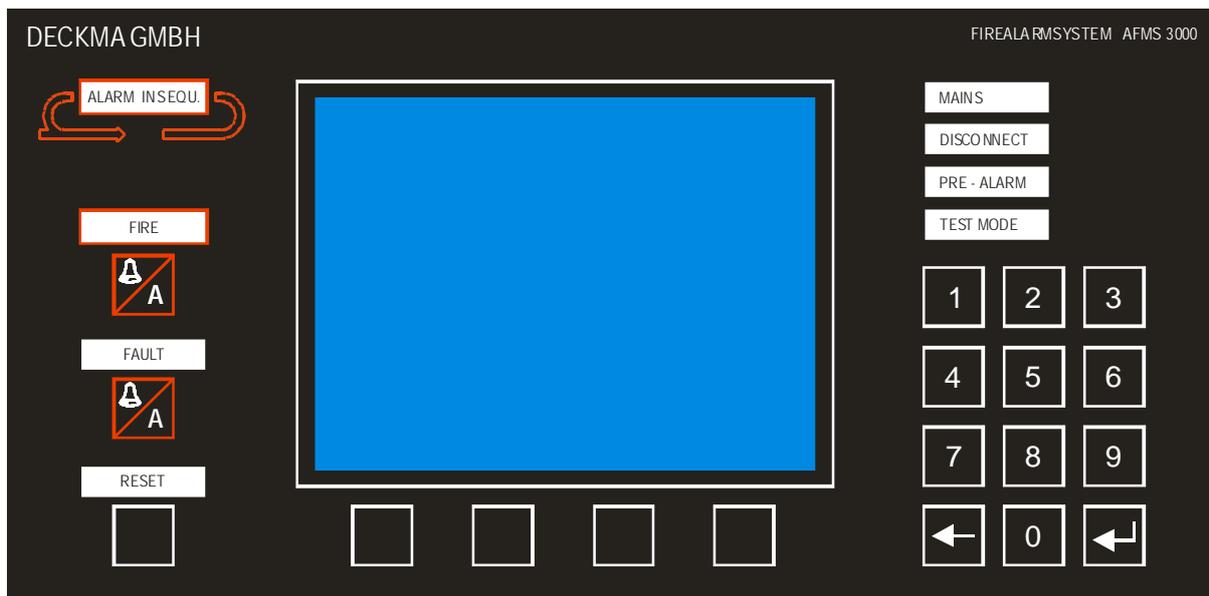


## 20140208BA AFMS3000 Operating instructions



### Version history

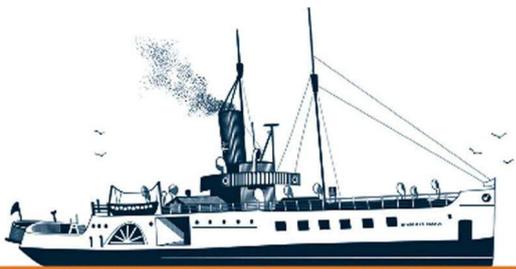
Version	Date	Author	Checked	Notes
0.5.10	23/09/09	STO	FWU	commissioning
0.5.11	28/06/11	TF	TM	revised
0.6	05/02/14	JB	TK	layout revised, terms adapted
0.7	07/02/14	JB	TK	revised
0.8	08/02/14	TK	STO	revised and further errors corrected
0.9	21/04/16	TK	STO	Improved information to earth fault measurements (1.4.)
1.0	18/03/17	TK	STO	Information about the system's functions added

Checker: Thomas Kruse, Technical Manager, DECKMA  
name – company

2018/03/17  
Date

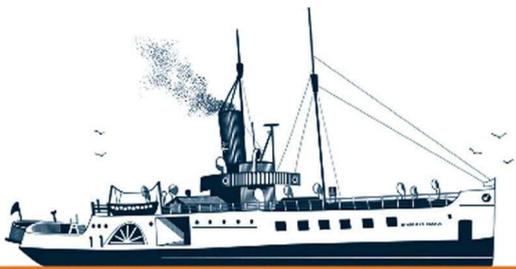
Approved: Sven Torbeck, General Manager, DECKMA  
name – company

2018/03/17  
Date



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# DECKMA GmbH

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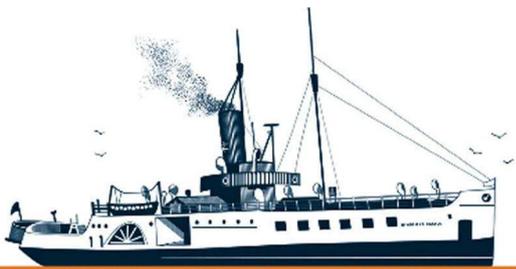
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Technical documentation

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## General

The AFMS3000 serves to detect, report and warn of fires and faults. The AFMS3000 can be operated with both addressable and non-addressable (conventional) fire detectors.

The AFMS3000 is of modular construction. The individual modules are connected to each other by an internal BUS and a common electricity supply voltage (24V DC). All modules, except for the main panel (AHT) and the main panel (HT), are intended for support rail mounting, but they can also be installed together in a metal cabinet or housing. The main panel (AHT) and the main panel (HT) are constructed as built-in devices, which are normally installed in a bridge control console. The AFMS3000 can either be wall-mounted or installed in a console.

**All modules of the FMS3000 can also be used in the AFMS3000 and have already been tested and approved under MED-Zulassung 61 075 – 13 HH.**

### 1. Description of the modules

The AFMS3000 consists of several modules in their own metal housings. The modules are connected by an internal bus through an RS485 data cable. If a fire detector registers an event (fire or smoke), the fire loop module recognises this event. The main panel (AHT, also the BUS Master) queries in a cycle the status of all modules, so it receives the existing fire alarm of the fire loop module. Independent of the configuration, the main module transmits to the output module which outputs it should now connect. It also sends this alarm to the VDR module and the printer module (if present). The VDR and printer modules output the fire alarm through a VDR output or printer respectively. In addition, the main panel warns the user acoustically and optically of the event (fire/fault).

#### 1.4. Power supply TR01-E

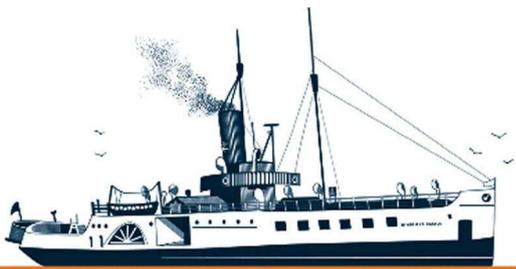
The power supply supplies the entire AFMS with a system voltage of 24V DC. For this purpose, the module has a toroidal core transformer, which can be operated as required with a supply voltage of 230V/AC or 115V/AC. The selection is made with a knob, the appropriate relay and the use of the appropriate fuses (1.6AT or 3.15AT).

The module is connected to a mains or emergency supply. It switches automatically to emergency power when the mains supply fails and vice versa. The electricity supply inputs are protected by miniature fuses (which can be changed).

#### 1.5. Main module NM01-E

The power supply is connected directly to the main module. The main module distributes the power supply and the BUS (knob setting = 1) to the other modules. If the mains and the emergency power fail, the main module switches to power supply from an accumulator. The main module has a charging circuit for this accumulator, an accumulator charge monitoring system, a cut out circuit and an energy management system. The main module also has a real time clock (RTC). The time is buffered in a button cell when no operating voltage is present.

The main module has 9 connections (all together counted) for various modules, for which max. 4A current can be delivered.



## 1.6. Output module AM01-E

The output module has eight relays, three switched 24V outputs and one input for an external button. To the outputs can be connected, for example, a machine alarm system, a VDR, fault and common status displays, sirens, an automatic general alarm system, fire doors and/or flashing lights. Max. 2 output modules can be connected to the AFMS. The BUS address is set with a rotary switch on the device. The configuration on the SD card must (as with all modules) correspond to the number of assemblies being used.

A microcontroller controls the relays, the 24V outputs, the button input and communicates with the master. On a command from the master, the output module switches its outputs. The rules for the switching of these outputs are set in the configuration (NO, NC or alternating).

## 1.7. Fire loop module AFM01-E

Addressable fire detectors are connected to the fire loop module (AFM). The fire detectors are addressed through a BUS. A fire loop module (AFM) contains two loops. Up to 127 detectors can be connected to one single loop. Up to four fire loop modules (AFM) can be used in one AFMS. This gives a maximum count of 1016 sensors.

The currently valid regulations for the maximum permissible number of fire detectors in a fire zone, an area, and the necessity for the use of short circuit isolators at the transition into different fire zones, or transitions from deck to deck are to be observed!

Each loop consists of two equivalent connection pairs (Drive & Return). A three-core wire is connected to connectors. The data transmission and electricity supply of the fire detectors is run through this wire. All fire detectors are parallel connected to this wire. The detector loops are monitored for short circuit, cable breakage and earth connection, so the live wires and the grounding wire can be switched individually through a microcontroller + further hardware. Due to the fact, that only one power input and only one metal housing exists, an earth connection cannot be measured individually or displayed. So all given earth fault events are only module based earth faults.

In order to ensure safe starting of the fire detectors, the outputs can be started slowly by a soft start voltage.

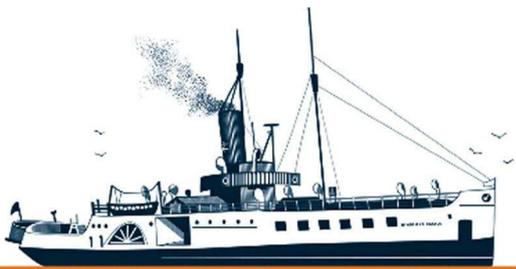
For each loop, there is a modulator and a demodulator for data transmission on the fire loop module (AFM) present.

Data transmission itself is according to ESP from HOCHIKI with 8Vss and 1200Baud.

The module also contains, in addition to the connections for the fire detectors, 8 potential-free outputs, which can be configured as required for fire or fault. Two microcontrollers control and monitor the loops, their outputs and communicate with the internal BUS.

## 1.8. Fire loop module FM01-E

Only non-addressable (conventional) fire detectors are connected to the fire loop module (FM). Up to 16 conventional detectors can be connected in parallel to one loop. Up to eight loops can be connected to one module. Up to 4 fire loop modules (FM) can be used in an AFMS (16\*8\*4 = 512 conventional detectors). The BUS address is also set with a rotary switch on the module itself. The configuration must correspond to the number of assembled units (see above).



In this case again, the currently valid regulations about the maximum permissible number of fire detectors in a loop are to be observed, too!

In normal operation, a minimum (closed-) current flows through each loop. In order that this is possible, the last detector in a loop is equipped with an EOL termination resistor (3k Ohm). In case of a fault (e.g. through the removal of a detector or a broken wire), no more current flows through the loop. The (FM) fire loop module monitors this current and informs the main module in case of a fault. The main module reacts to this incident according to its configuration.

In case of a **fire alarm**, a resistor (in the range from 390 to 560 Ohm) is switched on the loop by the relevant detector. The increased current is detected by the (FM) fire loop module and the main module is informed about a fire in the relevant loop.

The (FM) fire loop module monitors all the loops for a possible short circuit. In case of a short circuit, the relevant loop is switched off and the fault is reported to the main module. The maximum loop current in a loop is around 400mA. The sum of all loop currents (after activation of several loops) must not exceed 1.6A. Is the total current exceeded, the microcontroller switches off the loop with the highest current.

The module, in addition to the connections for the fire detectors, also contains 8 potential-free outputs, which can be configured as required for fault or fire. Two microcontrollers control and monitor the loops, their outputs and communicate with the BUS.

## 1.9. Printer module DM01-E

The printer module is used as an interface card to the connection of a "Centronics" (or similar), compatible printer. All messages (fault or fire alarms), as they are shown in the display of the main panel too, are automatically sent to this printer, but with much reduced information (see sample printouts underneath). The module receives the data from the BUS master.

Example of printout:

Date	Time	Information
30.12.06	15:33:02	AN loop 13
30.12.06	15:34:12	AR loop 13

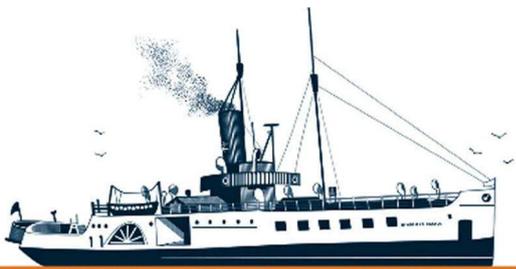
## 1.10. VDR module VM01-E

The VDR module sends data, which it filters from the BUS, through its own RS485 or RS232 interface to an "externally connected" VDR (Voyage Data Recorder). The communications profile of the VDR interface is according to the specifications:

IEC 61162-1	Part 1 Single talker and multiple listeners
IEC 61162-100	Extra requirements for the UAIS
IEC 61162-102	Extra requirements for the Voyage Data Recorder

Example:

\$--FIR,E,083945.00,FD,11,005,000,A,V,AN loop 5	*08	- fire alarm in loop 5 ,FM01
\$--FIR,E,084030.00,FD,11,005,000,A,A,AA loop 5	*1C	- fire has been accepted
\$--FIR,E,084035.00,FD,11,005,000,A,A,AR loop 5	*0A	- fire has been reset
\$--ALA,084225.00,FR,OT,11,910,H,V,FN loop 16	*56	- fault with cable breakage (open loop)



\$--ALA,084410.00,FR,OT,11,910,H,V,FN power batt \*36 - fault with battery defect  
\$--ALA,084720.00,FR,OT,11,910,H,V,FN module FM 4 \*2A - fault with a missing  
module (FM01)

## 1.11. Main panel AHT01-E

The AFMS can be operated from the main panel (AHT) and also from an additionally connected main panel (HT). There must always be at least one main panel (AHT as principal) in an AFMS! In addition to the main panel (AHT as principal), additional panels (main panel [HT] and main panels [AHT]) can be used in parallel. The operating possibilities are considerably reduced on all parallel-operated main panels, whether HT or AHT.

The operation of the main panel (AHT) is based on the operation of the main panel (HT) and is similar to it. Nonetheless, the main panel (AHT) offers more comfortable operation and operator guidance thanks to its larger display and an additional internal memory.

The main panel (AHT) is normally installed in a bridge control console on the command bridge near to the other modules.

The main panel (AHT) consists of a large graphic display, 19 keys, 7 illuminated display fields (3-coloured red-yellow-green) and an acoustic sounder. In order to be able to adapt the illuminated display fields optimally to the local conditions, the light intensity can be adjusted. The contrast and the brightness of the background lighting can also be adjusted (day/night operation).

## 1.12. Main panel HT01-E

The AFMS can be operated through the main panel (AHT) and the main panel (HT). There must always be at least one main panel (AHT) in an AFMS (as master).

The main panel (HT) in parallel operation is normally installed in the MCR (machine control room) or another safety station. On river ships, installation is also possible in the reception or on the bridge, as well as other installations in firefighting locations.

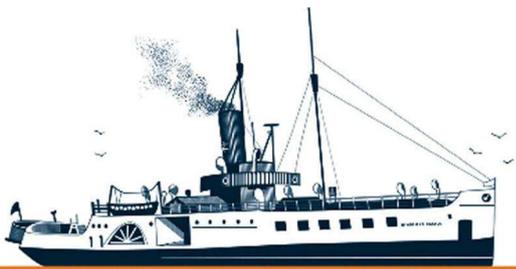
The main panel (HT) consists of a display (2 rows each with 20 characters), 10 keys with the associated multi-coloured illuminated fields, 2 further LEDs (with illuminated display fields) and an acoustic sounder. All illuminated display fields, the display and the LEDs can also be adjusted for brightness (as above), which also applies for the contrast of the LCD display.

A maximum of 2 main panels (HT) can be connected to an AFMS in addition to one main panel (AHT). The connected main panels (HT) always run only parallel to an AFMS and this restricts their function. The operation of a main panel (HT) is in the operating instructions of the MED-approved FMS3000, which in this case is included in the delivery.

## 1.13. Data module DT01-E

The data module is intended for saving the configuration data of the AFMS and data created during its operation on a special SD card. For this purpose, the module has its own microcontroller for reading and writing onto the SD card. Operation is thus ensured independently of superior systems. The module is connected through its own interface.

On the back of the module is a small slot for such card. It locks into position after insertion it into the card holder. In order to remove the SD card, it must be first 'pressed' a little – the card unlatches, comes out slightly and can then be removed easily.



## 2. Operation of the AFMS

### 2.4. Overview

The component of the AFMS that is first visible is either the main panel (AHT) or the main panel (HT). The operation of the AFMS by the user is performed exclusively through the main panel (AHT) or the main panel (HT). All main panels have a display, keys with illuminated display fields, LEDs and an acoustic sounder. These operating units are connected to the AFMS through a bus cable (including power supply).

Except for the displays on the main panel itself, the outputs of the fire loop module and the output module serve as further signalling elements. The outputs can be used to connect, for example, machine alarm systems, VDR, fault displays, sirens, a general automated alarm system, fire doors and /or blinkers.

### 2.5. Access levels

The AFMS has 4 access levels. Certain displays, operating elements and functions can only be accessed at the appropriate level.

#### 2.5.1. Access level 1

Level 1 is directly accessible without having to open anything and without using tools. Operation of level 1 is possible without any knowledge of the AFMS by simply pressing a key and/or calling up on screen.

#### 2.5.2. Access level 2

Level 2 is directly accessible without having to open anything and without using tools Level 2 can only be activated with knowledge of the AFMS and not by randomly pressing a key. It is possible to call up menus at this level, some of which are protected by a password.

#### 2.5.3. Access level 3

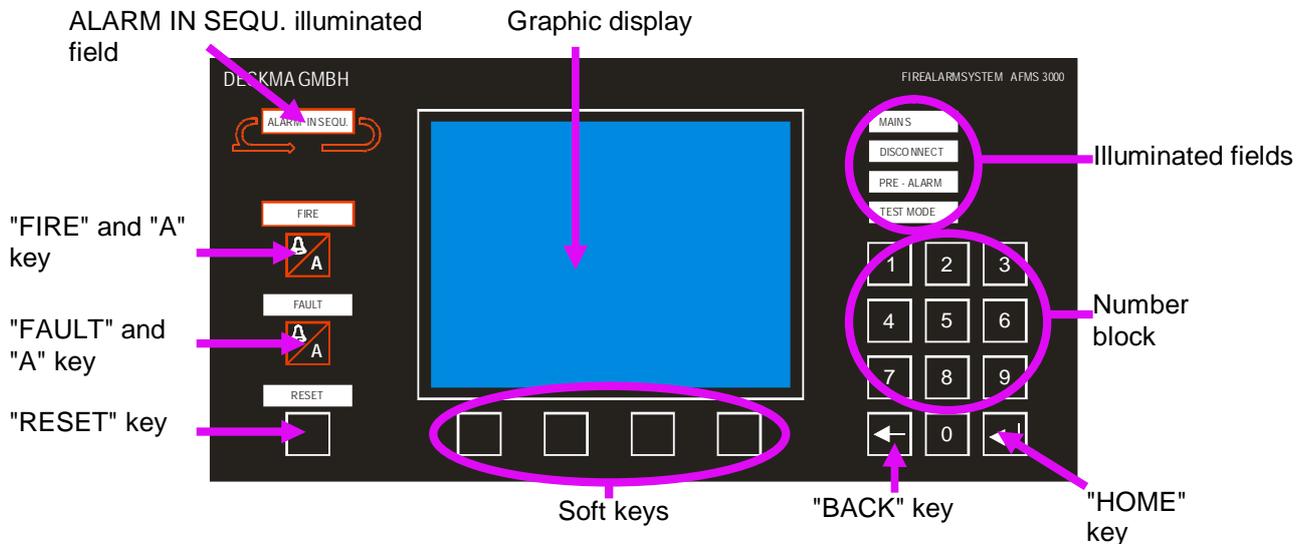
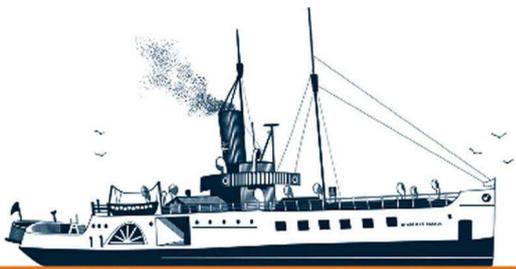
The AFMS is located in a closed steel Switchgear cabinet or is mounted on a support rail in a bridge console. In order to perform functions in level 3, tools have to be used to open the Switchgear cabinet or the installation doors in the bridge console. This would result in changes to the configuration by SD card.

#### 2.5.4. Access level 4

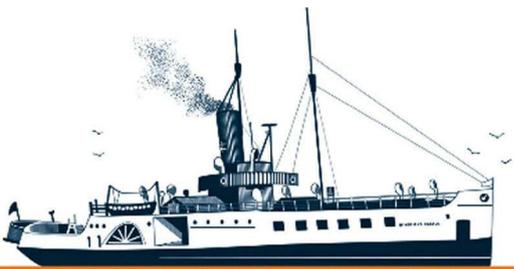
The AFMS is located in a closed steel Switchgear cabinet or is mounted on a support rail in a bridge console. In order to perform functions in level 4, tools have to be used to open the Switchgear cabinet or the installation doors in the bridge console. Additional equipment is required, like for example the ATMEL J-TAG programmer, the software and a computer for it. This includes updates for the firmware, which could change basic functional procedures.

## 2.6. Display and operating elements of the panel (AHT)

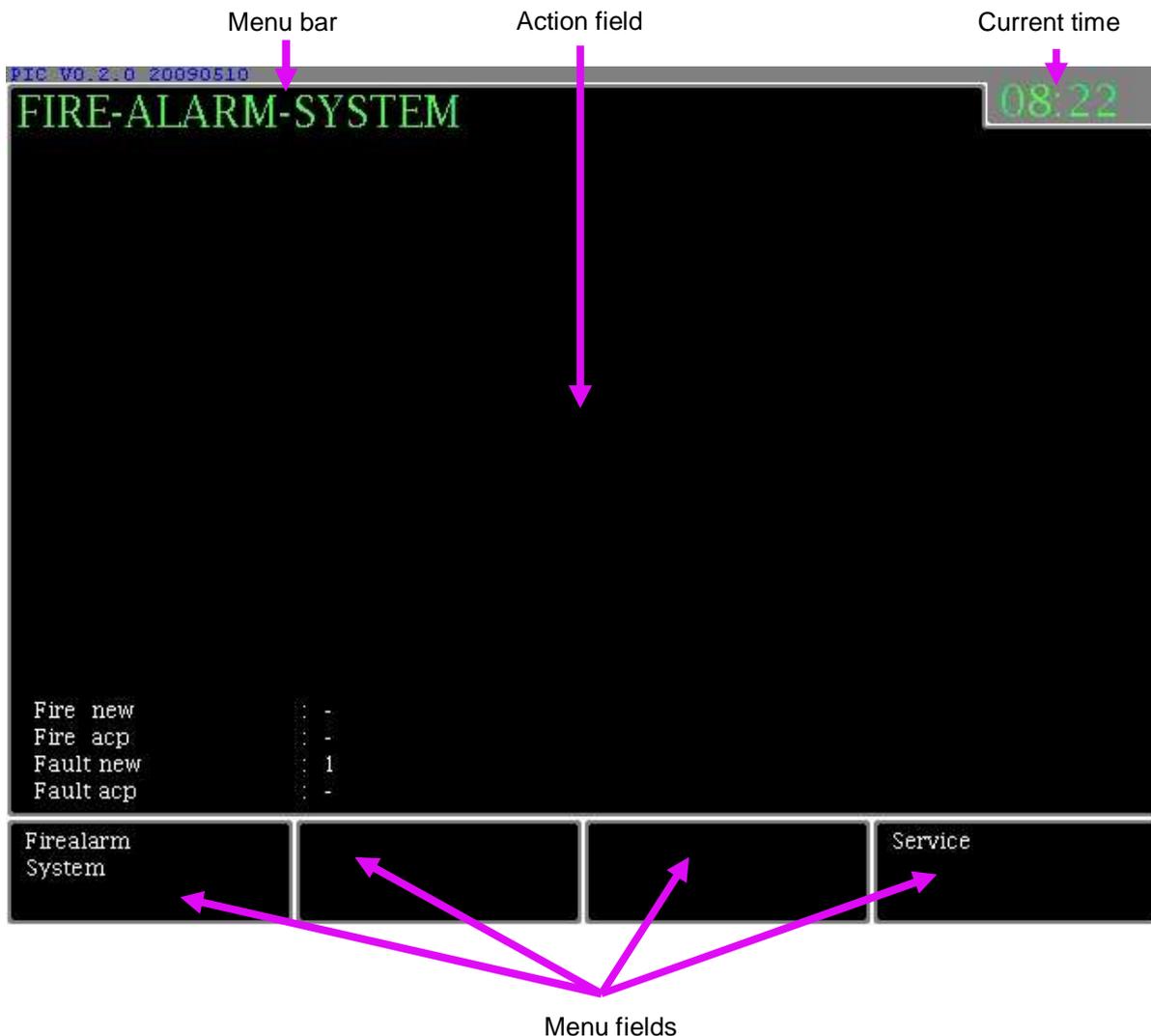
The main panel (AHT) as principal is used for display and operation of the AFMS. In addition, a main panel (AHT), and 2 further main panels (HT) can be connected in parallel. The panels in parallel operation have restricted functions.



The Menus for the various functions are structured in a strict hierarchy starting from a main menu (display without operation, system runs without messages). It is thus possible to select the relevant functions of the system by navigating forwards and backwards.



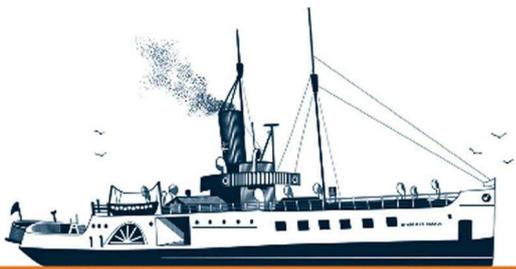
## 2.6.1. Graphic display



- In the menu field, only the current menu entry is shown. Additional information is also displayed such as the number of new and accepted fire alarms or faults (soft keys).
- In the actions field, certain elements of the menu navigation or an action are shown.
- In the four soft key menu fields with surrounds, the functions of the directly subordinate menu are shown.

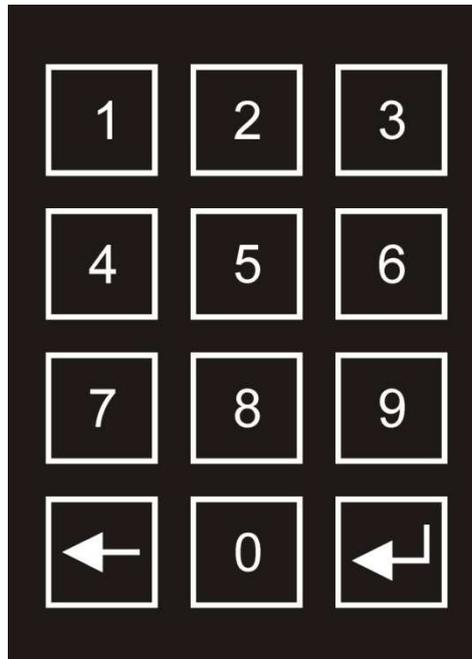
## 2.6.2. Menu keys (soft keys)





Four soft keys are available directly beneath the graphical display for menu navigation. The function of each key is shown in the graphical field directly above the relevant key (menu field).

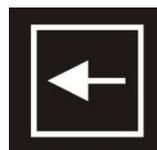
### 2.6.3. Number block



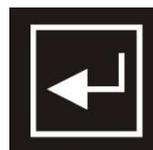
An extra number block (with numbers 0 - 9) is available for the input of parameters or numerical values such as date or sensitivities of individual detectors.

### 2.6.4. "HOME" and "BACK" keys

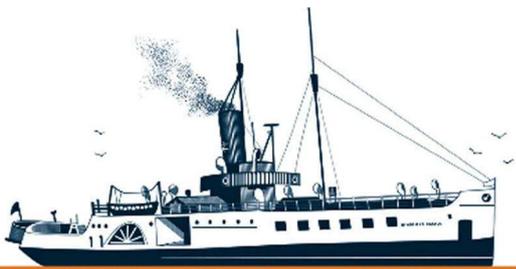
The "Home" key can be used to return directly to the main menu. The "Back" key only serves to jump back to the relevant higher menu entry.



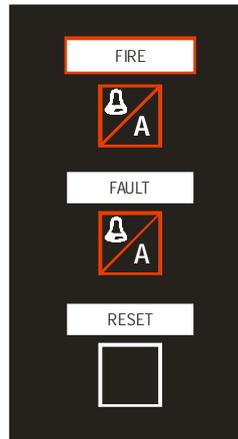
BACK



HOME



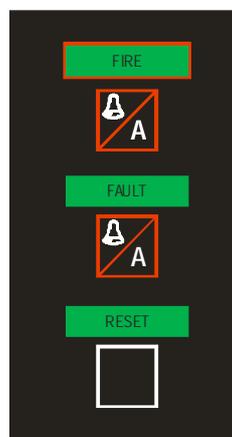
## 2.6.5. "FIRE"/"SILENCE", "FAULT"/"SILENCE" and "RESET" keys



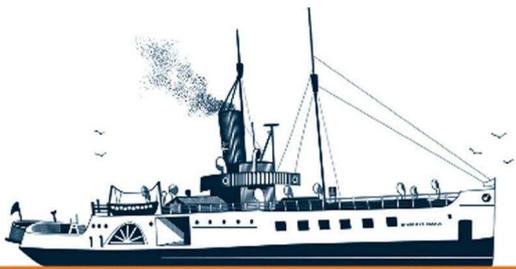
Three keys are available for the user to process incidents such as a fire alarm or a fault.

- FIRE/A
  - press 1st key: switch off signal (silence)
  - press 2nd key: accept fire alarm or
  - press 2nd key: open fire menu (required for a RESET)
- FAULT/A
  - press 1st key: switch off signal (silence)
  - press 2nd key: accept fault or
  - press 2nd key: open fault menu (required for a RESET)
- RESET
  - Reset fire alarm or fault

## 2.6.6. "FIRE", "FAULT" and "RESET" illuminated fields



As normal operation, all fields illuminate green. If a new fire alarm occurs, the field "FIRE" lights up red. The acoustic sounder emits a steady note.



If the fire alarm is accepted, the field lights permanently red. After resetting of the fire alarm (using RESET), the "FIRE" field returns to green.

The "FAULT" field behaves correspondingly in case of a fault, except here with a beeping from the sounder. If the fault is accepted, the field lights up permanently yellow. After the resetting the fault (once again using RESET), the "FAULT" field also returns to green.

If there are several new fire alarms or faults respectively, the relevant field ("FAULT", "FIRE") blinks until all messages have been accepted.

If there are several accepted fire alarms or faults respectively, the relevant field remains illuminated until all messages have been reset.

The "RESET" illuminated field can also turn from green to yellow for a short time. During this time, for example, a system reset is being transmitted to a module and executed.

After a restart of the AFMS, the "RESET" field blinks until all modules and assemblies are initialised (also in case a previously switched off loop is reconnected).

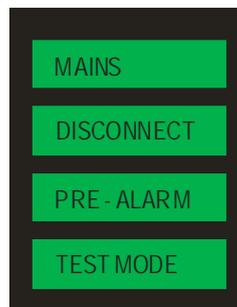
### 2.6.7. "ALARM IN SEQU." illuminated field



In normal operation, the "ALARM IN SEQU." field is illuminated green. If there is more than one fire alarm, the field turns from green to red.

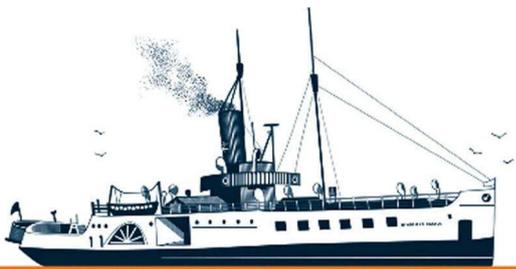
When the fire alarms are reset except for one fire, the illuminated field changes back to green.

### 2.6.8. "MAINS", "DISCONNECT", "PRE-ALARM" and "TEST MODE" illuminated fields



In normal operation, all fields are illuminated green. In certain cases, these can also be illuminated yellow.

- MAINS Fault in the power supply (mains or emergency power)
- DISCONNECT Detectors, zones, loops or outputs are switched off
- PRE-ALARM Preliminary alarm at a smoke detector
- TEST MODE The AFMS is in test mode (one man test )



## 2.7. Operating modes of the AFMS

### 2.7.1. Fire alarm

If a fire alarm occurs, the illuminated field "FIRE" blinks red and the acoustic sounder sounds permanently. If the system is in the main menu, this jumps automatically to the menu entry "New Fire". Information about the new fire is shown in the display.



When the key "FIRE"/"A" is pressed once, the acoustic sounder stops. The display is renewed. If the system is not yet in the menu entry "New Fire", this is now repeated (e.g. in case a new fire alarm occurs while the user is navigating through the sub-menus).

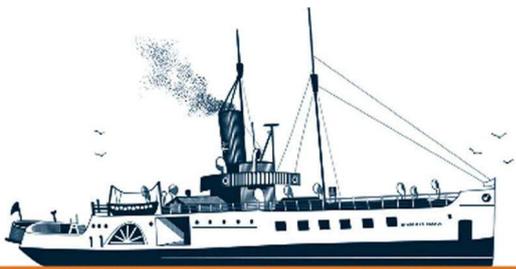


Pressing the "FIRE"/"A" key accepts all the fire alarms that are currently shown in the display. By accepting a fire alarm, the user signals acknowledgement of the fire alarm and that further measures have been introduced. If all fire alarms have been accepted, the field "FIRE" illuminated permanently red.

If the alarm is not accepted within two minutes, the switching of the 3<sup>rd</sup> output of the output module automatically activates an externally connected automatic general alarm system. The display then shows at top right corner "general alarm!"

If more than the five (5) fire alarms that can be displayed accumulate, it is possible to change between the fire alarms by pressing the ">>>" menu key. The display is changed from fire alarm to a fault by pressing the relevant "FIRE" or "FAULT" key. The display always shows the newest and the oldest fire alarm and the newest and oldest fault for 30s after the last interaction. The last fire alarm that occurred appears in the top position.

With a reset action of the fire alarm, the user signs, that the fire has been extinguished. In order to reset a fire alarm (condition "cleared"), the menu entry "Accepted Fire" (repeated pressing of the "FIRE" key) must be selected. All accepted fire(s) are shown in this menu tab. Pressing the "RESET" key again only resets the fire alarm selected with the white arrow! The relevant detector is then automatically set to "armed". Each fire alarm has to be reset individually! If all fire alarms have been reset, the "FIRE"-field turns back into green colour. If a new fire alarm occurs (after resetting of a fire alarm), then this fire detector is still active or is active again (e.g. due to residual smoke in the optical chamber of a smoke detector). In this case a new alarm will come up!

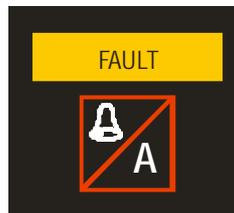


## 2.7.2. Faults

In case of a fault, the "FAULT" field illuminates yellow, the acoustic sounder sounds alternatively and the relay at output JP10 on the main module drops to 'off'. Should the system be in the main menu, it jumps automatically to the menu tab "New Fault". Information about the new fault is shown in the display.



Pressing the "FAULT"/"A" key silences the acoustic sounder. The display is renewed. Should the system not yet be in the menu tab "New Fault", this is now shown (e.g. when a new fault occurs while the user is navigating in the sub-menus).



Pressing the "FAULT"/"A" key accepts all displayed faults. With the accepting of a fault, the user signals that the fault has been acknowledged and corresponding measures have been introduced to remedy it. When all faults have been accepted, the "FAULT" field illuminates once more permanently yellow.

If more faults have accumulated than the five that can be shown, it is possible to switch between the faults by pressing the ">>>" menu key. The display is switched from showing a fire alarm to a fault by pressing the "FIRE"/"A" or "FAULT"/"A" key. The display always shows the newest and the oldest fire alarm and the newest and oldest fault for 30 s after the last interaction.

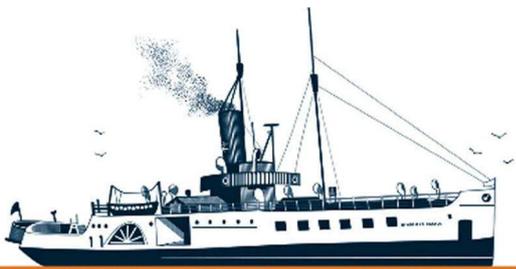
Resetting a fault must be undertaken out of the menu entry "Accepted Fault" (repeated pressing of the "FAULT"/"A" key). In this menu entry, all accepted faults are shown. Pressing the "RESET" key now only resets the fault selected with an arrow.

After the successful resetting of all faults, the "FAULT" symbol illuminated green again and the relay at output JP10 of the main module picks up again (common status contact).

If the power supply (mains or emergency supply) fails, the "MAINS" field illuminates yellow. After a configurable time, a fault also occurs.(shown in the display + blinking "FAULT" field). If both power supplies are restored, the "MAINS" field turns green again. If the power supply fails completely (also the emergency battery), the AFMS switches off completely. This means that all relays of the modules and also the relay behind the "JP10" drop out!

## 2.8. Operation functions

The main menu can be reached from any sub-menu by pressing the "HOME" key. Pressing the "BACK" key returns to the previous menu tab, not to the main menu.



After about 30 seconds (without any further key being pressed), the main panel (AHT) returns automatically to the main menu screen or it will be updated only (e.g. in TEST mode).

### 2.8.1. Show firmware

This menu tab enables the firmware of all modules to be shown. It can be reached from the main menu by selecting the sub-menu tabs:

→ Service → System Status → Firmware

### 2.8.2. RESET of the AFMS

This menu entry enables a restart of the whole AFMS system. It can be reached from the main menu by selecting the sub-menu tabs:

→ Service → System Reset

Three RESET functions are available:

1. Reset with deleting all (with password): The previously accumulated fire alarms and faults will be all deleted and the system is restarted.
2. Reset with hold all: The system will be only restarted (holds all data).
3. Reset with new init modules (with password): All fire alarms and faults will be deleted, the modules and detectors are newly initialised and the system is then restarted.

In case the restart does not happen, it is possible to use the "Reset" key on the main module to activate a restart manually.

### 2.8.3. Set date and time

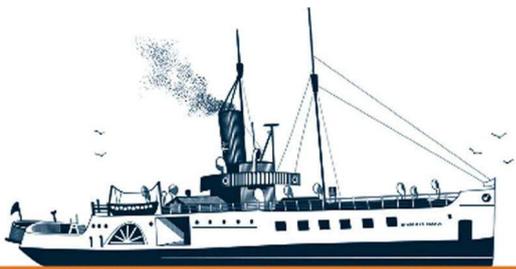
This menu entry enables the settings of time and date. It can be reached from the main menu by selecting the sub-menu entries:

→ Service → Settings → Set Date and Time

### 2.8.4. Perform lighting test of the illuminated fields

This menu entry enables a test of the lighting of the illuminated fields to be performed. It can be reached from the main menu by selecting the sub-menu entries:

→ Service → Settings → Lamp Test



## 2.8.5. Set background brightness of display

This menu entry enables the background lighting of the display to be adjusted. It can be reached from the main menu by selecting the sub-menu entries:

→ Service → Settings → Dimmer LED/TFT → Display → Display Backlight

## 2.8.6. Set display colours

This menu entry enables the type of display to be changed (black text on white background or vice versa). It can be reached from the main menu by selecting the sub-menu entries:

→ Service → Settings → Dimmer LED/TFT → Display → Display Colours

## 2.8.7. Set brightness of green LED

This menu entry enables the brightness of the green LEDs to be adjusted. It can be reached from the main menu by selecting the sub-menu entries:

→ Service → Settings → Dimmer LED/TFT → Green LED

## 2.8.8. Set brightness of yellow and red LEDs

This menu entry enables the brightness of the yellow and red LEDs to be adjusted. It can be reached from the main menu by selecting the sub-menu entries:

→ Service → Settings → Dimmer LED/TFT → Fault LED (red/yellow)

## 2.8.9. Change password and/or change display language

The password has to be entered!

This menu entry enables the password and/or the menu language to be changed. It is necessary to know the old password or the master password. 2 menu languages are available (depending on the firmware). The password has four characters. It can be reached from the main menu by selecting the sub-menu entries:

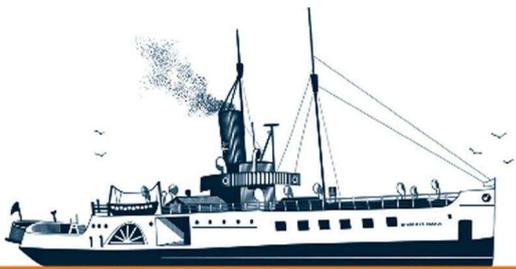
→ Service → Settings → User Settings → Set Operator Code or Set Language

## 2.8.10. Activate one man test

The one man test is used for the automatic processing of fire alarms. Accepting and resetting of the fire alarms is undertaken automatically by the AFMS. This can be activated or deactivated in this sub-menu (with RESET). It can be reached from the main menu by selecting the sub-menu entries:

→ Fire Alarm System → Control → Start test Mode → One Man Test

Should no new fire be detected within 30 minutes while the one man test is activated, the one man test is automatically terminated and the AFMS returns to normal operation.



## 2.8.11. Activate/deactivate detectors, zones or outputs

The password has to be entered!

This menu entry enables individual detectors, fire zones or outputs from the two output modules to be activated or deactivated. It can be reached from the main menu by selecting the sub-menu entries:

→ Fire Alarm System → Management → Disconnections

## 2.8.12. Set delay times of the detectors

The password has to be entered!

This menu entry enables delay times to be set for individual detectors. It can be reached from the main menu by selecting the sub-menu entries:

→ Fire Alarm System → Management → Delay

## 2.8.13. Set thresholds for detectors

The password has to be entered!

This menu entry enables thresholds for the individual detectors to be adjusted. It can be reached from the main menu by selecting the sub-menu entries:

→ Fire Alarm System → Management → Adjustments

## 2.8.14. Overview display status of the detectors

This menu entry enables the status of all detectors to be displayed in a tabular overview. The display shows all detectors in the currently (selected) loop (selected using the number block). It can be reached from the main menu by selecting the sub-menu entries:

→ Fire Alarm System → Management → Loop (and key "More Information")

## 2.8.15. Activate/deactivate loops

The password has to be entered!

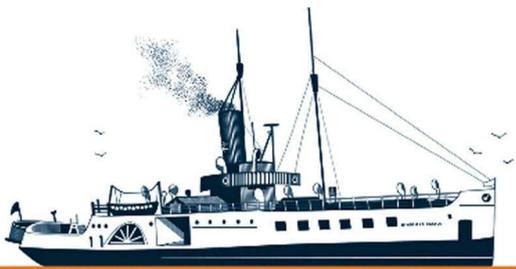
This menu entry enables a loop to be deactivated. It can be reached from the main menu by selecting the sub-menu entries:

→ Fire Alarm System → Management → Loop (and key "Change Connect Status")

## 2.9. Main panel in parallel operation

A second main panel can be connected to the AFMS. This only enables "parallel" operation. In contrast to the first main panel, which runs as principal 'master', the second main panel in parallel operation has a few restricted functions only.

The main panel in parallel operation cannot be used, for example, to change the configuration of the AFMS. It serves only simple information (as some kind of monitor) for any users. Faults and fire alarms are shown as on the principal main panel (including acoustic sounder, the LEDs and alarm



messages). The acoustic sounders must be switched off individually (at any location) on each main panel (principal or parallel operation). Faults and fire alarms can however only be accepted and reset at the main panel (operating as principal master). Both panels are otherwise 100% identical (same hard- and software). The needed (or wanted) operating mode (from such displays) is set by changing a jumper in the black connector plug housing! So the connector is responsible for the working mode.

Independent of the mode of operation, the brightness of the illuminated fields, the LEDs and the display can be adjusted on any panel separately. The lamp test can also be performed locally (in both operating modes) and the unit firmware can be displayed.

### 3. Glossary

#### 3.1. Acoustic sounder

An acoustic sounder emits a "loud" tone. It is located only on the back side of every main panel and serves to provide a local acoustic notification of a fire or a fault event.

#### 3.2. Fire detector

The FMS3000 can only be used with non-addressable sensors. The alarm resistance should be between 390 and 560 Ohm. The AFMS can likewise operate with non-addressable fire detectors, but can also administrate addressable detectors (sensors working with HOCHIKI ESP telegrams). The AFMS is mainly designed to operate only with HOCHIKI ESP sensors. Manual call points and also all address units (different CHQ modules are possible) are counted like other detectors. The functional principle of a detector (in the example a smoke detector is used) is explained in little more detail in section 3.13.

#### 3.3. Fire zone

A number of detectors can be collected into a group or fire zone, independent of whether they are connected to one loop. If a fire is activated in a certain fire zone or group, a defined outcome can be switched for that zone or group.

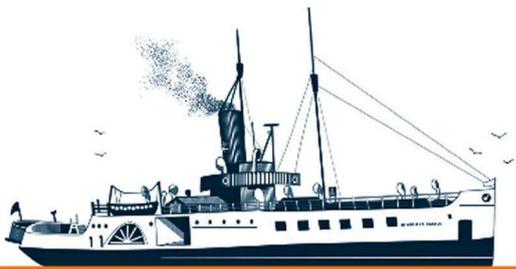
#### 3.4. Graphic display

A large display, on which both text and graphics can be displayed.

#### 3.5. Configuration (Config Tool)

This is where all the basic settings of the AFMS are configured. A system configuration is "written" with an Excel tool or the DECKMA Config Tool. These aids create 35 text files from the inputs, which are copied onto the "root" of an SD card. The SD card is inserted into the data module at the back of the AHT. The data module must be **continuously** connected with the AHT (it is secured to the AHT with 2 screws or bolts). The configuration contains:

- Which modules are being used (type).
- The number of outputs and fire loop assemblies (+ active loops).
- The events linked with the outputs of the fire loop and output assemblies.
- The names of the detectors (detector location), fire zones, detector sensitivities ...
- Delay in case of fault due to failure of mains or emergency power supply.
- Charging current for the accumulator(s)



- Language and menu files for the display in the soft key fields
- Definition of timers and switching off e.g. smoke detectors
- Definition of MODBUS-Ident data for external SPS systems

### 3.6. LED

Light emitting diodes (LED) create light.

### 3.7. Loop

The physical connection (through plugs JLD1, JLR1, JLD2, JLR2) of the fire loop module (AFM), to which the detectors are connected. Outcomes can be configured independently of the loop, to which a detector is connected. Each fire loop module has 4 terminals for altogether 2 fire detector loops (loop 1 with "drive" and "return" and loop 2 with "drive" and "return").

### 3.8. Illuminated fields

Illuminated fields are provided on all main panels. Some are above the keys or located next to the LEDs they are assigned to. They have a symbol or are labelled. The illuminated fields can light up in various colours (red, green, yellow) depending on the situation. Their brightness can be adjusted (daytime/night time operation). Fires or faults always light up with the full brightness on first occurrence until they have been accepted (daytime operation with dimmed display)!

### 3.9. Power supply

There is a mains and an emergency power supply. If one fails, the AFMS reports a fault. If the mains power fails, the AFMS switches to emergency power. If both power supplies fail, the AFMS switches to accumulator emergency operation until the accumulator has run down. Then the system switches off (protection against full discharge for the accumulator(s)).

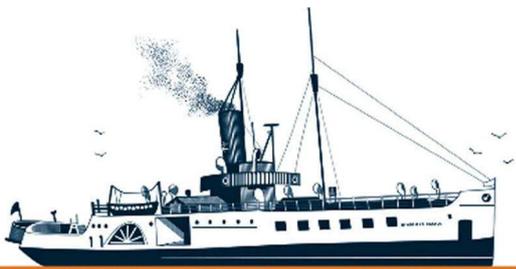
### 3.10. Loops

Up to 16 conventional fire detectors can content a conventional loop in parallel. In the last fire detector of a loop, a termination resistor of 3k $\Omega$  (+/-10%) must be fitted. With non-addressable fire detectors, which can only be used by the FMS3000, a fires can only be detected in one loop and not in one detector.

Up to 127 addressable fire detectors (better sensors) can be present in an addressable loop. There is no termination resistance or "EOL device" needed. All detectors are connected in parallel to one cable and each sensor can be only identified through HOCHIKI's ESP telegram. All ESP sensors must be programmed with a programmer (TCH-B100 [old]/TCH-B200 [new]) or the relevant address is set on site by using the dip switches on the sensor itself (this applies to some CHQ modules). The maximum possible loop current is limited to 400mA. Any loop current is monitored by the existing energy management system to keep any loop current as low as possible. So that data can be transmitted over long distances, the loop current is kept as low as possible by the ESP-supported special energy management (keywords: "line loss", "voltage drop on cables" and "line load").

### 3.11. Loop name

A conventional loop can be given a name in the configuration. This can describe the location of the detectors connected to the loop. In an addressable system, the detectors possess a clear detector text (and its group/fire zone), such as e.g. "Steering Gear Room 125 Aft" and the fire zone "Engine Room Aft" and its address 38.



### 3.12. Fault (error)

A fault is an error, which disturbs the proper operation of the system. Parts not affected by the fault continue to function correctly.

A fault should be remedied as quickly as possible in order to ensure permanent fault-free operation. If the AFMS detects a fault, it reports it.

Supply faults in the power supply can be configured regarding the time (up to max 240 seconds).

Faults in detector telegrams (detector has disappeared) are reported after 60 seconds.

Faults in the internal communication of the assemblies are reported after about 90 seconds.

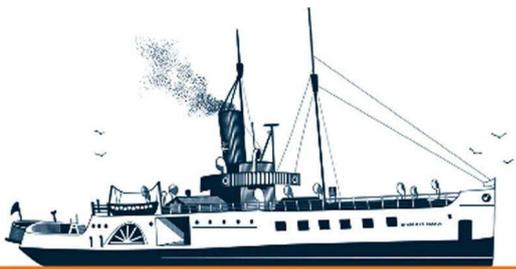
### 3.13. Working principle of sensors (smoke sensor)

Smoke detectors report once a threshold has been exceeded and then falls below this level again. The smoke detector itself triggers an interrupt (with ESP telegram), which identifies this (unique) sensor and displays it. Detectors can be checked regularly with a suitable test gas (or with "real" smoke). It should be well noted, that not too much of the gas should be used, as residues in the detector are possible. Also, a detector should not be reset "as quick as possible" (immediately) after a test procedure, as the detector chamber may not be "clean" again from gas (or smoke) in time (under some circumstances)! Too early reset will re-trigger a new (maybe unwanted) fire alarm! Wherever a chamber is "clean" from gas or smoke, and when, cannot be seen from outside and depends only on the existing air exchange to the detector's position! Thus, there may be rooms present where no air exchange takes place and the detector is constantly into this "fog" threshold which then inevitably lead into a technical error or a PRE-ALARM condition. This is here a "normal function" due to the present environment.

If a detector reports unusually often alarms, his position is more than unfavorable. A heat detector (mounted under a hot panel) can be triggered by heat build-up, a smoke detector (over a dishwasher mounted) will trigger by drops of 'hot' water when opening the dishwasher door – same to shower cabins where the sensor is mounted to close in front of the wet cabin's door. If a detector triggers "unintentionally" often, always check the environment as the cause! The HOCHIKI's failure rate from sensors are negligible less.

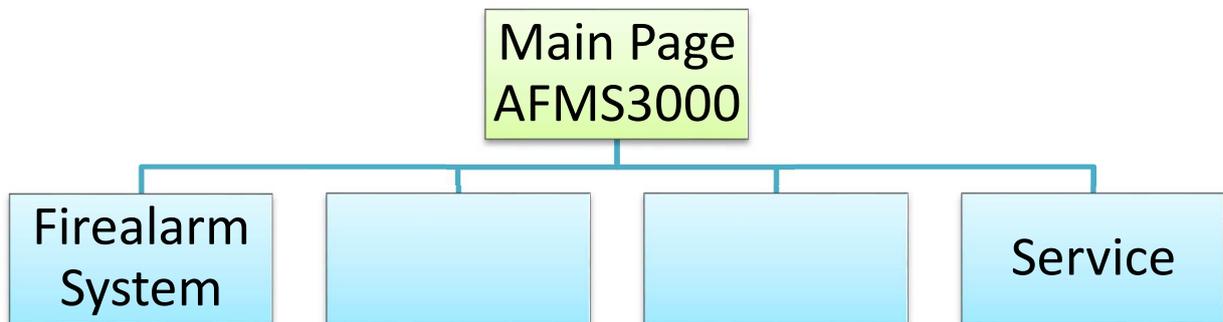
When a detector has triggered, his red alarm LEDs lights up. This is the case with the first five (5) detectors of each loop! From the 6<sup>th</sup> detector (in chain), no LED will turn on. Each loop can be unilaterally connected in the event of a fault (loop open), then the load (due to too many LEDs) cannot become infinitely large. The integrated - and ESP-based - energy management system protects the loop against possible overload and (as cause of this) against too much voltage drop.

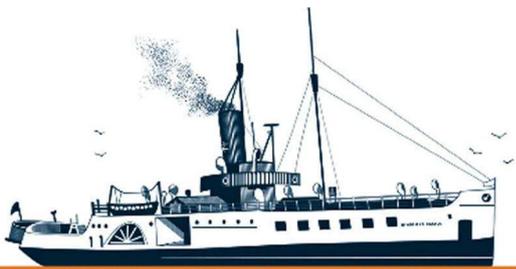
In normal operation (no detector has triggered), a loop current of less than 1mA flows for 127 smoke detectors! Each pair of red LEDs represents here a much higher load factor for the loop – this must be avoided. Only in this way can data be transmitted over many kilometers of loop cable at all. Therefore, the number of LEDs that lights up simultaneously is limited to only five (5). This principle applies to smoke detectors, heat detectors and manual detectors and affects only the LEDs of the detectors.



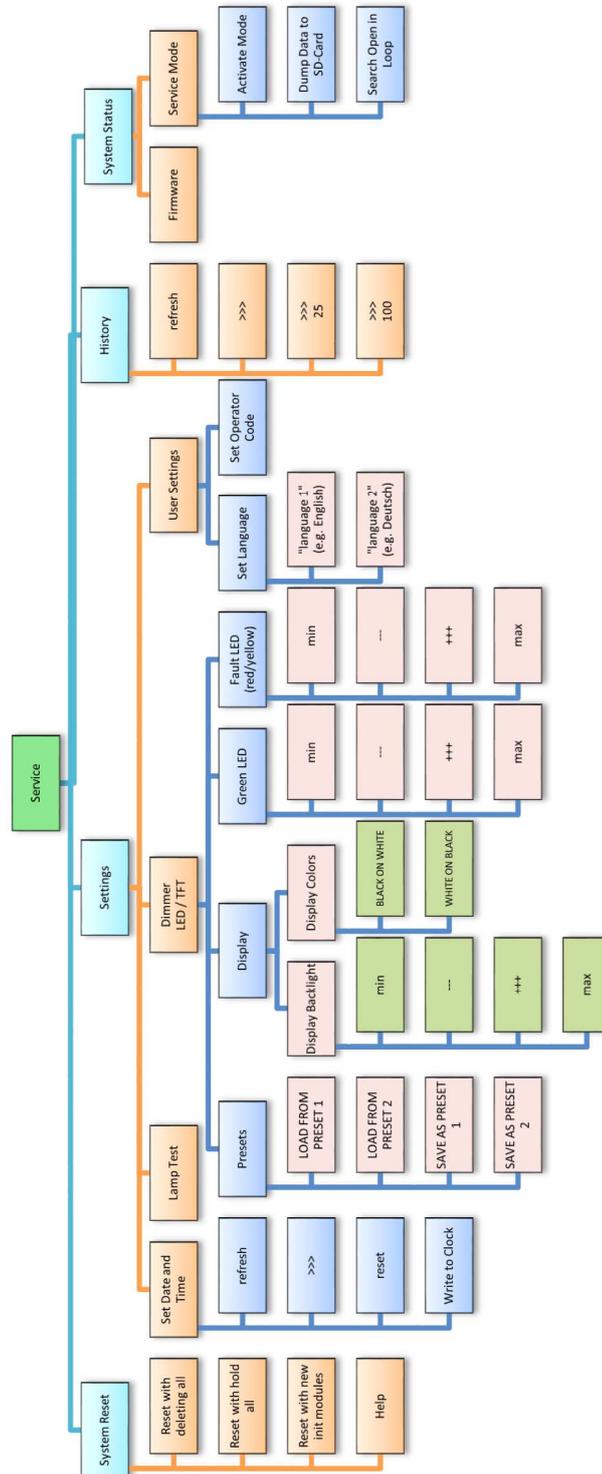
## 4. Menu structures

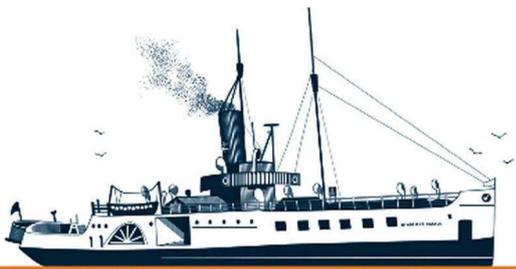
### 4.1 Menu Main Page





## 4.2 Menu Service





## 4.3 Menu Fire Alarm System

