352 14:48 03L 06 +18 + 123456 123456

Totalizer                 Vt(L)    V0(L)
Compartment 1:          12345678 12345678
Compartment 2:          12345678 12345678
Compartment 3:          12345678 12345678

Totalizer (Vt)            Total      Day
Compartment 1:          12345678 12345678
Compartment 2:          12345678 12345678
Compartment 3:          12345678 12345678

End
```

Example 1:

Total block for compartments

Report header:
• General information

Delivery block:

• Receipt	Receipt number
• Time	Start of delivery
• Co	Compartment number
• Pr	Product code
• Tmp	Average delivery temperature
• S	Calibration Status (+ = calibrated)
• Vt	Non-compensated delivery volume
• V0	Compensated delivery volume

Total during reporting period
• Here: Totalized by compartment

Totalizer
• Always compartment-related

9.3.4.2. Report <1/2> – Tour report List – Example 2

```
Tour report
(sample printout!)

01.07.2010 13:42:45 - 15.09.2010 12:46:10
  Device           : MultiLevel
****************************************
* Version          : 1.22[1.26]EN       *
* Seal number      : 000004             *
* Serial no.       : 18AB1234           *
* Comp. no.        : 4711/0815          *
****************************************
* Seal OK!                              *
****************************************

01.07.2010
 Receipt Time  Co  Pr Tmp S  Vt(L)  V0(L)
 0012345 13:42 01L 05 +23 + 123456 123456
 0012346 13:42 02L 02 +22 + 123456 123456
 0012347 13:42 03L 03 +24 + 123456 123456
 0012348 17:48 01L 03 +19 + 123456 123456
 0012348 17:48 02G 02 +20 - 123456 123456
 0012348 17:48 03L 06 +18 + 123456 123456
02.07.2010
 Receipt Time  Co  Pr Tmp S  Vt(L)  V0(L)
 0012349 11:12 01L 05 +23 + 123456 123456
 0012349 11:12 02L 02 +22 + 123456 123456
 0012349 11:12 03L 03 +24 + 123456 123456
 0012350 14:48 01L 03 +19 + 123456 123456
 0012351 14:48 02G 02 +20 - 123456 123456
 0012352 14:48 03L 06 +18 + 123456 123456

Sum                          Vt(L)    V0(L)
Diesel:                   12345678 12345678
Ultimate:                 12345678 12345678
V-Power:                  12345678 12345678

Totalizer (Vt)              Total      Day
Compartment 1:            12345678 12345678
Compartment 2:            12345678 12345678
Compartment 3:            12345678 12345678

End
```

Example 2:

Total block for products

Report header:
- General information

Delivery block:

• Receipt	Receipt number
• Time	Start of delivery
• Co	Compartment number
• Pr	Product code
• Tmp	Average delivery temperature
• S	Calibration Status (+ = calibrated)
• Vt	Non-compensated delivery volume
• V0	Compensated delivery volume

Total during reporting period
- Here: totalized by product

Totalizer
- Always compartment-related

9.4. Settings and changes

The main menu looks as follows:

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

☞ The appropriate submenu is accessed by pressing the **<numeric keys>** (here, for example, **<1> to <5>**) corresponding to the number preceding the respective function.

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

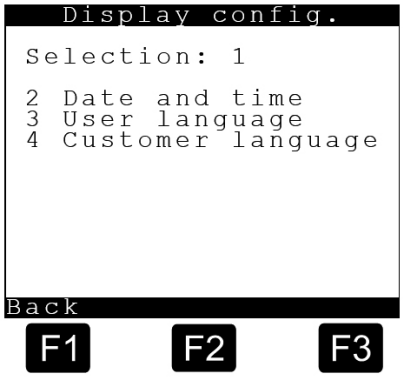
Explanation of the submenus

1 Display config.:	Configuration of the display
2 Loading plan:	Display of the loading plan
3 Parameter list:	Input of the setup parameters
4 Service:	Call-up of diagnosis functions
5 Remote access:	Remote access functions
6 Data transmission:	Data transmissions functions
7 Totalizer:	Totalizer functions

9.5. Display configuration – 1

Display config. screen

☞ The submenu for the configuration of the display is accessed by pressing **<1>**.



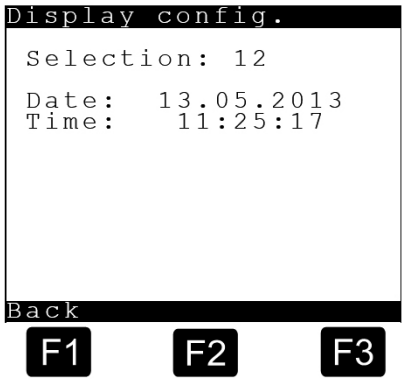
▶ 55

▶ 13 – User language

▶ 14 – Customer language

Display configuration screen

☞ Follow the display instructions for setting the date and time.



▶ **12 – Date and time**
Then enter the date and time via the **<numeric keys>**.

• After the day has been entered, e.g.: **"13"**, the cursor automatically jumps to the month etc.

• The year may not be entered in short form, as otherwise the entered data will not be adopted into the system.

• Pressing the **<F1>** key 'BACK' takes you back to the main menu.

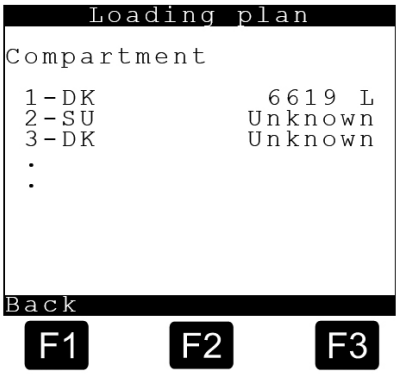
▶ **13 – User language**
The user language is used for the menu system, general displays and error messages.

▶ **14 – Customer language**
The customer language is used for the printout of the delivery receipt.

9.6. Display of the loading plan – 2

Loading plan display with NoMix

If MultiLevel is operated together with NoMix, only the fill levels and the product can be read off here in the loading plan display. Changes are not possible.

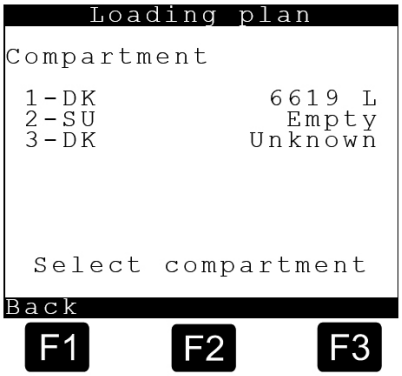


Loading plan display in stand-alone mode

In stand-alone mode on the other hand, the I/O interface (chapter 7.8 "I/O interface - NM2IO") is connected directly to the MultiLevel for the control of the foot and line valves.

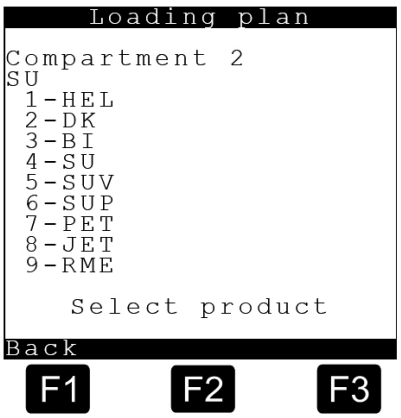
For more information about stand-alone mode, refer to chapter 7.1.6 "Stand-alone mode".

The loading plan must now be entered manually. The compartments can be selected with the **<numeric keys> <1> to <x>** and the product adapted accordingly.



Product selection in stand-alone mode

The product for the selected compartment can then be selected with the **<numeric keys> <1>** to **<9>** according to the specified values.



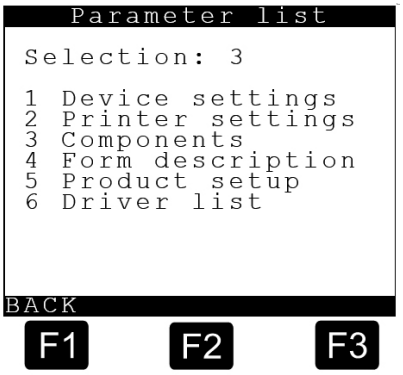
9.7. Parameter list – 3

During commissioning of the MultiLevel system, the “tank truck supplier” has to adapt the system to the respective tank truck type. This is done here in the ‘Parameter list’ submenu, which in turn possesses further submenus.

Pressing **<3>** switches from the main menu to the display to the right.

Further submenus can then be accessed by pressing the numeric key corresponding to the number preceding the respective submenu.

▶ Pressing **<F1>** = BACK or **<Stop>** takes you back to the next higher level. The currently selected submenu or parameter is displayed in the upper part of the display after the word ‘selection’.



The setup parameter **‘number of compartments’**, for example, is located in the submenu:

▶ **Selection: 3131.**
These submenus/parameter numbers are listed later on for each individual parameter. If an asterisk precedes the setup parameter in the following description, e.g. ***3131**, then the parameter is calibration-relevant. If a parameter has a grey background, e.g. ***3132133**, then it either does not need to be adjusted or it may only be changed after consulting F.A. Sening, whichever the case may be.

Explanation of the submenus

1 Devise settings:	Device-specific parameters
2 Printer settings:	Printer-specific parameters
3 Components:	Adjustment of individual hardware components
4 Form description:	Form settings
5 Remote access:	Product-specific parameters
6 Driver list:	Driver-specific parameters

SETUP Switch

To prevent safety-relevant / calibration-relevant parameters from being changed arbitrarily, certain parameters can only be changed after a hardware switch in the main unit has been switched over (drawing no. **51.351675** or MLMAINDISP).

The SETUP switch is switch no. 8 on the DIP switch on the MLMAIN CPU board. If the SETUP LED (red) is lit, SETUP is enabled and all parameters can be changed.

In order to change a parameter, press the **<Enter>** key. In the case of safety or calibration-relevant parameters, you will additionally be requested to enter various passwords / IDs.

The following IDs are factory-preset:

▶ “Your ID”: 1

▶ "Your passord': 1

▶ "Seal code": 12345678

The correct adjustment of the SETUP is to be certified by the specialist company.
The parameter list must be printed out in addition to being recorded on an appropriate form.

Furthermore, the parameter list should also be stored on a chip card for archiving. In order to do this, the chip card reader / writer (part number: CCR) must be connected at least when entering the parameters.

If the MultiLevel system is installed in a vehicle that is sealed and operated under the supervision of the Office of Weights and Measures, all calibration-relevant parameters must be checked by the W&M official and sealed afterwards. The applicable national regulations regarding this are to be adhered to.

The procedures for the calibration of a MultiLevel vehicle are described in DOK-480 ‘MultiLevel calibration and official verification’.

Once the setup is complete, the switch has to be returned to its original position, i.e. the LED (red) will go out. In addition, the electronic seal must be set.

9.7.1. Device Setting – 31

Setting device-specific parameters.

Explanation of the submenus

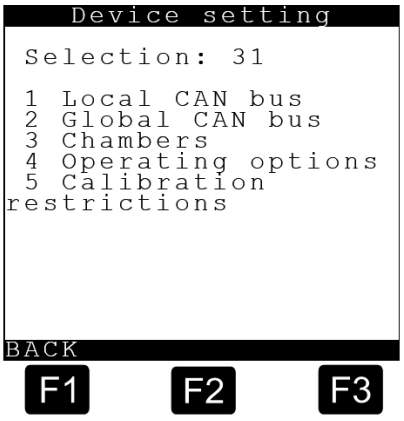
1 Local CAN bus:

2 Global CAN bus:

3 Chambers:

4 Operating options:

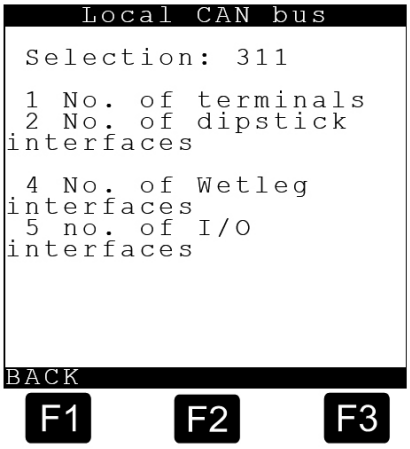
5 Calibration restrictions:



9.7.1.1. Local CAN bus – 311

The parameters for the local CAN bus, also known as the 'internal CAN bus', are set here. MultiLevel communicates with related interface sub-assemblies such as the dipstick interface, wet-leg interface etc. by means of the internal CAN bus.

▶ **3111 – No. Terminals**
The number of terminals / operating devices is set here. On a TKW (tanker vehicle) with discharge facilities on both sides, you are absolutely advised to install operating devices on both sides of each TKW: On one side, the main unit and display (MLMAINDISP / MLMAINDISP2) and, on the other side, a standard operating device (NM2DISPLAY). Node number '0' must be set for the first operating device (MLMAINDISP(2)) and node number "1" must be set for the second (NM2DISPLAY).



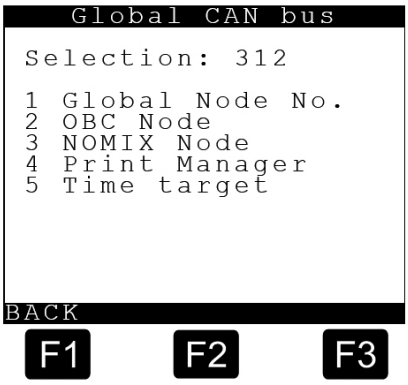
▶ ***3112 – No. Dipstick interface**
Setting, showing how many dipstick interfaces are installed. At present, the software only supports one dipstick interface.

▶ ***3114 – No. Wetleg interface** (wet-leg detector interface)
Setting showing how many wet-leg detector interfaces are installed. At present, the software only supports one wet-leg detector interface.

▶ ***3115 – No. I/O interface** (wet-leg detector interface)
Setting to show how many I/O interfaces are installed. The I/O interface is used to control the valves and is only in operation without NOMIX (in "Standalone" mode). During operations with NOMIX, it takes charge of controlling the foot valves and in-line valves.

9.7.1.2. Global CAN bus – 312

The parameters for the global CAN bus, also known as the external CAN bus, are set here. MultiLevel uses the external CAN bus to communicate with other devices on the tanker vehicle, e.g. NoMix 2000, EMIS (OBC), etc.



▶ **3121 – Global Node No.**
The MultiLevel node number is set here; the factory setting is no. "1". This node number should not be altered under any circumstances.

▶ **3122 – OBC Node**
The EMIS node number is set here. The factory setting is no. '0', since communication with an on-board computer (OBC) is not yet supported by the EMIS interface. After completion of the software, node number '21' will be used in future. Please ensure that '21' is also set as the dedicated EMIS node number.

▶ **3123 – NOMIX Node**
The NoMix 2000 node number is set here. The factory setting is No. "11". Please ensure that the dedicated node number '11' is also set for NoMix 2000.

During the calibration process, it is currently necessary to set node no. 10 for both the NoMix and MultiLevel.

▶ **3124 – Print Manager**
If several systems share a common printer, the node number of that print manager needs to be set here. On the vehicle side, set No. "1". That means that MultiLevel manages the printer. If for example NoMix 2000 starts a printout, then that print order is sent to MultiLevel first. MultiLevel then sends the data to the printer.

▶ **3125 – Time Target**
Synchronization only occurs at the node set under parameter '3125'.

▶ Parameter '3125' is not W&M protected

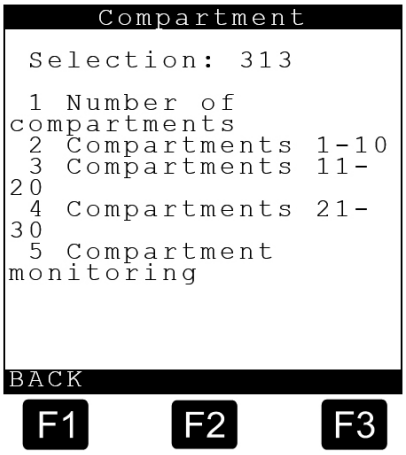
▶ Factory setting: '21' (default EMIS)

▶ Time synchronization can be deactivated with "3125" = 0.

No time synchronization takes place between 23:00:00 – 00:59:59.

Example:
- Pre-synchronization
  - MultiLevel: 08.22.2011, 00:01:00
  - EMIS: 08.21.2011, 23:59:00
- Post-synchronization:
  - MultiLevel: 08.22.2011, 23:59:00
  - EMIS: 08.21.2011, 23:59:00

9.7.1.3. Chambers – 313



Compartment-specific parameters are set here:

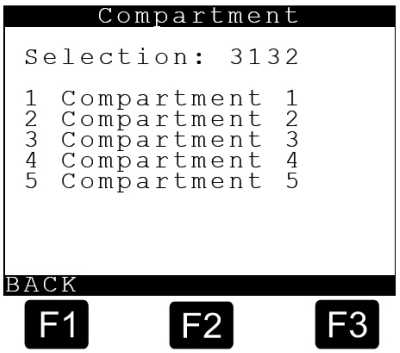
Explanation of the submenus

1 Number of compartments
2 Compartments 1-10
3 Compartments 11-20
4 Compartments 21-30
5 Compartment monitoring

▶ **3131 – Number of compartments**
Here the number of chambers is set. At the present time, the maximum number is limited to 24 compartments.

When the number of compartments is altered, all the totalizers are reset.

9.7.1.3.1. Compartments 1-10 – 3132



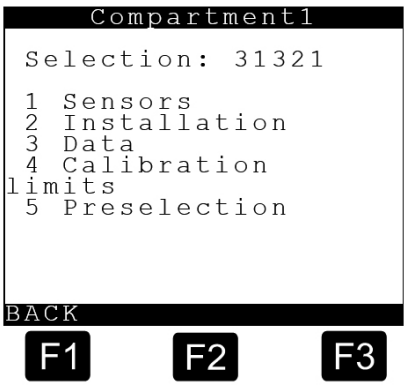
Here further parameters are set for the first 10 compartments. Only display the number of compartments set for the 'Number of compartments' parameter.

The following section describes the parameters for the first tank truck compartment. They start with selection no.:

▶ **31321xx**
These parameters must of course also be set for all other compartments. That means that the second compartment starts with selection no.

▶ **31322xx**
etc.

9.7.1.3.1.1. Compartments 1-10 – 31321



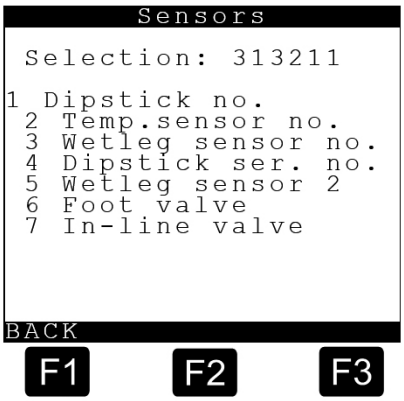
Various compartment-related data are set here:

Explanation of the submenus

1 Sensors
2 Installation
3 Data
4 Calibration limits
5 Pre-selection

9.7.1.3.1.1.1. Compartment 1 Sensors – 313211

The settings for the various sensors are made here:



The following parameters already contain the number of the related compartment as a preliminary setting. Alternatively, the values can be altered if so desired

▶ **3132111 – Dipstick no.**
The dipstick number of the first compartment, i.e. '1' is entered here.

▶ **3132112 – Temp. Sensor no.**
The temperature sensor number of the first compartment, i.e. '1' is entered here.

▶ **3132113 – Wetleg Sensor no.**
The wet-leg detector number of the first compartment, i.e. '1' is entered here.

The following input takes place automatically when the system is switched on, provided the MultiLevel is not sealed. This entry cannot be assigned differently!

▶ **3132114 – Dipstick Ser. no.**
The dipstick serial number of the first compartment is entered automatically here.

▶ **3132115 – Wetleg Sensor 2**
Correlation of wet-leg detector number 2.
Selecting from '0' to '32' is possible.

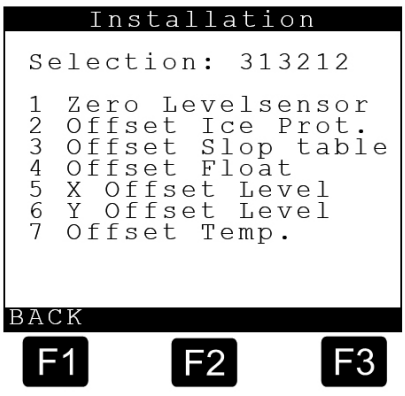
▶ **3132116 – Foot Valve**
Correlation of the foot valve number. Selecting from '0' to '32' is possible.

▶ **3132116 – Inline Valve**
Correlation of the in-line valve number. Selection is possible from '0' to '32'.

This correlation changes every time the number of compartments is reset to the factory settings!

9.7.1.3.1.1.2. Compartment 1 Installation – 313212

Various installation parameters are set here. This is described in detail in DOK-480 ‘MultiLevel calibration and official verification’. The following four parameters are necessary in order to precisely determine the fill level. Details of the height parameters in chapter 5.8 "Height definition of the sensor head ".



▶ **3132121 – Level sensor zero point**
Sensor zero point the zero point of the level sensor is set here. The zero point of the level sensor is read off with an empty compartment, when the float is resting on the ice protection. This value can be read off in the Diagnosis menu / level sensor interface and must subsequently be entered here. In order to simplify entry, a menu item has been provided in which this takes place automatically. See chapter 9.8.2 "Calibration - 42".
→ value in 1/1000 mm.

▶ **3132122 – Ice protection offset**
The height of the ice protection (= ice protection offset) is set here. The standard value is 25.0 mm and may only be changed in exceptional cases on consultation with TechnipFMC.
→ value in 1/1000 mm.

▶ **3132123 – Inclination tab. offset**
A possible inclination table offset can be set here. The standard value is ‘0’ mm and may only be changed in exceptional cases on consultation with Technip-FMC.
→ value in 1/1000 mm.

▶ **3132124 – Float offset**
The float offset (= immersion depth of the float) is set here. This value is given on the pre-acceptance test certificate with the documents for the respective level sensor.
→ value in 1/1000 mm.

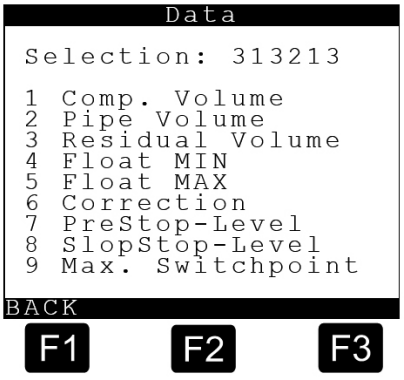
▶ **3132125 – X shift**
The inclination table in can be shifted in the X-direction (longitudinal direction) here. This can be necessary if the level sensor is shifted in the longitudinal direction due to manufacturing tolerances.
→ positive: shift towards the front
→ negative: shift towards the rear
→ value in mm.

▶ **3132126 – Y shift**
The inclination table can be shifted in the Y-direction (transverse direction) here. This can be necessary if the level sensor is shifted in the transverse direction due to manufacturing tolerances.
→ positive: shift to the right (in the direction of travel)
→ negative: shift to the left (in the direction of travel)
→ value in mm.

▶ **3132127 – Temp offset**
An offset for the temperature sensor in °C can be set here. (The parameter is not normally needed and is left at 0 °C.)

9.7.1.3.1.1.3. Compartments 1 Data – 313213

Further compartment-specific data is data here:



▶ **3132131 – Compartment volume**
The compartment volume in liters is entered here.

3132132 – Pipe Volume
The volume of the pipe between the foot valve and the line valve is entered here. This parameter is entered automatically during the data transmission from the calibration system to the MultiLevel. As a rule it no longer needs to be changed by hand.
→ value in mL = 1/1000L

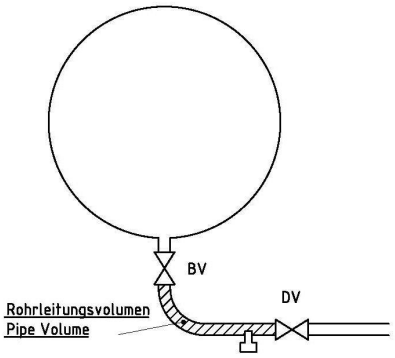


Figure 42: Pipe Volume

3132133 – Residual Volume
The entire residual volume that can no longer be measured by the level sensor **(including the pipe volume)** is entered here. This parameter is entered automatically during the data transmission from the calibration system to the MultiLevel. As a rule it no longer needs to be changed by hand.
→ value in **mL = 1/1000L**

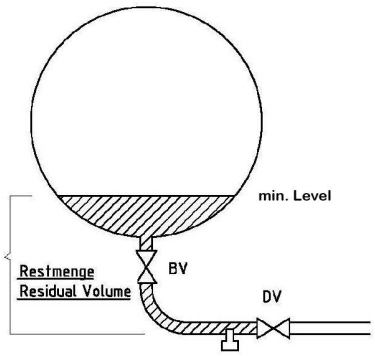


Figure 43: Residual Volume

3132134 – Float MIN
Fill level or minimum float position below which the measurement of the residual volume begins and the fill volume is no longer determined in relation to the fill height.
→ value in **1/1000 mm**
→ specified: **40000 µm = 40mm**
(Deviations permitted only in special cases and only on consultation with TechnipFMC)

3132135 – Float MAX
Max. fill level that should be reached when calibrating the compartment. This value serves to avoid overfilling during calibration by automatically switching off the pump when the value is exceeded. The value must be determined manually before calibration.

ATTENTION:
- The value is valid only for the compartment that is being calibrated and not for compartments that serve as storage tanks during calibration!
- The value is of no importance during operation and does not replace any overfill protection functions!!

→ value in 1/1000 mm
→ Can be read off from the help display on the delivery screen or from the loading screen, if no calibration has been performed yet and height values are displayed.

3132136 – Correction
A fixed correction factor (= K-factor) can be set here, if a linear deviation between the display on the MultiLevel and bell prover is determined during measurements in the bell prover.

K affects only the volume in accordance with the level sensor table, not the correction volume of the inclination table and not the residual volume!

$$K_{new} = \frac{V_{target} \times K_{old}}{V_{actual}}$$

V_{target} = volume in the bell prover
V_{actual} = MultiLevel display
K_{old} = K-factor used to determine V_{actual}.

ATTENTION:
Observe compensation, i.e. compare only V_T or only V_0!

3132137 – Preliminary Switch-Off
In the case of unfavourably shaped measuring compartments with large residual volumes that can no longer be measured by the level measuring instrument, there is a possibility to activate a preliminary switch-off. This serves as an instruction to the driver to check whether there is enough room in the storage tank for the entire residual volume. If this is not the case, a printout of the partial volume already measured can be generated and the remaining product metered out into another tank.

→ value in **mm**
→ The value must be within a range where the level sensor can still measure before the residual volume discharge. (With a standard setting, the value should be > 45 mm.)
→ value = **0** means that the preliminary switch-off is deactivated.

3132138 – Inclination Stop
If the inclination of the vehicle is not within the permitted calibration limits when the wet leg sensor runs dry, an uncalibrated measurement takes place, since it is not certain whether residual quantities have remained in the compartment.

A preliminary check can be activated via the inclination stop. If the inclination is not adhered to when the level falls below the set height, the delivery is STOPPED and a corresponding error message is generated. The operator can then correct the vehicle alignment if necessary and finish the delivery as a calibrated delivery.

→ value in **mm**
→ value = **0** means that the inclination stop is deactivated
→ value = **9999** means check before starting delivery

▶ **3132139 – Max. Switch Point**
• During filling, overfilling individual compartments should be avoided.

• The Loading pre-switching is to operate separately for each compartment.

Tripping the Loading pre-switching for a particular (overfilled) compartment has no effect on current filling operations of other compartments.

• When an adjustable limit value **("Max. Switch point")** is reached/exceeded, the foot valve for the corresponding compartment is closed.

• Any change to the **"Max. Switch point"** parameter is noted in the parameter logbook.

• After overfilling and switch-off, the overfilled compartment remains blocked (interlocked) against further filling attempts, even if the fill level should fall again.

• The interlock is cancelled only when exiting filling mode.

• If a compartment has been locked (overfilled) this condition is shown on the display.

• For NOMIX operation: filling mode = chamber (set in NOMIX!)

The first time crossing: The bottom valve is closed and the loading can not be restarted.

Parameter = Volume VT
Overfill = **^^^** to the right of the display chamber number

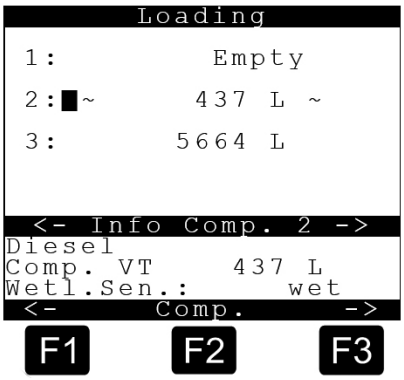
→ value in **liters**
→ value = **0** means Loading pre-switching is disabled.

Display during loading (page 1)

▶ **Compartment 1**
- empty
- Foot valve closed

▶ **Compartment 2**
- Filling underway
- Gauge moving
- Foot valve closed

▶ **Compartment 3**
- Filled
- Foot valve closed

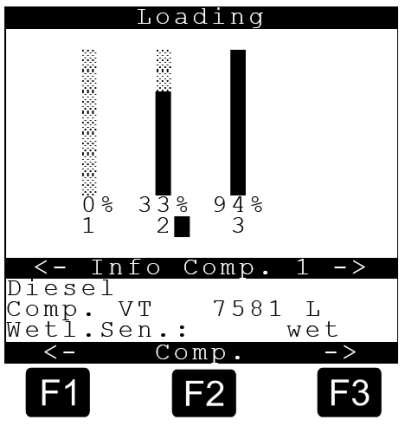


Display during loading (page 2)

▶ **Compartment 1**
- empty
- Foot valve closed

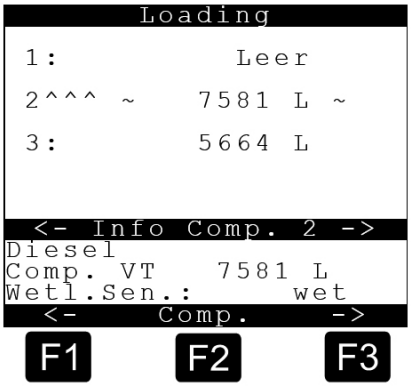
▶ **Compartment 2**
- Filling underway
- Gauge moving
- Foot valve closed

▶ **Compartment 3**
- Filled
- Foot valve closed



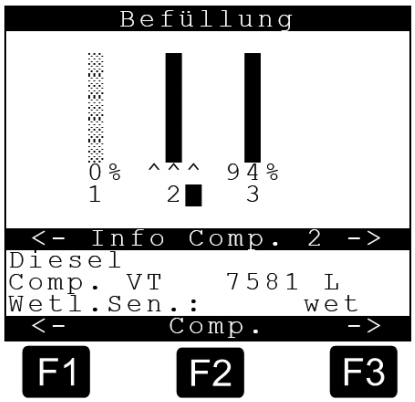
Display when switched off by Loading pre-switching (page 1)

- **Compartment 1**
  - empty
  - Foot valve closed
- **Compartment 2**
  - Filling stopped due to overfilling
  - Gauge moving
  - Foot valve closed
- **Compartment 3**
  - Filled
  - Foot valve closed



Display when switched off by Loading pre-switching (page 2)

- **Compartment 1**
  - empty
  - Foot valve closed
- **Compartment 2**
  - Filling stopped due to overfilling
  - Gauge moving
  - Foot valve closed
- **Compartment 3**
  - Filled
  - Foot valve closed



9.7.1.3.1.1.4. Compartments 1 – Calibration Limits – 313214

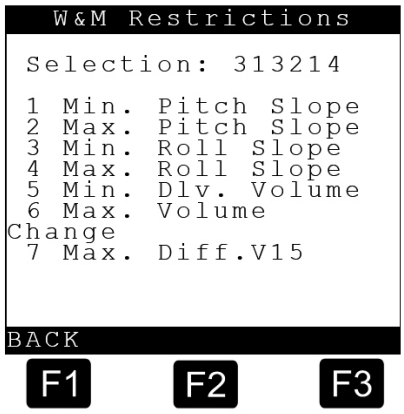
Different **compartment-dependent** calibration limits are set here:

General information about inclination limits

The parameters for the compartment-dependent inclination limits are intended to ensure that no residual volumes remain in the compartment and in the piping in the case of an unfavourable inclination of the vehicle.

To this end, limits are entered for each compartment. If these limits are exceeded, no further calibrated delivery takes place.

Inclination limits are specified for the entire vehicle independent of the compartment-dependent limits. The aim here is to avoid larger errors resulting from inaccuracies inthe measurement of the inclination.



The following illustration shows an example of the effects that the inclination limits have on a delivery.

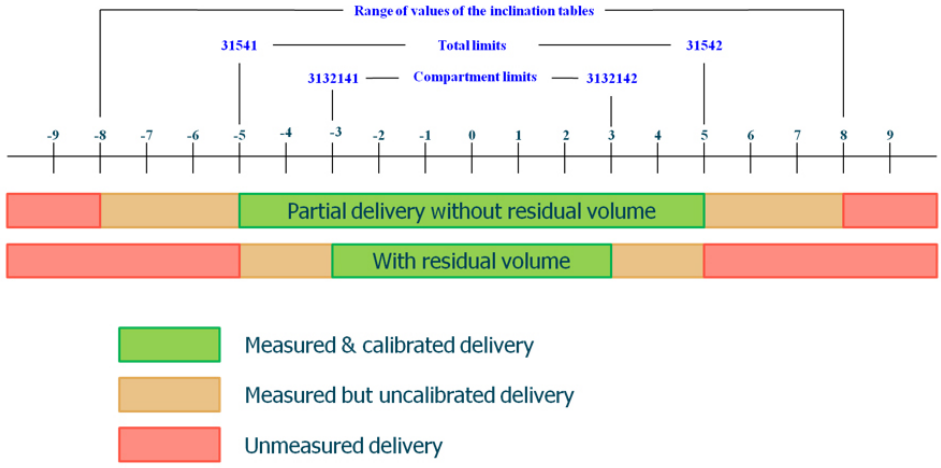


Figure 44: Inclination Limits

The following parameters are set here by way of example:

Compartment	Vehicle
Min. pitch: -3	Min. pitch: -5
Min. pitch: +3	Min. pitch: +5

We recommend setting the 'favorable' compartment-dependent inclination limits, with which the residual volume delivery always works, to the same value that is specified for the entire vehicle in the case of calibrated deliveries.

Rough estimations have shown that relatively small residual volumes remain in the compartments, even if the vehicle deviates by 1° to 1.5° from a favorable alignment. TechnipFMC therefore recommends setting the residual volume delivery to 1° to 1.5° from the ideal drain direction in order to avoid problems with the delivery. The procedure must be agreed with the responsible W&M official.

The transverse inclination limits can normally be set to the vehicle-dependent inclination limits, because the inclination hardly has any influence on the delivery of the residues.

3132141 – Min. Pitch
Setting for the minimum pitch. If this value is undershot, the delivery is uncalibrated when the wet leg sensor runs dry.

→ Example: -3,0°

(Vehicle lower at the front ==> setting is normally suitable for a rear compartment!)

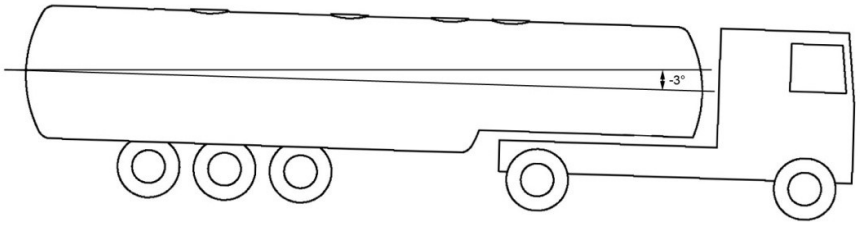


Figure 45: Tank truck inclined negatively in a longitudinal direction by -3,0°

→ value in ° **(degrees)**

3132142 – Max. Pitch
Setting for the maximum pitch. If this value is exceeded, the delivery is uncalibrated when the wet leg sensor runs dry.

→ Example: +3°
(Vehicle higher at the front ==> setting is normally suitable for a front compartment!)

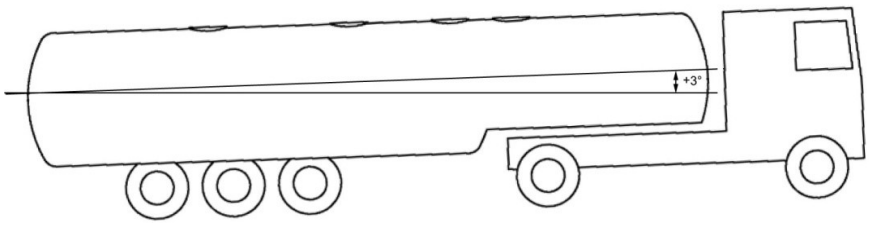


Figure 46: Tank truck inclined positively in a longitudinal direction by +3°

→ value in ° **(degrees)**

3132143 – Min. Roll
Setting for the minimum roll. If this value is undershot, the delivery is uncalibrated when the wet leg sensor runs dry.

→ Example: -3,0°
→ Value in ° **(degrees)**

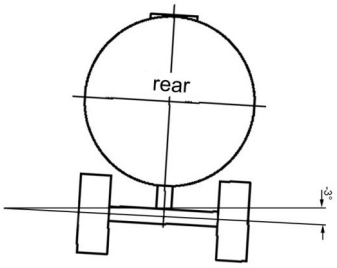


Figure 47: Tank truck inclined negatively in a transverse direction by -3,0°

3132144 – Max. Roll
Setting for the maximum roll. If this value is exceeded, the delivery is uncalibrated when the wet leg sensor runs dry.

→ Example: +3°
→ Value in ° **(degrees)**

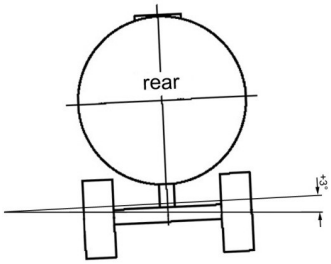


Figure 48: Tank truck inclined positively in a transverse direction by +3,0°

3132145 – Min. Delivery Quantity
Entry of the minimum delivery quantity permissible in terms of calibration. The specification is made on the basis of the applicable rules. If the vehicle is to be used in applications requiring compulsory calibration, the specification is made by the W&M official.

→ values in **litres**

3132146 – Max. Change in Volume
Input of the maximum change in volume of a 'non-active' compartment that is tolerated during delivery from one or more other compartments. If the value should be exceeded, the system interprets this as manipulation and an extended receipt is printed with the height measurements before and after the delivery of all compartments. All measurements are marked as uncalibrated.

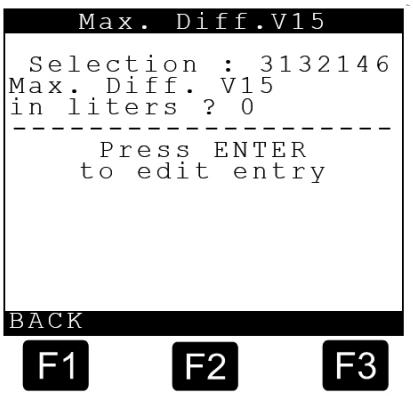
→ values in **litres**

▶ **3132146 – Max. Diff. V15**
• Max. difference V15 can be set separately for each compartment.

• Parameter is an absolute amount: positive or negative deviation

• **0 liter = OFF** (factory setting)

→ values in **litres**



▶ Comparison between quantity loaded and delivered

Comparison of V15 – quantity between loading and delivery

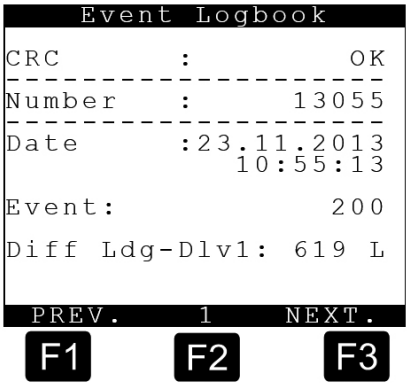
Takes place after delivery of whole compartment (residual quantity sensor dry)

If max. deviation is exceeded:

→ Warning message to driver

If max. deviation is exceeded:

→ Entry in the event logbook



▶ No comparison is made if:

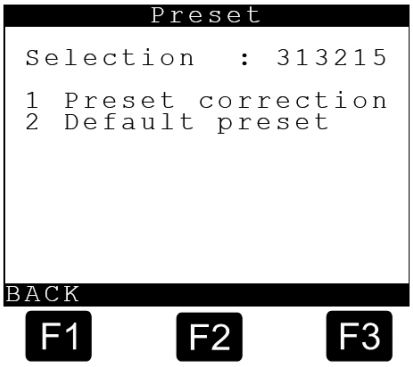
• The switch-off is by parameter 313xx47.

• A product with deactivated temp. comp. is being delivered.

• Calculation of the V15 quantity is not possible because of an error:
- Failure of temp. sensor
- Failure of gradient sensor
- Failure of direction rod
- Failure of residual quantity sensor
- Inconsistent sensor data
- etc.

9.7.1.3.1.1.5. Compartments 1 – Volume Preset – 313215

▶ **3132151 – Correction Value**
After the delivery, the correction value for the volume preset is automatically adjusted. This correction value is necessary because, after the command is given to close the valves, a certain amount of time passes before the flow is actually stopped. This after run quantity can be entered in the correction value, so that the specified preset amount is achieved with significantly greater precision.



▶ **3132152 – Standard Preset**
→ Value in **liters = 5000**

9.7.1.3.2. Compartments monitoring during loading – 31351

A setting is made here as to whether the compartment should be monitored during loading.

	Description	Comment
OFF	No compartment monitoring	
Without foot valve	Level monitoring only	
FV only at start	Can delay the 'calming' of the level, since air may be in the piping.	Not recommended, unless expressly desired.
FV only at end		Not recommended, unless expressly desired.
FV at start and end	**ATTENTION:** If the foot valves are opened again shortly before printing the receipt, residual volumes can lead to the wet leg sensor being wetted!	Not recommended, unless expressly desired.

9.7.1.3.3. Compartments monitoring during delivery – 31352

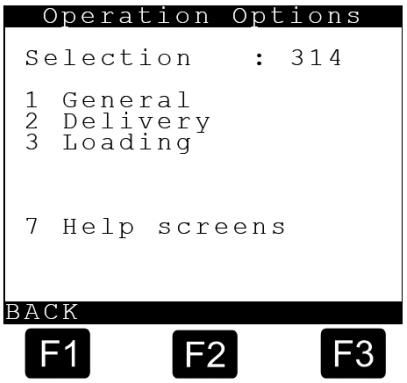
A setting is made here as to whether the compartment should be monitored during delivery.

	Description	Comment
OFF	No compartment monitoring	
Without foot valve	Level monitoring only	PTB requires this setting
FV only at start	Can delay the 'calming' of the level, since air may be in the piping.	Not recommended, unless expressly desired.
FV only at end	**ATTENTION:** If the foot valves are opened again shortly before printing the receipt, residual volumes can lead to the wet leg sensor being wetted!	Not recommended, unless expressly desired.
FV at start and end	**ATTENTION:** If the foot valves are opened again shortly before printing the receipt, residual volumes can lead to the wet leg sensor being wetted!	Not recommended, unless expressly desired.

9.7.1.4. Operating Options – 314

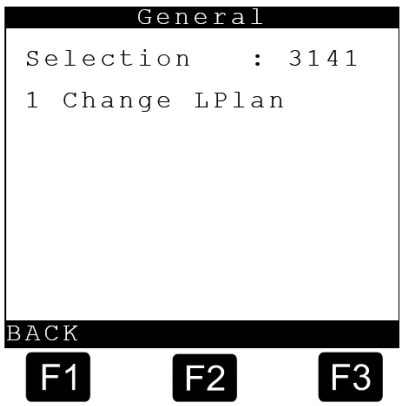
Explanation of the submenus

1 General
2 Delivery
3 Loading
4
5
6
7 Help screens



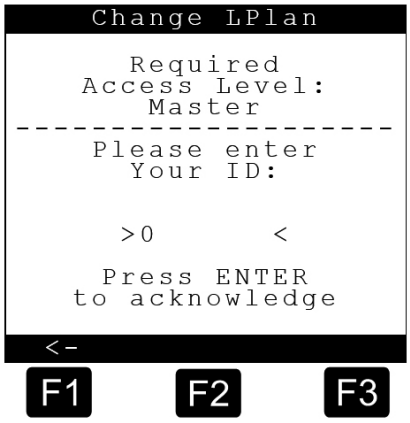
9.7.1.4.1. General – 3141

Select change of loading plan with **<1>**.



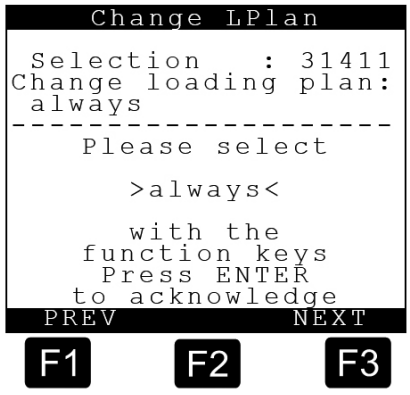
9.7.1.4.1.1. Change Loading Plan – 31411

The **<ID>** and **<Password>** for master authorization are required in order to change the loading plan.



9.7.1.4.1.2. Change Loading Plan – 31411

The selection is made with the **<PREVIOUS>** and **<NEXT>** keys and confirmed with **<ENTER>**.



In the case of operation *with* NOMIX, the loading plan can only be viewed. Changes to the loading plan are not possible here.

In the case of operation *without* NOMIX, the loading plan can/must be edited by the driver. Here, the parameter **31411** (change loading plan) affects the function:

- **31411 = 'always':** A change is also possible when the compartment is full
- **31411 = 'empty':** A change is possible only when the compartment is empty.

9.7.1.4.2. Delivery – 3142

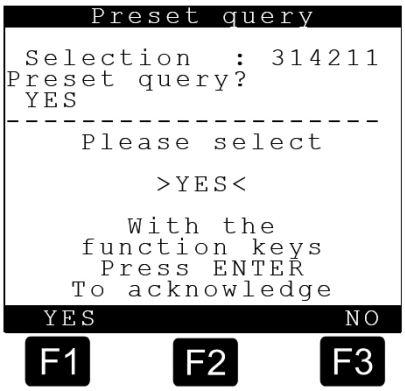
Press **<1>** to select the volume preset.

9.7.1.4.2.1. Sub-menu for volume preset - 31421

Explanation of the submenus

1 Preset Query
2 Preset Type
3 Auto-Adjust

9.7.1.4.2.1.1. Preset Query – 314211

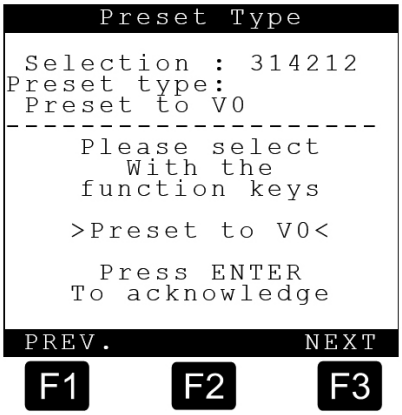


Possible settings:
YES / NO.

▶ If set to **<YES>** (factory setting), the preset volume is queried before the start of each delivery. The standard preset for the respective compartment (parameter 313xx52) is pre-entered in the input mask. If an interrupted delivery is resumed, there is an additional query as to whether the delivery should continue with the previously entered preset amount or whether a new (additional) preset amount is to be entered. The delivery stops upon reaching the preset amount. If the delivery is continued after that, then a new (additional) preset amount is queried.

▶ If set to **<NO>**, the volume preset will not be queried at the start of the delivery.

9.7.1.4.2.1.2. Preset Type – 314212

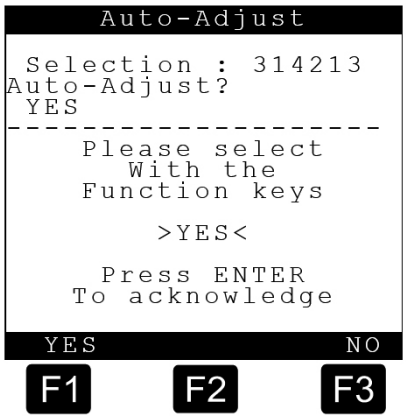


☞ Possible settings:
"Preset to V0" / **"Preset to VT"**

▶ In the case of **'Preset to V0'** (factory setting), the volume is preset to the compensated volume (V0).

▶ In the case of **'Preset to VT'**, the volume is preset to the uncompensated volume (VT).

9.7.1.4.2.1.3. Preset Type – 314213

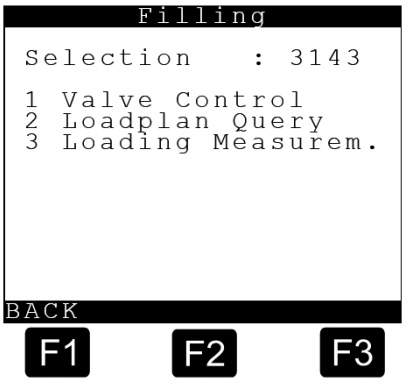


☞ Possible settings:
YES / NO.

▶ If set to **<YES>** (factory setting), an automatic adjustment of the correction value (parameter 313xx51) for the volume presetting takes place after each delivery. This correction value is necessary because, after the command is given to close the valves, a certain amount of time passes before the flow is actually stopped. This after run quantity can be entered in the correction value, so that the specified preset amount is achieved with significantly greater precision.

▶ If set to **<NO>**, no automatic adjustment of the correction value takes place.

9.7.1.4.3. Filling – 3143

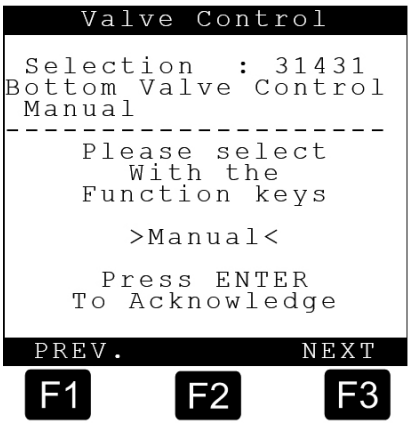


Explanation of the submenus

1 Valve Control
2 Loadplan Query
3 Loading Measurement

9.7.1.4.3.1. Valve Control – 31431

Possible settings:
"automatic" / "manual"
This parameter is effective only if the MultiLevel is operated without NOMIX, i.e. the MultiLevel is equipped with its own I/O interface and controls the foot and line valves itself.



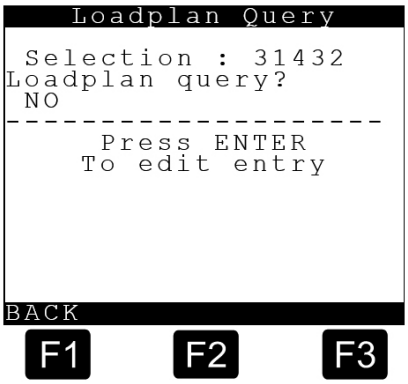
▶ If set to **<manual>** (factory setting), the foot valves remain closed when switching to loading mode (exception: compartment monitoring). To start loading in this case, the individual foot valves must be opened manually by entering the compartment number.

▶ If set to **<automatic>**, the foot valves are opened automatically when switching to loading mode. A loading operation can be stopped (foot valve is closed) and restarted (foot valve is opened) by entering the compartment number.

9.7.1.4.3.2. Loadplan Query – 31432

YES / NO, only relevant to operation without NOMIX.

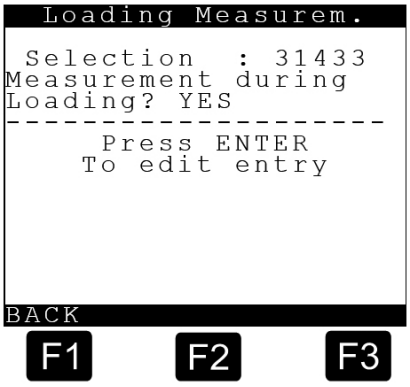
▶ **YES:**
When switching over during filling, the load plan is initially input manually.



9.7.1.4.3.3. Loading Measurement – 31433

YES / NO

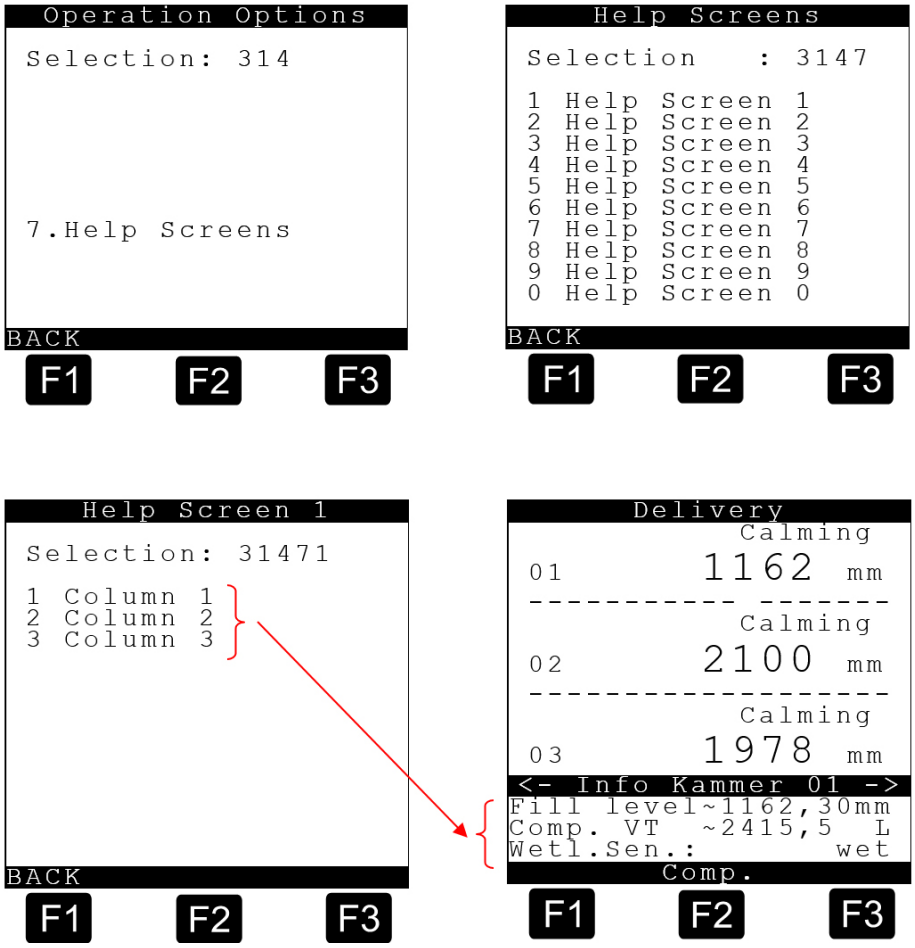
▶ Measurement of volume loaded incl. TK (if configured for product) and print-out of receipt at end of loading.



9.7.1.4.4. Help Screens – 3147

The information which is to be displayed in the ‘Compartment info’ in the lower third of the display during the delivery is set here in accordance with the numeric key shown below.

The help display settings are accessed with **<7>**. Three details can be shown on each display page. (Lines 1 to 3).



Details for 8 of a maximum 10 possible display pages are defined below. These have proven themselves in practice and should therefore not be changed. (Factory setting)

Param.	Factory Setting	Meaning
3.1.4.7.1.1	11	Page 1 / line 1: Fill height in mm
3.1.4.7.1.2	37	Page 1 / line 2: Compartment VT (volume in litres)
3.1.4.7.1.3	38	Page 1 / line 3: Wet leg sensor status
3.1.4.7.2.1	1	Page 2 / line 1: Current roll in °
3.1.4.7.2.2	2	Page 2 / line 2: Min. permissible roll in °
3.1.4.7.2.3	3	Page 2 / line 3: Max. permissible roll in °
3.1.4.7.3.1	6	Page 3 / line 1: Current pitch in °
3.1.4.7.3.2	7	Page 3 / line 2: Min. permissible pitch in °
3.1.4.7.3.3	8	Page 3 / line 3: Max. permissible pitch in °
3.1.4.7.4.1	16	Page 4 / line 1: Current temperature in °C

Param.	Factory Setting	Meaning
3.1.4.7.4.2	19	Page 4 / line 2: Delivered volume VT in liters
3.1.4.7.4.3	20	Page 4 / line 3: Delivered volume V15 in liters
3.1.4.7.5.1	23	Page 5 / line 1: CTL
3.1.4.7.5.2	24	Page 5 / line 2: API table for the product
3.1.4.7.5.3	31	Page 5 / line 3: Product density in kg/m³
3.1.4.7.6.1	28	Page 6 / line 1: Current flow rate in l/min.
3.1.4.7.6.2	29	Page 6 / line 2: Average flow rate in l/min.
3.1.4.7.6.3	30	Page 6 / line 3: Delivered mass in kg
3.1.4.7.7.1	42	Page 7 / line 1: Preset amount in liters (VT or V15)
3.1.4.7.7.2	43	Page 7 / line 2: Remaining volume until preset in liters
3.1.4.7.7.3	44	Page 7 / line 3: Remaining time until preset in min.
3.1.4.7.8.1	46	Page 8 / line 1: Current NOMIX status of the compartment
3.1.4.7.8.2	36	Page 8 / line 2: Product name
3.1.4.7.8.3	38	Page 8 / line 3: Wet leg sensor status

Table showing all available help displays and their numbers:

ID	Description	Example >123456789012345678901<
0	Blank line	
1	Roll (Y)	>Roll -0,71 ° <
2	Min. roll (compartment)	>C.min.roll -3,00 ° <
3	Max. roll (compartment)	>C.max.roll +3,00 ° <
4	Min. roll (total)	>Tl.min.roll -5,00 ° <
5	Max. roll (total)	>Tl.max.roll +5,00 ° <
6	Pitch (X)	>Pitch 2,51 ° <
7	Min. pitch (compartment)	>C.min.pitch -3,00 ° <
8	Max. pitch (compartment)	>C.max.pitch +3,00 ° <
9	Min. pitch (total)	>Tl.min.pitch -5,00 ° <
10	Max. pitch (total)	>Tl.max.pitch +5,00 ° <
11	Fill height [mm]	>Fill height 1234,56 mm<
12	Measured value of level sensor (raw data) [mm]	>Levelsens. 1234,56 mm<
13	Current date + current time	>16.09.2004 10:45:23<
14	Current time	>Time 10:45:23<
15	Current date	>Date 16.09.2004<
16	Current product temperature [° Celsius]	>Curr. temp. +23,4 °C<
17	Current product temperature [°Fahrenheit]	>Curr. temp. +74,1 °F<
18	Current product temperature [° Kelvin]	>Curr. temp. +74,1 °K<
19	Volume VT	>VT 123456,7 l <
20	Volume V15	>V15 123456,7 l <
21	Start time	>Start 10:45:23<
22	Start date	>Start 16.09.2004<
23	Current compensation factor CTL	
24	API table used	
25	Average product temperature [° Celsius]	>Ave. temp. +23,4 °C<
26	Average product temperature [° Fahrenheit]	>Ave. temp. +74,1 °F<

ID	Description	Example >123456789012345678901<
27	Average product temperature [° Kelvin]	>Ave. temp. +74,1 °K<
28	Current flow rate	<Flow rate 1234 l/min<
29	Average flow rate	<Ave. flow 1234 l/min<
30	Mass	>Mass 123456 Kg<
31	Average density	>Density 123,45 <
32*	Compensation YES/NO	
33	Reference temperature [° Celsius]	<comp. temp 15 °C<
34*	Reference temperature [° Fahrenheit]	
35*	Reference temperature [° Kelvin]	
36	Product name	>EL Heating oil <
37	Compartment fill volume VT in liters	>V15 ~12345,7 L <
38	Wet leg sensor status	>Wet leg: dry<
39	Residual volume status	>Residual vol.: added<
40*	Max. Compartment volume (100%) in liters	Kammervol. 12345 l
41*	Fill height (bar chart display in %)	
42	Preset [litres]	>Preset 123456 L<
43	Residual volume until preset [litres]	>Res. vol. 123456 L<
44	Remaining delivery time	>Time left 123 min.<
45	Program version	>Vers. 01.00[01.00]EN<
46	Nomix fault	>xxxxxxxxxxxxxxxxxxxxx<
47	Status of foot valve	>Bottom valve : OPEN<
48	Status of throughput valve	>Line valve : CLOSED<

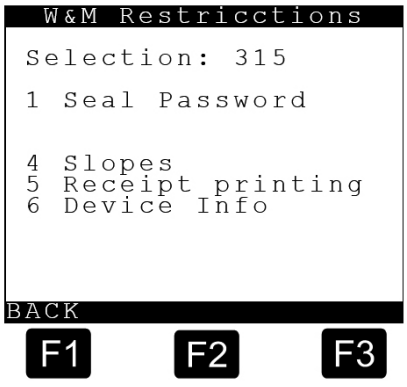
*) = The light-grey fields have not yet been implemented.

9.7.1.5. Calibration Restrictions – 315

Additional calibration-relevant parameters are listed here.

▶ ***3151 – Seal password**
The 8-digit ID (password) for authorization to change the calibration-relevant parameters is set here.

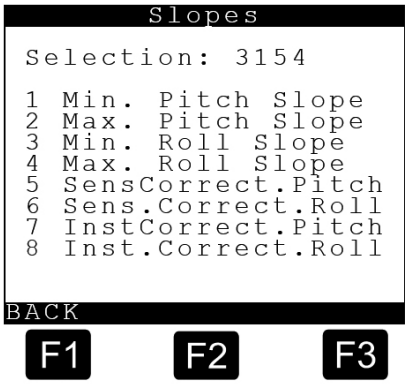
→ This ID is preset in the factory to **'12345678'**.



9.7.1.5.1. Slopes – 3154

Additional calibration-relevant parameters concerning the angle of inclination that are valid for the entire vehicle are listed here.

Please refer to the explanations of these four parameters on page "Calibration restrictions". If exceeded or undershot, an uncalibrated delivery takes place.



▶ ***31541 – Min. Pitch Slope**
The minimum pitch permitted in terms of calibration is set here.

→ This value is preset in the factory to **-5.00°**.

▶ ***31542 - Max. Pitch Slope**
The maximum pitch permitted in terms of calibration is set here.

→ This value is preset in the factory to **+5.00°**.

▶ ***31543 - Min. Roll Slope**
The minimum roll permitted in terms of calibration is set here.

→ This value is preset in the factory to **-5.00°**.

▶ ***31544 - Max. Roll Slope**
The maximum roll permitted in terms of calibration is set here.

→ This value is preset in the factory to **+5.00°**.

The following four parameters describe the inclination sensor. There are two sensor parameters for each direction. The first (= sensor correction value) defines the correction factor required by the sensor itself in order to compensate angular deviations relative to its bearing surface. The second (= installation correction value) defines the correction factor required to compensate the angular deviations of the assembly cross beam on the tank truck. This enables the inclination sensor to be exchanged without having to align the vehicle to 0°.

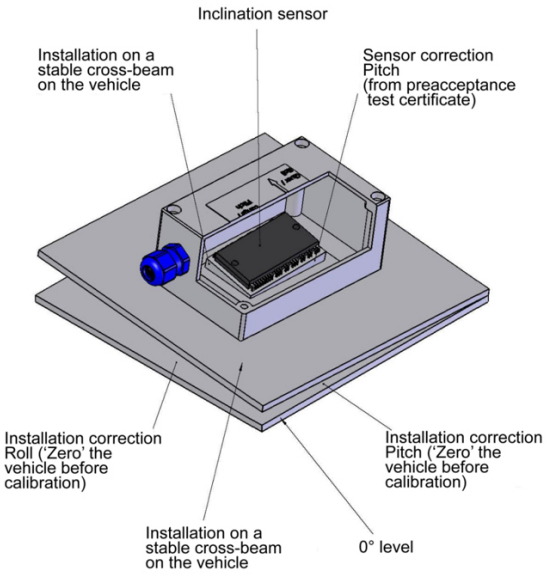


Figure 49: Angle definitions

▶ ***31545 – Sens. Correction Pitch**
Each inclination sensor is pre-checked for accuracy and reproducibility in the works by the Office of Weights and Measures. Since the actual inclination sensor chip in the housing can be never installed exactly in the 0-position, the correction value in the longitudinal direction is recorded and entered on the pre-acceptance test certificate.

→ This value from the pre-acceptance test certificate must be entered here.

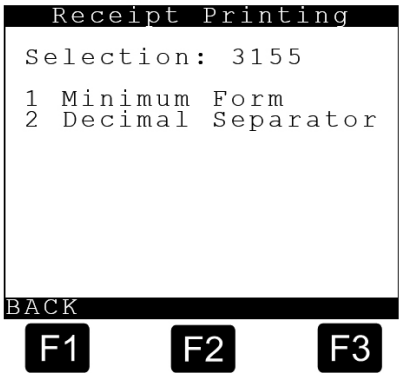
▶ ***31546 – Sens. Correction Roll**
Proceed as for the sensor correction value in the longitudinal direction: See above!

▶ ***31547 – Inst. Correction Pitch**
The semitrailer is placed as accurately as possible in the 0° position in a longitudinal direction prior to the calibration. (The 0° of the tank is described in the tank approval). The inclination sensor, which is firmly connected to the tank, will indicate a somewhat different value. This is the installation error in the longitudinal direction, which must be corrected. The value displayed in the Diagnosis menu must be entered here as a negative installation correction for the pitch.

▶ ***31548 - Inst. Correction Roll**
Proceed as for the installation correction value in the longitudinal direction: See above!

9.7.1.5.2. Printing – 3155

Additional calibration-relevant parameters concerning the receipt printout are listed here:

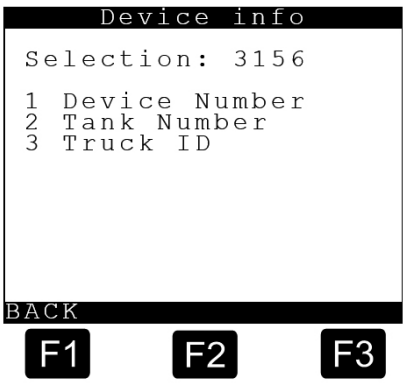


▶ ***31551 – Minimum Form**
Minimum requirement of the weights and measures authority for a printed receipt; list of the minimum required form elements.

▶ ***31552 – Decimal Separator**
Selection of the decimal separator.
Possible values:
→ Comma
→ Point

9.7.1.5.3. Device Info – 3156

Further device-specific settings are made here:



▶ ***31561 - Device number**
Entry, for example, of the serial number of the MultiLevel central unit. This is additionally stored internally, where it cannot be changed, and appears on parameter and seal printouts as ‘Ser. no.’

▶ ***31562 – Tank number**
The measuring tank serial number | can be entered in this field.

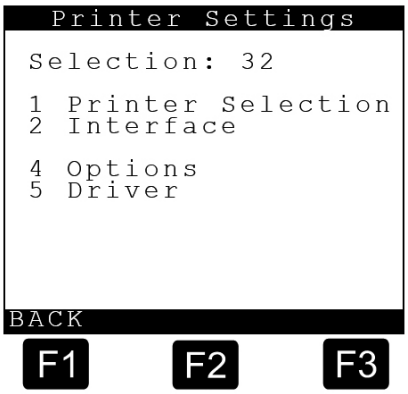
▶ ***31563 - Truck ID**
The registration number of the semitrailer can be entered in this field.

9.7.2. Printer Settings – 32

Printer-specific parameters can be set here:

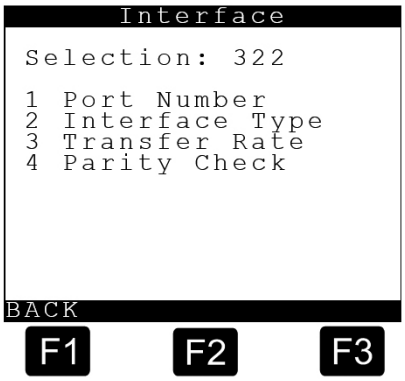
The factory setting should be changed only after consulting F.A. Sening!

- **321 – Printer selection**
  Various printer types can be set here:
- **DR-295**
- **DR-298**
- **DR-220**
- **ESC/P**
- **ESC/P2**
- **ASCII**
- **User defined**
- **No printer**



9.7.2.1. Interface – 322

Interface-specific parameters can be set here:



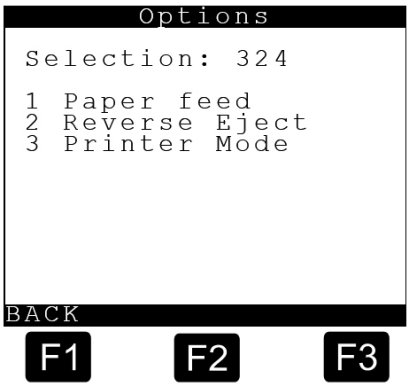
- **3221 – Port Number**
  The interface no. is set here. ‘COM1’ or ‘COM2’ can be selected.
  → The factory setting is ‘COM1’

- **3222 – Interface**
  The type of interface is set here. ‘RS232’ or ‘RS485’ can be selected.
  → The factory setting is ‘RS232’

- **3223 – Transfer Rate**
  The following data rates can be set:
  1200; 2400; 4800; 9600, 19200; 38400; 57600; 115200.
  → The factory setting is ‘9600’.

- **3224 – Parity check**
  The parity check is set here:
  • none
  • odd
  • even
  → The factory setting is ‘even’

9.7.2.2. Options – 324



Further optional parameters can be set here:

▶ **3241 – Paper Feed**
Sets whether the automatic paper feed is to be activated.

▶ Possible settings: **>YES<** or **>NO<**
→ The factory setting is **'YES'**

▶ **3242 – Reverse Eject**
Sets whether or not the paper ejection is to be reversed.

▶ Possible settings: >YES< or >NO<
→ The factory setting is 'NO'

▶ **3243 – Printing Mode**
Whether and how a printer is used by several systems is specified here:

▶ Exclusive access:
The printer is used exclusively by the MultiLevel system.

▶ Shared access:
The printer interfaces of several systems are connected to one common printer. The printer manager (parameter 3124) controls access.

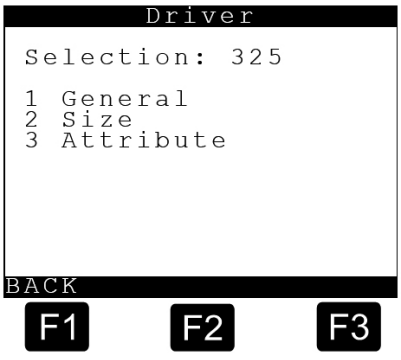
▶ Network:
The printer is connected only to the printer manager (parameter 3124). If other systems want to print, they must send the print data via CAN bus to the printer manager.

→ The factory setting is **'Network**'

▶ **3244 – Page Width**
Maximum page width of the printer; specification of the print area in characters.

→ The factory setting is **'35'**.

9.7.2.3. Driver – 325

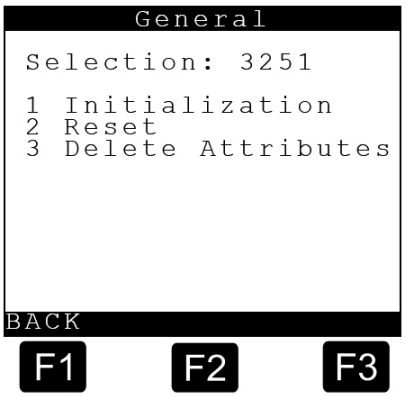


Parameters specific to the printer drivers can be set here:

Changes should be made only after consulting F.A. Sening.

9.7.2.3.1. General – 3251

General parameters specific to the printer drivers can be set here. The control sequences are entered in hexadecimal. Details are to be taken from the manual for the printer employed. The factory setting corresponds to the control sequences for a printer with ESCIP control:



▶ **32511 – Initialization**
Character string for initialization.

▶ **32512 – Reset**
Character string for resetting the printer.
→ Factory setting: 1B40 <ESC> '@'

▶ **32513 – Delete Attributes**
Character string to delete all printer attributes.
→ Factory setting: **1B77001B541B2100**
<ESC> 'w' 0 Double height OFF
ESC 'T' Superscript/subscript OFF
ESC '!' 0 Master select:
10cpi, Proportional print OFF, Condensed OFF,
Bold OFF, Double print OFF, Wide print OFF

9.7.2.3.2. Size – 3252

▶ **32521 – 10 CPI**
Character string for changing to 10 cpi (characters per inch)
→ Factory setting: **1B501B32**
ESC 'P' 10 cpi
ESC '2' 1/6 inch line spacing

▶ **32522 – 12 CPI**
Character string for changing to 12cpi
→ Factory setting: **1B4D1B32**
ESC 'M' 12 cpi
ESC '2' 1/6 inch line spacing

▶ **32523 – 15 CPI**
Character string for changing to 15cpi
→ Factory setting: **1B671B32**
ESC 'g' 15 cpi
ESC '0' 1/8 inch line spacing

▶ **32524 – Double width**
Character string for changing to double character width
→ Factory setting: **1B5701**
ESC 'w' 1 double width ON

▶ **32525 – Double height**
Character string for changing to double character height
→ Factory setting: **1B77011B3336**
ESC 'w' 1 double height ON
ESC '3' 36 54/216 inch line spacing
(54 = 36HEX)

9.7.2.3.3. Attributes – 3253

▶ **32531 – Condensed Font**
Character string for changing to condensed font

→ Factory setting: **1B671B30**
ESC ’g’ 15 cpi
ESC ’0’ 1/8 inch line spacing

▶ **32532 – Bold Font**
Character string for changing to bold font

→ Factory setting: **1B45**
ESC ’E’ Bold font ON

▶ **32533 – Italic Font**
Character string for changing to italics

→ Factory setting: **1B34**
ESC ’D’ Italics ON

▶ **32534 – Underlined Font**
Character string for changing to underscore

→ Factory setting: **1B2D01**
ESC ’-’ 1 Underscore ON

▶ **32535 – Superscript**
Character string for changing to superscript

→ Factory setting: **1B5300**
ESC ’5’ 0 Superscript ON

▶ **32536 – Subscript**
Character string for changing to subscript

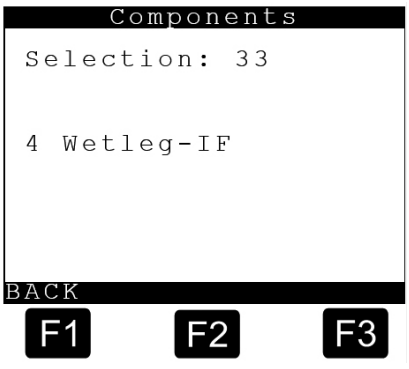
→ Factory setting: **1B5301**
ESC ’5’ 1 Subscript ON

9.7.3. Components – 33

The parameters for the individual hardware components can be set here:

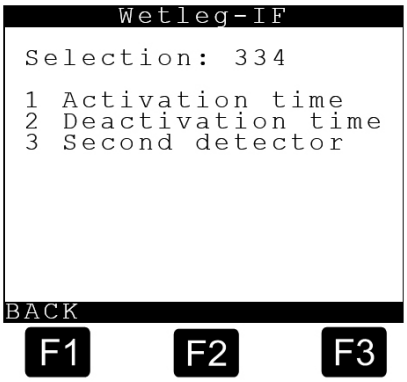
The factory setting should only be changed after consultation with F. A. Sening.

Selection of components



9.7.3.1. Wetleg-IF – 334

The parameters for the wet-leg detector interface can be set here:



▶ ***3341 – Activation time**
Time delay between wet-leg detector report from Empty to Full and the time at which this change is evaluated.
→ The factory setting is '7'
→ value in s

▶ ***3342 – Deactivation time**
Time delay between wet-leg detector report from Full to Empty and the time at which this change is evaluated.
→ The factory setting is '30'
→ value in s

▶ ***3343 - Second detector**
Activation of a second Wetleg detector. This setting is after the reporting of an old parameter set 'No'.
The selection options are:
- 'No'
- 'In pipework'.
→ The factory setting is 'No'

9.7.4. Form Description – 34

The operation of a level sensor system requires a series of forms for different printing tasks. The delivery note in particular is subject to individual user requirements and is therefore flexible in design. The forms can be adjusted and changed here via the menu:

More detailed information on the form description can be found in chapter 10 "Form layout".

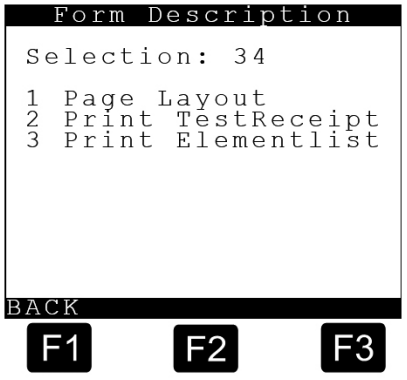
Form description selection menu

▶ **<1>** = new / change page layout

▶ **<2>** = print test receipt

▶ **<3>** = print elements

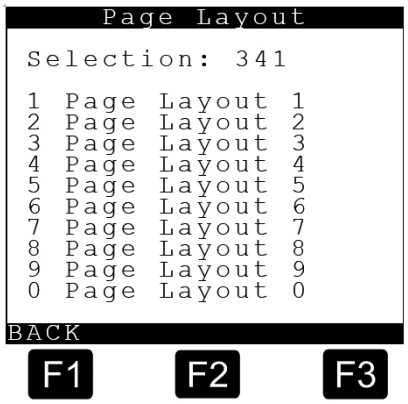
For more detailed information see: Overview of the possible receipt elements: chapter 10.2.1 "Identifier - ID for type of receipt element".



9.7.4.1. Page Layout – 341

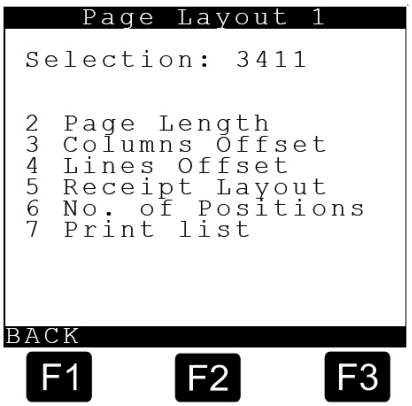
The parameters for the 10 available page layouts are set here:

The parameters for the first layout are described below. They begin with selection no:



- **3411xx**
  These parameters must also be set for further layouts if necessary. It follows that the **second** layout begins with selection no.
- **3412xx**
  etc.

9.7.4.1.1. Page Layout 1 – 3411



- **34112 – Page Length**
  Maximum page length of the layout; specification of the length in lines.
  → The factory setting is '55'.
- **34113 – Columns Offset**
  TShift of the layout in the X-direction
  → The factory setting is ‘0’.
- **34114 – Lines Offset**
  Shift of the layout in the Y-direction
  → The factory setting is ‘0’.
- **34115 – Receipt Layout**
  Opens the editor for editing the page layout.
  For more detailed information see:
  chapter 10.3.1 "Input dialogue".
- **34116 – No. of Positions**
  Number of product or compartment blocks per receipt
  → The factory setting is ‘99’.
- **34117 – Print List**
  Prints the receipt layout (See next page for sample printout).

Receipt Layout (sample printout)

Form layout

```
Form layout
           13.02.2008 13:15:08
  Devic             : MultiLevel
****************************************
* Version           : ?.??[?.??]DE       *
* Seal counter      : 000001             *
* Serial no.        : ????????           *
* Meter name        : - ? -              *
****************************************
* Seal OK!                               *
****************************************
No.    ID     Y-Pos.  X-Pos.  Attr.  Opt.
Format (Deutsch)
Format (English)
========================================
01    0001    0000    0000
Formular Nr.1
Layout No.1
----------------------------------------
02    0050    0000    0000     DW
Beleg-Titel
Receipt Title
----------------------------------------
03    0051    0001    0009      B      K
(Kopie)
(Copy)
----------------------------------------
04    0107    0002    0000      2
 Datum             :    #16#
 Date              :    #16#
----------------------------------------
05    0101    0003    0000      2
 Tanknummer        :  * #16# *
 Tank number       :  * #16# *
----------------------------------------
06    0103    0004    0000      2
 Beleg-Nr.         :  * #16# *
 Receipt Nr.       :  * #16# *
----------------------------------------
07    0004    0005    0000      2
Linie
Linie
----------------------------------------
08    0006    0006    0000      2
Eich-Anmerkung
W&M Remark
```

Receipt elements:

01
:
11

See also ‘Overview of the possible receipt elements’

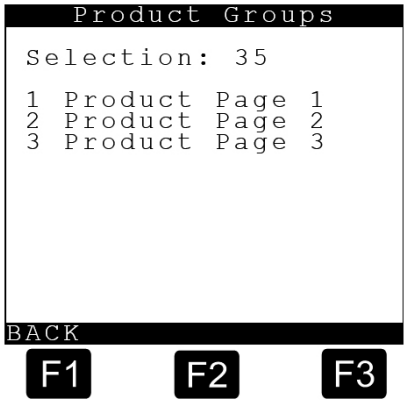
9.7.5. Product Definition – 35

Product-specific parameters can be set here.

→ Density value in kg/m³
→ Float correction value in µm = 1/000mm

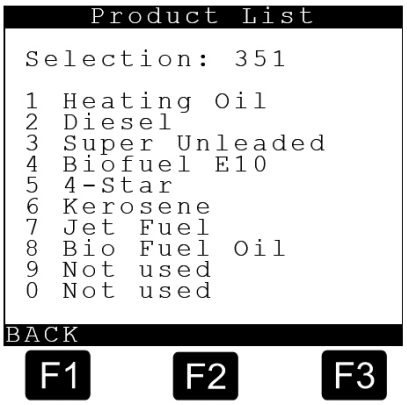
The factory setting should be changed only after consulting F.A. Sening! The same applies to extension by a new product.

Product group selection



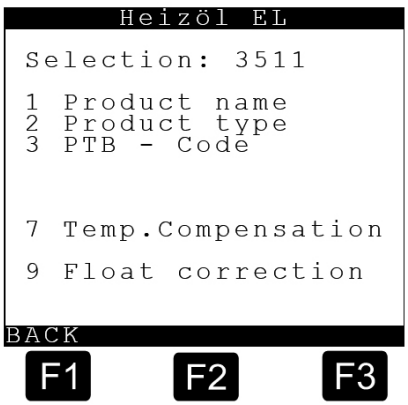
9.7.5.1. Product List (page 1) – 351

Entry of the products: see the following pages for details



9.7.5.1.1. Product Specification – 3511

Select the desired product specification with **<1> ... <9>**.



9.7.5.1.2. Product Names – 35111

☞ Enter the product name with **<1>** and the abbreviation with **<2>**.

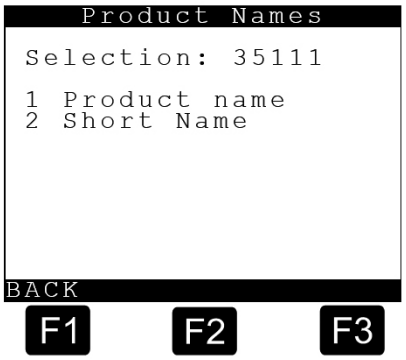


Table of all used abbreviations:

No.	Name	Abbr.	PTB code	Comp.	Density [kg/m³]	Float corr. (µm)	Factor 1	Factor 2	Factor 3	Min. Temp.	Max. Temp.
11	Heating oil EL	HEL	1	LIN	835	770	0.84E-3	0.0	0.0	-20	+50
12	Diesel	DK	2	LIN	833	780	0.84E-3	0.0	0.0	-20	+50
13	Super unleaded	SU5	3	LIN	743	1750	1.27E-3	0.0	0.0	-20	+50
14	Bio-fuel E10	SU10	5	LIN	743	1750	1.27E-3	0.0	0.0	-20	+50
15	Super-Plus (98)	SUP	6	LIN	753	1600	1.27E-3	0.0	0.0	-20	+50
16	Petroleum	PET	7	54B	807	1000	0.0	0.0	0.0	0	0
17	Jet Fuel	JET	8	54B	801	1050	0.0	0.0	0.0	0	0
18	Bio-Diesel (RME)	RME	9	LIN	882	550	0.84E-3	0.0	0.0	-20	+50
30	Water	H2O	2	---	1000	0	0.0	0.0	0.0	0	0

9.7.5.1.3. Product 1 – 3511

- ***35111 – Product name** Heating oil EL
- ***35112 – Product type** Liquid product
- ***35113 – PTB code** 1
- ***351171 – Compensation** YES
- ***351172 – Comp. temperature** 15
- ***351173 – API table** 54B
- ***351174 – Average density** 835,0
- ***351175 – Factor 1** 0,84E-3
- ***351176 – Factor 2** 0,0
- ***351177 – Factor 3** 0,0
- ***351178 – Min. temp.** -20
- ***351179 – Max. temp.** +50
- ***35119 – Float correction** 770

9.7.5.1.4. Product 2 – 3512

***35121 – Product name**	Diesel
***35122 – Product type**	Liquid product
***35123 – PTB code**	2
***351271 – Compensation**	YES
***351272 – Comp. temperature**	15
***351273 – API table**	54B
***351274 – Average density**	833,0
***351275 – Factor 1**	0,84E-3
***351276 – Factor 2**	0,0
***351177 – Factor 3**	0,0
***351178 – Min. temp.**	-20
***351179 – Max. temp.**	+50
***35129 – Float correction**	780

9.7.5.1.5. Product 3 – 3513

***35131 – Product name**	Super Unleaded
***35132 – Product type**	Liquid product
***35133 – PTB code**	3
***351371 – Compensation**	YES
***351372 – Comp. temperature**	15
***351373 – API table**	54B
***351374 – Average density**	743,0
***351175 – Factor 1**	1,27E-3
***351176 – Factor 2**	0,0
***351177 – Factor 3**	0,0
***351178 – Min. temp.**	-20
***351179 – Max. temp.**	+50
***35139 – Float correction**	1750

9.7.5.1.6. Product 4 – 3514

***35141 – Product name**	Bio fuel E10
***35142 – Product type**	Liquid product
***35143 – PTB code**	5
***351471 – Compensation**	YES
***351472 – Comp. temperature**	15
***351473 – API table**	LIN

- ***351474 – Average density** 743,0
- ***351175 – Factor 1** 1,27E-3
- ***351176 – Factor 2** 0,0
- ***351177 – Factor 3** 0,0
- ***351178 – Min. temp.** -20
- ***351179 – Max. temp.** +50
- ***35149 – Float correction** 1750

9.7.5.1.7. Product 6 – 3515

- ***35161 – Product name** 4-Star (Premium)
- ***35162 – Product type** Liquid product
- ***35163 – PTB code** 6
- ***351671 – Compensation** YES
- ***351672 – Comp. temperature** 15
- ***351673 – API table** 54B
- ***351674 – Average density** 753,0
- ***351175 – Factor 1** 1,27E-3
- ***351176 – Factor 2** 0,0
- ***351177 – Factor 3** 0,0
- ***351178 – Min. temp.** -20
- ***351179 – Max. temp.** +50
- ***35169 – Float correction** 1600

9.7.5.1.8. Product 7 – 3516

- ***35171 – Product name** Kerosene
- ***35172 – Product type** Liquid product
- ***35173 – PTB code** 7
- ***351771 – Compensation** YES
- ***351772 – Comp. temperature** 15
- ***351773 – API table** 54B
- ***351774 – Average density** 807,0
- ***351175 – Factor 1** 1,27E-3
- ***351176 – Factor 2** 0,0
- ***351177 – Factor 3** 0,0
- ***351178 – Min. temp.** 0
- ***351179 – Max. temp.** 0
- ***35179 – Float correction** 1000

9.7.5.1.9. Product 8 – 3517

- ***35181 – Product name** Jet Fuel
- ***35182 – Product type** Liquid product
- ***35183 – PTB code** 8
- ***351871 – Compensation** YES
- ***351872 – Comp. temperature** 15
- ***351873 – API table** 54B
- ***351874 – Average density** 801,0
- ***351175 – Factor 1** 0,0
- ***351176 – Factor 2** 0,0
- ***351177 – Factor 3** 0,0
- ***351178 – Min. temp.** 0
- ***351179 – Max. temp.** 0
- ***35189 – Float correction** 1050

9.7.5.1.10. Product 9 – 3518

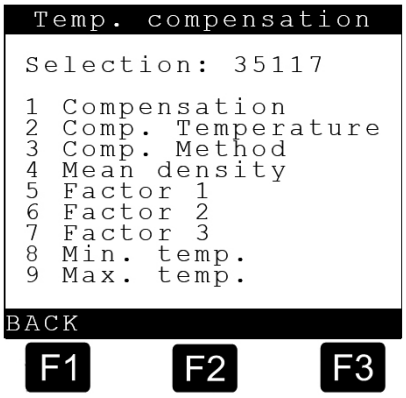
- ***35191 – Product name** Bio Diesel fuel
- ***35192 – Product type** Liquid product
- ***35193 – PTB code** 9
- ***351971 – Compensation** YES
- ***351972 – Comp. temperature** 15
- ***351973 – API table** 54B
- ***351974 – Average density** 882,0
- ***351175 – Factor 1** 0,84E-3
- ***351176 – Factor 2** 0,0
- ***351177 – Factor 3** 0,0
- ***351178 – Min. temp.** -20
- ***351179 – Max. temp.** +50
- ***35199 – Float correction** 550

9.7.5.1.11. Product 10 – 3530

- ***35301 – Product name** Water
- ***35302 – Product type** Liquid product
- ***35303 – PTB code** 2
- ***353071 – Compensation** NO
- ***353072 – Comp. temperature** 15
- ***353073 – API table** - - -

▶	***353074 – Average density**	1000,0
▶	***351175 – Factor 1**	0,0
▶	***351176 – Factor 2**	0,0
▶	***351177 – Factor 3**	0,0
▶	***351178 – Min. temp.**	0
▶	***351179 – Max. temp.**	0
▶	***35309 – Float correction**	0

9.7.5.1.12. Temp. Compensation – 35117



☞ Select the Temp. Compensation menu with **<7>**. Specific temperature compensation values can be entered and defined here. Also see "Table of all used abbreviations"**.**

☞ With **<5>** Factor 1:
Linear interpolation (LIN):

$V_0 = V_T \times (1 - k_{0E} \times \Delta T)$

- Factor 1 (k_{0E}) defined by the PTB for various products.
- No distinction between summer and winter.
- Factors and temperature range can be adjusted in Setup (W&M protected).

☞ With **<5>** - **<7>** Factor 1-3:
Polynomial level 3 (POL):

$V_0 = V_T \times \{1 + [(A_1 \times \Delta T) + (A_2 \times \Delta T^2) + (A_3 \times \Delta T^3)]\}$

- Factor 1-3 ($A_1 – A_3$) defined for various products by the PTB.
- No distinction between summer and winter.
- Factors and temperature range can be adjusted in Setup (W&M protected).

☞ With **<8>** as the min. product temperature for LIN & POL.

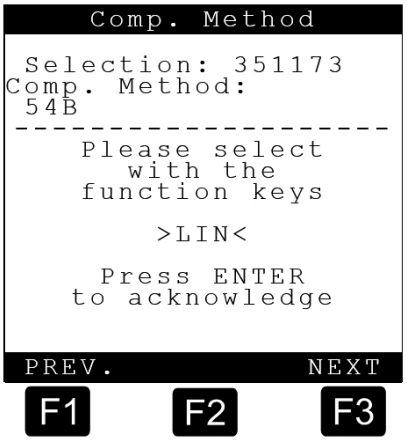
☞ With **<9>** as the max. product temperature for LIN & POL.

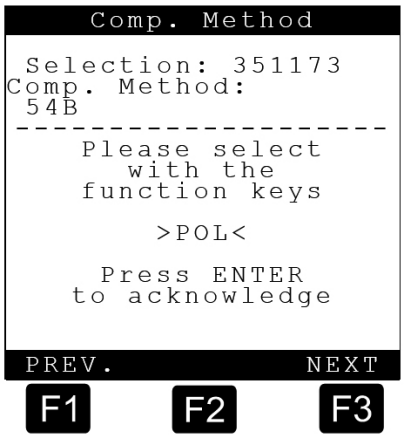
9.7.5.1.13. Compensation method – 35xx73

Select with parameter 35xx73.

• Possible selections:
– --- no temperature compensation
– 54A temperature compensation according to API table 54A
– 54B temperature compensation according to API table 54B
– 54D temperature compensation according to API table 54D
– 54X temperature compensation according to API table 54X
– 6A temperature compensation according to API table 6A
– 6B temperature compensation according to API table 6B
– LIN temperature compensation with linear approximation (method ‘1’)
– POL temperature compensation with 3rd-degree polynomial (method ‘2’)

Compare also "Table of all used abbreviations".



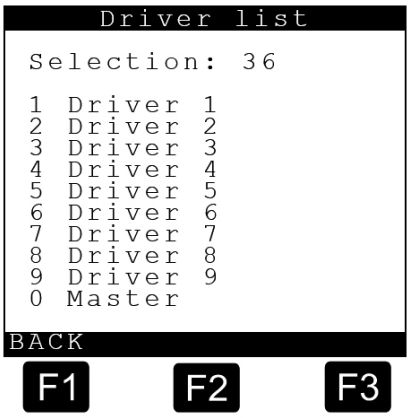


9.7.6. Driver List – 36

Driver-specific parameters can be set here.

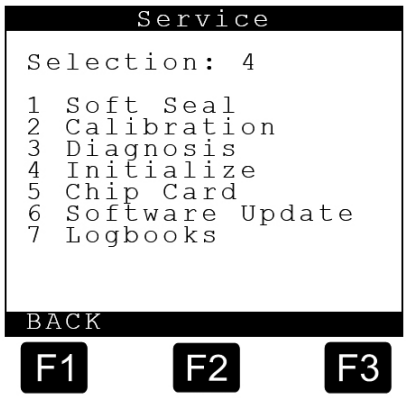
This is shown as an example for one driver. Up to 9 driver-specific parameters can be entered.

- **3611 – Driver number**
  A number between >0 and 99999999< can be entered as the driver number.
- **3612 – Driver name**
  The name of the driver can be entered with the numeric and alphabetic keys.
- **3613 – Master key**
  A number between >0 and 99999999< can be entered as the master key.



9.8. Service – 4

Service main menu screen



The Service submenu is accessed from the main menu by pressing **<4>**.

It is then possible to branch off from the **'Service'** submenu to further submenus.

Explanation of the submenus
1 Soft Seal:
2 Calibration:
3 Diagnosis:
4 Initialize:
5 Chip Card:
6 Software Update:
7 Logbooks

9.8.1. Soft Seal – 41

The Seal submenu is accessed from the Service menu by pressing <1>.

Seal screen

▶ **411 – Display seal**
The seal status is displayed if <1> is now pressed, e.g.:

Seal status screen

▶ Using the arrow keys ← and → it is then possible to scroll to other detail displays, where, for example, the serial numbers of the different sensors etc. are displayed.

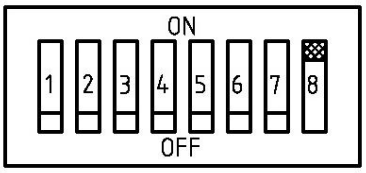
▶ The display is exited with the **<Stop>** key.

Following calibration and sealing of the vehicle, the seal certificate can be printed at this point.

▶ **412 – Print seal**
The seal is printed by pressing **<2>**.

Break seal screen

▶ **413 – Break seal**
In order to make changes to calibration-relevant parameters, the seal must be broken. If you activate the '**Break seal**' parameter in the Seal menu, you will be requested to place the seal switch in the MultiLevel central unit, which is also the setup switch **(main unit DIP 8)**, in the **'ON'** position.

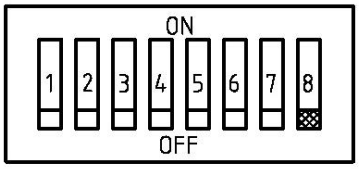


▶ After switching the seal switch to **'ON'**, confirm this by pressing **<F1> = OK.**

The seal is now broken and you can also change calibration-relevant parameters after entering the various IDs.

Set seal screen

▶ **414 – Set seal**
The seal must be set again once all necessary parameters have been changed. You will be requested to return the seal switch in the MultiLevel central unit to the **'OFF'** position.



▶ Alternatively, the seal switch can also be switched to OFF, before the menu is called up. After that, menu **'414 Set seal'** must be called up.

☞ After placing the seal switch in the **'OFF'** position, confirm this with **<F1> = OK.**

☞ Press **<4>** for seal setting again and follow the instructions on the display.

☺ After entering the various IDs, the adjacent display appears:

☞ After pressing **<F1> = OK**, the following display appears:

☞ You now have the possibility

▶ **e.g. to enter your name or the name of the company** with the numeric keys. A maximum of 8 letters / numbers are possible. An **'A'**, for example, is entered by pressing the numeric key **'1'** twice, an **'F'** by pressing the numeric key **'2'** four times.

▶ Switching between upper and lower case letters is accomplished with the **<F2> key**.

▶ Press the **<F3>** key = → to go to the **next** character,

▶ or the **<F1>** key = ← to go back to the previous letter.

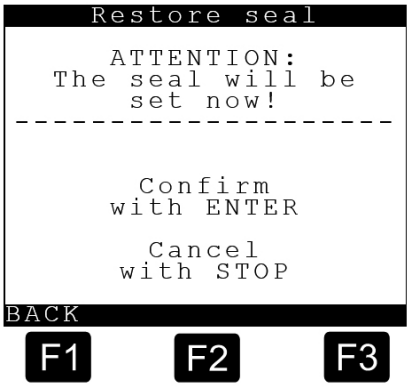
☞ This display is exited with the **<ENTER>** key and **'Renew seal'** appears, as shown on the next page.

Set seal screen

☞ The seal is set by pressing the **<ENTER>** key.

☞ Confirm the subsequent display with **<F1> = OK**.

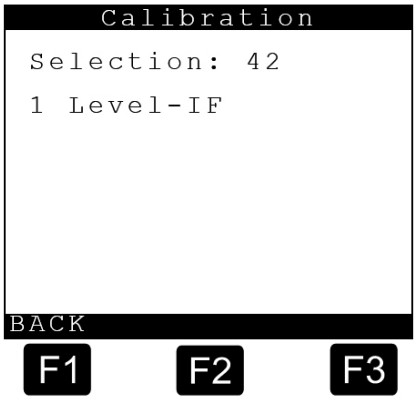
☞ The operation can be aborted by pressing the **<Stop>** key.



9.8.2. Calibration – 42

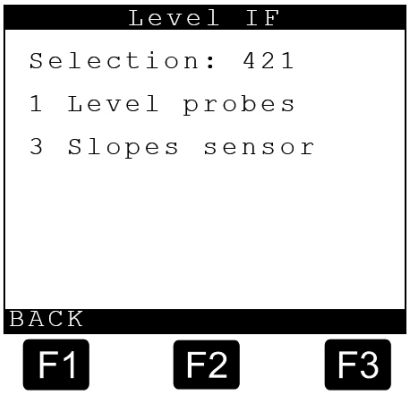
The Calibration submenu is accessed from the main menu by pressing <2>.

☞ The Calibration submenu **'Level sensor IF'** is accessed by pressing **<1>**. (Calibration functions currently exist only for the level sensor interface)



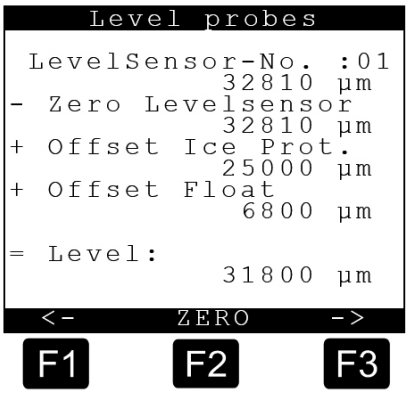
9.8.2.1. Level Sensor IF – 421

Level Sensor IF Screen:



Explanation of the submenus
1 Level probes:
3 Slopes sensor:

9.8.2.1.1. Level sensor calibration screen



The offset values for the level sensor are displayed here. These values must be entered into the system first, before the calibration is started.

▶ **4211 – Level probes**

Entry of compartment-specific parameters for each compartment:

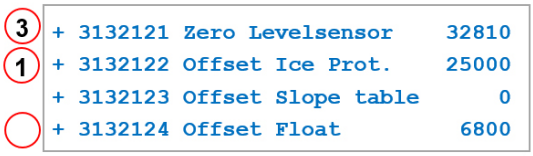
▶ 1. Entry of ice protection offset: always 25 mm
-> ice protection offset = ice protection height

▶ 2. Entry of float offset from the pre-acceptance test certificate
-> float offset = depth of immersion of float

▶ 3. Entry of level sensor zero point. Enter the raw value for the level sensor from the Diagnosis menu or enter it automatically with the aid of the <F2> key = 'zeroing' function.

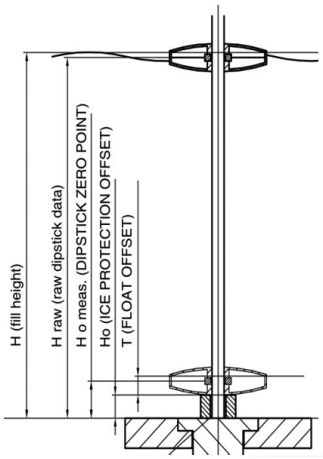
▶ 4. Float MAX: Fill height, up to which the compartment is to be filled at the start of the calibration. (Determine by measurement or by trial and error when loading!).

▶ Keys <F1> = ← and F3> = → are used to change to the other compartments.



▶ The adjacent diagram shows how the height parameters are structured in the system. The 'zeroing' of the level sensor means that the measured height value is entered automatically into the system as the 'Level sensor zero point', i.e. H_{0meas}. The fill height is then calculated using the following equation:

$$H = H_{roh} - H_{0mess} + H_o + T$$



In the case of service, the level sensor can be exchanged without having to perform calibration trials once again.

ATTENTION:
The **'zeroing'** function may be only executed if the compartment is empty and the float is resting on the ice protection!!

9.8.2.1.2. Inclination sensor calibration screen

The sensor correction values and the installation correction values for the inclination sensor are displayed here. These values must also be entered into the system before calibrating.

▶ **4213 – Slope sensors**
In order to simplify the entry of the installation correction values for roll and pitch, 'Inst. K-value', these can be entered automatically using the **<F2>** key, provided that the vehicle is aligned to 0°. Otherwise the values from the Diagnosis menu described below would have to be read, noted and entered into the parameter lists individually.

Entry of vehicle-specific parameters once for each vehicle:

▶ 1. Ensure that the vehicle is aligned to 0°.

▶ 2. Enter the sensor corrections from the pre-acceptance test certificate

▶ 3. Enter the installation corrections on the vehicle. Read the value from the Diagnosis menu and enter it such that both inclinations indicate 0°, or enter it automatically with the aid of 'zeroing' function:

```
+ 31545 Sens.Correct.Pitch    0.30
+ 31546 Sens.Correct.Roll    -0.33
+ 31547 Inst.Correct.Pitch   -0.66
+ 31548 Inst.Correct.Roll     0.37
```

2

First:
Entry of the sensor correction values from the pre-acceptance test certificate. The results are the sensor data.

Afterwards:
'Zeroing' function with the **<F2>** key:

3

```
Slope Sensor

Sensor data:
 Roll slope    +0,66°
 Pitch slope   -0,37°

Inst.K Value:
 Roll slope    -0,66°
 Pitch slope   +0,37°

Result:
 Roll slope    +0,00°
 Pitch slope   -0,00°

ZERO
F1   F2   F3
```

Calculation scheme for both directions in each case:

Raw inclination data
+ Sens.K-Value
= Sensor data
+ Inst.K-Value
= Vehicle pitch

▶ The **<F2>** key = **'zeroing'** causes the Inst. K-values to be entered automatically, so that **0°** appears in both directions as a result.

In the case of service, the inclination sensor can be exchanged without having to perform calibration trials or align the vehicle to 0° again. Only the new sensor correction values need to be entered.

ATTENTION:
The 'zeroing' function may be only executed if the vehicle is aligned to 0° and the Sens. K-values have been entered beforehand.

9.8.3. Diagnostics – 43

All devices connected to the local (internal) CAN bus can be tested in the "Diagnostics Menu". Select the local CAN bus, then the relevant interface for this purpose.

9.8.3.1. Diagnostics, Local CAN bus, Operation (Terminal) 1 – 4311

The software and hardware versions of the operating device (oper.dev.) are displayed in this Diagnostics Menu. It is also possible to run a keyboard test here.

Diagnostics screen for terminal

The respectively pressed button is displayed on the screen. If several operating devices are installed, the

▶ **<F3>** = **NEXT** key is pressed to switch to the next operating device.

▶ To quit this Diagnostics Menu, press the **<Stop>** key.

▶ If an acoustic signal sensor is connected, it can be tested by pressing the **<F2>** key.

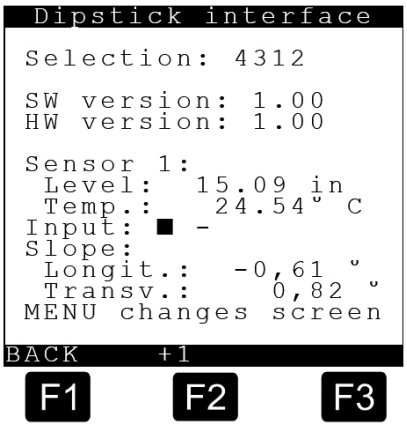
9.8.3.2. Diagnostics, Local CAN bus, Dipstick interface – 4312

The software and hardware versions of the dipstick interface are displayed in this Diagnostics Menu. In addition, all the connected sensors can be tested here.

Diagnostics screen 1 for dipstick interface

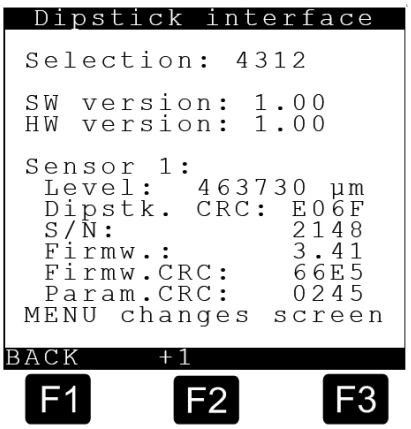
▶ Press the **<F2>** = **+1** key to test the
--> dipstick sensors,
--> temperature sensors and
--> slope sensors
in the other compartments.

▶ Press the **<MENU>** key to display further detailed information about the dipstick sensors.



Diagnostics screen 2 for dipstick interface

▶ Press the **<MENU>** key again to return to '1. Detailed information'.

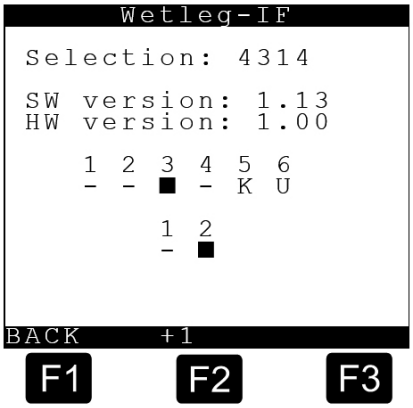


9.8.3.3. Diagnostics, Local CAN bus, Wetleg-IF – 4314

The software and hardware versions of the wet-leg detector interface are displayed in this Diagnostics Menu. Furthermore, the wet-leg detectors and the two intrinsically safe inputs can be tested.

Diagnostics screen 1 for Wetleg-IF

Run the wet-leg detector test on all compartments.



The display for wet-leg detectors for each compartment signifies:

Symbol	Meaning
-	Compartment status = empty
■	Chamber status = Filled, non-empty compartments
K	Short circuit in detector or in the sensor line
U	Interruption (open circuit) in detector or in the sensor line.
The display for both intrinsically safe inputs signifies:	
-	Input open, not active
■	Input closed, active

Table 2: Symbols for the wet-let detectors

Once the Setup is enabled, it is possible to simulate a full chamger for test purposes by disconnecting the plug-in connection of the wet-leg detector!

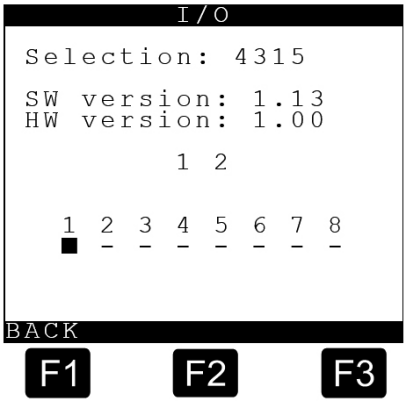
Diagnostics screen for I/O interface

Run the I/O

The display for the I/O interface signifies:

Symbol	Meaning
-	Input open, not active
■	Input closed, active

Table 3: Symbols for the I/O interface



Controlling the foot valves in Diagnostics mode

Previous behavior:
• The foot valves of filled compartments cannot be opened

New behavior:
• With a sealed device, the behavior is as before.
• If the device is not sealed and the DIP switch 8 = ON: Foot valves can always be switched.

9.8.4. Initialization – 44

The factory settings can be restored in this menu in the event of serious errors.

Prior to initialization, always sve the set parameters on a chip card to enable these to be re-loaded at a later date (chapter 9.8.5 "Chip card - 45").

CAUTION:
As a safety precaution, the parameters must always be printed out before every initialization process.

Initialization screen

▶ After selecting the 'Initialization' menu, the various IDs must be entered first.

Then the following screen appears:

▶ Press the <F1> = OK key to restore the factory setting or

▶ press the <F3> = BACK key to terminate the process.

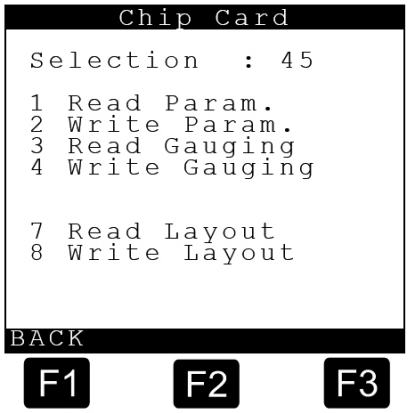
9.8.5. Chip Card – 45

The setup parameters and the gauge tables can be read from or written to the chip card in this menu.

Chip card screen

Explanation of the submenus

1 Read param.
2 Write param.
3 Read gauge tab.
4 Write gauge tab.
5
6
7 Read Layout
8 Write Layout

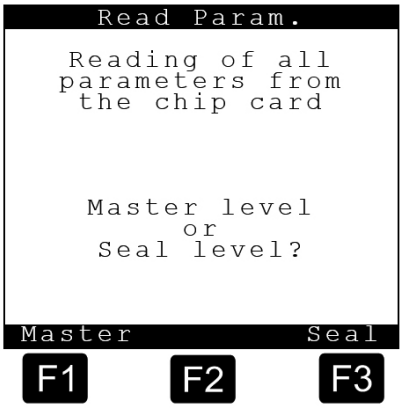


Read parameters screen

▶ **451 – Read param.**
Insert a chip card into the chip card reader.

▶ Press **<F1>** in order to read the parameters at master level, i.e. only parameters without calibration protection. This action can be also carried out when the seal is set.

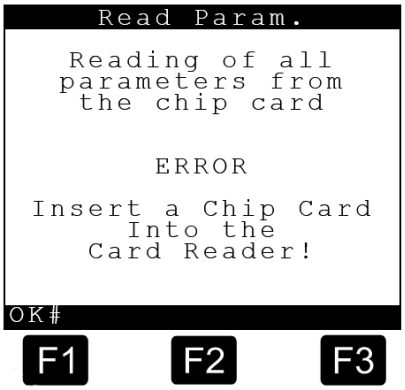
▶ Press **<F3>** to read at seal level (all parameters). This action can only be carried out when the seal is broken. The reading of the parameters takes some time and progress is indicated by a bar chart with a % display.



If all parameters have been successfully read in, a corresponding message appears.

Read parameters screen

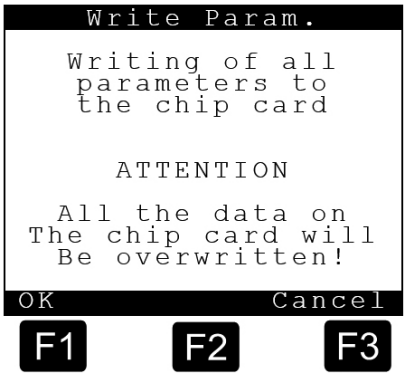
1 An **error message** appears if the chip card is faulty or has been incorrectly inserted into the chip card reader.



Write parameters screen

▶ **452 – Write param.**
Insert a chip card into the chip card reader.

▶ Press **<F1>** in order to write the parameters from the MultiLevel to the chip card. All parameters will be overwritten if the chip card is not empty. The writing of the parameters takes some time and progress is indicated by a bar chart with a % display.



If all parameters have been successfully written, a corresponding message appears.

2 An error message appears if the chip card is faulty or has been incorrectly inserted into the chip card reader (see 451).

▶ **453 – Read Gauging**
The gauge tables created during calibration and stored on the chip card can be read into the MultiLevel's memory here.
The procedure is identical to **'451 – Read param.'**

▶ **454 – Write Gauging**
The gauge tables stored in the MultiLevel are written to the chip card here.
The procedure is identical to **'452 – Write param.'**

▶ **457 – Read Layouts**
The print layouts created previously and stored on the chip card can be read into the MultiLevel's memory here.
The procedure is identical to **'451 - Read param.'**

▶ **458 – Write Layouts**
The print layouts stored in the MultiLevel are written to the chip card here.
The procedure is identical to **'452 – Write param.'**

9.8.6. Software-Update – 46

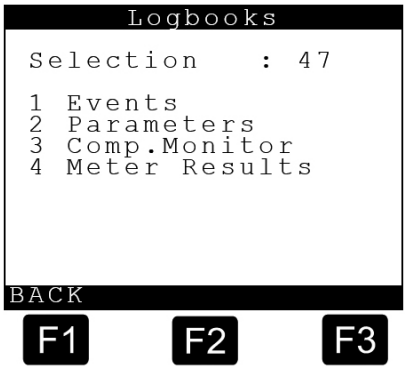
For a detailed description, see chapter chapter 13.5.8 "Operating procedure to update the software."

9.8.7. Logbooks – 47

In the Logbooks menu, all events entered in the logbook can be shown in chronological order on the display.

In order to list them, enter a time range for which the logbook events are to be displayed. These logbook displays are mainly of interest to the service department, since all alarms that refer to possible sources of error or malfunctions are also listed there.

Displaying the logbooks



The Logbooks submenu is accessed from the Service menu by pressing **<7>**.

It is then possible to branch off from the **'Logbooks'** submenu to further submenus.

▶ 1. Events

▶ 2. Parameters

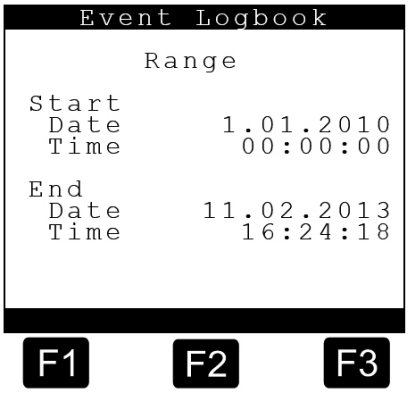
▶ 3. Compartment Monitoring

▶ 4. Measurement

All device activities (especially deliveries) are recorded in the logbook. Trip reports are then derived from this.

The logbook (list of the events) is designed as a ring buffer, in which only a limited number of events can be held. The event data are secured by a checksum for the purposes of data security.

Select range in the event logbook



In order to list them, enter a time range for which the logbook events are to be displayed.
Before entering the time range, the various IDs must be entered.

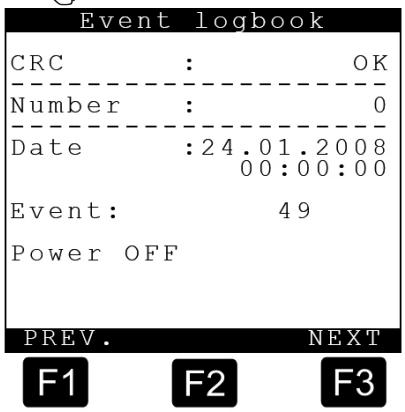
▶ 1. Start Date
Enter the date at the ***flashing cursor*** and confirm with 'Enter'.

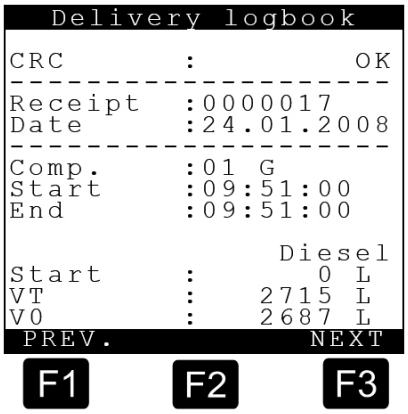
▶ 2. Start time: (same as for the date)

▶ 3. End date: (see above)

▶ 4. End time: (see above)

or abort the entry with **'Stop'** and return to the Logbooks menu.



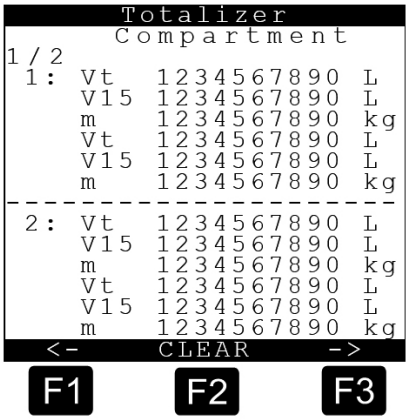


The events from the specified reporting period can be displayed step-by-step using the **<F1>** key = PREVIOUS or the **<F3>** key = NEXT.

9.9. Totalizer – 7

Totalizer screen (page 1)

Totals are displayed by calling up menu **<7>**.



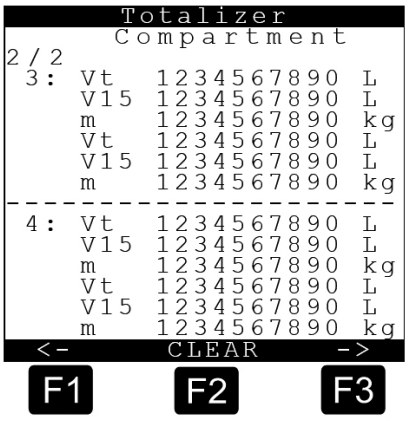
Functions:

- Compartment-related totalizer.
- Resettable daily totalizer (shift totalizer)
- Non resettable overall totalizer
- VT: Non-compensated volume
- V15: Compensated volume
- m: Mass

Totalizer screen (page 2)

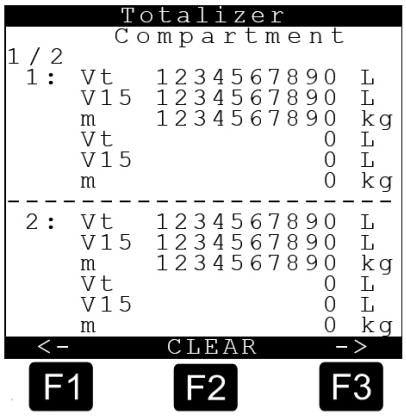
As it may not be possible for all totals to be displayed on one page, switching over to the subsequent pages is via **<F3>**.

It is possible to scroll back to a subsequent page via **<F1>** and scroll forward again via **<F3>**.



Totalizer screen (page 2)

By pressing key **<F2>** all daily totalizers are reset.



10 – Form Layout

10.1. Form Description

See also, menus:
Additional and more detailed information about menu control can be found on the one hand in chapter chapter 9.7.4 "Form decription - 34" and for the user interface in chapter chapter 10.3 "User interface (operation)".

The operation of a level sensor system requires a series of forms for different printing tasks. The delivery note in particular is subject to individual user requirements and is therefore flexible in design.

A form is described by a chain of form elements (receipts). A receipt element consists of the following fields:

Field	Meaning / property	Chap. / page
Identifier	ID for type of receipt element	Chapter 10.2.1 "Identifier - ID for type of receipt element".
Line (Y) Column (X)	Position in the form, specified in lines and columns	Chapter 10.2.2 "Y, X - positions of the receipt elements".
Attributes	Appearance properties, e.g. bold, italics, …	Chapter 10.2.3 "Attribute - appearance properties".
Options	Conditions for use	Chapter 10.2.4 "Options - Conditions for use".
Format	Multi-purpose field, formatting instructions	Chapter 10.2.5 "Format - Multi-purpose field, formatting instructions.

The MultiLevel system has a max. of 10 forms, each with a max. of 30 receipt elements.

Before printing the operator is given the option to select the desired form from the list of defined forms.

10.2. Definition of a receipt (delivery receipt or invoice)

The definition of a delivery receipt gives rise to many different requirements. On the one hand in the case of delivery receipts or invoices that can be freely designed or, on the other, in the case of pre-specified forms where texts and values have to be placed in fixed fields.

Furthermore, it should be possible to vary the printout of the receipts and also the character representation, for example in order to highlight certain texts and, hence, to change the printout in terms of size, width etc.

In addition to predefined text modules, there should also be a possibility to define custom texts.

For the definition of the character layout ***attributes*** are available, with whose assistance the font size and width can be individually adjusted.

In addition, the conditions under which the text is to be printed can be defined. This can be specified via ‘Options - Conditions for use’ when defining the receipt.

The word ‘copy’, for example, should not appear on the original receipt; accordingly, the option ‘C’ is assigned to the text field ‘copy’.

The applications of the various ***attributes*** and ***options*** are described by means of examples in this chapter.

10.2.1. Identifier – ID for type of receipt element

The type of receipt element specifies what is printed. The currently available receipt elements are listed and described in the following tables.

10.2.1.1. General receipt elements

ID	Printed Text	Name	Comments
0		Free, vacant	
1		Form header	This receipt element is present in each form and serves as an 'anchor' for all user-defined elements. This element does not appear on the receipt. The text specified in the 'Format' field serves to identify the form, e.g. in selection lists.
2		Sub-form header	This receipt element is present in each sub-form and serves as an 'anchor' for all user-defined elements. This element does not appear on the receipt.
3	|12345678901234567890123456789012345678901 2| +----------+ |Arbitrary Text |	Character string	Arbitrary text
4	|12345678901234567890123456789012345678901 2| +----------+ |----------|	Line	Single dividing line
5	|12345678901234567890123456789012345678901 2| +----------+ |==========|	Double line	Double dividing line
6	|12345678901234567890123456789012345678901 2| +----------+ | **Data from calibrated system elements** | | **are enclosed by asterisks *** |	Calibration note	Standard text for forms without an appropriate pre-printed form
7	|12345678901234567890123456789012345678901 2| +----------+ | **Seal broken!** | | **No measured values guaranteed!** |	Seal alarm	Standard text in case the seal has been broken
8	|12345678901234567890123456789012345678901 2| +----------+ | **For internal purposes only,** | | **not intended for sale!** |	Transfer note	Standard text for forms in the case of product transfer / self-loading
50		Receipt title	Contains fields 52 - 57
51	|12345678901234567890123456789012345678901 2| +----------+ | Copy |	(Copy)	Appears only on copies
52	|12345678901234567890123456789012345678901 2| +----------+ | **I n v o i c e** |	Invoice	Appears only on invoices
53	|12345678901234567890123456789012345678901 2| +----------+ | **D e l i v e r y n o t e** |	Delivery note	Appears only on delivery notes
54	|12345678901234567890123456789012345678901 2| +----------+ | **E m e r g e n c y r e c e i p t** |	Emergency receipt	Appears only on emergency receipts (e.g. after power failure)
55	|12345678901234567890123456789012345678901 2| +----------+ | **Z e r o r e c e i p t** |	Zero receipt	Appears only on zero receipts
56	|12345678901234567890123456789012345678901 2| +----------+ | K a l i b r i e r b e l e g |	Calibration receipt	Appears only on calibration receipts
57	|12345678901234567890123456789012345678901 2| +----------+ | P r o d u k t - T r a n s f e r |	Product transfer	Appears only on transfer receipts

ID	Printed Text	Name	Comments
58	|12345678901234567890123456789012345678901234567890| +----------+ | S e l b s t b e f ü l l u n g |	Self-loading	Appears only on self-loading receipts
59	|12345678901234567890123456789012345678901234567890| +----------+ | L o a d i n g |	Loading	Appears on receipts only after loading
60	|12345678901234567890123456789012345678901234567890| +----------+ | R o u t e r e p o r t |	Route report	Appears as a heading on a route report
100	|12345678901234567890123456789012345678901234567890| +----------+ |**Device number** : *12345678901234567890*|	Device number	For unambiguous identification, corresponds to parameter 31561
* 101	|12345678901234567890123456789012345678901234567890| +----------+ |**Tank number** : *12345678901234567890*|	Tank number	For unambiguous identification, corresponds to parameter 31562
102	|12345678901234567890123456789012345678901234567890| +----------+ |**Tank truck ID** : *12345678901234567890*|	Tank truck ID	For unambiguous identification, corresponds to parameter 31563
* 103	|12345678901234567890123456789012345678901234567890| +----------+ |**Receipt no.** : *12345678901234567890*|	Receipt no.	A sequential number that is incremented at each printout
104	|12345678901234567890123456789012345678901234567890| +----------+ |**Customer no.** : 12345678901234567890 |	Customer number	The assigned customer number
105	|12345678901234567890123456789012345678901234567890| +----------+ |**Driver no.** : 12345678901234567890 |	Driver number	Driver number from the driver table
106	|12345678901234567890123456789012345678901234567890| +----------+ |**Driver name** : 12345678901234567890 |	Driver name	Driver name from the driver table
107	|12345678901234567890123456789012345678901234567890| +----------+ |Date : 25.10.2007 |	Date	Current date at the time of printing
108	|12345678901234567890123456789012345678901234567890| +----------+ |**Time** : 10:45:32 |	Time	Current time at the time of printing
109	|12345678901234567890123456789012345678901234567890| +----------+ |Version : * 1.23[1.26]DE *|	Version	The software version of the equipment
110	|12345678901234567890123456789012345678901234567890| +----------+ |Ser.No. : * 18AB1234 *|	Serial number	The serial number of the equipment
111	|12345678901234567890123456789012345678901234567890| +----------+ |Seal number : * 25 *|	Seal number	The current seal number at the time of printing
112	|12345678901234567890123456789012345678901234567890| +----------+ |Seal : * OK *| or |Seal : * broken *|	Seal status	The current seal status at the time of printing
113	|12345678901234567890123456789012345678901234567890| +----------+ |31.01.2011 08:00:00 - 04.02.2011 16:00:00 |	Reporting period	The selected period for a report
114	|12345678901234567890123456789012345678901234567890| +----------+ | 01 |	Compartment number	The compartment number, e.g. for report printout

Table 4: Form receipt element types (general)

• Fields with a dark gray background are not yet available in the current version, since the associated functions have not yet been implemented.

10.2.1.2. Compartment or product-related detail blocks

ID	Printed Text	Name	Comments
200	Reference to separate receipt layout (compartment-related)	Compartment sub-layout	Called up for each compartment. Specification of the sub-layout with the attributes
201	|12345678901234567890123456789012345678901234567890123456789012| +----------+ |Compartment : 01 L | |**Start – end time** : 11:28:01 – 11:49:43 | |**Average temp.** : 18.5 °C | |* Diesel *| |**Counter at start** : * 0 liters *| |**Vol. at del. temp.** : * 1234 liters *| |**Vol. at 15°C** : * 1233 liters *|	Compartment block 1	Standard block no. 1 for compartment-related receipts. The layout is not changeable; an appropriate sub-layout is to be created in the case of deviating requirements.
220	Reference to separate report layout	Report sub-layout	Is called up for every delivery. Details of sub-layout given with attributes
221	|12345678901234567890123456789012345678901234567890123456789012| +----------+ |02.05.2011 | | Receipt Time Co Pr Tmp S Vt(L) V0(L) | | 220 14:27:31 01 1 +2 + 3137 3171 | | 221 16:45:17 02 3 +4 + 2578 2631 | | 222 17:21:39 03 2 +2 + 3137 3171 |	Report block 1	Standard block no. 1 for reports. The layout is not changeable; an appropriate sub-layout is to be created in the case of deviating requirements.
250	Reference to separate receipt layout (product-related)	Product sub-layout	Called up for each product, i.e. the data of identical products are summarized. Specification of the sub-layout with the attributes.
251	|12345678901234567890123456789012345678901234567890123456789012| +----------+ |Start – end time : 11:28:01 – 11:49:43 | |Average temp. : 18.5 °C | |* Diesel *| |Counter at start : * 0 liters *| |Vol. at del. temp. : * 1234 liters *| |Vol. at 15°C : * 1233 liters *|	Product block 1	Standard block no. 1 for product-related receipts. The layout is not changeable; an appropriate sub-layout is to be created in the case of deviating requirements.

Table 5: Form receipt element types (compartment-related details)

10.2.1.3. Delivery details

ID	Printed Text	Name	Comments
300	|12345678901234567890123456789012345678901234567890123456789012| +----------+ |**Delivery date** : 25.10.2007 |	Start date	Date at start of delivery
301	|12345678901234567890123456789012345678901234567890123456789012| +----------+ |**Delivery start** : 11:28:01 |	Start time	Start of delivery
302	|12345678901234567890123456789012345678901234567890123456789012| +----------+ |**Delivery end** : 11:49:43 |	End time	End of delivery
303	|12345678901234567890123456789012345678901234567890123456789012| +----------+ |**Start – end time** : 11:28:01 – 11:49:43 |	Start-end time	Start and end of delivery
304	|12345678901234567890123456789012345678901234567890123456789012| +----------+ | Level change during delivery! | | Please check all compartments! | | Compartment 01 : 01234 mm / 01234 mm | | Compartment 02 : 01234 mm / 01234 mm | | Compartment 03 : 01234 mm / 01234 mm | |----------|	Tab. compt. monitor.	Printed only if the compartment monitoring is active and has detected discrepancies

ID	Printed Text	Name	Comments
305	|12345678901234567890123456789012345678901234567890123456789012| +--+ | Compartment monitoring : inactive | or | Compartment monitoring : OK! | or | Compartment monitoring : Check data! |	Compt. monitor. status	Status (result) of the compartment monitoring: Inactive: Compartment monitoring is deactivated via setup. OK: no discrepancies detected. Check data! Discrepancies have been detected.
400	|12345678901234567890123456789012345678901234567890123456789012| +--+ |Compartment (start) : 01 F |	Compartment start	Compartment number and status before start of delivery: F The wet leg sensor is wet, the compartment is considered to be filled E The wet leg sensor is wet, the compartment is empty
401	|12345678901234567890123456789012345678901234567890123456789012| +--+ |Compartment (end) : 01 L |	Compartment end	Compartment number and status after end of delivery: F The wet leg sensor is wet, the compartment is considered to be filled. E The wet leg sensor is wet, the compartment is empty
402	|12345678901234567890123456789012345678901234567890123456789012| +--+ |**Counter at start** : * 0 Liter *|	Counter start	Counter before the delivery
403	|12345678901234567890123456789012345678901234567890123456789012| +--+ |**Start volume** : * 1233 Liter *|	Start volume	Compartment fill volume before start of delivery
404	|12345678901234567890123456789012345678901234567890123456789012| +--+ |**End volume** : * 1233 Liter *|	End volume	Compartment fill volume after end of delivery.
405	|12345678901234567890123456789012345678901234567890123456789012| +--+ |**Start level** : * 1233 mm *|	Start level	Compartment fill level before start of delivery
406	|12345678901234567890123456789012345678901234567890123456789012| +--+ |End level : * 1233 mm *|	End level	Compartment fill level after end of delivery
500*	|12345678901234567890123456789012345678901234567890123456789012| +--+ |* Diesel *|	Product name	The name of the delivered product
501	|12345678901234567890123456789012345678901234567890123456789012| +--+ |**Average density** : * 825 kg/m3 *|	Ave. density	The average density (reference density) of the product
502	|12345678901234567890123456789012345678901234567890123456789012| +--+ |**Average temp.** : * 18.5 °C *|	Ave. temp. in °C	The mean (average) temperature of the delivered volume in °C.
503*	|12345678901234567890123456789012345678901234567890123456789012| +--+ |**Vol. at del. temp.** : * 1234 Liter *|	Vol. del. temp.	The delivered volume at delivery temperature (uncompensated volume, VT)
504*	|12345678901234567890123456789012345678901234567890123456789012| +--+ |**Vol. at 15°C** : * 1233 Liter *|	Volume 15°C	The delivered volume in relation to the reference temperature (compensated volume, V0)
505	|12345678901234567890123456789012345678901234567890123456789012| +--+ |Average throughput : * 1233 L/min *|	Average throughput	Average throughput during delivery
506	|12345678901234567890123456789012345678901234567890123456789012| +--+ | 03 |	Product code	The product code (PTB-Code) for the product delivered
507	|12345678901234567890123456789012345678901234567890123456789012| +--+ | 17 |	Average temp. in °C (abbrev., without unit)	The mean (average) temperature of the quantity delivered in °C
508	|12345678901234567890123456789012345678901234567890123456789012| +--+ | + |	Calibration note	The calibration status of the measurement: a calibrated delivery is shown by a “+“

ID	Printed Text	Name	Comments
509	|12345678901234567890123456789012| +----------+ | 12345678 |	Quantity at delivery temperature (short, without unit)	The quantity delivered at delivery temperature (non-compensated quantity, VT)
510	|12345678901234567890123456789012| +----------+ | 12345678 |	Quantity 15°C (abbrev. without unit)	The delivery quantity related to reference temperature (non-compensated quantity, V0)
600	|12345678901234567890123456789012| +----------+ |Totalizer (Vt) Total Day| | Compartment 1: 42294 38752| | Compartment 2: 59783 47197| | Compartment 3: 32854 31517|	Totalizer block Vt	Current totals for all totalizers for the volume Vt (in liters) at the time of printout
601	|12345678901234567890123456789012| +----------+ |Totalizer (V0) Total Day| | Compartment 1: 42294 38752| | Compartment 2: 59783 47197| | Compartment 3: 32854 31517|	Totalizer block V0	Current totals for all totalizers for the volume V0 (in liters) at the time of printout
602	|12345678901234567890123456789012| +----------+ |Totalizer (Mass) Total Day| | Compartment 1: 42294 38752| | Compartment 2: 59783 47197| | Compartment 3: 32854 31517|	Totalizer block Mass	Current totals for all totalizers for mass (in kg) at the time of printout
700	|12345678901234567890123456789012| +----------+ |Totalizer (Vt) Total Day| | Compartment 1: 42294 38752| | Compartment 2: 59783 47197| | Compartment 3: 32854 31517|	Total block (compartment-related)	Compartment-related total block for route reports: gives the totalized volume Vt (in liters) for each compartment
701	|12345678901234567890123456789012| +----------+ |Totalizer (Vt) Total Day| | Compartment 1: 42294 38752| | Compartment 2: 59783 47197| | Compartment 3: 32854 31517|	Total block (product-related)	Product-related total block for route reports: gives the totalized volume Vt (in liters) for each product delivered.

Table 6: Form receipt element types (delivery details)

• Receipt elements marked with * are calibration-relevant. When saving the layout and before each delivery, a check is performed as to whether the form contains the necessary receipt elements (see ‘Minimum Layout’ parameter).

• Fields with a dark gray background are not yet available in the current version.

10.2.2. Y, X – Positions of the receipt elements

By means of line and column data it can be specified where each receipt element is printed. Here it must be noted that the specified positions for the individual receipt elements relate to the origin of the form (2) or to that of a sub-layout (3). This form origin can in turn be shifted to the sheet position (1).

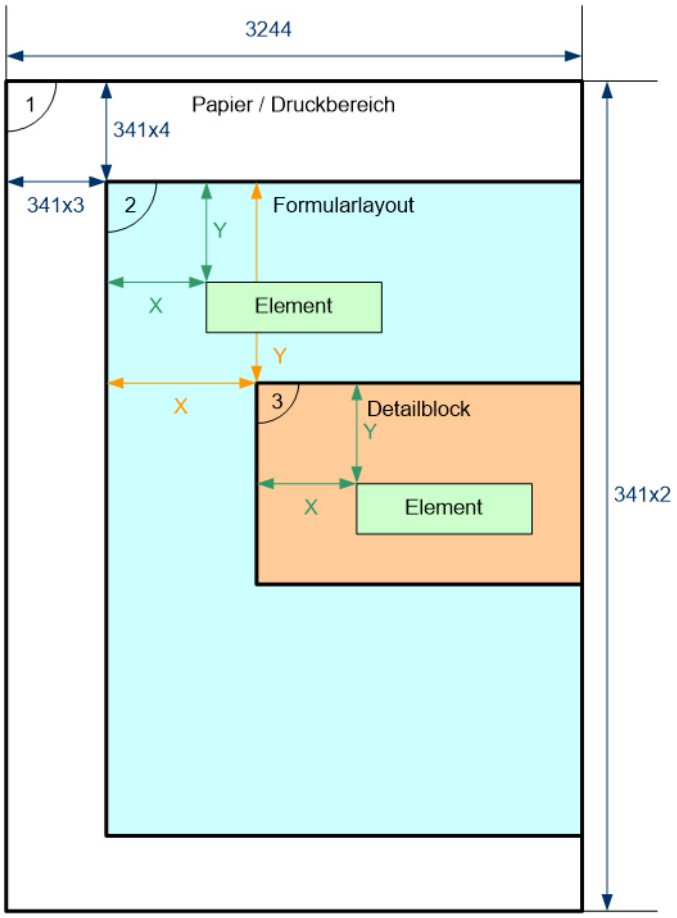


Diagram 50: Form layout (printing position)

- Parameter 3244: page width
- Parameter 341x2: page length
- 341x3: columns before print
- 341x4: lines before print
- X: specified position in the form element
- Y: specified position in the form element

10.2.3. Attribute – Appearance properties

A series of print attributes is available to the user for the individual design of the receipt or the individual receipt elements. The selection of the available print attributes is limited by the options offered by the printer used.

A character string represents the attributes used (max. combination of 3):

Attribute	Explanantion	TM-U220	DR-295 TM-U295	DR-298	DR-570	FX	ASCII
B	Bold	yes	-	yes	yes	yes	-
C	Condensed	-	-	-	yes	yes	-
I	Italic	-	-	(yes)*	yes	yes	-
U	Underlined	yes	yes	yes	yes	yes	-
H	Superscript	-	-	-	yes	yes	-
L	Subscript	-	-	-	yes	yes	-
S	Small	-	-	-	yes	(yes)**	-
R	Red Characters	yes	-	-	-	-	-
D	Double Height	yes	yes	yes	yes	(yes)**	-
W	Double Width	yes	yes	yes	yes	yes	-
1	10 CPI (font size 1)	yes	yes	yes	yes	yes	-
2	12 CPI (font size 2)	yes	yes	yes	yes	yes	-
* Displayed inverted instead of in italics. ** Dependent on the type of printer used.							

Table 7: Print attributes

Example: 'DWU':

- The text is printed with double height,
- double width and
- underlined

10.2.4. Options – Conditions for use

Using one or more option characters, there is an additional possibility to specify when the text is to be printed. The text is printed only if the selected conditions are satisfied after starting the print job.

Here it must be noted that a distinction is made between upper and lower case letters:

• **Upper case letters mean:** Condition ***satisfied***
• **Lower case letters mean:** Condition ***not satisfied***

The following abbreviations are defined:

Letter	Upper case	Lower case
L/D	Delivery note	No delivery note
R/I *	Invoice	No invoice
C	Copy	No copy (redundant)
N/Z *	Zero receipt	No zero receipt
V	Sealed	Not sealed
T *	Product transfer	No product transfer
S *	Self-loading	No self-loading
M	Measured delivery	Unmeasured delivery
C/G	Calibrated	Uncalibrated
B/F	Loading	Delivery
P	Power failure during current delivery	No error due to power failure

** Fields with a dark gray background are not yet available in the planned version.*

Table 8: Print options

Example:
- 'DC' The receipt element with these options is printed only on delivery note copies.
- 'v' A text with this option appears only if the electronic seal has been broken (not sealed).
- 'mD' The receipt element with these options is only printed on delivery notes in the case of an unmeasured delivery.

10.2.5. Format – Multi-purpose field, formatting instructions

10.2.5.1. Placeholder

Placeholders are provided for values that only arise during printing (e.g. time, date, delivered volume). The placeholders are enclosed in hash marks (#) and the number between the hash marks indicates the number of characters that are reserved for formatting:

#16# :
means that a 16-character space is reserved for this value and that the data is inserted right-justified into this area.

#16.2# :
means that a 16-character space is reserved for this value and that the data is inserted right-justified into this area with two decimal places.
Therefore 13 characters are available for the digits before the decimal point: 16 – 2 x decimal places – 1 x decimal point.

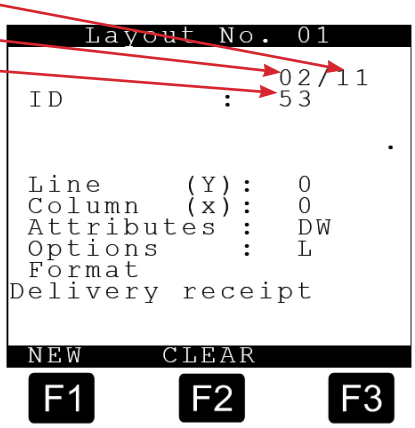
The length of the placeholder always specifies the **minimum** length of the field. If the output should require more characters, the specification is ignored and the current value is inserted right-justified into the reserved area.

10.3. User interface (operation)

10.3.1. Input dialogue

The input dialogue for a form is intended to put the user in a position to sift through the list of receipt elements that describe a form and to change or delete receipt elements or to add new ones.

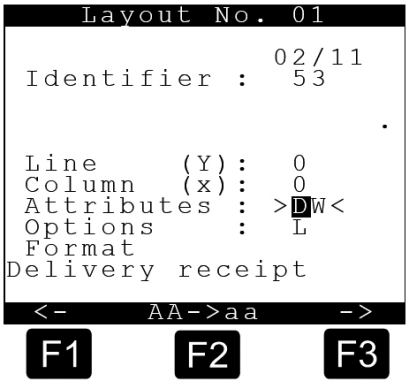
11 – Number of elements in the layout
02 – Current receipt element
53 – Receipt element ID



Key assignment for controlling the list:

F1	Create / insert new receipt element
F2	Delete shown receipt element
↓/→	Show next receipt element
←/↑	Show previous receipt element
Enter	Edit receipt element or step to next receipt element
Stop	Finish form editing; with confirmation

☞ The field to be edited is indicated by angle brackets **>** **<**:



Key assignment for controlling the list:

F1	Moves the cursor to the left
F2	Switches between upper and lower case
F3	Moves the cursor to the right
Menu	**In the 'Format' field:** Change of language in the case of multilingual texts. **All other fields:** Terminate input mode; the changes are saved.
Enter	Save changes, continue with next input field
Stop	Terminate input mode; the changes are *not* saved.

10.3.2. Parameters

The following parameters are relevant for the control of the delivery receipt:

No.	Name	K	Factory setting	Meaning
3.1.5.5	**Receipt printing**			
3.1.5.5.1	Minimum layout	E		Mindestanforderung der PTB an Belege
3.1.5.5.2	Decimal separation	E	Komma	Trennzeichen zwischen Vor- und Nachkommaanteil
3.2	Printer settings.			
3.2.1	Druckerauswahl	M	DR-295	Auswahl des verwendeten Druckers: - DR-295 - DR-298 - DR-220 - ESC/P - ESC/P2 - ASCII - Benutzerdefiniert
3.4.n	**Formular n**			
3.4.n.1	Step size			Reserved for future functions
3.4.n.2	Page length			Number of printable lines per page
3.4.n.3	Columns before print			Number of columns before printout (form X-offset)
3.4.n.4	Lines before print			Number of lines before printout (form Y-offset)
3.4.n.5	Form definition			Definition of the form by means of special editor
3.4.n.6	Number of items	M	99	Number of items per receipt

Table 9: Parameters for the control of the delivery receipt

10.3.1. Changing forms after sealing

After sealing the MultiLevel, the calibration-relevant parts of the form description are secured against manipulation. This means that those form receipt elements that are specified in the minimum requirement (parameter 3.1.5.5.1) are subject to particular monitoring.

Page intentionally left blank.

11 – Info and Error Messages

Fault finding and corrective action must be carried out by a service workshop. The warnings on the housings, and generally EN 60079 and VDE 0165 must be followed. An appropriate measuring instrument must be used. If necessary, this should be Ex-protected (e.g. digital multi-meter from EX-ELEC, type DIGEX-A). Prior to disconnecting or connecting of plug connectors or cables, the electronic system must be switched off.

11.1. Fault Finding

Fault- (Message)	Possible cause	Corrective action
No display - the LEDs for indicating the supply voltage in the main unit and in the interface modules are not lit	• No 24 V supply voltage in the main unit & display and in the interface modules (drawing **51.351673** between terminal 1 & 2). • Power supply unit of the display interface is faulty	• Ensure supply voltage is present, check supply line from the on-board supply system to the main unit & display and to the interface modules. • If only the LED for indicating the supply voltage on the Display Interface CPU board is not lit → exchange the upper part of the main unit & display.
Display: Generic Terminal FMC F.A.SENING DC electronics off F1=Setup Display	• No communication connection between the main unit and the operating unit(s), or the operating unit is faulty. Drawing no. **51.351352**	Check the cabling of the internal CAN bus (green and yellow wire) between the main unit and all interface modules. If the wiring is OK → replace the display interface. If the fault has not been rectified → replace the main unit. When installing the main unit & display, part no. NM2MAINDISP, the complete unit must be exchanged.
Display: FAULT No connection to Interface wet leg sensor 1.	The wet leg sensor interface receives no supply voltage, or there is no communication connection between the main unit and the wet leg sensor interface, or the wet leg sensor interface is faulty. Drawing no. **51.351346**	Check the cabling of the supply voltage (white and brown wire) and of the internal CAN bus (green and yellow wire) between the main unit and all interface modules. If the wiring is OK → replace the wet leg sensor interface.
Display: FAULT No connection to level sensor interface 1.	The level sensor interface receives no supply voltage, or there is no communication connection between the main unit and the level sensor interface, or the level sensor interface is faulty. Drawing no. **61.351918**	Check the cabling of the supply voltage (white and brown wire) and of the internal CAN bus (green and yellow wire) between the main unit and all interface modules. If the wiring is OK → replace the level sensor interface.
A wet leg sensor reports "not empty"	Residue in the compartment. Glass prism of the wet leg sensor is heavily soiled. Wet leg sensor is faulty. Connecting line or wet leg sensor interface NM2WET-E is faulty. Drawing no. 51.351346	Empty compartment Unscrew level sensor and clean with a soft, clean and lint-free cloth. Connect the level sensor to the level sensor cable of a compartment where '*empty*' was previously indicated. If the level sensor still shows not empty, the level sensor has to be replaced. If the level sensor was enabled according to the above test, reconnect the level sensor with the associated wire and connect it to a different input terminal in the level sensor interface that had previously reported '*empty*'. If the level sensor now does not show '*empty*', first of all the connection line should be replaced. If the fault is still not rectified, the level sensor interface has to be replaced.

Fault- (Message)	Possible cause	Corrective action
Display in the wet leg sensor test menu "K" or "U"	Short circuit or interruption in the wet leg sensor	Disconnect the wet leg sensor wire in the wet leg sensor interface and disconnect the plug connector to the wet leg sensor. Check the cable with an ohmmeter for short circuit and interruption, replace the cable if necessary.
	Wet leg sensor is faulty	If the wet leg sensor wire is not faulty, check the wet leg sensor with an ohmmeter for short circuit and interruption; replace the wet leg sensor if necessary.
	Wet leg sensor interface faulty	If the wet leg sensor wire and the wet leg sensor are not faulty, a wet leg sensor from another compartment should be connected for testing purposes. If short circuit or interruption continues to be displayed, the wet leg sensor interface has to be replaced.
One or several keys of an operating unit are not working.	The keyboard of the operating unit is faulty	Carry out a keyboard test (see chapter and , parameters 3.1.1.1.12 and 3.1.1.7.6). If keys are still not functioning, the operating unit has to be replaced.
Printer not printing	Printer is not connected correctly	Check the printer and the printer cable according to **DOK-415**, NoMix 2000 installation.
	Printer faulty	If the printer connection (printer cable) does not show a fault, replace the printer.

Table 10: Overview of system error messages

11.2. Messages

11.2.1. Information

No.	Display	Meaning
1002	Unmeas. delivery x! Level not within gauge table!	The fill level of a compartment is outside the gauge table.
1003	Pitch is not within the inclination table!	The pitch is not within the inclination correction table. The measurement will be changed to 'unmeasured' if delivery is restarted.
1004	Roll is not within the inclination table!	The roll is not within the inclination correction table. The measurement will be changed to 'unmeasured' if delivery is restarted.
1005	Unmeasured delivery x! Wet leg sensor error!	The delivery has been changed to 'unmeasured' due to a wet leg sensor error.
1006	Unmeasured delivery x! Gauge table CRC error!	The delivery has been changed to 'unmeasured' due to a checksum error in the specified gauge table.
1007	Unmeasured delivery x! Inclination table CRC error!	The delivery has been changed to 'unmeasured' due to a checksum error in the specified inclination correction table.

No.	Display	Meaning
1008	Unmeasured delivery x! Interface connection error!	The delivery has been changed to ‘unmeasured’ due to an error in communication with one of the interfaces.
1009	Unmeasured delivery x! Hardware defective!	The delivery has been changed to ‘unmeasured’ due to a hardware error (not specified in greater detail) in one of the interfaces.
1010	Pitch not within the calibration limits!	The pitch is not within the calibration limits. The measurement will be changed to ‘uncalibrated’ if delivery is restarted.
1011	Roll not within the calibration limits!	The roll is not within the calibration limits. The measurement will be changed to ‘uncalibrated’ if delivery is restarted.
1012	Uncalibrated delivery x! Pitch not within the compartment limits!	The compartment-dependent angles of inclination are checked when the wet leg sensor runs dry. If the pitch lies outside the permitted range, then the delivery is changed to ‘uncalibrated’.
1013	Uncalibrated delivery x! Roll not within the compartment limits!	The compartment-dependent angles of inclination are checked when the wet leg sensor runs dry. If the roll lies outside the permitted range, then the delivery is changed to ‘uncalibrated’.
1014	Uncalibrated delivery x! Min. delivery quantity not reached!	When receipt printing commences, a check is performed as to whether the minimum delivery quantity specified for the respective compartment was reached. If this is not the case, the delivery is changed to an uncalibrated delivery.
1015	Uncalibrated delivery x! Residue not discharged completely!	The delivery was interrupted during residue removal, with the wet leg sensor still wet. **Result**: The remaining volume has not been added!
1016	Operating mode cannot be quit.	The current operating mode cannot be quit. Possible causes: • Delivery(ies) not yet finished • Hoses not disconnected
1017	Residue discharge x! Observe quantity & inclination!	At the value entered in the ‘Preliminary switch-off’ parameter, the delivery is stopped and the driver is reminded by this message about adherence to the angles of inclination and the residual quantity.

No.	Display	Meaning
1018	Uncalibrated delivery x if inclination is not within the limits!	At the value entered in the ‘Inclination stop’ parameter, the delivery is stopped and the driver is reminded by this message about adherence to the angles of inclination.
1019	Printing currently not possible!	Printing cannot be carried out at the moment. Possible causes: • No print data available • Delivery(ies) not yet finished • Printer being used by another device
1020	Please print!	The user tries to exit loading mode via <STOP> but data are still available for printing.
1021	Deviation from loading x too high!	The difference between the filled and delivered quantity is too high. Monitoring the differences on the basis of compensated volumes is carried out only if: • Measurement is switched on during loading • The max. difference for the compartment is >0 • Temp. compensation for the product is switched on

Table 11: Overview of the messages from the category ‘Information’

11.2.2. Errors

No.	Display	Meaning
4100	Hardware defective: Operating device x	The operating device reports a hardware error that is not specified in greater detail. Any deliveries in progress will be stopped and changed to ‘unmeasured’.
4101	No CAN bus connection to operating device x	There is no communication between the operating device x and the CAN bus. Any deliveries in progress will be stopped and changed to ‘unmeasured’.
4150	Hardware defective: Level sensor interface x	The interface reports a hardware error that is not specified in greater detail. Any deliveries in progress will be stopped and changed to ‘unmeasured’.

No.	Display	Meaning
4151	No CAN bus connection to level sensor no. x	There is no communication between the sensor and the CAN bus. Ongoing delivery is stopped and the measurement is changed to ‘unmeasured’.
4152	Level sensor no. x is short-circuited!	The specified level sensor is short-circuited. Any delivery in progress will be interrupted. If the delivery is resumed, then the measurement is changed to ‘unmeasured’.
4153	Level sensor no. x is disconnected!	The specified level sensor is disconnected. Any delivery in progress will be interrupted. If the delivery is resumed, then the measurement is changed to ‘unmeasured’.
4154	Level sensor no. x - timeout!	The specified level sensor has not transmitted any data for a long time. Any delivery in progress will be interrupted. If the delivery is resumed, then the measurement is changed to ‘unmeasured’.
4155	Level sensor no. x - checksum error!	The data transmitted by the specified level sensor causes a checksum error. Any delivery in progress will be interrupted. If the delivery is resumed, then the measurement is changed to ‘unmeasured’.
4156	Level sensor no. x - incorrect serial number!	The serial number transmitted by the specified level sensor does not correspond to the serial number stored in the parameters. Any delivery in progress will be interrupted. If the delivery is resumed, then the measurement is changed to ‘unmeasured’.
4157	Compartment x level outside the table(s)!	The fill level of the specified compartment is outside at least one table (gauge table and/or inclination correction table). Any delivery in progress will be interrupted. If the delivery is resumed, then the measurement is changed to ‘unmeasured’.

No.	Display	Meaning
4158	Level sensor no. x - general problem with the sensor	The level sensor circuitry reports a general sensor problem.
4159	Level sensor no. x - RAM error!	The level sensor circuitry reports an error in the internal RAM memory.
4160	Level sensor no. x - parameter checksum error!	The level sensor circuitry reports a checksum error in the internal parameter memory.
4161	Level sensor no. x - invalid float position!	The float is in an invalid position, i.e. no clear measured value can be produced.
4162	Level sensor no. x invalid ref.magnet position!	The reference magnet is in an invalid position, i.e. no clear measured value can be produced.
4163	Level sensor no. x - float installed upside down!	The float has been installed upside down; please observe the assembly instructions!
4164	Level sensor no. x - ref.magnet installed upside down!	The reference magnet has been installed upside down; please observe the assembly instructions!
4165	Level sensor no. x - measuring range exceeded!	The level sensor circuitry reports that the permitted measuring range has been exceeded.
4166	Temp. sensor no. x is short-circuited!	The specified temperature sensor is short-circuited. Any delivery in progress will be interrupted. If the delivery is resumed, then the measurement is changed to ‘unmeasured’.
4167	Temp. sensor no. x is disconnected!	The specified temperature sensor is disconnected. Any delivery in progress will be interrupted. If the delivery is resumed, then the measurement is changed to ‘unmeasured’.
4168	Temp. sensor no. x - timeout!	The specified temperature sensor has not transmitted any data for a long time. Any delivery in progress will be interrupted. If the delivery is resumed, then the measurement is changed to ‘unmeasured’.
4169	Temp. sensor no. x - checksum error!	The data transmitted by the specified temperature sensor causes a checksum error. Any delivery in progress will be interrupted. If the delivery is resumed, then the measurement is changed to ‘unmeasured’.
4170	Temp. sensor no. X outside API table!	The measured data from the specified temperature sensor lie outside the API table configured to the product. Any delivery in progress will be interrupted. If the delivery is resumed, then the measurement is changed to ‘unmeasured’.

No.	Display	Meaning
4171	Inclination sensor is short-circuited!	The inclination sensor is short-circuited. Any delivery in progress will be interrupted. If the delivery is resumed, then the measurement is changed to ‘unmeasured’.
4172	Inclination sensor is disconnected!	The inclination sensor is disconnected. Any delivery in progress will be interrupted. If the delivery is resumed, then the measurement is changed to ‘unmeasured’.
4173	Inclination sensor - timeout	The inclination sensor has not transmitted any data for a long time. Any delivery in progress will be interrupted. If the delivery is resumed, then the measurement is changed to ‘unmeasured’.
4174	Inclination sensor - checksum error	The data transmitted by the inclination sensor causes a checksum error. Any delivery in progress will be interrupted. If the delivery is resumed, then the measurement is changed to ‘unmeasured’.
4250	Hardware defective: Wet leg sensor IF x	The interface reports a hardware error that is not specified in greater detail. Any deliveries in progress will be stopped and changed to ‘unmeasured’.
4251	No connection to Wet leg sensor IF x	There is no communication between the interface and the CAN bus. Ongoing delivery is stopped and the measurement is changed to ‘unmeasured’.
4252	Wet leg sensor no. x is short-circuited!	The specified wet leg sensor is short-circuited. Any delivery in progress will be interrupted. If the delivery is resumed, then the measurement is changed to ‘unmeasured’.
4253	Wet leg sensor no. x is disconnected!	The specified wet leg sensor is disconnected. Any delivery in progress will be interrupted. If the delivery is resumed, then the measurement is changed to ‘unmeasured’.
4254	Wet leg sensor no. x is invalid!	The signal from the specified wet leg sensor is invalid. Any delivery in progress will be interrupted. If the delivery is resumed, then the measurement is changed to ‘unmeasured’.

No.	Display	Meaning
4255	Wet leg sensor no. x should be wet!	The system is in a condition in which the wet leg sensor should be ‘wet’, but it signals ‘dry’, i.e. the foot valve is opened and the level sensor indicates a fill height within the gauge table. Any delivery in progress will be interrupted; resumption will lead to an unmeasured delivery.
4300	Hardware defective: Valve driver IF x	The interface reports a hardware error that is not specified in greater detail. Any deliveries in progress will be stopped and changed to ‘unmeasured’.
4301	No connection to Valve driver IF x	There is no communication between the interface and the CAN bus. Ongoing delivery is stopped and the measurement is changed to ‘unmeasured’.
4600	Gauge table x checksum error!	While reading the gauge table a checksum error is detected.
4601	Inclination table x checksum error!	While reading the inclination table a checksum error is detected.

Table 12: Overview of the messages from the category ‘Errors’

11.2.3. Seal Breakage

No.	Display	Meaning
5002	Seal switch activated!	The electronic seal has been broken because the seal switch (DIP switch no. 8) has been activated.
5003	Parameter checksum incorrect!	The electronic seal has been broken because the parameter check failed on the basis of the checksum.

Table 13: Overview of the messages from the category ‘Seal breakage’

12 – Technical Data

12.1. System Data

Approvals:	Certification: PTB-A4.5 (PBTWMS-4-411-06-12) Examined after OIML R80 -1 Explosion protection: ATEX II 2 G EEx m ia e IIB T4
Measuring range:	40 to 4.000 mm
Measuring accuracy:	± 0,1 mm
Pitch measurement (dip stick):	Up to ±5°: calibrated delivery ±5° to ±8°: measured delivery over ±8°: unmeasured delivery
Communication:	intern: CAN bus and TAG Protocol extern: EMIS Interface (RS232, DOK-411, E7 Protocol)
Measuring medium viscosity range:	≤ 20 mPa●s at 20 °C
Operating temperature:	-20 °C to +60 °C
Power supply:	24 VDC (15-30V) < 30 W
Functional reliability:	The following guidelines are met DIN 26053 Secured measurement of tank vehicles for the delivery of heating oil, diesel fuel and biodiesel to consumers

12.1.1. Main Unit Display / MLMAINDISP2

Power supply:	24V DC nominal voltage (operating range from 10....30V DC) under 30 Watt, from built-in battery of corresponding vehicle, protected against overvoltage (>50V)
CAN bus circuit, external:	U ≤ 24 V / I ≤ 1 A
CAN bus circuit, internal:	U ≤ 24 V / I ≤ 1 A
Printer circuit:	U ≤ 24 V / I ≤ 1 A
EC-Type Examination Certificate Number:	TÜV 03 ATEX 2022

12.1.2. Level Gauge Interface Type LLGIF

Power supply:	24V DC nominal voltage (operating range from 15....30V DC) under 30 Watt, from built-in battery of corresponding vehicle, protected against overvoltage (>50V)
Data circuit:	U ≤ 24 V I ≤ 1 A
Level gauge circuits:	In intrinsically safe level of protection: II 2 G EEx ia IIB with following maximum values: UO = 16,8 V IO = 161 mA PO = 0,68 W Characteristic: linear Max. permissible external inductance LO = 5,5 mH Max. permissible external capacitance CO = 2,29 µF

Sensor circuits:	In intrinsically safe level of protection: II 2 G EEx ia IIB with following maximum values: U_O = 16,8 V I_O = 240 mA P_O = 1,0 W Characteristic: linear Max. permissible external inductance L_O = 2,7 mH Max. permissible external capacitance C_O = 2,29 µF
R55 circuits:	In intrinsically safe level of protection: II 2 G EEx ia IIB with following maximum values: U_O = 16,8 V I_O = 80 mA P_O = 340 mW Characteristic: linear Max. permissible external inductance L_O = 20 mH Max. permissible external capacitance C_O = 2,29 µF
R56 circuits:	In intrinsically safe level of protection: II 2 G EEx ia IIB with following maximum values: U_O = 16,8 V I_O = 2 mA P_O = 8 mW Characteristic: linear Max. permissible external inductance L_O = 1 H Max. permissible external capacitance C_O = 2,29 µF
Level gauge sensor circuits:	In intrinsically safe level of protection: II 2 G EEx ia IIB with following maximum values: U_O = 16,8 V I_O = 179 mA P_O = 0,75 W Characteristic: linear Max. permissible external inductance L_O = 4,5 mH Max. permissible external capacitance C_O = 2,29 µF
Temperature / inclination – sensor circuits	In intrinsically safe level of protection: II 2 G EEx ia IIB with following maximum values: U_O = 16,8 V I_O = 251 mA P_O = 1 W Characteristic: linear Max. permissible external inductance L_O = 2,5 mH Max. permissible external capacitance C_O = 2,29 µF
Namur sensor circuits:	In intrinsically safe level of protection: II 2 G EEx ia IIB with following maximum values: U_O = 16,8 V I_O = 47 mA P_O = 198 m W Characteristic: linear Max. permissible external inductance L_O = 60 mH Max. permissible external capacitance C_O = 2,29 µF
EC-Type Examination Certificate Number	TÜV 05 ATEX 2969

12.1.3. Inclination sensor type LLGIS

Measuring circuit (prefabricated cable):	In intrinsically safe level of protection: II 2 G EEx ia IIB/IIA with following maximum values: U_O = 17 V I_O = 260 mA P_O = 1,1 W C_O = 5 nF L_O = 0,25 mH
Maximum permissible ambient temperature:	+60 °C
EC-Type Examination Certificate Number:	TÜV 05 ATEX 2868

12.1.4. Temperature sensor type LLGDTS-2

Measuring circuit (prefabricated cable):	In intrinsically safe level of protection: II 2 G EEx ia IIB/IIA with following maximum values: U_O = 17 V I_O = 260 mA P_O = 1,1 W C_O = 5 nF L_O = 0,25 mH
Maximum permissible ambient temperature:	+60 °C
EC-Type Examination Certificate Number:	TÜV 05 ATEX 2867

12.1.5. Level Sensor Interface

Power supply:	24V DC nominal voltage (operating range from 15....30V DC) under 30 Watt, from built-in battery of corresponding vehicle, protected against overvoltage (>60V)
CAN bus circuit, internal:	U ≤ 24 V I ≤ 1 A
Level sensor circuit:	In intrinsically safe level of protection: II 2 G EEx ia IIB with following maximum values: U_O = 7,14 V I_O = 42 mA P_O = 75 mW Characteristic: linear Max. permissible external inductance L_O = 70 mH Max. permissible external capacitance C_O = 260 µF
Input circuit:	In intrinsically safe level of protection: II 2 G EEx ia IIB with following maximum values: U_O = 7,14 V I_O = 18 mA P_O = 32 mW Characteristic: linear Max. permissible external inductance L_O = 300 mH Max. permissible external capacitance C_O = 260 µF
Permissible ambient temperature range:	-20 °C to +60 °C
EC-Type Examination Certificate Number:	TÜV 00 ATEX 1603

12.1.6. Level Sensor S-NS-2...

Input circuit:	In intrinsically safe level of protection: II 2 G EEx ia IIB Only for connection to a certified intrinsically safe circuit with following maximum values: U_O = 16 V I_O = 52 mA P_O = 208 mW The effective internal capacitance and inductance are negligibly small.
Operating temperature:	-20 °C to +60 °C
EC-Type Examination Certificate Number:	TÜV 02 ATEX 1982

12.2. Printer

Classification:	DR-295 FDW
Printer type:	7 Pin-Shuttle-Printer
Characters per line:	42/35
Printing speed:	approx. 2,3 lines/s
Printing width:	65 mm
Paper feeder:	Platform for sheets Minimum 80 mm x 80 mm Maximum 182 mm x 257 mm
Interface	serial V.24 with FDW protocol
Power supply:	24V DC ±10%

CE Conformity with the EC Directive 89/336/EEC or the German EMC Act (EMCA).

Copies of relevant certificates are attached to this documentation.

13 – Other Information

13.1. Abstract from ElexV (§12)

Inspections

(1) The operator must arrange for the electrical devices to be inspected for the proper condition of their assembly, installation and operation by a qualified electrician or directed and supervised by a qualified electrician.

1. before first use

2. in specific time intervals.

The periods must be calculated so that resulting deficiencies, which must be assumed, are determined in a timely manner. The inspections according to sentence 1 no. 2 must be carried out every three years. They may be omitted if the electrical devices are constantly monitored by a responsible engineer.

(2) During the inspection, related standard engineering practices must be followed.

(3) If requested by the relevant authority, a test book with specific entries must be kept.

(4) In case of damage or in special cases, the regulating authority may arrange a special inspection by an expert. The operator must arrange that an assigned inspection, executed according to sentence 1, is carried out.

Abstract from Bundesarbeitsblatt 3/1997 page 101
(German Labor Bureau Sheet 3/1997)

13.2. Maintenance

The devices must not be modified mechanically or electronically in any way.

During cleaning with a steam cleaner orwith 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.

For all devices, a regular safety check in accordance with industrial safety regulations must be carried out. Equipment and protective systems which fall under the scope of EC Directive 94/9/EC and are operated in hazardous areas are also classified installations. The standard IEC / EN 60079 17 shall be observed and there could be other country-specific policies applicable.

13.2.1. Maintenance Plan

	daily	weekly	monthly	annually
Clean the outside of the device			**X**	
Visual testing	**X**			
Checking the LED's				**X**
Examination of the case mounting for tight fit		**X**		
Check the cable and check function with GWG		**X**		

13.3. Software Replacement

13.3.1. Main Unit

Prior to each software replacement, the tank truck setup must be recorded or printed, so that during re-commissioning with the new software all vehicle-specific parameters can be reproduced in the setup.

The EPROM (contains software) can be found in the main unit on the main CPU board (drawing no. **51.351675**).

It has a 32-PIN "PLCC" housing (rectangular housing with one beveled corner) and a sticker showing the software version number (e.g. 1.32). One of the corners of the base on the printed circuit board is also beveled. A special, commercially available "PLCC removal tool" is required for removing the EPROM from the base, in order to avoid damaging the EPROM during removal. The two claws of the removal tool must be inserted into the two recesses of the EPROM base. The two arms of the removal tool are then pushed together. This causes the EPROM to be lifted from the base.

Prior to inserting the new EPROM, its connection contacts should be checked for damage ('bent connection legs'?).

The new EPROM is inserted into the base and pressed in with your fingers without canting, until it noticeably engages.

The beveled corner of the EPROM must be aligned with the beveled corner of the base.

After an EPROM on the main CPU board has been replaced, the complete SETUP menu has to be reset / checked.

13.4. Interface Modules

The software for all interface modules is integrated into the microprocessor. The microprocessor has to be replaced if software needs replacing. The procedure is identical to that described in chapter chapter 7.1 "Main Unit / Display - MLMAINDISP / MLMAINDISP2".

Attention is to be paid to correct potential equalization when performing any work on the interface modules. The electronic components or modules can be destroyed or their functions changed by static discharge. It is therefore recommended to wear an earthing strap attached to the wrist in order to equalize the potential with the module.

13.5. Download / Software Update

13.5.1. Software Separation

The MultiLevel software consists of individual blocks / modules / functions.

These can be divided into calibration-relevant and non-calibration-relevant.

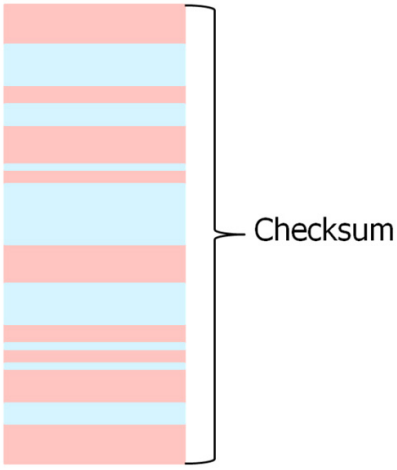
For unambiguous identification a checksum is created via the software.

Example:

Calibration-relevant	Non-calibration-relevant
Height measurement	User guidance
Inclination measurement	Warning messages
Detection of wet leg sensors	Ext. CAN-Bus (e.g. EMIS)
Temperature measurement	Languages
Volume calculation	Printer driver
Temperature-volume conversion	Volume preset
Delivery control	Data storage on chip card
Parameters	Parameters

13.5.2. Memory partitioning without software separation

- Calibration-relevant and non-calibration-relevant parts are unsorted in the memory.
- One checksum for the entire memory.
- In the case of changes in the non-calibration-relevant area also: new checksum; hence, new test by PTB.

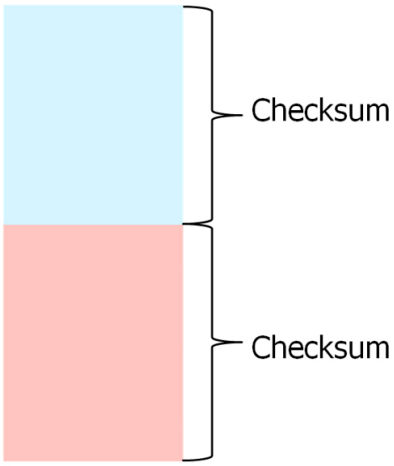


Disadvantages:

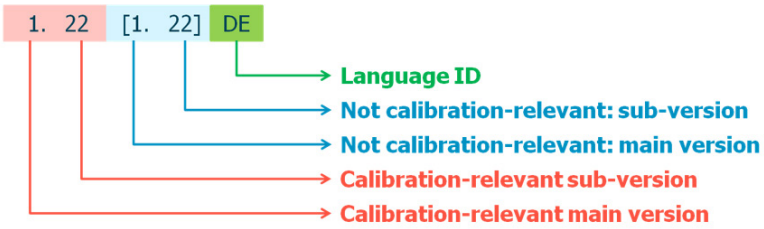
- Each change in the software leads to a new checksum.
- If changes are made to non-calibration-relevant parts, this has undesired consequences:
  - The software must be tested and certified by the PTB.
  - W&M seals must be broken in order to update the devices.

13.5.3. Memory partitioning with software separation

- Calibration-relevant and non-calibration-relevant parts are separated
- Separate checksums.
- In the case of changes in the non-calibration-relevant area:
  - Checksum of the calibration-relevant area does not change
  - no test by PTB



13.5.4. Version Name

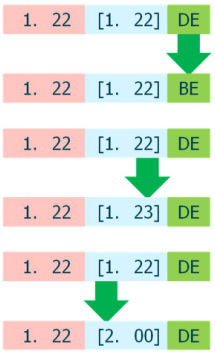


13.5.5. Update Logbook

- Saves update events within the calibration-relevant area.
- Currently offers 100 entries.
- If the logbook is full: no further updates within the calibration-relevant area are saved.
- Can be reset if the seal is broken.

```
Update-Report
17.10.2010 14:48:45 - 07.11.2010 19:38:22
  Device            : MultiLevel
-----------------------------------------
  Version           : 1.22[1.22]DE
  Seal count        : 000003
  Serial No.        : 18AB1234
  Meter Name        : 1234ABCD
-----------------------------------------
  Seal broken!
-----------------------------------------
  Rest attempts     : 95
-----------------------------------------
17.10.08 14:48 + 098BB138            Eggers
```

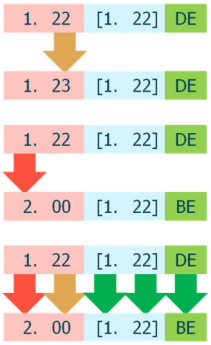
13.5.6. Update Logbook



Change of language:
- No logbook entry
- No seal breakage

Change of sub-version:
- No logbook entry
- No seal breakage

Change of main version:
- No logbook entry
- No seal breakage



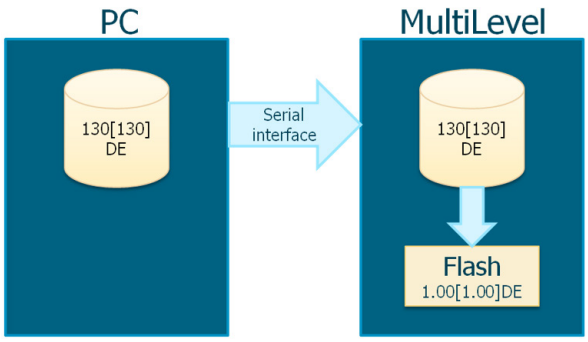
Change of sub-version:
- Logbook entry
- No seal breakage

Change of main version:
- Logbook entry
- Seal breakage

Summary

13.5.7. Update Procedure

- New software is downloaded by means of PC / laptop.
- The PC is connected to the MultiLevel in place of the printer.
- The update is transferred to the MultiLevel's internal SD card first.



- The update is carried out via an operation on the MultiLevel; a PC does not have to be connected.
- Several updates (e.g. language versions) can be stored on the SD card.

13.5.8. Operating Procedure to update the software

"Download":

- Transmission of a program version from a connected PC to the MultiLevel's internal buffer memory

"Software Update":

- Transmission of a program version from the internal buffer memory to the program memory for execution

13.5.8.1. Illustration of the menu navigation

☞ Call menu **46**: Registration as 'Master'

▶ File selection dialogue:

▶ Selection of the file for software update

If the selected file is not a valid software update:

<F1> takes you back to the menu system

If the selected file is a valid software update:

Entry of the file checksum:

The checksum is delivered with the update file and serves for unambiguous identification as well as for ensuring the correct transmission.

After checking the checksum, the following message appears:

This message must be confirmed with **<F1>**

Subsequently, you are requested to input your name (who is carrying out the update?):

The input is confirmed with **<ENTER>**. The name entered is listed later in the update logbook.

Finally a last warning is given about the execution of the update, with information about seal breakage if applicable:

This is the last opportunity to abort the update procedure by means of **<F3>**:

Pressing **<F1>** executes the update procedure.

First of all a backup copy of the current memory contents is made:

The original condition can be restored with this backup copy if the update should fail.

In the next step the memory is cleared:

From this point in time onwards, a power failure, for example, would lead to failure of the update procedure!

Finally the file selected beforehand is transferred to the memory:

In the last step the system is automatically restarted.

No further updates can be performed if the logbook is completely full. In this case the following message appears when menu item **46** is selected:

The logbook can only be reset after printing out the update logbook with the seal broken; after printing, the corresponding query appears:

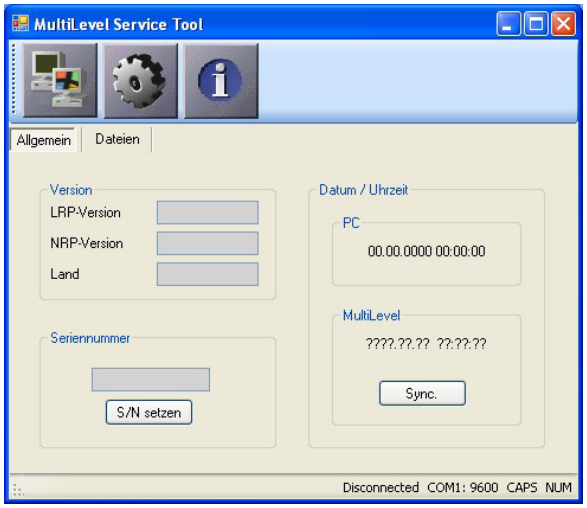
A new empty logbook is created automatically after the deletion of the logbook:

13.6. MultiLevel Service Tool

This service tool enables certain functions of the MultiLevel to be accessed via the serial interface. To this end, the MultiLevel's printer is disconnected and the PC / laptop is connected in its place via a suitable adapter cable (e.g. Sening part number MFLOW-PCADAP).

After starting the software, the following program window appears:

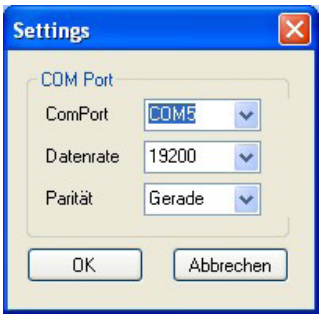
A few settings are necessary at the first time of starting.



To do this, click the symbol:

The 'Settings' is opened:

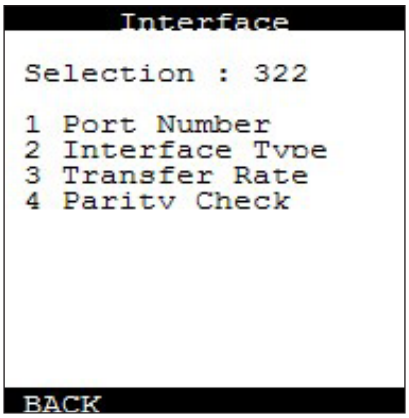
The PC serial interface employed, i.e. the interface to which the MultiLevel is connected, has to be specified in the **'ComPort'** selection list.



Data rate and **parity** must correspond to the settings on the MultiLevel.

To this end, also compare the settings in menu 322 on the MultiLevel:

In order to minimize the transmission times, the data rate (parameter **3223**) can be increased, for example, to 38400 or 57600. If transmission errors occur due to the installation (cable lengths, shielding), then the data rate must be set lower accordingly.



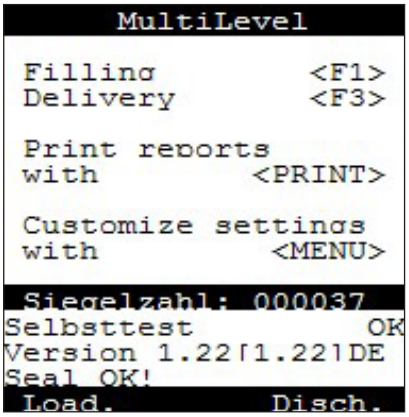
After service access is finished, it is essential to set parameter 3223 back to its original value (usually 9600)!

The settings are adopted and saved by selecting the 'OK' button; i.e. the saved settings are reused at the next program start.

13.6.1. MultiLevel Service Tool

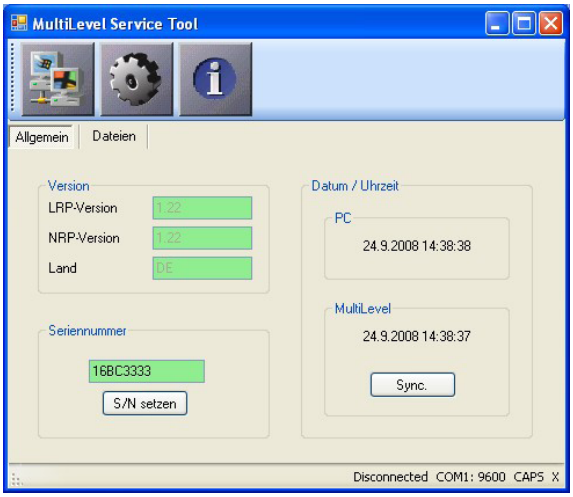
After the program start, no communication with the MultiLevel has been established yet. This is shown by the message **'Disconnected'** in the status line as well as the  symbol on the first button.

The MultiLevel should be in the initial state before communication is established:

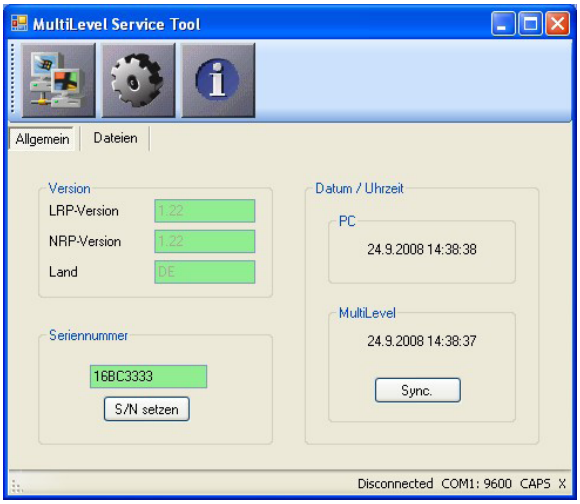


If the MultiLevel is in another mode of operation (e.g. loading, delivery, menu), then remote access is not possible!

-  Communication is established by clicking the first symbol. The successful establishment of a connection can be recognized by the following items:
- Instead of **'Disconnected'** the word **'Connected'** now appears in the status bar at the bottom.
-  The first symbol changes its appearance.



The general information is displayed in the window:



Version:
LRP version: Software version of the program section requiring calibration

NRP version: Software version of the program section not requiring calibration

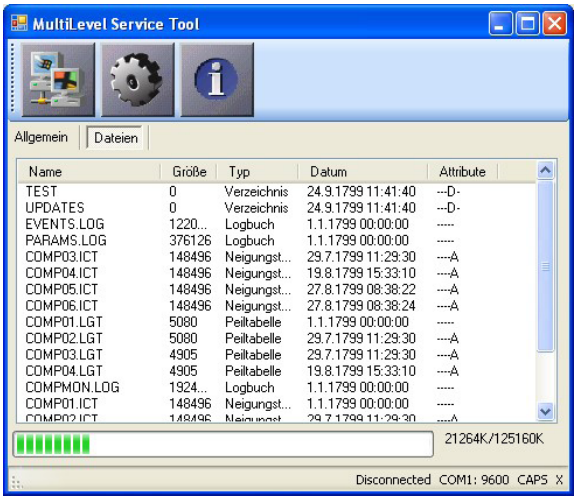
Country: Country code of the software:
DE: Germany
GB: United Kingdom
BE: Belgium

Serial number: The serial number of the MultiLevel is displayed here. This can be changed and transmitted back to the MultiLevel by means of the 'Set S/N' button.

Date / time: The date/time of both the PC and the MultiLevel connected to it are displayed here. The date/time of the MultiLevel are synchronized to the PC by means of the 'Sync.' button.

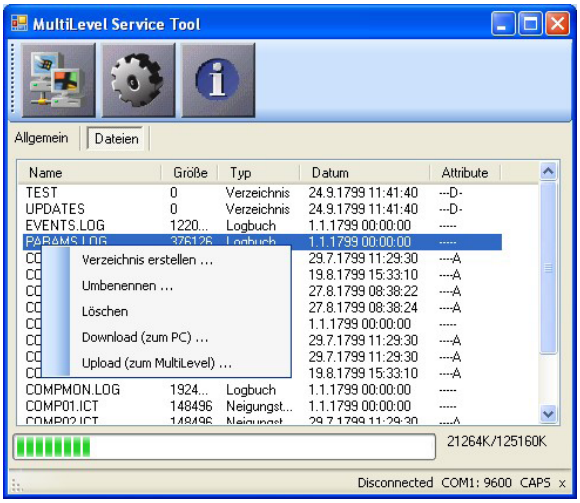
Main Window – Files

If the 'Files' tab is clicked, the file window opens and the program then loads the file list from the MultiLevel's SD card:



All available files as well as the subdirectories are displayed in a table. A bar below the table shows the amount of card memory used; next to the bar the extent of memory usage (used/total) is displayed in text form.

A context menu is opened by double-clicking or right-clicking a file:



Create directory: Creates a new subdirectory in the current directory

Rename: Renames the selected file

Delete: Deletes the selected file

Download: Transfers the selected file from the MultiLevel to the PC

Upload: Transfers a file (still to be selected) from the PC to the MultiLevel

The operations rename, delete and upload are disabled in the sealed condition for the following file types:

*. LOG Logbook
*. LGT Gauge table
*. ICT Inclination table

Double clicking a directory opens it and reads the contents.

13.7. MultiLevel software version history/change log

Key:
Date: Date of approval
LRP: Legally relevant part
NRP: Legally not relevant part
CC: Country Code

Date	LRP	NRP	CC	Comment
17.08.11	1.24	1.29	CZ DE HU RO SE	E10 Kompensation (Kompensationsmethoden „linear“ & „Polynom“) Zweiter Restmengensensor Freie Zuordnung der Sensoren & Ventile EMIS: Übertragung Kammerüberwachung, Abfrage aktueller Daten, Zeitsynchronisierung Steuerung Ventile im Servicemode überarbeitet
04.07.11	1.23	1.28	CZ DE HU RO SE	Div. Texte in der englischen Sprache korrigiert Beleg-Kopien können jetzt ohne Meister-Kennwort erstellt werden Produkt-Kurzbezeichnungen mit 4 Buchstaben werden jetzt korrekt verarbeitet Life-Test mit Kalibriereinheit deaktiviert Restmenge (Param. 313xx33) kann jetzt mit 7 Stellen (max. 9999,999 Liter) eigegeben werden
11.05.11	1.23	1.27	CZ DE HU RO SE	Preset: Automatische Anpassung der Vorabschaltung korrigiert Preset: Abgabe kompletter Kammern jetzt fehlerfrei möglich Messung Befüllung incl. Kammerüberwachung im NOMIX-Betrieb: div. Fehler beseitigt MultiLevel + NOMIX: Kammerüberwachung vor Abgabe kann jetzt mit STOP unterbrochen werden
15.02.11	1.23	1.26	CZ DE HU RO SE	Measurement incl. temperature compensation during loading Monitoring difference between loading/delivery Function: “ Loading pre-switching“ during loading Preset control via EMIS Day or route report incl. totalizer
09.07.10	1.22	1.25	DE SE	Filling mode: Display “Residual quantity“ or “Empty“ instead of “3.2 mm“
09.04.10	1.22	1.24	CZ	FormFeeed (paper feed) after printing a layout list or element list Diagnosis RS232: Labeling function key corrected Reading a layout chip card optimized: only the layouts used are read Parameters for layout control (page length, X/Y offset, number of items) are included in storage on a layout chip Delivery note printout: indenting of blocks corrected Parameters logbook: negative values (eg B. 3132x25) are now correctly stored NOMIX remote access via menu point 5: NOMIX can now also be printed via MultiLevel Language module for Czech created
08.01.10	1.22	1.23	DE	Shared printer access (MultiLevel, MultiFlow ad EMIS share a joint printer) Error removed from English language module (spelling, translation)
10.11.09	1.22	1.22	DE	Division of the software into calibration-relevant and non-calibration-relevant parts Software download Remote access to NOMIX display Operation of MultiLevel without NOMIX (stand-alone) EMIS communication Volume preset

Key:
Date: Date of approval
LRP: Legally relevant part
NRP: Legally not relevant part
CC: Country Code

Date	LRP	NRP	CC	Comment
18.08.08	1.21	[1.21]	DE	Temperature-volume conversion for ethanol/petrol mixtures added Erroneous behavior after printing an emergency receipt corrected Calculation of the parameter checksum corrected Error handling for internal level sensor errors changed Warning messages added to the program section 'Level sensor calibration' Warning messages added to the program section 'Inclination sensor calibration' Print screen function implemented in various program sections Data transmission to the calibration unit
10.04.08	1.20	[1.20]	DE	Conditions for exiting delivery mode adapted Time delays for the wet leg sensor taken into account Uncoupling of the hose taken into account in the sequence Optimization of communication & speed Access to the memory card improved Revision of the evaluation and handling of errors Print layout freely configurable Expansion of the memory capacity Line & page counter for printout corrected User guidance for the printout of logbooks standardized Data transmission from/to the chip card optimized Factory setting for 'Float MAX' parameter changed Additional logbook entries for various events Logbook entries in the case of changes of valve states only on changes Print screen function when displaying messages Printer reservation corrected Second language implemented Country-specific special characters Print screen error corrected Missing parameters added to the printed parameter list
17.08.07	1.16	[1.16]	DE	Seal breakage on change of the software checksum User guidance for logbook printout adapted Direct exit from loading mode only by pressing the STOP button Change of valve states now recorded correctly in the logbook Synchronization of the operating mode between MultiLevel and NOMIX changed
08.06.07	1.15	[1.15]	DE	Initialization when restoring factory settings improved Querying / evaluation of printer status and printer controller improved Time delay inserted for detection of residual volume Communication with the level sensors improved Preparation for preset control Event logbook extended & supplemented Menu system updated
30.01.07	1.10	[1.10]	DE	Change of date only possible with broken seal 'Temperature offset' parameter removed Switch-on delay for error evaluation Logbook entries in the case of unmeasured / uncalibrated delivery New menu entry: 'Print seal' Optimization of the checksum calculation Error in the software driver for the internal memory card rectified Problems with the import of a chip card with gauge tables rectified Gauge tables only exported if the data is correct NOMIX status display removed Editor for YES/NO queries can be exited with <STOP> Calculation of the compartment volume corrected Layout of the delivery receipt adapted
18.08.06	1.00	[1.00]	DE	

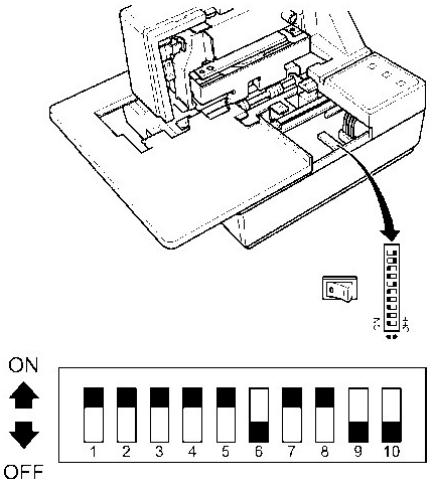
13.8. DIL Switch Settings for DR-298-FDW

The switches that determine the operating mode of the DR-298 are located in the interior of the unit (see manual).

☞ The following factory settings are to be checked on the printer in the event of a fault:

Switch	Position	Function
SW-1	ON	9600 Baud
SW-2	ON	
SW-3	ON	8 Bit
SW-4	ON	No Parity
SW-5	ON	
SW-6	OFF	Handshake XON/XOFF
SW-7	ON	Printer mode Star
SW-8	ON	
SW-9	OFF*	Pin 6 Reset inactive
SW-10	OFF*	Pin 25 Reset inactive

* Any setting is valid

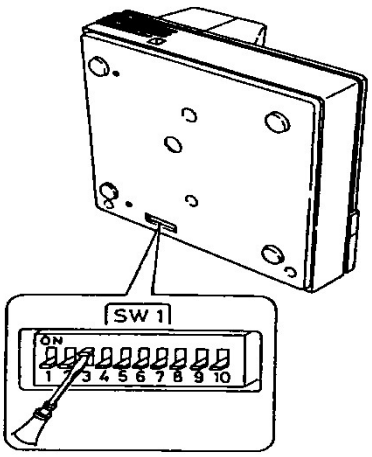


13.9. DIL switch settings DR-295

☞ The following factory settings are to be checked on the printer in the event of a fault:

Switch	Position	Function
1	OFF	Transfer error print "?"
2	OFF	512 Byte Data buffer
3	ON	Handshake XON/XOFF
4	OFF	8 bits
5	ON	Parity used
6	ON	Even parity
7	OFF	9600 Baud
8	OFF	
9	OFF	No Pin 6: Reset signal
10	OFF	No Pin 25: Reset signal

Table 14: Printer configuration DR-295

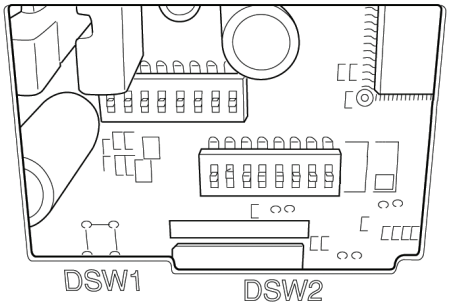


13.10. DIL Switch Settings DR-220

The switches for setting the operating mode of the DR-220 are located behind a cover on the underside of the device (see manual).

☞ The following factory settings are to be checked on the printer in the event of a fault:

Switch DSW 1	Position	Function
1	OFF	Transfer error print “?“
2	ON	40 Byte Data buffer
3	ON	Handshake XON/XOFF
4	OFF	8 bits
5	ON	Use Parity
6	ON	Even parity
7	OFF	9600 Baud
8	ON	Busy: Buffer full and offline



Switch DSW 2	Position	Function
1	ON	42/35 characters/line
2	OFF	Autocutter
3	OFF	- - -
4	OFF	Activation of serial interface by means of DIP switch
5	OFF	- - -
6	OFF	Overwrite flash memory deactivated
7	OFF	Pin6 Reset deactivated
8	OFF	Pin 25 Reset deactivated

13.11. Assembling the EMC cable gland for data and printer cables

Step 1:

- Strip cable sheath by 100 mm
- Expose shielding braid screen and shorten to 15mm

Step 2:

- Feed cable through the union nut
- Feed cable through terminal insert
- Place shielding braid over terminal insert
- Shielding braid must extend over the O-ring approx. 2 mm

Step 3:

- Insert terminal insert into the adapter piece
- Attach screw connection and tighten it
- Job done!

14 – Address and Contact Details

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

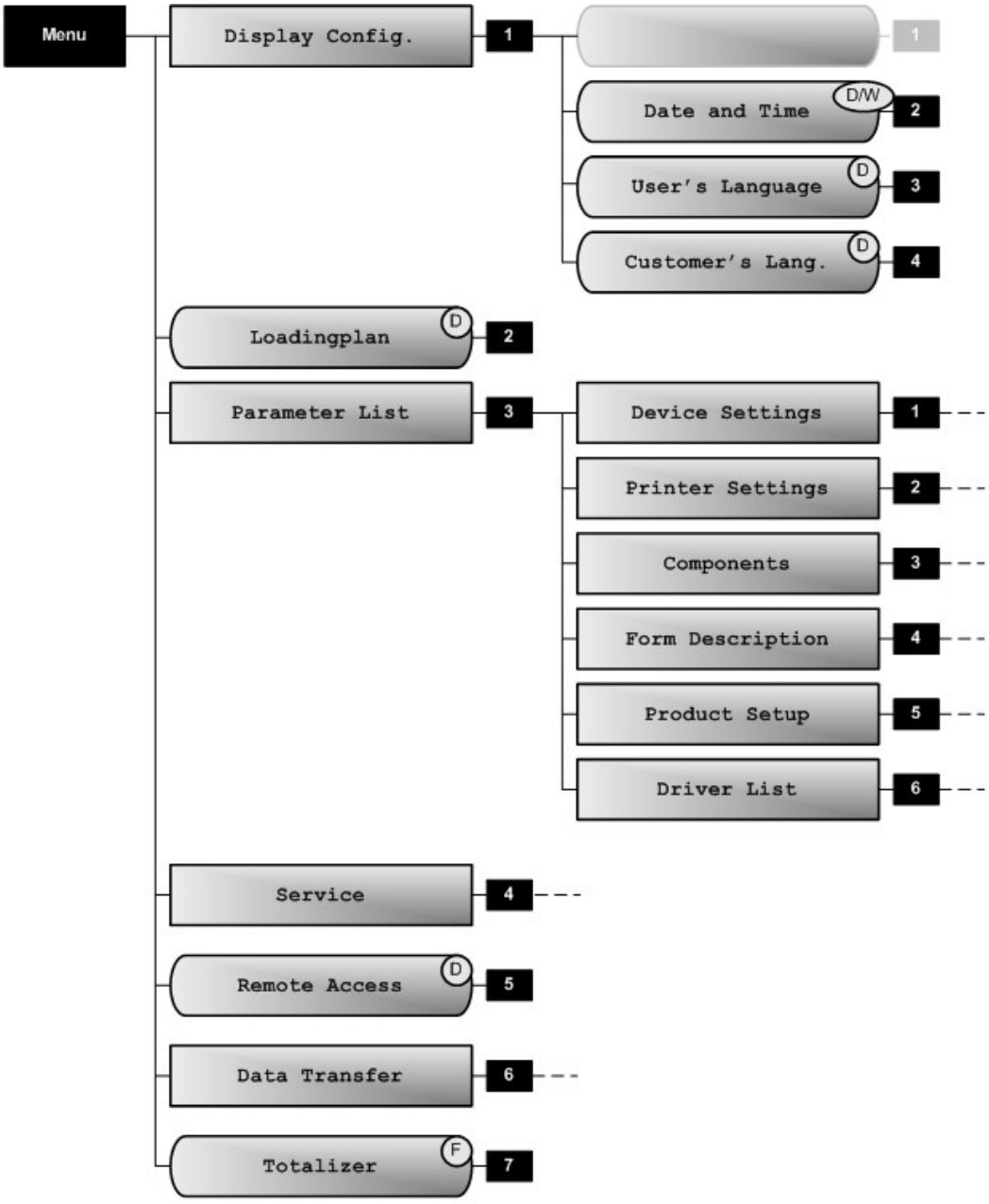
TechnipFMC
FMC Technologies Measurement Solutions
F. A. Sening GmbH
Regentstrasse 1
D-25474 Ellerbek

Tel.: +49 (0)4101 304 - 0 (Reception)
Fax: +49 (0)4101 304 - 152 (Service)
Fax: +49 (0)4101 304 - 133 (Sales)
Fax:+49 (0)4101 304 - 255 (Customer service)
E-Mail: info.ellerbek@fmcti.com
Web: www.fmctechnologies.com/seningttp

Page intentionally left blank.

15 – Short Overview of Menu System

Main Menu



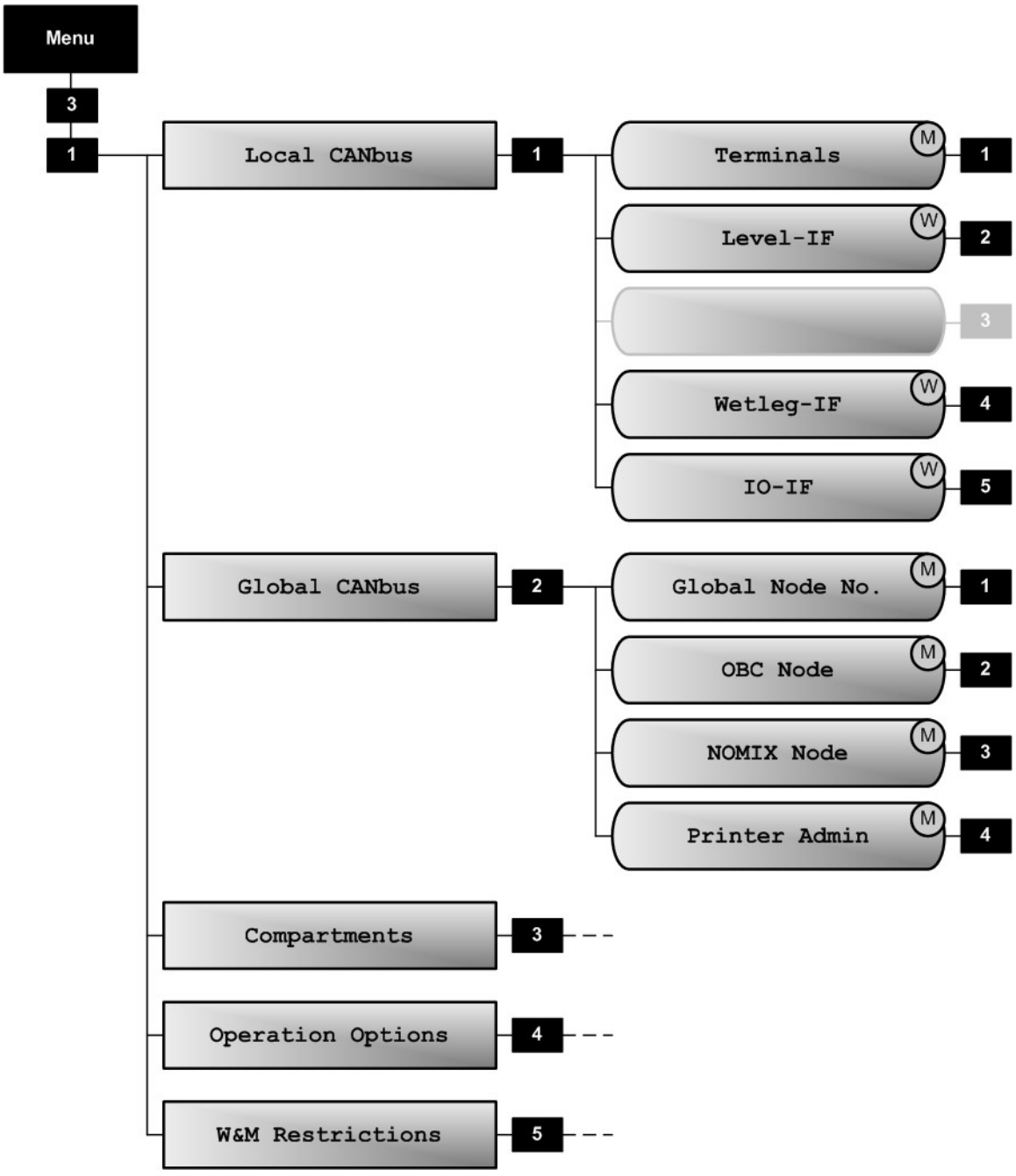
Symbols used:

(D) = Driver

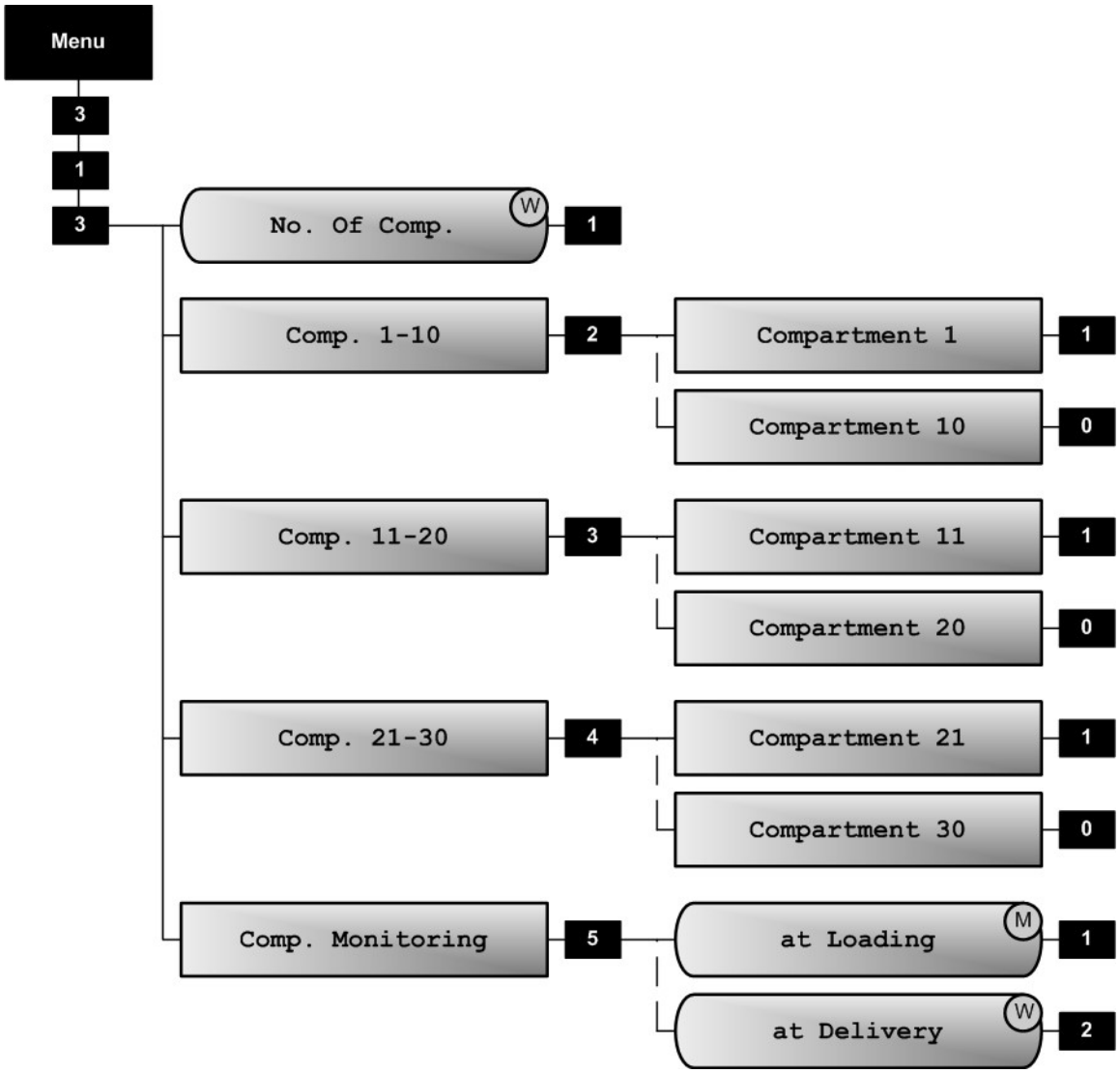
(W) = W&M Calibration

(M) = Factory setting

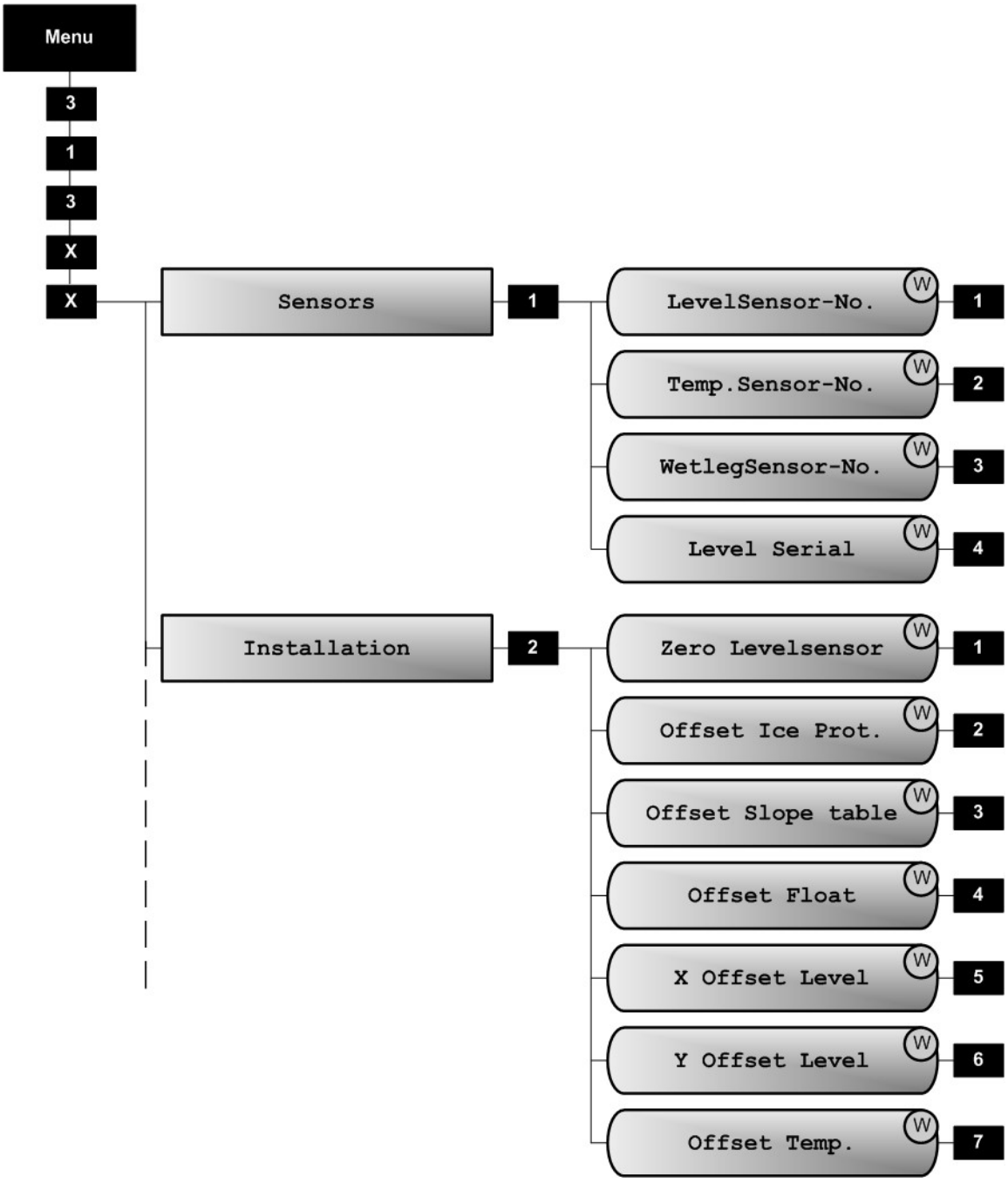
31 Device Settings



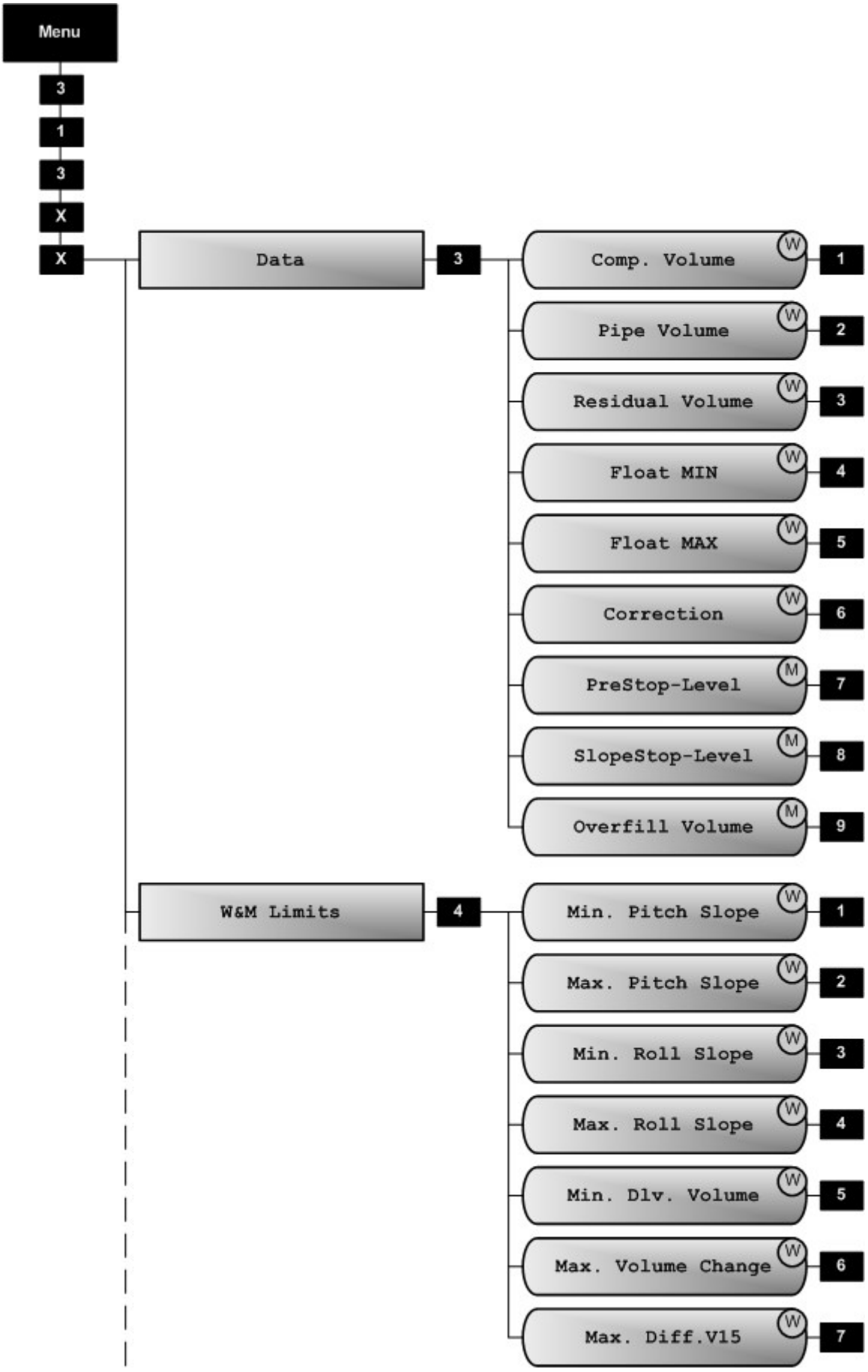
313 Compartment Settings [1/3]



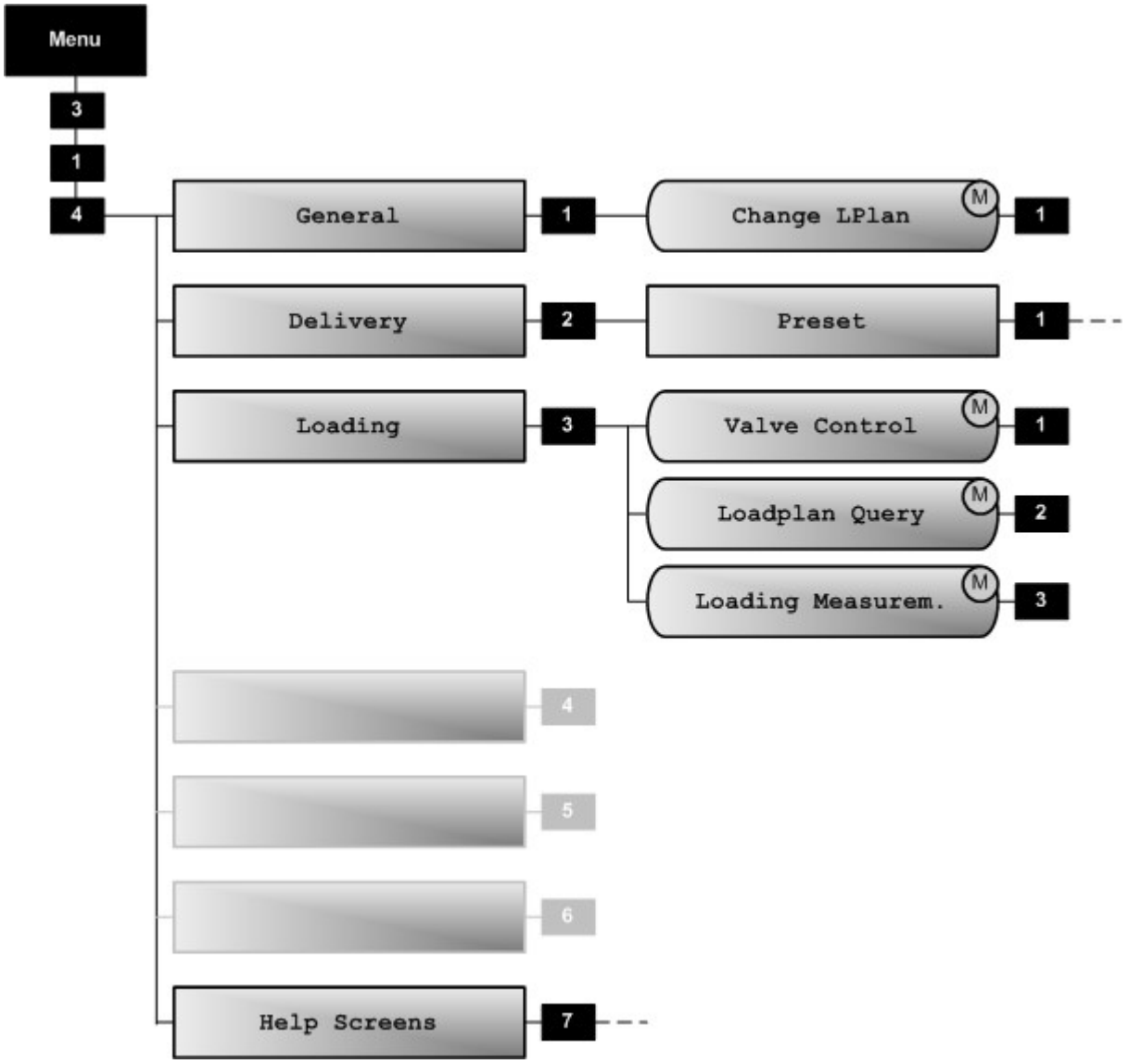
313xx Individual Compartment [2/3]



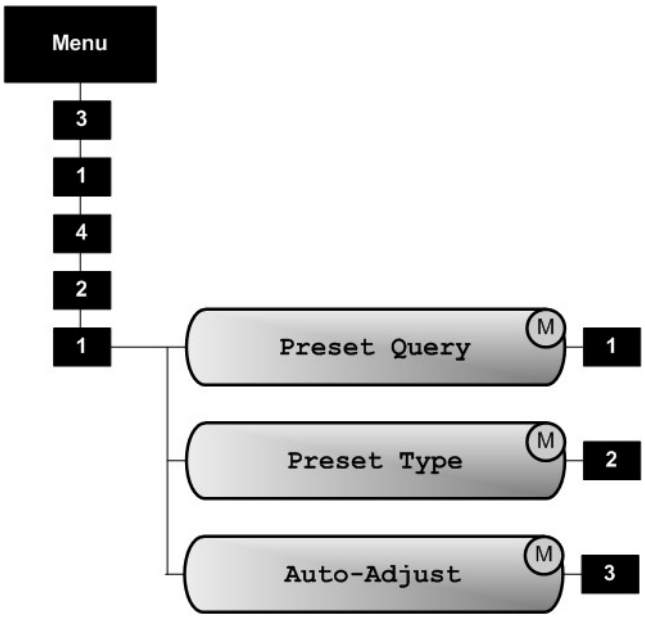
313xx Individual Compartment [3/3]



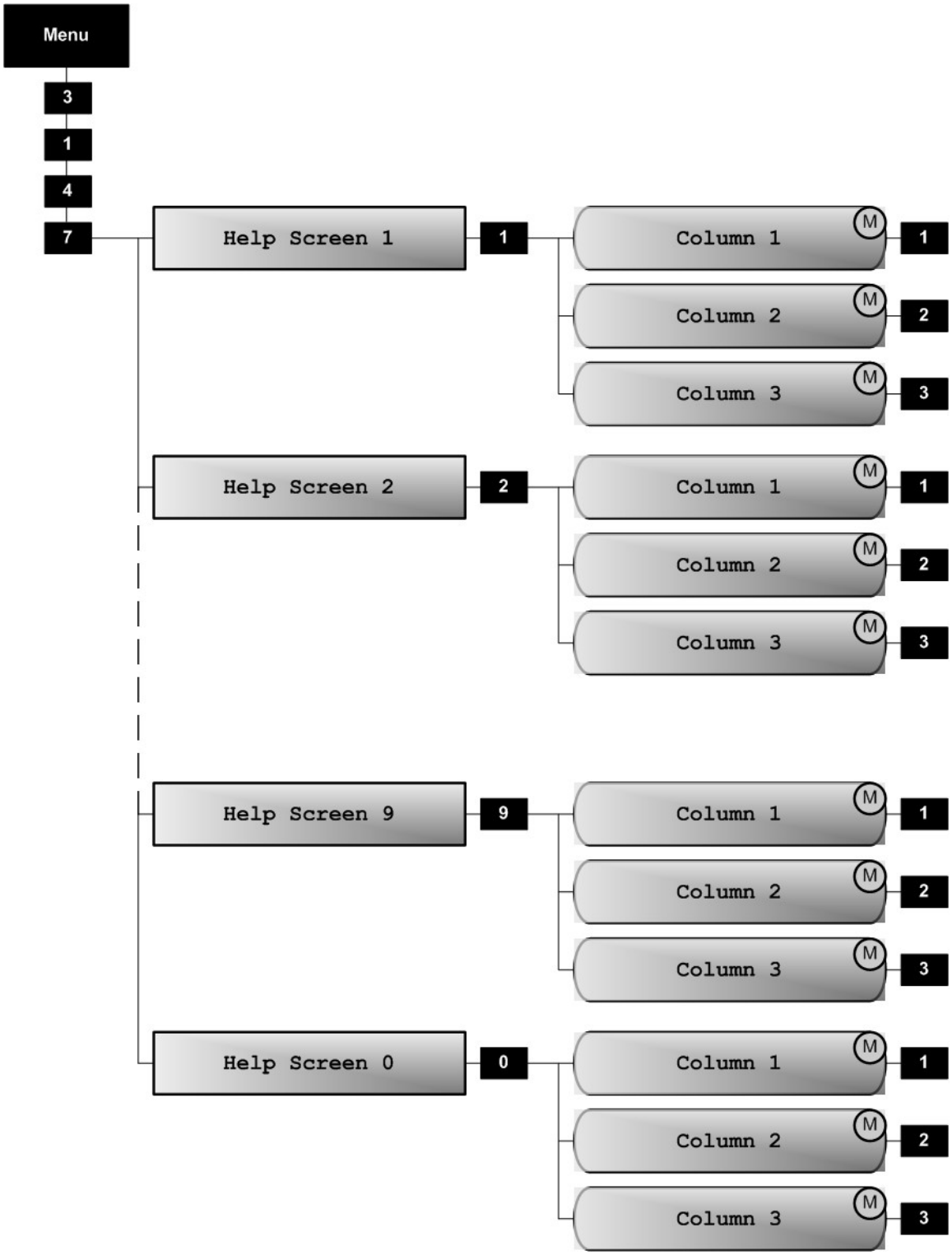
314 Operating Options



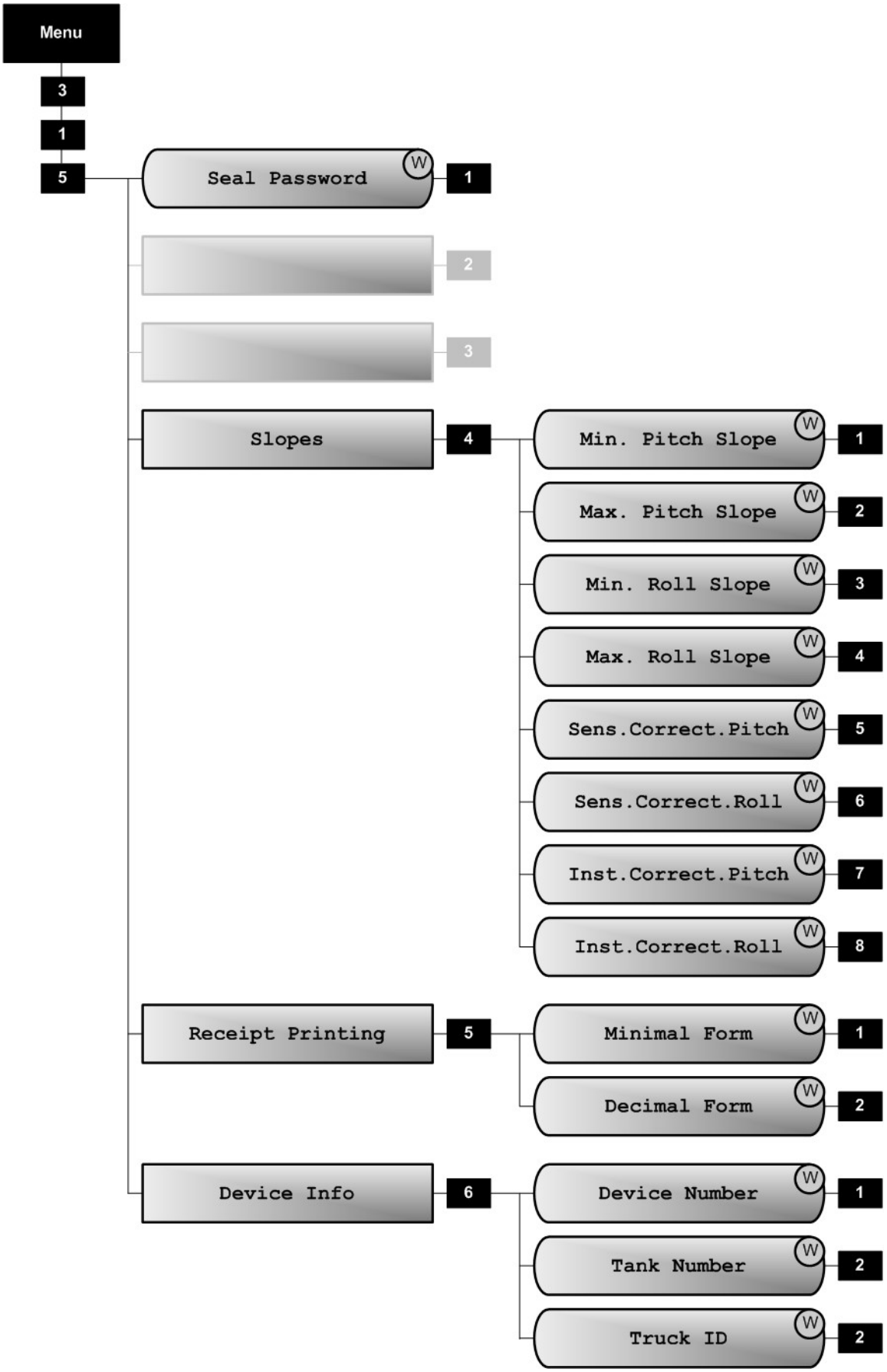
31421 Volume Preset



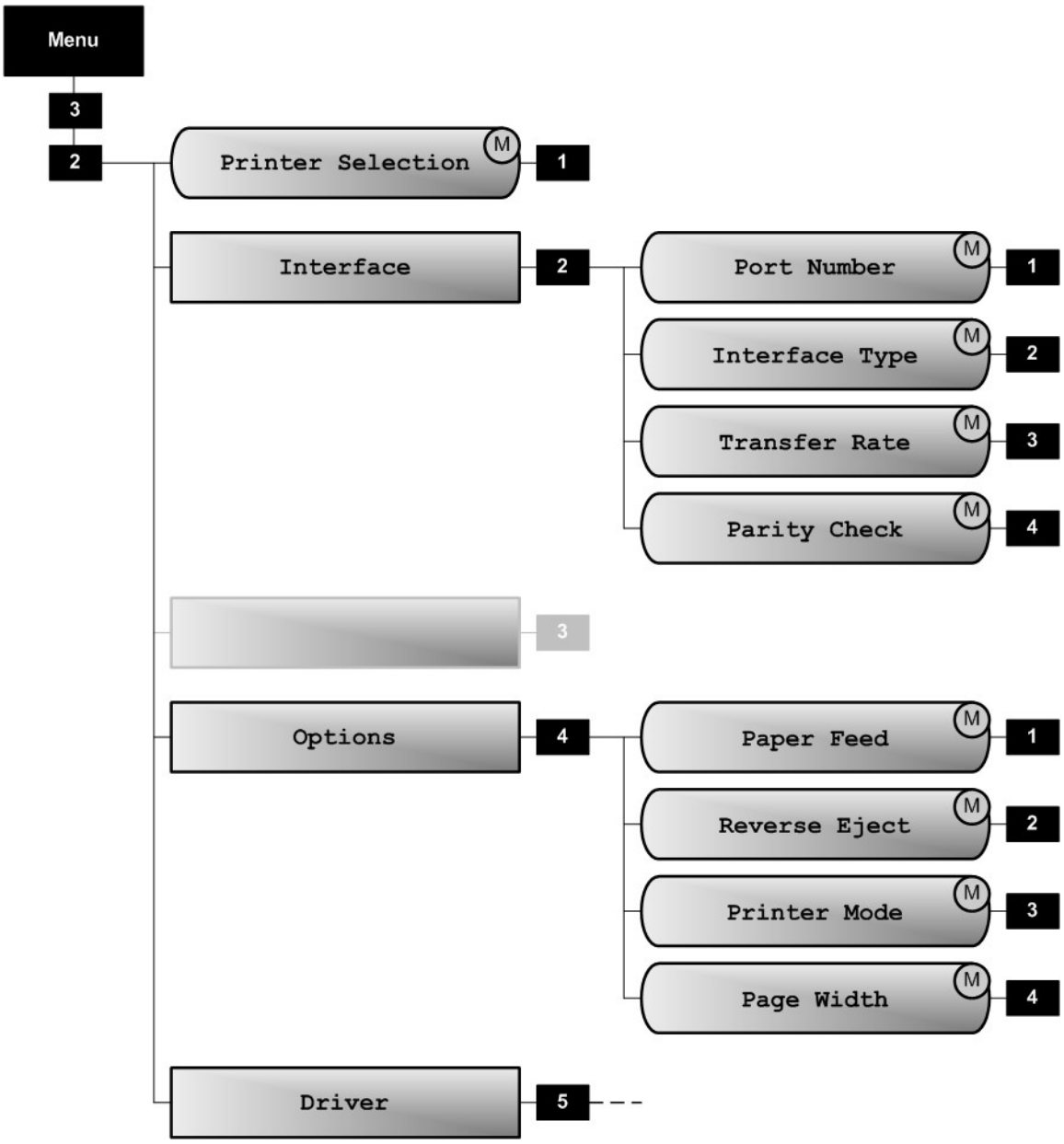
3147 Help Displays



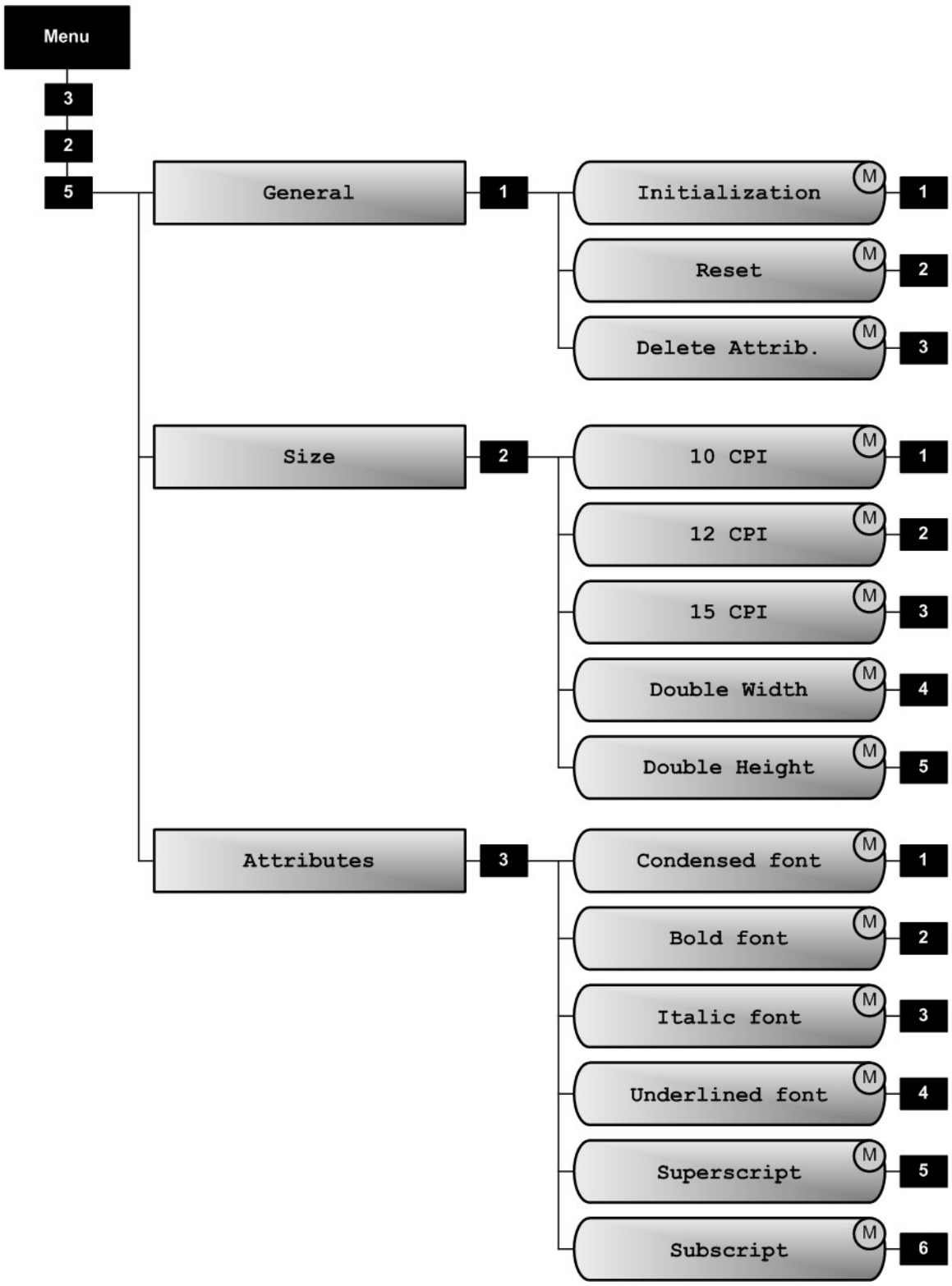
315 Calibration Restrictions



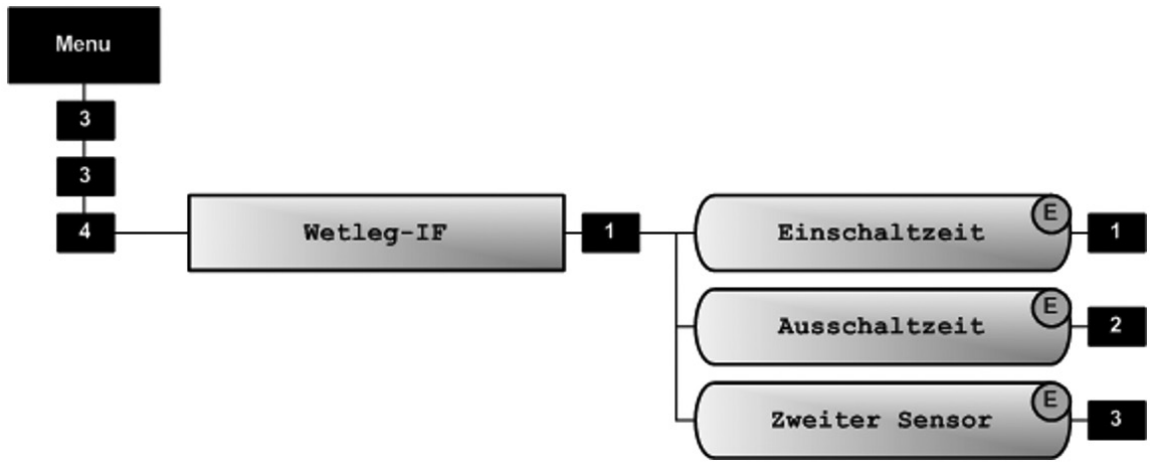
32 Printers

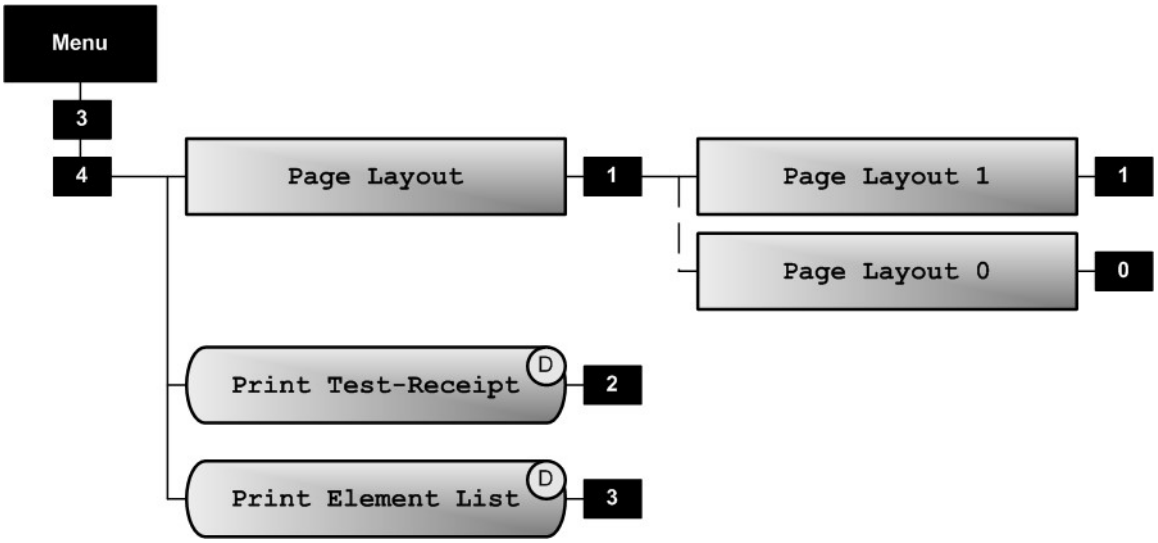

Menu
3
2
Printer Selection
M
1
Interface
2
Port Number
M
1
Interface Type
M
2
Transfer Rate
M
3
Parity Check
M
4
3
Options
4
Paper Feed
M
1
Reverse Eject
M
2
Printer Mode
M
3
Page Width
M
4
Driver
5

325 Printer Driver

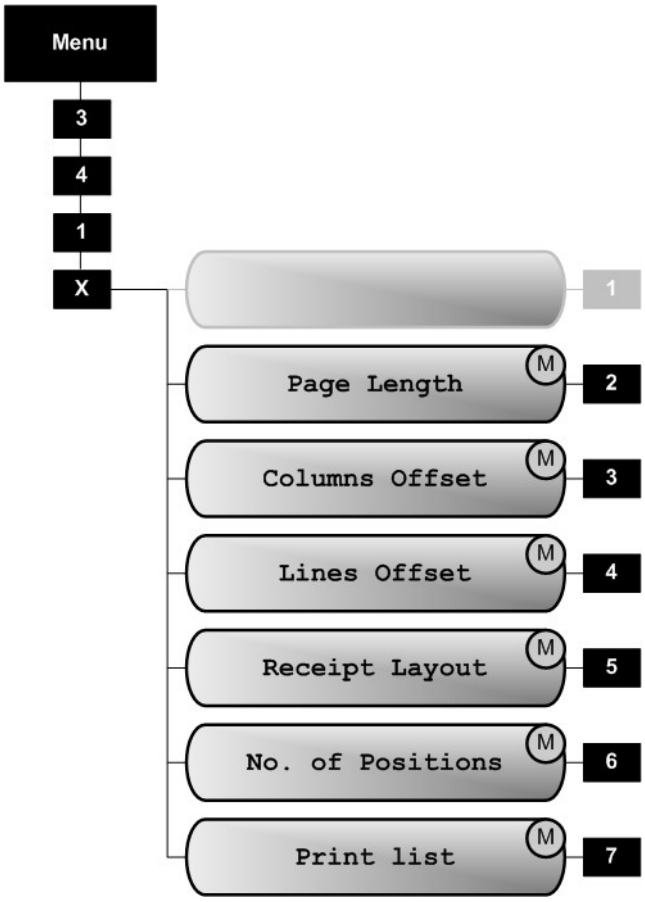


34 Form Description

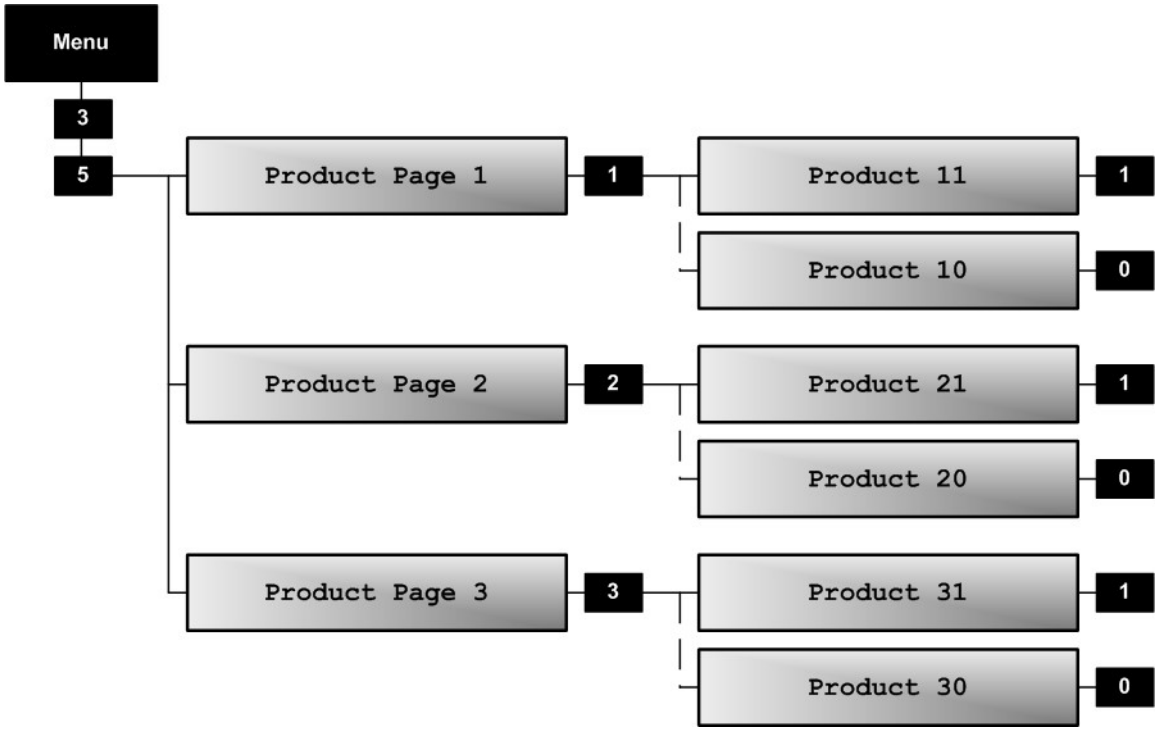




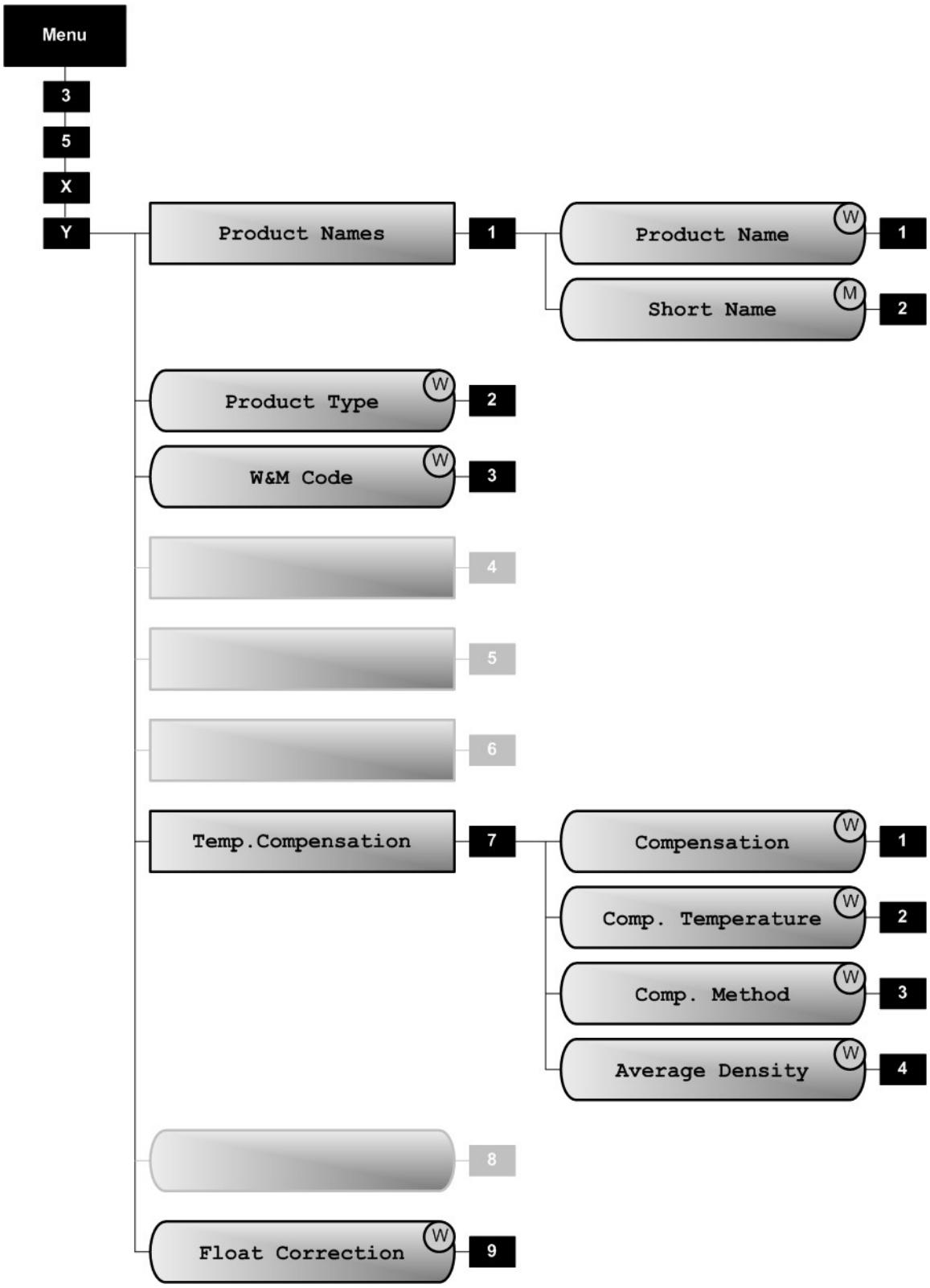
341x Page Layout



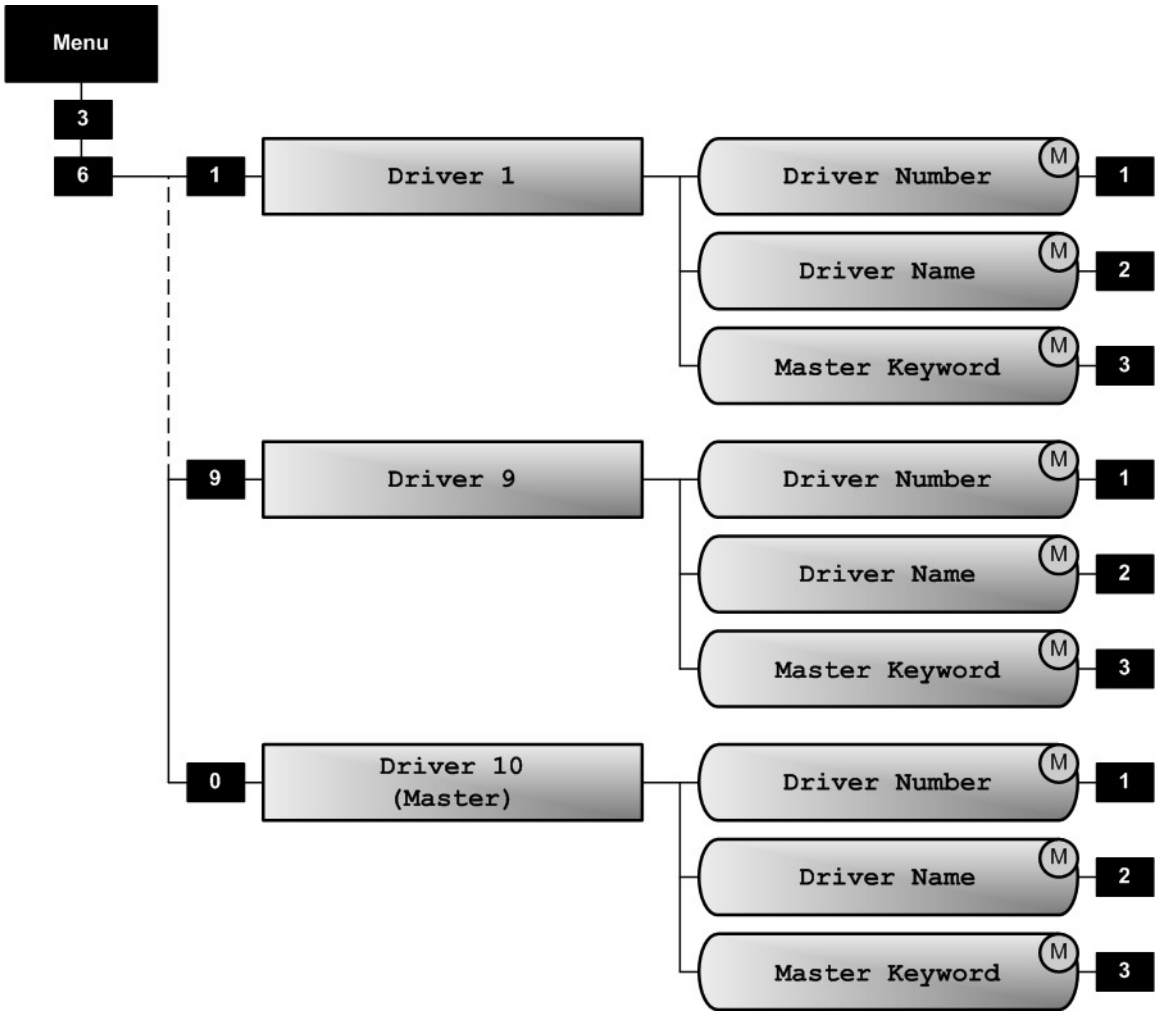
35 Products


Menu
3
5
Product Page 1
1
Product 11
1
Product 10
0
Product Page 2
2
Product 21
1
Product 20
0
Product Page 3
3
Product 31
1
Product 30
0

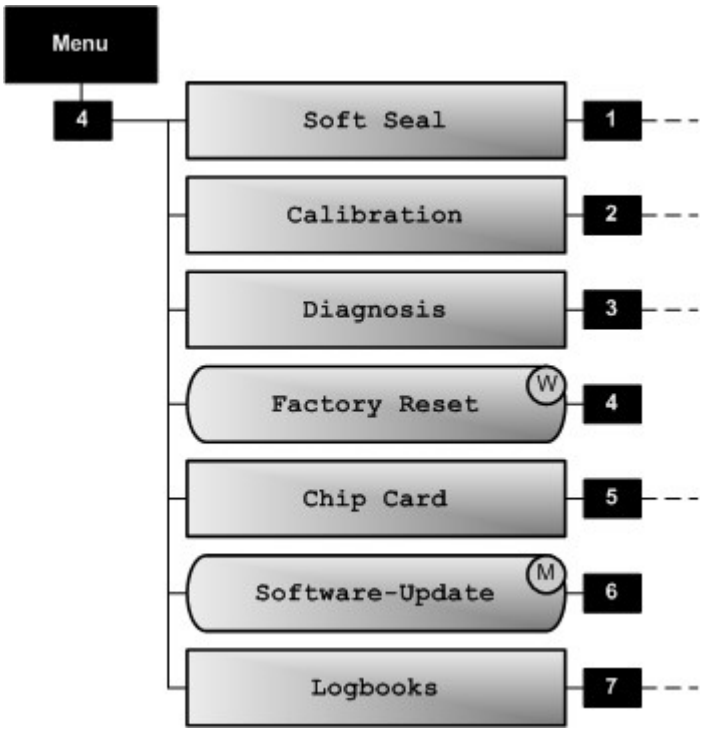
35xy Product Information



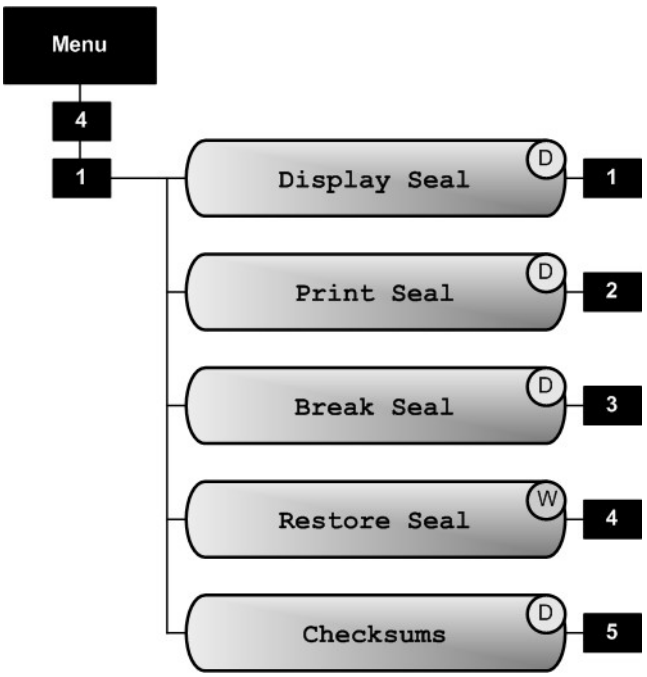
36 Driver List



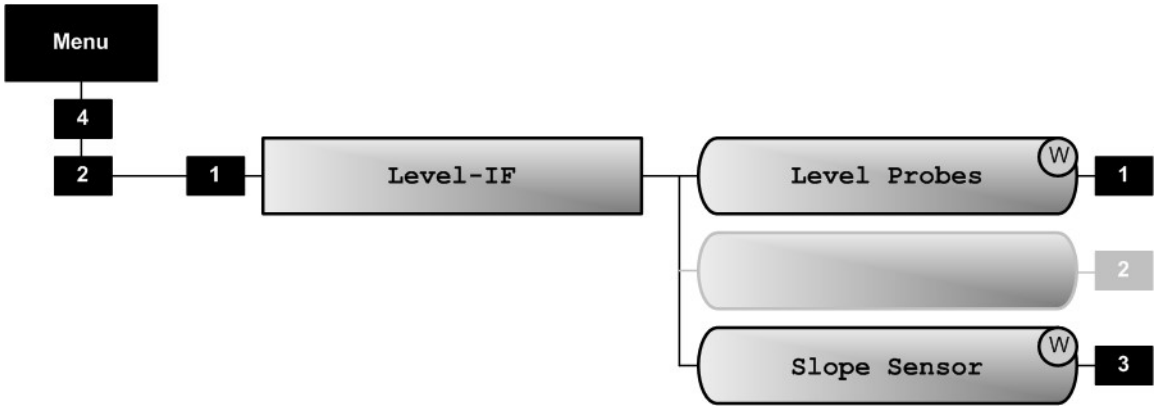
4 Service



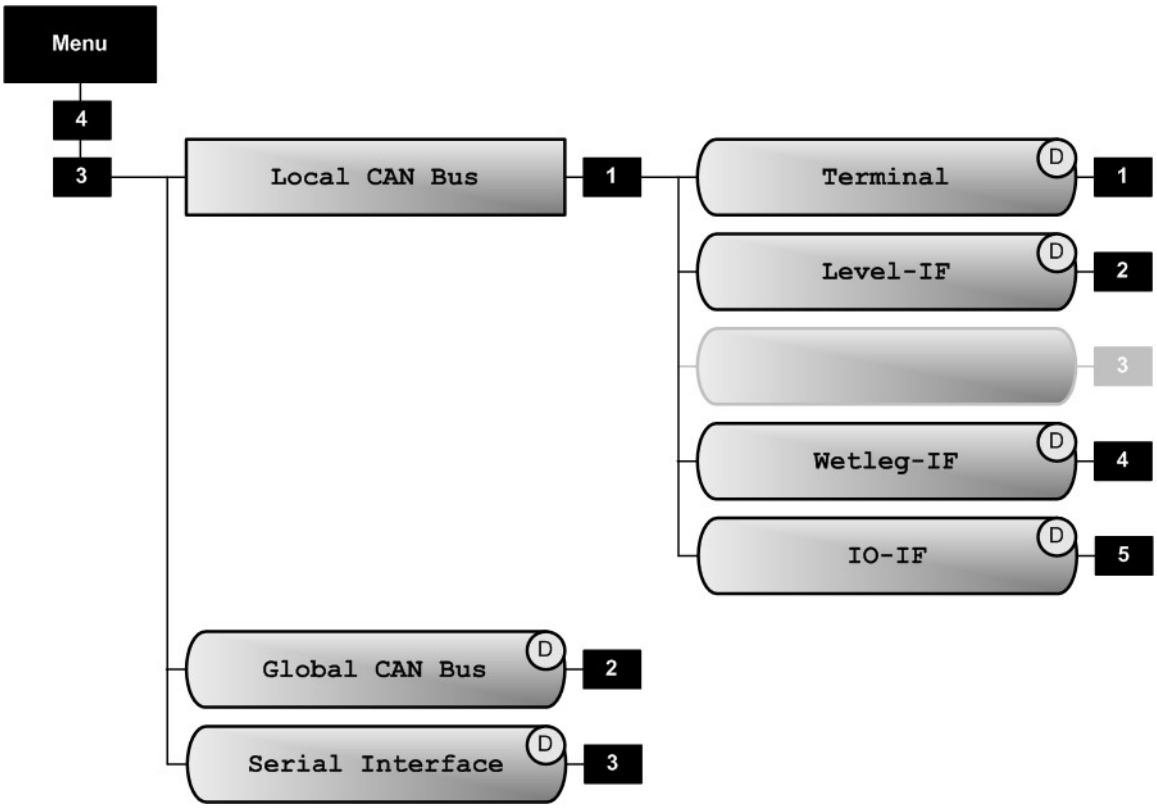
41 Electr. Seal



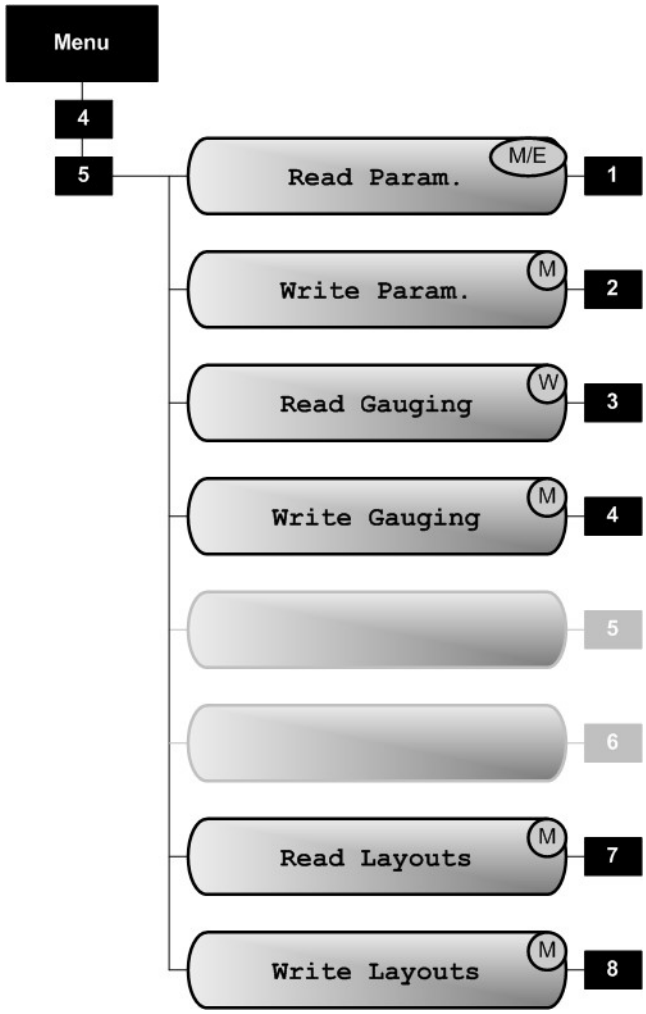
42 Calibration



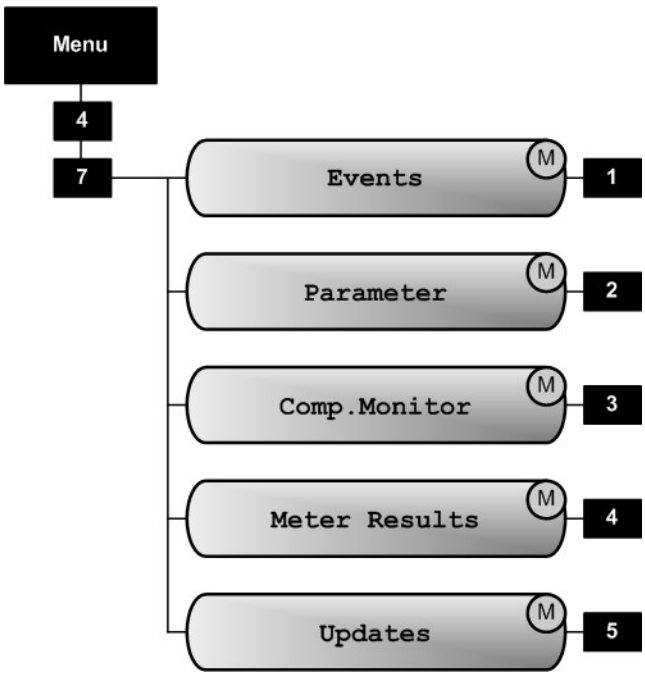
43 Diagnosis



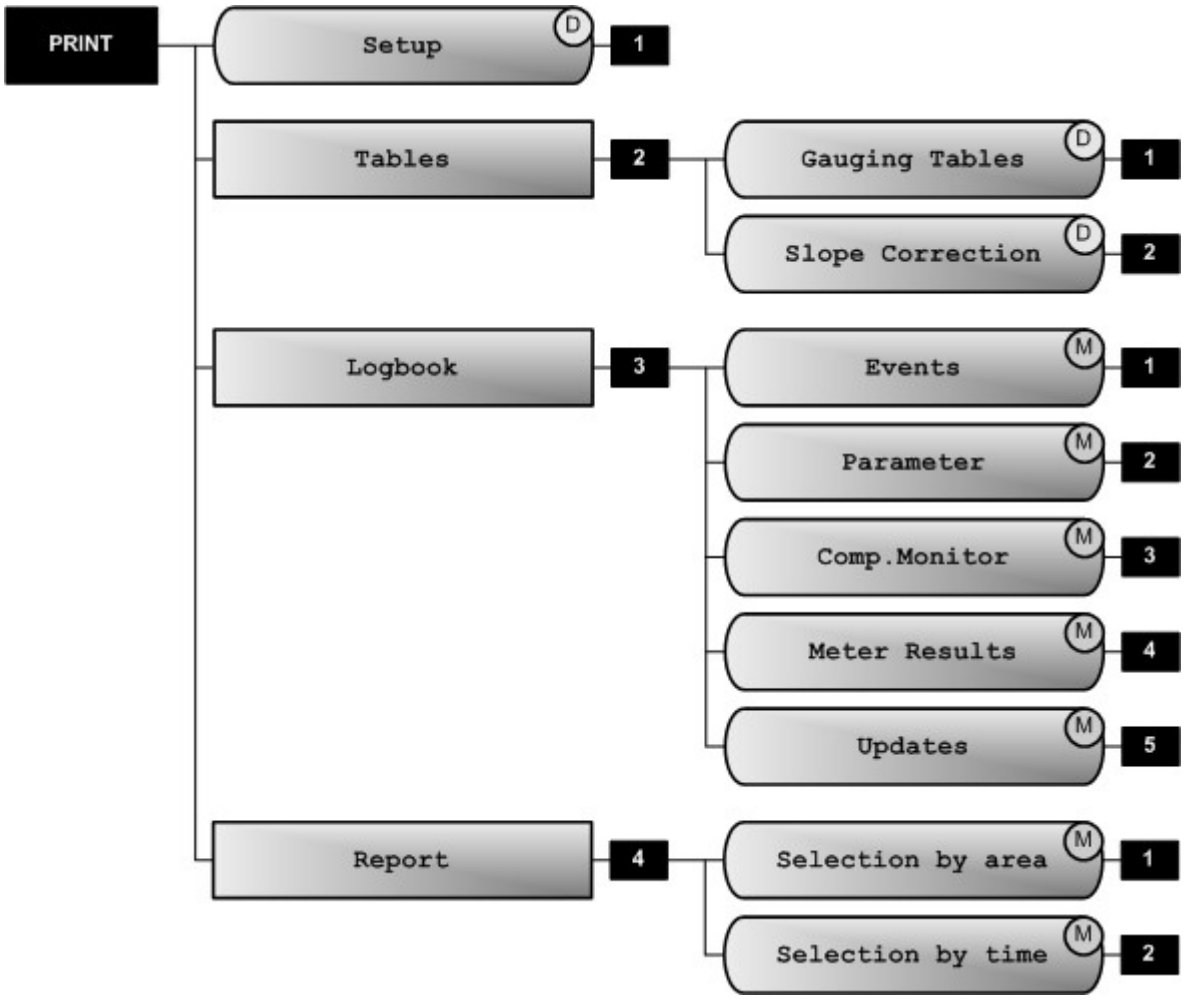
45 Chip Card



47 Logbooks



PRINT Menu


PRINT
Setup
D
1
Tables
2
Gauging Tables
D
1
Slope Correction
D
2
Logbook
3
Events
M
1
Parameter
M
2
Comp.Monitor
M
3
Meter Results
M
4
Updates
M
5
Report
4
Selection by area
M
1
Selection by time
M
2

16 – Parameter List

16.1. Parameter Table (V1.29)

No.	Name	K	Factory Setting	Meaning
1	**Display Config.**			
1.2	Date and Time	F E		Set internal clock **ATTENTION:** Date is calibration-protected!
1.3	User's Language	F	German	Display language for menus, alarms and reports
1.4	Customer's Lang.	F	German	Display language for deliveries and receipts
2	Loading Plan	F		
3	**Parameter List**			
3.1	**Device Settings**			
3.1.1	**Local CAN bus**			
3.1.1.1.	Terminals	M	1	Number of operating devices connected. **ATTENTION:** Chip card reader always at first device 1!
3.1.1.2.	Level IF	E	1	Number of level sensor interfaces connected
3.1.1.4.	Wetleg-IF	E	1	Number of wet leg interfaces connected
3.1.1.5.	IO-IF	E	0	Number of I/O interfaces connected
3.1.2.	**Global CAN-bus**			
3.1.2.1.	Global Node No.	M	1	Node number (address) of MultiLevel on the CAN bus. 0 No CAN communication 1 Node number of the first MultiLevel. 2-31 Node numbers of additional devices.
3.1.2.2.	OBC node	M	0	Node number of the On-Board computer. 0 No communication with OBC (not available 21 Standard node number of the OBC
3.1.2.3	NOMIX node	M	11	Node number of the NOMIX system. 0 No communication with NOMIX (not available) 11 Standard node number of NOMIX
3.1.2.4	Printer admin	M	1	Node number of the printer manager
3.1.2.5	Time target	M	1	Node number for time synchronization
3.1.3	**Compartments**			
3.1.3.1	No of compartments	E	3	Number of compartments in the tank truck
3.1.3.2 ... 3.1.3.4.	Compartments 1-10 … Compartments 21-30			See separate table
3.1.3.5.	**Comp. monitoring**			
3.1.3.5.1.	At loading	M	OFF	Compartment monitoring mode during loading: - OFF - Without foot valves - FV only at start - FV only at end - FV at start and end
3.1.3.5.2.	At delivery	E	OFF	Compartment monitoring mode during delivery (see above)
3.1.4	**Operation options**			
3.1.4.1	**General**			
3.1.4.1.1	Change Lplan	M	always	Enable changes to loading plan: - **always** Also possible with filled compartment - **empty** Only possible with empty compartment
3.1.4.2	**Delivery**			
3.1.4.2.1	**Preset**			
3.1.4.2.1.1	Preset Query	M	YES	Activates / deactivates volume preset
3.1.4.2.1.2	Preset Type	M	V0	Type of volume preset: **V0** Volume preset to compensated volume **VT** Volume preset to uncompensated volume

No.	Name	K	Factory Setting	Meaning
3.1.4.2.1.3	Auto-Adjust	M	YES	Activates / deactivates the automatic adjustment of the stop point for volume preset
3.1.4.3	**Loading**			
3.1.4.3.1	Valve Control	M	manual	Control of the bottom valves during loading - **automatic** Bottom valves are opened automatically - **manual** Bottom valves must be opened manually
3.1.4.3.2	Loadplan Query	M	NO	Query of Loading plan at beginning of Loading (Only in configuration without NOMIX) - **YES** Query at beginning of loading - **NO** No query Parameter 31411 (change Lplan) also applies!
3.1.4.3.3	Loading measurement	M	NO	Temperature-compensated Measurement during Loading - **YES** Measurement incl. Printing - **NO** No Measurement, no Printing See also Parameter 313xx47 (Max.Diff.V15)
3.1.4.7	**Help screens**	M		See separate table
3.1.5	**W&M restrictions**			
3.1.5.1	Seal password	E	12345678	Password for electronic W & M seal
3.1.5.4	**Slopes**			
3.1.5.4.1	Min. pitch slope	E	-5.0°	Min. pitch slope for calibrated delivery
3.1.5.4.2	Max. pitch slope	E	+5.0°	Max. pitch slope for calibrated delivery
3.1.5.4.3	Min. roll slope	E	-5.0°	Min. roll slope for calibrated delivery
3.1.5.4.4	Max. roll slope	E	+5.0°	Max. roll slope for calibrated delivery
3.1.5.4.5	Sens. Correct.Pitch	E	0.0	Inclination sensor offset in the longitudinal direction (see pre-acceptance test certificate)
3.1.5.4.6	Sens. Correct.Roll	E	0.0	Inclination sensor offset in the transverse direction (see pre-acceptance test certificate)
3.1.5.4.7	Inst. Correct.Pitch	E	0.0	Longitudinal Installation offset for inclination sensor
3.1.5.4.8	Inst. Correct.Roll	E	0.0	Transverse Installation offset for the inclination sensor
3.1.5.5	**Receipt printing**			
3.1.5.5.1	Minimum form	E	101, 103, 500, 503, 504	Minimum requirement of the weights and measures authority for delivery receipts: the specified elements must appear on the receipt.
3.1.5.5.2	Decimal Separator	E	Comma	Decimal separator: comma ',' or point '.'
3.1.5.6	**Device info**			
3.1.5.6.1	Device number	E	- ? -	The device number (rating plate, see housing of operating device) must be entered in this parameter.
3.1.5.6.2	Tank Number	E	- ? -	Serial number of the tank
3.1.5.6.3	Truck-ID	E	- ? -	e.g. registration number of the tank truck
3.2	**Printer settings**			
3.2.1	Printer selection	M	DR-295	Selection of the printer used: - DR-295 - DR-298 - DR-220 - ESC/P - ESC/P2 - ASCII - user-defined
3.2.2	**Interface**			
3.2.2.1	Port Number	M	COM1	Selection of the interface to be employed: **COM1** 1. serial interface (RS232/RS485) **COM2** 2. serial interface (RS232)
3.2.2.2	Interface Type	M	RS232	Switching between RS232 and RS485 (only for COM1)
3.2.2.3	Transfer Rate	M	9600	Transmission speed

No.	Name	K	Factory Setting	Meaning
3.2.2.4	Parity Check	M	Even	Parity for data transmission: - No parity - Even parity - uneven parity
3.2.4	**Options**			
3.2.4.1	Paper Feed	M	YES	Activation of automatic paper feed when using the TM-295
3.2.4.2	Reverse Eject	M	NO	Enables the reversal of the paper ejection direction for DR-295- und DR-298 printers. - **NO** Ejection takes place opposite to the printing direction (i.e. 'forward') - **YES** Ejection takes place in the printing direction (i.e. 'backwards')
3.2.4.3	Printer Mode	M	Exclusive access	Printing mode of the printer: - Exclusive access - Shared access - Network
3.2.4.4	Page Width	M	35	Page width (printable area) in characters
3.2.5	**Driver**			
3.2.5.1	**General**			
3.2.5.1.1	Init-Sequence	M		Initialization of the printer, e.g. character set
3.2.5.1.2	Reset Sequence	M	1B40	Reset of the printer
3.2.5.1.3	All attributes OFF	M	1B77001B54 1B2100	Reset of all attributes
3.2.5.2	**Size**			
3.2.5.2.1	10 CPI	M	1B501B32	Switch to 10 characters/inch
3.2.5.2.2	12 CPI	M	1B4D1B32	Switch to 12 characters/inch
3.2.5.2.3	15 CPI	M	1B671B30	Switch to 15 characters/inch
3.2.5.2.4	Double Width	M	1B5701	Switch to double character width
3.2.5.2.5	Double Height	M	1B77011B33 36	Switch to double character height
3.2.5.3	**Attributes**			
3.2.5.3.1	Condensed font	M	1B671B30	Switch to condensed font
3.2.5.3.2	Bold font	M	1B45	Switch to bold font
3.2.5.3.3	Italic font	M	1B34	Switch to italics
3.2.5.3.4	Underlined font	M	1B2D01	Switch to underscore
3.2.5.3.5	Superscript	M	1B5300	Switch to superscript characters
3.2.5.3.6	Subscript	M	1B5301	Switch to subscript
3.3.4	**Wetleg-IF**			
3.3.4.1	Timeout ON	E	7	Switch-on delay for sensor & digital inputs
3.3.4.2	Timeout OFF	E	30	Switch-off delay for sensor & digital inputs
3.3.4.3	Second sensor	E	No	Setting whether to use two wet leg sensors per compartment
3.4	**Form description**			**See separate table**
3.4.1	Page Layout	M		See separate table
3.4.2	Print Test Receipt	F		Prints a selected form with test data
3.4.3	Print Element List	F		Prints a list of the available form elements
3.5	**Product definition**			**See separate table**
3.6	**Driver list**			**See separate table**

16.2. Compartments

No.	Name	K	Factory Setting	Meaning
3.1.3.nn.1	**Sensors**			
3.1.3.nn.1.1	Level Sensor No	E	Comp.-No.	Assignment of compartment no. => level sensor
3.1.3.nn.1.2	Temp. Sensor No.	E	Comp.-No.	Assignment of compartment no. => temp. sensor
3.1.3.nn.1.3	Wet leg Sensor No.	E	Comp.-No.	Assignment of compartment no. => wet leg sensor
3.1.3.nn.1.4	Level Serial No.	E		Serial number of the connected level sensor
3.1.3.nn.1.5	Wet leg Sensor 2	E	N + Comp.-No.	Assignment of compartment no. => wet leg sensor 2
3.1.3.nn.1.6	Foot valve	E	Comp.-No.	Assignment of compartment no. => foot valve
3.1.3.nn.1.7	In-line valve	E	N + Comp.-No.	Assignment of compartment no. => in-line valve
3.1.3.nn.2	**Installation**			
3.1.3.nn.2.1	Zero Level sensor	E	0	Zero point of the level sensor
3.1.3.nn.2.2	Offset Ice Prot.	E	25000	Offset of the ice protection
3.1.3.nn.2.3	Offset Slope Table	E	0	Shift of the inclination correction table
3.1.3.nn.2.4	Offset Float	E	0	Float immersion depth (see pre-acceptance test certificate)
3.1.3.nn.2.5	X Offset level	E	0	Level sensor shift in longitudinal direction
3.1.3.nn.2.6	Y Offset level	E	0	Level sensor shift in transverse direction
3.1.3.nn.2.7	Offset Temp.	E	0.0	Shift of the temperature measurement
3.1.3.nn.3	Data			
3.1.3.nn.3.1	Comp. volume	E	5000	Volume of the compartment
3.1.3.nn.3.2	Pipe Volume	E	0	Volume between foot valve & line valve (determined automatically during calibration)
3.1.3.nn.3.3	Residual Volume	E	0	Volume between start of gauge table & line valve (determined automatically during calibration)
3.1.3.nn.3.4	Float MIN	E	40000	
3.1.3.nn.3.5	Float MAX	E	1000000	
3.1.3.nn.3.6	Correction	E	1.0	Correction value for the gauge table
3.1.3.nn.3.7	PreStop Level	M	0	Fill height at which preliminary switch-off takes place 0 = OFF
3.1.3.nn.3.8	SlopeStop Level	M	0	Fill height at which an inclination stop takes place 0 = OFF
3.1.3.nn.3.9	Max. Switchpoint	M	0	Volume (Vt) for Loading pre-switching cut-off (only during loading mode) 0 = OFF, no Loading pre-switching functionality
3.1.3.nn.4	**W&M Limits**			
3.1.3.nn.4.1	Min. Pitch Slope	E	-3.0°	Min. Pitch for residue discharge
3.1.3.nn.4.2	Max. Pitch Slope	E	+3.0°	Max. Pitch for residue discharge
3.1.3.nn.4.3	Min. Roll Slope	E	-3.0°	Min. Roll for residue discharge
3.1.3.nn.4.4	Max. Roll Slope	E	+3.0°	Max. Roll for residue discharge
3.1.3.nn.4.5	Min. Dlv. Volume	E	5000	Minimum delivery quantity for calibrated delivery
3.1.3.nn.4.6	Max. Volume Change	E	100	Max. Change in volume for compartment monitoring
3.1.3.nn.4.7	Max. Diff.V15	E	0	Alarm value for max. difference V15 between loading and delivery. 0 = OFF.
3.1.3.nn.5	**Preset**			
3.1.3.nn.5.1	Preset Correction	M	20000	Switch-off point for accurately reaching the preset amount (preliminary switch-off)
3.1.3.nn.5.2	Default Preset	M	5000	Standard preset amount

16.3. Form Description

No.	Name	K	Factory Setting	Meaning
3.4.1.n	**Form n**			
3.4.n.2	Page length	M	55	Page length in lines: DIN A4 = 55 lines for DR-295
3.4.n.3	Columns before print	M	0	Shift of the form in the vertical direction Specification of the shift in characters
3.4.n.4	Lines before print	M	0	Shift of the form in the vertical direction Specification of the shift in characters
3.4.n.5	Receipt definition	M		Definition of the form (receipt layout)
3.4.n.6	Number of items	M	99	Number of individual items per receipt: **99:** All items are printed on a receipt **1:** A separate receipt is printed for each item
3.4.n.7	Print list	F		Prints the receipt definition as reference list

16.4. Product Definition

No.	Name	K	Factory Setting	Meaning
3.5.n	**Product page-**			
3.5.nn.1.1	Product name	E	s.u.	Product name
3.5.nn.1.2	Short name	M	s.u.	Abbreviated name of the product (max. 4 characters)
3.5.nn.2	Product ype	E	s.u.	Current selection options: - Disabled - Liquid product
3.5.nn.3	W&M Code	E	s.u.	PTB article identification code
3.5.nn.7	**Temp.Compensation**			
3.5.nn.7.1	Compensation	E	s.u.	Activation of the compensation
3.5.nn.7.2	Comp.Temperature	E	s.u.	Selection of the compensation temperature
3.5.nn.7.3	API Table	E		Determination of the compensation method depending on the product group. **---** No API table (e.g. bulk goods) **6A** API table 6A **6B** API table 6B **54A** API table 54A (crude oil) **54B** API table 54B (refined oils) **54D** API table 54D (lubricating oil) **54X** API table 54X (liquid gases) **LIN** Linear approximation **POL** 3rd degree polynomial
3.5.nn.7.4	Average Density	E	s.u.	Physical constant, stipulated by the PTB.
3.5.nn.7.5	Factor 1	E	s.u.	Factor 1 for comp.method „LIN“ & „POL“
3.5.nn.7.6	Factor 2	E	s.u.	Factor 2 for comp.method „POL“
3.5.nn.7.7	Factor 3	E	s.u.	Factor 3 for comp.method „POL“
3.5.nn.7.8	Min. Temp.	E	s.u.	Min. temperature for comp.method „LIN“ & „POL“
3.5.nn.7.9	Max. Temp.	E	s.u.	Max. temperature for comp.method „LIN“ & „POL“
3.5.nn.9	Float Correction	E	s.u.	Product-dependent correction factor for the float immersion depth

16.5. Help Displays

No.	Name	K	Factory Settings	Meaning
3.1.4.7.1.1	Column 1	M	36	Page 1 / line 1: Product name
3.1.4.7.1.2	Column 2	M	37	Page 1 / line 2: Compartment VT (volume in liters)
3.1.4.7.1.3	Column 3	M	38	Page 1 / line 3: Wet leg sensor status
3.1.4.7.2.1	Column 1	M	1	Page 2 / line 1: Current roll in °
3.1.4.7.2.2	Column 2	M	2	Page 2 / line 2: Min. permissible roll in °
3.1.4.7.2.3	Column 3	M	3	Page 2 / line 3: Max. permissible roll in °
3.1.4.7.3.1	Column 1	M	6	Page 3 / line 1: Current pitch in °
3.1.4.7.3.2	Column 2	M	7	Page 3 / line 2: Min. permissible pitch in °
3.1.4.7.3.3	Column 3	M	8	Page 3 / line 3: Max. permissible pitch in °
3.1.4.7.4.1	Column 1	M	16	Page 4 / line 1: Current temperature in °C
3.1.4.7.4.2	Column 2	M	19	Page 4 / line 2: Delivered volume VT in liters
3.1.4.7.4.3	Column 3	M	20	Page 4 / line 3: Delivered volume V15 in liters
3.1.4.7.5.1	Column 1	M	23	Page 5 / line 1: CTL
3.1.4.7.5.2	Column 2	M	24	Page 5 / line 2: API table for the product
3.1.4.7.5.3	Column 3	M	31	Page 5 / line 3: Product density in kg/m³
3.1.4.7.6.1	Column 1	M	28	Page 6 / line 1: Current flow rate in l/min.
3.1.4.7.6.2	Column 2	M	29	Page 6 / line 2: Average flow rate in l/min.
3.1.4.7.6.3	Column 3	M	30	Page 6 / line 3: Delivered mass in kg
3.1.4.7.7.1	Column 1	M	42	Page 7 / line 1: Preset amount in liters (VT or V15)
3.1.4.7.7.2	Column 2	M	43	Page 7 / line 2: Remaining volume until preset in liters
3.1.4.7.7.3	Column 3	M	44	Page 7 / line 3: Remaining time until preset in min.
3.1.4.7.8.1	Column 1	M	46	Page 8 / line 1: Current NOMIX status of the compartment
3.1.4.7.8.2	Column 2	M	36	Page 8 / line 2: Product name
3.1.4.7.8.3	Column 3	M	38	Page 8 / line 3: Wet leg sensor status

16.6. The following help displays are defined

ID	Description	Example >12345678901234567890 1<
0	Blank line	
1	Roll (Y)	>Roll -0.71 ° <
2	Min. roll (compartment)	>C.min.roll -3.00 ° <
3	Max. roll (compartment)	>C.max.roll +3.00 ° <
4	Min. roll (total)	>Tl.min.roll -5.00 ° <
5	Max. roll (total)	>Tl.max.roll +5.00 ° <
6	Pitch (X)	>Pitch 2.51 ° <
7	Min. pitch (compartment)	>C.min.pitch -3.00 ° <
8	Max. pitch (compartment)	>C.max.pitch +3.00 ° <
9	Min. pitch (total)	>Tl.min.pitch -5.00 ° <
10	Max. pitch (total)	>Tl.max.pitch +5.00 ° <
11	Fill height [mm]	>Fillheight 1234.56 mm<
12	Measured value of level sensor (raw data) [mm]	>Levelsens. 1234.56 mm<

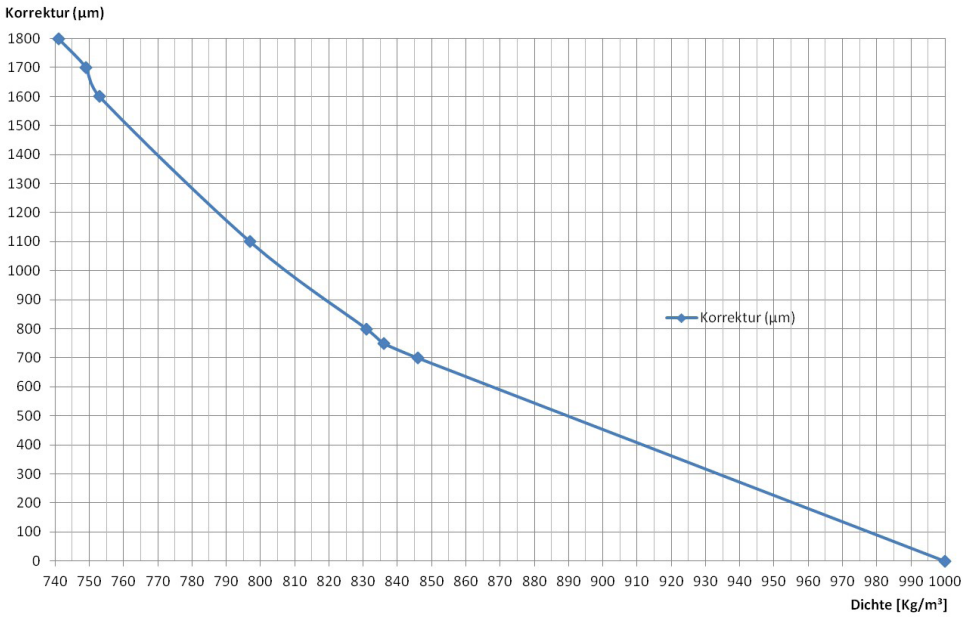
ID	Description	Example >123456789012345678901<
13	Current date + current time	>16.09.2004 10:45:23<
14	Current time	>Time 10:45:23<
15	Current date	>Date 16.09.2004<
16	Current product temperature [° Celsius]	>Curr. temp. +23.4 °C<
17	Current product temperature [° Fahrenheit]	>Curr. temp. +74.1 °F<
18	Current product temperature [° Kelvin]	>Curr. temp. +74.1 °K<
19	Volume VT	
20	Volume V15	>V15 123456.7 l <
21	Start time	>Start 10:45:23<
22	Start date	>Start 16.09.2004<
23	Current compensation factor CTL	
24	API table used	
25	Average product temperature [° Celsius]	>Ave. temp. +23.4 °C<
26	Average product temperature [° Fahrenheit]	>Ave. temp. +74.1 °F<
27	Average product temperature [° Kelvin]	>Ave. temp. +74.1 °K<
31	Average density	
33	Reference temperature [° Celsius]	
36	Product name	
37	Compartment fill volume VT in litres	>V15 ~12345.7 l <
38	Wet leg sensor status	>Wet leg: dry<
39	Residual volume status	>Residual vol: added<
	Undefined	>Not defined! <

16.7. The factory settings include the following products

Table of all used abreviations:

No.	Name	Abbr.	PTB code	Comp.	Density [kg/m³]	Float corr. (µm)	Factor 1	Factor 2	Factor 3	Min. Temp.	Max. Temp.
11	Heating oil EL	HEL	1	LIN	835	770	0.84E-3	0.0	0.0	-20	+50
12	Diesel	DK	2	LIN	833	780	0.84E-3	0.0	0.0	-20	+50
13	Super unleaded	SU5	3	LIN	743	1750	1.27E-3	0.0	0.0	-20	+50
14	Bio-fuel E10	SU10	5	LIN	743	1750	1.27E-3	0.0	0.0	-20	+50
15	Super-Plus (98)	SUP	6	LIN	753	1600	1.27E-3	0.0	0.0	-20	+50
16	Petroleum	PET	7	54B	807	1000	0.0	0.0	0.0	0	0
17	Jet Fuel	JET	8	54B	801	1050	0.0	0.0	0.0	0	0
18	Bio-Diesel (RME)	RME	9	LIN	882	550	0.84E-3	0.0	0.0	-20	+50
30	Water	H2O	2	---	1000	0	0.0	0.0	0.0	0	0

16.7.1. Correction curve for immersion depths



Values not listed on this table can be determined using the correction curve.

17 – Drawings and Approvals

Drawing specially for Level Sensor	Nr.
Equipment parts	E71.251579
Level sensor installation, complete	E61.251579
Complete Level sensor for MultiLevel	E51.351851
Protective tube	E51.251583
Weld-in flange TW220 DN65	E51.251588
Connection flange for Level sensor	E51.251593
MultiLevel Main Unit & Display, complete	E61.352025
Circuit diagram - Main Unit / Display	
- NM2MAINDISP(2) - MSMAINDISP(2) - LLGMAINDISP(2) -	E51.351673
Circuit diagram - display interface (NM2Display)	E51.351352
NoMix 2000 Main Unit & Display, complete, NM2MAINDISP	E61.351549
EPROM exchange / SETUP switch Main CPU board - conversion instructions	E51.351675
Temperature sensor MLDTS-2	E51.351978
MLIF interface	E51.351998
Sensor NS-2E, complete	E51.351307
Wet leg sensor setting behind the NS-2E / NS-2A	E51.350839
Circuit diagram – wet leg sensor interface NM2WET	E51.351346
ML wet leg sensor interface, complete, NMN2WET-E	E51.351997
Circuit diagram - Level sensor interface MLIF	E61.351918
I/O interface, complete, NM2IO	E51.351466
Circuit diagram - I/O interface	E51.351468
Inclination sensor	E51.351979
Chip card reader / CCR	E51.351801
Circuit diagram - signal generator / chip card reader on Display CPU board	E51.351751
Overall wiring diagram - NoMix2000 & MultiLevel	E11.351906

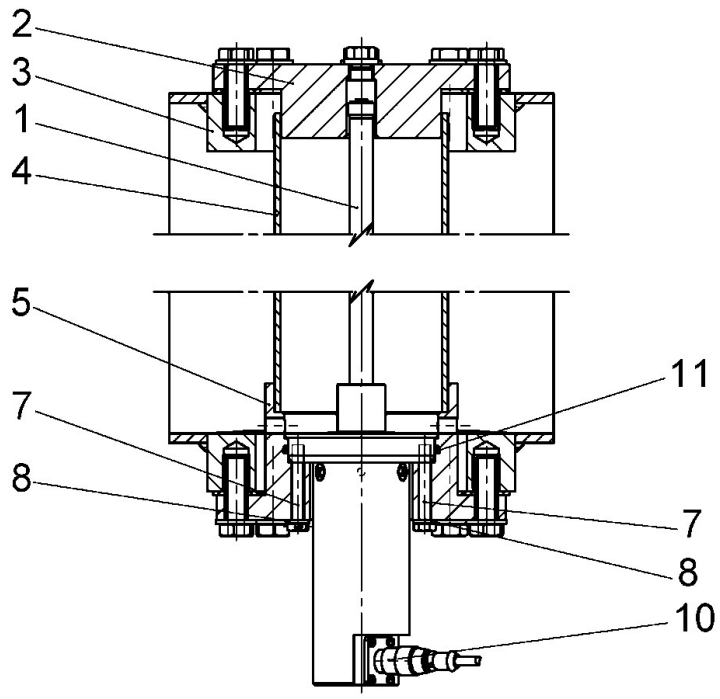
Approvals	
EC declaration of conformity EMC	ATEX_FAS_KEel_130_MultiLevel

Documentation and drawings as PDF files on the Internet:

http://info.smithmeter.com/literature/Sening_Handbook_Main.html

17.1. Drawings

17.1.1. 71.251579 – Equipment parts



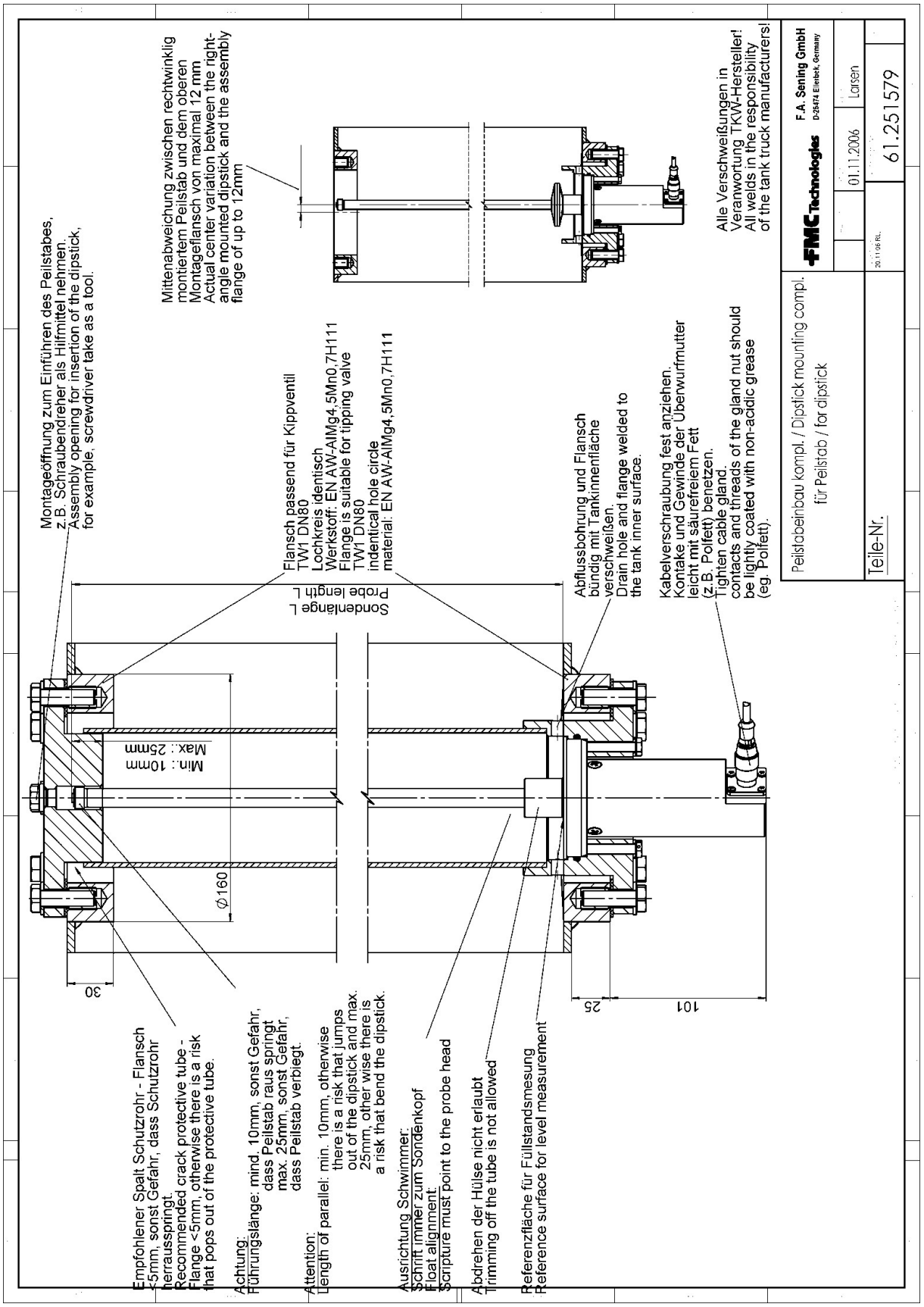
Pos./ Item	Teile-Nr./ Part-No.	Stück/ Quant.	Benennung	Description
1	MLDSBO-XXXX	1	Peilstab komplett	Dipstick complete
2	251592	1	Flansch, kpl. für Peilstabführung	Flange, compl. for dipstick guide
3	251588	2	Einschweißflansch	Weld-in flange
4	251583	1	Schutzrohr	Protective tube
5	251593	1	Anschlußflansch komplett	Coupling flange complete
7	4100231	2	Sechskantschraube M6x40	Hexagon screw M6x40
8	4300024	4	Scheibe 6,4	Washer 6,4
9	4100231	2	Sechskantschraube M6x40 mit Plombenbohrung	Hexagon screw M6x40 with seal bore
10	7000079	1	Kabeldose M12 Gerade	Cable box M12
11	6000126	1	O-Ring	O-ring
12	251596	1	Produktschwimmer	Product float

Peilstab für MultiLevel
Flansche geschraubt
in TW220 DN65

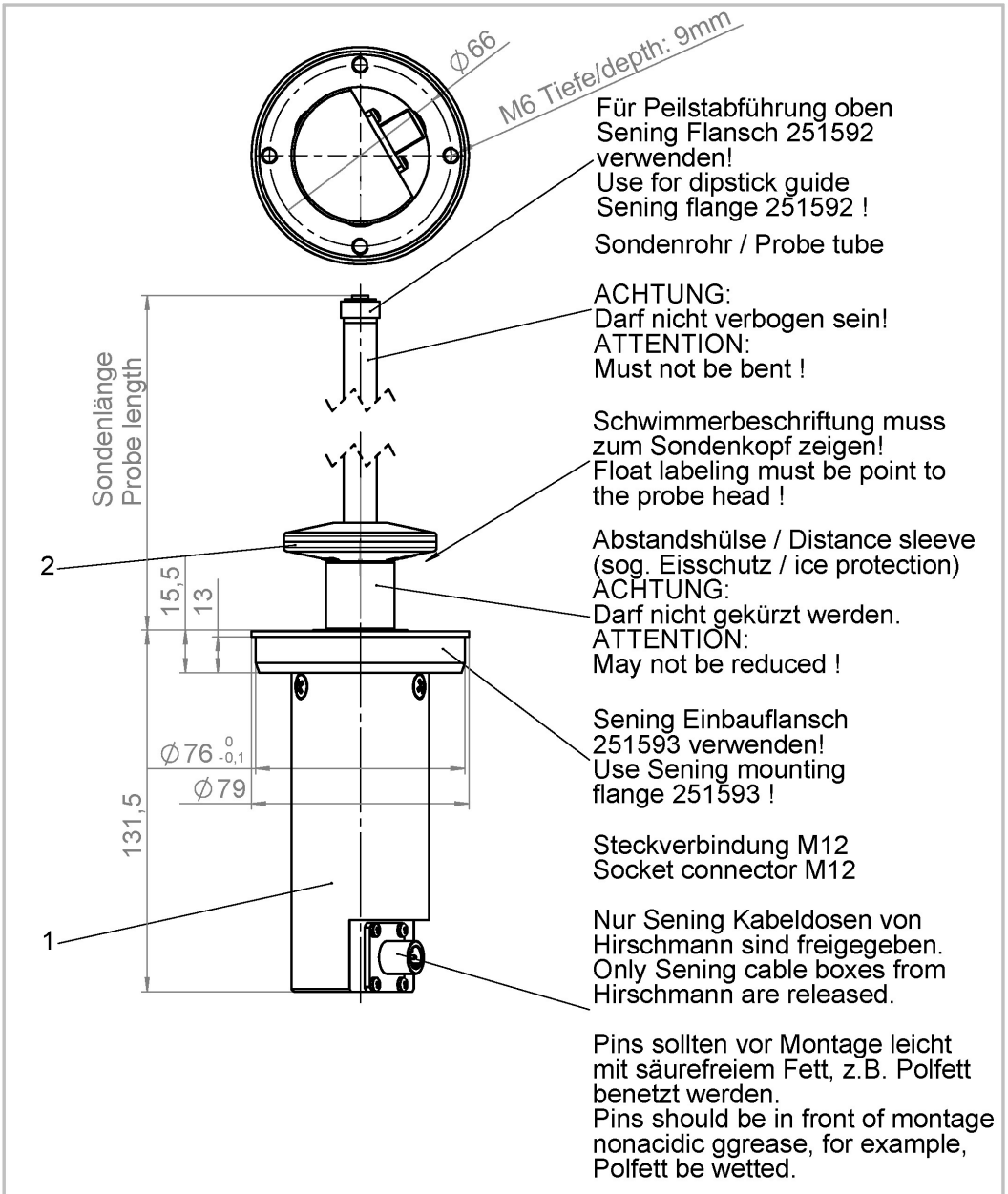
FMC Technologies
F.A. Sening GmbH
D-25474 Ellerbek, Germany

Gezeichnet | Datum 11.01.2007 | Name Fedde
Zeichnungs-Nr. 71.251579 | Rev

17.1.2. 61.251579 – Level sensor installation, complete



17.1.3. 51.351851 – Complete Level sensor for MultiLevel



Pos.	Beschreibung	Description	Stk/Qty.	Teile-Nr./Part-No.
2	Schwimmer vorgeprüft	Float pretested	1	251596
1	Peilstab vorgeprüft	Dipstick pretested	1	351849-xxxx

xxxx: Sondenlänge in mm (Längentoleranz: + 4,5 mm)
Probe length in mm (length tolerance: + 4,5 mm)

Teile-Nr. MLDSBO-xxxx

Peilstab kompl. / Dipstick compl.
für/for MultiLevel
eichamtlich vorgeprüft/office of W&M pretested

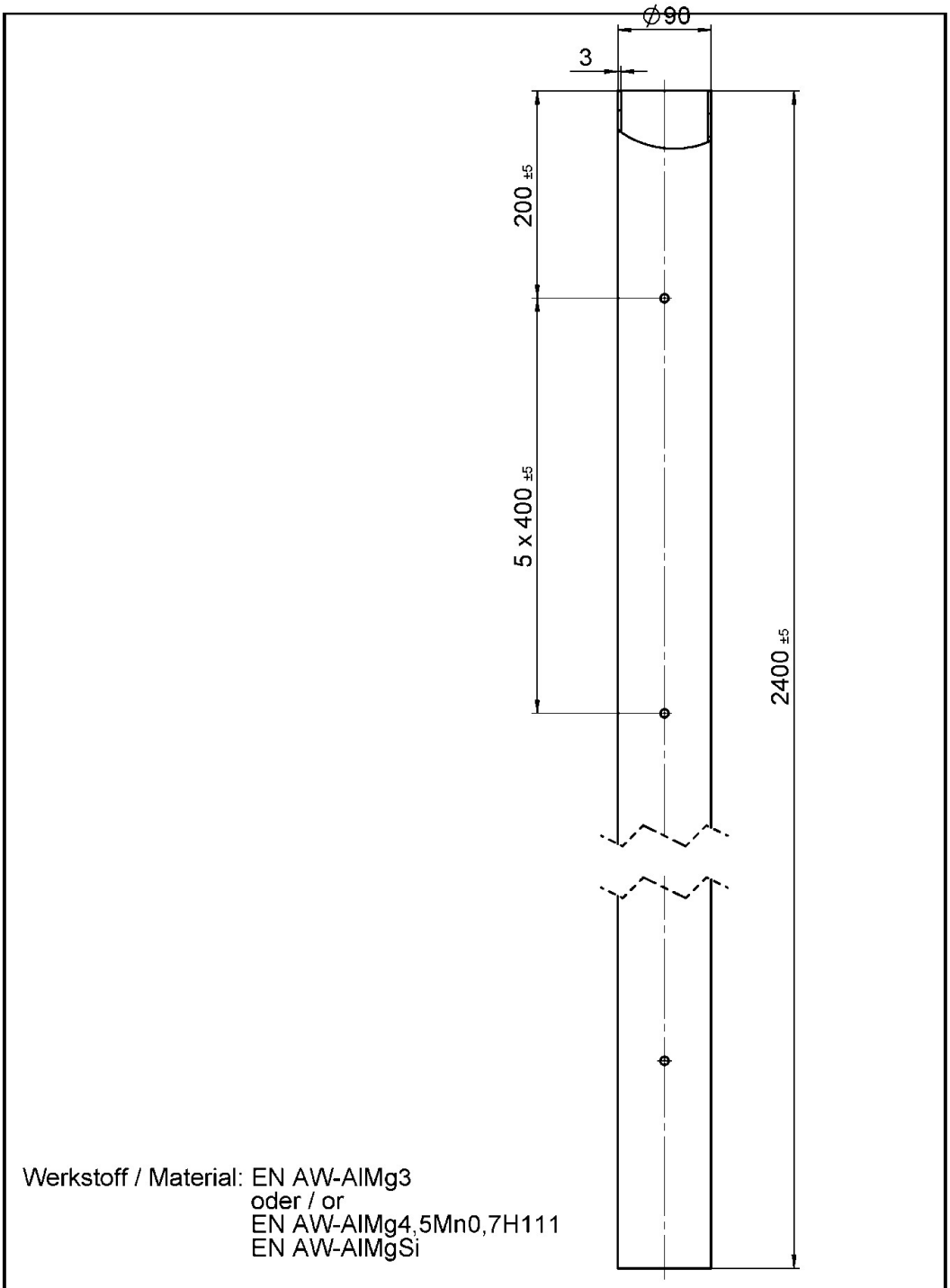
FMC Technologies
F.A. Sening GmbH
D-25474 Ellerbek, Germany

Geänd. am:	Datum:	Name:
	18.01.2007	Fedde

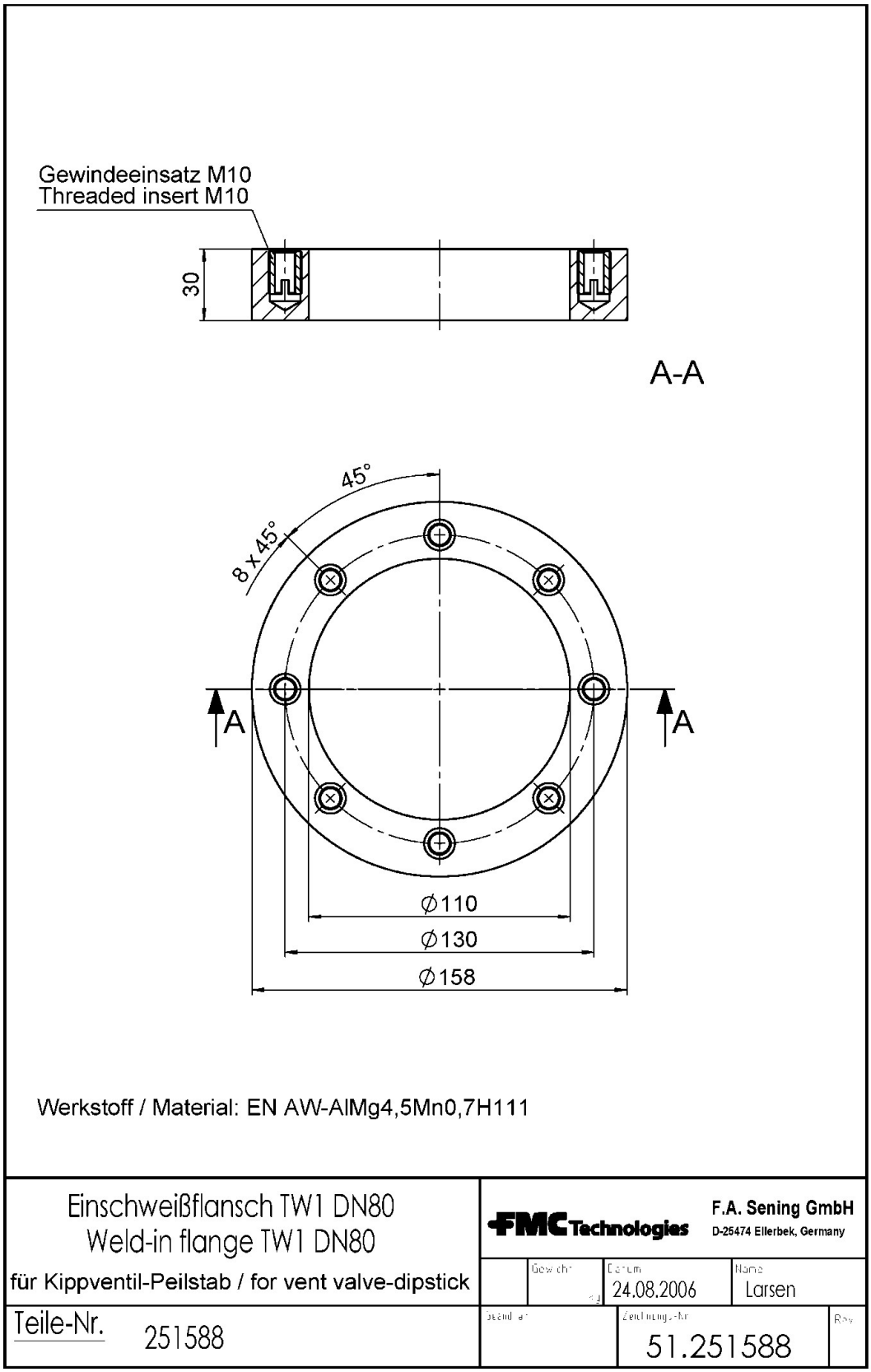
Zeichnungs-Nr.: 51.351851 Rev.:

"Schutzvermerk nach DIN ISO 16016 beachten"

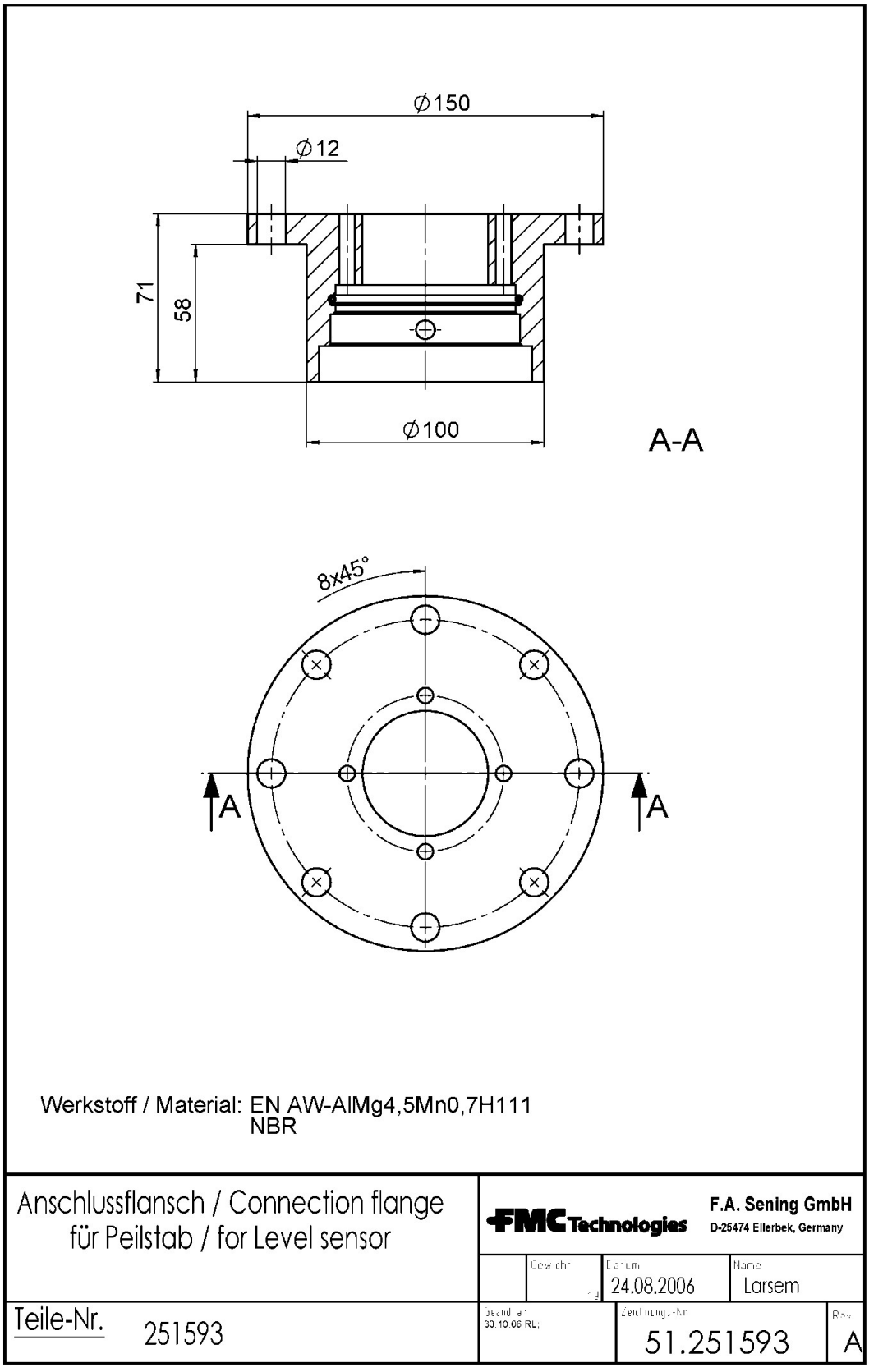
17.1.4. 51.251583 – Protective tube



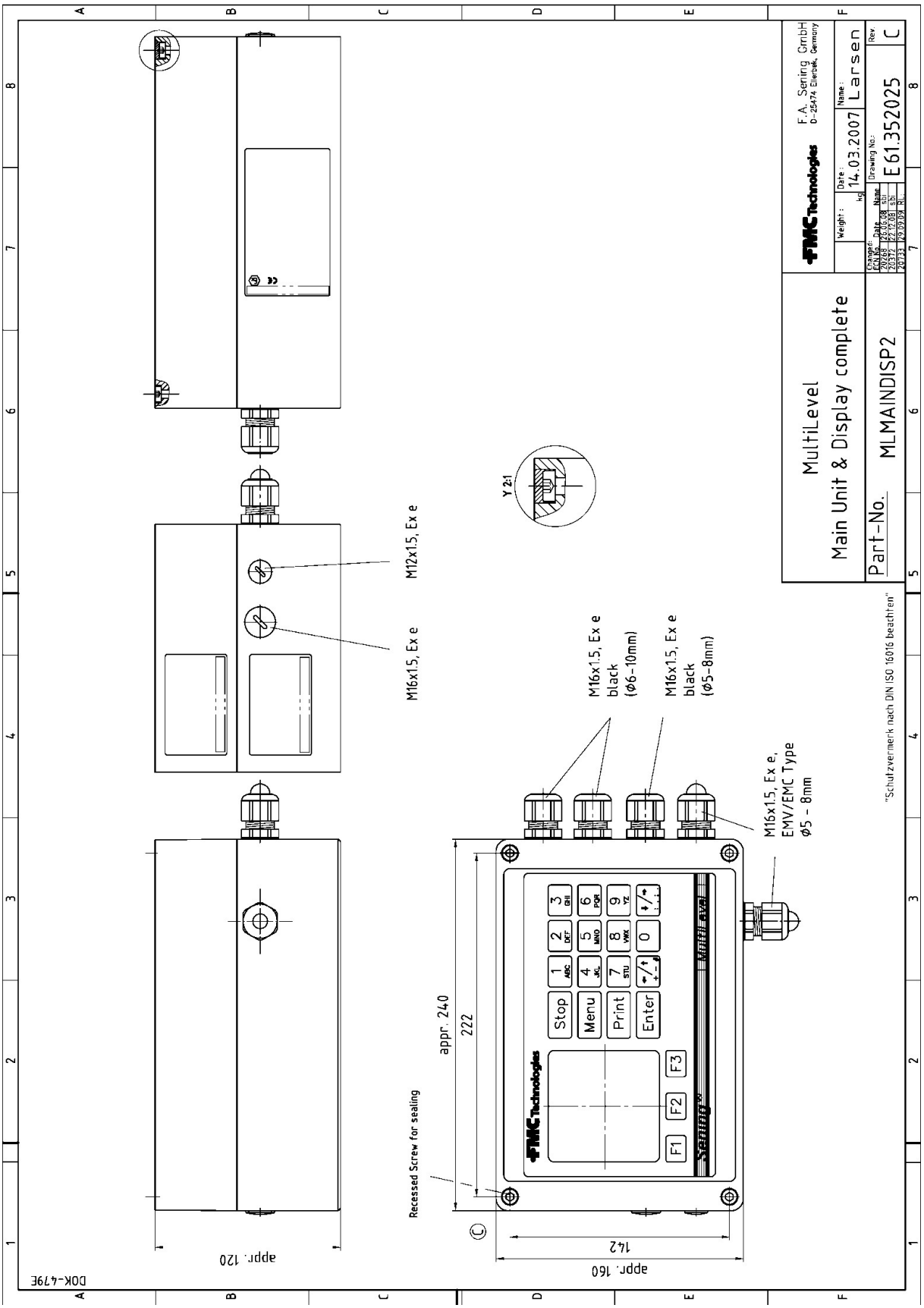
17.1.5. 51.251588 – Weld-in flange TW220 DN65



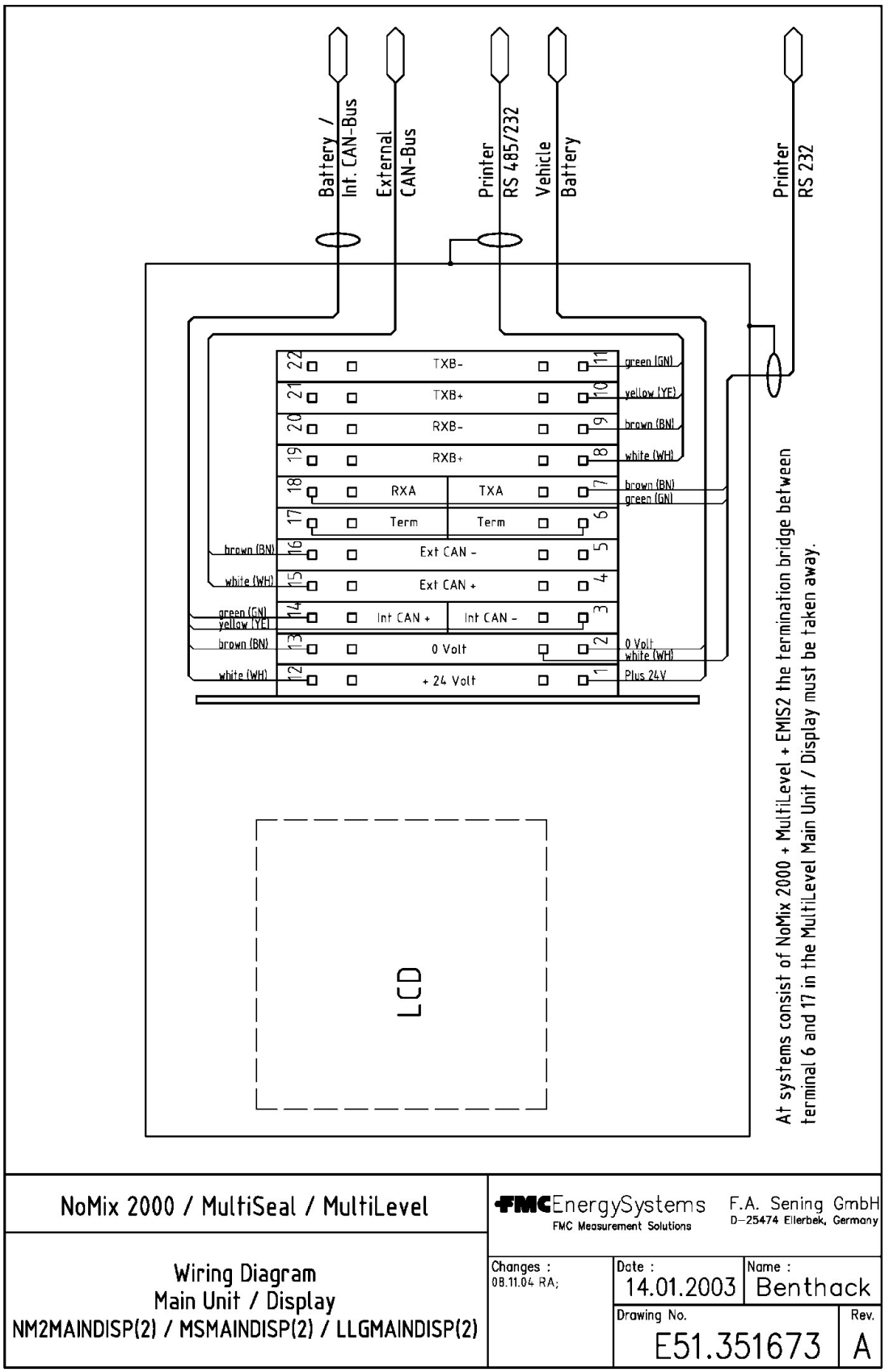
17.1.6. 51.251593 – Connection flange for Level sensor



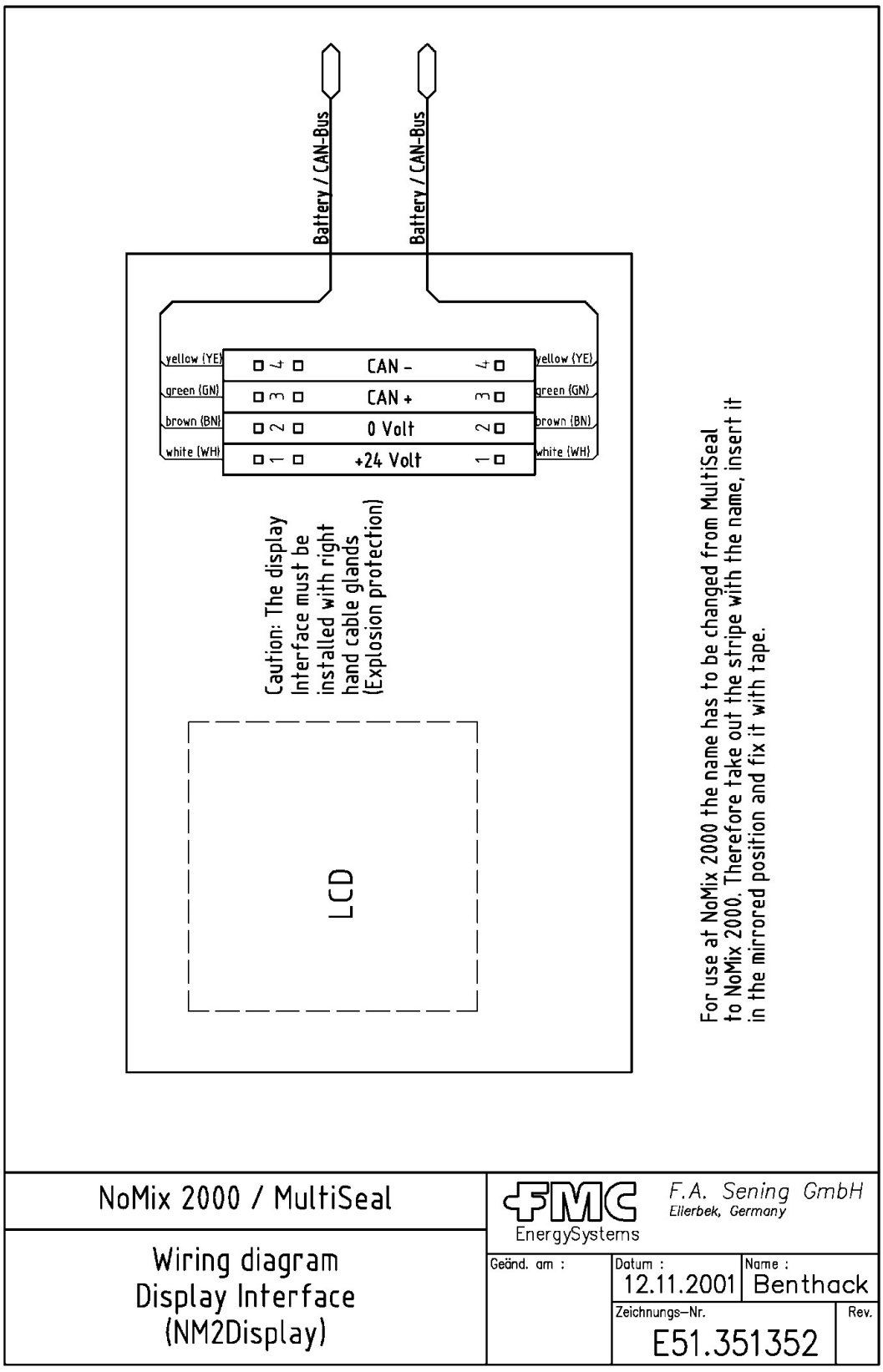
17.1.7. 61.352025 – MultiLevel Main Unit & Display, complete



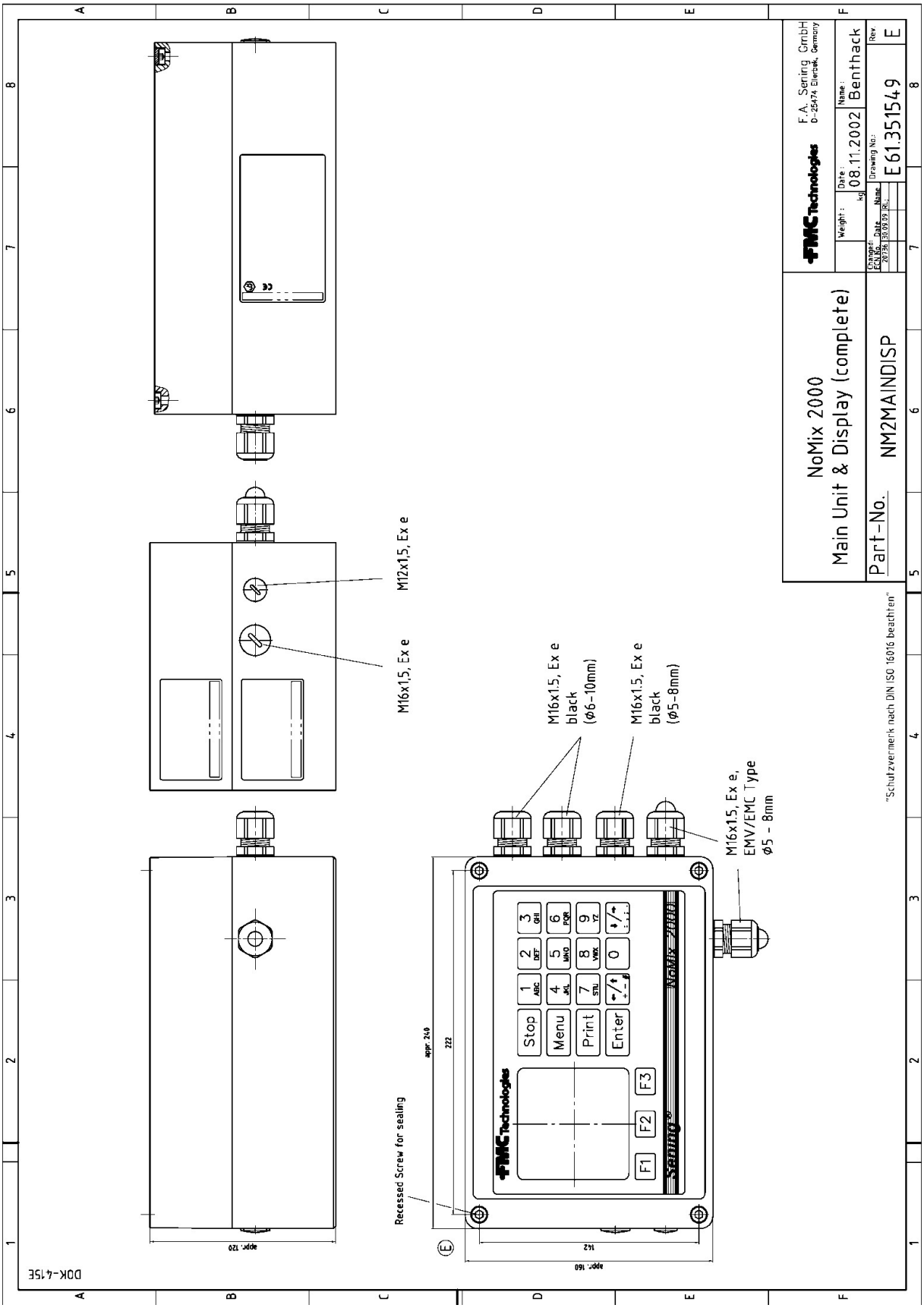
17.1.8. 51.351673 – Wiring diagram Main Unit / Display – NM2MAINDISP(2) – MSMAINDISP(2) – LLGMAINDISP(2)



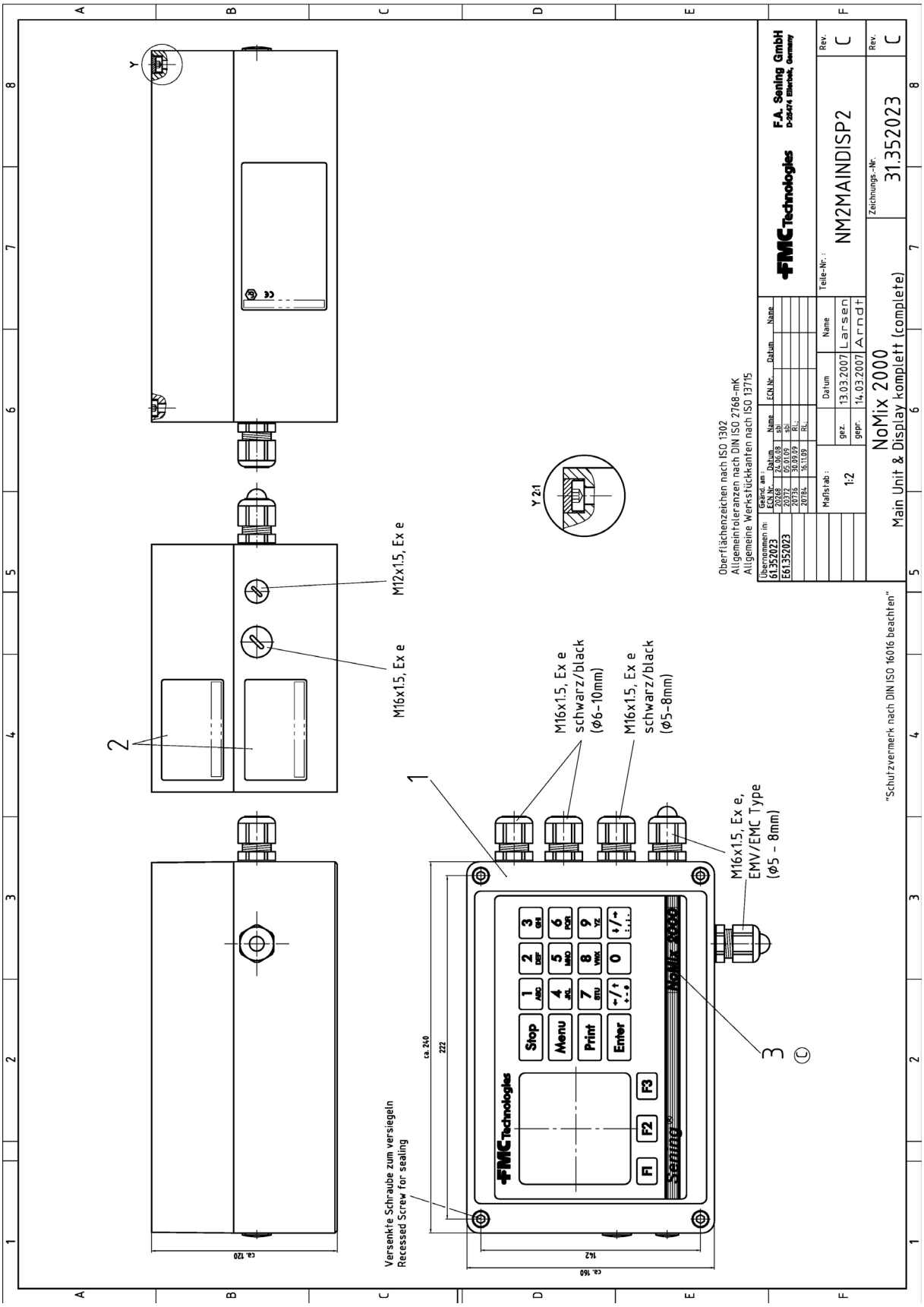
17.1.9. 51.351352 – Circuit diagram – Display Interface (NM2Display)



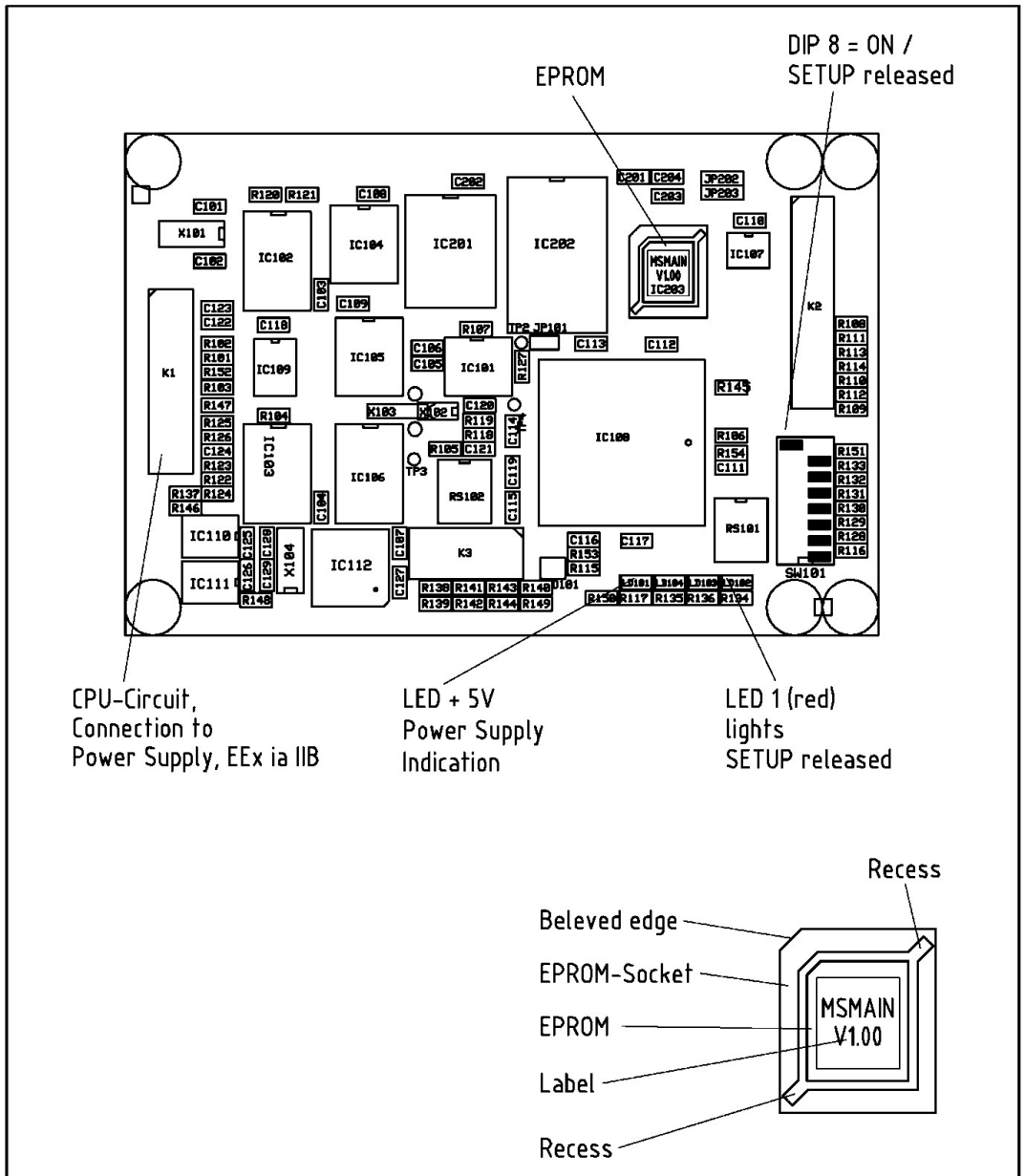
17.1.10. 61.351549 – NoMix 2000 Main Unit & Display, complete - NM2MAINDISP



17.1.11. 31.352023 – NoMix Main Unit & Display, complete - NM2MAINDISP2



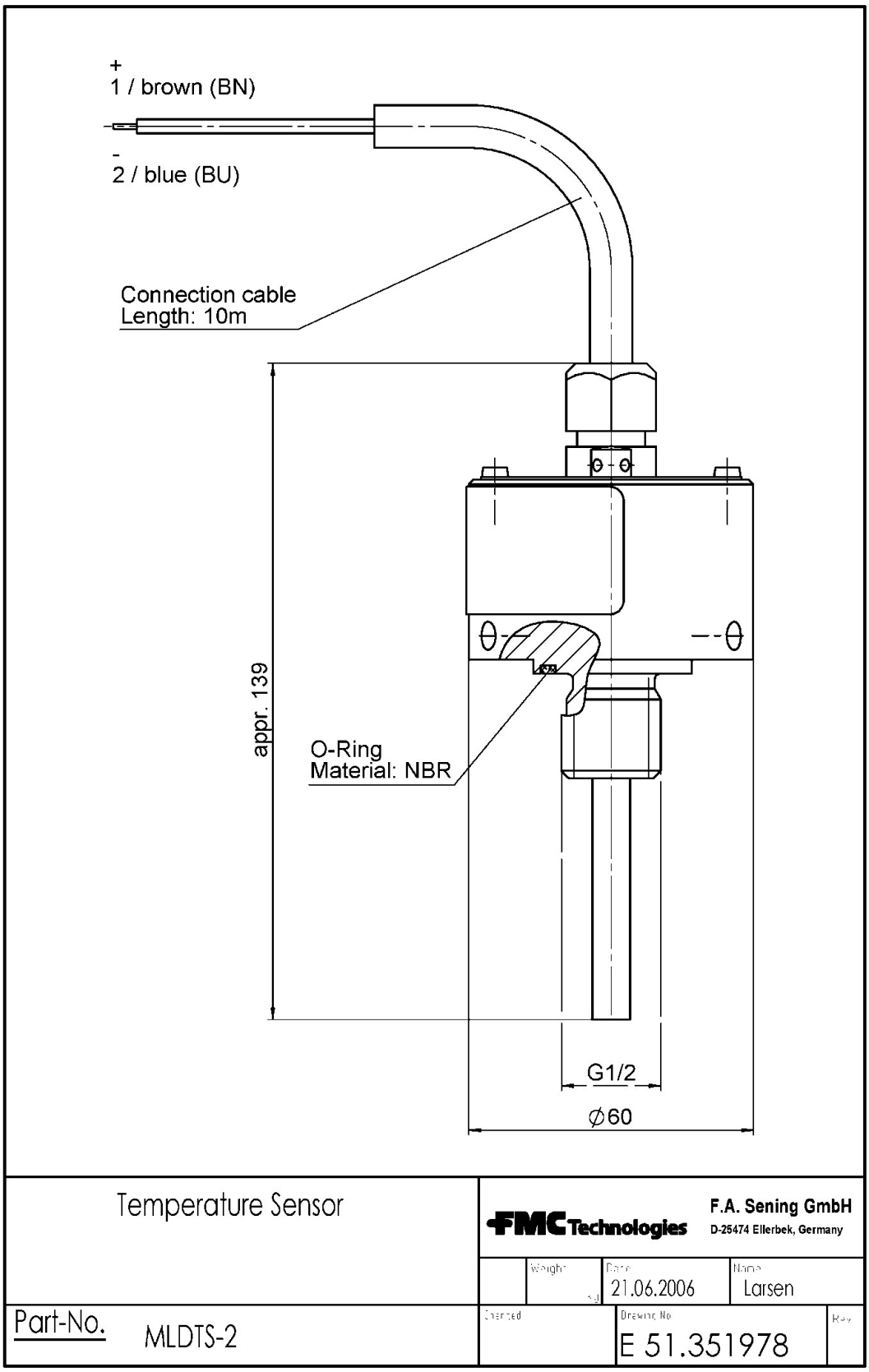
17.1.12. 51.351675 – EPROM removal / SETUP switch Main CPU-Board removal instruction



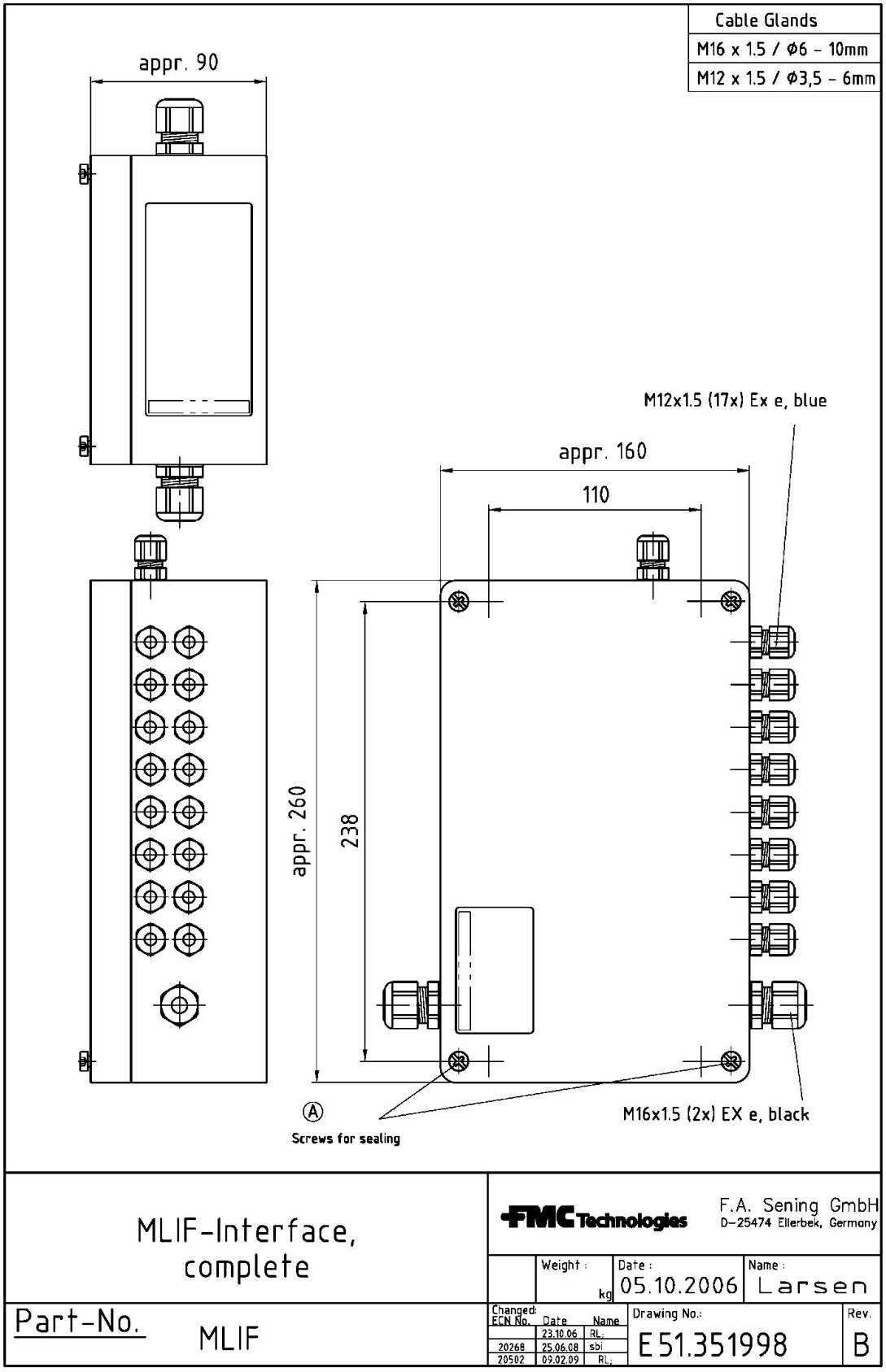
CAUTION: To remove the EPROM from the base, a special PLCC removal tool must be used (see also instruction DOK-415E and DOK-416E).

NoMix 2000/MultiSeal Main Unit / Display	FMC EnergySystems FMC Measurement Solutions	F.A. Sening GmbH D-25474 Ellerbek, Germany	
EPROM-Removal / SETUP-Switch Main CPU-Board - Instruction Manual -	Changes : 26.08.04 RA;	Date : 29.01.2003	Name : Benthack
		Drawing No. E51.351675	Rev. A

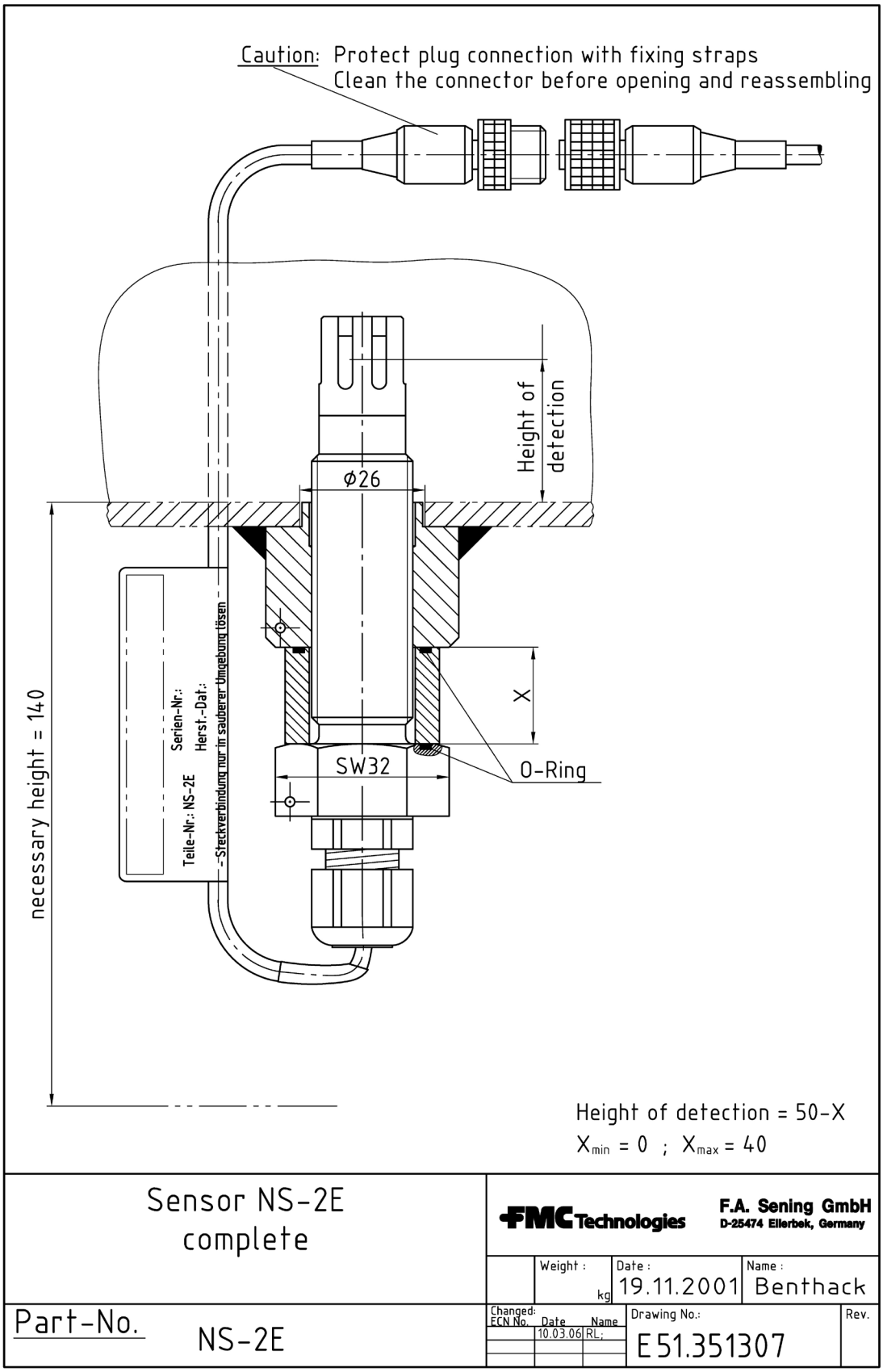
17.1.13. 51.351978 – Temperature sensor MLDTS-2



17.1.14. 51.351998 – MLIF interface



17.1.15. 51.351307 – Sensor NS-2E, complete



17.1.16. 51.350839 – Wet leg sensor setting behind the NS-2E / NS-2A

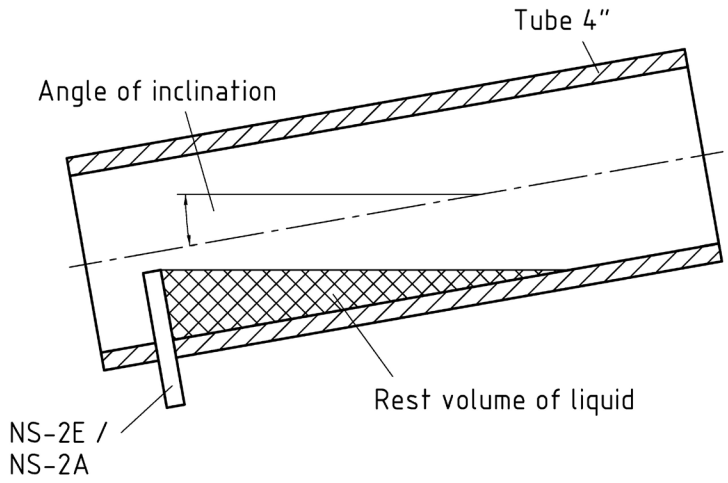


Figure: Rest volume of liquid behind the NS-2E / NS-2A

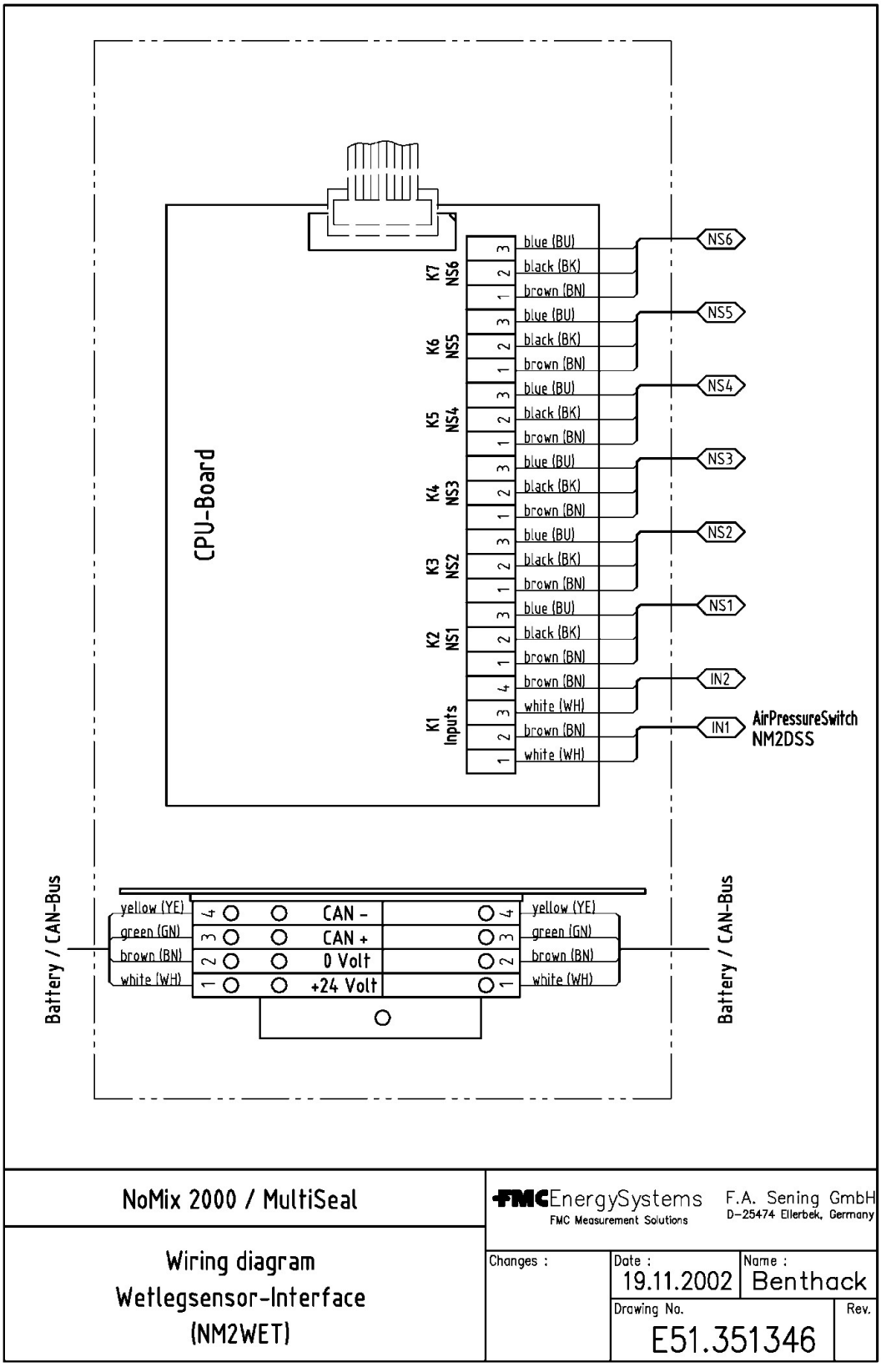
Hight of operation in [mm]	Inclination angle of the tube [Grade]				
	1	2	3	4	5
20	0.5	0.3	0.2	0.1	0.1
30	1.4	0.7	0.5	0.4	0.3
40	2.8	1.4	0.9	0.7	0.6
50	4.8	2.4	1.6	1.2	1.0

Rest volume of liquid behind the NS-2E / NS-2A in [Liter]

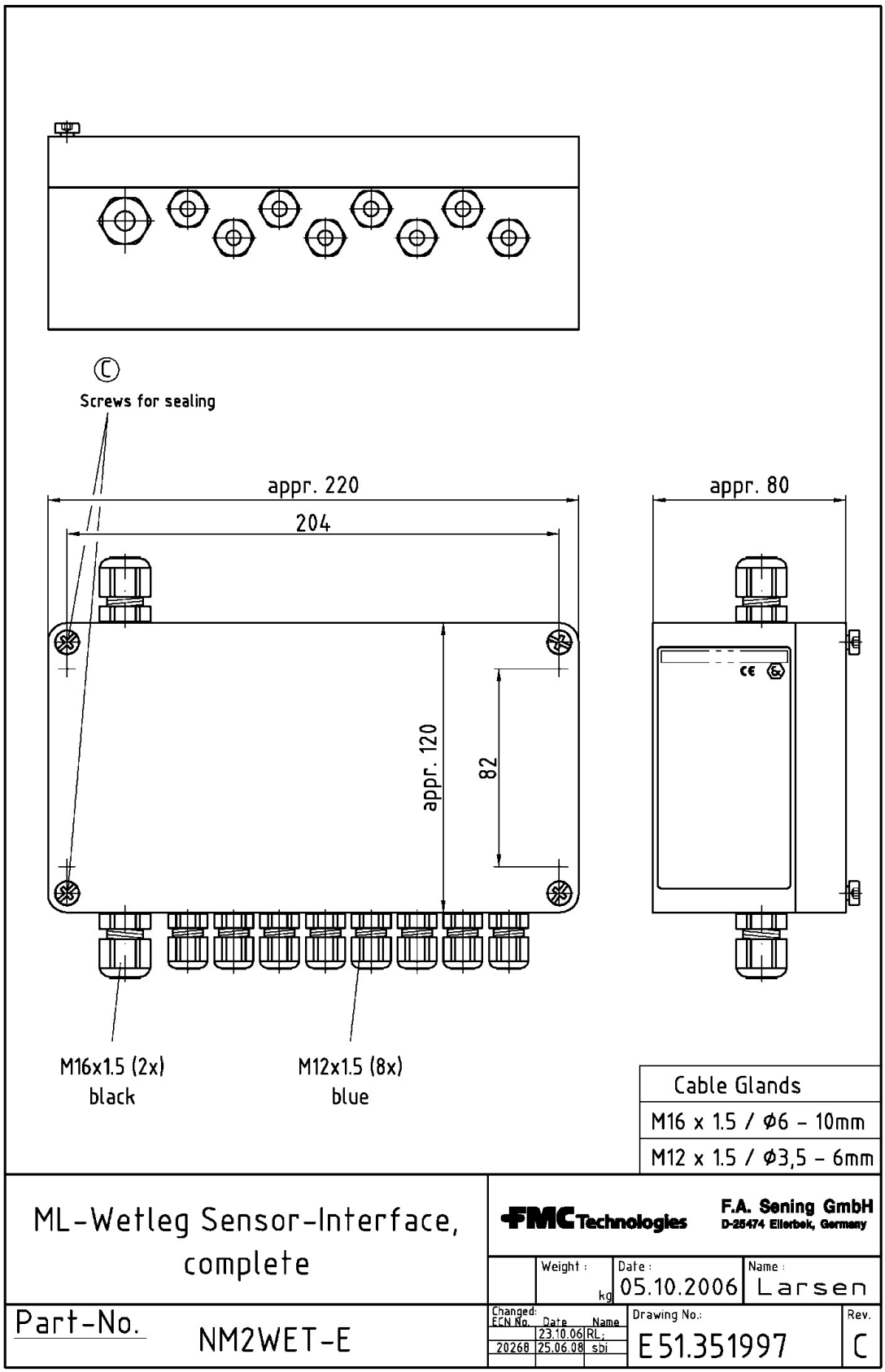
Table: Calculated rest volume of liquid

Rest volume behind the NS-2E / NS-2A	FMC Technologies F.A. Sening GmbH D-25474 Ellerbek, Germany	
	Changed : ECN No. 31.08.00 Name MK.:	Date : 15.01.1997 Name : Kracht
		Drawing No. E51.350839 Rev.

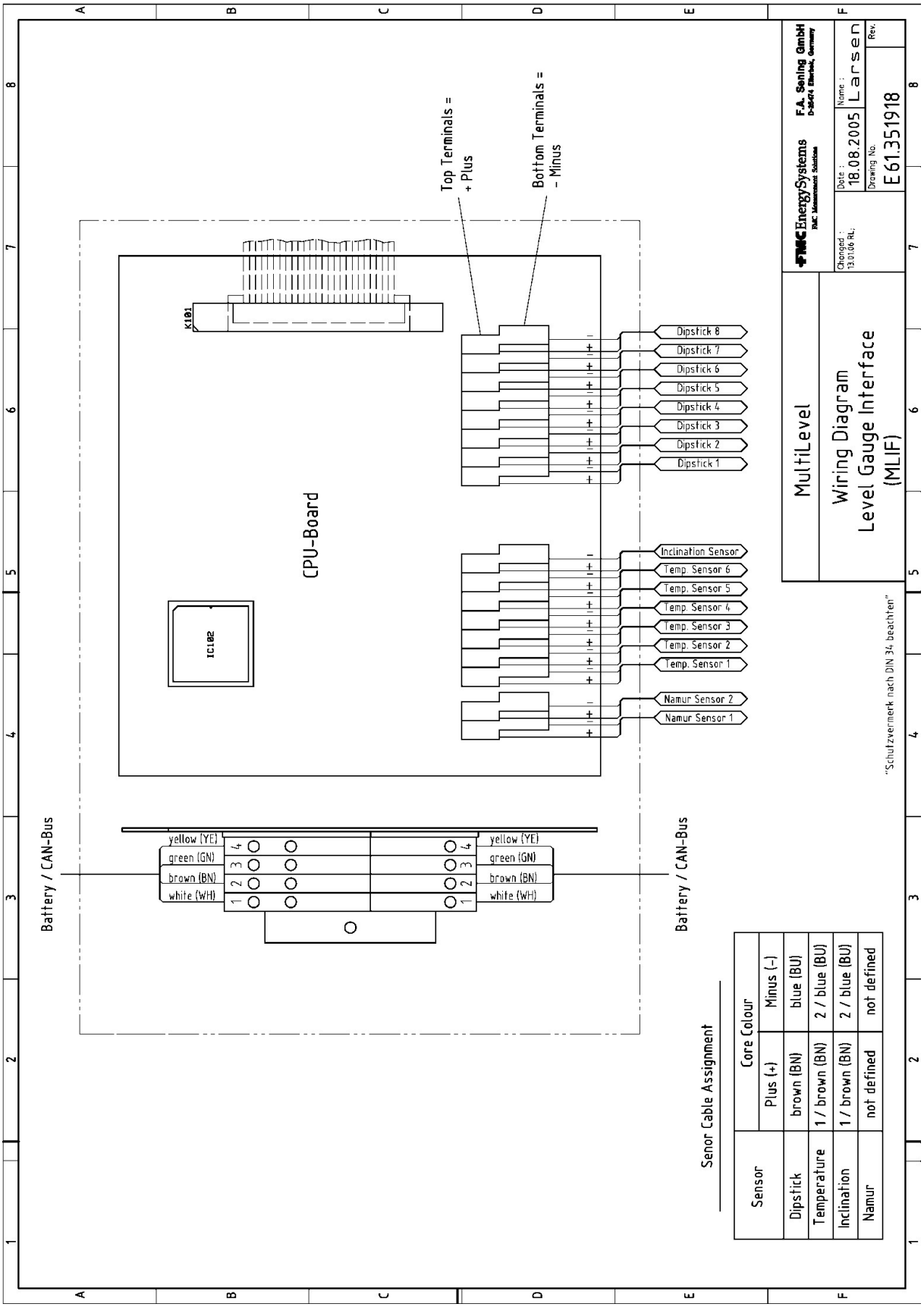
17.1.17. 51.351346 – Wiring diagram wet leg sensor interface - NM2WET



17.1.18. 51.351997 – ML-Wet leg sensor interface, complete – NMN2WET-E

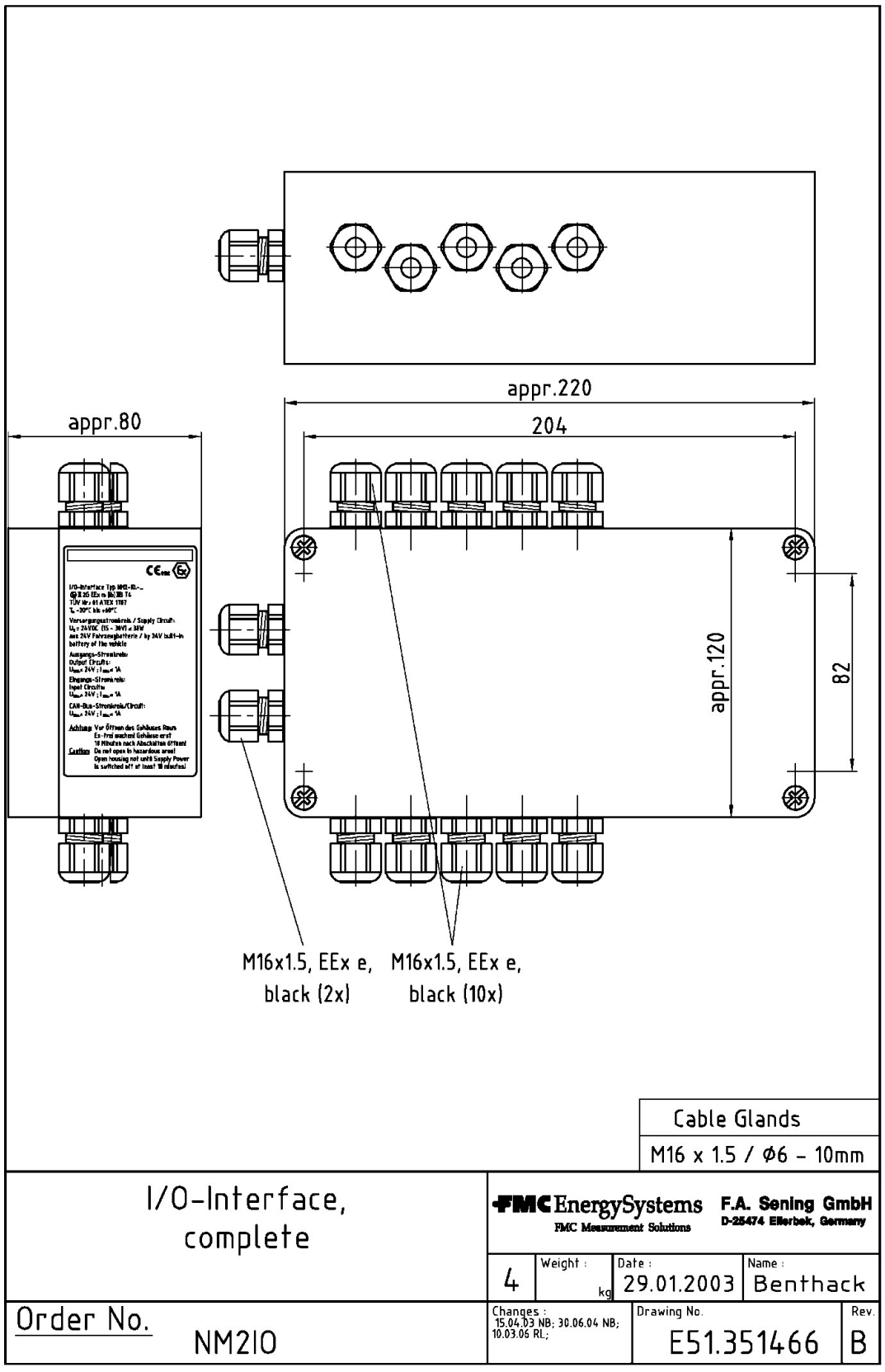


17.1.19. 61.351918 – Circuit diagram – Level sensor interface MLIF

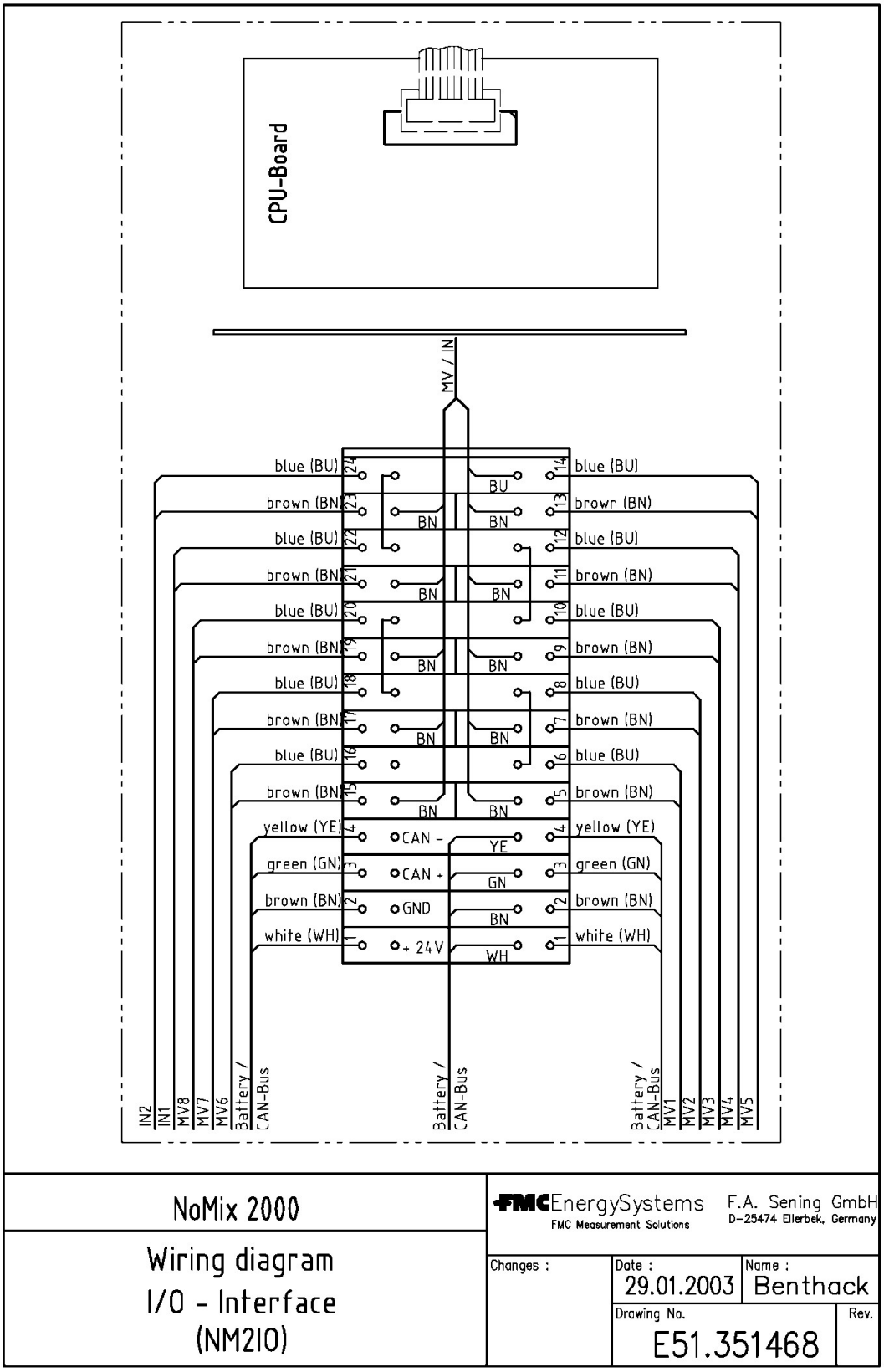


Sensor	Core Colour	
	Plus (+)	Minus (–)
Dipstick	brown (BN)	blue (BU)
Temperature	1 / brown (BN)	2 / blue (BU)
Inclination	1 / brown (BN)	2 / blue (BU)
Namur	not defined	not defined

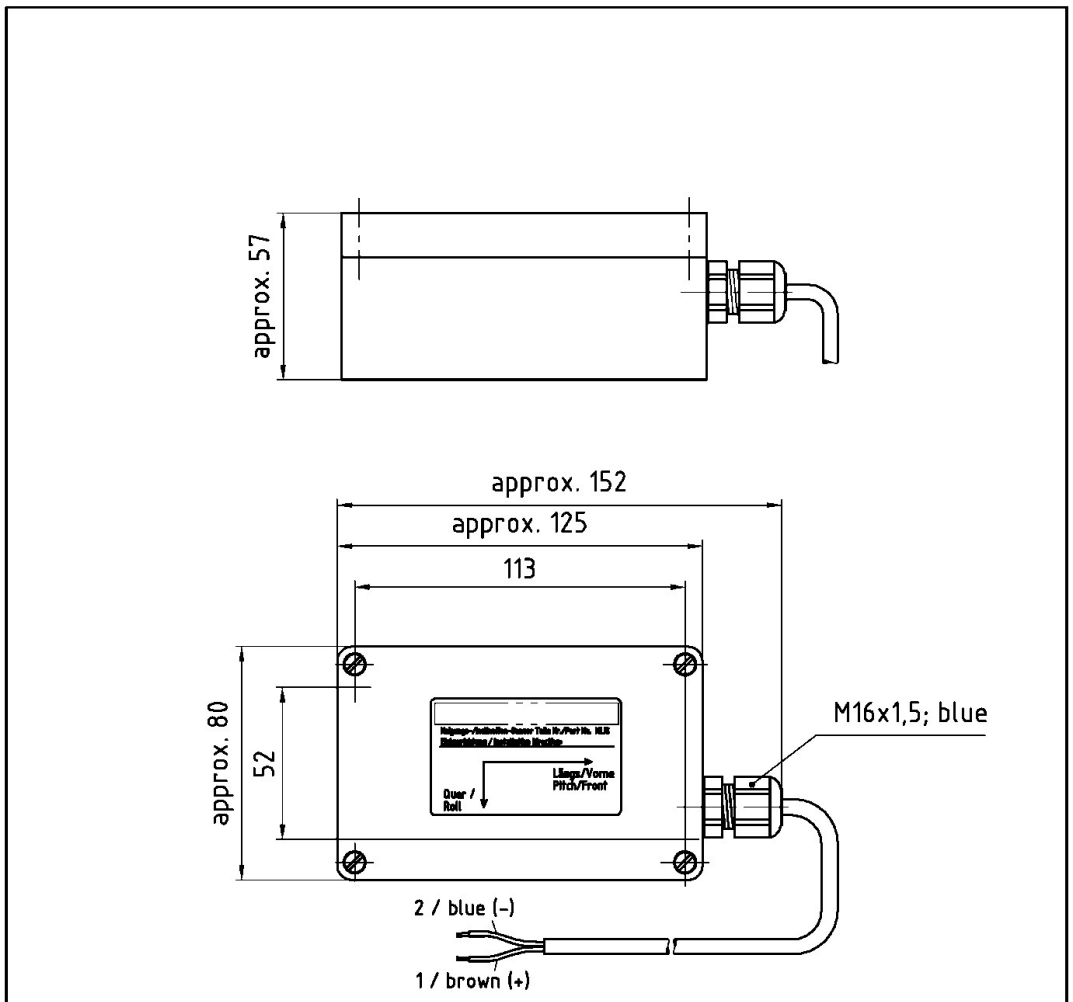
17.1.20. 51.351466 – I/O interface NM2IO



17.1.21. 51.351468 – Circuit diagram – I/O interface

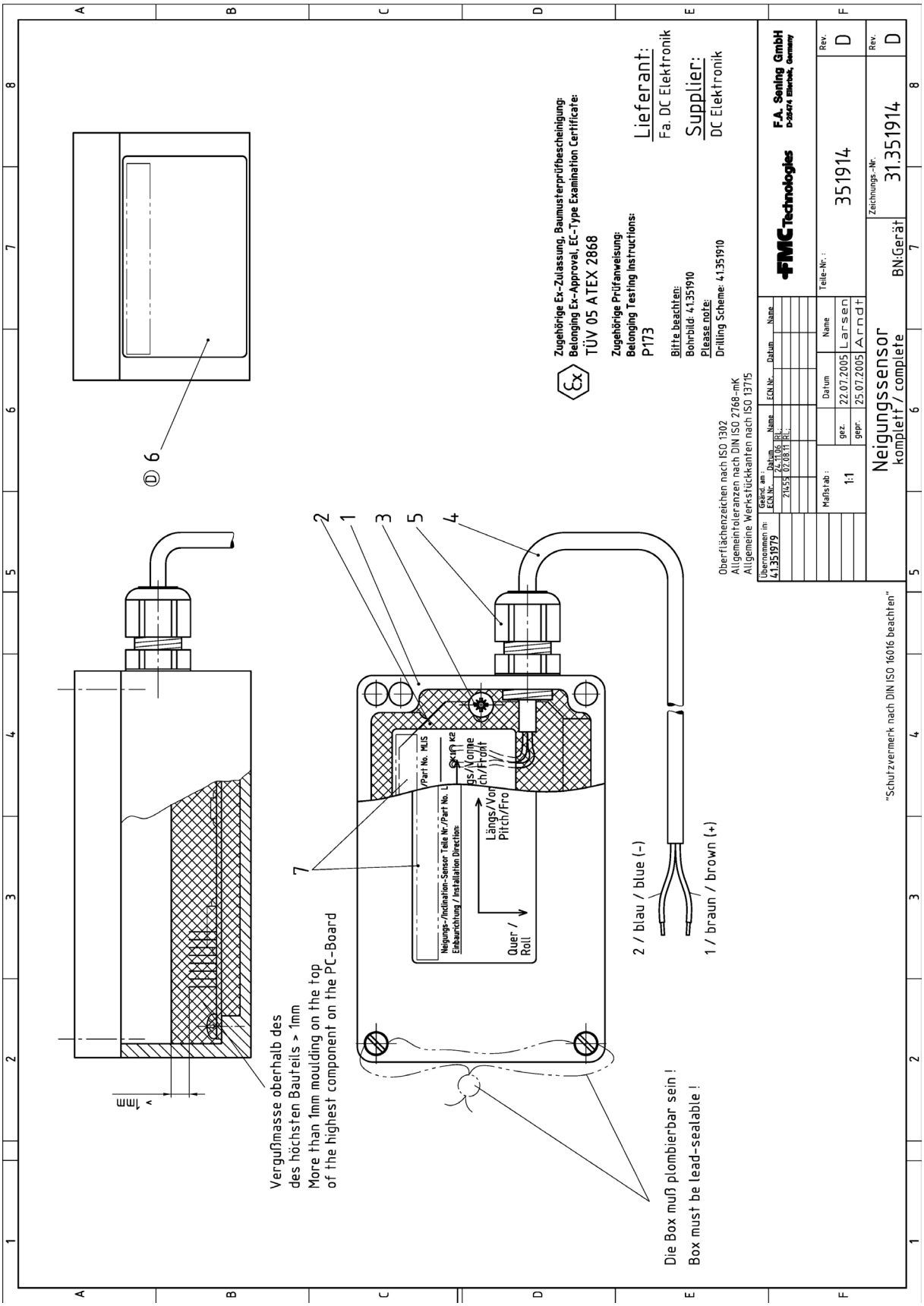


17.1.22. 51.351979 – Inclination sensors

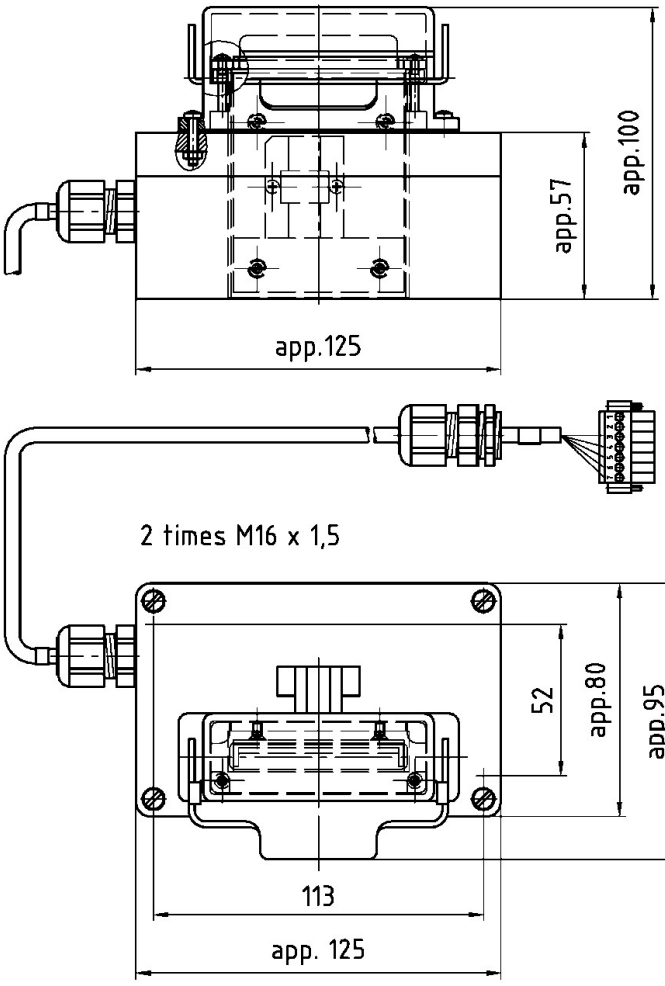


Inclination sensor	FMC Technologies F.A. Sening GmbH D-25474 Ellerbek, Germany		
	Weight : kg	Date : 25.07.2005	Name : Larsen
Part-No. MLIS	Changed :	Drawing No.: E51.351979	Rev.

17.1.23. 31.351914 – Inclination sensor, complete (MLIS)



17.1.24. 51.351801 - Chip card reader / CCR

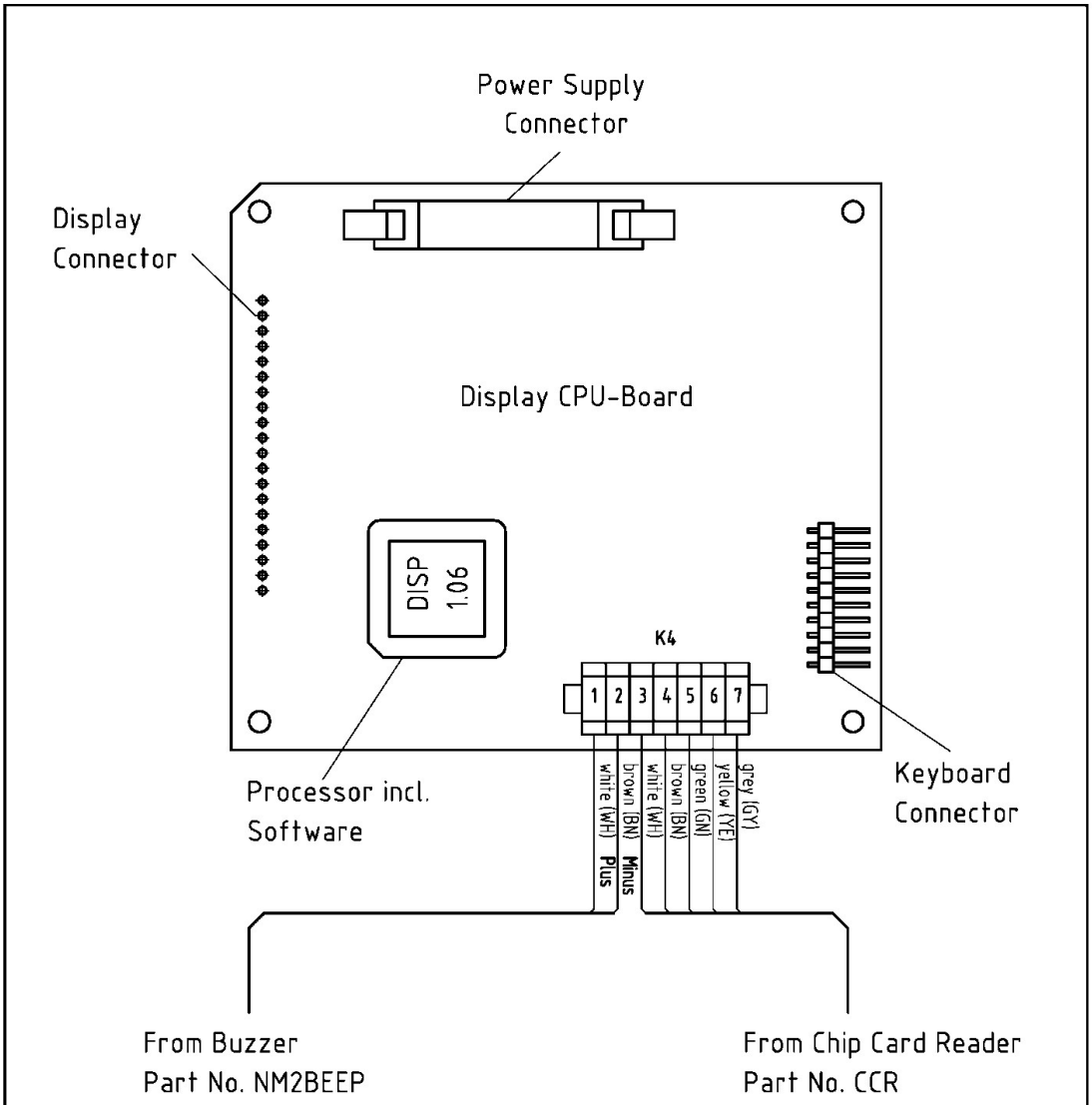


Anschluß CCR Connection CCR	Farbe Colour	Signal	Anschluß Display Connection Display
1	braun/brown (BN)	+5V	4
2	weiß/white (WH)	GND	3
3	grün/green (GN)	CD	5
4	gelb/yellow (YE)	SCL	6
5	grau/grey (GY)	SDA	7
6	nicht belegt/n.c.		2
7	nicht belegt/n.c.		1

Build in Chip Card Reader with left hand cable entry.
Pin-Out of 7-Pin-Connector for Connection at Display CPU-Board. The length of the connection cable, app. 3 m, can be shortened if necessary.
(See also Drawing No. E51.351751)

Chip-Card-Reader	FMC Technologies F.A. Sening GmbH D-25474 Ellerbek, Germany		
	Weight : kg	Date : 28.10.2004	Name : Arndt
Part-No. CCR	Changed: ECN No. / Date / Name: 08.08.05 RL; 20072 09.11.07 RL;	Drawing No.: E51.351801	Rev. B

17.1.25. 51.351751 - Anschlußplan Signalgeber / Chip Card Reader auf Display CPU-Platine

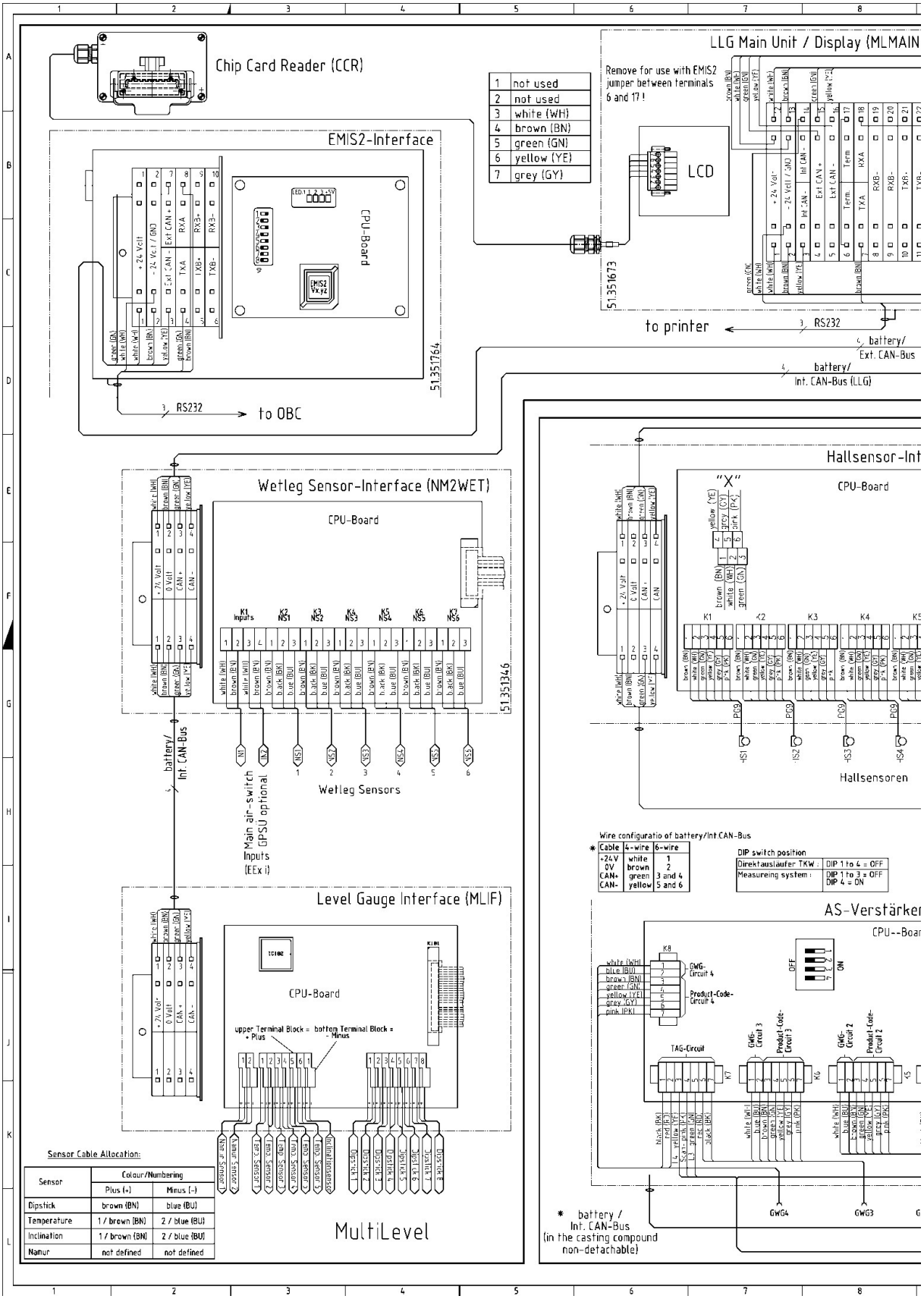


For connecting the buzzer the included blue cable entry M12 x 1,5 has to be used to insert the cable into the housing. Therefore the blind cap has to be removed.

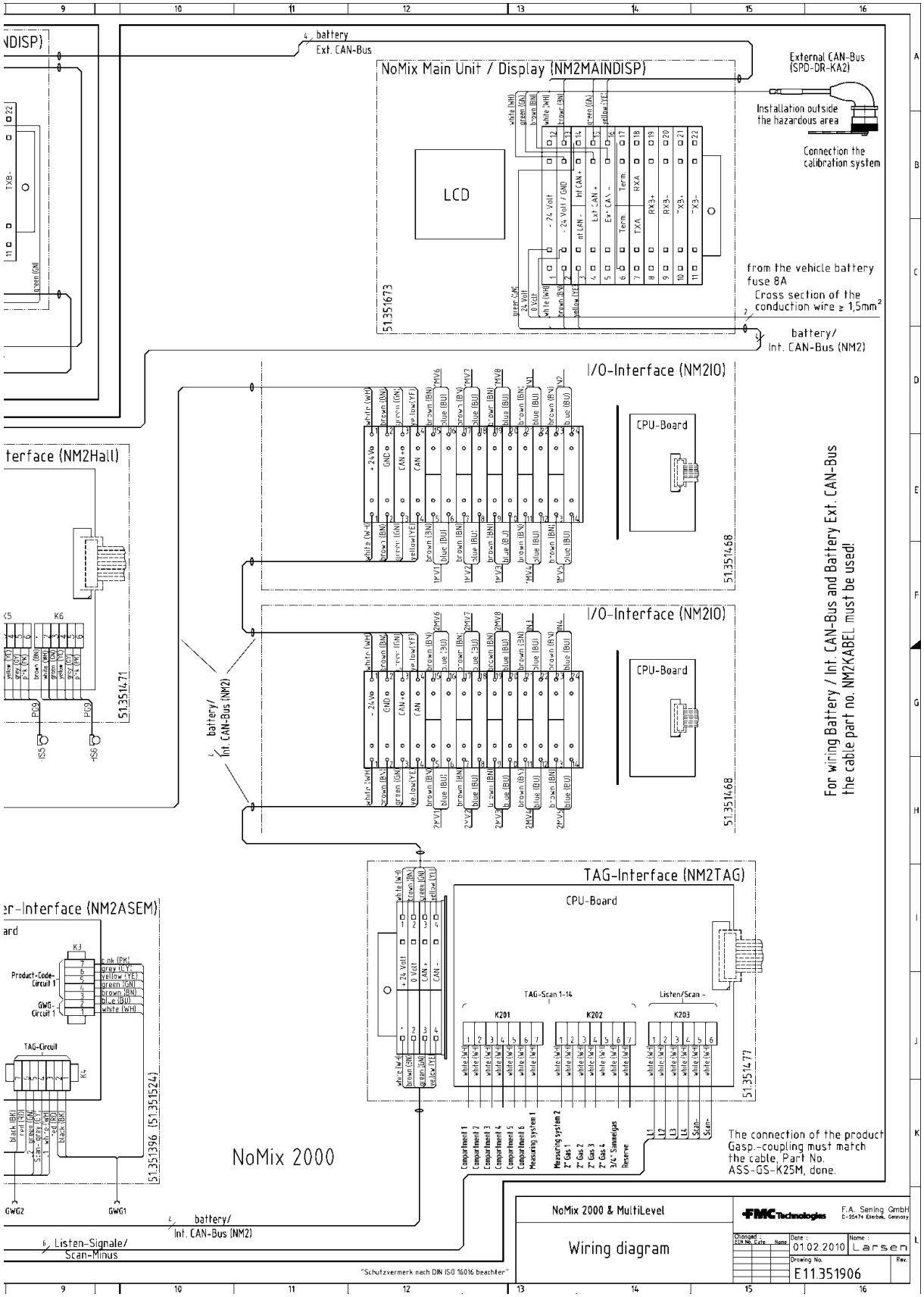
For connecting the Chip Card Reader the included EMC cable entry M12 x 1,5 has to be used to insert the cable into the housing. Therefore the blind cap has to be removed.

NoMix 2000 / MultiLevel	FMC EnergySystems FMC Measurement Solutions	F.A. Sening GmbH D-25474 Ellerbek, Germany	
Connection Diagram Part No. NM2BEEP and CCR at Display Interface CPU-Board	Changed :	Date : 05.11.2004	Name : Arndt
		Drawing No. E 51.351751	Rev.

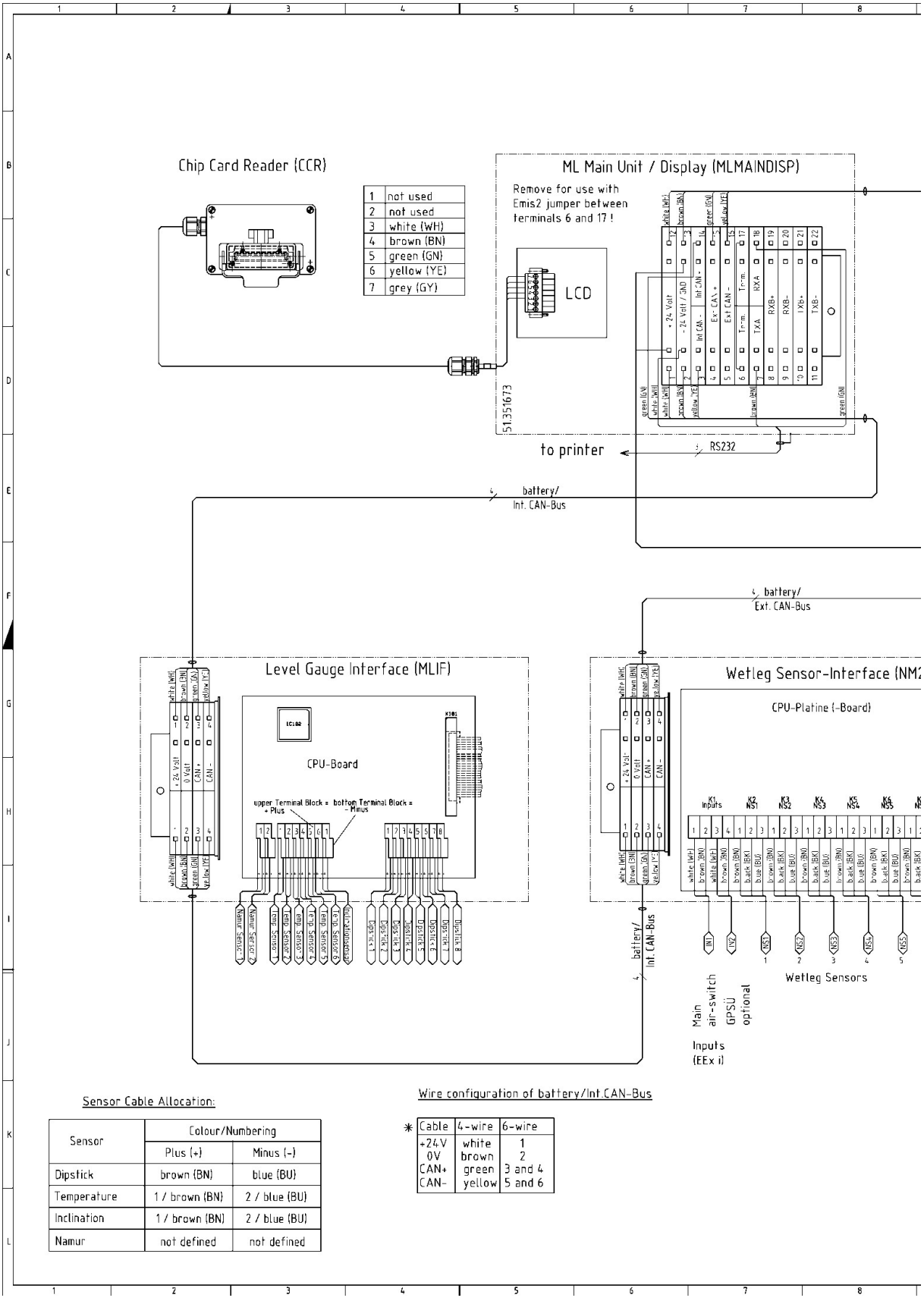
17.1.26. 11.351906 – Overall wiring diagram NoMix2000 & MultiLevel – 1 of 2



11.351906 – Overall wiring diagram NoMix2000 & MultiLevel – 2 of 2



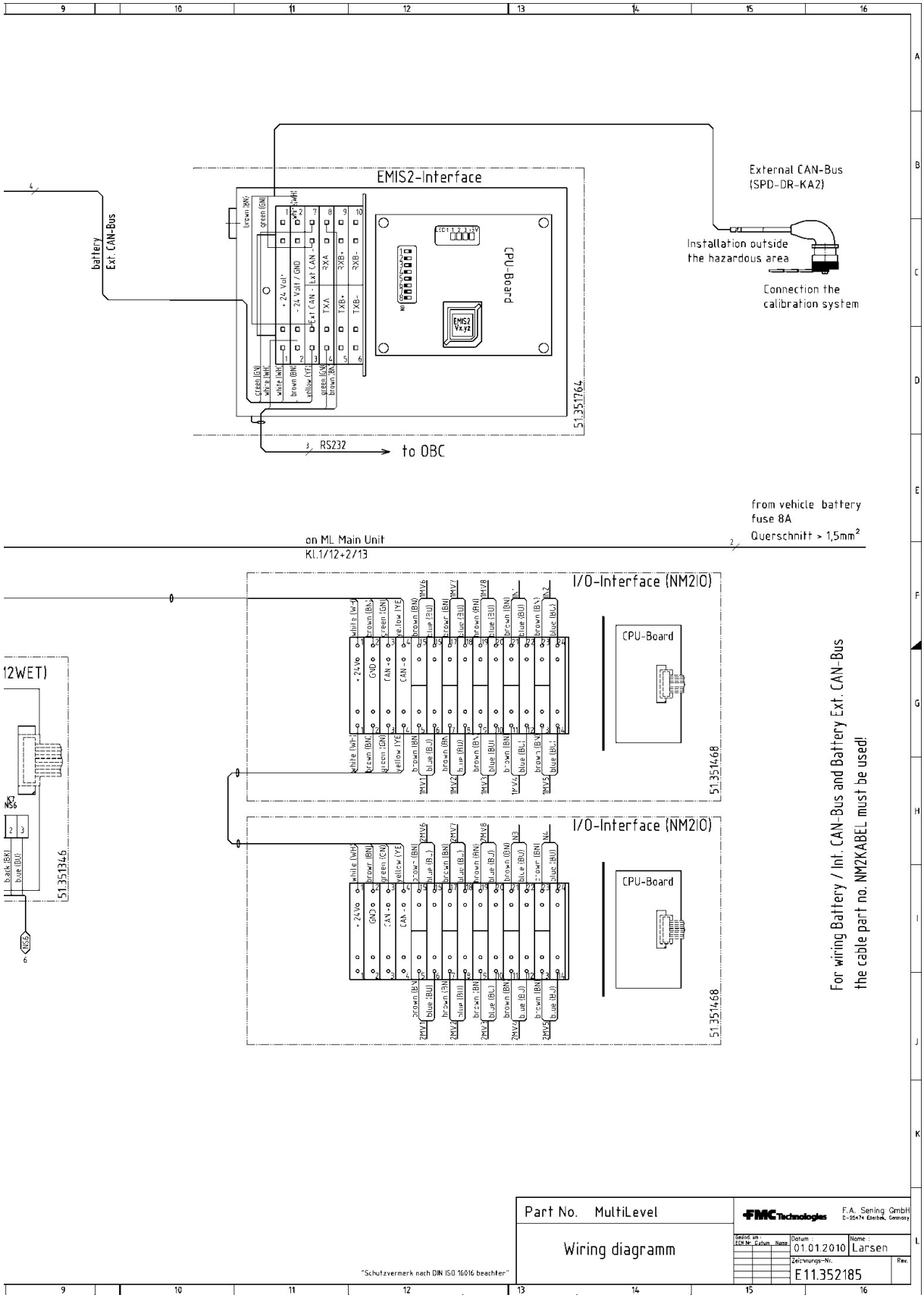
17.1.27. 11.352185 – Overall wiring diagram - MultiLevel – 1 of 2



Sensor	Colour/Numbering	
	Plus (+)	Minus (-)
Dipstick	brown (BN)	blue (BU)
Temperature	1 / brown (BN)	2 / blue (BU)
Inclination	1 / brown (BN)	2 / blue (BU)
Namur	not defined	not defined

*	Cable	4-wire	6-wire
	+24V	white	1
	0V	brown	2
	CAN+	green	3 and 4
	CAN-	yellow	5 and 6

11.352185 – Overall wiring diagram – MultiLevel – 2 of 2



17.2. Approvals

FMC Technologies

F.A. Sening GmbH
Ellerbek, Germany

EG - Konformitätserklärung

EC - Declaration of Conformity

im Sinne der EG-Richtlinie über explosionsgeschützte Geräte
nach 94/9/EG (ATEX)
as defined by non-electrical explosion protected Equipment Directive 94/9/EC

Der Hersteller / *The Manufacturer*

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

erklärt hiermit, dass das (die) explosionsgeschützte(n) Gerät(e) des Systems
herewith we declare, that the explosion protected Equipment of the system

MultiLevel

Produktbezeichnung: ***Product:***	**Zündschutzart:** ***Type of protection:***	**EG – Baumusterbescheinigung*** ***EC – Type Test Approval***
Main Unit / Display	Ex II 2 G EEx m ia e IIB T4	TÜV 03 ATEX 2022
Peilstab Interface MLIF	Ex II 2 G EEx m e ia [ia] IIB T4	TÜV 05 ATEX 2869
Neigungssensor MLIS	Ex II 2 G EEx ia IIB T4	TÜV 05 ATEX 2868
Temperatursensor MLDTS-2	Ex II 1/2 G EEx ia IIB T4	TÜV 05 ATEX 2867
Niveausensor Interface	Ex II 2 G EEx e ia [ia] m IIB T4	TÜV 00 ATEX 1603
Niveau-Sensor	Ex II 1 G EEx ia IIB T4	TÜV 02 ATEX 1982

*einschließlich aller Ergänzungen / *including all supplements*

In der gelieferten Ausführung den folgenden Sicherheitsanforderungen entspricht (entsprechen):
Corresponds to following safety requirements in the delivered implementation:

Grundlegende Normen / CENELEC: ..... EN 50 014; EN 50 019; EN 50 020; EN 50 028
Basic norms:

Angewandte harmonisierte Normen, insbesondere:.....
Applied harmonized standards, in particular:

Andere angewandte Bestimmungen / EG-Richtlinien:.....
Other applied appointments / EC-Directives:

Benannte Stelle / Produktionsüberwachung:.....Physikalisch-Technische Bundesanstalt
Notified Body Production control PTB 99 ATEX Q001; CE 0102

Prüfungen/Überwachung/Kontrollen während der Fertigung:.....Hersteller
Examination/inspection/tests during manufacturing: *Manufacturer*

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

No. of document: KEel 130

page 1 of 2

FMC Technologies

F.A. Sening GmbH
Ellerbek, Germany

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

13 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:

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

15 Ort und Datum: Ellerbek, 29.08.2011
Location and date

Geschäftsführer
General Manager *(F. Jönsson)*

No. of document: KEel 130

page 2 of 2

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 TechnipFMC.com and click on the “Contact Us” link.

TechnipFMC
FMC Technologies
Measurement Solutions, Inc.
13460 Lockwood Rd.
Houston, Texas 77044 USA
P:+1 281.591.4000

F.A. Sening GmbH, Inc.
Regentstrasse 1
25474 Ellerbek, Germany
P:+49 4101 304.0

TechnipFMC.com

FMCTechnologies.com/MeasurementSolutions

 MNF18001EN / DOK-479-E Issue/Rev. 1.4 (9/18)