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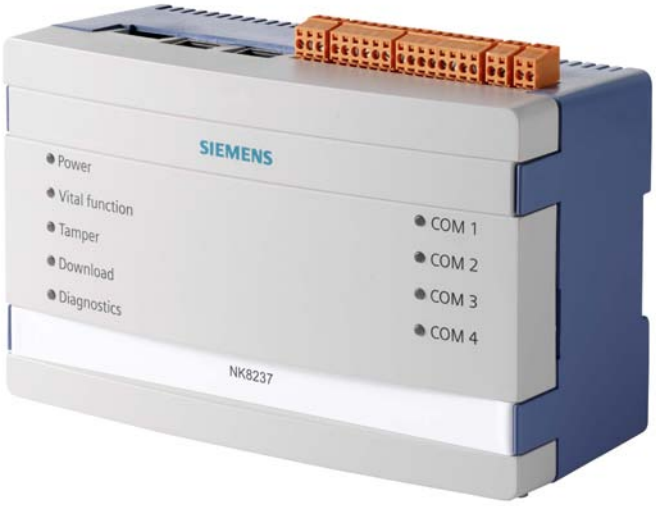

NK8237 MP4.80

Modbus Gateway for Sinteso™ and Cerberus® PRO Fire Detection Systems

Interface Specifications

A6V10316242_a_en
30.09.2015

Building Technologies
CPS Fire Safety

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About this document

Purpose

This manual is intended as a guide to the Modbus interface provided by the NK823x Gateway for the fire control units of FS20/FS720/STT20 families. The manual presents the application-level information of this interface indicating the fire objects mapping, and describes the corresponding Modbus registry structure and the applicable Modbus functions.

Important: It is assumed that readers of this document are familiar with the Modbus protocol and data communication in general.

Scope

This document applies to the Modbus Interface gateway **NK823x MP4.80**.

Target audience

This documentation is intended for the following users:

- Project Managers
- Project Engineers

Documentation resource information

The *DMS8000 Documentation Resource Information and Glossary Guide* assembles important information regarding documentation resources. This document contains the following:

- Comprehensive definitions of the target audiences for Siemens FS DMS documents
- Training program information including the Siemens intranet link
- A complete list of all available DMS8000 documents
- Instructions for how to obtain a document via the Siemens intranet using the Siemens Asset Portal
- A map of relevant documents for each target audience group
- Customer Support links & resources
- A glossary containing definitions of all terms and acronyms used in DMS8000 documentation

To access the *DMS8000 Documentation Resource Information and Glossary Guide* (document no. A6V10089056), go to the link and follow the document search instructions below:

http://assetportal.bt.siemens.com/portal/index.html

1. In the Search column on the left, set:
   - Segment: **04 Fire -3F**
   - Document Type: **All**
   - Image Type: **All**
   - Advanced search criteria: Select **Brochure No.** and enter the document number to search for (*A6V10089056*). Alternatively, select **Title** and enter the product name (*DMS8000*).
2. Click **Search** to start.
3. In the resulting area on the right, click on **Contents** link to show the list of search results.

For more information such as Siemens news and announcements, visit the STEP Web portal at:

https://workspace.sbt.siemens.com/content/00001123/default.aspx

Operational and safety regulations

Before groups of persons begin work on the system, they must have read and understood the Safety Regulations [→ 8] section in this manual.

Liability disclaimer for damage or injuries

Before products are delivered, they are tested to ensure they function correctly when used properly. Siemens disclaims all liability for damage or injuries caused by the incorrect application of the instructions, or the disregard of danger advisories. This disclaimer applies in particular to personal injuries or damage caused by:

- Improper and/or incorrect use.
- Disregard of safety instructions in the documentation or on the product.
- Poor maintenance or a lack of maintenance.

We have checked the contents of this manual for agreement with the hardware and software described. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the data in this manual are reviewed regularly and any necessary corrections are included in subsequent editions. Suggestions for improvement are welcome.

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Documentation Conventions

The following table lists conventions to help you use this document in a quick and efficient manner.

Convention	Examples
Numbered Lists (1, 2, 3…) indicate a procedure with sequential steps.	**1.** Turn OFF power to the field panel. **2.** Disconnect the power cord. **3.** Open the cabinet.
One-step procedures are indicated by a bullet point.	● Expand the Event List.
Conditions that you must complete or must be met before beginning a procedure are designated with a ▷. Results, after completing a step or at the end of the entire procedure, are designated with a ⇨.	▷ The report you want to print is open. **1.** Click the **Print** icon  . ⇨ The **Print** dialog box appears. **2.** Select the **printer** and click **Print**. ⇨ The print confirmation appears.
Bold font in a procedure indicates something you should select or type.	Type **F** for Field panels. Click **OK** to save changes and close the dialog box.
Menu paths are indicated in **bold**.	Select **File > Text, Copy > Group**, which means from the **File** menu, then select **Text**, **Copy** and finally **Group**.

Error and system messages are displayed in `Courier New` font.	The message `Definition successfully renamed` displays in the status bar.
Italics are used to emphasize a term.	The Open Processor continuously executes a user-defined set of instructions called the *control program*.
	This symbol signifies a Note. Notes provide additional information or helpful hints.
 Caution	This is a Caution message and indicates that minor or moderate injury or property damage may occur if a procedure is not followed.
 Warning	This is a Warning message and indicates that a serious injury or a severe equipment and property damage may occur if a procedure is not followed.
Cross references to other information in printed material are indicated with an arrow and the page number, enclosed in brackets: [→92]	For more information on creating flowcharts, see Flowcharts [→92].

Modification index

Note: For versions more than four years old, please visit the Siemens Asset Portal.

Modification index.		
Version	**Date**	**Notes**
A6V10316242_a_en	09.2015	Corresponds with MP4.80
A6V10316242_a_en	09.2014	Corresponds with MP4.70
A6V10316242_a_en	06.2013	Corresponds with MP4.60
A6V10316242_a_en	06.2012	Corresponds with MP4.50
A6V10316242_a_en	06.2011	Corresponds with MP4.40

1 Safety regulations

This section describes the danger levels and the relevant safety regulations applicable to the use of the products described in this manual. Please read the following work instructions as well as the preceding section *About this document* thoroughly before beginning any work.

1.1 Country-specific standards

Siemens products are developed and produced in compliance with the relevant international and European safety standards. Should additional country-specific, and/or local safety standards or regulations concerning project planning, installation, and/or operation of the product(s) apply, then these standards and/or regulations must also be taken into account, in addition to the safety regulations mentioned in the product documentation.

1.2 Assembly and installation

The NK8000 units and NE8000 cabinets should always be installed in a clean and stable environment; see the specific requirements given in the Technical Data section of the specific NK823x datasheets.

In particular, keep units and cabinets away from the following:

- High levels of dust
- High temperature and humidity
- Locations where it might became wet
- Vibration and impact

Also, abide by the safety regulations of the connected devices.

1.3 Commissioning and testing

- Activate security-, fire- and third party systems or devices *only* in the presence of the person responsible.
- Abide by the safety regulations of the connected sub-systems when working on management stations. This especially applies when switching-off system components.
- Inform people before the testing of alarm devices; take the possibility of panic reactions into account.
- Inform the alarm and fault receiving stations connected to the system before carrying out any tests.

1.4 Disposal and recycling

The NK8000 units include electrical and electronic components and must not be disposed of as domestic waste. **Current local legislation must be observed.**

These devices have been manufactured as much as possible from materials that can be recycled or disposed of in a manner that is not environmentally damaging. However, they contain parts (batteries) that require disposal in a controlled waste stream according to local environmental standards and/or regulations.

1.5 Modifications to system design and products

Modifications to a system or to individual products may cause faults or malfunctioning.

Please request written approval from Siemens Building Technologies, FS-DMS, and the relevant authorities concerning intended system modifications and system extensions.

2 Modbus Interface Specifications

The Modbus gateway enables Modbus master/client stations to access the FS20/FS720/STT20 fire control units for acquiring the status information.

The gateway also allows for control commands to be transmitted from the Modbus master/client stations to the fire system. A specific agreement with Siemens is required for this type of functions.

This document deals with the application-level communication and illustrates the register maps used for implementing it. For information about the physical protocols involved and the related configuration procedures, please refer to the NK8237 Installation, Configuration, and Commissioning Guide (document no. A6V10316241).

2.1 Modbus Gateway

2.1.1 Modbus Connections

Up to four Modbus protocols can be handled, via serial and/or TCP/IP connection:

- Serial connection: two links as Modbus slave in RTU mode over an RS232 or RS485 line.
- TCP/IP connection: Modbus server for four TCP/IP client connections. Separate Ethernet ports can be used for BACnet/IP and Modbus TCP/IP for maximum protection of the safety network.

Modbus hosts and system limits per each connected NK823x unit.	
Modbus hosts	**Detectors and units per NK823x**
1 Modbus host	● Max. 10,000 detectors. ● 16 FS20/FS720 units - OR - 12 FS20/FS720 units and 10 STT20 units in FCnet/SAFEDLINK topology.
2 Modbus hosts	● Max. 5,000 detectors. ● 8 FS20/FS720 units - OR - 6 FS20/FS720 units and 5 STT20 units in FCnet/SAFEDLINK topology.
3 Modbus hosts	● Max. 3,500 detectors. ● 6 FS20/FS720 units - OR - 5 FS20/FS720 units and 3 STT20 units in FCnet/SAFEDLINK topology.
4 Modbus hosts	● Max. 2,500 detectors. ● 4 FS20/FS720 units - OR - 3 FS20/FS720 units and 2 STT20 units in FCnet/SAFEDLINK topology

2.1.2 Modbus Functions

The gateway supports the following Modbus functions:

Function code	Function	Applicable table types	Notes
0x02	Read Discrete Input	Bit Status	
0x03	Read Holding Registers	Command, Date and Time	Use it for reading date & time registers

Function code	Function	Applicable table types	Notes
0x04	Read Input Registers	Summary; Status; Compact Status	Use it for reading status information
0x06	Write Single Register	Command; Synchronization	Use it for writing command registers, to perform control actions, and date & time registers, thus synchronizing the NK8237 clock.
0x07	Read Exception Status	-	Serial Line only
0x08	Diagnostics	-	Serial Line only
0x0B	Get Comm Event Counter	-	Serial Line only
0x11	Report Slave ID	-	Serial Line only
0x2B / 0x0E	Read Device ID	-	General NK8237 info.

2.2 Modbus Data Model

According to the Modbus protocol specifications, the application-level communication between *Modbus devices* occurs via memory tables representing the Modbus *Registers*. In fact, Modbus functions operate on registers to provide both monitor and control I/O.

The gateway is capable of supporting an *Input Register Map* providing a process image of the fire system status for the Modbus master/client stations, which periodically read the input registers and acquire the related conditions. Control actions can also be initiated by the Modbus master/client stations by writing appropriate values in specific *Holding Registers*. This results then in command messages being transmitted to the fire system.

2.2.1 Model Configuration Workflow

The detailed definition of the register map implementing the Modbus data model occurs at configuration time. The Composer tool can import the *FS20/FS720/STT20 metafile* (the object list) and create the register map that represents the fire objects in a simplified set of types as described in the Register Map [➙ 14] section.

The register map can be directly applied or further customized to adapt the addressing scheme to your specific application. Some modifications to the map can be done in the Composer configuration tool, including the tables' base addresses and individual offsets. In addition, all information of the map can be exported into a *CSV file*, then customized externally, and finally re-imported into the Composer environment.

Tip: Although various customizations are possible in the Composer tool, detailed modifications to the offset addresses can be better performed using a spreadsheet application (e.g. MS-Office Excel™) on the exported CSV file.

Once finalized, the CSV file can be used for integrating the model information in the Modbus master/client station, and the corresponding register map downloaded into the NK823x unit.

Note: All addressing starts with offset 0.

2.2.1.1 Customizing Modbus Maps

▷ The following illustrates the overall map customization procedure.

1. Start the Composer tool and open the Modbus gateway project.
   ⇨ The project tree displays in the Composer environment.
2. In the **Modbus station** node, select the **Host** tab and modify the **Modbus Base Address** values as needed. Make sure to define a consistent address scheme and avoid any conflicts.
3. In the **Modbus station** node, launch the **Node Commands > Export in CSV** command and follow the instructions.
   ⇨ A CSV file is created.
4. Using e.g. MS-Office Excel, edit the CSV file.
   – You can modify the **ModbusAddress** of any object.
5. When the CSV is ready, launch the import procedure on the same node used above for exporting.
   ⇨ The new map is available in Composer.
6. Download the configuration into the NK823x gateway unit.

Note: When modifying the address values, make sure to define a consistent mapping, avoiding any address conflict.

Note: The export command also generates a TXT file containing information about supported Modbus functions.

For a detailed description of the configuration process, please refer to the NK8237 Installation, Configuration, and Commissioning Guide (document no. A6V10316241).

2.2.1.2 CSV Export File Structure

The CSV export file can be created in Composer using the node command for the Modbus master/client node. It contains the entire set of objects mapped in Modbus registers to represent the fire system.

The CSV file can be used for:

- Modifying the registers address and (re)organize the data memory to optimize the Modbus master/client treatment.
- Feeding the fire system configuration into the Modbus master/client configuration tool.

The following fields (columns) are present in the CSV file:

SubsystemId

Identifier of the subsystem in the Composer project, and used during file re-import. It cannot be modified.

NodeId

Identifier of the node in the Composer project, and used during file re-import. It cannot be modified.

⚠ WARNING

Composer subsystem and node IDs are used during the re-import to identify the object positions. Any modification to those fields in the imported file are likely to cause the system to fail.

FieldDevice

Description text of the control unit. Modifications to this field are ignored in the re-import.

ModbusSlaveAddress

Address of the Modbus slave (range: 1… 247). Modifications to this field are ignored in the re-import.

ParentDescription

Description text of the parent object. Modifications to this field are ignored in the re-import.

Description

Description text of the object. Modifications to this field are ignored in the re-import.

TechnicalText

Technical text of the object in the Composer project. Modifications to this field are ignored in the re-import.

ObjectName

Unique technical tag of the object. It cannot be modified.

ModbusTable

Name of the table in the Modbus data representation (see FS2xxx Register Map [→ 14]). It cannot be modified.

Modbus BaseAddress

Starting address of the set of Modbus registers associated to the object. Modifications to this field are ignored in the re-import. Note however that the base addresses can be modified in the Composer configuration.

For each object, the actual Modbus register address is determined by summing the **Modbus BaseAddress** and the **ModbusAddress**.

CommandRange

Starting address of the set of Modbus Holding Registers associated to the command objects. Modifications to this field are ignored in the re-import. Note however that the base addresses for the command tables can be modified in the Composer configuration.

For each object, the actual Modbus register address is determined by summing the **Modbus BaseAddress** and the **ModbusAddress**.

ModbusAddress

Object offset address. This value can be changed in the CSV file and re-imported into Composer.

CompactAddress

Starting address of the set of Modbus registers associated to the compact tables. Modifications to this field are ignored in the re-import. Note however that the base addresses for the compact tables can be modified in the Composer configuration.

For each object, the actual Modbus register address is determined by summing the **Modbus BaseAddress** and the **ModbusAddress**.

Base address for Bit Status Tables

The CSV file contains also the starting addresses of the Bit Status Tables (see Bit Status Tables [→ 22]).

Modifications to these fields are ignored in the re-import. Note however that the base addresses for the compact tables can be modified in the Composer configuration.

2.2.2 FS2xxx Register Map

Data Representation

The NK823x Modbus gateway can support multiple fire detection panels or terminals (FC2xxx and FT2xxx). Each panel, terminal and gateway is represented as a virtual Modbus device with its own Modbus Slave Address and a complete register map. The map includes a number of sub-maps that represent the fire units, and a general table for the gateway itself.

Fire Control Unit Representation

In the Modbus data representation, *each panel is mapped as a separate Modbus device with an individual address*. The device address is defined at configuration time.

A dedicated register sub-map is used for each panel, including six types of tables. Namely:

- **Summary tables**
  These are a set of word input registers including:
  - The overall panel conditions (1 word register).
  - The vitality counter (1 word register).
  - As many as 525 data change flags (33 word registers) reporting any modifications in the register area (the complete range of 65536 registers is monitored).
- **Status tables**
  These are word input registers reporting the conditions of all the mapped objects. Each word corresponds with one object and is organized in two bytes: bits 0-7 are used to represent the object operating modes, for example the on/off (inclusion/exclusion) conditions, whereas bits 8-15 contain the abnormal event conditions, such as alarms, fault, and so on.
  Status tables cover the entire set of supported objects, grouped by general

categories. A specific status table is dedicated to notifications coming from objects not included in the configuration. Namely:

- Areas
- Sections
- Detection zones
- Detection elements (logical channels)
- Controls
- Control elements (control channels)
- Hardware objects
- Unidentified event (for objects not included in the configuration)

- **Compact status tables**
  These are available for a limited set of detection objects. The compact status tables are word input registers containing a simplified status representation. In fact, each representation is made up of 4-bit status for zones or 2-bit status for detectors. This results in 4 or even 8 objects being packet in a single word register, thus allowing a faster acquisition whenever communication performances have priority than status details.
  The compact tables list includes:
  - Detection zones
  - Detection elements (logical channels)
- **Bit status tables**
  For extremely simple applications, a set of bit input registers is also provided for specific objects and events that are combined in very basic 1-bit (on/off) status report. The list of bit input registers includes:
  - Detection zone alarmed
  - Detection zone pre-alarmed
  - Detection zone not ready or in other abnormal state
  - Detection zone in test mode or excluded
  - Detection element (logical channel) active
  - Detection element (logical channel) faulty
  - Detection element (logical channel) in test mode or excluded
  - Control alarmed
  - Control faulty or in other abnormal state
  - Control in test mode or excluded
  - Control element (control channel) active
  - Control element (control channel) faulty
  - Control element (control channel) in test mode or excluded
  - HW object alarm
  - HW object fault
  - PS fault
  - PS emergency power
- **Command tables**
  The output command tables (read/write holding registers) enables Modbus master/client stations to initiate control commands to the fire control panels. Note that, depending on a configuration setting, certain commands may not be available.
  The command tables list includes:
  - Global panel acknowledgement
  - Global panel reset
  - Area manned/unmanned: set day or night mode
  - Section on/off: include/exclude all zones belonging to the section
  - Detection zone on/off: include/exclude the zone

  - Detection element (logical channel) on/off: include/exclude the detector
  - Control on/off: include/exclude the actuation group
  - Control element (control channel) on/off: include/exclude the actuator
- **Date and Time**
  See Summary Table [→ 16].

Gateway Unit Representation

A dedicated register sub-map is used for the NK823x unit, including one status table.

- **Status table**
  This is a word input register reporting the conditions of the gateway. Each word corresponds with one object and is organized in two bytes: bits 0-7 are used to represent the object operating modes, for example the on/off (inclusion/exclusion) conditions, whereas bits 8-15 contain the abnormal event conditions, such as alarms, fault, and so on.
  The gateway table includes the following:
  - NK8237 Points
  - Power Supply

2.2.2.1 Summary Table

The Summary table includes one register.

FC20 synthesis

`WT_FC20 Syn` (Input register, default base address: 1000)

One input (read-only) word register reporting 16 general on/off panel conditions in the 16 bits. The following relationship applies:

Bit	Information	Notes about the conditions corresponding to the “1” state (bit active)
0 (lsb)	Spare	Not used
1	Spare	Not used
2	Spare	Not used
3	Spare	Not used
4	Reset command required	A reset command is expected by the fire control panel
5	Ack command required	An acknowledged command is expected by the fire control panel
6	Control off / test	One or more control devices have been excluded or set in test mode
7	Detection off / test	One or more detection devices have been excluded or set in test mode
8	Emergency power	Due to missing or faulty mains supply, the panel is operating in battery mode. The delay of the event generation is configurable in the panel (00:00:00 - 02:00:00).
9	Power supply fault	Troubles with the power supply: mains or battery failure
10	Hardware fault	One or more faults have been detected in general hardware components
11	Control fault	One or more faults have been detected in control components

Bit	Information	Notes about the conditions corresponding to the “1” state (bit active)
12	Detection fault	One or more faults have been detected in detection components
13	Hardware alarm	One or more alarms have been generated by general hardware components
14	Control activation / alarm	One or more alarms have been generated by control components
15 (msb)	Detection alarm / fault	One or more alarms/faults have been generated by detection components

2.2.2.2 Synchronization Tables

The Synchronization tables include a fixed number of registers. Namely:

Life Check

`LifeCheck` (Input register, default base address: 1010)

One input (read-only) word register that is constantly incremented as long as the NK823x gateway software works properly and the communication with the fire panel and with the Modbus unit is active.

The counter stops being incremented if any of these events occurs:

- The communication between the NK823x gateway and the Modbus unit goes down (this event can be detected and treated by other Modbus units).
- The communication between the NK823x gateway and the fire panel goes down.

Bit	Information	Notes
0-15	Panel Vitality Counter	Incremented every 250 msec as long as operating properly

Data Change

`DataChange` (Input registers, default base address: 1020)

A set of 33 input word registers (525 bits are used) reporting any modifications in the register area. The complete range of 65536 Modbus registers is covered, with each flag representing changes in one or more registers in a corresponding group of 125 word registers.
The first flag, i.e. the least significant bit of the first change word register, corresponds with the registers 0 to 124, the second flag corresponds with the registers 125 to 249, and so on.
Active flags are automatically reset upon reading the registers that changed and caused the flags activation.

Word / Bit	Information	Notes
0 / 0	Registry 0-124 (00h-7Ch)	Flag 0
0 / 1	Registry 125-249 (7Dh-F9h)	Flag 1
…		Flags 2 to 14 (Word register 0)
0 / 15	Registry 1875-1999 (0753h-07CFh)	Flag 15
…		Flags 16 to 522 (Word registers 1 to 32)

Word / Bit	Information	Notes
32 / 11	Registry 65375-65499 (FF5F-FFDBh)	Flag 523
32 / 12	Registry 65500-65535 (FFDC-FFFFh)	Flag 524

Date and Time

`DateTime` (Holding registers, default base address: 1060)

Three holding (read/write) word registers used for reading or synchronizing the NK823x date and time.

The synchronization must be enabled in the configuration settings and results, in turn, in the synchronization of the fire system (FS20 and then STT20 via FS20).

Alternatively, if the synchronization on these registers is not enabled, the NK823x gateway gets the date and time periodically from the fire system (FS20). In this case, writing to the registers is disabled, and a Modbus error code 0x04 is returned upon trying a write command.

When synchronization occurs, all registers should be written in sequence to prevent any possible data interpretation error. The NK823x gateway acquires the new time stamp when the last of the 3 values gets written.

The three 16-bit registers are organized in 6 byte containing 6 hexadecimal values corresponding with day, month, year, hour, minute, and second, respectively.

Word / Bit	Information	Notes
0 / 0-7	Day	1-31 code in hexadecimal, e.g. 1B hex for day 27.
0 / 8-15	Month	1-12 code in hexadecimal
1 / 0-7	Year	10-99 code in hexadecimal
1 / 8-15	Hour	0-23 code in hexadecimal
2 / 0-7	Minute	0-59 code in hexadecimal
2 / 8-15	Second	0-59 code in hexadecimal

Note: For detailed information about the time synchronization options on the Modbus host interface, refer to the Modbus interface configuration section of the NK8237 Installation, Configuration, and Commissioning manual (A6V10316241).

2.2.2.3 Status Tables

The status tables include an input word register per object. The number of tables depends on the specific systems whose object list is defined at configuration time. For example, there may be 8 area registers corresponding with 8 areas of a given fire system.

The list of object types includes:

Area

`WT_Area` (Input registers, default base address: 6500)

Bit	Information	Notes
0 (lsb)	Non-default mode	Default range for possible abnormal mode
1-3	—	Not used
4	WalkTest[1)]	Walktest active
5	Manned	Set in day (attended) mode
6	Test[1)]	Set in test mode
7	Off[1)]	Excluded
8	Non-default value[1)]	Abnormal condition such as alarm output(s) disabled or other states resulting in a reduced safety
9-15	—	Not used

1) Available only for versions up to MP4.0.

Section

`WT_Section` (Input registers, default base address: 6100)

Bit	Information	Notes
0 (lsb) - 3	—	Default range for possible abnormal mode
1-3	—	Not used
4	WalkTest	Walk test active, all zones in Walk test
5	—	Not used
6	Test	All zones in test mode
7	Off	All zones excluded
8	Non-default value	Abnormal condition resulting in a reduced safety, for example if alarming is excluded while keeping the fault supervision on, or all zones in Alarm verification are off. Note that manual zones cannot be in this state, so that it is intended that a section without manual zones is selected.
9-15	—	Not used

Detection Zone

`WT_Zone` (Input registers, default base address: 1500)

Bit	Information	Notes
0 (lsb)	Non-default mode	Default range for possible abnormal mode
1-3	—	Not used
4	WalkTest	Walktest active
5	—	Not used
6	Test	Set in test mode
7	Off	Excluded
8	Non-default value	Abnormal condition such as zone not ready or other states resulting in a reduced safety

Bit	Information	Notes
9-13	—	Not used
14	Pre-alarm	Pre-alarmed[1)]
15	Alarm	Alarmed[1)]

1) If the Channel Delegation option is configured, the Pre-alarm and Alarm events are on the element level (not the Zone level).

Detection element (logical channel)

`WT_LogCh` (Input registers, default base address: 2500)

Bit	Information	Notes
0 (lsb)	Non-default mode	Default range for possible abnormal mode
1-5	—	Not used
6	Test	Set in test mode
7	Off	Excluded
8	Non-default value	Abnormal condition resulting in a reduced safety
9-10	—	Not used
11	Test active	Activated for test
12	—	Not used
13	Fault	Faulty
14	Prealarm	Pre-alarmed
15	Active / Alarm	Activated / Alarmed

Control

`WT_Ctrl` (Input registers, default base address: 3500)

Bit	Information	Notes
0 (lsb)	Non-default mode	Default range for possible abnormal mode
1-5	—	Not used
6	Test	Set in test mode
7	Off / Temporary off	Excluded, Excluded temporarily
8	Non-default value	Abnormal condition such as drift state (maintenance required) or other anomalies resulting in a reduced safety
9-10	—	Not used
11	Test active	Activated for test
12	Not ready	Not ready to switch on, for example if a previous activation is somehow still affecting the detection
13	Fault	Faulty
14	—	Not used
15	Active	Activated

Control element (control channel)

`WT_CtrlChan` (Input registers, default base address: 4800)

Bit	Information	Notes
0 (lsb)	Non-default mode	Default range for possible abnormal mode
1-5	—	Not used
6	Test	Set in test mode
7	Off	Excluded
8	Non-default value	Abnormal condition resulting in a reduced safety
9-10	—	Not used
11	Test active	Activated for test
12	—	Not used
13	Fault	Faulty
14	—	Not used
15	Alarm	Activated / Alarmed

Hardware object

`WT_HWObj` (Input registers, default base address: 6601)

Bit	Information	Notes
0 (lsb)	Non-default mode	Default range for possible abnormal mode
1-6	—	Not used
7	Off	Excluded
8	Non-default value	Abnormal condition resulting in a reduced safety
9-12	—	Not used
13	Fault	Faulty
14	—	Not used
15	Alarm	Activated / Alarmed

Power Supply

`WT_PowerSupply` (Input register, default base address: 6600)

Bit	Information	Notes
0 (lsb)	Non-default mode	Default range for possible abnormal mode
1-7	—	Not used
8	Non-default value	Currently not used (foreseen for future extensions)
9	—	Not used
10	Emergency Power	Due to missing or faulty mains supply, the FS20/FS720 is operating in battery mode.
11-12	—	Not used
13	Fault	Troubles with the power supply: mains or battery failure
11-15	—	Not used

Unidentified Event

`WT_Unidentified` (Input register, default base address: 8000)

Bit	Information	Notes
0 (lsb)	Non-default mode	Default range for possible abnormal mode
1-7	—	Not used
8	Non-default value	Abnormal condition coming from an object not included in the configuration
9-15	—	Not used

2.2.2.4 Compact Status Tables

The compact tables provide a summarized representation for the following objects:

- Detection zones: 4-bit status representation
- Detection elements (logical channels): 2-bit status representation

The corresponding data structures, illustrated here below, are packed in the register areas defined at configuration time. The word input registers contain 4 zones and 8 elements each.

Detection zone (compact)

`CT_Zone` (Input registers, default base address: 8100)

Bit	Information	Notes
0 (lsb)	-	Not used
1	Off and Test mode	Off and test mode
2	Pre-alarm, Not ready and other abnormal states	Pre-alarm, Not ready, and other abnormal condition[1)]
3	Alarm	Alarmed[1)]

[1)] If the Channel Delegation option is configured, the Pre-alarm and Alarm events are on the element level (not the Zone level).

Detection element (compact)

`CT_LogChan` (Input registers, default base address: 9000)

Bit	Information	Notes
0 (lsb)	Fault	Faulty
1	Active	Alarmed

2.2.2.5 Bit Status Tables

The bit status tables (input registers) presents single on/off event conditions for specific objects (detection zones, detection elements, controls, and control elements) and related conditions, for example *detection zone alarms*. In all tables, the value 1 indicates that the condition is present on the corresponding object. The list of objects is defined at configuration time.

The table below collects the list of bit status tables.

Table	Information	Related object type	Default base address
BT_ZoneAlarm	Detection zone alarmed[1)]	Detection zones	21000
BT_ZonePreAlarm	Detection zone pre-alarmed[1)]	Detection zones	22000
BT_ZoneNDV&Notready	Detection zone not ready or in other abnormal state	Detection zones	23000
BT_ZoneModeOff&Test	Detection zone in test mode or excluded	Detection zones	24000
BT_LogChanActive	Detection element (logical channel) active	Detection elements	10000
BT_LogChanFault	Detection element (logical channel) faulty	Detection elements	11000
BT_ LogChanModeOff&Test	Detection element (logical channel) in test mode or excluded	Detection elements	12000
BT_CtrlAlarm&Active	Control alarmed or activated	Controls	13000
BT_CtrlNDV&Fault	Control faulty or in other abnormal state	Controls	14000
BT_CtrlModeOff&Test	Control in test mode or excluded	Controls	15000
BT_CtrlChanActive	Control element (control channel) active	Control elements	16000
BT_CtrlChan Fault	Control element (control channel) faulty	Control elements	17000
BT_CtrlChanModeOff&Test	Control element (control channel) in test mode or excluded	Control elements	18000
BT_HWObjAlarm	Hardware object alarm	Hardware components	19000
BT_HWObjFault	Hardware object fault	Hardware components	20000
BT_PowerSupplyFault	Power supply fault	Power supply unit	32000
BT_PowerSupplyEmerPow er	Power supply emergency power	Power supply battery	33000

1) If the Channel Delegation option is configured, the Pre-alarm and Alarm events are on the element level (not the Zone level).

2.2.2.6 Command Tables

The command tables enable the Modbus master/client to issue control commands to the fire units.

A read/write holding register is foreseen for each of the objects listed below. Given an initial object state, a data value corresponding to a control action can be written in the register to trigger the command that is then expected to modify the object state and therefore cause a corresponding change in the object input registers. Note that the holding registers store the code of the latest command after its execution.

The list of command tables includes:

Global panel acknowledgement and reset

CMDT_FC20 (Holding register, default base address 25000)

State	Command (dec)	New state after a successful command execution
Ack required	12	Panel acknowledged
Reset required	14	Panel reset

Area manned/unmanned: set day or night mode

CMDT_Area (Holding register, default base address 31000)

State	Command (dec)	New state after a successful command execution
Unmanned	3	Manned (day mode)
Manned	4	Unmanned (night mode)

Section on/off: include/exclude all zones belonging to the section

CMDT_Section (Holding register, default base address 30000)

State	Command (dec)	New state after a successful command execution
Off	5	On
On	6	Off

Detection zone on/off: include/exclude the zone

CMDT_Zone (Holding register, default base address 26000)

State	Command (dec)	New state after a successful command execution
Off	5	On
On	6	Off

Detection element (logical channel) on/off: include/exclude the detector

CMDT_LogChan (Holding register, default base address 27000)

State	Command (dec)	New state after a successful command execution
Off	5	On
On	6	Off

Control on/off: include/exclude the actuation group

CMDT_Ctrl (Holding register, default base address 28000)

State	Command (dec)	New state after a successful command execution
Off	5	On
On	6	Off

Control element (control channel) on/off: include/exclude the actuator

`CMDT_CtrlChan` (Holding register, default base address 29000)

State	Command (dec)	New state after a successful command execution
Off	5	On
On	6	Off

2.2.2.7 Example of Register Map

The following illustrates an example of an NK8237 register map as it is presented in the Composer configuration tool. In the case of the panel map, the default addresses are listed, which can be customized in the Composer configuration.

Field Device	Modbus slave address
NK8237	4
FC20 Panel 1	5
FC20 Panel 2	6

Field Devices: example including two FC20 fire panels

Modbus Table	Modbus Base Address	Offset	Register
DateTime	1060	0	Holding register
DataChange	1020	0	Input register
LifeCheck	1010	0	Input register
WT_FC20 Syn	1000	0	Input register
WT_Zone	1500	0	Input register
WT_Zone	1500	1	Input register
WT_Zone	1500	2	Input register
WT_LogChan	2500	0	Input register
WT_LogChan	2500	1	Input register
WT_Ctrl	3500	0	Input register
WT_Ctrl	3500	1	Input register
WT_CtrlChan	4800	0	Input register
WT_Section	6100	0	Input register
WT_Section	6100	1	Input register
WT_Area	6500	0	Input register
WT_HWObj	6601	0	Input register
WT_NK8237Point	8000	0	Input register
WT_PowerSupply	6600	0	Input register
CT_Zone	8100	0	Input register
CT_LogCh	9000	0	Input register

Modbus Table	Modbus Base Address	Offset	Register
BT_ZoneAlarm	21000	0	Discrete input
BT_ZonePreAlarm	22000	0	Discrete input
BT_ZoneNDV&NotReady	23000	0	Discrete input
BT_ZoneModeOff&Test	24000	0	Discrete input
BT_LogChanActive	10000	0	Discrete input
BT_LogChanNDV&Fault	11000	0	Discrete input
BT_LogChanModeOff&Test	12000	0	Discrete input
BT_CtrlAlarm&Active	13000	0	Discrete input
BT_CtrlNDV&Fault	14000	0	Discrete input
BT_CtrlModeOff&Test	15000	0	Discrete input
BT_CtrlChanActive	16000	0	Discrete input
BT_CtrlChanFault	17000	0	Discrete input
BT_CtrlChanModeOff&Test	18000	0	Discrete input
BT_HWObjAlarm	19000	0	Discrete input
BT_HWObjFault	20000	0	Discrete input
BT_PowerSupply	32000	0	Discrete input
BT_EmergencyPower	33000	0	Discrete input
CMDT_FC20	25000	0	Holding register
CMDT_Zone	26000	0	Holding register
CMDT_LogChan	27000	0	Holding register
CMDT_Ctrl	28000	0	Holding register
CMDT_CtrlChan	29000	0	Holding register
CMDT_Section	30000	0	Holding register
CMDT_Area	31000	0	Holding register

Panel map: default base address of the available tables, organized by object type

Note: The default base addresses listed above may not exactly match the addressed of your system. Before using them for any related configuration, please check the actual settings of the Modbus master station in the Composer tool.

For more information on the Composer configuration, refer to the NK8237 Installation, Configuration, and Commissioning Guide (document no. A6V10316241).

⚠ WARNING

The convention of Modbus base addresses frequently found, namely 3xxxx for input registers, 4xxxx for holding registers and so on, is not followed by NK8237. Note that some tools strictly based on this convention will not work properly with NK8237.

2.2.2.8 FS20/FS720 Fire Objects

This section lists the FS20/FS720 fire objects and the corresponding types in the NK8237 Modbus data model (refer to the Register Map section [→ 14]).

Here below the complete list of fire objects is presented, organized by model types.

WT_FC20

Sinteso™ FS20:

- FC2020
- FC2030
- FC2040
- FC2060
- FC2080
- FT2040
- FT2080

Cerberus PRO™ FS720:

- FC722
- FC724
- FC726
- FT724

WT_Zone

- Automatic Zone
- Single Alarm Subsystem zone
- Single Exting discharged zone
- Single extinguishing prealarm zone
- Single gas alarm zone
- Single gas warning zone
- Multiple automatic zone
- (Holland) sprinkler zone
- Multi Dependency Zone
- Sprinkler Zone
- Manual FSE Zone
- Manual Zone
- Manual alarm sub-system zone
- Manual Redundancy Alarm
- Technical Zone
- Technical fault sub-system –Zone
- Technical sub-system off zone
- Fault extinguishing system zone
- Technical Gas Alarm

- Fire Subsystem Zone
- Sprinkler Control (ControlSprinklerElem; ZoneSprinklerElem)
- XC10 (ControlXC10Elem; ZoneXC10Elem)
- StandardZoneGas

WT_LogChan

- Input channel(ChannelLogInputAlarmDaElem; ChannelLogInputAlarmLimit-SwitchElem)
- Wired Automatic channel (ChannelLogSensorDaAutomaticWiredElem)
- Wireless Automatic channel (ChannelLogSensorDaAutomatic-WirelessElem)
- Wired Manual channel
- Wireless Manual channel (ChannelLogSensorDaManual-WiredElem)
- Collective channel (ChannelLogSensorDaCollectiveElem)
- Gas channel (ChannelLogSensorDaGasElem; ChannelPhysSen-sorP2GasElem)
- ByPassable Input (ChannelLogInputAaConfirmationElem; ChannelLogInput-tAaFaultElem; ChannelLogInputAaSupervisionElem; ChannelLogInputFireE-lem; ChannelLogInputSprinklerElem; ChannelLogEvacElem; ChannelLogIn-putSprinkler1Elem; ChannelLogInputSprinkler2Elem)
- Non Bypassable Input (ChannelLogInputBlockedElem; ChannelLogInputDi-schargedElem; ChannelLogInputFaultElem; ChannelLogInputPrealarmElem; ChannelLogInputSubsystemPrealarmElem; ChannelLogInputSubsystemAlarmElem; ChannelLogInputSubsystemFaultElem; ChannelLogInputSubsystemIsolatedElem)
- Fsd InputLogChannel
- Fsd Output LogChannel
- Led Output
- Release Output channel

WT_Ctrl

- Evac Control
- Evac Unit Control
- Fire Control
- Alarm Control
- RtDevice Control
- RtFault Control
- RtFire Control
- RtSounder Control
- Counter Control Alarm
- Uga Elem Control (ConfigUgaElem)
- Generic Sounders
- Releasing Control Group
- LED elem

WT_CtrlChan

- Output Subsystem
- Generic Output
- Fire Output
- RtOutput
- RtVdsOutput
- AlertSounders

- AlertEvacSounders
- EvacSounders
- FireEffectRequest
- SprinklerEffectRequest
- CauseIncidentGeneric

WT_Section

- Section (SectionElem)

WT_Area

- Area(AreaElem)
- Station Area

WT_HWObj

Modules:

- Module Power Supply
- Module Evacuation
- Module Fba
- Module IO
- Module Vds
- Module P2
- Module FCI
- Module Collective
- Module Ethernet
- Module MS9
- ModuleReleasing
- Module CPU
- Module Rt Card
- Legacy Field Bus Modules
- Legacy Modules Lines

Sub-Modules:

- Submodule P2 Element
- Submodule Communication
- Submodule Degrade Element
- Submodule License Element
- Submodule Collective
- Submodule Ms9
- Submodule Nac
- Submodule Firmware

Devices:

- Device Generic (DeviceP2UnlinkedFDCL221Elem; DeviceP2UnlinkedFDCL221MElem; DeviceP2UnlinkedFDCL221WElem; DeviceP2UnlinkedFDCW221Elem; DeviceP2DetectorOOH740Elem; DeviceP2DetectorOOHC740Elem)
- Config ElementsPrinter Configuration (ConfigPrinterElem; ConfigPrinterGenericElem; ConfigPrinterITCElem)
- Config Evac Elem (ConfigEvacMasterElem; ConfigEvacSlaveElem)
- Generic Configuration Elem (ConfigFatStandardElem; ConfigFatWithFbfElem; ConfigFbfElem; ConfigFrdElem; ConfigFrtElem; ConfigPagerElem; ConfigSttElem; ConfigSynoptic24Elem; ConfigSynoptic48Elem;

ConfigVisualizerElem; ConfigFbfAtElem; ChannelLogFrdElem; ChannelLogFrtElem; ConfigCerloopElem)

- Config Fsd (ConfigFsdElem)
- Uga Configuration Elem (ConfigUgaElem)

2.2.3 STT20 Register Map

Data Representation

The NK823x Modbus gateway can support multiple fire detection panels or terminals (STT20, FC2xxx and FT2xxx). Each STT20 panel, terminal and gateway is represented as a virtual Modbus device with its own Modbus Slave Address and a complete register map. The map includes a number of sub-maps that represent the fire units, and a general table for the gateway itself.

Fire Control Unit Representation

In the Modbus data representation, *each panel is mapped as a separate Modbus device with an individual address*. The device address is defined at configuration time.

A dedicated register sub-map is used for each panel, including six types of tables. Namely:

- **Summary tables**
  These are a set of word input registers including:
  - The overall panel conditions (1 word register).
  - The vitality counter (1 word register).
  - As many as 525 data change flags (33 word registers) reporting any modifications in the register area (the complete range of 65536 registers is monitored).
- **Status tables**
  These are word input registers reporting the conditions of all the mapped objects. Each word corresponds with one object and is organized in two bytes: bits 0-7 are used to represent the object operating modes, for example the on/off (inclusion/exclusion) conditions, whereas bits 8-15 contain the event conditions, such as alarms, fault, and so on.
  Status tables cover the entire set of supported objects. A specific status table is dedicated to notifications coming from objects not included in the configuration. The status tables list includes:
  - Panel
  - Activation Mode
  - Buzzer
  - Communication Link
  - Hardware Link
  - MEA
  - MDHW
  - Mains
  - Battery
  - MCIO
  - MDIO
  - Functions
  - Extinguishing Functions
  - UGA
  - BOP Evacuation Mode
  - Horn
  - Element

  - Extinguishing Element
  - Unidentified event (for objects not included in the configuration)

- **Compact status tables**
  These are available for a limited set of detection objects. The compact status tables are word input registers containing a simplified status representation. In fact, each representation is made up of 4-bit status for functions or 2-bit status for elements. This results in 4 or even 8 objects being packet in a single word register, thus allowing a faster acquisition whenever communication performances have priority than status details.
  The compact tables list includes:
  - Functions
  - Elements
- **Bit status tables**
  For extremely simple applications, a set of bit input registers is also provided for specific objects and events that are combined in very basic 1-bit (on/off) status report. The list of bit input registers includes:
  - Panel Fault
  - Activation Mode Fault
  - Activation Mode Abnormal
  - Communication Link Fault
  - Mains Fault
  - Battery Fault
  - Function Safety Position Failed
  - Function In Command
  - Function Wait Position Failed
  - Function Fault
  - UGA Alarm
  - UGA Activated Evacuation
  - UGA Fault
  - BOP Evacuation Mode On Manual
- **Command tables**
  The output command tables (read/write holding registers) enables Modbus master/client stations to initiate control commands to the fire control panels. Note that, depending on a configuration setting, certain commands may not be available.
  The command tables list includes:
  - Panel acknowledgement
  - Panel reset
  - Buzzer acknowledgement
  - Buzzer reset
  - Function activation command
  - Evacuation command
- **Date and Time**
  See Summary Table [➙ 16].

Gateway Unit Representation

A dedicated register sub-map is used for the NK823x unit, including one status table.

- **Status table**
  This is a word input register reporting the conditions of the gateway. Each word corresponds with one object and is organized in two bytes: bits 0-7 are used to represent the object operating modes, for example the on/off (inclusion/exclusion) conditions, whereas bits 8-15 contain the abnormal event

conditions, such as alarms, fault, and so on.
The gateway table includes the following:

– NK823x Points
– Power Supply

2.2.3.1 Summary Table

The Summary table includes one register.

STT20 synthesis

`WT_STT20` Syn (Input register, default base address: 1000)

One input (read-only) word register reporting 16 general on/off panel conditions in the 16 bits. The following relationship applies:

Bit	Information	Notes about affected objects and conditions corresponding to the “1” state (bit active)
0 (lsb)	Evacuation manual mode	BOP Alarm function or HLB Alarm function. Legal information for a repeater terminal.
1	Evacuation fault	BOP Alarm function or HLB Alarm function. Legal information for a repeater terminal.
2	Evacuation active	BOP Alarm function or HLB Alarm function. Legal information for a repeater terminal.
3	Alarm received	BOP Alarm function. Legal information for a repeater terminal.
4	Reset command required	A reset command is expected by the STT20 panel.
5	Ack command required	An acknowledgment command is expected by the STT20 panel.
6	Function fault	Standard Function, Stop Fan function, Technical CMSI function, Technical SDI function, or Rearming function. Legal summary information for a repeater terminal.
7	Wait position failed	Standard Function, Stop Fan function, Technical CMSI function, Technical SDI function, or Rearming function. Legal summary information for a repeater terminal.
8	Security position failed	Standard Function, Stop Fan function, Technical CMSI function, Technical SDI function, or Rearming function. Legal summary information for a repeater terminal.
9	Safety position failed	Standard Function, Stop Fan function, Technical CMSI function, Technical SDI function, or Rearming function. Legal summary information for a repeater terminal.
10	Battery fault	MC20, MCO, MD20, or battery element.
11	Mains fault	MC20, MCO, MD20, or mains element.
12	Network fault	SAFEDLINK or Fire Links.
13	Activation Mode Mixed	
14	Activation Mode Manual	
15	STT20 Panel fault	

2.2.3.2 Synchronization Tables

The Synchronization tables include a fixed number of registers. Namely:

Life Check

`LifeCheck` (Input register, default base address: 1010)

One input (read-only) word register that is constantly incremented as long as the NK823x gateway software works properly and the communication with the fire panel and with the Modbus unit is active.

The counter stops being incremented if any of these events occurs:

- The communication between the NK823x gateway and the Modbus unit goes down (this event can be detected and treated by other Modbus units).
- The communication between the NK823x gateway and the fire panel goes down.

Bit	Information	Notes
0-15	Panel Vitality Counter	Incremented every 250 msec as long as operating properly

Data Change

`DataChange` (Input registers, default base address: 1020)

A set of 33 input word registers (525 bits are used) reporting any modifications in the register area. The complete range of 65536 Modbus registers is covered, with each flag representing changes in one or more registers in a corresponding group of 125 word registers.
The first flag, i.e. the least significant bit of the first change word register, corresponds with the registers 0 to 124, the second flag corresponds with the registers 125 to 249, and so on.
Active flags are automatically reset upon reading the registers that changed and caused the flags activation.

Word / Bit	Information	Notes
0 / 0	Registry 0-124 (00h-7Ch)	Flag 0
0 / 1	Registry 125-249 (7Dh-F9h)	Flag 1
…		Flags 2 to 14 (Word register 0)
0 / 15	Registry 1875-1999 (0753h-07CFh)	Flag 15
…		Flags 16 to 522 (Word registers 1 to 32)
32 / 11	Registry 65375-65499 (FF5F-FFDBh)	Flag 523
32 / 12	Registry 65500-65535 (FFDC-FFFFh)	Flag 524

Date and Time

`DateTime` (Holding registers, default base address: 1060)

Three holding (read/write) word registers used for reading or synchronizing the NK823x date and time.

The synchronization must be enabled in the configuration settings and results, in turn, in the synchronization of the fire system (FS20 and then STT20 via FS20).

Alternatively, if the synchronization on these registers is not enabled, the NK823x gateway gets the date and time periodically from the fire system (FS20). In this case, writing to the registers is disabled, and a Modbus error code 0x04 is returned upon trying a write command.

When synchronization occurs, all registers should be written in sequence to prevent any possible data interpretation error. The NK823x gateway acquires the new time stamp when the last of the 3 values gets written.

The three 16-bit registers are organized in 6 byte containing 6 hexadecimal values corresponding with day, month, year, hour, minute, and second, respectively.

Word / Bit	Information	Notes
0 / 0-7	Day	1-31 code in hexadecimal, e.g. 1B hex for day 27.
0 / 8-15	Month	1-12 code in hexadecimal
1 / 0-7	Year	10-99 code in hexadecimal
1 / 8-15	Hour	0-23 code in hexadecimal
2 / 0-7	Minute	0-59 code in hexadecimal
2 / 8-15	Second	0-59 code in hexadecimal

Note: For detailed information about the time synchronization options on the Modbus host interface, refer to the Modbus interface configuration section of the NK8237 Installation, Configuration, and Commissioning manual (A6V10316241).

2.2.3.3 Status Tables

The status tables include an input word register per object. The number of tables depends on the specific systems whose object list is defined at configuration time. For example, there may be 8 function registers corresponding with 8 functions of a given fire system.

The list of object types includes:

Panel

`WT_Panel` (Input registers, default base address: 1100)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode resulting in a reduced safety
1-7	-	Not used
8	Non-default value	Abnormal condition such as states resulting in a reduced safety
9-12	-	Not used
13	Fault	
14	-	Not used
15	Alarm	

Activation Mode

`WT_ActivationMode` (Input registers, default base address: 1300)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode resulting in a reduced safety
1-7	-	Not used

Bit	Information	Notes
8	Non-default value	Abnormal condition resulting in a reduced safety
9-11	-	Not used
12	Anomaly	STT20 in mixed mode
13	Fault	STT20 in manual mode
14-15	-	Not used

Buzzer

`WT_Buzzer` (Input registers, default base address: 1400)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode resulting in a reduced safety
1-7	-	Not used
8	Non-default value	Abnormal condition resulting in a reduced safety
9-14	-	Not used
15	Active	

Communication Link (SafeDlink, Cerloop)ù

`WT_ CommunicationLink` (Input registers, default base address: 1500)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode resulting in a reduced safety
1-7	-	Not used
8	Non-default value	Abnormal condition resulting in a reduced safety
9-12	-	Not used
13	Fault	Communication faulty on local network (SafeDlink/Cerloop)
14-15	-	Not used

Hardware Link

`WT_ HWLink` (Input registers, default base address: 1600)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode resulting in a reduced safety
1-7	-	Not used
8	Non-default value	Abnormal condition resulting in a reduced safety
9-12	-	Not used
13	Fault	Communication faulty with STT20 user interfaces (TAE, US, MCO)
14-15	-	Not used

MEA – *Module Electronique Adressable* (addressable field control module)

`WT_MEA` (Input registers, default base address: 1700)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode resulting in a reduced safety
1-7	-	Not used
8	Non-default value	Abnormal condition resulting in a reduced safety
9-12	-	Not used
13	Fault	
14-15	-	Not used

MDHW – *Matériel Déporté* (Remote Module Hardware)

`WT_MDHW` (Input registers, default base address: 1800)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode resulting in a reduced safety
1-7	-	Not used
8	Non-default value	Abnormal condition resulting in a reduced safety
9-12	-	Not used
13	Fault	MD20 fault or Internal bus fault (BBUS, GBUS, PBUS)
14-15	-	Not used

Mains Power Supply

`WT_Mains` (Input registers, default base address: 1900)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode resulting in a reduced safety
1-7	-	Not used
8	Non-default value	Abnormal condition resulting in a reduced safety
9-12	-	Not used
13	Fault	Mains power supply is not available (on MC20, MCO, or MD20 modules) or mains element is faulty.
14-15	-	Not used

Battery

`WT_Battery` (Input registers, default base address: 2500)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode resulting in a reduced safety
1-7	-	Not used
8	Non-default value	Abnormal condition resulting in a reduced safety
9-12	-	Not used

Bit	Information	Notes
13	Fault	Battery fault (on MC20, MCO, or MD20 modules) or battery element faulty
14-15	-	Not used

MCIO – MC20 Input/Output

`WT_MCIO` (Input registers, default base address: 3500)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode resulting in a reduced safety
1-7	-	Not used
8	Non-default value	Abnormal condition resulting in a reduced safety
9-14	-	Not used
15	Active	Input or Output is active

MDIO – MD20 Input/Output

`WT_MDIO` (Input registers, default base address: 4000)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode resulting in a reduced safety
1-7	-	Not used
8	Non-default value	Abnormal condition resulting in a reduced safety
9-12	-	Not used
13	Fault	Input is faulty
14	-	Not used
15	Active	Input or Output is active

Function – Standard / Stop fan / Fire technical / Technical / Rearming functions

`WT_Function` (Input registers, default base address: 5000)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode resulting in a reduced safety
1-6	-	Not used
7	Locked	Function locked
8	Non-default value	Function locked without fault
9-11	-	Not used
12	Wait position failed	Wait position fault
13	Fault	
14	In command or Safety position	
15	Safety position failed	Safety position fault

Extinguishing Function

`WT_ExtFunction` (Input registers, default base address: 6000)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode resulting in a reduced safety
1-7	-	Not used
8	Non-default value	Abnormal condition resulting in a reduced safety
9-11	-	Not used
12	System fault	Extinguishing fault report
13	Fault	
14-15	-	Not used

UGA – *Unité de Gestion d'Alarme* (evacuation control unit)

`WT_UGA` (Input register, default base address: 7000)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode resulting in a reduced safety
1-5	-	Not used
6	Evacuation activated	
7	-	Not used
8	Non-default value	Evacuation activated without fault
9-12	-	Not used
13	Fault	
14	-	Not used
15	Alarm	Alarm received

BOP Evacuation Mode

`WT_BOPEvacuationMode` (Input registers, default base address: 7500)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode resulting in a reduced safety
1-4	-	Not used
5	Manual (OnManual)	Manual mode
6-7	-	Not used
8	Non-default value	Manual mode
9-15	-	Not used

Horn

`WT_Horn` (Input registers, default base address: 7700)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode resulting in a reduced safety
1-6	-	Not used

Bit	Information	Notes
7	Disabled	
8	Non-default value	Disabled
9-15	-	Not used

Element – Standard / Power supply elements

`WT_Element` (Input registers, default base address: 8200)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode resulting in a reduced safety
1-7	-	Not used
8	Non-default value	Abnormal condition resulting in a reduced safety
9-11	-	Not used
12	Wait position failed	Wait position fault
13	Fault	
14	In command or Safety position	
15	Safety position failed	Safety position fault

Extinguishing Element

`WT_ExtElement` (Input registers, default base address: 9200)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode resulting in a reduced safety
1-7	-	Not used
8	Non-default value	Abnormal condition resulting in a reduced safety
9-13	-	Not used
14	Extinguishing released	
15	-	Not used

Unidentified Event

`WT_Unidentified` (Input register, default base address: 9300)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode coming from an object not included in the configuration
1-7	-	Not used
8	Non-default value	Abnormal condition coming from an object not included in the configuration
9-15	-	Not used

2.2.3.4 Compact Status Tables

The compact tables provide a summarized representation for the following objects:

- Functions: 4-bit status representation
- Elements: 2-bit status representation

The corresponding data structures, illustrated here below, are packed in the register areas defined at configuration time. The word input registers contain 4 zones and 8 elements each.

Functions (compact)

`CT_Function` (Input registers, default base address: 8100)

Bit	Information	Notes
0 (lsb)	-	Not used
1	Locked	
2	Fault or Wait position failed or Safety position failed	
3	In command or Safety position or Safety position failed	

Element (compact)

`CT_Element` (Input registers, default base address: 9000)

Bit	Information	Notes
0 (lsb)	Fault or Wait position failed or Safety position failed	
1	In command or Safety position or Safety position failed	

2.2.3.5 Bit Status Tables

The bit status tables (input registers) presents single on/off event conditions for specific types of object (Panel, Faults, Functions, and so on) and related conditions, for example *function in command*. In all tables, the value 1 indicates that the condition is present for at least one of the objects considered. The list of objects is defined at configuration time.

The table below collects the list of bit status tables.

Table	Information	Related object type	Default base address
BT_Panel_Fault		Panel	10000
BT_Activation_Mode_Fault		Activation mode	11000
BT_ Activation_Mode_Abnormal		Activation mode	12000
BT_ Communication Link Fault		Communication Link	13000
BT_ Mains Fault		Mains	14000

Table	Information	Related object type	Default base address
BT_ Battery Fault		Battery	15000
BT_ Function Safety Position Failed		Function	16000
BT_ Function In Command		Function	17000
BT_ Function Wait Position Failed		Function	18000
BT_ Function Fault		Function	19000
BT_ UGA Alarm		Evacuation Control Unit	20000
BT_ UGA Activated Evacuation		Evacuation Control Unit	21000
BT_ UGA Fault		Evacuation Control Unit	22000
BT_ BOP Evacuation Mode On Manual		Evacuation Mode	23000

2.2.3.6 Command Tables

The command tables enable the Modbus master/client to issue control commands to the fire units.

A read/write holding register is foreseen for each of the objects listed below. Given an initial object state, a data value corresponding to a control action can be written in the register to trigger the command that is then expected to modify the object state and therefore cause a corresponding change in the object input registers. Note that the holding registers store the code of the latest command after its execution.

The list of command tables includes:

Global panel: acknowledgement and reset

`STT20` (Holding register, default base address 25000)

State	Command (dec)	New state after a successful command execution
Ack required	12	Panel acknowledged
Reset required	14	Panel reset

Function

`Function Active` (Holding register, default base address 27000)

State	Command (dec)	New state after a successful command execution
Quiet	1	Function activated

BOP/HLB Alarm Function

`Alarm Function Activate Evac` (Holding register, default base address 28000)

State	Command (dec)	New state after a successful command execution
Not activated	33	Evacuation activated

2.2.3.7 Example of Register Map

The following illustrates an example of a register map as it is presented in the Composer configuration tool. In the case of the panel map, the default addresses are listed, which can be customized in the Composer configuration.

Field Device	Modbus slave address
NK8237	4
FC20 Panel	5
STT20 Panel	6

Field Devices: example including one FC20 and one STT20 fire panel

Modbus Table	Modbus Base Address	Offset	Register
WT_STT20 Syn	1000	0	Input register
LifeCheck	1010	0	Input register
DataChange	1020	0	Input register
DateTime (Month/Day)	1060	0	Holding register
DateTime (Hour/Year)	1060	1	Holding register
DateTime (Second/Minute)	1060	2	Holding register
WT_Panel	1100	0	Input register
WT_ActivationMode	1300	0	Input register
WT_Buzzer	1400	0	Input register
WT_CommunicationLink	1500	0	Input register
WT_CommunicationLink	1500	1	Input register
WT_HWLink	1600	0	Input register
WT_Mea	1700	0	Input register
WT_Mea	1700	1	Input register
WT_MDHW	1800	0	Input register
WT_MDHW	1800	1	Input register
WT_MDHW	1800	2	Input register
WT_Mains	1900	0	Input register

Modbus Table	Modbus Base Address	Offset	Register
WT_Mains	1900	1	Input register
WT_Battery	2500	0	Input register
WT_Battery	2500	1	Input register
WT_MCIO	3500	0	Input register
WT_MCIO	3500	1	Input registert
WT_MCIO	3500	2	Input register
WT_MDIO	4000	0	Input register
WT_MDIO	4000	1	Input register
WT_Function	5000	0	Input register
WT_Function	5000	1	Input register
WT_Function	5000	2	Input register
WT_Function	5000	3	Input register
WT_Function	5000	4	Input register
WT_ExtFunction	6000	0	Input register
WT_ExtFunction	6000	1	Input register
WT_UGA	7000	0	Input register
WT_UGA	7000	1	Input register
WT_BOPEvacuationMode	7500	0	Input register
WT_Horn	7700	0	Input register
WT_Horn	7700	1	Input register
WT_Element	8200	0	Input register
WT_Element	8200	1	Input register
WT_Element	8200	2	Input register
WT_ExtElement	9200	0	Input register

STT20 map: default base address of the available tables, organized by object type

Note: The default base addresses listed above may not exactly match the addressed of your system. Before using them for any related configuration, please check the actual settings of the Modbus master station in the Composer tool.

For more information on the Composer configuration, refer to the NK8237 Installation, Configuration, and Commissioning Guide (document no. A6V10316241).

⚠ WARNING

The convention of Modbus base addresses frequently found, namely 3xxxx for input registers, 4xxxx for holding registers and so on, is not followed by NK823x. Note that some tools strictly based on this convention will not work properly with NK823x.

2.2.4 NK823x Gateway Register Map

2.2.4.1 Status Tables

The gateway status tables include two types of input word registers applied to a number of objects.

NK823x Gateway Points

`WT_NK8237Point` (Input registers, default base address: 8000)

This table is applied to six objects:

- NK823x Status
- NK823x Tamper
- Generic Inputs (up to 3 optional signals, which may be used for reporting the power supply supervision)
- Relay Output (optional, reporting a Modbus communication fault)

Therefore, up to six registers are provided, each one corresponding with one object.

Bit	Information	Notes
0 (lsb)	Non-default mode	Currently note used (foreseen for future extensions)
1-6	-	Not used
7	Tamper disabled	Tamper detection disabled Note: this information is only available on the tamper register.
8	Non-default value	Currently note used (foreseen for future extensions)
9	Abnormal	Configuration mismatch between gateway and fire system Note: this information is only available on the NK823x status register.
10-14		
15	Alarm	Activated / Alarmed / Tamper Note: this information is available on the Tamper, Input and Output registers.

2.2.4.2 NK823x Objects

This section lists the gateway objects and the corresponding types in the NK823x Modbus data model (refer to the Register Map section [→ 14]).

WT_NK823xPoint

- Application node (NK823x status)
- NK823x unit tamper

- Digital Input Onboard (power supply supervision or generic inputs)
- Digital Output Onboard (Modbus communication fault)

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