

USER MANUAL: MODBUS / RS-485



μ-FEP

FIRE DETECTION & EXTINGUISHING CONTROL PANEL WITH AN INTEGRATED UPS



Document Revision Details

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Important Notes – PLEASE READ CAREFULLY

This manual should be thoroughly read and understood before installation and commissioning of the system is undertaken. This MODBUS manual is an integral part of the μ -FEP user manual version 1.9 of January 1, 2021.

The μ -FEP, with the associated connections, must be installed, commissioned, and maintained by a skilled, knowledgeable, and competent personnel that is trained to perform this work. It is assumed that the personnel who commission the system is familiar with objective of the equipment and the technical terminology associated with this. Except for the backup battery there are no user-serviceable parts in the μ -FEP.

Electrostatic Discharge (ESD) precautions when opening the μ -FEP.

Always wear a properly grounded anti-static wrist strap. Avoid direct contact with any of the components on the printed circuit board. Never let the electronics come in contact with clothing. The ground strap cannot dissipate static charges from fabrics. Failure to follow accepted ESD handling practices could cause damage to the μ -FEP. The warranty may be void if the equipment is damaged by ESD.

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Reservations

The diagrams of operating principles of the μ -FEP fire-/extinguisher system, included in this manual, are intended to support this manual and are therefore not intended and suitable for technical implementation or realization. No part of this manual may be reproduced, stored in an automated database, or made public in any form or by any means either electronically, mechanically or by photocopying, recording, or in any other way, without prior written permission from K&G Groep BV. The policy of the K&G Groep BV is one of continuous improvement and as such we reserve the right to make changes to product specifications at any time and without prior notice.

Errors and omissions excepted.

1 INTRODUCTION

The μ -FEP is designed to be used in a fully integrated system. Remote devices can read the status and parameters of the μ -FEP by a digital bus system. The technology used is MODBUS. This is a very well-established bus technology that uses RS-485 as the underlying physical layer. Please read the μ -FEP User Manual before using the device. This manual only handles the data bus usage.

2 CONNECTING THE DATA BUS

RS-485 is a 3-wire bus. Two wires for the communication data and one wire for the ground connection. Be aware that this ground wire must always be connected and physically kept together with the two data signal lines. Not connecting this wire can lead to communication faults and even damaged devices due to EFT or Surge events or Voltage level differences between different floating ground potentials.

Make sure the A and B data lines are not reversed. Although nothing can be damaged, the communication will not work that way.

It is strongly recommended to use a twisted pair cable to reduce the risk of communication failures due to Electro Magnetic Interference (EMI). Twisting all four lines together instead of twisting in pairs of 2 is also a good solution.

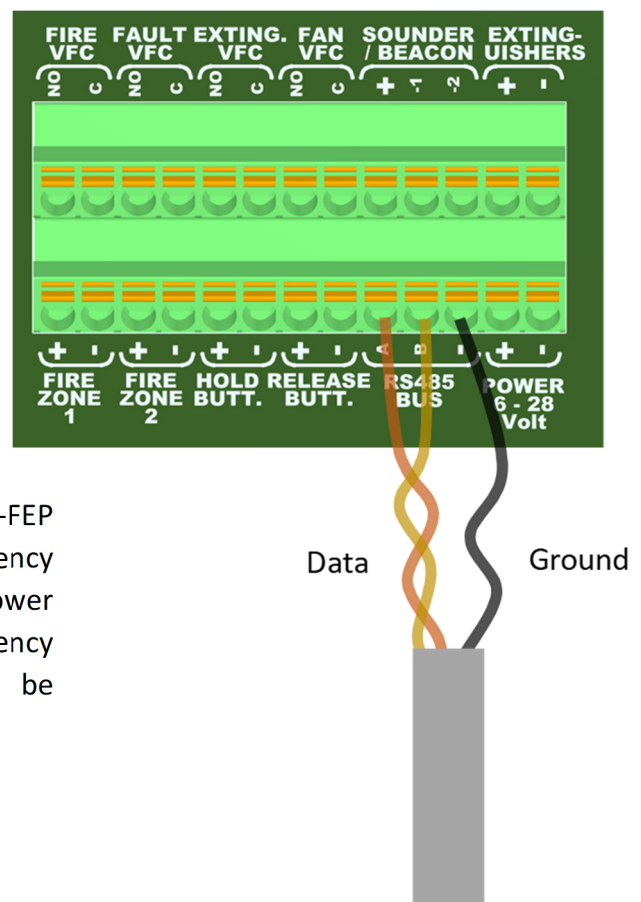
3 CONNECTION SETTINGS

The MODBUS type is RTU and the settings of the communication are 8N1 baudrate 9600. This means:

- Baudrate 9600 bps
- 1 start bit
- 8 data bits
- No parity bit
- 1 stop bit

4 MODBUS / EMERGENCY POWER

When using Modbus, the power consumption of the μ -FEP increase by approx. 15%. That means in case of emergency power situation a decrease of the emergency power capacity of 15%. To prevent unnecessary use of emergency power capacity, the Modbus communication will be disabled if there is NO communication for 5 minutes.



5 CHANGING THE MODBUS ADDRESS

It is possible to connect multiple devices to one data bus. It is very important to give each device in the data bus a unique address. This is done via the buttons on the μ -FEP.

5.1 STEP1

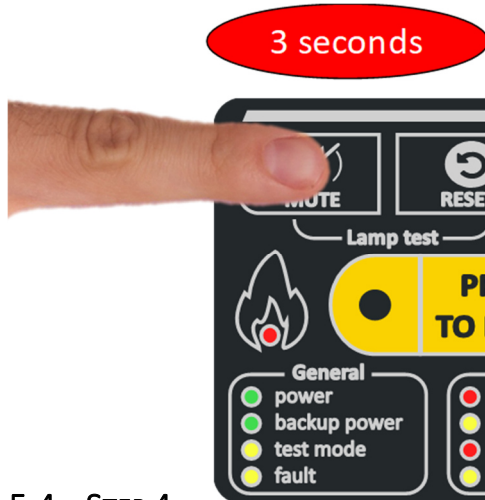
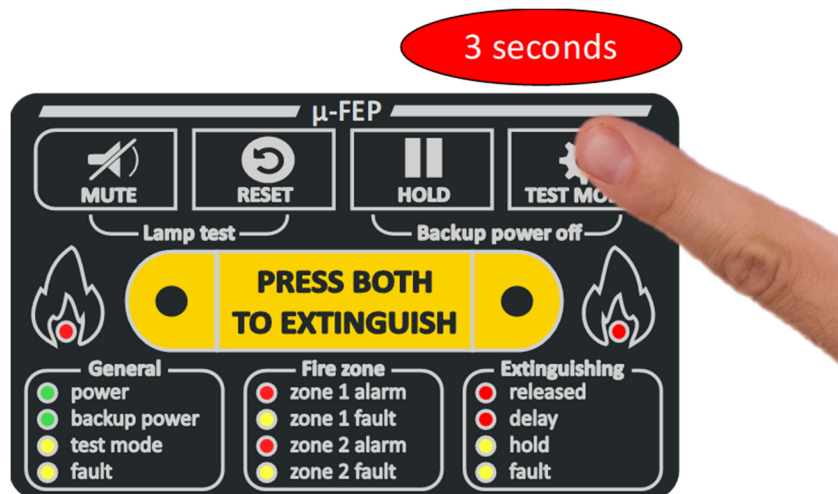
Make sure the μ -FEP device is in test mode by holding the test button for more than 3 seconds.

5.2 STEP2:

Make sure the Test mode LED is ON.

5.3 STEP 3

Hold the Mute button for more than 3 seconds.

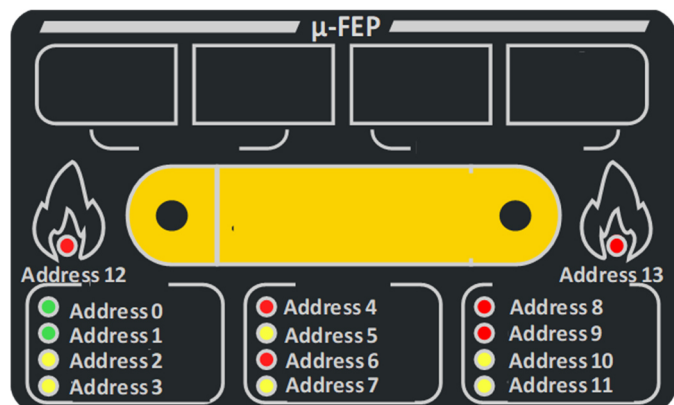


5.4 STEP 4

One LED will be blinking fast. The following picture show the MODBUS address that you configured. Press the Mute button **shortly** to change the address.

5.5 STEP 5

To confirm the address, press the MUTE button for at least 3 seconds or press the Reset button to cancel. If there is no button pressed for 60 seconds during this MODBUS address selection mode. The operation is automatically canceled.



6 TEST CONNECTION

To test the connection and the communication, various tools are available in the market. For example, the FTDI USB-RS485-WE-1800-BT cable can be used to connect the hardware to a PC. A simple and easy to use test application, among others, is the Schneider Electric Modbus Tester application for Windows.

7 MODBUS REGISTER

All parameters are read only holding registers and can be read by an external MODBUS RTU master device via "Read hold register" commands. It is possible to read multiple registers with one command by changing the requested data length. All register contains 16 bits data. If data is requested beyond the last available register the data is cut-off at the end and the reply will have the corrected data length. The data has the most significant byte first (MSB first) as this is the most common way to format the 16 bits register content in MODBUS RTU.

| Register | Name | Description | length |
|----------|--|--|--------|
| 40000 | Product name | Always replies with the string "KNG9239-app" | 20 |
| 40020 | Version | Firmware version Major revision in high byte, minor revision in lower byte | 1 |
| 40021 | Reboots | Number of reboots since first started | 1 |
| 40022 | Testing | The device is in test state | 1 |
| 40023 | Sounder state | External sounder state: 0 = IDLE, 1 = OPEN, 2 = SHORTED, 3 = ACTIVATED | 1 |
| 40030 | Current event state: fault Extinguish line open | 1 = Active, 0 = Not active | 1 |
| 40031 | Current event state: fault Extinguish line shorted | 1 = Active, 0 = Not active | 1 |
| 40032 | Current event state: fault fire zone 1 open | 1 = Active, 0 = Not active | 1 |
| 40033 | Current event state: fault fire zone 1 shorted | 1 = Active, 0 = Not active | 1 |
| 40034 | Current event state: fault fire zone 2 open | 1 = Active, 0 = Not active | 1 |
| 40035 | Current event state: fault fire zone 2 shorted | 1 = Active, 0 = Not active | 1 |
| 40036 | Current event state: fault sounder open | 1 = Active, 0 = Not active | 1 |
| 40037 | Current event state: fault sounder shorted | 1 = Active, 0 = Not active | 1 |
| 40038 | Current event state: fault external hold open | 1 = Active, 0 = Not active | 1 |
| 40039 | Current event state: fault external hold shorted | 1 = Active, 0 = Not active | 1 |
| 40040 | Current event state: fault external hold midrange | 1 = Active, 0 = Not active | 1 |
| 40041 | Current event state: fault external release open | 1 = Active, 0 = Not active | 1 |
| 40042 | Current event state: fault external release shorted | 1 = Active, 0 = Not active | 1 |
| 40043 | Current event state: fault external release midrange | 1 = Active, 0 = Not active | 1 |
| 40044 | Current event state: fault power disconnected | 1 = Active, 0 = Not active | 1 |
| 40045 | Current event state: external release | 1 = Active, 0 = Not active | 1 |
| 40046 | Current event state: external hold | 1 = Active, 0 = Not active | 1 |
| 40047 | Current event state: fire zone 1 fire | 1 = Active, 0 = Not active | 1 |
| 40048 | Current event state: fire zone 2 fire | 1 = Active, 0 = Not active | 1 |
| 40049 | Current event state: dead battery | 1 = Active, 0 = Not active | 1 |
| 40050 | Current event state: charged cap | 1 = Active, 0 = Not active | 1 |
| 40051 | Current event state: battery overcurrent | 1 = Active, 0 = Not active | 1 |
| 40080 | Event count: fault Extinguish line open | Nr. Of events occurred since reboot | 1 |
| 40081 | Event count: fault Extinguish line shorted | Nr. Of events occurred since reboot | 1 |
| 40082 | Event count: fault fire zone 1 open | Nr. Of events occurred since reboot | 1 |
| 40083 | Event count: fault fire zone 1 shorted | Nr. Of events occurred since reboot | 1 |
| 40084 | Event count: fault fire zone 2 open | Nr. Of events occurred since reboot | 1 |
| 40085 | Event count: fault fire zone 2 shorted | Nr. Of events occurred since reboot | 1 |
| 40086 | Event count: fault sounder open | Nr. Of events occurred since reboot | 1 |
| 40087 | Event count: fault sounder shorted | Nr. Of events occurred since reboot | 1 |

| Register | Name | Description | length |
|----------|--|---|--------|
| 40088 | Event count: fault external hold open | Nr. Of events occurred since reboot | 1 |
| 40089 | Event count: fault external hold shorted | Nr. Of events occurred since reboot | 1 |
| 40090 | Event count: fault external hold midrange | Nr. Of events occurred since reboot | 1 |
| 40091 | Event count: fault external release open | Nr. Of events occurred since reboot | 1 |
| 40092 | Event count: fault external release shorted | Nr. Of events occurred since reboot | 1 |
| 40093 | Event count: fault external release midrange | Nr. Of events occurred since reboot | 1 |
| 40094 | Event count: fault power disconnected | Nr. Of events occurred since reboot | 1 |
| 40095 | Event count: external release | Nr. Of events occurred since reboot | 1 |
| 40096 | Event count: external hold | Nr. Of events occurred since reboot | 1 |
| 40097 | Event count: fire zone 1 fire | Nr. Of events occurred since reboot | 1 |
| 40098 | Event count: fire zone 2 fire | Nr. Of events occurred since reboot | 1 |
| 40099 | Event count: dead battery | Nr. Of events occurred since reboot | 1 |
| 40100 | Event count: charged cap | Nr. Of events occurred since reboot | 1 |
| 40101 | Event count: battery overcurrent | Nr. Of events occurred since reboot | 1 |
| 40130 | Led state: fire zone 1 alarm | 0 = off, 1 = on, 2 = blink, 3 = blink fast | 1 |
| 40131 | Led state: fire zone 2 fault | 0 = off, 1 = on, 2 = blink, 3 = blink fast | 1 |
| 40132 | Led state: general fault | 0 = off, 1 = on, 2 = blink, 3 = blink fast | 1 |
| 40133 | Led state: power | 0 = off, 1 = on, 2 = blink, 3 = blink fast | 1 |
| 40134 | Led state: common fire | 0 = off, 1 = on, 2 = blink, 3 = blink fast | 1 |
| 40135 | Led state: delay | 0 = off, 1 = on, 2 = blink, 3 = blink fast | 1 |
| 40136 | Led state: hold | 0 = off, 1 = on, 2 = blink, 3 = blink fast | 1 |
| 40137 | Led state: fire zone 1 fault | 0 = off, 1 = on, 2 = blink, 3 = blink fast | 1 |
| 40138 | Led state: fire zone 2 alarm | 0 = off, 1 = on, 2 = blink, 3 = blink fast | 1 |
| 40139 | Led state: test mode | 0 = off, 1 = on, 2 = blink, 3 = blink fast | 1 |
| 40140 | Led state: backup power | 0 = off, 1 = on, 2 = blink, 3 = blink fast | 1 |
| 40141 | Led state: fire2 | 0 = off, 1 = on, 2 = blink, 3 = blink fast | 1 |
| 40142 | Led state: extinguish released | 0 = off, 1 = on, 2 = blink, 3 = blink fast | 1 |
| 40143 | Led state: extinguish release line fault | 0 = off, 1 = on, 2 = blink, 3 = blink fast | 1 |
| 40144 | Led state: sounder/beacon fault | 0 = off, 1 = on, 2 = blink, 3 = blink fast | 1 |
| 40145 | Led state: extern release fault | 0 = off, 1 = on, 2 = blink, 3 = blink fast | 1 |
| 40146 | Led state: extern hold release fault | 0 = off, 1 = on, 2 = blink, 3 = blink fast | 1 |
| 40150 | VFC state: Fire | 1 = Active, 0 = Not active | 1 |
| 40151 | VFC state: Fault | 1 = Active, 0 = Not active | 1 |
| 40152 | VFC state: Extinguish | 1 = Active, 0 = Not active | 1 |
| 40153 | VFC state: Fan | 1 = Active, 0 = Not active | 1 |
| 40160 | Button state: Reset | 0 = not pushed, 1 = pushed, 2 = pushed long, 3 = pushed longer | 1 |
| 40161 | Button state: Hold | 0 = not pushed, 1 = pushed, 2 = pushed long, 3 = pushed longer | 1 |
| 40162 | Button state: Test | 0 = not pushed, 1 = pushed, 2 = pushed long, 3 = pushed longer | 1 |
| 40163 | Button state: Mute | 0 = not pushed, 1 = pushed, 2 = pushed long, 3 = pushed longer | 1 |
| 40164 | Button state: Extinguish | 0 = not pushed, 1 = pushed, 2 = pushed long, 3 = pushed longer | 1 |
| 40165 | External Button state: Hold | 0 = not pushed, 1 = pushed, 2 = fault | 1 |
| 40166 | External Button state: Extinguish | 0 = not pushed, 1 = pushed, 2 = fault | 1 |
| 40170 | Button pushed count: Reset | Nr. Of events occurred since reboot | 1 |

| Register | Name | Description | length |
|----------|---|-------------------------------------|--------|
| 40171 | Button pushed count: Hold | Nr. Of events occurred since reboot | 1 |
| 40172 | Button pushed count: Test | Nr. Of events occurred since reboot | 1 |
| 40173 | Button pushed count: Mute | Nr. Of events occurred since reboot | 1 |
| 40174 | Button pushed count: Extinguish | Nr. Of events occurred since reboot | 1 |
| 40180 | Button pushed long count: Reset | Nr. Of events occurred since reboot | 1 |
| 40181 | Button pushed long count: Hold | Nr. Of events occurred since reboot | 1 |
| 40182 | Button pushed long count: Test | Nr. Of events occurred since reboot | 1 |
| 40183 | Button pushed long count: Mute | Nr. Of events occurred since reboot | 1 |
| 40184 | Button pushed long count: Extinguish | Nr. Of events occurred since reboot | 1 |
| 40190 | Button pushed longer count: Reset | Nr. Of events occurred since reboot | 1 |
| 40191 | Button pushed longer count: Hold | Nr. Of events occurred since reboot | 1 |
| 40192 | Button pushed longer count: Test | Nr. Of events occurred since reboot | 1 |
| 40193 | Button pushed longer count: Mute | Nr. Of events occurred since reboot | 1 |
| 40194 | Button pushed longer count: Extinguish | Nr. Of events occurred since reboot | 1 |
| 40220 | Main voltage | units: mV | 1 |
| 40221 | Internal voltage | units: mV | 1 |
| 40222 | Battery voltage | units: mV | 1 |
| 40223 | Battery current | units: mA | 1 |
| 40224 | Extinguish power capacitor voltage | units: mV | 1 |
| 40225 | Board temperature | units: degrees Celsius * 10 | 1 |
| 40226 | Extinguish sense voltage | units: mV | 1 |
| 40227 | Sounder port voltage positive pole | units: mV | 1 |
| 40228 | Sounder port voltage negative pole | units: mV | 1 |
| 40229 | Fire zone 1 Voltage | units: mV | 1 |
| 40230 | Fire zone 2 Voltage | units: mV | 1 |
| 40231 | Fire zone 1 Current | units: uA | 1 |
| 40232 | Fire zone 2 Current | units: uA | 1 |
| 40233 | Fire zone 1 Resistance | units: Ohm | 1 |
| 40234 | Fire zone 2 Resistance | units: Ohm | 1 |
| 40235 | External release button resistance | units: Ohm | 1 |
| 40236 | External hold button resistance | units: Ohm | 1 |
| 40250 | Reading this register or higher will return no answer | | |

8 NOTES
